

ACORACEAE Martinov 1820 (Calamus Family)

The family consists only of *Acorus*. References: Thompson in FNA (2000); Bogner & Mayo in Kubitzki (1998b).

Acorus Linnaeus 1753 (Calamus, Sweetflag)

A genus of 2-4 species, widespread in north temperate and subtropical regions. Although traditionally treated as part of the Araceae, recent evidence strongly suggests that *Acorus* should be segregated in a separate family. A wide variety of morphological, anatomical, and embryological evidence supports the segregation of the Acoraceae (Grayum 1987), a segregation additionally supported by molecular studies (Duvall et al. 1993, Chase et al. 1993). The spathe in *Acorus* is not morphologically equivalent to the spathe of the Araceae. References: Thompson in FNA (2000); Grayum 1987.

- 1 Midvein of the leaves not well-developed, about equally as prominent as the lateral veins; mature fruits produced **A. americanus**
- 1 Midvein of the leaves well-developed, distinctly more prominent than the lateral veins; mature fruits not produced **A. calamus**

Acorus americanus (Rafinesque) Rafinesque, American Calamus, Sweetflag. Cp (GA?, VA), Mt (GA): marshes, wet meadows, other wet areas, limey seeps; rare (GA Special Concern). May-June. Widespread in ne. North America. This species is apparently a fertile diploid. Because this species has not generally been recognized in floras, its distribution is poorly known; additional distributional records should be expected and sought. [= FNA, K; *A. calamus* Linnaeus -- RAB, C, F, G, GW, in part; *A. americanus* -- W, in part]

* **Acorus calamus** Linnaeus, European Calamus, Sweetflag. Cp, Pd, Mt (NC, SC, VA): marshes, wet meadows, other wet areas; uncommon, introduced from Eurasia, now widespread in e. North America. May-June. The aromatic rhizome and leaves have been used medicinally and candied as a confection. Populations of *A. calamus* introduced in our area are apparently sterile triploids from Europe, though diploid and tetraploid populations of *A. calamus* are known from Asia. [= FNA, K; *A. calamus* Linnaeus -- RAB, C, F, G, GW, in part only (also see *A. americanus*); *A. americanus* -- W, in part]

AGAVACEAE Endlicher 1841 (Agave Family)

A family of about 11 genera and 315 species, herbs and rosette shrubs, of temperate and tropical America. The placement of *Camassia*, *Schoenolirion*, and *Hastingsia*, sometimes grouped as Hyacinthaceae subfamily Chlorogaloideae, is uncertain; they are probably better placed in the Agavaceae, a position supported by molecular, serological, and biogeographic evidence. References: Verhoek & Hess in FNA (2002a); Bogler & Simpson (1995, 1996); Verhoek in Kubitzki (1998a).

- 1 Plants with erect woody stems; leaves cauline **Yucca**
- 1 Plants acaulescent; leaves in basal rosettes.
 - 2 Margins of leaves fraying into coarse, whitish, curly fibers; tepals about 4 cm long **Yucca**
 - 2 Margins of leaves entire, not fraying; tepals 0.2-0.5 cm long.
 - 3 Leaves oblong-acute, 2-9 cm wide, 2-10x as long as wide, fleshy **Manfreda**
 - 3 Leaves linear, 0.3-1.8 cm wide, 20-100x as long as wide, herbaceous or wiry.
 - 4 Leaves narrowly linear, 3-5 mm wide, wiry and grasslike; inflorescence a diffuse panicle; perianth segments 2-4 mm long, white [**Nolina** -- see **RUSCACEAE**]
 - 4 Leaves linear, 2-18 mm wide, herbaceous; inflorescence a raceme; perianth segments 13-18 mm long, blue or nearly white.
 - 5 Perianth segments 13-18 mm long, blue or nearly white **Camassia**
 - 5 Perianth segments 5-7 mm long, white, cream, or yellow **Schoenolirion**

Camassia Lindley 1832 (Wild Hyacinth, Quamash Lily, Camas Lily)

A genus of 6 species, of North America. The family placement of *Camassia* is uncertain; there is some increasing evidence that the affinities of *Camassia* are with the Agavaceae, rather than the Hyacinthaceae (Fay & Chase 1996, Bogler & Simpson 1996, Speta in Kubitzki 1998a). References: Ranker & Hogan in FNA (2002a); Speta in Kubitzki (1998a).

Camassia scilloides (Rafinesque) Cory, Wild Hyacinth, Quamash Lily, Eastern Camas Lily. Mt (GA, VA), Cp (NC), Pd (SC): moist forests, over circumneutral soils, in VA on limestone, in NC on slopes and natural levees along the Roanoke River, in SC over gabbro; rare (NC Threatened, SC Rare, VA Rare). April-May. W. PA and s. Ontario west to s. WI and e. KS, south to nw. GA (Jones & Coile 1988) and TX, nearly entirely west of the Blue Ridge, with only a few disjunct occurrences in the Piedmont and Coastal Plain. [= RAB, C, F, FNA, G, K, W; *Quamasia hyacintha* (Rafinesque) Britton -- S]

Manfreda Salisbury 1866 (False-aloe)

A genus of about 26 species, primarily in sw. United States, Mexico, and Central America. References: Verhoek in FNA (2002a); Speta in Kubitzki (1998a).

Manfreda virginica (Linnaeus) Salisbury ex Rose, Rattlesnake-master, Eastern False-aloë. Pd (GA, NC, SC), Cp (GA, NC, SC), Mt (GA, NC, SC, VA): granite flatrocks, diabase glades, xeric woodlands over mafic or calcareous rocks, sandhill woodlands; uncommon (VA Rare). Late May-mid July; August-October. E. SC, c. NC, sw. VA, WV, s. OH, s. IN, s. IL, and MO south to n. FL and TX. [= FNA, K, S, W; *Agave virginica* Linnaeus -- RAB, C, F; *M. tigrina* (Engelmann) Small -- S; *Polianthes virginica* (Linnaeus) Shinnery]

Nolina
(see **RUSCACEAE**)

Schoenolirion Torrey ex Durand (Sunnybell)

A genus of 3 species, herbs, of s. North America. References: Sherman in FNA (2002a).

- 1 Inflorescence with 1-6 branches; leaves without fleshy bases, withering to a persistent fibrous crown **Sch. albiflorum**
- 1 Inflorescence rarely branched; leaves with fleshy bases, not fibrous.
 - 2 Perianth white [**Sch. wrightii**]
 - 2 Perianth golden-yellow **Sch. croceum**

Schoenolirion albiflorum (Rafinesque) R.R. Gates, White Sunnybell. Cp (GA): wet pinelands, cypress depressions, and *Hypericum* depressions; rare (GA Special Concern). E. GA south to FL and west to AL. [= FNA, K; *Sch. elliottii* Feay ex A. Gray -- GW; *Oxytria albiflora* (Rafinesque) Pollard -- S]

Schoenolirion croceum (Michaux) Wood, Yellow Sunnybell. Pd (Ga, SC), Cp (GA, NC?), Mt (GA): seepages on granite flatrocks, wet seepages in sandhills (allegedly); rare (NC Watch List, SC Rare). April-May; May-June. SC (and allegedly NC) south to n. FL, west to se. TX; and in c. TN on limestone glades (Chester et al. 1993). The occurrence in NC in "wet pinelands" in Richmond County referred to in RAB has not been relocated or further documented. [= RAB, FNA, GW, K; *Oxytria crocea* (Michaux) Rafinesque -- S]

Schoenolirion wrightii Sherman, Texas Sunnybell, occurs east to AL. [= FNA, K; *Oxytria texana* (Scheele) Pollard -- S]

Yucca Linnaeus 1753 (Yucca, Adam's-needle)

A genus of about 40 species, of sw. North America, n. Mexico, se. United States, and the West Indies. References: Hess & Robbins in FNA (2002a); Speta in Kubitzki (1998a).

- 1 Leaf margins fraying into filamentous threads; plant acaulescent (or essentially so); fruit erect.
 - 2 Inflorescence branches glabrous; tepals 5-7 cm long; leaves 2-6 cm wide, stiff, the apex acute-acuminate to obtuse, often concave upwards at the apex **Y. filamentosa**
 - 2 Inflorescence branches scurfy-pubescent; tepals 3-5 cm long; leaves 1.5-4 cm wide, pliable, the apex attenuate-acuminate, not notably concave **Y. flaccida**
- 1 Leaf margins not fraying, minutely notched-serrulate or entire, and hyaline; plant with a trunk; fruit pendulous (erect in *Y. recurvifolia*).
 - 3 Leaf margins minutely notched-serrulate, particularly towards the base; seeds 2.5 mm thick, marginless **Y. aloifolia**
 - 3 Leaf margins entire, smooth, hyaline-brown or hyaline-tellow; seeds ca. 1 mm thick, margined.
 - 4 Leaf blades rigid, straight; fruits pendent, 5.5-8 cm long; [plants of NC south to FL] **Y. gloriosa**
 - 4 Leaf blades recurved, flexible; fruits generally erect, 2.5-4.5 cm long; [plants of GA westwards] **Y. recurvifolia**

Yucca aloifolia Linnaeus, Spanish Dagger. Cp (GA, NC, SC): dunes; uncommon. June-early July; October-December. E. NC (Carteret County) south to FL and west to LA. [= RAB, FNA, K, S]

Yucca filamentosa Linnaeus, Curlyleaf Yucca, Spoonleaf Yucca. Cp, Pd (GA, NC, SC, VA), Mt (NC, SC, VA): woodlands, forests, dunes, roadsides, disturbed areas; common. Late April-early June; September-October. MD or s. NJ south to GA, west to MS; escaped from cultivation over a broader area of e. United States. [= FNA, F, S, W; *Y. filamentosa* var. *filamentosa* -- RAB; *Y. filamentosa* -- C, G, K, in part (also see *Y. flaccida*); *Y. concava* Haworth -- S]

Yucca flaccida Haworth, Weakleaf Yucca. Cp, Pd, Mt (GA, NC, SC, VA*): woodlands, roadsides, disturbed areas; rare (NC Watch List). Late April-early June; September-October. C. NC and TN south to FL and AL. Whether or not this taxon is valid (and if so, as a variety or as a species) has been unclear; further research is needed. The occurrence of this species in VA is apparently the result of cultivation and persistence. [= FNA, S, W; *Y. filamentosa* var. *smalliana* (Fernald) Ahles - RAB; *Y. filamentosa* -- C, G, K, in part; *Y. smalliana* Fernald -- F]

Yucca gloriosa Linnaeus, Mound-lily Yucca, Spanish Bayonet. Cp (GA, NC, SC): dunes, shell middens; uncommon, rare in NC (NC Rare). (April), October; November-December. E. NC (Dare County) south to ne. FL, west to LA (Kartesz 1999). [= RAB,

K, S; *Y. gloriosa* var. *gloriosa* – FNA]

Yucca recurvifolia Salisbury, Curve-leaf Yucca. Cp (GA): dunes, dry sandy soils; rare. GA west to LA (?). [= S; *Yucca gloriosa* Linnaeus var. *recurvifolia* (Salisbury) Engelm. – FNA]

ALISMATACEAE Ventenat 1799 (Water-plantain Family)

A family of about 12 genera and 80 species, herbs, subcosmopolitan in distribution. References: Haynes & Hellquist in FNA (2000); Rogers (1983); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b).

- 1 Pistils in a single whorl, borne on a flat receptacle; stamens 6; inflorescence compound, many of the primary nodes bearing whorled branches which in turn bear whorled branches or whorled flowers ***Alisma***
- 1 Pistils spiraled in several to many whorls, borne on a globose receptacle; stamens 6-many; inflorescence racemose (or in some species of both *Echinodorus* and *Sagittaria* somewhat compound, with the lowermost node or two bearing branches which in turn bear whorled flowers).
 - 2 Achenes turgid, with ribs or ridges; flower whorls subtended by 3 bracts and additional bracteoles ***Echinodorus***
 - 2 Achenes flattened, with winged margins and often also with irregular corky ornamentations on the faces; flower whorls subtended by 3 bracts, with no additional bracteoles ***Sagittaria***

Alisma Linnaeus 1753 (Water-plantain)

A genus of about 9 species, herbs, subcosmopolitan in distribution. References: Haynes & Hellquist in FNA (2000); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b).

- 1 Leaf blades 2.7-5x as long as wide (or even narrower on submerged leaves), tapering at the base; petals pink, 2.3-3.7 mm long; achene with a dorsal ridge flanked by two dorsal grooves ***A. gramineum***
- 1 Leaf blades 1.3-2.5 (2.7)x as long as wide, rounded to subcordate at the base; petals white, **either** 1.8-2.5 mm **or** 3.8-4.5 mm long; achene with a single dorsal groove.
 - 2 Petals 1.8-2.5 mm long, 1.4-2.0 mm wide ***A. subcordatum***
 - 2 Petals 3.8-4.5 mm long, 3.0-3.9 mm wide [***A. triviale***]

Alisma gramineum Lejeune, Grassleaf Water-plantain. Cp (VA): in seasonally flooded areas in impoundments; rare (VA Watch List). June-August. This species is circumboreal, ranging in North America south to e. VA, NY, WI, MO, NM, and CA. The occurrence of this species in our area may be the result of dispersal by waterfowl; first reported for our area by Wieboldt et al. (1998). [= C, F, FNA, K; *A. plantago-aquatica* Linnaeus var. *americanum* J.A. Schultes -- G, in part]

Alisma subcordatum Rafinesque, Southern Water-plantain. Mt, Pd (NC, SC, VA), Cp (NC, VA): marshes, ponds, stream edges; uncommon. April-November. MA west to ND, south to FL and TX. [= RAB, C, F, FNA, G, GW, K, S, W; *A. plantago-aquatica* Linnaeus ssp. *subcordatum* (Rafinesque) Hultén; *A. plantago-aquatica* var. *parviflorum* (Pursh) Torrey]

Alisma triviale Pursh, Northern Water-plantain, ranges south to s. PA (and according to Fernald to MD and WV). [= C, F, FNA, K; *A. plantago-aquatica* Linnaeus var. *americanum* J.A. Schultes -- G, in part]

Echinodorus L.C. Richard ex Engelm. 1848 (Burhead)

A genus of about 27 species, herbs, primarily of the American tropics and subtropics. References: Haynes & Hellquist in FNA (2000); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b).

- 1 Leaf blades 1-3 cm long, 0.2-2 cm wide; achenes 10-20 per head; stamens 6 or 9; petals 1-3 mm long; scapes 5-10 cm tall, erect; [subgenus *Helanthium*] ***E. tenellus***
- 1 Leaf blades 5-20 cm long, 3-15 cm wide; achenes 40 or more per head; stamens ca. 21; petals 6-12 mm long, scapes 20-120 cm tall, erect or arching/reclining; [subgenus *Echinodorus*].
 - 2 Scapes arching and rooting down at maturity; veins of the sepals papillose-roughened ***E. cordifolius* ssp. *cordifolius***
 - 2 Scapes rigidly erect at maturity; veins of the sepals smooth.
 - 3 Stamens 9-15; plants to 70 cm tall [***E. berteroi***]
 - 3 Stamens 21; plants to 200 cm tall [***E. floridanus***]

Echinodorus cordifolius (Linnaeus) Grisebach, Creeping Burhead. Cp (NC, SC, VA): swamps, ditches, wet thickets, especially on base-rich substrates, such as over calcareous or mafic rocks; common. June-November. MD south to FL, west to TX, south into tropical America, and north in the interior (primarily in the Mississippi Embayment) to s. IL. [= FNA; *E. cordifolius* -- RAB, F, G, GW, K, infraspecific taxa not distinguished; *E. cordifolius* var. *cordifolius* -- C; *E. radicans* (Nuttall) Engelm. -- S]

Echinodorus tenellus (Martius) Buchenau, Mud-babies, Dwarf Burhead. Cp (GA, NC, SC), Mt (VA): on drawdown zones of Coastal Plain ponds, pineland ponds, blackwater riverbanks, or ponds in the Mountains with Coastal Plain affinities (Augusta

County, VA); rare (GA Special Concern, NC Rare, VA Rare). MA west to MN, south to c. peninsular FL and e. TX, but widely scattered and disjunct in that range. [= FNA, G, K; *E. parvulus* Engelm. -- G, GW; *E. tenellus* (Martius) Buchenau var. *parvulus* (Engelm.) Fassett -- C; *Helanthium parvulum* (Engelm.) Britton -- S]

Echinodorus berteroi (Sprengel) Fassett, Tall Burhead, occurs from OH, IL, and ND south to FL, GA, and TX. [= FNA, K; *E. berteroi* var. *lanceolatus* (Engelm. ex S. Watson & Coulter) Fassett -- C; *E. cordifolius* -- S, misapplied; *E. rostratus* (Nuttall) Engelm. -- GW]

Echinodorus floridanus R.R. Haynes & J.R. Burkhalter is a recently named endemic, known only from Escambia County, FL. [= FNA, K]

Sagittaria Linnaeus 1753 (Arrowhead)

A genus of about 25 species, herbs, primarily of the Americas. References: Haynes & Hellquist in FNA (2000); Bogin (1955)=Z; Wooten (1973)=Y; Beal, Wooten, & Kaul (1982)=X; Preston & Adams (1961); Haynes, Les, & Holm-Nielsen in Kubitzki (1998b).

