

SALICACEAE (Willow Family)

A family of 2 genera and about 435 species, trees, shrubs, and subshrubs, nearly cosmopolitan.

- 1 Leaf blades 0.8-2 (-3)x as long as wide; stamens 5-80; buds covered by several, overlapping scales; flowering catkins arching or drooping **Populus**
- 1 Leaf blades (2-) 3-30x as long as wide; stamens 1-9; buds covered by a single scale; flowering catkins usually erect or ascending **Salix**

Populus Linnaeus (Poplar, Aspen, Cottonwood)

A genus of about 35 species, trees, largely north temperate.

(Significant rework pending)

- 1 Mature leaves densely white-tomentose beneath; leaves weakly 3-9 lobed or coarsely and irregularly toothed **P. alba**
- 1 Mature leaves glabrous or glabrescent (densely pubescent beneath when young in *P. heterophylla* and *P. grandidentata*); leaves regularly and finely or coarsely toothed, but not lobed.
 - 2 Petioles terete, nearly terete, flattened only adjacent to the blade, or slightly flattened throughout.
 - 3 Leaves obtuse or rounded at the tip, cordate at the base; buds not viscid; [native trees mostly of swamps of the Coastal Plain] **P. heterophylla**
 - 3 Leaves acuminate or acute at the apex, truncate, subcordate, or cordate at the base; buds viscid (sticky and shiny as if recently varnished); [introduced trees mostly of riverbanks of the Mountains] **P. xjackii**
 - 2 Petioles distinctly flattened laterally.
 - 4 Leaves with a well-developed translucent or whitened border broader than the adjacent main veinlets (use 10x magnification); leaves rather triangular or deltoid in shape, the base often subcordate or truncate; leaf teeth incurved and callous-tipped (at 10x); bark rough; stamens 15 or more; ament scales glabrous, ciliate-margined with numerous segments.
 - 5 Leaf blades (6-) 7-12 (-20 cm wide; sinuses between the largest teeth of leaf blade (1.5-) 2-5 mm deep; [native large trees] **P. deltoides** var. **deltoides**
 - 5 Leaf blades usually less than 8 cm wide; sinuses between the largest teeth of leaf blade 1-2 mm deep; [introduced small trees, generally obviously alien] **P. nigra**
 - 4 Leaves lacking a well-developed translucent or whitened border broader than the adjacent main veinlets (use 10x magnification); leaves mostly rounded or orbicular, the base often rounded or broadly cuneate; stamens less than 12; ament scales pilose, also fringed with only 3- 7 (-10) linear to lanceolate segments.
 - 6 Leaf margins coarsely crenate- or undulate-toothed, with fewer than 12 (-15) teeth per side, the sinuses of the larger teeth 1.5-6 mm deep; leaves puberulent beneath when young (glabrate in age) **P. grandidentata**
 - 6 Leaf margins finely crenulate-serrulate, with 15-35 (-70 teeth per side, the sinuses 0.5-1.0 mm deep; leaves glabrous **P. tremuloides**

* **Populus alba** Linnaeus, Silver Poplar, White Poplar. Mt, Pd, Cp (NC, SC, VA): disturbed areas, suburban woodlands; common, native of Europe. March-April. [= RAB, C, F, G, K, S, W]

Populus deltoides Bartram ex Marshall var. **deltoides**, Eastern Cottonwood. Pd, Cp (NC, SC, VA), Mt (VA): riverbanks, bottomland forests (not found along blackwater streams); common. March-April. Var. **deltoides** ranges from Quebec west to MN, south to FL and TX. Var. **occidentalis** Rydberg [ssp. **monilifera** (Aiton) Eckenwalder] is more western, primarily of the Great Plains. [= C, F, GW; *P. deltoides* -- RAB, G, W, infraspecific taxa not distinguished; *P. deltoides* var. **missouriensis** (A. Henry) A. Henry -- F; *P. deltoides* ssp. **deltoides** -- K; *P. balsamifera* Linnaeus -- S, misapplied]

Populus grandidentata Michaux, Bigtooth Aspen. Mt (NC, VA), Pd, Cp (VA): dry, rocky, upland forests; common, rare south of VA (NC Watch List). April-May. Nova Scotia west to MN, south to w. NC, sc. TN, and n. MO. [= RAB, C, F, G, K, S, W]

Populus heterophylla Linnaeus, Swamp Cottonwood. Cp (NC, SC, VA), Pd (NC, VA): blackwater and brownwater swamp forests; common (rare in Piedmont). March-April. CT west to MI, south to n. FL and LA, scattered and irregular in distribution, absent from the Appalachians. [= RAB, C, G, GW, K, S]

* **Populus xjackii** Sargent, Balm-of-Gilead. Mt (NC, VA): bottomlands, riverbanks, streambanks; rare or locally abundant, spread from cultivation. April. This cultivar is of uncertain origin, considered by some to be a hybrid *P. balsamifera* x *deltoides*, by others to be an atypical pistillate clone of *P. balsamifera* Linnaeus. It is locally abundant along the New River in Watauga, Ashe, and Alleghany counties, NC. [= C, K; *P. candicans* Aiton -- RAB, G, S, misapplied; *P. xgileadensis* Rouleau -- W]

* **Populus nigra** Linnaeus, Black Poplar, Lombardy Poplar. Pd (VA): disturbed suburban areas; rare, introduced from s. Europe. Cultivated in many forms, including the columnar "Lombardy Poplar;" short-lived and only weakly spreading to disturbed areas in the vicinity of plantings. [= F, G, K; *P. italica* (Du Roi) Moench -- S]

Populus tremuloides Michaux, Quaking Aspen. Mt (NC, VA), Pd (VA): heath balds, rocky woodlands, exposed rock outcrops, and clearings; rare (VA Rare). April-May. Labrador west to AK, south to NJ, VA, w. NC, WV, MO, and (in the Rockies) to TX and Mexico. [= C, G, K, S, W; *P. tremuloides* var. **tremuloides** -- F]

Populus balsamifera Linnaeus, Balsam Poplar, Hackmatack, ranges south to s. PA (Rhoads & Klein 1993) and to VA (according

to Kartesz 1999). {investigate} [= C; *P. balsamifera* ssp. *balsamifera* -- K] {not yet keyed}

Populus xcanadensis Moench (pro sp.) [*P. deltoides* x *nigra*], is reported for a county in c. GA (Jones & Coile 1988) and for NC and VA (Kartesz 1999). [= K] {not yet keyed}

Populus xcanescens (Aiton) Sm. (pro sp.) [*P. alba* x *tremula*], occurs at scattered locations in TN, n. GA (Jones & Coile 1988), se. PA (Rhoads & Klein 1993), and NC, SC, and VA (Kartesz 1999). [= K] {not yet keyed}

Populus simonii Carrière, Chinese Poplar. Mt (NC): riverbanks; rare, native of China. Naturalized in the Mountains of NC. [specimen at NCU] {not yet keyed}

Salix Linnaeus (Willow)

A genus of about 400 species, trees, shrubs, and subshrubs, mostly north temperate and boreal. References: Argus (1986)=Z; Dorn (1995), abbreviated as Y. Key adapted from Z.

- 1 Leaves mostly alternate, but some opposite or subopposite ***S. purpurea***
- 1 Leaves all alternate.
 - 2 Bud apex sharp-pointed; bud scale margin free and overlapping; leaf length/width ratio 5-13.
 - 3 Leaves glaucous beneath; pistils borne on stipes averaging 2 mm long (range 1-5 mm); stipules usually prominent and persistent, to 15 mm long; leaf length/width ratio averaging 7.5 (range 4-13).... ***S. caroliniana***
 - 3 Leaves not (or thinly) glaucous beneath; pistils borne on stipes averaging 1 mm long (range 0.5-1.5 mm); stipules usually small and caducous, to 12 mm long; leaf length/width ratio averaging 9 (range 4-16) ***S. nigra***
 - 2 Bud apex blunt; bud scale margin fused; leaf length/width ratio 2-30.
 - 4 Leaves green or pale green beneath.
 - 5 Leaves linear, (7-) 11-19 (-30)x as long as wide; leaf margin distinctly glandular-denticulate; stomates present on the upper leaf surface; pistils pubescent to glabrescent; stamens 2, the staminate floral bracts tawny, the aments on leafy branches ***S. exigua* var. *sericans***
 - 5 Leaves lanceolate or elliptic-lanceolate, 2-6x as long as wide; leaf margin serrate; stomates usually absent on the upper leaf surface; pistils glabrous; stamens 3, or if 2 (*S. eriocephala*), the staminate floral bracts dark brown, the aments sessile with a few leafy bracts.
 - 6 Stipules not glandular on their margins; pistillate floral bracts present after flowering; petioles not glandular; stamens 2 ***S. eriocephala* var. *eriocephala***
 - 6 Stipules glandular on their margins (stipules caducous and often absent in *S. pentandra*); pistillate floral bracts deciduous after flowering; petioles glandular near the junction with the blade; stamens 3-9.
 - 7 Stipules persistent and prominently glandular; young leaves and twigs with reddish-brown hairs, glabrescent or glabrous later; leaves long-acuminate; capsules 5-7 mm long ***S. lucida***
 - 7 Stipules caducous, inconspicuously glandular; young leaves and twigs glabrous; leaves short-acuminate; capsules 8-9 mm long ***S. pentandra***
 - 4 Leaves glaucous beneath.
 - 8 Leaf margin serrulate or serrate.
 - 9 Shrubs to 6 m tall; leaves lacking stomates on the upper surface; [plants native to our area].
 - 10 Stipules prominent, 5-15 mm long; branches flexible; mature leaves glabrous or glabrescent beneath; staminate aments borne on short, leafy branches ***S. eriocephala* var. *eriocephala***
 - 10 Stipules absent or of small glands (rarely to 4 mm long on vigorous shoots); branches brittle; mature leaves short-sericeous beneath; staminate aments sessile, sometimes with a few leafy bracts ***S. sericea***
 - 9 Trees; leaves with stomates on the upper surface; [plants introduced in our area].
 - 11 Leaf margin coarsely and irregularly serrate; leaves glabrous beneath; leaf blade 4-7 (-10)x as long as wide; petioles (7-) 10-20 mm long, glabrous ***S. fragilis***
 - 11 Leaf margin minutely and uniformly serrulate; leaves long-sericeous or glabrate beneath; leaf blade 5-13x as long as wide; petioles 3-12 mm long, tomentose or sericeous.
 - 12 Leaves glabrate beneath; branches normally pendulous; leaves very narrowly lanceolate, with length/width ratio of 6.5-13; petioles 7-12 mm long; petioles 7-12 mm long, tomentose; flowering branchlets ca. 0.3 cm long ***S. babylonica***
 - 12 Leaves long-sericeous beneath; branches ascending (rarely pendulous); leaves narrowly lanceolate, with length/width ratio of 5-6.5; petioles 3-6 mm long; petioles 3-6 mm long, sericeous; flowering branchlets 1-1.5 cm long ***S. alba***
 - 8 Leaf margin entire or crenate (to slightly and irregularly serrate).
 - 13 Leaves glabrate (sparsely pubescent when young), not revolute ***S. discolor***
 - 13 Leaves permanently pubescent, at least on the lower surface (densely villous or tomentose when young), revolute.
 - 14 Leaf margin entire and undulate; pistillate aments 1-3.5 cm long; pistils borne on stipes mostly less than 2 mm long; staminate aments 0.5-2 cm long; plants shrubs less than 2 m tall.

- 15 Leaves stipulate; leaf blades (5-) avg. 7 (-13) cm long, (12-) avg. 17 (-35) mm wide; staminate aments 1-2 cm long; pistillate aments 2-3.5 cm long... **S. humilis**
- 15 Leaves exstipulate; leaf blades (2.5-) avg. 4 (-5) cm long, (5-) avg. 7 (-10) mm wide; staminate aments 0.5-1.1 cm long; pistillate aments 1-2 cm long... **S. occidentalis**
- 14 Leaf margin crenate or irregularly serrate (rarely nearly entire); pistillate aments 3-8 cm long; pistils borne on stipes mostly more than 2 mm long; staminate aments 2-5 cm long; plants shrubs to small trees, mostly 3-15 m tall.
- 16 Trees or tall shrubs, to 15 m tall; decorticated wood of 1-4 year old branches smooth or with a few ridges usually less than 5 mm long... **S. caprea**
- 16 Shrubs, 3-7 (12) m tall; decorticated wood of 1-4 year old branches with numerous ridges, many of them longer than 2 cm.
- 17 Leaves tomentose beneath with a mixture of white and rusty hairs... **S. atrocinerea**
- 17 Leaves tomentose beneath with white or gray hairs... **S. cinerea**

