

**FLORA OF NORTHERN ALABAMA, PART 6.
ORCHID AND IRIS FAMILIES**

DANIEL D. SPAULDING

Senior Curator
Anniston Museum of Natural History
800 Museum Drive
Anniston, Alabama 36206
dspaulding@annistonmuseum.org

JOHN T. KARTESZ

BONAP Director
9319 Bracken Lane
Chapel Hill, North Carolina 27516
john_kartesz@yahoo.com

BRIAN J. FINZEL

St. John Paul II Catholic High School
7301 Old Madison Pike
Huntsville, Alabama 35806
bfinzel@jp2falcons.org

T. WAYNE BARGER

Alabama Dept. of Conservation & Natural Resources
State Lands Division, Natural Heritage Section
64 North Union Street
Montgomery, Alabama 36130
wayne.barger@dcnr.alabama.gov

ERIC C. SOEHRN

Alabama Dept. of Conservation & Natural Resources
State Lands Division, Wehle Land Conservation Center
4819 Pleasant Hill Road
Midway, Alabama 36053
Eric.Soehren@dcnr.alabama.gov

BRIAN R. KEENER

Department of Biological & Environmental Sciences
University of West Alabama
Livingston, Alabama 35470
bkeener@uwa.edu

J. KEVIN ENGLAND

University of West Alabama Herbarium
11560 Alabama Hwy 33
Moulton, Alabama 35650
alabamaplants@gmail.com

HOWARD E. HORNE

Barry A. Vittor and Associates, Inc.
8060 Cottage Hill Road
Mobile, Alabama 36695
hhorne@bvaenviro.com

MELANIE TAYLOR SPAULDING

Environmental Researcher
4566 County Road 13
Heflin, Alabama 36264
bamabiodiversity@gmail.com

ABSTRACT

This paper is a floristic guide to native and naturalized plants in the orchid and iris families (Orchidaceae & Iridaceae, order Asparagales) found within the Interior Plains and Appalachian Highlands physiographic divisions of northern Alabama. The flora includes identification keys, photographs, illustrations, maps, habitats, distributional data, pertinent synonymy, and comments for each taxon.

Orchidaceae is one of the world's largest and most diverse plant families, with approximately 750 genera and up to 35,000 species (Dressler 2005, Christenhusz & Byng 2016, Stevens 2017, Soltis et al. 2018). Alabama has 25 genera and 61 species of orchids, with only one, *Zeuxine strateumatica* (L.) Schlechter (Soldier's Orchid), being non-native (Keener et al. 2022). The study area of this paper includes 19 genera with 39 species in the orchid family.

The iris family (Iridaceae) contains about 66 genera, with an estimated 2,250 species worldwide (Christenhusz & Byng 2016). Keener et al. (2022) list seven genera and 35 confirmed taxa in our state. In northern Alabama, we have four genera (*Crocasmia*, *Gladiolus*, *Sisyrinchium*, and *Iris*), totaling 24 taxa; thirteen are native, and eleven (nine species & two hybrids) are exotic.

Within the study region of this flora, the Alabama Natural Heritage Program (pers. comm. Al Schotz 2023) tracks 17 species (Table 1) in the orchid and Iris families. Note that *Sisyrinchium calciphilum* (Limestone Blue-Eyed-Grass) is endemic to Alabama, and *Platanthera integrilabia* (White Fringeless Orchid) is the only federally listed (threatened) species.

Table 1. Orchidaceae and Iridaceae species of conservation concern in northern Alabama.

| Scientific Name | Vernacular Name | State Rank | Global Rank |
|---------------------------------|---------------------------|------------|-------------|
| <i>Aplectrum hyemale</i> | Puttyroot | S2 | G5 |
| <i>Cleistesiosis bifaria</i> | Small Rosebud Orchid | S2 | G3 |
| <i>Corallorhiza odontorhiza</i> | Autumn Coralroot | S1 | G5 |
| <i>Corallorhiza wisteriana</i> | Spring Coralroot | S2 | G5 |
| <i>Cypripedium candidum</i> | White Lady's-Slipper | S1 | G4 |
| <i>Cypripedium kentuckiense</i> | Southern Lady's-Slipper | S1 | G3 |
| <i>Iris prismatica</i> | Slender Blue Iris | S1 | G4 |
| <i>Isotria verticillata</i> | Large Whorled Pogonia | S2 | G5 |
| <i>Liparis liliifolia</i> | Large Twayblade | S1 | G5 |
| <i>Liparis loeselii</i> | Fen Orchid | SH | G5 |
| <i>Platanthera integra</i> | Golden Fringeless Orchid | S2 | G3 |
| <i>Platanthera integrilabia</i> | White Fringeless Orchid | S2 | G2 |
| <i>Platanthera lacera</i> | Ragged Fringed Orchid | S2 | G5 |
| <i>Platanthera peramoena</i> | Purple Fringeless Orchid | S1 | G5 |
| <i>Sisyrinchium calciphilum</i> | Limestone Blue-Eyed-Grass | S1 | G1 |
| <i>Spiranthes lucida</i> | Shining Ladies'-Tresses | S1 | G4 |
| <i>Triphora trianthophoros</i> | Three-Birds Orchid | S2 | G4 |

Members of Iridaceae are mostly perennial herbs from rhizomes, bulbs, or corms, though some species are annual with only fibrous roots. Their flowers are showy, usually radially symmetrical (rarely bilaterally symmetrical), and subtended by two expanded spathe-like bracts. The

perianth consists of three petals and three petal-like sepals, typically united basally forming a tube. The flower has an inferior ovary (attached below all other floral parts), three stamens, a pistil composed of three united carpels, and a single style with three stigmas (Baumgardt 1982). In most species of *Iris*, the style is cleft into three petaloid branches. The capsular fruit can be papery, leathery, to nearly woody (Zomlefer 1986). Plants in the Iridaceae have distinctive two-ranked, equitant leaves that overlap basally in a flat, fan-like arrangement (Fig. 1a).

Orchidaceae are a highly specialized family with adaptations to attract, deceive, and manipulate insects to achieve cross-pollination (Dressler 1981). For centuries, botanists and collectors have been fascinated by the mesmerizing beauty and complexity of the orchid family (Zomlefer 1983). Orchids are cosmopolitan, occupying a diversity of habitats worldwide. Most tropical species are epiphytic (grow upon another plant), while temperate orchids are primarily terrestrial (Baumgardt 1982).

Orchids have a unique floral morphology (Fig. 1b). Their flowers are typically bilaterally symmetrical with two whorls of three somewhat similar segments (tepals). The perianth includes three sepals, two lateral petals, and a highly modified petal called the lip or labellum. This specialized petal is often enlarged and flamboyant, frequently serving as a landing platform and an attractant for pollinators. Orchid flowers are usually resupinate, meaning their flowerstalks twist 180°, turning them upside-down and orienting the lip to the lowermost position. A single elongated structure in the flower's center is called the column. Its undersurface contains fused male and female reproductive organs, with the male (stamen/anther) located above the female (pistil/stigma). To prevent self-pollination, the stigma of many orchids has a projecting beak-like modification (rostellum) that separates it from the anther. Under the anther cap are usually waxy, sac-like packets of pollen (pollinia) that attach to insects. The ovary is inferior (located in the floral tube below the perianth) and produces a fruiting capsule usually containing numerous tiny, dust-like seeds (Dressler 1981).

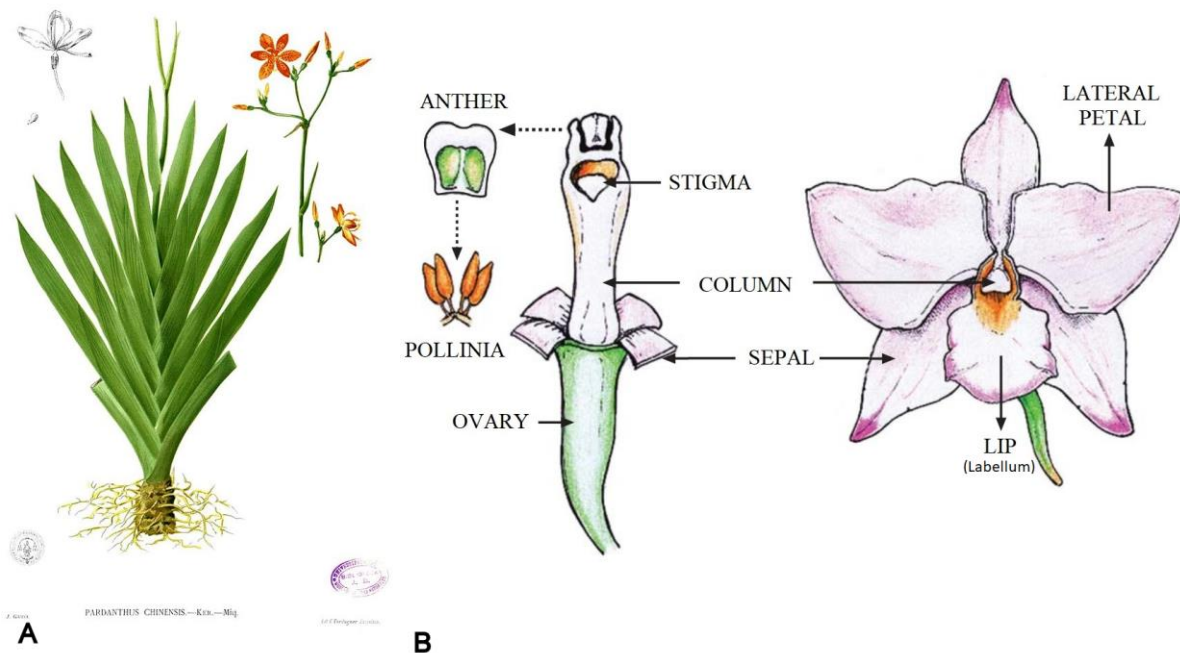


Figure 1. A. Equitant leaves and flowers of *Iris domestica* [= *Pardanthus chinensis*], illustration by Juan Garcia, 1875. B. Schematic drawing of an orchid flower (Aceto & Gaudio 2011).

METHODS AND FORMAT OF THE FLORA

Northern Alabama includes all the counties within the Interior Plains and Appalachian Highlands (Fig. 2). The region comprises four physiographic provinces (Fenneman 1938): Interior Low Plateaus (Highland Rim section), Appalachian Plateaus (Cumberland Plateau section), Ridge & Valley (Tennessee section), and Piedmont Plateau (Piedmont Upland section).

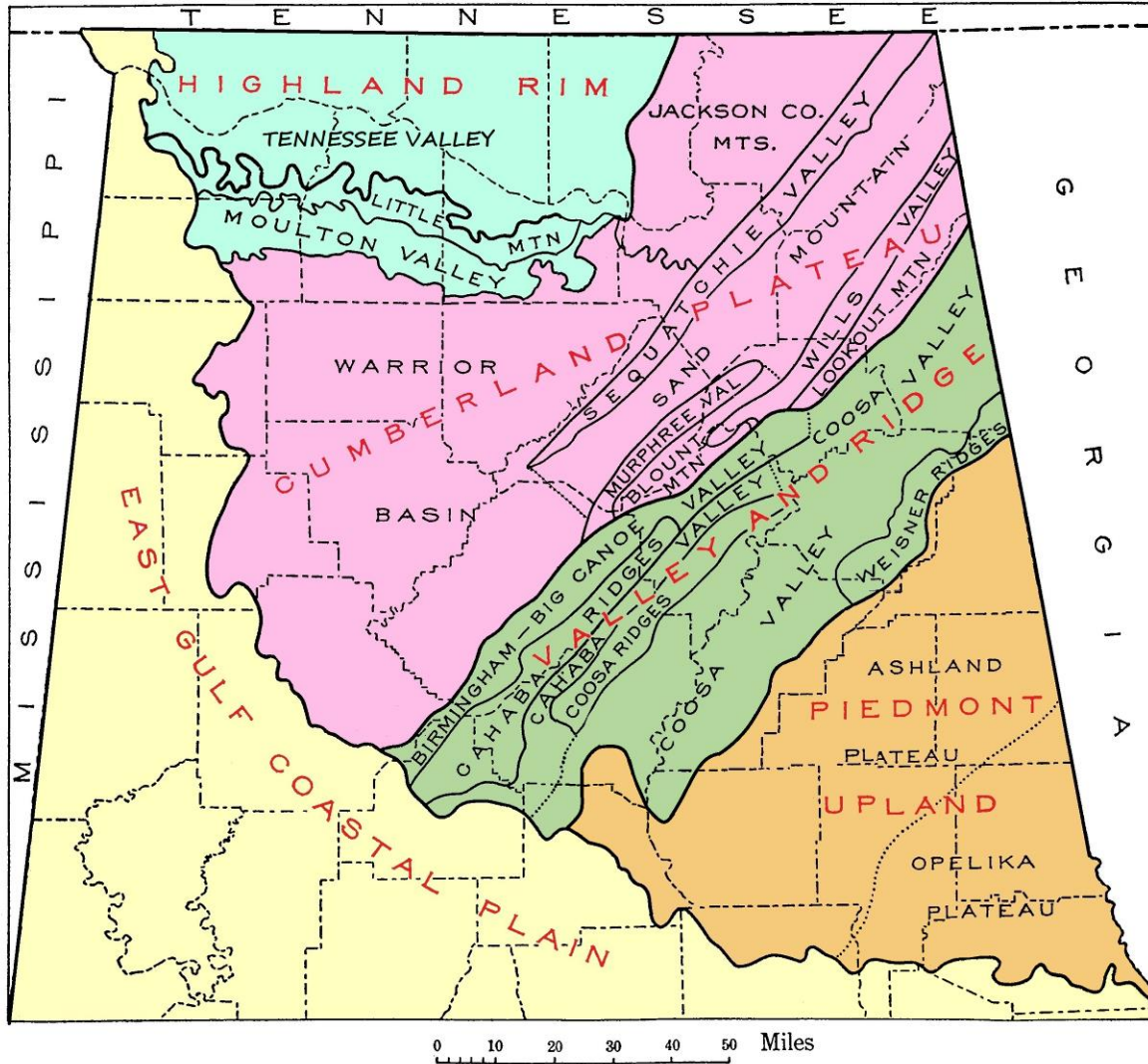


Figure 2. Map of northern Alabama's physical divisions (adapted and modified from Johnston 1930).

County distribution maps with physiographic regions are provided for each species in northern Alabama (Fig. 3). A symbol documents county-level occurrences within the physiographic province (Table 2). A county with multiple regions might have more than one symbol. Specimens were examined from various herbaria, and searches for online collections were made from the following sites: Alabama Plant Atlas (Keener et al. 2022), Floristic Synthesis of North America (Kartesz 2022), iNaturalist (2021), and the Southeast Regional Network of Expertise and Collections Data Portal (SERNEC 2021). Accessed vouchered specimens are from the following herbaria: ALNHS, AMAL, AMES, APSC, AUA, BRIT, CM, DUKE, GA, GH, JSU, KE, LSU, MISSA, MO, NCU, NLU, NY, SAMF, SMU, TENN, TROY, UNA, UCHT, UNAF, US, UWAL, WIS, and VDB. Herbarium acronyms follow those in *Index Herbariorum* (Thiers 2016). Abbreviations for authors' names follow Brummitt & Powell (1992).

The phylogenetic arrangement of families and genera follows Weakley et al. (2022), while species are arranged alphabetically. Generic names include authors and date of publication. The format for common names follows Kartesz (2022) and Kartesz & Thieret (1991). Alabama Natural Heritage Program (2022) tracking list codes are defined in Table 3.

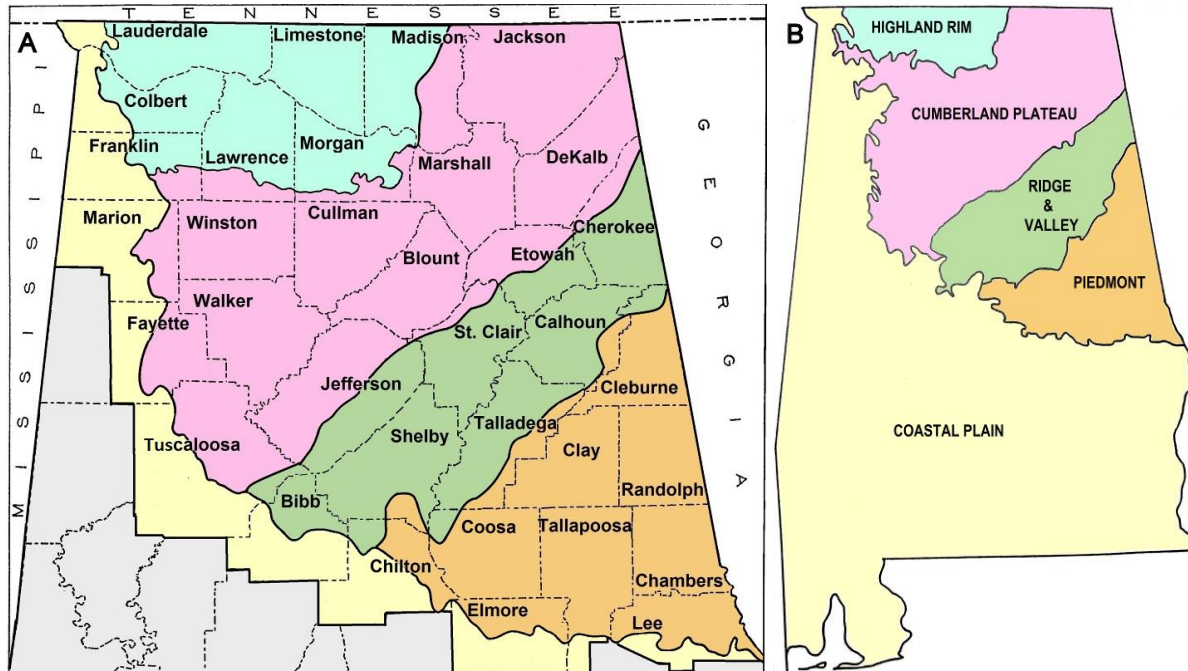


Figure 3. A. Counties of the study area. B. State map of physiographic regions.

The following sequence is applied to each taxon description: scientific name, authority citation for specific and infraspecific taxa, including their derivation. Vernacular name(s). Synonyms. Habit/duration. Flowering dates, fruiting dates (listed only if significantly different from flowering times), and frequency of occurrence in Alabama provinces. Overall range and distribution. Comments. Derivations of scientific names are chiefly from Coombes 1987; Correll 1950; Diggs et al. 2006; Fernald 1950; Flora of North America Committee 2002; Gledhill 1989; Neal 1992; Shosteck 1974; and Stearn 1983, 2002.

Table 2. Map key to the symbols.

| MAP KEY | |
|---------|--|
| ● | Native taxon, present in a physiographic area of the county |
| ✪ | Sensitive species, listed as imperiled or rare in Alabama |
| ◉ | Introduced in the region, but native to the southeastern USA |
| ▼ | Exotic taxon, adventive or naturalized in Alabama |
| * | Waif; cultivated escape, likely not persisting in wild |

Frequency of occurrence is defined as follows, ranging in descending order: *common* (occurring in abundance throughout a province); *frequent* (occurring throughout a province, but not abundant); *uncommon* (occurring in scattered localities within a province); *rare* (known only from a small number of populations, 6 to 20 occurrences, often restricted to specific localities or habitats); and *very rare* (known only from a few populations, five or fewer occurrences, often narrow endemics, disjuncts, or peripheral taxa at the edges of their ranges).

Table 3. Definition of state ranks.

| Code | Designation | State Rank Definition |
|------|----------------------|---|
| S1 | Critically Imperiled | At high risk of extirpation because of extreme rarity (5 or fewer occurrences of very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extirpation from Alabama. |
| S2 | Imperiled | At risk of extirpation because of rarity – very restricted range, very few populations, steep declines, or other factors making it very vulnerable to extirpation from Alabama. |
| S3 | Vulnerable | Rare or uncommon in Alabama – at moderate risk of extirpation due to a restricted range, relatively few populations, recent and widespread declines, or other factors. |
| S4 | Apparently Secure | May be uncommon, but not rare. May have some cause for long-term concern due to declines or other factors. |
| S5 | Secure | Demonstrably secure in Alabama; common, widespread, and abundant in the state. |
| SX | Presumed Extirpated | Species or community is believed to be extirpated from Alabama. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered. |
| SH | Historical | Species or communities occurred historically in Alabama, and there is some possibility that they may be rediscovered. Its presence may not have been verified in the past 20–40 years. |

The following publications were utilized to help create the taxonomic keys: Braun 1967; Clewell 1985; Correll 1950; Correll & Johnston 1970; Deam 1940; Diggs et al. 2006; Fernald 1950; Flora of North America Committee 2002; Gleason 1952; Gleason & Cronquist 1963; Godfrey & Wootton 1979; Haines 2011; Jones 2005; Luer 1972, 1975; Mohlenbrock 1970, 1975; Pace & Cameron 2017; Radford et al. 1968; Rhoads & Block 2007; Rickett 1968; Small 1933; Smith 1994; Strausbaugh & Core 1997; Tennessee Flora Committee 2015; Weakley et al. 2022; Wofford 1989, and Yatskiyevych 1999. Specimens were also examined from Alabama herbaria and the Botanical Research Institute of Texas (BRIT) to assist in constructing the keys.

KEY TO FAMILIES

1. Flowers usually bilaterally symmetrical (left & right halves are mirror images) or rarely somewhat asymmetrical (in *Tipularia* & *Liparis*); perianth differentiated into 1 lip (labellum), 2 lateral petals, and 3 sepals; stamens 1 or 2; filaments absent; male and female parts united to form a column; spathes (sheathing bracts) absent below inflorescence (individual flowers often with small bracts); leaves (if present) not equitant (iris-like) or distichous (arranged in two vertical rows on opposite sides of the stem); placentation parietal (ovules attached to outer wall of ovary); capsule with countless, dust-like seeds (lacking an endosperm)..... **1. Orchidaceae**
1. Flowers usually radially symmetrical (parts arranged around a central axis) or occasionally bilaterally symmetrical (in *Crocasmia* & *Gladiolus*); perianth with 6 similar tepals **or** differentiated into 3 petals and 3 sepals with petaloid styles; stamens 3; filaments present; male and female parts separate, not forming a column; sheaths present just below inflorescence (green or scarious, and well-developed); leaves equitant and distichous (in a fan-like array, basally folded [unifacial] and partly enclosing adjacent upper leaf with only the lower leaf surface visible due to fusion of the upper surfaces); placentation axile (ovules attached in center axis of ovary); capsule with typical seeds..... **2. Iridaceae**

1. ORCHIDACEAE (Orchid Family) – in ASPARAGALES

1. Lip a large, inflated slipper-like pouch (2–6 cm long); inflorescence 1 or 2 flowered; fertile anthers 2; pollen granular; staminode (sterile stamen) present, partially enclosing lip entrance; leaves pubescent (hairy) and plicate (with parallel folds); rhizome present **Cypripedium**
1. Lip flat, not slipper-like, curved, or if inflated, less than 1.2 cm long (in *Goodyera* & *Ponthieva*); inflorescence 1 or more flowered (solitary to few-flowered, frequently in spikes or racemes); fertile anthers 1; pollen in sac-like waxy masses (pollinia); staminode absent; leaves smooth (glabrous) and flat, plicate, or folded lengthwise (conduplicate); plants with or without rhizomes.
 2. Lip with a spur (tubular extension, often with a nectar reward).
 3. Leaves absent or withering at flowering; leaf solitary, basal, usually pleated with a purplish undersurface; petals arranged asymmetrically with one petal overlapping dorsal sepal; plant with a thickened corm **Tipularia**
 3. Leaves present at flowering, 1–5, uniformly green; petals not asymmetrical; plant without corms.
 4. Flowers usually bicolored, pink, or purplish, and white-lipped, occasionally uniform pink-purple or rarely all white; petals converging (connivent) with sepals forming a hood; spur tapering from a broad base (cornucopia-like); viscidia (sticky disk of the pollinia) enclosed in a bursicle (pouch-like structure) of the rostellum (beaked projection of the column); leaves 2, basally only **Galearia**
 4. Flowers not distinctly bicolored; petals either spreading or converging only with dorsal sepal forming a hood; spur not noticeably tapering from a broad base; viscidia separate and exposed; leaves 1–5, cauline.
 5. Petals divided into 2 linear divisions; lip deeply divided into 3 linear divisions (not further divided, fringed, or eroded); flowers greenish or yellowish-green; stigmatic processes (horn-like projections on stigma) prominent; root-tuberoids, if present, spherical **Habenaria**
 5. Petals not divided (entire, fringed, or crenate along margin); lip not 3-parted (lip entire to fringed), if 3-parted, divisions not linear (lobes deeply fringed, eroded, or entire); flowers green, white, purple, orange, or yellow; stigmatic processes absent or very minute; root-tuberoids, if present, lance-fusiform **Platanthera**
 2. Lip without a spur.
 6. Inflorescence spirally twisted or 1-sided; flowers sessile, small, usually numerous; flowers tubular and mostly white; stem with foliaceous (leaf-like) sheaths **Spiranthes**
 6. Inflorescence not spirally twisted or 1-sided; flowers stalked (pedicellate), numerous to solitary; flowers variously shaped and colored; stems with or without foliaceous sheaths.
 7. Plants mycoheterotrophic (partly or entirely non-photosynthetic, obtaining nutrients from fungi); leaves reduced to sheathing, scale-like bracts; stems usually yellowish, brownish, or purplish, occasionally greenish; rhizome coralloid (coral-like) or annulate (segmented), much-branched.
 8. Flowers yellowish with strongly contrasting purplish-brown veins; sepals and petals spreading; lip 3-lobed with 5–7 fleshy ridges extending from base nearly to apex; pedicels stout, 4–6 mm long; pollinia 8 **Hexalectris**

8. Flowers purplish-green, purple, or greenish-yellow, usually with a white, purple-spotted lip; sepals and petals converging together (connivent), forming a hood; lip unlobed with 2 fleshy ridges present near base; pedicels slender, 2–4 mm long; pollinia 4..... **Corallorhiza**
7. Plants photosynthetic; leaves conspicuous, occasionally withering or absent at flowering time (in *Aplectrum*); stems typically green; rhizomes, if present, not coralloid or annulated.
9. Leaves absent or beginning to wither at flowering time (leaf basal, solitary, plicate, purplish beneath, green above with raised white veins); plant with thickened corms connected by slender rhizomes..... **Aplectrum**
9. Leaves always present at flowering time; plants with or without corms.
10. Leaves grass-like, linear or linear-lanceolate (sheathing the stem near the base); leaf blade plicate (corrugated); lip bearded and positioned apically on flower (not resupinate); perianth pinkish (rarely white)..... **Calopogon**
10. Leaves elliptic, ovate, or oblanceolate, not grass-like; leaf blade not corrugated; lip bearded, papillate, or smooth, positioned apically or basally (resupinate) on flower; perianth color various.
11. Leaves basal, near ground level.
12. Inflorescence and stem glabrous (lacking hairs); perianth mostly purplish-brown or yellowish, or greenish-yellow; petals inconspicuous, thread-like; leaves usually ascending (occasionally flat on the ground, especially later in the season) **Liparis**
12. Inflorescence and stem pubescent (hairy); flowers white or greenish-white; lip deeply concave or inflated (saccate); petals conspicuous, not thread-like; leaves (at least lower, mature ones) usually more-or-less horizontally oriented, flat on the ground or just above the surface.
13. Leaves evergreen, variegated (veins distinctly lined with white or greenish-white); lip positioned basally on flower (resupinate); petals converging with dorsal sepal forming a hood over lip..... **Goodyera**
13. Leaves herbaceous, solid green; lip positioned apically on flower (not resupinate); petals and sepals spreading **Ponthieva**
11. Leaves (or solitary leaf) cauline, not basal (arranged along stem or appearing so due to long-sheathing leaf bases).
14. Leaves whorled or opposite.
15. Leaves 5 or 6, whorled at stem summit; inflorescence usually solitary (rarely with 2 flowers); petals converging (connivent) with lip, forming a tube; sepals at least twice as long as petals; lip 3-lobed; sepals narrowly lanceolate, 34–60 mm long **Isotria**
15. Leaves usually 2, opposite in middle of stem (rarely a whorl of 3); inflorescence a raceme typically of 5–25 flowers; petals widely spreading; lip deeply cleft; sepals ovate, < 2 mm long **Neottia**

14. Leaves solitary or 2–6 scattered alternately up the stem.
16. Inflorescence a raceme with usually 10–50 tiny green flowers (1–3 mm long); lip notched apically with a small tooth between lobes; petals thread-like, inconspicuous; bracts minute (< 1.5 mm long); plant base with a globose pseudobulb **Malaxis**
16. Inflorescence composed of 1–6 showy pink or white flowers (>15 mm long); lip entire (not notched); petals conspicuous; bracts foliaceous (leaf-like); plant lacking pseudobulbs.
17. Flowers typically 3 (1–6); leaves usually 3 or more (alternately arranged on opposite sides of stem); leaf blades bract-like (1–2 cm long), broadly ovate or cordate **Triphora**
17. Flowers often solitary, occasionally 2, rarely 3; leaves usually solitary; leaf blades conspicuous (2–20 cm long), lanceolate, elliptic, ovate, or oblong.
18. Sepals pink to rose (rarely white), 1.3–2.5 cm long; petals somewhat spreading (leaning over column); lip with a fringed (bearded) crest, margins lacinate (jagged); leaf ovate, elliptic, or broadly ovate-lanceolate, herbaceous, attached about halfway up the stem **Pogonia**
18. Sepals brownish to purplish, 2.4–5.5 cm long; petals converging (connivent) with lip forming a cylindrical tube; lip with a papillose crest, margins crenulate (with small rounded teeth); leaf oblong-lanceolate or elliptic-oblong, leathery, attached above middle of the stem **Cleistesiopsis**

1. APLECTRUM (Nuttall) Torrey 1826

[Greek *a*, without, and *plectron*, spur; lip lacking a spur]

1. *Aplectrum hyemale* (Muhl. ex Willd.) Torr. {of winter; for conspicuous overwintering leaf} — PUTTYROOT; ADAM-AND-EVE (Fig. 4). [*Cymbidium hyemale* Muhl. ex Willd.]

Perennial, terrestrial herb from corms. Rich woods and mesic hardwood forests. Flowers late April–June, fruits late June–November; rare in the Highland Rim and Cumberland Plateau (Fig. 5). Native to the eastern USA and adjacent Canada, from Quebec to Minnesota, south to eastern Oklahoma and north Georgia (Sheviak & Catling 2002a).

Puttyroot is an imperiled (S2) species in Alabama (ALNHP 2022). It has a solitary, overwintering leaf that appears in autumn, withering in early spring, usually before the flowering stalk appears (Fig. 6a). A deteriorating leaf is occasionally present at anthesis (Fig. 6b). Fruiting stalks and leaves persist through winter (Fig. 6c). The leaf is corrugated (plicate), purplish beneath and green above with raised white veins. Plants produce new leaves in fall, taking advantage of the higher light intensity under naked hardwood trees. Leaf litter covering the forest floor helps to keep the soil moist and provides greater nutrient levels (Auclair 1972).

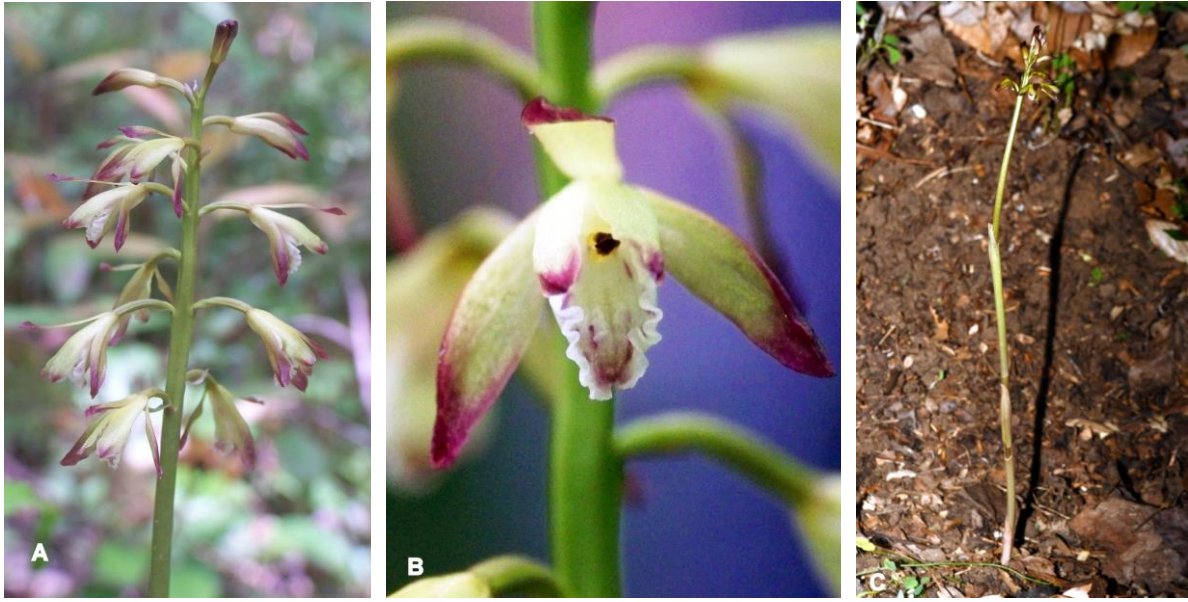


Figure 4. *Aplectrum hyemale*. A–B. Inflorescence & flower, Lawrence Co., Alabama, 22 Apr 2007. Photos: Kevin England. C. Whole plant starting to bloom, Morgan Co., Alabama, 30 Apr 2021. Photo: Brian Finzel.

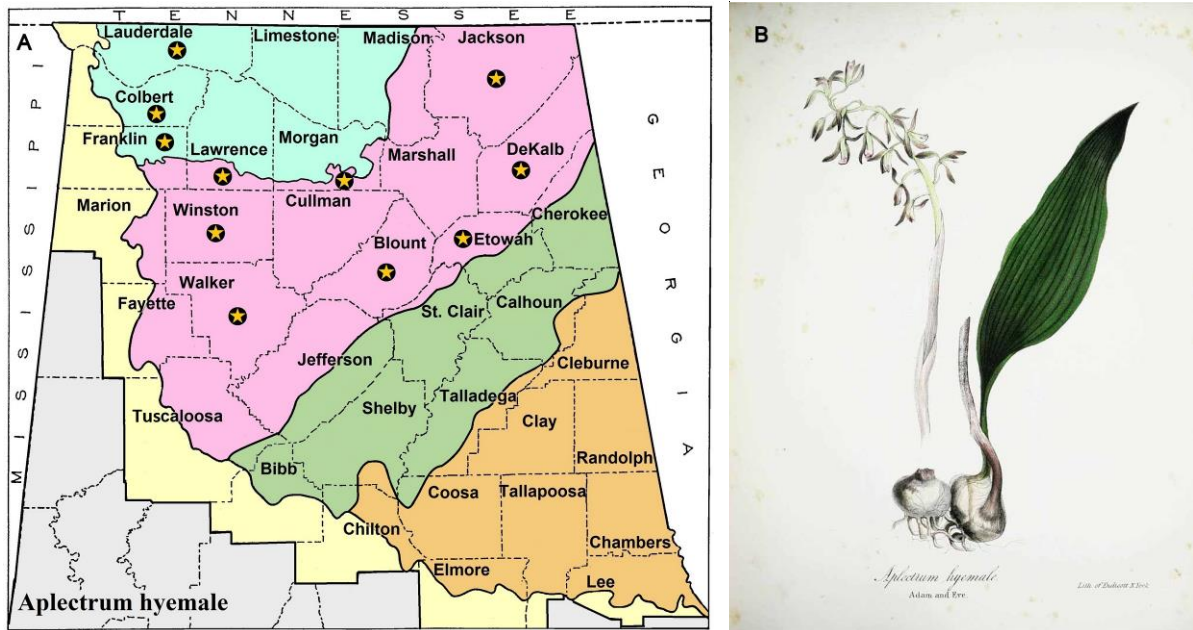


Figure 5. *Aplectrum hyemale*. A. Distribution map. B. Lithograph by George Endicott, 1843.

The rootstalk consists typically of two subglobose, glutinous corms connected by slender stolons (Fig. 6d), the basis for the plant's vernacular name Adam-and-Eve (Correll 1950). Occasionally, a thick withering corm can be present. The corms yield a gooey putty, giving rise to the common name “puttyroot” (Coffey 1993). Pursh (1814) noted: “The roots bruised, with a small addition to water, give a strong cement, which when applied to broken china and glass is exceedingly durable.” Gibson (1905) wrote, “In olden days, it was the custom of thrifty housewives to grind the roots and mix the powder with water, making a sticky paste with which they were able to mend their broken crockery.” However, Shosteck (1974) wrote that the common name “puttyroot” came about because the corms resembled chunks of putty.



Figure 6. *Aplectrum hyemale*. A. Etowah Co., Alabama, 16 Dec 2004. Photo: Larry Brasher. B. Withering leaf, Morgan Co., Alabama, 30 Apr 2021. Photo: Brian Finzel. C. Etowah Co., Alabama, 6 Dec 2022. Photo: Larry Brasher. D. Twin corms, EIU herbarium specimen, *Wieler s.n.*, Coles Co., Illinois, 10 Feb 1996.

Baldwin (1884) writes: “The character of the root has given the popular name of Adam and Eve Orchid, and the bulbs are worn as amulets by the southern negroes and poor whites, who also place the (separated) bulbs in water and according as Adam or Eve pops up, calculate the chances of retaining a friend’s affection or of living in peace with neighbors.” Plants typically have only two joined corms. However, a third withering one is sometimes present. Native Americans harvested the corms and utilized them for various purposes. The Catawba Indians made a medicinal paste from beaten rootstalks and applied it to boils (Taylor 1940). The Cherokee fed corms to children and hogs to fatten them up (Moerman 1998).

2. CALOPOGON R. Brown 1813

[Greek *kalos*, beautiful, and *pogon*, beard; alluding to the bearded lip]

1. *Calopogon tuberosus* (L.) Britton, Stearns & Poggenb. var. *tuberosus* {tuberosus} — COMMON GRASS-PINK; TUBEROUS GRASS-PINK (Fig. 7). [*Calopogon tuberosus* var. *latifolius* (St. John) Boivin; *Calopogon pulchellus* var. *pulchellus* R. Br.; *Calopogon pulchellus* var. *latifolius* (St. John) Fern.; *Limodorum tuberosum* var. *tuberosum* L.; *Limodorum tuberosum* var. *nanum* Nieuwl.]

Perennial, terrestrial herb from corms. Bogs, seeps, wet ditches, swamp margins, and pine savannas. Flowers April–July, fruits July–September; very rare in the Cumberland Plateau, Ridge & Valley, and Piedmont; uncommon in the Coastal Plain (Fig. 8). Native to the eastern USA and adjacent Canada, from Newfoundland to Manitoba, south to Florida and east Texas (Goldman et al. 2002a).

Although some botanists recognize several varieties of *Calopogon tuberosus*, others labeled them morphological extremes found at the northern and southern limits of its range. Correll (1950) considered these differences mainly as forms of one highly variable species. Two northern variants were the first to be separated. Nieuwland (1913) named a dwarf form he called *C. tuberosus* var. *nanum*, and Fernald (1946) described *C. tuberosus* var. *latifolius* differing from the type species by having a pair of broad leaves greatly overtopping a short scape. Catling & Lucas (1987) determined that formal taxonomic recognition of these two northern taxa is inappropriate because of the variation within populations.



Figure 7. *Calopogon tuberosus* var. *tuberosus*, DeKalb Co., Alabama, 5 June 2020. Photos: Mary Shew.

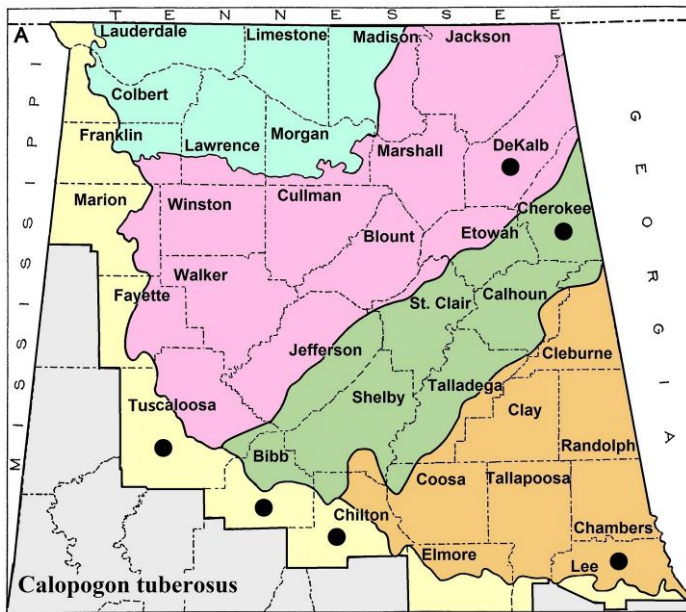


Figure 8. *Calopogon tuberosus* var. *tuberosus*. A. Distribution map. B. Illustration, Thomas Meehan, 1879.

A southern variant, *Calopogon tuberosus* var. *simpsonii* (Small) Magrath [Simpson's Grass-Pink], occurs in south Florida (primarily within the Everglades) and the Bahamas. Small (1903) originally described this variety as a species, *Limodorum simpsonii* (Fig. 9). Goldman et al. (2002a) state that it differs from the typical variety by "its strongly transversely curled leaves, the frequently narrowed and pale apex of the middle lip lobe, and by its habitat in wet, marly soils." Trapnell (1995) and Goldman (2000) determined the southern entity to be a distinct taxon based on morphology, allozymes, and DNA data. Only the typical variety (var. *tuberosus*) occurs in Alabama.

The genus *Calopogon* comprises five showy species endemic to eastern North America and the West Indies (Goldman et al. 2002a). They all occur in our state, but only *C. tuberosus* inhabits northern Alabama. It is also the most widespread species (Kartesz 2022). The common name “grass pink” alludes to the plant’s rose-pink flowers and grass-like appearance (Gibson 1905). Many botanical manuals of the 20th Century (Correll 1950, Fernald 1950, Gleason & Cronquist 1963, Radford et al. 1968) treated Common Grass-Pink as *C. pulchellus*. However, Mackenzie (1925) established that the correct name was *C. tuberosus* [= *Limodorum tuberosum*].

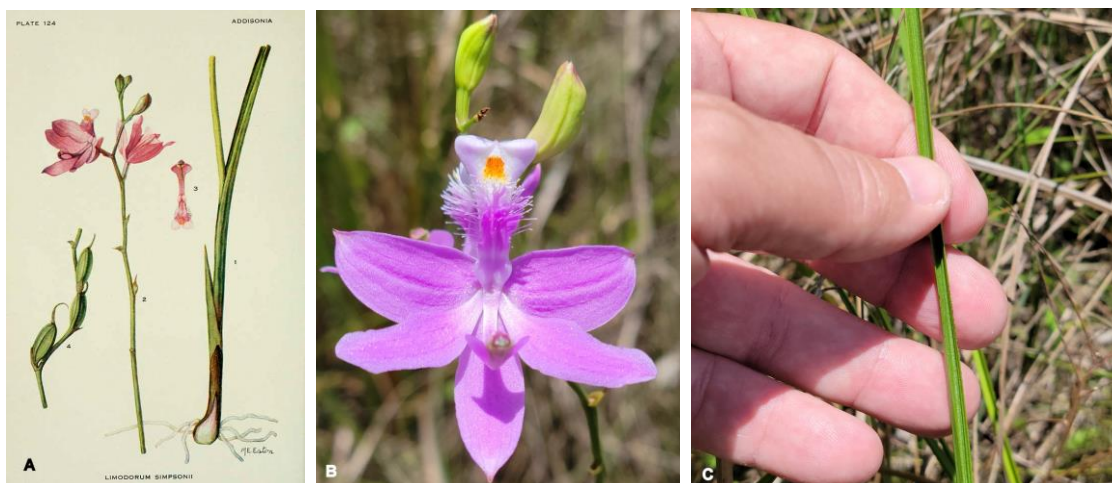


Figure 9. *Calopogon tuberosus* var. *simpsonii* [= *Limodorum simpsonii*]. A. Illustration by Mary Emily Eaton, 1919. B. & C. Everglades, Collier Co., Florida, 27 May 2022. Photos: Jay Horn.

Calopogon tuberosus flowers do not produce nectar or offer a pollen reward; thus, enticing pollinators must be accomplished through deception and mimicry of similar nectar-bearing orchids (Trapnell et al. 2004). Bees (*Bombus*, *Xylocopa*) land on the large lip and attempt to gather pollen from the yellow-orange hairs (the beard), which somewhat resemble anthers (Goldman et al. 2002a). Unlike most Alabama orchids, the lip is oriented on the top part of the flower (non-resupinate), enabling the weight of an insect to bend the lip downward, resulting in the column-attaching pollinia adhering to the insect’s back (Firmage & Cole 1988).

3. CLEISTESIOPSIS Pansarin & F. Barros 2008

[*Cleistes* (tropical orchid genus), and Greek *opsis*, appearance; for its likeness to the genus]

1. *Cleistesiopsis bifaria* (Fernald) Pansarin & F. Barros {two-fold; from the two regions of occurrence when first named} — SMALL ROSEBUD ORCHID; APPALACHIAN DRAGONHEAD POGONIA; SMALL SPREADING POGONIA (Fig. 10). [*Cleistes bifaria* (Fernald) Catling & Gregg; *Cleistes divaricata* (L.) Ames var. *bifaria* Fernald; *Pogonia bifaria* (Fernald) P.M. Brown & Wunderlin]

Perennial, terrestrial herb. Moist or dry meadows and pine woodlands in acidic soils. Flowers May–July, fruits July–September; very rare in the Highland Rim and Ridge & Valley, rare in the Cumberland Plateau (Fig. 11a). Nearly endemic to the Southern Appalachians, from Virginia and West Virginia, south to northeastern Alabama and north Georgia (Kartesz 2022).

According to Wherry (1928), the common name “rose-bud” alludes to the flower resembling the color and form of a slender bud of a rose. The flowers are magenta-pink to white (Fig. 12). *Cleistes* is Greek for “closed,” referring to the narrow funnel-shaped corolla (Correll 1950). The Alabama Natural Heritage program plans to list *Cleistesiopsis bifaria* as critically imperiled (S1) in their 2023 tracking list (pers. comm. Al Schotz 2023).



Figure 10. *Cleistesopsis bifaria*, DeKalb Co., Alabama, 25 May 2019. Photos: Mary Shew.

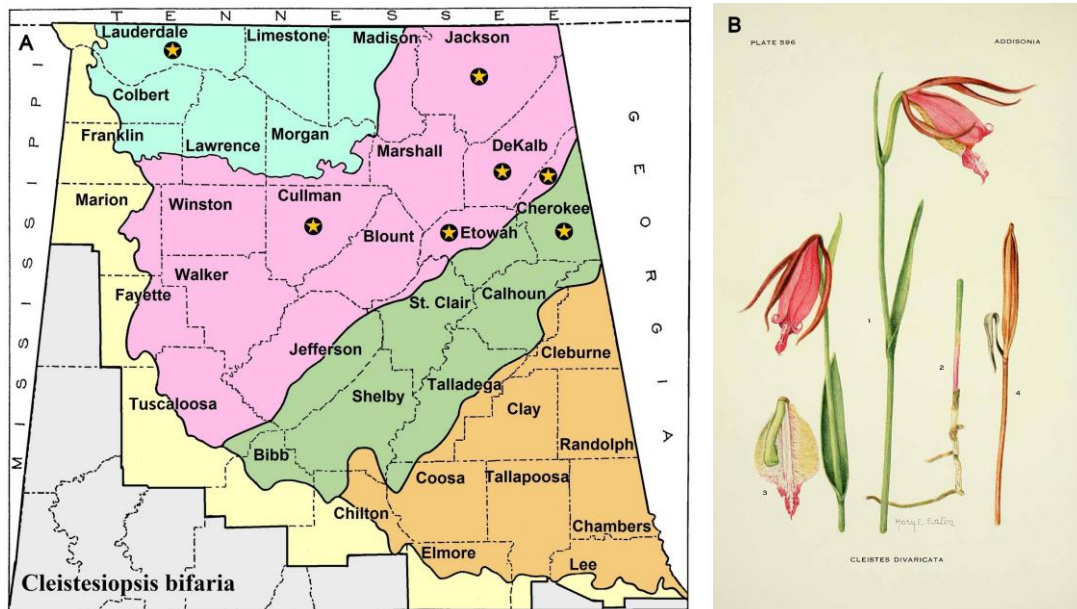


Figure 11. A. Distribution map of *Cleistesopsis bifaria*. B. Illustration of *Cleistesopsis divaricata* [= *Cleistes divaricata*] by Mary Emily Eaton, 1934.

Botanical manuals formerly included *Cleistesopsis* in the genus *Cleistes* (Small 1933, Fernald 1950, Gleason & Cronquist 1963, Radford et al. 1968; Gregg & Catling 2002). Historically, only one species, *Cleistes divaricata*, was recognized in North America (Luer 1975). Its distribution was from New Jersey south chiefly along the Coastal Plain to central Florida and west to eastern Louisiana, with disjunct populations in the Blue Ridge and Appalachians of the southeastern USA (Correll 1950). Fernald (1946) segregated a smaller mountainous variant as var. *bifaria*. Catling & Gregg (1992) later elevated the taxon to a specific rank, *Cleistes bifaria*, and included smaller-flowered populations on the Southeast Coastal Plain.

Based on morphological and molecular characteristics, Pansarin & Barros (2008) segregated the North American *Cleistesiosopsis* (two species) from the Central and South American genus *Cleistes* (with 54 species), creating two monophyletic genera. Brown (2009) added a third species, *Cleistesiosopsis oricamporum*, the small-flowered Coastal Plain variant. He stated it differed from the similar *C. bifaria* by having a floral bract equal to or shorter than the pedicillate flower (vs. longer) and a sweet vanilla fragrance (absent in *C. bifaria*). *Cleistesiosopsis divaricata* (Fig. 11b) is native to the Atlantic Coastal Plain (Gregg 1991) and has larger flowers with a daffodil-like scent (Smith et al. 2004).



Figure 12. *Cleistesiosopsis bifaria*. A. Marion Co., Tennessee, 19 June 2008. B. & C. Coffee Co., Tennessee, 6 Jun 2015. Photos: Brian Finzel.

Bumblebees (*Bombus*) and leafcutter bees (*Megachile*) are the chief pollinators of rosebud orchids (Gregg 1991). *Cleistesiosopsis* flowers lack nectaries, so they can only offer pollen as a reward. Bees regularly collect pollen from the two fragrant Coastal Plain species but not from the scentless *C. bifaria* (Smith et al. 2004). Gregg (1989) calls this deceitful orchid a “bee-food-flower mimic” and observed that unsatisfied bees visited flowers only once, which may encourage outcrossing.

4. CORALLORHIZA Gagnebin 1755

[Greek *korallion*, coral, and *rhiza*, root; for its coral-like, branching rhizome]

- 1. Plants flowering late winter or spring (Feb–May); sepals and petals somewhat spreading, 5–7.5 mm long; dorsal sepal > 4.5 mm long, 3-nerved; lip 4.0–7.5 mm long; stem not bulbous-thickened at base..... **Corallorhiza wisteriana**
- 1. Plants flowering late summer or fall (Aug–Nov); sepals and petals purplish-green or purple, 3–4.5 mm long, converging together forming a hood; dorsal sepal < 4.5 mm long, 1-nerved; lip 2.6–3.8 mm long; stem bulbous-thickened at base **Corallorhiza odontorhiza**

1. Corallorhiza odontorhiza (Willd.) Poir. {toothed-root; for its tooth-like projections on rhizome} — AUTUMN CORALROOT; LATE CORALROOT (Fig. 13). [*Corallorhiza odontorhiza* var. *pringlei* (Greenm.) Freudenstein]



Figure 13. *Corallorrhiza odontorhiza*. Jefferson Co., Alabama, 17 Oct 2015. Photos: Brian Finzel.

Perennial, mycoheterotrophic herb from rhizomes. Mesic to dry forests, especially under oaks. Flowers August–October, fruits September–November; rare throughout northern Alabama (Fig. 14). Native to the eastern USA and adjacent Canada, from Ontario to Quebec, south to Georgia and east Oklahoma (Magrath & Freudenstein 2002).