Identification notes: Portions of this key (and treatment) are provisional. The taxonomy and best characters to use in the linear-leaved species is particularly problematic.

- 1 Leaf blades sagittate or cordate (at least some of the leaves on a plant with sagittate or cordate basal lobes; some species are keyed both here and below).
 - 2 Leaf blades stellate-pubescent; [subgenus *Sagittaria*] ***S. latifolia* var. *pubescens***
 - 2 Leaf blades glabrous.
 - 3 Sepals appressed in fruit; lower flowers perfect, the stamens either functional or not; stamen filaments roughened with minute scales (except glabrous in *S. spatulata*); [subgenus *Lophotocarpus*].
 - 4 Leaves primarily phyllodial, lanceolate or spatulate (sagittate leaves rare in the population and few on a given plant); flowers in 1-2 (-3) whorls; stamen filaments glabrous (use 10x); [plants of tidal marshes, native] ***S. spatulata***
 - 4 Leaves primarily sagittate (phyllodial leaves rare in the population and few on a given plant); flowers in 3-12 whorls; stamen filaments roughened with minute scales (use 10x); [plants **either** introduced aliens, sometimes in tidal marshes, **or** native, found in inland alkaline sites].
 - 5 Petals white, immaculate; stamens of pistillate flowers functional; [plants of inland sites, native or introduced at a given locality] ***S. calycina***
 - 5 Petals white, with a purple spot at the base; stamens of pistillate flowers generally nonfunctional; [plants native to South America, introduced around coastal ports] ***S. montevidensis***
 - 3 Sepals reflexed or at least widely spreading in fruit; lower flowers pistillate; stamens glabrous (except roughened with minute scales in *S. rigida*); [subgenus *Sagittaria*].
 - 6 Leaves cordate basally, floating; stalks of the pistillate flowers stout, reflexed in fruit; stamens mostly fewer than 15 ***S. filiformis***
 - 6 Leaves sagittate basally, emersed; stalks of the pistillate not notably stout, ascending in fruit; stamens 15 or more.
 - 7 Beak of the achene lateral (at a right angle to the long axis of the achene); bracts of the inflorescence 2-14 mm long, boat-shaped, obtuse or broadly acute.
 - 8 Lowermost (pistillate) flowers on long pedicels (at least 20 mm), the pedicels of the lowermost flowers longer than those in whorls above; inflorescence normally not bent; stamen filaments glabrous ***S. latifolia* var. *latifolia***
 - 8 Lowermost (pistillate) flowers sessile or on short pedicels (to 5 mm or rarely 10 mm long), the pedicels of the lowermost flowers notably shorter than those in whorls above; inflorescence normally bent at the lowest whorl of flowers; stamen filaments minutely roughened with minute scales ***S. rigida***
 - 7 Beak of the achene terminal (extending along the long axis of the achene); bracts of the inflorescence 5-40 mm long, either blunt or acuminate, not boat-shaped.
 - 9 Bracts of the inflorescence thick and herbaceous, 5-25 mm long, rounded at the tip; flowers in 2-4 whorls; achenes with facial resin-ducts; [plants of acidic, blackwater habitats of the Coastal Plain] ***S. engelmanniana***
 - 9 Bracts of the inflorescence papery and tan, 7-40 mm long, acuminate at the tip; flowers in 5-12 whorls; achenes without resin-ducts; [plants primarily of other habitats, commectively widespread].
 - 10 Petiole sharply 5-wing-angled in cross-section; inflorescence unbranched; fruiting heads 1.0-1.5 cm in diameter, globular ***S. australis***
 - 10 Petiole corrugated but not wing-angled in cross-section; inflorescence often branched at the base; fruiting heads (1.2-) 1.7-2.2 cm in diameter, often globular-depressed ***S. brevirostra***
 - 1 Leaf blades linear or lanceolate, or modified as linear, bladeless phyllodia, these often of spongy texture.
 - 11 Stalks of the pistillate flowers stout, reflexed in fruit; stamen filaments glabrous (except roughened with minute scales in

- S. platyphylla* and *S. calycina*); [subgenus *Lophotocarpus*].
- 12 Sepals appressed in fruit; lower flowers perfect, the stamens either functional or not.
- 13 Leaves generally primarily sagittate (phyllodial leaves generally rare in the population); flowers in 3-12 whorls; stamen filaments roughened with minute scales (use 10x); [plants of inland alkaline sites] ***S. calycina***
- 13 Leaves primarily phyllodial, lanceolate or spatulate (sagittate leaves rare in the population and few on a given plant); flowers in 1-2 (-3) whorls; stamen filaments glabrous (use 10x); [plants of tidal marshes] ***S. spatulata***
- 12 Sepals reflexed or at least widely spreading in fruit; lower flowers pistillate; [subgenus *Sagittaria*].
- 14 Plant generally with erect, emersed leaves with well-developed blades with firm texture, the blades lanceolate, elliptic, or ovate, 2-8 cm wide; stamen filaments roughened with minute scales ***S. platyphylla***
- 14 Plant with all leaves phyllodial, if expanded at the summit, the expanded blade of weak texture, floating.
- 15 Leaves very variable from population to population, in swiftly flowing black water typically about 100 cm long and 2-3 mm wide, in more stagnant water (or when emersed by dropping water levels, typically with lax petioles and floating blades, the blades lanceolate, or elliptic, the base cuneate, rounded, or cordate; [plants of nontidal waters] ***S. filiformis***
- 15 Leaves 2-30 cm long, 3-8 mm wide (sometimes with dilated tip to 20 mm wide); [plants of tidal, fresh to brackish waters] ***S. subulata***
- 11 Stalks of the pistillate flowers not notably stout, ascending or spreading in fruit; stamen filaments roughened with minute scales (except glabrous in *S. engelmanniana*).
- 16 Stamens filaments linear, less thick than the anther, changing little in diameter from near base to near summit.
- 17 Bracts of the inflorescence firm in texture, smooth; stamen filaments glabrous; [plants of inland acidic wetlands] ***S. engelmanniana***
- 17 Bracts of the inflorescence either papillose or longitudinally striate-ribbed; stamen filaments roughened with minute scales; [plants of estuarine areas and associated nontidal wetlands].
- 18 Bracts and sepals striate-ribbed; stamen filaments 2-5 mm long; [rare, from e. SC southwards] ***S. lancifolia* var. *lancifolia***
- 18 Bracts and sepals papillose; stamen filaments 1.5-3.5 mm long; [common, throughout our coastal area] ***S. lancifolia* var. *media***
- 16 Stamens filaments either distinctly dilated towards the base (often broadly conic) or thickened throughout, the filament (at least basally) as thick or thicker than the anther.
- 19 Lowermost (pistillate) flowers sessile or on short pedicels (to 5 mm or rarely 10 mm long); inflorescence normally bent at the lowest whorl of flowers ***S. rigida***
- 19 Lowermost (pistillate) flowers on longer pedicels; inflorescence normally not bent.
- 20 Leaves all phyllodia, the phyllodia terete or nearly so; [plants from DE and NJ northwards] [***S. teres***]
- 20 Leaves with blades and petioles, or if all phyllodia, the phyllodia flattened or triangular in cross-section; [plants collectively widespread].
- 21 Plants with corms and/or stolons, lacking coarse rhizomes.
- 22 Blades of emersed leaves lanceolate, narrowly spatulate; [plants of Mountain and upper Piedmont bogs, swamp forests, and adjacent ditches] ***S. fasciculata***
- 22 Blades of emersed leaves linear (less than 3 mm wide); [plants of Coastal Plain depression wetlands] ***S. isoetiformis***
- 21 Plants with coarse rhizomes, lacking corms and stolons.
- 23 Abaxial wing of fruit scalloped or toothed; [plants of n. AL] [***S. secundifolia***]
- 23 Abaxial wing of fruit entire; [plants collectively widespread].
- 24 Larger phyllodes 0.8-2.5 cm wide, the apices blunt (rarely acute); longer pistillate pedicels 2-5 (-6.5) cm long; median resin duct of mature achene linear, about as wide as the posterior duct (or ducts absent) ***S. weatherbiana***
- 24 Larger phyllodes to 1 cm wide (except sometimes wider in *S. graminea* var. *chapmanii*), the apices avute; longer pistillate pedicels 1-4 cm long; median resin duct of mature achene club-shaped and 2x the diameter of the posterior duct.
- 25 Inflorescence branched at the base (in at least some plants of a population); bracts of the inflorescence only slightly connate, the free tips narrowly triangular, 6-15 mm long ***S. chapmanii***
- 25 Inflorescence unbranched at the base; bracts of the inflorescence slightly to almost fully connate ***S. graminea***

Sagittaria australis (J.G. Smith) Small. Cp, Pd, Mt (NC, SC, VA): marshes, swamps, margins of ponds and lakes; common. June-October. NY west to s. IN and se. MO, south to SC and MS. [= C, F, FNA, K, S, W, X; *S. longirostra* -- RAB, S, misapplied; *S. engelmanniana* J.G. Smith ssp. *longirostra* -- G, GW, Z, misapplied]

Sagittaria brevirostra Mackenzie & Bush, Midwestern Arrowhead. Mt (VA): {habitat}; rare. June-October. OH west to ND, south to w. VA, e. TN, AL, and TX. [= C, F, FNA, K, W, X; *S. engelmanniana* J.G. Smith ssp. *brevirostra* (Mackenzie & Bush) Bogin -- G, Z]

Sagittaria calycina Engelmann. Pd* (NC*, SC*), Mt (VA): ponds; rare (VA Rare). May-September. N. OH and MI west to SD and CO, south to sw. VA, c. TN, LA, TX, and Mexico; disjunct in CA. Presumably only introduced in North Carolina and South Carolina. First reported for South Carolina by Hill & Horn (1997). [= RAB, C, W; *Lophotocarpus calycinus* (Engelmann) J.G. Smith -- F; *S. montevidensis* Cham. & Schlecht. ssp. *calycina* (Engelmann) Bogin -- FNA, G, GW, Z; *S. calycina* var. *calycina* -- K]

Sagittaria chapmanii (J.G. Smith) C. Mohr, Chapman's Arrowhead. Cp (NC, SC): limesink (doline) ponds with drawdown hydrology, mucky ditches; rare (NC Rare). May-September. Se. NC south to s. FL, west to s. AL. First reported for SC by Nelson & Kely (1997). Analyses of allozyme variation in the *S. graminea* complex revealed great differentiation between *S. graminea*, *S. chapmanii*, and *S. platyphylla*; *S. graminea* and *S. platyphylla* appeared to be more closely related to one another than either was to *S. chapmanii* (Hauber & Legé 1999). Therefore, it seems best to treat these three taxa at equal rank and at the species level. [= S; *S. graminea* Michaux ssp. *chapmanii* (J.G. Smith) R.R. Haynes & C.B. Hellquist – FNA; *S. graminea* Michaux var. *chapmanii* J.G. Smith – GW, K, Y, Z]

Sagittaria engelmanniana J.G. Smith. Cp (NC, SC, VA), Pd (NC, VA): blackwater streambanks, sphagnum bogs, pocosins, beaver ponds; rare (NC Watch List, VA Rare). June-October. MA and NY south to n. FL and s. MS, primarily on the Coastal Plain. [= RAB, C, F, FNA, K, W, X; *S. engelmanniana* ssp. *engelmanniana* – G, GW, Z]

Sagittaria fasciculata E.O. Beal, Bunched Arrowhead. Mt (NC, SC), Pd (SC): bogs, ditches adjacent to drained bogs, wooded seepage areas; rare (US Endangered, NC Endangered). May-July. Endemic to a several-county area in sw. NC and nw. SC, where most of its former habitat has been drained. The type material of *S. macrocarpa* J.G. Smith is ambiguous. [= RAB, FNA, GW, K, W, Y; *S. macrocarpa* J.G. Smith -- S; *S. graminea* Michaux var. *macrocarpa* (J.G. Smith) Bogin -- K, Z]

Sagittaria filiformis J.G. Smith. Cp (NC, SC): swiftly flowing water of blackwater rivers and streams, blackwater lake shores; rare (NC Rare). May-September. As conceived here, ranging from MA south to FL and s. AL. The forms growing in swiftly flowing black water are remarkable and unlikely to be recognized as a *Sagittaria* unless in flower, with linear leaves over 100 cm long and only 1-3 mm wide, with 5-7 parallel ribbed veins, resembling *S. kurziana* Glück of spring-fed streams of FL. The proper taxonomic treatment and associated nomenclature to apply to these plants remains unclear. [= FNA, K, S; *S. stagnorum* Small -- GW, S; *S. subulata* (Linnaeus) Buchenau var. *gracillima* (S. Watson) J.G. Smith -- RAB, F, G, Z; *S. subulata* -- C, in part; *S. lorata* (Chapman) Small -- S]

Sagittaria graminea Michaux. Cp (NC, SC, VA), Pd, Mt (VA): marshes, ponds, tidal areas; uncommon (rare in the Piedmont and Mountains). May-November. Newfoundland and Labrador west to MN and SD, south to s. FL and c. TX; and in the West Indies. [= F, S; *S. graminea* Michaux var. *graminea* – RAB, C, G, GW, K, Y; *S. eatonii* J.G. Smith -- F; *S. graminea* ssp. *graminea* – FNA; *S. cycloptera* (J. G. Smith) C. Mohr -- S; *S. graminea* -- W, infraspecific taxa not distinguished; *S. graminea* var. *graminea* -- Z, in part (also see *S. isoetiformis*)]

Sagittaria isoetiformis J.G. Smith. Cp (NC, SC): clay-based Carolina bays, other seasonally flooded depressions; rare (NC Rare). June-September. Se. NC south to c. peninsular FL, west to s. MS (Sorrie & Leonard 1999). See Godfrey & Adams (1964) for additional discussion of this species. [= FNA, GW, K, S, Y; *S. teres* -- RAB, S, misapplied; *S. graminea* Michaux var. *graminea* -- Z, in part]

Sagittaria lancifolia Linnaeus var. *lancifolia*. Cp (SC): marshes, swamps; rare. May-June. E. SC south to s. FL, west to FL Panhandle; also throughout the West Indies and in n. South America. [= C; *S. lancifolia* -- RAB, S, in the narrow sense; *S. lancifolia* ssp. *lancifolia* -- FNA, GW, K, Z; *S. angustifolia* Lindley -- S]

Sagittaria lancifolia Linnaeus var. *media* Micheli. Cp (NC, SC, VA): freshwater to brackish tidal marshes, ditches; common. June-October. S. DE south to n. FL, west to TX; also scattered in Central America. If recognized as a species, this taxon is *S. falcata*. [= C; *S. falcata* Pursh -- RAB, F, G, S; *S. lancifolia* ssp. *media* (Micheli) Bogin -- FNA, GW, K, Z]

Sagittaria latifolia Willdenow var. *latifolia*. July-October. Cp, Pd, Mt (NC, SC, VA): marshes, swamps, farm ponds, ditches, bogs; common. June-September. Nova Scotia west to British Columbia, south to tropical America (rare in the Appalachian region). In addition to the pubescence difference, var. *latifolia* and var. *pubescens* can be separated by the presence (var. *latifolia*) or absence (var. *pubescens*) of resin-ducts on the achene-faces. [= RAB, C, F, G, GW, W, Z; *S. latifolia* var. *obtusata* (Engelmann) Wiegand -- RAB, F; *S. planipes* Fernald -- F; *S. latifolia* – FNA, K, infraspecific taxa not distinguished; *S. latifolia* -- S, in the narrow sense; *S. ornithorhyncha* Small -- S]