- * **Salix alba** Linnaeus, European White Willow. Mt, Pd (NC, VA), Cp (VA): disturbed areas; rare, native of Eurasia. March-April. [= RAB, C, F, G, S, W, Z; *S. alba* var. ?? -- K]
- * **Salix atrocinerea** Brot., Common Sallow, Olive-leaf Willow. Mt (NC): disturbed areas; rare, native of western Europe. April. [= K; *S. cinerea* Linnaeus ssp. *oleifolia* (Smith) Macreight -- Z; *S. cinerea* -- RAB, C, F, G, in part]
- * **Salix babylonica** Linnaeus, Weeping Willow. Mt, Pd, Cp (NC, VA): disturbed areas; common, native of Asia. March-April. [= RAB, C, F, G, K, S, W, Z; *S. xpendulina* Wenderoth (*fragilis* x *?sepulcralis*) -- K; *S. xsepulcralis* Simonkai (*alba* x *?pendulina*) -- K]
- * **Salix caprea** Linnaeus, Goat Willow, Great Sallow. Mt (NC, VA), Pd (VA): disturbed areas; rare, native of Eurasia. April. [= C, F, G, K, Z]
- Salix caroliniana** Michaux, Carolina Willow, Coastal Plain Willow. Cp, Pd, Mt (NC, SC, VA): riverbanks, sandbars, other wet sites; common (uncommon to rare in Piedmont and Mountains). March-April. Widespread in the Southeast, *S. caroliniana* has a somewhat peculiar range, with three main centers of distribution, the Coastal Plain from VA south to FL, the Interior Low Plateau of TN, KY, and n. AL, and the Ozark-Ouachita Highlands of AR and MO. [= RAB, C, F, G, GW, K, Z; *S. longipes* Andersson -- S]
- * **Salix cinerea** Linnaeus, Gray Willow. Mt, Pd (NC, SC, VA), Cp (NC): disturbed areas; rare, native of Eurasia. April. [= K; *S. cinerea* ssp. *cinerea* -- Z; *S. cinerea* -- RAB, C, F, G (circumscription uncertain but apparently including *S. atrocinerea*)]
- Salix discolor** Muhlenberg, Pussy Willow. Mt (VA), Pd (NC): calcareous wetlands, disturbed areas; rare, apparently native in VA, introduced only in NC (VA Rare). April. Newfoundland and Alberta south to DE, w. VA, KY, MO, SD, and MT. [= C, K, S, Z; *S. discolor* var. *discolor* -- F, G]
- Salix eriocephala** Michaux var. **eriocephala**, Heart-leaved Willow. Mt, Pd, Cp (VA): seepage areas, ditches, alluvial areas; common. April-May. Newfoundland and Québec west to Yukon and British Columbia, south to e., c., and w. VA, n. KY, w. TN, n. AR, ne. KS, and CA; disjunct in AL and adjacent w. GA, s. GA, and panhandle FL. Var. *eriocephala* is the more eastern of six varieties, and ranges from Newfoundland west to ND, south to w. FL and s. KS (Dorn 1995). [*S. eriocephala* -- C, K, W, Z, infraspecific taxa not distinguished; *S. rigida* Muhlenberg var. *rigida* -- F, G; *S. rigida* var. *angustata* (Pursh) Fernald -- F; *S. cordata* Muhlenberg -- S, misapplied; *S. eriocephala* ssp. *eriocephala* var. *eriocephala* -- Y]
- Salix exigua** Nuttall var. **sericans** (Nees) Nesom, Sandbar Willow. Mt, Pd, Cp (VA): sandbars, riverbanks, creekbanks; rare (VA Rare). March-mid May and June-August. *S. exigua* occurs throughout North America except most of the Southeast, south to DE, w. VA, e. TN, MS, LA, TX, and Mexico; var. *sericans* is the more eastern variety of the complex (Nesom 2002). [*Salix exigua* -- K, W, Z, in the broad sense; *S. exigua* ssp. *interior* (Rowlee) Cronquist var. *angustissima* (Andersson) Reveal & Broome -- C; *S. interior* Rowlee var. *interior* -- F, G; *S. interior* Rowlee -- GW, S]
- * **Salix fragilis** Linnaeus, Crack Willow, Brittle Willow. Pd (VA): low areas; rare, native to Asia Minor, introduced to Europe and thence to here. [= C, F, G, K, S, Z]
- Salix humilis** Marshall, Upland Willow, Prairie Willow. Mt, Pd (NC, VA), Cp (NC, SC, VA): upland areas, often in open or semi-open sites, in barrens, fens, and grassy balds over mafic rocks (such as amphibolite) up to at least 1800m elevation, also in powerline rights-of-way, woodland borders, and other miscellaneous habitats; uncommon. March-May. This species is widespread in e. North America. [= C, G, S; *S. humilis* -- RAB, GW, in part only (see also *S. occidentalis*); *S. humilis* var. *humilis* -- F, K, W, Z; *S. humilis* var. *hyporhysa* Fernald -- F]
- * **Salix lucida** Muhlenberg, Shining Willow. Mt (VA): low areas; rare (VA Watch List). May. Doubtfully indigenous to the one known population in Roanoke County, VA. [= C, W, Z; *S. lucida* var. *lucida* -- F, G; *S. lucida* ssp. *lucida* -- K]
- Salix nigra** Marshall, Black Willow. Pd, Mt, Cp (NC, SC, VA): riverbanks, sandbars, other moist areas; common. March-April. *S. nigra* occurs nearly throughout e. North America. [= RAB, F, G, GW, K, S, W, Z; *S. nigra* var. *nigra* -- C]
- Salix occidentalis** Walter, Dwarf Upland Willow, Sage Willow. Mt, Pd (NC, VA), Cp (NC, SC, VA): upland areas, often over mafic (amphibolite) or ultramafic (olivine) rocks; uncommon. March-May. This species is less widespread than the related *S. humilis*, with a distribution centered in the central Appalachians. [= C; *S. humilis* -- RAB, GW, in part; *S. humilis* var. *microphylla* (Andersson) Fernald -- F, W, Z; *S. tristis* Aiton -- G, S; *S. humilis* var. *tristis* (Aiton) Griggs -- K]
- * **Salix pentandra** Linnaeus, Bay Willow. Pd, Mt (NC, VA): disturbed areas; rare (perhaps not established), introduced from Eurasia. April. [= C, F, G, K, Z]
- * **Salix purpurea** Linnaeus, Basket Willow, Purple Willow, Purple Osier. Mt (NC, VA): disturbed areas; rare, native of Europe. April. [= RAB, C, F, G, K, S, Z]
- Salix sericea** Marshall, Silky Willow. Mt, Pd, Cp (NC, SC, VA): bogs, peaty swamps, banks of small streams; uncommon.

March-April. *S. sericea* is a northeastern species, ranging south to w. NC, ne. GA, e. TN, sc. TN, AL, and AR. [= RAB, C, F, G, GW, K, S, W, Z]

Salix bebbiana Sargent, Long-beaked Willow, Gray Willow, is widespread and rather common in PA (Rhoads & Klein 1993) and also occurs in MD (Kartesz 1999). [= K]

Salix cordata Michaux, south to MD, PA (Kartesz 1999). [= K] {not yet keyed}

Salix elaeagnos Scopoli is reported for SC (Kartesz 1999). {investigate} [= K] {not yet keyed}

Salix floridana Chapman, Florida Willow. Cp (GA): sphagnous seepages; rare (GA Endangered). c. GA south to FL. [= K]

Salix interior Rowlee, Sandbar Willow, is reported for VA (Kartesz 1999). {investigate} [= K] {not yet keyed}

Salix matsudana Koidzumi, Corkscrew Willow, is reported for VA (Harvill et al. 1992, Kartesz 1999). {investigate} [= K] {not yet keyed}

Salix myricoides Muhlenberg var. *myricoides* ranges south to s. PA (Dorn 1995, Rhoads & Klein 1993); it may be found in our area. [= K]

Salix petiolaris J.E. Smith, Meadow Willow, ranges south to NJ and PA and has been sometimes reported for our area, reports which Argus states are based on misidentifications of *S. sericea*. [= K]

Salix serissima (Bailey) Fernald, Autumn Willow, occurs south to s. PA (Rhoads & Klein 1993) and NJ (Kartesz 1999). [= K]

SANTALACEAE (Sandalwood Family)

A family of about 34 genera and 540 species, trees, shrubs, and herbs, primarily of tropical and warm temperate regions of the Old World and New World. All members of the family are hemiparasitic, attaching to the roots of other plants. Viscaceae are closely related and should perhaps be included (Angiosperm Phylogeny Group 2003). References: Nickrent & Malécot (2001).

- 1 Leaves alternate; plant a monoecious herb or shrub.
 - 2 Plant an herb, to 2 (-3) dm tall; leaves 1-4 cm long; inflorescence a terminal panicle of cymes; [tribe *Comandreae*] **Comandra**
 - 2 Plant a shrub, more than 4 dm tall; leaves 5-15 cm long; inflorescence a terminal raceme; [tribe *Pyrularieae*] **Pyrularia**
- 1 Leaves opposite; plant a dioecious shrub.
 - 3 Staminate flowers in terminal umbel-like dichasia; pistillate flowers solitary, terminal; plant a clumped shrub to 4 m tall; [tribe *Thesiae*] **Buckleya**
 - 3 Staminate flowers in axillary umbels; pistillate flowers solitary, axillary; plant a rhizomatous shrub to 1 m tall; [tribe *Santaleae*] **Nestronia**

Buckleya Torrey (Piratebush)

A genus of 4 species, shrubs, of temperate e. North America and e. Asia -- the 3 other species are *B. lanceolata* (Siebold & Zuccarini) Miquel of Japan, and *B. henryi* Diels and *B. graebneriana* Diels of China. References: Carvell & Eshbaugh {}; Massey et al. (1983).

Buckleya distichophylla (Nuttall) Torrey, Piratebush. Mt (NC, VA): dry or rocky bluffs and slopes; rare (US Species of Concern, NC Endangered, VA Endangered). April-May; June-October. A Southern Appalachian endemic: sw. VA south through ne. TN to sw. NC, in the western edge of the Blue Ridge and to the west in the Ridge and Valley. It is apparently parasitic on a variety of hosts -- not limited to *Tsuga*, as has sometimes been reported. The branches are often mistaken for a compound leaf. [= RAB, C, F, G, K, S, W]

Comandra Nuttall (Bastard-toadflax)

A genus of 2 species (the only other species European).

Comandra umbellata (Linnaeus) Nuttall ssp. *umbellata*, Eastern Bastard-toadflax. Pd, Mt (GA, NC, SC, VA), Cp (NC, SC, VA): dry forests and woodlands, woodland borders; common. April-early June; July. Ssp. *umbellata* ranges from ME to MI, south to n. GA and AL; other subspecies are western. [= K; *C. umbellata* -- RAB, W, infraspecific taxa not distinguished; *C. umbellata* var. *umbellata* -- C; *C. umbellata* -- F, G, S; *C. richardsiana* -- F, G]

***Nestronia* Rafinesque (Nestronia)**

A monotypic genus, a shrub, endemic to se. United States. References: Libby & Bloom (1998).

Nestronia umbellula Rafinesque, Nestronia, Conjuror's-nut, Leechbrush. Pd (GA, NC, SC, VA), Cp (GA, NC, SC): relatively mesic sites in sandhills in the upper Coastal Plain, mesic to dry Piedmont oak forests; rare (GA Threatened, NC Watch List, SC Rare, VA Endangered). April-May; July. Sc. VA south and west to sc. GA, se. AL, nc. AL, and sc. TN; disjunct in sc. KY. See Libby & Bloom (1998) for an interesting discussion and county distribution map. In its clonal, usually knee-high growth, *Nestronia* has something of the aspect of an opposite-leaved lowbush blueberry. It sometimes forms colonies (presumably clones) several hectares in size. [= RAB, C, F, G, K, S, W]

***Pyralia* Michaux (Buffalo-nut)**

A genus of 4 species, shrubs, of e. North America and e. Asia (the other 3 species are of e. Asia).

Pyralia pubera Michaux, Buffalo-nut, Oil-nut. Mt, Pd (GA, NC, SC, VA): moist forests; common. April-May; July-October. A Southern and Central Appalachian endemic, *Pyralia* ranges from sw. PA (Rhoads & Klein 1993), e. WV, and w. VA south and west to e. KY, w. NC, e. TN, and n. and wc. GA. The oil in the fruits is very poisonous. [= RAB, C, F, G, K, S, W]

SAPINDACEAE (Soapberry Family)

A family of about 133 genera and 1465 species, trees, shrubs, vines, and herbs, primarily of tropical (rarely temperate) regions of the Old World and New World. Evidence increasingly suggests that the inclusion of the Hippocastanaceae and Aceraceae in the Sapindaceae is warranted.

- 1 Leaves simple (lobed and/or toothed) ***Acer***
- 1 Leaves compound.
 - 2 Leaves palmately compound ***Aesculus***
 - 2 Leaves pinnately or biternately compound.
 - 3 Plant a vine; leaves biternately compound ***Cardiospermum***
 - 3 Plant a tree or shrub; leaves pinnately compound.
 - 4 Leaflets entire; fruit drupe-like; [plant a native of coastal hammocks of se. SC] ***Sapindus***
 - 4 Leaflets coarsely toothed; fruit a samara or inflated "pod."
 - 4 Fruit a samara; [plant native or alien] ***Acer***
 - 4 Fruit inflated; [plant an alien ornamental, rarely escaped] ***Koelreuteria***

***Acer* Linnaeus (Maple)**

A genus of about 111 species, primarily north temperate. References: Murray (1970)=Z.

