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FLORA OF NORTHERN ALABAMA, PART 5. LILIACEOUS FAMILIES

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ABSTRACT

This paper is a floristic guide to native and naturalized liliaceous plants in the orders Dioscoreales, Pandanales, Liliales, and Asparagales (excluding Orchidaceae and Iridaceae) found within the Interior Plains and Appalachian Highlands of northern Alabama. The families included in this treatment are Nartheciaceae, Burmanniaceae, Dioscoreaceae, Stemonaceae, Trilliaceae, Xerophyllaceae, Chionographidaceae, Melanthiaceae, Alstroemeriaceae, Colchicaceae, Smilacaceae, Liliaceae, Hypoxidaceae, Hemerocallidaceae, Alliaceae, Amaryllidaceae, Asparagaceae, Ruscaceae, Agavaceae, and Hyacinthaceae. The Flora contains identification keys, photographs, maps of occurrence in northern Alabama, habitats, flowering and fruiting times, distributional data, pertinent synonymy, and comments for each taxon.

The present publication covers 109 species and 4 hybrids (nothospecies) of liliaceous monocots in 4 orders: Pandanales, Dioscoreales, Liliales, and the Asparagales (Fig. 1). Forty-three genera representing twenty different plant families are included. The families Iridaceae and Orchidaceae, in the order Asparagales, will be treated separately in part 6 of the flora (in prep).

Pandanales is represented by the single species within the flora region, *Croomia pauciflora*, a globally rare plant in the Stemonaceae. Three families of **Dioscoreales** occur in North Alabama: Nartheciaceae (2 species), Burmanniaceae (1 species), and Dioscoreaceae (2 species).

Liliales includes the following eight families: Trilliaceae (18 species), Xerophyllaceae (1 species), Chionographidaceae (1 species), Melanthiaceae (6 species), Alstroemeriaceae (1 species), Colchicaceae (3 species), Smilacaceae (12 species), and Liliaceae (14 species).

Asparagales is represented in northern Alabama by the following eight families (excluding Orchidaceae and Iridaceae): Hypoxidaceae (1 species), Hemerocallidaceae (2 species), Alliaceae (12 species), Amaryllidaceae (11 species & 4 hybrids), Asparagaceae (1 species), Ruscaceae (7 species), Agavaceae (9 species), and Hyacinthaceae (4 species).

Of the 113 taxa treated, 77 species (68%) are classified as native to northern Alabama. A total of 36 taxa (32 species and 4 hybrids of *Narcissus*) are considered non-native and are naturalized in the region (32%).

There has been considerable debate regarding the overall taxonomy of liliaceous plants (Weakley 2020). This treatment's higher-level classifications follow Weakley (2020) in recognizing smaller, more narrowly defined families, particularly in the Liliales and the Asparagales. A discussion of the preferred taxonomic concepts used in this work (Table 1) is provided along with a comparison of alternative treatments of classification systems, including Engler & Prantl (1887–1915), Cronquist (1981), and the circumscriptions of the most recent Angiosperm Phylogeny Group's classification of families and orders (APG 2016).

Based on modern phylogenetic studies utilizing DNA sequences, the Pandanales and Dioscoreales are now known to share a sister relationship (Chase et al. 2006, Soltis et al. 2018). Together they form a clade that is basal to the remainder of the monocot orders covered here. These long-established orders have never been considered closely related, and other than DNA data, there are no morphological traits known to unite these orders (Soltis et al. 2018).

Reflecting the lack of informative characters, the circumscriptions of orders have previously included a number of different families depending on the classification system used. Historically, most of the liliaceous genera in this paper have been treated under Liliaceae, except for *Burmannia*, *Dioscorea*, and *Croomia* (Table 1).

The most popular taxonomic system used by most 20th Century botanists was devised by two German botanists, Engler and Prantl (1887–1915). These two men produced a monumental reference work, *Die Natürlichen Pflanzenfamilien*, published in 23 volumes. According to Radford (1986), the Engler-Prantl approach "became the standard classification scheme for most botanical institutions and publications, and until the 1980s, most floras."

The Engler-Prantl taxonomic scheme was followed by such authors as Britton (1901), Robinson & Fernald (1908), Britton & Brown (1913), Fernald (1950), Gleason (1952), Gleason & Cronquist (1963), and Radford et al. (1968). One notable exception was John K. Small (1933), who deviated from their system in *Manual of the Southeastern Flora*. He wrote: "The arrangement of the

natural plant families is essentially that of Engler and Prantl, *Die Natürlichen Pflanzenfamilien*, although in a few cases modifications of the sequence there adopted seemed to be desirable." His variations were especially true regarding the liliaceous genera, where he recognized almost a dozen new families.

Cronquist (1981) placed members of the current Pandanales and Dioscoreales into three unrelated orders. He considered Burmanniaceae related to orchids, classifying the family in the Orchidales while including Stemonaceae and Dioscoreaceae in the order Liliales. Cronquist placed members of the current Nartheciaceae into an extremely broad and artificial Liliaceae (see below). His order Pandanales comprised only family Pandanaceae, of which no species occur in northern Alabama as currently recognized.

The situation involving the classification of Liliales was similarly problematic, if not more so. Cronquist's (1981) system included 15 families in the Liliales, which are now distributed across six different orders. At the heart of the matter was how best to comprehensively classify many lily-like plants into a natural system of families to reflect their true evolutionary relationships.

Despite recognizing the need for smaller and more homogenous families, Cronquist was unable to find a reasonable solution and ended up lumping numerous species possessing six tepals into a broad and arbitrary Liliaceae, making it one of the largest monocot families with over 300 genera and 4,500 species (Reveal & Pires 2002, Soltis et al. 2018). Many botanists believed that this "catch-all" concept of the Liliaceae was artificial. Even Cronquist recognized that additional work was necessary to reorganize liliaceous plants into smaller families (Reveal & Pires 2002, Weakley 2020).

Advances in molecular phylogenetics have greatly clarified the evolutionary relationships of the lilioid monocots over the past few decades. The Angiosperm Phylogeny Group (APG 1998, 2003, 2009, 2016) made rapid progress in creating an overall monophyletic classification of the monocots, including its liliaceous members.

While Liliales and Asparagales are monophyletic and can be defined using molecular data, no consistent morphological synapomorphies (shared ancestral traits) readily distinguish them (Reveal & Pires 2002, Pires et al. 2006, Soltis et al. 2018). Liliales can be generally characterized as perennial, bulb-producing plants (geophytes) that possess elliptical leaves with fine reticulate venation (Soltis et al. 2018).

One non-DNA character uniting all members of the Asparagales, except Orchidaceae, is the presence of a phytomelanous seed coat (a blackish organic crust-like covering). However, this phytomelan layer occurs in other unrelated vascular plant families such as Asteraceae (Reveal & Pires 2002, Pires et al. 2006, Soltis et al. 2018).

This flora's current volume uses the same ordinal classification of APG IV (2016), classifying species into four orders (Pandanales, Dioscoreales, Liliales, and Asparagales). Our family circumscriptions (Table 1) differ from APG IV (2016) by using more narrowly defined taxonomic concepts promoted in Weakley (2020). We recognize Trilliaceae, Chionographidaceae, and Xerophyllaceae as segregate families from the Melanthiaceae. Within the Asparagales, Alliaceae is treated as a separate family from Amaryllidaceae. The families Ruscaceae, Hyacinthaceae, and Agavaceae are segregated from Asparagaceae. Hemerocallidaceae is recognized as a separate family from Asphodelaceae, which is not represented in the flora.

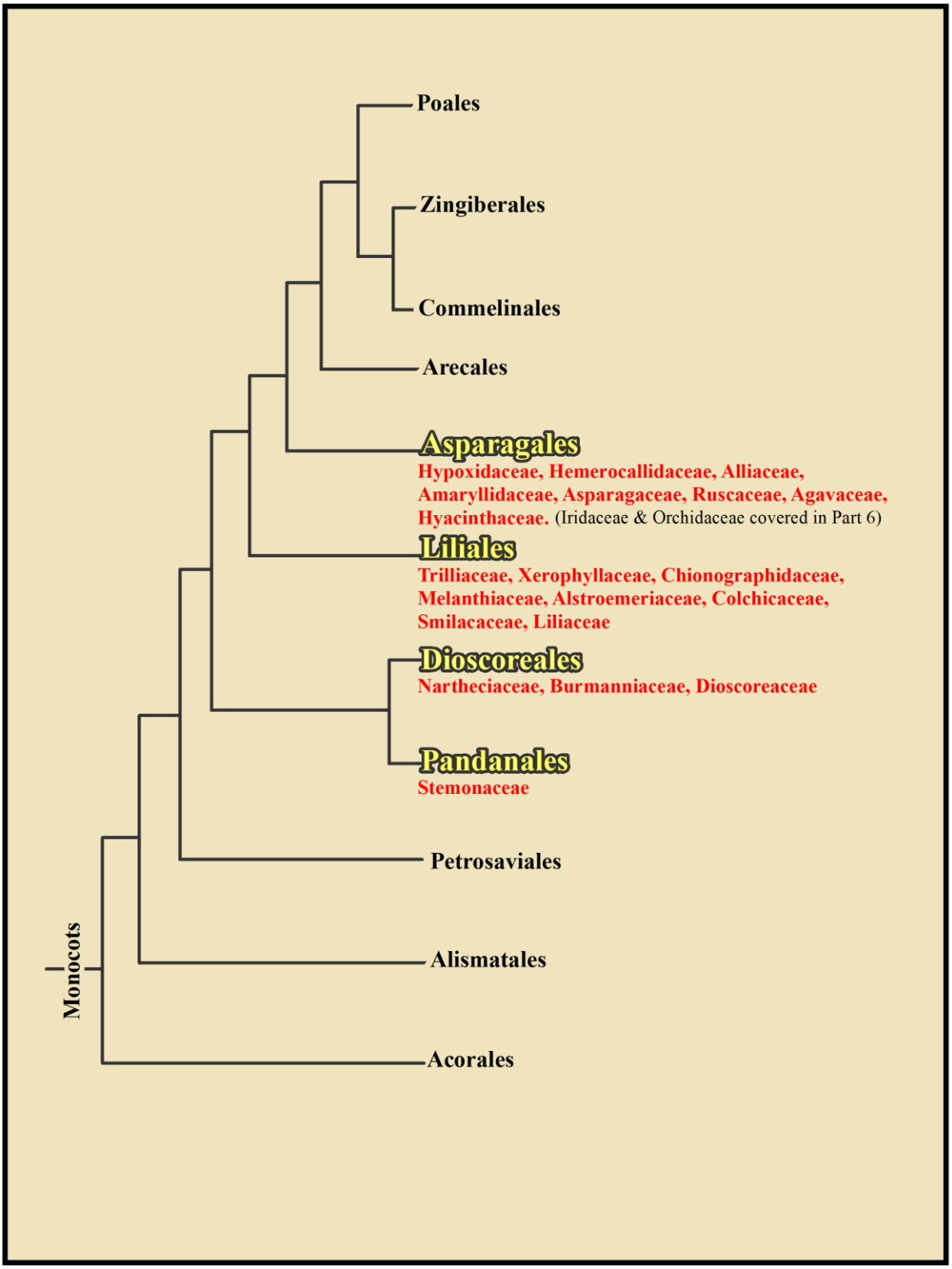

Figure 1. Relationships of the major monocot clades. Liliaceous families in this treatment are labeled in red and orders in yellow. Cladogram adapted and modified from Soltis et al. 2018.

Table 1. Comparison of taxonomic classification systems for Liliaceous families.

Genus	Current Family Weakley (2020)	APG (2016)	Cronquist (1988)	Engler & Prantl (1877-1915)
Aletris	Nartheciaceae	Nartheciaceae	Liliaceae	Liliaceae
Burmannia	Burmanniaceae	Burmanniaceae	Burmanniaceae	Burmanniaceae
Dioscorea	Dioscoreaceae	Dioscoreaceae	Dioscoreaceae	Dioscoreaceae
Croomia	Stemonaceae	Stemonaceae	Stemonaceae	Stemonaceae
Trillium	Trilliaceae	Melanthiaceae	Liliaceae	Liliaceae
Xerophyllum	Xerophyllaceae	Melanthiaceae	Liliaceae	Liliaceae
Chamaelirium	Chionographidaceae	Melanthiaceae	Liliaceae	Liliaceae
Amianthium	Melanthiaceae	Melanthiaceae	Liliaceae	Liliaceae
Melanthium	Melanthiaceae	Melanthiaceae	Liliaceae	Liliaceae
Stenanthium	Melanthiaceae	Melanthiaceae	Liliaceae	Liliaceae
Alstroemeria	Alstroemeriaceae	Alstroemeriaceae	Liliaceae	Liliaceae
Uvularia	Colchicaceae	Colchicaceae	Liliaceae	Liliaceae
Smilax	Smilacaceae	Smilacaceae	Smilacaceae	Liliaceae
Erythronium	Liliaceae	Liliaceae	Liliaceae	Liliaceae
Lilium	Liliaceae	Liliaceae	Liliaceae	Liliaceae
Medeola	Liliaceae	Liliaceae	Liliaceae	Liliaceae
Prosartes	Liliaceae	Liliaceae	Liliaceae	Liliaceae
Tulipa	Liliaceae	Liliaceae	Liliaceae	Liliaceae
Hypoxis	Hypoxidaceae	Hypoxidaceae	Liliaceae	Liliaceae
Hemerocallis	Hemerocallidaceae	Asphodelaceae	Liliaceae	Liliaceae
Allium	Alliaceae	Amaryllidaceae	Liliaceae	Liliaceae
Ipheion	Alliaceae	Amaryllidaceae	Liliaceae	Liliaceae
Nothoscordum	Alliaceae	Amaryllidaceae	Liliaceae	Liliaceae
Galanthus	Amaryllidaceae	Amaryllidaceae	Liliaceae	Amaryllidaceae
Zephyranthes	Amaryllidaceae	Amaryllidaceae	Liliaceae	Amaryllidaceae
Hymenocallis	Amaryllidaceae	Amaryllidaceae	Liliaceae	Amaryllidaceae
Leucojum	Amaryllidaceae	Amaryllidaceae	Liliaceae	Amaryllidaceae
Lycoris	Amaryllidaceae	Amaryllidaceae	Liliaceae	Amaryllidaceae
Narcissus	Amaryllidaceae	Amaryllidaceae	Liliaceae	Amaryllidaceae
Asparagus	Asparagaceae	Asparagaceae	Liliaceae	Liliaceae
Maianthemum	Ruscaceae	Asparagaceae	Liliaceae	Liliaceae
Polygonatum	Ruscaceae	Asparagaceae	Liliaceae	Liliaceae
Liriope	Ruscaceae	Asparagaceae	Liliaceae	Liliaceae
Ophiopogon	Ruscaceae	Asparagaceae	Liliaceae	Liliaceae
Convallaria	Ruscaceae	Asparagaceae	Liliaceae	Liliaceae
Agave	Agavaceae	Asparagaceae	Liliaceae	Amaryllidaceae
Camassia	Agavaceae	Asparagaceae	Liliaceae	Liliaceae
Hosta	Agavaceae	Asparagaceae	Liliaceae	Liliaceae
Schoenolirion	Agavaceae	Asparagaceae	Liliaceae	Liliaceae
Yucca	Agavaceae	Asparagaceae	Liliaceae	Liliaceae
Hyacinthoides	Hyacinthaceae	Asparagaceae	Liliaceae	Liliaceae
Muscari	Hyacinthaceae	Asparagaceae	Liliaceae	Liliaceae
Ornithogalum	Hyacinthaceae	Asparagaceae	Liliaceae	Liliaceae

METHODS AND FORMAT OF THE FLORA

Northern Alabama (Fig. 2) includes all counties occurring within the Interior Plains and Appalachian Highlands. 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).

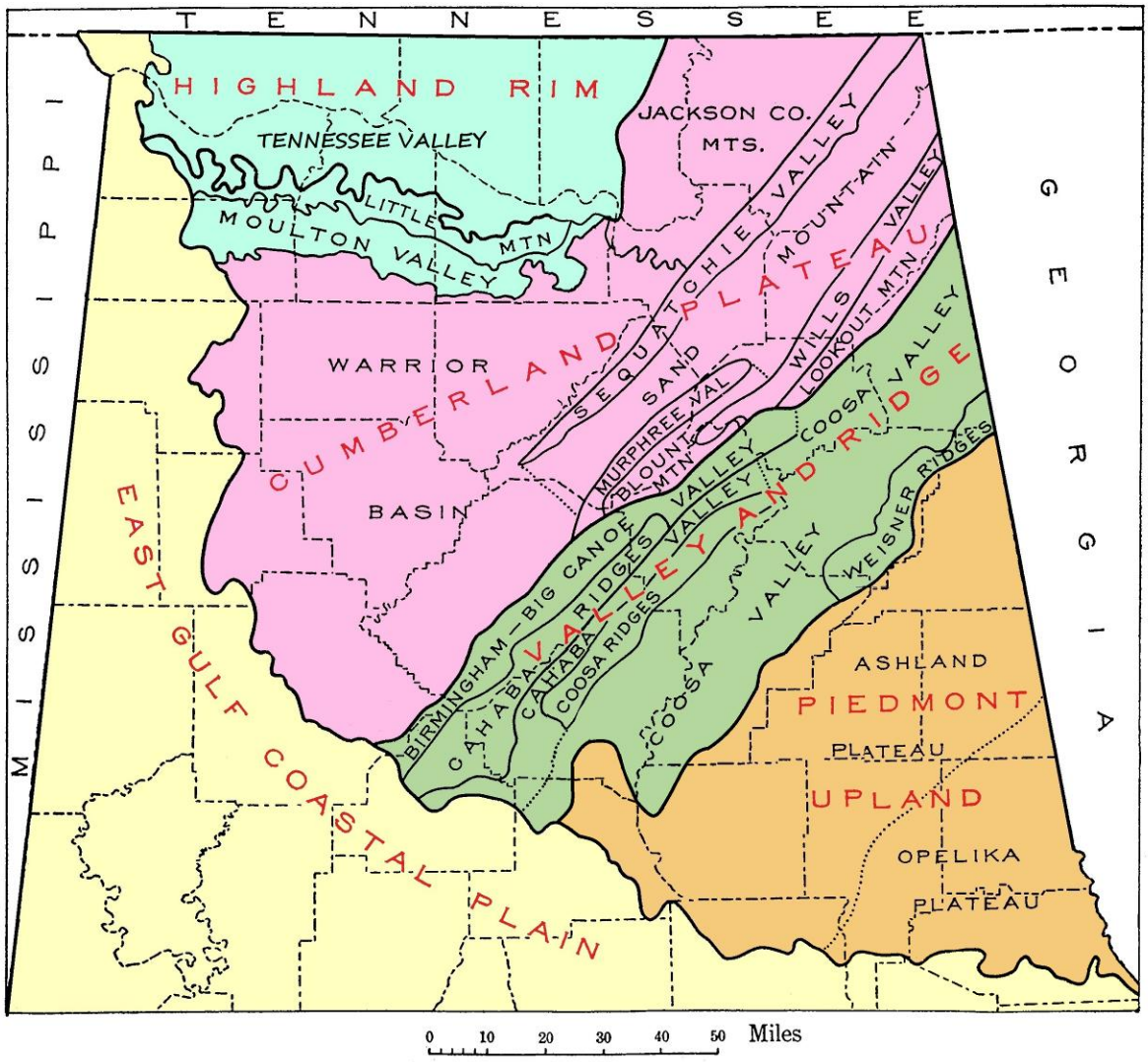

Figure 2. Map of northern Alabama's physical divisions (adapted and modified from Johnston 1930).

County distribution maps with physiographic regions are provided for each species in northern Alabama (Fig. 3). A symbol is used to document county-level occurrences within the physiographic province. In some cases, more than one symbol is used per county. The senior author examined specimens from various herbaria, and searches for collections were made online from the following sites: Alabama Plant Atlas (Keener et al. 2020), Floristic Synthesis of North America (Kartesz 2020), iNaturalist (2020), and the Southeast Regional Network of Expertise and Collections Data Portal (SERNEC 2020). All vouchered specimens that were accessed are from the following herbaria: ALNHS, AMAL, APSC, AUA, BRIT, CM, DUKE, EKY, GA, GSW, KANU, LSU, MO, NCSC, NCU, NLU, SMU, SWSL, TENN, TROY, UCHT, UNA, UNAF, USF, UWAL, VDB, and WCUH. Herbarium acronyms follow those in *Index Herbariorum* (Thiers 2016).

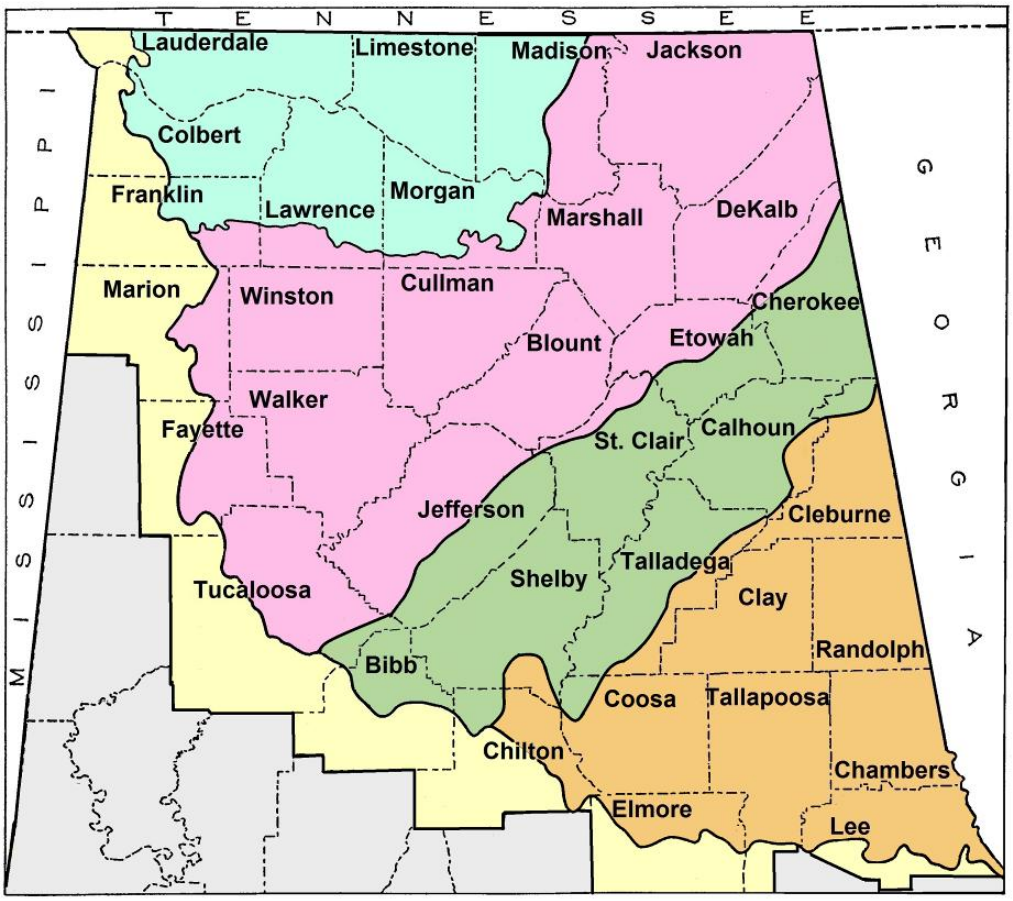

Figure 3. Counties in the study area (above); a key to symbols used in species distribution maps (below).

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

Family and generic sequences follow Weakley (2020) and are arranged phylogenetically, while species are alphabetical. Generic names include authors and date of publication. The format for common names follows Kartesz (2020) and Kartesz & Thieret (1991). The following sequence is followed within a given description of taxa: Scientific name, authority citation for specific and infraspecific taxa, including their derivation. Vernacular name(s). Synonyms. Habit/duration. Habitat, 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; Diggs et al. 2006; Fernald 1950; Flora of North America Committee 2002; Gledhill 1989; Neal 1992; Shosteck 1974; and Stearn 1983, 2002.

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 in 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).

The following publications were utilized in creating keys: Bailey 1929; Blanchard 1990; Braun 1967; Bullard & Allen 2013; Clewell 1985; Coker 1944; Davenport 1996; Deam 1940; Diggs et al. 2006; Duncan 1967; Fernald 1950; Flora of North America Committee 2002; Freeman 1975, 1995; Gleason 1952; Gleason & Cronquist 1963; Godfrey & Wooton 1979; Haines 2011; Hitchcock & Standley 1919; Jones 2005; Mangaly 1968; Mohlenbrock 1970, 1975; Nesom 2010b; Parks & Hardin 1963; Patrick 1986; Radford et al. 1968; Rickett 1968; Serviss et al. 2016; Small 1933; Smith 1994; Strausbaugh & Core 1997; Tennessee Flora Committee 2015; Weakley 2020; Webb 1980; Wilbur 1963; Wofford 1989, and Yatskievych 1999. Specimens from various southeastern herbaria and recent collections in the field were also examined to help construct the keys.

KEY TO FAMILIES

1. Plant a vine.

    2. Plant climbing by stipular tendrils; leaves alternate; stems woody or herbaceous, usually armed with prickles (absent in *Smilax pumila*); flowers in axillary umbels; ovary superior (attached above all other floral parts) ..... **11. Smilacaceae** (in part)
    2. Plant climbing by twining; leaves whorled or opposite; stems herbaceous, prickles absent; flowers in axillary paniculate or spike-like inflorescences; ovary inferior (attached below all other floral parts) ..... **3. Dioscoreaceae**

1. Plant not a vine.

    3. Leaves absent at flowering (stems scapose; leaves appearing in spring, usually withering before anthesis).

        4. Tepals red, pinkish, or pale purple, more than 2 cm long and fused basally, forming a corolla tube; crushed leaves or bulbs lacking an onion or garlic odor; ovary inferior (attached below all other floral parts); leaves more than 3, linear ..... **16. Amaryllidaceae** (*Lycoris*)
        4. Tepals pale yellow to cream, not fused (distinct), less than 1 cm long; crushed leaves or bulbs with a pungent onion or garlic odor; ovary superior (attached above all other floral parts); leaves 2–3, broadly lanceolate to elliptic ..... **15. Alliaceae** (*Allium tricoccum*)

    3. Leaves present at flowering (*Allium tricoccum* occasionally has an immature inflorescence present, but its leaves wither away after flower buds open).

        5. Leaves scale-like, < 10 mm long (in *Asparagus*, leaves subtended by needle-like cladophylls < 20 mm, reduced branches that function as leaves, and appearing leaf-like).

            6. Plant large (> 50 cm tall), multi-branched with filiform cladophylls borne singly or in clusters; flowers unisexual (dioecious), axillary on nodding pedicels; ovary superior (attached above all other floral parts); fruit a berry ..... **17. Asparagaceae**
            6. Plant small (< 35 cm tall), unbranched, cladophylls absent; flowers bisexual, terminating stem in head-like clusters; ovary inferior (attached below all other floral parts); fruit a capsule ..... **2. Burmanniaceae**

5. Leaves (bracts in *Trillium*) not scale-like, > 25 mm long (cladophylls absent).

7. Plants woody (at least basally); leaves evergreen, leathery, and sword-like, clustered in spiral rosettes either basally or along the stem; leaf tips sharp-pointed; inflorescence a terminal panicle with large whitish flowers (>2.5 cm); fruit large (>3 cm) and cylindrical ..... **19. Agavaceae** (*Yucca*)
7. Plants herbaceous; leaves, inflorescence, and fruits without the above combination of characters.

8. Stems scapose, all leaves basal (stem appearing leafy in *Convallaria* due to sheathing petioles).

9. Leaves linear, grass-like with parallel sides; leaf blades sessile, petioles absent.

10. Flowers with a corona (a fused tubular or flattened petaloid structure above the tepals); inflorescence an umbel or flowers solitary; ovary inferior (attached below other floral parts) ..... **16. Amaryllidaceae** (*Hymenocallis, Narcissus*)
10. Flowers lacking a corona; inflorescence various; ovary inferior, partly inferior, or superior.

11. Flowers large (> 5 cm long); tepals orange or yellow; inflorescence a pair of helicoid cymes; filaments fused to tepals ..... **14. Hemerocallidaceae**
11. Flowers smaller (< 5 cm long); tepals variously colored; inflorescence various, but not in helicoid cymes; filaments not fused to tepals.

12. Inflorescence umbellate, in head-like clusters or 1-flowered, subtended by spathed or sheathed bracts.

13. Ovary superior (attached above all other floral parts); crushed plants with or without an onion or garlic odor; flowers occasionally replaced by bulblets ..... **15. Alliaceae** (in part)
13. Ovary inferior (attached below all other floral parts); crushed plants lacking an onion or garlic odor; flowers never replaced by bulblets..... **16. Amaryllidaceae** (in part)

12. Inflorescence neither umbellate nor in head-like clusters, not subtended by spathes or bracts (pedicel of individual flowers with bracts).

14. Plant hairy; tepals yellow (rarely white); ovary inferior; inflorescence corymbose ..... **13. Hypoxidaceae**
14. Plant glabrous; tepals variously colored; ovary partly inferior or superior; inflorescence various.

15. Tepals fused more than half their length, forming an urn-like tube often with white tooth-like lobes; perianth blue-purple, violet, or blue..... **20. Hyacinthaceae** (*Muscari*)
15. Tepals fused basally or completely free; perianth variously colored.

16. Bulbs absent; roots often with tubers; flowers with pedicels < 5 mm long, solitary or in clusters of 2 or more on rachis; anthers nearly as long as filaments; "fruit" berry-like ..... **18. Ruscaceae** (*Liriope, Ophiopogon*)
16. Bulbs present; roots lacking tubers; flowers with pedicels > 7 mm long, solitary on rachis; anthers distinctly shorter than filaments; fruit a capsule.

    17. Inflorescence corymbose (flat-topped); tepals white inside and green outside with narrow white margins; lower pedicels > 3 cm long; base of bracts > 2mm wide ..... **20. Hyacinthaceae** (*Ornithogalum*)
    17. Inflorescence racemose (cylinder-shaped); tepals blue, yellow, pink, or white; lower pedicels < 2.5 cm long; base of bracts < 1.5 mm wide.

        18. Perianth wheel-shaped (rotate); tepals tips not recurved; flowers ascending; bracts 1 per flower ..... **19. Agavaceae** (*Camassia, Schoenolirion*)
        18. Perianth bell-shaped (campanulate); tepal tips recurved; flowers nodding or horizontal; bracts 2 per flower ... **20. Hyacinthaceae** (*Hyacinthoides*)

9. Leaves elliptic, ovate, obovate, elliptic-lanceolate, or cordate (not grass-like, sides not parallel); leaf blades sessile, perfoliate, or petiolate.

    19. Inflorescence a raceme; tepals fused more than 1/2 of their length, forming an urn-like tube; leaves petiolate (appearing sessile in *Convallaria* due to sheathing petioles); plants from rhizomes.

        20. Leaves 2–3; leaf base tapering; tepals white; flowers fragrant; fruit a berry ..... **18. Ruscaceae** (*Convallaria*)
        20. Leaves 4 or more; leaf base cordate; tepals bluish to purplish; flowers not fragrant; fruit a capsule ..... **19. Agavaceae** (*Hosta*)

    19. Inflorescence umbellate or 1-flowered; tepals free or only basally fused; leaves sessile; plants from bulbs.

        21. Inflorescence an umbel with numerous flowers; plants with a distinct onion or garlic odor; leaves 2–3, not mottled, usually absent at anthesis (when flower buds open) ..... **15. Alliaceae** (*Allium tricoccum*)
        21. Inflorescence a solitary flower; plants lacking onion odor; leaves 2, often mottled, present at anthesis ..... **12. Liliaceae** (*Erythronium*)

8. Plants caulescent with leafy stems or subscapose with leaves reduced upward.

    22. Leaves basally disposed; inflorescence a terminal panicle or raceme.

        23. Leaves fleshy, occasionally spotted; perianth green; styles 1; anthers 12–15 mm long; ovary inferior ..... **19. Agavaceae** (*Agave*)

23. Leaves herbaceous, not spotted; perianth white, greenish-white, yellow, or maroon; styles 3; anthers < 2.5 mm long; ovary partly inferior or superior.

    24. Inflorescence ebracteate (base of pedicels lacking bracts); flowers unisexual (dioecious)..... **7. Chionographidaceae**
    24. Inflorescence bracteate (base of pedicels with bracts); flowers bisexual.

        25. Leaves narrowly linear, most < 2 mm wide, evergreen; blades rigid, keeled, margins serrulate ..... **6. Xerophyllaceae**
        25. Leaves not narrowly linear, most > 2 mm wide (linear, lanceolate, elliptic, or ovate), senescing during winter; blades flexible, not keeled, margins entire.

            26. Tepals fused for more than 1/2 their length, forming a tube; perianth wrinkled or roughened (appearing mealy); stems glabrous..... **1. Nartheciaceae**
            26. Tepals free to the base; perianth smooth; stems glabrous or pubescent with hairs or scales ..... **8. Melanthiaceae**

22. Leaves (or leaf-like bracts in *Trillium*) chiefly cauline; inflorescence various, terminal or axillary.

    27. Leaves in a single whorl of 3 at summit; perianth segments differentiated into sepals and petals (sepals often green or occasionally tinged reddish-purple, petals variously colored); flowers solitary; styles 3..... **5. Trilliaceae**
    27. Leaves alternate or whorled, more than three leaves per whorl, not terminating stem; perianth segments similarly colored (tepals); flowers one or more; styles 1.

        28. Leaves with petioles.

            29. Flowers large, 3.5–4.5 cm long; tepals usually reddish with purplish-brown spots; inflorescence a terminal umbel; leaf base cuneate; ovary inferior..... **9. Alstroemeriaceae**
            29. Flowers small, < 1 cm long; tepals green, not spotted; inflorescence an axillary umbel or cyme; leaf base cordate; ovary superior.

                30. Leaves net-veined; flowers unisexual (dioecious); inflorescence an umbel with numerous flowers ..... **11. Smilacaceae** (in part)
                30. Leaves parallel-veined (palmate); flowers bisexual; inflorescence a 2–3 flowered cyme..... **4. Stemonaceae**

        28. Leaves sessile or perfoliate (clasping stem).

            31. Leaves whorled ..... **12. Liliaceae** (*Medeola*, *Lilium*)
            31. Leaves alternate.
                32. Flowers large, more than 3 cm long; tepals orange, white, or red; plants from bulbs ..... **12. Liliaceae** (*Tulipa*, *Lilium*)
                32. Flowers smaller, less than 3 cm long; tepals variously colored; plants from bulbs or rhizomes.

33. Leaves linear, with parallel sides for most of their length; leaf bases sheathing stem; inflorescence a terminal umbel, subtended by sheathing bracts; bruised plants with strong garlic odor; plants from bulbs..... **15. Alliaceae** (in part)
33. Leaves mostly lanceolate, elliptic, or ovate, sides not parallel; leaf bases rounded, tapered, or perfoliate, not sheathing stem; inflorescence various, not subtended by sheathing bracts; bruised plants without garlic odor; plants from rhizomes.

    34. Flowers axillary (in the base of leaves along the stem).

        35. Tepals fused nearly to tips, white, yellowish-white, or green; flowers usually two or more, occurring in successive leaf axils; stems unbranched; fruit a berry ..... **18. Ruscaceae** (*Polygonatum*)
        35. Tepals separate, yellow; flowers solitary, not in successive leaf axils; stems usually branched; fruit a capsule .....**10. Colchicaceae** (*Uvularia*)

    34. Flowers terminal (at stem apex).

        36. Stems unbranched; inflorescence a panicle with numerous flowers; tepals inconspicuous (< 1 mm long)..... **18. Ruscaceae** (*Maianthemum*)
        36. Stems branched; inflorescence not paniculate, flowers 1–3; tepals very conspicuous (> 14 mm long)..... **12. Liliaceae** (*Prosartes*)

1. NARTHECIACEAE (Bog-Asphodel Family) – in DIOSCOREALES

1. ALETRIS Linnaeus 1753

[Greek *aletris*, a female slave who grinds corn, alluding to the mealy texture of the perianth]

1. Perianth white to creamy white; tube cylindric, 7–10 mm long, 2–3 times as long as broad; tepal lobes somewhat spreading, lanceolate to lance-oblong; beak of fruit abruptly narrowed ..... **Aletris farinosa**
1. Perianth bright yellow (fading in dried specimens); tube bell-shaped (campanulate), 5.5–7.0 mm long, ca. 1.5–2 times as long as broad; tepal lobes erect or incurved, ovate to triangular; beak of fruit gradually narrowed ..... **Aletris aurea**

1. Aletris aurea Walter {golden} — GOLDEN COLIC-ROOT; GOLDEN MILLER'S-MAID (Fig. 4).

Perennial, subscapose herb with short, thick rhizomes. Seeps, bogs, wet pine savannas, pine flatwoods, and roadside ditches. Flowers late April–July, fruits late June–August; rare in the Piedmont; frequent in the Coastal Plain (Fig. 5). Native to the southeastern USA, from southeast Oklahoma and southern Maryland, south to northern Florida, and west to eastern Texas (Weigant 2002).

Figure 4. *Aletris aurea*, bog, Baldwin Co., Alabama, 30 May 2016. Photos: Brian Finzel.

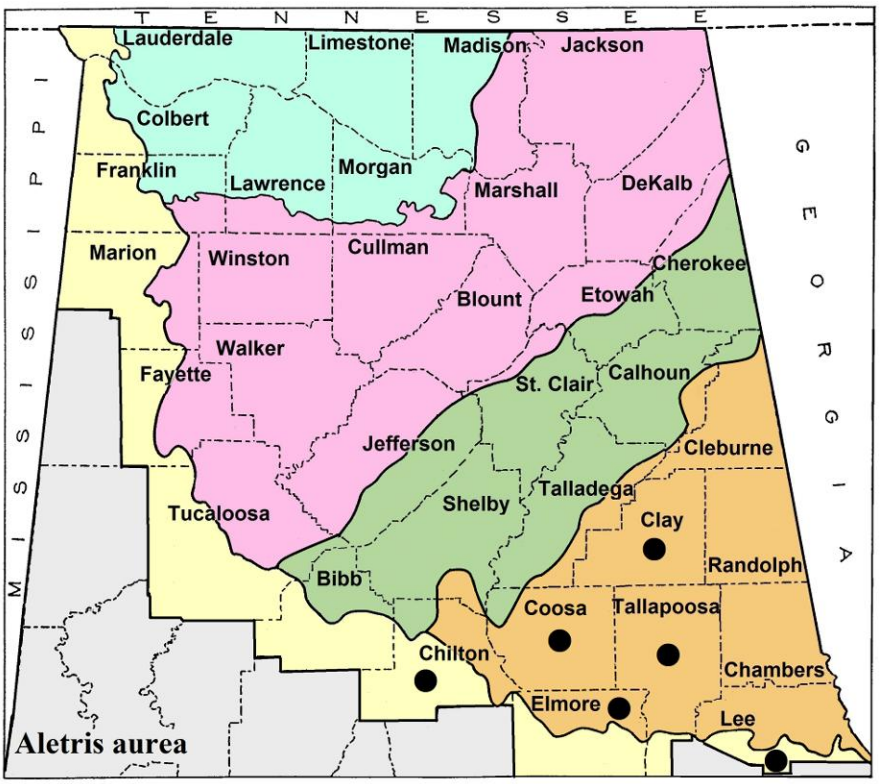

Figure 5. Distribution of *Aletris aurea* in northern Alabama.

Figure 6. *Aletris lutea*, Monroe Co., Florida, 20 Mar 2007. Photos: Brian Finzel.

Aletris aurea is occasionally confused with *A. lutea* Small [Yellow Colic-Root] (Fig. 6). Both species have yellow flowers and are native to the southeastern USA, but *A. lutea* is strictly a Coastal Plain species (Weigant 2002). A 1949 collection of *A. lutea* made from Lee County is most likely within the Fall Line district of the Coastal Plain (pers. comm. Curtis Hansen 2019). Yellow Colic-Root blooms a little earlier in the season (March–May) than Golden Colic-Root. The distinctive character of *A. lutea* is its longer, urn-shaped flowers (2.5–4× as long as broad) with spreading lobes. *Aletris aurea* has shorter, bell-shaped flowers (1–2× as long as broad) with erect or slightly incurved lobes.

2. Aletris farinosa L. {mealy; granular perianth} — NORTHERN WHITE COLIC-ROOT; WHITE-TUBE COLIC-ROOT; WHITE STAR-GRASS; MEALY COLIC-ROOT; UNICORN-ROOT; UNICORN-HORN (Fig. 7).

Perennial, subscapose herb with short, thick rhizomes. Wet road banks, roadside ditches, seeps, bogs, pine savannas, pine flatwoods, and depressions in sandstone outcrops. Flowers late April –June, fruits July–September; very rare in the Highland Rim (Little Mountain district); rare in the Cumberland Plateau; uncommon in the Ridge & Valley and Piedmont; frequent in the Coastal Plain (Fig. 8). Native to the eastern USA and southern Ontario. Aside from Vermont, *Aletris farinosa* is found in every state east of the Mississippi River and occurs in Arkansas, Louisiana, eastern Oklahoma, and eastern Texas (Kartesz 2020). It has the broadest range of the five species native to North America (Weigant 2002).

Shosteck (1974) states that the name "colic-root" was given to this plant because "the root was used as a remedy for colic early in the nineteenth century." Coffey (1993) notes that "the tapering raceme of white flowers, which seem to be dipped in flour, resembles a unicorn's horn." Its star-like, basal rosette of leaves gave rise to the vernacular name "star-grass" (Dwyer et al. 1986).

Figure 7. *Aletris farinosa*, DeKalb Co., Alabama, 5 Jun 2009. Photos: Brian Finzel.

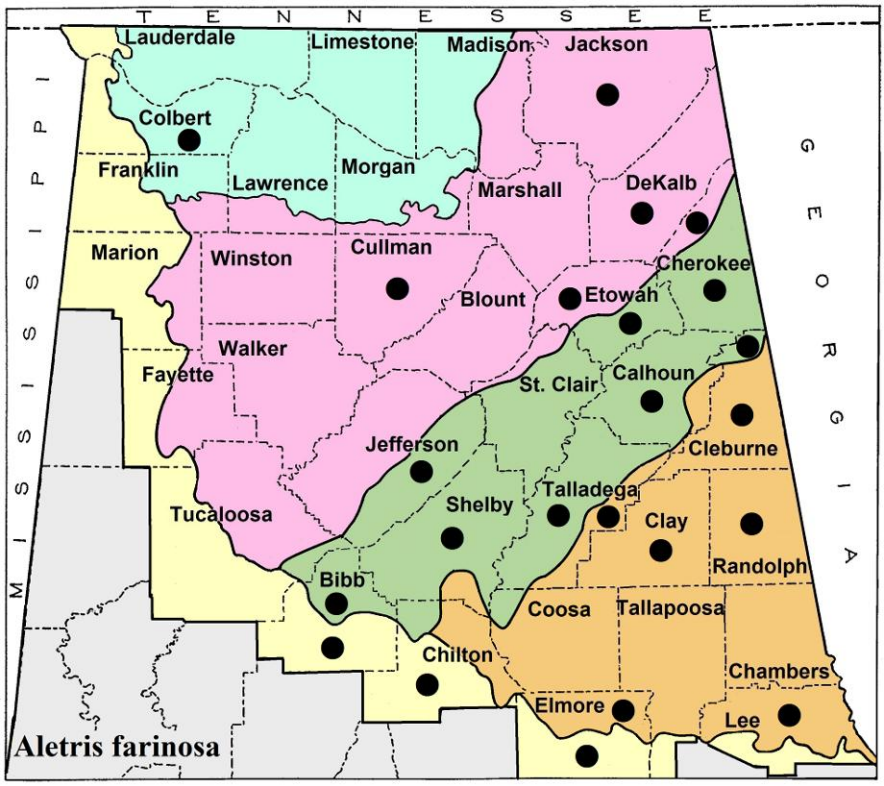

Figure 8. Distribution of *Aletris farinosa* in northern Alabama.


Figure 9. *Aletris farinosa*, Cleburne Co., Alabama, 30 Jun 2019. Photos: Dan Spaulding.

Another white-flowered species, *Aletris obovata* Small [Southern White Colic-Root], occurs on the lower Coastal Plain from South Carolina to Mississippi (Kartesz 2020). It can be distinguished from *A. farinosa* by its shorter flowers (4–6 vs. 6–10mm long) with corolla lobes turned slightly inward, and beaks of its fruits gradually tapering from body to tip (Weigant 2002). The beaks of *A. farinosa* fruits abruptly taper from the body to the tip, forming a "genie bottle" shape (Fig. 9).

2. BURMANNIACEAE (Burmannia Family) – in DIOSCOREALES

1. BURMANNIA Linnaeus 1753
[Named for Johannes Burman, 1707–1779, a Dutch botanist]

1. Burmannia capitata (Walter ex J.F. Gmel.) Mart. {in heads; the flowers} — SOUTHERN BLUETHREAD; CAP BURMANNIA; WHITE BURMANNIA (Fig. 10).


Figure 10. *Burmannia capitata*, sandstone outcrop, Etowah Co., Alabama, 13 Sep 2020. Photos: Brian Finzel.

Annual, unbranched herb. Depressions in sandstone and granite outcrops in northern Alabama; pine savannas, bogs, seeps, and roadside ditches in the Coastal Plain. Flowers and fruits August–November; very rare in the Cumberland Plateau and Piedmont; uncommon on the Coastal Plain (Fig. 11). Native to southeastern USA, Mexico, Central America, and the northern half of South America (Lewis 2002).

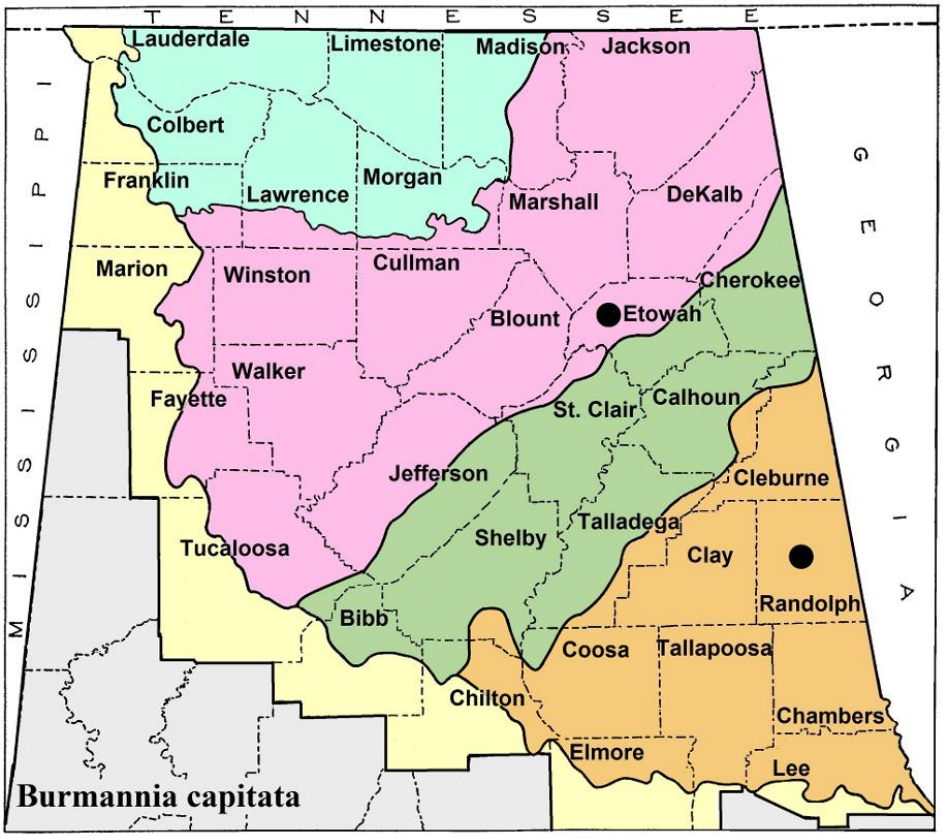

Figure 11. Distribution of *Burmannia capitata* in northern Alabama.

Burmannia capitata is easily overlooked because of its diminutive size (3–20 cm tall). It has alternate, scale-like cauline leaves, and few or no basal leaves. Southern Bluethread's tiny, whitish flowers form head-like clusters and are probably self-pollinated because the stigmas are often covered with pollen before the flower buds open (Wood 1983). Perhaps the name "bluethread" alludes to the flowers, which are occasionally tinged with blue and develop on slender, thread-like stems. The species is typically found on the Coastal Plain in the southeastern USA but is disjunct on scattered sandstone and granite outcrops in the Piedmont and Cumberland Plateau (Kartesz 2020).

3. **DIOSCOREACEAE** (Yam Family) – in DIOSCOREALES

1. **DIOSCOREA** Linnaeus 1753

[Named for Dioscorides, ca. 40–90, Greek physician and author of *De Materia Medica*]

1. Leaves ovate with sides convex, often pubescent underneath; lower leaves in whorls of 3–9; stem lacking bulblets in leaf axils; plant from rhizomes ..... **Dioscorea villosa**
1. Leaves hastate with sides concave in the middle portion, glabrous; lower leaves usually opposite; stems often with bulblets in leaf axils; plant from elongate tubers ..... **Dioscorea polystachya**

1. Dioscorea polystachya Turcz. {many spikes; referring to inflorescences} — CHINESE YAM; CINNAMON-VINE (Fig. 12). [*Dioscorea batatas* Decne.; *Dioscorea oppositifolia* L.]

Figure 12. *Dioscorea polystachya*, male flowers, Cleburne Co., Alabama, 30 Jun 2019. Photos: Dan Spaulding.

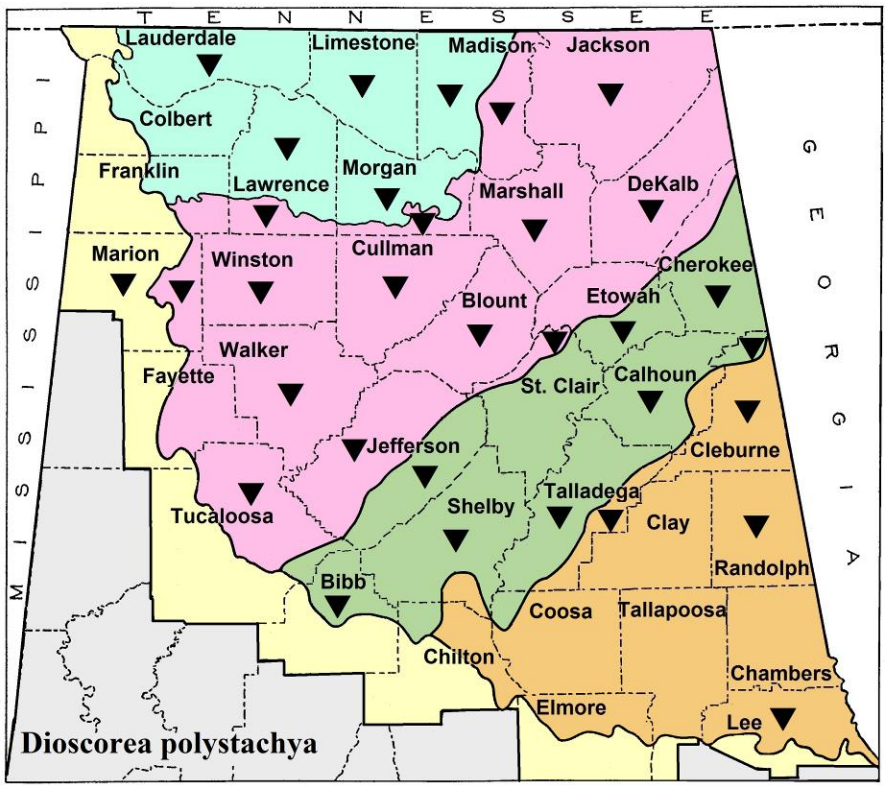

Figure 13. Distribution of *Dioscorea polystachya* in northern Alabama.

Perennial, herbaceous vine from elongate tubers. Alluvial woods, bottomland forests, riverbanks, drainage ditches, fence rows, and other disturbed areas. Flowers June–August (staminate plants only); frequent in northern Alabama; rare in the Coastal Plain (Fig. 13). Native to eastern Asia, naturalized in most of the eastern USA (Raz 2002).

Chinese Yam is cultivated in eastern Asia for its edible underground tubers called yams (Fig. 14a). In Europe, during the blight of the mid-1800s, this species was eaten as a substitute for potatoes, *Solanum tuberosum* L. (Al-Shehbaz & Schubert 1989). Yams in the USA are occasionally confused with sweet-potatoes, *Ipomoea batatas* (L.) Lam., but true yams belong to the genus *Dioscorea*. The word "yam" is derived from the African words *nyami* and *inhame*, meaning to eat (Shosteck 1974). In North America, *D. polystachya* was grown as a garden ornamental (Raz 2002). The flowers of this species are cinnamon-scented, hence the name "cinnamon-vine" (Shosteck 1974).

Dioscorea polystachya is not known to reproduce sexually in the USA. The entire population consists nearly exclusively of staminate plants (Raz 2002). Since plants produce no seeds, this invasive exotic spreads vegetatively by potato-like tubers (bulblets) found within its leaf axils (Fig. 14b). These starchy structures are chiefly dispersed by water, colonizing along riparian corridors (Thomas et al. 2005).

Figure 14. *Dioscorea polystachya.* A. Underground tuber, Marion Co., Alabama, 17 May 2020. B. Bulblets in leaf axils, Cleburne Co., Alabama, 7 Jun 2019. Photos: Dan Spaulding.

A similar species, *Dioscorea bulbifera* L. [Air Yam], has erroneously been reported for northern Alabama (Kartesz 2020, Keener et al. 2020). Like *D. polystachya*, it has tubers in the leaf axils, but the bulblets of *D. bulbifera* are dark-brown and elongate rather than light-brown and globose. Air Yam also has angular or winged stems that twine left to right (clockwise), whereas Chinese yam has round, unwinged stems that twine right to left (Weakley 2020).

2. Dioscorea villosa L. {soft-hairy} — COMMON WILD YAM (Fig. 15). [*Dioscorea glauca* Muhl. *ex* Bartlett; *Dioscorea hirticaulis* Bartlett; *Dioscorea quaternata* J.F. Gmel.; *Dioscorea villosa* var. *glabrifolia* (Bartlett) Fernald; *Dioscorea villosa* var. *hirticaulis* (Bartlett) H.E. Ahles]

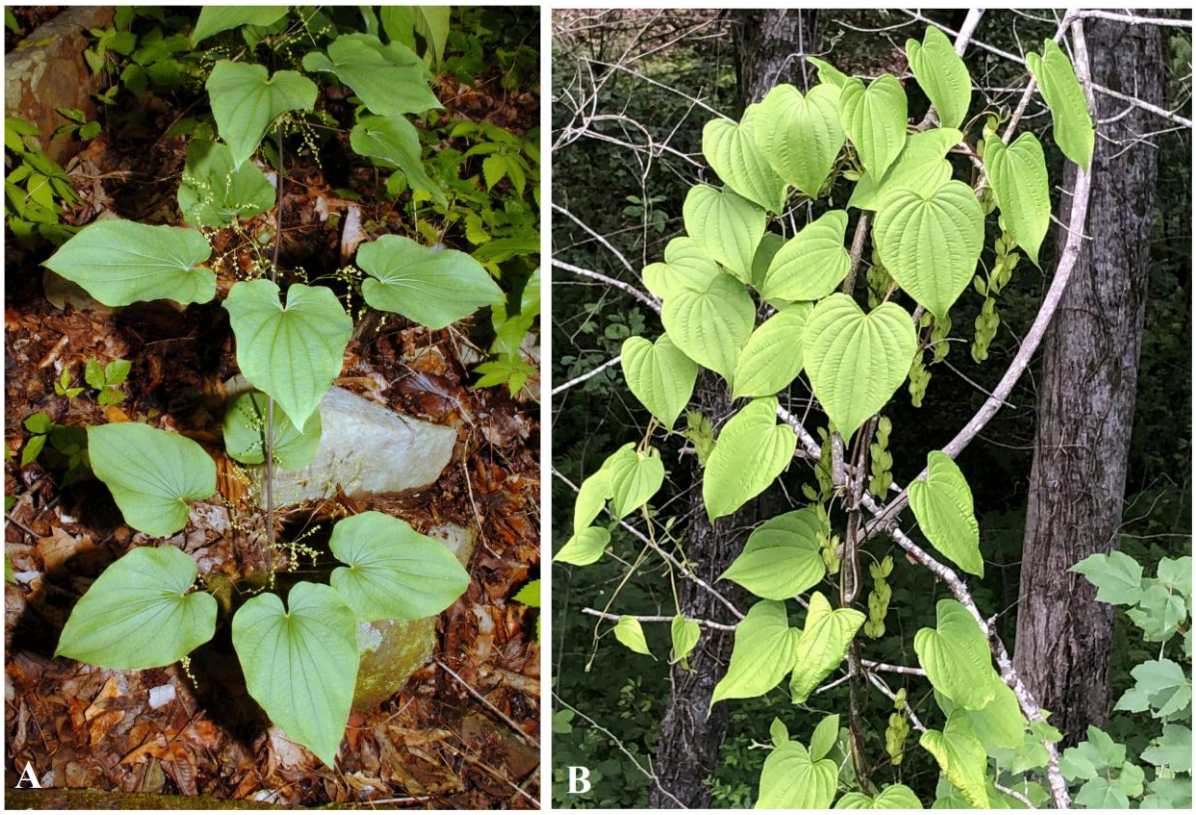

Figure 15. *Dioscorea villosa*. A. Flowering plant, DeKalb Co., Alabama, 6 May 2007. Photo: Brian Finzel. B. Fruiting plant, Cleburne Co., Alabama, 20 Jun 2019. Photo: Dan Spaulding.

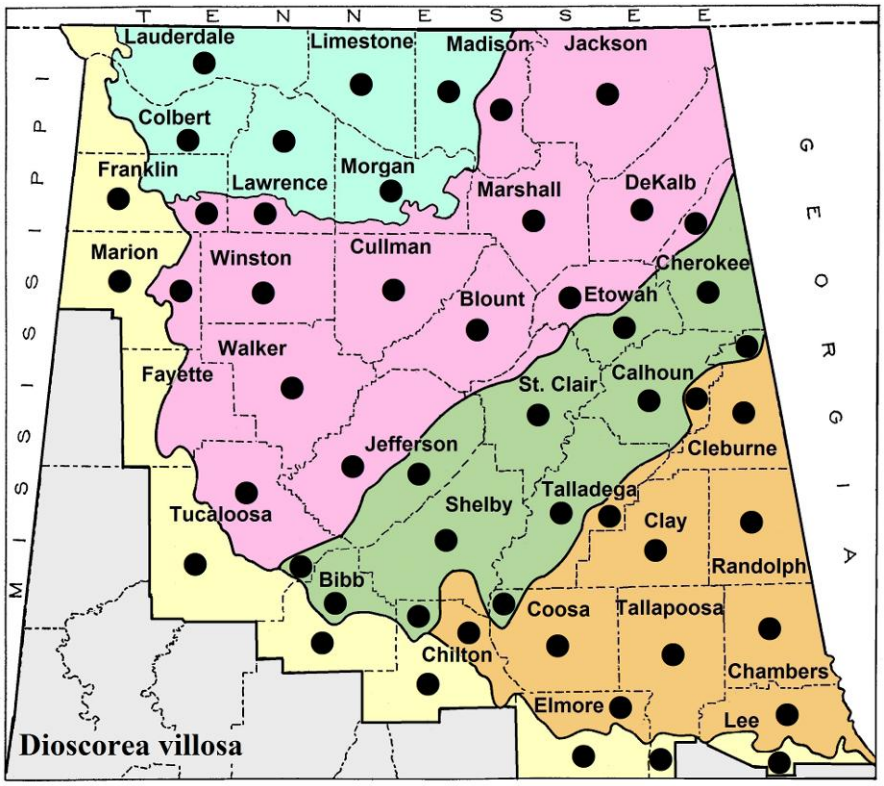

Figure 16. Distribution of *Dioscorea villosa* in northern Alabama.

Perennial, herbaceous vine from rhizomes. Moist to dry forests and woodland borders. Flowers April–June, fruits late May–November; frequent throughout Alabama (Fig. 16). Native to eastern North America (Raz 2002).

The inflorescence of *Dioscorea villosa* is composed of either female (Fig. 17a) or male (Fig. 17b) flowers. They occur at the leaf axils on separate plants (vines are dioecious). The flowers are somewhat sweet-scented and believed to be pollinated by night-flying insects (Coursey 1967). The fruit (Fig. 18) is a 3-winged, triangular capsule, mostly wind-dispersed, carried for short distances by gliding or whirling through the air (Al-Shehbaz & Schubert 1989).

(A) Pistillate flower with sterile stamens. (B) Male flowers.

Figure 17. *Dioscorea villosa*. A. Wade Mountain Preserve, Madison Co., Alabama, 9 May 2015. B. Blevins Gap, Madison Co., Alabama, 7 May 2015. Photos: Brian Finzel.

Figure 18. *Dioscorea villosa* mature and old fruits, Madison Co., Alabama, 21 May 2011. Photo: Brian Finzel.

Dioscorea villosa is similar to *D. polystachya*, but its leaves have convex sides, leaf blades are often pubescent beneath (Fig. 19a), leaf axils lack bulblets, and plants are rhizomatous (Fig. 19b). Common Wild Yam has been used historically for medicinal purposes (Bartlett 1910). Dwyer et al. (1986) stated it was "recommended as a diuretic, emetic, expectorant, and remedy for colic and muscle spasms." Native American women of the Meskwaki "Fox" tribe prepared the root to reduce childbirth pain (Moerman 1998).

Figure 19. *Dioscorea villosa.* A. Leaf undersurface, Lawrence Co., Alabama, 19 Jul 2020. B. Rhizome, Jefferson Co., Alabama, 6 May 2020. Photos: Dan Spaulding.

During the 19th Century, all native yams of the eastern USA were grouped into a single species, *Dioscorea villosa*. Bartlett (1910), in his revision of *Dioscorea*, recognized five species within the complex (Anderson 1934b). However, Raz (2002) synonymized most of these, stating, "*Dioscorea villosa* is a highly polymorphic species, exhibiting complex patterns of variation across its geographic range." In his treatment, he recognized only two native species, *D. floridana* Bartlett [Florida Yam] and *D. villosa*. Florida Yam is chiefly found in the Coastal Plain from South Carolina to Alabama (Kartesz 2020). It differs from Common Wild Yam by having 2–5 staminate inflorescences within the leaf axils, instead of one.

4. STEMONACEAE (Stemona Family) – in PANDANALES

1. CROOMIA Torrey 1840

[Named in honor of Hardy B. Croom, 1797–1837, discoverer of the plant]

1. Croomia pauciflora (Nutt.) Torr. {few-flowered} — CROOMIA; ELFIN-SHOES (Fig. 20).

Perennial, erect herb from extensive rhizomes. Forested ravines, bottomlands, north-facing slopes, alluvial forests, and rich woods. Flowers April–May, fruits May–June; rare in the Cumberland Plateau and Ridge & Valley; uncommon in the Piedmont and Coastal Plain (Fig. 21). Endemic to Alabama, West Georgia, and the Panhandle of Florida. A single 19th Century collection from Louisiana is considered doubtful (Whetstone 2002).

Figure 20. *Croomia pauciflora*, Tallapoosa Co., Alabama, 23 Apr 2008. Photos: Wayne Barger.

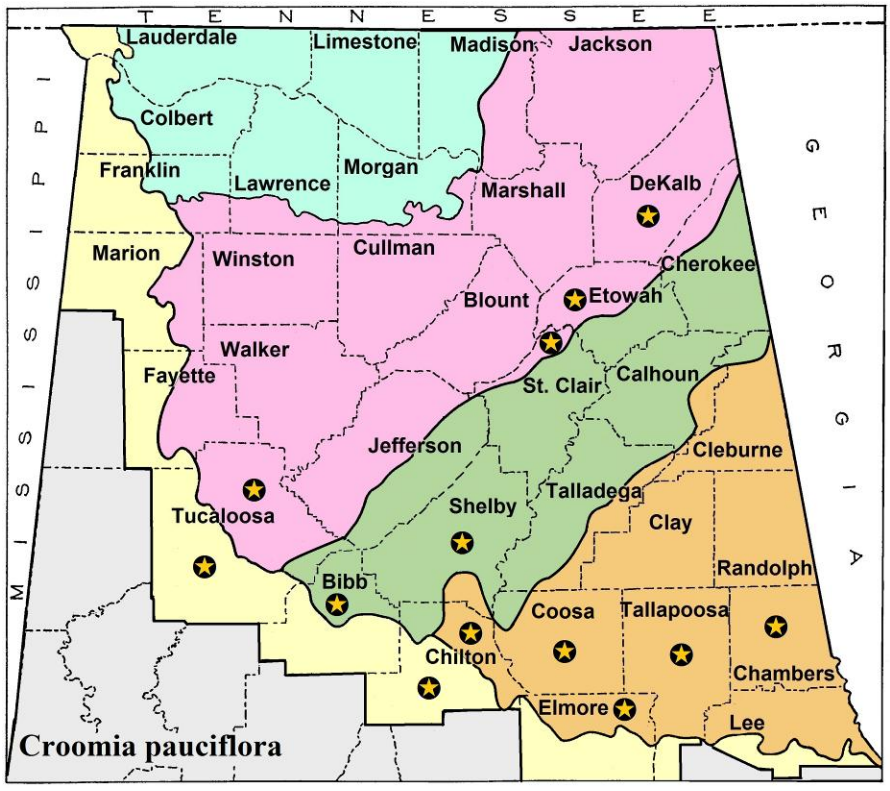

Figure 21. Distribution of *Croomia pauciflora* in northern Alabama.

ALNHP (2016) listed *Croomia* as imperiled (S2) in Alabama, but they currently classify it as an S3 (vulnerable) taxon. Katelyn Lawson (pers. comm. 2021) said the ALNHP is not tracking it due to the many occurrences in the state; however, it is still a globally rare (G3) species. Whetstone (1984) stated, "*Croomia pauciflora* is a rare element of the southeastern flora and is considered an 'endangered' or 'threatened' species in portions of its range." He noted that its current restricted distribution resulted from "colder Pleistocene temperatures and limited habitat availability south of the Appalachian Highlands Province." The species spreads by rhizomes, forming dense colonies; however, it is vulnerable to disturbance and slow to propagate from seed (Rogers 1982). Whetstone (2002) thought that "*Croomia pauciflora* sometimes may be overlooked because of its superficial resemblance to juvenile forms of *Smilax ecirrhata* S. Watson and *S. herbacea* Linnaeus."

Hardy Bryan Croom, a lawyer and avid naturalist, discovered *Croomia pauciflora* near his home in 1830 along the Apalachicola River in Florida (Whetstone 1984). Sadly, Mr. Croom and his family members died in a shipwreck off North Carolina's coast on October 9, 1837 (Reveal 2014). Elfin-Shoes was later discovered on the Coastal Plain of Alabama (Wilcox County) in 1840 and was recollected in 1854 from Georgia's Piedmont province (Harper 1942). In 1874, Eugene A. Smith expanded its range into Alabama with a collection from Tuscaloosa County (Mohr 1901). By the turn of the 20th Century, additional collections were made in the Piedmont and Coastal Plain. In 1942, Roland Harper discovered what is known to represent its northernmost location on the Cumberland Plateau in DeKalb County (Harper 1942). Whetstone (1984) wrote that "most of the known localities for *Croomia pauciflora* are along watercourses with headwaters in the southern Appalachian Mountains and flow southward to the Gulf of Mexico."

Six species are recognized globally within the genus, with *Croomia pauciflora* endemic to the southeastern USA (Kadota 2012). The other five species are native to Japan, but *C. japonica* Miq. also occurs in China. Some authors believe *Croomia* (together with *Stichoneuron*) are more primitive than other members of the Stemonaceae and should be treated within their own family, Croomiaceae (Zhanhe & Duyfjes 2000).

5. **TRILLIACEAE** (Trillium Family) – in LILIALES

Trilliaceae is a small family comprised of 5 genera with approximately 80 species of perennial herbs (Weakley 2020). Only the genus *Trillium* is found in North America, but it also occurs in Asia (Case 2002). Some *Trillium* species have been used medicinally because of sapogenins (steroidal organic chemicals) contained within their rhizomes. Zomlefer (1996) writes that "they have been variously used as uterine stimulants, antiseptics, coagulants, and expectorants — hence the common names wake-robin, birthroot, and Indian balm." *Trillium* species are popular in the ornamental trade, resulting in numerous populations being over-collected by unscrupulous individuals.

1. **TRILLIUM** Linnaeus 1753

[Latin, *trilix*, triple; alluding to the flowers having parts in threes]

1. Flowers pedicillate (on stalks); leaves solid green (subgenus *Trillium*).

    2. Petals delicate in texture, wavy-margined, white to deep pink (white flowers often turning pink with age); stigmas uniformly thin from base to apex, united (fused) at the base forming a short style; ovary white to greenish-white; mature fruit white or pale green.

        3. Flowers usually held below leaves on a recurved pedicel, rarely leaning close to horizontal; leaves petiolate; sepals recurved, margins undulate; anthers curved or twisted outward; stigma fused into a style 2–6 mm long; pollen dark yellow.....**Trillium catesbaei**

3. Flower held above the leaves, pedicel inclined to strictly erect; leaves sessile or subsessile; sepals straight, margins not undulate; anthers straight and erect; stigma barely fused basally into a short style; pollen light yellow.

    4. Leaves lanceolate to narrowly elliptic, 1–3 cm wide with obtuse apices; sepals about as wide as or wider than the petals, rounded at apex; petals 1.5–3 cm long; pedicel erect; anther connectives purplish-green between anther sacs ..... **Trillium pusillum**
    4. Leaves ovate, 8–15 cm wide with acuminate apices; sepals narrower than the petals, acute at apex; petals 4–7.5 cm long; pedicel somewhat angled; anther connectives white to greenish-white between anther sacs ..... **Trillium grandiflorum**

2. Petals thick in texture, straight-margined (occasionally becoming slightly wavy when dried), white or maroon (white flowers turning brown with age); stigmas thicker basally, tapering gradually toward the apex with styles completely separate (distinct); ovary white, maroon, red, purplish, or black; mature fruit red, purple, or maroon.

    5. Petals white (rarely bicolored with green, purple, or rose); ovary white, greenish-white, or stained to streaked pink, reddish, or purple (apically or throughout).

        6. Flower held beneath the leaves; pedicel usually short, 1–4 (-7) cm long, strongly recurved below horizontal; anthers deep purple; ovary white or streaked/stained purplish to reddish; stigmas usually purple, rarely white; rhizome tapered to a point..... **Trillium rugelii**
        6. Flower held at, above, or below level of the leaves; pedicel longer, 4–12 cm long, mostly straight, typically inclined at an angle above horizontal (occasionally nearly horizontal, declined below horizontal, or erect); anthers commonly white or yellow, rarely lavender or purplish; ovary white or sometimes streaked/stained rose-pink; stigmas usually creamy-white, occasionally pinkish; rhizome blunt (abruptly terminated)..... **Trillium flexipes**

    5. Petals red or maroon (rarely white or yellowish); ovary maroon, dark purple, or dark red-purple.

        7. Flower held beneath leaves on a declined pedicel; stamens about two times longer than pistil; filaments as long or longer than ovary; anthers nearly exceeding stigmas by their entire length; ovary small, 3–12 mm long; flower fragrance pungent, rose-like; fruit small, 1–1.4 cm long ..... **Trillium vaseyi**
        7. Flower held above leaves on inclined or erect pedicel; stamens about 1.5 times longer than pistil; filaments shorter than ovary; anthers only exceeding styles by about half their length; ovary larger, 15–18 mm long; flower fragrance pleasant, sweet to fungal, similar to fresh mushrooms; fruit larger, 1.5–3 cm long..... **Trillium sulcatum**

1. Flowers sessile; leaves (bracts) mottled with different shades of green (subgenus *Sessilium*).

    8. Stem (scape) at least partially lying on the ground (decumbent), often in an S-shape; leaves resting on ground surface or slightly above; anther connectives prolonged beyond anther sacs (forming a slender beak).

        9. Upper stem finely pubescent; petals linear-lanceolate or oblanceolate, 4–10 cm long; filaments 2–5 mm long; stamens about 0.25 times as long as the petals; anther dehiscence extrorse (opening toward the petals, facing outward); plants of the Cumberland Plateau and Ridge & Valley in Alabama ..... **Trillium decumbens**

9. Upper stem glabrous; petals narrowly elliptic-oblanceolate, 2.5–5.5 cm long; filaments 1–2 mm long; stamens about 0.5 times as long as the petals; anther dehiscence introrse (opening toward the ovary, facing inward); plants of lower Piedmont and Coastal Plain in Alabama .....**Trillium reliquum**

8. Stem erect and straight; leaves borne well above ground (leaf tips of *T. underwoodii* often touch the ground during anthesis); anther connectives prominently, slightly, or not at all extended beyond anther sacs.

10. Sepals bent downward (deflexed), either parallel to the leaves or reflexed below them and appressed to stem; anthers usually strongly curved inward; filaments about as long as anthers; rhizome slender and elongated.

11. Leaves sessile or subsessile, blades lanceolate or narrowly elliptic; petals 4–7 times as long as wide, linear, lanceolate, or narrowly spatulate, erect, often slightly twisted .....**Trillium lancifolium**
11. Leaves distinctly petiolate, blades obovate or broadly elliptic; petals 2–3 times as long as wide, lanceolate-ovate, arched inward, not twisted .....**Trillium recurvatum**

10. Sepals usually erect, ascending, or spreading, occasionally tips curving downward; anthers straight or only slightly curved; filaments much shorter than anthers; rhizome stout and compact.

12. Petals spreading to horizontal, with 1–2 spiral twists; stamens completely exposed, not obscured by petals; stems usually pilose just below leaves (occasionally sparse); anther dehiscence extrorse (opening toward petals) .....**Trillium stamineum**
12. Petals erect to slightly spreading, not spirally twisted; stamens only partially hidden by the petals; stems glabrous; anther dehiscence introrse (opening toward the ovary), or latrorse (opening on the side).

13. Anther connectives prominently prolonged beyond anther sacs into a slender beak, usually 2–5 mm long (nearly as long as filaments); stamens about 1/2 as long as petals; ovary subglobose, narrowed to the base of stigmatic branches; stigmas longer than the ovary (>1.5×).....**Trillium sessile**
13. Anther connectives shortly extended beyond anther sacs (≤ 2mm) or not at all (if extended, then distinctly shorter than filaments); stamens about 1/3 or less as long as petals; ovary ovoid or ellipsoid, not narrowed to the base of stigmatic branches; stigmas as long as or shorter than the ovary.

14. Anther connectives prolonged past anther sacs (1–2 mm); stigmas strongly recurved or coiled; leaf margins of the outer 1/3 of the blade more or less straight; leaf blade usually mottled with three or more shades of green, the palest shade often forming a very conspicuous light silvery-green streak along midvein; ovary ellipsoid.

15. Stem short, 1–2 times as long as leaves (occasionally elongating late in the season), leaf tips often touching ground during anthesis (when flowers open); petals narrower, usually 3–5 times as long as wide, primarily elliptic-oblanceolate.....**Trillium underwoodii**

15. Stem long, 2.5–3 times as long as the leaves, leaf tips held well above ground; petals broader, usually 1.5–3 times as long as wide, primarily obovate.....**Trillium decipiens**

14. Anther connectives scarcely, if at all, prolonged past the anther sacs (0–1 mm); stigmas divergent-recurved, erect or spreading, not strongly coiled or distinctly recurved; leaf margins of the outer 1/3 of the blade convex-curved; leaf blade mottled with 2–3 shades of green, paler shades occasionally prominent along midvein; ovary ovoid.