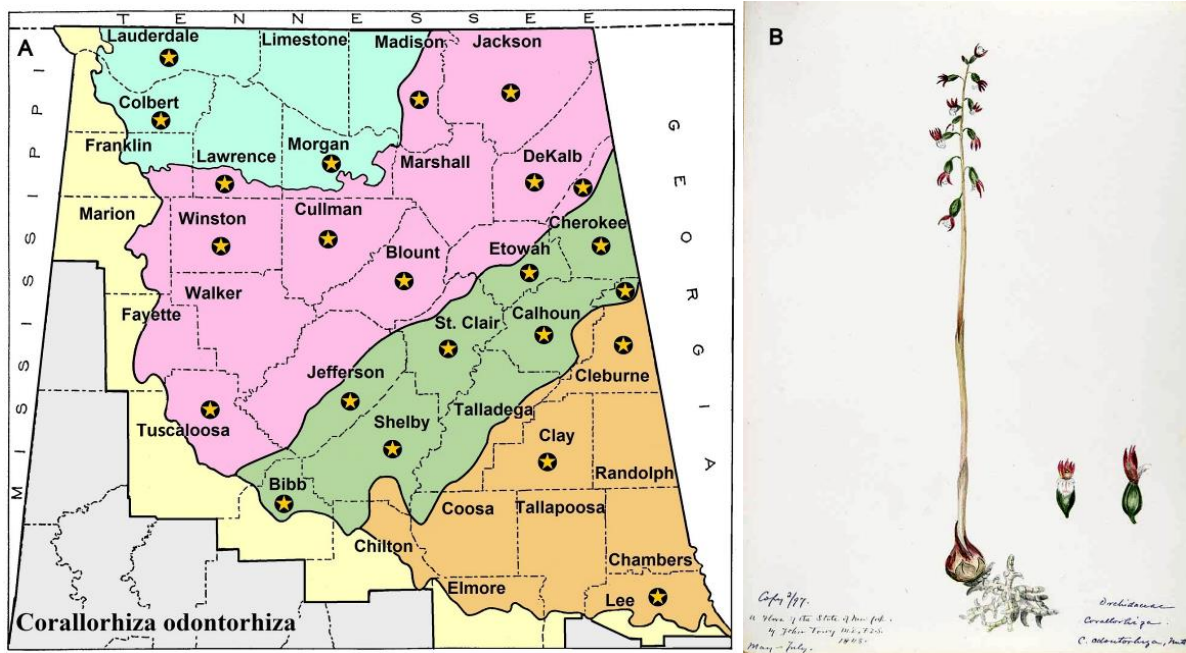


Figure 14. *Corallorrhiza odontorhiza*. A. Distribution map. B. Drawing by Helen Sharp, 1897.

The Alabama Natural Heritage Program (ALNHP 2022) lists *Corallorrhiza odontorhiza* as critically imperiled (S1) but plans to change its status to imperiled (S2) in the state (pers. comm. Al Schotz 2023). Because of the diminutive stature of this leafless orchid, it is often overlooked and probably occurs more frequently in the state than thought.

Correll (1950) noted that the coral-like rootstalks “have a rather strong peculiar odor and have been used as a diaphoretic [to induce perspiration] and sedative.” Grieve (1931) wrote, “it promotes perspiration without producing any excitement in the system, so is of value in pleurisy, typhus fever, and other inflammatory diseases.”

Corallorrhiza odontorhiza has either widely open flowers (chasmogamous) or nearly closed ones (cleistogamous). Magrath & Freudenstein (2002) treated plants with chasmogamous flowers as var. *pringlei*. However, Weakley et al. (2022) do not recognize the variety, stating that “both flower types apparently exist within the same populations with seemingly no ecological or phenological separation.” Cleistogamous individuals are likely self-pollinating (Freudenstein 1997).

2. *Corallorrhiza wisteriana* Conrad {for its discoverer, Philadelphia naturalist, Charles Jones Wister, 1782–1865} — SPRING CORALROOT; WISTER’S CORALROOT (Fig. 15).

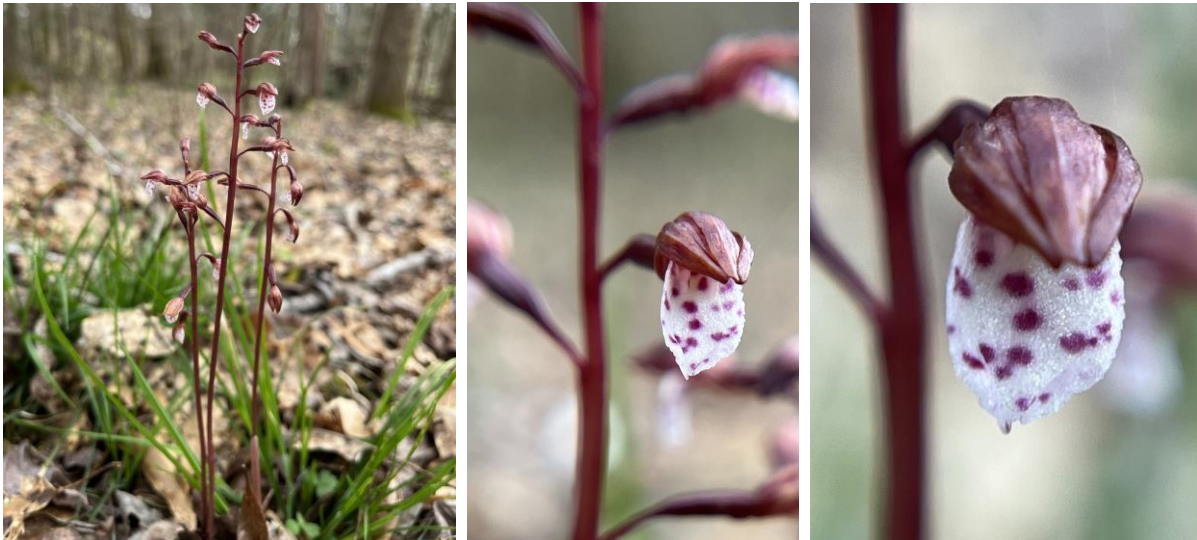


Figure 15. *Corallorrhiza wisteriana*, Shelby Co., Alabama, 11 Mar 2022. Photos: Chasa Fulkerson.

Perennial, mycoheterotrophic herb from rhizomes. Moist to dry forests, often in calcareous soils. Flowers late February–May, fruits March–June; rare throughout Alabama (Fig. 16). Native in the eastern USA from Pennsylvania to Missouri, south to Florida and Texas. Disjunct in the Rocky Mountains from western South Dakota and Montana south to Mexico (Magrath & Freudenstein 2002).

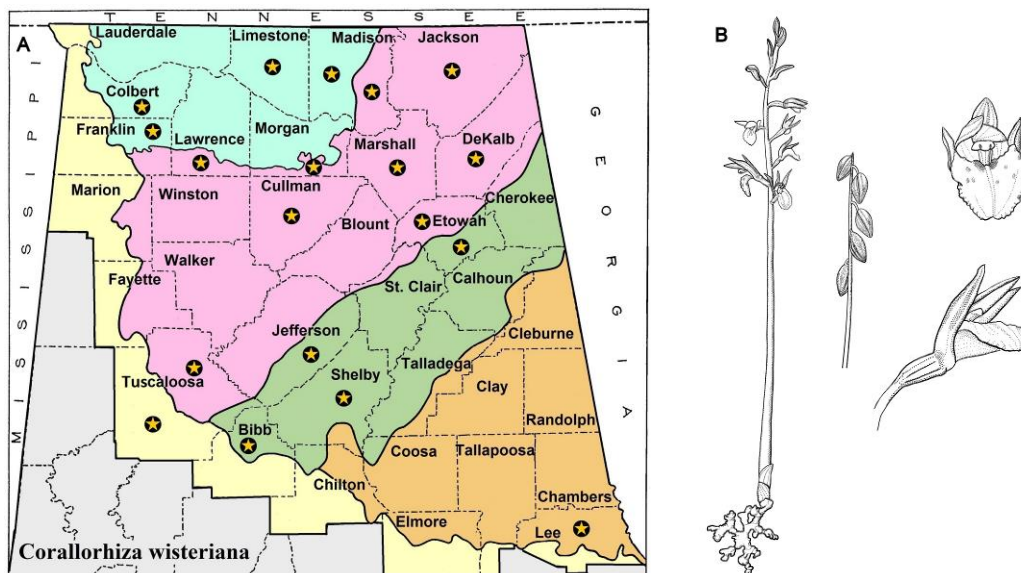


Figure 16. *Corallorrhiza wisteriana*. A. Distribution map. B. Drawing by Kathleen Marie Garness, 2022.

Spring Coralroot is an imperiled (S2) species in Alabama (ALNHP 2022). *Corallorhiza wisteriana* was discovered in 1828 by Charles Wister in woods along the Schuylkill River in Pennsylvania. It is morphologically similar to *C. odontorhiza*, but its flowers are nearly twice as large, and it blooms in spring rather than summer and fall, hence its common name. Coralroots lack true leaves and are mycoheterotrophic, receiving their nutrients chiefly from fungi. However, since there is no evidence that the fungi derive any benefits, the relationship can be labeled parasitic rather than mutualistic (Freudenstein & Barrett 2014).

5. CYPRIPEDIUM Linnaeus 1753

[Latin *Kypris*, Venus (Aphrodite), and *pedilon*, foot; alluding to the beautiful, slipper-like lip]

Slipper orchids offer no nectar or pollen reward; therefore, they must “deceive” insects into pollinating their flowers (Pemberton 2013). Bees (Apinae) are attracted by the color and sweet floral fragrance of *Cypripedium* (Stoutamire 1967). They enter the flower through the orifice (opening) in the pouch (with incurved margins), crawl beneath the sticky pollen mass, and exit through a small hole at the base (Davis 1986). Correll (1950) writes: “If the luckless insect fails to find the opening, or if it chanced to be too large for the opening, it is doomed to death in a most ornate death chamber.”

Like all orchids, *Cypripedium* relies on a mycorrhizal fungal association for seed germination and seedling growth (Shefferson et al. 2005). The soil fungi contribute nutrition to the plant, while the orchid provides carbohydrates through its roots to the fungi. This relationship is considered to be mutualistic. It takes approximately 10–16 years for lady-slippers to reach maturity and begin flowering (Shefferson et al. 2001).

- 1. Plant scapose (stem leafless); leaves 2, entirely basal; pouch-like lip pink (rarely white) with a longitudinal fissure..... **Cypripedium acaule**
- 1. Plant caulescent (stem with leaves); leaves (2) 3–7 scattered on stem; pouch-like lip yellow or white with a rounded orifice, not fissured.
 - 2. Lip white, 1.5–2.5 cm long; orifice margin acute at apex; plants of calcareous barrens and glades **Cypripedium candidum**
 - 2. Lip bright yellow, pale yellow, or creamy white, (2.0-) 2.2-6.3 cm long; orifice margin rounded-obtuse at apex; plant of various habitats.
 - 3. Lip medium to rich yellow, 2.0–5.4 cm long; pouch orifice 0.5–1.3 cm long; dorsal sepal 1.5–2.9 cm wide; plants typically 2–5 (-6) dm tall **Cypripedium parviflorum**
 - 3. Lip ivory, creamy white, or pale yellow, 4.5–6.5 cm long; pouch orifice 2.7–4.5 cm long; dorsal sepal 3.5–5.0 cm wide; plants typically 5–8 dm tall **Cypripedium kentuckiense**

1. Cypripedium acaule Aiton {stemless} — PINK LADY’S-SLIPPER; PINK MOCCASIN-FLOWER; TWO-LEAVED LADY’S-SLIPPER (Fig. 17). [*Fissipes acaulis* (Aiton) Small]

Perennial, terrestrial herb from rhizomes. Dry to mesic forests and woodlands, usually in acidic soils. Flowers late April–June, fruits July–September; rare throughout northern Alabama (Fig. 18). Native to Canada (Alberta to Newfoundland) and the eastern USA, ranging through the Great Lakes states to Maine, south to northeast Alabama and northern Georgia (Sheviak 2002a). Freeman et al. (1979) listed *Cypripedium acaule* as a threatened species in Alabama because, at that time, it was thought to occur in Jackson and DeKalb counties only.



Figure 17. *Cyripedium acaule*, Cleburne Co., Alabama, 3 Apr 2023. Photos: Melanie Taylor Spaulding.

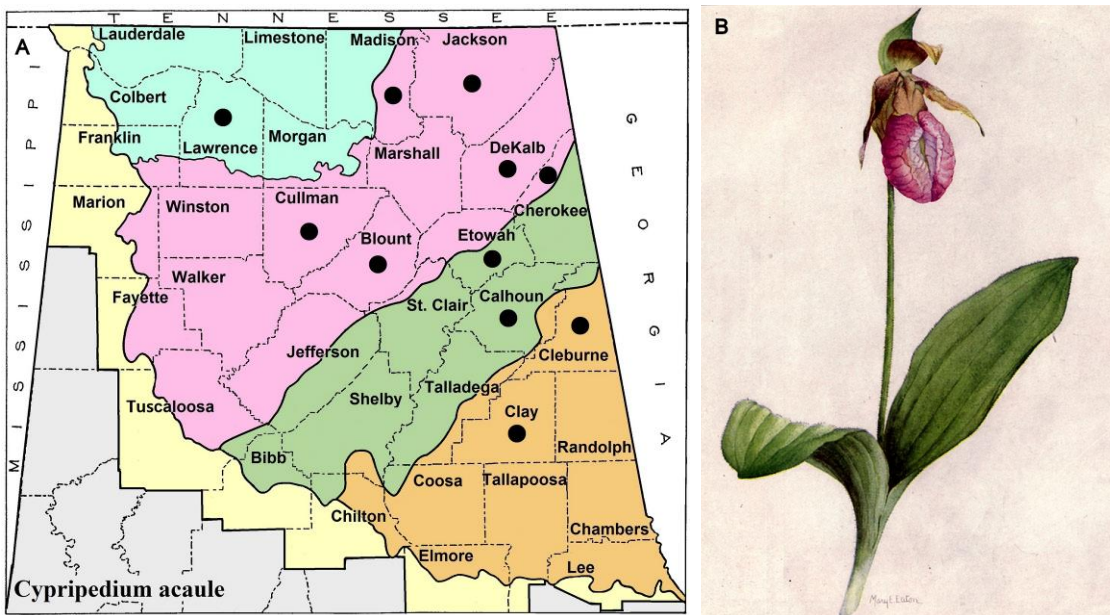


Figure 18. *Cyripedium acaule*. A. Distribution map. B. Illustration by Mary Emily Eaton, 1917.

Pink Lady's-Slipper often occurs in large populations, but only a few plants produce capsules (Correll 1950). Davis (1986) concluded that the low frequency of capsule formation is pollinator-limited. He states this "follows the same pattern of other deceptive, non-rewarding orchids, which set relatively few fruits, but offset this limitation by producing a large number of seeds."

Coffey (1993) notes that Native Americans called the plant ‘moccasin-flower’ in their native language, referring to the shoe-like flower. Cherokee Indians used the root of *Cypripedium acaule* medicinally for pain, worms, spasms, kidney trouble, and as a sedative (Moerman 1998). Herbalists called the plant “nerve-root” since a preparation made from the rhizome supposedly served as a stimulant or antispasmodic (Coffey 1993).

2. *Cypripedium candidum* Muhl. ex Willd. {white} — WHITE LADY’S-SLIPPER; SMALL WHITE LADY’S-SLIPPER (Fig. 19).



Figure 19. *Cypripedium candidum*, Dallas Co., Alabama, 5 Apr 2007. Photos: Eric Soehren.

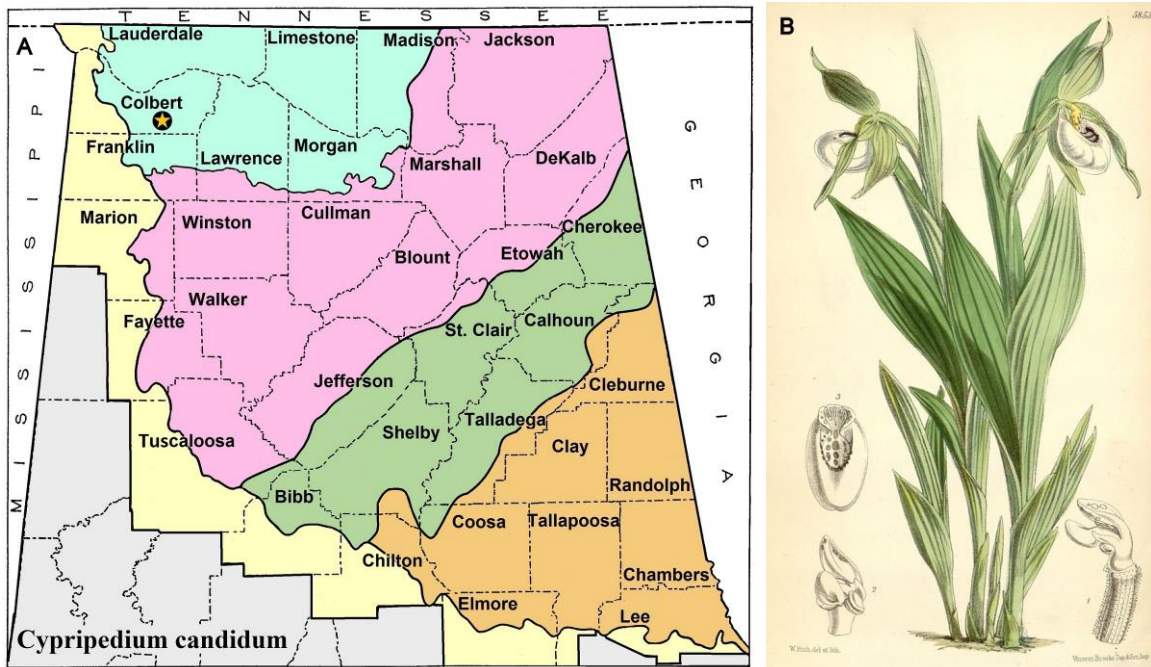


Figure 20. *Cypripedium candidum*. A. Distribution map. B. Illustration by Walter Hood Fitch, 1870.

Perennial, terrestrial herb from rhizomes. Moist calcareous barrens and chalk bluffs. Flowers April–May, fruits June–July; very rare in the Highland Rim (Moulton Valley) and the Black Prairie district of the Coastal Plain (Fig. 20). Native to the chiefly northern USA and adjacent Canada, from New York to Saskatchewan, south to Missouri and Virginia, disjunct in Alabama (Sheviak 2002a).

The common name, White Lady’s-Slipper, refers to its inflated white lip. It is a critically imperiled (S1) species in Alabama (ALNHP 2022). It was first reported for Alabama in the 1980s as an outlier station of populations in the midwestern USA (Bowles 1983). In northern Alabama, botanists discovered it growing in a limestone prairie barren (Webb et al. 1997). Brian Keener and Dan Spaulding visited the only known site in Colbert County in the early 2000s and found no individuals. The population in northwest Alabama has likely been extirpated due to intensive grazing by livestock.

The species is extant in two counties, Dallas and Lowndes, within the Black Belt of Alabama (Keener et al. 2022). Habitat destruction is the leading cause of its decline. Wake (2007) lists pedestrian trampling, over-grazing, and all-terrain vehicle use as additional degradation threats. He states *Cypripedium candidum* is not a shade-tolerant species and benefits from mowing and controlled burns.

3. *Cypripedium kentuckiense* C.F. Reed {of Kentucky} — SOUTHERN LADY’S-SLIPPER; KENTUCKY YELLOW LADY’S-SLIPPER (Fig. 21).



Figure 21. *Cypripedium kentuckiense*, Talladega Co., Alabama, 4 May 2008. Photos: Eric Soehren.

Perennial, terrestrial herb from rhizomes. Rich hardwood forests and mesic deciduous woods along small streams. Flowers April–May, fruits June–August; rare in the Piedmont and Coastal Plain (Fig. 22). Native to the southeastern USA, with scattered populations from Kentucky to eastern Oklahoma, south to Georgia and east Texas, and disjunct in eastern Virginia (Sheviak 2002a). *Cypripedium kentuckiense* is a critically imperiled (S1) species in Alabama (ALNHP 2022).

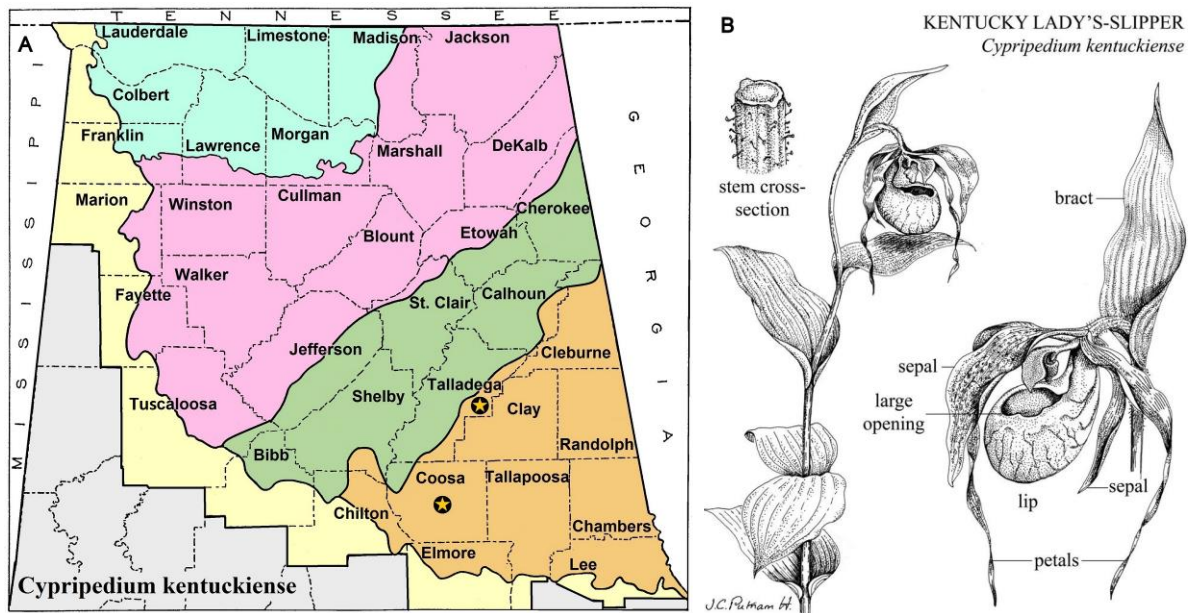


Figure 22. *Cypripedium kentuckiense*. A. Distribution map. B. Illustration by Jean C. P. Hancock, 2007.

Botanists have known of a large, pale-flowered form of the Yellow Lady's-Slipper for nearly a century in some southern states (Correll 1950). Clyde Reed (1981) recognized this entity as *Cypripedium kentuckiense* based on its large, pale flowers. The genetic research of Case et al. (1998) supported its distinctness as a species with a recent origin from *C. parviflorum*. Weldy et al. (1996) noted that “the dorsal sepal width and orifice length are two important characters that can be used to discriminate between *C. kentuckiense* and *C. parviflorum*.” Sheviak (2002a) observed that the shape of the orifice and lip are unique. He stated that the lip is not particularly slipper-shaped, having sides “terminating abruptly at the orifice without curving toward the horizontal.” Its “slipper” is more bucket-like and resembles a big, pouting lip (Fig. 22b). In comparison, *C. parviflorum* has a shallower, flatter labellum pouch resembling a ballet shoe. *Cypripedium kentuckiense* also tends to have proportionally shorter and broader leaves than *C. parviflorum* (pers. comm. Nicholas Wei 2023). Kentucky Lady's-Slipper is among the most sought-after native lady's-slippers in the southern USA. Gardeners frequently search for its availability because this orchid is relatively easy to cultivate.

4. *Cypripedium parviflorum* Salisb. {small-flowered} — YELLOW LADY'S-SLIPPER (Fig. 23). [*Cypripedium calceolus* L. var. *parviflorum* (Salisb.) Fernald; *Cypripedium calceolus* var. *pubescens* (Willd.) Correll; *Cypripedium hirsutum* Mill.; *Cypripedium pubescens* Willd.]

Perennial, terrestrial herb from rhizomes. Slopes and bottoms of rich, mesic hardwood forests. Flowers April–June, fruits June–August; rare throughout Alabama (Fig. 24). Native to Canada and the USA, ranging from Newfoundland to Alaska, south through the Rocky Mountains to the Colorado Plateaus, and in the eastern USA, south to Georgia and east Oklahoma (Sheviak 2002a). Freeman et al. (1979) listed this species as threatened in Alabama because it only occurred in four counties. While rare, botanists have made more discoveries within the state since then.



Figure 23. *Cyripedium parviflorum* var. *pubescens*, Madison Co., Alabama, 26 Apr 2014. Photos: Brian Finzel.

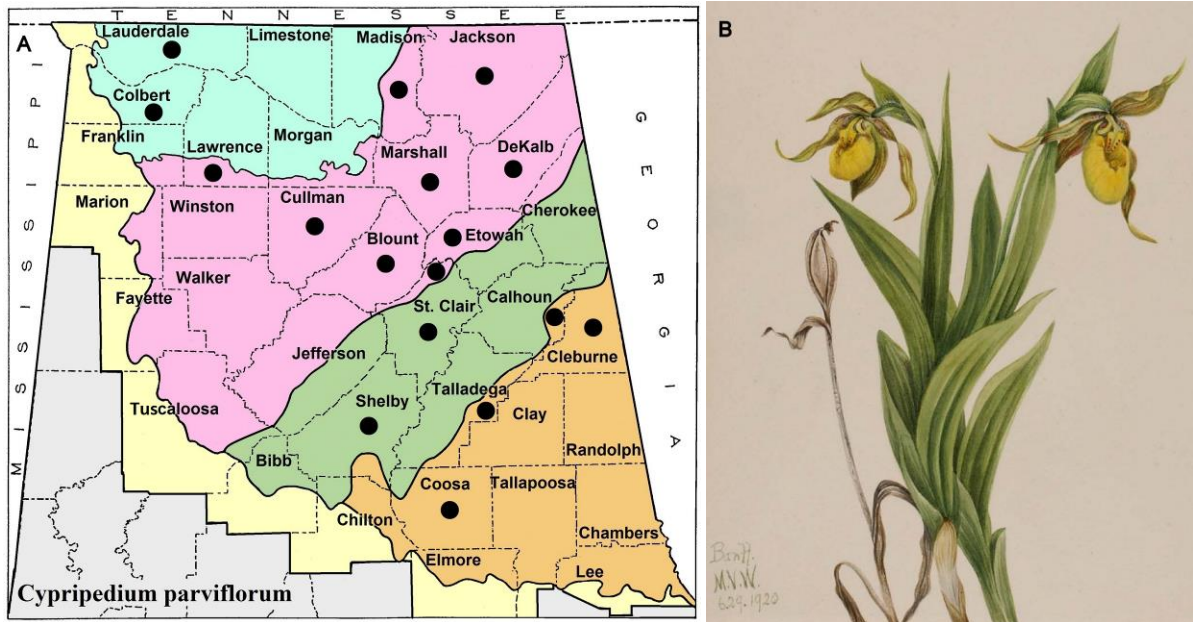


Figure 24. *Cyripedium parviflorum*. A. Distribution map. B. Watercolor by Mary Vaux Walcott, 1920.

British botanist Richard Salisbury in 1781, assigned *Cyripedium parviflorum* to the yellow American lady's-slipper (Wallace & Case 2000). Early North American botanical manuals treated this entity as distinct from the Eurasian *C. calceolus* (Chapman 1872, Britton 1901, Small 1933). However, Correll (1938) said, "I am led to the conclusion that *Cyripedium calceolus* L. is a polymorphic boreal species to which our North American yellow *Cyripediums* should be referred." He proposed the name *C. calceolus* var. *pubescens* to include all our yellow lady's-slippers (*Cyripedium parviflorum* and *C. pubescens* (= *C. hirsutum*)). Others followed suit after his paper

was published (Fernald 1950, Gleason & Cronquist 1963, Radford et al. 1968, Luer 1975). Some authors recognized three North American varieties of *C. calceolus* based chiefly on the size of the pouch-like lip. However, Atwood (1985), Sheviak (1993, 1994, 1995), and Cribb (1997) concluded that *C. parviflorum* is a distinct species and *C. calceolus* is restricted to Eurasia (Mergen 2006).

In *Flora of North America*, Sheviak (2002a) recognized three varieties of *C. parviflorum*, with two (var. *parviflorum* & var. *pubescens*) occurring in Alabama. However, he notes that the species “is extremely variable” and that “the southeastern var. *parviflorum* differs from var. *pubescens* primarily in flower size and color, and the two might be merely forms.” *Cypripedium parviflorum* var. *parviflorum* (Fig. 25a) usually has smaller flowers than *C. parviflorum* var. *pubescens*. Both taxa grow in similar upland habitats. Below is a key to the two varieties.

- 1. Flowers relatively small, pouch-like lip 2.2–3.4 cm long; sepals and lateral petals usually densely and minutely spotted with dark reddish brown or purple, thus often appearing uniformly dark (rarely coarsely spotted or blotched)..... *Cypripedium parviflorum* var. *parviflorum*
- 1. Flowers larger, pouch-like lip 3.0–5.8 cm long; sepals and lateral petals usually streaked, blotched, or striped with dark reddish brown or purple (occasionally unmarked)..... *Cypripedium parviflorum* var. *pubescens*

Cypripedium parviflorum is similar to another small-flowered variety, *C. parviflorum* var. *makasin* (Farw.) Sheviak (Fig. 25b), which is found further north and inhabits wetlands. It differs from var. *parviflorum* by having a slightly pubescent to glabrous sheathing bract and flowers with a strong sweet scent. Sheviak (2002a) notes:

“Most works dealing with *Cypripedium parviflorum* have treated the primarily boreal var. *makasin* as var. *parviflorum*, either including all small-lipped plants within var. *parviflorum*, or in some cases restricting the name to the northern variety and excluding the southeastern plants described by Salisbury as *C. parviflorum*. Fernald’s original publication on *C. calceolus* var. *parviflorum* actually treated var. *makasin*, citing a description of that variety and clearly discussing the northern plant. Additionally, although geographically accommodating Salisbury’s plant, Fernald excluded most of the range of the southeastern var. *parviflorum*, thereby referring most plants of var. *parviflorum* to var. *pubescens*, and further restricted var. *pubescens* to the east, thereby assigning most plants of that variety to his northern var. *parviflorum*, i.e., var. *makasin*.”

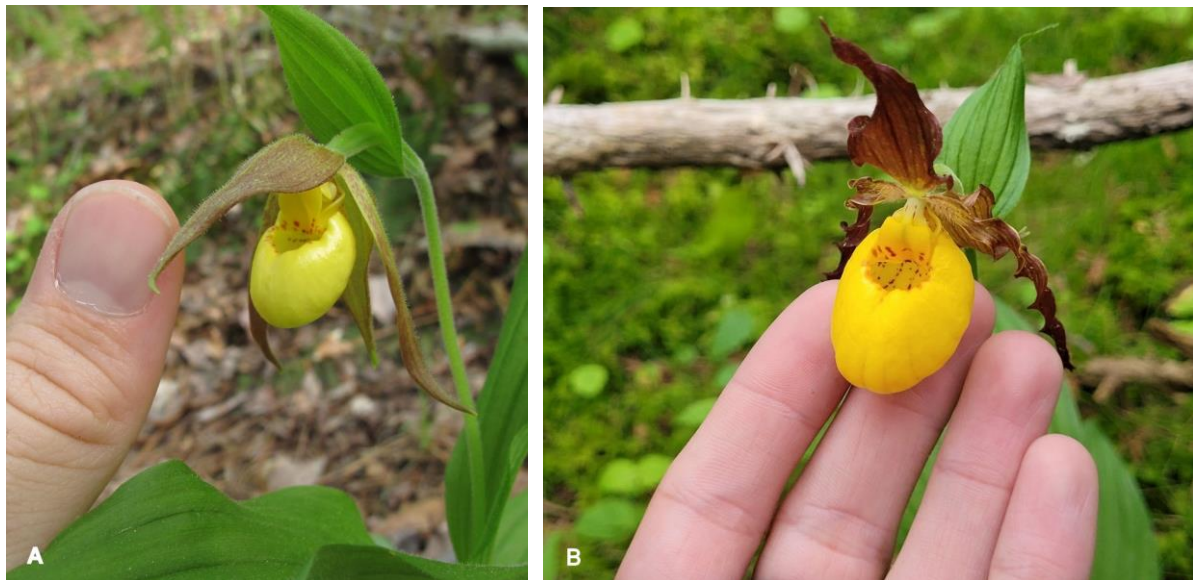


Figure 25. A. *Cypripedium parviflorum* var. *parviflorum*, Coosa Co. Alabama, 24 Apr 2014. Photo: Eric Soehren. B. *Cypripedium parviflorum* var. *makasin*, Piscataquis Co. Maine, 18 June 2022. Photo: Adriel Diver.

Cherokee Indians made a drug from the rootstalk of *Cypripedium parviflorum* to ease pain and rid the body of worms (Moerman 1998). Native Americans also made a boiled extract to calm the nerves. Historically, doctors referred to the plant as “American valerian” because of its sedative properties, prescribing it for irritability, delirium, hysteria, epilepsy, and neuralgia (Dwyer et al. 1986).

6. GALEARIS Rafinesque 1833

[Latin *galea*, helmet; for the shape of flowers]

1. *Galearis spectabilis* (L.) Raf. {showy} — SHOWY ORCHIS; PURPLE HOODED ORCHID (Fig. 26).
[*Galeorchis spectabilis* (L.) Rydb.; *Orchis spectabilis* L.]



Figure 26. *Galearis spectabilis*, Madison Co., Alabama, 9 Apr 2016. Photos: Brian Finzel.

Perennial, terrestrial herb. Rich woods and mesic hardwood forests, often in calcareous soils. Flowers late March–May, fruits June–July; rare throughout northern Alabama (Fig. 27). It is native to the eastern USA and Canada, from New Brunswick to Minnesota, south to eastern Oklahoma and Georgia (Sheviak & Catling 2002b).

The showy, bicolored flowers of this species suggest its common name, Showy Orchis. Long-tongued bumblebees (*Bombus*) are its chief pollinators. They use the flower’s lip as a landing pad and probe for a nectar reward found at the base of the spur (Dieringer 1982). The common name, “Preacher-in-the-Pulpit,” alludes to the pollinia under the purple hood, which fancifully resembles clergymen canopied under an old-fashioned sounding board (Baldwin 1884). Freeman et al. (1979) listed *Galearis spectabilis* as a species of special concern.

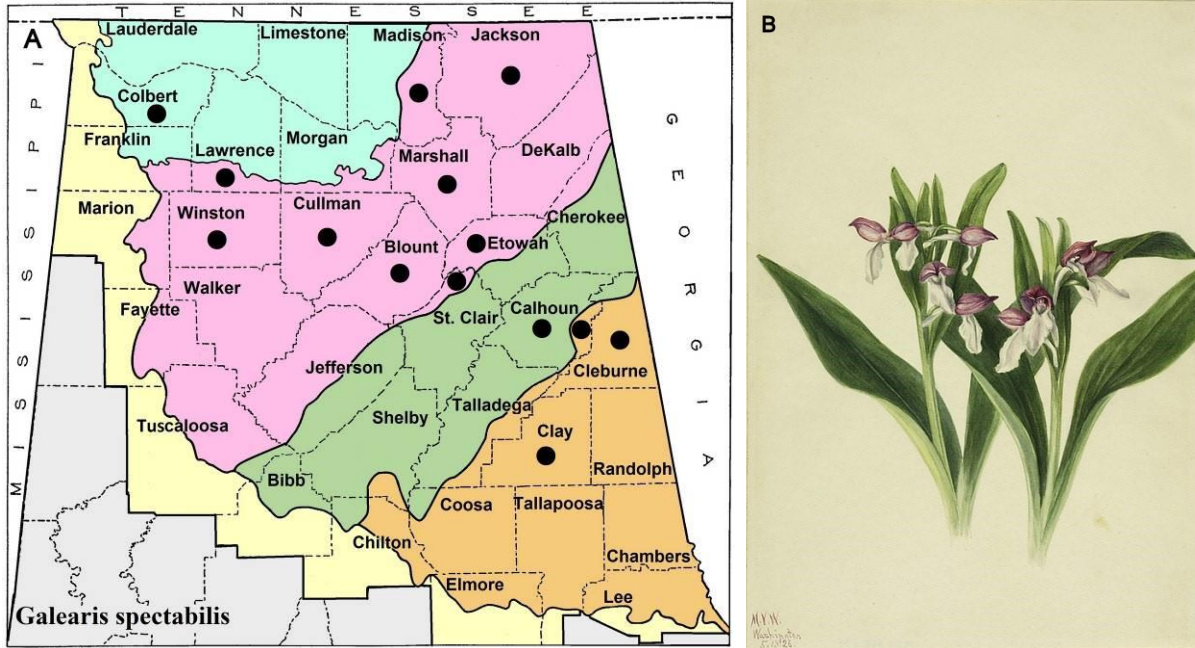


Figure 27. *Galearis spectabilis*. A. Distribution map. B. Watercolor by Mary Vaux Walcott, 1926.

7. GOODYERA R. Brown 1813

[Named for John Goodyer (1592–1664), an English botanist]

1. *Goodyera pubescens* (Willd.) R. Br. {pubescent; entire plant} — DOWNY RATTLESNAKE-PLANTAIN (Fig. 28). [*Peramium pubescens* (Willd.) MacMill.]

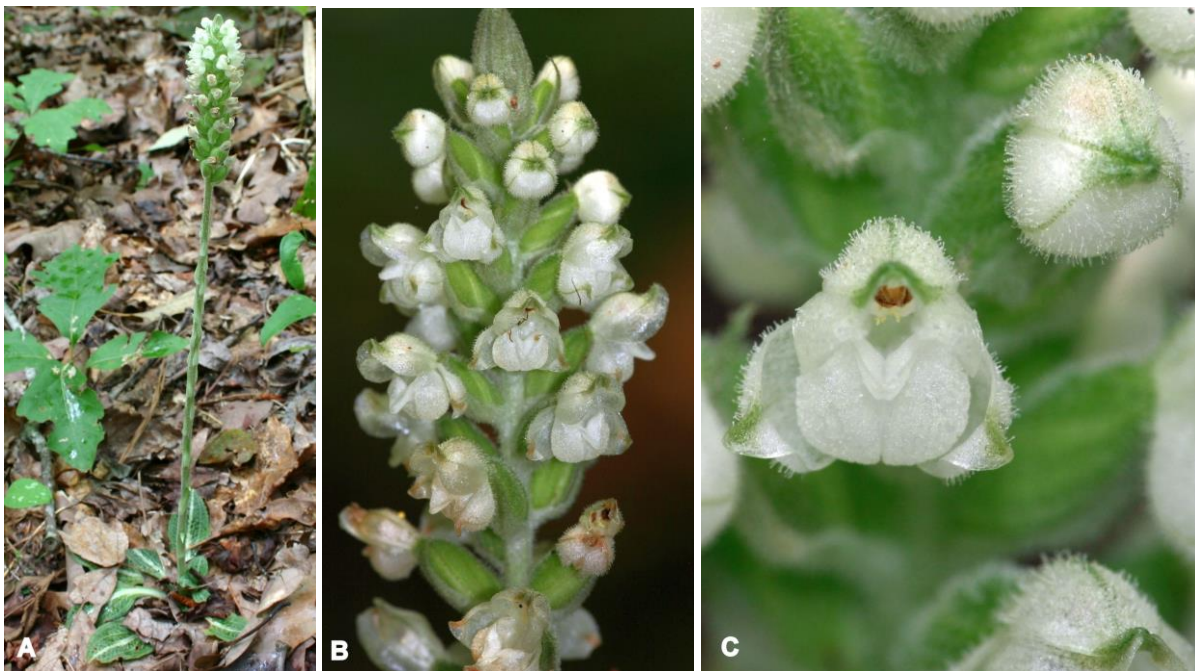


Figure 28. *Goodyera pubescens*, Talladega National Forest. A. Cleburne Co. Alabama, 12 Aug 2006. B–C. Talladega Co. Alabama, 4 Aug 2007. Photos: Eric Soehren.

Perennial, terrestrial herb from creeping rhizomes. Hardwood forests, mixed woods, and pine woodlands. Flowers June–August, fruits August–November; uncommon throughout northern Alabama; rare in the upper Coastal Plain (Fig. 29). Native to the eastern USA and adjacent Canada, from Nova Scotia to Minnesota, south to eastern Oklahoma and Georgia, disjunct in the Florida Panhandle (Kallunki 2002).

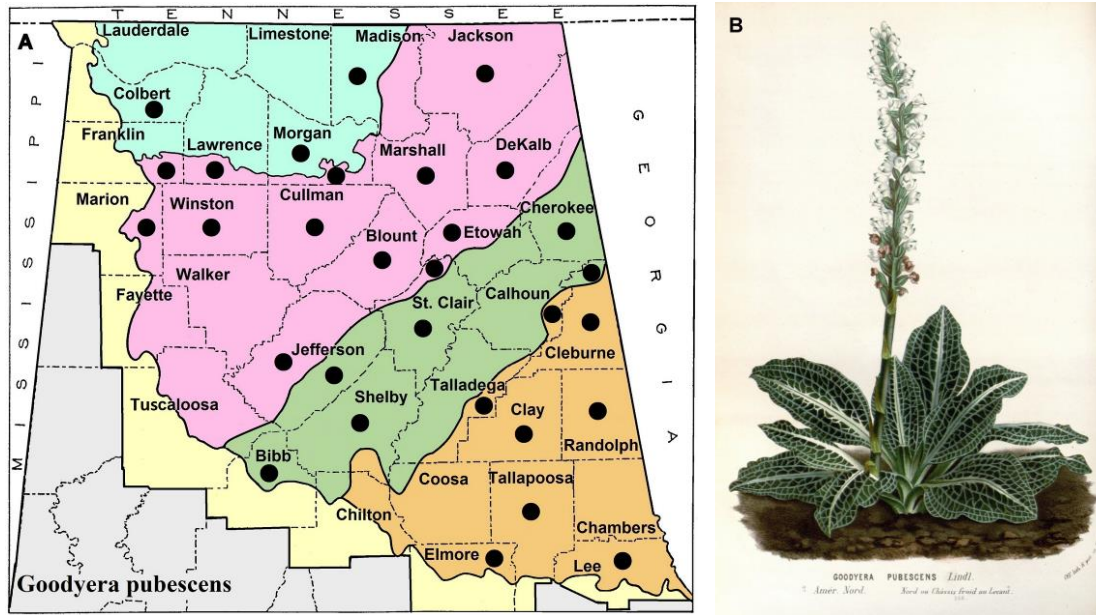


Figure 29. *Goodyera pubescens*. A. Distribution map. B. Illustration by Louis van Houtte, 1845.



Figure 30. *Goodyera pubescens*. A. Leaves, Cleburne Co., Alabama, 7 July 2019. B. Old fruiting capsules, Cleburne Co., Alabama, 4 Apr 2023. Photos: Melanie Taylor Spaulding.

The common name, Downy Rattlesnake-Plantain, alludes to its plantain-like leaves with markings resembling a snake's skin (Fig. 30a) and its densely hairy flower scape (Coffey 1993). Its fruiting stalks often persist through winter (Fig. 30b). American settlers believed the leaf's mottled

pattern suggested a cure for snake bites. Baldwin (1884) writes that “the Indians are so convinced of its power as an antidote that they allow a snake to drive its fangs into them, then chew the leaves and apply them to the wound.” Pursh (1814) also noted that the plant “has a widespread reputation as an infallible cure for hydrophobia, and a New England divine [preacher] tells us that the leaves of Rattlesnake Plantain were used by the country folk to make a decoction to cure skin diseases.”

8. HABENARIA Willdenow 1805

[Latin *habena*, rein or strap; referring to the spurs of flowers]

1. *Habenaria repens* Nutt. {creeping; alluding to decumbent lower stems rooting at the nodes} — WATER-SPIDER ORCHID; FLOATING ORCHID; WATER-SPIDER FALSE REIN ORCHID (Fig. 31).



Figure 31. *Habenaria repens*, lake margin, Shelby Co., Alabama, 12 Nov 2021. Photo: Jordan Broadhead.

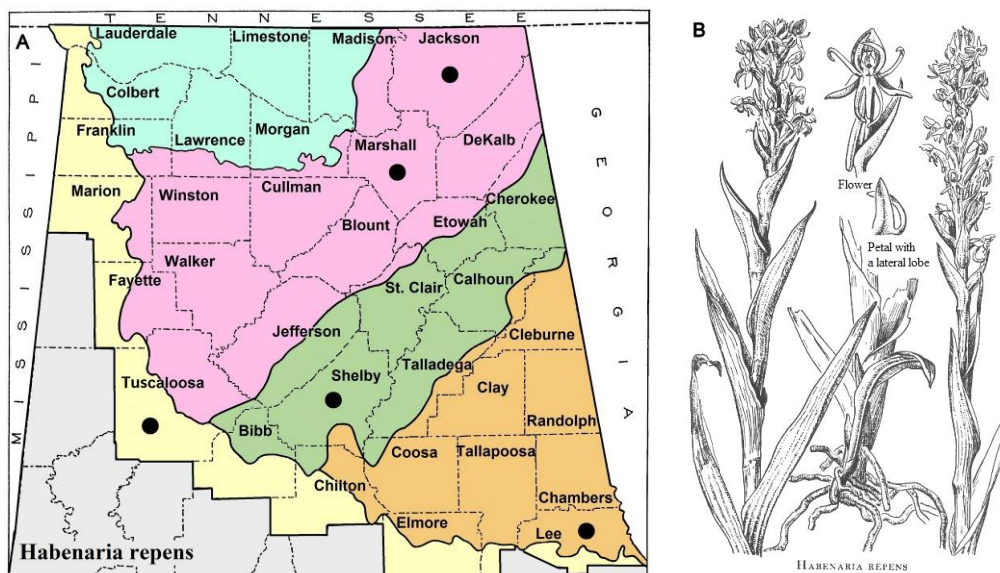


Figure 32. *Habenaria repens*. A. Distribution map. B. Drawing by Blanche A. Ames, 1947.

Perennial, terrestrial herb with spherical tuberoids. Sloughs, marshes, and swamps. Flowers & fruits July–November; very rare in the Cumberland Plateau (Sequatchie Valley district), Ridge & Valley, and Piedmont; uncommon in the Coastal Plain (Fig. 32). Native to the southeastern USA, chiefly in the Coastal Plain and south to the West Indies, Mexico, Central America, and northern South America (Sheviak 2002b).

The multiple vernacular names of *Habenaria repens* refer to its aquatic to semi-aquatic habit. A second species (Fig. 33), *H. quinqueseta* (Michx.) Eaton [Long-Horn False Rein Orchid] also occurs in Alabama and is native to the Southeastern Coastal Plain. It ranges southward through tropical America (Sheviak 2002b). This orchid differs from *H. repens* by its white flowers with long spurs (> 4 cm) and terrestrial habitat (Weakley et al. 2022). Eugene A. Smith collected a specimen in 1878 from Tuscaloosa County (Keener et al. 2022). However, the label does not include locality information (Fig. 33c). It is not included in this treatment because we believe it was probably collected in the Fall Line Hills district of central Alabama.



Figure 33. *Habenaria quinqueseta*. A. Photo, Eric Soehren, Baldwin Co., Alabama, 15 Aug 2007. B. Drawing by Blanche A. Ames, 1904. C. UNA herbarium specimen, *Smith s.n.*, Tuscaloosa Co., Alabama, 2 Aug 1878.

Johnson et al. (1999) isolated a compound (habenariol) from *Habenaria repens* with antioxidant activity. Their research confirmed that this chemical has the “ability to inhibit formation of lipid hydroperoxides” of human low-density lipoprotein (LDL). The plant uses habenariol as a chemical defense to deter aquatic animals, such as crayfish (*Procambarus*), from eating it (Wilson et al. 1999).

9. HEXALECTRIS Rafinesque 1825

[Greek *hex*, six, and *alectryon*, rooster; fleshy ridges on the lip supposedly resemble a cock’s comb]

1. *Hexalectris spicata* (Walter) Barnhart {spiked; alluding to the inflorescence} — CRESTED-CORALROOT; COCK’S-COMB; BRUNETTA (Fig. 34). [*Bletia spicata* (Walter) Sosa & M.W. Chase; *Hexalectris aphylla* (Nutt.) Raf.]



Figure 34. *Hexalectris spicata*, Montgomery Co., Alabama, 3 July 2021. Photos: Eric Soehren.

Perennial, mycoheterotrophic herb from rhizomes. Well-drained hardwood, pine, and mixed forests. Flowers late July–August, fruits late August–October; rare throughout Alabama (Fig. 35). It is native to northern Mexico and the southern USA from Maryland to eastern Oklahoma, south to Arizona, Texas, and Florida (Goldman et al. 2002b).

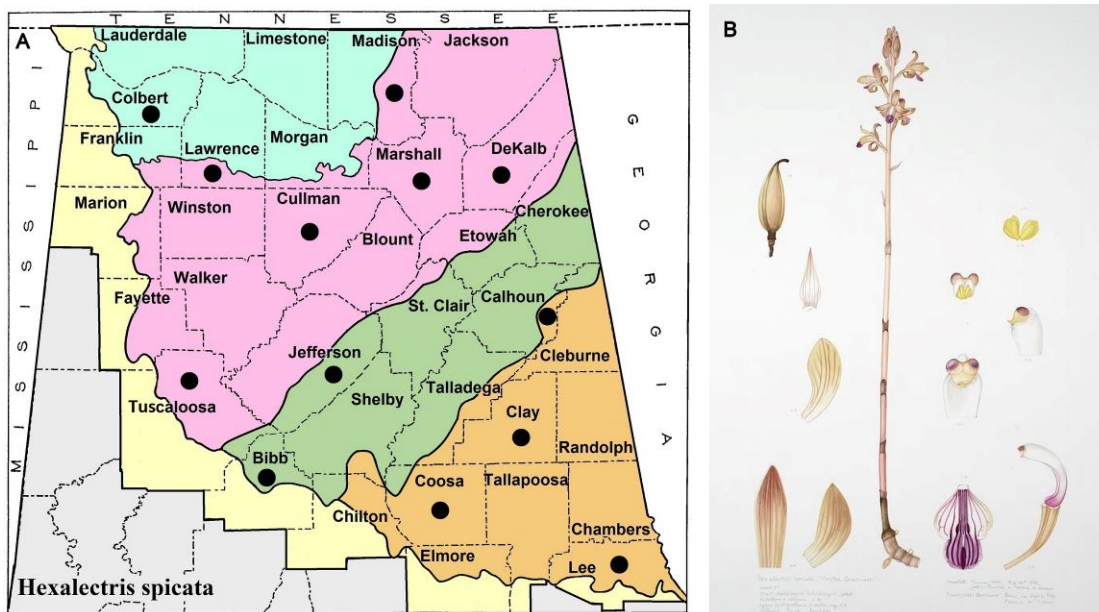


Figure 35. *Hexalectris spicata*. A. Distribution map. B. Watercolor by Elsie Margaret Stones, 1982 (Native Flora of Louisiana: Watercolor Drawings, Louisiana Digital Library, Baton Rouge, LA).

The common name “Crested-Coralroot” alludes to its ridged lip (Fig. 37) and rhizome resembling a branching tropical coral. The crested lip gave rise to the vernacular name “cock’s-comb.” The designation “Brunetta” perhaps refers to the brown-streaked sepals and lateral petals.



Figure 37. *Hexalectris spicata*, Madison Co., Alabama, 19 July 2017. Photos: Brian Finzel.

Crested-Coralroot is achlorophyllous, lacking chlorophyll in its leaves, roots, and stems. Most of its life cycle is spent entirely underground except when flowering. Hill (2007a) writes: “Because it has no chlorophyll, it has no need to appear above ground except for reproduction, and it does not use sunlight to make its food like most other plants. Instead, the body of the plant, a rhizome, lives in association with fungi, and the fungal hyphae function as root hairs to absorb water and nutrients, plus the fungus breaks down plant debris into chemical nutrients that the orchid can use for its own growth.” Catling (2004) suggests that the members of the genus *Hexalectris* are valuable bioindicators of sensitive habitats.

Based on their phylogenetic analyses, Sosa & Chase (2020) concluded that *Hexalectris* is embedded within the genus *Bletia*. However, Weakley et al. (2022) state, “the published evidence does not provide clear and convincing support that *Hexalectris* and *Bletia* are not each monophyletic and morphologically well-supported genera.”

10. ISOTRIA Rafinesque 1808

[Greek *iso*, equal, and *tri*, three; referring to the number of sepals, which are the same size and shape]

1. *Isotria verticillata* (Muhl. ex Willd.) Raf. {verticillate; referring to the whorled leaves} — LARGE WHORLED POGONIA; PURPLE FIVE-LEAF ORCHID (Fig. 38). [*Pogonia verticillata* (Muhl. ex Willd.) Nutt.]

Perennial, terrestrial herb with cord-like rhizomes. Dry or mesic upland forests, acidic seeps, and bogs. Flowers March–May, fruits April–October; rare throughout northern Alabama (Fig. 39). Native to southern Ontario and the eastern USA, from Michigan to Maine, south to east Texas and north Florida.

Large Whorled Pogonia is an imperiled (S2) species in Alabama (ALNHP 2022). Horizontal root-like rhizomes connect individual plants, often forming extensive colonies (House 1906, Mehrhoff & Homoya 2002). The survival of this orchid depends largely upon protecting its habitat rather than just specific individuals (Hill 2007c). Solitary bees (Andrenidae) are the common pollinator of its fragrant flowers (Mehrhoff 1983).

