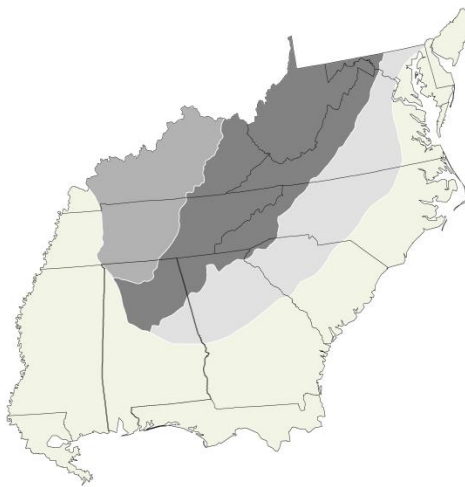


Flora of Georgia

Working Draft of 17 May 2017



by

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403. ASTERACEAE (Aster Family) [in ASTERALES]

A family of about 1500-1700 genera and 20,000-25,000 species, shrubs, herbs, trees, and vines, cosmopolitan in distribution.
References: SE.

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).
 - 4 Heads liguliflorous (composed of ligulate florets); sap usually milky **Key D**
 - 4 Heads discoid, disciform, radiant, or radiate; sap usually clear.
 - 5 Heads discoid, disciform, or radiant.
 - **Key E**
 - 5 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.
 - **Borrichia**
 - 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].
 - 5 Heads solitary, axillary in the axils of leaves or leafy bracts; heads nodding, the involucre 2-7 mm high; [collectively widespread in our area, of maritime and inland wetlands or moist disturbed areas]; [tribe *Heliantheae*; subtribe *Ambrosiinae*] **Iva**
 - 5 Heads many, terminal on the branches of corymbiform arrays; heads erect, the involucre 4-12 mm high; [of Coastal Plain of FL, s. GA, s. AL, and c. MS, of dry, sandy scrub and pinelands, blackland prairies, or dry, disturbed areas].
 - **Palafoxia**

**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; receptacle naked (without paleae or well-developed bristles); [tribe *Heliantheae*; subtribe *Eupatorieae*].
 - 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 Heads pink (rarely bluish); receptacles flat; florets 18-25 per head **Fleischmannia**
 - 6 Heads blue; receptacles conic; florets 25-70 per head.
 - **Conoclinium**
 - 5 Heads white to cream or, rarely, pale lilac.
 - 7 Florets 3-7 per head **Eupatorium**
 - 7 Florets at least 9 per head.
 - 8 Phyllaries not strongly imbricate, with the principal ones subequal and sub-biseriate; petioles 0.5-10 cm **Ageratina**
 - 8 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.
 - 9 Leaves whorled, linear, < 2 mm wide; head solitary; [aquatic herb growing in shallow stagnant water] **Sclerolepis**
 - 9 Leaves opposite (or alternate in part), broader in shape and > 5 mm wide; heads typically not solitary; [terrestrial or wetland plants].
 - 10 Receptacle naked.

- 11 Pappus of 4-10 scales; heads white, pink, or blue.
 - 12 Heads with 20-125 florets; leaves serrate; [rarely naturalized aliens in our area] *Ageratum*
 - 12 Heads with 10-30 florets; leaves entire; [natives, of FL, s. GA, and MS in our area] *Palafoxia*
- 11 Pappus none, or of a few bristles or irregular coroniform lobes; heads green to yellow.
 - 13 Heads bright yellow, closely aggregated into corymbiform arrays of flat-topped to dome-shaped glomerules *Flaveria*
 - 13 Heads greenish or greenish yellow, borne in spiciform, racemiform, or panicleform arrays. *Iva*
- 10 Receptacle with paleae or well-developed bristles.
 - 14 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*]
 - 15 Heads unisexual; cypselas shed within an indurated bur or "nut" with hooked or straight spines developed from the phyllaries and/or paleae.
 - 16 Involucre of the female heads with tubercles or straight spines developing from the phyllaries; burs 1-8 mm long *Ambrosia*
 - 16 Involucre of the female heads with hooked spines developing from the phyllaries/paleae; burs 10-35 mm long *Xanthium*
 - 15 Heads bisexual, with functionally male and female flowers in the same head; cypselas shed individually, not enclosed. *Iva*
 - 14 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*).
 - 17 Disc flowers maroon-purple; leaves mainly basal *Helianthus radula*
 - 17 Disc flowers white, pale yellow, or bright yellow; leaves mainly or strictly cauline.
 - 18 Disc flowers bright yellow.
 - 19 Involucre of phyllaries not subtended by a calyculus *Acmella*
 - 19 Involucre of phyllaries subtended by a calyculus of bracts obviously different in color, texture, and shape than the phyllaries *Bidens*
 - 18 Disc flowers bright white or pale yellow.
 - 20 Disc flowers bright white; leaves unlobed or with 2 basal lobes *Melanthera*
 - 20 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 Cypselas beaked, not strongly flattened, 7-30 mm long, with 1 groove per face; leaves highly dissected *Cosmos*
 - 2 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.
 - 3 Cypselas 2.5-16 mm long, usually not winged; pappus awns (if present) usually retrorsely barbed *Bidens*
 - 3 Cypselas 1.2-8 mm long, usually winged; pappus awns (if present) barbed 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*).
 - 4 Ray florets white, pink, or purple (rarely pale yellow or lavender).
 - 5 Ray flower persistent on the achene and becoming papery and bleached. *Zinnia*
 - 5 Ray flower articulate from the achene and falling.
 - 6 Pappus of a minute crown; disk florets white or whitish *Eclipta*
 - 6 Pappus either lacking, or of numerous scales, or of retrorsely barbed awns; disk florets yellow.
 - 7 Annual of disturbed habitats; leaves usually < 1 dm long; phyllaries < 5 mm long *Galinsoga*
 - 7 Perennial of native habitats; leaves > 1 dm long; phyllaries > 6 mm long *Polymnia*
 - 4 Rays predominantly yellow, orange, or red (sometimes with some brown, maroon, or purple coloration as well).
 - 8 Receptacle naked, epaleate.
 - 9 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*].
 - 10 Leaves unlobed, entire (though with marginal setae) *Pectis*
 - 10 Leaves pinnately lobed, the margins also often serrate. *Tagetes*
 - 9 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.
 - 11 Phyllaries 6 (-9), in 1 series; disc florets 1-15 *Flaveria*
 - 11 Phyllaries 12-26, in 2-3 series; disc florets 20-150.
 - 12 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*
 - 12 Phyllaries broadly ovate, squarrose, in several imbricate series; rays usually 8; leaves cauline; [on calcareous substrates in n. AL] *Jamesianthus alabamensis*
 - 8 Receptacle paleate, with paleae, bristles, or scales.
 - 13 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).
 - 14 Inner phyllaries prickly with straight or uncinate prickles, and each enveloping a cypselas and swelling into a bur-like structure *Acanthospermum*

- 14 Inner phyllaries unarmed, not becoming bur-like (though those of *Melampodium* do invest the fruit).
 15 Slender, small plants, the stems to 5 dm long, often trailing; pappus persistent, forming a crown *Chrysogonum*
 15 Taller, robust plants, the stems usually 5-40 cm long at maturity, erect; pappus absent or of 2 awns.
 16 Cypselas strongly flattened, borne in 2-3 series from the 2-3 series of ray florets *Silphium*
 16 Cypselas thick, not flattened, borne in 1 series from the 1 series of ray florets *Smallanthus*
 13 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).
 17 Ray corolla persistent on the achene and becoming papery and bleached.
 18 Plant a perennial; cypselas subterete, 4-5 mm long *Heliopsis*
 18 Plant an annual; cypselas 3-angled or flattened, 6-10 mm long *Zinnia*
 17 Ray corolla articulate from the achene and falling after flowering.
 19 Paleae flattened, not notably clasping the cypselas; cypselas 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.
 *Calypocarpus vialis*
 19 Paleae conduplicate (V-shaped in cross section), the 2 sides of the V partially clasping the cypselas; cypselas either subterete, multi-angled in \times -section, or flattened parallel to the radii of the head; heads mostly larger.
 20 Phyllaries apparently 4 (the 4 outer foliaceous phyllaries forming a quadrangle which hides the much smaller and narrower inner phyllaries) *Tetragonotheca*
 20 Phyllaries not as above (5 or more phyllaries readily visible).
 21 Cypselas (of at least the disk florets) strongly flattened and generally also winged.
 22 Cypselas 1-2.5 mm long; herb to 2 dm tall (erect or creeping) *Acmella*
 22 Cypselas 3-7 mm long; herb to 1-40 dm tall (erect) *Verbesina*
 21 Cypselas subterete, quadrangular, variously angled, or diamond-shaped in \times -section, not winged.
 23 Ray florets pistillate ("fertile").
 *Pascalina glauca*
 23 Ray florets completely neuter.
 *Helianthus*

**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).
 4 Pappus of bristles *Taraxacum*
 4 Pappus either of outer scales and inner bristles or entirely of aristate scales.
 *Leontodon*
 2 Heads several per stem, in various corymbiform, umbrelliform, spiciform, or paniculiform arrays (rarely solitary and terminal in the smallest and most depauperate individuals in a population).
 5 Achenes distinctly flattened *Lactuca*
 5 Achenes terete or prismatic.
 6 Pappus of plumose bristles, at least the inner series; plant an annual or biennial.
 *Hypochaeris*
 6 Pappus of simple capillary bristles; plant an annual, biennial, or perennial.
 7 Beak of the cypselas with a ring of soft white reflexed hairs at the summit (just below the pappus) *Pyrrophappus*
 7 Beak of the cypselas lacking a ring of hairs as described.
 8 Pappus of 80-150 barbellulate bristles; plant an annual or biennial *Crepis*
 8 Pappus either of 40-50 (or more) smooth bristles or of 20-30 barbellulate bristles; plant a perennial
 *Chondrilla*
 1 Cypselas beakless.
 9 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.
 10 Pappus absent or of both scales and barbellulate bristles *Krigia*
 10 Pappus of bristles only (these barbellulate or plumose).
 11 Leaves with entire margins; plants perennials, either from long to short rhizomes or from a short caudex with fibrous roots
 *Hieracium*
 11 Leaves coarsely toothed or pinnately lobed; plants annuals, from a taproot.
 12 Involucre 5-12 mm high; achenes usually > 2.5 mm long; pappus bristles distinct, 3-7 mm long *Crepis*
 12 Involucre 3-5 mm high; achenes 1.5-2.5 mm long; pappus bristles basally connate, 2.5-3.5 mm long *Youngia*
 9 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.
 13 Pappus absent or of scales.
 14 Corollas pale blue (rarely pink or white) *Cichorium*
 14 Corollas yellow (rarely orange).
 15 Cypselas 1.2-2.8 mm long; heads borne single at the ends of scapiform stems that are unbranched (rarely few-branched near the base); plants to 7 dm tall *Krigia*
 15 Cypselas 3-5 mm long; heads borne in corymbiform or thyriform arrays; plants to 15 dm tall *Lapsana*

- 13 Pappus of numerous smooth, barbellate, or plumose bristles.
 16 Cypselas more or less strongly flattened. *Sonchus*
- 16 Cypselas terete or prismatic, slightly or not at all flattened.
 17 Corollas pink, purple, lavender, white, or creamy-yellow.
 18 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*
- 18 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*
- 17 Corollas bright yellow, orange, or red.
 19 Plants taprooted annuals and biennials (rarely perennials); pappus bristles white and soft in texture *Crepis*
- 19 Plants fibrous-rooted perennials; pappus bristles white, light to medium tan, or sordid, stiff.
 20 Cypselas (2-) 2.5-7 mm long; pappus of (30-) 40-80 white, tan, or sordid bristles, in 1-2+ series; plants caespitose; corollas yellow *Hieracium*
- 20 Cypselas 1-2.5 mm long; pappus of 25-40+ white to sordid bristles, in 1 series; plants stoloniferous (caespitose in a few species); corollas yellow or orange *Pilosella*

Key E - . Herbaceous composites with leaves spiny, leaves alternate or basal, and heads discoid

- 1 Stem winged, the wings armed with spines. *Carduus*
- 1 Stem not winged.
 2 Disk flowers pink (rarely white) *Cirsium*
- 2 Disk flowers yellow.
 3 Pappus of numerous plumose bristles *Cirsium*
- 3 Pappus absent or of scales or barbellulate bristles. *Centaurea benedicta*

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.
 7 Phyllaries hooked at tip; heads forming burs at maturity *Arctium*
- 7 Phyllaries not hooked at tip; heads not forming burs at maturity.
 8 Heads larger, the involucre 6-15 mm high, with 15-40 phyllaries; leaves with conspicuous (at least at 10× magnification) resin dots *Carphephorus*
- 8 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.
 9 Pappus lacking or of scales or awns.
 10 Disk florets blue or purple.
 11 Heads few-flowered, aggregated into secondary heads with leafy bracts *Elephantopus*
- 11 Heads many-flowered, not aggregated into secondary heads *Vernonia*
- 10 Disk florets yellow to yellowish green or reddish to reddish brown.
 12 Cypselas winged and spined; heads sessile in the branch forks *Soliva*
- 12 Cypselas not winged and spined; heads not sessile in the branch forks. *Artemisia*
- 9 Pappus of capillary bristles.
 13 Heads yellow.
 14 Perennial; leaves remotely toothed to entire; [of shale barrens] *Packera*
- 14 Annual; leaves irregularly toothed to pinnatifid; [weed of disturbed soil] *Senecio*
- 13 Heads white, whitish, pink, purple, red,
 15 Florets all perfect.
 16 Larger leaves hastate; heads whitish *Senecio*
- 16 Leaves not hastate; heads whitish to red or pink to violet or deep purple.
 17 Phyllaries in essentially one series; leaves palmately veined, ovate to reniform *Arnoglossum*
- 17 Phyllaries in several series; leaves variously veined, linear to broadly ovate.
 18 Heads white or whitish; [of uplands] *Brickellia*

- 18 Heads pink to red or violet to deep purple or, rarely, white; [of uplands or wetlands].
 - 19 Pappus bristles of one length *Liatris*
 - 19 Pappus double with inner bristles long and the outer very short *Vernonia*
- 15 Some or all florets pistillate.
 - 20 Leaves not white-woolly.
 - 21 Phyllaries in essentially one series; fresh plants not strongly scented *Erechtites*
 - 21 Phyllaries in several series; fresh plants with a strong, aromatic fragrance *Pluchea*
 - 20 Leaves white woolly, at least beneath.
 - 22 Plants dioecious.
 - *Antennaria*
 - 22 Plants not dioecious.
 - 23 Blooming Mar-Jul; pappus bristles united at base *Gamochaeta*
 - 23 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 Receptacles flat *Helianthus*
 - 5 Receptacles conical or columnar *Rudbeckia*
 - 2 Receptacles naked, rarely with bristles.
 - 6 Pappus of scales or a crown.
 - *Helenium*
 - 6 Pappus of bristles, sometimes also with shorter outer scales.
 - 7 Phyllaries in one series.
 - *Packera*
 - 7 Phyllary in 2+ series.
 - 8 Pappus double.
 - 9 Ray florets without pappus *Heterotheca*
 - 9 Ray florets with pappus (similar to that of disk florets).
 - 10 Leaves pinnately veined, usually broader and not grasslike *Chrysopsis*
 - 10 Leaves parallel-veined, linear and grasslike *Pityopsis*
 - 8 Pappus simple.
 - 11 Plants taprooted [of dry Coastal Plain sands from se. VA southwards] *Croptilon*
 - 11 Plants not taprooted [widespread].
 - 12 Inflorescences flat-topped corymbs; leaves resinous-punctate, narrow, entire, sessile or subsessile *Euthamia*
 - 12 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.
 - 13 Receptacles chaffy.
 - 14 Phyllaries dry, scarious-margined.
 - 15 Ray florets 1–5 mm long; heads small in corymbiform arrays *Achillea*
 - 15 Ray florets > 5 mm long; heads large, terminating the branches *Anthemis*
 - 14 Phyllaries herbaceous, not scarious on margins.
 - 16 Ray florets < 2.5 mm long; disk florets sterile, with an undivided style *Parthenium*
 - 16 Ray florets > 5 mm long; disk florets fertile, with a divided style.
 - 17 Ray florets pink or light purple, > 15 mm long; heads single *Echinacea*
 - 17 Ray florets white, 5–10 mm long; heads 20–100 in a compound corymb *Verbesina*
 - 13 Receptacles naked.
 - 18 Pappus lacking.
 - *Leucanthemum*
 - 18 Pappus present.
 - 19 Taprooted annuals; ray florets 1–7 mm long.
 - 20 Leaves and stems not fleshy, rarely glabrous; cypselas < 1.4 mm long *Conyza*
 - 20 Leaves and stems fleshy, mostly glabrous; cypselas > 1.4 mm long *Symphotrichum*
 - 19 Not taprooted and mostly perennials; ray florets > 3 mm long.
 - 21 Ray florets usually > 60; blooming Apr-Oct *Erigeron*
 - 21 Ray florets rarely > 60; blooming late May-Nov.
 - 22 Receptacles hemispheric to conic; pappus often with 2–4 awns *Boltonia*
 - 22 Receptacles flat to slightly convex; pappus lacking awns.
 - 23 At least the basal and lower leaves both petiolate and cordate/subcordate at base.
 - 24 Often colonial; inflorescence corymbiform, flat-topped or rounded; outer phyllaries > 1 mm broad *Eurybia*
 - 24 Not colonial; inflorescence paniculiform, often elongate; outer phyllaries < 1 mm broad *Symphotrichum*
 - 23 Basal and lower leaves not both petiolate and cordate/subcordate at base.

- 25 Leaves sessile and auriculate or cordate-clasping *Symphotrichum*
- 25 Leaves petiolate or epetiolate but not auriculate or cordate-clasping.
 - 26 Cypselas glandular; pappus double *Oclemena*
 - 26 Cypselas not glandular; pappus single or double or in four series.
 - 27 Leaves silvery-silky on both sides (at least when young), entire *Symphotrichum*
 - 27 Leaves not silvery-silky, entire or toothed.
 - 28 Pappus double, with inner bristles distinctly longer than outer bristles.
 - 29 Leaves not rigid, veiny, lanceolate to elliptic or ovate, > 6 mm wide *Doellingeria*
 - 29 Leaves rigid, 1-nerved, linear to linear-spatulate, < 5 mm wide *Ionactis*
 - 28 Pappus simple with all bristles often about the same length.
 - 30 Ray florets white, few (usually 3–8); cypselas densely silky *Sericocarpus*
 - 30 Ray florets white to pink or blue or purple, more numerous (usually 8–30); cypselas glabrous to pubescent but not densely silky.
 - 31 Ray florets white; involucre < 6 mm long; phyllaries < 1 mm wide *Symphotrichum*
 - 31 Ray florets white or pink to blue or purple; involucre 7–12 mm long; phyllaries usually > 1 mm wide.
 - 32 Phyllaries glandular *Eurybia*
 - 32 Phyllaries not glandular.
 - 33 Phyllaries long-attenuate or loose and spreading *Symphotrichum*
 - 33 Phyllaries appressed, not long-attenuate.
 - 34 Plants coarse-hairy; lowest leaves > 5 cm wide *Aster*
 - 34 Plants glabrous to hairy; lowest leaves < 3 cm wide *Eurybia*

***Acanthospermum* Schrank 1820 (Paraguay Bur)**

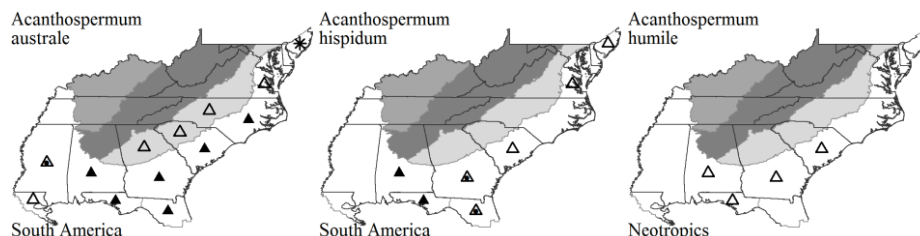
A genus of about 6 species, herbs, of tropical America. References: SE; Strother in FNA21 (2006c).

- 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 surface *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. Disturbed areas; native of South America. May-Nov. [= C, F, FNA9, G, K, RAB, S, SE, Va, WH3]

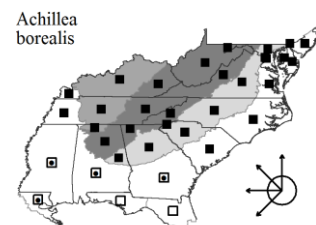
* *Acanthospermum hispidum* A.P. de Candolle, Hispid Starbur. Disturbed areas, soybean and peanut fields, gardens; native of n. South America. Jul-Nov. First reported from SC by Hill & Horn (1997). [= FNA9, K, S, SE, WH3]

* *Acanthospermum humile* (Swartz) A.P. de Candolle, Low Starbur. Disturbed areas; native of the West Indies. Reported for SC by Nelson (2003). [= FNA9, K, S, SE, WH3; = *Melampodium humile*]



***Achillea* Linnaeus 1753 (Yarrow, Milfoil, Thousand-leaf)**

A genus of about 115 species, herbs, primarily Eurasian. References: Arriagada, J.E. & N.G. Miller (1997); SE; Guo, Y.-P., F. Ehrendorfer, & R. Samuel (2004); Guo, Y.-P. et al. (2005); Ramsey, J., A. Robertson, & B. Husband (2008); Trock in FNA19 (2006a).



Achillea borealis Bongard, American Yarrow, American Thousandleaf. Grassy balds, meadows, pastures, roadsides, disturbed areas. Apr-Nov. Widespread in North America. 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) have 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). [= Ramsey, J., A. Robertson, & B. Husband (2008); = *Achillea lanulosa* – Arriagada, J.E. & N.G. Miller (1997), F; = *Achillea millefolium* ssp. *lanulosa* – C, G, W;

= *Achillea millefolium* var. *occidentalis* – K; < *Achillea millefolium* – FNA9, Pa, RAB, SE, Tn, Va, WH3; > *Achillea millefolium* var. *lanulosa* – Il; >> *Achillea millefolium* var. *millefolium* – Il]

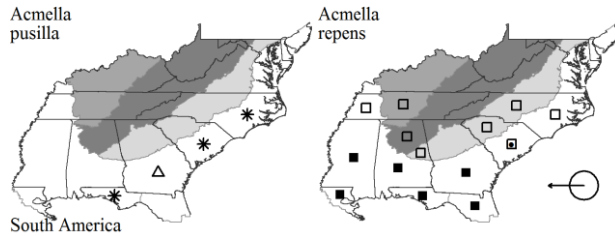
***Acmella* L.C. Richard ex C.H. Persoon 1807 (Spotflower)**

A genus of about 30 species, herbs, primarily of tropical distribution. References: SE; Jansen, R.K. (1985); Strother in FNA21 (2006c).

- 1 Leaves linear to lanceolate; petioles 2-4.5 mm long; outer series of phyllaries narrowly to broadly ovate, the apex acute; heads radiate or discoid ***Acmella pusilla***
- 1 Leaves narrowly to broadly ovate; petioles (3-) 5-43 mm long; outer series of phyllaries lanceolate, the apex acuminate; heads radiate ***Acmella repens***

* ***Acmella pusilla*** (Hooker & Arnott) R.K. Jansen, Argentine Spotflower. Lawns, disturbed areas (especially around old seaports); native of South America. May-Sep. Known from scattered locations in the se. United States (NC, SC, GA, FL), associated with old seaports, such as Wilmington, NC, Savannah, GA, Pensacola and Apalachicola, FL, and perhaps not well-established at some of the reported locations. Reported as naturalized and "locally common" at a site in Chatham County, GA (Carter, Baker, & Morris 2009). [= FNA9, Jansen, R.K. (1985), K, WH3]

Acmella repens (Walter) L.C. Richard in Persoon, Creeping Spotflower. Floating vegetation mats, roadsides, streambanks, other moist, open, habitats. Jul-Dec. Se. NC south to s. FL, west to e. TX, north in the Mississippi Embayment to w. TN and s. MO. 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*. [= FNA9, Il, Tn; = *Acmella oppositifolia* var. *repens* – Jansen, R.K. (1985), K, WH3; = *Spilanthes americana* var. *repens* – F, RAB; < *Spilanthes americana* – C, G, GW2, S, SE]



***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, A.F. & J.W. Wooten (1971); SE; Nesom in FNA21 (2006c).

- 1 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].
 - 2 Larger leaf blades >5× as long as the petiole; leaf margins crenate; corolla lobes densely long-pubescent; achenes glabrous; [widespread in our area] ***Ageratina aromatica***
 - 2 Larger leaf blades (1-) 2-4× as long as the petiole; leaf margins crenate, dentate, or incised; corolla lobes glabrous or sparsely short-pubescent; achenes usually short-pubescent, at least near the apex; [of e. GA southward] ***Ageratina jucunda***
- 1 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].
 - 3 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 area] ***Ageratina altissima* var. *altissima***
 - 3 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 altissima* var. *roanensis***

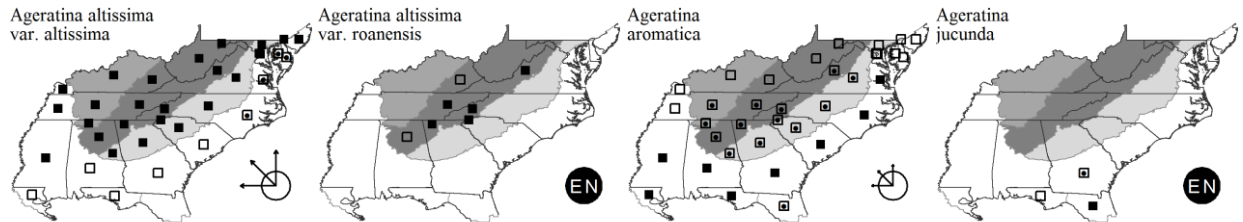
Ageratina altissima King & H.E. Robinson var. *altissima*, Common White Snakeroot, Common Milk-poison. Moist forests, such as cove forests. Late Jul-Oct. Var. *altissima* ranges from QC west to se. ND, south to Panhandle FL and c. TX. Var. *angustata* (A. Gray) Clewell & Wooten ranges from IL and e. KS south to LA and c. TX. 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. [= FNA9, K1, K3, Pa, Tn, Va; = *Eupatorium rugosum* var. *rugosum* – C, SE; = *Eupatorium urticifolium* – S; < *Ageratina altissima* var. *altissima* see *luciae-brauniae* – Clewell, A.F. & J.W. Wooten (1971); < *Eupatorium rugosum* – G, RAB, W; > *Eupatorium rugosum* var. *chlorolepis* – F; > *Eupatorium rugosum* var. *rugosum* – F; > *Eupatorium rugosum* var. *tomentellum* – F]

Ageratina altissima King & H.E. Robinson var. ***roanensis*** (Small) Clewell & Wooten, Appalachian White Snakeroot, Appalachian Milk-poison. Moist forests, often abundant at high elevations. Aug-Oct. Endemic to moderate to high elevations of the Southern Appalachians, from nw. VA south to w. SC, n. GA, e. TN, e. KY, and possibly ne. AL. [= Clewell, A.F. & J.W. Wooten (1971), FNA9, K1, K3, Tn, Va; = *Eupatorium roanensis* – S; = *Eupatorium rugosum* var. *roanense* – C, F, SE; < *Eupatorium rugosum* – G, RAB, W]

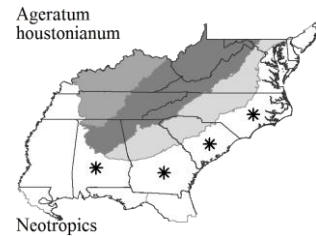
Ageratina aromatica (Linnaeus) Spach, Small-leaved White Snakeroot, Wild-hoarhound. Woodlands and forests, usually xeric, and often fire-maintained, sandhills, also woodland edges. Late Aug-Oct. MA, NY, and OH, south to ne. FL, Panhandle FL, and e. LA (Florida parishes). Two varieties have been delineated, 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. [= Clewell, A.F. & J.W. Wooten (1971), FNA9, K3, Pa, Tn, Va, WH3; = *Eupatorium aromaticum* – C, G, RAB, SE, W; > *Ageratina aromatica* var. *aromatica* – K1; > *Ageratina aromatica* var. *incisa* – K1; > *Eupatorium aromaticum* – S; > *Eupatorium aromaticum* var. *aromaticum* – F; > *Eupatorium aromaticum* var. *incisum* – F; > *Eupatorium latidens* – S]

Ageratina jucunda (Greene) Clewell & Wooten, Hammock Snakeroot. Sandhills, dry pinelands, and subxeric hardwood hammocks. Se. GA south to s. FL, west to e. Panhandle FL. [= Clewell, A.F. & J.W. Wooten (1971), FNA9, K1, K3, WH3; = *Eupatorium jucundum* – S, SE]



Ageratum Linnaeus 1753 (*Ageratum*, Flossflower, Pussyfoot)

A genus of about 44 species, herbs, of tropical America. References: SE; Nesom in FNA21 (2006c).



* ***Ageratum houstonianum*** P. Miller, *Ageratum*. Disturbed areas; apparently native of se. Mexico and Central America. Jul-Aug. Reported for AL by Diamond (2014). [= FNA9, K1, K3, S, SE, WH3]

Ambrosia Linnaeus 1753 (Ragweed)

A genus of about 43 species, herbs, cosmopolitan. References: SE; Strother in FNA21 (2006c).

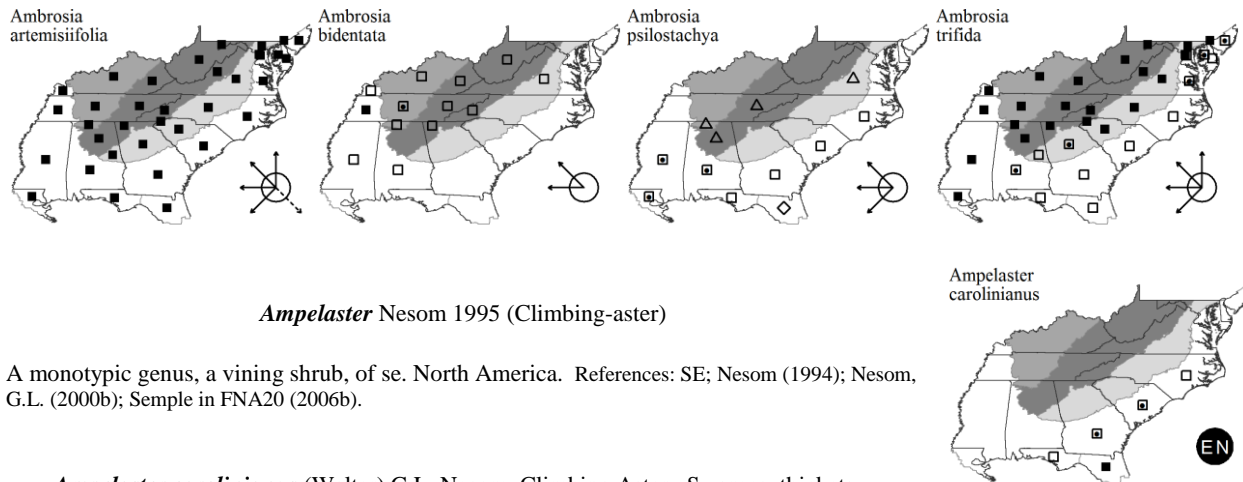
- 1 Leaves either undivided, with 2 lateral teeth, or palmately 3-5-lobed.
 - 2 Leaves sessile to clasping, 2.5-7 cm long, undivided, with 2 teeth near the base ***Ambrosia bidentata***
 - 2 Leaves petiolate, 7-30 cm long, (1-) 3 (-5) lobed ***Ambrosia trifida***
- 1 Leaves 1- to 3-pinnatifid.
 - 3 Annual, with fibrous roots; fruiting involucre with short, sharp spines ***Ambrosia artemisiifolia***
 - 3 Perennial, with deep-seated, creeping roots; fruiting involucre with bumps ***Ambrosia psilostachya***

Ambrosia artemisiifolia Linnaeus, Common Ragweed. Roadsides, gardens, disturbed soils, thin soils on rock outcrops. Aug-Nov. NL (Newfoundland), Nunavut, and BC south to FL, TX, CA and southward. [= C, FNA9, G, Il, K3, Pa, RAB, SE, Tn, Va, WH3; > *Ambrosia artemisiifolia* var. *artemisiifolia* – F, K1, K2; > *Ambrosia artemisiifolia* var. *elator* – F, K1, K2; > *Ambrosia artemisiifolia* var. *paniculata* – F, K1, K2; > *Ambrosia elator* – S; > *Ambrosia glandulosa* – S; > *Ambrosia monophylla* – S]

* ***Ambrosia bidentata*** Michaux, Lanceleaf Ragweed. Barrens, prairies, mafic woodlands. Aug-Nov. CT, NY, and MN south to Panhandle FL and TX. Widely scattered throughout TN, east to e. TN (Chester, Wofford, & Kral 1997) and in nw. GA (Jones & Coile 1988). [= C, FNA9, G, Il, K3, RAB, S, SE, Tn, Va]

* ***Ambrosia psilostachya*** A.P. de Candolle, Perennial Ragweed. Loamy sandy soil of flats and slight depressions in periodically burned longleaf pine uplands, also in disturbed areas. Sep-Nov. 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. [= C, FNA9, G, Il, K3, Pa, SE; = *Ambrosia pilostachya* – WH3; = *Ambrosia rugelii* – S; > RAB; > *Ambrosia psilostachya* var. *coronopifolia* – F; > *Ambrosia psilostachya* var. *psilostachya* – F; > *Ambrosia rugelii* – RAB]

* ***Ambrosia trifida*** Linnaeus, Giant Ragweed, Riverweed, Hogweed. Floodplains, moist pastures; disturbed ground. Jul-Nov. NS and BC south to n. peninsular FL, Panhandle FL, TX, and CA. The distinction between var. *trifida* and var. *texana* (or at the specific rank *A. trifida* and *A. aptera*) warrants additional study. [= FNA9, K3, Pa, RAB, SE, Tn, Va, WH3; > S; > *Ambrosia aptera* – S; > *Ambrosia trifida* var. *texana* – C, F, G, Il; > *Ambrosia trifida* var. *trifida* – C, F, G, Il]



***Ampelaster* Nesom 1995 (Climbing-aster)**

A monotypic genus, a vining shrub, of se. North America. References: SE; Nesom (1994); Nesom, G.L. (2000b); Semp in FNA20 (2006b).

Ampelaster carolinianus (Walter) G.L. Nesom, Climbing Aster. Swamps, thickets, marshes, streambanks. Late Sep-Dec. Se. NC south to s. FL. Grown horticulturally. [= FNA9, K1, K3, Nesom (1994); = *Aster carolinianus* – GW2, RAB, S, SE; = *Symphytotrichum carolinianum* – WH3; = *Virgulus carolinianus*]

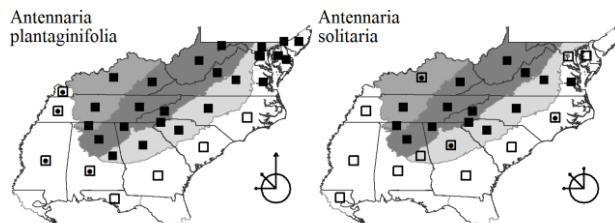
***Antennaria* Gaertner 1791 (Pussytoes)**

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, J.E. (1998); Bayer in FNA19 (2006a); Bayer, R.J. (1984); Bayer, R.J. (1985); Bayer, R.J. & G.L. Stebbins (1982); Bayer, R.J. & G.L. Stebbins (1987); Bayer, R.J. & G.L. Stebbins (1993); SE.

- 1 Flowering stalks with 1 head ***Antennaria solitaria***
 1 Flowering stalks with 2 or more heads. ***Antennaria plantaginifolia***

* ***Antennaria plantaginifolia*** (Linnaeus) Hooker, Plantain Pussytoes. Dry woodlands, roadside banks, cemeteries, pastures. Late Mar-early May. NS west to SK, south to FL, AL, MS, AR, and OK. *A. plantaginifolia* is a sexual diploid ancestor of the *A. howellii* complex (FNA). [= Arriagada, J.E. (1998), Bayer, R.J. & G.L. Stebbins (1993), FNA9, Il, K1, K3, Pa, Tn, Va, W, WH3; = *Antennaria plantaginifolia* var. *plantaginifolia* – C, G, RAB, SE; > S, S; > *Antennaria caroliniana* – S; > *Antennaria plantaginifolia* var. *petiolata* – F; > *Antennaria plantaginifolia* var. *plantaginifolia* – F]

Antennaria solitaria Rydberg, Southern Single-head Pussytoes. Forests and woodlands, often mesic and/or shaded. Late Mar-early May. VA, WV, sw. PA, and s. IN south to GA, LA, and OK. *A. solitaria* is a sexual diploid ancestor of the *A. parlinii* complex (FNA). [= Arriagada, J.E. (1998), Bayer, R.J. & G.L. Stebbins (1993), C, F, FNA9, G, Il, K1, K3, Pa, RAB, S, SE, Tn, Va, W]



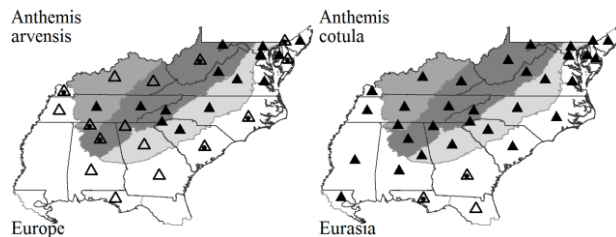
Anthemis Linnaeus 1753 (Chamomille)

A genus of about 175-210 species, herbs, mainly Eurasian. References: Arriagada, J.E. & N.G. Miller (1997); SE; Watson in FNA19 (2006a).

- 1 Rays sterile and usually neutral; receptacle chaffy only toward the middle *Anthemis cotula*
 1 Rays pistillate and fertile; receptacle chaffy throughout. *Anthemis arvensis*

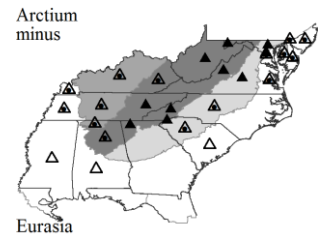
* *Anthemis arvensis* Linnaeus, Corn Chamomille. Roadsides, disturbed areas; native of Europe. Late Apr-Jul. Var. *agrestis* differs from var. *arvensis* in having chaff shorter than the disk flowers; if recognized, both varieties apparently occur in our area. [= Arriagada, J.E. & N.G. Miller (1997), C, FNA9, G, K3, Pa, RAB, S, SE, Tn, Va, W, WH3; > *Anthemis arvensis* var. *agrestis* – F, Il, K1; > *Anthemis arvensis* var. *arvensis* – F, K1]

* *Anthemis cotula* Linnaeus, Mayweed, Stinking Chamomille, Mayweed, Dog-fennel, Chigger-weed. Roadsides, disturbed areas; native of Eurasia. May-Jul. [= Arriagada, J.E. & N.G. Miller (1997), C, F, FNA9, G, Il, K1, K3, Pa, RAB, SE, Tn, Va, W, WH3; = *Maruta cotula* – S]

*Arctium* Linnaeus 1753 (Burdock)

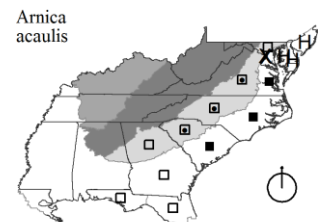
A genus of about 11 species (though circumscription remains uncertain), herbs, of the temperate Old World. References: SE; Duistermaat, H. (1996); Keil in FNA19 (2006a).

* *Arctium minus* Bernhardt, Common Burdock. Pastures, barnyards, roadsides, other disturbed areas; native of Eurasia. Late Jun-Nov. [= C, Duistermaat, H. (1996), F, FNA9, Il, K, Pa, RAB, S, SE, Va, W; = *Arctium minus* ssp. *minus*; < G]

*Arnica* Linnaeus 1753 (Arnica)

A genus of about 29-32 species, perennial herbs, north temperate, boreal, and arctic. References: SE; Wolf in FNA21 (2006c).

Arnica acaulis (Walter) Britton Sterns, & Poggenburg, Leopard's-bane, Southeastern Arnica. Pine savannas, sandhills, clayey or sandy woodlands, powerline rights-of-way, roadbanks. Late Mar-Jun. DE (historical) and se. PA and MD (where on serpentine) south to Panhandle FL, on the Coastal Plain and lower Piedmont. [= C, F, FNA9, G, GW2, K, Pa, RAB, S, SE, Va, WH3; = *Doronicum acaule*]

*Arnoglossum* Rafinesque 1817 (Indian-plantain)

A genus of about 8 species, herbs, of e. North America. References: Anderson in FNA20 (2006b); Anderson, L.C. (1998); Barkley, T.M. (1999); SE; Harper, R.M. (1905); Kral, R. & R.K. Godfrey (1958); Phippen, R.W. (1978); Robinson (1974); Ward, D.B. (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 below; 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).
..... *Arnoglossum sulcatum*

Arnoglossum atriplicifolium (Linnaeus) H.E. Robinson, Pale Indian-plantain. Mesic forests, woodland edges, clearings, prairies, meadows. Jun-Oct. NY, MN, and NE south to Panhandle FL and LA (attribution to MA is in error, A.Haines, pers.comm.). [= Anderson, L.C. (1998), Barkley, T.M. (1999), FNA9, IL, K1, K3, Mo, Pa, Tn, Va, WH3; = *Cacalia atriplicifolia* – C, F, G, Pippen, R.W. (1978), RAB, SE, W; = *Mesadenia atriplicifolia* – S]

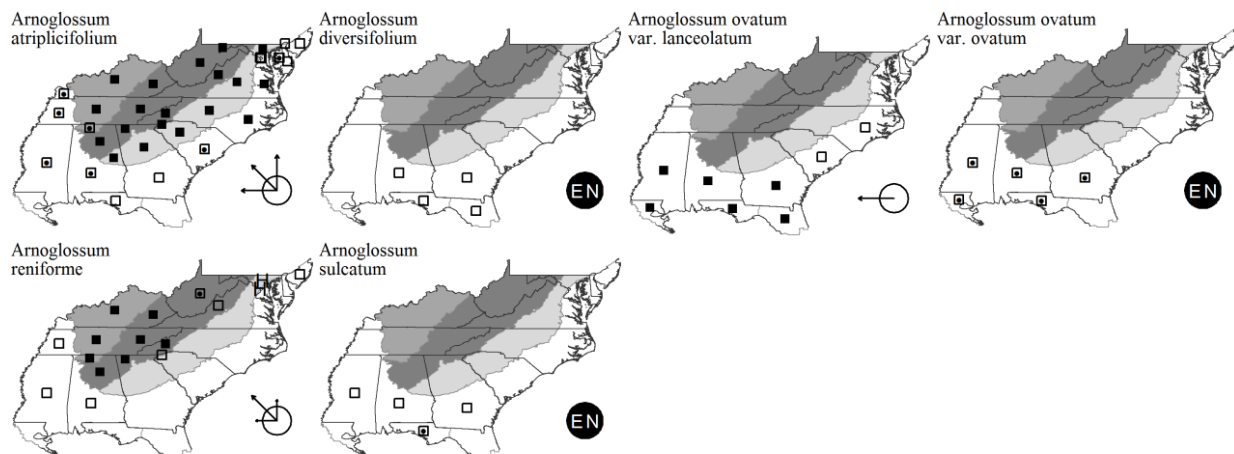
Arnoglossum diversifolium (Torrey & A. Gray) H.E. Robinson, Variable-leaf Indian-plantain. Calcareous swamps, calcareous hydric hammocks. (Late Feb-) May-Aug; Jul-Sep. Sw. GA and Panhandle FL, west to s. AL; disjunct in nw. peninsular FL. [= Anderson, L.C. (1998), Barkley, T.M. (1999), FNA9, GW2, K1, K3, WH3; = *Cacalia diversifolia* – Kral, R. & R.K. Godfrey (1958), Pippen, R.W. (1978), SE; = *Mesadenia diversifolia* – S]

Arnoglossum ovatum (Walter) H.E. Robinson var. *lanceolatum* (Nuttall) D.B. Ward, Savanna Indian-plantain. Wet savannas, especially over coquina limestone ("marl"). Late Jul-Oct. Se. NC to s. FL, west to e. TX. [= Ward, D.B. (2004c); = *Cacalia lanceolata* – RAB; = *Cacalia lanceolata* var. *lanceolata* – Kral, R. & R.K. Godfrey (1958); = *Mesadenia lanceolata* – S; < *Arnoglossum ovatum* – Anderson, L.C. (1998), Barkley, T.M. (1999), FNA9, GW2, K1, K3, WH3; < *Cacalia ovata* – Pippen, R.W. (1978), SE; > *Mesadenia lanceolata* var. *lanceolata* – Harper, R.M. (1905); > *Mesadenia lanceolata* var. *virescens* – Harper, R.M. (1905)]

Arnoglossum ovatum (Walter) H.E. Robinson var. *ovatum*, Broadleaf Indian-plantain. Bottomlands, bay forests, moist or wet forests. Late Jul-Oct. E. GA west to e. LA. The division of *A. ovatum* into two taxa (species or, as done here, varieties) needs additional study. [= Ward, D.B. (2004c); = *Cacalia lanceolata* var. *elliottii* – Kral, R. & R.K. Godfrey (1958); < *Arnoglossum ovatum* – Anderson, L.C. (1998), Barkley, T.M. (1999), FNA9, GW2, K1, K3, WH3; < *Cacalia ovata* – Pippen, R.W. (1978), SE; > *Mesadenia elliottii* – S; > *Mesadenia maxima* – S]

Arnoglossum reniforme (Hooker) H.E. Robinson, Great Indian-plantain. Cove forests, floodplains, other mesic forests. Jun-Oct. The very large, reniform leaves (sometimes up to 75 cm across) are conspicuous in rich cove forests. PA and MN, south to SC (Gaddy 2014), GA, MS, and OK. [= Anderson, L.C. (1998), Barkley, T.M. (1999), FNA9, IL, K2, K3, Pa, Tn, Va; = *Arnoglossum muhlenbergii*; = *Cacalia muhlenbergii* – C, F, G, Harper, R.M. (1905), Pippen, R.W. (1978), RAB, SE, W; = *Mesadenia reniformis* – S]

Arnoglossum sulcatum (Fernald) H.E. Robinson, Grooved-stem Indian-plantain. Bottomland forests. Sw. GA and Panhandle FL west to s. AL. [= Anderson, L.C. (1998), Barkley, T.M. (1999), FNA9, GW2, K1, K3, WH3; = *Cacalia sulcata* – Kral, R. & R.K. Godfrey (1958), Pippen, R.W. (1978), SE; = *Mesadenia sulcata* – S]



Artemisia Linnaeus 1753 (Wormwood, Mugwort, Sage)

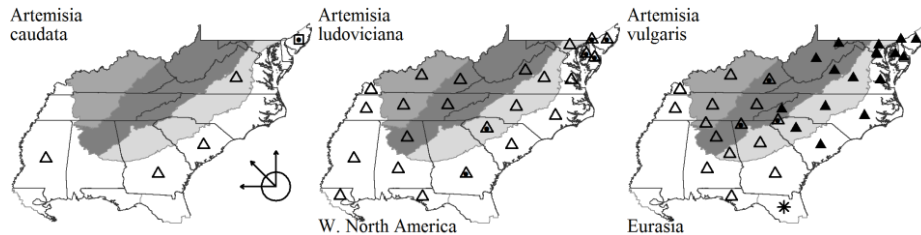
If defined (as here) to include the segregate genus *Seriphidium*, a genus of about 500 species, shrubs and herbs, north temperate, boreal, and arctic. References: Arriagada, J.E. & N.G. Miller (1997); SE; Ling Yeou-Ruenn (1995); Schulz in FNA19 (2006a).

- 1 Disk flowers sterile, with abortive ovaries; plant not aromatic when fresh; [subgenus *Dracunculus*] *Artemisia caudata*
- 1 Disk flowers fertile, with normal ovaries; plant variously aromatic or not when fresh.
- 2 Leaves entire to 1-pinnatifid; leaves lacking stipule-like lobes at the base *Artemisia ludoviciana*
- 2 Leaves 2-pinnatifid; leaves with 1-2 stipule-like lobes at the base *Artemisia vulgaris*

* ***Artemisia caudata*** Michaux, Sand Wormwood, Beach Wormwood. Sandy woodlands; presumably introduced from western United States. Sep-Oct. [= II, Ling Yeou-Ruenn (1995), RAB, S; = *Artemisia campestris* ssp. *caudata* – Arriagada, J.E. & N.G. Miller (1997), FNA9, K, Pa, SE, WH3; = *Oligosporus campestris* ssp. *caudatus*; = *Oligosporus caudatus*; > *Artemisia caudata* var. *calvens* – F; > *Artemisia caudata* var. *caudata* – F]

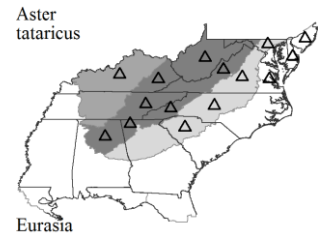
* ***Artemisia ludoviciana*** Nuttall, White Sage, White Sagewort, Prairie Sage, Western Mugwort. Roadsides, fencerows, disturbed areas; native of western North America. Late Aug-Nov. [= Pa, Va, WH3; = *Artemisia ludoviciana* ssp. *ludoviciana* – FNA9, K; = *Artemisia ludoviciana* var. *ludoviciana* – C, G, SE; > Ling Yeou-Ruenn (1995), RAB; > *Artemisia ludoviciana* var. *gnaphalodes* – F, II; > *Artemisia ludoviciana* var. *ludoviciana* – F, II]

* ***Artemisia vulgaris*** Linnaeus, Common Mugwort, Felon Herb. Roadsides, pastures, fencerows, disturbed areas; native of Eurasia. Jul-Nov. [= Arriagada, J.E. & N.G. Miller (1997), C, FNA9, Ling Yeou-Ruenn (1995), Pa, RAB, S, SE, Tn, Va, WH3; > *Artemisia vulgaris* var. *glabra* – II; > *Artemisia vulgaris* var. *latiloba* – II; > *Artemisia vulgaris* var. *vulgaris* – F, II, K]



Aster Linnaeus 1753 (*Aster*)

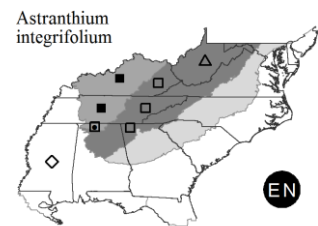
It is now abundantly clear that the traditional, broad circumscription of *Aster*, as a genus of some 250 species of North America and Eurasia, is untenable. All of our native asters have affinities elsewhere than with Old World *Aster*; most are now placed in *Symphotrichum* and *Eurybia*, with fewer 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 in FNA20 (2006b); Brouillet, L. & J.C. Semple (1981); SE; Jones, A.G. (1980a); Jones, A.G. (1980b); Jones, A.G. (1984); Jones, A.G. & D.A. Young (1983); Lamboy, W.F. (1992); Nesom (1994); Nesom, G.L. (1993a); Nesom, G.L. (1993b); Nesom, G.L. (1994a); Nesom, G.L. (1994b); Nesom, G.L. (1997); Nesom, G.L. (2000b); Noyes, R.D. & L.H. Rieseberg (1999); R. Jones (1992); Reveal, J.L. & C.S. Keener (1981); Semple, J.C. & L. Brouillet (1980a); Semple, J.C. & L. Brouillet (1980b); Semple, J.C., J.G. Chmielewski, & M.A. Lane (1989); Semple, J.C., S.B. Heard, & ChunSheng Xiang (1996); Semple, J.C., S.B. Heard, & ChunSheng Xiang (1996); Xiang, Chunsheng, & J.C. Semple (1996).



* ***Aster tataricus*** Linnaeus f, Tartarian Aster. Commonly cultivated, rarely persisting or spreading short distances from plantings; native of Eurasia. Sep-Nov. [= C, FNA9, G, II, K, Nesom (1994), Pa, RAB, SE, Tn, Va, W]

Astranthium Nuttall 1840 (*Western-daisy*)

A genus of about 11 species, herbs, of sc. North America and Mexico. References: SE; DeJong, D.C.D. (1965); Nesom in FNA20 (2006b); Nesom, G.L. (2000b); Nesom, G.L. (2005a).



* ***Astranthium integrifolium*** (Michaux) Nuttall. Limestone glades, barrens, rocky woodlands, roadsides. Nc. KY south through c. TN to nw. GA and ne. AL (primarily in the Interior Low Plateau); disjunct in c. MS and also disjunct in nc. WV, where perhaps introduced. The related *A. ciliatum* (Rafinesque) Nesom of the Ozarkian region and Texas is sometimes 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. The report for NC by Kartesz (1999) is erroneous; the cited documentation does not mention NC. [= FNA9, Nesom, G.L. (2005a), Tn; = *Astranthium integrifolium* ssp. *integrifolium* – DeJong, D.C.D. (1965), K; = *Astranthium integrifolium* var. *integrifolium* – C; < F, G, SE, W]

Baccharis Linnaeus 1753 (*Silverling, High-tide Bush, Mullet Bush, Groundsel Tree*)

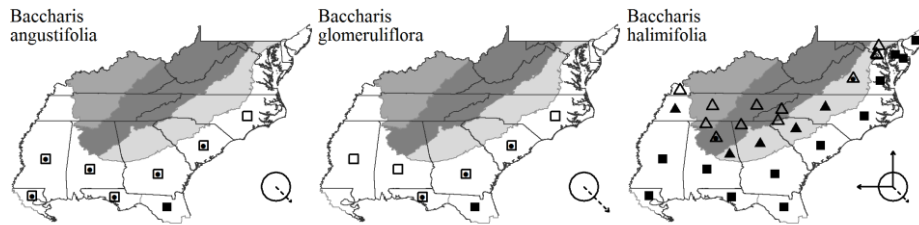
A genus of about 350–450 species, shrubs, perennial herbs, and trees, of tropical, subtropical, and warm temperate America. References: SE; Nesom, G.L. (2000b); Sundberg & Bogler in FNA20 (2006b).

- 1 Leaves linear, 1-3 mm wide, entire *Baccharis angustifolia*
- 1 Leaves obovate, oblanceolate, or elliptic, the larger > 7 mm wide and generally coarsely toothed toward the tip.
- 2 Most of the heads sessile (a few pedunculate), the glomerules scattered along leafy branches in the axils of well-developed leaves; [strictly of the outer Coastal Plain, not spread inland as a weed] *Baccharis glomeruliflora*
- 2 Most of the heads pedunculate (a few sessile), the glomerules grouped into terminal paniculiform inflorescences; [of the outer Coastal Plain and also spread extensively inland as a weed] *Baccharis halimifolia*

Baccharis angustifolia Michaux, False-willow. Interdune swales, wet hammocks, marsh edges. Sep-Oct. Ne. NC (Dare County) south to s. FL, west to LA; Bahamas. [= FNA9, GW2, K, RAB, S, SE, WH3]

Baccharis glomeruliflora Persoon. Wet hammocks, marsh edges, interdune swales. Oct-Nov. Se. NC (Brunswick County) south to s. FL, west to MS; West Indies. [= FNA9, GW2, K, RAB, S, SE, WH3]

* *Baccharis halimifolia* Linnaeus, Silverling, High-tide Bush, Mullet Bush, Groundsel Tree. Fresh and brackish marshes, marsh borders, hammocks, moist abused land, roadsides, ditches, old fields, and a wide variety of disturbed areas. Aug-Oct. Se. MA south to s. FL, west to TX, AR, and OK; West Indies. *B. halimifolia* is becoming increasingly common inland, and can be an aggressive invader in sunny sites after silvicultural disturbance. [= C, F, FNA9, G, GW2, K, Pa, RAB, S, SE, Tn, Va, WH3]



***Balduina* Nuttall 1818 (Honeycomb-head, Balduina)**

A genus of 3 species, herbs, of se. North America. References: SE; Keener in FNA21 (2006c); Parker, E.S. & S.B. Jones (1975).

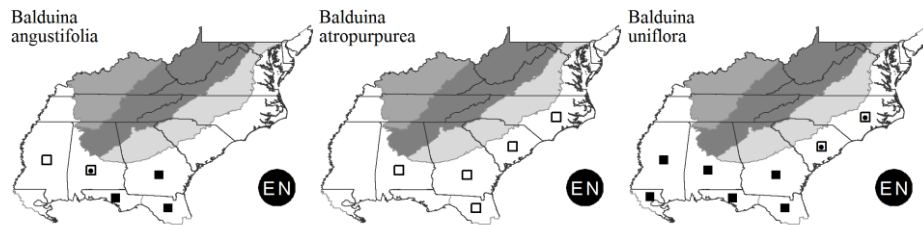
Identification Notes: The common name alludes to the honeycomb-like texture of the receptacle, made up of connected receptacular bractlets which surround the achenes. This condition is diagnostic of the genus, and can be seen even when the plant is in flower by stripping the flowers from the receptacle. 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. Sandhills and other dry, sandy soils. GA south to s. FL, west to s. MS; it should be sought in s. SC. [= FNA9, K1, K3, Parker, E.S. & S.B. Jones (1975), SE, WH3; = *Actinospermum angustifolium* - S]

Balduina atropurpurea R.M. Harper, Bog Honeycomb-head, Purple Honeycomb-head, Purple Balduina. Peaty seepage bogs and wet pine savannas. Late Aug-early Nov; Oct-Dec. A southeastern Coastal Plain endemic, very rare and disjunct in se. NC and nc. SC (where not recently seen), primarily in ne. to sc. GA and ne. FL. [= FNA9, GW2, K1, K3, Parker, E.S. & S.B. Jones (1975), RAB, SE, WH3; = *Endorima atropurpurea* - S]

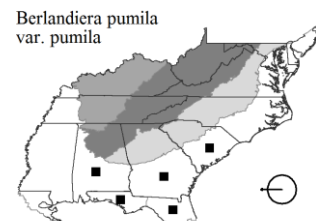
Balduina uniflora Nuttall, Savanna Honeycomb-head, Yellow Balduina. Wet pine savannas and pine flatwoods. Late Jul-Sep. A southeastern Coastal Plain endemic: se. NC and immediately adjacent ne. SC (apparently absent from much of SC), and from extreme s. SC south to ne. FL, FL Panhandle, and west to e. LA. [= FNA9, GW2, K1, K3, Parker, E.S. & S.B. Jones (1975), RAB, SE, WH3; = *Endorima uniflora* - S]



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: SE; Nesom, G.L. & B.L. Turner (1998); Pinkava in FNA21 (2006c).



Berlandiera pumila (Michaux) Nuttall var. **pumila**, Eastern Green-eyes. Longleaf pine sandhills, disturbed sandy areas. Late May–Nov. Nc. SC south to n. peninsular FL, west to s. AL; sw. AR and w. LA to c. TX. Plants in w. LA and e. TX accepted here as *B. pumila* var. *scabrella* G.L. Nesom & Turner (1998) have also been considered to represent introgression between *B. pumila* and *B. texana* A.P. de Candolle (Pinkava in FNA 2006c). [= K1, Nesom, G.L. & B.L. Turner (1998); = *Berlandiera pumila* – FNA9, K3; < *Berlandiera pumila* – RAB, S, SE, WH3]

Bidens Linnaeus 1753 (Beggarticks, 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, R. (1986); SE; Sherff, E.E. & E.J. Alexander (1955); Strother & Weedon in FNA21 (2006c).

Identification Notes: The involucre of phyllaries is subtended by an additional series of bracteal structures, the calyculus.

- 1 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).
 - 2 Leaves 2-3× dissected, primary lobes > 20, the ultimate segments rounded to acute, 2-10 mm wide; ray florets pale yellowish *Bidens bipinnata*
 - 2 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*
- 1 Inner cypselas flattened (if 4-angled, the alternating angles acute and obtuse), thickest toward the tip; ray florets yellow or orange (or absent).
 - 3 Most leaves simple, the margins dentate to serrate or incised (with 3-7 lobes).
 - 4 Leaves (except sometimes the lower) sessile; heads usually nodding, at least in age.
 - 5 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*
 - 5 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*
 - 4 Leaves with a distinct petiole 1-4 cm long (this sometimes winged); heads erect.
 - 6 Rays 12-25+ mm long; cypselas 2.5-4.5 mm long, the margins not barbed or ciliate *Bidens mitis*
 - 6 Rays absent or 2-5 (-12) mm long; cypselas (3-) 6-13 mm long, the margins sometimes barbed or ciliate. *Bidens connata*
 - 3 Most leaves either 1-pinnately compound, the 3-5 (-7) leaflets petiolulate, or -1-2× pinnately lobed.
 - 7 Ray florets 0, or rays 1-3, the laminae 2-3.5 mm long.
 - 8 Calyculus bractlets (3-) 4 (-5), seldom ciliate; disc florets usually 10-20 *Bidens discoidea*
 - 8 Calyculus bractlets 5-21, usually ciliate; disc florets 20-150. *Bidens frondosa*
 - 7 Ray florets (5-) 8-13, the laminae 10-30 mm long.
 - 9 Cypselas 2.5-4× as long as wide *Bidens trichosperma*
 - 9 Cypselas 1.5-2 (-2.5)× as long as wide.
 - 10 Cypselas 2.5-5 mm long, the margins not winged, barbed, or ciliate *Bidens mitis*
 - 10 Cypselas (4-) 5-8 mm long, the margins usually barbed or ciliate, and often also corky-winged. *Bidens aristosa*

* **Bidens alba** (Linnaeus) A.P. de Candolle var. **radiata** (Schultz 'Bipontinus') Ballard ex T.E. Melchert. Disturbed areas; adventive from the New World tropics. [= Ballard, R. (1986), K1; = *Bidens pilosa* var. *radiata* – Sherff, E.E. & E.J. Alexander (1955); < *Bidens alba* – II, WH3; < *Bidens pilosa* – FNA9, K3, RAB, S, SE]

* **Bidens aristosa** (Michaux) Britton, Midwestern Tickseed-sunflower, Ozark Tickseed-sunflower. Marshes, wet meadows, ditches, bogs. Aug–Oct (-Nov). DE, MD, IL, and MO south to 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. Two taxa have often been recognized, usually at species rank (see synonymy): *B. aristosa*, with calculus bractlets 8-12 (-16), these (4-) 5-7 (-12) mm long, and *B. polylepis*, with calculus bractlets 12-21, these (6-) 8-12 (20) mm long. [= K1, K3; > C, FNA9, G, GW2, Pa, RAB, S, SE, Tn, Va, W; > *Bidens aristosa* var. *aristosa* – F, Il, S, Sherff, E.E. & E.J. Alexander (1955); > *Bidens aristosa* var. *fritcheyi* – F, Il, Sherff, E.E. & E.J. Alexander (1955); > *Bidens aristosa* var. *mutica* – F, Il, S, Sherff, E.E. & E.J. Alexander (1955); > *Bidens polylepis* – C, FNA9, G, GW2, Il, Pa, RAB, SE, Tn, W; > *Bidens polylepis* var. *polylepis* – F, Sherff, E.E. & E.J. Alexander (1955); > *Bidens polylepis* var. *retrorsa* – F, Sherff, E.E. & E.J. Alexander (1955)]

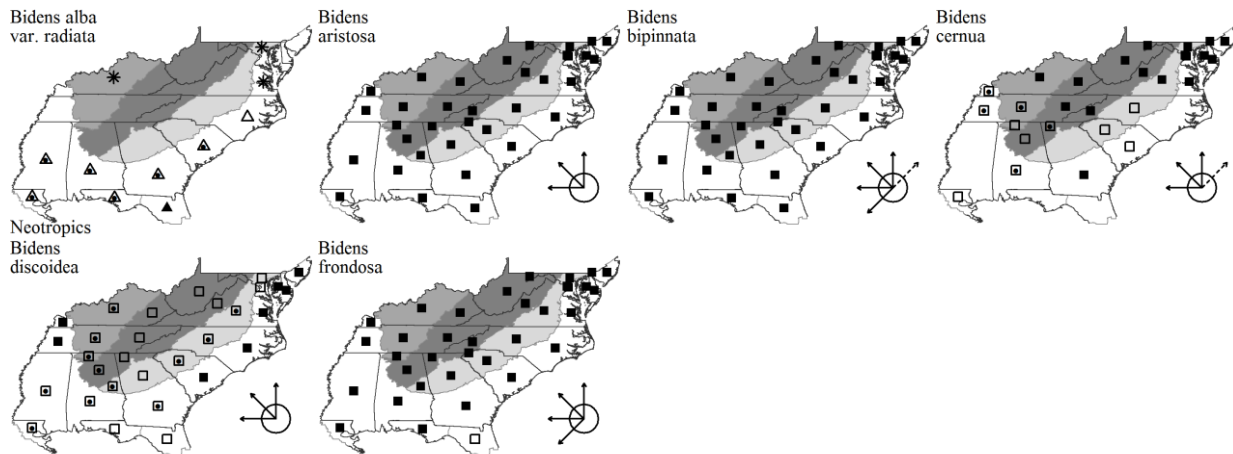
Bidens bipinnata Linnaeus, Spanish Needles. Floodplains, disturbed areas, gardens, fields, roadsides, ditches. Jul-Oct. MA, NY, ON, IA, NE, and AZ south to Mexico; also e. Asia. [= C, F, FNA9, G, Il, K1, K3, Pa, RAB, S, SE, Tn, Va, W, WH3; > *Bidens bipinnata* var. *bipinnata* – Sherff, E.E. & E.J. Alexander (1955)]

Bidens cernua Linnaeus, Nodding Bur-marigold. Marshes, wet meadows, bogs, ditches. Aug-Oct. Circumboreal, south in North America to GA, AL, LA, NM, AZ, and CA. [= C, FNA9, G, GW2, Il, K1, K3, Pa, RAB, S, SE, Tn, Va, W; > *Bidens cernua* var. *cernua* – F, Sherff, E.E. & E.J. Alexander (1955); > *Bidens cernua* var. *elliptica* – F; > *Bidens cernua* var. *integra* – F]

Bidens connata Muhlenberg, Purplestem Beggar-ticks. Mt (GA, WV), Cp (DE, VA), {NC, SC}.: marshes, bogs, wet meadows, disturbed areas; uncommon? (rare in VA and WV). Aug-Oct. QC, ON, and ND south to GA, AL, and KS. [= C, FNA9, G, Il, K1, Pa, S, Va; > *Bidens connata* var. *anomala* – F, Sherff, E.E. & E.J. Alexander (1955); > *Bidens connata* var. *connata* – F, Sherff, E.E. & E.J. Alexander (1955); > *Bidens connata* var. *fallax* – F, Sherff, E.E. & E.J. Alexander (1955); > *Bidens connata* var. *petiolata* – F, Sherff, E.E. & E.J. Alexander (1955); < *Bidens tripartita* – K3, RAB]

Bidens discoidea (Torrey & A. Gray) Britton, Few-bracted Beggar-ticks. Floodplain forests, marshes. Late Aug-Nov. NS and MN south to ne. FL, Panhandle FL, and TX. [= C, F, FNA9, G, GW2, Il, K1, K3, Pa, RAB, S, SE, Sherff, E.E. & E.J. Alexander (1955), Tn, Va, W, WH3]

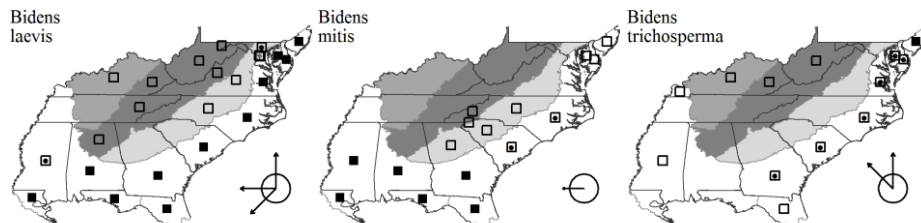
Bidens frondosa Linnaeus, Devil's Beggar-ticks. Fields, pastures, wet meadows, swamp forests, ditches. Jun-Oct. Nova Scotia and AK south to FL, TX, CA, and southward. [= C, FNA9, G, GW2, Il, K1, K3, Pa, RAB, S, SE, Tn, Va, W, WH3; > *Bidens frondosa* var. *anomala* – Sherff, E.E. & E.J. Alexander (1955); > *Bidens frondosa* var. *frondosa* – F, Sherff, E.E. & E.J. Alexander (1955)]



Bidens laevis (Linnaeus) Britton Sterns, & Poggenburg, Showy Bur-marigold. Marshes, stream banks, ditches. Aug-Nov. ME, NY, IN, MO, NV, and CA southward. [= C, F, FNA9, G, GW2, Il, K1, K3, Pa, RAB, SE, Sherff, E.E. & E.J. Alexander (1955), Tn, Va, W, WH3; > S; > *Bidens nashii* – S]

Bidens mitis (Michaux) Sherff, Coastal Plain Tickseed-sunflower. Brackish marshes, fresh marshes, bogs (inland). Jul-Oct. NJ south to FL, west to TX, primarily Coastal Plain, rare and scattered inland. [= C, F, FNA9, G, GW2, K1, K3, RAB, SE, Sherff, E.E. & E.J. Alexander (1955), W, WH3; > *Bidens mitis* var. *leptophylla* – S; > *Bidens mitis* var. *mitis* – S]

Bidens trichosperma (Michaux) Britton, Northern Tickseed-sunflower. Tidal marshes, other marshes. Aug-Oct. QC, MN, and SD south to ne. FL, GA, LA, and NE. [= FNA9, K3, Pa, Va, WH3; = *Bidens coronata* – C, G, GW2, K1, RAB, S, SE; = *Bidens trichosperma* var. *trichosperma* – Il; > *Bidens coronata* var. *brachyodonta* – F; > *Bidens coronata* var. *coronata* – F, Sherff, E.E. & E.J. Alexander (1955); > *Bidens coronata* var. *trichosperma* – F]



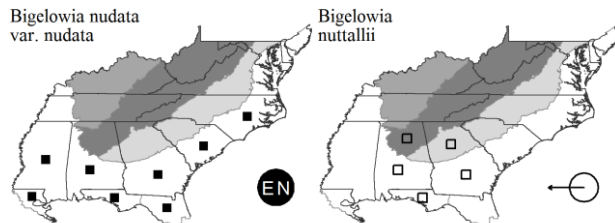
Bigelovia A.P. de Candolle 1836 (Rayless-goldenrod)

A genus of 2 species (one with 2 varieties), herbs, of se. North America. References: Anderson, L.C. (1970); SE; Nesom in FNA20 (2006b); Nesom, G.L. (2000b).