Sagittaria latifolia Willdenow var. *pubescens* (Muhlenberg ex Nuttall) J.G. Smith. Mt, Pd, Cp (NC, SC, VA): bogs, marshes; common. July-October. C. PA, OH, and TN, south to n. FL and e. TX, primarily in the Appalachians. [= RAB, C, F, G, GW, W, Z; *S. latifolia* – FNA, K, infraspecific taxa not distinguished; *S. pubescens* Muhlenberg ex Nuttall -- S]

* ***Sagittaria montevidensis*** Chamisso & Schlechtendahl. Cp (NC, SC): disturbed areas, marshes; rare, introduced from South America. July. Most of the collections from the southeastern United States are old collections around major seaports, suggesting that this plant was introduced on the ballast of sailing ships. [= RAB, K, S; *S. montevidensis* ssp. *montevidensis* -- FNA, GW, Z]

Sagittaria platyphylla (Engelmann) J.G. Smith. Cp (GA, SC, VA), Pd (NC): marshes, ditches, farm ponds; rare (GA Special Concern, NC Watch List, VA Watch List), perhaps introduced from the s. Midwest. June. The distribution of this species is primarily in the Mississippi drainage; occurrences east of the Appalachians may be introduced, either by humans or by waterfowl. First reported for VA by Wieboldt et al. (1998). Known from numerous counties in sc. GA (Jones & Coile 1988). [= F, FNA, K, S, Y; *S. graminea* Michaux var. *platyphylla* Engelmann -- RAB, G, Z; ? *S. mohrii* J.G. Smith -- S]

Sagittaria rigida Pursh, Sessile-fruited Arrowhead. Mt (VA): mountain ponds, wet meadows; rare (VA Rare). July-October. ME and MN, south to w. VA, nc. TN, MO, -- NE. [= C, F, FNA, G, K, S, W, Y, Z]

Sagittaria spatulata (J.G. Smith) Buchenau. Cp (NC, VA): tidal marshes; uncommon (NC Watch List, VA Rare). May-September. New Brunswick south to e. NC along the coast. [= C, G; *Lophotocarpus spongiosus* (Engelmann) J.G. Smith -- F; *S. calycina* var. *spongiosa* Engelmann -- K; *S. montevidensis* Cham. & Schlecht. ssp. *spongiosa* (Engelmann) Bogin -- FNA, Z]

Sagittaria subulata (Linnaeus) Buchenau. Cp (NC, SC, VA): tidal marshes and mud flats; uncommon. May-September. MA and NY south to FL and AL. [= FNA, GW, K, S; *S. subulata* var. *subulata* -- RAB, F, G, Z; *S. subulata* -- C, in part (also see *S. stagnorum*); *S. subulata* var. *natans* (Michaux) J.G. Smith -- F]

Sagittaria weatherbiana Fernald. Cp (NC, SC, VA): fresh to brackish marshes, streambanks, pineland pools; uncommon. April-June. Se. VA south to n. FL. Isozyme studies by Hauber & Lege (1996) provide evidence that this taxon should be given

species status; its genetic identity with var. *graminea* is low, and comparable to the difference between *S. graminea* var. *graminea* and *S. platyphylla*. [= F; *S. graminea* Michaux var. *weatherbiana* (Fernald) Bogin -- RAB, C, G, GW, K, Y, Z; *S. graminea* Michaux ssp. *weatherbiana* (Fernald) R.R. Haynes & C.B. Hellquist – FNA]

Sagittaria secundifolia Kral, Little River Water-plantain. Mt (GA): crevices in sandstone bedrock in streambeds; rare (US Threatened, GA Threatened). Nw. GA and nc. AL. See Kral (1982) and Threlkeld & Soehren (2003) for additional information. [= FNA, K] {not yet keyed}

Sagittaria teres S. Watson ranges from MA south to DE and NJ. [= C, F, FNA, G, K; *S. graminea* Michaux var. *teres* (S. Watson) Bogin] {not yet keyed}

ALLIACEAE J. Agardh 1858 (Onion Family)

References: Fay & Chase (1996); Rahn in Kubitzki (1998a).

- 1 Inflorescence a solitary flower; flowers blue, lavender, or white; plant with an onion odor; [subfamily *Gillesioideae*] ***Tristagma***
- 1 Inflorescence an umbel; flowers white, greenish white, cream, pink, or magenta-purple; plant with or without an onion odor.
 - 2 Tepals 2-9 mm long; ovary 3-celled, each with 1-2 ovules; plant with an onion odor; [subfamily *Allioideae*] ***Allium***
 - 2 Tepals 10-15 mm long; ovary 3-celled, each with 6-10 ovules; plant usually without an onion odor; [subfamily *Gillesioideae*] ***Nothoscordum***

Allium Linnaeus 1753 (Onion, Garlic, Leek, Ramps, Chives)
(also see *Nothoscordum*)

A genus of 500-700 species, herbs, of Eurasia, n. Africa, and North America (especially diverse in c. Asia). References: Rahn in Kubitzki (1998a); McNeal & Jacobsen in FNA (2002a).

- 1 Leaves appearing before the flowers and withering before anthesis; leaves lanceolate to elliptic (the margins not parallel for most of the length), mostly more than 2 cm wide.
 - 2 Leaves (1.5-) 2-4 (-4.5) cm wide, without a distinct petiolar base, the basal portion white; flowers (6-) 10-18 (-25) per umbel (fruits often fewer by abortion); spathe bracts 1-2 cm long; fruiting pedicels (8-) 10-15 (-18) mm long ***A. burdickii***
 - 2 Leaves (3-) 5-8 (-9) cm wide, with a distinct petiolar base, the petioles usually red or pink; flowers (15-) 30-55 (-63) per umbel (fruits often fewer by abortion); spathe bracts 2-3 cm long; fruiting pedicels (10-) 15-25 (-30) mm long ***A. tricoccum***
- 1 Leaves present at flowering; leaves linear (the margins parallel for most of the length), mostly less than 2 cm wide.
 - 3 Leaves cylindric (round or channeled-indentured in cross section), hollow.
 - 4 Stem stout, usually 1 cm or more in diameter; peduncles with a distinct swollen portion ***A. cepa***
 - 4 Stem slender, less than 5 mm in diameter; peduncles without a distinct swollen portion ***A. vineale***
 - 3 Leaves variously flattened or keeled (flat or V-shaped in cross section), not hollow.
 - 5 Stem leafy for half its length; leaves 1.5-4.5 cm wide.
 - 6 Inflorescence of flowers only ***A. ampeloprasum***
 - 6 Inflorescence of flowers and bulblets ***A. sativum***
 - 5 Stem scapose, leafy only at its base; leaves less than 1.4 cm wide.
 - 7 Inflorescence erect, the peduncle not bent.
 - 8 Ovary or capsule crested with projections about 1 mm long; perianth segments acuminate.
 - 9 Spathe bracts usually 5-nerved; ovary crests contorted, ascending; tepals reflexed; leaves 3-10 mm wide ***A. cuthbertii***
 - 9 Spathe bracts 1-nerved; ovary crests plane, flattened, spreading; tepals spreading; leaves 1-2 mm wide ***A. speculae***
 - 8 Ovary or capsule not crested with projections; perianth segments acute.
 - 10 Inflorescence partly or entirely of bulblets ***A. canadense* var. *canadense***
 - 10 Inflorescence entirely of normal flowers ***A. canadense* var. *mobile***
 - 7 Inflorescence nodding, the peduncle bent 30-150 degrees in its uppermost several cm (at least in bud -- in *A. stellatum* becoming erect in flower or fruit).
 - 11 Flowers stellate, the tepals spreading; scape nodding in bud, becoming erect in flower or fruit; bulb ovoid **[*A. stellatum*]**
 - 11 Flowers urceolate, campanulate, to nearly rotate, the tepals strongly to slightly incurved; scape nodding in bud, flower, and fruit; bulb elongate.
 - 12 Perianth urceolate, deep magenta-purple; sepals obtuse; [plants of moderate to high elevations in the Mountains] ***A. allegheniense***
 - 12 Perianth campanulate to nearly rotate, pink, pale pink, or nearly white; sepals acute (obtuse in *A.*

- oxyphilum*); [plants moderate to low elevations in the Mountains, Piedmont, and Coastal Plain].
- 13 Plants flowering late August-early October; petals 6-9 mm long, pale pink to nearly white; leaves moderately to strongly keeled in cross section (the angle between the two lower flat faces generally 90-135 degrees), 4-12 mm wide; [plants of calcareous wet savannas of the outer Coastal Plain] **A. species 1**
- 13 Plants flowering June-early August; petals 5-6.5 mm long, pink to pale pink (white to greenish white in *A. oxyphilum*); leaves rounded to moderately keeled in cross section (if keeled, the angle between the two lower flat faces generally 120-165 degrees), 2-8 mm wide; [plants of the Piedmont and Mountains].
- 14 Pedicels relatively stout, 1.6-3 cm long; petals pink or pale pink (sometimes nearly white); plants flowering June to early August; [plants widespread in our area, on moderately to strongly calcareous substrates] **A. cernuum**
- 14 Pedicels relatively slender, 2-4 cm long; petals greenish white to white; plants flowering August; [plants of barrens developed over strongly acid shales in e. WV] . **[A. oxyphilum]**

Allium allegheniense Small, Allegheny Onion. Mt (NC, VA): in thin soils around outcrops, generally of mafic rocks (such as amphibolite or hornblende gneiss) or calcareous rocks, primarily at moderate to fairly high elevations (1000-1600m); uncommon (VA Watch List). July-early September; August-October. Although not recognized by most recent authors, *A. allegheniense* seems distinctive enough in morphology, distribution, and range to warrant taxonomic recognition. Known from w. NC, w. VA, and e. WV, possibly more widespread. [= K, S; *A. cernuum* -- RAB, C, F, FNA, G, W, in part]

* **Allium ampeloprasum** Linnaeus, Wild Leek. Cp, Pd, Mt (NC, SC, VA): roadsides and other disturbed areas; rare, introduced from Eurasia. Late May-early July; July-August. [= RAB, C, F, FNA, G, W; *A. ampeloprasum* var. *ampeloprasum* -- K; *A. ampeloprasum* var. *atroviolaceum* (Boiss.) Regel -- K]

Allium burdickii (Hanes) A.G. Jones, Narrow-leaf Ramps, White Ramps. Mt (NC, VA): northern hardwood forests, primarily at higher elevations than *A. tricoccum*, perhaps also in cove forests and rich mountain slopes; rare (NC Rare, VA Watch List). June; August. Only recently determined to be a separate taxon, *A. burdickii* is apparently rare in the Southern Appalachians. It blooms about a month earlier than *A. tricoccum*. See Jones (1979) for more details and discussion. Largely sympatric with *A. tricoccum*, it is somewhat more northern and midwestern, ranging from ME west to ND and south to NJ, and in the Mountains to w. NC and e. TN. [= K, W; *A. tricoccum* var. *burdickii* Hanes -- C, FNA]

Allium canadense Linnaeus var. **canadense**, Wild Onion. Pd, Cp, Mt (NC, SC, VA): bottomland forests, pastures, roadsides; common. Mid April-May; late May-June. Though native, often appearing weedy. New Brunswick west to ND, south to FL and TX. [= RAB, C, FNA, K; *A. canadense* -- F, G, S, W]

Allium canadense Linnaeus var. **mobile** (Regel) Ownbey. Cp, Pd (SC): dry woodlands; rare. Mid April-May; Late May-June. S. SC south to FL, west to TX. This taxon is perhaps better treated as a distinct species. [= RAB, FNA, K; *A. microscordium* Small -- S; *A. mutabile* Michaux -- F; *A. arenicola* Small -- S]

* **Allium cepa** Linnaeus, Garden Onion. Cp, Pd, Mt (NC, SC): persisting from gardens, or appearing around compost or trash piles; rare as an escape (commonly grown), native to Eurasia. May-June; July. [= RAB, C, FNA, G; *A. cepa* var. *cepa* -- K]

Allium cernuum Roth, Nodding Onion. Pd, Mt (NC, SC, VA): generally in open woodlands or around outcrops of shale, mafic, or calcareous rocks, in the mountains at low elevations; uncommon (SC Rare). June-early August; August-October. NY, MI, MN, and British Columbia, south to GA and AZ. See discussion of *A. oxyphilum* at end of genus. [*A. cernuum* -- RAB, C, F, FNA, G, K, W, in part (also see *A. allegheniense* and/or *A. oxyphilum*); *A. cernuum* var. *cernuum* -- K; *A. cernuum* -- S]

Allium cuthbertii Small, Cuthbert's Onion. Pd (NC, SC), Cp (SC): in thin soils around rock outcrops, receiving nutrient-rich seepage and occurring with many strict calciphiles; rare (NC Rare). May-June; June-July. The bright emerald green ovary of the fresh flowers is striking and distinctive. Two morphological forms occur in our area, probably warranting taxonomic recognition. Typical *A. cuthbertii* occurs on xeric Coastal Plain sands from c. SC south through GA and AL to FL; the perianth is white and the plants 1.5-3.5 dm tall. In NC, a peculiar form of *A. cuthbertii* is apparently limited to a series of unusual granitic domes in the Brushy Mountains of Alexander and Wilkes counties; these plants are more robust (4-8 dm tall), and the perianth is always pink. [= RAB, FNA, K, S, W]

* **Allium sativum** Linnaeus, Garlic. Cp, Pd (SC): gardens, trash heaps, fields; commonly cultivated, rarely occurring as a waif or persistent in gardens. [= C, F, FNA, G, K]

Allium species 1, Savanna Onion. Cp (NC): wet savannas over coquina limestone (marl); rare (NC Rare). Late August-early October; late September-November. This remarkable Coastal Plain relative of *A. cernuum* was first discovered in 1981 by Steve Leonard in Pender County; it has since been found in similar sites in Onslow and Brunswick counties, always associated with other endemic species of primarily montane genera, such as *Thalictrum cooleyi* and *Parnassia caroliniana*. It appears to warrant taxonomic status.

Allium speculacae Ownbey & Aase, Flatrock Onion. Pd (GA): seepy edges of vegetation mats on Lithonia granitic gneiss (and on sandstone in ne. AL); rare (GA Threatened). May-June; mid June-mid July. Endemic to wc. GA and ne. AL. See Patrick, Allison & Krakow (1995) for additional information. [= FNA, K]

Allium tricoccum Aiton, Ramps, Red Ramps, Wild Leek, Rampscallions. Mt (NC, VA): cove forests and mesic slope forests; common. June-July; August-September. See *A. burdickii* for a discussion of the two species of ramps. Nova Scotia and ND south to n. GA, n. AL, and MO. [= K, W; *A. tricoccum* -- RAB, F, G, in part (see also *A. burdickii*); *A. tricocum* var. *tricoccum* -- C, FNA; *Validallium tricoccum* (Aiton) Small -- S]

* **Allium vineale** Linnaeus, Field Garlic. Pd, Cp, Mt (NC, SC, VA): lawns, pastures, other disturbed places; common, introduced from Eurasia. Late May-June; June-August. This is the common weed, often known as "onion grass". [= RAB, C, F,

FNA, G, S, W; *A. vineale* ssp. *vineale* -- K]

Allium oxyphilum Wherry occurs on shale barrens in WV (Greenbrier, Mercer, Monroe, and Summers counties). Although there has been much discussion of its taxonomic status, it is apparently distinct from *A. cernuum*. It should be expected in VA, although the outcrops of suitable shales are quite limited (Bartgis, pers. comm.; Wieboldt, pers. comm.). [= K; *A. cernuum* -- C, F, FNA, G, W, in part]

Allium stellatum Nuttall ex Ker-Gawler occurs east to c. TN. [= C, F, FNA, G, K]

Other members of the genus are widely cultivated for food, spice, or ornament; some may escape or persist. Some of the more familiar are *A. porrum* Linnaeus (Leek), *A. oleraceum* Linnaeus (Field Garlic), and *A. schoenoprasum* Linnaeus (Chives), introduced from Eurasia.