16. Petals > 4.5 times as long as wide, narrowly oblanceolate-spatulate to linear-oblanceolate; ovary 3-ridged at base of stigmas; anther dehiscence introrse (opening toward the ovary, facing inward); plants mostly of the Coastal Plain and adjacent Piedmont..... **Trillium maculatum**
16. Petals < 4 times as long as wide, elliptic-oblanceolate to oblanceolate; ovary 6-ridged at base of stigmas; anther dehiscence mostly latrorse (opening on the side), occasionally introrse at the base with age; plants of the mountains or widespread throughout Alabama.

17. Petals usually maroon (occasionally yellow, bronze, greenish-yellow, or green-flowered individuals are scattered in a population); ovary (at least portions of it) purplish when young; stamens purplish; flower fragrance fruity, spicy, or musky ..... **Trillium cuneatum**
17. Petals greenish-yellow or pale lemon-yellow, turning dark yellow with age or when dried (population usually with only yellow-flowered individuals); ovary greenish-white when young; stamens greenish-white; flower fragrance lemon-scented..... **Trillium luteum**

1. Trillium catesbaei Ell. {for its discoverer, Mark Catesby, 1679–1749} — CATESBY'S TRILLIUM; ROSY WAKE-ROBIN; BASHFUL TRILLIUM; BASHFUL WAKE-ROBIN (Fig. 22).

Figure 22. *Trillium catesbaei*, Cleburne Co., Alabama, 17 Mar 2018. Photo: Melanie Taylor Spaulding.

Perennial herb from short rhizomes. Rich woods, mesic slopes, mixed woods, ravines, rocky woods, and bottomland forests. Flowers mid-March–early June, fruits June–August; uncommon in eastern portions of the Cumberland Plateau, Ridge & Valley, and Coastal Plain; frequent in the Piedmont (Fig. 23). Endemic to the southeastern USA, from eastern Tennessee and North Carolina, south to Georgia, and east Alabama (Kartesz 2020). Its distribution is centered in the Piedmont but extends into the mountains and Coastal Plain (Weakley 2020).

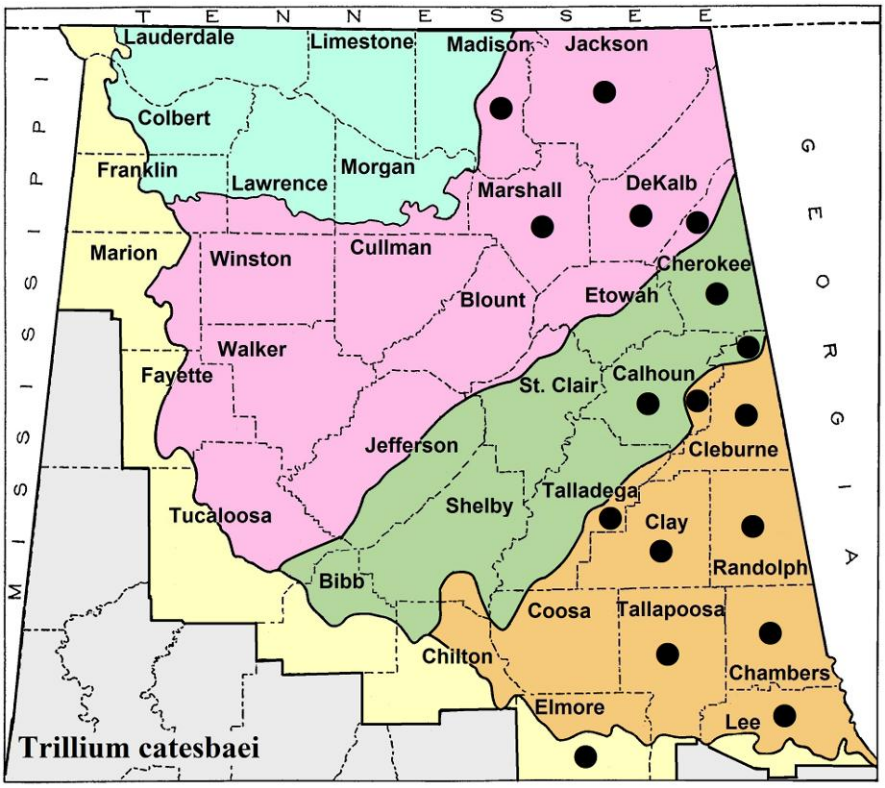

Figure 23. Distribution of *Trillium catesbaei* in northern Alabama.

Weakley (2020) notes in his flora: "Traditionally spelled '*catesbaei*,' this is necessarily corrected to '*catesbyi*' under provisions of the Code." Catesby's Trillium has white, pink, or rose flowers, usually nodding below its short petiolate leaves (Fig. 24). Petals lack prominent veins and usually have wavy margins. The greenish to whitish fruits are pulpy, angled capsules. Plants typically grow abundantly along small streams on acidic soils (Case & Case 1997). This species is easy to grow, and the showy flowers make it one of the most popular cultivated trilliums.

Figure 24. *Trillium catesbaei*, Randolph Co., Alabama, 29 Mar 2020. Photos: Dan Spaulding.

2. Trillium cuneatum Raf. {wedge-shaped; the base of petal} — LITTLE-SWEET-BETSY; LARGE TOADSHADE; WHIPPOOR-WILL-FLOWER; SWEET BETSY; PURPLE TOADSHADE; WEDGE-PETAL TRILLIUM (Fig. 25). [*Trillium hugeri* Small]

Figure 25. *Trillium cuneatum*, Colbert Co., Alabama, 24 Mar 2020. Photo: Kevin England.

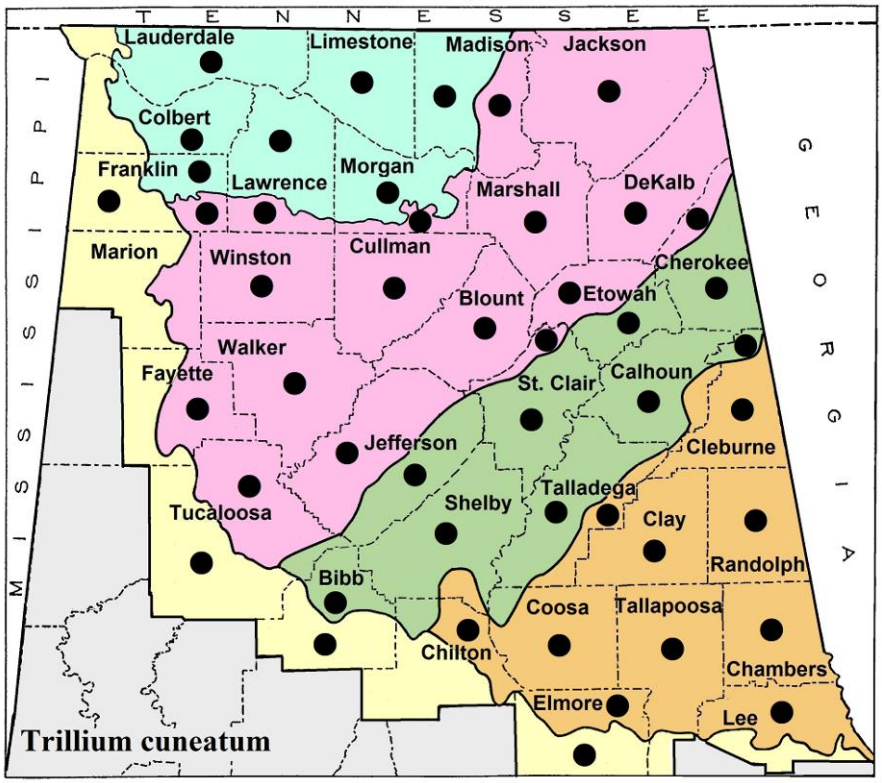

Figure 26. Distribution of *Trillium cuneatum* in northern Alabama.

Perennial herb from short rhizomes. Forested slopes and bottomlands. Flowers late February –May, fruits May–July; frequent throughout Alabama, except in the lower Coastal Plain (Fig. 26). *Trillium cuneatum* is centered chiefly in the southern Appalachians, from Kentucky and middle Tennessee to the Carolinas, south to Georgia, Alabama, and Mississippi (Weakley 2020).

Little Sweet-Betsy's petals are typically maroon but are occasionally green (Fig. 27a), yellow (Fig. 27b), or shades in between. Its stamens are purplish, anthers open (dehisce) on the side and anther connectives are slightly prolonged past the sacs (Fig. 27c). Mature fruits are greenish and often stained with purple areas (Fig. 28a). Yellow forms of *Trillium cuneatum* are frequently confused with *T. luteum*, but *T. cuneatum* nearly always has maroon-flowered individuals mixed within the population. Flower fragrances can also help to separate the two species. *Trillium luteum* is lemon-scented, and *T. cuneatum* usually has a sweet, spicy odor, hence the common name "sweet Betsy." Trilliums typically have only three leaves (bracts), but aberrant forms can have four (Fig. 28b), and very young plants have one leaf (Fig. 28c).

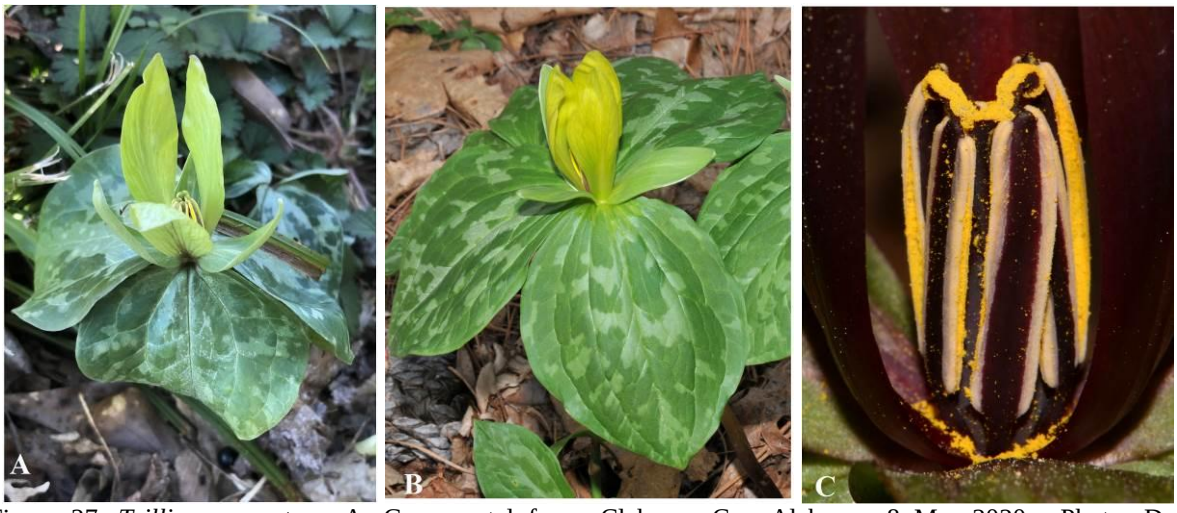

Figure 27. *Trillium cuneatum*. A. Green petal form, Cleburne Co., Alabama, 8 Mar 2020. Photo: Dan Spaulding. B. Yellow petal form, Madison Co., Alabama, 11 Mar 2012. C. Anther connectives scarcely prolonged past sacs (anthers with latrorse dehiscence), Bibb Co., Alabama, 26 Mar 2015. Photos: Brian Finzel.

Figure 28. *Trillium cuneatum*. A. Fruit, Cleburne Co., Alabama, 8 Jun 2020. B. 4-leaf plant, Cleburne Co., Alabama, 28 Mar 2020. C. Juvenile plants, Cleburne Co., Alabama, 4 Apr 2020. Photos: Dan Spaulding.

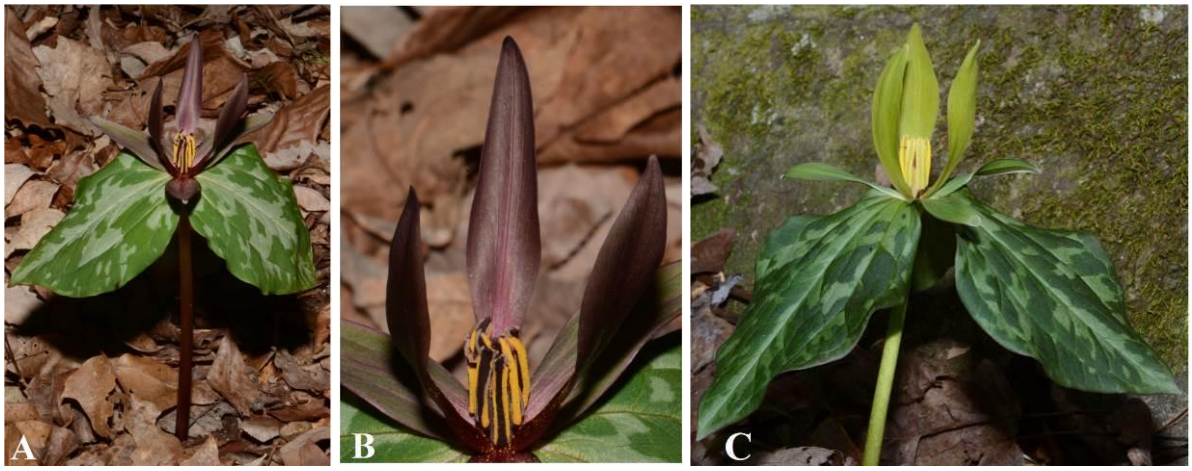

Figure 29. *Trillium* "*freemanii*." A–B. Maroon petal form, Ruby Falls, Hamilton Co., Tennessee, 24 Mar 2015. C. Yellow petal form, Shakerag Hollow, Franklin Co., Tennessee, 26 Mar 2016. Photos: Brian Finzel.

Trillium cuneatum is one of the most common sessile-flowered trilliums in North America (Case 2002). Multiple forms occur in the southeastern USA, and some entities are being elevated to species (Schilling et al. 2013). A possible new and undescribed species, *T. "freemanii*" (Fig. 29), within the *T. cuneatum* complex, is endemic to the Lookout Mountain region of northwest Georgia, southeast Tennessee, and northeast Alabama (Weakley 2020). It superficially resembles *T. ludovicianum* Harb. [Louisiana Trillium] because of its narrower petals.

3. Trillium decipiens J.D. Freeman {deceptive} — DECEIVING TRILLIUM; DECEPTIVE TRILLIUM; CHATTAHOOCHEE RIVER WAKE-ROBIN; CHATTAHOOCHEE TRILLIUM (Fig. 30).

Figure 30. *Trillium decipiens*. A. Maroon petal form, Russell Co., Alabama, 17 Mar 2007. B. Yellow petal form, Houston Co., Alabama, 17 Mar 2007. C. Stamens and ovary, Russell Co., Alabama, 24 Mar 2018. Photos: Brian Finzel.

Perennial herb from short rhizomes. Rich woods, mesic slopes, ravines, coves, and bottomlands. Flowers late January–April, fruits late April–June; rare in the Piedmont; uncommon in the Coastal Plain (Fig. 31). It is endemic to the southeastern USA, centered in Alabama, with a few populations in the Florida Panhandle, east-central Georgia, and northwestern South Carolina (Kartesz 2020).

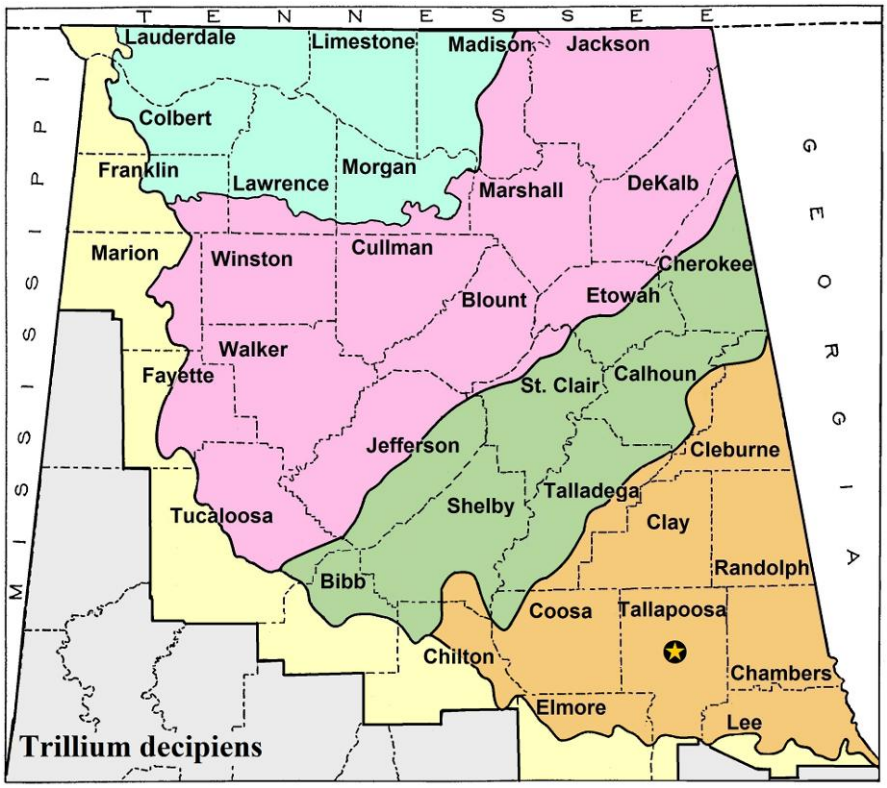

Figure 31. Distribution of *Trillium decipiens* in northern Alabama.

Trillium decipiens looks very similar to *T. underwoodii* but is much taller. The stem of *T. decipiens* is 2.5–3 times as long as the leaves and its leaf tips are held well above ground. Freeman (1975) named this species "deceptive" because of its resemblance to *T. underwoodii*. Case & Case (1997) thought that the leaves of *T. decipiens* were perhaps "the most highly colored and attractive of any of the sessile trilliums."

4. Trillium decumbens Harb. {decumbent} — TRAILING TRILLIUM; DECUMBENT TRILLIUM; TRAILING WAKE-ROBIN (Fig. 32).

Perennial herb from short rhizomes. Moist forests. Flowers late February–April, fruits late April–early June; uncommon in the Cumberland Plateau and Ridge & Valley; very rare in the upper Piedmont (Fig. 33). It is endemic to the southeastern USA, centered in north-central Alabama, with a few populations in southeast Tennessee and northwest and central Georgia (Weakley 2020).

Trillium decumbens often grows in large colonies in the Cumberland Plateau and Ridge & Valley of Alabama. It typically occurs over coal-bearing rocks in the Cumberland Plateau; unfortunately, strip mining has destroyed large populations (Case & Case 1997). Freeman et al. (1979) listed *T. decumbens* as a species of "special concern" in Alabama.

Figure 32. *Trillium decumbens*, Cleburne Co., Alabama, 25 Mar 2020. Photo: Melanie Taylor Spaulding.

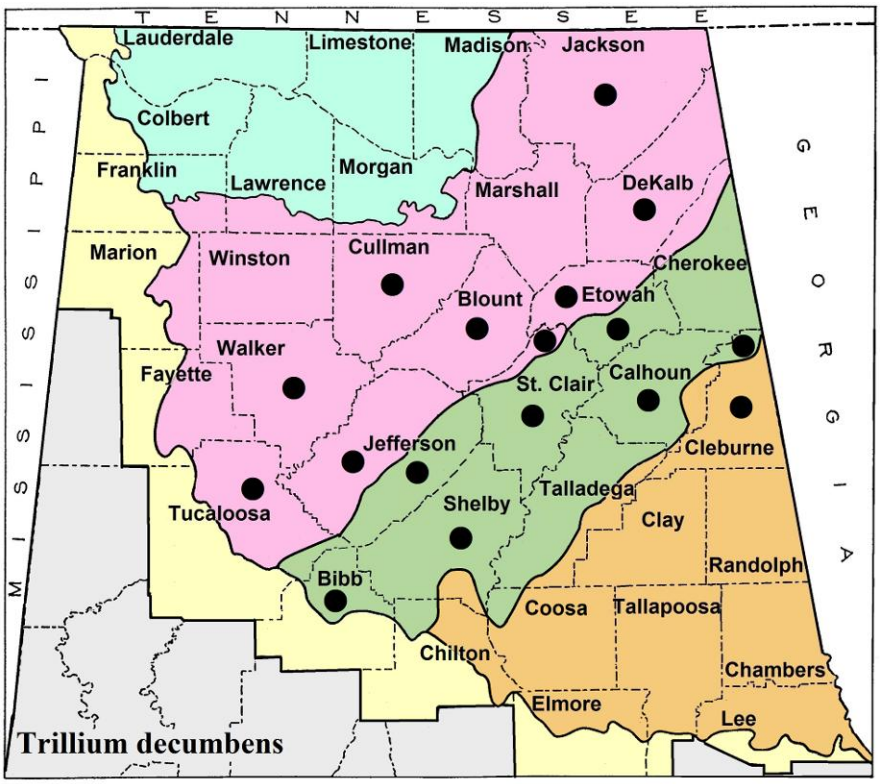

Figure 33. Distribution of *Trillium decumbens* in northern Alabama.

In 1901, C.L. Boynton, of the Biltmore Herbarium, discovered *Trillium decumbens* on Sand Mountain, DeKalb County, Alabama (Harbison 1901). Trailing Trillium is easily recognized in the field by its leaves occurring close to the ground and pubescent upper stems. Freeman (1975) observed: "In *T. decumbens* the bracts usually spread out flat against the leaf litter of the forest floor, imparting a 'floating' aspect to the plants because of the hidden scapes." This sessile-flowered trillium has maroon or dark purple petals, occasionally fading to greenish-yellow. Freeman (1975)

commented that fruiting specimens are rare in herbaria "because all appendages (i.e., the bracts, sepals, petals) soon wither and die after flowering." The ovary matures into a dark purple berry perched on a naked stem (Case & Case 1997).

Trillium reliquum resembles *T. decumbens* because of its low-growing habit. However, Trailing Trillium has pubescent upper stems (Fig. 34a), longer filaments (2–5 mm long), extrorse anther dehiscence (opening outward), and anther connectives conspicuously extended (3.5–4 mm) past anther sacs (Fig. 34b). In comparison, Relict Trillium has short filaments (1–2 mm long), introrse anther dehiscence (opening inwards), and shorter anther connectives (extending 1–2 mm past anther sacs).

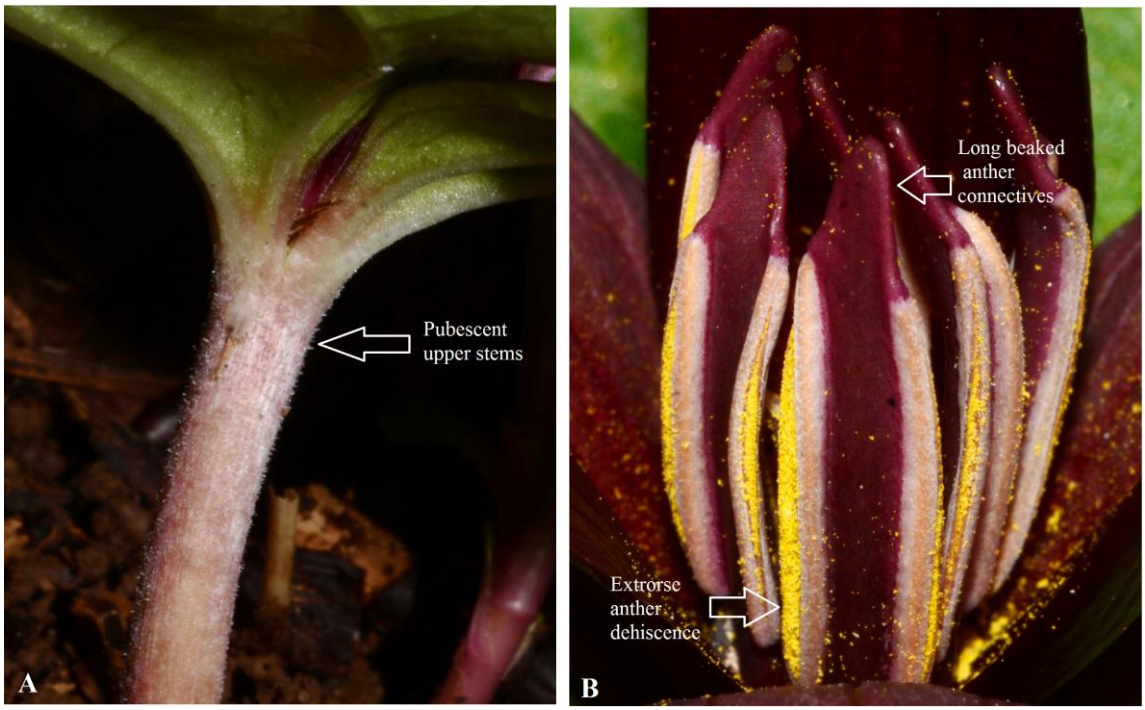

Figure 34. *Trillium decumbens*, Etowah Co., Alabama, 14 Mar 2018. Photos: Brian Finzel.

Freeman (1975) noted that *Trillium reliquum* "has scapes more or less decumbent, but they are glabrous, unlike those of *T. decumbens*." Those two trilliums were the only low-growing species known at the time, but *T. delicatum* Floden & E.E. Schill. [Ocmulgee Trillium] was recently described from central Georgia (Schilling et al. 2019). The authors state that Ocmulgee Trillium "differs from the two other low-growing species of the subgenus, *T. decumbens* and *T. reliquum*, in features such as straight stems and dung-scented flowers."

5. Trillium flexipes Raf. {with bent foot-stalk; the leaning flower} — BENT WHITE TRILLIUM; BENT TRILLIUM; NODDING WAKE-ROBIN; DROOPING TRILLIUM (Fig. 35). [*Trillium declinatum* auct. non (A. Gray) Gleason; *Trillium erectum* L. var. *declinatum* A. Gray; *Trillium gleasonii* Fernald]

Perennial herb with short, horizontal rhizomes. Rich woods, mesic slopes, ravines, and coves often over calcareous substrates. Flowers March–May, fruits late April–June; uncommon in the Cumberland Plateau; rare in the Highland Rim and Ridge & Valley (Fig. 36). Native chiefly to central portions of the USA and adjacent southern Ontario. It ranges from the eastern Dakotas to New York, south through the Appalachians to northern Alabama, west to Arkansas and Iowa (Kartesz 2020). It is listed as imperiled to vulnerable (S2S3) in Alabama (ALNHP 2020).

Figure 35. *Trillium flexipes*, Jackson Co., Alabama, 18 Apr 2006. Photo: Wayne Barger.

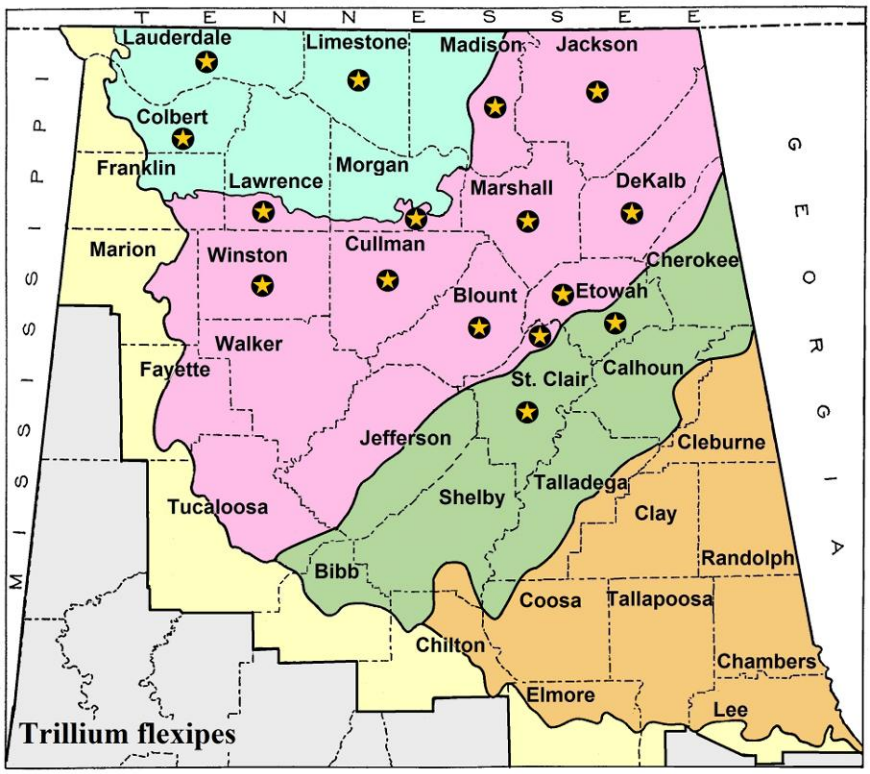

Figure 36. Distribution of *Trillium flexipes* in northern Alabama.

Figure 37. *Trillium flexipes*. A. Horizontal pedicel, Blount Co., Alabama, 4 Apr 2007. B. Completely white flower form with reflexed petals, St. Clair Co., Alabama, 20 Apr 2017. Photos: Brian Finzel.

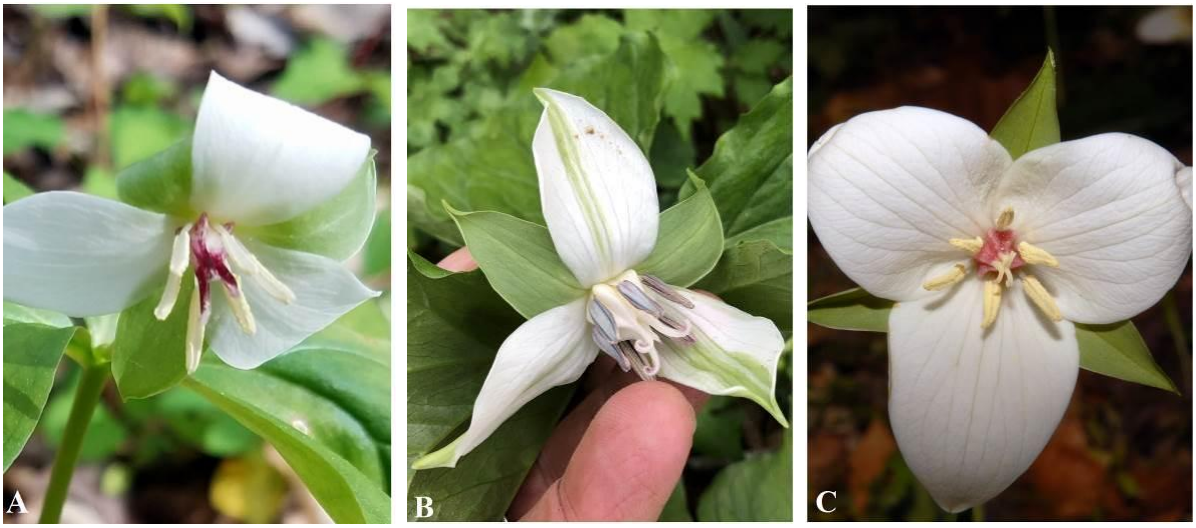

Figure 38. *Trillium flexipes*. A. Purplish stained ovary and stigmas, Blount Co., Alabama, 5 Apr 2018. Photo: Karen & Philip White. B. Green-streaked petals & lavender anthers, Etowah Co., Alabama, 27 Mar 2020. Photo: Dan Spaulding. C. Rose-pink ovary, Lincoln Co., Tennessee 9 Apr 2007. Photo: Brian Finzel.

Bent White Trillium has sweet to musty-scented flowers, typically held above the leaves, leaning forward on long, straight pedicels. However, the flower stalks are occasionally horizontal or declined below horizontal (Fig. 37a). Flowers usually have solid white petals (sometimes swept backward), and the anthers, ovaries, and stigmas are frequently white or cream-colored (Fig. 37b). However, some plants have green-striped petals, lavender anthers, and purplish to rose-pink stained ovaries or stigmas (Fig. 38a–c). *Trillium rugelii* resembles *T. flexipes*, but it generally has dark purple stamens and stigmas, plus its flowers nearly always nod below the leaves on recurved pedicels.

6. Trillium grandiflorum (Michx.) Salisb. {large-flowered} — GREAT WHITE TRILLIUM; LARGE-FLOWER TRILLIUM; LARGE-FLOWER WAKE-ROBIN; WHITE WAKE-ROBIN (Fig. 39).

Perennial herb from short rhizomes. Rich woods. Flowers April–May, fruits June–August; very rare in the Cumberland Plateau (Fig. 40). Native to eastern North America and adjacent Canada, mostly east of the Mississippi River with the southern portion of its range chiefly in Tennessee but extending into northeastern Alabama and northern Georgia (Kartesz 2020).

Figure 39. *Trillium grandiflorum*, Jackson Co., Alabama, 14 Apr 2001. Photo: Eric Soehren.

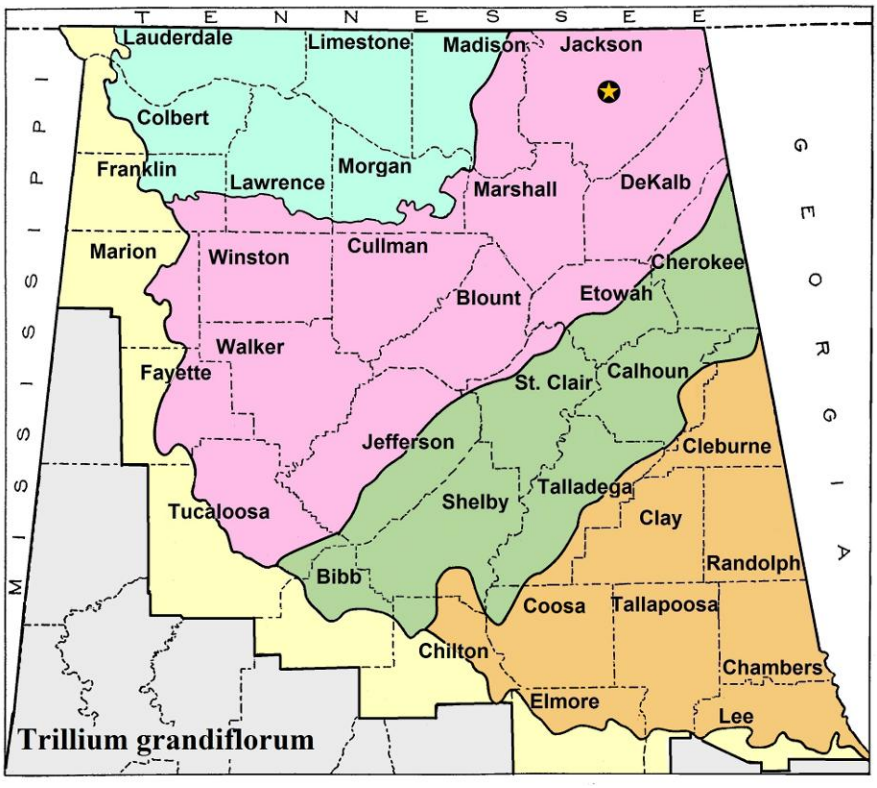

Figure 40. Distribution of *Trillium grandiflorum* in northern Alabama.

Trillium grandiflorum is the most widespread wake-robin in North America. Case & Case (1997) consider it to be "the most showy, best known and loved of all the trilliums." It has large, odorless, trumpet-shaped flowers (Fig. 41a) and thin petals with distinctly wavy margins. The flowers are usually white, turning pink with age (Fig. 41b), but some individuals in a population emerge pink (Patrick 1986). *Trillium flexipes* can be mistaken for *T. grandiflorum* but differs by having thick-textured petals with non-wavy margins.

Figure 41. *Trillium grandiflorum*, Swain Co., North Carolina, 9 Mar 2007. Photos: Brian Finzel.

Great White Trillium is very rare and critically imperiled (S1) in Alabama (ALNHP 2020), known only from Jackson County. It was first collected by Randy Parker in 1986 and deposited at the AUA herbarium. Steve Threlkeld (pers. comm. 2021) verified the population's existence in the spring of 2001. *Trillium grandiflorum* is more common further north and displays considerable variations with many named forms (Case & Case 1997).

7. Trillium lancifolium Raf. {lance-leaved} — LANCE-LEAF TRILLIUM; LANCE-LEAF WAKE-ROBIN; NARROWLEAF TRILLIUM (Fig. 42). [*Trillium lanceolatum* Boykin ex S. Watson; *Trillium recurvatum* L.C. Beck var. *lanceolatum* Boykin ex S. Watson]

Perennial herb from short rhizomes. Alluvial woods and bottomland forests. Flowers late February–April, fruits May–June; very rare in the Highland Rim and upper Piedmont; rare in the Cumberland Plateau (Sand Mountain district), Ridge & Valley, and Coastal Plain (Fig. 43). It is endemic to the southeastern USA, centered in Alabama, with populations in southeast Tennessee, Georgia, western South Carolina, and the Florida Panhandle (Kartesz 2020).

Lance-Leaf Trillium is scattered throughout the state in small, isolated populations, often on alluvial soils. It is globally rare (G3) and is listed as imperiled to vulnerable (S2S3) in Alabama (ALNHP 2020). *Trillium lancifolium* is similar to *T. recurvatum*, both species having downward-pointing sepals and anthers curving strongly inward. *Trillium lancifolium* can be distinguished from *T. recurvatum* by its sessile to subsessile, lanceolate leaves, and slightly twisted erect petals.

Figure 42. *Trillium lancifolium*, Cleburne Co., Alabama, 2 Apr 2020. Photos: Melanie Taylor Spaulding.

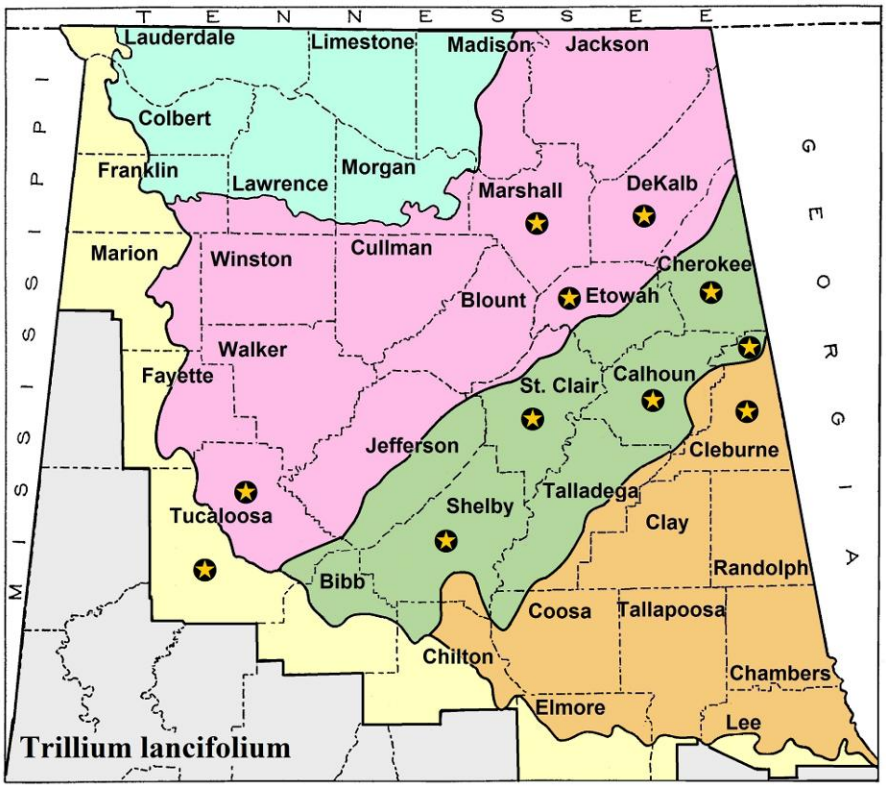

Figure 43. Distribution of *Trillium lancifolium* in northern Alabama.

8. Trillium luteum (Muhl.) Harb. {yellow} — YELLOW TRILLIUM; YELLOW WAKE-ROBIN; LEMON-SCENTED TRILLIUM; YELLOW TOADSHADE; WAX TRILLIUM (Fig. 44). [*Trillium cuneatum* Raf. var. *luteum* (Muhl.) H.E. Ahles; *Trillium viride* L.C. Beck var. *luteum* (Muhl.) Gleason]

Figure 44. *Trillium luteum*, Blount Co., Tennessee, 20 Apr 2007. Photo: Brian Finzel.

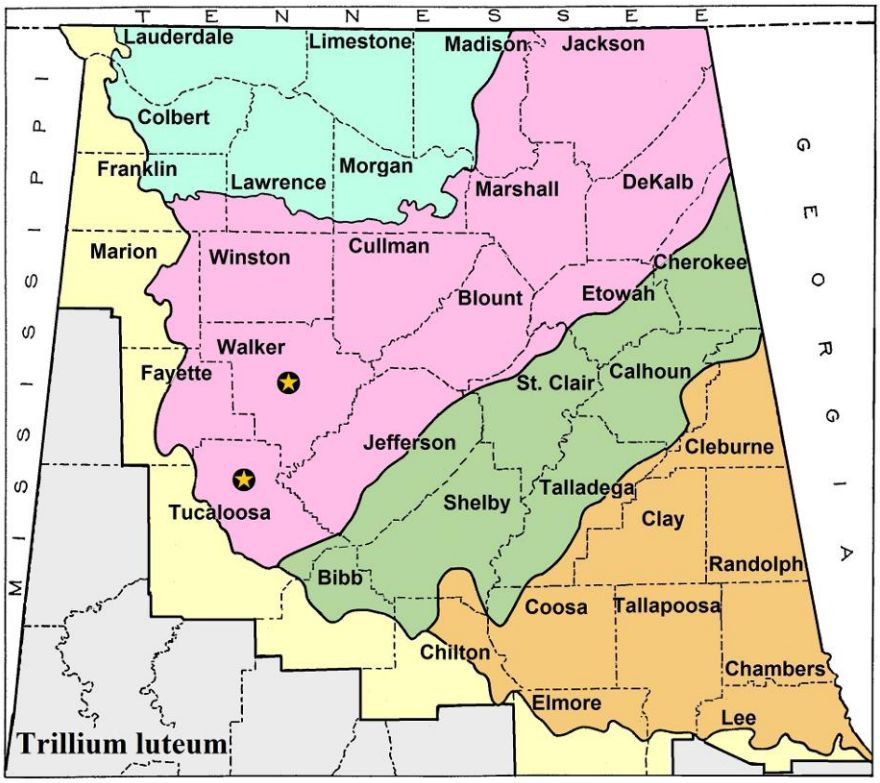

Figure 45. Distribution of *Trillium luteum* in northern Alabama.

Perennial herb from short rhizomes. Rich woods. Flowers March–May, fruits May–June; rare in the Warrior Basin district of the Cumberland Plateau (Fig. 45). Nearly endemic to the southern Appalachians of North Carolina, eastern Tennessee, northwest Georgia, and southeastern Kentucky; disjunct in central Alabama (Weakley 2020).

Trillium luteum is most abundant in the mountains of eastern Tennessee, with pure stands carpeting the forest floor (Anderson 1934a). Freeman (1975) stated that this species is easily identified in the field because it "produces lemon-yellow flowers that make a showy display and emit a pleasant lemon-like odor." Aaron Floden (pers. comm. 2019) describes the fragrance of *T. luteum* as very distinctive and reminiscent of Lemonhead candies or lemon-scented Joy dishwashing liquid. He states, "the many scents of [*T.*] *cuneatum* just never come close to [it] with their unpleasant chemical or semi-pleasant fermenting fruit odors." According to Patrick (1986), the essential features of *T. luteum* are its lemony odor and lack of purple pigmentation.

The late George Woods, co-founder of the Alabama Wildflower Society, discovered *Trillium luteum* in Alabama (pers. comm. Brian Keener, 2019). However, some botanists doubt whether Alabama plants are simply a color variant of *Trillium cuneatum*, but our entity consists of only yellow-flowered individuals with a lemon scent (Keener et al. 2020). Jayne Lampley (pers. comm. 2019) has extracted DNA samples from individuals in Walker County, Alabama, and additional insight may be expected from molecular evidence. So the taxonomic status of *T. luteum* in Alabama remains uncertain.

9. Trillium maculatum Raf. {blotched, spotted} — SPOTTED TRILLIUM; MOTTLED TRILLIUM; SPOTTED WAKE-ROBIN (Fig. 46).

Figure 46. *Trillium maculatum*, Lowndes Co., Alabama, 25 Feb 2012. Photos: Eric Soehren.

Perennial herb from short rhizomes. Alluvial woods and rich forests, often over calcareous substrates. Flowers February–April, fruits late April–May; rare in the Piedmont; uncommon in the Coastal Plain (Fig. 47). It is endemic to the southeastern USA, ranging from South Carolina to Georgia, northern Florida, and west to southcentral Alabama (Kartesz 2020). Chiefly occurring on the Coastal Plain, but also in the adjacent Piedmont (Weakley 2020).

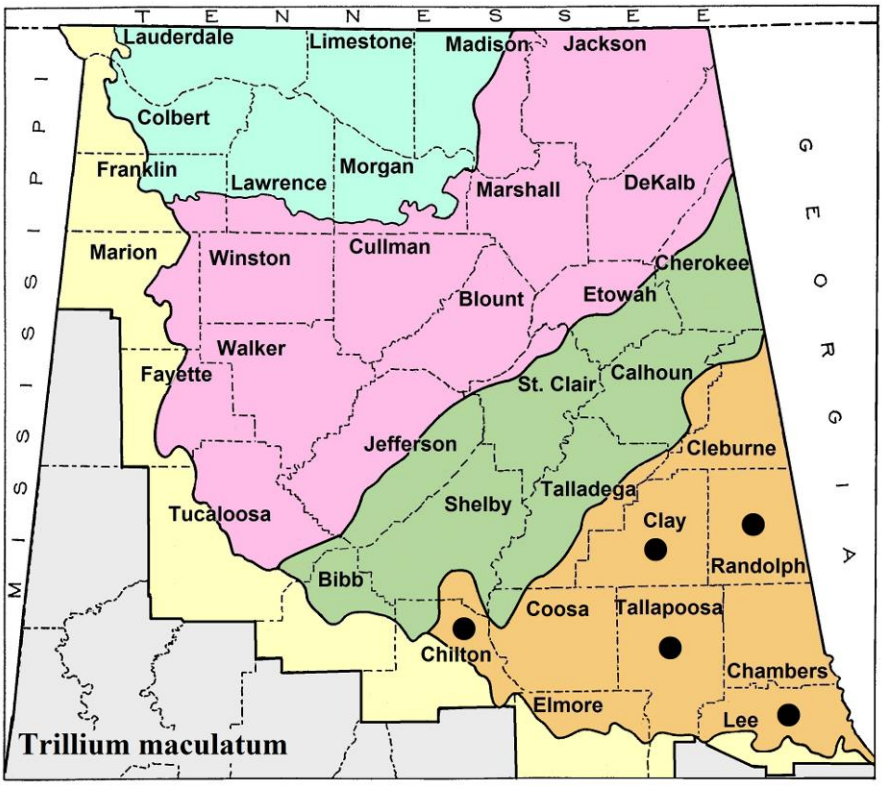

Figure 47. Distribution of *Trillium maculatum* in northern Alabama.

Superficially, *Trillium maculatum* resembles *T. cuneatum*. It can be distinguished from *T. cuneatum* by its 3-angled ovary (vs. 6-angled) and linear to broadly spatulate petals with the widest point well above the middle. The petals are usually dark red-maroon to reddish-purple, rarely sulfur yellow or purple basally, becoming yellow toward the apex (Case 2002). The flowers of *T. maculatum* have a spicy fragrance (Patrick 1986).

10. Trillium pusillum Michx. {very small} — DWARF WAKE-ROBIN; ALABAMA LEAST TRILLIUM; (Fig. 48). [*Trillium alabamicum* C.J. Garrett ex S.B. Farmer comb. nov. ined.; *Trillium pusillum* var. *alabamicum* nom ined.; *Trillium pusillum* var. *ozarkanum* (Palmer & Steyermark) Steyermark]

Perennial herb from short rhizomes. Wet woods, swamps, and forested floodplains. Flowers late February–early April, fruits late April–May; rare in the western Highland Rim and northeastern Cumberland Plateau (Fig. 49). The *Trillium pusillum* complex is centered in the southeastern USA and contains about ten taxa (Weakley 2020). Our taxon, an unnamed variety or a possible new species, occurs in northern Alabama and extends northward to central Tennessee (Weakley 2020).

Sepals of *Trillium pusillum* are as wide as or wider than its undulate-margined petals. The Alabama entity has pedicellate white flowers, aging to pink (Fig. 50), and lanceolate to narrowly elliptic leaves. It typically grows on floodplain soils under deciduous trees (Case & Case 1997).

Figure 48. *Trillium pusillum*, Limestone Co., Alabama, 11 Mar 2018. Photos: Brian Finzel.

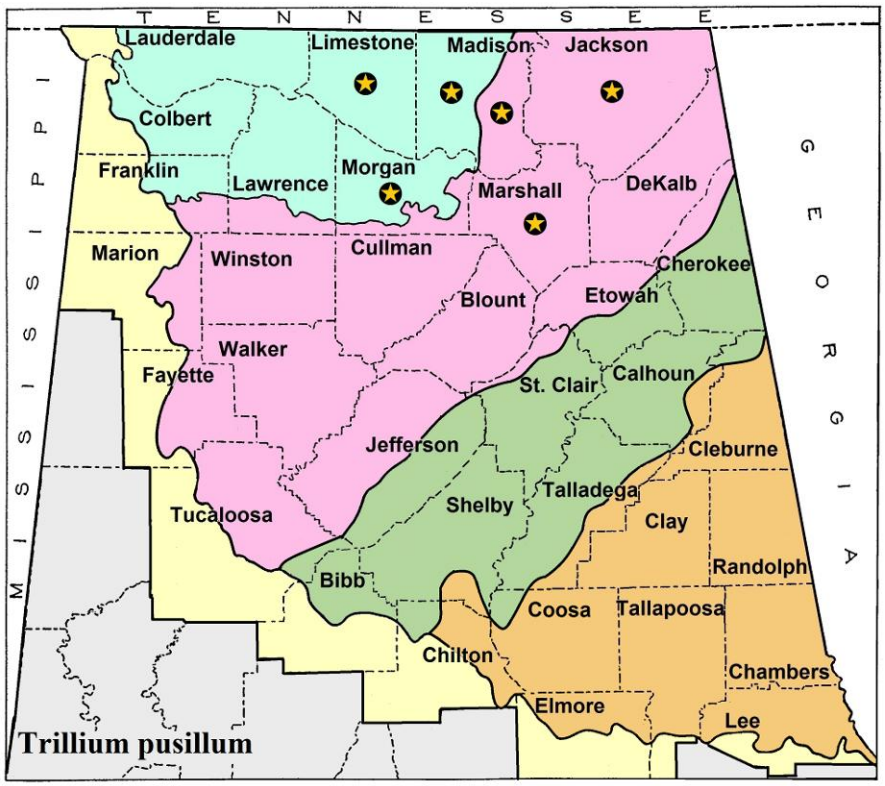

Figure 49. Distribution of *Trillium pusillum* in northern Alabama.

Figure 50. *Trillium pusillum*, Limestone Co., Alabama, 11 Mar 2018. Photo: Brian Finzel.

Case (2002) recognized only two varieties of *Trillium pusillum*; the typical variety having pedicillate flowers and the other, var. *virginianum* Fernald, having sessile to subsessile flowers. Weakley (2020) lists two species and eight varieties in this complex, with some yet to be named. *Trillium* expert, John D. Freeman (1995), anticipated publishing the Alabama taxon as *T. pusillum* var. *alabamicum* Freeman & Garrett but died in 1997 (he was only 55 years old). Susan Farmer (2007), in her Ph.D. dissertation, elevated the taxon to *T. alabamicum*. She recently stated (pers. comm. 2021), "I'm almost done with the paper. Hopefully, it will be In-Press real soon now." ALNHP (2020) treats our entity as var. *ozarkanum* and lists it as imperiled (S2) in Alabama.

11. Trillium recurvatum Beck {recurved; the sepals} — PRAIRIE TRILLIUM; PRAIRIE WAKE-ROBIN; BLOODY-BUTCHER; PURPLE WAKE-ROBIN (Fig. 51).

Figure 51. *Trillium recurvatum*, Morgan Co., Alabama, 2 Apr 2018. Photo: Brian Finzel.

Perennial herb from short rhizomes. Rich woods, coves, and alluvial forests, often in soils derived from limestone. Flowers mid-March–early May, fruits May–June; very rare in the Highland Rim; rare in the Cumberland Plateau (Fig. 52). It is primarily a species of the central USA, occurring more commonly in states along the Mississippi River (Kartesz 2020). *Trillium recurvatum* ranges from Iowa, south to eastern Texas, and east to Alabama and western Ohio (Case 2002). It is listed as imperiled (S2) in Alabama (ALNHP 2020).

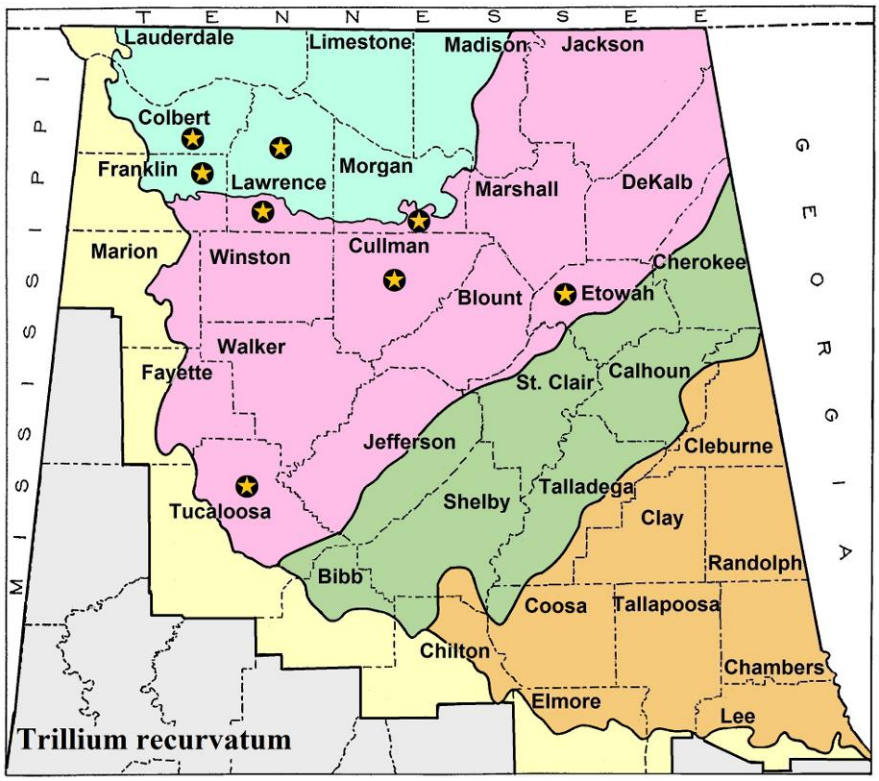

Figure 52. Distribution of *Trillium recurvatum* in northern Alabama.


Figure 53. *Trillium recurvatum*, petioled leaves, Grundy Co., Tennessee, 30 Mar 2012. Photo: Brian Finzel.

Prairie Trillium is a distinct species with strongly recurved sepals, recurved stamens, and long-petioled leaves (Fig. 53). Its petals are clawed (have a stalk-like base), incurved, and typically dark maroon-purple; however, clear yellow or even bicolored individuals occur (Case & Case 1997).

12. Trillium reliquum J.D. Freeman {remnant, relict} — RELICT TRILLIUM; CONFEDERATE WAKE-ROBIN; CONFEDERATE TRILLIUM (Fig. 54).

Figure 54. *Trillium reliquum*, Bullock Co., Alabama, 17 Mar 2013. Photo: Eric Soehren.

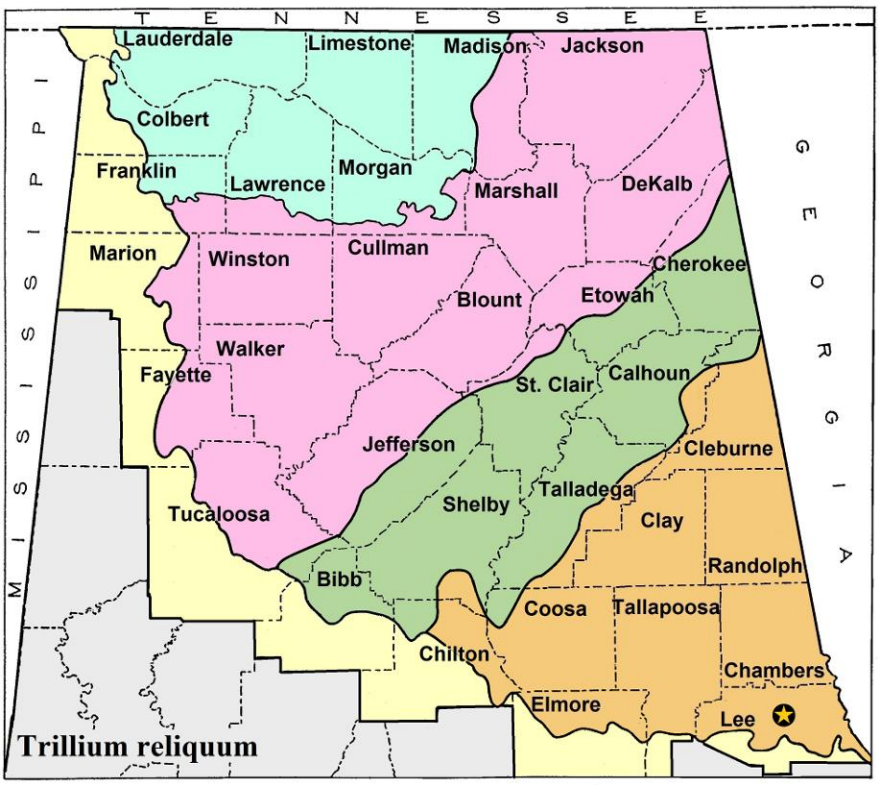

Figure 55. Distribution of *Trillium reliquum* in northern Alabama.

Perennial herb from short rhizomes. Rich woods, forested bluffs, ravine slopes, and alluvial woods. Flowers March–April, fruits late April–May; very rare in the lower Piedmont; rare in the adjacent Coastal Plain (Fig. 55). It is endemic to the southeastern USA, with scattered populations in the Coastal Plain and adjacent Piedmont of western South Carolina, Georgia, and eastern Alabama (Kartesz 2020).

Flowers of *Trillium reliquum* have brownish-maroon to greenish-yellow tepals and emit an unpleasant, fetid odor. Freeman (1975) described the smell as similar to decaying, putrid meat. Thus, beetles or flies might be attracted to the carrion-like scent; however, specific insect pollinators are unknown (Heckel & Leege 2007). *Trillium decumbens* resembles *T. reliquum* because both species have S-shaped stems (Fig. 56a), beaked anther connectives (Fig. 56b), and leaves often held close to the ground (Case & Case 1997). Relict Trillium's distinctive characters are its introrse anther dehiscence (opening toward the ovary) and entirely glabrous stems. Patrick (1986) lists the following essential features: "decumbent habit; stamens half as long as petals; anthers with beaks." Case & Case (1997) note that the stems of *T. reliquum* do not always lie on the ground and can occasionally be semi-decumbent or weakly erect.

Figure 56. *Trillium reliquum*, Macon Co., Georgia, 25 Mar 2018. Photos: Brian Finzel.

Freeman (1975) recognized *Trillium reliquum* as a distinct species and considered it the rarest, sessile-flowered trillium. Relict Trillium is listed as endangered in the USA (USFWS 1988). It is considered globally rare (G3) and imperiled (S2) in Alabama (ALNHP 2020). Threats to *T. reliquum* include habitat destruction from residential development, logging, road construction, and transmission line clearings (USFWS 1990). Heckel (2004) notes that the encroachment of exotic, invasive vines, such as Kudzu (*Pueraria montana* Ohwi) and Japanese Honeysuckle (*Lonicera japonica* Thunb.), also limits Relict Trillium's distribution.

13. Trillium rugelii Rendle {for Ferdinand Rugel, 1806–1879, a German botanist} — SOUTHERN NODDING TRILLIUM; ILL-SCENTED WAKE-ROBIN; SOUTHERN NODDING WAKE-ROBIN (Fig. 57).

Perennial herb from short rhizomes. Alluvial woods, mesic slopes, and bottomland forests. Flowers March–May, fruits May–July; uncommon in the Cumberland Plateau, Ridge & Valley, and Piedmont; rare in the upper Coastal Plain (Fig. 58). It is endemic to the southeastern USA, ranging from western North Carolina and eastern Tennessee to northern Georgia and Alabama (Kartesz 2020). It is considered globally rare (G3) and possibly imperiled (S2?) in Alabama (ALNHP 2020), but due to the many occurrences in the state, it probably does not need to be tracked.

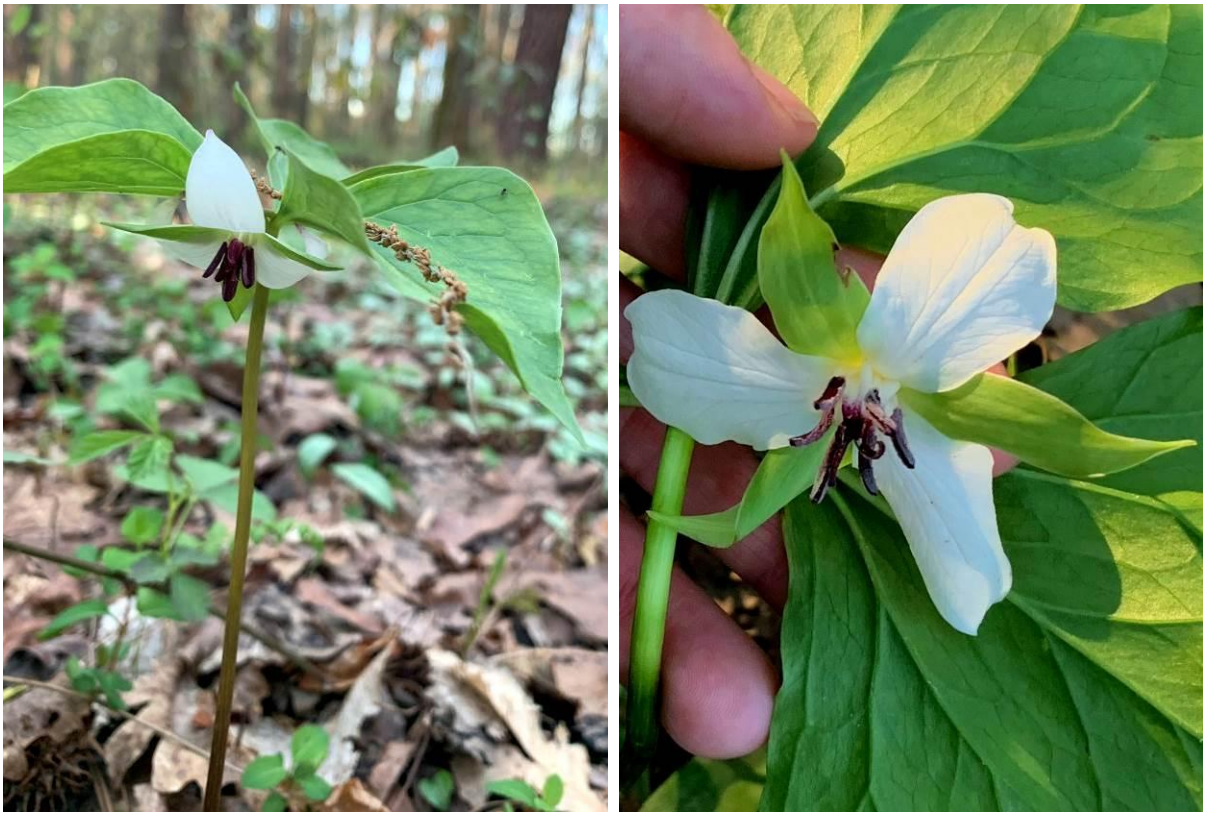

Figure 57. *Trillium rugelii*, Cleburne Co., Alabama, 25 Mar 2020. Photos: Melanie Taylor Spaulding.

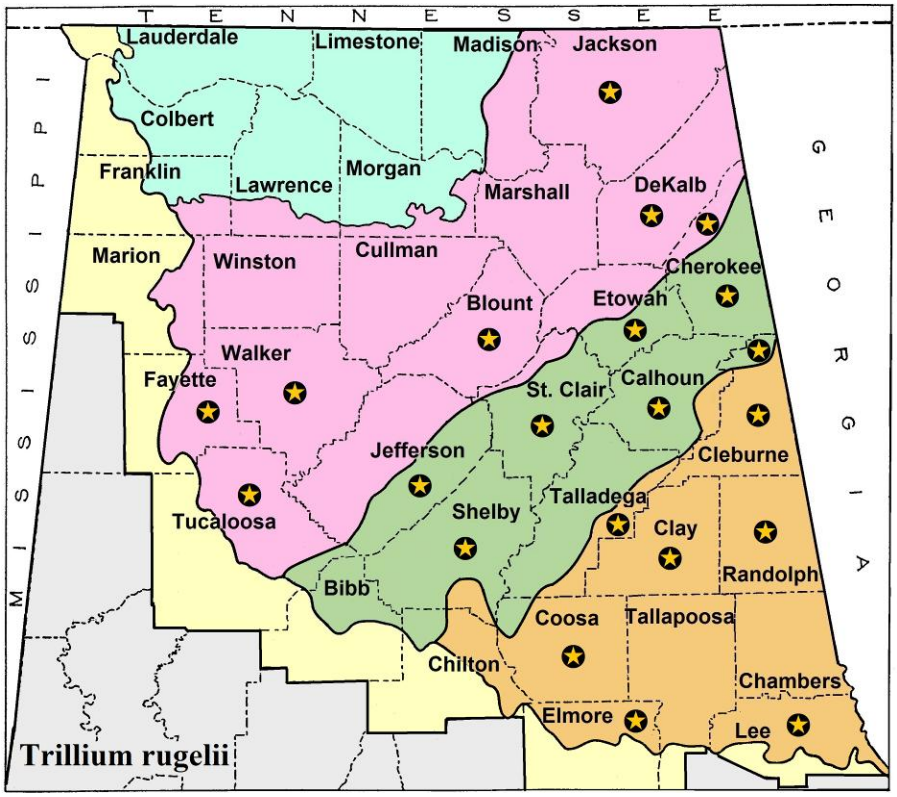

Figure 58. Distribution of *Trillium rugelii* in northern Alabama.

Trillium rugelii superficially looks like *T. flexipes* because both species typically have solid white flowers and similarly shaped leaves. Distinguishing characters of *T. rugelii* in Alabama include flowers (and fruits) on short, curved pedicels held below the leaves; dark purple stamens (rarely white); and a white ovary with purple stigmas (Fig. 59a–c). In other states within the species range, its petals are infrequently bicolored, with a rose or dark purple blotch at the base (Fig. 60a), and the ovary is white, purple, or maroon. According to Case & Case (1997), *T. rugelii* petals are usually white; however, "bicolored rose and white, rose, dark rose-red and rose-red with a white center forms occur, usually mixed colonies with *T. vaseyi* and apparently represent hybrids (Fig. 60b–c)."

Trillium flexipes differs from *T. rugelii* by typically having flowers raised above the leaves on straight pedicels (rarely declined below horizontal). Its stamens are usually white (rarely lavender), and its ovary and stigmas are white, occasionally stained or streaked with pink. The key features listed above for both species are characteristic of a population as a whole, but aberrant individuals occasionally lack fundamental attributes. The common name "ill-scented wake-robin" does not apply to Alabama plants, which are said to have an odor of old-fashioned garden roses (Case & Case 1997).

Figure 59. *Trillium rugelii* (from Alabama). A. Fruit, Cleburne Co., Alabama, 8 Jun 2020. B–C. Flower, Cleburne Co., Alabama, 28 Mar 2020. Photos: Dan Spaulding.

Figure 60. A. *Trillium rugelii* with purple-stained ovary and base of tepals, Buncombe Co., North Carolina, 30 Apr 2019. Photo: Brett Hopkins. B–C. Possible hybrids of *T. rugelii* with *T. vaseyi*, Swain Co., North Carolina, (B) 22 Apr 2007 and (C) 21 Apr 2007. Photos: Brian Finzel.

14. Trillium sessile L. {sessile} — TOADSHADE TRILLIUM; SESSILE TRILLIUM; TOAD TRILLIUM; SESSILE TOADSHADE; SESSILE-FLOWER WAKE-ROBIN (Fig. 61).

Figure 61. *Trillium sessile*, Jackson Co., Alabama, 24 Mar 2006. Photo: Eric Soehren.

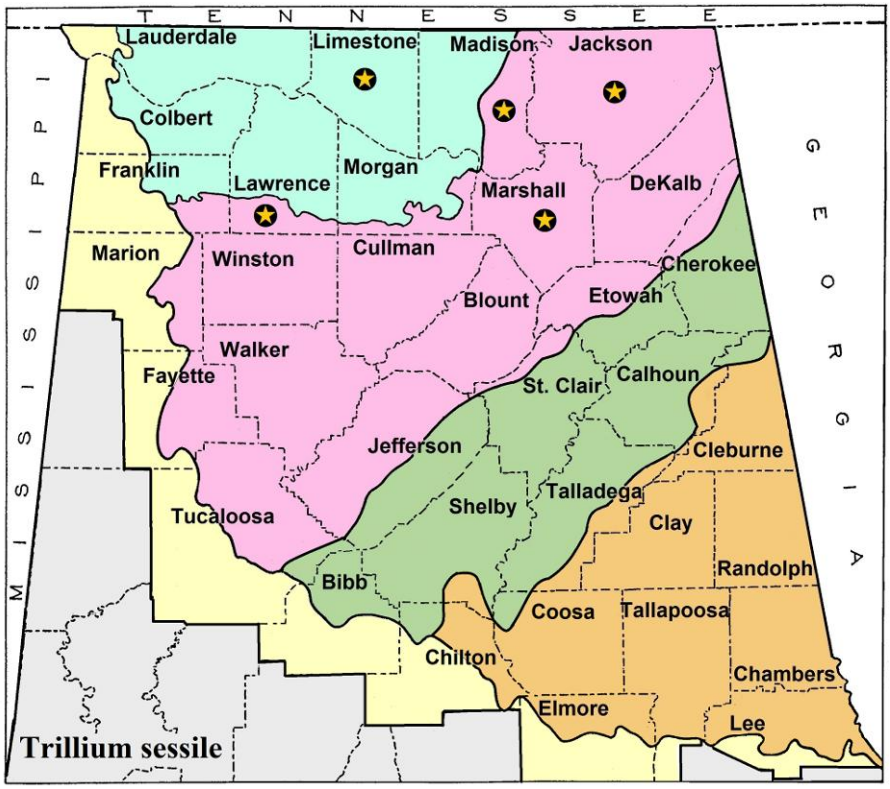

Figure 62. Distribution of *Trillium sessile* in northern Alabama.

Perennial herb from short rhizomes. Rich forests, mesic slopes, and low woods, especially over limestone. Flowers March–April, fruits late April–May; very rare in the Highland Rim; rare in the Cumberland Plateau (Fig. 62). It is primarily a species of the midwestern USA, ranging from eastern Kansas to western New York south to northern Georgia and eastern Oklahoma (Kartesz 2020). It is listed as imperiled (S2) in Alabama (ALNHP 2020).

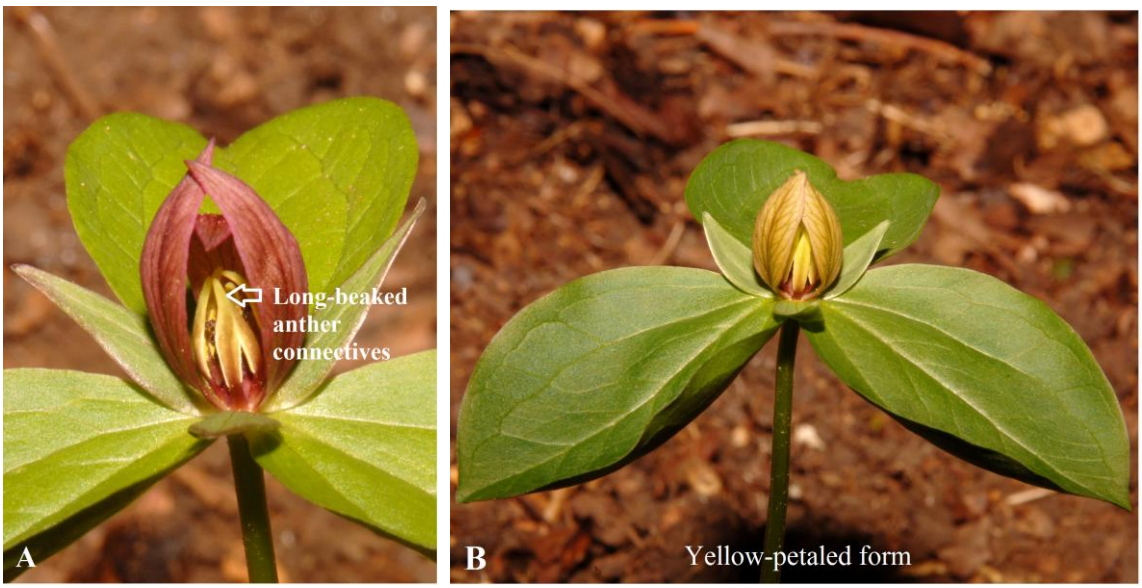

Figure 63. *Trillium sessile*, Limestone Co., Alabama, 30 Mar 2007. Photos: Brian Finzel.

Trillium sessile was the first sessile-flowered trillium named by Linnaeus (Case & Case 1997). It can be distinguished easily from other members by its anther connectives extending 2.0–5.0 mm past the anther sacs, forming a prominent slender beak (Fig. 63a). Its petals are usually maroon, rarely yellowish-green (Fig. 63b), and its flowers have a slightly fetid fragrance (Patrick 1986).

Its vernacular name "toad shade" is a fanciful reference to toads hiding in the shade of leaves. American Indians utilized *Trillium sessile* as a medicinal plant. Mashed rhizomes steeped in water were applied to the eyes to relieve inflammation and used to reduce bleeding following childbirth (Shosteck 1974).

15. Trillium stamineum Harb. {with prominent stamens} — TWISTED TRILLIUM; BLUE RIDGE WAKE-ROBIN; PROPELLER TRILLIUM; HELICOPTER TRILLIUM; PROPELLER TOADSHADE (Fig. 64).

Perennial herb from short rhizomes. Hardwood bottoms, ravine slopes, wooded creek banks, calcareous woods, and cedar glades. Flowers late January–early May, fruits May–June; frequent in the Highland Rim, Cumberland Plateau, and western Coastal Plain; uncommon in the Ridge & Valley (Fig. 65). It is endemic to the southeastern USA, from central Tennessee south through central Alabama and eastern Mississippi (Kartesz 2020).

Trillium stamineum is sessile-flowered and easily identified by its twisted, propeller-like petals spreading horizontally, completely exposing the central cluster of 6 stamens (Fig. 66a); hence the specific epithet, "with prominent stamens." Freeman (1975) mentioned that the pilose hairs on the upper portion of the stem and leaf undersurface serve as another good character (Fig. 66a). However, some plants in a population can have glabrous stems and lack twisted petals (Shaver 1957). The petals and stamens are typically maroon, rarely yellow (Fig. 66b–c) and flowers have an unpleasant putrid smell, possibly attracting carrion insects as pollinators (Case & Case 1997).

Figure 64. *Trillium stamineum*, Madison Co., Alabama, 22 Mar 2007. Photo: Eric Soehren.