- 1 Basal leaves many, 1-2 mm wide; plants strongly rhizomatous and colonial; [of dry clayey or rocky places] **Bigelovia nuttallii**
 1 Basal leaves few, 2-14 mm wide; plants caespitose, or weakly rhizomatous; [of wet to mesic pine savannas and flatwoods].
 **Bigelovia nudata** var. **nudata**

Bigelovia nudata (Michaux) A.P. de Candolle var. **nudata**, Rayless-goldenrod. Savannas, pine flatwoods, pocosin edges. Aug-Oct. E. NC south to n. FL and west to LA. [= FNA9, SE; = *Bigelovia nudata* ssp. *nudata* – Anderson, L.C. (1970), GW2, K1, K3, WH3; < *Chondrophora nudata* – RAB, S]

Bigelovia nuttallii (Michaux) A.P. de Candolle. Prairies, sandstone glades, granite flatrocks, Altamaha Grit glades, and roadbanks. Sep-Oct. 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, and wc. peninsular FL. [= Anderson, L.C. (1970), FNA9, GW2, K1, K3, SE, WH3; = *Chondrophora virgata* – S]

**Boltonia** L'Héritier 1789 (Doll's-daisy)

(contributed by John F. Townsend and Alan S. Weakley)

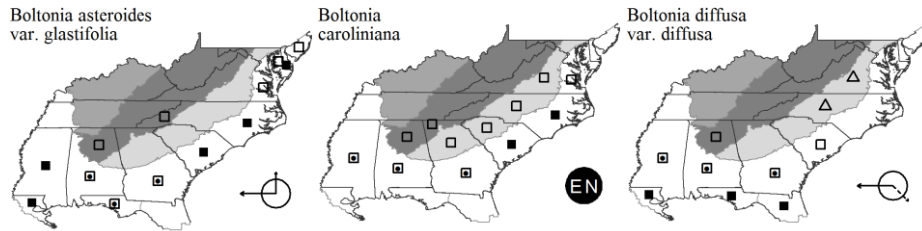
A genus of about 6-7 species, herbs, of e. and c. North America. References: Anderson, L.C. (1987); SE; Karaman-Castro & Urbatsch in FNA20 (2006b); Morgan, J.T. (1966); Nesom, G.L. (2000b); Townsend, J.F. (2013); Townsend, J.F. & V. Karaman-Castro (2006).

- 1 Achenes with pappus reduced to a short ring of bristles to 0.15 mm long or with occasional slender awns to 0.6 mm; achene wings lacking or up to 0.1 mm wide; faces of achenes glabrous.
 **Boltonia caroliniana**
 1 Achenes with two distinct pappus awns in addition to a shorter ring of bristles, the awns mostly 0.3-1.8 mm long; achene wings obvious, mostly 0.2-0.5 mm wide; faces of achenes pubescent.
 2 Inflorescence subulate-bracteate.
 **Boltonia diffusa** var. **diffusa**
 2 Inflorescence more or less leafy-bracteate.
 **Boltonia asteroides** var. **glastifolia**

Boltonia asteroides (Linnaeus) L'Héritier var. **glastifolia** (Hill) Fernald, Eastern Doll's-daisy. Marshes, ditches. Aug-Oct. NJ south to Panhandle FL, west to MS and LA, mostly on the Coastal Plain, but with a few disjunct occurrences inland, such as Henderson County, NC. [= F, K3, Townsend, J.F. (2013), Va; < *Boltonia asteroides* – RAB, W, WH3; < *Boltonia asteroides* var. *asteroides* – Anderson, L.C. (1987), C, FNA9, G, K1, Morgan, J.T. (1966), SE, Townsend, J.F. & V. Karaman-Castro (2006); < *Boltonia* sp. – GW2]

Boltonia caroliniana (Walter) Fernald, Carolina Doll's-daisy. Bottomlands, ditches, roadsides, prairies. Aug-Oct. Se. VA south to s. SC (and GA according to Kartesz 1999), primarily on the Coastal Plain and Piedmont. [= Anderson, L.C. (1987), C, FNA9, G, K1, K3, SE, Townsend, J.F. & V. Karaman-Castro (2006), Va; = *Boltonia diffusa* var. *caroliniana* – Morgan, J.T. (1966); < RAB; > F; > *Boltonia ravenelii* – F; < *Boltonia* sp. – GW2]

* **Boltonia diffusa** Elliott var. **diffusa**, Southern Doll's-daisy. Clay-based Carolina bays, roadsides, powerline rights-of-way, and other artificially open areas. Aug-Oct. 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). See Sorrie & LeBlond (2008) for comments on distribution and nativity. [= F, FNA9, IL, K1, Morgan, J.T. (1966), Va; < *Boltonia caroliniana* – RAB; < *Boltonia diffusa* – Anderson, L.C. (1987), C, G, K3, SE, WH3; < *Boltonia* sp. – GW2]



Borrichia Adanson 1763 (Seaside Oxeye)

A genus of 2 species, shrubs, of se. United States and West Indies. References: SE; Semple in FNA21 (2006c).

Borrichia frutescens (Linnaeus) A.P. de Candolle, Silver Seaside Oxeye. Salt and brackish marshes. Jan-Dec. DC and e. VA south to s. FL, west to TX and Mexico; also in Bermuda. This species often forms nearly pure stands of many hectares, conspicuous from the fleshy, gray leaves. [= C, F, FNA9, G, K1, K3, RAB, S, SE, Va, WH3]

Bradburia Torrey & A. Gray 1842 (Golden-aster)

A genus of 2 species, annual herbs, native to sc. North America. References: SE; Harms, V.L. (1974); Nesom, G.L. (2000b); Semple in FNA20 (2006b); Semple (1996); Semple, J.C. (1981).

* **Bradburia pilosa** (Nuttall) Semple. Barrens, sandy roadsides; perhaps introduced from a primary, native range from s. MO and se. KS, south to TX. Jul-Sep. See Anderson (2007) for FL record. [= FNA9, K3, Semple (1996), Tn, WH3; = *Chrysopsis pilosa* – F, G, SE, Semple, J.C. (1981); = *Heterotheca pilosa* – Harms, V.L. (1974); < *Heterotheca gossypina* – RAB]

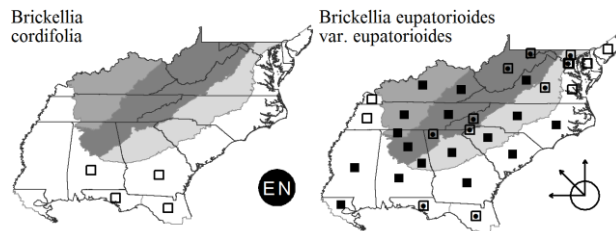
Brickellia Elliott 1823 (False-boneset, Brickell-bush)

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; Shinnars 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: SE; Schilling et al (2015); Scott in FNA21 (2006c); Shinnars, L.H. (1946); Shinnars, L.H. (1971); Turner (1989).

- 1 Leaves rounded to cordate at base; upper stem leaves reduced in size but similar in shape to the lower leaves; pappus purplish, of ca. 40 bristles; [of s. GA south]; [section *Brickellia*]***Brickellia cordifolia***
 1 Leaves cuneate at base; upper stem leaves (at least) linear-lanceolate; pappus whitish, of 20-25 bristles; [collectively widespread in our area].
***Brickellia eupatorioides* var. *eupatorioides***

Brickellia cordifolia Elliott, Flyr's Brickellia, Flyr's False-boneset. Mesic pine-hardwood or oak-hickory woods of upland hammocks. Late Aug-late Oct. Sw. GA (Jones & Coile 1988; Carter, Baker, & Morris 2009) and AL south to Panhandle FL and n. peninsular FL. [= FNA9, K1, K3, SE, WH3; = *Coleosanthus cordifolius* – S]

Brickellia eupatorioides (Linnaeus) Shinnars var. *eupatorioides*, Eastern False-boneset. Dry slopes, shale barrens, dry woodlands, thickets. Jun-Oct. NJ west to IN, south to c. peninsular FL and se. TX. In addition to var. *eupatorioides*, *B. eupatorioides* includes several other varieties, of more western distribution. Var. *texana* (Shinnars) Shinnars [= var. *ozarkana* (Shinnars) Shinnars] 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. [= Ar, FNA, K1, K3, Shinnars, L.H. (1971), Turner (1989), Va; = *Kuhnia eupatorioides* var. *eupatorioides* – C, F, G, SE; = *Kuhnia eupatorioides* var. *pyramidalis* – Shinnars, L.H. (1946); < *Brickellia eupatorioides* – Pa, Tn, WH3; < *Kuhnia eupatorioides* – RAB, S, W; >> *Kuhnia eupatorioides* var. *eupatorioides* – SE; >> *Kuhnia eupatorioides* var. *gracilis* – SE]



Brintonia Greene 1895 (Brintonia)

A monotypic genus of the East Gulf Coastal Plain of the Southeastern United States, though sometimes combined with *Solidago*. References: Nesom (1993); Semple in FNA20 (2006b).

Brintonia discoidea (Elliott) Greene, Brintonia, Rayless Mock-goldenrod. Rich bluff forests. Aug-Oct. Sw. GA and Panhandle FL west to LA. [= FNA9, K3, S, SE, WH3; = *Solidago discoidea* – K1]

Calypso Lessing 1832 (Straggler-daisy, Lawnflower)

A genus of 2-3 species, herbs, of sw. North America south to Central America. References: SE; Sherff, E.E. & E.J. Alexander (1955); Strother in FNA21 (2006c).

* ***Calypso vialis*** Lessing, Straggler-daisy, Lawnflower, Horse-herb, Hierba del Caballo. Disturbed areas, roadsides, lawns, flower-beds; native of tropical America. Jan-Dec. Nesom (2011d) discusses the native distribution of *C. vialis* and concludes that it was originally native to s. TX and Mexico. [= FNA9, II, K1, K3, S, SE, Sherff, E.E. & E.J. Alexander (1955), WH3]

Carduus Linnaeus 1753 (Plumeless Thistle)

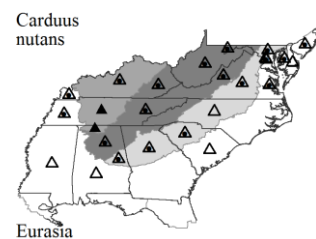
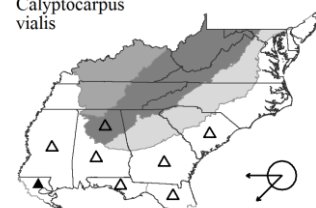
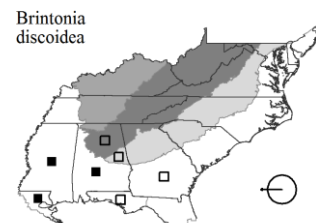
A genus of about 90 species, herbs, of temperate Old World. References: SE; Keil in FNA19 (2006a).

* ***Carduus nutans*** Linnaeus, Musk Thistle, Nodding Thistle. Fields, roadsides, disturbed areas; native of Eurasia. Late May-Nov. *C. nutans* in its native range 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 FNA for discussion). [= C, F, FNA9, G, II, K3, Pa, RAB, SE, Tn, Va, W; > *Carduus nutans* ssp. *macrolepis* – K1]

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 carnosus* Small (of c. peninsular FL). References: Correa, M.D. & R.L. Wilbur (1969); SE; DeLaney, K.R., N. Bissett, & J.D. Weidenhamer (1999); Nesom in FNA21 (2006c); Orzell, S.L. & E.L. Bridges (2002); Schilling (2011).

- 1 Heads small, the involucre 3.5-6 mm high, with 5-12 phyllaries; leaves without shining punctate glands (except punctate-glandular in *Litrisa carnosus*, of the FL peninsula).
 - 2 Stem glabrous; peduncles glabrous; inflorescence corymbiform *Trilisa odoratissima*
 - 2 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.
 - 3 Leaves linear, the widest 1-3 mm wide; [sw. GA west through the East Gulf Coastal Plain] *Carphephorus pseudoliatris*
 - 3 Leaves oblanceolate, the widest 7-40 mm wide; [se. VA south to Panhandle FL and FL peninsula].



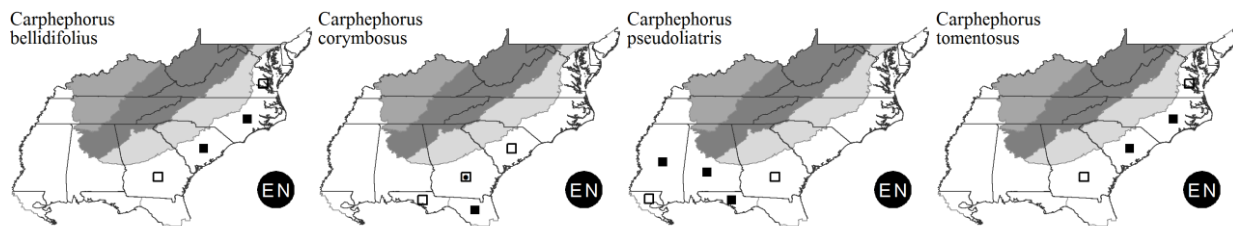
- 4 Stem glabrous or nearly so, the pubescence (if present) short and appressed; surfaces of the basal leaves glabrous; inflorescence corymbiform *Carphephorus bellidifolius*
- 4 Stem conspicuously spreading hirsute, at least on the lower part of the stem; surfaces of the basal leaves conspicuously pubescent to glabrous; inflorescence corymbiform or thyrsoid-paniculate.
 - 5 Stems, peduncles, phyllaries, and corollas eglandular; phyllaries glabrous on the back; phyllaries subacute to rounded, entire to erose; [se. SC south to Panhandle FL] *Carphephorus corymbosus*
 - 5 Stems, peduncles, phyllaries, and corollas gland-dotted; phyllaries viscid-pubescent on the back; phyllaries acute to subacute, entire; [se. VA south to e. GA] *Carphephorus tomentosus*

Carphephorus bellidifolius (Michaux) Torrey & A. Gray, Sandhill Chaffhead. Xeric sandy forests and woodlands, primarily in sandhills. Aug-Oct. Se. VA to extreme e. GA. The leaf apices are generally blunt, giving the leaves a nearly spatulate shape. Although often occurring with other species of *Carphephorus*, *C. bellidifolius* ranges into drier habitats than its congeners. [= C, Correa, M.D. & R.L. Wilbur (1969), F, FNA9, G, K1, K3, RAB, S, Schilling (2011), SE, Va]

Carphephorus corymbosus (Nuttall) Torrey & A. Gray, Flatwood Chaffhead. Wet flatwoods. Aug-Oct. Se. SC south to s. FL. This species was reported as far north as NC by Small (1933); Correa & Wilbur (1969) considered the northern limit of the species to be e. GA, but it is now known from Jasper County, SC. [= Correa, M.D. & R.L. Wilbur (1969), DeLaney, K.R., N. Bissett, & J.D. Weidenhamer (1999), FNA9, K1, K3, RAB, S, Schilling (2011), SE, WH3]

Carphephorus pseudoliatris Cassini, Lavender Lady. Seepage bogs, savannas, wet to moist pinelands. Sw. GA and FL Panhandle west to e. LA. [= Correa, M.D. & R.L. Wilbur (1969), DeLaney, K.R., N. Bissett, & J.D. Weidenhamer (1999), FNA9, GW2, K1, K3, S, Schilling (2011), WH3; = *Carphephorus pseudo-liatris* – SE]

Carphephorus tomentosus (Michaux) Torrey & A. Gray, Carolina Chaffhead. Savannas, flatwoods, and sandhills. Aug-Oct. Se. VA south to s. GA. The specific epithet is somewhat misleading; *C. tomentosus* is highly variable in its pubescence, ranging from glabrate to densely hirsute. [= C, Correa, M.D. & R.L. Wilbur (1969), FNA9, G, GW2, K1, K3, RAB, S, Schilling (2011), SE, Va; > *Carphephorus tomentosus* var. *tomentosus* – F; > *Carphephorus tomentosus* var. *walteri* – F]



Centaurea Linnaeus 1753 (Star-thistle, Knapweed)

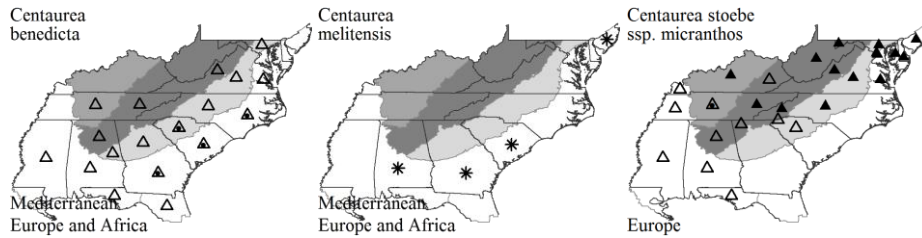
A genus of about 500 species, herbs, native of Eurasia and n. Africa. *Cyanus* is better separated at the generic level (Greuter 2003). References: Boršić, I. et al. (2011); SE; Greuter (2003a); Keil & Ochsmann in FNA19 (2006a).

- 1 Phyllaries evidently spine-tipped.
 - 2 Heads sessile, closely subtended and partially concealed by large foliar bracts *Centaurea benedicta*
 - 2 Heads obviously pedunculate, lacking large foliar bracts subtending the head. *Centaurea melitensis*
- 1 Phyllaries not spine-tipped.
 - 3 Plant an annual; flowers pale to medium blue, flowering Apr-Jun *Cyanus*
 - 3 Plant a perennial; flowers pink to purple, flowering Jun-Oct. *Centaurea stoebe* ssp. *micranthos*

* ***Centaurea benedicta*** (Linnaeus) Linnaeus, Blessed-thistle. Fields, roadsides, disturbed areas; native of Mediterranean Europe. Late Mar-Jun. [= FNA9, II, K3, RAB, Tn, Va, WH3; = *Cnicus benedictus* – C, F, G, K1, S, SE, W]

* ***Centaurea melitensis*** Linnaeus, Maltese Star-thistle. Waste areas near wool-combing mill, roadsides, disturbed areas; native of Mediterranean Europe. Jun-Sep. [= C, F, FNA9, G, II, K1, K3, S, SE]

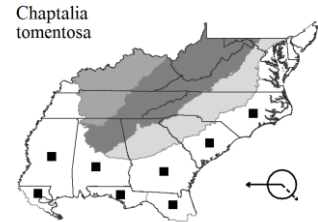
* ***Centaurea stoebe*** Linnaeus ssp. *micranthos* (S.G. Gmelin ex Gugler) Hayek, Spotted Knapweed, Bushy Knapweed. Roadsides, disturbed areas; native of Europe. Late Jun-Nov. [= FNA9, K3, Pa, Tn, Va, WH3; = *Centaurea biebersteinii* – K1; = *Centaurea maculosa* – C, F, G, RAB, SE, W; > II; > *Centaurea biebersteinii* – II]



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: SE; Nesom in FNA19 (2006a); Nesom, G.L. (1995a); Vuilleumier, B.S. (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.

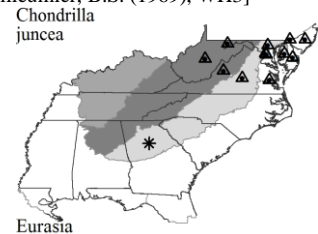


Chaptalia tomentosa Ventenat, Sunbonnets, Pineland Daisy, Night-nodding Bog-dandelion, Woolly Sunbonnets. Savannas, sandhill seeps, pine flatwoods. Dec (southwards)-May. E. NC south s. FL and west to e. TX; allegedly disjunct in Hispaniola (Acevedo-Rodríguez & Strong 2012). [= FNA9, GW2, K1, K3, Nesom, G.L. (1995a), RAB, S, SE, Vuilleumier, B.S. (1969), WH3]

Chondrilla Linnaeus 1753 (Skeleton-weed)

A genus of about 25 species, herbs, of temperate Eurasia. References: SE; Gottlieb in FNA19 (2006a).

* **Chondrilla juncea** Linnaeus, Skeleton-weed, Gum-succory. Cultivated fields, disturbed areas, roadsides; native of Eurasia. Jun-Sep. [= C, F, FNA9, G, Il, K1, K3, Pa, SE, Va]



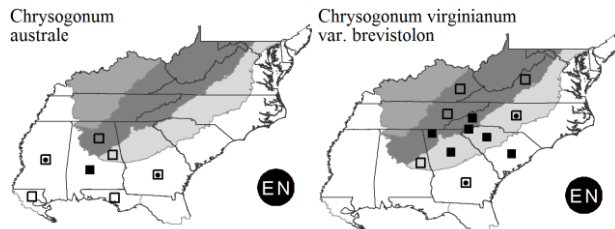
Chrysogonum Linnaeus 1753 (Green-and-gold)

A genus of 2 species and 3 taxa, perennial herbs, of se. North America. References: SE; Nesom in FNA21 (2006c); Nesom, G.L. (2001b).

- 1 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 virginianum** var. **brevistolon**
- 1 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. Moist to fairly dry woodlands and forests. Late Feb-early May. FL Panhandle and sc. and sw. GA west to e. LA. Genetic evidence suggests that this entity is better treated as a species than as a variety (E.E. Schilling, pers.comm., 2014). [= *Chrysogonum virginianum* var. *australe* – FNA9, K3, Nesom, G.L. (2001b), WH3; < S; < *Chrysogonum virginianum* var. *australe* – RAB, SE, W]

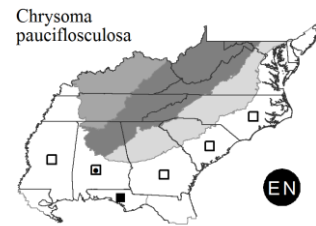
Chrysogonum virginianum Linnaeus var. **brevistolon** G.L. Nesom, Carolina Green-and-gold. Moist to fairly dry woodlands and forests. Late Mar-early Jun. Ne. SC, sc. NC, nw. NC, sw. VA, ne. TN, and se. KY south to e. GA, c. GA, and ec. AL. [= FNA9, K3, Nesom, G.L. (2001b), Tn, Va; < *Chrysogonum australe* – S; < *Chrysogonum virginianum* var. *australe* – RAB, SE, W]



Chrysoma Nuttall 1834 (Woody Goldenrod)

A monotypic genus, a shrub, of se. North America. References: SE; Nesom in FNA20 (2006b); Nesom, G.L. (2000b).

Chrysoma pauciflosculosa (Michaux) Greene, Woody Goldenrod. Coastal dunes, xeric sands of very barren, open, white-sand sandhills, fluvial dunes, and less commonly in driest habitats in the fall-line Sandhills. Late Jul-Oct. S. NC south to n. FL and west to s. MS. *Chrysoma* has a growth habit unlike any other shrub in our flora. 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. [= FNA9, K1, K3, S, SE, WH3; = *Solidago pauciflosculosa* – RAB]

*Chrysopsis* (Nuttall) Elliott 1823 (Golden-aster)

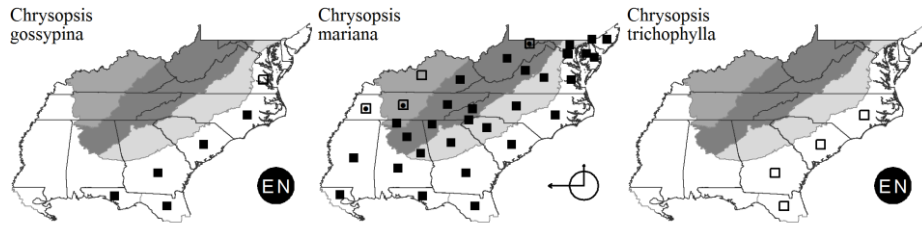
A genus of about 12-15 species, herbs, of se. North America, Mexico, and the Bahamas. This remains a difficult and rather poorly understood group. The appropriate taxonomic status of many of the entities remains unclear; for the moment, I am recognizing a number of entities at the specific level, the appropriate nomenclatural combinations not already available in all cases. References: SE; DeLaney, K.R., R.P. Wunderlin, & J.C. Semple (2003); Harms, V.L. (1974); Nesom, G.L. (2000b); Semple in FNA20 (2006b); Semple (1996); Semple, J.C. (1981).

- 1 Stem, leaves, and phyllaries sparsely to densely pubescent with spreading non-glandular hairs as well as 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. ***Chrysopsis mariana***
 - 2 Cypselas with 2-10 translucent, yellow to reddish brown, longitudinal ridges; phyllaries glabrous to densely pilose, and sometimes also stipitate-glandular.
 - 3 Mid and upper stem leaves distinctly pilose-ciliate along the margins. ***Chrysopsis gossypina***
 - 3 Mid and upper stem leaves not pilose-ciliate along the margins ***Chrysopsis trichophylla***

Chrysopsis gossypina (Michaux) Elliott, Cottonleaf Golden-aster. Sandhills, coastal dunes, other dry sandy places. Sep-Oct. Se. VA south to c. peninsular FL and sw. GA. 2n chromosome number=18. [= Va; < C, G, SE; >> *Chrysopsis arenicola* – S; > *Chrysopsis decumbens* – S; < *Chrysopsis gossypina* ssp. *gossypina* – FNA9, K3, Semple, J.C. (1981), WH3; > *Chrysopsis longii* – F; > *Chrysopsis pilosa* – S; < *Heterotheca gossypina* – Harms, V.L. (1974), RAB]

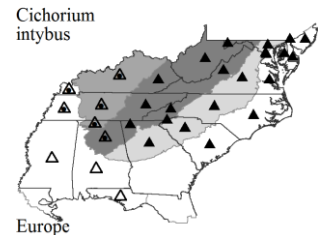
Chrysopsis mariana (Linnaeus) Elliott, Maryland Golden-aster. Dry forests and woodlands, roadsides, other dry habitats. Late Jun-Oct. Se. NY west to se. OH, c. KY, w. TN, south to c. peninsular FL and se. TX. As currently defined, *C. mariana* includes 2x (2n=8), 4x (2n=16), 6x (2n=24) and 8x (2n=32) 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 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. [= C, FNA9, G, K3, Pa, S, SE, Semple, J.C. (1981), Tn, Va, W, WH3; = *Heterotheca mariana* – Harms, V.L. (1974), RAB; > *Chrysopsis mariana* var. *macradenia* – F; > *Chrysopsis mariana* var. *mariana* – F]

Chrysopsis trichophylla (Nuttall) Elliott. Sandhills, sandy roadsides, coastal dunes. The taxon treated by many authors as *C. trichophylla* was reduced to a form by Semple (1981), as *C. gossypina* ssp. *gossypina* f. *trichophylla* (Nuttall) Semple. He suggests, though, that varietal status may be warranted. Plants in SC previously identified as *C. cruiseana* are referable to *C. trichophylla*. 2n chromosome number=18. [= SE; = *Heterotheca trichophylla* – RAB; > S; >> *Chrysopsis arenicola* – S; < *Chrysopsis gossypina* – C, G; < *Chrysopsis gossypina* ssp. *gossypina* – FNA9, K3, Semple, J.C. (1981), WH3; >> *Chrysopsis pilosa* – S; < *Heterotheca gossypina* – Harms, V.L. (1974)]



Cichorium Linnaeus 1753 (Chicory)

A genus of 7 species, herbs, of Europe and n. Africa. References: SE; Kiers, A.M. et al. (1999); Strother in FNA19 (2006a).



* **Cichorium intybus** Linnaeus, Chicory, Succory, Blue-sailors. Roadsides, fencerows, vacant lots, disturbed areas; native of Europe. Late May-Nov. The dried roasted root is used as a flavoring or substitute for coffee. See Anderson (2007) for FL record. [= C, F, FNA9, G, II, K1, K3, Kiers, A.M. et al. (1999), Pa, RAB, S, SE, Tn, Va, W, WH3]

Cirsium P. Miller 1754 (Thistle)

A genus of about 250 species, herbs, north temperate. References: SE; Keil in FNA19 (2006a).

- 1 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**
- 1 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].
 - 2 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**
 - 2 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. altissimum*).
 - 3 Heads immediately subtended by several spiny-toothed leaves (appearing as a leafy involucre); flowers yellow, white, or purple.
 - 4 Involucres more-or-less densely tomentose; stems densely tomentose; [of the Coastal Plain and Piedmont] **Cirsium horridulum var. horridulum**
 - 4 Involucres glabrous; stems glabrous or sparsely tomentose; [of the Coastal Plain] **Cirsium horridulum var. vittatum**
 - 3 Heads pedunculate (rarely with 1 or 2 reduced leaves below); flowers pink, purple, lavender, or white.
 - 5 Lower surface of the leaves densely white-tomentose beneath, this persistent and entirely obscuring the green surface.
 - 6 Heads 15-25 mm high; plants 4-15 dm tall; larger leaves < 5 cm wide.
 - 7 Cauline leaves mostly 10-25; plants flowering Apr-Jun; [of dry soils of the Piedmont] **Cirsium carolinianum**
 - 7 Cauline leaves mostly 30-70; plants flowering Aug-Oct; [of moist to dry soils of the Coastal Plain (and rarely the lower Piedmont in association with other Coastal Plain species, such as *Pinus palustris*)] **Cirsium virginianum**
 - 6 Heads 25-35 mm high; plants 10-40 dm tall; larger leaves usually > 5 cm wide.
 - 8 Leaves toothed or shallowly lobed **Cirsium altissimum**
 - 8 Leaves deeply pinnatifid **Cirsium discolor**
 - 5 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.
 - 9 Heads 15-25 mm high; plants 5-35 dm tall, usually much branched and with numerous heads **Cirsium nuttallii**
 - 9 Heads 25-50 mm high; plants 2-10 dm tall, usually strict or few-branched and with 1 or a few heads.
 - 10 Heads on well-developed peduncles; [of moist to wet pinelands of the Coastal Plain from NC and SC south] **Cirsium lecontei**
 - 10 Heads on short peduncles; [of various habitats, mostly inland from the Coastal Plain, or of dry pinelands of the Coastal Plain] **Cirsium repandum**

Cirsium altissimum (Linnaeus) Sprengel, Tall Thistle. Pastures, woodlands, thickets. Sep-Nov. MA west to ND, south to Panhandle FL (Jackson County) and TX. [= C, F, FNA9, G, II, K, Pa, S, SE, Tn, Va, W, WH3; = *Carduus altissimus* – RAB]

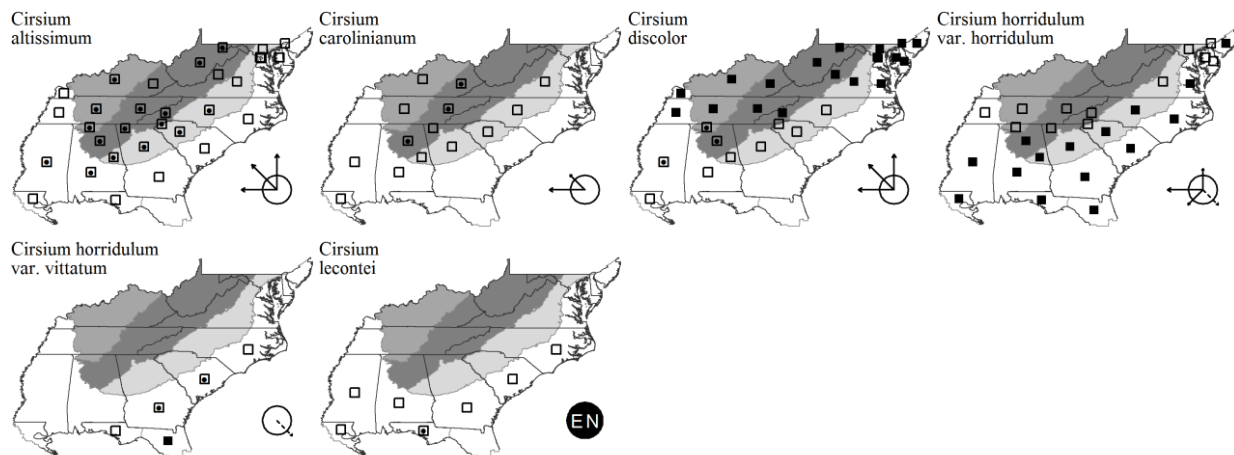
Cirsium carolinianum (Walter) Fernald & Schubert, Carolina Thistle, Spring Thistle. Prairies, open woodlands over mafic, ultramafic, or calcareous rocks. Apr-Jun (-Jul). N. VA west to s. OH and MO, south to w. SC, n. GA, AL, and TX. In our area, *C. carolinianum* seems to be restricted to prairies and 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. [= C, F, FNA9, G, II, K, SE, Tn, Va, W; = *Carduus carolinianus* – RAB; > *Cirsium flaccidum* – S; > *Cirsium virginianum* – S]

Cirsium discolor (Muhlenberg ex Willdenow) Sprengel, Field Thistle. Pastures, woodlands, thickets. Aug-Nov. QC west to MB, south to NC, MS, LA, and KS. [= C, F, FNA9, G, Il, K, Pa, S, SE, Tn, Va, W; = *Carduus discolor* – RAB]

Cirsium horridulum Michaux var. *horridulum*, Common Yellow Thistle, Bull Thistle. Roadsides, woodlands, pine savannas. Late Mar-early Jun. ME south to FL, west to TX, mostly on the Coastal Plain and adjacent provinces; also Mexico and Bahamas. [= C, FNA9, K, Pa, SE, Va; = *Carduus spinosissimus* – RAB; = *Cirsium horridulum* – S; < *Cirsium horridulum* – F, G, Tn, WH3; < *Cirsium horridulum* complex – GW2]

Cirsium horridulum Michaux var. *vittatum* (Small) R.W. Long, Southern Yellow Thistle, Pineland Thistle. Wet pine savannas. May-Jul. Se. NC south to s. peninsular FL and Panhandle FL; Bahamas; West Indies. [= FNA9; = *Carduus smallii* – RAB; < K, SE; < *Cirsium horridulum* – WH3; < *Cirsium horridulum* complex – GW2; > *Cirsium smallii* – S; > *Cirsium vittatum* – S]

Cirsium lecontei Torrey & A. Gray, LeConte's Thistle. Wet pine savannas, bogs. Jun-Aug. E. NC south to Panhandle FL, west to LA. [= FNA9, GW2, K, S, SE, WH3; = *Carduus lecontei* – RAB]



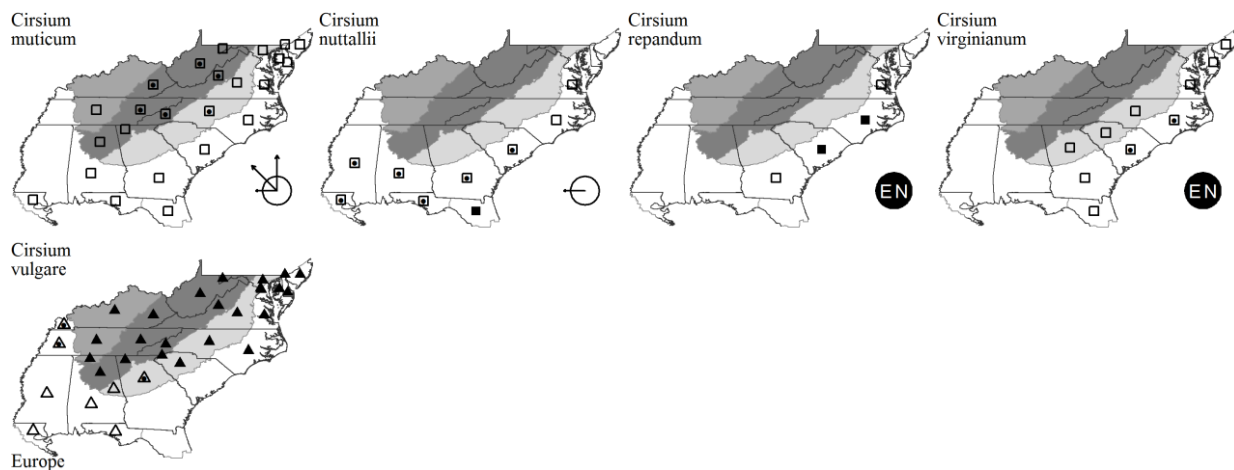
Cirsium muticum Michaux, Swamp Thistle. Swamps, wet thickets, woodlands, seepage slopes, wet prairies, meadows. Aug-Nov. NL (Newfoundland) west to SK, south to DE, NC, TN, and MO, and less commonly south to FL, AL (Diamond & Woods 2009), and TX. [= C, FNA9, G, GW2, Il, K, Pa, S, SE, Tn, Va, W, WH3; = *Carduus muticus* – RAB; > *Cirsium muticum* var. *muticum* – F]

Cirsium nuttallii A.P. de Candolle, Coastal Tall Thistle. Pine savannas, roadsides, pastures. Jun-Aug. Se. VA south to FL, west to LA; reported for the first time from NC (Krings, Westbrooks, & Lloyd 2002). [= C, F, FNA9, G, GW2, K, S, SE, Va, WH3; = *Carduus nuttallii* – RAB]

Cirsium repandum Michaux, Sandhill Thistle. Sandhills, other dry sandy habitats. May-Jul. Se. VA south to e. GA, nearly endemic to the Carolinas. Similar in distribution to *Vaccinium crassifolium*, *Carphephorus bellidifolius*, and *Baptisia cinerea*, which are all locally abundant endemic indicators of Carolina pinelands. [= C, FNA9, G, K, S, SE, Va; = *Carduus repandus* – RAB]

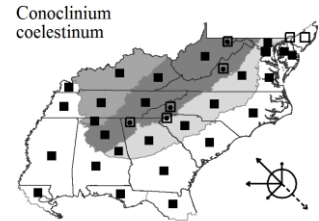
Cirsium virginianum (Linnaeus) Michaux, Virginia Thistle. Moist to fairly dry pine savannas, bogs. Aug-Oct. S. NJ south to ne. FL, on the Coastal Plain. [= C, F, FNA9, G, GW2, K, SE, Va, WH3; = *Carduus virginianus* – RAB; = *Cirsium revolutum* – S]

* *Cirsium vulgare* (Savi) Tenore, Bull Thistle. Meadows, pastures, and disturbed areas; native of Europe. Late Jun-Nov. [= C, F, FNA9, G, Il, K, Pa, SE, Tn, Va, W, WH3; < *Carduus lanceolatus* – RAB; < *Cirsium lanceolatum* – S]



Conoclinium A.P. de Candolle 1836 (Mistflower)

A genus of 4 species, of e. and c. North America extending into Mexico. References: Patterson & Nesom in FNA21 (2006c); Schmidt, G.J. & E.E. Schilling (2000).

***Conoclinium coelestinum*** (Linnaeus) A.P. de Candolle, Mistflower, Ageratum.

Streambanks, moist to wet disturbed areas, especially ditches, probably more common than formerly. Late Jul-Oct. 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. See Wooten & Clewell (1971) for further discussion of this species. [= FNA9, IL, K2, Tn, Va, WH3; = *Conoclinium coelestinum* – Pa; = *Eupatorium coelestinum* – C, F, G, RAB, SE, W, WV]

Conyza Lessing 1832 (Horseweed)

A genus of about 60 species, herbs, shrubs, and trees, of temperate, subtropical, and tropical regions. Recent molecular studies have indicated the likely polyphyly of *Conyza* and its close relationship with *Erigeron*; the ultimate circumscription of these genera is in doubt (Nesom 2000b, Noyes 2000). References: SE; Nesom, G.L. (2000b); Nesom, G.L. (2008b); Strother in FNA20 (2006b).

Unkeyed taxa:*Conyza floribunda*

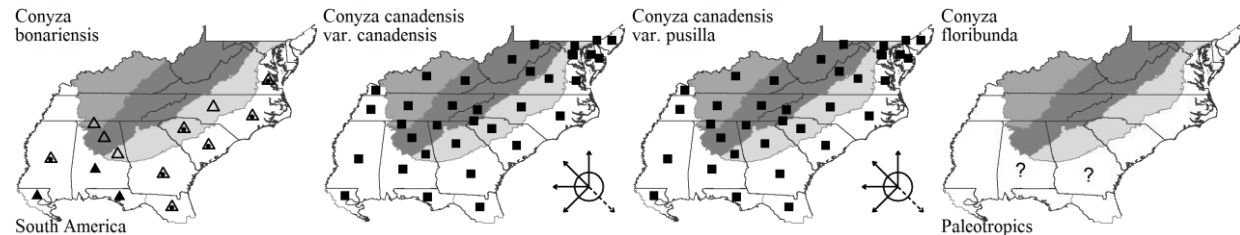
- 1 Involucre 4-6 mm high, densely pubescent; pistillate flowers (50-) 70-200 or more per head *Conyza bonariensis*
- 1 Involucre 3-4 mm high, glabrous or very sparsely pubescent; pistillate flowers mostly 25-45 per head.
 - 2 Stem coarsely spreading-hirsute; leaves ciliate, the larger generally with a few to many coarse teeth; phyllaries green-tipped *Conyza canadensis* var. *canadensis*
 - 2 Stem glabrous or with widely scattered, appressed hairs; leaves with a few cilia toward the base, generally entire; phyllaries purple-tipped *Conyza canadensis* var. *pusilla*

* ***Conyza bonariensis*** (Linnaeus) Cronquist, South American Horseweed. Fields, disturbed areas; apparently native of South America. Apr-Oct. Se. VA south into the tropics. [= C, FNA9, K2, SE, Va, WH3; = *Conyza floribunda* – G; = *Erigeron bonariensis* – F, RAB; > *Leptilon bonariense* – S; > *Leptilon linifolium* – S]

Conyza canadensis (Linnaeus) Cronquist var. *canadensis*, Common Horseweed. Old fields, disturbed areas, gardens. Jul-Nov. S. Canada south through nearly all of the United States to tropical America. [= C, G, Pa, SE, Va, W; = *Erigeron canadensis* – F; = *Erigeron canadensis* var. *canadensis* – RAB; = *Leptilon canadense* – S; < *Conyza canadensis* – FNA9, IL, K2, Tn, WH3; < *Erigeron canadensis* – WV]

Conyza canadensis (Linnaeus) Cronquist var. *pusilla* (Nuttall) Cronquist, Southern Horseweed. Dunes, old fields, disturbed areas. (May-) Jul-Dec. Se. MA and CT west to s. IN, south to FL and TX, and south into tropical America. [= C, G, Pa, SE, Va, W; = *Conyza parva*; = *Erigeron canadensis* var. *pusillus* – RAB; = *Erigeron pusillus* – F; = *Leptilon pusillum* – S; < *Conyza canadensis* – FNA9, K2, Tn, WH3]

* ***Conyza floribunda*** Kunth. Reported as introduced in GA, AL, and MS by Kartesz (1999), probably on the basis of confusion with *C. bonariensis*. {rejected; not keyed; not mapped}. [= FNA9, K2]

***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: SE; Sherff, E.E. & E.J. Alexander (1955); Smith (1976); Sorrie, B.A., R.J. LeBlond, & A.S. Weakley (2013); Strother in FNA21 (2006c).

Unkeyed taxa:

Coreopsis pubescens var. *debilis*

Coreopsis pulchra

Coreopsis tinctoria var. *atkinsoniana*

- 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).
 - 4 Ray flowers pink (white); plant rhizomatous *Coreopsis rosea*
 - 4 Ray flowers yellow; plant fibrous-rooted.
 - 5 Leaf blades ovate (to elliptical), very gradually reduced upward, margins ciliolate, surfaces lacking tiny dark dots; achenes about 5 mm long; [se. SC south to Panhandle FL] *Coreopsis integrifolia*
 - 5 Leaf blades linear-oblongate to linear, rapidly reduced upward, margins glabrous, surfaces with numerous tiny dark dots (easiest to see on undersurface); achenes < 2.5 mm long; [se. VA south to ne. and Panhandle FL, west to e. TX] *Coreopsis linifolia*
 - 3 All of the major cauline leaves alternate.
 - 6 Ray flowers pink; leaves juncoide (linear-terete) *Coreopsis nudata*
 - 6 Ray flowers yellow; leaves with an expanded blade.
 - 7 Basal/lower leaves (at least 4 nodes) absent at anthesis; mid-cauline leaves broadly (to narrowly) elliptical; achene awns 0.2-1.0 mm long; flowering Sep-Oct; [swamp forests and streamside openings, fresh-tidal creek margins]; [from se. NC south to n. FL] *Coreopsis palustris*
 - 7 Basal/lower leaves present at anthesis; leaves rapidly reduced upward such that mid-cauline leaves are narrow or slender; achene awns 0.5-1.5 mm long; flowering early May-early Nov; [wet savannas, seepage slopes, pitcher-plant bogs, streamhead ecotones, pocosin ecotones]; [collectively more widespread].
 - 8 Leaves (at least one major leaf per plant) with 1-few slender auricles near base (rarely no auricled leaves present or at least readily visible); achene wing broad, >3/4 width of achene body; achene awns averaging 0.5 mm; leaf texture firm but not thick and leathery; flowering early May-early Jul; [se. VA south to e. GA] *Coreopsis falcata*
 - 8 Leaves without auricles; achene wing narrow, < 1/2 the width of the achene body; achene awns averaging 1.5 mm long; leaf texture thick and leathery; flowering mid Aug-early Nov; [se. NC south to c. FL and west to s. MS; also rarely inland in GA, NC, SC, off the Coastal Plain] *Coreopsis gladiata*
 - 1 Disk flowers with 5 corolla lobes and 5 anthers; ray flowers apically entire, or with (2-) 4-5 teeth.
 - 9 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.
 - 10 Leaves all simple, 4-12 cm wide, the margins coarsely serrate (some of the lower leaves sometimes pinnately lacerate basally); [section *Silphidium*] *Coreopsis latifolia*
 - 10 Leaves simple, usually (but not always) some of the leaves on a plant with basal auricles or lobes, the leaf blades (or terminal leaflets) 0.5-3.5 cm wide, the margins entire; [section *Coreopsis*].
 - 11 Stems with (5-) 6-12 nodes between the first node > 1 cm above the basal leaves and the first head.
 - 12 Leaf blades (or terminal leaflets) more or less broadly elliptical, ca. 1.5-4 cm wide, acute; stem (and often also the leaves) rather densely hairy (to glabrate) *Coreopsis pubescens* var. *pubescens*
 - 12 Leaf blades (or terminal leaflets) narrowly elliptical to oblanceolate, ca. 0.6-2 cm wide, acuminate; stem and leaves glabrous *Coreopsis pubescens* var. *robusta*
 - 11 Stems with 1-5 (-8) nodes between the first node > 1 cm above the basal leaves and the first head.
 - 13 Annual; rays yellow, with a red-brown or purple blaze or spotting near the base. *Coreopsis basalis*
 - 13 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.
 - 14 Plants spreading by elongate stolons; leaf blades (or terminal leaflets) 1-2.2× as long as wide *Coreopsis auriculata*
 - 14 Plants lacking stolons; leaf blades (or terminal leaflets) > 3× as long as wide (basal leaves sometimes broader). *Coreopsis lanceolata*
 - 9 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.
 - 15 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*].
 - 16 Leaves palmately 3-foliate (rarely simple or 3-foliate with the middle leaflet 2- or 3-lobed), the total number of leaflets or divisions thus 3 (-5), the middle leaflet of median leaves 5-30 mm wide *Coreopsis major*
 - 16 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.
 - 17 Leaflets usually lobed (rarely simple), the total number of leaflets or divisions (3-) 5-11 (-15) per leaf, the segments of median leaves (1.5-) 2-7 (-9) mm wide *Coreopsis delphinifolia*
 - 17 Leaflets pinnatifid, the total number of leaflets or divisions 11-25 or more per leaf, the segments of median leaves 0.2-1.2 mm wide *Coreopsis verticillata*
 - 15 Leaves, at least the lower, distinctly petioled on petioles 5-50 mm or more long.
 - 18 Ray flowers not toothed terminally (or rarely with a few with inconspicuous and irregular teeth); mid-cauline leaves palmately 3-foliate, the terminal leaflet sometimes again 3-5-foliate (sometimes giving an appearance of a pinnately 5-7-foliate leaf), the leaflets 6-35 mm wide, 3-15× as long as wide; [section *Gyrophyllum*] *Coreopsis tripteris*

- 18 Ray flowers apically with (2-) 4-5 teeth; mid-cauline leaves pinnately 5-11-foliate, 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*].
- 19 Disk flowers reddish; ray flowers usually with a basal red mark; leaflets of mid-cauline leaves 3-15 mm wide and about 1-3× as long as wide *Coreopsis basalis*
- 19 Disk flowers yellow; ray flowers yellow; leaflets of mid-cauline leaves 0.5-6 (-10) mm wide and > 10× as long as wide.
- 20 Achene wings fimbriate; [of granitic outcrops of the Piedmont of GA and AL] *Coreopsis grandiflora* var. *saxicola*
- 20 Achene wings entire; [collectively more widespread].
- 21 Larger divisions of midstem and upper stem leaves 2-6 (-10) mm wide *Coreopsis grandiflora* var. *grandiflora*
- 21 Larger divisions of midstem and upper stem leaves 0.5-1.5 mm wide *Coreopsis grandiflora* var. *harveyana*

Coreopsis auriculata Linnaeus, Lobed Coreopsis. Moist slopes and woodlands. Apr-Jun. C. and ne. VA, s. WV, and KY south to MS, AL, and GA. [= C, F, FNA9, G, K, RAB, S, SE, Sherff, E.E. & E.J. Alexander (1955), Smith (1976), Tn, Va, W, WV]

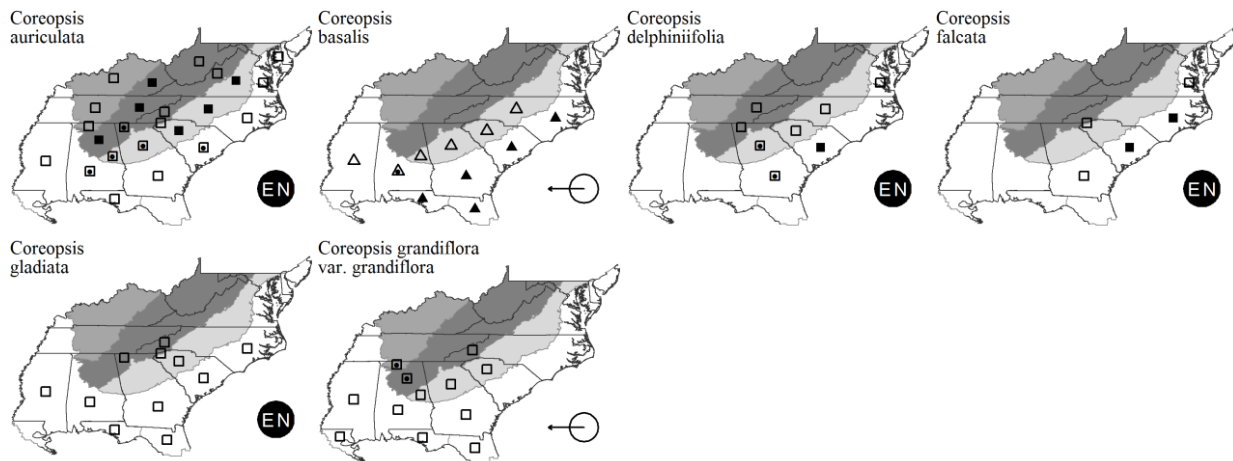
* *Coreopsis basalis* (A. Dietrich) Blake, Texas Coreopsis. Sandy roadsides and fields; native of farther west. May-Jul. Probably native only to e. TX, now distributed across the Coastal Plain from TX east to FL and north to NC. [= C, F, FNA9, G, IL, K, RAB, SE, Smith (1976), WH3; > *Coreopsis basalis* var. *basalis* – Sherff, E.E. & E.J. Alexander (1955)]

Coreopsis delphinifolia Lamarck, Larkspur Coreopsis. Dry woodlands. May-Jul. The species ranges from e. VA and s. NC south to c. GA, and se. TN (Polk County) (Chester, Wofford, & Kral 1997), and reputedly AL. Smith (1976) indicates that the species is an allopolyploid derivative (at 4×, 6×, and 8×) of *C. major*, *C. tripteris*, and *C. verticillata*. Its range extends south well beyond the range of *C. verticillata*. [= FNA9, K, Tn, Va; = *Coreopsis* × *delphinifolia* – Smith (1976); = *Coreopsis delphinifolia* – F, G, S, SE; > *Coreopsis delphinifolia* var. *chloodea* – Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis delphinifolia* var. *delphinifolia* – Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis major* var. *linearis* – Sherff, E.E. & E.J. Alexander (1955); < *Coreopsis major* var. *stellata* – RAB]

Coreopsis falcata Boynton, Pool Coreopsis. Peat bogs, very wet savannas, ditches and borrow pits in savannas. Early May-early Jul (rarely later, perhaps in response to growing season fire). The species is endemic to the Coastal Plain of se. VA (City of Chesapeake), e. NC, e. SC, and e. GA; disjunct in Oconee County, SC. First reported for VA by Wieboldt et al. (1998). *C. falcata* should not be included (as by Cronquist in C and SE) in *C. gladiata*; the two species are distinctive in ecological preferences, morphology, phenology, and distribution. [= GW2, K, RAB, S, Sherff, E.E. & E.J. Alexander (1955), Smith (1976), Sorrie, B.A., R.J. LeBlond, & A.S. Weakley (2013), Va; < *Coreopsis gladiata* – FNA9, WH3; < *Coreopsis gladiata* var. *gladiata* – C, SE]

Coreopsis gladiata Walter, Swamp Coreopsis. Swamp forests. Mid-Aug-early Nov. Se. NC south to c. FL and west to s. MS; scattered inland as a disjunct in montane (and sometimes uppermost piedmontane) NC, SC, and GA. See *C. palustris* and *C. linifolia* for further discussion of the taxonomy of this group of species. [= RAB, S, Smith (1976), Sorrie, B.A., R.J. LeBlond, & A.S. Weakley (2013); < FNA9, GW2, K, WH3; > Sherff, E.E. & E.J. Alexander (1955); < *Coreopsis gladiata* var. *gladiata* – C, G, SE; ? *Coreopsis linifolia* – W; > *Coreopsis longifolia* var. *godfreyi* – Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis longifolia* var. *longifolia* – Sherff, E.E. & E.J. Alexander (1955)]

* *Coreopsis grandiflora* Hogg ex Sweet var. *grandiflora*, Large-flowered Coreopsis. In thin soils of rock outcrops, especially granitic flatrocks. Late May-late Jun. 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). [= F, IL, K, Smith (1976); < C, SE; > Sherff, E.E. & E.J. Alexander (1955); < *Coreopsis grandiflora* – FNA9, G, RAB, S, W, WH3; > *Coreopsis grandiflora* var. *pilosa* – Sherff, E.E. & E.J. Alexander (1955)]



* *Coreopsis grandiflora* Hogg ex Sweet var. *harveyana* (A. Gray) Sherff, Large-flowered Coreopsis. Disturbed areas; native of farther west. Late May-late Jun. As treated by Smith (1976), the species consists of 4 varieties. 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. Var. *longipes* (Hooker) Torrey & Gray is endemic to e. TX. See Crawford & Smith (1984) for additional discussion of the varieties. [= F, IL, K, Sherff, E.E. & E.J. Alexander (1955), Smith (1976), Va; < *Coreopsis grandiflora* – FNA9, G, RAB, S, Tn, W, WH3, WV; < *Coreopsis grandiflora* var. *grandiflora* – C, SE]

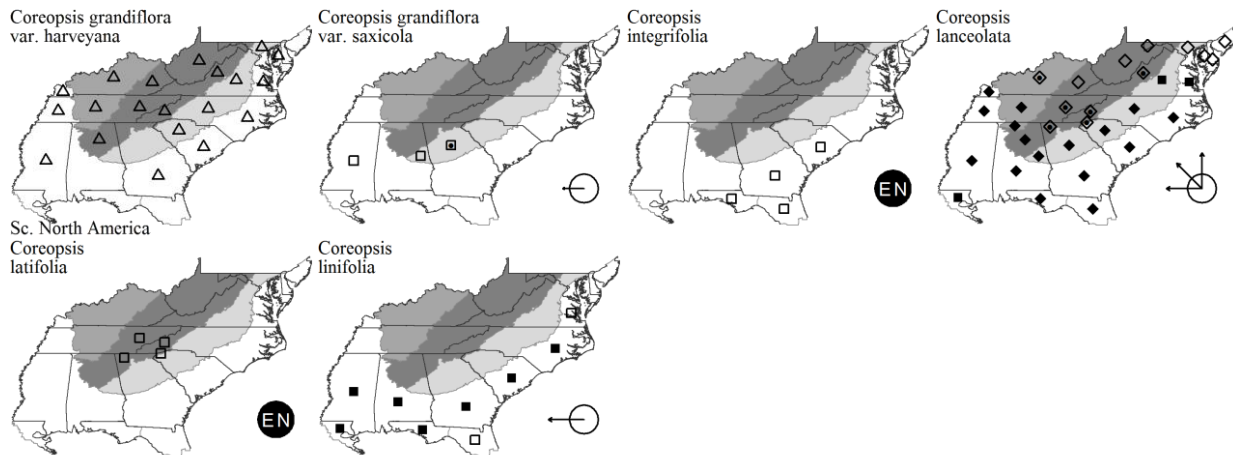
***Coreopsis grandiflora* Hogg ex Sweet var. *saxicola* (Alexander) E.B. Smith**, Stone Mountain Coreopsis. Granitic outcrops. As interpreted by Smith (1976) and Cronquist (1980), this variety is endemic to granite outcrops in c. GA and ec. AL and to sandstone outcrops in nc. AR; the AR plants, differing in morphology, phenology, karyotype, and distribution, may well warrant separate status. [= K, SE, Smith (1976); = *Coreopsis saxicola* – S; < *Coreopsis grandiflora* – FNA9; > *Coreopsis saxicola* var. *duncanii* – Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis saxicola* var. *saxicola* – Sherff, E.E. & E.J. Alexander (1955)]

***Coreopsis integrifolia* Poiret**, Chipola Dye-flower. Banks and floodplains of small blackwater streams (especially over limestone), edges of swamp forests bordering longleaf pinelands or bordering brackish marshes. Mid Aug-early Nov. Se. SC south to FL Panhandle, apparently uncommon throughout its range. It is related to *C. palustris* and *C. linifolia*; the leaves are cauline and opposite, the petioles are ciliate. [= FNA9, GW2, K, S, SE, Sherff, E.E. & E.J. Alexander (1955), Smith (1976), Sorrie, B.A., R.J. LeBlond, & A.S. Weakley (2013), WH3]

* ***Coreopsis lanceolata* Linnaeus**, Longstalk Coreopsis. Disturbed areas. Apr-Jun. 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. The distinction of *C. lanceolata* (= *C. lanceolata* var. *lanceolata*) from *C. crassifolia* (= *C. lanceolata* var. *villosa*) needs additional study. [= C, FNA9, K, Pa, RAB, SE, Smith (1976), Tn, Va, W, WH3, WV; > IL, S; > *Coreopsis crassifolia* – IL, S; > *Coreopsis heterogyna* – F; > *Coreopsis lanceolata* var. *lanceolata* – Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis lanceolata* var. *villosa* – F, G, Sherff, E.E. & E.J. Alexander (1955)]

***Coreopsis latifolia* Michaux**, Broadleaf Coreopsis. In rich, moist, cove forests and slopes at medium elevations, primarily from 500 m in the Blue Ridge Escarpment to nearly 1500 m, often locally abundant. (Jul-) Aug-Sep. A Southern Appalachian endemic: sw. NC and se. TN (Polk County) (Chester, Wofford, & Kral 1997) south into nw. SC and ne. GA. This species is treated by Smith (1976) in a monotypic section (section *Silphidium*) of *Coreopsis*, and, indeed, it does not closely resemble our other species. Smith (1976) considered it a primitive species, with its closest relatives in Mexico, and all of his attempts to hybridize it with other Southeastern *Coreopsis* failed. Flowering appears to be triggered by canopy tree-fall light gaps. It often occurs with *Helianthus glaucophyllus*. [= FNA9, K, RAB, S, SE, Sherff, E.E. & E.J. Alexander (1955), Smith (1976), Tn, W; = *Leiodon latifolius*]

***Coreopsis linifolia* Nuttall**, Savanna Coreopsis. Savannas, sandhill seeps, sandhill-pocosin ecotones. Early Jul-late Oct. Se. VA south to ne. and Panhandle FL, west to e. TX. 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. 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 typical variety of *C. gladiata*. The abundant morphologic, phenologic, and ecologic differences between *C. gladiata*, *C. linifolia*, and *C. falcata* render such an approach undesirable. [= GW2, K, Sherff, E.E. & E.J. Alexander (1955), Smith (1976), Sorrie, B.A., R.J. LeBlond, & A.S. Weakley (2013), Va, WH3; = *Coreopsis angustifolia* – RAB; = *Coreopsis gladiata* var. *linifolia* – C, G, SE; < *Coreopsis gladiata* – FNA9; > *Coreopsis oniscicarpa* var. *oniscicarpa* – F; > *Coreopsis oniscicarpa* var. *simulans* – F]



* ***Coreopsis major* Walter**, Woodland Coreopsis. Dry woodlands, forests, longleaf pine sandhills, roadsides, May-Jul. W. VA, WV, s. OH, and KY south to GA, FL Panhandle, s. AL, s. MS, and se. LA; disjunct in w. LA. How to treat the "*Coreopsis major* complex" (here including *C. major*, *C. delphiniifolia*, and *C. verticillata*) is not clear. 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. [= FNA9, K1, K3, S, Smith (1976), Tn, Va, WH3; > *Coreopsis major* var. *major* – C, F, G, RAB, SE, Sherff, E.E. & E.J. Alexander (1955), W; > *Coreopsis major* var. *rigida* – C, F, SE, Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis major* var. *stellata* – F, G, RAB, Sherff, E.E. & E.J. Alexander (1955), WV]

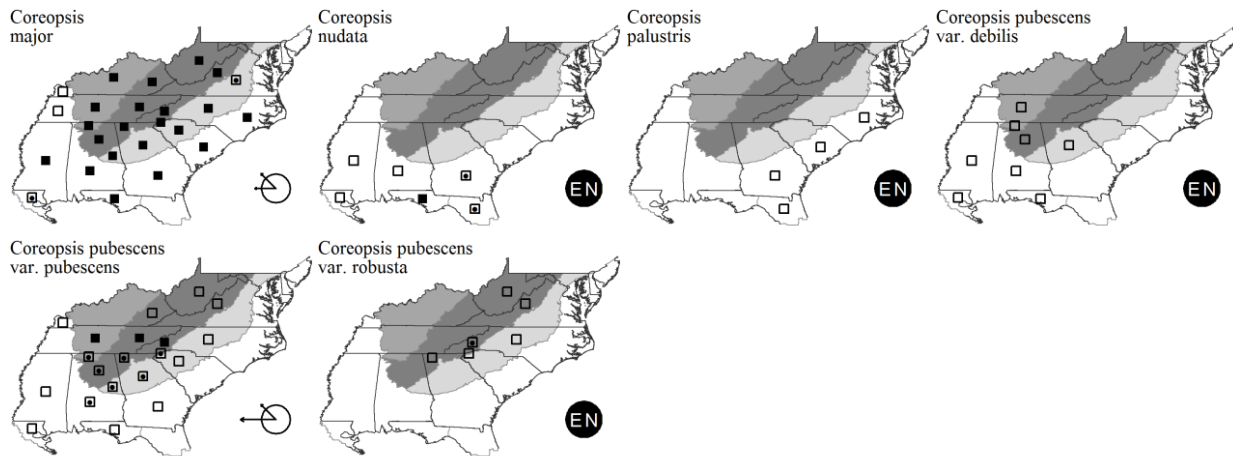
***Coreopsis nudata* Nuttall.** Seasonally flooded pineland depressions, either herbaceous-dominated or under a canopy of *Taxodium ascendens*. Mar-Apr. E. GA (in close proximity to SC) south to ne. FL and Panhandle FL, west to e. LA. [= FNA9, GW2, K, S, SE, Sherff, E.E. & E.J. Alexander (1955), Smith (1976), Sorrie, B.A., R.J. LeBlond, & A.S. Weakley (2013), WH3]

***Coreopsis palustris* Sorrie, Beadle's Coreopsis.** Swamp forests, swamp edges, borrow pits; rare. Sep-Oct. Se. NC south to ne. FL (records outside this area, so far as is known, all represent misidentifications. The validity of this taxon has been controversial, and its nomenclature also difficult; see Weakley et al. (2011). Smith (1976) includes it in *C. gladiata*, considering it merely a pubescent form. Cronquist (in SE) regards it as distinct at the species level, despite his serious over-lumping of all its close relatives into a single species with two varieties: *C. gladiata* var. *gladiata* (including *C. falcata* and *C. gladiata*), and var. *linifolia* (including *C. oniscicarpa* and *C. linifolia*). [= Sorrie, B.A., R.J. LeBlond, & A.S. Weakley (2013); = *Coreopsis helianthoides* – RAB, S, SE, Sherff, E.E. & E.J. Alexander (1955), Smith (1976); < *Coreopsis gladiata* – FNA9, GW2, K, WH3]

***Coreopsis pubescens* Elliott var. *debilis* (Sherff) E.B. Smith.** {habitat}. C. TN south through AL and ne. MS to w. FL, s. AL, s. MS, and se. LA; it has very narrow leaf blades or terminal leaflets. {not yet keyed}. [= GW2, K, Smith (1976); > *Coreopsis cornicularis* – Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis debilis* – Sherff, E.E. & E.J. Alexander (1955); < *Coreopsis pubescens* – FNA9, S, SE, Tn]

***Coreopsis pubescens* Elliott var. *pubescens*, Common Hairy Coreopsis.** Forests, woodlands, and rock outcrops. Jul-Sep. 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. [= F, GW2, K, Sherff, E.E. & E.J. Alexander (1955), Smith (1976); < *Coreopsis pubescens* – C, FNA9, G, IL, RAB, S, SE, Va, W, WH3, WV]

***Coreopsis pubescens* Elliott var. *robusta* Gray ex Eames, Mountain Hairy Coreopsis.** Rocky slopes, glades, edges of rock outcrops. Jul-Sep. Var. *robusta* is a Southern Appalachian endemic, known from sw. VA, w. NC, nw. SC, n. GA, e. TN, and c. AL. [= F, GW2, K, Sherff, E.E. & E.J. Alexander (1955), Smith (1976); < *Coreopsis pubescens* – C, FNA9, G, RAB, S, SE, Va, W, WV]



***Coreopsis pulchra* F.E. Boynton, Lookout Mountain Coreopsis.** Sandstone outcrops and adjacent woodlands. Endemic to ne. AL (reports from GA are apparently unsubstantiated). {not yet keyed}. [= FNA9, K, S, SE, Sherff, E.E. & E.J. Alexander (1955), Smith (1976)]

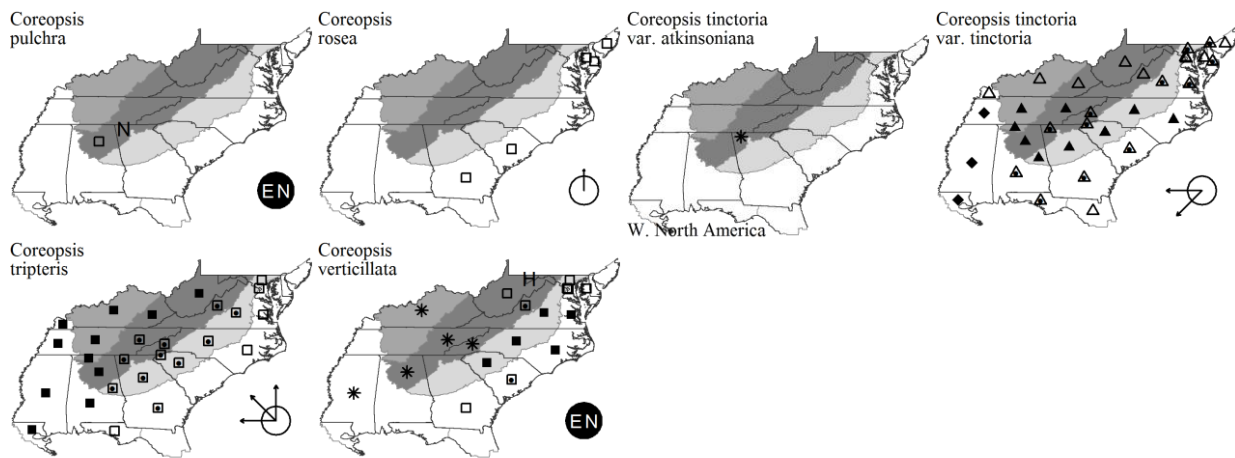
***Coreopsis rosea* Nuttall.** Upland depression ponds in the Inner Coastal Plain, drawdown zones on banks of blackwater rivers in the Outer Coastal Plain. Jul-Sep. Coastal Plain of s. NS, MA, RI, NY (Long Island), NJ, PA (Rhoads & Block 2007), DE, MD, e. SC, and e. GA, where it occurs on shores with fluctuating water levels, primarily on Coastal Plain pond shores, but also on river banks. It occurs in Horry County, SC, in the drawdown zone on the banks of the Waccamaw River; it should be sought in NC. The only other pink-rayed species in our flora is *C. nudata*, which ranges in the Coastal Plain from GA west to e. LA and has terete "juncooid" leaves. [= FNA9, GW2, K, Pa, S, SE, Sherff, E.E. & E.J. Alexander (1955), Smith (1976), Sorrie, B.A., R.J. LeBlond, & A.S. Weakley (2013)]

* ***Coreopsis tinctoria* Nuttall var. *atkinsoniana* (Douglas ex Lindley) H.M. Parker ex E.B. Smith.** Roadsides; apparently introduced eastward in nw. GA from a distribution in w. North America. [= K; = *Coreopsis atkinsoniana* – Y]. {not yet keyed, Y}. {not yet keyed; synonymy incomplete, synonymy incomplete}[= K; < *Coreopsis tinctoria* – FNA9, FNA9, SE, SE]

* ***Coreopsis tinctoria* Nuttall var. *tinctoria***, Calliopsis, Plains Coreopsis. Roadsides and other disturbed places; probably introduced from farther west. Var. *tinctoria* was apparently widespread in the Great Plains, now distributed nearly throughout North America. Var. *similis* (Boynton) H.M. Parker ex E.B. Smith is endemic to s. TX and adjacent Tamaulipas and Nuevo León. [= C, K, Smith (1976), Va; > Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis cardaminefolia* – RAB, S, Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis stenophylla* – Sherff, E.E. & E.J. Alexander (1955); < *Coreopsis tinctoria* – FNA9, G, GW2, Pa, SE, Tn, W, WH3, WV; > *Coreopsis tinctoria* – RAB, S]

***Coreopsis tripteris* Linnaeus**, Tall Coreopsis. Bottomland forests, riverside scours, other rich, moist woodlands and woodland borders, primarily over calcareous or mafic rocks or on nutrient-rich alluvium. Jul-early Sep. MA, s. ON, and WI south to Panhandle FL and TX. [= C, FNA9, G, GW2, K, Pa, RAB, S, SE, Smith (1976), Tn, Va, W, WH3, WV; > *Coreopsis tripteris* var. *deamii* – F, Il; > *Coreopsis tripteris* var. *intercedens* – F, Il, Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis tripteris* var. *smithii* – F, Sherff, E.E. & E.J. Alexander (1955); > *Coreopsis tripteris* var. *tripteris* – F, Il, Sherff, E.E. & E.J. Alexander (1955)]

* ***Coreopsis verticillata* Linnaeus**, Threadleaf Coreopsis. Dry sandy, rocky, or clayey woodlands and woodland borders. May-Jul. 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. The finely-divided leaves are attractive and the plant is cultivated horticulturally; scattered occurrences outside the ranges indicated above are escapes from cultivation. [= C, F, FNA9, G, K, RAB, S, SE, Sherff, E.E. & E.J. Alexander (1955), Smith (1976), Va, W, WV]



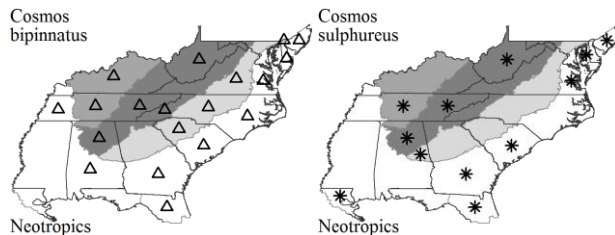
Cosmos Cavanilles 1791 (*Cosmos*)

A genus of about 26 species, of tropical, subtropical, and warm temperate America. References: SE; Kiger in FNA21 (2006c); Sherff, E.E. & E.J. Alexander (1955).