Brodiaea

(see *Dichelostemma* in **THEMIDACEAE**)

Dichelostemma Kunth

(see **THEMIDACEAE**)

Ipheion

(see *Tristagma*)

Nothoscordum Kunth 1843 (Grace Garlic, False Garlic)

A genus of about 25 species, herbs, of the Americas (primarily South America). References: Rahn in Kubitzki (1998a)=Z; Jacobsen & McNeal in FNA (2002a).

- 1 Leaves 1-4 mm wide; flowers 17 or fewer per umbel; flowers fragrant ***N. bivalve***
- 1 Leaves 4-12 mm wide; flowers 15 or more per umbel; flowers not fragrant ***N. gracile***

Nothoscordum bivalve (Linnaeus) Britton, Grace Garlic, False Garlic. Cp, Pd (GA, NC, SC, VA), Mt (GA): around granite flatrocks, in glades and barrens of various kinds, in open woodlands, and also weedy in fields and along roadsides; common (VA Rare). Mid March-mid May, and again in September-October; May-June, and again in October-November. Se. VA west to s. OH and KS, south to FL, TX, and South America. An onion-like plant, but generally lacking the odor of onion. [= C, F, G, K, S, W, Z; *Allium bivalve* (Linnaeus) Kuntze -- RAB]

* ***Nothoscordum gracile*** (Aiton) Stearn. Cp (GA, SC): disturbed areas; rare, introduced from South America. [= FNA, K; *Nothoscordum borbonicum* Kunth -- Z, misapplied?; *Allium inodorum* Aiton -- RAB; *N. fragrans* (Ventenat) Kunth -- S]

Tristagma Poepp. (Star-of-Bethlehem)

A genus of 3 species, herbs, of South America. References: Rahn in Kubitzki (1998a).

* ***Tristagma uniflorum*** (Graham) Traub, Star-of-Bethlehem. Cp (GA, NC, SC, VA), Pd (NC, SC, VA): commonly cultivated, escaping to lawns, suburban woodlands, bottomlands, disturbed places; rare, introduced from South America. March-April. Reported for South Carolina by Hill & Horn (1997). [= K; *Ipheion uniflorum* (Graham) Rafinesque -- RAB]

ALSTROEMERIACEAE (Peruvian-lily Family)

Alstroemeria pulchella Linnaeus f., Peruvian-lily, is naturalized in GA and other states along the Gulf Coast (Holmes in FNA 2002). [= FNA]

AMARYLLIDACEAE J. St. Hilaire 1805 (Amaryllis Family)

(also see **AGAVACEAE** and **HYPOXIDACEAE**)

A family of about 59 genera and 850 species, nearly cosmopolitan (especially diverse in the tropics). References: Dahlgren, Clifford, & Yeo (1985); Müller-Doblies & Müller-Doblies (1996); Meerow & Snijman in Kubitzki (1998a).

- 1 Corona present (a fused tubular or flattened petaloid structure in the center of the flower, above the tepals).

- 2 Filaments fused with the corona; corona very membranous in texture, distinctly thinner than the tepals; flowers white; [native plants of riverine or tidal shores and marshes]; [tribe *Hymenocallideae*, subtribe *Hymenocallidinae*] **Hymenocallis**
- 2 Filaments not fused with the corona; corona membranous in texture, but similar to the tepals (in texture, though sometimes of a different color); flowers usually at least partly yellow or orange (sometimes purely white); [alien species naturalized in primarily upland and disturbed habitats]; [tribe *Narcisseae*, subtribe *Narcissinae*] **Narcissus**
- 1 Corona absent.
 - 3 Flowers red; stamens about 2x as long as the tepals; [tribe *Lycoridae*] **Lycoris**
 - 3 Flowers white, yellow, or white-pink; stamens shorter than or about as long as the tepals.
 - 4 Flowers yellow; [tribe *Narcisseae*, subtribe *Narcissinae*] **Sternbergia**
 - 4 Flowers white or white-pink.
 - 5 Tepals 3-10 cm long, white or sometimes white-pink.
 - 6 Tepals spreading, separate, the perianth rotate; inflorescence a several-flowered umbel terminating the stem; [tribe *Amaryllideae*, subtribe *Crininae*] **Crinum**
 - 6 Tepals ascending, overlapping, the perianth tubular; inflorescence of a single flower; [tribe *Hippeastreae*, subtribe *Zephyranthinae*] **Zephyranthes**
 - 5 Tepals 0.4-2.5 cm long, white, with small green or yellow spots; [tribe *Narcisseae*, subtribe *Galanthininae*].
 - 7 Inner 3 tepals distinctly shorter and blunter than the outer 3 tepals **Galanthus**
 - 7 Inner 3 tepals and outer 3 tepals of similar size and shape **Leucojum**

Crinum Linnaeus 1753 (Swamp Lily, String Lily)

A genus of about 65 species, pantropical, extending locally into warm temperate regions. References: Holmes in FNA (2002a); Meerow & Snijman in Kubitzki (1998a).

Identification notes: *Crinum* can be distinguished vegetatively from *Hymenocallis* by its spiral (vs. distichous) leaf arrangement and leaf margins finely toothed (vs. entire).

- 1 Flowers sessile; umbels 2-7-flowered; sepals and petals shorter than the tube **C. americanum**
- 1 Flowers pedicellate; umbels 8-13-flowered; sepals and petals longer than the tube **C. bulbispermum**

Crinum americanum Linnaeus, Swamp Lily, String Lily. Cp (GA, NC, SC): swamp forests; rare (NC Rare). June-October. Se. NC south to s. FL and west to TX. [= GW, K, S; *C. americanum* var. *americanum* – FNA]

* **Crinum bulbispermum** (Burman f.) Milne-Redhead & Schweickerdt. Cp (GA?, NC, SC): commonly cultivated, occasional in waste areas; rare, introduced. June-July. [= FNA, K; *C. longifolium* (Linnaeus) Thunberg -- S]

Galanthus Linnaeus 1753 (Snowdrop)

A genus of about 17 species, of Europe and w. Asia. References: Stace (1997)=Z; Straley & Utech in FNA (2002a); Meerow & Snijman in Kubitzki (1998a).

- 1 Leaves inrolled as they unfold, at least one leaf > 1 cm wide at flowering; inner tepals with green blotch at base and apex **[G. elwesii]**
- 1 Leaves flat as they unfold, all leaves <1 cm wide at flowering; inner tepals with green blotch at apex only **G. nivalis**

* **Galanthus nivalis** Linnaeus, Snowdrop. Pd (NC, VA): persistent after cultivation; rare, introduced from Europe. February-March. [= F, FNA, K, Z]

Galanthus elwesii Hooker f., Giant Snowdrop, Greater Snowdrop, reported as cultivated and rarely naturalized in PA (Rhoads & Klein 1993). [= FNA, Z; *G. elwesii* – K, orthographic error]

Hymenocallis Salisbury 1812 (Spider-lily)

A genus of about 50 species, from s. North America and the West Indies south to ne. South America. The appropriate systematics and nomenclature of *Hymenocallis* in se. United States are still unstable and uncertain. Recent publications by Smith and co-workers (e.g. Smith & Garland 1996, 2003; Smith & Flory 1990; Smith & Flory in FNA (2002a) have greatly improved our understanding of southeastern United States *Hymenocallis*. References: Smith & Garland (2003)=Z; Meerow & Snijman in Kubitzki (1998a); Smith & Flory in FNA (2002a). Key adapted from on Smith & Flory in FNA (2002a).

Identification notes: *Hymenocallis* can be distinguished vegetatively from *Crinum* by its distichous (vs. spiral) leaf arrangement and leaf margins entire (vs. finely toothed).

- 1 Staminal cup >4.5 cm long; [plants of rocky river shoals of the Piedmont] ***H. coronaria***
- 1 Staminal cup <4.5 cm long; [plants of the Coastal Plain, Piedmont floodplains, and the GA Ridge and Valley].
 - 2 Leaves oblanceolate, distinctly wider towards the tip.
 - 3 Leaves coriaceous, not glaucous; scape bracts 3-4 (-6) cm long, the tip acute; bulbs rhizomatous; [plants of wet habitats] ***H. choctawensis***
 - 3 Leaves not coriaceous, distinctly glaucous; scape bracts 4-7 cm long, the tip long-acuminate; bulbs rhizomatous; [plants of moist but not mucky habitats] ***H. occidentalis* var. *occidentalis***
 - 2 Leaves liguliform, not wider towards the tip, the margins parallel throughout.
 - 4 Staminal cups rotate at full anthesis; leaves chiefly arching low, often appearing prostrate; [plants of s. GA south into FL] ***H. duvalensis***
 - 4 Staminal cups funnelliform at full anthesis but gradually spreading in time; leaves suberect to erect; [plants of se. NC south to FL].
 - 5 Perianth segments (6-) 7-11.5 cm long; leaves 3-7 dm long ***H. crassifolia***
 - 5 Perianth segments 5.0-6.5 cm long; leaves 1.5-2.5 dm long ***H. pygmaea***

Hymenocallis choctawensis Traub, Florida Panhandle Spiderlily, Choctaw Spiderlily. Cp (GA): floodplains; rare (GA Watch List). GA (floodplain of the Ochlockonee River) and FL west to LA. [= FNA, K, Z; *Hymenocallis* sp. -- GW]

Hymenocallis coronaria (LeConte) Kunth, Shoals Spiderlily, Cahaba Lily. Pd (GA, SC): rocky river shoals, usually with *Justicia americana* and *Podostemum ceratophyllum*; rare (GA Endangered). Mid May-July; July-September. SC south and west to AL. Notable stands of this spectacular plant occur on the Saluda River (SC), Savannah River below I-20 (GA-SC border), and on the Cahaba River (Bibb County, AL). [= FNA, Z; *H. caroliniana* (Linnaeus) Herbert -- K, misapplied; *H. occidentalis* (Le Conte) Kunth -- RAB, S, misapplied; *Hymenocallis* sp. -- GW]

Hymenocallis crassifolia Herbert. Cp (GA, NC, SC): tidal marshes, margins of tidal guts, banks of blackwater rivers; common. May-June; June-July. Se. NC south to n. FL. [= RAB, FNA, S, Z; *Hymenocallis* sp. -- GW; *H. floridana* (Rafinesque) Morton – K, misapplied]

Hymenocallis duvalensis Traub, Dixie Spiderlily, Duval Spiderlily. Cp (GA): blackwater floodplain (Suwanee River); rare (GA Watch List). S. GA (floodplain of the Suwanee River) south to n. FL. [= FNA, K, Z; *Hymenocallis* sp. -- GW]

Hymenocallis occidentalis (LeConte) Kunth var. ***occidentalis***, Hammock Spiderlily, Woodland Spiderlily. Cp (GA, SC), Pd (GA, NC), Mt (GA): mesic soils of slopes and floodplain forests, gabbro glades and other calcareous upland flats; uncommon. NC west to AR and LA. Var. *eulae* (Shinn ers) G.L. Smith & Flory is endemic in the West Gulf Coastal Plain. [= FNA, Z; *Hymenocallis* sp. -- GW; *H. occidentalis* – S, infraspecific taxa not distinguished; *H. caroliniana* (Linnaeus) Herbert – K, misapplied]

Hymenocallis pygmaea Traub, Pygmy Spiderlily, Waccamaw Spiderlily. Cp (NC, SC): banks of blackwater rivers; rare. May-June; June-July. Se. NC south to ne. SC, perhaps endemic to the Waccamaw River drainage. Needing further study, but strikingly different in appearance from *H. crassifolia*. [= FNA, Z; *Hymenocallis* sp. -- GW; *H. palmeri* S. Watson – K, misapplied]

Leucojum Linnaeus 1753 (Snowflake)

A genus of about 10 species, of Europe, n. Africa, and w. Asia. References: Straley & Utech in FNA (2002a); Meerow & Snijman in Kubitzki (1998a).

* ***Leucojum aestivum*** Linnaeus, Snowflake. Cp (NC, SC, VA), Pd (VA): persistent after cultivation; rare, introduced from Europe. March-April. Reported naturalized in NC by Leonard (1971b). [= RAB, C, F, FNA, G; *L. aestivum* ssp. *aestivum* -- K]

Lycoris Herbert 1819 (Magic Lily)

A genus of about 20 species, primarily e. Asian. References: Meerow & Snijman in Kubitzki (1998a).

* ***Lycoris radiata*** (L'Héritier) Herbert, Magic Lily, Surprise Lily, Hurricane Lily. Pd, Cp (NC, SC): frequently cultivated, sometimes persistent for long periods of time, especially in lawns around older homes; rare, introduced from e. Asia. September-October. Leaves and flowers are not present at the same time. [= RAB, K]

Narcissus Linnaeus 1753 (Daffodil, Jonquil, Narcissus, Buttercup)

A genus of about 40-60 species, of Europe, n. Africa, and w. Asia. References: Stace (1997)=Z; Jefferson-Brown (1991)=Y; Straley & Utech in FNA (2002a); Hanks (2002); Jefferson-Brown (1969); Meerow & Snijman in Kubitzki (1998a).

Identification notes: The familiar flower consists of 6 tepals spreading in more or less a plane, and a fused, tubular, corona. The hypanthial tube is below the perianth lobes.

- 1 Perianth lobes 10-15 mm long; corona 3-5 mm long; leaves and stems cylindrical, hollow; umbel (or spathe, or stem) with 3-10 flowers ***N. jonquilla***

- 1 Perianth lobes 20-50 mm long; corona 5-50 mm long; leaves and stems flattened, solid; umbel (or spathe, or stem) with 1-4 flowers.
 - 2 Hypanthial tube (below the tepals) parallel-sided (though sometimes suddenly expanded at its apex); corona less than 10 mm long, usually wider than high; corona less than 0.5x as long as the perianth lobes; corona rarely undulate; umbel (or spathe, or stem) with 1-10 flowers.
 - 3 Corona of a single color, all white or yellow; umbel (or spathe, or stem) with (1-) 2 (-3) flowers . . . **N. xmedioluteus**
 - 3 Corona rim red, contrasting with the white or yellow corona; umbel (or spathe, or stem) with 1 flower . . . **N. poeticus**
 - 2 Hypanthial tube (below the tepals) distinctly widening towards its apex; corona usually more than 10 mm long, usually as long as wide or longer than wide; corona more than 0.5x as long as the perianth lobes; corona margin undulate; umbel (or spathe, or stem) with 1 flower.
 - 4 Tepals linear to lanceolate, less than 5 mm wide **N. bulbocodium**
 - 4 Tepals ovate, triangular-ovate, or suborbicular, more than 10 mm wide.
 - 5 Corona 10-25 mm long, distinctly shorter than the perianth lobes **N. xincomparabilis**
 - 5 Corona 30-50 mm long, about as long as the perianth lobes **N. pseudonarcissus**

* **Narcissus bulbocodium** Linnaeus, Hoop-petticoat Daffodil. Cp (NC): grassy roadsides, established; rare (introduced from Eurasia). March. [= Y, Z]

* **Narcissus xincomparabilis** P. Miller (pro sp.) [*poeticus* x *pseudonarcissus*], Nonesuch Daffodil. Cp, Pd (NC, SC, VA): cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas; common, introduced from Europe. March-April. [= C, K, Z; *N. incomparabilis* -- RAB, F, G]

* **Narcissus jonquilla** Linnaeus, Jonquil. Cp (NC, SC): cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas; uncommon, introduced from Europe. March-April. [= RAB, C, F, FNA, G, K, Z]

* **Narcissus xmedioluteus** P. Miller (pro sp.) [*poeticus* x *tazetta*], Primrose-peerless. Cp, Pd, Mt (NC, SC, VA): cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas; common, introduced from Europe. March-May. [= K, Z; *N. tazetta* x *poeticus* -- RAB]

* **Narcissus poeticus** Linnaeus, Poet's Narcissus, Pheasant's-eye Daffodil. Cp, Pd, Mt (NC, SC, VA): cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas; common, introduced from Europe. March-May. [= RAB, C, F, FNA, G, K, Z]

* **Narcissus pseudonarcissus** Linnaeus, Daffodil, Buttercup. Cp, Pd, Mt (NC, SC, VA): cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas; common, introduced from Europe. February-April. [= RAB, C, FNA, K, Z; *N. pseudo-narcissus* -- F, G, orthographic variant]

Other taxa are under cultivation and may be expected as persistent or escaped in our area. Manuals of cultivated plants and the extensive horticultural literature on *Narcissus* (such as the references listed above) should be consulted by those interested in more information on members of this genus.