- 1 Leaves compound, divided into 3-7 (-9) leaflets; [subgenus *Negundo*].
 - 2 Twigs glabrous ***A. negundo* var. *negundo***
 - 2 Twigs puberulent ***A. negundo* var. *texanum***
- 1 Leaves simple, generally shallowly to deeply 3-5 (-7) lobed.
 - 3 Leaves finely to coarsely toothed, the toothing often regular, the teeth 8-50 per principal lobe; sinuses between the principal leaf lobes generally sharp, forming a definite angle (or if rounded, then the sinus much deeper than broad).
 - 4 Leaves deeply lobed, the two sinuses on either side of the central lobe deep and narrow, approaching the midrib, the terminal lobe thus narrower at its base than at its middle; leaves silvery white beneath; flowers without petals; [subgenus *Eriocarpa*, section *Eriocarpa*] ***A. saccharinum***
 - 4 Leaves shallowly lobed, the two sinuses on either side of the central lobe broadly wedge-shaped, not approaching the midrib, the terminal lobe thus broadest at its base and progressively (though often irregularly) narrowing towards the tip; leaves green, pale-green, greenish-white, or strongly glaucous-whitened beneath; flowers with petals; [subgenus *Acer*].
 - 5 Winter buds stalked, with 2-4 valvate scales; inflorescence an elongate raceme or panicle; petals green to bright yellow, 2-10 mm long; fruits maturing in midsummer to autumn; leaves green beneath; shrub, small tree, or medium tree (to 35 cm DBH).
 - 6 Bark with narrow white stripes on a green background (best seen on stems 3-10 cm in diameter); leaf blades 12-20 (-30) cm long and wide, finely serrate (5-10 teeth per cm), pubescent beneath with yellow to orange hairs 0.1-0.3 mm long (as seen at 10x); inflorescence a drooping raceme; [subgenus *Acer*, section *Macrantha*] ***A. pensylvanicum***
 - 6 Bark brownish, never conspicuously striped; leaf blades 8-12 (-14) cm long and wide, coarsely serrate (2-3 teeth per cm), pubescent beneath with whitish hairs 0.3-1.0 mm long (as seen at 10x); inflorescence

- an erect panicle; [subgenus *Acer*, section *Spicata*] **A. spicatum**
- 5 Winter buds sessile, with 6-10 imbricate scales; inflorescence a sessile or subsessile cluster or fascicle; petals red (rarely yellowish), 1-3 mm long; fruits maturing in spring; leaves slightly to strongly glaucous-whitened beneath; medium to large tree (to 100 cm DBH); [subgenus *Eriocarpa*, section *Rubra*].
 - 7 Mature leaves densely felty-pubescent beneath; mature samaras 2.7-5 cm long **A. drummondii**
 - 7 Mature leaves glabrous (or nearly so) beneath; mature samaras 1.5-3 cm long.
 - 8 Leaves (3-) 5 (-9)-lobed, the central lobe 4-8 cm long, the 2 upper lateral lobes 2-5 cm long; leaf base generally cordate (rarely rounded); leaves 7-18 cm wide; [plants widespread, in nearly all habitats, except peaty wetlands of the Coastal Plain] **A. rubrum var. rubrum**
 - 8 Leaves (1-) 3 (-5)-lobed (sometimes unlobed or 5-lobed), the central lobe 1-5 cm long, the lateral lobes 0.5-2 (-3) cm long; leaf base broadly cuneate to rounded or subcordate; leaves 3-10 cm wide; [plants primarily of wetlands, especially in the Coastal Plain] **A. rubrum var. trilobum**
- 3 Leaves not toothed, or often with a few rounded, coarse, and irregular teeth on the principal lobes, these teeth 0-5 per principal lobe; sinuses between the principal leaf lobes generally broadly rounded, the sinus broader than deep.
 - 9 Petioles and young twigs exuding milky sap when broken; inflorescence peduncled, the flowers on ascending, moderately stout pedicels; [subgenus *Acer*, section *Platanoidea*] **A. platanooides**
 - 9 Petioles and young twigs exuding clear sap when broken; inflorescence sessile, the flowers on drooping, filiform pedicels; [subgenus *Saccharodendron*].
 - 10 Leaves pale, grayish, silvery-gray, or strongly heavily glaucous beneath, glabrous, pubescent on the veins, or pubescent across the surface; leaf sinuses on either side of the terminal lobe deep, the two sides of each sinus forming an angle of less than 70 degrees (the terminal lobe typically with parallel margins, or even narrower towards the base than towards the tip); leaves usually planar, but sometimes with drooping lobe tips, especially in *A. barbatum*, and especially in sun-exposed individuals.
 - 11 Leaves small, (3.5-) avg. 8 (-11) cm broad; leaf undersurface usually pubescent; fruits 20-25 mm long; medium to large trees; bark gray, smooth and beech-like, becoming irregularly furrowed or plated in large individuals; [plants primarily of the Coastal Plain and Piedmont, extending into the Mountains in GA] **A. barbatum**
 - 11 Leaves large, (8-) avg. 15 (-20) cm broad; leaf undersurface glabrous or pubescent only on the veins; fruits 25-30 mm long; large trees; bark grayish-brown, with loose-edged plates; [plants primarily of the Mountains and upper Piedmont] **A. saccharum**
 - 10 Leaves green beneath, moderately to densely pubescent across the surface; leaf sinuses on either side of the terminal lobe shallow, the two sides of each sinus forming an angle of more than 90 degrees (the terminal lobe typically broadly triangular); leaves sometimes planar, more usually with drooping lobe tips.
 - 12 Leaves small, (3-) avg. 6 (-11) cm broad; small trees, often multi-trunked and crooked; bark whitish (in part because of dense growth of crustose lichens), becoming cracked and blackened on larger stems; [plants primarily of the Piedmont, extending into the lower Mountains in w. SC and n. GA] **A. leucoderme**
 - 12 Leaves large, (8-) avg. 15 (-20) cm broad; large trees, single-trunked; bark dark brown or blackish, becoming furrowed in large individuals; [plants primarily of the Mountains and west] **A. nigrum**

Acer barbatum Michaux, Southern Sugar Maple, Florida Maple. Pd, Cp (GA, NC, SC, VA), Mt (GA): bottomland forests, mesic slopes, especially common over mafic or calcareous rocks, but not at all limited to such situations; common, rare in Mountains. April-May; June-October. S. VA, w. TN, se. MO, and e. OK south to FL and TX. It is widely planted in southern cities and towns as a street tree. [= C, F, G, K; *A. saccharum* ssp. *floridanum* (Chapman) Desmarais -- RAB, Z; *A. barbatum* var. *longii* (Fernald) Fernald -- F, G; *Saccharodendron floridanum* (Chapman) Nieuwland -- S; *A. floridanum* (Chapman) Pax]

Acer drummondii Hooker & Arnott ex Nuttall, Swamp Red Maple, Drummond Red Maple. Cp (GA, NC, SC, VA): swamps and floodplains; uncommon. January-March; April-June. *A. drummondii* is mostly southern, ranging north to NJ (?), IN, and MO. It reaches its greatest abundance in the basin of the Mississippi River. Because this taxon is more distinctive than the other taxa in the *A. rubrum* complex, it is often (as here) given specific status. [*A. rubrum* -- RAB, C, GW, infraspecific taxa not distinguished; *A. rubrum* Linnaeus var. *drummondii* (Hooker & Arnott ex Nuttall) Sargent -- F, G, K; *Rufacer drummondii* (Hooker & Arnott ex Nuttall) Small -- S; *A. rubrum* ssp. *drummondii* (Nuttall) Murray -- Z]

Acer leucoderme Small, Chalk Maple. Pd, Mt (GA, NC, SC), Cp (GA): rocky slopes and bluffs, particularly over mafic or calcareous rock; uncommon (rare in Mountains and Coastal Plain). March-April; May-September. A species of se. North America, primarily of the Piedmont from NC to AL, less commonly in the Ridge and Valley of se. TN (Chester, Wofford, & Kral 1997), low Blue Ridge of w. NC and adjacent TN and GA, Coastal Plain of GA, AL, MS, LA, and se. TX, and in sw. AR and se. OK. The leaves, at least those on lower and inner branches, tend to dry a tawny color and remain on the tree until spring, reminiscent of beech. [= K, W; *A. saccharum* ssp. *leucoderme* (Small) Desmarais -- RAB, Z; *Saccharodendron leucoderme* (Small) Nieuwland -- S]

Acer negundo Linnaeus var. *negundo*, Eastern Box Elder, Ash-leaved Maple. Pd, Cp, Mt (GA, NC, SC, VA): riverbanks, swamps, bottomlands; common (uncommon in Coastal Plain and Mountains). March-April; May-October. The species, broadly treated, ranges nearly across North America, including well into the arid west along rivers. Var. *negundo* is the typical eastern variety, occurring throughout e. North America. *A. negundo* often grows on the banks of rivers, leaning out over the water at a 45 degree angle. The leaves can resemble poison ivy (*Toxicodendron radicans*), which has alternate leaves. The coarse toothing (approaching lobing) distinguishes it from any of our ashes (*Fraxinus*). [= C, F, G, K, Z; *A. negundo* -- RAB, GW, W, infraspecific taxa not distinguished; *Negundo negundo* (Linnaeus) Karsten -- S, infraspecific taxa not distinguished; *Negundo aceroides*

(Linnaeus) Moench]

Acer negundo Linnaeus var. **texanum** Pax, Texas Box Elder. Mt (NC): riverbanks and bottomlands: rare. April; June-October. The status of this variety in our area is poorly known at present. Var. *texanum* is primarily southcentral in distribution (Texan and Ozarkian), but apparently scattered as far east as w. NC and s. OH. [= C, F, G, K, Z; *A. negundo* -- RAB, GW, W, infraspecific taxa not distinguished; *Negundo negundo* (Linnaeus) Karsten -- S, infraspecific taxa not distinguished; *Negundo aceroides* (Linnaeus) Moench]

Acer nigrum Michaux f., Black Maple. Mt (GA, NC, VA): riverbanks, streambanks, cove forests, river slope forests; uncommon in VA, rare in GA and NC (NC Watch List). May-June; June-September. Fairly widespread in nc. North America. *A. nigrum* ranges primarily west of the Appalachians. [= C, F, G, K, W; *A. saccharum* Marshall ssp. *nigrum* (Michaux f.) Desmarais -- RAB, Z; *Saccharodendron nigrum* (Michaux f.) Small -- S; *A. saccharum* Marshall var. *viride* (Schmidt) E. Murray]

Acer pensylvanicum Linnaeus, Striped Maple. Mt (GA, NC, SC, VA), Pd (VA): dry to mesic forests; common, rare in Piedmont (SC Rare). May; June-September. Primarily a broad Appalachian species, but extending into the Great Lakes region, south to PA and OH, and, in the mountains, to w. NC, e. TN, ne. GA, and nw. SC. The prominently striped bark of this common, mid-elevation understory tree is unmistakable. [= RAB, C, F, G, K, S, W, Z]

* **Acer platanoides** Linnaeus, Norway Maple. Mt, Pd, Cp (VA): escaped from horticultural cultivation to hedgerows, suburban areas, disturbed forests; uncommon, introduced from Europe. March-April. In much of the ne. United States, *A. platanoides* has become a noxious weed tree. A commonly planted cultivar has purple foliage. [= C, F, G, K, W, Z]

Acer rubrum Linnaeus var. **rubrum**, Eastern Red Maple. Mt, Pd, Cp (GA, NC, SC, VA): upland deciduous forests, up to at least 1500m elevation, moist bottomlands and slopes; common. January-March; April-July. This variety is the most widespread and common in NC; indeed it is one of the most ubiquitous and common trees in the state. It is probably more abundant than formerly, because of its weedy abilities. Overall, it ranges throughout e. North America. Whether the varieties of *A. rubrum* are worthy of recognition is a matter of disagreement; I choose here to try to distinguish them. [= F, K, Z; *A. rubrum* -- RAB, C, GW, W, infraspecific taxa not distinguished; *A. rubrum* var. *rubrum* -- G, but including also var. *trilobum*; *Rufacer rubrum* (Linnaeus) Small -- S]

Acer rubrum Linnaeus var. **trilobum** Torrey & Gray ex K. Koch, Carolina Red Maple. Cp (GA, NC, SC, VA): wetlands, especially peaty, acid sites; common. January-March; April-June. Primarily a Southeastern Coastal Plain variety, the range of var. *trilobum* is unclear, possibly extending well inland and northward (see F). This variety has greatly increased in abundance in the Coastal Plain of our area because of fire suppression and mechanical disturbance of peaty wetlands. Former large pocosin tracts, such as the Dismal Swamp, are now largely dominated by this tree. [= F, K, Z; *A. rubrum* -- RAB, C, GW, infraspecific taxa not distinguished; *A. rubrum* var. *rubrum* -- G, in part; *Rufacer carolinianum* (Walter) Small -- S]

Acer saccharinum Linnaeus, Silver Maple, Soft Maple. Mt, Pd, Cp (GA, NC, SC, VA): bottomlands, riverbanks, and disturbed areas; uncommon (locally common). February-April; April-July. Widespread in ne. North America, south to AL and MS west of the Appalachians, east of the Appalachians and south of VA, rare and mostly introduced. This is an abundant tree along major rivers in the Piedmont of VA. In our area (particularly from c. NC south), the species is more common as a street tree or an escape from cultivation than as a native tree. On the Coastal Plain of NC and SC, *A. saccharinum* is largely confined to the banks and levees of large brownwater rivers, such as the Roanoke and Congaree. The silvery undersides of the leaves are obvious in windy conditions. [= RAB, C, F, G, GW, K, W, Z; *Argentacer saccharinum* (L.) Small -- S]

Acer saccharum Marshall, Sugar Maple, Hard Maple, Sugar Tree. Mt (GA, NC, VA), Pd (*GA, *NC, *SC, VA): cove forests, rich forests, especially over mafic rocks; common (rare in Piedmont, where perhaps only introduced south of VA). April-June; June-September. Two varieties are sometimes recognized. Var. *saccharum* is widespread in ne. and nc. North America. Var. *schneckii* Rehder, with petioles and lower leaf surfaces densely pubescent, is alleged to occur in s. PA (Rhoads & Klein 1993), IN, IL, and MO; it is probably only a form. *A. saccharum* is the primary source of maple sugar and maple syrup; formerly, commercial sugaring was done in w. NC and w. VA. Large individuals of this species are the favorite substrate of a number of lichens, including *Lobaria pulmonaria*. The brown, platy bark is often similar to that of *Aesculus flava*. For its bright orange fall color, *A. saccharum* is one of our most prized ornamental trees. In NC, it is most common northwards and on mafic rocks, thus reaching perhaps its best development in the amphibolite peaks of Ashe, Watauga, Avery, and Mitchell counties; it is more general in VA. [= C; *A. saccharum* var. *saccharum* -- F, G, K, Z; *A. saccharum* ssp. *saccharum* -- RAB, W; *Saccharodendron barbatum* (Michaux) Nieuwland -- S, misapplied]

Acer spicatum Lamarck, Mountain Maple. Mt (GA, NC, VA): high elevation forests (northern hardwoods or spruce-fir), generally above 1500 m in NC, above 1000m in VA, especially common in periglacial boulderfields; uncommon (GA Special Concern). May-July; August-October. Widespread in ne. North America, south to PA and OH, and in the mountains to w. NC, e. TN, ne. GA, and ne. AL. The foliage is quite similar to that of *A. rubrum* var. *rubrum*, with which it can occur; in addition to the key characters, *A. spicatum* can be distinguished from *A. rubrum* by its leaves which have a strongly rugose texture, the secondary and tertiary veins impressed on the upper surface, distinctly raised on the lower (vs. not rugose, the secondary and tertiary veins only slightly impressed on the upper surface, and slightly raised on the lower). *A. spicatum* is also sometimes confused with *A. pensylvanicum*, but these two species are readily distinguished by their leaves (see key). [= RAB, C, F, G, K, S, W, Z]

Acer campestre Linnaeus, Hedge Maple, introduced from a native range in Europe and w. Asia, is reported to be "occasionally spreading from cultivation to moist, rocky, disturbed woods" in sc. and se. PA (Rhoads & Klein 1993). Infraspecific taxa are recognized in its native area. [subgenus *Acer*, section *Platanoidea*] [= K, Z] {not yet keyed}

Acer ginnala Maximowicz, Amur Maple, introduced from a native range in e. Asia, is reported as "cultivated and escaped" in s. PA (Rhoads & Klein 1993). Infraspecific taxa are recognized in its native area. [subgenus *Acer*, section *Ginnala*] [= K, Z] {not yet keyed}

Acer palmatum Thunberg, Japanese Maple, introduced from a native range in e. Asia, is frequently planted in its numerous cultivars. Intraspecific taxa are recognized in its native area. It is reported as escaped in the DC area (Shetler & Orli 2000). [subgenus *Acer*, section *Palmata*] [= K, Z] {not yet keyed}

Acer pseudoplatanus Linnaeus, Sycamore Maple, introduced from a native range in Europe, is planted in our area as a street and yard tree, especially in the mountains. It may be naturalized in our area; northwards it is a noxious weed tree. *A. pseudoplatanus* has large, serrate, 5-lobed leaves, the inflorescence a pendulous panicle. [subgenus *Acer*, section *Acer*] [= C, K, Z] {not yet keyed}

The hybrid *Acer xfreemanii* E. Murray [*A. rubrum* x *saccharinum*] has been collected at scattered locations in our area.