- 1 Rays pink or white; ultimate leaf segments mostly ca. 1 mm wide or less *Cosmos bipinnatus*
 1 Rays orange, yellow, or red; ultimate leaf segments mostly > 2 mm wide *Cosmos sulphureus*

* ***Cosmos bipinnatus* Cavanilles**, Common Cosmos. Garden edges, roadsides, disturbed areas, commonly cultivated, sometimes escaped; native of Mexico. (May-) Aug-Nov. [= C, F, FNA9, G, Il, K, Pa, RAB, S, SE, Tn, WH3, WV; > *Cosmos bipinnatus* var. *bipinnatus* – Sherff, E.E. & E.J. Alexander (1955)]

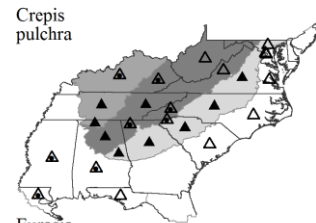
* ***Cosmos sulphureus* Cavanilles**, Orange Cosmos. Garden edges, roadsides, disturbed areas; commonly cultivated, rarely escaped, native of tropical America. Aug-Nov. [= C, F, FNA9, G, Il, K, Pa, S, SE, WH3; > *Cosmos sulphureus* var. *sulphureus* – Sherff, E.E. & E.J. Alexander (1955)]



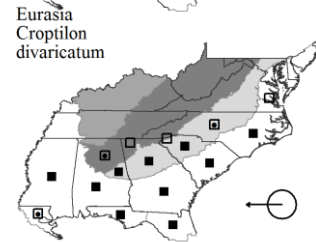
Crepis Linnaeus 1753 (Hawksbeard)

A genus of about 200 species, herbs, of the Northern Hemisphere, South America, and southern Africa. References: Bogler in FNA19 (2006a); SE.

* *Crepis pulchra* Linnaeus, Smallflower Hawksbeard. Roadsides, fields, disturbed areas; native of Eurasia. Late Apr-Jul. [= C, F, FNA9, G, Il, K, RAB, SE, Tn, Va, W, WH3, WV]

*Croptilon* Rafinesque 1837 (Scratch-daisy)

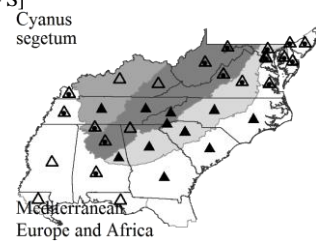
A genus of 3 species, herbs, of s. North America. References: Correll & Johnston (1970); SE; Nesom in FNA20 (2006b); Nesom, G.L. (2000b); Smith, E.B. (1981).



Croptilon divaricatum (Nuttall) Rafinesque, Scratch-daisy. Sandy soils of fields, roadsides, and sandhill woodlands. Aug-Nov. Se. VA south to c. peninsular FL and west to c. TX, inland to se. OK and s. AR. [= FNA9, K1, K3, Va, WH3; = *Haplopappus divaricatus* – C, F, G, RAB, SE, W; = *Isopappus divaricatus* – S]

Cyanus P. Miller 1754 (Cornflower, Bachelor's-buttons)

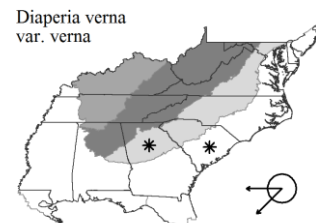
A genus of about 30 species, herbs, native of Eurasia and n. Africa. *Cyanus* is better separated at the generic level (Greuter 2003). References: Boršič, I. et al. (2011); SE; Greuter (2001, 2003a); Keil & Ochsmann in FNA19 (2006a).



* *Cyanus segetum* Hill, Cornflower, Bachelor's-buttons. Roadsides, disturbed areas; native of Mediterranean Europe. Apr-Sep. [= *Centaurea cyanus* – C, F, FNA9, G, Il, K, Pa, RAB, S, SE, Tn, Va, W, WH3]

Diaperia Nuttall 1840 (Dwarf Cudweed)

A genus of 3 species, annual herbs, of c. United States and n. Mexico. References: Anderberg, A.A. (1991); Arriagada, J.E. (1998); SE; Morefield in FNA19 (2006a).



* *Diaperia verna* (Rafinesque) Morefield var. *verna*, Cotton-rose, Poverty-weed. Disturbed areas, waste areas around wool-combing mill; introduced from farther south and west (Nesom 2004d). Early Mar-late Jun. [= FNA9; = *Filago verna* – Anderberg, A.A. (1991), Arriagada, J.E. (1998); ? *Evax multicaulis* – SE; ? *Evax verna* var. *verna* – K; ? *Filaginopsis nivea* – S]

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), and Noyes & Rieseberg (1999). References: Brouillet, L. et al. (2009); SE; Nesom, G.L. (1993d); Nesom, G.L. (2000b); Semple & Chmielewski in FNA20 (2006b); Semple, J.C., J.G. Chmielewski, & C. Leeder (1991).

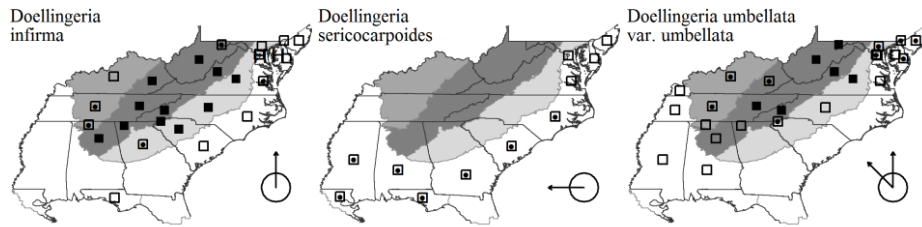
- 1 Inflorescence branches flexuous, bractless or with a few very small bracts; heads 3-40 (-67) per plant; cypselas glabrous; plants with stems solitary or several from a crown, to 11 dm tall; [plants of upland dry to submesic habitats, typically glades, barrens, and dry to dry-mesic woodlands] *Doellingeria 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. Woodland borders, dry or dry-mesic woodlands, glades. Late Jun-Sep. MA west to KY, south to SC, GA, Panhandle FL

(Gadsden County), AL, and wc. TN. [= FNA9, K, Nesom, G.L. (1993d), Pa, S, Tn, Va, WH3; = *Aster infirmus* – C, G, RAB, SE, Semple, J.C., J.G. Chmielewski, & C. Leeder (1991), W]

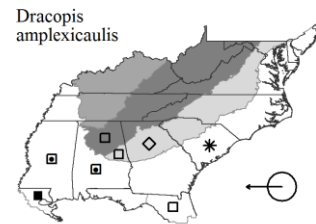
Doellingeria sericocarpoides Small, Pocosin Flat-topped Aster, Southern Flat-topped Aster, Southern Tall Flat-topped Aster. Peaty soils of sandhill ecotones and streamhead pocosins, other acidic seeps and swamps. Late Jul-Oct. S. NJ south to ne. FL and Panhandle FL, west to MS and se. LA; also in the West Gulf Coastal Plain of w. LA, AR, se. OK, and e. TX. [= FNA9, K, Nesom, G.L. (1993d), WH3; = *Aster sericocarpoides* – SE, Semple, J.C., J.G. Chmielewski, & C. Leeder (1991); = *Aster umbellatus* var. *brevisquamus* – RAB; = *Aster umbellatus* var. *latifolius* – GW2; > S; > *Doellingeria humilis* – S]

Doellingeria umbellata (P. Miller) Nees var. *umbellata*, Northern Flat-topped White Aster, Northern Tall Flat-topped Aster. Wet meadows, pastures, bogs, fens, marshes, stream floodplains, roadbanks, to at least 1900 m. Jul-Oct. 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. 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). [= FNA9, K, Mo; = *Aster umbellatus* var. *umbellatus* – Semple, J.C., J.G. Chmielewski, & C. Leeder (1991); = *Doellingeria umbellata* – Il; < *Aster umbellatus* – C, G, SE, W; < *Aster umbellatus* var. *umbellatus* – GW2, RAB; < *Doellingeria umbellata* – Nesom, G.L. (1993d), Pa, S, Tn, Va]



***Dracopis* Cassini 1825 (Coneflower)**

A monotypic genus, an annual herb, of sc. and se. North America, perhaps better included in *Rudbeckia*. References: Urbatsch & Cox in FNA21 (2006c).



* ***Dracopis amplexicaulis*** (Vahl) Cassini. Prairies, calcareous bottomlands, dry open areas, disturbed areas, waste areas near wool-combing mill; introduced in part in our area. Jul-Sep. 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). [= Il, K, SE, WH3; = *Rudbeckia amplexicaulis* – F, FNA9]

***Echinacea* Moench 1794 (Purple Coneflower)**

A genus of 4-9 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, J.M., K.M. Snyder, & C.C. Baskin (1993); Binns, S.E., B.R. Baum, & J.T. Arnason (2002); SE; Foster, S. (1991); Gaddy, L.L. (1991); McGregor, R.L. (1968); McKeown, K. (1999); Urbatsch, Neubig, and Cox in FNA21 (2006c).

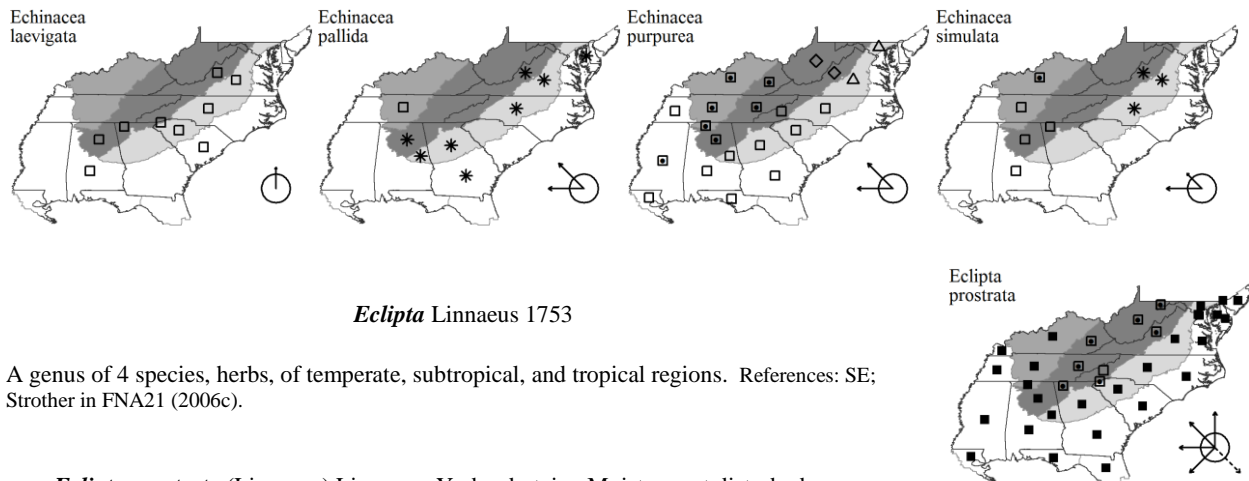
- 1 Leaves lanceolate to ovate, the larger > 5 cm wide, the stem leaves well-developed, though smaller than the basal.
 - 2 Leaves glabrous on both sides, or scabrous above; chaffy bracts (pales) ca. 9 mm long, the awns about a fourth as long as the body of the pales and with incurved tips; rays 3.5-8 cm long, strongly drooping *Echinacea laevigata*
 - 2 Leaves pubescent or scabrous on both sides; chaffy bracts (pales) 10-13 mm long, the awns about half as long as the body of the pales and with straight tips; rays 2.5-5.5 cm long, horizontal to slightly drooping *Echinacea purpurea*
- 1 Leaves lanceolate to linear, the larger < 5 cm wide, stem leaves few and poorly developed, the basal leaves predominant.
 - 3 Fresh pollen white *Echinacea pallida*
 - 3 Fresh pollen pale to bright yellow *Echinacea simulata*

Echinacea laevigata (C.L. Boynton & Beadle) S.F. Blake, Smooth Purple Coneflower. Pd (NC, VA), Mt (GA, SC, VA), Cp (SC):. open woodlands and glades over mafic or calcareous rocks, such as diabase, limestone, and dolostone, rarely in oak-pine savannas of the upper Coastal Plain over circumneutral clay sediments; rare. Late May-Jul. The species is an eastern sibling of *E. purpurea*. In NC, this attractive, medicinal plant is now limited to a few populations in Durham, Granville, and Rockingham counties. Extensive populations occur over Elbrook Dolomite in Montgomery, VA. Populations of this species in sandy soils of the Coastal Plain of SC have been variously interpreted as native or introduced (Nelson & Kelly 1997). [= Binns, S.E., B.R. Baum, & J.T. Arnason (2002), C, F, FNA9, Foster, S. (1991), K, Pa, RAB, S, SE, Va, W; = *Echinacea purpurea* var. *laevigata* – G]

* ***Echinacea pallida*** (Nuttall) Nuttall, Pale Purple Coneflower. Dry prairies, open dry woodlands, roadsides (introduced eastwards in our area). Jun-Jul. ON west to MI, WI, and NE, south to IN, LA, and TX; disjunct eastward in TN, AL, GA, SC, NC, and VA, where probably but uncertainly native). 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. [= Baskin, J.M., K.M. Snyder, & C.C. Baskin (1993), FNA9, Foster, S. (1991), Il, K, RAB, Tn; = *Echinacea pallida* var. *pallida* – Binns, S.E., B.R. Baum, & J.T. Arnason (2002); < F, G, W; < *Echinacea pallida* var. *pallida* – C, SE]

* ***Echinacea purpurea*** (Linnaeus) Moench, Eastern Purple Coneflower. Open woodlands, roadsides, some of the occurrences persistent or spread from cultivation. OH, WI, and IA south to FL and TX; introduced more broadly as in ne. United States and ON, the exact limits of the native distribution unclear. [= Binns, S.E., B.R. Baum, & J.T. Arnason (2002), C, F, FNA9, Foster, S. (1991), Il, K, Pa, RAB, SE, Tn, W, WH3; = *Echinacea purpurea* var. *purpurea* – G]

* ***Echinacea simulata*** R.L. McGregor, Prairie Purple Coneflower. Prairies, dry open woodlands, roadsides. Jun-Jul. IN, IL, and MO south to KY and TN; 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. GA native populations (Floyd Co.) are *E. simulata*. [= Baskin, J.M., K.M. Snyder, & C.C. Baskin (1993), FNA9, Foster, S. (1991), Il, K, Tn; = *Echinacea pallida* var. *simulata* – Binns, S.E., B.R. Baum, & J.T. Arnason (2002); < *Echinacea pallida* – F, G, W; < *Echinacea pallida* var. *pallida* – C, SE]



A genus of 4 species, herbs, of temperate, subtropical, and tropical regions. References: SE; Strother in FNA21 (2006c).

Eclipta prostrata (Linnaeus) Linnaeus, Yerba-de-tajo. Moist or wet disturbed areas, ditches, shores, disturbed bottomlands. Jun-Nov. MA west to WI, south to s. FL and TX, and southward into the tropics. [= C, FNA9, Il, K, Pa, Tn, Va, WH3; = *Eclipta alba* – F, G, GW2, RAB, SE, W, WV; = *Verbesina alba* – S]

***Elephantopus* Linnaeus 1753 (Elephant's-foot)**

A genus of about 12-30 species, of tropical, subtropical, and warm temperate regions. References: SE; Jones, S.B., Jr (1982); Strother 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 sparsely 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.

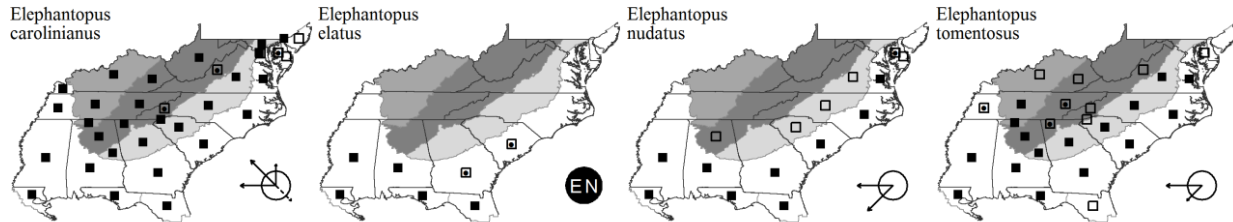
- 1 Leaves cauline, the stem with well-developed leaves over 10 cm long ***Elephantopus carolinianus***
- 1 Leaves basal, the stem scapose or with a few leaves much smaller than the basal, usually < 8 cm long.
 - 2 Longest phyllaries 10-13 mm long; pappus 6-8 mm long; basal leaves 5.5-10.5 cm wide, usually 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 Räuschel, Leafy Elephant's-foot. Mesic to dry forests and woodlands. Aug-Nov. NJ west to KS, south to s. FL and e. TX; West Indies. [= C, F, FNA9, G, GW2, Il, Jones, S.B., Jr (1982), K, Pa, RAB, S, SE, Tn, Va, WH3, WV]

Elephantopus elatus Bertoloni, Southern Elephant's-foot. Pine flatwoods and sandhills. Late Aug-Sep. E. SC south to s. FL, west to se. LA, on the Coastal Plain. [= FNA9, Jones, S.B., Jr (1982), K, RAB, S, SE, WH3]

Elephantopus nudatus A. Gray, Coastal Plain Elephant's-foot. Woodlands and woodland borders, usually fairly dry. Late Jul-Sep. DE south to n. peninsular FL, west to e. TX and AR, primarily on the Coastal Plain; south into n. South America. [= C, F, FNA9, G, GW2, Jones, S.B., Jr (1982), K, RAB, S, SE, Va, WH3]

Elephantopus tomentosus Linnaeus, Common Elephant's-foot. Woodlands and woodland borders, usually fairly dry. Aug-Nov. MD south to Panhandle FL, west to e. TX, north in the interior to w. NC, KY, and south to Chiapas, Mexico. [= C, F, FNA9, G, Jones, S.B., Jr (1982), K, RAB, S, SE, Tn, Va, WH3]



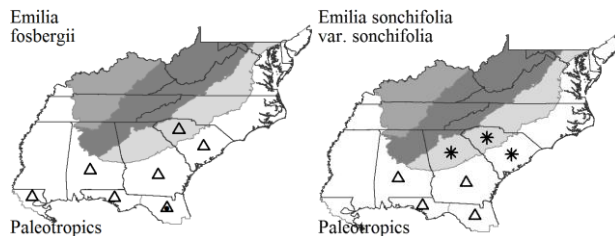
Emilia Cassini 1817 (Tasselflower)

A genus of 50-100 species, of the Old World. References: Barkley in FNA20 (2006b); SE.

- 1 Leaves well-distributed along the stem, with at most few and shallow lobes; corollas salmon or red-orange; involucre 1-2 (-3)× as high as wide *Emilia fosbergii*
- 1 Leaves mostly on the lower portion of the stem, the larger lyrate-pinnatifid; corollas lilac; involucre 3-4× as high as wide *Emilia sonchifolia* var. *sonchifolia*

* *Emilia fosbergii* Nicolson, Salmon Tasselflower, Cupid's-shaving-brush. Disturbed areas; native of Old World tropics. Scattered as an introduction in FL, including the Panhandle; reported for Lowndes County, GA (Carter, Baker, & Morris 2009). [= FNA9, K, SE, WH3]

* *Emilia sonchifolia* (Linnaeus) A.P. de Candolle var. *sonchifolia*, Lilac Tasselflower. Disturbed areas; native of the Old World tropics. The occurrence of this species in SC was first reported by Nelson & Kelly (1997); it is unclear how well established *Emilia* is in the northern part of our area. See Anderson (2007) for FL Panhandle record. [= FNA9, K; < *Emilia sonchifolia* – S, SE, WH3]



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 in FNA20 (2006b); SE.

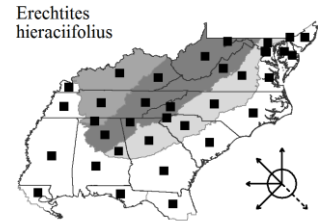
Erechtites hieraciifolius (Linnaeus) Rafinesque ex A.P. de Candolle, Fireweed, American Burnweed. In disturbed soil in nearly all habitats except the extremely xeric, present in most parts of the modern (beat-up) landscape at least as seedlings, liable to turn up at the smallest disturbance (such as 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. Late Jul-Nov. NL (Newfoundland) west to SK, south to s. FL and e. TX; West Indies; tropical America. 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. [= Tn, Va; = *Erechtites hieraciifolia* var. *hieraciifolia* – C, G, K, SE; = *Erechtites hieraciifolia* var. *hieraciifolia* – Pa; = *Erechtites hieraciifolius* var. *hieraciifolius* – FNA9; < WH3; < *Erechtites hieraciifolia* – GW2, RAB, S, W,

WV; > *Erechtites hieracifolia* var. *hieracifolia* – F, Il; > *Erechtites hieracifolia* var. *intermedia* – F, Il; > *Erechtites hieracifolia* var. *praealta* – F, Il; < *Senecio hieracifolius* var. *hieracifolius* – K3]

***Erigeron* Linnaeus 1753 (Daisy Fleabane)**

A genus of about 150 species, nearly cosmopolitan. Sections follow Nesom (2008b).

References: Allison, J.R. & T.E. Stevens (2001); SE; Nesom in FNA20 (2006b); Nesom (2008); Nesom, G.L. (2008b).



- 1 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 *Phalacrolooma*].
 - 2 Stem leaves many, mostly toothed, the larger > 1 cm wide; pubescence of the mid-stem long and spreading *Erigeron annuus*
 - 2 Stem leaves few, mostly entire, the larger usually < 1 cm wide; pubescence of the mid-stem usually short and appressed.
 - 3 Plants annual (rarely biennial), lacking rhizomes; [of various, often weedy, habitats] *Erigeron strigosus* var. *strigosus*
 - 3 Plants perennial, rhizomatous; [plants of shallow soil over calcareous rock].
 - *Erigeron strigosus* var. *calcicola*
- 1 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.
 - 4 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*
 - 4 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].
 - 5 Disk corollas 4-6 mm long; rays 50-100, 0.8-1.2 mm wide; [section *Pauciflori*].
 - *Erigeron pulchellus* var. *pulchellus*
 - 5 Disk corollas 2.0-3.2 mm long; rays 60-400, 0.3-0.5 mm wide.
 - 6 Involucre 4-6 mm high; rays 150-400, white to deep pink, 5-10 mm long; [section *Quercifolium*] *Erigeron philadelphicus* var. *philadelphicus*
 - 6 Involucre 2.5-4 mm high; rays 60-250, blue-lavender (rarely white to pink), 2.5-5 (-6) mm long.
 - *Erigeron quercifolius*

Erigeron annuus (Linnaeus) Persoon, Annual Fleabane. Roadsides, disturbed areas, gardens. May-Oct. NL (Newfoundland) west to MB, south to Panhandle FL and TX (and beyond). [= C, F, FNA9, Il, K, Pa, RAB, S, SE, Tn, Va, W, WH3, WV; > *Erigeron annuus* var. *annuus* – G]

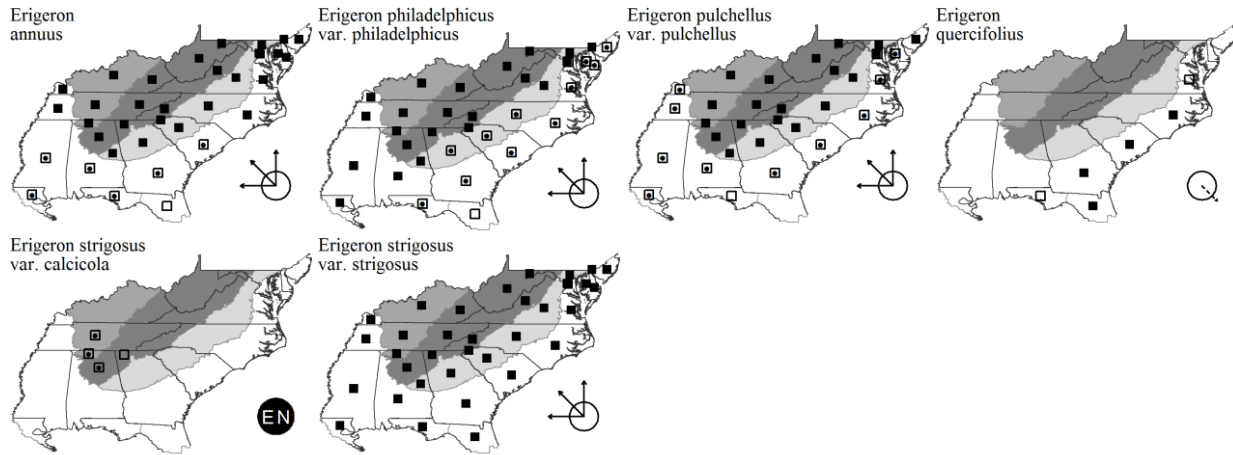
Erigeron philadelphicus Linnaeus var. *philadelphicus*, Philadelphia-daisy. Roadsides, meadows, disturbed areas. Apr-Aug. NL (Newfoundland) west to BC, south to n. FL and TX. Var. *scaturicola* Fernald, of bluffs along the James River in VA, seems to be merely an extreme form. Other varieties [var. *glaber* Henry and var. *provancheri* (Marie-Victorin & Rousseau) B. Boivin] may have more merit. [= FNA9, K, Pa, Va; > F; < *Erigeron philadelphicus* – C, G, GW2, Il, RAB, S, SE, Tn, W, WH3, WV; > *Erigeron philadelphicus* var. *scaturicola* – F]

Erigeron pulchellus Michaux var. *pulchellus*, Robin's-plantain. Moist slopes, coves, limestone bluffs, trail margins, roadbanks. Apr-early Jun. ME west to MN, south to Panhandle FL (Jackson County), GA, and TX. 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. [= C, F, FNA9, G, K, Pa, SE, Va, WV; < *Erigeron pulchellus* – GW2, Il, RAB, S, Tn, W, WH3]

Erigeron quercifolius Lamarck, Oak-leaved Fleabane. Sandy roadsides, disturbed areas. Apr-Jun. Se. VA south to s. FL, west to FL Panhandle; Bahamas. Nesom in FNA (2006b) points out that putative records from further west are based on misidentifications. [= C, F, FNA9, G, K, RAB, S, SE, Va, WH3]

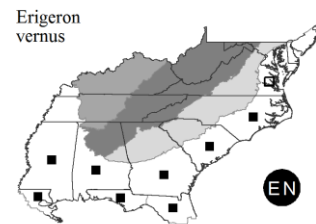
Erigeron strigosus Muhlenberg ex Willdenow var. *calcicola* J. Allison, Cedar Glade Daisy Fleabane. Limestone glades. (Apr-) May-Oct. Central basin of TN (Allison & Stevens 2001), nw. GA (GANHP) and n. AL. [= Allison, J.R. & T.E. Stevens (2001), FNA9, Tn]

Erigeron strigosus Muhlenberg ex Willdenow var. *strigosus*, Common Rough Fleabane. Roadsides, disturbed areas; open woodlands. Late Apr-Oct. NS west to WA, south to c. peninsular FL and TX. [= FNA9, Pa, Tn, Va; > Allison, J.R. & T.E. Stevens (2001), C, F, G, Il, K, SE; < *Erigeron ramosus* – S; < *Erigeron strigosus* – RAB, W, WH3, WV; > *Erigeron strigosus* var. *beyrichii* – Allison, J.R. & T.E. Stevens (2001), C, F, G, Il, K, SE]



Erigeron vernus (Linnaeus) Torrey & A. Gray, Whitetop Fleabane. Wet savannas, seepages, interdunal swales. Late Mar-Jun. E. VA south to s. FL, west to LA. [= C, F, FNA9, G, GW2, K, RAB, S, SE, Va, WH3]

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 agamosperous 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: SE; Godfrey, R.K. (1949); Schilling (2011); Siripun & Schilling in FNA21 (2006c).

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 *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.
 - 3 Leaves long-petiolate, the petioles of larger leaves > 10 mm long. ***Eupatorium serotinum***
 - 3 Leaves sessile or short-petiolate, the petioles < 9 mm long.
 - 4 Florets (3-) 5 (-7) per head **Key B**
 - 4 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.
 - 3 Larger leaves < 6 cm long; leaves with few or no resin glands. *Eupatorium petaloideum*
 - 3 Larger leaves > 6 cm long (and usually > 8 cm long); leaves with sparse to abundant resin glands.
 - 4 Leaves sparsely pubescent; lower stem pubescence typically appressed, the hairs < 1 mm long; phyllaries acute-acuminate to mucronate.
 - 5 Leaves with abundant resin glands *Eupatorium fernaldii*
 - 5 Leaves with sparse resin glands *Eupatorium vaseyi*
 - 4 Leaves moderately pubescent; lower stem pubescence typically spreading, the hairs 0.5-1 mm long; phyllaries (at least the inner) long-attenuate. *Eupatorium album*
- 1 Phyllaries acute to obtuse.
 - 6 Leaf bases broadly cuneate, truncate, or subcordate, the leaves generally distinctly broadest near the base.
 - 7 Leaves (2.5-) 3-6 (-7)× as long as wide; plants glabrous below the inflorescence. *Eupatorium sessilifolium* var. *sessilifolium*
 - 7 Leaves 1-3 (-3.5)× as long as wide; plants pubescent below the inflorescence.
 - 8 Leaves pinnately veined *Eupatorium godfreyanum*
 - 8 Leaves prominently 3-veined from the base or just above it.
 - 9 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*
 - 9 Leaves averaging 1-2× as long as wide, usually lacking a purple border; upper leaves and main inflorescence branches usually all opposite.
 - 10 Leaves mostly 1-1.5 (-1.7)× as long as wide, tending to be obtuse (the apex usually 90° 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*
 - 10 Leaves mostly (1.2-) 1.5-2× as long as wide, tending to be acute (the apex usually 90° 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.
 - 11 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, not borne in a vertical plane, up to 10 cm long and 6.5 cm wide *Eupatorium pubescens*
 - 11 Leaves distinctly cuneate, firm in texture, the pubescence rather harsh and short, the leaf blade twisted at the base, thus borne in a vertical plane, up to 5.5 cm long and 3 cm wide *Eupatorium scabridum*
 - 6 Leaf bases narrowly cuneate, the leaves generally broadest near the middle or toward the tip.
 - 12 Plants from conspicuously tuberous-thickened (ca. 1 cm in diameter) horizontal rhizomes; leaves deflexed, spreading, or ascending.
 - 13 Leaves 15-30 mm wide, spreading or ascending *Eupatorium anomalum*
 - 13 Leaves 2-12 mm wide, deflexed to erect-ascending.
 - 14 Stems 3-6 (-7) dm tall, often erectly branching from near the base; involucre 3-4 mm high, the bracts with rounded apices *Eupatorium recurvans*
 - 14 Stems (6-) 10-15 dm tall, not branching near the base; involucre 5-7 mm high, at least some of the inner bracts with acute apices *Eupatorium mohrii*
 - 12 Plants from crowns or caudices; leaves usually spreading or ascending (not deflexed).
 - 15 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.
 - 16 Leaves broadly oblanceolate, 5-15 mm wide, crenate or serrate in the upper half *Eupatorium glaucescens*
 - 16 Leaves narrowly oblanceolate, 3-8 mm wide, entire or remotely serrate apically *Eupatorium linearifolium*
 - 15 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.
 - 17 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).
 - 18 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*

- 18 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*
- 17 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.
- 19 Involucre 2.5-4 mm high; leaves obtuse to acute, elliptic to elliptic-oblongate, the 2 main lateral veins separating from the midrib about 1 cm above the base; leaves commonly 3 per node *Eupatorium semiserratum*
- 19 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. *Eupatorium altissimum*

Eupatorium album Linnaeus, White-bracted Thoroughwort. Dry woodlands. Late Jun-Sep. 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*). *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. [= Schilling (2011), Tn; < Pa, RAB, S, WH3; < *Eupatorium album* var. *album* – C, FNA9, K, SE, Va, W; > *Eupatorium album* var. *album* – F, G, WV; > *Eupatorium album* var. *glandulosum* – F, G, WV]

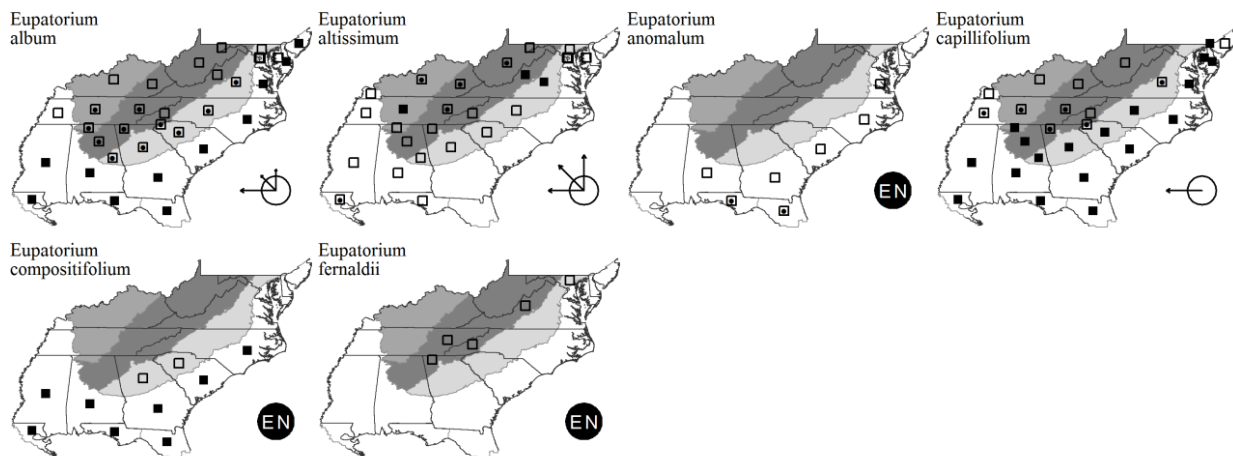
Eupatorium altissimum Linnaeus, Tall Thoroughwort. Woodlands, old fields, woodland borders, and openings over mafic rocks (such as diabase) or calcareous rocks (such as limestone and calcareous sandstone). Late Aug-Nov. CT, NY, QC, MN, and NE, south to Panhandle FL and TX, primarily in the midwest, especially on limestone substrates, and uncommon east of the mountains. [= F, G, Il, Pa, RAB, S, Tn, Va, W, WV; < C, FNA9, K, SE, WH3]

Eupatorium anomalum Nash, Anomalous Eupatorium. Moist savannas, moist interdune swales. Aug-Oct. *E. anomalum* is believed to be a triploid and tetraploid, apomictic derivative of the hybrid *E. mohrii* × *serotinum*. 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. [= FNA9, GW2, K, SE, Va; = *Eupatorium* × *anomalum* – WH3; < S; < *Eupatorium recurvans* – RAB]

* ***Eupatorium capillifolium*** (Lamarck) Small, Common Dog-fennel, Yankeeweed. Disturbed soils, old fields, clearcuts. Sep-Nov. CT, PA, KY, MO, and OK south to s. FL and TX. This species, like *E. compositifolium*, is an excellent indicator of soil disturbance. [= C, F, FNA9, G, GW2, Il, K, S, SE, Tn, Va, W, WH3, WV; = *Eupatorium capillifolium* var. *capillifolium* – RAB]

Eupatorium compositifolium Walter, Coastal Dog-fennel, Yankeeweed. Sandy disturbed areas; common. Sep-Dec. S. VA, KY, and OK south to s. FL and TX. This species, like *E. capillifolium*, is an excellent indicator of soil disturbance. At its northern limit, in se. VA, this species occurs on riverbanks, in the seasonally exposed drawdown zone (Fleming & Ludwig 1996). [= FNA9, GW2, K, RAB, S, SE, W, WH3]

Eupatorium fernaldii Godfrey, Fernald's Eupatorium. This species is an apomictic species derived from *E. perfoliatum* × *petaloideum* × *sessilifolium* (Schilling 2011). MD to w. NC and GA; perhaps more widespread. [= Schilling (2011); < *Eupatorium album* var. *vaseyi* – FNA9]



Eupatorium glaucescens Elliott, Wedgeleaf Eupatorium, Broadleaf Bushy Eupatorium. Sandhills, dry sandy woodlands. Late Jul-Oct. Widespread in the Southeastern Coastal Plain, ranging from se. VA south to FL and west to MS. The name *E. cuneifolium* must be rejected on nomenclatural grounds (Gandhi & Thomas 1991). [= K; = *Eupatorium cuneifolium* – S; < *Eupatorium cuneifolium* – C, G, RAB, SE; ? *Eupatorium cuneifolium* var. *cuneifolium* – F; < *Eupatorium linearifolium* – FNA9, WH3]

Eupatorium godfreyanum Cronquist, Godfrey's Eupatorium. Dry woodlands. Jul-Sep; Aug-Oct. NJ, MD, and WV south through VA to nc. NC and TN, reaching its greatest abundance in wc. VA. See Cronquist (1985) for additional information and illustrations. Siripun & Schilling (2006) confirmed that this species is an apomictic derivative of the hybrid *E. rotundifolium* ×

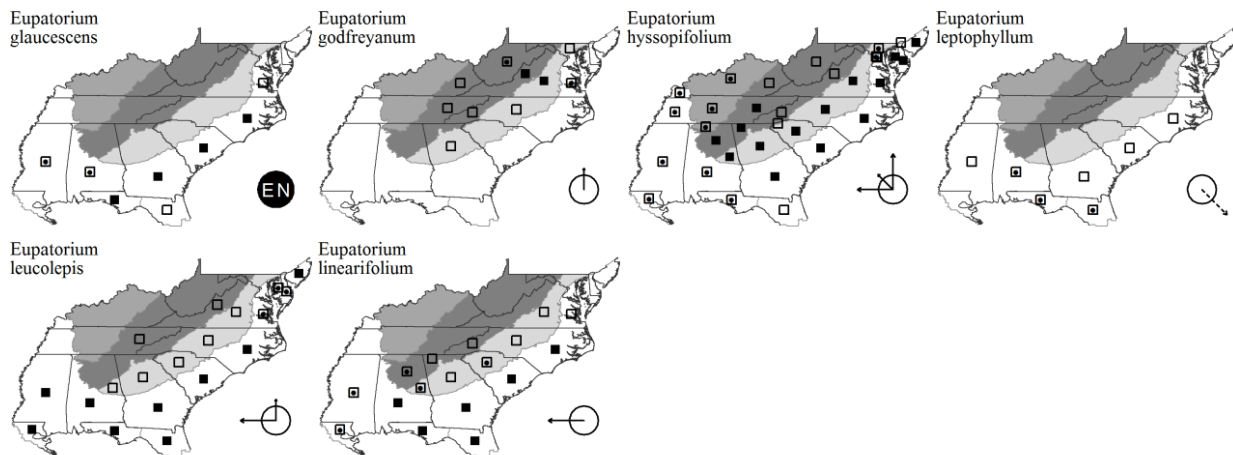
sessilifolium. [= C, FNA9, K, Pa, Tn, Va; < *Eupatorium sessilifolium* – SE; < *Eupatorium sessilifolium* var. *vaseyi* – F, RAB; < *Eupatorium vaseyi* – G]

Eupatorium hyssopifolium Linnaeus, Hyssopleaf Eupatorium. Roadbanks, pastures, fields, disturbed areas, dry woodlands. Late Jul-Oct. MA south to ne. FL, and west to TN and LA. [= IL, Tn, Va; = *Eupatorium hyssopifolium* var. *hyssopifolium* – C, FNA9, G, Pa, SE, W; < RAB, WV; > *Eupatorium hyssopifolium* var. *calcaratum* – F, K; > *Eupatorium hyssopifolium* var. *hyssopifolium* – F, K; > *Eupatorium lecheifolium* – S; > *Eupatorium sessilifolium* – S]

Eupatorium leptophyllum A.P. de Candolle, Limesink Dog-fennel. Limesink depression ponds (dolines) in the outer Coastal Plain and clay-based Carolina bays in the inner Coastal Plain. Sep-Nov. A Southeastern Coastal Plain endemic, ranging from se. NC south to FL and west to s. GA and s. AL; Bahamas and Cuba. [= FNA9, GW2, K, S, SE, WH3; = *Eupatorium capillifolium* var. *leptophyllum* – RAB]

Eupatorium leucolepis (A.P. de Candolle) Torrey & A. Gray, Savanna Eupatorium, Justiceweed. Savannas, seepage bogs, depression ponds. Aug-Oct. 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). 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*. [= Tn, Va; = *Eupatorium leucolepis* var. *leucolepis* – C, F, G; < GW2, Pa, RAB, S, SE, W, WH3; < *Eupatorium leucolepis* var. *leucolepis* – FNA9, K]

Eupatorium linearifolium Walter, Narrowleaf Bushy Eupatorium. Sandhills. Late Jul-Oct. Se. VA south to FL and west to LA. The appropriate treatment of this taxon is unclear; it may be a derivative of the hybrid *E. cuneifolium* × *hyssopifolium*. [= F, Va; = *Eupatorium hyssopifolium* var. *linearifolium* – K; = *Eupatorium tortifolium* – S; < FNA9, WH3; < *Eupatorium cuneifolium* – C, G, RAB, SE]



Eupatorium mohrii Greene, Mohr's Eupatorium. Moist savannas, other wet habitats. Aug-Oct. Se. VA south to s. FL and west to TX. This is by far the most abundant of the *E. recurvans-anomalum-mohrii* complex in our area. 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. [= GW2, Va; < C, FNA9, K, SE, W, WH3; < *Eupatorium anomalum* – S; < *Eupatorium recurvans* – F, G, RAB]

Eupatorium perfoliatum Linnaeus, Boneset. Marshes, swamps, bogs, wet pastures, and other wet habitats. Aug-Oct. NS west to MB, south to n. peninsular FL and TX. [= FNA9, GW2, IL, Pa, RAB, Tn, Va, W, WH3, WV; = *Eupatorium perfoliatum* var. *perfoliatum* – C, F, G, K, S, SE; ? *Eupatorium cuneatum* – S]

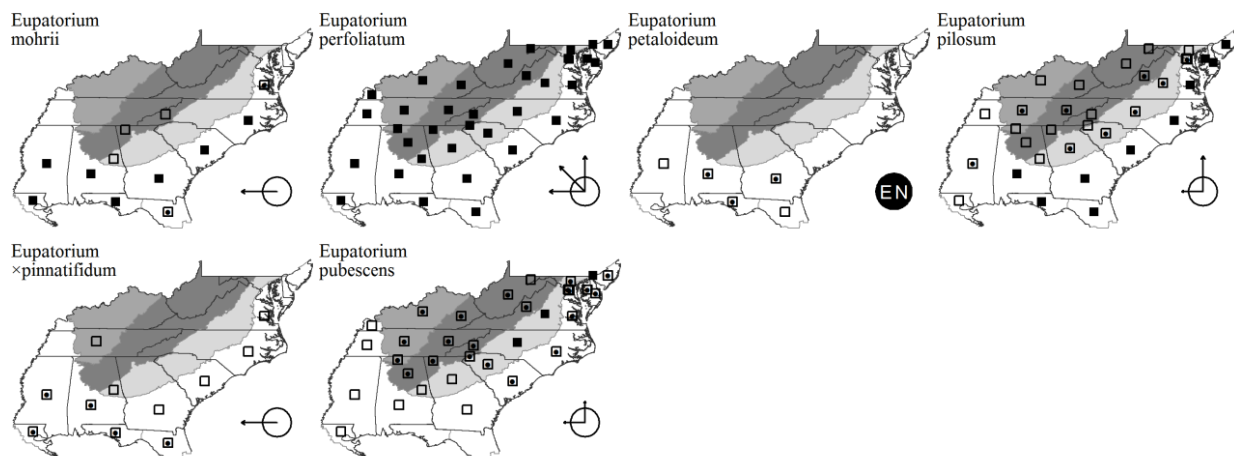
Eupatorium petaloideum Britton, Showy White Eupatorium. Sandhills, scrub, dryish pinelands. GA south to FL, west to s. MS. [= FNA9, S, Schilling (2011); = *Eupatorium album* var. *petaloideum*; < *Eupatorium album* – WH3; < *Eupatorium album* var. *album* – K, SE]

Eupatorium pilosum Walter, Ragged Eupatorium. Savannas, bogs, other moist areas. Aug-Oct. MA south to c. peninsular FL, west to KY, c. TN, and MS; reports from w. LA need checking. *E. pilosum* is a species distinct from *E. rotundifolium*. [= C, F, FNA9, GW2, K, Pa, RAB, Tn, Va, WH3, WV; = *Eupatorium rotundifolium* var. *saundersii* – G, SE, W; = *Eupatorium verbenaeifolium* – S]

Eupatorium xpinatifidum Elliott. E. VA south to Panhandle FL. 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. {not keyed}. [= FNA9, K, Tn, WH3; = *Eupatorium pinnatifidum* – GW2, S, SE]

Eupatorium pubescens Muhlenberg ex Willdenow, Inland Roundleaf Eupatorium. Forests and woodlands, woodland edges, roadbanks. Jul-Sep. The distribution, abundance, and phenology of *E. pubescens* in our area need additional study. Where growing together, *E. pubescens* apparently flowers about a month earlier than *E. rotundifolium*. Primarily in the Appalachians and adjacent provinces, ranging from ME south to n. GA and n. AL. 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. [= F, Va, WV; = *Eupatorium rotundifolium* ssp. *ovatum*; = *Eupatorium rotundifolium* var. *ovatum* – C, FNA9, G, K, Pa, SE, W; < S; < *Eupatorium rotundifolium* – GW2; < *Eupatorium rotundifolium* var. *ovatum* – RAB]



Eupatorium recurvans Small, Recurved Eupatorium. Longleaf pine sandhills, other dry, sandy habitats, moist savannas. Aug-Oct. Se. NC south to GA and s. FL. The diploid sexual *E. recurvans* (sensu stricto) is rare in our area; GW gives its range as se. and sc. GA and FL. *E. mohrii* is believed to be a triploid and tetraploid, apomictic derivative of the hybrid *E. recurvans* × *rotundifolium*; it is more widespread. [= GW2, S; < RAB; < *Eupatorium mohrii* – C, FNA9, K, SE, WH3]

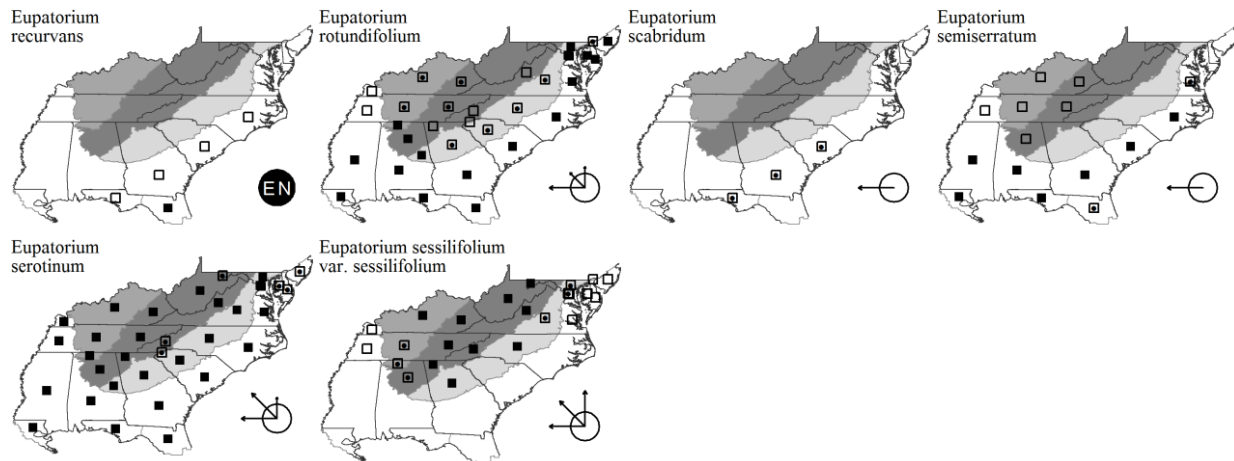
Eupatorium rotundifolium Linnaeus, Common Roundleaf Eupatorium. Savannas, seepage bogs, woodlands. Aug-Oct. MA, NY, IN, and OK south to s. FL and TX. [= F, S, Tn, Va; = *Eupatorium rotundifolium* var. *rotundifolium* – C, FNA9, G, K, Pa, RAB, SE, W; < GW2, WH3; *Eupatorium rotundifolium* ssp. *rotundifolium*]

Eupatorium scabridum Elliott, Roughleaf Eupatorium. Savannas, wet pinelands. Late Jul-Oct. SC south to n. FL, west to AR, LA, and OK. 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 GW 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). [= GW2, S, Tn; = *Eupatorium rotundifolium* var. *scabridum* – FNA9, K, SE; < *Eupatorium rotundifolium* – WH3]

Eupatorium semiserratum A.P. de Candolle. Swamp forests, seepage bogs, savannas, clay-based Carolina bays, other wetlands. Late Jul-Oct. Se. VA south to ne. FL, Panhandle FL, west to TX and AR; disjunct in sc. TN. This species often has 3 leaves per node; most similar species rarely or never have whorled leaves. [= C, FNA9, G, GW2, K, RAB, S, SE, Tn, Va, WH3; = *Eupatorium cuneifolium* var. *semiserratum* – F]

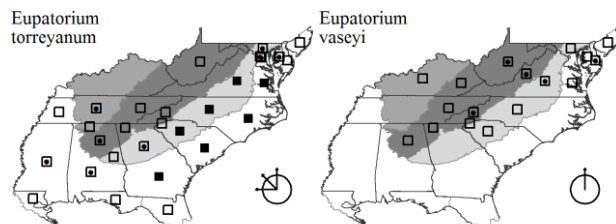
Eupatorium serotinum Michaux, Late Eupatorium. Interdune swales, fields, open forests, powerline rights-of-way, tidal marshes, disturbed areas. Late Aug-Oct. MA, NY, MI, WI, MN, and NE south to s. FL, LA, and TX. This species was apparently largely or strictly coastal in our area, but has spread inland rapidly along corridors of disturbance, somewhat similarly to *Baccharis halimifolia*. [= C, F, FNA9, G, GW2, Il, K, Pa, RAB, S, SE, Tn, Va, W, WH3, WV]

Eupatorium sessilifolium Linnaeus var. *sessilifolium*, Sessile-leaf Eupatorium. Open upland woodlands and woodland borders, especially calcareous or mafic. Jul-Oct. S. NH west to se. MN, south to n. GA, n. AL, n. MS, n. AR, and e. KS. 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. [= F, K, Va, WV; < RAB; < *Eupatorium sessilifolium* – C, FNA9, G, Pa, S, SE, Tn, W]



Eupatorium torreyanum Short & R. Peter, Torrey's Eupatorium. Dry woodlands, powerline rights-of-way, roadsides, marshes. Late Jul-Oct. NY south to n. peninsular FL, Panhandle FL, and west to OH, TN, and LA. 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. [= S, Tn, Va; = *Eupatorium hyssopifolium* var. *laciniatum* – C, F, FNA9, G, K, SE, W, WH3; < *Eupatorium hyssopifolium* – RAB, WV]

Eupatorium vaseyi T.C. Porter, Vasey's Eupatorium. Moist to dry woodlands and openings, fire-maintained woodlands over mafic rocks (such as diabase). Jul-Oct. KY south to se. TN (Chester, Wofford, & Kral 1997), n. GA, and n. AL. This species is an apomictic species derived from *E. petaloideum* × *sessilifolium* (Schilling 2011). It has often been treated as a variety of *E. album*, but is better regarded as a species of hybrid origin. [= Schilling (2011), Tn, Va; = *Eupatorium album* var. *monardifolium* – F; = *Eupatorium sessilifolium* var. *vaseyi* – K, RAB, WV; < G; < *Eupatorium album* var. *vaseyi* – C, FNA9, SE, W]



***Eurybia* (Cassini) Cassini 1820 (Wood-aster)**

A genus of about 23 species, perennial herbs, of North America and n. Eurasia. References: Brouillet in FNA20 (2006b); Lamboy, W.F. (1987); Lamboy, W.F. (1988); Lamboy, W.F. (1992); Nesom, G.L. (1994b).

- 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].
 - 3 Ray flowers purplish or bluish; branches of the inflorescence glandular-pubescent ***Eurybia macrophylla***
 - 3 Ray flowers white; branches of the inflorescence not glandular-pubescent.
 - 4 Longest peduncle in inflorescence > 1.5 cm long; involucre 6.5-9 (-10) mm tall; ray florets (8-) 12-16 (-20), the ray portion (10-) 17-18 (-20) mm long; disc florets (12-) 17-26; [mostly of high mountain forests, primarily over 1200 m in elevation] ***Eurybia chlorolepis***
 - 4 Longest peduncle in inflorescence < 1.5 cm long; involucre (3.5-) 4.2-6 (-7.5) mm tall; ray florets 5-10 (-12), the ray portion (5-) 10-15 mm long; disc florets 12-19 (-25); [mostly of lower elevation forests, primarily below 1200 m in elevation] ***Eurybia divaricata***
- 1 Basal and lower cauline leaves not as above.
 - 5 Leaves linear, up to about 10 mm wide; leaves strongly basally disposed.
 - 6 Inflorescence flat-topped (corymbiform); [subgenus *Heleastrum*, section *Heleastrum*].
 - 7 Pappus fine, the bristles not thickened above; ray florets 8-15 (-25); [of the Piedmont and low Mountains of GA, SC, and possibly sw. NC] ***Eurybia avita***

- 7 Pappus coarse, the larger bristles thickened above (clavellate-flattened); ray flowers 15-35; [of the Coastal Plain, of ne. NC south to ne. FL] *Eurybia paludosa*
- 6 Inflorescence elongate (spike-like or raceme-like).
- 8 Stem spreading-hairy throughout; ray florets 25-60, white or pinkish; disc florets; [endemic of FL Panhandle and adjacent sw. GA and se. AL]; [subgenus *Heleastrum*, section *Eryngiifolii*] *Eurybia eryngiifolia*
- 8 Lower stem glabrous, upper stem variously hairy; ray florets 8-30, deep lavender or purple; [collectively widespread] *Eurybia hemispherica*
- 5 Leaves broader, the largest on a plant over 15 m wide; leaves somewhat basally disposed, the lowermost sometimes withering before flowering.
- 9 Ray florets 9-14; rays 5-15 mm long *Eurybia compacta*
- 9 Ray florets 15-35; rays 10-25 mm long. *Eurybia surculosa*

Eurybia avita (Alexander) G.L. Nesom, Alexander's Rock Aster. In shallow soils on granitic flatrocks and granitic domes where moist from seasonal seepage. Upper Piedmont and Escarpment endemic: w. SC (or sw NC?) to wc. GA. A diploid species (2n=18). [= FNA9, K, Nesom, G.L. (1994b); = *Aster avitus* – SE, W]

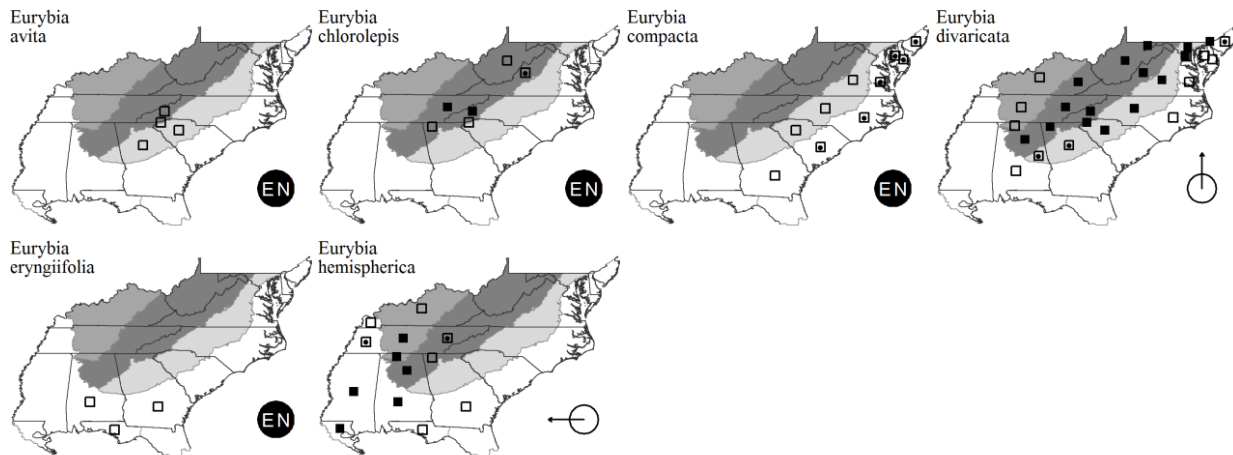
Eurybia chlorolepis (E.S. Burgess) G.L. Nesom, Blue Ridge White Heart-leaved Aster. Northern hardwood forests, spruce-fir forests. Aug-Oct. A Southern Appalachian endemic: sw. VA south through w. NC and e. TN to nw. SC and n. GA (Lamboy 1992); also reported for scattered locations in WV (Harmon, Ford-Werntz, & Grafton 2006). Lamboy (1992) has shown that *Eurybia chlorolepis* is a species distinct from *Eurybia divaricata*. *E. chlorolepis* is tetraploid (2n=36) and hexaploid (2n=54); *E. divaricatus* is diploid (2n=18). [= FNA9, K, Nesom, G.L. (1994b), Tn, Va; = *Aster chlorolepis* – G, Lamboy, W.F. (1987), S; = *Aster divaricatus* var. *chlorolepis* – C, RAB, SE, W; < *Aster divaricatus* – F, WV]

Eurybia compacta G.L. Nesom, Slender Aster. Pine savannas, woodlands, clearings. Late Jul-Oct. NJ to e. GA, mainly on the Coastal Plain, but also in the lower Piedmont. A diploid species (2n=18). [= FNA9, K, Nesom, G.L. (1994b), Va; = *Aster gracilis* – C, F, G, RAB, S, SE]

Eurybia divaricata (Linnaeus) G.L. Nesom, Common White Heart-leaved Aster. Moist to fairly dry forests and woodlands. Aug-Oct. N. NH west to s. ON, sw. QC, and n. OH, south to e. NC, c. SC, n. GA, and c. AL. The many species described by Burgess and here treated as synonyms may deserve further assessment; see S for details. A diploid species (2n=18). [= FNA9, K, Nesom, G.L. (1994b), Pa, Tn, Va; = *Aster divaricatus* – G, Lamboy, W.F. (1987); = *Aster divaricatus* var. *divaricatus* – C, RAB, SE, W; > *Aster boykinii* – S; > *Aster castaneus* – S; < *Aster divaricatus* – F, WV; > *Aster divaricatus* – S; > *Aster excavatus* – S; > *Aster flexilis* – S; > *Aster stillettiformis* – S; > *Aster tenebrosus* – S]

Eurybia eryngiifolia (Torrey & A. Gray) G.L. Nesom, Eryngo-leaved Aster. Pine savannas. May-Jun. East Gulf Coastal Plain endemic: sw. GA and Panhandle FL west to se. AL. [= FNA9, K, Nesom, G.L. (1994b), WH3; = *Aster eryngiifolius* – S, SE]

Eurybia hemispherica (Alexander) G.L. Nesom, Prairie Grass-leaved Aster. Glades, barrens, rocky woodlands. E. TN west to MO, south to nw. GA, se. GA, and FL Panhandle. Apparently diploid (2n=18) and tetraploid (2n=36). [= FNA9, K, Nesom, G.L. (1994b), Tn, WH3; = *Aster hemisphaericus* – W; = *Aster hemisphericus* – C, F, SE; = *Aster paludosus* ssp. *hemisphericus* – G]



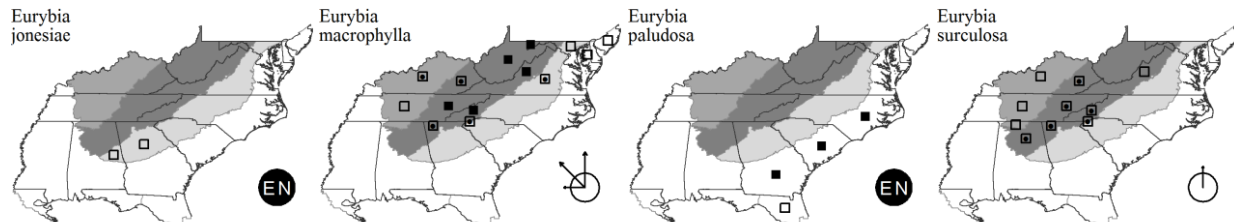
Eurybia jonesiae (Lamboy) G.L. Nesom, Piedmont Big-leaved Aster. Moist forests. Aug-Oct. Endemic to the Piedmont: e. GA west to e. AL (Lee Co.). A hexaploid species (2n=54). [= FNA9, K, Nesom, G.L. (1994b); = *Aster commixtus* – S; = *Aster jonesiae*; < *Aster commixtus* – SE]

Eurybia macrophylla (Linnaeus) Cassini, Big-leaved Aster. Moist to dryish forests, in NC mostly at moderate to high elevations, particularly in red oak forests on ridgetops. Late Jul-Sep. NB and QC west to MN, south to PA, MD, VA, NC, ne. GA, e. TN, and IN. *Aster macrophyllus* var. *ianthinus* [= *Aster multiflorus*] is sometimes recognized. It is alleged to differ in having the stipitate glands of the pedicels with minute heads (vs. broadly capitate), the leaves thin in texture and only slightly scabrous (vs. thick in texture and strongly scabrous). Many other varieties have been recognized by Fernald (1950); see F for a key. *E. macrophylla* is octoploid (2n=72). [= FNA9, II, K, Nesom, G.L. (1994b), Pa, Tn, Va; = *Aster macrophyllus* – C, G, Lamboy, W.F. (1987), RAB, SE, W; > *Aster macrophyllus* – S; > *Aster macrophyllus* var. *apricensis* – F; > *Aster macrophyllus* var. *excelsior* – F, WV; > *Aster*

macrophyllus var. *ianthinus* – F, WV; > *Aster macrophyllus* var. *macrophyllus* – F, WV; > *Aster macrophyllus* var. *pinguifolius* – F; > *Aster macrophyllus* var. *pinquifolius* – WV; > *Aster macrophyllus* var. *sejunctus* – F; > *Aster macrophyllus* var. *velutinus* – F, WV; > *Aster multiflorus* – S; > *Aster riciniatus* – S]

Eurybia paludosa (Aiton) G.L. Nesom, Savannah Grass-leaved Aster. Wet savannas, sandhill / pocosin ectones. Jul-Oct. An Atlantic Coastal Plain endemic: ne. NC south to se. GA and ne. FL (Nassau County). A tetraploid species ($2n=36$). [= FNA9, K, Nesom, G.L. (1994b), WH3; = *Aster paludosus* – C, GW2, RAB, SE; = *Aster paludosus* ssp. *paludosus* – G]

Eurybia surculosa (Michaux) G.L. Nesom, Creeping Aster. Rock outcrops, glades, rocky woodlands. Late Aug-Oct. A Southern Appalachian endemic: se. KY and w. VA south to w. NC, e. TN, nw. SC, and n. GA. 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 ($2n=36$). [= FNA9, K, Nesom, G.L. (1994b), Tn, Va; = *Aster surculosus* – C, F, G, RAB, S, SE, W]



Euthamia (Nuttall) Cassini 1825 (Flat-topped Goldenrod)

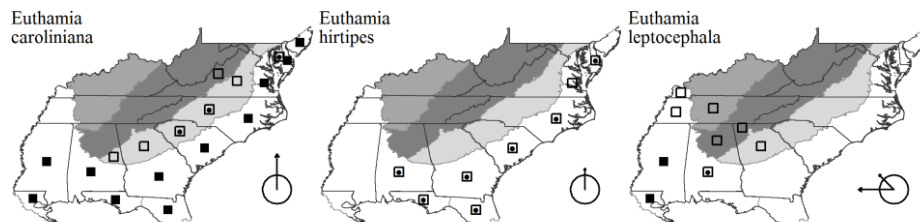
A genus of about 8-10 species, herbs, of North America. There are a number of serious problems remaining in our knowledge of *Euthamia*. References: SE; Haines in FNA20 (2006b); Johnson (1995); Sieren, D.J. (1981); Sorrie (in prep.); Taylor, C.E.S. & R.J. Taylor (1983).