Sternbergia Waldst. & Kit. 1805 (Winter Daffodil)

A genus of about 8 species, of Mediterranean Europe, n. Africa, and w. Asia. References: Meerow & Snijman in Kubitzki (1998a).

* **Sternbergia lutea** (Linnaeus) Ker-Gawler ex Sprengel, Winter Daffodil. Cp (VA): cultivated as an ornamental, persistent and naturalized in lawns, roadsides, woodland borders, and disturbed areas; rare, introduced from Europe. This species has yellow, *Crocus*-like flowers, in the autumn. [= K]

Zephyranthes Herbert 1821 (Atamasco-lily, Zephyr-lily, Rain-lily)

A genus of about 50 species, from s. North America and the West Indies south to s. South America. References: Flagg, Smith, & Flory in FNA (2002a); Meerow & Snijman in Kubitzki (1998a).

- 1 Flowers (from base of ovary to apex of perianth) 3-5 cm long; stamens 1.5-2.5 cm long; stigma 1, 3-lobed; [introduced species, escaped from cultivation] **Z. candida**
- 1 Flowers 6-10 cm long; stamens 4.5-8 cm long; stigmas 3; [native species, sometimes also cultivated].
 - 2 Style and stigma as long as or shorter than the anthers; perianth segments erect-ascending at full anthesis, mostly 3-6 cm long **Z. simpsonii**
 - 2 Style and stigmas extending beyond the anthers; perianth segments spreading at full anthesis, mostly 5-8 cm long.
 - 3 Mature leaves concave, 3-8 mm wide; perianth tube usually <2.3 cm long; filaments >1.5x as long as the perianth tube **Z. atamasca**
 - 3 Mature leaves grooved, 1-4 mm wide; perianth tube usually >2.3 cm long; filaments <1.5x as long as the perianth tube **Z. treatiae**

Zephyranthes atamasca (Linnaeus) Herbert, Common Atamasco-lily. Cp, Pd (GA, NC, SC, VA), Mt (NC, SC): bottomland forests and adjacent road shoulders, wet meadows; common (rare in VA Piedmont, rare in Mountains). Late March-April; May-

June. Se. and sc. VA south to n. FL, west to s. MS. [= FNA; *Z. atamasco* -- RAB, C, F, G, GW, orthographic variant; *Zephyranthes atamasca* var. *atamasca* -- K; *Atamosco atamasco* (Linnaeus) Greene -- S, orthographic variant]

* ***Zephyranthes candida*** (Lindley) Herbert. Cp (GA, NC, SC): cultivated, persistent or spreading from cultivation; rare, introduced from South America. Late September-October. [= RAB, FNA, K; *Atamosco candida* (Lindley) Small -- S]

Zephyranthes simpsonii Chapman, Atamasco-lily. Cp (GA, NC, SC): dry to dry-mesic sandy soils (usually with admixture of shell hash) of coastal fringe sandhills or mainland maritime forests, usually associated with *Quercus hemispherica*, on barrier islands or within about 10 km of the ocean (NC, SC), pine flatwoods (GA); rare (GA Special Concern, NC Rare). April-May; May-June. NC and SC material referred to *Z. simpsonii* occurs on the outer Coastal Plain of Columbus County and Brunswick County, NC, and Horry and Georgetown counties, SC. It may differ from *Z. simpsonii* (sensu stricto) of c. and s. peninsular FL, and needs additional study. [= RAB, FNA, GW, K; *Atamosco simpsonii* (Chapman) Greene -- S]

Zephyranthes treatiae S. Watson. Cp (GA): wet savannas; uncommon. January-April. S. GA (Jones & Coile 1998) south into FL. [= FNA, GW; *Z. atamasca* (Linnaeus) Herbert var. *treatiae* (S. Watson) Meerow -- K; *Atamosco treatiae* (S. Watson) Greene -- S]

ARACEAE de Jussieu 1789 (Arum Family)
(also see ACORACEAE)

A family of about 104 genera and 3300 species, herbs, mostly tropical and subtropical. References: Thompson in FNA (2000); Mayo, Bogner, & Boyce in Kubitzki (1998b); Serviss, McDaniel, & Bryson (2000).

- 1 Plant a floating aquatic, with gray-green, velvety, cabbage-like leaves; [subfamily *Aroideae*, tribe *Pistaeae*] ***Pistia***
- 1 Plant rooted (even when growing in water), the leaves various, but not as above.
 - 2 Leaves compound; [subfamily *Aroideae*, tribe *Arisaemateae*].
 - 3 Bulblets lacking on the petiole; spadix free from the spathe; [plants common natives in our area] ***Arisaema***
 - 3 Bulblets present at base and summit of the petiole; spadix fused to the spadix; [plant a rare alien] [***Pinellia***]
 - 2 Leaves simple.
 - 4 Leaves peltate and cordate-hastate; [subfamily *Aroideae*, tribe *Colocasieae*] ***Colocasia***
 - 4 Leaves not peltate, either cuneate, rounded, or hastate.
 - 5 Spathe absent or obscure; leaf blade 2.5-4x as long as wide, cuneate at the base, lanceolate or narrowly elliptic; leaf venation parallel; [subfamily *Orontioideae*, tribe *Orontieae*] ***Orontium***
 - 5 Spathe present, surrounding the spadix, at least at its base; leaf blade 1-2.5x as long as wide, either hastate at the base (*Peltandra*), or rounded (*Symplocarpus*), or cordate (*Calla*), broadly ovate in outline.
 - 6 Spathe white; leaves cordate; plants from elongate rhizomes; [subfamily *Calloideae*] [***Calla***]
 - 6 Spathe green or white; leaves hastate or rounded at base; plants from fibrous roots, a short thick rhizome, or a corm.
 - 7 Leaves ovate, rounded at base; spathe purple, or purple flecked with white; [subfamily *Orontioideae*, tribe *Orontieae*] ***Symplocarpus***
 - 7 Leaves hastate at base (somewhat arrowhead-shaped); spathe green or white; [subfamily *Aroideae*].
 - 8 Plant with fibrous roots; larger leaf blades less than 5 dm long; longer petioles less than 7 dm long; [subfamily *Aroideae*, tribe *Peltandreae*] ***Peltandra***
 - 8 Plant with corm or rhizome; larger leaf blades more than 5 dm long; longer petioles 10-20 dm long; [subfamily *Aroideae*, tribe *Caladieae*] [***Xanthosoma***]

Arisaema Martius 1831 (Jack-in-the-pulpit, Indian-turnip)

A genus of about 170 species, of Asia, e. North America, e. Africa, and Arabia. Some of the taxa here recognized as subspecies of *A. triphyllum* might better be considered as species with relatively subtle morphological distinctions. They are broadly sympatric, and sometimes occur together in mixed populations with little sign of introgression or hybridization. Ssp. *triphyllum* is tetraploid and does not produce fertile seed when crossed with the other (diploid) subspecies (Treiber 1980). References: Thompson in FNA (2000); Huttleston (1981)=Z; Treiber (1980)=Y; Huttleston (1949)=X; Gusman & Gusman (2002)=Q; Mayo, Bogner, & Boyce in Kubitzki (1998b). Key based on the references.

- 1 Leaf with (5-) 7-15 leaflets, arranged pedately on a semicircular axis; spadix 9-20 cm long, attenuate, long-exserted from the spathe; [section *Tortuosa*] ***A. dracontium***
- 1 Leaf with 3-5 leaflets, arranged palmately; spadix 3.5-8 cm long, clavate or cylindrical and blunt, included in the spathe; [section *Pedatisecta*].
 - 2 Leaves glaucous beneath at maturity; spathe flange 2-9 mm broad; spathe hood green, or green with purple stripes; sterile spadix (appendix) clavate or cylindrical.
 - 3 Lateral leaflets (of primary leaf if more than one) 2-parted or 2-lobed (rarely unlobed); sterile spadix 1-3 mm in diameter, cylindrical, curved outward; spathe hood green ***A. triphyllum* ssp. *quinatum***
 - 3 Lateral leaflets (of primary leaf if more than one) undivided (rarely lobed); sterile spadix 4-10 mm in diameter, clavate, straight; spathe hood green, or green striped with purple ***A. triphyllum* ssp. *triphyllum***

- 2 Leaves green beneath at maturity (very rarely glaucous); spathe flange 1-3 mm broad; spathe hood green with white stripes, green with purple stripes, solid green, or solid purple; sterile spadix (appendix) cylindrical.
- 4 Spathe tube not fluted (rarely weakly fluted); spathe hood solid green or solid purple . . . **A. triphyllum** ssp. **pusillum**
- 4 Spathe tube strongly fluted; spathe hood green with white or purple stripes **A. triphyllum** ssp. **stewardsonii**

Arisaema dracontium (Linnaeus) Schott, Green Dragon. Pd, Mt, Cp (NC, SC, VA): bottomlands and floodplains; uncommon (rare in Mountains and Coastal Plain). May; July. S. Québec, MI, and WI, south to FL and e. TX. [= RAB, C, F, FNA, G, GW, K, Q, W; *Muricauda dracontium* (Linnaeus) Small -- S]

Arisaema triphyllum (Linnaeus) Schott ssp. **pusillum** (Peck) Huttleston, Small Jack-in-the-pulpit. Cp, Pd, Mt (NC, SC, VA): swamps and moist forests; common. March-May. CT, NY, and IN, south to FL and LA. Widespread in e. North America. This taxon is diploid ($2n=28$). [= K, X, Z; *A. triphyllum* -- RAB, F, FNA, GW, W, in part, some or all of the subspecies not recognized; *A. triphyllum* var. *pusillum* Peck -- C, G; *A. pusillum* (Peck) Nash -- S; *A. acuminatum* Small -- S; *A. triphyllum* ssp. *pusillum* -- Q, Y, in part (also see ssp. *quinatum*)]

Arisaema triphyllum (Linnaeus) Schott ssp. **quinatum** (Buckley) Huttleston, Southern Jack-in-the-pulpit. Mt, Pd (NC, SC): mesic forests; uncommon. March-April. Sc. NC, sw. NC, se. TN south to n. FL and e. TX. This taxon is of uncertain validity; Treiber lumps it with ssp. *pusillum*, while Huttleston recognizes it as a full species (Huttleston 1949) or as a ssp. (Huttleston (1981). This taxon is diploid ($2n=28$). [= K, Z; *A. triphyllum* -- RAB, FNA, W, in part, some or all of the subspecies not recognized; *A. quinatum* (Buckley) Schott -- GW, S, X; *A. triphyllum* ssp. *pusillum* -- Q, Y, in part; *A. polymorphum* Buckley]

Arisaema triphyllum (Linnaeus) Schott ssp. **stewardsonii** (Britton) Huttleston, Bog Jack-in-the-pulpit. Mt (NC, VA): bogs and peaty swamps; rare (NC Rare). April-May. Nova Scotia west to MN, south to w. NC, e. TN, and n. IN (Treiber 1980). This subspecies is the most northern, and also has the most distinctive habitat, being restricted to distinctly wet, peaty sites. This taxon is diploid ($2n=28$). [= K, Q, X, Y, Z; *A. triphyllum* -- RAB, FNA, GW, W, in part, some or all of the subspecies not recognized; *A. triphyllum* var. *stewardsonii* (Britton) G.T. Stevens -- C, G; *A. stewardsonii* Britton -- F]

Arisaema triphyllum (Linnaeus) Schott ssp. **triphyllum**, Common Jack-in-the-pulpit. Cp, Pd, Mt (NC, SC, VA): mesic forests; common. March-April. New Brunswick west to se. Manitoba, south to FL, LA, and e. TX (Treiber 1980). This taxon is tetraploid ($2n=56$). [= K, Q, X, Y, Z; *A. triphyllum* sensu lato -- RAB, F, FNA, GW, W, in part, some or all of the subspecies not recognized; *A. triphyllum* var. *triphyllum* -- C, F; *A. atrorubens* (Aiton) Blume -- F; *A. triphyllum* sensu stricto -- S]

Arum Linnaeus 1753 (Arum)

A genus of about 26 species, of temperate Eurasia. References: Thompson in FNA (2000); Mayo, Bogner, & Boyce in Kubitzki (1998b).

Arum italicum Linnaeus has been collected in NC, apparently persisting from horticultural planting. It has a large (more than 10 cm long) white spathe. It probably cannot be considered a naturalized component of our flora. [= FNA] {not yet keyed}

Calla Linnaeus 1753 (Calla)

A monotypic genus, of circumboreal distribution. References: Thompson in FNA (2000); Mayo, Bogner, & Boyce in Kubitzki (1998b).

Calla palustris Linnaeus, Wild Calla, Water-arum, is a circumpolar species of seepage swamps, ranging south in North America to sw. PA, w. MD, n. IL, c. MN, and British Columbia. [= C, F, FNA, G, K]

Colocasia Schott 1832 (Elephant's-ear, Taro, Dasheen)

A genus of about 8 species, of tropical Asia. References: Thompson in FNA (2000); Mayo, Bogner, & Boyce in Kubitzki (1998b); Serviss, McDaniel, & Bryson (2000)=Z.

* **Colocasia esculenta** (Linnaeus) Schott, Elephant's-ear, Taro, Dasheen. Cp (GA, NC, SC): naturalized in ditches or shores; rare, native of the Tropics. Frequently planted for its "tropical" appearance, becoming naturalized, for instance at Lake Waccamaw, Columbus County, NC, where it grows scattered along much of the shoreline, spread by fragments of rhizome. In our area, it is generally infertile. In the Tropics, *Colocasia* is a food crop cultivated for its rhizomes and shoots. The rhizomes are the source of "poi," a starchy staple of the Hawaiian Islands. See Serviss, McDaniel, & Bryson (2000) for a discussion of various varieties cultivated in the southeastern United States, their identification, and their weediness. [= FNA, GW, K; *C. antiquorum* Schott -- S; *C. esculenta* var. *antiquorum* (Schott) Hubb. & Rehd. -- Z; *C. esculenta* var. *esculenta* -- Z]

Orontium Linnaeus 1753 (Golden Club)

A monotypic genus, an aquatic herb, of e. North America. References: Thompson in FNA (2000); Mayo, Bogner, & Boyce in Kubitzki (1998b).

Orontium aquaticum Linnaeus, Golden Club, Bog Torches, Never-wet. Cp, Mt, Pd (GA, NC, SC, VA): generally in peaty and stagnant water, such as beaver ponds, blackwater streams, swamps, pools in low pocosins, streambeds in the Piedmont, bogs and swamps in the mountains; common (rare in Piedmont and Mountains). March-April. MA and c. NY south to FL and west to LA, north in the inland to w. NC, KY, and WV, primarily but by no means strictly Coastal Plain. Fresh leaves are unwettable, silvery-glistening when forced under water. [= RAB, C, F, FNA, G, GW, K, S, W]

Peltandra Rafinesque 1819 (Arrow-arum)

A genus of 2 species, endemic to e. North America. References: Thompson in FNA (2000); Blackwell & Blackwell (1974)=Z; Mayo, Bogner, & Boyce in Kubitzki (1998b).

Identification notes: *Peltandra* is often confused in vegetative condition with *Pontederia* and *Sagittaria*, superficially similar emergent aquatics with hastate or sagittate leaves. *Peltandra* leaves have pinnate venation, a prominent midvein, a prominent vein running parallel to the leaf margin, and the hastate lobes with rounded to acute apices. *Pontederia* leaves have parallel venation, lack a prominent midvein and a prominent vein parallel to the leaf margin, and have hastate lobes with broadly rounded apices. The leaves of sagittate species of *Sagittaria* have parallel venation, a prominent midrib, a vein at 90 degrees to the midrib at the junction of the main blade and each of the hastate lobes that forks, with at least one fork directed apically and at least one fork directed into the basal lobe, lack a prominent vein parallel to the margin, and have hastate-sagittate lobes with acuminate apices.

