Zinnia Linnaeus 1759 (Zinnia)


1 Achenes wingless; receptacular bracts (chaff) toothed or erose on the lip.................................................... ...............
   1 Achenes winged; receptacular bracts (chaff) with a differentiated fimbriate lip.................................................... ...............


BALSAMINACEAE A. Richard 1822 (Touch-me-not Family)


Impatiens Linnaeus (Jewelweed, Touch-me-not, Snapweed, Balsam)


1 Corolla purple, pink, or white; plants 3-6 (-8) dm tall; stems puberulent or glabrous; [cultivated alien, rarely escaped].
   2 Sepal spur strongly recurved; stems puberulent............................................................................... .............
   2 Sepal spur slightly curved; stems glabrous or with widely scattered hairs.................................................... ..

1 Corolla yellow or orange (rarely cream or white); plant mostly 5-25 dm tall; stems glabrous; [native].
   3 Flowers orange (rarely orange-yellow or white); calyx spur (colored) 7-10 mm long, curved forward parallel to the calyx sac ..................................................................................................................
   3 Flowers yellow (rarely cream or white); calyx spur (colored) 4-6 mm long, at a right angle to the calyx sac ....I. pallida


Impatiens capensis Meerb. Orange Jewelweed, Orange Touch-me-not, Spotted Touch-me-not. Mt, Pd, Cp (GA, NC, SC, VA): moist forests, bottomlands, cove forests, streambanks, bogs; common (rare in Coastal Plain of GA). May-November. Newfoundland west to Saskatchewan and AK, south to SC, panhandle FL, AL, and TX. Within the portion of our area where I. capensis and I. pallida overlap, the two species often occur in mixed populations. I. capensis tends to have the leaf apices and crenulations more rounded than I. pallida, but the character is overlapping and variable. [= RAB, C, F, GW, K, W; = I. biflora Walter – G, S]


* Impatiens walleriana Hooker f., Garden Impatiens. Pd (NC): suburban woodlands, weakly spreading from horticultural plantings; rare, native of Africa. [= K]

BATACEAE von Martius ex Meisner 1842 (Batis Family)

A monogeneric family, low shrubs, or subshrubs of tropical and subtropical shores of the Americas, New Guinea, the Pacific, and Australia. References: Rogers (1982b); Bayer & Appel in Kubitzki & Bayer (2003).

Batis P. Browne 1756 (Saltwort, Beachwort, Batis)

A genus of 2 species, low shrubs, of tropical and subtropical shores of the Americas, New Guinea, the Pacific, and Australia. The only other member of the family and genus is B. argillicola, of New Guinea and Australia. References: Rogers (1982b); Goldblatt (1976); Bayer & Appel in Kubitzki & Bayer (2003).

Batis maritima Linnaeus, Saltwort, Beachwort, Batis. Cp (GA, NC?, SC): brackish marshes; rare north of GA (but locally common). June-July; October. Se. SC south to s. FL, west to TX, and in Central and South America (apparently introduced in
BERBERIDACEAE

As broadly defined here, a family of about 15 genera and 650 species, herbs and shrubs, of the temperate Northern Hemisphere and Andean South America. There has been much debate and study of whether the Berberidaceae should be recognized as a broadly defined unit, or split into a variety of segregate families (such as Podophyllaceae, Epimediaceae, Nandinaceae, Leonticaceae). Based on molecular studies, Kim & Jansen (1996, 1998) conclude that division of the Berberidaceae into segregate families is not warranted. References: Whetstone, Atkinson, & Spaulding in FNA (1997); Stearn (2002); Kim & Jansen (1996, 1998); Ahrendt (1961); Loconte & Estes (1989b); Meacham (1980); Loconte in Kubitzki, Rohwer, & Bittrich (1993).

1 Plant a shrub.
   2 Leaves ternately compound; [subfamily Nandinoideae]................................. Nandina
   2 Leaves simple or 1-pinnately compound; [subfamily Berberidoeae, tribe Berberidinae].
      3 Leaves simple, < 6 cm long, fascicled on short spur shoots; stems spiny ......................... Berberis
      3 Leaves 1-pinnately compound, > 10 cm long, not fascicled on short spur shoots; stems not spiny ........ Mahonia

1 Plant an herb.
   4 Leaves compound; flowers greenish or maroon; [subfamily Berberidoideae, tribe Leonticeae] ........ Caulophyllum
   4 Leaves simple (though parted); flowers white; [subfamily Berberidoeae, tribe Epimediinae].
      5 Plant caulescent; flower solitary and scapose; leaf segments 2; fruit a capsule ......................... Jeffersonia
      5 Plant caulescent; flower solitary, or cymose to umbellate, borne on a stem with leaves; leaf segments several; fruit a berry.
         6 Flowers cymose or umbellate; stamens 6; berry globose, 8-12 mm long, 2-4 seeded; larger leaves with only 2 clefts that extend > halfway to the peltate center of the leaf (thus the leaf divided into 2 halves, the other sinuses shallow) ................................................................. Diphyleia
         6 Flower solitary; stamens 12-18; berry ovoid, 25-70 mm long, many-seeded; larger leaves with 5 or more clefts that extend > halfway to the peltate center of the leaf (thus the leaf fairly evenly divided into multiple lobes) ........................................................................................................ Podophyllum

BERBERIDACEAE A.L. de Jussieu 1789 (Barberry Family)


1 Leaves entire; flowers solitary or 2-4 in umbels; spines mostly simple; [section Tschonoskyanae] ............. B. thunbergii
1 Leaves bristly-serrate; flowers 5-many in racemes (sometimes the racemes umbelliform); spines mostly trifurcate (some simple or bifurcate).
   2 Leaves deciduous, herbaceous; leaf teeth tipped with weak bristles; fruits red, not pruinose.
      3 Leaves with 1-9 (20) bristles on each margin, the bristles 3-6 mm apart; berries ovoid (6-9 mm long, 6-7 mm broad), 5-10 (rarely more) in an often umbellate raceme; petals notched at apex; [section Canadenses] ......................... B. canadensis
      3 Leaves with 18-36 bristles on each margin, ca. 2 mm apart; berries ellipsoid (8-10 mm long, 4-5 mm broad), 10-20 in a raceme; petals obute at apex; [section Vulgares] ................................................................. B. vulgaris

Berberis Linnaeus (Barberry)
(also see Mahonia)

Berberis canadensis P. Miller, American Barberry, Allegheny Barberry. Pd, Mt (GA, NC, SC, VA): rocky woods, forest openings, glades, usually over mafic rocks (such as diabase) or calcareous rocks (such as limestone), sometimes along fence-rows in sw. VA (presumably spread by birds); uncommon, rare south of VA and in VA Piedmont (GA Special Concern, NC Rare). April-May; September-October. A broad Southern Appalachian-Ozarkian endemic, not occurring in Canada (the epithet a
**Caulophyllum** Michaux (Blue Cohosh)


1 Carpels 3.5-5 mm long, averaging 4 mm; style 0.8-1.5 mm long; sepalas 6-9 mm long, usually purple; terminal leaflets (5-) 7-9 (-10) cm long, (4-) 5-7.5 (-8) cm wide; main inflorescence with 4-18 flowers; first leaf 2-ternate or 3-ternate ...................... ................................................ ................................................

1 Carpels 1.3-2.8 mm long, averaging 2 mm; style 0.3-1.0 mm long; sepals 3-6.5 mm long, yellow, yellow-purple, or green; terminal leaflets (3-) 5-7 (-8) cm long, (2-) 3.5-6.5 (-10) cm wide; main inflorescence with 5-70 flowers; first leaf 3-ternate or 4-ternate...................... ................................................

**Caulophyllum giganteum** (Farwell) Loconte & Blackwell, Northern Blue Cohosh. Mt (NC, VA): rich forests; rare (NC Rare). April-May; July-August. *C. giganteum* is more northern in distribution than *C. thalictroides*, ranging south to VA, nw. NC, ne. and nc. TN (Chester, Wofford, & Kral 1997), and c. KY. This species blooms about 2 weeks earlier than *C. thalictroides* where they grow together. The combination of sympatry, morphologic distinctness, and phenologic separation of the two taxa argues for recognition at the species level. [= FNA, K, SE, W, Y, Z; < C. thalictroides – RAB, F, G, S; = C. thalictroides var. giganteum Farwell – C]

**Caulophyllum thalictroides** (Linnaeus) Michaux, Common Blue Cohosh, Green Vivian. Mt (GA, NC, SC, VA), Pd (NC, SC, VA), Cp (VA): rich forests; common (rare in Piedmont and Coastal Plain) (SC Rare). April-May; July-August. The species is widespread in e. North America, south to GA, AL, and AR. [= FNA, K, SE, W, Y, Z; < C. thalictroides – RAB, F, G, S (also see C. giganteum); = C. thalictroides var. thalictroides – C]

**Diphylleia** Michaux (Umbrella-leaf)


**Diphylleia cymosa** Michaux, Umbrella-leaf, Pixie-parasol. Mt (GA, NC, SC, VA): seepages and brook-banks, sometimes away from brooks or seeps in northern hardwood or cove hardwood forests (but then usually in subterranean seepage), primarily at moderate to high elevations; uncommon (SC Rare, VA Watch List). May-June; July-August. A narrow Southern Appalachian endemic: high mountains of w. NC and c. TN, extending a short distance into ne. GA, nw. SC, and sw. VA. [= RAB, C, F, FNA, G, K, S, SE, W, Y, Z]

**Jeffersonia** W. Barton (Twinleaf)

A genus of 2 species, the only other species of the genus is native to e. Asia (eastern Russia, Korea, Manchuria). The closest North American relatives of *Jeffersonia* are *Achlys* and *Vancouveria* of the Pacific Northwest. References: George in FNA (1997); Stearn (2002)=Y; Loconte & Estes (1989b); Loconte in Kubitzki, Rohwer, & Bittrich (1993).
Jeffersonia diphylla (Linnaeus) Persoon, Twinleaf. Mt (GA, NC, VA), Pd (VA): moist and extremely nutrient-rich forests, generally over calcareous or mafic rocks (including limestone, dolostone, amphibolite, greenstone, etc.) or very rich alluvium; uncommon, rare in NC (GA Endangered, NC Rare). March-April; May. The species is widespread in ne. United States, south to MD, NC, and AL. It is somewhat suggestive of Sanguinaria in both foliage and flower. [= RAB, C, F, FNA, G, K, S, SE, W, Y]

Mahonía Nuttall (Mahonia, Holly-grape, Oregon Grape)

A genus of over 100 species, shrubs, of w. North America and e. Asia. Many authors favor the inclusion of Mahonia in Berberis. It appears that Mahonia is a paraphyletic grade basal to Berberis (in the narrow sense) (Kim, Kim, & 2004). References: Whittemore in FNA (1997); Locubite in Kubitzki, Rohwer, & Bittrich (1993).

1. Leaflet blades with 2-7 teeth per side, each tooth 3-8 mm long; leaflets very thick and stiff .......................................................... M. bealei
1. Leaflet blades with 6-13 teeth per side, each tooth 1-2 (-3) mm long; leaflets thickish, but flexible when fresh ......... M. nervosa


Nandina Thunberg 1781 (Nandina, Sacred-bamboo)

A monotypic genus, a shrub, native of Japan, China, and India. Here treated as a monotypic genus in the Berberidaceae, Nandina seems to have only a general kinship to the Berberidaceae (see Ehdaie & Russell 1984, Locubite & Estes 1989b, Meacham 1980) and should likely be placed in its own monotypic family. References: Whetstone, Atkinson, & Spaulding in FNA (1997); Ehdaie & Russell (1984); Locubite in Kubitzki, Rohwer, & Bittrich (1993).

* Nandina domestica Thunberg, Nandina, Sacred-bamboo. Cp (GA, NC, SC, VA), Pd (GA, NC, SC): forests and woodlands in suburban areas, commonly planted, increasingly escaping and spreading; rare, introduced from China. May-June; October-November. Nandina has numerous cultivated forms, and is widely planted in the Piedmont and Coastal Plain of our area, especially southward. Leaflet shape varies in cultivated forms from broadly ovate to linear. [= RAB, FNA, K, SE]

Podophyllum Linnaeus 1753 (May-apple)

A genus of 2 species (or ca. 14 if Dysosma is included), herbs, one in e. North America, the other in e. Asia. The obvious morphological kinship of Podophyllum, Diphylleia, and Hydrastis is corroborated by alkaloid chemistry. References: George in FNA (1997); Shaw (2000, 2002)=Z; Locubite in Kubitzki, Rohwer, & Bittrich (1993).

Podophyllum peltatum Linnaeus, May-apple, American Mandrake. Mt, Pd, Cp (GA, NC, SC, VA): rich forests, bottomlands, slopes, pastures; common. March-April; May-June. P. peltatum is widespread through most of e. United States. The ripe fruits are edible; the rest of the plant contains a variety of alkaloids, and is poisonous-medicinal. Compounds from Podophyllum are used in wart removal, and show anti-viral and anti-cancer promise. [= RAB, C, F, FNA, G, K, S, SE, W; > P. peltatum var. peltatum – Z; > P. peltatum var. annulare J.M.H. Shaw – Z]

BETULACEAE S.F. Gray 1821 (Birch Family)

A family of 6 genera and about 150 species, primarily of subarctic to cold temperate regions of the Northern Hemisphere, but extending through Central America to n. South America. The two subfamilies recognized here are sometimes elevated to family status, as by Govaerts & Frodin (1998). References: Furlow in FNA (1997); Furlow (1990)=Z; Hardin (1971)=Y; Govaerts & Frodin (1998); Kubitzki in Kubitzki, Rohwer, & Bittrich (1993).

1. Scales of the pistillate catkins persistent; leafy involucr present; fruit a small winged nut; [subfamily Betuloideae].
2. Pistillate scales woody, forming a persistent conelike catkin; plant a shrub, < 4 m tall (except A. glutinosa)................. Alnus
2. Pistillate scales deciduous with or soon after the fruits; plant a tree, > 10 m tall at maturity......................................................... Betula
1. Scales of the pistillate catkins caduceous; leafy involucr present, conspicuous; fruit an unwinged nut; [subfamily Coryloideae].
3. Nut spherical, 1-1.5 cm in diameter, closely enveloped by the involucr ................................................................. Corylus
3. Nut ovoid, 0.4-0.6 cm long, loosely or not at all enveloped by the involucr.


Betula Linnaeus 1753 (Birch)


1 Leaf blades suborbicular, the apex rounded; [section Costatae] .............................................. B. lenta var. uber
2 Leaf blades ovate or triangular, the apex acute to acuminate.

3 Inner bark of the twigs bitter, not aromatic; leaves cuneate at the base.......................... B. nigra
3 Inner bark of the twigs with odor and flavor of wintergreen; leaves rounded to subcorporate at the base.
4 Bark of stems 5-30 cm in diameter (on larger trees look up for branches) yellow or yellowish-gray, exfoliating in papery shreds (bark of larger trunks becoming platey, the plates not prominently marked horizontally by old lenticels); scales of fruiting catkins 6-13 mm long, pubescent and marginally ciliate.............. B. alleghaniensis
4 Bark of stems 5-30 cm in diameter (on larger trees look up for branches) reddish-brown or dark brown, tight (bark of larger trunks becoming platey, the plates prominently marked horizontally by old lenticels); scales of fruiting catkins 5-7 mm long, glabrous .................. B. lenta var. lenta

2 Bark white to pale gray; samara strongly retuse at its apex, the wings making up over 1/2 of the width; fruiting catkins peduncled; [section Betula].
5 Leaves glabrous beneath or somewhat pubescent on the veins; bark of young stems remaining tight; leaf apex long-acuminate to attenuate; central lobe of infructescence scales shorter than the basal and lateral lobes.
6 Leaf apex long-acuminate, but not attenuate; infructescence scales sparsely pubescent on the outer surface; bark of mature trees creamy to bright white............................................................... B. pendula
6 Leaf apex attenuate-acuminate; infructescence scales densely pubescent on the outer surface; bark of mature trees grayish white.............................................................. B. populifolia
5 Leaves pubescent beneath, at least on the veins; bark of young stems exfoliating; leaf apex acute to short-acuminate; central lobe of infructescence scales equal to or longer than the basal and lateral lobes.
7 Twigs glabrous or slightly pubescent (and then glabrate in age); leaves cordate (rarely rounded) at the base; leaves with 9-12 lateral veins on each side of the midvein.............................................. B. cordifolia
7 Twigs densely pubescent; leaves cuneate to rounded (rarely truncate) basally; leaves with 6-9 lateral veins on each side of the midvein.............................................................................................................. B. papyrifera

Betula alleghaniensis Britton, Yellow Birch. Mt (GA, NC, SC, VA): forests at medium to high elevations, rarely at low elevations; common (SC Rare). April-May; June-August. Newfoundland west to se. Manitoba, south to DE, PA, OH, n. IN, WI, MN, and IA, and in the mountains south to w. NC, n. GA, and e. TN. [= C, FNA, S, W, Y, Z; = B. lutea Michaux f. – RAB; > B. lutea var. lutea – F; G; > B. lutea var. macrolepis Fernald – F; G; > B. alleghaniensis var. alleghaniensis – K; > B. alleghaniensis var. macrolepis (Fernald) Brayshaw – K]

Betula cordifolia Regel, Mountain Paper Birch. Mt (NC, VA): high elevation forests, primarily on talus of avalanche chutes, in the Black Mountains, Yancey County, NC, and on talus slopes and adjacent forests at high elevations, especially on quartzite on the western flank of the Blue Ridge, and on sandstone talus in the Ridge and Valley in VA; rare (NC Rare, VA Rare). May-August; July-September. Newfoundland and e. Québec south to the mountains of NY; disjunct in n. MN, w. VA, w. NC, and e. TN (Chester, Wofford, & Král 1997). The question of the appropriate treatment of B. cordifolia and B. papyrifera is difficult (and still controversial). [= FNA, G, S, Y, Z; = B. papyrifera Marshall var. cordifolia (Regel) Fernald – RAB, C, F, K, W]

Betula lenta Linnaeus var. lenta, Sweet Birch, Cherry Birch, Black Birch, "Mahogany." Mt (GA, NC, SC, VA), Pd (NC, SC, VA): forests at low to high elevations; common (uncommon in Piedmont). March-April; June-July. S. ME west to OH, south to GA and n. AL. This species is generally restricted elevationally in North Carolina to medium elevations and lower, but in VA it reaches higher elevations, where it can be as common as B. alleghaniensis. Once the primary source of methyl salicylate (wintergreen flavoring), used in medicines and confections; it is now produced synthetically. [= B. lenta – RAB, F, FNA, G, K, S, W, Z; < B. lenta – C, Y (also including B. uber)]

Betula lenta Linnaeus var. uber Ashe, Virginia Roundleaf Birch. Mt (VA): mountain forests in Smyth County, VA; rare (US Endangered, VA Endangered). May-June; July-August. B. lenta var. uber is related very closely to B. lenta var. lenta, and is apparently endemic to Smyth County, VA. In addition to the characters in the key, it differs from B. lenta var. lenta in having the leaves 2-6 cm long (vs. 7-15 cm long), with 4-6 pairs of lateral veins (vs. 8-12 pairs). See Mazzeo (1974), Ogle & Mazzeo (1976), Hayden & Hayden (1984), and McAllister & Ashburner (2004) for additional information on this birch and its history. It

*Betula pendula* Roth, European Weeping Birch, European White Birch. Mt, Pd (VA): persistent and escaping from plantings; rare, introduced from Europe. [= C, F, FNA, K]

*Betula populifolia* Marshall, Gray Birch, White Birch. Mt (NC*, VA): native in old fields and young forests in the Big Meadows area on greenstone (Madison & Page counties, VA), introduced in disturbed areas; rare (native in VA, introduced only in NC) (VA Rare). May-June; June-July. Nova Scotia to s. Québec, south to s. NJ and MD, more or less disjunct in n. VA, s. Ontario, n. OH, and n. IN. [= RAB, C, F, FNA, G, K, W, Y, Z]

Betula papyrifera Marshall, Paper Birch, Canoe Birch, has sometimes been attributed to the Mountains of VA, but apparently these reports are based on *B. cordifolia* (see above). [= FNA, G, Y, Z, = *B. papyrifera* var. *papyrifera* – C, F, K, W]

*Betula pubescens* Ehrhart ssp. *pubescens*, European White Birch, Downy Birch, is reported as an introduction in e. GA (Jones & Coile 1988) and at scattered sites throughout PA (Rhoads & Klein 1993). [= FNA, K; = B. alba Linnaeus – C, F, G, an ambiguous name] [not keyed at this time]

Carpinus Linnaeus 1753 (Hornbeam, Ironwood, Muscle-tree, Water-beech, Blue-beech)

A genus of about 26 species, trees, in the Northern Hemisphere, extending southward to se. Asia and Central America. The smooth gray bark gives *Carpinus* the names "Water-beech" and "Blue-beech", the fluted, sinewy appearance of the trunk the name "Muscle-tree", and the very hard, heavy wood the name "Ironwood." References: Furlow (1990)–Z; Hardin (1971)–Y; Furlow (1987a); Furlow (1987b); Furlow in FNA (1997); Govaerts & Frodin (1998); Kubitzki in Kubitzki, Rohwer, & Bittrich (1993).

1 Leaves narrowly ovate to oblong-ovate, 3-8.5 cm long, 1.5-4.5 cm wide; the apex acute, secondary teeth small and blunt, the lower leaf surface lacking conspicuous dark glands; bracts of the infructescence with rounded to subacute tips and few, blunt teeth; [trees primarily of the Coastal Plain and lower Piedmont].............................................. *C. caroliniana* var. *caroliniana*

1 Leaves ovate to elliptic, 5.5-12.5 cm long, 2.5-6.0 cm wide, usually abruptly narrowed to the tip (sometimes gradually tapered to a long, acuminate apex), the secondary teeth often almost as long as the primary teeth, sharp-tipped, the lower leaf surface with conspicuous dark-brown glands; bracts of the infructescence mostly sharp-tipped and bearing several sharp teeth; [trees primarily of the Mountains and Piedmont]............................................................. *C. caroliniana* var. *virginiana*

Carpinus caroliniana Walter var. *caroliniana*, Coastal American Hornbeam. Cp, Pd (GA, NC, SC, VA), Mt [GA, SC]: streambanks, riverbanks, bottomland forests, lower slopes, maritime forests; common. March-April; September-October. S. NJ, e. MD, and e. VA south to c. peninsular FL, west to e. TX, and north in the inland to s. MO and s. IL. The validity of 2 taxa was established by Furlow (1987a, 1987b) largely through statistical methods. The two taxa have some morphologic and phytogeographic coherence, but intergradation appears to be extensive, and individual specimens (in the herbarium) or trees (in the field) may not be readily identifiable to variety. [= C, F; = *C. caroliniana* ssp. *caroliniana* – FNA, K, X, Z; < *C. caroliniana* – RAB, G, GW, S, Y]


Corylus Linnaeus 1753 (Hazelnut, Filbert)

A genus of about 15-18 species, shrubs and trees, of temperate regions of the Northern Hemisphere. Eurasian species of this genus, *C. avellana* Linnaeus and *C. maxima* P. Miller, are the sources of commercial filberts or hazelnuts. They are sometimes cultivated in North America, especially in the Pacific Northwest. Our wild species are also excellent eating, but wild animals, especially squirrels, usually harvest them before they are ripe. References: Furlow in FNA (1997); Kubitzki in Kubitzki, Rohwer, & Bittrich (1993); Whitcher & Wen (2001); Forest & Bruneau (2000); Govaerts & Frodin (1998).

1 Mature involucre 1.5-3 cm long, the lobes flattened and laciniate; young twigs and petioles stipitate-glandular; [section Corylus, subsection Corylus].................................................................................................................. *C. americana*

1 Mature involucre 4-7 cm long, extended into a tubular beak; young twigs and petioles villous, glandless; [section Corylus, subsection Siphonochlamys]........................................................................ *C. cornuta* var. *cornuta*
**BETULACEAE**


**Ostrya** Scopoli 1760 (Hop-hornbeam, Ironwood)


*Ostrya virginiana* (P. Miller) K. Koch, American Hop-hornbeam, Ironwood. Mt, Pd, Cp (GA, NC, SC, VA): mesic to dry forests, often rocky, especially over basic rocks, reaching high elevations; common. April-May; August-October. Nova Scotia west to Manitoba, south to FL and TX. One of our heaviest and hardest woods. [= RAB, C, FNA, G, S, W, Y, Z; > *O. virginiana* var. *lasia* Fernald – F; > *O. virginiana* var. *virginiana* – F; = *O. virginiana* var. *virginiana* – K]

**BIGNONIACEAE** A.L. de Jussieu 1789 (Bignonia Family)


1 Leaves simple, cordate; plant a tree; corolla white (marked internally with other colors); [tribe *Tecomeae*] ......................... *Catalpa*

1 Leaves pinnately compound; plant a vine; corolla reddish or yellowish.

2 Leaves 7-15-foliolate, with a leaflet in the terminal position; [tribe *Tecomeae*] .................................................. *Campsis*

2 Leaves 2-foliolate, with a 3-branched tendril in the terminal position; [tribe *Bignonieae*].

3 Tendrils not hooked, claw-like............................................................................................................. *Bignonia*

3 Tendrils hooked, claw-like............................................................................................................. *Macfadyena*

**Bignonia** Linnaeus 1753 (Cross-vine)


*Bignonia capreolata* Linnaeus, Cross-vine. Cp, Pd, Mt (GA, NC, SC, VA): swamp forests, bottomlands, forests, woodlands; common (rare in Mountains). April-May; July-August. MD west to s. OH and s. MO, south to s. FL and e. TX. This species is absent from most of the Mountains in our area (also scarce in the Piedmont of Virginia and upper Piedmont of NC), reappearing at lower elevations on the west side of the Blue Ridge. Though primarily a species of swamp and bottomland forests, *Bignonia* often occurs as well in mesic or even dry forests, where it generally remains stunted (most individuals with only a few leaves) and does not flower or fruit. [= C, F, GW, K, W, Z; = *Anisostichus capreolata* (Linnaeus) Bureau – RAB, G; = *Anisostichus crucigera* (Linnaeus) Bureau – S]

**Campsis** Loureiro 1790 (Trumpet Creeper)


*Campsis radicans* (Linnaeus) Seemann ex Bureau, Trumpet-creeper. Cp, Pd, Mt (GA, NC, SC, VA): bottomland forests, swamp forests, fencerows, old fields, forests, thickets, disturbed areas; common. June-July; September-October. NJ west to IA, south to FL and c. TX. In the pre-Columbian landscape this plant was primarily limited to swamps and bottomlands; it has done well as a weedy colonizer of abandoned farmland, fencerows, and thickets (where particularly conspicuous on fenceposts and old tobacco barns). In swamps of the Coastal Plain it is a common liana, often with its foliage in the canopy 30-40 m above the ground, and with stems to 15 cm in diameter. Even when the foliage cannot be seen, *Campsis* is immediately recognizable by its shelly tan or yellow bark (unlike any of our other high-climbing vines). [= RAB, C, F, G, GW, K, W, Z; = *Bignonia radicans* Linnaeus – S]
**BIGNONIACEAE**

*Catalpa* Scopoli 1777 (Catalpa)

A genus of about 10 species, trees, of eastern North America (2 species), e. Asia (4 species), and the West Indies (4 species). References: Manning (2000)=Z; Fischer, Theisen, & Lohmann in Kubitzki (2004).

1 Corolla 2-4 cm wide, the lower corolla lobe entire; pod 6-10 mm thick; seeds with 2 elongated wings, each wing narrowing to an acutish end, the hairs at the end appressed to one another in 2 planes, thus forming a pointed tail..........*C. bignonioides*

1 Corolla 4-6 cm wide, the lower corolla lobe notched; pod 10-15 mm thick; seeds with 2 elongated wings, each wing narrowing only slightly to a rounded or oblique end, the hairs at the end appressed to one another only in one plane, thus forming a flattish fringe .................................................................*C. speciosa*

*Catalpa bignonioides* Walter, Southern Catalpa. Cp (GA, NC*, SC*), Mt*, Pd* (GA, *NC*, SC*, VA*), Cp (NC, SC): bottomlands and streambanks (as a native), escaped or persistent after cultivation; uncommon, introduced from the Gulf Coastal Plain. June; October. The native range was apparently from panhandle FL west to s. MS (or LA?), on the Coastal Plain, early naturalized in a more widespread area, and now extending north to CT and MI. [= RAB, C, F, G, GW, K, W, Z; = C. catalpa (Linnaeus) Karsten – S]

* Catalpa speciosa (Warder) Warder ex Engelmann, Northern Catalpa. Cp, Pd (GA, NC, SC, VA), Mt (NC, SC, VA): escaped or persistent after cultivation, and sometimes thoroughly naturalized; uncommon, introduced from the northern Mississippi River Embayment. May-June; July-August. S. IN and s. IL, south to w. TN and e. AR; early naturalized in a more widespread area. [= RAB, C, F, G, K, S, W, Z]

* Catalpa ovata G. Don, Chinese Catalpa, is introduced in WV, MD, and PA (Manning 2000; Kartesz 1999). [= K, Z] {not keyed at this time}

**Macfadyena** Alphonse de Candolle 1845 (Claw-vine)


* Macfadyena unguis-cati (Linnaeus) A.H. Gentry, Claw-vine, Cat's-claw-vine. Cp (GA, SC): cultivated and naturalized; rare, introduced from tropical America. This vine is introduced and naturalized in s. and e. GA (Jones & Coile 1988) and is locally commonly naturalized in Charleston. [= K, Z; = Bignonia unguis-cati Linnaeus]

**BORAGINACEAE** A.L. de Jussieu 1789 (Borage Family)

[also see HELIOTROPIACEAE]

A family of about 130 genera and ca. 2500 species, herbs, shrubs, and trees, nearly cosmopolitan (Al-Shehbaz 1991). Closely related to the Hydrophyllaceae, and the two may either be combined or subfamily Heliotropoideae elevated to family status as Heliotropiaceae (Ferguson 1998; Diane, Förther, & Hilger 2002; Hilger & Diane 2003). References: Al-Shehbaz (1991)=Z throughout the family. Key to genera based on RAB, C, and Z.

1 Ovary slightly 2-4-lobed, or not at all lobed; style terminal or reduced to a sessile terminal stigma ................................................................. [see Heliotropium in HELIOTROPIACEAE]

1 Ovary deeply 4-parted; style gynobasic; [subfamily Boraginoideae].

2 Mericarps with glochidiate prickles (like grappling hooks), these visible early in development.

3 Mericarps spreading or divergent, attached to the gynobase on the upper third of the mericarp; [tribe Cynoglossae] ............................................................................................................................................................................. *Cynoglossum*

3 Mericarps erect, attached to the gynobase near the middle of the mericarp; [tribe Eritrichieae] ............................................................................................................. *Hackelia*

4 Fruiting pedicels deflexed; plant perennial or biennial................................................................. *Lappula*

4 Fruiting pedicels erect-ascending; plant annual.............................................................................. *Lappula*

2 Mericarps smooth, rugose, or pitted, lacking glochidiate prickles.

5 Corolla rotate, lacking a well-developed tube, blue; [tribe Boragineae]................................................................. *Borago*

5 Corolla with a well-developed tube at least 3 mm long, of various colors (including blue).

6 Corolla lobes distinctly unequal, pink to blue.

7 Stamens equal in length, entirely included within the corolla tube ............................................. *Anchusa*

7 Stamens unequal in length, the longer conspicuously exerted...................................................... *Echium*

6 Corolla lobes equal, of various colors (including pink to blue).

8 Mericarps attached laterally to a pyramidal gynobase.

9 Corolla yellow, the tube 4-5 mm long; corolla throat lacking appendages................................... *Amsinckia*

9 Corolla white (with a yellow eye), or pink to blue, the tube 6-20 mm long; corolla throat with appendages.
Amsinckia Lehmann (Fiddleneck)


Anchusa Linnaeus (Bugloss, Alkanet)


* Anchusa arvensis (Linnaeus) M. Bieberstein, Small Bugloss, Alkanet. Pd (NC, VA): disturbed areas, rare, introduced from Europe. [= C, K; ie Lycopsis arvensis Linnaeus – F, G, S]

Borago Linnaeus (Borage)


* Borago officinalis Linnaeus, Borage. Pd (VA): disturbed areas; rare, introduced from s. Europe. [= C, F, G, K, Z]

Buglossoides Moench (Corn-gromwell)

A genus of about 7 species, herbs or shrubs, of temperate Eurasia. References: Al-Shehbaz (1991)=Z.

* Buglossoides arvensis (Linnaeus) I.M. Johnston ssp. arvensis, Corn-gromwell. Mt (NC, SC, VA), Pd, Cp (GA, NC, SC, VA): roadsides, dry disturbed areas, sandy fields; common, introduced from Eurasia. March-June. Other subspecies are not known to be naturalized in our area. [= Z; ie B. arvensis – K; ie Lithospermum arvense Linnaeus – RAB, C, F, G, S, W]

Cynoglossum Linnaeus (Comfrey)

A genus of about 75 species, herbs, of temperate regions. References: Al-Shehbaz (1991)=Z.

1 Flowering stem with leaves above the first inflorescence branch; corolla reddish-purple; [plant a biennial alien, weedy] ...........
   .................................................. C. officinale

1 Flowering stem leafless above the first branch; corolla blue or white; [plant a perennial native, not weedy].
2 Nutlets 3.5-5 mm; calyx at anthesis 2-2.5 mm long; corolla 6-8 mm wide, the lobes oblong and not overlapping ...........
   .................................................. C. virginianum var. boreale
2 Nutlets 5.5-9 mm; calyx at anthesis (3.0-) 3.5-4.5 mm long; corolla (8-) 10-12 mm wide, the lobes broadly rounded and more or less overlapping.......................................................... C. virginianum var. virginianum


Cynoglossum virginianum Linnaeus var. virginianum, Wild Comfrey. Mt, Pd, Cp (GA, NC, SC, VA): moist deciduous forests; common (rare in Coastal Plain). April-June. Var. virginianum ranges from CT west to OK, south to FL and LA. [= C, K; < C. virginianum – RAB, W; = C. virginicum – F, G, Z; = C. virginicum – S, orthographic error]

Cynoglossum virginianum var. boreale (Fernald) Cooperrider, Northern Hound's-tongue, ranges from New Brunswick west to British Columbia, south to CT, NY, e. PA, n. OH, MI, and MN. Cooperrider (1995) prefers varietal status for this taxon, stating that in OH there are numerous intermediates, while Voss (1996) and Rhoads & Klein (1993) maintain C. boreale at the species level. [= C, K; = C. boreale – F, G, Z]

Echium Linnaeus (Viper's-bugloss, Blueweed)

A genus of about 60 species, herbs, widespread in the Old World. The common name is pronounced "bew-gloss," not "bug-loss," as it refers to an ox's tongue rather than the departure of insects. References: Al-Shehbaz (1991)=Z.

1 Hairs of the stem pustular-based......................................................................................................................................................... [E. pustulatum]
1 Hairs of the stem not pustular-based....................................................................................................................................................... E. vulgare


* Echium pustulatum Sibthorp & Smith, Blue-devil, is reported by F for "N.J. to W.Va.," and by G and K as south to VA. It differs in having pustular-based hairs on the foliage. [= K; = E. vulgare var. pustulatum (Sibthorp & Smith) Coincy – F, G; < E. vulgare – Z]

Hackelia Opiz (Stickseed)


Lappula Moench (Sheepbur)


1 Nutlets with 1 row of marginal prickles.................................................................................................................................................. L. occidentalis var. occidentalis
1 Nutlets with 2-3 rows of marginal prickles........................................................................................................................................... [L. squarrosa]


* Lappula squarrosa (Retzius) Dumortier. Introduced south to MD, WV, KY, and TN. [= C, Z; = L. echinata Gilibert – F, G; = L. lappula (Linnaeus) Karst. – S]

Lithospermum Linnaeus (Gromwell, Puccoon, Stoneseed)

(also see Buglossoides)

1 Calyx strigose, the hairs neither spreading nor uncinate; [mostly of moist to wet habitats].
2 Plant with basal rosette; lower cauline leaves about equal in size to the upper cauline leaves; leaves acute to obtuse.
3 Upper stem internodes mostly 3-6 cm long; leaves mostly >2 cm wide, acuminate
4 Upper stem internodes mostly 1-2 cm long; leaves mostly <2 cm wide, acute

L. tuberosum

2 Calyx with some loose or spreading, uncinate hairs; [of various habitats, mostly dry].
2 Plant lacking basal rosette; lower cauline leaves smaller than the upper cauline leaves; leaves acuminate or acute.
3 Corolla white or yellowish-white, the tube 4-8 mm long.

Mertensia virginica

L. canescens

Lithospermum canescens (Michaux) Lehmann, Hoary Puccoon, Indian-paint. Pd (NC, SC, VA), Mt (GA, VA), Cp? (VA): dry woodlands and glades over calcareous rocks (such as limestone, dolostone) or mafic rocks (such as diabase); uncomum (rare in NC). April-May. Ontario west to Saskatchewan, south to e. NC, nw. GA, AL, and TX. [= RAB, C, F, G, K, W, Y, Z; = Batschia canescens Michaux; S]

Lithospermum caroliniense (Walter ex J.F. Gmelin) MacMillan, Coastal Plain Puccoon. Cpl (GA, SC, VA): sandhills, dry sandy soils; common (rare north of s. SC). April-June. A Southeastern Coastal Plain endemic: se. SC south to FL, and west to TX, on the Southeastern Coastal Plain; disjunct in e. VA. The disjunction from SC to se. VA, skipping over large amounts of apparently suitable sandhill habitat in NC, is surprising. The sibling taxa L. caroliniense and L. croceum have been variously treated as distinct species, subspecies, or varieties, or as mere forms (see synonymy). They appear to be as clearly separable as L. caroliniense is from L. croceum: I regard them as allopatric species. [= F; < L. caroliniense – RAB, G, Z; = L. caroliniense var. caroliniense – C, K; = Batschia caroliniensis Walter ex J.F. Gmelin – S; = L. caroliniense ssp. caroliniense – Y]


Lithospermum croceum Fernald ranges from Ontario west to MT, south to w. PA, n. OH, AR, OK, and CO. Reports by Kartesz (1999) for WV, KY, and TN have not been verified. [= F; = L. caroliniense (Walter ex J.F. Gmelin) MacMillan var. croceum (Fernald) Cronquist – C, K; < L. caroliniense – G, Z; = L. caroliniense ssp. croceum A.W. Cusick – Y]


Mertensia Roth (Bluebell)


Myosotis Linnaeus (Forget-me-not, Scorpion-grass)

A genus of about 100 species, temperate and montane tropical. References: Al-Shehbaz (1991)=Z. Key based closely on RAB and C.

1 Calyx strigose, the hairs neither spreading nor uncinate; [mostly of moist to wet habitats].
1 Calyx with some loose or spreading, uncinate hairs; [of various habitats, mostly dry].
3 Corolla limb 5-8 mm wide; perennial ................................................................. M. sylvatica
3 Calyx limb 1-4 mm wide; annual or biennial.
4 Calyx lobes unequal, 3 lobes shorter than the other 2; corolla white; [native, of dry or moist habitats].
5 Fruiting pedicels divergent; fruiting calyx deciduous, 3-10 mm long; inflorescence internodes usually longer than 10 mm; mericarps 1.4-2.2 mm long.................................................................*M. macrosperma*

5 Fruiting pedicels more-or-less erect; fruiting calyx persistent, 3.5-5.5 mm long; inflorescence internodes usually shorter than 10 mm; mericarps 1.2-1.5 mm long .................................................................*M. verna*

4 Calyx lobes equal, all 5 the same size; corolla blue (occasionally yellow or white); [alien, mostly of dry disturbed habitats].
6 Fruiting pedicels equaling or generally longer than the calyx.........................................................*M. arvensis*

6 Fruiting pedicels distinctly shorter than the calyx.
7 Plants floriferous from about the middle upward; style surpassing the mericarps..............*M. discolor*

7 Plants floriferous nearly to the base; style shorter than the mericarps........................................*M. stricta*


*Myosotis sylvatica* Ehrike x Hoffman, Garden Forget-me-not. Pd (NC): gardens, rarely persistent or found as a waif; rare, introduced from Eurasia. April-September. [= RAB, C, F, G, K, Z]

*Myosotis verna* Nuttall, Early Forget-me-not. Cp, Pd, Mt (GA, NC, SC, VA): dry woodlands, roadsides, disturbed areas, dry fields; common. March-July. ME west to SD, south to GA and TX; also from ID and British Columbia south to OR. [= RAB, C, F, G, K, W, Z; = M. virginica – S, misapplied]

**Onosmodium** Linnaeus (Marbleseed, False-gromwell)

A genus of about 7 species (or fewer species and the same number of taxa in some interpretations), perennial herbs, of North America. References: Cochran (1976)=X; Turner (1995a)=Y; Al-Shehbaz (1991)=Z. Key based in part on X and Y.

1 Corolla lobes yellow to orange; nutlet 2.0-2.8 mm long; corolla lobes either 2.5-4× as long as wide and acuminated (*O. virginianum*) or 1.5-2× as long as wide, acute (*O. decipiens*).

2 Stem hairs 2.5-5.0 mm long; corolla lobes 1.5-2× as long as wide, acute; tips of the anthers reaching the base of the corolla sinuses; [endemic to Ketona dolomite glades, Bibb County, c. AL].................................[*O. decipiens*]

2 Stem hairs < 2.0 mm long; corolla lobes 2.5-4× as long as wide and acuminated; tips of the anthers below the corolla sinuses; [widespread in our area] ........................................................... ..................

3 Leaf vestiture solely of dense appressed hairs on both surfaces (the plant appearing ashy-white) .................... [*O. molle*]

3 Leaf vestiture at least in part of spreading or ascending hairs.
4 Stems mostly glabrous below the inflorescence branches .........................................................[*O. subsetosum*]

4 Stems persistently and obviously pubescent below the inflorescence branches.
5 Corolla 6-10 mm long; nutlets flared at the base, forming a collar; longest stem hairs near midstem > 2.3 mm long .................................................................................................................... *O. hispidissimum*

5 Corolla 11-20 mm long; nutlets tapered to the base, lacking a collar; longest stem hairs near midstem < 2.2 mm long .................................................................................................................... *O. occidentale*

**Onosmodium hispidissimum** Mackenzie, Eastern Prairie Marbleseed, Shaggy Marbleseed. Mt (VA): calcareous woodlands, barrens, and glades, and nearby in disturbed areas, such as older pasture edges; rare. June-July. W. NY and Ontario west to MN, south to SC. PA (Rhoads & Klein 1993), w. VA, e. TN (Chester, Wofford, & Kral 1997), LA, and TX. This species was attributed to NC by F and S; the documentation of these reports is not known. [= G, S, W; = O. molle Michaux var. hispidissimum (Mackenzie) Cronquist – C; > O. hispidissimum var. hispidissimum – F; > O. hispidissimum var. macropermum Mackenzie & Bush – F; = O. molle Michauxssp. hispidissimum (Mackenzie) Boivin – K, X, Z; = O. bejariense Alphonse de Candolle sp. hispidissimum (Mackenzie) B.L. Turner – Y]

**Onosmodium occidentale** Mackenzie. Mt (GA): open woodlands over limestone; rare (GA Special Concern). Ranges east to e. TN (Chester, Wofford, & Kral 1997) and nw. GA (Jones & Coile 1988). [= F, G; O. molle Michaux var. occidentale]
Onosmodium virginianum (Linnaeus) Alphonse de Candolle, Virginia Marbleseed. Cp, Pd, Mt (GA, NC, SC, VA):
sandhill woodlands, shell middens in the outer Coastal Plain, woodlands and barrens over diabase and other mafic rocks in the
Piedmont and low Mountains, barrens, glades, or woodlands over calcareous rocks in the Mountains; uncommon, rare in NC and VA (NC Watch List, VA Rare). April-September. LA to FL, north to NY and MA, primarily on the Coastal Plain; the species has become very rare north of NC. It is peculiarly distributed in our area, occurring on highly acidic sands in the fall-line sandhills, but seemingly restricted to circumneutral soils derived from mafic rocks (Piedmont), calcareous rocks (Mountains), or calcareous shell (Coastal Plain) in the rest of our area. The unifying ecological factor determining its distribution may be an open, woodland condition maintained by fire. The species seems characteristically to occur in very small populations, consisting often of fewer than five plants. [= RAB, C, F, G, K, S, W, Y, Z]


Onosmodium molle Michaux. Limestone barrens. C. KY, c. TN (Chester, Wofford, & Kral 1997), nw. AL, and disjunct in the Ozarkian Highlands of MO. O. molle was attributed to our area (Durham County, NC) (RAB); Baskin et al. (1983) determined that this report was based on a misidentification of a specimen of O. virginianum. [= F, G; = O. molle var. molle – C; = O. molle ssp. molle – K, X, Z; < O. molle – S]


Plagiobothrys Fischer & C.A. Meyer (Popcorn-flower)


Symphytum Linnaeus (Comfrey)


1 Upper leaves not decurrent, or decurrent < 1 cm below the leaf attachment; pubescence of stem in part of strong, recurved
prickles (resembling miniature rose thorns).................................................................................... [S. asperum]
1 Upper leaves decurrent on the stem; pubescence of the stem not of prickles................................................... S. officinale

* Symphytum officinale Linnaeus, Common Comfrey. Mt (GA, VA), Pd (VA): disturbed areas; uncommon, introduced from Europe. Symphytum is a traditional "medicinal herb," but recent evidence suggests that it can cause dangerous (even fatal) liver damage. [= C, F, G, K, S, Z]

* Symphytum asperum Lepechin, Prickly Comfrey, another Eurasian species, is reported by F as occurring south to MD. It may occur in our area. [= C, F, G, K, Z]

BRASSICACEAE Burnett 1835 or CRUCIFERAE A.L. de Jussieu 1789 (Mustard Family)

A family of about 340 genera and 3400 species, annuals, perennials, shrubs, and rarely trees and vines, of cosmopolitan

Alliaria Heister ex Fabricius 1759 (Garlic Mustard)

A genus of 2 species, annual or biennial herbs, of Eurasia. References: Rollins (1993)=Z; Al-Shehbaz (1988b)=Y.

* Alliaria petiolata (Bieberstein) Cavara & Grande, Garlic Mustard, Hedge Garlic. Mt (NC, VA), Pd, Cp (VA) {GA, SC}:
mother forests in bottomlands and on slopes; common (uncommon in VA Piedmont, rare in NC and VA Coastal Plain), introduced from Europe. April-May; May-June. This species has become a noxious weed in ne. United States, invading undisturbed moist


Arabidopsis Heynhold (Mouse-ear Cress)


1 Fruit strongly flattened; petals 6-10 mm long; [native perennial, of calcareous and mafic rock outcrops].................................A. lyrata ssp. lyrata
   1 Fruit terete; petals 2-4 mm long; [alien annual, of disturbed, weedy sites].........................................................A. thaliana


* Arabis thaliana* (Linnaeus) Heynhold, Mouse-ear Cress. Cp, Pd, Mt (GA, NC, SC, VA): disturbed areas, fields, roadsides, lawns; common, introduced from Eurasia. March-May. Arabidopsis thaliana has sometimes been referred to as the white mouse of the vascular plant world, having been very extensively used as an experimental plant; a journal, the Arabidopsis Information Service, publishes annual bibliographies of studies using this plant. [= RAB, C, F, G, K, S, W, X, Y, Z]

Arabis Linnaeus 1753 (Rockcress)

(see also Arabidopsis, Boechera, Turritis)

The circumscription of *Arabis* is in flux; there is increasing evidence that the broad circumscription employed in most North American floras includes discordant elements. Based on molecular phylogenetic studies and morphology, *Arabis* in our area should be divided into 4 genera, as follows: *Arabidopsis* (A. *lyrata*); *Arabis* sensu stricto (n=8) (*A. hirsuta* var. *adpressipilis*, *A. hirsuta* var. *pycnocarpa*, *A. georgiana*); *Boechera* Löve & Löve (n=7) (*A. canadensis*, *A. drummondi*, *A. laevigata* var. *burkii*, *A. laevigata* var. *laevigata*, *A. missouriensis*, *A. patens*, *A. perstellata* var. *ampla*, *A. serotina*, *A. shortii*); and *Turritis* (*A. glabra* var. *glabra*). References: Hopkins (1937)=Z; Rollins (1993)=Y; Wieboldt (1987); Al-Shehbaz (1988a)=X; Koch, Bishop, & Mitchell-Olds (1999); Koch & Al-Shehbaz (2002).

1 Plants matted from a branching caudex, perennial; [cultivated and rarely persistent or escaped].........................[*A. caucasica*]
   1 Plants unbranched, biennial; [native to our area].
      2 Petals 6-9 mm long; siliques (4.5-) 5-7 cm long; [endemic to w. GA and c. AL].................................[*A. georgiana*]
      2 Petals 3-5 mm long; siliques 3-6 cm long; [collectively known from NC, TN, VA, and northward and westward from those states].
      3 Stem pubescence primarily appressed and of 2-armed or dolabriform hairs...........[*A. pycnocarpa* var. *adpressipilis*]
      3 Stem pubescence primarily spreading and of simple hairs..........................[*A. pycnocarpa* var. *pycnocarpa*]

*Arabis georgiana* Harper, Georgia Rockcress. Mt, Pd, Cp (GA): nutrient-rich streambanks and rock outcrops; rare (US Candidate, GA Threatened). April-May; May-early July. Endemic to n. and sw. GA and c. AL. It differs from our other species by the following combination of characters: fruits 5-7 cm long, borne appressed to ascending, leaves with bifurcate, trifurcate, or stellate hairs. See Patrick, Allison, & Krakow (1995). [= K, Y, Z]

*Arabis pycnocarpa* M. Hopkins var. *adpressipilis* M. Hopkins, Slender Rockcress, Hairy Rockcress. Pd (NC), Mt (NC, VA): thin soils near outcrops of mafic or other rock weathering to nutrient-rich soils; rare (NC Rare, VA Rare). April-May; May-June. Var. *adpressipilis* ranges from OH to IL, south to AR, c. TN, and LA; disjunct east of the mountains in NC. Related to, but specifically distinct from, *A. hirsuta* (Linnaeus) Scopoli of Europe and *A. eschscholtziana* Andrzejowski in Ledebour of w. North America. [= Z; = *A. hirsuta* (Linnaeus) Scopoli var. *adpressipilis* (M. Hopkins) Rollins – C, F, G, X, Y; < *A. hirsuta* var. *pycnocarpa* (M. Hopkins) Rollins – K; > *A. ovata* Michaux – S)

_Arabis pycnocarpa_ M. Hopkins var. _pycnocarpa_. Québec west to AK, south to e. and sw. PA (Rhoads & Klein 1993), AR, and AZ, primarily west of the Blue Ridge. Reports of this taxon from GA (Fernald 1950, Kartesz 1999, Hopkins 1937) are based on material collected by A.W. Chapman near Rome, and later described as _Arabis georgiana_. (See discussion under _A. pycnocarpa_ var. _adpressipilis._) [= _A. hirsuta_ (Linnaeus) Scopoli var. _pycnocarpa_ (M. Hopkins) Rollins – C, F, G, X, Y; < _A. hirsuta_ (Linnaeus) Scopoli var. _pycnocarpa_ – K (also see var. _adpressipilis_); = _A. pycnocarpa_ M. Hopkins var. _typica_ – Z]

_Armoracia_ Gaertner, Meyer, & Scherbius 1800 (Horseradish, Lake Cress)
(also see Neobeckia)


1 Plant aquatic; stem submersed or prostrate; fruit unilocular ...............................................................
[see _Neobeckia aquatica_]

1 Plant terrestrial; stem erect; fruit bilocular............................................................................... ...............................


_Barbarea_ R. Brown 1812 (Winter-cress, Creasy Greens)


1 Basal leaves with 4-10 pairs of lateral lobes; siliques 4.5-7 cm long; pedicels 1.2-1.8 mm thick............................. ......

1 Basal leaves with 1-4 pairs of lateral lobes; siliques 1.5-3 cm long; pedicels 0.5-1.0 mm thick........................................


_Berteroa_ Augustin de Candolle 1821 (Hoary Alyssum)

A genus of about 5 species, annual or perennial herbs, of Europe and the Middle East. References: Rollins (1993)=Z; Al-Shehbaz (1987)=Y.

* Berteroa incana_ (Linnaeus) Augustin de Candolle, Hoary Alyssum. Pd, Mt (VA): disturbed areas; uncommon, introduced from Europe. [= C, F, G, K, Y, Z]

_Boechera_ Löve & Löve 1975 (Rockcress)


1 Pedicels of flowers or fruits deflexed........................................................................................................... _B. canadensis_

1 Pedicels of flowers or fruits erect, ascending, or spreading.

2 Mature fruits < 4 cm long; stems branched or simple at the base.

3 Stem leaves (most of them) < 5 mm wide; stems branched at the base..........................[see _Arabidopsis lyrata_ ssp. _lyrata_]

3 Stem leaves (most of them) > 8 mm wide; stems simple at the base.

4 Lower cauline leaves glabrous or sparsely pubescent on the upper surface; fruits erect and appressed, 3-5 cm long ...............................................................
[see _Arabis_]
4 Lower cauline leaves hirsute or strigose on the upper surface; fruits widely ascending or spreading. 1.5-4 cm long.

5 Petals 6-9 mm long; fruiting pedicels 10-16 mm long; mature fruits 2.5-4 cm long; pubescence of the lower leaf surface simple; seeds winged .............................................. \textit{B. patens}

5 Petals 2-5 mm long; fruiting pedicels 2-10 (-13) mm long; mature fruits 1.5-3 cm long; pubescence of the leaf surface stellate; seeds wingless.

6 Petals 3-5 mm long, pink or purplish; fruiting pedicels 5-10 (-13) mm long; siliques 1.5-2 cm long; pubescence of the upper leaf surface stellate.............................................. \textit{[B. perstellata]}

6 Petals 2-3 mm long, white to cream; fruiting pedicels 2-3.5 mm long; siliques 1.5-3 cm long; pubescence of the upper leaf surface simple.............................................. \textit{B. shortii}

2 Mature fruits > 4 cm long; stems generally simple at the base.

7 Fruits erect, pressed against the stem, the fruiting inflorescence < 2 cm in diameter.

8 Mature fruits terete, (4-) 7-9.5 cm long; basal leaves 5-12 cm long, stellate pubescent; cauline leaves 4-12 cm long; pubescence of the stem mostly of spreading, simple hairs .......................................... \textit{[see Turritis]}

8 Mature fruits flat, 1.5-10 cm long; basal leaves 2-8 cm long, nearly glabrous; cauline leaves 1-4 cm long; pubescence of the stem mostly of appressed, forked hairs.

9 Mature fruits 4-10 cm long, 1.5-2.5 mm wide, with 2 rows of seeds in each locule ................. \textit{[B. stricta]}

9 Mature fruits 1.5-7 cm long, 0.7-1.1 mm wide, with 1 row of seeds in each locule ................. \textit{[see Arabis]}

7 Fruits ascending to spreading (not erect and pressed against the stem), the fruiting inflorescence > 4 cm in diameter.

10 Cauline leaves not at all auricled or sagittate-clasping at the base.

11 Calyx 2.9-4.8 mm long; plant flowering April-May; plant unbranched or with 1-3 branches (sometimes more if the main stem damaged), the inflorescence thus a raceme or slightly paniculate; mature fruits 5.2-9.8 cm long; seeds with wing 0.2-0.5 mm wide.............................................. \textit{B. laevigata} var. 1

11 Calyx 2.0-3.3 mm long; plant flowering mid-July-September; plant with numerous branches (well-developed plants usually with at least 10), the inflorescence thus a diffuse panicle; mature fruits 4.3-8.0 cm long; seeds with wing 0.1-0.2 mm wide .............................................. \textit{B. sp. 1}

10 Cauline leaves auricled or sagittate-clasping at the base.

12 Mature fruits 2.5-4.5 cm long.............................................................. \textit{B. patens}

12 Mature fruits 5-10 cm long.

13 Basal leaves subentire to serrate or sinuate-serrate; petals white, to 5 mm long, equalling or slightly surpassing the sepals; longest cauline leaves usually 8-18 cm long; plant glaucous ................. \textit{B. laevigata} var. \textit{laevigata}

13 Basal leaves sharply serrate-dentate to strongly laciniate or lyrate-pinnatifid; petals creamy-white, to 8 mm long, about 2× the length of the sepals; longest cauline leaves usually 3-5 cm long; plant green or red-tinged .......................................................... \textit{B. missouriensis}
nutrient-rich seepage from amphibolite at Chimney Rock, Rutherford County. [= Q; = Arabis patens Sullivant – RAB, C, F, G, K, S, W, X, Y, Z]

Boechera shortii (Fernald) Al-Shehbaz. Pd (VA): nutrient-rich alluvial and river bluff forests (along the Potomac River in our area); rare (VA Rare). April-May. NY west to MN, south to n. VA, nc. TN (Chester, Wofford, & Kral 1997), and AR. [= Q; = Arabis shortii (Fernald) Gleason – C, G, K, X, Y; = A. perstellata E.L. Braun var. shortii Fernald – F; = A. dentata (Torrey) Torrey & A. Gray – S, Z (name preoccupied); > A. shortii var. phalacrocarpa (M. Hopkins) Steyermark]

Boechera sp. 1, Shale Barren Rockcress. Mt (VA): shale barrens; rare (US Endangered, VA Threatened). Mid-July-September. Endemic to Devonian and Ordovician shales of w. VA and e. WV. Wieboldt (1987) has clarified the taxonomy of this species and A. laevigata var. burkii. Also see Porter & Wieboldt (1991) for further discussion. [= Arabis serotina Steele – C, K, X, Y; < A. laevigata var. burkii – F, G, Z (included within concept of A. laevigata var. burkii by Z and most earlier floras); < Boechera laevigata – Q]

Boechera perstellata (E.L. Braun) Al-Shehbaz is apparently endemic to KY and c. TN (Chester, Wofford, & Kral 1997). [= Q; = Arabis perstellata – K, Y; > Arabis perstellata E.L. Braun var. perstellata – X; > Arabis perstellata E.L. Braun var. ampla Rollins – X]

Boechera stricta (Graham) Al-Shehbaz. Labrador and AK south to NJ, DE, OH, IL, NM, AZ, and CA. [= Q; = Arabis drummondii A. Gray – C, F, G, K, Y; > A. drummondii A. Gray var. typica – Z; = Boechera drummondii (A. Gray) Löve & Löve, illegitimate name]

Brassica Linnaeus 1753 (Mustard, Turnip, Rape, Cabbage, Collard Greens, Kale, Broccoli, Cauliflower, Kohlrabi, Rutabaga, Bok-Choy, Chinese Cabbage, Brussels Sprouts) (also see Erucastrum, Sinapis)

A genus of about 40 species, herbs, of the Old World. References: Rollins (1993)=Z; Al-Shehbaz (1985b)=Y. Key adapted from Z.

1 Upper cauline leaves auriculate, slightly to strongly clasping the stem; [section Rapa].
2 Petals 10-18 mm long, dark yellow; beak of the silique usually 7-10 mm long; plant usually glaucous; siliques 5-10 cm long ........................................................................................................................ ..........................
2 Petals 6-10 (-11) mm long, pale yellow; beaks of the siliques usually 10-15 mm long; plant usually green; siliques 3-7 cm long .......................................................................................................................... ..........................................
1 Upper cauline leaves petiolar, or sessile and cuneate.
3 Pedicels and siliques widely spreading to divaricately ascending; siliques 2-4 cm long, terete or nearly so; [section Rapa] ........................................................................................................................................... Br. napus
3 Pedicels and siliques erect and appressed to the rachis; siliques 1-2 cm long, more-or-less 4angled; [section Melanosinapis] ........................................................................................................................................... Br. juncea

* Brassica juncea (Linnaeus) Czern., Leaf Mustard, Brown Mustard, Indian Mustard, Mustard Greens, Chinese Mustard. Cp (GA, SC, VA), Mt (NC, SC, VA), Pd (SC, VA): fields, disturbed areas; uncommon, introduced from Eurasia. April-June. This species is apparently a recently derived polyploid of B. nigra and B. rapa. The seeds of this species are one source of table mustard; other components include B. nigra and Sinapis alba. [= RAB, C, G, K, W, Y, Z; > B. juncea – S; > B. japonica Thunberg – S]

* Brassica napus Linnaeus, Rutabaga, Rape, Canola, Colza, Swede. Mt, Pd (GA, NC, SC, VA?), Cpx (SC): fields, disturbed areas; rare, introduced from Eurasia. May-July. This species is apparently a recently derived polyploid of B. oleracea and B. rapa. The seeds of this species are the source of "canola" oil, the name recently coined by marketers from "Canadian" and "oil" to avoid the negative connotation of "rape." [= K, W, Y, Z; < B. napus – RAB (also see B. rapa)]

* Brassica nigra (Linnaeus) W.D.J. Koch, Black Mustard, Charlock. Cpx, Pd, Mt (VA) {NC}: fields, disturbed areas; uncommon, introduced from Eurasia. May-August. The seeds of this species are one source of table mustard; other components include B. juncea and Sinapis alba. [= C, F, G, K, S, Y, Z; < Sinapis nigra Linnaeus]

* Brassica rapa Linnaeus var. rapa, Turnip, Bird's-scape, Field Rape, Field Mustard, Bok-choy, Chinese Cabbage. Mt (GA, NC, SC, VA), Pd (NC, VA), Cpx (NC, SC, VA): fields, disturbed areas; common, introduced from Europe. March-June. B. rapa is cultivated in a variety of forms, B. rapa var. chinensis (Linnaeus) Kitam. (Bok-choy or Pak-choi) and B. rapa var. amplexicaulis Tanaka & Ono (Chinese Cabbage). [= K; < B. rapa – C, Y, Z; < B. napus – RAB; > B. rapa – G; > B. campestris Linnaeus – G, S]

* Brassica oleracea Linnaeus is commonly cultivated in our area in a variety of forms, including B. oleracea var. acephala Augustin de Candolle (Collard Greens, Kale), B. oleracea var. capitata Linnaeus (Cabbage), B. oleracea var. italicana Plenck (Broccoli), B. oleracea var. botrytis Linnaeus (Cauliflower), B. oleracea var. gemmifera Zenk (Brussels Sprouts), and B. oleracea var. gongylodes Linnaeus (Kohlrabi). [= K] {not keyed}


_Bunias_ Linnaeus 1753 (Warty-cabbage)


1 Plant an annual; cauline leaves < 5 cm long; siliques 10-12 mm long, more-or-less straight, 4-winged, spiny; seeds 3-4 per siliquen................................................................. _B. erucago_
1 Plant a perennial; cauline leaves > 10 cm long; siliques 5-10 mm long, usually curved, not winged, verrucose; seeds 1 per siliquen................................................................. _B. orientalis_

* *Bunias erucago* Linnaeus, Southern Warty-cabbage. Cp? (VA): disturbed areas; rare, introduced from Europe. April-June. [= C, K, Z]

_Cakile_ P. Miller 1754 (Sea Rocket)


Identification notes: The siliques of _Cakile_ are divided near their middle by an abscission zone into two halves, each with a single seed: the upper abscises and disperses by water or wind, the lower remains attached to the parent plant. The size of the two segments and the contour of the abscised surface remaining on the lower segment are important taxonomic characters.

1 Lower silique segment with 2 opposite lateral horns or wings on the sides prolonged upward into sharp triangular wedges, concave in between; petals lavender (rarely white), 8-14 mm long, 3-6 mm wide; most of the leaves deeply pinnatifid into 6-9 lobes................................................................. _C. maritima_ ssp. _maritima_.
1 Lower silique segment without lateral horns, triangular wedges absent to 1.5 mm high; petals white (rarely lavender), 4-10 mm long, 1.4-3 mm wide; most of the leaves with a few to many irregular teeth (or pinnatifid in _C. lanceolata_ ssp. _pseudoconstricta_).

2 Infructescences usually >20 cm long; [of the Gulf Coast] ................................................................. _C. lanceolata_ ssp. _pseudoconstricta_.
2 Infructescences 10-20 cm long; [collectively widespread].
3 Siliques 3-4 mm wide, the beak conical and acute at the apex; [of the Gulf Coast]................................................................. _C. constricta_.
3 Siliques 5-9 mm wide, the beak somewhat flattened and typically rather blunt; [of the Atlantic Coast].
4 Upper fruit segment 7-15 mm long, 4-angled (to weakly 8-ribbed); articulating surface of lower fruit segment flat to concave and with 2 (-6) small teeth projecting upward or the sides prolonged upward into 2 opposite triangular wedges; [of NC northward to Labrador] ................................................................. _C. edentula_.
4 Upper fruit segment 12-20 mm long, 8-ribbed; articulating surface of lower fruit segment flat (to slightly convex or concave) and without teeth; [of NC southward to St. Lucie County, FL].............................. _C. harperi_.

_Cakile edentula_ (Bigelow) Hooker, Northeastern Sea Rocket. Cp (NC, VA): beaches, at or near the wrack line; common. May-June (-October). Labrador south to NC; introduced in various other shores around the world, including w. North America and Australia. See _C. harperi_ for discussion of the relation between these taxa. [= RAB, S; = _C. edentula_ var. _edentula_ – C, F, G; = _C. edentula_ ssp. _edentula_ – GW; = _C. edentula_ ssp. _edentula_ var. _edentula_ – K, X, Y, Z]

_Cakile harperi_ Small, Southeastern Sea Rocket. Cp (GA, NC, SC): beaches, at or near the wrack line; common. May-June (-October). A Southeastern Coastal Plain endemic: e. NC south to the east coast of peninsular FL. Rodman (1974) and most authors since have treated _C. harperi_ as _C. edentula_ ssp. _harperi_ (Small) Rodman. Rodman further treats the Great Lakes and ne. United States coastal populations (respectively) as _C. edentula_ ssp. _edentula_ var. _lacustris_ Fernald and _C. edentula_ ssp. _edentula_ var. _edentula_. Rodman points out the morphologic distinctions between the three taxa, the chemical differences between "edentula" and "harperi," and the rarity or absence of intermediates in areas of pairwise overlap between the 3 entities. The geographic / morphologic pattern is not clinal, but is rather a sharp step function, with an overlap in the distribution of (and rare hybridization between) two largely distinct taxa. The few intermediates can be interpreted as hybrids or very limited and local introgression between otherwise distinct (though related) taxa. _C. harperi_ shows greater chemical similarity to _C. constricta_ Rodman and _C. lanceolata_ (Willdenow) O.E. Schultz than to _C. edentula_, and also shows some morphologic affinities with these more southern taxa. For these reasons I prefer the simplicity of treating the three taxa as binomial species. [= RAB, S; = _C. edentula_ (Bigelow) Hooker ssp. _harperi_ (Small) Rodman – GW, K, X, Y, Z]
*Cakile maritima* Scopoli, European Sea Rocket. Cp (NC, VA): beaches, at or near the wrack line; uncommon, introduced from Europe. The other subspecies are also European but are apparently not introduced in our area. The NC location was on ballast at Wilmington, and is apparently not persistent. VA locations are, however, well-established. [= X, Y; < *C. maritima* – C, F, G, K, Z; = *C. cakile* (Linnaeus) Karstens – S]

*Cakile constricta* Rodman, Gulf Coast Sea Rocket. Beaches, coastal sands. February-October. FL, AL, MS, LA, TX. [= GW, K, X, Y, Z]


*Calepina* Adanson 1763


* Calepina irregularis* (Asso) Thellung. Mt (NC), Pd, Cp (VA): fields, disturbed areas; rare, introduced from Eurasia. April. [= RAB, C, K, Y, Z]

*Camelina* Crantz 1762 (Gold-of-pleasure, False-flax)


1 Siliques 4-7 mm long; leaves and stem rough-hairy, the stellate trichomes exceeded by simple trichomes (which are 1-2 mm long).......................................................................................................................... ........................................... *C. microcarpa*

2 Plants entirely glabrous; leaflets highly dissected with linear to filiform segments; [in our area known from Piedmont of NC and VA]......................................................................................................................... ........................................... *C. sativa*


*Capsella* Medikus 1792 (Shepherd's Purse)

A monotypic genus, an annual or biennial herb, of Europe. References: Rollins (1993)=Z; Al-Shehbaz (1986)=Y.

* Capsella bursa-pastoris* (Linnaeus) Medikus, Common Shepherd's Purse. Cp (NC, SC, VA), Mt (NC, VA), Pd (GA, NC, VA): fields, roadsides, disturbed areas; common, introduced from Europe. March-June. *C. rubella* Reuter, Pink Shepherd's Purse, is sometimes distinguished (as by F, G, Stace 1997), and occurs in our area. It is alleged to be diploid (vs. tetraploid), to have pink petals 1-2 mm long (vs. white, 2-3 mm long), and lateral margins of the fruit concave (vs. straight to convex). Al-Shehbaz (1986) considered the character correlations to be poor, not warranting taxonomic recognition. [= RAB, C, K, W, Y, Z; > *C. bursa-pastoris* – F, G; > *C. rubella* Reuter – F, G; > *C. gracilis* Gren. – F; = Bursa bursa-pastoris* (Linnaeus) Britton – S]

*Cardamine* Linnaeus 1753 (Bittercress, Toothwort)


1 Leaves palmately divided (if 1-ternate, then palmately so, the terminal leaflets on a petiolule the same length as the those of the lateral leaflets); [Dentaria].