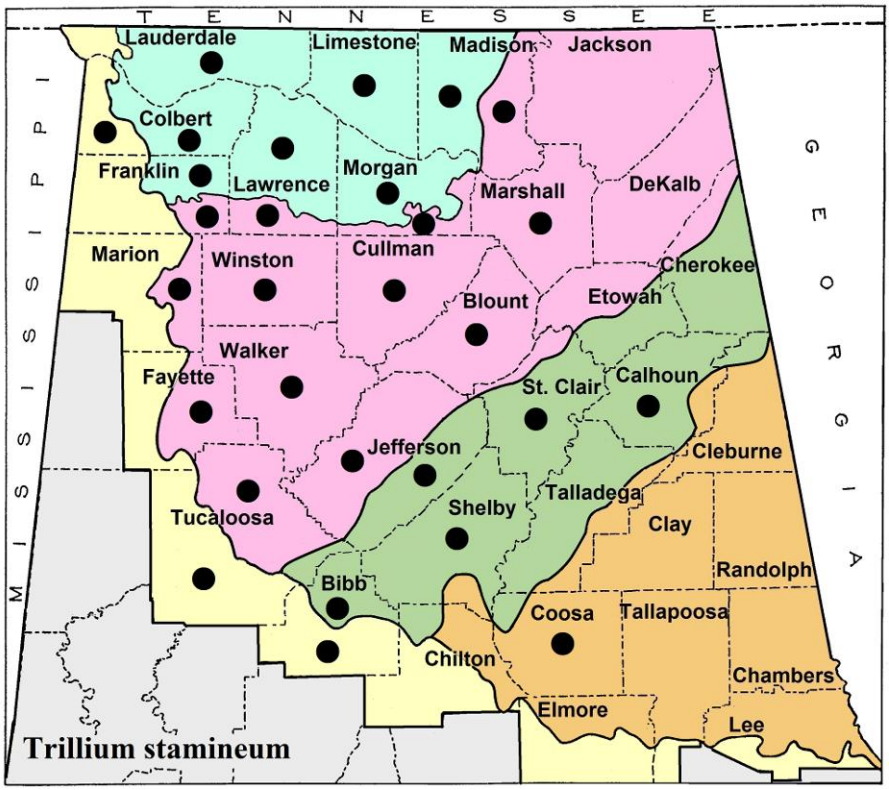

Figure 65. Distribution of *Trillium stamineum* in northern Alabama.

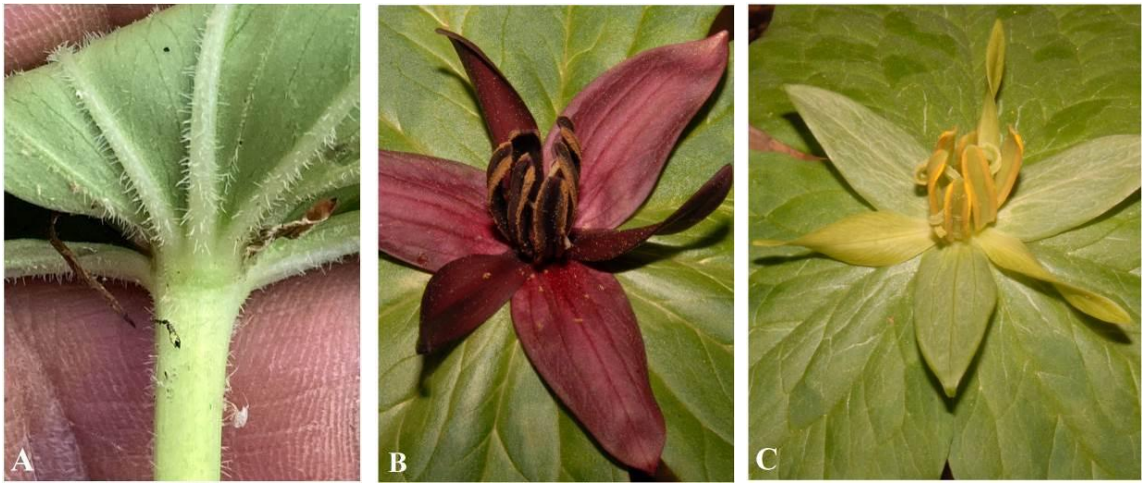

Figure 66. *Trillium stamineum*. A. Hairy upper stem & leaf undersurfaces, Franklin Co., Alabama, 20 May 2020. Photo: Dan Spaulding. B. Exposed cluster of stamens, Lauderdale Co., Alabama, 12 Apr 2008. C. Yellow-petal form, Colbert Co., Alabama, 6 Apr 2008. Photos: Brian Finzel.

16. Trillium sulcatum T.S. Patrick {furrowed, sulcate; sepal tips} — SOUTHERN RED TRILLIUM; BARKSDALE'S TRILLIUM; FURROWED WAKE-ROBIN (Fig. 67). [*Trillium erectum* L. var. *sulcatum* Barksdale]

Figure 67. *Trillium sulcatum*, Jackson Co., Alabama, 14 Apr 2001. Photo: Eric Soehren.

Perennial herb from short rhizomes. Rich woods, moist slopes, coves, and bottomlands. Flowers April–May, fruits May–June; rare in the eastern Cumberland Plateau (Fig. 68). Endemic to the southern Appalachians, from southern West Virginia and southwest Virginia south through central Tennessee, northwest Georgia, and northeast Alabama (Weakley 2020). Case (2002) writes, "*Trillium sulcatum* is present mainly on the Cumberland Plateau and is absent from the Great Smoky Mountains and the southern Blue Ridge Mountains." It is listed as critically imperiled (S1) in Alabama (ALNHP 2020).

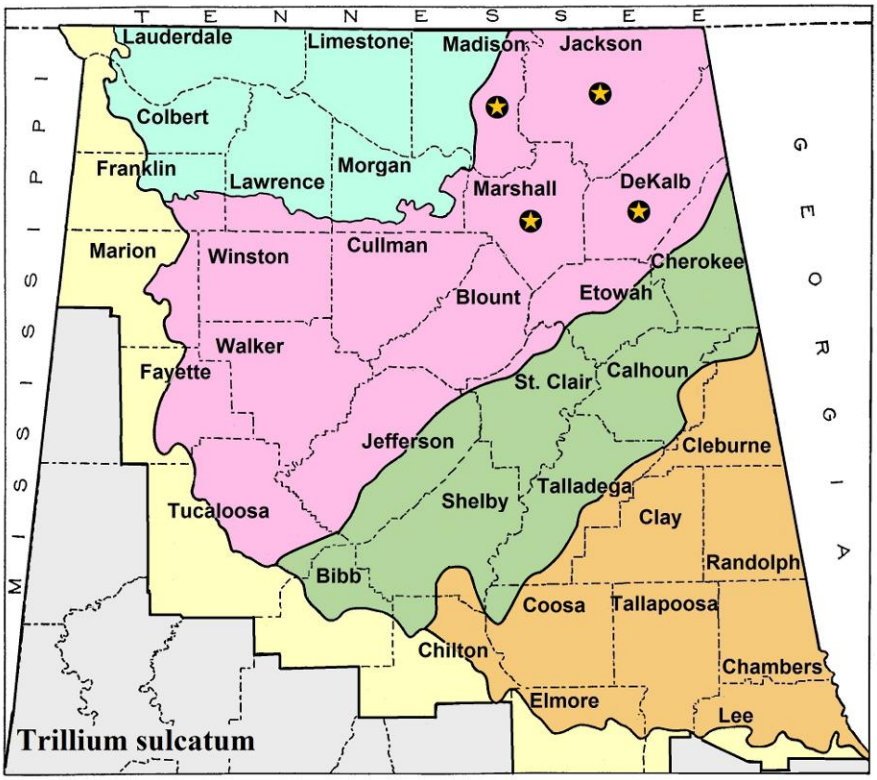

Figure 68. Distribution of *Trillium sulcatum* in northern Alabama.

Barksdale (1938) circumscribed *Trillium sulcatum* as a variety of *T. erectum* in his paper on pedicillate trilliums of the southern Appalachians. Patrick (1984) recognized Barksdale's Trillium as a new species and documented two color forms: usually maroon (Fig. 69a), rarely cream (Fig. 69b). White-flowered individuals also occur (Fig. 69c) and can be confused with *T. flexipes* but differ by having grooved or sulcate sepals (Fig. 69d) and a dark purple ovary that ripens into a globose, red fruit (Case & Case 1997).

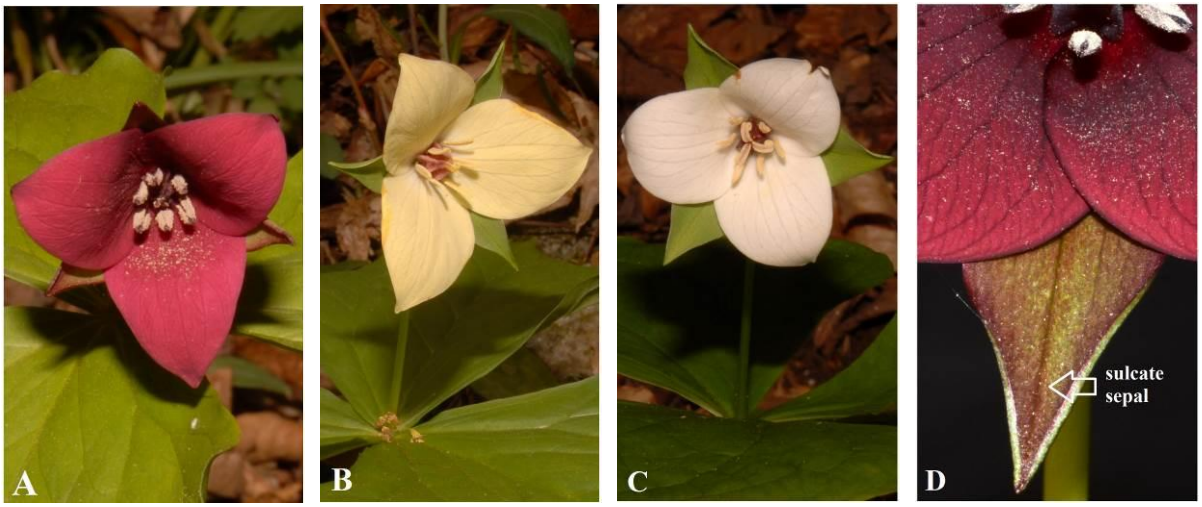

Figure 69. *Trillium sulcatum*. A. Maroon petal form, Coffee Co., Tennessee, 9 Apr 2007. B. Cream petal form, Coffee Co., Tennessee, 9 Apr 2007. C. White petal form, Marshall Co., Alabama, 19 Apr 2007. D. Sulcate (grooved) sepal, Coffee Co., Tennessee, 10 Apr 2016. Photos: Brian Finzel.

Trillium sulcatum looks like *T. vaseyi* but has long-pediceled flowers held above the leaves. Patrick (1986) lists the following critical features for *T. sulcatum*: "sulcate-tipped, maroon-tinged sepals; overlapping ovate petals forming a cup-shaped base resembling a candle snuffer in profile; long pedicels." Patrick (1984) observed that the tips of the sepals are also sometimes bent inward or curled up (Fig. 69d). Additionally, he notes that the flowers have a fragrance resembling fresh fungus (mushroom-like), but the odor is detectable only during warmer periods.

17. Trillium underwoodii Small {for its discoverer, Lucien M. Underwood, 1853–1907, American botanist} — UNDERWOOD'S TRILLIUM; LONG-BRACT WAKE-ROBIN (Fig. 70).

Figure 70. *Trillium underwoodii*, Elmore Co., Alabama, 17 Mar 2007. Photo: Brian Finzel.

Perennial herb from short rhizomes. Rich woods, alluvial forests, and moist ravines. Flowers February–early May, fruits May–June; uncommon in the Piedmont and Coastal Plain (Fig. 71). It is endemic to the southeastern USA, known from central and southern Alabama, west-central Georgia, and northern Florida (Weakley 2020).

Trillium underwoodii and *T. decipiens* are somewhat similar. The leaves of both species have a silvery-green streak along the midvein (Fig. 72a) and more or less straight margins in the distal third of the blade. Other characteristics include their anther connectives being distinctly prolonged past the anther sacs (Fig. 72b) and their flowers having a fetid odor. The key difference is Underwood's Trillium has shorter stems and leaf tips that often droop and touch the ground during anthesis (Case & Case 1997). Later in the season, its stem usually elongates, raising the leaves above the ground (Weakley 2020). According to Patrick (1986), *T. underwoodii* is the "only erect trillium with stems less than twice as long as leaves."

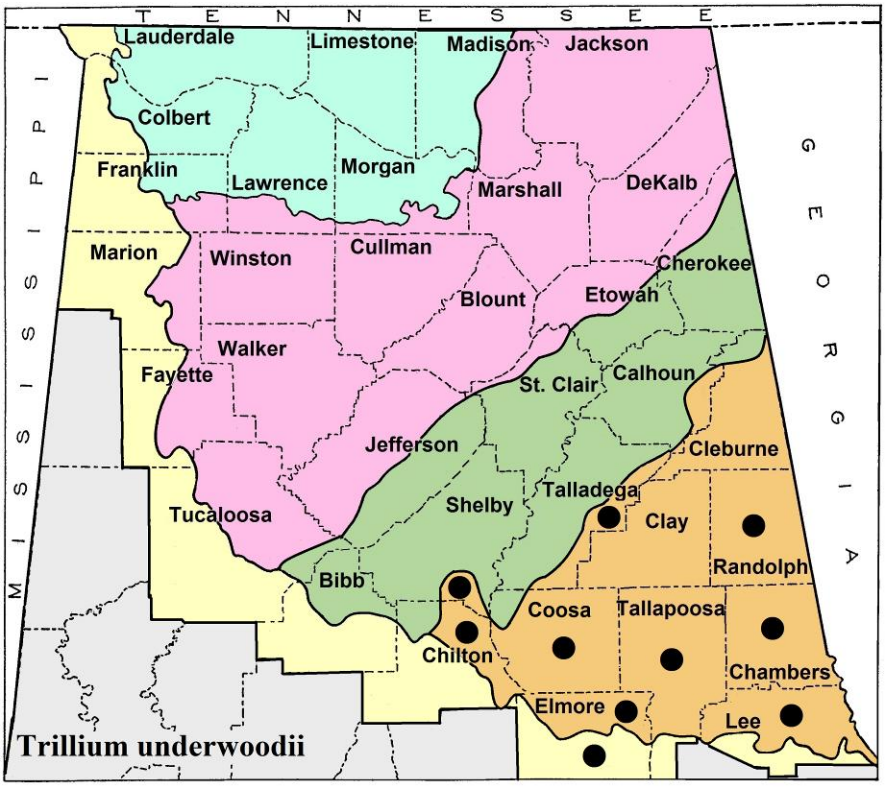

Figure 71. Distribution of *Trillium underwoodii* in northern Alabama.

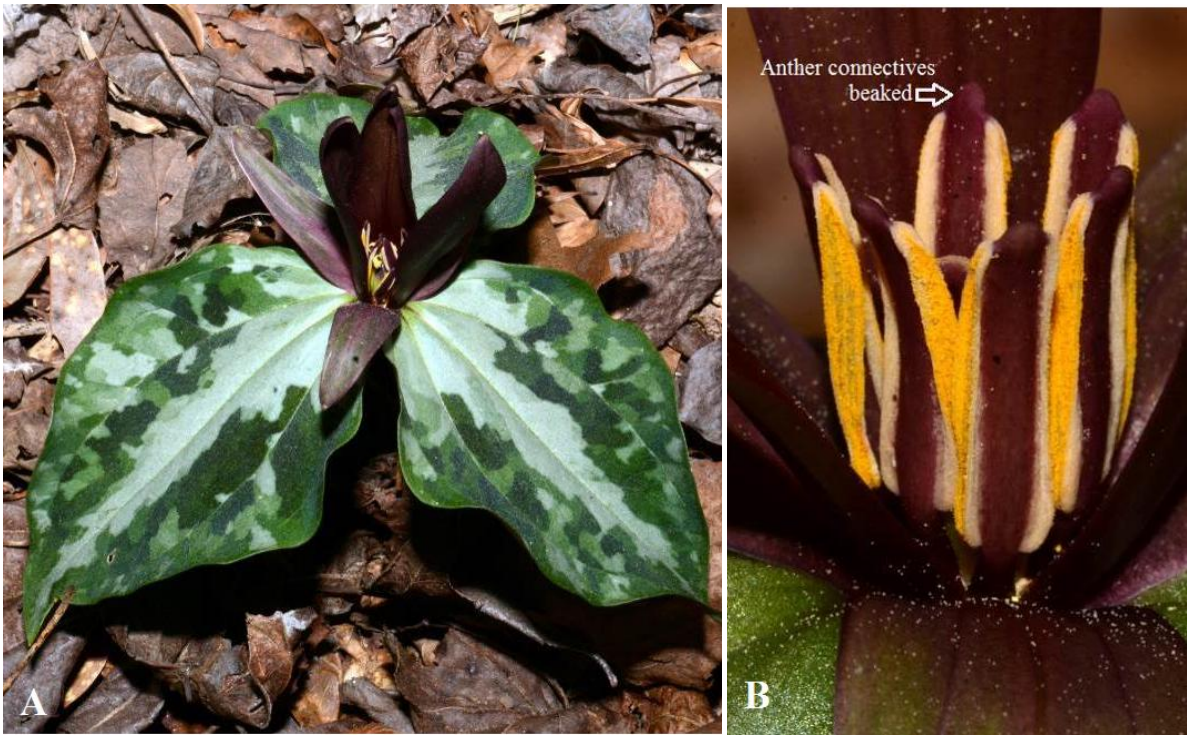

Figure 72. *Trillium underwoodii*, Tallapoosa Co., Alabama, 14 Mar 2018. Photos: Brian Finzel.

18. Trillium vaseyi Harb. {named in honor of George Vasey, 1822–1893, American botanist} — VASEY'S TRILLIUM; SWEET-BETH; SWEET WAKE-ROBIN; SWEET TRILLIUM (Fig. 73). [*Trillium erectum* L. var. *vaseyi* (Harb.) H.E. Ahles]

Figure 73. *Trillium vaseyi*, Haywood Co., North Carolina, 13 May 2018. Photos: Brian Finzel.

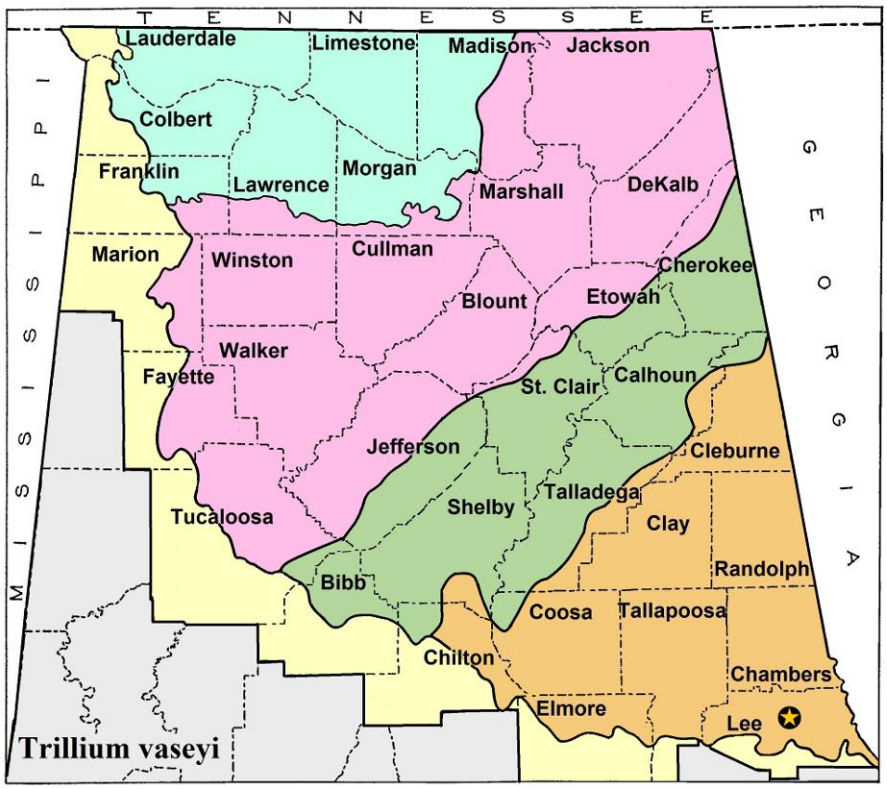

Figure 74. Distribution of *Trillium vaseyi* in northern Alabama.

Perennial herb from short rhizomes. Rich woods. Flowers late April–early June, fruits June–July; very rare in the Piedmont (Fig. 74). Endemic to the southern Appalachians, centered in western North Carolina, eastern Tennessee, northwest South Carolina, and northern Georgia, disjunct in the Piedmont of Alabama and Coastal Plain of Georgia (Kartesz 2020).

Figure 75. *Trillium vaseyi*. A. Stamens 1.5–2 times taller than its small, globose ovary, Haywood Co., North Carolina, 13 May 2018. B. Straight, declined pedicel, Swain Co., North Carolina, 20 May 2007. Photos: Brian Finzel. C. Herbarium specimen (AUA), *J.D. Freeman s.n.*, Lee Co., Alabama, 4 May 1968.

Vasey's Trillium is one of the most stunningly beautiful and largest-flowered trilliums, certainly the most spectacular among the pedicellate trilliums. Its petals are usually maroon-red, rarely white (Case & Case 1997). Patrick (1986) listed the following as essential features of *Trillium vaseyi*: "stamens far exceeding the small, globose ovary (Fig. 75a); petals veiny, overlapping near the base in robust specimens and recurved between sepals; flowers nodding below leaves, fragrance funereal, like roses." Its pedicel is straight and declined below the leaves (Fig. 75b), whereas *T. rugelii* has a pedicel recurved below the leaves.

Brian Keener noted in the Alabama Plant Atlas (Keener et al. 2020):

> "The presence of this species in Alabama is a bit of an enigma. Freeman knew of its occurrence in Lee County (pers. comm.), but oddly no specimens exist in the Auburn Herbarium from his experience. Tom Patrick observed it in Chewacla State Park (pers. comm.) in Lee County, but no specimens are known from that observation. The only specimen in the [Alabama Plant] Atlas was taken from cultivation at the home of Dr. Sam Jones of Smiths Station, a local Veterinarian and plant enthusiast now deceased. In 2002, Dr. Jones took B. Keener to the site where the cultivated material was originally collected, but the area had been logged. Pedicellate species of *Trillium* were found but were weakened from too much sunlight."

When the senior author visited the herbarium at Auburn University on January 31, 2019, he observed the "long-lost" collection of *Trillium vaseyi* from May 4, 1968 (Fig. 75c). According to Curtis Hansen (pers. comm. 2020):

> "Dr. George M. Hocking was professor emeritus of pharmacy at Auburn University. He retired from teaching in 1975 but remained very active until his death in 2001. He maintained two full herbarium cabinets of plants that he and his students had collected over the years. About 2001, these plants were going to be thrown away, and the cabinets were left on a loading dock for that purpose. Luckily, staff from the John D. Freeman Herbarium (AUA) were made aware of the situation and retrieved the two cabinets of specimens. In 2019, while going through the Hocking collection again, the curator [Curtis Hansen] found a specimen of *Trillium vaseyi* from Lee County, Alabama. Until now, there were references of *T. vaseyi* occurring in Lee County, but no voucher specimen was known. This specimen, from the Hocking collection, may be the voucher in question."

Trillium vaseyi is extremely rare in the state and is considered a critically imperiled (S1) species (ALNHP 2020). Al Schotz (pers. comm. 2020) of the Alabama Natural Heritage Program notes that Ed Schilling and Aaron Floden think it might be an aberrant form of *T. rugelii*. However, *Trillium* expert, John D. Freeman, determined the Alabama plants as *T. vaseyi* (Fig. 75c).

6. XEROPHYLLACEAE (Bear-Grass Family) – in LILIALES

1. XEROPHYLLUM Michaux 1803

[Greek *xeros*, dry, and *phyllon*, leaf; probably alluding to its xeric habitat and distinct foliage]

1. Xerophyllum asphodeloides (L.) Nutt. {resembling *Asphodelus*} — EASTERN TURKEYBEARD; MOUNTAIN-ASPHODEL; BEAR-GRASS (Fig. 76).

Figure 76. *Xerophyllum asphodeloides*, Calhoun Co., Alabama, 30 Apr 2019. Photos: Brian Finzel.

Perennial, subscapose herb from a tuberous, woody rhizome. Ridges and slopes of longleaf pine forests. Flowers May–June, fruits July–August; very rare in the Piedmont (Fig. 77). Native to dry woodlands of the southern Appalachians, from western Virginia and eastern West Virginia south through the mountains to northeast Alabama, disjunct in sandy soils of the New Jersey Pine Barrens in the Coastal Plain (Utech 2002j).

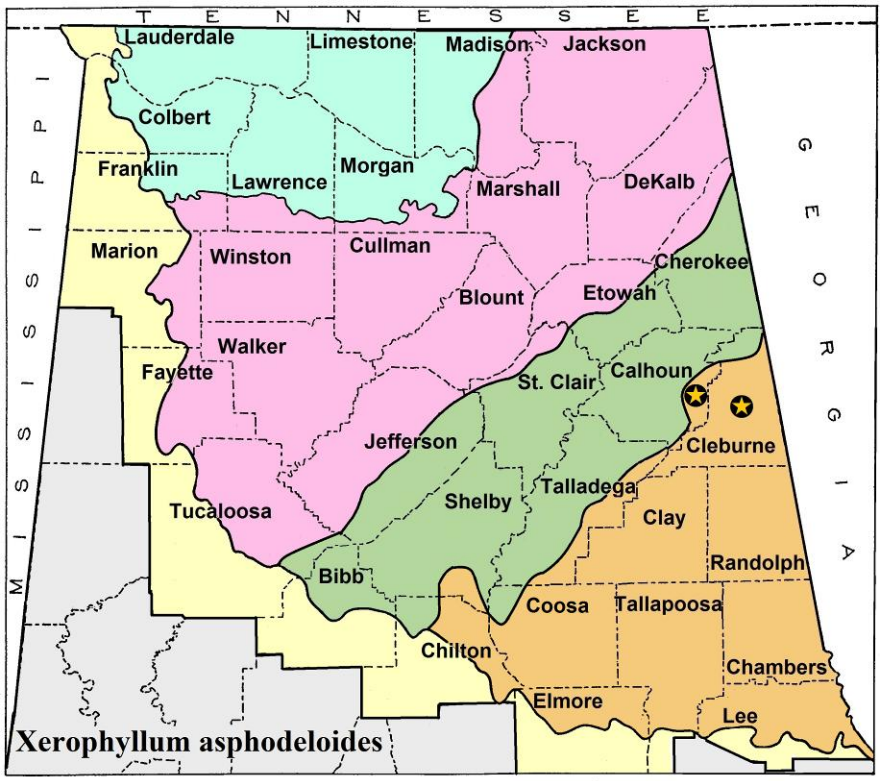

Figure 77. Distribution of *Xerophyllum asphodeloides* in northern Alabama.

Figure 78. *Xerophyllum asphodeloides* habitat, Calhoun Co., Alabama, 27 May 2010. Photo: Eric Soehren.

Xerophyllum asphodeloides was first discovered in Alabama by former U.S. Forest Service botanist Suzanne Oberholster on May 24, 1995, growing on a dry ridge in a longleaf pine-dominated community in the Talladega National Forest (Fig. 78). Turkeybeard is a rare plant listed as critically imperiled (S1) in Alabama (ALNHP 2020). This species has a dense cluster of wiry leaves that could be mistaken for a young longleaf pine in its "grass stage," but is unmistakable at anthesis when it sends up its tall flower stalk terminated by a dense plume of white flowers (Grimm 1968). *Xerophyllum asphodeloides* is a fire-dependent species, shown to increase both flower and seed via prescribed burns; therefore, fire is recommended for its conservation (Bourg et al. 2015).

The genus consists of two species endemic to North America. *Xerophyllum asphodeloides* occurs in the southeastern USA and *Xerophyllum tenax* (Pursh) Nutt. [Western Turkeybeard] is found in the western USA and adjacent Canada. Western Turkeybeard grows in wetter habitats than Eastern Turkeybeard (Utech 2002j). Zomlefer (1997) believes the common name of the genus "refers to the conspicuous terminal raceme of white flowers which resembles a long feather." The inflorescence possibly alludes to the beard of a Wild Turkey (*Meleagris gallopavo*).

7. CHIONOGRAPHIDACEAE (Fairy-Wand Family) – in LILIALES

1. CHAMAELIRIUM Willdenow 1808

[Greek *chamae*, dwarf, and *lirion*, white lily; possibly alluding to numerous, small flowers]

1. Chamaelirium luteum (L.) A. Gray {yellow; possibly referring to the yellow tepals of dried specimens or yellow anthers in male inflorescences} — FAIRY-WAND; DEVIL'S-BIT; BLAZING-STAR; FALSE UNICORN-ROOT (Fig. 79). [*Chamaelirium obovale* Small]

Figure 79. *Chamaelirium luteum*, Bibb Co., Alabama, 7 May 2009. Photos: Wayne Barger.

Perennial, subscapose herb from a stout rhizome. Hardwood slopes, pine woods, roadbanks, streambanks, alluvial woods, and bottomland forests. Flowers late March–July, fruits June –November; uncommon in the Highland Rim and Coastal Plain; frequent in the Cumberland Plateau, Ridge & Valley, and Piedmont (Fig. 80). Native to the eastern USA and adjacent Canada, from Massachusetts and Ontario to Louisiana and Florida (Kartesz 2020).

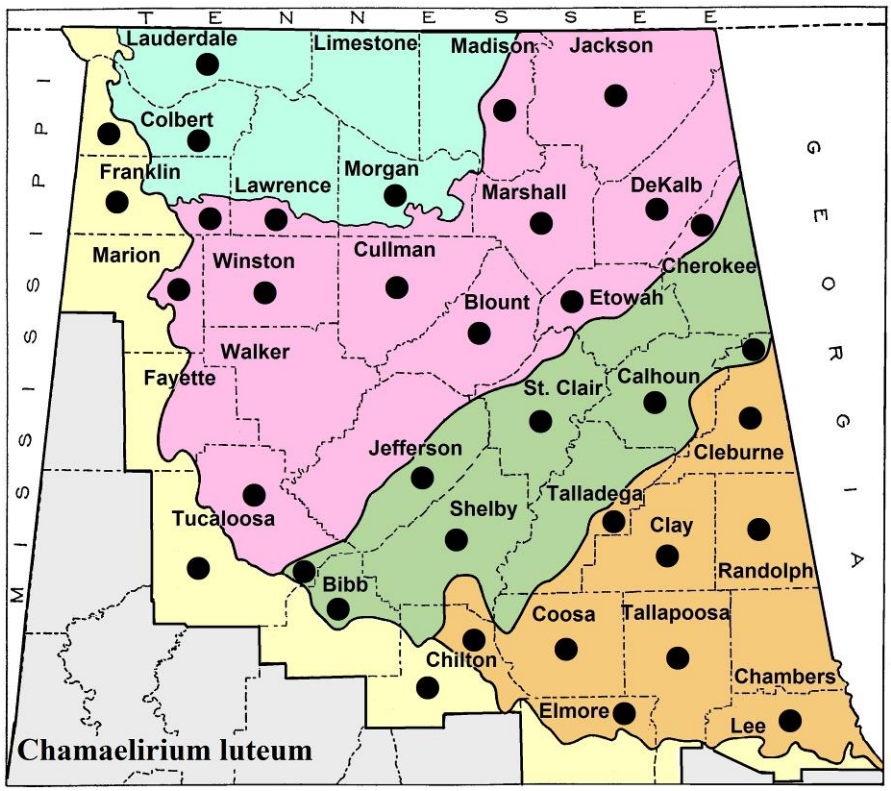

Figure 80. Distribution of *Chamaelirium luteum* in northern Alabama.

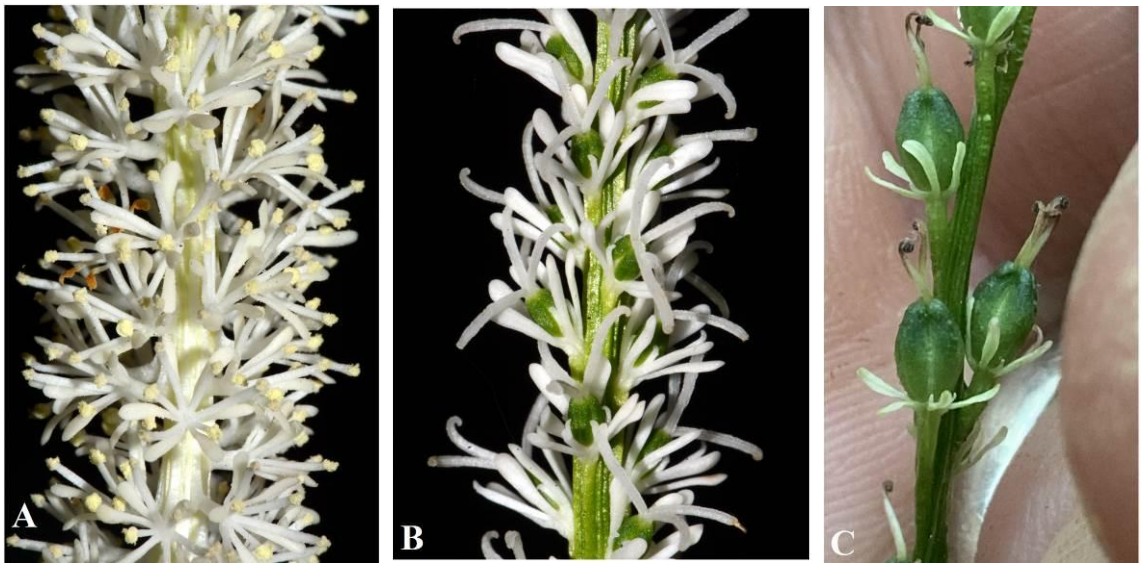

Figure 81. *Chamaelirium luteum*. A. Male (staminate) flowers, Bibb Co., Alabama, 22 Apr 2017. B. Female (pistillate) flowers, Bibb Co., Alabama, 27 May 2017. Photos: Brian Finzel. C. Young fruit, Cleburne Co., Alabama, 14 Jun 2020. Photo: Dan Spaulding.

Chamaelirium luteum is usually dioecious, with unisexual flowers found on different plants (Fig. 81a–c). Fairy-Wand exhibits sexual dimorphism (Utech 2002b). Female (pistillate) plants are typically more robust than males. The inflorescence of males is shorter and more delicate than the females, and male plants generally have fewer leaves in their basal rosette (Zomlefer 1997). Meacher & Anonovics (1982) state that the mortality rate is higher in females due to the "evolutionary cost" of reproduction efforts; hence, males are usually more prevalent within a given population.

Figure 82. *Chamaelirium luteum* rhizome, Tuscaloosa Co., Alabama, 14 May 2020. Photo: Dan Spaulding.

According to Zomlefer (1997), the common name devil's-bit "is derived from the truncate, bitten-off appearance of older rhizomes, which decay, ending abruptly (Fig. 82)." A fanciful legend regarding its short rootstock relates to the devil biting off the rhizome tip to destroy its medicinal properties (Shosteck 1974). The name 'fairy-wand' refers to the cluster of wand-like flowers. *Chamaelirium* is endemic to the eastern USA (Utech 2002b). Zomlefer (1997) believes it to be a monotypic genus; Weakley (2020), however, states that "*C. obovale* Small (or other previously unnamed entities) may warrant recognition at some level and need additional study."

8. **MELANTHIACEAE** (Bunchflower Family) – in LILIALES

1. Inflorescence axis and upper stems scurfy-pubescent; tepal glands present; leaves either linear to narrowly oblanceolate with clawed tepals (abruptly narrowed with a stalk-like base) or leaves broader with clawless tepals (gradually tapering to base).....**Melanthium**
1. Inflorescence axis and stems glabrous; tepal glands absent or obscure; leaves linear with clawless tepals (base not stalk-like).

    2. Inflorescence branched, flowers in a terminal panicle of narrow racemes; pedicels (flower stalks) absent or up to 2 mm long; tepals narrowly lanceolate, tapering at apex; stamens less than half as long as tepals; bracts linear; seeds brown and lacking a fleshy seed coat; bulb cylindric .....**Stenanthium**
    2. Inflorescence unbranched, flowers in a densely ovoid raceme; pedicels 12–18 mm long; tepals oblong-obovate, rounded at apex; stamens as long or longer than the tepals; bracts ovate; seeds with a purple to red fleshy seed coat (sarcotesta); bulb ovoid .....**Amianthium**

1. AMIANTHIUM A. Gray 1837
[Greek *amianthos*, unspotted, and *anthos*, flower; alluding to the lack of glands on perianth]

1. Amianthium muscitoxicum (Walter) A. Gray {fly-poison} — FLY-POISON; STAGGER-GRASS; CROW-POISON (Fig. 83). [*Chrosperma muscaetoxicum* (Walter) Kuntze; *Melanthium muscaetoxicum* Walter; *Zigadenus muscitoxicus* (Walter) Regel]

Figure 83. *Amianthium muscitoxicum*, Talladega Co., Alabama, 25 May 2009. Photos: Wayne Barger.

Perennial, subscapose herb from a bulb. Rich woods, forested slopes, alluvial woods, sandhills, longleaf pine savannas, sandstone outcrops, wet meadows, woodland borders, and roadbanks. Flowers late April–July, fruits June–September; rare in the Cumberland Plateau, uncommon in the Ridge & Valley, Piedmont, and Coastal Plain (Fig. 84). Native to the eastern USA, from southern New York and Pennsylvania, west to the Appalachians, south to Mississippi and northern Florida, disjunct in the Ozarks of Arkansas, Missouri, and Oklahoma (Weakley 2020).

Fly-Poison produces a tall flower stalk in the spring from a basal rosette of long, strap-like leaves. The flowering stem has numerous reduced leaves, and the terminal inflorescence is a dense, cylindrical cluster of white flowers, later turning green or reddish (Fig. 85a). Beetles are the chief pollinators, and a change in floral color might be a visual signal for them to avoid old flowers, thus increasing the likelihood of pollination (Travis 1984). *Amianthium* is practically self-incompatible, and only outcrossed plants normally produce viable fruit (Palmer et al. 1988).

Amianthium is occasionally included within a broadly circumscribed *Zigadenus* (Utech 2002a), but Zomlefer et al. (2001) confirmed a monotypic circumscription of *Amianthium*. The defining morphological characters of *A. muscitoxicum* are its lack of tepal glands; 1–2 large seeds per locule, each with a fleshy, reddish seed coat (Fig. 85b); and presence of a unique alkaloid, amianthine (Zomlefer 1997).

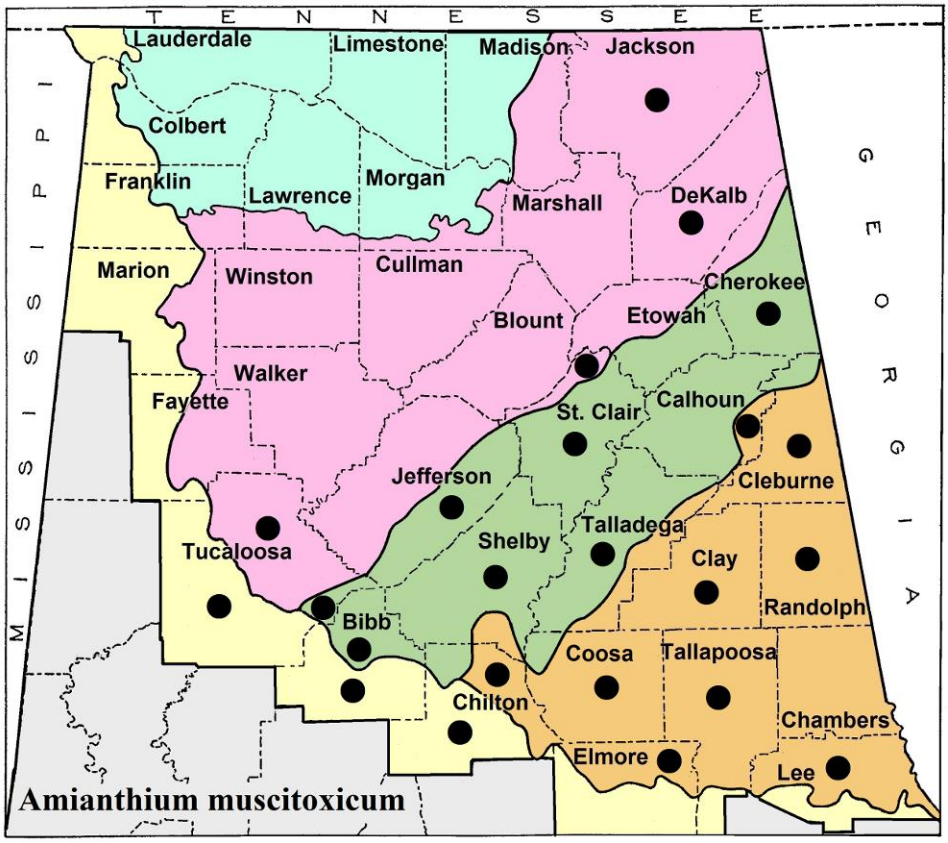

Figure 84. Distribution of *Amianthium muscitoxicum* in northern Alabama.

Figure 85. *Amianthium muscitoxicum*. A. Older flowers, Cleburne Co., Alabama, 14 Jun 2009. B. Red seeds, Cleburne Co., Alabama, 26 Jul 2020. C. Bulb, Cleburne Co., Alabama, 3 May 2020. Photos: Dan Spaulding.

The common names of this species refer to its toxic alkaloids. Losses in livestock, especially cattle, have resulted from consuming its narcotic, grass-like leaves (Marsh et al. 1918). Historically, the bulbs (Fig. 85c) were crushed and mixed with honey or molasses to attract and kill houseflies (Elliott 1821). Cherokee Indians prepared the bulbs as a dermatological relief for itch and poison for crows (Moerman 1998).

2. **MELANTHIUM** Linnaeus 1753

[Greek *melas*, black, and *anthos*, flower; alluding to the black perianth of some species]

Zomlefer et al. (2001) treated *Melanthium* under a broadly defined *Veratrum*. Alan Weakley (pers. comm. 2020) says: "About 20 years ago, there was a big push based on early molecular results to lump *Melanthium* into *Veratrum*, and that was widely followed. But, the latest (and more advanced) molecular results suggest that *Melanthium* is in a clade with *Stenanthium* and *Anticlea*, sister to a clade containing *Veratrum* and *Amianthium* — strongly suggesting that *Melanthium* should be retained as a separate genus."

The two genera are closely related, but Kim et al. (2016) verified that the generic concept of *Veratrum s.l.* (including *Melanthium*) is not supported by evidence; thus, they should be treated as distinct genera. The critical morphological character separating the two genera is that *Melanthium* has stamens fused (adnate) to the tepals, whereas in *Veratrum s.s.* stamens are inserted at the base of the ovary (Bodkin 1978).

1. Tepals abruptly clawed (constricted basally, creating a narrow stalk-like base); tepals light yellow, greenish-white, white, or creamy white (occasionally fading brownish), with a pair of conspicuous, succulent glands near the base; leaves lanceolate, narrowly oblanceolate, or linear (1–7 cm wide).

    2. Tepal blades flat with entire margins, ovate to obovate-oblong (longer than wide), apices tapering to an acute tip; tepal claw short, less than half as long as tepal blade; leaves all linear ..... **Melanthium virginicum**
    2. Tepal blades strongly undulate with crisped margins, orbiculate to rhombic (nearly as wide as long), apices rounded with a short, acuminate tip; tepal claw elongated, more than half as long as tepal blade; leaves lanceolate to narrowly oblanceolate ..... **Melanthium hybridum**

1. Tepals not distinctly clawed (gradually narrowed at the base); tepals greenish-yellow, olive green, purplish maroon, or chocolate brown, with diffuse glandular areas near the base; leaves broadly oblanceolate, elliptic, or obovate (3–14 cm wide).

    3. Tepals greenish to yellowish; ovaries glabrous; tepals with an obscure greenish, glandular area at base..... **Melanthium parviflorum**
    3. Tepals maroon, purplish, or brown above, green below; ovaries densely wooly-pubescent; tepals with distinct bands of dark glandular areas at base..... **Melanthium woodii**

1. Melanthium hybridum Walter {hybrid; from a mixture of fertile and infertile flowers} — CRISPED BUNCHFLOWER; SLENDER BUNCHFLOWER; BROADLEAF BUNCHFLOWER (Fig. 86). [*Melanthium latifolium* Desr.; *Veratrum hybridum* (Walter) Zimmerman *ex* Zomlefer; *Veratrum latifolium* (Desr.) Zomlefer]

Perennial, subscapose herb from a bulb with short, vertical rhizomes. Woodlands, slopes, ravines, longleaf pine savannas, and sandhills. Flowers late June–August, fruits September–October; very rare in the lower Piedmont and upper Coastal Plain (Fig. 87). Native to the eastern USA, ranging from Pennsylvania and western Connecticut, south to east Tennessee and central Alabama, disjunct in the Ozarks of Arkansas (Weakley 2020). Crisped Bunchflower is more common in the Appalachian Mountains north of Georgia and is a critically imperiled (S1) species in Alabama (ALNHP 2020, Kartesz 2020).

Figure 86. *Melanthium hybridum*, Coosa Co., Alabama, 30 Jun 2019. Photos: Brian Finzel.

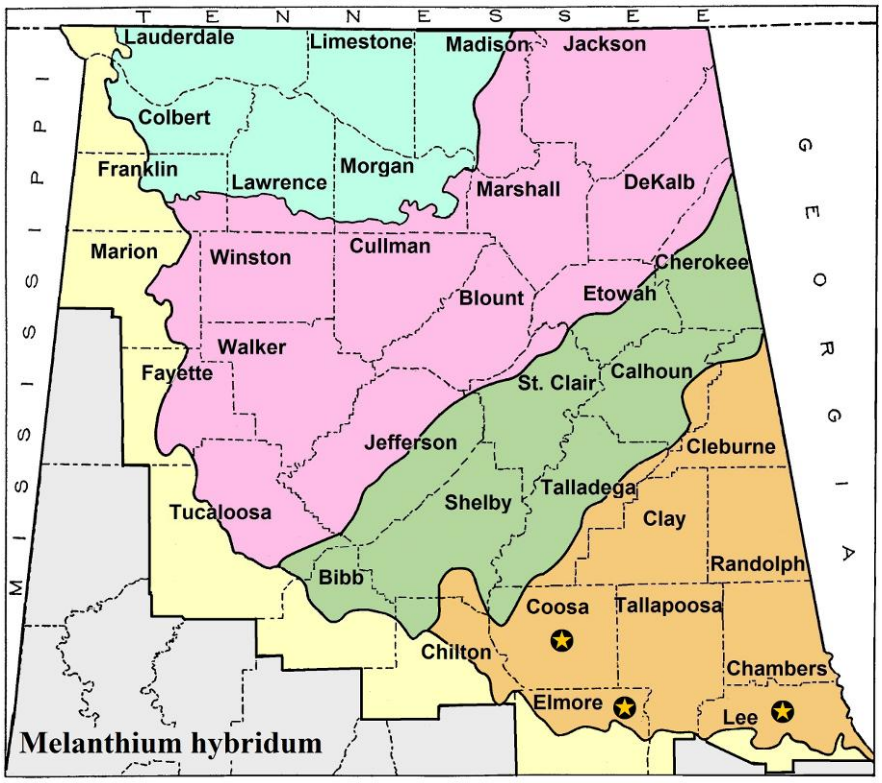

Figure 87. Distribution of *Melanthium hybridum* in northern Alabama.

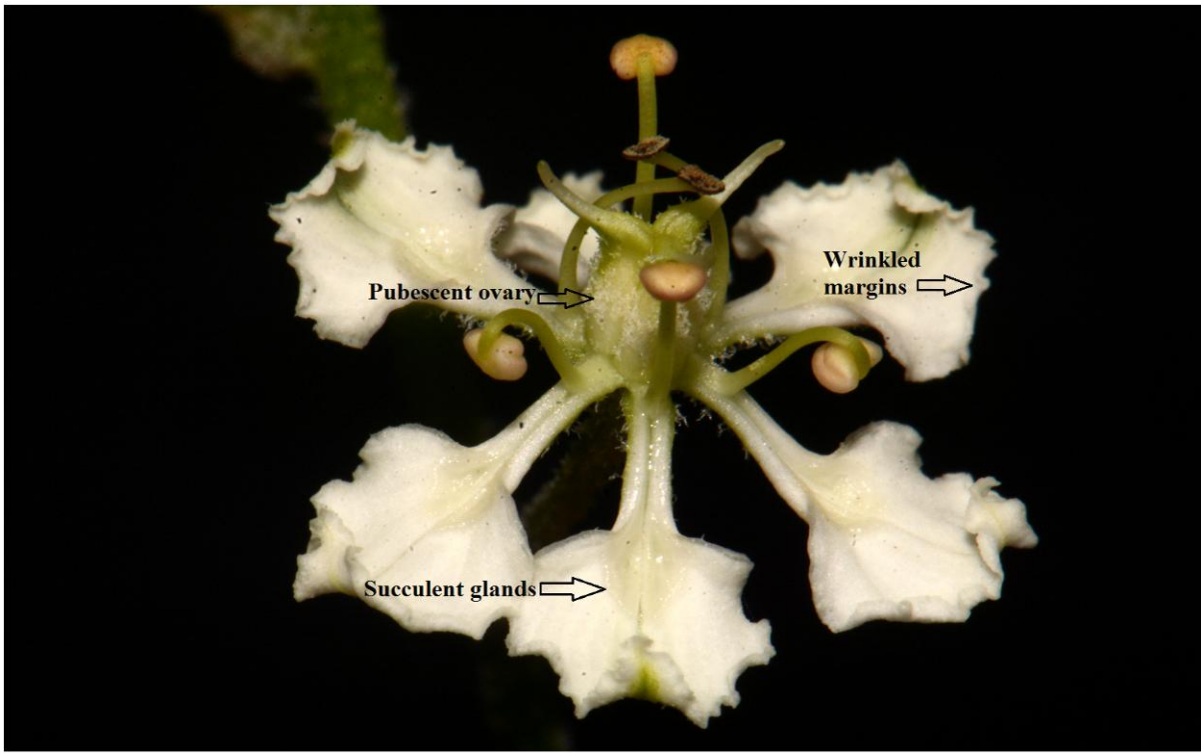

Figure 88. *Melanthium hybridum*, flower close-up, Coosa Co., Alabama, 30 Jun 2019. Photo: Brian Finzel.

Crisped Bunchflower's tepals are similar to Virginia Bunchflower's in that both species have clawed, glandular tepals. However, Crisped Bunchflower differs by having wrinkled or crisped margins (Fig. 88); hence the common name. In some floras (e.g., Bodkin & Utech 2002), this species is treated as *Melanthium latifolium* because the authors considered the name *M. hybridum* misapplied (Bodkin 1978). However, Zomlefer (2012) validated Walter's *M. hybridum* as the correct name for this species, which has priority over *M. latifolium*. Bodkin (1978) rejected Walter's name because of presumed ambiguities in the Latin diagnosis, which he based on a 1946 reprint edition of *Flora Caroliniana* with handwritten annotations by other botanists. However, in the original publication (Walter 1788), the botanical description referred to the Crisped Bunchflower (Zomlefer 2012).

2. Melanthium parviflorum (Michx.) S. Watson {small-flowered} — MOUNTAIN BUNCHFLOWER APPALACHIAN BUNCHFLOWER; SMALLFLOWER FALSE HELLEBORE (Fig. 89). [*Veratrum parviflorum* Michx.]

Perennial, subscapose herb from a bulb with short, vertical rhizomes. Rich woods and riparian zones of creeks and streams. Flowers July–September, fruits August–October; rare in the Cumberland Plateau; very rare in the Ridge & Valley and Piedmont (Fig. 90). A southern Appalachian endemic, ranging from West Virginia and Virginia, south to east Tennessee, and northeast Alabama (Weakley 2020). It is likely a critically imperiled (S1S2) species in Alabama (ALNHP 2020).

Melanthium parviflorum, like other species within the genus, is toxic due to poisonous alkaloids (Zomlefer 1997). In Georgia, two hikers consumed the plant, thinking it was a wild leek, and exhibited nausea, vomiting, hypotension, and bradycardia (Anwar et al. 2018). Nonetheless, White-tailed Deer (*Odocoileus virginianus*) are commonly known to browse the entire inflorescence without ill effect (Bodkin 1978).

Figure 89. *Melanthium parviflorum*, DeKalb Co., Alabama, 10 Aug 2019. Photos: Brian Finzel.

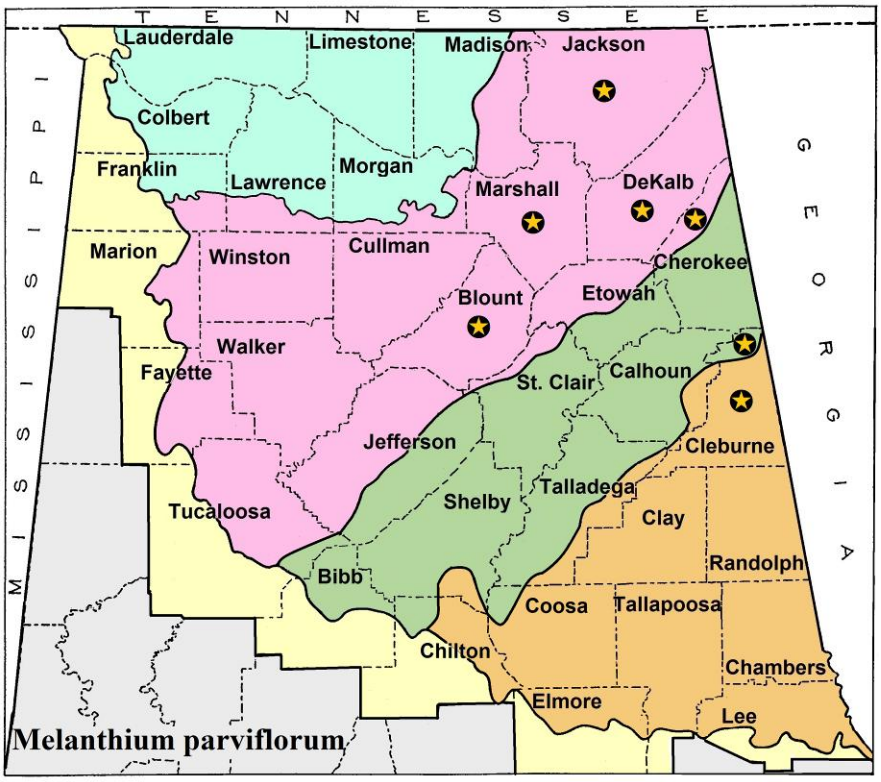

Figure 90. Distribution of *Melanthium parviflorum* in northern Alabama.

3. Melanthium virginicum L. {Virginian} — VIRGINIA BUNCHFLOWER; BOG BUNCHFLOWER; BUNCH-LILY (Fig. 91). [*Melanthium dispersum* Small; *Veratrum virginicum* (L.) W.T. Aiton]

Figure 91. *Melanthium virginicum*, Sumter Co., Alabama, 25 Jul 2014. Photos: Brian Finzel.

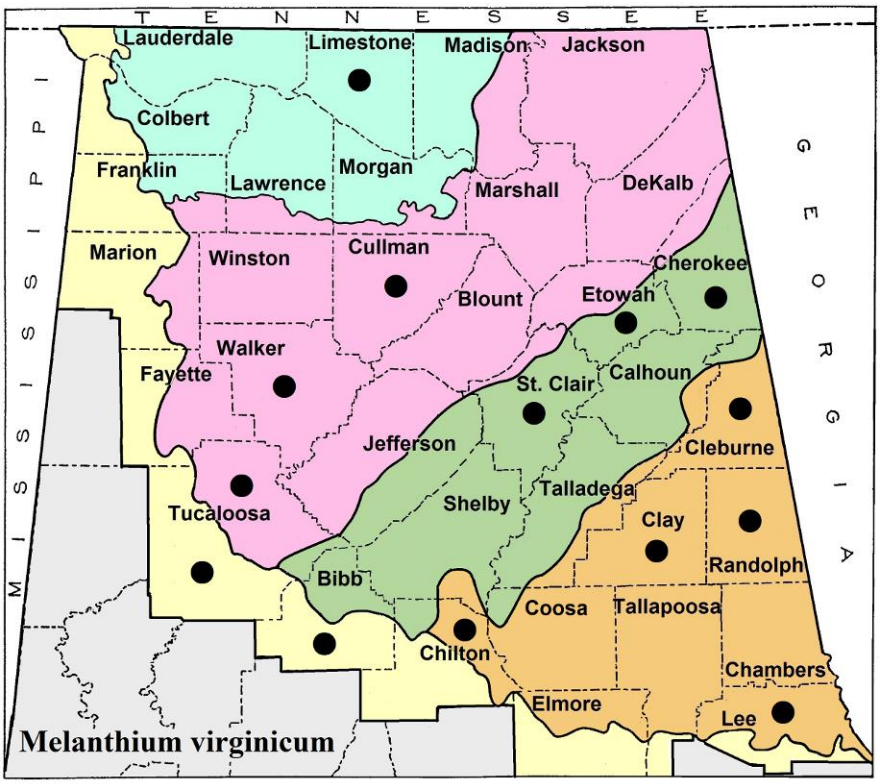

Figure 92. Distribution of *Melanthium virginicum* in northern Alabama.

Perennial, subscapose herb from a bulb with short, vertical rhizomes. Wet woods, swamps, roadside ditches, alluvial woods, seeps, bogs, and wet pine savannas. Flowers late May–August, fruits August–October; very rare in the Highland Rim; rare in the Cumberland Plateau, Ridge & Valley, Piedmont, and Coastal Plain (Fig. 92). Native to the eastern USA, from Iowa to southern New York, south to Florida, and west to eastern Texas (Kartesz 2020).

Figure 93. *Melanthium virginicum* older flower, Sumter Co., Alabama, 25 Jul 2014. Photo: Brian Finzel.

Virginia Bunchflower has linear, grass-like leaves and clawed, creamy-white tepals that turn greenish or reddish as they age (Fig. 93). This color change may signal pollinators to visit viable "pre-change" flowers (Weiss & Lamont 1997). *Melanthium virginicum* is toxic to both humans and livestock. In the Southeast, horses, cattle, and sheep poisonings have been reported following the consumption of hay containing this plant (Kingsbury 1964).

4. Melanthium woodii (J.W. Robbins ex Wood) Bodkin {named in honor of Alphonso Wood, 1810–1881, American botanist} — WOOD'S BUNCHFLOWER; OZARK BUNCHFLOWER; WOOD'S FALSE HELLEBORE (Fig. 94). [*Veratrum intermedium* Chapm.; *Veratrum woodii* J.W. Robbins ex Wood]

Perennial, subscapose herb from a bulb with short, vertical rhizomes. Mixed woods often in calcareous soils. Flowers July–September, fruits September–October; very rare in the Cumberland Plateau, Ridge & Valley, and Coastal Plain (Fig. 95). It primarily occurs in the central USA, with scattered populations in the Southeast (Kartesz 2020). ALNHP (2020) lists *Melanthium woodii* as a critically imperiled (S1) species in Alabama.

Wood's Bunchflower flowers sporadically, with some populations often including numerous sterile plants (Bodkin & Utech 2002). This condition might be related to the quantity of precipitation since flowering tends to increase after heavy rainfall in spring and summer (Ebinger 1996). It is challenging to separate sterile *Melanthium woodii* from *M. parviflorum* because both species have broad, slightly plicate (ridged) leaves with distinct petioles. The leaf blades of *M. woodii* are elliptic to oblanceolate (Fig. 96a), while those of *M. parviflorum* are broadly oblanceolate to obovate (Bodkin & Utech 2002). Wood's Bunchflower is easy to identify when in flower because of its maroon tepals and pubescent ovaries (Fig. 96b). However, its tepals often turn green with age (Kral 1983), so one should examine ovaries in mature flowering plants. Overall, *M. woodii* has a more robust habit, with stouter inflorescences and larger flowers than *M. parviflorum* (Zomlefer 1997).

Figure 94. *Melanthium woodii*, Madison Co., Alabama, 2 Aug 2019. Photos: Brian Finzel.

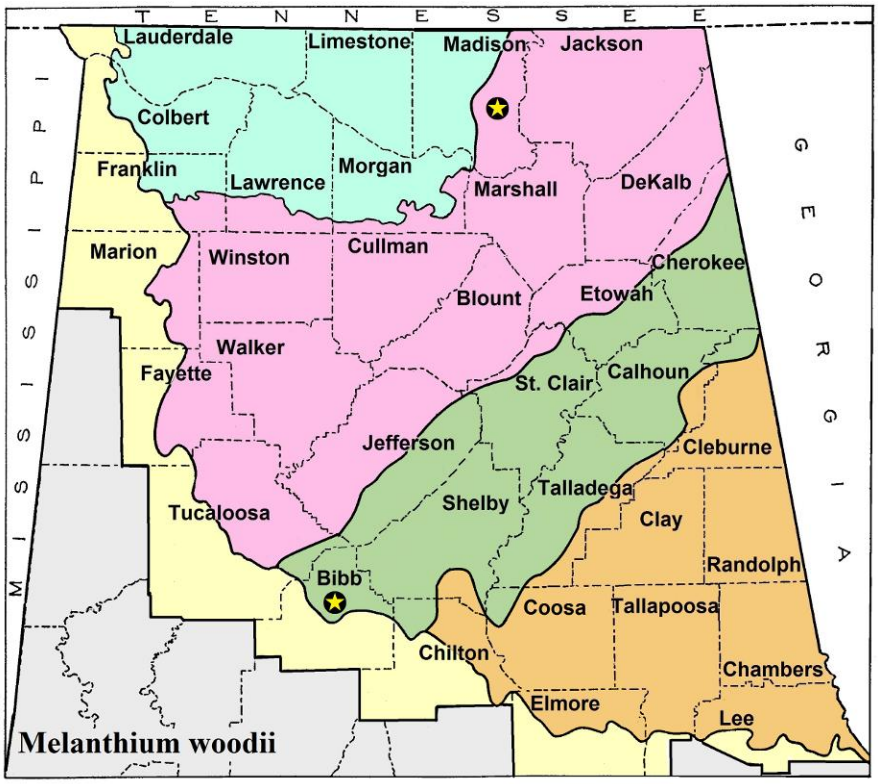

Figure 95. Distribution of *Melanthium woodii* in northern Alabama.

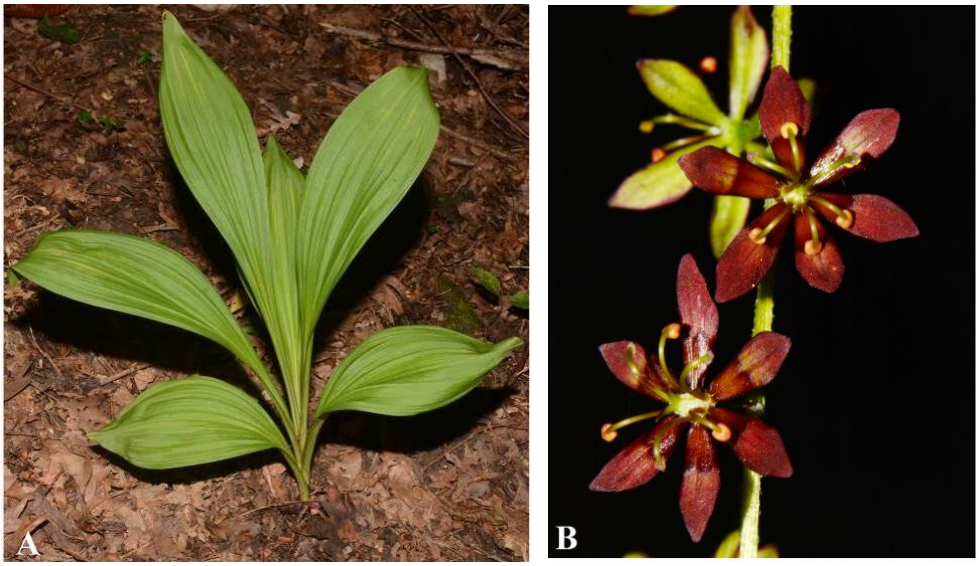

Figure 96. *Melanthium woodii*, Madison Co., Alabama. A. Basal leaves earlier in the season, 14 Jul 2019. B. Flowers (tepals green underneath and maroon above), 2 Aug 2019. Photos: Brian Finzel.

3. STENANTHIUM (A. Gray) Kunth 1843

[Greek *stenos*, narrow, and *anthos*, flower; alluding to the narrow tepals]

1. Stenanthium gramineum (Ker-Gawl.) Morong {grass-like} — EASTERN FEATHERBELLS; FEATHERFLEECE; COMMON FEATHERBELLS (Fig. 97). [*Stenanthium gramineum* var. *micranthum* Fernald; *Stenanthium gramineum* var. *robustum* (S. Watson) Fernald; *Stenanthium robustum* S. Watson]

Figure 97. *Stenanthium gramineum*, Cleburne Co., Alabama, 4 Aug 2019. Photos: Dan Spaulding.

Perennial, subscapose herb from bulbs with reduced rhizomes. Mixed upland woods, calcareous woods, pine forests, roadbanks, ravines, alluvial woods, mesic slopes, seeps, and bogs. Flowers late May–September, fruits late July–early November; rare in the Cumberland Plateau and Coastal Plain; uncommon in the Ridge & Valley and Piedmont (Fig. 98). Native to the eastern USA, from Missouri to New York south to eastern Texas and Florida (Kartesz 2020).

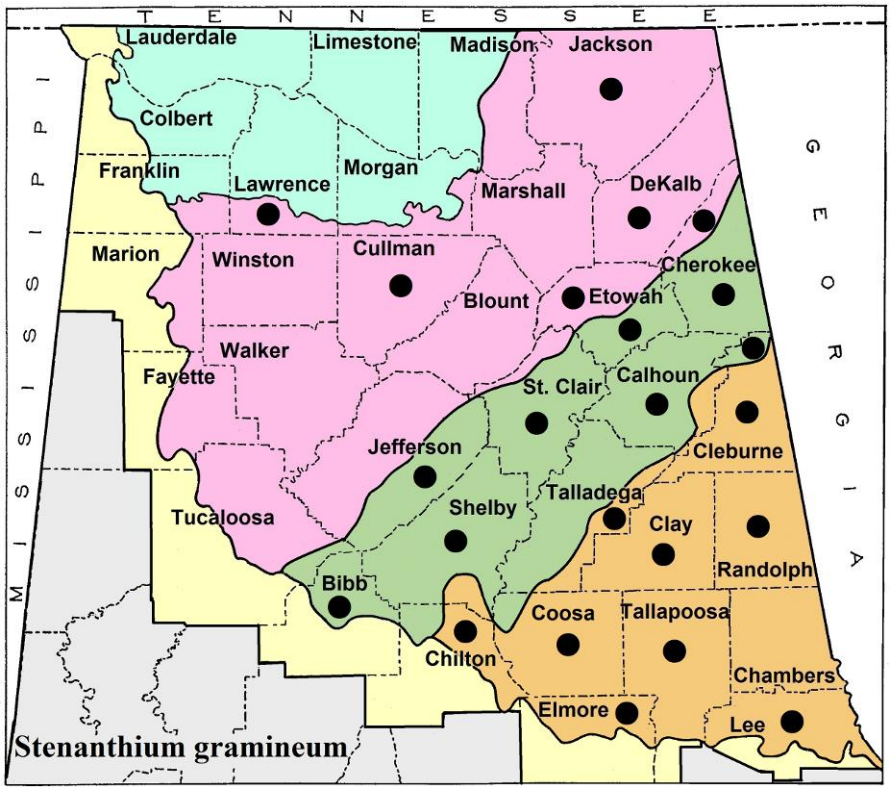

Figure 98. Distribution of *Stenanthium gramineum* in northern Alabama.

Figure 99. *Stenanthium gramineum*. A. Creamy-white tepals, Cleburne Co., Alabama, 4 Aug 2019. Photo: Dan Spaulding. B. Greenish tepals, Dade Co., Georgia, 30 May 2015. C. Older tepals tinged with red (with maturing fruit), DeKalb Co., Alabama, 21 Jul 2009. Photos: Brian Finzel.

Stenanthium gramineum has grass-like leaves and a branched, smooth inflorescence with white to greenish-yellow flowers (Fig. 99a–b). Its tepals are clawless, lack glands, and often become tinged with red later in the season when fruiting (Fig. 99c). According to Shosteck (1974), the common names for this plant are derived from the "much-branched flower stalk, bearing tiny flowers, which give it a feathery appearance."

Fernald (1946) recognized three varieties of *Stenanthium gramineum* based on the size of the stem, inflorescence, and flowers. Zomlefer (1997) only recognized a single, variable species, stating that "the varieties are probably unworthy of taxonomic recognition." Utech (2002i) said they "are indistinct and sympatric," and Weakley (2015) indicated that "the characters of putative taxa seem to be variable and overlapping, and the putative taxa have broadly overlapping distributions." However, Weakley (2020) now recognizes *S. gramineum* var. *robustum* (S. Watson) Fernald [Giant Featherbells] as a valid variety. Kral et al. (2011) included this variety in the Alabama checklist, but Keener et al. (2020) does not include any varieties. Giant Featherbells is more robust than *S. gramineum* var. *gramineum*, inhabiting sphagnous bogs and swamps, and is known to occur in the Cumberland Plateau of northeast Alabama. Plants are 12–20 dm tall, with tepals 5–10 mm long, and capsules 9–10 mm long. This paper treats *S. gramineum* as one variable species, but the robust variety may warrant recognition after additional study.

Stenanthium leimanthoides (Gray) Zomlefer & Judd [Pinebarren Death-Camas] was reported for northern Alabama (Morris 2012). These reports were based on erroneously identified specimens of two distinct species, *S. texanum* (Bush) Sorrie & Weakley and *S. tennesseense* Sorrie & Weakley, within the *S. leimanthoides-densum* complex (Sorrie & Weakley 2017). Their 2017 paper treated *Stenanthium texanum* as *S. macrum*, later determined to be an illegitimate name (Weakley et al. 2018). *Stenanthium tennesseense* and typical *S. leimanthoides* occur north of our state, but the former species occurs in Franklin County, Tennessee, adjacent to Jackson County, Alabama. See Sorrie & Weakley (2017) for a key to the species, distinguished mainly by basal sheath coloration, presence or absence of basal fibers, and unique characteristics of their inflorescence.

9. ALSTROEMERIACEAE (Peruvian-Lily Family) – in LILIALES

1. ALSTROEMERIA Linnaeus 1762

[Named for Clas Alströmer, 1736–1794, Swedish naturalist and pupil of Linnaeus]

1. Alstroemeria pulchella L. f. {pretty} — PERUVIAN-LILY; PARROT-LILY; PARROT-FLOWER; LILY-OF-THE-INCAS (Fig. 100). [*Alstroemeria brasiliensis* auct. non Spreng.; *Alstroemeria psittacina* auct. non Lehm.]

Perennial herb from fascicles of tubers. Suburban forests, roadsides, vacant lots, pastures, clear-cuts, ditches, and other disturbed areas. Flowers April–June; very rare in northern Alabama; uncommon in Coastal Plain (Fig. 101). A native of southeast Brazil, Paraguay, and northeast Argentina (Sanso 1996). It is naturalized in Australia, New Zealand, and the USA, chiefly along the Coastal Plain from South Carolina to Florida, west to eastern Texas (Assis 2012, Kartesz 2020).

Alstroemeria is the largest genus in the family, consisting of about 60 species, all endemic to South America (Sarwar et al. 2010). Several species and hybrids are commercially cultivated as ornamental plants and cut flowers (Holmes 2002a). Only one species (Peruvian-Lily) is known to escape cultivation in North America. Historically, our naturalized plant was recognized as *A. psittacina* (Bailey & Bailey 1976). Most modern floras treat it as *A. pulchella* (Holmes 2002a, Weakley 2020); however, some authors believe the name *A. pulchella* has been misapplied, and the correct name should be *A. psittacina* (Sanso 1996; Assis 2012).

Figure 100. *Alstroemeria pulchella*. A. Flowers, Mobile Co., Alabama, 19 May 2019. Photo: Amy Ferguson. B. Leaves on immature plants, Barbour Co., Alabama, 16 Dec 2018. Photo: Alvin Diamond.

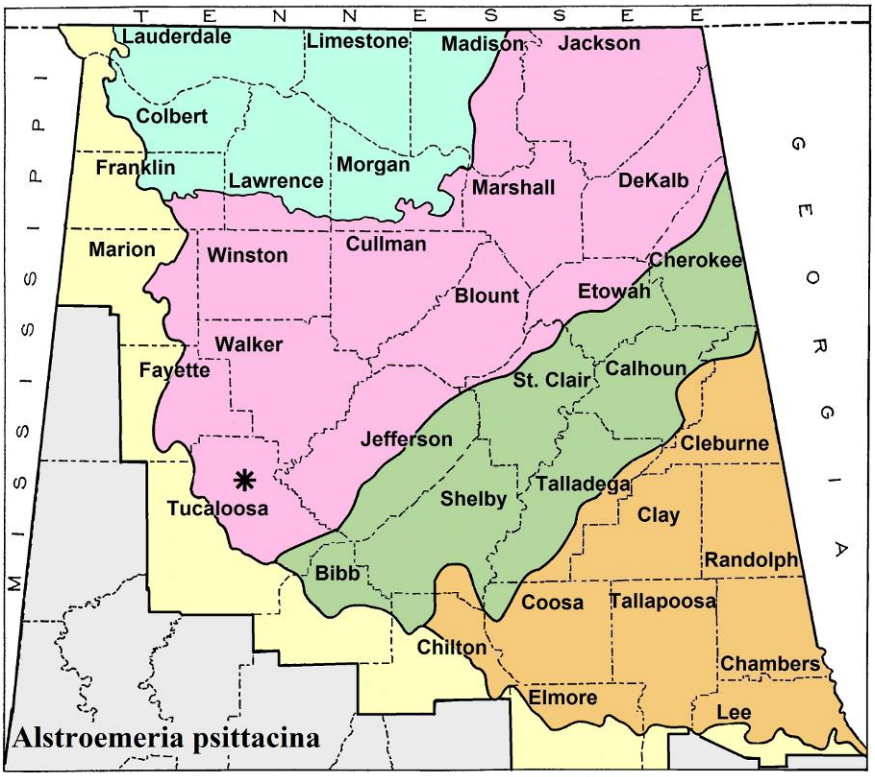

Figure 101. Distribution of *Alstroemeria pulchella* in northern Alabama.

10. COLCHICACEAE (Meadow-Saffron Family) – in LILIALES

1. UVULARIA Linnaeus 1753

[Latin *uvula*, alluding to flowers hanging like the organ in the back of the mouth]

1. Leaves sessile, narrowed basally, margins minutely papillose-denticulate (with tiny, rounded teeth); upper stems angled and solid; capsule ellipsoid, acute at the summit; rhizomes elongate (10–15 cm long), bearing fibrous roots..... **Uvularia sessilifolia**
1. Leaves perfoliate (surrounding stem), margins smooth; upper stems rounded and hollow; capsule obovoid or obpyramidal, truncate to rounded at the summit; rhizomes short (ca. 1 cm long), bearing fleshy roots.

    2. Tepals conspicuously granular-papillose on inner surface; leaves glabrous and glaucous beneath; mature capsule angularly obpyramidal, deeply grooved (bifid) between lobes, forming two dorsal ridges with tapering beaks (these distinguishing features are often lost in pressed specimens)..... **Uvularia perfoliata**
    2. Tepals smooth on the inner surface (pollen grains can mimic papillae); leaves typically minutely white-pubescent beneath, occasionally glabrous with the surface being pale green or white-dotted (not glaucous); mature capsule roundly obpyramidal, only shallowly grooved between lobes (capsule not deeply lobed nor 2-horned)..... **Uvularia grandiflora**

1. Uvularia grandiflora J.E. Sm. {large-flowered} — LARGE-FLOWER BELLWORT; FAIRY-BELLS; BIG MERRYBELLS (Fig. 102).

Figure 102. *Uvularia grandiflora*, Lawrence Co., Alabama, 27 Mar 2017. Photos: Helen A. Czech.