- 1 Leaves with numerous slightly raised, pale, translucent, blister-like pustules; leaves transmit light when held up; plant glabrous ***Euthamia leptoccephala***
- 1 Leaves without pale pustules, or if present then leaves opaque and do not transmit light; plants glabrate to pubescent.
 - 2 Leaves < 3 mm wide; major veins 1 (-3), nearly always with axillary fascicles (rarely without); [of Coastal Plain and lower Piedmont from se LA eastward] ***Euthamia caroliniana***
 - 2 Leaves > 3 mm wide, main veins 3 (-5), without axillary fascicles. ***Euthamia hirtipes***

Euthamia caroliniana (Linnaeus) Greene ex Porter & Britton. Pine savannas, moist forests, ditches, pastures, disturbed areas. (Aug) Sep-Dec. S. ME 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). [= FNA9, II, Johnson (1995), K, Pa, Sorrie (in prep.), Va, WH3; = *Euthamia minor* – S; = *Euthamia tenuifolia* – Sieren, D.J. (1981), W; > *Euthamia minor* – GW2, SE; < *Euthamia tenuifolia* – GW2; > *Euthamia tenuifolia* – SE; > *Euthamia tenuifolia* var. *microcephala* – C; > *Euthamia tenuifolia* var. *tenuifolia* – C; > *Solidago microcephala* – F, G, RAB; > *Solidago tenuifolia* – G; > < *Solidago tenuifolia* – RAB; > *Solidago tenuifolia* var. *tenuifolia* – F]

Euthamia hirtipes (Fernald) Sieren, Marsh Flat-topped Goldenrod. Brackish marshes, salt marshes, marsh edges, wet hammocks. Sep-Dec. S. NJ and DE south to c. peninsular FL, west to s. AL. *E. hirtipes* has been variously treated: considered by Fernald to be a hybrid of "*minor*" and "*graminifolia* var. *nuttallii*", by Sieren to be a species endemic to NC, SC, and VA, by Taylor and Taylor (1983) to be a variety of *E. graminifolia* ranging from se. VA south to FL and west to LA, and by GW to be equivalent to *E. tenuifolia*. [= Sieren, D.J. (1981), Sorrie (in prep.), Va; = *Euthamia* × *hirtipes* – C; = *Euthamia graminifolia* var. *hirtipes* – Johnson (1995), K, Taylor, C.E.S. & R.J. Taylor (1983); < *Euthamia graminifolia* – FNA9, WH3; < *Euthamia tenuifolia* – GW2; > *Solidago* × *hirtipes* – F; > *Solidago gymnospermoides* – F, G; > < *Solidago leptoccephala* – F; < *Solidago tenuifolia* – RAB]

Euthamia leptoccephala (Torrey & A. Gray) Greene. Fields, pastures, roadsides, prairies, savannas. Aug-Oct. KY, IL, MO, and OK south to nw. GA (Floyd and Heard counties), AL, and TX. [= C, FNA9, GW2, II, K, S, SE, Sieren, D.J. (1981), Sorrie (in prep.), Tn; = *Solidago leptoccephala* – F, G]



Eutrochium Rafinesque 1838 (Joe-pye-weed)

A genus of 5 species, perennial herbs, of North America. The separation of *Eutrochium* (*Eupatoriadelphus*) from *Eupatorium* has been supported by Schmidt & Schilling (2000). Lamont (2004) makes the necessary combinations under the oldest available generic name, *Eutrochium* Rafinesque. References: Lamont in FNA21 (2006c); Lamont (2004); Lamont, E.E. (1995); Schmidt, G.J. & E.E. Schilling (2000).

- 1 Florets (4-) 6-9 (-12) per head; leaves more or less 3-nerved from the base, rather abruptly contracted to the short petiole, thick in texture, 5-12 (-15) cm long, strongly resin-dotted beneath; leaves in whorls of (2-) avg. 3-4 (-5); stem generally purple-speckled (sometimes uniformly purple); [primarily of the Coastal Plain] *Eutrochium dubium*
- 1 Florets either (8-) 9-22 or 4-7 per head; leaves generally pinnately veined (rarely with a tendency to be 3-nerved), usually cuneate and less abruptly contracted to the petiole, thick or thin in texture, 6-35 cm long, weakly or not at all resin-dotted beneath (except often strongly resin-dotted in *E. maculatum*); leaves in whorls of (2-) 3-7; stem purple-speckled, purple at the nodes, purple throughout, or green; [collectively widespread in our area].
 - 2 Florets (8-) 9-22 per head; leaves mostly in whorls of (3-) avg. 4-5 (-6), 6-20 cm long; inflorescence more or less flat-topped; stem usually speckled with purple (rarely evenly purplish) *Eutrochium maculatum* var. *maculatum*
 - 2 Florets 4-7 per head; leaves in whorls of (2-) 3-7, 8-35 cm long; inflorescence rounded; stem usually purple throughout, purple at the nodes, or lacking purplish pigment.
 - 3 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*
 - 3 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.
 - 4 Leaves ovate to broadly elliptical, the apex acute to obtuse; leaf teeth acute to blunt, 1-serrate; leaf lower surface densely softly lanulose on the surface and the veins; achenes with many long-papillate glands at anthesis; [apparently narrowly distributed in the Piedmont of NC and SC] *Eutrochium purpureum* var. *carolinianum*
 - 4 Leaves broadly lanceolate to ovate, the apex acuminate to acute; leaf teeth sharply 1-2-serrate; leaf lower surface usually glabrate (slightly to densely softly lanulose on the veins only; achenes with sparse to medium short-papillate glands at anthesis; [widespread in our area] *Eutrochium purpureum* var. *purpureum*

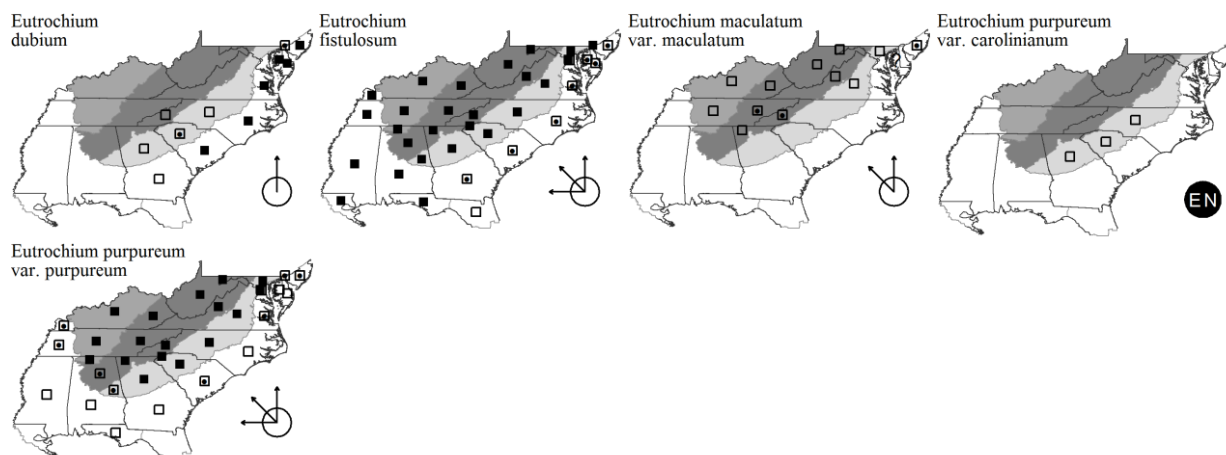
Eutrochium dubium (Willdenow ex Poir.) E.E. Lamont, Three-nerved Joe-pye-weed. Swamp forests, pocosins, other wet, acidic habitats. Jul-Oct. NS, s. ME, and NH south to se. SC, on or near the Coastal Plain. Reported as adventive in West Virginia (Harmon, Ford-Werntz, & Grafton 2006). [= FNA9, Lamont (2004), Pa, Va; = *Eupatoriadelphus dubius* – GW2, Schmidt, G.J. & E.E. Schilling (2000); = *Eupatorium dubium* – C, F, G, K, Lamont, E.E. (1995), RAB, SE, W; = *Eupatorium purpureum* – S]

Eutrochium fistulosum (Barratt) E.E. Lamont, Hollow-stem Joe-pye-weed. Moist forests, marshes, ditches. Jul-Oct. S. ME, NY, IL, and MO, south to c. peninsular FL, Panhandle FL, and e. TX. [= FNA9, Il, Lamont (2004), Pa, Tn, Va; = *Eupatoriadelphus fistulosus* – GW2, Schmidt, G.J. & E.E. Schilling (2000); = *Eupatorium fistulosum* – C, F, G, K, Lamont, E.E. (1995), RAB, SE, W, WH3, WV; = *Eupatorium maculatum* – S]

Eutrochium maculatum (Linnaeus) E.E. Lamont var. *maculatum*, Spotted Joe-pye-weed. Marl fens, wet calcareous meadows, cove forests, grassy balds. Late Jul-Oct. The species is widespread across n. North America. NL (Newfoundland), ME, QC, ON, and MN, south to PA, OH, n. KY, c. IL, and c. IA, and in the Mountains south to e. WV, w. VA, and w. NC. Var. *bruneri* (A. Gray) E.E. Lamont is more western; var. *foliosum* (Fernald) E.E. Lamont, is more northern. Further investigation is needed of the peculiar and implausible change in habitat of this species, from calcareous wetlands in c. VA northward, to mesic high elevation slopes and forests (in acidic to very acidic soils) from sw. VA southward. Such a change is suggestive of the presence of an unrecognized, cryptic taxon in the Southern Appalachians. [= FNA9, Lamont (2004), Va; = *Eupatorium maculatum* ssp. *maculatum* var. *maculatum* – C, Lamont, E.E. (1995); = *Eupatorium maculatum* var. *maculatum* – F, G, K, SE; < *Eupatoriadelphus maculatus* – Schmidt, G.J. & E.E. Schilling (2000); < *Eupatorium maculatum* – RAB, W, WV; < *Eutrochium maculatum* – Il, Pa, Tn]

Eutrochium purpureum (Linnaeus) E.E. Lamont var. *carolinianum* Sorrie, Carolina Joe-Pye-weed. Dry forests, woodlands, oak savannas, and roadsides. Late Jun-Aug. Se. NC south to SC. See Sorrie (2010) for additional detail. [< *Eupatorium purpureum* – RAB, SE; < *Eupatorium purpureum* var. *purpureum* – K, Lamont, E.E. (1995); < *Eupatorium trifoliatum* – S; < *Eutrochium purpureum* var. *purpureum* – FNA9, Lamont (2004)]

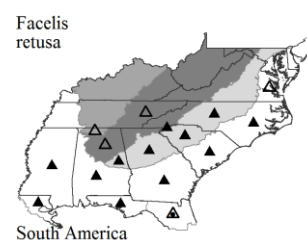
Eutrochium purpureum (Linnaeus) E.E. Lamont var. *purpureum*, Purple-node Joe-pye-weed. Upland, usually mesic forests. Jul-Oct. NH west to se. MN, IA, and e. NE, south to SC, GA, Panhandle FL, n. LA, and e. OK; var. *holzingeri* (Rydberg) E.E. Lamont, differing in having the lower leaf surface densely and persistently pubescent (vs. glabrous or nearly so) is found in the Midwest (Lamont 1990). *Eupatorium purpureum* var. *amoenum* is smaller, more slender, with narrower leaves which are nearly glabrous below; it is probably only a form. [= Il, Va; < FNA9, Lamont (2004); < *Eupatorium purpureum* – C, F, RAB, SE, W, WH3; > *Eupatorium purpureum* var. *amoenum* – G, WV; < *Eupatorium purpureum* var. *purpureum* – G, K, Lamont, E.E. (1995), WV; < *Eupatorium trifoliatum* – S; < *Eutrochium purpureum* – Pa, Tn]



***Facelis* Cassini 1819**

A genus of 3 species, herbs, of South America. References: Anderberg, A.A. (1991); Arriagada, J.E. (1998); SE; Nesom in FNA19 (2006a).

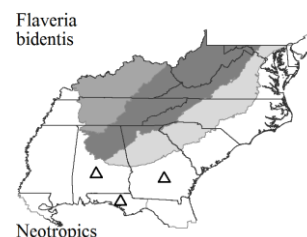
* ***Facelis retusa*** (Lamarck) Schultz ‘Bipontinus’, Trampweed. Fields, roadsides, lawns, disturbed areas; native of s. South America. Late Apr-Jun. [= Anderberg, A.A. (1991), Arriagada, J.E. (1998), FNA9, K, RAB, SE, WH3; ? *Facelis apiculata* – S]



***Flaveria* de Jussieu 1789**

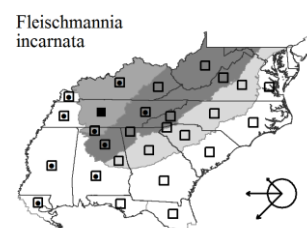
A genus of about 21 species, herbs and subshrubs, subcosmopolitan in tropical and subtropical areas. References: SE; Yarborough & Powell in FNA21 (2006c).

* ***Flaveria bidentis*** (Linnaeus) Kuntze. Disturbed areas; native of tropical America. FL Panhandle, s. FL, AL, GA. [= FNA9, K1, K3, S, SE, WH3]



***Fleischmannia* Schultz ‘Bipontinus’ 1850**

A genus of about 80 species of s. North America, south through Central America to w. (Andean) South America. References: Nesom in FNA21 (2006c); Schultz & Schilling (2000); Wooten, J.W. & A.F. Clewell (1971).



Fleischmannia incarnata (Walter) King & H.E. Robinson, Pink Thoroughwort, Pink Eupatorium. Nutrient-rich, moist to dry, forests and woodlands over diabase, limestone, coquina limestone, or other basic rocks, or on rich alluvium. Late Aug-Oct. 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 fragmented. See Wooten & Clewell (1971) for further information about this species. [= FNA9, IL, K, Tn, Va, WH3, Wooten, J.W. & A.F. Clewell (1971); = *Eupatorium incarnatum* – C, F, G, RAB, S, SE, W, WV]

***Gaillardia* Fougereux 1786 (Blanket-flower, Gaillardia, Fire-wheels)**

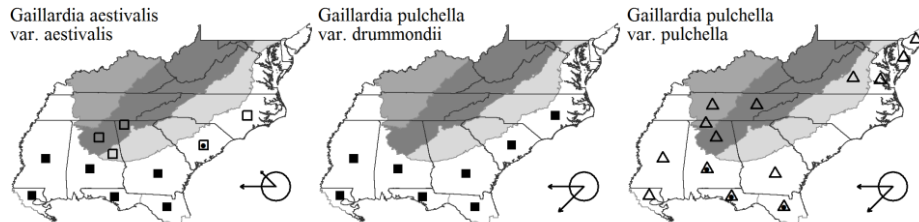
A genus of about 15-30 species, herbs, of temperate North America and South America. References: SE; Strother in FNA21 (2006c); Turner, B.L. & M. Whalen (1975); Turner, B.L. et al. (2003).

- 1 Receptacle naked, lacking well-developed setae (if setae present, < 1 mm long) ***Gaillardia aestivalis* var. *aestivalis***
- 1 Receptacle with well-developed setae 2-3 mm long.
 - 2 Leaves fleshy; perennial or annual, strongly branching, the secondary branches spreading and therefore forming compact, rounded “bushes” ***Gaillardia pulchella* var. *drummondii***
 - 2 Leaves herbaceous; annual, with secondary branches ascending ***Gaillardia pulchella* var. *pulchella***

Gaillardia aestivalis (Walter) H. Rock var. *aestivalis*, Sandhills Gaillardia. Sandhills, disturbed sandy soils. Jul-Oct. Sc. NC south to c. peninsular FL, west to TX. The occurrence in nw. GA reported in Jones & Coile (1988) is odd. [= K, SE; = *Gaillardia lanceolata* var. *lanceolata* – G; < *Gaillardia aestivalis* – FNA9, RAB, WH3; < *Gaillardia lanceolata* – S]

Gaillardia pulchella Fougeroux var. *drummondii* (Hooker) B.L. Turner, Beach Blanket-flower. Dunes, sandy flats behind the dunes, roadsides on barrier islands. Apr-Dec. Ne. NC south to FL, west to TX. [= Turner, B.L. et al. (2003); = *Gaillardia picta* – S; = *Gaillardia pulchella* var. *picta* – K, Turner, B.L. & M. Whalen (1975); < *Gaillardia pulchella* – C, F, FNA9, G, RAB, SE, WH3]

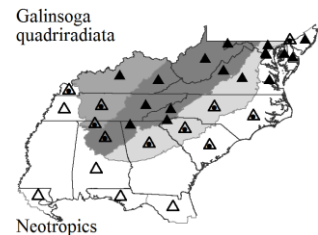
* *Gaillardia pulchella* Fougeroux var. *pulchella*, Common Blanket-flower. Disturbed areas, persistent after cultivation; rare, introduced from farther south and west. Apr-Sep. [= K, Turner, B.L. & M. Whalen (1975), Turner, B.L. et al. (2003); = *Gaillardia drummondii* – S; < *Gaillardia pulchella* – C, F, FNA9, G, IL, RAB, SE, WH3]



***Galinsoga* Ruiz & Pavón 1794 (Peruvian-daisy, Quickweed)**

A genus of about 13 species, herbs, of temperate and subtropical Central America and South America. References: Canne-Hilliker in FNA21 (2006c); SE.

* *Galinsoga quadriradiata* Ruiz & Pavón, Common Peruvian-daisy, Devil's-delight, Raceweed, Quickweed. Disturbed areas, roadsides, barnyards; native of Central and South America. May-Nov. 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. [= C, IL, K, Pa, SE, Tn, Va, W, WH3; > *Galinsoga bicolorata* – F, G; > *Galinsoga caracasana* – F, G; > *Galinsoga ciliata* – F, G, RAB, S, WV]



***Gamochaeta* Weddell 1856 (Cudweed, Everlasting)**

A genus of about 61 species, herbs, subcosmopolitan, but primarily in South America. *Gamochaeta* is more closely related to other genera than it is to *Gnaphalium*. References: Arriagada, J.E. (1998); SE; Nesom in FNA19 (2006a); Nesom, G.L. (1990); Nesom, G.L. (2004b); Nesom, G.L. (2004c); Pruski, J.F. & G.L. Nesom (2004); Urtubey, E. 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 1/3-1/2 as long as the inner, none with purplish color; flowering May-Jul *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 1/2-2/3 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 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 coarctata*
 - 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); involucre 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); involucre 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; involucre 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 argyria*
- 7 Blades of cauline leaves oblanceolate to spatulate (basal cells of hairs on adaxial faces persistent, expanded, glassy); involucre 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. Disturbed areas, fields, lawns. Mar-Jul. VA south to s. FL, west to AR and TX; Cuba; South America; Europe (introduced); New Zealand (introduced). [= FNA9, Nesom, G.L. 2004b., Nesom, G.L. (2004c), Urtubey, E. et al. (2016), WH3; < *Gamochaeta falcata* – K, Nesom, G.L. (1990); < *Gnaphalium calviceps* – F; < *Gnaphalium falcatum* – S; < *Gnaphalium purpureum* – W; < *Gnaphalium purpureum* var. *falcatum* – C, G, RAB, SE]

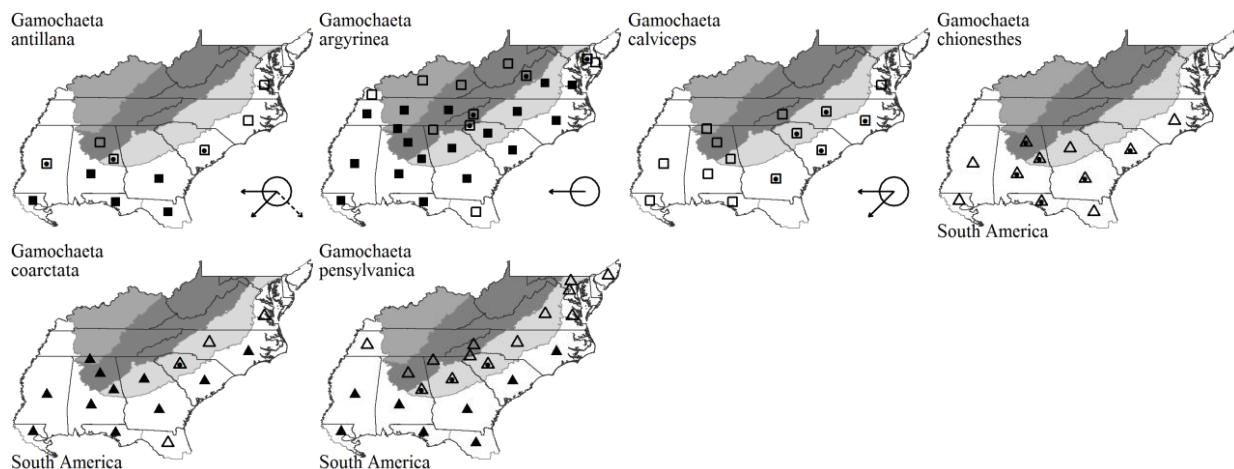
Gamochaeta argyria G.L. Nesom. Disturbed areas, roadsides, fields, lawns. Mar-Jul. DE, MD, WV, KY, s. MO, se. KS, south to Panhandle FL and e. TX. [= FNA9, Nesom, G.L. 2004b., Nesom, G.L. (2004c), Tn, Urtubey, E. et al. (2016), Va, WH3; < *Gamochaeta purpurea* – Arriagada, J.E. (1998), K, Nesom, G.L. (1990); < *Gnaphalium purpureum* – F, S, W; < *Gnaphalium purpureum* var. *purpureum* – C, G, RAB, SE]

Gamochaeta calviceps (Fernald) Cabrera, Narrow-leaf Purple Everlasting. Disturbed areas, roadsides. Mar-Jul. VA south to FL, west to TX; South America, California (introduced); Europe (introduced), New Zealand (introduced). [= FNA9, Nesom, G.L. 2004b., Nesom, G.L. (2004c), Va; < *Gamochaeta falcata* – K, Nesom, G.L. (1990); < *Gnaphalium calviceps* – F; < *Gnaphalium falcatum* – S; < *Gnaphalium purpureum* – W; < *Gnaphalium purpureum* var. *falcatum* – C, G, RAB, SE]

* ***Gamochaeta chionesthes*** G.L. Nesom. Roadsides, disturbed areas; apparently introduced from South America. Mar-Jul. [= FNA9, Nesom, G.L. 2004b., Nesom, G.L. (2004c), Urtubey, E. et al. (2016), WH3; < *Gamochaeta purpurea* – Arriagada, J.E. (1998), K, Nesom, G.L. (1990); < *Gnaphalium purpureum* – F, S, W; < *Gnaphalium purpureum* var. *purpureum* – C, G, RAB, SE]

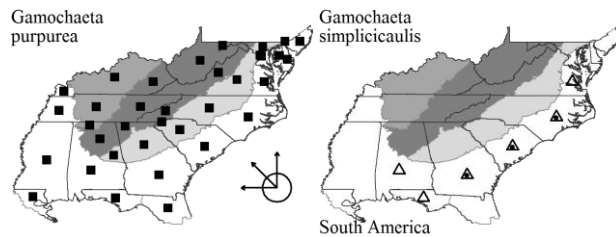
* ***Gamochaeta coarctata*** (Willdenow) Kerguelen. Sandy roadsides, disturbed areas; native of South America. Mar-Jul. [= FNA9, Nesom, G.L. 2004b., Nesom, G.L. (2004c), Urtubey, E. et al. (2016), Va, WH3; < *Gamochaeta americana* – Arriagada, J.E. (1998), K, Nesom, G.L. (1990); < *Gnaphalium purpureum* var. *americanum* – RAB]

* ***Gamochaeta pensylvanica*** (Willdenow) Cabrera, Pennsylvania Everlasting. Fields, roadsides, pastures, disturbed areas; probably native of South America. Mar-Jul. PA south to s. FL, west to TX, mostly on the Coastal Plain, and widespread in South America and elsewhere. [= FNA9, K, Nesom, G.L. 2004b., Nesom, G.L. (2004c), Nesom, G.L. (1990), Tn, Urtubey, E. et al. (2016), Va, WH3; > *Gnaphalium peregrinum* – F; < *Gnaphalium purpureum* – W; < *Gnaphalium purpureum* var. *purpureum* – C, G, SE; >> *Gnaphalium purpureum* var. *spatulatum* – RAB; >> *Gnaphalium spatulatum* – S]



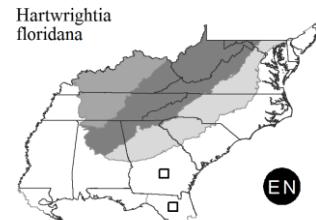
Gamochaeta purpurea (Linnaeus) Cabrera, Spoonleaf Purple Everlasting. Fields, roadsides, pastures, disturbed areas. Late Mar-Sep. ME west to MI, south to s. FL and e. TX; apparently disjunct in CA and OR, adventive in w. US, Mexico, South America, and elsewhere. [= FNA9, Il, Nesom, G.L. 2004b., Nesom, G.L. (2004c), Tn, Urtubey, E. et al. (2016), Va, WH3; = *Gamochaeta purpurea* var. *purpurea* – Pa; < Arriagada, J.E. (1998), K, Nesom, G.L. (1990); < *Gnaphalium purpureum* – F, S, W, WV; < *Gnaphalium purpureum* var. *purpureum* – C, G, RAB, SE]

* ***Gamochaeta simplicicaulis*** (Willdenow ex Sprengel) Cabrera. Disturbed areas, roadsides; apparently native of South America. Late Jun-Aug. See Nesom (1999, 2000d, 2004b) for additional information. [= FNA9, Nesom, G.L. 2004b., Nesom, G.L. (2004c), Urtubey, E. et al. (2016), WH3]



Hartwrightia A. Gray ex S. Watson 1888 (Hartwrightia)

A monotypic genus, a perennial herb, of se. United States (FL and GA). References: Nesom in FNA21 (2006c).



Hartwrightia floridana A. Gray ex S. Watson, Hartwrightia. Seepages and wet pinelands. Jul-Nov. Se. GA south to c. peninsular FL. [= FNA9, K1, K3, S, SE, WH3]

Helenium Linnaeus 1753 (Sneezeweed, Bitterweed)

A genus of about 32-40 species, herbs, of America. References: Bierner, M.W. (1972); Bierner, M.W. (1989); SE; Knox, J.S. (1987); Rock, H.F.L. (1957); Rydberg, P.A. (1915).

- 1 Stem leaves very numerous, 0.5-2 (-4) mm wide, not decurrent on the stem or branches; plant a taprooted annual; [section *Amarum*].
..... **Helenium amarum** var. **amarum**
- 1 Stem leaves few to numerous, at least the larger > 4 mm wide, decurrent on the stems and branches; plant a fibrous-rooted perennial or a taprooted annual.
 - 2 Ray flowers bearing a pistil and style, fertile.
..... **Helenium autumnale**
 - 2 Ray flowers lacking a pistil and style, sterile; [section *Leptopoda*].
 - 3 Disc flowers with lobes brown, red, or purple.
 - 4 Disc flowers 5-lobed and with 5 stamens **Helenium brevifolium**
 - 4 Disc flowers predominately 4-lobed and with 4 stamens **Helenium flexuosum**
 - 3 Disc flowers with lobes yellow.
 - 5 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**
 - 5 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).
 - 6 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**
 - 6 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 var. **amarum**, Bitterweed. Roadsides, overgrazed pastures, urban areas; apparently introduced from farther west. May-Dec. Now widespread in e. North America. Bierner (1989) discusses the taxonomy of section *Amarum*, consisting only of the 2 varieties of *H. amarum*. 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. [= Bierner, M.W. (1989), C, FNA9, K1, K3, Pa, Va, WH3; = *Helenium amarum* – Bierner, M.W. (1972), G, RAB, Tn, W; = *Helenium tenuifolium* – F, S; < *Helenium amarum* – Il, SE]

Helenium autumnale Linnaeus, Common Sneezeweed. Moist pastures, forests, woodlands, forest edges. Sep-Oct. QC west to BC, south to n. peninsular FL, TX, and CA. Like *H. amarum*, *H. autumnale* is bitter and unpalatable to grazing animals, becoming more abundant in pastures. [= FNA9, K3, Pa, RAB, Tn, Va, WH3; < GW2, W; > *Helenium autumnale* var. *autumnale* – C, F, G, Il, K1, SE, WV; > *Helenium autumnale* var. *parviflorum* – F, Il, K1, WV; > *Helenium latifolium* – S; > *Helenium parviflorum* – S]

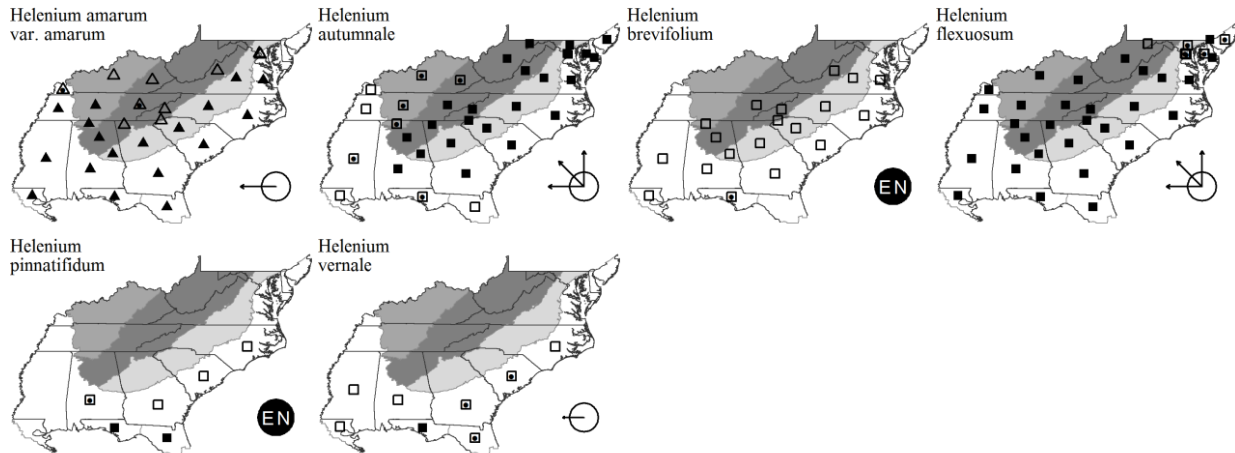
Helenium brevifolium (Nuttall) Alph. Wood. Seepage bogs, river-scoured cobble bars. May-Jun. *H. brevifolium* has a peculiar distribution, reaching its greatest abundance on the Gulf Coastal Plain, from Panhandle FL west to e. LA, and occurring

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. [= Bierner, M.W. (1972), C, FNA9, G, GW2, K1, K3, RAB, SE, Tn, Va, W, WH3; > F, S; > *Helonium curtisii* – F, S]

* ***Helonium flexuosum*** Rafinesque, Southern Sneezweed. Moist pastures, moist forests, riverbanks. May-Aug. S. ME west to MN, south to c. peninsular FL and TX. [= Bierner, M.W. (1972), C, FNA9, G, GW2, K1, K3, Pa, RAB, SE, Tn, Va, W, WH3, WV; > *Helonium nudiflorum* – F, S; > *Helonium polyphyllum* – S]

Helonium pinnatifidum (Nuttall) Rydberg. Wet savannas and adjacent ditches. Apr-May. A Southeastern Coastal Plain endemic: se. NC south to s. FL, west to Panhandle FL, sw. GA, and s. AL. [= Bierner, M.W. (1972), FNA9, GW2, K1, K3, RAB, SE, WH3; = *Helonium vernale* – S]

Helonium vernale Walter. Wet savannas and adjacent ditches. Apr-May. A Southeastern Coastal Plain endemic: se. NC south to ne. FL, Panhandle FL, and west to e. LA. [= Bierner, M.W. (1972), FNA9, GW2, K1, K3, RAB, SE, WH3; = *Helonium helonium* – S]



Helianthus Linnaeus 1753 (Sunflower)

A genus of about 50 species, herbs, of North America. References: SE; Heiser, C.B. et al. (1969); Schilling in FNA21 (2006c); Schilling, E.E. et al. (1998).

- 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) **Key B**
- 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).
- 3 Basal leaves 6-20 cm long; lower several pairs of stem leaves up to 1/2 as long and wide as the basal leaves. *Helianthus atrorubens*
- 3 Basal leaves 4-15 cm long; lower several pairs of stem leaves often < 1/2 as long and wide as the basal leaves.
- 4 Basal leaves (1.6-) 2-5× as long as wide; ray flowers present, 12-18, typically 1.5-3.5 cm long; [of wet savannas and bogs] *Helianthus heterophyllus*
- 4 Basal leaves 1-1.5× as long as wide; ray flowers none, or present, 2-8, but < 1 cm long; [of 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 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).
 - 3 Style branches yellow; [section *Agrestes*] *Helianthus agrestis*
 - 3 Style branches red; [section *Helianthus*].
 - 4 Phyllaries ovate to ovate-oblong, > 4 mm wide, abruptly contracted to an acuminate tip, the margins strongly ciliate; leaves 5-25 cm wide; disk (2-) 3-30 cm wide; plants (0.5-) 1-3 m tall *Helianthus annuus*
 - 4 Phyllaries lanceolate, gradually tapering to an acuminate tip, the margins not ciliate or weakly so; leaves 1.5-9 cm wide; disk 1-2.5 cm wide; plants 0.4- 1 (-1.5) m tall.
 - 5 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*
 - 5 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

- 1 Leaf blades long and narrow, linear or lanceolate and usually > 10× as long as wide.
 - 2 Plants short, < 1.5 m tall; leaves < 1 cm wide; rhizomes lacking or poorly developed *Helianthus angustifolius*
 - 2 Plants robust, > 1.5 m tall; leaves > 1 cm wide; rhizomes well developed *Helianthus simulans*
- 1 Leaf blades shorter and broader, lanceolate, lance-ovate, deltoid, deltoid-ovate and usually < 5× as long as wide.
 - 3 Phyllaries 1.5-3 mm broad, lanceolate *Helianthus floridanus*
 - 3 Phyllaries 3-5 mm broad, oblong, ovate, or obovate.
 - 4 Phyllaries oblong-lanceolate, apex acuminate, abaxially usually pubescent *Helianthus laetiflorus*
 - 4 Phyllaries elliptical to oblong-ovate, apex acute, abaxially glabrate *Helianthus pauciflorus* ssp. *pauciflorus*

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 linear-lanceolate, with only a single main vein *Helianthus smithii*
 - 3 Leaves linear-lanceolate to lanceolate, lance-ovate, or ovate, triplinerved at base.
 - 4 Rays few, usually 5 or 8; heads small, the involucre 9 mm broad or less.
 - 5 Leaves abaxially whitish in color and glabrous and glaucous, lacking sessile glandular trichomes ('resin dots') *Helianthus glaucophyllus*
 - 5 Leaves abaxially greenish in color, usually tomentulose (sometimes glabrate), with abundant sessile glandular trichomes *Helianthus microcephalus*
 - 4 Rays usually 10 or more in larger heads; heads larger, the involucre usually > 9 mm broad.
 - 6 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*
 - 6 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.
 - 7 Anther appendages yellow.
 - 8 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*
 - 8 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*
 - 7 Anther appendages dark or reddish-brown.
 - 9 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 sessile glandular trichomes ('resin dots') *Helianthus strumosus*
 - 9 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 sessile glandular trichomes *Helianthus decapetalus*
 - 1 Stems pubescent throughout, not glaucous.
 - 10 Leaves sessile and cordate, mostly or all opposite *Helianthus mollis*
 - 10 Leaves petiolate or sessile, but not cordate, and alternate or opposite.
 - 11 Phyllaries attenuate, conspicuously exceeding the disk in length and reflexed, apically with numerous sessile 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*

- 11 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.
- 12 Phyllaries conspicuously graduated and imbricate, usually appressed.
- 13 Leaf blades lanceolate to ovate, petiole 1-5 cm long and usually $< \frac{1}{2}$ as long as blade; anther appendages with dark pigment; cypselas 4-5 mm, usually sterile *Helianthus laetiflorus*
- 13 Leaf blades ovate to elliptic, petiole distinct, > 2 cm and usually $> \frac{1}{2}$ as long as the blade; anther appendages yellow; cypselas 3-4 mm long, fertile *Helianthus occidentalis* ssp. *occidentalis*
- 12 Phyllaries not conspicuously graduated and imbricate, usually loose or spreading.
- 14 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*
- 14 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.
- 15 Leaves truncate to broadly rounded at base, shortly but distinctly petiolate *Helianthus hirsutus*
- 15 Leaves cuneate, gradually narrowing to base, sessile to petiolate.
- 16 Ligules lacking subsessile glandular trichomes; leaves not strongly revolute *Helianthus giganteus*
- 16 Ligules abaxially with subsessile glandular trichomes ('resin dots'); leaves usually revolute.
- 17 Leaves conspicuously undulate; ovate to elliptical to lanceolate, occasionally linear (if so, usually < 10 cm long), usually $< 5\times$ as long as wide; heads 1-6 per plant; outer phyllaries acute to obtuse *Helianthus floridanus*
- 17 Leaves not conspicuously undulate; linear to lanceolate, $> 5\times$ as long as broad (and also 8-16 cm long); heads 3-16 per plant; outer phyllaries acuminate to acute.
- 18 Plants short, < 1.5 m tall; leaves < 1 cm wide; rhizomes lacking or poorly developed *Helianthus angustifolius*
- 18 Plants robust, > 1.5 m tall; leaves > 1 cm wide; rhizomes well developed *Helianthus similans*

Helianthus agrestis Pollard, Southeastern Sunflower. Floodplain marshes, mucky areas in pine flatwoods. Aug-Dec. S. GA south to s. FL. [= FNA9, GW2, K1, K3, S, SE, WH3]

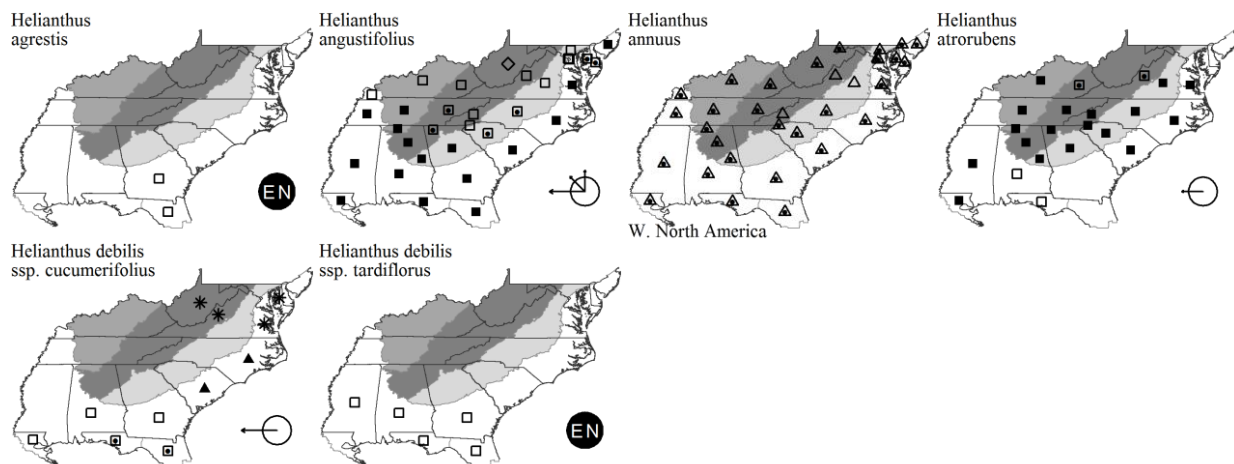
* *Helianthus angustifolius* Linnaeus, Narrowleaf Sunflower. Savannas, ditches, marshes, other wet habitats. (Jul-) Sep-Oct (-frost). Primarily Coastal Plain, from Long Island, NY south to c. peninsular FL and west to TX, irregularly inland to OH, IN, and MO. This plant is very showy when in flower on roadsides, especially in Oct. [= C, FNA9, G, GW2, IL, K1, K3, Pa, RAB, S, SE, Tn, Va, W, WH3, WV; $> Helianthus angustifolius$ var. *angustifolius* - F; $> Helianthus angustifolius$ var. *planifolius* - F]

* *Helianthus annuus* Linnaeus, Common Sunflower. Disturbed areas, often cultivated in gardens, sometimes cultivated in fields; native of the Plains states. Jun-Oct. This is the common cultivated sunflower grown for its flowers, seeds, and oil. [= C, F, FNA9, G, IL, K1, K3, Pa, RAB, S, SE, Tn, Va, W, WH3, WV]

Helianthus atrorubens Linnaeus, Appalachian Sunflower. Dry soils of rocky, sandy, or clayey woodlands and roadbanks. Late Jul-Oct. N. VA west to w. TN, and south to c. GA, Panhandle FL, AL, and se. LA. Related to the Ozarkian *H. silphoides* Nuttall. [= C, FNA9, K1, K3, RAB, SE, Tn, Va, W, WH3; = *Helianthus atrorubens* var. *atrорubens* - G; $< S$; $> Helianthus atrorubens$ var. *alsodes* - F; $> Helianthus atrorubens$ var. *atrорubens* - F]

* *Helianthus debilis* Nuttall ssp. *cucumerifolius* (Torrey & A. Gray) Heiser, Cucumber-leaf Sunflower. Sandy soils of fields and roadsides. May-Aug. Sw. GA and FL west to c. TX. [= FNA9, K1, K3; = *Helianthus debilis* ssp. *cucumerifolius* var. *cucumerifolius* - SE; = *Helianthus debilis* var. *cucumerifolius* - C, F, RAB, WV; $< WH3$; $< Helianthus cucumerifolius$ - G, S]

Helianthus debilis Nuttall ssp. *tardiflorus* Heiser, Gulf Coast Beach Sunflower. Sandy beaches, dry pinelands. Mar-Sep. GA, FL, AL, and MS. [= FNA9, K1, K3; = *Helianthus debilis* ssp. *cucumerifolius* var. *tardiflorus* - SE; $< Helianthus cucumerifolius$ - S; $< Helianthus debilis$ ssp. *cucumerifolius* - WH3]



Helianthus decapetalus Linnaeus, Forest Sunflower. Mesic woodlands and forests, oak savannas. Jul-Oct. ME and QC west to WI and IA, south to GA and MO. [= C, FNA9, G, IL, K1, K3, Pa, RAB, S, SE, Tn, Va, W; $> F$, WV; $> Helianthus trachelifolius$ - F, WV]

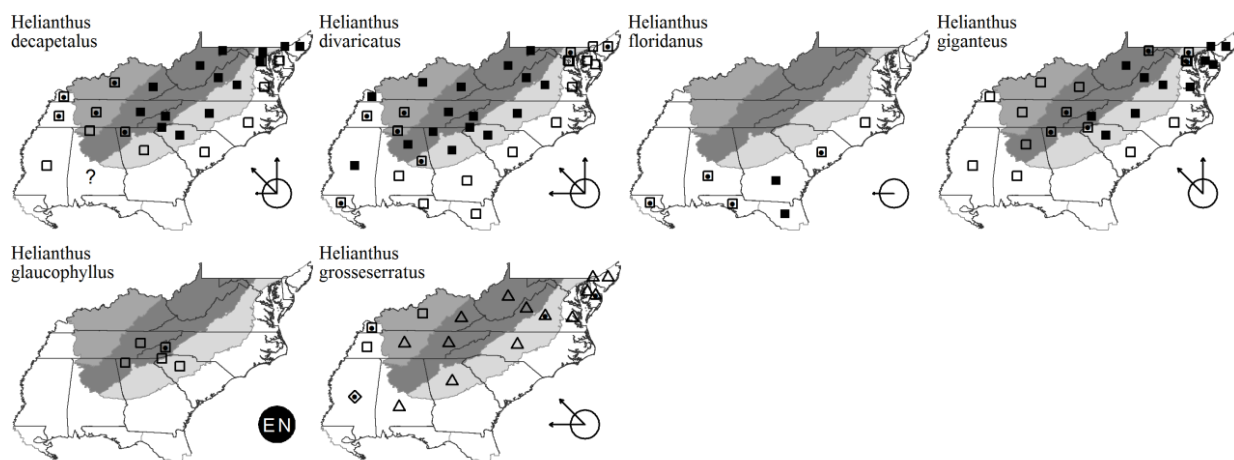
Helianthus divaricatus Linnaeus, Spreading Sunflower. Mesic to dry woodlands and forests, forest edges. Jun-Aug. ME, QC, ON, and IA south to Panhandle FL, LA, and OK. [= C, FNA9, G, IL, K1, K3, Pa, RAB, S, SE, Tn, Va, W, WH3, WV; > *Helianthus divaricatus* var. *angustifolius* – F; > *Helianthus divaricatus* var. *divaricatus* – F]

Helianthus floridanus A. Gray ex Chapman, Florida Sunflower. Wet savannas and pocosin edges. Sep-Oct. A Southeastern Coastal Plain species: se. NC south to c. peninsular FL, and west to se. LA. [= FNA9, GW2, K1, K3, RAB, S, SE, WH3]

Helianthus giganteus Linnaeus, Tuberous Sunflower, Swamp Sunflower. Bog edges, moist thickets, ditches. Late Jul-Oct. NB and ME west to MN, south to n. SC, n. GA, e. and c. TN, c. KY, n. IN, n. IL, and WI. [= C, F, FNA9, G, GW2, IL, K1, K3, Pa, RAB, S, SE, Tn, Va, W, WV; > S; > *Helianthus alienus* – S; > *Helianthus validus* – S]

Helianthus glaucophyllus D.M. Smith, Whiteleaf Sunflower. Moist forests, woodlands, and woodland edges, at medium elevations, mostly from 1000-1500 m (but sometimes lower), generally flowering only when in a canopy gap (as caused by a tree-fall) or along banks of narrow roads. Jul-Sep. A narrow Southern Appalachian endemic: w. NC, nw. SC, and ne. TN (Chester, Wofford, & Kral 1997). First reported for SC by Hill & Horn (1997). [= FNA9, K1, K3, RAB, SE, Tn, W]

* *Helianthus grosseserratus* Martens, Sawtooth Sunflower. Disturbed areas; introduced from farther west. Jul-Oct. 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). [= C, F, FNA9, G, K1, K3, Pa, Tn, Va, W, WV; = *Helianthus grosse-serratus* – S, SE]



Helianthus heterophyllus Nuttall, Savanna Sunflower. Wet savannas, seepage bogs. Aug-Oct. A Southeastern Coastal Plain endemic: se. NC south to Panhandle FL and west to se. LA. [= FNA9, GW2, K1, K3, RAB, S, SE, WH3]

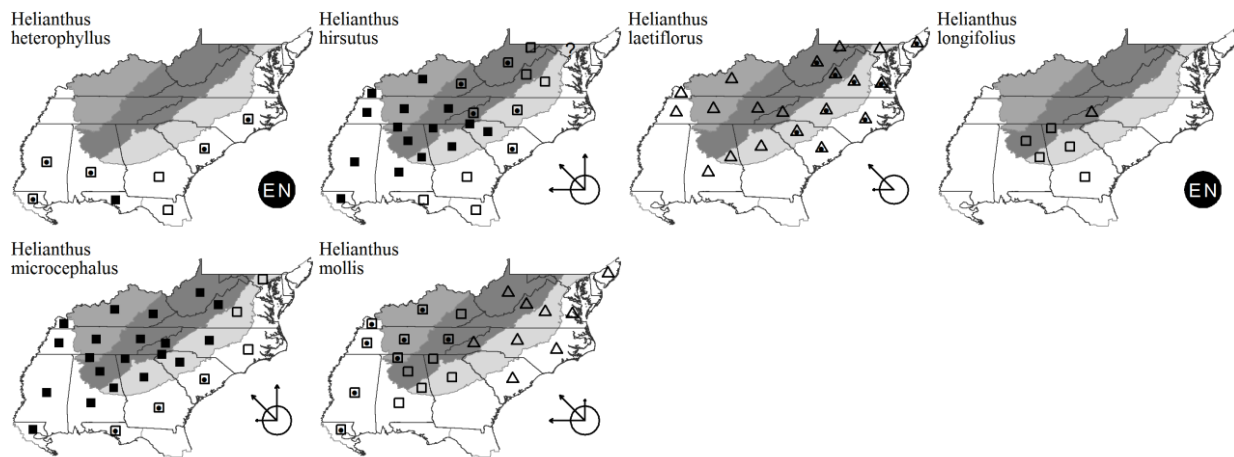
Helianthus hirsutus Rafinesque, Hairy Sunflower. Woodlands and other sunny or semi-sunny habitats. Jul-Oct. PA and MN, south to n. FL and TX. [= C, FNA9, G, K1, K3, Pa, RAB, S, SE, Tn, Va, W, WH3, WV; > *Helianthus hirsutus* var. *hirsutus* – F, IL; > *Helianthus hirsutus* var. *stenophyllus* – F, IL; > *Helianthus hirsutus* var. *trachyphyllus* – F, IL]

* *Helianthus laetiflorus* Persoon. Disturbed areas; introduced from farther west. Late Jul-Sep. 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*. [= G, Pa, RAB, S, SE, Va, WV; = *Helianthus* × *laetiflorus* – C, FNA9, IL, K1, K3, Tn; = *Helianthus laetiflorus* var. *laetiflorus* – F]

* *Helianthus longifolius* Pursh, Longleaf Sunflower. Sandstone and granite glades and woodlands, loamy to xeric longleaf pine sandhills. Aug-Oct. This species is apparently rare, occurring in ne. AL, n. GA (introduced in sw. NC). [= FNA9, K1, K3, RAB, S, SE]

* *Helianthus microcephalus* Torrey & A. Gray, Small-headed Sunflower. Dry woodlands and roadbanks. Jul-Oct. NJ west to MN, south to Panhandle FL and se. LA. [= F, FNA9, G, IL, K1, K3, Pa, RAB, S, Tn, Va, W, WH3, WV; < C, SE]

* *Helianthus mollis* Lamarck, Ashy Sunflower, Gray Sunflower. Calcareous prairies and barrens, disturbed places. Jul-Sep. 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. [= C, FNA9, G, IL, K1, K3, Pa, RAB, S, SE, Tn, Va, W; > *Helianthus mollis* var. *cordatus* – F; > *Helianthus mollis* var. *mollis* – F]



* ***Helianthus occidentalis* Riddell ssp. *occidentalis***, Naked-stem Sunflower. Rocky or sandy flood-scoured riversides, dry hammocks (in FL). Jul-Oct. MD and DC west to MN, and south to w. NC, n. GA, Panhandle FL, and TX. Ssp. *occidentalis* occupies most of the range of the species. Ssp. *plantagineus* (Torrey & Gray) Shinnery 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. 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. [= FNA9, K1, K3, Va; = *Helianthus occidentalis* – G, Il, RAB, S, Tn, W, WH3; = *Helianthus occidentalis* var. *occidentalis* – Pa; > *Helianthus dowellianus* – WV; > *Helianthus occidentalis* – WV; > *Helianthus occidentalis* var. *dowellianus* – C, F, SE]

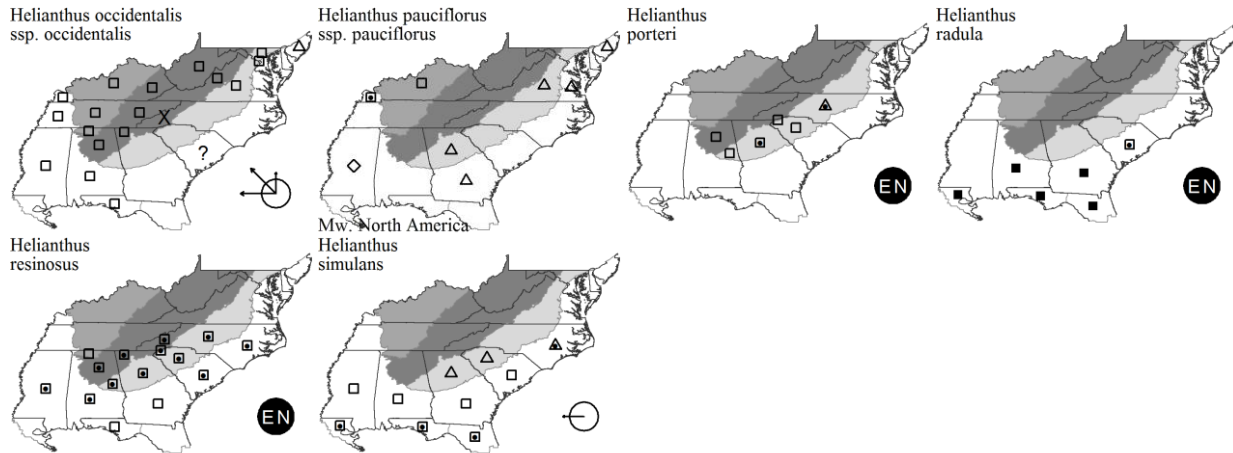
* ***Helianthus pauciflorus* Nuttall ssp. *pauciflorus***, Stiff Sunflower. Prairies, disturbed areas. Jul-Sep. ON and MI west to SD and SK, south to w. KY, n. MS, and TX. Reported for VA by Fernald (1950) under the name *H. laetiflorus* var. *rigidus* and for nc. GA by Jones & Coile (1988) under the name *H. rigidus*. [= FNA9, K1, K3; = *Helianthus pauciflorus* var. *pauciflorus* – C; > *Helianthus laetiflorus* var. *rigidus* – F; < *Helianthus pauciflorus* – Il; > *Helianthus rigidus* – S; ? *Helianthus rigidus* var. *rigidus* – SE]

* ***Helianthus porteri* (A. Gray) Pruski**, Confederate Daisy. In shallow soils over granite on low-elevation granite domes or flatrocks. Aug-Sep. A Piedmont endemic: nw. SC south to GA and ec. AL. 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 an ecological experiment (Mellinger 1972; McCormick & Platt 1964); it is now aggressively weedy at these sites. [= FNA9, K1, K3; = *Viguiera porteri* – S, SE]

***Helianthus radula* (Pursh) Torrey & A. Gray**, Roundleaf Sunflower, Rayless Sunflower. Sandhills, dryish savannas, and dry pine flatwoods. Late Aug-Oct. S. SC south to s. peninsular FL and west to se. LA. It is readily distinguishable from all other species by its rosette of orbicular to nearly round leaves, borne flat against the ground. [= FNA9, GW2, K1, K3, RAB, S, SE, WH3]

***Helianthus resinosus* Small**, Resinous Sunflower. Woodlands, thickets, roadsides. Jun-Oct. Nc. and w. NC south to Panhandle FL and west to MS. Listed for VA by F; documentation unknown. [= FNA9, K1, K3, S, SE, W, WH3; = *Helianthus tomentosus* – F, RAB, S]

* ***Helianthus simulans* E. Watson**. Wet soils, ditches, roadsides. Oct-Nov. Native from SC south to c. peninsular FL, FL Panhandle, and west to LA; now spread more widely by horticultural use. [= FNA9, GW2, K1, K3, S, SE, WH3]

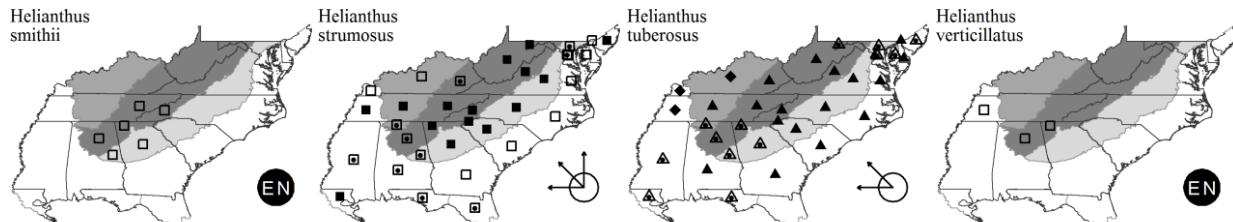


Helianthus smithii Heiser, Smith's Sunflower. Dry forests and woodlands. Aug-Sep. Known from n. GA, e. AL, and se. TN. It has small heads (like *H. microcephalus*, *H. laevigatus*, *H. schweinitzii*), the leaves narrowly lanceolate and subsessile (like *H. schweinitzii* or *H. laevigatus*), the leaves resin-dotted below (like *H. microcephalus*), but nearly glabrous. It may be a hybrid derivative of *H. microcephalus* and *H. strumosus*. [= FNA9, K1, K3, Tn; < *Helianthus microcephalus* – C, SE]

Helianthus strumosus Linnaeus, Roughleaf Sunflower. Woodlands and roadsides. Late Jul-Sep. ME, MN, and KA south to ne. FL, Panhandle FL, and TX. [= C, F, FNA9, G, Il, K1, K3, Pa, RAB, SE, Tn, Va, W, WH3, WV; > S; > *Helianthus montanus* – S; > *Helianthus saxicolus* – S]

* ***Helianthus tuberosus*** Linnaeus, Jerusalem Artichoke. Native in rich bottomlands and along streams, disturbed areas, cultivated in gardens for the edible tubers; native of farther west. Jul-Oct. [= C, FNA9, K1, K3, Pa, RAB, S, SE, Tn, Va, W, WH3; > *Helianthus tuberosus* var. *tuberosus* – F, G, Il]

Helianthus verticillatus Small, Whorled Sunflower. Seasonally wet to moist calcareous prairies. Aug-Oct. Nw. GA, ne. AL, and w. TN. This taxon is a species, not a hybrid; its morphological characteristics alone (with its unique whorled leaves) make hybrid status implausible. See Matthews et al. (2002) for additional information. [= FNA9, K3, S, Tn; = a hybrid of *H. angustifolius* with either *H. eggertii* or *H. grosseserratus* – C, SE; = *Helianthus* × *verticillatus* – K1]



Heliopsis Persoon 1807 (Sunflower-everlasting, Oxeye)

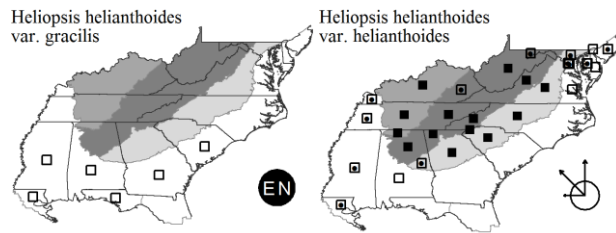
A genus of about 18 species, herbs, of America. References: SE; Fisher, T.R. (1957); Smith in FNA21 (2006c).

- 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 helianthoides* var. *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 helianthoides (Linnaeus) Sweet var. ***gracilis*** (Nuttall) Gandhi & R.D. Thomas, Smooth Oxeye, Pineywoods Oxeye, Coastal Plain Sunflower-everlasting, Coastal Plain Oxeye. Moist calcareous forests. Apr-Jul; May-Jul. 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). [= K, WH3; = *Heliopsis gracilis* – Fisher, T.R. (1957), FNA9, SE; = *Heliopsis minor* – S]

Heliopsis helianthoides (Linnaeus) Sweet var. ***helianthoides***, Eastern Sunflower-everlasting, Eastern Oxeye. Forests, woodlands, woodland borders. May-Oct. VT, ON, and WI south to GA and LA. [= C, FNA9, G, Il, K, Pa, SE, Va; = *Heliopsis helianthoides* – S, WV; = *Heliopsis helianthoides* ssp. *helianthoides* – Fisher, T.R. (1957); > F; < *Heliopsis helianthoides* – RAB, Tn, W; > *Heliopsis helianthoides* var. *solidaginoides* – F]



***Heterotheca* Cassini 1817 (Camphorweed, Golden-aster)**

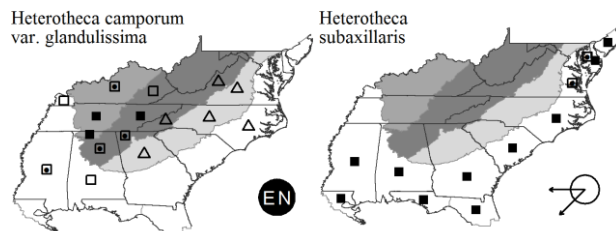
A genus of about 28 species, herbs, of North America. References: SE; Gandhi, K.N. & R.D. Thomas (1989); Semple in FNA20 (2006b); Semple (1996); Semple, J.C. (1983); Semple, J.C. (2004); Wagenknecht, B.L. (1960).

- 1 Ray flowers with pappus; perennial, from creeping rhizomes; upper and lower leaves cuneate to a sessile base ***Heterotheca camporum* var. *glandulissima***
- 1 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.
 - 2 Plants erect, 0.5-2 m tall; leaves hirsute-pilose on both sides or scabrous above; phyllaries moderately hirsute and glandular on the back; [of a variety of weedy habitats, mainly inland] ***Heterotheca latifolia* var. *latifolia***
 - 2 Plants erect or decumbent, 0.3-1 m tall; leaves scabrous on both sides or only beneath; phyllaries densely hirsute and glandular on the back; [of coastal dunes] ***Heterotheca subaxillaris***

* ***Heterotheca camporum* (Greene) Shinnery var. *glandulissima*** Semple, Nashville Camphorweed, Lemon-yellow Goldenaster. Roadsides, disturbed areas. [= FNA9, Tn, Va; = *Chrysopsis camporum* var. *glandulissima* – C; = *Heterotheca camporum* var. *glandulissimum* – K, Semple (1996); < *Chrysopsis camporum* – F, Il, SE, W; < *Chrysopsis villosa* var. *camporum* – G]

* ***Heterotheca latifolia* Buckley var. *latifolia***, Common Camphorweed. Roadsides, disturbed areas; native of the sc. United States and adjacent Mexico. Aug-Oct. [= Semple (1996), Wagenknecht, B.L. (1960); = *Heterotheca subaxillaris* ssp. *latifolia* – FNA9, Q, Tn; = *Heterotheca subaxillaris* var. *latifolia* – Gandhi, K.N. & R.D. Thomas (1989); < *Heterotheca subaxillaris* – C, F, G, Il, K, Pa, RAB, S, SE, W, WH3]

***Heterotheca subaxillaris* (Lamarck) Britton & Rusby**, Dune Camphorweed. Coastal dunes and sand-flats. Jul-Oct (-Jan). NJ south to FL, west to TX and Mexico, along the coast. This taxon is apparently native in our area, and is a conspicuous component of the flora of ocean dunes. [= Semple (1996), Va; = *Heterotheca subaxillaris* ssp. *subaxillaris* – FNA9, Q; = *Heterotheca subaxillaris* var. *subaxillaris* – Gandhi, K.N. & R.D. Thomas (1989), Wagenknecht, B.L. (1960); < C, F, G, K, Pa, RAB, S, SE, WH3]



***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, S. & W. Greuter (2007); SE; Kilian, Gemeinholzer, & Lack (2009); Strother in FNA19 (2006a).