***Aesculus* Linnaeus (Buckeye)**

A genus of about 13 species, trees and shrubs, of temperate North America, e. Asia, and se. Europe. References: Hardin (1957)=Z.

- 1 Petals white, unmarked with red; stamens long-exserted; inflorescence 2-5 dm long; [section *Macrothyrsus*] . . . ***Ae. parviflora***
- 1 Petals yellow, red, or white (then marked with red); stamens not long-exserted; inflorescence 1-2.5 dm long.
 - 2 Petals usually 5, white with a reddish mark near the cordate base of the petal-blade; buds glutinous (sticky); fruit spiny; leaflets 7 (-9) per leaf; [plant an alien, uncommonly planted, rarely naturalized]; [section *Aesculus*] . . . ***Ae. hippocastanum***
 - 2 Petals 4, yellow or red, none of them with a cordate petal-blade; buds not glutinous; fruit smooth (with prickles in *Ae. glabra* var. *glabra*); leaflets 5 (-7) per leaf; [plants native]; [section *Pavia*].
 - 3 Stamens about 2x as long as the petals, well-exserted beyond the corolla; petals only slightly unequal in size; fruit spiny with short prickles (rarely essentially smooth) ***Ae. glabra* var. *glabra***
 - 3 Stamens about 1x as long as the petals, included or barely exserted beyond the corolla; petals markedly unequal in size; fruit smooth.
 - 4 Petal margins stipitate-glandular; petals scarlet; fruits 3-6 cm in diameter ***Ae. pavia* var. *pavia***
 - 4 Petal margins villous, not glandular; petals yellow; fruits 2-8 cm in diameter.
 - 5 Calyx and pedicels stipitate-glandular; large tree; petiolules 2-3 (-4) mm long; fruits 5-8 cm in diameter ***Ae. flava***
 - 5 Calyx and pedicels puberulent; shrub to small tree; petiolules 3-12 mm long; fruits 2-4 cm in diameter ***Ae. sylvatica***

Aesculus flava Solander, Yellow Buckeye. Mt, Pd (GA, NC, SC, VA): moist forests, up to nearly 2000m, especially prominent in seepy cove forests, in the Piedmont only in "montane" habitats; common (rare in Piedmont). Late April-mid June; August-September. A broad Southern Appalachian endemic: sw. PA, s. OH, s. IN, and s. IL south through KY, WV, sw. VA, and TN to n. AL, n. GA, nw. SC, and w. NC. *A. flava* is one of the largest, most massive, and commonest trees in Southern Appalachian coves, recognizable in winter by the bark of large plate-like slabs, thick twigs, and massive form. Meyer & Hardin (1987) discuss the nomenclatural issues relating to the names "*A. flava*" and "*A. octandra*." [= C, K, W; *A. octandra* Marshall -- RAB, F, G, Z; *A. octandra* -- S, in part only (see also *A. sylvatica*)]

Aesculus glabra Willdenow var. *glabra*, Ohio Buckeye. Mt (GA): mesic forests over limestone; rare (GA Special Concern). Largely midwestern, but ranges east to sw. PA, e. TN, and nw. GA (Jones & Coile 1988); it is also sometimes introduced eastwards of that distribution. It occurs in TN counties adjacent to both VA and NC. [= C, F, G, K, Z; *Ae. glabra* -- S, infraspecific taxa not distinguished]

* ***Aesculus hippocastanum*** Linnaeus, Horsechestnut. Mt (NC), Pd (NC, SC): urban and suburban areas, perhaps not definitely naturalized, but fairly often planted as a street tree and escaping as seedlings in the vicinity of plantings; rare, native of se. Europe. [= C, F, G, K, Z]

Aesculus parviflora Walter, Bottlebrush Buckeye. Cp (GA), Pd (SC): mesic forests on bluffs and in ravines (the SC occurrence is on Fall Line river bluffs, with shaley, subcalcareous soils); rare (GA Special Concern, SC Rare). Sc. SC southwest to AL. See Wyatt (1985) for a discussion of this interesting, relictual occurrence. Occasionally planted outside its native range. [= K, S, Z]

Aesculus pavia Linnaeus var. *pavia*, Red Buckeye. Cp, Pd (GA, NC, SC, VA?), Mt (GA): swamp forests, usually stagnant, usually blackwater (not receiving significant alluvium), and especially over marl (coquina limestone); uncommon (rare in Piedmont). April-early May; July-August. Var. *pavia* ranges from se. NC south to n. FL and west to e. TX, extending north in the Mississippi Embayment to se. MO and s. IL, and in scattered occurrences off the Coastal Plain, as in sc. TN. Var. *flavescens* (Sargent) Correll occurs in the Edwards Plateau of c. TX. Fernald reports this species from VA and WV, but there may be taxonomic or nomenclatural confusion. [= K, Z; *A. pavia* -- RAB, C, F, G, S, W, infraspecific taxa not distinguished; *A. discolor* Pursh -- F]

Aesculus sylvatica Bartram, Painted Buckeye. Pd (GA, NC, SC, VA), Cp (GA, NC, VA), Mt (GA, NC, SC): in the Piedmont in mesic, nutrient-rich forests, on bottomlands, lower slopes, and in ravines, in the Coastal Plain primarily on floodplains of brownwater (alluvium-carrying) rivers (most notably the Roanoke River in NC), in the Mountains only at low elevations; common. April-mid May; July-August. Primarily a Southeastern Piedmont endemic, occurring primarily in the Piedmont from sc. VA south through c. NC, c. SC, and nc. GA to nc. AL, with an extension north into e. TN. [= RAB, C, F, K, W, Z; *A. neglecta* Lindley -- G; *A. octandra* -- S, in part only (also see *A. flava*); *Ae. georgiana* Sargent]

The following hybrids are known from our area: *Aesculus xneglecta* Lindley [*flava* x *sylvatica*] and *Aesculus xmutabilis* (Spach) Scheele [*pavia* x *sylvatica*]. They can be recognized by their intermediate morphology.

Cardiospermum Linnaeus (Balloon Vine)

A genus of about 14 species, vines, of tropical regions (especially America).

* ***Cardiospermum halicacabum*** Linnaeus, Balloon Vine, Heartseed. Mt (GA), Pd (SC): disturbed areas; rare, introduced from tropical America. August-September. [= RAB, F, G, K, S; *C. halicababum* -- C, orthographic error]

Koelreuteria Laxmann (Golden Rain Tree)

A genus of 3 species, trees, of temperate China and Taiwan.

* ***Koelreuteria paniculata*** Laxmann, Golden Rain Tree. Pd (NC, VA): disturbed areas; rare, introduced from e. Asia (frequently cultivated as an ornamental tree, rarely escaped). June; September. [= RAB, C, F, G, K]

Sapindus Linnaeus (Soapberry)

A genus of about 13 species, trees, of tropical and warm temperate regions of the Old and New World.

Sapindus marginatus Willdenow, Florida Soapberry. Cp (GA, SC?): coastal marsh hammocks, shell middens; rare (GA Special Concern). May-June. Se. SC (?) and e. GA south to c. peninsular FL. Small (1933) reports this species from SC; there is doubt whether this species was actually ever documented to occur in SC. There are no recent records. Although sometimes combined (as by K) with the tropical *Sapindus saponaria*, I follow most recent Florida authors (Wunderlin 1982, Clewell 1985, Tomlinson 1986, Godfrey 1988, Nelson 1994, Nelson 1996) in maintaining it as distinct. [= RAB, S; *S. saponaria* Linnaeus var. *saponaria* -- K; *Sapindus saponaria* var. *drummondii* (Hooker & Arnott) L. Benson, misapplied?]

SAPOTACEAE (Sapodilla Family)

A family of about 53 genera and 975 species, trees and shrubs, primarily tropical (rarely temperate), of Old World and New World.

Sideroxylon Linnaeus (Bumelia, Buckthorn, Bully)

As defined broadly by Pennington (1991), *Sideroxylon* includes about 75 species, widely distributed in the New World and Old World Tropics (our species are the northern tip of a "tropical iceberg"). He found that no consistent set of characters could be used to separate *Bumelia* from other New World genera (such as *Mastichodendron* and *Dipholis*), and that the New World segregate genera were also not separable from several Old World genera. The Linnaean *Sideroxylon* has nomenclatural priority. Four of the five taxa in or approaching our area were originally named in *Sideroxylon*. References: Pennington (1991)=Z; Godfrey (1988)=Y. Key adapted from Y.

- 1 Leaves pubescent beneath with appressed to tomentose hairs, ranging in color (depending partly on age) from silvery through coppery to dark brown; first-year twigs persistently pubescent, the hairs silvery, tan, gray, tan or brown.
 - 2 Mature leaves pubescent beneath, the hairs woolly-tomentose, neither matted nor shiny; leaves 1-10 cm long, 0.8-4 cm wide ***S. lanuginosum* ssp. *lanuginosum***
 - 2 Mature leaves densely pubescent beneath, the hairs sericeous, matted and shiny; leaves 2-5 (-7) cm long, 0.5-2 (-3) cm wide ***S. tenax***
- 1 Leaves glabrous, glabrate, or sparsely pubescent beneath with appressed blond hairs or cottony white hairs; first-year twigs pubescent when young, soon becoming glabrous or nearly so, the hairs white to yellow.
 - 3 Upper surfaces of the mature leaf blades faintly and coarsely reticulate-veined (at 20x or greater magnification), the veins of the reticulum not at all raised, usually somewhat impressed, and, although pale, not bony-cartilaginous . . . ***S. thornei***
 - 3 Upper surfaces of the mature leaf blades notably finely reticulate-veined (at 20x or greater magnification), the veins of the reticulum usually raised above the enclosed islets, and bony-cartilaginous in contrast to the green islets.
 - 4 Larger leaf blades 8-12 (-14) cm long; plant a large shrub or small tree, the stem usually solitary; berries 10-15 mm long, 10-12 mm in diameter; [plant occurring in NC, SC, and VA and southwards] ***S. lycioides***
 - 4 Larger leaf blades 2-5 (-7) cm long; plant a small to large shrub, usually multi-stemmed; berries 5-8 mm long, ca. 5 mm in diameter; [plant occurring in SC and southwards] ***S. reclinatum* ssp. *reclinatum***

Sideroxylon lanuginosum Michaux ssp. *lanuginosum*, Gum Bumelia, Gum Bully, ranges from e. GA south to nc. FL, west to LA. Other subspecies are more western. Reported for SC by Kartesz (1999). {investigate} [= K; *Bumelia lanuginosa* (Michaux)

Persoon -- S, infraspecific taxa not distinguished; *Bumelia lanuginosa* ssp. *lanuginosa* -- Y; *S. lanuginosum* -- Z, infraspecific taxa not distinguished]

Sideroxylon lycioides Linnaeus, Buckthorn Bumelia, Buckthorn Bully. Cp (NC, SC, VA), Pd (NC): maritime forests, maritime scrub, river bluffs, swamp margins, usually in circumneutral soil (over shell hash, coquina limestone, marl, or limestone), in the Piedmont in rich, mesic forests over mafic rocks; uncommon (NC Watch List, VA Watch List). June-July; September-October. Se. VA south to panhandle FL, west to se. TX, north in the interior to s. IL and se. MO, mostly on the Coastal Plain, but extending (in our area in NC and SC) to the upper Piedmont and north in the interior (primarily on limestone) to KY and TN. This species is extremely variable in leaf shape; though described in most works as up to 10-12 cm long and up to 4 cm wide, the leaves can be to 15 cm long and 8 cm wide. The leaf apex can be acuminate, acute, rounded, or notched. [= K, Z; *Bumelia lycioides* (Linnaeus) Persoon -- RAB, C, F, G, GW, S, Y; *B. lycioides* var. *virginiana* Fernald -- F]

Sideroxylon reclinatum Michaux ssp. ***reclinatum***, Smooth Bumelia, Florida Bully. Cp (SC): floodplain forests and river margins; rare. Ssp. *reclinatum* ranges from s. SC and se. GA south to c. peninsular FL. Ssp. *rufotomentosum* (Small) Kartesz & Gandhi [= K; *Bumelia rufotomentosa* Small -- S] occurs in n. FL. Ssp. *austroridense* (Whetstone) Kartesz & Gandhi [= K; *Bumelia reclinata* (Michaux) Ventenat var. *austroridensis* Whetstone] occurs in peninsular FL. [= K; *Bumelia reclinata* -- S, in a narrow sense; *Bumelia reclinata* (Michaux) Ventenat var. *reclinata* -- Y; *Sideroxylon reclinatum* -- Z, in a broad sense]

Sideroxylon tenax Linnaeus, Tough Buckthorn, Tough Bumelia, Tough Bully. Cp (NC, SC): maritime scrub, maritime forests; rare (NC Rare). May-June; September-October. Se. NC south to c. peninsular FL. [= K, Z; *Bumelia tenax* (Linnaeus) Willdenow -- RAB, S, Y]

Sideroxylon thornei (Cronquist) Pennington, Thorne's Bumelia, Swamp Bumelia. Cp (GA): bottomlands and limesink depressions, particularly over calcareous substrates; rare (GA Endangered). May- June; August-early October. Ne. GA south to FL. The validity of this species has been supported by Anderson (1996). [= K, Z; *Bumelia thornei* Cronquist -- Y]

Sideroxylon alachuense L.C. Anderson, Alachua Bully, Silver Buckthorn. Cp (GA): sandy hammocks, shell middens; rare (GA Special Concern). [= K; *Bumelia anomala* (Sargent) R.B. Clark] {not yet keyed}

***Sideroxylon* sp. 1**, Ohoopée Bumelia. Cp (GA): longleaf pine sandhills; rare (GA Special Concern). {not yet keyed}

SARRACENIACEAE (Pitcherplant Family)

A family of 3 genera and about 17 species, perennial insectivorous herbs, of e. North America (*Sarracenia*), w. North America (*Darlingtonia*), and ne. South America (*Heliamphora*).