Perennial herb from rhizomes. Rich woods, mesic ravines, and cove forests. Flowers March –early May, fruits April–July; uncommon in the Highland Rim and Cumberland Plateau (Fig. 103). Native to the eastern and central USA and adjacent Canada, ranging from Ontario to Quebec south to northern Georgia and eastern Oklahoma (Kartesz 2020).

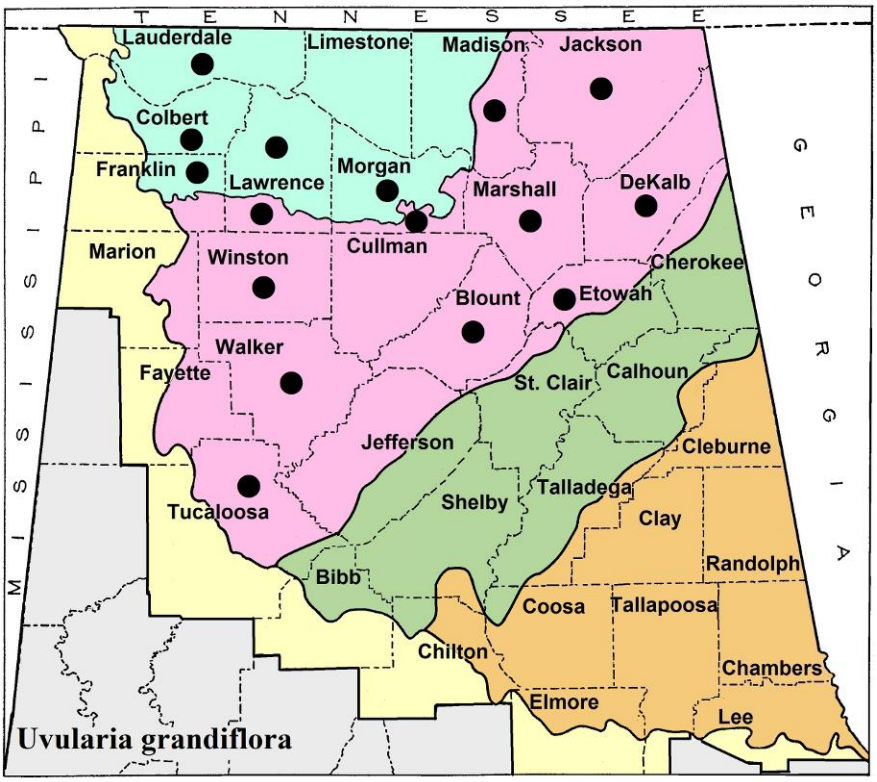

Figure 103. Distribution of *Uvularia grandiflora* in northern Alabama.

Sterile plants of *Uvularia grandiflora* and *U. perfoliata* are morphologically similar. The leaves of *U. perfoliata* are always glabrous beneath, whereas those of *U. grandiflora* are typically pubescent beneath (Fig. 104a). However, glabrous forms of *U. grandiflora* do occur. Some authors (Wilbur 1963, Weakley 2020) suggest that the number of leaves below the lowest branch of the inflorescence aids in separating the two species, but this character is unreliable.

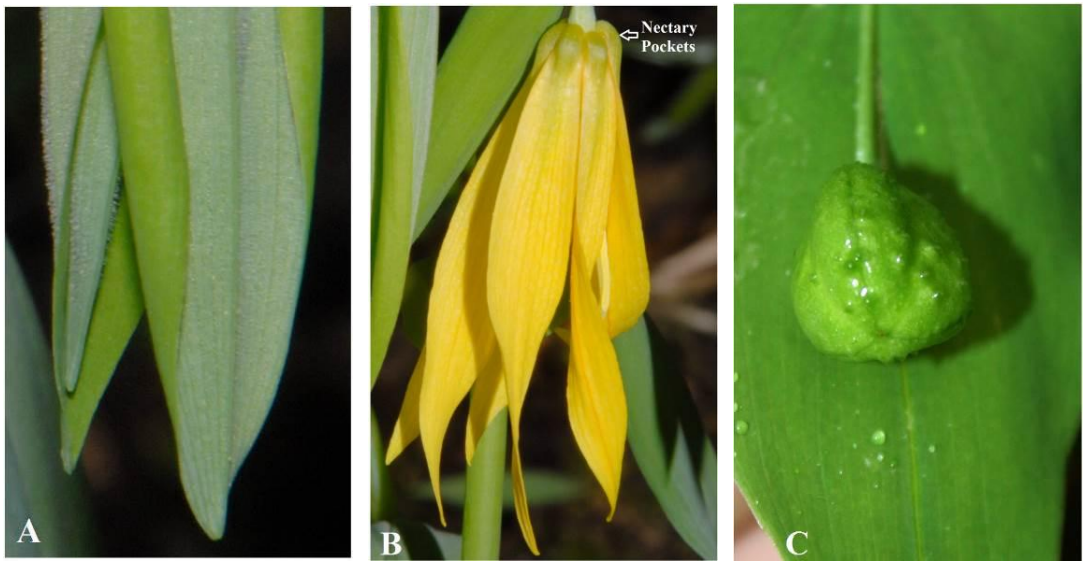

Figure 104. *Uvularia grandiflora*. A–B. Morgan Co., Tennessee, 13 Apr 2009, (A) leaves hairy beneath, (B) tepals smooth. Photos: Brian Finzel. C. Fruit, Lawrence Co., Alabama, 28 Apr 2020. Photo: Kevin England.

Large-Flower Bellwort is relatively easy to identify when in flower or fruit. Its tepals are entirely smooth (Fig. 104b) rather than granular-papillose, and its capsule lobes are broadly rounded and lack deep grooves (Fig. 104c). Medium-sized bees pollinate flowers of *U. grandiflora* (Meier et al. 2020), likely attracted by the nectary pockets (Fig. 104b) found near the base of the tepals (Wilbur 1963).

2. Uvularia perfoliata L. {perfoliate; the leaves} — PERFOLIATE BELLWORT; MEALY BELLWORT; DWARF MERRYBELLS; STRAW-BELL (Fig. 105).

Figure 105. *Uvularia perfoliata*, Monroe Co., Alabama, 9 Mar 2020. Photos: Eric Soehren.

Perennial herb from rhizomes. Mixed woods, ravine slopes, hardwood forests, wooded bluffs, and roadbanks. Flowers March–April, fruits April–August; frequent throughout Alabama (Fig. 106). Native to eastern North America, ranging from New Hampshire, southern Ontario, and central Ohio, south to the Panhandle of Florida and eastern Texas (Kartesz 2020).

Uvularia perfoliata tepals have distinctively granular-roughened inner surfaces (Fig. 107a), unique within the genus. Its leaves are always glabrous and glaucous underneath (Fig. 107b). Its fruit differs from *U. grandiflora* by having more angular, deeply grooved lobes, making capsules appear 6-horned or winged (Fig. 107c). Flightless rove beetles (Staphylinidae) pollinate the flowers, and ants disperse the seeds, which contain edible fleshy arils (Whigham 1974). Perfoliate Bellwort has short rhizomes with clusters of fleshy roots and 1 or 2 elongate stolons (Fig. 108). It reproduces asexually by the slender subterranean stolons, which soon disintegrate after new plants form (Wilbur 1963).

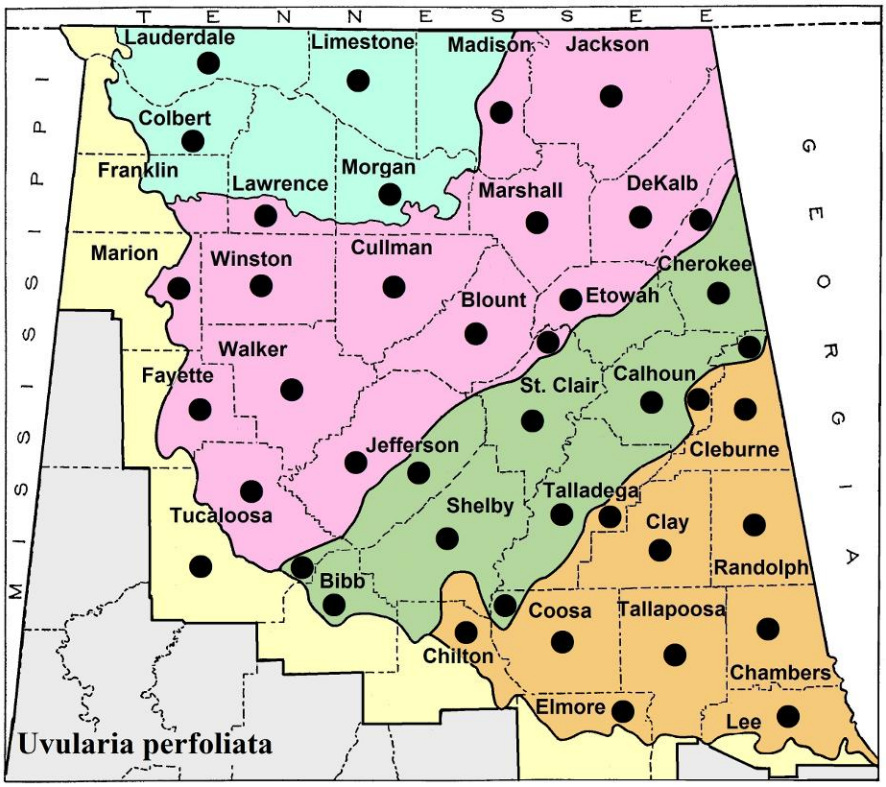

Figure 106. Distribution of *Uvularia perfoliata* in northern Alabama.

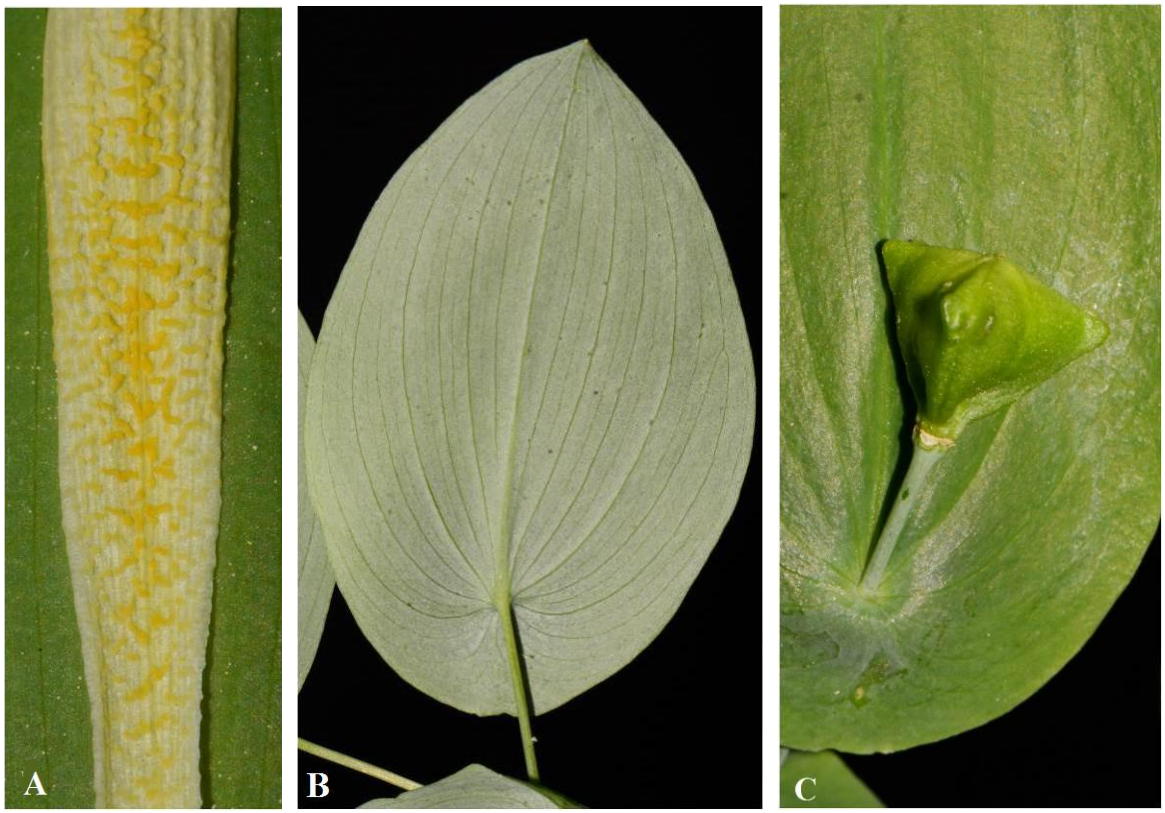

Figure 107. *Uvularia perfoliata*. A. Leaf undersurface, Cleburne Co., Alabama, 19 May 2019. B. Tepal, DeKalb Co., Alabama, 11 Apr 2015. C. Fruit, Cleburne Co., Alabama, 19 May 2019. Photos: Brian Finzel.

Figure 108. *Uvularia perfoliata*, Tuscaloosa Co., Alabama, 14 May 2020. Photo: Dan Spaulding.

According to the Doctrine of Signatures, since its flowers resemble the fleshy uvula hanging in the back of the human throat, the plant was believed to cure throat ailments (Martin 1988). Cherokee Indians ate the plants after being boiled or fried with fat (Moerman 1998).

3. Uvularia sessilifolia L. {sessile leaves} — SESSILE-LEAF BELLWORT; SMALL BELLWORT; SESSILE BELLWORT; STRAW-LILY; WILD-OATS (Fig. 109). [*Oakesiella sessilifolia* (L.) S. Watson]

Figure 109. *Uvularia sessilifolia*, Cleburne Co., Alabama, 28 Mar 2020. Photos: Dan Spaulding.

Perennial herb from rhizomes. Alluvial woods, mixed woods, moist slopes, deciduous forests, rich woods, damp roadbanks, swamps, bottomland forests, and moist wooded bluffs. Flowers March–April, fruits April–August; frequent throughout Alabama (Fig. 110). Native to eastern and central North America, from Manitoba and North Dakota east to Nova Scotia and Maine, south to northern Florida and eastern Texas (Kartesz 2020).

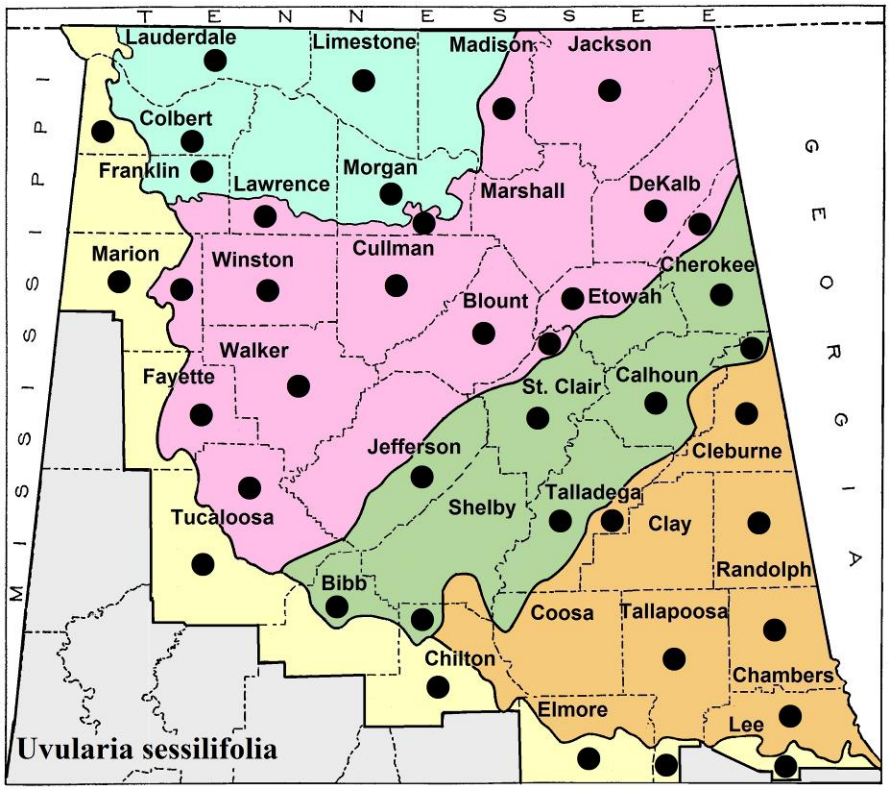

Figure 110. Distribution of *Uvularia sessilifolia* in northern Alabama.

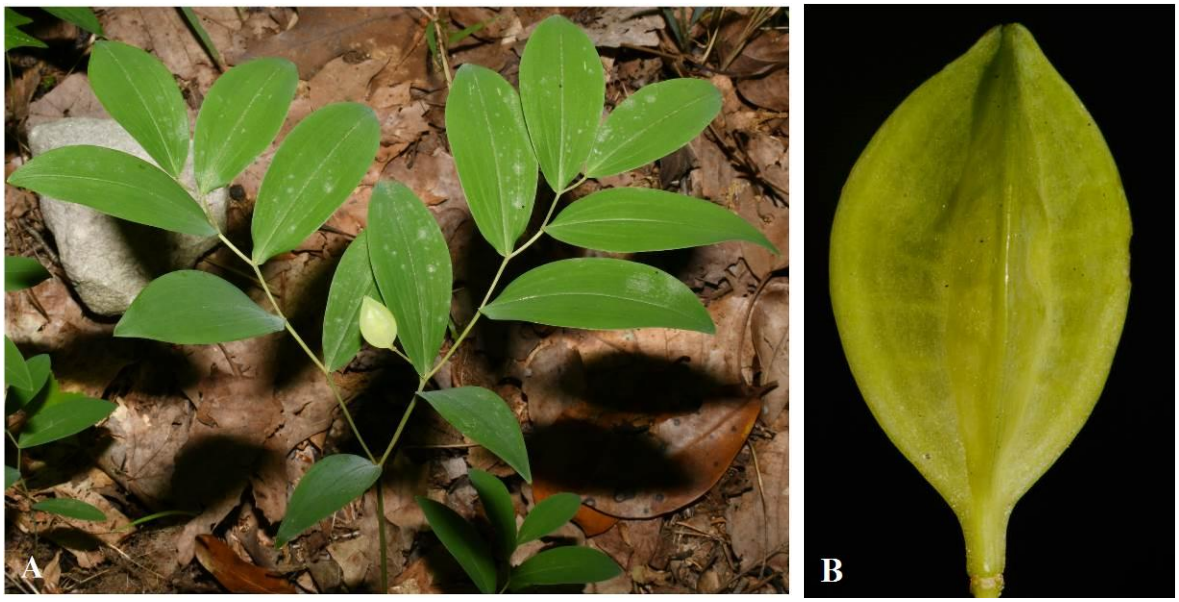

Figure 111. *Uvularia sessilifolia*. A. Fruiting Plant, Madison Co., Alabama, 15 May 2020. B. Capsule, Hamilton Co., Tennessee, 22 May 2019. Photos: Brian Finzel.

Young shoots of Sessile-Leaf Bellwort can be eaten like asparagus (Coffey 1993). Cherokee Indians ate the leaves as cooked greens and made an infusion from the root to combat diarrhea (Moerman 1998). *Uvularia sessilifolia* is easily distinguished from other bellworts in northern Alabama by its sessile, non-perfoliate leaves; hence the common name. This character becomes most apparent when leaves fully expand after flowering (Fig. 111a). Other differences include angled upper stems (vs. rounded), leaf margins with tiny teeth (vs. smooth), and ellipsoid fruit with an acute apex (Fig. 111b). Capsules are often hidden underneath leaves and not easily observed.

A similar species, *Uvularia floridana* Chapm. [Florida Bellwort] is found on the Coastal Plain from South Carolina to Mississippi (Kartesz 2020). It is occasionally mistaken for *U. sessilifolia*, but Florida Bellwort has a leafy bract at the base of its flowering-branchlet, tepals with acuminate tips, and sessile to subsessile capsules with a long, pointed beak (Utech & Kawano 2002).

11. SMILACACEAE (Greenbrier Family) – in LILIALES

1. SMILAX Linnaeus 1753

[Ancient Greek name of an evergreen oak; possibly alluding to evergreen leaves of some species]

1. Stem annual and herbaceous, lacking prickles; inflorescence on long peduncles usually > 4 cm long.

    2. Plants erect, short herbs, up to 1 m tall; leaves few (< 15); tendrils absent or rudimentary and short; inflorescences (if present) usually few, mostly 1–4, the majority arising from bract axils on the stem.

        3. Plant with flowers or fruit; leaves pubescent beneath ..... **Smilax hugeri**
        3. Plant sterile (juveniles); leaves glabrous or pubescent beneath.

            4. Undersurface of leaves glabrous ..... **Smilax herbacea**
            4. Undersurface of leaves pubescent.

                5. Leaves dark green beneath (similar to the upper surface) ..... **Smilax pulverulenta**
                5. Leaves glaucous or pale green beneath (paler than upper surface).

                    6. Leaf blades oblong, oblong-ovate, or occasionally oval ..... **Smilax hugeri**
                    6. Leaf blade mostly ovate..... **Smilax lasioneura**

    2. Plants climbing or sprawling vines, 1 to 3 m tall; leaves numerous (> 20); tendrils numerous and well-developed; inflorescences on older plants usually more than 10, arising primarily from leaf axils, rarely from bract axils on stem. [Note: young flowering individuals are shorter and have fewer leaves and umbels, but functional tendrils will be present].

        7. Undersurface of leaves glabrous and usually glaucous (at least when fresh); mature fruit blue (and glaucous) ..... **Smilax herbacea**
        7. Undersurface of leaves minutely pubescent (at least on prominent veins) and dark or pale green (but hairs are often whitish); mature fruit black, blue, or bluish-black.

            8. Leaves pale green and dull beneath (distinctly paler than upper surface); peduncle typically (3-) 5–10× as long as the petioles; berries glaucous..... **Smilax lasioneura**
            8. Leaves dark green and shiny beneath (similar to the upper surface); peduncle typically 1–3× as long as subtending petioles; berries not glaucous..... **Smilax pulverulenta**

1. Stem perennial and woody, usually armed with prickles (absent in *S. pumila*); inflorescence on relatively short peduncles, usually < 4 cm long (1.5–6.5 cm in *S. hispida* & *S. bona-nox*).

    9. Leaves densely tomentose beneath; stems tomentose prickles absent; plant trailing or ascending, rarely more than 0.5 m tall; berries red with a pointed tip ..... **Smilax pumila**
    9. Leaves glabrous or papillate beneath; stems glabrous or stellate-scurfy, prickles present (at least basally); plant climbing, ascending, or trailing, mature plants typically well over 0.5 m tall; berries black, dark blue, or red with a blunt or pointed tip.

        10. Lower surface of the leaves white to bluish-gray and densely papillate (leaves occasionally turning brown when dried, but papillae remain evident)..... **Smilax glauca**
        10. Lower surface green to pale green, not papillate (mostly glabrous below, but may have a few small teeth or spines on principal veins).

            11. Leaf blades mostly lanceolate or oblong; leaf bases usually tapering (cuneate to attenuate), occasionally rounded; leaves evergreen; flowers July–August; berries ripening the following summer or fall; plants high climbers (to 20 meters) with lower stem often more than 1.5 cm in diameter.

                12. Leaves thin, lanceolate, elliptic-lanceolate, lanceolate-ovate, usually ascending, but not erect; blade with five main veins at base, midvein on the undersurface barely more prominent than the lateral veins; leaf surface distinctly reticulate between main veins; prickles concentrated on lower stems usually with few to none upward; berries rounded at apex, mostly 2-seeded..... **Smilax smallii**
                12. Leaves thick, oblong, oblong-elliptical, or oblong-linear, often erect; blade with three main veins at base, midvein on the undersurface conspicuously elevated and more prominent than the lateral veins; leaf surface scarcely reticulate between main veins; prickles numerous on lower stems and upper stems; berries often pointed at apex, 1-seeded ..... **Smilax laurifolia**

            11. Leaf blades mostly ovate, ovate-lanceolate, ovate-oblong, suborbicular, or hastate; leaf bases rounded, truncate, or cordate (occasionally cuneate at petiole insertion); usually semi-evergreen or deciduous; flowers April–June; berries ripening the same year or later in the fall/winter (*S. walteri*); plants low to medium climbers (to 7 meters) with lower stem usually less than 1.5 cm in diameter.

                13. Prickles abundant on lower stem, typically thin and needle-like, scarcely broader at the base, many are shiny brown or black (prickles few or absent on upper stems); leaf margins minutely fimbriate or serrulate with many small, tooth-like projections (at least in the lower half of blade); peduncles longer than the subtending petioles; leaves drying a dull, ashy green..... **Smilax hispida**
                13. Prickles scattered along stem, broad-based, claw-like or awl-like (subulate), pale or only dark-tipped; leaf margins smooth, prickly (spinulose-ciliate), or with a few scattered tooth-like projections; peduncles longer or shorter than the subtending petioles; leaves drying tan, pale green, brownish-green, or orange-tinted brown.

14. Leaf margin thickened with a cartilaginous band, appearing as prominent marginal vein (often poorly developed in young or shade leaves); leaves semi-evergreen, solid green or variegated with white and pale green blotches; leaf blade broadly ovate, lanceolate-ovate, hastate, or pandurate (fiddle-shaped); petiole green; leaf margins entire or spinulose; lower stem frequently whitish scurfy-stellate; peduncle longer than petiole of subtending leaf (1.5–6.5 cm long); berries 1-seeded; rhizomes tuberous and spiny..... **Smilax bona-nox**

14. Leaf margin thin, lacking a prominent, thickened band; leaves deciduous or tardily deciduous, solid green; leaf blade ovate, suborbicular, ovate-oblong, or ovate-lanceolate; petiole green or red; leaf margins smooth or with a few tiny teeth (tooth-like projections), not spinulose; lower stems and prickles glabrous; peduncle shorter or a little longer than petiole of subtending leaf (0.5–2 cm long); berries with 2–4 seeds; rhizomes not tuberous or spiny.

    15. Leaf blades mostly broadly ovate to suborbicular, margins often with scattered, flattish, tooth-like projections; berries ripening in spring or summer, black or bluish-black; prickles stout (up to 12 mm long), found on main stems and branches; leaves usually drying pale to brownish green; plant of wet to dry sites from a variety of upland and lowland habitats ..... **Smilax rotundifolia**

    15. Leaf blades usually ovate-lanceolate to ovate-oblong, margins completely entire; berries ripening in fall or winter, bright orange-red or scarlet; prickles slender (up to 4 mm long), located chiefly on the lower stem; leaves drying orange-tinted brown; plant of swamps, bogs, and other wetlands (often in mud or shallow water)..... **Smilax walteri**

1. Smilax bona-nox L. var. **bona-nox** {good-night} — SAW GREENBRIER; FRINGED GREENBRIER; BULLBRIER; TRAMP'S-TROUBLE; CATBRIER (Fig. 112). [*Smilax bona-nox* var. *exauriculata* Fernald; *Smilax bona-nox* var. *hastata* (Willd.) A. DC.; *Smilax bona-nox* var. *hederifolia* (Bey.) Fernald]

Figure 112. *Smilax bona-nox*. A. Variegated leaf form, fence row, Chilton Co., Alabama, 30 Apr 2020. B. Solid green leaf form, woodland border, Calhoun Co., Alabama, 5 Feb 2020. Photos: Dan Spaulding.

Woody, semi-evergreen vine from tuberous, stoloniferous rhizomes. Mixed woods, pine forests, alluvial woods, low woods, woodland borders, thickets, fencerows, pastures, prairies, glades, old fields, roadsides, landscaped beds, and other disturbed sites. Flowers April–June, fruits June –December; common throughout Alabama (Fig. 113). Native to the central and southeastern USA, West Indies, and Mexico (Holmes 2002b).

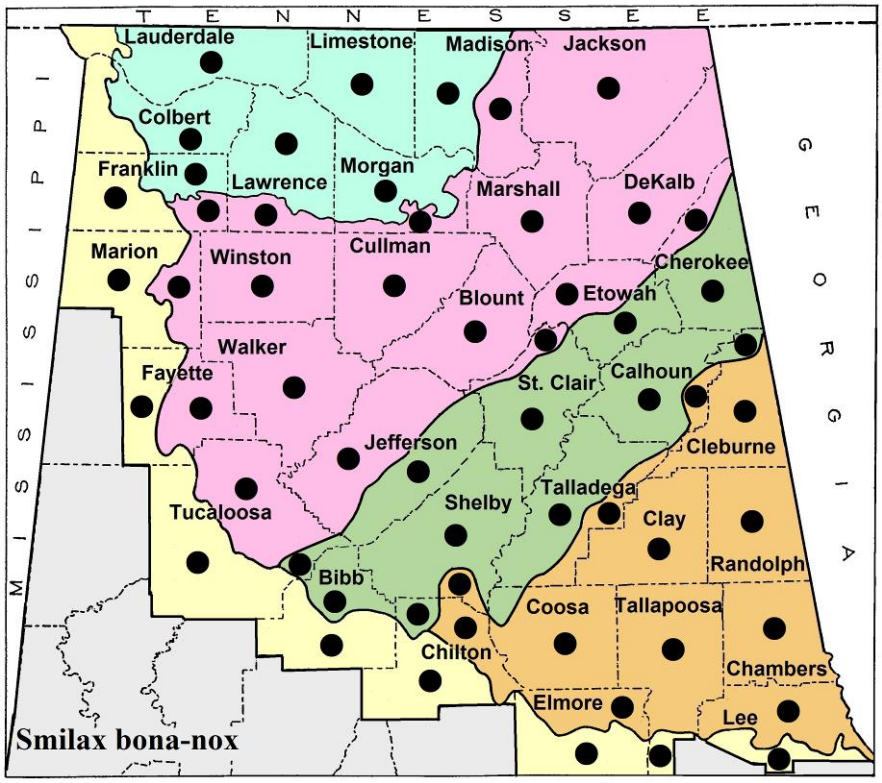

Figure 113. Distribution of *Smilax bona-nox* var. *bona-nox* in northern Alabama.

The peduncles of *Smilax bona-nox* are flattened and typically longer than the leaf stalk (Fig. 114a). Flowers appear in the spring (Fig. 114b), and berries mature in the fall of the same year (Fig. 114c). Some woody species of *Smilax*, such as *S. bona-nox*, are taxonomically challenging because of variation in leaf morphology (Judd 1998). The leaves of Saw Greenbrier are exceptionally variable but are usually leathery (Fig. 115a) and have a prominent vein along the margin (Fig. 115b). Although, this thickened marginal band is often missing in young or shade leaves. Plants are easily identified if their leaves are variegated and have spinulose margins or basal lobes (Fig. 115c). However, when lacking these traits, they are often confused with *S. rotundifolia*. Other distinguishing characters include nodal prickles in cow-horn-like pairs (Fig. 116a), often an abundance of whitish to brownish warts on lower stems (Fig. 116b), and berries with a single seed (Fig. 116c). *Smilax rotundifolia* has prickles only present along the internodes, smooth stems, and two-seeded berries. Coker (1944) utilized the underground parts as important taxonomic characters to aid in identification. *Smilax bona-nox* is the only greenbrier with spiny tubers (Fig. 116d). *Smilax glauca* tubers lack spines, but its underground runners (stolons) are armed (Coker 1944).

Smilax bona-nox is a weedy species found often growing within cultivated shrubs. Birds are attracted to *Smilax* berries and disperse the seeds when they defecate (Judd 1998). Choctaw Indians ground the tubers of this species into flour to make bread and cakes (Moerman 1998). Comanche Indians used its leaves as cigarette wrappers (Coker 1944).

Figure 114. *Smilax bona-nox*. A. Peduncles longer than petioles (with immature fruit), Shelby Co., Alabama, 17 Aug 2020. B. Flowers, Winston Co., Alabama, 11 Apr 2020. C. Ripe berries, Calhoun Co., Alabama, 27 Nov 2020. Photos: Dan Spaulding.

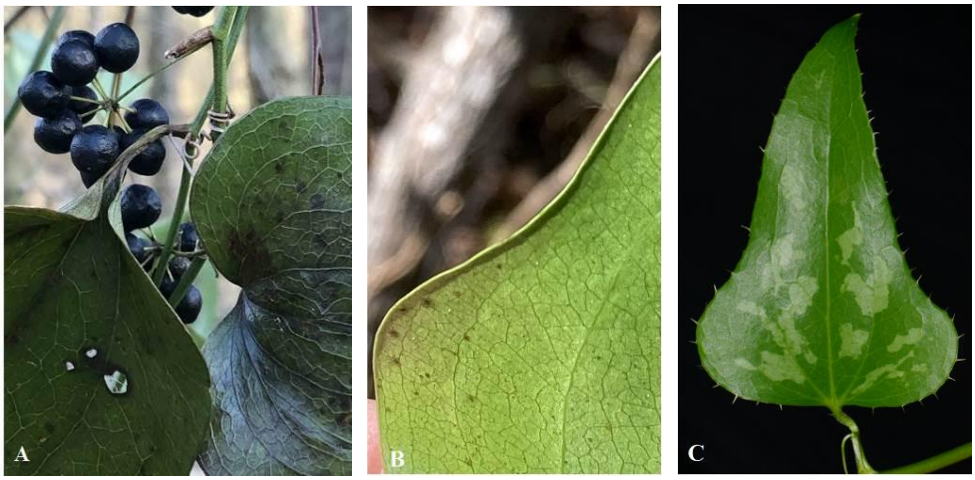

Figure 115. *Smilax bona-nox*. A. Leathery leaves, Cleburne Co., Alabama, 8 Feb 2020. B. Leaves with a thick, marginal band, Calhoun Co., Alabama, 27 Nov 2020. Photos: Dan Spaulding. C. Variegated leaf with basal lobes and spinulose margins, Madison Co., Alabama, 2 Aug 2015. Photo: Brian Finzel.

Figure 116. *Smilax bona-nox*. A. Nodal prickles, Calhoun Co., Alabama, 9 Mar 2020. B. Scurfy lower stems Calhoun Co., Alabama, 9 Mar 2020. C. Single-seeded fruit, Calhoun Co., Alabama, 27 Nov 2020. D. Spiny tuber, Calhoun Co., Alabama, 9 Mar 2020. Photos: Dan Spaulding.

Several varieties of *Smilax bona-nox* have been named, but Weakley (2020) only recognizes var. *littoralis* Coker ex Sorrie [Maritime Catbrier] as well as the typical variety. Maritime Catbrier occurs in dunes, maritime shrub thickets, and maritime forests from southeast Virginia to Alabama (Kartesz 2020). This variety differs by the following characters: tubers lacking sharp spines; stems smooth, not stellate-scurfy; and leaves 7–9 veined (Sorrie 2014). Another Coastal Plain species, *S. auriculata* Walt. [Ear-Leaf Greenbrier] is similar to *S. bona-nox* but has short peduncles (0.2–1.5 cm long), berries with 2–3 seeds, mostly zig-zag stems, and frequently hastate-oblong leaves with smooth margins (Clewell 1985, Weakley 2020).

2. Smilax glauca Walter {whitened with bloom; leaf undersurfaces} — WHITE-LEAF GREENBRIER; CAT GREENBRIER; WHITE-LEAF CATBRIER; CAT SAW-BRIER; WILD SARSAPARILLA (Fig. 117). [*Smilax glauca* var. *leurophylla* S.F. Blake]

Figure 117. *Smilax glauca*, Conecuh Co., Alabama, 19 Jan 2019. Photo: Alvin Diamond.

Woody, semi-evergreen vine from tuberous, stoloniferous rhizomes. Mixed woods, pine forests, low woods, woodland borders, prairies, thickets, fencerows, pastures, old fields, roadsides, and other disturbed areas. Flowers April–May, fruits June–November; common throughout Alabama (Fig. 118). Native to the central and eastern sections of the USA and Mexico (Weakley 2020).

Smilax glauca flowers appear in spring (Fig. 119a), and fruits mature in the fall of the same year. The berries are black or blue and often covered with a white bloom (Fig. 119b). This species can be quickly identified by its white to grayish-white (glaucous) lower leaf surfaces. The undersurfaces occasionally turn brown in dried specimens due to the heat from drying (Holmes 2002b). However, numerous papillae (tiny nipple-like projections) covering the undersurface are evident under magnification, confirming the identity of the species (Fig. 119c).

White-Leaf Greenbrier's prickles are slender and often slightly recurved, simulating a cat's claw (Fig. 119d); hence its vernacular names. The prickles at the base of the stem are occasionally numerous and somewhat needle-like, resembling *S. hispida*, except they are usually thicker and not dark-colored, except for the tip. Leaf blades of *S. glauca* can be variegated (Fig. 119e), but *S. smallii* and *S. bona-nox* also exhibit this trait (Bullard & Anderson 2013). Coker (1944) noted that both *S. glauca* and *S. bona-nox* have conspicuous spiny stolons; however, unlike *S. bona-nox*, the tubers of *S. glauca* are not armed (Fig. 120).

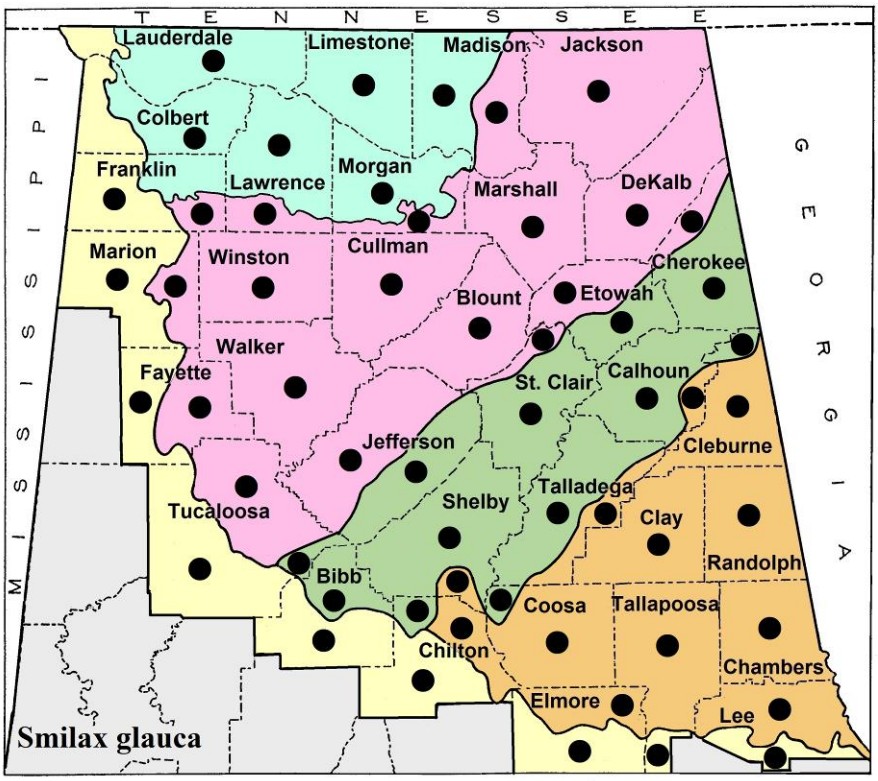

Figure 118. Distribution of *Smilax glauca* in northern Alabama.

Figure 119. *Smilax glauca*. A. Flowers, Blount Co., Alabama, 4 May 2012. B. Ripe berries, Winston Co., Alabama, 31 Oct 2010. Photos: Brian Finzel. C. Leaf undersurface, herbarium specimen (AMAL), *Barger & Tenaglia CC-186*, Tallapoosa Co., Alabama, 13 Jun 2006. D. Prickle, DeKalb Co., Alabama, 21 May 2015. Photo: Brian Finzel. E. Variegated leaf, Stone Co., Mississippi, 8 Sep 2019. Photo: Janet Wright.

Figure 120. *Smilax glauca* tuber and spiny stolon, Calhoun Co., Alabama, 5 Feb 2021. Photo: Dan Spaulding.

Holmes (2002b) notes that *Smilax glauca* is reportedly the weediest species of the genus. It can become a serious weed in fields because of its small, deeply set tubers, reportedly eaten by wild hogs (Coker 1944). Sarsaparilla, an extract made from dried rhizomes of *S. glauca* and other *Smilax*, was used to flavor certain drinks and medicinal tonics (Judd 1998). Cherokee Indians ate the tubers and parched the leaves to make a dressing for burns and scalds (Moerman 1998).

3. Smilax herbacea L. {herbaceous} — SMOOTH CARRION-FLOWER; COMMON CARRION-FLOWER (Fig. 121). [*Nemexia herbacea* (L.) Small]

Figure 121. *Smilax herbacea*, Cleburne Co., Alabama, 10 May 2020. Photos: Dan Spaulding.

Herbaceous, perennial vine from rhizomes. Mixed woods, limestone woods, rocky woods, alluvial woods, woodland borders, mesic slopes, rich woods, thickets, riverbanks, and roadbanks. Flowers April–June, fruits June–September; uncommon in the Highland Rim, Cumberland Plateau, Ridge & Valley, and Piedmont; rare in the Coastal Plain (Fig. 122). Native to the eastern USA and adjacent Canada, from Ontario to New Brunswick, south to Georgia and Alabama (Kartesz 2020).

Smooth Carrion-Flower is similar to other climbing herbaceous *Smilax* but differs by having glabrous, glaucous leaf undersurfaces (Fig. 123a). In northern Alabama, young sterile plants lacking tendrils (Fig. 123b) are often misidentified as non-flowering *S. biltmoreana*. Mature, fertile plants of *S. herbacea* usually occur in the vicinity of immature plants.

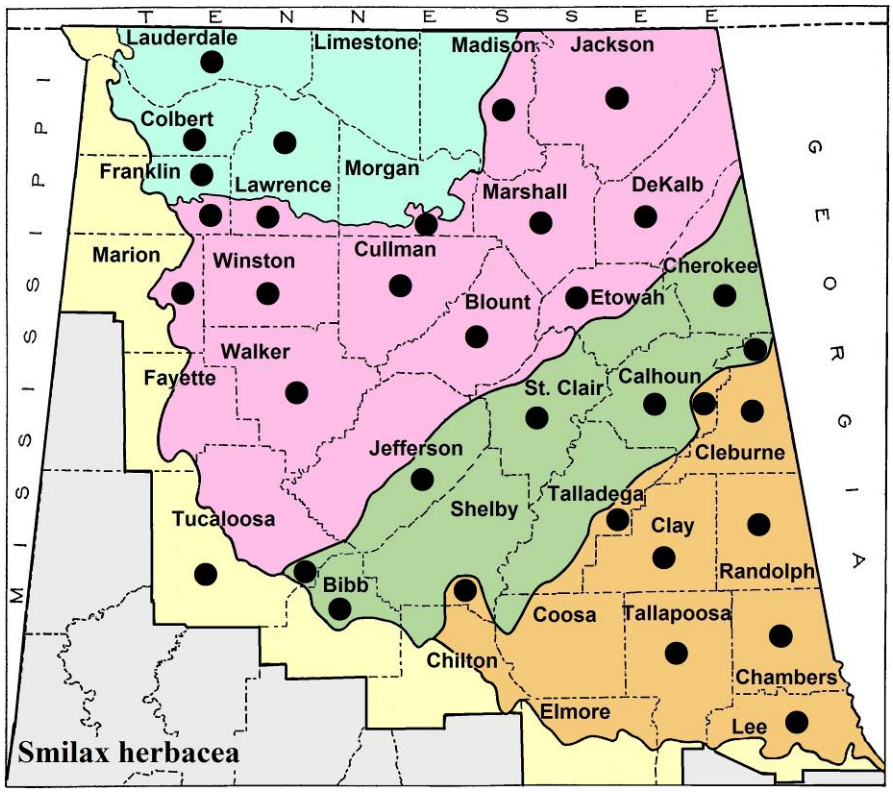

Figure 122. Distribution of *Smilax herbacea* in northern Alabama.

Figure 123. *Smilax herbacea*. A. Leaf undersurface, Marshall Co., Alabama, 13 Apr 2019. Photo: Brian Finzel. B. Immature plant, Cleburne Co., Alabama, 3 May 2020. Photo: Dan Spaulding.

Judd (1998) notes that the flowers of *Smilax herbacea*, as well as other herbaceous species, "have a putrid odor reminiscent of that of decomposing cheese," which "attract and are pollinated by carrion flies." Henry David Thoreau wrote in 1854 that the flower "smells exactly like a dead rat in the wall, and apparently attracts flies like carrion" (Coffey 1993). Its common name reflects this attribute. Its glaucous berries (Fig. 124) have a pleasant taste, and several eastern Native American tribes ate the fruit (Moerman 1998). Shosteck (1974) writes, "The young sprouts are tender and edible in the spring and can be used in salads."


Figure 124. *Smilax herbacea* ripe berries, Orange Co., Vermont, 8 Oct 2020. Photo: Tom Norton.

4. Smilax hispida Raf. var. **hispida** {with stiff hairs, bristly; the stem} — BRISTLY GREENBRIER; BRISTLY BULLBRIER; CHINA-ROOT; HELLFETTER (Fig. 125). [*Smilax tamnoides* L. var. *hispida* (Muhl. *ex* Torr.) Fernald; *Smilax tamnoides* var. *tamnoides*]

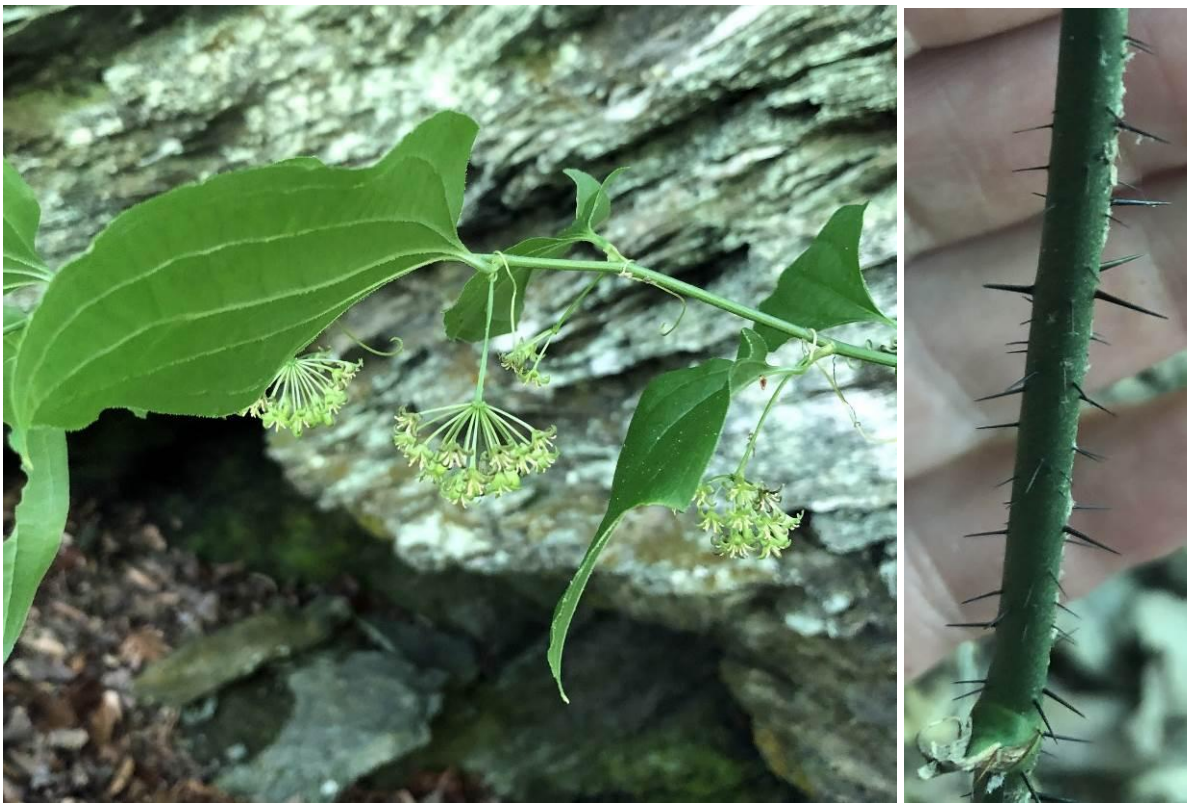
Figure 125. *Smilax hispida* var. *hispida*, Cleburne Co., Alabama, 3 May 2020. Photos: Dan Spaulding.

Woody, tardily deciduous vine from rhizomes. Alluvial woods, rich woods, floodplains, bottomlands, riparian forests, limestone woods, swamp margins, creek banks, and roadsides along woods. Flowers late April–June, fruits June–October; uncommon throughout Alabama (Fig. 126). Native to the central and eastern USA and adjacent Canada (Kartesz 2020).

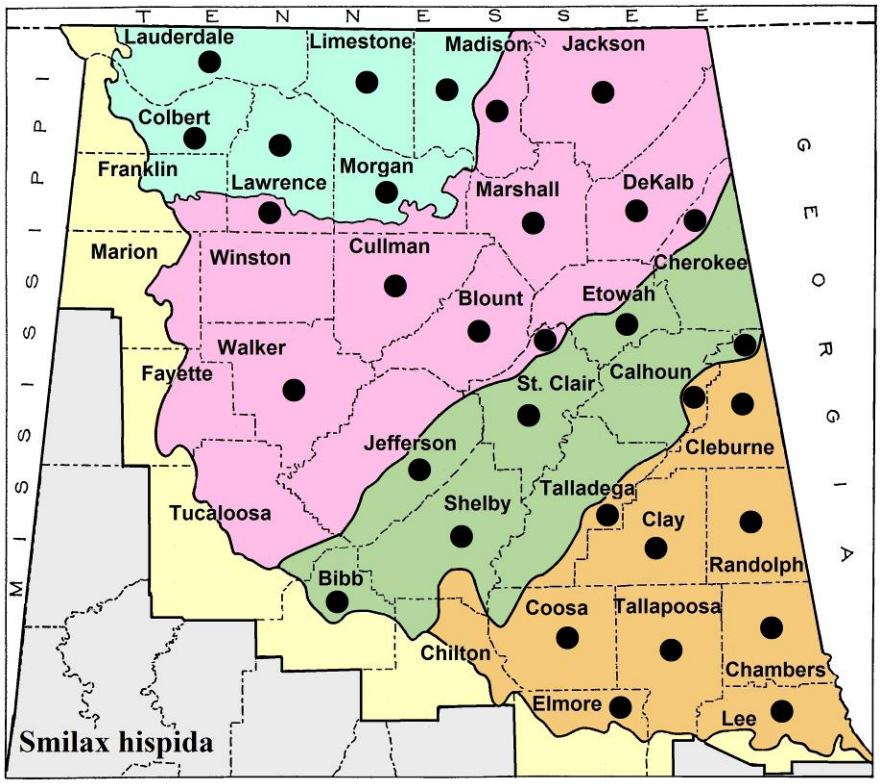

Figure 126. Distribution of *Smilax hispida* var. *hispida* in northern Alabama.

Figure 127. *Smilax hispida* var. *hispida*, Cleburne Co., Alabama, 18 Jul 2020. A. Young stem with green bristles. B. Leaf margins minutely toothed. C. Leaves with strong net venation. Photos: Dan Spaulding.

Figure 128. *Smilax hispida* var. *hispida*, Shelby Co., Alabama, 8 Aug 2020. Photo: Dan Spaulding.

A good character for identifying *Smilax hispida* is its brownish bristles (Fig. 125), occurring mainly on the lower portion of stems. Young shoots often have greenish bristles that will darken when they mature (Fig. 127a). Collections lacking bristled stems are harder to determine but can be identified by their finely toothed leaf margins (Fig. 127b), peduncles are much longer than petioles, and dull, ashy green dried leaves. Janet Wright (pers. comm. 2020) also notes that the "leaves have a distinctive veiny look, with the veins quilted on the upper side like the seams of an old-fashioned parachute, and protruding on the lower side (Fig. 127c)." Its rhizome is short, knotty, and lacks tubers, but slender underground runners (stolons) are often present (Fig. 128). A southern variety, *S. hispida* var. *australis* Small, is found on the Coastal Plain in the southeastern USA and differs mainly by having leaves with basal lobes (Coker 1944, Weakley 2020).

5. Smilax hugeri (Small) J.B. Norton ex Pennell {for Arthur M. Huger, 1842-1925, American botanist} — HUGER'S CARRION-FLOWER (Fig. 129). [*Nemexia hugeri* Small; *Smilax ecirrhata* (Engelm. *ex* Kunth) S. Watson var. *hugeri* (Small) H.E. Ahles]

Figure 129. *Smilax hugeri*, Etowah Co., Alabama, 27 Mar 2020. Photos: Dan Spaulding.

Perennial, erect herb from slender rhizomes. Rich woods, ravine slopes, coves, and bottomland forests. Flowers March–April, fruits June–September; uncommon in the Highland Rim, Ridge & Valley, and Piedmont; frequent in the Cumberland Plateau; rare in the Coastal Plain (Fig. 130). Native to the southeastern USA, from Tennessee to North Carolina, south to Mississippi and northern Florida (Kartesz 2020).

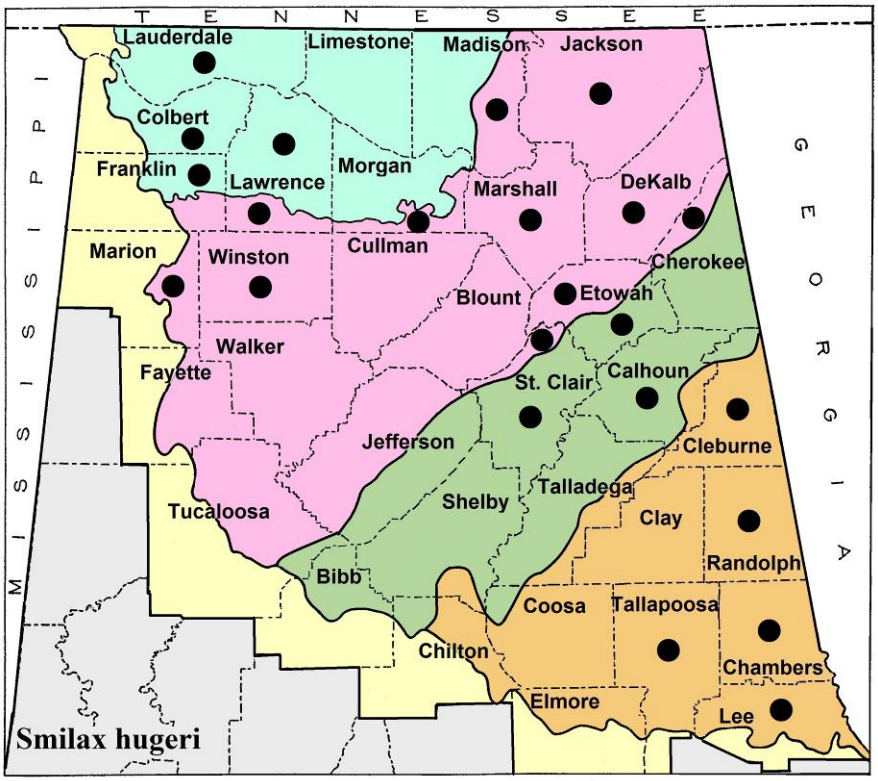

Figure 130. Distribution of *Smilax hugeri* in northern Alabama.

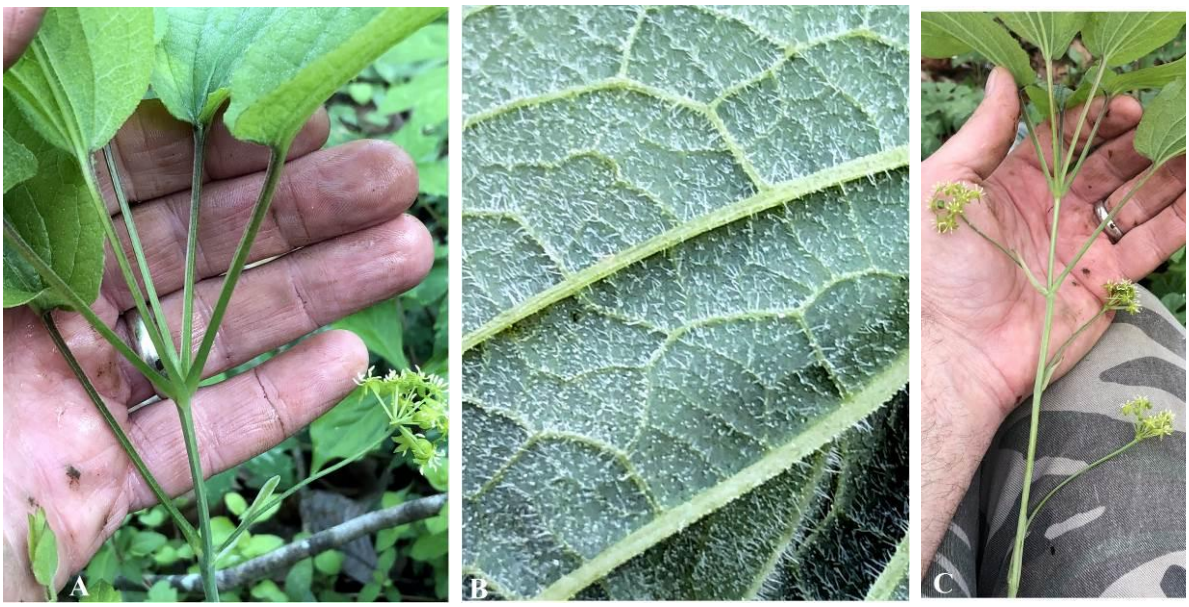

Figure 131. *Smilax hugeri*, Etowah Co., Alabama, 27 Mar 2020. A. Cluster of leaves near summit of the stem. B. Leaves pubescent beneath. C. Peduncles arising from bracts on the stem. Photos: Dan Spaulding.

Huger's Carrion-Flower is the only herbaceous *Smilax* in northern Alabama with erect stems. Mature plants lack tendrils or have only rudimentary ones. Other closely related *Smilax* in our region "mimic" *S. hugeri* when immature but become vines with developed tendrils at maturity.

A similar species, *Smilax ecirrata* [Upright Carrion-Flower], has been erroneously reported for Alabama (SERNEC 2020), likely because Harry Ahles treated *S. hugeri* as a variety of *S. ecirrata* (Radford et al. 1968). Thus, some collectors failed to include the correct varietal name associated with the plant. Both species have leaves with pubescent undersurfaces, but *S. ecirrata* differs by having more numerous leaves (usually 6–13) well distributed in the stem's upper half. Additionally, its leaf blades are often acuminate. *Smilax ecirrata* occurs mainly in the Mid-Central Plains and the Great Lakes Region, extending south into Tennessee (Mangaly 1968). *Smilax hugeri* typically has 4–8 leaves clustered near the stem's summit (Fig. 131a) and leaf tips are obtuse to acute.

Another member of the *Smilax ecirrata* complex, *S. biltmoreana* (Small) J.B.S. Norton ex Pennell [Biltmore's Carrion-Flower], was reported for northern Alabama (Keener et al. 2020), but all specimens examined were determined to represent juvenile *S. herbacea*. Flowering individuals of *S. biltmoreana* are similar to *S. hugeri*. The main differences are that *S. biltmoreana* has glabrous, broadly ovate leaves, and its flowers occur mostly in the leaf axils rather than from bracts on the stem. *Smilax hugeri* leaves are distinctly pubescent underneath (Fig. 131b) though sometimes sparsely hairy. Leaf blades are mostly oblong-ovate, and its flower stalks (peduncles) mainly arise from bracts (Fig. 131c). *Smilax biltmoreana* is endemic to the southeastern USA, found primarily in the Blue Ridge of Georgia, North Carolina, and South Carolina, with disjunct stations in southcentral Kentucky, North Florida (primarily Apalachicola region), and adjacent southeast Alabama (Judd 1998, Weakley 2020).

6. Smilax lasioneura Hook {hairy-nerved; on veins of leaf} — MIDWESTERN CARRION-FLOWER; BLUE RIDGE CARRION-FLOWER (Fig. 132a–c). [*Nemexia lasioneura* (Hook.) Rydb.; *Smilax herbacea* L. var. *lasioneura* (Hook.) A. DC.]

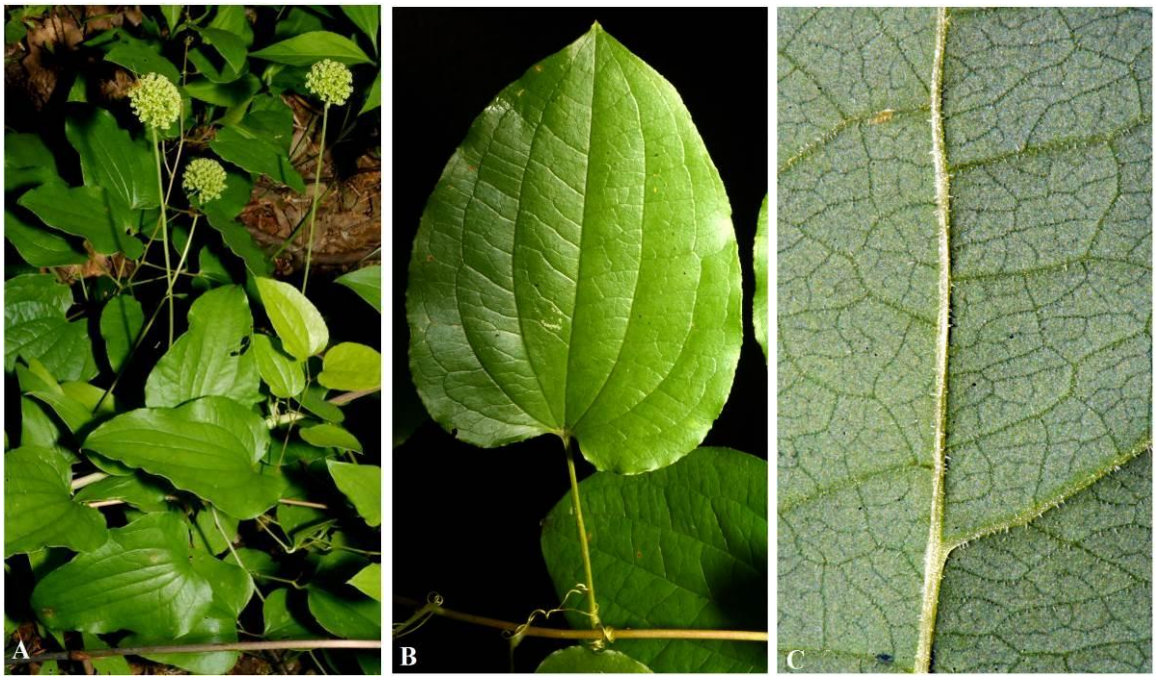

Figure 132. *Smilax lasioneura*. A. Flowering vine, Marengo Co., Alabama, 16 Apr 2020. B–C. Limestone Co., Alabama, 28 Jun 2019, (B) upper surface of leaf, (C) undersurface of the leaf. Photos: Brian Finzel.

Perennial, herbaceous vine from rhizomes. Bottomland forests, rich woods, bluffs, cove hardwoods, and limestone woods. Flowers April–May, fruits June–September; rare throughout Alabama (Fig. 133). Native to the midwestern USA and Canada, primarily distributed in the central plains, south to eastern Texas and northern Florida with disjunct populations in the Blue Ridge and elsewhere in the southeastern USA (Holmes 2002b, Kartesz 2020).

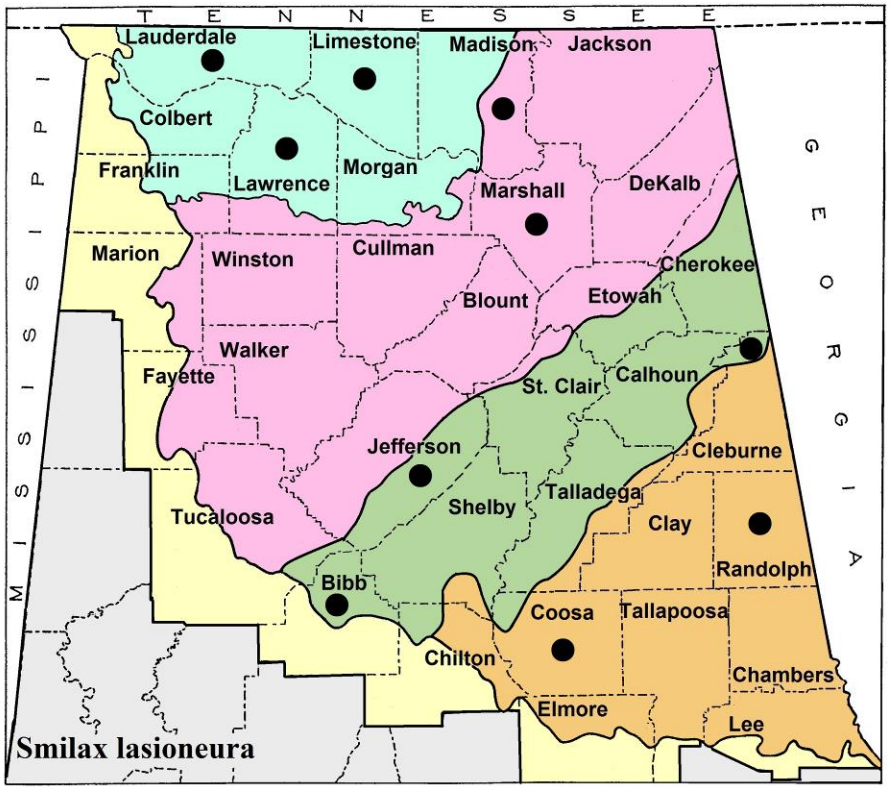

Figure 133. Distribution of *Smilax lasioneura* in northern Alabama.

Figure 134. *Smilax lasioneura*. A. Immature berries on long peduncle, Cleburne Co., Alabama, 9 Jun 2019. Photo: Dan Spaulding. B. Ripe berries, Washtenaw Co., Michigan, 10 Oct 2020. Photo: Roberto San Antonio.

Smilax lasioneura is similar to *S. herbacea*, but its leaves are pubescent beneath (Fig. 132c), whereas *S. herbacea* are glabrous. *Smilax pulverulenta* is sometimes mistaken for *S. lasioneura* since both have pubescent leaf undersurfaces. However, the leaves of *S. lasioneura* are pale green beneath, while those of *S. pulverulenta* are shiny, dark green underneath. Holmes (2002b) states that the petioles of *S. lasioneura* are shorter than the blade (Fig. 132b), and the petioles of *S. pulverulenta* are about the same length as the blade. However, this character appears to be unreliable for use in identification.

Peduncle length is sometimes used to differentiate species (Weakley 2020), but this trait is also variable. Flower stalks (peduncles) of *Smilax lasioneura* are frequently much longer than the subtending leaf (Fig. 132a), typically 5–10 times as long as the petioles. However, they can be short or long, often relative to ecological and climatic variations (Mangaly 1968). Peduncles of *S. pulverulenta* are usually shorter than subtending leaf, about 1–3 times as long as the petioles. Berries of *S. lasioneura* are bluish-black to black and often glaucous (Fig. 134), whereas those of *S. pulverulenta* are black and not glaucous.

7. Smilax laurifolia L. {laurel-leaved} — LAUREL-LEAF GREENBRIER; LAUREL GREENBRIER; BAMBOO-VINE; BLASPHEME-VINE; BAYLEAF SMILAX (Fig. 135).

Figure 135. *Smilax laurifolia*, Tallapoosa Co., Alabama, 27 Jul 2019. Photos: Dan Spaulding.

Woody, evergreen vine from tuberous rhizomes. Swamps, bogs, seeps, wet woods, alluvial forests, pine savannas, flatwoods, ditches, marshes, and wet fields. Flowers July–August, fruits September–December (in the second year and persisting); rare in the Highland Rim and the Cumberland Plateau; uncommon in the Ridge & Valley; frequent in the Piedmont; common in the Coastal Plain (Fig. 136). Native primarily to the southeastern USA, ranging from New Jersey, south to Florida, Bahamas, and Cuba, west to eastern Oklahoma, and eastern Texas (Holmes 2002b).

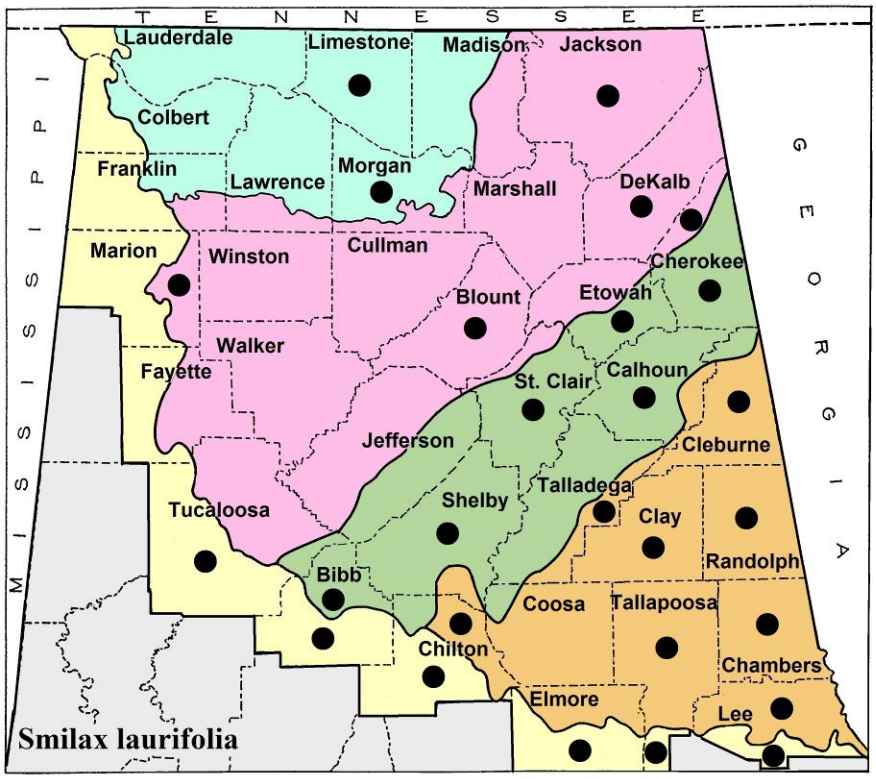

Figure 136. Distribution of *Smilax laurifolia* in northern Alabama.

Smilax laurifolia is a wetland plant with thick, oblong leaves and large stems armed with stout prickles (Fig. 137a). Like *S. smallii*, it is a high climbing, evergreen vine but differs mainly by its thicker, prominently single-veined leaves. Both species begin flowering in summer (Fig. 137b), with fruit maturing the following year (Fig. 137c). However, the berries of *S. laurifolia* differ by being single-seeded and often slightly tapering at the tip (Fig. 137d).

Figure 137. *Smilax laurifolia*. A. Stout stem & prickles, Jackson Co., Mississippi, 26 Feb 2021. Photo: Janet Wright. B. Flowers, Shelby Co., Alabama, 8 Aug 2020. Photo: Dan Spaulding. C. Ripe berries, Jackson Co., Mississippi, 23 Jan 2021. D. Single-seeded fruit, Jackson Co., Mississippi, 13 Jan 2021. Photos: Janet Wright.


Figure 138. *Smilax laurifolia* rhizome and tubers, Jackson Co., Mississippi, 18 Jan 2021. Photo: Janet Wright.

Laurel-Leaf Greenbrier has massive, hard, semi-woody tubers (Fig. 138). Cherokee Indians prepared a tonic and compound of "root bark" and used it as a wash for sores. Choctaw Indians made bread and flour from the starch ground from the tubers (Moerman 1998). The tubers were first beaten, and fibers were washed out before bread or mush was made (Coker 1944).

8. Smilax pulverulenta Michx. {powdery; for fine pubescence of leaves} — DOWNY CARRION-FLOWER (Fig. 139).


Figure 139. *Smilax pulverulenta*, Madison Co., Alabama, 3 May 2007. Photo: Brian Finzel.

Perennial, herbaceous vine from rhizomes. Rich woods, ravines, and cove forests, especially over calcareous rocks. Flowers May–June, fruits July–October; very rare in the Highland Rim and Ridge & Valley; rare in the Cumberland Plateau (Fig. 140). Native to the central and eastern USA, ranging primarily from Missouri and southeastern New York, south to Arkansas and North Carolina (Weakley 2020).

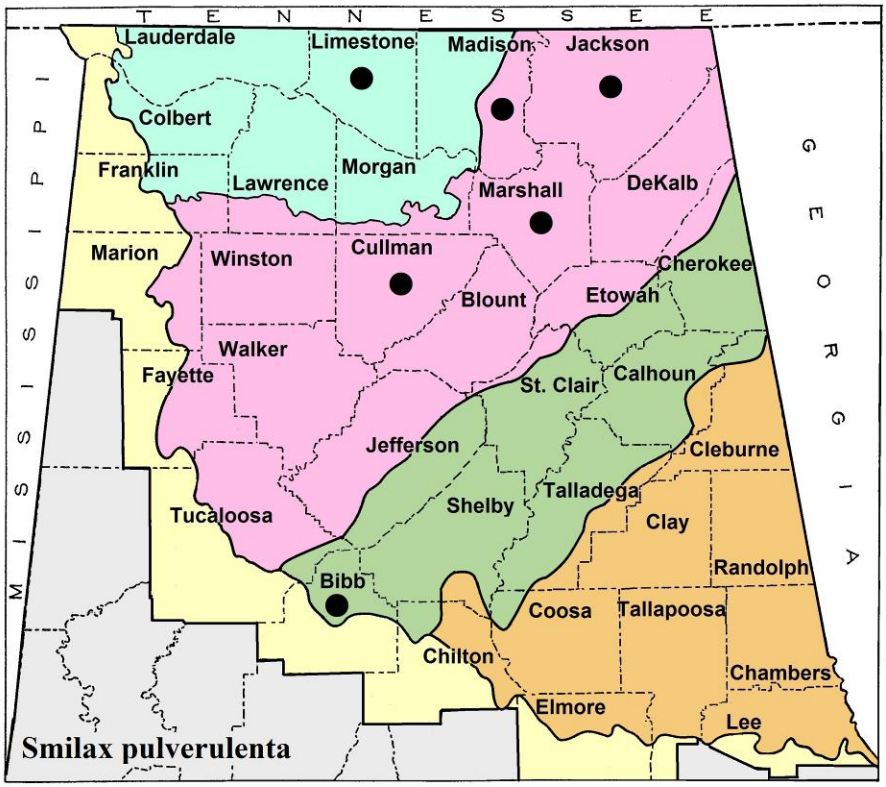

Figure 140. Distribution of *Smilax pulverulenta* in northern Alabama.

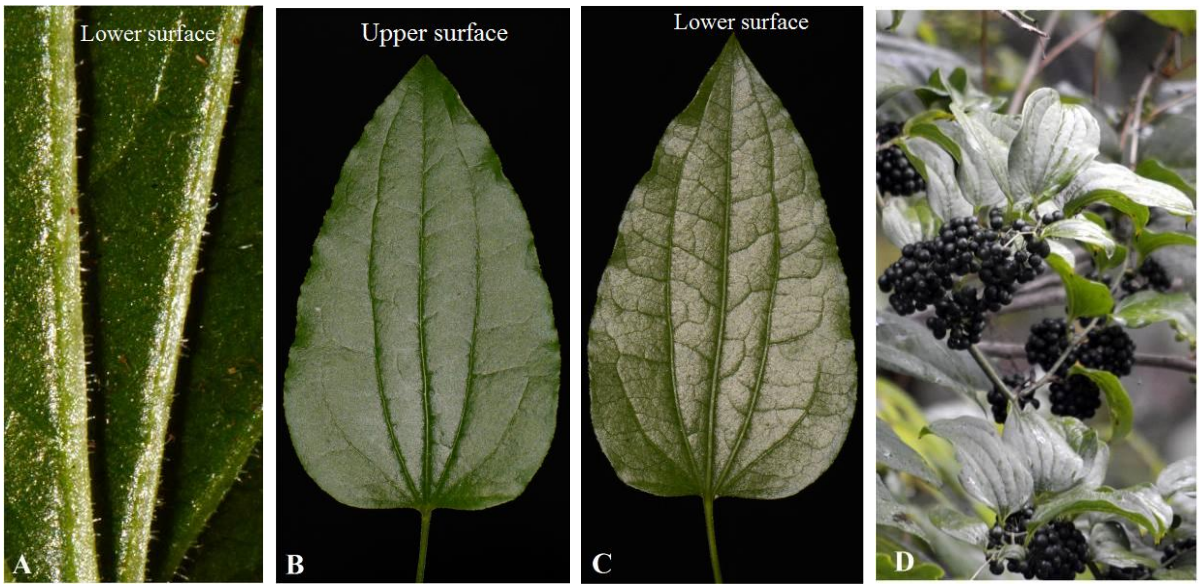

Figure 141. *Smilax pulverulenta*. A–C. Leaves, upper and lower surfaces, Bibb Co., Alabama, 30 Apr 2019, Photos: Brian Finzel. D. Ripe berries, Barbour Co., West Virginia, 18 Aug 2017. Photo: Randy Bodkins.