- 1 Spathe green at base, bright white above (the white portion not merely a margin), flared open and therefore only loosely surrounding the spadix, succulent below, the white portion thin and herbaceous, the margins generally nearly entire and plane; fruits red; distal portion of leaf blade lacking broad, coarse veins similar to the midvein (all the veins alike and fine) ***P. sagittifolia***
- 1 Spathe green (rarely with a narrow cream-colored or whitish margin up to 1.7 cm wide), tightly surrounding the spadix, thick and succulent throughout, the margins crisped; fruits green to dark purplish-green; distal portion of leaf blade often with several broad, coarse veins similar to the midvein, the remainder of the veins fine (sometimes the distal portion of the leaf with fine veins only) ***P. virginica***

Peltandra sagittifolia (Michaux) Morong, Spoonflower, White Arrow-arum. Cp (GA, NC, SC, VA): pocosins of the outer Coastal Plain, sphagnum swamps; rare (GA Special Concern, NC Rare, SC Rare). July-August. A Southeastern Coastal Plain endemic: e. NC south to c. peninsular FL and west to se. LA. The reduction of *P. sagittifolia* to a subspecies of *P. virginica* (Blackwell & Blackwell 1974) was based on confusion of true *P. sagittifolia* with forms of *P. virginica*. The two species are distinct. [= FNA, GW, K; *P. sagittaefolia* (Michaux) Morong -- RAB (an orthographic variant); *P. glauca* (Elliott) Feay -- S; *P. virginica* ssp. *luteospadix* (Fernald) Blackwell & Blackwell -- Z, misapplied; *P. luteospadix* Fernald, misapplied]

Peltandra virginica (Linnaeus) Schott, Green Arrow-arum, Tuckahoe. Cp, Pd, Mt (GA, NC, SC, VA): marshes, bogs, beaver ponds, pocosins, other stagnant, aquatic situations; common (rare in Mountains). May-June. ME, s. Québec, and n. MI south to s. FL and e. TX. [= RAB, C, F, FNA, G, GW, K, S, W; *P. luteospadix* Fernald -- F; *P. virginica* ssp. *virginica* -- Z; *P. virginica* ssp. *luteospadix* (Fernald) Blackwell & Blackwell -- Z]

Pinellia Tenore 1839 (Pinellia)

A genus of about 6 species, herbs, of temperate e. Asia. References: Thompson in FNA (2000); Mayo, Bogner, & Boyce in Kubitzki (1998b).

Pinellia ternata (Thunberg) Makino ex Breitenbach, Pinellia, is introduced from Japan and rarely naturalized, at least north of our area, as in DC, se. PA, NJ, and s. NY. It is likely naturalized in our area, at least in n. VA. [= C, F, FNA, G, K]

Pistia Linnaeus 1753 (Water Lettuce)

A genus of probably a single species, widespread in the tropics of both hemispheres. References: Thompson in FNA (2000); Mayo, Bogner, & Boyce in Kubitzki (1998b).

* ***Pistia stratiotes*** Linnaeus, Water Lettuce. Cp (SC), Pd (NC): stagnant or slow-moving waters of rivers, sometimes cultivated in ponds, where it persists for a while (presumably eventually eliminated by cold winters); rare, introduced from farther south. This floating aquatic, pantropically distributed, appeared in the Waccamaw River of SC (downstream from NC) in 1990 and 1991, apparently successfully overwintering (Nelson 1993). Further south it is a noxious water-weed. The original distribution is unclear. [= FNA, GW, K, S]

Symplocarpus R.A. Salisbury ex Nuttall 1818 (Skunk Cabbage)

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A genus of 3 species, of north temperate e. North America and ne. Asia. References: Thompson in FNA (2000); Mayo, Bogner, & Boyce in Kubitzki (1998b).

Symplocarpus foetidus (Linnaeus) Salisbury ex W.P.C. Barton, Skunk Cabbage. Mt, Pd, Cp (NC, VA): seepage-fed bogs and nonalluvial swamps; common in VA across the state, uncommon in NC (rare in Piedmont and Coastal Plain of NC). January-March; July-September. Nova Scotia and s. Québec west to MN, south to n. NC, ne. TN, s. OH, and IL. [= RAB, C, F, FNA, G, GW, K, W; *Spathyema foetida* (Linnaeus) Rafinesque -- S; *Dracontium foetidum* Linnaeus]

Xanthosoma Schott 1832

A genus of about 60 species, herbs, of tropical Central and South America. References: Mayo, Bogner, & Boyce in Kubitzki (1998b); Serviss, McDaniel, & Bryson (2000)=Z.

Xanthosoma sagittifolium (Linnaeus) Schott, Elephant-ear, is cultivated in the Southeast, more frequently to the south, but sometimes in our area. It can be seen in ditches adjacent to ornamental plantings; it is uncertain whether it can be considered naturalized in our area. It is superficially similar to *Colocasia*, differing in its non-peltate leaves. [= K, Z; *Xanthosma sagittifolium* -- GW, orthographic error]

ARECACEAE Schultz 1832 or **PALMAE** de Jussieu 1789 (Palm Family)

A family of about 190 genera and 2000 species, trees and shrubs, of tropical and subtropical regions of both hemispheres. Cold-hardy palms in other genera are sometimes planted in NC and SC, particularly near the coast. References: Zona in FNA (2000); Dransfield & Uhl in Kubitzki (1998b).

- 1 Leaves pinnate (with a well-developed central axis, the leaf blade much longer than wide); [introduced species]; [subfamily *Arecoideae*, tribe *Cocoeae*] **[*Butia*]**
- 1 Leaves palmate or costapalmate (lacking a central axis or with a short central axis, the leaf blade about as long as wide; [native species]; [subfamily *Coryphoideae*, tribe *Corypheae*].
 - 2 Petioles armed with sharp recurved teeth; [subtribe *Livistoninae*] ***Serenoa***
 - 2 Petioles smooth, unarmed (leaf sheaths with long needle-like spines in *Rhapidophyllum*).
 - 3 Petioles and lower leaf surfaces green and glabrous; leaf sheaths without spines; [subtribe *Sabalinae*] ***Sabal***
 - 3 Petioles and lower leaf surfaces more or less silvery pubescent; leaf sheaths bearing long (10-50 cm) needle-like spines; [subtribe *Thrinacinae*] ***Rhapidophyllum***

Butia (Beccari) Beccari 1916 (*Butia*)

A genus of about 8 species, trees, native of subtropical regions of South America. References: Dransfield & Uhl in Kubitzki (1998b).

Butia capitata (Mart.) Beccari, Brazilian *Butia*, South American Jelly Palm, is widely planted in the outer Coastal Plain of se. NC, e. SC, and e. GA. It persists and can appear naturalized in apparently semi-natural situations.

Cocos Linnaeus (Coconut Palm)

A monotypic genus, the single species now pantropical. References: Zona in FNA (2000).

Cocos nucifera Linnaeus, Coconut Palm, rarely reaches our shores as propagules (coconuts), but is apparently not established. Photographic evidence has been supplied from Bear Island, Onslow County, NC, 11 June 1996 (Dave Owen, pers. comm. and photograph). [= FNA, K]

Rhapidophyllum H. Wendl. & Drude ex Drude 1876 (Needle Palm)

A monotypic genus, a shrub of se. North America (Henderson, Galeano, & Bernal 1995). The closest relative to *Rhapidophyllum* is apparently *Trachycarpus* of the Himalayan region of se. Asia (Zona in FNA 2000). References: Zona in FNA (2000); Clancy & Sullivan (1990); Dransfield & Uhl in Kubitzki (1998b).

Rhapidophyllum hystrix (Pursh) H. Wendl. & Drude ex Drude, Needle Palm. Cp (GA, SC): moist to wet soils of small blackwater stream swamps, especially where underlain with coquina limestone ("marl"); rare (SC Rare). Se. SC (Beaufort and Jasper counties) south to c. peninsular FL, and west to s. MS. [= FNA, GW, K, S]

Sabal Adanson 1763 (Palmetto)

Sabal has 16 species, primarily distributed around the Caribbean Sea. The other species of se. United States are *S. etonia* Swingle ex Nash, of scrub habitats in peninsular FL, *S. miamiensis* Zona, endemic of s. FL pine rocklands, and *S. mexicana* Martius, of the s. TX coast (Henderson, Galeano, & Bernal 1995). References: Zona in FNA (2000); Dransfield & Uhl in Kubitzki (1998b).

- 1 Shrub, with subterranean, rhizomatous "trunk" (very rarely emerging as much as 1 meter from the ground); blade with midrib not decurved, typically appearing 1-2 cm long and oblique on the upper surface, 4-7 (-12) cm long on the lower surface; leaf with the deepest partition generally the terminal one, thus parting the leaf into 2 halves; segments with margins lacking filamentose fibrils ***S. minor***
- 1 Tree, with erect trunk (though young plants appear as trunkless shrubs, similar in habit to *S. minor*); blade with midrib 5-50 cm long, decurved; leaf lacking a deep terminal partition dividing the leaf into 2 halves; margins of leaf segments with filamentose fibrils ***S. palmetto***

Sabal minor (Jacquin) Persoon, Dwarf Palmetto. Cp (GA, NC, SC), Pd (GA): swamps, maritime forests, low moist woods, especially in calcareous soils developed from shell limestone (marl); common. May-July; September-November. Ne. NC south to c. peninsular FL, west to e. TX, c. TX and s. AR; disjunct in Nuevo León (Goldman 1999). This palm reaches its northern limit in Dare County, NC. No other New World palm has a native range extending so far north. [= RAB, FNA, GW, K, S]

Sabal palmetto (Walter) Loddiges ex J.A. & J.H. Schultes, Cabbage Palmetto. Cp (GA, NC, SC): maritime forests, marsh edges, and other near-coastal communities; common, rare in NC (NC Rare). July; October-November. This palm is the state tree of South Carolina and is common and conspicuous (both as a native tree and in plantings) along the South Carolina coast; it currently reaches its northern limit as a native species in Brunswick County, NC, where it is a conspicuous part of the forest on Smith Island complex (Bald Head Island, Middle Island, Bluff Island). It is planted elsewhere (and further north) on the coast. Periodic disturbance by hurricanes helps maintain populations of *Sabal palmetto*, which survives winds and flooding that topple or kill *Quercus virginiana*. Curtis (1883) reports that "Cape Hatteras is, or was, the northern limit of this Palm... It is to be deeply regretted, however, that a reckless indifference to the future, which has been charged as a characteristic of Americans, is likely to efface, at no very distant time, every vestige of this interesting ornament of our coast. The inner portion of the young plant is very tender and palatable, somewhat resembling the Artichoke and Cabbage in taste (hence its name of *Cabbage Tree*), and is often taken for pickling, and the stock is ruined by the process. Thus for a pound or two of pickles, no better either than many other kinds, the growth of half a century is destroyed in a moment, and posterity left to the wretched inheritance of vain mourning for the loss of the greatest beauty of our maritime forest." [= RAB, FNA, GW, K, S]

Serenoa Hooker f. 1828 (Saw Palmetto)

Serenoa is monotypic shrub (Henderson, Galeano, & Bernal 1995). *Serenoa* is most closely related to *Acoelorrhaphe*, of the West Indies, including s. FL (Zona in FNA 2000). References: Zona in FNA (2000); Dransfield & Uhl in Kubitzki (1998b).

Serenoa repens (Bartram) Small, Saw Palmetto. Cp (GA, SC): pine flatwoods and maritime forests; common (rare though locally dominant in SC). May-July; October-November. Se. SC (in maritime forests in Charleston and Colleton counties, and in spodosolic flatwoods in Beaufort and Jasper counties) south to s. FL and west to e. LA. *Serenoa* forms extensive clonal patches, connected by underground rhizomes, and is a dominant plant in many parts of FL and other Gulf Coast states, for instance in pine flatwoods or coastal scrub. [= RAB, FNA, GW, K, S]

ASPARAGACEAE (Asparagus Family)

A family of a single genus and 170-300 species, widespread in Europe, Africa, Asia, and Australia (introduced elsewhere). References: Dahlgren, Clifford, & Yeo (1985); Kubitzki & Rudall in Kubitzki (1998a).

Asparagus Linnaeus (Asparagus)

A genus of 170-300 species, widespread in Europe, Africa, Asia, and Australia (introduced elsewhere). The "Asparagus Fern" grown as a house plant is another species of *Asparagus*, *A. setaceus* (Kunth) Jessop, native to S. Africa. References: Kubitzki & Rudall in Kubitzki (1998a); Straley & Utech in FNA (2002a).

* ***Asparagus officinalis*** Linnaeus, Asparagus, Sparrowgrass, Garden Asparagus. Mt, Pd, Cp (GA, NC, SC, VA): commonly cultivated, commonly escaped to fencerows, roadsides, disturbed areas; common, native of Eurasia. April-May (or later); July-October. [= RAB, C, F, FNA, G, K, S, W]

BROMELIACEAE se Jussieu 1789 (Bromeliad or Pineapple Family)

A family of about 56 genera and 2600 species, herbs, shrubs, and trees, of the New World tropics and subtropics (very rarely warm temperate). References: Luther & Brown in FNA (2000); Smith & Till in Kubitzki (1998b).

Tillandsia Linnaeus 1753 (Spanish-moss)

A genus of about 540 species, herbs, of s. North America south to s. South America. References: Luther & Brown in FNA (2000); Smith & Till in Kubitzki (1998b). Key based in part on FNA.

- 1 Leaves distichous; inflorescence 1-2 (-3) flowered.
 - 2 Plants in dense, more or less spherical clusters; inflorescence scapose, exerted from the cluster; corolla violet ***T. recurvata***
 - 2 Plants in elongate, pendulous festoons; inflorescence sessile; corolla yellowish green ***T. usneoides***
- 1 Leaves spiral in a rosette; inflorescence more than 3-flowered.
 - 3 Leaves narrowly linear, 1-5 mm wide.
 - 4 Leaves densely and coarsely lepidote, appearing gray; floral bracts rose; corolla violet ***T. bartramii***
 - 4 Leaves finely lepidote, appearing green or reddish; floral bracts green or reddish; corolla lavender ***T. setacea***
 - 3 Leaves broader, 10-35 mm wide.
 - 5 Scape 10-35 cm long; floral bracts imbricate, covering all of the rachis, or nearly all . ***T. fasciculata* var. *densispica***
 - 5 Scape 20-50 cm long; floral bracts widely spaced, leaving much of the rachis exposed at anthesis [***T. utriculata***]

Tillandsia bartramii Elliott, Bartram's Air-plant. Cp (GA): on tree branches in bayswamps, tidal swamp forests, and mesic hardwood bluffs; rare (GA Rare). E. GA south through Florida; disjunct in Tamaulipas. In five counties in e. GA, as far north as Liberty County (Jones & Coile 1988), and reported for SC as extirpated (Kartesz 1999). [= FNA, K; *T. myriophylla* Small -- S]

Tillandsia fasciculata Sw. var. ***densispica*** Mez, Quill-leaf Airplant. Cp (GA): branches of trees, especially evergreen oaks; rare (GA Rare). Se. GA south through FL, and in the West Indies, Mexico, and Central America. [= FNA, K; *T. fasciculata* – S]

Tillandsia recurvata (Linnaeus) Linnaeus, Ball-moss, Bunch-moss. Cp (GA): on tree branches in maritime forests; rare (GA Threatened). Se. GA south to s. FL; LA to AZ and south through Mexico, Central America, and South America; West Indies. Outside of our area, this species occurs on rock cliffs and is frequent on powerlines. [= FNA, K; *Diaphoranthema recurvata* (Linnaeus) Beer -- S]

Tillandsia setacea Sw., Wild-pine, Pine-needle Airplant. Cp (GA): in tree branches, especially on hardwoods, in mesic bluff forests; rare (GA Rare). Se. GA south to s. FL; West Indies; Mexico and Central America. [= FNA, K; *T. tenuifolia* Linnaeus -- S, misapplied]

Tillandsia usneoides (Linnaeus) Linnaeus, Spanish-moss. Cp (NC, SC, VA), Pd (NC, SC): branches of trees, especially in swamps, but elsewhere where air humidity is high enough, often even in dry forests (near Wilmington, NC *Tillandsia* is abundant on *Quercus laevis* in an extensive dry sandhill area which receives frequent fog from the Cape Fear, Brunswick, and Northeast Cape Fear rivers); common, very rare in lower Piedmont (VA Rare). April-June. S. MD (historically), se. VA south to s. FL, west to TX and Mexico, extending south to South America. *T. usneoides* is the only member of a very large genus to occur north of s. GA. The epithet '*usneoides*' refers to its resemblance to the common lichen *Usnea*. [= RAB, C, F, FNA, G, K; *Dendropogon usneoides* (Linnaeus) Rafinesque -- S]

Tillandsia utriculata Linnaeus, Giant Wild-pine, is reported for GA by Kartesz (1999), but not by Luther & Brown in FNA (2000). [= FNA, K, S]

BURMANNIACEAE (Burmattia Family)

A family of about 13-15 genera and 130 species, pantropical and warm-temperate. References: Wood (1983a)=Z; Lewis in FNA (2002a); Maas-van de Kamer in Kubitzki (1998a).