Sarracenia Linnaeus (Pitcherplant)

A genus of about 11 species, perennial insectivorous herbs, of e. North America. References: McDaniel (1971); Wood (1960)=Z; Schnell & Determann (1997)=Y; GW; Schnell (2002b)=X; Schnell (1979, 1981, 1993, 1998, 2002); Bell (1952); Bell & Case (1956); Reveal (1993); Cheek (1994, 2001); Godt & Hamrick (1999); Naczi et al. (1999); Romanowski (2002).

- 1 Leaves (pitchers) mostly decumbent; lateral wing of the pitcher very prominent.
 - 2 Leaves (pitchers) prominently marked with white on the hood; hood of the pitcher globose; orifice formed by the fusion of the hood margins ***S. psittacina***
 - 2 Leaves (pitchers) not marked with white on the hood; hood of the pitcher expanded and erect; orifice not involving the hood margins.
 - 3 Petals pale pink; lip of pitcher 2.6-7.5 mm thick at thickest point; scape 16.3-35.1 cm high; style arm 2.6-4.1 cm long; [plants of the Gulf Coastal Plain, from sw. GA westwards] ***S. rosea***
 - 3 Petals red to deep maroon; lip of pitcher 0.7-3.1 mm thick at thickest point; scape 22-79 cm high; style arm 1.7-2.9 (-3.8) cm long; [plants of e. GA northwards]
 - 4 Leaves (pitchers) more than 3x as long as broad; pitchers glabrous on the outer surface; petals dark maroon (occasionally red); rhizomes generally vertical, and with relatively many pitchers per crown (often 6-10); [plants of e. VA northwards] ***S. purpurea* var. *purpurea***
 - 4 Leaves (pitchers) less than 3x as long as broad; pitchers bristly-pubescent on the outer surface; petals bright red; rhizomes generally horizontal, and with relatively few pitchers per crown (often 4-5); [plants of the Coastal Plain of se. VA southwards, and in the Mountains and Piedmont of NC and SC].
 - 5 Hood lobes closely incurved, touching each other or nearly so, obscuring the hood opening; hairs lining the hood averaging 0.8-1.0 mm long; [plants of the Mountains of sw. NC, nw. SC, and ne. GA] ***S. purpurea* var. *montana***
 - 5 Hood lobes not closely incurved and touching; hairs lining the inner surface of the hood (1.0-) 1.5-3.0 mm long; [plants of the Atlantic Coastal Plain of VA, NC, and SC south to e. GA] . . . ***S. purpurea* var. *venosa***
 - 1 Leaves (pitchers) erect; lateral wing of the pitcher generally not prominent.
 - 6 Leaves (pitchers) with white (or whitish and translucent) patches toward the summit of the pitcher and behind the orifice and/or on the hood.
 - 7 Areas of whitish, translucent tissue toward the summit of the pitcher and on the lower portion of the hood, behind the orifice, the areas of translucent white tissue not enclosed within a conspicuous network of reddish venation; hood

- arching horizontally over the orifice; petals pale lemon yellow; [native in our area] **S. minor**
- 7 Areas of white tissue all around the summit of the pitcher and throughout the hood, the areas of bright white tissue surrounded by a conspicuous network of reddish venation; hood erect or ascending; petals maroon; [introduced in our area, though in natural appearing habitats] **S. leucophylla**
- 6 Leaves (pitchers) without white or translucent patches toward the summit of the pitcher.
- 8 Hood typically 4-10 cm wide, the margins conspicuously reflexed (outrolled); petals yellow.
- 9 Narrowed base of the hood purple or purple-spotted on the inside, its sides very strongly and loosely rolled back, the edges often nearly touching in the back; blade of the hood broadly reniform to orbicular-reniform, broadly cordate basally; phyllodia (nonpitcher leaves) rare, only a few per plant (if present), 12-30 cm long, straight to slightly curved **S. flava**
- 9 Narrowed base of the hood not purple or purple-spotted on the inside, with revolute margins, but not conspicuously rolled back, the edges never close to touching in the back; blade of hood ovate, not at all or just barely cordate basally; phyllodia (nonpitcher leaves) common, many per plant, 5-18 cm long, strongly curved, usually 45-90 degrees **S. oreophila**
- 8 Hood typically 1-3 cm wide, the margins not conspicuously reflexed (outrolled); petals maroon.
- 10 Leaves (pitchers) averaging 40-50 cm tall (ranging 25-75 cm); scapes about the same height as the leaves (pitchers); hood ascending, leaving the orifice exposed, 1.5-6.5 cm long, 2.0-5.4 cm wide **S. jonesii**
- 10 Leaves (pitchers) averaging 15-30 cm tall (ranging 7-55 cm); scapes 1.5-2x the height of the leaves (pitchers); hood horizontal, held closely over the orifice, 0.7-4.5 cm long, 0.7-3.9 cm wide **S. rubra**

Sarracenia flava Linnaeus, Yellow Pitcherplant, Trumpets. Cp, Pd (NC, SC, VA): savannas, seepage bogs, pocosins; common, rare in Piedmont and rare in VA (VA Rare). March-April; May-June. Se. VA south to n. FL and west to s. AL and se. MS. In the centers of peat domes and large peat-filled Carolina bays, *S. flava* is sometimes very abundant, sometimes the dominant plant over areas exceeding several square kilometers. [= RAB, C, F, G, GW, K, W, Z; *S. flava* -- S, in part only (see also *S. oreophila*); *S. flava* var. *flava* -- X; *S. flava* var. *atropurpurea* (Bull) Bell -- X; *S. flava* var. *maxima* Bull ex Masters -- X; *S. flava* var. *ornata* Bull ex Masters -- X; *S. flava* var. *cuprea* Schnell -- X; *S. flava* var. *rugelii* (Shuttleworth ex de Candolle) Masters -- X; *S. flava* var. *rubricorpora* Schnell -- X]

Sarracenia jonesii Wherry, Mountain Sweet Pitcherplant. Mt (NC, SC): bogs; rare (US Endangered, NC Endangered, SC Rare). May; July. Endemic to a small area in sw. NC and nw. SC. There has been a great deal of disagreement over the taxonomic treatment of this taxon, a montane sibling of *S. rubra*. See Wherry (1929), Bell (1949), McDaniel (1971), Wherry (1972), Case and Case (1976), Schnell (1977), Massey et al. (1983), and McDaniel (1986) for further discussion. [= W; *S. rubra* -- RAB, GW, Z, in part; *S. rubra* ssp. *jonesii* (Wherry) Wherry -- K, X]

Sarracenia leucophylla Rafinesque, Whitetop Pitcherplant, Crimson Pitcherplant. Cp (GA, *NC): wet pine savannas; rare (GA Endangered). Sw. GA, w. FL, s. AL, and se. MS, a Gulf Coastal Plain endemic; introduced in eastern NC. The NC population (on Croatan National Forest, Carteret Co.) was apparently introduced in the 1980s; it is not known whether this species will spread in NC, but it is persisting and has been independently "discovered" several times. [= GW, K, X, Z; *S. drummondii* Croom -- S]

Sarracenia minor Walter, Hooded Pitcherplant. Cp (GA, NC, SC): wet savannas; uncommon, rare in NC (NC Watch List). April-May; June-July. Se. NC south through SC and GA to c. peninsula and e. panhandle FL. Schnell (2002a) recognizes var. *okeefenoakensis* Schnell as endemic to the Okeefenokee Swamp area of GA. [= RAB, GW, K, S, X, Z]

Sarracenia oreophila (Kearney) Wherry, Green Pitcherplant. Mt (GA, NC): seepage bogs; rare (US Endangered, GA Endangered, NC Endangered). April-May; June-July. A montane-piedmontane sibling of *S. flava*, known from sw. NC, se. TN (where presumed extirpated from the state), n. GA, and c. and ne. AL (Govus 1987, Wherry 1933, Schnell 1980b, Dennis 1980). [= GW, K, W, X, Z; *S. flava* -- S, in part]

Sarracenia psittacina Michaux, Parrot Pitcherplant. Cp (GA): savannas; uncommon (GA Threatened). This distinctive species is distributed primarily in the East Gulf Coastal Plain, but ranges east to the Atlantic Coastal Plain of e. GA (Bullock County), in close proximity to the SC border. [= GW, K, S, X]

Sarracenia purpurea Linnaeus var. *montana* Schnell & Determann, Southern Appalachian Purple Pitcherplant. Mt (GA, NC, SC), Pd (NC, SC): mountain bogs, seepage bogs; rare (GA Endangered). May; July. Var. *montana* is restricted to a few dozen populations in sw. NC (south of Asheville), nw. SC, and ne. GA (Rabun County). These montane populations (in sw. NC, nw. SC, and ne. GA) show some consistent differences and appear to warrant taxonomic distinction (Schnell & Determann 1997); further study is warranted. For those tolerant of quadrinomial taxonomy, plants in our area can be called *S. purpurea* ssp. *venosa* (Rafinesque) Fernald var. *montana* Schnell & Determann. Allozyme studies by Godt and Hamrick (1999) show striking genetic differences between var. *montana*, var. *purpurea*, var. *venosa* and the Gulf Coast var. *burkii*, supporting their taxonomic recognition. In fact, the genetic differentiation is greater than that between taxa in the *S. rubra* complex. [*S. purpurea* -- RAB, GW, S, W, infraspecific taxa not distinguished; *S. purpurea* var. *purpurea* -- Reveal (1993); *S. purpurea* ssp. *venosa* (Rafinesque) Fernald var. *montana* Schnell & Determann -- K, Y; *S. venosa* Rafinesque]

Sarracenia purpurea Linnaeus var. *purpurea*, Northern Purple Pitcherplant. Cp (VA): bogs; rare (VA Rare). April-May; June-July. The species as a whole is widespread in e. North America, the only *Sarracenia* to extend north of se. VA. Var. *purpurea* is northeastern, extending south to ne. VA, MD, DE, and NJ. A nomenclatural battle about the application of the typical variety has been resolved, with var. *purpurea* applying to the northern variety (Reveal 1993, Cheek 1994, Kartesz & Gandhi 1995, Cheek 2001). [= C, F, G, Z; *S. purpurea* -- RAB, GW, S, W, infraspecific taxa not distinguished; *S. purpurea* ssp. *gibbosa* (Rafinesque) Wherry -- K; *S. purpurea* var. *terrae-novae* de la Pylaie -- Reveal (1993); *S. purpurea* ssp. *purpurea* -- X]

Sarracenia purpurea Linnaeus var. *venosa* (Rafinesque) Fernald, Southern Purple Pitcherplant. Cp (NC, SC, VA), Pd? (NC?): wet savannas, sandhill seepage bogs; common (VA Rare). April-May; June-July. Var. *venosa* is restricted to the Atlantic Coastal Plain of the southeastern United States, ranging from se. VA south to se. SC. For those tolerant of quadrinomial

taxonomy, plants in our area may be considered *S. purpurea* ssp. *venosa* (Rafinesque) Fernald var. *venosa*. It is notable, though, that the findings of Godt and Hamrick (1999) do not support the greater relationship of the southern taxa to one another and their divergence from the northern taxon, and thus do not support the quadrinomial taxonomy. [= C, F, G, Z: *S. purpurea* -- RAB, GW, S, W, infraspecific taxa not distinguished; *S. purpurea* Linnaeus ssp. *purpurea* var. *purpurea* -- K; *S. purpurea* var. *purpurea* -- Reveal (1993); *S. purpurea* ssp. *venosa* (Rafinesque) Fernald var. *venosa* -- X, Y; *S. venosa* Rafinesque]