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. ×alleganiense* Britton (pro sp.)], *H. gronovii* × *venosum*, *H. paniculatum* × *scabrum*, *H. paniculatum* × *venosum* [*H. ×scribneri* Small (pro sp.)], *H. scribneri* – K1], *H. scabrum* × *venosum*.

- 1 Cypselas 1-2.5 mm long; pappus of 25-40+ white to sordid bristles, in 1 series; plants stoloniferous (cespitose in a few species); corollas yellow or orange ***Pilosella***
- 1 Cypselas (2-) 2.5-7 mm long; pappus of (30-) 40-80 white, tan, or sordid bristles, in 1-2+ series; plants cespitose; corollas yellow.
 - 2 Leaves primarily cauline, the largest leaves definitely on the stem, basal leaves usually absent.

- 3 Florets 8-20 (-30) per head; leaves nearly glabrous, or with a few long hairs on the lower surface; upper stem glabrous *Hieracium paniculatum*
- 3 Florets 30-110 per head; leaves setose, with long hairs on the upper and lower surfaces; upper stem stipitate-glandular, stellate-pubescent, or glabrous. *Hieracium scabrum*
- 2 Leaves primarily basal, the largest leaves basal, leaves in some species extending onto the lower portion of the stem.
- 4 Leaves purple-veined (when fresh).
- 5 Lower stem strongly pilose; leaves weakly purple-veined *Hieracium marianum*
- 5 Lower stem glabrous or nearly so; leaves strongly purple-veined *Hieracium venosum*
- 4 Leaves not purple-veined.
- 6 Inflorescence a narrow to broad panicle.
- 7 Cypsels truncate, broadest at the tip; flowers 40-100 per head *Hieracium scabrum*
- 7 Cypsels narrowed to the tip; flowers 20-40 per head *Hieracium gronovii*
- 6 Inflorescence corymbiform.
- 8 Stem with several well-developed leaves slightly smaller than the basal leaves; inflorescence corymbiform or tending toward paniculate.
- 9 Involucre mostly 6-9 mm high; inflorescence generally elongate and cylindric (appearing corymbiform in depauperate individuals); achenes 2.5-4 mm long; corollas 8-9 mm long *Hieracium gronovii*
- 9 Involucre mostly 8-11 mm high; inflorescence broadly corymbiform; achenes 3.5-5 mm long; corollas 10-13 mm long *Hieracium megacephalon*
- 8 Stem leafless, or with only a few leaves distinctly smaller than the basal leaves; inflorescence strongly corymbiform.
- 10 Involucre glabrous or with short stipitate glands, but lacking long setae (either gland-tipped or glandless) *Hieracium marianum*
- 10 Involucre with long setae (either gland-tipped or glandless). *Hieracium megacephalon*

Hieracium gronovii Linnaeus, Beaked Hawkweed, Queendevil. Sandhills, dry forests, woodland margins, roadsides. Jul-Nov. MA west to s. ON and KS, south to c. peninsular FL and TX. [= C, F, FNA9, G, II, K1, K3, Pa, RAB, S, SE, Tn, Va, W, WH3, WV]

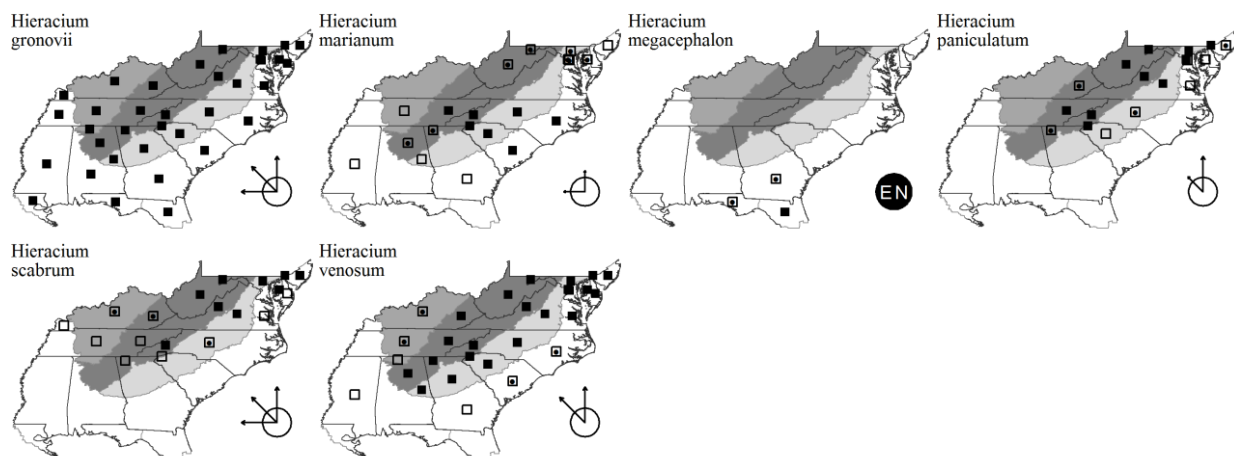
Hieracium marianum Willdenow, Maryland Hawkweed. Dry forests, woodland margins, roadsides. May-Nov. NH west to OH, south to FL and MS. Considered to derive from hybridization between *H. gronovii* Linnaeus and *H. venosum* Linnaeus. There is apparently no definite report from VA. [= F, K1, K3, S, WV; = *Hieracium* × *marianum* – C, RAB, SE]

Hieracium megacephalon Nash, Bigheaded Hawkweed. Dry sandy soils of pinelands and hammocks. S. GA south to s. FL. [= K1, K3, WH3; = *Hieracium megacephalum* – FNA9, SE; > S; > *Hieracium argyraeum* – S]

Hieracium paniculatum Linnaeus, Leafy Hawkweed. Dry to mesic forests, especially along dirt roads. Jul-Oct. NS and QC west to MN, south to w. NC, n. GA, and OH. The leafy stem and lack of basal leaves of *H. paniculatum* readily distinguish it from our other species of *Hieracium*. In fact, it often puzzles the inexperienced botanist, who may overlook the possibility that this plant is a *Hieracium*! The milky sap and obscure teeth on the leaves are good corroborative characters. [= C, F, FNA9, G, K1, K3, Pa, RAB, S, SE, Tn, Va, W, WV]

Hieracium scabrum Michaux, Rough Hawkweed. Dry forests, woodland margins, roadsides. Jul-Nov. NS and QC west to MN, south to VA, n. GA, KY, and MO. [= C, FNA9, G, K3, Pa, RAB, S, SE, Tn, Va, W, WV; > *Hieracium scabrum* var. *intonsum* – II; > *Hieracium scabrum* var. *scabrum* – F, II, K1]

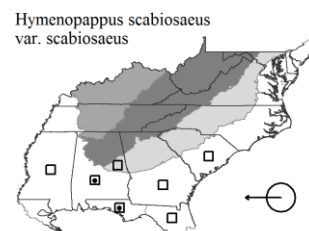
Hieracium venosum Linnaeus, Veiny Hawkweed, Rattlesnake Weed. Dry forests, woodland margins, roadsides. Apr-Sep. NY west to MI, south to GA, AL, and TN; apparently disjunct in FL. [= C, FNA9, G, K3, Pa, RAB, S, SE, Tn, Va, W, WV; > *Hieracium venosum* var. *nudicaule* – F, K1; > *Hieracium venosum* var. *venosum* – F, K1]



Hymenopappus L'Héritier 1788 (Woolly-white)

A genus of about 11-14 species, herbs, of s. North America. References: SE; Strother in FNA21 (2006c).

Hymenopappus scabiosaeus L'Héritier var. *scabiosaeus*, Old Plainsman. Turkey oak sandhills and adjacent sandy fields. 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. Var. *corymbosus* (Torrey & A. Gray) B.L. Turner is distributed in the s. Great Plains and adjacent areas, from NE south to TX and Coahuila. [= C, FNA9, K1, K3, SE; < *Hymenopappus scabiosaeus* – F, G, IL, RAB, S, WH3]

*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 in FNA19 (2006a); SE.

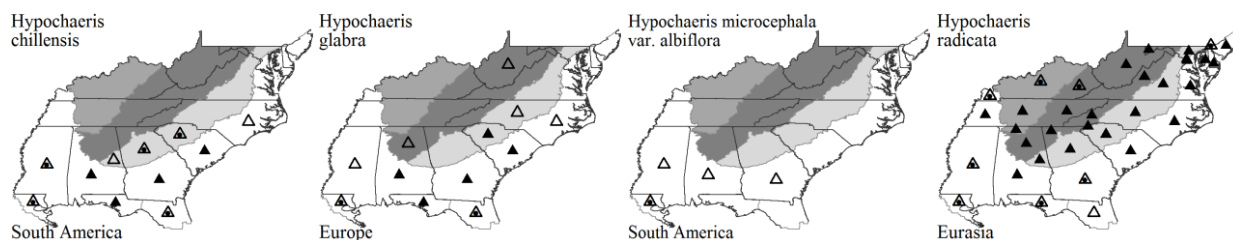
- 1 Stem with at least a few well-developed leaves, clasping and similar to the basal; pappus of one length, all long and plumose.
 - 2 Flowers yellow; middle and outer phyllaries hispid; heads usually 5-8 mm across at anthesis, the involucre campanulate *Hypochaeris chillensis*
 - 2 Flowers white; middle and outer phyllaries glabrous or puberulent; heads usually 2-4 mm wide at anthesis, the involucre cylindric *Hypochaeris microcephala* var. *albiflora*
- 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. Roadsides, fields, other disturbed places; native of South America. Late Apr-Jul. More common in the NC Coastal Plain than shown in RAB (common in Duplin, Sampson, and Wayne cos.) (A.J. Bullard, pers. comm., 2003). [= FNA9, K3, WH3; ? *Hypochaeris brasiliensis* var. *tweediei* – K1, SE; ? *Hypochaeris elata* – RAB]

* *Hypochaeris glabra* Linnaeus, Smooth Cat's-ear. Roadsides, fields, disturbed areas; native of Europe. Late Mar-Jul. [= FNA9, IL, K1, K3, S, WH3; = *Hypochaeris glabra* – C, RAB, SE, WV]

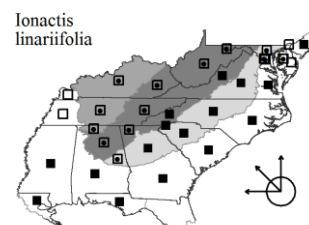
* *Hypochaeris microcephala* (Schultz 'Bipontinus') Cabrera var. *albiflora* (Kuntze) Cabrera, White-flowered Cat's-ear. Disturbed areas; native of South America. This species has been found as a naturalized introduction at Fort Pulaski (Chatham County, GA) (T. Govus, pers. comm., 2006) and in Camden County, GA (Carter, Baker, & Morris 2009). [= FNA9, K1, K3, SE]

* *Hypochaeris radicata* Linnaeus, Spotted Cat's-ear. Roadsides, fields, disturbed areas; native of Eurasia. Apr-Oct. [= FNA9, G, IL, K1, K3, Pa, S, Tn, Va, WH3; = *Hypochaeris radicata* – C, F, RAB, SE, WV]

*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: SE; Nesom in FNA20 (2006b); Nesom & Leary (1992).

Ionactis linariifolia (Linnaeus) Greene, Stiff-leaved Aster. Dry savannas, 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. Jul-Nov. ME and QC west to WI, south to ne. FL, Panhandle FL, and TX. 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. [= FNA9, K2, Nesom & Leary (1992), Pa, Tn, Va, WH3; = *Aster linariifolius* – C, G, RAB, SE, W, WV; = *Ionactis linariifolius* – IL, 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: SE; Jackson (1960); Strother in FNA21 (2006c); Turner, B.L. (2009a).

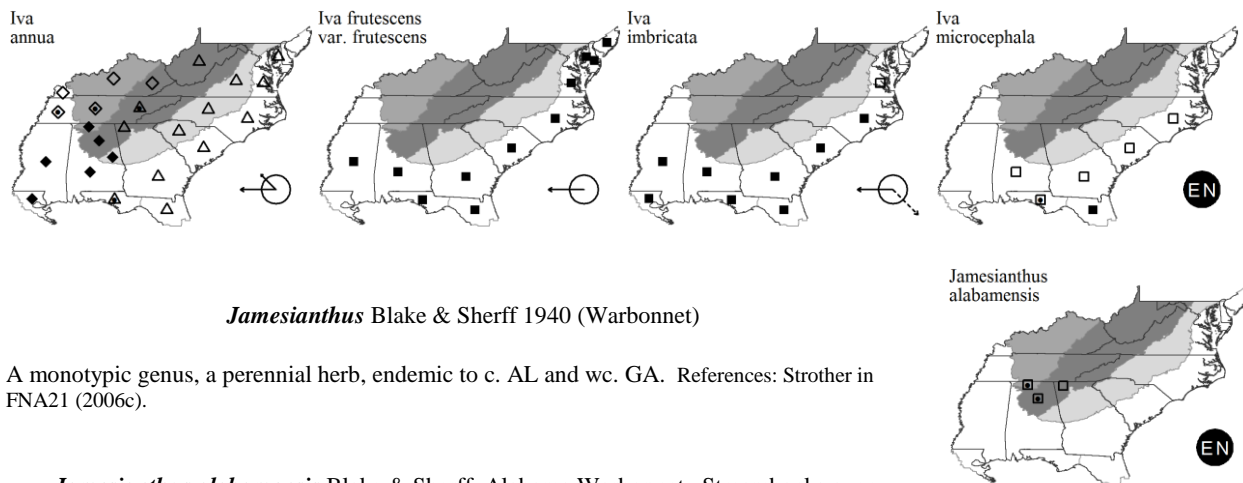
- 1 Plants perennial, fleshy, glabrous (or strigillose on the leaf faces); [mostly of maritime situations, such as brackish marshes, marsh edges, or ocean dunes]; [section *Iva*].
 - 2 Leaves 1.5-4.5 (-6.0) cm long, 0.4-1.0 (-1.5) cm wide, 1-3 mm thick when fresh, mostly untoothed; involucre 4-7 mm high; leaves alternate from midstem upward; [mostly of dunes and the upper beach]*Iva imbricata*
 - 2 Leaves 4-10 cm long, 0.7-4.0 cm wide, 0.5-1 mm thick when fresh, usually toothed; involucre 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].
 - 3 Leaves 20-70 mm wide, ovate; staminate flowers usually 8-16 (-20) per head; [mostly of disturbed ground]; [section *Iva*]*Iva annua*
 - 3 Leaves 0.5-8 mm wide, linear; staminate flowers 1-9 per head; [section *Linearbractea*].
.....*Iva microcephala*

* *Iva annua* Linnaeus, Sumpweed, Rough Marsh-elder. Fields, especially bottomlands, disturbed places; in the eastern and inland part of area probably introduced (by native Americans) from farther west. Sep-Nov. PA, ND, and CO south to FL, NM, and Mexico (the original distribution uncertain). Reported for MD (Longbottom, Naczi, & Knapp 2016). This species was apparently an important crop of native Americans. 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. [= C, FNA9, GW2, Il, Pa, RAB, SE, Tn, Va, W, WH3; = *Iva ciliata* - F; > *Iva annua* var. *annua* - Jackson (1960), K; > *Iva annua* var. *caudata* - Jackson (1960), K; > *Iva annua* var. *macrocarpa* - Jackson (1960), K; > *Iva caudata* - S; > *Iva ciliata* - S; > *Iva ciliata* var. *ciliata* - G; > *Iva ciliata* var. *macrocarpa* - G]

Iva frutescens Linnaeus var. *frutescens*, Southern Maritime Marsh-elder. Brackish marshes and marsh edges, normally on the back side of barrier islands. Late Aug-Nov. NJ south to s. FL, west to TX. See *I. frutescens* var. *oraria* for discussion of the two taxa. [= C, F, G, SE; = *Iva frutescens* ssp. *frutescens* - GW2, Jackson (1960); < *Iva frutescens* - FNA9, K2, Pa, RAB, S, Va, WH3]

Iva imbricata Walter, Dune Marsh-elder. Dunes, upper beach, island-end flats. Late Aug-Nov. Se. VA south to s. FL, west to LA; Bahamas and Cuba. 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*. [= C, F, FNA9, G, Jackson (1960), K2, RAB, S, SE, Va, WH3]

Iva microcephala Nuttall, Small-headed Marsh-elder. Wet pine flatwoods, flatwood ponds, clay-based Carolina bays. Sep-Oct. C. NC south to s. FL, west to se. AL. A seed-banking annual, locally abundant some years and absent others depending on the variable hydrologic conditions of Carolina bays and other seasonally flooded wetlands. [= FNA9, GW2, Jackson (1960), K2, RAB, S, SE, WH3]

*Jamesianthus* Blake & Sherff 1940 (Warbonnet)

A monotypic genus, a perennial herb, endemic to c. AL and wc. GA. References: Strother in FNA21 (2006c).

Jamesianthus alabamensis Blake & Sherff, Alabama Warbonnet. Streambanks over limestone or other calcareous rocks. Endemic to stream banks in c. AL and wc. GA. The opposite leaves are squared off at the base in a distinctive manner. [= FNA9, K, SE]

Krigia Schreber 1791 (Cynthia, Dwarf-dandelion)

A genus of 7 species, herbs, of (mainly e.) North America. References: Chambers & O'Kennon in FNA19 (2006a); Chambers, K.L. (2004); SE; Kim, K.-J. & B.L. Turner (1992).

Unkeyed taxa:*Krigia occidentalis*

- 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

- 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.
- 2 Pappus of 5 scales and 5 bristles; plant a winter annual; stem leafless or leafy at the base only *Krigia dandelion*
- 2 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.
- 3 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 montana*
- 3 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.
- 4 Peduncles usually 1 per leaf axil; leaves linear-lanceolate, the larger 1-12 mm wide; perennial from an underground rhizome (to 5 mm in diameter), larger plants with an extensive rootmat and multiple stems *Krigia montana*
- 4 Peduncles usually 2 per leaf axil; leaves oblanceolate, the larger 15-45 mm wide; solitary-stemmed perennial from a short caudex ...

Krigia biflora var. *biflora*

Krigia biflora (Walter) S.F. Blake var. *biflora*, Orange Dwarf-dandelion. Rich, moist forests. May-Oct. 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. The natural hexaploid hybrid *Krigia* × *shinnensis* K.L. Chambers [*K. biflora* × *montana*] is documented from the Craggy Mountains, Buncombe County, NC (Chambers 2004; Kim & Turner 1992). [= Kim, K.-J. & B.L. Turner (1992), Va; = *Cynthia virginica* – S; < *Krigia biflora* – C, F, FNA9, G, Il, K2, Pa, RAB, SE, Tn, W, WV]

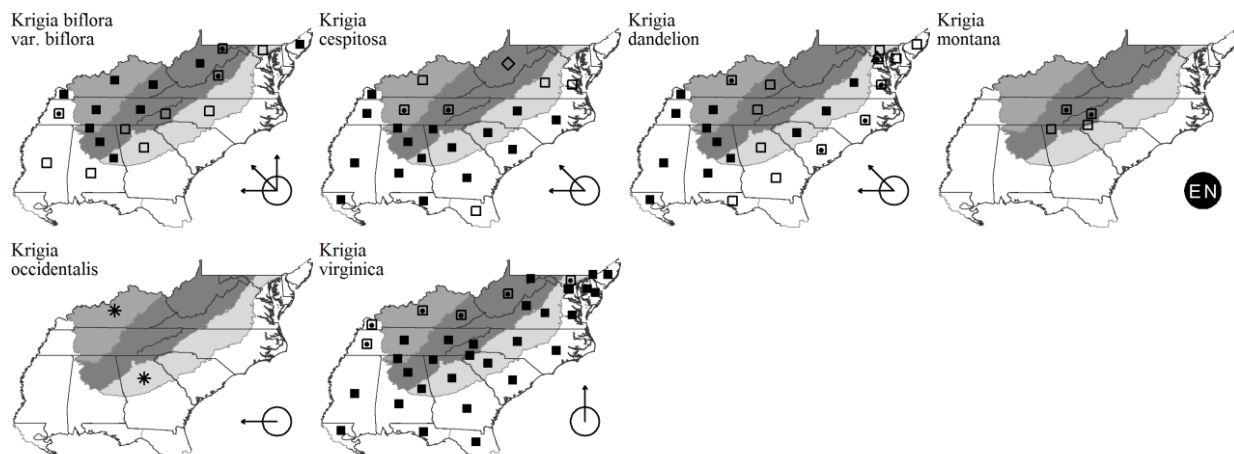
* ***Krigia cespitosa*** (Rafinesque) K.L. Chambers, Opposite-leaf Dwarf-dandelion. Fields, roadsides, disturbed places. Late Mar-early Jun. Se. VA and NE south to c. peninsular FL and TX. *K. gracilis* (A.P. de Candolle) Shinners occurs in TX, OK, and LA; it is sometimes treated as *K. cespitosa* var. *gracilis* (A.P. de Candolle) K.L. Chambers, but is better considered as a species, as it is sympatric and generally distinct. [= Tn, Va; = *Krigia caespitosa* var. *caespitosa* – K2; = *Krigia cespitosa* var. *caespitosa* – Chambers, K.L. (2004), FNA9; = *Krigia oppositifolia* – C, G, RAB, SE, W; = *Serinia cespitosa* – Il; = *Serinia oppositifolia* – F, S; < GW2, Kim, K.-J. & B.L. Turner (1992), WH3]

* ***Krigia dandelion*** (Linnaeus) Nuttall, Colonial Dwarf-dandelion. Woodlands, roadsides, disturbed areas. Apr-May. NJ, IL, and KA, south to Panhandle FL and ne. TX. [= C, F, FNA9, G, GW2, Il, K2, Kim, K.-J. & B.L. Turner (1992), RAB, SE, Tn, Va, W, WH3; = *Cynthia dandelion* – S]

Krigia montana (Michaux) Nuttall, Mountain Dwarf-dandelion. Cliffs and rock outcrops at medium to high elevations. May-Sep. A Southern Appalachian endemic: w. NC, e. TN, nw. SC, and ne. GA. The natural hexaploid hybrid *Krigia* × *shinnensis* K.L. Chambers [*K. biflora* × *montana*] is documented from the Craggy Mountains, Buncombe County, NC (Chambers 2004; Kim & Turner 1992). [= FNA9, K2, Kim, K.-J. & B.L. Turner (1992), RAB, SE, Tn, W; = *Cynthia montana* – S]

* ***Krigia occidentalis*** Nuttall. {GA}. Mar-May. MO and KS south to LA and TX; disjunct eastward in GA. {not yet keyed; add to synonymy}. [= FNA9, K2, SE]

Krigia virginica (Linnaeus) Willdenow, Virginia Dwarf-dandelion. Rocky woodlands, roadsides, disturbed areas. Late Mar-Jul. ME west to MN, south to c. peninsular FL and c. TX. [= C, F, FNA9, G, GW2, Il, K2, Kim, K.-J. & B.L. Turner (1992), Pa, RAB, S, SE, Tn, Va, W, WH3]



Lactuca Linnaeus 1753 (Lettuce)

A genus of about 75 species, herbs, nearly cosmopolitan (especially north temperate). References: SE; McVaugh, R. (1972); Strother in FNA19 (2006a).

Identification Notes: Most species are highly variable in leaf lobing.

- 1 Achene beaks stout and short, 0.1-0.5 (-1.0) mm long ($< \frac{1}{2}$ 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 ($> \frac{1}{2}$ as long as the body of the achene); rays yellow or blue (sometimes white or drying bluish).
 - 2 Each face of the achene with (3-) 5-9 nerves; stems typically white or pale green; rays yellow (sometimes drying blue); [aliens].
 - 3 Unlobed cauline leaves lanceolate to linear *Lactuca saligna*
 - 3 Unlobed cauline leaves oblong, obovate, or spatulate.
..... *Lactuca serriola*
 - 2 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].
 - 4 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*
 - 4 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].
 - 5 Lobes of leaves mostly widest at the base and tapering to a pointed tip; leaves and stems rarely noticeably pubescent; fruiting involucre 10-15 mm tall; achenes 2.5-3.5 mm long (excluding the beak) *Lactuca canadensis*
 - 5 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 involucre 15-22 mm tall; achenes 4.5-6 mm long (excluding the beak) *Lactuca hirsuta*

Lactuca canadensis Linnaeus, American Wild Lettuce. Fields, roadsides, disturbed ground. Jun-Nov. NS and BC south to n. peninsular FL, TX, and CA. [= C, FNA9, K, Pa, RAB, SE, Tn, Va, W, WH3; > S; > *Lactuca canadensis* var. *canadensis* – F, G, Il, WV; > *Lactuca canadensis* var. *latifolia* – F, G, Il, WV; > *Lactuca canadensis* var. *longifolia* – F, G, Il, WV; > *Lactuca canadensis* var. *obovata* – F, G, Il; > *Lactuca sagittifolia* – S]

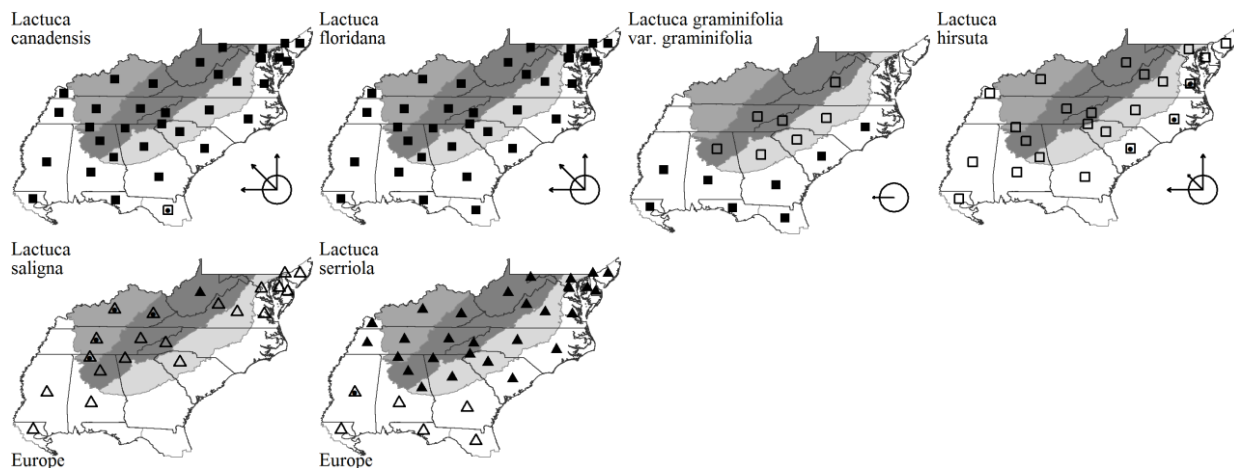
Lactuca floridana (Linnaeus) Gaertner, Woodland Lettuce. Mesic and dry-mesic forests. Aug-Nov. NY, MB and MN south to s. FL and TX. [= C, FNA9, RAB, SE, Tn, Va, W, WH3, WV; > *Lactuca floridana* var. *floridana* – F, G, Il, K, Pa; > *Lactuca floridana* var. *villosa* – F, G, Il, K, Pa; > *Mulgedium floridanum* – S; > *Mulgedium villosum* – S]

Lactuca graminifolia Michaux var. *graminifolia*, Coastal Plain Lettuce. Mesic to dry-mesic pine-oak woodlands and forests, longleaf pine sandhills, sandy fields, and sandy roadsides. Apr-Jul. E. NC south to s. FL, west to c. LA; disjunct in s. NJ. 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. [= K, Va; = *Lactuca graminifolia* – S; < *Lactuca graminifolia* – F, FNA9, RAB, SE, Tn, W, WH3]

Lactuca hirsuta Muhlenberg ex Nuttall, Downy Lettuce. Forests and forest edges. Late May-Nov. NS and ON south to n. FL and TX. [= C, FNA9, Pa, RAB, S, SE, Tn, Va, W, WV; > *Lactuca hirsuta* var. *hirsuta* – F, G, K; > *Lactuca hirsuta* var. *sanguinea* – F, G, Il, K]

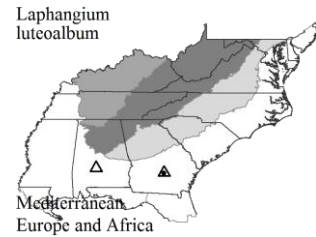
* *Lactuca saligna* Linnaeus, Willowleaf Lettuce. Fields, roadsides, disturbed ground, perhaps associated with circumneutral soils; native of Europe. Aug-Nov. [= C, F, FNA9, G, Il, K, Pa, RAB, SE, Tn, Va, W, WV]

* *Lactuca serriola* Linnaeus, Prickly Lettuce. Roadsides, disturbed ground, pastures; native of Europe. Jun-Nov. [= C, FNA9, Il, K, Pa, SE, Tn, Va, WH3; = *Lactuca scariola* – F, RAB; > *Lactuca scariola* – S; > *Lactuca serriola* var. *integrata* – G, W; > *Lactuca virosa* – S]



***Laphangium* (Hilliard & B.L. Burt) Tzvelev 1993 [1994] (Red-tipped Rabbit-tobacco)**

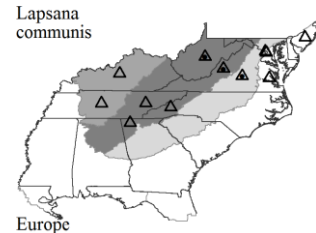
A genus of 3 species, of Mediterranean Europe, Africa, and w. Asia. References: Anderberg, A.A. (1991); Arriagada, J.E. (1998); Galbany-Casals et al (2004); Greuter (2003b); Nesom in FNA19 (2006a); Nesom, G.L. (2001a).



* ***Laphangium luteoalbum*** (Linnaeus) Tzvelev, Red-tipped Rabbit Tobacco. Mowed rights-of-way, other disturbed areas; native of Eurasia. Apr-Jun. Best treated in *Laphangium* (see synonymy) (G. Nesom, pers. comm., 2016). {not yet keyed in Asteraceae key; add synonymy}. [= Greuter (2003b); = *Helichrysum luteoalbum* – Galbany-Casals et al (2004), K3; = *Pseudognaphalium luteoalbum* – FNA9, WH3]

***Lapsana* Linnaeus 1753 (Nipplewort)**

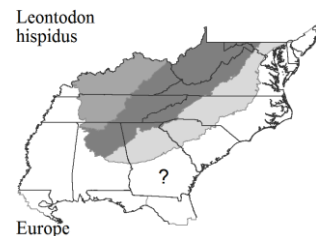
A monotypic genus (after the removal of most members to *Lapsanastrum*), an annual herb, of temperate Eurasia. References: Bogler in FNA19 (2006a); SE.



* ***Lapsana communis*** Linnaeus, Nipplewort. Fields, forests, vacant lots, disturbed areas; native of Europe. Jun-Sep. First reported for GA (Rabun County) by Stiles & Howel (1998). See Poindexter (2006). [= C, F, FNA9, G, II, K, Pa, RAB, SE, Tn, Va, W, WV]

***Leontodon* Linnaeus 1753 (Hawkbit)**

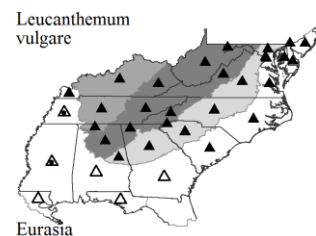
A genus of about 30 species, herbs, primarily of temperate Eurasia. Samuel et al. (2006) show that *Leontodon* subgenus *Oporinia* should be recognized as a separate genus from *Leontodon* sensu stricto. References: Bogler in FNA19 (2006a); SE; Samuel, R. et al. (2006).



* ***Leontodon hispidus*** Linnaeus, Bristly Hawkbit. Scattered states in eastern North America. [= FNA9; > *Leontodon hirtus* – K; > *Leontodon hispidus* ssp. *hispidus* – K]

***Leucanthemum* P. Miller 1754 (Oxeye Daisy)**

A genus of about 35 species, herbs, of Eurasia. References: Arriagada, J.E. & N.G. Miller (1997); SE; Strother in FNA19 (2006a).



* ***Leucanthemum vulgare*** Lamarck, Oxeye Daisy, White Daisy, Common Daisy, Marguerite. Fields, roadsides, pastures, disturbed areas; native of Eurasia. Apr-Oct. [= Arriagada, J.E. & N.G. Miller (1997), FNA9, II, K, Pa, Va, WH3; = *Chrysanthemum leucanthemum* – C, G, RAB, SE, W; = *Leucanthemum leucanthemum* – S; > *Chrysanthemum leucanthemum* var. *pinnatifidum* – F, WV]

***Liatris* Schreber 1791 (Blazing-star, Gayfeather)**

A genus of 40-50 species, herbs, of e. and c. North America. References: SE; Gaiser (1946); Godfrey, R.K. (1948); Mayfield, M.H. (2002); Nesom in FNA21 (2006c); Stucky, J.M. (1991); Stucky, J.M. (1992); Stucky, J.M. & M. Pyne (1990).

- 1 Pappus plumose, the barbels along each pappus bristle mostly 0.5-1.0 mm long.
- 2 Inner phyllaries with apices prolonged, loosely spreading, slightly dilated, and petaloid (white to yellow, pink, or purplish); heads 3-5 mm in diameter, with 4-6 flowers per head; corolla lobes glabrous within; [of the Coastal Plain from SC southward].
- 3 Heads sessile; petaloid phyllary apices lavender, pink, or magenta, recurved, the petaloid portion short relative to the green phyllary bases *Liatris elegans* var. *elegans*
- 3 Heads pedunculate on short peduncles; petaloid phyllary apices light yellow or cream (rarely pale lavender), divergent with tips ascending, the petaloid portion elongate relative to the green phyllary bases *Liatris elegans* var. *kralii*
- 2 Inner phyllaries not prominently petaloid; heads 10-20 mm in diameter, with 10-60 flowers per head; corolla lobes coarsely hairy within; [collectively widespread].
- 4 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*
- 4 Outer phyllaries shorter than the inner phyllaries, erect-appressed to spreading or reflexed, the spreading portion 0-2 mm long.

- 5 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*
- 5 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.
- 6 Leaves 3-5-veined.
 - 7 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; involucre 7-9 mm, purplish to greenish; florets 5-6 (-8) per head; [mainly of the Coastal Plain] *Liatris spicata* var. *resinosa*
 - 7 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; involucre (7-) 8-11 mm, usually greenish; florets (4-) 6-8 (-12) per head; [of the Mountains and Piedmont] *Liatris spicata* var. *spicata*
- 6 Leaves 1-veined.
 - 8 Mid and inner phyllaries either apically acute or rounded-retuse and minutely involute-cuspidate to apiculate.
 - 9 Stems hirtellous with spreading to slightly deflexed hairs or variously puberulent to hirsute.
 - 10 Stems hirsute to puberulent to pilose-puberulent or strigose-puberulent *Liatris gracilis*
 - 10 Stems hirtellous with spreading to slightly deflexed hairs.
 - 11 Heads sessile, relatively crowded in a cylindric arrangement, rigidly ascending, appressed to the rachis and to each other, densely overlapping; [e. NC south to Panhandle FL and AL] *Liatris chapmanii*
 - 11 Heads sessile to short-pedunculate, in a relatively loose, spiciform, racemoid, or paniculate, commonly secund arrangement; [e. GA south through ne. FL to c. peninsular FL] *Liatris pauciflora*
 - 9 Stems glabrous.
 - 12 Phyllaries apically usually rounded-retuse and minutely involute-cuspidate to apiculate; corolla tubes glabrous within.
 - 13 Stems and basal leaves glabrous; basal leaves mostly arising from congested nodes at very base of plant, (1-) 2-6 (-9) mm wide, abruptly reduced in size distally, surfaces minutely white-dotted by stomates, not glandular-punctate *Liatris laevigata*
 - 13 Stems and basal leaves glabrous to very sparsely pilose, leaves usually with a few, spreading cilia near insertion; basal and lower cauline leaves arising from numerous, separated nodes on proximal part of stem, 1-2 (-2.5) mm wide and relatively even-sized, surfaces glandular-punctate *Liatris tenuifolia*
 - 12 Phyllaries apically acute; corolla tubes pilose within.
 - 14 Heads often in a secund arrangement; involucre 7-15 mm; phyllaries obovate; florets 3-6.
 - 15 Stems glabrous (rarely sparsely hirtellous); leaves and phyllaries sparsely or not at all gland-dotted; involucre 11-15 mm high; inner phyllaries with acute apices *Liatris pauciflora*
 - 15 Stems minutely puberulent-hirtellous; leaves and phyllaries gland-dotted; involucre 7-10 (-14) mm high; inner phyllaries with abruptly acuminate apices, often apiculate or mucronulate *Liatris secunda*
 - 14 Heads in a secund arrangement or not; involucre (6-) 7-9 mm; phyllaries ovate-triangular to generally oblong; florets 4-10 (-12).
 *Liatris virgata*
 - 8 Mid and inner phyllaries apically rounded, not rounded-retuse or cuspidate to apiculate.
 - 16 Stems glabrous (rarely sparsely to moderately pilose in *L. pilosa*).
 - 17 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*
 - 17 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*).
 *Liatris elegantula*
 - 16 Stems puberulent to strigose.
 - 18 Involucres 2.5-7 mm wide; florets 3-12.
 - 19 Stems and peduncles puberulent to pilose-puberulent or strigose-puberulent; heads usually on ascending peduncles 2-10 (-12) mm; involucre 2.5-4 (-5) mm wide; phyllaries apically rounded or obtuse to acute or acuminate; florets 3-6 (-9).
 - 20 Cauline leaves (proximal) spatulate (petioles slender, blades elliptic to lance-elliptic), (8-) 11-22 (-27) mm wide (bracts subtending proximal heads 2+ mm wide, grading gradually from distal cauline leaves); phyllary apices usually acuminate to acute, rarely obtuse *Liatris gholsonii*
 - 20 Cauline leaves (proximal) usually lanceolate, linear, linear-oblongate, or oblongate, sometimes narrowly spatulate, 2-8 (-10) mm wide (bracts subtending proximal heads to 2 mm wide, abruptly differentiated from distal cauline leaves); phyllary apices usually rounded or obtuse-truncate, rarely acute *Liatris gracilis*
 - 19 Stems and peduncles stiffly short-strigose with closely ascending hairs; heads on divergent, arcuate-ascending peduncles 10-25 (-30) mm; involucre 5-7 mm wide; phyllaries apically rounded to nearly flat; florets 7-12 *Liatris patens*
 - 18 Involucres 13-22 (-25) mm wide or (6-) 8-15 mm wide (*L. squarrosa*); florets 11-80.
 - 21 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* var. *scariosa*
 - 21 Heads usually sessile, less commonly subsessile on peduncles 1-8 mm (rarely more); at least outer phyllaries usually reflexing; florets 11-26 (-30); corolla tubes pilose within.
 - 22 Phyllaries glabrous, bullate, with broad, conspicuous, often erose to lacerate or irregular, hyaline border *Liatris aspera*
 - 22 Phyllaries glabrous to puberulent or puberulent-hirtellous, essentially flat (not bullate), without hyaline border or border narrow and inconspicuous *Liatris squarrosa*

Liatis aspera Michaux, Rough Blazing-star. Prairies, barrens, glades. Aug-Sep (-Oct). ON and ND south to Panhandle FL and TX. [= C, FNA9, G, K2, RAB, SE, Tn, Va, W, WH3; > *Laciniaria aspera* var. *aspera* – S; > *Laciniaria aspera* var. *spheroidea* – S; > *Liatis aspera* var. *aspera* – F, Il; > *Liatis aspera* var. *intermedia* – F, Godfrey, R.K. (1948), Il, K, WV; > *Liatis spheroidea* – K1]

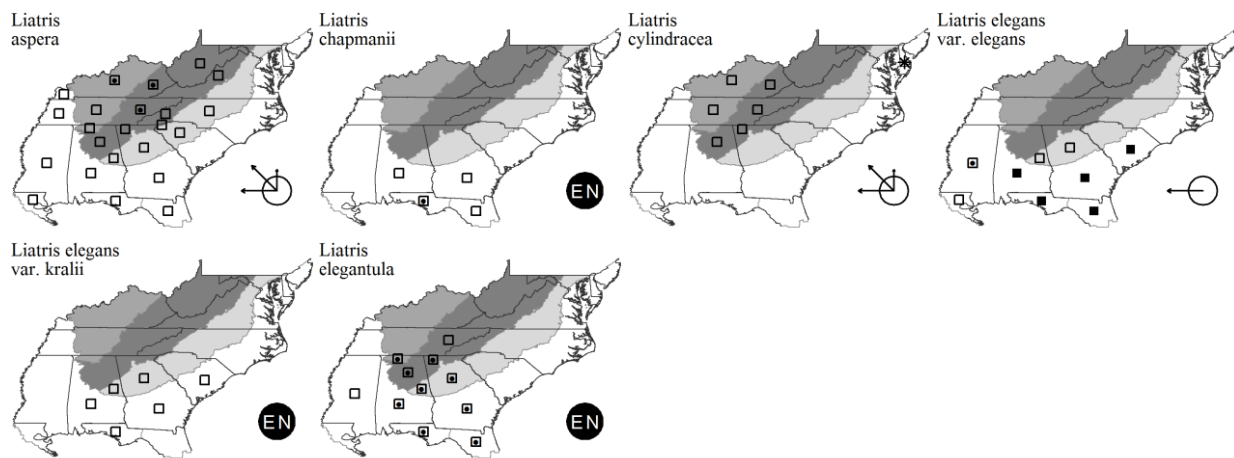
Liatis chapmanii Torrey & A. Gray, Chapman's Blazing-star. Xeric sands of scrub and longleaf pine sandhills. Aug-Oct. Sw. GA, s. AL (Barger, Spaulding, & Holt 2013), south to s. FL. {synonymy incomplete}. [= FNA9, K2, SE, WH3; = *Laciniaria chapmanii* – S]

* ***Liatis cylindracea*** Michaux, Barrelhead Blazing-star. Limestone glades, prairies, rarely escaped from cultivation eastward. Jul-Sep. NY, ON, and MN south to se. TN (Ridge and Valley) (Chester, Wofford, & Kral 1997), nw. GA, and c. AL (Bibb County), and OK. {synonymy incomplete}. [= C, F, FNA9, G, Il, K2, SE, Tn]

Liatis elegans (Walter) Michaux var. *elegans*, Common Elegant Blazing-star. Sandhills. SC south to FL, west to TX. See Mayfield (2002) for discussion of infraspecific taxa in this species. [= FNA9, K2; < Gaiser (1946), K1; > *Laciniaria elegans* – S; > *Laciniaria flabellata* – S; < *Liatis elegans* – RAB, SE, WH3; > *Liatis elegans* var. *flabellata* – Gaiser (1946), K1]

Liatis elegans (Walter) Michaux var. *kralii* Mayfield, Kral's Elegant Blazing-star. Sandhills. Se. SC (Allendale Co.) south to n. FL and west to s. MS. See Mayfield (2002) for discussion of infraspecific taxa in this species. [= FNA9, K2; < *Laciniaria elegans* – S; < *Liatis elegans* – Gaiser (1946), SE, WH3]

Liatis elegantula (Greene) K. Schumann. Sandhills, other dry woodlands; uncommon. Aug-Oct (-Nov). GA south to n. peninsular FL, west to MS. {synonymy incomplete}. [= FNA9, WH3; = *Laciniaria elegantula*; = *Liatis graminifolia* var. *elegantula* – Gaiser (1946); < *Laciniaria graminifolia* – S; < *Liatis graminifolia* – SE]



Liatis gholsonii L.C. Anderson, Gholson's Blazing-star. Mesic sandy sites, bluff forests. (Jul-) Aug-Oct (-Nov). Endemic to Liberty and Leon counties, FL. {not yet keyed}. [= FNA9, K2, WH3; < *Liatis gracilis* – K1, SE]

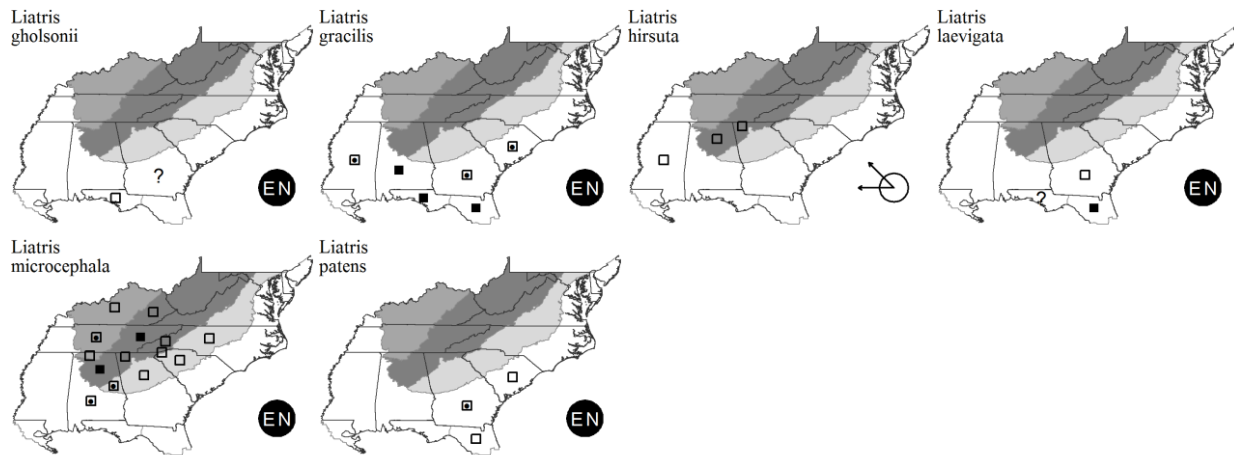
Liatis gracilis Pursh, Slender Blazing-star. Sandhills, dry pine flatwoods. (Jul-) Aug-Oct (-Nov). SC south to s. FL, west to MS. [= FNA9, K2, WH3; < *Laciniaria gracilis* – K1, RAB, SE; > *Laciniaria gracilis* – S; > *Laciniaria laxa* – S]

Liatis hirsuta Rydberg. Glades and prairies. IA and NE south to MS, LA, and TX; disjunct eastward in nw. GA. Jun-Sep. {add to synonymy}. [= FNA9, Il; = *Liatis squarrosa* var. *hirsuta* – C, F, G, Gaiser (1946), Godfrey, R.K. (1948), K, SE; < *Laciniaria squarrosa* – S; < *Liatis squarrosa* – W]

Liatis laevigata (Nuttall) Small, Smooth Blazing-star. Longleaf pine sandhills, scrub. Aug-Oct (-Nov). Se. GA (Charlton and Camden counties) (Carter, Baker, & Morris 2009) south to s. FL. [= FNA9; = *Liatis tenuifolia* var. *quadriflora* – K, SE, WH3; < *Laciniaria tenuifolia* – S]

Liatis microcephala (Small) K. Schumann, Small-head Blazing-star. Outcrops of acidic rocks (sandstone, granite, gneiss), barrens, prairies. Aug-Oct. W. NC and KY south to w. SC, n. and c. GA, and n. AL. [= C, F, FNA9, G, Gaiser (1946), Godfrey, R.K. (1948), K, RAB, SE, Tn, W; = *Laciniaria microcephala* – S]

Liatis patens G.L. Nesom & Kral, Georgia Blazing-star. Longleaf pine sandhills and dry flatwoods. Late Aug-early Nov. SC south to e. Panhandle FL. See Kral & Nesom (2003) for detailed information. [= FNA9, WH3]



Liatris pauciflora Pursh, Few-flower Blazing-star. Xeric sands of Florida scrub, longleaf pine sandhills. Aug-Oct. GA (Tatnall Co.) south to c. peninsular FL; alleged by Small (1933) to extend to SC. [= *Laciniaria pauciflora* – S; = *Liatris pauciflora* var. *pauciflora* – FNA9, K2, WH3; < K1, SE]

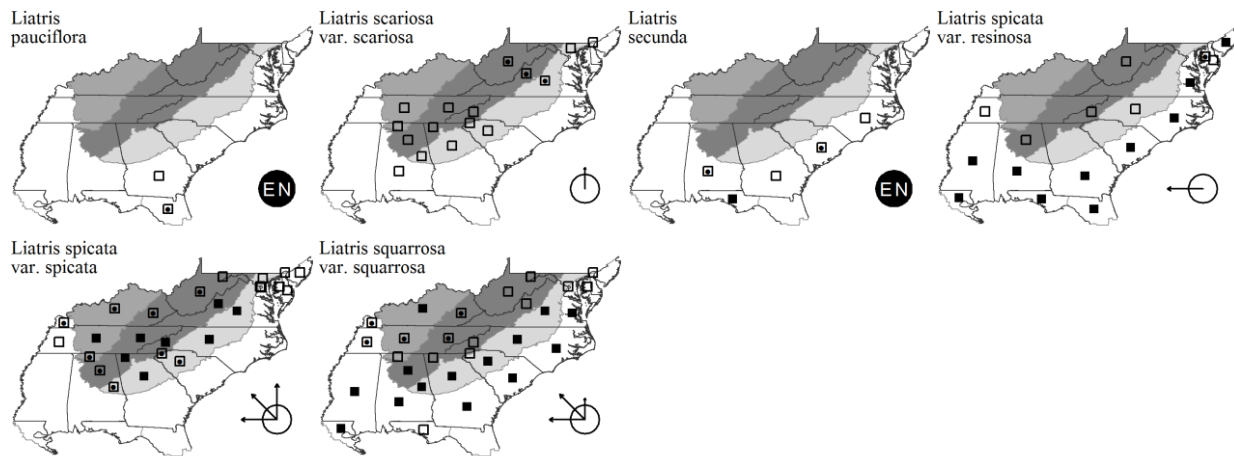
Liatris scariosa (Linnaeus) Willdenow var. *scariosa*, Northern Blazing-star. Shale barrens, dry rock outcrops, roadbanks. Aug-Sep (-Oct). PA, MD, and WV south to NC and TN. [= C, FNA9, K, SE, Va; = *Liatris scariosa* – F, G; > Gaiser (1946), Godfrey, R.K. (1948), WV; < *Laciniaria scariosa* – S; < *Liatris scariosa* – Pa, RAB, Tn, W; > *Liatris scariosa* var. *virginiana* – Gaiser (1946), Godfrey, R.K. (1948), WV]

Liatris secunda Elliott, Sandhill Blazing-star. Sandhills. Aug-Sep (-Oct). S. NC south to w. Panhandle FL and s. AL. [= Godfrey, R.K. (1948), RAB; = *Laciniaria secunda* – S; = *Liatris pauciflora* var. *secunda* – FNA9, WH3; < *Liatris pauciflora* – K1, SE]

Liatris spicata (Linnaeus) Willdenow var. *resinosa* (Nuttall) Gaiser. Bogs, wet longleaf pine savannas, seepages. (Jul-) Aug-Oct (-Nov). NJ south to s. FL, west to LA. [= F, FNA9, G, Gaiser (1946), Godfrey, R.K. (1948), K, RAB, Va, WV; < *Laciniaria spicata* – S; < *Liatris spicata* – C, SE, Tn, W, WH3]

Liatris spicata (Linnaeus) Willdenow var. *spicata*, Florist's Gayfeather. Prairies, roadsides, seepages, bogs, grassy balds. Jul-Sep. MA, ON, and MI, south to GA, AL, MS, and AR. [= F, FNA9, G, K, Pa, RAB, Va, WV; = *Liatris spicata* var. *typica* – Gaiser (1946), Godfrey, R.K. (1948); < *Laciniaria spicata* – S; < *Liatris spicata* – C, IL, SE, Tn, W]

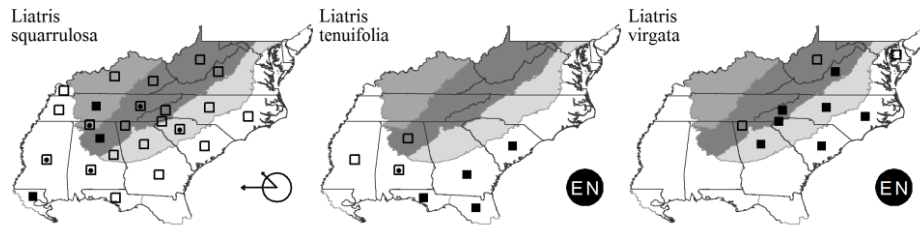
Liatris squarrosa (Linnaeus) Michaux var. *squarrosa*. Dry woodlands, glades, barrens. [= C, FNA9, G, K, SE, Va; > F; < *Laciniaria squarrosa* – S; < *Liatris squarrosa* – IL, RAB, Tn, W, WH3, WV; > *Liatris squarrosa* var. *gracilentia* – F, Gaiser (1946), Godfrey, R.K. (1948); > *Liatris squarrosa* var. *typica* – Gaiser (1946), Godfrey, R.K. (1948)]



Liatris squarrosa Michaux. Diabase barrens, other glades and barrens, prairies, longleaf pine sandhills, open woodlands. Aug-Oct (-Nov). S. WV, KY, IL, and MO south to GA, Panhandle FL, AL, and TX. Highly variable in morphology and habitats and badly in need of additional study to determine if multiple taxa should be recognized. [= C, FNA9, IL, K1, K3, SE, Tn, Va, W, WH3; > G; > *Laciniaria ruthii* – S; > *Laciniaria shortii* – S; > *Laciniaria tracyi* – S; > *Liatris earlei* – F, Gaiser (1946), Godfrey, R.K. (1948), RAB; > *Liatris scabra* – F, G, IL; > *Liatris scariosa* var. *squarrosa* – Gaiser (1946), Godfrey, R.K. (1948)]

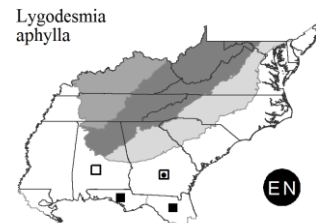
Liatris tenuifolia Nuttall. Longleaf pine sandhills. Aug-Nov. SC south to s. FL, west to AL. [= FNA9, RAB; = *Liatris tenuifolia* var. *tenuifolia* – K1, K3, SE, WH3; < *Laciniaria tenuifolia* – S]

Liatris virgata Nuttall. Open woods, roadbanks. (Jul-) Aug-Oct (-Nov). {distribution}. [= FNA9, K, Va; > *Laciniaria regimontis* – S; > *Laciniaria smallii* – S; < *Liatris graminifolia* – RAB, SE, W; > *Liatris graminifolia* var. *smallii* – F, Gaiser (1946), Godfrey, R.K. (1948); > *Liatris graminifolia* var. *virgata* – F; > *Liatris regimontis* – C, G, Godfrey, R.K. (1948); > *Liatris regimontis* – F]



Lygodesmia D. Don 1829 (Rush Pink, Skeletonplant)

A genus of about 5-7 species, herbs, of w. and s. North America. References: Bogler in FNA19 (2006a); SE; Tomb, A.S. (1980).



Lygodesmia aphylla (Nuttall) Torrey & A. Gray, Flowering Straw, Rose-rush. Xeric sandhills. C. GA south to s. FL and west to c. Panhandle FL. [= FNA9, K2, S, SE, Tomb, A.S. (1980), WH3]

Marshallia Schreber 1791 (Barbara's-buttons)

A genus of about 11 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 sw. TX. References: Beadle, C.D. & F.E. Boynton (1901); Channell, R.B. (1957); SE; Watson in FNA21 (2006c); Watson, L.E. & J.R. Estes (1990); Watson, L.E., R.K. Jansen, & J.R. Estes (1991); Watson, L.E., W.J. Elisens, & J.R. Estes (1991); Weakley, A.S. & D.B. 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.
 - 3 Lower stem leaves (and basal leaves) erect, narrowly lanceolate to linear-lanceolate, with attenuate or long-acuminate apices, relatively thick in texture, the 2-4 lateral nerves (parallel to the midnerve) prominent; caudex with fibrous remnants of the previous year's leaves (if not burned off); phyllaries thick, ovate-attenuate; [NC, SC, and extreme e. GA] ***Marshallia graminifolia***
 - 3 Lower stem leaves (and basal leaves) spreading, oblanceolate or spatulate, with rounded or obtuse apices, relatively thin in texture, the 2 lateral nerves (parallel to the midnerve) often obscure; caudex lacking fibrous remnants of the previous year's leaves; phyllaries thin, linear-subulate; [e. GA southward and westward] ***Marshallia tenuifolia***
 - 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 Heads 2-10 (-20) (rarely solitary on depauperate plants).
 - 5 Leaves 6-10 cm long, 8-23 mm wide, mostly 3-10× as long as wide; heads 2-5 (-10), 22-37 mm in diameter; [sandstone, limestone, and dolostone glades of nw. GA and c. AL] ***Marshallia mohrii***
 - 5 Leaves 8-20 cm long, 2-7 (-10) mm wide, mostly > 15× as long as wide; heads (2-) 4-10 (-20), 10-25 mm in diameter; [Altamaha Grit glades, pinelands, and ultramafic outcrop barrens of e. GA and Panhandle FL] ***Marshallia ramosa***
 - 4 Head solitary.
 - 6 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***
 - 6 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***

Marshallia graminifolia (Walter) Small, Grassleaf Barbara's-buttons. Pine savannas. Late Jul-mid Oct. Ne. NC south to se. SC, and rarely to e. GA (Emanuel County) (Sorrie 1998b). [= Channell, R.B. (1957), GW2, RAB, SE; = *Marshallia graminifolia* ssp. *graminifolia* – Watson, L.E. & J.R. Estes (1990); = *Marshallia graminifolia* var. *graminifolia* – K; < FNA9; > *Marshallia graminifolia* var. *graminifolia* – Beadle, C.D. & F.E. Boynton (1901); > *Marshallia graminifolia* var. *laciniarioides* – Beadle, C.D. & F.E. Boynton (1901); > *Marshallia laciniarioides* – S; > *Marshallia williamsonii* – S]

Marshallia mohrii Beadle & F.E. Boynton, Coosa Barbara's-buttons. Sandstone, limestone, and dolostone glades, calcareous prairies. Nw. GA and n. and c. AL. It somewhat resembles *M. grandiflora*, but typically has 2-10 heads per plant (or

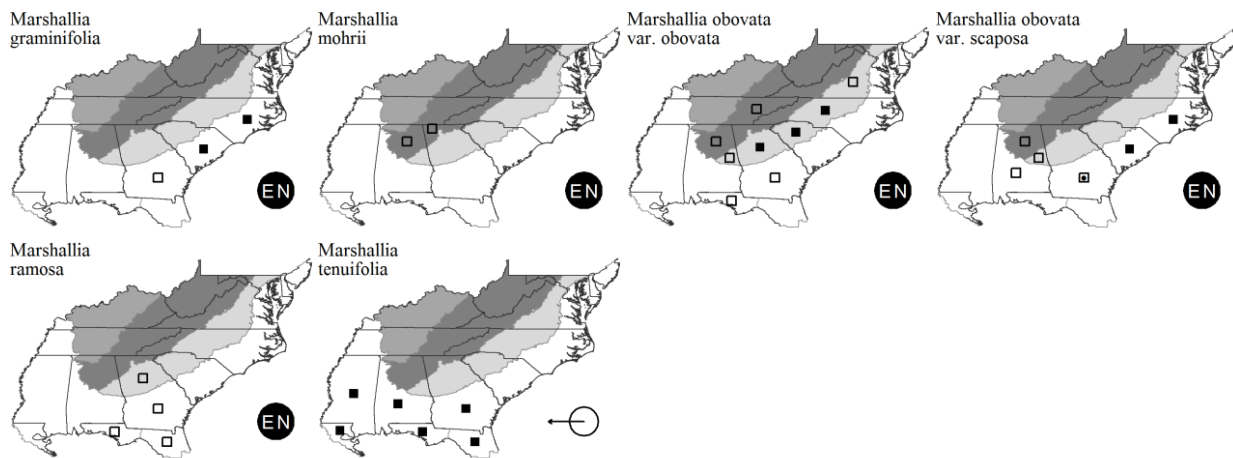
solitary in depauperate individuals). [= Beadle, C.D. & F.E. Boynton (1901), Channell, R.B. (1957), FNA9, K, S, SE, Watson, L.E. & J.R. Estes (1990)]

Marshallia obovata (Walter) Beadle & F.W. Boynton var. *obovata*, Piedmont Barbara's-buttons, Spoon-leaved Barbara's-buttons. Clay flats, woodland borders, dry woodlands. Late Apr-May (-early Jun). Sc. VA south to se. TN (Chester, Wofford, & Kral 1997), sw. GA, Panhandle FL, and c. AL, primarily in the Piedmont. [= C. Channell, R.B. (1957), G, K, RAB, SE, Va, Watson, L.E. & J.R. Estes (1990); = *Marshallia obovata* var. *platyphylla* – Beadle, C.D. & F.E. Boynton (1901), F; < *Marshallia obovata* – FNA9, S, Tn, W, WH3]

Marshallia obovata (Walter) Beadle & F.W. Boynton var. *scaposa* Channell. Pine savannas. Late Apr-May. E. NC south to se. AL, in the Coastal Plain. [= Channell, R.B. (1957), K, RAB, SE, Watson, L.E. & J.R. Estes (1990); = *Marshallia obovata* var. *obovata* – Beadle, C.D. & F.E. Boynton (1901), F; < *Marshallia obovata* – FNA9, S]

Marshallia ramosa Beadle & F.E. Boynton, Pineland Barbara's-buttons, Southern Barbara's-buttons. Pinelands, Altamaha Grit outcrops, woodlands over ultramafic rocks. Late May-Jun. Coastal Plain from e. GA south to ne. FL and Panhandle FL. It somewhat resembles *M. graminifolia* in its linear leaves, but differs in the phyllaries acute (vs. subulate-acuminate), and flowering period (late May-Jun vs. Jul-mid-Oct). [= Beadle, C.D. & F.E. Boynton (1901), Channell, R.B. (1957), FNA9, K, S, SE, Watson, L.E. & J.R. Estes (1990), WH3]

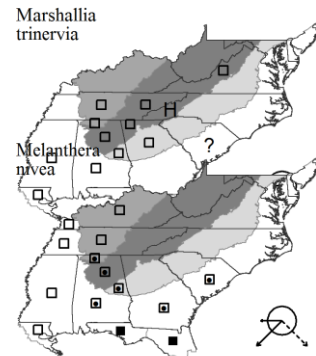
Marshallia tenuifolia Rafinesque. Pine savannas. E. GA south to c. peninsular FL, west to e. TX. [= Channell, R.B. (1957), GW2, SE; = *Marshallia graminifolia* – S; = *Marshallia graminifolia* ssp. *tenuifolia* – Watson, L.E. & J.R. Estes (1990); = *Marshallia graminifolia* var. *cynanthera* – Beadle, C.D. & F.E. Boynton (1901), K; < *Marshallia graminifolia* – FNA9, WH3]



Marshallia trinervia (Walter) Trelease, Colonial Barbara's-buttons, Broadleaf Barbara's-buttons. Moist rocky streambanks and in calcareous clays, more often in shady habitats than its congeners. Jul. E. SC (?), sw. NC, and sc. TN, south to s. AL and s. MS (Sorrie & Leonard 1999). Reported for VA by C; the documentation is unknown. [= Beadle, C.D. & F.E. Boynton (1901), C, Channell, R.B. (1957), F, FNA9, G, K, RAB, S, SE, Tn, W, Watson, L.E. & J.R. Estes (1990)]

***Melanthera* Rohr 1792 (Black-anthers)**

A genus of about 35 species, herbs, of tropical and subtropical areas. References: Acevedo-Rodríguez & Strong (2012); SE; Long, R.W. & O. Lakela (1976); Parks in FNA21 (2006c); Parks, J.C. (1973); Wagner, W.L. & H. Robinson (2001).



Melanthera nivea (Linnaeus) Small, Snowy Black-anthers, Snow Squarestem. Calcareous outcrops, sandy woodlands. Jun-Oct. 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). Additional taxa have sometimes been recognized within what is treated here as a very broad *M. nivea*; they warrant additional study. [= FNA9, II, K, SE, Tn, Wagner, W.L. & H. Robinson (2001); < Acevedo-Rodríguez & Strong (2012), WH3; > Long, R.W. & O. Lakela (1976), Parks, J.C. (1973); > *Melanthera aspera* var. *aspera* – Long, R.W. & O. Lakela (1976), Parks, J.C. (1973); > *Melanthera aspera* var. *glabriuscula* – Long, R.W. & O. Lakela (1976), Parks, J.C. (1973); > *Melanthera deltoidea* – S; > *Melanthera hastata* – RAB, S; > *Melanthera ligulata* – Parks, J.C. (1973), S]

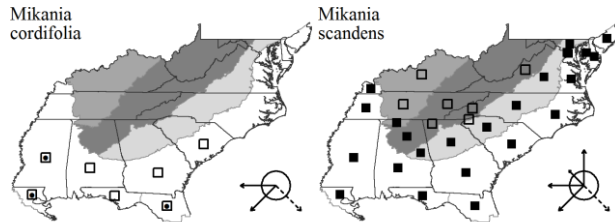
***Mikania* Willdenow 1803 (Climbing Hempweed)**

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, P.J. et al. (2012); SE; Holmes in FNA21 (2006c).

- 1 Involucre 6.5-8 mm; achenes 3.5-4.5 mm long; stems, leaves, and involucre spreading pubescent; pseudostipule a low ridge with a tomentose fringe; [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 involucre puberulent or nearly smooth; pseudostipule membranous[widespread in our area]. *Mikania scandens*

Mikania cordifolia (Linnaeus f.) Willdenow, Heartleaf Climbing Hempweed. Bottomland hardwood forests, mesic hammocks near the coast, margins of tidal marshes. 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. [= FNA9, K, S, SE, WH3]

Mikania scandens (Linnaeus) Willdenow, Climbing Hempweed. Marshes, swamp forests, wet thickets, seepages. Jun-Oct. ME to s. ON, south to s. FL and e. TX, south into the tropics. [= C, FNA9, G, GW2, IL, K, Pa, RAB, S, Tn, Va, W; < SE, WH3; > *Mikania scandens* var. *pubescens* – F; > *Mikania scandens* var. *scandens* – F]



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 in FNA19 (2006a); SE; Fusiak, F. & E.E. Schilling (1984); Johnson, M.F. (1980); Kilian, Gemeinholzer, & Lack (2009); Lack in Kadereit, J.W. & C. Jeffrey (2007); Sennikov, A.N. (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.