2 Plants entirely glabrous; leaflets highly dissected with linear to filiform segments; [in our area known from Piedmont of NC and VA].......................................................................................................................... ........................................... *C. dissecta*

3 Rhizome toothed, not fragile, and rarely breaking into irregular segments.

4 Trichomes of leaf margins appressed and ca. 0.1 mm long; cauline leaves usually 2................................. *C. diphylla*

3 Rhizome toothless or only obscurely toothed, fragile and readily breaking into narrowly fusiform, oblong, or linear segments.
5 Trichomes of the leaf margin appressed and ca. 0.1 mm long; lateral leaflets of the cauline leaves typically not lobed, or shallowly and irregularly lobed. \textit{C. angustata}.
5 Trichomes of the leaf margin erect and ca. 0.2-0.3 mm long; lateral leaflets of the cauline leaves frequently deeply 2-lobed. \textit{C. concatentata}.

1 Leaves simple, pinnately lobed, or pinnately divided (if 1-ternate, then pinnately so, the terminal leaflet on a longer petiolule than those of the lateral leaflets); [\textit{Cardamine}].
6 Cauline leaves simple, sometimes the lower to middle cauline leaves with 1-2 pairs of very small lateral lobes.
7 Plant from a tuberous or bulbous base, erect and generally unbranched, not stoloniferous or rooting down from upper nodes after flowering; petals 7-20 mm long.
8 Stem glabrous; corolla white, rarely pink; stem leaves 4-12; silique 1.5-3 cm long, plus a 3-7 mm beak. \textit{C. bulbosa}.
8 Stem cinereous-pubescent; corolla pink to lavender, rarely white; stem leaves 2-5; silique 1-2 cm long, plus a 2-4 mm beak. \textit{C. douglasi}. 

7 Plant from a fibrous root system, frequently much branched from the base, some of the branches becoming stoloniferous and rooting down at the upper nodes after flowering; petals 2-10 mm long or absent.
9 Petals absent or present, if present 0.7-2 mm long; silique 5-10 (-15) mm long, plus a 0.5-1.0 mm beak, on thick pedicels 1-3 (-6) mm long. \textit{C. longii}.
9 Petals present, 2-10 mm long; silique 8-21 cm long, plus a 1-3 mm beak, on slender pedicels 10-20 mm long.
10 Petals 5-10 mm long, the tips spreading or ascending; anthers oblong, about 1 mm long; stylar beak of the silique 2-3 mm; mid-cauline and upper cauline leaves cordate, often clasping around the stem or branch; basal leaves with 0-1 pairs of lateral leaflets. \textit{C. rotundifolia}.
10 Petals 3-5 mm long, the tips ascending or erect; anthers orbicular, ca. 0.3 mm across; stylar beak of the silique 1-1.5 mm; mid-cauline and upper cauline leaves cuneate, rounded, or truncate (rarely the mid-cauline leaves subcordate, but not clasping); basal leaves with 1-3 pairs of lateral leaflets. \textit{C. micranthera}. 

6 Cauline leaves 1-ternate or pinnatifid (if 1-ternate, the lateral leaflets about as large as the terminal leaflet).
11 Cauline leaves with 3-5 leaflets; petals 4-10 mm long; plant a perennial.
12 Stem glabrous; lower leaves green underneath; petiole auriculate at the base, the auricles 1-5 mm long, acute to acuminate; leaves 3-5-foliolate; siliques 22-40 mm long. \textit{C. clematiitis}.
12 Stem pubescent at base; lower leaves purple underneath; petioles not auriculate at the base; leaves 3-5-foliolate; siliques 10-25 mm long.
13 Petals 6-9 mm long; stamens shorter than the petals by 1 mm or more; sepals 3-4 mm long; filaments obviously flattened. \textit{C. flagellifera var. flagellifera}.
13 Petals 4-6 mm long; stamens equaling to slightly exceeding the petals; sepals 2.5-3.5 mm long; filaments terete to somewhat flattened. \textit{C. flagellifera var. hugeri}.

11 Cauline leaves with 7-numerous leaflets; petals 1-4 mm long or absent (8-15 mm long in \textit{C. pratensis} var. \textit{palustris}); plant an annual, biennial, or perennial.
14 Petals 8-15 mm long. \textit{C. pratensis var. pratensis}.
14 Petals 1-4 mm long or absent.
15 Cauline leaves with prolonged sagittate-auriculate bases, the 13-19 leaflets acuminate. \textit{C. impatiens}.
15 Cauline leaves without basal auricles, the 5-15 (-17) leaflets mostly obtuse.
16 Plant with many, persistent basal leaves forming a rosette; stem bases and petioles hirsute.
16 Plant with few or no basal leaves, not forming a rosette; stem bases and petioles glabrous (or sparsely hirsute).
17 Siliques <1 mm wide. \textit{C. debilis}.
17 Siliques >1 mm wide. \textit{C. parviflora var. arenicola}.
18 Cauline leaves 2-4 cm long; terminal leaflet similar to the lateral leaflets in size and shape; leaflets neither decurrent along the rachis nor petiolulate; stem glabrous throughout. \textit{C. parviflora var. arenicola}.
18 Cauline leaves 4-10 cm long; terminal leaflet broader than the lateral leaflets; leaflets either decurrent along the rachis or petiolulate; stem pubescent at base.
19 Leaflets petiolulate; stem flexuous; [alien weed]. \textit{C. flexuosa}.
19 Leaflets decurrent on the rachis; stems typically erect; [native]. \textit{C. pensylvanica}.

\textbf{Cardamine angustata} O.E. Schulz, Eastern Slender Toothwort. Pd, Mt (GA, NC, SC, VA), Cp (NC, SC, VA): rich, mesic forests; common (rare in VA Mountains and VA Coastal Plain). March-April; April-May. NJ and IN south to n. GA, c. TN, and ne. MS; disjunct in the Ouachita Mountains of AR. Var. \textit{ouachitana} E.B. Smith, alleged to differ from var. \textit{angustata} in its nonciliate leaves (vs. leaves with margins ciliate with antrorse trichomes 0.1 mm long), is apparently not a valid taxon. \[= C, K, X, Y, Z; = C. angustata var. angustata – RAB; = Dentaria heterophylla Nuttall – F, G, S, W]\n
\textbf{Cardamine bulbosa} (Schreber ex Muhlenberg) Britton, Sterns, & Poggenburg, Bulbous Bittercress. Cp, Pd, Mt (GA, NC, SC, VA): swampy forests and bogs, primarily (but not strictly) in circumneutral soils over limestone or mafic rocks; uncommon. March-May; April-May. Widespread in e. North America. There has been recent disagreement over the correct nomenclature of
Cardamine clematis Shuttleworth ex A. Gray, Mountain Bittercress. Mt (NC, VA): shaded brookhanks, rock outcrops with seepage, at high elevations (1200m and above); rare (US Species of Concern, NC Rare, VA Rare). April-May; June-July. Endemic to the high elevation Southern Appalachians of w. NC, e. TN, and sw. VA. [= C, K, S, W, X, Z; < C. clematis Shuttleworth ex Gray – RAB, F, G, GW (also see "flagellifera")


* Cardamine debilis D. Don. Cp (GA): disturbed areas; rare, introduced from Europe. This species is similar to C. pensylvanica and C. flexuosa and may be overlooked (Rollins 1993, Brown & Marcus 1998). It is reported for e. GA (Jones & Coile 1988). [= K, Z]


Cardamine dissecta (Leavenworth) Al-Shelbazi, Dissected Toothwort. Pd (NC, VA), Mt (GA): rich, mesic forests; rare (GA Special Concern, NC Rare). March-April; April-May. Al-Shelbazi (1988c) describes the range as separated into four areas: c. AL (3 counties); c. NC and sc. VA (6 counties); nw. GA, c. TN, and s. KY (18 counties); and sc. IN, ne. KY, and s. OH (6 counties). He states that C. dissecta is easily distinguished from its relatives “by its glabrous leaves that are divided into filiform to narrowly linear segments.” See Al-Shelbazi (1988c) for additional discussion of the systematics, nomenclature, ecology, and distribution of this species. First reported for VA by Wieboldt et al. (1998). [= C, K, X, Y, Z; = Cardamine angustata var. multifida (Muhlenberg ex Elliott) Ahles – RAB; = Dentaria multifida Muhlenberg ex Elliott – F, G, W; > Dentaria multifida – S; > Dentaria furcata Small – S; = Cardamine multifida (Muhlenberg ex Elliott) Wood]


Cardamine flagellifera O.E. Schulz var. flagellifera, Large-flowered Blue Ridge Bittercress. Mt (GA, NC, SC, VA), Pd (NC): in seepages, on streambanks, and in moist cove or bottomland forests, mainly at moderate to low elevations; uncommon (NC Watch List, SC Rare, VA Rare). March-May; June-July. C. flagellifera is endemic to the Southern Appalachians of w. NC, SC, e. TN, GA, WA, and WV, and is quite distinct from C. clematis, as pointed out by Dudley (1974). Rollins's division of this species into two varieties (follows Small's recognition of two species) needs further evaluation. [= K, Z; < C. flagellifera – C, W, X; < C. clematis – RAB, GW; = C. flagellifera – S]

Cardamine flagellifera O.E. Schulz var. hugeri (Small) Rollins, Small-flowered Blue Ridge Bittercress. Mt (NC, VA), Pd (NC): in seepages, on streambanks, and in moist cove or bottomland forests, mainly at moderate to low elevations; uncommon (NC Watch List, SC Rare, VA Rare). March-April; June-July. Endemic to the Southern Appalachians of NC and TN. [= K, Z; < C. flagellifera – C, W, X; < C. clematis – RAB, GW; = C. hugeri Small – S]

* Cardamine flexuosa Withering, Woodland Bittercress. Mt, Cp, Pd (NC, VA): disturbed sites; rare, introduced from Europe. February-May. Lihová et al. (2006) show that Asiatic “C. flexuosa” is a distinct taxon from European C. flexuosa and will need a new name; at least some of our material is the Asiatic species, whose proper name is unclear (Lihová et al. 2006). Both the European and Asiatic taxa are allotetraploids of unclear parentage. [= RAB, F, K, X, Z]


Cardamine longii Fernald, Long's Bittercress. Cp (NC, VA): tidal freshwater marshes and cypress-gum swamps; rare (NC Rare, VA Rare Watch List). June-September. In distribution, irregularly from ME south to NC. Difficult to distinguish from depauperate or submerged forms of C. pensylvanica with few leaflets; the short style (capsule beak) and short and thick pedicels appear to be the most reliable characteristics. [= C, F, K, X, Z]

Cardamine micranthera Rollins, Streambank Bittercress, Small-panthered Bittercress. Pd (NC, VA): sand and gravel bars in creeks, swampy floodplain woods, seepage over rocks; rare (US Endangered, NC Endangered, VA Rare). April-May; May-June. A narrow endemic, known only from Stokes County, NC, and Patrick County, VA; apparently extirpated from Forsyth County, NC. Note that the description and key in RAB are partly in error, being based on the inadequate and unrepresentative material available at the time. C. micranthera is most closely related to C. rotundifolia, but also shows some affinities to C. pensylvanica. It can be distinguished from C. rotundifolia by the characters in the key; additionally, C. micranthera does not form proliferative branches from the upper nodes, generally branching from the base in vigorous plants, or unbranched in smaller plants. It can be distinguished from C. pensylvanica by its predominately simple leaves, especially those on the upper stem, the larger flowers, the petals 3-5 mm long (vs. 1.5-3 mm long), the fruiting pedicels thin, 10-20 mm long, spreading to ascending (vs. thick, 4-10 mm long, ascending). Wieboldt (1992) reasonably speculates that C. micranthera may be an in-breeding relative derived from C. rotundifolia in the Piedmont/Mountain interface. [= RAB, K, X, Z]

Cardamine parviflora Linnaeus var. arenicola (Britton) O.E. Schulz, Sand Bittercress. Mt, Pd, Cp (GA, NC, SC, VA): various habitats, primarily seasonally wet areas with shallow soil or sand, also on mafic outcrop glades, as on greenstone,
BRASSICACEAE

diabase, and nutrient-rich granites; common. March-May. The typic variety is Eurasian; our variety is widespread in e. North America, also occurring in the Pacific Northwest. Our plant may warrant specific status. [= RAB, C, F, K, X, Z; < C. parviflora – G, GW, S, W; = C. arenicola Britton – S]

**Cardamine pensylvanica** Muhlenberg ex Willdenow, Quaker Bittercress. Mt, Pd, Cp (GA, NC, SC, VA): various wet habitats, especially swampy depressions, streambanks, small woodland seeps; common. March-May. Widespread, ranging over most of North America. [= RAB, C, G, GW, K, S, X, Z; > C. pensylvanica var. pensylvanica – F; > C. pensylvanica var. brittoniana Farwell – F]

**Cardamine pratensis** Linnaeus var. palustris Wimmer & Graebner, American Cuckoo-flower, Lady's-smock. Mt, Cp (VA): bogs and swamps; rare (VA Rare). April-May. Var. *palustris* ranges from Canada south to NJ, VA, OH, IN, MN, and British Columbia. The Eurasian var. pratensis, with pink (vs. white) flowers, is introduced in ne. North America and may occur in our area. These two varieties may not be distinguishable; Rollins combines var. palustris into var. pratensis. [= C, F, G; < C. pratensis var. pratensis – K, Z]

**Cardamine rotundifolia** Michaux, American Bittercress, Mountain Watercress. Mt, Pd (GA?, NC, VA): seepages, streambanks, swampy depressions; rare (NC Rare). April-May; June-July. Characteristically, *C. rotundifolia* branches from the upper nodes while in flower, the branches rooting down and proliferating vegetatively. This species is a rather broad endemic of the Central Appalachians, ranging from PA and w. NY, west to OH and KY, south to the Mountains and upper Piedmont of NC. [= RAB, C, F, G, GW, K, S, W, X, Z]

**Cardamine maxima** (Nuttall) Wood, Large Toothwort ranges south to NJ, PA, OH, WV, and KY. [= K, Y, Z; = C. ×maxima – C; = Dentaria maxima Nuttall – F, G]

**Cardaria** Desvaux (Hoary Cress)

(see Lepidium)

**Chorispora** Augustin de Candolle 1821 (Chorispora)


* Chorispora tenella (Pallas) Augustin de Candolle, Chorispora, Blue Mustard, native of w. Asia is well established in the w. United States, and occurs at scattered locations eastward, as in c. and w. TN (Chester, Wofford, & Kral 1997) and s. PA (Rhoads & Klein 1993). [= C, K, Y, Z]

**Coincya** Porta & Rigo ex Rouy 1891 (Wallflower-cabbage, Coincya)


**Conringia** Adanson 1763 (Hare's-ear Mustard)


**Coronopus** Zinn (Wart-cress, Swine-cress)

(see Lepidium)

**Descurainia** Webb & Berthelot 1836 (Tansy-mustard, Flixweed)

A genus of ca. 40 species, primarily of North and South America. References: Rollins (1993)=Z, Al-Shehbaz (1988b)=Y; Detling (1939)=X.
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**Descurainia pinnata** (Walter) Britton var. brachycarpa (Richardson) Fernald, Northeastern Tansy-mustard. Mt, Pd (VA), Cp (NC*): dry rocky openings and woodlands; rare (VA Watch List). April-June. Québec west to Mackenzie, south to VA, TN, and TX; introduced in the Coastal Plain of NC. (= C, F, G; = D. brachycarpa (Richardson) O.E. Schulz – RAB; = D. pinnata var. pinnata – S)


* Descurainia pinnata (Walter) Britton var. pinnata, Southeastern Tansy-mustard. Cp (GA, NC, SC): open sandy areas, especially roadsides; common. February-May. E. NC south to FL, west to TX and OK. (= C, F, G; = D. pinnata – RAB (in the narrow sense); = D. pinnata ssp. pinnata – K, X, Y, Z; = Sophia pinnata (Walter) T.J. Howell – S)


**Diplotaxis** Augustin de Candolle 1821 (Wall-rocket)


1 Leaves mostly basal or very low-cauline; plant annual or biennial; siliques lacking a stipe between the sepal scars and the base of the valves; [section Anocarpum].......................................................................................................................... D. muralis

1 Leaves mostly cauline; plant perennial, becoming somewhat woody at the base; siliques with a 0.5-2 mm stipe between the sepal scars and the base of the valves; [section Diplotaxis].......................................................................................................................... D. tenuifolia


**Draba** Linnaeus 1753 (Draba, Whitlow-grass)


1 Leaves all basal; petals deeply bifid (about 1/2 way to base).......................................................................................................................... Dr. verna

1 Leaves basal and cauline (the basal sometimes withering by fruiting); petals merely emarginate.

2 Silique twisted; petals 5-6 mm long; styles conspicuous, 1.5-3 mm long; perennial; [on calcareous rock outcrops].................. Dr. ramosissima

2 Silique not twisted; petals 0.5 mm long; styles absent to inconspicuous, 0-0.25 mm long; winter-annuals; [mostly in open situations in sandy or clayey soils, not over limestone].

3 Silique 1-4 mm long; leaves extending upward into the lower branches of the inflorescence.

4 Pubescence of the lower leaves of stalked cruciform trichomes; siliques densely pubescent; fruiting branches congested, mostly < 1 cm long and appearing almost glomerate .............................................................. Dr. aprica

4 Pubescence of the lower leaves of sessile cruciform trichomes; siliques glabrous; fruiting branches elongate . .................................................................................. Dr. brachycarpa

3 Silique 8-14 mm long; leaves low-cauline, not extending upward into the lower branches of the inflorescence.

5 Inflorescence congested, the fruiting portion ca. 1.5 cm long; trichomes of the upper leaf surface simple or once-forked; pedicels glabrous.......................................................... Dr. reptans

5 Inflorescence not congested, the fruiting portion mostly > 2.5 cm long; trichomes of the upper leaf surface dendritic; pedicels pubescent.
6 Siliqua ca. 3-6x as long as wide, 5-15 mm long, 1.2-2.2 (-2.8) mm wide, pubescent with simple or branched trichomes .................................................. Dr. cuneifolia var. cuneifolia
6 Siliqua ca. 2x as long as wide, 5-8 mm long, 2.5-3.7 mm wide, pubescent with simple trichomes ..........
.......................................................................................................................... ............... Dr. platycarpa


**Draba brachycarpa** Nuttall ex Torrey & A. Gray, Short-fruited Draba. Pd, Cp (GA, NC, SC, VA), Cp (GA): granitic flatrocks, open places (fields, roadsides, woodland margins, disturbed areas); uncommon (VA Watch List). February-April; March-May. VA west to IN and KS, south to FL and TX. [= RAB, C, F, G, K, S, W, Y, Z]

**Draba cuneifolia** Nuttall ex Torrey & A. Gray var. cuneifolia. Cp (GA, NC, SC, VA): open blackland prairies, preferring rocky, bare soil, also waste areas around wool-combing mills, possibly other habitats; rare, in NC and SC perhaps only introduced from further west. February-March; March-April. All three varieties are primarily distributed in sw. United States, but the species extends as a native at least as far east as c. GA (Houston County) and AL, where it occurs in prairies. [= K, Z; < *D. cuneifolia* – RAB, C, F, G, S]

**Draba platycarpa** Torrey & A. Gray. Cp (SC): waste areas around wool-combing mill; rare, perhaps not established, introduced from w. North America. [= K, Z]

**Draba ramosissima** Desvaux, Rocktwist, Appalachian Draba. Mt (NC, VA), Pd (VA): in crevices of rock outcrops, or in dry talus slopes, over a variety of rock types (including limestone, dolostone, schist, gneiss, shale); common (rare in NC and VA Piedmont) (NC Rare). April-May; May-July. W. MD and e. WV south through w. VA and e. KY south to w. NC and e. TN. [= RAB, K, S, W, Z]

**Draba reptans** (Lamarck) Fremd. Pd (NC), Cp (SC): dry soil; rare (NC Rare, SC Rare). February-March; March-April. MA and Ontario west to WA, south to NC, GA, TX and CA. The few occurrences in our area seem to make little ecological or phytogeographic sense; they may represent introductions. The first collection in our area was, however, by Walter. [= RAB, K, Z; > *D. reptans* var. reptans – C, F, G; > *D. caroliniana* Walter – S]

* **Draba verna** Linnaeus, Whitlow-grass Cp (NC, SC, VA), Pd, Mt (GA, NC, SC, VA): disturbed areas, especially in dry, barren soils, including granitic flatrocks; common, introduced from Europe. February-April; March-May. [= RAB, C, K, S, W, Z; > *D. verna* var. verna – F, G; > *D. verna* var. boerhaavii van Hall – F, G; = *Erophila verna* (Linnaeus) Besser]

**Eruca** P. Miller 1754 (Rocket-salad, Arugula)


* **Eruca vesicaria** (Linnaeus) Cavanilles ssp. *sativa* (P. Miller) Thellung, Garden Rocket, Rocket-salad, Arugula. Pd (NC): cultivated as a salad green, persistent around gardens or occurring as a waif; rare, introduced from Mediterranean Europe. [= K, Y, Z; = *E. sativa* P. Miller – C, F; < *E. vesicaria* – G; < *E. erucaria* (Linnaeus) Ascherson & Graebner – S]

**Erucastrum** K.B. Presl 1826 (Dog-mustard)

A genus of ca. 22 species, herbs, of Africa, Europe, and Arabia. References: Rollins (1993)=Z; Luken, Thieret, & Kartesz (1993); Al-Shehbaz (1985b)=Y.


**Erysimum** Linnaeus 1753 (Wallflower, Treacle Mustard)


1 Petals 13-25 (-30) mm long, 4-11 (-13) mm wide; seeds 2-3 mm long; biennial or perennial; [native, usually in thin rocky soil] .......................................................... *E. capitatum* var. capitatum
1 Petals 3.5-10 mm long, < 3 mm wide; seeds ca. 1 mm long; annual or biennial; [introduced, usually in disturbed situations].
2 Sepals 2.3-3.5 mm long; petals 3.5-5.5 mm long; fruits 1.2-3 cm long; pedicels slender, (6-) 8-12 (-14) mm long...........
2 Sepals 4.5-5.5 mm long; petals 6-10 mm long; fruits (3-) 5-12 cm long; pedicels thick, 2-8 mm long ........... *E. repandum*
**Erysimum capitatum** (Douglas ex Hooker) E.L. Greene *var. capitatum*, Western Wallflower. Mt (VA): shale barrens and shale woodlands of Alleghany and Bath counties, VA; rare (VA Rare). April-July; June-August. Rollins (1993) interprets *E. capitatum* as including five varieties, all but the typic restricted to the Great Plains and west. Though most floras (including C, F, and G) give the impression that *Erysimum* is not native east of IL, MO, and AR ("rarely adventive farther east along railroads"), this taxon is native and relictual in w. VA, as well as in ec. TN (Chester, Wofford, & Kral 1997) and e. WV (Pendleton and Grant counties). [= K, Z; = *E. asperum* var. *asperum* – C, misapplied; > *E. arkansanum* Nuttall – F; < *E. asperum* – G, misapplied; < *Cheirinia aspera* (Nuttall) Britton – S, misapplied; = *Erysimum capitatum* ssp. capitatum – Y]


* Erysimum inconspicuum (S. Watson) MacM. *var. inconspicuum*, Shy Wallflower. South to PA and MD. Var. *coarctatum* (Fernald) Rossback is more northern. [= K, Z; < *E. inconspicuum* – C, Y; = *E. inconspicuum* – F, G] {not keyed at this time}

**Hesperis** Linnaeus 1753 (Dame's Rocket)


* Hesperis matronalis Linnaeus, Dame's Rocket. Mt (NC, VA), Pd, Cp (VA), {GA}: bottomlands, roadsides, moist forests; common (uncommon in Piedmont, rare in Coastal Plain), native of Europe. April-June. The flowers are white or pink. [= RAB, C, F, G, K, W, Y, Z]

**Iberis** Linnaeus 1753 (Candytuft)


* Iberis amara Linnaeus, Annual Candytuft, is reported from PA, WV, and KY (Kartesz 1999). [= C, K, Z]

* Iberis sempervirens Linnaeus, Evergreen Candytuft, is reported for NC and TN by Kartesz (1999), but the specimens he cites are from cultivated material. [= K]

**Iodanthus** Torrey & A. Gray 1840 (Purple Rocket)


Identification notes: *Iodanthus pinnatifidus* somewhat resembles *Hesperis matronalis* in overall appearance, but differs in the following ways: petals 10-13 mm long (vs. 20-25 mm long), siliques 2-4 cm long (vs. 5-10 cm long), pubescence of the lower stem of simple trichomes (vs. branched trichomes).

*Iodanthus pinnatifidus* (Michaux) Steudel, Purple Rocket, is a native crucifer occurring from w. PA west to MN and IA, south through WV and e. and c. TN to AL and TX. It may occur in the westernmost parts of our area, especially in sw. VA, in rich bottomlands. [= C, F, G, K, S, Y, Z]

**Isatis** Linnaeus 1753 (Woad)


**Leavenworthia** Torrey 1837 (Glade Cress)


1 Petals entire, white, < 7 mm long; leaf lobes deeply dentate, the terminal lobe only slightly larger than the larger lateral lobes ................................................................. *L. uniflora*
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1  Petals deeply to shallowly emarginate (notched at the tip), yellow, white, or lavender, 7-15 mm long; leaf lobes entire to shallowly dentate, the terminal lobe markedly larger than the largest lateral lobes.
2  Siliques conspicuously torulose (constricted between the seeds), even when young...............................\[L. torulosa\]
2  Siliques not torulose (constricted between the seeds) (or slightly so in \textit{L. stylosa}).
3  Petals 7-10 mm long, shallowly emarginate; style 1-3 mm long; siliques flat; [of AL, GA, KY, and TN].
4  Petals yellow; [of AL and TN].................................................................\[L. exigua var. lutea\]
4  Petals white to pale lavender; [of KY, TN, and nw. GA].
5  Styles 1-2 mm long; sepalae lavender; [of TN and nw. GA]..................\textit{L. exigua} var. \textit{exigua}
5  Styles 2-3 mm long; sepalae green; [of KY]...........................................\textit{L. exigua} var. \textit{lacinia}
3  Petals 10-16 mm long, deeply emarginate; styles 2.5-7 mm long; siliques thick or flat; [of AL and TN].
6  Siliques thin, flat; styles 1.5-5.5 mm long; petals white to lavender; [of n. AL].
7  Styles 2-5.5 mm long; mature siliques cuneate at the base and acute at the tip; [of Colbert, Franklin, and Lawrence counties, AL]..............................\textit{L. alabamica} var. \textit{alabamica}
7  Styles 1.5-2 (-3) mm long; mature siliques rounded at the base and at the tip; [of Morgan County, AL]... \textit{L. crassa} var. \textit{crassa}
6  Siliques thick, fleshy; styles 2.5-7 mm long; petals yellow, white, or lavender; [of n. AL and c. TN].
8  Siliques 12-15 mm long, 3-4 mm wide; seeds slightly elongate, cleft at one side of the long axis; [of Sumner, Smith, Wilson, Davidson, Rutherford, Bedford, and Maury counties, TN]..............\textit{L. stylosa}
8  Siliques 6-12 mm long, 4-5 mm wide; seeds orbicular, cleft at the basal end; [of Lawrence and Morgan counties, AL].
9  Siliques 6-10 mm long; styles 3-6 mm long; petals white to yellow, 10-13 mm long; [of Lawrence and Morgan counties, AL].................................................................\textit{L. crassa} var. \textit{crassa}
9  Siliques 8-12 mm long; styles 1.5-3.5 mm long; petals yellow, 9-11 mm long; [of Morgan County, AL].................................\textit{L. crassa} var. \textit{elongata}


\textit{Leavenworthia uniflora} (Michaux) Britton, Gladecrest. Mt (GA): limestone glades; rare (GA Special Concern). Endemic to the Central Basin of c. TN (8 counties), the Ridge and Valley of c. TN (Hamilton, Meigs, Bledsoe, and Knox counties), nw. GA (Walker and Murray counties), and c. KY (15 counties). [= C, F, G, K, S, Y, Z]

\textit{Leavenworthia alabamica} Rollins var. \textit{alabamica}. Endemic to n. AL (Colbert, Franklin, and Lawrence counties). [= K, Y, Z]

\textit{Leavenworthia alabamica} var. \textit{brachystyla} Rollins. Endemic to n. AL (Morgan County). [= K, Y, Z]

\textit{Leavenworthia crassa} Rollins var. \textit{crassa}. Endemic to n. AL (Lawrence and Morgan counties). [= K, Y, Z]

\textit{Leavenworthia crassa} var. \textit{elongata} Rollins. Endemic to n. AL (Morgan County). [= K, Y, Z]

\textit{Leavenworthia exigua} var. \textit{lacinia} Rollins. Endemic to the Western Highland Rim and w. Knobs of c. KY (Bullitt and Jefferson counties). [= C, K, Y, Z]

\textit{Leavenworthia exigua} var. \textit{lutea} Rollins. Endemic to the Central Basin of n. AL (Jefferson County) and c. TN (Bedford and Maury counties) (Chester, Wofford, & Kral 1997). [= K, Y, Z]

\textit{Leavenworthia stylosa} A. Gray. Endemic to the Central Basin of c. TN (Sumner, Smith, Wilson, Davidson, Rutherford, Bedford, and Maury counties) (Chester, Wofford, & Kral 1997). [= K, S, Y, Z]

\textit{Leavenworthia torulosa} A. Gray. Endemic to the Central Basin of c. TN (10 counties), the Ridge and Valley of e. TN (Bradley and Meigs counties), and the Western Highland Rim of KY (Logan, Simpson, Todd, and Warren counties). [= C, F, G, K, S, Y, Z]

\textit{Lepidium} Linnaeus 1753 (Pepperwort, Peppergrass, Pepperweed)


section \textit{Lepidium}: \textit{perfoliatum}, \textit{graminifolium}

section \textit{Cardamon}: \textit{sativum}

section \textit{Lepia}: \textit{campestre}

section \textit{Dileptium}: \textit{austri num}, \textit{densiflorum} var. \textit{densiflorum}, \textit{oblongum} var. \textit{oblongum}, \textit{virginicum} var. \textit{virginicum}


1 Upper cauline leaves perfoliate or sagittate.

1


* Lepidium africanum (Burmann f.) Augustin de Candolle, African Pepperwort. Waif around wool-combing mills in Coastal Plain of SC; there appears to be little evidence that it is established in our area. For further information and keys, see Rollins (1993) and Al-Shehbaz (1986). [= K, Y, Z]

* Lepidium austrinum Small, Southern Pepperwort. Waif around wool-combing mills in Coastal Plain of SC; there appears to be little evidence that it is established in our area. March-June. For further information and keys, see Rollins (1993) and Al-Shehbaz (1986). [= K, Y, Z]

* Lepidium bonariense Linnaeus, Argentinian Pepperwort. Waif around wool-combing mills in Coastal Plain of SC; there appears to be little evidence that it is established in our area. For further information and keys, see Rollins (1993) and Al-Shehbaz (1986). [= K, Y, Z]

* Lepidium graminifolium Linnaeus, Grassleaf Pepperwort. Introduced, especially on ballast, south to MD, PA. April-June. [= K, Y, Z]

* Lepidium lasiocarpum Nuttall var. lasiocarpum. Waif around wool-combing mills in Coastal Plain of SC; there appears to be little evidence that it is established in our area. March-June. For further information and keys, see Rollins (1993) and Al-Shehbaz (1986). [= K, Z; < L. lasiocarpum – Y]

* Lepidium oblongum Small var. oblongum. Waif around wool-combing mills in Coastal Plain of SC; there appears to be little evidence that it is established in our area. For further information and keys, see Rollins (1993) and Al-Shehbaz (1986). [= K, Z; < L. oblongum – Y]

* Lepidium sativum Linnaeus, Garden Cress, is reported for scattered locations in sc. and se. PA (Rhoads & Klein 1993) and VA (K based on Massey 1961). May-August. [= C, F, G, K, Z]


* Lepidium squamatum Forskål, introduced at scattered locations in se. PA (Rhoads & Klein 1993), TN, AL, and FL (K). [= X; = Coronopus squamatus (Forskål) Ascherson – C, K; ? Coronopus procumbens Gilibert – F, G; = Carara coronopus (Linnaeus) Medikus – S]

Lesquerella S. Watson 1888 (Bladderpod) (see Faysonia and Physaria)

Lobularia Desvaux 1815 (Sweet Alyssum)


* Lobularia maritima (Linnaeus) Desvaux, Sweet Alyssum. Pd (VA), Cp (NC, VA): disturbed areas, lawns; rare, introduced from Europe. June-November. The NC occurrences are doubtfully established, from gardens and a "lawn." [= C, F, G, K, Y, Z]

Lunaria Linnaeus 1753 (Honesty)


1 Upper cauline leaves coarsely and irregularly dentate; siliques broadly rounded at both ends; plant annual or biennial ..........

.............................................................................................................................. .......................................................

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1 Upper cauline leaves spinulose-dentate; siliques acute at both ends; plant perennial ...............................................

* Lunaria annua Linnaeus, Annual Honesty, Silver-dollar. Cp, Pd (VA), Mt (NC, VA) [GA]: escaped from cultivation around gardens, not usually persistent; rare, introduced from se. Europe. April-June. [= C, F, G, K, Z]


**Matthiola** R. Brown 1812 (Stock)


**Microthlaspi** F.K. Meyer 1973 (Penny-cress)


**Nasturtium** R. Brown 1812 (Watercress)


1 Petioles of emergent leaves lacking auricles toward the base; seeds yellowish-brown, finely reticulate, with 400-500 polygonal depressions on each side ................................................................. [N. floridanum]

1 Petioles of emergent leaves auriculate toward the base; seeds reddish-brown, rather coarsely reticulate, with 25-150 (-175) polygonal depressions on each side.

2 Mature siliques 1-1.5 mm wide, terete or subterete; seeds in 1 row in each locule of the silique; seeds with (75-) 100-150 (-175) polygonal depressions on each side ................................................................. [N. officinale]

2 Mature siliques (1.8-) 2-3 mm wide, flattened; seeds in 2 rows in each locule of the silique; seeds with 25-50 (-60) polygonal depressions on each side ......................................................................................................

* Nasturtium microphyllum Boenninghausen ex Reichenbach, Narrow-fruited Watercress. Mt (NC, VA): streams, springs; rare, introduced from Europe. See Green (1962) for additional information. [= V; = Rorippa microphylla (Boenninghausen ex Reichenbach) Hylander ex Löve & Löve – C, K, Q, X, Z; < Nasturtium officinale – RAB, G, W; = Nasturtium officinale R. Brown var. microphyllum (Boenninghausen ex Reichenbach) Thellung – F]

* Nasturtium officinale R. Brown, Watercress. Mt, Pd, Cp (GA, NC, SC, VA): streams, springs, seepages; common (uncommon or rare south of VA), introduced from Eurasia. April-July. [= GW, V; = Rorippa nasturtium-aquaticum (Linnaeus) Hayek – C, K, Q, X, Z; < Nasturtium officinale – RAB, G, W (also see N. microphyllum); > Nasturtium officinale var. officinale – F; > Nasturtium officinale var. sifolium (Reichenbach) W.D.J. Koch – F; = Sisymbrium nasturtium-aquaticum Linnaeus – S]

Nasturtium floridanum (Al-Shehbaz & Rollins) Al-Shehbaz & R.A. Price, Florida Watercress. Endemic to FL, but north to counties adjacent to se. GA. [= V; = Rorippa floridana Al-Shehbaz & Rollins – K, Z; < Nasturtium microphyllum Boenninghausen ex Reichenbach – GW, misapplied; Nasturtium stylosum Shuttleworth ex O.E. Schulz] {synonymy incomplete}

**Neobeckia** Greene 1896 (Lake Cress)


Neobeckia aquatica (Eaton) Greene, Lake Cress. Cp (GA, VA): shallow water of swamps and lake margins; rare (GA Special Concern, VA Rare). VT west to MN, south to s. GA, FL, and e. TX, widely scattered and probably dispersed by
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Paysonia O'Kane & Al-Shehbaz 2002 (Bladderpod)

A genus of 8-9 species, herbs, endemic to southeastern United States. O'Kane & Al-Shehbaz (2002) clearly show that Paysonia is not a part of Lesquerella, which itself is included within Physaria. References: Rollins (1993)=Z; Rollins & Shaw (1973)=Y; O'Kane & Al-Shehbaz (2002)=X; Al-Shehbaz (1987)=V. Key adapted from X and Z.

1 Cauline leaves cuneate or petiolate at the base, not auriculate; flowers yellow ..................................................... [see Physaria]

2 Siliques not compressed, nearly globose, subglobose, pyriform, or slightly bilobed; valves glabrous or pubescent with only a single type of trichome; flowers white or yellow.

3 Flowers yellow; siliques globose to subglobose; septum (of the siliqua) perforate or nearly absent.

4 Siliques densely pubescent, depressed globose or slightly bilobed; valves (of the siliqua) papery, densely pubescent on the interior; styles glabrous ............................................................... [Physaria perforata]

5 Siliques glabrous; styles glabrous ........................................................................................... [Physaria stonensis]

* Physaria gordonii (A. Gray) O'Kane & Al-Shehbaz ssp. gordonii, Gordon's Bladderpod. Mnt (VA): roadside; rare, introduced from further west. Rollins (1993) reports this species (identification unconfirmed) as a waif along the Blue Ridge Parkway, VA; it may not be established. [= X; = Lesquerella gordonii (A. Gray) S. Watson var. gordonii – Z; < L. gordonii – K, Y]

2 Siliques (1-) 2-2.8 mm long, sparsely pubescent on the exterior; petals 3.5-6.5 (-7.5) mm long ............ [Physaria globosa]

2 Siliques (3.5-) 4-8 mm long, glabrous on the exterior; petals 5-8 mm long......................... Physaria gordonii ssp. gordonii
Physaria globosa (Desvaux) O’Kane & Al-Shehbaz. Endemic to an area from Posey County, IN and allegedly also s. OH south through c. KY to c. TN. [= X; = Lesquerella globosa (Desvaux) S. Watson – C, F, G, K, S, V, Y, Z]

Physaria gracilis (Hooker) S. Watson ssp. gracilis. TN, IL, MO, and OK south to AL, MS, LA, and TX. [= X; < Lesquerella gracilis – F, G; = Lesquerella gracilis (Hooker) S. Watson ssp. gracilis – K, V, Z]

Raphanus Linnaeus 1753 (Radish)


1 Siliques moniliform (contricted between the seeds), the silique body about the same diameter for most of its length, longitudinally grooved; petals usually yellow, fading white (rarely purple); seeds 4-12 per silique .................. R. raphanistrum

1 Siliques not moniliform, the silique body tapered from its widest point below the middle to the apex, smooth or slightly longitudinally grooved; petals usually purple (rarely white); seeds 1-3 (-5) per silique ..................... R. sativus

* Raphanus raphanistrum Linnaeus, Wild Radish, Jointed Charlock, White Charlock. Cp, Pd, Mt (GA, NC, SC, VA): fields, roadsides, disturbed areas; common (rare in Mountains), introduced from Mediterranean Europe. March-June (and sporadically later). Many European authors (such as Stace 1997) recognize several infraspecific taxa in R. raphanistrum; their validity (and applicability in North America) is poorly known. [= RAB, C, F, G, K, W, Y, Z]


Rapistrum Crantz 1769 (Bastard-cabbage)


* Rapistrum rugosum (Linnaeus) Allioni var. rugosum, Annual Bastard-cabbage. Cp (SC): waste areas around wool-combing mills; rare, introduced from Mediterranean Europe. Also naturalized at scattered sites in c. TN (Chester, Wofford, & Kral 1997), PA (Rhoads & Klein 1993), and elsewhere. [= G; = R. rugosum ssp. rugosum – K, Y; < R. rugosus – C, F, Z]

Rorippa Scopoli (Yellow Cress, Marshcress)

(also see Nasturtium)

A genus of about 75 species, herbs, cosmopolitan. The separation of Nasturtium from Rorippa is warranted (Al-Shehbaz & Price 1998); Franzke et al. (1998) provide corroboration based on molecular analysis. References: Al-Shehbaz (1988a)=X; Rollins (1993)=Z; Stuckey (1972)=Y.

1 Plant a rhizomatous, colony-forming perennial; petals (2.0-) 2.8-6.0 mm long.

2 Stems branched at the base, decumbent to ascending; leaf sinuses not reaching the midrib, the lateral segments entire to weakly toothed; siliques 3-6× as long as wide; [section Sinuatae] .................................................. R. sinuata

2 Stems branched in the upper portions, erect; leaf sinuses reaching the midrib, the lateral segments often sharply toothed; siliques 6-15× as long as wide; [section Rorippa] ............................................................... R. sylvestris

1 Plant a taprooted annual or biennial; petals 1-3.5 mm long; siliques 1-9 (-10)× as long as wide; [section Sinuatae] .................................................. R. sinuata

3 Flowers nearly sessile; petals absent; lower fruiting pedicels 0.5-1.5 mm long; siliques (3-) 5.4-8.5 (-10.2) mm long, (1.4-) 1.8-2.6 (-3.3) mm wide, mostly 3-5× as long as wide. .................................................. R. sessiliflora

3 Flowers clearly pedicellate; petals present; lower fruiting pedicels > 4 mm long; siliques 4-20 mm long, 1-5× as long as wide.

4 Siliques 2.5-9 mm long, 2-5× as long as wide; leaves serrate, lobed, or pinnately dissected, the pinnae (when present) merely toothed; seeds 0.5-0.9 mm long, 20-80 per silique.

5 Leaves hirsute on the lower surface; stems hirsute usually up to the terminal raceme ........................................... R. palustris var. hispida

5 Leaves glabrous on the lower surface; stems glabrous or sparsely hirsute.

6 Plants mostly 4-10 dm tall, often reddish; stems thick, mostly > 3 mm in diameter; leaves thick-textured; siliques 2.5-5 mm long .......................................................... R. palustris var. fernaldiana

6 Plants mostly 1-4 dm tall, often purplish; stems slender, mostly < 3 mm in diameter; leaves thin-textured; siliques 4-9 mm long .......................................................... R. palustris var. palustris
BRASSICACEAE


**Rorippa sinuata** (Nuttall) A.S. Hitchcock. Native, east to w. KY. [= C, F, G, GW, K, X, Y, Z]

**Sibara** E.L. Greene 1896 (Sibara)


**Sibara virginica** (Linnaeus) Rollins, Sibara. Cp, Pd (GA, NC, SC, VA), Mt (NC): disturbed areas, fields, roadsides; common. February-June. VA west to IN and KS, south to FL and TX. A native weed, presumably much more common now than formerly. [= RAB, C, F, G, K, W, X, Y, Z; = *Arabis virginica* (Linnaeus) Poiret – S]

**Sinapis** Linnaeus 1753 (Mustard)

A genus of 7 species, herbs, of s. Europe. References: Rollins (1993)=Z; Al-Shehbaz (1985b)=Y. Key adapted from Z and C.

1 Beak of siliqua strongly compressed; siliqua densely covered with long, stiff trichomes, ca. 4 mm in diameter; pedicels slender, mostly at right angles to the rachis; seeds 4-8 per siliqua; [section Sinapis] ................................................................. *S. alba*

1 Beak of siliqua conical; siliqua glabrous or nearly so, ca. 2 mm in diameter; pedicels thick, erect to spreading; seeds 7-13 per siliqua; [section Ceratosinapis] ......................................................................................... *S. arvensis*  

* **Sinapis alba** Linnaeus, White Mustard, Yellow Mustard. Mt, Pd (NC): disturbed areas; rare, introduced from Mediterranean Europe. April-June. The seeds of this species are one source of table mustard; other components include *Brassica juncea* and *B. nigra*. [= C, K, S, Y, Z; ? *Brassica hirta* – RAB, F, G]


**Sisymbrium** Linnaeus (Jim Hill Mustard)


1 Siliqua linear, 5-10 cm long; spreading from the rachis; pedicels 5-20 mm long; petals 6-8 mm long................. *S. altissimum* 

1 Siliqua subulate, 0.8-1.5 cm long, appressed to the rachis; pedicels 1-3 mm long; petals 3-4 mm long................. *S. officinale*


* **Sisymbrium irio** Linnaeus, London-rocket. Waif around wool-combing mills in Coastal Plain of SC; there appears to be little evidence that it is established in our area. For further information and keys, see Rollins (1993) and Al-Shehbaz (1986b). [= C, F, G, K, Y, Z]

* **Sisymbrium loeselii** Linnaeus. Waif around wool-combing mills in Coastal Plain of SC; there appears to be little evidence that it is established in our area. For further information and keys, see Rollins (1993) and Al-Shehbaz (1986b). [= C, F, G, K, Y, Z]

* **Sisymbrium turczaninowii** Sonderegger, Russian Rocket. Waif around wool-combing mills in Coastal Plain of SC; there appears to be little evidence that it is established in our area. For further information and keys, see Rollins (1993) and Al-Shehbaz (1986b). [= K, Y, Z]

**Teesdalia** Aiton f. 1812 (Shepherd's Cress)


**Thlaspi** Linnaeus 1753 (Penny-cress)

(also see *Microthlaspi*)


1 Siliques 5-8 mm long, 2-4 mm wide; seeds brown, alveolate; lower stem with scattered long hairs; fresh plant smelling of garlic when crushed; [section *Pterotropis*] ............................................................................................................ *T. alliaceum*

1 Siliques (8-) 10-17 mm long, 7-12 mm wide; seeds brown, concentrically ridged; lower stem glabrous; fresh plant not smelling of garlic when crushed; [section *Thlaspi*] .......................................................................................... *T. arvense*

* **Thlaspi alliaceum** Linnaeus, Garlic Penny-cress. Pd (NC, VA): fields, disturbed areas, roadsides; rare, native of Europe. March-April; April-May. [= RAB, K, X, Y, Z]


**Turritis** Linnaeus 1753 (Tower Mustard)


* **Turritis glabra** Linnaeus, Tower Mustard. Mt (NC, VA): open disturbed areas, forest edges; rare (NC Rare, VA Rare). May-June; July-August. Circumboreal, south in North America to NC, sc. TN (Chester, Wofford, & Kral 1997), AR, KS, NM, and CA. Possibly only an introduction in our area. [= *Arabis glabra* (Linnaeus) Bernhardi – RAB, C, F, G, W; > *A. glabra* var. *glabra* – Y, Z]

**Warea** Nuttall 1834 (Warea, Pineland-cress)

A genus of 4 annual herbs, of se. North America. The genus is endemic to se. United States, consisting of our species and two others of peninsular FL. This is the only genus of tribe *Thelypodieae* in our area. References: Rollins (1993)=Z; Al-Shehbaz (1985a)=Y; Channell & James (1964).

Identification notes: *Warea* (Brassicaceae) and *Polanisia* (Cleomaceae) are superficially similar. The genus is quite showy and conspicuous, reminiscent of a small *Cleome* because of its white to pink, clawed petals and silique borne on a long gynophore.
BRASSICACEAE

1 Leaves cuneate at the base; petals white to pink.......................... W. cuneifolia
1 Leaves rounded or slightly auriculate at the base; petals deep purple.......................... W. sessilifolia

Warea cuneifolia (Muhlenberg ex Nuttall) Nuttall, Carolina Warea, Carolina Pineland-cress. Cp (GA, NC, SC): xeric white sands of sandhills, primarily in Sandhill Region; rare (NC Rare). July-September; August-September. Sc. NC south to panhandle FL and se. AL. [= RAB, K, S, Y, Z]


BUDDLEJACEAE (Butterfly-bush Family)

(see SCROPHULARIACEAE and TETRACHONDRACEAE)

1 Plant a shrub .......................................................... [see SCROPHULARIACEAE – Buddleja]
1 Plant an herb .......................................................... [see TETRACHONDRACEAE – Polypremum]

BUXACEAE Dumortier 1822 (Boxwood Family)


1 Plant a woody shrub; leaves opposite, < 1 cm wide......................................................... Buxus
1 Plant a suffrutescent herb; leaves alternate, 1.5-7 cm wide.............................................. Pachysandra

Buxus Linnaeus (Boxwood)

A genus of about 50-90 species, shrubs, of tropical to temperate areas of Europe, Africa, West Indies, and Central America.

* Buxus sempervirens Linnaeus, Boxwood. Mt (NC, VA): persistent for decades at abandoned homesites; rare, introduced from Europe. Popular for hedges and landscaping; also cultivated in the Mountains for wreathing. [= K]

Pachysandra Michaux (Pachysandra)

A genus of 4 species, 1 of e. North America, the other 3 of e. Asia, suffruticose herbs and shrubs. References: Robbins (1968)=Z.

1 Leaves subcoriaceous, semi-evergreen, pubescent, mottled (more apparently so at some seasons than others); [native plant of rich forests] .................................................................................. P. procumbens
1 Leaves coriaceous, evergreen, glabrous, dark green; [cultivated alien plant, rarely persistent] .................. P. terminalis

Pachysandra procumbens Michaux, Mountain Pachysandra, Allegheny-spurge. Pd (GA, NC, SC), Mt (GA): moist rich woods in the upper Piedmont (nearly in the Mountains); rare (GA Special Concern, NC Rare, SC Rare). March-April; July-August. C. KY south to w. NC, nw. SC, w. GA, panhandle FL (Jackson County only), AL, MS, and e. LA (on loess in the Tunica Hills). The only locations for this species in NC are in Polk County, NC, which has other notable disjunctions of species which normally occur west of the Blue Ridge (Veratrum woodii, Smilax lasioneura). Channell & Wood (1987) refer to P. procumbens as a "nonaggressive if not 'semile' species with a very low evolutionary potential." Its distribution (and, for that matter, that of the genus as a whole) appears to be relictual and to reflect a poor ability to disperse itself and colonize new territory. [= RAB, C, F, G, K, S, W, Z]

* Pachysandra terminalis Siebold & Zuccarini, Pachysandra, Japanese-spurge. Pd (NC, VA): persistent after cultivation, and spreading vegetatively to adjacent forests; commonly cultivated, rarely persistent to naturalized, native of China and Japan. This species is a popular ground-cover, difficult to eradicate once well-established. [= RAB, C, F, G, K, Z]

CABOMBACEAE A. Richard 1828 (Water-shield Family)

A family of 2 genera and about 6 species, aquatic herbs, nearly cosmopolitan. This family is closely related to the Nymphaeaceae and may be best combined with it (Angiosperm Phylogeny Group 2003). References: Wiersema in FNA (1997); Williamson & Schneider in Kubitzki, Rohwer, & Bittrich (1993); Les et al. (1999).

1 Plants with all leaves floating and peltate; plants coated with a layer of transparent, mucilaginous jelly; floating peltate leaves 3.5-11 cm long, 2.6-5.0 cm wide; [subfamily Hydroveltoideae] ................................................................................. Brasenia
**CABOMBACEAE**

1 Plants with submersed leaves dichotomously divided into linear segments; plants not coated with mucilaginous material; floating peltate leaves (when present) 0.6-3.0 cm long, 0.1-0.4 wide; [subfamily *Cabomboideae*]...................... *Cabomba*

**Brasenia** Schreber (Water-shield)

A monotypic genus, an aquatic herb, widely distributed in tropical and temperate regions of the Old and New World. References: Williamson & Schneider in Kubitzki, Rohwer, & Bittrich (1993).

**Identification notes:** The elliptic peltate leaves and mucilaginous petioles make *Brasenia* unmistakable.

*Brasenia schreberi* J.F. Gmelin, Water-shield, Purple Wen-dock. Cp (GA, NC, SC, VA), Pd, Mt (NC, VA): lakes, ponds, sluggish streams, floodplain oxbow ponds; common (rare in Piedmont and Mountains). June-October. Nova Scotia west to MN, south to s. FL and TX; also from British Columbia south to CA; also in tropical America and the Old World. [= RAB, C, F, FNA, G, GW, K, S, W]

**Cabomba** Aublet (Fanwort)

A genus of about 5 species, aquatic herbs, tropical and temperate regions of America. References: Williamson & Schneider in Kubitzki, Rohwer, & Bittrich (1993).

**Identification notes:** *Cabomba* is sometimes mistaken for other, superficially somewhat similar aquatics, such as *Ceratophyllum* (Ceratophyllaceae), *Utricularia* (Lentibulariaceae), and *Myriophyllum* (Haloragaceae). *Cabomba* has the leaves opposite (rather than whorled), dichotomously divided (like *Ceratophyllum*), but the divisions lacking the marginal denticles of *Ceratophyllum*, and on a 1-3 cm long petiole (vs. sessile or on a petiole 0-2 mm long). *Utricularia* has the leaves sometimes dichotomously divided, but the divisions are usually irregular, the leaves are alternate (in most species), and bladder traps are present. *Myriophyllum* has the leaves pectinately rather than dichotomously divided.

*Cabomba caroliniana* A. Gray, Fanwort. Cp (GA, NC, SC, VA), Pd (GA, NC, VA): millponds, lakes, slow-moving streams; uncommon (rare and probably only introduced in the Piedmont). May-September. NJ west to OH, s. MI, and MO, south to FL and TX; sporadically introduced elsewhere from aquarium "throw-outs." *C. caroliniana* var. *pulcherrima* R.M. Harper, with purplish flowers and vegetative parts, occurs in the southeastern Coastal Plain; it needs further evaluation. GW imply that the purple pigmentation may be merely an environmental response to warm waters, and is not correlated with morphologic characters. [= RAB, C, F, FNA, G, GW, S; > C. caroliniana var. *caroliniana* – K; > C. *pulcherrima* (R.M. Harper) Fassett]

**CACTACEAE** A.L. de Jussieu 1789 (Cactus Family)

A family of about 100 genera and 1500 species, herbs, shrubs, vines, and trees, of tropical, subtropical, and temperate America (a single species occurring as well in Africa, Madagascar, and Ceylon), with centers of diversity in sw. United States-Mexico, s. South America, and West Indies. References: Parfitt & Gibson in FNA (2003b); Barthlott & Hunt in Kubitzki, Rohwer, & Bittrich (1993); Anderson (2001).

**Opuntia** P. Miller 1754 (Prickly-pear Cactus)


**Identification notes:** new joints sometimes bear reduced leaves and have not yet developed spines; look for spines 1 or 2 joints back from the growing tip.

1 Spines absent.

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<table>
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<tr>
<td>2</td>
<td>Joints narrowly obovate, narrowly elliptic, or oblong, mostly 12-25 (-35) cm long, 7.5-10 (-20) cm broad; [of the Coastal Plain]...................... <em>O. stricta var. stricta</em></td>
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<tr>
<td>2</td>
<td>Joints orbiculate to obovate, 5-7.5 (12.5) cm long, 4-6 (-7.5) cm broad; [widespread in our area].</td>
</tr>
<tr>
<td>3</td>
<td>Joints mostly 7.5-10 (-15) cm long, 5-9 (-12.5) cm broad; hypanthium with 7 or more areoles; style diameter &lt; 3.5 mm; petals &gt; 3 cm long; [of the Coastal Plain]...................... <em>O. humifusa var. austrina</em></td>
</tr>
<tr>
<td>3</td>
<td>Joints mostly 5-7.5 (-12.5) cm long, 4-6.2 (-7.5) cm broad; hypanthium with 6 or fewer areoles; style diameter &gt; 3.5 mm; petals &lt; 3 cm long; [widespread in our area]...................... <em>O. humifusa var. humifusa</em></td>
</tr>
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1 Spines present.
4 Spines strongly and retrorsely barbed; joints slender, (2-)3-6 (-13) cm long, 2-5 (-7) cm broad, easily detached from the plant; spines to 3.7 cm long, 0-2 per areole (usually some areoles on a plant with 2 well-developed spines); [of coastal dunes]

...O. pusilla...

4 Spines not strongly and retrorsely barbed; joints broad, 10-30 cm long, 7.5-12.5 cm broad, not easily detached from the plant; spines to 7.5 cm long, 0-2 (-12) per areole; [of various habitats, including coastal dunes].

5 Spines (at least the larger) flattened throughout or basally, narrowly elliptic in cross-section, 0-11 per areole.

6 Spines 1-11 per areole, 1.2-4 (-6) cm long; pads 20-30 cm long, 5-12 cm broad.........O. stricta var. dillenii

6 Spines 0 (-1 per areole only in marginal areoles), usually < 2 cm long; pads 10-30 cm long, 7-15 (-25) cm broad ................................................................................................................. O. stricta var. stricta

5 Spines needle-like, not flattened, elliptic to circular in cross-section, 1-6 (-12) per areole.

7 Plants not mat-forming or prostrate, rising the height of several joints, commonly 3-20 dm tall; largest joints (7.5-) 10-30 cm long, (5-) 7.5-12.5 cm broad; spines gray, reddish-brown, or yellowish-brown; fruit 5-7.5 cm long, 4-5 cm in diameter; [introduced, rarely spread or persistent from cultivation] ...............O. monacantha

7 Plants low and mat-forming, usually prostrate and < 3 dm tall, the joints usually in series of 3-5; largest joints 3.8-10 cm long, 4-6 cm broad; spines white, gray, or brown; fruit 2.5-4 cm long, 2-3 cm in diameter; [native].

8 Joints mostly 7.5-10 (-15) cm long, 5-9 (-12.5) cm broad; spines to 8 cm long; hypanthium with 7 or more areoles; style diameter < 3.5 mm; petals > 3 cm long; [of the Coastal Plain].................................O. humifusa var. austrina

8 Joints mostly 5-7.5 (-12.5) cm long, 4-6 (-7.5) cm broad; spines to 3 cm long; hypanthium with 6 or fewer areoles; style diameter > 3.5 mm; petals < 3 cm long; [inland in our area].................................O. humifusa var. humifusa

Opuntia humifusa (Rafinesque) Rafinesque var. austrina (Small) Dress, Southern Prickly-pear. Cp (GA, SC): dunes, shell middens, and other dry sandy soils, mostly but not entirely on barrier islands; rare. Var. austrina (Small) Linnaeus Benson occurs throughout FL, and at scattered locations north to se. SC and west to se. TX. A third variety, var. ammophila (Small) L. Benson, is apparently endemic to FL, occurring in most of the state; it might occur in the southern portion of our area. It has more elongate joints than the other two varieties, with a length-to-width ratio of 2-4 (vs. 1-2) and is a more erect plant, often 3-4 joints high. [= K, Y, Z; < O. humifusa var. humifusa – FNA; = O. cumulicola Small – S; = O. compressa (Salisbury) J.F. Macbride var. austrina (Small) L. Benson]

Opuntia humifusa (Rafinesque) Rafinesque var. humifusa, Eastern Prickly-pear. Cp, Pd, Mt (GA, NC, SC, VA): dry open places, such as in thin soil around rock outcrops, sandhill forests and woodlands, dry barrens and woodlands, barrier island dunes, dry pastures; common (uncommon in Piedmont and Mountains). May-June; August-October. The only cactus widespread in e. North America, var. humifusa ranges from MA, MI, and e. IA, south to s. FL and c. TX, with some outlying stations farther west. Where growing in proximity to O. pusilla, the two species hybridize rather freely, sometimes producing hybrid swarms. See Doyle (1990) for discussion of the correct nomenclature for this taxon (O. compressa vs. O. humifusa). [= K, Y, Z; < O. humifusa var. humifusa – FNA; > O. compressa (Salisbury) J.F. Macbride var. compressa – G; < O. compressa – RAB; < O. humifusa (Rafinesque) Rafinesque – C, F, W; > O. pollardii Britton & Rose – G, S; > O. impedita Small – S; > O. macarriha Gibbes – S; > O. opuntia (Linnaeus) Karten – S]


Opuntia pusilla (Haworth) Nuttall, Dune Prickly-pear, Sand-bur Prickly-pear, Little Prickly-pear, Creeping Cactus. Cp (GA, NC, SC): dunes on barrier islands; uncommon. May-June; August-October. A Southeastern Coastal Plain endemic: NC (Dare county) south to FL and west to se. TX, nearly always within a few hundred meters of the sea. As mentioned by Small (1933) and RAB, this little coastal cactus is inconspicuous and often becomes attached by its retrorsely barbed-spines to the pants or shoes of people walking through the dunes. It can inflict painful wounds, the spines not easily removed from flesh or clothing because of the retrorse barbs. O. pusilla sometimes forms hybrid swarms with O. humifusa on coastal dunes (see Y for additional discussion). [= FNA, K, Z; = O. drummondii Graham – RAB, S]

Opuntia stricta (Haworth) Haworth var. dillenii (Ker-Gawler) L. Benson. Cp (GA, NC, SC): dunes on barrier islands; rare. Se. SC south to s. peninsular FL. This taxon was reported from NC by Small (1933), as O. tunoidea Gibbs. Benson (1982) and Doyle (1990) do not verify this distribution, showing var. dillenii reaching its northern limit along the coast in se. SC. [= K, Y, Z; < O. stricta – FNA; > O. tunoidea Gibbs – S]

Opuntia stricta (Haworth) Haworth var. stricta. Cp (GA, NC, SC, VA?): dunes, shell middens, sandhills, dry woodlands; rare. Se. NC (Robeson County) and c. SC south to s. peninsular FL, with a single collection from Isle of Wight County, VA, mostly near the coast. Small (1933) describes the habitat of O. stricta as "shell mounds, kitchenmiddens, and aboriginal village sites" and identifies it as the "the prickly-pears the early Spanish records tell us the aborigines feasted on for three months of each year and also cured, like figs, for food when out of season." [= K, Y, Z; < O. stricta – FNA; > O. stricta – S (in the narrow sense)]

Small (1933) also reports O. cantabrigiensis Lynch from dunes near Beaufort, NC, based on a fragmentary 1930 collection accompanied by a photograph. Similar plants were apparently seen near Beaufort by Engelmann, prior to 1856. Benson (1982) refers the collection tentatively to O. lindheimeri Engelmann var. cuija (Griffiths & Hare) L. Benson, treated in K as O. engelmannii Salm-Dyck var. cuija Griffiths & Hare, a native of Mexico. Benson (1982) also states, however, that it could also be var. lindheimeri (primarily of TX and Mexico), or, indeed, O. tuna (Linnaeus) P. Miller (native to the West Indies). Benson (1982) failed to relocate the plant in the field in 1956, but stated there was "insufficient time for a thorough search." Unless
relocated (and hope is fading for that, with the extensive destruction of maritime vegetation in the vicinity of Beaufort by construction), the identity of the plant will probably remain a mystery, as well as whether it represents a native species, an established population from aboriginal use, or a more recent introduction or adventive.

**CALLITRICHEACEAE** (Water-starwort Family)

(see PLANTAGINACEAE)

**CALYCANTHACEAE** Lindley 1819 (Sweet-shrub Family)

A family of 4 genera and about 8 species, shrubs and trees, of temperate e. China, temperate e. North America, temperate w. North America, and tropical ne. Australia. References: Nicely (1965); Wood (1958); Li et al. (2004); Kubitzki in Kubitzki, Rohwer, & Bittrich (1993).

*Calycanthus* Linnaeus 1759 (Sweet-shrub, Strawberry-shrub, Carolina Allspice, Sweet Bubby-bush)

A genus of 3-4 species, 1 or 2 of e. North America, 1 of w. North America, and 1 of China (the latter sometimes segregated as a separate genus, *Sinocalycanthus*). References: Johnson in FNA (1997); Kubitzki in Kubitzki, Rohwer, & Bittrich (1993); Nicely (1965)=Z; Ferry & Ferry (1987)=Y.

1 Tepals pale yellowish-green; seeds ca. 6 mm in diameter, with short, curved hairs ............................................ *C. brockianus*

1 Tepals reddish brown; seeds ca. 10 mm in diameter, with long, straighter hairs.

2 Twigs, petioles, and leaf undersurfaces pubescent ........................................................................ *C. floridus* var. *floridus*

2 Twigs, petioles, and leaf undersurfaces glabrous or very sparsely pubescent........................................ *C. floridus* var. *glaucus*

*Calycanthus brockianus* Ferry & Ferry, Brock Sweetshrub. Mt (GA): moist slopes; rare. Endemic to mesic hardwood forests in GA (GA Special Concern). Its taxonomic validity is uncertain and controversial. [= *C. brockiana* – K, Y, orthographic variant]

*Calycanthus floridus* Linnaeus var. *floridus*, Hairy Sweet-shrub. Mt (GA, NC, SC, VA), Pd (GA, NC, SC), Cp (GA, SC, VA): forested slopes and streambanks; uncommon (rare in NC and VA) (NC Watch List, VA Rare). April-May; August-September. MD and VA south and west to GA, nw. FL, AL, and s. MS, overall more southern and at lower elevations than var. *glaucus* (though with great overlap). [= RAB, FNA, GW, K, Y, Z; = *C. floridus* – F; > *C. floridus* – S; > *C. mohrii* Small – S]


**CALYCERACEAE** R. Brown ex Richard 1820 (Calycera Family)

*Acicarpha* Antoine Laurent de Jussieu


* Acicarpha *tribuloides* Antoine Laurent de Jussieu. Cp (NC, SC): on ship's ballast near old port-cities; rare (probably no longer present), introduced from South America (native range Brazil, Uruguay, Paraguay, and Argentina). The NC and SC records were both collected by Gerald McCarthy in 1888; though the localities are not specified, the likely sites (based on his itinerary and what is known of the species) are Wilmington and Charleston. DeVore (1991) discusses ballast plants and the apparent failure of *Acicarpha* to naturalize in North America. This species has not been collected in our area (or North America) since 1888; it is here treated for historical interest and to increase the likelihood that it will be relocated, if it is, indeed, actually naturalized. [= K, S, Z]

**CAMPANULACEAE** A.L. de Jussieu 1789 (Bellflower Family)

(also see SPHENOCLEACEAE)

A family of about 82 genera and 2000 species, mostly herbs, cosmopolitan. There is controversy about the circumscription of the family, specifically whether subfamily Lobelioideae should be recognized at the family level. References: Rosatti (1986)=Z; Eddie et al. (2003); Shulkina, Gaskin, & Eddie (2003).

1 Corollas bilaterally symmetrical (zygomorphic); carpels 2; [subfamily Lobelioideae] ............................................ *Lobelia*
Corollas radially symmetrical (actinomorphic); carpels (2-) 3-5; [subfamily Campanuloideae].

Inflorescence spicate, the flowers sessile, mostly in the axils of well-developed leaves; corollas rotate and style straight .................................................. Triodanis

Inflorescence racemose or paniculate, the flowers pedicelled, sometimes axillary to well-developed leaves; corollas campanulate or funnelform, with a straight or curved style (Campanula) or rotate with a curved style (Campanulastrum).

Corolla campanulate or funnelform; style straight or curved; small to fairly coarse perennials...... Campanula

Corolla rotate; style curved; coarse annual or biennial.............................................. Campanulastrum

Capsule dehiscent apically; flowers solitary or in very diffuse panicles (Platycodon, Wahlenbergia), or in compact involucrate umbels (Jasione); [aliens, generally in weedy or disturbed situations].

Flowers and fruits borne in an involucrate umbel .......................................................................................... Jasione

Flowers and fruits solitary or in a diffuse inflorescence.

Flowers large, 1 to few, solitary or nearly so; leaves large, ovate to elliptic .............................................. Platycodon

Flowers small, several to many, borne in a diffuse inflorescence; leaves small, linear to narrowly elliptic...... Wahlenbergia

Campanula Linnaeus (Bellflower)
(also see Campanulastrum)

A genus of about 300 species, herbs (rarely shrubby), north temperate, most diverse in s. Europe. References: Rosatti (1986)=Z; Shetler & Morin (1986); Shetler (1982)=Y.

Stems weak and slender, reclining, 3-angled.

Corolla 4-10 mm long; pedicels divergent, the bractless portion 0.4-4 cm long; corolla white to very pale blue........... C. aparinoides var. aparinoides

Corolla 5-13 mm long; pedicels ascending, the bractless portion 1-8 cm long; corolla pale blue.......................... [C. aparinoides var. grandiflora]

Stems more robust, erect, terete or nearly so.

Flowers on long pedicels (generally longer than 40 mm long), the inflorescence a diffuse panicle; [native species of rock outcrops or rocky woodlands].

Corolla 6-8 mm long; leaves lanceolate, averaging about 1 cm wide, generally with prominent, often somewhat divergent teeth; [section Rapunculus] .............................................................................. C. divaricata

Corolla 12-20 mm long; leaves of the stem linear, averaging < 5 mm wide, generally lacking teeth (or the teeth minute and obscure); [section Campanula, subsection Heterophylla] ..................................... C. rotundifolia

Flowers mostly on short pedicels (the upper < 5 mm long), the inflorescence a raceme; [alien species usually of disturbed areas].