Sarracenia rosea Naczi, F.W. Case, & R.B. Case, Rose Pitcherplant. Cp (GA): wet pine savannas and seepage bogs; rare (GA Endangered). Sw. GA west to s. MS and (?) e. LA. Schnell (1993) distinguished the distinctive East Gulf Coastal Plain population (with short peduncles, white stigmas, and pale pink petals) as *S. purpurea* ssp. *venosa* var. *burkii* Schnell; Naczi et al. (1999) elevated this to species rank, as *S. rosea*. See Naczi et al. (1999) and Schnell (1993) for more detailed information and color photographs. Naczi et al. (1999) treatment of this taxon at specific rank is supported by the greater genetic distance found by Godt and Hamrick (1999). [*S. purpurea* -- GW, S, in part; *S. purpurea* Linnaeus ssp. *purpurea* var. *burkii* Schnell -- K, in part; *S. purpurea* var. *purpurea* -- Reveal (1993); *S. purpurea* ssp. *venosa* (Rafinesque) Fernald var. *burkii* Schnell -- X, Y]

Sarracenia rubra Walter, Sweet Pitcherplant, Redflower Pitcherplant. Cp (GA, NC, SC): sandhill seepage bogs, pocosins, wet savannas; uncommon (GA Endangered, SC Rare). April-May; June-July. The *S. rubra* complex consists of five geographically isolated entities, variously treated as species, subspecies, or geographic races (see *S. jonesii* for some of the pertinent references). The *S. rubra* complex is here treated as five separate species, of which *S. rubra* (sensu stricto) is the northeasternmost element, primarily limited to the Atlantic Coastal Plain, extending from se. and sc. NC south through SC and GA to n. FL. Three of the entities ("*alabamensis*", "*gulfensis*", and "*wherryi*") are limited to the Gulf Coastal Plain. *S. jonesii*, of montane sw. NC and nw. SC, is the other. [*S. rubra* -- RAB, GW, S, Z, in part only, their concepts broader (also see *S. jonesii*); *S. rubra* ssp. *rubra* -- K, X]

Sarracenia alabamensis F.W. and R.B. Case, Alabama Pitcherplant. [*S. rubra* Walter ssp. *alabamensis* (F.W. & R.B. Case) Schnell -- X, K; *S. rubra* -- GW, S, Z, in part; *S. alabamensis* F.W. & R.B. Case ssp. *alabamensis*] {not keyed}

Hybrids between the various species of pitcher-plants are relatively frequent; see Bell (1952) and Bell & Case (1956) for further discussion. They are usually rather easy to determine, since they show intermediacy in characters, and usually are found in close proximity to both parents. *S. xatesbaei* is by far the most frequent of the hybrids. The following hybrids are known to occur in our area:

Sarracenia xatesbaei Elliott [*S. flava* x *purpurea*]. Known from Brunswick, Carteret, Harnett, Iredell, Montgomery, and Pender counties, NC; Chesterfield County, SC; Greensville County, VA. [= K, X]

Sarracenia xchelsonii Veitch ex Masters [*S. purpurea* x *rubra*]. Known from Scotland County, NC. [= K, X]

Sarracenia xformosa Veitch ex Masters [*S. minor* x *psittacina*]. Known from GA. [= K, X]

Sarracenia xharperi Bell [*S. flava* x *minor*]. Known from Charleston and Hampton counties, SC. [= K, X]

Sarracenia xmoorei Masters [*S. flava* x *leucophylla*]. Known from GA. [= K, X]

Sarracenia xpoppei hort. ex Masters [*S. flava* x *rubra*]. Known from Moore County, NC. [= K, X]

Sarracenia xreherdi Bell [*S. minor* x *rubra*]. Known from Brunswick County, NC. [= K, X]

Sarracenia xswaniana (W. Robinson) Bell [*S. minor* x *purpurea*]. Known from Brunswick and Bladen counties, NC. [= K, X]

Sarracenia jonesii* x *purpurea. Known from Henderson County, NC.

SAURURACEAE E. Meyer 1827 (Lizard's-tail Family)

A family of 4 genera and 6 species, perennial herbs, of temperate e. and se. Asia (*Saururus*, *Gymnotheca*, *Houttuynia*), w. North America (*Anemopsis*), and e. North America (*Saururus*). One other member of the family occurs in North America: *Anemopsis californica* Hooker & Arnott, primarily of the sw. United States. References: Buddell & Thieret in FNA (1997); Wood (1971); Cheng-Yih & Kubitzki in Kubitzki, Rohwer, & Bittrich (1993); Meng et al. (2003).

Saururus Linnaeus 1753 (Lizard's-tail, Water-dragon)

A genus of 2 species, perennial herbs, our species in temperate e. North America, the other in e. Asia. References: Cheng-Yih & Kubitzki in Kubitzki, Rohwer, & Bittrich (1993).

Saururus cernuus Linnaeus, Lizard's-tail, Water-dragon. Cp, Pd, Mt (GA, NC, SC, VA): swamps, ditches, overwash pools in stream floodplains, usually where in water seasonally or periodically; common (rare in Mountains). May-July; August-September. CT, s. Quebec, s. Ontario, and MI south to s. FL and e. TX. In swamps of the Coastal Plain, *Saururus* often is dominant in large patches. The elongate inflorescence, drooping at the tip, is distinctive, attractive, and the (rather fanciful) inspiration for the genus name, the specific epithet, and the common names. Thien et al. (1994) studied the reproductive biology of *Saururus cernuus*, and found that pollination was both by wind and by insects. [= RAB, C, F, FNA, G, GW, K, S, W]

SAXIFRAGACEAE (Saxifrage Family) (see also *GROSSULARIACEAE*, *HYDRANGEACEAE*, *ITEACEAE*, *PARNASSIACEAE*, *PENTHORACEAE*)

If narrowly circumscribed (as here), a family of about 30 genera and 650 species, herbs, nearly cosmopolitan, but especially diverse in warm temperate and cold temperate regions of North America and Eurasia. The circumscription of a much narrower Saxifragaceae is clearly warranted, based on a wide variety of data, and recently strongly corroborated by molecular data (Morgan & Soltis 1993). References: Spongberg (1972); Morgan & Soltis (1993).

- 1 Leaves compound **Astilbe**
- 1 Leaves simple (sometimes cleft or lobed).
 - 2 Stem creeping, the leaves all cauline, opposite; leaves short-petioled or sessile, less than 2 cm long . . . **Chrysosplenium**
 - 2 Stem erect, the leaves mostly or entirely basal, alternate (stem leaves opposite in *Mitella*); leaves long-petioled, more than 4 cm long (except short-petioled or sessile and sometimes less than 4 cm long in *Saxifraga*).
 - 3 Basal leaves short-petioled or sessile, the petioles 0-1x as long as the blade; basal leaves cuneate or rounded at the base; leaf venation predominately pinnate **Saxifraga**
 - 3 Basal leaves long-petioled, the petioles (1-) 2-5x as long as the blade; basal leaves cordate at the base; leaf venation predominantly palmate.
 - 4 Stem leaves opposite; petals fimbriate; inflorescence a raceme; flowers on pedicels 1.5-3 mm long . . . **Mitella**
 - 4 Stem leaves absent or alternate; petals not fimbriate; inflorescence a panicle or raceme; flowers mostly on pedicels more than 3 mm long.
 - 5 Inflorescence racemose; stamens 10 **Tiarella**
 - 5 Inflorescence paniculate; stamens 5.
 - 6 Seeds winged, 1.3-1.5 mm long; leaves cleft less than halfway to base; hypanthium fused to the pistils only at their bases; stems normally with several petiolate leaves much like the basal leaves (though typically somewhat smaller) **Sullivantia**
 - 6 Seeds papillose, echinate, smooth, or slightly ridged, 0.4-0.7 mm long; leaves cleft more than halfway to base (in *Boykinia*) or less than halfway (in *Heuchera*); hypanthium fused to the lower half or more of the pistils; stems with (in *Boykinia*) or without (in *Heuchera*) several petiolate leaves.
 - 7 Stems normally with several petiolate leaves much like the basal leaves (though typically somewhat smaller); ovary with 2 locules; leaves cleft more than halfway to base **Boykinia**
 - 7 Stems with only very reduced sessile bracts unlike the basal leaves; ovary with 1 locule; leaves cleft less than halfway to base **Heuchera**

Astilbe Buchenau-Hamilton ex D. Don (False Goat's-beard)

A genus of 14 species, perennial herbs, of e. Asia and e. North America.

Identification notes: Superficially, *Astilbe* is quite similar to *Aruncus* (Rosaceae). *Astilbe* may be distinguished by the following characteristics: pubescence of the stem and lower leaf surface glandular, plants monoecious, carpels 2 per flower, stamens 10 per flower (vs. *Aruncus*: pubescence nonglandular, plants dioecious, carpels 3-4 per flower, stamens 15-20 per flower).

- 1 Leaves serrate, the teeth sharp; fruit conic-lanceolate, tapering gradually, 4-5 mm long **A. biternata**
- 1 Leaves crenate, the teeth rounded (but with a prominent mucronate tip); fruit ovoid, abruptly contracted to the tip, 3 mm long **A. crenatiloba**

Astilbe biternata (Ventenat) Britton, Appalachian False Goat's-beard. Mt (NC, SC, VA): cove forests, seepage slopes; common. May-June; July-August. VA, sw. WV, and KY south to n. GA. [= C, F, G, K, S, W; *A. biternata* -- RAB, in part only (see also *A. crenatiloba*)]

Astilbe crenatiloba (Britton) Small, Roan Mountain False Goat's-beard. Mt (NC): mountain forests; rare (believed extinct) (US Species of Concern, NC Rare). July?; September. This species has apparently not been seen since the original collections by N.L. Britton on the NC and TN flanks of Roan Mountain; the habitat, flowering and fruiting dates, and other characteristics of this species are therefore poorly known. The morphologic characters are striking. [= K, S, W; *A. biternata* -- RAB, in part]

Boykinia Nuttall (Boykinia)

A genus of 9-12 species, herbs, of e. Asia, e. North America, and w. North America, a classic relictual distribution. The other species are distributed primarily in the Pacific Northwest or Rocky Mountains, with several endemics in Japan and an endemic in the unglaciated portions of Alaska and e. Siberia.

Identification notes: Easily mistaken in vegetative condition for *Trautvetteria*, which is a coarser plant, often occupying similar habitats.

Boykinia aconitifolia Nuttall, Brook-saxifrage, Aconite-saxifrage, Eastern Boykinia. Mt (NC, SC, VA): streambanks, riverbanks, in crevices in spray cliffs around waterfalls, seepages; uncommon (SC Rare). June-July. A Southern Appalachian endemic: sw. VA and s. WV, south through w. NC, e. TN, and nw. SC, to n. GA and ne. AL. [= RAB, C, F, G, GW, K, W;

Therophon aconitifolium (Nuttall) Millspaugh -- S]

Chrysosplenium Linnaeus (Golden-saxifrage)

A genus of about 60 species, herbs, of Europe, ne. Asia, n. North America, n. Africa, and temperate South America.

Chrysosplenium americanum Schweinitz ex Hooker, Golden-saxifrage, Water-mat, Water-carpet. Mt (GA, NC, SC, VA), Pd, Cp (VA): in shallow seepage in shade; uncommon (GA Special Concern). March-June. Québec west to Saskatchewan, south to e. VA, w. NC, n. GA, e. TN, and IN. [= RAB, C, F, G, GW, K, S, W]

Heuchera Linnaeus (Alumroot)

A genus of about 55 (or fewer) species, perennial herbs, of North America. Soltis (1985) found that speciation in *Heuchera* "apparently occurs with little divergence at genes coding for isozymes." Vegetatively, *Heuchera* resembles *Tiarella* and *Mitella*. References: Wells (1984)=Z; Wells (1979). The keys adapted from Wells (1984).

- 1 Plants in flower.
 - 2 Calyx glandular-villous, white or pink, often with green-tipped lobes, 1.3-3.3 mm long, 1.1-2.9 mm in diameter; free hypanthium 0.1-0.4 mm long; petals linear or oblanceolate, 2-3x as long as the calyx lobes, glabrous; plants flowering (June-) July-October.
 - 3 Leaves with widely to narrowly triangular lobes; petals linear, often coiled; seeds echinate; internodes of floral branches 0.3-2.9 mm long ***H. villosa***
 - 3 Leaves with rounded lobes; petals oblanceolate, reflexed; seeds smooth; internodes of floral branches 2.5-11.2 mm long ***H. parviflora***
 - 2 Calyx glandular-puberulent, greenish, 2.9-13.2 mm long, 2.4-7.5 mm in diameter; free hypanthium 0.6-7.0 mm long; petals rhombic-spatulate, slightly shorter to slightly longer than the calyx lobes, glandular-puberulent on the abaxial (lower) surface; plants flowering April-June.
 - 4 Free hypanthium less than 2 mm long; calyx weakly zygomorphic; calyx urceolate, subglobose, or campanulate.
 - 5 At the onset of anthesis stamens exerted 0.2-1.5 mm beyond the calyx and styles included or exerted up to 1.1 mm beyond the calyx; calyx subglobose ***H. caroliniana***
 - 5 At the onset of anthesis the stamens exerted 3 mm or more beyond the calyx and styles exerted 2.6 mm or more beyond the calyx; calyx urceolate or campanulate.
 - 6 Free hypanthium less than 1.5 mm long; petals greenish, white, creamy, or pink, the margins entire or bearing short teeth ***H. americana***
 - 6 Free hypanthium 1.5-1.9 mm long; petals purple, the margins fimbriate ***H. hispida***
 - 4 Free hypanthium more than 2 mm long; calyx weakly to strongly zygomorphic; calyx subglobose, campanulate, or tubular.
 - 7 Stigmas included within the calyx (the calyx lobes extending 1.3-5.3 mm beyond the stigma tips); calyx tubular; calyx lobes and petals inflexed, closing the mouth of the flower ***H. longiflora***
 - 7 Stigmas barely included within the calyx (the calyx lobes extending up to 0.6 mm beyond the stigma tips) to moderately exerted beyond it; calyx subglobose or campanulate; calyx lobes and petals erect or spreading, not closing the mouth of the flower.
 - 8 Calyx 2.8-4.5 mm long, subglobose; [plants of the Piedmont of sc. VA southwards to SC] ***H. caroliniana***
 - 8 Calyx 5.5-13.2 mm long, narrowly campanulate; [plants primarily of the Mountains and upper Piedmont of VA and nc. NC].
 - 9 Flowers large, with white, exerted petals; [plants of high elevations (usually over 1000 m) on strongly acidic substrates, such as quartzitic sandstones, in w. VA and adjacent e. WV] ***H. alba***
 - 9 Flowers smaller, with greenish or purplish-green petals; [plants of lower elevations on circumneutral or subacidic substrates] ***H. pubescens***
 - 1 Plants in vegetative condition (not all plants will be identifiable based solely on foliage characteristics).
 - 10 Petioles villous or hirsute with long, sparse to dense trichomes.
 - 11 Leaf lobes acute; teeth acute ***H. villosa***
 - 11 Leaf lobes obtuse or rounded; teeth obtuse.
 - 12 Both leaf surfaces moderately villous; leaves never white-mottled; leaf texture membranous, very thin ***H. parviflora***
 - 12 Both leaf surfaces glabrous or minutely puberulent (rarely one or both surfaces hispid, short-hirsute, or strigose); leaves sometimes white-mottled; leaf texture subcoriaceous to herbaceous, not very thin ***H. americana***
 - 10 Petioles minutely puberulent or glabrate.
 - 13 Both leaf surfaces moderately villous; leaves never white-mottled; leaf texture membranous, very thin ***H. parviflora***
 - 13 Both leaf surfaces glabrous or minutely puberulent (rarely one or both surfaces hispid, short-hirsute, strigose; leaves sometimes white-mottled; leaf texture subcoriaceous to herbaceous, not very thin.