Smilax pulverulenta is similar to *S. lasioneura* since both are herbaceous, climbing vines with pubescent leaf undersurfaces (Fig. 141a). However, the leaves of *S. pulverulenta* are shiny, dark green beneath (Fig. 142c), similar in color to upper surfaces (Fig. 141b), and its peduncles (flower stalks) are usually shorter than subtending leaves (Fig. 139). In contrast, *S. lasioneura* leaves have pale green undersurfaces, and their peduncles are typically (not always) longer than subtending leaves. The two species also can be separated by their fruit. *Smilax lasioneura* berries are glaucous (visible on immature and ripe fruit), but *S. pulverulenta* berries are not (Fig. 141d). Mangaly (1968) notes that the blooming time of *S. pulverulenta* is typically two weeks earlier than *S. lasioneura* and *S. herbacea*.

Some authors use other characters to identify species in the *Smilax herbacea* complex. According to Braun (1967), *S. lasioneura* and *S. herbacea* usually have dense, globose umbels, whereas the umbels of *S. pulverulenta* are more hemispheric because they typically have fewer flowers. Strausbaugh & Core (1997) reported in the *Flora of West Virginia* that the leaves of *S. pulverulenta* usually have about five prominent veins that run into the tip, whereas *S. herbacea* leaves have seven to nine. Holmes (2002b) described the petioles of *S. pulverulenta* as being about the same length as the blade, and *S. lasioneura* having petioles shorter than the blade. However, because these traits are variable, they are not always valuable for identification.

9. Smilax pumila Walter {dwarf, very small} — DWARF GREENBRIER; SARSAPARILLA-VINE; HAIRY GREENBRIER; GROUND-BRIER; DWARF SMILAX (Fig. 142a–b).

Figure 142. *Smilax pumila*. A. Flowers, Baldwin Co., Alabama, 27 Oct 2020. Photo: Eric Soehren. B. Fruit, Macon Co., Alabama, 18 Nov 2019. Photo: Nick O'Farrell.

Trailing woody, evergreen vine or subshrub from rhizomes. Sandy forests, alluvial woods, pine savannas, sloped woods, sandhills, creek banks, and roadbanks. Flowers September–November, fruits January–April (persisting later); very rare in the lower Cumberland Plateau and Ridge & Valley; rare in the Piedmont; frequent in the Coastal Plain (Fig. 143). A native of the southeastern USA, primarily on the Coastal Plain from eastern Texas to South Carolina (Kartesz 2020).

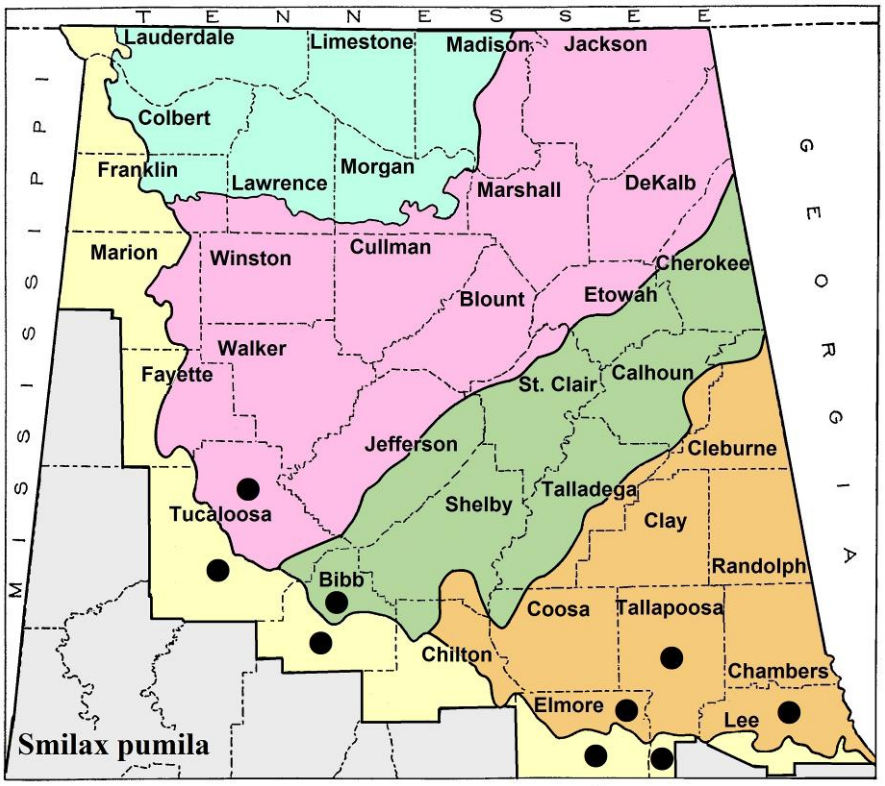

Figure 143. Distribution of *Smilax pumila* in northern Alabama.

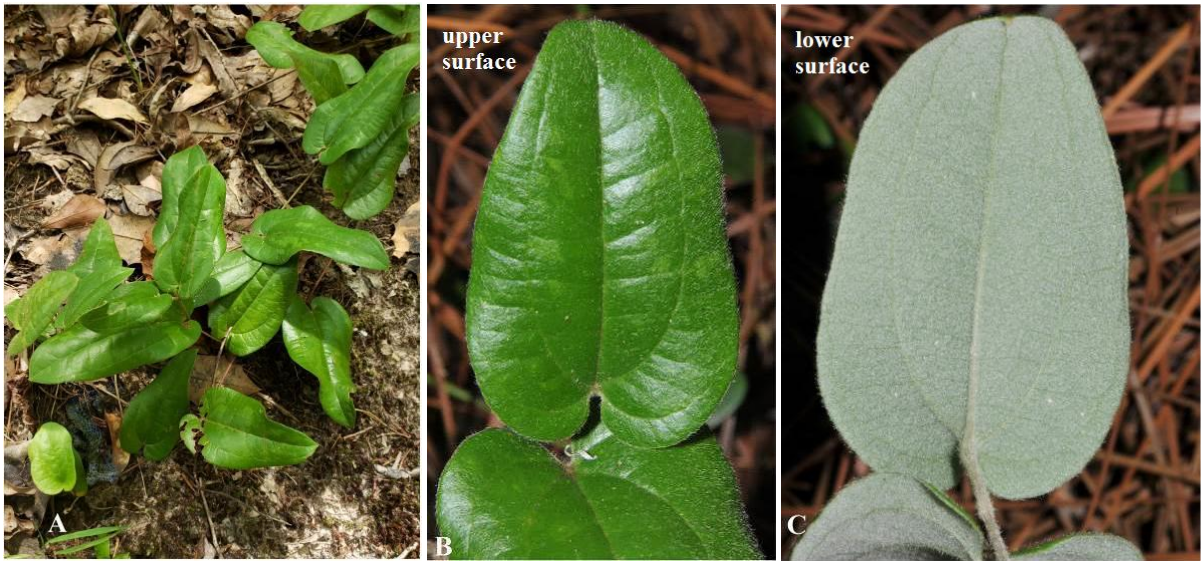

Figure 144. *Smilax pumila*. A. Habit, Dale Co., Alabama, 10 Aug 2019. Photo: Alvin Diamond. B–C. Leaf surfaces, (B) upper, (C) lower, Mobile Co., Alabama, 10 Oct 2011. Photos: Brian Finzel.

Smilax pumila is unmistakable and unique among Alabama's woody *Smilax*. It has a low-growing habit (Fig. 144a), hairy stems lacking prickles, and evergreen, hairy leaves that are densely pubescent beneath (Fig. 144b–c). Plants bloom in the fall and form glossy red berries with pointed tips over the winter (Fig. 142b). Holmes (2002b) writes, "In Louisiana, the dried leaves are used to prepare a tea for upset stomach." Dwarf Greenbrier is occasionally cultivated in the South as a ground cover.

10. Smilax rotundifolia L. {round-leaved} — ROUNDLEAF GREENBRIER; COMMON GREENBRIER; HORSEBRIER; DEVIL'S-HOPVINE (Fig. 145). [*Smilax rotundifolia* var. *quadrangularis* (Muhl. ex Willd.) Alph. Wood]

Figure 145. *Smilax rotundifolia*, Madison Co., Alabama, 4 Oct 2020. Photo: Kevin England.

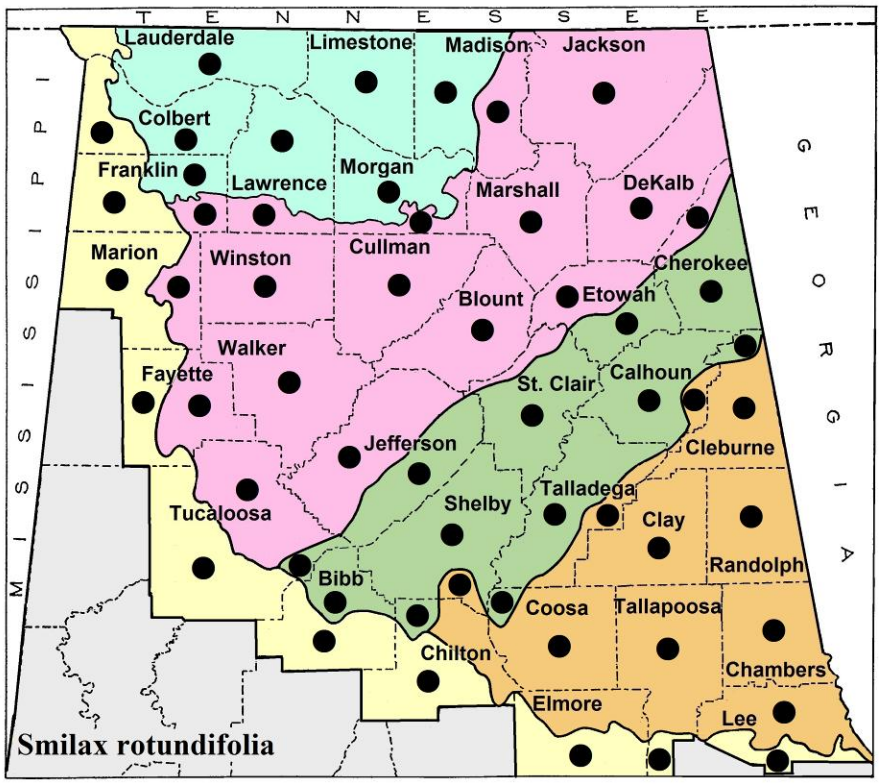

Figure 146. Distribution of *Smilax rotundifolia* in northern Alabama.

Woody, tardily deciduous vine from slender, elongate rhizomes. In a wide variety of dry to wet forests, fencerows, pastures, old fields, prairies, pond/lake margins, roadsides, and other disturbed areas. Flowers March–May, fruits June–November; common throughout Alabama (Fig. 146). Native to the southeastern and eastern USA and adjacent Canada, from Nova Scotia to southern Ontario, south to northern Florida and eastern Texas (Weakley 2020).

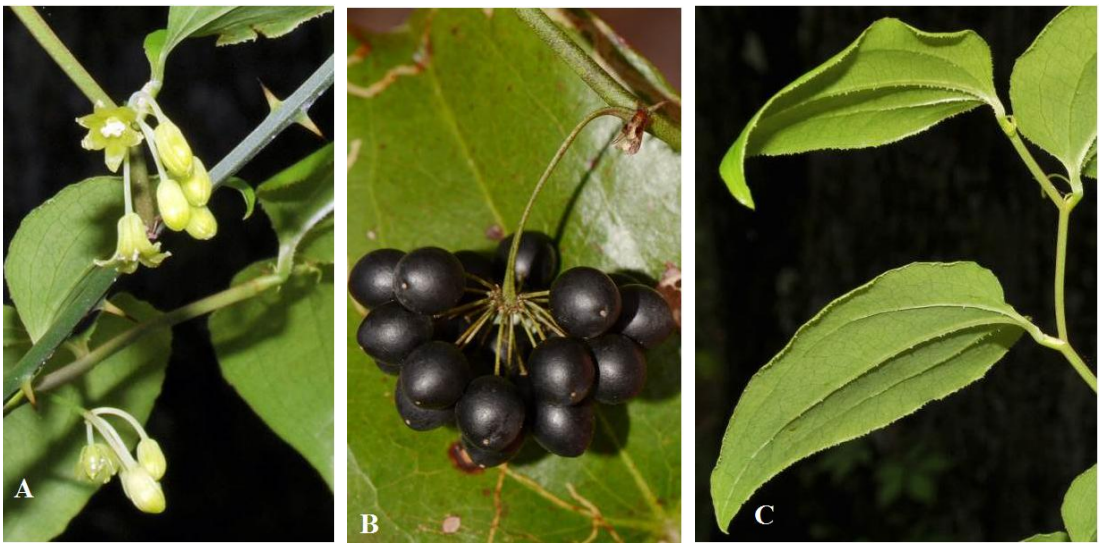

Figure 147. *Smilax rotundifolia*. A. Flowers, Madison Co., Alabama, 21 Apr 2011. B. Fruit, Madison Co., Alabama, 3 Oct 2019. C. Leaves with tiny teeth, Madison Co., Alabama, 21 Apr 2011. Photos: Brian Finzel.

Figure 148. *Smilax rotundifolia*. A. Winter vines, Cleburne Co., Alabama, 16 Feb 2020. B. Prickles, Cleburne Co., Alabama, 23 Feb 2020. C. Lower stem, Calhoun Co., Alabama, 1 Mar 2020. Photos: Dan Spaulding.

Smilax rotundifolia is one of the most widely distributed *Smilax* in the USA (Coker 1944). In spring, the vines flower (Fig. 147a), producing black to bluish-black fruit in fall (Fig. 147b). The berries contain 2 or 3 seeds. Leaves are often broadly ovate, usually with small, tooth-like projections along their margins and sometimes on primary veins beneath (Fig. 147c). Roundleaf Greenbrier is not a high climber, and its leaves are tardily deciduous. Vines are typically "naked" over the winter (Fig. 148a). It is similar to *S. walteri*, especially if its petioles are red, but differs by having tiny teeth on its leaves and numerous prickles on its upper stems. *Smilax rotundifolia* can be mistaken for some expressions of *S. bona-nox*, but it does not have thickened leaf margins, nodal prickles (Fig. 148b),

stellate-scurfy stems (Fig. 148c), nor tuberous rhizomes (Fig. 149). *Smilax bona-nox* vines often climb much higher, and their leaves are semi-evergreen and occasionally spinulose along the margins. In addition, Saw Greenbrier's peduncles are longer than the petiole of subtending leaf (up to 6.5 cm long), and its berries are one-seeded.

Figure 149. *Smilax rotundifolia*, rhizome, Cleburne Co., Alabama, 18 Apr 2020. Photo: Dan Spaulding.

Cherokee Indians used the leaves of *Smilax rotundifolia* as a burn dressing, analgesic for local pains, gastrointestinal relief for stomach issues, and gynecological aid for expelling afterbirth (Moerman 1998). Fresh rootstalks are white but will turn reddish when exposed to the air. Dried rhizomes can be processed into flour to make bread and create a tasty jelly or delicious tea (Shosteck 1974). Young shoots are edible and eaten like asparagus (Judd 1998).

11. Smilax smallii Morong {for its discoverer, John Kunkel Small, 1869–1938, American botanist} — LANCE-LEAF GREENBRIER; JACKSON-VINE; SMALL'S GREENBRIER; JACKSON-BRIER; CHINA-BRIER (Fig. 150). [*Smilax lanceolata* L.; *Smilax maritima* Alph. Wood]

Figure 150. *Smilax smallii*, Jefferson Co., Alabama, 1 Jul 2019. Photos: Dan Spaulding.

Woody, evergreen vine from tuberous rhizomes. Alluvial woods, bottomland forests, stream banks, pond/lake margins, riparian forests, flatwoods, and low woodland borders along roadsides. Flowers June–July, fruits March–June the following year; rare in the Highland Rim; uncommon in the Cumberland Plateau; frequent in the Ridge & Valley and Piedmont; common in the Coastal Plain (Fig. 151). It is endemic to the southeastern USA, from eastern Oklahoma, west to North Carolina, south to peninsular Florida and eastern Texas (Kartesz 2020).

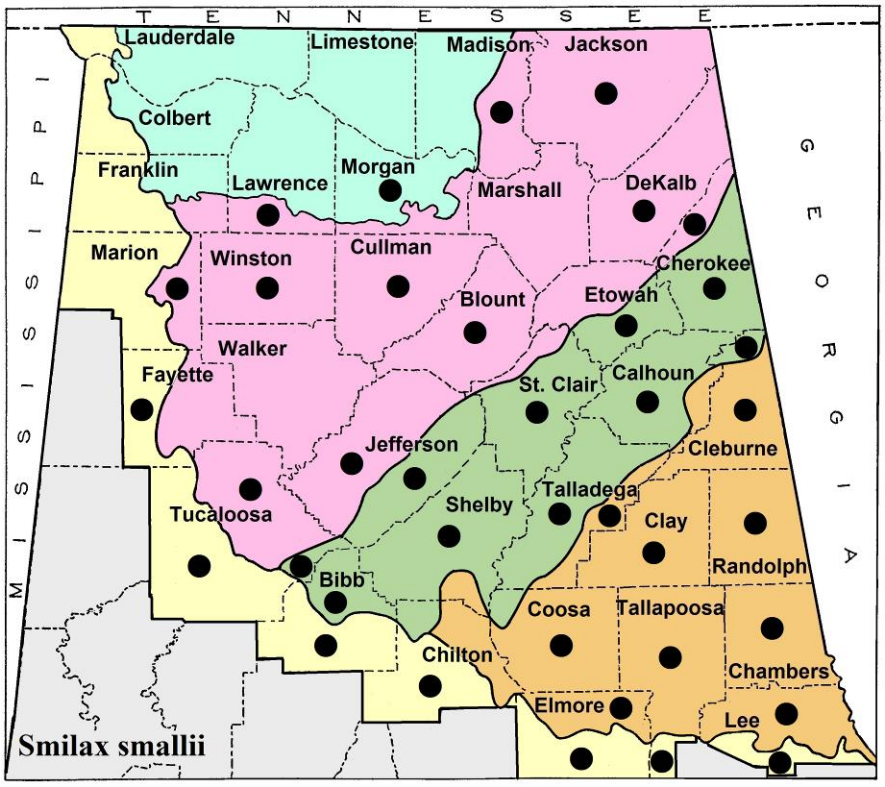

Figure 151. Distribution of *Smilax smallii* in northern Alabama.

Figure 152. *Smilax smallii*. A. Vine, Tuscaloosa Co., Alabama, 28 Jan 2020. B. Lower stem, Cullman Co., Alabama, 17 Feb 2020. C. Variegated leaves, Jefferson Co., Alabama, 5 Mar 2021. Photos: Dan Spaulding.

Smilax smallii is a beautiful, high-climbing vine with evergreen, lanceolate leaves on cascading branches, often forming dense curtains within surrounding trees (Fig. 152a). Jackson-Vine is commonly cultivated in the South for arbors; fortunately, the prickles mainly occur on the lower portion of the stems (Fig. 152b). Harper (1928) noted that the "leaves keep their shape and color pretty well for a few weeks after the stem is cut, and this makes it very desirable for decorative purposes." Large quantities of the foliage were collected from wild populations to make wreaths and other decorations (Judd 1998). In 1888, plants were shipped from Evergreen, Alabama, to northern markets, making the city famous (Harper 1928). The leaves of *S. smallii* are solid green or sometimes variegated (Fig. 152c). The foliage is similar to *S. laurifolia* but differs by being thinner, reticulate, and usually having five principal veins. Its berries are three-seeded and initially green, becoming maroon-red, then black when ripe (Fig. 153a–c).

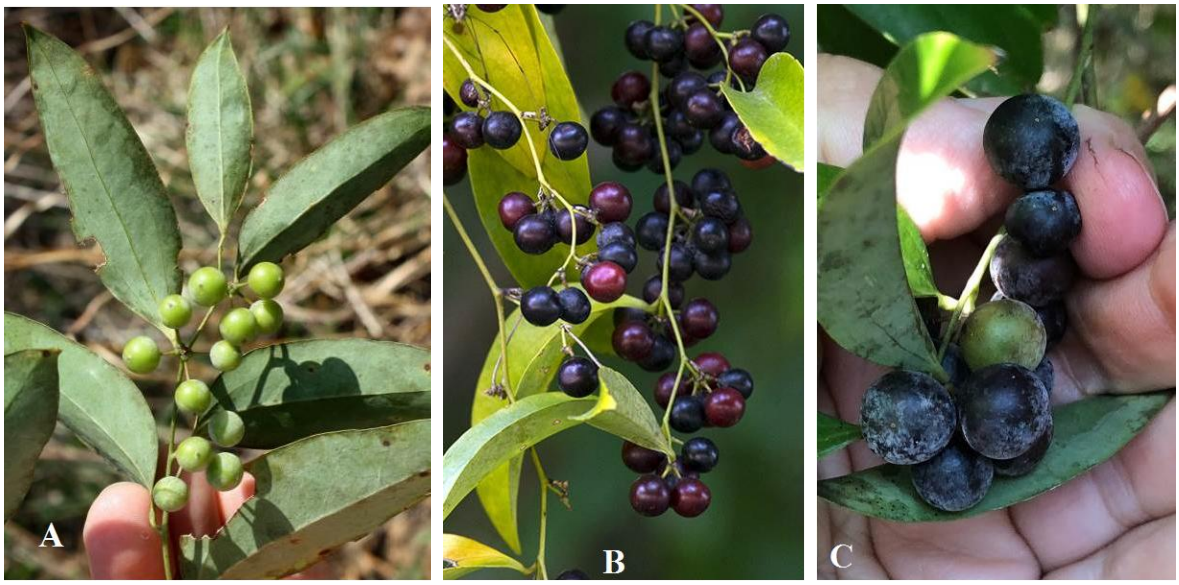

Figure 153. *Smilax smallii*. A. Unripe berries, Shelby Co., Alabama, 13 Mar 2021. Photo: Kevin England. B. Ripening berries, Richland Parish, Louisiana, 19 Jun 2020. Photo: Bette J. Kauffman. C. Ripe berries, Jackson Co., Mississippi, 30 Jun 2018. Photo: Janet Wright.

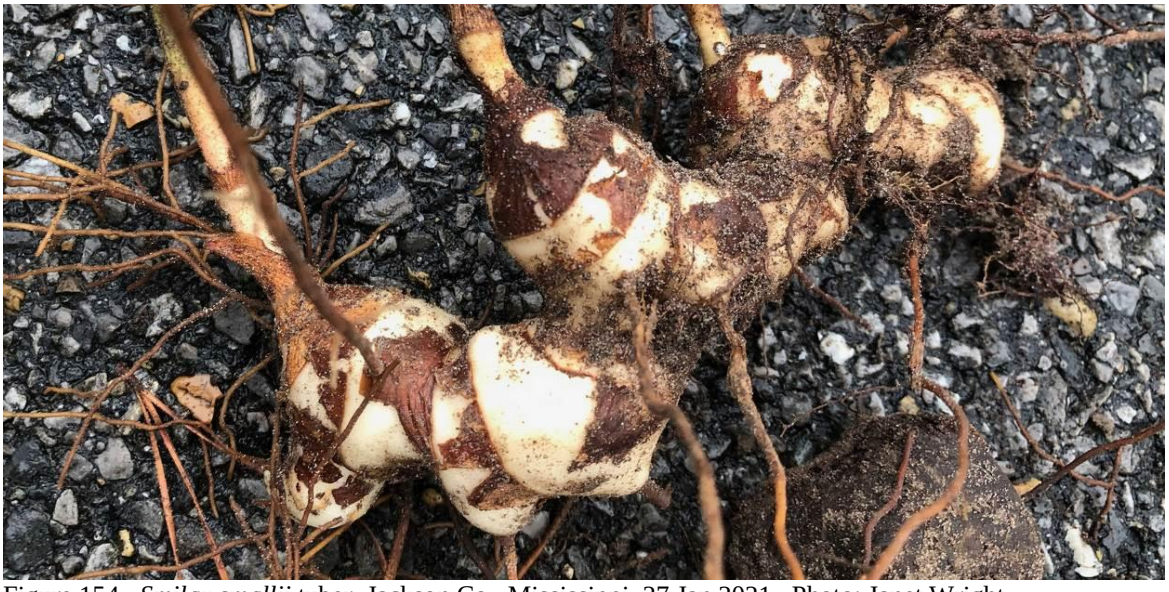

Figure 154. *Smilax smallii* tuber, Jackson Co., Mississippi, 27 Jan 2021. Photo: Janet Wright.

Smilax smallii has large, fleshy edible tubers (Fig. 154). Coker (1944) said this species of *Smilax* has "the least tough tubers, the young ones being easily cut with a knife like a very firm, crisp apple." In the South, young shoots were eaten like asparagus, and the hard seeds were used as beads. Brier pipes were also made from the light and porous rootstalks, and beer was produced from the starch mixed with molasses, parched corn, and fermented rice. Lance-Leaf Greenbrier tubers were valued as a food source by Native Americans, and tribes from the Southeast prepared a jelly from them, called "red coontie" (Coker 1944).

12. Smilax walteri Pursh {for its discoverer, Thomas Walter, 1740-1789, British-American botanist} — CORAL GREENBRIER; RED-BEAD GREENBRIER; RED-BERRY GREENBRIER; RED-BERRY SWAMP SMILAX; WALTER'S GREENBRIER (Fig. 155).

Figure 155. *Smilax walteri*. A. Berries and new leaves, Mobile Co., Alabama, 6 Apr 2018. B. Vines with previous year's berries in swampy habitat, Mobile Co., Alabama, 31 Mar 2019. Photos: Howard Horne.

Woody, deciduous vine from slender, elongate rhizomes. Swamps, bogs, wooded seeps, and other shaded wetlands. Flowers March–May, fruits June–November; rare in northern Alabama; frequent in the Coastal Plain (Fig. 156). Native chiefly to the southeastern USA, primarily on the Coastal Plain, ranging from New Jersey south to peninsular Florida and west to eastern Oklahoma and eastern Texas (Kartesz 2020).

Smilax walteri is an obligate wetland, spring-flowering species (Fig. 157), producing distinctive red or orange berries that ripen in fall or winter. When not in fruit, it is occasionally mistaken for other woody *Smilax*, but this species typically grows in mud or shallow water and can be distinguished by the following combination of characters: deciduous ovate-lanceolate leaves with rounded or truncate bases (Fig. 158a); red petioles (Fig. 158b); peduncles about as long as subtending petiole or shorter (Fig. 158c); slender prickles mostly found on lower stems; smooth leaf margins; and leaves becoming orange, tinted with brown after being dried. Harper (1928) noted that Coral Greenbrier "is a deciduous vine, with bright red berries which hang on all winter, and therefore make it desirable for decorative purposes."

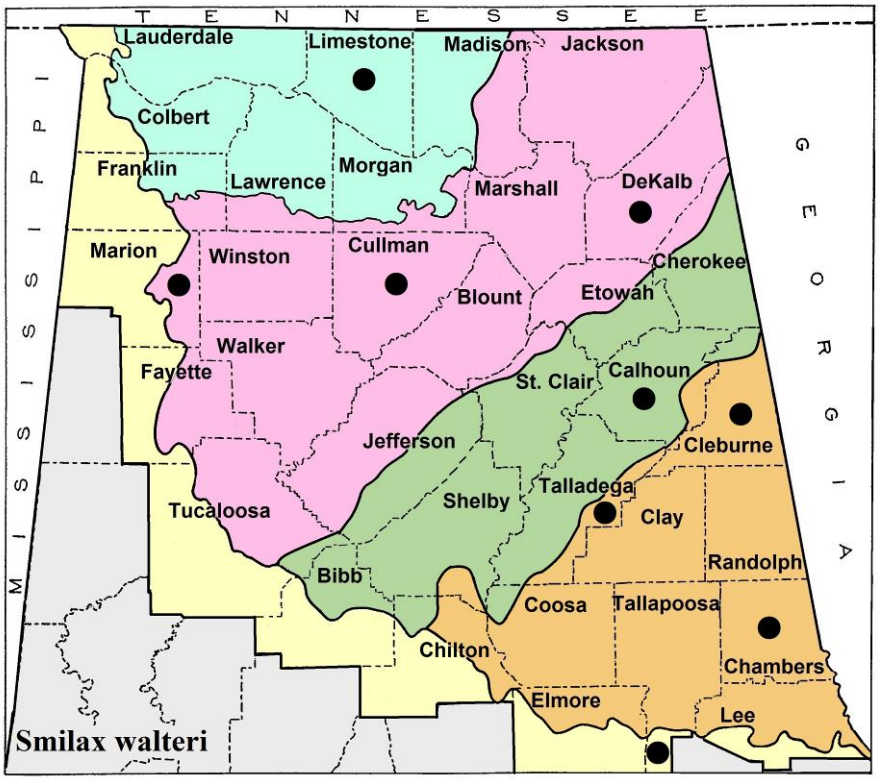

Figure 156. Distribution of *Smilax walteri* in northern Alabama.

Figure 157. *Smilax walteri* male flowers, Sumter Co., Georgia, 8 Apr 2012. Photo: Alan Cressler.

Figure 158. *Smilax walteri.* A–B. Cleburne Co., Alabama, 8 Aug 2020, (A) ovate-lanceolate leaves and (B) red petioles. Photos: Dan Spaulding. C. Buds, Jackson Co., Mississippi, 15 Mar 2015. Photo: Janet Wright.

12. **LILIACEAE** (Lily Family) – in LILIALES

1. Leaves all basal, 1 or 2, usually mottled; flowers solitary on leafless scape ..... **Erythronium**
1. Leaves cauline, usually 3 or more, not mottled; flowers 1 or more at the end of a leafy stem.

    2. Leaves whorled (at most nodes).

        3. Leaves in several whorls, occasionally alternate at a few nodes; tepals more than 2 cm long, orange, red, or yellow; fruit a green or tan capsule; plant from bulbs..... **Lilium**
        3. Leaves in a single whorl with a second whorl of leaf-like bracts terminating stem; tepals less than 1 cm long, yellowish; fruit a blue or blackish berry; plant from rhizome ..... **Medeola**

    2. Leaves alternate.

        4. Stems branched; tepals < 3 cm long, yellow, white, yellowish-white, or yellowish-green; fruit a berry; plant from rhizomes ..... **Prosartes**
        4. Stems unbranched; tepals > 3 cm long, white, orange, red, yellow, pink, or purple; fruit a capsule; plant from bulbs.

            5. Leaves numerous (>20); flowers usually 3 or more, funnel-shaped, white or orange; tepals recurved; plants > 75 cm tall..... **Lilium**
            5. Leaves (2)3–7; flowers solitary, cup-shaped, variously colored (often red); tepals erect or incurved; plants < 60 cm tall..... **Tulipa**

1. **ERYTHRONIUM** Linnaeus 1753

[Greek *erythros*, red; alluding to pinkish-purple flowers of the type species, *E. dens-canis* L.]

This genus has vernacular names such as trout-lily, fawn-lily, dog-tooth-violet, and adder's-tongue, whimsical references to speckled skins or parts of various animals (Coffey 1993). Some interpretations include: the spotted leaves fully develop during trout season (when flowers bloom); the two leaves resemble a fawn's ears; the long, protruding stamens suggest an adder's tongue; and the small, white bulbs allude to a dog's canine teeth (Martin 1988). The name "dog-tooth-violet" was applied to our American species by 18th Century European botanists because *Erythronium dens-canis*

of the Old World has red or purple flowers similar to violets (Harper 1941). John Burroughs (1837–1921), an American Naturalist, coined the names trout-lily and fawn-lily because he did not like the European name (Rickett 1968).

Bumblebees (*Bombus*), miner bees (Andrenidae), and honey bees (*Apis mellifera*) are chief pollinators of trout-lily flowers (Harder et al. 1993). *Erythronium* capsules contain numerous large seeds. Ants are attracted to the nutritious elaiosome, rich in fats and proteins, thus dispersing the seeds (Ruhren & Dudash 1996). The leaves can be cooked as a potherb, and its bulbs, raw or cooked, are reported to be nutritious and sweet (Fernald & Kinsey 1943). Cherokee Indians used warmed, crushed leaves as a dermatological aid for wounds that would not heal (Moerman 1998).

1. Tepals white on the inside (with a yellow spot near base); stigmas 2–3 mm long, recurved to spreading (lobes distinctly separate); petal bases (inner three tepals) lacking auricles or lobes; anthers yellow; flowers nodding; mature capsule held above the ground; capsule apex rounded to occasionally slightly pointed or indented; plants typically growing in calcareous soils in northwest Alabama ..... **Erythronium albidum**
1. Tepals yellow on the inside; stigmas short, club-like, free tips erect or slightly spreading (lobes almost united); petal bases with or without auricles; anthers yellow, brown, or purple; flowers erect or nodding; mature capsule held erect or resting on the ground; capsule apex beaked, rounded apiculate (with a small point), or umbilicate (indented); plants growing in a variety of soils throughout northern Alabama.

    2. Flowers facing outward or erect (at anthesis); tepals not speckled on the inside; well-developed auricles ("eared" lobes) present at base of petals (inner 3 tepals), partially encircling adjacent filament; anthers yellow; capsule apex distinctly long-beaked (style persistent on mature fruit); bulbs with stolons (on sterile, single-leaved plants) ..... **Erythronium rostratum**
    2. Flowers strongly nodding; tepals occasionally speckled with reddish-brown dots on the inner surface; small auricles present or absent at base of petals; anthers yellow, brown, or purple; apex of capsule apiculate to umbilicate (style withering entirely or partially on mature fruit); bulbs with or without stolons on sterile, single-leaved plants.

        3. Petals (inner 3 tepals) with a pair of small auricles ("ears" folded inwards) near base; tepals lacking a white spot near the base on the inside; apex of capsule and ovary usually apiculate (pointed), occasionally rounded or truncate (very rarely umbilicate); mature capsules usually held well off the ground, the apex ascending or oriented horizontally; stolons present on sterile 1-leaved plants ..... **Erythronium americanum**
        3. Petals lacking auricles near base (upper perianth margins can be slightly irregular with unpaired lobes); tepals often with a white or pale spot near the base on the inside; apex of capsule and ovary usually distinctly umbilicate; mature capsules reclining on the ground or held just above the surface with the apex oriented downward; stolons absent on all bulbs ..... **Erythronium umbilicatum**

1. Erythronium albidum Nutt. {white} — WHITE TROUT-LILY; WHITE FAWN-LILY; BLONDE-LILIAN; WHITE DOG-TOOTH-VIOLET (Fig. 159).

Perennial, scapose herb from a bulb. Limestone woods, cedar glades, and alluvial woods. Flowers March–April, fruits late March–May; rare in the Highland Rim and adjacent Cumberland Plateau. (Fig. 160). Native to central and eastern North America from southern Ontario and New York, south to Texas and northern Georgia (Kartesz 2020). It is a critically imperiled to imperiled (S1S2) species in Alabama (ALNHP 2020).

Figure 159. *Erythronium albidum*, Lawrence Co., Alabama, 19 Mar 2020. Photos: Kevin England.

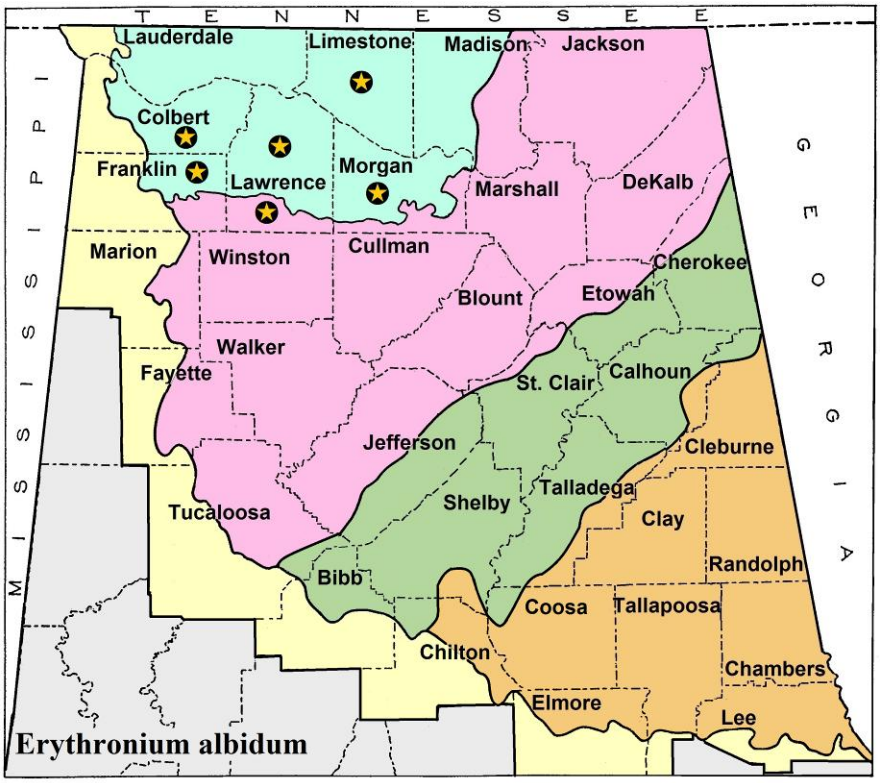

Figure 160. Distribution of *Erythronium albidum* in northern Alabama.

In April 1943, Thomas F. Hall, a botanist with the Tennessee Valley Authority, discovered *Erythronium albidum* in Sheffield, Alabama (Colbert County) from wooded limestone slopes (Harper 1945). The plant's diagnostic characters include reflexed white tepals and distinctly separate stigma lobes (Fig. 161a). The outer surfaces of its tepals are whitish but often tinged with pink, blue, lavender, or green, and the inner surfaces are pure white with a yellow basal botch (Fig. 161b). Mature fruits usually do not rest on the ground (capsules are nodding or erect), and they have rounded, pointed, or slightly umbilicate apices (Fig. 161c). Since *E. albidum* chiefly reproduces vegetatively from stoloniferous bulbs, a lower frequency of flowering individuals typically exists within any given population (Muller 1979). White Trout-Lily often forms extensive colonies with many single-leaved plants lacking flowers (Allen & Robertson 2002).

Figure 161. *Erythronium albidum.* A. Stigma lobes distinct, 12 Mar 2016, Fayette Co., Kentucky. B–C. Franklin, Co., Tennessee, 26 Mar 2016, (B) basal yellow spots and (C) maturing capsule. Photos: Brian Finzel.

Erythronium albidum is similar to the white-flowered *E. mesochoreum* Knerr [Midland Fawn-Lily]. *Erythronium mesochoreum* occurs mainly in prairies of midwestern USA and differs from *E. albidum* by the following characters: narrower, unmottled, folded (conduplicate) leaves; spreading tepals (not strongly reflexed); bulbs lacking stolons; and capsules resting on the ground with arching peduncles (Robertson 1966).

2. Erythronium americanum Ker-Gawl. {American} subsp. **harperi** (W. Wolf) Parks & Hardin {for Roland Harper (1878–1966), a botanist for the Geological Survey of Alabama} — HARPER'S TROUT-LILY (Fig. 162). [*Erythronium harperi* W. Wolf]

Perennial, scapose herb from a bulb. Alluvial woods, rich woods, mesic slopes, creek bottoms, and streambanks. Flowers February–early April, fruits late March–May; uncommon in the Highland Rim and Cumberland Plateau; rare in the Ridge & Valley and Piedmont; very rare in the Coastal Plain (Fig. 163). Endemic to the southeastern USA, from northeast Mississippi, west through Alabama, Tennessee, and Georgia.

Allen and Robertson (2002), in *Flora of North America*, state that *Erythronium americanum* subsp. *harperi* differs from subsp. *americanum* [American Trout-Lily] by having recurved, grooved stigma lobes (Fig. 164a) and capsules with an apiculate (nipple-like) apex (Fig. 164b). American Trout-Lily is native to the eastern USA and adjacent Canada, south to Tennessee and northern South Carolina (Kartesz 2020). Harper's Trout-Lily is very similar but has a more restricted range. Both

taxa have nodding yellow flowers with brownish, purplish, or yellow anthers (Fig. 164c); tepals usually with reddish-brown specks on the inside; petals (inner three tepals) with small auricles (Fig. 164a); and capsules typically held off the ground. Both subspecies of *E. americanum* form extensive colonies (Fig. 165a) from slender, white underground runners (stolons). Only the bulbs of sterile, single-leaved individuals have stolons (Fig. 165b–c). Some populations consist mostly of plants with single leaves and very few flowering individuals. It takes several years before sterile plants produce two leaves and flower stalks.

Figure 162. *Erythronium americanum* subsp. *harperi*, Madison Co., Alabama, 10 Mar 2007. Photo: Brian Finzel.

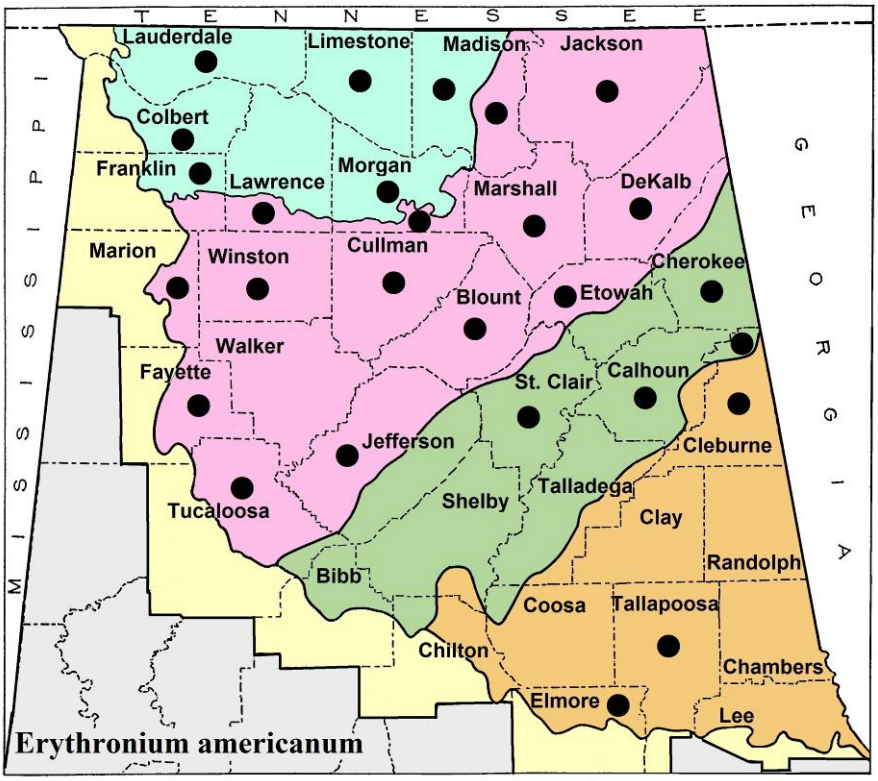

Figure 163. Distribution of *Erythronium americanum* subsp. *harperi* in northern Alabama.

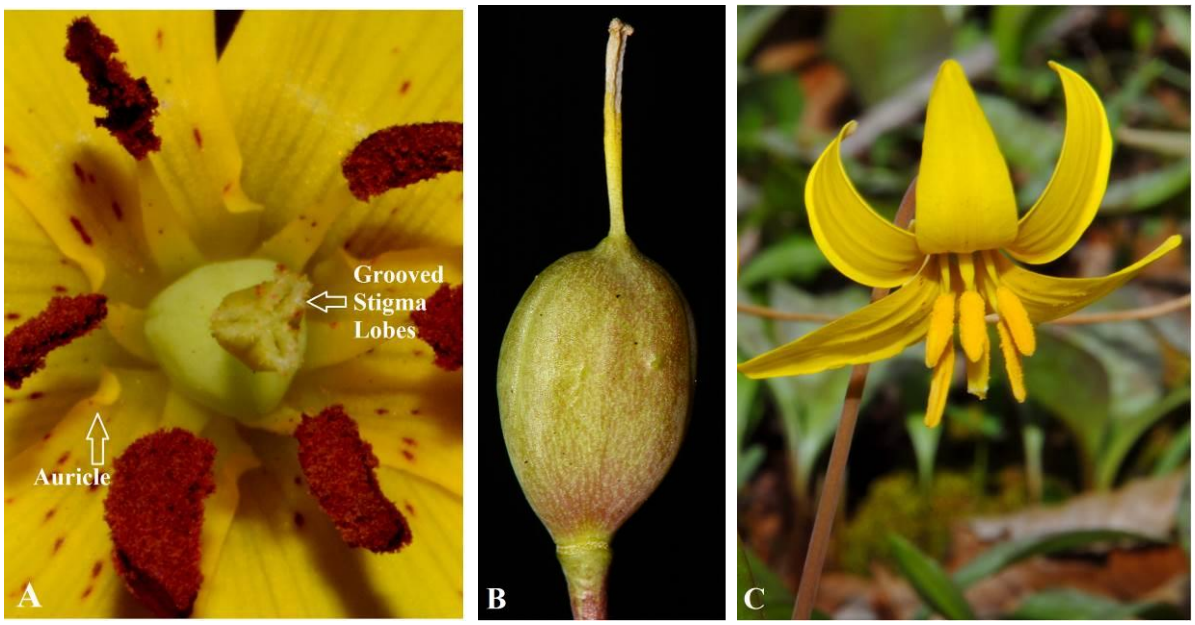

Figure 164. *Erythronium americanum* subsp. *harperi*. A. Flower close-up, Madison Co., Alabama, 23 Mar 2015. B. Apiculate capsule (only base of style persistent), Jackson Co., Alabama, 31 Mar 2008. C. Yellow anther form, Madison Co., Alabama, 10 Mar 2007. Photos: Brian Finzel.

Figure 165. *Erythronium americanum* subsp. *harperi*. A. Colony in rich woods, Etowah Co., Alabama, 18 Mar 2020. B. Stolons are arising above the ground, Cleburne Co., Alabama, 25 Mar 2020. C. Single-leaved plants with stolons, Etowah Co., Alabama, 27 Mar 2020. Photos: Dan Spaulding.

Wolfgang Wolf, a self-taught botanist and Benedictine monk at St. Bernard Abbey in Cullman, Alabama, named Harper's Trout-Lily (Hansen 2017). He first described this plant as *Erythronium harperi* and believed it was closely related to *E. albidum* rather than *E. americanum* (Wolf 1941). Parks & Hardin (1963) treated Wolf's species as a subspecies of *E. americanum* but stated that subsp. *harperi* does not significantly differ from subsp. *americanum*, suggesting "that *harperi* represents merely a southern race of the widely distributed *americanum* and that the variation reflects a north–south cline." Brian Keener (pers. comm. 2020) does not recognize *E. americanum*

subsp. *harperi* as distinct from subsp. *americanum.* The senior author discovered from recent fieldwork that the apiculate capsule is sometimes unreliable for identifying the subspecies. Most seed pods exhibit this trait, but the apex can occasionally be rounded or truncate. There is one documented population with umbilicate capsules, but all other characters match *E. americanum* (Fig. 166a–d). This entity, "Brasher's Trout-Lily" (Fig. 167), is known only from the Cumberland Plateau of Etowah County, Alabama, and perhaps represents an undescribed taxon (see discussion under *E. umbilicatum*).

Figure 166. "Brasher's Trout-Lily" in Etowah Co., Alabama. A–C. 21 Mar 2020, (A) ovary, (B) petal auricles, and (C) indented capsule. Photos: Brian Finzel. D. Bulb with two (broken) stolons, 18 Mar 2020. Photo: Dan Spaulding.

Figure 167. "Brasher's Trout-Lily" in fruit, Etowah Co., Alabama, 29 Mar 2020. Photo: Brian Finzel.

3. Erythronium rostratum W. Wolf {beaked} — BEAKED TROUT-LILY (Fig. 168).

Figure 168. *Erythronium rostratum*, Talladega Co., Alabama, 17 Mar 2021. Photos: Dan Spaulding.

Perennial, scapose herb from a bulb. Rich woods, mesic slopes, bluffs, bottomland forests, and cedar glades. Flowers February–April, fruits late February–May; uncommon in the Highland Rim, Cumberland Plateau, and Ridge & Valley; very rare in the Piedmont and Coastal Plain (Fig. 169). Native to the south-central USA, from eastern Oklahoma and southern Ohio to Alabama and eastern Texas (Kartesz 2020).

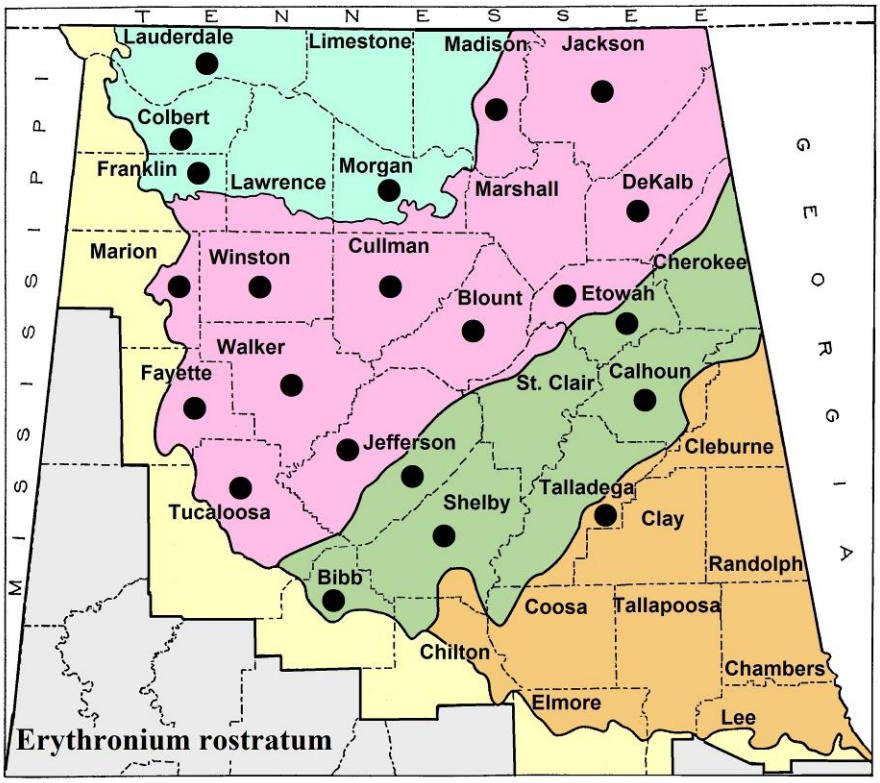

Figure 169. Distribution of *Erythronium rostratum* in northern Alabama.

Figure 170. *Erythronium rostratum*. A. Capsule, Colbert Co., Alabama, 16 Apr 2016. B–C. Colbert Co., Alabama, 15 Mar 2016, (B) ovary close-up, and (C) petal auricles. Photos: Brian Finzel.

Beaked Trout-Lily's flowers are erect or outward-facing, its tepals are not speckled, and anthers are yellow. Its capsule is distinctly long-beaked (Fig. 170a–b); hence the common name. The fruit is usually held erect at maturity, often on an upward-curving peduncle (Allen & Robertson 2002). Plants form large colonies from stolons on single-leaved bulbs. Mohr (1901), in *Plant Life of Alabama*, listed only one species of trout-lily, *Erythronium americanum.* In 1930, Wolf (1941) suspected other species might occur and later described *E. rostratum*, differing from *E. americanum* by its persistent beak-like style and petals having well-developed auricles (Fig. 170c). Harper (1949), after discovering another unnamed trout-lily for Alabama (see *E. umbilicatum* below), wrote, "There is no imaginable reason why Alabama should not have more species of *Erythronium* than any other eastern state." Parks & Hardin (1963), referring to the species in the eastern USA, stated: "It now appears that Alabama lies within the area of greatest natural variation."

4. Erythronium umbilicatum Parks & Hardin subsp. **umbilicatum** {umbilicate; for dimpled ovary} — DIMPLED TROUT-LILY; DIMPLED FAWN-LILY (Fig. 171a–b).

Perennial, scapose herb from a bulb. Alluvial woods, mesic slope forests, bottomland forests, creek/stream banks, and granite outcrops. Flowers February–April, fruits mid-March–May; uncommon in the Cumberland Plateau, Ridge & Valley, and Piedmont; very rare in the Coastal Plain (Fig. 172). Native to the southeastern USA, primarily in the Southern Appalachians and Piedmont, from Virginia and Kentucky, south to the Panhandle of Florida and Alabama (Kartesz 2020).

Harper (1949) was the first to report this taxon from the Piedmont of Alabama, but he did not formally name it. He visited the site in March of 1948 with Dr. Pallister of the Geological Survey of Alabama, who discovered it two weeks earlier, writing "the Clay County plant was evidently different from anything I had seen in Alabama before, but apparently identical with one seen in Durham County, North Carolina, in May 1940, with a pear-shaped capsule that hangs straight down, and often rests on the ground at maturity." Parks & Hardin (1963) described it as a new species, *Erythronium umbilicatum* subsp. *umbilicatum*. The following are key characteristics of this taxon: petal auricles absent (Fig. 173a); tepals often with a basal white spot on the inside; apex of ovary and capsule distinctly indented (Fig. 173b); mature capsules on arching peduncles with apex oriented downward with fruit either touching the ground or held just above the surface (Fig. 173c); and bulbs lacking stolons (Fig. 174a). The perianth margins (tepals) are infrequently irregular with unpaired lobes (Fig. 174b–c), though Weakley (2020) assigns this trait only to *E. umbilicatum* subsp. *monostolum*. Dimpled Trout-Lily's anthers are usually lavender, brown, cinnamon, purple, occasionally yellow, or rarely cream-colored.

Figure 171. *Erythronium umbilicatum* subsp. *umbilicatum*. A. Cleburne Co., Alabama, 18 Mar 2020. Photo: Lori Hammond. B. Tepals with white basal spots, Randolph Co., Alabama, 24 Feb 2018. Photo: Daniel Folds.

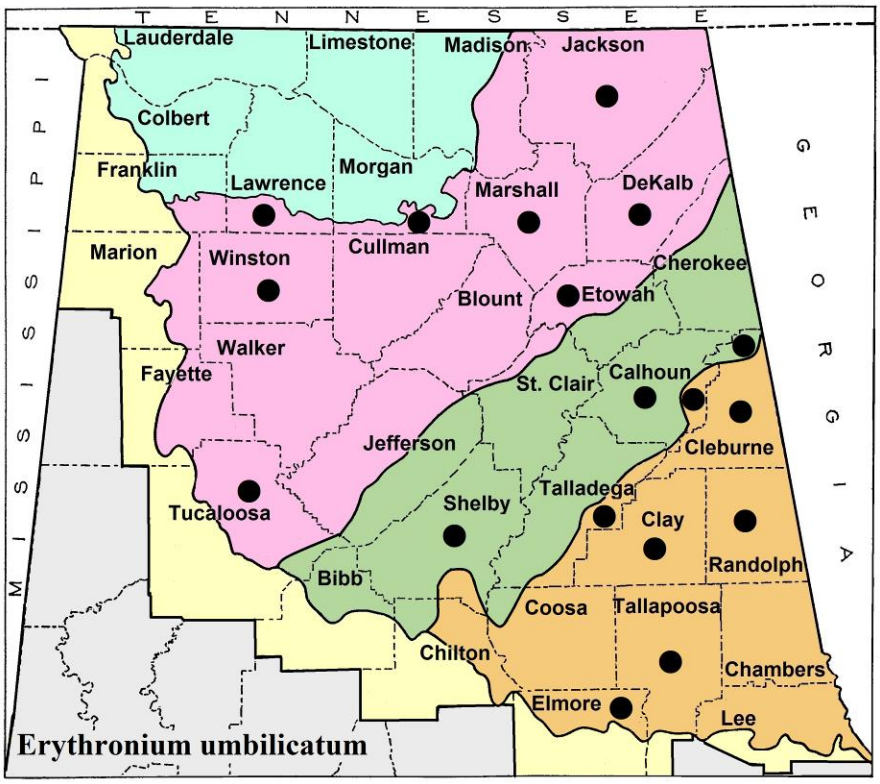

Figure 172. Distribution of *Erythronium umbilicatum* subsp. *umbilicatum* in northern Alabama.

Figure 173. *Erythronium umbilicatum* subsp. *umbilicatum*. A. Close-up of flower, Randolph Co., Alabama, 17 Mar 2019. Photo: Brian Finzel. B. Capsule, Randolph Co., Alabama, 29 Mar 2020. C. Arching peduncle with capsule apex facing downward, Randolph Co., Alabama, 29 Mar 2020. Photos: Dan Spaulding.

Figure 174. *Erythronium umbilicatum* subsp. *umbilicatum*, Cleburne Co., Alabama, 15 Mar 2020. A. Bulb lacking stolons. B. Irregular perianth margins, inside surface of tepals (rare form). C. Outer surface of tepals. Photos: Dan Spaulding.

Parks & Hardin (1963) described a stoloniferous subspecies from the high mountains in the Blue Ridge of North Carolina and Tennessee. They named the taxon *Erythronium umbilicatum* subsp. *monostolum* [Southern Appalachian Trout-Lily]. It differs from the typical subspecies by having one stolon on bulbs of single-leaved plants. Larry Brasher reported this subspecies from the Cumberland Plateau of Etowah County, Alabama (Brasher 2010). In March of 2020, the senior author visited the population and determined the taxon was not *E. umbilicatum* subsp. *monostolum*. The mature capsules were umbilicate; however, the bulbs had more than one stolon, the petals were auriculate, and capsule apices were not downward-facing (though their sides occasionally rested on the ground). This unusual entity is treated here as *E. americanum* because of its similar morphological features (Fig. 166 & 167). Dr. Brasher (pers. comm. 2020) sent some fresh specimens to Ed Schilling of the University of Tennessee for molecular study to determine if this anomaly should merit recognition.

2. LILIUM Linnaeus 1753

[Greek *lirion*, white lily; after the white flowers of the type species *Lilium candidum* L.]

1. Leaves alternate throughout.

    2. Tepals orange; upper leaves usually with dark purple bulblets in axils; stems scabrous, upper portion with cottony (arachnoid) pubescence ..... **Lilium lancifolium**
    2. Tepals white; leaves lacking bulblets in axils; stem glabrous ..... **Lilium philippinense**

1. Leaves mostly whorled, occasionally alternate at a few nodes.

    3. Leaves oblanceolate to obovate (broadest near tips); stems usually with 2–5 whorls of leaves; flowers fragrant ..... **Lilium michauxii**
    3. Leaves lanceolate or narrowly elliptic (not wider near tips); stems usually with 5–15 whorls of leaves; flowers not fragrant.

        4. Leaf margin and main veins smooth (rarely with a few rounded papillae); tepals strongly recurved almost from base of corolla tube; anthers 15–25 mm long; green nectaries near base of tepals large (1–1.5 cm long), forming a visible green star..... **Lilium superbum**
        4. Leaf margin and main veins scabrous (roughened with small sharp spicules); tepals recurved from around the middle or only spreading near tips; anthers 10–15 mm long; green nectaries at base of tepals small (< 1 cm long), not visible in the mouth of corolla.

            5. Tepals recurved below the middle closer to corolla base (perianth curves backward, forming a circular shape, tips often reaching base of corolla tube); stamens moderately exserted beyond corolla tube (distinctly protruding past mouth); filaments arching outward at maturity (parallel when young) ..... **Lilium michiganense**
            5. Tepals spreading or recurved above middle closer to tips (perianth curves outward, forming a bell-like shape); stamens usually slightly exserted beyond corolla tube (mostly the anthers seen from the side); filaments nearly parallel to style..... **Lilium canadense**

1. Lilium canadense L. {Canadian} — CANADA LILY; CANADIAN LILY; MEADOW LILY (Fig. 175). [*Lilium canadense* var. *editorum* Fernald; *Lilium canadense* ssp. *editorum* (Fernald) Wherry]

Perennial herb from a bulb. Moist, rich woods, north-facing limestone slopes, low roadsides, wet meadows, and bog margins. Flowers June–July, fruits late July–September; rare in the Highland Rim and Cumberland Plateau; very rare in the Ridge & Valley (Fig. 176). Native to the eastern USA and adjacent Canada, from Ontario to Nova Scotia, south to northern Alabama and Georgia (Kartesz 2020). It is listed as an imperiled (S2) species in Alabama (ALNHP 2020).

Tepals of *Lilium canadense* are spreading or recurved above the middle (closer to the tips). Its stamens are scarcely exserted past the corolla tube and are parallel to the style. *Lilium michiganense* is similar, but its tepals are distinctly bent backward (they are reflexed below the middle closer to the corolla tube base). Michigan Lily's stamens are moderately exserted beyond the corolla tube and are widely spreading at maturity. Canada Lily's tepals are red, orange, or yellow (Fig. 177a–b), but only plants with red or reddish-orange tepals are known to occur in Alabama. Fernald (1943) described an Appalachian entity with red flowers as variety *editorum* and included other characteristics such as broader leaves and tepals reflexed closer to the middle. Skinner (2002) believes this variety is not taxonomically warranted because these characters are variable.

Ruby-throated Hummingbirds (*Archilochus colubris*) have been observed pollinating the flowers of *Lilium canadense* (Skinner 2002). Cherokee Indians used an infusion of the "root" to combat diarrhea and prepared bread from the bulb during famine (Moerman 1998).

Figure 175. *Lilium canadense*, Jackson Co., Kentucky, 17 Jul 2018. Photos: Tara Rose Littlefield.

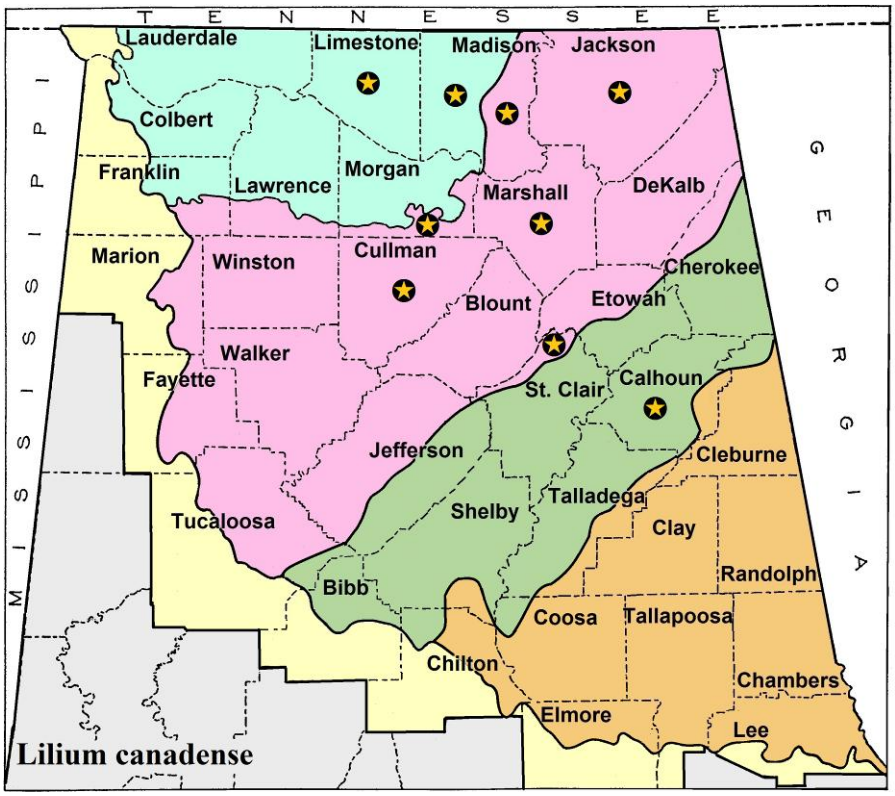

Figure 176. Distribution of *Lilium canadense* in northern Alabama.

Figure 177. *Lilium canadense*. A. Yellow flower form, Orange Co., Vermont, 9 Jul 2017. Photo: Tom Norton. B. Red flower form, Madison Co., Alabama, 13 May 1996. Photo: Steven Threlkeld.

2. Lilium lancifolium Thunb. {lance-leaved} — TIGER LILY; GARDEN LILY (Fig. 178). [*Lilium tigrinum* L.]


Figure 178. *Lilium lancifolium*, Cleburne Co., Alabama, 6 Jul 2019. Photo: Melanie Taylor Spaulding.

Perennial herb from a bulb. Roadsides, roadbanks, woodland borders, old homesites, and other disturbed areas. Flowers July–August, fruits September–October; rare in northern Alabama (Fig. 179). Native to China, naturalized in central and eastern USA and adjacent Canada (Kartesz 2020).

Lilium lancifolium is easily identified by its lanceolate leaves, cottony upper stems, dark bulblets within its leaf axils (Fig. 180a), and beautiful bright orange tepals with numerous purple-black spots (Fig. 180b). It is a very popular garden ornamental, possibly one of the earliest domesticated lilies (Skinner 2002). Historically, the Tiger Lily has been recognized under the botanical name *L. tigrinum*, but *L. lancifolium* has priority.

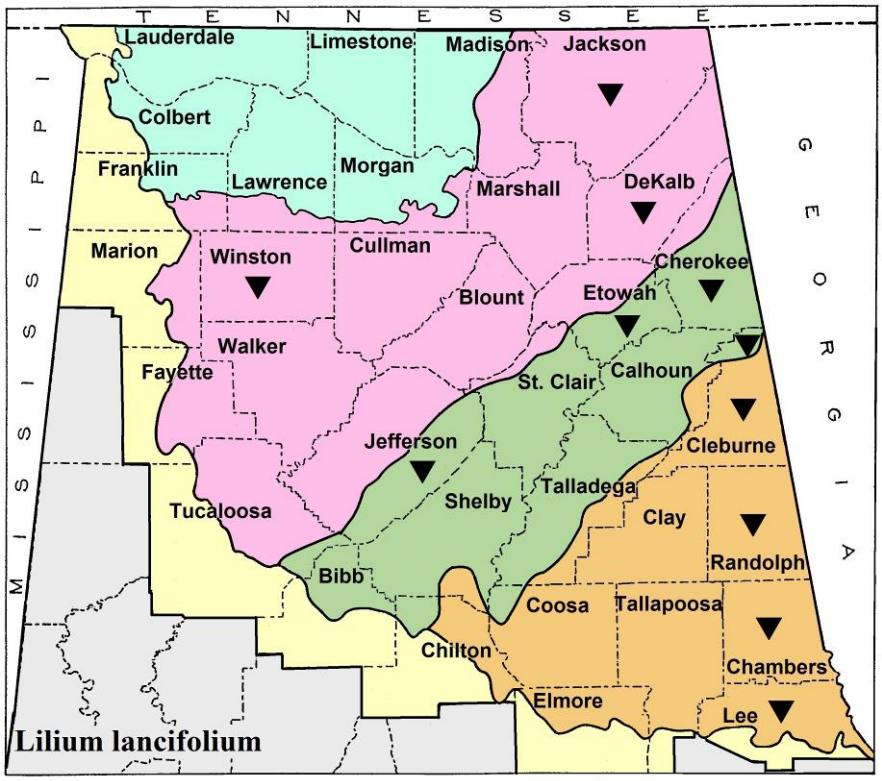

Figure 179. Distribution of *Lilium lancifolium* in northern Alabama.

Figure 180. A–B. *Lilium lancifolium*, Cleburne Co., Alabama, 6 Jul 2019. Photos: Dan Spaulding. C. *Lilium catesbaei*, Mobile Co., Alabama, 26 Aug 2016. Photo: Howard Horne.

Lilium catesbaei Walter [Pine Lily], a southeastern Coastal Plain endemic, also has alternate, lanceolate leaves, but they lack bulblets in the axils. Pine Lily's flowers are erect and have reddish to orange-pink, clawed (abruptly tapering) tepals (Fig 180c). Dr. Robert Kral collected this species from the Coastal Plain of Chilton County in a Longleaf Pine seep (Keener et al. 2021). Another lily, *L. philadelphicum* L. var. *philadelphicum* [Wood Lily], also has erect flowers and clawed tepals but differs by having whorled leaves at 3–6 nodes. It is unknown in Alabama but is native to the Appalachians, from southeastern Canada, south to adjacent Georgia and Tennessee.

3. Lilium michauxii Poir. {for its discoverer, André Michaux, 1746–1802} — CAROLINA LILY; MICHAUX'S LILY (Fig. 181a–b). [*Lilium carolinianum* Michx., non Bosc *ex* Lam.]

Figure 181. *Lilium michauxii*. A. Jefferson Co., Alabama, 28 Jul 2011. Photo: Brian Finzel. B. Flower, Cleburne Co., Alabama, 4 Aug 2019. Photo: Dan Spaulding.

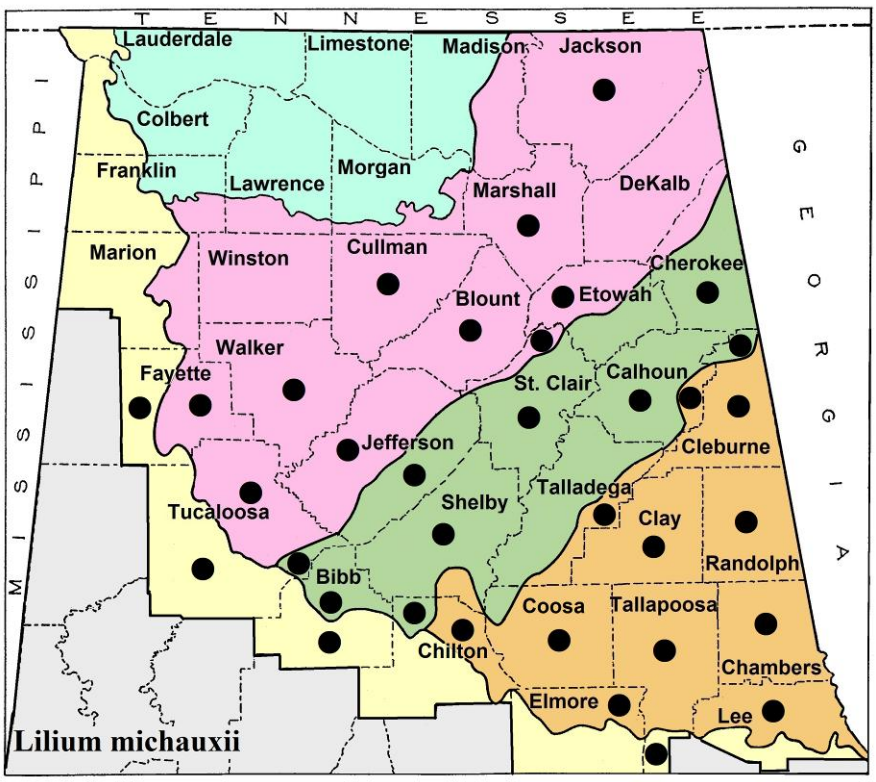

Figure 182. Distribution of *Lilium michauxii* in northern Alabama.

Perennial herb from a bulb. Mixed woods, riparian forests, wooded slopes, woodland borders, and roadbanks. Flowers June–August, fruits August–October; uncommon in the Cumberland Plateau, Ridge & Valley, Piedmont, and Coastal Plain (Fig. 182). Native to the southeastern USA, from southern Virginia and east Tennessee south to eastern Texas and northern Georgia (Kartesz 2020).

Figure 183. *Lilium michauxii*. A. Flower, Sumter Co., Alabama, 25 Jul 2012. B. Oblanceolate leaves, Bibb Co., Alabama, 31 Jul 2013. Photos: Brian Finzel.

Lilium michauxii is the most common lily species in Alabama. It has showy flowers with strongly reflexed tepals (Fig. 183a). Its small stature and oblanceolate leaves in a few whorls make it easy to identify (Fig. 183b). Carolina Lily is the only native *Lilium* east of the Rocky Mountains with fragrant flowers. Large swallow-tailed butterflies (Papilionidae) are its pollinators (Skinner 2002).

4. Lilium michiganense Farw. {of Michigan} — MICHIGAN LILY (Fig. 184). [*Lilium canadense* L. subsp. *michiganense* (Farw.) Boivin & Cody]

Perennial herb from a bulb. Floodplains, bottomlands, alluvial woods, and moist prairies. Flowers May–July, fruits August–October; rare in the Highland Rim, Cumberland Plateau, and Ridge & Valley; very rare in the Coastal Plain (Fig. 185). Native to the central USA and Ontario, from Minnesota to Ohio and western New York south to eastern Oklahoma and northwest Georgia (Kartesz 2020). It is listed as a critically imperiled (S1) species in Alabama (ALNHP 2020).

Skinner (2002), in *Flora of North America*, omitted *Lilium michiganense* for Alabama, even though it appears to be more frequent in the state than *L. canadense*. Both species have whorled leaves (Fig. 186a) and are virtually identical when not in flower. Michigan Lily differs from Canada Lily by having strongly reflexed tepals, usually recurving above the middle (Fig. 186b). Its stamens distinctly extend beyond the corolla tube, and filaments arch outward at maturity (Fig. 186c). Overall, diagnostic characters separating the two taxa are few. Wherry (1946) recognized the taxa as distinct species; whereas, Boivin and Cody (1956) treated *L. michiganense* as a subspecies of *L. canadense*. Another *Lilium* with distinctly reflexed tepals in Alabama is *L. superbum*. It is similar to *L. michiganense* but has smooth leaf margins (vs. scabrous), longer anthers (15–25 mm vs. 10–15 mm), and a broader, green band at the base of tepals (> 1 cm long) that is visible as a green star.

Figure 184. *Lilium michiganense*, Colbert Co., Alabama, 25 Jun 2014. Photos: Wayne Barger.

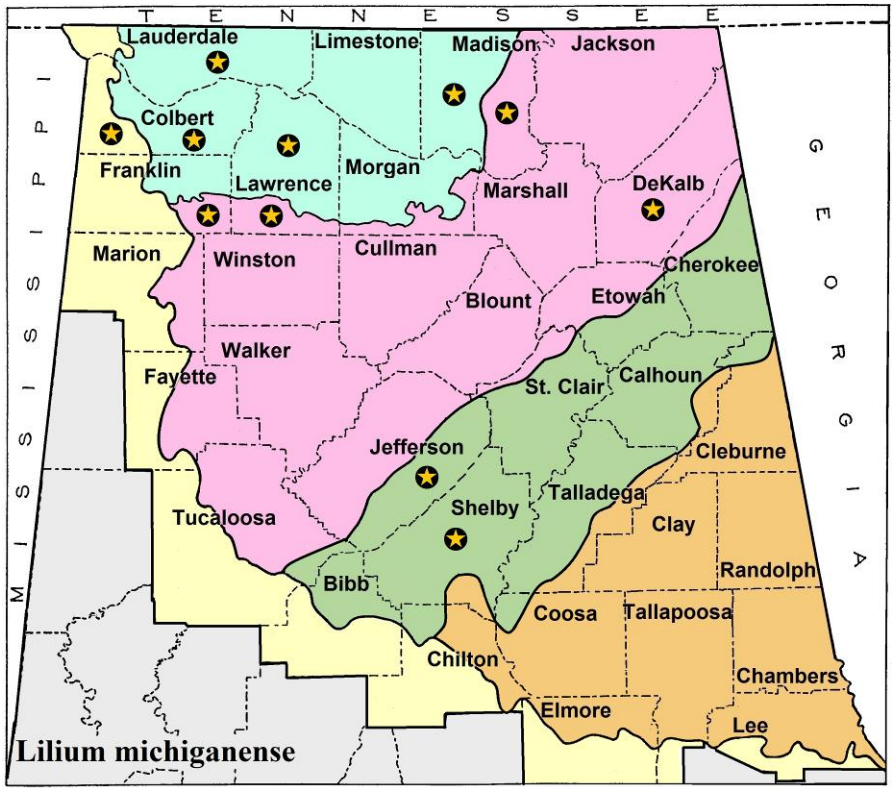

Figure 185. Distribution of *Lilium michiganense* in northern Alabama.