Capsules with pores in the apical half; [section Rapunculus, subsection Campanulastrum] .................. C. persicifolia

Capsules with pores at or near the base........................................................................................................ C. rapunculoides

Campanula aparinoides Pursh var. aparinoides, Marsh Bellflower. Mt (GA, NC, VA), Pd, Cp (VA): bogs, marshes, wet meadows, seepage slopes over mafic or calcareous rocks; uncommon (rare in NC and VA Piedmont and VA Coastal Plain) (GA Special Concern; NC Rare). Late June-August; August-September. Widespread in ne. North America, south to se. Mexico. [F, S]

Campanula divaricata Michaux, Southern Harebell, Appalachian Bellflower. Mt, Pd (GA, NC, SC, VA), Cp (NC): rock outcrops, cliffs, rocky summits, talus, up to at least 1850m; common (uncommon in Piedmont). July-October; September-December. A broad endemic of the Southern and Central Appalachians: MD and KY south to AL and GA. [C. aparinoides – F, S]

Campanula persicifolia Linnaeus, Peachleaf Bellflower. Mt (NC): naturalized from gardens; rare, native of Eurasia. This species was reported by Small (1933) as “escaping from gardens” in w. NC; no specimens have been seen to document this occurrence. Additional documentation is needed to confirm this record. [C. aparinoides – F, S]


Campanula rotundifolia Linnaeus, Bluebell, Harebell, Bluebell-of-Scotland. Mt (NC, VA): limestone outcrops, high elevation rocky summits (in thin soil over amphibolite); rare (NC Rare, NC Rare). July-August; August-September. A circumboreal species, widespread and common in n. North America and n. Eurasia, southward becoming rare, and generally limited to limestone in its occurrences in the Central Appalachians of WV and VA. It was added to the flora of NC in 1991. See Shetler (1982) for a detailed study of the species. [C. aparinoides – F, S]
Campanula aparinoides var. grandiflora Holzinger ranges south to PA. It should be sought in our area. It has been variously treated at a species, variety, geographic phase, or form; its taxonomic status is uncertain. [= C, G; < C. aparinoides – K; = C. uliginosa Rydberg – F]

Campanulastrum Small (Tall Bellflower)

A monotypic genus, a biennial herb, distinct from Campanula (Shulkina, Gaskin, & Eddie 2003). As stated by Shetler & Morin (1986), "Small's view [segregating Campanula americana into the monotypic genus Campanulastrum] appears to have increasing justification from palynological, cytological, and now seed evidence." References: Rosatti (1986)=Z; Shetler & Morin (1986); Shulkina, Gaskin, & Eddie (2003).

Campanulastrum americanum (Linnaeus) Small, Tall Bellflower. Mt, Pd (GA, NC, SC, VA), Cp (GA, VA): moist to fairly dry forests, especially over mafic or calcareous rocks; common (uncommon in Piedmont and rare in Coastal Plain) (SC Rare). Late June-September; August-October. This coarse annual or biennial is distributed nearly throughout e. North America. [= K, S; = Campanula americana Linnaeus – RAB, C, F, G, W, Z]

Jasione Linnaeus (Sheep's-bit)

References: Rosatti (1986)=Z.


Lobelia Linnaeus 1753 (Lobelia)


1 Corolla bright red (faded in dried specimens) or very rarely white, 30-45 mm long .............................................. L. cardinalis
1 Corolla blue, purple, or white, 10-33 mm long.
2 Larger leaves in a basal rosette, elongate, either linear or linear-oblanceolate with an elongate petiole; [plants of wetlands, often growing in shallow water].
   3 Leaves linear, fleshy, and hollow; [of the northern United States, rarely south to MD, PA, and NJ] .............................................. [L. dortmanna]
   3 Leaves linear-oblanceolate, not hollow; [of the Southeastern Coastal Plain from NC (?) or GA southward and westward].
   4 Calyx segments with small auricles at the base; pedicels with very small bracteoles at the base; filament tube (6-) 7-9 (-11) mm long; corolla tube not fenestrate; larger leaves 10-30 cm long; plants (5-) 8-10 (-15) dm tall .............................................. L. floridana
   4 Calyx segments not auriculate; pedicels lacking bracteoles; filament tube 3-4.5 mm long; corolla tube fenestrate; larger leaves 5-12 cm long; plants (4-) 5-6 (-13) dm tall .............................................. L. paludosa
2 Larger leaves cauline; [collectively of a range of habitats].
5 Flowers relatively large, the corolla (including the hypanthium) 18-33 mm long, fenestrate.
   6 Calyx with prominent leafy auricles; pedicels with bracteoles near the middle ….. L. sipilitica var. sipilitica
   6 Calyx not auriculate; pedicels with bracteoles near the base (or sometimes near the middle in L. puberula).

L. amoena
L. elongata
L. georgiana
[L. brevifolia]
L. glandulosa
L. sp. 1
L. puberula var. mineolana
L. puberula var. puberula
L. puberula var. simulans

5 Flowers relatively small, the corolla (including the hypanthium) 7-22 mm long, not fenestrate (except XX).
15 Stem leaves very narrow, the largest on a plant 1-5 mm wide.
16 Pedicels lacking bracteoles (but with subtending bracts); plant perennial from rhizomes, the stem often spongy-thickened toward the base...........................................................................L. boykinii
16 Pedicels bearing bracteoles near the base or middle (and also with subtending bracts); stems not spongy-thickened.
17 Bracteoles borne near the middle of the pedicel; [of northern wetlands, south to WV and PA]...........

17 Bracteoles borne at the base of the pedicel; [collectively widespread in our area].
18 Lower lip of corolla pubescent inside at the base; corolla blue, lacking a white eye....L. canbyi
18 Lower lip of the corolla glabrous; corolla blue, with a white eye.............................L. nuttallii
15 Stem leaves broader, the largest on a plant > 10 mm wide.
19 Bracteoles borne near the middle of the pedicel.........................................................L. flaccidifolia
19 Bracteoles borne at the base of the pedicel.

[L. appendiculata var. appendiculata]
[L. appendiculata var. gattingeri]
L. inflata
L. spicata var. leptostachys
L. spicata var. scaposa
L. spicata var. spicata
[L. spicata var. campanulata]

Lobelia amoena Michaux. Mt (GA, NC, SC), Pd (GA): marshes, streambanks, seeps; common. Late July-October. W. NC and e. TN south to c. GA and ec. AL. Reported for VA by Kartesz (1999), supposedly on the basis of McVaugh (1936), but McVaugh does not record L. amoena for VA. [= RAB, C, GW, S, Y; = L. amoena var. amoena – K; < L. amoena – W]


Lobelia canbyi A. Gray. Cp (GA, NC, SC): pine savannas; uncommon. July-November. NJ to GA in the Coastal Plain; disjunct in Coffee County, TN, with other Coastal Plain plants. [= RAB, C, F, GW, K, S, Y]


Lobelia floridana Chapman. Cp (GA, NC?): wet pine savannas and flatwoods, depression ponds; rare. Se. GA (Jones & Coile 1988), Panhandle FL west to LA; disjunct in se. NC? McVaugh (1936) reports this species for Wilmington, New Hanover County, NC, based on a collection by MacFarlane in 1909 (PENN). This record seems unlikely and needs confirmation; mislabeling is a possibility. [= GW, K, S, Y]

Lobelia georgiana McVaugh. Cp, Pd (GA, NC, SC, VA), Mt (NC): swamps, wet places; common. August-October. See McVaugh (1940) for an explanation of the need to replace the name L. glandulifera with L. georgiana. [= C, F, GW; < L. elongata – RAB; = L. amoena Michaux var. glandulifera A. Gray – K; = L. glandulifera (A. Gray) Small – S, Y; < L. amoena – W]


Lobelia siphilitica Linnaeus var. siphilitica, Great Blue Lobelia. Mt (GA, NC, VA), Pd, Cp (VA): Late July-October. [= C, F, GW, K, Y; < L. siphilitica – RAB, S, W]

Lobelia sp. 1. Cp (NC, SC): seepages; rare. Endemic to the Sandhills Region of NC and SC. Under study by A. Bert Pittman. ["L. batissonii" in prep.]


Lobelia spicata Lamarck var. scaposa McVaugh. (NC, SC, VA): Late May-August. [= C, F, K, Y; < L. spicata – RAB, GW, S, W]
**Lobelia spicata** Lamarck var. *spicata*. (GA, NC, SC, VA): Late May-August. [= F, G, K; < *L. spicata* var. *spicata* – C; < *L. spicata* – RAB, GW, W; > *L. spicata* – S; > *L. bracteata* Small – S; = *L. spicata* var. *originalis* – Y]

**Lobelia appendiculata** Alphonse de Candolle var. *appendiculata*. AL westward to KS, OK, and TX. [= K; = *L. appendiculata* – GW, S, Y]

**Lobelia appendiculata** Alphonse de Candolle var. *gattingeri* (A. Gray) McVaugh. Endemic to sc. KY south through c. TN to n. AL. [= K; = *L. appendiculata* – GW, S, Y]

**Lobelia brevifolia** Nuttall ex Alphonse de Candolle Savannas, flatwoods, and bogs, endemic to the East Gulf Coastal Plain of FL, AL, MS, and LA. [= GW, K, S, Y]

**Lobelia dortmanna** Linnaeus, Water Lobelia, south to NJ, MD, and PA (Kartesz 1999). [= C, F, G, K, Y]

**Lobelia kalmii** Linnaeus, south to WV and PA. [= C, F, G, K, Y]

**Lobelia puberula** Michaux var. *mineolana* F. Wimmer. East to AL and KY. [= K; < *L. puberula* – C, G, GW, S; = *L. puberula* "form d" – Y]

**Lobelia spicata** Lamarck var. *campanulata* McVaugh. South to MD, WV, PA. [= F, G, K, Y; < *L. spicata* var. *spicata* – C; < *L. spicata* – W]

**Platycodon** Alphonse de Candolle (Japanese Bellflower, Balloonflower)


* **Platycodon grandiflorum** (Jacquin) Alphonse de Candolle, Japanese Bellflower, Balloonflower. Cp, Pd (NC): ditches, disturbed areas, spread from horticultural cultivation; rare, introduced from e. Asia. [= RAB, K, Z]

**Triodanis** Rafinesque ex Greene (Venus's Looking-glass)

A genus of 8 species, annual herbs, American and s. Europe. References: McVaugh (1945)=Z; McVaugh (1948). Key based on Z.

1 Openings of the capsule linear, 0.2-0.4 mm wide; seeds minutely tuberculate in longitudinal lines ..................[T. holzingeri]
1 Openings of the capsule broadly elliptic, oval, or rounded, 0.5-1.5 mm wide; seeds either muricate over the entire surface or nearly to quite smooth.
2 Pores at or very near the apex of the capsule; seeds smooth and highly polished; open (chasmogamous) corolla usually 1 (the terminal), the others usually closed (cleistogamous) ................................................................. T. biflora
2 Pores well below the apex of the capsule (usually 1-1.5 mm below), usually about midway between apex and base; seeds muricate or smooth and lustrous; open (chasmogamous) corollas usually several.................. T. perfoliata


**Triodanis perfoliata** (Linnaeus) Nieuwland. Cp, Pd, Mt (GA, NC, SC, VA): roadsides, gardens, glades, disturbed areas; common. April-June. ME and British Columbia south to FL and Mexico; West Indies; Ecuador. [= C, K, Z; = Specularia perfoliata (Linnaeus) Alphonse de Candolle – RAB, F, G; = T. perfoliata var. *perfoliata* – W]

**Triodanis holzingeri** McVaugh, east to TN. [= K, Z; = Specularia holzingeri (McVaugh) Fernald – F]

**Wahlenbergia** Schrader ex Roth (Wahlenbergia)

References: Rosatti (1986)=Z.

* **Wahlenbergia marginata** (Thunberg) Alphonse de Candolle. Cp (GA, NC, SC), Pd (GA): sandy soils along roadsides and in fields; common, introduced from e. Asia and Oceania. Apparently only recently introduced in se. United States, the earliest recorded date 1937 in Alachua County, FL (Rosatti 1986), but now quite common on sandy roadsides. [= RAB, K, Z]

**CANNABACEAE** Endlicher 1827 (Hops Family)

As circumscribed to include the Celtidaceae, a family of 14 genera and about 120 species, trees, shrubs, woody vines, herbs, and herbaceous vines, of cosmopolitan distribution. Zavada & Kim (1996) discuss compelling reasons to recognize the Celtidaceae as a family distinct from the Ulmaceae. The distinctiveness of the Celtidaceae from the Cannabaceae and Moraceae is more questionable; and Sytsma et al. (2002) conclude that Celtidaceae should be considered a part of Cannabaceae. References: Small
\section*{CANNABACEAE}

In FNA (1997); Kubitzki in Kubitzki, Rohwer, & Bittrich (1993); Sherman-Broyles, Barker, & Schulz in FNA (1997); Zavada & Kim (1996); Todzia in Kubitzki, Rohwer, & Bittrich (1993); Sytsma et al. (2002).

1 Tree or shrub; leaves simple and unlobed........................................................................................................... \textit{Celtis}

1 Herb or vine; leaves either compound or lobed.

2 Erect herb; leaves with 3-7 leaflets ....................................................................................... \textit{Cannabis}

2 Climbing or sprawling vine; leaves simple, with 1-9 lobes................................................................. \textit{Humulus}

\textit{Cannabis} Linnaeus 1753 (Hemp, Marijuana)

A genus of 1-3 species, herbs, originally native to c. Asia. \textit{Cannabis} was formerly widely cultivated nearly worldwide for the fiber hemp; it is now better known as the source of the drug marijuana. References: Small in FNA (1997); Hillig & Mahlberg (2004); Kubitzki in Kubitzki, Rohwer, & Bittrich (1993).

* \textit{Cannabis sativa} Linnaeus, Hemp, Marijuana. Mt, Pd, Cp (GA, NC, SC, VA): disturbed areas and clandestinely cultivated plots; uncommon, introduced from Asia. June-October. Though perhaps not truly naturalized or persistent, \textit{Cannabis} is treated here since clandestine cultivated plots will be encountered fairly regularly by the field biologist, especially in fairly remote areas in the mountainous parts of our area. [= F, FNA, G; \textit{C. sativa} Linnaeus ssp. sativa – C, K]

\textit{Celtis} Linnaeus 1753 (Hackberry)


1 Branches armed with short spines........................................................................................................... [\textit{C. iguanaea}]

1 Branches unarmed.

2 Leaf blades mostly \(> 2 \times \) as long as wide, the tip attenuate and long-acute to long-acuminate, the base cuneate to rounded; leaf margins entire or with a few teeth on each margin; leaves glabrous or nearly so (except the margins often ciliate); [large trees, mostly of floodplains, but also in upland situations over calcareous substrates such as limestone, dolostone, and shell middens]........................................................................................................... \textit{C. laevigata}

2 Leaf blades mostly \(< 2 \times \) as long as wide, the tip obtuse to short-acuminate, the base slightly to strongly cordate at least on one side; leaf margins entire or with a few teeth on each margin (the plant then a shrub or small tree of rocky places) or distinctly serrate with 10-35 teeth on each margin; leaves scabrous above, at least toward the tip; [shrubs to medium trees, of floodplains, moist slopes, and dry rocky woodlands, barrens, and glades].

3 Leaves 2-8 cm long, toothed only near the tip if at all; fruit 5-14 mm long, ellipsoid or subglobose, dark orange, purple, or black, on a pedicel 7-25 mm long; [small to medium trees of dry to moist habitats]..........

3 Leaves 5-12 cm long, toothed only near the tip if at all; fruit 7-14 mm long, ellipsoid or subglobose, dark orange, red, or brown, on a pedicel 3-13 mm long; [shrubs or small twisted trees of dry, rocky habitats]..........

\textit{C. occidentalis}

\textit{Celtis laevigata} Willdenow, Southern Hackberry, Sugarberry. Cp, Pd, Mt (GA, NC, SC, VA): bottomland forests, especially on natural levees, upland calcareous forests and woodlands, shell middens; common (uncommon in the Mountains). April-May; August-October. MD, WV, IN, IL, MO and KS south to FL and TX. [= RAB, C, FNA, G, GW, W; \textit{C. laevigata} var. laevigata – F; \textit{C. laevigata} var. smallii (Beadle) Sargent – F; \textit{C. laevigata} var. laevigata – K; \textit{C. mississippiensis} Bosc – S; \textit{C. smallii} Beadle – S]

\textit{Celtis occidentalis} Linnaeus, Northern Hackberry. Mt, Pd, Cp (GA, NC, VA): xeric to mesic glades, outcrops, barrens, woodlands, and bottomland forests, usually over calcareous substrate; common (rare in NC). April-May; August-October. NH, Québec, Manitoba, and MT south to FL, TX, and NM. [= C, FNA, G, K, S, W; \textit{C. occidentalis} var. occidentalis – RAB; \textit{C. occidentalis} var. canina (Rafinesque) Sargent – F; \textit{C. occidentalis} var. occidentalis – F; \textit{C. occidentalis} var. pumila (Pursh) A. Gray – F]

\textit{Celtis tenuifolia} Nuttall, Dwarf Hackberry, Georgia Hackberry. Mt (GA, NC, VA), Pd, Cp (GA, NC, SC, VA): xeric to mesic glades, outcrops, barrens, woodlands, often over calcareous substrate; common (uncommon in Mountains of NC). April-May; August-October. NJ, PA, IN, IL, and KS south to FL and TX. [= C, FNA, G, K, W; \textit{C. occidentalis} var. georgiana (Small) Ahles – RAB; \textit{C. tenuifolia} var. georgiana (Small) Fernald & Schubert – F; \textit{C. tenuifolia} var. tenuifolia – F; \textit{C. georgiana} Small – S]

\textit{Celtis iguanaea} (Jacquin) Sargent, Iguana Hackberry. Shell-middens and calcareous coastal sites. AL, FL, West Indies, American tropics. [= K; \textit{Momisia iguanaea} (Jacquin) Rose & Standley – S]

\textit{Humulus} Linnaeus 1753 (Hops)

\textit{Humulus} Linnaeus 1753 (Hops)
CANNABACEAE

A genus of 2 species, herbaceous vines, of temperate regions of the Northern Hemisphere. References: Small (1978)=Z; Small in FNA (1997); Kubitzki in Kubitzki, Rohwer, & Bittrich (1993). Key adapted from Z.

1 Veins on lower surface of leaves armed with rigid, spinulose hairs; bracts of pistillate flowers spinulose-ciliate; most leaves 5-9 lobed .......................................................... H. lupulus

1 Veins on lower surface of leaves more or less pubescent with lax, weak hairs, but lacking rigid, spinulose hairs; bracts of pistillate flowers smooth-margined; most leaves 1-3 lobed.

2 Lower surfaces of leaves (measured on middle lobe of 4-6 cm long leaves of flowering or fruiting branches) with usually with < 20 hairs per cm of length of midrib; glands (measured on leaves as above) < 25 per 10 square mm of intervein lower leaf surface; [introduced variety, sometimes showing introgression with native varieties]..........................

.............................................................................................................................. H. lupulus var. lupulus

2 Lower surfaces of leaves (measured on middle lobe of 4-6 cm long leaves of flowering or fruiting branches) usually with > 20 hairs per cm of length of midrib; glands (measured on leaves as above) > 25 per 10 square mm of intervein lower leaf surface; [native varieties, though often weedy and sometimes showing introgression with var. lupulus].

3 Lower surfaces of leaves (measured on middle lobe of 4-6 cm long leaves of flowering or fruiting branches) conspicuously pubescent between the veins and on the veins, with > 100 hairs per cm of length of midrib; smaller leaves unlobed (less commonly 3-lobed) ...............................................................

.............................................................................................................................. H. lupulus var. pubescens

3 Lower surfaces of leaves (measured on middle lobe of 4-6 cm long leaves of flowering or fruiting branches) not conspicuously pubescent, the pubescence usually limited to the veins, usually with < 100 hairs per cm of length of midrib; smaller leaves generally 3-lobed ...............................................................

.............................................................................................................................. H. lupulus var. lupuloides

* Hulus lupulus Linnaeus Siebold & Zuccarini, Japanese Hops. Mt (VA), Pd (GA, NC, SC, VA), Cp (NC, VA): disturbed areas, particularly in rich, alluvial soils, where it has become a serious weed along major VA rivers; common (in NC and SC), introduced from Asia, native to Japan, Taiwan, and China. June-October; July-October. [= RAB, C, F, FNA, G, K, W, Z]

Humulus lupulus Linnaeus var. lupuloides E. Small, Northeastern Hops. Pd, Mt (VA), Cp (NC, VA): disturbed areas, particularly in rich, alluvial soils; uncommon (in NC and in VA Coastal Plain) (NC Watch List). July-August; September-October. Nova Scotia and Newfoundland south to VA and NC, west to NE, MT, and Alberta. It is not clear whether its occurrence in NC is native or introduced from further north. The 3 varieties (two native and one introduced) in our area are subtly different, the differences apparently sometimes further obscured by introgressive hybridization. [= C, FNA, K, Z; < H. lupulus – RAB, F, G, S, W]

* Hulus lupulus Linnaeus var. lupulus, Brewer's Hops, European Hops. Pd (VA): disturbed areas; rare, introduced from Europe. July-August; September-October. The European var. lupulus is (of course) one of the key ingredients of beer. [= C, FNA, K, Z; < H. lupulus – RAB, F, G, S, W]

Humulus lupulus Linnaeus var. pubescens E. Small, Midwestern Hops. Mt (GA, NC, VA), Pd (NC, VA), Cp (VA): disturbed areas, particularly in rich, alluvial soils; rare (NC Watch List). July-August; September-October. NY and PA south to NC and ne. GA and west to MN, NE, KA, and AR). It is not clear whether the few occurrences east of the Blue Ridge (including those in NC and VA) are native or adventive from further west. [= C, FNA, K, Z; < H. lupulus – RAB, F, G, S, W]

CAPPARACEAE A.L. de Jussieu 1789 (Caper Family)

(see CLEOMACEAE)

CAPRIFOLIACEAE A.L. de Jussieu 1789 (Honeysuckle Family)

(also see ADOXACEAE, DIERVILLACEAE, and LINNAEACEAE)

As here circumscribed, a family of about 5 genera and 220 species, shrubs, trees, and less typically herbs and vines, mainly north temperate and boreal. Circumscription of the family is controversial. Various segregate families (or reassignments) of taxa traditionally placed in the Caprifoliaceae have been proposed, including the transfer of Sambucus and Viburnum to the Adoxaceae, placement of Diervilla and Weigela in the Diervillaceae (Backlund & Pyck 1998), placement of Abelia and Linnaea in the Linnaeaceae (Backlund & Pyck 1998), and retention of Lonicera, Symphoricarpus, and Triosteum in a much more narrowly circumscribed Caprifoliaceae. Alternatively, all these taxa could be included in the Caprifoliaceae, along with Dipsacaceae and Valerianaceae, as a very broadly circumscribed Caprifoliaceae. References: Backlund & Pyck (1998); Ferguson (1966a).

Lonicera Linnaeus 1753 (Honeysuckle)

A genus of about 180 species, shrubs and vines, mainly north temperate. References: Ferguson (1966a)=Z; Rehder (1903)=Y; Green (1966).

1 Flowers in opposite 3-flowered cymes, borne in terminal clusters subtended by connate leaves; corolla red and yellow (or yellowish-orange only); twining vine or shrub with vining tendencies (in L. flava the 'vininess' sometimes not apparent).
2. Corolla tube (20-)30-50 mm long; corolla lobes 4-8 mm long, more or less radially symmetrical; [of a wide variety of habitats, primarily in the Piedmont and Coastal Plain].

3. Leaves ciliate, pubescent on the upper surface; hypanthium glandular or glabrous; stems glandular or glabrous; ........................................................... L. sempervirens var. hirsutula

4. Leaves entire, glabrous on the upper surface; hypanthium glabrous; stems glabrous; ........................................................... L. sempervirens var. sempervirens

2. Corolla tube 10-30 mm long; corolla lobes 8-15 mm long, unequally divided into 2 lips (4 lobes on the upper side and one lobe on the lower side); [of ridgetops, rocky slopes, granite domes, and bogs of the Mountains, or of areas to the north or west of the primary area].

4. Leaves pubescent on the upper surface; [of moist forests, south to PA] ........................................................... L. hirsuta

4. Leaves glabrous on the upper surface.

5. Fused leaves immediately below the inflorescence glaucous on the upper surface, rounded or emarginate; [of c. TN and other areas west and north of our primary area] ........................................................... L. reticulata

6. Corolla tube 30-35 mm long; leaves gray beneath; [of soil mats on dome outcrops of s. NC, SC, and GA and westward] ........................................................... L. flava

6. Corolla tube 15-25 mm long; leaves strongly white-glaucous beneath; [of rocky forests, ridgetops, and bogs of n. NC, VA, and northward].

7. Hypanthium glabrous; leaves glabrous beneath; style glabrous to sparsely hairy; ........................................................... L. diocia var. diocia

7. Hypanthium densely glandular; leaves sparsely to densely villous beneath; style hirsute; ........................................................... L. diocia var. orientalis

1. Flowers in peduncled pairs in the axils of leaves, not subtended by connate leaves; corolla white to pastel pink or yellow; plant an erect shrub or (L. japonica) a trailing or climbing vine.

8. Trailing or climbing vine; corolla 30-50 mm long; fruit black at maturity; leaves of vigorous shoots often pinnately lobed; ........................................................... L. japonica

8. Upright shrub; corolla 7-25 mm long; fruit red or yellow at maturity; leaves unlobed.

9. Branches with solid and continuous, white pith; [native and exotic species].

10. Corolla lobes 5, nearly equal; ovaries separate, divergent; [native species of cool moist forests and bogs] ........................................................... L. canadensis

10. Corolla lobes fused into a 4-lobed lip and a 1-lobed lip; ovaries fused; [exotic species].

11. Branches glabrous; corolla glabrous on the exterior ........................................................... L. fragrantissima

11. Branches retrorsely hispid with reddish-brown hairs; corolla pilose on the exterior ........................................................... L. standishii

9. Branches hollow between the nodes, with tannish pith; [exotic species, many of them seriously invasive and likely to be encountered in natural areas].

12. Peduncles shorter than or equal to the subtending petiole; leaves ovate (broadest near the base) and distinctly long-acuminate; ........................................................... L. maackii

12. Peduncles longer than the subtending petiole; leaves elongate (broadest near the middle) and obtuse to acute (rarely short-acuminate).

13. Leaves glabrous; peduncles 15-25 mm long; ........................................................... L. tatarica

13. Leaves pubescent, at least on the lower surface; peduncles 5-15 mm long.

14. Corolla pink (aging to yellow), nearly glabrous on the exterior, barely bulging on one side at the base; leaves thinly pubescent beneath ........................................................... L. × bella

14. Corolla white (aging to yellow), pubescent on the exterior, distinctly bulging on one side at the base; leaves rather densely grayish-pubescent beneath.

15. Bracts and sepals ciliate, not glandular; ovary lacking glands; leaf blades broadest at or below the middle; ........................................................... L. × morrowii

15. Bracts and sepals glandular; ovary glabrous; leaf blades broadest beyond the middle; ........................................................... L. ×xylosteum


Lonicera diocia Linnaeus var. dioica. Mt (GA, NC, VA): shrubby mountain bogs at high elevations; rare (GA Special Concern). June-August; August-September. MA and Québec west to WI, south to NJ, NC, and IN. [= C, F, G, Z; < L. diocia – RAB, K, W; = L. diocia – S, Y ]

Lonicera diocia Linnaeus var. orientalis Gleason. Mt (NC, VA): seepages; rare. June-August; August-September. S. Ontario west to s. MI, south to w. VA and w. NC. [= C, G; < L. diocia – RAB, K, W; < L. diocia var. glaucescens (Rydb) Butters – F, Z; = L. glaucescens (Rydb) Rydberg – S, Y ]

* Lonicera fragrantissima Lindley & Paxton, Sweet-breathe-of-spring. Pd (GA, NC, VA), Cp, Mt (VA). [SC]: forests, woodlands, old house sites; common and invasive, introduced from China. February-early April; April-May. [= RAB, K, Y, Z; = *Xylosteon fragrantissimum* (Lindley & Paxton) Small – S]


* Lonicera maackii* (Ruprecht) Maximowicz, Amur Honeysuckle. Pd (GA, NC, SC, VA), Cp (NC, VA), Mt (GA, VA): suburban woodlands, moist forests, fencerows; common, introduced from e. Asia (China, Korea, Japan). May-June. Aggressively invasive in the vicinity of DC. [= C, K, Y, Z]

* Lonicera morrowii* A. Gray, Morrow's Honeysuckle. Mt (NC, SC, VA), Pd, Cp (VA): forests, woodlands, old house sites, suburban woodlands; common, introduced from China. April. Seriously invasive in WV, MD, DC, and northward; first reported for NC by Leonard (1971b) and for SC by Hill & Horn (1997). [= C, K, W, Y; > *L. morrowii* – F, G, orthographic variant]


* Lonicera sempervirens* Linnaeus var. *selyemprivirens*, Coral Honeysuckle. Cp, Pd, Mt (GA, NC, SC, VA): dry forests and woodlands, maritime forests; common. March-July (and sporadically to November); July-September. CT to OK, south to FL and TX; and more widely distributed as an escape from cultivation. [= C, G, K, Y; < *L. sempervirens* – RAB, GW, W, Z; > *L. sempervirens* var. *minor* Aiton – F; < *Phenianthus sempervirens* (Linnaeus) Rafinesque – S]

* Lonicera standishii* Jacques, Standish's Honeysuckle. Pd (NC): forests, woodlands, old home sites; rare but locally abundant, introduced from China. Invasive in c. NC (Uwharrie National Forest, Montgomery County, NC). Also reported from KY (Jones 2005), se. PA (Rhoads & Klein 1993), and MD (Kartesz 1999). [= F, K, Y]

* Lonicera tatarica* Linnaeus, Tartarian Honeysuckle. Pd, Cp, Mt (VA): disturbed forests; uncommon, introduced from Central Asia. [= C, F, G, K; > *L. tatarica* var. *tatarica* – Y]

* Lonicera xylosteum* Linnaeus, European Fly-honeysuckle. Mt (VA): disturbed forests; uncommon, introduced from Europe and Asia. Establishing mainly in ne. United States, south to VA, MD (Kartesz 1999), and KY (Clark et al. 2005). [= C, F, G, K; > *L. xylosteum* var. *xylosteum* – Y]

**Symphoricarpos** Duhamel (Snowberry, Coralberry)

A genus of about 17 species, shrubs, of North America and e. Asia. References: Jones (1940); Ferguson (1966a)=Z.

1 Corolla 2-4 mm long; fruits pink to purple ..........................................................**S. orbiculatus**

1 Corolla 5-9 mm long; fruits white.

2 Fruit 6-10 (-12) mm in diameter; young twigs puberulent; leaves usually pubescent beneath; shrub usually < 1 m tall; [native].............................................................................................................................................**S. albus** var. *albus*

2 Fruit 12-20 mm in diameter; young twigs glabrous; leaves usually glabrous beneath; shrub usually 1-2 m tall; [introduced].............................................................................................................................................**S. albus** var. *laevigatus*

**Symphoricarpos albus** (Linnaeus) Blake var. *albus*, Common Snowberry. Mt (VA): limestone woodlands; rare (VA Rare). Québec west to s. AK, south to w. VA, WV, MI, MN, and CA. Var. *albus* is the more eastern variety. [= C, F, G, K, Z; < *S. albus* – RAB, S, W]


**Symphoricarpos orbiculatus** Moench, Coralberry. Mt, Pd (GA, NC, SC, VA), Cp (NC, VA): moist to dry forests, woodlands, thickets, pastures, and old fields, especially over mafic or calcareous rocks; common. Late July-September; September-November (and often persisting well into winter). CT west to IN, MN, and CO, south to FL, TX, and Mexico. Seemingly increasing in VA and behaving aggressively in dry woodlands and barrens over greenstone and diabase. [= RAB, C, F, G, K, W, Z; = *S. symphoricarpos* (Linnaeus) MacM. – S]
Symphoricarpos occidentalis Hooker, Western Snowberry, in PA, MD, KY. {investigate} [= K] {not keyed at this time}

Triosteum Linnaeus (Horse-gentian, Feverwort)

A genus of 6 species, rather woody herbs, of e. Asia (3 species) and e. North America (3 species); the 3 North American species form one clade, the 3 Asian species another (Gould & Donoghue 2000). References: Gould & Donoghue (2000); Ferguson (1966a)–Z.

1 Longer (nonglandular) hairs of the stem 1.5-3 mm long; corolla greenish-yellow; leaves 1.5-6 cm wide.
   2 Lower leaf surface glabrous or pubescent only along the main veins; leaves averaging 4× as long as wide .................
      .............................................................................................................................. T. angustifolium var. angustifolium
   2 Lower leaf surface densely puberulent; leaves averaging 2× as long as wide ...................................................
      .............................................................................................................................. ...............
      T. angustifolium var. eamesii

1 Longer (nonglandular) hairs of the stem 0.5-1.5 mm long (or with a few longer hairs); leaves 4-15 cm wide; corolla greenish-yellow to purple.
   3 Most the stem hairs 1-2 mm long, mostly not gland-tipped; leaves predominantly not connate (or if 1-3 pairs connate, then only 1-2 cm wide at the joined base); style equalling or slightly shorter than the corolla (rarely exserted) ................
      .............................................................................................................................. ........
      T. aurantiacum var. aurantiacum
   3 Most the stem hairs 0-0.5 mm long (sometimes with a few scattered longer hairs), gland-tipped; leaves predominantly connate-perfoliate, the joined base 3-9 cm wide; style exserted beyond the corolla ....................... T. perfoliatum

Triosteum angustifolium Linnaeus var. angustifolium, Smooth Lesser Horse-gentian. {Pd (NC, VA), Mt (GA, VA): distributional and habitat information needed for two varieties} (GA Rare). April-May; July-August. CT west to Ontario and MO, south to NC, mw. GA (Jones & Coile 1988), AL, and LA. [= C, F, G; < T. angustifolium – RAB, K, S, W, Z]

Triosteum angustifolium Linnaeus var. eamesii Wiegand, Hairy Lesser Horse-gentian. {Pd (NC, VA), Mt (VA): distributional and habitat information needed for two varieties}. April-May; July-August. CT and NJ south to NC. [= C, F, G; < T. angustifolium – RAB, K, S, W, Z]

Triosteum aurantiacum Bicknell var. aurantiacum Bicknell, Perfoliate Horse-gentian. Mt (GA?, NC, SC, VA), Pd (NC, VA): woodlands and forests in circumneutral soils, particularly those over mafic or calcareous rocks; uncommon (GA Rare, NC Watch List). Late May-early June; August-October. Québec west to MN, south to GA, KY, and OK; other varieties are more restricted and midwestern or northern in distribution. [= C, F, K; < T. aurantiacum – RAB, S, W, Z; < T. perfoliatum Linnaeus var. aurantiacum (Bicknell) Wiegand – G]

Triosteum perfoliatum Linnaeus, Perfoliate Horse-gentian. Mt (GA, NC, SC, VA), Pd (NC, SC, VA), Cp (VA): woodlands and forests in circumneutral soils, particularly those over mafic or calcareous rocks; uncommon. Late May-early June; August-October. MA west to MN, south to n. SC, n. GA (Jones & Coile 1988), and OK. [= RAB, C, F, K, S, W, Z; = T. perfoliatum var. perfoliatum – G]

CARYOPHYLLACEAE A.L. de Jussieu 1789 (Pink Family)


1 Stipules present and readily apparent, scarious or hyaline.
   2 Fruit a utricle; seed 1 per fruit; petals absent; [subfamily Paronychioideae] ......................................................... Key A
   2 Fruit a capsule; seeds 3-many per fruit; petals present; [subfamily Polycarpoideae] ............................................. Key B
   1 Stipules absent.
   3 Sepals fused into a toothed or lobed tube; [subfamily Caryophylloideae] ............................................................ Key C
   3 Sepals distinct, or slightly fused at their bases; [subfamily Absinoideae] .............................................................. Key D

   Key A – Paronychioideae

   1 Leaves alternate; staminodes petaloid, ovate to oblong ................................................................. [Corrigiola]
   1 Leaves opposite (or the uppermost alternate in Herniaria); staminodes not petaloid, subulate.
   2 Stipules inconspicuous; sepals green-margined, obtuse, lacking awns ........................................................... [Herniaria]
   2 Stipules usually conspicuous; sepals white-scari-marginated, hooded or awned ........................................... Paronychia

   Key B – Polycarpoideae
1 Petals present (rarely obsolete or essentially absent); fruit a few-many seeded capsule; styles 3-5.

1 Stem leaves subulate, 1-2 mm long, pectinate-fringed at the base; basal rosette leaves spatulate (usually withering quickly after overwintering; stems wiry, stiff, subdichotomously branched; [of xeric sands on the Coastal Plain from se. VA southward]) .......................................................... Stipulicida

1 Stem leaves larger, mostly both longer and broader, not pectinate-fringed at the base; basal rosette present or absent; stems either thicker, more flexuous, or not subdichotomously branched; [collectively more widespread].

2 Leaves appearing verticillate, 10-16 per node, filiform to linear ..................................................... Spergula

2 Leaves opposite or in whorls of 4, linear to ovate or spatulate.

3 Leaves mostly in whorls of 4, obovate-spatulate, 2-8 mm long ......................................................... Polycarpón

3 Leaves opposite, linear or orbicular, 5-40 mm long.

4 Leaves orbicular-ovate; styles partly united .................................................................................. Drymaria

4 Leaves linear; styles separate ........................................................................................................ Spargularia

Key C – Caryophylloideae

1 Calyx immediately subtended by 1-3 pairs of bracts.

2 Calyx 20-40-nerved ......................................................................................................................... Dianthus

2 Calyx 15-nerved .......................................................................................................................... Petrorhagia

1 Calyx lacking subtending bracts.

3 Sepals 25-62 mm long; calyx lobes longer than the calyx tube, the lobes as long as or longer than the corolla lobes...... ................................................................. Agrostemma

3 Sepals (1-) 10-28 (-40) mm long; calyx lobes shorter than the calyx tube, the lobes much shorter than the corolla lobes (except Gypsophila).

4 Styles 3-5 (or 0 in staminate plants); fruit valves 3, 4, 5, 6, 8, or 10; petals generally appendaged ......... Silene

4 Styles 2; fruit valves 4; petals appendaged or not.

5 Sepals 1-5 mm long, the commissures between the sepals scarious .................................................. Gypsophila

5 Sepals 7-25 mm long, lacking commissures.

6 Calyx tubular, 20-nerved; petals appendaged; perennial .................................................................. Saponaria

6 Calyx ovoid, 5-nerved; petals not appendaged; annual .................................................................. Vaccumia

Key D – Alsinoideae

1 Petals absent; fruit a 1-seeded, indehiscent utricle; styles 2.............................................................. Scleranthus

1 Petals present (rarely obsolete or essentially absent); fruit a few-many seeded capsule; styles 3-5.

2 Leaves fleshy; seeds > 3 mm long; [of seabeaches and dunes] .............................................................. Honckeyna

2 Leaves membranaceous or stiff; seeds < 2 mm long; [of various habitats].

3 Styles 4-5.

4 Leaves linear-subulate, < 2 mm wide; styles 4-5.

5 Valves or teeth of the capsule twice as many as the styles ................................................................ Moenchia

5 Valves or teeth of the capsule as many as the styles ......................................................................... Sagina

4 Leaves ovate, obovate, > 4 mm wide; styles 5.

6 Capsule cylindric, dehiscence by 10 apical teeth ............................................................................ Cerastium

6 Capsule ovoid, dehiscence by 5 valves, each apically 2-cleft ............................................................... Myosotis

3 Styles 3.

7 Inflorescence umbelliform; petals irregularly dentiiicate at apex ...................................................... Holosteum

7 Inflorescence cymose or racemiform; petals entire, notched, or deeply cleft.

8 Petals shallowly to deeply 2-cleft, notched at least 1/4 of the length, often divided nearly to the base and then appearing almost as 10 petals.

9 Capsule cylindrical, twice as long as the sepals ............................................................................. Cerastium

9 Capsule spherical or ellipsoid, as long as or slightly longer than the sepals......................................... Stellaria

8 Petals entire, or emarginate.

10 Valves or teeth of the capsule twice as many as the styles .......................................................... Minuartia

10 Valves or teeth of the capsule as many as the styles.

11 Seeds with an aril ........................................................................................................................... Moehringia

11 Seeds lacking an aril.

12 Capsule straight; petals entire or barely emarginated .................................................................. Arenaria

12 Capsule cylindric, and often somewhat curved; petals emarginate to bifid .... Cerastium

*Agrostemma* Linnaeus 1753 (Corncockle)

A genus of about 150-210 species, herbs, of temperate and subarctic regions of the Northern Hemisphere, extending southward to the montane tropics of South America and Africa. References: Hartman, Rabeler, & Utech in FNA (2005); Bittrich in Kubitzki, Rohwer, & Bittrich (1993).

1 Leaves lanceolate to oblanceolate, (7-)15-32 mm long, 2-8 (-14) mm wide; perennial, stems to 8 dm long………………………………………A. lanuginosa var. lanuginosa

1 Leaves ovate, 3-8 mm long, 1-4 mm wide; annual, stems to 3 dm long.
   2 Seeds 0.4-0.5 mm long; fruiting calyx 2-3 mm long………………………………………A. leptoclados
   2 Seeds ca. 0.6 mm long; fruiting calyx 3-4 mm long………………………………………A. serpyllifolia

_Arenaria lanuginosa_ (Michaux) Rohrbach var. lanuginosa, Spreading Sandwort. Cp (GA, NC, SC, VA): dunes, maritime forests, coquina limestone outcrops; r. (NC Watch List, VA Rare). May-July. Se. VA south to FL, west to TX, AR, and Mexico, and north in the interior to se. TN (Chester, Wofford, & Kratl 1997). [= C, FNA; < _A. lanuginosa_ – RAB, F; S; = _A. lanuginosa_ ssp. lanuginosa – G; > _A. lanuginosa_ ssp. lanuginosa var. lanuginosa – K; > _A. lanuginosa_ ssp. lanuginosa var. longepedunculata – Duncan – K; Spergulastrum lanuginosum Michaux var. lanuginosum]

* Arenaria leptoclados* (Reichenbach) Gussone, Small Thyme-leaved Sandwort, Slender Sandwort. {GA, NC, SC, VA} The relative ranges, habitats, and abundance of the _A. leptoclados_ are poorly known {additional herbarium work}. March-June. [= S; < _A. serpyllifolia_ – RAB, K, W; = _A. serpyllifolia_ Linnaeus var. tenuior Mertens & W.D. J. Koch – C, F, FNA, G; = _A. serpyllifolia_ Linnaeus ssp. leptoclados (Reichenbach) Nyman]

* Arenaria serpyllifolia* Linnaeus, Large Thyme-leaved Sandwort. {GA, NC, SC, VA} The relative ranges, habitats, and abundance of this and _A. leptoclados_ are poorly known. March-June. [= S; < _A. serpyllifolia_ – RAB, K, W; = _A. serpyllifolia_ var. serpyllifolia – C, F, FNA, G; = _A. serpyllifolia_ ssp. serpyllifolia]

_Cerastium_ Linnaeus 1753 (Mouse-ear Chickweed, Mouse-ear)

A genus of about 100 species, herbs, especially north temperate but nearly cosmopolitan. References: Morton in FNA (2005); Bittrich in Kubitzki, Rohwer, & Bittrich (1993); Rabeler & Thieret (1988); Scheen et al. (2004). Key based in part on FNA.

1 Petals 10-18 mm long, 2-3× as long as the sepals; leaves 2-7 cm long; plants perennial, typically with some shoots not flowering.

2 Leaf blades narrowly to broadly linear, acute or short-acuminate at tip, tapered to base; stems erect nearly whole length
   3 Plants strongly rhizomatous with long-creeping shoots, lacking taproot; flowering stems usually 5-20 cm long; stem pubescence eglandular; sepals 3.5-6 (-7) mm long; anthers 1.0-1.1 mm long; petals often turning brown when dried; [native]………………………………………[C. arvense ssp. arvense]
   3 Plants clumped, with taproots or shortly rhizomatous; flowering stems usually 5-20 cm long; stem pubescence glandular; sepals 3.5-6 (-7) mm long; anthers 0.8-0.9 mm long; petals usually remaining white when dried; [endemic to serpentine in PA and MD]………………………………………[C. arvense ssp. strictum]

2 Leaf blades narrowly lanceolate to narrowly ovate, obstone to acute at tip, more-or-less rounded at base; stems spreading or decumbent basally, ascending-erect distally.

3 Leaf blades narrowly lanceolate, obtuse to acute, well-spaced on stem, moderately to densely pubescent with dull hairs but may be glabrate in age; plants forming small clumps…………………[C. velutinum var. velutinum]

3 Leaf blades narrowly ovate, obtuse and blunt at tip, tightly spaced on stem, very densely pubescent with silvery or translucent-white permanent hairs; plants form clumps to several dm wide; [endemic to serpentine in PA and MD]………………………………………[C. velutinum var. villosissimum]

1 Petals 3-8 mm long, shorter than, equaling, or up to 1.5× as long as the sepals; leaves 0.5-3.0 cm long (to 8 cm long in _C. nutans_ and _C. brachypodum_); plants annual, with all shoots producing flowers (except _C. fontanus_ ssp. vulgaris).

4 Perennial, matted at the base and rooting at the nodes………………………………………_C. fontanus_ ssp. vulgaris

4 Annual, taprooted.
   5 Sepals with long, appressed, eglandular hairs extending beyond the tip of the sepal.
   6 Inflorescence an open cyme, most of the pedicels longer than the sepals………………………………………_C. brachypetalum
   6 Inflorescence a compact, cymose cluster, most of the pedicels shorter than the sepals…………………_C. glomeratum

5 Sepals lacking long, appressed, eglandular hairs.
   7 Styles, sepals, and petals 3-4 (-5); capsule teeth 6-8 (-10).
   8 Styles, sepals, and petals 4 (-5); capsule teeth 8 (-10); capsules ca. 1.5× as long as the sepals; cauline leaves 2-3× as long as wide………………………………………[C. diffusum]
CARYOPHYLLACEAE

8 Styles, sepals, and petals 3 (-4); capsule teeth 6 (-8); capsules ca. 2 × as long as the sepals; cauleine leaves 8-10 × as long as wide .................................................. C. dubium

7 Styles, sepals, and petals 5; capsule teeth 10.

9 Bracts of the inflorescence with distinctly scarious margins; leaves mostly 0.5-1.0- (-1.5) cm long.
10 Petals equaling or surpassing the sepals; cleft in petal apex 1.0-1.5 mm deep .................. C. pilum
10 Petals shorter than the sepals; cleft in petal apex 0.2-0.5 (-0.9) mm deep .................. C. semidecandrum
9 Bracts of the inflorescence with green margins; leaves mostly (1.0-) 1.5-8 cm long.
11 Pedicels 3-10 (-15) mm long; leaves to 3.5 cm long .................................................. C. brachypodum
11 Pedicels (10-) 15-40 (-55) mm long; leaves to 8 cm long .................................................. C. nutans

* Cerastium brachypetalum Desportes, Gray Mouse-ear. Mt (NC, SC), Pd (NC, SC, VA), Cp (NC, VA): roadsides, disturbed areas; common (rare in SC), introduced from Europe. April-June. The reports of C. tetrandrum for e. VA in F and G are actually this species. [= RAB, C, F, FNA, G, W; > C. brachypetalum ssp. brachypetalum – K; >> C. tetrandrum W. Curtis – F, G, misidentified]

* Cerastium brachypodium (Engelmann ex A. Gray) B.L. Robinson. Mt (NC, VA), Pd (SC, VA), Cp (VA): disturbed areas, roadsides; rare. April-May. IL west to Alberta and OR, south to NC, nc. GA (Jones & Coile 1988), and AZ. This taxon is perhaps only introduced in our area from further west. [= F, FNA, K, S; = C. nutans Rafinesque var. brachypodium Engelmann ex A. Gray – RAB, G, W; < C. nutans – C]

* Cerastium dubium (Bastard) Guépin. Cp (VA): disturbed areas; rare, introduced from s. Europe and Asia. Introduced in scattered states in the United States, including VA, KY, TN, MS (FNA). First reported for VA by Belden et al. (2004). [= C, FNA, K]


* Cerastium glomeratum Thuiller, Sticky Mouse-ear. Cp, Pd, Mt (NC, SC, VA): fields, disturbed areas; common, introduced from Europe. March-May. [= RAB, FNA, K, W; = C. viscous Linnaeus – C, F, G, S, an ambiguous name, of uncertain application]


* Cerastium pilum W. Curtis, Dwarf Mouse-ear. Cp (NC, VA), Pd (NC, SC, VA), Mt (NC): disturbed areas; rare, introduced from Europe. April-May. See Rabeler & Thieret (1988) for discussions and reports. [= F, FNA, G, K; > C. glutinosum Fries]


* Cerastium velutinum Rafinesque var. velutinum, Field Mouse-ear, Starry Grasswort. Pd, Mt (VA): rocky river-scour areas, other open situations; rare. April-August. [= FNA; < C. arvense – C, G, S, W; < C. arvense Linnaeus var. villosum (Muhlenberg ex Darlington) Hollick & Britton – F; = C. arvense Linnaeus ssp. velutinum (Rafinesque) Ugborogho var. velutinum (Rafinesque) Britton – K; >> Cerastium arvense Linnaeus var. velutinum (Rafinesque) Britton]

* Cerastium arvense Linnaeus ssp. arvense. Introduced at scattered locations in ne. North America, including MD and NJ (FNA). [= FNA, K; < C. arvense – C, G; < C. arvense var. arvense – F]

* Cerastium arvense Linnaeus var. strictum (Linnaeus) Ugborogho. Reported for GA, TN, KY, WV, MD, DE, and NJ, among other states (Kartesz 1999), the GA record not validated in FNA. [= FNA, K; < C. arvense – C, G; < C. arvense var. arvense – F]

* Cerastium diffusum Persoon, Sea Mouse-ear. East to KY and TN (K), though not shown for those states in FNA. March-April. [= FNA, K; ? C. diffusum var. diffusum – C]

* Cerastium velutinum Rafinesque var. villosissimum (Pennell) J.K. Morton. This taxon is highly restricted, found only at a few stations in the serpentine barrens of Chester County, PA, and Cecil County, MD (Gustafson et al. 2003). [= FNA; = C. arvense var. villosissimum Pennell – F; < C. arvense – C, G, S, W; < C. arvense Linnaeus ssp. velutinum (Rafinesque) Ugborogho var. villosum (Muhlenberg ex Darlington) Hollick & Britton – K]

Corrigiola Linnaeus (Strapwort)


* Corrigiola littoralis Linnaeus ssp. littoralis, Strapwort. Introduced south to MD and PA. [= FNA; < C. littoralis – C, F, G, orthographic variant; < C. littoralis – K]
**CARYOPHYLLACEAE**

**Dianthus Linnaeus 1753 (Pink, Carnation)**

A genus of about 300-320 species, herbs, of Eurasia and Africa. Species other than those treated here are grown in gardens and may escape or persist. References: Rabeler & Hartman in FNA (2005); Bittrich in Kubitzki, Rohwer, & Bittrich (1993).

1 Flowers clustered in crowded cymes, short-pedicelled; [subgenus *Carthusianastrum*].
2 Leaves 2-5 (-8) mm wide; annual or biennial; inflorescence pubescent.........................................................D. armeria
2 Leaves mostly (8-) 10-20 mm wide; perennial; inflorescence glabrous.........................................................D. barbatus
1 Flowers solitary, or few, long-pedicelled; [subgenus *Dianthus*].
3 Petal blade 5-9 (-10) mm long, toothed....................................................................................... ....................D. deltoides
3 Petal blade (8-) 12-18 mm long, fringed ...................................................................................... ..................

* **Dianthus barbatus** Linnaeus ssp. barbatus, Sweet William. Pd (NC, SC), Mt (VA), {GA}: cultivated as an ornamental, rarely escaped to disturbed areas; rare, introduced from Europe. June-August. [= FNA; < *D. barbatus* – RAB, C, F, G, K]
* **Dianthus deltoides** Linnaeus ssp. deltoides, Maiden Pink, Meadow Pink. Pd (NC, VA), Mt (NC): cultivated as an ornamental, rarely escaped to adjacent areas; rare, introduced from Europe. May. See Rabeler & Thieret (1988) for additional information. [= FNA; < *D. deltoides* – C, F, G, K]
* **Dianthus plumarius** Linnaeus ssp. plumarius, Garden Pink, Grass Pink. Cp (NC), Pd (NC, SC), Mt (VA): cultivated as an ornamental, rarely escaped to disturbed areas; rare, introduced from e. Europe. June-August. [= FNA; < *D. plumarius* – RAB, C, F, G, K]

**Drymaria Willdenow ex J.A. Schultes 1819 (Drymary)**


**Drymaria cordata** (Linnaeus) Willdenow ex Schultes var. cordata, Drymary, West Indian Chickweed. Cp (GA): moist hammocks, moist disturbed areas; rare. Sc. GA south to FL south into the New World tropics; also old World tropics. Var. *diandra* Blume is restricted to the Old World. [= FNA; = *D. cordata* ssp. cordata – K, Z; < *D. cordata* – S]

**Gypsophila Linnaeus 1754 (Baby's-breath)**


1 Stems simple, few-branched toward the top; leaves (1-) 3-16 mm wide.......................................................... ..........G. elegans
1 Stems diffusely and repeatedly near the base and upward; leaves 0.2-2 (-3) mm wide .................................... [*G. muralis*]

* **Gypsophila elegans** Bieberstein, Annual baby's-breath. Cp, Pd (NC): disturbed areas, persistent from cultivation, doubtfully established; rare, introduced. See Rabeler & Thieret (1988) for additional information. [= C, FNA, K]

* **Gypsophila muralis** Linnaeus, Cushion baby's-breath. Disturbed areas, roadsides, yards, cemeteries; native of Europe, reported for various eastern states, including KY, TN, PA, NJ (FNA, Kartesz 1999). [= C, FNA, K]

**Herniaria Linnaeus (Rupture-wort)**


**Holosteum Linnaeus 1753 (Jagged Chickweed)**

**Caryophyllaceae**

* *Holostenum umbellatum* Linnaeus *ssp. umbellatum*, Jagged Chickweed. Mt, Pd (GA, NC, SC, VA), Cp (VA): fields, roadways, lawns, other disturbed areas; common, introduced from Europe. March-May. Four additional subspecies are not known to be present in North America. [= FNA; < *H. umbellatum* – RAB, C, F, G, K, S, W]

**Honckenya** Ehrhart 1788 (Seabeach-chickweed, Sea-sandwort)


**Honckenya peploides** (Linnaeus) Ehrhart *ssp. robusta* (Fernald) Hultén, Southern Seabeach-chickweed, Southern Sea-sandwort. Cp (VA): seabeaches and dunes; rare (VA Rare). June-July. The species is circumboreal, in North America ranging south to e. VA. Ssp. *robusta* ranges from Newfoundland south to e. VA; 3 other subspecies do not occur south of Newfoundland. [= FNA, K; = *Honckenya peploides var. robusta* (Fernald) House – C; = *Arenaria peploides* Linnaeus var. *robusta* Fernald – F; = *Honkenya peploides ssp. robusta* – G (apparently misspelled)]

**Lychnis** Linnaeus 1753 (Campion)

(see *Silene*)

**Minuartia** Linnaeus 1753 (Sandwort)

A genus of about 120-175 species, herbs, of the northern hemisphere (and rarely South America). References: Rabeler, Hartman, & Utech in FNA (2005); Bittrich in Kubitzki, Rohwer, & Bittrich (1993).

<table>
<thead>
<tr>
<th>1</th>
<th>Sepals acute, with prominent nerves; [of calcareous or mafic barrens of VA, and westward or northward].</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Primary leaves with axillary fascicles of secondary leaves ................................................................................... <em>M. michauxii var. michauxii</em></td>
</tr>
<tr>
<td>2</td>
<td>Primary leaves lacking axillary fascicles of secondary leaves.</td>
</tr>
<tr>
<td>3</td>
<td>Sepals 3-nerved; seeds 0.7-0.9 mm long ................................................................................................................. <em>[M. muscorum]</em></td>
</tr>
</tbody>
</table>
| 3 | Sepals 5-nerved; seeds 0.5-0.7 mm long .................................................................................................................... *M. patula*

<table>
<thead>
<tr>
<th>1</th>
<th>Sepals obtuse (rarely sub-acute), nerveless or with very obscure nerves; [of various habitats].</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Lower stem leaves closely imbricated; [of xeric sands of the Coastal Plain of NC and SC] ............................................ <em>M. caroliniana</em></td>
</tr>
<tr>
<td>4</td>
<td>Lower stem leaves not imbricate; [either of rock outcrops of the Piedmont and Mountains or of moist habitats of the Coastal Plain].</td>
</tr>
<tr>
<td>5</td>
<td>Stems erect, leafy mostly near the base, the stem leaves few in number and reduced in size upward; pedicels and sepals glabrous; [of rock outcrops of the Piedmont and Mountains].</td>
</tr>
</tbody>
</table>
| 6 | Larger stem leaves 2-5 (-7) mm long; petals 1-7 mm long ..................................................................................... *M. uniflora*
| 6 | Larger stem leaves (7-) 10-30 mm long; petals 4-10 mm long. |
| 7 | Leaves distinctly oblanceolate, very thin in texture, prominently veined; flowers 1-3 per stem ........................................... *[M. cumberlandensis]* |
| 7 | Leaves linear-lanceolate, herbaceous but not notably thin, not prominently veined; flowers 3-many per stem. |
| 8 | Plants 10-20 cm tall, annual, not mat-forming; cymes 9-15-flowered; sepals 3-4 mm long; petals 4-6 (-8) mm long; [of Piedmont and low mountain granitic flatrocks and other outcrops] .... *M. glabra*
| 8 | Plants 5-10 (-15) cm tall, perennial, mat-forming; cymes 3-7-flowered; sepals 3.5-5.5 mm long; petals 6-10 mm long; [of mountain peaks and Piedmont monadnocks] ............ *M. groenlandica* |


**Minuartia glabra** (Michaux) Mattfeld, Appalachian Sandwort. Pd, Mt (GA, NC, SC, VA): granitic flatrocks, other outcrops of granite, granitic gneiss, or other felsic gneisses and schists, in the mountains restricted to low or medium elevations; uncommon. April-May. ME and NH south to w. GA (Jones & Coile 1988) and AL, primarily on the Piedmont and also in the Cumberland (Chester, Wofford, & Kral 1997). [= FNA, K; = *Arenaria groenlandica* (Retzius) Sprengel var. glabra (Michaux) Fernald – RAB, C, F, G; = *A. glabra* Michaux – GW, W; *Sabulina glabra* (Michaux) Small – S; = *Porsildia groenlandica* (Retzius) Á. Löve & D. Löve ssp. glabra (Michaux) Á. Löve & D. Löve]

**Minuartia godfreyi** (Shinners) McNeill, Godfrey's Sandwort. Cp (NC, SC), {GA}: tidal freshwater marshes, other wetlands; rare (US Species of Concern, NC Endangered, SC Rare). April-June. Peculiarly and irregularly distributed, with isolated and scattered locations in the Coastal Plain and Mountains: wc. VA, ne. TN, e. NC, ne. SC, ne. FL, wc. AL, and se. AR.
**Minuartia Michaux** (Fenzl) Farwell var. **michauxii**, Rock Sandwort. Mt (VA): limestone, dolostone, calcareous sandstone, and calcareous shale outcrops and barrens; uncommon. June-July. Var. **erecta**, named on the basis of its tiny flowers, has been shown to be a self-pollinating form of *M. uniflora* which has arisen repeatedly and independently at various sites in the range of *M. uniflora*. [= FNA, K; = Arenaria godfreyi Shinners – RAB, GW, W; = Sabulina uniflora – S, misapplied; = Stellaria paludicola Fernald & Schubert]

**Minuartia groenlandica** (Retzius) Ostenfeld, Mountain Sandwort, Greenland Sandwort. Mt (NC, VA), Pd (NC): low elevation rock outcrops (such as sandstone pavements in the VA Ridge and Valley) to high elevation rock outcrops in the Mountains (ascending to nearly 2000m on Roan Mountain), also disjunct on the summits of quartzite monadnocks in the upper Piedmont (such as Pilot Mountain, Surry County, NC and Hanging Rock, Stokes County, NC); rare (NC Rare, VA Rare). May-October. Greenland, Nova Scotia, and Québec south to the higher mountains of New England and NY; disjunct in the Southern Appalachians of VA, w. NC, and e. TN. [= FNA, K; = Arenaria groenlandica (Retzius) Sprengel var. groenlandica – RAB, C, F, G; = Sabulina groenlandica (Retzius) Small – S; = A. groenlandica (Retzius) Sprengel – W; = Porsildia groenlandica (Retzius) A. Löve & D. Löve ssp. groenlandica]

**Minuartia michauxii** (Michaux) Mattfeld, Lime-barren Sandwort. Mt (GA, VA), Pd (GA), Cp (GA): on rocky barrens of calcareous or mafic rocks, locally common in Lee County, VA; rare (VA Rare). April-June. Ec. PA and w. VA west to IN and MN, south to AL and TX. [= FNA, K; = Arenaria patula Michaux var. patula – C, G; < A. patula Michaux – F; < Sabulina patula (Michaux) Small – S; < A. stricta Michaux – W]

**Minuartia uniflora** (Walter) Mattfeld, Lime-barren Sandwort. Mt (GA, VA), Pd (GA), Cp (GA): granitic flatrocks, outcrops of Altamaha grit; rare (NC Endangered, SC Rare). April-May. S. NC south to c. GA, west to ec. AL, on the Piedmont and extending into the Coastal Plain of Georgia on Altamaha grit. *M. alabamensis*, named on the basis of its tiny flowers, has been shown to be a self-pollinating form of *M. uniflora* which has arisen repeatedly and independently at various sites in the range of *M. uniflora*. [= FNA, K; = Arenaria uniflora (Walter) Muhlenberg – RAB; > A. uniflora (Walter) Muhlenberg – GW, W; > A. alabamensis McCormick, Bozeman, & Spongberg – GW, W; = Sabulina brevifolia (Nuttall ex Torrey & A. Gray) Small – S; > M. alabamensis (McCormick, Bozeman, & Spongberg) Wyatt]

**Moehringia Linnaeus 1753** (Grove-sandwort)


**Moehringia lateriflora** (Linnaeus) Fenzl, Grove-sandwort, Blunt-leaved Sandwort. Pd (VA): rocky, disturbed areas (powerline) over mafic rocks (diabase); rare (VA Rare). May-July. Circumboreal, ranging south in North America to n. VA (Fairfax County), e. WV (Morton et al. 2004), MO, and CA. [= FNA, K; = Arenaria lateriflora Linnaeus – C, F, G]

**Moenchia** Ehrhart 1788


* **Moenchia erecta** (Linnaeus) P.G. Gaertner, B. Meyer, & Scherbius ssp. erecta, Upright Chickweed. Cp (SC): disturbed areas; rare, introduced. This species was collected as a "wool alien" in Berkeley County, SC in 1958 (Rabeler 1991). [= FNA; < M. erecta – K; = Sagina erecta Linnaeus]

**Myosoton** Moench 1794 (Water-chickweed)


Paronychia P. Miller 1754 (Whitlow-wort, Nailwort)

A genus of about 110 species, herbs and shrubs, nearly cosmopolitan in distribution. This genus consists mostly of plants of dry rocky or sandy habitats. References: Hartman, Thieret, & Rabeler in FNA (2005); Chaudhri (1968)=Z, Ward (1977a, 1977b)=Y; Shinners (1962)=X; Bittrich in Kubitzki, Rohwer, & Bittrich (1993). Key adapted from Y and Z.

**Identification notes:** Magnification of at least 10× is necessary for the identification of many of the taxa.

1. Leaf surfaces with silky, appressed pubescence (usually densely so, but sometimes sparse), giving the plant a silvery appearance; flowers 3.5-6 mm long, largely concealed by scarious bracts; [subgenus Paronychia] ................. P. argyrocoma
2. Leaf surfaces glabrous or with very short pubescence (neither appressed nor silky), the plant green; flowers 1-4 mm long, not concealed by scarious bracts.

3. Sepals petaloid, the tip, margins, or entire sepal whitish; perigynous zone very well developed (mostly equaling or somewhat longer than the sepals); [of the Coastal Plain, from SC southward and westward]; [subgenus Siphonochila].
4. Stems minutely gray-puberulent ............................................................................ [P. erecta var. corymbosa]
5. Stems glabrous and often also glaucous................................................................. [P. erecta var. erecta]
6. Sepals densely pubescent on the basal portion (glabrous above); plant a sprawling, ascending or erect annual.
7. Pubescent portion of the sepal nearly ½ its length; sepals broadly rounded and hooded; stem glabrous or one side with curly hairs ........................................................................................................... P. americana
8. Pubescent portion of the sepal <1/3 its length; sepals narrowed toward the apex, with a short tooth or awn; stem uniformly pubescent with retrorse hairs.
9. Stem spreading or ascending, the branching unevenly dichotomously, the flowers therefore in diffuse cymes; glabrous portion of the sepal 0.8 mm long......................................................... P. patula
10. Stem erect, the branching symmetrical and dichotomous, the flowers therefore in weirdly geometric, tight square cymes; glabrous portion of the sepal > 1.1 mm long ........................................ P. rugelii
11. Style short, 0.3-0.35 mm long; anthers ca. 0.15 mm in diameter; stipular bracts subtending the flowers narrowly lanceolate, ca. 0.5× as long as the flowers......................................................... P. baldwinii
12. Style elongate, 0.6-0.75 mm long; anthers 0.25-0.3 mm in diameter; stipular bracts subtending the flowers narrowly lanceolate, ca. 0.5× as long as the flowers......................................................... P. montana
13. Style short, 0.3-0.35 mm long; anthers ca. 0.15 mm in diameter; stipular bracts subtending the flowers lanceolate, from much shorter than to exceeding the flowers.
14. Stems glabrous; leaves oval-elliptic, 5-25 mm long, 2-8 (-10) mm wide, obtuse (rarely sub-obtuse or acute), very thin in texture, deep-green; sepals oblong-ovate, 1-nerved, planar, the apiculate hood very short. ................................................................. P. canadensis
15. Stems retrorsely puberulent (sometimes sparsely so); leaves oblanceolate, 5-15 mm long, 2-5 mm wide, acute (rarely sub-acute to obtuse), firm in texture, dull brownish-green; calyx 2-3 mm long.
16. Stipular bracts subtending the flowers exceeding the flowers (calyx) ................................................................. P. fastigiata var. paleacea
17. Stipular bracts subtending the flowers somewhat shorter than the flowers (calyx).
18. Sepals with a minute cusp or muroco ............................................................... P. fastigiata var. fastigiata
19. Sepals with a distinct white awn to 0.2 mm long ................................................................. P. fastigiata var. nuttallii

Paronychia americana (Nuttall) Fenzl ex Walpers, American Whitlow-wort. Cp (GA, SC): sandhills; rare (SC Rare). June-September. S. SC south to GA and s. FL. Two taxa have been unquestionably distinguished. Ssp. americana, with the cymes many-flowered and forming spheroidal glomerules, has the range of the species; ssp. pauciflora (Small) Chaudhri, differing in its
laxer, more open cymes, is restricted to s. GA and n. FL. [= FNA, X, Y; = Paronychia americana (Nuttall) Fenzl ex Walpers ssp. americana – K, Z; = Paronychia americana (Nuttall) Fenzl ex Walpers ssp. pauciflora (Small) Chaudhri – K, Z; = P. americana – RAB; > Siphonychia americana (Nuttall) Torrey & Gray – S; > Siphonychia pauciflora Small – S]


**Paronychia baldwinii** (Torrey & A. Gray) Fenzl ex Walpers ssp. baldwinii, Annual Dune Whitlow-wort. Cp (GA, NC, SC): dry sandy sites, woodlands or dunes; uncommon. June-October. E. NC south to FL and west to AL (and LA?), on the Coastal Plain. [= K, Y, Z; < P. baldwinii – FNA; = P. baldwinii – RAB; = Anychiastrum baldwinii (Torrey & Gray) Small – S]

**Paronychia caudata** (Chapman) Fernald, Chaudhri, Perennial Dune Whitlow-wort. Cp (GA, NC, SC, VA): dry sandy sites, woodlands or dunes; uncommon (VA Watch List). June-October. Sc. VA south to n. FL (and AL?), on the Coastal Plain. Though Chaudhri (1968) and Ward (1977a and 1977b) independently reached the conclusion to reduce *P. riparia* to a subspecies of *P. baldwinii*, neither stated any reasons for their choice of subspecific status. I here follow the independent conclusions of Chaudhri and Ward, but the appropriate taxonomic rank remains unclear. [= K, Y, Z; = Paronychia caudata – FNA, C, F, G, Z; = Siphonychia caudata (Linnaeus) Britton, Sterns, & Poggenburg – S]

**Paronychia fastigiata** (Rafinesque) Fernald, Common Forked Whitlow-wort. Mt, Pd, Cp (NC, SC, VA): dry, usually rocky, woodlands, often on thin soil around outcrop edges; uncommon. June-October. MA west to MN south to FL and TX. The three varieties of *P. fastigiata* (though accepted by Chaudhri and many recent floras) need additional investigation to confirm their taxonomic status, habitats, and geographic ranges. [= C, F, G, K, Z; < P. fastigiata – RAB, W; < P. fastigiata var. fastigiata – FNA; < Anychia polygonoides Rafinesque – S]


**Paronychia herniarioides** (Michaux) Nuttall, Michaux's Whitlow-wort. Cp (NC, SC): sandhills; rare. April-July. Sc. NC south to c. peninsular FL. The NC distribution ascribed by Small, Chaudhri, and FNA is based on the type specimen of André Michaux (“in arenosis aridis Caroliniae septentrionalis”); the species has been relocated in NC (Scotland County) by Harry E. LeGrand, Jr. [= RAB, FNA, K, Y, Z; = Gastronychia herniarioides (Michaux) Small – S]

**Paronychia montana** (Small) Pax & K. Hoffmann, Shale-barren Whitlow-wort. Mt (NC, VA): dry rock outcrops and talus barrens, especially on shale barrens; uncommon. June-October. C. PA (and OH?) south through w. VA and e. WV to a few localities in NC, TN, GA, and AL. [= K, Z; < P. fastigiata – RAB, W; = P. fastigiata var. pumila (A. Wood) Fernald – C, F, FNA, G; = Anychiastrum montanum Small – S]

**Paronychia patula** Shinners, Pineland Nailwort. Cp (GA): sandhills; rare (GA Special Concern). July-September. Sw. GA west to s. AL, south to c. peninsular FL. [= FNA, K, X, Y, Z; = Siphonychia diffusa Chapman – S]


**Paronychia virginica** Sprengel var. virginica, Virginia Whitlow-wort. Mt (VA), Pd (GA, VA): shale barrens, rocky riversides, calcareous rock outcrops and talus, serpentine outcrops; rare (US Species of Concern, GA Special Concern, VA Rare). June-August. The ranges of the two varieties are variously stated; the distinguishing characteristics and distributions are not clear. Var. virginica occurs in w. MD, w. VA, WV, GA, and AL (or allegedly also in NC, AR, OK, and TX). Var. parkissii (Cory) Chaudhri occurs in TX (or also in OK). [= C, Z; < P. virginica – F, FNA, K, W; = P. virginica ssp. virginica – G; = P. dichotoma (Linnaeus) Nuttall – S]

**Paronychia erecta** (Chapman) Shinners var. corymbosa (Small) Chaudhri, Hairy Squareflower. Coastal dunes, Panhandle FL west to se. LA. March-November. [= K, Y, Z; = Odontonychia corymbosa Small – S; < Paronychia erecta – FNA, X]

**Paronychia erecta** (Chapman) Shinners var. erecta, Smooth Squareflower. Coastal dunes, Panhandle FL west to s. MS. March-November. [= K, Y, Z; = Odontonychia erecta (Chapman) Small – S; < Paronychia erecta – FNA, X]

_Petrorphagia_ (Seringe) Link 1831 (Pink)

1 Flowers in capitate inflorescences (solitary in impoverished or very young plants); bracts subtending the calyx broad and long, usually completely enclosing the calyx; [section Kohlruschia].................................................................P. prolifera

1 Flowers solitary (or in fascicles of 2-3); bracts subtending the calyx narrow and short, enclosing about ½ of the calyx; [section Petrorhagia].............................................................................................................................. ..............