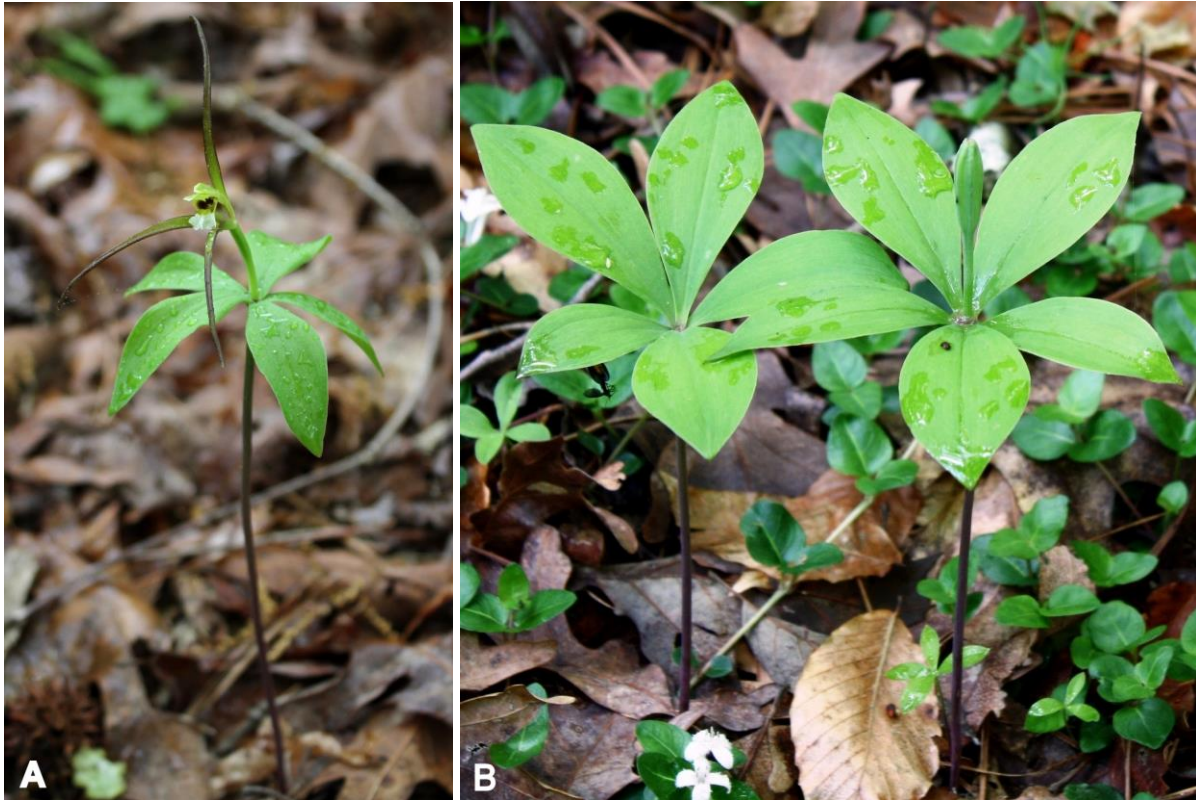


Figure 38. *Isotria verticillata*. A. DeKalb Co., Alabama, 2 May 2013. Photo: Wayne Barger. B. Fruiting, Lawrence Co., Alabama, 27 Apr 2012. Photo: Kevin England.

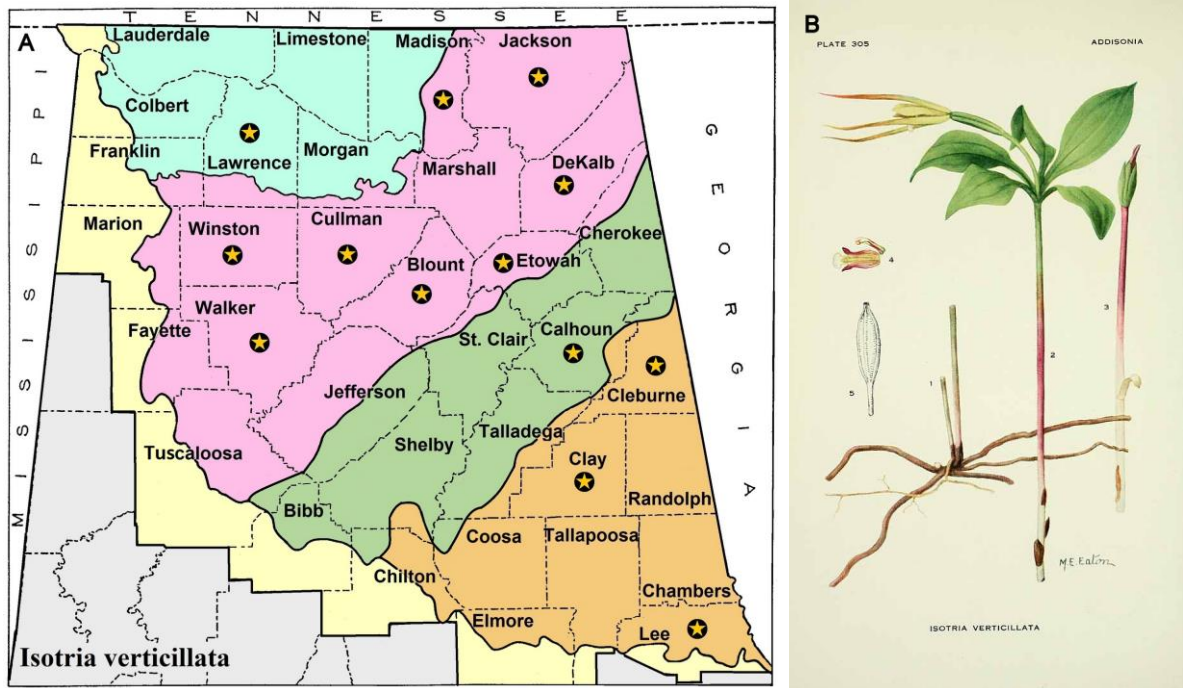


Figure 39. *Isotria verticillata*. A. Distribution map. B. Illustration by Mary Emily Eaton, 1924.



Figure 40. *Isotria verticillata*. A. Typical single-flowered plant, Franklin Co., Tennessee, 26 Apr 2020. Photo: Brian Finzel. B. Rare two-flowered plant, DeKalb Co., Alabama, 24 Apr 2013. Photo: Mary Shew.

Large Whorled Pogonia appears to have five sessile leaves terminating the stem, but they are, in fact, floral bracts. The plant's true leaves are scale-like structures near the base (Hill 2007c). Its flowers are typically solitary (Fig. 40a); rarely, two terminate the stem (Fig. 40b). Sterile *Isotria* individuals are sometimes confused with *Medeola virginiana* (Indian Cucumber-root) because both have whorls of five leaves. However, *Isotria verticillata* has a purplish fleshy stem lacking hairs, whereas *Medeola* has a wiry green stem with matted woolly hairs (House 1906, Weakley et al. 2022).

11. LIPARIS L.C. Richard 1817

[Greek *liparos*, fat or greasy; referring to the shiny, thickened leaves of this genus]

1. Lip pale-purple, mauve, or brownish-purple (rarely green), 8–12 mm long, translucent; pedicels 11–18 mm long, equal to or longer than mature capsule; column 3–4 mm long; plant of mesic to moist forests, woodlands..... **Liparis liliifolia**
1. Lip yellowish-green, yellowish-white, or green, 4–5.5 mm long, opaque; pedicels 3–7 mm long, shorter than mature capsule; column 2–3 mm long; plant of bogs, wet meadows, thicket swamps, and seepage habitats..... **Liparis loeselii**

1. Liparis liliifolia (L.) Rich. ex Lindl. {lily-leaved} — LARGE TWAYBLADE; MAUVE SLEEKWORD; RUSSET-WITCH; BROWN WIDE-LIP ORCHID (Fig. 41). [*Leptorchis liliifolia* (L.) Kuntze]

Perennial, terrestrial herb with pseudobulbs. Rich woods and mesic forests. Flowers May–June, fruits June–October; very rare in the Moulton Valley district of the Highland Rim district and the Jackson County Mountain district of the Cumberland Plateau (Fig. 42). Native to the eastern USA and adjacent Canada, from Vermont and Quebec to Ontario and Minnesota, south to eastern Oklahoma and northern Georgia (Magrath 2002).



Figure 41. *Liparis liliifolia*, Jackson Co., Alabama, 17 May 2007. Photos: Eric Soehren.

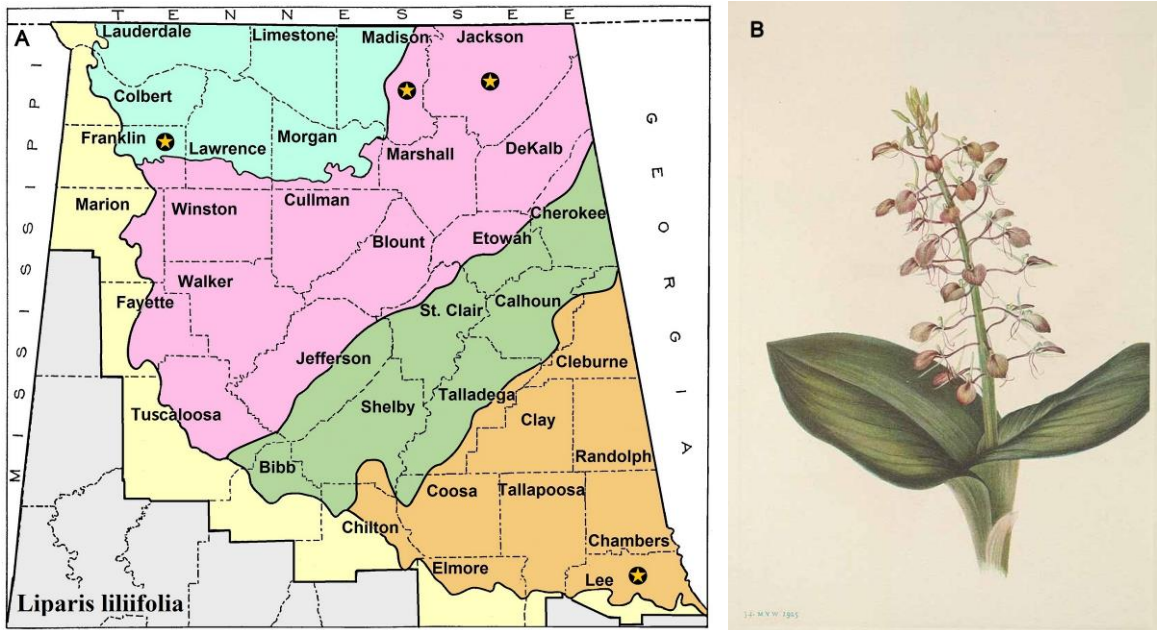


Figure 42. *Liparis liliifolia*. A. Distribution map. B. Illustration by Mary Vaux Walcott, 1925.

Large Twayblade is a critically imperiled (S1) species in Alabama (ALNHP 2022). Potential threats include habitat destruction, competition from invasive species, deer browsing, and over-collecting by humans (Mattrick 2004). *Liparis liliifolia* is not self-compatible but relies on cross-pollination for seed production (Whigham & O’Neill 1991). Flesh flies (Sarcophagidae) are its

primary pollinators (Christensen 1994). Although the flowers are odorless, their mauve-purple coloration (Fig. 43) may resemble rotting flesh (Whigham & O'Neill 1991). Individual plants have a single pair of basal leaves, alluding to the common name “Twayblade” from Old English, meaning two leaves (Shosteck 1974). A similar species, *L. loeselii*, has smaller yellowish flowers and proportionally slender leaves. It also usually has more fruit than *L. liliifolia* because its flowers are self-pollinated.



Figure 43. *Liparis liliifolia* flowers, Wilson Co., Tennessee, 6 June 2015. Photos: Brian Finzel.

2. *Liparis loeselii* (L.) Rich. {for Johann Loesel, 1607–1655, a German botanist} — FEN ORCHID; LOESEL’S TWAYBLADE; BOG TWAYBLADE, YELLOW WIDE-LIP ORCHID (Fig. 44). [*Leptorchis loeselii* (L.) MacMill.]



Figure 44. *Liparis loeselii*, St. Lawrence Co., New York, 15 June 2021. Photos: Steven Daniel.

Perennial, terrestrial herb with pseudobulbs. Bogs, wet meadows, and seeps. Flowers May–July, fruits June–October; historical in the Piedmont of Alabama (Fig. 45). Native to Central Europe, Canada, and the USA, chiefly from Nova Scotia to Saskatchewan, south to Missouri, and through the Appalachian Mountains to northern Georgia, with scattered populations along the periphery of its range in North America (Magrath 2002).

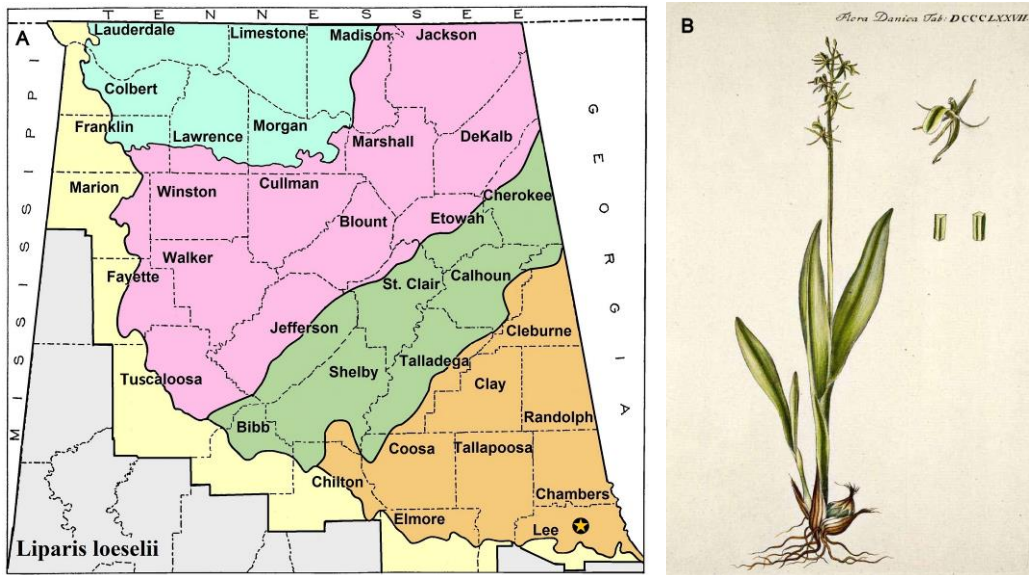


Figure 45. *Liparis loeselii*. A. Distribution map. B. Illustration by Johann Christoph Bayer (in *Flora Danica* vol. 5, 1777–1782).

The greenish-yellow lip of the Fen Orchid forms the widest perianth part (Fig. 46a). The flowers are self-pollinated (autogamous), with raindrops assisting in the process by striking the anther cap, pushing the pollen-masses onto the stigmatic surface (Catling 1980). Luer (1975) states, “The little flowers develop and fade quickly and set their capsules quite readily (Fig. 46b).” Plants produce pseudobulbs (Fig. 45b), which are storage organs that produce new plants (Carroll et al. 1984). Luer (1975) notes, “Last year’s pseudobulb usually persists beside the new one or two, which are well concealed by the leaf bases.” Cherokee Indians made an infusion from the “roots” to treat urinary issues (Moerman 1998).



Figure 46. *Liparis loeselii*. A. Rutland Co., Vermont, 26 June 2017. Photo: Susan Elliott. B. St. Lawrence Co., New York, 15 July 2015. Photo: Steven Daniel. C. NY herbarium specimen, Earle & Baker s.n., Lee Co., Alabama, 8 May 1897.

In 1897, Franklin Earle and Charles Baker collected a specimen near Auburn (Lee County). They initially determined it as *Liparis liliifolia*. Donovan Correll examined their collection in 1939 and annotated it to *L. loeselii* (Fig. 46c). Correll (1950) stated, “It is noteworthy that this typically northern plant extends along the Allegheny Mountains to North Carolina, with a disjunct station on the Piedmont Plateau in Alabama (Lee County).” Luer (1975) writes that *L. loeselii* “is the northern counterpart of *Liparis liliifolia* of the South, becoming more common where the latter disappears.”

The Alabama Natural Heritage Program (ALNHP 2022) lists *Liparis loeselii* as a critically imperiled (S1) species in the state. However, it should probably be listed as extirpated since no occurrences have been documented for over 100 years. Fen Orchids are declining in numbers throughout their range due to the expansion of urban areas and the draining of their wetland habitat (Pillon et al. 2007).

12. MALAXIS Solander ex Swartz 1788

[Greek *malaxis*, softening; alluding to the soft texture of leaves]

1. *Malaxis unifolia* Michx. {one-leaved; referring to its typical solitary leaf} — GREEN ADDER’S-MOUTH ORCHID (Fig. 47). [*Achroanthes unifolia* (Michx.) Raf.; *Microstylis ophioglossoides* (Muhl. ex Willd.) Nutt. ex Eaton; *Microstylis unifolia* (Michx.) Britton, Stearns & Poggenb.]



Figure 47. *Malaxis unifolia*. A. Etowah Co., Alabama, 14 May 2006. Photo: Larry Brasher. B. Lawrence Co., Alabama, 27 Apr 2012. Photo: Kevin England. C. Randolph Co. Alabama, 28 Jun 2020. Photo: Dan Spaulding.

Perennial, terrestrial herb from a bulbous corm. Moist forests, alluvial woods, seeps, and bogs. Flowers late April–June, fruits June–October; uncommon throughout Alabama (Fig. 48). Native to eastern Canada and the USA, south to the West Indies, Mexico, and Central America (Catling & Magrath 2002).

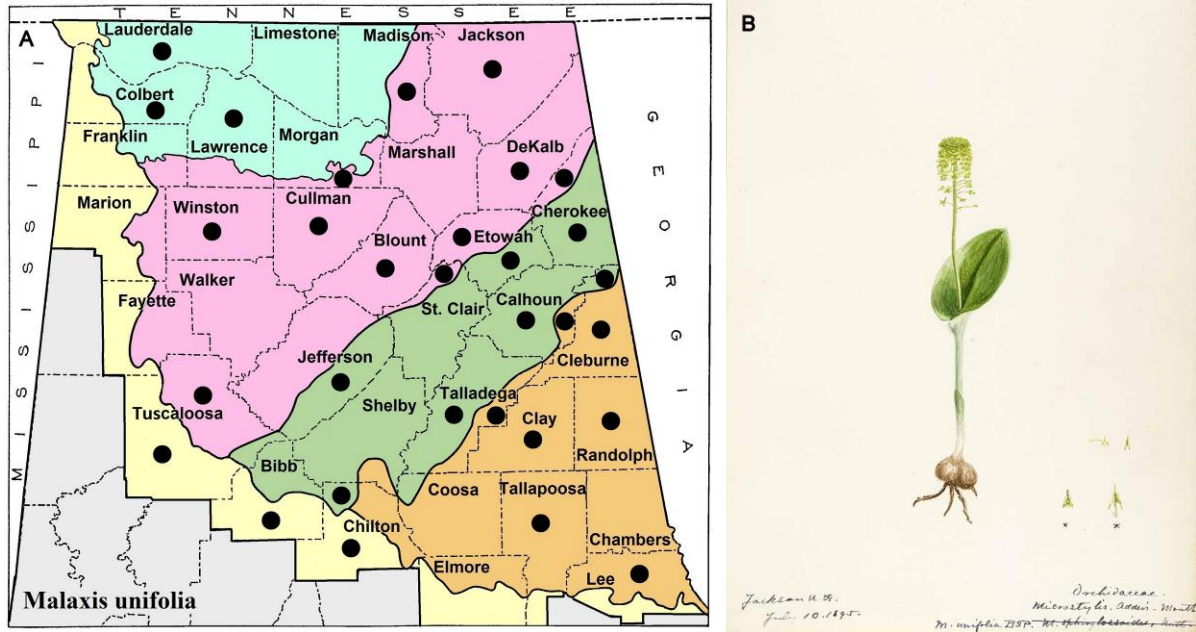


Figure 48. *Malaxis unifolia*. A. Distribution map. B. Watercolor by Helen Sharp, 1895.

The common name likely refers to its green flowers and leaves, which resemble those of adder's-tongue ferns (*Ophioglossum*). However, Luer (1975) suggests: "In the flower some fancy they see a minute, bright green viper's head, the bifid lip resembling the bared fangs of the tiny snake (Fig. 49)." Small, winged insects, such as fungus gnats (Mycetophilidae), pollinate the minute flowers of *Malaxis unifolia* (Anderson 2006). Native Americans made a compound from the "roots" and used it as a diuretic (Moerman 1998).

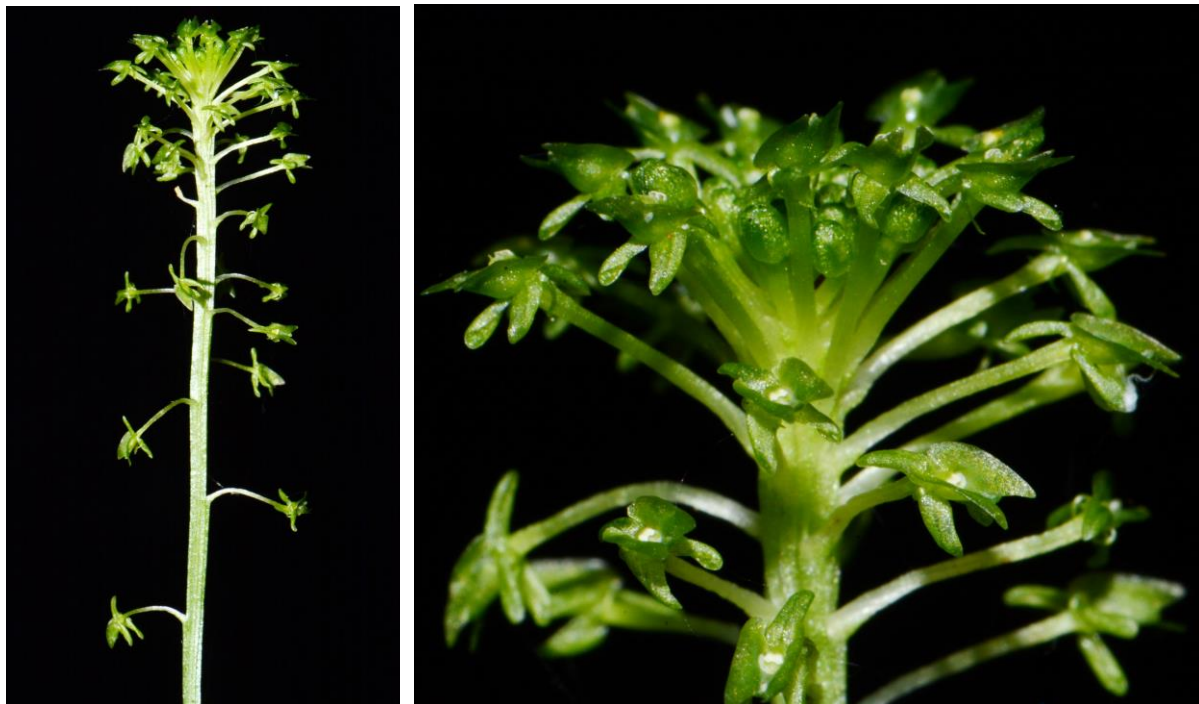


Figure 49. *Malaxis unifolia* inflorescence, Madison Co., Alabama, 3 June 2015. Photos: Brian Finzel.

13. NEOTTIA Guettard 1754

[Greek *neottia*, nest; alluding to tangled mass of roots of some species, which resemble a bird's nest]

1. *Neottia bifolia* (Raf.) Baumbach {two-leaved} — SOUTHERN TWAYBLADE (Fig. 50).
 [*Bifolium australe* (Lindl.) Nieuwl.; *Listera australis* Lindl.; *Ophrys australis* (Lindl.) House]



Figure 50. *Neottia bifolia*, rich woods, Etowah Co., Alabama, 21 Mar 2020. Photos: Brian Finzel.

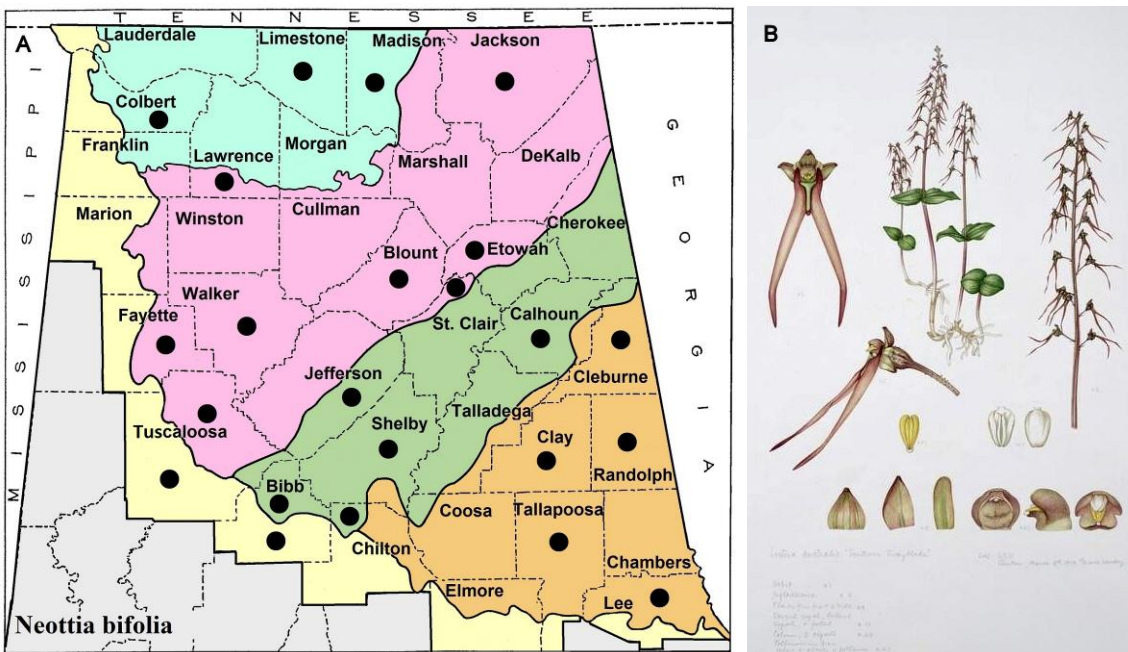


Figure 51. *Neottia bifolia*. A. Distribution map. B. Watercolor by Elsie Margaret Stones, 1979 (Native Flora of Louisiana: Watercolor Drawings, Louisiana Digital Library, Baton Rouge, LA).

Perennial, terrestrial herb. Floodplain forests, rich woods, moist woodlands, swamp margins, and seeps. Flowers late January–April, fruits March–June; rare in northern Alabama; uncommon in the Coastal Plain (Fig. 51). Native to the southeastern USA from North Carolina to eastern Texas and distributed northward up the Atlantic coast through New York and Vermont into adjacent Canada (Magrath & Coleman 2002).

The Alabama Natural Heritage Program (ALNHP 2003) previously listed *Neottia bifolia* as imperiled (S2); however, they no longer track this species because of its many occurrences. This delicate little plant is inconspicuous and often overlooked in the field. Historically, most botanists treated Southern Twayblade as *Listera australis* (Chapman 1872, Britton 1901, Correll 1950, Fernald 1950, Radford et al. 1968, Luer 1975, Magrath & Coleman 2002). John K. Small (1933) was an outlier, merging it into the Linnaean genus *Ophrys*. Recent research includes *Listera* in the genus *Neottia* (Pridgeon et al. 2005, Chase et al. 2015). Weakley et al. (2022) state: “Our species, all autotrophs with a pair of green leaves on the stem, have been traditionally treated in the genus *Listera*, but it appears to be phylogenetically embedded in the fully mycotrophic *Neottia*.” Linnaeus described *Neottia* in 1753, and it has priority over Robert Brown’s *Listera*, which he designated in 1813.

Tiny flying insects, such as fungus gnats (Mycetophilidae), are attracted to the purplish, fetid-smelling flowers and are rewarded with a small amount of nectar (Hoy 2003). Southern Twayblade has a unique mechanism aiding in pollination (Ramsey 1950). A pollinator activates a trigger by touching pressure-sensitive hairs at the tip of the rostellum (beak-like projection of the column). This results in the rostellum ejecting a liquid glue-like substance, followed by a rapid release of the two pollinia, which adhere to the drops of quick-drying “glue” on the back of the insect. In a triggered flower, the rostellum is flattened and covers the stigma to prevent self-pollination. Ackerman & Mesler (1979) note: “This position is maintained for approximately one day, after which the rostellar barrier gradually lifts, exposing the receptive stigma.” The flower parts persist on the tip of the fruiting capsule (Magrath & Coleman 2002). The wind scatters the dust-like seeds in the summer.

14. PLATANThERA L.C. Richard 1817

[Greek *platys*, broad, and *anthera*, anther; referring to the base of the pollinia in the type species]

Most botanical publications since Donavon S. Correll’s *Native Orchids of North America* (1950) included the genus *Platanthera* within *Habenaria*. Carlyle A. Luer set the trend when he recognized *Platanthera* in his book *Native Orchids of the United States and Canada* (1975). French botanist Louis Claude Richard first described this genus in 1817 and characterized it by its broad anthers. *Platanthera* differs from *Habenaria* by having lance-fusiform root-tuberoids (vs. spherical) and tiny or no stigmatic processes (horn-like projections on stigma). Hybrids are occasionally found in mixed populations of two parents and are generally intermediate in characteristics. The key below does not include the hybrids.

- 1. Lip deeply 3-parted (divided at least halfway to the base).
 - 2. Flowers purple (rarely white); lateral divisions of lip entire or toothed (crenate to dentate); middle division notched at apex; spur 2–3 cm long..... **Platanthera peramoena**
 - 2. Flowers greenish-white or yellowish-green; lateral divisions of lip deeply cut and fringed; middle division coarsely fringed at apex; spur 1.1–2.3 cm long **Platanthera lacera**

- 1. Lip shallowly 3-parted or unlobed (margins entire, toothed, or deeply fringed)
 - 3. Lip conspicuously fringed; flowers orange to yellow-orange.

4. Spur longer than the pedicellate ovary, 20–35 mm long; lip, linear-oblong to linear-cuneate, 8–12 mm long; raceme 4–8 cm thick..... **Platanthera ciliaris**
4. Spur equal to or shorter than the pedicellate ovary, 4–17 mm long; lip ovate to ovate-oblong, 4–6 mm long; raceme 2–4 cm thick..... **Platanthera cristata**
3. Lip not fringed (margins entire or deeply cut, apex occasionally toothed to slightly lobed); flowers white, green, yellow, or pale orange.
5. Flowers pure white; spur 40–50 mm long; lip 11–15 mm long..... **Platanthera integrilabia**
5. Flowers yellow, orange, green, or white; spur 4–12 mm long; lip 2–7 mm long.
6. Flowers golden-yellow or lemon-orange; lip eroded or lacerated along margins (rarely entire) **Platanthera integra**
6. Flowers yellowish-green, green, greenish-white, or almost pure white; lip entire or obscurely 3-lobed apically.
7. Stem usually with 2–3 larger leaves; spur 4–8 mm long, distinctly shorter than ovary/fruit; lip with a tubercle on upper surface and often a pair of basal lobes (auricles); apex of lip entire or with small round teeth (crenulate); raceme 5–20 cm long, 1.2–2 cm thick..... **Platanthera flava**
7. Stem usually with 1 larger leaf, rarely 2; spur 8–12 mm long, exceeding ovary/fruit; lip without a tubercle and lacking basal lobes; apex of lip obscurely 3-lobed; raceme 2–9 cm long, 2–3.5 cm thick..... **Platanthera clavellata**

1. *Platanthera ciliaris* (L.) Lindl. {fringed; referring to the lip} — ORANGE FRINGED ORCHID; YELLOW FRINGED ORCHID; ORANGE-PLUME (Fig. 52). [*Blephariglotis ciliaris* (L.) Rydb.; *Habenaria ciliaris* (L.) R. Br.]



Figure 52. *Platanthera ciliaris*, roadside seep, Clay Co., Alabama, 26 July 2020. Photos: Dan Spaulding.

Perennial, terrestrial herb with fusiform tuberoids. Wet to moist roadsides, bogs, seeps, pine savannas, marshes, and open wet woods. Flowers late June–September, fruits August–November; rare in the Highland Rim; uncommon in northern Alabama; frequent in the Coastal Plain (Fig. 53). It is native to the eastern USA and southern Ontario, from New York to Michigan, south to Florida and east Texas (Sheviak 2002c).

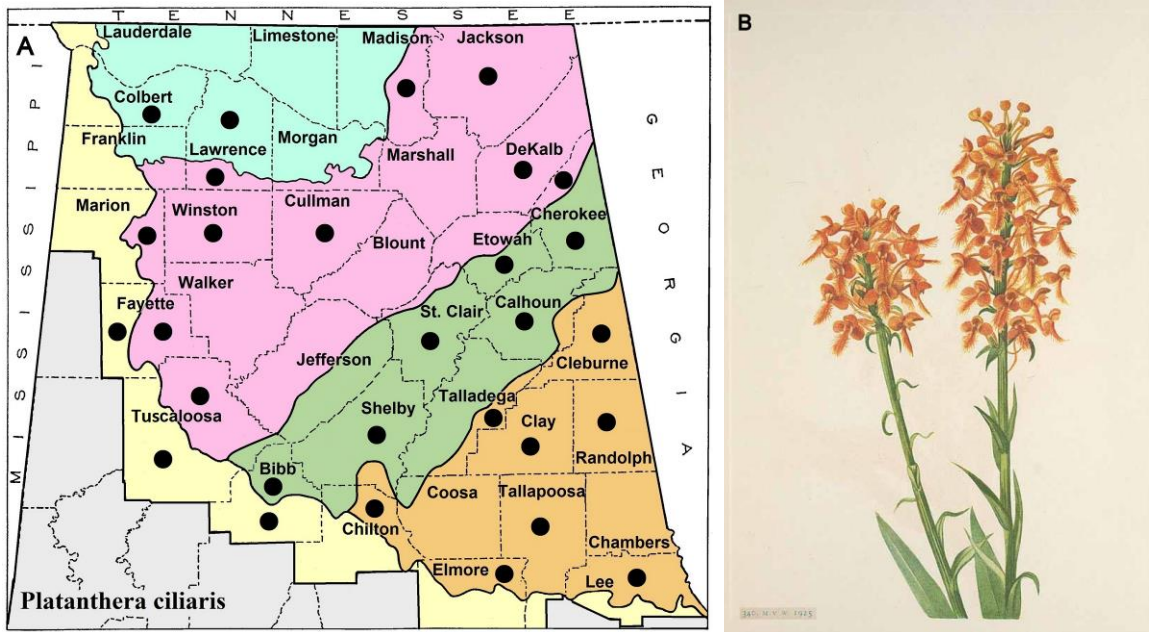


Figure 53. *Platanthera ciliaris*. A. Distribution map. B. Illustration by Mary Vaux Walcott, 1925.



Figure 54. A. *Platanthera conspicua* inflorescence, Baldwin Co., Alabama, 25 Aug 2019. Photo: Howard Horne. B. *Platanthera ciliaris* inflorescence, DeKalb Co., Alabama, 8 Aug 2020. Photo: Brian Finzel. C. *Platanthera ciliaris* in fruit, Fayette Co., Alabama, 23 Aug 2022. Photo: Dylan Shaw.

Orange Fringed Orchid is one of our showiest wildflowers. Luer (1975) fondly writes: “It is one of our most striking native orchids, readily recognized by its broad apricot head of fringed-lipped flowers. How beautifully these handsome plants of golden torches stand out in the grassy meadow during the hot, late August days! Summer’s swallow-tail butterflies (*Papilio* spp.) may sometimes be seen shaking the whole raceme as they quiver their wings while clinging to the bearded lips and slipping their proboscis down into the nectaries.” Some pollination ecology studies indicate that moths are chief pollinators of white-fringed orchids, whereas butterflies typically pollinate the bright orange flowers of *P. ciliaris* (Smith & Snow 1976). However, Cole & Firmage (1984) stated that while the white-fringed orchid “possesses characteristics typical of moth-pollinated plants,” their study only documented diurnal pollinators.

A similar white-flowered species, *Platanthera conspicua* (Nash) P.M. Brown [Large White Fringed Orchid], had been erroneously reported from the Cumberland Plateau of Alabama. Prof. M. Morgan collected it from Cullman County on June 18, 1941, which he deposited in the St. Bernard College herbarium (later transferred to AUA). Dan Spaulding recently annotated this specimen to *P. ciliaris*. The two orchids are easily identified in the field by their flower color; however, dried plants are more challenging to identify because the orange perianth of *P. ciliaris* often fades. Correll (1950) noted that the lip fringes of *P. conspicua* (Fig. 54a) are relatively coarse and appear bristly, whereas those of *P. ciliaris* (Fig. 54b) are slender and weak. The spur also tends to be longer in *P. conspicua*, 30–50 mm vs. 20–33 mm (Weakley et al. 2022). Both species have long spurs that exceed the ovary, but this does not always apply when the fruit is ripe (Fig. 54c). Luer (1975) treated *P. conspicua* as *P. blephariglottis* (Willd.) Lindl. var. *conspicua*. Sheviak (2002c) mapped this taxon as endemic to the Coastal Plain of the southeastern USA.

2. *Platanthera clavellata* (Michx.) Luer {like a little club; for club-like spur} — SMALL GREEN WOOD ORCHID; LITTLE CLUB-SPUR ORCHID (Fig. 55). [*Gymnadeniopsis clavellata* (Michx.) Rydb.; *Habenaria clavellata* (Michx.) Spreng.]



Figure 55. *Platanthera clavellata*. A. Flowering, Bibb Co., Alabama, 22 July 2022. B. Fruiting, Winston Co., Alabama, 17 Aug 2022. Photos: Dylan Shaw.

Perennial, terrestrial herb with fusiform tuberoids. Margins of shaded streams, woodland seeps, bogs, swamps, and wet floodplains. Flowers June–August, fruits late July–November; uncommon throughout Alabama (Fig. 56). It is native to the eastern USA and adjacent Canada, from Newfoundland to Ontario, south to east Texas and the Panhandle of Florida (Sheviak 2002c).

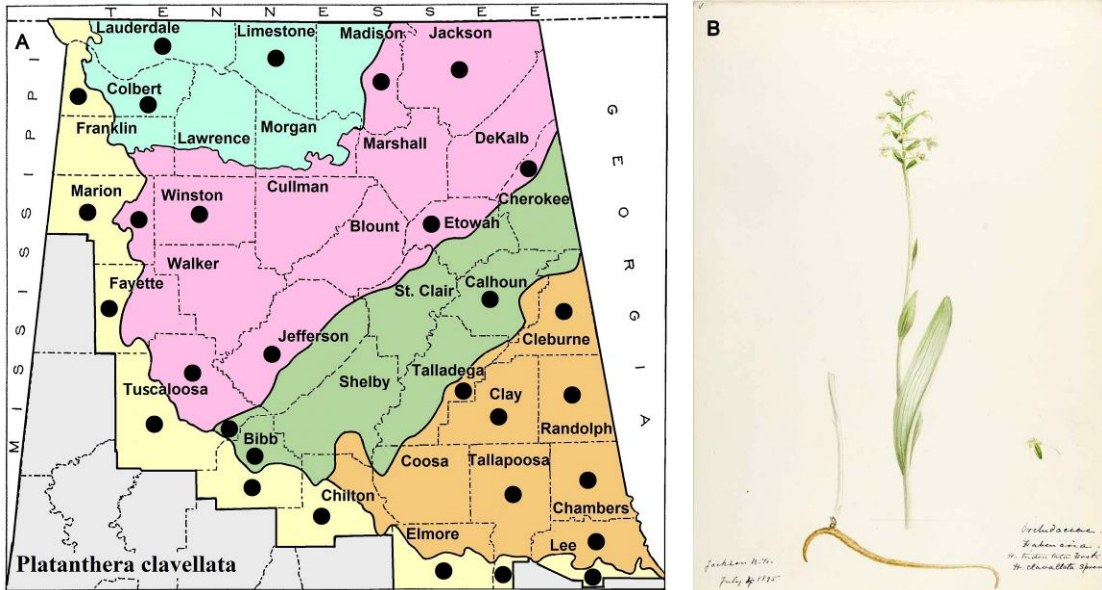


Figure 56. *Platanthera clavellata*. A. Distribution map. B. Watercolor by Helen Sharp, 1895.



Figure 57. *Platanthera clavellata*, Cumberland Co., Tennessee, 10 July 2015. Photos: Brian Finzel.

Small Green Wood Orchid (Fig. 57) is one the most widespread species of *Platanthera* in eastern North America and the least conspicuous (Hill 2007b). The common names refer to its small stature, greenish flowers, and typical woodland habitat. Since the flowers are self-pollinated, plants usually produce an abundance of ripe capsules (Correll 1950). *Platanthera clavellata* is often confused with *P. flava*. The distinguishing characteristics of *P. clavellata* are its strongly curved spur exceeding the ovary, lip apex with three lobes, and stem with only one prominent leaf, rarely two. The inflorescence typically has flowers clustered near the top. However, more floriferous individuals can be mistaken for *P. flava*, but the latter has a distinctive tubercle on its labellum (lip).

Dylan Shaw (Alabama Power biologist) found a hybrid between *Platanthera clavellata* and *P. integrilabia* in northwestern Alabama. Brian Keener is researching this discovery and plans to publish a paper on the results soon. Sheviak (2002c) lists a rare hybrid, *P. ×vossii* Case, occurring between *P. clavellata* and *P. blephariglotis* (Willd.) Lindl., a close relative of *P. integrilabia*.

3. *Platanthera cristata* (Michx.) Lindl. {crested; alluding to the fringed tip of lateral petals} — ORANGE CRESTED ORCHID; CRESTED YELLOW ORCHID; CRESTED FRINGED ORCHID (Fig. 58). [*Blephariglotis cristata* (Michx.) Raf.; *Habenaria cristata* (Michx.) R. Br.]



Figure 58. *Platanthera cristata*. A. Fayette Co., Alabama, 9 Aug 2022. B. Marion Co., Alabama, 11 Aug 2022. C. Fruiting, Winston Co., Alabama, 22 Sep 2022. Photos: Dylan Shaw.

Perennial, terrestrial herb with fusiform tuberosids. Bogs, seeps, wet woodlands, roadside ditches, and pine savannas. Flowers late June–September, fruits late June–October; rare in the Cumberland Plateau, Ridge & Valley, Piedmont, and Coastal Plain (Fig. 59). It occurs chiefly in the southeastern USA, from New Jersey to Arkansas, south to eastern Texas and Florida, with disjunct populations in the northeastern USA (Sheviak 2002c).

Platanthera cristata is easily mistaken for *P. ciliaris*. However, the flowers of *P. cristata* (Fig. 60) are typically smaller, with a spur about 1 cm long and an ovate lip less than 6 mm long, whereas *P. ciliaris* has a longer spur (2–3.5 cm) and an oblong lip more than 8 mm long. Another difference is that *P. cristata* has closely spaced rostellum lobes (roughly parallel) with rounded tips. In contrast, *P. ciliaris* has widely spaced lobes with pointed tips that extend outward.

Alabama native, James P. Folsom (1984), described the hybrid between *Platanthera ciliaris* and *P. cristata* and named it *P. ×channellii* in honor of Harvard botanist Robert B. Channell, who collected the type specimen. Dr. Channell made his collections in the Cumberland Plateau of Marion County, Alabama, on August 7, 1957. During the summer of 2021, Dan Spaulding visited the type locality; however, most regrettably, a road expansion of US-43 destroyed the entire population and habitat.

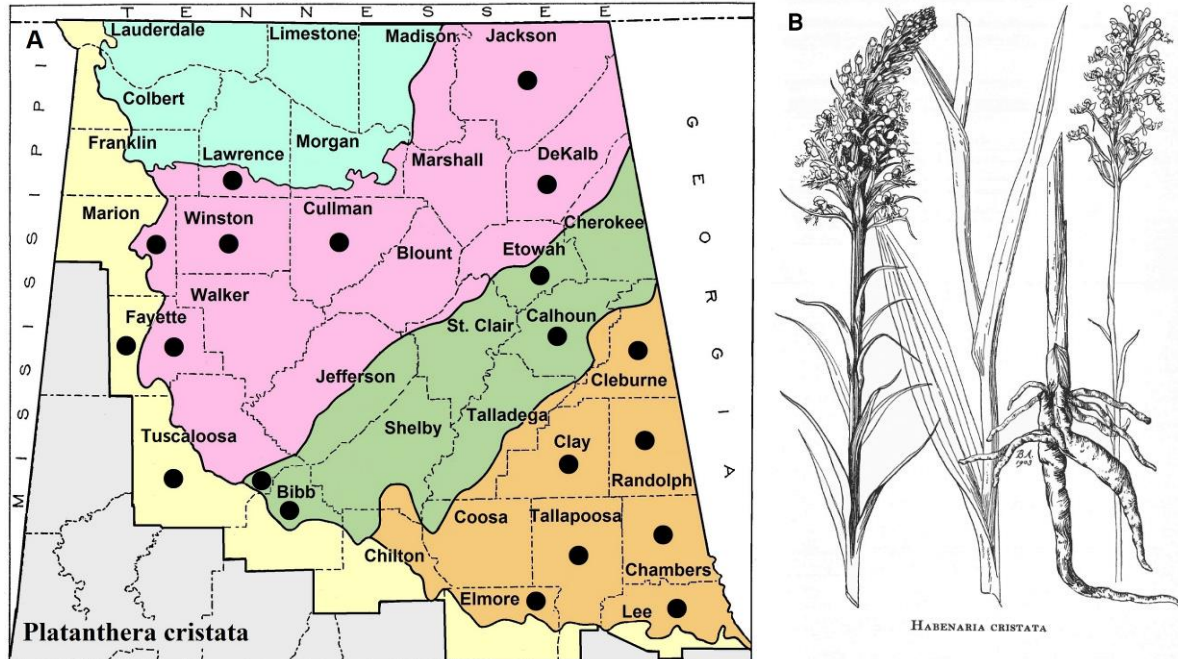


Figure 59. *Platanthera cristata*. A. Distribution map. B. Drawing by Blanche A. Ames, 1903.

Historically, botanists recognized the hybrid between *Platanthera ciliaris* and *P. cristata* as *P. ×chapmanii* (Small) Luer (Correll 1950, Luer 1975). Folsom (1984) treated *P. chapmanii* as a valid species and concluded that it arose from an ancient hybridity and now reproduces independently. It is native to the lower Southeastern Coastal Plain of Georgia and northern Florida, with disjunct populations in eastern Texas. Brown (2004) states that the only observable difference between the ancient and recent contemporary hybrid is that *P. chapmanii* is “a stable, reproducing species with a very distinctive bent column [downwardly hooked].” He also notes that if the two parents are present in the field, the plants are likely *P. ×channellii*.



Figure 60. *Platanthera cristata*, Etowah Co., Alabama, 8 Aug 2020. Photos: Brian Finzel.

4. *Platanthera flava* (L.) Lindl. var. *flava* {yellow; referring to yellow-green flowers} — SOUTHERN REIN ORCHID; SOUTHERN GYPSY-SPIKE; PALE-GREEN ORCHID (Fig. 61). [*Gymnadenia flava* (L.) Lindl.; *Habenaria flava* (L.) R. Br.; *Perularia bidentata* (Ell.) Small; *Perularia scutellata* (Nutt.) Small]



Figure 61. *Platanthera flava* var. *flava*. Shelby Co., Alabama, 14 Aug 2022. Photos: Brian Finzel.

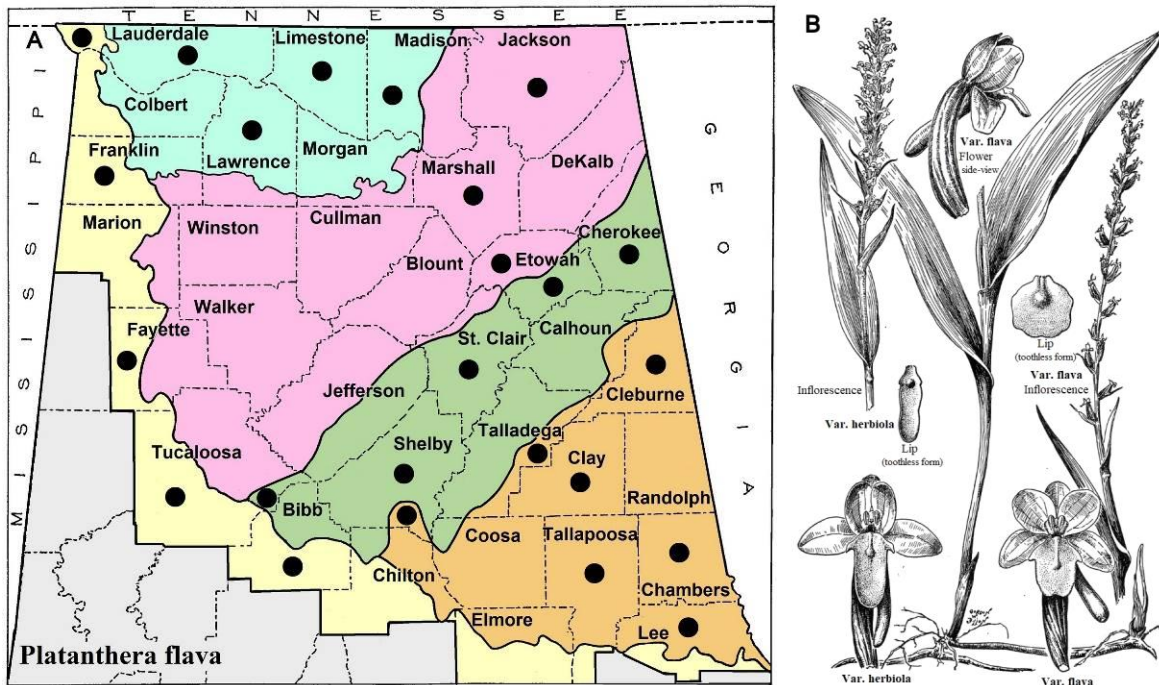


Figure 62. *Platanthera flava*. A. Distribution map of var. *flava*. B. Drawing by Gordon W. Dillon, 1950.

Perennial, terrestrial herb with fusiform tuberoids. Swamps, seeps, bogs, and wet hardwood forests. Flowers late May–October, fruits July–November; rare in northern Alabama; uncommon in the Coastal Plain (Fig. 62). The typical variety is native to the southeastern USA, from New Jersey to Missouri, south to east Texas and Florida, with disjunct populations further north (Sheviak 2002c).

Kral (1983) listed *Platanthera flava* as a potentially threatened species due to the destruction of its habitat (Fig. 63a). He writes: “The greatest danger faced by this particular orchid comes from the wholesale clearcutting of large tracts of bottomland throughout its range. Such cutting results in a raising of the water table, thus more than normal flooding of the bottoms. It also results in a conversion from a relatively clean alluvial forest floor to a sunny jungle of invading woody weeds.”

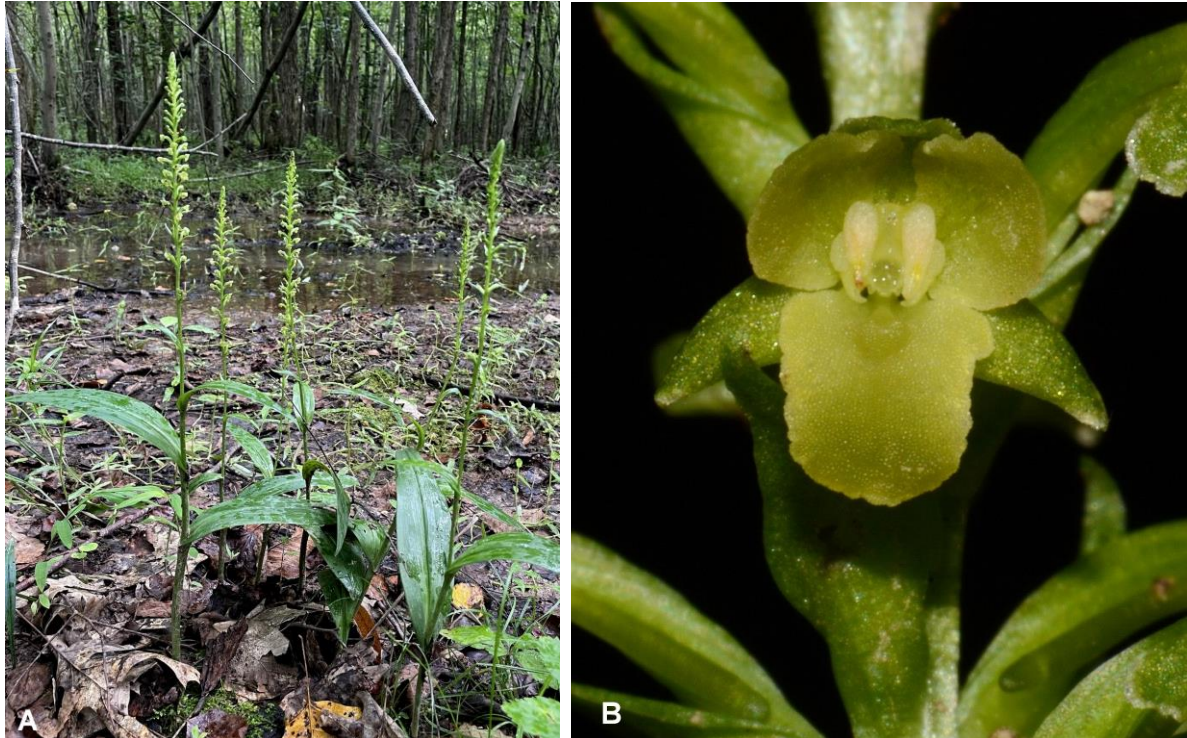


Figure 63. *Platanthera flava* var. *flava*. A. Habitat, Lauderdale Co., Alabama, 4 July 2023. Photo: Dylan Shaw. B. Flower close-up, Coffee Co., Tennessee, 22 July 2014. Photo: Brian Finzel.