- 1 Phyllaries glabrous or with few cilia or inconspicuous fine short pubescence at the tip.
- 2 Principal phyllaries (4-) 5 (-6); flowers 4-6 per head *Nabalus altissimus*
- 2 Principal phyllaries 7-10; flowers 8-15 per head.
- 3 Inflorescences narrow and elongate (virgate); flowers pink to purple *Nabalus autumnalis*
- 3 Inflorescences open, corymbiform to paniculiform, with some elongate branches; flowers white, cream, yellowish, pink, or purple.
- 4 Pappus cinnamon-brown; corolla whitish to pinkish *Nabalus albus*
- 4 Pappus straw-colored to light brown; corolla pale yellow *Nabalus trifoliolatus*
- 1 Phyllaries evidently (though sometimes sparsely) pubescent with long coarse hairs (1.5-3 mm long).
- 5 Phyllaries densely setose; leaves usually merely toothed, sinuate, or shallowly lobed *Nabalus barbatus*
- 5 Phyllaries sparsely setose; principal leaves usually evidently lobed *Nabalus serpentarius*

Nabalus albus (Linnaeus) Hooker, Northern Rattlesnake-root. Forests, especially over calcareous substrates. Jul-Nov. ME west to MB, south to ne. NC, w. NC, WV, and MO. Reports of *N. albus* from the Coastal Plain of NC and perhaps VA are based on *P. alba* ssp. *pallida*, which is invalidly published; additionally, specimens attributed to this taxon appear to belong to *P. trifoliolata*. [= S, Tn, Va; = *Prenanthes alba* – C, F, FNA9, G, Johnson, M.F. (1980), K, Pa, SE, W; = *Prenanthes alba* ssp. *alba* – RAB]

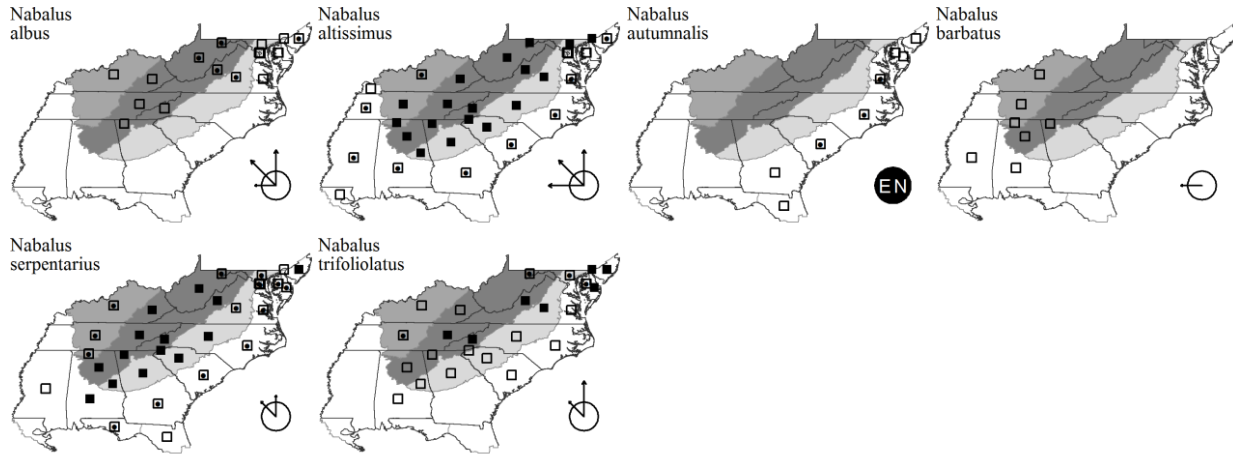
Nabalus altissimus (Linnaeus) Hooker, Tall Rattlesnake-root. Forests. Aug-Nov. NL (Newfoundland) west to MI, south to GA, LA, and AR. The variation of pappus color responsible for the sometime recognition of two varieties (see synonymy) needs additional study. [= S, Tn, Va; = *Prenanthes altissima* – FNA9, Fusiak, F. & E.E. Schilling (1984), G, Johnson, M.F. (1980), K, Pa, RAB, W, WV; > *Nabalus altissimus* var. *altissimus* – IL; > *Nabalus altissimus* var. *cinnamomea* – IL; > *Prenanthes altissima* var. *altissima* – C, F, SE; > *Prenanthes altissima* var. *cinnamomea* – C, F, SE]

Nabalus autumnalis (Walter) Weakley, Slender Rattlesnake-root. Pocosins, pine savannas, forest edges. Sep-Nov. NJ south to ne. FL, a Southeastern Coastal Plain endemic. [= Va; = *Nabalus virgatus* – S; = *Prenanthes autumnalis* – C, F, FNA9, G, Johnson, M.F. (1980), K, RAB, SE, WH3]

Nabalus barbatus (Torrey & A. Gray) A. Heller, Barbed Rattlesnake-root, Flatwoods Rattlesnake-root, Prairie Lion's-foot. Limestone glades, calcareous barrens, and calcareous oak flatwoods. C. TN (Western Highland Rim) (Chester, Wofford, & Kral 1997), nw. GA, and n. AL west to se. AR, e. TX and w. LA. [= Tn; = *Prenanthes barbata* – FNA9, K, SE; = *Prenanthes serpentaria* var. *barbata*; < *Nabalus integrifolius* – S]

Nabalus serpentarius (Pursh) Hooker, Lion's-foot, Gall-of-the-earth. Forests. Aug-Oct. MA south to GA, ne. FL, Panhandle FL, and MS. [= Tn, Va; = *Prenanthes serpentaria* – C, F, FNA9, Fusiak, F. & E.E. Schilling (1984), G, Johnson, M.F. (1980), K, Pa, RAB, SE, W, WH3, WV; > S; >> *Nabalus integrifolius* – S]

Nabalus trifoliolatus Cassini, Gall-of-the-earth. Forests. Aug-Nov. NL (Newfoundland) south to e. NC, n. GA, and TN. [= Tn, Va; = *Nabalus trifoliatus* – S; = *Prenanthes trifoliolata* – C, FNA9, G, Johnson, M.F. (1980), K, Pa, SE, W; > *Prenanthes alba* ssp. *pallida* – RAB; > *Prenanthes trifoliolata* – RAB; > *Prenanthes trifoliolata* var. *trifoliolata* – F]



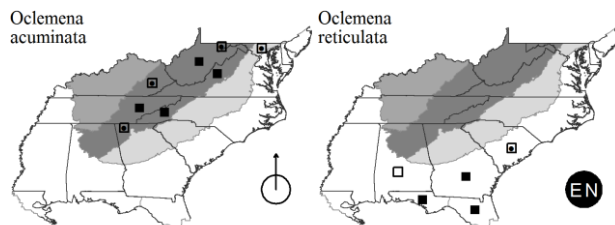
Oclemena E.L. Greene 1903 (Aster, Nodding-aster)

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 in FNA20 (2006b); SE; Nesom (1994); Nesom, G.L. (1997); Semple, J.C., S.B. Heard, & ChunSheng Xiang (1996).

- 1 Leaves obovate, acuminate at the tip, thin in texture; [of the Mountains] *Oclemena acuminata*
 1 Leaves narrowly elliptic, acute to obtuse at the tip, coriaceous in texture; [of the Coastal Plain, from se. SC southward]
 *Oclemena reticulata*

Oclemena acuminata (Michaux) Greene, Whorled Aster, Whorled Nodding-aster. Spruce-fir forests, northern hardwood forests, mountain seepages and streambanks, other cool, moist situations. Jul-Sep. NL (Newfoundland) and QC south to w. NC, ne. GA, and e. TN. [= FNA9, K1, K3, Nesom (1994), Pa, Semple, J.C., S.B. Heard, & ChunSheng Xiang (1996), Tn, Va; = *Aster acuminatus* – C, F, G, RAB, SE, W, WV]

Oclemena reticulata (Pursh) G.L. Nesom, Pine-barren Aster. Wet pine flatwoods. Early Apr-early Jun. Se. SC south through e. GA to c. peninsular FL. [= FNA9, K1, K3, Nesom (1994), WH3; = *Aster reticulatus* – GW2, RAB, SE; = *Doellingeria reticulata* – S]



Packera Á. & 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, T.M. (1962); Barkley, T.M. (1978); Barkley, T.M. (1999); Bremer, K. (1994); SE; Mahoney, A. M. & R.R. Kowal (2008); Trock in FNA20 (2006b).

- 1 Plant an annual (rarely a biennial); leaf with lateral lobes broadly rounded, resembling the terminal lobe; [of wet soil of swamps and wet fields] *Packera glabella*
- 1 Plant a perennial (rarely a biennial); leaf with lateral lobes absent, or distinctly narrower than the terminal lobe; [of dry to mesic soils, but not generally as above].
 - 2 Principal leaves (especially the basal) 2-3-pinnatifid, the segments mostly 1-3 mm wide *Packera millefolium*
 - 2 Principal leaves entire, toothed, or irregularly and raggedly 1-pinnatifid.
 - 3 Basal leaves with leaf bases cordate, truncate, obliquely truncate, or rounded, abruptly tapering to the petiole; leaf blades cordate, reniform, or orbicular, either 0.8-2× as long as broad or 4-7× as long as broad. *Packera aurea*
 - 3 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 spatulate, 1.5-8× longer than broad.
 - 4 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.
 - 5 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*
 - 5 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.
 - 6 Heads many, generally 20-100; basal leaves (including petioles) up to 30 cm long and 3.5 cm wide *Packera anonyma*
 - 6 Heads few, generally 5-20; basal leaves (including petioles) up to 12 cm long and 2 cm wide.
 - 7 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*
 - 7 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*
 - 4 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).
 - 8 Basal leaves (including petioles) mostly 10-25 cm long, held in a vertical posture; [Coastal Plain and Piedmont of NC, SC, and VA, and Mountains of SC] *Packera tomentosa*
 - 8 Basal leaves (including petioles) mostly 3-10 cm long, arching or prostrate; [Mountains]. *Packera paupercula* var. *appalachiana*

Packera anonyma (Wood) W.A. Weber & Á. Löve, Appalachian Ragwort, Small's Ragwort. Rock outcrops, roadsides, woodlands; hammocks, disturbed areas. May-early Jun. S. PA, DE, and KY, south to Panhandle FL and c. MS. [= Barkley, T.M. (1999), FNA9, K1, K3, Pa, Tn, Va, WH3; = *Senecio anonymus* – Barkley, T.M. (1978), C, SE; = *Senecio smallii* – F, G, RAB, S, WV]

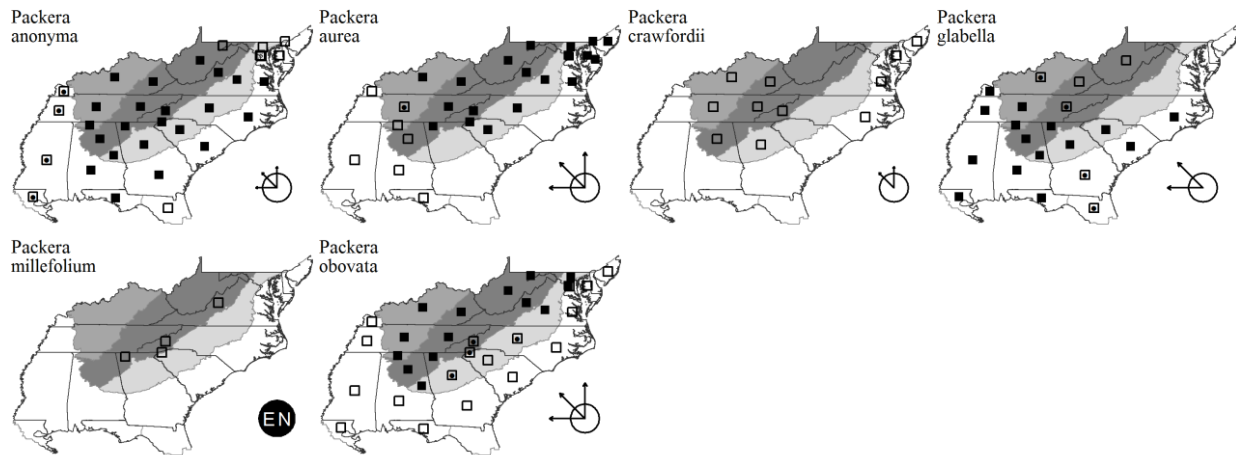
* *Packera aurea* (Linnaeus) Á. Löve & D. Löve, Golden Ragwort, Heartleaf Ragwort. Moist forests, bottomlands, bogs, stream banks. Late Mar-Jun. NL (Labrador) west to MN, south to NC, ne. SC, n. GA, n. AL, and c. AR; disjunct in Panhandle FL. This species is variable, and some of the more striking variants have been named; some may well warrant formal taxonomic recognition, but additional study is needed. [= Barkley, T.M. (1999), FNA9, II, K1, K3, Pa, Tn, Va, WH3; = *Senecio aureus* – Barkley, T.M. (1978), C, G, GW2, RAB, SE, WV; > *Senecio aureus* – S; > *Senecio aureus* var. *aureus* – F; > *Senecio aureus* var. *gracilis* – F; > *Senecio aureus* var. *intercurus* – F; > *Senecio gracilis* – S]

Packera crawfordii (Britton) A.M. Mahoney & R.R. Kowal, Crawford's Ragwort. Bogs and fens. NJ, PA, and s. IN south to e. NC, w. NC, and TN. See Kowal et al. (2015) and Mahoney & Crawford (in press) for additional information. [= Tn; = *Senecio crawfordii* – F; < *Packera paupercula* – FNA9, Pa, WH3; < *Senecio paupercula* – Barkley, T.M. (1978), C, G, GW2, RAB, S, SE]

Packera glabella (Poirot) C. Jeffrey, Butterweed, Smooth Ragwort, Yellowtop. Swamp forests, bottomland forests, cleared areas in bottomlands, wet agricultural fields, ditches, often in mucky soils. Mar-early Jun. E. NC south to s. FL, west to e. TX, north in the interior to sw. WV, OH, MO, and SD. [= Barkley, T.M. (1999), FNA9, II, K1, K3, Pa, Tn, WH3; = *Senecio glabellus* – Barkley, T.M. (1978), C, F, G, GW2, RAB, S, SE, WV]

Packera millefolium (Torrey & A. Gray) W.A. Weber & Á. Löve, Blue Ridge Ragwort, Yarrowleaf Ragwort. Granitic domes, cliffs, and rocky woodlands, over granite, gneiss, schist, and amphibolite, and (in sw. VA) in calcareous glades and woodlands. Late Apr-early Jun. Endemic to sw. NC, nw. SC, and ne. GA; disjunct in sw. VA (Lee Co.). The Lee County material needs additional assessment to determine if it is actually conspecific with *P. millefolium*, which seems implausible based on habitat and biogeography. The hybrid with *Packera anonyma* [= *Packera ×memmingeri* (Britton) Weakley; = *Senecio ×memmingeri* Britton (pro sp.)] occurs with the parents, and in some populations appears to be swamping out the rare *P. millefolium* (Gramling 2006). The epithet in *Packera* has sometimes been spelled "*millefolia*" (see synonymy), ignoring that this epithet is a noun in apposition (rather than an adjective) based on the pre-Linnaean genus name *Millefolium* (for *Achillea*) (Weakley et al. 2011). [= K3, Va; = *Packera millefolia* – Barkley, T.M. (1999), FNA9, K1; = *Senecio millefolium* – Barkley, T.M. (1978), C, F, RAB, S, SE]

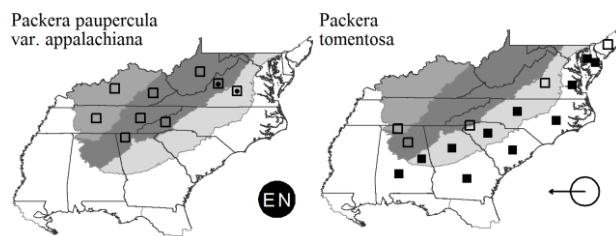
Packera obovata (Muhlenberg ex Willdenow) W.A. Weber & Á. Löve, Roundleaf Ragwort, Running Ragwort. Nutrient rich forests and woodlands (dry or moist), usually over calcareous or mafic rocks. Mar-Jun. VT west to KS, south to Panhandle FL and TX. [= Barkley, T.M. (1999), FNA9, II, K1, K3, Pa, Tn, Va, WH3; = *Senecio obovatus* – Barkley, T.M. (1978), C, RAB, SE; > *Senecio obovatus* – S; > *Senecio obovatus* var. *elliottii* – F, G, WV; > *Senecio obovatus* var. *obovatus* – F, G, WV; > *Senecio obovatus* var. *rotundus* – F; > *Senecio rotundus* – S]



Packera paupercula (Michaux) Á. Löve & D. Löve var. ***appalachiana*** A.M. Mahoney, Appalachian Ragwort. Glades, cliffs, barrens, over mafic, or calcareous rocks. Apr-May. E. WV and w. VA south to w. NC and e. TN. [= K3, Tn, Va; < *Packera plattensis* – Barkley, T.M. (1999), FNA9, K1, Pa; < *Senecio plattensis* – Barkley, T.M. (1978), C, F, G, SE]

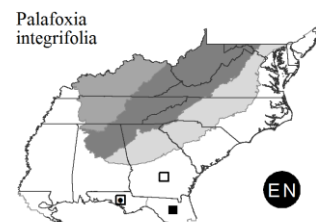
Packera paupercula (Michaux) Á. Löve & D. Löve var. ***paupercula***, Balsam Ragwort, Northern Meadow Groundsel. Thickets, meadows, glades, generally over circumneutral soils derived from calcareous or mafic rocks. Apr-May. NL (Labrador) west to AK, south to GA, Panhandle FL (Bay County), AL, and OR. [= K3, Tn, Va; > Il; < *Packera paupercula* – Barkley, T.M. (1978), Barkley, T.M. (1999), FNA9, K1, Pa, WH3; < *Senecio pauperculus* – C, G, GW2, RAB, S, SE; > *Senecio pauperculus* var. *balsamitae* – F; > *Senecio pauperculus* var. *pauperculus* – F; > *Senecio pauperculus* var. *praelongus* – F]

Packera tomentosa (Michaux) C. Jeffrey, Woolly Ragwort. Sandy roadsides, sandy woodlands and forests, granitic flatrocks, granitic domes. Apr-early Jun. 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. [= Barkley, T.M. (1999), FNA9, K1, K3, Va; = *Senecio tomentosus* – Barkley, T.M. (1978), C, F, G, GW2, RAB, SE; > *Senecio alabamensis* – S; > *Senecio tomentosus* – S]



Palafoxia Lagasca y Segura 1816 (Palafoxia)

A genus of about 12 species, shrubs and herbs, of s. North America. References: SE; Strother in FNA21 (2006c); Turner, B.L. & M.I. Morris (1976).



Palafoxia integrifolia (Nuttall) Torrey & A. Gray, Coastal Plain Palafoxia. Sandhills. Oct. Sc. GA (Carter, Baker, & Morris 2009) south to s. FL. [= FNA9, K2, SE, Turner, B.L. & M.I. Morris (1976), WH3; = *Polypteris integrifolia* – S]

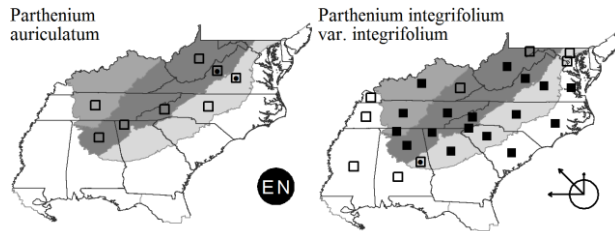
Parthenium Linnaeus 1753 (Wild Quinine)

A genus of about 16 species, herbs and shrubs, of North America and the West Indies. References: SE; Mears, J.A. (1975); Strother in FNA21 (2006c).

- 1 Stems with coarse, spreading pubescence 1-3 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***
- 1 Stems glabrous or with short, appressed pubescence <1 mm long; cauline leaves only rarely auriculate-clasping, the upper cauline leaves 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***

Parthenium auriculatum Britton, Glade Wild Quinine. In shallow, xeric, circumneutral soil of glades, barrens, and woodlands, over calcareous rocks (such as dolostone) or mafic rocks (such as diabase). Mid May-Aug. Ne. WV south to c. NC and n. AL, west to c. TN. 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). It is apparently a close relative of the Ozarkian *P. hispidum* Rafinesque, and perhaps not readily distinguished from it; some, at least, of our material has creeping rhizomes and heads over 7 mm in diameter, supposed to be distinguishing features of *P. hispidum*. [= C, G, K1, K3, SE, Va; = *Parthenium hispidum* var. *auriculatum* – F, WV; = *Parthenium integrifolium* var. *auriculatum* – Mears, J.A. (1975), RAB; < *Parthenium hispidum* – W; < *Parthenium integrifolium* – FNA9, S]

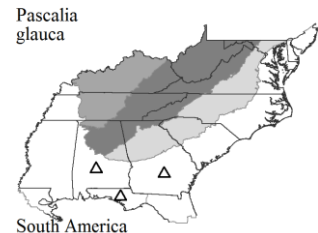
Parthenium integrifolium Linnaeus var. *integrifolium*, Common Wild Quinine. Woodlands, roadsides, various dryish habitats, mainly open or sparsely wooded. Late May-Aug. VA west to MN, south to SC, GA, ne. MS, and nw. AR. Var. *henryanum* Mears appears to be merely a form of var. *integrifolium*. [= K1, Va; < RAB, Tn; > Mears, J.A. (1975); < *Parthenium integrifolium* – C, F, FNA9, G, II, K3, Pa, S, SE, W, WV; > *Parthenium integrifolium* var. *henryanum* – Mears, J.A. (1975)]



***Pascalial* Ortega 1797**

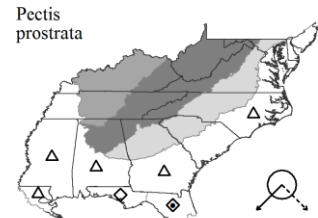
A genus of 2 species, perennial herbs, of South America. References: Strother in FNA21 (2006c).

* ***Pascalial glauca*** Ortega, Beach Creeping Oxeye. Coastal dunes, disturbed areas; native of South America, perhaps only a waif. Reported for FL, GA, and AL. [= FNA9, K, S, WH3; = *Wedelia glauca* – SE]



***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: Keil in FNA21 (2006c).



* ***Pectis prostrata*** Cavanilles. Roadsides, mowed areas, other dry disturbed areas; native of tropical America (probably including s. FL). Jul-Nov. Reported for NC (Basinger, pers. comm., 2006) and GA (Carter, Baker, & Morris 2009). Spreading northward along roadsides, the original distribution unclear. [= FNA9, K3, S, SE, WH3]

***Pilosella* Hill 1756 (Mouse-ear Hawkweed)**

A genus of 20-80 species (depending on species concepts applied to the many apomictic and hybrid-derived entities), herbs, of Eurasia and n. Africa. Sometimes included in *Hieracium*, the separation of *Pilosella* as a genus is increasingly supported by molecular, morphological, and biological evidence, and has become the dominant approach in Europe (Bräutigam & Greuter 2007) and worldwide (Funk et al. 2009; Kilian, Gemeinholzer, & Lack 2009). References: Bräutigam, S. & W. Greuter (2007); SE; Kilian, Gemeinholzer, & Lack (2009); Strother in FNA19 (2006a).

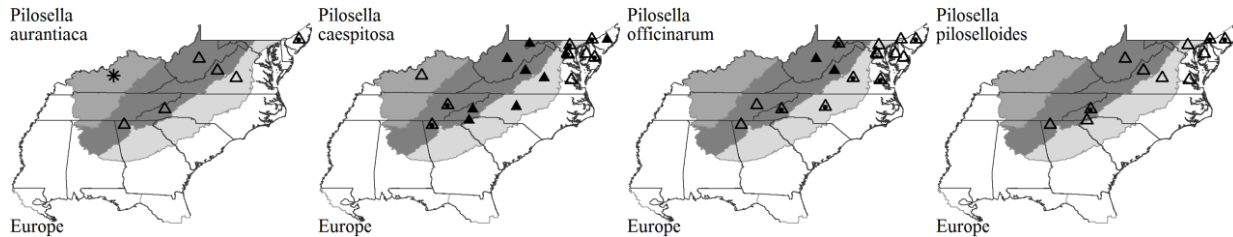
- 1 Plants not stoloniferous.
 - 2 Leaves and stem not glaucous; leaves hairy on the upper surface *Pilosella caespitosa*
 - 2 Leaves and stem glaucous; leaves sparsely hairy to nearly glabrous on the upper surface *Pilosella piloselloides*
- 1 Plants stoloniferous.
 - 3 Heads 1 (-3) per stem *Pilosella officinarum*
 - 3 Heads (1-) 2-many per stem.
 - 4 Flowers deep orange-red (often turning purplish when dried) *Pilosella aurantiaca*
 - 4 Flowers yellow.
 - *Pilosella caespitosa*

* *Pilosella aurantiaca* (Linnaeus) F. Schultz & Schultz 'Bipontinus', Orange Hawkweed, Devil's-paintbrush, Orange King-devil, Fox-and-cubs. Pastures, roadsides; native of Europe. May-Aug. [= Bräutigam, S. & W. Greuter (2007); = *Hieracium aurantiacum* – F, FNA9, G, Il, K, Pa, RAB, SE, Va, W, WH3, WV]

* *Pilosella caespitosa* (Dumortier) P.D. Sell & C. West, Yellow King-devil, Yellow Fox-and-cubs. Pastures, fields, roadsides, grassy balds; native of Europe. May-Oct. [= Bräutigam, S. & W. Greuter (2007); = *Hieracium caespitosum* – C, FNA9, Il, K, Pa, SE, Tn, Va, W; ? *Hieracium pratense* – F, G, RAB, WV]

* *Pilosella officinarum* F. Schultz & Schultz 'Bipontinus', Mouse-ear Hawkweed. Pastures, roadsides, disturbed areas; native of Europe. May-Jul. [= Bräutigam, S. & W. Greuter (2007); = *Hieracium pilosella* – C, FNA9, G, Pa, RAB, SE, Tn, Va, W; > *Hieracium pilosella* var. *pilosella* – F, K, WV]

* *Pilosella piloselloides* (Villars) Soják, Glaucous King-devil. Fields, pastures, roadsides, native of Europe. May-Sep. [= Bräutigam, S. & W. Greuter (2007); = *Hieracium piloselloides* – C, FNA9, Il, Pa, Va; ? *Hieracium florentinum* – G, RAB, SE, W; > *Hieracium florentinum* – F; > *Hieracium piloselloides* – K; > *Hieracium praealtum* var. *decipiens* – F, K]



Pityopsis Nuttall 1840 (Grass-leaved Golden-aster)

(contributed by Alan S. Weakley & Bruce A. Sorrie)

A genus of about 8-13 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, F.D. (1972); SE; Semple in FNA20 (2006b); Semple, J.C. & F.D. Bowers (1985); Ward, D.B. (2004c).

- 1 Basal leaves shorter than the stem leaves; middle and upper stem leaves similar in size to one another, 1-5 mm wide (to 7 mm wide in *P. flexuosa* and to 10 mm wide in *P. species 1*). *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 (except in *P. species 1*), usually the largest stem leaves > 5 mm wide.
 - 2 Heads < 10; cauline leaves few, generally 2-7; [distinctly wetland in habitat and typically spring-flowering]; [of sw. GA westward and southward] *Pityopsis oligantha*
 - 2 Heads > 10; cauline leaves many; [primarily upland in habitat and fall-flowering]; [collectively widespread in our area].
 - 3 Peduncles and upper stem densely glandular-hairy (stipitate-glandular); phyllaries densely glandular-hairy; involucre 4.5-8 mm high; lower leaves < 10 mm wide.
 - 4 All stem leaves silky pubescent; stems pubescent, with no visible glands; [widespread in our area] *Pityopsis adenolepis*
 - 4 Lower leaves silky pubescent, the mid to upper stem leaves glabrate and evidently stipitate glandular along the margins; stems glandular to the base; [of sc. GA south into Panhandle FL] *Pityopsis aspera*
 - 3 Peduncles and upper stem eglandular to sparsely glandular; phyllaries eglandular, or the inner phyllaries sparsely to densely glandular, at least distally; involucre 5-14 mm high; lower leaves up to 20 mm wide.
 - 5 Involucre (8-) 9-14 mm high; disc florets > 30; tetraploid and hexaploid. *Pityopsis graminifolia* var. *latifolia*
 - 5 Involucre 5-8 mm high; disc florets 15-29; diploid.
 - 6 Inner phyllaries densely stipitate-glandular, at least distally *Pityopsis graminifolia* var. *graminifolia*
 - 6 Inner phyllaries eglandular to sparsely glandular *Pityopsis graminifolia* var. *tenuifolia*

Pityopsis adenolepis (Fernald) Semple. Dry woodlands, forests, and disturbed places, apparently in the NC Mountains only in the Escarpment. Late Jun-Oct. E. MD (R. Simmons, pers. comm., 2016) and e. and c. VA south to n. FL and west to s. MS. *P. 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). [=; = *Chrysopsis graminifolia* – F; = *Heterotheca adenolepis* – Bowers, F.D. (1972); = *Pityopsis aspera* var. *adenolepis* – FNA9, K1, K2, Semple, J.C. & F.D. Bowers (1985), Va; < *Chrysopsis graminifolia* var. *aspera* – C, G, SE, W; > *Heterotheca adenolepis* – RAB; < *Heterotheca aspera*; > *Heterotheca graminifolia* – RAB; < *Pityopsis aspera* – S, WH3]

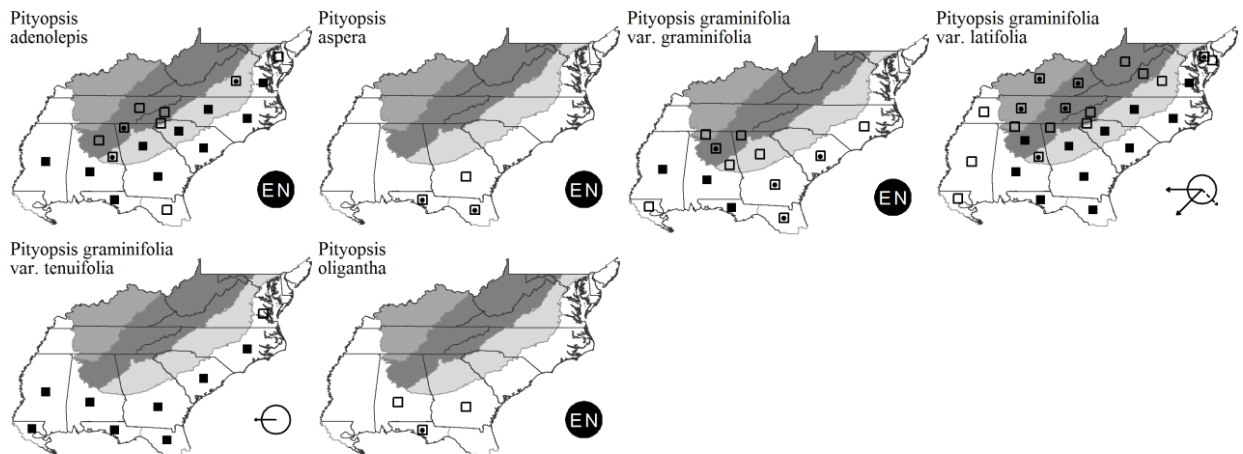
Pityopsis aspera (Shuttleworth ex Small) Small. Sandhills, dry flatwoods. Aug-Oct. Eastern FL Panhandle and adjacent sc. GA. [= *Heterotheca aspera* – Bowers, F.D. (1972); = *Pityopsis aspera* var. *aspera* – FNA9, K1, K2, Semple, J.C. & F.D. Bowers (1985); < S, WH3; < *Chrysopsis graminifolia* var. *aspera* – SE]

Pityopsis graminifolia (Michaux) Nuttall var. ***graminifolia***. Sandhills. Jul-Oct. Semple & Bowers (1985) treat *P. graminifolia* as encompassing five varieties "that intergrade and hybridize, when the ploidy level is the same" (Semple & Bowers 1985). Var. *graminifolia* ranges from se. NC south to c. peninsular FL, and west to e. LA. This taxon is diploid ($2n=18$). [= FNA9, K1, K2, Semple, J.C. & F.D. Bowers (1985); < *Chrysopsis graminifolia* var. *graminifolia* – C; < *Chrysopsis graminifolia* var. *microcephala* – SE; < *Heterotheca microcephala* var. *microcephala* – Bowers, F.D. (1972); < *Heterotheca nervosa* var. *microcephala* – RAB; < *Pityopsis graminifolia* – WH3; < *Pityopsis microcephala* – S]

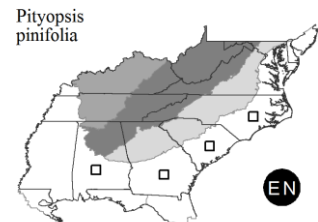
Pityopsis graminifolia (Michaux) Nuttall var. ***latifolia*** Fernald. Sandhills, dry woodlands and forests (such as ridgetop pine/heath communities in the Mountains), roadbanks. Jun-Oct. Var. *latifolia* is the most widely distributed variety of *P. graminifolia*, ranging from DE (formerly), s. OH, and c. AR south to s. FL and e. TX; Bahamas; also in Mexico (Tamaulipas, Vera Cruz, Oaxaca, Chiapas) and Central America (Belize, Guatemala, Honduras). This taxon (or set of taxa) is tetraploid ($2n=36$). [= FNA9, K1, K2, Semple, J.C. & F.D. Bowers (1985), Tn, Va; = *Chrysopsis graminifolia* var. *graminifolia* – SE; = *Chrysopsis graminifolia* var. *latifolia* – C, W; = *Pityopsis graminifolia* – S; = *Pityopsis nervosa* var. *nervosa* – Ward, D.B. (2004c); < *Chrysopsis graminifolia* – G; > *Chrysopsis nervosa* var. *nervosa* – F; > *Chrysopsis nervosa* var. *stenolepis* – F; > *Chrysopsis nervosa* var. *virgata* – F; > *Heterotheca correllii* – RAB; < *Heterotheca graminifolia* – Bowers, F.D. (1972); > *Heterotheca nervosa* var. *nervosa* – RAB; < *Pityopsis graminifolia* – WH3; > *Pityopsis nervosa*; > *Pityopsis species 2* ("latifolia")]

Pityopsis graminifolia (Michaux) Nuttall var. ***tenuifolia*** (Torrey) Semple & F.D. Bowers. Sandhills, sandy woodlands, savannas, pine flatwoods. Jul-Oct. Var. *tenuifolia* ranges from se. NC south to s. FL and west to e. TX (north inland to c. AR and e. OK); apparently disjunct in se. VA. This taxon is diploid ($2n=18$). [= FNA9, K1, K2, Semple, J.C. & F.D. Bowers (1985); = *Pityopsis microcephala*; < *Chrysopsis graminifolia* var. *microcephala* – SE; < *Heterotheca microcephala* var. *microcephala* – Bowers, F.D. (1972); < *Heterotheca nervosa* var. *microcephala* – RAB; < *Pityopsis graminifolia* – WH3; < *Pityopsis microcephala* – S]

Pityopsis oligantha (Chapman ex Torrey & A. Gray) Small, Narrow-leaved Goldenaster, Bog Goldenaster. Wet pine flatwoods, pine savannas, and pitcherplant bogs. Mar-Jun. Sw. GA and Panhandle FL west to s. AL; reports from e. TX (Holmes & Singhurst 2012), e. LA, and w. LA, represent mis-identifications. [= FNA9, K1, K2, S, Semple, J.C. & F.D. Bowers (1985), WH3; = *Chrysopsis oligantha* – SE; = *Heterotheca oligantha* – Bowers, F.D. (1972)]



Pityopsis pinifolia (Elliott) Nuttall, Sandhill Goldenaster. Sandhills, sandy roadsides. Aug-Oct. 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. [= FNA9, K1, K2, S, Semple, J.C. & F.D. Bowers (1985); = *Chrysopsis pinifolia* – SE; = *Heterotheca pinifolia* – Bowers, F.D. (1972), RAB]



***Pluchea* Cassini 1817 (Marsh-fleabane)**

A genus of about 40 species, herbs and shrubs, of tropical, subtropical, and warm temperate regions. References: Arriagada, J.E. (1998); SE; Godfrey (1952); Nesom in FNA19 (2006a); Nesom, G.L. (1989); Nesom, G.L. (2004a); Pruski (2005).

- 1 Leaves petiolate or narrowly cuneate at the base; [section *Pluchea*].
 - 2 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, widespread in the Coastal Plain and Piedmont] *Pluchea camphorata*
 - 2 Phyllaries short-pubescent with several-celled glandular-tipped hairs; inflorescence more-or-less cymiform 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*
- 1 Leaves sessile, and either rounded, truncate, or clasping at the base; [section *Amplectifolium*].

- 3 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*
- 3 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].
- 4 Plants 3-11 dm tall; inner phyllaries 4-6 mm long; [widespread in our area] *Pluchea foetida* var. *foetida*
- 4 Plants 9-25 dm tall; inner phyllaries 6-7 mm long; [of the Coastal Plain of SC southward] *Pluchea foetida* var. *imbricata*

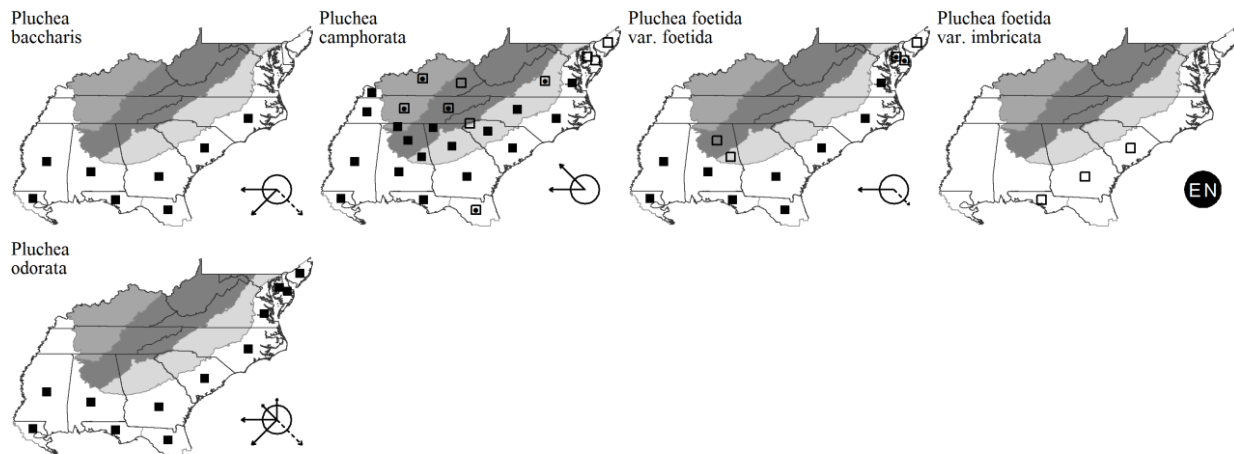
Pluchea baccharis (P. Miller) Pruski, Marsh Fleabane. Wet savannas, natural ponds, marshes, ditches. Jun-Jul. E. NC south to s. FL, west to se. TX; Bahamas, Cuba, Mexico, and Central America. Pruski (2005) established that *P. baccharis* is the correct name for the taxon known in recent decades as *P. 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. [= FNA9, Pruski (2005), WH3; = *Pluchea rosea* – Arriagada, J.E. (1998), K, Nesom, G.L. (1989), Nesom, G.L. (2004a), RAB; = *Pluchea rosea* var. *rosea* – GW2, SE]

Pluchea camphorata (Linnaeus) A.P. de Candolle, Camphorweed, Camphor Pluchea. Bottomland sloughs, clay flatwoods, other freshwater wetlands. Aug-Oct. DE (formerly) and MD south to n. peninsular FL, west to TX and OK, north in the interior to s. OH and e. KS. [= Arriagada, J.E. (1998), C, F, FNA9, G, GW2, Il, K, Nesom, G.L. (1989), Nesom, G.L. (2004a), RAB, SE, Tn, Va, WH3; = *Pluchea petiolata* – S]

Pluchea foetida (Linnaeus) A.P. de Candolle var. *foetida*, Stinking Fleabane. Seasonally wet areas, ditches, various other freshwater wetlands. Late Jul-Oct. S. NJ south to s. FL, west to e. TX and se. OK; West Indies (Hispaniola). [= K, Va; < *Pluchea foetida* – Arriagada, J.E. (1998), C, F, FNA9, G, GW2, Nesom, G.L. (1989), Nesom, G.L. (2004a), RAB, SE, WH3; > *Pluchea foetida* – S; > *Pluchea tenuifolia* – S]

Pluchea foetida (Linnaeus) A.P. de Candolle var. *imbricata* Kearney. Freshwater wetlands. Late Jul-Oct. SC south to FL Panhandle. The validity and distribution of this taxon need additional study. [= K; = *Pluchea imbricata* – S; < *Pluchea foetida* – Arriagada, J.E. (1998), C, FNA9, GW2, Nesom, G.L. (1989), Nesom, G.L. (2004a), RAB, SE, WH3]

Pluchea odorata (Linnaeus) Cassini, Saltmarsh Fleabane. Salt and brackish marshes. Aug-Oct. MA and MI south to s. FL and TX (mostly on the Coastal Plain), also in w. United States, Central America, and South America. 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. [= Arriagada, J.E. (1998), GW2, Nesom, G.L. (1989), Nesom, G.L. (2004a), Va, WH3; = *Pluchea purpurascens* – RAB; > *Pluchea camphorata* – S; > *Pluchea odorata* var. *odorata* – C, FNA9, K, SE; > *Pluchea odorata* var. *succulenta* – C, FNA9, Il, K, Pa, SE; > *Pluchea purpurascens* var. *purpurascens* – F, G; > *Pluchea purpurascens* var. *succulenta* – F, G]



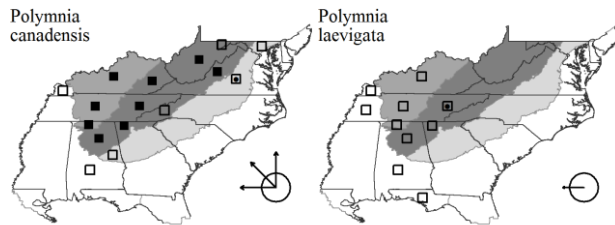
Polymnia Linnaeus 1753

A genus of 4 species, herbs, of e. North America. References: SE; Estes, D. & J. Beck (2011); Strother in FNA21 (2006c); Wells, J.R. (1965).

- 1 Cypselas (4-) 5 (-6)-ribbed; stem glabrous or nearly so (except sometimes short-hairy in the inflorescence); heads 3-7 mm in diameter; disc florets 15-29; ray florets 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. Moist forests, particularly over calcareous rocks. Jul-Oct. VT and ON west to MN, south to NC, nw. GA, AL, and AR. Previously recognized species or varieties (see synonymy) may have merit and need additional evaluation (Tennessee Flora Committee 2015). [= C, Estes, D. & J. Beck (2011), F, FNA9, G, II, K, Pa, RAB, SE, Tn, Va, W, Wells, J.R. (1965), WV; > S; > *Polymnia canadensis* var. *radiata*; > *Polymnia radiata* – S]

Polymnia laevigata Beadl. Tennessee Leafcup. Boulderly slopes, coquina outcrops and rubble (in FL). W., c., and se. TN (Chester, Wofford, & Kral 1997), AL, Panhandle FL (Jackson County), nw. GA, and MO. [= Estes, D. & J. Beck (2011), FNA9, K, S, SE, Tn, Wells, J.R. (1965), WH3]



Pseudognaphalium Kirpicznikov 1950 (Rabbit-tobacco)

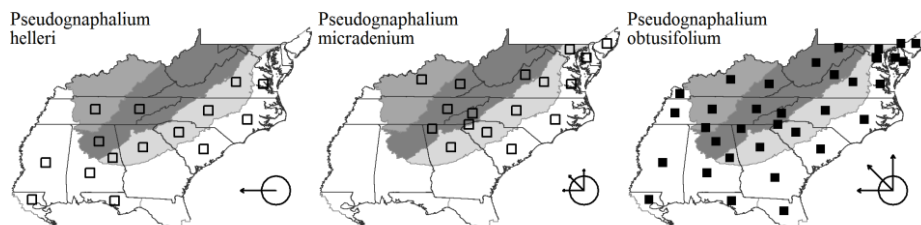
A genus of about 100 species, herbs, nearly cosmopolitan, especially of American temperate regions. References: Anderberg, A.A. (1991); Arriagada, J.E. (1998); SE; Galbany-Casals et al (2004); Mahler, W.F. (1975); Nesom in FNA19 (2006a); Nesom, G.L. (2001a).

- 1 Leaves distinctly (but shortly) decurrent 1-10 mm and adnate-auriculate on the stem. ***Laphangium luteoalbum***
- 1 Leaves sessile, not decurrent or adnate-auriculate.
 - 2 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***
 - 2 Stem glandular-pubescent or glandular-puberulent, the hairs at right angles to the stem, the stem surface plainly visible.
 - 3 Stems glandular-villous, the stipitate glands (0.1-) 0.3-1.0 mm high, prominently variable in height on any portion of the stem, with a stalk broadened toward the base and about equal the gland width; pistillate florets 83-107, bisexual florets 9-15; leaves mostly oblong-lanceolate, 2.5-7 cm long, 4-20 mm wide, 4-8 times longer than wide; plant 4-10 dm tall ***Pseudognaphalium helleri***
 - 3 Stems glandular-puberulent, the stipitate glands 0.1-0.2 mm high, relatively even in height on any portion of the stem, with a filiform stalk of even width and narrower than the gland width; pistillate florets 47-78, bisexual florets (7-) 11-20; leaves linear to linear-lanceolate or linear-oblong-lanceolate, 1.5-5.5 cm long, 1.5-10 mm wide, 6-10 times longer than wide; plant 3-7 dm tall ***Pseudognaphalium micradenium***

* ***Pseudognaphalium helleri*** (Britton) A. Anderberg, Heller's Rabbit-tobacco. Dry woodlands and openings (especially over mafic rocks), sandhills. Sep-Oct. Sc. VA south to Panhandle FL, s. AL, west to AR, LA, and ne. TX. [= FNA9, Nesom, G.L. (2001a), Tn, Va; = *Gnaphalium helleri* var. *helleri* – Mahler, W.F. (1975); = *Gnaphalium obtusifolium* var. *helleri* – Arriagada, J.E. (1998), F; = *Pseudognaphalium helleri* ssp. *helleri* – K2; < WH3; < *Gnaphalium helleri* – C, G, RAB, S, SE, W]

* ***Pseudognaphalium micradenium*** (Weatherby) G.L. Nesom, Small Rabbit-tobacco, Delicate Rabbit-tobacco. Dry woodlands and openings. Sep-Oct. Se. ME west to WI, south to e. SC, c. GA, se. TN, and s. MO. Nesom (2001a) discusses the distinctiveness of this taxon and its treatment as a species, rather than variety. [= FNA9, Nesom, G.L. (2001a), Tn, Va; = *Gnaphalium helleri* var. *micradenium* – Mahler, W.F. (1975); = *Gnaphalium obtusifolium* var. *micradenium* – Arriagada, J.E. (1998), F; = *Pseudognaphalium helleri* ssp. *micradenium* – K2; < *Gnaphalium helleri* – C, G, RAB, S, SE, W]

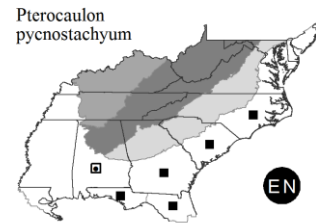
Pseudognaphalium obtusifolium (Linnaeus) Hilliard & Burtt, Eastern Rabbit-tobacco, Fragrant Rabbit-tobacco. Openings, woodlands, coastal dunes, sandy pinelands, disturbed areas. Aug-Nov. NL (Newfoundland) west to ON, south to s. FL and TX. [= FNA9, II, Nesom, G.L. (2001a), Pa, Tn, Va, WH3; = *Gnaphalium obtusifolium* – RAB, S, SE, W, WV; = *Gnaphalium obtusifolium* var. *obtusifolium* – Arriagada, J.E. (1998), C, G; > *Gnaphalium obtusifolium* var. *obtusifolium* – F; > *Gnaphalium obtusifolium* var. *praecox* – F; ? *Gnaphalium polyccephalum*; > *Pseudognaphalium obtusifolium* ssp. *obtusifolium* – K2; > *Pseudognaphalium obtusifolium* ssp. *praecox* – K2]



***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, J.E. (1998); SE; Nesom 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.



***Pterocaulon pycnostachyum* (Michaux) Elliott, Blackroot, Pineland Wingstem.** Sandhills, dry pinelands, pine flatwoods. Apr-Jun. Se. NC south to s. FL and west to s. AL. [= Arriagada, J.E. (1998), FNA9, GW2, K, RAB, SE, WH3; = *Pterocaulon undulatum* – S]

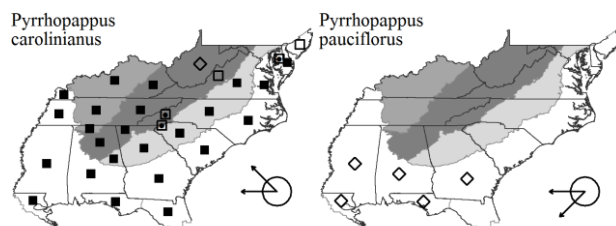
***Pyrrhopappus* A.P. de Candolle 1838 (False-dandelion)**

A genus of 3-5 species, herbs, of sw. and se. North America. References: SE; Strother in FNA19 (2006a).

- 1 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 pinnately 1-5-lobed ***Pyrrhopappus carolinianus***
- 1 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***

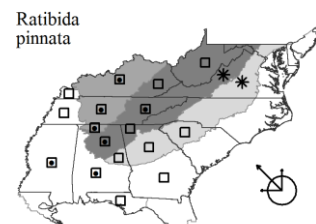
* ***Pyrrhopappus carolinianus* (Walter) A.P. de Candolle, False-dandelion.** Dry and moist forests, roadsides, meadows, fields. Mar-Jun (and sometimes later). DE, se. PA, and MD south to c. peninsular FL, west to IL, MO, and TX; he pre-Columbian range is uncertain. [= C, F, FNA9, G, IL, K, Tn, Va, W, WH3, WV; = *Sitilias caroliniana* – S; > *Pyrrhopappus carolinianus* var. *carolinianus* – RAB, SE; > *Pyrrhopappus carolinianus* var. *georgianus* – RAB, SE; > *Pyrrhopappus georgianus*]

* ***Pyrrhopappus pauciflorus* (D. Don) A.P. de Candolle, Small-flowered Desert-Chicory.** Disturbed areas. (Feb.) Apr-May. Probably merely adventive in our area from a native distribution from TX south to Coahuila, Nuevo León, and Tamaulipas. [= FNA9; = *Pyrrhopappus multicaulis* – SE; = *Sitilias multicaulis* – S; < K]

***Ratibida* Rafinesque 1817 (Prairie Coneflower)**

A genus of about 7 species, herbs, of North America. References: SE; Richards, E.L. (1968); Urbatsch & Cox in FNA21 (2006c).

* ***Ratibida pinnata* (Ventenat) Barnhart, Globular Prairie Coneflower, Grey-headed Coneflower, Drooping Coneflower.** 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 (naturalized from cultivation). Jun-Aug. 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. A characteristic plant of midwestern prairies and limestone glades, remarkably disjunct to "Piedmont prairie" remnants in SC (Nelson 1993). [= C, F, FNA9, G, IL, K, Pa, Richards, E.L. (1968), S, SE, Tn, W, WH3, WV]

***Rudbeckia* Linnaeus 1753 (Yellow Coneflower, Black-eyed Susan)**

A genus of about 15 species, herbs, of North America. References: Perdue, R.E., Jr (1957); Urbatsch & Cox in FNA21 (2006c).

Identification Notes: This treatment needs considerable additional work in the herbarium, and will likely be substantially modified.

- 1 Leaves grasslike, linear-lanceolate, > 10× as long as wide, the basal with blade 10-20 cm long and < 1 cm wide; [of Coastal Plain, of s. GA southward and westward].
.....*Rudbeckia mohrii*
- 1 Leaves broader, lanceolate, ovate, or pinnately-cleft, < 10× as long as wide; [collectively widespread].
- 2 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).
- 3 Disc flowers yellow or yellowish-green; achenes 3.5-6.0 mm long.
- 4 Basal and lower stem leaves 1-2-pinnatifid, with 5-many lobes; plants 1-3 m tall.
.....*Rudbeckia laciniata* var. *laciniata*
- 4 Basal and lower stem leaves 1-5-lobed; plants 0.5-2 m tall.
.....*Rudbeckia laciniata* var. *digitata*
- 3 Disc flowers purple-brown; achenes 1.9-3.5 mm long.
.....*Rudbeckia triloba* var. *triloba*
- 2 Leaves simple, unlobed, toothed (or entire).
- 5 Pales (bracts of the receptacle) glabrous or nearly so (except sometimes for a minutely ciliate margin).
- 6 Plants 2-3 m tall; stem leaves strongly auriculate-clasping*Rudbeckia auriculata*
- 6 Plants 0.5-1.3 m tall; stem leaves petiolate or sessile, but not auriculate-clasping.
.....*Rudbeckia fulgida* var. *fulgida*
- 5 Pales densely pubescent near the tip.
- 7 Plants glabrous or with scattered inconspicuous hairs.
- 8 Stem very sparsely spreading-villous (to more conspicuously hairy, and then keyable under 21b); disc to 15 mm high*Rudbeckia heliopsidis*
- 8 Stem glabrous; disc elongating in fruit, ultimately 12-60 mm high.
.....*Rudbeckia nitida*
- 7 Plants conspicuously hirsute or pilose.
- 9 Plants perennials from a woody rhizome; pappus a low crown; style appendages short, blunt.
- 10 Disc 10-15 mm across; rays 6-12, mostly spreading, 15-25 mm long; leaves not folded longitudinally*Rudbeckia heliopsidis*
- 10 Disc 15-25 mm across; rays 12-25, mostly reflexed, 30-50 mm long; leaves folded longitudinally.
.....*Rudbeckia grandiflora* var. *grandiflora*
- 9 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*).
- 11 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*
- 11 Stems and leaves with coarse and stiffish hairs; style branches elongate, subulate; [plants collectively widespread in our area].
.....*Rudbeckia hirta* var. *angustifolia*

Rudbeckia auriculata (Perdue) Kral, Swamp Black-eyed Susan. Pitcherplant bogs, wet roadsides and powerline rights-of-way, seepages. Sw. GA and Panhandle FL (Walton County) west to c. and s. AL. See Diamond & Boyd (2004) for detailed information. [= FNA9, K, SE, WH3; = *Rudbeckia fulgida* var. *auriculata*]

Rudbeckia fulgida Aiton var. ***fulgida***, Common Eastern Coneflower. Dry to wet meadows. Aug-Oct. NY and IL south to FL and AL. {add to synonymy, especially F, Z}. [= C, FNA9, G, K, Pa, SE; = *Rudbeckia fulgida* – F, Il, Tn; > *Rudbeckia acuminata* – S; > *Rudbeckia foliosa* – S; < *Rudbeckia fulgida* – GW2, RAB, Va, W, WH3; > *Rudbeckia fulgida* – S; > *Rudbeckia truncata* – S]

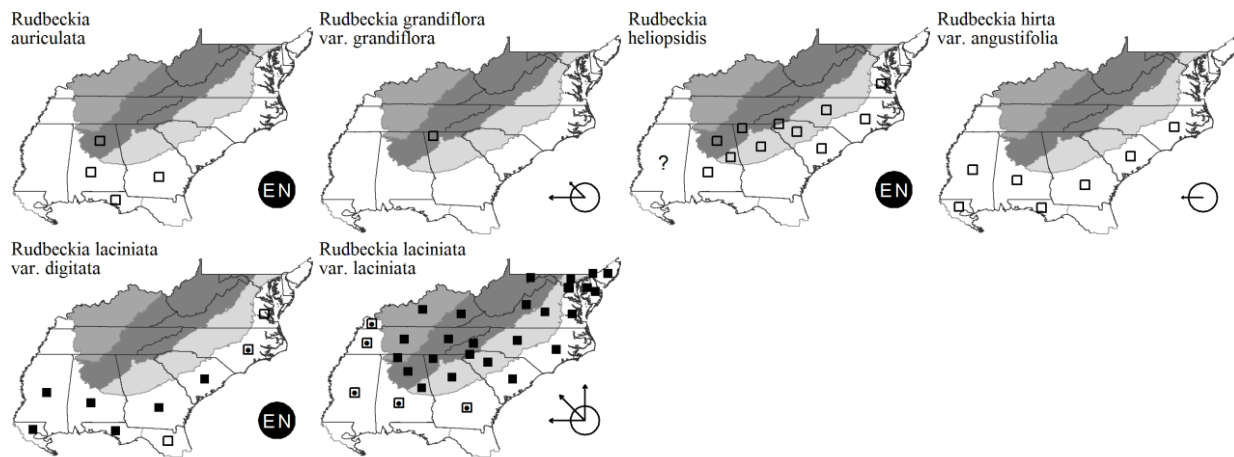
Rudbeckia grandiflora (Sweet) A.P. de Candolle var. ***grandiflora***, Largeflower Coneflower. Limestone glades and barrens; rare. MO and KS south to LA and TX; disjunct in nw. GA. [= FNA9, K, Perdue, R.E., Jr (1957), SE; = *Rudbeckia grandiflora* – Il, S]

Rudbeckia heliopsidis Torrey & A. Gray, Sunfacing Coneflower, Pineywoods Coneflower. Limestone or sandstone streambanks and barrens, pinelands, roadsides. Jul-Sep. VA south to GA and AL. [= C, F, FNA9, G, K, Perdue, R.E., Jr (1957), RAB, S, SE, Va, W]

Rudbeckia hirta Linnaeus var. ***angustifolia*** (T.V. Moore) Perdue, Coastal Plain Black-eyed Susan. Cp (FL?, GA, NC, SC):. May-Jul. SC south to FL, west to TX. [= FNA9, K, Perdue, R.E., Jr (1957), SE; ? *Rudbeckia divergens* – S; < *Rudbeckia hirta* – RAB, Va, WH3]

Rudbeckia laciniata Linnaeus var. ***digitata*** (Miller) Fiori, Coastal Plain Cutleaf Coneflower. Seepage bogs, streamsides. Jul-Oct. VA south to FL, west to LA. [= C, F, K, Tn; < SE, Va; < *Rudbeckia laciniata* – GW2, RAB, S, W, WH3; < *Rudbeckia laciniata* var. *humilis* – FNA9; < *Rudbeckia laciniata* var. *laciniata* – G]

Rudbeckia laciniata Linnaeus var. ***laciniata***, Common Cutleaf Coneflower, Goldenglow. Cp (DE, FL?, GA, NC, SC, VA), Pd (DE, GA, NC, SC, VA), Mt (GA, NC, SC, VA):. moist forests, bottomlands, streambanks; common (uncommon in DE Coastal Plain). Jul-Oct. NB, ON, and MB south to FL and TX. [= FNA9, K, SE, Tn, Va; < C, G; > F, WV; > Pa; < *Rudbeckia laciniata* – GW2, Il, RAB, S, W, WH3; > *Rudbeckia laciniata* var. *hortensia* – F; > *Rudbeckia laciniata* var. *hortensis* – Pa, WV]

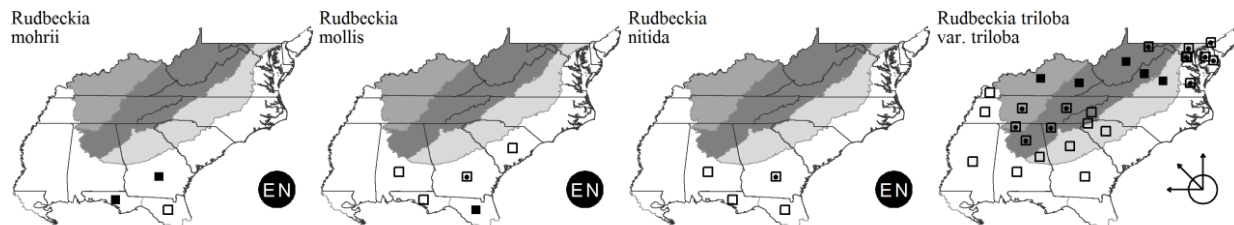


Rudbeckia mohrii A. Gray, Mohr's Coneflower. Wet pine savannas. Ec. GA to Panhandle FL. [= FNA9, K, S, SE, WH3]

Rudbeckia mollis Elliott, Woolly Coneflower. Longleaf pine / turkey oak sandhills. Late Aug-Oct. SC south to n. peninsular FL, FL Panhandle, west to s. AL. [= FNA9, K, Perdue, R.E., Jr (1957), RAB, S, SE, WH3]

Rudbeckia nitida Nuttall, St. John's Black-eyed Susan. Wet pine savannas, adjacent roadsides. E. GA and ne. FL south to c. peninsular FL, west to s. AL (Diamond 2016). [= FNA9, K, WH3; = *Rudbeckia nitida* var. *nitida* – SE; > S; > *Rudbeckia glabra* – S]

Rudbeckia triloba Linnaeus var. *triloba*, Common Three-lobed Coneflower. Moist forests and rock outcrops. Jul-Oct. VT, ON, MN, and NE south to GA and TX; westward in CO and UT (as introductions?). [= C, F, FNA9, G, II, K, Pa, SE, Tn, Va; = *Rudbeckia triloba* – S; < *Rudbeckia triloba* – RAB, W, WV]



Santolina Linnaeus 1753

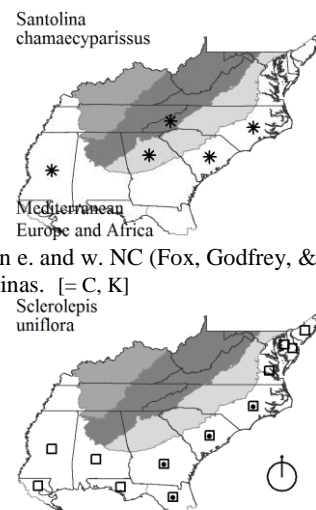
A genus of about 8-18 species, shrubs, of the Mediterranean region. References: Watson in FNA19 (2006a).

* ***Santolina chamaecyparissus*** Linnaeus, Holy-flax, Lavender-cotton, Cypress Lavender-cotton. Disturbed areas; native of Mediterranean Europe. Mar-Oct. This species is introduced in e. and w. NC (Fox, Godfrey, & Blomquist 1952). Graetz (1973) recommended it for planting in barrier island areas of the Carolinas. [= C, K]

Sclerolepis Cassini 1816 (*Sclerolepis*)

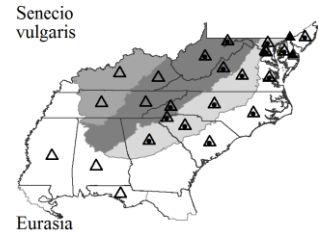
A monotypic genus, a perennial herb, of se. North America. References: SE; Lamont in FNA21 (2006c).

Sclerolepis uniflora (Walter) Britton Sterns, & Poggenburg, *Sclerolepis*. 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. May-Aug; Jul-Oct. 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). [= C, F, FNA9, G, GW2, K, RAB, SE, Va, WH3]



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 traditionally treated as "*Senecio*" in our flora are not even part of a broadly defined core group, and have been transferred to *Packera* and *Rugelia*. *Hasteola* (*Synosma*) has been treated as a small genus of perennial herbs (consisting of *Hasteola suaveolens* and the FL peninsular endemic, *H. robertiorum* L.C. Anderson), but Pelser et al. (2007) demonstrate that *Hasteola* is deeply embedded in *Senecio* and closely related to a group of New World *Senecio*; it is so included here. References: Anderson, L.C. (1994); Barkley in FNA20 (2006b); Barkley, T.M. (1978); Barkley, T.M. (1999); Bremer, K. (1994); SE; Pelser, P.B. et al. (2007); Phippen, R.W. (1978).



* *Senecio vulgaris* Linnaeus, Common Groundsel. Roadsides, fields, disturbed areas; native of Eurasia. Mar-Jun. [= Barkley, T.M. (1978), Barkley, T.M. (1999), C, F, FNA9, G, IL, K, RAB, S, SE, Tn, Va, W, WH3, WV]

Sericocarpus Nees 1832 (White-topped Aster)

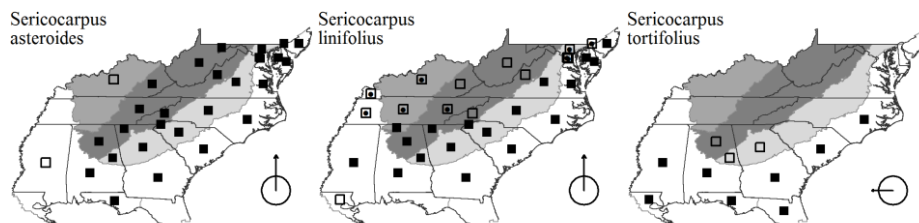
A genus of 5 species, herbs, of North America. This group of species, traditionally treated as *Sericocarpus*, was transferred to *Aster* by Cronquist, a treatment followed by most (but not all) recent floristic works. It now appears, based on morphological and molecular studies, that the traditional treatment as a separate genus is far superior. Nesom (1993a) argues that a variety of characters indicate that *Sericocarpus* is more closely allied to *Solidago*, *Euthamia*, *Bigelovia*, *Chrysoma*, and *Gutierrezia* than it is to *Aster*. Noyes & Rieseberg (1999) provide 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: SE; Leonard, M.R., R.E. Cook, & J.C. Semple (2005); Nesom, G.L. (1993a); Semple & Leonard in FNA20 (2006b).