Figure 186. *Lilium michiganense*. A–C. Lawrence Co., Alabama, 4 Jun 2019, (A) whorled leaves, (B) distinctly reflexed tepals, and (C) stamens are spreading at maturity. Photos: Helen A. Czech.

5. Lilium philippinense Baker {of the Philippines} — BENGUET LILY; PHILIPPINE ISLAND LILY (Fig. 187).


Figure 187. *Lilium philippinense*, Walker Co., Alabama, 2 Aug 2020. Photos: Dan Spaulding.

Perennial herb from a bulb. Roadsides, fence rows, and other disturbed areas. Flowers July –August; rare throughout Alabama (Fig. 188). An endemic species of the Cordillera Central Range on Luzon Island in the Philippines (Balangcod et al. 2011). It is cultivated outdoors in warmer regions and has naturalized in the southeastern USA (Bailey 1929, Kartesz 2020).

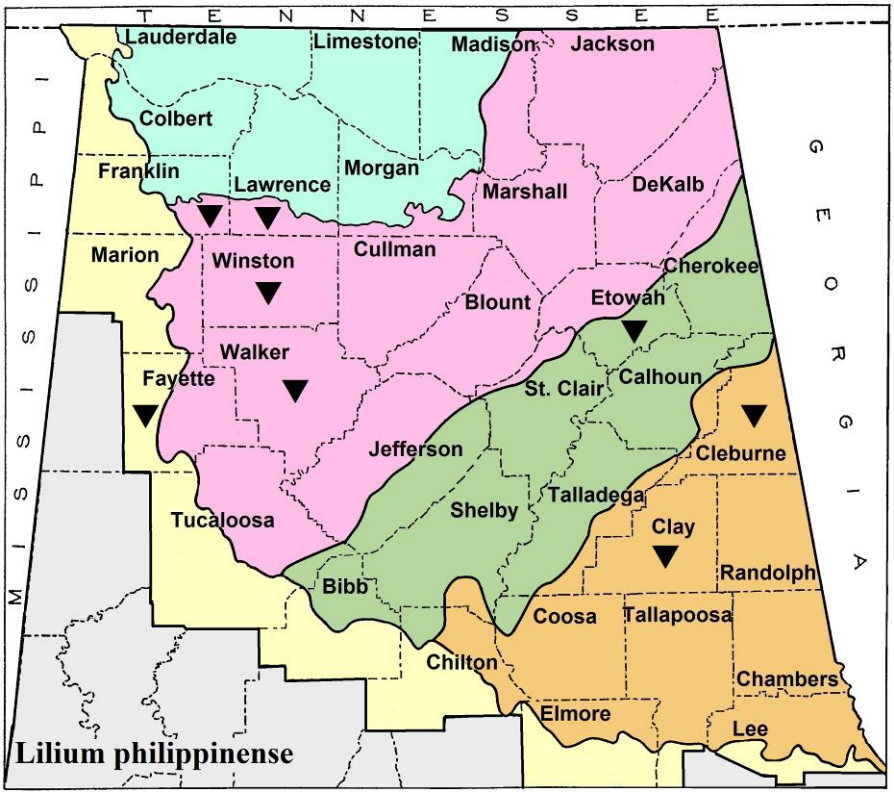

Figure 188. Distribution of *Lilium philippinense* in northern Alabama.

Lilium philippinense is the only "trumpet lily" documented from northern Alabama. It looks very similar to the Easter lily of commerce (*L. longiflorum* Thunb.) used in churches, weddings, funerals, and decorations for other special events (Bailey 1929). Benguet Lily is native to the Benguet province of the Philippines. It was first discovered on high mountain slopes in 1871 by Gustav Wallis (1830–1878), a German horticulturist (Balangcod et al. 2011).

Figure 189. *Lilium philippinense*. A–C. Winston Co., Alabama, 12 Jul 2020, (A) tall plants, (B) linear leaves with one chief vein, and (C) segmented bulb. Photos: Dan Spaulding.

Flowers of *Lilium philippinense* are the largest in the genus (Skinner 2002). They have a pleasant fragrance and are white, occasionally streaked with green or red. This species can grow up to 3 meters tall (Fig. 189a) and has alternate, linear leaves with a single dominant vein (Fig. 189b). Plants are perennial from bulbs composed of fleshy segments (Fig. 189c). Benguet Lily is often confused with the closely related *L. longiflorum* [Easter Lily] of Japan, which has lanceolate leaves with 3–5 veins. Kral (1981) reported another trumpet lily, *L. regale* E.H. Wilson [Regal Lily], from Lamar and Chilton counties, but these records represent *L. philippinense* (Skinner 2002).

6. Lilium superbum L. {superb} — TURK'S-CAP LILY; LILY-ROYAL; SUPERB LILY (Fig. 190).

Figure 190. *Lilium superbum*, Cleburne Co., Alabama, 18 Jul 2020. Photos: Dan Spaulding.

Perennial herb from a bulb. Low woods, creek bottoms, forested wetlands, seeps, pine savannas, streambanks, and moist roadbanks. Flowers July–August, fruits September–October; very rare in the Cumberland Plateau and Ridge & Valley; rare in the Piedmont and Coastal Plain (Fig. 191). Native to the eastern USA, from Massachusetts to Missouri, south to the Florida Panhandle and east Louisiana (Kartesz 2020).

Lilium superbum is the showiest of all our Alabama lilies. It is also the tallest native lily east of the Rocky Mountains (Fig. 192a), with the most numerous and largest flowers in the eastern USA (Skinner 2002). It is vegetatively similar to *L. canadense* and *L. michiganense*, with whorls of leaves at its nodes (Fig. 192b). However, the leaf margins and main veins of *L. superbum* are smooth rather than scabrous. At the base of its tepals is a conspicuous green mark (nectary gland) that forms a star-like shape at the mouth of the corolla (Fig. 193a). Its flowers have strongly recurved orange to reddish-orange tepals (Fig. 193b). Plants produce cylindrical seed pods (capsules) in late summer and fall (Fig. 193c).

The common name "Turk's-cap" refers to the reflexed tepals, which Hill (2007) says "is based upon a fancied resemblance to the highly decorative red caps worn by some Turks in the 1700's." Note that the yellow pollen from this species will stain almost anything it touches.

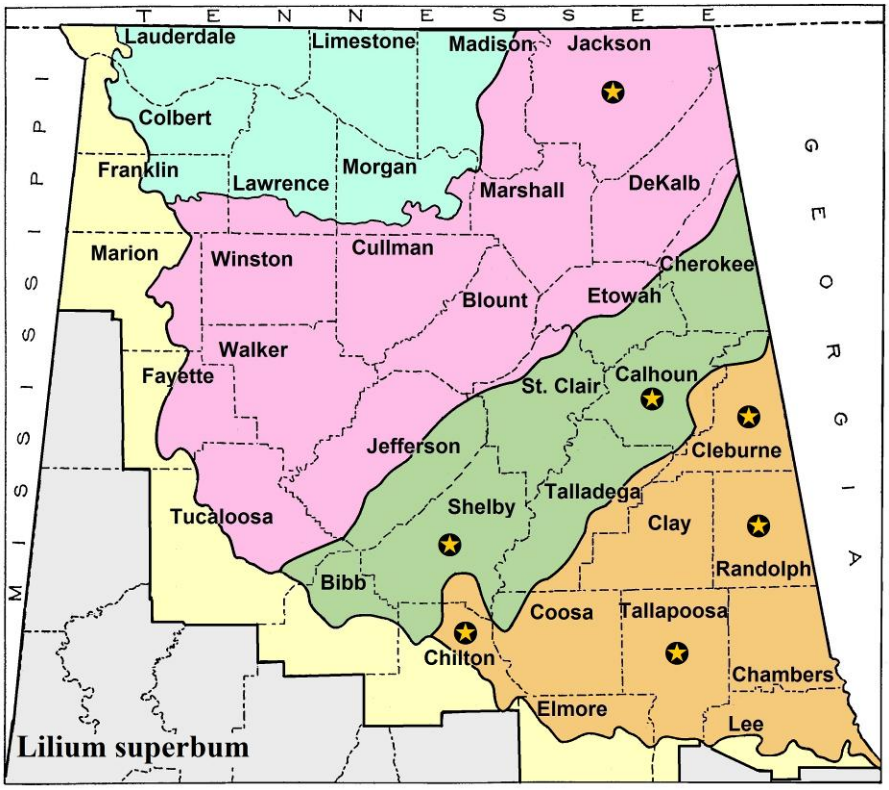

Figure 191. Distribution of *Lilium superbum* in northern Alabama.

Figure 192. *Lilium superbum*. A–B. Cleburne Co., Alabama, 18 Jul 2020, (A) senior author, Dan Spaulding, 6' 2" tall (removing pandemic mask) with lilies, and (B) whorled leaves. Photos: Melanie Taylor Spaulding.

Figure 193. *Lilium superbum*. A. Green star-like shape in corolla mouth, Sevier Co., Tennessee, 5 Jul 2011. Photo: Brian Finzel. B. Plant with reddish tepals, Cleburne Co., Alabama, 18 Jul 2020. Photo: Dan Spaulding. C. Seed pods, Cleburne Co., Alabama, 6 Sep 2019. Photo: Melanie Taylor Spaulding.

Turk's-Cap Lily is rare and is a vulnerable (S3) species in Alabama (ALNHP 2020). Threats to populations include competition from invasive plants and deer herbivory, but primarily habitat destruction and degradation from human activities. *Lilium superbum* is a facultative wetland (FACW) plant, and any alteration in the hydrology of its habitat can be detrimental to its survival (Hill 2007). A similar species, *L. iridollae* Henry [Panhandle Lily], is native to bogs of the Florida Panhandle and adjacent Alabama. It differs by having 1–5 whorls of leaves and 1–4 flowers (Skinner 2002). *Lilium iridollae* often has yellowish tepals, giving rise to another name, Pot-of-Gold Lily.

3. **MEDEOLA** Linnaeus 1753

[Named after Medea, a mythical sorceress; possibly alluding to its supposed medicinal virtues]

1. Medeola virginiana L. {of Virginia} — INDIAN CUCUMBER-ROOT (Fig. 194).

Perennial herb from short, horizontal rhizomes. Rich woods, woodland seeps, mesic forests, creek bottoms, floodplains, and streambanks. Flowers late March–May, fruits June–September; rare in the Highland Rim; uncommon in the Cumberland Plateau, Ridge & Valley, Piedmont, and Coastal Plain (Fig. 195). Native to the eastern USA and adjacent Canada, from Ontario and Nova Scotia, south to east Louisiana and the Florida Panhandle (Kartesz 2020).

Medeola virginiana appears to have two whorls of leaves, but the upper, smaller whorl are actually bracts. Flowers develop below the bracts, but the pedicels become erect in fruit. The berries turn blackish-purple at maturity and are attached to reddish fruiting stalks (Fig. 196a), which attract frugivorous (fruit-eating) birds that aid in dispersing seeds (Peterson 1914).

The common name refers to its edible, succulent, tuberous rhizomes (Fig. 196b) with a cucumber-like flavor (Utech 2002f). Fernald & Kinsey (1943) write: "The rootstock is crisp and starchy, with a delicate taste of cucumber, and forms a pleasant nibble in the woods, or when dressed with vinegar or vinegar and oil, a pleasant salad or pickle." Native Americans used the crunchy white tubers as food and medicine (Coffey 1993).

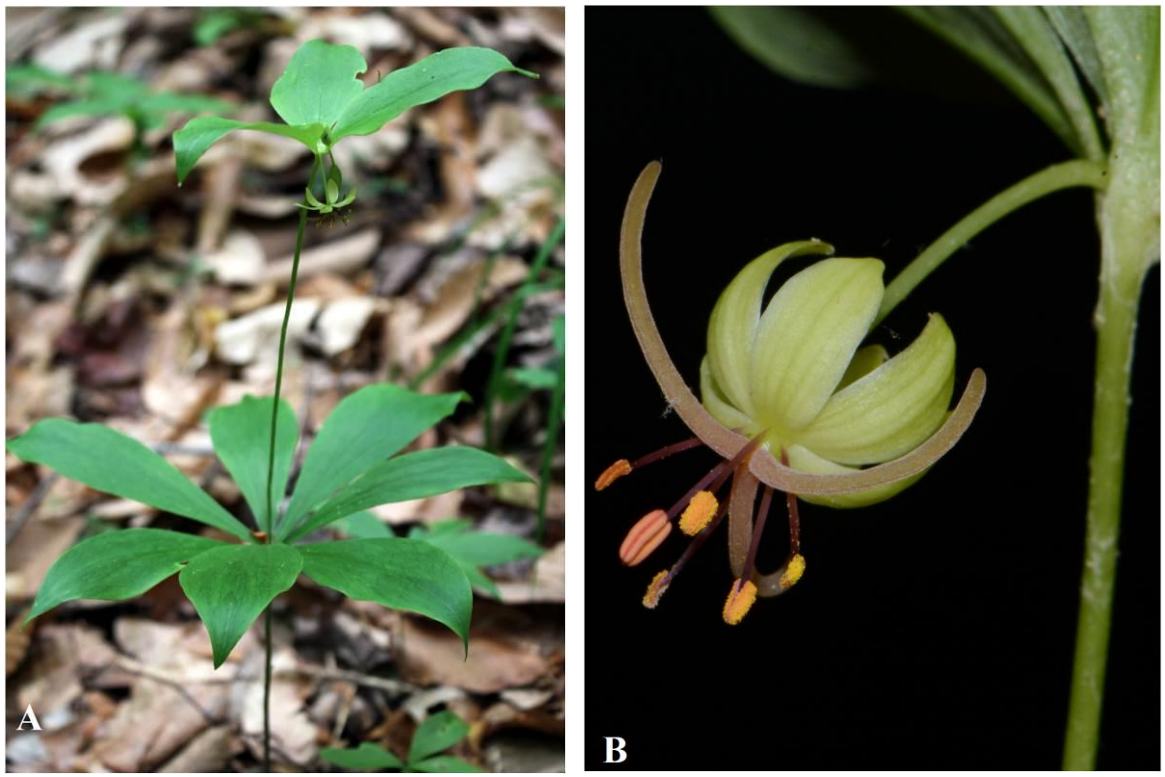

Figure 194. *Medeola virginiana*. A. DeKalb Co., Alabama, 1 May 2013. Photo: Wayne Barger. B. DeKalb Co., Alabama, 21 May 2015. Photo: Brian Finzel.

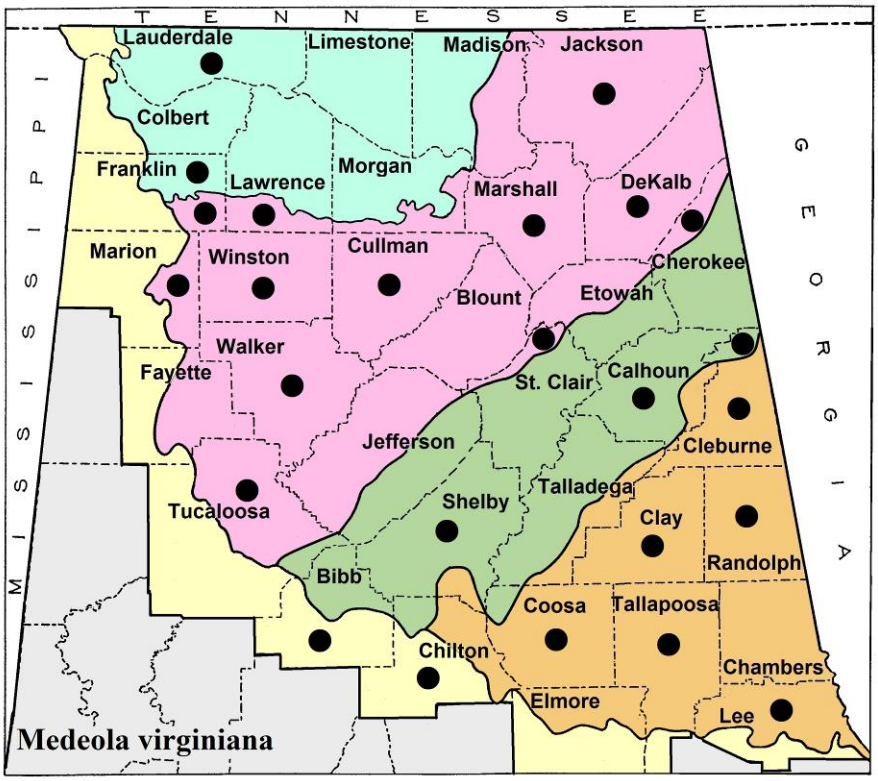

Figure 195. Distribution of *Medeola virginiana* in northern Alabama.

Figure 196. *Medeola virginiana*. A. Plant in fruit, Cleburne Co., Alabama, 29 Aug 2020. Photo: Marc A.K. Johnson. B. Rhizome, Transylvania Co., North Carolina, 20 Apr 2013. Photo: Janie K. Marlow.

4. **PROSARTES** D. Don 1839

[Greek *prosarto*, to append or attach, alluding to pendulous ovules in the type species, *P. lanuginosa*]

The genus *Prosartes* was erected from *Streptopus* by Don (1841). He noted that the group was similar to *Disporum*, differing by the following characters: base of the anther attached to the filament (basifixed) vs. the whole length of the anther attached to the filament (adnate); nearly entire styles vs. deeply divided styles; and pendulous seeds vs. ascending seeds. Bentham & Hooker (1862–1883) failed to recognize this genus in their epic work *Genera Plantarum* and included all North American taxa within the East Asia genus *Disporum*. Jones (1951) considered that the two groups had many distinctions but treated them as sections of a single genus, *Disporum*. Molecular data, however, provide evidence for separating *Prosartes* from *Disporum* (Shinwari et al. 1994).

1. Tepals greenish-yellow, unspotted, linear-lanceolate, apex long-acuminate, base gradually narrowed; stamens distinctly shorter than tepals; undersurface of leaves pubescent with lax hairs, soft to the touch; fruit glabrous, surface smooth and shiny, berry ellipsoid (unlobed), fleshy, red or orange when ripe ..... **Prosartes lanuginosa**
1. Tepals whitish, spotted with purple, ovate to ovate-lanceolate, apex base abruptly narrowed (clawed); stamens equaling or longer than tepals; undersurface of leaves pubescent with stiff hairs, rough to the touch; fruit pubescent, surface textured (papillose) and dull, berry 3-lobed (or less by abortion), dry, pale or straw-colored when ripe ..... **Prosartes maculata**

1. Prosartes lanuginosa (Michx.) D. Don {woolly} — YELLOW FAIRYBELLS; YELLOW MANDARIN; HAIRY MANDARIN; HAIRY DISPORUM (Fig. 197). [*Disporum lanuginosum* (Michx.) G. Nicholson; *Streptopus lanuginosus* Michx.]

Figure 197. *Prosartes lanuginosa*, Morgan Co., Alabama, 12 Apr 2007. Photo: Brian Finzel.

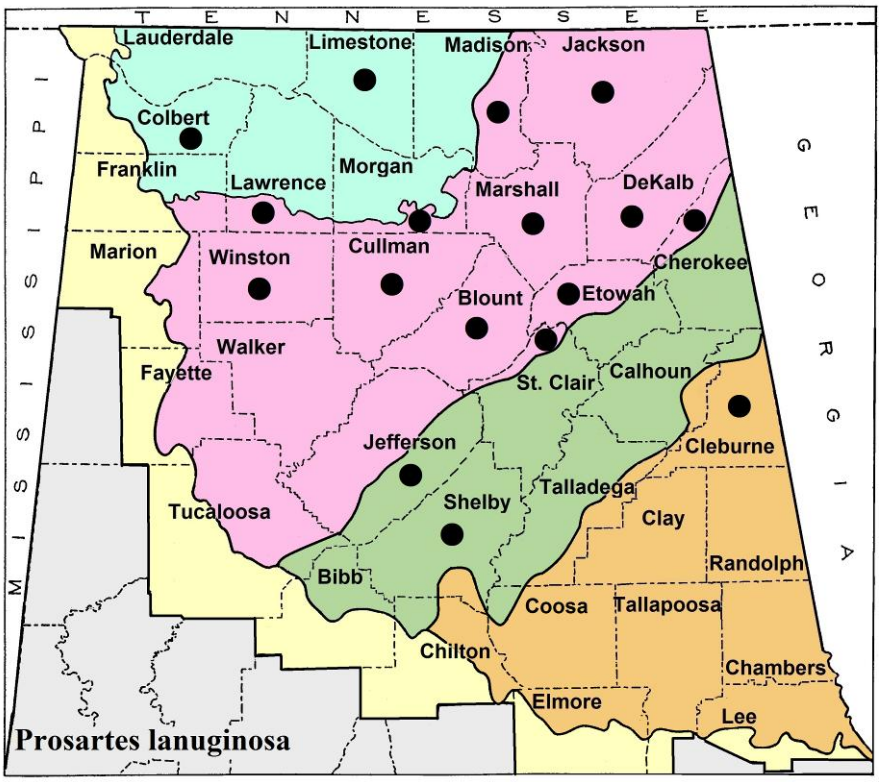

Figure 198. Distribution of *Prosartes lanuginosa* in northern Alabama.

Perennial herb from slender, knotty rhizomes. Rich woods, mesic ravine slopes, and coves. Flowers late March–early June, fruits June–September; rare in the Highland Rim and Ridge & Valley; uncommon in the Cumberland Plateau; very rare in the Piedmont (Fig. 198). Native to eastern North America, from New York and southern Ontario, south to north Georgia and Alabama (Weakley 2020). *Prosartes lanuginosa* is primarily an Appalachian species but disjunct in the Ozarks of Arkansas (Utech 2002h).

Figure 199. *Prosartes lanuginosa*, Cullman Co., Alabama, 24 Mar 2020. Photo: Kevin England.

Fairybells can be mistaken for *Uvularia* (bellworts), but *Prosartes* flowers are terminal rather than axillary. *Prosartes lanuginosa* is similar to *P. maculata*, differing mainly by its unspotted greenish-yellow, long-tapered tepals (Fig. 199); soft pubescence; and smooth, orange-red berries (Fig. 200a–b). Birds eating the showy fruits scatter the seeds via defecation. Ants also disperse seeds because they are attracted to the fleshy elaiosome (rich in lipids and protein) attached to the seed base (Gaddy 1986). The common name "fairybells" is a reference to the dainty flowers.

Figure 200. *Prosartes lanuginosa*. A. Immature fruit, Madison Co., Alabama, 28 Jul 2019. Photo: Brian Finzel. B. Ripe berries, Smyth Co., Virginia, 18 Aug 2017. Photo: Linda Phillips.

2. Prosartes maculata (Buckley) A. Gray {spotted; the flowers} — SPOTTED MANDARIN; NODDING MANDARIN; SPOTTED FAIRYBELLS; SPOTTED DISPORUM (Fig. 201). [*Disporum maculatum* (Buckley) Britton; *Streptopus maculata* Buckley]

Figure 201. *Prosartes maculata*, DeKalb Co., Alabama, 10 Apr 2019. Photos: Brian Finzel.

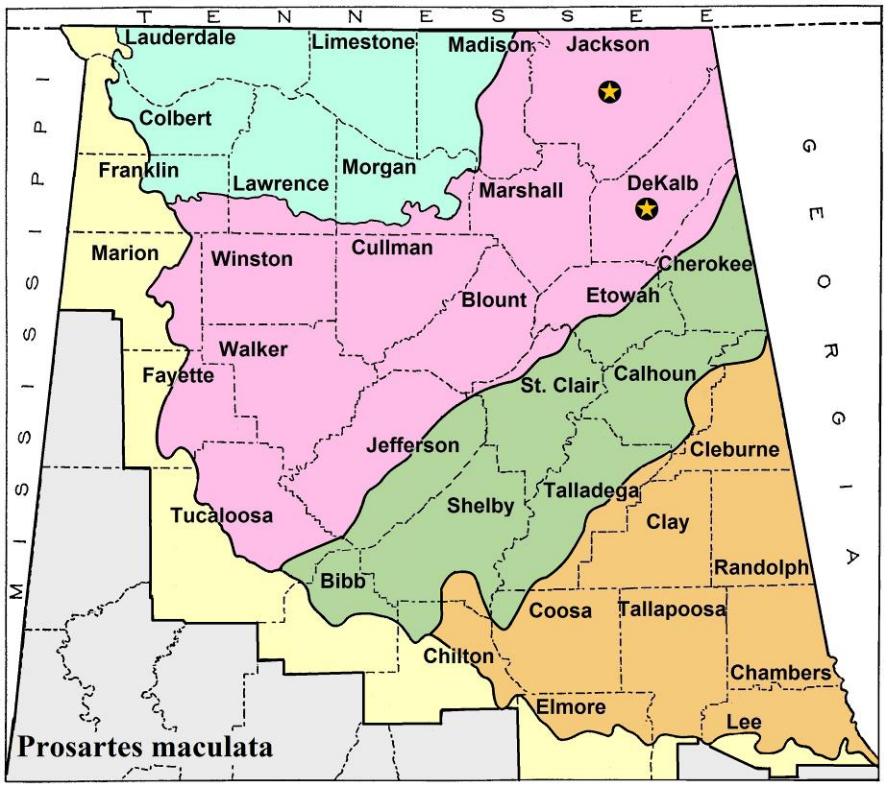

Figure 202. Distribution of *Prosartes maculata* in northern Alabama.

Perennial herb from slender, knotty rhizomes. Rich wooded slopes and ravines. Flowers March–May, fruits late April–August; very rare in the northeastern section of the Cumberland Plateau (Fig. 202). Native primarily to the southern Appalachians, from southern Ohio and southwestern Virginia south to northeast Alabama and north Georgia, disjunct in Michigan (Kartesz 2020). It is listed as a critically imperiled (S1) species in Alabama (ALNHP 2020).

Figure 203. *Prosartes maculata*. A. Immature, hairy fruit, DeKalb Co., Alabama, 10 Apr 2019. Photo: Brian Finzel. B. Ripening, pale-colored, three-lobed fruit, cultivated in Monroe Co., Michigan, 9 Jun 2018. Photo: Jeff Ausmus. C. Leaf with abruptly tapering tip, DeKalb Co., Alabama, 10 Apr 2019. Photo: Brian Finzel.

Spotted Mandarin populations within its range are considered localized and mainly restricted to older geologic provinces in the eastern USA, such as the Blue Ridge, Cumberland, Ridge & Valley, and Allegheny (Johnson 1968). *Prosartes maculata* has purple-spotted, whitish tepals and densely pubescent, whitish to straw-colored three-lobed fruit (Fig. 203a–b). Vegetatively, it is similar to *P. lanuginosa*, but *P. maculata* differs by its abruptly acuminate leaf tips (Fig. 203c) and stiff hairs, making the plant rough to the touch. The origin of the common name "mandarin" is obscure, but its former genus, *Disporum*, is centered in East Asia, with most species from China.

5. TULIPA Linnaeus 1753

[Persian *thoulyban* or Turkish *tulbend*, turban; alluding to the shape of perianth just before opening]

1. Tulipa gesneriana L. {for Conrad Gesner, 1516–1565, Swiss physician} — GARDEN TULIP; DIDIER'S TULIP (Fig. 204).

Perennial herb from a bulb. Disturbed woodlands. Flowers March–May; very rare in northern Alabama (Fig. 205). A native of western Turkey, a waif in North America (Kartesz 2020).

The Garden Tulip has a long history of cultivation in Europe. Turks are believed to be the first to collect it from the wild and grow it within their gardens (Bailey 1929). Tulips represent some of the showiest of the planted spring flowers. Numerous cultivars display a range of colors, shapes, and sizes. They are usually grown as annuals in Alabama and throughout the South. Plants do not grow well in warmer climates because the bulbs typically require longer, colder winters, triggering a biochemical process necessary for flowering. Tulip bulbs contain the toxic glycoside Tulipalin A, which inhibits bacteria growth but causes allergic dermatitis ("tulip finger") in some people who handle them (Gracie 2012). Nonetheless, tulip bulbs are desired by voles, so gardeners attempting to grow them need to protect the bulbs from marauding vermin.

Figure 204. *Tulipa gesneriana*, Cleburne Co., Alabama, 24 Mar 2020. Photos: Dan Spaulding.

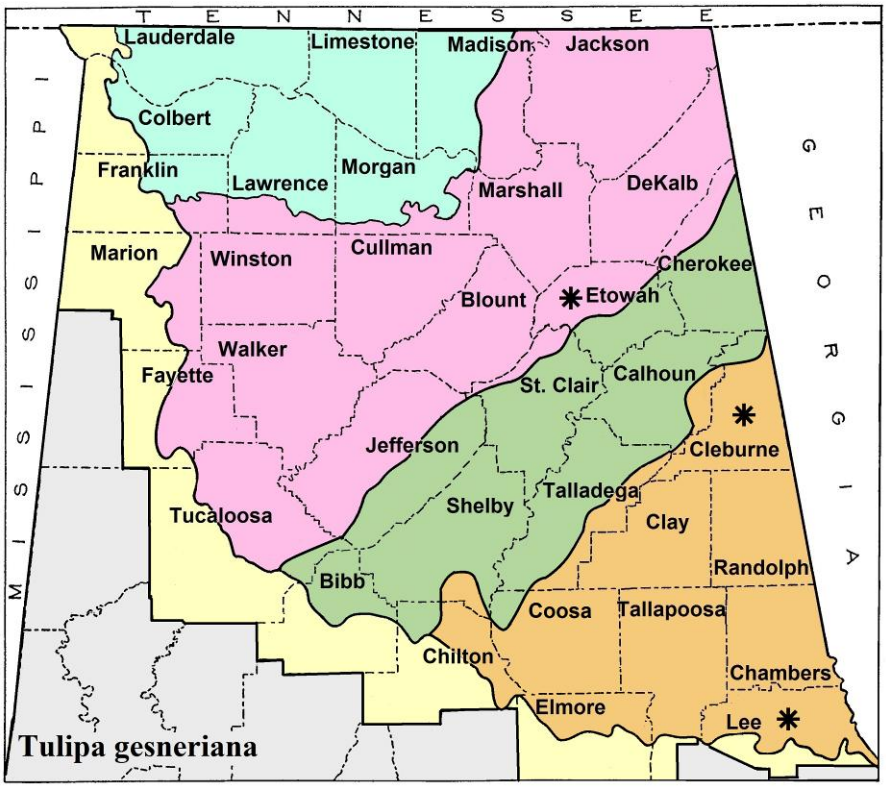

Figure 205. Distribution of *Tulipa gesneriana* in northern Alabama.

13. HYPOXIDACEAE (Stargrass Family) – in ASPARAGALES

1. HYPOXIS Linnaeus 1759

[Greek *hypo*, under, and *oxys*, sharp; referring to the pointed bases of the ovaries]

1. Hypoxis hirsuta (L.) Coville {stiffly hairy} — COMMON STARGRASS; EASTERN YELLOW STARGRASS; COMMON GOLDSTAR (Fig. 206).

Figure 206. *Hypoxis hirsuta*, Shelby Co., Alabama, 24 Apr 2009. Photo: Brian Finzel.

Perennial, scapose herb from corms. Inhabiting a wide variety of dry to moist forests, roadsides, rock outcrops, and woodland borders. Flowers late February–November, fruits May –December; common throughout Alabama (Fig. 207). Native to the midwestern and eastern North America, from Saskatchewan and New England, south to Georgia and eastern Texas (Kartesz 2020).

Hypoxis hirsuta is Alabama's most common stargrass, and it has the most extensive range in the USA. Five species occur in our state, four of which are restricted chiefly to the Coastal Plain of the southeastern USA (Weakley 2020). In Alabama, only *H. hirsuta* has been verified outside of the Coastal Plain, although other species have been reported from the northern portion of the state (Herndon 2002, Kartesz 2020, Keener et al. 2020). The common names allude to the shape of the flower and the grass-like leaves (Shosteck 1974).

The genus *Hypoxis* is easily recognized, but species recognition can be challenging. The most effective way to determine taxa is by their seed coats (Brackett 1923). *Hypoxis hirsuta* seeds are black, lustrous (non-iridescent), and densely covered with short, sharp points (murications). Additionally, the following suite of characters will help separate Common Stargrass from other *Hypoxis*: pedicels more than two times as long as bracts (Fig. 208a); ovary densely pubescent and obconic (inverted cone-shaped) when mature; inflorescence umbellate; tepals much longer than ovary (Fig. 208b); leaves soft, flat, flexible; and basal sheaths not disintegrating into bristles (Herndon 2002). Its tepals are usually yellow, rarely white (Fig. 208c).

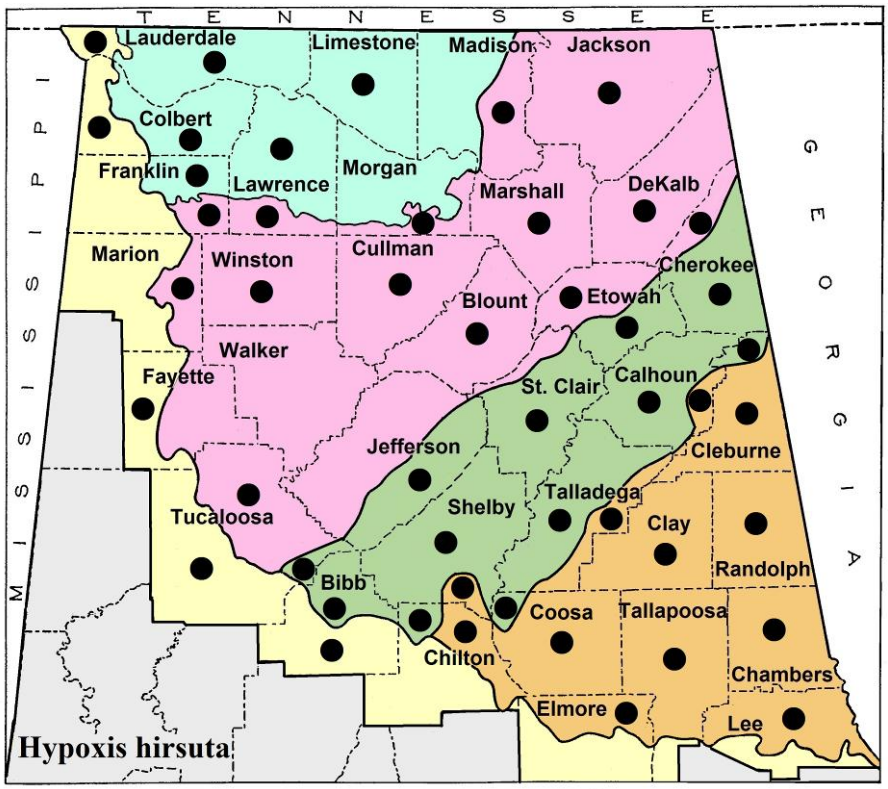

Figure 207. Distribution of *Hypoxis hirsuta* in northern Alabama.

Figure 208. *Hypoxis hirsuta*. A. Bracts of flowers, Shelby Co., Alabama, 26 Apr 2003. Photo: Vitaly Charny. B. Developing fruit (below sepals), Randolph Co., Alabama, 25 May 2019. Photo: Dan Spaulding. C. White-flowered form, Bibb Co., Alabama, 1 Oct 2006. Photo: Brian Finzel.

14. HEMEROCALLIDACEAE (Day-Lily Family)

1. HEMEROCALLIS Linnaeus 1753

[Greek *hemeros*, day, and *kallos*, beauty, alluding to showy flowers that bloom then wilt in a day]

1. Tepals tawny-orange, reticulate-veined; petals (inner 3 tepals) with wavy margins; flowers not fragrant; capsules usually not developing, seeds never produced.....**Hemerocallis fulva**
1. Tepals lemon-yellow, parallel-veined; petals with flat margins; flowers fragrant; capsules fully developing with viable seeds .....**Hemerocallis lilioasphodelus**

1. Hemerocallis fulva (L.) L. {reddish-yellow} — ORANGE DAY-LILY; TAWNY DAY-LILY; FULVOUS DAY-LILY (Fig. 209).

Figure 209. *Hemerocallis fulva*, Cleburne Co., Alabama, 5 Jun 2016. Photos: Vitaly Charny.

Perennial, scapose herb from rhizomes. Roadsides, ditches, old fields, pastures, streambanks, pond/lake margins, and old homesites. Flowers May–July; frequent throughout Alabama (Fig. 210). A native of East Asia, naturalized in Eurasia and North America, mainly in the central and eastern USA and adjacent Canada (Straley & Utech 2002c).

Hemerocallis fulva was first introduced into Europe from Asia. Later, a European clone ('Europa') was imported into North America in the 17th Century and was first reported to escape from cultivation around Philadelphia, Pennsylvania, in 1818 (Zomlefer 1998). This species has become a troublesome weed in the eastern USA (Fig. 211a). Its tuberous roots (Fig. 211b) make it difficult to eradicate (Muenscher 1955). These introduced triploid plants do not produce seeds but can still spread by root fragmentation (Straley & Utech 2002c). Double-flowered cultivars have also escaped and are naturalized (Fig. 211c).

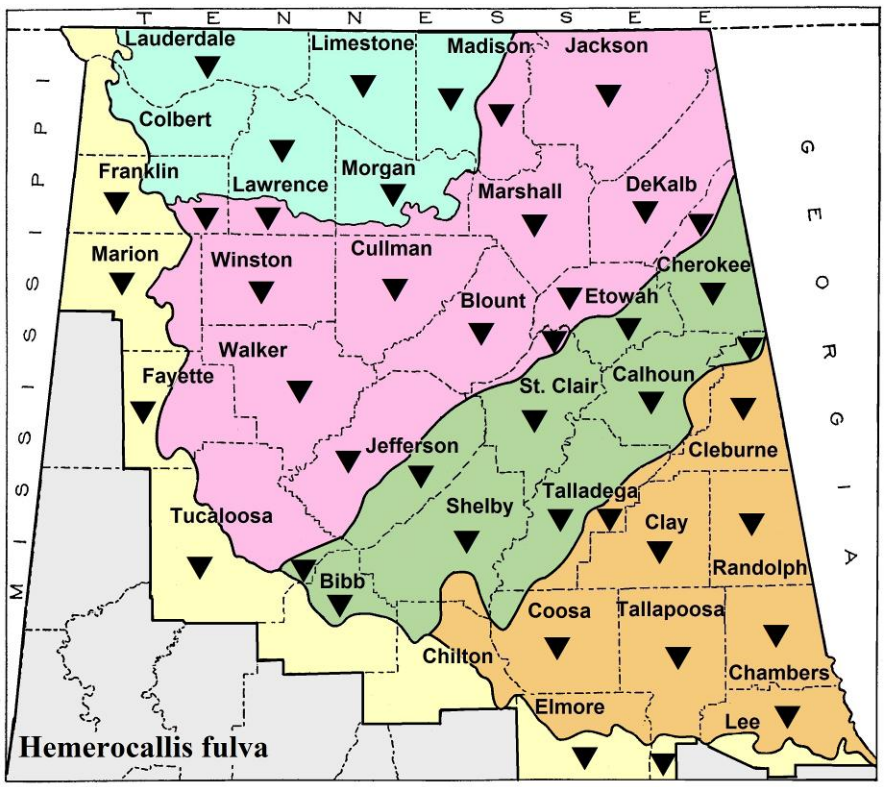

Figure 210. Distribution of *Hemerocallis fulva* in northern Alabama.

Figure 211. *Hemerocallis fulva*. A–B. Cleburne Co., Alabama, 8 Mar 2020, (A) roadside population and (B) tuberous roots. C. Double-flowered cultivar, Calhoun Co., Alabama, 18 Jun 2019. Photos: Dan Spaulding.

This species is grown as a food crop for its edible flowers, shoots, and tuberous roots in Asia. Plants are typically blanched to remove caustic substances. Flower buds are often batter-fried, stir-fried, or added to soups. The tubers have a radish-like taste and are eaten raw, toasted, baked, or roasted (Zomlefer 1998). *Hemerocallis* possibly contains the alkaloid colchicine, which can act as a laxative and cause diarrhea (Duke 1992).

2. Hemerocallis lilioasphodelus L. {Lily-Asphodel; a combination of liliaceous genera} — YELLOW DAY-LILY; LEMON DAY-LILY (Fig. 212). [*Hemerocallis flava* (L.) L.]

Figure 212. *Hemerocallis lilioasphodelus*, Cullman Co., Alabama, 21 Jun 2020. Photos: Dan Spaulding.

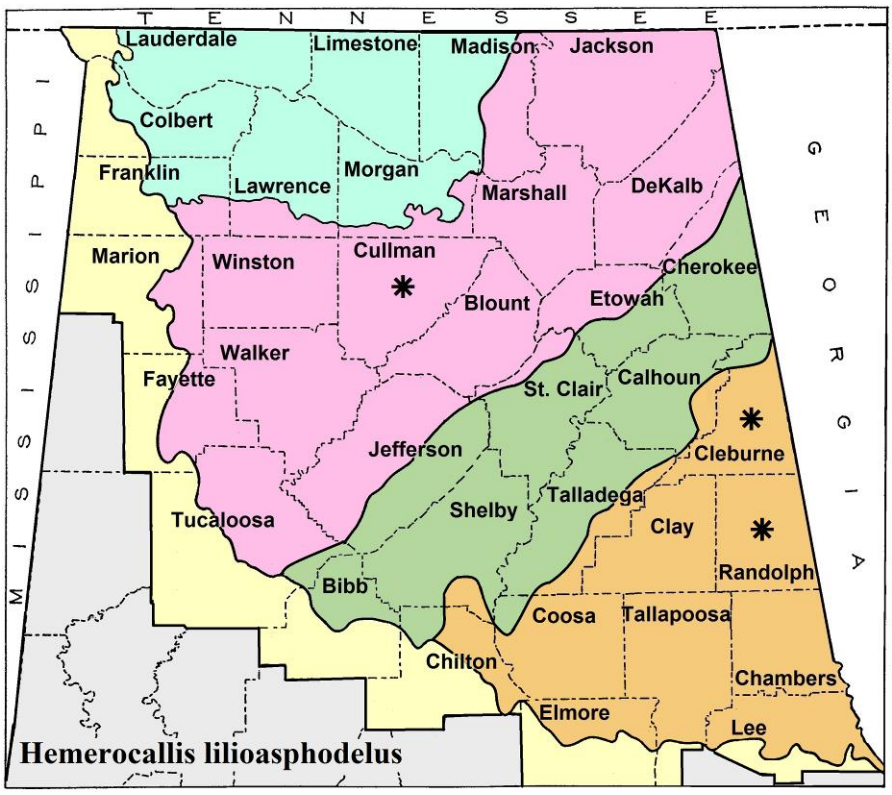

Figure 213. Distribution of *Hemerocallis lilioasphodelus* in northern Alabama.

Perennial, scapose herb from rhizomes. Roadsides and other disturbed sites. Flowers May –July; very rare in northern Alabama and the upper Coastal Plain (Fig. 213). Native to East Asia, sporadically naturalized in Europe and North America (Straley & Utech 2002c).

Yellow Day-Lily was likely imported from Asia into Hungary in the 16th Century and planted around Hungarian monasteries and castles. Cultivated material was later introduced into Western Europe, then into North America (Zomlefer 1998). Although it is a seed-producing, diploid species, it escapes sporadically and is not persistent in the wild (Straley & Utech 2002c). In 2019, Melanie Taylor Spaulding documented it in Randolph County, Alabama (Spaulding & Triplett 2021).

The fragrant flowers of this species produce an abundance of nectar, attracting various insect pollinators. Most *Hemerocallis* bloom for only a day, but *H. lilioasphodelus* has an extended bloom time, up to 50 hours. Plants contain a neurotoxin called hemerocallin, an effective pain-reliever (analgesic), but overdose allegedly causes blindness, paralysis, or death. Day-lilies have been utilized as medicinal herbs in Chinese culture for over a thousand years (Zomlefer 1998).

15. **ALLIACEAE** (Onion Family) – in ASPARAGALES

1. Inflorescence a solitary flower; tepals 20–28 mm long; filaments united ..... **Ipheion**
1. Inflorescence an umbel with 3 or more flowers (occasionally replaced with bulblets); tepals < 15 mm long; filaments separate.

    2. Pedicels within umbel nearly equal in length; anthers oblong, averaging 1 mm long; flowers occasionally replaced by bulblets; tepals white, greenish-white, pink, or magenta-purple; capsule 1–2 seeded; plants with onion or garlic odor when bruised ..... **Allium**
    2. Pedicels within umbel of variable lengths; anthers linear, 1.5–2 mm long; flowers never replaced by bulblets; tepals white to cream; capsule 6–10 seeded; plants lacking onion or garlic odor when bruised ..... **Nothoscordum**

1. **ALLIUM** Linnaeus 1753
[Classical Latin name for garlic]

1. Leaves elliptic to elliptic-lanceolate (margins not parallel), 2–3 per bulb, petiolate; foliage absent when flowers bloom (usually withering before anthesis, but inflorescence with flower buds or old fruiting stalks are occasionally present) ..... **Allium tricoccum**
1. Leaves linear to filiform (margins parallel for most of their length), usually 3 or more per bulb, sessile; foliage is present when flowers bloom (occasionally withering soon after anthesis).

    2. Stems inflated below middle, 3–30 mm in diameter; leaves cylindric, hollow, 5–20 mm in diameter; bulbs usually > 2 cm in diameter; outer bulb coat membranous or papery, not fibrous; plant introduced, a rare escape from cultivation (waif) ..... **Allium cepa**
    2. Stems not inflated, < 5 mm in diameter; leaves and bulbs various; plants native or introduced and established.

        3. Stems leafy 1/3–1/2 their length; outer bulb coat membranous or papery, not fibrous.

            4. Leaves slender (0.2–0.5 cm wide), cylindrical, often channeled, hollow; stem slender; umbel hemispherical to subspherical; spathe bracts deciduous ..... **Allium vineale**
            4. Leaves broad (1.5–4.5 cm wide) flat, sometimes folded, solid; stem stout; umbel globose; spathe bracts persistent ..... **Allium ampeloprasum**

3. Stems scapose, leaves all basal; outer bulb coat membranous or fibrous.

    5. Inflorescence nodding, peduncle bent; bulb coat membranous.....**Allium cernuum**
    5. Inflorescence erect, peduncle straight; bulb coat a persistent, dense fibrous mesh (the net-like skin is easily removed, lacking in some herbarium specimens).

        6. Ovary and capsule crestless; tepals acute; bulblets occasionally replacing flowers in the inflorescence.

            8. Umbel with bulblets, few to no flowers present, rarely producing capsules or seeds ..... **Allium canadense**
            8. Umbel without bulblets, entirely composed of flowers, producing capsules and seeds .....**Allium mutabile**

        6. Ovary and capsule crested on top with projections along the sutures; tepals acuminate; bulblets absent in the inflorescence.

            7. Ovary crests flattened and horizontally spreading, not contorted; spathe bracts with 1 (-3) distinct main veins; leaves usually 3 or more per bulb; plants of sandstone outcrops in the northeastern Cumberland Plateau .....**Allium speculae**
            7. Ovary crests contorted and ascending; spathe bracts usually with 5–7 main veins; leaves usually 2 per bulb; plants of fields, prairies, open woods, and granite outcrops in the lower Piedmont and Coastal Plain ..... **Allium cuthbertii**

1. Allium ampeloprasum L. {leek of the vineyard} — BROADLEAF WILD LEEK; ELEPHANT GARLIC; GREAT-HEADED GARLIC; YORKTOWN ONION (Fig. 214).

Figure 214. *Allium ampeloprasum* with the senior author's son, Taylor Spaulding, pasture, Cleburne Co., Alabama, 7 Jun 2020. Photo: Dan Spaulding.

Perennial, semi-scapose herb from a bulb. Roadsides, roadbanks, old homesites, fields, glades, pastures, and other disturbed areas. Flowers late May–July, fruits July–August; uncommon throughout Alabama (Fig. 215). Native to southern Europe, North Africa, and western Asia (McNeal & Jacobsen 2002). It is naturalized in North America, in the southeastern USA, with disjunct populations in West Coast states (Kartesz 2020).

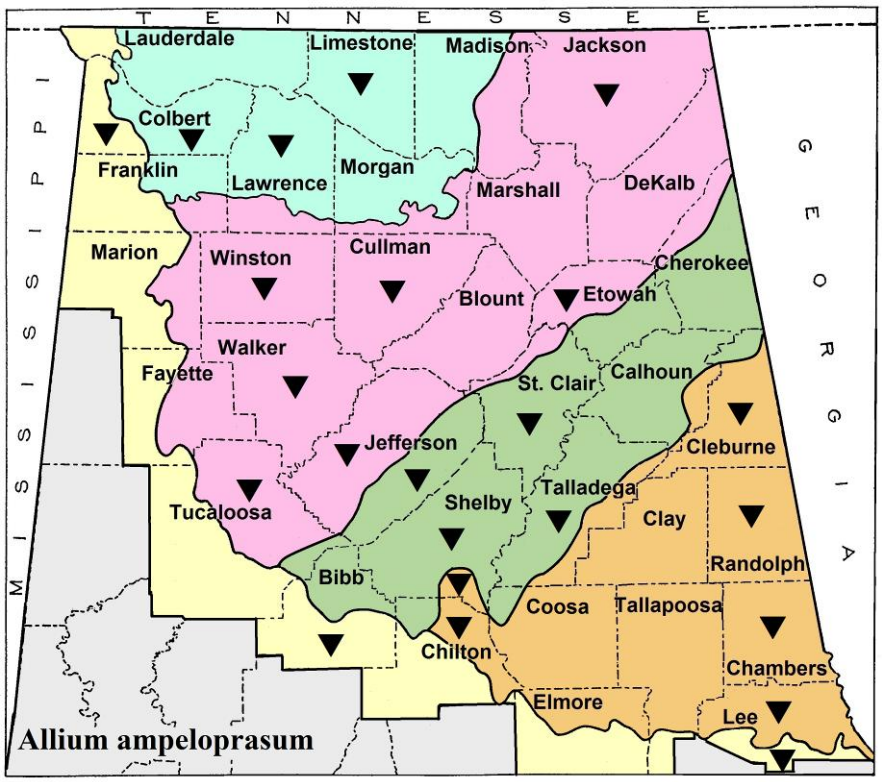

Figure 215. Distribution of *Allium ampeloprasum* in northern Alabama.

Figure 216. *Allium ampeloprasum*. A–B. Bibb Co., Alabama, 13 May 2020, (A) Flower buds and (B) flat semi-cauline leaves. C. Membranous bulbs, Cleburne Co., Alabama, 10 Mar 2021. Photos: Dan Spaulding.

Historically, Garden Leek has been treated as a separate species, *Allium porrum* L., but it is probably just a cultivar of *A. ampeloprasum* (McNeal & Jacobsen 2002). The swollen, whitish basal portions of a leek's leaves are eaten along with the bulbs. Early European settlers introduced *Allium ampeloprasum* to North America, and it is now naturalized along roadsides and fields throughout the Southeast (Pink 1993). It has persistent spathe bracts with long beaks (Fig. 216a), leafy stems with broad, flat leaves (Fig. 216b), and smooth bulbs lacking a fibrous coat (Fig. 216c). Leeks originated in the Near East and were cultivated in Ancient Egypt (Simpson & Ogorzaly 1986). Shosteck (1974) states, "the leek has a long history of use among the peoples of Northern Europe, and it is the national emblem of Wales."

Leeks are rich in fiber, zinc, and various phytochemicals with antioxidant activity, enhancing a diet if consumed (García-Herrera et al. 2014). Its showy, globe-like inflorescence is occasionally used in dried flower arrangements. *Allium ampeloprasum* can be mistaken for *A. sativum* L. [Cultivated Garlic]. Broadleaf Wild Leek (or Elephant Garlic) is a more robust plant, usually from a single bulb (rarely with a few cloves), and its inflorescence typically lacks bulblets. Cultivated Garlic has a bulb comprised of numerous cloves, and its umbel has bulblets (McNeal & Jacobsen 2002).

2. Allium canadense L. var. **canadense** {Canadian} — WILD ONION; MEADOW GARLIC; CANADIAN GARLIC (Fig. 217).

Figure 217. *Allium canadense* var. *canadense*, Franklin Co., Alabama, 11 May 2017. Photos: Kevin England.

Perennial, scapose herb from a bulb. Roadsides, lawns, pastures, fields, low woods, swamps, granite outcrops, limestone glades, roadsides, and other disturbed sites. Flowers late March–June, fruits May–July; common throughout Alabama (Fig. 218). Native to central and eastern USA and Canada, from Ontario to New Brunswick, south to Texas and Florida (Kartesz 2020).

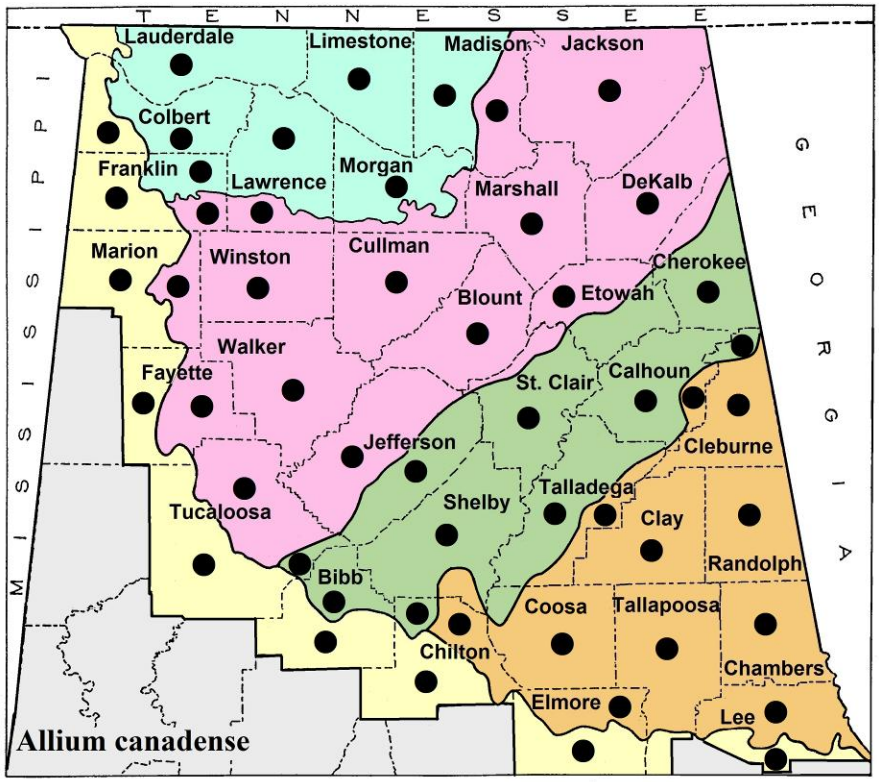

Figure 218. Distribution of *Allium canadense* var. *canadense* in northern Alabama.

Figure 219. *Allium canadense* var. *canadense*, Chilton Co., Alabama, 30 Apr 2020. Photos: Dan Spaulding.

Allium canadense var. *canadense* is native to Alabama, but it is relatively weedy and commonly found in lawns and gardens. *Allium mutabile* and *A. speculae* are similar, but they lack bulblets in their inflorescence. Wild Onion's umbel has mostly bulblets, often entirely replacing flowering pedicels (Fig. 219a), but its flowers (if present) rarely produce capsules or seeds (McNeal & Jacobsen 2002). Bulblets frequently sprout green, tail-like stalks that occasionally produce secondary umbels with bulblets and flowers (Fig. 219b). *Allium vineale* also produces bulblets in its inflorescence but differs vegetatively by having semi-leafy stems, round leaves, and a papery outer bulb coat. *Allium canadense* has flat to broadly grooved leaves (all basal) and a fibrous net-like structure covering its bulb (Fig. 219c).

The bulbs of *Allium canadense* are sweet and palatable and used as a substitute for onion or garlic (Fernald & Kinsey 1943). Cherokee Indians utilized Wild Onion as food by mixing boiled bulbs with fried grease and greens. Native Americans also used the plants medicinally to relieve flatulence and coughs (Moerman 1998).

3. Allium cepa L. {Classical Latin name for onion} — GARDEN ONION (Fig. 220).

Figure 220. *Allium cepa*, Calhoun Co., Alabama, 30 May 2020. Photos: Dan Spaulding.

Perennial, scapose herb from a bulb. Waif in disturbed areas. Flowers April–June; very rare in northern Alabama (Fig. 221). Unknown in the wild but widely cultivated in Europe, North America, and Asia (McNeal & Jacobsen 2002).

Allium cepa is the onion of commerce and, like garlic (*A. sativum*), has been cultivated before recorded history; perhaps originating in Central Asia (Simpson & Ogorzaly 1986). Both species sporadically escape cultivation in North America from discarded bulbs but generally do not persist in the wild. Although *A. sativum* has been reported from Alabama, we have seen no specimens. Cultivated Garlic differs from Garden Onion by having clustered bulbs (vs. single bulb), flat cauline leaves (vs. swollen basal leaves), and an inflorescence with both flowers and bulblets (vs. inflorescence lacking bulblets).

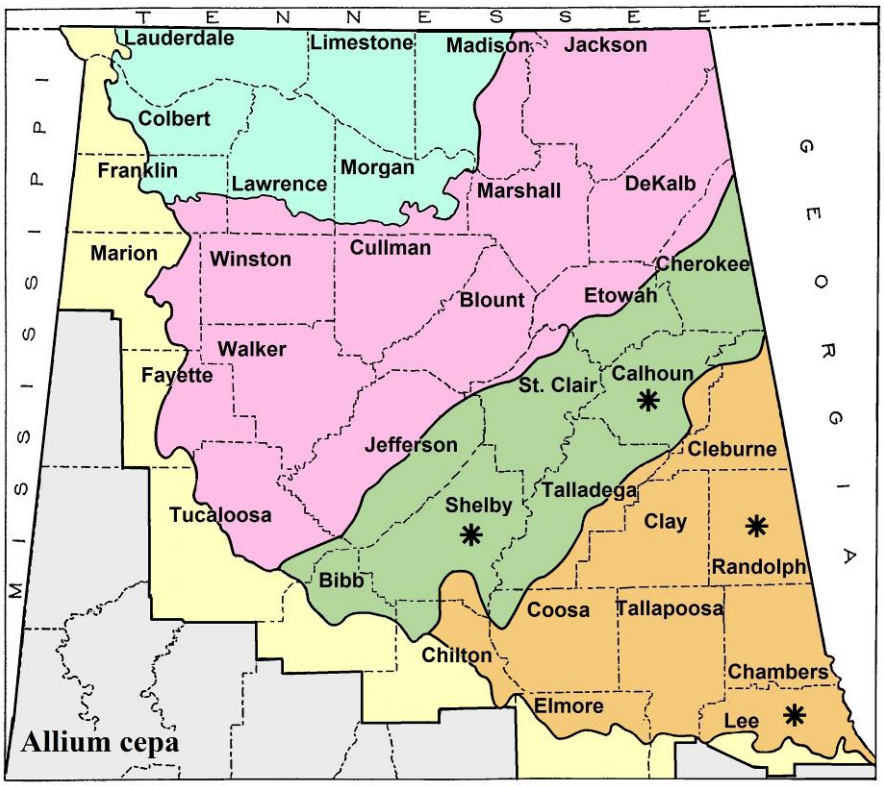

Figure 221. Distribution of *Allium cepa* in northern Alabama.

Onion and garlic have been used medicinally for centuries, particularly as an external antiseptic to prevent infections. Some studies suggest that consuming them could help reduce hypertension, high blood sugar, and cholesterol. Perhaps due to the bulb's powerful aroma, both were used during the Middle Ages as a charm to ward off evil spirits and the plague (Dwyer et al. 1986). The pungent odor of plants in the onion family is from volatile sulfur compounds released from ruptured cells; hence onions make us cry when we cut them.

4. Allium cernuum Roth {nodding; the inflorescence} — NODDING ONION (Fig. 222).

Perennial, scapose herb from a bulb. Meadows, low roadsides, rock outcrops, prairies, and open woods, often in calcareous soils. Flowers and fruits August–October; rare in the Highland Rim, Cumberland Plateau, and Ridge & Valley (Fig. 223). Native to North America, from southern Canada south through much of the USA to Mexico (McNeal & Jacobsen 2002).

Nodding Onion has a broad range in North America. Weakley (2020) noted that "the distribution is oddly fragmented into largely Rocky Mountain, Ozarkian, and Appalachian segments, and it is quite possible that cryptic taxa are involved." Aaron Floden (pers. comm. 2020) stated: "There are a myriad of problems in this group that needs a synthesis approach of multiple data sources to resolve the problems. It seems simple to the field botanist based on flowering times, geography, and morphology, but convincing others needs a lot of good supporting data."

Alabama populations of *Allium cernuum* flower later in the season than other states, suggesting that perhaps an unnamed species might be involved (pers. comm. Brian Keener 2020). Because our plants bloom late summer to fall, they are occasionally misidentified as *A. stellatum* Fraser ex Ker-Gawl. [Autumn Onion]. McNeal & Jacobsen (2002) note that *A. stellatum* differs by having star-shaped, pink flowers with spreading tepals; a nodding scape in bud, becoming erect in

flower or fruit; and an ovoid bulb. *Allium cernuum* has bell-shaped, pink or white flowers with mostly erect tepals; a scape that always nods; and an elongate bulb. Cherokee Indians used the bulbs as food and made a medicinal juice as an aid for respiratory, dermatological, gastrointestinal, and urinary issues (Moerman 1998).

Figure 222. *Allium cernuum*, Cherokee Co., Alabama, 9 Sep 2020. Photos: Wayne Barger.

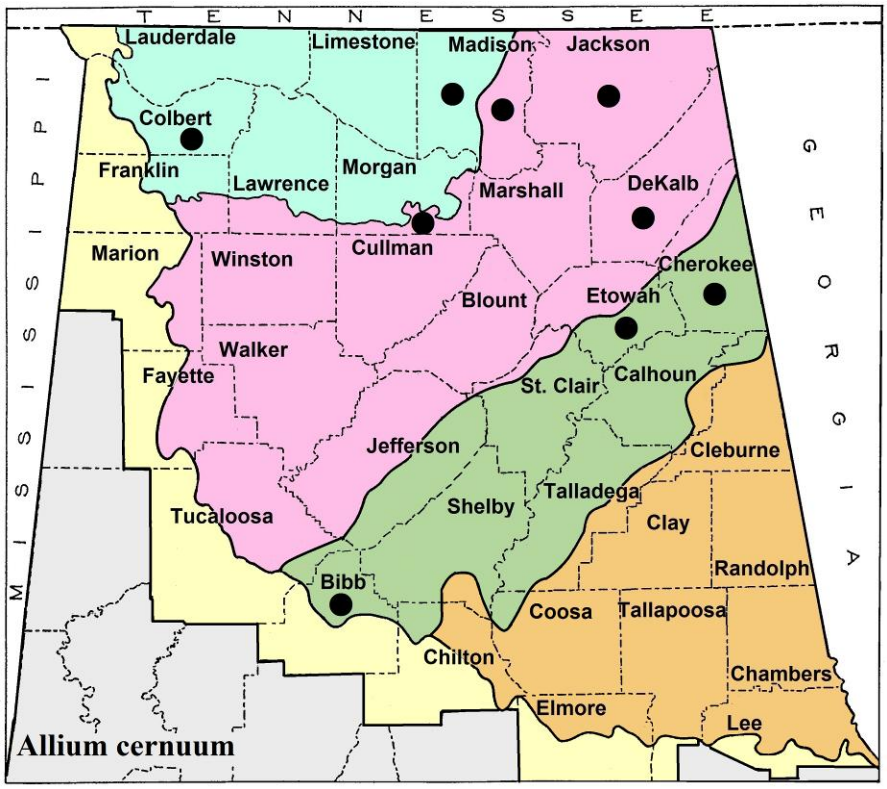

Figure 223. Distribution of *Allium cernuum* in northern Alabama.

5. Allium cuthbertii Small {named in honor of its discoverer, Alfred Cuthbert (1857–1932), Georgia naturalist} — STRIPED GARLIC; CUTHBERT'S ONION; STRIPED ONION (Fig. 224).

Figure 224. *Allium cuthbertii*, Taylor Co., Georgia, 9 May 2020. Photos: Brian Finzel.

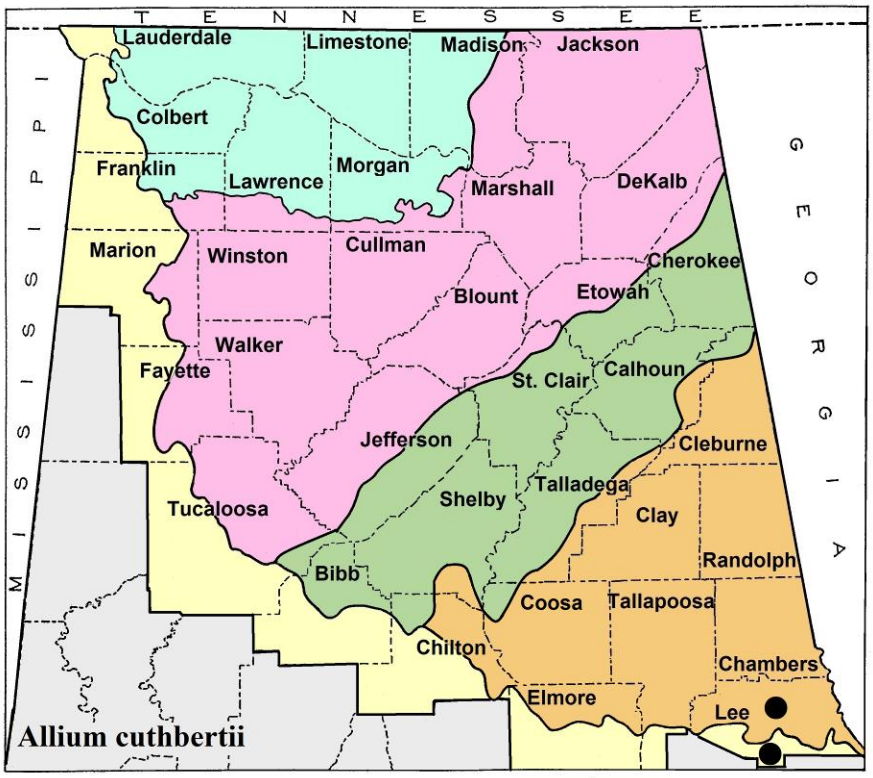

Figure 225. Distribution of *Allium cuthbertii* in northern Alabama.

Perennial, scapose herb from a bulb. Sandhills, pine savannas, chalk prairies, roadsides, and granite outcrops. Flowers late April–June, fruits June–August; very rare in the Piedmont; rare in the upper Coastal Plain (Fig. 225). This species is endemic to the southeastern USA, from North Carolina to Alabama and northeast Florida (Kartesz 2020).

John K. Small (1903) named *Allium cuthbertii* in honor of Alfred Cuthbert, a Georgia state senator and amateur naturalist who discovered the plant. Both men were members of the Torrey Botanical Club and botanized together in Florida (Pennell 1920). The tepals of Cuthbert's Onion are white to occasionally pink or purple with a green stripe on their outer surface; hence the names Striped Onion and Striped Garlic.

Allium cuthbertii is similar to *A. speculae*, but differs by having contorted, knobby crests on its ovaries and spathe bracts with 5–7 main veins. *Allium speculae* has ovaries with flattened, horizontal crests and spathe bracts with fewer veins. Both species have bulbs covered with a fibrous, net-like coat. Weakley (2020) notes that in *A. cuthbertii*, the "bright emerald green ovary of the fresh flowers is a striking and distinctive character."

6. Allium mutabile Michx. {changeable; Michaux initially confused it with two other species} — MEADOW ONION; MOBILE ONION; PINK WILD ONION (Fig. 226). [*Allium arenicola* Small; *Allium canadense* L. subsp. *mobilense* (Regel) Traub & Ownbey; *Allium canadense* var. *mobilense* (Regel) Ownbey; *Allium microscordion* Small; *Allium mobilense* Regel]

Figure 226. *Allium mutabile*, Franklin Co., Alabama, 20 May 2020. Photos: Dan Spaulding.

Perennial, scapose herb from a bulb. Roadsides, fields, chalk prairies, limestone woods, calcareous glades, sandstone outcrops, and pine savannas. Flowers March–May, fruits May–June; uncommon in the Highland Rim, Cumberland Plateau, and Ridge & Valley; rare in the Piedmont; frequent in the Coastal Plain (Fig. 227). Native chiefly to the southeastern USA, from southern Missouri and North Carolina south to Texas and northern Florida (McNeal & Jacobsen 2002).

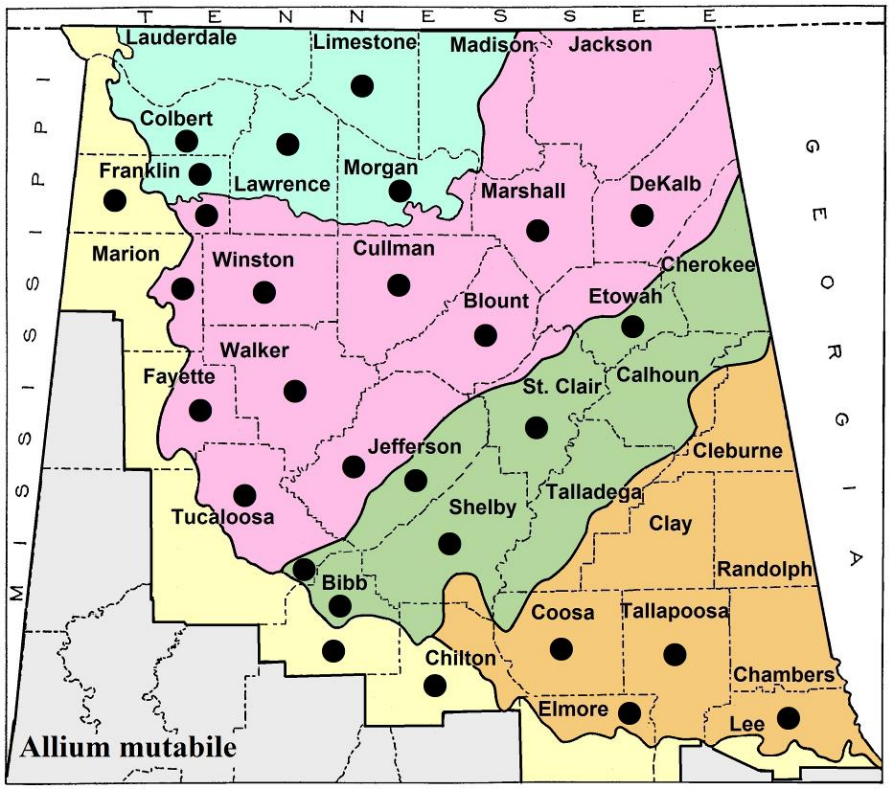

Figure 227. Distribution of *Allium mutabile* in northern Alabama.

Figure 228. *Allium mutabile* seeds, Cullman Co., Alabama, 21 Jun 2020. Photo: Dan Spaulding.

Figure 229. *Allium mutabile*, Lawrence Co., Alabama, 19 May 2015. Photos: Brian Finzel.

Allium mutabile is similar to *A. canadense* and treated by some authors as a variety of that species (McNeal & Jacobsen 2002). Weakley (2020) says, "This taxon is perhaps better treated as a distinct species." The inflorescence of *A. canadense* var. *canadense* differs by having bulblets and sterile flowers that do not form capsules or seeds, whereas *A. mutabile* has only fertile flowers that produce seeds (Fig. 228). *Allium speculae* is also confused with *A. mutabile* because both species lack bulblets in their inflorescence; however, *A. mutabile* does not have crested ovaries (Fig. 229).

7. Allium speculae Ownbey & Aase {a mirror or reflector} — FLATROCK ONION; LITTLE RIVER CANYON ONION; OWNBEY'S ONION (Fig. 230a–b).

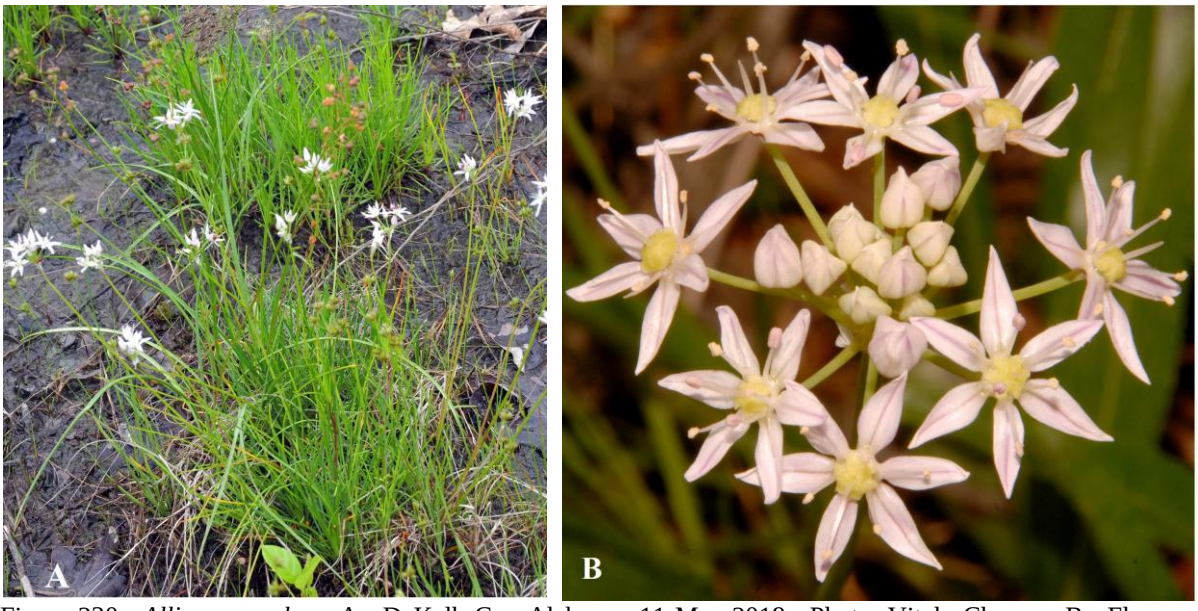

Figure 230. *Allium speculae*. A. DeKalb Co., Alabama, 11 May 2019. Photo: Vitaly Charny. B. Flowers, DeKalb Co., Alabama, 18 May 2008. Photo: Brian Finzel.

Perennial, scapose herb from a bulb. Depressions in sandstone outcrops and thin soils over sandstone. Flowers May–June, fruits June–July; rare in the Cumberland Plateau (Fig. 231). Endemic to northeast Alabama, west-central Georgia, and southeast South Carolina (Kartesz 2020).