Stoutamire (1971) documented that mosquitos (*Aedes* spp.) are one of the various pollinators of *Platanthera flava*. The tubercle on the upper surface of the lip serves as a pollinator-deflecting device (Fig. 63b). Luer (1975) described the process: “After exploring the flower with its proboscis, the mosquito ultimately discovers one of the two channels into the nectary. Being forced by the tubercle to one side, it reaches beneath one of the viscidia to obtain the nectar. The viscidium becomes adherent to the shaft of the proboscis, and upon withdrawing the proboscis, the pollinarium is pulled from the anther sac. It is carried to the next flower where pollen grains are deposited upon the stigma during further searches for nectar.” Note: The viscidium (plural viscidia) is the sticky portion of the rostellum, a beak-like extension of the stigma separating the flower’s male and female parts. Pollinarium is a term referring to the whole pollination unit of most orchids.

Platanthera flava var. *flava* is the only variety of this species in Alabama. Previous specimens in the study area identified as *P. flava* var. *herbiola* (Etowah Co., 3 Jul 1995, *Hodge-Spaulding* 4279; Jackson Co., 30 Aug 1997, *Ballard* 7249; Limestone Co. 29 Jun 1996, *Ballard* 5950) have all been corrected to *P. flava* var. *flava* thus rendering *P. flava* var. *herbiola* as excluded from

the state. Ames & Correll (1943), who first described the species under *Habenaria*, wrote that “variety *herbiola* (Fig. 64) is distinguished from the typical form of the species in that the plant is more robust and the usually broader leaves, which may be as many as five, extend further up the stem. The raceme is also more compact with the longer floral bracts often much exceeding the flowers.” Weakley et al. (2022) treat the two geographical entities as separate species. *Platanthera flava* var. *flava* [Southern Rein Orchid] is often confused with *P. clavellata* but differs by having at least two larger cauline leaves, flowers with a tubercle on the lip, and spurs shorter than the ovary.



Figure 64. *Platanthera flava* var. *herbiola*, Chenango Co., New York, 1 July 2017. Photos: Michael Hough.

5. *Platanthera integra* (Nutt.) A. Gray ex L.C. Beck {entire; referring to the unfringed lip} — GOLDEN FRINGELESS ORCHID; YELLOW FRINGELESS ORCHID (Fig. 65). [*Gymnadeniopsis integra* (Nutt.) Rydb.; *Habenaria integra* (Nutt.) Spreng.]

Perennial, terrestrial herb with fusiform tuberoids. Wet pine savannas and bogs. Flowers July–September, fruits September–November; historical in the Piedmont; rare in the lower Coastal Plain (Fig. 66). Native chiefly to the Coastal Plain of the southeastern USA, from North Carolina south to Florida, and west to eastern Texas, with disjunct populations in the Pine Barrens of New Jersey and the Central Basin of Tennessee (Kartesz 2022). Weakley et al. (2022) list the species as extirpated in the Piedmont of Alabama and the Blue Ridge and Piedmont of North Carolina.

Platanthera integra is an imperiled (S2) species in Alabama (ALNHP 2021). Its survival is dependent upon periodic burning, creating open, park-like habitats (Morris 2013). Kral (1983) states that in the absence of fire, its habitat is overwhelmed by invading shrubs and trees, shading out the orchid. He notes that creating drainage ditches to drain wetlands will destroy this bog plant.



Figure 65. *Platanthera integra*. A. Baldwin Co., Alabama, 13 Aug 2008. Photo: Eric Soehren. B. Brunswick Co., North Carolina, 18 Aug 2022. Photo: Alex Patton.

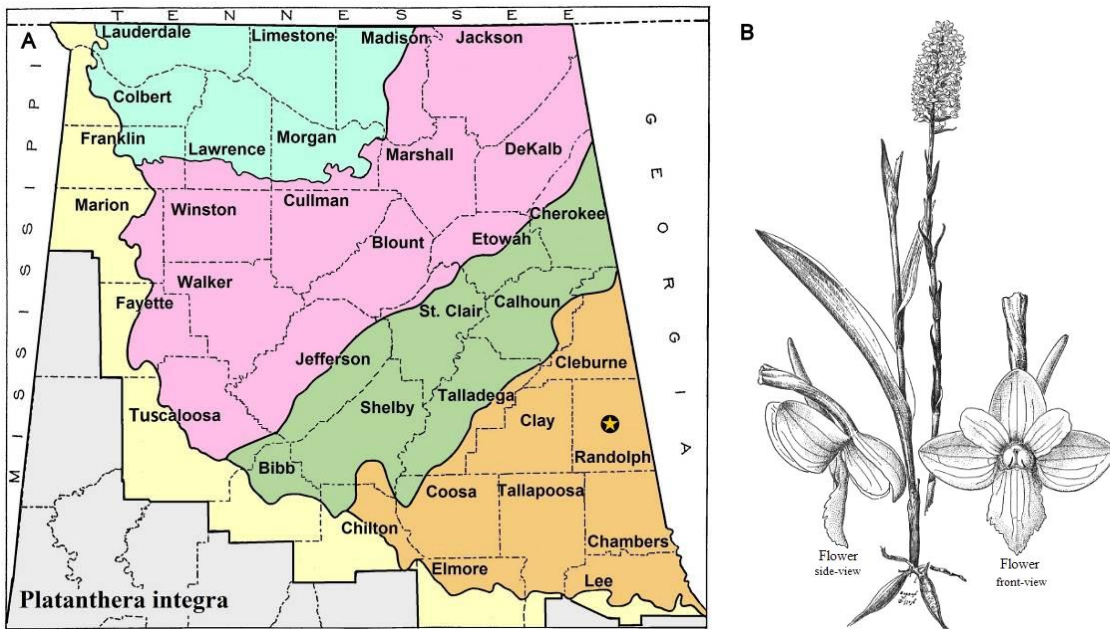


Figure 66. *Platanthera integra*. A. Distribution map. B. Drawing by Gordon W. Dillon, 1950.

In Alabama, all populations of *Platanthera integra* occur in the lower Coastal Plain except for one historical occurrence in the Piedmont (Kartesz 2022). Eugene A. Smith collected the northern Alabama specimen from Randolph County on September 10, 1874, in “damp piney woods” near Pinetucky (Keener et al. 2022). This site is possibly the historic Pinetucky Gold Mine located around Morrison Crossroads.



Figure 67. *Platanthera integra*, Coffee Co., Tennessee, 22 Aug 2021. Photos: Brian Finzel.

From a distance, *Platanthera integra* and *P. cristata* look quite similar, but on closer inspection, the lip of *P. integra* is unfringed rather than fimbriate (Kral 1983). Golden Fringeless Orchid's flowers are a lighter lemon-orange (Fig. 67). Luer (1975) writes: "When it first begins to bloom, the raceme is conical in shape, but it soon becomes a trim little cylinder, tightly and neatly packed with solid, golden-yellow flowers. Out in the open fields, their tiny torches literally glow in the midsummer sunshine."

6. *Platanthera integrilabia* (Correll) Luer {entire lip} — WHITE FRINGELESS ORCHID; MONKEY-FACE ORCHID (Fig. 68). [*Blephariglottis integrilabia* (Correll) W.J. Schrenk; *Habenaria blephariglottis* (Willd.) Hook. var. *integrilabia* Correll]



Figure 68. *Platanthera integrilabia*, Calhoun Co., Alabama, 10 Aug 2020. Photo: Bill Garland.

Perennial, terrestrial herb with fusiform tuberoïds. Woodland seeps, bogs, and streambanks. Flowers late July–September, fruits September–October; rare in the Cumberland Plateau, Ridge & Valley, Piedmont, and upper Coastal Plain (Fig. 69). Endemic to Kentucky, eastern Tennessee, southwest Virginia, western North Carolina, northern Alabama, and north Mississippi (Weakley et al. 2022).

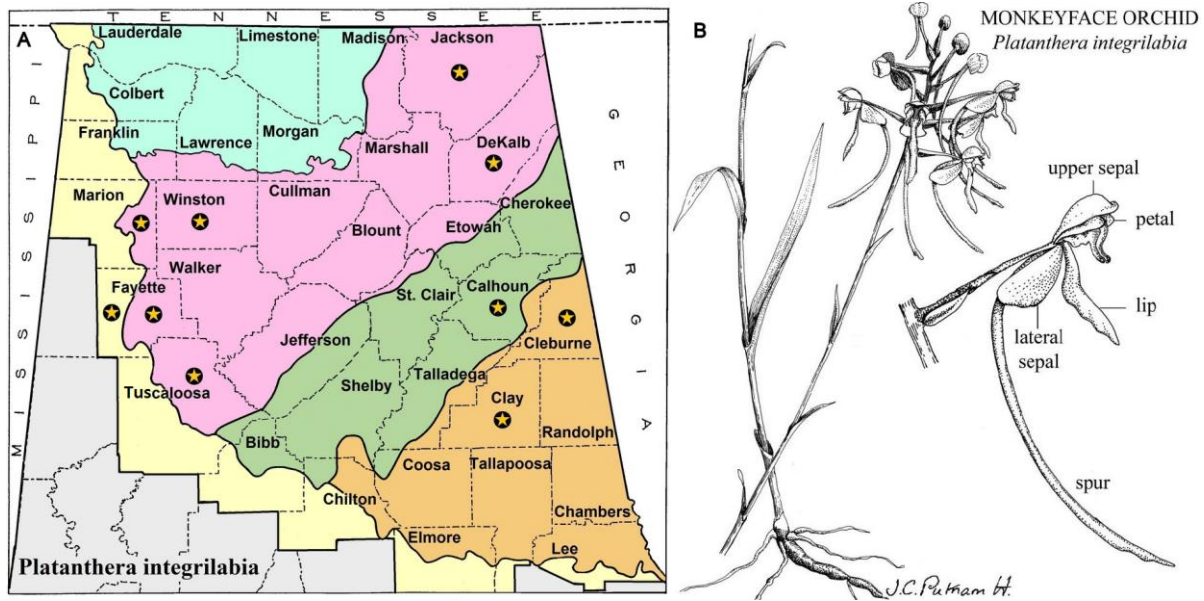


Figure 69. *Platanthera integrilabia*. A. Distribution map. B. Illustration by Jean C. P. Hancock, 2007.

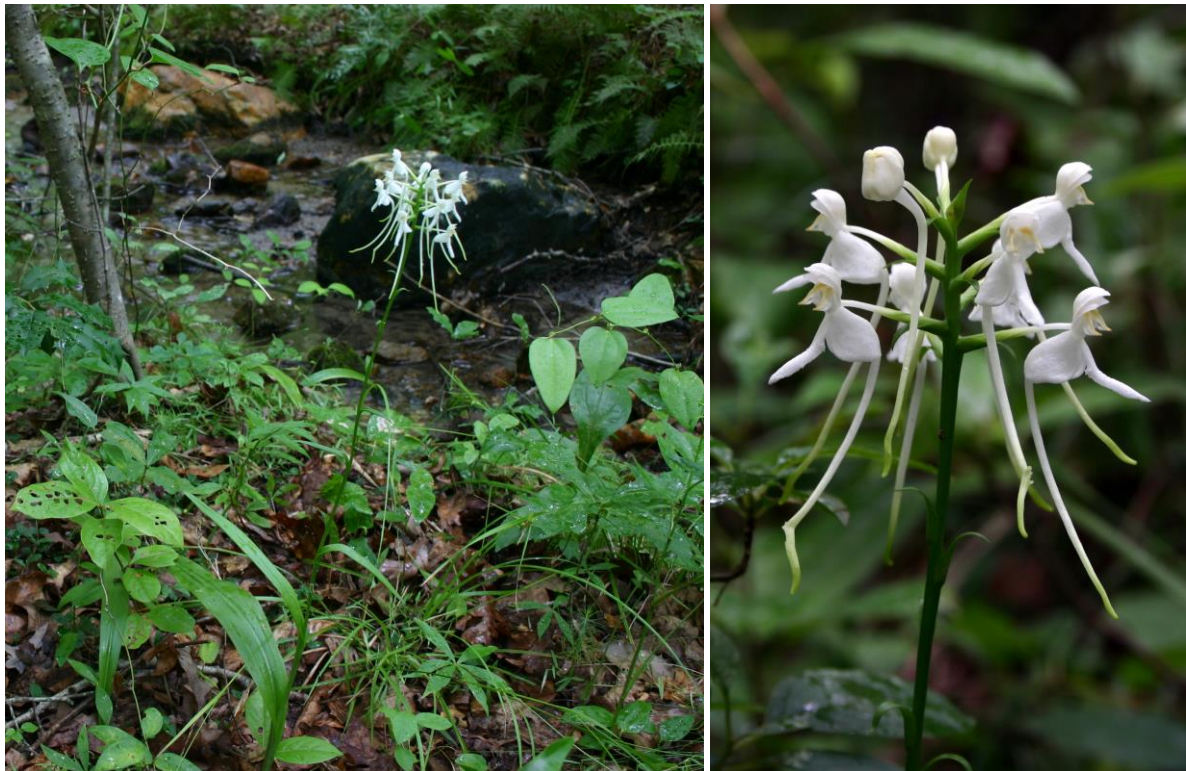


Figure 70. *Platanthera integrilabia*, Cleburne Co., Alabama, 12 Aug 2006. Photos: Eric Soehren.

The U.S. Fish and Wildlife Service lists *Platanthera integrilabia* (Fig. 70) as a federally threatened species. It is imperiled to rare (G2G3) globally and imperiled (S2) in Alabama (ALNHP 2022). Habitat destruction from logging is a significant threat. Even clearcutting adjacent slopes are hazardous because runoff from the uplands can bury plants in silt (Kral 1983). This species typically grows in sites under the forest canopy (Fig. 71), but Wooten et al. (2020) demonstrated that too much shade decreases reproduction and survival. White Fringeless Orchid differs from the white fringed orchids, *P. conspicua* and *P. blephariglottis* (Willd.) Lindl., by having an entire (fringeless) lip.



Figure 71. *Platanthera integrilabia* habitat, Calhoun Co., Alabama, 10 Aug 2020. Photo: Bill Garland.



Figure 72. A–B. *Platanthera ciliaris* and *P. integrilabia*, Calhoun Co., Alabama, 16 Aug 2022, Scott Ward (left) and Bill Garland (right). Photos: Dan Spaulding. C. *Platanthera xrhinehartii*, Calhoun Co., Alabama, 11 Aug 2021. Photo: Noah Yawn.

Management practices such as understory thinning and periodic burning increase the number of individuals and thus enhance reproduction (Chafin 2007). Wooten et al. (2020) noted that herbivory by White-Tailed Deer (*Odocoileus virginianus*) could also impact the healthiness and growth of this orchid. However, they state: “We also found that increased light availability could benefit *P. integrilabia* in areas where white-tailed deer are abundant by moderating the impacts of grazing.” They also suggest that fencing the habitat can help mitigate the problem.

A drastic decline in the population of *Platanthera integrilabia* occurred following the closure of an army base (Ft. McClellan) in Calhoun County, Alabama. Afterward, the orchid’s habitat became overgrown with woody plants. Periodic fires resulting from an adjacent firing range had routinely cleared the underbrush, allowing more sunlight to reach the forest floor, thus supporting the orchid’s growth and reproduction. At this site in 2021, Patrick Thompson, Auburn Arboretum Specialist, documented *P. ×rhinehartii* C. Wilson ex P.M. Br. (Barger et al. 2023), a hybrid between *P. integrilabia* and *P. ciliaris* (Brown 2020). Dan Spaulding searched the site with Scott Ward, Research Botanist at UNC, and Bill Garland, a former USFWS Biologist, for the hybrid in 2022 but encountered its parents only (Fig. 72).

7. *Platanthera lacera* (Michx.) G. Don {torn; referring to the deeply cut and irregularly fringed lip} — RAGGED FRINGED ORCHID; GREEN FRINGED ORCHID; RAGGED ORCHID (Fig. 73). [*Blephariglotis lacera* (Michx.) Farw.; *Habenaria lacera* (Michx.) R. Br.]



Figure 73. *Platanthera lacera*, DeKalb Co., Alabama, 2 June 2009. Photos: Eric Soehren.

Perennial, terrestrial herb with fusiform tuberoids. Woodland seepages, bogs, marshes, and wet roadsides. Flowers May–August, fruits July–October; rare in the Highland Rim, Cumberland Plateau, Piedmont, and Coastal Plain (Fig. 74). Native to the eastern USA and adjacent Canada, from Newfoundland to southeastern Manitoba, south to northeast Texas and Georgia (Sheviak 2002c).

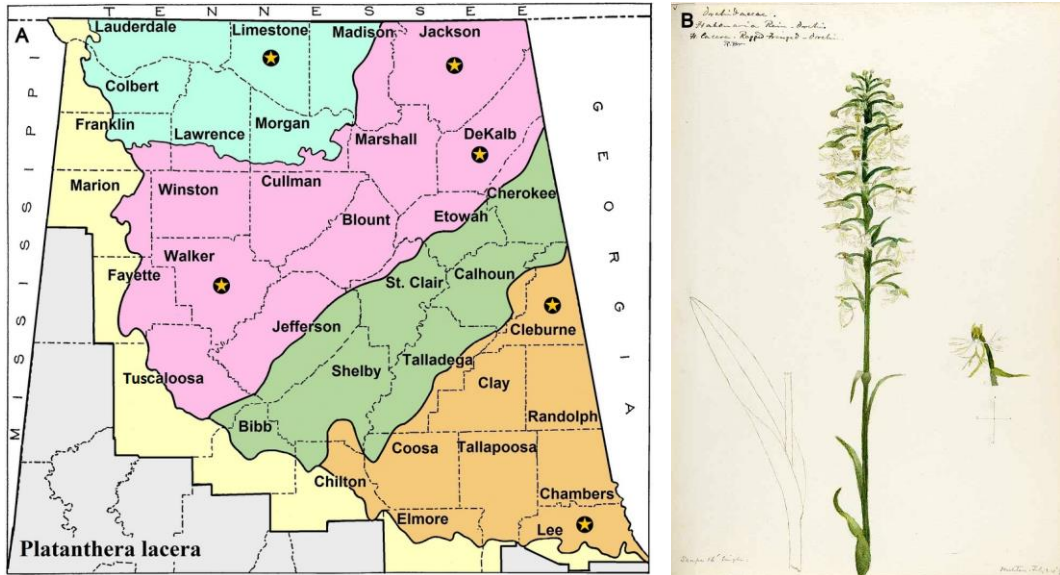


Figure 74. *Platanthera lacera*. A. Distribution map. B. Watercolor by Helen Sharp, 1895.

The Alabama Natural Heritage Program (ALNHP 2022) lists *Platanthera lacera* as imperiled (S2), but it is globally secure (G5). The use of herbicides in Alabama has decimated some habitats along roadsides. In 2009, Eric Soehren visited a population in DeKalb County growing in a wet roadside ditch. He noted that all the orchids were gone after herbicide spraying began the following year. In her book *Silent Spring*, Rachel Carson (1962) lamented: “By their very nature, chemical controls are self-defeating, for they have been devised and applied without taking into account the complex biological systems against which they have been blindly hurled.”



Figure 75. *Platanthera lacera*, Van Buren Co., Tennessee, 1 July 2013. Photos: Brian Finzel.

The common name of Ragged Fringed Orchid refers to its shredded, greenish flowers (Fig. 75). Gibson (1905) wrote: “These fantastically cut and slashed blossoms that make a greenish-yellow maze on the slender stem of their species deserve a better name than Ragged Orchis.” The attractive Hummingbird Clearwing (*Hemaris thysbe*) and noctuid moths (Noctuidae) are frequent visitors seeking nectar from the flower’s spurs (Little et al. 2005).

8. *Platanthera peramoena* (A. Gray) A. Gray {very lovely; alluding to the purple flowers} — PURPLE FRINGELESS ORCHID; PURPLE SPIRE ORCHID; PRIDE-OF-THE-PEAK (Fig. 76). [*Blephariglotis peramoena* (A. Gray) Rydb.; *Habenaria peramoena* A. Gray; *Platanthera fissa* (R. Br.) Lindl.]



Figure 76. *Platanthera peramoena*, Talladega Co., Alabama, 6 July 2020. Photos: Eric Soehren.

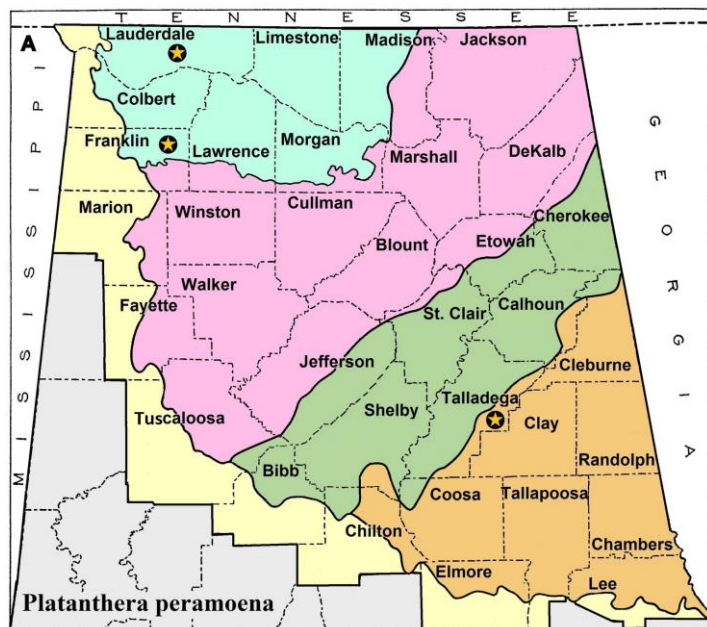


Figure 77. *Platanthera peramoena*. A. Distribution map. B. Painting by Kathleen Marie Garness, 2009.

Perennial, terrestrial herb with fusiform tuberoids. Alluvial woods, moist meadows, and streambanks. Flowers June–August, fruits August–October; very rare in the Tennessee Valley district of the Highland Rim and Ashland Plateau district of the Piedmont (Fig. 77). Native to the eastern USA, from New Jersey to east Missouri south to Mississippi and northern Georgia (Sheviak 2002c).

Platanthera peramoena is easily distinguished from other species of the genus in Alabama by its showy purplish flowers with a three-parted lip. Interestingly, the flower color is very similar to some *Phlox* species; both plants often bloom around the same time. Luer (1975) notes: “From a short distance, the two plants are indistinguishable.” *Platanthera grandiflora* (Bigelow) Lindl. [Greater Purple Fringed Orchid] and *P. psycodes* (L.) Lindl. [Lesser Purple Fringed Orchid] are also purple-flowered but do not occur in Alabama. These relatives chiefly differ by having copiously fringed lip divisions (Fig. 78) rather than entire segments with slightly eroded ends.



Figure 78. Illustrations of purple fringed orchids. A. *Platanthera grandiflora* by Mary Vaux Walcott, 1925. B. *Platanthera psycodes* by Helen Sharp, 1890.



Figure 79. *Platanthera peramoena*, Talladega Co., Alabama, 6 July 2022. Eric Soehren (left & solo) and Ryan Shurette (right). Photos: Dan Spaulding.

Purple Fringeless Orchid is a critically imperiled (S1) species in Alabama (ALNHP 2022). Kral (1983) writes: “Danger to this orchid comes from draining of the wet meadow for conversion to improved pasture or to row crop agriculture as well as from clear-cutting of swamp woodland and creek bottoms which causes an abrupt upswing in rank woody and herbaceous growth.” John H. Harrison made the first known collection of this species from Lauderdale County in 1896. It has been collected several times from that county (Keener et al. 2022). Spooner et al. (1983) reported it from Madison County. In 1995, Jacksonville State University graduate students Mark and Terri Ballard discovered the orchid in Talladega County. Dan Spaulding, Eric Soehren, and Ryan Shurette (Forest Service Botanist) visited this site in 2022, and they observed only two flowering plants (Fig. 79). On June 10, 2020, Stephen Krotzer (Alabama Power Biologist) discovered a small population in a roadside drainage ditch in Franklin County.

15. POGONIA Antoine Laurent de Jussieu 1789
[Greek *pogonias*, bearded; alluding to the bristly lip]

1. *Pogonia ophioglossoides* (L.) Ker Gawl. {like *Ophioglossum* (adder’s tongue fern); referring to the leaves} — ROSE POGONIA; SNAKE-MOUTH, ADDER’S-MOUTH; BEARD-FLOWER (Fig. 80).



Figure 80. *Pogonia ophioglossoides*. A. Bog in Cherokee Co., Alabama, 3 May 2003. Photo: Brian O’Brien. B. Mobile Co., Alabama, 18 April 2009. Photo: Eric Soehren.

Perennial, terrestrial herb with slender, cord-like rhizomes. Bogs, seeps, wet meadows, and pine savannas. Flowers March–June, fruits May–September; very rare in the Cumberland Plateau, Ridge & Valley, and Piedmont; uncommon in the Coastal Plain (Fig. 81). Native to the eastern USA and adjacent Canada, from Newfoundland to Manitoba, south to east Texas and south Florida (Sheviak & Catling 2002c).

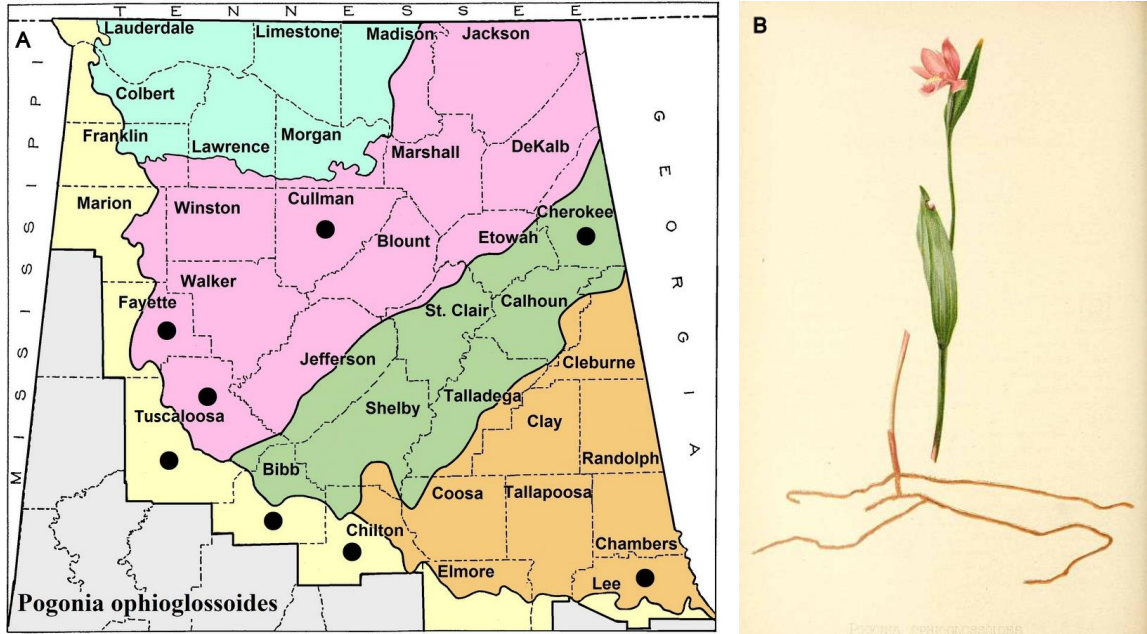


Figure 81. *Pogonia ophioglossoides*. A. Distribution map. B. Illustration by Alois Lunzer, 1878.



Figure 82. *Pogonia ophioglossoides*. A. Coffee Co., Tennessee, 23 May 2020. Photo: Brian Finzel. B. Fruit (rare two-flowered plant), Fayette Co., Alabama, 14 June 2022. Photo: Dylan Shaw.

Rose Pogonia has one cauline leaf attached mid-way up the stem. Plants typically have only a single flower. However, vigorous individuals can occasionally produce two or three flowers, each subtended by a leaf-like bract (Fig. 82). Boland & Scott (1991) report that these orchids “are specifically adapted for pollination by *Bombus* [bumbees].” The sweet-scented flowers of Rose Pogonia are rose-pink to white and only bloom for about five days (Luer 1975). Gibson (1905) writes that the scent is reminiscent of sweet violets or red raspberries but notes, “the fragrance disappears and gives place to a peculiar faint disagreeable odor when the flower withers.” Coffey (1993) describes the offensive aroma of old flowers as smelling like a snake. The vernacular names, Snake-Mouth and Adder’s-Mouth, supposedly refer to a serpent’s mouth, alluding to the appearance of the gaping flowers rather than their odor (Shosteck 1974).

16. PONTHIEVA R. Brown 1813

[In honor of Henri de Ponthieu, 1731–1808, French botanist]

1. *Ponthieva racemosa* (Walter) C. Mohr {like a raceme; referring to the type of inflorescence} — HAIRY SHADOW-WITCH (Fig. 83).



Figure 83. *Ponthieva racemosa*, Shelby Co., Alabama, 15 Sep 2013. Photos: Brian Finzel.

Perennial, terrestrial herb with clustered fleshy roots. Usually in calcareous soils of forested floodplains, springs, swamp margins, north-facing slopes, moist ravines, and shaded prairies. Flowers September–October, fruits October–November; rare in the Highland Rim, Cumberland Plateau, Ridge & Valley, and Coastal Plain (Fig. 84). Native to South America, Central America, West Indies, and the southeastern USA, from southeastern Virginia south to Florida and west to eastern Texas (Ackerman 2002); disjunct in middle Tennessee (Kartesz 2022).

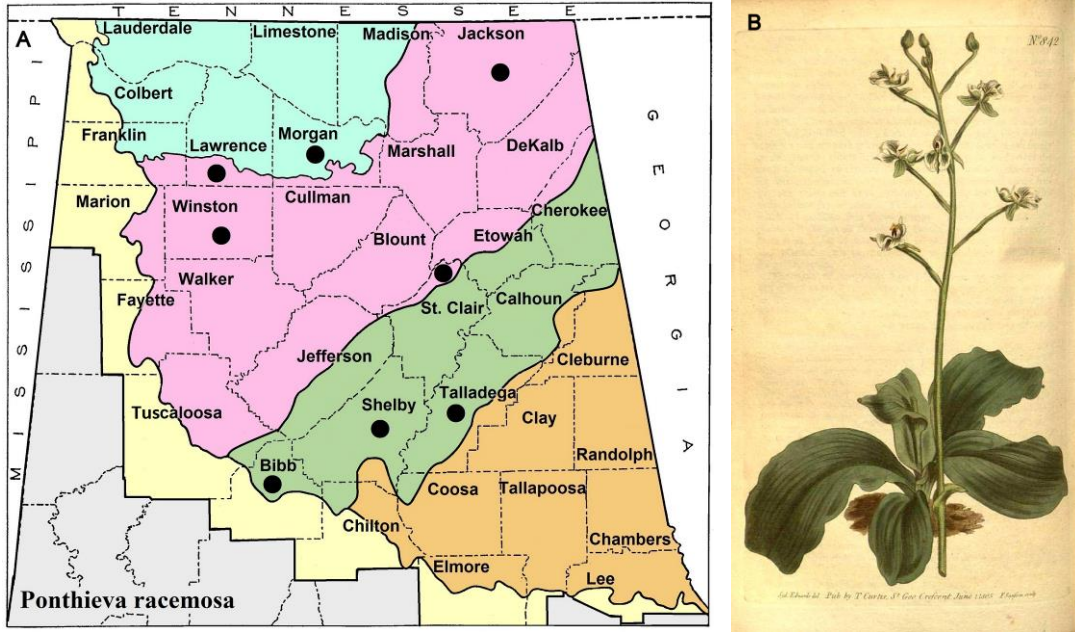


Figure 84. *Ponthieva racemosa*. A. Distribution map. B. Illustration by Sydenham Teast Edwards, 1805.

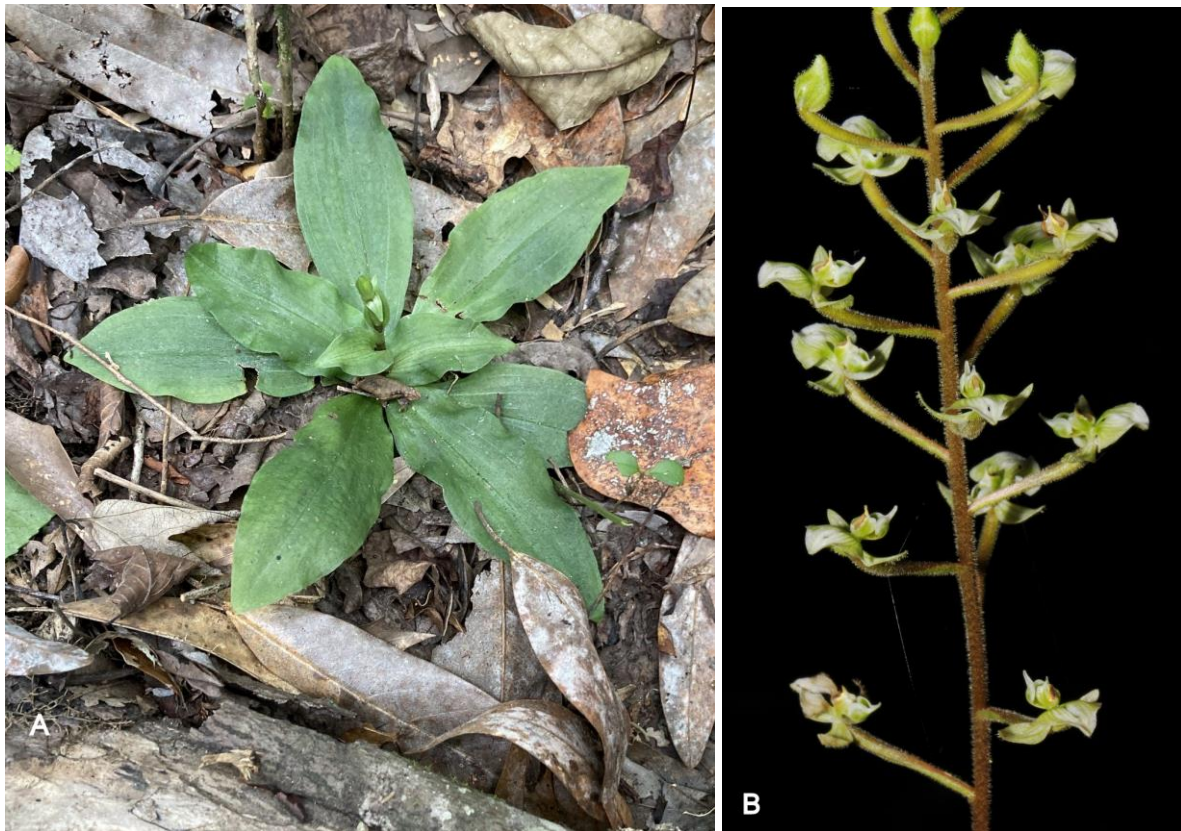


Figure 85. *Ponthieva racemosa*. A. Whorl of leaves with a new shoot, Shelby Co., Alabama, 8 Aug 2020. Photo: Dan Spaulding. B. Hairy inflorescence, Shelby Co., Alabama, 15 Sep 2013. Photo: Brian Finzel.

The Alabama State Heritage Program (2011) previously listed *Ponthieva racemosa* as imperiled (S2), but they no longer track it due to many occurrences throughout the state (ALNHP 2022). Its common name refers to its pubescent (hairy) stem and possibly the shaded environments it

inhabits. Unlike most orchids, its flowers are not resupinate, meaning the orientation of the lip is on top rather than on the bottom. Luer (1972) gives an enlightening description of this orchid: “Appearing from the growth center in early spring is the rosette of rich, satiny green leaves with a silvery luster to their surface (Fig. 85a). From the center, later in the year, springs the slender, pubescent stem (Fig. 85b). On its upper half, the raceme of intriguing little blossoms develops by autumn. Each is held out well from the stem and then tilted back so as to face upward, the peaks of the uppermost lips pointing to the axis. When viewed from above, a striking kaleidoscopic snowflake pattern is achieved. The green-veined lateral sepals are tipped gracefully upward like wings.”

17. SPIRANTHES L.C. Richard 1817

[Greek *speira*, coil, and *anthos*, flower; referring to the twisted spikes of flowers]

Harvard orchidologist Oakes Ames (1921) wrote, “The genus *Spiranthes* is set apart by the spiral arrangement of flowers,” and they are “the most perplexing orchid genus in our flora.” Fresh plants are much easier to identify than herbarium specimens because some diagnostic features are lost when pressed and dried. One should include observation notes on herbarium labels. Weakley et al. (2022) write: “Particular attention must be paid to the curvature and orientation of the lateral sepals, and various characteristics of the lip (color, papillae presence, gland shape).”

These orchids are commonly known as “ladies’-tresses,” most likely alluding to their coiled inflorescences resembling a lady’s braided hair (Luer 1975). However, this vernacular name may be a corruption of an earlier name. Dana (1893) noted that “the English name was formerly ‘ladies’ traces,’ from a fancied resemblance between its twisted clusters and the lacings which played so important a part in the feminine toilet.” Gibson (1905) writes that their flower clusters “look as though the fairies had threaded spikes of white coral in stalks of grass and twisted them for fun, as children do a string that is to twirl a ball. Around and around in a close-pressed single row, these little white flowers, insignificant as individuals, form an odd artistic spike.”

- 1. Lip golden yellow or orange-yellow (lined with obscure greenish veins centrally); viscidium ovoid, 2–2.5 times as long as wide (it is the sticky pad under beak-like projections of column); leaves elliptic-lanceolate or oblanceolate, persistent through anthesis; blooms April–May; known only from riverscour floodplains in Bibb County, Alabama.....**Spiranthes lucida**
- 1. Lip light yellow, green, pure white, or white to greenish-white with distinct green veins; viscidium linear, 3–12 times as long as wide; leaves various, present or absent at anthesis; blooms in spring, summer, or fall; found in various habitats throughout Alabama.
- 2. Inflorescence densely pubescent with non-glandular, mostly sharp-pointed hairs; flowers forming a single spiral; lip centrally yellowish to nearly white (rarely tinged with orange-brown or green), veins never green; leaves linear-lanceolate, persisting through anthesis; blooms May–July.....**Spiranthes vernalis**
- 2. Inflorescence either glabrous (lacking hairs) or pubescent with gland-tipped hairs (capitate, not tapering at the tip); flowers forming a single spiral, multiple intertwined spirals, or occasionally a dense cylindrical spike (when coils are not discernable); lip variously colored; leaves various, present or absent at anthesis; blooms in spring, summer, or fall.
- 3. Lip green veined; rachis sparsely pubescent with gland-tipped (capitate) hairs to nearly glabrous; leaves linear to linear-lanceolate, usually persisting through anthesis; flowering March–June.....**Spiranthes praecox**
- 3. Lip lacking green veins; rachis glabrous (smooth) to densely pubescent (hairy) ; leaves various, present or absent at anthesis; flowering May–November.

4. Inflorescence in an open, obvious spiral, flowers single ranked (occasionally 1-sided); axis of inflorescence slightly pubescent (hairy) to glabrous (smooth); flowers 2–6 mm long.
- 6. Lip pure white; rachis entirely glabrous; flowers gaping near middle; plant from a solitary tuberoid (rarely divided at the tip) **Spiranthes tuberosa**
 - 6. Lip green centrally; rachis often sparsely pubescent, occasionally glabrous (a few hairs usually detectable on ovaries); flowers gaping from beyond middle; plant from clustered tuberoids **Spiranthes lacera**
4. Inflorescence typically in tight, somewhat obscure spirals (often in dense cylindrical spikes), flowers 2 or more ranked; axis of inflorescence moderately to densely pubescent; flowers 3.5–18 mm long.
- 7. Petals about 6 mm long; lip usually pure white, occasionally tinged yellow centrally; flowers unscented; leaves always present through flowering.....**Spiranthes ovalis**
 - 7. Petals over 7 mm long, lip solid white or centrally yellow or yellow-green; flowers unscented to intensely fragrant; leaves present or absent during flowering.
 - 8. Lateral sepals spreading, incurved, and arching upward, angled away from rest of perianth; basal callosities (conical knobs) of lip short, usually < 1 mm long; lip centrally light yellow; flowers slender, not basally inflated; leaves typically absent at flowering; plants of dry, calcareous habitats **Spiranthes magnicamporum**
 - 8. Lateral sepals appressed to somewhat spreading, primarily parallel to the rest of perianth; basal callosities of lip prominent, 1–2 mm long; flowers appearing inflated; lip centrally light yellow, greenish-yellow, or entirely white; leaves present or absent at flowering; plants typically of moist to wet habitats.
 - 9. Leaves all basal or 1–2 extending to lower portion of stem, absent or present at anthesis (flowering time); petioles < 6 mm wide; flowers mostly 8–11 mm long, not fragrant or only slightly so; lip entirely white or faintly yellow centrally; stolons absent; plants widespread throughout Alabama **Spiranthes cernua**
 - 9. Leaves basal and usually cauline, often extending well up the stem (occasionally merging gradually with bracts below inflorescence), present through anthesis; petioles > 7 mm wide; flowers mostly 10–18 mm long, strongly fragrant; lip yellow or yellowish-green centrally; stolons present (forming colonies); plants chiefly occurring in the Coastal Plain, disjunct along the Tennessee River in Alabama..... **Spiranthes odorata**

1. *Spiranthes cernua* (L.) Rich. {nodding; alluding to flowers} — NODDING LADIES'-TRESSES (Fig. 86). [*Gyrostachys cernua* (L.) Kuntze; *Ibidium cernuum* (L.) House]

Perennial, terrestrial herb with fleshy roots. Roadside ditches, bogs, sandstone/granite outcrops, pond/lake margins, swamps, and marshes, typically in acidic soils. Flowers & fruits August–November; uncommon throughout Alabama (Fig. 87). Native to the eastern USA and adjacent Canada, from Nova Scotia west to southern Ohio and Oklahoma, south to northern Florida and central Texas, essentially to the south and east of the Eastern Continental Divide and Ohio River (Pace & Cameron 2017).



Figure 86. *Spiranthes cernua*, DeKalb Co., Alabama, 21 Oct 2006. Photos: Brian Finzel.

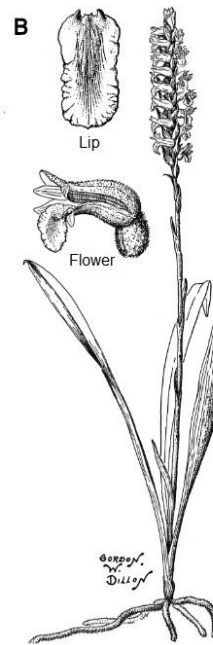
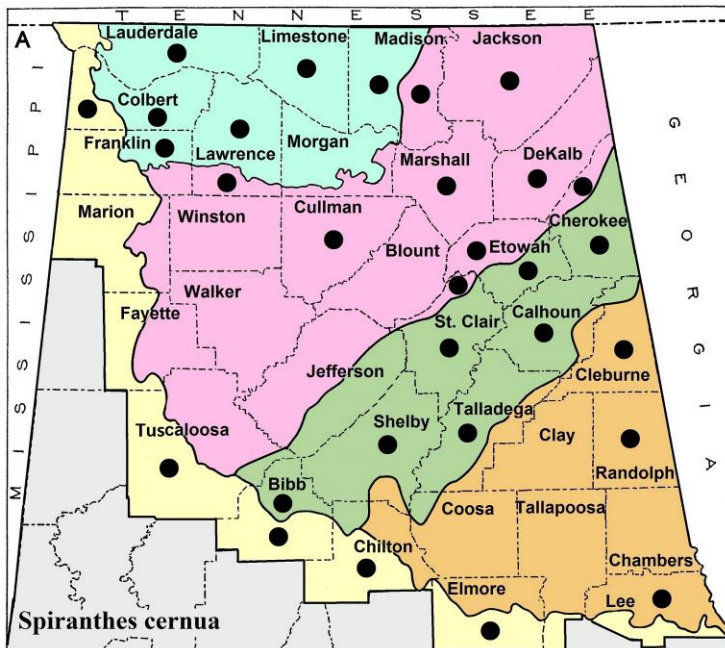


Figure 87. *Spiranthes cernua*. A. Distribution map. B. Drawing by Gordon W. Dillon, 1950.

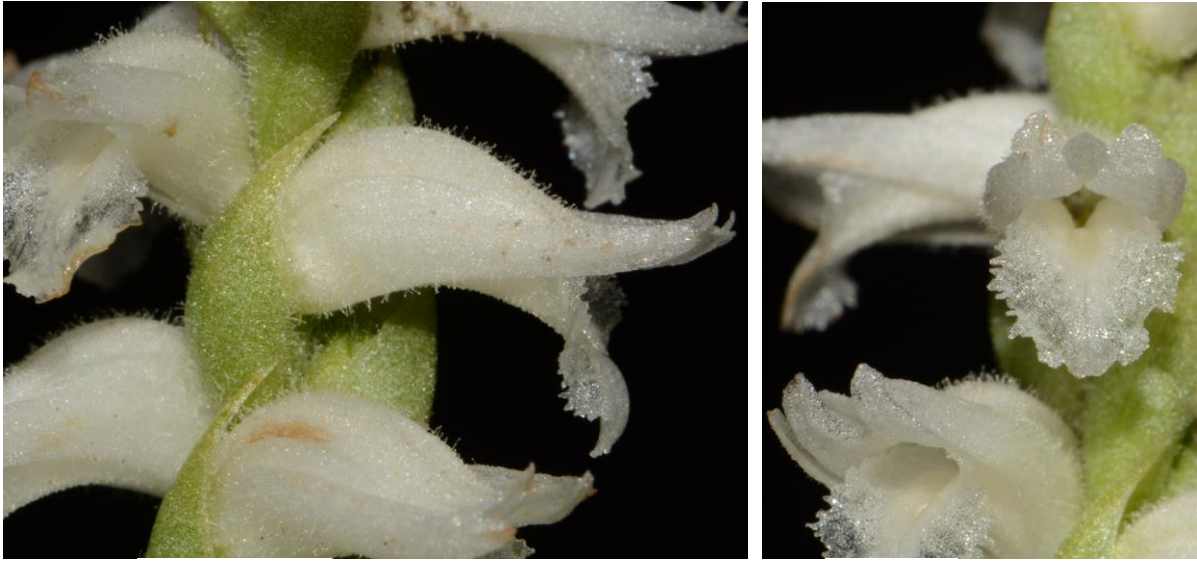


Figure 88. *Spiranthes cernua*, Coffee Co., Tennessee, 8 Oct 2014. Photos: Brian Finzel.



Figure 89. *Spiranthes cernua* herbarium specimens. A. UWAL, *Spaulding 12773*, Shelby Co., Alabama, 21 Oct 2007. B. AMAL, *Spaulding & Garland 14187*, Calhoun Co., Alabama, 1 Oct 2014.

The common name, Nodding Ladies'-Tresses, refers to its flowers that begin nodding at maturity. Ames (1921) observed that its inflorescence is loosely flowered in the early stages of development. Under favorable conditions, new plants will produce their first flowers the following season, but spikes are few-flowered and slender. The seeds of this species ripen quickly and

disseminate shortly after flowering. *Spiranthes cernua* (Fig. 88) is similar to *S. odorata* but differs by being nearly leafless during anthesis or with a few basal leaves, rarely with 1 or 2 extending up the lower part of the stem (Fig. 89). In contrast, *Spiranthes odorata* has both basal and cauline leaves (often extending up to the middle of the stem or higher). Its leaf blades are thickened because of spongy air spaces (aerenchyma) and are typically broader than those of *S. cernua*.



Figure 90. *Spiranthes ochroleuca*, Carroll Co., New Hampshire, 15 Sep 2018. Photos: John Gange.

A similar species, *Spiranthes ochroleuca* (Rydb.) Rydb. [Yellow Nodding Ladies'-Tresses] was treated as a variety of *S. cernua* by Ames (1921). This taxon ranges from northeastern North America south through the Blue Ridge of Tennessee and Virginia. Its flower lip is yellow with rounded glands on its lower surface. In contrast, the lip of *S. cernua* is usually white (rarely yellowish) with reduced conical glands on its lower surface (Pace & Cameron 2017). Luer (1975) noted, “*Spiranthes ochroleuca* is a little taller than *S. cernua*, growing on higher ground, in more shade. The flowers of *S. cernua* frequently touch or overlap, but in *S. ochroleuca*, they are more widely spaced (Fig. 90).”

2. *Spiranthes lacera* (Raf.) Raf. {irregularly cleft; flowers} var. *gracilis* (Bigelow) Luer {slender} — SOUTHERN SLENDER LADIES'-TRESSES (Fig. 91). [*Gyrostachys gracilis* (Bigelow) Kuntze; *Ibidium gracile* (Bigelow) House; *Spiranthes beckii* Lindl.; *Spiranthes gracilis* (Bigelow) L.C. Beck]

Perennial, terrestrial herb with clustered, tuberous roots. Roadsides, pastures, meadows, prairies, bog margins, open woodlands, and rock outcrops. Flowers & fruits late June–October; uncommon throughout Alabama (Fig. 92). Native to the eastern USA, from Maine to Wisconsin, south to east Texas, southern Georgia, and the Panhandle of Florida (Weakley et al. 2022).



Figure 91. *Spiranthes lacera* var. *gracilis*, Cherokee Co., Alabama, 23 July 2011. Photos: Brian Finzel.

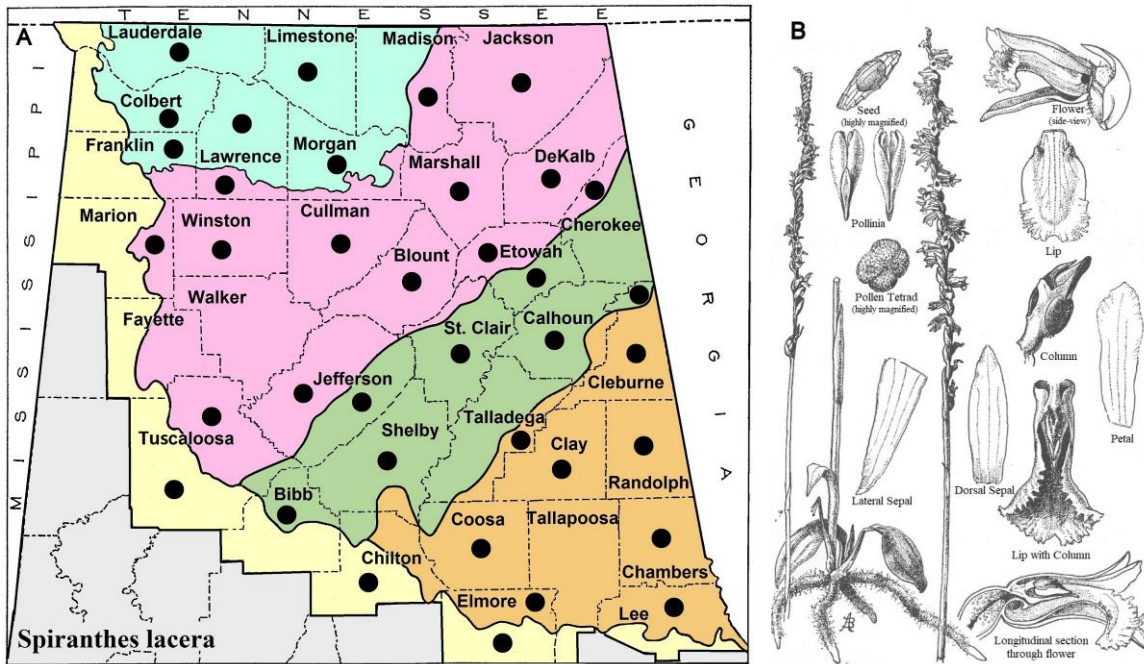


Figure 92. *Spiranthes lacera* var. *gracilis*. A. Distribution map. B. Drawing by Blanche A. Ames, 1947.

Sheviak & Brown (2002) recognize two varieties of Slender Ladies'-Tresses, *Spiranthes lacera* var. *gracilis* and *S. lacera* var. *lacera* (Fig. 93). The typical variety is distributed mainly through northern portions of eastern North America, becoming less frequent southward to Arkansas, Tennessee, and western North Carolina (Kartesz 2022). *Spiranthes lacera* var. *gracilis* is widespread in eastern North America and is the only variety documented for Alabama (Keener et al. 2022).



Figure 93. *Spiranthes lacera* var. *lacera*, St. Louis Co., Minnesota, 30 July 2022. Photos: Rubin Stenseng.



Figure 94. *Spiranthes lacera* var. *gracilis* herbarium specimens. A. TROY, Barger & Holt HC-307, Jackson Co., Alabama, 27 Aug 2009. B. UWAL, England 1335, Lawrence Co., Alabama, 4 Oct 2008.



Figure 95. *Spiranthes lacera* var. *gracilis*, Marion Co., Tennessee, 22 Aug 2015. Photos: Brian Finzel.