* Petrorhagia saxifraga (Linnaeus) Link var. saxifraga, Saxifrage Pink, is "cultivated and occasionally escaped" south to se. PA (Rhoads & Klein 1993), s. NJ, and MD (Rabeler (1985). Rabeler (1985) reports a location from Page Co. VA, but it appears that this is persistent from cultivation. [= FNA; < P. saxifraga – C, K, Z; < Tunica saxifraga (Linnaeus) Scopoli]

Polycarpon Linnaeus 1759 (Allseed)

A genus of about 18 species, herbs, primarily of Europe, with several species in South America, and 1 cosmopolitan. References: Thieret & Rabeler in FNA (2005); Bittrich in Kubitzki, Rohwer, & Bittrich (1993).

* Polycarpon tetraphyllum (Linnaeus) Linnaeus

Sagina Linnaeus 1753 (Pearlwort)

[also see Moenchia]


1 Annual, usually without a persistent rosette of leaves; flowers (4-) 5-merous; seeds 0.3-1.4 mm long; sepals erect-appressed in fruit....................................................................................................................... ............................................

1 Perennial, usually with a persistent rosette; flowers 4 (-5)-merous; seeds (0.3-) 0.4 (0.5) mm long; sepals spreading in fruit...

................................................................................................................................................. S. decumbens

................................................................................................................................................. S. procumbens

Sagina decumbens (Elliott) Torrey & A. Gray, Eastern Pearlwort. Cp, Pd, Mt (GA, NC, SC, VA): disturbed ground, fields, cracks in pavement or sidewalks; common (uncommon in Mountains). March-June. New Brunswick west to IL and MO, south to FL and TX, with adventive occurrences further west. Crow (1978) and Crow in FNA (2005) treat S. decumbens and S. occidentalis S. Watson of the Pacific Coast of North America as subspecies. They differ primarily in seed architecture. Though clearly closely related, they seem equally well (and more simply) regarded as sibling species. A report of S. subulata (Swartz) K. Presl for Bedford County, VA, is apparently actually S. decumbens. [= RAB, C, F, G, S, W; = S. decumbens ssp. decumbens – FNA, K, Z]

* Sagina procumbens Linnaeus, Northern Pearlwort, Bird's-eye. Mt (NC): gravel parking lot on summit of Roan Mountain; rare, introduced from Eurasia (or, at least, ne. North America). May-September. Crow (1978) questions whether S. procumbens is native at all in the Western Hemisphere. In North America, it is concentrated in 2 main regions, from Nova Scotia and Québec south to MD, and from sw. British Columbia south to e. CA, with scattered occurrences elsewhere, such as around the Great Lakes, CO, AR, s. OH, and w. NC. Whether or not the species is native in the New World, the occurrence in NC is almost certainly adventive. [= C, FNA, G, K, Z; > S. procumbens var. procumbens – F; > S. procumbens var. compacta Lange – F]

* Sagina japonica (Swartz) Ohwi, Japanese Pearlwort, native of e. Asia, is naturalized in se. PA (Rhoads & Klein (1993). [= FNA, K]

Saponaria Linnaeus 1753 (Soapwort)

(also see Vaccaria)


Scleranthus Linnaeus 1753 (Knawel)


* Scleranthus annuus Linnaeus, Knawel. Pd, Cp, Mt (GA, NC, SC, VA): fields, ditches, roadsides, other disturbed areas; common (uncommon in Mountains), introduced from Europe. April-October. [= RAB, C, F, G, K, W]

Silene Linnaeus 1753 (Catchfly, Campion, Fire-pink, Wild-pink)


1 Styles mostly 5; capsule with 5 or 10 teeth; calyx tubular at anthesis, becoming strongly inflated later in S. dioica and S. latifolia.
   2 Petal limbs deeply divided into 4 linear segments ............................................................................ [S. flos-cuculi]
   3 Leaf blades with dense silky white hairiness; flowers bisexual .......................................................... S. coronaria
      4 Petals pink; capsule teeth revolute .......................................................................................... [S. dioica]
      5 Petals white; capsule teeth spreading to slightly reflexed ......................................................... S. latifolia

1 Styles mostly 3; capsule with 3 or 6 teeth; calyx tubular or campanulate at anthesis, not greatly inflated (except in S. vulgaris).
   5 Middle cauline leaves in whorls of 4; petals fimbriate .................................................................... S. stellata
   6 Flowers bright red.
      7 Petals entire or slightly erose at the tip; cauline leaves 10-20 pairs .............................................. S. regia
      8 Cauline leaves 2.0-7.0 cm wide, elliptic, obovate, or orbicular, usually 1-2× as long as wide; entire plant sticky glandular-pubescent; [of sandstone cliffs and crevices, in our area only in sw. VA] .......................... S. rotundifolia
         9 Petals pink; capsules about 1 cm long; stem with white hairs ................................................. [S. virginica]
         10 Plants usually 2 to 8 dm tall; plant annual or biennial [perennial]; [either alien weeds occurring mostly in disturbed sites, or native in forests, woodlands, or rock outcrops].
            11 Plant < 2.5 dm tall; plant perennial, with a stout, carrot-like taproot; [native, of woodlands, rock outcrops, barrens, glades, and dry roadbanks].
               12 Cauline leaves 0.8-2.0 cm wide, mostly oblanceolate, usually at least 3× as long as wide; plant not covered with sticky glandular hairs; [of various, mostly rocky, habitats, widespread in our area] .......................... S. caroliniana var. wherryi

13 Leaves glabrous on the surface, ciliate on the margin; basal leaves mostly acute to obtuse at the apex, to 15 cm long and 2 cm wide; [of NC north, often associated with calcareous or mafic rocks in the Piedmont and Mountains] .......... S. caroliniana var. pensylvanica

11 Plant usually 2-8 dm tall (depauperate individuals rarely smaller); plant annual or biennial [perennial from a creeping rhizome in S. nivea and S. vulgaris), lacking a carrot-like taproot; [alien, mostly of disturbed habitats (except S. nivea and S. antirrhina).]
   14 Plants rhizomatous perennials (biennial in S. csereii); petals white.
      15 Fruiting calyx ovoid, contracted at the mouth to ca. ½ the diameter of the calyx at its widest point; stamens ca. 2 × as long as the calyx; filaments purple ........................................................................ S. csereii
      16 Fruiting calyx clavate or campanulate, not contracted at the mouth; stamens 1.0-1.5 × as long as the calyx; filaments usually white.


**Silene caroliniana** Walter var. *caroliniana*, South Carolina Wild-pink, Rock Catchfly. Pd, Cp (GA, NC, SC): in acidic, sandy, open woodlands, especially woodlands around granitic flatrocks and sandy Coastal Plain woodlands; common (rare in NC) (GA Special Concern, NC Watch List). April-July. Sc. NC south through the e. three-quarters of SC just into e. GA. See Wilbur (1970b) and Clausen (1939) for additional discussion of these infraspecific taxa in *S. caroliniana*. [= C, F; < *S. caroliniana* – RAB, S; = *S. caroliniana* ssp. *caroliniana* – FNA, G, K, Z; = *S. caroliniana* ssp. *caroliniana* var. *caroliniana* – Y]


* Silene csereii* Baumgarten, Balkan Bladder-campion. Mt (NC): habitat not known; rare, introduced from Europe. Documented for w. NC (J.K. Morton, pers.comm.). Also reported in se. PA (Rhoads & Klein 1993) and e. WV. [= FNA, K; *S. cserei* – C, F, G, orthographic variant]

* Silene dichotoma* Ehrhart ssp. *dichotoma*, Forked Catchfly. Mt (NC, VA), Pd (VA), {GA}: fields, disturbed areas; common, introduced from Europe. May-August. [= FNA; < *S. dichotoma* – RAB, C, F, G, K, S, W]


* Silene nivea* (Nuttall) Muhlenberg ex Oth, Snowy Campion. Mt (GA, VA), Pd (VA): rocky or sandy flood-scoured riversides or creeksides; rare (VA Rare). June-July. NJ west to ND, south to n. VA, w. VA, s. WV, nw. GA (Jones & Coile 1988), TN, and MO. [= C, FNA, G, K, W; = *Silene alba* Muhlenberg – S, misapplied]


* Silene ovata* Pursh, Mountain Catchfly. Mt (GA, NC, SC, VA), Cp (GA): circumneutral soils of woodlands and forests, especially over mafic or calcareous rocks, mostly at medium elevations in the mountains; rare (US Species of Concern, GA Special Concern, NC Rare, SC Rare, VA Rare). August-September. Sw. VA and KY west to AR, south to nw. GA, n. AL, and AR; disjunct in sc. and sw. GA. [= RAB, C, FNA, G, K, S, W]


* Silene regia* Sims, Royal Catchfly. Cp (GA): prairies and calcareous woodlands and forests; rare (GA Rare). OH and e. MO south to e. TN (Chester, Wofford, & Kral 1997), nw. and sw. GA (Jones & Coile 1988), FL Panhandle (Jackson County), and AL. [= C, F, FNA, G, K, S]

* Silene rotundifolia* Nuttall, Roundleaf Fire-pink, Sandstone Fire-pink. Mt (GA, VA): sandstones cliffs, ledges, and talus, and at bases of sandstone cliffs; rare (GA, Special Concern, VA Rare). S. OH and WV south to nw. GA (Jones & Coile 1988) and n. AL, nearly restricted to the Cumberland Plateau. [= C, F, FNA, G, K, S]

Silene virginica Linnaeus, Fire-pink. Mt, Pd, Cp (GA, NC, SC, VA): woodlands, rock outcrops, crevices in cliffs, roadbanks; common (rare in Coastal Plain). April-July. NJ and NY west to s. Ontario and se. MI, south to Panhandle FL (Bay County), GA and OK. Three varieties require additional investigation. Var. robusta Strausbaugh & Core, named from locations in e. WV, should be in our area, but the distinction stated in Strausbaugh & Core (1978) (“a more vigorous plant with leaves up to 15 cm. long”) needs strengthening to warrant recognition. [= RAB, C, F, FNA, G, S, W; = Lychnis dioica Linnaeus var. robusta Strausbaugh & Core – K]

* Silene vulgaris (Moench) Garcke, Bladder Campion, Maiden's-tears. Mt (NC, VA), Pd (GA, NC, VA), Cp (NC, SC, VA): disturbed areas; common (uncommon to rare south of VA and in VA Coastal Plain), introduced from Europe. May-August. [= C, FNA, K; = Silene cucubalus Wibel – RAB, G, W; = > Lychnis dioica Linnaeus var. wherryi (Small) Small]

Silene caroliniana Walter var. wherryi (Small) Fernald. {VA}: {habitat}; rare? OH and WV (and VA according to FNA) south and west to AL, KY, MO, and KS. [= F; > S. caroliniana var. pensylvanica – C; = S. caroliniana ssp. wherryi (Small) Clausen – FNA, G, K, Y, Z; = > Lychnis dioica Linnaeus]

* Silene dioica (Linnaeus) Clairville, Red Campion, Red Catchfly, is introduced south at least to scattered locations in s. PA (Rhoads & Klein 1993). Reported rather vaguely for VA (Maguire 1950) as “south to Virginia;” no additional documentation is known to me. [= C, F, FNA, K; = Lychnis dioica Linnaeus]


Spergula Linnaeus 1753 (Spurrey)


1 Wing of the seed as wide as or wider than the body of the fruit; leaf blades terete or nearly so, 0.3-1.5 (-2.0) cm long............................................Sp. arvensis
2 Seeds 0.4-0.6 mm long, sculptured with wavy lines, not winged but with peglike papillae; leaf blades scarcely fleshy...............
3 Seeds 0.8-1.1 mm long, smooth, without scupturing except for wings; leaf blades fleshy

* Spergula arvensis Linnaeus, Corn Spurrey. Cp (GA, NC, SC, VA), Pd (NC, SC, VA), Mt (VA): fields, roadsides; common, introduced from Europe. April-June. Two varieties are sometimes recognized; var. arvensis, with seeds ornamented with white, clavate papillae, the plants sparsely glandular, and var. sativa, with seeds reticulate and lacking papillae, the plants sparsely to densely glandular. Additional information is needed on the distinctiveness, range in our area, etc. of the two putative varieties. [= RAB, C, FNA, K, S; > S. arvensis Linnaeus var. arvensis – F, G; > S. arvensis Linnaeus var. sativa (Boenninghausen) Mertens & W.D.J. Koch – F, G]


* Spergula morisonii Boreau, Morison’s Spurrey. Fallow fields, disturbed areas. Introduced from Europe, known from MD (Prince Georges County) (Steury 2004a), MA, and NJ (FNA). [= C, FNA]

Spergularia (Persoon) J. & K. Presl 1819 (Sand-spurrey)


1 Stamens 6-10; seeds either 0.4-0.6 or 0.8-1.1 mm long; axillary leaf clusters of 2-4 leaves (or sometimes absent in Sp. media).
2 Seeds 0.8-1.1 mm long, smooth, without scupturing except for wings; leaf blades fleshy...............
3 Seeds 0.4-0.6 mm long, sculptured with wavy lines, not winged but with peglike papillae; leaf blades scarcely fleshy....


1 Leaves narrow, usually linear, lanceolate, oblanceolate, or narrowly elliptic, the blade 3-10 × as long as wide, 0.8-10 mm wide; stems prominently 4-angled.

2 Sepals 2.0-3.5 mm long; petals 0-3.0 mm long, shorter than the sepals or absent; seeds 0.3-0.9 mm long.

3 Inflorescence a leafy terminal cyme of (1-) 5-50 flowers; seeds 0.7-0.9 mm long, smooth or slightly rugose.

   3 Inflorescences axillary, solitary or in small cymes of 2-5 flowers; seeds 0.3-0.8 mm long, distinctly papillate.

   4 Flowers in axillary inflorescences of 1-5 flowers; sepals 5; petals 5; seeds 0.3-0.4 mm long, with small, rounded tubercles; [widespread].

   4 Flowers solitary in leaf axils; sepals 4 (-5); petals absent; seeds 0.6-0.8 mm long, with stalked, knoblike tubercles; [of e. KY and TN].

   5 Seeds 0.7-1.2 mm long; bracts of the inflorescence scarious; petals notched > halfway to the base.

   6 Sepals 4.5-5.5 mm long, strongly 3-nerved; seeds 0.8-1.2 mm long, coarsely tuberculate; inflorescence diffuse, many-flowered.

   6 Sepals 3.5-4.5 mm long, weakly 3-nerved; seeds 0.7-1.0 mm long, obscurely sculptured and appearing almost smooth; inflorescence more compact, fewer-flowered.

   2 Sepals 3.5-9 mm long; petals 3.5-13 mm long, equalling or longer than the sepals; seeds 0.7-2.5 mm long.

   5 Seeds 2.2-5 mm long; bracts of the inflorescence herbaceous; petals notched < halfway to the base.

   6 Sepals 0.7-1.2 mm long; bracts of the inflorescence scarious; petals notched < halfway to the base.

   7 Sepals 3.5-11 mm long, broadly acute to acuminate; seeds 0.4-2.0 mm long; stem glabrous or glandular-puberulent (the pubescence not diffuse, many-flowered).

   8 Leaves 0.5-4.0 cm long; seeds 0.6-1.7 mm long; stem pubescent always in vertical lines; perennial, the stems weak and in part prostrate, the tips or vigorous growth ascending; [alien].

   9 Sepals 5.0-6.5 mm long; stamens 8-10; seeds 1.1-1.7 mm long.

   10 Sepals 3.0-5.2 (-6.0) mm long; stamens 1-5 (-8); seeds 0.4-1.3 mm long.

   11 Stamens 3-5 (-8); sepals 4.5-5.2 (-6.0) mm long; seeds 0.9-1.4 mm long; petals usually present.

   11 Stamens 0-3 (-5); sepals 3.0-4.0 mm long; seeds 0.4-0.9 mm long; petals usually absent.

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have an interesting seasonal growth form, producing short and relatively small-leaved flowering shoots in the spring (which wither following fruiting), followed by taller, more vigorous summer shoots with larger and tougher leaves and lacking flowers, which persist until autumn. Some of the description in various manuals of differences in petiole length and leaf size and shape between the two species is obscured or complicated by these seasonal differences; more careful observation is needed. [= RAB, FNA, K, W; = S. pubera Michaux var. silvatica (Béguinot) Weatherby – C, F; = S. silvatica (Béguinot) Maguire – G, preoccupied; = Alsine tennessensis (C. Mohr) Small – S, misapplied]

* Stellaria graminea (Linnaeus, Common Stitchwort, Lesser Stitchwort. Mt, Pd, Cp (NC, SC, VA): fields, roadsides, pastures, disturbed areas; common, introduced from Europe. May-August. [= FNA, G, W; = Alsine longifolia (Muhlenberg ex Willdenow) Britton – S, misapplied]

* Stellaria holostea (Linnaeus, Easter-bell, Greater Stitchwort. Cp? (NC): escaped or persistent from cultivation; rare, introduced from Europe. [= C, F, FNA, G, K]


* Stellaria media (Linnaeus) Villars, Common Chickweed. Mt, Pd (GA, NC, SC, VA), Cp (NC, SC, VA): disturbed areas, gardens, fields; common, introduced from Europe. January-December. [= FNA; < S. media – RAB, C, G, W (also see S. pallida); < S. media var. media – F; = S. media ssp. media – K; = Alsine media Linnaeus – S]

* Stellaria neglecta Weihe. Mt (NC): disturbed areas; rare, introduced from Europe. Similar to S. media and S. pallida. It has been found at scattered localities in e. North America and will presumably eventually be found elsewhere in our area. [= FNA, G; < S. media (Linnaeus) Villars – RAB, C, W; < S. media var. media – F; = S. media ssp. neglecta (Weihe) Murbeck – K; = Alsine neglecta (Weihe) A. & D. Löve – S, misapplied]


* Stellaria prostrata Baldwin. Cp (GA, SC): moist soil along streams; rare. March-April. Apparently ranging from SC south to c. peninsular FL, west to c. TX. This species has been reported repeatedly for SC and sometimes for VA as well; the VA reports are referable to S. pallida. More information is needed about its occurrence in our area. [= K; = S. cuspidata Willdenow ex Schlechtendahl ssp. prostrata (Baldwin) J.K. Morton – FNA; = Alsine baldwinii Small – S]

* Stellaria pubera Michaux, Star Chickweed, Common Starwort, Giant Chickweed, Great Chickweed. Mt, Pd (GA, NC, SC, VA), Cp (NC, SC, VA): bottomland forests, moist slopes, coves; common (uncommon in Coastal Plain). April-June. NJ west to IL, south to panhandle FL and AL. See S. corei for comments. [= RAB, FNA, G, K, W; = S. pubera var. pubera – C, F; = Alsine pubera (Michaux) Britton – S]

* Stellaria borealis Bigelow var. borealis is a native species which ranges south to Canaan Valley (Tucker County, WV) and sc. PA; it might be sought in our area in cold swamps in w. VA. It will key most closely to S. alsine in the key above, but differs in having seeds smooth or weakly sculptured (vs. tuberculate) and in having the lower bracts of the inflorescence leaf-like rather than scarious. [= C; = S. borealis ssp. borealis – FNA, K; > S. calycantha (Ledebour) Bongard var. floribunda Fernald – F, G; > S. calycantha var. isophylla Fernald – F, G, misapplied]

Stellaria fontinalis (Short & Peter) B.L. Robinson is a native species of c. TN (Chester, Wofford, & Kral 1997) and c. KY, occurring in seepages and wet cliffs. Its generic placement has been controversial and uncertain (see synonymy). [= F, FNA, G, K; = Sagina fontinalis Short & Peter – C; = Alsine fontinalis (Short & Peter) Britton – S; = Arenaria fontinalis (Short & Peter) Shinners; = Spargula fontinalis (Short & Peter) Dietrich]

Stipulicida Michaux 1803 (Wire-plant)


Identification notes: Immediately recognizable by its very wiry, dichotomously branched stems, the stem leaves reduced to subulate scales 0.5-2 mm long. Often overlooked are the basal rosette of spatulate leaves, to 15 mm long and 4 mm wide.

Stipulicida setacea Michaux var. setacea. Wire-plant. Cp (GA, NC, SC, VA): xeric sands of sandhills, dry pine flatwoods, maritime forests; common, rare in VA (VA Rare). May-August. Se. VA south to FL, west to LA. Var. lacerata James is endemic to peninsular FL. Var. filiformis (Nash) D.B. Ward, also of FL, is sometimes lumped into var. setacea. [< S. setacea var. setacea – FNA, K (in a broader sense, including var. filiformis); < S. setacea – RAB, C; < S. setacea – S, in a narrower sense (not including var. filiformis)]

Vaccaria von Wolf 1781 (Cow-cockle, Cow-herb)


CASUARINACEAE R. Brown 1814 (Casuarina Family)

A genus of about 17 species, trees, tropical to warm temperate in s. Asia, Australia, and Polynesia. References: Johnson & Wilson in Kubitzki, Rohwer, & Bittrich (1993); Rogers (1982c).

Casuarina Rumph. ex Linnaeus 1759 (Casuarina, Beefwood, She-oak)

A genus of about 17 species, trees, tropical to warm temperate in s. Asia, Australia, and Polynesia. References: Johnson & Wilson in Kubitzki, Rohwer, & Bittrich (1993); Rogers (1982c)=Z.

* Casuarina equisetifolia Linnaeus ssp. equisetifolia, Casuarina, Australian-pine, Horsetail Casuarina, Beach She-oak, Coastal She-oak, was reported as planted and persistent on the Outer Banks of NC by Brown (1959). It is probably not established. [= FNA; < C. equisetifolia – K, S, Z]

CELASTRACEAE R. Brown 1814 (Bittersweet Family)

A family of ca. 98 genera and ca. 1200 species, trees, shrubs, lianas, perennial and annual herbs, nearly cosmopolitan, especially in the tropics and subtropics. References: Brizicky (1964); Simmons in Kubitzki (2004).

1 Leaves spiny-toothed, coriaceous; [rare waif in our area].............................................................................................................. Crossopetalum
1 Leaves entire to serrate (but not spiny-toothed), herbaceous to coriaceous; [collectively common in our area].
2 Leaves alternate; twining woody vines ................................................................................................................................. Celastrus
2 Leaves opposite; upright to trailing shrubs.
3 Leaves widely spaced, averaging < 1 pair per cm of stem; leaves 2.5-12 cm long, (0.5-) 1-6 cm wide; [shrubs to small trees, mostly > 0.4 m tall, collectively in many habitats]. Euonymus
3 Leaves closely spaced, 2-4 pairs per cm of stem; leaves 1.1-2.5 cm long, 0.2-0.6 cm wide; [shrub < 0.4 m tall, native to calcareous rock outcrops, rarely naturalized elsewhere]. Paxistima

Celastrus Linnaeus 1753 (Bittersweet)

A genus of ca. 30 species, scandent shrubs, primarily in e. Asia, Malaysia, Oceania, Madagascar, and Central and South America. The one species native to e. North America is related to e. Asian species. The grammatical gender of the genus has been conserved as masculine (Brummitt 2005). References: Duncan (1969)=Z ; Simmons in Kubitzki (2004).

1 Flowers in 2-3-flowered axillary cymes; leaves mostly obovate, averaging 1.2-1.7× as long as wide .......... C. orbiculatus
1 Flowers in 6-many-flowered terminal panicles; leaves mostly oate-lanceolate to elliptic, averaging 1.8-2.6× as long as wide ................................................. C. scandens

* Celastrus orbiculatus Thunberg, Oriental Bittersweet. Mt, Pd, Cp (GA, NC, SC, VA): thickets, roadsides, forests; common, introduced from Asia. May; August-September. C. orbiculatus, though attractive, is becoming a noxious weed in our area. The first reports of its occurrence in our area appear to be in the 1960's; it is now much more common than its native relative, C. scandens. [= RAB, C, F, W, Z; = C. orbiculata – G, K, orthographic variant]


Crossopetalum P. Browne 1756 (Christmas-berry)

A genus of about 26 species, trees and shrubs, of the West Indies and tropical America. References: Simmons in Kubitzki (2004).
* Crossoptelum ilicifolium* (Poir.) Kuntze, Holly-leaf Rhacoma, Christmas-berry. Cp (NC): disturbed, acid, peaty soil; rare, introduced from subtropical FL. Presumably introduced via cattle at an agricultural experiment station near Wrenona, Washington County, NC (Hayes 1946). The species has probably not persisted in our area. [= K; = Rhacoma ilicifolia (Poir.) Trelease – S]

_Euonymus_ Linnaeus 1753 (Spindle-tree, Euonymus, Strawberry-bush)

A genus of ca. 129 species, of temperate and tropical areas, trees, shrubs, and lianas. The genus name was variously spelled "Euonymus" and "Euvonymus" by Linnaeus. The spelling _Euonymus_ has been nomenclaturally "conserved." The genus is now considered to be grammatically masculine, and specific epithets therefore end in "-us." References: Voss (1985)=Z; Simmons in Kubitzki (2004). Key adapted in part from Duncan & Duncan (in prep.).

1 Leaf undersurface with mostly erect hairs to ca. 0.2 mm long; petioles 8-20 mm long; flowers 4-merous; [native]; [section _Euonymus_]..............................................................................................................

1 Leaf undersurface glabrous (or with some hairs on the midrib); flowers 4- or 5-merous; [introduced or native].

2 Leaves evergreen; flowers 4-merous; [introduced species, rarely naturalized].

3 Petioles of the larger leaves (8-) 11-17 mm long; trailing shrub or climbing vine............. _E. fortunei_ var. radicans

3 Petioles of the larger leaves 4-7 (-8) mm long; shrub or small tree to 6 m tall.

4 Petioles of the larger leaves 6-12 mm long; leaves evergreen, rather thick in texture; inflorescence a dense, few-flowered cyme; shrub or small tree to 6 m tall......................................................... _E. japonicus_

4 Petioles of the larger leaves 4-7 (-8) mm long; leaves semi-evergreen, rather thin in texture; inflorescence a loose, many-flowered cyme; spreading shrub to 3 m tall.............................................. _E. kiautschovicus_

2 Leaves deciduous; flowers 4- or 5-merous; [introduced or native].

5 Petioles 5-33 mm long; flowers 4-merous; [introduced, rarely naturalized].

6 Leaf apex long-acuminate; larger leaves with teeth 6-8 per cm .............................................................. _E. bungeanum_

6 Leaf apex acute to short-acuminate; larger leaves 8-11 per cm; [section _Euonymus_] .................. _E. europaeus_

5 Petioles 1-5 mm long; flowers 4- or 5-merous; [native and introduced].

7 Twigs and branches with 2-4 corky wings; flowers 4-merous; capsules smooth; [introduced, rarely naturalized]; [section _Melanocarya_]...................................................................................... _E. alatus_

7 Twigs and small branches lacking corky wings, terete (or nearly so); flowers 5-merous; capsules muricate; [native species]; [section _Echinococcus_].

8 Primary stems erect, to 20 dm tall; upper leaves widest at or below the middle; petioles mostly 1-3 mm long; [widespread in our area].............................................................................................. _E. americanus_

8 Primary stems trailing or decumbent, the tips and flowering branches ascending to 3 (-6) dm tall; upper leaves widest at or beyond the middle; petioles mostly 3-5 mm long; [of the Mountains]...... _E. obovatus_


_Euonymus americana_ Linnaeus, Strawberry-bush, Heart's-a-bust'-(with-love). Mt, Pd, Cp (NC, SC, VA): forests; common. May-June; September-October. Se. NY west to s. OH and se. MO, south to n. peninsular FL and TX. A variety, var. _angustifolia_ (Pursh) A. Wood, with narrowly lanceolate to linear leaves, has been named and occurs in our area; it is of uncertain status (Brizicky 1964). [= RAB, C, F, G, S, W; = _Euonymus americana_ – K]

_Euonymus atropurpureus_ Jacquin var. _atropurpureus_, American Wahoo, Burning Bush. Mt (NC, SC, VA), Pd (NC, SC, VA), Cp (VA): bottomland forests, riverbanks, mostly on rich alluvial sediments, or on slopes over mafic or calcareous rocks; uncommon (rare south of VA). May; October. NY west to ND, south to panhandle FL and TX. [= K; < _Euonymus atropurpureus_ – RAB, C, F, G, S, W; = _Euonymus atropurpurea_ – Z]


* _Euonymus europaeus_ Linnaeus, European Spindle-tree. Cp (VA): cultivated, rarely naturalized; rare, introduced from Europe. [= C, F, G; = _Euonymus europaea_ – K, Z]

* _Euonymus fortunei_ (Turczaninow) Handel-Mazzetti var. _radicans_ (Siebold ex Miq.) Rehder, Wintercreeper, Chinese Spindle-tree. Pd (NC, SC), Mt, Cp (VA): cultivated, rarely naturalized, as in bottomlands or swamps, where sometimes climbing into the canopy; rare, introduced from China. [= K; < _E. fortunei_ – F, G, Z]


* _Euonymus kiautschovicus_ Loesener. Pd (NC): cultivated, rarely naturalized; rare, introduced from e. and c. China. [= _Euonymus kiautschovicus_ – K]

* _Euonymus obovatus_ Nuttall, Running Strawberry-bush. Mt (GA, NC): cove forests, northern hardwood forests, other mesic forests, especially in boulderfields, where sometimes quite abundant locally; uncommon. May-June; September-October. W. NY west to s. MI, south to sw. NC, ne. GA, TN, and MO. [= RAB, C, F, G, S, W; = _Euonymus obovata_ – K, Z]
Paxistima Rafinesque 1838 (Mountain-lover)

A genus of 2 species, rhizomatous shrubs, of temperate North America. The only other species in the genus is *P. myrsinites* (Pursh) Rafinesque of the Western Cordillera; its two subspecies are *sssp. myrsinites*, ranging from British Columbia and Alberta south to AZ and NM, and *sssp. mexicana* Navaro & Blackwell of mountainous Mexico (Coahuila, Nuevo Leon, and Tamaulipas). For discussion of the long confusion and controversy over the appropriate spelling of the genus, see Navaro & Blackwell (1990) and Uttal (1986). The first validly published spelling of the name was "Paxistima," and this spelling should be retained. References: Navaro & Blackwell (1990)=Z; Simmons in Kubitzki (2004).

**Paxistima canbyi** A. Gray, Cliff-green, Canby's Mountain-lover, Ratstripper. Mt (NC*, VA): in VA on calcareous bluffs and cliffs (generally near the top of the cliffs or bluffs, rarely far below the crest), mostly on limestone and dolostone, but rarely on greenstone or shale; in NC naturalized at the site of a plant nursery and possibly also native (see discussion below); rare (US Species of Concern, NC Watch List, VA Rare). April-May; September. The species is a Central Appalachian endemic: se. PA (Bedford County) (Rhoads & Klein 1993), e. WV, w. VA, s. OH, e KY, ne. TN, and w. NC (where questionably native). The only collection definitely known from NC is that from an old nursery site (Hardin 1963). Navaro & Blackwell (1990) note that "the presence of *P. canbyi* in North Carolina was, however, noticed as long ago as 1883 by Chapman, and *P. canbyi* is likely native to North Carolina." Small (1933) reports it from "n. NC." Casting some doubt on its native status in NC is the species' habitat: limestone ravines and bluffs, a very rare habitat in NC. [= RAB, C, K, W, Z; = *Pachystima canbyi* – G, S (the name not validly published)]

**CELASTRACEAE** Link 1831 (Hackberry Family)

(see **CANNABACEAE**)

**CERATOPHYLLACEAE** S.F. Gray 1821 (Hornwort Family)


**Ceratophyllum** Linnaeus 1753 (Hornwort, Coontail)


**Identification notes:** *Ceratophyllum* is sometimes mistaken for other, superficially somewhat similar aquatics, such as *Cabomba* (Cabombaceae), *Utricularia* (Lentibulariaceae), and *Myriophyllum* (Haloragaceae). *Cabomba* has the leaves opposite (rather than whorled), dichotomously divided (like *Ceratophyllum*), but the divisions lacking the marginal denticles of *Ceratophyllum*, and on a 1-3 cm long petiole (vs. sessile or on a petiole 0-2 mm long). *Utricularia* has the leaves sometimes dichotomously divided, but the divisions are usually irregular, the leaves are alternate (in most species), and bladder traps are present. *Myriophyllum* has the leaves pectinately rather than dichotomously divided.

1 Largest leaves forking 1-2× (count branching-nodes from the base of the leaf to the tip of the most-forked division); leaves coarse-textured, stiff, the marginal denticles usually strongly raised on a broad base of green tissue; achene margin wingless, with 2 basal spines or tubercles (these rarely absent), otherwise entire (lacking marginal spines) ....................... *C. demersum*

1 Largest leaves forking 3-4× (count branching nodes from the base of the leaf to the tip of the most-forked division); leaves fine-textured, flaccid, the marginal denticles not raised on a broad base of green tissue, sometimes obscure or obsolete; achene margin winged, with 2-20 lateral spines 0.1-6.5 mm long (occasionally spineless), with 2 basal spines (these rarely absent).

2 Achene body (excluding the spines) 3-4.5 mm long; first leaves of the plumule simple; [Coastal Plain, NC southward]. .......................................................... ..................... *C. australe*

2 Achene body (excluding the spines) 4.5-6 mm long; first leaves of the plumule forked; [widespread]........ *C. echinatum*

**Ceratophyllum australe** Grisebach. Cp (GA, NC): ponds, pools, slow-moving streams; rare (NC Watch List). May-September. Se. NC south to s. FL and panhandle FL, and in the West Indies; also in s. Mexico, Central America, n. South America, with apparent disjunctions in c. South America and the Galapagos Islands. Les treats this taxon as a subspecies of the Old World *C. muricatum*. Because of their allopatriotic distribution on separate continents and relative morphological distinctiveness (as shown by Les), I prefer to recognize them at the species level. [= *Ceratophyllum muricatum* Chamisso ssp. *australe* (Grisebach) Les – FNA, K, Z; < *C. muricatum* Chamisso – GW (also see *C. echinatum*)]
Ceratophyllum demersum Linnaeus, Coontail. Cp (GA, NC, SC, VA), Mt (GA, VA), Pd (VA): ponds, pools, slow-moving streams; uncommon. May-September. Newfoundland west to AK, south to s. FL, TX, CA, and south through the West Indies and Central America to South America. [= RAB, C, F, FNA, G, GW, K, W, S, Z]

Ceratophyllum echinatum A. Gray in Torrey & A. Gray. Cp (NC, SC, VA), Mt (GA, VA), Pd (VA): ponds, pools, slow-moving streams; uncommon. May-September. Newfoundland west to Ontario and n. MN, south to c. peninsular FL and e. TX; also in British Columbia, WA, and OR. [= RAB, C, F, FNA, G, K, S, Z; < C. muricatum Chamisso – GW (also see C. australe); = C. submersum Linnaeus var. echinatum (A. Gray) Wilmot-Dear]

CHENOPODIACEAE Ventenat 1799 (Goosefoot Family)


{Note: several of the genera below have been treated in very different ways by various authors. Complicating the situation is the pantemperate or pantropical distribution of some species, questions of application of names having priority, and the use of technical characters not readily observed on herbarium specimens. The treatments below of Salicornia, Sarcocornia, Atriplex, and Suaeda may require considerable change prior to publication}

1 Leaves opposite, reduced to scales a few mm long, clasping and appressed against the succulent stem; flowers in groups of 3, sunken into the stem; [subfamily Salicornioideae, tribe Salicornieae].
2 Annual from a taproot; central flower (of each group of 3) considerably longer than the 2 lateral flowers Salicornia
3 Perennial from a horizontal rhizome; central flower (of each group of 3) slightly or not at all longer than the 2 lateral flowers

..........................................................................................................................
Sarcocornia

1 Leaves mostly or entirely alternate (the lower sometimes opposite), not reduced to appressed scales; flowers not usually grouped into groups of 3, not sunken into the stem.
3 Fruit enclosed and concealed by paired accrescent bracteoles (these usually deltoid, diamond-shaped, or ovoid).

..........................................................................................................................
Atriplex

1 Leaves petiolate, lanceolate or wider, the larger leaves generally toothed, not succulent or only slightly so;
5 Leaves pinnatifid, lanceolate or wider, the larger leaves generally toothed, not succulent or only slightly so;
6 Fruit dehiscent; ovary half-inferior; roots usually enlarged; [tribe Beteae].
6 Fruit indehiscent; ovary superior; roots not enlarged.
7 Fruiting calyx not winged, the lobes flat, keeled, or hooded; [tribe Chenopodieae] Chenopodium
7 Fruiting calyx winged horizontally; [tribe Camphorosmeae]...

..........................................................................................................................
Cycloloma

5 Leaves sessile, linear, entire, succulent or not.
8 Leaves spine-tipped; [subfamily Salsoloideae; tribe Salsoleae].
8 Leaves not spine-tipped.

..........................................................................................................................
Salsola

Atriplex Linnaeus 1753 (Orach)


Identification notes: There are a number of idiosyncratic characters that are used for the identification of the species of Atriplex. Many important characters are associated with the mature fruits. The fruit is closely invested by 2 bracteoles, which are variously shaped and ornamented. Mature seeds are dimorphic in most of our species, with large, brown seeds and small, black seeds. The radicle of the seeds is variously apical, lateral, or basal (which can be seen by observing the seed through the clarified bracteoles or with strong transmitted light).

1 Leaves white to gray, densely and finely scurfy, especially adaxially.
2 Seeds dimorphic, black and brown; branches not angled; [introduced, of disturbed situations]; [subgenus Atriplex, section Semibaccata]...

..........................................................................................................................
[A. semibaccata]
2 Seeds monomorphic, brown; branches obtusely angled; [native, of coastal saline situations]; [subgenus Obione, section Obione, subsection Arenariae].
3 Fruiting bracteoles (3.5-) 4.5-7 mm long, 3.5-5.6 mm wide, longer than broad; faces with or without appendages; [of NC northward].................................................................................................................. A. mucronata
3 Fruiting bracteoles 2.5-4.5 mm long, 2.6-5 mm wide, as wide as or wider than long; faces with appendages; [of NC southward].................................................................................................................. A. pentandra
1 Leaves usually green on both surfaces, glabrous or only sparingly powdery or scurfy; [subgenus Atriplex, section Teutliopsis].
4 Fruiting bracteoles not thickened with spongy tissue.
5 Bracteoles rhombic to diamond-shaped, broadly cuneate at the base; brown seeds broadly elliptic, (1.5-) 2.1-3.0 mm wide; seed radicle lateral; [of saline coastal habitats]................................................................................................................. A. dioica
5 Bracteoles triangular, nearly truncate across the bottom; brown seeds round, 2.5-3.1 (-3.7) mm wide; seed radicle subbasal; [primarily ruderal, of inland situations].................................................................................................................. A. patula
4 Fruiting bracteoles thickened with spongy tissue, especially toward the base.
6 Seeds ellipsoid, wider than long; leaves thickened in texture ................................................................................. A. dioica
6 Seeds disc-shaped, as wide as long; leaves thin in texture.
7 Lower leaves linear or ovate-lanceolate; brown seeds 2.0-2.8 mm wide; black seeds 1.5-2.0 mm wide; [of MD and PA northward].................................................................................................................. [A. littoralis]
7 Lower leaves triangular-hastate; brown seeds 1.0-2.5 mm wide; black seeds 1.0-1.5 mm wide; [widespread in our area, primarily in the outer Coastal Plain]......................................................................................... A. prostrata

Atriplex mucronata Rafinesque, Seabeach Orach. Cp (NC, VA): ocean beaches, island-end flats; uncommon. July-frost. NH south to FL west to TX. This species and A. pentandra are closely related, and have been variously treated as species, subspecies, varieties, and forms. [= FNA; < A. arenaria Nuttall – RAB, C, G, GW, S, Y (also see A. pentandra); < A. cristata Humboldt and Bonpland ex Willenow – K (also see A. pentandra); < A. pentandra ssp. arenaria H.M. Hall & Clements]
* Atriplex patula Linnaeus, Spear Orach. Pd, Mt (VA): disturbed areas, inland saline areas; rare, introduced from Eurasia. July-frost. [= C, FNA, K, S, Y; < A. patula Linnaeus – RAB, W (also see A. prostrata); = A. patula var. patula – F, G]
Atriplex pentandra (Jacquin) Standley in N.L. Britton et al., Seabeach Orach. Cp (GA, NC, SC): ocean beaches, island-end flats; uncommon. July-frost. NC to FL, west to TX; West Indies; South America. This species and A. mucronata are closely related, and have been variously treated as species, subspecies, varieties, and forms. [= FNA; < A. arenaria Nuttall – RAB, C, G, GW, S, Y (also see A. mucronata); < A. cristata Humboldt and Bonpland ex Willenow – K (also see A. mucronata); = A. pentandra ssp. pentandra]
* Atriplex littoralis Linnaeus, Narrow-leaved Atriplex. Introduced south to PA (FNA) and MD (Kartesz 1999). [= FNA, K; < A. littoralis Linnaeus – C; < A. patula Linnaeus var. littoralis (Linnaeus) A. Gray – F]
* Atriplex semibaccata R. Brown, Australian Saltbush, Berry Saltbush. Introduced at various localities in North America, including DC (FNA). [= FNA, K]
* Atriplex tatarica Linnaeus, Tatarian Orach. Introduced on ballast at scattered localities, including AL, FL, NJ, and PA (FNA). [= FNA; ? A. lampa Gillies – K, S, misapplied} {not keyed}

Bassia Allioni 1766 (Bassia)


1 Calyx segments (1 lower and 2 upper) bearing stout knobs................................................................................. B. hirsuta
1 Calyx segments (all 5) bearing a horizontal wing.................................................................................................. B. scoparia


*Beta vulgaris* Linnaeus *ssp. vulgaris*, Garden Beet, Swiss Chard, Ruby Chard, Mangel-wurzel. Cp, Pd, Mt (NC, SC, VA): commonly cultivated, rarely escaped or persisting, introduced from Eurasia. [= FNA; > *B. vulgaris var. vulgaris* – G; > *B. vulgaris var. cicla* – G; < *B. vulgaris* – K, Z; ? *B. vulgaris* – S]

**Chenopodium** Linnaeus 1753 (Goosefoot, Lamb's-quarters, Pigweed)

(also see Dysphania)


1 Seeds vertical or both horizontal and vertical; leaf blades glabrous or occasionally sparsely farinose; [subgenus Blitum].
2 Perianth segments 5; plants perennial; [subgenus Blitum, section Agathophyton] .......................... [Ch. bonus-henricus]
3 Perianth segments 3; plants annual.
3 Leaves lancolate or oblong, glaucous on the lower surface.................................................. Ch. glaucum
4 Leaves farinose on the lower surface; [subgenus Blitum, section Degenia] .......................... Ch. macropermum
5 Leaves glabrous on the lower surface.
5 Glomerules 3-10 mm in diameter, borne sessile on unbranched terminal and occasionally axillary spikes; perianth segments fleshy and red at maturity; [subgenus Blitum, section Blitum] ..........................
6 Glomerules 2-5 mm in diameter, borne sessile on lateral branched spikes; perianth segments membranaceous, green at maturity; [subgenus Blitum, section Pseudoblitum] .......................... [Ch. rubrum]
1 Seeds all horizontal; leaf blades usually farinose; [subgenus Chenopodium].
6 Flowers individually disposed in panicles; leaf blades glabrous; [subgenus Chenopodium, section Grossefoweata] ......
7 Primary leaves linear, linear-lanceolate, at least 2-3× as long as wide, usually untoothed and unlobed (but often with 2 basal lobes in Ch. foggii); [subsection Leptophylla].
8 Perianth spreading from fruit at maturity; plants strictly erect. .......................... Ch. pratericola
9 Perianth enclosing the fruit at maturity; plants erect to spreading. .......................... Ch. berlandieri
9 Plants usually spreading; perianth segments obtuse; leaf blades usually unlobed .............[Ch. desiccatum]
10 Plants erect; perianth segments acute; leaf blades often with basal lobes. ..................... Ch. foggii
7 Primary leaves ovate, rhombic, triangular, or lanceolate, usually with basal lobes and often also with additional teeth on the margins.
10 Seeds honeycomb-pitted; [subsection Favosa].
11 Seeds 1.2-2.0 mm in diameter.
12 Style bases with yellow area; seeds 1.2-1.5 mm in diameter .................. Ch. berlandieri var. zschackei
12 Style bases without yellow area; seeds 1.3-2.0 mm in diameter.
13 Inflorescences large and drooping; seeds 1.7-2.0 mm in diameter .................. Ch. berlandieri var. boscianum
13 Inflorescences small and erect; seeds 1.3-1.9 mm in diameter .......................... Ch. berlandieri var. macrocalycium
11 Seeds 1.0-1.3 mm in diameter.
14 Leaves rhombic-triangular, usually without basal lobes; inflorescences becoming bractless. ........................................ Ch. berlandieri var. boscianum
14 Leaves 3-lobed; inflorescences with or without bracts.
15 Inflorescences bractless .................. Ch. berlandieri var. berlandieri
15 Inflorescences with leafy bracts .................. Ch. berlandieri var. zschackei
10 Seeds smooth or areolate.
16 Leaves triangular.
16 Seeds 1.0-1.5 mm in diameter, the seed margin sharp; leaf blades without basal lobes; [subsection Undata] .......................... Ch. murale
17 Seeds 0.8-1.2 mm in diameter, the seed margin rounded; leaf blades often with basal lobes; [subsection Urbica] .......................... Ch. urbicum
16 Leaves ovate to broadly ovate, rhombic, or lanceolate, variously lobed or toothed.
CHENOPODIACEAE

Chenopodium album Linnaeus, Lamb's-quarters, Pigweed. Cp, Pd, Mt (GA, NC, SC, VA): disturbed soils, gardens; common. June-November. As broadly interpreted, this species includes both native and alien races and is now distributed nearly worldwide. [= FNA, W; < Ch. album – RAB, in part (also including Ch. berlandieri and all vars); > Ch. album Linnaeus var. album – K; > Ch. album Linnaeus var. missouriense (Aellen) I.J. Bassett & C.W. Crompton – K; > Ch. album – C, in the narrow sense; < Ch. album – G; > Ch. missouriense Aellen – C, Y; > Ch. paganum – F, S, misapplied; < Ch. album – FNA, G, in part; > Ch. album var. album – Y; > Ch. album var. lanceolatum (Muhlenberg ex Willdenow) Coss. & Germ. – Y; > Ch. giganteum Don – Y; > Ch. lanceolatum Muhlenberg ex Willdenow].

Chenopodium album<br>

Chenopodium berlandieri Moquin-Tandon var. boscianum (Moquin-Tandon) H.A. Wahl. Cp (GA, NC, SC, VA): beaches, marshes; uncommon. August-September. FL west to e. TX; with scattered occurrences further north (these of unknown nativity). [= FNA, K, Y; < Ch. album – RAB].

Chenopodium berlandieri<br>

Chenopodium laniceps Moquin-Tandon var. bushianum (Aellen) Cronquist, Soybean Goosefoot. Cp (NC, SC, VA): disturbed areas, alluvial forests; rare. June-November. ME west to ND, south to VA, TN, LA, and KS. [= C, FNA, K; < Ch. album – RAB, G; < Ch. berlandieri – S; = Ch. bushianum Aellen – Y].

Chenopodium laniceps<br>

Chenopodium laniceps var. macrocalycium (Aellen) Cronquist. Cp (NC, SC, VA): coastal sands, beaches; rare. August-October. Nova Scotia south to FL. [= C, FNA, K; < Ch. album – RAB, G; = Ch. macrocalycium Aellen – Y].

Chenopodium laniceps var. macrocalycium<br>

Chenopodium noguense H.A. Wahl. Mt (NC, VA): rocky, mountain slopes; rare. July. ME and Ontario south to w. VA and w. NC. [= FNA, K, Y; < Ch. pratericola Rydberg – C, in part].

Chenopodium noguense<br>

Chenopodium pratericola S. Watson. Cp (SC): waste areas near wool-combing mills; rare, perhaps merely a waif, introduced from sw. North America. [= FNA, K, Y; < Ch. album – RAB].

Chenopodium pratericola<br>


Chenopodium pratericola var. sinuatum<br>

Chenopodium foggii H.A. Wahl. Mt (NC, VA): rocky, mountain slopes; rare. July. ME and Ontario south to w. VA and w. NC. [= FNA, K, Y; < Ch. pratericola Rydberg – C, in part].

Chenopodium argentatum S. Watson. Cp (SC): waste areas near wool-combing mills; rare, perhaps merely a waif, native of w. North America. [= FNA; = Ch. fremontii var. fremontii – K, Y] {not keyed}.

Chenopodium argentatum<br>

Chenopodium glaucum Linnaeus, Oakleaf Goosefoot. Pd (VA), {SC}: disturbed areas; rare, native of ne. North America and Europe. [= FNA, K; < Ch. glaucum – C, F, G, in a broad sense; = Ch. glaucum var. glaucum – Y].

Chenopodium glaucum<br>


Chenopodium incanum<br>

Chenopodium macrocarpus Hooker f. Cp (NC): disturbed areas; rare, native of South America. Reported for NC (FNA 2003b). [= FNA; > Ch. macrocarpus Hooker f. var. farinosum (S. Watson) J.T. Howell – K; > Ch. macrocarpus Hooker f. var. halophilum (Phil.) Standley – K, Y].

Chenopodium macrocarpus<br>


Chenopodium murale<br>

Chenopodium opulifolium Schrader ex Koch & Ziz, Gray Goosefoot. Cp (NC): disturbed areas on ship's ballast; rare, introduced from s. Europe. [= RAB, C, FNA, K].

Chenopodium opulifolium<br>

Chenopodium pratericola Rydberg, Narrowleaf Goosefoot. Cp (GA, NC, SC, VA): sandy soils, roadsides, disturbed areas; uncommon. May-November. Maine and Ontario west to Yukon, south to FL, TX, and CA. [= FNA, K; = Ch. desiccatum A. Nelson var. leptophylloides (J. Murray) H.A. Wahl – RAB, W, misapplied; < Ch. pratericola – C (also see Ch. foggii); ? Ch. leptophyllum – F, G, in part; = Ch. pratericola var. pratericola – Y].

Chenopodium pratericola<br>

Chenopodium simplex (Torrey) Rafinesque, Mapleleaf Goosefoot. Mt (NC, VA), Pd (VA): in shaded situations, generally at cliff bases; rare (NC Rare, VA Watch List). July-October. Nova Scotia west to AK, south to nw. NC, LA, TX, and UT. [= FNA, K; = Ch. giganteum Aellen – C, W, Y; = Ch. hybridum Linnaeus var. giganteum (Aellen) Rouleau – F; < Ch. hybridum – G; = Ch. hybridum Linnaeus ssp. giganteum (Aellen) Hultén].

Chenopodium simplex<br>

Chenopodium standleyanum Aellen, Woodland Goosefoot. Mt, Pd (VA), {GA, NC, SC}: rock outcrops, steep slopes, shaded disturbed soils; uncommon? Québec west to ND, south to FL and e. TX. [= RAB, C, FNA, G, K, W; < Ch. boscianum – F, S, misapplied].

Chenopodium standleyanum
**Chenopodium berlandieri** Moquin-Tandon var. berlandieri. (SC, VA). Reported for SC and VA by Kartesz (1999), but not attributed to our area by FNA (2003b). [= FNA, K]

* Chenopodium bonus-henicus* Linnaeus, Good King Henry, is cultivated and is known from as far south as MD and PA. [= FNA, C, K, Y]

**Chenopodium capitatum** (Linnaeus) Ascherson var. capitatum, Indian-paint, Strawberry-blite, a native, occurs south to scattered locations in PA (Rhoads & Klein 1993). [= FNA, Y; < Ch. capitatum – C; = Ch. capitatum – K, in a narrow sense; Blitum capitatum Linnaeus]

* Chenopodium desiccacatum* A. Nelson. (SC, VA?). (VA Watch List). {Resolve against Ch. pratericola.} [= FNA; Ch. pratericola var. oblongifolium (S. Watson) H.A. Wahl – Y]

* Chenopodium rubrum* Linnaeus, Red Goosefoot, alien, reported as far south as MD and in other widely scattered sites (such as AL) (Kartesz 1999) and PA (FNA). [= C, K; > Ch. rubrum var. rubrum – FNA, Y]

**Chenopodium strictum** Roth. Scattered locations south to se. PA. Reported for SC (Kartesz 1999). [= FNA; = Chenopodium album Linnaeus var. striatum (Krašan) comb. nov. ined. – K; > Chenopodium strictum ssp. glaucophyllum (Aellen) Aellen & Just.; > Chenopodium strictum Roth var. glaucophyllum (Aellen) H.A. Wahl – Y]

* Chenopodium urbicum* Linnaeus, City Goosefoot, occurs as an introduction in waste ground south to MD, s. PA (Rhoads & Klein 1993), WV, KY, and TN (Kartesz 1999, FNA 2003b). [= C, FNA, K, Y]

* Chenopodium vulvaria* Linnaeus, Stinking Goosefoot, is introduced as scattered locations in eastern North America, as in MD, PA, DE, FL (FNA 2003b). [= C, FNA, K, Y]

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**Cyclocoma** Moquin 1840 (Winged-pigweed)


**Dysphania** R. Brown 1810

A genus of about 32 species, annual and perennial herbs, mostly in the tropics, subtropics, and warm temperate areas. References: Clements & Mosyakin in FNA (2003b); Wahl (1954)=Y.

1 Leaves deeply pinnately lobed, the lobes linear; plant perennial; mature calyx shallowly toothed, obovoid-urceolate, reticulate-veiny; [section Adenois] .............................................................................................. **D. multifida**

1 Leaves serrate to sinuate-pinnatifid, the lobes broad-based and triangular-tapered; plant annual; mature calyx deeply lobed, neither reticulate nor prominently veined.

2 Flowers in a slender thyrsoid inflorescence of lateral cymes; [section Botryoides] .............................................................................................. **D. botrys**

2 Flowers in dense glomerules arranged in spikes and panicles.

3 Leaf blades 2-8 cm long; seeds mostly horizontal; stems 3-15 dm tall; [section Adenois].

4 Inflorescences foliose throughout................................................................. **D. ambrosioides**

4 Inflorescences leafless (leaves in the inflorescence absent or shorter than the glomerules)........................ **D. anthelmintica**

5 Perianth segments keeled and crested ...................................................... **D. cristata**

5 Perianth segments rounded........................................................................... **D. pumilio**

* Dysphania ambrosioides* (Linnaeus) Mosyakin & Clements, Mexican-tea. Cp, Md, Mt (GA, NC, SC, VA): disturbed habitats; common, probably native southward. Widespread in North America to South America, the original range unclear. [= FNA; < Ch. ambrosioides – RAB, C, G, W, Y (also see Dysphania anthelmintica); = Chenopodium ambrosioides var. ambrosioides – F, in a narrow sense; < Ch. ambrosioides var. ambrosioides – K (also see Dysphania anthelmintica); < Ambrina ambrosioides (Linnaeus) Spach – S (also see D. anthelmintica); < Teloxys ambrosioides (Linnaeus) W.A. Weber]

**Dysphania anthelmintica** (Linnaeus) Mosyakin & Clements, Wormseed. Cp (GA, NC, SC, VA): dunes; common. NY south to FL, west to TX; Mexico, West Indies, Bermuda, Central America; scattered inland in North America probably as an introduction. [= FNA; < Ch. ambrosioides – RAB, C, G, W, Y; = Ch. ambrosioides var. anthelmintica (Linnaeus) A. Gray – F; < Ch. ambrosioides var. ambrosioides – K; < Ambrina ambrosioides (Linnaeus) Spach – S]


**Kochia** Roth 1801

(see *Bassia*)

**Salicornia** Linnaeus 1753 (Glasswort)

(also see *Sarcocornia*)


1 Scale-leaves below the spikes mucronate; spikes mostly 4.5-6 mm in diameter............................................................. **S. bigelovii**

1 Scale-leaves below the spike obtuse to slightly acute; spikes mostly 1.5-4.5 mm in diameter .............................................. **S. virginica**

**Salicornia bigelovii** Torrey, Dwarf Glasswort, Dwarf Saltwort. Cp (GA, NC, SC, VA): salt pannes in coastal marshes; common. July-October. ME (Nova Scotia?) south to FL, west to TX; also West Indies; also CA. [= RAB, C, F, FNA, G, GW, K, S, Z]

**Salicornia virginica** Linnaeus, Samphire. Cp (GA, NC, SC, VA), Mt (VA): salt pannes in coastal marshes; common. July-October. Nova Scotia and Quebec south to FL; It is unclear whether our eastern North American plants are distinct from European plants of the *S. europaea* complex. Recent European workers recognize multiple species in the *S. europaea* complex. *S. europaea* (in the narrow sense) is a diploid species; our plants are apparently all tetraploid and may or may not be conspecific with one of the European tetraploid entities in this complex. Until further studies are completed, it seems best to recognize our plants as distinct. The oldest name available for the American plants is *Salicornia virginica* Linnaeus, which has unfortunately been generally misapplied to the perennial glasswort, *Sarcocornia perennis*. [= K; = Salicornia depressa Standley in N.L. Britton et al. – FNA; < Salicornia europaea Linnaeus – RAB, C, G, GW, S, W, Z, misapplied; >> Salicornia europaea var. europaea – F]

**Salicornia maritima** Wolff & Jefferies, Sea Saltwort, supossedly occurs south to MD (Kartesz (1999); FNA (2003b) does not map it south of the Canadian Maritimes. [= FNA, K] {not yet mapped; synonymy incomplete}

**Salsola** Linnaeus 1753 (Saltwort, Russian-thistle)


1 Leaf blades not fleshy in fresh material, narrowly linear to filiform, < 1 mm wide in herbarium material; leaves with a weak apical spine; [of disturbed areas]............................................................. **S. tragus**

1 Leaf blades fleshy in fresh material, linear, 1-2 mm wide in dried specimens; leaves with a strong apical spine; [of sea-beaches].

2 Perianth segments with a weak non-spiny apex and obscure midvein; bracteoles connate at base, swollen................................. ................................................................. **S. caroliniana**

2 Perianth segments with subspinoso apex and prominent midvein; bracteoles distinct, not swollen............................. **S. kali**


**Salsola kali** Linnaeus, Northern Saltwort. Cp (NC, SC, VA): upper beaches, fore-dunes, and island-end flats; uncommon. June-frost. Newfoundland to SC; Europe. Generally considered to be introduced in North America, but it may well be a native. [< S. kali Linnaeus – RAB, C, S, Z, in part; = S. kali var. kali – F; = S. kali ssp. kali – FNA, K; < S. kali var. kali – G]


**Sarcocornia** A.J. Scott 1978 (Woody Glasswort)


*Sarcocornia pacifica* (Standley) A.J. Scott, Woody Glasswort, Perennial Glasswort. Cp (GA, NC, SC, VA): coastal salt marshes; common. July-October. NH south to FL; CA south into w. Mexico. Ball in FNA (2003b) treats all North American *Sarcocornia* as *Sarcocornia pacifica*, which is also present on the Pacific coast of North America. *Sarcocornia perennis* is restricted to the Pacific coast of North America, as well as being in Europe, sw. Asia, and Africa. [= FNA; *Sarcocornia perennis* (P. Miller) A.J. Scott – K, apparently misapplied to east Coast material; *Salicornia virginica* Linnaeus – RAB, C, F, G, GW, misapplied; *Salicornia perennis* P. Miller – S, Z, apparently misapplied to East Coast material; *Arthrocnemum perenne* (P. Miller) Moss; *Salicornia ambigu*a Michaux]

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**Spinacia** Linnaeus 1753 (Spinach)


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**Suaeda** Forsskål ex Scopoli 1777 (Sea-blite)


1 Calyx segments keeled on the back; flowers in 1-3-flowered glomerules, these aggregated in a dense panicle; seeds dimorphic, black seeds shiny, 1-1.8 mm in diameter, brown seeds dull, 1.5-2.6 mm in diameter ............................................. *S. linearis*

1 Calyx segments rounded or obscurely keeled on the back; flowers in axillary glomerules of 1-3 (-4) flowers; seeds monomorphic, reddish brown or black, 1-2.2 mm in diameter ............................................. *S. maritima*

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*? Suaeda maritima* (Linnaeus) Dumortier, White Sea-blite. Cp (VA): salt marsh edges and disturbed saline habitats; uncommon, possibly native, introduced, or a combination. Usually considered (as by C, GW, S) to be naturalized from Eurasia, but Ferren & Schenk (2003b) consider *S. maritima* in North America to include native and naturalized components. [= C, F, FNA, G, GW, Y, Z; > *S. maritima* ssp. maritima – K; = Dondia maritima (Linnaeus) Druce – S]

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**CHRYSOBALANACEAE** R. Brown 1818 (Coco-plum Family)

A family of about 18 genera and 530 species, trees and shrubs, of tropical and subtropical areas, especially tropical America. References: Prance & Sothers (2003); Prance (1970).

**Licania** Aublet (Gopher-apple)


**Licania michauxii** Prance, Gopher-apple, Ground-oak. Cp (GA, SC): sandhills, dry sandy pinelands; rare north of GA (SC Rare). May-June; September-October. Se. SC south to s. FL, west to LA, becoming abundant and ubiquitous in dry sandy habitats in the southern part of its range. *L. michauxii* is one of 49 species of subgenus *Moquilea*, section *Moquilea*, which is distributed from se. North America through Central America and the West Indies to South America; our species may be most closely related to *L. retifolia* Blake, a small tree of sw. Mexico and El Salvador (Prance 1970; Prance & Sothers 2003). A rare upright shrub form (to over 1.5 dm tall) has been found in Brevard County, FL, suggesting that *L. michauxii* evolved from a taller
**CHENOPODIACEAE**

A family of about 8 genera and 180 species, shrubs and herbs, of warm temperate and subtropical areas, centered in Mediterranean Europe. References: Arrington & Kubitzki in Kubitzki & Bayer (2003).

<table>
<thead>
<tr>
<th>1</th>
<th>Shrub, usually much branched from the lower stem; flowers solitary, terminal on the branches; leaves 1-3 mm long and scalelike, or 3-7 mm long and acicular; capsule cylindric, &gt; 2x as long as wide.</th>
<th><em>Hudsonia</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Succulents, herb, usually little branched from the lower stem (often much branched above, and in <em>Lechea</em> with specialized short basal shoots at ground level); flowers axillary or terminal in branching inflorescences; leaves 4-50 mm long, mostly linear, lanceolate, oblone, or elliptic; capsule globose, subglobose, ellipsoid, ovoid, or obovoid, &lt; 2x as long as wide.</td>
<td><em>Crocanthemum</em></td>
</tr>
</tbody>
</table>

**CISTACEAE** A.L. de Jussieu 1789 (Rockrose Family)

A genus of about 20 species, of eastern North America, California, Mexico, and s. South America. The eastern North American species previously attributed to *Helianthemum* are in a clade distinct from the Old World *Helianthemum*, and should be recognized as *Crocanthemum*. References: Daoud & Wilbur (1965)=Z; Wilbur & Daoud (1964)=Y; Arrington & Kubitzki in Kubitzki & Bayer (2003).

**Identification notes:** The identification of most of our species of *Crocanthemum* requires an understanding of the 2 types of flowers. Cleistogamous flowers have showy yellow petals and larger sepals, the distinct portion of the 2 linear outer sepals usually linear, (0.7-) 1.3-5.5 mm long, the distinct portion of the 3 broader inner sepals 2.5-12 (-14) mm long. Cleistogamous flowers lack petals and have smaller sepals, the distinct portion of the 2 linear outer sepals 0.2-3 mm long, the distinct portion of the 3 broader inner sepals 1.5-4.8 mm long. In some species (*C. canadense*, *C. bicknellii*, *C. propinquum*) the chasmogamous flowers open earlier (April-July) than the cleistogamous (June-September). In others (*C. corymbosum*, *C. georgianum*, *C. rosmarinifolium*), the two types of flowers open at the same time (March-June) or cleistogamous flowers are nearly always absent (*C. carolinianum*). Capsules from chasmogamous flowers are larger and contain more seeds than those from cleistogamous flowers.

| 1 | Leaves 1-4 (-7) mm wide, (5-) 7–15× as long as wide; capsules from chasmogamous flowers 2-3 mm long, with 1-3 (-6) seeds; capsules from cleistogamous flowers 1.3-1.7 mm long, with 1 (-2) seeds. | *C. rosmarinifolium* |
| 2 | Leaves basally disposed, the largest and most prominent leaves in a basal rosette; stem leaves 2-5 below those subtending flowers or fruits; stem with spreading trichomes to 2.5 mm long; lower surface of leaves sparsely pubescent, the surface readily visible; cleistogamous flowers usually never produced; capsules 6-9 (-10.5) mm long, with 80-92 (-135) papillate seeds. | *C. carolinianum* |
| 3 | Ovary and capsule densely stellate pubescent. | *C. nashii* |
| 4 | Chasmogamous flowers usually solitary, terminal or subterminal, later overtopped by lateral branches; seeds papillate, 35-46 per chasmogamous capsule, 5-9 (12) per cleistogamous capsule; chasmogamous capsules (4-) 6-7 (-8.5) mm long, cleistogamous capsules (2-) 2.3-3.0 (-3.8) mm long; upper surface of cauleine leaves with some long simple trichomes mixed with the shorter stellate trichomes. | *C. canadense* |

**Crocanthemum** Spach 1836 (Frostweed, Rockrose)

A genus of about 20 species, of eastern North America, California, Mexico, and s. South America. The eastern North American species previously attributed to *Helianthemum* are in a clade distinct from the Old World *Helianthemum*, and should be recognized as *Crocanthemum*. References: Daoud & Wilbur (1965)=Z; Wilbur & Daoud (1964)=Y; Arrington & Kubitzki in Kubitzki & Bayer (2003).