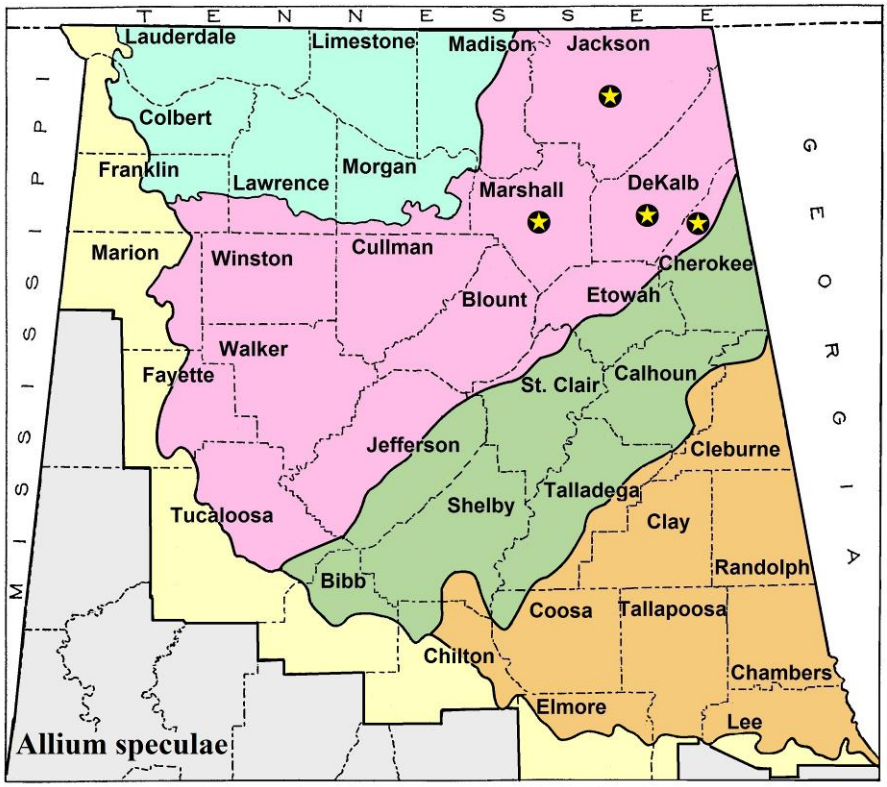

Figure 231. Distribution of *Allium speculae* in northern Alabama.


Figure 232. *Allium speculae* habitat, DeKalb Co., Alabama, 11 May 2019. Photo: Vitaly Charny.

Figure 233. *Allium speculae*, DeKalb Co., Alabama, 21 May 2015. Photos: Brian Finzel.

Ownbey & Aase (1959) described this species from plants on sandstone outcrops along Little River Canyon in DeKalb County, Alabama (Fig. 232). Carroll E. Wood, Jr. collected the type specimen in 1955. The authors noted that *Allium speculae* resembled *A. canadense* var. *mobilense* (=*A. mutabile*), differing mainly by its prominently crested ovaries (Fig. 233) and primarily 1-nerved bracts. The only other species with crested ovaries in eastern North America is *A. cuthbertii*; however, it has contorted crests and mostly 5-nerved bracts. *Allium speculae* is a globally imperiled (G2) species and ranked as imperiled (S2) in Alabama (ALNHP 2020). Flatrock Onion was under review as an endangered species, but no formal status was designated (Whetstone 1988).

8. Allium tricoccum Aiton {3-locular; the ovary} — RAMPS; WILD LEEK; RAMP-SCALLIONS; WOOD LEEK (Fig. 234). [*Validallium tricoccum* (Aiton) Small]

Figure 234. *Allium tricoccum*, Fayette Co., Kentucky, 24 Jul 2008. Photos: Brian Finzel.

Perennial, scapose herb from a bulb. Rich woods and cove forests. Flowers June–July, fruits August–September; rare in the northern Cumberland Plateau (Fig. 235). Al Schotz (pers. comm. 2020), Natural Heritage Program botanist, reported it in the Cumberland Plateau of Morgan and Marshall counties near Newsome Sinks Karst Area. The species is critically imperiled (S1) in the state (ALNHP 2020). It is native to the northcentral and eastern USA and adjacent Canada, from Nova Scotia to North Dakota south to Missouri and North Georgia (Weakley 2020).

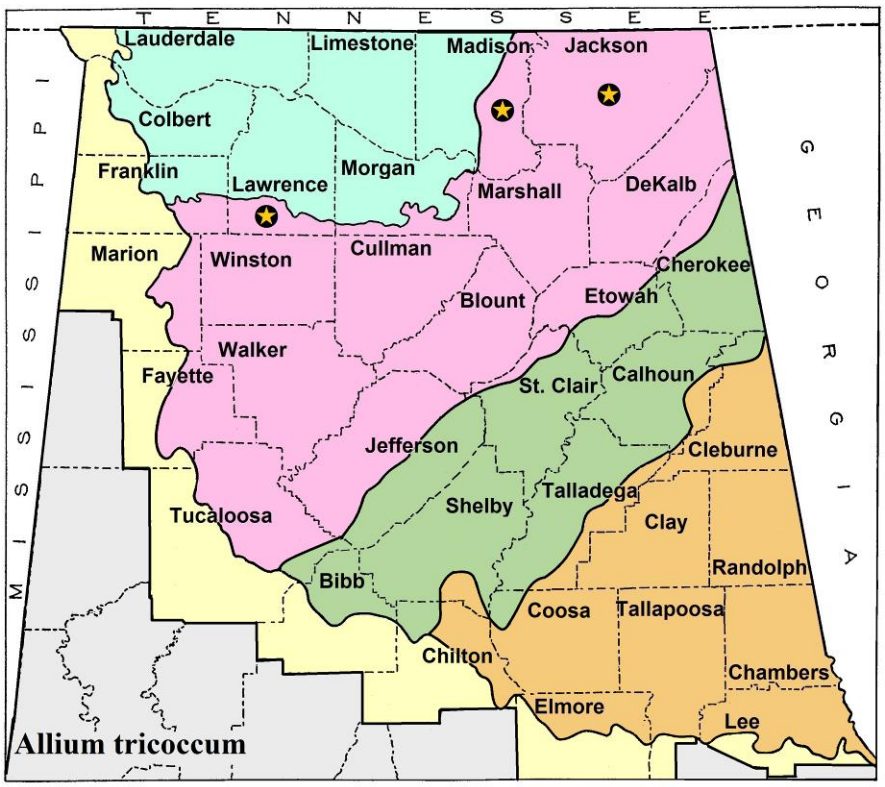

Figure 235. Distribution of *Allium tricoccum* in northern Alabama.

Ramps emerge from the ground in late winter, and the leaves fully expand in the spring (Fig. 236). Each bulb has only two or three leaves (Fig. 237a). The foliage is ephemeral, withering before the creamy-white flowers bloom in the summer (Fig. 237b). After the capsules open, the large, black seeds often remain attached through winter (Fig. 237c). They passively fall to the ground or are catapulted a short distance when the semi-flexible scape moves (Nault & Gagnon 1993). The fruiting stalks are occasionally present when leaves appear (Fig. 237d).

Mountaineers were the first to use the word "ramps" for *Allium tricoccum*. It is a corruption of the English *ramson*, a vernacular name of *A. ursinum* L., the European Bear Leek (Core 1945). *Allium tricoccum* occurs throughout eastern North America and is well-known as a tasty, wild edible to country folk. Fernald & Kinsey (1943) wrote that Henry Rusby, an American botanist and explorer, subsisted primarily on this species during an expedition. The authors stated further that Rusby "speaks of the large, clustered bulbs of the Wild Leek, *A. tricoccum*, as one of the best, mildest and sweetest." Small (1933) wrote that "the bulbs, being pleasantly flavored, are much sought after by the natives of the mountains." In some mountain towns of the southern Appalachians, ramp-eating festivals are still popular. They are held in early spring before the leaves appear because this is when bulbs taste their best. Cherokee Indians and other eastern North American tribes ate the bulbs and used them medicinally for various ailments (Moerman 1998).

Figure 236. *Allium tricoccum*, Jackson Co., Alabama, 28 Mar 2012. Photo: Wayne Barger.

Figure 237. *Allium tricoccum*. A. Bulb, Lawrence Co., Alabama, 5 Apr 2020. Photo: Kevin England. B. Flowers, Fayette Co., Kentucky, 18 Jun 2008. Photo: Brian Finzel. C. Fruit, Jackson Co., Alabama, 24 Jun 2020. Photo: Wayne Barger. D. Seeds, Jackson Co., Alabama, 15 Mar 2019. Photo: Helen A. Czech.

Small (1933) transferred the species into a new monotypic genus, *Validallium* (meaning "strong onion"); however, his genus is not recognized by most botanists today (McNeal & Jacobsen 2002). Two morphological variants of *Allium tricoccum* were reported by Hanes & Ownbey (1946) to occur within the species range. Hanes (1953) officially recognized them as varieties and published *A. tricoccum* var. *burdickii* as having narrower leaves and fewer flowers than the typical expression. Jones (1979) later elevated it to species level. At one time, both taxa were thought to occur in Alabama. This view has now changed. Alan Weakley (pers. comm. 2020) stated, regarding the southern entity of ramps in Alabama and elsewhere, "I'm pretty certain these will end up as not *tricoccum* and not *burdickii*. The 'southern *burdickii*' is not the same species as what is in the northern Midwest – Harvey Ballard and some of his students [Sitepu 2018] are pretty sure about this."

9. Allium vineale L. {of the vineyard} — WILD GARLIC; FIELD GARLIC; CROW GARLIC; ONION-GRASS; STAG'S GARLIC (Fig. 238).

Figure 238. *Allium vineale*, Lawrence Co., Alabama, 7 Jun 2020. Photo: Kevin England.

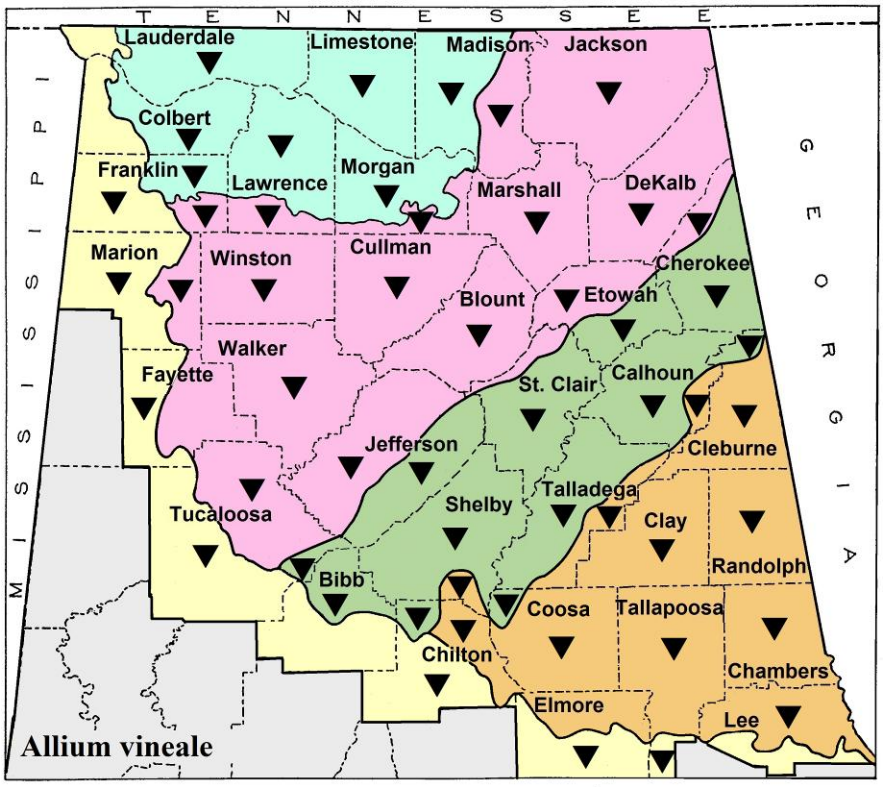

Figure 239. Distribution of *Allium vineale* in northern Alabama.

Perennial, scapose herb from a bulb. Roadsides, fields, waste places, railroad tracks, lawns, pastures, other disturbed areas. Flowers May–June, fruits June–July; common throughout Alabama (Fig. 239). Native to Europe, naturalized in North America and adjacent Canada, mainly in the central and eastern USA, disjunct in West Coast states (McNeal & Jacobsen 2002).

Allium vineale stems are striate, and their leaves extend almost halfway up the stem (Fig. 240a–c). The leaves are hollow, easily compressed, round at first, later becoming channeled. Bulbs (Fig. 240d) are enclosed by a membranous outer coat and often have secondary segments, each flattened on one side. Umbels are mostly hemispherical, with flowers completely or partly replaced by bulblets, which sometimes sprout long, green tails (Fig. 241). Wild Garlic is often mistaken for Wild Onion, but *A. canadense* has flat, solid, entirely basal leaves and unsegmented bulbs.

Figure 240. *Allium vineale*, Calhoun Co., Alabama, 18 Mar 2021. Photos: Dan Spaulding.


Figure 241. *Allium vineale*, Calhoun Co., Alabama, 30 May 2020. Photo: Dan Spaulding.

Wild Garlic is very weedy, often infesting roadsides, fields, lawns, and pastures. The bulbs have a strong onion taste, rarely used as human food. Cattle and other livestock occasionally eat the plant, giving the milk a garlic flavor (Fernald & Kinsey 1943). Small bulblets within the umbel can infiltrate wheat harvests, resulting in contaminated grain, ultimately producing flour tainted with a garlic taste (Muenscher 1955).

2. Ipheion Rafinesque 1837

[Ancient Greek name given to it by the philosopher Theophrastus; derivation obscure]

1. Ipheion uniflorum (Graham) Raf. {one-flowered} — SPRING STAR-FLOWER; SPRING-STAR; STAR-OF-BETHLEHEM (Fig. 242). [*Tristagma uniflorum* (Lindl.) Traub]

Figure 242. *Ipheion uniflorum*, Calhoun Co., Alabama, 13 Mar 2019. Photos: Dan Spaulding.

Perennial, scapose herb from a bulb. Lawns, vacant lots, cemeteries, roadsides, suburban forests, and old homesites. Flowers late February–April; uncommon throughout Alabama (Fig. 243). Endemic to grasslands of the Pampean Region of Argentina and Uruguay, but is naturalized on most continents (Sassone et al. 2017). In North America, it is chiefly found in the southeastern USA and California (Kartesz 2020). Oddly, Utech (2002e) omitted this species in the *Flora of North America*.

Ipheion uniflorum has been grown as an ornamental species since the early 19th Century (Sassone et al. 2017). It often escapes cultivation and persists in lawns. Its grass-like leaves have an onion odor when bruised. Bulbs produce several scapes (Fig. 244a) with solitary, fragrant flowers ranging from white to blue-violet. The outer surface of the tepals has a distinctive reddish-brown central line (Fig. 244b).

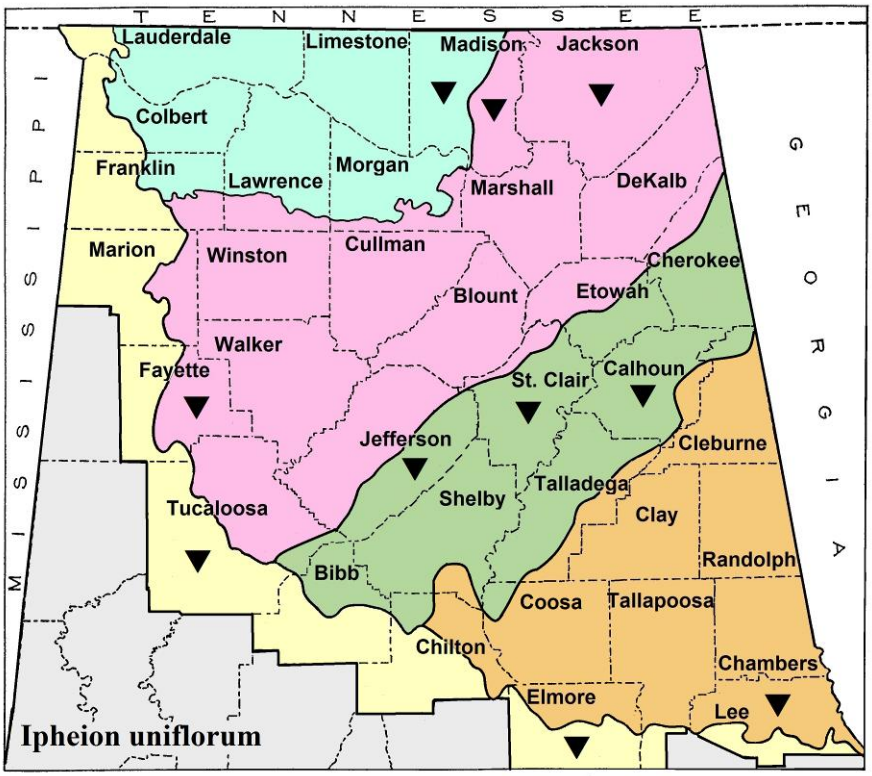

Figure 243. Distribution of *Ipheion uniflorum* in northern Alabama.

Figure 244. *Ipheion uniflorum*, Jefferson Co., Alabama, 6 Mar 2020. Photos: Dan Spaulding.

Ipheion was transferred into the genus *Tristagma* because traditional delimitation was considered paraphyletic/polyphyletic (Traub 1963b, Rahn 1998). However, Sassone et al. (2014) resurrected the genus *Beauverdia* to include four distantly related species, previously included in *Ipheion*, then he recognized the genus *Ipheion* in a narrower sense (*sensu stricto*), with only three species, including *I. uniflorum*.

3. **NOTHOSCORDUM** Kunth 1843

[Greek *nothos*, false, and *scordon*, garlic; referring to the odorless bulbs and foliage]

1. Leaves 1–4 (-5) mm wide; umbel usually with 3–6 (-12) flowers; base of tepals usually yellowish; perianth segments usually completely separate or nearly so; flowers not fragrant; bulbs with few or no bulblets ..... **Nothoscordum bivalve**
1. Leaves 4–12 mm wide; umbel typically with 10–20 flowers (occasionally less); base of tepals usually greenish; perianth segments fused near the base (up to 1/3 of their length); flowers fragrant; bulbs usually with numerous bulblets ..... **Nothoscordum gracile**

1. Nothoscordum bivalve (L.) Britton {two-valved} — FALSE GARLIC; GRACE-GARLIC; CROW-POISON (Fig. 245). [*Allium bivalve* (L.) Kuntze]

Figure 245. *Nothoscordum bivalve*, Morgan Co., Alabama, 25 Mar 2007. Photo: Brian Finzel.

Perennial, scapose herb from a bulb. Roadsides, fields, lawns, rock outcrops, pine savannas, open woods, prairies, pastures, and other disturbed sites. Flowers late February–May and September –January, fruits April–July and October–January; common throughout Alabama (Fig. 246). Native to the Americas, from Arizona to Illinois and Virginia, south through Mexico to South America (Jacobsen & McNeal 2002).

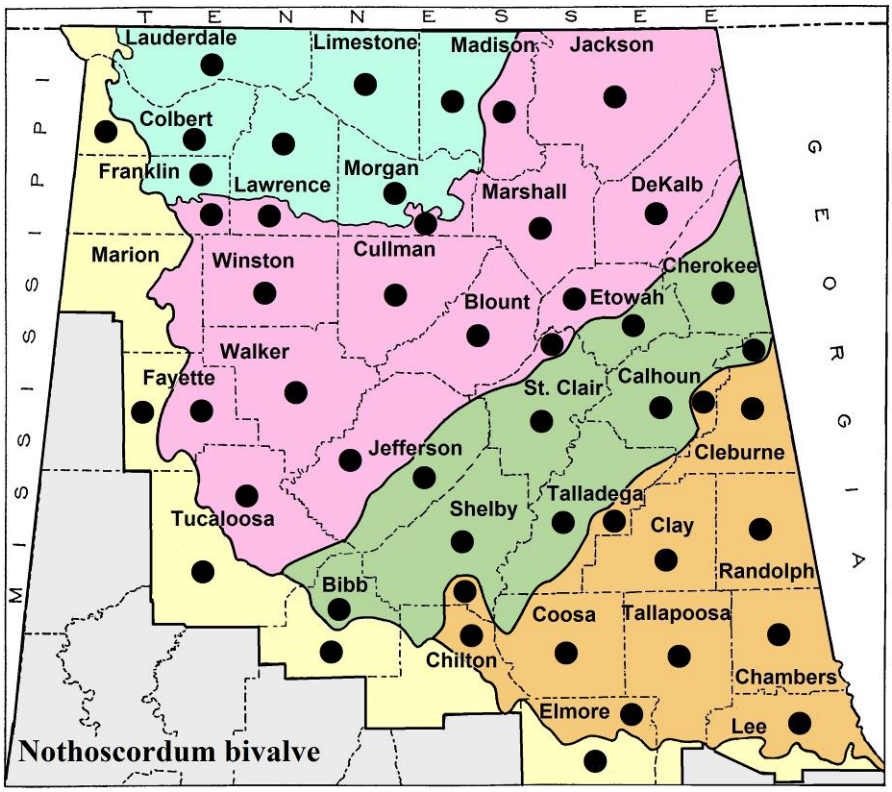

Figure 246. Distribution of *Nothoscordum bivalve* in northern Alabama.

Nothoscordum bivalve resembles *Allium* and has affinities to that genus but lacks an onion-like odor; hence the common name False Garlic. Its tepals are white with a yellowish base and often have a light pink midvein along the back (Fig. 247). The capsules are green, roundish, or obovoid (Fig. 248). The origin of the common name "crow-poison" is obscure, but its bulb has been reported to be mildly poisonous and suspected of being toxic to cattle (Chesnut 1898).


Figure 247. *Nothoscordum bivalve* flowers, Bibb Co., Alabama, 26 Mar 2015. Photos: Brian Finzel.

Figure 248. *Nothoscordum bivalve* capsules, Montgomery Co., Alabama, 7 Apr 2021. Photos: Dan Spaulding.

2. Nothoscordum gracile (Dry. ex Aiton) Stearn {slender} — ONION-WEED; SLENDER FALSE GARLIC; FRAGRANT FALSE GARLIC; HONEY-BELLS; DEVIL-BULBS (Fig. 249). [*Nothoscordum fragrans* (Vent.) Kunth]

Figure 249. *Nothoscordum gracile*, Madison Co., Alabama, 8 Apr 2020. Photo: Brian Finzel.

Perennial, scapose herb from a bulb. Roadsides, lawns, and other disturbed areas. Flowers April–June and sporadically later, fruits May–July; rare in northern Alabama; frequent on the Coastal Plain (Fig. 250). Native to South America, naturalized mainly in the Coastal Plain of the southeastern USA, disjunct in California (Jacobsen & McNeal 2002).

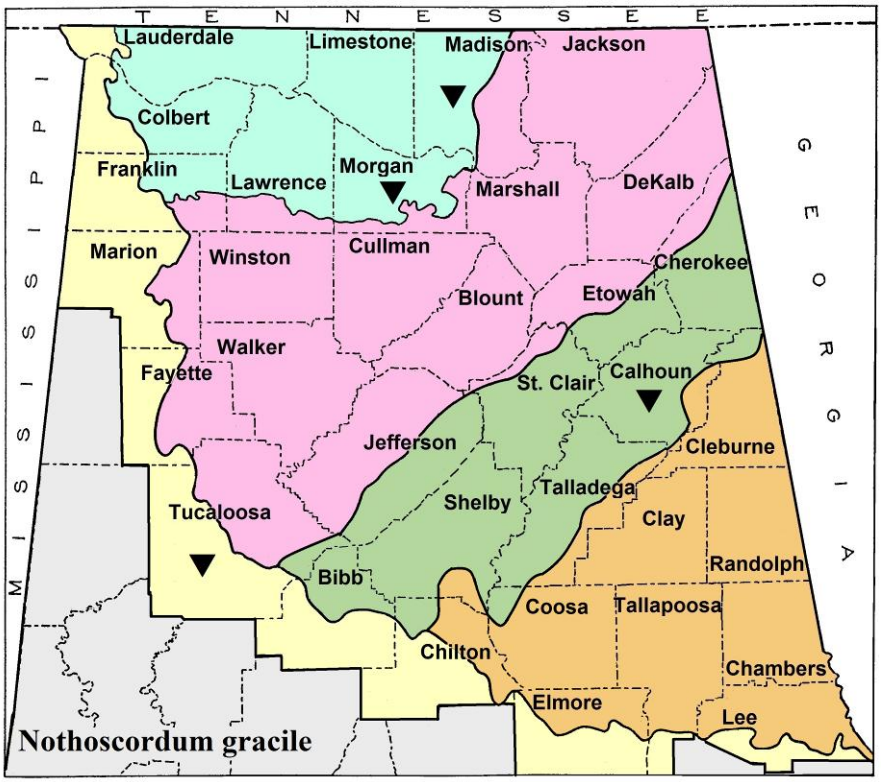

Figure 250. Distribution of *Nothoscordum gracile* in northern Alabama.

Figure 251. *Nothoscordum gracile* flowers, Calhoun Co., Alabama, 18 Apr 2020. Photos: Dan Spaulding.

Figure 252. *Nothoscordum gracile*, Calhoun Co., Alabama. A. Capsules with 8–12 seeds per locule, 30 May 2020. B. Bulb with bulblets, 24 Mar 2021. Photos: Dan Spaulding.

Onion-Weed usually has ten or more fragrant flowers with white tepals that often have greenish bases and pink midveins on the outside (Fig. 251). *Nothoscordum gracile* is a potentially invasive weed that should not be grown as an ornamental flower. Plants can spread by seeds (Fig. 252a) and numerous underground bulblets growing off the main bulb (Fig. 252b). Once established, this species is difficult to eradicate because viable bulblets remain behind when the plants are pulled up; hence the common name "devil-bulbs." The most effective control method is the physical removal of the entire plant with the soil around it. Herbicides are helpful, but individuals often persist from bulblets, requiring multiple reapplications.

16. **AMARYLLIDACEAE** (Amaryllis Family) – in ASPARAGALES

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

    2. Filaments fused with the corona; tepals distinctly thicker than the corona; flowers white; plants native, primarily growing in undisturbed floodplains, swamps, moist hardwood forests, marshes, and river shoals ..... **Hymenocallis**
    2. Filaments not fused with the corona; tepals similar in texture to the corona (although sometimes of a different color); flowers white, yellow, or orange; plants introduced, primarily growing in disturbed upland habitats ..... **Narcissus**

1. Corona absent.

    3. Flowers yellow, orange, red, or pink; leaves withering before flowers appear.

        4. Inflorescence a solitary flower; tepals yellow to orange-yellow; spathe tubular (valves fused), located well-below perianth segments ..... **Zephyranthes**
        4. Inflorescence an umbel of several flowers; tepals red or pink; spathe not tubular (valves not fused), located just below perianth segments ..... **Lycoris**

    3. Flowers white or pinkish-white (sometimes with green or yellow markings); leaves present when flowers appear.

5. Flowers erect to slightly inclined, solitary; tepals large, 5–16 cm long, lacking green or yellow markings ..... **Zephyranthes**
5. Flowers nodding, either solitary or several in an umbel; tepals smaller, 0.4–2.5 cm long, some with green or yellow spots, blotches, or patches.

    6. Inflorescence an umbel with 2–7 flowers; tepals all of similar size and shape; scape hollow ..... **Leucojum**
    6. Inflorescence a solitary flower; inner 3 tepals (petals) distinctly shorter and blunter than the outer 3 tepals (sepals); scape solid ..... **Galanthus**

1. GALANTHUS Linnaeus 1753

[Greek *gala*, milk, and *anthos*, flower; referring to the color of the flowers]

1. Galanthus elwesii Hook. f. {for British botanist Henry John Elwes (1846–1922) who discovered the species in 1874} — GREATER SNOWDROP; GIANT SNOWDROP; ELWES' SNOWDROP (Fig. 253).

Figure 253. *Galanthus elwesii*, Jefferson Co., Alabama, 29 Jan 2020. Photos: Dan Spaulding.

Perennial, scapose herb from a bulb. Suburban forests in disturbed alluvial woods. Flowers and fruits January–March; very rare in northern Alabama (Fig. 254). Native to southeast Europe and southwest Asia (Straley & Utech 2002b). It is a rare escape from cultivation in North America (Kartesz 2020).

Galanthus elwesii is cultivated as an ornamental for its white, honey-scented flowers that bloom early, sometimes emerging through the snow; hence the name "snowdrop" (Straley & Utech 2002b). The inner tepals are shorter than the outer tepals and marked with green blotches (Fig. 255a). These green marks function primarily as a nectar guide for pollinators, but it is also photosynthetic, providing nourishment (photo-assimilates) for developing seeds (Aschan & Pfanz 2006). The inferior ovary (below the tepals) is initially green, becoming yellowish at maturity (Fig. 255b–c).

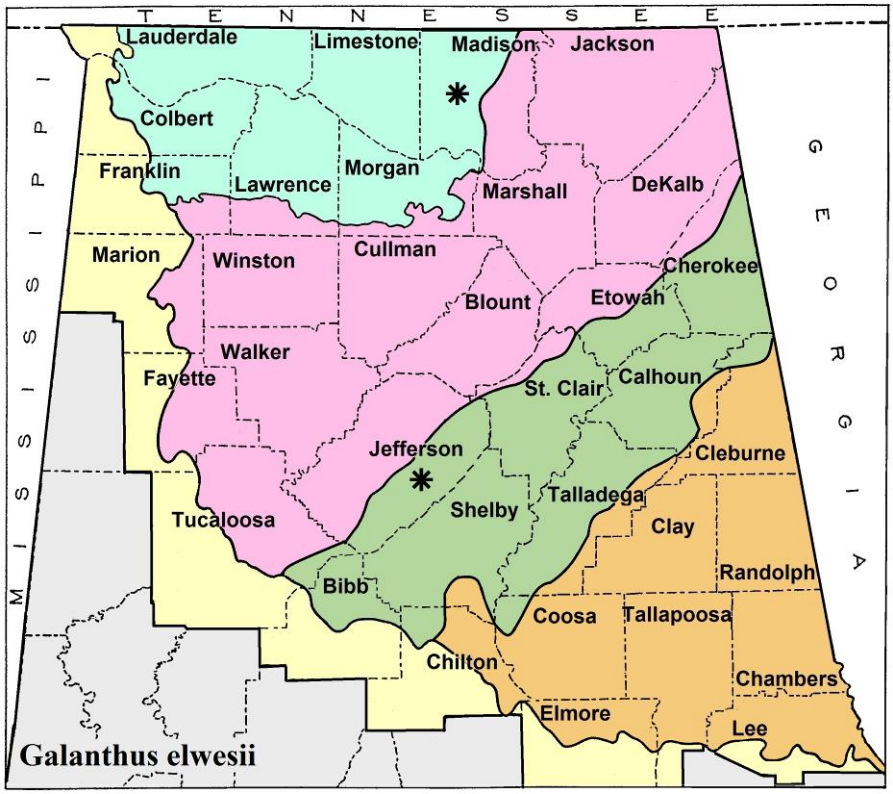

Figure 254. Distribution of *Galanthus elwesii* in northern Alabama.

Figure 255. *Galanthus elwesii*, Jefferson Co., Alabama. A–B. 29 Jan 2020, (A) flower and (B) young capsules. C–D. 6 Mar 2020, (C) ripe fruit, and (D) bulb. Photos: Dan Spaulding.

Wayne Barger first reported this species from alluvial woods in Jefferson County, Alabama (Barger et al. 2012). He initially determined it as *Galanthus plicatus* M. Bieb. [Pleated Snowdrop], but Aaron Floden (pers. comm.2019) thought it was *G. nivalis* L. [Common Snowdrop]. Patrick Hacker (pers. comm. 2021), however, concluded it was *G. elwesii*. Hacker noted that "the outer leaf is wrapped around the inner one at the base. This is called supervolute vernation (as opposed to the explicative vernation of *G. plicatus*), which is a characteristic of *G. elwesii*. The leaves are rather flat and do not have the distinctive folds of *G. plicatus* where the edges are bent backward."

An observation of *Galanthus nivalis* (Fig. 256a) was documented on iNaturalist by Margaret Cobbs for Jefferson County, Alabama [<www.inaturalist.org/observations/20163353>]. Her observation was from Jemison Park along the nature trail; however, she could not determine if park staff or volunteers cultivated the plants (pers. comm. 2021). Common Snowdrop differs from Greater Snowdrop by its narrower leaves (most < 6 mm wide), flat-facing leaf bases (applanate vernation), and flat leaf tips. Its petals have a green mark apically (usually an inverted V or U). *Galanthus elwesii* (Fig. 256b) has broad leaves (most > 9 mm wide), leaf bases that wrap around each other, and hooded leaf tips (Crawley 2010). The green marks on the petals of this species are variable. Patrick Hacker (pers. comm. 2021) states, "*G. elwesii* has a large variety of different spot patterns on the inner tepals. For example, it can be just one small spot, two spots (Fig. 256b), an 'X'-shaped spot, or a large blotch like the one on the plants you found."

Figure 256. A. *Galanthus nivalis*, 28 Feb 2020, Bergen Co., New Jersey. B. *Galanthus elwesii* with two green marks on its petals, 9 Feb 2020, Bronx Co., New York. Photos: Sandy Wolkenberg.

Snowdrops are toxic if ingested. Kingsbury (1964) noted: "During World War II, the bulbs (Fig. 255d) of this plant proved poisonous when fed to livestock in the Netherlands as a substitute for unavailable feeds." The entire plant contains a bioactive alkaloid, galantamine. In the early 1950s, Dimitar Paskov, a Bulgarian pharmacologist, first isolated the compound from *Galanthus nivalis*. He reportedly noticed local people using the plant medicinally by rubbing it on their foreheads (Heinrich 2010). Galantamine was used to ease nerve pain associated with polio and is now prescribed to patients to treat facial nerve paralysis, schizophrenia, and dementia (Greenblatt et al. 1999).

2. **HYMENOCALLIS** Salisbury 1812

[Greek *hymên*, membrane, and *kallos*, beauty; referring to stamens united by a membrane]

1. Flowers typically flowering May–June; corona (staminal cup) > 4.5 cm long; leaves erect, gradually tapering to a point, frequently long and narrow (70–90 × 3–4 cm); seeds dark green, sinking in water; plants of rocky shoals without canopy cover ..... **Hymenocallis coronaria**
1. Flowers, typically flowering July–August (in northern Alabama); corona (staminal cup) < 4.5 cm long; leaves lax, abruptly tapering to a point, usually short and broad (50–60 × 4–6 cm); seeds light green, floating in the water; plants chiefly of floodplains, swamps, and moist hardwood forests, often with a closed canopy ..... **Hymenocallis occidentalis**

1. Hymenocallis coronaria (LeConte) Kunth {garlanding, forming a crown} — SHOALS SPIDER-LILY; CAHABA-LILY (Fig. 257). [*Hymenocallis caroliniana* (L.) Herb., in part]

Figure 257. *Hymenocallis coronaria*, Bibb Co., Alabama, 12 May 2007. Photos: Brian Finzel.

Perennial, scapose herb from a bulb. Rocky shoals of rivers and broad streams. Flowers late April–June, fruits June–August; rare in the Cumberland Plateau, Ridge & Valley, and Piedmont (Fig. 258). Native to the southeastern USA, endemic to South Carolina, Georgia, and Alabama (Davenport 1996).

The explorer William Bartram was the first botanist to observe Shoals Spider-Lily in 1783 on the Savannah River in Augusta, Georgia (Smith & Flory 2002). The Alabama Natural Heritage program (2020) ranks *Hymenocallis coronaria* as an imperiled (S2) species. It is also globally imperiled (G2) and has been under consideration for federal protection. While still locally abundant in some waterways (Fig. 259), entire populations have been destroyed by dam construction on major river systems (Smith & Flory 2002). Larry Davenport (1996), who studied this species over its entire range, stated, "Its very specialized habitat demands – swift-flowing water over rocks, with an open canopy–restrict it to shoal areas of broad streams."

Hymenocallis coronaria is morphologically similar to *H. occidentalis*, differing in seed buoyancy. Both species have large, green, leathery fruits (Fig. 260) containing 2–4 fleshy seeds in each of the three locules. Davenport (1996) discovered that the seeds of *H. occidentalis* float, while those of *H. coronaria* sink and "drop to the stream bottom and are swept into rock crevices." This one trait provides the reason why these two species occur in entirely different habitats.

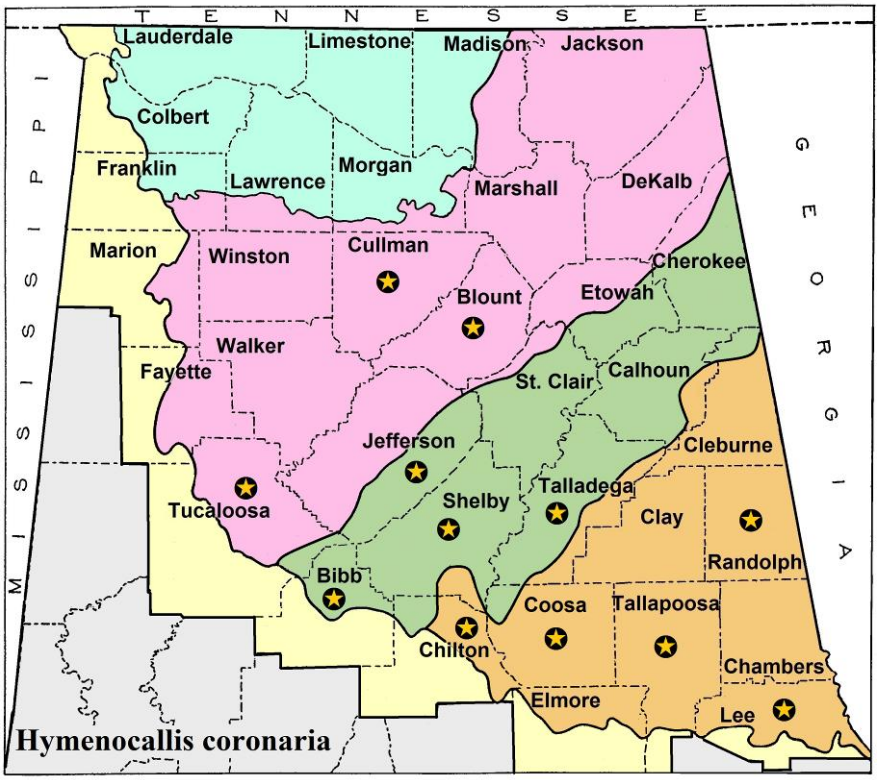

Figure 258. Distribution of *Hymenocallis coronaria* in northern Alabama.

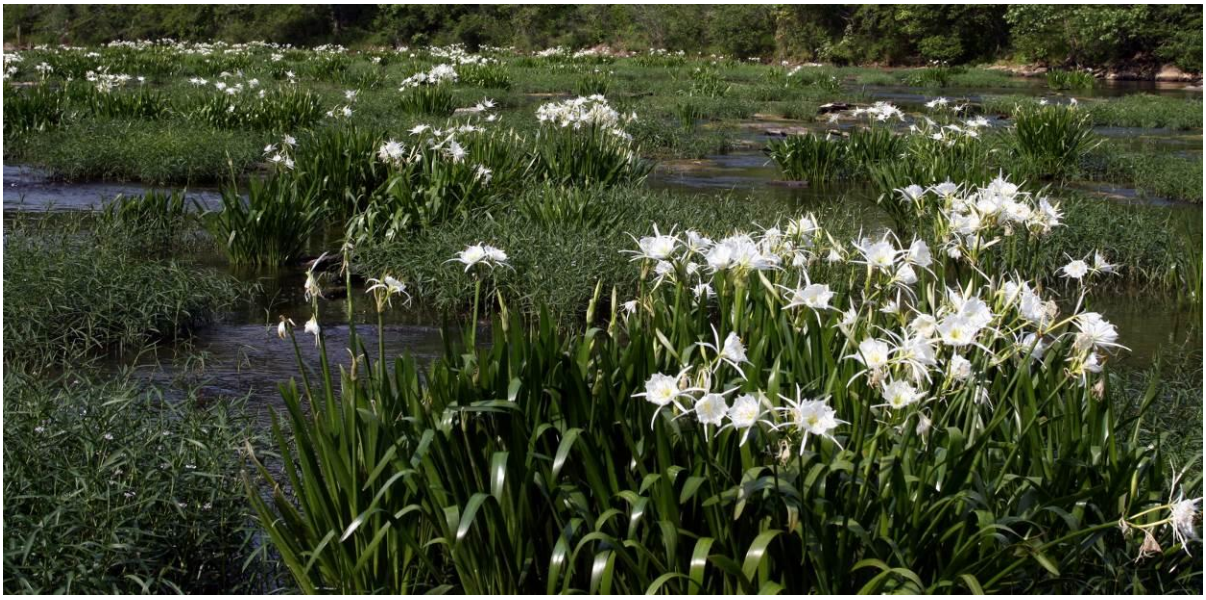

Figure 259. *Hymenocallis coronaria*, Cahaba River, Bibb Co., Alabama, 10 May 2007. Photo: Bill Garland.

Figure 260. *Hymenocallis coronaria* seed pods, Bibb Co., Alabama, 13 Jun 2020. Photos: Roger Birkhead.

The Plebeian Sphinx Moth (*Paratrea plebeja*) and Pipevine Swallowtail (*Battus philenor*) pollinate the fragrant flowers of *Hymenocallis coronaria* (Davenport 1996). One of the few pests of Shoals Spider-Lily is the larva of the Spanish moth (*Xanthopastis regnatrix*), the black and white "convict" caterpillar (Fig. 261a–b), which primarily feeds on Amaryllidaceae (Van Zandt et al. 2013).

Figure 261. Convict caterpillar (*Xanthopastis regnatrix*) on *Hymenocallis*. A. Bibb Co., Alabama, 17 May 2017. Photo: David Butler. B. Baldwin Co., Alabama, 16 Jul 2020. Photo: Giff Beaton.

Hymenocallis coronaria is called "Cahaba lily" in Alabama because of its frequent presence in the free-flowing Cahaba River (Davenport 1990). Davenport (1993) notes it is a celebrated wildflower in Alabama, occasionally poached for its beautiful, large, showy flowers. However, without flowing water, it rarely flowers and soon perishes. He continues, "not only is it a symbol of our streams and a plant of great beauty, it is an indicator of healthy water."

2. Hymenocallis occidentalis (LeConte) Kunth var. **occidentalis** {western; for hemisphere} — WOODLAND SPIDER-LILY; NORTHERN SPIDER-LILY; SWAMP SPIDER-LILY; HAMMOCK SPIDER-LILY; CAROLINA SPIDER-LILY (Fig. 262). [*Hymenocallis caroliniana* (L.) Herb., in part]

Figure 262. *Hymenocallis occidentalis*, Colbert Co., Alabama, 26 Jul 2012. Photos: Brian Finzel.

Perennial, scapose herb from a bulb. Alluvial woods, bottomland forests, swamps, forested floodplains, rich woods, moist hardwood forests, wet pastures, marshes, riverbanks, wooded seeps, lake margins, and roadside ditches. Flowers late June–August (earlier on lower Coastal Plain), fruits August–October; uncommon throughout Alabama (Fig. 263). Native to the central and southeastern USA, from eastern Oklahoma to southern Illinois and western North Carolina, south to eastern Texas and the Florida Panhandle (Kartesz 2020).

Spider-lilies are easily recognized by their white, funnel-shaped membrane (corona) that unites the stamens by their filaments, forming a staminal cup. The flowers emit a strong, sweet fragrance, attracting bumblebees (*Bombus*) and butterflies that pollinate them diurnally, and moths, especially hawkmoths (Sphingidae), nocturnally (Graham 2010). Leaves of *Hymenocallis occidentalis* are oblanceolate (broader above the middle), tapered to a narrow base, and glaucous when young. Bulbs (and often leaves) of *Hymenocallis* contain poisonous alkaloids (Schmutz & Hamilton 1979).

Woodland Spider-Lily is similar to Shoals Spider-Lily but typically grows in mesic upland forests and floodplains (Fig. 264), not river shoals. Also, its seeds float rather than sink, and water transports them to new locations such as floodplains. *Hymenocallis occidentalis* var. *occidentalis* is the hardiest, most widespread spider-lily in North America and is often cultivated in southern gardens (Smith & Flory 2002).

A second variety, *Hymenocallis occidentalis* var. *eulae* (Shinners) G.L. Sm. & W. Flory occurs primarily in eastern Texas, adjacent Oklahoma, and Arkansas, with a disjunct population in Mississippi (Kartesz 2020). This taxon differs from the typical variety by being suberect, forming dense clusters, and having leaves that wither before the flowers open (Smith & Flory 2001). Lloyd Shinners (1951) first described it as a species and named it after his herbarium assistant, Eula Whitehouse, at Southern Methodist University.

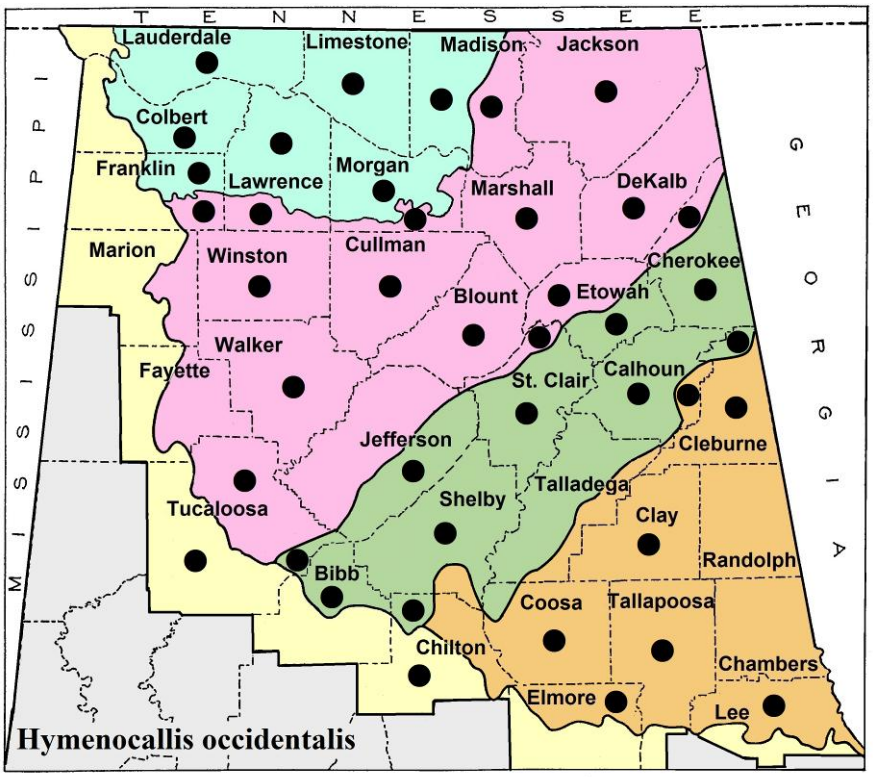

Figure 263. Distribution of *Hymenocallis occidentalis* var. *occidentalis* in northern Alabama.

Figure 264. *Hymenocallis occidentalis* habitat, Madison Co., Alabama, 11 Apr 2020. Photo: Brian Finzel.

3. **LEUCOJUM** Linnaeus 1753

[Greek *leukos*, white, and *ion*, violet; alluding to flower color and violet-like fragrance]

1. Leucojum aestivum L. {of summer} — SUMMER SNOWFLAKE; MEADOW SNOWFLAKE (Fig. 265).

Figure 265. *Leucojum aestivum*. A. Macon Co., Alabama, 16 Feb 2012. B. Calhoun Co., Alabama, 2 Mar 2011. Photos: Wayne Barger.

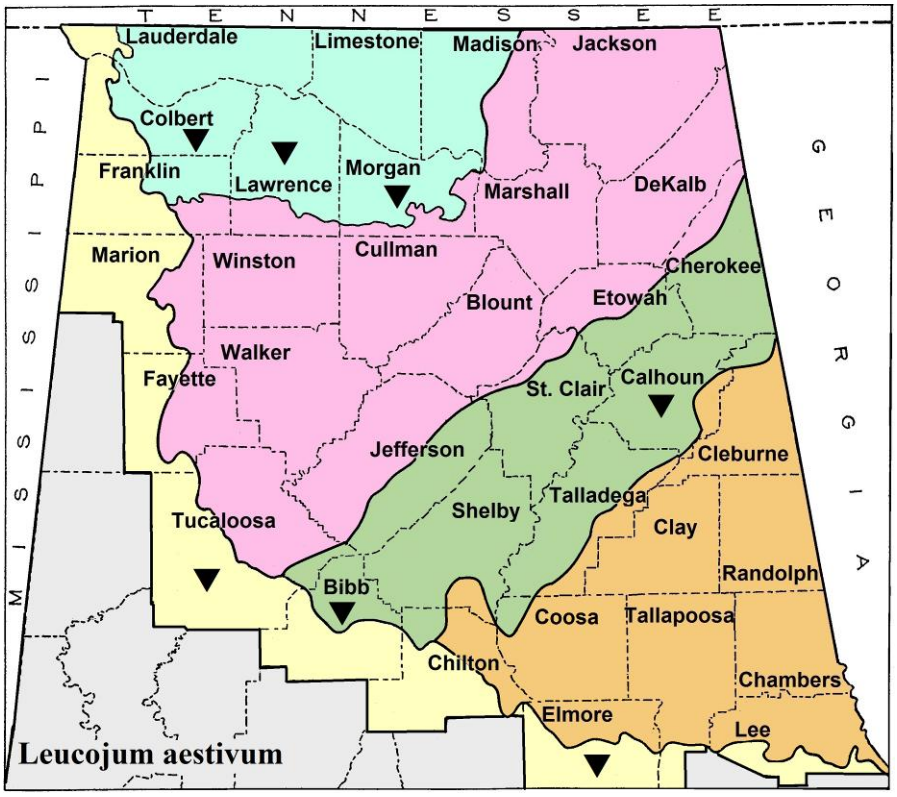

Figure 266. Distribution of *Leucojum aestivum* in northern Alabama.

Perennial, scapose herb from a bulb. Low roadsides, ditches, damp woodland borders, abandoned lots, old homesites, and other disturbed areas. Flowers February–April; rare in northern Alabama; uncommon in the Coastal Plain (Fig. 266). A native of Europe, introduced in North America, primarily in the southeastern USA (Kartesz 2020).

Figure 267. *Leucojum aestivum*, Colbert Co., Alabama, 16 Apr 2016. Photo: Brian Finzel.

Summer Snowflake is widely cultivated as an ornamental flower, naturalizing within temperate regions (Straley & Utech 2002d). *Leucojum* is closely related to *Galanthus*, differing by having similar-sized tepals, hollow stems, and 2–7 flowered umbels (Fig. 267). Snowdrop (*Galanthus*) has unequal tepals, solid stems, and solitary flowers. *Leucojum aestivum* is toxic due to various alkaloids, including galantamine that is used in a drug to treat Alzheimer's disease (Berkov et al. 2008).

4. **LYCORIS** Herbert 1819

[Named after Lycoris, a beautiful Roman actress and mistress of Marc Antony]

Lycoris was first cultivated in England in the 18th Century and shortly after that in the USA (Hsu et al. 1994). They bloom in summer and autumn, and their leaves wither before flowering, making these "surprise-lilies" popular since most flower bulbs sold are spring flowering.

1. Tepals red, 4–4.5 cm long, reflexed, margins crisped (wavy); stamens much longer than tepals; blooming mostly August–November; leaves appearing in late autumn or winter (withering before anthesis); leaf blades 0.3–1 cm wide, dark green with a whitish-green central stripe (best seen in fresh material); bulbs 1–3 cm in diameter ..... **Lycoris radiata**
1. Tepals pink to lilac, 6–7 cm long, reflexed only at tips, margins crisped only at base; stamens equal to or shorter than tepals; blooming July–August; leaves produced in late winter or early spring (senescing by June); leaf blades usually 1.8–2.5 cm wide, solid light green; bulbs about 5 cm in diameter..... **Lycoris squamigera**

1. Lycoris radiata (L'Hér.) Herb. var. **radiata** {radiating; the long stamens} — RED SPIDER-LILY; RED MAGIC-LILY; RED NAKED-LADIES; RED SURPRISE-LILY; RED HURRICANE-LILY (Fig. 268).

Figure 268. *Lycoris radiata* starting to bloom, Etowah Co., Alabama, 4 Sep 2019. Photos: Savannah Spaulding.

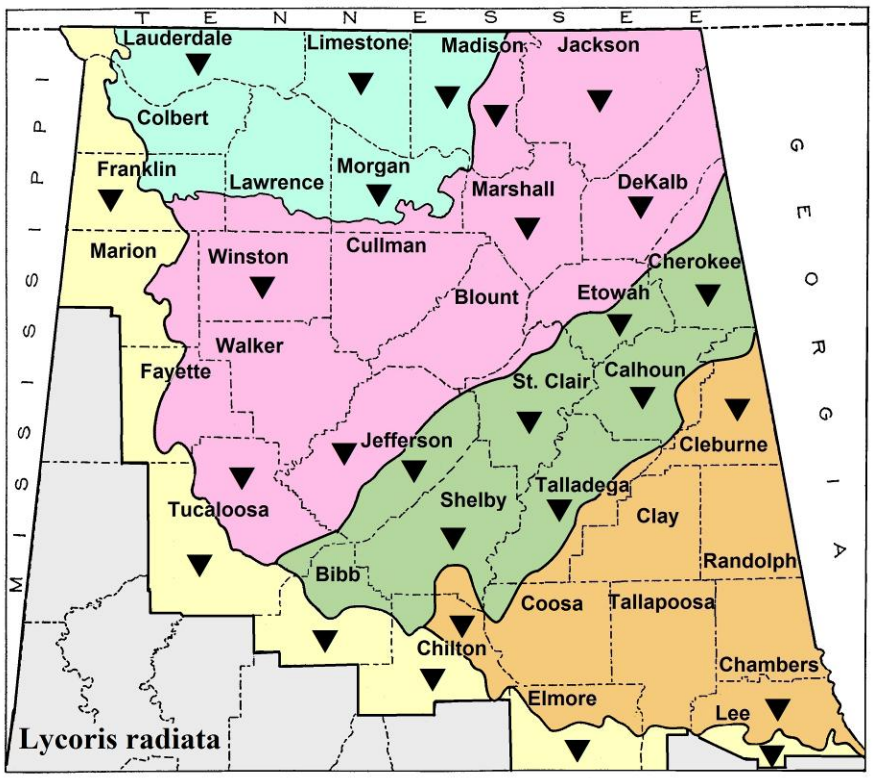

Figure 269. Distribution of *Lycoris radiata* in northern Alabama.

Perennial, scapose herb from a bulb. Roadsides, lawns, old homesites, suburban forests, and vacant lots. Flowers August–November; uncommon throughout Alabama (Fig. 269). A native of China and chiefly naturalized in the southeastern USA (Lee et al. 2003; Kartesz 2020).

Figure 270. *Lycoris radiata*, Baldwin Co., Alabama, 2 Sep 2018. Photo: Howard Horne.

The bright red flowers with long, spider-like anthers (Fig. 270) gave Red Spider-Lily its common name. Its flowers seem to "suddenly" appear without foliage; hence the vernacular names "magic-lily," "naked-ladies," and "surprise-lily." Leaves (Fig. 271a) appear in late autumn following anthesis, withering in early summer. They are dark green with a pale central stripe (Fig. 271b). Bulbs (Fig. 271c) are poisonous due to toxic alkaloids that cause abdominal pain, nausea, and diarrhea (Lee et al. 2003).

Figure 271. *Lycoris radiata* leaves and bulb, Etowah Co., Alabama, 30 Dec 2019. Photos: Dan Spaulding.

Being sterile triploids, flowers of *Lycoris radiata* var. *radiata* bear no seeds. Its broad distribution occurs from asexual reproduction via lateral bulbs, spreading plants from one location to another. The diploid variety, *L. radiata* var. *pumila* Grey, is endemic to China and reproduces sexually through viable seeds (Hsu et al. 1994). This taxon has not been documented in Alabama.

2. Lycoris squamigera Maxim. {bearing scales; referring to small scales on flowers, giving them their iridescent sparkle} — PINK MAGIC-LILY; PINK RESURRECTION-LILY; PINK SURPRISE-LILY; PINK NAKED-LADIES (Fig. 272).

Figure 272. *Lycoris squamigera*, Calhoun Co., Alabama, 28 Jul 2019. Photos: Melanie Taylor Spaulding.

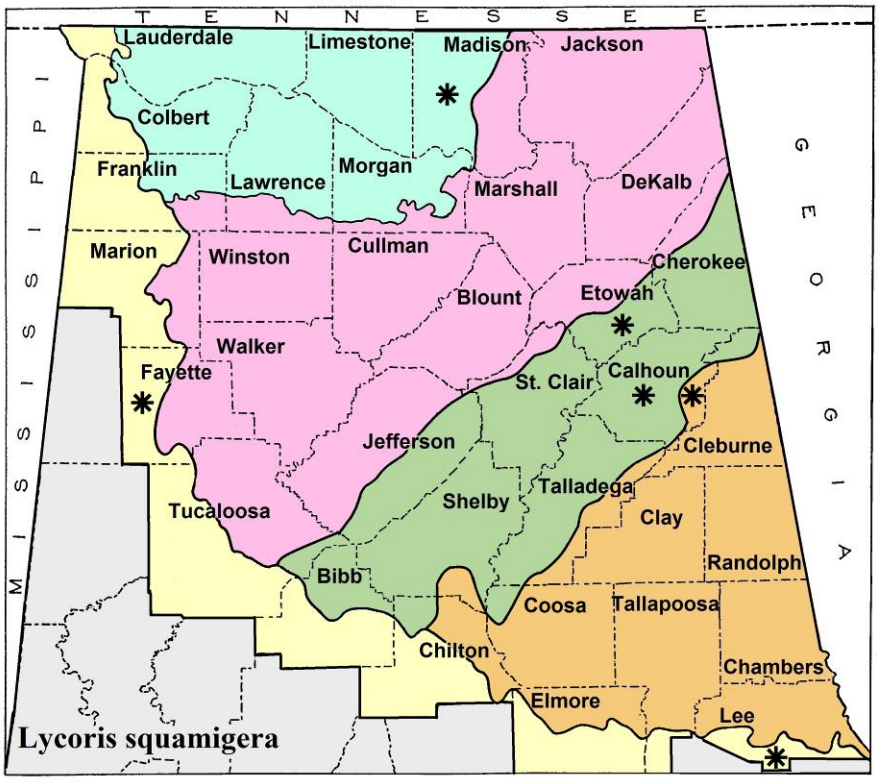

Figure 273. Distribution of *Lycoris squamigera* in northern Alabama.

Perennial, scapose herb from a bulb. Old homesites, lawns, and roadsides. Flowers July –August; very rare throughout Alabama (Fig. 273). A native of China, rarely persistent after cultivation, documented in the USA from Ohio and Alabama (Kartesz 2020).

Figure 274. *Lycoris squamigera* leaves, roadside, Etowah Co., Alabama, 30 Mar 2020. Photos: Dan Spaulding.

Lycoris squamigera is a sterile triploid, likely of ancient hybrid origin. It occurs only near human habitations, even in China (Hsu et al. 1994). Leaves of this species appear in spring (Fig. 274) and die back in early summer, while fragrant, pink flowers develop on naked scapes soon after the leaves wither away, hence the common names. The toxic bulbs of Pink Magic-Lily contain numerous crystalline alkaloids (Hung & Ma 1964).

5. **NARCISSUS** Linnaeus 1753

[Named after Narkissos of Greek mythology; a youth who fell in love with his reflection]

Narcissus species are native to meadows and woods of Europe, North Africa, and West Asia, with their distribution center in the Mediterranean region (Webb 1980). Various common names, including daffodil and jonquil, are applied to members of the genus. The number of species varies widely, depending on classification. Straley & Utech (2002f) estimate about 26, while other authors delineate more than 60 species (Ji & Meerow 2000).

Various species and hybrids are widely used in gardens and landscapes. The cultivation of daffodils began during the 16th Century, with collections originating from Spain and grown in the Netherlands (Pugsley 1933). Today, thousands of named *Narcissus* cultivars are grouped into divisions such as trumpet daffodils, chalice-cupped daffodils, poet daffodils, bunch-flowered daffodils, double daffodils, and jonquils (Spaulding & Barger 2014). Serviss et al. (2016) make an important caveat, which applies to this treatment: "Please also consider that the following key should only be used with plants that are encountered as spontaneous to naturalized or clearly persisting from cultivation. Most of the modern cultivars and hybrids commonly found in cultivation will not key properly here, or if keyed, may cause identification errors."

1. Flowers doubled, corona divided into numerous segments resembling tepals; stamens usually petaloid.

    2. Corona segments and tepals all about the same length; flowers yellow to greenish, corona segments frequently similar in color to tepals..... **Narcissus pseudonarcissus**
    2. Corona segments shorter than tepals; flowers bicolored, corona segments usually bright orange and tepals pale yellow to creamy-yellow .....**Narcissus ×incomparabilis**

1. Flowers not doubled, corona undivided and distinct from tepals; stamens not petaloid.

    3. Corona as long as or longer than tepals; flowers yellow to orange-yellow (rarely white) and always solitary (1 per flowering stalk) .....**Narcissus pseudonarcissus**
    3. Corona distinctly shorter than the tepals; flowers yellow or white, 1–20 per flowering stalk.

        4. Corona 1/2 to 3/4 as long as the tepals; hypanthial tube (just below perianth) distinctly widening towards the apex; tepals cream-colored, pale or bright yellow and corona orange-yellow to golden-yellow.

            5. Inflorescences always solitary; leaves mostly 7–11 mm wide, flat and not grooved; flowers somewhat fragrant and typically bicolored, tepals cream-colored or pale yellow and corona usually dark yellow-orange.....**Narcissus ×incomparabilis**
            5. Inflorescences often umbellate with (1-) 2–3 (-4) flowers; leaves mostly 2–6 mm wide, thickened and grooved; flowers very fragrant and mostly uniform in color (corona occasionally slightly darker), tepals and corona both golden-yellow to yellowish-orange ..... **Narcissus ×odorus**

        4. Corona much less than 1/2 as long as tepals; hypanthial tube mostly parallel-sided, although usually slightly flaring near the apex; tepals and corona yellow or white.

            6. Leaves thickened and either cylindrical (rush-like) or concave to folded, 2–9 mm wide; leaf surface green (not glaucous); tepals yellow.

                7. Leaves mostly round, occasionally folded or grooved (often flattened when pressed), 2–4 mm wide; flowers typically uniformly golden-yellow, corona only slightly darker than tepals or the same color; inflorescence 1–4 -flowered ..... **Narcissus jonquilla**
                7. Leaves concave (curved inward and somewhat flattened on one side), 3–10 mm wide; flowers with light lemon-yellow tepals and usually a distinctly darker yellow-orange corona; inflorescence 3–7-flowered .....**Narcissus ×intermedius**

            6. Leaves flat, not grooved, 6–20 mm wide; leaf surface often glaucous; tepals white to cream (rarely yellow).

                8. Inflorescence always solitary (only one flower per stalk); corona bright yellow with a distinctive red, wavy rim (which often fades when dried); tepals white, usually 20–30 mm long; flowers fragrant..... **Narcissus poeticus**
                8. Inflorescence usually with 2 flowers (occasionally solitary, rarely in 3's); corona usually yellow (rarely orange), but lacking a red rim (a reddish line is often present just below the rim); tepals cream-colored to white, usually less than 20 mm long; flowers not fragrant or only slightly so ..... **Narcissus ×medioluteus**

1. Narcissus ×incomparabilis P. Mill. {incomparable} — NONESUCH DAFFODIL; PEERLESS DAFFODIL (Fig. 275).

Figure 275. *Narcissus ×incomparabilis*, Morgan Co., Alabama, 17 Feb 2020. Photos: Dan Spaulding.

Perennial, scapose herb from a bulb. Roadsides, pastures, woodland borders, railroad tracks, and other disturbed areas. Flowers February–April; uncommon throughout Alabama (Fig. 276). Naturalized chiefly in the southeastern USA, sporadically in other states (Kartesz 2020).

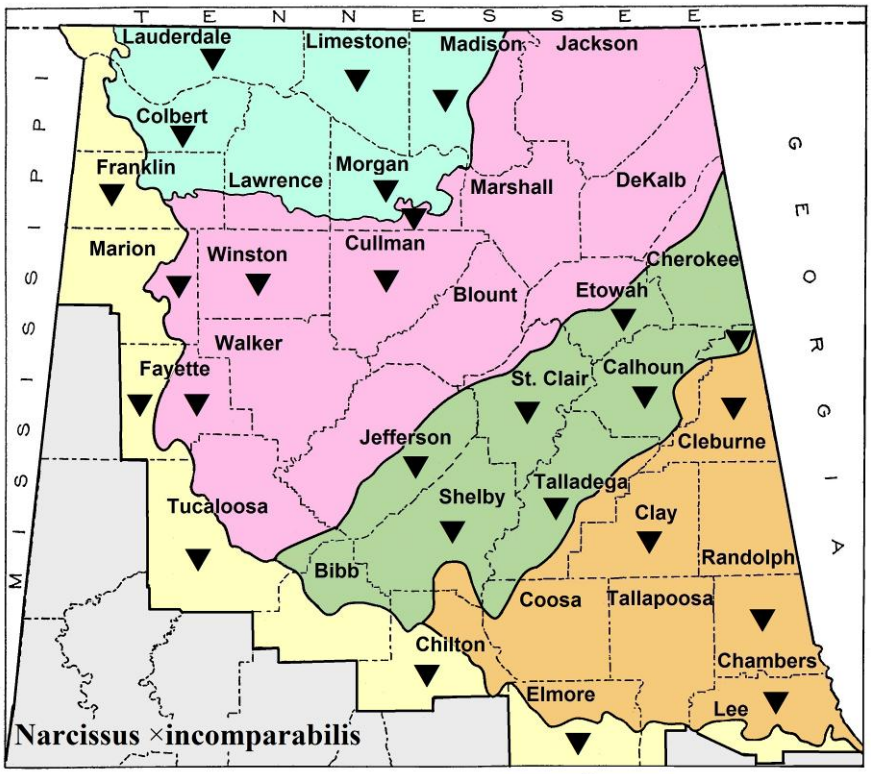

Figure 276. Distribution of *Narcissus ×incomparabilis* in northern Alabama.

The parents of this sterile hybrid are *Narcissus poeticus* and *N. pseudonarcissus.* It is thought to occur as a natural hybrid in the wild (Webb 1980). Nonesuch Daffodil is sometimes mistaken for *N. pseudonarcissus* because of its solitary, yellowish flowers, but *N.* ×*incomparabilis* has a corona about half the length of the tepals. *Narcissus poeticus* is also similar but has an even shorter corona with a red rim.

2. Narcissus ×intermedius Loisel. {intermediate} — STAR DAFFODIL; STAR JONQUIL (Fig. 277). [*Narcissus* ×*compressus* Haw.]

Figure 277. *Narcissus* ×*intermedius*, Jefferson Co., Alabama, 6 Mar 2020. Photos: Dan Spaulding.

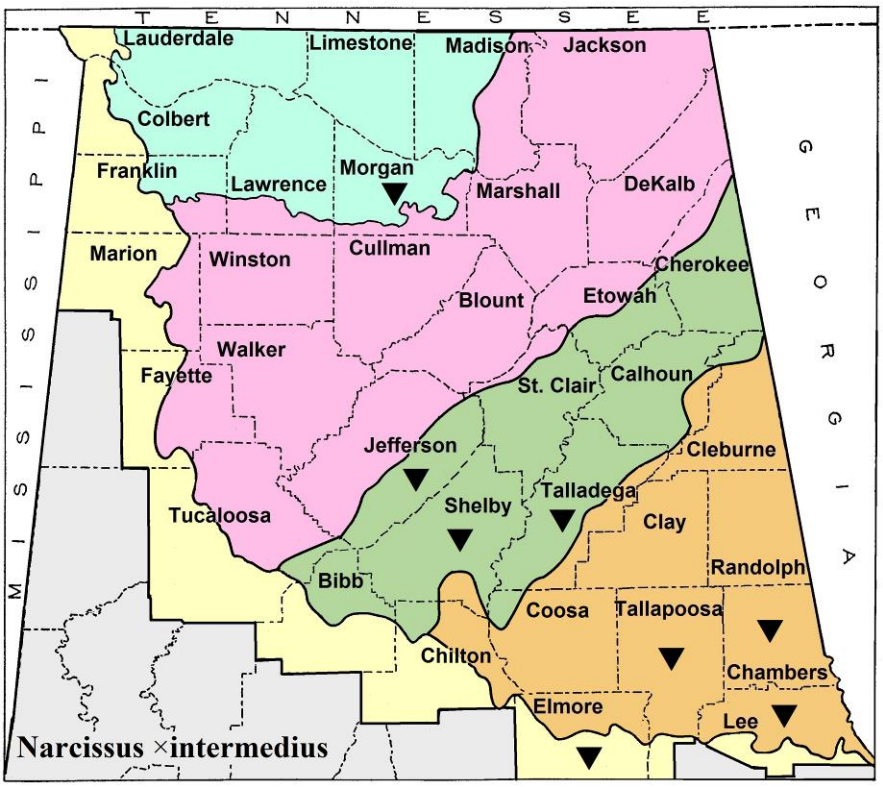

Figure 278. Distribution of *Narcissus* ×*intermedius* in northern Alabama.

Perennial, scapose herb from a bulb. Roadsides, fields, power line right-of-ways, lawns, woodland borders, old home sites, and other disturbed areas. Flowers February–March; rare in northern Alabama; uncommon in the Coastal Plain (Fig. 278). Naturalized in the southeastern USA, mainly on the Coastal Plain from South Carolina to eastern Texas (Kartesz 2020).

Narcissus ×*intermedius* is a sterile hybrid that spreads asexually via bulblets (Nesom 2010a). It is often confused with *N. jonquilla* but can be distinguished by its swollen, grooved leaves, mostly over 4 mm wide, and its darker orange corona, contrasted by lighter yellow tepals. It appears to be intermediate between its parents, *N. jonquilla* and *N. tazetta*.

3. Narcissus jonquilla L. {Spanish name for *Juncus*; rush-like leaves} — JONQUIL; APODANTHUS DAFFODIL (Fig. 279).

Figure 279. *Narcissus jonquilla*, Tallapoosa Co., Alabama, 14 Mar 2018. Photos: Brian Finzel.

Perennial, scapose herb from a bulb. Roadsides, lawns, woodland borders, and other disturbed areas. Flowers February–April; uncommon throughout Alabama (Fig. 280). A native of Europe, naturalized chiefly in the southeastern USA, sporadically in other states (Kartesz 2020).

Narcissus jonquilla has round, slender, hollow rush-like leaves (occasionally narrowly grooved), resembling the genus *Juncus* (rushes). The name jonquil is derived from European names for rush (Martin 1988). *Narcissus* ×*intermedius* is often confused with *N. jonquilla*, but the hybrid has broader, concave leaves and bi-colored flowers with slightly darker coronas, whereas Jonquil has narrower, tubular leaves and uniformly golden-yellow flowers. *Narcissus* ×*odorus* is also similar but has much larger flowers with a longer corona.

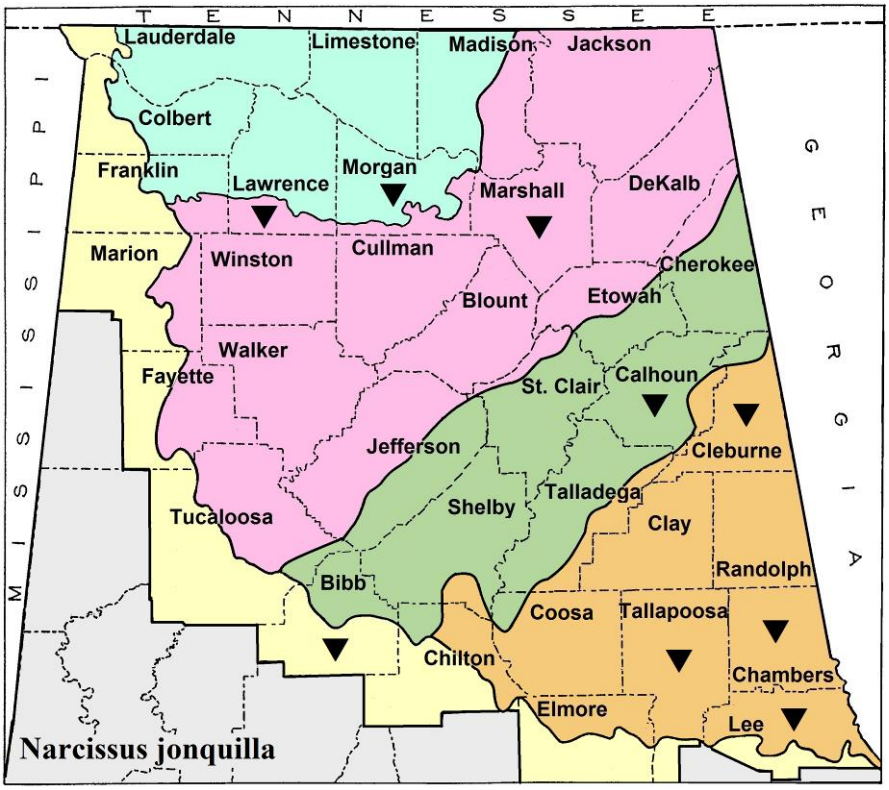

Figure 280. Distribution of *Narcissus jonquilla* in northern Alabama.

Two "bunchflower" species, *Narcissus tazetta* L. [Cream Narcissus] (Fig. 281a) and *N. papyraceus* Ker-Gawl. [Paper-White Narcissus] (Fig. 281b) are known from the Coastal Plain of Alabama and expected in our region (Spaulding & Barger 2014). They look very similar when dried but are easily identified in the field. *Narcissus papyraceus* has pure white tepals and corona, whereas *N. tazetta* has a yellow or orange corona, usually contrasted by white tepals.

Figure 281. A. *Narcissus tazetta*, Conecuh Co., Alabama, 16 Feb 2019. Photo: Alvin Diamond. B. *Narcissus papyraceus*, Elmore Co., Alabama, 24 Nov 2020. Photo: Ross Hornsby.

4. Narcissus ×medioluteus P. Mill. {medium-yellow; for corona} — PRIMROSE-PEERLESS; TWIN-SISTERS; TWO-FLOWER NARCISSUS (Fig. 282).

Figure 282. *Narcissus ×medioluteus*, Clay Co., Alabama, 13 Apr 2019. Photos: Dan Spaulding.

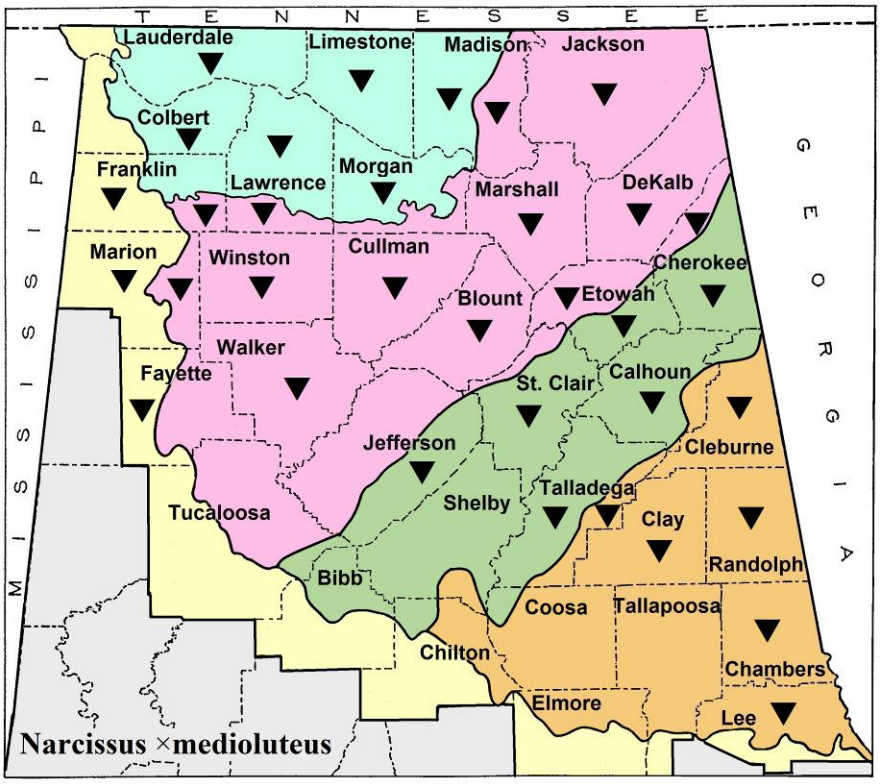

Figure 283. Distribution of *Narcissus ×medioluteus* in northern Alabama.