Figure 96. *Spiranthes lacera* var. *gracilis*, Jefferson Co., Alabama, 24 Dec 2022. Photos: Briggs Armstrong.

Correll (1950) treated *Spiranthes lacera* as a synonym of *S. gracilis*. Fernald (1946) recognized both a northern and southern entity. He wrote, “*Spiranthes gracilis*, as generally interpreted, consists of two quite different species.” Luer (1975) later treated *S. gracilis* as a variety of *S. lacera*. He noted: “In the spike of var. *lacera*, the row of flowers is only slightly twisted, once or twice, or often not at all, and the lower portion of the spike has widely spaced flowers. The spike of var. *gracilis* is usually more tightly twisted, and the flowers are closely spaced, often overlapping. The pubescence of the spike is moderate in var. *lacera* and is sparse or absent in var. *gracilis*.” He also stated that in var. *lacera*, “the basal rosette of oval leaves usually persists in fresh condition into anthesis.” The leaves of var. *gracilis* are usually absent or occasionally withered at flowering (Fig. 94). *Spiranthes lacera* var. *gracilis* (Fig. 95) is similar to *S. tuberosa*, differing by having a lip that is green within (vs. entirely white), often slightly hairy inflorescence (vs. hairless), and growing from several tuberooids (Fig. 96) rather than one.

Spiranthes eatonii Ames ex P.M. Brown [Eaton’s Ladies’-Tresses] is closely related to *S. lacera* and native to the Southeastern Coastal Plain, from Virginia to eastern Texas (Sheviak & Brown 2002). In Alabama, it ranges northward to the Fall Line Hills of Chilton and Lee counties, just outside the range of this flora. Eaton’s Ladies’-Tresses (Fig. 97) differs from *S. lacera* var. *gracilis* by having an earlier blooming time (spring vs. summer/fall) and lateral sepals with green bases and blunt to rounded tips (vs. pure white and acuminate). It also has oblanceolate leaves, whereas *S. lacera* var. *gracilis* leaves are obovate or elliptic. However, the foliage of both taxa usually withers before flowers appear. Ward (2012) treated *S. eatonii* as a variety of *S. lacera*, stating that “the plants appear to represent populations showing small morphological discontinuities with their related congeners.” Dueck et al. (2014) said that *S. eatonii* is “perhaps an early flowering form of *S. lacera*, itself a highly variable species.” They concluded that “further systematic studies are needed” to determine its species status.



Figure 97. *Spiranthes eatonii*, Duval Co., Florida, 18 Apr 2021. Photos: Mike Ingram.

3. *Spiranthes lucida* (H.H. Eaton) Ames {shining; referring to the glossy sheen of leaves} — SHINING LADIES’-TRESSES; WIDE-LEAF LADIES’-TRESSES (Fig. 98). [*Gyrostachys latifolia* (A. Rich. & Galeotti) Kuntze; *Ibidium plantagineum* (Raf.) House; *Spiranthes latifolia* Torr. ex Lind.]



Figure 98. *Spiranthes lucida*, Bibb Co., Alabama, 29 Apr 1994. Photos: Jim Allison.

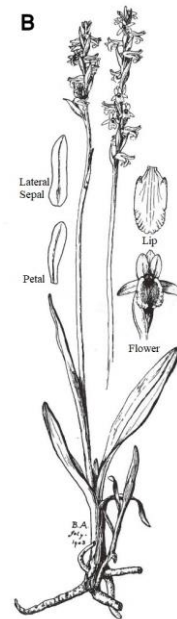


Figure 99. *Spiranthes lucida*. A. Distribution map. B. Drawing by Blanche A. Ames, 1903.

Perennial, terrestrial herb with clustered, fleshy roots. Moist seepage areas along riverbanks over calcareous rock. Flowers & fruits May–July; very rare in the Cahaba Ridges district of the Ridge & Valley (Fig. 99). Native to the eastern USA and adjacent Canada, from Nova Scotia to southern Ontario, south to northern Arkansas, Tennessee, and northwestern North Carolina, with disjunct populations along the periphery of its range (Kartesz 2022). Shining Ladies'-Tresses is a critically imperiled (S1) species in Alabama (ALNHP 2022).



Figure 100. *Spiranthes lucida*. A. Flowers, Pike Co., Ohio, 5 June 2021. Photo: Elias Pschernig. B. Robust specimen, Sharp Co., Arkansas, 11 May 2017. Photo: Theo Witsell.



Figure 101. *Spiranthes lucida* habitat, Bibb Co., Alabama, 29 Apr 1994. Photos: Jim Allison.

The key characteristics of Shining Ladies'-Tresses include its bright orange-yellow lip (Fig. 100a), spring-blooming, and broad leaves (Fig. 100b) persistent throughout the flowering season. Jim Allison discovered this species in Alabama on April 29, 1994, while canoeing the Little Cahaba River with Dr. Jim Affolter and David Handlay. They were surveying the habitat of the Ketona Dolomite Formation in Bibb County. Allison & Stevens (2001) wrote: "*Spiranthes lucida* is very rare as far south as Tennessee, its previous southern limit, and is thus far known in Alabama from a (different) single rocky place on the right bank of the Little Cahaba River. The single locality known is a ledge of dolomite just above the river, where a glade extends down to the water's edge (Fig. 101)." Allison (pers. comm. 2021) said: "When I first saw the plants, I was unfamiliar with *Spiranthes lucida*, but I knew it was a species new to me, as I had never encountered a *Spiranthes* with such strong orange coloration on the lower lip of the flower."

4. *Spiranthes magnicamporum* Sheviak {of the Great Plains} — GREAT PLAINS LADIES'-TRESSES (Fig. 102).

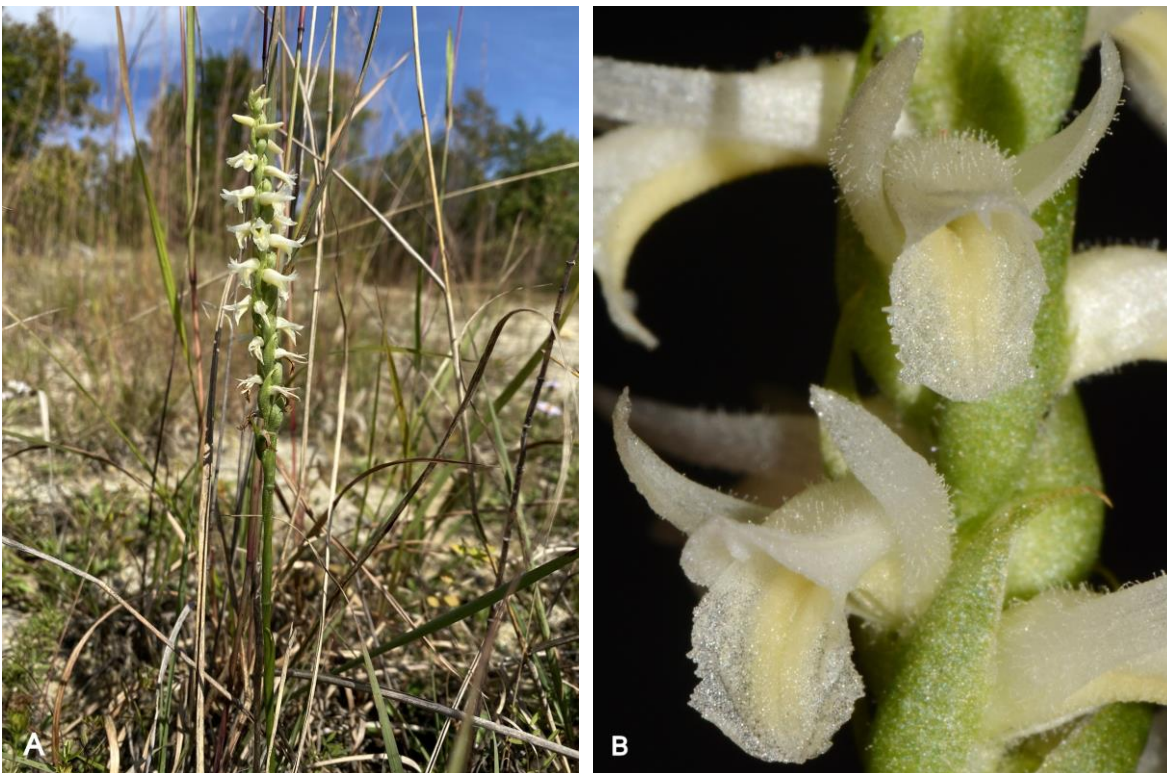


Figure 102. *Spiranthes magnicamporum*, Madison Co., Alabama. A. Habitat, 19 Oct 2021. Photo: Wayne Barger. B. Close-up of flowers, 10 Oct 2014. Photo: Brian Finzel.

Perennial, terrestrial herb with fleshy roots. Chalk prairies, limestone/dolomite glades, and grassy barrens in calcareous soils. Flowers & fruits September–November; very rare in the Highland Rim, Cumberland Plateau, and Ridge & Valley; uncommon in the upper Coastal Plain (Fig. 103). Native primarily to the Great Plains region of Canada and the USA, with scattered populations west and east of that region (Sheviak & Brown 2002).

Sheviak (1973) demonstrated that *Spiranthes magnicamporum* was distinct enough from its ally, *S. cernua*, to warrant a specific rank. He noted that Great Plains Ladies'-Tresses occurs in dry habitats and wrote: "In my experience, *S. magnicamporum* has proven to be a distinct calciphile, whereas the old field ecotype of *S. cernua* occupies strictly acidic soils." In contrast, *S. cernua*

occupies wetter sites. Morphologically, *S. magnicamporum* (Fig. 104) differs from *S. cernua* by having lateral sepals that are often ascending, widely spreading, and often loosely incurved (vs. more or less appressed). *Spiranthes magnicamporum* also has intensely fragrant flowers with a sweet odor resembling vanilla (vs. odorless or faintly aromatic). Its leaves are nearly always absent at anthesis (Fig. 105). The Alabama Natural Heritage Program (ALNHP 2008) listed *S. magnicamporum* as rare (S3) but stopped tracking it because of its frequency in the Black Belt region.

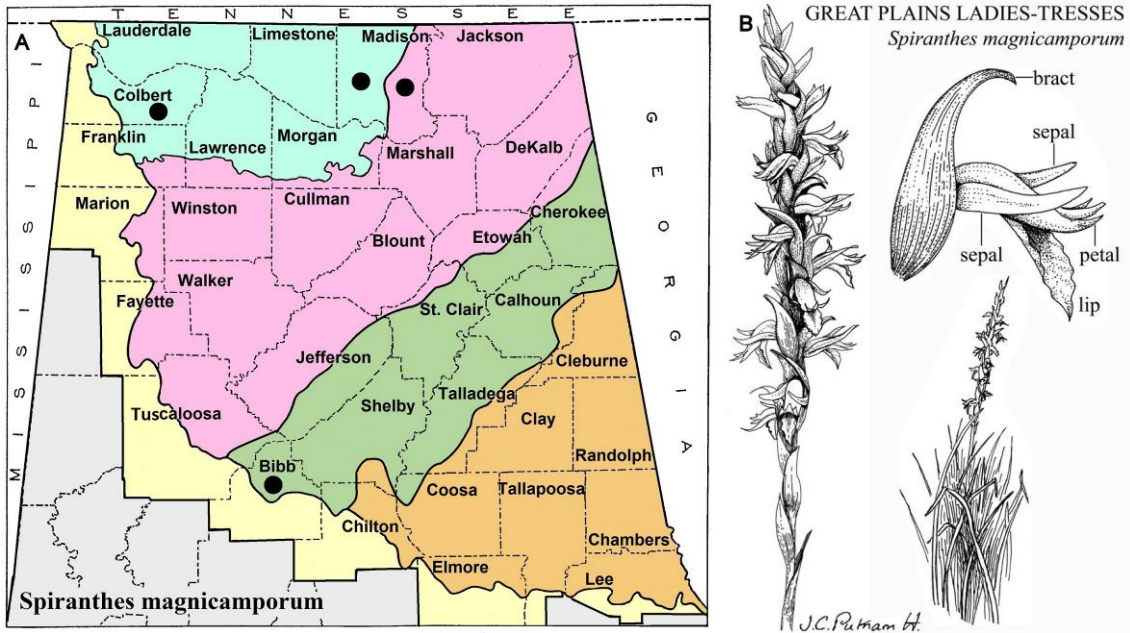


Figure 103. *Spiranthes magnicamporum*. A. Distribution map. B. Illustration by Jean C. P. Hancock, 2007.



Figure 104. *Spiranthes magnicamporum*, Bullock Co., Alabama, 31 Oct 2013. Photos: Eric Soehren.



Figure 105. *Spiranthes magnicamporum*. A. VDB herbarium specimen, *Kral 29621*, Marengo Co., Alabama, 7 Oct 1967. B. UNA herbarium specimen, *Allison 7437*, Bibb Co., Alabama, 1 Nov 1992.

5. *Spiranthes odorata* (Nutt.) Lindl. {fragrant; flowers} — FRAGRANT LADIES'-TRESSES; MARSH LADIES'-TRESSES (Fig. 106). [*Gyrostachys odorata* (Nutt.) Kuntze; *Ibidium odoratum* (Nutt.) House; *Spiranthes cernua* (L.) Rich. var. *odorata* (Nutt.) Correll]



Figure 106. *Spiranthes odorata*. A. Cypress swamp, Butler Co., Alabama, 18 Oct 2013. Photo: Alvin Diamond. B–C. Baldwin Co., Alabama, 14 Oct 2004. Photos: Eric Soehren.

Perennial, terrestrial herb with long, fleshy roots and horizontally spreading stolons. Swamps, marshes, and river sloughs. Flowers & fruits September–November; rare in the Tennessee Valley district of the Highland Rim, Sequatchie Valley district of the Cumberland Plateau, and Coastal Plain (Fig. 107). Its distribution is chiefly in the Coastal Plain of the southeastern USA, from New Jersey south to Florida, west to eastern Texas, and southeastern Oklahoma, with disjunct populations further north in the Southeast (Kartesz 2022).

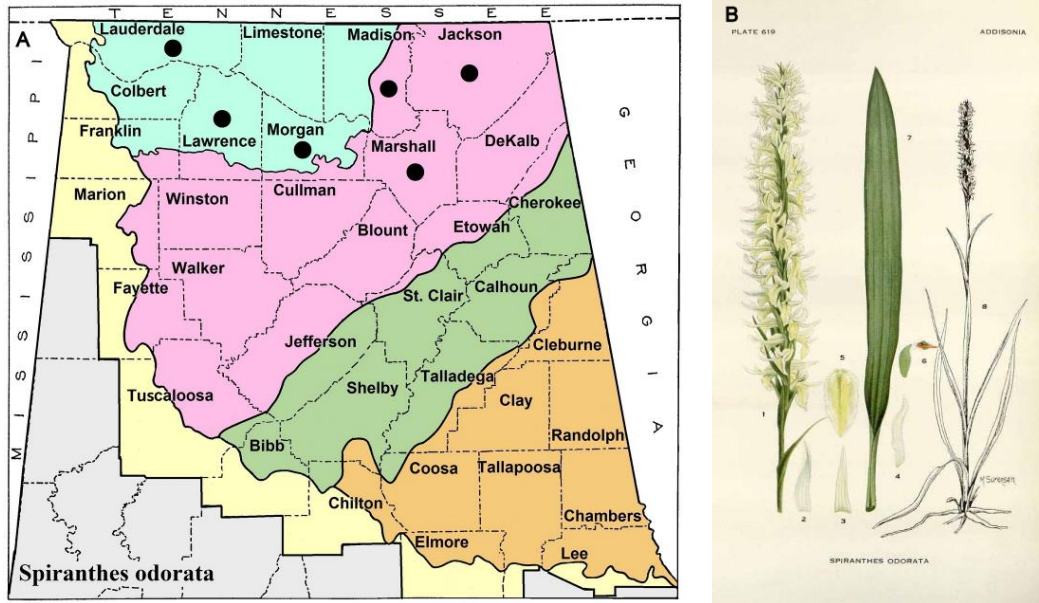


Figure 107. *Spiranthes odorata*. A. Distribution map. B. Illustration by Margaret Sorensen, 1935.



Figure 108. *Spiranthes odorata*. A. UWAL herbarium specimen, Webb 7437, Lauderdale Co., Alabama, 10 Oct 2017. B. VDB herbarium specimen, Kral 62918, Houston Co., Alabama, 12 Oct 1978.



Figure 109. *Spiranthes odorata*, Jackson Co., Alabama, 9 Oct 2014. Photos: Brian Finzel.

Fragrant Ladies'-Tresses is quite similar to *Spiranthes cernua*. Correll (1940) treated it as a variety of that species, stating that it “seems to be a luxuriant variant of *S. cernua*.” *Spiranthes odorata* differs chiefly by having stolons and semi-succulent leaves that typically extend up the stem (Fig. 108) and by having very aromatic flowers (Fig. 109). Luer (1975) wrote: “Perhaps one of the most distinctive features is the potent fragrance which has been compared to many scents (sweet coumarin, vanillin, or jasmine) by various authors.” Correll (1950) noted that Fragrant Ladies'-Tresses “is largely confined to the coastal region in wet, swampy situations. It often grows in the water or on rotten stumps and wood in flooded tupelo-cypress swamps where it occurs in dense clumps because of its stoloniferous habit.” Sheviak & Brown (2002) had *S. odorata* restricted to the lower Coastal Plain of Alabama. In 2009, TVA biologist David Webb discovered populations in the northern part of the state along the Tennessee River (Keener et al. 2022).

6. *Spiranthes ovalis* Lindl. {oval; inflorescence} var. ***erostellata*** Catling {without a rostellum} — LESSER LADIES'-TRESSES; OCTOBER LADIES'-TRESSES; OVAL LADIES'-TRESSES (Fig. 110). [*Ibidium ovale* (Lindl.) House]

Perennial, terrestrial herb with slender, fleshy roots. Rich woods, bottomland forests, and floodplains. Flowers & fruits August–November; rare throughout northern Alabama and the Coastal Plain (Fig. 111). Native to southern Ontario and the eastern USA, from New York to Wisconsin, south to eastern Texas and northern Florida (Kartesz 2022).

Sheviak & Brown (2002) recognize two varieties of *Spiranthes ovalis* (Fig. 112), the typical variety, which is cross-pollinated (allogamous), and var. *erostellata* (Fig. 113), which is self-pollinated (autogamous). *Spiranthes ovalis* var. *ovalis* has fully opened flowers with ovaries that swell progressively up the inflorescence. It occurs mainly in the Southeastern Coastal Plain. *Spiranthes ovalis* var. *erostellata* (Fig. 113) has a broader range and is the only variety occurring in northern Alabama. Its flowers are partially opened or closed; all ovaries swell simultaneously (Sheviak & Brown 2002). Catling (1983) states that var. *erostellata* differs chiefly from var. *ovalis* by lacking a viscidium and rostellum, which aid cross-fertilization. A viscidium is a sticky pad that attaches to pollinating insects. The rostellum is a beak-like extension of the stigma separating it from the anther, preventing self-pollination. The allogamous *S. ovalis* var. *ovalis* (Fig. 114) has larger flowers with lateral sepals 4–6.1 mm long vs. 3.5–5 mm in var. *erostellata*.



Figure 110. *Spiranthes ovalis* var. *erostellata*, Jackson Co., Alabama, 22 Sep 2018. Photos: John Abbott.

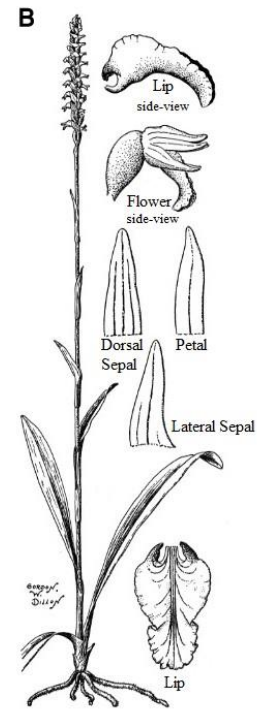
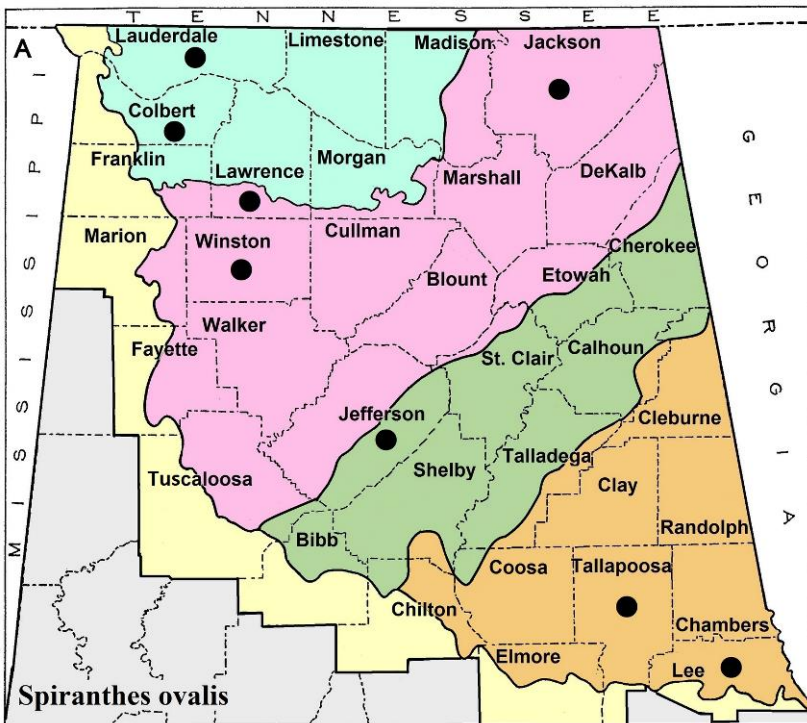


Figure 111. *Spiranthes ovalis* var. *erostellata*. A. Distribution map. B. Drawing by Gordon Dillon, 1950.

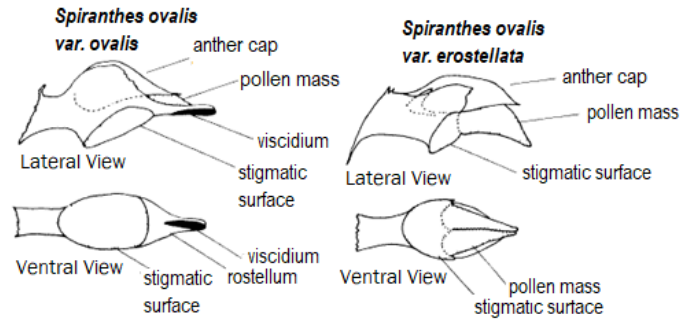


Figure 112. Columns of *Spiranthes ovalis* varieties (adapted from Catling 1983).



Figure 113. *Spiranthes ovalis* var. *erostellata*, Lauderdale Co., Alabama, 19 Sep 2020. Photos: Brian Finzel.

Spiranthes ovalis is often confused with *S. cernua*. However, *S. ovalis* has smaller flowers (lip about 6 mm long) with cupped lateral sepals arranged in three distinct columns, with leaves present during the flowering time (Fig. 115). *Spiranthes cernua* flowers are slightly larger (lip > 6 mm long), not arranged in distinct columns, and have flattened lateral sepals. Its leaves are often absent or occasionally present at anthesis.



Figure 114. *Spiranthes ovalis* var. *ovalis*, Leon Co., Florida, 23 Oct 2022. Photos: Floyd Griffith.



Figure 115. *Spiranthes ovalis* var. *erostellata* herbarium specimens. A. VDB, Kral 44970, Winston Co., Alabama, 7 Oct 1972. B. ALNHS, Barger & Holt FH-562, Colbert Co., Alabama, 22 Sep 2014.

7. *Spiranthes praecox* (Walter) S. Watson {early maturing; spring blooming time} — GREEN-VEIN LADIES'-TRESSES; GRASS-LEAVED LADIES'-TRESSES (Fig. 116). [*Gyrostachys praecox* (Walter) Kuntze; *Ibidium praecox* (Walter) House]



Figure 116. *Spiranthes praecox*, Bullock Co., Alabama, 25 Apr 2019. Photos: Eric Soehren.

Perennial, terrestrial herb with slender, fleshy roots. Bogs, swamps, savannas, and wet roadside ditches. Flowers & fruits late March–early June; rare in northern Alabama; uncommon in the Coastal Plain (Fig. 117). Native to the southeastern USA, from New Jersey south to Florida, west to southern Arkansas and eastern Texas (Sheviak & Brown 2002).

One can usually easily identify *Spiranthes praecox* (Fig. 118) by its green-veined lip, spring flowering, and linear or lanceolate leaves that persist through anthesis (Fig. 119). However, the flowers of some individuals have faint green veins or are entirely white. These unusual specimens resemble *S. vernalis*, but *S. praecox* does not have translucent bract margins, a yellowish lip, or pointed hairs.

Brown (2001) described a closely related species as *S. sylvatica* [Woodland Ladies'-tresses], which he documented only from the Southeastern Coastal Plain. Its range is not entirely known, and it possibly occurs elsewhere. Weakley et al. (2022) state that *S. sylvatica* has a laxer spiral (as few as three or four flowers per turn), much longer lip (recurved), relatively spreading sepals (oriented downward), larger flowers [10–17 mm vs. 6–9 mm] with greenish veins on both sepals and lips and the flowers overall with a more yellowish green color (vs. bright white).” Some botanists doubt the

uniqueness of *Spiranthes sylvatica*. The Virginia Botanical Associates (2022) states that “the differences appear to be totally clinal, with many populations exhibiting intermediate characters (M. Pace, pers. comm.). It may represent an ecotype of *S. praecox* adapted to shaded, upland forest habitats.” Orchid expert John Gange (pers. comm. 2022) writes, “*S. sylvatica* is supposed to have comparatively large (apparently 10–17 mm vs. 6–9 mm), creamy green flowers, lateral sepals which are not appressed to the petals, and supposedly multiple-ranked inflorescences. Most of these characteristics appear to occur on a spectrum. To me, *S. sylvatica* is likely not a species.” Dueck et al. (2014) write that *S. sylvatica* is “possibly a more chlorophyllous, dark-green form of *S. praecox* adapted to shady habitats” and that further systematic study is needed.

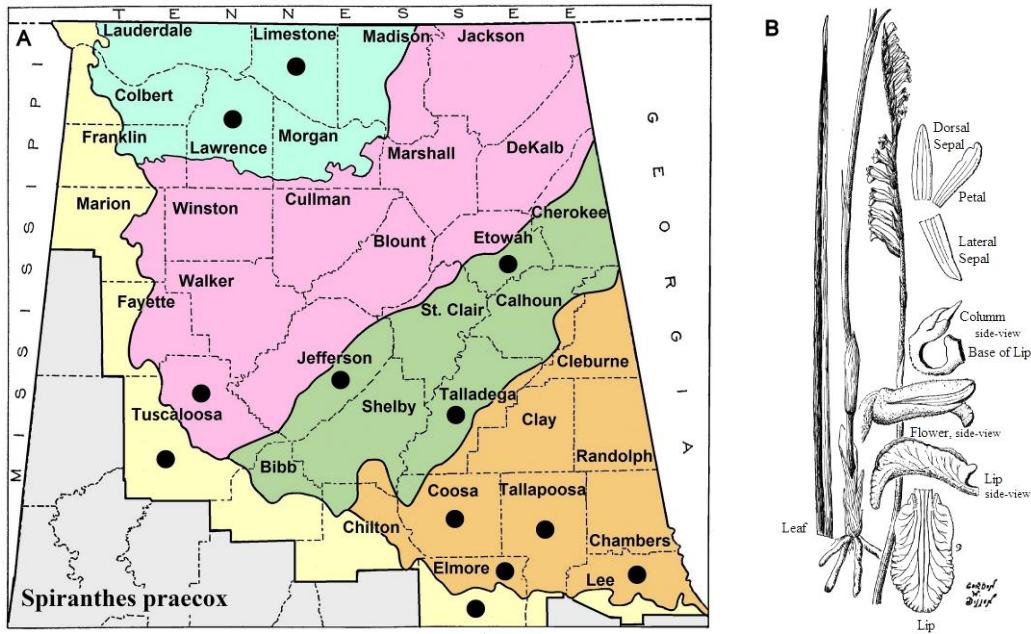


Figure 117. *Spiranthes praecox*. A. Distribution map. B. Drawing by Gordon W. Dillon, 1950.



Figure 118. *Spiranthes praecox*, Russell Co., Alabama, 1 May 2021. Photos: Brian Finzel.



Figure 119. *Spiranthes praecox* herbarium specimens. A. UWAL, Kral 84732, Limestone Co., Alabama, 19 May 1995. B. UWAL, Horne 2843, Mobile Co., Alabama, 23 Apr 2015.

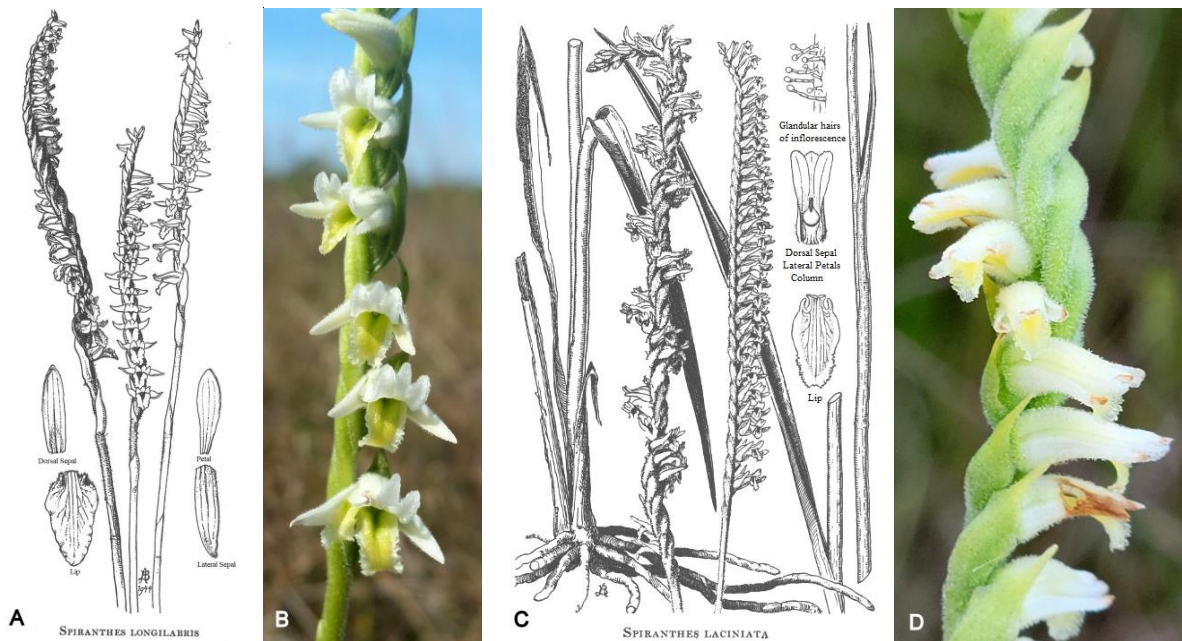


Figure 120. A. Drawing of *Spiranthes longilabris* by Blanche Ames, 1944. B. Photo of *S. longilabris* by Jay Horn, Everglades, Charlotte Co., Florida, 27 Nov 2019. C. Drawing of *Spiranthes laciniata* by Blanche Ames, 1947. D. Photo of *Spiranthes laciniata* by Jay Horn, Hendry Co., Florida, 17 May 2022.

We have eliminated two additional *Spiranthes* species reported from northern Alabama, including *S. longilabris* Lindl. [Giant-Spiral Ladies'-Tresses] from Tuscaloosa County (UNA) and *S. laciniata* (Small) Ames [Lace-Lip Ladies'-Tresses] from Lee County (AUA). Dan Spaulding determined both specimens as *S. praecox*. Matthew Pace, an orchid expert from the New York Botanical Gardens, assisted in their determination. Giant-Spiral Ladies'-Tresses and Lace-Lip Ladies'-Tresses are Southeastern Coastal Plain endemics (Weakley et al. 2022). Their flowers have lips with yellowish centers rather than green veins. These two species are similar (Fig. 120), but *S. longilabris* has widely spreading, flat lateral sepals and usually flowers from October to December. *Spiranthes laciniata* has cupped lateral sepals that are slightly spreading, and it blooms from May through August in various parts of its range (Correll 1950).

8. *Spiranthes tuberosa* Raf. {tuberous; referring to the tuberoid root} — LITTLE LADIES'-TRESSES; LITTLE PEARL-TWIST (Fig. 121). [*Gyrostachys simplex* (Griseb.) Kuntze; *Spiranthes beckii* auct. non Lindl.; *Spiranthes grayi* Ames; *Spiranthes tuberosa* var. *grayi* (Ames) Fernald]



Figure 121. *Spiranthes tuberosa*. A. Shelby Co., Alabama, 1 Sep 2018. Photo: Vitaly Charny. B. St. Clair Co., Alabama, 17 Sep 2015. Photo: Brian Finzel.

Perennial, terrestrial herb with a solitary, tuberous root. Roadsides, fields, lawns, and well-drained woodlands. Flowers & fruits late May–October; uncommon throughout Alabama (Fig. 122). Native to the eastern USA, from Massachusetts, Michigan, and eastern Kansas, south to Florida and east Texas (Kartesz 2022).

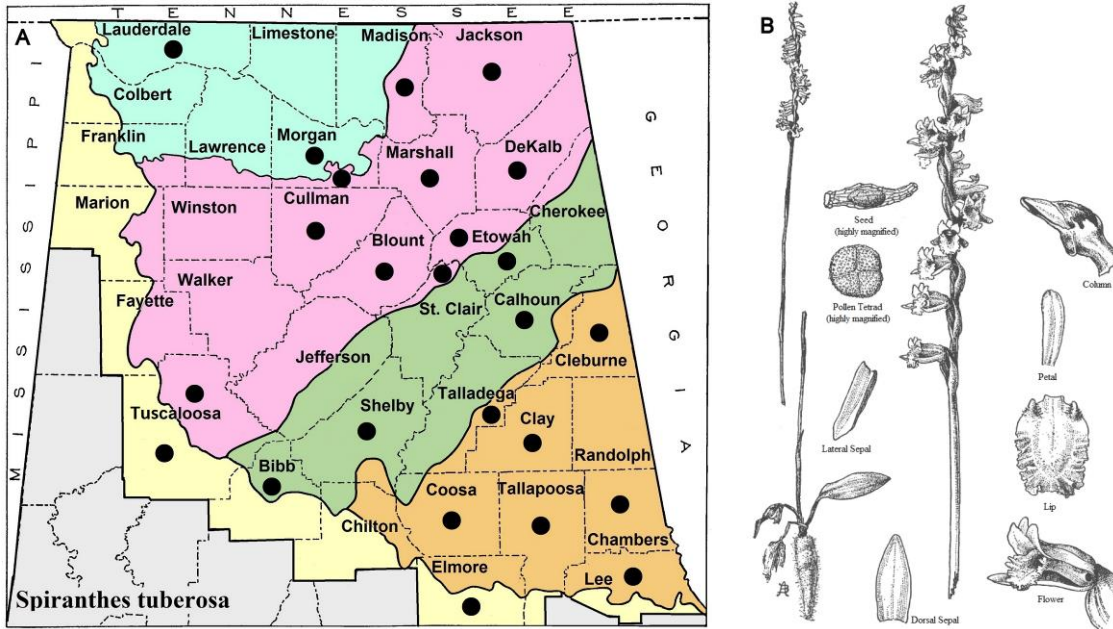


Figure 122. *Spiranthes tuberosa*. A. Distribution map. B. Drawing by Blanche A. Ames, 1947.



Figure 123. Comparison of two *Spiranthes*. A. *Spiranthes tuberosa*, St. Clair Co., Alabama, 17 Sep 2015. Photo: Brian Finzel. B. *S. lacera* var. *gracilis*, Etowah, Co., Alabama, 25 July 2021. Photo: Dan Spaulding.

Little Ladies'-Tresses is endemic to the eastern USA (Sheviak & Brown 2002). Fernald (1946) recognized two varieties of *Spiranthes tuberosa*, stating that it “consists of two strongly marked geographical variations.” He wrote that the northern entity, var. *grayi*, had a “relatively dense and strongly spiraling spike.” The southern variant, var. *tuberosa*, had “one-sided to slightly twisted spikes with flowers that did not overlap.” Ames (1947) disagreed with Fernald. He stated that “varying degrees of spirality in the arrangement of the flowers may be regarded as the consequence of individual variation or as the effects of climate or environment. Under certain climatic conditions and in response to favorable edaphic influences, the flower scape may elongate rapidly.”



Figure 124. *Spiranthes tuberosa* herbarium specimens. A. UWAL, Spaulding & Soehren 14718, Elmore Co., Alabama, 5 Sep 2016. B. JSU, Spaulding 2785, Marshall Co., Alabama, 30 Aug 1992.

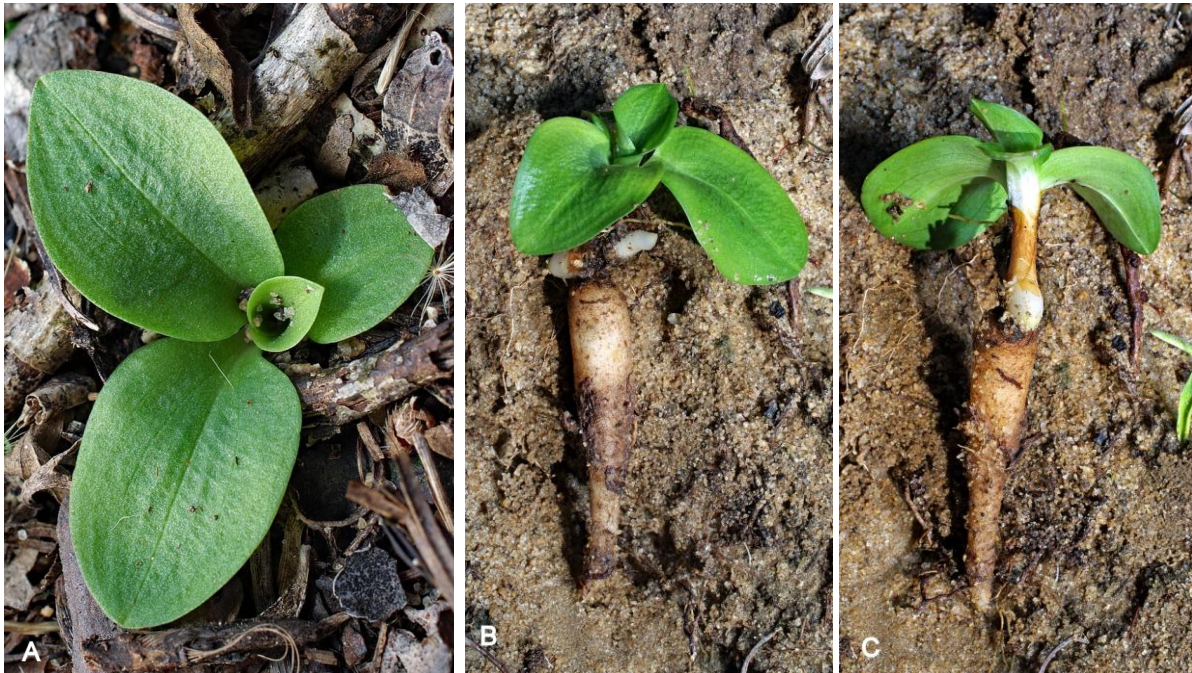


Figure 125. *Spiranthes tuberosa* leaves and tuber, Jackson Co., Florida. A. 11 Dec 2021. B–C. 22 Dec 2021. Photos: Floyd Griffith.

Spiranthes lacera var. *gracilis* is similar to *S. tuberosa* (Fig. 123). These two species bloom around the same time, occur in similar habitats, and often lack leaves when flowering (Fig. 124). *Spiranthes tuberosa* has an entirely white lip (vs. green centrally) and a solitary tuberoid (Fig. 125) rather than several. Additionally, Little Ladies'-Tresses has a hairless inflorescence, whereas *lacera* var. *gracilis* generally have at least a few scattered hairs along its rachis. Sheviak & Brown (2002) state that *S. lacera* var. *gracilis* is essentially glabrous, but numerous specimens in Alabama have scattered hairs within their inflorescence (Fig. 123b). Both taxa also generally lack leaves at anthesis.

9. *Spiranthes vernalis* Engelm. & A. Gray {spring; flowering time} — SPRING LADIES'-TRESSES; NARROW-LEAF LADIES'-TRESSES (Fig. 126). [*Gyrostachys vernalis* (Engelm. & A. Gray) Kuntze; *Ibidium vernale* (Engelm. & A. Gray) House]



Figure 126. *Spiranthes vernalis*, Cleburne, Co., Alabama, 5 June 2022. Photos: Dan Spaulding.

Perennial, terrestrial herb with thick, fleshy roots. Roadside ditches, bogs, meadows, marshes, low pastures, moist woodland borders, and depressions in rock outcrops. Flowers & fruits April–August; uncommon in northern Alabama; frequent in the Coastal Plain (Fig. 127). Native to the eastern USA, from Massachusetts, southern Indiana, and eastern Nebraska, south to eastern Texas and Florida (Sheviak & Brown 2002); also in Mexico and Central America (Correll 1950).

Spiranthes vernalis initiates flowering in spring and produces grass-like leaves at anthesis; however, its leaves can appear absent at flowering due to grazing animals or mowing of their grassy habitats. The main characteristics of *S. vernalis* are its densely pubescent inflorescence composed of non-glandular, sharp-pointed hairs (Fig. 128), floral bracts with thin translucent margins, and yellowish lip lacking green veins. *Spiranthes vernalis* (Fig. 129) can be confused with *S. praecox*, which is also spring flowering and has narrow leaves that generally persist through anthesis. Further northward, *S. vernalis* flowers later in the summer and is called “grass-leaved ladies’-tresses.” This designation adds to the confusion because *S. praecox* bears the same common name.

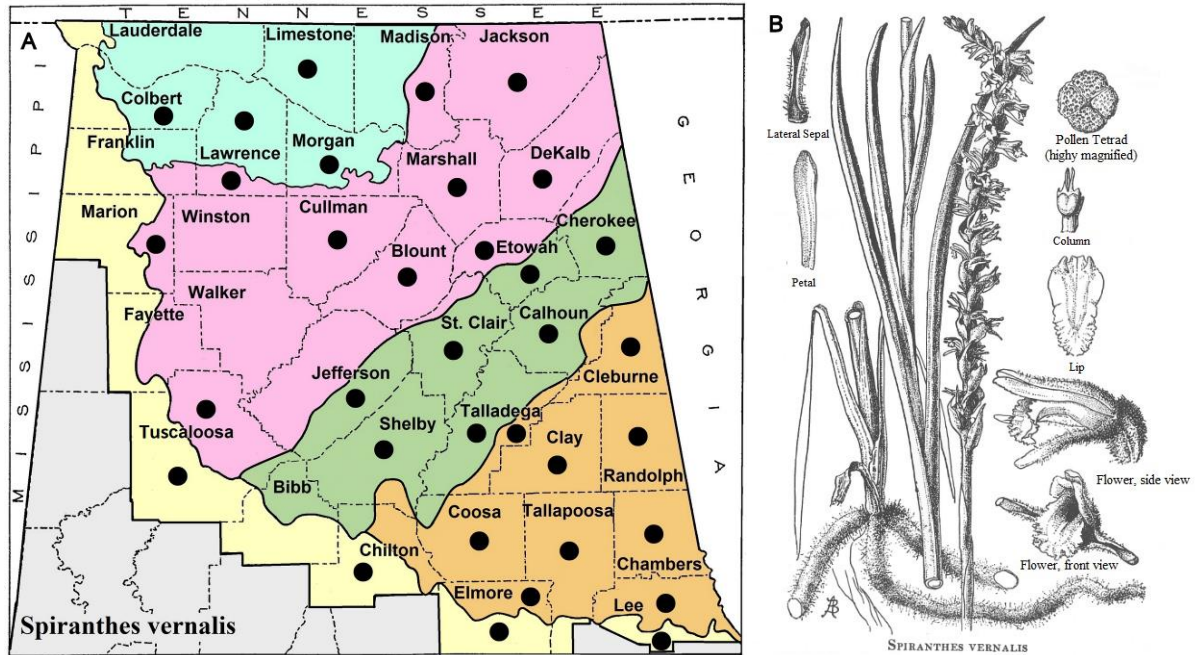


Figure 127. *Spiranthes vernalis*. A. Distribution map. B. Drawing by Blanche A. Ames, 1947.



Figure 128. *Spiranthes vernalis*, Baldwin Co., Alabama, 3 May 2015. Photos: Brian Finzel.



Figure 129. *Spiranthes vernalis* herbarium specimens. A. UWAL, *England 795*, Lawrence Co., Alabama, 12 June 2008. B. UWAL, *England 4913*, Baldwin Co., Alabama, 6 June 2014.

18. TIPULARIA Nuttall 1818

[Latin *tippula*, crane-fly; alluding to the flowers resembling the crane-fly in flight]

1. *Tipularia discolor* (Pursh) Nutt. {two-colored; alluding to contrasting color of leaf surfaces} — CRANEFLY ORCHID; CRIPPLED-CRANEFLY (Fig. 130). [*Tipularia unifolia* Britton, Stearns & Poggenb.]

Perennial, terrestrial herb from jointed corms. Growing in a wide variety of mesic to dry forests and woodlands. Flowers July–September, fruits August–November (persisting through winter); frequent throughout Alabama (Fig. 131). Native to the eastern USA, from New York and Massachusetts to southern Michigan and eastern Oklahoma, south to northern Florida and east Texas (Catling & Sheviak 2002).

The flowers of this orchid somewhat resemble a cranefly (Tipulidae), giving rise to its common name (Shosteck 1974). It is also known as “crippled-crane-fly” because of a distorted petal (Fig. 132). Correll (1950) states: “One of the petals distinctly overlaps the dorsal sepal for about half its width, resulting in a ‘crippled’ appearance of the flower.” Luer (1975) writes: “The flimsy little lopsided flowers hang loosely out from the slender stem, and do indeed resemble at first glance a parade of crippled crane-flies.”

Crane-fly Orchid produces a solitary leaf in autumn that is evergreen throughout the winter. It withers the following summer when the flowering stalks appear. Puttyroot (*Aplectrum hyemale*) is the only other Alabama orchid that exhibits this trait, though its “naked” inflorescence appears in the spring (Fig. 133). The two species are sometimes mistaken for each other when not in flower since both have a solitary overwintering leaf (usually purplish beneath) arising from corms (Fig. 134).

Aplectrum differs by having leaves that taper at both ends and are noticeably pleated above with white, thickened veins. *Tipularia* leaves have rounded or truncated bases. Their upper surface is ribbed and lacks white veins, though they can have scattered warty spots of purple. Rarely is the entire leaf of the Crane-fly Orchid colored purple (Fig. 135a). Old fruiting stalks are often present with the leaves (Fig. 135b–c & 136).



Figure 130. *Tipularia discolor*. A. Lee Co., Alabama, 1 Aug 2018. B–C. Bullock Co., Alabama, 13 Aug 2021. Photos: Eric Soehren.

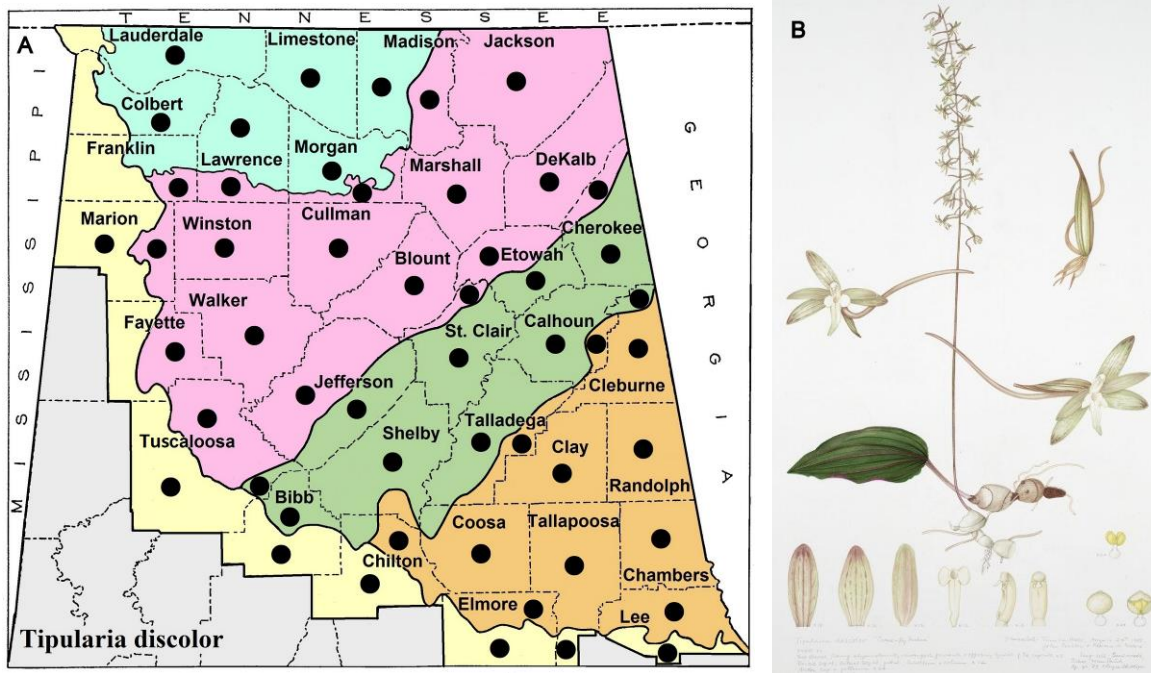


Figure 131. *Tipularia discolor*. A. Distribution map. B. Watercolor by Elsie Margaret Stones, 1982 (Native Flora of Louisiana: Watercolor Drawings, Louisiana Digital Library, Baton Rouge, LA).

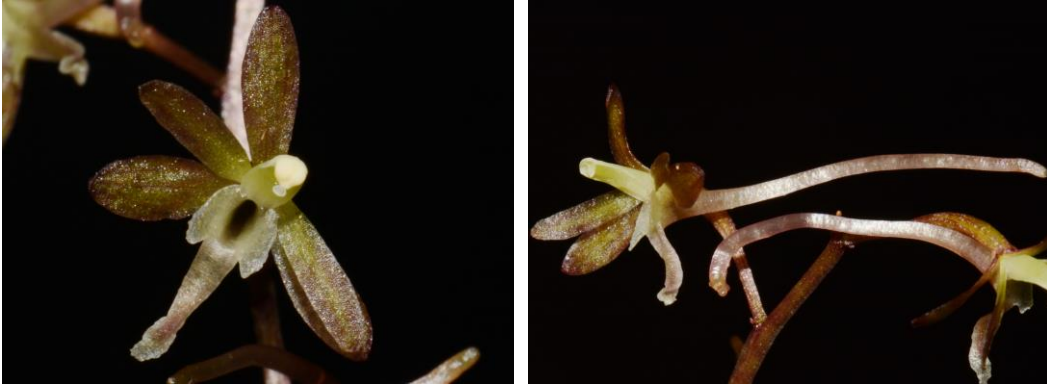


Figure 132. *Tipularia discolor*, Franklin Co., Tennessee, 27 July 2014. Photos: Brian Finzel.



Figure 133. *Tipularia discolor*. A. In bud, Henry Co., Alabama, 20 July 2022. B. Morgan Co., Alabama, 11 Aug 2022. Photos: Dylan Shaw. C. Cleburne, Co., Alabama, 23 Aug 2020. Photo: Dan Spaulding.



Figure 134. *Tipularia discolor*. A. Calhoun, Co., Alabama, 24 Feb 2022. B–D. Chambers Co., Alabama, 23 Oct 2021. Photos: Dan Spaulding.



Figure 135. *Tipularia discolor*. A. DeKalb Co., Alabama, 15 Oct 2022. Photo: @Blushine, iNaturalist. B. Macon Co., Alabama, 26 Mar 2020. Photo: Eric Soehren. C. Calhoun, Co., Alabama, 24 Feb 2022. Photo: Dan Spaulding.



Figure 136. *Tipularia discolor* herbarium specimens. A. JSU, Brodeur & Whetstone 1000, Jackson Co., Alabama, 3 July 1998. B. UWFP, Burkhalter & Wilhelm 10527, Escambia Co., Alabama, 30 Dec 1986.

19. TRIPHORA Nuttall 1818

[Greek *tri*, three, and *phoros*, bearing; alluding to the few flowers or number of crests on the lip]

1. *Triphora trianthophoros* (Sw.) Rydb. var. *trianthophoros* {three blossoms} — THREE-BIRDS ORCHID; NODDING-POGONIA (Fig. 137). [*Pogonia pendula* Lindl.; *Pogonia trianthophoros* (Sw.) Britton, Sterns & Poggenb.; *Triphora trianthophoros* var. *schaffneri* Camp]



Figure 137. *Triphora trianthophoros*, Jackson Co., Alabama, 21 Aug 2022. Photos: Helen A. Czech.