**Identification notes:** The identification of most of our species of *Crocanthemum* requires an understanding of the 2 types of flowers. Cleistogamous flowers have showy yellow petals and larger sepals, the distinct portion of the 2 linear outer sepals usually linear, (0.7-) 1.3-5.5 mm long, the distinct portion of the 3 broader inner sepals 2.5-12 (-14) mm long. Cleistogamous flowers lack petals and have smaller sepals, the distinct portion of the 2 linear outer sepals 0.2-3 mm long, the distinct portion of the 3 broader inner sepals 1.5-4.8 mm long. In some species (*C. canadense*, *C. bicknellii*, *C. propinquum*) the chasmogamous flowers open earlier (April-July) than the cleistogamous (June-September). In others (*C. corymbosum*, *C. georgianum*, *C. rosmarinifolium*), the two types of flowers open at the same time (March-June) or cleistogamous flowers are nearly always absent (*C. carolinianum*). Capsules from chasmogamous flowers are larger and contain more seeds than those from cleistogamous flowers.

| 1 | Leaves 1-4 (-7) mm wide, (5-) 7–15× as long as wide; capsules from chasmogamous flowers 2-3 mm long, with 1-3 (-6) seeds; capsules from cleistogamous flowers 1.3-1.7 mm long, with 1 (-2) seeds. | *C. rosmarinifolium* |
| 2 | Leaves 2-20 mm wide, 2-6 (-8)× as long as wide; capsules from chasmogamous flowers (2.4-) 3-9 (-10.5) mm long, with 6-92 (-135) seeds; capsules from cleistogamous flowers 1.5-4.2 mm long, with 1-20 seeds. | *C. carolinianum* |
| 3 | Ovary and capsule densely stellate pubescent. | *C. nashii* |
| 4 | Chasmogamous flowers usually solitary, terminal or subterminal, later overtopped by lateral branches; seeds papillate, 35-46 per chasmogamous capsule, 5-9 (12) per cleistogamous capsule; chasmogamous capsules (4-) 6-7 (-8.5) mm long, cleistogamous capsules (2-) 2.3-3.0 (-3.8) mm long; upper surface of cauleine leaves with some long simple trichomes mixed with the shorter stellate trichomes. | *C. canadense* |
5 Chasmogamous and cleistogamous flowers borne together, the two types of flowers open at the same time (March-June); seeds smooth, 15-35 per chasmogamous capsule, 4-20 per cleistogamous capsule; outer sepals of the cleistogamous flowers 1.4-3.0 mm long; inner sepals of the cleistogamous flowers 2.0-4.8 mm long; [of the outer Coastal Plain (primarily barrier islands) of NC and SC].

6 Flowers borne in dense many-flowered flat-topped cymes terminating the stem and sometimes also the main branches; capsules of the cleistogamous flowers 1.6-3.8 mm long, with 4-8 (-10) seeds; pedicels and calyx with 0.5-1.5 mm long simple trichomes mixed with the shorter stellate trichomes; outer sepals of both chasmogamous and cleistogamous flowers with an expanded, obtuse, spathulate tip, 0.3-1.2 mm wide .................................................. \textit{C. corymbosum}

6 Flowers borne in loose 1-7-flowered cymes or racemes at the ends of the main branches; capsules of the cleistogamous flowers 3.0-4.2 mm long, with 12-20 seeds; pedicels and calyx with short stellate pubescence only; outer sepals of both chasmogamous and cleistogamous flowers linear, 0.2-0.5 mm wide .......................................................... \textit{C. georgianum}

5 Chasmogamous and cleistogamous flowers borne in separate inflorescences, the chasmogamous flowers opening earlier (April-July) than the cleistogamous flowers (June-September); seeds reticulate, 12-26 per chasmogamous capsule, 1-2 (-3) per cleistogamous capsule; outer sepals of the cleistogamous flowers 0.2-1.2 (-1.8) mm long; inner sepals of the cleistogamous flowers 1.7-2.5 (-3.0) mm long; [of the Mountains and less commonly the Piedmont of NC and VA, and very rarely the Coastal Plain of VA].

7 Stems mostly 20-50 cm tall, clustered, arising from an upright caudex; distinct portion of the outer sepals of the cleistogamous flowers linear, (0.3-) 0.6-1.2 (-1.8) mm long, about 3-5× as long as wide; distinct portion of calyx of the chasmogamous flowers (2.4-) 3.5-4.5 (-8) mm long; cleistogamous capsules sharply 3-angled in cross-section; leaf with broadly cuneate base ............... \textit{C. bicknellii}

7 Stems mostly 10-30 cm tall, scattered, arising from horizontal elongate rootstocks; distinct portion of the outer sepals of the cleistogamous flowers rudimentary, knob-like, 0.2-0.5 mm long, 1-2× as long as wide; distinct portion of calyx of the chasmogamous flowers (0.7-) 1.5-3.0 (-4.0) mm long; cleistogamous capsules somewhat rounded in cross-section; leaf with narrowly cuneate to attenuate base .................................................. \textit{C. propinquum}

\textit{Crocanthemum bicknellii} (Fernald) Barnhart, Hoary Frostweed, Plains Frostweed, Plains Sunrose, Bicknell's Hoary Rockrose. Mt (GA, NC, VA), Pd (NC, VA): woodlands, glades, barrens, rock outcrops, and, grassy balds, to at least 1500m in elevation; rare (GA Special Concern, NC Rare, VA Rare). June-July (chasm.), July-September (cleist.); August-October. ME and s. Ontario west to MN and s. Manitoba, south to ne. GA, e. TN, AR, KS, and CO. [= \textit{Helianthemum bicknellii} Fernald – RAB, C, F, G, K, W, Y, Z; \textit{Halimium}]


\textit{Crocanthemum corymbosum} (Michaux) Britton, Pinebarren Sunrose. Cp (GA, NC, SC): openings in maritime forests; rare (NC Rare). April-May; July-October. E. NC south to s. FL, east to s. MS. [= \textit{Helianthemum corymbosum} Michaux – RAB, K, Y, Z; \textit{Halimium corymbosum} (Michaux) Grosser]

\textit{Crocanthemum georgianum} (Chapman) Barnhart, Georgia Frostweed, Georgia Frostweed. Cp (GA, NC, SC): openings in maritime forests; rare (NC Rare, SC Rare). April-May; May-October. E. NC south to n. FL, west to c. TX and AR. [= \textit{Helianthemum georgianum} Chapman – RAB, K, Y, Z; \textit{Halimium georgianum} (Chapman) Grosser]

\textit{Crocanthemum nashii} (Britton) Barnhart, Florida Scrub Sunrose, Nash's Sunrose. Cp (NC): xeric sandhills; rare (NC Rare). Endemic to peninsular FL; disjunct in se. NC (New Hanover County). May-June; July-September. [= \textit{Helianthemum nashii} Britton – K, Y, Z; \textit{Halimium nashii} (Britton) Grosser]

\textit{Crocanthemum propinquum} (Bicknell) Bicknell, Low Frostweed, Creeping Sunrose. Mt, Pd (NC, VA), Cp (VA): woodlands, rock outcrops, sandy barrens and fields (in VA); rare (NC Rare, VA Rare). June-July (chasm.), July-September (cleist.); August-October. Se. MA and se. NH south to w. NC and e. and c. TN. [= \textit{Helianthemum propinquum} Bicknell – RAB, C, F, G, K, W, Y, Z; \textit{Halimium}]

\textit{Crocanthemum rosinarinifolium} (Pursh) Barnhart, Rosemary Sunrose. Cp (GA, NC, SC): sandy roadsides, fields; common (NC Watch List). May-June; July-October. S. NC south to panhandle FL, west to c. TX; also disjunct in the West Indies. [= \textit{Helianthemum rosinarinifolium} Pursh – RAB, K, Y, Z; \textit{Halimium rosinarinifolium}]

\textit{Hudsonia} Linnaeus 1767 (Sand-heather, Golden-heather, Beach-heather)

1 Pedicels 0-1 (-3) mm long; leaves 1-3 mm long, ovate, densely tomentose, appressed to the stem and overlapping; stamens 8-20; [of the outer Coastal Plain of VA and ne. NC northward].......................... *H. tomentosa*

1 Pedicels 4-10 mm long; leaves 3-7 mm long, subulate, slightly pubescent, spreading; stamens 10-30; [collectively of the Mountains of NC and inner Coastal Plain of SC].

2 Sepals obtuse to acute, lacking long-acuminate apices; stamens 10-20; leaves 3-4.5 (-6) mm long, sparsely villous; fruits cylindric; [of the inner Coastal Plain of SC (in our area)].......................... *H. ericoides*

2 Sepals acuminate, with attenuate apices 1-2 mm long; stamens 20-30; leaves 5-7 mm long, glabrate to sparsely villous; fruits urceolate to campanulate; [of the Mountains of NC].......................... *H. montana*

**Hudsonia ericoides** Linnaeus, Northern Golden-heather. Cp (SC): sandy flats in longleaf pine sandhill; rare (SC Rare). May; August. Newfoundland south to ME, NH, MD (Stipple 2002), and DE; disjunct in nc. SC. The disjunct occurrence in SC has every appearance of being native; it is discussed by Bozeman & Logue (1968). [= RAB, C, F, G, K, S, Z; = *H. ericoides* Linnaeus ssp. *ericoides* – Y]

**Hudsonia montana** Nuttall, Mountain Golden-heather. Mt (NC): shallow sandy soils on ledges of quartzite or other felsic rocks in the Blue Ridge Escarpment, at various sites along the eastern side of Linville Gorge, Burke County, NC, and disjunct further south in McDowell County, NC; rare (US Threatened, NC Endangered). June-early July; mid-July-September. This species is endemic to w. NC; it is almost certainly a southern sibling of the more northern *H. ericoides*. As well as being a very narrowly distributed endemic, *H. montana* is endangered by fire suppression in its habitat. [= RAB, K, S, W, Z; = *H. ericoides* Linnaeus ssp. *montana* (Nuttall) Nickerson & J. Skog – Y]

**Hudsonia tomentosa** Nuttall, Woolly Beach-heather. Cp (NC, VA): dunes, sand flats, blowouts; common (NC Rare). May-June; August-September. Labrador west to s. Mackenzie and Manitoba, south to WV (Panther Knob), WI, and MN, and south along the Atlantic Coast from ME to VA and ne. NC (where it reaches its southern limit in Dare County). [= RAB, C, F, G, S, Z; > *H. tomentosa* var. *tomentosa* – K; = *H. ericoides* Linnaeus ssp. *tomentosa* (Nuttall) Nickerson & J. Skog – Y]

**Lechea** Linnaeus 1753 (Pinweed)

(Contributed by Bruce A. Sorrie)


**Identification notes**: *Lechea* is recognizable by its production of numerous basal shoots (usually prostrate) in the late summer and fall. These are evergreen and overwinter, and the fertile stems (usually erect or ascending) are produced from renewed growth of the basal shoots in the spring and summer.

1 Pubescence of the stems strongly spreading, not at all appressed; inner sepals carinate (U- or V-shaped in cross-section); plant tall, often > 5 dm tall.......................... *L. mcrurana*

1 Pubescence of the stems more or less appressed, usually strongly so; inner sepals shallowly curved in cross section, not carinate; plants variable in height.

2 Outer (slender) sepals equaling or exceeding the inner (broad) sepals.

3 Base of the fruiting calyx clearly differentiated into a hardened, shiny, yellowish, obconic base 0.4-0.6 mm long, contrasting in color and texture with the rest of the calyx; pedicels averaging > 2 mm long........... *L. racemulosa*

4 Capsule exerted, usually conspicuously so, the sepals not enclosing the summit of the fruit, ellipsoid to ovate; leaves < 8× (usually 6×) as long as wide; plant usually taller, 1.5 dm tall. 5 Outer sepals distinctly longer than the inner sepals, usually also longer than the capsule; stem leaves usually whorled, 2 mm wide; plant erect, with short, ascending branches...................... *L. minor*

5 Outer sepals shorter than to barely longer than the inner sepals, shorter than the capsule; stem leaves alternate, rarely wider than 1.5 mm wide; plant ascending (sometimes erect or spreading, branches spreading.......................... *L. sessiliflora*

2 Outer (slender) sepals shorter than the inner (broad) sepals.

6 Capsules ellipsoid to narrowly pyriform, normally about 2× as long as wide (or even longer in *L. racemulosa*). 7 Stigmas not persistent; pedicels averaging about 2 mm long; base of the fruiting calyx clearly differentiated into a hardened, shiny, yellowish, obconic base 0.4-0.6 mm long, contrasting in color and texture with the rest of the calyx................... *L. racemulosa*

7 Stigmas persistent, reddish-brown, conspicuous on the summit of the capsule; base of the fruiting calyx not conspicuously differentiated in texture and color.......................... *L. sessiliflora*
6 Capsules of a broader shape, ovoid, broadly ellipsoid, or subglobose, normally < 1.5× as long as wide.
8 Capsules obviously longer than the sepals.
9 Seeds 3-4, 1-1.1 mm long, frequently thickened dorsiventrally and keeled; calyx in fruit light- to dark-brown, cuneate-obovoid; panicle slenderly ovoid to subcylindric, the principal branches subequal, the ultimate branches greatly reduced, bearing crowded, frequently clustered fruits; fruiting stems to 5.5 dm tall ........................................... L. pulchella var. pulchella
9 Seeds 2 (-3), 1.1-1.25 mm long, compressed dorsiventrally and equilateral; calyx in fruit brownish- to reddish-purple, pyriform, narrow to broad above; panicle subcylindric to subglobose, the branches diminishing upward, the ultimate branches several cm in length, bearing racemes of scattered fruits; fruiting stems to 8 dm tall...................................................... L. pulchella var. 1
8 Capsules almost completely enveloped by the sepals.
10 Leaves sparsely pubescent on the midrib and margin only beneath; branches and stems sparsely subappressed-pilose; seeds 4-6.............................................................. L. intermedia var. intermedia
10 Leaves appressed pubescent on the surface beneath; branches and stems moderately to densely gray-canescence; seeds 2-3.
11 Leaves 0.5-1.0 mm wide; seeds 3; [of sandhills and flatwoods]............................ L. torreyi var. congesta
11 Leaves 1.5-3.0 (-4.0) mm wide; seeds 2-4 (-5); [of coastal dunes].
12 Seeds 3-4 (-5), obscurely 3-sided and more-or-less resembling sections of an orange, or 2-sided and convex ventrally; main stems 1.0-2.5 mm diameter, strongly ascending-erect to subprocumbent; sepals strongly tinged maroon, occasionally dull brown; [s. ME and e. NH south to DE]........................................... [L. maritima var. maritima]
12 Seeds 2 (-3), 2-sided and flattish, concave ventrally; main stems 2.0-4.0 mm diameter, procumbent to ascending; sepals dull brown, occasionally tinged maroon; [se. DE south to ne. NC]......................................................................................................................... L. maritima var. virginica

Lechea intermedia Leggett ex Britton var. intermedia. Pinweed. Mt, Pd (VA): dry areas; rare (VA Rare). July-August; August-October. L. intermedia ranges from New Brunswick west to Ontario, MN, and Saskatchewan, south to VA, n. OH, n. IL, and nw. NE. Only variety. intermedia ranges south of New England; 3 other varieties occur in New England and Canada. [= F, K; < L. intermedia – C, G, W; = L. intermedia var. typica – Z]

Lechea maritima Leggett ex Britton, Sterns, & Poggenburg var. virginica Hodgdon. Cp (NC, VA): sandy dunes, flats, and blowouts, often associated with Hudsonia tomentosa; uncommon (NC Rare, VA Watch List). June-August; August-September. L. maritima occurs from s. ME south to n. NC, and disjunct in n. New Brunswick (reports of this species south to GA are apparently based on misidentifications); var. virginica is endemic from se. DE, e. MD, e. VA, and ne. NC. [= C, F, G, K, Z; < L. maritima – S]


Lechea mucronata Rafinesque. Pd (GA, NC, SC, VA), Mt (GA, NC, SC), Cp (VA): open dry habitats, dunes, woodlands; common (uncommon in VA Coastal Plain, rare in Piedmont and Mountains). June-August; July-October. NH west to MI and OK, south to FL, TX, and n. Mexico. [= C, K, W; = L. villosa Elliott – RAB, F, G, S, Y; > L. villosa var. typica – Z]

Lechea pulchella Rafinesque var. pulchella. Mt, Pd (VA): dry woodlands, disturbed places; uncommon. June-August; August-October. L. pulchella was interpreted by Hodgdon (under the name L. leggettii) as consisting of 3 varieties. Var. pulchella ranges from e. MA west to ne. OH, south to c. VA. A second variety, var. moniliformis (Bicknell) Seymour, is not known from our area, occurring on the Coastal Plain from Nantucket Island, MA south to s. NJ, and disjunct along the Great Lakes (a common phytogeographic pattern, lending credence to the validity of the variety). The third variety, of the Southeastern Coastal Plain, is treated below. [< L. leggettii Britton & Hollick – RAB, C; = L. leggettii var. leggettii – F, G, Y; < L. pulchella var. pulchella – K; < L. pulchella – W; = L. pulchella var. typica – Z]

Lechea pulchella Rafinesque var. 1. Cp (GA, NC, SC, VA): pine-oak woodlands, savannas, flatwoods, sandhills, openings in maritime forests, sometimes in wet, almost peaty soils; common. June-August; August-October. This taxon, treated by Hodgdon under the name L. leggettii Britton & Hollick var. ramosissima Hodgdon apparently currently lacks a valid name, following the adoption of the Rafinesquian L. pulchella. Wilbur & Daoud (1961) tacitly accepted the validity of the variety. It ranges from se. VA south to FL and west to e. LA; disjunct in sc. TN (Coffee County). [< L. leggettii Britton & Hollick – RAB, C, G, S; = L. leggettii Britton & Hollick var. ramosissima Hodgdon – F, G, Y, Z; < L. pulchella var. pulchella – K]

Lechea racemulosa Michaux. Mt, Pd (GA, NC, SC, VA), Cp (NC, SC, VA): dry pine woodlands, other woodlands, forest edges, old fields; common. June-July; July-October. Se. NY west to s. OH and s. IL, south to se. VA, NC, c. GA, and AL, with a few disjunct occurrences west to MO; the range is centered on the Appalachian Mountains. [= RAB, C, F, G, K, S, W, Y, Z]

Lechea sessiliflora Rafinesque. Cp (GA, NC, SC): sandhills; common. July-August; August-October. A Southeastern Coastal Plain endemic: s. NC south to s. FL and west to s. MS. [= K; = L. patula Leggett – RAB, S, Y, Z]

Lechea tenuifolia Michaux. Pd, Cp (GA, NC, SC, VA): dry oak-pine forests and openings; common. June-August; August-October. Ms. SE south to Coastal Plain (mostly inner Coastal Plain and Piedmont), and from s. IN n. IL, s. MN, and NE south to e. LA and c. TX. [= RAB, K, S, W, Y; > L. tenuifolia var. tenuifolia – C, F, G; > L. tenuifolia var. typica – Z]

Lechea torreyi Leggett ex Britton var. congesta Hodgdon. Cp (GA, NC, SC): sandhills and pine flatwoods; rare (NC Rare, SC Rare). June-July; August-October. As interpreted by Hodgdon, L. torreyi consists of 2 varieties, the more widespread var. congesta ranging from se. NC south to s. FL and west to s. MS (disjunct in Belize), and the more restricted var. torreyi restricted
to FL. Wilbur & Daoud (1961) express doubt about the validity of the 2 varieties, but present little evidence for or against their recognition. Var. congesta may indeed prove to be no more than a form. [= Z; < L. torreyi – RAB, K, S, Y]

**Lechea deckertii** Small, Deckert's Pinweed. Cp (GA): xeric sands of scrub; rare (GA Special Concern). Sc. GA (Jones & Coile 1988) south to s. FL. [= K, S] {not keyed at this time; synonymy incomplete}

**Lechea maritima** Leggett ex Britton, Sterns, & Poggenburg var. maritima, Coastal dunes. S. ME and c. NH south to DE. [= C, F, G, K, Z]

**CLEOMACEAE** Horaninow 1834 (Cleome Family)

The Cleomaceae is here circumscribed to include the members of the Capparaceae, subfamily Cleomoideae, following phylogenetic analyses which show this group to be a monophyletic clade more closely related to Brassicaceae than to the rest of Capparidaceae (Hall, Sytsma, & Iltis 2002). References: Hall, Sytsma, & Iltis (2002); Judd, Sanders, & Donoghue (1994); Sanders & Judd (2000).

1 Stamens (8-) 10-27; petals notched or irregularly lacerate at the apex; gynophore (stipe of the pistil, above the calyx) 2-6 mm long; leaflets (1-) 3

*Polanisia*

1 Stamens 6; petals obtuse or acute at the apex; gynophore (stipe of the pistil, above the calyx) 10-60 mm long; leaflets 5-7....

*CLEOME* Linnaeus 1753 (Cleome, Spiderflower)


1 Bracts subtending the flowers 3-foliolate; leaves lacking stipular spines; corolla in bud minute, not covering the stamens......

*C. gynandra*

1 Bracts subtending the flowers simple; leaves subtended by stipular spines; corolla in bud well-developed, the petals overlapping and surrounding the stamens...

* C. hassleriana

* Cleome aculeata Linnaeus var. aculeata, Prickly Spiderflower. Disturbed areas. Reported for AL. [< Cleome aculeata Linnaeus – K; = Hemiscola aculeata (Linnaeus) Rafinesque var. aculeata – FNA]


* Cleome hassleriana Chodat, Cleome, Spiderflower. Pd, Cp, Mt (GA, NC, SC, VA): gardens, disturbed areas, persistent and self-seeding from cultivation as an ornamental; rare, introduced from South America. June-November. The petals in bud are a pale pink to nearly white, they turn a deep pink upon opening late in the day; by morning the petals have once again faded to a pale pink or white. [= C, K; = Tarenaya hassleriana (Chodat) H.H. Iltis – FNA; ? C. houtteana Schlechtendahl – RAB, misapplied; ? C. spinosa Jacquin – F, G, misapplied; ? Neolecome spinosa (Jacquin) Small – S, misapplied]

* Cleome serrata Jacquin. Reported as introduced in GA (Kartesz 1999). [= K; = Cleoserrata serrata (Jacquin) H.H. Iltis – FNA; = Neocleome serrata (Jacquin) Small – S] {not keyed at this time; synonymy incomplete}

* Cleome viscosa Linnaeus, Wild Caia, Yellow Cleome. Cp (GA, SC): disturbed areas; rare, introduced, native of Asia (now pantropical). Reported for sc. GA (Jones & Coile 1988), se. PA (Rhoads & Klein 1993), and recently from Beaufort County, SC (J. Nelson, pers.comm. 2006). [= K; = Arivela viscosa (Linnaeus) Rafinesque – FNA] {not keyed at this time; synonymy incomplete}

* Cleome diffusa Banks ex de Candolle. On ballast, Mobile AL. [= K; = Hemiscola diffusa (Banks ex de Candolle) H.H. Iltis – FNA]

* Cleome spinosa Jacquin. []

* Polanisia* Rafinesque (Clammy-weed)

A genus of about 6 species, of North America. References:

Identification notes: *Polanisia* has some resemblance to *Warea*.

1 Petals broadest toward the base, barely or not at all clawed; capsule valvate; [of xeric longleaf pine sandhills].... *P. tenuifolia*

1 Petals broadest toward the tip, narrowed to a long, distinct claw; capsule opening near the tip; [of floodplains and disturbed soils].

2 Larger petals 3.5-6.5 (-8) mm long; longest stamens 4-10 (-14) mm long............ *P. dodecandra var. dodecandra*

2 Larger petals (7-) 8-13 (-16) mm long; longest stamens (9-) 12-30 mm long............ *P. dodecandra var. trachysperma*
Polanisia dodecandra (Linnaeus) Augustin de Candolle var. dodecandra, Clammy-weed, Spider-weed. Mt, Pd (VA): sandy or gravelly floodplains along the James River; rare (VA Rare). June-September. VT west to Manitoba, w. VA, TN, AR, and OK. Apparently native in our area. [= C; = P. dodecandra ssp. dodecandra – K; = P. graveolens Rafinesque – F, S; = P. dodecandra – G; < P. dodecandra – W; Cleome graveolens (Rafinesque) Sch. & Sch.]


CLETHRACEAE Klotzsch 1851 (Clethra Family)

A monogeneric family of 65-95 species, shrubs and trees, primarily of tropical America and Asia. Sometimes combined into the Cyrillaceae. References: Sleumer (1967b); Anderberg & Zhang (2002); Schneider & Bayer in Kubitzki (2004).

Clethra Linnaeus (Sweet Pepperbush, White-alder, Clethra)


1 Leaves obovate or elliptic, 8-20 cm long, acuminate; [of the Mountains]................................................................. C. acuminata
1 Leaves obovate or oblong, 4-11 cm long, obtuse to acute; [of the Coastal Plain and rarely lower Piedmont]................. C. alnifolia

Clethra acuminata Michaux, Mountain White-alder. Mt (GA, NC, SC, VA): moist forests, heath balds, margins of rock outcrops at high elevations; common. July-August; September-October. Endemic to the Southern and Central Appalachians, C. acuminata ranges from sw. PA south through e. WV, w. VA, e. TN, w. NC to nw. SC and ne. GA. [= RAB, C, F, G, K, S, W, Z]

Clethra alnifolia Linnaeus, Coastal White-alder. Cp (GA, NC, SC, VA), Pd (VA): pocosins, blackwater swamp forests, nonriverine swamp forests; common (rare in Piedmont). June-July; September-October. Primarily a southeastern Coastal Plain species, C. alnifolia ranges from Nova Scotia and ME south to FL, west to TX; disjunct in sc. TN (Coffee County) (Chester, Wofford, & Kral 1997). Two taxa are sometimes recognized; they need additional assessment. Var. alnifolia, with glabrous to glabrescent undersurface of the leaf occupies the full range of the species. Var. pubescens Aiton differs in its persistently white-tomentose undersurface of the leaf, and ranges from e. SC south to FL, and west to e. LA (east of the Mississippi River). If the more pubescent (and more southern) variety is recognized, the correct name is var. pubescens Aiton, which predates var. tomentosa (Lamarck) Michaux (Sleumer 1967b, Wilbur 1970b). [= C, F, G, GW, K, S; > C. alnifolia var. alnifolia – RAB, Z; > C. alnifolia var. tomentosa (Lamarck) Michaux – RAB; > C. alnifolia – S; > C. tomentosa Lamarck – S; > C. alnifolia var. pubescens Aiton – Z]

CLUSIACEAE (Mangosteen Family)

(see HYPERICACEAE)

CONVOLVULACEAE A.L. de Jussieu 1789 (Morning Glory Family)

A family of about 56 genera and 1600 species, nearly cosmopolitan, especially in tropical and subtropical areas. Tribes follow the classification of Stefanović, Austin, & Olmstead (2003). References: Wilson (1960b); Austin (1979), Stefanović, Krueger, & Olmstead (2002); Stefanović, Austin, & Olmstead (2003).

1 Plant parasitic; stems orange; [tribe Cuscutaeae] ........................................................................................................ Cuscuta
1 Plant photosynthetic; stems green.
2 Corolla 0.1-0.2 cm long; capsule deeply 2-lobed; leaves orbicular-reniform, 1-3 cm long and wide, not fleshy; [tribe Dichondraceae] ........................................................................................................ Dichondra
2 Corolla 1-10 cm long; capsule entire; leaves various, but not as above (most similar vegetatively are Calystegia soldanella, Ipomoea pes-caprae var. emarginata, and I. imperati, all beach plants with fleshy, emarginate, and usually larger leaves).
3 Styles 2, free nearly to the ovary or fused most of their length (at least the terminal 1-2 mm free); corolla 1-2.5 cm long; leaves cuneate or rounded at the base, and narrowly ovate, lanceolate, or linear; [tribe Cresseae] Evolvulus
4 Styles free, each 2-cleft, the stigmas therefore 4, linear-filiform ............................................................................. Stylisma
CONVOLVULACEAE

3 Styles 1 (sometimes with 2 stigmas, or a bilobed stigma); stigmas capitate, elongate, flattened, or filiform; corolla > 2.5 cm long (except *Jacquemontia*; *Convolvulus*, and a few *Ipomoea* spp.); leaves cordate, sagittate, or truncate at the base, and (mostly) ovate in outline.

5 Flowers in a dense head with numerous interspersed bracts; [tribe *Jacquemontieae*] ... *Jacquemontia*

5 Flowers solitary or in an open, few-flowered inflorescence.

6 Calyx concealed by 2 large bracts; [tribe *Convolvuleae*] ... *Convolvulus*

6 Calyx not concealed by bracts.

7 Stigma 1, capitate (sometimes lobed); leaves 5-15 cm long, mostly strongly hastate or cordate at base; corolla white, pink, lavender, blue, orange, or red.

8 Anthers straight after dehiscence; fruits valvate-dehiscent; [tribe *Ipomoeae*] ... *Ipomoea*

8 Anthers twisted after dehiscence; fruits longitudinally or irregularly dehiscent; [tribe *Merremieae*] ... *Merremia*

*Convolvulus* spithamaeus

Stefanović, Krueger, & Olmstead (2002) conclude (based on molecular phylogeny) that *Calystegia* should be combined with *Convolvulus*. References: Wilson (1960b)=Z; Lewis & Oliver (1965); Brummitt (1965, 1980); Austin, Duggs, & Lipscomb (1997)=Y.

1 Plant an upright herb.

2 .......................................................... *C. spithamaea ssp. purshiana*

2 .......................................................... *C. spithamaea ssp. spithamaea*

3 Plant a trailing or climbing vine.

3 Leaves about as wide as long, rounded at the tip .......................................................... *C. soldanella*

3 Leaves longer than wide, abtuse, acute, or acuminate at the tip .......................................................... *C. catesbiana*, *C. macounii*, *C. pubescens*, *C. sepium* spp., *C. silvatica ssp. fraterniflora*

*Calystegia* catesbiana Pursh, Catesby’s Bindweed. (GA, NC, SC, VA): longleaf pine savannas, openings in dry to dry-mesic montane forests; rare (GA Special Concern). = K; < *Calystegia spithamaea* – C; < *Convolvulus spithamaeus* Linnaeus var. *pubescens* (Gray) Fernald – F; = *Calystegia sericata* (House) Bell – RAB, W; = *Convolvulus sericusatus* House – S, Z

*Calystegia macounii* (Greene) Brummitt. (NC, VA). {R.K. Brummitt says not east of the Mississippi} = K, Y = *Convolvulus macounii* Greene


* Calystegia soldanella* (Linnaeus) R. Brown ex Roemer & J.A. Schultes. Cp (NC, VA): beaches, dunes; rare (NC Watch List, VA Watch List). = RAB, K; = *Convolvulus soldanella* Linnaeus


*Calystegia spithamaea* (Linnaeus) Pursh ssp. *spithamaea* Low Bindweed. (VA) = K; < *Calystegia spithamaea* – RAB, C, W; = *Calystegia spithamaea var. spithamaea*; = *Convolvulus spithamaeus var. spithamaeus* – F; = *Convolvulus spithamaeus* Linnaeus – G, S; < *Convolvulus spithamaeus* – Z

*Cuscuta* Linnaeus 1753 (Dodder)


**Identification notes:** corolla measurements are from the base to the sinuses of the corolla. The infrastaminal scales are transparent structures at the base of the stamens.

<table>
<thead>
<tr>
<th>1</th>
<th>Styles more-or-less united; capsule circumscissile; [subgenus Monogynella]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Stigmas flattened-depressed; flowers 2.5-4 mm long ......................................................... <em>C. cassyooides</em></td>
</tr>
<tr>
<td>2</td>
<td>Stigmas oval or conical; flowers ca. 2 mm long ..................................................................... [C. japonica]</td>
</tr>
<tr>
<td>1</td>
<td>Styles separate and distinct from the base; capsule not circumscissile (except the rare aliens <em>C. epilinum</em> and <em>C. epithymum</em>).</td>
</tr>
<tr>
<td>3</td>
<td>Style about equalling the ovary, included in the corolla; fruit 2.0-2.5 mm long ............................ [C. epilinum]</td>
</tr>
<tr>
<td>4</td>
<td>Style (including the stigma) much longer than the ovary, exserted from the corolla; fruit ca. 1.5 mm long ........................................................... [C. epithymum]</td>
</tr>
<tr>
<td>3</td>
<td>Stigmas capitate, about as wide as long; capsule not circumscissile, either indehiscent or rupturing irregularly;</td>
</tr>
<tr>
<td>5</td>
<td>Each flower subtended by 1-10 imbricate bracts; sepals distinct nearly to the base.</td>
</tr>
<tr>
<td>6</td>
<td>Bract apex reflexed or spreading ......................................................................................... [C. glomerata]</td>
</tr>
<tr>
<td>6</td>
<td>Bract apex erect.</td>
</tr>
<tr>
<td>7</td>
<td>Pedicels absent, the flowers in compact clusters sessile on the stem........................................ [C. compacta]</td>
</tr>
<tr>
<td>7</td>
<td>Pedicels 0.5-3 mm long, the flowers in loose panicles ............................................................ [C. cuspidata]</td>
</tr>
<tr>
<td>5</td>
<td>Flowers not bracteate; sepals various.</td>
</tr>
<tr>
<td>8</td>
<td>Perianth surface granular; fresh flowers fleshy; corolla lobes acute, tips typically curved inwards.</td>
</tr>
<tr>
<td>9</td>
<td>Corolla tubular; calyx &gt; ½ as long as the corolla; flowers 4 (-5)-merous; infrastaminal scales reduced, merely bifid or shallowly toothed .......................................................... [C. coryl]</td>
</tr>
<tr>
<td>9</td>
<td>Corolla campanulate; calyx ca. ½ as long as the corolla; flowers 5-merous; infrastaminal scales profusely fringed ............................................................................... [C. indecora]</td>
</tr>
<tr>
<td>10</td>
<td>Corolla lobes acute .................................................................................................................. [C. cephalanthi]</td>
</tr>
<tr>
<td>1</td>
<td>Styles separate and distinct from the base; capsule not circumscissile (except the rare aliens <em>C. epilinum</em> and <em>C. epithymum</em>).</td>
</tr>
<tr>
<td>11</td>
<td>Ovary with a long, beak-like projection at the top; corolla 2.2-3.5 mm long, 2-3 mm wide; seeds ca. 1.5 mm long; [widespread] ............................................................................... [C. gronovii]</td>
</tr>
<tr>
<td>11</td>
<td>Ovary blunt to pointed, but not beaked; corolla 4-6 mm long, 4-6 mm wide; seeds 2-3 mm long; [of the Mountains] ................................................................................ [C. rostrata]</td>
</tr>
<tr>
<td>12</td>
<td>Flowers subsessile, therefore in globular inflorescences.</td>
</tr>
<tr>
<td>13</td>
<td>Flowers 5-merous .................................................................................................................. [C. obtusiflora var. glandulosa]</td>
</tr>
<tr>
<td>13</td>
<td>Flowers mostly 3-4-merous.</td>
</tr>
<tr>
<td>14</td>
<td>Corolla lobes rounded or obtuse ......................................................................................... [C. cephalanthi]</td>
</tr>
<tr>
<td>14</td>
<td>Corolla lobes acute .............................................................................................................. [C. polygonorum]</td>
</tr>
<tr>
<td>12</td>
<td>Flowers on pedicels slightly shorter than to longer than the flowers, therefore in loose inflorescences.</td>
</tr>
<tr>
<td>15</td>
<td>Flowers mostly longer than wide ......................................................................................... [C. suaveolens]</td>
</tr>
<tr>
<td>15</td>
<td>Flowers mostly as wide as long.</td>
</tr>
<tr>
<td>16</td>
<td>Flowers 1.5-3.0 mm long, at least some exceeding 2.5 mm long; calyx lobes not overlapping at the base in older flowers, and therefore the flowers not pronouncedly 5-angled ........................................................................................................ [C. campestris]</td>
</tr>
</tbody>
</table>
16 Flowers 0.9-2.5 mm long; calyx lobes strongly overlapping and forming definite angles at the sinuses, thus the flower strongly 4-5-angled.

17 Flowers 4-merous; flowers 0.9-1.4 mm long; stems very slender; [on granite and sandstone outcrops] ...............................................................C. harperi

17 Flowers 5-merous; flowers 1.5-2.5 mm long; stems not especially slender; [widespread] .................................................................................C. pentagona


Cuscuta compacta Antoine Laurent de Jussieu ex Choisy var. compacta, Compact Dodder. Cp, Pd, Mt (GA, NC, SC, VA); wet habitats, on herbaceous and especially on woody hosts; common. August-November. VT, Québec, and NE south to FL and TX. [= K, W, Y, Z; < C. compacta – RAB, C, F, G, GW, S, X; = C. compacta – K, V, W, orthographic variant; = Grammica compacta (Engelmann) Hadac & Chrtek]


Cuscuta harperi Small, Harper's Dodder. Cp, Pd (GA): outcrops of granite (Piedmont) and Altamaha grit (Coastal Plain), typically on plants such as Liatris microcephala, Bigelowia nutallii, Hypericum gentianoides, and Croton willdenowii; rare (GA Threatened). September-November. C. and wc. GA west to nw. AL. [= K, S, V, Z]


* Cuscuta japonica Choisy, Japanese Dodder. Mt (SC): disturbed area; rare, native of e. Asia. Apparently known in our area only from Pickens County, SC, and eradicated. [= K, Z]

Cuscuta obtusiflora Kunth var. glandulosa Engelmann, Glandular Dodder. Cp (GA): on herbs; rare. GA and OK south to FL, TX, Mexico; West Indies. [= G, GW, K, V, X; = C. glandulosa Small – S]


Cuscuta cuspidata Engelmann. IN, ND, and UT south to KY, MS, TX, and NM. [= C, F, K, X, Z]


Dichondra J.R. & J.G. Forster (Ponyfoot, Dichondra)


Dichondra carolinensis Michaux, Carolina Ponyfoot. Cp (GA, NC, SC, VA), Pd (GA, NC, SC): lawns, roadsides, moist pinelands; common (VA Watch List). March-May. Se. VA south to FL, west to AR and TX; also in Bermuda and reported for
the Bahamas. This plant is rarely seen in a "natural" habitat, but is often seen in lawns and other mowed grassy areas. [= RAB, C, GW, K, S; = D. repens J.R. Forster var. carolinensis (Michaux) Choisy – F, G]

**Evolvulus** Linnaeus (Dwarf Morning-glory)

A genus of about 90-100 species, almost all of tropical, subtropical, and warm temperate America. References: Ward (1968); Wilson (1960b)=Z.

1 Leaves densely pilose on both surfaces with spreading to loosely appressed hairs; internodes short, generally < 1 cm long; [of calcareous glades and barrens of c. TN]..........................[E. nuttallianus]  
1 Leaves densely pilose with appressed (sericeous) hairs below, the upper surface glabrous or loosely pubescent; internodes long, many over 1.5 cm long; [of Altamaha Grit outcrops in the the Coastal Plain of GA]..............**E. sericeus var. sericeus**


**Evolvulus nuttallianus** J.A. Schultz, Shaggy Dwarf Morning-glory, in c. TN (Chester, Wofford, & Kral 1997), disjunct from the Great Plains. [= F, K, Z; **E. nuttallianus** – C, orthographic variant; = E. pilosus Nuttall – G]

**Ipomoea** Linnaeus 1753 (Morning-glory)


1 Erect woody shrub with hollow stems; [subgenus *Eriospervum*, section *Eriospervum*, series Jalapae]...............................I. carnea ssp. fistulosa  
1 Trailing or twining vine.  
2 Corolla salverform, the long narrow tube cylindrical (with sides more-or-less parallel) for most of its length, the limb abruptly flaring at the summit of the tube.  
3 Corolla 3-9 cm long, lavender to white; flowers open from evening until early morning.  
4 Leaves tomentose beneath; corolla mostly white on the outer surface, lavender to purple on the inner surface, thus bicolored in-and-out; [of outer Coastal Plain hammocks shell middens in se. NC and SC]; [subgenus *Eriospervum*, section *Eriospervum*, series Jalapae] ..................................................I. macrorhiza  
4 Leaves glabrous beneath; corolla either white on both surfaces or lavender on both surfaces, not bicolored in-and-out; [weedy, of disturbed habitats]; [subgenus Quamoclit, section Calonyction]..........................I. muricata  
3 Corolla 2-4 cm long, scarlet, orange or yellow; flowers open from early morning to late morning or late afternoon; [subgenus Quamoclit, section Mina].  
5 Leaf blade pinnately divided into 11-31 (or more) linear segments...................................................I. quamoclit  
5 Leaf blade entire, or angled or lobed into 3-7 lanceolate or ovate segments.  
6 Calyx (5-) 6-8 (-9) mm long; fruit reflexed......................................................I. coccinea  
6 Calyx 4-4.5 mm long; fruits erect..........................................................I. hederifolia  
2 Corolla funnelform to campanulate, the short to long tube expanding from below the middle, the limb gradually to abruptly flaring at the summit of the tube.  
7 Pedicels and peduncles with spreading, ascending, or reflexed trichomes; gynoeicum 3-parted; [subgenus *Ipomoea*, section *Pharbitis*].  
8 Sepals with very narrow elongate green tips much longer than the body of the sepal; [series Heterophyllae].  
9 Sepals abrupty narrowed, the long subacute tips strongly spreading or curved....................I. hederacea  
9 Sepals gradually narrowed, the long acute tip suberect, straight, scarcely spreading ..................[I. nil]  
7 Pedicels and peduncles glabrous or with short, appressed trichomes; gynocoeium 2-parted; [subgenus *Eriospervum*].  
10 Stems trailing, rooting at the nodes; leaf apex emarginate, truncate, or obtuse; [of beaches from se. NC southward]; [subgenus *Eriospervum*, section *Eripomoea*].  
11 Corolla white with a yellowish or purple eye; larger leaves 3-7-lobed ...........................................I. imperati  
11 Corolla lavender, larger leaves not lobed (though notched at the apex)..... I. pes-caprae var. emarginata  
10 Stems erect or twining, not rooting at the nodes (except sometimes in I. batatas); leaf apex acute to acuminate; [collectively of various habitats, not beaches, widespread]; [subgenus *Eriospervum*, section *Eriospervum*].  
12 Leaf base sagittate; [series Jalapae]..........................................................I. sagittata  
12 Leaf base cuneate to cordate.
Ipomoea bataua (Linnaeus) Lamarr. Sweet Potato. Cp (GA, NC, SC, VA): persistent in fields after cultivation, disturbed areas; rare, apparently introduced from tropical America. [= RAB, K, S, Y, Z]


Ipomoea hederifolia Linnaeus, Scarlet Creeper. Cp (GA): disturbed areas; uncommon. {Distribution in our area uncertain, native of tropical America – Kartesz (1999) says GA only} [= GW, K, Y, Z; = I. coccinea Linnaeus var. hederifolia (Linnaeus) A. Gray]

Ipomoea imperata (Vahl) Grisebach, Beach Morning-glory. Cp (GA, NC, SC): beaches, dune blowouts, fore-dunes; rare (NC Rare, SC Rare). August-October. Se. NC south to s. FL, west to TX, and extensively distributed in the tropics. [= K, Y; I. stolonifera (Cirillo) J.F. Gmelin – RAB, GW, S, Z]


Ipomoea macrorhiza Michaux, Manroot. Cp (GA, NC, SC): hammocks, shell middens, dry sands, disturbed maritime areas; rare (GA Special Concern, NC Watch List, SC Rare). June-July. Se. NC south to FL, west to s. AL. [= RAB, K, S, Y, Z]


Ipomoea pes-caprae (Linnaeus) R. Brown var. emarginata Hallier f., Railroad Vine, Goat's-foot, Bay Hops, Bay Winders. Cp (GA, NC, SC): ocean beaches; rare. E. NC (Carteret County), SC (Beaufort, Horry, Charleston, Colleton, and Georgetown counties), south to FL, west to TX, and widespread on tropical shores of the the New World and Old World. The records in the Carolinas may reflect the periodic arrival of sea-borne seeds. (< I. pes-caprae – GW, S, Z; ? I. pes-caprae ssp. brasiliensis (Linnaeus) van Ooststr. – K, Y)


Ipomoea sagittata Poiret. Cp (GA, NC, SC): edges of brackish marshes, moist thickets on barrier islands, hammocks; common. July-September. E. NC south to s. FL, west to TX; also in the West Indies. [= RAB, GW, K, S, Y, Z]

Ipomoea cairica (Linnaeus) Sweet. East to AL, introduced from Africa. [= K, S] {not keyed at this time; synonymy incomplete}

Ipomoea nil (Linnaeus) Roth occurs in scattered states, such as MD and MS, as a rare introduction from tropical America (Kartesz 1999). [= K, Y, Z; Pharbitis nil (Linnaeus) Choisy – S]

Ipomoea tricolor Cavanilles is reported for several locations in se. PA (Rhoads & Klein 1993). [= K] {not keyed at this time; synonymy incomplete}
* Ipomoea wrightii A. Gray, native of India, has been reported as likely naturalized in central TN, "spreading northward from the Gulf Coastal Plain" (Kral 1981). It also is known from GA (Kartesz 1999). [= K] {not keyed at this time; synonymy incomplete}

* Ipomoea ×multifida (Rafinesque) Shinners [I. coccinea × quamoclit], Cardinal Climber, is cultivated and may escape. [= K] {not keyed}

Jacquemontia Choisy (Jacquemontia)

A genus of about 90 species, tropical, subtropical, and warm temperate areas, especially America. References: Wilson (1960b)=Z.

* Jacquemontia tannifolia (Linnaeus) Grisebach, Jacquemontia. Cp (GA, NC, SC, VA), Pd (GA, SC): fields, roadsides, other disturbed areas; uncommon (rare in VA). August-September. Se. VA south to FL, west to AR and TX; also widespread in West Indies, Central America, and South America, its original range difficult to determine. In our area, it is probably adventive. Fox, Godfrey, & Blomquist (1952) report the first collections of the species in NC, in 1938 and 1950, from obviously disturbed situations. [= RAB, C, F, G, GW, K, Z; = Thyella tannifolia (Linnaeus) Rafinesque – S]

Merremia Dennst. ex Endlicher

References: Wilson (1960b)=Z.

* Merremia dissecta (Jacquin) Hallier f., Noyau Vine. Cp (GA): disturbed areas; rare, introduced from South America. Ranges as far north as e. and sw. GA. [= K, Z; = Ipomoea sinuata Ortega; = Operculina dissecta (Jacquin) House]

Stylisma Rafinesque (Dawnflower)

A genus of about 6 species (and about 8 taxa), vining to trailing herbs, endemic to se. North America. References: Myint (1966)=Z; Shinners (1962)=Y; Wilson (1960b)=X.

1 Bracteoles of the flowers and fruits leaflike, (2-) 10-20 mm long (tending to be deciduous in August or September); styles fused nearly to bases of the stigmas (fused > 5/6 of the total length); stylar branches < 3 mm long; leaves 1-3 mm wide (the very basal sometimes wider), held in a vertical, erect position .................................................... S. pickeringii var. pickeringii

1 Bracteoles of the flowers and fruits bractlike, 1-3 (-5) mm long; styles free to near the summit of the ovary (fused < ½ of the total length); stylar branches > 5 mm long; leaves 2-28 mm wide, held in a horizontal or ascending position (rarely nearly erect).

2 Corolla pink or purple; filaments glabrous, or nearly so; leaves densely and conspicuously silvery-sericeous; [of seasonally wet habitats] ............................................................................................................. S. aquatica

2 Corolla white; filaments villous, at least near the base; leaves puberulent or pubescent, but not conspicuously silky-sericeous; [of dry habitats].

3 Larger leaves (7-) 12-30 mm wide; inflorescences with (1-) 3-7 (-12) flowers; stems with tendency to twine, at least near growing tip.

4 Sepals glabrous; [widespread in the Coastal Plain and Piedmont of our area] ................................................. S. humistrata

4 Sepals densely villous; [of s. GA southward and westward] ............................................................... S. villosa

3 Larger leaves 2-10 mm wide; flowers usually solitary (rarely in 3-5-flowered cymes); stems without tendency to twine.

5 Surface of sepals moderately to densely villous (rarely nearly glabrous); leaves mostly 4-6× as long as wide; inflorescence of 1 (-3) flowers .............................................................................................. S. patens ssp. patens

5 Surface of sepals glabrous (rarely with a few scattered hairs), the margins ciliate; leaves 7-15× as long as wide; inflorescence of 1 (-3) flowers) ...................................................................... S. patens ssp. angustifolia

Stylisma aquatica (Walter) Rafinesque, Water Dawnflower. Cp (GA, NC, SC): clay-based Carolina bays and wet savannas; rare (NC Rare). June-July. Se. NC south to FL panhandle, west to se. AR and e. TX. S. aquatica, as the epithet implies, occurs in wetter habitats than our other species. [= GW, K, S, Z; = Bonamia aquatica (Walter) A. Gray – RAB, Y; = Breweria michauxii Fernald & Schubert – F; = Bonamia michauxii (Fernald & Schubert) K.A. Wilson – X]

Stylisma humistrata (Walter) Chapman, Southern Dawnflower. Cp, Pd (GA, NC, SC, VA): sandhills and other dry woodlands, especially on dryish stream terraces; common (VA Watch List). June-August. Se. VA south to n. FL, west to AR and e. TX, north in the interior to n. AL and w. TN. [= C, K, S, Z; = Bonamia humistrata (Walter) A. Gray – RAB, X, Y; = Breweria humistrata (Walter) A. Gray – F, G]

CONVOLVULACEAE

(Sparses (Desrousseaux) Shinners var. angustifolia (Nash) Shinners – RAB, Y; = S. angustifolia (Nash) House – S; = Bonamia angustifolia (Nash) K.A. Wilson – X]

**Stylisma patens** (Desrousseaux) Myint ssp. *patens*, Common Dawnflower. Cp (GA, NC, SC): sandhills and other relatively dry sandy areas; common. June-August. Overall, the most common and widespread taxon of the genus in our area, regularly encountered in its habitat. E. NC south to n. FL, and west to s. MS. [= K, Z; = Bonamia patens (Desrousseaux) Shinners var. *patens* – RAB, Y; = S. *trichosanthes* (Michaux) House – S, misapplied; = Bonamia aquatica (Walter) A. Gray – X, misapplied]

**Stylisma pickeringii** (Torrey ex M.A. Curtis) A. Gray var. *pickeringii*, Pickering's Dawnflower. Cp (GA, NC, SC): sandhills, usually in the driest, most barren, deep-sand areas, occasionally colonizing dry, disturbed areas in sandhills, such as sandy roadbanks, known from the Fall-line Sandhills, acolium rions of Carolina bays, and sandhills on relicet riverine dunes along Coastal Plain rivers; rare (GA Threatened, NC Endangered, SC Rare). June-August (September); July-September. This rare species is easily recognizable by its growth form, with numerous stems arching from a central point, then trailing radially away, forming a mound 1-2 meters in diameter. The narrowly linear leaves are borne vertically. Fernald and Schubert (1949) named four varieties in this widely but disjunctly distributed species; Myint (1966) reduced this to two varieties, one eastern and one western. Var. *pickeringii* ranges from s. NC south through SC, GA, AL, and e. MS, with a disjunct area in the Pine Barrens of NJ, sometimes treated as the separate var. *caesariensis* Fernald & Schubert. Var. *pattersonii* ranges from IL and IA south through KS and OK to e. TX, w. LA, and w. MS. Material in MS is equivocal. [= C, K, Z; = Bonamia pickeringii (Torrey ex M.A. Curtis) A. Gray – RAB, X, Y; = Breweria *pickeringii* (Torrey ex M.A. Curtis) A. Gray var. *pickeringii* – F; = Breweria *pattersonii* (Torrey ex M.A. Curtis) A. Gray – S]

**Stylisma villosa** (Nash) House, Hairy Dawnflower. Cp (GA): sandhills; rare. Late April-July. S. GA south to s. peninsular FL, west to e. TX. [= K, S, Z; = Bonamia villosa (Nash) Wilson – X, Y; = Breweria villosa (Nash) House; = Bonamia *villosa* (Nash) Wilson – X, Y; = Breweria villosa Nash]

CORNACEAE (Berchtold & J. Presl) Dumortier 1829 (Dogwood Family)

A family of 2 genera and about 80 species, trees, shrubs, lianas, and subshrubs, semicosmopolitan. The Cornaceae is best circumscribed to include *Nyssa* (Xiang et al. 2002). References: Xiang et al. (2002); Kubitzki in Kubitzki (2004).

*Cornus* Linnaeus 1753 (Dogwood, Cornel)
(by Z.E. Murrell & A.S. Weakley)

A genus of about 60 species, trees, shrubs, and subshrubs, mainly north temperate. The generic limits are controversial. Phylogenetic analyses show that *Cornus* is monophyletic, but various clades within it are also monophyletic and have levels of genetic and morphologic divergence often regarded as warranting generic distinction. At very least, the subgenera are well-marked. References: Godfrey (1988)=Z; Wilson (1965); Murrell (1993); Xiang et al. (2006); Fan & Xiang (2001); Eyde (1987); Xiang, Soltis, & Soltis (1998); Ferguson (1966c, 1966d)=Y; Kubitzki in Kubitzki (2004).

1 Leaves alternate (the internodes typically short and therefore the leaves looking nearly whorled); [subgenus *Mesomora*]........

............................................................................................................................................

1 Leaves opposite.

2 Herb or dwarf shrub from a woody rhizome, to 2 dm tall; leaves in 2-4 pairs below the inflorescence; [of NJ and montane VA and WV northward]; [subgenus *Arctoctrania*].............................................................

C. canadensis

2 Shrub or tree, much taller than 2 dm when mature; leaves many; [collectively widespread].

3 Inflorescence subtended by 4 showy (white, creamy, or pink) bracts.

4 Showy bracts subtending the inflorescence rounded and notched; fruits separate in a compact cluster; [common native small tree]; [subgenus *Cymoxylon*].............................................................

C. *florida*

4 Showy bracts subtending the inflorescence acute; fruits fused together; [exotic uncommonly planted, rarely escaped or persistent]; [subgenus *Syncarpea*].............................................................

[C. *kousa*]

3 Inflorescence lacking bracts; [subgenus *Kranioptes*].

5 Veins usually 5 or more per leaf side.

6 Bark of older branches and stems splitting longitudinally, appearing braided; leaves without tufts of trichomes in axils of secondary veins on abaxial surface.

7 Abaxial leaf surface not coronulate, trichomes appressed and rigid, and erect and curling, on the same leaf, leaf base usually rounded or truncate .................................................................

C. *amomum*

7 Abaxial leaf surface coronulate, trichomes all appressed and rigid, leaf base usually cuneate........

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C. *obliqua*

6 Bark of older branches and stems smooth, with scattered protruding lenticels; leaves with tufts of trichomes in axils of secondary veins on the abaxial surface.

8 Area surrounding lenticels suffused with purple; leaves suborbicular or broadly ovate; 7-9 veins per leaf side; tertiary veins usually prominent.................................................................

C. *rugosa*

8 Area surrounding lenticels not differentiated; leaves lanceolate, elliptic, or ovate; 5-7 veins per leaf side; tertiary veins not prominent..........................

C. *stolonifera*

5 Veins usually 3-4 per leaf side.

9 Trichomes erect on abaxial surface.
**CORNACEAE**

10 Petioles 3-7 mm long; leaf veins evenly spaced ................. *C. asperifolia* or *C. asperifolia × stricta*

10 Petioles 8-25 mm long; leaf veins emanate from the basal half of the leaf ............... *C. drummondii*

9 Trichomes appressed or slightly raised on abaxial leaf surface.

11 Rhizomatous, forming large colonies; lenticels protrude slightly, older stems appear verrucose; fruit white .......................................................... *C. racemosa*

11 Multiple stems from a single rootstock (occasionally appearing rhizomatous from decumbent stems); lenticels not protruding, bark swelling between lenticels; fruit blue ................................................. *C. stricta*


*Cornus amomum* P. Miller, Silky Dogwood. Mt, Pd, Cp (GA, NC, SC, VA): shores, streams, bottomlands; common. May-June; August-September. NY and MA west to IN, south to GA and MS. [= RAB, F, G, K, W; = *Cornus amomum* var. *amomum* – C; = *Cornus amomum* P. Miller ssp. *amomum* – GW, Y, Z; = *Svida amomum* – S; = *Svida amomum* (P. Miller) Small]

*Cornus asperifolia* Michaux, Eastern Roughleaf Dogwood. Cp (GA, NC, SC), Pd (GA): mesic caulerphic forests and thickets, shell middens, calcareous hammocks; uncommon (rare in NC) (NC Significantly Rare). May-June; August-September. Se. NC south to FL, west to s. AL. Nash (1896) collected *C. asperifolia* Michaux at River Junction, Florida; based upon conflicting reports of fruit colors given by Chapman (1860) and Coulter and Evans (1890) for the two rough-leaved dogwoods (*C. asperifolia* and *C. drummondii*), Nash decided to name the rough-leaved dogwood with blue fruit as *C. microcarpa*. However, Michaux’s (1803) description, even without reference to fruit color, is clearly attributable to this species, since its locality was given as "Carolinae inferiores." The populations of this rough-leaved dogwood in NC and SC have morphology intermediate between *C. stricta* and *C. asperifolia* and these should possibly be attributed to a hybrid origin. More analysis needs to done on this complex. [= RAB, K, Y, Z; = *Cornus foemina* P. Miller ssp. *microcarpa* (Nash) J.S. Wilson – GW; = *Svida microcarpa* (Nash) Small – S; = *Svida asperifolia* (Michaux) Small]

*Cornus canadensis* Linnaeus, Bunchberry, Dwarf Cornel, Dwarf Dogwood. Mt (VA): high elevation forests, in humus or on talus, under *Betula cordifolia*, *Picea rubens*, or *Pinus rigida*; rare (VA Rare). Greenland west to AK, south to NJ, VA, WV, and CA. [= C, F, G, K, W, Y; = *Chamaemyrtium canadense* (Linnaeus) Ascherson & Graebner]

*Cornus drummondii* C.A. Meyer, Midwestern Roughleaf Dogwood. Mt (GA): open woodlands and glades over caulerphic rocks (limestone, calcareous shale); rare (GA Special Concern). NY, Ontario, and SD south to e. TN, nw. GA, LA, and TX. [= C, G, GW, K, Y; = *Cornus drummondii* – F; = *Cornus priceae* Small – F; = *Svida priceae* (Small) Small – S; = *Svida asperifolia* – S, misapplied; = *Svida drummondii* (C.A. Meyer) Sojak]


*Cornus obliqua* Rafinesque, Silky Dogwood. Mt, Pd (VA): ME and Québec west to MN, south to VA, KY, c. TN, AR, and OK. Some material intermediate between *C. amomum* and *C. obliqua* has been found in the Mountains of nw. NC and w. VA. It is recognizable by leaves intermediate between the putative parents, ovate with an attenuate base, abaxial surface papillose; abaxial and adaxial surfaces with mostly appressed ornamented trichomes, but with scattered unornamented trichomes and erect arns on both blade surfaces and midvein and secondary veins. [= F, K; = *Cornus amomum* P. Miller var. *scheuteaena* (C.A. Meyer) Rickett – C; = *Cornus purpureus* Koehne – G; = *Cornus amomum* P. Miller ssp. *obliqua* (Rafinesque) J.S. Wilson – GW, Y; = *Svida obliqua* (Rafinesque) Moldenke]

*Cornus racemosa* Lamarck, Northern Swamp Dogwood. Mt (VA), Pd (NC, VA), Cp (VA): wet forests and thickets; uncommon (rare in NC). May; August-September. ME and s. Quebec west to s. Manitoba, south to VA, nc. NC, s. IL, and MO. [= RAB, C, F, G, K, W; = *Svida foemina* (P. Miller) Small – S, misapplied; = *Cornus foemina* P. Miller ssp. *racemosa* (Lamarck) J.S. Wilson – W, Y; = *Svida racemosa* (Lamarck) Moldenke]

*Cornus rugosa* Lamarck, Roundleaf Dogwood. Mt, Pd (VA): at high elevations, usually on talus (greenstone, quartzite, sandstone); rare (VA Rare). Québec to Manitoba, south to NJ, PA, w. VA, OH, IN, and IL. [= C, F, G, K, W]

*Cornus stolonifera* Michaux, Red Osier Dogwood. Pd, Mt, Cp* (VA): shrub swamps, bottomlands, suburban areas; rare (VA Rare). At least some of the occurrences in VA represent horticultural introductions. In e. KY (Clark et al. 2005). Attempts to link the name *C. sericea* Linnaeus to the red-osier dogwood have focused on the Linnaean description of "foliis subtilibus sericeis" and "ramis rubicundis." The reference to the red branches has been emphasized to rule out any other species, yet *C. amomum* and *C. obliqua* also have reddish-maroon branches. The description of "fructo nigro-caeruleo" cannot be dismissed as a reference to individuals of the red-osier dogwood which have pale blue fruit, often considered to be due to hybridization with *C. amomum* or *C. obliqua*. It seems clear that the description fits *C. obliqua* better than it does the red-osier dogwood. Although there is a specimen in the Linnaean herbarium which has been identified as the red-osier dogwood, it is neither dated nor is the label of *C. sericea* in Linnaeus’ hand. Also, considering the similarity of the red-osier dogwood and *C. alba* Linnaeus, it is doubtful Linnaeus would have described the red-osier dogwood without reference to *C. alba*. Therefore, we agree with Rickett's rejection of *C. sericea* as a nomen dubium. [= G, W; = *C. sericea* Linnaeus – C, nomen dubium; = *Cornus stolonifera* Michaux – G, W; = *Cornus stolonifera* var. *stolonifera* – F; = *Cornus stolonifera* var. *baileyi* (Coulter & Evans) Drescher – F; = *C. sericea* ssp. *sericea* – K, nomen dubium; = *Svida sericea* (Linnaeus) Holub, nomen dubium]

*Cornus stricta* Lamarck, Southern Swamp Dogwood. Cp, Pd, Mt (GA, NC, SC, VA): swamps, streambanks, marshes, alluvial forests; common, rare in Mountains. April-May; July-August. DE south to FL, west to TX, and north in the interior to
CORNACEAE

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TN, s. IN, s. IL, AR, and se. OK. [= RAB, C, G; = Cornus foemina P. Miller – F, K, Z; = Cornus stricta Lamarck – RAB, C, G; = Svida stricta (Lamarck) Small – S; = Cornus foemina P. Miller ssp. foemina – GW, W, Y; = Swida foemina (P. Miller) Rydberg]

* Cornus kousa Hance, Kousa Dogwood, is sometimes planted as an ornamental and may persist. [= K; = Cynoxylon kousa (Hance) Nakai]

CRASSULACEAE DC. 1825 (Stonecrop Family)
(also see PENTHORACEAE)

A family of about 35 genera and 1100 species, succulent shrubs and herbs, nearly cosmopolitan. References: Moran in FNA (in prep.).

1 Leaves connate at the base, opposite; flowers solitary in the axils of leaves; flowers 3-4-merous; [subfamily Crassuloideae].

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CRASSULACEAE

Hylotelephium H. Ohba (Live-for-ever)

A genus of about 30 species, of temperate Eurasia and North America. References: Moran in FNA (in prep.); Clausen (1975) = Z.

1 Petals 2× as long as the sepals; nectaries wider than long; flowers fertile; [native] ................................................. H. telephoides
1 Petals 3-4× as long as the sepals; nectaries longer than wide; flowers sterile (rarely fertile); [introduced].
2 Flowers white or greenish; cymes lax, subcorymbose; leaves not markedly reduced upward from base of plant upward . ................................................. H. erythrostrictum
2 Flowers deep pink to purple; cymes densely subglobose; leaves typically strongly reduced in size from base of plant upward .......................................................... H. telephium


Hylotelephium telephoides (Michaux) H. Ohba, Allegheny Live-for-ever. Mt (NC, SC, VA): rock outcrops, mostly at high to moderate elevations, ascending to 2000m; uncommon. July-September; August-October. Essentially a Central and Southern Appalachian endemic, H. telephoides ranges from s. PA south to w. NC, with a few outlying populations to the west in s. IL, s. IN, and w. KY. The species is apparently not known from TN. [= FNA, K; = Sedum telephoides Michaux – RAB, C, F, G, W, Z; = Anacamptoporo telephoides (Michaux) Haworth – S]


Rhodiola Linnaeus (Roseroof)

A genus of about 30 species, of cold temperate and boreal areas of the northern hemisphere. References: Moran in FNA (in prep.); Clausen (1975) = Z.

Rhodiola rosea Linnaeus, Roseroot. Mt (NC): high elevation rocky summits; rare (NC Endangered). July-August; August-September. Circumboreal, widely distributed in northern Europe, Asia, and North America, south in e. North America to e. PA and thence disjunct to Roan Mountain (Mitchell County, NC) and Grandfather Mountain (Avery County, NC), where nearly (if not completely) extirpated. Dwarfed, high elevation forms of Sedum telephoides, with narrow, nearly toothless leaves, have been confused with Rh. rosea; they are perhaps readily distinguished only in flower or fruit. [= FNA, K; = Sedum rosea (Linnaeus) Scopoli – Z; = Sedum rosea (Linnaeus) Scopoli var. rosea – C; < S. rosea var. rosea – F; < S. rosea – RAB, G, W; > Rhodiola roanensis Britton – S; > Sedum rosea (Linnaeus) Scopoli var. roanense (Britton) Berger]

Sedum Linnaeus 1753 (Stonecrop, Orpine, Sedum)
(also see Diamorpha, Hylotelephium, and Rhodiola)

A genus of perhaps 200 species, depending on circumscription. There is considerable controversy about the circumscription of the genus Sedum. Diamorpha is clearly to be separated; the separation of Rhodiola and Hylotelephium seem warranted, but are less clear. Other segregates which would affect the species treated below have been proposed, such as Chetyson, Clausenellia, and Spathalata (see synonymy). References: Clausen (1975) = Z; Calie (1981) = Y.

1 Perennials without rosettes, the stems 0.5-10 dm tall; leaves large, relatively thin in texture, usually 5-25 times as wide as thick, often crenate; flowers pink, purple, white, or greenish; [subtribe Telephinae].
2 Flowers 5-merous, bisexual; flowering stems 2-10 dm tall, from an underground, tuberous base; average leaves 3-11 cm long, 1.5 cm wide; ovaries attenuate at the base .......................................................... [see Hylotelephium]
2 Flowers 4-5-merous, usually unisexual and then the plants dioecious; flowering stems 0.5-4 dm tall, from axes of brown scale-leaves clothing a stout rootstock at least in part exposed aboveground; average leaves 1.5 cm long, 0.4-1.5 cm wide; ovaries not attenuate at the base .......................................................... [see Rhodiola]
1 Perennials or annuals with or without rosettes, the stems < 2 dm tall; leaves smaller, flat or terete, relatively thicker, entire; flowers white or yellow; [subtribe Sedinae].
3 Carpels united basally (to about 1/3 their length); petals ciliate (hoodlike), initially partly enclosing 4 of the 8 stamens; follicles dehiscing by a tear-shaped valve on the abaxial (lower) surface; stem and leaves normally red; [of granitic flatrocks of the Piedmont of NC and SC] ................................................................................. [see Diamorpha]
3 Carpels free; petals flat, never enclosing any of the 8 anthers; follicle dehiscing by a longitudinal slit along the adaxial (upper) suture; stem and leaves normally green, sometimes somewhat pink or reddish; [collectively various habitats, including granitic flatrocks of NC, SC, and VA].
CRASSULACEAE

4 Leaves primarily opposite .................................................................[S. spurium]

4 Leaves primarily alternate or in whorls of 3-4.

5 Leaves primarily whorled in 3's or 4's.

6 Largest leaves distinctly spatulate, much wider than thick, 8-20 mm wide; flowers and fruits 4-merous; petals white; [native, of moist forest and rock outcrops]................................................... S. tetrorum

6 Largest leaves linear-lanceolate, oblanceolate, or elliptic, almost as thick as wide, < 7 mm wide; flowers and fruits 5-merous; petals yellow; [alien].