- 1 Leaves basally disposed, leaves of the basal rosette much larger than the cauline leaves; leaves (at least the basal) toothed *Sericocarpus asteroides*
- 1 Leaves cauline, basal rosette lacking, the mid-cauline leaves the largest; leaves entire (or with 1-2 teeth in *S. tortifolius*).
 2 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; involucre glabrous *Sericocarpus linifolius*
- 2 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 the leaf blade into a more-or-less vertical plane); leaves puberulent, glandular-punctate, and with prominent resin globules (at 10× magnification); involucre puberulent *Sericocarpus tortifolius*

Sericocarpus asteroides (Linnaeus) Britton Sterns, & Poggenburg, Toothed White-topped Aster. Dry woodlands, thin soils around rock outcrops, sandhills, dry pinelands. Jun-Jul. S. ME and s. VT west to c. OH, south to e. SC, c. GA, w. Panhandle FL, s. AL, and s. MS. Coastal Plain populations are rhizomatous, while inland populations are not; some taxonomic distinction may be warranted (Nesom, pers. comm.). [= F, FNA9, K, Leonard, M.R., R.E. Cook, & J.C. Semple (2005), Nesom, G.L. (1993a), Pa, S, Tn, Va, WH3, WV; = *Aster paternus* – C, G, RAB, SE, W]

Sericocarpus linifolius (Linnaeus) Britton Sterns, & Poggenburg, Narrow-leaf White-topped Aster. Dry woodlands, sandhills. Jun-Jul. MA west to s. OH and s. IN, south to se. SC, c. GA, s. AL, s. MS, and e. LA (Florida parishes). [= F, FNA9, K, Leonard, M.R., R.E. Cook, & J.C. Semple (2005), Nesom, G.L. (1993a), Pa, S, Tn, Va, WV; = *Aster solidagineus* – C, G, RAB, SE, W]

Sericocarpus tortifolius (Michaux) Nees, Twisted-leaf White-topped Aster. Dry to mesic sandhills. Aug-Nov. 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. [= FNA9, K1, K3, Leonard, M.R., R.E. Cook, & J.C. Semple (2005), Nesom, G.L. (1993a), WH3; = *Aster tortifolius* – RAB, SE, W; = *Sericocarpus bifolius* – S]



Silphium Linnaeus 1753 (Rosinweed)

A genus of 20-30 species, herbs, of e. North America. References: Clevinger in FNA21 (2006c); Clevinger, J.A. (2004); SE; Cruden (1962); Medley, M.E. (1989); Perry, L.M. (1937); Steyermark, J.A. (1951); Sweeney, C.R. (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 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. mohrii*, 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 Phyllaries acuminate, hispid; leaves cuneate to rounded at the base *Silphium mohrii*
 - 3 Phyllaries obtuse to acute, glabrous (though ciliate-margined); leaves subcordate, cordate, truncate-sagittate, or clasping at the base. *Silphium simpsonii*
 - 2 Stem nearly naked, bearing only a few bracteal (very reduced) leaves.
 - 4 Heads relatively large (involucre 13-25 mm high, disk 15-25 mm wide), with 14-40 ray flowers; [of calcareous or mafic glades or woodlands].
 - 5 Principal leaves shallowly to deeply pinnatifid; leaf blade base cuneate, tapering to the petiole *Silphium pinnatifidum*
 - 5 Principal leaves only toothed (or subentire); leaf blade base cordate or truncate at the base (rarely abruptly narrowed) *Silphium terebinthinaceum*
 - 4 Heads relatively small (involucre 6-11 mm high, disk 8-15 mm wide), with 6-12 ray flowers; [of a wide range of mostly dry, often acidic habitats].
 - 6 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; [of the upper Piedmont and Mountains] *Silphium reniforme*
 - 6 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].
 - 7 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; [of the Coastal Plain and lower Piedmont from se. VA south to extreme e. GA] *Silphium compositum* var. *compositum*
 - 7 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.
 - 8 Achene wing tip obtuse, the sinus between the wing tips narrowly U-shaped; leaf blade usually longer than wide; petiole short, as long as or shorter than the leaf blade (midrib); [of se. SC south to c. peninsular FL and FL Panhandle] *Silphium compositum* var. *ovatifolium*
 - 8 Achene wing tip acute to acuminate, the sinus between the wing tips V-shaped; leaf blade usually as long as wide; petiole long, as long as or longer than the leaf blade (midrib); [of se. NC south to se. GA and FL Panhandle] *Silphium compositum* var. *venosum*
 - 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.
 - 9 Ray flowers 20-30 per head (or more) *Silphium radula*
 - 9 Ray flowers 12-20 per head. *Silphium simpsonii*

***Silphium compositum* Michaux var. *compositum*.** Sandhills, other xeric forests and woodlands. May-Sep. VA south to GA. Perhaps worth 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. [= K1, Perry, L.M. (1937), Va; = *Silphium compositum* – F; = *Silphium compositum* ssp. *compositum* – Sweeney, C.R. (1970); < RAB; > *Silphium collinum*; < *Silphium compositum* – C, FNA9, G, K2, SE, Tn, W; > *Silphium compositum* – S; > *Silphium orae* – S]

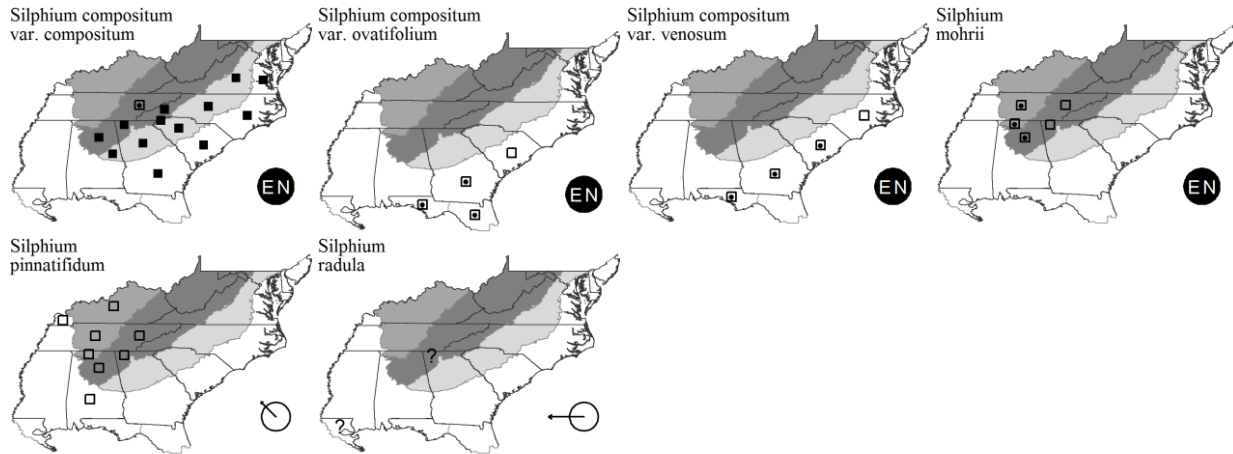
***Silphium compositum* Michaux var. *ovatifolium* Torrey & A. Gray.** Sandhills. May-Sep. Se. SC south to c. peninsular FL and FL Panhandle. [= K1; = *Silphium compositum* ssp. *ovatifolium* – Sweeney, C.R. (1970); = *Silphium ovatifolium* – Perry, L.M. (1937), S; < *Silphium compositum* – FNA9, K2, SE, WH3]

***Silphium compositum* Michaux var. *venosum* (Small) Kartesz & Gandhi.** Sandhills, xeric forests. May-Sep. Se. NC south to se. GA and FL Panhandle. [= K1; = *Silphium compositum* ssp. *venosum* – Sweeney, C.R. (1970); = *Silphium venosum* – Perry, L.M. (1937); < *Silphium compositum* – FNA9, K2, SE, WH3; < *Silphium compositum* var. *compositum* – RAB; > *Silphium lapsuum* – S; > *Silphium venosum* – S]

***Silphium mohrii* Small, Shaggy Rosinweed.** Prairies. Endemic to c., sc., and se. TN (Chester, Wofford, & Kral 1997) south to nw. GA (Jones & Coile 1988) and nc. AL. [= C, FNA9, K1, K2, Perry, L.M. (1937), S, SE, Tn]

***Silphium pinnatifidum* Elliott, Tansy Rosinweed.** Limestone glades and woodlands. Jul-Sep. OH and IN south to nw. GA and AL. [= II, K1, S, SE, Tn; = *Silphium terebinthinaceum* var. *pinnatifidum* – F, FNA9, K2, Perry, L.M. (1937); > *Silphium chickamaugense*; < *Silphium terebinthinaceum* – G]

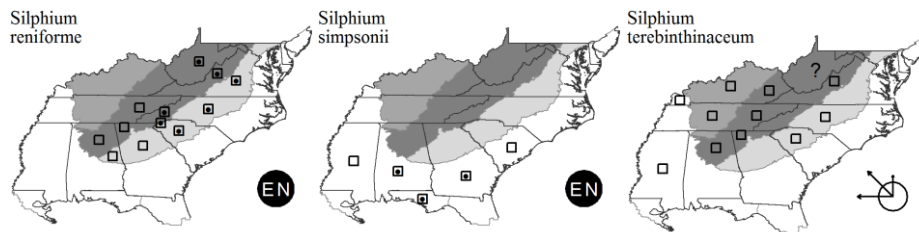
Silphium radula Nuttall. Sometimes reported as occurring east of the Mississippi River (as by Jones & Coile 1988 for nw. GA) and therefore in the Flora area, but there appears to be no authoritative evidence to support that. {rejected}. [= K1, SE; ? *Silphium aspernum* – Perry, L.M. (1937); ? *Silphium gatesii* – Y?]



Silphium reniforme Rafinesque ex Nuttall. Dry forests. Sc. VA, e. WV, and e. TN, south to c. SC, c. GA, and e. AL. Plants with shallowly lobed leaves, with nearly the same distribution as typical *S. reniforme*, have been variously interpreted. [= S; = *Silphium compositum* ssp. *reniforme* – Sweeney, C.R. (1970), WV; = *Silphium compositum* var. *reniforme* – F, K1, Perry, L.M. (1937), RAB, Va; < *Silphium compositum* – C, FNA9, G, K3, SE, W]

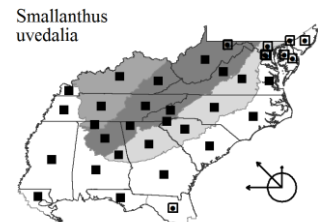
Silphium simpsonii Greene. Longleaf pinelands. SC south to FL, west to MS. [= K1; = *Silphium asteriscus* var. *simpsonii* – Clevinger, J.A. (2004), FNA9, K3; = *Silphium simpsonii* var. *simpsonii* – Perry, L.M. (1937); < *Silphium asteriscus* – WH3; < *Silphium gracile* – S, SE]

* *Silphium terebinthinaceum* Jacquin, Prairie-dock. Mafic or calcareous glades, barrens, woodlands, prairies, and roadsides. Jul-Sep. NY, ON, WI, and NE south to nw. GA, MS, and AR; disjunct eastward in Piedmont of NC and n. SC. *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). The distinction of var. *luciae-brauniae* Steyermark, with leaf blades glabrous above vs. scabrous, is dubious but needs additional study. [= RAB, SE, Tn, Va; = *Silphium terebinthinaceum* var. *terebinthaceum* – F, FNA9, K3; < G; > S; > *Silphium rumicifolium* – Perry, L.M. (1937), S; > *Silphium terebinthinaceum* var. *luciae-brauniae* – K1; *Silphium terebinthinaceum* var. *lucy-brauniae* – II; > *Silphium terebinthinaceum* var. *terebinthaceum* – II, K1, Perry, L.M. (1937)]



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: SE; Robinson, H. (1978); Strother in FNA21 (2006c); Wells, J.R. (1965).



Smallanthus uvedalia (Linnaeus) Mackenzie, Bearsfoot, Leafcup. Moist forests, bottomland forests, and disturbed places. Jul-Oct. NY, s. MI, IL, MO, and se. KS south to c. peninsular FL and c. TX. 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 (including our area), *S. uvedalia* has sometimes been separated into varieties (see synonymy); further study is warranted. [= FNA9, K3, S, Tn, WH3; = *Polymnia uvedalia* – C, RAB, SE, W, WV; =

Smallanthus uvedalius – Il, K1, Pa, Robinson, H. (1978), Va; > *Polymnia uvedalia* var. *densipilis* – F, G, Wells, J.R. (1965); > *Polymnia uvedalia* var. *floridana* – F, Wells, J.R. (1965); > *Polymnia uvedalia* var. *uvedalia* – F, G, Wells, J.R. (1965)]

***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 here included in *Solidago* rather than being treated as the separate genus *Oligoneuron*. References: Braun, E.L. (1942); Brouillet, L. & J.C. Semple (1981); Cook, R.E. & J.C. Semple (2004); SE; SE; Heard, S.B. & J.C. Semple (1988); Morton, G.H. (1973); Morton, G.H. (1974); Nesom, G.L. (1990); Nesom, G.L. (1993b); Semple & Cook in FNA20 (2006b); Semple (2013); Semple et al (2016); Semple et al (2017); Semple, J.C. & J. Peirson (2013); Semple, Tong, & Chong (2017); Zhang, J. (1996).

Identification Notes: Several related genera readily mistaken for (and/or sometimes included in) *Solidago* are included here as keying “failsafes”.

Unkeyed taxa:

Solidago pallescens

Solidago austrina

- 1 Inflorescence corymbiform, flat-topped or broadly rounded and about as broad as long, or broader; [section *Ptarmicoideae*, and section *Solidago*, subsection *Multiradiatae*]**Key A**
- 1 Inflorescence a panicle, raceme, thyse, 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 cauline leaves larger, petiolate, and usually persistent, the middle and upper cauline leaves smaller and less petiolate.
 - 3 Inflorescence cylindrical, of axillary clusters subtended by well-developed stem leaves, or a terminal thyse 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 cauline, the basal and lower cauline leaves (when not early withering) the same size as or smaller than the middle and upper cauline 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 with corymbiform inflorescences
(section *Ptarmicoideae*, and section *Solidago*, subsection *Multiradiatae*)**

- 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-ob lanceolate, the longer (10-) 15-20× as long as wide; pappus bristles slightly to strongly clavellate-thickened; [section *Ptarmicoideae*] *Solidago ptarmicoides*
 - 3 Rays yellow; leaves oblong, elliptic, obovate, or spatulate, 2-8× as long as wide; pappus bristles not clavellate thickened.
 - 4 Larger leaves 3-6 cm wide, ca. 2-8× as long as wide, acute to obtuse, serrate to crenate with numerous teeth (sometimes the teeth very obscure), with many pinnate-netted veins; leaves, stems, and peduncles moderately to densely pubescent. *Solidago rigida* var. *glabrata*
 - 4 Larger leaves 0.4-1.6 cm wide, ca. 12-25× as long as wide, acuminate to acute, entire or serrate with a few salient teeth on either side, with 3+ parallel veins. *Solidago riddellii*

**Key B - goldenrods with basally disposed leaves and elongate, non-secund inflorescences
(section *Solidago*, subsections *Glomeruliflorae*, *Humiles*, *Maritimae*, *Squarrosae*)**

- 1 Phyllaries and often also vegetative parts with minute sticky glands (use at least 10× magnification); stem leaves petiolate; [subsection *Humiles*].
 - 2 Leaves, peduncles, and phyllaries copiously glandular; [plants of Coastal Plain sandhills] *Solidago kralii*
 - 2 Leaves, peduncles, and phyllaries slightly glandular; [plants of rocky glades, cliffs, barrens, and river-scoured outcrops, primarily on mafic or calcareous rocks)]. *Solidago arenicola*
- 1 Phyllaries and vegetative parts lacking minute sticky glands; stem leaves sessile.
 - 3 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*].
 - 4 Basal leaves 0.7-8 cm wide; plants short, 4-10 (-15) dm tall, typically fairly stout; [of the Mountains and northward]. *Solidago simulans*

- 4 Basal leaves 0.7-2.5 (-5) cm wide; plants short to tall, 3-20 dm tall, typically very slender; [of the Coastal Plain and lower Piedmont and southward].
 - 5 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*
 - 5 Leaf margins tending to become smooth on the upper stem; panicle branches usually stiffly erect; pappus 4.0-4.5 (-5.0) mm long
..... *Solidago virgata*
- 3 Petioles of lower stem leaves not sheathing the stems; [of mesic or drier habitats]; [subsection *Squarrosae*].
 - 6 Phyllaries linear-lanceolate, attenuate, tapering to a pointed or minutely rounded tip.
 - 7 Stems glabrous below and to the mid-stem; rays mostly 6-9; inner phyllaries usually striate with 2 prominent secondary veins
..... *Solidago roanensis*
 - 7 Stems finely hairy throughout with minute strigillose hairs; rays mostly 9-16; inner phyllaries not striate.
 - 8 Leaves 20-50 (-60) per stem; midstem leaves usually 4-5 cm long; phyllaries attenuate; [of the Mountains and Piedmont of GA northward, and Coastal Plain from VA northward] *Solidago puberula*
 - 8 Leaves (20-) 50-120 per stem; midstem leaves usually 1-4 cm long; phyllaries acute to acuminate; [of the Coastal Plain from DE southward] *Solidago pulverulenta*
 - 6 Phyllaries ovate to lanceolate, acute to obtuse or rounded.
 - 9 Rays white *Solidago bicolor*
 - 9 Rays yellow (may turn pale yellow with age).
 - 10 Involucres (6-) avg. 7.2 (-9.5) mm high *Solidago porteri*
 - 10 Involucres 3.5-6.5 mm high.
 - 11 Leaves and stems sparsely to densely hairy with spreading to appressed hairs *Solidago hispida* var. *hispida*
 - 11 Leaves and upper stems glabrous.
 - 12 Inflorescence either very narrowly thyriform and often interrupted or branches well spaced; mid cauline leaves 0.5-2.0 cm wide; [of MA to se. IN, south to GA and MI, mostly avoiding the Coastal Plain southward] *Solidago erecta*
 - 12 Inflorescence usually denser, broader, and crowded, sometimes more open in robust plants, or narrow in plants outside range of *S. erecta*; mid cauline leaves often > 20 mm wide; [of MA to GA, west to SD and scattered south in CO to ne. NM].
 - 13 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*
 - 13 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 elongate, secund inflorescences
(section *Solidago*, subsections *Argutae*, *Junceae*, *Maritimae*, *Nemorales*) {add *S. ulmifolia* vars to Key C}

- 1 Basal and lower cauline leaves petiolate with a cordate or subcordate blade and/or a cordate-clasping petiole; [subsection *Argutae*].
 - 2 Pappus > 1/2× as long as the disc corollas; rays 1-3 *Solidago auriculata*
 - 2 Pappus < 1/4× as long as the disc corollas; rays 3-6 *Solidago sphacelata*
- 1 Basal and lower cauline 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 cauline 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; [of the Mountains, Interior Low Plateau, and rarely Piedmont] *Solidago patula*
 - 6 Involucre (3.5-) avg. 6.1 (-8.8) mm high; basal and lower cauline 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; [of the Coastal Plain and very rarely the lower Piedmont] *Solidago salicina*
 - 5 Leaves moderately to densely soft-villous or puberulent.
..... *Solidago brachyphylla*
 - 4 Leaves either glabrous (or nearly so) or strigose or strigillose.
 - 7 Plants with slender, stoloniferous rhizomes (in addition to the main, more deeply-seated rhizomes) *Solidago tarda*
 - 7 Plants lacking slender, stoloniferous rhizomes.
 - 8 Leaves strigose or strigillose *Solidago arguta* var. *boottii*
 - 8 Leaves glabrous *Solidago arguta* var. *caroliniana*
 - 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).
 - 9 Petiole bases of basal and lower cauline leaves not sheathing the stem; [of mesic or dry habitats].
 - 10 Stems obviously densely and loosely puberulent; [subsection *Nemorales*] *Solidago nemoralis* var. *nemoralis*
 - 10 Stems glabrous or nearly so; [subsection *Junceae*].
 - 11 Rhizomes thin, elongated, creeping; stem leaves usually 3-nerved; [disjunct from west to glades and barrens]
..... *Solidago missouriensis* var. *fasciculata*
 - 11 Rhizomes thick, short; stem leaves not 3-nerved; [collectively of various habitats].
..... *Solidago juncea*
 - 9 Petiole bases of basal and lower cauline leaves sheathing the stem; [of seasonally saturated habitats]; [subsection *Maritimae*].

- 12 Leaves somewhat fleshy, the stem leaves reduced but not very markedly so; inflorescence almost always with lower branches strongly recurved with second heads; [usually of maritime or otherwise saline habitats, rarely in nontidal marshes or swamps].
..... *Solidago mexicana*
- 12 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 second heads; [of inland habitats, except rarely *S. stricta*].
- 13 Basal leaves 0.7-2.5 (-5) cm wide; plants short to tall, 3-20 dm tall, typically very slender; [of the Coastal Plain and lower Piedmont and southward].
- 14 Leaf margins scabrous (or at least tuberculate) throughout; panicle branches often spreading-erect with recurved-second tips; pappus 2.2-4.0 mm long *Solidago gracillima*
- 14 Leaf margins tending to become smooth on the upper stem; panicle branches usually stiffly erect; pappus 4.0-4.5 (-5.0) mm long *Solidago virgata*
- 13 Basal leaves 0.7-8 cm wide; plants short, 4-10 (-15) dm tall, typically fairly stout; [mainly of the Mountains (and the Coastal Plain from e. VA northwards), e. VA, w. NC, nw. SC, ne. GA, and northward].
..... *Solidago simulans*

Key D - goldenrods with cauline leaves 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.
..... *Solidago petiolaris* var. *petiolaris*
- 1 Leaves generally many- and sharp-toothed; achenes persistently pubescent; outer phyllaries with appressed tips; [subsection *Glomeruliflorae*].
- 3 Stem terete, glaucous.
4 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* var. *caesia*
4 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 caesia* var. *zedia*
- 3 Stem striate-angled, green.
5 Leaves 1-3 (-3.5)× as long as wide.
6 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 teeth) *Solidago flaccidifolia*
6 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 teeth) *Solidago flexicaulis*
5 Leaves 3-10× as long as wide.
..... *Solidago curtisii*

Key E - goldenrods with cauline leaves and well-developed paniculate inflorescences
(section *Solidago*, subsections *Nemorales*, *Triplinervae* and *Venosae*)

- 1 Mid-stem leaves 3-nerved (obscurely so in *S. tortifolia*); leaves elliptic, lanceolate, oblanceolate, or linear.
2 Rays 2-6; larger leaves linear to lance-linear, 2-7 (-10) mm wide, twisted at base; plants (3-) 7-13 dm tall; [subsection *Triplinervae*] *Solidago tortifolia*
- 2 Rays 4-17 (-24); larger leaves 5-30 mm wide, not twisted at base; plants 5-20 dm tall.
3 Rays 4-10 (-11); plants 3-15 dm tall.
..... *Solidago radula*
- 3 Rays (7-) 9-17 (-24); plants (5-) 10-20 dm tall; [collectively widespread]; [subsection *Triplinervae*].
4 Stems glabrous and usually also glaucous *Solidago gigantea*
4 Stems pubescent (at least the upper portion).
5 Leaves glabrous above and below, or pubescent only on the main veins beneath; midstem leaves serrulate, with 1-10 teeth per side, the largest < 0.5 mm long; [of the Coastal Plain, from NC south to FL and AL] *Solidago leavenworthii*
5 Leaves moderately to densely pubescent across the lower surface, and scabrous to puberulent above; midstem leaves entire, serrulate, or serrate; [collectively widespread].
6 Inflorescence broad; upper stem leaves not reduced in size relative to the mid-stem leaves; [broadly eastern] *Solidago altissima* var. *altissima*
6 Inflorescence elongated, narrow; upper stem leaves reduced; [southern] *Solidago altissima* var. *pluricephala*
- 1 Mid-stem leaves reticulate-nerved; leaves generally obovate, elliptic, lanceolate, or oblanceolate (if linear, then the fresh leaves anise-scented); [subsection *Venosae*].
7 Stems from branched caudices or short rhizomes, lacking elongated rhizomes.
8 Leaves entire; leaves translucent-punctate; fresh leaves anise-scented.
9 Main leaves ovate to lanceolate, 2-5 (-6)× as long as wide; stem pubescence general and circumferential; [of FL] *Solidago chapmanii*
9 Main leaves lanceolate to linear, (4-) 5-15× as long as wide; stem pubescence in lines decurrent down the stem from the margins of the leaf bases; [widespread] *Solidago odora*
8 Leaves serrate; leaves not translucent-punctate; fresh leaves not anise-scented
..... *Solidago ulmifolia* var. *ulmifolia*
- 7 Stems from elongated creeping rhizomes.
10 Mid-stem leaves sessile, somewhat clasping; leaf margins nearly entire to obscurely serrulate; leaves planar

- *Solidago fistulosa*
- 10 Mid-stem leaves subsessile, not clasping; leaf margins strongly serrate; leaves rugose.
- 11 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*
- 11 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).
- 12 Leaves relatively thin, not very rugose, usually sharply serrate, the apices acuminate, glabrous or soft-hairy on the surfaces.
- *Solidago rugosa* var. *rugosa*
- 12 Leaves relatively thick and firm, strongly rugose, usually subentire to bluntly serrate, the apices often only acute, scabrous or stiffly-hairy on the surfaces.
- 13 Inflorescences narrow, the lower lateral branches only slightly exceeding the subtending leaves; leaves sparsely pubescent; [of the Southern Appalachians] *Solidago rugosa* var. *cronquistiana*
- 13 Inflorescences broad, the lower lateral branches generally much longer than the subtending leaves; leaves moderately to densely pubescent; [collectively widespread].
- 14 Upper cauline leaves lanceolate to elliptic, not much reduced relative to leaves lower on the stem *Solidago rugosa* var. *aspera*
- *Solidago rugosa* var. *celtatifolia*
- 14 Upper cauline leaves ovate, much reduced relative to leaves lower on the stem

Solidago altissima Linnaeus var. *altissima*, Tall Goldenrod. Fields, roadsides, disturbed areas. Aug-Oct. NS, QC, and SK south to n. GA, n. AL, n. MS, AR, and OK; introduced in w. North America. Var. *gilvocanescens* (Rydborg) Semple, with heads smaller (mainly 2-3 mm high vs. 3-4 mm high) is mainly distributed in the Great Plains. [= II; < Va; < *Solidago altissima* – F, GW2, K, Pa, RAB, Tn, WV; < *Solidago altissima* ssp. *altissima* – FNA9; < *Solidago canadensis* – W; < *Solidago canadensis* var. *scabra* – C, G, SE, WH3; < *Solidago hirsutissima* – S]

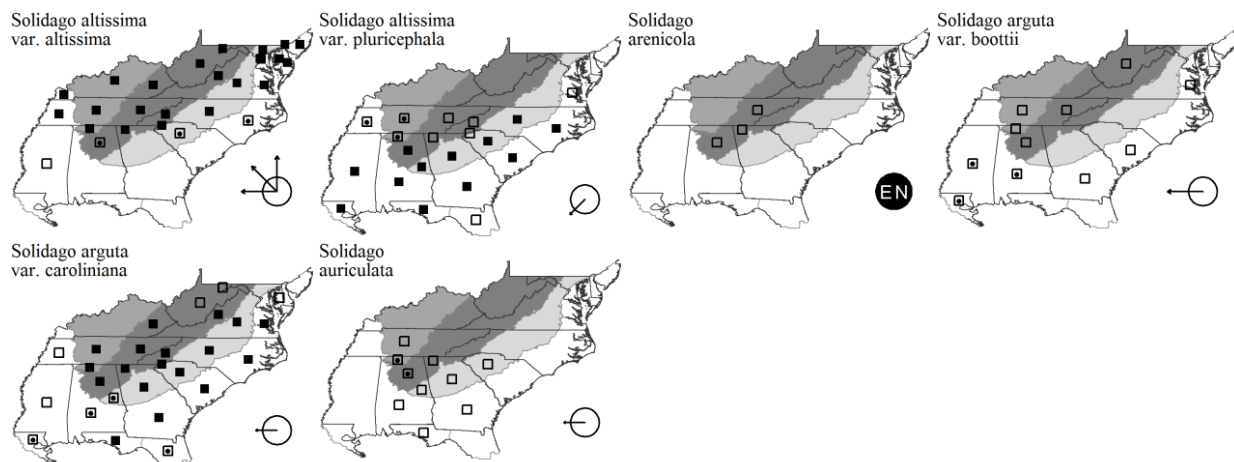
Solidago altissima Linnaeus var. *pluricephala* M.C. Johnston, Southern Tall Goldenrod. Fields, roadsides, disturbed areas. Aug-Oct. Se. VA, NC, TN, AR, and OK south to c. peninsular FL, s. TX, and adjacent Mexico. See Semple et al. (2015). [= *Solidago altissima* var. *altissima* – Va; < *Solidago altissima* – F, GW2, K, Pa, RAB, WV; < *Solidago altissima* ssp. *altissima* – FNA9; < *Solidago canadensis* – W; < *Solidago canadensis* var. *scabra* – C, G, SE, WH3; < *Solidago hirsutissima* – S]

Solidago arenicola B.R. Keener & Kral, Black Warrior Goldenrod. Riverside scour areas. Sep-Oct. Known from Blount County, AL (Black Warrior River) and on rivers in the Cumberland Plateau of TN and KY (notably Big South Fork of the Cumberland River). See Keener & Kral (2003) for additional information. [= FNA9, Tn]

Solidago arguta Aiton var. *boottii* (Hooker) Palmer & Steyermark, Boott's Goldenrod. Dry open woodlands, dry slopes, often in sandy or rocky soils. Aug-Oct. 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. [= K, SE, Tn; = *Solidago arguta* ssp. *boottii*; = *Solidago arguta* ssp. *caroliniana* var. *boottii* – FNA9; = *Solidago boottii* – II; < *Solidago arguta* – RAB; > *Solidago boottii* – F, S, WV; > *Solidago boottii* var. *boottii* – G; > *Solidago strigosa* – F, G, S]

Solidago arguta Aiton var. *caroliniana* A. Gray, Vasey's Goldenrod. Forests, woodlands, grassy balds. Sep-Oct. 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. [= C, K, SE, Tn, Va, W; = *Solidago arguta* ssp. *australis*; = *Solidago arguta* ssp. *caroliniana*; = *Solidago arguta* ssp. *caroliniana* var. *caroliniana* – FNA9; = *Solidago arguta* ssp. *pseudoyadkinensis*; = *Solidago pseudoyadkinensis*; = *Solidago yadkinensis* – F, S; < WH3; < *Solidago arguta* – RAB, WV; > *Solidago boottii* var. *caroliniana* – G; ? *Solidago vaseyi*]

Solidago auriculata Shuttleworth ex Blake, Eared Goldenrod. Rocky forests over circumneutral rocks, bottomland forests, calcareous hammocks. Aug-Sep. Wc. SC, sc. TN (Chester, Wofford, & Kral 1997), AR, and OK south to GA, c. Panhandle FL, AL, MS, LA, and TX. [= FNA9, K, SE, Tn, WH3; = *Solidago notabilis* – RAB, S]



Solidago austrina Small, Southern Bog Goldenrod. Seepage bogs, swamps, depression wetlands. Sc. NC south to GA, Panhandle FL, and nw. AL, possibly extending into TN and KY. 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. {not yet keyed}. [= F, G, S, Tn; < *Solidago gracillima* – K, RAB, SE, W, WH3; < *Solidago stricta* ssp. *gracillima* – FNA9]

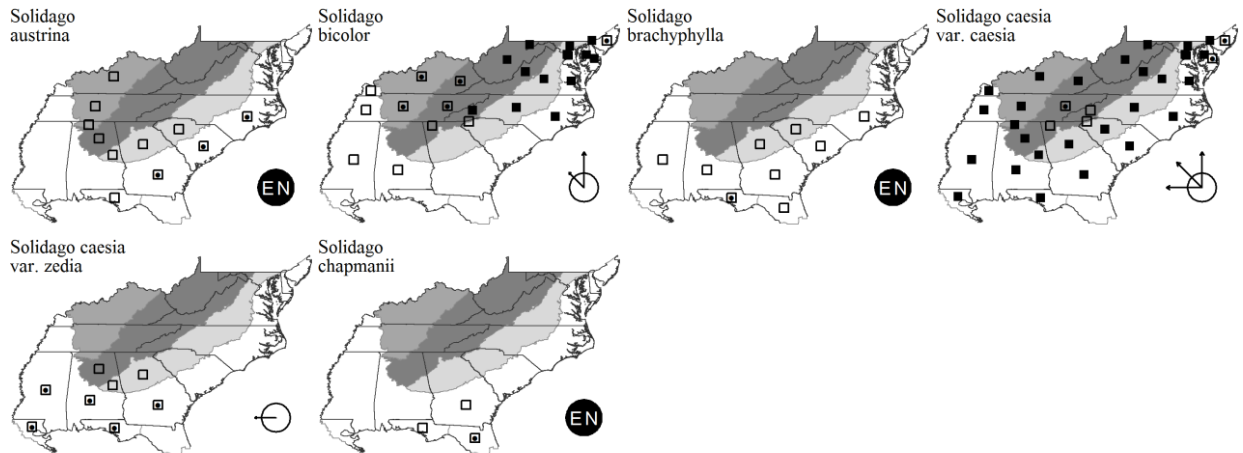
Solidago bicolor Linnaeus, Silverrod, White Goldenrod. Woodlands, roadbanks, pastures. Aug-Oct. NS and MB south to GA and LA. [= C, FNA9, G, Il, K1, K3, Pa, RAB, S, SE, Semple et al (2017), Tn, Va, W, WV; > *Solidago bicolor* var. *bicolor* – F; > *Solidago bicolor* var. *ovalis* – F]

Solidago brachyphylla Chapman, Dixie Goldenrod. Open woodlands, bluff forests. Sep-Nov. SC (NC?) south to ne. FL and Panhandle FL, west to s. AL (s. MS?). [= FNA9, K, S, SE, WH3]

Solidago caesia Linnaeus var. *caesia*, Axillary Goldenrod. Moist forested slopes. Aug-Oct. ME and ON south to FL and LA. [= FNA9, Va; < *Solidago caesia* – C, F, G, Il, K, Pa, RAB, S, SE, Tn, W, WH3, WV]

Solidago caesia Linnaeus var. *zedia* R.E. Cook & Semple, Gulf Coast Axillary Goldenrod. Moist forests. Sep-Oct. GA and Panhandle FL west to LA and AR. [= FNA9; < *Solidago caesia* – K, S, SE, WH3]

Solidago chapmanii A. Gray, Chapman's Goldenrod. Sandhills and dry, open hammocks. Sep-Oct. S. GA south to s. FL and Panhandle FL. Species status is supported by Semple, Bzovsky, & Tong (2016). [= S; = *Solidago odora* ssp. *chapmanii* – FNA9; = *Solidago odora* var. *chapmanii* – K, WH3; = *Solidago odora* var. *chapmanii* – SE]



Solidago curtisii Torrey & A. Gray, Curtis's Goldenrod. Moist forested slopes, and rarely in mafic woodlands in the Piedmont of VA. Sep-Oct. A Central and Southern Appalachian endemic: PA, WV, and MD south to n. GA and n. AL. 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. [= C, Pa, SE, Tn, Va, W, WV; = *Solidago caesia* var. *curtisii*; = *Solidago curtisii* var. *curtisii* – FNA9; < K; > S; < *Solidago curtisii* var. *curtisii* – RAB; > *Solidago curtisii* var. *curtisii* – F, G; > *Solidago curtisii* var. *pubens* – F, G, RAB; > *Solidago pubens* – S]

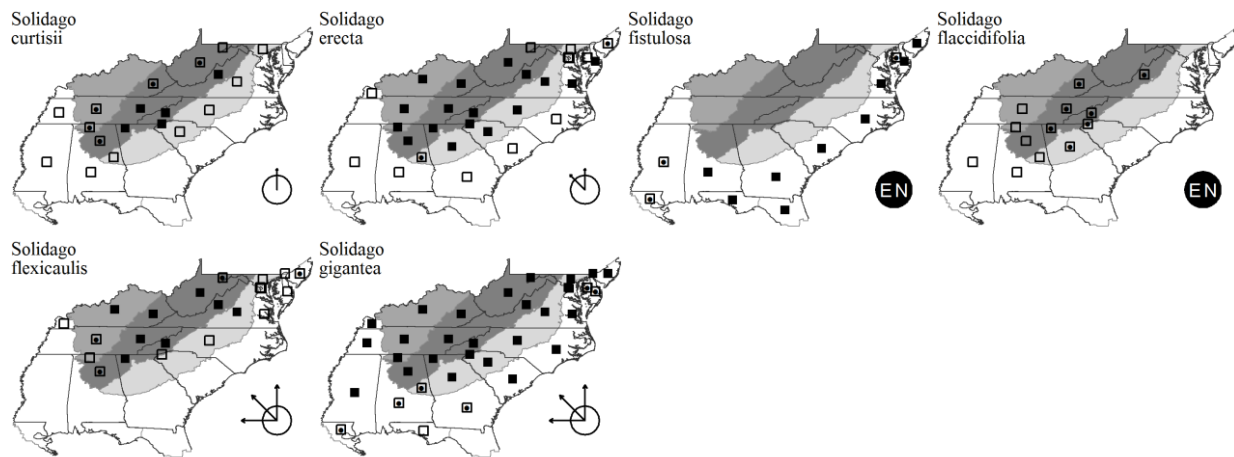
Solidago erecta Pursh. Woodlands, old fields, woodland borders, grassy balds. Aug-Oct. NY and CT south to GA, AL, and MS. [= C, F, FNA9, G, K1, K3, Pa, RAB, S, SE, Semple et al (2017), Tn, Va, W, WV; = *Solidago speciosa* var.; < FNA9]

Solidago fistulosa P. Miller, Hairy Pinewoods Goldenrod. Pocosins, swamp forests, wet savannas, wet pine flatwoods, maritime forests. Aug-Nov. NJ south to s. FL, west to LA. [= C, F, FNA9, G, GW2, K, RAB, S, SE, Va, WH3]

Solidago flaccidifolia Small, Appalachian Goldenrod. Forests. Sep-Oct. VA and KY south to GA and ne. AL; disjunct in nc. MS. [= C, G, K, SE, Tn, Va, W; = *Solidago caesia* var. *paniculata*; = *Solidago curtisii* var. *flaccidifolia* – FNA9; = *Solidago latissimifolia* – S; < *Solidago caesia* – F, RAB]

Solidago flexicaulis Linnaeus, Zigzag Goldenrod, Broad-leaved Goldenrod. Moist wooded slopes, especially over calcareous or mafic rocks. Aug-Oct. NS, ON and ND south to GA, AL, MS, and KS. [= C, F, FNA9, G, Il, K, Pa, RAB, S, SE, Tn, Va, W, WV; > *Solidago latifolia*]

Solidago gigantea Aiton, Smooth Goldenrod. Old fields, roadsides, streamside meadows, bottomlands. Aug-Sep (-Oct). NS west to SK and MT, south to Panhandle FL (Liberty County), TX, and CO. [= C, GW2, Il, K, RAB, Tn, Va, W, WH3; = *Solidago serotina* – S; > *Solidago gigantea* var. – F, G, Pa, SE, WV; > *Solidago gigantea* var. *leiophylla* – F, WV; > *Solidago gigantea* var. *serotina* – G, Pa, SE]



Solidago gracillima Torrey & A. Gray, Southern Bog Goldenrod, Graceful Goldenrod. Wet pine savannas, seepage bogs. Aug-Oct. E. VA south to c. Panhandle FL, west to s. AL. 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; disc flowers 9-13; of the Coastal Plain. [$< C, K, RAB, SE, Va, W, WH3$; $> S$; $> Solidago perlonga - F$; $< Solidago stricta$ ssp. *gracillima* - FNA9]

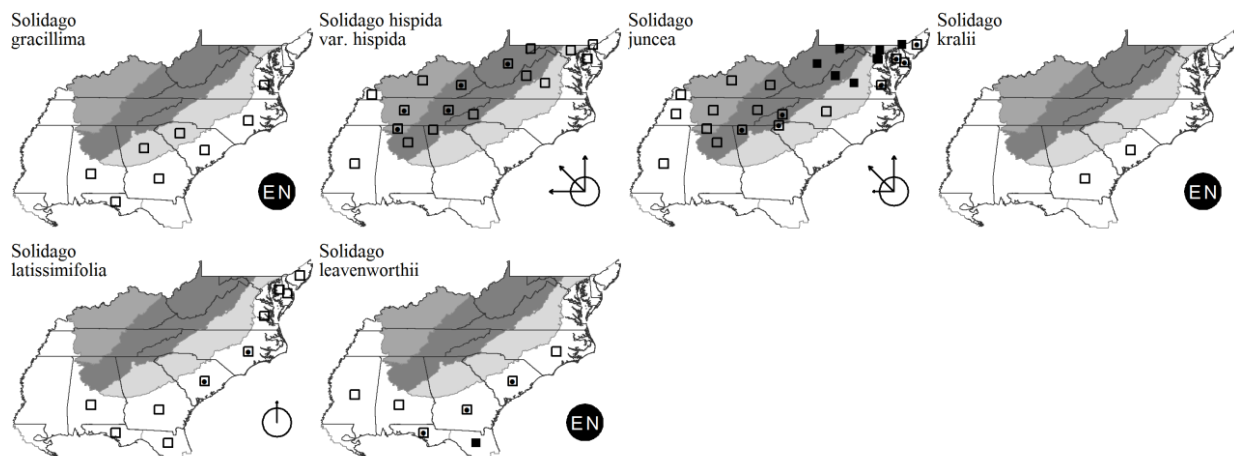
Solidago hispida Muhlenberg ex Willdenow var. *hispida*, Hairy Goldenrod. Dry rocky forests and woodland edges. Aug-Oct. NL (Labrador) west to SK, south to nw. GA, AL, AR, IA, and SD. Widespread in e. and c. TN (Chester, Wofford, & Kral 1997) and in nw. GA (Jones & Coile 1988). Also reported for NC and SC by Kartesz (1999, 2010). Our variety is the typical; other varieties are more northern, around the Great Lakes and in maritime Canada. [= F, G, K2, Semple et al (2017); $> F, G, II, K1$; $< Solidago hispida - C, FNA9, Pa, S, SE, Tn, Va, W, WV$]

Solidago juncea Aiton, Early Goldenrod. Meadows, pastures, roadbanks, woodland borders. Jul-Sep. NS west to MN, south to GA, AL, MS, and LA. [= C, FNA9, Pa, RAB, S, SE, Tn, Va, W, WV; $> Solidago juncea$ var. *juncea* - F, G, K; $> Solidago juncea$ var. *neobohemica* - F, K; $> Solidago juncea$ var. *ramosa* - G]

Solidago kralii Semple, Kral's Goldenrod. Longleaf pine sandhills. Aug-Sep. SC south to GA. See Semple (2003) for additional information. [= FNA9]

Solidago latissimifolia P. Miller, Coastal Swamp Goldenrod. Pocosins, swamp forests, sandhill seepages, sandhill-pocosin ecotones. Aug-Oct. NS south c. peninsular FL, west to s. AL. [= FNA9, K, Va, WH3; = *Solidago elliotii* - C, G, GW2, RAB, S, SE; $> Solidago elliotii$ var. *ascendens* - F; $> Solidago elliotii$ var. *pedicellata* - F]

Solidago leavenworthii Torrey & A. Gray, Leavenworth's Goldenrod. Wet pine savannas, wet pine flatwoods, pond margins, marshes. Aug-Nov. Se. NC south to s. FL, west to s. AL. [= FNA9, GW2, K, RAB, S, SE, WH3]



Solidago mexicana Linnaeus, Southern Seaside Goldenrod. Coastal dunes, dune slacks, maritime wet grasslands, tidal marshes. Late Aug-Dec (and year-round southwards). E. MA south to s. FL, west and south to TX and Mexico; West Indies.

This taxon warrants distinction at specific rank from *S. sempervirens* s.s. [= *S. Semple* et al (2016); = *Solidago sempervirens* ssp. *mexicana* – FNA9; = *Solidago sempervirens* var. *mexicana* – C, F, G, GW2, IL, K, SE, Va; < *Solidago sempervirens* – RAB, WH3]

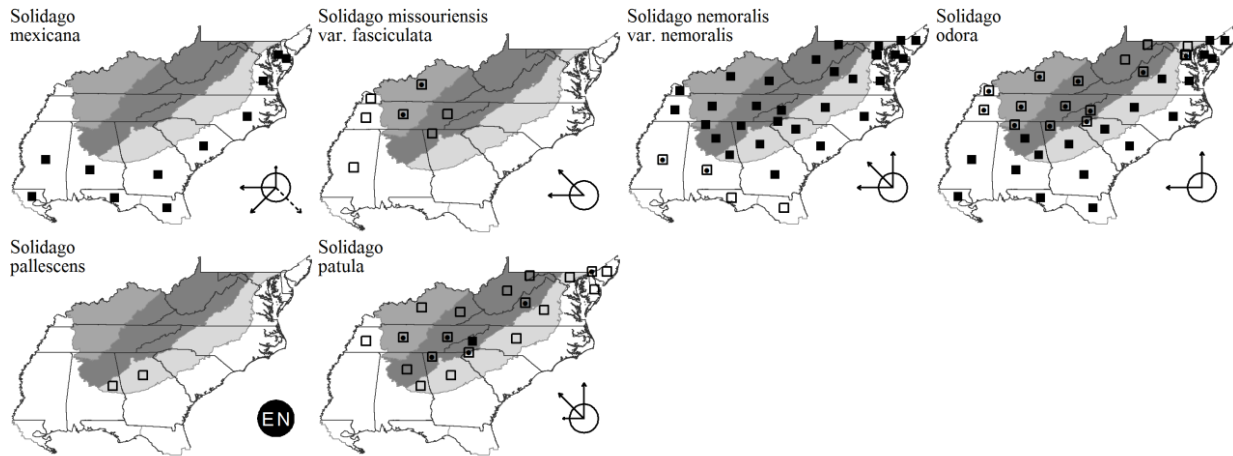
Solidago missouriensis* Nuttall var. *fasciculata Holzinger, Eastern Missouri Goldenrod. Barrens, Coosa prairies. (Jul-) Aug-Oct. In nw. GA (T. Govus, pers. comm. 2009); in c. TN (Chester, Wofford, & Kral 1997). [= C, F, G, K, SE, Tn; = *Solidago glaberrima* – IL, S; < *Solidago missouriensis* – FNA9]

Solidago nemoralis* Aiton var. *nemoralis, Eastern Gray Goldenrod. Woodlands, glades, barrens, roadbanks. Jun-Oct. NS west to ND, south to Panhandle FL and TX. The more western var. *decemflora* (A.P. de Candolle) Fernald does not enter our area. [= K, Va; = *Solidago nemoralis* – IL; = *Solidago nemoralis* ssp. *nemoralis* – FNA9; > C, F, G, SE, WV; < *Solidago nemoralis* – Pa, RAB, S, Tn, W, WH3; > *Solidago nemoralis* var. *haleana* – C, F, G, SE, WV]

***Solidago odora* Aiton**, Licorice Goldenrod. 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. Jul-Oct. NH, VT, NY, OH, and MO south to FL and TX. [= F, G, Pa, RAB, S, Tn, Va, W, WV; = *Solidago odora* ssp. *odora* – FNA9; = *Solidago odora* var. *odora* – C, K, SE, WH3]

***Solidago pallescens* C. Mohr**. Ec. AL and wc. GA. {not yet keyed}.

***Solidago patula* Muhlenberg ex Willdenow**, Northern Roughleaf Goldenrod. Bogs, seepages over mafic rocks, grassy balds (as Whitetop Mountain). Aug-Sep (-Oct). NH, VT, NY, s. ON, MI and WI south to w. VA, w. NC, nc. GA, c. TN, w. TN, and se. MO. Nearly all Coastal Plain records represent misidentifications of *S. salicina*. Semple, Tong, & Pastolero (2012) have clarified the taxonomy, distribution, and nomenclature of this and *S. salicina*. [= IL, Tn; = *Solidago patula* ssp. *patula* – FNA9, Pa; = *Solidago patula* var. *patula* – C, F, G, K, RAB, SE, Va; = *Solidago rigida* – S; < GW2, W, WV]



Solidago petiolaris* Aiton var. *petiolaris, Downy Goldenrod. Upland forests and woodlands. Late Aug-Nov. The distribution of *S. petiolaris* (in the broad sense) is peculiar, with an eastern component (NC south to ne. FL and Panhandle FL, west to AL) and a western component (IL, MO, AR, and LA west to NE, CO, and NM). 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). [= C, C, F, F, K, K, SE, SE; = *Solidago petiolaris* – G, IL; > *Solidago harperi* – S; > *Solidago milleriana* – S; < *Solidago petiolaris* – RAB, W, WH3]

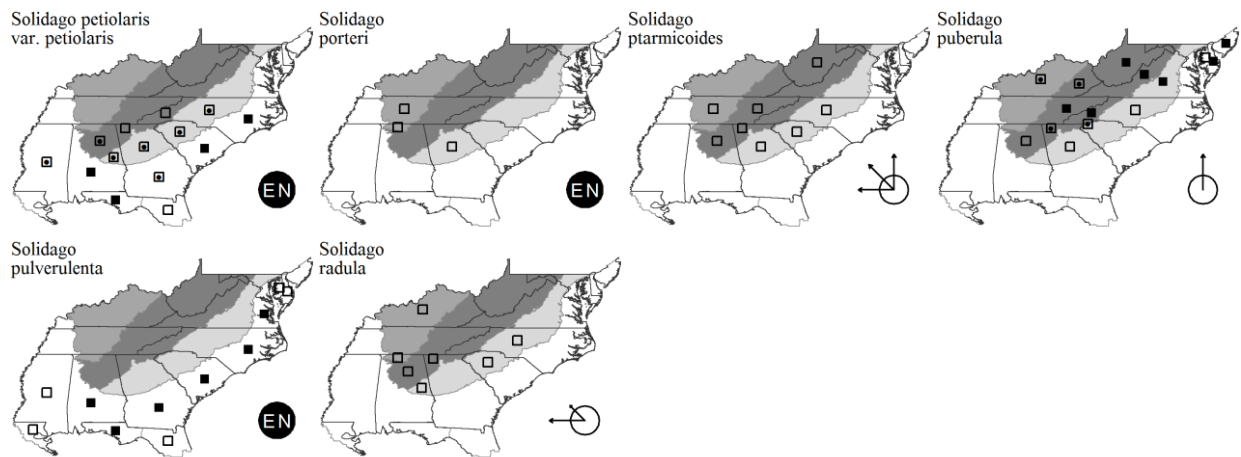
***Solidago porteri* Small**, Porter's Goldenrod. Oak savannas, barrens, woodland edges (roadsides). Aug-Sep. Rediscovered and clarified by Semple & Estes (2014). {not yet keyed}. [= K1, K3, S, SE, Semple et al (2017), Tn; < *Solidago erecta* – FNA9]

***Solidago ptarmicoides* (Torrey & A. Gray) B. Boivin**, White Prairie-goldenrod, Upland White Aster. Prairie-like barrens over mafic, ultramafic, or calcareous rock, serpentine woodlands, prairies. Aug-Oct. 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). [= Brouillet, L. & J.C. Semple (1981), C, FNA9, SE, Tn, W; = *Aster ptarmicoides* – F, G, S; = *Oligoneuron album* – IL, K, Nesom, G.L. (1993b); = *Solidago asteroides superfluous name*; = *Unamia alba*; > *Aster ptarmicoides* var. *georgianus* to plants]

***Solidago puberula* Nuttall**, Downy Goldenrod. Bogs, wet meadows, and wet pastures, in dry acid soils in VA and WV. Aug-Oct. NS west to ON, south to GA and TN. [= S, Tn; = *Solidago puberula* ssp. *puberula* – FNA9; = *Solidago puberula* var. *puberula* – C, F, G, K, RAB, SE, Va; < Pa, W, WV]

***Solidago pulverulenta* Nuttall**. Savannas, streamhead pocosins, flatwoods, swamps, seepages in pinelands, and disturbed areas. Sep-Oct. Se. VA south to Panhandle FL, west to LA. [= S; = *Solidago puberula* ssp. *pulverulenta* – FNA9; = *Solidago puberula* var. *pulverulenta* – C, F, G, K, RAB, SE, Va, WH3]

***Solidago radula* Nuttall**, Rough Goldenrod. Dry woodlands over mafic rocks. Aug-Oct. IL west to KS, south to LA and TX; disjunct eastward in KY, NC, SC, GA, and AL. [= C, FNA9, G, K2, RAB, S, SE, W; > *Solidago radula* var. *radula* – IL, K1; > *Solidago radula* var. *stenolepis* – IL, K1]



* *Solidago riddellii* Frank ex Riddell, Riddell's Goldenrod. Wet, calcareous prairies; rare. Aug-Nov. ON and MB south to OH, IN, IL, n. AR, and KS; disjunct in w. VA and nw. GA. The specimen from Fort Monroe ("Fortress Monroe, Va." – Fernald 1950) is accurately identified but may be mislabeled. [= C, F, FNA9, G; = *Oligoneuron riddellii* – II, K, Nesom, G.L. (1993b)]

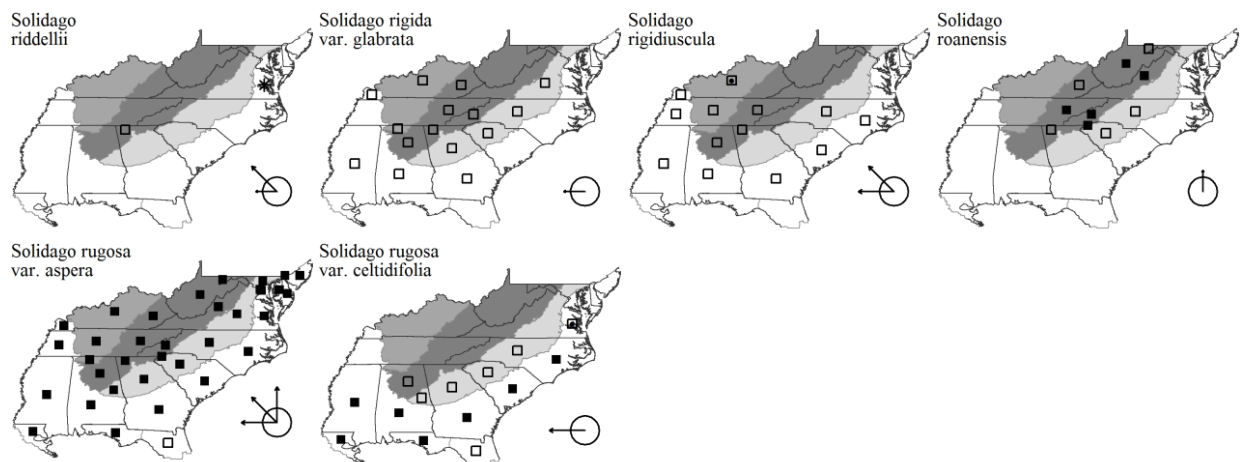
Solidago rigida Linnaeus var. *glabrata* E.L. Braun, Southeastern Bold Goldenrod. Glades, barrens, and prairie-like areas, over mafic (such as diabase) or calcareous (such as calcareous shale) rocks, and in adjacent disturbed areas, such as roadbanks and powerline rights-of-way. Late Aug-Oct. Sc. VA, se. TN, c. OH, and e. MO south to c. SC, sw. GA, and e. TX. 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. Var. *glabrata* is apparently strictly diploid; it may warrant specific rank. [= C, G, SE, Va; = *Oligoneuron jacksonii* – S; = *Oligoneuron rigidum* var. *glabratum* – II, K, Nesom, G.L. (1993b); = *Solidago jacksonii* – F; = *Solidago rigida* ssp. *glabrata* – FNA9, Heard, S.B. & J.C. Semple (1988), Tn; < *Solidago rigida* – RAB, W]

Solidago rigidiuscula (Torrey & A. Gray) Porter. Limestone barrens. (Aug-) Sep-Oct. 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), and KY. Probably best accorded specific rank, following Semple et al. (2012). Semple et al. (2012) also mention occurrences as far east as the Carolinas; this requires additional assessment. {synonymy incomplete}. [= II, P, S; = *Solidago speciosa* ssp. *speciosa* var. *rigidiuscula* – FNA9; = *Solidago speciosa* var. *angustata* – F; = *Solidago speciosa* var. *rigidiuscula* – C, G, K, SE, Tn]

Solidago roanensis Porter, Roan Mountain Goldenrod. Forests, woodlands, roadbanks. Jul-Sep. MD and WV south to AL and GA. [= C, FNA9, G, K1, K3, Pa, RAB, S, SE, Semple et al (2017), Tn, Va, W; > *Solidago roanensis* var. *monticola* – F; > *Solidago roanensis* var. *roanensis* – F; > *Solidago roanensis* var. *monticola* – WV]

Solidago rugosa P. Miller var. *aspera* (Aiton) Fernald. Fields, forests, roadsides. Aug-Nov. ME west to MI, south to FL and TX. [= F, Tn, WV; = *Solidago aspera* – II; = *Solidago rugosa* ssp. *aspera* var. *aspera* – FNA9, Pa; < WH3; < *Solidago altissima* – S; < *Solidago rugosa* – GW2, Va; < *Solidago rugosa* ssp. *aspera* – C, G, K, SE, W; < *Solidago rugosa* var. *rugosa* – RAB]

Solidago rugosa P. Miller var. *celtidifolia* (Small) Fernald, Hackberry-leaf Goldenrod. Fields, forests, wetlands. Sep-Nov. VA south to FL, west to OK and TX. [= F, RAB; = *Solidago celtidifolia* – S; = *Solidago rugosa* ssp. *aspera* var. *celtidifolia* – FNA9; < *Solidago rugosa* – GW2, Va; < *Solidago rugosa* ssp. *aspera* – C, G, K, SE, W; < *Solidago rugosa* var. *aspera* – WH3]



Solidago rugosa P. Miller var. *cronquistiana* Semple, Cronquist's Goldenrod. High elevation balds and forests. Sep-Oct. A Southern Appalachian endemic: w. NC and e. TN south to n. GA. See Semple (2003) for additional information. [= Tn; =

Solidago rugosa ssp. *aspera* var. *cronquistiana* – FNA9; < *Solidago altissima* – S; < *Solidago rugosa* – GW2; < *Solidago rugosa* ssp. *aspera* – K, SE, W; < *Solidago rugosa* var. *rugosa* – RAB]

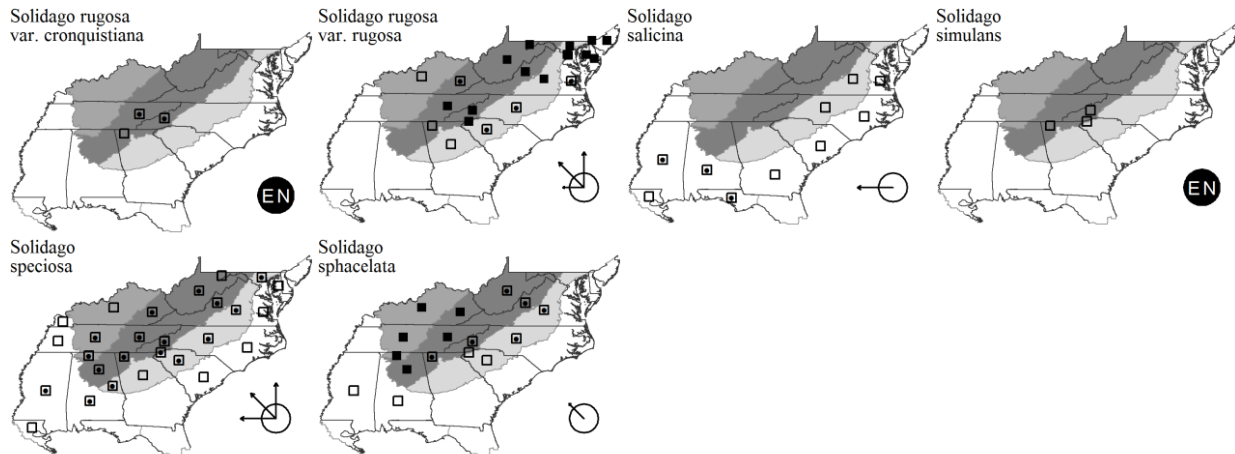
Solidago rugosa P. Miller var. *rugosa*, Wrinkle-leaf Goldenrod. Fields, forests, wetlands. Aug-Oct. NS west to ON, south to GA, AL, MS, LA, TX. [= *Solidago rugosa* – Il; = *Solidago rugosa* ssp. *rugosa* var. *rugosa* – C, FNA9, G, K, Pa, SE; < RAB; > F, WV; < *Solidago rugosa* – GW2, Va; < *Solidago rugosa* ssp. *rugosa* – W; > *Solidago rugosa* ssp. *rugosa* var. *villosa* – C, G, K, SE; > *Solidago rugosa* var. *villosa* – F, WV]

Solidago salicina Elliott, Southern Roughleaf Goldenrod. Streamhead pocosins, sandhill seepages, swamp edges. Sep-Oct. 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. Semple, Tong, & Pastolero (2012) have clarified the taxonomy, distribution, and nomenclature of this and *S. patula*. [= K3, S; = *Solidago patula* ssp. *strictula* – FNA9; = *Solidago patula* var. *strictula* – C, G, K1, RAB, SE, Va, WH3; > F; < *Solidago patula* – GW2; > *Solidago patula* var. *strictula* – F]

Solidago simulans Fernald, Granite Dome Goldenrod, Cliffside Goldenrod. In thin soil mats wetted by periodic seepage on granitic domes and lower elevation montane cedar hardwood woodlands. Aug-Sep. Endemic to sw. NC, nw. SC, and ne. GA. [= K; < *Solidago gracillima* – SE; < *Solidago uliginosa* – FNA9, RAB]

Solidago speciosa Nuttall, Showy Goldenrod. Pastures, forests, woodlands, roadbanks. Aug-Oct. NH, VT, NY, and WI south to GA, MS, LA, and OK. Probably better accorded species rank, following Semple et al. (2012). [= Il, P; = *Solidago speciosa* ssp. *speciosa* var. *speciosa* – FNA9; = *Solidago speciosa* var. *speciosa* – C, F, G, K, SE, Tn, Va; < Pa, RAB, W, WV; > *Solidago conferta* – S; > *Solidago harperi* – S]

Solidago sphacelata Rafinesque, Limestone Goldenrod, False Goldenrod, Heartleaved Goldenrod. Rock outcrops and dry rocky forests, usually over calcareous or mafic rocks. (Jul-) Aug-Sep (-Oct). C. VA, s. WV, s. OH, c. IN, and s. IL south to n. GA, c. AL, and ne. MS. [= C, F, G, Il, K, RAB, SE, Tn, Va, W, WV; = *Brachychaeta sphacelata* – S]

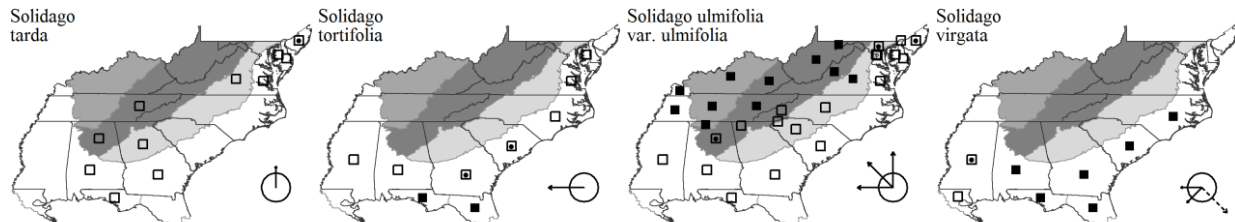


Solidago tarda Mackenzie. Sandhills, other dry pinelands, xeric fluvial sand ridges, Piedmont barrens. Sep-Oct. NJ and e. PA south to e. VA, c. and s. GA, AL, and Panhandle FL, in our area primarily in the Coastal Plain; disjunct in Marion County, TN (Chester, Wofford, & Kral 1997). [= C, FNA9, S, SE, Tn, Va; < *Solidago arguta* – RAB; < *Solidago arguta* var. *arguta* – K; < *Solidago arguta* var. *caroliniana* – WH3; < *Solidago ludoviciana* – F]

Solidago tortifolia Elliott, Leafy Pinewoods Goldenrod. Sandhills and dry pinelands. Aug-Nov. Se. VA south to s. FL, west to AR and TX. [= C, F, FNA9, G, K, RAB, S, SE, Va, WH3]

Solidago ulmifolia Muhlenberg ex Willdenow var. *ulmifolia*, Elmleaf Goldenrod. Rocky forests and woodlands, especially on mafic and calcareous substrates, moist hammocks (in FL). Aug-Oct. NS, ME, ON, and MN, south to FL and TX. [= C, FNA9, G, K, SE; < *Solidago ulmifolia* – F, Il, Pa, RAB, S, Tn, Va, W, WH3, WV]

Solidago virgata Michaux, Wand Goldenrod. Longleaf pine savannas, Coastal Plain bogs, pocosins, marshes. Late Aug-Oct. NJ and DE (formerly) south to s. FL, west to TX; West Indies and s. Mexico. [= Semple et al (2016); = *Solidago petiolata* – S; = *Solidago stricta* – C, F, G, K, SE, WH3; = *Solidago stricta* ssp. *stricta* – FNA9; < *Solidago stricta* – GW2, RAB]



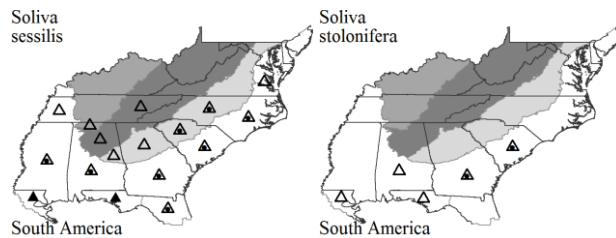
Soliva Ruiz & Pavón 1794 (Burweed)

A genus of about 8 species, herbs, of South America. References: Arriagada, J.E. & N.G. Miller (1997); SE; Watson 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. *Soliva stolonifera*

* *Soliva sessilis* Ruiz & Pavón, Field Burweed, Lawn Burweed, Spurweed. Lawns, roadsides; native of South America. Apr-May. [= Arriagada, J.E. & N.G. Miller (1997), FNA9, K, S, Va, WH3; = *Soliva pterosperma* – RAB, SE]

* *Soliva stolonifera* (Brotero) Loureiro, Carpet Burweed. Lawns, roadsides, moist open areas; native of South America. Mar-Apr. [= Arriagada, J.E. & N.G. Miller (1997), FNA9, SE; = *Gymnostyles stolonifera* – K, WH3; ? *Gymnostyles nasturtiifolia* – S; ? *Soliva nasturtiifolia* – RAB]

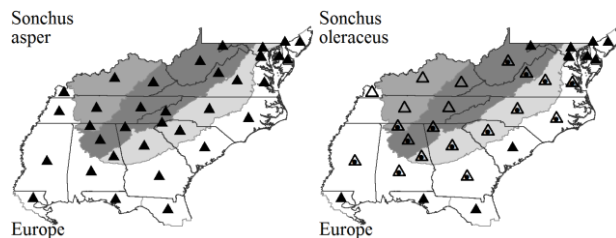
*Sonchus* Linnaeus 1753 (Sow-thistle, Milk-thistle)

A genus of about 50-60 species, herbs and shrubs, of the Old World. References: SE; Hyatt in FNA19 (2006a).

- 1 Leaf base auricles rounded; mature achenes not transversely rugose *Sonchus asper*
 1 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. Roadsides, fields, pastures, disturbed areas; native of Europe. Late Mar-Jul. [= C, F, FNA9, G, Il, K, Pa, RAB, S, SE, Tn, Va, W, WH3, WV]

* *Sonchus oleraceus* Linnaeus, Common Sow-thistle. Roadsides, fields, pastures, disturbed areas; native of Europe. Late Mar-Jul. [= C, F, FNA9, G, Il, K, Pa, RAB, S, SE, Tn, Va, W, WH3, WV]

*Stokesia* L'Héritier 1789 (Stokesia, Stokes Aster)

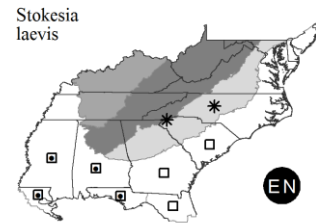
A monotypic genus, an herb, of se. North America. References: SE; Jones, S.B., Jr (1982); Strother in FNA19 (2006a).

* *Stokesia laevis* (Hill) Greene, Stokesia, Stokes Aster, Blue Stokesia. Native in pitcherplant bogs and moist pinelands of FL, GA, and SC, rather frequently grown as a garden plant and naturalized from cultivation at least in NC. Late Jun-Aug. Native from e. SC south ne. FL, FL Panhandle, west to LA. 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). [= FNA9, Jones, S.B., Jr (1982), K, RAB, S, SE, WH3]

Symphyotrichum Nees 1833 (American Aster)

A genus of about 90 species, of the Americas and e. Asia, most diverse in our area. References: Brouillet et al. FNA (2006b); Brouillet, L. & J.C. Semple (1981); Campbell & Seymour (2014); SE; Jones, A.G. (1980a); Jones, A.G. (1980b); Jones, A.G. (1984); Jones, A.G. & D.A. Young (1983); Lamboy, W.F. (1987); Lamboy, W.F. (1992); Nesom (1993a, 1993b, 1994, 1997); Nesom (1994); Nesom, G.L. (2005b); Noyes, R.D. & L.H. Rieseberg (1999); R. Jones (1983); R. Jones (1992); Reveal, J.L. & C.S. Keener (1981); Semple, J.C. & L. Brouillet (1980a); Semple, J.C. & L. Brouillet (1980b); Semple, J.C., J.G. Chmielewski, & M.A. Lane (1989); Semple, J.C., S.B. Heard, & ChunSheng Xiang (1996); Sundberg, S.D. (2004); Warners, D.P. & D.C. Laughlin (1999); Xiang, Chunsheng, & J.C. Semple (1996).