Perennial, terrestrial herb with tuberoids. Bottomland forests, rich woods, and floodplains. Flowers July–September, fruits September–November (earlier further south); rare throughout Alabama (Fig. 138). Native to the eastern USA and adjacent Canada, from southern Maine to Ontario and Wisconsin, south to east Texas and central Florida; disjunct in north-central Mexico (Medley 2002).

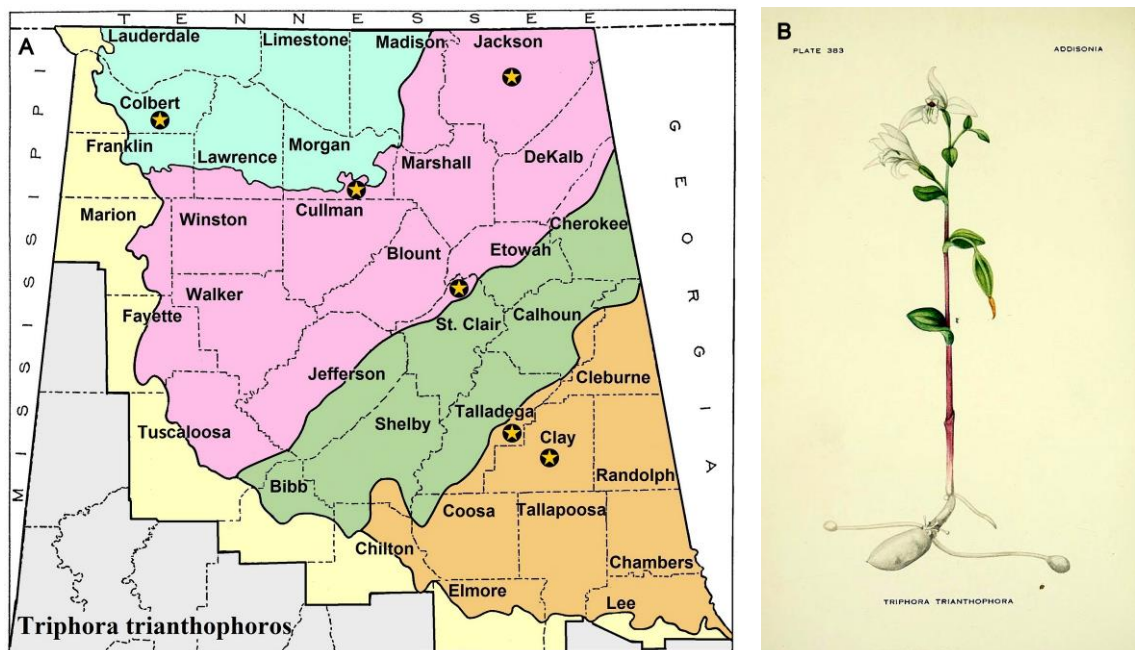


Figure 138. *Triphora trianthophoros*. A. Distribution map. B. Illustration by Mary Emily Eaton, 1926.

Three-Birds Orchid (Fig. 139) is a delicate little plant with a few small, roundish leaves that clasp its fragile stem. It typically has one to six white to pinkish flowers (Fig. 140) borne in the axils of its upper bract-like leaves (Correll 1950). However, it frequently has only three flowers, which fancifully resemble birds in flight, giving rise to its common name (Grimm 1968). *Triphora trianthophoros* is rare or threatened throughout much of its range in North America, and habitat destruction is its biggest threat (Ramstetter 2001). The Alabama State Heritage Program plans to rank this orchid as imperiled (S2) on the 2023 state inventory list (Al Schotz pers. comm. 2023).



Figure 139. *Triphora trianthophoros*, Swain Co., North Carolina, 17 Aug 2018. Photos: Brian Finzel.

Weakley et al. (2022) note that “the flowers are extremely ephemeral, making the species very difficult to locate.” Each flower usually lasts only a day, but some may remain fresh for a second day if not fertilized (Luer 1975). Small bumblebees (*Bombus*) and masked bees (*Hylaeus*) are its chief pollinators (Williams 1994). Dr. Robert Kral (pers. comm. 1999) shared with Dan Spaulding that he called *Triphora* his “ghost orchid” because he had never encountered it in the field. Williams (1994) wrote that *T. trianthophoros* is “elusive and secretive, appearing abundantly one year and rare or absent for many succeeding years.” She continued: “The most unusual feature of this orchid, however, is its existence for years at a time in a subterranean, tuberous condition.”



Figure 140. *Triphora trianthophoros*, Sumter Co., Florida, 24 Apr 2010. Photos: Mark Larocque.

Three-Birds Orchid usually exists in small, scattered populations, exhibiting synchronous flowering to enhance their chances of cross-fertilization (Medley 2002). Williams (1994) wrote that most of its short-lived flowers begin to bloom 48 hours after a temperature drop. This phenomenon produces the simultaneous flowering of all individuals in a region. Still, plants infrequently set seed (Williams 1994). Ramstetter (2001) noted that *Triphora trianthophoros* “may rely heavily on vegetative reproduction via tuberoids (Fig. 141a).”



Figure 141. *Triphora trianthophoros* herbarium specimens. A. Flowering with tuberoid, TROY, Webb s.n., Conecuh Co., Alabama, 12 Aug 2014. B. Nodding fruit, JSU, Ballard 5078, Clay Co., Alabama, 28 Sep 1994. C. Erect fruit, AMAL, Barger & Holt HC-421, Jackson Co., Alabama, 26 Oct 2009.



Figure 142. *Triphora trianthophoros*. A. Young fruiting capsules, Scott Co., Tennessee, 1 Sep 2022. Photo: Debra Exberger. B. Mature capsules dehiscent, Noxubee Co., Mississippi, 18 Oct 2022. Photo: Sam Schmid.

Triphora trianthophoros var. *trianthophoros* is the only variety occurring in Alabama. It was previously known only from eastern North America, but Medley (1996) discovered a disjunct population in Mexico. A second variant, var. *mexicana* (S. Watson) P.M. Brown, ranges south from Mexico to Central America. Medley (1991) treated this southwestern plant as a subspecies, stating

that it differed by having purple markings on its lip and broadly ovate leaves, often basally disposed and purple underneath. Brown & Pike (2006) described a third variety, *T. trianthophoros* var. *texensis*, endemic to Houston County, Texas. Weakley et al. (2022) state that this entity “needs additional evaluation before being accepted.” Camp (1940) designated another variety, *T. trianthophoros* var. *schaffneri*, based on its erect capsules. He named it in honor of its discoverer, Ohio State University botanist John Henry Schaffner (1866–1939). Ramstetter (2001) stated it was not a genuine variety because all nodding capsules eventually become upright (Figs. 141b–c & 142).

2. IRIDACEAE (Iris Family) – in ASPARAGALES

- 1. Flowers sessile, bilaterally symmetric (zygomorphic); inflorescence a spike or panicle of spikes; plants from corms.
 - 2. Inflorescence a panicle of spikes; bracts 1.5 cm long; stem usually branched; perianth orange-red; flowers weakly zygomorphic **Crocasmia**
 - 2. Inflorescence a spike; bracts 2 cm or longer; stem unbranched; perianth an assortment of colors; flowers strongly zygomorphic..... **Gladiolus**

- 1. Flowers pedicellate (stalked), radially symmetric (actinomorphic); inflorescence an umbellate 1-sided cyme; plants from rhizomes or fibrous roots.
 - 3. Flowers small, perianth segments (tepals) < 15 mm long; stems winged; leaves narrow, 0.5–6 mm wide; plants from fibrous roots; seeds small, 0.5–1.3 mm in diameter **Sisyrinchium**
 - 3. Flowers larger, perianth segments > 15 mm long; stems not winged; leaves often broader, 2–50 mm wide; plants from rhizomes; seeds large, mostly 4–6 mm in diameter.....**Iris**

1. CROCOSMIA Planchon 1851

[Greek *krokos*, crocus, and *osme*, scent; dried flowers smell like saffron, which comes from *Crocus*]

1. *Crocasmia* ×*crocosmiiflora* (Lemoine) N.E. Br. {crocus-scented flowers} — COPPER-TIPS; FALLING-STARS; MONTBRETIA (Fig. 143). [*Montbretia* ×*crocosmiiflora* Lemoine]

Perennial herb from a corm. Roadside ditches, disturbed alluvial woods, and creek banks. Flowers late May–September; very rare throughout Alabama (Fig. 144). Parents of this taxon are native to South Africa; the hybrid has escaped cultivation chiefly in the southeastern USA, Pacific States, and adjacent British Columbia (Goldblatt 2002b).

In 1880, French nurseryman Victor Lemoine crossed *Crocasmia aurea* (Pappe ex Hook. f.) Planch. with *C. pottsii* (Macnab ex Baker) N.E. Br., creating *C. ×crocosmiiflora* (Bailey 1949). The hybrid is grown for its vivid reddish-orange flowers, much valued for attracting hummingbirds (Fig. 145a). The inflorescences are suitable for fresh-cut flowers, which florists frequently use in commercial arrangements. *Crocasmia* ×*crocosmiiflora* has escaped cultivation in the Pacific Islands, Madagascar, Central America, South America, and North America (Goldblatt 2002b). When cultivated, unimpeded sunlight is necessary to produce maximum flower development. The fruiting capsules often produce viable seeds, but since this plant is stoloniferous (Fig. 145b), it can also spread vegetatively, forming large colonies. Indigenous South African women traditionally used *Crocasmia* corms to enhance fertility (Steenkamp 2003). The corms contain many biologically active compounds, including chemicals with anti-tumor activities (Żurawik et al. 2015).



Figure 143. *Crocosmia x crocosmiiflora*, Cleburne Co., Alabama, 23 July 2008. Photos: Bill Garland.

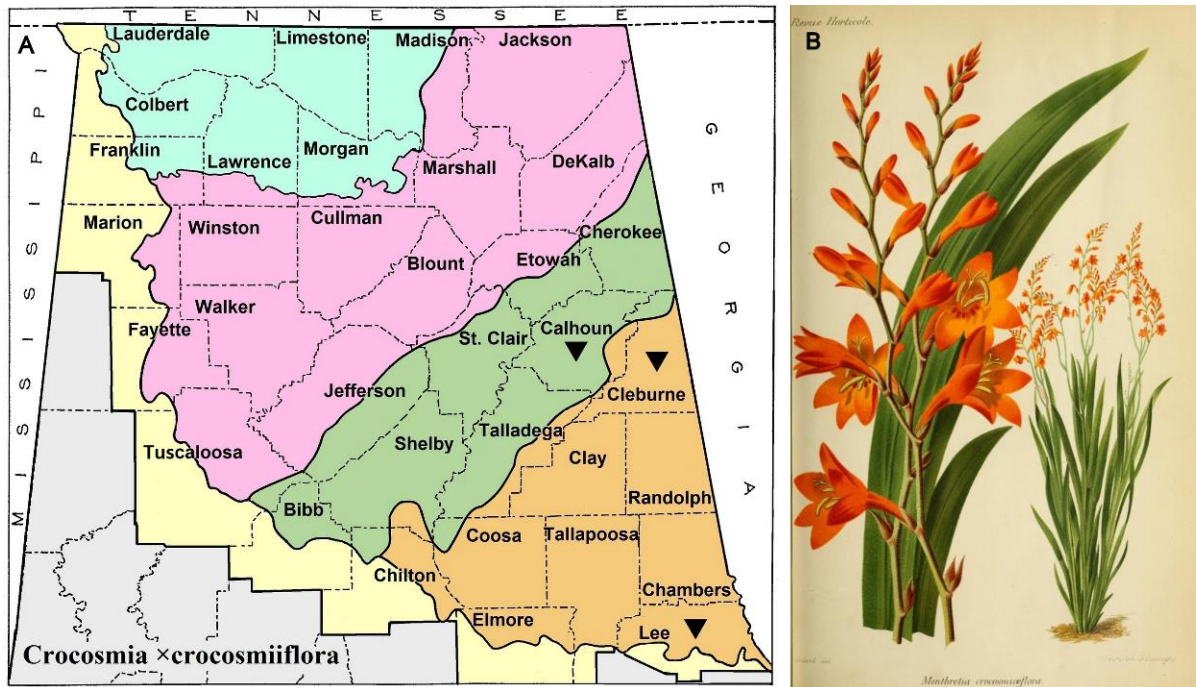


Figure 144. *Crocosmia x crocosmiiflora*. A. Distribution map. B. Illustration by Edouard Godard, 1882.



Figure 145. *Crocosmia* ×*crocosmiiflora*. A. Flowering branch, Cleburne Co., Alabama, 23 July 2008. Photo: Bill Garland. B. Corm with stolons, Calhoun Co., Alabama, 18 July 2022. Photo: Dan Spaulding.

2. GLADIOLUS Linnaeus 1754

[Latin *gladius*, little sword; alluding to the shape of the leaf]

1. Flowers small, less than 6 cm long; perianth reddish-purple, magenta, or pinkish-purple with white streaks on outer tepals; floral tube short, 0.8–1.5 cm long; claw of outer tepals narrow, less than 3 mm wide; floral bracts 2–3.5 cm long and < 1 cm wide..... **Gladiolus communis**
1. Flowers larger more than 6 cm long; perianth variously colored and marked, but not as above; floral tube longer, 2.5–4.5 cm long; claw of tepals broader, more than 5 mm wide; floral bracts > 3.5 cm long and > 1 cm wide at the base.
 2. Outer tepals 3.5–5 cm long and < 2.5 cm wide, typically all three arched or hooded over stamens; perianth orange to reddish-orange with yellow marking or tepals yellow with reddish-brown streaks, lower (inner) tepals mostly yellow except for the tips..... **Gladiolus dalenii**
 2. Outer tepals 6–7 cm long and > 2.5 cm wide, often the two lateral ones spreading with dorsal tepal arched over stamens; perianth red, yellow, orange, pink, peach, purple, or white with various markings **Gladiolus** ×**gandavensis**

1. Gladiolus communis L. {common} — EASTERN GLADIOLUS; FALSE CORNFLAG, SWORD-LILY; TURKISH CORNFLAG (Fig. 146). [*Gladiolus byzantinus* Mill.; *Gladiolus communis* ssp. *byzantinus* (Mill.) A.P. Ham.; *Gladiolus papilio* auct. non Hook. f.]

Perennial herb from a corm. Roadsides, fields, and old homesites. Flowers April–May; rare throughout Alabama (Fig. 147). Native to southwest Europe and North Africa, centered around the Mediterranean region, introduced in the southeastern USA (Goldblatt 2002c).



Figure 146. *Gladiolus communis*, Lauderdale Co., Alabama, 22 May 2021. Photos: Kevin England.

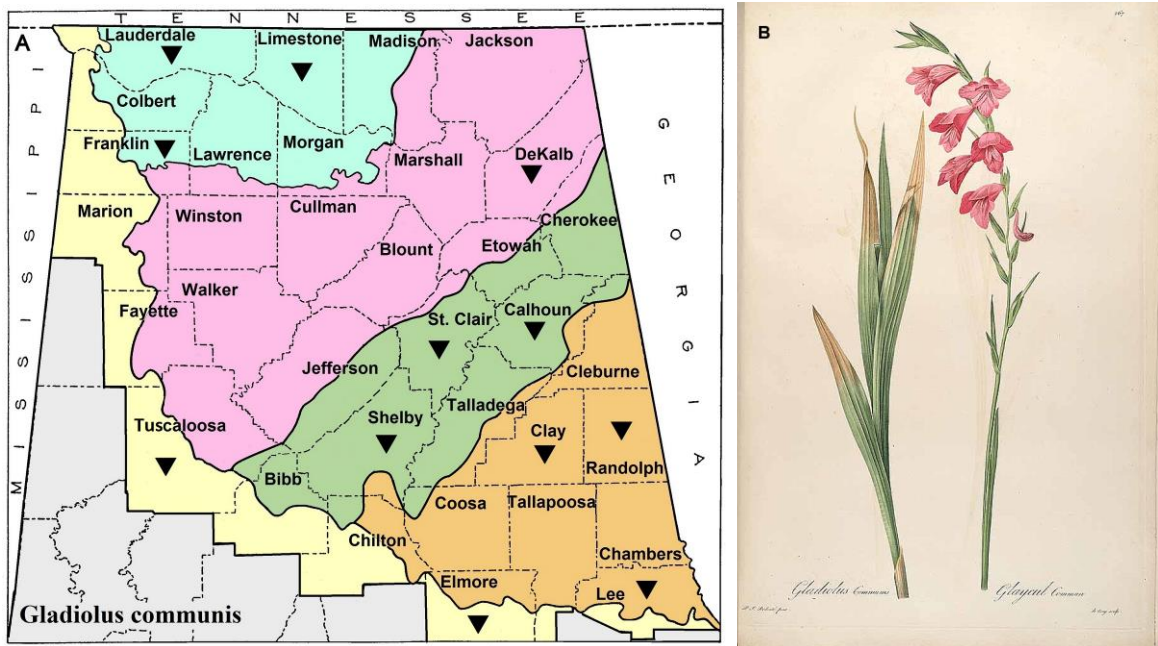


Figure 147. *Gladiolus communis*. A. Distribution map. B. Painting by Pierre Joseph Redouté, 1805.

Five species of *Gladiolus* are native to Europe, all of which have reddish-purple flowers (Hamilton 1980). Goldblatt (2002c) listed only two occurring in North America, with *G. communis* (Fig. 148) scattered throughout the southern USA and *G. italicus* [Field Gladiolus] escaping in California. Kartesz (2022) documented other occurrences in South Carolina, Georgia, Tennessee, Kentucky, Mississippi, and east Texas. In the spring of 2022, Wayne Barger made the first collection of *G. italicus* (Fig. 149a) for our state in Macon County, Alabama (Barger et al. 2023). The site is in the Fall Line Sand Hills, just outside our study area.



Figure 148. *Gladiolus communis*, DeKalb Co., Alabama, 18 May 2022. Photos: Mary Shew.

Goldblatt (2002c) writes that the distinguishing characteristics of *G. italicus* lie in its anthers being longer than the filaments (Fig. 149b), globose capsules (Fig. 149c), and its unwinged seeds (Fig. 150a). The anthers of *G. communis* are shorter or nearly as long as the filaments (Fig. 151a); its fruit is longer than broad (Fig. 151b); and its seeds are winged (Fig. 150b). Mifsud & Hamilton (2013) state that the wings “help the seed to be dispersed by wind further away from the mother plant. Although the lack of wings might appear to be a disadvantage for the plants, it is well observed that unwinged seeds can withstand the threshing process of food grains better than winged seeds. Unintentionally, humans have, as a result, selected these species with unwinged seeds in favor of those with winged by repeated threshing practices over many decades.”



Figure 149. *Gladiolus italicus*, herbarium specimens. A–B. Flowering (note long anthers), ALNHS, *Barger SP#5697*, Macon Co., Alabama, 20 Apr 2022. C. Fruiting (note globose capsules), ALNHS, *Barger SP#5730*, Macon Co., Alabama, 10 May 2022.

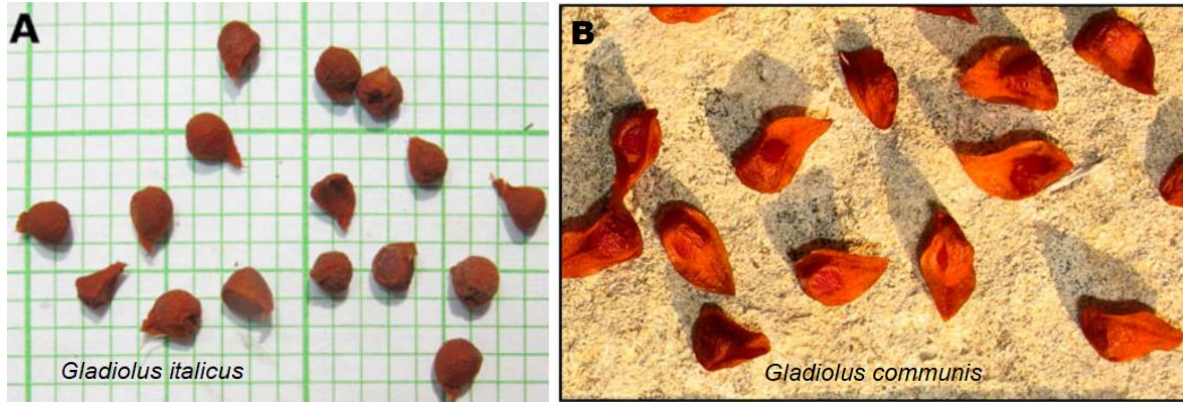


Figure 150. *Gladiolus* seeds (Mifsud & Hamilton 2013). A. Unwinged, *G. italicus*. B. Winged, *G. communis*.

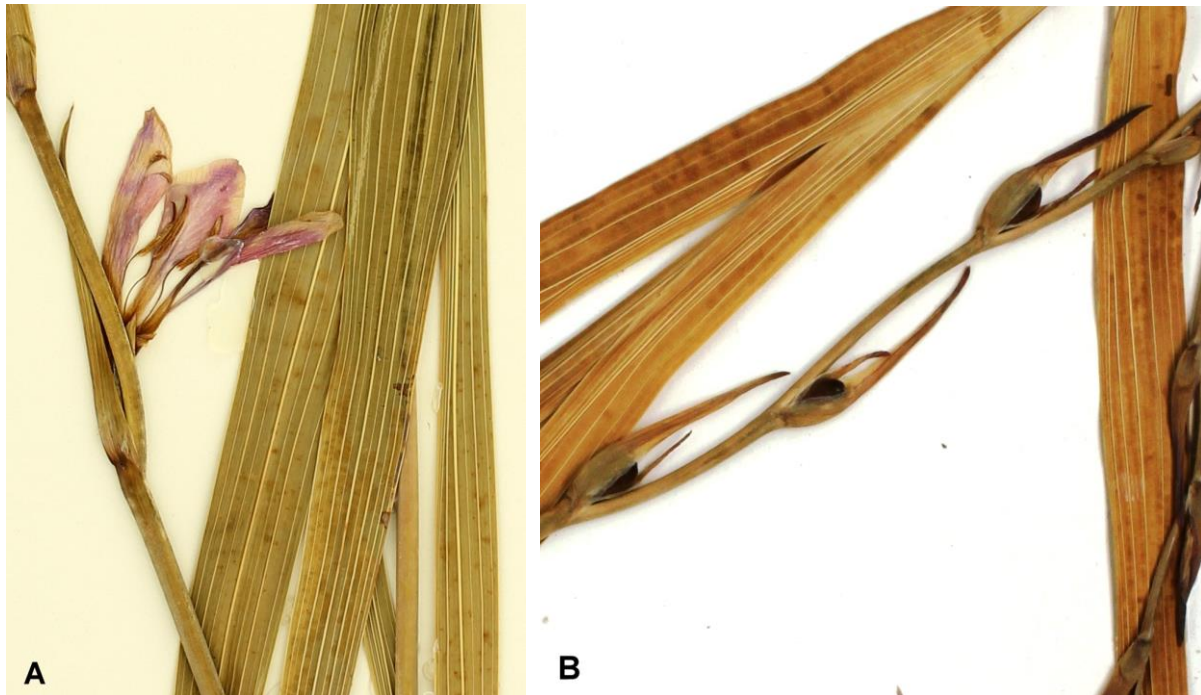


Figure 151. *Gladiolus communis*. A. Long filaments, UNA, Keener 2879, DeKalb Co., Alabama, 11 May 2006. B. Oblong capsules, AMAL, Haynes 7177, Calhoun Co., Alabama, 23 May 1979.

Goldblatt (2002c) notes that in some regional floras (e.g., Radford et al. 1968), *G. communis* “is sometimes confused with the southern African *G. papilio* Hooker; the resemblance is entirely superficial.” He does not recognize *G. byzantinus*, stating, “Plants of *G. communis* found in North America have traditionally been treated as *G. byzantinus*, which differs little from *G. communis* except in degree of robustness. Distinction at even subspecific rank does not seem warranted.”

2. *Gladiolus dalenii* Van Geel {for Cornelius Dalen, 1766–1852, Dutch botanist} — DRAGON’S-HEAD-LILY; PARROT GLADIOLUS; AFRICAN GLADIOLUS (Fig. 152).

Perennial herb from a corm. Roadsides, fields, and other disturbed areas. Flowers April–July; rare throughout Alabama (Fig. 153). Native to sub-Saharan Africa, Madagascar, and Arabia. This species has escaped cultivation in the southeastern USA (Goldblatt 2002c).



Figure 152. *Gladiolus dalenii*, Etowah Co., Alabama, 22 May 2021. Photos: Kevin England.

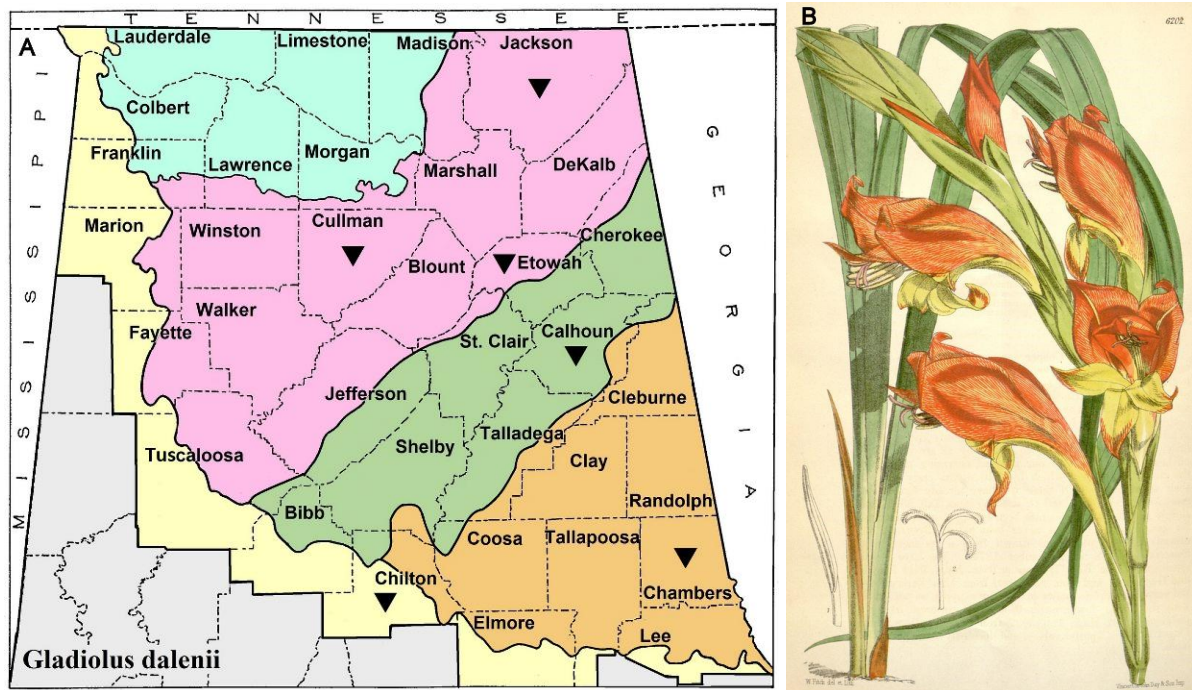


Figure 153. *Gladiolus dalenii*. A. Distribution map. B. Illustration by Walter Hood Fitch, 1875.



Figure 154. *Gladiolus dalenii* herbarium specimens. A. UNA, MacDonald 1173, Houston Co., Alabama, 11 May 1998. B. UNA, Lee 46, Geneva Co., Alabama, 27 May 1979.



Figure 155. *Gladiolus dalenii*, Houston Co., Alabama, 22 May 2021. Photos: John Trent.

Gladiolus dalenii is often misidentified as *G. ×gandavensis* since both have large, showy flowers. Medley (2002) described the differences between the two taxa, but before that time, we were unaware that *G. dalenii* occurred in Alabama (Fig. 154). Dragon’s-Head-Lily (Fig. 155) typically has orange to reddish-orange upper (outer) tepals streaked or marked with yellow. The lower (inner) tepals are mostly yellow except near the tips. The arched flowers of *G. dalenii* are usually hooded above, and its three lower tepals are recurved, possibly giving rise to the common name Dragon’s-Head-Lily, referring to the mythical creature. Garden Gladiolus (*G. ×gandavensis*) comes in many bright colors, and its flowers are slightly larger, with tepals usually spreading.

Lim (2012) states, “*Gladiolus dalenii* is one of the most widely distributed species of *Gladiolus*, occurring from eastern South Africa and Madagascar throughout tropical Africa and into western Arabia.” He notes that the flowers, with anthers removed, are edible and can be boiled as a vegetable or used in salads. In South Africa, *Gladiolus dalenii* is a medicinal plant used in traditional medicine to treat various diseases. Local communities use the corms to treat dysentery, gonorrhea, and infections of the lungs, skin, and gut (Nguedia et al. 2004, Sayim et al. 2016). Ngoupaye et al. (2013) suggest that plant extracts could help with seizures and insomnia because of their anticonvulsant and sedative activities.

3. *Gladiolus ×gandavensis* Van Houtte {of Ghent, Belgium} — GARDEN GLADIOLUS; GHENT CORNFLAG (Fig. 156). [*Gladiolus ×hortulanus* Bailey; *Gladiolus lemoinei* Baker]

Perennial herb from a corm. Roadsides, old homesites, and disturbed fields. Flowers April–July; rare throughout Alabama (Fig. 157). Parents of this taxon are native to Africa, Madagascar, and Arabia; the hybrid weakly spreads from cultivation (Goldblatt 2002c). It is naturalized in the southeastern USA, from Pennsylvania to Illinois, south to Louisiana and Florida (Kartesz 2022).



Figure 156. *Gladiolus ×gandavensis*, Cleburne Co., Alabama, 28 June 2021. Photos: Dan Spaulding.

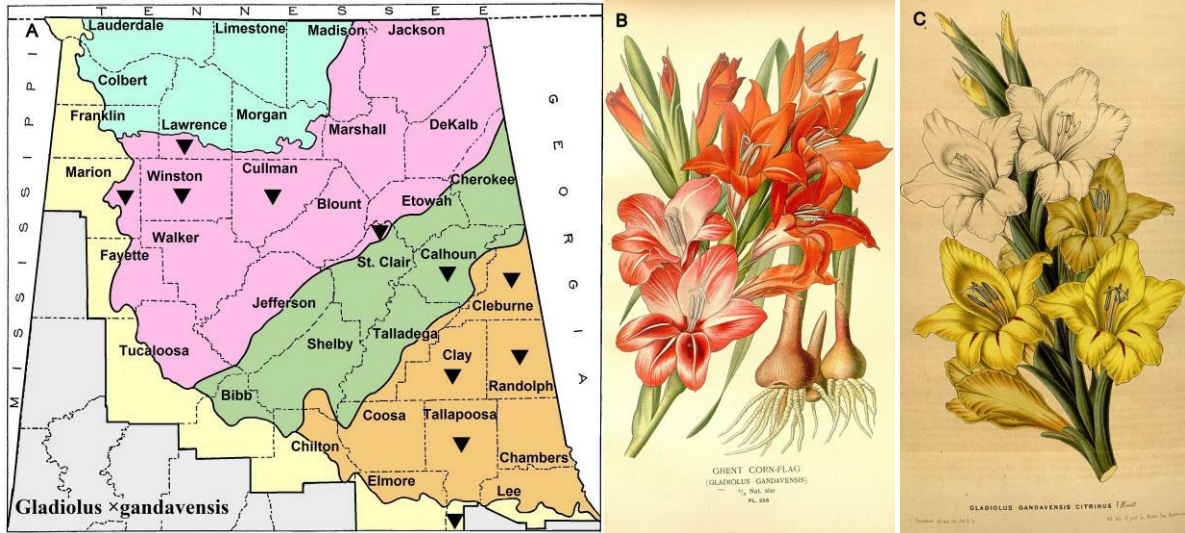


Figure 157. *Gladiolus* \times *gandavensis*. A. Distribution map. B. Illustration by Désiré Georges Jean Marie Bois 1897. C. Illustration by Louis Benoît van Houtte, 1849.

The flowers of *Gladiolus* hybrids are large and come in an assortment of bright colors (Fig. 158a). They are grown commonly as ornamental plants in the southeastern USA and other regions with mild winters. Like most *Gladiolus* grown in cultivation, full sunlight is necessary for abundant flower development. These plants are significant to the florist industry and rank in the world's top four plants grown for cut flowers (Qian et al. 2022). The genus consists of almost 300 species, primarily centered in South Africa (250), with others scattered in Asia, Europe, and North Africa (Susaj et al. 2012).



Figure 158. *Gladiolus* \times *gandavensis*. A. Cultivated, Cleburne Co., Alabama, 19 June 2022. B. Red-flowered plant, Tallapoosa Co., Alabama, 24 May 2020. Photos: Dan Spaulding. C. *Gladiolus* \times *gandavensis* 'Boone' (perhaps *G. dalenii* \times *oppositiflorus*), St. Clair Co., Alabama, 5 July 2023. Photo: Brian Keener.

Goldblatt (2002c) states hybrid strains of *Gladiolus* “are the product of crossing between four or five species, followed by selection.” He notes they are “named variously *G. gandavensis* L. van Houtte, *G. lemoini* Baker, and *G. hortulanus* L. H. Bailey.” We follow Weakley et al. (2022) in placing all hybrids collectively under the name *G. ×gandavensis*. Occasionally hybrids with red flowers and yellow throats (Fig. 158b) are mistaken for *G. dalenii*. However, *G. ×gandavensis* has larger upper sepals (6–7 cm vs. 3.5–5 cm long), typically spreading rather than appressed or hooded.

A hybrid cultivar with apricot-colored flowers (Fig. 158c) known as ‘Boone’ is included here under *Gladiolus ×gandavensis*. Jeff Owen, an extension agent in Avery County, North Carolina, discovered it at an abandoned homesite in Boone, NC, and distributed corms to local nurseries. The origin and parentage of this cultivar remain a mystery, but some nursery workers believe this hybrid is a cross between *G. dalenii* & *G. oppositiflorus* Herb. (<sunfarm.com/specials/gladiolus_boone.phtml>, <usperennials.com/gladiolus-x-dalenii-boone-hardy-gladiolus-boone/>).

3. IRIS Linnaeus 1753

[Greek *iris*, the rainbow; alluding to the colorful flowers]

The multi-colored flower of some *Iris* species inspired the Greeks to name this genus after the goddess of the rainbow, *Iris*. Martin (1988) writes, “Since one of the duties of *Iris* was to lead the souls of women to the Elysian Fields after they died, Greeks often put *Iris* blossoms on the graves of their women.” Throughout history, irises have been associated with royalty and used as a symbol of power in the Middle Ages (Stokes & Stokes 1985). Ward (2011) stated, “By their beauty and ease of cultivation, species of *Iris* (Iridaceae) have long been popular in horticulture. A distinctive floral structure permits their immediate recognition of the genus (Fig. 159a). But subtle, often hidden morphological differences have long contributed to misidentifications and misunderstandings among the species.”

Small (1933) described 97 species of *Iris* in the southeastern USA, plus the Dwarf Iris, which he placed in the genus *Neubeckia*. In *Flora of North America*, Henderson (2002) considered 76 of Small’s “new” species as possible hybrids in series *Hexagonae*. Most of these occur in Louisiana marshes. A controversial study of the genus by Mavrodiev et al. (2014) suggests splitting the approximately 250–300 species into at least 23 genera. We found this untenable; therefore, we follow Weakley et al. (2022) in recognizing a single genus.

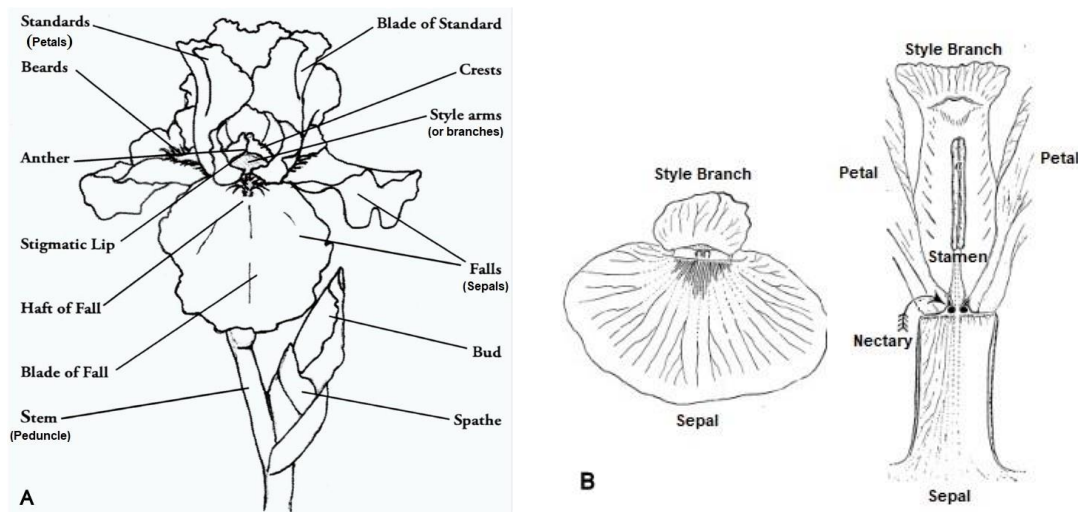


Figure 159. A. Illustration of an *Iris* flower by David Anstiss, 2015. B. Entrance into a flower as seen from the front (adapted from Needham 1900).

Wesselingh & Arnold (2000) observed Ruby-throated Hummingbirds (*Archilochus colubris*) as being the most abundant visitors of the red-flowered *Iris fulva* flowers; however, bees (Apidae) are the chief pollinators of the blue-flowered *Iris* (Needham 1900). Stokes & Stokes (1985) describe the pollination process (Fig. 159b): “After a bee lands on one of the large floppy sepals, it follows the yellow lines and crawls into the opening under the female part [curved petal-like style-branches]. The lip of the female part scrapes off any pollen that was on the bee’s back from a previous flower. As the bee crawls farther, it gets new pollen from the male part [anther] all over its back. The bee then continues crawling down to the base of the flower, where it feeds on nectar. When finished, it leaves through the openings formed by the large bend in the middle of the female part.”

1. Flowers orange or reddish-orange with yellow or brownish-purple spots; floral tube absent; perianth segments similar, tepals all spreading; style branches narrow, stamens clearly visible; seeds black and shiny, fully exposed at maturity in a blackberry-like cluster**Iris domestica**
1. Flowers blue, violet, yellow, or white; floral tube present; perianth segments dissimilar, differentiated into spreading sepals (“falls”) and erect petals (“standards”); style branches petaloid, concealing stamens; seeds tan to brown, contained within capsule at maturity.
 2. Plants short (<16 cm high), aerial stems not well-developed; sepals and petals nearly equal in length and width.
 3. Sepals crested with several orange ridges; flowers unscented or only slightly fragrant; leaves falcate (curved), 10–25 mm wide; rhizome composed of naked cord-like segments alternating with swollen nodes bearing scale-like leaves.....**Iris cristata**
 3. Sepals not crested; flowers strongly fragrant; leaves straight or nearly so, 5–13 mm wide; rhizome uniformly thickened and covered with scale-like leaves..... **Iris verna**
 2. Plants tall (>25 cm high), aerial stems well-developed; sepals distinctly longer and wider than petals.
 4. Floral tube 2–3 mm long; leaves 2–7 mm wide; capsules sharply 3-angled; seeds pyriform (pear-shaped), in 1 row per locule; rhizome slender, cord-like, 2–5 mm in diameter, superficial or only slightly buried**Iris prismatica**
 4. Floral tube 6–20 mm long; leaves 5–35 mm wide; capsules obtusely 3-angled or 6-angled; seeds D-shaped or oval-shaped, in 2 rows per locule; rhizomes thicker, 10–40 mm in diameter, barely superficial to deep-seated.
 5. Stems hollow; leaves narrow, 5–13 mm wide.....**Iris sanguinea**
 5. Stems solid; leaves broader, 15–35 mm wide.
 6. Sepals bearded with multicellular hairs along midrib; plants of disturbed upland habitats; [garden hybrids are not keyed; they are generally intermediate in characters].
 7. Spathes silvery-white, entirely scarios (papery & translucent); flowers pale blue or pale purple (mauve to lilac) **Iris pallida**
 7. Spathes mostly green or purplish, only partly scarios in the upper portion or along margins; flowers blue-violet, purple or white.
 8. Flowers white (with yellow streaked veins); inflorescence unbranched or rarely with one branch; peduncles (flowerstalks) usually short and often hidden within the bracts..... **Iris albicans**

- 8. Flowers violet-blue or purple; inflorescence branched, peduncles of lower flowers much longer than bracts.....**Iris germanica sensu lato**
- 6. Sepals glabrous (not bearded); plants of swamps, marshes, shorelines, and other wetland habitats.
 - 9. Flowers hidden among leaves, appearing nearly basal; stems shorter than leaves, 1–3.5 dm tall, declining or semi-erect, usually sharply zigzag; uppermost cauline leaf at least twice as long as the spathe, clearly exceeding flowers; capsules 6-angled **Iris brevicaulis**
 - 9. Flowers held well above most leaves; stems 5–15 dm tall, as long as or longer than leaves, erect, slightly if at all zigzag; uppermost cauline leaf shorter than to slightly longer than the spathe, but not exceeding flowers; capsules 3-angled.
 - 10. Perianth blue to violet, rarely white; floral tube 10–20 mm long, constricted above floral tube; fruiting pedicels erect.....**Iris virginica**
 - 10. Perianth yellow; floral tube 6–8 mm long, not constricted above ovary; fruiting pedicels arching or drooping **Iris pseudacorus**

1. Iris albicans Lange {whitish; referring to flowers} — CEMETERY IRIS; WHITE LILY-OF-THE-FIELD; WHITE FLAG IRIS (Fig. 160). [*Iris florentina* Kunze, non L.; *Iris* ×*germanica* L. subsp. *albicans* (Lange) O. Bolòs & Vigo]



Figure 160. *Iris albicans*, Morgan Co., Alabama, 6 Apr 2021. Photos: Howard Horne.

Perennial herb from rhizomes. Roadsides, fence rows, old homesites, and other disturbed areas. Flowers March–early June; rare throughout Alabama (Fig. 161). Native to the Arabian Peninsula and naturalized in Mediterranean countries and other temperate places (Crespo 2013).

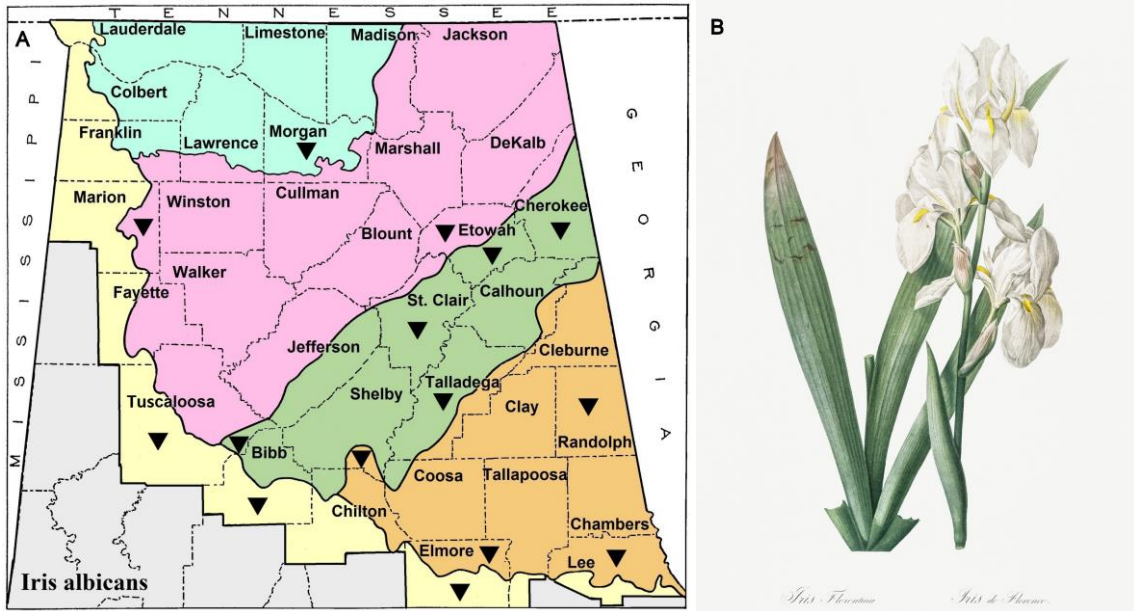


Figure 161. *Iris albicans*. A. Distribution map. B. Painting, Pierre Joseph Redouté, 1805 [= *I. florentina*].

Wister (1927) quoted the biblical text, “Consider the lily of the field and how they grow,” and said the phrase refers to *Iris albicans*, not the Easter Lily (*Lilium lanceolatum* Thunb.) since *Lilium* is not native to biblical lands. He writes, “We see these delicate flowers blooming out of barren piles of stones, growing in cracks of boulders on the hillsides and springing up out of the dry sand. Rightly did the great Teacher say that Solomon in all his glory was not arrayed like one of these.”



Figure 162. *Iris albicans* herbarium specimens. A. UWAL, Spaulding 15145, Tuscaloosa Co., Alabama, 18 Mar 2018. B. AMAL, Spaulding 13728, Marion Co., Alabama, 20 Apr 2013.

Dykes (1913) noted that Cemetery Iris “is the common ornament of Mahomedan cemeteries...and we see now that the wide distribution of *I. albicans* is due to the fact that the Mahomedans took it everywhere with them as a sacred plant or at least as a conventional ornament for graveyards.” Wister (1927) said Arab armies brought these irises with them to put on a soldier’s grave, “and today this plant is still found growing in fields where great battles, long since forgotten, were fought.”

Botanists have often misidentified *Iris albicans* (Fig. 162) as *I. germanica*. The likely reason is Henderson (2002) did not include *Iris albicans* as naturalized in North America. Cemetery Iris, like *I. germanica*, has been treated as a species or hybrid. *Iris albicans* differs from *I. germanica* by having white rather than purplish flowers with typically nearly sessile flower branches (Crespo 2013). Dykes (1913) stated that *I. albicans* has stiffer, broader leaves that are often slightly twisted when fully grown. He noted that Europeans cultivated this iris in large numbers to help reduce bank erosion surrounding vineyards along the Mediterranean. Martini & Viciani (2018) believe that Linnaeus validly described this species as *I. florentina*, which predates *I. albicans*. This white iris was popular in ancient times in Florence, Italy, and other southern European regions.

2. *Iris brevicaulis* Raf. {short-stemmed} — LEAFY BLUE-FLAG; ZIGZAG IRIS; SHORT-STEMMED IRIS; LAMANCE IRIS (Fig. 163). [*Iris foliosa* Mack. & Bush; *Iris hexagona* Walt. var. *lamancei* J.N. Gerard; *Iris mississippiensis* Alexander; *Phaeiris brevicaulis* (Raf.) M.B. Crespo, Mart.-Azorín & Mavrodiev]



Figure 163. *Iris brevicaulis*, Lee Co., Alabama, 31 May 2021. Photos: Kathy E. Quinn.

Perennial herb from rhizomes. Swamps, river/lake shores, floodplains, marshes, bogs, and wet roadside ditches. Flowers late April–June, fruits June–August; rare in northern Alabama; uncommon in the Coastal Plain (Fig. 164). Native to the central USA, from western Ohio to eastern Kansas, south to the Panhandle of Florida and east Texas; disjunct in southeastern Ontario (Henderson 2002).

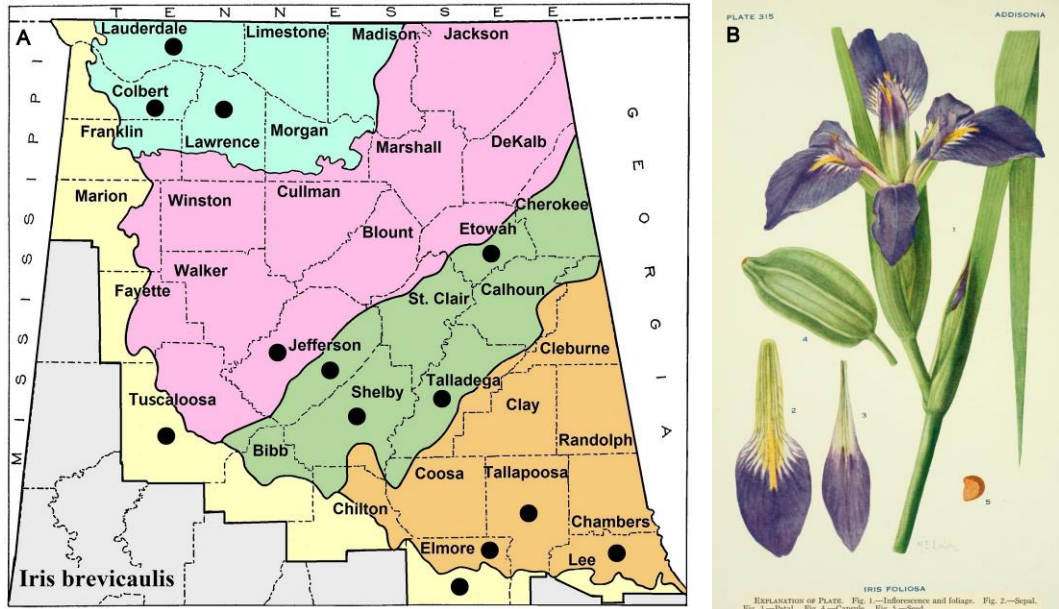


Figure 164. *Iris brevicaulis*. A. Distribution map. B. Illustration by Mary E. Eaton, 1924 [as *I. foliosa*].

Leafy Blue Flag is similar to *Iris virginica*, but its stems are shorter (1–3.5 dm tall) and zigzag, with the upper leaves exceeding the flowers (Fig. 165a). Other characteristics of *I. brevicaulis* lie in its fruiting capsules, having six ribs (Fig. 165b–c), and the base of its sepals (the claw) is green beneath (Fig. 166a). *Iris virginica* differs by being taller and having straighter flowering stems exceeding the leaves; its capsules have three ribs, and the undersurface of its sepal claws is centrally green, with a network of veins visible along the more transparent yellowish margins (Fig. 166b).



Figure 165. *Iris brevicaulis*. A. Zigzag stem, Macon Co., Alabama, 11 May 2020. Photo: Ross Hornsby. B–C. Six-angled fruiting capsule, Tallapoosa Co., Alabama, 28 Aug 2021. Photos: Dan Spaulding.



Figure 166. Comparisons of sepal claw. A. *Iris brevicaulis*, Jackson Co., Florida, 3 May 2022. Photo: Jason Berry. B. *Iris virginica*, Cherokee Co., Alabama, 4 May 2022. Photo: Dan Spaulding.

Iris brevicaulis is placed in the series *Hexagonae*, a monophyletic complex of three to seven species and associated hybrids (Henderson 2002, Meerow et al. 2011, Hamlin et al. 2017, Mavrodiev et al. 2021). This group is popularly known as the Louisiana Irises because the center of their diversity occurs in this state. These irises have inflorescences with leaf-like spathes and capsules with six ribs or lobes. Kral et al. (2011) listed *I. brevicaulis* and three others within the series in Alabama (Fig. 167): *I. fulva* Ker-Gawl. [Copper Iris], *I. giganteaerulea* Small [Giant Blue Iris], and *I. savannarum* Small [Prairie Iris]. The latter three species are endemic to the Southeastern Coastal Plain (Henderson 2002). Trahan (2007) wrote about the decline of Louisiana irises. He stated that the large masses of iris have vanished and that the whole complex is on a death march due to habitat destruction from human development and agriculture.



Figure 167. Illustrations of *Iris* series *Hexagonae* by Mary Emily Eaton. A. *Iris fulva*, 1927. B. *Iris savannarum*, 1927. C. *Iris giganteaerulea*, 1929.

3. *Iris cristata* Aiton {crested; the sepals} — DWARF CRESTED IRIS (Fig. 168). [*Lophiris cristata* (Aiton) M.B. Crespo, Mart.-Azorín & Mavrodiev; *Neubeckia cristata* (Aiton) Alef.]



Figure 168. *Iris cristata*. A. Madison Co., Alabama, 4 Apr 2020. B. Jackson Co., Alabama, 11 April 2015. Photos: Brian Finzel.

Perennial herb from rhizomes. Alluvial woods, streambanks, rich woods, and moist roadbanks. Flowers March–May, fruits May–July; frequent in northern Alabama; rare in the Coastal Plain (Fig. 169). Native to the eastern USA, from Maryland, Indiana, and southeastern Missouri, south to eastern Oklahoma, Mississippi, and northern Georgia (Henderson 2002).