- 14 Petioles minutely puberulent.
 - 15 Terminal lobe of leaf generally not elongated, broader than long ***H. americana***
 - 15 Terminal lobe of leaf generally elongated, longer than broad ***H. longiflora***
- 14 Petioles nearly glabrous (the trichomes so short as to appear absent).
 - 16 Terminal lobe of leaf generally elongated, longer than broad ***H. longiflora***
 - 16 Terminal lobe of leaf generally not elongated, broader than long.
 - 17 Marginal teeth predominantly acute ***H. hispida*, *H. pubescens*, or *H. alba***
 - 17 Marginal teeth predominantly obtuse ***H. americana*, *H. caroliniana*, or *H. hispida***

Heuchera alba Rydberg. Mt (VA): quartzitic outcrops at high elevations; rare. Further study of *H. alba* Rydberg is needed; its recognition as distinct from *H. pubescens* is probably warranted (Bartgis, pers. comm.). It apparently differs from *H. pubescens* in its large flowers with white, exerted petals (vs. greenish or purplish-green petals), and occurs at higher elevations (usually over 1000 m) on acidic substrates, such as quartzitic sandstones (vs. at lower elevations on circumneutral or subacidic substrates). [= K; *H. pubescens*, in part -- C, F, S, W, Z; *H. pubescens* var. *brachyandra* Rosendahl, Butters, & Lakela, in part? -- F, G]

Heuchera americana Linnaeus, American Alumroot. Mt, Pd (NC, SC, VA), Cp (NC, VA): rocky forests, rock outcrops, particularly where soils are subacidic to circumneutral; common (uncommon in Coastal Plain). April-June. CT and NY west to s. Ontario, n. IN, s. IL, and sc. MO south to c. GA, c. AL, n. MS, and n. LA, and the most widespread in our area, *H. americana* is the only *Heuchera* in the Coastal Plain, though *H. caroliniana* reaches the lower Piedmont. Within the range of *H. caroliniana*, *H. americana* is absent. [= C; *H. americana* var. *americana* -- F, G, K, Z; *H. americana* -- RAB, W, in part only; *H. americana* var. *heteradenia* Fernald -- F; *H. americana* var. *subtruncata* Fernald -- F; *H. americana* var. *brevipetala* Rosendahl, Butters, & Lakela -- G; *H. curtisii* -- S]

Heuchera caroliniana (Rosendahl, Butters, & Lakela) E. Wells, Carolina Alumroot. Pd (NC, SC, VA): rocky forests, rock outcrops, particularly where soils are subacidic to circumneutral, replacing *H. americana* in much of the upper Piedmont; uncommon (NC Watch List). April-June. Endemic to the Piedmont of sc. VA, NC, and nc. SC; first found in VA by T.F. Wieboldt in 2002 (Ludwig, pers. comm., 2002). [= K, Z; presumably included in the concept of *H. americana* by RAB, F, G, S]

Heuchera hispida Pursh, Purple Alumroot. Mt (VA), Pd (NC, VA): calcareous rocky forests, rock outcrops, particularly where soils are subacidic to circumneutral; rare (NC Watch List, VA Watch List). April-June. S. PA south through MD, WV, and VA to nw. NC. This species is intermediate between *H. americana* and *H. pubescens*; it is almost certainly of hybrid origin. The treatment of this hybrid derivative of *H. americana* and *H. pubescens* as *H. americana* var. *hispida* (a variety of one parent) seems undesirable. Since it partly replaces its parents within its range, occurs in populations away from one or both parent, and is not strictly intermediate, it seems best to accord it species status. [= F, G, S; *H. americana* -- RAB, W, in part; *H. xhispida* Pursh -- C; *H. americana* var. *hispida* (Pursh) E. Wells -- K, Z]

Heuchera longiflora Rydberg, Long-flowered Alumroot. Mt (NC, VA): rich shaded forests and woodlands over calcareous rocks such as limestone, dolostone, or calcite-cemented shales, siltstones, or sandstones, in circumneutral soils; rare (NC Watch List). May-June. This species is nearly limited to sedimentary rocks, occurring in e. and c. KY, s. OH, sw. WV, sw. VA, ne. TN, w. NC, and c. AL (?). In NC, it occurs primarily in the sedimentary window around Hot Springs, and is possibly limited to Madison, Buncombe, and Haywood counties. Wells (1984) calls it "most distinctive", "characterized by a unique combination of floral characters: long, tubular calyx, deeply included styles, inflexed calyx lobes and petals that close the mouth of the flower obliquely, and horizontal orientation of the flowers." [= C, F, G, K, S, W, Z; *H. longiflora* Rydberg var. *aceroides* (Rydberg) Rosendahl, Butters, & Lakela; *H. aceroides* Rydberg -- S; *H. scabra* Rydberg -- S]

Heuchera parviflora Bartling, Cave Alumroot. Mt (NC, SC, VA), Pd (NC): shaded cliff bases, usually under overhangs, on grotto floors, behind waterfalls where humidity is high but not in the spray zone, nearly always in deeply shaded situations where little or no direct sunlight falls; rare (NC Watch List, SC Rare, VA Watch List). July-September. An uncommon species throughout its range (ec. TN, KY, s. WV, sw. VA, w. NC, n. GA, n. AL, s. MO, s. IL, and s. IN), *H. parviflora* is probably most common in the gorge and waterfall country of sw. NC and in the Cumberland Plateau of TN and KY. In deeply shaded sites, it is often the only vascular plant present. The closely related species *H. puberula* Mackenzie & Bush [*H. parviflora* var. *puberula* (Mackenzie & Bush) E. Wells] occurs in s. MO and nc. AR, with scattered disjunct sites as far east as c. KY, c. TN, and s. IN. [= RAB, F, G, S, W; *H. parviflora* var. *parviflora* -- C, K, Z; *H. parviflora* var. *rugelii* (Shuttleworth) Rosendahl, Butters, & Lakela -- F, G]

Heuchera pubescens Pursh, Marbled Alumroot. Mt (SC?, VA), Pd (NC, VA): rocky forests, rock outcrops, particularly where soils are subacidic or circumneutral; uncommon (NC Watch List). May-June. Primarily a species of the Ridge and Valley Province of PA, MD, WV, and VA, *H. pubescens* ranges south to only a few locations in the upper Piedmont of NC. See discussion under *H. alba*. The report in RAB of the occurrence of *H. pubescens* in Madison County is apparently erroneous; Wells (1984) shows *H. pubescens* reaching its southern limit just south of the VA border, and not occurring at all in KY, TN, or the mountains of NC. She found the bract characters used in the key in RAB to be unreliable. Reported by Hill & Horn for South Carolina (report needs verification). [= K; *H. pubescens*, in part (also see *H. alba*) -- C, F, S, W, Z; *H. pubescens* -- RAB, probably misapplied; *H. pubescens* var. *brachyandra* Rosendahl, Butters, & Lakela, in part? -- F, G]

Heuchera villosa Michaux, Crag-jangle, Rock Alumroot. Mt, Pd (NC, SC, VA): in crevices of rock outcrops, or in thin soil over boulders, a characteristic component of the flora of high elevation cliffs and summits (to at least 1920m), not particular about the rock type, occurring on a wide range of rock types in our area, including felsic gneisses and schists, mafic gneisses, granites, quartzites, and others, probably the most acidophilic of our species of *Heuchera*; common (rare in upper Piedmont). Late June-October. W. VA, s. WV, s. OH, and s. IN, south through w. NC, KY, and TN to nw. SC, n. GA, n. AL, and ne. MS (primarily a Southern Appalachian endemic). In the Ozarks of AR it is replaced by the related *H. arkansana* Rydberg [*H. villosa* var. *arkansana* (Rydberg) E.B. Smith] with shorter and narrower inflorescence, shorter pedicels, and larger flowers. *H. villosa* Michaux var. *macrorhiza* (Small) Rosendahl, Butters, & Lakela is usually now lumped, but is recognized by Chester et al. (1997); it occurs in c.

TN and adjacent KY. [= RAB, S, W; *H. villosa* var. *villosa* -- C, F, G, K, Z; *H. villosa* var. *macrorhiza* (Small) Rosendahl, Butters, & Lakela -- F, G, in part; *H. villosa* var. *intermedia* Rosendahl, Butters, & Lakela -- F; *H. macrorhiza* Small -- S]

H. puberula Mackenzie & Bush, east to c. TN, c. KY. [*H. parviflora* Bartling var. *puberula* (Mackenzie & Bush) E. Wells – K] {not yet keyed}

H. sanguinea Engelman var. *sanguinea* is cultivated as an ornamental "wildflower". [= K]

Mitella Linnaeus (Miterwort)

A genus of about 20 species, herbs, of cold temperate e. North America, w. North America, and e. Asia.

Mitella diphylla Linnaeus, Two-leaved Miterwort. Mt (NC, SC, VA), Pd, Cp (VA): moist rich forests, especially in the Mountains, and especially rocky; common (uncommon in Piedmont, rare in Coastal Plain) (SC Rare). April-June. Québec west to MN, south to e. VA, w. NC, nw. SC, ne. GA, nw. GA, and MO. The fringed petals will reward a close look. [= RAB, C, F, G, GW, K, S, W]

Saxifraga Linnaeus (Saxifrage)

As currently circumscribed, a large and heterogeneous genus of about 440 species, mostly perennial herbs, of north temperate areas. As shown by molecular data, *Saxifraga* as currently defined is polyphyletic, and all of our species will likely be recognized in the near future as *Micranthes* (Soltis 1995, Soltis et al. 1996, Mort & Soltis 1999). Soltis et al. (1996) demonstrate that *Micranthes* is closely allied with *Heuchera*, *Mitella*, and *Tiarella*, less closely related to *Astilbe*, *Boykinia*, *Sullivantia*, and *Chrysosplenium*, and least closely related to the bulk of *Saxifraga*. Four of our six species are Southern or Southern Appalachian/Central Appalachian endemics.

- 1 Larger leaf blades oblanceolate, 4-10x as long as wide.
 - 2 Leaf margin entire to crenate; petals greenish-white, lacking yellowish spots **S. pennsylvanica**
 - 2 Leaf margin coarsely serrate; petals white, either 3 or 5 of them with yellowish spots.
 - 3 Leaves mostly with 4-8 teeth per side; pubescence of the leaves and scapes mostly gland-tipped; corolla bilaterally symmetrical, the 3 upper petals distinctly clawed (the petal blade with a cordate or truncate base) and with 2 yellow spots, the 2 lower petals smaller, cuneate, and not spotted; filaments filiform; [plants mostly of rock outcrops and seepages, often exposed, but sometimes shaded] **S. michauxii**
 - 3 Leaves with mostly 12-40 teeth per side; pubescence of the leaves and scapes mostly nonglandular; corolla radially symmetrical; filaments strongly clavate; [plants mostly of shaded seepages and brook-banks] **S. micranthidifolia**
- 1 Larger leaf blades ovate or obovate, 1-3 (-4)x as long as wide.
 - 4 Leaf margins entire or with obscure teeth mostly less than 1 mm long; leaves to 5 (-9) cm long and 2.5 cm wide; filaments 1-1.5 mm long; ovary partly inferior, the hypanthium partly adnate to the ovary; petals spatulate and cuneate, but not clawed; [plants widespread in our area].
 - 5 Inflorescence remaining compact with age; inflorescence axis sparsely short-hairy, the hairs not glandular (or with a very few glandular hairs interspersed; pedicels glabrous or nearly so; petals 2-3.5 mm long; [plants of granite outcrops in GA, otherwise in sc. US] **S. texana**
 - 5 Inflorescence branching with age, some branches often lower than the midpoint of the plant's height; inflorescence axis glandular-hairy; pedicels glandular-hairy; petals 3.5-6 mm long; [plants widespread in our area] **S. virginiana**
 - 4 Leaf margins with coarse teeth mostly 2-10 mm long; leaves to 15 cm long and 8 cm wide; filaments 2.5-3.5 mm long; ovary superior, the hypanthium free from the ovary; petals (either 3 or 5 of them) moderately to strongly clawed; [plants of the Mountains and upper Piedmont].
 - 5 Leaves not petiolate, cuneate to the base, gradually increasing in width from the base to the widest point; corolla bilaterally symmetrical, the 3 upper petals distinctly clawed and with yellow spots, the 2 lower smaller, cuneate, and not spotted **S. michauxii**
 - 5 Leaves petiolate, the blade rather abruptly contracted to the petiole; corolla radially symmetrical, all the petals alike.
 - 6 Sepals erect, later spreading; filaments filiform (use 10x); body of fruit (excluding the beak) 2.5-5 mm long; petals not spotted, or each with 2 obscure yellow spots **S. careyana**
 - 6 Sepals spreading, later reflexed; filaments slightly clavate (use 10x); body of fruit (excluding the beak) 4-5 mm long; petals each with 2 yellow spots **S. caroliniana**

Saxifraga careyana A. Gray, Carey Saxifrage. Mt (GA, NC, VA): moist rock outcrops and cliffs, often under overhangs, often in moist soil at the base of a vertical or overhanging rock outcrop; rare (GA Special Concern, NC Watch List, SC Rare, VA Rare). May-June. A Southern Appalachian endemic: sw. VA south to e. TN, w. NC, and nw. SC. There remains a great deal of doubt regarding the taxonomic relationship between *S. careyana* and *S. caroliniana*. Many of the characters appear to be poorly correlated, and most specimens have been annotated at one time or another, by one investigator or another, as both species. The synonymization of *Micranthes tennesseensis* Small under *S. careyana* seems questionable, since the capsule size (seemingly one of the more stable characters in this complex) suggests *S. caroliniana*. I here retain the two taxa more to draw continued attention

to them than out of conviction that the two are entirely satisfactory taxa (at least as currently defined). [= RAB, C, F, G, GW, K, W; *Micranthes careyana* (A. Gray) Small -- S; *Micranthes tennesseensis* Small -- S?]