7 Stems decumbent; leaves linear-lanceolate .......................................[S. lineare]

7 Stems long-creeping; leaves oblong-lanceolate to elliptic ...................... S. sarmentosum

5 Leaves primarily alternate.

8 Flowers and fruits 5-merous; [plants aliens].

9 Leaves flat, spatulate, 15-30 mm long...........................................[S. kamtschaticum ssp. ellacombianum]

9 Leaves terete or subterete, 2-15 mm long.

10 Leaves 2-5 mm long; petals yellow .................................................... S. acre

10 Leaves 6-15 mm long; petals yellow or white.

11 Petals white; flowers 5-merous .........................................................[S. album]

11 Petals yellow; flowers (5-) 7 (-9) merous .........................................[S. reflexum]

8 Flowers and fruits 4-merous; [plants natives].

12 Leaves of flower-bearing stems linear, sagittate-spurred at the base (the spurs clasping the stem); petals pink to white; annual; [section Ternata].

12 Leaves of flower-bearing stems narrowly elliptic, oblanceolate, spatulate, cuneate or short-spurred at the base (not clasping); petals white; perennial or annual.

13 Plants annual; sepals 0.4-1 mm long; petals 1.4-4.2 mm long; [restricted to shallow soils of granitic flatrocks of the Piedmont, from s. NC south to wc. GA]; [section Tetrorum]................................. S. pusillum

13 Plants perennial; sepals 2-9 mm long; petals 4-9 mm long; [of outcrops of various rocks, not as above]; [section Ternata].

14 Leaves of flowering stems with width/thickness ratio of >2.0; seeds averaging 0.8 mm long; leaves pale green or bluish green, sometimes with a glaucous coating; [of MD south through VA and WV to sc. and sw. NC] ................................................................. S. glaucophyllum

14 Leaves of flowering stems with width/thickness ratio of <1.7; seeds averaging 0.7 mm long; leaves green or gray-green, but not glaucous; [of sc. TN south into AL and GA]....................... S. nevii


Sedum glaucophyllum Clausen, Cliff Stonecrop. Mt (NC, VA): rock outcrops, usually basic and/or sedimentary; common (rare in Piedmont and south of VA) (NC Rare). May-June; June-July. Endemic to the Central and Southern Appalachians (extending into the Piedmont), known from MD, WV, VA, and NC (reports for GA are based on confusion with S. nevii). This species is complex, with several ploidies and morphologies represented, some at least showing geographic segregation and probably worthy of taxonomic recognition. Material in sw. NC (south of the Asheville Basin) has been identified as polyploid and differs in many ways from more typical S. glaucophyllum, in some ways suggesting the similar and closely related S. nevii A. Gray (known from nearby TN and AL). Further study is needed of this interesting group. [= C, F, K, W, Y, Z; < S. nevii A. Gray – RAB, G, S]

Sedum nevii A. Gray, Nevius's Stonecrop. Pd (GA): gneiss rock outcrops on river bluffs; rare (GA Threatened). Endemic to se. TN (Polk County, just west of Cherokee County, NC) (Chester, Wofford, & Kral 1997), nc. and ec. AL, and we. GA (where it occurs on gneiss outcrops along the Chattahoochee River in Muscogee and Harris counties). [= K, W, Y, Z; < S. nevii – S; also see S. glutinosum]

Sedum pulchellum Michaux, Widow's-cross. Mt (GA): calcareous rock outcrops; rare. E. TN (Monroe, Knox, and Bradley counties) (Chester, Wofford, & Kral 1997) and nw. GA (Jones & Coile 1988) west to KS, OK, and TX. [= C, F, G, K, W, Y, Z; > Chetyson pulchella (Michaux) A. & D. Löve; > Sedum pulchellum – S; > Sedum vigilimontis Small – S; > Chetyson vigilimontis (Small) A. & D. Löve]

Sedum pusillum Michaux, Puck's Orpine. Pd (GA, NC, SC): in very thin soil (generally less than of vernally wet depressions on granite flatrocks, often in mats of the moss Hedwigia ciliata; rare (US Species of Concern, GA Threatened, NC Endangered, SC Rare). March-April; April-May. Endemic to granite flatrocks of the southeastern Piedmont, from sc. NC south to wc. GA. Superficially rather similar to Diamorpha smallii, and historically confused with it (see Wilbur 1988 for details). Wyatt (1983) discusses the reproductive biology of this species. [= RAB, GW, K, S, Z; = Tetrorum pusillum (Michaux) Rose]


Sedum tenuifolium Michaux, Mountain Stonecrop. Mt (GA, NC, SC, VA), Pd (NC, SC, VA), Cp (VA): moist forests, coves, bottomlands, shaded rock outcrops; common. April-June; May-July. NJ west to IA and AR, south to nw. GA and AL. [= RAB, C, F, G, K, S, W, Y, Z; = Clausenellia tenuata (Linnaeus) A. & D. Löve]
**Sedum album** Linnaeus, White Stonecrop, native of Eurasia, is introduced and naturalized as far south as se. PA. [= C, F, G, K, Z; = *Oreosedum album* (Linnaeus) Grulich]

**Sedum kamtschaticum** Fischer & C.A. Meyer ssp. *ellacombianum* (Praeger) Clausen, Kamchatka Stonecrop, is introduced and naturalized as far south as se. PA. [= K, Z]

**Sedum lineare** Thunberg. Pd (GA): margin of granitic flatrock; rare, native of e. Asia. Duncan (1985) discusses the establishment of this species in Columbia Co., GA. [= K, Z] {not keyed at this time}

**Sedum reflexum** Linnaeus. Pd (GA): Reported for nc. GA (Jones & Coile 1988). [= C, K; = *Petrosedum reflexum* (Linnaeus) Grulich]

**Sedum spurium** M. Bieberstein, Caucasian Stonecrop, native of the Caucasus, is introduced and naturalized as far south as se. PA. [= C, F, G, K, Z; = *Spathulata spuria* (M. Bieberstein) A. & D. Löve]

Other species of *Sedum* are grown as ornamentals, especially in rock gardens; some are aggressive and rather weedy and can be expected eventually to become a naturalized part of our flora.

**CUCURBITACEAE** A.L. de Jussieu 1789 (Gourd Family)

A family of about 120 genera and 775 species, of tropical and subtropical areas, with a few extending to temperate areas.

1 Ovaries and fruits with prickles; fruits 1-5 cm long at maturity; tendrils present, 3-forked.
   2 Corolla 6-lobed; fruit 4-seeded, dehiscent by 2 pores; stems and leaves glabrous or glabrescent................. *Echinocystis*
   2 Corolla 5-lobed; fruit 1-seeded, indehiscent; stems and leaves conspicuously viscid-pubescent.......................... *Sicyos*

1 Ovaries and fruits smooth or pubescent, but not prickly; fruits 1-70 cm long at maturity; tendrils absent or present (if present either forked or simple).

3 Leaves pinnately lobed, the divisions rounded; fruit surface green and white, the flesh red or pink ............... *Citrullus*
   3 Leaves palmately lobed, the divisions angular and toothed; fruit surface red, green, white, black, orange, yellow, or blue, the flesh white, orange, yellow, tan, or green.
   4 Fruit < 3 cm long; tendrils present, simple; [native, mostly in moist forests or thickets].
      5 Fruit surface red at maturity; pedicel of pistillate flowers and fruits 1-3 mm long.......................... *Cayaponia*
      5 Fruit surface black or dark green at maturity; pedicel of pistillate flowers and fruits > 20 mm long............. *Melothria*
   4 Fruit > 5 cm long; tendrils absent or present (if present, forked); [introduced, mostly in gardens, fields, or disturbed places].
      6 Corolla < 3 cm long; [cantaloupes and cucumbers] ................................................................. *Cucumis*
      6 Corolla > 5 cm long; [squashes, gourds, pumpkins].
      7 Corolla campanulate, yellow; [squashes, pumpkins]................................................................. *Cucurbita*
      7 Corolla salverform, white or yellow; [bottle gourd, luffa].
         8 Corolla white with green veins; fruit clavate (with a neck) .................................................. *Lagenaria*
         8 Corolla yellowish; fruit elongate, cylindrical ................................................................. *Luffa*

*Cayaponia* Silva Manso

A genus of about 45 species, of tropical, subtropical and warm-temperate America.

*Cayaponia quinqueloba* (Rafinesque) Shinners. Cp (GA, SC): swamp forests, river banks; rare (GA Special Concern). June-November. E. SC south to GA, west to e. TX, north in the interior to w. TN. [= GW, K; = *C. boykinii* (Torrey & A. Gray) Cogniau – RAB, S]

*Citrullus* Schrader (Watermelon)


*Cucumis* Linnaeus (Cantaloupe, Muskmelon, Cucumber)

References: Decker-Walters et al. (2002).
CUCURBITACEAE

1  Fruit more-or-less spherical, the flesh sweet, orange, yellow, or green; [cantaloupes and honeydew melons]............. C. melo
1  Fruit elongate, cylindrical, the flesh not sweet, whitish; [cucumbers] ................................................................. C. sativus

* Cucumis melo Linnaeus, Canteloupe, Honeydew Melon. Cp, Pd, Mt (GA, NC, SC, VA): gardens, fields, trash heaps; commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year, introduced from w. Africa. See Decker-Walters et al. (2002) for discussion of the origins of wild melons of the southeastern Gulf Coast (in LA, TX, and FL). [= RAB, F, G, K, S]

* Cucumis sativus Linnaeus, Cucumber. Cp, Pd, Mt (GA, NC, SC, VA): gardens, fields, trash heaps; commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year, introduced from s. Asia. [= F, G, K]

* Cucumis anguria Linnaeus var. longaculeatus J.H. Kirkbride, West Indian Gherkin, reported for GA (Jones & Coile 1988) and FL (Kartesz 1999). [= K] {not keyed at this time; synonymy incomplete}

Cucurbita Linnaeus (Squash, Zucchini, Pumpkin)

* Cucurbita maxima Duchesne, Hubbard Squash, Pumpkin. Cp, Pd, Mt (GA, NC, SC, VA): gardens, fields, trash heaps; commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year, introduced from tropical America. [= F, K]

* Cucurbita moschata (Duchesne ex Lamarck) Duchesne ex Poiret, Butternut Squash. Cp, Pd, Mt (GA, NC, SC, VA): gardens, fields, trash heaps; commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year, introduced from tropical America. [= F, K; = Pepo moschata (Duchesne ex Lamarck) Britton – S]

* Cucurbita pepo Linnaeus, Pumpkin, Zucchini, Pattypan Squash, Yellow Squash, Crookneck Squash, Straightneck Squash, Acorn Squash. Cp, Pd, Mt (GA, NC, SC, VA): gardens, fields, trash heaps; commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year, introduced from tropical America. [= RAB, F; > C. pepo var. pepo – K; = Pepo pepo (Linnaeus) Britton ex Small – S]

Echinocystis Torrey & A. Gray (Wild-cucumber)

A monotypic genus of e. North America.


Lagenaria Seringe (Bottle Gourd)

A genus of 6 species, Old World tropical, centered in Africa.

* Lagenaria siceraria (Molina) Standley, Bottle Gourd, Calabash Gourd. Cp, Pd, Mt (GA, NC, SC, VA): gardens, fields, trash heaps; commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year, introduced from the Old World. [= K; ? L. vulgaris Seringe – RAB, F; ? L. leucantha Rusby – G; = Cucurbita lagenaria Linnaeus – S]

Luffa P. Miller

A genus of 7 species, vines, of the tropics.

1  Fruits strongly 10-angled; leaves shallowly lobed ...................................................................................................... L. acutangula
1  Fruits not angled; leaves deeply lobed ............................................................................................................................. L. aegyptiaca

* Luffa acutangula (Linnaeus) Roxburgh, Angled Luffa. Pd (VA): gardens, fields, trash heaps; cultivated in home gardens, sometimes volunteering from seed the following year, introduced from the Old World. [= K]

* Luffa aegyptiaca P. Miller, Smooth Luffa, Vegetable Sponge. Cp, Pd, Mt (GA, NC, SC, VA): gardens, fields, trash heaps; commonly cultivated in home gardens and commercially, sometimes volunteering from seed the following year, introduced from the Old World. [= K; ? L. cylindrica (Linnaeus) M. Roemer – S]

Melothria Linnaeus (Melonette)

A genus of about 10 species, New World.
Melothria pendula Linnaeus var. pendula, Melonette, Creeping Cucumber. Cp, Pd, Mt (GA, NC, SC, VA): bottomland forests, moist roadsides and disturbed areas, marshes; common (rare in Mountains). June-November. DC, MD, and VA west to IN, south to FL and TX. [= K; < M. pendula – RAB, C, GW, W; = M. pendula – F, G, S]

Melothria pendula Linnaeus var. aspera Cogn. AL and FL. [= K; < M. pendula – GW; > M. microcarpa Shuttleworth – S; > M. nashii Small – S] {not keyed at this time; synonymy incomplete}

Sicyos Linnaeus (Bur-cucumber)
A genus of about 50 species, of Australia, Pacific Islands, tropical America.


CUSCUTACEAE (Dodder Family)
[see CONVOLVULACEAE]

CYRILLACEAE Endlicher 1841 (Ti-ti Family)
A family of 2 genera and 3 or more species, ranging from se. North America to the West Indies and n. South America (following the removal of Puridiaea to the Clethraceae (Anderberg & Zhang 2002). References: Godfrey (1988); Anderberg & Zhang (2002); Thomas (1960)=Y; Kubitzki in Kubitzki (2004). Key adapted from Godfrey (1988).

1 Lateral veins of the leaf blades scarcely or not at all apparent on either surface; flowers in terminal and axillary racemes, the racemes solitary or several at a node, not markedly radiating; fruit 5-7 mm long, 2-5 winged.................................Cliftonia

1 Lateral veins of the leaf blades readily apparent on both surfaces, the main laterals neatly pinnate, the smaller veins forming a fine reticulum; flowers in lateral racemes, the racemes clustered together at the summit of the previous year's growth and radiating outward or reflexed; fruit 2-2.5 mm long, not winged..............................................................Cyrrilla

Cliftonia Banks ex Gaertner f. (Black Ti-ti, Buckwheat-tree)

Cliftonia monophylla (Lamarck) Britton ex Sargent, Black Ti-ti, Buckwheat-tree. Cp (GA, SC): acid bogs, swamps, and streambanks; common, rare north of GA (SC Rare). Se. SC south to n. FL, west to se. LA. [= GW, K, S, Y]

Cyrrilla Garden ex Linnaeus (Ti-ti)

1 Leaves mostly 1-4 cm long, mostly < 1 cm wide; inflorescences mostly 4-9 cm long; petals < 3 mm long; [mostly of flatwoods ponds, in s. GA southward] .................................................................C. parvifolia

1 Leaves mostly 5-10 cm long, mostly > 1 cm wide; inflorescences mostly > 10 cm long; petals > 3 mm long; [of various wetland habitats, throughout our area and widely distributed beyond] .................................................................C. racemiflora

Cyrrilla parvifolia Rafinesque, Littleleaf Ti-ti. Cp (GA): flatwood pond margins and along drains through savannas; rare. S. GA south into Panhandle FL. Its taxonomy is problematic; while very distinctive in some places (such as Apalachicola National Forest, FL), apparent intermediates are seen elsewhere. [= K, S, Z; < C. racemiflora – GW, Y]

Cyrrilla racemiflora Linnaeus, Ti-ti. Cp (GA, NC, SC, VA), Pd (GA, NC, SC): pocosins, swamps, lake and flatwood pond margins, streambanks, pine flatwoods; common, uncommon in VA, rare in Piedmont. May-July; September-October. E. VA (Accomack County) south to FL, west to TX, and south into the West Indies, Belize, Mexico, and n. South America (Thomas 1960). The leaves are quite variable in shape and size; the venation and glossy smoothness, however, are distinctive once learned. Under various ecological conditions, titi can be anything from a small shrub to a medium tree (or large tree in the West Indies). [= RAB, C, G, K, S, Z; < C. racemiflora – GW, Y; > C. racemiflora var. racemiflora – F; > C. racemiflora var. subglobosa Fernald – F]

1 Leaves cauleine, generally < 10 cm long and < 3 mm wide; [of Coastal Plain pinelands] .......................................... Pyxidanthera
1 Leaves basal (or on a short caudex), generally > 50 mm long and > 30 mm wide; [throughout our area, more common in the Piedmont and Mountains].
2 Leaves orbicular, rounded or with a slight point at the apex, finely serrate (4-8 teeth per cm), the teeth not prominently mucronate; flowers in racemes; [widespread]......................................................................................................................... Galax
2 Leaves broadly elliptic, generally emarginate (slightly notched) at the apex, coarsely serrate (1-4 teeth per cm), the teeth prominently mucronate; flowers solitary; [native to humid gorges along the escarpment between the Mountains and Piedmont, sometimes cultivated and becoming established elsewhere] ...................................................................... Shortia

Galax Sims 1804 (Galax)


Galax urceolata (Poiret) Brummitt, Galax. Mt, Pd (GA, NC, SC, VA), Cp (NC, SC, VA): mountain forests, rock outcrops, nearly ubiquitous in the Mountains, more restricted in habitat elsewhere, moist to dry slopes in the Piedmont and Coastal Plain, often associated with Kalmia latifolia or Rhododendron maximum; common (uncommon in the Coastal Plain, absent from n. VA). May-July; August-October. The genus consists of this single species, with a range centered in the Southern Appalachians, occurring in NC, SC, GA, AL, e. TN, KY, VA, WV, and MD. Diploid and tetraploid races exist, and both are present in our area (Nesom 1983). In NC, diploids are the predominant race in the Mountains, the s. Piedmont, and the s. and e. Coastal Plain; tetraploids predominate along the Blue Ridge Escarpment, the n. Piedmont, and the n. Coastal Plain. In SC, diploids occur in the Coastal Plain and Piedmont, tetraploids in the mountains and escarpment. In GA, the pattern is similar, with diploids extending further into the Piedmont and tetraploids restricted to the Mountains and upper Piedmont. In AL, only diploids are known. In VA, however, tetraploids occupy the Coastal Plain and e. Piedmont, diploids in the upper Piedmont and Mountains. A study of the flavonoids supported the idea that the tetraploid is an autopolyploid derivative of the diploid. Because of the close morphologic similarity, substantially sympatric distributions, and apparent general absence of demonstrable ecologic differentiation between the two races, it seems best not to attempt to taxonomically distinguish them (Nesom 1983; Soltis, Bohm, & Nesom 1983). "Galax-pulling" (the gathering of the often bronze-colored evergreen leaves for the florist trade) is an important folk industry in the mountains. [= F, K, W, X; = G. aphylla Linnaeus – RAB, C, F, G, S]

Pyxidanthera Michaux 1803 (Pyxie-moss, Pyxie)


1 Leaves (3.3) 4-10 mm long; leaves lanceolate, averaging > 1.0 mm wide (oblanceolate and up to 2.5 mm wide if etiolated under leaf litter); leaves (in fresh material) herbaceous in texture, < 0.1 mm thick; leaves of sterile shoots ciliate along the margins at the base, usually also pubescent on the upper surface near the base, but the pubescence rarely extending > 1/3 of the way from the base to the tip; internodes usually > 1 mm long; [of moist sites in the outer and inner Coastal Plain, including the Sandhills] ......................................................................................................................... P. barbulata
1 Leaves 1-5 mm long (rarely to 7 mm long if etiolated under leaf litter); leaves ovate, averaging < 1.2 mm wide (lanceolate and up to 1.5 mm wide if etiolated under leaf litter); leaves (in fresh material) succulent in texture, up to 0.5 mm thick; leaves of sterile shoots lanose to densely pubescent on the upper surface at the base, the pubescence becoming sparser toward the tip of the leaf, but extending past the midpoint of the leaf and often its full length; internodes usually < 1 mm long; [in extremely xeric sites over coarse deep sand or clay in the Sandhills region of sc. NC and nc. SC] ........ P. brevifolia

Pyxidanthera barbulata Michaux, Common Pyxie-moss, Big Pyxie. Cp (NC, SC, VA): pine savannas, pine flatwoods, pocosin margins, edges of sandhill seepage bogs, primarily in mesic to hydric sites, in wet sands and peaty sands, occasionally extending to submesic sands, but generally with a permanently or seasonally high water table, often with Sphagnum; common (uncommon to rare in the inner Coastal Plain and Sandhills) (SC Rare, VA Rare). March-April; May-June. NY (Long Island) south to NJ, and from se. VA south to n. SC. In the Sandhills, where its range overlaps var. brevifolia, var. barbulata is limited to seepage areas or pocosin ecotones, while P. brevifolia occurs in xeric situations far upslope. [= F, FNA, G, GW, K, S; = P. barbulata var. barbulata – RAB; < P. barbulata – X, Z]

Pyxidanthera brevifolia B.W. Wells, Sandhills Pyxie-moss, Wells's Pyxie-moss, Little Pyxie. Cp (NC, SC): on xeric sandhills, generally over deep sand or sand-clay mixtures near the summits or on the upper slopes of sandhills, restricted to the Sandhills region; rare (US Species of Concern, NC Endangered, SC Rare). December-March; February-May. The variety is
A genus of 5-6 species, perennial herbs, of e. Asia and the Southern Appalachians. The Asian species are: *S. uniflora* (Maximowicz) Maximowicz of montane Japan (with 3 varieties), *S. rotundifolia* (Maximowicz) Makino of Japan, *S. exappendiculata* Hayata, of montane Taiwan, *S. soldanelloides* (Siebold & Zuccarini) Makino, of montane Japan (with as many as 5 varieties recognized), and *S. sinensis* Hemsley of montane Yunnan Province, China. References: Nesom in FNA (in prep.); Davies (1952)=Z; Hatley (1977)=Y; Barnes (1990); Scott in Kubitzki (2004).

1 Style 6-10 (-12) mm long; filaments generally 5-7 mm long; [native of McDowell County, NC] ...............................................

A genus of 5-6 species, perennial herbs, of e. Asia and the Southern Appalachians. The Asian species are: *S. uniflora* (Maximowicz) Maximowicz of montane Japan (with 3 varieties), *S. rotundifolia* (Maximowicz) Makino of Japan, *S. exappendiculata* Hayata, of montane Taiwan, *S. soldanelloides* (Siebold & Zuccarini) Makino, of montane Japan (with as many as 5 varieties recognized), and *S. sinensis* Hemsley of montane Yunnan Province, China. References: Nesom in FNA (in prep.); Davies (1952)=Z; Hatley (1977)=Y; Barnes (1990); Scott in Kubitzki (2004).

1 Style (10-) 12-18 mm long; filaments generally 6-9 mm long; [native to Transylvania and Jackson counties, NC, Oconee and Pickens counties, SC, and Rabun County, GA; introduced elsewhere] .............................................

**Shortia** Torrey & Gray 1842 (Shortia, Ocone Bells)

A genus of 5-6 species, perennial herbs, of e. Asia and the Southern Appalachians. The Asian species are: *S. uniflora* (Maximowicz) Maximowicz of montane Japan (with 3 varieties), *S. rotundifolia* (Maximowicz) Makino of Japan, *S. exappendiculata* Hayata, of montane Taiwan, *S. soldanelloides* (Siebold & Zuccarini) Makino, of montane Japan (with as many as 5 varieties recognized), and *S. sinensis* Hemsley of montane Yunnan Province, China. References: Nesom in FNA (in prep.); Davies (1952)=Z; Hatley (1977)=Y; Barnes (1990); Scott in Kubitzki (2004).

1 Style 6-10 (-12) mm long; filaments generally 5-7 mm long; [native of McDowell County, NC] ...............................................

**Shortia galacifolia** Torrey & A. Gray var. *brevistyla* Davies, Northern Shortia. Mt (NC): on moist slopes, creekbanks, and rock outcrops in humid escarpment gorges with high rainfall, generally in deep shade under *Rhododendron maximum*, at elevations of 350-550m; rare (NC Endangered). March-April; July-August. This variety is known only from McDowell County, NC, where it occurs on several tributaries of the Catawba River and North Fork Catawba River. It has also been reported from the gorge of the Linville River, Burke County, but this locality is questionable and has not been relocated. This area is disjunct about 100 kilometers to the northeast along the Blue Ridge Escarpment from the range of the typic variety. In addition to the characters used in the key, var. *brevistyla* differs in a variety of characters of the flowers and leaves, as discussed in Davies (1952) and Hatley (1977). Whether the recognition of infraspecific taxa is warranted is not clear; Davies argued for and Hatley against. Though the morphological characters are relatively minor and partially overlapping, their correlation with disjunct ranges and their likely influence on pollination and reproduction influence me to provisionally accept varietal status, pending further research. [= FNA, K, Z; < *Shortia galacifolia* – RAB, C, G, W, X, Y; < *Sherwoodia galacifolia* (Torrey & A. Gray) House – S]

**Shortia galacifolia** Torrey & A. Gray var. *galacifolia*, Southern Shortia, Ocone Bells. Mt (GA, NC, SC), Pd* (VA*): on moist slopes, creekbanks, and rock outcrops in humid escarpment gorges with high rainfall, generally in deep shade under *Rhododendron maximum* and *Rh. minus*, at elevations (in NC) of 350-650m; rare (GA Endangered, NC Endangered, SC Rare). March-April; July-August. This variety occurs in Transylvania and Jackson counties, NC, Oconee and Pickens counties, SC, and Rabun County, GA, where it occurs in the remarkable escarpment gorges region, at elevations from 200-650m (formerly at lower elevations, now submerged under Lake Jocassee). Most of the population of this species, including the type locality, was destroyed in the early 1960’s by the construction of Lake Jocassee (Zahner & Jones 1983). In the gorge tributaries of the Eastatoe, Toxaway, Horsepasture, and Thompson rivers, *Shortia* can sometimes form a dense groundcover covering acres. Various outlying locations, such as in NC (Swain and Macon counties), VA (Amherst County), and TN (Blount, Monroe, and McMinn counties) are not considered native, and are adventive or the result of persistence after cultivation. The species is prized by gardeners, and survives well outside its natural range. [= FNA, K, Z; < *Shortia galacifolia* – RAB, C, G, W, X, Y; < *Sherwoodia galacifolia* (Torrey & A. Gray) House – S]

**Sherwoodia galacifolia** (Torrey & A. Gray var. *galacifolia*, Southern Shortia, Ocone Bells. Mt (GA, NC, SC), Pd* (VA*): on moist slopes, creekbanks, and rock outcrops in humid escarpment gorges with high rainfall, generally in deep shade under *Rhododendron maximum* and *Rh. minus*, at elevations (in NC) of 350-650m; rare (GA Endangered, NC Endangered, SC Rare). March-April; July-August. This variety occurs in Transylvania and Jackson counties, NC, Oconee and Pickens counties, SC, and Rabun County, GA, where it occurs in the remarkable escarpment gorges region, at elevations from 200-650m (formerly at lower elevations, now submerged under Lake Jocassee). Most of the population of this species, including the type locality, was destroyed in the early 1960’s by the construction of Lake Jocassee (Zahner & Jones 1983). In the gorge tributaries of the Eastatoe, Toxaway, Horsepasture, and Thompson rivers, *Shortia* can sometimes form a dense groundcover covering acres. Various outlying locations, such as in NC (Swain and Macon counties), VA (Amherst County), and TN (Blount, Monroe, and McMinn counties) are not considered native, and are adventive or the result of persistence after cultivation. The species is prized by gardeners, and survives well outside its natural range. [= FNA, K, Z; < *Shortia galacifolia* – RAB, C, G, W, X, Y; < *Sherwoodia galacifolia* (Torrey & A. Gray) House – S]

**Abbreviations**

- **RAB**: Rolled Back
- **C**: Cool
- **G**: Gentle
- **W**: Warm
- **X**: Xeric
- **Y**: Yeric

**Caprifoliaceae** (Rafinesque) Pyck 1998 (Bush-honeysuckle Family)

Various segregate families (or reassignments) of taxa traditionally placed in the Caprifoliaceae have been proposed, including the transfer of *Sambucus* and *Viburnum* to the Adoxaceae, placement of *Diervilla* and *Weigela* in the Diervillaceae (Backlund & Pyck 1998), placement of *Abelia* and *Linnaea* in the Linnaeaceae (Backlund & Pyck 1998, Pyck et al. 2002), and retention of *Lonicera, Symphoricarpos*, and *Triosteum* in a much more narrowly circumscribed Caprifoliaceae. Alternatively, all these taxa could be included in the Caprifoliaceae, along with Dipsacaceae and Valerianaceae, as a very broadly circumscribed Caprifoliaceae. References: Backlund & Pyck (1998); Pyck et al. (2002); Ferguson (1966a).

**Diervilla** P. Miller (Bush-honeysuckle)

1 Petioles 5-8 mm long; leaves ciliate on the margins; twig terete in cross-section; [of the Mountains of VA and n. NC, south to Buncombe and McDowell counties, NC] .................................................. D. lonicera

1 Petioles 0-5 mm long; leaves not ciliate; twig more-or-less square in cross-section; [of the Mountains of SC and s. NC, north to Mitchell and Yancey cos., NC].

2 Branchlets, leaves, pedicels, and calyx densely pubescent; sepal lobes < 2 mm long ........................................ D. rivularis

2 Branchlets, leaves, pedicels, and calyx glabrous, except for hairs on the twig angles; sepal lobes 2-3 mm long ..........

.......................................................... .................................................. D. sessilifolia


Diervilla rivularis Gattinger, Hairy Southern Bush-honeysuckle. Mt (GA, NC): rock outcrops, ridges, and streambanks at moderate to high elevations; rare (NC Rare). June-August; August-October. W. NC (Yancey County) and e. TN south to nw. GA (Jones & Coile 1988) and ne. AL. [= K, S, Y, Z; = D. sessilifolia Buckley var. rivularis (Gattinger) Ahles – RAB, W]

Diervilla sessilifolia Buckley, Smooth Southern Bush-honeysuckle. Mt (GA, NC, SC): rock outcrops, ridges, landslide scars, trail margins, other rocky open places, streambanks, at moderate to high elevations; uncommon. June-August; August-October. Sw. NC and e. TN south to nw. SC, ne. GA, and ne. AL. [= F, K, S, Y, Z; = D. sessilifolia Buckley var. sessilifolia – RAB, W]

Weigela Thunberg (Weigela)

A genus of about 10 species, shrubs, of e. Asia.

* Weigela floribunda (Siebold & Zuccarini) K. Koch, Weigela, native of Asia, is cultivated and sometimes naturalized, as in e. TN (Chester, Wofford, & Kral 1998). [= K]

DIONAEACEAE (Venus Flytrap Family)

(see DROSERACEAE)

DIPSACACEAE A.L. de Jussieu 1789 (Teasel Family)

A family of about 11 genera and 300 species, herbs and shrubs, of Eurasia and Africa.

1 Stem prickly ........................................................................................................ Dipsacus

1 Stem not prickly ................................................................................................... [Knautia]

Dipsacus Linnaeus (Teasel)

A genus of about 15 species, herbs, of Eurasia. Dipsacus begins flowering about halfway up the head, the flowers then opening sequentially toward both the base and the tip of the inflorescence. References: Ferguson (1965)=Z; Ferguson & Brizicky (1965); Stace (1997).

1 Principal cauline leaves laciniate-pinnatifid, cut at least halfway to the midrib .................................................. D. laciniatus

1 Principal cauline leaves entire or toothed.

2 Bracts on the receptacle with straight apical spines, these stiff but flexible; bracts of the involucre curved upward

2 Bracts on the receptacle with recurved apical spines, these rigid; bracts of the involucre spreading more or less horizontally .................................................................................................................. D. sativus

* Dipsacus fullonum Linnaeus, Wild Teasel, Common Teasel. Mt (NC, VA), Pd, Cp (VA): roadsides, pastures, disturbed areas; common (rare in NC and in Coastal Plain of VA), introduced from Europe. July-September; September-October. The inflorescences are frequently collected for crafts and dried arrangements. [= K, W, Z; = D. sylvestris Hudson – RAB, C, F, G, S; = D. fullonum ssp. sylvestris (Hudson) Clapham]

* Dipsacus laciniatus Linnaeus, Cutleaf Teasel. Mt, Pd (VA): disturbed areas; uncommon, introduced from Europe. July-September; September-October. [= C, F, G, K, Z]

* Dipsacus sativus (Linnaeus) Honckeny, Fuller's Teasel. Mt (VA): disturbed areas; rare, introduced from Europe. July-September; September-October. I am here following Ferguson (1965), Ferguson & Brizicky (1965), and Stace (1997) in their determination that D. sativus is the correct name to apply to this plant. The occurrence of this species in our area is implied in
various sources; I have not seen specimens. The dried inflorescences were used in the past for fulling cloth (raising the nap). [= K, Z; = D. fullonum – C, F, G, misapplied]

**Knautia** Linnaeus

A genus of about 60 species, herbs, of Europe, w. Asia, and n. Africa. 

* Knautia arvensis (Linnaeus) Coulter, Blue Buttons. Disturbed areas. Naturalized south at least to s. PA (Rhoads & Klein 1993), MD, and WV (Kartesz 1999). June-September. [= C, F, G, K; = Scabiosa arvensis Linnaeus]

**DROSERACEAE** Salisbury 1808 (Sundew Family)

A family of 3 genera (*Drosera, Dionaea, Aldrovanda*) and about 100 species, nearly cosmopolitan. References: Schnell (2002b); Kubitzki in Kubitzki & Bayer (2003).

1 Leaves catching insects via "snap-trap" leaves, with stiff marginal hairs; stamens 10-20; inflorescence cymose; [endemic to the Coastal Plain of se. NC and ne. SC]........................................................................................ .................................

2 Petals 7-10 (12) mm long; leaves 8-25 (-30) cm long, < 1 mm wide; glandular hairs on the leaves red to purple, drying dark brown; scape 6-26 cm long ........................................................................................................... *D. filiformis*

3 Scapes stipitate-glandular; basal rosettes 0.8-3.5 cm in diameter; stipules absent or obsolete (consisting of a few hair-like segments); seeds black, crateriform ........................................................................................................... *D. rotundifolia var. rotundifolia*

4 Leaf blades wider than long, suborbicular or reniform; seeds about 6× as long as wide; [primarily of the Mountains, rarely disjunct eastward] ........................................................................................................... *D. rotundifolia var. rotundifolia*

4 Leaf blades about as wide as long, spatulate to obovate; seeds 1-2× as long as broad; [primarily of the Coastal Plain, rarely disjunct westward].

**Drosera** Linnaeus 1753 (Sundew)


1 Leaves filiform, the expanded leaf bases forming a corn-like base.

2 Petals 7-10 (12) mm long; leaves 8-25 (-30) cm long, < 1 mm wide; glandular hairs on the leaves red to purple, drying dark brown; scape 6-26 cm long ........................................................................................................... *D. filiformis*

3 Scapes stipitate-glandular; basal rosettes 0.8-3.5 cm in diameter; stipules absent or obsolete (consisting of a few hair-like segments); seeds black, crateriform ........................................................................................................... *D. brevifolia*

3 Scapes glabrous; basal rosettes (2-) 3-12 cm in diameter; stipules present, fimbriate; seeds light brown and longitudinally striate, or reddish brown to black and densely papillose, or brown and coarsely corrugated into 14-16 longitudinal ridges.

4 Leaf blades wider than long, suborbicular or reniform; seeds about 6× as long as wide; [primarily of the Mountains, rarely disjunct eastward] ........................................................................................................... *D. rotundifolia var. rotundifolia*

4 Leaf blades about as wide as long, spatulate to obovate; seeds 1-2× as long as broad; [primarily of the Coastal Plain, rarely disjunct westward].

**Dionaea** Ellis 1768 (Venus Flytrap, Meadow Clam)

This monotypic genus is endemic to the Coastal Plain of NC and SC; it has been introduced in various places, including panhandle FL, Yancey County in the mountains of NC, and s. NJ, where it persists and spreads to varying degrees (Evert 1957). References: Roberts & Oosting (1958); Wood (1960); Schnell (2002b)=Z.

Dionaea muscipula Ellis, Venus Flytrap, Meadow Clam, Tippitiwitchet. Cp (NC, SC): wet savannas, sandhill seepages; rare (US Species of Concern, NC Rare/Special Concern, SC Rare). The shiny black seeds are exposed at the maturity and dehiscence of the capsule. Perhaps the most remarkable species in our flora, *Dionaea* has become increasingly rare and now receives some protection as a NC Special Concern species and a Convention on International Trade in Endangered Species "Appendix 2" species. Although collection and trade as a novelty item have contributed to the decline of *Dionaea*, its more fundamental problem is that faced by the great majority of Coastal Plain species in our area – destruction of habitat and fire suppression. In the fall-line Sandhills, *Dionaea* is now restricted to a very few sites on Fort Bragg; in the central Coastal Plain, it is also nearly extirpated. Substantial populations remain only in the Outer Coastal Plain, primarily in Brunswick, Pender, and Onslow counties. Ellis's Latin phrase describing the plant to Linnaeus (quoted in Croom 1837) is worth repeating for its succinctness: "Miraculum naturae! – folia biloba, radicalia, ciliata, sensibilia, conduplicanda, insecta incarcerantia." The colonial governor of North Carolina, Arthur Dobbs, wrote in 1759, "we have a kind of Catch Fly Sensitive which closes upon anything that touches it." Gibson (1991) shows that trap size and prey size are correlated; trap leaves of *Dionaea* primarily capture insects about 5 mm smaller than the length of the trap. [= RAB, GW, K, S, Z]
5 Petioles glabrous; petals white; plants usually with a leafy stem 1-10 cm long; scape arching at base; seeds reddish brown to black and densely papillose ........................................... D. intermedia

Drosera brevifolia Pursh, Dwarf Sundew. Cp (GA, NC, SC, VA), Pd (GA, NC), Mt (GA, SC): pine savannas, other wet sandy sites, rarely in seepage over rock outcrops; common (rare in lower Piedmont only and Mountains) (VA Watch List). April-May. The species ranges from se. VA south to FL and west to AR, OK, and TX; disjunct in se. TN. D. leucantha may be the correct name for this taxon; see Shinners (1962) and Wood (1966) for a contentious discussion of nomenclatural issues. [= GW, K, Q, S, X, Z; = D. leucantha Shinners – RAB, Y]

Drosera capillaris Point, Pink Sundew. Cp (GA, NC, SC, VA), Pd (NC, SC, VA): pine savannas, other wet sandy or peaty sites; common (rare in Piedmont) (VA Watch List). May-August. Se. VA south to FL and west to TX, rarely inland, as in TN; also extending into tropical America, in the West Indies, Mexico, and n. South America. [= RAB, C, F, G, GW, K, Q, S, W, X, Y, Z]

Drosera filiformis Rafinesque, Threadleaf Sundew. Cp (NC): margins of natural pools in pinelands, especially clay-based Carolina bays; rare (NC Rare). June; August. E. MA south to se. NC; disjunct in the FL panhandle (Bay and Washington counties) and in sw. Nova Scotia (Sorrie 1998a). Sorrie (1998a) has clarified the taxonomy and phytogeography of D. filiformis and D. tracyi. See comments about D. tracyi below. [= GW, K, Y; < D. filiformis – RAB, C, G (also see D. tracyi); = D. filiformis var. filiformis – F, Q, X, Z; < D. tracyi Macfarlane in L.H. Bailey – S (also see D. filiformis)]

Drosera intermedia Hayne, Water Sundew, Spoonleaf Sundew. Cp (GA, NC, SC, VA), Pd (NC, SC): savannas, ditches, pocosins, margins of pools or streams, often in standing water; common (rare in Piedmont and n. of NC) (VA Watch List). July-September. D. intermedia is circumboreal, in North America ranging from Newfoundland and MN south to FL and TX, and into tropical America. [= RAB, C, F, G, GW, K, Q, S, W, X, Y, Z]

Drosera rotundifolia Linnaeus var. rotundifolia, Roundleaf Sundew. Mt (GA, NC, SC, VA), Cp (NC, VA), Pd (VA): mountain bogs and fens, seepage slopes, vertical seepages on rock (in the mountains) or clay (as along the Little River in the Sandhills of NC); uncommon (GA Special Concern). A circumboreal species ranging south in North America to SC, ne. GA, e. and nc. TN, IL, and CA. Var. comosa Fernald is restricted to e. Canada, New England, and n. NY. [= F, K; < D. rotundifolia – RAB, C, F, G, GW, K, S, W, X, Y, Z]

Drosera tracyi MacFarlane in Bailey, Tracy's Sundew. Cp (GA): savannas; rare (GA Special Concern). Sc. GA and panhandle FL, west to e. LA; it has been reported for SC by various authors, including Wynne (1944), but the basis for these reports is unknown. The notion that this species is not distinguishable from D. filiformis (or is only varietally distinct) is erroneous (Sorrie 1998a). See Schnell (1995) for a contrary view. [= GW, K, Y; = D. filiformis Rafinesque var. tracyi (MacFarlane in Bailey) Diels – Q]

EBENACEAE Gürke 1891 (Ebony Family)

A family of 2 genera and 500-600 species, trees and shrubs, distributed in tropical and subtropical (rarely warm temperate) regions. References: Wallnöfer in Kubitzki (2004).

Diospyros Linnaeus 1753 (Persimmon)

A genus of 500-600 species, trees and shrubs, of tropical and subtropical regions (with very few exceptions). The genus includes a variety of tropical trees called ebony in the wood trade. References: Spongberg (1977)=Z; Wallnöfer in Kubitzki (2004).

Identification notes: Seedlings and fire sprouts are superficially very similar to Nyssa sylvatica, but can be separated in the following ways: bundle scar 1 per bud scar, narrowly crescent-shaped (vs. Nyssa with 3 distinct, circular, bundle scars arranged in a broad V pattern), leaves never with teeth (vs. Nyssa leaves sometimes with a few irregular teeth), leaves glabrate to tomentose with curly hairs (vs. glabrous or with a few straight, forward-pointing hairs), leaves with sessile to short-stipitate glands on upper surface of midrib and outer petiole, later becoming necrotic spots (vs. leaves without glands).

1 Twigs stout, reddish-pubescent; fruits to 7.5 cm in diameter; [cultivated alien]........................................... [D. kaki]
1 Twigs slender, glabrous or with gray pubescence; fruits to 4 cm in diameter; [native] ........................................ D. virginiana

Diospyros virginiana Linnaeus, American Persimmon. Pd, Cp, Mt (GA, NC, SC, VA): dry woods, sandhills, disturbed places, floodplain and mesic forests, fencerows; common. May-June; September-December (and persisting). CT, PA, OH, IN, IL, MO, and e. KS south to FL and TX. East of the Mississippi River, D. virginiana var. virginiana has leaves cuneate to rounded at the base, and glabrous or glabrescent; mostly west of the Mississippi River and perhaps eastward along the Coastal Plain, D. virginiana var. pubescens (Pursh) Dippel has leaves subcordate, and persistently pubescent. Though these differences seem relatively trivial, they are consistent, geographically correlated, and may be worthy of varietal recognition. Persimmons are famous for their sweet and edible fruits, and infamous for the bitter-astringency of the not fully ripe fruit. The species is dioecious, the male trees appear to reach a greater size than the females. The wood is one of the heaviest and hardest in e. North America. [= RAB, GW, K, W; > D. virginiana var. virginiana – C, F, G, Z; > D. virginiana – S; > D. mosieri Small – S]
* Diospyros kaki Linnaeus f., Kaki, Kaki-plum, Japanese Persimmon, is rarely grown in our area for its fruits, which are much larger than D. virginiana (to 9 cm in diameter). [= Z]

**ELAEAGNACEAE** A.L. de Jussieu 1789 (Oleaster Family)

A family of 3 genera and 30-50 species, shrubs, small trees, and lianas, of temperate Eurasia and North America, and tropical Asia and Australia. References: Bartish & Swenson in Kubitzki (2004).

**Elaeagnus** Linnaeus 1753 (Silverberry, Oleaster, Russian-olive)


1 Flowering in the fall (October-November) and fruiting in the spring (March-April); leaves evergreen; branches usually spiny .............................................................................................................................. ....................................................

1 Flowering in the spring and fruiting in the fall; leaves deciduous (somewhat coriaceous in texture and semi-persistent); branches spiny or not.

2 Fruit yellow, lepidote with silver scales; leaves with silver scales beneath ................................................... E. angustifolia

2 Fruit reddish-brown or pinkish, lepidote with silver and brown scales; leaves with a mixture of silver and bronze scales beneath.

3 Fruit 10-15 mm long; fruiting pedicel 15-25 mm long; hypanthium tube about as long as the separate calyx lobes..

3 Fruit 6-8 mm long; fruiting pedicel 8-12 mm long; hypanthium tube about 2× as long as the separate calyx lobes...

.............................................................................................................................. .............


* Elaeagnus pungens* Thunberg, Autumn Silverberry. Pd (GA, NC, SC, VA), Cp (NC, SC, VA): forests and woodlands in suburban areas, spread by birds; uncommon, introduced from Japan. October-November; March-April. [= RAB, K]

* Elaeagnus umbellata* Thunberg var. *parvifolia* (Royle) Schneider, Spring Silverberry. Mt, Pd (GA, NC, SC, VA), Cp (NC, SC, VA): forests and woodlands, spread by birds; common, introduced from Japan and China. April-May; August-September. This species is becoming a noxious weed shrub, still unfortunately sometimes promoted for "wildlife plantings." [= K; < E. umbellata – RAB, C, F, G, W; E. umbellatus – S]

**ELATINACEAE** Dumortier 1829 (Waterwort Family)


**Elatine** Linnaeus (Waterwort)

A genus of about 10 species, aquatic, tropical and temperate.

1 Seeds mostly straight, the areoles elliptic, the rounded ends not dovetailing into adjacent rows, the longitudinal ridges thus appearing straight and distinct; seeds basal-axile, extending lengthwise through the capsule, not overlapping; leaves 1-5 mm long; flowers mostly 2-merous ................................................................. E. minima

1 Seeds mostly curved, the areoles 6-sided, the angular ends dovetailing into the adjacent rows, the longitudinal ridges thus appearing broken or irregular; seeds axile, attached along an elevated placenta at different levels, therefore overlapping; leaves 3-8 (-10) mm long; flowers mostly 3-merous.

2 Leaves obovate to broadly spatulate, rounded at the tip, 3-8 mm long, the larger 1.5-5 mm wide; seeds with 20-30 pits in each row .................................................................................................................... E. americana

2 Leaves linear-lanceolate to narrowly spatulate, emarginate to truncate to rounded at the tip, 1-15 mm long, the larger 0.5-3 mm wide.

3 Leaves 1.5-4 mm long, 0.7-1.8 mm wide; seeds with 9-15 pits per row ..................................................... E. brachysperma

3 Leaves 2.8-15 mm long, 0.5-3 mm wide; seeds with 16-25 pits per row ..................................................... E. rubella

* Elatine americana* (Pursh) Arnott, American Waterwort. Cp (VA), Mt (NC, SC): tidal flats, lakes; rare (NC Watch List, VA Watch List). July-October. Widespread in ne. United States, s. to NC and MO. The only known site for this species in NC
is an artificial lake; it is uncertain whether it should be considered native or introduced. [= F, K, S; *E. triandra* Schkuhr – RAB, W (broadly interpreted to include *E. americana*); *E. triandra* var. *americana* (Pursh) Fassett – C, G, GW]

**Elatine brachysperma** A. Gray, Shortseed Waterwort. Pd (GA): [habitat not known]; rare. It has been reported for nc. GA (Jones & Coile 1988). [= F, K; *E. triandra* Schkuhr var. *brachysperma* (A. Gray) Fassett – C, G]

**Elatine minima** (Nutall) Fischer & C.A. Meyer, Tiny Waterwort. Cp (VA), Pd (NC, SC): tidal flats, lakes; rare (NC Watch List, VA Rare). July-October. First found in NC in 1990, *E. minima* is widespread in ne. United States, south to VA, NC, and SC (Horn, pers. comm. 2004). The only known site for this species in NC is the spillway of an artificial lake (Lake Butner, Granville County); it is uncertain whether it should be considered native or exotic in NC. It may have been introduced by waterfowl or humans. [= C, F, G, K]

**Elatine rubella** Rydberg, Red Waterwort. Pd (SC): ponds; rare. This species occurs in AL (Fayette County) as well as north of our area (Haynes 1998). Hill & Horn (1997) reported *E. triandra* for SC, but the specimen is *E. rubella* Rydberg (Horn, pers. comm. 2004). [= K; *E. triandra* Schkuhr – F, misapplied; *E. triandra* var. *triandra* – C, G, misapplied]

**ERICACEAE** A.L. de Jussieu 1789 (Heath Family)

A family of about 107-124 genera and 3400-4100 species, primarily shrubs, small trees, and subshrubs, nearly cosmopolitan. The Ericaceae is very important in our area, with a great diversity of genera and species, many of them rather narrowly endemic. Our area is one of the north temperate centers of diversity for the Ericaceae. Along with Quercus and Pinus, various members of this family are dominant in much of our landscape. References: Kron et al. (2002); Wood (1961); Judd & Kron (1993); Kron & Chase (1993); Luteyn et al. (1996)–L; Dorr & Barrie (1993); Cullings & Hileman (1997); Stevens et al. in Kubitzki (2004).

**Main Key, for use with flowering or fruiting material**

1 Plant an herb, subshrub, or sprawling shrub, not clonal by underground rhizomes (except *Gaultheria procumbens* and *Epigaea repens*), rarely > 3 dm tall; plants mycotrophic or hemi-mycotrophic (except *Epigaea, Gaultheria,* and *Arctostaphylos*).

2 Plants without chlorophyll (fully mycotrophic); stems fleshy; leaves represented by bract-like scales, white or variously colored, but not green; pollen grains single; [subfamily Monotropoideae; tribe Monotrapeae].

3 Petals separate; fruit nodding, a berry; flower and fruit several per stem.................................**Monotropis**

3 Petals united; fruit erect, a capsule; flower and fruit 1-several per stem.

4 Flowers few to many, racemose; stem pubescent, at least in the inflorescence; plant yellow, orange, or red when fresh, aging or drying dark brown.................................................................**Hypopitys**

4 Flower solitary; stem glabrous; plant white (rarely pink) when fresh, aging or drying black ............**Monotropa**

2 Plants with chlorophyll (hemi-mycotrophic or autotrophic); stems woody; leaves present and well-developed, green; pollen grains in tetrads (single in *Orthilia*).

5 Herb with a rosette of ascending basal leaves; flowers scapose; [subfamily Monotropoideae; tribe *Pyroleae*].

6 Style and filaments straight; filaments straight, the anthers closely surrounding the style; inflorescence distinctly secund (1-sided) .................................................................**Orthilia**

6 Style and filaments strongly declined; filaments curved, the anthers not closely surrounding the style; inflorescence slightly or not at all secund (1-sided) ..........................................................**Pyrola**

5 Subshrub or sprawling shrub with cauleine leaves; flowers axillary (except scapose in *Chimaphila*).

7 Plant erect, the leaves clustered near the apex of the single stem.

8 Leaves lanceolate or obovate, normally 2-4× as long as wide (sometimes proportionately less narrow in stunted individuals; fruit a capsule, borne 1-several on an erect scape above the leaves [subfamily Monotropoideae; tribe *Pyroleae*] .................................................................**Chimaphila**

8 Leaves obovate, 1-2× as long as wide; fruit a red berry, borne on nodding axillary pedicels beneath the leaves; [subfamily Vaccinioideae; tribe *Gaultherieae*] .................................................................**Gaultheria**

7 Plant creeping or sprawling, leaves scattered along the stems.

9 Flowers solitary and axillary; fruit a white berry; [subfamily Vaccinioideae; tribe *Gaultherieae*] ..........**Gaultheria**

9 Flowers in axillary or terminal spikes or racemes; fruit a fleshy loculicidal capsule or red drupe.

10 Leaves glabrous, 1-3 cm long, tapered to the base; corolla urceolate; calyx not subtended by large bracts; [subfamily Arbutoideae] .................................................................**Arctostaphylos**

10 Leaves pilose (glabrate in age), 2-10 cm long, rounded or subcordate at the base; corolla salverform, the lobes spreading; calyx subtended by 2 large bracts; [subfamily Ericoideae; tribe *Phyllocladaceae*] .................................................................**Epigaea**

1 Plant a shrub, > 3 dm tall, or 1-3 dm tall and definitely and obviously clonal by underground rhizomes; plants not mycotrophic or hemi-mycotrophic.

11 Leaves ca. 1 mm wide, 8-12 mm long, appearing opposite, alternate, or whorled (the internodes very short, thus the leaves generally appearing whorled); petals absent; fruit a subglobose, 2-stoned drupe, 2-3 mm in diameter; branches often appearing in whorls of 3-7; [subfamily Ericoideae; tribe *Empetreae*] .................................................................**Ceratiola**
11 Leaves either > 2 mm wide or < 5 mm long, mostly alternate or whorled; petals present; fruit not as above, mostly either a capsule or 10- or many-seeded berry; branches appearing alternate or whorled; subfamily Vaccinioideae; tribe Vaccinieae.
12 Ovary inferior; fruit indehiscent, a fleshy berry.
13 Ovary 10 locular; seeds 10; leaves glandular-punctate, at least on the lower surface (except G. brachycera)...
14 Petals separate; fruit 2-7-locular; either a shrub to 1 m tall with ovate to oblong, evergreen leaves, 0.6-1.2 cm long, or a shrub to small tree 2-6 (-9) m tall with elliptic, deciduous leaves, 4-12 cm long, or a shrub 1-2.5 m tall, with elliptic to ovate, evergreen leaves 2-4 cm long; [subfamily Ericoideae].
15 Fruit 2-3 (5)-locular; shrub to 1 m tall; leaves, 0.4-1.2 cm long; petals 2-4 mm long; [subfamily Ericoideae; tribe Phyllodoceae] ...
16 Fruit 4-7-locular; shrub to small tree 1-6 (-9) m tall; leaves 2-12 cm long; petals 12-30 mm long.
17 Leaves whorled, < 5 mm long, linear; [subfamily Ericoideae; tribe Ericaeae] ...
18 Flowers 4-merous; fruits 4-locular; leaves with a series of fascicles of trichomes on the midrib below; [subfamily Ericoideae; tribe Rhododendraceae] ...
19 Leaves alternate or whorled, > 20 mm long.
20 Leaves sharply and distinctly serrate.
21 Pedicels slender, 7-10 mm long; filaments strongly curved just below the anthers; pith transversely diaphragmed; [subfamily Vaccinioideae; tribe Lyoniaceae] ...
22 Capsules ovoid to globose or subglobose, about as long as broad, 5-8 mm long.
23 Leaves with a prominent vein running parallel to (and about 1 mm in from) the margin; [subfamily Vaccinioideae; tribe Lyoniaceae] ...
24 Corolla saucer-shaped, 20-30 mm across; leaves entire; [subfamily Ericoideae; tribe Phyllodoceae] ...
25 Capsules elongate, > 2× as long as broad, 7-23 mm long; [subfamily Ericoideae; tribe Rhododendraceae] ...
26 Leaves < 2.5 cm wide.
27 Leaves linear to narrowly lanceolate, 8× or more as long as wide. strongly revolute, strongly whitened beneath; [subfamily Vaccinioideae; tribe Andromedae] ...
28 Leaves broader, not revolute or slightly so, not strongly whitened below.
29 Pedicels with 2 bracteoles near the summit; [subfamily Vaccinioideae; tribe Gaulteriaceae] ...
30 Pedicels with 2 bracteoles near the base; [subfamily Vaccinioideae; tribe Lyoniaceae] ...
31 Capsule broader than long; shrub; bracteoles just below the calyx; [subfamily Vaccinoideae; tribe Gaultherieae]..............................Eubotrys
31 Capsule longer than broad; tree; bracteoles generally near the middle of the pedicel; [subfamily Vaccinoideae; tribe Oxydendreae]..............................Oxydendrum

30 Pedicels without bracteoles.
32 Leaves entire to minutely serrulate; capsule sutures pale and thickened; [subfamily Vaccinoideae; tribe Oxydendreae].............................Lyonia
32 Leaves crenate; capsule sutures not thickened and pale; [subfamily Vaccinoideae; tribe Andromedeae]..............................................Zenobia

Key to Ericaceae (including some relatives), emphasizing vegetative characters
This key includes some related shrubs, of the Diapensiaceae, Clethraceae, and Cyrillaceae

1 Leaves and stems lacking chlorophyll (either white or variously tinted with colors such as pink, tan, red, or violet)................Key A
1 Leaves and stems with chlorophyll (green, though some parts may have the green pigment obscured with purple or other colors).
  2 Leaves membranaceous or subcoriaceous, deciduous or tardily deciduous, usually not particularly glossy (except in new foliage of some species).............................................................................................................................................Key B
  2 Leaves coriaceous, more or less stiff, evergreen, usually glossy and often dark green.
    3 Subshrub or sprawling shrub, 0-1 (-2) dm tall, not clonal by underground rhizomes (except Gaultheria procumbens), though often clonal by creeping stems, or sprawling and patch-forming (many of these species are only ambiguously shrublike and are considered herbs by the casual observer); leaves evergreen................Key C
    3 Shrub, > 3 dm tall, or 1-3 dm tall and definitely and obviously clonal by underground rhizomes; leaves evergreen or deciduous......................................................................................................................................................Key D

Key A – Achlorophyllose plants

1 Flower solitary; stem glabrous; plant white (rarely pink) when fresh, aging or drying black..............................Monotropa uniflora
1 Flowers few to many, racemose; stem glabrous (Monotropis) or pubescent, at least in the inflorescence (Hypopitys); plant yellow, orange, or red when fresh, aging or drying dark brown.
  2 Plant yellow, orange, or red when fresh, aging or drying dark brown; stem pubescent, at least in the inflorescence; petals fused at base............................................................................................................................................................................Hypopitys monotropa
  2 Plant lavender when fresh; stem glabrous; petals separate at base .................................................................Monotropsis odorata

Key B – Deciduous ericaceous shrubs and trees
Gaylussacia spp.
Vaccinium spp.
Elliottia racemosa
Menziesia pilosa
Rhododendron spp.
Kalmia cuneata
Chamaedaphne calyculata
Lyonia mariana
Lyonia ligustrina var. ligustrina
Lyonia ligustrina var. foliosiflora
Eubotrys racemosa
Eubotrys recurva
Oxydendrum arboreum
Zenobia pulverulenta
Clethra acuminata
Clethra alnifolia
Cyrilla racemiflora

Key C – Evergreen subshrubs and sprawling shrubs

1 Plant erect, the leaves few (< 10), clustered near the apex of the single stem.
  2 Leaves obovate, 1-2× as long as wide; fruit a red berry, borne on nodding axillary pedicels beneath the leaves............Gaultheria procumbens
1 Plant creeping or sprawling, leaves scattered along the stems, or tufted at the base.

2 Leaves lanceolate or oblanceolate, normally 2-4" as long as wide (sometimes proportionately less narrow in stunted individuals; fruit a capsule, borne 1-several on an erect scape above the leaves.

3 Leaves lanceolate (broadest below the middle), base rounded, striped with white or paler green along the major veins ................................................................. Chimaphila maculata

3 Leaves oblong-lanceolate (broadest above the middle), base cuneate, solid dark green throughout ................................................................. Chimaphila umbellata ssp. cisatlantica

4 Leaves 2-15 cm wide; leaves (2-) 3.5-15 cm long, rounded or subcordate at the base.

5 Leaves dull green, with a pebbled texture, pilose (glabrate in age) ......................................................... Epigaea repens

5 Leaves bright shiny green (or pruple), with a smooth texture, glabrous.

6 Leaves orbicular, rounded or with a slight point at the apex, finely serrate (4-8 teeth per cm), the teeth not prominently mucronate; flowers in racemes; [widespread in distribution] .................................................. Galax urceolata [DIAPENSIACEAE]

6 Leaves broadly elliptic, generally emarginate (slightly notched) at the apex, coarsely serrate (1-4 teeth per cm), the teeth prominently mucronate; flowers solitary; [native to humid gorges along the escarpment between the Mountains and Piedmont, sometimes cultivated and becoming established elsewhere] .............................................................. Shortia galacifolia [DIAPENSIACEAE]

7 Leaves broader, > 2 mm wide.

8 Leaves (3.3) 4-10 mm long; leaves lanceolate, averaging > 1.0 mm wide (oblong-lanceolate and up to 2.5 mm wide if etiolated under leaf litter); leaves (in fresh material) herbaceous in texture, < 0.1 mm thick; leaves of sterile shoots ciliate along the margins at the base, usually also pubescent on the upper surface near the base, but the pubescence rarely extending > 1/3 of the way from the base to the tip; internodes usually > 1 mm long ................................................................. Pyxidanthera barbulata [DIAPENSIACEAE]

8 Leaves 1-5 mm long (rarely to 7 mm long if etiolated under leaf litter); leaves ovate, averaging < 1.2 mm wide (lanceolate and up to 1.5 mm wide if etiolated under leaf litter); leaves (in fresh material) succulent in texture, up to 0.5 mm thick; leaves of sterile shoots lanceolate to densely pubescent on the upper surface at the base, the pubescence becoming sparser toward the tip of the leaf, but extending past the midpoint of the leaf and often its full length; internodes usually < 1 mm long .......... Pyxidanthera brevifolia [DIAPENSIACEAE]

9 Leaves serrate or serrulate (sometimes inconspicuously so); [of pinelands of the Coastal Plain and (very rarely) lower Piedmont of se. VA southward].

10 Leaves (2-) 3-18 (-25) mm long, generally elliptic (less commonly ovate or obovate); angle of leaf base typically > 90 degrees; margins finely glandular mucronulate-crenulate, the teeth tightly appressed and therefore often obscure, the margin superficially entire; stems mostly prostrate (ascending in areas that have been long fire-suppressed); [widespread in NC and SC, rare in se. VA and e. GA] ................................................................. Vaccinium crassifolium

10 Leaves (4-) 7-35 (-63) mm long, elliptic to obovate (less commonly elliptic-ovate); angle of leaf base typically < 90 degrees; margins glandular mucronulate-serrulate to serrulate-crenulate, the teeth apparent, especially toward the apex; stems often ascending to upright; [of Lexington County, SC] ............ Vaccinium semprevirens

9 Leaves entire; [of the Mountains of VA northward, except Vaccinium macrocarpon of bogs, as far south as se. sc. and sw. NC].

11 Leaves 10-30 mm long; leaves oblanceolate to obovate, the widest point past the middle; primary stems 1-3 mm in diameter; [of relatively dry, rocky habitats] .................................................. Arctostaphylos uva-ursi

11 Leaves 5-10 (-18) mm long; leaves ovate or elliptic, the widest point below or at the middle; primary stems delicate; [of moist to distinctly boggy habitats].

12 Leaf undersurface green, sparsely bristly; [of moist habitats] .................................................. [Gaultheria hispidula]

12 Leaf undersurface whitened, glabrous; [of saturated wetlands].

13 Leaves elliptic, broadest near middle, (5-) 7-10 (-18) mm long, (2-) 3-4 (-5) mm wide; leaves blunt-rounded and non-involute; pedicels with 2 green, leaf-like bracts 1-2 mm wide; berry 8-15 mm in diameter ................................................................. Vaccinium macrocarpon

13 Leaves ovate, broadest toward base, (3-) 5-6 (-9) mm long, (1-) 2-3 (-5) mm wide; leaves involute at least along the margins, thus making the leaf tip acute; pedicels with (0-) 2 (-5) reddish, scale-like bracts < 1 mm wide; berry 6-12 mm in diameter .......[Vaccinium oxyccocos]

**Key D – Evergreen ericaeous shrubs (either tall or obviously clonal) and trees**

1 Leaves linear, needle-like, appearing whorled (at least in part, sometimes also with nodes appearing opposite or alternate).

2 Leaves glabrous; leaves 5-15 mm long; [native] ................................................................. Ceratiola ericoïdes

2 Leaves densely puberulent and ciliate with gland-tipped hairs; leaves 1.5-5 mm long; [exotic, rarely naturalized] ............ Erica tetralix
LEAVES WIDER, ALTERNATE (OR WHORLED OR OPPOSITE IN *Kalmia*).

3 Leaves (all of them) < 2 cm long.

4 [**Either** of the Mountains, the Piedmont, or the Coastal Plain of ne. SC and se. NC].

5 Leaves alternate, glabrous, finely serrulate ................................................................. *Gaylussacia brachycera*

5 Leaves alternate or opposite, stipitate-glandular or glabrous, entire, or with a few obscure teeth..............

................................................................. *Kalmia hirsuta*

4 [Of the Coastal Plain, from se. SC southward].

6 Twigs densely hispid; leaves hispid on both surfaces ................................................. *Kalmia hirsuta*

6 Twigs glabrous to puberulent; leaves glabrous or with scattered inconspicuous hairs.

7 Plant glaucous and bluish-green throughout; leaf undersurface lacking scattered glandular hairs; [of s. GA south to s. peninsular FL, west to e. TX] ......................................................... *Vaccinium darrowii*

7 Plant dark green throughout, generally exceeding 20 mm in length; leaf undersurface with scattered glandular hairs, these sometimes very few by late in the season (best seen in the field by folding a leaf, holding the fold up to the light, and using a 10× lens); [of se. SC southward to n. FL, west to s. AL] ......

................................................................. *Vaccinium myrtillus*

3 Leaves (at least the larger) > 3 cm long.

8 Leaves toothed, at least toward the tip of the leaf (note that fine serrations or crenations can be obscured by revolute margins).

9 Leaves elliptic to oblanceolate, widest near or above the middle, obtuse, acute, or short-acuminate, 1.5-7 cm long, 0.5-2.5 cm wide; leaf serrations fine and obscure; leaf surfaces with small stipitate glands (*Pieris*) or lepidote with scales (*Chamaedaphne*).

10 Leaves lepidote with scales; leaves oblanceolate, widest above the middle.............. *Chamaedaphne calyculata*

10 Leaves with small stipitate glands, otherwise appearing glabrous; leaves elliptic, widest near the middle.

11 Inflorescence a many-flowered panicle of racemes, borne terminally; seeds 2.5-3 mm long; [of slopes and ridges of the Mountains and upper Piedmont] .............................................. *Pieris phillyrea*

11 Inflorescence a 3-9 flowered raceme, borne in the axils of upper leaves; seeds ca. 1 mm long; [of wetlands of the Coastal Plain, often associated with *Taxodium ascendens*] ............ *Pieris phillyrea*

9 Leaves lanceolate or ovate, widest below the middle, short-acuminate to acuminate, 4-15 cm long, 1.5 cm wide; leaf serrations generally obvious (at least toward the acuminate leaf tip); leaf surfaces glabrous, or with non-stipitate hairs on the lower surface.

12 Pith transversely diaphragmed; [pedicels slender, 7-10 mm long]; [filaments strongly curved just below the anthers] ........................................................................................................ *Agarista populifolia*

12 Pith solid; [pedicels stout, 2-6 mm long]; [filaments straight].

13 Leaves with an acute or short-acuminate apex; racemes 2-4 (5) cm long; sepals ovate, with an obtuse or rounded apex; longest petioles 3-8 mm long ............................................ *Leucothoe axillaris*

13 Leaves with a long-acuminate apex; racemes 4-10 cm long; sepals lanceolate-ovate, with an acute (or subacute) apex; longest petioles 8-15 mm long ............................................ *Leucothoe fontanesiana*

8 Leaves entire.

14 Leaves whitened beneath by a dense mat of white hairs; leaves linear and strongly revolute..............

................................................................. *Andromeda polifolia var. glaucophylla*

14 Leaves green or brown beneath, glabrous, glabrescent, or lepidote with scales.

15 Leaves densely lepidote on the under surface with brown scales.

16 Leaves planar, not revolute; petioles 7-20 mm long; twigs more-or-less terete in cross-section; [of the Mountains, Piedmont, and upper Coastal Plain].

17 [Corolla mostly 1.5-2 cm long, the corolla tube (0.9–1.3 cm long) shorter than to as long as the corolla lobes (1.2-1.8 cm long)]; [plant flowering early relative to *Rh. minus*, despite occurring at higher elevations and more northern latitudes]; [calyx lobes deltoid]; [of mountain ridges, heath balds, and rocky summits, mostly either away from the Blue Ridge Escarpment or north of the Asheville Basin] ......................................................... *Rhododendron carolinianum*

17 [Corolla mostly 2.5-3 cm long, the corolla tube (1.6-2.2 cm long) longer than the corolla lobes (0.8-1.2 cm long)]; [plant flowering late relative to *Rh. carolinianum*]; [calyx lobes ovate]; [of the Coastal Plain, Piedmont, and Mountains, in the Mountains mostly of the Blue Ridge Escarpment of sw. NC and nw. SC, ranging in elevation up to the higher granitic domes in Macon and Jackson counties, NC] ......................................................... *Rhododendron minus*

16 Leaves slightly to strongly revolute (or nearly planar in *Lyonia fruticosa*); petioles 1-7 mm long; twigs angled in cross-section; [of the lower Coastal Plain, from se. SC southward].