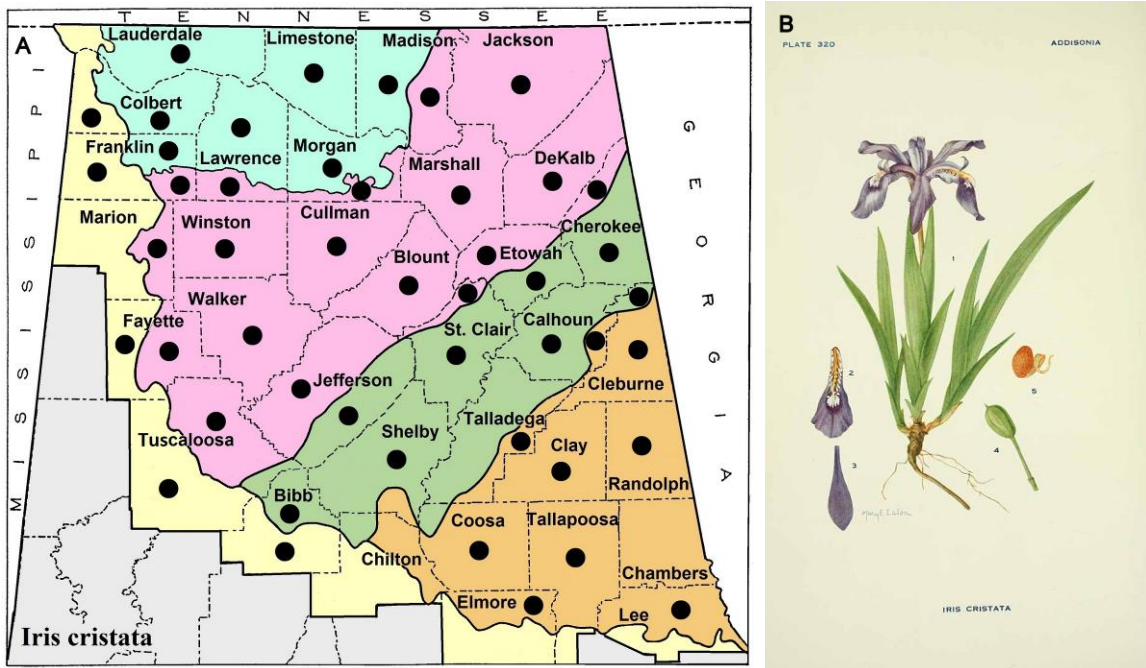


Figure 169. *Iris cristata*. A. Distribution map. B. Illustration by Mary Emily Eaton, 1924.

Iris cristata is often mistaken for *I. verna* since both are short plants with blue flowers. However, Crested Dwarf Iris differs by having curved leaves and ruffled ridges on its sepals (Fig. 168a). Its rhizomes are slender with swollen nodes. Small (1924) wrote, “The crested dwarf-iris has coarse-wiry branching rootstocks with tuber-like thickenings (Fig. 170). The rhizomes of *I. verna* are deeper in the soil, whereas *I. cristata* has surficial rhizomes, and one can easily pull them out of the ground by gently tugging on the leaves (Weakley et al. 2022). Plants often form dense colonies (Fig. 171). Cherokee Indians pulverized the rhizome of *I. cristata* to make a salve for ulcers and a decoction for liver and kidney issues (Moerman 1998). Pursh (1814) wrote, “The roots of this species when chewed are very remarkable; they at first occasion a pleasant sweet taste, which in a few minutes to a burning sensation, by far more pungent than *Capsicum* [hot peppers].”



Figure 170. *Iris cristata*. A. UWAL herbarium specimen, *Lawler s.n.*, Wilcox Co., Alabama, 5 Apr 2018. B. Rhizome, Tuscaloosa Co., Alabama, 13 Nov 2021. Photo: Dan Spaulding.



Figure 171. *Iris cristata* colony, Jefferson Co., Alabama, 6 May 2020. Photo: Dan Spaulding.

The dwarf irises (*Iris cristata* & *I. verna*) appear to have adapted to drier habitats by evolving coarse, wiry rhizomes with fibrous roots; while the larger blue-flag irises (*I. brevicaulis* & *I. virginica*) being wetland species have stouter rhizomes and fleshy roots, assisting in anchoring them in the muddy soil. Their seed-dispersal mechanisms are also very different. Small (1924) noted, “The corky-coated seeds of the blue-flags merely float away or about on the water of the plant’s habitat. Each seed of the dwarf-irises, inhabitants of dry places, has a viscid appendage (aril) by which it may adhere to feathers of birds or fur of animals and thus be disseminated.”

4. *Iris domestica* Goldblatt & Mabb. {cultivated} — BLACKBERRY-LILY; LEOPARD-LILY (Fig. 172). [*Belamcanda chinensis* (L.) DC.; *Ixia chinensis* L.]



Figure 172. *Iris domestica*. A. Wilson Co., Tennessee, 17 July 2022. B. Rutherford Co., Tennessee, 28 July 2017. Photos: Brian Finzel.

Perennial herb from rhizomes. Roadsides, cedar glades, outcrops, disturbed woodlands, and old homesites. Flowers May–August, fruits August–November; very rare throughout Alabama (Fig. 173). Native to Asia; introduced to the Pacific Islands, South America, and eastern USA (Goldblatt 2002a).

Gardeners often cultivate *Iris domestica* for its attractive fruits and flowers, which are atypical for the genus. The flowers are orange-spotted on an orange-red background (hence the name ‘leopard-lily’), and the ripe fruit resembles a blackberry (Shosteck 1974). When the fruiting capsules ripen, they split open, exposing their fleshy black seeds (Fig. 174). Bailey (1929) noted, “The seed stalks are sometimes used with dried grasses for decoration.” Goldblatt (2002a) treated Blackberry-Lily as *Belamcanda chinensis* in *Flora of North America*. Goldblatt & Mabberley (2005) later included it in *Iris* after Wilson (2004) suggested *Belamcanda* was phylogenetically nested within *Iris*. The Chinese used rootstalks in traditional medicine to treat inflammation, asthma, breast infections, and throat disorders. Xin et al. (2015) demonstrated that the rhizome has “marked bioactivity, especially in the respiratory system and as an oestrogenic [estrogen-like] and hepatoprotective [liver-protecting] agent. This activity is related to its traditional use and provides opportunities for the development of novel drugs and therapeutic products for various diseases.”

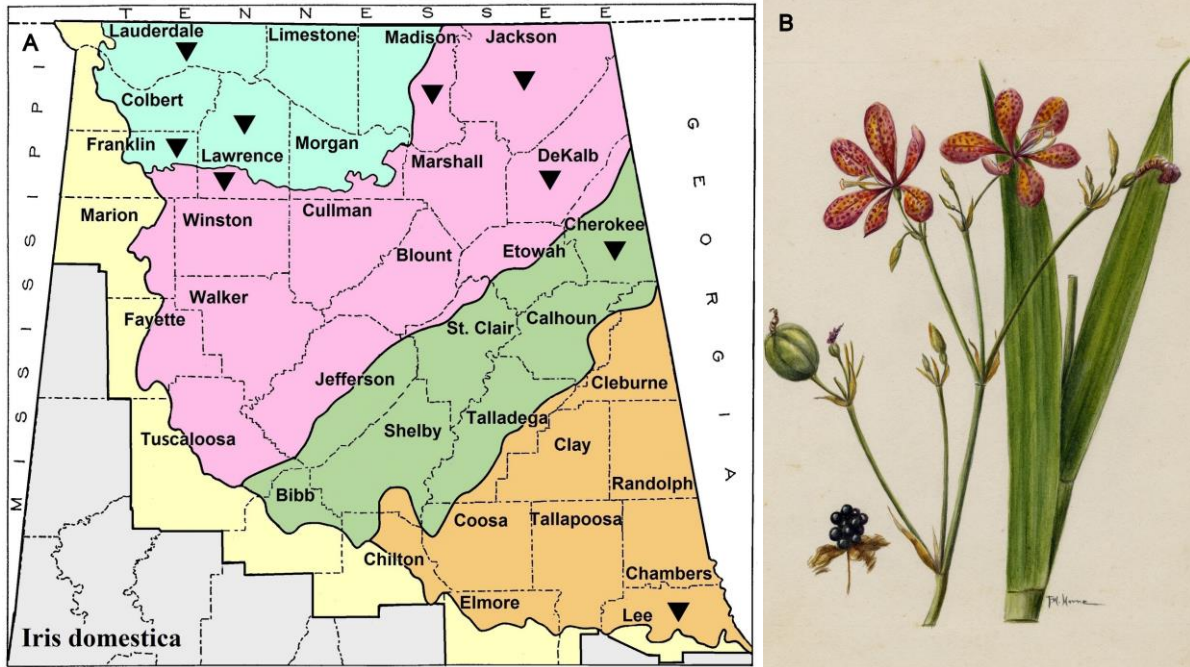


Figure 173. *Iris domestica*. A. Distribution map. B. Watercolor by Frances W. Horne (in N.L Britton, Flora Borinqueña, 1918–1934).



Figure 174. *Iris domestica*. A. Fruiting capsules, AMAL herbarium specimen, *Kral 62514*, Lee Co., Alabama, 20 Aug 1977. B. Ripe, opened capsules, Wilson Co., Tennessee, 11 Sep 2011. Photos: Brian Finzel.

5. *Iris germanica* L. {of Germany} — GERMAN IRIS; TALL BEARDED IRIS; PURPLE-FLAG (Fig. 175).
 [*Iris ×violacea* Savi; *Iris ×vulgaris* Pohl]



Figure 175. *Iris germanica* (*sensu lato*), Calhoun Co., Alabama, 25 Mar 2020. Photos: Dan Spaulding.

Perennial herb from rhizomes. Roadsides, woodland borders, and old homesites. Flowers March–early June; very rare in Alabama (Fig. 176). Native to Asia Minor, introduced and widely cultivated in temperate regions (Wister 1927).

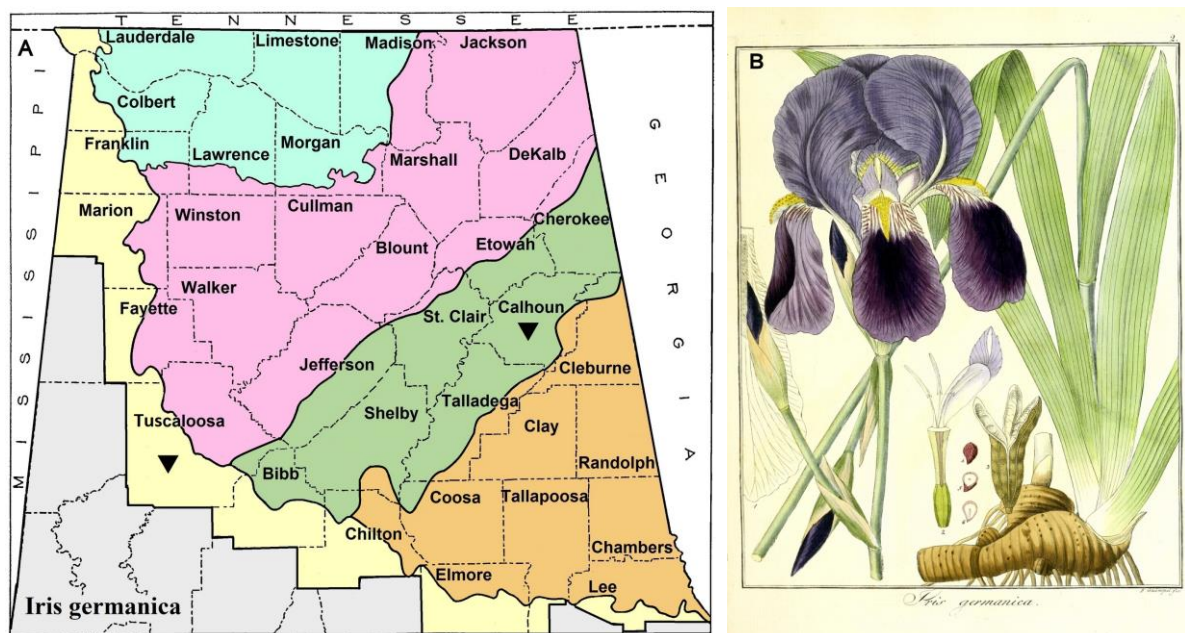


Figure 176. *Iris germanica*. A. Distribution map. B. Illustration by Friedrich Gottlob Hayne, 1804.

Mahan (2007) believes true *Iris germanica* (*sensu stricto*) is not established in North America. He writes that “an indefensible muddling of the identity of *Iris germanica* is contained in the Flora of North America, Volume 26, published in 2002.” He said, “The editors and taxonomic reviewers accepted a fallacious definition of *Iris germanica*.” Some botanists treat German Iris as a hybrid (*Iris* × *germanica*). Others recognize it as a valid species with a hybrid origin (Webb & Chater 1980, Henderson 1992, Crespo 2013). Dykes (1913) noted that “all the known forms of this iris [*I. germanica*] have been found growing either in semi-cultivated conditions or in such positions that they might easily have escaped from cultivation. No undoubtedly wild specimens are known.”

Henderson (2002) purported that *Iris germanica* was possibly a natural hybrid between two European species, *I. pallida* [Sweet Iris] and *I. variegata* L. [Hungarian Iris]. *Iris germanica* usually has violet-blue flowers and green or purplish spathes with scarious margins (Fig. 177a). By comparison, *I. pallida* has pale blue flowers and silvery spathes that are entirely papery and translucent (Fig. 180). *Iris variegata* has yellow petals, white to yellowish-white sepals with dark blue-violet veins, and purplish or green spathes lacking scarious margins. (Fig. 177b). Mahan (2007) said prior definitions have not considered it to be a natural hybrid between these two species.

Wister (1927) asserted *Iris germanica* was native to Asia Minor (Turkey) and that it was “named by Linnaeus in the mistaken belief it came from Germany.” Dykes (1913) stated that “the origin of *I. germanica*, which is perhaps the most widely cultivated of all irises, is shrouded in mystery.” German Iris is a very popular ornamental, and nursery workers crossed it with closely related species to create the bearded iris varieties of our temperate gardens. Steven Still (1988) said that because of extensive hybridization, “several hundred cultivars are currently offered by nurseries. Tall bearded iris can be obtained in nearly every color of the rainbow.” Horticulturalists often use *Iris* × *hybrida* Hort. for this large hybrid complex (Fan et al. 2019).



Figure 177. A. *Iris germanica* (*sensu stricto*), Calabria province, Italy, 10 Feb 2023. Photo: Alberto Capuano. B. *Iris variegata*, Pest County, Hungary, 4 June 2020. Photo: Attila Steiner.

Dried rhizomes of German Iris and other European species (known as orrisroot) produce an essential oil with an aroma of violets. A perfume made from its rootstalks is quite expensive because nearly 5 years is required for the rhizomes to develop their fragrance and yield a minimal product (Gracie 2012). Skinner (1911) wrote, “Orris is also used to throw upon fires and give out a pleasant odor; to remove the smell of liquor, garlic, and tobacco from formable breaths; and to simulate violet in sachets.”

6. *Iris pallida* Lam. {pale; referring to light bluish flowers} — SWEET IRIS; PALE IRIS (Fig. 178). [*Iris* × *germanica* L. subsp. *pallida* (Lam.) O. Bolòs & Vigo]



Figure 178. *Iris pallida*, Franklin Co., Alabama, 16 Apr 2020. Photos: Dan Spaulding.

Perennial herb from rhizomes. Roadsides, old homesites, and other disturbed areas. Flowers March–early June; very rare in Alabama (Fig. 179). Native to southern Europe, originating in Italy (Wister 1927), introduced and widely cultivated in temperate regions (Henderson 2002).

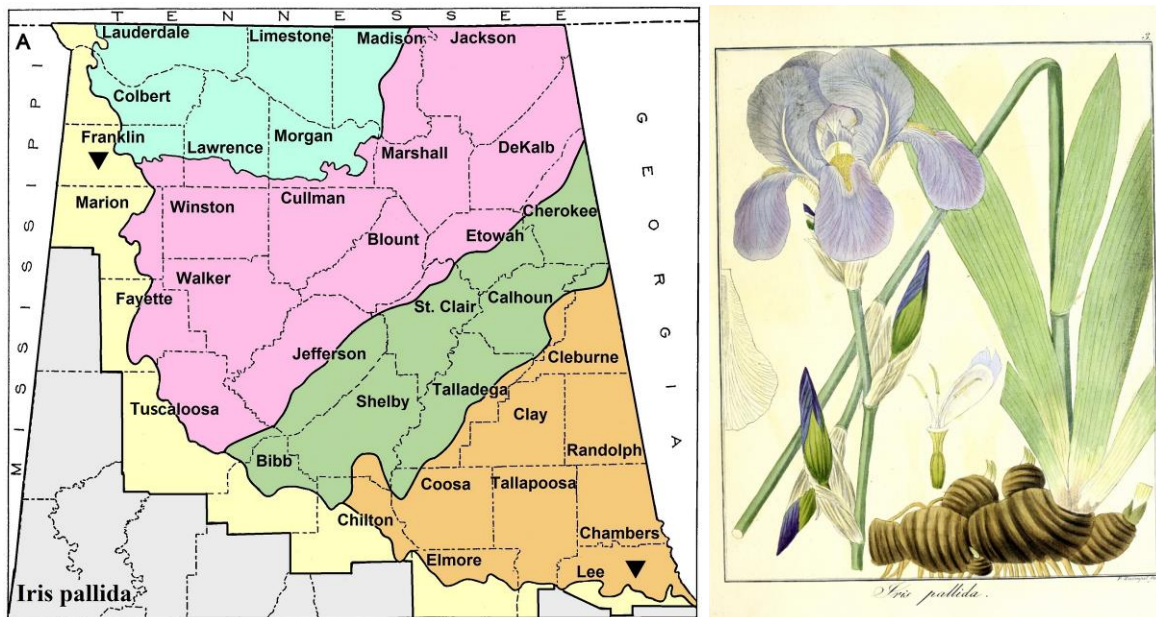


Figure 179. *Iris pallida*. A. Distribution map. B. Illustration by Friedrich Gottlob Hayne, 1804.

Henderson (2002) considered *Iris pallida* to be one of the parents of *I. germanica*, contributing to the bluish pigment of its flowers. These two bearded irises are somewhat similar. However, Dykes (1913) stated that “no one who had ever seen *I. pallida* develop its inflorescence could fail to separate it from *I. germanica*, for it is distinguished at once by its silvery-white scarious spathes.” German Iris has partially scarious spathes, either translucent along their margins or papery in the upper half.

Kral et al. (2011) did not list *Iris pallida* as occurring in Alabama. Henderson (2002) considered this species as escaping in California, Georgia, Indiana, and Missouri only, though other states have documented its occurrence since then (Kartesz 2022). Dan Spaulding recently discovered *I. pallida* from Franklin County, Alabama (Fig. 180a) and later annotated a specimen from Lee County, collected in 1969, which was initially determined as *I. germanica*.



Figure 180. *Iris pallida*. A. AMAL herbarium specimen, *Spaulding 16110*, Franklin Co., Alabama, 16 Apr 2020. Photo: Dan Spaulding. B. Wild plant in Livorno, Toscana, Italy, 19 Apr 2017. Photo: Valerio Lazzeri.

The sweet-scented, pale blue flower of *Iris pallida* (Fig 180b.) suggests its common name. Some authors recognize plants with darker violet flowers as a separate subspecies within the *I. pallida* complex (Webb & Chater 1980). However, Mitić et al. (2001) treat these as distinct species, native and indigenous to northeast Italy, Slovenia, and coastal Croatia (Dalmatia).

7. *Iris prismatica* Pursh {like a prism; alluding to sharply angled ovary and capsule} — SLENDER BLUE IRIS; SLENDER BLUE FLAG (Fig. 181). [*Iris carolina* Radius ex Steud.; *Iris prismatica* var. *austrina* Fernald; *Limniris prismatica* (Pursh) Rodion.]



Figure 181. *Iris prismatica*. A. Coffee Co., Tennessee, 13 May 2022. Photo: Bart Jones. B. Etowah Co., Alabama, 30 May 2023. Photo: Eric Soehren.

Perennial herb from rhizomes. Bogs, wet prairies, marshes, and wet pine flatwoods. Flowers May–June, fruits May–August; very rare in the Coosa Valley district of the Ridge & Valley (Fig. 182). Native chiefly to the Atlantic Seaboard states, including Pennsylvania, from Maine south to Georgia; disjunct in Northeast Alabama, northwest Georgia, Middle Tennessee, and Nova Scotia (Kartesz 2022).

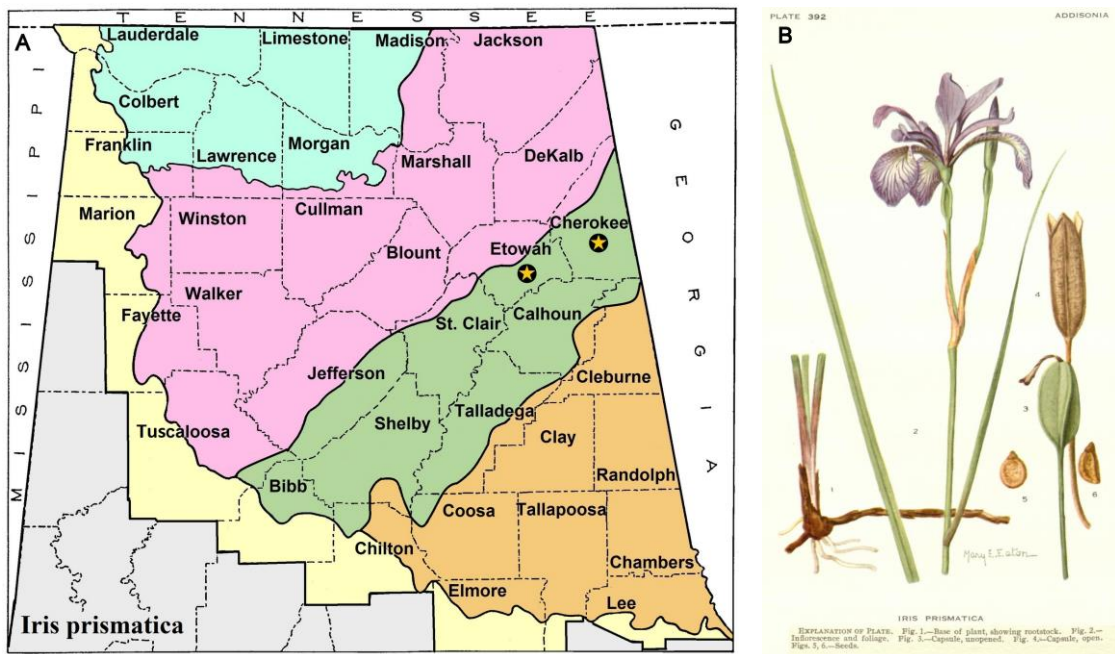


Figure 182. *Iris prismatica*. A. Distribution map. B. Illustration by Mary Emily Eaton, 1927.



Figure 183. *Iris prismatica*. A. Coffee Co., Tennessee, 26 May 2014. Photo: Brian Finzel. B. Fruiting, Richmond Co., New York, 3 July 2016. Photo: Erik Danielsen.



Figure 184. *Iris prismatica* specimen, ALNHS, Barger SP#1361, Etowah Co., Alabama, 15 May 2014.

In Alabama, *Iris prismatica* only occurs in two counties within the Coosa Valley district of the Ridge & Valley province. The Alabama State Heritage Program plans to rank it as critically imperiled (S1) on their next state inventory list (Al Schotz pers. comm. 2023). The distinctive characteristics are its narrow, grass-like leaves (Fig. 183a), sharply three-angled capsules (Fig. 183b), and slightly buried rhizomes with long, cord-like branches (Fig. 184). Slender Blue Iris often grows in bogs and freshwater marshes, but along the Atlantic coast, it occurs in brackish or saline marshes (Fernald 1950).

8. *Iris pseudacorus* L. {false *Acorus*; leaves somewhat resemble those of sweet-flag} — YELLOW FLAG IRIS; WATER FLAG; FLEUR-DE-LYS (Fig. 185). [*Limniris pseudacorus* (L.) Fuss]



Figure 185. *Iris pseudacorus*, Marshall Co., Alabama, 15 May 2022. Photos: Emily Spaulding.

Perennial herb from rhizomes. Roadside ditches, swamp borders, marshes, riverbanks, lake and pond margins. Flowers late March–June, fruits late June–October; uncommon throughout Alabama (Fig. 186). Native to Eurasia and North Africa; naturalized in North America (Henderson 2002).

Iris pseudacorus is found in all European countries except Iceland and extends into western Asia and North Africa (Sutherland 1990). It is one of the most commonly planted *Iris* species, cultivated in ponds and wetlands throughout most temperate regions. It often escapes, spreading aggressively by rhizomes to form impenetrable thickets. Yellow Flag Iris is distinct in its flower morphology (Fig. 187a) but can be mistaken for *I. virginica* when the flowers disappear. However, mature fruits of *I. virginica* are erect, whereas those of *I. pseudacorus* droop (Fig. 187b).

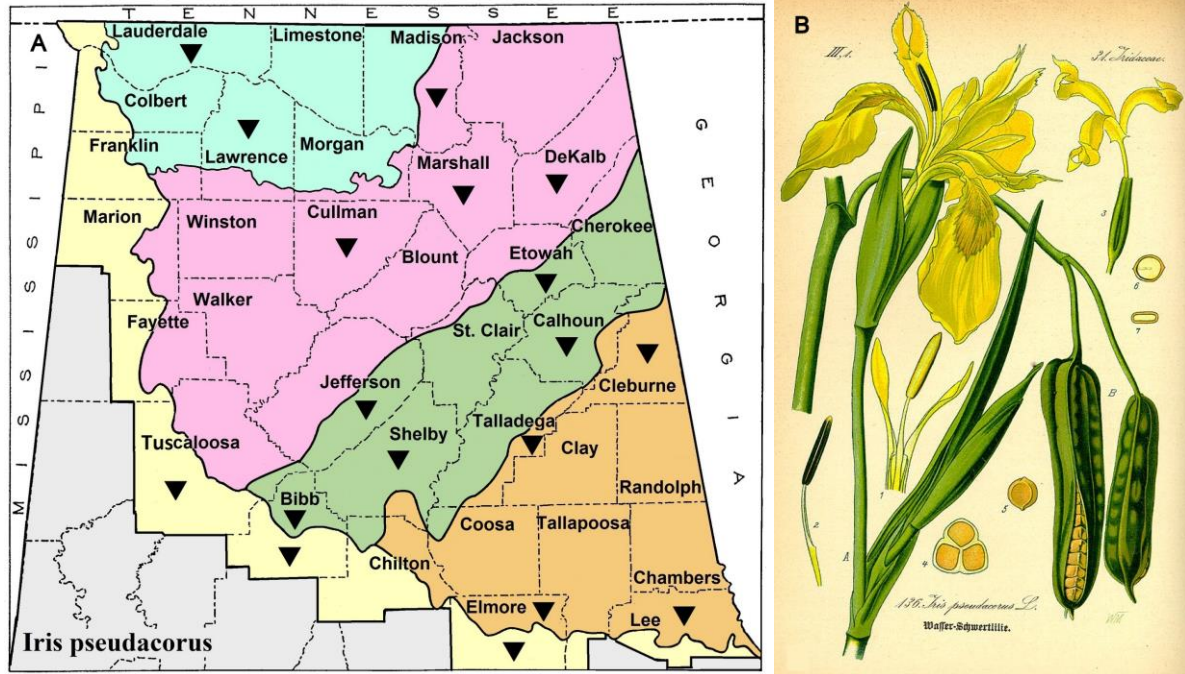


Figure 186. *Iris pseudacorus*. A. Distribution map. B. Illustration by Otto Wilhelm Thomé, 1885.



Figure 187. *Iris pseudacorus*. A. Madison Co., Alabama, 21 Apr 2011. Photo: Brian Finzel. B. Fruiting, Greater Vancouver Co., British Columbia, Canada, 3 July 2016. Photo: Ted Goshulak.

In French, Yellow Flag Iris is called Fleur-de-Lys. The name translates to “flower of the lily,” but possibly refers to the River Lys (Leie) in northern France, where *Iris pseudacorus* occurs commonly along its banks. The Kings of France were the first to use the symbol as their coat of arms. The “fleur-de-lys” is prominent on many of their flags (Fig. 188). The emblem was first adopted in the 1st Century by Clovis I, King of the Franks. Martin (1988) says one legend tells us that “his army found itself trapped on one side by an enemy army and a river on the other side. Looking out across the water, Clovis saw a yellow flag iris growing midway across and realized that the river was shallow enough for his army to cross to safety.”

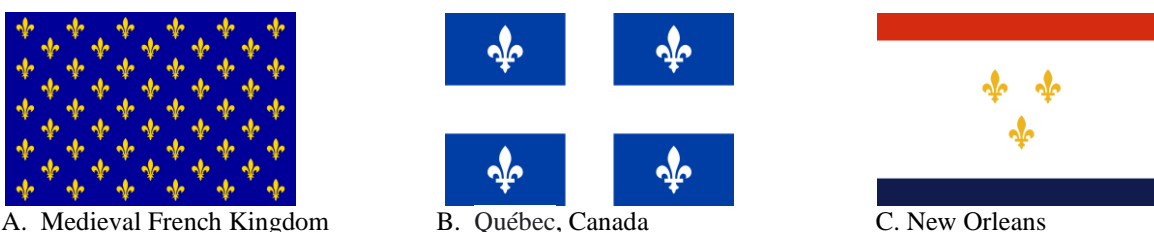


Figure 188. A–C. Fleur-de-Lys symbol on French flags.

Some pharmacologists report evidence that rhizomes have anti-inflammatory activities. Historically, a cooling astringent lotion was supposedly effective when applied to wounds. Dwyer et al. (1986) noted that *Iris pseudacorus* flowers produce a yellow dye, and the roots yield brown and black pigments used as ink. The roasted seeds also make a good coffee substitute.

9. *Iris sanguinea* Donn ex Hornem. {bloody; for purplish spathe} — BLOOD IRIS; JAPANESE IRIS (Fig. 189). [*Iris orientalis* Thunb. non Mill.; *Iris sanguinea* Donn ex Hornem.; *Limniris sanguinea* (Donn ex Hornem.) Rodion.]



Figure 189. *Iris sanguinea*, Cleburne Co., Alabama, 21 Apr 2021. Photos: Dan Spaulding.

Perennial herb from rhizomes. Roadside ditches and moist banks. Flowers April–June, fruits June–August; very rare in Alabama (Fig. 190). Native to Japan, Korea, Mongolia, and Russia (Shu 2002). introduced in the USA and Canada, rarely escaping cultivation (Henderson 2002).

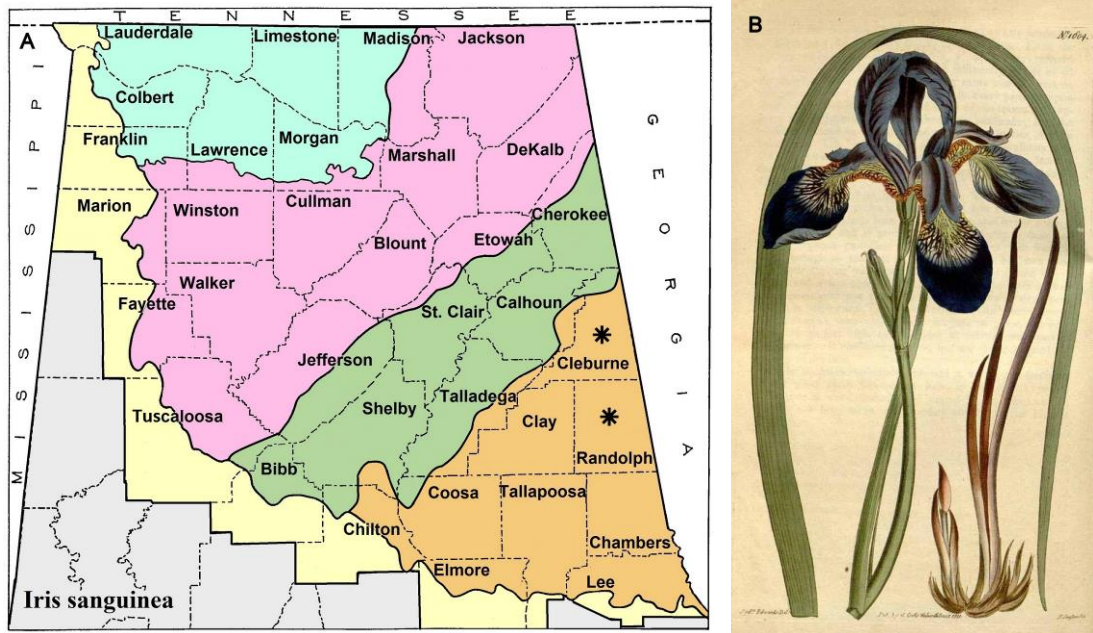


Figure 190. *Iris sanguinea*. A. Distribution map. B. Illustration by Sydenham Teast Edwards, 1814.

Iris sanguinea was first documented in Alabama by Wayne Barger in 2012 from Randolph County (Barger SP# 516). In 2021, Melanie Taylor Spaulding discovered it in Cleburne County (Spaulding & Triplett 2022). Blood Iris has green spathes with thin translucent margins, often tinged with purple (Fig. 191a). Its mature capsules are 3.5–5.5 cm long on nearly equal stalks (Fig. 191b). *Iris sanguinea* is similar to *I. sibirica* L. [Siberian Iris]. Both species have hollow stems (Fig. 191c) and showy, purple flowers. *Iris sibirica* differs by having completely scarious (translucent & papery) spathes and smaller capsules (2–3.5 cm long) supported by unequal pedicels.

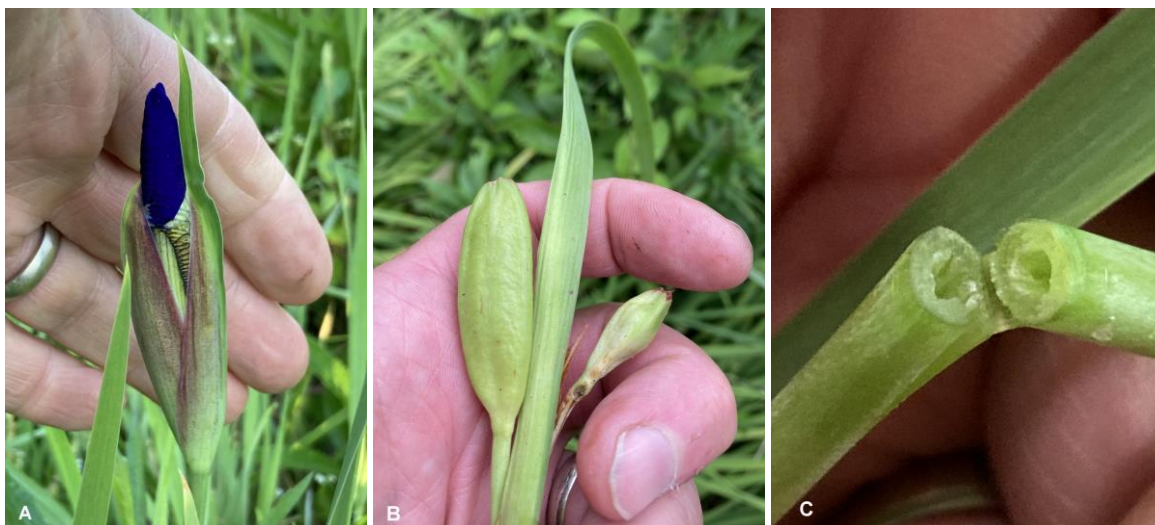


Figure 191. *Iris sanguinea*, Cleburne Co., Alabama. A. Purplish spathe (enclosing the flower), 21 Apr 2021. B. Capsules (left one almost ripe), 30 June 2021. C. Hollow stem, 21 Apr 2021. Photos: Dan Spaulding.

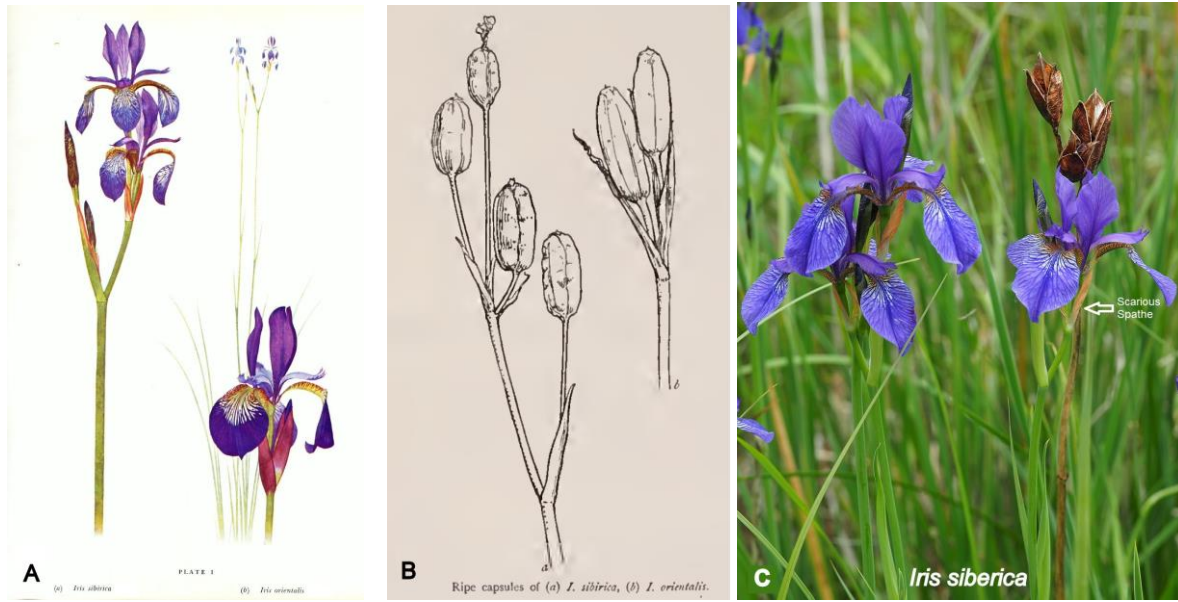


Figure 192. A–B. Illustrations of *Iris sibirica* & *Iris sanguinea* [= *I. orientalis* Thunb.] by Dykes (1913). C. Photograph of *Iris sibirica* by Felix Riegel, 5 June 2022, Dachau district, Bavaria, Germany.

Dykes (1913) treated *Iris sibirica* and *I. sanguinea* as distinct but used an illegitimate name, *I. orientalis* Thunb., for *I. sanguinea* (Fig. 192). Based on morphological and DNA studies, Boltenev et al. (2020) concluded that *I. sanguinea* is conspecific with *I. sibirica*. However, Yuri K. Pirogov (pers. comm. 2022) disagrees with their work, stating, “the method adopted by the authors of characterizing the inflorescence on only one sign (the absence or presence of a lateral branch) does not sufficiently characterize the diversity of the shape of the inflorescences in these two species.”

10. *Iris verna* L. {spring} var. *smalliana* Fernald ex M.E. Edwards {in honor of John K. Small (1868–1938), American botanist} — UPLAND DWARF IRIS; VIOLET IRIS (Fig. 193). [*Gattenhofia verna* (L.) Medik.; *Neubeckia verna* (L.) Small]



Figure 193. *Iris verna* var. *smalliana*. A. DeKalb Co., Alabama 7 Apr 2011. B. Jefferson County, Alabama, 6 Apr 2003. Photos: Vitaly Charny.

Perennial herb from rhizomes. Upland woods and forests. Flowers March–May, fruits June–July; frequent in northern Alabama; uncommon in the Coastal Plain (Fig. 194). Native to southcentral Pennsylvania and southeastern Ohio, south to eastern Mississippi, Georgia, Alabama, and the Panhandle of Florida (Henderson 2002).

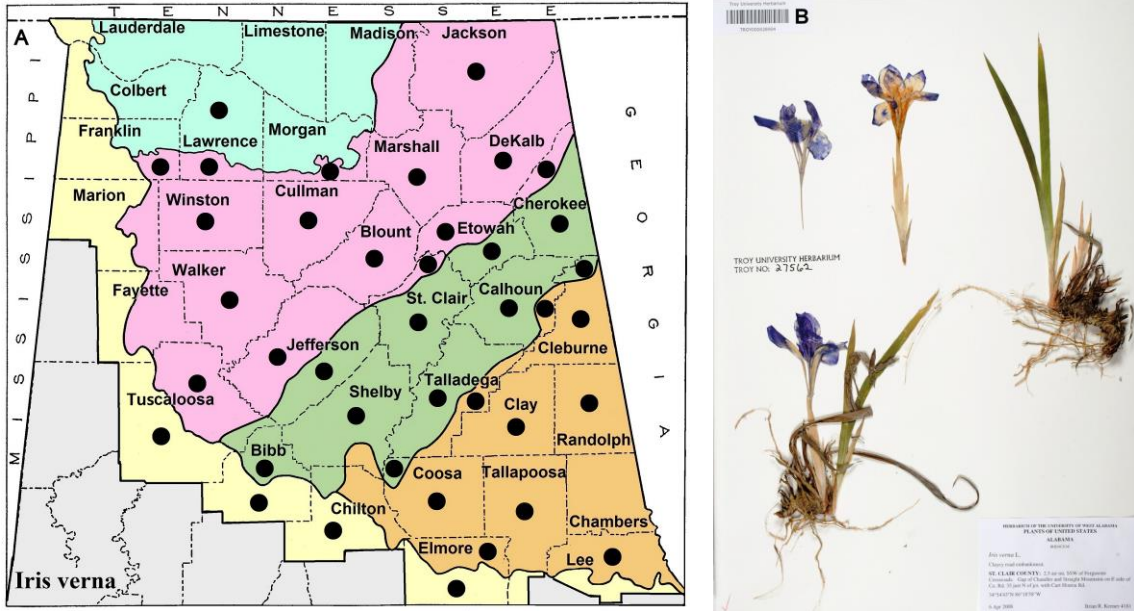


Figure 194. *Iris verna* var. *smalliana*. A. Distribution map. B. TROY herbarium specimen, Keener 4181, St. Clair Co., Alabama, 6 Apr 2008.



Figure 195. Varieties of *Iris verna* illustrated by Mary Emily Eaton. A. *Iris verna* var. *smalliana* (mountain form, 1929). B. *Iris verna* var. *verna* (Coastal Form, 1931).

Two distinct geographical expressions of *Iris verna* occur in the southeastern USA. The typical variety, *I. verna* var. *verna* [Coastal Plain Dwarf Iris], occurs chiefly on the Atlantic Coastal Plain, rarely adjacent Piedmont or mountains, but not in Alabama. The other, *I. verna* var. *smalliana*, is found primarily in the mountains and Piedmont provinces. It extends south through the Coastal Plain of Alabama, southwest Georgia, Mississippi, and the western Florida Panhandle (Kartesz 2022).



Figure 196. *Iris verna* var. *smalliana*. A. DeKalb Co., Alabama 6 Apr 2007. Photo: Brian Finzel. B. Fruiting, DeKalb County, Alabama, 17 May 2021. Photo: Mary Shew.



Figure 197. *Iris verna* var. *smalliana*. A. Bullock Co., Alabama, 2 Mar 2023. Photo: Eric Soehren. B. DeKalb Co., Alabama, 6 Mar 2023. Photo: T. Wayne Barger.

John K. Small first described these taxa as a mountain (Fig. 195a) and Coastal Plain form (Fig. 195b). He wrote (1929) that *Iris verna* ranged from the Coastal Plain to the mountains but that the plants of the two regions were markedly different. Small (1931) described the Coastal Plain element as having “a more lax habit, with slender, long jointed rootstocks, and a smaller, usually more fragrant flower which has narrower clawed sepals and longer-clawed petals.” Weakley et al. (2022) note that *I. verna* var. *verna* [Coastal Plain Dwarf Iris] is rarely clump-forming because its rhizomes are much longer between connected plants (5–15 cm). By comparison, the rhizomes of var. *smalliana* are relatively shorter between offshoots (1–3 cm); thus, plants are clump-forming. Fernald (1947) recognized Small’s mountain form of *Iris verna* and named the variety in his honor.

Iris verna and *I. cristata* are dwarf plants, giving rise to their common names. However, *I. verna* differs by having sweet-scented flowers lacking sepal crests (Fig. 196a). The flowers of *I. cristata* lack a fragrance and have ridges on the sepal signals (colored area). The fruiting capsules of both species are three-angled and taper to a beak formed by the dried floral tube (Fig. 196b). Botanists often overlook their fruits because they occur low to the ground, often hidden within the spathes. However, when fruiting, the dwarf irises can be identified by their leaves and rhizomes. *Iris cristata* has curved (falcate) leaves that are typically broader (1–3 vs. 0.5–1.5 cm wide), and its rhizomes are cord-like with swollen nodes. *Iris verna* has straight, narrow leaves, and its rhizomes are mostly uniformly thickened (Fig. 197).

Small (1931), referring to the common name Violet Iris, writes, “The name given to it by the layman in many parts of the south is violet iris. This refers to the fact that both in color and fragrance, it bears a striking similarity to the English sweet violet (*Viola odorata*).” Cherokee Indians prepared a decoction of pulverized rootstalks to make a salve for ulcers, and Creek tribes used it as a powerful cathartic (Moerman 1998).

11. *Iris virginica* L. {Virginian} var. *shrevei* (Small) E.S. Anderson {for Ralph W. Shreve (1895–1983), American horticulturalist} — SOUTHERN BLUE-FLAG; INLAND BLUE-FLAG; SHREVE’S IRIS (Fig. 198). [*Iris carolina* auct. non Radius; *Iris caroliniana* S. Watson; *Iris shrevei* Small; *Limniris shrevei* (Small) M.B. Crespo, Mart.-Azorín & Mavrodiev]



Figure 198. *Iris virginica* var. *shrevei*, Cherokee Co., Alabama, 4 May 2022. Photos: Dan Spaulding.

Perennial herb from rhizomes. Swamps, river/stream margins, marshes, and roadside ditches. Flowers late March–June, fruits May–September; uncommon in northern Alabama and the Coastal Plain (Fig. 199). The species is native to the eastern USA and southern Canada, from Ontario and Quebec, south through New York and Minnesota to Florida and east Texas (Henderson 2002).

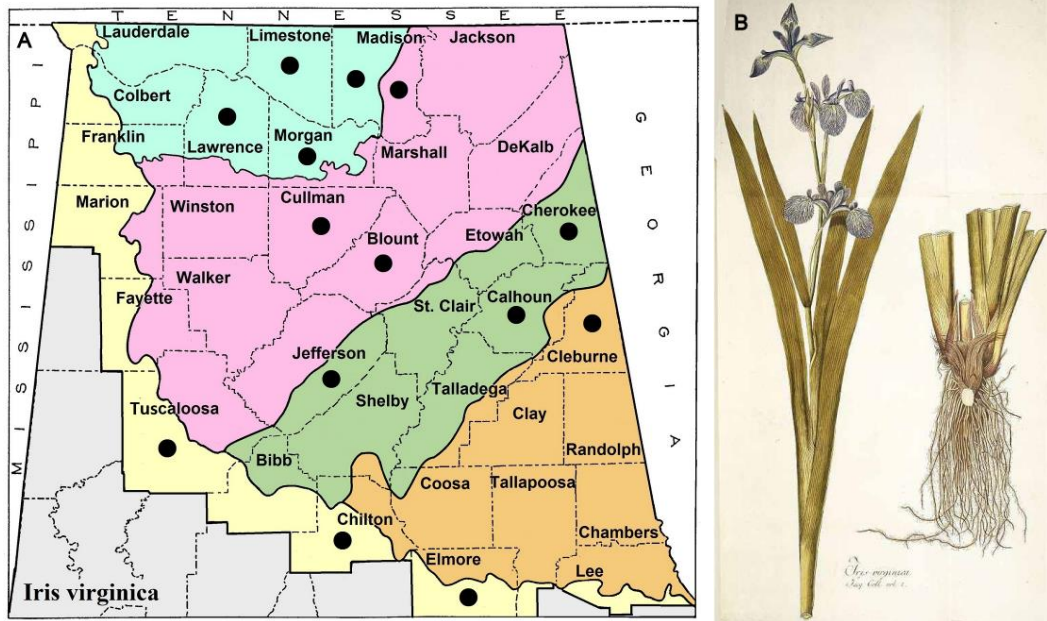


Figure 199. *Iris virginica* var. *shrevei*. A. Distribution map. B. Illustration, Nikolaus Joseph Jacquin, 1786.



Figure 200. Illustrations of the *Iris virginica* complex by Mary Emily Eaton. A. *Iris virginica* var. *virginica* [= *I. carolina*], 1924. B. *Iris virginica* var. *shrevei* [= *I. shrevei*], 1927.

The *Iris virginica* complex consists of two geographic entities (Fig. 200), var. *virginica* and var. *shrevei*. Small (1933) recognized these varieties as separate species. He (1927) described *I. shrevei* a few years earlier and had Mary E. Eaton illustrate the plant for him. Weakley et al. (2022) also treated this variant as a species, stating that this taxon is taller (up to 10 dm vs. 6 dm), has longer capsules (7–11 vs. 4–7 cm), and usually has 1–2 well-developed branches (vs. rarely branched). Anderson (1936) reduced *I. shrevei* to a variety of *I. virginica* because the only consistent character he saw was the shape of mature capsules. Henderson (2002) did not formally recognize the two taxa as distinct in the Flora of North America. He said, “Plants of *Iris virginica* from the southeastern and south-central states having stems 2–3-branched (Fig. 201a) and seldom falling to the ground after flowering, and with capsules long-cylindric (Fig. 201b) have been recognized as var. *shrevei*.”



Figure 201. *Iris virginica* var. *shrevei*. A. Branched stems, Cherokee Co., Alabama, 4 May 2022. B. Cylindric capsules, Cherokee Co., Alabama, 25 July 2022. Photos: Dan Spaulding.

Iris virginica var. *virginica* occurs chiefly in the Southeastern Coastal Plain, from Virginia to Mississippi, with disjunct populations further inland (Kartesz 2022). It has ovoid capsules and typically unbranched inflorescences, which often bend into the water when fruiting. *Iris virginica* var. *shrevei* occurs mainly outside the Coastal Plain. This variety ranges from southwest Quebec to Minnesota, south to western North Carolina, northern Alabama, eastern Tennessee, Arkansas, and eastern Kansas (Weakly 2022). All the specimens of *I. virginica* examined from northern Alabama represent var. *shrevei*.

The flowers of *Iris virginica* begin to wither soon after pollination. As the fruiting capsule matures, it splits along its sutures, slowly releasing the large interior seeds. The water currents can disperse the buoyant seeds. Dislodged rhizomes also can float and be carried downstream, creating new colonies (Anderson 1933). If swallowed, the poisonous rootstalks can cause stomach and intestinal inflammation (Kingsbury 1964).

4. SISYRINCHIUM Linnaeus 1753

[Greek *sys*, pig, and *rynchos*, snout; alluding to swine excavating roots for food]

Around the turn of the 20th Century, Eugene Bicknell (1896, 1899a–d, 1900, 1901) conducted comprehensive surveys of *Sisyrinchium* in the USA and Canada, naming 78 “new” species. Ward (2014) noted, “Though many of these names are surely synonyms, others perhaps represent populations that are not wholly understood and may merit taxonomic recognition.” Still, Bicknell named more of the accepted species in North America than any other botanist. Regarding the origin of the generic name, Shosteck (1974) writes: “A highly imaginative botanist named this ‘pig snout’ in Greek. Pigs were observed to eagerly grub for the roots and corms of this herb.”

Sisyrinchium is a problematic genus because of its many overlapping morphological characters. All species produce tufts of narrow, grass-like leaves with clusters of flowers arising from spathe bracts. The inflorescence is technically called a rhipidium. Its tepals are frequently blue or violet, usually with sharply tapering tepals. White-flowered individuals occasionally occur in most species, while a yellow-flowered exception exists in *S. rosulatum*. Their stems can be branched or unbranched, with a central body bordered by thin wings. Significant characteristics such as stem width, whether or not fibrous remains of old leaves exist on bases, and if stems are branched or unbranched are often critical for species recognition. However, habitually branched species within a population can have unbranched stems (particularly when immature). Similarly, taxa typically with unbranched stems can have a few branched individuals. Also helpful in identification is the color of dried plants, as some lighten or darken upon drying. The stem-width measurements in the keys below are from dried specimens. Note the stems can be up to 1.5 times broader in live plants (Ward 1959, Keith 2022).