- 1 Floral tube terete; ovary 1-locular ***Apteria***
- 1 Floral tube 3-angled or 3-winged; ovary 3-locular ***Burmattia***

Apteria Nuttall (Nodding Nixie)

A monotypic genus, the single species distributed from s. North America south to c. South America. References: Lewis in FNA (2002a); Maas-van de Kamer in Kubitzki (1998a).

Apteria aphylla (Nuttall) Barnhart ex Small, Nodding Nixie. Cp (GA): acid swamps; rare. E. GA (Glynn County) west to e. TX, south to c. South America, and in the West Indies. [= FNA, GW, K, S]

Burmattia Linnaeus (Burmattia)

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A genus of about 63 species, autotrophic or mycotrophic herbs, pantropical (to warm temperate). References: Lewis in FNA (2002a); Maas-van de Kamer in Kubitzki (1998a).

Identification notes: Both species of *Burmannia* are very small and easy to overlook; they occasionally occur together.

- 1 Floral tube 3-winged, violet; flowers in a spicate cyme (solitary in depauperate individuals) ***B. biflora***
- 1 Floral tube obtusely 3-angled, greenish to creamy white; flowers in a capitate cluster (solitary in depauperate individuals) ***B. capitata***

Burmannia biflora Linnaeus, Violet Burmannia. Cp (GA, NC, SC, VA): savannas, bogs, shores of Coastal Plain depression ponds; uncommon (SC Rare, VA Rare). August-November. Se. VA south to FL, west to e. TX. [= RAB, C, F, FNA, G, GW, K, S]

Burmannia capitata (J.F. Gmelin) von Martius, White Burmannia. Cp (GA, NC, SC), Pd (GA): savannas, bogs, shores of Coastal Plain depression ponds; uncommon. July-November. E. NC south to FL, west to TX and se. OK; also in the West Indies, Central America, and South America. [= RAB, FNA, GW, K, S]

CALOCHORTACEAE Dumortier 1829
(see **LILIACEAE**)

CANNACEAE de Jussieu 1789 (Canna Family)

A family of a single genus, herbs, of tropical and warm temperate America. References: Kress & Prince in FNA (2000); Kubitzki in Kubitzki (1998b).

Canna Linnaeus 1753 (Canna)

A genus of about 10-25 species, of tropical and warm temperate America. References: Kress & Prince in FNA (2000); Kubitzki in Kubitzki (1998b).

Identification notes: The petals are generally sepeloid (sometimes brightly colored); the showy, colored portions of the flower are the staminodes.

- 1 Flowers not tubular at the base (or with a short tube to 2 cm long); petals erect; [plant a cultivated and persistent alien] ***C. xgeneralis***
- 1 Flowers tubular at the base; petals reflexed; [plant native or cultivated].
 - 2 Flowers yellow; capsule 5-6 cm long, ellipsoid (longer than broad); leaves glaucous; [plant a native] ***C. flaccida***
 - 2 Flowers red, orange, or mixed red-and-yellow; capsule 1.5-3 cm long, globose or subglobose (about as long as broad); leaves green; [plant a cultivated and persistent alien] ***C. indica***

Canna flaccida Salisbury, Golden Canna, Yellow Canna. Cp (GA, SC): wet pine savannas, marshes, ditches; uncommon. May-early July; July-August. E. SC south to FL, west to TX, and south into Central America. [= RAB, FNA, K, S]

* ***Canna xgeneralis*** L.H. Bailey (pro sp.) [= *C. glaucaxindica*], Common Garden Canna. Cp, Pd (GA, NC, SC): cultivated and persisting; rare. June-September; August-October. [= RAB, FNA, K]

* ***Canna indica*** Linnaeus, Indian-shot, Platanillo. Cp, Pd (GA, NC, SC): cultivated and persisting; rare. June-September; August-October. [= FNA, GW, K, S]

COLCHICACEAE DC. 1805 (Meadow Saffron Family)

As here circumscribed, a family of 19 genera and about 225 species, nearly cosmopolitan. The circumscription is uncertain and likely to change. References: Dahlgren, Clifford, & Yeo (1985); Nordenstam in Kubitzki (1998a).

- 1 Plant acaulescent, from a tunicated bulb ***Colchicum***
- 1 Plant with leafy stem, from a rhizome ***Uvularia***

Colchicum Linnaeus 1753 (Meadow Saffron)

A genus of about 90 species, of s. Europe, n. Africa, and w. and c. Asia. References: Nordenstam in Kubitzki (1998a).

* ***Colchicum autumnale*** Linnaeus, Meadow Saffron, Autumn-crocus. Pd (NC): planted as an ornamental, at least long-persistent; rare, introduced from s. Europe. September-October. [= C, F, G, K]

Uvularia Linnaeus 1753 (Bellwort, Merrybells)

A genus of about 5 species, of temperate eastern North America. References: Wilbur (1963)=Z; Uttal (1991)=Y; Utech & Kawano in FNA (2002a); Nordenstam in Kubitzki (1998a).

- 1 Leaves perfoliate, the margins scarios but smooth; [section *Uvularia*].
 - 2 Tepals glabrous within; leaves puberulent beneath (or rarely glabrate); leaves below the fork (0-) 1 (-2) . . . ***U. grandiflora***
 - 2 Tepals conspicuously granular-papillose within; leaves glabrous and often glaucous beneath; leaves below the fork 2-4 . . . ***U. perfoliata***
- 1 Leaves sessile, the margins scarios and minutely papillose-denticulate; [section *Oakesiella*].
 - 3 Undivided portion of the style 0.5-1x as long as the style branches; upper stem and lower leaf surfaces puberulent to glabrous, light green; rhizome very short, with clustered, thickened roots.
 - 4 Leaves cuneate at base, thin in texture, faintly reticulate on the undersurface, glabrous (rarely puberulent becoming glabrate); stems usually glabrous; [plants of the Coastal Plain and Piedmont] ***U. puberula* var. *nitida***
 - 4 Leaves broadly rounded to somewhat clasping at base, firm in texture, obviously reticulate on the undersurface, puberulent (sometimes becoming glabrate); stems usually minutely puberulent in lines; [plants of the Mountains and Piedmont] ***U. puberula* var. *puberula***
 - 3 Undivided portion of the style 3-5x as long as the style branches; upper stem and lower leaf surfaces glabrous, usually also glaucous; rhizome elongate, with scattered, fibrous roots.
 - 5 Pedicel bearing a sessile, leaf-like bract 5-17 mm below the flower; capsule sessile at base, conspicuously beaked at apex ***U. floridana***
 - 5 Pedicel bractless; capsule on a stalk 2-4 (-6) mm long, not beaked ***U. sessilifolia***

Uvularia floridana Chapman, Florida Bellwort. Cp (GA, SC): alluvial forests; uncommon. Mid March-early April. C. SC south to panhandle FL, west to c. MS, apparently rare and local throughout its range. [= RAB, FNA, GW, K, Z; *Oakesiella floridana* (Chapman) Small -- S]

Uvularia grandiflora J.E. Smith, Large-flowered Bellwort. Mt (GA, NC, VA), Pd (NC, VA): cove forests and other moist, rich, forested sites; common. Mid April-mid May; July-August. S. Quebec west to ND, south to w. NC, w. SC, n. GA, c. AL, MS, c. AR, and e. OK. [= RAB, C, F, FNA, G, K, S, W, Z]

Uvularia perfoliata Linnaeus, Perfoliate Bellwort. Mt, Pd, Cp (GA, NC, SC, VA): moist to fairly dry hardwood forests; common. April-early May; June-August. S. NH, s. Ontario, and c. OH, south to panhandle FL and LA. [= RAB, C, F, FNA, G, K, S, W, Z]

Uvularia puberula Michaux var. ***nitida*** (Britton) Fernald, Coastal Bellwort. Cp (GA, NC, SC, VA): dry to moist upland, acidic forests; uncommon. Late March-late April; August-October. Var. *nitida* ranges from Long Island NY south to GA in the Coastal Plain and Sandhills. Var. *nitida* is reported to intergrade with var. *puberula* in c. NC; elsewhere, the 2 varieties appear to be geographically allopatric and more-or-less morphologically distinguishable. While Wilbur (1963) chose not to recognize varieties, Uttal (1991) recently supported varietal recognition. [= C, Y; *U. pudica* (Walter) Fernald -- RAB, nomen dubium; *U. pudica* var. *nitida* (Britton) Fernald -- F, G; *U. puberula* -- FNA, K, W, Z, infraspecific taxa not distinguished; *Oakesiella puberula* (Michaux) Small -- S, infraspecific taxa not distinguished]

Uvularia puberula Michaux var. ***puberula***, Appalachian Bellwort. Mt, Pd (GA, NC, SC, VA): dry to moist upland, acidic forests, up to at least 1500m; common. Early April-Early May; August-October. Var. *puberula* ranges from s. PA to GA in the Mountains and (more rarely) Piedmont. [= C, Y; *U. pudica* (Walter) Fernald -- RAB, nomen dubium; *U. pudica* var. *pudica* -- F, G; *U. puberula* -- FNA, K, W, Z, infraspecific taxa not distinguished; *Oakesiella puberula* (Michaux) Small -- S, infraspecific taxa not distinguished]

Uvularia sessilifolia Linnaeus, Straw-lily, Wild-oats. Pd, Mt (GA, NC, SC, VA), Cp (NC, SC, VA): moist hardwood forests, on slopes and mainly in bottomlands; common. Late March-early May; August-October. Nova Scotia west to ND, south to panhandle FL and n. LA. [= RAB, C, F, FNA, K, W, Z; *Oakesiella sessilifolia* (Linnaeus) S. Watson -- S]

COMMELINACEAE R. Brown 1810 (Spiderwort Family)

A family of about 41 genera and 650 species, herbs, of tropical and warm temperate regions of both hemispheres. References: Faden in FNA (2000); Faden in Kubitzki (1998b); Tucker (1989).

- 1 Spathes paired, terminating the stem, resembling foliage leaves in size, shape, texture, and coloration; [tribe *Tradescantieae*] ***Tradescantia***
- 1 Spathes single, either terminal or axillary, differing from the foliage leaves (in *Commelina* folded, heart-shaped when spread, and usually pale-green, in *Cuthbertia* and *Murdannia* scale-like, scarios, and inconspicuous, sometimes hidden by foliage leaves in *Murdannia*).
 - 2 Spathe folded, heart-shaped when unfolded, usually pale-green, closely subtending and surrounding the flower pedicels; petals unequal, the 2 upper petals larger and usually more deeply colored than the lower petal (which is sometimes absent); [tribe *Commelineae*] ***Commelina***
 - 2 Spathe scale-like, scarios, and inconspicuous, not closely subtending and surrounding the flower pedicels; petals equal, in size and coloration.

- 3 Leaves linear, more than 20x as long as wide; fertile stamens 6; petals bright pink; [plants of xeric, sandy or rocky habitats]; [tribe *Tradescantieae*] **Cuthbertia**
- 3 Leaves lanceolate, less than 20x as long as wide; fertile stamens 3, alternating with 3 staminodia; petals pink to purplish or bluish; [plants of moist to aquatic habitats]; [tribe *Commelineae*] **Murdannia**

Callisia Loefling
(also see *Cuthbertia*)

References: Faden in FNA (2000); Tucker (1989)=Z.

Callisia cordifolia (Swartz) E.S. Anderson & Woodson is reported for nw. GA (Faden in FNA 2000). [=FNA, K; *Tradescantia cordifolia* Swartz; *Tradescantella floridana* (S. Watson) Small] {not yet keyed}

Commelina Linnaeus 1753 (Dayflower)

A genus of about 170 species, herbs, cosmopolitan. References: Faden in FNA (2000); Tucker (1989)=Z; Faden (1993)=Y; Brashier (1966)=X; Faden in Kubitzki (1998b). The key is adapted in part from X, Y, and Z.

- 1 Spathes with margins free to the base; [introduced species, usually in weedy habitats].
 - 2 Spathes generally whitish or pale green towards the peduncle, with contrasting dark green veins; middle petal white or paler than the others; capsules with 2 locules (the third aborting); seeds rugose foveate-reticulate.
 - 3 Larger petals light blue; sterile anthers entirely yellow **C. communis var. communis**
 - 3 Larger petals intense violet blue; sterile anthers with brownish-purple spot **C. communis var. ludens**
 - 2 Spathes lacking contrasting veins; middle petal about the same color as the others; capsules with 3 locules; seeds reticulate or smooth to faintly alveolate.
 - 4 Spathes not at all to slightly falcate (the lower margin straight or very nearly so); upper cyme usually vestigial (rarely well-developed and 1-flowered); seeds smooth to faintly alveolate; peduncles of the spathes with hairs to 0.5 mm long **C. caroliniana**
 - 4 Spathes usually distinctly falcate (the lower margin curved); upper cyme in larger spathes usually well-developed and 1-several-flowered; seeds deeply reticulate; peduncles of the spathes with hairs to 0.1 mm long . . . **C. diffusa**
- 1 Spathes with margins fused basally; [native species, usually in natural habitats, or introduced and weedy].
 - 5 Flowers peach-colored [**C. nigrifolia var. gambiae**]
 - 5 Flowers white and/or bluish.
 - 6 Leaf sheaths ciliate with coarse reddish-brown hairs, the sheath not auriculate; middle petal blue, lilac, or lavender.
 - 7 Plant annual from fibrous roots, the stem decumbent; leaf blades broadly elliptic-ovate, 2-9 cm long; leaf margin and upper surface pubescent; [plants alien, weedy] [**C. benghalensis**]
 - 7 Plant perennial from horizontal rhizomes, often forming clonal patches of erect stems; leaf blades lance-oblong, 6-20 cm long; leaf margin and upper surface scabrous; [plants mostly of moist floodplain forests] **C. virginica**
 - 6 Leaf sheaths ciliate with white hairs, the sheath prolonged upwards into auricles; middle petal white; plant perennial from thickened, fibrous roots, not forming clonal patches; [plants mostly of dry, sandy or rocky soil].
 - 8 Larger leaves 4-10 (-13) cm long, 0.4-1.4 cm wide; spathes 1-2 (-2.5) cm long; [plant primarily of the Coastal Plain, especially on sandhills and dunes] **C. erecta var. angustifolia**
 - 8 Larger leaves (6-) 10-15 cm long, (1.1-) 1.5-3.5 cm wide; spathes (2.0) 2.5-3.6 cm long; [plant primarily of the Piedmont and Mountains] **C. erecta var. erecta**

* **Commelina caroliniana** Walter, Indian Dayflower. Cp (NC, SC): moist disturbed areas; rare, apparently introduced from India and Bangladesh. June-October. Faden (1989, 1993) discusses in detail the taxonomy and history of this species. It was apparently introduced to our area early, probably as a weed in rice. [= RAB, C, FNA, G, K, S, Y; *C. diffusa* -- GW, X, Z, in part; *C. hasskarlii* C. B. Clarke (the earliest name applied to the species in India)]

* **Commelina communis** Linnaeus var. **communis**, Common Dayflower. Cp, Pd, Mt (NC, SC, VA): gardens, bottomlands, disturbed ground; common, introduced from the Old World. May-October. [= F, G, K, Z; *C. communis* -- RAB, C, FNA, GW, S, W, X, Y, infraspecific taxa not distinguished]

* **Commelina communis** Linnaeus var. **ludens** (Miquel) C.B. Clarke, Bright-blue Dayflower. The distribution of this taxon in our area is poorly known. May-October? Not recognized by many recent authors (see synonymy). [= F, G, K, Z; *C. communis* -- RAB, C, FNA, GW, S, W, X, Y, infraspecific taxa not distinguished]