18 Ultimate branches not rigidly ascending, flowers nearly always restricted to branches of the previous year, the leaves not conspicuously reduced toward the branch tips; leaves with distal margin usually revolute, sometimes strongly so; major veins usually depressed; lower leaf surface with some scales often large and with irregular margins, others smaller and more nearly entire, at least the smaller scales more-or-less persistent; [shrub or small tree to 6 (-10) m tall] .................................................................. *Lyonia ferruginea*

18 Ultimate branches rigidly ascending, flowers frequent on branches of the current year (though also on older growth), the leaves conspicuously reduced toward the branch tips; leaves with
distal margin at most slightly revolute; major veins not depressed; lower leaf surface with scales usually all large and with irregular margins, the scales often deciduous; [shrub to 1.5 (-3) m tall]........................................................................................................... Lyonia fruticosa

Lyonia fruticosa

Leaves not lepidote beneath (Lyonia lucida with scattered minute scales on young leaves).

Leaves alternate.

19 Leaves alternate.

20 Calyx lobes glandular-canescence and with marginal stipitate glands; leaves glabrous beneath; bracts and bracteoles densely glandular; stamens 18 μ long and 9 μ wide, 35-51 per 0.2 square millimeter; shrub to 2 m tall (though often much shorter); [of se. and sw. VA southward]............................... Kalmia angustifolia

20 Calyx lobes canescent but lacking glands; leaves short puberulent beneath; bracts and bracteoles nearly glandless; stamens 13 μ long and 9 μ wide, 35-51 per 0.2 square millimeter; shrub to 2 m tall (though often much shorter); [of ne. NC northward].............. Kalmia carolina

Agarista D. Don ex G. Don 1834 (Agarista)


Agarista populifolia (Lamarck) Judd, Agarista, Pipe-plant. Cp (GA, NC?, SC): blackwater swamps, hydric hammocks, marly spring runs; rare (GA Special Concern, NC Watch List, SC Rare). April-May; September-October. E. SC (or se. NC?) south to n. peninsular FL. A specimen at the University of North Carolina at Chapel Hill is labeled as coming from a nursery, originally taken from plants in a swamp in Columbus County, NC. The record is plausible and would add the species to the state's flora. [= K, L, Z; = Leucothoe populifolia (Lamarck) Dippel – RAB, GW; = Leucothoe acuminata (Aiton) G. Don – S; = Andromeda populifolia Lamarck]

Andromeda Linnaeus 1753 (Bog-rosemary, Andromeda)


Andromeda polifolia Linnaeus var. glaucophylla (Link) Augustin de Candolle, Bog-rosemary, occurs south to ne. PA (Rhoads & Klein 1993) and e. WV (at Cranberry Glades, Pocahontas County), and NJ. [= K; = A. glaucophylla Link – C, F, G, L]

Arctostaphylos Adanson 1760 (Bearberry)


Arctostaphylos uva-ursi (Linnaeus) Sprengel, Bearberry, Kinnikinick. Mt (VA): high elevation granitic outcrop; rare (VA Rare). May-June. Following Rosatti (1987), A. uva-ursi is here treated inclusively, as a complex species not readily divisible into infraspecific taxa. A. uva-ursi is circumboreal, ranging in North America from Labrador west to AK, south to n. VA, n. IN, NM, and CA. [= C, K, L, W, Z; > A. uva-ursi var. coactilis Fernald & J.F. Macbride – F, G; > A. uva-ursi ssp. coactilis (Fernald & J.F. Macbride) A. & D. Löve & Kapoor]

Bejaria Mutis in Linnaeus 1771 (Tarflower)
A genus of 15 species, ranging from southeastern United States to Cuba, and from Mexico south into Bolivia. The spelling of the generic name has been controversial; it was originally published as 'Befaria,' because of Linnaeus's misreading of Mutis's handwriting, but was intended to commemorate Don Bejari. The spelling has now been conserved as 'Bejaria' (Greuter et al. 2000). References: Stevens et al. in Kubitzki (2004).

**Bejaria racemosa** Ventenat, Tarflower, Flycatcher. Cp (GA): pine flatwoods; common. E. GA (adjacent to se. SC) south to s. peninsular FL. [= L; = Befaria racemosa – GW, K, S, orthographic variant]

**Calluna** R.A. Salisbury 1802 (Heather)

A monotypic genus, a shrub, of Europe. References: Stevens et al. in Kubitzki (2004).


**Ceratiola** Michaux 1803 (Florida Rosemary)

A monotypic genus, a shrub, of se. North America. *Ceratiola* has been traditionally placed in the Empetraceae. Many workers have expressed doubt about the naturalness of the Empetraceae and its distinction from the Ericaceae. Molecular data have corroborated that concern, and shown *Ceratiola* and the rest of the Empetraceae to be better included in a broader Ericaceae (Kron & Chase 1993); the affinities of *Ceratiola* may actually be with other southeastern United States genera, *Kalmia*, *Elliottia*, and *Bejaria* (Kron & Chase 1993). References: Kron & Chase (1993); Judd & Kron (1993); Johnson (1982); Stevens et al. in Kubitzki (2004).

**Ceratiola ericoides** Michaux, Rosemary, Florida Rosemary, Sandhill Rosemary, Sand Heath. Cp (GA, SC): xeric sandhills, usually in white "sugar sand"; uncommon (GA Threatened). October-November. Ne. SC south to FL and west to s. MS. Its content of aromatic compounds makes it very flammable. [= RAB, K, L, S]

**Chamaedaphne** Moench 1794 (Leatherleaf, Cassandra)


**Chamaedaphne calyculata** (Linnaeus) Moench, Leatherleaf, Cassandra. Cp (NC, SC), Mt (NC): pocosins in the Coastal Plain, bogs in the Mountains; uncommon (nearly extirpated in the Mountains). March-April; June-October. Circumboreal; in North America from Newfoundland to Alberta to Newfoundland, south to MD, OH, n. IL, WI, n. IA, Alberta, and British Columbia; disjunct to the mountains of NC and ne. SC. The Coastal Plain occurrences in our area are mainly in the centers of large peat dome or Carolina Bay pocosins, the insufficiently famous southern blanket bogs or "southern muskeg." In these areas, *Chamaedaphne* is sometimes dominant (or codominant with *Zenobia pulverulenta* or *Sarracenia flava*) over expanses of 25 square kilometers. The southern occurrences of *Chamaedaphne* are certainly the result of Pleistocene distributions. A number of varieties have been named (the Eurasian var. *calyculata*, var. *latifolia* in Maritime Canada, south to n. New England, and var. *angustifolia*, to which our material would presumably be referred). The validity of the varieties is doubtful. [= C, G, K, L, S, W; = Cassandra *calyculata* (Linnaeus) D. Don – RAB, GW; > Chamaedaphne *calyculata* var. *angustifolia* (Aiton) Rehder – F]

**Chimaphila** Pursh 1814 (Pipsissewa)

A genus of 4-5 species, subshrubs, of temperate and tropical America, and Eurasia. References: Stevens et al. in Kubitzki (2004).

1 Leaves lanceolate (broadest below the middle), base rounded, striped with white or paler green along the major veins .........
   ........................................................................................................................................................................C. maculata

1 Leaves oblanceolate (broadest above the middle), base cuneate, solid dark green throughout ........................................
   ........................................................................................................................................................................C. umbellata ssp. cisatlantica

**Chimaphila maculata** (Linnaeus) Pursh, Pipsissewa, Striped Wintergreen. Mt, Pd, Cp (GA, NC, SC, VA): forests and woodlands, mostly rather xeric and acid; common. May-June; July-October. ME west to MI, south to GA and AL. [= RAB, C, F, G, K, L, S, W]  

**Chimaphila umbellata** (Linnaeus) W. Barton var. *cisatlantica* Blake, Prince's-pine. Pd, Cp (NC, VA), Mt (VA): forests and woodlands, mostly rather xeric and acid; uncommon. May-June; July-October. Circumboreal, extending (in the interpretation of some) south into Central America. Var. *cisatlantica* is widespread in ne. North America, from Nova Scotia and
Québec west to MN, south to NC and IN. [= C, F, G, L; < Ch. umbellata – RAB, W; = Ch. umbellata ssp. cisatlantica (Blake) Hultén – K; ? Ch. corymbosa Pursh – S]

**Elliottia** Muhlenberg ex Elliott 1817 (Elliottia, Southern-plume)

A genus of 4 species (as here circumscribed), shrubs to small trees, of se. North America, nw. North America, and Japan. As discussed by Wood (1961), the generic limits of *Elliottia* have been controversial. The closest relatives of *E. racemosa*, whether or not considered congeneric (here considered congeneric), are *E. paniculata* (Siebold & Zuccarini) Bentham & Hooker and *E. bracteata* (Maximowicz) Bentham & Hooker, both of Japan, and *E. pyroliflorus* (Bong.) S.W. Brim & P.F. Stevens [Cladothamnus pyroliflorus (Bong.)], of AK, British Colombia, WA, and OR. References: Stevens et al. in Kubitzki (2004).

**Elliottia racemosa** Muhlenberg ex Elliott, Elliottia, Southern-plume, Georgia-plume. Cp (GA, SC), Pd (GA): xeric sandy ridges, sandhills, river bluffs; serpentine woodlands; rare (GA Threatened, SC Rare). June-August. Endemic to e. GA and s. SC (Aiken County, where considered to have been extirpated). *Elliottia* extends barely into the Piedmont in Georgia, occurring on Burks Mountain on serpentine in a *Pinus palustris* woodland. [= K, L, S]

**Epigaea** Linnaeus 1753 (Trailing Arbutus)

A genus of 3 species, subshrubs, in e. North America and Eurasia; the other 2 species of the genus occur in the Caucasus and Asia Minor, and in Japan. References: Stevens et al. in Kubitzki (2004).

**Epigaea repens** Linnaeus, Trailing Arbutus. Mt, Pd (GA, NC, SC, VA), Cp (NC, SC, VA): a wide variety of acidic forests, xeric to mesic, sandy, rocky, and loamy; common. Late February-early May; April-June. Newfoundland and Québec west to Saskatchewan, south to FL, MS, and IA. At maturity, the fruits split along the sutures, exposing tiny brown seeds embedded in "sticky, white, placental tissue" which is "distinctly sweet to the taste" (Clay 1983). Ants are strongly attracted to the placental tissue, and in carrying it away disperse the seeds (Clay 1983). [= RAB, C, G, K, L, S; > E. repens var. glabrifolia Fernald – F; > E. repens var. repens – F]

**Erica** Linnaeus 1753 (Heath)


**Eubotrys** Nuttall 1842 (Deciduous Fetterbush)

A genus of 2 species, shrubs to small trees, of e. North America. Recent molecular evidence supports the recognition of *Eubotrys* as a genus separate from *Leucothoe*, supporting the views, based on morphological grounds, of many earlier authors (Kron et al. 2002). References: Kron et al. (2002); Stevens et al. in Kubitzki (2004).

1 Anthers with 4 awns; capsule rounded on the sutures; sepals broadly lanceolate; seeds not winged, shaped like a section of an orange.......................... *E. racemosa*
1 Anthers with 2 awns; capsule angled on the sutures; sepals ovate; seeds winged, oblanceolate, flat .......................... *E. recurva*

**Eubotrys racemosa** (Linnaeus) Nuttall, Coastal Fetterbush. Cp, Pd, Mt (GA, NC, SC, VA): swamps, pocosins, streambanks, and other wet places; common (uncommon in Piedmont, rare in Mountains). Late March-early June; September-October. E. MA south to FL and west to LA, primarily on the Coastal Plain; disjunct inland, as in c. TN (Chester, Wofford, & Kral 1997). [= C, G; = Leucothoe racemosa (Linnaeus) A. Gray – RAB, GW, K, L, W; > L. racemosa var. projecta Fernald – F; > L. racemosa var. racemosa – S; > Eubotrys elongata Small – S]

**Eubotrys recurva** (Buckley) Britton, Mountain Fetterbush. Mt (GA, NC, SC, VA), Pd (NC, SC, VA): heath balds, high elevation ridges and granitic domes, bogs; common (rare in Piedmont) (GA Special Concern). April-early June (rarely sporadically in the fall); August-October. A Southern Appalachian endemic: sw. VA, s. WV, and se. KY south through w. NC and ne. TN to ne. GA (Rabun County) and nw. SC. [= C, G, S; = Leucothoe recurva (Buckley) A. Gray – RAB, F, K, L, W]

**Gaultheria** Kalm ex Linnaeus 1754 (Wintergreen, Teaberry)
A genus of 130-135 species, shrubs and subshrubs, of Asia, Australia and New Zealand, South America, Central America, and North America (primarily Asian). References: Stevens et al. in Kubitzki (2004).

1 Stems creeping, the leaves 5-10 mm long, well-distributed along the stem; berries white; flowers 4-merous .\[G. hispidula] 1
2 Stems erect, the leaves 15-50 mm long, clustered at the tip of the stem; berries red; flowers 5-merous .\[G. procumbens]


_Gaultheria hispidula_ (Linnaeus) Muhlenberg ex Bigelow, Creeping Snowberry, Moxie, has been attributed to NC by C, F, G, S, the documentation is unknown. It is known from as far south as e. WV and MD and its occurrence in our area is plausible. [= C, F, G, K, = _Chiogenes hispidula_ (Linnaeus) Torrey & A. Gray – S]

_Gaylussacia_ Kunth 1819 (Huckleberry)


1 Leaves 0.7-2.2 cm long, serrulate, leathery, evergreen, lacking punctate glands; [section _Vitis-idea_] .\[G. brachycera] 1
2 Leaves membranaceous to subcoriaceous, deciduous, with punctate glands.

3 Young twigs, raceme axes, flower stalks, and floral tubes with long, spreading, silvery-silky hairs, minutely glandular at their tips; shrub to 1.5 m (or more) tall; [collectively widespread in our area].

4 Leaf margins entire, ciliate with abundant whitish hairs as well as red-tipped stipitate glands; shrub commonly 5-10 dm tall, well-branched; bracts of the inflorescence slightly to densely stipitate-glandular above as well as below; [of mountain bogs, high elevation peaks, low pocosins, and seepage bogs, in very wet, boggy sites] .\[G. mosieri] 4

5 Leaves glandular on both surfaces; racemes 0.5-1.5 cm long; [section _Decamerium, subsection Baccatae_] .\[G. baccata] 5
6 Leaves glandular on the lower surface only; racemes 1-5 cm long.

7 Young twigs glabrous; leaves glabrous or pubescent beneath, often glaucous; shrub to 20 dm tall; [collectively widespread in our area].

8 Larger leaves mostly 2-4 cm long and 1-2 cm wide, the lower surface sparsely short-pubescent with the longer hairs ca. 0.13 mm long, usually strongly glaucous; floral tube and calyx glaucous; shrub 2-6 (-10) dm tall .\[G. frondosa] 8

9 Larger leaves mostly 3-6 cm long and 2-3.5 cm wide, the lower surface sparsely to densely short-pubescent with the longer hairs ca. 0.25 mm long, not glaucous; floral tube and calyx not glaucous; shrub to 10 dm tall .\[G. tomentosa]
Gaylussacia baccata (Wangenheim) K. Koch, Black Huckleberry, Crackleberry. Mt (GA, NC, SC, VA), Pd (NC, SC, VA), Cp (NC, VA): xeric, acidic forests and woodlands, rock outcrops, to 1600m elevation; common (uncommon in Piedmont and Coastal Plain of NC and SC) (SC Rare). April-June; July-August. Newfoundland and Quebec west to Ontario and Manitoba, south to ne. NC, nw. SC, n. GA, AL, and MO; in GA, NC, and SC it is primarily montane in distribution, but in VA it occurs throughout the state. [= RAB, C, F, G, K, L, V, W, Y, Z; = Decachaena baccata (Wangenheim) Small – S]

Gaylussacia brachycera (Michaux) A. Gray, Box Huckleberry. Mt (VA), Pd (NC): dry, acidic ridgetops and upper slopes; uncommon (but locally forming large clumps) (VA Rare). May-June. Sc. PA and DE south to e. KY and ec. TN, primarily on the Cumberland and Alleghany Plateaus; also disjunct on a steep, xeric, west-facing bluff in Durham Co. NC, where evidently native. Treatment of this species in a monotypic genus may be warranted, but the genus name Buxella (as used by Small) is unavailable, as it had already been used prior to Small in a different application (Wilbur & Bloodworth 2004). [= C, F, G, K, L, W, Y, Z; = Buxella brachycera (Michaux) Small – S (but Buxella is preoccupied); = Vaccinium brachycerum Michaux; note that the report in RAB is based on a misidentification]

Gaylussacia dumosa (Andrews) Torrey & A. Gray var. bigeloviana Fernald, Northern Dwarf Huckleberry. Mt (GA, NC), Cp (NC, SC, VA): mountain bogs, high elevation peaks, peat dome pocosins (in NC and VA), sandhill seepage bogs (SC), generally growing in peat, forms transitional to var. dumosa in wet pinelands and disturbed pocosins; rare (NC Watch List). April-June; June-October. Var. bigeloviana ranges from Newfoundland south to NJ, with forms transitional to var. dumosa as far south as se. VA, and disjunct in Carteret, Dare, and Pender counties, NC (in low pocosins of large peat domes with Chamaedaphne and Zenobia), in a Sandhill seepage bog in Lexington County, SC, and in the sw. mountains of NC (Henderson, Transylvania, Macon, and Jackson counties), where found in bogs and wet, high elevation peaks. The montane plants named Lasiococcus ocoreola by Small are closely allied to northern G. dumosa var. bigeloviana, and occur with other notable northern disjuncts, such as Myrica gale and Chamaedaphne calyculata (often associated with var. bigeloviana in northern peat bogs). They are tentatively assigned here to var. bigeloviana, though further study may indicate that they deserve recognition as a third variety. [= C, F, G, Y; < G. dumosa – RAB, GW, K, L, W, X, Z; > Lasiococcus ocoreola (Small) Small – S; > G. ocoreola (Small) Camp – Y, Z]

Gaylussacia dumosa (Andrews) Torrey & A. Gray var. dumosa, Southern Dwarf Huckleberry. Cp, Pd, Mt (GA, NC, SC, VA): xeric to mesic, acidic forests and woodlands; common (uncommon in Piedmont and Mountains of NC and SC, rare in Piedmont and Mountains of VA). March-June; June-October. This variety is one of the most common shrubs of the Southeastern Coastal Plain, with an overall range from NJ south to FL and west to e. LA, primarily in the Coastal Plain, less commonly inland (as in sc. TN and se. WV). [= C, F, G, Y; < G. dumosa – RAB, GW, K, L, W, V, X, Z, = Lasiococcus dumosus (Andrews) Small – S]

Gaylussacia frondosa (Linnaeus) Torrey & A. Gray ex Torrey, Dangleberry. Cp, Mt, Pd (NC, SC, VA): mesic, acidic woodlands, especially in sandhill-pocosin and savanna-pocosin ecotones, also in xeric chestnut oak forests in the lower Piedmont; common (uncommon in Piedmont and Mountains of VA). Late March-May; June-August. Primarily a Southeastern Coastal Plain species: s. NH south to s. SC, less commonly inland to w. NY, c. and w. PA, w. VA, and w. SC. [= C, F, G, K, L, W, V; = G. frondosa var. frondosa – RAB, GW, X, Y, Z, = Decachaena frondosa (Linnaeus) Torrey & Gray – S]

Gaylussacia mosieri Small, Mosier’s Huckleberry, Hirsute Huckleberry. Cp (GA), Panhandle FL and west to e. LA. Material from Lexington County, SC originally identified as this taxon has been reassigned to G. dumosa var. bigeloviana. [= GW, K, L, V, X, Y, Z; = Lasiococcus mosieri (Small) Small – S]

Gaylussacia nana (A. Gray) Small, Dwarf Dangleberry. Cp (GA, NC, SC): xeric sandhills; rare (NC Rare). This species is disjunct at several sites in xeric sandhills of se. NC (on the Carolina Beach peninsula and the 421 Sandhills nw. of Wilmington), and otherwise is known to range from se. NC (Beaufort Co.) south west to n. and c. peninsular FL, panhandle FL, and sw. AL. It is common in e. GA (such as Glascock and Bryan counties), and may also be found in se. SC. G. nana has a diploid chromosome complement (n=12), compared to tetraploid for G. tomentosa (n=24). [Luteyn et al. 1996]. [= K, L, V, W, Y; = G. frondosa (Linnaeus) Torrey & A. Gray ex Torrey var. tomentosa A. Gray – RAB, GW, X, W, Y; = Decachaena tomentosa (Pursh ex Small) Small – S]

Gaylussacia ursina (M.A. Curtis) Torrey & A. Gray ex A. Gray, Bear Huckleberry, Mountain Huckleberry. Mt (GA, NC, SC): mesic to xeric forests, frequently dominant, but limited to areas southwest of the Asheville Basin; common. May-June; July-September. A narrow Southern Appalachian endemic: sw. NC, nw. SC, ne. GA, and se. TN. On mountain slopes and summits in that area it is often the dominant shrub, forming large clonal patches. [= RAB, K, L, V, W, Y, Z; = Decachaena ursina (M.A. Curtis) Small – S]

Hypopitys Crantz 1766 (Pinesap)

A genus of 1-several species, herbs, of circumboreal distribution. Recent molecular evidence supports its separation as a genus distinct from Monotropa (as has often been done in the past) (Neyland & hennigan 2004). References: Stevens et al. in Kubitzki (2004).
**ERICACEAE**


**Kalmia** Linnaeus 1753 (Wicky, Sheepkill, Mountain Laurel, Ivy, Sand-myrtle)

A genus of 9-11 species, shrubs, of North America and Cuba, except the circumboreal *K. procumbens* (formerly Loiseleuria). *Leiophyllum*, traditionally treated as a monotypic or small genus of se. United States, is better treated as a part of *Kalmia* along with the northern *Loiseleuria*, based on molecular and morphological studies (Kron & King 1996, Kron et al. 2002). While this idea may initially seem outlandish (particularly to those whose concept of *Kalmia* is based only on *Kalmia latifolia*), the morphological and habitat similarities of *Leiophyllum* to *Kalmia* are striking. The foliage and wood of all species (and the smoke from burning them) are poisonous. References: Southall & Hardin (1974)=Z; Ebinger (1974)=Y; Strand & Wyatt (1991)=Q; Wilbur & Racine (1971)=R; Camp (1938)=P; Kron & King (1996); Kron et al. (2002)=V; Stevens et al. in Kubitzki (2004).

1 Petals separate; fruit 2-3 (-7)-locular ................................................................. *K. buxifolia*

1 Petals fused; fruit 5-locular.

2 Leaves whorled (rarely opposite); inflorescence an axillary raceme.

3 Calyx lobes glandular-canescens and with marginal stipitate glands; leaves glabrous beneath; bracts and bracteoles densely glandular; stamens 18 μ long and 13 μ wide, 15-24 per 0.2 square millimeter; shrub to 1 (-1.2) m tall; [of ne. NC northward] ................................................................. *K. angustifolia*

3 Calyx lobes canescent but lacking glands; leaves short puberulent beneath; bracts and bracteoles nearly glabrous; stamens 13 μ long and 9 μ wide, 35-51 per 0.2 square millimeter; shrub to 2 m tall (though often much shorter); [of se. and sw. VA southward] ......................................................... *K. carolina*

2 Leaves alternate; inflorescence a terminal fascicle or a terminal panicle.

4 Leaves 0.5-1.5 cm long, 2-8 mm wide; twigs densely persistently hispid; [of s. SC southward] ............... *K. hirsuta*

4 Leaves 2.5-12 cm long, 7-50 mm wide; twigs glabrous or puberulent (glabrescent in age); [collectively widespread in our area].

5 Leaves deciduous, dull, and subcoriaceous, 1.5-3 cm wide; inflorescence a fascicle of 1-3 flowers, auxiliary to leaf scars near the tips of the previous year’s growth; petiole 1-4 mm long; [of the Coastal Plain of NC and SC] ………………………………………………………………………………… *K. cuneata*

5 Leaves evergreen, glossy, and coriaceous, (1) 3-5 cm wide; inflorescence a terminal panicle; petiole 7-45 mm long; [widespread]……………………………………………………………………………………………… *K. latifolia*

**Kalmia angustifolia** Linnaeus, Northern Sheepkill. Cp (NC, VA): sandy, xeric to mesic hillsides and moist areas; rare (VA Rare). April-May; September-October. Labrador west to MN, south to se. VA and extreme ne. NC, s. Ontario, and MI, reaching its southern limit in the Coastal Plain of extreme ne. NC and the n. Mountains of VA. See *Kalmia carolina* for discussion of the taxonomy of these two taxa. [= K, S, Z; = K. angustifolia var. angustifolia – C, F, G, L, Y]

**Kalmia buxifolia** (P.J. Bergius) Giff, Kron, & Stevens, Sand-myrtle. Mt (GA, NC, SC), Cp (NC, SC), Pd (NC): locally abundant but very restricted in wet (spodosol) pinelandls of the outer Coastal Plain (in Brunswick and Carteret counties, NC), locally common in relatively dry sandhills in a few locations in the Sandhills, disjunct in the Piedmont on a few quartzite monadnocks, fairly common in the mountains on rock outcrops at high to moderate elevations (on a wide variety of rock types); uncommon (GA Special Concern). Late March-June (sporadically to October); September-October. This species, a close relative of the more widespread and northern *K. angustifolia*, occurs in two disjunct areas: the Coastal Plain, from se. VA south through NC to w. GA (Taylor County), and the Southern Appalachians from sw. VA south through w. NC and ne. TN to ne. GA. Southall & Hardin (1974) favored species status for *K. carolina* because of its essentially allopatric distribution relative to *K. angustifolia* (the 2 meet in Southampton County, VA), the near
absence of intermediates or hybrids in nature, and because "significant morphological and anatomical differences have developed and remain constant between these two species when grown together." [= GW, K, S, W, Z; = K. angustifolia Linnaeus var. caroliniana (Small) Fernald – RAB (an orthographic error); = K. angustifolia var. carolina (Small) Fernald – C, F, G, L, Y]

Kalma cuneata Michaux, White Wicky. Cp (NC, SC): pocosins and pocosin-savanna or pocosin-sandhill ecotones; rare (US Species of Concern, NC Endangered/Proposed Candidate, SC Rare). Late May-June; September-October. This species is a narrow endemic of the Coastal Plain of se. NC and e. SC. It is not closely related to other species in the genus. It is most easily distinguished from other pocosin shrubs by the combination of the following characters: leaves deciduous, alternate, oblanceolate (cuneate-attenuate at base, obtuse at apex), revolute, dark green above, paler and prominently stipitate-glandular beneath, woody capsule rounded, stipitate-glandular, persistent through the winter, borne on delicate, recurved pedicels usually 2-3 cm long. [= RAB, GW, K, L, S, Y, Z]


Kalma latifolia Linnaeus, Mountain Laurel, Ivy, Calico-bush. Mt, Pd, Cp (GA, NC, SC, VA): acidic forests, bluffs, bogs, along sandhill streams, and in a wide range of other habitats, nearly ubiquitous in the mountains, up to at least 1600m, more restricted in habitat in the lower Piedmont and Coastal Plain; common. April-June; September-October. ME and OH south to FL and extreme e. LA. Unlike our other species, which are strictly shrubs, K. latifolia reaches the stature and diameter of a small tree. [= RAB, C, K, L, S, W, Y, Z; > K. latifolia var. laeipes Fernald – F, G; > K. latifolia var. latifolia – F, G]

Leiophyllum (see Kalmia)

Leucothoe D. Don 1834 (Fetterbush, Leucothoe)
(also see Agarista and Eubotrys)

Leucothoe axillaris (Lamarck) D. Don, Coastal Doghobble. Cp (GA, NC, SC, VA), Pd (GA, NC, SC): pocosins, blackwater swamp forests, and moist and acid slopes; common (rare in Piedmont, uncommon in VA). Late March-May; September-October. A Southeastern Coastal Plain endemic: se. VA south to FL and west to extreme e. LA. [= C, G, GW, K, L, S; = L. axillaris var. axillaris – RAB; > L. axillaris var. axillaris – F; > L. axillaris var. ambigens Fernald – F]


Lyonia Nuttall 1818 (Staggerbush, Maleberry, Fetebush)

Lyonia ferruginea 1 Ultimate branches not rigidly ascending, flowers nearly always restricted to branches of the previous year, the leaves not conspicuously reduced toward the branch tips; leaves with distal margin usually revolute, sometimes strongly so; major veins usually depressed; lower leaf surface with some scales often large and with irregular margins, others smaller and more nearly entire, at least the smaller scales more-or-less persistent; [shrub or small tree to 6 (-10) m tall]. ..............................................................L. ferruginea

Lyonia fruticosa 1 Ultimate branches rigidly ascending, flowers frequent on branches of the current year (though also on older growth), the leaves conspicuously reduced toward the branch tips; leaves with distal margin at most slightly revolute; major veins not depressed; lower leaf surface with scales usually all large and with irregular margins, the scales often deciduous; [shrub to 1.5 (-3) m tall].................................L. fruticosa
Lyonia ferruginea (Walter) Nuttall, Crookedwood, Dragonwood, Staggerbush. Cp (GA, SC): pocosins; common (rare but locally common in spodosolic flatwoods of Jasper and Beaufort counties, SC) (SC Rare). April-May; September-October. Se. SC south to sc. peninsular FL, west to panhandle FL. See discussion under L. fruticosa. [= GW, K, L, Z; < Lyonia ferruginea – RAB (also see L. fruticosa); = Xolisma ferruginea (Walter) Heller – S]

Lyonia fruticosa (Michaux) G.S. Torrey, Staggerbush, Poor-grub. Cp (GA, SC): pocosins; common (rare in SC). Se. SC (at least formerly) south to s. peninsular FL, west to panhandle FL. Though not included in RAB for our area, Judd (1981) cites several old specimens from SC. The species is definitely known from immediately adjacent GA, and there seems no reason to doubt its (at least historical) occurrence in SC. This species is difficult to distinguish from L. ferruginea, with which it often co-occurs. [= GW, K, L, Z; < L. ferruginea – RAB; = Xolisma fruticosa (Michaux) Nash – S]

Lyonia ligustrina (Linnaeus) Augustin de Candolle var. foliosiflora (Michaux) Fernald, Southern Maleberry, He-huckleberry. Cp (GA, NC, SC, VA), Pd (GA, NC, SC, VA): pocosins, seepage bogs, and other wet habitats; common (rare in the Piedmont) (VA Watch List). Late April-June; September-October. Se. VA south to c. FL, west to e. TX and e. OK, and (west of the mountains) north to TN and AR. Rather nondescript when sterile, the gray-green hue of the leaves is a useful character. Var. foliosiflora is the usual variety on the Coastal Plain (including the fall-line sandhills). [= GW, K, L, W, Z; < L. ligustrina – RAB, C, G; > L. ligustrina var. capreaefolia (Watson) Augustin de Candolle – F; > L. ligustrina var. foliosiflora – F; > L. ligustrina var. salicifolia (Watson) Augustin de Candolle – F; = Arsenococcus frondosus (Pursh) Small – S]

Lyonia ligustrina (Linnaeus) Augustin de Candolle var. ligustrina. Northern Maleberry, He-huckleberry. Mt (GA, NC, SC, VA), Pd (GA, NC, SC, VA): mountain bogs, shrub balds, bottomlands, other moist to wet habitats, "dry" ridges at high elevations; common. May-June; September-October. Se. VA south to s. FL and west to e. and c. LA; also in w. Cuba. Readily distinguished by the glossy, coriaceous leaves with a prominent vein running along the margins. When in flower in large numbers, the odor is cloyingly sweet. [= GW, K, L, W, Z; < L. ligustrina – RAB, C, G; = Arsenococcus ligustrinus (Linnaeus) Small – S]

Lyonia lucida (Lamarck) K. Koch, Shining Fetterbush. Cp (GA, NC, SC, VA), Pd (GA): pocosins, wet woodlands, blackwater swamp forests, other acidic wetlands, especially if peaty; common (uncommon in VA). April-early June; September-October. Se. VA south to s. FL and west to e. and c. LA; also in w. Cuba. Readily distinguished by the glossy, coriaceous leaves with a prominent vein running along the margins. When in flower in large numbers, the odor is cloyingly sweet. [= RAB, C, F, G, GW, K, L, Z; = Desmothamnus lucidus (Lamarck) Small – S; = Neopieris nitida (Bartram ex Marshall) Britton]

Lyonia mariana (Linnaeus) D. Don, Staggerbush. Cp (GA, NC, SC, VA): pine flatwoods, savannas, pocosin-sandhill ecotones, dry rocky woodlands in the lower Piedmont (especially with chestnut oak); common (uncommon in Piedmont). April-May; September-October. RI (formerly) and NY (Long Island) south to c. and w. FL; disjunct in se. MO, c. AR, nw. LA, se. OK, and e. TX. Readily distinguishable by the broadly elliptic leaves borne at an ascending 45 degree angle, with bright pink axillary buds. [= RAB, C, F, G, GW, K, L, Z; = Neopieris mariana (Linnaeus) Britton – S]

Menziesia J.E. Smith 1791 (Minniebush)

A genus of about 7-10 species, shrubs, of e. Asia (mostly), w. North America, and se. North America. Menziesia ferruginea J.E. Smith of N. America is closely related; the other species of the genus are e. Asian. Molecular evidence suggests that Menziesia should be included in Rhododendron, and is actually closely related within Rhododendron to R. vaseyi (Goetsch, Eckert, & Hall 2005; Kurashige et al. 2001). References: Stevens et al. in Kubitzki (2004).

Menziesia pilosa (Michaux ex Lamarck) Antoine Laurent de Jussieu ex Persoon, Minniebush. Mt (GA, NC, SC, VA), Pd (NC, SC, VA): heath balds, bogs, rocky summits, and rocky woodlands, mostly at high elevations; common (uncommon in NC Mountains, rare in GA Mountains, rare in SC and NC Piedmont) (GA Special Concern). May-July; August-October. A Southern and Central Appalachian endemic: sc. PA, sw. PA, e. WV, w. VA, e. TN, w. NC, and ne. GA. The very prominent mucro on the leaves and the series of fascicles of trichomes along the leaf midrib below readily distinguish the species in sterile condition from superficially somewhat similar Rhododendron and Vaccinium. [= RAB, C, F, G, K, L, S, W; = Rhododendron species I]
Monotropa Linnaeus 1753 (Indian Pipes, Pinesap)
(also see Hypopitys)

A monotypic genus, an herb, of North America, Central America, South America, and e. Asia. The segregation of Monotropa, Hypopitys, and Monotropsis into the Monotropaceae or their inclusion in the Ericaceae has been controversial. Recent studies suggest that their inclusion in the Ericaceae is warranted (Kron & Chase 1993, Judd & Kron 1993). References: Stevens et al. in Kubitzki (2004).

1 Flowers few to many, racemose; stem pubescent, at least in the inflorescence; plant yellow, orange, or red when fresh, aging or drying dark brown ................................................................. [Hypopitys monotropa]
1 Flower solitary; stem glabrous; plant white (rarely pink) when fresh, aging or drying black ................................. Monotropa uniflora

Monotropa uniflora Linnaeus, Indian Pipes. Mt, Pd, Cp (GA, NC, SC, VA): a wide variety of forests; common. June-October; August-November. Widespread in North America, and also in South America and e. Asia. A preliminary molecular study suggests that splitting of worldwide Monotropa uniflora into several geographic species or varieties may be warranted (Neyland & Hennigan 2004). [= RAB, C, F, G, K, L, W; > M. uniflora – S; > M. brittonii Small – S]

Monotropsis Schweinitz in Elliott 1817 (Sweet Pinesap)


Monotropsis odorata Schweinitz ex Elliott, Sweet Pinesap. Pd, Mt (GA, NC, SC, VA), Cp (VA): dry to mesic upland woods under oaks and/or pines (Pinus virginiana or P. echinata), especially slopes or bluffs with abundant heaths, often Rhododendron maximum; rare (GA Special Concern, NC Rare, SC Rare, VA Rare). September-November and February-April; October-November and May-June. Centered in the Appalachians: MD and WV south to GA and AL. The flowers are very fragrant, the odor variably described as similar to cloves, nutmeg, cinnamon, and violets. Since the diminutive plants (3-10 cm tall) are often covered by leaf litter, fragrance is often the key to finding this species. Monotropsis is mycotrophic, receiving its nutrition by association with a mycorrhizal fungus, the intertwined root mass and fungal mantle about 1-2 cm in diameter. [= C, F, G, K, L, W; > M. odorata var. lehmaniae (Burnham) Ahles – RAB; > M. odorata var. odorata – RAB; > M. lehmaniae Burnham – S; > M. odorata – S]

Orthilia Rafinesque 1840 (One-sided Shinleaf)

A monotypic genus, a subshrub, circumboreal in distribution. The recognition of Orthilia as separate from Pyrola is supported by molecular data (Freudenstein 1999a). References: Stevens et al. in Kubitzki (2004).

Orthilia secunda (Linnaeus) House, One-sided Shinleaf, One-sided Pyrola. Pd, Mt (GA, NC, SC, VA), Cp (VA): forests under Pinus virginiana, other forests?; rare (VA Rare). June-July; July-September. Circumboreal, in North America south to VA, IN, MN, and NM. [= K, L; = Pyrola secunda Linnaeus – C, G, W; > P. secunda var. secunda – F]

Oxydendrum Augustin de Candolle 1839 (Sourwood)

A monotypic genus, a tree, of se. North America. The genus Oxydendrum is "isolated ... among the Ericaceae, apparently with no close relatives" (Wood 1961): the only member of tribe Oxydendreae. References: Stevens et al. in Kubitzki (2004).

Oxydendrum arboreum (Linnaeus) Augustin de Candolle, Sourwood, Sorrel-tree. Mt, Pd, Cp (GA, NC, SC, VA): mesic to xeric deciduous forests, especially dry-mesic to xeric oak-hickory and oak-pine forests, also in the fall line sandhills in sandhill/pocosin ecotones; common (becoming uncommon to rare in n. VA). Se. and sw. PA west to IL, south to n. FL and se. and c. LA. It is an especially characteristic understory tree of upland forests of the Piedmont and lower Mountains. The bark is dark grayish-brown and fairly deeply furrowed; the tree nearly always has a characteristic lean (toward a former canopy light-gap). The finely serrate, elliptic leaves are distinctive, with the sour taste of garden sorrel (Rumex acetosa Linnaeus), sheep sorrel (Rumex acetosella), or wood sorrel (Oxalis). [= RAB, C, F, G, K, L, S, W]

Pieris D. Don 1834 (Evergreen Fetterbush)

**ERICACEAE**

1  Inflorescence a many-flowered panicle of racemes, borne terminally; seeds 2.5-3 mm long; [of slopes and ridges of the Mountains and upper Piedmont]; [subgenus *Pieris*, section *Pieris*]................................. *P. floribunda*

1  Inflorescence a 3-9 flowered raceme, borne in the axils of upper leaves; seeds ca. 1 mm long; [of wetlands of the Coastal Plain, often associated with *Taxodium ascendens*]; [subgenus *Pieris*, section *Phillyreoides*] ........................... *P. phillyreifolia*

**Pieris floribunda** (Pursh) Bentham & Hooker f., Mountain Andromeda, Evergreen Mountain Fetterbush. Mt (GA?, NC, VA), Pd (NC, VA): acid wooded slopes, heath balds at high elevations, summits of Piedmont monadnocks; common (uncommon and local in NC, rare in Piedmont). May-June; August-October. A Southern Appalachian endemic: e. WV, w. VA, w. NC, e. TN, and n. GA. The type locality is supposedly in n. GA. The range in NC is peculiar, the species occurring at high elevations southwest of Asheville, absent from apparently suitable habitats to the northeast (such as the Craggies, Blacks, Roan Mountain, and Grandfather Mountain), yet reappearing in a few disjunct populations at low elevations in the upper Piedmont. In w. VA (and adjacent e. WV), *P. floribunda* occurs on rather dry sandstone ridges and upper slopes, often under an oak canopy, especially in the front ranges of the Cumberland Mountains. *P. floribunda* is placed in subgenus *Pieris*, section *Pieris*, along with *P. japonica* (see below) and another Asian species.  [= RAB, C, F, G, K, L, S, W, Z; Goetsch, Eckert, & Hall (2005); Towe (2004); Kron & Creel (1999); Stevens et al. in Kubitzki (2004).]

**Pieris phillyreifolia** (Hooker) Augustin de Candolle, Vine-wicky, Climbing Fetterbush. Cp (GA, SC): swamp forests; rare (SC Rare). E. SC south to c. peninsular FL west to s. AL. This southeastern species has the remarkable habit of often growing as a creeping vine under the bark of *Taxodium ascendens*, the branches exserted through the cypress bark, sometimes ascending into the upper canopy with the main stem never visible except at the very base of the tree; it also sometimes grows as a low shrub. Godfrey (1969) documents the occurrence of this species in our area. See GW and Godfrey (1989) for excellent decriptions and illustrations of this curious "shrub-vine." It is apparently most closely related to the other two members of subgenus *Pieris*, section *Phillyreoides*, *P. cubensis* (Grisebach) Small, endemic to w. Cuba, and *P. swinhoei* Hemsley, of se. China, neither of which shares its unique habit.  [= GW, K, L, Z; = *Amelothamnus phillyreifolius* (Hooker) Small – S]

* Pieris japonica (Thunberg) D. Don ex G. Don, Japanese Andromeda or Lily-of-the-valley Bush, rather closely related to our *P. floribunda*, is frequently grown as an ornamental.  [= Z]  {not keyed}

**Pyrola** Linnaeus 1753 (Shinleaf, Pyrola)

A genus of 30-35 species, subshrubs, circumoreal and also in Sumatra and Guatemala. The inclusion of this group of species in the Ericaceae or its recognition as a separate family has been controversial. Recent studies (Judd & Kron 1993, Kron & Chase 1993) suggest that it is best resubmerged in the Ericaceae. References: Stevens et al. in Kubitzki (2004).

1  Calyx lobes distinctly longer than broad, 3-4 mm long; leaves coriaceous, more or less glossy .................. *P. americana*

1  Calyx lobes about as broad as long, 1.5-2 mm long; leaves not coriaceous, dull.

2  Leaves mostly 1-3 cm long, the blade < 2.5 cm wide; calyx lobes broadly ovate, the apex subacute to obtuse ............................ *P. chlorantha*

2  Leaves mostly 3-9 cm long, the blade > 2.5 cm wide; calyx lobes triangular, the apex acute to acuminate ...... *P. elliptica*


**Pyrola chlorantha** Swartz. Mt, Pd (VA): dry forests; rare (VA Rare). June-August; August-October. Circumboreal, in North America south to VA, WV, IN, and NE.  [= C, K, L, W; > *P. virens* var. *virens* – F, G; > *P. virens* var. *convoluta* (Bart.) Fernald – F, G]

**Pyrola elliptica** Nuttall, Elliptic Shinleaf. Mt (NC, VA): moist to dry forests, including rich northern hardwood forests; rare (NC Rare, VA Rare). June-August; July-October. Newfoundland and Quebec, west to British Columbia, south to WV, nw. NC, and IA. Known in NC only from Ashe County, in Long Hope Valley (McDowell 1984) and on Phoenix Mountain.  [= C, F, G, K, L, S, W]

**Rhododendron** Linnaeus 1753 (Rhododendron, Azalea)


1  Leaves evergreen, coriaceous, entire; stamens 10; [rhododendrons].

2  Lower surface of leaves not punctate with brown scales; larger leaves 10-30 cm long; [subgenus *Hymenanthes*, section *Ponticum*, subsection *Pontica*].

3  Leaves rounded at base (rarely broadly cuneate or slightly cordate), obtuse at apex; leaf generally 1.5-2.5× as long as wide; corolla usually deep pink to purple; sepals 0.5-1 mm long .......................................................... *Rh. catawbiense*

3  Leaves cuneate at base, acute at apex; leaf generally 3-5× as long as wide; corolla usually white to pale pink; sepals 4-6 mm long .......................................................... *Rh. maximum*
ERIACEAE

2 Lower surface of leaves punctate with brown scales; larger leaves 6-12 cm long; [subgenus Rhododendron, section Carolina].

4 Corolla mostly 15-20 mm long, the corolla tube (9-13 mm long) shorter than to as long as the corolla lobes (12-18 mm long); plant flowering early relative to Rh. minus, despite occurring at higher elevations and more northern latitudes; seeds ovoid, < 1.0 mm long, < 2.5x as long as wide (reminiscent of tiny watermelon seeds), coarsely textured, unornamented at the ends; calyx lobes deltoid; [of mountain ridges, heath balds, and rocky summits, mostly either away from the Blue Ridge Escarpment or north of the Asheville Basin] ......................... Rh. carolinianum

4 Corolla mostly 25-37 mm long, the corolla tube (13-22 mm long) longer than the corolla lobes (8-12 mm long); plant flowering late relative to Rh. carolinianum; seeds usually > 1.0 mm long, usually > 3x as long as wide, ornamented at one or both ends; calyx lobes ovate; [of the Coastal Plain, Piedmont, and Mountains, in the Mountains mostly of the Blue Ridge Escarpment of sw. NC and nw. SC, ranging in elevation up to the higher granitic domes in Macon and Jackson counties, NC].

5 Leaf apices mostly obtuse to rounded; petioles 2-6 (-7) mm long; branches erect and rigid; seeds moderately to elaborately ornamented with flared protrusions at both ends; [of n. FL].............................. [Rh. chapmani]

5 Leaf apices mostly acute to acuminate; petioles (5-) 6-20 mm long; branches spreading, not notably erect and rigid; seeds somewhat ornamented at one end; [of c. GA northward]................................. Rh. minus

1 Leaves deciduous, membranaceous, ciliate or serrulate; stamens 5-7; [azaleas emphasizing vegetative characters].

6 Corolla tube 2-5 mm long, much shorter than the corolla lobes; stamens (5-) 7; leaves elliptic, often broadly so (commonly 3-6 cm wide), acuminate; capsule ellipsoid-ovoid, 10-14 mm long; [subgenus Azaleastrum, section Sciadorhodion]................................................................. Rh. vaseyi

6 Corolla tube 13-25 mm long, equal to or longer than the corolla lobes; stamens 5; leaves generally oblanceolate to narrowly elliptic, generally < 3 cm wide, acute to obtuse, mucronate; capsule cylindroid-ellipsoid, 10-25 mm long; [subgenus Hymenathes, section Pentanthera].

7 Corolla yellow, orange, or red.

8 Flowers appearing after the leaves have expanded.

9 Twigs pubescent with multicellular hairs; [north of ec. AL and wc. GA] .................. Rh. cumberlandense

9 Twigs glabrous; [south of ec. AL and wc. GA] ........................................... Rh. prunifolium

8 Flowers appearing before or with the leaves.

10 Corolla limb shorter than the length of the corolla tube, the tube gradually expanding into the limb ........

10 Corolla limb nearly as broad as the tube is long, the tube abruptly expanding into the limb.

11 Floral bud-scales with glandular margins, the outer surface glabrous; corolla tube glandular-pubescent on its outer surface; sepals 2.0-3.0 mm long............................................................... Rh. calendulaceum

11 Floral bud-scales with ciliate margins, the outer surface glabrous to sparsely pubescent; corolla tube pubescent (not glandular or rarely very weakly so) on the outer surface; sepals 0.5-3.0 mm long..... ......................................................... Rh. flammeum

7 Corolla white or pink (white marked with yellow in Rh. eastmanii and Rh. alabamense).

12 Sepals 1.5-5 mm long.

13 Young stems densely pubescent, generally with a mixture of glandular and nonglandular hairs; clonal shrub, the upright stems up to 1.5 m tall................................................................. Rh. atlanticum

13 Young stems glabrous (rarely very sparsely pubescent); nonclonal shrub or small tree, to 7 m tall ........

12 Sepals 0.1-1 mm long.

14 Leaves glabrous beneath, except for strigose bristles along the midrib and major veins.

15 Pedicels densely stipitate-glandular; flowers appearing after the leaves ...................... Rh. viscosum

15 Pedicels strigose to puberulent, not stipitate-glandular; flowers appearing with or before the leaves.

14 Leaves densely and softly pubescent beneath.

16 Corolla lobes about as long as the corolla tube; capsule densely glandular-pubescent; [of northern distribution, of montane areas of w. NC, w. VA, and northward]. ......................................................... Rh. prinsophyllum

16 Corolla lobes much shorter than the corolla tube; capsule sparsely pubescent, the pubescence not glandular (or with some of the hairs glandular in Rh. eastmanii and Rh. alabamense); [of southern distribution, from c. SC and sc. TN southward].

17 Corolla pale to deep pink, without yellow markings; scales of the winter buds pubescent on the outer surface .............................................................................................................. Rh. canescens

17 Corolla white, with a blotch of yellow on the upper lobe; scales of the winter buds glabrous on the outer surface.

18 Flowers opening before the leaves have expanded; flower buds with non-glandular margins .............................................................. Rh. alabamense

18 Flowers opening after the leaves have expanded; flower buds with margins glandular along their lower 2/3s ................................................................. Rh. eastmanii
Alternate Key to Azaleas

This key makes as much use as possible of vegetative characters, geography, and capsule characters; capsules are generally available for longer during the year than flowers, and even when plants are in flower, last year's capsules can often be found.

1 Corolla tube 2-5 mm long, much shorter than the corolla lobes; stamens (5-) 7; leaves elliptic, often broadly so (commonly 3-6 cm wide), acuminate; capsule ellipsoid-ovoid, 10-14 mm long; [subgenus Pentanthera, section Rhodora] = Rh. vaseyi

1 Corolla tube 13-25 mm long, equal to or longer than the corolla lobes; stamens 5; leaves generally oblanceolate to narrowly elliptic, generally <3 cm wide, acute to obtuse and usually also noticeably mucronate; capsule cylindroid-ellipsoid or ovoid, 10-29 mm long; [subgenus Pentanthera, section Pentanthera].

2 Outer (abaxial) surface of the vegetative bud scales densely pubescent; flowers appearing before or with the leaves (at least some of the leaves still folded or the vegetative bud scales still present) (except Rh. viscosum).

3 Capsule ovoid, 2-3 (4-) x as long as broad (if capsules absent, try both leads).

4 Corolla yellow-orange to orange-red; upper corolla lobe with a contrasting blotch; hairs of the capsule not gland-tipped; [of the Piedmont and Coastal Plain of GA and w. SC] = Rh. flammeum

4 Corolla white to pink; upper corolla lobe uniform in color (lacking a contrasting blotch); hairs of the capsule gland-tipped (at least in part; nonglandular hairs also present); [collectively widespread in our area].

5 Flowers appearing after the leaves have expanded (essentially all of the leaves unfolded, and the vegetative bud scales absent), typically May (Coastal Plain, low elevation, or south) to August (mountains, high elevation, or north) = Rh. viscosum

5 Flowers appearing before or with the leaves (at least some of the leaves still folded or the vegetative bud scales still present), typically April-May (unless stimulated by fire or weather).

6 Leaf blade (3.2-) 3.4-4.7 (-5.2) cm long, (0.8-) 1.1-1.9 (-2.0) cm wide; plant typically strongly rhizomatous; [of the Coastal Plain from s. NJ south to sc. GA] = Rh. atlanticum

6 Leaf blade (3.9-) 5.0-7.3 (-8.7) cm long, (1.2-) 1.8-3.0 (-3.7) cm wide; plant typically nonrhizomatous; [of the Mountains and upper Piedmont] = Rh. prinophyllum

3 Capsule cylindroid, (3-) 4-5 x as long as broad.

7 Corolla yellow-orange to orange-red; upper corolla lobe with a contrasting blotch; [of s. GA west to se. MS].

7 Corolla white to pink; upper corolla lobe uniform in color (lacking a contrasting blotch); [collectively widespread in our area].

8 Corolla tube narrow and somewhat abruptly expanding into the lobes, the lobes distinctly shorter than the tube; pedicels usually eglandular (occasionally glandular), (4-) 5-10 (-13) mm long; leaves inconspicuously ciliate, the cilia appressed to the leaf margin; capsule densely covered with nonglandular hairs; flowering March-May; [widely distributed from s. NC and n. TN southward] = Rh. canescens

8 Corolla tube broader, gradually expanding into the lobes, the lobes about as long as or longer than the tube; pedicels usually glandular, (7-) 10-16 (-26) mm long; leaves conspicuously ciliate, the cilia diverging from the leaf margin; capsule glabrous or sparsely pubescent, the hairs at least partly gland-tipped; flowering May-June; [of the Mountains and upper Piedmont from n. NC (and rarely n. AL) northward] = Rh. prinophyllum

3 Capsule ovoid, 2-3.5 x as long as broad.

9 Capsule ovate, 2-3.5 x as long as broad; corolla white to pink; flowers appearing before or with the leaves (at least some of the leaves still folded or the vegetative bud scales still present).

10 Corolla deep pink (rarely white or nearly so), lacking a contracting blotch on the upper lobe; [widely distributed in our primary and secondary area] = Rh. alabamense

10 Corolla white, with a contrasting yellowish blotch on the upper lobe; [of se. TN and w. GA westward] = Rh. prinophyllum

11 Corolla white to pink; flowers appearing before or with the leaves. 

11 Corolla yellow, orange, or orange-red (except white or pink in Rh. arborescens and Rh. viscosum); flowers appearing before, with, or after the leaves.

11 Corolla yellow, orange, or orange-red...

Rhododendron alabamense (Rehder, Alabama Azalea. Cpo, Mt (GA): moist slopes, bluffs, streambanks; uncommon. March-April. W. GA and Panhandle FL west through AL to e. MS. Rh. alabamense is reported by RAB to occur Calhoun County, SC; this record actually represents Rh. eastmanii. [= K, L, Z; = Azalea alabamensis (Rehder) Small – S]

Rhododendron arborescens (Pursh) Torrey, Sweet Azalea, Smooth Azalea. Mt, Pd (GA, NC, SC, VA), Cp (GA, NC, SC): rocky riversides, wooded stream banks, swamps, high elevation forests, shrub balds; common (rare in VA) (VA Rare). Late May-July; July-October. Primarily Appalachian: ne. PA and se. KY south to sc. NC, w. SC, c. GA, and c. AL. [= RAB, C, F, G, K, L, W, Z; = Azalea arborescens Pursh – S]

Rhododendron atlanticum (Ashe) Rehder, Dwarf Azalea. Cp (GA, NC, SC, VA): pocosins, savannas, pine flatwoods, sandhill-pocosin ecotones; common. April-May (sporadically later, particularly in response to fire); August-October. An Atlantic Coastal Plain endemic: s. NJ and se. PA south to sc. GA. [= RAB, C, F, G, GW, K, L, Z; = Azalea atlantica Ashe – S]
**Rhododendron austrinum** (Small) Rehder. Cp (GA): {habitat}; rare. Sc. GA west to se. MS (Kron 1993), and reported for e. GA (Jones & Coile 1988). [= K, L, Z; = Azalea austrina Small – S]

**Rhododendron calendulaceum** (Michaux) Torrey, Flame Azalea. Mt (GA, NC, SC, VA), Pd (GA, NC, SC): deciduous forests, particularly on mountain slopes, grassy balds; common (rare in Piedmont, absent from n. VA). May-June; June-September. Largely Appalachian: s. PA and s. OH to e. GA and e. TN. This is the only species of azalea in our area with a tetraploid chromosome number; various theories have been advanced about the origin of this polyploid chromosome complement. Kron (1993) argues that the evidence best fits an allopolyploid derivation of *Rh. calendulaceum*, involving hybridization between ancestors of *Rh. cumberlandense* and *Rh. prinophyllum*. [= RAB, C, F, G, K, L, W, Z; = Azalea calendulacea Michaux – S]

**Rhododendron canescens** (Michaux) Sweet, Piedmont Azalea, Southern Pinxterbloom Azalea, Wild Azalea. Cp, Pd (GA, NC, SC): swamps, pocoxins, and savannas; uncommon. March-early May; September-October. Se. and sc. NC, n. TN, se. KY, s. IL, and e. OK, south to c. peninsular FL and se. TX. [= RAB, C, F, G, GW, L, W, Z; > Rh. canescens var. canescens – K; > Rh. canescens var. candidum (Small) Rehder – K; > Azalea canescens var. subglobum Rehder – K; = Azalea candida Small – S; = Azalea canescens Michaux – S]

**Rhododendron carolinianum** Rehder, Carolina Rhododendron, Punctatum. Mt (NC, SC): rocky summits, heath balds, high elevation forests, moist slopes; uncommon. Late April-May; September-October. A Southern Appalachian endemic: w. NC, e. TN, ne. GA, and nw. SC, from the Linville Gorge area south and west to the Great Smoky Mountains; its precise southern limit uncertain. *Rh. carolinianum* is phenologically separated from *Rh. minus*, flowering earlier than *Rh. minus*, despite its occurrence at higher elevations and with a more northerly distribution. Morphological distinctions between the two taxa are subtle and inconsistent, as discussed by Duncan & Pullen (1962). From a horticultural perspective, Davidian (1982) supports recognition of *Rh. carolinianum* and *Rh. minus* as distinct. Gensel (1988 and pers. comm.) did detailed studies of the complex and supported the recognition of 3 taxa (*Rh. carolinianum*, *Rh. minus*, and *Rh. chapmanii*). [= D, K, S; < Rh. minus – RAB, W; < Rh. minus var. minus – L, Q, V]

**Rhododendron catawbiense** Michaux, Pink Laurel, Catawba Rhododendron, Mountain Rosebay. Mt (GA, NC, SC, VA), Pd (NC, SC): rocky summits, shrub balds, acid ridges and slopes (mostly at high elevations), north-facing bluffs in the Piedmont; common (rare in Piedmont and Coastal plain) (SC Rare). April (in the Piedmont and Coastal Plain)-June; July-October. A Southern Appalachian endemic: VA and KY south to GA and AL, with scattered disjunct populations in the Piedmont and extreme upper Coastal Plain. The disjunct populations in central NC are discussed by Coker (1919), who named them forma insularis on the basis of “the larger and broader leaves and ... the longer flowers.” *Rh. catawbiense* is apparently most closely related to *Rh. macrophyllum* D. Don ex G. Don of nw. North America (Milne 2004). [= RAB, C, F, G, K, L, S, W, X]

**Rhododendron cumberlandense** E.L. Braun, Cumberland Azalea. Mt (GA, NC, VA), Pd (SC): balsams, exposed or moist slopes; rare (NC Rare, VA Rare). June-July; June-October. A Southern Appalachian endemic, primarily west of the Blue Ridge: e. KY and w. VA south to ec. TN, n. GA, and ne. AL; apparently disjunct in the Piedmont of SC (Kron 1993). [= F, G, K, L, W, Z; = Rh. bakeri (Lehmann & McKay) Hume – C, misapplied]

**Rhododendron eastmanii** Kron & Creel, May White Azalea, Eastman’s Azalea. Pd (SC): rich slopes, rare. Early-mid May. This species is known only from Calhoun, Laurens, Newberry, Orangeburg, Richland, Union counties, South Carolina (Kron & Creel 1999; C. Horn pers. comm. 2000). It is locally fairly common, in the Broad River drainage (C. Horn, pers. comm. 2000). It should be sought in NC and GA. The RAB reference to *Rh. alabamense* in SC is probably based on this species. [< Rhododendron alabamense Rehder – RAB, misapplied]

**Rhododendron flammecum** (Michaux) Sargent, Ocone Azalea, Catawba Azalea. Cp, Pd (GA, SC), Mt (GA): sandhills, upland forests on slopes, ridges, stream bluffs; rare (SC Rare). April. W. SC west to w. GA. [= K, L, Z; = Azalea speciosa Willdenow – S; = Rhododendron speciosum (Willdenow) Sweet – S]


**Rhododendron minus** Michaux, Gorge Rhododendron, Punctatum. Mt, Pd (GA, NC, SC): rocky slopes, escarpment gorges, rocky areas in the Piedmont, sandhill bluffs in the Coastal Plain; common (rare in Piedmont and Coastal Plain). Late April (in the Piedmont and Coastal Plain)-June (at the higher elevations along the Blue Ridge escarpment); September-October. GA and AL north to the Blue Ridge escarpment of n. GA, nw. SC, and sw. NC, and the Piedmont and inner Coastal Plain (fall-line sandhills) of sc. NC. This species ranges up to granite domes along the Blue Ridge Escarpment (such as Whiteside Mountain, Macon and Jackson counties, NC). [= D, K, S; < Rh. minus – RAB, W (also see *Rh. carolinianum*); < Rh. minus var. minus – L, Q, V]

**Rhododendron periclymenoides** (Michaux) Shimmers, Wild Azalea, Pinxterflower, Pinxterbloom Azalea, Election Pink. Mt, Pd, Cp (GA, NC, SC, VA): moist to dry slopes and streambanks; common. Late March-May; September-October. Fairly widespread in e. United States, ranging from MA, NY, and s. OH, south to GA and AL. See Shimmers (1962) for explanation of the change from the name *Rh. nudiflorum*. [= C, K, L, W, Z; = Rh. nudiflorum (Linnaeus) Torrey – RAB, F, G, GW; = Azalea nudiflora Linnaeus – S]

**Rhododendron prinophyllum** (Small) Millais, Election Pink, Early Azalea, Rosesholl Azalea. Mt (NC, VA), Pd (VA): upland forests (especially under *Quercus montana* and *Quercus rubra*), xeric pine and oak woodlands; common in VA, rare in NC, rare in VA Piedmont (NC Rare). May-June; August-October. NH, NY, and ne. OH, south to w. NC, ne. KY, and s. OH; disjunct in ne. AL and c. TN; also disjunct from s. IL and s. MO south to AR and e. OK. The only known location in VA is on
Rhododendron prunifolium (Small) Millais, Plumleaf Azalea. Cp, Pd (GA): mesic ravine forests and streambanks; rare (GA Threatened). Endemic to a small area along the AL-GA border, in se. AL (Kron 1993) and sw. and wc. GA (Jones & Coile 1988). [= K, L, Z; = Azalea prunifolia Small – S]

Rhododendron vaseyi A. Gray, Pinkshell Azalea. Mt (GA, NC): moist slopes, bogs, high elevation rocky summits, cliffs, high elevation heath balds; rare (NC Rare). May–June; August–October. Endemic to the mountains of NC, though approaching very close to SC and GA in the vicinity of Cashiers and Highlands, NC and reported for Rabun Bald (Rabun Co. GA) without definite documentation; *Rh. vaseyi* occurs primarily southwest of the Asheville Basin, but is found at scattered locations farther north and is locally abundant on Grandfather Mountain (at the junction of Avery, Watauga, and Caldwell counties, NC), its northernmost outpost. Judd & Kron (1995) treat *Rh. vaseyi* and *Rh. canadense* (Linnaeus) Torrey (of ne. North America) as the only two members of section *Rhodora*. When not in flower, *Rh. vaseyi* is readily distinguished from our other azaleas by its distinctive foliage (see key). [= RAB, F, K, L, W, Y; = Bilia vaseyi (A. Gray) Small – S]

Rhododendron viscosum (Linnaeus) Torrey, Swamp Azalea, Clammy Azalea. Cp, Mt, Pd (GA, NC, SC, VA): bogs, pocosins, moist streambanks, shrub balds, and other moist habitats; common (uncommon in VA Piedmont and VA Mountains). Late May–July; July–October. ME and OH south to FL and LA. *Rh. viscosum* (var. *serrulatum*) may well deserve recognition at some taxonomic level. [= GW, K, L, W, Z; > Rh. viscosum var. *serrulatum* (Small) Ahles – RAB; > Rh. viscosum var. *viscosum* – RAB; > Rh. *serrulatum* (Small) Millais – C, F, G; > Rh. *viscosum* – C, F, G; > Azalea *viscosa* Linnaeus – S; > Azalea *serrulata* Small – S]

Rhododendron chapmanii A. Gray, Chapman's Rhododendron. Endemic to Panhandle FL, with an isolated disjunction in ne. FL (Clay County). [= D, K, S; = Rh. minus *Michaux* var. *chapmanii* (A. Gray) Duncan & Pullen = L, V; = Rh. minus var. *chapmanii* – Q, orthographic error]

**Vaccinium** Linnaeus 1753 (Blueberry)

A genus of 140 species, shrubs, lianes, and small trees, semicosmopolitan. *Vaccinium* in our area is divided into 6 strongly differentiated sections, sometimes, as by Small, treated as separate genera. The taxonomy of *Vaccinium* remains unclear – past divergence of opinion is obvious in the synonymy. For instance, Small (1933) recognizes 6 genera and 25 species for our area, Ahles in RAB (1968) recognizes 1 genus and 14 species (one with 2 varieties) (not including VA), and Vander Kloet (1988) recognizes 1 genus and 9 species. The highbush blueberries of section *Cyanococcus* are particularly difficult. Vander Kloet's extremely broad concept of the highbush blueberries as consisting of a single species, *V. corymbosum*, including *V. fuscatum* (*V. atroccocum* – RAB), *V. simulatum* ("V. constablaeet" – RAB), *V. virgatum* (*V. amoenum* – RAB), *V. elliottii*, *V. formosum* (*V. australe*), and *V. caesariane* (and many other named taxa not recognized here) has been adopted by some recent authors, at least partly for its ease of application. I agree with Godfrey (1988), though, that *V. elliottii* has "such distinctiveness as to be recognizable in the field at a glance." The other taxa are less easily recognizable, but seem to have substantial morphological and phytogeographic integrity. The fairly frequent presence of hybrid individuals and populations can make identification frustrating, but I agree with Ward (1974) that "the genus *Vaccinium* ... is difficult but not in any way an irresolvable tangle of intergrading populations. The vast bulk of individuals encountered in the field may be assigned, as with any non-apomict genus, to a relatively few, discrete, and wholly recognizable species". Many of the taxa included in *V. corymbosum* by Vander Kloet (1988) and Luteyn et al. (1996) occur together in combinations of two to four, are immediately recognizable in the field, bloom at different times, and have different flower, fruit, and leaf morphology. Failure to recognize multiple entities within the highbush blueberries results in the taxonomic homogenization of the diversity of the group and obscures important phytogeographic patterns. Our area, with 20 species (24 taxa) in 6 sections, has a greater diversity of *Vaccinium* than any other comparably sized area in North America. References: Vander Kloet (1988) = Z; Ullal (1987) = Y; Camp (1945) = X; Ashe (1931) = V; Ward (1974) = Q; Luteyn et al. (1996) = L; Vander Kloet & Hall (1981); Vander Kloet (1977, 1978a, 1978b, 1980, 1982, 1983a, 1983b); Ullal (1986a, 1986b); Stevens et al. in Kubitzki (2004). Key based in part on Ullal (1987).

1. Trailing vines, erect shoots (if present) borne on horizontal stems; leaves evergreen, glossy and dark green above, rarely exceeding 20 mm in length.
2. Leaves narrowly elliptic, glabrous above, glaucous-white below; leaf margin entire and eglandular; berry red when ripe, 8-15 mm long; [cranberries, section *Oxycoccus*] ................................................................................................................. Key A
3. Leaves elliptic, puberulent above, pale green below; leaf margin obscurely to fairly strongly serrate and glandular; berry black when ripe, 6-8 mm long; [creeping blueberries, section *Herpesthamnus*] ................................................................................................................. Key B
4. Erect shrubs, the growth form various (single-stemmed, multi-stemmed and clump-like, or clonal with numerous erect shoots from a network of subterranean rhizomes); leaves deciduous to semi-evergreen (evergreen in *V. myrsinites*), dull to somewhat glossy and medium green above (dark green and glossy in *V. myrsinites*), generally exceeding 20 mm in length (5-30 mm long in *V. myrsinites*).
5. Twigs of the season verrucose (the surface abundantly covered with small bumps, readily visible without magnification); [blueberries, section *Cyanococcus*] ................................................................................................................. Key C
6. Twigs of the season not verrucose.
**Key B – creeping blueberries, section Herpothamnus**

1 Leaves (2-) 3-18 (-25) mm long, generally elliptic (less commonly ovate or obovate); angle of leaf base typically >90 degrees; margins finely glandular mucronulate-crenulate, the teeth tightly appressed and therefore often obscure, the margin superficially entire; stems mostly prostrate (ascending in areas that have been long fire-suppressed); [widespread in NC and SC, rare in se. VA and e. GA] ............................................................. **V. crassifolium**

1 Leaves (4-) 7-35 (-63) mm long, elliptic to obovate (less commonly elliptic-ovate); angle of leaf base typically <90 degrees; margins glandular mucronulate-serrulate to serrulate-crenulate, the teeth apparent, especially toward the apex; stems often ascending to upright; [of Lexington County, SC] ................................................................. **V. sempervirens**

**Key C – blueberries, section Cyanococcus**

Note: Hybrids and apparent local races in this section are frequent, and will key poorly. Hybrids are particularly frequent among the taxa of the highbush blueberries, somewhat less so among lowbush blueberries and between lowbush and highbush. In the Coastal Plain, **V. ×marianum** (formosum × fuscatum) is the most common, and will be responsible for most difficulties encountered in the key from lead 10 on. Uttal (1987) presents a complicated key with **V. ×marianum** (but not other hybrids) included.