1. Plants annual with thin roots; leaves and stems typically depressed and radially spreading; perianth bell-shaped (campanulate-urceolate), petals joined together at the base forming a cup; tepals bluish-purple, light purple, lavender-pink, yellow, or white with a rose-purple or brown eye-ring; capsules with purplish sutures or occasionally entirely purple **Sisyrinchium rosulatum**
1. Plants perennial with thicker roots; leaves and stems primarily erect; perianth spreading and open (rotate), petals almost free to the base; tepals blue, violet, or sometimes white, lacking an eye-ring; capsules lacking purplish sutures.
 2. Stems unbranched; spathes sessile at the apex of a simple stem.
 3. Inflorescences solitary (not paired); 2 spathe bracts present; outer spathe bract much longer than inner one; bract-like cauline leaf absent..... **Sisyrinchium mucronatum**
 3. Inflorescences paired (twinned); 4 spathe bracts present (borne so close together that innermost pair is often obscured); spathe bracts of equal length (outer ones occasionally slightly longer); bract-like cauline leaf present, distinctly exceeding spathe bracts.
 4. Stems mostly 1.0–2.5 mm wide, margins often finely toothed; corolla white or blue; spathe bracts and uppermost portion of stem glabrous or with scattered flat, white dots or lenticels (not farinose-papillose); spathe bracts green or slightly purple-tinged; plants of various habitats throughout Alabama **Sisyrinchium albidum**
 4. Stems mostly 0.7–1.3 mm wide, margins smooth; corolla blue; spathe bracts and uppermost portion of stems usually with a white, granular coating (farinose-papillose); spathe bracts often strongly purple-tinged; plants of limestone glades in northwest Alabama **Sisyrinchium calciphilum**

- 2. Stems branched with 1–5 nodes; spathes on long stalks (peduncles).
 - 5. Base of plant with fibrous remains of old leaves, persisting as a tuft of bristle-like fibers.
 - 6. Main stems broad, 2.3–4.5 mm wide; stem body much narrower than wings; plants usually drying light olive green or dull light green **Sisyrinchium nashii**
 - 6. Main stems narrow, 1–2 mm wide; stem body about as broad as the wings; plants usually drying brownish to blackish, occasionally olive green..... **Sisyrinchium fuscatum**
 - 5. Base of plant lacking fibrous remains of leaves or with some fibers or shreds but not in dense tufts.
 - 7. Stem body distinctly wider than winged margins, making stems appear rounded with sides often tapering to scarcely discernible wings; main stems usually 0.8–2.1 mm wide; plants drying yellowish or light olive green; base of dried stem typically dark brown with a whitish band above it; fruiting capsules black, contrasting with the lighter dried foliage; stem body and wings similar in color when dry..... **Sisyrinchium atlanticum**
 - 7. Stem body as wide as or narrower than winged margins (center core similar to a midvein), thus stems appearing flattened with easily discernable wings; stems 1–6 mm wide; plants drying uniformly dark olive, dull green, or brownish; stem body often drying slightly lighter than wings, forming a pale “stripe” down the center; fruiting capsules light brown to dark brown, not contrasting with dried foliage.
 - 8. Main stems (dried) averaging more than 2 mm wide (2.3–6 mm wide); spathe bracts green, translucent margins rarely purplish **Sisyrinchium angustifolium**
 - 8. Main stems averaging less than 2 mm wide (0.5–2.2 mm); spathe bracts purple-tinged or green, translucent margins often purplish **Sisyrinchium langloisii**

1. *Sisyrinchium albidum* Raf. { whitish; referring to the flowers } — WHITE BLUE-EYED-GRASS (Fig. 202). [*Sisyrinchium scabrellum* E.P. Bicknell]



Figure 202. *Sisyrinchium albidum*, Madison Co., Alabama, 3 Apr 2015. Photos: Brian Finzel.

Perennial herb from fibrous roots. Open woods, cedar glades, chalk prairies, meadows, fields, and roadsides, often in calcareous soils. Flowers & fruits March–May; uncommon throughout Alabama (Fig. 203). Native to the eastern USA and adjacent southern Canada, from Ontario, Michigan, and western New York, south to northern Florida and east Texas (Cholewa & Henderson 2002).

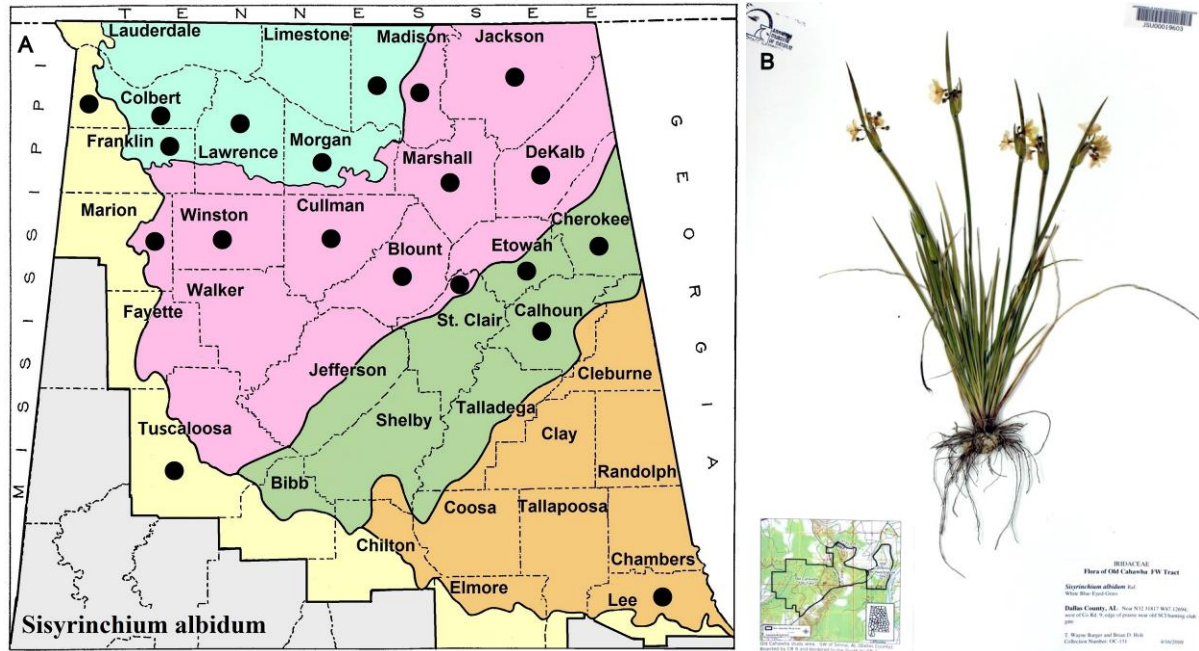


Figure 203. *Sisyrrinchium albidum*. A. Distribution map. B. AMAL herbarium specimen, *Barger & Holt OC-131*, Dallas Co., Alabama, 16 Apr 2010.



Figure 204. *Sisyrrinchium albidum* flower colors. A. Lowndes Co., Alabama, 12 Mar 2020. Photo: Alvin Diamond. B. Cheatham Co., Tennessee, 16 Apr 2020. Photo: Dwayne Estes. C. Sumter Co., Alabama, 1 Apr 2017. Photo: Julie Tuttle.

The common name of *Sisyrinchium albidum* can be deceiving. While its flowers are typically white, they can occasionally be blue or violet (Fig. 204). Furthermore, other species in the genus can also have white flowers and are often misidentified as White Blue-Eyed Grass. The main difference is that *S. albidum* has simple, unbranched stems with two spathes clustered on top. Although four spathe bracts exist, the inner pair is hidden by the bract-like cauline leaves; and is occasionally difficult to see. This species is similar to *S. calciphilum* but has wider stems.

2. *Sisyrinchium angustifolium* Mill. {narrow-leaved} — COMMON BLUE-EYED-GRASS; STOUT BLUE-EYED-GRASS; NARROW-LEAF BLUE-EYED-GRASS (Fig. 205). [*Sisyrinchium bermudiana* auct. non L.; *Sisyrinchium graminoides* E.P. Bicknell]



Figure 205. *Sisyrinchium angustifolium*, Calhoun Co., Alabama, 23 Apr 2022. Photos: Savannah Spaulding.

Perennial herb from fibrous roots. Moist meadows, woods, roadsides, prairies, woodland borders, floodplains, and creek banks. Flowers & fruits March–July; frequent throughout Alabama (Fig. 206). Native to the eastern USA and adjacent southern Canada, from Nova Scotia to Ontario, south to Texas and northern Florida (Cholewa & Henderson 2002).

Common Blue-Eyed-Grass is the most widespread *Sisyrinchium* in North America. It has broad (> 2 mm wide) branched stems with distinct wings (Fig. 207) and lacks fibrous remains of old leaves basally. Its flowers are usually blue, rarely white. A similar wide-stemmed blue-eyed grass, *Sisyrinchium nashii*, differs by having basal fibrous bristles. Herbarium specimens of the two species are easily identified by their foliage color; *Sisyrinchium nashii* dries yellowish-green or light olive green, whereas *S. angustifolium* usually is dark olive green to bronze (Fig. 206b).

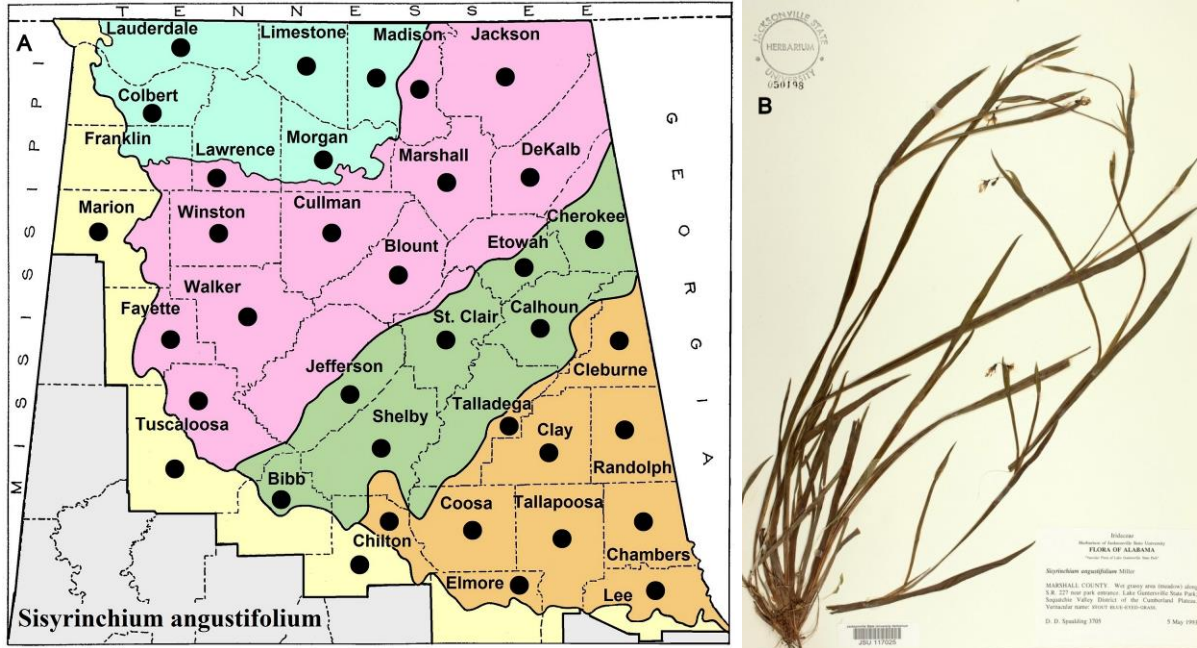


Figure 206. *Sisyrinchium angustifolium*. A. Distribution map. B. JSU herbarium specimen, *Spaulding 3705*, Marshall Co., Alabama, 5 May 1993.



Figure 207. *Sisyrinchium angustifolium*, Cleburne Co., Alabama, 9 May 2021. Photos: Dan Spaulding.

3. *Sisyrinchium atlanticum* E.P. Bicknell {Atlantic} — ATLANTIC BLUE-EYED-GRASS; EASTERN BLUE-EYED-GRASS (Fig. 208). [*Sisyrinchium mucronatum* Michx. var. *atlanticum* (E.P. Bicknell) H.E. Ahles]



Figure 208. *Sisyrinchium atlanticum*, Cleburne Co., Alabama, 15 Apr 2023. Photos: Dan Spaulding.

Perennial herb from fibrous roots. Moist meadows, bogs, roadside ditches, pine savannahs, swales, wet fields, alluvial woods, and streambanks. Flowers & fruits April–June; rare in northern Alabama; frequent on the Coastal Plain (Fig. 209). Native to Nova Scotia and the eastern USA, from Maine to Wisconsin, south to Texas and Florida (Kartesz 2022).

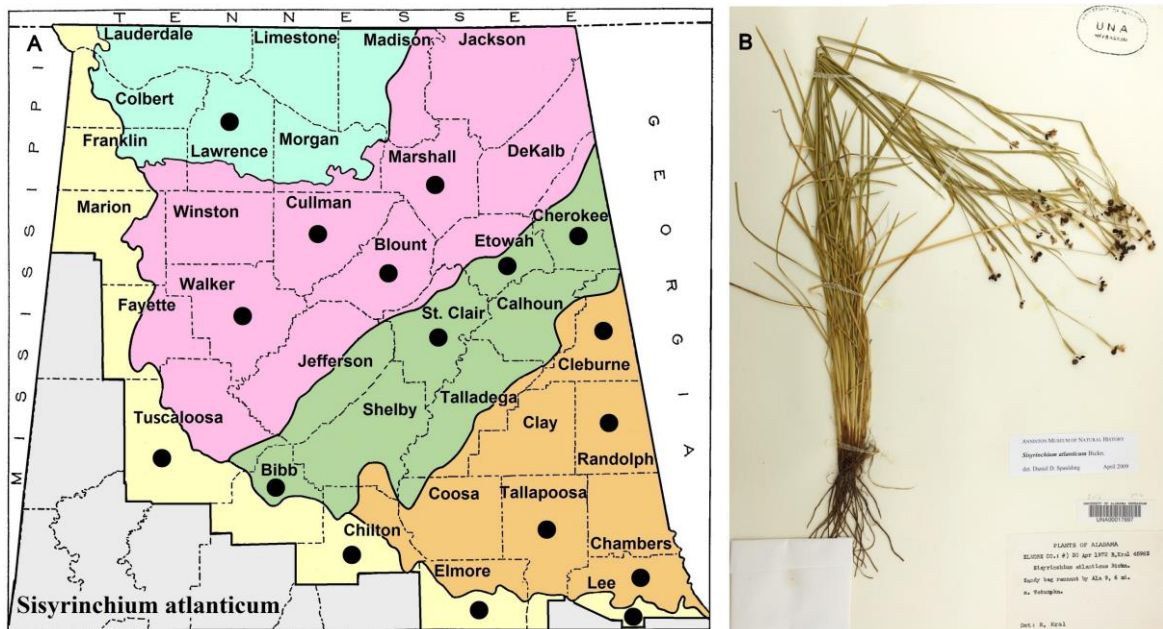


Figure 209. *Sisyrinchium atlanticum*. A. Distribution map. B. UNA herbarium specimen, *Kral 45983*, Elmore Co., Alabama, 30 Apr 1972.

Blue-eyed-grasses with narrow stems (< 2) mm are often misidentified as *Sisyrinchium atlanticum*. The main difference between them is that the stems of *S. atlanticum* appear to be rounded because the body of the stem is broader than its narrow wings (Fig. 210a). Whereas other species in northern Alabama have stems appearing flattened because the wings are wider than the body. Other key characteristics of *S. atlanticum* include its bent or geniculate nodes (Fig. 210b) and individual plants, usually dry yellowish to light olive, contrasting strongly with its black-fruited capsules (Fig. 210c).

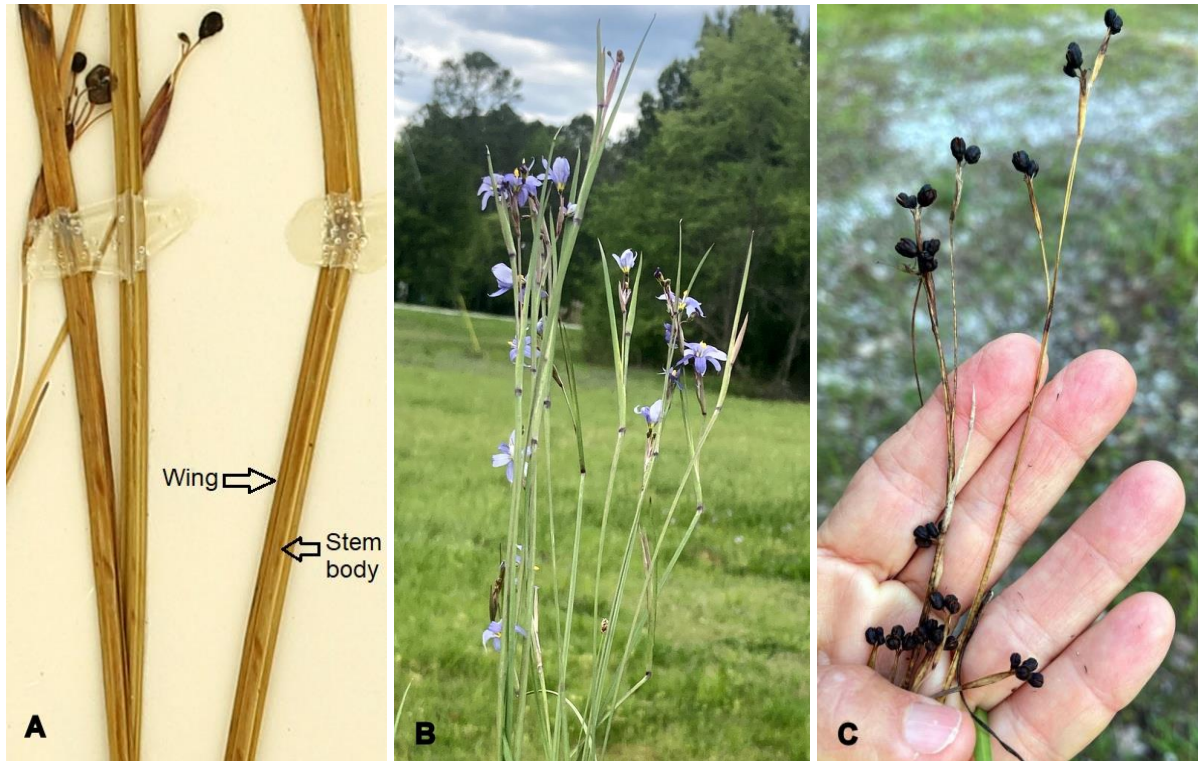


Figure 210. *Sisyrinchium atlanticum*. A. Narrow wings and broad stem body, UNA herbarium specimen, Harper 3725, Cullman Co., Alabama, 13 May 1939. B. Geniculate nodes, Cleburne Co., Alabama, 15 Apr 2023. Photo: Dan Spaulding. C. Black capsules, Jackson Co., Mississippi, 4 June 2021. Photo: Janet Wright.

Sisyrinchium corymbosum E.P. Bicknell [Godzilla Blue-Eyed-Grass] is a robust version of *S. atlanticum*, occurring in the southeastern Coastal Plain. Cholewa & Henderson (2002) treated it as a synonym of *S. atlanticum*, but Ward (2005) recognized it as a distinct species. It shows most characteristics of *S. atlanticum* but has much wider stems (over 2 mm wide), but like *S. atlanticum*, the stem body comprises most of its width due to its narrow wings.

4. *Sisyrinchium calciphilum* Sorrie {limestone-loving} — GLADE BLUE-EYED-GRASS; LIMESTONE BLUE-EYED-GRASS; ALABAMA BLUE-EYED-GRASS; (Fig. 211).

Perennial herb from fibrous roots. Cedar glades and open limestone woods. Flowers & fruits March–June; rare in the Moulton Valley district of the Highland Rim and adjacent Warrior Basin district of the Cumberland Plateau with exposed Bangor Limestone (Fig. 212). Endemic to northwestern Alabama (Sorrie et al. 2012). Weakley et al. (2022) report it for south-central Tennessee, but no vouchered specimens were examined from that region. *Sisyrinchium calciphilum* is a globally imperiled (G1) species. The Alabama State Natural Heritage Program plans to rank this species as critically imperiled (S1) on their 2023 state inventory list (Al Schotz pers. comm. 2023).



Figure 211. *Sisyrrhynchium calciphilum*, Franklin Co., Alabama, 27 Mar 2012. Photos: T. Wayne Barger.

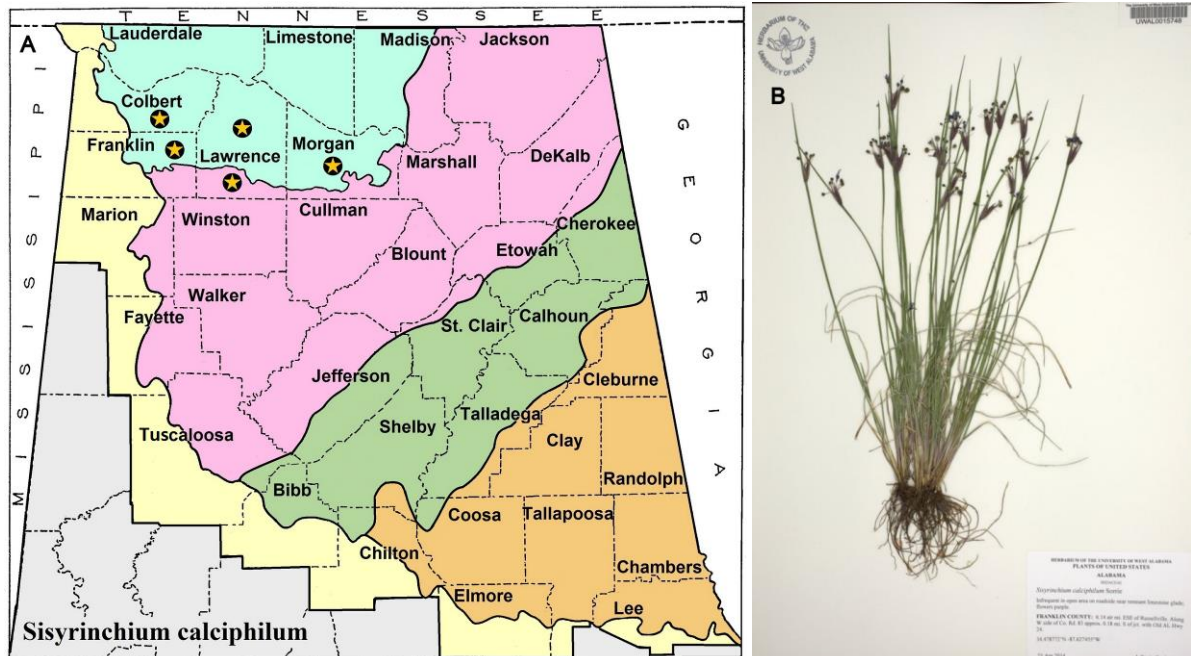


Figure 212. *Sisyrrhynchium calciphilum*. A. Distribution map. B. UWAL herbarium specimen, England 4816, Franklin Co., Alabama, 23 Apr 2014.

Sisyrinchium calciphilum is a recently described species (Sorrie et al. 2012). Cholewa & Henderson (2002) treated this taxon under *S. capillare* in *Flora of North America*. Both species have unbranched stems and twinned inflorescences (Fig. 213). However, *S. calciphilum* has narrowly winged stems (vs. unwinged), purple-tinged spathes (vs. green), and plant bases lacking fibrous leaf remains. Moreover, *S. calciphilum* occurs in high pH limestone glades of Alabama, whereas *S. capillare* is restricted to acidic, fire-maintained longleaf pine savannas from southeastern Virginia south to northeastern Florida, mainly within the Coastal Plain (Sorrie et al. 2012).



Figure 213. *Sisyrinchium calciphilum*, Lawrence Co., Alabama, 12 Apr 2015. Photos: Brian Finzel.

Glade Blue-Eyed-Grass resembles *Sisyrinchium albidum* but has narrower stems (0.7–1.3 mm vs. 1.0–2.5), and its corolla color is medium blue, unlike the typical white or pale blue corolla of *S. albidum*. Additionally, the spathe bracts of *S. calciphilum* are often covered with a white, mealy coating (Fig. 213). In contrast, those of *S. albidum* have a smoother surface, sometimes with scattered, flat, white dots or lenticels. Coupled with the restricted range and habitat preference of *S. calciphilum*, these morphological differences are significant at the species level.

5. *Sisyrinchium fuscatum* Bicknell {brown or dusky} — COASTAL-PLAIN BLUE-EYED-GRASS; SANDPLAIN BLUE-EYED-GRASS (Fig. 214). [*Sisyrinchium incrustatum* E.P. Bicknell; *Sisyrinchium tenellum* E.P. Bicknell]

Perennial herb from fibrous roots. Sandy moist fields, roadside ditches, savannahs, pine flatwoods and bogs. Flowers & fruits March–July; very rare in the Piedmont; uncommon in the Coastal Plain (Fig. 215). Native to the southeastern USA, from northwest Georgia and southern Tennessee west to southeast Oklahoma and eastern Texas (Cholewa & Henderson 2002).

Sisyrinchium fuscatum (Fig. 216) is one of three Alabama species with old leaf bases persisting as distinctive tufts of bristle-like fibers (Keener et al. 2022). *Sisyrinchium nashii* differs from *S. fuscatum* by having broader stems (2.3–2.5 mm wide). *Sisyrinchium rufipes* E.P. Bicknell, an endemic to the Southeastern Coastal Plain, has narrower stems than *S. fuscatum* (0.5–1.2 vs. 1.5–2.1 mm wide) and shorter spathe bracts (12–15 mm vs. 15–25 mm long). Cholewa & Henderson (2002) placed *S. rufipes* in synonymy under *S. fuscatum*, but Weakley et al. (2022) recognize it as a valid species.



Figure 214. *Sisyrrinchium fuscatum*, Mobile Co., Alabama, 22 Mar 2020. Photos: Howard Horne.

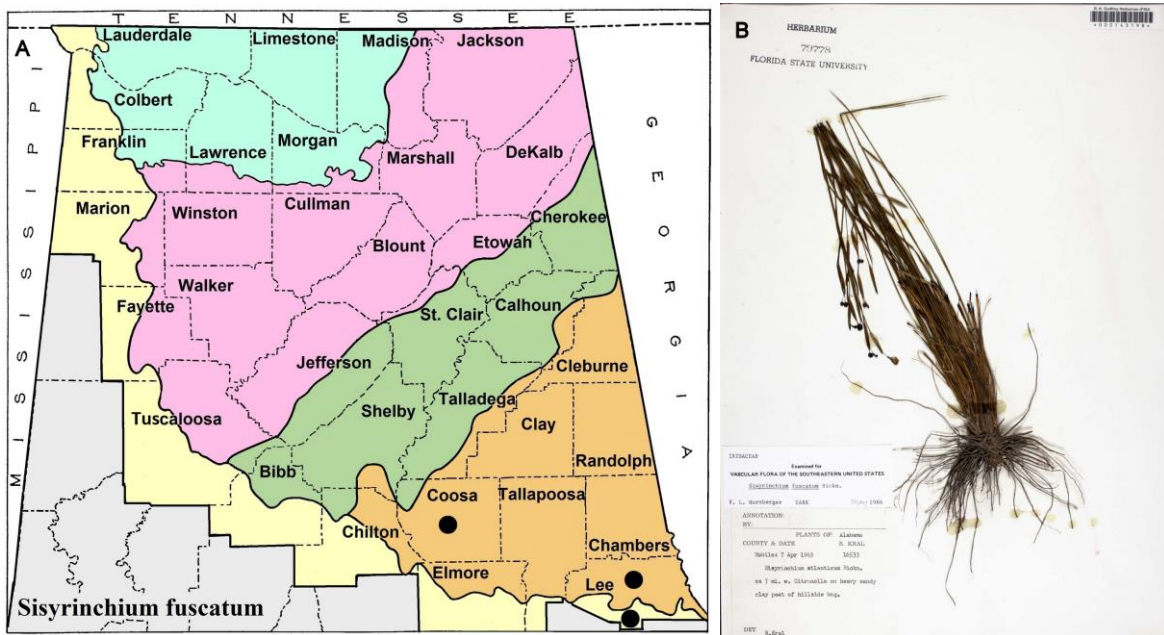


Figure 215. *Sisyrrinchium fuscatum*. A. Distribution map. B. FSU herbarium specimen, Kral 16533, Mobile Co., Alabama, 7 April 1963.



Figure 216. *Sisyrinchium fuscatum*, Baldwin Co., Alabama, 3 Mar 2009. Photos: Wayne Barger.

Coastal-Plain Blue-Eyed-Grass, as its vernacular name implies, is primarily found in the Coastal Plain, but there are a few records in Alabama from the lower Piedmont (Figs. 217a–b). However, in the late 1800s, Charles Mohr made a dubious collection of *S. fuscatum* for the Cumberland Plateau. He first labeled it as collected in Montgomery and later changed it to Cullman (Fig. 217c).



Figure 217. *Sisyrinchium fuscatum* herbarium specimens. A. NCU, Clark 11427, Mobile Co., Alabama, 29 April 1967. B. UNA (ALU), Earle s.n., Lee Co., Alabama, 6 May 1896. C. UNA, Mohr s.n., Montgomery/Cullman Co., Alabama (the late 1800s).

F.S. Earle & L.M. Underwood collected a blue-eyed-grass (NYBG) from Lee County on May 9, 1896, which they determined as *Sisyrinchium tenellum* E.P. Bicknell. Kartesz (2022) lists this taxon as a synonym of *S. fuscatum*. The specimen was annotated in 1985 to *S. angustifolium* by K.L. Hornberger and later in 2004 to *S. miamiense* E.P. Bicknell [Miami Blue-Eyed-Grass] by A.F. Cholewa (SERNEC 2022). Miami Blue-Eyed-Grass has short, thick rhizomes and lacks bristles at the base of its stem. Its leaves are mostly 2–2.5 mm wide, with pale margins and midrib that often stand out on dried specimens. This species occurs mainly in Florida, but populations are scattered on the lower Coastal Plain, from South Carolina to Mississippi (Kartesz 2022). In 2006, Cholewa annotated the specimen as a possible syntype of *S. tenellum*. Dan Spaulding examined the herbarium specimen online, and there were no obvious rhizomes.

6. *Sisyrinchium langloisii* Greene {for Auguste Barthélemy Langlois, 1832–1900, French-born Louisiana botanist & priest} — ROADSIDE BLUE-EYED-GRASS (Fig. 218). [*Sisyrinchium canbyi* E.P. Bicknell; *Sisyrinchium furcatum* E.P. Bicknell; *Sisyrinchium implicatum* E.P. Bicknell]



Figure 218. *Sisyrinchium langloisii*, St. Clair Co., Alabama, 23 Apr 2022. Photos: Dan Spaulding.

Perennial herb from fibrous roots. Open woodlands, roadsides, chalk prairies, limestone glades, and dolomite outcrops. Flowers & fruits March–June; frequent throughout Alabama (Fig. 219). Native to the southeastern USA, from northwest Georgia and southern Tennessee west to southeast Oklahoma and eastern Texas (Cholewa & Henderson 2002).

Sisyrinchium langloisii is a branched species with stems usually less than 2 mm wide and smooth spathe bracts that are often purple-tinged. It is occasionally confused with *S. angustifolium*, which differs by having broader stems (2–6 mm wide) and green spathe bracts. Hornberger (1991) states that the spathe bracts *S. angustifolium* are noticeably unequal, while those of *S. langloisii* are equal to subequal; however, this character does not appear consistent.

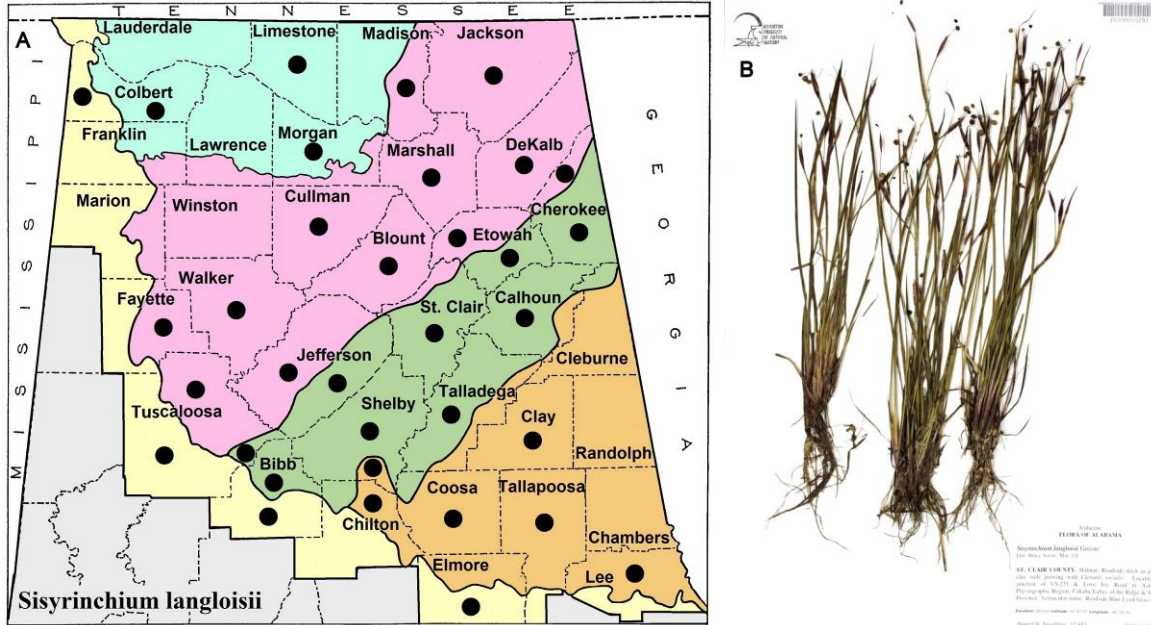


Figure 219. *Sisyrrinchium langloisii*. A. Distribution map. B. AMAL herbarium specimen, Spaulding 12853, St. Clair Co., Alabama, 30 Apr 2008.

Cholewa & Henderson (2002) listed a similar branched species, *Sisyrrinchium pruinorum* E.P. Bicknell [Dotted Blue-Eyed-Grass] from Alabama. Keener et al. (2022) map it in Marengo and Dallas counties. Bruce Sorrie (pers. comm. 2023) states that he has annotated specimens (NCU) collected from Sumter and St. Clair counties to *S. pruinorum*. We have not examined these collections to verify their identification. Dotted Blue-Eyed-Grass occurs mainly west of the Mississippi River (Kartesz 2022). Its stems and spathes are usually scabrous with tiny, white projections (papillae or spicules). The spathes are green with the outer bract 2.5–5.5 mm longer than the inner bract. Hornberger (1991) synonymized *S. pruinorum* under *S. langloisii* because of its similar morphology, chromosome number (2n), and flavonoid chemistry that suggested a single large complex. The stem width of *S. langloisii* is variable in this taxon (Fig. 220). There are possibly some cryptic species present within the complex. Brian Keener is investigating a new entity in the Black Belt of Alabama.



Figure 220. *Sisyrrinchium langloisii* leaf width variations. A. Sumter Co., Alabama, 2 Apr 2013. Photo: T. Wayne Barger. B. DeKalb Co., Alabama, 8 May 2021. Photo: Vitaly Charny.

7. *Sisyrinchium mucronatum* Michx. {sharp-pointed; tepals} — NEEDLE-TIP BLUE-EYED-GRASS; MICHAUX’S BLUE-EYED-GRASS (Fig. 221).



Figure 221. *Sisyrinchium mucronatum*, Prince William Co., Virginia, 2 May 2022. Photos: Peter Friedman.

Perennial herb from fibrous roots. Open woods, fields, and roadsides. Flowers & fruits April–June; very rare in the Cumberland Plateau (Fig. 222). Native to the eastern USA and Canada, from Maine and Quebec west to Saskatchewan and North Dakota, south through the Great Lakes and Atlantic to northwest Georgia and northeast Alabama (Cholewa & Henderson 2002).

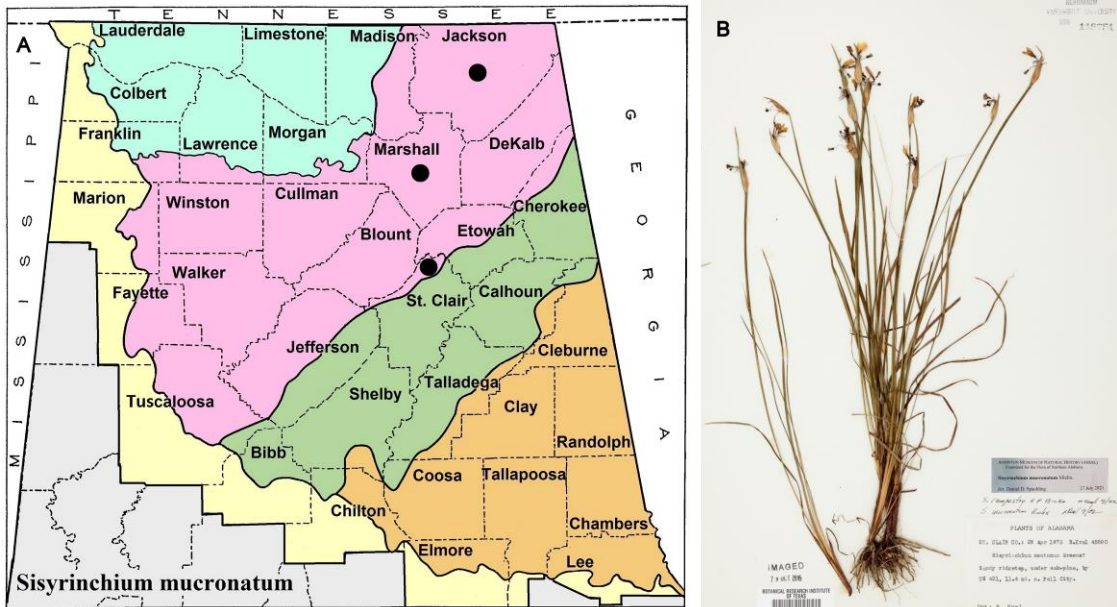


Figure 222. *Sisyrinchium mucronatum*. A. Distribution map. B. VDB herbarium specimen, Kral 45880, St. Clair Co., Alabama, 29 Apr 1972.

Many blue-eyed-grass specimens have been misidentified as *Sisyrinchium mucronatum* because of their narrow stems. There are only three valid collections of this species in Alabama, all from the Cumberland Plateau. *Sisyrinchium atlanticum* is closely related to *S. mucronatum* (Fig. 223a), with both taxa having narrow stems that will dry yellowish to light olive. The main difference is that *S. mucronatum* has simple, unbranched stems, whereas *S. atlanticum* has branched stems (Fig. 223b). The confusion between the two species might have arisen when Harry Ahles (Radford et al. 1968) treated *S. atlanticum* as a variety of *S. mucronatum*. The *Manual to the Vascular Flora of the Carolinas* (Radford et al. 1968) was the predominant treatment used by Alabama botanists until the 21st Century.



Figure 223. A. *Sisyrinchium mucronatum*, Ludwig Reichenbach, 1828. B. *Sisyrinchium atlanticum*, Eugene P. Bicknell, 1896. C. *Sisyrinchium sagittiferum*, SMU, Whitehouse 23061, Newton Co., Texas, 26 Mar 1950.



Figure 224. *Sisyrinchium mucronatum*, Granville Co., North Carolina, 16 May 2021. Photos: Eric Ungberg.

Sisyrinchium mucronatum is similar to *S. sagittiferum* E.P. Bicknell [Spear-Bract Blue-Eyed-Grass]. Both have solitary spathes at the apex of a simple stem, with an outer bract being much longer than the inner (a bract-like cauline leaf is absent). *Sisyrinchium sagittiferum* has old leaves persisting as fibrous basal tufts (Fig. 223c), whereas *S. mucronatum* (Fig. 224) lacks basal bristles. Cholewa & Henderson (2002) reported a specimen of *S. sagittiferum* from Alabama. We could not locate a voucher for this species in the state, but Hornberger (1987) listed it for Montgomery County. It would be the only record east of the Mississippi; most of the population occurs in East Texas and Louisiana (Kartesz 2022). The common name of both species perhaps refers to the elongated inner spathe bract, which resembles a spear or needle tip.

8. *Sisyrinchium nashii* E.P. Bicknell {for George Valentine Nash, 1864–1921, American botanist from Brooklyn, New York} — NASH’S BLUE-EYED-GRASS (Fig. 225). [*Sisyrinchium carolinianum* E.P. Bicknell; *Sisyrinchium fibrosum* E.P. Bicknell; *Sisyrinchium floridanum* E.P. Bicknell]



Figure 225. *Sisyrinchium nashii*, Cleburne Co., Alabama, 8 May 2022. Photos: Dan Spaulding.

Perennial herb from fibrous roots. Woodlands, forests, roadsides, and fields. Flowers & fruits March–June; rare in the Highland Rim; frequent throughout Alabama (Fig. 226). Native to the southeastern USA, from Virginia to Tennessee, south to Florida and eastern Louisiana (Cholewa & Henderson 2002).

Sisyrinchium nashii appears nearly identical to *S. angustifolium* in the field because of their shared, broad, branching stems. Nash’s Blue-Eyed-Grass has old leaf bases persisting as a tuft of bristle-like fibers at the plant base (Fig. 227), whereas *S. angustifolium* lacks them. Poorly collected (“top-snatched”) samples of *S. nashii* may lack bristles, but its foliage typically dries a light olive-green (Fig. 226b), and its fruit dries tan to beige. *Sisyrinchium angustifolium* specimens turn dark olive-green to bronze, and their capsules are dark brown to black when dried. These two species also grow in different habitats; *S. nashii* grows in drier upland soils, and *S. angustifolium* typically inhabits low, moist ground.

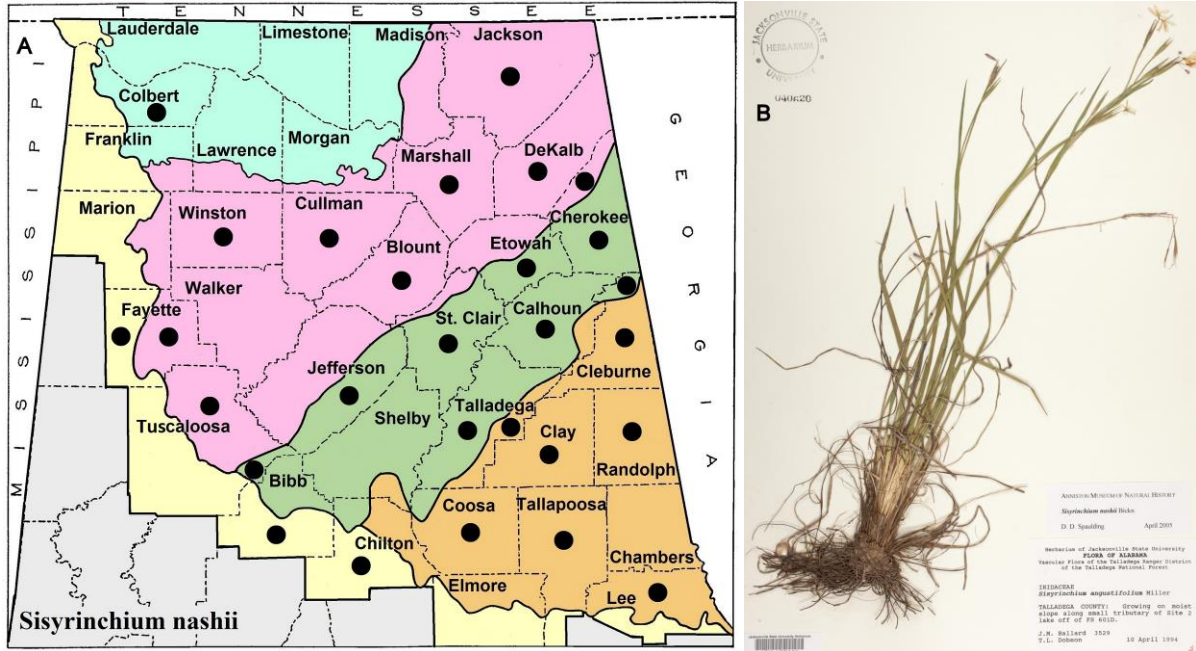


Figure 226. *Sisyrinchium nashii*. A. Distribution map. B. JSU herbarium specimen, Ballard & Dobson 3529, Talladega Co., Alabama, 10 Apr 1994.



Figure 227. *Sisyrinchium nashii*, Etowah Co., Alabama, 23 Apr 2022. Photos: Savannah Spaulding.

9. *Sisyrinchium rosulatum* E.P. Bicknell {beaked; possibly alluding to longer outer spathe bract} — ANNUAL BLUE-EYED-GRASS; LAWN BLUE-EYED-GRASS; FAIRY-STARS; SPREADING BLUE-EYED-GRASS (Fig. 228). [*Sisyrinchium brownei* Small; *Sisyrinchium exile* E.P. Bicknell]



Figure 228. *Sisyrinchium rosulatum*, Chambers Co., Alabama, 22 May 2021. Photos: Dan Spaulding.

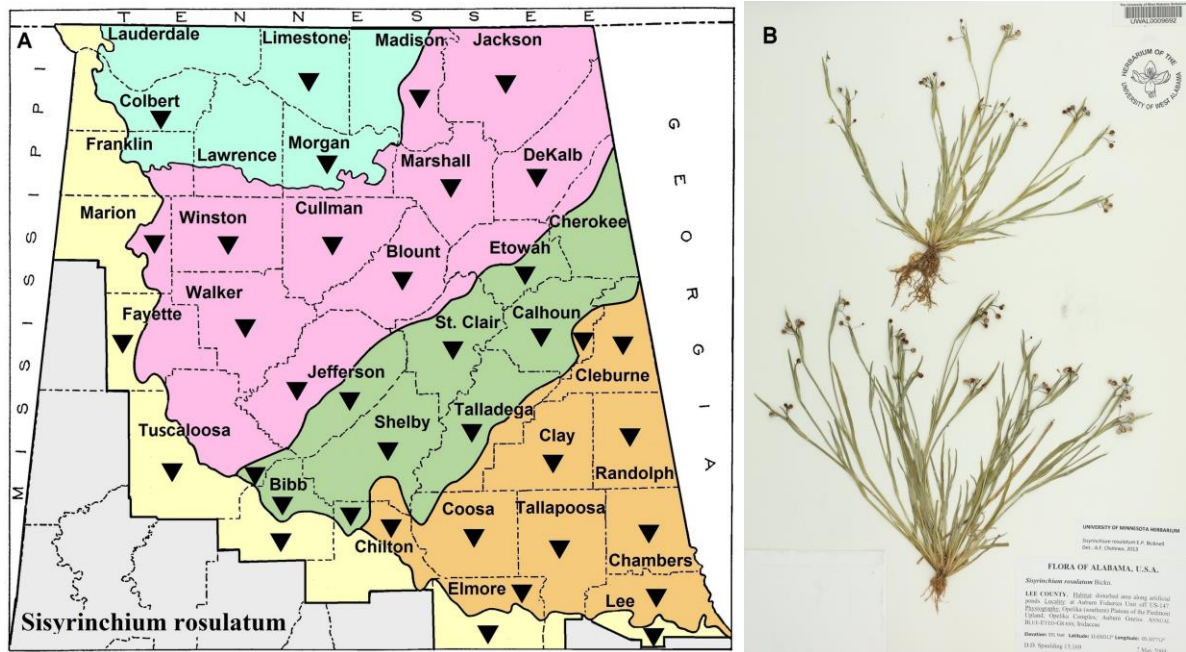


Figure 229. *Sisyrinchium rosulatum*. A. Distribution map. B. UWAL herbarium specimen, Spaulding 13169, Lee Co., Alabama, 7 May 2009.

Annual herb from fibrous roots. Lawns, meadows, roadsides, prairies, open woods, clear-cuts, and other disturbed sites. Flowers & fruits March–June. Common throughout Alabama (Fig. 229). Native to temperate South America (Shinners 1962). It is naturalized in the southeastern USA from Virginia to Arkansas, south to Florida and east Texas (Kartesz 2022). *Sisyrinchium rosulatum* is becoming worldwide in its distribution. Gjeta et al. (2020) state that the species is established in the Dominican Republic, Puerto Rico, Hawaii, New Caledonia, Madagascar, Japan, Korea, Tibet, India, Bhutan, Iran, Albania, and Spain.



Figure 230. *Sisyrinchium rosulatum* flower colors. A. Randolph Co., Alabama, 13 Apr 2019. Photo: Dan Spaulding. B. St. Clair Co., Alabama, 23 Apr 2009. C. Wilcox Co., Alabama, 14 Apr 2007. Photos: Brian Finzel.



Figure 231. *Sisyrinchium rosulatum* capsules. A. Calhoun Co., Alabama, 22 Apr 2022. B. Cleburne Co., Alabama, 23 May 2021. Photos: Dan Spaulding.

Bicknell (1899a) named *Sisyrinchium rosulatum* from plants collected in Mobile, Alabama (1852) and Sullivan’s Island, South Carolina (1896). He noted it was “very distinct from any of our eastern species, having its affinity with certain South American forms and a Mexican and Central American species which is perhaps unnamed.” Many botanical manuals (Mohr 1901, Cholewa & Henderson 2002, Weakley et al. 2022) treat *S. rosulatum* as native to portions of the southeastern USA since Bicknell’s type locality was from the Southeast.

Cholewa & Henderson (2002) mapped *Sisyrinchium rosulatum* mainly on the Southeastern Coastal Plain; however, it is now ubiquitous in many lawns and other moist, disturbed sites throughout Alabama. Its bell-shaped flowers with a dark eye ring and sprawling habit make it easily identifiable in the field. It typically has purplish-white to light purple flowers with a rose-purple eye-ring. Occasionally yellow, lavender-rose, or pure white flowered individuals occur within a single population (Fig. 230). Shinners (1962) treated the yellow expression with a brownish-red eye-ring as *S. exile* E.P. Bicknell. Annual Blue-Eyed-Grass has spherical fruiting capsules with purplish to brownish stripes (Fig. 231a) or occasionally entirely purple (Fig. 231b).

A similar annual species, *Sisyrinchium minus* Engelm. & Gray [Dwarf Blue-Eyed-Grass] was first collected in Wilcox County, Alabama, by Dr. Robert Kral. But he and his coauthors omitted it from the state’s checklist of vascular plants (Kral et. 2011). Later, England & Keener (2007) confirmed its presence in the Blackbelt of Alabama (Fig. 232a). Dwarf Blue-Eyed-Grass chiefly occurs in moist prairies and low meadows from East Texas to western Mississippi (Cholewa & Henderson 2002). It has not been documented for northern Alabama.



Figure 232. *Sisyrinchium minus*. A. AMAL, Kral 73815, Wilcox Co., Alabama, 1 May 1987. B. Illustration by Mary Emily Eaton, 1916. C. Photo by Andrea Cox, Burlison Co., Texas, 17 Apr 2022.

The barrel-shaped capsules and fused filaments are reliable characteristics that distinguish *Sisyrinchium minus* (Fig. 232b–c). Although three anthers exist in *S. minus*, it appears to have only one (Fig. 233a). *Sisyrinchium rosulatum* has rounded fruits, and its filaments are fused basally (Fig. 233b). Thus, the three anthers of *S. rosulatum* are distinct and easily seen. Furthermore, the tepals of *S. minus* are typically rose-pink with sharp-pointed bristle tips (Fig. 233a). In contrast, those of *S. rosulatum* are rarely pink and usually taper to a point (Fig. 233c).

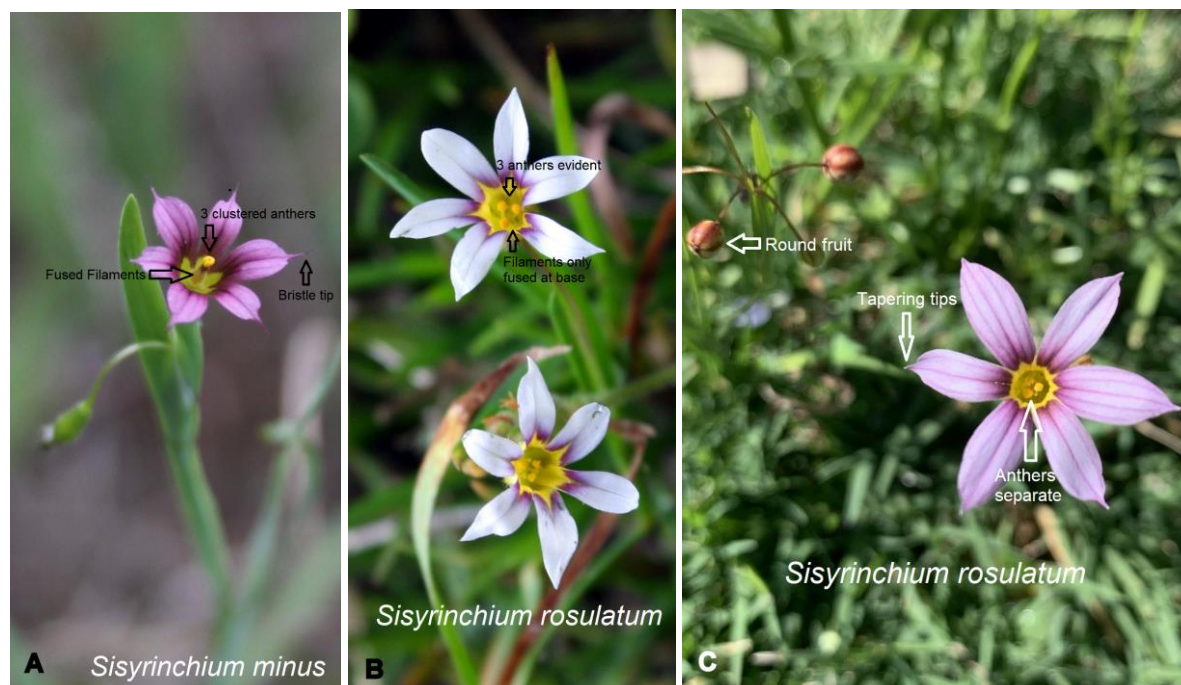


Figure 233. Comparisons of annual blue-eyed-grasses. A. *Sisyrrinchium minus*, Clarke Co., Alabama, 21 March 2012. B. *Sisyrrinchium rosulatum*, Baldwin Co., Alabama, 2 Apr 2008. Photos: T. Wayne Barger. C. *Sisyrrinchium rosulatum* Travis Co., Texas, 2 Apr 2021. Photo: Alexandra Vonhindenfalken.

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