Saxifraga caroliniana A. Gray, Carolina Saxifrage. Mt (NC, VA): moist rock outcrops and cliffs, often under overhangs, often in moist soil at the base of a vertical or overhanging rock outcrop; rare (US Species of Concern, NC Rare, VA Rare). May-June. A Southern Appalachian endemic: WV south to w. NC and ne. TN. See *S. careyana* for discussion of the 2 taxa. [= RAB, C, F, G, K, W; *Micranthes caroliniana* (A. Gray) Small -- S]

Saxifraga michauxii Britton, Cliff Saxifrage. Mt (GA, NC, SC, VA), Pd (NC, VA): in crevices in exposed rock outcrops at high elevations, other rock outcrops (moist to rather dry), periglacial boulderfields, rocky seeps; common (rare in VA Piedmont). June-August. A Southern Appalachian endemic: nw. VA, WV, and KY south to e. TN, w. NC, sw. SC, and ne. GA. The orange anthers are an attractive contrast to the white petals (the three upper with two yellow spots each). [= RAB, C, F, G, GW, K, W; *Hydatica petiolaris* (Rafinesque) Small -- S; *Micranthes*]

Saxifraga micranthidifolia (Haworth) Steudel, Branch-lettuce. Mt (GA, NC, SC, VA), Pd (NC, VA): wet soils of seepages, in the beds of high elevation brooks, brookbanks; rocky seepages; common (rare in VA Piedmont). May-June. A Southern and Central Appalachian endemic: e. PA and WV, south to e. TN, w. NC, nw. SC, and ne. GA. This plant is gathered in large quantities as a spring green in the mountains of our area, and can sometimes even be seen for sale in grocery stores. The common name refers to the plant's habitat; "branches" are mountain streams. [= RAB, C, F, G, GW, K, W; *Micranthes micranthidifolia* (Haworth) Small -- S]

Saxifraga pensylvanica Linnaeus, Swamp Saxifrage. Mt, Pd (NC, VA), Cp (VA): mountain bogs, mucky seeps; uncommon, rare in NC (NC Rare). April-June. ME west to MN, south to e. VA, c. and w. NC, and MO. [= RAB, C, F, K, W; *S. pensylvanica* ssp. *pensylvanica* -- G; *Micranthes pensylvanica* (Linnaeus) Haworth]

Saxifraga texana Buckley, Texas Saxifrage. Pd (GA): granite outcrops; rare (GA Special Concern). Found in 1980 by Jim Allison on a small granite outcrop in McDuffie County, GA. It is uncertain whether its occurrence in GA represents a natural disjunction or a freak introduction (J. Allison, pers. comm.). [= F, G, K; *Micranthes texana* (Buckley) Small -- S]

Saxifraga virginiana Michaux, Early Saxifrage. Mt, Pd (GA, NC, SC, VA), Cp (NC, SC, VA): rock outcrops, moist alluvial and slope forests, streambanks, riverbanks; common (rare in Coastal Plain). March-May. New Brunswick west to Manitoba, south to c. GA, LA, and AR. [= RAB, C, F, G, GW, W; *S. virginiana* var. *virginiana* -- K; *Micranthes virginiana* (Michaux) Small -- S]

Sullivantia Torrey & A. Gray ex A. Gray (*Sullivantia*)

A genus of 4 species, perennial herbs, of c. North America. References: Soltis (1980)=Z.

Sullivantia sullivantii (Torrey & A. Gray) Britton, *Sullivantia*. Mt (VA): moist limestone cliffs; rare (VA Rare). June-August. *S. sullivantii* has a very scattered, relictual distribution, known from w. VA, e. KY, s. OH, IL, sw. WI, ne. IA, se. MN, and MO. [= C, F, G, K, Z]

Tiarella Linnaeus (Foamflower)

A genus of about 5 species, perennial herbs, of temperate North America and e. Asia. References: Lakela (1937)=Y; Spongberg (1972)=Z.

- | | | |
|---|--|--|
| 1 | Plant without stolons; capsules 6-10 mm long; lower pedicels 6-10 mm long; [plants of the Mountains, Piedmont, and (rarely) Coastal Plain] | <i>T. cordifolia</i> var. <i>collina</i> |
| 1 | Plant with stolons; capsules 8-12 mm long; lower pedicels 7-13 mm long; [plants of the Mountains] | <i>T. cordifolia</i> var. <i>cordifolia</i> |

Tiarella cordifolia Linnaeus var. ***collina*** Wherry. Mt, Pd (NC, SC, VA), Cp (VA): moist forests, cove forests, rock outcrops; common. April-June. VA and KY south to GA, AL, and MS. The recognition of several taxa in e. North American *Tiarella* has been controversial, with from one to three taxa recognized, at varietal and specific levels, and with differing concepts as to the dividing lines between taxa. Further study is needed. [= RAB, C, G, K, Z; *T. wherryi* Lakela -- F; *T. cordifolia* -- S, W, infraspecific taxa not distinguished; *T. wherryi* Lakela -- Y, Z]

Tiarella cordifolia Linnaeus var. ***cordifolia***. Mt (NC, SC, VA): moist forests, cove forests, rock outcrops; common. April-June. Nova Scotia west to Ontario and WI, south to w. NC, nw. SC, n. GA, and MO. [= RAB, C, G, K, Z; *T. cordifolia* -- F, in the narrow sense; *T. cordifolia* -- S, W, infraspecific taxa not distinguished; *T. macrophylla* Small -- S; *T. cordifolia* var. *typica* -- Y]

Tiarella cordifolia Linnaeus var. *austrina* Lakela, in sw. GA. Reported for all our area (Kartesz 1999). {investigate} [= K, Y] {not yet keyed}

SCHISANDRACEAE Bl. 1830 (Star-vine Family)

A family of 2 genera and about 50 species, woody vines, of e. Asia and e. North America (only our single species). References: Keng in Kubitzki, Rohwer, & Bittrich (1993).

Schisandra Michaux 1803 (Star-vine)

A genus of about 25 species, woody vines, of e. Asia (about 24 species) and e. North America (1 species). References: Vincent in FNA (1997); Godfrey (1988)=Z; Keng in Kubitzki, Rohwer, & Bittrich (1993).

Schisandra glabra (Brickell) Rehder, Star-vine, Climbing-magnolia, Magnolia-vine. Cp (GA, NC, SC), Pd (GA, NC), Mt (GA): rich slopes adjacent to bottomland forests, or mesic "islands" surrounded by bottomlands; rare (GA Threatened, NC Threatened). May-June; July-August. Se. SC south to the FL panhandle, west to LA, north in the interior to n. GA, w. TN, sc. KY, and e. AR; disjunct in ne. NC (Martin County) and sc. NC (Gaston County). [= RAB, K, Z; *Schizandra coccinea* Michaux -- S (orthographic variant); *S. coccinea* Michaux -- W]

SCROPHULARIACEAE (Snapdragon Family)
(also see *OROBANCHACEAE*, *PHRYMACEAE*)

There is increasing evidence that the Scrophulariaceae as traditionally constituted includes two main and quite distinct groups (Olmstead & Reeves 1995; Young, Steiner, & dePamphilis 1999). Based on molecular analysis, Young, Steiner, & dePamphilis (1999) suggest that Scrophulariaceae, Antirrhinanthaceae, and Orobanchaceae be restructured to include the current members of Orobanchaceae, Scrophulariaceae, and Callitrichaceae. Beardsley & Olmstead (2002) suggest that *Mimulus* and *Mazus* be included with *Phryma* in a redefined Phrymaceae. References: Pennell (1935)=P; Olmstead & Reeves (1995); Young, Steiner, & dePamphilis (1999); Olmstead et al. (2001); Beardsley & Olmstead (2002).

Disposition of the traditional Scrophulariaceae (including Antirrhinanthaceae), Orobanchaceae, Plantaginaceae, Callitrichaceae, Buddlejaceae, Phrymaceae:

Scrophulariaceae s.s.: *Buddleja*, *Scrophularia*, *Verbascum*

Orobanchaceae: *Agalinis*, *Aureolaria*, *Buchnera*, *Castilleja*, *Conopholis*, *Dasistoma*, *Epifagus*, *Macranthera*, *Melampyrum*, *Orobanche*, *Pedicularis*, *Schwalbea*, *Seymeria*, *Striga*

Plantaginaceae (Veronicaceae): *Amphianthus*, *Antirrhinum*, *Bacopa*, *Callitriche*, *Chaenorhinum*, *Chelone*, *Collinsia*, *Cymbalaria*, *Digitalis*, *Gratiola*, *Kickxia*, *Leucospora*, *Limnophila*, *Limosella*, *Linaria*, *Lindernia*, *Mecardonia*, *Micranthemum*, *Misopates*, *Nuttallanthus*, *Penstemon*, *Plantago*, *Scoparia*, *Veronica*, *Veronicastrum*

Phrymaceae: *Mazus*, *Mimulus*, *Phryma*

Buddleja Linnaeus (Butterfly-bush)

The two species listed (and others) are grown for ornament and for their attractiveness as nectaring sites for butterflies.

- 1 Leaves serrate or crenate; corolla, calyx, pedicels, and inflorescence rachis pubescent (not granular-farinoso) **B. davidii**
- 1 Leaves entire or remotely dentate; corolla, calyx, pedicels, and inflorescence rachis granular-farinoso **B. lindleyana**

* **Buddleja davidii** Franchet, Summer-lilac, Orange-eye Butterfly-bush. Mt (GA, NC, VA), Pd (SC): planted, rarely escaped to disturbed places, such as thickets or streambanks (Wise Co., VA); rare, native of China. June-October. [= RAB, C, F, G, K]

* **Buddleja lindleyana** Fortune ex Lindley. Pd (GA, NC, SC), Mt, Cp (NC, SC): rarely escaped to disturbed areas; rare, native of China. June-October. [= RAB, K; *Adenoplea lindleyana* (Fortune ex Lindley) Small -- S]

EXCLUDED: *B. alternifolia* Maximowicz is reported as introduced in NC by Kartesz (1999), but the alleged documentation is not present. *B. officinalis* Maximowicz is reported as introduced in GA by Kartesz (1999), but the alleged documentation is not available.

Scrophularia Linnaeus (Figwort)

A genus of about 200 species, of temperate and tropical regions of the Old and New Worlds. Though our 2 species are only subtly distinct morphologically, they are clearly distinct.

- 1 Sterile filament (hidden under the upper corolla lip) yellowish-green, often wider than long; leaf serrations coarse, often more than 3 mm long; flowering May-early July; capsule 6-10 mm long **S. lanceolata**
- 1 Sterile filament dark purple or brownish, often longer than wide; leaf serrations fairly fine, less than 3 mm long; flowering mid July-October; capsule 4-7 mm long **S. marilandica**

Scrophularia lanceolata Pursh, American Figwort. Mt, Pd, Cp (VA): woodlands and forests; common (rare in Piedmont and

Coastal Plain). May-early July. Québec and Nova Scotia west to British Columbia, south to VA, MO, NM, and n. CA. [= C, F, G, K, P, W]

Scrophularia marilandica Linnaeus, Eastern Figwort. Mt, Pd, Cp (NC, SC, VA): moist to dry, nutrient-rich woodlands and forests, especially over mafic or calcareous rocks; common (rare in Piedmont and Coastal Plain south of VA). July-October. Québec west to MN, south to SC, ne. GA, sw. GA, and LA. [= RAB, C, F, G, K, P, S, W]

Verbascum Linnaeus (Mullein)

A genus of about 360 species, annual herbs, perennial herbs, and shrubs, of Eurasia and Africa.

- * ***Verbascum blattaria*** Linnaeus, Moth Mullein. Cp, Pd, Mt (VA): [= RAB, C, K, P]
- * ***Verbascum lychnitis*** Linnaeus, White Mullein. Cp, Pd (VA): [= RAB, C, K, P]
- * ***Verbascum phlomoides*** Linnaeus, Claspig Mullein. Mt, Pd, Cp (VA): [= RAB, C, K, P]
- * ***Verbascum thapsus*** Linnaeus, Woolly Mullein, Common Mullein, Flannel-plant. Mt, Pd, Cp (VA): [= RAB, C, K, P]
- * ***Verbascum virgatum*** Stokes. (NC, SC). [= RAB, C, K, P]

Verbascum nigrum Linnaeus is known from 19th century ballast collections in se. PA (Rhoads & Klein 1993). [= K, P]

Verbascum sinuatum Linnaeus is known from 19th century ballast collections in se. PA (Rhoads & Klein 1993) and MD (Kartesz 1999). [= K, P]