1 Shrubs rhizomatous, forming clonal colonies, the upright stems < 1 m tall (and often < 0.5 m tall); ["lowbush blueberries"].

2 Leaves evergreen, 5-15 mm long (rarely to 30 mm long on fire sprouts), subcoriaceous, glossy dark-green or dull blue-green; [restricted in our area to the Coastal Plain of SC southward].

3 Plant glaucous and bluish-green throughout; leaf undersurface lacking scattered glandular hairs; [of s. peninsular FL, west to e. TX] ...................................................................................................................... **V. darrowii**

3 Plant dark green throughout; leaf undersurface with scattered glandular hairs, these sometimes very few by late in the season (best seen in the field by folding a leaf, holding the fold up to the light, and using a 10× lens); [of se. SC southward to n. FL, west to s. AL] ...................................................................................................................... **V. myrsinites**

2 Leaves deciduous to semi-evergreen, herbaceous, generally > 20 mm in length, dull to somewhat glossy and medium green; [collectively widespread in our area].

3 Lower surfaces of the leaves with red stipitate glands (sometimes pubescent as well when young); berry usually black and lustrous; [of the Coastal Plain and lower Piedmont] .................................................................................................................. **V. tenellum**

3 Lower surfaces of the leaves eglandular, pubescent or glabrous; berry either blue and glaucous, or black and glandular-hirsute; [collectively widespread in our area].

4 Leaves sharply serrulate (each tooth with a small glandular tip), 20-32 mm long, 6-16 mm wide, green and shiny below (rarely glaucous), glabrous or nearly so .......................................................... **V. angustifolium**

4 Leaves entire or obscurely serrulate (if obscurely serrulate then 30-50 mm long and 13-25 mm wide), either glaucous and glabrous (or nearly so) beneath, or green and densely pubescent beneath.

5 Leaves pale and glaucous, glabrous on both sides or pubescent on the underside only; berry blue and glaucous; [plants collectively widespread].

6 Plants mostly 0.5-1.0 (-1.4) m tall, stems brown for much of their length; leaves entire; fruit 7-12 mm in diameter; [of moderate to high elevations of the Mountains] .................................................. **V. alomontanum**

6 Plants mostly 0.2-0.6 (-1.0) m tall, stems green to the base (or brown at the very base); leaves serrulate (rarely entire); fruit 4-7 (-8) mm in diameter; [widespread, at low to moderate elevations].
Key D – mountain cranberry, section Oxycoccoides

One species in our area ................................................................. V. erythrocarpum

Key E – farkleberry, section Batodendron

One species in our area ................................................................. V. arboreum

Key F – deerberries, section Polycodium

[This key and treatment provisional]

1 Leaves strongly white-glaucescent beneath; stamens 4-6 mm long.
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<tr>
<td>1</td>
<td>Leaves green beneath (often slightly paler but not at all glaucous); stamens 5-8 mm long.</td>
<td><strong>V. stamineum</strong> var. caesium</td>
</tr>
<tr>
<td>2</td>
<td>Bracts of the inflorescence nearly as large as normal foliage leaves; [of the Coastal Plain from se. NC southward].................................................................</td>
<td><strong>V. stamineum</strong> var. 2</td>
</tr>
<tr>
<td>3</td>
<td>Bracts of the inflorescence much smaller than normal foliage leaves; [of the Mountains and Piedmont]..................................................................................</td>
<td><strong>V. stamineum</strong> var. 1</td>
</tr>
<tr>
<td>4</td>
<td>Hypanthium and fruit glabrescent ..........................................................................................................................................................................................</td>
<td><strong>V. stamineum</strong> var. sericeum</td>
</tr>
<tr>
<td>5</td>
<td>Hypanthium and fruit glabrous ...............................................................................................................................................................................................</td>
<td><strong>V. stamineum</strong> var. stamineum</td>
</tr>
</tbody>
</table>

**Vaccinium altomontanum** W.W. Ashe, Blue Ridge Blueberry. Mt (GA, NC, SC, VA): grassy balds, heath balds, high elevation forests and woodlands; uncommon. May-June; July-September. The tetraploid *V. altomontanum* occurs primarily in the Mountains at moderate to high elevations (the type collection is from the Fodderstacks, Macon County, NC); it differs from the diploid *V. pallidum* in forming tighter (often circular) clones, with taller plants (to 1 m tall), the leaves thick in texture, often revolute, strictly glaucous and glabrous, and with excellent berries. [< *V. corymbosum* – RAB; = *V. alta-montanum* – G, X, orthographic variant; < *V. pallidum* – K; > *Cyanococcus subcordatus* Small – S; > *Cyanococcus liparis* Small – S, as to type] *Vaccinium angustifolium* Aiton, Northern Lowbush Blueberry, Sugarberry, Low Sweet Blueberry. Mt (VA): acidic forests and woodlands, cliffs and talus (especially sandstone and quartzite), usually at high elevations; common. Labrador and Newfoundland west to Manitoba, south to NJ, PA, sw. VA, IL, and MN, [= C, K, W, Y, Z; > *V. angustifolium* var. angustifolium – F; > *V. angustifolium* var. laevifolium House – F; > *V. angustifolium* var. hypolaxilum Fernald – F; > *V. angustifolium* var. nigrum (Wood) Dole – F; > *V. angustifolium* – G, X; > *V. lamarkii* Camp – G, X; > *V. brittonii* Porter ex Bicknell – X] *Vaccinium arboreum* Marshall, Farkleberry, Sparkleberry. Cp (GA, NC, SC, VA), Pd (GA, NC, SC, VA), Mt (GA, NC, SC): rocky or sandy woodlands, bluffs, and cliffs, usually xeric and often fire-maintained, and unlike most other *Vaccinium*, often on mafic, ultramafic, or calcareous rocks; common (uncommon in Piedmont, rare in Mountains). Late April-June; September-October. This species is widely distributed in se. North America, from TX and FL north to MO, IN, KY, and VA. It can be a small tree, to 30 cm DBH and 10 m tall. The leaves are coriaceous and semi-evergreen, often being retained for much or all of the winter. Var. *glaucescens* (Greene) Sargent may be worthy of recognition. It occurs mainly south and west of our area, but is known in our area from SC and s. NC (Coastal Plain and Piedmont). It differs from var. *arborescens* in its subglaucous to conspicuously blue-green leaves (vs. dark green leaves) and the bracts at the base of the pedicels nearly equal in size and shape to the leaves (vs. bracts distinctly smaller and often also different in shape than the leaves). [= RAB, C, G, K, L, W, Y, Z; > *V. arboreum* var. arboreum – F; > *V. arboreum* var. *glaucescens* (Greene) Sargent – F; = *Batodendron arboreum* (Marshall) Nuttall – S] *Vaccinium caesariense* Mackenzie, New Jersey Highbush Blueberry. Cp (GA, NC, SC, VA), Pd (GA?, SC): swamps, bogs, moist ground; rare. Late February-May; June-August. S. ME south to n. FL. This species is diploid. (= C, F, G, K, X, Y; < *V. corymbosum* – RAB, L, Z] *Vaccinium corymbosum* Linnaeus, Smooth Highbush Blueberry. Mt (GA, NC, SC, VA), Pd (NC): bogs, wet swamp forests, moist high elevation bogs, balds, and forests; common (rare in Piedmont). May; August. Nova Scotia west to MI, south to WV, OH, and IN, south in the Appalachians (and rarely on Piedmont monadnocks) to w. NC, nw. SC, n. GA, and e. TN. In our area, *V. corymbosum* (sensu stricto) appears to be limited to the Mountains, except for occurrences on Piedmont monadnocks and outlier ridges, such as Hanging Rock, Stokes County, NC, and the Brushy Mountains, NC. See the end of the genus treatment for discussion of taxonomic controversy involving this species and its allies. Note that this treatment recognizes 2 species (*V. formosum* and *V. caesariense*) included within *V. corymbosum* by RAB. *V. formosum* is the common "corymbosum" type blueberry of the Coastal Plain. *V. corymbosum* is primarily tetraploid, *V. constablaei A. Gray* (misapplied to *V. simulatum* by RAB) is correctly applied to hexaploid plants of the high elevation Blue Ridge of NC and TN, especially on heath balds and grassy balds. Camp (1945) considered *V. constablaei* to be an allopolyploid derivative of *V. simulatum* and *V. altomontanum* (itself a tetraploid apparently related to diploid *V. corymbosum*). The type blueberry of the Coastal Plain. *V. crassifolium* Andrews, Creeping Blueberry. Cp (GA, NC, SC, VA), Pd (NC): savannas, pine flatwoods, podocarps-sandhill ecotones, upland sandhills over clay pans; common (rare in VA, rare in lower Piedmont only of NC and SC) (VA Rare). April-May; June-July. This species is nearly endemic to the Carolinas, barely extending into immediately adjacent VA and GA. See Kirkman, Wentworth, & Ballington (1989) and Kirkman & Ballington (1990) for discussion of the systematics and ecology of this species and the closely related *V. sempervirens*. [= RAB, C, F, G, GW, Y; = *Craspedites semperflorens* (Andrews) Small – S; > *Herpothamnus crassifolius* (Andrews) Small – S; > *Craspedites semperflorens* (Andrews) Small – S; > *Craspedites semperflorens* (Andrews) Small – S] *Vaccinium darrowii* Camp, Darrow's Blueberry. Cp (GA): pine flatwoods; uncommon. S. GA south to s. peninsular FL and west to se. TX. (= K, L, X, Z; = *V. darrowii* – GW, orthographic variant; = *Cyanococcus myrsinites* (Lamarck) Small var. *glaucom* A. Gray – S] *Vaccinium elliotii* Chapman, Mayberry. Cp (GA, NC, SC, VA), Pd (GA, NC, SC): bottomlands, slopes, sandy river terraces, natural levees; common (rare in Piedmont, uncommon in VA). March-April; May-June. Primarily a Coastal Plain
species, *V. elliottii* ranges from se. VA south to FL, west to se. TX and AR, disjunct in Coffee County, TN (Chester, Wofford, & Kral 1997).  [= RAB, C, F, G, Kw, K, X, Y; = *Cyanococcus elliottii* (Chapman) Small – S; < *V. corymbosum* – L, Z]

**Vaccinium erythrocarpum** Michaux, Bearberry, Highbush Cranberry, Mountain Cranberry. Mt (GA, NC, VA): rocky ridges, shrub or grassy balds, bogs, spruce-fir forests, usually at high elevations; uncommon. Late May-July; August-September. A Southern and Central Appalachian endemic, *V. erythrocarpum* ranges from WV through VA to w. NC, e. and ec. TN, and ne. GA. The only other member of Section *Oxyccocoides* is *V. japonicum* Micelone of montane Japan, so similar as to be sometimes regarded as only a subspecies or variety of our species. [= RAB, C, F, G, K, L, W, Y, Z; = *Hugeria erythrocarpa* (Michaux) Small – S]

**Vaccinium formosum** H.C. Andrews, Southern Highbush Blueberry, Swamp Highbush Blueberry. Cp (GA, NC, SC, VA), Mt (VA): bogs, swamps (especially blackwater, or at least where away from strong alluvial influence), seepages, depression ponds (dolines), other moist ground; common (rare in Mountains). Late February-May; June-August. Appropriately ranging from NJ south to n. FL and e. TX, primarily on the Coastal Plain. This species is the primary source of the cultivated highbush blueberries. It has the largest and arguably the highest quality fruit of the native highbush blueberries. [= K, Y; < *V. corymbosum* – RAB, C, L, Z; = *V. australe* Small – G, GW, X; = *Cyanococcus virgatus* (Aiton) Small – S, misapplied]


**Vaccinium hirsutum** Buckley, Woollyberry, Hairy Blueberry. Mt (GA, NC): mountain slopes, primarily in pine-oak and oak forests; rare (NC Rare). April-May; June-July. *V. hirsutum* is a narrow Southern Appalachian endemic, occurring only in a few counties of sw. NC, se. TN, and n. GA. It is the only species in our area with pubescent fruit. [= RAB, K, L, W, X, Z; = *Cyanococcus hirsutus* (Buckley) Small – S]

**Vaccinium macrocarpon** Aiton, Cranberry, Large Cranberry. Mt, Cp (NC, VA): mountain bogs, low pocosins with deep peat, interdunal swales; rare (NC Rare, VA Rare). May-July; August-November. Unlike the circumboreal *V. oxycoccos* Linnaeus, *V. macrocarpon* is limited to North America. This is the familiar edible cranberry, raised commercially in artificial bogs, primarily in MA, WI, and NJ. It ranges as a native plant from Newfoundland west and south to s. Ontario, MN, ne. IL, n. IN, n. and c. OH, PA, and NJ, extending south along the Appalachians as a disjunct rarity through WV, w. VA, and ne. and se. TN to w. NC, and south along the outer Coastal Plain as a disjunct rarity in e. MD, se. VA, and ne. and se. NC. The occurrence in the inner Coastal Plain (fall-line sandhills) along the Little River in Cumberland County, NC is questionably native. [= RAB, C, F, G, Kw, K, L, W, Y, Z; = *Oxyccoccus macrocarpus* (Aiton) Persson – S]

**Vaccinium myrsinoides** Lamarck, Southern Evergreen Blueberry. Cp (GA, SC): pine flatwoods; common (rare in SC, but locally dominant in spodosotic flatwoods in Beaufort and Jasper counties, SC and very locally common as far north as Horry County); common. March-April; May-June. Se. SC south to s. peninsular FL, west to s. AL. *V. myrsinae* is readily distinguished from all our species by the following combination of characteristics: clonal shrub with upright stems usually < 50 cm tall, the young twigs verrucose, leaves evergreen, mostly 5-15 mm long and 2-10 mm wide, lower surface of young leaves with stout glandular leaves. Further south, it can be difficult to distinguish from the closely related *V. darrowii* Camp (see key), with which it often co-occurs in their area of overlap. [= RAB, GW, K, L, X, Z; = *Cyanococcus myrsinoides* (Lamarck) Small var. *myrsinoides* – S]

**Vaccinium myrtillus** Michaux, Velvetleaf Blueberry, Sourtop, Canada Blueberry. Mt (NC, VA): acidic, high elevation slopes and cliffs; rare (VA Rare). May-July. Labrador west to British Columbia, south to PA, VA, w. NC, WV, IN, and MN. Reported for the NC side of Great Smoky Mountains National Park (Haywood County) (K. Langdon, pers. comm.. 2006). The possible occurrence of this species on Grandfather Mountain is questionably native. [= C, F, G, Kw, K, W, X, Y, Z] for a discussion of the systematics and ecology of this species and its relationship to *V. pallidum*.

**Vaccinium palustris** Aiton, Cranberry, Large Cranberry. Mt, Pd (GA, NC, SC, VA), Cp (NC, SC, VA): forested slopes, usually rather xeric; common. March-April; May-June. Widespread in e. United States, *V. palustris* is centered in the Appalachians and Ozarks. Vander Kloet (1978, 1988) and Utal (1987) do not favor Camp's (1945) separation of *V. palustris* and *V. vacillans*. If the two taxa are combined (as here), *V. palustris* has nomenclatural priority. *V. palustris* is primarily diploid. See *V. altomontanum* for discussion of its relationship to *V. palustris*. [= C, K, L, W, Y, Z; = *vaccilis* Kalm ex Torrey – RAB; > *vaccilis* Torrey var. *vaccilis* – F; > *v. crinitum* Fernald – F; > *V. palustris* – F, G, X; > *v. palustris* – G, X; > *Cyanococcus palidis* (Aiton) Small – S; > *Cyanococcus palidis* (Kalm ex Torrey) Rydberg – S]

**Vaccinium sempervirens** Rayner & Henderson, Rayner's Blueberry. Cp (SC): seepage bogs in the fall-line Sandhills, longleaf pine woodlands over sandstone and gravel outcrops; rare (US Species of Concern, SC Rare). Endemic to Lexington County, SC, known from only a few sites. This species is clearly closely allied to *V. crassifolium*. Kirkman & Ballington (1990) reduce it to a subspecies. Because it is allopatric and relatively discrete morphologically, despite occurring in similar habitats, I prefer to retain it as a species. See Kirkman, Wentworth, & Ballington (1989) and Kirkman & Ballington (1990) for further discussion of the systematics and ecology of this species and *V. crassifolium*. [= *V. crassifolium* Andrews ssp. *sempervirens* (Rayner & Henderson) Kirkman & Ballington – K; < *V. crassifolium* – L, Z]

**Vaccinium simulatum** Small, Mountain Highbush Blueberry. Mt (GA, NC, SC, VA): forested slopes (northern hardwoods, spruce-fir forests), ridges, and shrub balds, at moderate and high elevations; common. Late April-early June; July-August. A Southern and Central Appalachian endemic, *V. simulatum* ranges from e. KY and sw. VA south through w. NC and e. TN to n. GA and n. AL. The name *V. constablaei* has been misapplied to this species, as by RAB; see *V. corymbosum* for a discussion of the correct application of *V. constablaei*. [= G, K, X, Y; = *V. constablaei* Gray – RAB, G, misapplied; < *V. corymbosum* – C, L, W, Z; = *Cyanococcus simulatus* (Small) Small – S]
**Vaccinium stamineum** Linnaeus var. *I.*, Dwarf Deerberry. Cp (GA, NC, SC): pinelands; common. April-June; August-October. This dwarf taxon is characteristic of Coastal Plain pinelands; its stature is not the result of fire; it never achieves greater height, even following decades of fire suppression. Se. NC south to GA. [<V. stamineum var. stamineum – RAB; <Vaccinium stamineum – C, K, L, W, Y, Z; = Polycodium arenicola W.W. Ashe – V]>

**Vaccinium stamineum** Linnaeus var. *2*, Appalachian Deerberry. Mt, Pd (GA, NC, SC, VA): xeric to submesic woodlands and forests, including pine-oak/heath and shrub balds; common. April-June; August-October. PA south to GA, in the Appalachians and adjacent provinces. [<V. stamineum var. stamineum – RAB; F; <V. stamineum – C, K, L, W, Y, Z; = Polycodium candicans Small – S; V; = F. candidicans (C. Mohr) Sleumer]

**Vaccinium stamineum** Linnaeus var. *caesium* (Greene) D.B. Ward, Florida Deerberry, Whiteleaf Deerberry. Cp (GA, NC, SC): xeric woodlands; rare. April-May; August-October. Se. NC south to c. peninsular FL, and west to s. AL. [= Q; <V. stamineum var. stamineum – RAB; <V. stamineum – C, K, L, W, Y, Z; ? V. caesium Greene – F (probably misapplied); > Polycodium floridanum (Nuttall) Greene – S; > Polycodium ashei Harbison – S; > Polycodium floridanum var. floridanum – V; > Polycodium floridanum var. caesium – V]


**Vaccinium stamineum** Linnaeus var. *stamineum*, Common Deerberry. Mt, Pd, Cp (GA, NC, SC, VA): xeric to submesic woodlands, forests, and rock outcrops (unlike most *Vaccinium*, often on mafic, ultramafic, or calcareous rocks); common. April-June; August-October. MA, NY, s. Ontario, and MO south to Panhandle FL and TX. [= Q; < V. stamineum var. stamineum – RAB; < V. stamineum – C, K, L, W, Y, Z; > V. stamineum var. stamineum – F; > V. stamineum var. interius (Ashe) Palmer & Steyermark – F; > V. stamineum var. neglectum (Small) Deam – F; > Vaccinium neglectum (Small) Fernald – G; > Polycodium stamineum (Linnaeus) Greene – S; > V. melanocarpus Small – S; > Polycodium neglectum Small – S, V]

**Vaccinium tenellum** Aiton, Southern Blueberry, Small Cluster Blueberry. Cp, Pd (GA, NC, SC, VA): sandhills, pine flatwoods, other xeric woodlands; common (uncommon in Piedmont and VA Coastal Plain, rare in VA Piedmont). Late March–early May; June-July. Though abundant in the Carolinas, *V. tenellum* is rather restricted, occurring as a common species from se. VA to e. GA, with a range extension (where it is scattered and rare) south and west to n. FL, s. AL, and se. MS. [= RAB, C, F, G, K, L, X, Y, Z; = Cyanococcus tenellus (Aiton) Small – S]

**Vaccinium virgatum** Aiton, Swamp Blueberry, Rabbiteye Blueberry. Cp (GA, NC, SC): pocosins and *Chamaecyparis* swamps, also in various drier habitats, including turkey oak sandhills; uncommon in SC, rare in NC (NC Watch List). March-April; May-June. A Southeastern Coastal Plain species, *V. virgatum* occurs from se. NC south to FL and west to e. TX. [= GW, K; = V. amoenum Aiton – RAB; = Cyanococcus amoenum (Aiton) Small – S; < V. corymbosum – L, Z; > V. virgatum – X; > V. amoenum – X; > V. ashei Reade – X]

**Vaccinium oxycoccos** Linnaeus, Small Cranberry. Bogs. Circumboreal, south in North America to NJ, PA, WV (Grant, Mineral, Pendleton, Pocahontas, Preston, Randolph, and Tucker counties), IN, and MN. This species has been reported for NC, by Fernald (1950) as *V. oxycoccos* var. *ovalifolium* Michaux, by Scoggan (1979) as *Oxycoccus ovalifolius* (Michaux) Porsild, and by Kartesz (1999). Most likely, ambiguous collections of *V. macrocarpon* are the basis for this record. [= C, G, K; > F. oxycoccos Linnaeus var. *ovalifolium* – F; = Oxycoccus palustris Persoon; > Oxycoccus palustris Persoon var. *ovalifolius* (Michaux) Seymour; > Oxycoccus *ovalifolius* (Michaux) Porsild]

**Vaccinium stamineum** Linnaeus var. *glandulosum* (Ashe) D.B. Ward. Supposedly endemic to the FL Panhandle, probably in GA. [= Polycodium glandulosum Ashe; < Vaccinium stamineum – L] [not keyed at this time; synonymy incomplete]

Some of the hybrids known to occur in our area are listed below. Nearly every combination of co-occurring species in section *Cyanococcus* may be expected to form hybrids.

*V. × atlanticum* Bicknell (pro sp.) [angustifolium × corymbosum]
*V. × dobbinii* Burnham (pro sp.) [angustifolium × pallidum]
*V. × margaretiae* Ashe (pro sp.) [fuscatum × pallidum]
*V. × marianum* S. Watson (pro sp.) [formosum × fuscatum]

**Zenobia** D. Don 1834 (Zenobia, Honey-cups)


**Zenobia pulverulenta** (Bartram ex Willdenow) Pollard, Zenobia, Honey-cups. Cp (GA, NC, SC, VA): pocosins, margins of pineland ponds; common (rare in GA and VA) (VA Rare). April-June; September-October. This monotypic genus is a narrow endemic of the Coastal Plain of se. VA, NC, SC, and e. GA (Bryan Co.). It was considered by Wood (1961) to have "no close relatives," but molecular phylogeny suggests that it is sister to *Andromeda*. The crenate leaves help distinguish *Zenobia* from other pocosin shrubs. The flowers are extremely fragrant. The species is remarkably variable in leaf glaucescence. Many plants in the fall-line sandhills and outer Coastal Plain have the lower leaf surface, pedicels, and capsules covered in wax to the point that they are bright white; outer Coastal Plain plants generally lack any glaucescence. The division into two species listed below
in synonymy was based largely on this character; further study appears warranted. In the centers of major peat domes in the Outer Coastal Plain and in large Carolina bays in the Bladen Lakes region, where peat depths reach 3-5 meters, occur areas of up to 25 square kilometers dominated by *Zenobia* (sometimes codominant with *Chamaedaphne* or *Sarracenia flava*). This community has been referred to as "deciduous low pocosin," to distinguish it from the dominance of evergreen shrubs found in most pocosins. [= RAB, C, F, G, GW, K, L; > *Z. pulverulenta* – S; > *Z. cassinefolia* (Ventenat) Pollard – S]

**EUPHORBIACEAE** A.L. de Jussieu 1789 (Spurge Family)
(also see **PHYLLANTHACEAE**)

A family of about 313-322 genera and 8100-9000 species, trees, shrubs, vines, and herbs, nearly cosmopolitan in distribution, as defined broadly. Molecular systematics suggests that various units traditionally included in the Euphorbiaceae should be segregated (Soltis et al. 2000, Chase et al. 2002). In our flora, this includes *Phyllanthus* (in Phyllanthaceae). References: Webster (1967), Webster (1994); Govaerts, Frodin, & Radcliffe-Smith (2000).

1 Shrub or tree (woody).
   2 Leaves entire.
      3 Leaf blades 2.5-5× as long as wide; petioles 0.2-1.0 cm long; plant a native shrub; [subfamily *Euphorbioideae*]..........
         ............................................................................................................................. .............
         ............................................................................................................................. **Ditraysinia**
      3 Leaf blades 1-1.5× as long as wide; petioles 2-6 cm long; plant an alien tree; [subfamily *Acalyphoideae*]..........
         ............................................................................................................................. **Triadia**
   2 Leaves crenate, serrate, or palmately lobed.
      4 Leaves crenate or serrate; [subfamily *Euphorbioideae*]...................................................... **Stillingia**
      4 Leaves palmately lobed.
         5 Inflorescence a panicle; petals absent; [subfamily *Acalyphoideae*]........................................ **Ricinus**
         5 Inflorescence a dichasium; petals present; [subfamily *Crotonoideae*].............................. **Vernicia**
   1 Herb.
      6 Leaves generally not lobed, entire or serrate (rarely pinnately lobed in *Euphorbia*).
         7 Plant with copious white latex; flowers enclosed in a cyathium; [subfamily *Euphorbioideae*].
         7 Plant glabrous; calyx green or purple; leaves peltate; [subfamily *Acalyphoideae*].................. **Ricinus**
      6 Leaves generally not lobed, entire or serrate (rarely pinnately lobed in *Euphorbia*).
         8 Plant with copious white latex; flowers enclosed in a cyathium; [subfamily *Crotonoideae*].
         9 Leaves strictly opposite, oblique or inequilateral at base; branches often prostrate .......... **Chamaesyce**
         9 Leaves alternate or opposite, not oblique or asymmetric at base; branches usually erect .......... **Euphorbia**
      8 Plant without white latex (the sap clear), or slightly milky in Stillingia; flowers not enclosed in a cyathium.
         10 Pubescence of stellate trichomes and/or scales; [subfamily *Crotonoideae*]...................... **Croton**
         10 Pubescence of simple trichomes, or glabrous.
            11 Flowers in terminal spikes; stout perennial with several to many stems arising from a subterranean crown [subfamily *Euphorbioideae*]................................................................. **Stillingia**
            11 Flowers strictly axillary or both axillary and terminal, in small clusters, racemes, or spikes; finer perennial or annual, not typically with > 1 stem arising from a subterranean crown.
            12 Ovules and seeds 2 per locule (the capsule thus 6-seeded); flowers in small axillary clusters of 2-4..
               ............................................................................................................................. [see *Phyllanthus* – **PHYLLANTHACEAE**]
            12 Ovules and seeds 1 per locule (the capsule thus 3-seeded, or fewer by abortion); flowers in axillary spikes or in racemes borne in leaf axils or opposite the leaves; [subfamily *Acalyphoideae*].
               13 Pistillate flowers subtended by a conspicuous leafy bract; plant lacking stinging trichomes.....
                  ............................................................................................................................. **Acalypha**
               13 Pistillate flowers lacking a leafy bract; plant with stinging trichomes....................... **Tragia**

*Acalypha* Linnaeus 1753 (Copperleaf, Three-seeded Mercury)


1 Pistillate flowers all or chiefly in terminal spikes, the staminate flowers in axillary clusters.
   2 Leaves cordate at base; fruit tuberculate, but not pubescent ................................................. **A. ostryifolia**
   2 Leaves rounded to widely cuneate at base; fruit pubescent with pustular-based trichomes............ **A. setosa**
   1 Pistillate and staminate flowers all in axillary inflorescences, the staminate flowers above and pistillate flowers below in each inflorescence.
      3 Bracts subtending the pistillate flowers (5-) 7-9 (-11) lobed, usually stipitate-glandular; petiole 0.5-1.5× as long as the leaf blade; stems with only short, incurved trichomes.
         4 Fruit 2-seeded; seeds 2.2-3.2 mm long........................................................................**A. deamii**
**Acalypha deamii** (Weatherby) Ahles, Big-seeded Copperleaf, Two-seeded Copperleaf. Pd (VA): alluvial forests, especially on sandy levees; rare (VA Watch List). W. PA (Rhoads & Klein 1993), s. OH, and s. IN south to w. TN (Chester, Wofford, & Kral 1997) and AR; apparently disjunct in c. VA (Chesterfield, Powhatan, Buckingham, Fluvanna, and Cumberland counties on the James River; Pittsylvania, Halifax, and Campbell counties on the Staunton River; Rappahannock River), but perhaps only overlooked elsewhere. This plant is up to a meter tall and occurs in moist bottomland forests. [= C, K, Z; *A. gracilens* var. *deamii* (Weatherby) Weatherby – Y; *A. virginica* Linnaeus var. *deamii* Weatherby – Y; *A. virginica* Linnaeus var. *deamii* Weatherby – Y] {G?}

**Acalypha gracilens** A. Gray, Shortstalk Copperleaf. Cp, Pd, Mt (GA, NC, SC, VA): woodlands, disturbed ground; common. Late June-November. N. Jersey west to IN and NE, south to FL, TX, Mexico, and the West Indies. [*Chamaesyce* bombensis] = C, K, Z; *A. gracilens* var. *gracilens* – C, F, G; > *A. gracilens* var. *fraseri* (Müller of Aargau) Weatherby – C, F, G; = *A. virginica* Linnaeus var. *gracilens* (Gray) Müller of Aargau – Y; = *A. gracilens* ssp. *gracilens*

**Acalypha ostryifolia** Riddell, Rough-pod Copperleaf. Pd (GA, NC, SC, VA), Mt (GA, NC, VA), Cp (GA, SC): disturbed ground; uncommon (VA Watch List). Late June-November. NJ west to IN and NE, south to FL, TX, Mexico, and the West Indies. [% K, W, Y; = *A. ostryifolia* – RAB, C, F, G, S, orthographic variant]


**Acalypha virginica** Linnaeus, Virginia Copperleaf. Mt, Pd (GA, NC, SC, VA), Cp (NC, SC, VA): woodlands and disturbed ground; common. Late June-November. ME west to IN, IL, MO, and KS, south to c. GA and TX. [% RAB, C, F, G, GW, K, S, W, Z; = *A. virginica* Linnaeus var. *virginica* – Y]

**Aleurites**

(see *Vernicia*)

**Chamaesyce** S.F. Gray 1821

In our area, *Chamaesyce* is largely weedy and the original distributions of some of the species are difficult to assess. Only 3 of our species are definitely native, occurring characteristically in natural habitats: *Ch. bombensis* and *Ch. polygonifolia* of dunes, and *Ch. cordifolia* of sandhills. Other species are often found in shallow soils of rock outcrops, cliffs, glades, and barrens, perhaps reflecting their pre-Columbian habitats. References: Herndon (1993)=Z; Govaerts, Frodin, & Radcliffe-Smith (2000)=Q.

1 Young stems and leaves glabrous; leaves entire or serrulate, at least at the apex (use 10× magnification).
2 Leaves serrulate, at least at the apex (use 10× magnification); seeds with 2-4 transverse ridges.
3 Seeds 1.0-1.3 mm long, with 2-4 transverse ridges………………………………………………………*/Ch. glyptosperma*
4 Leaves absolutely entire; seeds smooth.
5 Leaves 1.5-2× as long as wide, not fleshy; mature seeds 1.0-1.2 (-1.4) mm long, angled; [of inland sandhills].……………………………………………………………………………………………………*/Ch. serpens*

6 Mature seeds (1.3-) 1.5-2.6 mm long; cyathia terminal on the stems and also axillary, ……*/Ch. bombensis*
7 Mature seeds (2.0-) 2.2-2.6 mm long; cyathia terminal on the stems …………………*/Ch. polygonifolia*
1 Young stems and leaves pubescent (at least in lines along the stems); leaves serrulate, at least at the apex (use 10× magnification).
7 Ovary and capsule glabrous.
8 Seeds 0.8-1.0 mm long, light gray, the faces with 2-3(-4) horizontal, low, blunt ridges, sometimes connected by 1-2 cross ridges; stems glabrous when young (uncommonly puberulent along 1 side of the branchlets); capsule 1.5-2.0 mm long .................................................. Ch. hyssopifolia
8 Seeds 1.0-1.3 mm long, dark gray, faces without ridges, though irregularly and finely wrinkled; stems puberulent when young on 1 side only; capsule 2.0-2.5 mm long.
9 Stems ascending or suberect, puberulent when young .................................................. Ch. nutans
9 Stems prostrate or widely spreading, spreading-hirsute .................................................. Ch. vermiculata
7 Ovary and capsule pubescent.
10 Stems with 2 types of trichomes, the longer 3-5 mm long; cyathia in axillary and terminal cymes, at least some of the peduncles > 10 mm long ...................................................................................... Ch. hirta
10 Stems with 1 type of trichome, these < 2 mm long; cyathia solitary or several in axils, the peduncles < 5 mm long.
11 Capsules spreading-villous, especially or solely on the angles; styles 0.2-0.3 mm long, bifid nearly to the base; seeds sharply quadrangular-angled, the faces with 3-4 transverse ridges .................. Ch. prostrata
11 Capsules minutely appressed-puberulent, on the entire surface (though sometimes primarily on the lower portion); styles 0.3-0.7 mm long, bifid only in the upper half or third; seeds quadrangular but not angled, the faces with inconspicuous transverse ridges or nearly smooth.
12 Involucre cleft on 1 side half its length; leaves mostly obovate, 1.5-2× as long as wide; styles 0.5-0.7 mm long, filiform; seed faces nearly smooth; adventitious roots formed at middle nodes along the stem ................................................................................ Ch. humistrata
12 Involucre cleft on 1 side a fourth to a third its length; leaves mostly oblanceolate, 2.3× as long as wide; styles 0.3-0.4 mm long, clavate; seed faces transversely ridged; adventitious roots not formed ....... Ch. maculata

Chamaesyce bombensis (Jacquin) Dugand, Southern Seaside Spurge, Dixie Sandmat. Cp (GA, NC, SC, VA): open sands of dunes, dune blowouts and overwashes, often growing with perennial grasses such as Uniola paniculata, but preferring open sand with little competition, sometimes mixed with the more common Ch. polygonifolia; uncommon (VA Rare). June-October. E. VA south to s. FL along the Atlantic, from s. FL to TX and Mexico along the Gulf of Mexico, and south into n. South America. Johnson (1992) contrasts the habitat of this species with that of the closely similar Ch. polygonifolia; Ch. bombensis prefers areas behind the foredune, while Ch. polygonifolia prefers the pioneer situation on the upper beach and foredune front. [= K, Z; = Euphorbia ammannioides Kunth – RAB, C, F, G; > Ch. ingallsii Small – S; = Euphorbia bombensis Jacquin – Q]

Chamaesyce cordifolia (Elliott) Small, Heartleaf Sandmat. Cp (GA, NC, SC): open sands of very dry sandhills; rare (NC Rare). July-October. Se. NC south to s. FL and west to s. TX. [= K, S, Z; = Euphorbia cordifolia Elliott – RAB, Q]

Chamaesyce hirta (Linaeus) Millspaugh, Pillpod Sandmat. Cp (GA, SC), Pd (GA): fields, disturbed ground; rare. June-October. SC south to FL, west to TX, and south into Central and South America. [= K, S, Z; = Euphorbia hirta Linnaeus – RAB, C, G, Q]

* Chamaesyce humistrata (Engelmann) Small, Spreading Sandmat. Cp, Mt (VA), Pd (GA, VA): exposed river shores, rocky riverside gravel bars, disturbed areas; rare, apparently adventive from further west, but possibly native in some areas. [= GW, K, S, Z; = Euphorbia humistrata Engelmann – C, F, G, Q]

Chamaesyce hyssopifolia (Linaeus) Small, Hyssopleaf Sandmat. Cp (GA, SC): disturbed ground; uncommon? May-October. SC south to FL, west to LA; also in w. TX, s. NM, and n. Mexico, and south to s. South America. Its status in our area has been muddled by confusion with C. nutans. [= GW, K, Z; = Euphorbia hyssopifolia Linnaeus – Q]

Chamaesyce maculata (Linaeus) Small, Milk-purslane, Spotted Spurge. Pd, Cp, Mt (GA, NC, SC, VA): gardens, fields, disturbed places, crevices in pavement or sidewalks; common. January-December. Quebec west to ND, south to FL and TX; introduced in various places worldwide. [= GW, K, S, Z; > Euphorbia supina Rafinesque – RAB, F; = Euphorbia maculata Linnaeus – C, G, Q, W]

Chamaesyce nutans (Lagascay Segura) Small, Eyebane. Pd, Cp, Mt (GA, NC, SC, VA): gardens, fields, waste places, disturbed ground; common. May-October. NH west to MI and ND, south to FL and TX; introduced in various places worldwide. [= GW, K, Z; = Euphorbia maculata Linnaeus – RAB, F, misapplied; = Euphorbia nutans Lagascay y Segura – C, Q, W; = Euphorbia prestii Guss. – G; = Ch. hyssopifolia (Linaeus) Small – S, in part, misapplied]

Chamaesyce polygonifolia (Linaeus) Small, Northern Seaside Spurge, Northern Sandmat. Cp (GA, NC, SC, VA): open sands of dunes, upper beach, dune blowouts and overwashes, sometimes growing with perennial grasses such as Uniola paniculata, but preferring open sands with little competition, sometimes mixed with the less common Ch. bombensis; common. May-October. Quebec to ne. FL along the Atlantic Ocean; disjunct to the Great Lakes. See Ch. bombensis for discussion of the habitats of these related species. [= K, S, Z; = Euphorbia polygonifolia Linnaeus – RAB, C, F, G, Q]


Chamaesyce glyptosperma (Engelmann) Small, Ridge-seed Spurge, east to sc. TN (Chester, Wofford, & Kral 1997). In VA, WV, LA (Q). [= K; = Euphorbia glyptosperma Engelmann – C, F, G, Q]
Chamaesyce hypericifolia (Linnaeus) Millsbaugh, reported for SC (Kartesz 1999), FL, GA, LA (Q). [Investigate] [= K, S; = Euphorbia hypericifolia Linnaeus – Q] [not keyed at this time]

Chamaesyce ophthalmica (Persoon) Burch. GA and PA (Kartesz 1999), but not in North America (Q). [= K; = Euphorbia ophthalmica Persoon – Q] [not keyed at this time]

Chamaesyce serpens (Kunth) Small. Cp (GA): In se. PA (Rhoads & Klein 1993) and e. GA. [= K; = Euphorbia serpens Kunth – C, F, G, Q]

Chamaesyce serpyllifolia (Persoon) Small ssp. serpyllifolia. In GA, PA, and DE (Kartesz 1999). In NC, GA, SC (Q) {Investigate} [= K; = Euphorbia serpyllifolia var. serpyllifolia – Q] [not keyed at this time]

Cnidoscolus Pohl 1827 (Spurge-nettle)


Cnidoscolus stimulosus (Michaux) Engelmann & A. Gray, Spurge-nettle, Tread-soffly, Finger-rot, Bull-nettle. Cp (GA, NC, SC, VA), Pd (GA, NC, SC), Mt (NC, SC): sandhills, dry sandy woodlands, other dry sandy soils; common (rare in Piedmont and Mountains). Late March-August; May-September. Se. VA south to FL, west to e. LA, mostly on the Coastal Plain, but further inland southward. Beset with stinging trichomes. Allied to Cn. urens of Mexico, central America, and n. South America, and sometimes treated as a variety of it. [= RAB, C, F, G, K, W, Y; = Bivonea stimulosa (Michaux) Rafinesque – S; = Cn. urens (Linnaeus) Arthur var. stimulosus (Michaux) Govaerts – Z]

Croton Linnaeus 1753 (Croton, Dowseweed, Rushfoil)

A genus of about 750-1225 species, herbs, shrubs, and (rarely) trees, of nearly cosmopolitan distribution. Webster (1992, 1993) considers the 2 species traditionally treated as Crotonopsis to be closely related to sections within Croton, such as section Gynamblosis. His reasoning is followed here. References: Webster (1992)=Z; Webster (1993)=Y; Govaerts, Frodin, & Radcliffe-Smith (2000).

1 Evergreen shrub, (1-) 2-3 m tall; pistillate flowers with petals; [section Lamprocroton] .......................................................................................... [C. alabamensis var. alabamensis]

1 Herbaceous or suffrutescent, 0.1-1.2 m tall; pistillate flowers lacking petals.

2 Leaves with coarsely serrate margins; 1-2 glands present near the junction of the petiole and the leaf-blade; [section Geiseleria] .......................................................................................... C. glandulosus var. septentrionalis

2 Leaves with entire margins; glands absent.

3 Leaves sessile or with short petioles (to 3.2 mm long), the petiole < 1/5 the length of the leaf blade; fruit 1-locular, indehiscent; seed 1 per fruit, 2-2.5 mm long; [section Crotonopsis].

4 Branches monopodial; stellate hairs of the upper leaf surface with arms to 0.3 mm long, not overlapping the arms of the nearby stellae. .......................................................................................... C. michauxii

4 Branches dichotomous and trichotomous; stellate hairs of the upper leaf surface with arms to 1.0 mm long, overlapping the arms of nearby stellae. .......................................................................................... C. willdenowii

3 Leaves with relatively long petioles (5-90 mm long), at least some of the petioles 1/2 or more the length of the leaf blades; fruit 3-locular (2-locular in C. monanthogynus), dehiscent; seeds 3 per fruit (1 per fruit in C. monanthogynus, the second locule aborting), 2.5-5.5 mm long.

5 Stem leaves mostly 2¥ or more as long as wide); lobes of the calyx of the pistillate flowers 5-9 (-12); [section Pilinophyton].

6 Leaves (the larger) 4-15 cm long, 1.5-6 cm wide (generally 2-3¥ as long as wide), lanceolate to elliptic, cordate at the base; hairs of 2 colors, the shorter gray, the longer tan; lobes of the calyx of the pistillate flowers (6-) 7-9 (-12); [alien, of disturbed habitats] .................................................. C. capitatus var. capitatus

6 Leaves (the larger) 2.5-6 cm long, 0.7-1.5 cm wide (generally 3-6¥ as long as wide), linear to linear-lanceolate, cuneate at the base; hairs of 1 color, all gray; lobes of the calyx of the pistillate flowers 5-6; [native, of Coastal Plain pondshores] ........................................................................................................... C. elliottii

5 Stem leaves mostly < 2¥ as long as wide, 1-8 cm long, broadly cuneate to rounded at the base (a few rarely subcordate); lobes of the calyx of the pistillate flowers 5.

7 Styles 3, each 4-lobed, the style branches thus 12; capsule erect, 5-7 mm long; seeds 4.5-5.0 mm long; lower leaf surface silvery; plant an annual or perennial; [of coastal dunes]; [section Drepanodium].

7 Styles 2 or 3, each 2-lobed, the style branches thus 4 or 6; capsule pendulous, 3-6 mm long; seeds 2.5-4.0 mm long; lower leaf surface white to silvery; plant an annual; [of limestone outcrops, fields, or weedy situations].

8 Fruit 2-locular; seeds 1 per fruit; styles 2, each 2-lobed; [of limestone outcrops or weedy situations]; [section Gynamblosis].

C. monanthogynus
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8 Fruit 3-locular; seeds 3 per fruit; styles 3, each 2-lobed or 4-lobed; [of fields or weedy situations]; [section Velamea] .............................................................. **C. lindheimerianus** var. lindheimerianus

* Croton capitatus Michaux var. capitatus, Woolly Croton, Hogwort, Capitate Croton. Pd, Mt (GA, NC, SC, VA), Cp (GA, NC, SC): fields, disturbed areas; uncommon, adventive from further west (VA Watch List). July-October. [= C, G, K; < Croton capitatus – RAB, W; = Croton capitatus - F, S]  

Croton elliottii Chapman, Pondshore Croton, Elliott's Croton. Cp (GA, SC): shores and exposed drawdown zones of clay-based Carolina bays and limesink ponds (dolines); rare (GA Special Concern, SC Rare). Se. SC south to panhandle FL, west to se. AL. [= K, S]  

* Croton glandulosus Linnaeus var. septentrionalis Müller of Aargau, Doveweed, Tooth-leaved Croton, Sand Croton. Cp, Pd, Mt (GA, NC, SC, VA): fields, roadides, disturbed areas; common. May-October. C. glandulosus is widespread in tropical and subtropical America; var. septentrionalis is the northernmost variety, but its pre-Columbian range is obscure because of its weedy nature. [= RAB, C, F, G, K, S, W]  

* Croton lindheimerianus Scheele var. lindheimerianus, Lindheimer's Croton. Pd (NC): fields and other disturbed soils; rare, adventive from further west. June-October. [= K; < Croton lindheimerianus – RAB]  

Croton michauxii Webster, Sand Rushfoil, Michaux's Croton. Cp (GA, SC, VA?): sandhills, disturbed sandy soils; rare (SC Rare). June-October. Sw. VA, OH, IN, IA, NE, and CO, south to nw. GA, FL, TX, and Mexico; adventive as a weed at scattered locations east of the Blue Ridge. [= RAB, C, F, G, K, S, W]  

**Crotonopsis** (see Croton)  

Ditrysinia Rafinesque 1825 (Sebastian-bush)  

A monotypic genus, a shrub, of the Southeastern United States Coastal Plain. Perhaps as close to Gymnanthes as to Sebastiania. References: Govaerts, Frodin, & Radcliffe-Smith (2000)=Z.  

**Ditrysinia fruticosa** (W. Bartram) Govaerts & Frodin, Sebastian-bush. Cp (GA, NC, SC): swamp forests, other wet to moist, mostly shaded, habitats; uncommon (NC Rare). May-June; July-October. Se. NC south to c. peninsular FL, west to e. TX. [= Z; = Sebastiania fruticosa (W. Bartram) Fernald – GW, K; = Sebastiania ligustrina (Michaux) Müller of Aargau – RAB; = Sebastiana ligustrina – S (orthographic error)]

Euphorbia Linnaeus 1753 (Spurge)  

(also see Chamaesyce)  


1 Bracteal leaves lobed or toothed (rarely linear), usually marked with red or white at the base; glands of the cyathia usually 1 (rarely more), bilabiate, lacking petaloid appendages; [subgenus Poinsettia].
1  Bracteal leaves entire, not marked with red (white-margined in *E. marginata*); glands of the cyathia 4-5, not bilabiate, with or without petaloid appendages.

2  Glands of the cyathia 5 (or 7-10 on the central cyathium in *E. pubentissima*), with petaloid appendages 0.1-5.0 mm long (measured along a radius); these white, maroon, red, pink, or green; stipules present, glandlike, often minute; 

   [subgenus *Tithymalopsis*].

4  Upper stem leaves and bracteal leaves with white margins, ovate, the apex acute; [alien, cultivated and rarely persisting or a waif]; [section *Petaloma*] .................................................................  *E. marginata*

5  Petaloid appendages (0.5-) 1.0-4.4 mm long (measured along a radius), about as long as wide or longer, white; stems (1.5-) 3-9 (-11) dm tall, erect; leaves not ciliate-margined.

6  Nodes below the umbel (6-) 15-26 (-41); cyathia (3.5-) 4.0-5.5 (-6.5) mm wide (across the appendages); stems usually 1-2 (-3) from a crown, each (0.8-) 1.5-2.8 (-3.5) mm in diameter at the base; plants (2-) 4-9 (-1.3) dm tall; leaves ascending, leathery, sessile or subpetiolate; plants flowering June-September; [plants (in our area) of the Mountains, upper Piedmont of NC, lower Piedmont and Coastal Plain of VA] .................................................................  *E. corollata*

7  Leaves 1.9-7.2 cm long, 0.1-0.5 cm wide, averaging > 10× as long as wide; primary inflorescence rays usually 3; [plants south of our area, and possibly in SC] .............................................  *E. discoidalis*

8  Leaf margins ciliate; cyathia 3.5-5.9 mm wide (across the appendages), green; leaves not fleshy, 1.7-2.2 (-3×) as long as wide, not especially variable; [of mesic forests with rich soils] ..............................  *E. mercurialina*  

9  Leaf margins not ciliate (except some marginal hairs in *E. curtisii*); cyathia 2.0-3.4 mm wide (across the appendages), green or maroon; leaves slightly to strongly fleshy, 0.7-20× as long as wide, often very variable in shape, even on the same plant; [of more or less xeric sandhill woodlands with acidic, sandy soils].

10 Cyathia and capsules green; petaloid appendages white or pink; leaves thin-textured, green, finely pubescent with appressed white hairs (0.1-0.3 mm long) on the lower surface and margins (visible at 10× or greater); branching dichotomous from the base of the plant (the branches typically equal, though sometimes unequal) .......................................................................................  *E. ipaeacuanhae*

11 Stems usually 10-18 per crown, decumbent to weakly ascending; leaves opposite (scales on the lower stem sometimes alternate), fleshy, blue-green with a narrow, thickened, red-hyaline margin; branching dichotomous from the base of the plant (the branches typically equal, though sometimes unequal) .......................................................................................  *E. ipaeacuanhae*

12 Ovary and capsule smooth .................................................................  *E. helioscopia*

13 Seeds smooth or very obscurely reticulate, 2-2.5 mm long .....................................................  *E. obtusata*

14 Seeds distinctly alveolate, 1.5-1.8 mm long ........................................................................  *E. spatulata*

11 Principal stem leaves finely serrulate (especially toward the apex); [subgenus *Esula*, section *Tithymalus*].

12 Ovary and capsule verrucose-roughened.

13 Seeds smooth or very obscurely reticulate, 2-2.5 mm long .....................................................  *E. obtusata*

14 Seeds distinctly alveolate, 1.5-1.8 mm long ........................................................................  *E. spatulata*

11 Principal stem leaves entire.

12 Ovary and capsule verrucose-roughened.

13 Seeds smooth or very obscurely reticulate, 2-2.5 mm long .....................................................  *E. obtusata*

14 Seeds distinctly alveolate, 1.5-1.8 mm long ........................................................................  *E. spatulata*
**Euphorbia corollata** Engelmann. Narrow-leaved Winter Spurge. Mt (NC, SC, VA), Cp (GA, VA): common in wet woods, margins of roads, etc. March-May. PA west to s. ON and MN, south to FL and TX. The southern var. (**Euphorbia corollata** falcata) has leaves only 1-2 cm long; annual, or perennial by basal offshoots, to 0.4 m tall; seeds pitted, 1.3-2.0 mm long; rays of the umbel usually 3-5; [subgenus Esula, section Esula].

**Euphorbia falcata** 

15 Stem leaves linear to narrowly oblong, averaging ca. 10× as long as wide; [subgenus Esula, section Esula].
16 Stem leaves 1-3 cm long, 1-3 mm wide ................................................................. **E. cyparissias**
16 Stem leaves 3-8 cm long, 4-8 mm wide ............................................................... **E. esula**
15 Stem leaves oblanceolate, obovate, elliptic, or oblong, 1-10 cm long, 5-30 mm wide, averaging 1-5× as long as wide.
17 Principal stem leaves elliptic to oblong, (5-) 7-10 cm long; rhizomatous perennial to 1 m tall; seeds smooth, 3-4 mm long; rays of the umbel usually 5-8; [subgenus Esula, section Tithymalus] ..............

**Euphorbia commutata**

Panhandle FL and e. TX. Park (1998) includes in synonymy March-May. PA west to s. ON and MN, south to FL and TX. The southern var. (**Euphorbia commutata** gracilior) has all the cauline leaves oblanceolate and with petioles 5-12 mm long; var. **commutata** has leaves varying from oblanceolate to obovate or ovate, the upper leaves usually broad and sessile. [= RAB, F, K, Q, W; > Eu. commutata var. **commutata** – C, G; > Eu. commutata var. **erecta** J.B.S. Norton – C, G; = Galarhoeus commutatus (Engelmann) Small – S]

**Euphorbia corollata** Linnaeus, Eastern Flowering Spurge. Mt (GA, NC, SC, VA), Pd (GA, NC, VA), Cp (VA): woodlands and forests; common. June-September. NH and MA west to s. Ontario, MI, WI, MN, and NE, south to se.VA, c. NC, n. GA, s. AL, and e. TX. Huft (1979) considered *Eu. marilandica* a sporadic growth form of *Eu. corollata*. [= K, Y, Z; = Eu. corollata var. **corollata** – RAB; > Eu. corollata var. **corollata** – C, F; > Eu. marilandica Greene – C, F, G; >> Eu. corollata – G, W (also see *Eu. pubentissima*); = Tithymalopsis corollata (Linnaeus) Klotzsch – S; < Eu. corollata var. **corollata** – Q (also see *Eu. discoidea*)]

**Euphorbia curtisii** Engelmann, White Sandhills Spurge, Curtis's Spurge. Cp (GA, NC, SC): sandhills; common. Late March-June. Sc. and se. NC to ne. FL and w. panhandle FL, on the Coastal Plain. Less variable in leaf shape than *Eu. ipecacuanhae* or *Eu. esula*. [= RAB, GW, K, Q, Y, Z; > Tithymalopsis curtisii (Engelmann) Small – S; > Tithymalopsis eriogonoides Small – S]


**Euphorbia dentata** Michaux, Painted Leaf, Wild Poinsettia, Toothed Spurge. Mt (GA, NC, VA), Pd (NC, SC, VA), Cp (VA): disturbed areas, hedgerows, thickets, railroad cinders; common, introduced from further west. July-October. [= RAB, C, F, G, Q, W; Eu. dentata var. **dentes** – K; = Poinsettia *dentata* (Michaux) Klotzsch & Garcke – S]

**Euphorbia discoidea** Chapman, Summer Spurge. Cp (GA): sandhills. E. and c. GA (or e. SC?) south and west to Panhandle FL and e. TX. Park (1998) includes in synonymy *Eu. corollata* var. *angustifolia* Elliott, with a stated type locality is e. SC. [= K, Y; = Tithymalopsis discoidea (Chapman) Small – S; < Eu. corollata var. **corollata** – Q; > Tithymalopsis discoidea (Linnaeus) Scopoli]

**Euphorbia esula** (Small) Coker, Maroon Sandhills Spurge, Coastal Sand Spurge. Cp (GA, NC, SC, VA): sandhills; uncommon. March-June. Sc. NC south to c. peninsular and e. panhandle FL; disjunct in se. VA (Sussex County) (Belden et al. 2004). The leaves are extremely variable in size and shape, from linear to rotund. Park (1998) recognizes *Eu. esula* and *Eu. gracilior* as distinct from one another, differing in the involucre (purple in *Eu. esula* and green in *Eu. gracilior*) and the appendages (rudimentary and purple in *Eu. esula* and semicircular and white in *Eu. gracilior*). [= K, Q, Z; = Eu. gracilior Cronquist – RAB; > Tithymalopsis esula Small – S; > Tithymalopsis gracilis (Boissier) Small – S; > Eu. esula – Y; > Eu. gracilior – Y]

**Euphorbia falcata** Linnaeus. Mt, Pd (VA): disturbed areas; rare, introduced from Europe. [= C, F, G, K; > Eu. falcata ss. falcata – Q]
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Euphorbia ipecacuanhae* Linnaeus, Carolina Ipecac. Cp (GA, NC, SC, VA): sandhills; common. February–May (and later, especially in response to fire). CT (formerly), NY (Long Island), NJ, and se. PA (Rhoads & Klein 1993) south to ec. GA, on the Coastal Plain. The leaves are extremely variable in size and shape, from linear to rotund. Huft (1979) considered Eu. arundelanae Bartlett (reported from MD, SC, and GA) a sporadic form of Eu. ipecacuanhae. Park (1998) suggested that Eu. ipecacuanhae is actually a member of Chamaesyce (treated by Park as a subgenus), rather than of Euphorbia. [= RAB, C, G, K, Q, Z; > Eu. ipecacuanhae – F; Eu. arundelanae Bartlett – F; = Tithymalopsis ipecacuanhae (Linnaeus) Small – S]

* Euphorbia latyris* Linnaeus, Caper Spurge, Myrtle Spurge, Mole Plant. Mt (NC, SC, VA); Pd (VA), Cp (VA): roadsides, disturbed areas; rare, introduced from Europe. June–August. [= RAB, F, K, Q, W; = Eu. latyris – C, G, an orthographic variant; = Galarhoeus latyris – S]

* Euphorbia marginata* Pursh, Snow-on-the-mountain. Cp (GA, NC, SC, VA), Pd (GA, VA), Mt (VA): roadsides, disturbed areas; uncommon, introduced from further west. July–November. [= RAB, C, F, G, K, Q; = Lepadona marginata (Pursh) Nieuwland – S; = Agaloma marginata (Pursh) A. & D. Löve]


* Euphorbia peplus* Linnaeus, Petty Spurge. Mt (VA): disturbed areas; rare, introduced from Eurasia. [= C, F, G, K; = Galarhoeus peplus (Linnaeus) Haworth – S; > Eu. peplus var. minima Augustin de Candolle – Q; > Eu. peplus var. peplus – Q; = Tithymalus peplus (Linnaeus) Hill]


Euphorbia purpurea* (Rafinesque) Fernald, Glade Spurge, Darlington Spurge, Purple Spurge. Mt (NC, VA): rich moist forests in bottomlands or on slopes, in rich soil around rock outcrops, especially over calcareous rocks (such as dolomite) or mafic rocks (such as amphibolite); rare (US Species of Concern, NC Rare, VA Rare). May–August. NJ, PA, and OH south to w. NC. [= RAB, C, F, G, K, Q, W; = Galarhoeus darlingtonii (A. Gray) Small – S]

Euphorbia spathulata* Lamarck, Prairie Spurge, Warty Spurge. Mt (NC?, VA): rocky woodlands; rare? May–June. MN and WA south to w. VA, AL, LA, TX, and Mexico. [= C, W; ? Eu. dictyosperma Fischer & Meyer – F, G; < Eu. spathulata – K, Q (also see Eu. obtusata); ? Galarhoeus arkansanus (Engelmann & A. Gray) Small ex Rydberg – S]

* Euphorbia davidii* Subils, introduced in se. TN (Chester, Wofford, & Kral 1997). Also in our area according to Kartesz (1999). {investigate} [= K, Q; = Eu. dentata var. gracillima Millsphaugh] [not keyed at this time]

Euphorbia exigua* Linnaeus, Dwarf Spurge, in PA and WV (Kartesz 1999). [= K; Eu. exigua ssp. exigua – Q] [not keyed at this time]


Euphorbia heterophylla* Linnaeus, in GA (Kartesz 1999). [= K, Q] [not keyed at this time]

Euphorbia inudata* Torrey ex Chapman var. inudata. Cp (GA): In se. GA (Bridges & Orzell 2002). [= X; < Eu. inudata – K, Q] [not keyed at this time]

Euphorbia tetrapora* Engelmann. In GA (Kartesz 1999). GA west to TX. [= K, Q] [not keyed at this time]

Manihot P. Miller 1754 (Cassava)

A genus of about 100 species, trees, shrubs, and herbs, of tropical and subtropical America. References: Govaerts, Frodin, & Radcliffe-Smith (2000)=Z.

* Manihot grahamii* Hooker, Graham's Cassava. Cp (GA): disturbed areas; grown as an ornamental, rarely naturalizing. Introduced in sw. GA (Jones & Coile 1988) and FL west to LA. [= K, Z] [add to genus key]

* Manihot esculenta* Crantz, Manioc, Tapioca, is naturalized on the Gulf Coast, as in AL and FL. [= K; = Jatropha manihot Linnaeus – S] [not keyed; add to synonymy]

* Mercurialis* Linnaeus 1753 (Mercury)
A genus of about 8 species, herbs, of the Old World. References: Govaerts, Frodin, & Radcliffe-Smith (2000)=Z.

* *Mercurialis annua* Linnaeus, Annual Mercury, Boys-and-girls, has been reported as a rare "ballast weed" from Charleston, SC and Mobile, AL (Wiggins 1932). It is presumably not established in our area. [= C, F, K, S, Z] {not keyed}

**Ricinus** Linnaeus 1753 (Castor-bean)

A monotypic genus, a shrub or tree, native to Africa and w. Asia, now pantropical. References: Govaerts, Frodin, & Radcliffe-Smith (2000)=Z.

* *Ricinus communis* Linnaeus, Castor-bean, Castor-oil Plant, Palma Christi. Cp (GA, NC, SC, VA), Pd (NC, SC): waste places, gardens; rare, native of the tropics, probably Africa. July-October. The seeds are dangerously poisonous, formerly the source of an oil used as a purgative and machine lubricant. In FL and further south in the tropics, *R. communis* is a small to medium tree. [= RAB, C, F, G, K, S, Z]

**Sapium** P. Browne (Chinese Tallow-tree)

(see *Triadica*)

**Sebastiania** Sprengel (Sebastian-bush)

(see *Ditrysinia*)

**Stillingia** Garden ex Linnaeus (Queen's-delight)


1. Stems woody, single; leaves < 1 cm wide; [of pineland ponds and other aquatic habitats] ...................................... *S. aquatica*

1. Stems herbaceous, several from a crown; leaves > 1 cm wide; [of dry habitats] ........................................... *S. sylvatica ssp. sylvatica*

**Stillingia aquatica** Chapman, Corkwood, Water Toothleaf. Cp (GA, SC): ponds in pine flatwoods; rare (SC Rare). May-September. Se. SC south to s. FL, west to sw. AL. [= RAB, K, S, Z]

**Stillingia sylvatica** Garden ex Linnaeus ssp. sylvatica, Queen's-delight. Cp (GA, NC, SC, VA), Pd (GA): sandhills, dryish coastal plain woodlands; common (VA Rare). May-July; June-September. Se. VA south to FL, west to TX and NM, north in the interior to KS. Ssp. *tenuis* (Small) D.J. Rogers is in s. FL. [= K, Z; < *S. sylvatica* – RAB, C, G; > *S. sylvatica* var. sylvatica – F; > *S. sylvatica* – S; > *S. spathulata* (Müller of Aargau) Small – S]

**Tragia** Linnaeus 1753 (Noseburn)

A genus of about 100-170 species, of tropical to warm temperate regions of the Old and New Worlds. References: Miller & Webster (1967)=Z; Govaerts, Frodin, & Radcliffe-Smith (2000)=Y.

1. Plant vining and trailing; larger leaf blades on a plant > 5 cm wide and > 8 cm long.............................................................. *T. cordata*

1. Plant not vining, erect; larger leaf blades on a plant < 3.5 cm wide and < 8 cm long.

2. Leaf base cuneate at base; leaf blade 3-20× as long as wide. ................................................................. *T. urens*

2. Leaf base cordate, subcordate, truncate, or broadly rounded at base; leaf blade 1-3× as long as wide.

3. Petioles 1-4 mm long; leaves rounded to acute at the tip; stamens 2 (-3) .................................................... *T. smallii*

3. Petioles 3-17 mm long; leaves acute to acuminate at the tip; stamens 3 .................................................. *T. urticifolia*

**Tragia cordata** Michaux, Heartleaf Noseburn. Cp (GA): rocky calcareous woodlands, calcareous prairies; rare (GA Rare). C. KY, s. IN to s. MO, south through e. TN, rarely to e. TN (Meigs County, in the Ridge and Valley Province) (Chester, Wofford, & Kral 1997), n. AL (Jackson Co.) (D. Spaulding pers. comm.) to sc. and sw. GA, Panhandle FL, and e. TX. [= C, K, Z; = *T. macrocarpa* Willdenow – S]

**Tragia smallii** Shinners, Gulf Coast Noseburn. Cp (GA): sandhills; uncommon. Sw. GA west to e. TX. Reports of *T. betonicaefolia* from GA are based on misapplication of that name to material representing *T. smallii*. [= K, Z; = *T. betonicaefolia* Nuttall – S, misapplied; *T. betonicaefolia* Nuttall, misapplied]

**Tragia urens** Linnaeus, Southeastern Noseburn, Wavyleaf Noseburn. Cp (GA, NC, SC, VA), Pd (GA, NC, SC), Mt (SC): sandhills, sandy woodlands, other woodlands; common (rare in Piedmont and Mountains). May-October. Se. VA south to FL and west to TX, mostly on the Coastal Plain, but ranging into the mountains southward. [= RAB, C, F, G, K, S, W, Z; = *T. linearifolia* Elliott – S]
EUPHORBIACEAE

Tragia urticifolia Michaux, Nettleleaf Noseburn. Pd (GA, NC, SC, VA), Cp (GA, SC), Mt (SC): dry woodlands and rock outcrops, particularly over mafic or calcareous rocks; common (VA Rare). May-October. Sc. VA west to MO, KS, and CO, south to FL and AZ. [= RAB, F, G, K, W; = T. urticaefolia – S, orthographic variant]

Triadica Loureiro 1790 (Chinese Tallow-tree)

A genus of 2-3 species, native to tropical and subtropical Asia. The most recent monographers of Sapium and related genera (Kruijt 1996; Esser 2002) place our single naturalized species in the genus Triadica, native to Asia; Sapium (excluding Triadica) is a genus of 21 species restricted to the neotropics. This conclusion is corroborated by molecular phylogenetic analysis (Wurdack, Hoffmann, & Chase (2005). References: Kruijt (1996)=Z; Esser (2002)=Y; Govaerts, Frodin, & Radcliffe-Smith (2000)=X.

* Triadica sebifera (Linnaeus) Small, Chinese Tallow-tree, Popcorn Tree. Cp (GA, NC, SC): marsh edges, shell deposits, disturbed areas; uncommon. May-June; August-November, native of e. Asia. With Euphorbia, Chamaesyce, and Cnidoscolus, one of our few Euphorbiaceous genera with milky sap. Triadica has become locally common from Colleton County, SC southward through the tidewater area of GA, and promises to become a serious weed tree (as it is in parts of LA, TX, and FL). [= K, S, X, Y, Z; = Sapium sebiferum (Linnaeus) Roxburgh – RAB, GW]

Vernicia Loureiro 1790 (Tung-oil Tree)


* Vernicia fordii (Hemsley) Airy-Shaw, Tung-oil Tree, Tung Tree. Cp (GA, NC): planted for the oil and for ornament, rarely naturalizing; rare, introduced from central and western China. Naturalized in GA, from former plantations; planted and showing a tendency to naturalize in the Coastal Plain of NC (Mount Olive, Wayne Co.). [= K, Z; = Aleurites fordii Hemsley]

FABACEAE Lindley 1836 or LEGUMINOSAE A.L. de Jussieu 1789 (Legume Family)

A family of about 730 genera and 20,000 species, trees, shrubs, and herbs, cosmopolitan. References: Isely (1990)=SE (throughout the family treatment); Wojciechowski, Lavin, & Sanderson (2004); Wilbur (1963); Isely (1998)=I; Robertson & Lee (1976).

1 Trees, shrubs, or woody vines.................................Key A

1 Herbs (including herbaceous vines).

2 Leaves 4-many-foliolate.

3 Leaves palmately compound, with 4 or more leaflets........................................................................Key B

3 Leaves pinnately or bipinnately compound.

4 Leaves bipinnately compound........................................Key C

4 Leaves pinnately compound........................................Key D

2 Leaves 1-3-foliolate.

5 Leaves unifoliolate................................................Key E

5 Leaves trifoliolate.

6 Leaves pinnately trifoliolate........................................Key F

6 Leaves palmately trifoliolate........................................Key G

Key A – woody legumes (trees, shrubs, or woody vines)

1 Leaves unifoliolate or trifoliolate, or reduced to phyllodial spines.

2 Tree; leaves unifoliolate and > 5 cm wide; [subfamily Caesalpinoideae, tribe Cercideae].................................Cercis

2 Shrubs or woody vines (rarely tree in Erythrina); leaves trifoliolate, unifoliolate, or reduced to phyllodial spines (if unifoliolate, < 2 cm wide); [subfamily Papilionoideae]

3 Woody vine.

4 Calyx 4.5-6 mm long; leaflets unlobed; [tribe Phaseoleae, subtribe Diocleinae].................................................Dioeca

4 Calyx 10-12 mm long; leaflets generally lobed; [tribe Phaseoleae, subtribe Glycininae].................................Pueraria

3 Shrub or tree.

5 Shrub or tree with twigs various, but not conspicuously green or flanged; leaves pinnately trifoliolate.

6 Corolla 30-50 mm long, scarlet; legume with several seeds; leaflets lobed; [tribe Phaseoleae, subtribe Erythrininae]..........................................................Erythrina

6 Corolla 8-15 mm long, purplish, pink, or white; legume 1-seeded; leaflets not lobed; [tribe Desmodieae, subtribe Lespedezinae]........................................Lespedeza