Key to subgenus *Astropolium* based on Nesom (2005b)

Unkeyed taxa:

Symphyotrichum elliottii

Symphyotrichum lanceolatum var. *lanceolatum*

Symphyotrichum praealtum var. *praealtum*

Symphyotrichum racemosum var. *racemosum*

Symphyotrichum simmondsii

- 1 Basal and lower stem leaves both petiolate and with cordate blades; [subgenus *Symphyotrichum*, section *Heterophylli*] **Key A**
- 1 Basal and lower stem leaves not both petiolate and cordate-bladed.
 - 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].
 - 3 Stem leaves fleshy, entire, linear; stems glabrous *Symphyotrichum tenuifolium*
 - 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 **Key F**

Key A - *Symphyotrichum* with petiolate, cordate-bladed lower leaves
[of subgenus *Symphyotrichum*, section *Heterophylli*]

- 1 Disc florets 35-50 (or more); ray florets (13-) 20-30; involucre (6-) 7-10 mm high; phyllary tips spreading to squarrose *Symphyotrichum retroflexum*
- 1 Disc florets (8-) 10-25 (-30); ray florets 8-20 (-25); involucre 3.8-7 mm high (or to 8 mm high in *S. oolentangiense*); phyllary tips appressed (or the outer phyllaries spreading).
 - 2 Cauline leaf blades sessile and cordate-clasping, or petiolate, the petiole strongly dilated to a cordate-clasping base, or both *Symphyotrichum undulatum*
 - 2 Cauline leaves not cordate clasping; [collectively widespread].
 - 3 Lower stems glabrous; upper stems sparsely hirtellous or pilose.
 - 4 Basal leaves deeply cordate; phyllaries with lanceolate diamond shaped blaze (2-3× as long as wide), purple to greenish purple *Symphyotrichum cordifolium*
 - 4 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.
 - 5 Phyllaries with short diamond shaped green blaze (1-1.5× as long as wide) *Symphyotrichum lowrieianum*
 - 5 Phyllaries with linear-lanceolate-shaped green blaze (> 4× as long as wide) *Symphyotrichum urophyllum*
 - 3 Lower stems glabrous to sparsely hirsute; upper stems densely hirtellous to hirsute; [mainly west of the Appalachians]. *Symphyotrichum shortii*

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 Heads at first at ends of long, bracteate branches, then produced and maturing as axillary and nearly sessile or on very short lateral branches, commonly on one side of the main stem and appearing secund to subsecund, in paniculiform arrangements; ray florets in 2-3 series, corollas mostly 2-3.5 (-4) mm long, laminae 0.2-0.4 mm wide (dry), blue to purple, coiling back in 2-3 (-4) coils; disc florets 11-23; [e. GA southward] *Symphotrichum bahamense*
- 2 Heads often at ends of long, bracteate branches, axillary heads usually maturing on elongate lateral branches, the whole arrangement often diffusely paniculiform to pyramidal-paniculiform, or heads more distally disposed and the arrangement corymbiform to thyrsiform; ray florets in 1 series, corollas mostly 4-7 mm long, laminae 0.4-0.8 mm wide (dry), blue to white, coiling back in 3-5 coils; disc florets (20-) 33-45 (-50); [sc. United States east to AL and scattered eastward as an introduction] *Symphotrichum divaricatum*

Key D - perennial asters
[of *Symphotrichum* 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 florets 6-12 (-20) per head; [section *Ericoidi*] *Symphotrichum 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 florets (6-) 11-110 per head.
- 2 Disc florets yellow, cream, or white (with purplish corolla lobes), fading purple or brown; mid and upper stem leaves with bases rounded to cuneate (or slightly clasping in *S. plumosum* of FL Panhandle); phyllaries not stipitate-glandular; [section *Virgulus*].
- 3 Rays 13-15 (-36); cypselas glabrous *Symphotrichum pratense*
- 3 Rays 7-12; cypselas densely strigose.
- 4 Phyllaries and upper stem leaves moderately to densely sericeous (silky-pubescent); [widespread] *Symphotrichum concolor* var. *concolor*
- 4 Phyllaries and upper stem leaves glabrous or sparsely pilose; [of the Gulf Coastal Plain] *Symphotrichum concolor* var. *devestitum*
- 2 Disc florets pink, fading purple; 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*); 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).
- 5 Mid-stem leaves < 1.5 cm long, either ascending-appressed, or spreading, and then the apical portion abruptly deflexed; rays 5-9 (-11) mm long; [of the Coastal Plain]; [section *Patentes*].
- 6 Blades of mid-stem leaves ascending-appressed, basally decurrent; [of s. GA south to s. FL, west to se. LA] *Symphotrichum adnatum*
- 6 Blades of mid-stem leaves spreading, the apical portion then abruptly deflexed, basally clasping; [of e. NC to c. peninsular FL] *Symphotrichum walteri*
- 5 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].
- 7 Phyllaries with attenuate, loosely spreading tips; disc florets 50-110; ray florets (40-) 50-75 (-100); [mainly of sunny, moist to wet marshes, swamps, fens, south to GA, wc. AL, c. MS]; [section *Grandiflori*] *Symphotrichum novae-angliae*
- 7 Phyllaries with obtuse to acute tips (the inner phyllaries sometimes acuminate, but not attenuate); disc florets 15-50; ray florets 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].
- 8 Involucres 8-10 (-12) mm high; disc florets 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*] *Symphotrichum georgianum*
- 8 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 florets 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 caespitose, 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*].
- 9 Disc florets 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] *Symphotrichum phlogifolium*
- 9 Disc florets 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]
- 10 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 *Symphotrichum patens* var. *patens*
- 10 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.
- 11 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*
 11 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 bracing 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

- 1 Middle stem leaves strongly clasping; involucre 3.8-5.5 mm high; disc corollas 15-22 (-25); phyllaries acute, acuminate, to attenuate; green blaze on phyllary lanceolate to elongate diamond-shaped *Symphyotrichum undulatum*
 1 Middle stem with a winged, sheathing petiole; involucre (4.2-) 4.5-8 mm high; disc corollas (15-) 19-33 (-43); phyllaries acute, green blaze on phyllary diamond-shaped, about as long as wide or slightly longer.
 2 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*
 2 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].
 *Symphyotrichum laeve*
 *Symphyotrichum puniceum* var. *puniceum*

Key F

- 1 [S. pilosum complex]
 2 X *Symphyotrichum priceae*
 2 XX
 3 Q *Symphyotrichum pilosum* var. *pilosum*
 3 QQ *Symphyotrichum pilosum* var. *pringlei*
 1
 4 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*
 4 Peduncle bracts mostly ascending (-appressed), sometimes spreading, oblong-linear to linear-subulate, acute.
 5 Cauline leaves 3-7 cm long; branches few; peduncles long; rays 14-17 (-20) *Symphyotrichum dumosum* var. *gracilipes*
 5 Cauline leaves to 15 cm long; branches abundant; peduncles long, short, or absent; rays 13-25.
 *Symphyotrichum dumosum* var. *subulifolium*

Symphyotrichum adnatum (Nuttall) G.L. Nesom. Sandhills, pine flatwoods. S. GA south to s. FL, west to se. LA; n. Bahamas. [= FNA9, K, Nesom (1994), WH3; = *Aster adnatus* – S, SE]

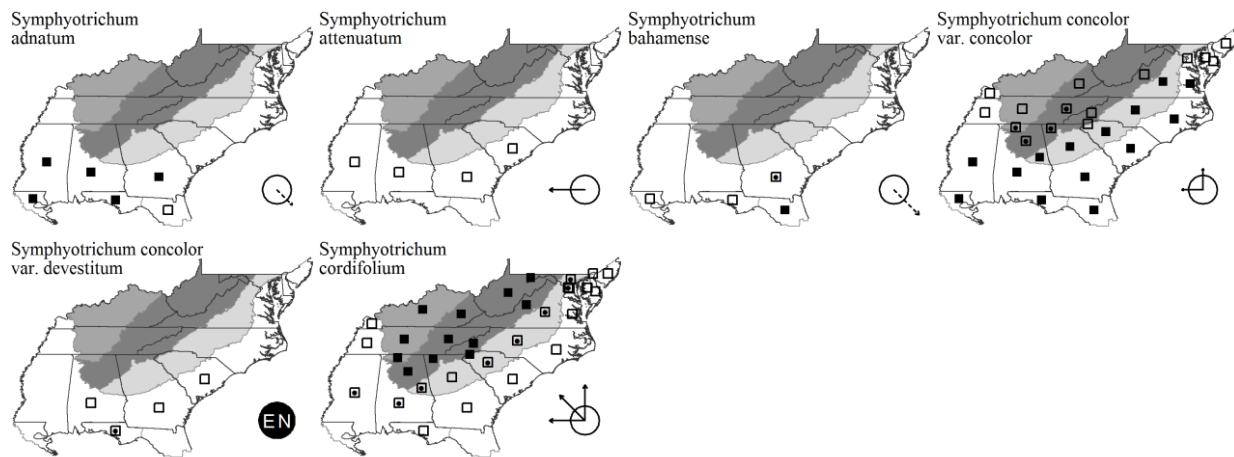
Symphyotrichum attenuatum (Lindley) Semple, Gulf Coast Smooth Aster. Open dry woodlands, prairies. Sep-Oct. SC and GA west to AR and TX. [= *Aster laevis* var. *purpuratus*; = *Symphyotrichum laeve* var. *purpuratum* – FNA9, K, Nesom (1994); > *Aster attenuatus* – G, S; > *Aster purpuratus* – S]

Symphyotrichum bahamense (Britton) G.L. Nesom, Bahama Salt-marsh Aster. Salt, brackish, and fresh marshes, ditches, wet areas. Oct-Nov. E. GA and e. FL Panhandle south to s. FL; apparently disjunct in se. LA (Urbatsch 2013); also Bahamas. [= K, Nesom, G.L. (2005b), WH3; = *Aster subulatus* var. *elongatus*; = *Symphyotrichum subulatum* var. *elongatum* – FNA9, Sundberg, S.D. (2004); < *Aster subulatus* – GW2; < *Aster subulatus* var. *cubensis* – SE]

Symphyotrichum concolor (Linnaeus) G.L. Nesom var. *concolor*, Eastern Silvery Aster. Sandhills, Piedmont woodlands, forest edges, roadbanks. Sep-Oct. MA and NY south to s. FL, west to LA, inland less commonly to TN and KY. [= FNA9; = *Symphyotrichum concolor* ssp. *concolor* – Haines, A.A. (2010); < WH3; < *Aster concolor* – C, F, G, RAB, S, SE, W; < *Symphyotrichum concolor* – K, Nesom (1994), Tn, Va, WH3; < *Virgulus concolor*]

Symphyotrichum concolor (Linnaeus) G.L. Nesom var. *devestitum* (S.F. Blake) Semple, Gulf Coast Silvery Aster. Savannas. Panhandle FL, maybe extending to GA, AL, and SC. See Semple (2004). [= FNA9; = *Aster concolor* var. *devestitum*; = *Symphyotrichum concolor* ssp. *devestitum* – Haines, A.A. (2010); < *Aster concolor* – RAB, S, SE; < *Symphyotrichum concolor* – K, Nesom (1994), WH3; < *Symphyotrichum concolor* var. *concolor* – WH3; < *Virgulus concolor*]

Symphyotrichum cordifolium (Linnaeus) G.L. Nesom, Heart-leaved Aster. Rich forests, shaded roadbanks. Sep-Oct. [= IL, K, Pa, Tn, Va; = *Aster cordifolius* – C, G, S, SE, W; < FNA9; < *Aster cordifolius* – RAB; > *Aster cordifolius* var. *cordifolius* – F, WV; > *Aster cordifolius* var. *polycephalus* – F; > *Aster cordifolius* var. *racemiflorus* – F, WV; > *Symphyotrichum cordifolium* var. *cordifolium* – Nesom (1994); > *Symphyotrichum cordifolium* var. *polycephalum* – Nesom (1994); > *Symphyotrichum cordifolium* var. *racemiflorum* – Nesom (1994)]



* *Symphyotrichum divaricatum* (Nuttall) G.L. Nesom, Midwestern Salt-marsh Aster. Disturbed areas, including mowed fields, periodically flooded floodplains, waste areas near wool-combing mill; native of sc. United States and Mexico. Aug-Nov. See Nesom (2000). [= Il, K, Nesom (1994), Nesom, G.L. (2005b), Va; = *Aster exilis* – F, RAB, S; = *Aster subulatus* var. *ligulatus* – SE; = *Symphyotrichum subulatum* var. *ligulatum* – FNA9, Sundberg, S.D. (2004), Tn; < *Aster subulatus* – GW2]

Symphyotrichum dumosum (Linnaeus) G.L. Nesom var. *dumosum*, Long-stalked Aster. Old fields, disturbed areas, pastures. Late Aug-Oct. NB, WV, IN, IL, OK south to FL and TX. [= K, Nesom (1994), Va; > *Aster coridifolius* – S; < *Aster dumosus* – C, G, GW2, RAB, SE, W; > *Aster dumosus* – S; > *Aster dumosus* var. *cordifolius* – F, WV; > *Aster dumosus* var. *dumosus* – F; < *Symphyotrichum dumosum* – FNA9, Il, Pa, Tn, WH3]

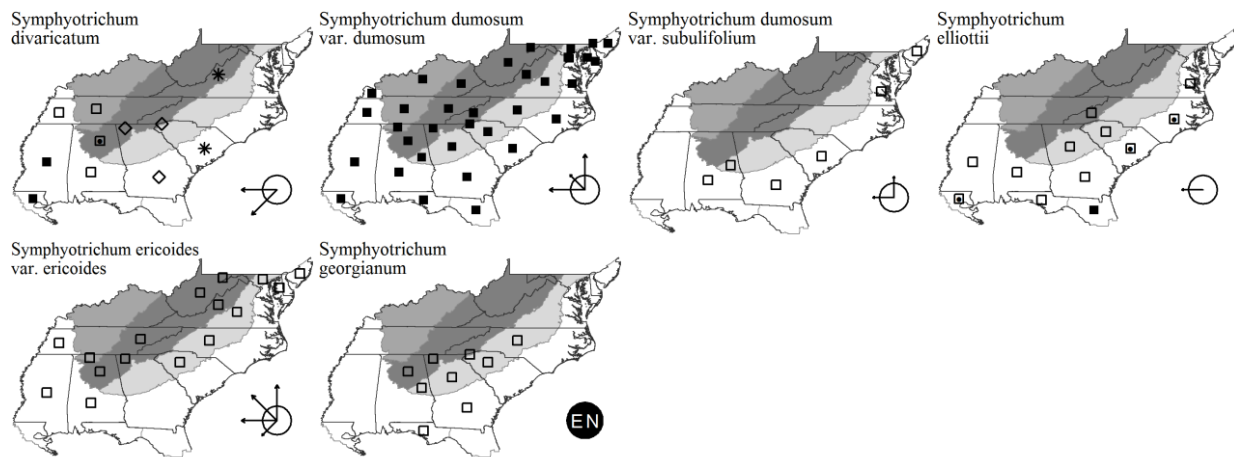
Symphyotrichum dumosum (Linnaeus) G.L. Nesom var. *gracilipes* (Wiegand) G.L. Nesom. {habitats}. Late Aug-Oct. SC south to FL, west to LA. [= K; = *Aster dumosus* var. *gracilipes*; = *Aster gracilipes* – S; < *Aster dumosus* – GW2, RAB, SE; < *Symphyotrichum dumosum* – FNA9, WH3]

Symphyotrichum dumosum (Linnaeus) G.L. Nesom var. *subulifolium* (Torrey & A. Gray) G.L. Nesom. {habitats}. Late Aug-Oct. ME south to FL, west to TX. [= K, Nesom (1994); = *Aster dumosus* var. *subulifolius* – F; < *Aster dumosus* – C, G, GW2, RAB, SE, W; < *Symphyotrichum dumosum* – FNA9, Pa, WH3]

Symphyotrichum elliotii (Torrey & A. Gray) G.L. Nesom, Southern Swamp Aster, Elliott's Aster. 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. Late Sep-Nov. Se. VA south to s. FL, west to LA. The Jones & Coile (1988) record for n. GA is rejected. [= FNA9, K, Nesom (1994), Va, WH3; = *Aster elliotii* – C, F, G, GW2, RAB, S, SE; = *Aster puniceus* var. *elliotii*]

Symphyotrichum ericoides (Linnaeus) G.L. Nesom var. *ericoides*, Heath Aster, Squarrose White Aster. Limestone glades. ME, NL (Labrador), ON, ND, CO, AZ, south to VA, MS, TX, Nuevo León, and Coahuila. [= FNA9, FNA9, Va; = *Aster ericoides* – C, F, SE, W; = *Virgulus ericoides*; > Il, K, Nesom (1994); > *Aster ericoides* var. *ericoides* – G; > *Aster ericoides* var. *prostratus* – G; < *Symphyotrichum ericoides* – Pa, Tn; > *Symphyotrichum ericoides* var. *prostratum* – Il, K, Nesom (1994)]

Symphyotrichum georgianum (Alexander) G.L. Nesom, Georgia Aster. 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. Early Oct-mid Nov (-Jan); Nov-Dec (-Jan). 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). [= FNA9, K, Nesom (1994), WH3; = *Aster georgianus* – R. Jones (1983), S; = *Aster patens* var. *georgianus* – SE; = *Virgulus georgianus*; = *Virgulus patens* var. *georgianus*; < *Aster patens* – RAB]



Symphyotrichum laeve (Linnaeus) Löve & Löve, Smooth Blue Aster. Mesic hardwood forests. Sep-Oct. NS west to MB, south to GA, LA, and OK. [= II, II; = *Aster laevis* var. *laevis* – C, G, RAB, SE, W; = *Symphyotrichum laeve* var. *laeve* – FNA9, K, Nesom (1994), Pa, Tn, Va; > *Aster falcidens* – S; > *Aster laevis* – S; >> *Aster laevis* – F, WV; > *Aster steeleorum* – F, WV]

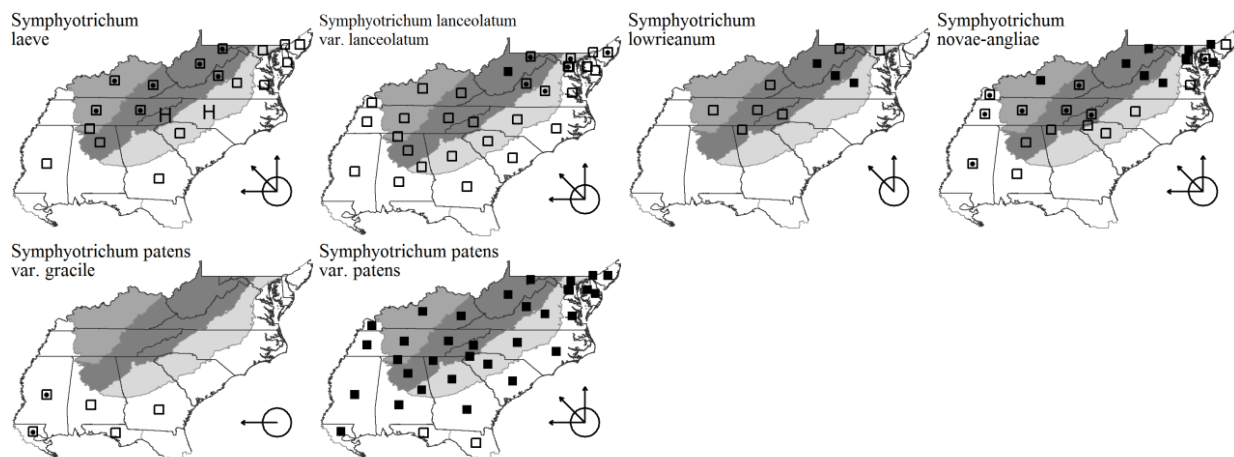
Symphyotrichum lanceolatum (Willdenow) G.L. Nesom var. ***lanceolatum***. Moist soils. Jul-Oct. NL (Newfoundland) west to SK, south to PA (Rhoads & Klein 1993), VA (reported in FNA), NC, SC (?), TN, MS, LA, and TX. Reported for Ashe County, NC (Poindexter & Murrell 2008). [= FNA9, II, Nesom (1994), Pa, Va; = *Aster lanceolatus* ssp. *lanceolatus*; = *Aster lanceolatus* ssp. *lanceolatus* var. *lanceolatus*; = *Aster lanceolatus* var. *lanceolatus* – C; = *Aster simplex* var. *ramosissimus* – F, G; < *Aster lanceolatus* – W; < *Aster simplex* – GW2, RAB, WV; < *Aster simplex* var. *simplex* – SE]

Symphyotrichum lowrianum (Porter) G.L. Nesom, Smooth Heart-leaved Aster. Mesic to dry-mesic forests. Sep-Oct. MA, NY, and ON, south to w. VA, w. NC, ne. GA, e. TN, and c. TN. Perhaps originating from hybridization of *S. cordifolium* and *S. laeve*. [= K, Nesom (1994), Pa, Va; = *Aster cordifolius* ssp. *laevigatus*; = *Aster lowrianus* – C, G, SE, W; < *Aster cordifolius* – RAB; > *Aster lowrianus* – S; > *Aster lowrianus* var. *lanceolatus* – F, WV; > *Aster lowrianus* var. *lowrianus* – F, WV; > *Aster plumarius* – S; < *Symphyotrichum cordifolium* – FNA9]

Symphyotrichum novae-angliae (Linnaeus) G.L. Nesom, New England Aster, Michaelmas-daisy. Wet meadows, bogs, prairies. Sep-Oct. NS west to MT, south to GA, wc. AL, c. MS, s. AR, OK, and NM. [= FNA9, II, K, Pa, R. Jones (1983), Tn, Va; = *Aster novae-angliae* – C, F, G, GW2, RAB, S, SE, W, WV; = *Virgulus novae-angliae*]

Symphyotrichum patens (Aiton) G.L. Nesom var. ***gracile*** (Hooker) G.L. Nesom. Dry woodlands. Aug-Nov. 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. [= FNA9, K; = *Aster patens* var. *gracilis* – R. Jones (1983); < *Aster patens* var. *gracilis* – C, F, G, SE]

Symphyotrichum patens (Aiton) G.L. Nesom var. ***patens***, Common Clasp Aster. Dry woodlands, roadsides, woodland edges, clearings, roadbanks. Late Aug-early Nov; Oct-Nov. 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. [< FNA9, K, Nesom (1994), Va; < *Aster patens* – RAB, S, W; >> *Aster patens* var. *gracilis* – C, F, G, SE; < *Aster patens* var. *patens* – C, F, G, R. Jones (1983), SE, WV; < *Symphyotrichum patens* – II, Pa, Tn, WH3; < *Virgulus patens* var. *patens*]



Symphyotrichum patens (Aiton) G.L. Nesom var. ***terranigrum*** J.J.N. Campbell & Seymour, Black Belt Clasp Aster. Prairies and woodlands. Distribution centered in the AL-MS Black Belt, but apparently with scattered occurrences over a more widespread area of the Southeastern United States. See Campbell & Seymour (2014) for detailed information. [< *Aster patens* –

RAB, S, W; > *Aster patens* var. *gracilis* – C, F, G, SE; < *Aster patens* var. *patens* – C, F, G, R. Jones (1983), R. Jones (1983), SE, WV; < *Symphiotrichum patens* – Pa, WH3; < *Symphiotrichum patens* var. *patens* – FNA9, K, Nesom (1994), Va; < *Virgulus patens* var. *patens*]

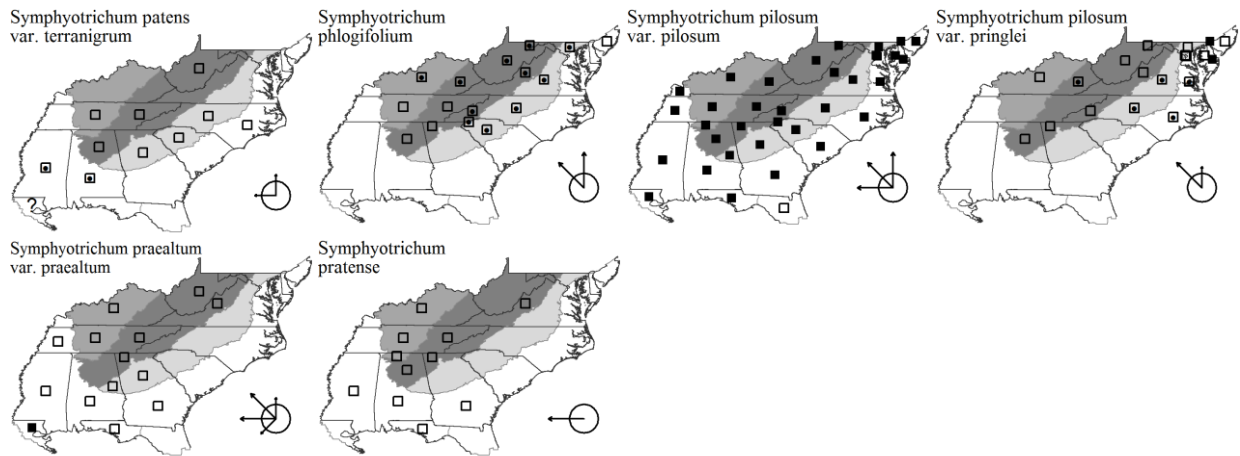
Symphiotrichum phlogifolium (Muhlenberg ex Willdenow) G.L. Nesom, Appalachian Clasp Aster. Mesic, nutrient-rich mixed hardwood forests. Late Aug-mid Oct. NJ and Long Island, NY west to PA, n. OH, and e. IN south to c. VA, c. NC, w. SC, n. GA, and ne. AL, primarily in the Appalachian Mountains and adjacent provinces. [= FNA9, Il, K, Nesom (1994), Pa, Tn, Va; = *Aster patens* var. *phlogifolius* – C, F, G, SE, WV; = *Aster phlogifolius* – R. Jones (1983), S, W; = *Virgulus patens* var. *phlogifolius*; < *Aster patens* – RAB]

Symphiotrichum pilosum (Willdenow) G.L. Nesom var. *pilosum*. Old fields, disturbed areas, woodland borders. Sep-Nov. NB west to MN, south to Panhandle FL and TX. [= FNA9, Il, K, Nesom (1994), Pa, Va; = *Aster pilosus* var. *pilosus* – C, F, G, SE, WV; < *Aster pilosus* – RAB, W; < *Symphiotrichum pilosum* – Tn, WH3]

Symphiotrichum pilosum (Willdenow) G.L. Nesom var. *pringlei* (A. Gray) G.L. Nesom. Dry soil, {habitats}. Sep-Nov. NS west to MN, south to GA and TN. [= FNA9, Il, K, Nesom (1994), Pa, Va; = *Aster pilosus* var. *demotus* – RAB, SE; = *Aster pilosus* var. *pringlei* – C; > *Aster pilosus* var. *demotus* – F, G, WV; > *Aster pilosus* var. *pringlei* – F, G, WV]

Symphiotrichum praealtum (Poiret) G.L. Nesom var. *praealtum*, Net-veined Aster. Moist forests over limestone, wooded fens (with *Acer rubrum* and *Fraxinus nigra*). Aug-Oct. NY, MN, and SD south to Panhandle FL and TX. Reported for Giles County, VA. [= Il, K, Nesom (1994); = *Aster praealtus* var. *praealtus* – F; < *Aster praealtus* – C, GW2, W, WV; < *Aster praealtus* var. *praealtus* – G, SE; < *Symphiotrichum praealtum* – FNA9, Pa, Tn, WH3]

Symphiotrichum pratense (Rafinesque) G.L. Nesom, Barrens Silky Aster. Calcareous glades and barrens, prairies. Sep-Oct. Se. 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), c. KY, TN (Chester, Wofford, & Kral 1997), nw. GA, sw. GA, Panhandle FL (Gadsden County), n. and c. AL, wc. MS. See Jones, Witsell, & Nesom (2008) for extensive discussion. [= FNA9, K, Nesom (1994), Tn, Va; = *Aster pratensis*; = *Aster sericeus* var. *microphyllus*; = *Symphiotrichum sericeum* var. *microphyllum* – WH3; < *Aster sericeus* – C, F, G, SE]



Symphiotrichum priceae (Britton) G.L. Nesom, Miss Price's Aster. Limestone glades. KY south through c. TN to nw. GA and n. AL. [= FNA9, K, Nesom (1994), Tn; = *Aster pilosus* var. *priceae* – C, G, SE; = *Aster priceae*; < *Aster pilosus* – W; < *Aster pilosus* var. *pringlei* – F]

Symphiotrichum puniceum (Linnaeus) Löve & Löve var. *puniceum*, Purple-stem Aster, Swamp Aster. Bogs, seeps, ditches, wet meadows. Sep-Oct. NL (Newfoundland) and NL (Labrador) west to BC, south to GA, AL, MO, and SD. Unresolved material from Grayson County mafic seeps. [= K, Nesom (1994), Va; = *Aster puniceus* var. *puniceus* – G; ? *Aster conduplicatus* – S; < *Aster puniceus* – C, GW2, RAB, S, SE, W; > *Aster puniceus* var. *compactus* – F; > *Aster puniceus* var. *puniceus* – F, WV; < *Symphiotrichum puniceum* – Il, Pa, Tn]

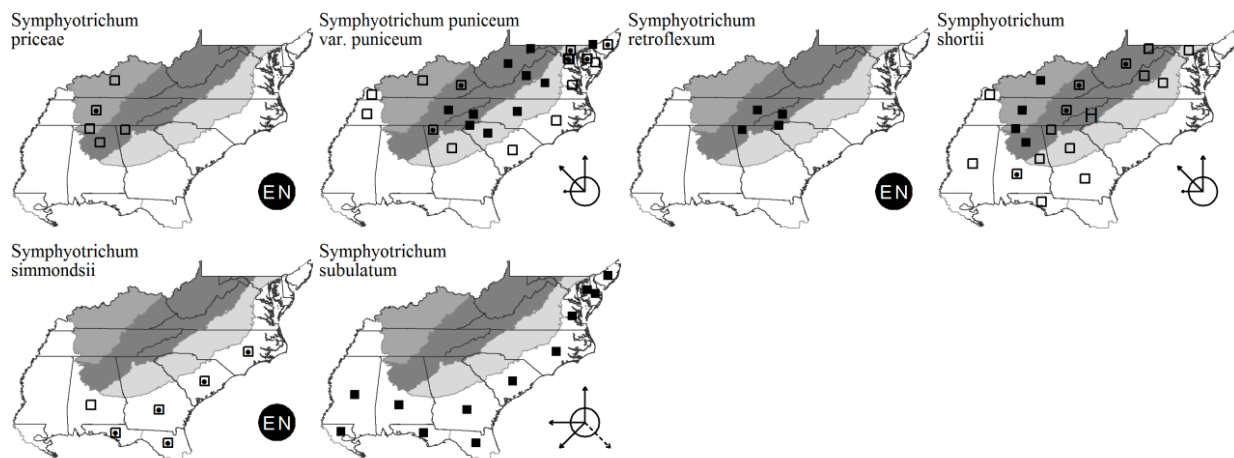
Symphiotrichum racemosum (Elliott) G.L. Nesom var. *racemosum*, Small White Aster. Cp (FL, GA, NC, SC, VA), Pd (GA, NC, SC, VA), Mt (VA, WV):. bottomlands, marshes; common. ME south to n. FL, west to TX, and inland to OH, IN, IL (?), MO, and OK. [= K, Nesom (1994), Va; = *Aster vimineus* – G, GW2, RAB, SE, W; > *Aster brachypholis* – S; < *Aster racemosus* – C; > *Aster racemosus* – F; > *Aster vimineus* var. *vimineus* – F; < *Symphiotrichum racemosum* – FNA9, FNA9, Pa, Tn, WH3]

Symphiotrichum retroflexum (Lindley ex A.P. de Candolle) G.L. Nesom. Moist forests. Late Aug-Oct. W. NC and e. TN south to nw. SC and n. GA. [= FNA9, K, Nesom (1994), Tn; = *Aster curtisii* – RAB, S, SE, W; = *Aster retroflexus* – C]

Symphiotrichum shortii (Lindley) G.L. Nesom, Midwestern Blue Heart-leaved Aster, Short's Aster. Dry, rocky slopes, calcareous hammocks (in FL). PA, s. ON, and MN, south to w. NC, c. GA, Panhandle FL (Gadsden and Jackson counties), MS, and AR. 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. [= FNA9, Il, K, Nesom (1994), Pa, Tn, Va, WH3; = *Aster shortii* – C, F, G, SE, WV; > *Aster camptosorus* – S; > *Aster shortii* – S; > *Aster shortii* var. *camptosorus*]

Symphiotrichum simmondsii (Small) G.L. Nesom, Simmonds's Aster. Florida wet prairies, wet pine flatwoods, ditches, other moist to wet habitats. (Nov-) Dec-Feb (-Mar). Se. NC south to s. FL, west to s. AL. {not yet keyed}. [= K, Nesom (1994); = *Aster simmondsii*; < FNA9, WH3; ? *Aster pinifolius*; < *Symphiotrichum kralii* – K3]

Symphiotrichum subulatum (Michaux) G.L. Nesom, Eastern Salt-marsh Aster. Tidal marshes. Sep-Nov. S. ME south to ne. FL, Panhandle FL, west to LA. See Sundberg (2004). [= Il, K, Nesom (1994), Nesom, G.L. (2005b), Va, WH3; = *Aster subulatus* var. *subulatus* – C, SE; = *Symphiotrichum subulatum* var. *subulatum* – FNA9, Sundberg, S.D. (2004); < *Aster subulatus* – GW2, RAB; > *Aster subulatus* var. *euroauster* – F; > *Aster subulatus* var. *obtusifolius* – F, G; > *Aster subulatus* var. *subulatus* – F, G]

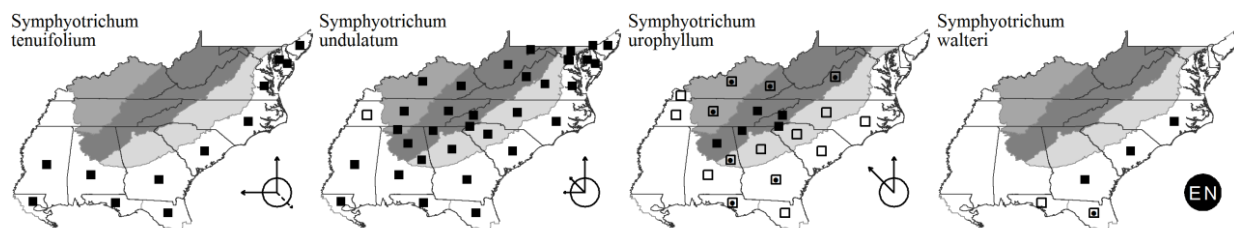


Symphiotrichum tenuifolium (Linnaeus) G.L. Nesom, Perennial Salt-marsh Aster. Brackish marshes. Jul-Nov. ME south to c. peninsular FL, west to TX. See Sundberg (2004). [= K, Nesom (1994), Nesom, G.L. (2005b), Va; = *Aster tenuifolius* – C, G, GW2, RAB, SE; = *Symphiotrichum tenuifolium* var. *tenuifolium* – FNA9, Sundberg, S.D. (2004); < WH3]

Symphiotrichum undulatum (Linnaeus) G.L. Nesom, Wavyleaf Aster. Dry forests, woodlands, glades, roadbanks. Aug-Nov. NS west to s. ON, south to c. peninsular FL and LA. [= FNA9, Il, K, Nesom (1994), Pa, Tn, Va, WH3; = *Aster undulatus* – C, G, RAB, SE, W; > *Aster asperifolius* – S; > *Aster claviger* – S; > *Aster corrigiatus* – S; > *Aster gracilescens* – S; > *Aster linguiformis* – S; > *Aster loriformis* – S; > *Aster mohrii* – S; > *Aster proteus* – S; > *Aster sylvestris* – S; > *Aster triangularis* – S; > *Aster truelli* – S; > *Aster undulatus* – S; > *Aster undulatus* var. *asperulus*; > *Aster undulatus* var. *diversifolius* – F; > *Aster undulatus* var. *loriformis* – F, WV; > *Aster undulatus* var. *undulatus* – F, WV]

Symphiotrichum urophyllum (Lindley ex A.P. de Candolle) G.L. Nesom, White Arrowleaf Aster. Moist to dry forests, fields, and roadbanks. Late Aug-Oct. ME west to MN and NE, south to e. Panhandle FL, MS, and OK. [= FNA9, Il, K, Nesom (1994), Pa, Tn, Va, WH3; = *Aster sagittifolius* – C, G, RAB, S, SE, W; = *Aster sagittifolius* var. *sagittifolius* – F; = *Aster urophyllum*]

Symphiotrichum walteri (Alexander) G.L. Nesom. Savannas, sandhills, pine flatwoods. E. NC south to c. peninsular FL. [= FNA9, K, Nesom (1994), WH3; = *Aster squarrosus* – RAB; = *Aster walteri* – S, SE; = *Virgulus walteri*]



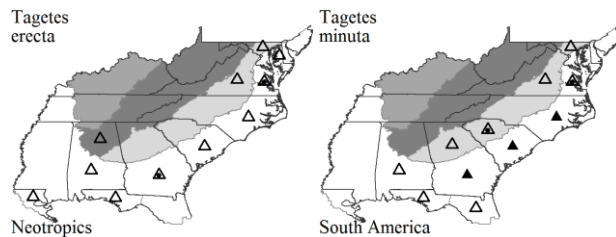
***Tagetes* Linnaeus 1753 (Marigold)**

A genus of about 40-50 species, of tropical and warm temperate America. References: SE; Strother in FNA21 (2006c).

- 1 Rays inconspicuous, ca. 1-2 mm long; [plant 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]..... ***Tagetes erecta***

* ***Tagetes erecta*** Linnaeus, Common Marigold, African Marigold, Aztec Marigold, Big Marigold. Commonly cultivated, rarely persistent or as a waif; native of Mexico. Jul-Nov. [= C, F, G, Il, K, RAB, S, SE, WH3; < FNA9]

* ***Tagetes minuta*** Linnaeus, Myster John Henry. Sandy fields, pecan orchards, sandy roadsides; native of South America. Late Sep-Nov. [= C, F, FNA9, G, K, RAB, S, SE, Va, WH3]



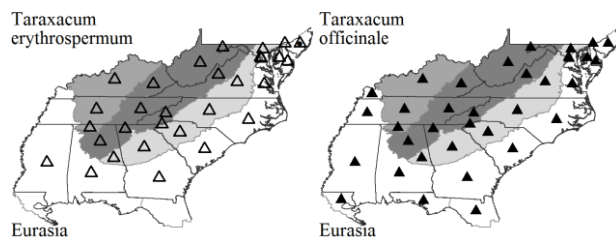
***Taraxacum* G.H. Weber ex Wiggers 1780 (Dandelion)**

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 in FNA19 (2006a); SE.

- 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***

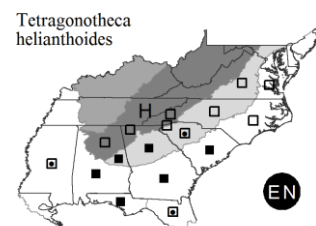
* ***Taraxacum erythrospermum*** Andrzejowski ex Besser, Red-seeded Dandelion. Roadsides, lawns, pastures, other disturbed sites; native of Eurasia. Year-round. Brouillet in FNA explains the nomenclatural and taxonomic complexities involved with the various names applied, and the reason for retaining *T. erythrospermum* at this time. [= F, FNA9, Il, Pa, RAB, Tn, Va, WV; < *Leontodon erythrospermum* – S; < *Taraxacum laevigatum* – C, G, K, SE, W]

* ***Taraxacum officinale*** G.H. Weber ex Wiggers, Common Dandelion. Lawns, roadsides, urban areas, pastures, disturbed areas, trailsides, less commonly in a variety of less disturbed habitats; native of Eurasia. Year-round. [= C, FNA9, G, Il, Pa, RAB, SE, Tn, Va, W, WH3, WV; = *Leontodon taraxacum* – S; > *Taraxacum officinale* ssp. *officinale* – K; > *Taraxacum officinale* var. *officinale* – F]



***Tetragonotheca* Linnaeus 1753 (Squarehead)**

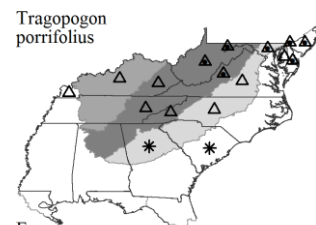
A genus of 4 species, herbs, endemic to se. North America. The other three species in the genus occur in LA, TX, and adjacent Mexico. References: SE; Strother in FNA21 (2006c); Turner, B.L. & D. Dawson (1980).



Tetragonotheca helianthoides Linnaeus, Squarehead, Pineland-ginseng. Sandhills, sandy woodlands, open hammocks, roadsides. Apr-Jul. Se. VA and e. TN south to c. peninsular FL and s. MS. [= C, F, FNA9, G, K1, K3, RAB, S, SE, Tn, Turner, B.L. & D. Dawson (1980), Va, W, WH3]

***Tragopogon* Linnaeus 1753 (Goat's-beard)**

A genus of about 110 species, herbs, of temperate Eurasia and the Mediterranean region. References: SE; P. Soltis in FNA19 (2006a); Voss, E.G. (1996).



* ***Tragopogon porrifolius*** Linnaeus, Purple Salsify, Vegetable-oyster, Purple Goat's-beard. Roadsides, fields; native of Europe. Late Apr-Jul. [= C, F, FNA9, G, Il, K, Pa, RAB, S, SE, Tn, Va, W, WV]

Trilisa Cassini 1820 (*Trilisa*)

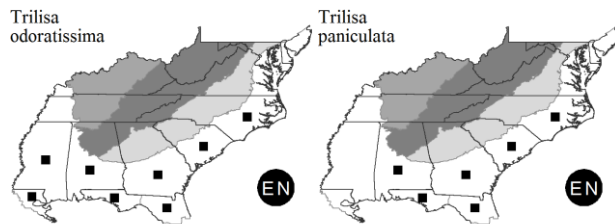
A genus of 2 species, perennial herbs, endemic to the Southeastern Coastal Plain of North America. The genus name is an anagram of *Liatris*, as is *Litrisa*. Schilling (2011) shows that *Trilisa* and *Litrisa* should be separated from *Carphephorus*. References: Correa, M.D. & R.L. Wilbur (1969); SE; DeLaney, K.R., N. Bissett, & J.D. Weidenhamer (1999); Nesom in FNA21 (2006c); Orzell, S.L. & E.L. Bridges (2002); Schilling (2011); Schilling, E.E. (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. Moist to mesic savannas and flatwoods. Late Jul-Oct; Sep-Nov. Se. NC south to c. peninsular FL and west to e. LA. *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. [= *Carphephorus odoratissimus* – DeLaney, K.R., N. Bissett, & J.D. Weidenhamer (1999); = *Carphephorus odoratissimus* var. *odoratissimus* – FNA9, K2, Orzell, S.L. & E.L. Bridges (2002), WH3; = *Trilisa odoratissima* var. *odoratissima* – Schilling, E.E. (2011b); < RAB, S; < *Carphephorus odoratissimus* – Correa, M.D. & R.L. Wilbur (1969), GW2, K1, SE]

Trilisa paniculata (J.F. Gmelin) Cassini, *Trilisa*. Savannas and flatwoods. Aug-Oct; Sep-Nov. Se. NC south to s. FL, and west to the FL Panhandle and s. AL. 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. [= RAB, S, Schilling, E.E. (2011b); = *Carphephorus paniculatus* – Correa, M.D. & R.L. Wilbur (1969), DeLaney, K.R., N. Bissett, & J.D. Weidenhamer (1999), FNA9, GW2, K1, K2, SE, WH3]

*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, J.R. (1966); SE; Olsen, J. (1979); Strother in FNA21 (2006c).

- 1 Leaves primarily opposite (the uppermost sometimes alternate).
- 2 Internodes winged; [collectively widespread].
 - 3 Plants 4-5 (-10) dm tall, perennating from short horizontal rhizomes; ray florets (5-) 8; disc florets 20-60+; [endemic to ne. FL and se. GA]; [section *Pterophyton*] *Verbesina heterophylla*
 - 3 Plants 10-30 dm tall, perennating from a crown with fleshy roots; ray florets (0-) 1-3 (-5); disc florets 8-15+; [widespread]; [section *Phaethusa*] *Verbesina occidentalis*
- 2 Internodes not winged; [collectively of sw. GA, s. AL, and FL Panhandle]; [section *Pterophyton*] *Verbesina aristata*
- 1 Leaves primarily alternate (the lowermost sometimes opposite).
- 4 Heads few, 1-15 (-20), in a compact inflorescence; disc 7-16 mm wide at anthesis; ray florets (5-) 7-15, yellow; plants 5-12 dm tall; [section *Pterophyton*] *Verbesina helianthoides*
- 4 Heads numerous, 10-200 or more, in a dense to open inflorescence; disc 3-15 mm wide at anthesis; ray florets either absent, or 1-5 and white, or 2-10 and yellow; plants 10-40 dm tall.
- 5 Ray florets 1-5, white; [section *Ochraetia*].
 - 6 Lower and middle leaves pinnately lobed or dissected; achenes of ray florets glabrous; [of the outer Coastal Plain from SC southward] *Verbesina virginica* var. *laciniata*
 - 6 Lower and middle leaves entire, serrate, or slightly undulate; achenes of ray florets papillose or short-pubescent; [more widespread in our area] *Verbesina virginica* var. *virginica*
- 5 Ray florets absent, or 2-10 and yellow; [section *Actinomeris*].
 - 7 Ray florets present, 2-10, yellow; disc florets yellow *Verbesina alternifolia*
 - 7 Ray florets absent; disc florets white *Verbesina walteri*

Verbesina alternifolia (Linnaeus) Britton ex Kearney, Common Wingstem. Alluvial forests, marshes, floodplain pastures. Aug-Sep. NY and s. ON west to IA, south to Panhandle FL and LA. [= C, FNA9, G, GW2, K, Pa, RAB, SE, Tn, Va, WH3, WV; = *Actinomeris alternifolia* – Il; = *Ridan alternifolia* – S]

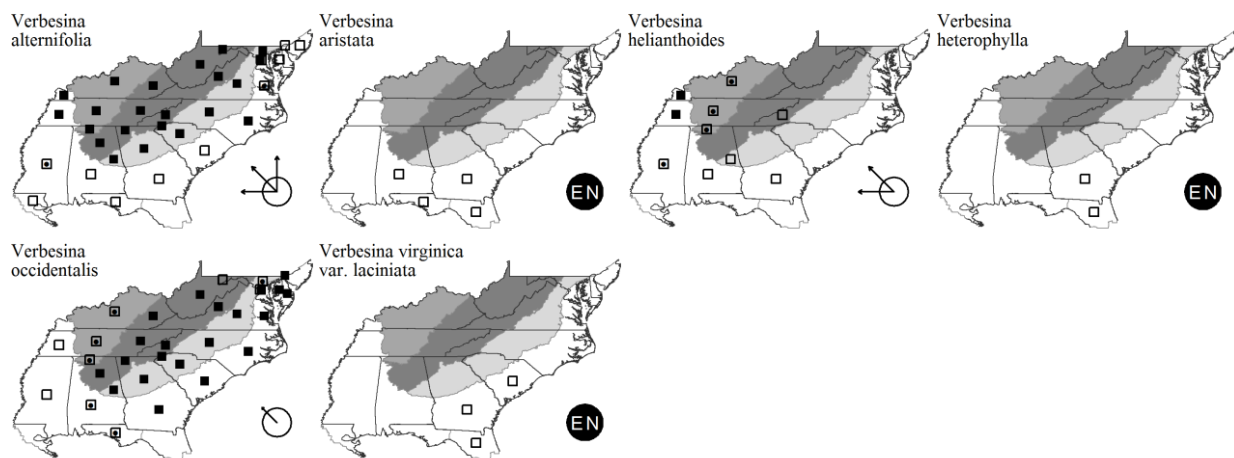
Verbesina aristata (Elliott) Heller, Coastal Plain Crownbeard. Longleaf pine sandhills, swamp margins, dry woodlands. Sw. GA and ne. FL west to FL Panhandle and s. AL. Jun-Aug. [= FNA9, K, SE, WH3; = *Pterophyton aristatum* – S]

Verbesina helianthoides Michaux, Ozark Crownbeard. Dry woodlands over mafic rocks, barrens, prairies. May-Oct. OH west to IA and KS, south to c. TN, nw. GA, n. AL, and nc. TX; disjunct in w. NC and e. GA. [= C, F, FNA9, G, K, SE, Tn; = *Actinomeris helianthoides* – Il; = *Pterophyton helianthoides* – S]

Verbesina heterophylla (Chapman) A. Gray. Pine flatwoods. (Apr-) Jun. Ne. FL (8 counties) and se. GA (Charlton County). [= FNA9, GW2, K, SE, WH3; = *Pterophyton heterophyllum* – S]

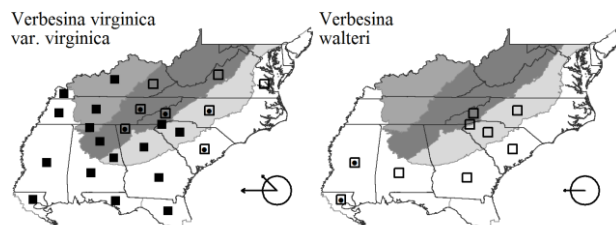
Verbesina occidentalis (Linnaeus) Walter, Southern Crownbeard. Forests, woodlands, pastures, and roadsides, especially abundant in alluvial areas or upslope over mafic or calcareous rocks. MD west to OH and MO, south to Panhandle FL and MS. [= C, F, FNA9, G, GW2, Il, K, RAB, SE, Tn, Va, WH3, WV; = *Phaethusa occidentalis* – S]

Verbesina virginica Linnaeus var. *laciniata* (Poiret) A. Gray, Southern Frostweed. Moist forests and thickets. Sep-Oct. E. SC (or e. NC?) south to s. FL. The two taxa need additional study. Olsen (1979) maps this entity (as a variety) as occurring in e. NC (documentation unknown). [= GW2, K1, Olsen, J. (1979), RAB, SE, WH3; = *Phaethusa laciniata* – S; = *Verbesina laciniata*; < *Verbesina virginica* – FNA, K3]



Verbesina virginica Linnaeus var. *virginica*, Common Frostweed. Moist to dryish forests, especially over mafic or calcareous rocks, in Coastal Plain ravines in VA over coquina limestone. Jul-Oct. Sc. NC (e. VA?) west to e. KS, south to s. FL and c. TX. Populations of *V. virginica* from e. VA appear to be substantially disjunct from other populations of either variety. [= C, GW2, K1, Olsen, J. (1979), RAB, SE, Va; = *Phaethusa virginica* – S; < *Verbesina virginica* – F, FNA, G, Il, K3, Tn, WH3]

Verbesina walteri Shinnars, Walter's Wingstem. Floodplains, low moist forests. Late Aug-Sep. Coastal Plain of SC south to GA, west to LA; disjunct in Piedmont of NC and Ouachita Mountains of AR. [= FNA9, GW2, K, RAB, SE; = *Ridan paniculata* – S]



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: Jones in SE (1980); Jones, S.B., Jr (1982); Strother in FNA19 (2006a); Urbatsch, L.E. (1972).

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 Basal rosette present, its leaves larger than those of the stem; [of xeric habitats of the Coastal Plain and (in NC southward) xeric rocky habitats of the Piedmont].
 - 2 Basal leaves 2-10 cm wide; stem leaves few, abruptly reduced upward in size relative to the basal *Vernonia acaulis*
 - 2 Basal leaves 0.5-2.5 cm wide; stem leaves relatively many, gradually reduced upward *Vernonia ×georgiana*
- 1 Basal rosette absent; [collectively of a wide variety of habitats].
 - 3 Phyllary tips subulate to filiform, the broadest long-acuminate.
 - 4 Middle cauline leaves 1.2-7.5 cm wide; plants 4-35 dm tall; [of various habitats, but not typically in Coastal Plain pinelands].
 - 5 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*
 - 5 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*
 - 4 Middle cauline leaves 0.1-1.8 cm wide; plants 3-11 dm tall; [of Coastal Plain pinelands].
 - 6 Leaves 3-7 cm long, (5-) 10-20+ mm wide, 2.5-6× as long as wide, somewhat auriculate at the base *Vernonia pulchella*
 - 6 Leaves 5-12 cm long, 2-4 (-8+) mm wide, (8-) 12-50× as long as wide, attenuate at the base.
 - 7 Tips of the inner phyllaries long-acuminate, 1.4-4.8 mm long *Vernonia angustifolia* var. *scaberrima*
 - 7 Tips of the inner phyllaries acuminate, 0.1-1.0 mm long *Vernonia angustifolia* var. *angustifolia*
 - 3 Phyllary tips acute to rounded (sometimes minutely apiculate), the narrowest short acuminate.
 - 8 Leaves 2-4 (-8+) mm wide, (8-) 12-50× as long as wide.
 - 9 Heads 16-19-flowered; phyllary tips acuminate *Vernonia angustifolia* var. *angustifolia*
 - 9 Heads 8-15-flowered; phyllary tips acute (to acuminate) *Vernonia angustifolia* var. *mohrii*
 - 8 Leaves 5-70 mm wide, 2-9 (-17)× as long as wide.
 - 10 Stems glabrous *Vernonia flaccidifolia*
 - 10 Stems hairy.
 - 11 Heads with 13-30 flowers; leaf blades linear-lanceolate, 10-30 cm long, 1.2-7.5 cm wide, 4-10× as long as wide; involucre 2.3-5.5 cm wide; phyllaries 1.2-3.1 mm wide *Vernonia gigantea*
 - 11 Heads with 9-20 flowers; leaf blades elliptic to oblanceolate, 6-20 cm long, 1.2-5 cm wide, 3-5× as long as wide; involucre 2.0-4.0 cm wide; phyllaries 0.9-1.8 mm wide *Vernonia ovalifolia*

Vernonia acaulis (Walter) Gleason, Flatwoods Ironweed. Longleaf pine flatwoods, moist ecotones, and moister sandhill situations, in the Piedmont in dry rocky woodlands, bluffs, and barrens. Late Jun-Aug; Aug-Oct. Coastal Plain and lower Piedmont of ne. and nc. NC south to sc. GA; allegedly disjunct in Polk County, FL. [= FNA9, K, RAB, S, SE, WH3]

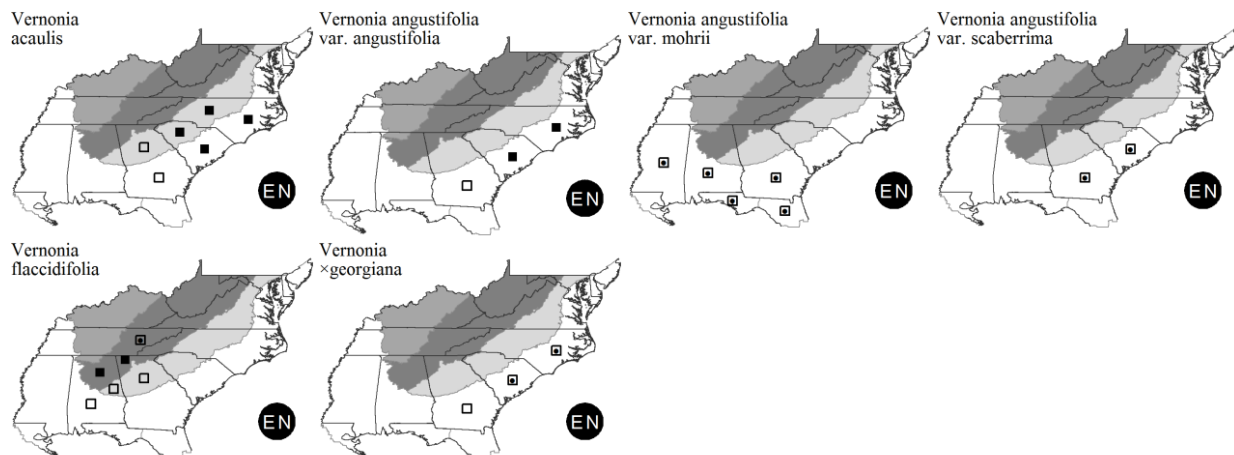
Vernonia angustifolia Michaux var. *angustifolia*, Carolina Sandhill Ironweed, Carolina Slender Ironweed. Sandhills. Late Jun-early Sep; Sep-Oct. Se. and sc. NC south to GA. [= RAB; = *Vernonia angustifolia* ssp. *angustifolia* – K, SE; < *Vernonia angustifolia* – FNA9, S]

Vernonia angustifolia Michaux var. *mohrii* S.B. Jones, Florida Sandhill Ironweed, Florida Slender Ironweed. Sandhills. Sw. GA and Panhandle FL south to c. peninsular FL and west to s. AL and s. MS. [= *Vernonia angustifolia* ssp. *mohrii* – K, SE; < *Vernonia angustifolia* – FNA9, S, WH3]

Vernonia angustifolia Michaux var. *scaberrima* (Nuttall) A. Gray, Georgia Sandhill Ironweed, Georgia Slender Ironweed. Sandhills. Late Jun-Aug; Aug-Oct. Se. SC south to se. GA. [= RAB; = *Vernonia angustifolia* ssp. *scaberrima* – K, SE; < *Vernonia angustifolia* – FNA9, WH3; > *Vernonia recurva* – S; > *Vernonia scaberrima* – S]

Vernonia flaccidifolia Small. Upland deciduous forests and woodlands, woodland borders. Jun-Sep. C. and nw. GA, se. TN, and ne. and c. AL (Urbatsch 1972). [= FNA9, K, S, SE, Tn, Urbatsch, L.E. (1972), W]

Vernonia ×georgiana Bartlett (pro sp.), Georgia Ironweed. Sandhills. Late Jun-early Aug; Aug-Oct. [= K, RAB, SE; = *Vernonia georgiana* – S]



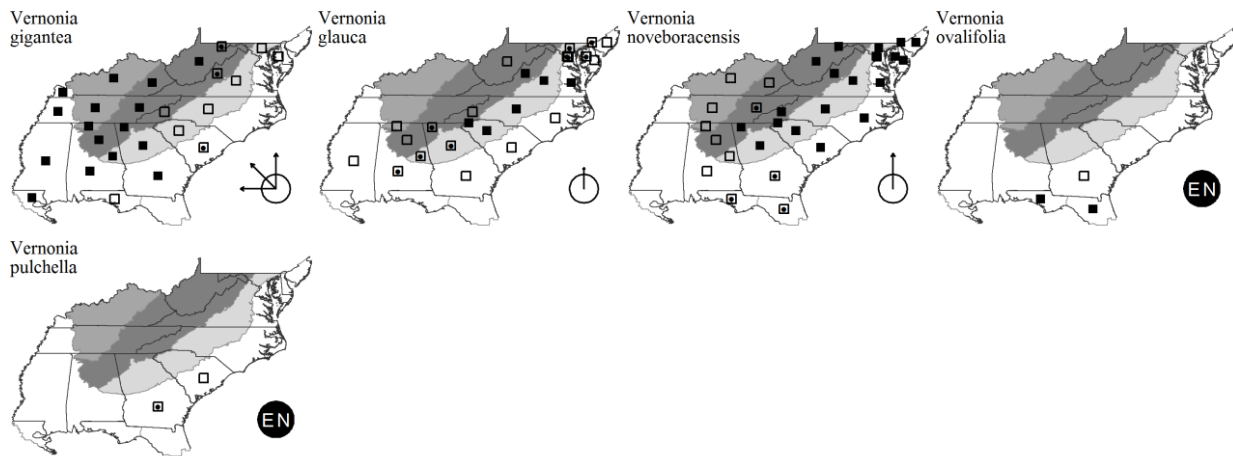
Vernonia gigantea (Walter) Trelease, Common Ironweed, Giant Ironweed. Pastures, bottomlands, streamsides. Late Aug-Oct; Aug-Nov. W. NY, s. MI and e. NE south to SC, FL, and TX. [= Pa, Tn, Va, W; = *Vernonia altissima* – G, RAB, WV; = *Vernonia gigantea* ssp. *gigantea* – K1, SE, Urbatsch, L.E. (1972); = *Vernonia gigantea* var. *gigantea* – C; < FNA9, WH3; > S; > *Vernonia altissima* – S; > *Vernonia altissima* var. *altissima* – F; > *Vernonia altissima* var. *taeniotricha* – F; > *Vernonia gigantea* var. "taeniotricha" – Il; > *Vernonia gigantea* var. *gigantea* – Il]

Vernonia glauca (Linnaeus) Willdenow, Appalachian Ironweed, Tawny Ironweed. Pastures, bottomlands, streamsides. Late Jun-Sep; Aug-Oct. NJ and PA south to GA, AL, and MS. [= C, F, FNA9, G, K, Pa, RAB, S, SE, Va, W, WV]

Vernonia noveboracensis (Linnaeus) Michaux, New York Ironweed. Pastures, bottomlands, streamsides. Jul-Sep; Aug-Oct. MA and NY south to ne. and e. Panhandle FL and AL. [= C, FNA9, G, K, Pa, RAB, SE, Tn, Va, W, WH3, WV; > S; > *Vernonia harperi* – S; > *Vernonia noveboracensis* var. *noveboracensis* – F; > *Vernonia noveboracensis* var. *tomentosa* – F]

Vernonia ovalifolia Torrey & A. Gray, Oval-leaf Ironweed. Rich woods, stream banks. Sw. GA south to Panhandle FL and c. peninsular FL. [= S; = *Vernonia gigantea* ssp. *ovalifolia* – K1, SE, Urbatsch, L.E. (1972); = *Vernonia gigantea* var. *ovalifolia*; < *Vernonia gigantea* – FNA9, WH3]

Vernonia pulchella Small, Pretty Ironweed. Sandhills. Se. SC (Beaufort and Jasper counties) south to se. GA. [= FNA9, K, S, SE]



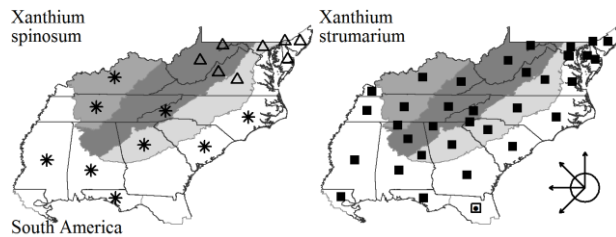
Xanthium Linnaeus 1753 (Cocklebur)

A genus of about 3 species, herbs, cosmopolitan (of somewhat uncertain original distribution). References: SE; Strother in FNA21 (2006c).

- 1 Leaves lanceolate, 2-5× as long as wide, cuneate at the base; leaf axil with a 1-3 cm long yellow 3-forked spine *Xanthium spinosum*
 1 Leaves ovate or orbicular, 0.8-1.5× as long as wide, cordate at the base; leaf axil lacking spines *Xanthium strumarium*

* ***Xanthium spinosum*** Linnaeus, Spiny Cocklebur. Fields, disturbed ground; apparently native of South America. Jul-Nov. [= C, FNA9, Il, K1, K3, Mo, Pa, RAB, SE, Va, WV; = *Acanthoxanthium spinosum* – S; > *Xanthium ambrosioides* – F; > *Xanthium spinosum* var. *inermis* – F; > *Xanthium spinosum* var. *spinosum* – F]

Xanthium strumarium Linnaeus, Cocklebur. Disturbed ground, roadsides, pastures, barnyards, beaches. Jul-Nov. Nearly cosmopolitan, its original distribution unclear, but probably native to the New World. Various taxa have been recognized (see synonymy); it is unclear that any are usefully distinguished. The most commonly followed recent treatment is that by Cronquist, recognizing two varieties in eastern North America: var. *canadense*, with burs 2-3.5 cm long, the prickles of the bur with spreading hairs and stipitate glands toward the prickle bases, and var. *glabratum* (A.P. de Candolle) Cronquist, with burs 1.5-2 cm long, the prickles of the bur nearly glabrous or with short glandular or nonglandular puberulence toward the prickle bases. [= FNA9, GW2, Mo, Pa, Tn, Va, WH3; > F, WV; > *Xanthium chasei* – F; > *Xanthium chinense* – F, Il; > *Xanthium echinatum* – F; > *Xanthium globosum* – F, Il; > *Xanthium inflexum* – F, Il; > *Xanthium italicum* – F, Il, WV; > *Xanthium orientale* – F; > *Xanthium oviforme* – F; > *Xanthium pennsylvanicum* – F, Il, WV; > *Xanthium speciosum* – Il; > *Xanthium strumarium* var. *canadense* – C, G, K, SE, W; > *Xanthium strumarium* var. *glabratum* – C, G, K, RAB, SE, W; > *Xanthium strumarium* var. *strumarium* – C, RAB; > *Xanthium varians* – F; > *Xanthium wootoni* – F]



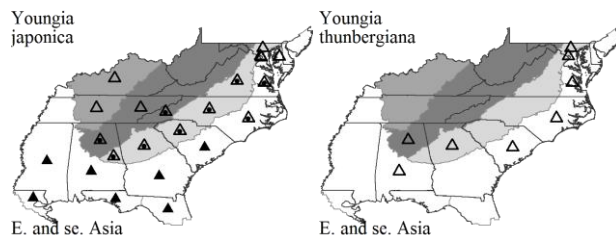
***Youngia* Cassini 1831 (*Youngia*)**

A genus of about 30-40 species, herbs, of Asia. References: SE; Spurr in FNA19 (2006a); Urbatsch, L.E., J.F. Pruski, & K.M. 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*. Roadsides, disturbed areas, trail edges; native of se. Asia. Apr-May. Spreading rapidly in our area, and now moving into minimally-disturbed natural areas. [= Urbatsch, L.E., J.F. Pruski, & K.M. Neubig (2013); = *Youngia japonica* ssp. *japonica*; < C, FNA9, K, SE, Tn, Va, WH3; < *Crepis japonica* – F, G, RAB, S]

* ***Youngia thunbergiana*** A.P. de Candolle, *Youngia*. Roadsides, disturbed areas; native of e. Asia. Apr-May. 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. [= Urbatsch, L.E., J.F. Pruski, & K.M. Neubig (2013); = *Youngia japonica* ssp. *elstonii*; < *Crepis japonica* – F, G, RAB, S; < *Youngia japonica* – C, FNA9, K, SE, Va, WH3; > *Youngia pseudosenecio*]



***Zinnia* Linnaeus 1759 (*Zinnia*)**

A genus of about 17 species, herbs, of sw. North America south to South America. References: SE; Smith 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 violacea*

* ***Zinnia peruviana*** (Linnaeus) Linnaeus, Peruvian Zinnia. Commonly cultivated, rare as a waif in disturbed areas; native of the New World tropics. May-Nov. [= FNA9, K, SE, WH3; ? *Zinnia pauciflora* – S]

* ***Zinnia violacea*** Cavanilles, Garden Zinnia, Elegant Zinnia. Disturbed areas, commonly cultivated; native of the New World tropics. May-Nov. [= FNA9, K; = *Zinnia elegans* – S, SE, WH3]