* **Commelina diffusa** Burmann f., Creeping Dayflower. Cp, Pd, Mt (NC, SC, VA): roadsides, fields, disturbed ground; uncommon, introduced from the Old World. June-October. [= RAB, C, F, G, W; *C. diffusa* -- GW, X, Z, in part only (also see *C. caroliniana*); *C. longicaulis* Jacquin -- S; *C. diffusa* var. *diffusa* -- FNA, K, Y]

* **Commelina erecta** Linnaeus var. **angustifolia** (Michaux) Fernald, Sand Dayflower. Cp (NC, SC), Pd, Mt (VA): dunes and dry sand flats on barrier islands, sandhills, other dry sandy sites, shale barrens, other dry rocky sites; common. June-October. E. NC south to s. FL, west to TX, and north and west in the interior to IA, nw. NE, CO, and NM. Contrary to the specific epithet, *C. erecta* var. *angustifolia* is a trailing plant, the stems sometimes as long as 1.3 m. The taxonomy and distribution of the two varieties

here recognized need further study. [= C, F, FNA, G, K, X; *C. erecta* -- RAB, W, Y, Z, infraspecific taxa not distinguished; *C. angustifolia* Michaux -- S; *C. crispa* Wooton -- S]

Commelina erecta Linnaeus var. ***erecta***, Erect Dayflower. Cp, Pd, Mt (NC, SC, VA): dry openings and woodlands, especially in thin soil around rock outcrops; common (uncommon in Mountains). June-October. PA west to MO and e. KS, south to FL and TX. [= C, F, FNA, G, K, X; *C. erecta* -- RAB, W, Y, Z, infraspecific taxa not distinguished; *C. erecta* -- S (in the narrow sense)]

Commelina virginica Linnaeus, Virginia Dayflower. Cp, Pd, Mt (NC, SC, VA): bottomlands, swamp forests, other moist to wet forests and forest edges; common (rare in the upper Piedmont and Mountains). July-October. Our most robust species of *Commelina*. NJ west to KS and OK, south to FL and TX. [= RAB, C, F, FNA, G, GW, K, S, W, X, Y, Z]

Commelina benghalensis Linnaeus is an annual, pantropical weed, well established in FL and s. GA (Faden 1993). It has been reported from Chatham County, GA, adjacent to Beaufort and Jasper counties, SC, and its occurrence in our area should be expected. "This annual species can be recognized by: its funnellform spathes that are often clustered; relatively broad leaves that frequently have red hairs at the summit of the sheath; and cleistogamous flowers that are borne at the base of the plant and are usually subterranean (in addition to normal, aerial, chasmogamous flowers)" (Faden 1993). [= FNA, K, Y]

Commelina nigriflora Benth var. *gambiae* (C. B. Clarke) Brenan, a w. African species first collected in North America in 1976 (Manatee County, FL), is immediately distinguishable from our species by its peach-colored flowers and fused spathes. Faden (1993) reports that it "appears to be spreading rapidly," but whether it can spread northwards from peninsular FL is questionable. [= K, Y; *C. gambiae* C.B. Clarke -- FNA]

Cuthbertia Small 1903 (Roseling)

A genus of 3 species, herbs, of se. North America. There seems ample reason for recognizing *Cuthbertia* as distinct from *Tradescantia*, based on the single spathes (vs. paired), glabrous filaments (vs. hairy), differently shaped anther connectives, etc. Hunt (1983, 1986) has treated *Cuthbertia* as a section of *Callisia* Loefling, a decision followed with little additional comment or discussion by Tucker (1989). While this course may be warranted, the authors advocating it have presented little evidence to support it. Hunt (1986), in discussing a number of small tropical genera which he also reduces to sections of *Callisia*, states "this leaves two alternatives: to recognize numerous (perhaps 10) genera of 1-2 species, or to experiment with an amplification and sectionalization of *Callisia*, which I find the lesser of the two evils." He mentions that "the succulent habit ... is a principal unifying feature of the enlarged genus as a whole, reflecting the concentration of its species in tropical seasonal habitats, often on rocks." *Cuthbertia* is endemic to se. North America (a separate and more northerly distribution than the remainder of a broad *Callisia*), is only slightly succulent, occurs primarily in sandy habitats, and has a different base chromosome number ($x=6$) than some components of a broad *Callisia*. Until and unless a more compelling case is presented for the inclusion of *Cuthbertia* in *Callisia*, I prefer a more conservative and traditional maintenance of *Cuthbertia*, which is also more in line with the philosophy on the circumscription of genera. References: Faden in FNA (2000); Tucker (1989)=Z; Giles (1942); Giles (1943); Lakela (1972); Faden in Kubitzki (1998b).

- 1 Leaves erect or ascending, the leaf blades 1-5 mm wide (narrower than the sheaths) ***C. graminea***
- 1 Leaves loosely spreading, the leaf blades 4-15 mm wide (as wide as or wider than the sheaths) ***C. rosea***

Cuthbertia graminea Small. Cp (NC, SC, VA): sandhills; common (VA Rare). May-July. *Cuthbertia graminea* includes 3 morphologically distinguishable cytological races, occupying different (but partially overlapping) ranges (Giles 1942, Giles 1943, Tucker 1989). The predominant race is tetraploid, occupying the outer Coastal Plain of VA, NC, and SC, middle Coastal Plain of NC and SC, fall-line sandhills of SC, and south into FL. The diploid race is endemic to the fall-line sandhills of sc. NC and nc. SC, a distribution similar to those of *Pyxidantha barbulata* var. *brevifolia*, *Liatis cokeri*, and *Lycopus cokeri*. Rare hexaploids have been found at scattered sites in SC and FL. The tetraploid race averages about 25 % larger than the diploid in most vegetative and floral characters, and is reported to exhibit a greater ecological amplitude (Giles 1942, 1943). [= S; *Tradescantia rosea* Ventenat var. *graminea* (Small) E.S. Anderson & Woodson -- RAB, C, F, G; *Callisia graminea* (Small) G. Tucker -- FNA, K, Z]

Cuthbertia rosea (Ventenat) Small. Cp (SC), Pd (NC, SC): sandhills, other dry woodlands; common (NC Watch List). May-July. [= S; *Tradescantia rosea* Ventenat var. *rosea* -- RAB; *Callisia rosea* (Ventenat) D.R. Hunt -- FNA, K, Z]

Murdannia Royle 1839 (Murdannia)

A genus of about 50 species, herbs, of tropical and warm temperate regions. References: Faden in FNA (2000); Tucker (1989)=Z; Faden in Kubitzki (1998b).

- 1 Flowers solitary or in 2-4-flowered racemes borne in the upper leaf axils; capsules 8-10 mm long; seeds ca. 3 mm long; pedicels much longer than the capsule ***M. keisak***
- 1 Flowers in stalked cymose racemes borne terminally or the uppermost leaf axil; capsules 4-5 mm long; seeds 1.0-1.5 mm long; pedicels about as long as the capsule ***M. nudiflora***

* **Murdannia keisak** (Hasskarl) Handel-Mazzetti. Cp, Pd, Mt (NC, SC, VA): stream banks, canals, ditches, marshes, swamp forests, wet disturbed places; common (primarily in the Coastal Plain, uncommon in the Piedmont, rare in the Mountains), introduced from Asia, now widespread in the se. United States. September-October. [= C, FNA, G, GW, K, W, Z; *Aneilema keisak* Hasskarl -- F]

* **Murdannia nudiflora** (Linnaeus) Brenan. Cp (NC, SC): moist sands, ditches, wet disturbed places; rare, introduced from Asia, now widespread in the tropics and subtropics of both hemispheres. May-October. This species apparently arrived in the se. United States earlier than *M. keisak* (S, for instance, treats this species and not *M. keisak*), but is distinctly less common. [= FNA, GW, K, Z; *Aneilema nudiflorum* (Linnaeus) Sweet -- RAB, S]

Tradescantia Linnaeus 1753 (Spiderwort)
(see also *Callisia* and *Cuthbertia*)

A genus of about 70 species, herbs, of the New World. References: Faden in FNA (2000); Anderson & Woodson (1935)=Y; Tucker (1989)=Z; Faden in Kubitzki (1998b).

- 1 Leaf blades of the upper stem constricted at their bases to a narrower subpetiolar sheath, the opened sheath narrower than the leaf blade; leaf blades 6-25 cm long, 1.0-5.0 cm wide, mostly less than 10x as long as wide; stomates much more abundant on the lower leaf surface than on the upper, giving the lower surface a much paler color ***T. subaspera* var. *montana***
- 1 Leaf blades of the upper stem not constricted to a subpetiolar sheath, the opened sheath about as wide or wider than the leaf blade; leaf blades 11-45 cm long, 0.4-2.0 (-4.5) cm wide, mostly more than 10x as long as wide; stomates slightly more abundant on the lower leaf surface than on the upper, or about equally distributed on the two surfaces, the lower surface slightly to not at all paler than the upper.
 - 2 Sepals, pedicels, and ovary glabrous or pubescent with eglandular hairs only (use 10x magnification); leaves glabrous or pilose at the junction of the blade and the sheath.
 - 3 Pedicels glabrous; sepals glabrous or the tip with a tuft of eglandular hairs; leaves glaucous; sepals glaucous (or rarely also suffused with purple), not inflated-turgid ***T. ohioensis***
 - 3 Pedicels pubescent; sepals eglandular-villous; leaves green; sepals green, inflated-turgid ***T. virginiana***
 - 2 Sepals, pedicels, and ovary pubescent with glandular hairs or a mixture of glandular and eglandular hairs; leaves slightly to densely puberulent or pubescent.
 - 4 Leaves dull green, densely pilose (rarely glabrate); sepals, pedicels, and ovary pubescent with a mixture of glandular and eglandular hairs; pedicels 2.0-3.5 cm long ***T. hirsuticaulis***
 - 4 Leaves glaucous to subglaucous, puberulent; sepals, pedicels, and ovary puberulent with glandular hairs only; pedicels 1.2-2.5 cm long ***T. roseolens***

Tradescantia hirsuticaulis Small, Hairy Spiderwort. Mt (NC, SC), Pd (SC): dry rocky woodlands, and rock outcrops (especially granitic flatrocks and domes); rare (NC Watch List). April-June. W. NC and w. SC southwest to n. GA and n. AL; disjunct in AR and e. OK (its core range). There is some question about the validity of this species. [= RAB, FNA, K, W, Y, Z]

Tradescantia ohioensis Rafinesque, Smooth Spiderwort. Mt, Pd, Cp (NC, SC, VA): woodlands and forests, alluvial bottoms, disturbed areas; common. April-July. MA west to MN, south to FL and TX, some of that range the result of naturalization from cultivation. [= RAB, C, F, FNA, G, K, W, Z; *T. reflexa* Rafinesque -- S; *T. canaliculata* Rafinesque -- Y]

Tradescantia roseolens Small, Sandhill Spiderwort. Cp, Pd (GA, SC): dry sandy woodlands; rare (GA Rare). May-June. SC south through GA to s. peninsular FL. [= RAB, FNA, K, Y, Z; *T. longifolia* Small -- S]

Tradescantia subaspera Ker-Gawler var. ***montana*** (Shuttleworth ex Britton) E.S. Anderson & Woodson, Appalachian Wide-leaved Spiderwort. Mt (NC, SC, VA), Pd (NC, SC): dry to mesic woodlands and forests; common (VA Watch List). June-July. *T. subaspera* var. *montana* ranges from sw. VA and c. WV south to nw. SC, n. GA, and se. TN, with disjunct occurrences in c. AL and panhandle FL. Var. *subaspera* ranges from WV west to n. IL, south to se. TN, ne. AR, and s. MO. It approaches our area and might be expected. Var. *subaspera* may be distinguished by the stem conspicuously zigzag above, except on depauperate or juvenile plants (vs. the stems straight or only slightly zigzag), uppermost lateral cymes sessile or short-pedunculate (vs. pedunculate throughout), uppermost internodes very reduced, crowding the upper leaves (vs. internodes less reduced), leaves much broader than the sheath (vs. only slightly broader), and its generally greater size than var. *montana*. The validity of the varieties has been questioned. [= C, F, G, K, Y, Z; *T. subaspera* -- RAB, FNA, W, infraspecific taxa not distinguished; *T. pilosa* J.G.C. Lemaire -- S]

Tradescantia virginiana Linnaeus, Virginia Spiderwort. Pd (NC, SC, VA), Mt, Cp (VA): nutrient-rich forests and woodlands; common (rare south of VA) (NC Rare, SC Rare). April-July. ME west to MI and WI, south to n. GA, MO, and AR. [= RAB, C, F, FNA, G, K, S, W, Y, Z; *T. brevicaulis* Rafinesque -- S]

Tradescantia ernestiana E.S. Anderson & Woodson. Reported for GA (Faden in FNA 2000). [= FNA]

Tradescantia fluminensis Vellozo, Wandering Jew, introduced and naturalized from GA south and west. [= FNA, K] {not yet keyed}

Tradescantia hirsutiflora Bush, in s. and e. GA, west to TX. Reported for SC (Richland Co.) (P. McMillan 2003). [= FNA, K; *T. hirsuticaulis* -- S, misapplied]

Tradescantia subaspera Ker-Gawler var. *subaspera*, reported for NC, TN, KY, WV (Kartesz 1999). {investigate} [= K; T.
subaspera – RAB, FNA, W, infraspecific taxa not distinguished] {not yet keyed}

CONVALLARIACEAE Horian. 1834 (Lily-of-the-valley Family)
[see *RUSCACEAE*]

CYMODOCEACEAE N. Taylor 1909 (Manatee-grass Family)

A family of about 5 genera and 16 species, estuarine aquatics, of tropical and subtropical (rarely temperate) waters. References: Kuo & McComb in Kubitzki (1998b); Haynes in FNA (2000); Green & Short (2003).

- 1 Leaves flat above the sheath; leaf tips 3-toothed; female plants with flowers with 1 pistil ***Halodule***
- 1 Leaves terete or subterete above the sheath; leaf tips acicular; female plants with flowers with 1-2 pistils **[*Syringodium*]**

Halodule Endlicher 1841 (Shoal-grass)

A genus of about 6 species, of tropical and subtropical regions of both hemispheres. References: Haynes in FNA (2000); McRoy & Helfferich (1977); Kuo & McComb in Kubitzki (1998b); Green & Short (2003)=Z.

Halodule wrightii Ascherson, Shoal-grass. Cp (NC, SC): submerged in estuarine waters up to about 2 m deep, especially in Core and Pamlico sounds, NC; common. E. NC south to FL, west to TX, and south along shores of the Gulf of México and Caribbean; also on the Pacific coast of Panama and Nicaragua. Haynes in FNA (2000) concludes that *H. beaudettei* is not taxonomically distinct from *H. wrightii* (the older name). Seagrasses (an informal group including *Halodule wrightii*, *Zostera marina*, and *Ruppia maritima* in our area) are very important components of estuarine ecosystems, providing a large proportion of the primary productivity in such systems and providing shelter and nursery grounds for fish, shrimp, and other invertebrates. An estimated 80,000 hectares of seagrass beds are found in Pamlico and Core sounds, NC, most of that area having *Halodule* as the co-dominant or dominant species (Ferguson, Rivera, & Wood 1989). There is concern about the destruction of seagrass beds by pollution, dredging of waterways, and mechanical disturbance by fishing boats (Koch & Orth 2003; Green & Short 2003). [= FNA, S, Z; *H. beaudettei* (den Hartog) den Hartog -- RAB, GW, K]

Syringodium F.T. Kützing in R.F. Hohenacker 1860 (Manatee-grass)

A genus of 2 species, seagrasses, of the Caribbean and Indo-West Pacific. References: Haynes in FNA (2000); Kuo & McComb in Kubitzki (1998b); Green & Short (2003)=Z.

Syringodium filiforme F.T. Kützing in R.F. Hohenacker, Manatee-grass, occurs in FL, westwards along the Gulf Coast, and in the West Indies; it is occasionally cast ashore in the Carolinas following hurricanes, but there is no evidence that it grows in our area. It is the only other member of the family in e. North America. [= FNA, Z; *Cymodocea filiformis* (F.T. Kützing in R.F. Hohenacker) Correll -- GW, K; *Cymodocea manatorum* Ascherson -- S]