Perennial, scapose herb from a bulb. Fields, roadsides, roadbanks, pastures, and other disturbed areas. Flowers March–April; frequent in northern Alabama; uncommon in the Coastal Plain (Fig. 283). Naturalized chiefly in the southeastern USA, sporadically in other states (Kartesz 2020).

Narcissus ×*medioluteus* is a hybrid of *N. poeticus* and *N. tazetta.* Its flowers resemble *N. poeticus* but are slightly smaller, usually in pairs but occasionally solitary or in threes. Primrose-Peerless coronas are white-rimmed rather than red-rimmed, though they often have a thin reddish-brown ring between the white and yellow portions. *Narcissus papyraceus* and *N. tazetta*, two white-flowered species, differ from this hybrid by having more flowers and usually lack yellow coloration at the tepal base adjacent to the corona.

5. Narcissus ×odorus L. {scented; fragrant flowers} — CAMPERNELLE JONQUIL; SWEET-SCENTED JONQUIL (Fig. 284).

Figure 284. *Narcissus* ×*odorus*, Cleburne Co., Alabama, 28 Feb 2021. Photos: Dan Spaulding.

Perennial, scapose herb from a bulb. Roadsides, fields, pastures, and other open disturbed areas. Flowers February–April; uncommon throughout Alabama (Fig. 285). Naturalized in the southeastern USA from Arkansas and North Carolina, south to Georgia and eastern Texas (Kartesz 2020).

Campernelle Jonquil is a sterile hybrid that spreads asexually. The parents of this hybrid are *Narcissus jonquilla* and *N. pseudonarcissus*. It is often confused with *N. pseudonarcissus* but is often multi-flowered, has golden-yellow tepals distinctly longer than the corona, and grooved, narrow leaves, typically overtopping the flowers. Common Daffodil differs by having solitary flowers with tepals as long as or slightly shorter than the trumpet-like corona. *Narcissus* ×*odorus* is similar to *N.* ×*intermedius* and *N. jonquilla* but has larger flowers than those two daffodils.

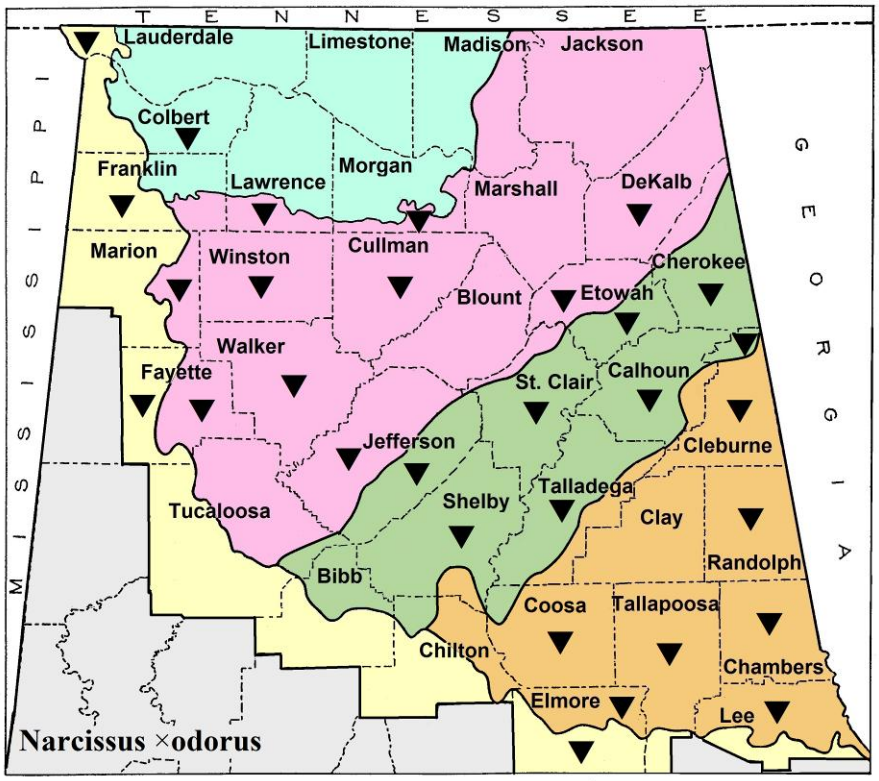

Figure 285. Distribution of *Narcissus ×odorus* in northern Alabama.

6. Narcissus poeticus L. {of the poets} — POET'S NARCISSUS; PHEASANT'S-EYE DAFFODIL; POET'S DAFFODIL (Fig. 286).

Figure 286. *Narcissus poeticus*, Morgan Co., Alabama, 21 Mar 2020. Photos: Brian Finzel.

Perennial, scapose herb from a bulb. Roadsides and old home sites. Flowers late March – May; rare in northern Alabama; very rare in the Coastal Plain (Fig. 287). Native to Europe, chiefly naturalizing in the central and eastern USA and adjacent Canada (Kartesz 2020).

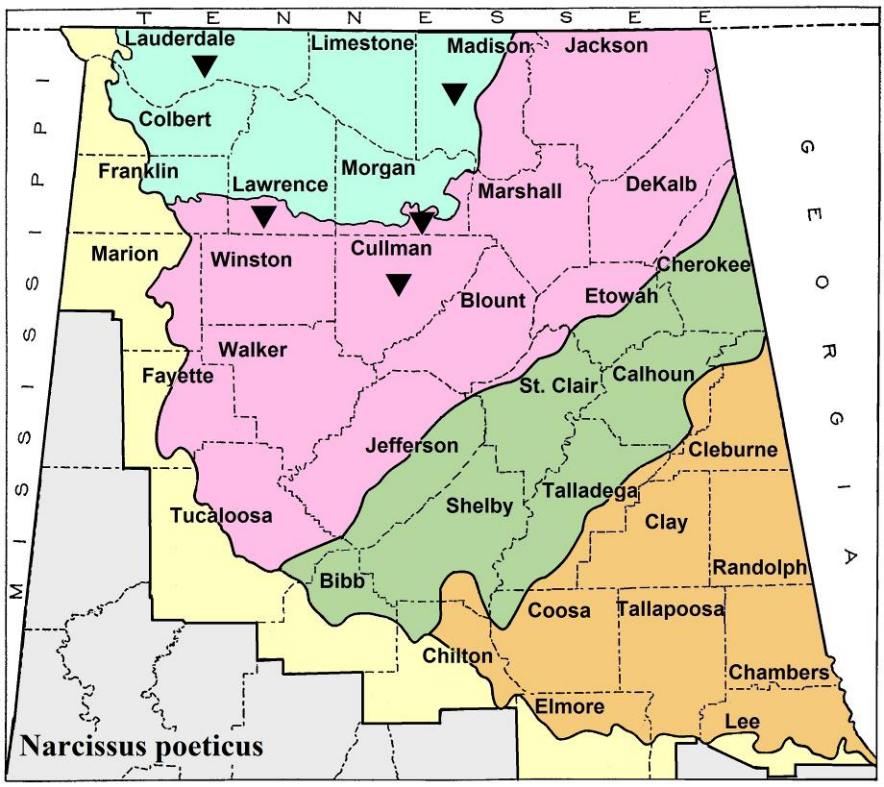

Figure 287. Distribution of *Narcissus poeticus* in northern Alabama.

Narcissus poeticus is often confused with *N.* ×*medioluteus* because both taxa have large solitary flowers. The senior author annotated most of the herbarium specimens identified as Poet's Narcissus to this hybrid. Flowers of *N. poeticus* are always solitary, and its corona has a distinct wavy, red rim. *Narcissus* ×*medioluteus* has one to three flowers without a red-rimmed corona.

7. Narcissus pseudonarcissus L. {false narcissus} — COMMON DAFFODIL; TRUMPET NARCISSUS; BUTTERCUP (Fig. 288).

Perennial, scapose herb from a bulb. Roadsides, fields, pastures, lawns, open woods, and old home sites. Flowers January–March; frequent throughout Alabama (Fig. 289). Native to Europe, widely naturalized in North America in the USA and Canada (Kartesz 2020).

Common Daffodil is the most widely naturalized *Narcissus* in North America. It has solitary flowers with a corona as long as or longer than the tepals. Double forms are often confused with double-flowered *N.* ×*incomparabilis*, but the tepals of *N. pseudonarcissus* are almost as long as the corona segments and similar in color.

Linnaeus (1753) named the genus and designated *Narcissus pseudonarcissus* as the type species. There are two possible derivations for the origin of the generic name. First is said to be derived from the Greek word "*narkeo*, "to be stupified," referring to the narcotic alkaloids of the bulbs (Dweck 2002). A second interpretation is that the beautiful flowers were named after

Narkissos, the Greek mythological character, who fell in love with his reflection (Grieve 1931). According to Martin (1988), the name 'daffodil" may have originated from the old English word, *affodyle*, meaning "that which comes early," or it possibly was first named "d'asphodel" after the somewhat similar Asphodel flowers (*Asphodelus*).

Figure 288. *Narcissus pseudonarcissus*, Calhoun Co., Alabama, 23 Feb 2014. Photos: Savannah Spaulding.

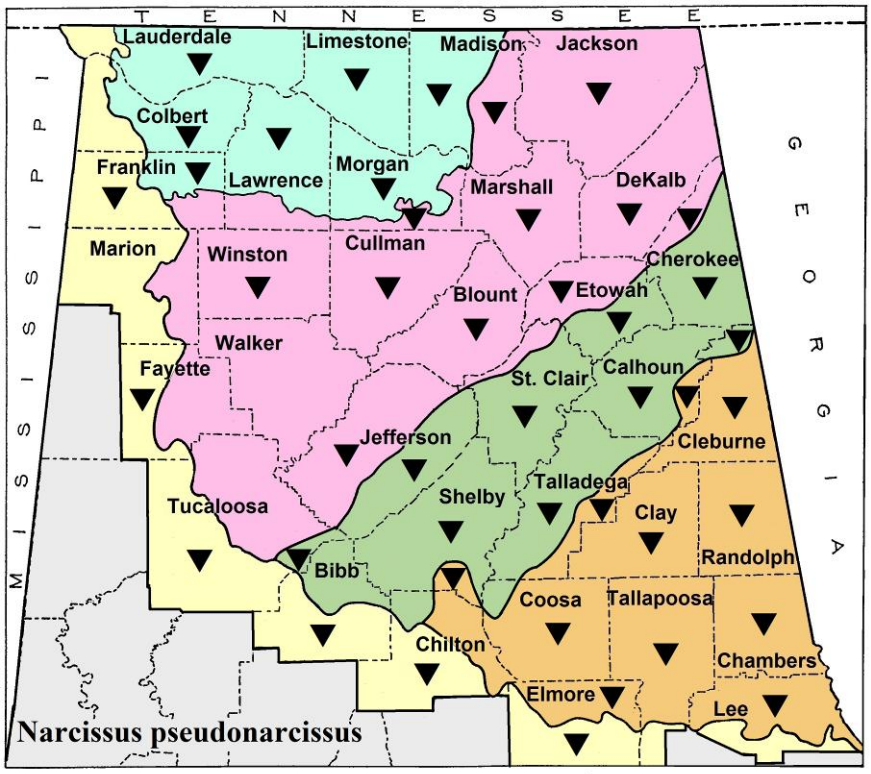

Figure 289. Distribution of *Narcissus pseudonarcissus* in northern Alabama.

Figure 290. A. *Narcissus bulbocodium*, open woods, Sumter Co., Alabama, 20 Mar 2014. Photo: Brian Keener. B. *Narcissus* hybrid, old homesite, Etowah Co., Alabama, 9 Feb 2020. Photo: Dan Spaulding.

Narcissus bulbocodium L. [Hoop-Petticoat Daffodil] is another single-flowered "trumpet" species that has escaped cultivation in the Coastal Plain of Alabama (Fig. 290a). It differs from *N. pseudonarcissus* by having slender leaves (< 3mm wide), broadly funnel-shaped coronas, and short, narrow tepals. The senior author collected an unidentified daffodil at an old homesite in northern Alabama that looks like a miniature *N. pseudonarcissus* (Fig. 290b). It differs in its diminutive stature and slightly swept-back tepals. These features are characteristic of the Cyclamineus Group cultivars. One primary parent of this hybrid group is *N. cyclamineus* DC. [Cyclamen Daffodil]. It has small, solitary flowers with strongly deflexed tepals and a trumpet-like corona (Webb 1980).

6. ZEPHYRANTHES Herbert 1821

[Greek *Zephyros*, west wind and *anthos*, flower; plants are native to the Western Hemisphere]

1. Flowers white, blooming spring–early summer; leaves present at anthesis; leaf blades 3–8 mm wide; stigmas 3, linear; filaments > 2.5 mm long ..... **Zephyranthes atamasco**
1. Flowers yellow or orange-yellow, blooming summer–fall; leaves absent at anthesis; leaf blades < 4 mm wide; stigma 1, capitate; filaments < 2 cm long ..... **Zephyranthes tubispatha**

1. Zephyranthes atamasco (L.) Herb. {Native American name} — COMMON ATAMASCO-LILY; ATAMASCO RAIN-LILY; ZEPHYR-LILY; FAIRY-LILY; STAGGER-GRASS (Fig. 291). [*Atamosco atamasca* (L.) Greene]

Perennial, scapose herb from a bulb. Alluvial woods, bottomland forests, moist prairies, creek bottoms, bogs, seeps, wet meadows, and swamp margins. Flowers February–May (-June), fruits April–July; very rare in the Cumberland Plateau; rare in the Ridge & Valley; uncommon in the Piedmont; frequent in the Coastal Plain (Fig. 292). Native to the southeastern USA, primarily in the Coastal Plain and Piedmont from Virginia to Mississippi (Flagg et al. 2002).

Gerard (1896) first believed the name "atamasco" was from the Virginian Indian word, *attamusco*, meaning "stained with red," alluding to the color of the sheath enclosing the flower (Fig. 293). However, Gerard (1907) later had another derivation, stating it was "from Tapehanek [Algonquian dialect] of Virginia *aitamdsku*, 'under grass,' a name descriptive of the bulb surmounted by grass-like leaves." Seminole Indians made an infusion of the bulbs as a remedy for toothaches (Moorman 1998). *Zephyranthes atamasco* is a poisonous plant, with most of the toxic compounds concentrated within the bulbs. Symptoms occur in less than 48 hours following ingestion and include the softening of feces (often mixed with bloody mucus), staggering, and possible death (Kingsbury 1964). Horses can get "staggers," a cerebrospinal disease, after eating the plant; hence the common name "stagger-grass" (Coffey 1993).

Figure 291. *Zephyranthes atamasco*, Cleburne Co., Alabama, 6 Apr 2020. Photos: Dan Spaulding.

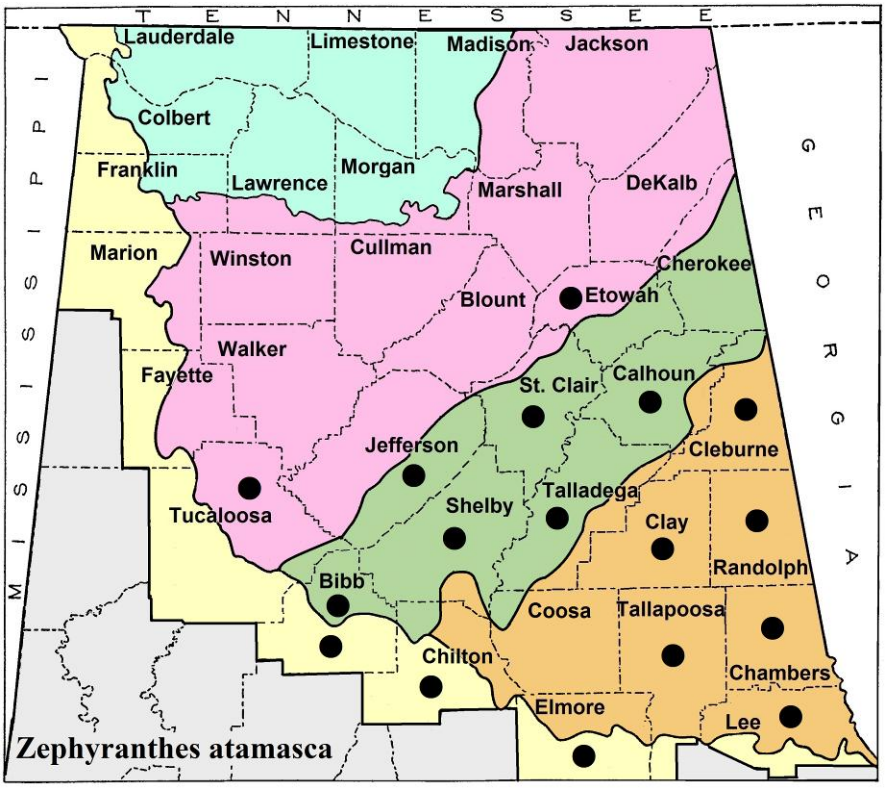

Figure 292. Distribution of *Zephyranthes atamasco* in northern Alabama.

Figure 293. *Zephyranthes atamasco*, Cleburne Co., Alabama, 3 Apr 2019. Photos: Melanie Taylor Spaulding.

Zephyranthes treatiae S. Wats. [Pineland Zephyr-Lily] was once considered a variety of *Z. atamasco*, but research has shown it to be a distinct species (Flagg & Smith 2008). It somewhat resembles *Z. atamasco,* with similar-sized white flowers. Pineland Zephyr-Lily differs by having a longer perianth tube, 1/4 as long as the free portion of the tepals and about as long as the filaments (Flagg et al. 2002). This species occurs in Florida and the adjacent Coastal Plain of Georgia (Kartesz 2020). The only other *Zephyranthes* endemic to the southeastern USA is *Z. simpsonii* Chapm. [Red-Margin Zephyr-Lily], ranging on the Coastal Plain from southern Virginia to Mississippi (Kartesz 2020). Red-Margin Zephyr-Lily differs from the other two species by having erect or ascending tepals (at full anthesis) and a shorter style with its stigma surrounded by the anthers (Flagg & Smith 2008).

2. Zephyranthes tubispatha (L'Hér.) Herb. {tubular spathe} — COPPER-LILY; COPPER RAIN-LILY; RIO GRANDE COPPER-LILY (Fig. 294). [*Habranthus texanus* (Herb.) Steud.; *Habranthus tubispathus* (L'Hér.) Traub; *Zephyranthes texana* Herb.]

Figure 294. *Zephyranthes tubispatha*, lawn, Geneva Co., Alabama, 31 Aug 2018. Photos: Alvin Diamond.

Perennial, scapose herb from a bulb. Roadsides, lawns, vacant lots, and other disturbed areas. Flowers June–early October; very rare in northern Alabama; uncommon in the Coastal Plain (Fig. 295). Native to South America (Flagg et al. 2002), naturalized in the southeastern USA, known from Texas, Louisiana, Alabama, Georgia, and Florida (Kartesz 2020).

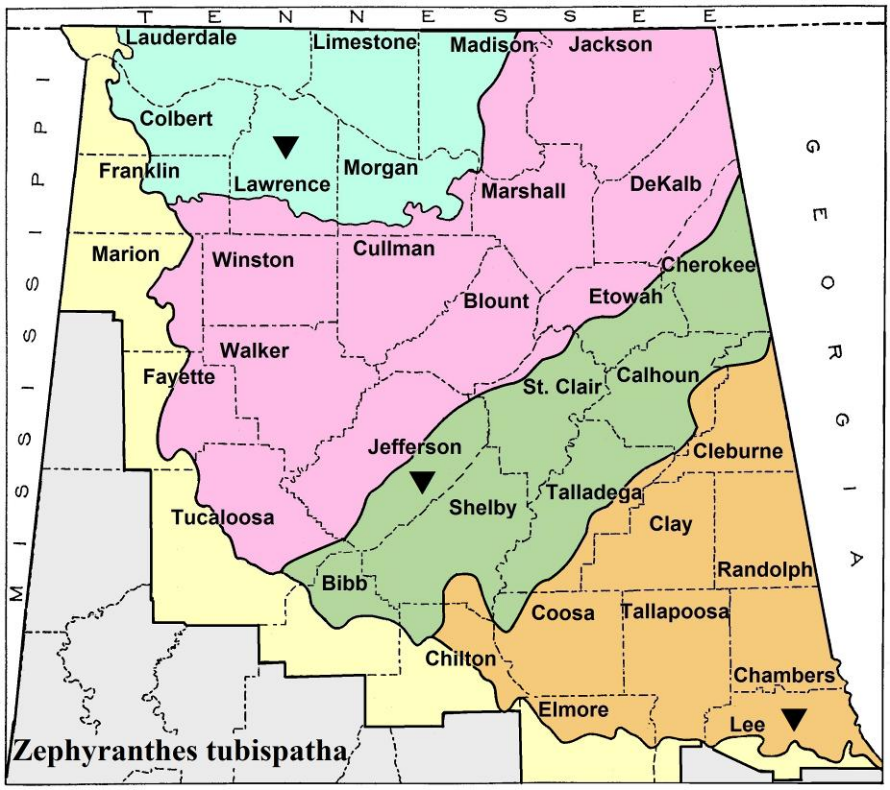

Figure 295. Distribution of *Zephyranthes tubispatha* in northern Alabama.

Figure 296. *Zephyranthes tubispatha*, Brazos Co., Texas, 23 Sep 2013. Photo: Dwight Bohlmeyer.

Correll & Johnston (1970) listed *Zephyranthes tubispatha* as endemic to Texas (Fig. 296). However, Sealy (1937) proposed that Spanish missionaries introduced the taxon into Texas from South America. Holmes & Wells (1980) treated it as native to Brazil, Uruguay, Argentina, and Chile, doubting its disjunction in North America. Copper-Lily is often cultivated for its exceptionally showy flowers. It sporadically naturalizes, and the expansion of its range is due to ornamental plantings. Alvin Diamond was the first to collect this species for Alabama in 1988 from Pike County (Diamond et al. 1998).

Copper-Lily was previously treated in *Habranthus* but historically included in *Zephyranthes* (Flagg 2014). North American plants were initially known as *H. texanus*, but Ravenna (1970) revealed that the correct name was *H. tubispathus*. However, molecular-based studies have shown that some genera in the tribe Hippeastreae (Amaryllidaceae) are polyphyletic (Meerow 2010). Recent phylogenetic analyses by García et al. (2019) places *Habranthus* within *Zephyranthes*, stating that "our current knowledge of the phylogeny of Hippeastreae suggests that it is better represented as a network rather than a bifurcating tree." Flagg (2014) described the main morphological differences between these two genera. He noted that *Zephyranthes* has radially symmetrical (actinomorphic) flowers, evenly spaced stamens with vertical anthers, and primarily straight filaments of two different lengths. *Habranthus* has bilaterally symmetrical (zygomorphic) flowers, stamens in clusters with horizontal anthers, and curved filaments of four different lengths.

17. ASPARAGACEAE (Asparagus Family) – in ASPARAGALES

1. ASPARAGUS Linnaeus 1753

[Greek *asparasso*, to rip; alluding to the spiny leaves of some species]

1. Asparagus officinalis L. {of the shops} — GARDEN ASPARAGUS; WILD ASPARAGUS; SPARROW-GRASS (Fig. 297).

Figure 297. *Asparagus officinalis*, Winston Co., Alabama, 16 Aug 2020. Photos: Dan Spaulding.

Perennial herb from fibrous rhizomes. Roadsides, fencerows, prairies, pastures, and other disturbed areas. Flowers April–June (sporadically later), fruits June–November (berries occasionally persisting through winter); uncommon throughout Alabama (Fig. 298). Native to Eurasia, naturalized in temperate regions worldwide, occurring throughout North America (Straley & Utech 2002a).

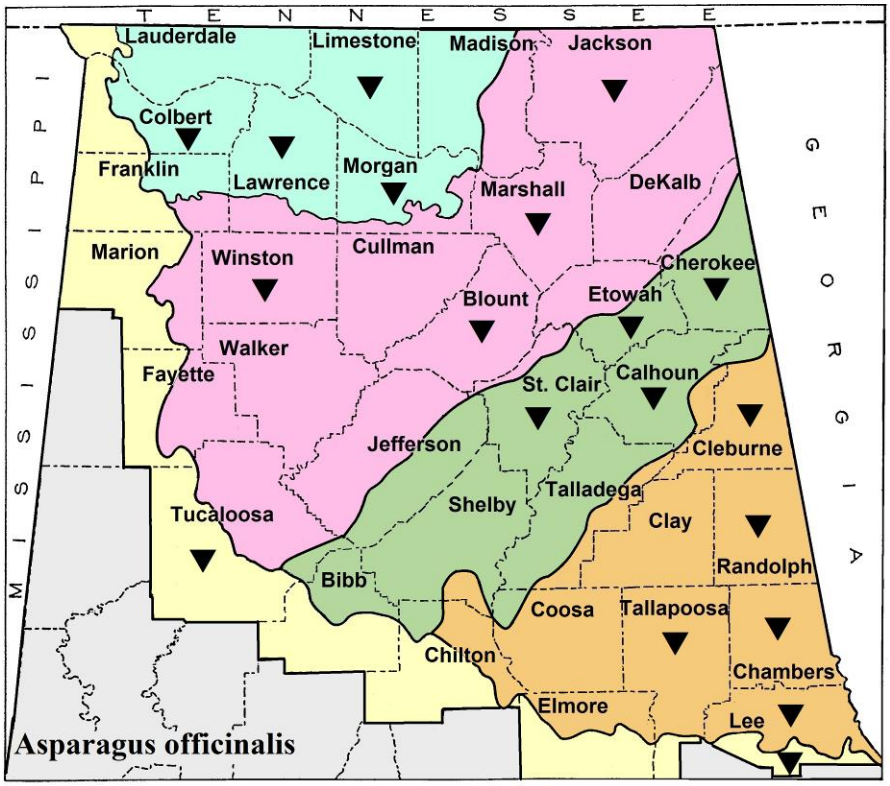

Figure 298. Distribution of *Asparagus officinalis* in northern Alabama.

Figure 299. *Asparagus officinalis*. A. Young shoots, Cook Co., Illinois, 7 May 2019. Photo: Katie Kucera. B. Flowers, Colbert Co., Alabama, 13 May 2020. Photo: Kevin England. C. Ripe fruit, Anne Arundel Co., Maryland, 24 Aug 2020. Photo: Matthew Beziat.

Asparagus officinalis is native to temperate scrub habitats of southern Europe, western Asia, and Northern Africa. The species adapts well to pyrogenic (fire-dependent) plant communities by resprouting promptly from its rhizomes. Prescribed burning practices were employed to enhance its spread (Simpson & Ogorzaly 1986). Immature, unexpanded shoots (Fig. 299a) encountered in the "wild" can be prepared and eaten similarly to the cultivated plants, but they are less succulent (Fernald & Kinsey 1943, Gibbons 1962). In Greece, "asparagus" was applied to plants with edible shoots (Gledhill 1989). Garden Asparagus has been cultivated as a vegetable since ancient times (Straley & Utech 2002a).

Male (staminate) and female (pistillate) flowers of *Asparagus officinalis* (Fig. 299b) are dioecious, occurring on separate plants (from Greek meaning two households). Birds eat the ripe red berries (Fig. 299c) produced from pistillate flowers, dispersing the seeds via their excrement (Shosteck 1974). The feathery "leaves" on the stem are cladophylls, photosynthetic leaf-like structures arising from nodes of its scale-like leaves. The "scales" on spears of asparagus shoots are the real leaves; the cladophylls appear later and are short, flattened stems.

18. RUSCACEAE (Ruscus Family) – in ASPARAGALES

1. Leaf blades linear with parallel sides, grass-like; leaves basally clustered, evergreen; roots often with fleshy, spindle-shaped tubers.

    2. Leaves 4–25 mm wide; flowers usually ascending, mostly in clusters of 3–8 on straight pedicels; scape usually more than 12 cm long; anthers separate, not fused; filaments longer than or as long as anthers; ovary superior; mature berry-like seeds blackish ..... **Liriope**
    2. Leaves 2–4 mm wide; flowers nodding, solitary or paired on recurved pedicels; scape 6–12 cm long; anthers more or less fused (connate) in a column; filaments much shorter than anthers; ovary inferior or half-inferior; mature berry-like seeds blue ..... **Ophiopogon**

1. Leaf blades elliptic, ovate, lanceolate, or elliptic-lanceolate, not grass-like; leaves cauline (or appearing so in *Convallaria*), not evergreen; roots lacking tubers.

    3. Leaves 2–3 near the base of a pseudo-stem; leaf blades distinctly petiolate (> 3 cm long); inflorescence on a naked scape ..... **Convallaria**
    3. Leaves numerous on an upright or arching stem; leaf blades sessile or with very short petioles (< 1 cm long); inflorescence on a leafy stem.

        4. Inflorescence a terminal raceme or panicle; tepals inconspicuous and separate; leaves not glaucous; stem and leaves typically pubescent; mature fruit red ..... **Maianthemum**
        4. Inflorescence of 1-several axillary flowers; tepals conspicuous and fused nearly to tips, forming a corolla tube with 6 lobes; leaves blue-green or glaucous beneath; stem and leaves glabrous or pubescent; mature fruit blue-black ..... **Polygonatum**

1. MAIANTHEMUM G.H. Weber ex Wiggers 1780

[Latin *Maius*, May, and Greek *anthemon*, flower; alluding to the month plants often bloom]

1. Maianthemum racemosum (L.) Link {raceme} — FALSE SOLOMON'S-SEAL; FALSE SPIKENARD; PLUME-LILY; EASTERN SOLOMON'S-PLUME; FEATHERY FALSE LILY-OF-THE-VALLEY (Fig. 300). [*Smilacina racemosa* (L.) Desf. var. *cylindrata* Fernald; *Smilacina racemosa* var. *racemosa*; *Vagnera australis* Rydb.; *Vagnera racemosa* (L.) Morong]

Figure 300. *Maianthemum racemosum*, Winston Co., Alabama, 25 Apr 2018. Photos: Brian Finzel.

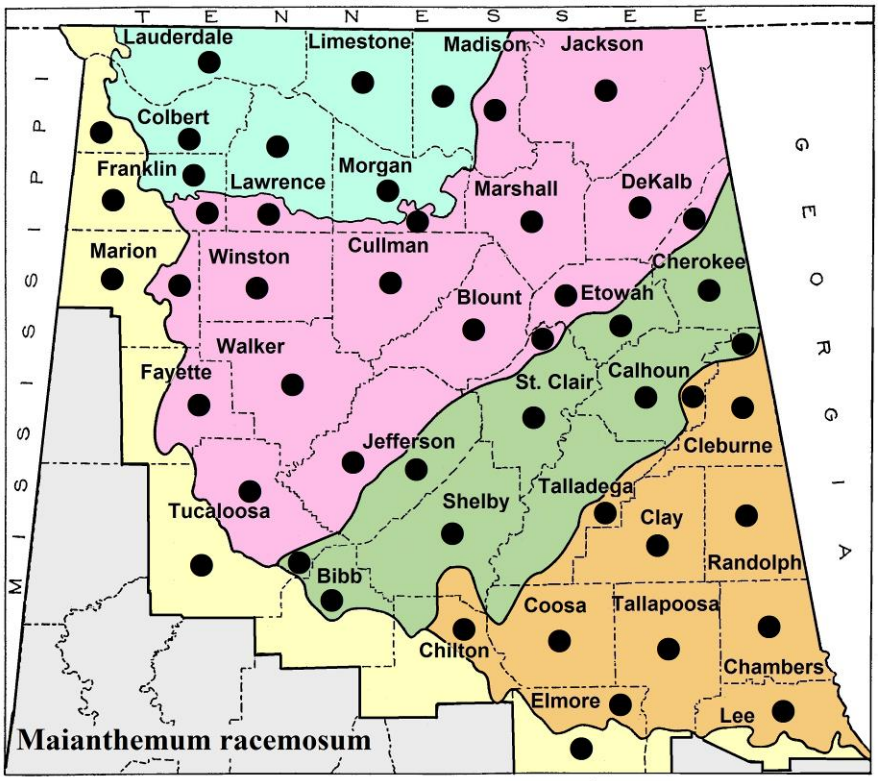

Figure 301. Distribution of *Maianthemum racemosum* in northern Alabama.

Perennial herb from elongate rhizomes. A variety of moist to dry woods, slopes, bluffs, rock outcrops, cedar glades, roadbanks, and woodland borders. Flowers mid-March–June, fruits June –October; frequent in northern Alabama; uncommon in the Coastal Plain (Fig. 301). Native to the midwestern and eastern USA and Canada, from Manitoba and Nova Scotia, south to northeast Texas and the Florida Panhandle (Kartesz 2020).

Figure 302. *Maianthemum racemosum*, Cleburne Co., Alabama, 13 May 2020. Photo: Melanie T. Spaulding.

False Solomon's-Seal has a terminal, paniculate raceme. It is compact in early anthesis (Fig. 302), becoming more diffuse later. Its foliage resembles King Solomon's-Seal (*Polygonatum biflorum*), which differs by producing flowers in leaf axils. Coffey (1993) writes this about the origin of the common name: "It is called 'false' since it has none of the magical or medicinal properties of 'real' Solomon's-Seal or Spikenard." Alan Weakley (pers. comm. 2020) states in a Facebook post: "Many of you know how I feel about 'false' as part of a plant name – no plant is 'false,' they're all true – even if we humans think that they resemble some other plant they're not imposters!"

Figure 303. *Maianthemum racemosum*. A. Rhizome, Tuscaloosa Co., Alabama, 14 May 2020. B. Ripe berries, Cleburne Co., Alabama, 8 Aug 2019. Photos: Dan Spaulding.

The starchy rootstalks (Fig. 303a) of *Maianthemum racemosum* are edible but need to be soaked in lye, then parboiled to remove the lye before being pickled or eaten like potatoes. Young shoots can be eaten like asparagus, and the juicy berries are somewhat palatable but mildly cathartic; thus, they should perhaps be eaten sparingly (Fernald & Kinsey 1943). Coffey (1993) quotes John Joselyn, a 17th Century English traveler to New England, who wrote that the sweet berries (Fig. 303b) have "the perfect taste of treacle [molasses] when they are ripe; and will keep good a long while; certainly a very wholesome berry, and medicinal." Various Native American tribes used rhizomes and fruits for food and medicines for various ailments (Moerman 1998).

Maianthemum racemosum was traditionally placed within *Smilacina*, but LaFrankie (1986) combined the two genera since the only significant difference was that flowers were dimerous (two parts per whorl- *Maianthemum s.s.*) or trimerous (three parts per whorl- *Smilacina*). He believed the trait resulted from evolutionary reduction. Thus, *Maianthemum racemosum* has been circumscribed to include two subspecies (LaFrankie 2002). However, Weakley et al. (2017) treated the western taxon with clasping leaves and mostly erect stems, at species rank, *M. amplexicaule* (Nutt.) W.A. Weber.

2. **POLYGONATUM** P. Miller 1754

[Greek *polys*, many, and *gony*, knee; referring to jointed rhizome]

1. Leaves minutely pubescent on veins beneath; peduncles (flower stalks) usually start from the lowest (1st) or 2nd leaf axil; stamens inserted high on the perianth tube (above the middle); sheathing bract present (when young), leaving a leaf scar near the center of the leafless portion of the lower stem; rhizomes shallowly set in substrate ..... **Polygonatum pubescens**
1. Leaves glabrous; peduncles usually start from the 3rd leaf axil or higher; stamens inserted near the perianth tube; sheathing bract absent; rhizomes deeply set in the substrate.

    2. Stem slender, 1.5–5 mm thick below lowest leaf; plants 2–7 (-9) dm tall; flowers 1–3 (-5) per leaf axil; lower axillary peduncles rounded; larger leaves 5.5–15 cm long, 1.2–6 cm wide; lower leaves mostly sessile or slightly clasping..... **Polygonatum biflorum** var. **biflorum**
    2. Stem robust, 5–13 mm thick below lowest leaf; plants 6–20 dm tall; flowers (2-) 3–6 (-15) per leaf axil; lower axillary peduncles strongly flattened; larger leaves 9–25 cm long, 3.5–13 cm wide; lower leaves distinctly clasping..... **Polygonatum biflorum** var. **commutatum**

1. Polygonatum biflorum (Walter) Ell. var. **biflorum** {two-flowered} — SMOOTH SOLOMON'S-SEAL; SMALL SOLOMON'S-SEAL; KING SOLOMON'S-SEAL (Fig. 304). [*Convallaria biflora* Walter]

Perennial herb from elongate rhizomes. Dry to moist forests, slopes, ravines, bluffs, bottoms, river/streambanks, woodland borders, and roadbanks. Flowers late March–June, fruits May–October; common in northern Alabama; frequent in the Coastal Plain (Fig. 305). Native to eastern and central North America, including northeast Mexico (Utech 2002g).

The genus *Polygonatum* contains nearly 57 species, occurring primarily in Europe and Asia (Utech 2002g). According to Martin (1988), the derivation of the common name "Solomon's-seal" originates from stem scars (knots) on the rootstalk (Fig. 306), supposedly resembling the mark of a royal seal. King Solomon of Israel allegedly placed his seal of approval upon this plant because of its medicinal powers. The use of *Polygonatum* rhizomes as medicine has a long history. Dioscorides, Greek physician and botanist of the 1st Century, recommended it for healing wounds. Galen, a Greek physician in the 2nd Century, purported that a medicinal drink or ale from the rhizomes helped heal broken bones. John Gerard, a 17th Century English herbalist, proclaimed that crushed rootstalks applied to bruises would help remove them (Shosteck 1974).

Figure 304. *Polygonatum biflorum* var. *biflorum*. A. Flowering plant, Madison Co., Alabama, 5 May 2009. B. Ripe fruits, Jefferson Co., Alabama, 28 Jul 2011. Photos: Brian Finzel.

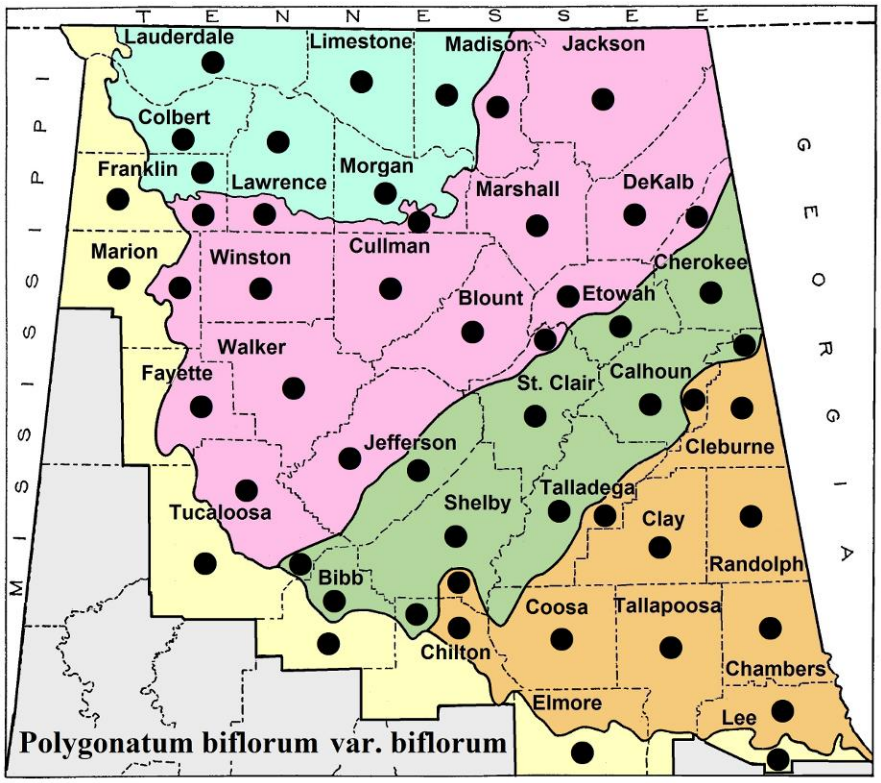

Figure 305. Distribution of *Polygonatum biflorum* var. *biflorum* in northern Alabama.

Figure 306. *Polygonatum biflorum* var. *biflorum*, Calhoun Co., Alabama, 2 Apr 2021. Photos: Dan Spaulding.

Cherokee Indians used *Polygonatum biflorum* medicinally as an antidiarrheal and dermatological aid. They also beat the dried rhizomes into flour to make bread and boiled young shoots as a vegetable (Moerman 1998). One must be careful when collecting Solomon's-Seal as a food source because its rhizomes can be confused with toxic plants such as May-Apple (*Podophyllum peltatum* L.), which commonly grow in the same habitat (Fernald & Kinsey 1943).

Figure 307. *Polygonatum biflorum* var. *biflorum*. A. Terminal leaf (leaves glabrous beneath), Madison Co., Alabama, 5 Aug 2015. B. Flowers, Madison Co., Alabama, 5 May 2009. Photos: Brian Finzel.

Polygonatum biflorum var. *biflorum* resembles *P. pubescens*, but Smooth Solomon's-Seal has glabrous leaves (Fig. 307a), whereas leaves of Hairy Solomon's-Seal are pubescent underneath. Both species have about the same number of flowers, but they are typically whitish or yellowish and larger in *P. biflorum* (Fig. 307b). However, these traits are variable and unreliable for identification.

2. Polygonatum biflorum (Walter) Ell. var. **commutatum** (J.A. & J.H. Schult.) Morong {changed, altered} — GREAT SOLOMON'S-SEAL; GIANT SOLOMON'S-SEAL; LARGE SOLOMON'S-SEAL (Fig. 308). [*Polygonatum canaliculatum* (Muhl. *ex* Willd.) Pursh; *Polygonatum commutatum* (J.A. & J.H. Schult.) A. Dietr.; *Polygonatum giganteum* A. Dietr.]

Figure 308. *Polygonatum biflorum* var. *commutatum*, steep roadbank in Cleburne Co., Alabama, 3 May 2020. Photos: Dan Spaulding.

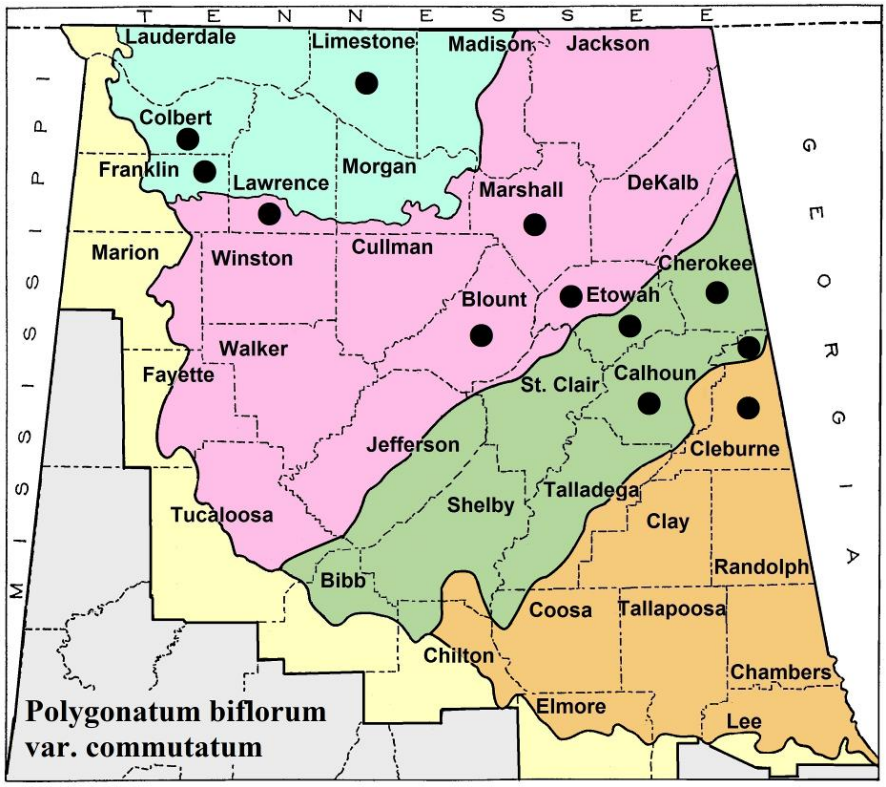

Figure 309. Distribution of *Polygonatum biflorum* var. *commutatum* in northern Alabama.

Perennial herb from elongate rhizomes. Rich woods, bluffs, and roadbanks. Flowers April –June, fruits June–October; rare in northern Alabama (Fig. 309). Native to central and eastern USA and adjacent Canada, from southern Manitoba and New Hampshire, south to eastern Texas and Georgia (Weakley 2020).

Figure 310. *Polygonatum biflorum* var. *commutatum*, Cleburne Co., Alabama. A. Inflorescences, 3 May 2020. B. Rhizome, 3 Apr 2021. Photos: Dan Spaulding.

Polygonatum biflorum var. *commutatum* is tetraploid, usually larger and coarser than typical diploid *P. biflorum* (Ownbey 1944). It typically has more flowers in leaf axils (Fig. 310a) and robust leaves, stems, and rhizomes (Fig. 310b). There have been various disagreements regarding the status of this taxon. Historically, many botanists treated it as a species (Gates 1917, Bush 1927, Fernald 1944a, Ownbey 1944). Weakley (2020) prefers to recognize the taxon as a variety due to differences in chromosome numbers. Utech (2002g) treated the *P. biflorum* polyploid complex as one species, and research by Jayne Lampley (2014) agreed with his assessment. She states (pers. comm. 2019):

> "I think for now the answer is that my thesis project did not give any clear evidence to support splitting out var. *commutatum* from *P. biflorum*. Considering other past studies on *P. biflorum* and my own field work and chromosome analysis, it appears that any *P. biflorum* population can send up some tetraploid var. *commutatum* individuals. As you know, the main morphological differences between the two are thought to be size of the stem, number of flowers, degree of lower leaf clasping, etc., but there is a little bit of overlap. I think the underlying problem is that the plants are sometimes too tricky to identify morphologically due to their age. *Polygonatum* plants, like *Trillium*, get more robust with age class. Also, if they experience some kind of temporary setback or bad conditions, they will be less robust."

3. Polygonatum pubescens (Willd.) Pursh {hairy} — HAIRY SOLOMON'S-SEAL; DOWNY SOLOMON'S-SEAL (Fig. 311). [*Convallaria pubescens* Willd.]

Figure 311. *Polygonatum pubescens*, Madison Co., Alabama, 13 Apr 2013. Photo: Brian Finzel.

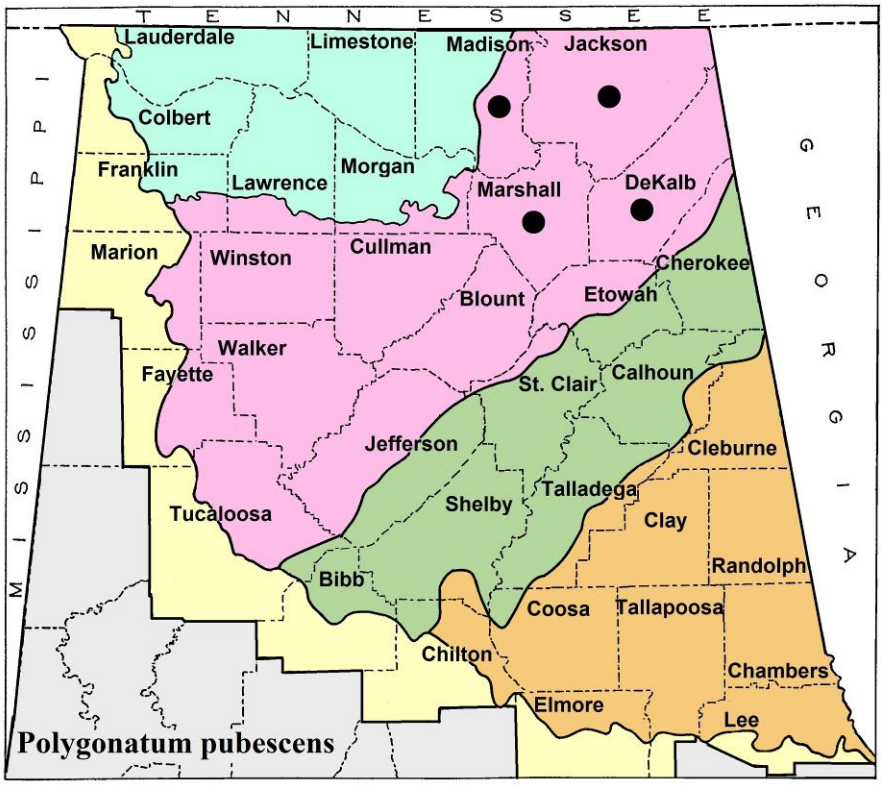

Figure 312. Distribution of *Polygonatum pubescens* in northern Alabama.

Perennial herb from elongate rhizomes. Rich woods, moist wooded slopes, cove forests, and damp rock crevices. Flowers March–May, fruits August–October; rare in the Cumberland Plateau (Fig. 312). Native to central and eastern North America, from Manitoba to Nova Scotia, south to northeastern Alabama and northern Georgia (Utech 2002g).

Figure 313. *Polygonatum pubescens*, Jackson Co., Alabama, 1 Sep 2019. A. Undersurface of a leaf. B. Ripe berries. Photos: Brian Finzel.

Polygonatum pubescens can be distinguished easily from *P. biflorum* by the pubescent undersurfaces of its leaves (Fig. 313a). Additional characteristics of *P. pubescens* (differentiating it from *P. biflorum*) include strongly deflexed peduncles (vs. curved); perianth tube constricted at base of lobes (vs. not constricted); stamens inserted near the top of the tube (vs. middle); filaments densely papillose (vs. minutely); cauline bracts papery and caducous (vs. persistent); and rhizomes near ground surface (vs. deep-seated). Also, the flowers of *P. pubescens* are green to yellowish-green, mostly 7–13 mm long, whereas those of *P. biflorum* are mostly whitish to greenish-yellow and typically larger (Ownbey 1944). However, flower color and size are too variable to be used to separate the two species. Solomon's-seal berries are almost black with a powdery bloom when ripe (Fig. 313b). Birds consume the fruit and disperse the seeds in their droppings (Thompson & Willson 1979).

3. **LIRIOPE** Loureiro 1790

[Named after *Liriope* of Greek mythology; a woodland nymph and mother of *Narkissos*]

Liriope, often called monkey-grass or lily-turf, is commonly utilized in landscaping throughout the southeastern USA, especially as a border-grass. Only two species, *L. muscari* and *L. spicata*, are commonly available in the horticultural trade (Fantz 2008). Lily-turf is not represented well within herbaria because they are often overlooked in the field (Spaulding et al. 2010). Plants spread asexually by fragmentation of stoloniferous clones and sexually by seeds.

1. Plants in clumps, cespitose, not spreading aggressively, stolons absent or very short and thick; leaves 8–20 (-35) mm wide ..... **Liriope muscari**
1. Plants in colonies, spreading aggressively by stoloniferous offsets, stolons numerous, long, and slender; leaves 4–8 (-11) mm wide ..... **Liriope spicata**

1. Liriope muscari (Decne.) L.H. Bailey {resembling the genus *Muscari*} — BIG BLUE LILY-TURF; BIG BLUE MONKEY-GRASS (Fig. 314a–b).

Figure 314. *Liriope muscari*. A. Barbour Co., Alabama, 8 Jul 2018. Photo: John Trent. B. Clumps of plants in alluvial habitat, Cleburne Co., Alabama. 6 Jul 2019. Photo: Melanie Taylor Spaulding.

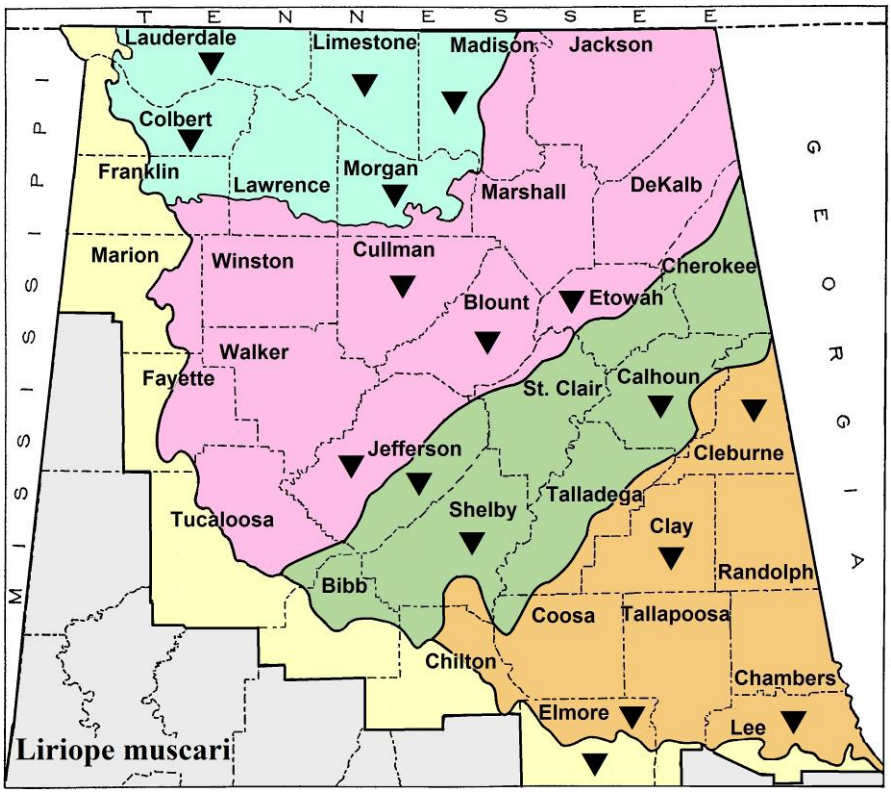

Figure 315. Distribution of *Liriope muscari* in northern Alabama.

Perennial, evergreen, scapose herb from short rhizomes. Suburban forests, alluvial woods, disturbed woods, roadbanks, woodland borders, old homesites, railroad tracks, vacant lots, and other disturbed areas. Flowers May–July, fruits August–November (berry-like seeds often persisting through winter); uncommon throughout Alabama (Fig. 315). Native to China, Japan, and Taiwan, naturalized chiefly in the southeastern USA (Chen & Tamura 2000, Kartesz 2020).

Figure 316. *Liriope muscari*, Cleburne Co., Alabama. 6 Apr 2021. Photos: Dan Spaulding.

Figure 317. *Liriope muscari*, Cleburne Co., Alabama. 6 Apr 2021. Photos: Dan Spaulding.

Liriope muscari has showy inflorescences that are often longer than the leaves. Its flowers are usually lavender or purple. Plants are cespitose (Fig. 316a), having very short stolons (Fig. 316b), or none at all (Chen & Tamura 2000, Nesom 2010b). Big Blue Lily-Turf is used to edge landscaped beds because it does not spread aggressively like the stoloniferous *L. spicata*. In contrast, new plants from *L. muscari* are produced vegetatively from older plants, forming clumping mounds that expand outward (Fig. 317a). The fruit ruptures early, exposing young green seeds (Chen & Tamura 2000). As the seeds mature in late summer or fall, they become berry-like and purplish-black (Fig. 317b). The fruit-like seeds begin to drop off over the winter, leaving behind a barren or naked inflorescence with persistent pedicels and a few scattered "berries" (Fantz 2008). A variegated cultivar of *L. muscari* with white-banded leaves is available in the nursery trade.

2. Liriope spicata (Thunb.) Lour. {spike; referring to inflorescence} — CREEPING LILY-TURF; CREEPING MONKEY-GRASS (Fig. 318a–b).

Figure 318. *Liriope spicata*. A. Roadbank, Tallapoosa Co., Alabama, 27 Jul 2019. B. Colony of plants, disturbed woodland border, Jefferson Co., Alabama, 29 Jan 2020. Photos: Dan Spaulding.

Perennial, evergreen, scapose herb from short rhizomes with long stolons. Disturbed woods, fields, pastures, low woods, railroad tracks, and suburban forests. Flowers May–July, fruits August –November (berry-like seeds often persisting through winter); uncommon throughout Alabama (Fig. 319). Native to China, Taiwan, Japan, Korea, and Vietnam, naturalized chiefly in the southeastern USA (Chen & Tamura 2000, Kartesz 2020).

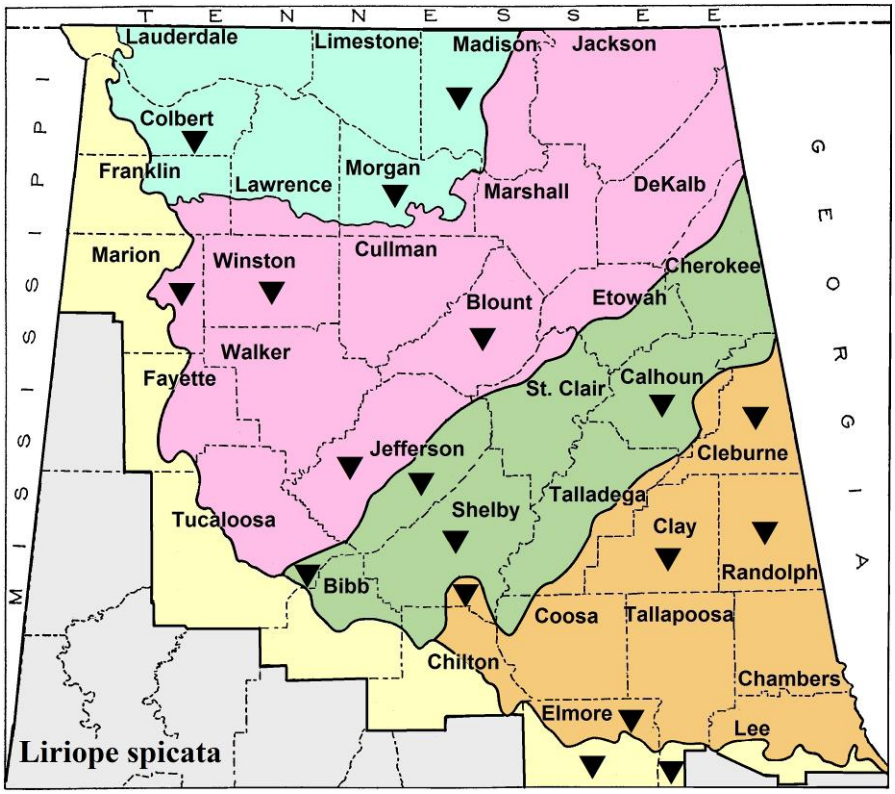

Figure 319. Distribution of *Liriope spicata* in northern Alabama.

Figure 320. *Liriope spicata* stolons. A–B. Winston Co., Alabama, 16 Jul 2020. C. Elmore Co., Alabama, 27 Jul 2019. Photos: Dan Spaulding.

Liriope spicata is an aggressive, invasive, stoloniferous plant (Fig. 320a–c) that is used for landscaping in the southern USA. Plants do help prevent soil erosion, especially on banks. Inflorescences are often shorter than the leaves, and the tepals can be white (Fig. 321a), pale violet, lavender, or purplish. When young, the fruit bursts open, exposing fleshy immature seeds (Fig. 321b), becoming blackish-purple and berry-like when ripe (Chen & Tamura 2000). The "berries" are persistent (Fig. 321c), and when the leaves flatten during the winter months, they become more visible (Fantz 2008). The tuberous roots are used in traditional Chinese medicine to treat diabetes (Rao et al. 2010).

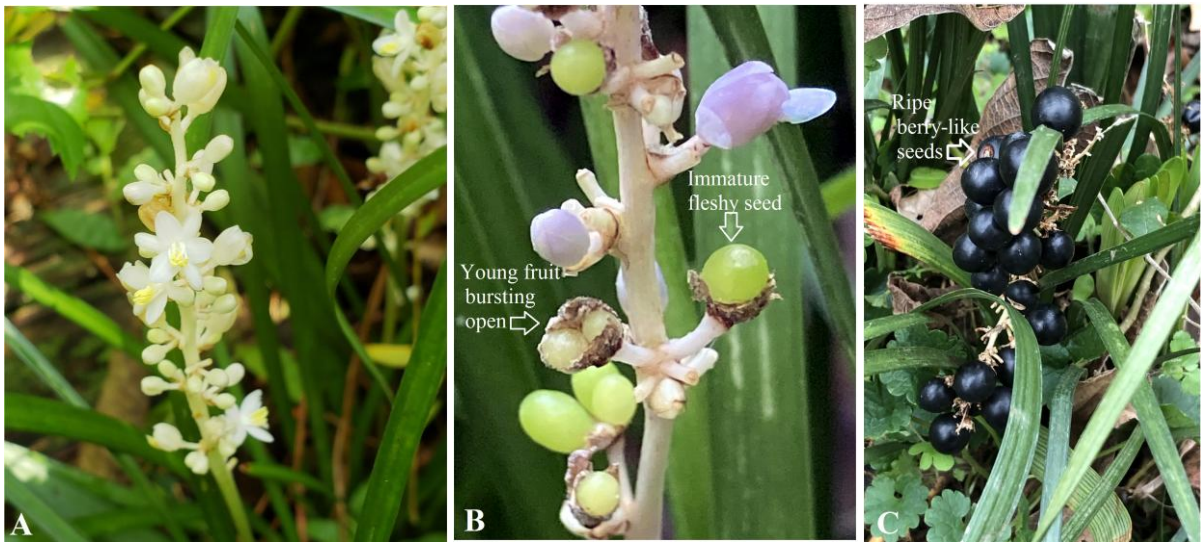

Figure 321. *Liriope spicata*. A. White form, Conecuh Co., Alabama, 11 Aug 2018. Photo: Alvin Diamond. B. Winston Co., Alabama, 16 Jul 2020. C. Jefferson Co., Alabama, 29 Jan 2020. Photos: Dan Spaulding.

4. **OPHIOPOGON** Ker-Gawler 1807

[Greek *ophis*, snake, and *pogon*, beard; allusion obscure]

1. Ophiopogon japonicus (Thunb.) Ker-Gawl. {from Japan} — MONDO-GRASS; DWARF LILY-TURF (Fig. 322a–b). [*Mondo japonicum* (Thunb.) Farw.]

Figure 322. *Ophiopogon japonicus*. A. Flowers, Nanjing, Jiangsu Province, China, 13 Jun 2016. Photo: Yao Li. B. Growth habit, Cleburne Co., Alabama, 24 Mar 2020. Photo: Dan Spaulding.

Perennial, evergreen, scapose herb from short rhizomes with stolons. Suburban forests, alluvial woods, roadsides, and other disturbed areas. Flowers late April–June, fruits July–August; rare throughout Alabama (Fig. 323). A native of China, Taiwan, Japan, and Korea (Chen & Tamura 2000), naturalized chiefly in the southeastern USA (Kartesz 2020).

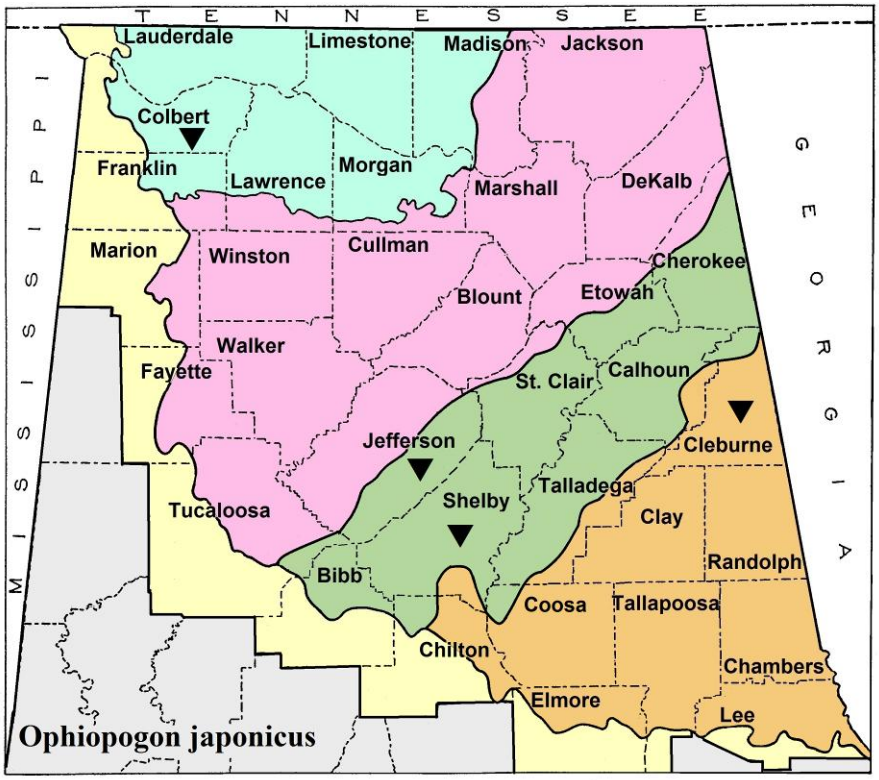

Figure 323. Distribution of *Ophiopogon japonicus* in northern Alabama.

Figure 324. *Ophiopogon japonicus*. A. Stolons and tuberous roots, Jefferson Co., Alabama, 29 Jan 2020. Photo: Dan Spaulding. B. Berry-like seeds, Tahara, Aichi Prefecture, Japan, 6 Jan 2018. Photo: Alpsdake.

Mondo-Grass is commonly cultivated in the southeastern and southcentral USA as a ground cover and border plant (Nesom 2010b). It is a stoloniferous, mat-forming evergreen with tuberous roots (Fig. 324a). The inflorescences, which appear during the summer months, are shorter than the grass-like leaves. Its flowers are white or lilac, and its fruits split early to reveal berry-like seeds, becoming bright blue at maturity (Fig. 324b). *Ophiopogon* is sometimes confused with *Liriope* but has narrower leaves and nodding flowers with filaments much shorter than the anthers. The leaves of *Liriope* are broader, and its flowers are erect or ascending with filaments as long as or longer than the anthers (Chen & Tamura 2000). In 2006, Dan Spaulding and Brian Keener were the first to document *O. japonicus* in the USA from Colbert County, Alabama (Spaulding et al. 2010).

5. CONVALLARIA Linnaeus 1753

[Latin *convallis*, valley; possibly alluding to its habitat]

1. Convallaria majalis L. {blooming in May} — EUROPEAN LILY-OF-THE-VALLEY; MAY-BELLS (Fig. 325).

Figure 325. *Convallaria majalis*, Barnstable Co., Massachusetts, 3 Jun 2020. Photo: Frederick Atwood.

Perennial, scapose herb from branched rhizomes. Waif in disturbed areas. Flowers April –May; very rare in northern Alabama (Fig. 326). Native to Europe, naturalized chiefly in eastern North America with scattered populations elsewhere in Canada and the USA (Kartesz 2020).

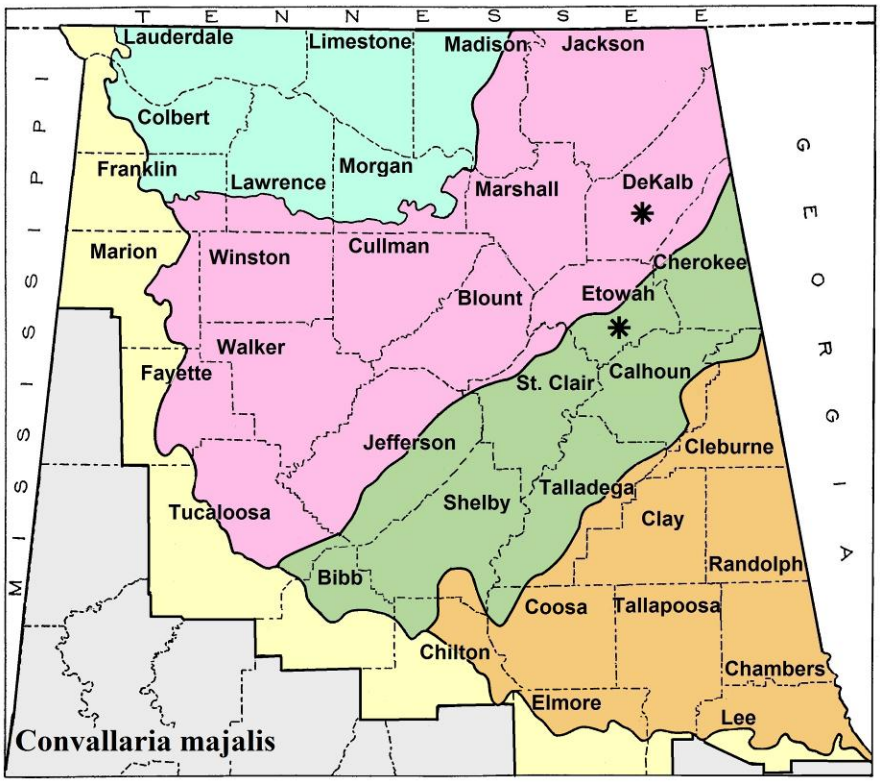

Figure 326. Distribution of *Convallaria majalis* in northern Alabama.

Figure 327. *Convallaria majalis*. A. Inflorescence, Livingston Co., Michigan, 22 May 2017. Photo: Ken Potter. B. Berries, Essex Co., Massachusetts, 21 Sep 2019. Photo: Julia Malonson.

Convallaria majalis is commonly planted in gardens for its fragrant, nodding, bell-shaped flowers (Fig. 327a) and attractive red berries that resemble tiny tomatoes (Fig. 327b). Perfumes and wedding bouquets are made from its aromatic flowers (Dwyer et al. 1986). However, *Convallaria* is poisonous, and children have died from drinking water from a vase that contained flowers. All plant parts are toxic due to cardiac glycosides (e.g., convallatoxin), which causes nausea, vomiting, irregular heartbeat, circulatory failure, coma, and death. Lily-of-the-Valley has been used historically for heart disease, dropsy, and as a purgative (Westbrooks & Preacher 1986).

A larger native species, *Convallaria pseudomajalis* Bartram [American Lily-of-the-Valley], occurs in the southern Appalachian Mountains from West Virginia south to eastern Tennessee and northern Georgia (Kartesz 2020). This taxon has been treated as a variety or subspecies of *C. majalis* by some authors (Utech 2002c, Judd 2003, Gandhi et al. 2012), but Weakley (2020) and Fernald (1944b) recognize it as a distinct species indigenous to North America.

19. AGAVACEAE (Agave Family) – in ASPARAGALES

1. Plants woody (at least basally); leaves > 40 cm long, evergreen, leathery; tepals white, thick, and waxy ..... **Yucca**
1. Plants herbaceous; leaves < 40 cm long, deciduous, not leathery; tepals white, green, yellow, blue, or purple, not thick and waxy.

    2. Leaves fleshy (semi-succulent), occasionally purple-spotted, margins with cartilaginous teeth; plant subscapose with strongly reduced leaves up the stem; perianth green; anthers 12–15 mm long; ovary inferior ..... **Agave**
    2. Leaves herbaceous, not spotted, margins lacking cartilaginous teeth; plant scapose with all leaves basal; perianth greenish-white, white, yellow, blue, or purple; anthers < 2.5 mm long; ovary superior.

        3. Leaves petiolate with broadly ovate or cordate blades; flowers large, perianth segments 4–15 cm long ..... **Hosta**
        3. Leaves sessile with linear grass-like blades; flowers smaller, perianth segments 0.5–1.8 cm long.

            4. Flowers with short perianth segments, 5–7 mm long; tepals white, cream, or yellow, with a narrow green or reddish stripe on the outside (abaxial) surface; sterile bracts (ones not subtending a flower) often present at the base of inflorescence; leaves 5–8 mm wide; capsule with 2 seeds per locule, surface lacking prominent veins ..... **Schoenolirion**
            4. Flowers with elongate perianth segments, 13–18 mm long; tepals light blue or white, lacking a stripe on outer surface; sterile bracts absent; leaves 5–20 mm wide; capsule with 2–5 seeds per locule, surface distinctly transversely veined ..... **Camassia**

1. AGAVE Linnaeus 1753

[Greek *agave*, noble or admirable; referring to the tall inflorescence of some species]

1. Agave virginica L. {Virginian} — EASTERN FALSE ALOE; EASTERN AGAVE; RATTLESNAKE-MASTER; VIRGINIA AGAVE (Fig. 328). [*Manfreda tigrina* (Engelm.) Small; *Manfreda virginica* (L.) Salisb. ex Rose; *Polianthes virginica* (L.) Shinners]

Figure 328. *Agave virginica*, Madison Co., Alabama, 17 Jul 2010. Photos: Brian Finzel.

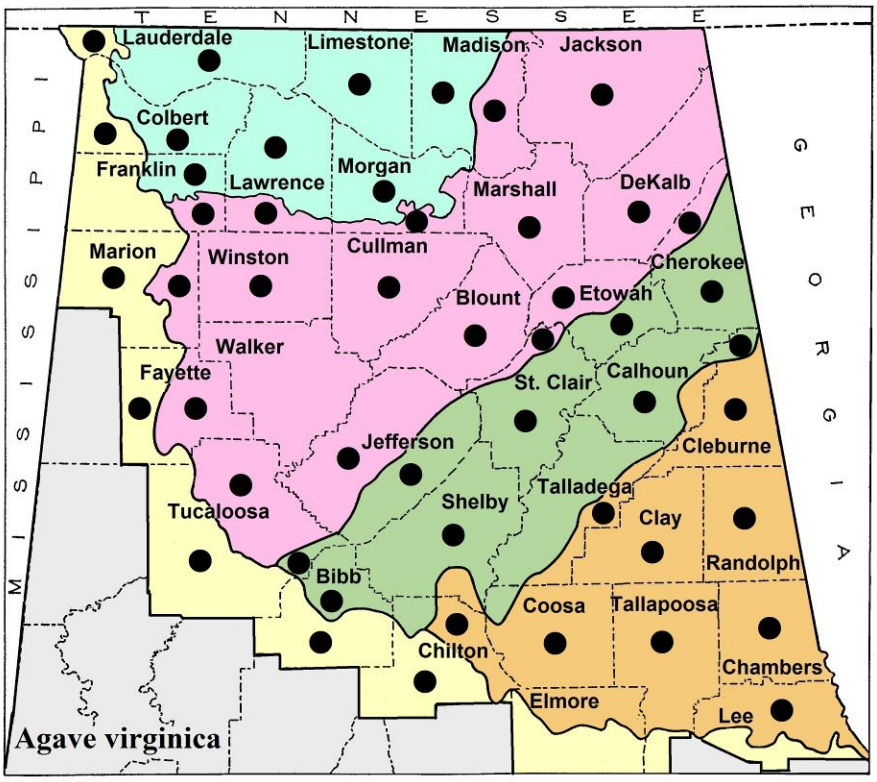

Figure 329. Distribution of *Agave virginica* in northern Alabama.

Perennial, subscapose herb from a vertical rhizome with thick fleshy roots. Roadbanks, rock outcrops, dry prairies, bluffs, open woods, woodland borders, and slopes. Flowers late May–August, fruits late June–October; frequent throughout Alabama (Fig. 329). Native to central and southeast USA, and adjacent Mexico, from southern Missouri to southwest Virginia, south to central Florida, eastern Texas, and Nuevo León (Verhoek 2002).

Figure 330. *Agave virginica*. A–B. Basal rosette of leaves sometimes spotted, Etowah Co., Alabama, 18 Jun 2019. C. Stem leaf, Cullman Co., Alabama, 21 Jun 2020. Photos: Dan Spaulding.

Eastern False Aloe has a distinct rosette of succulent, occasionally purple-spotted leaves (Fig. 330a–b), with smaller, thinner cauline leaves along the stem (Fig. 330c). The inflorescence is a spike-like raceme of tubular flowers with strongly exserted stamens and styles. Flowers have a sweet, fruity odor and are usually pollinated by bumblebees (*Bombus*) diurnally and hawkmoths (Sphingidae) nocturnally (Groman & Pellmyr 1999). Fruits are globose capsules (Fig. 331a–c) with flat seeds. Creek Indians used rhizomes as a remedy for rattlesnake bites. They boiled it in sweet milk and either swallowed the concoction or applied it as a wash over the bite (Campbell 1951). Cherokee Indians chewed the "root" to eliminate worms or ease persistent diarrhea (Moerman 1998).

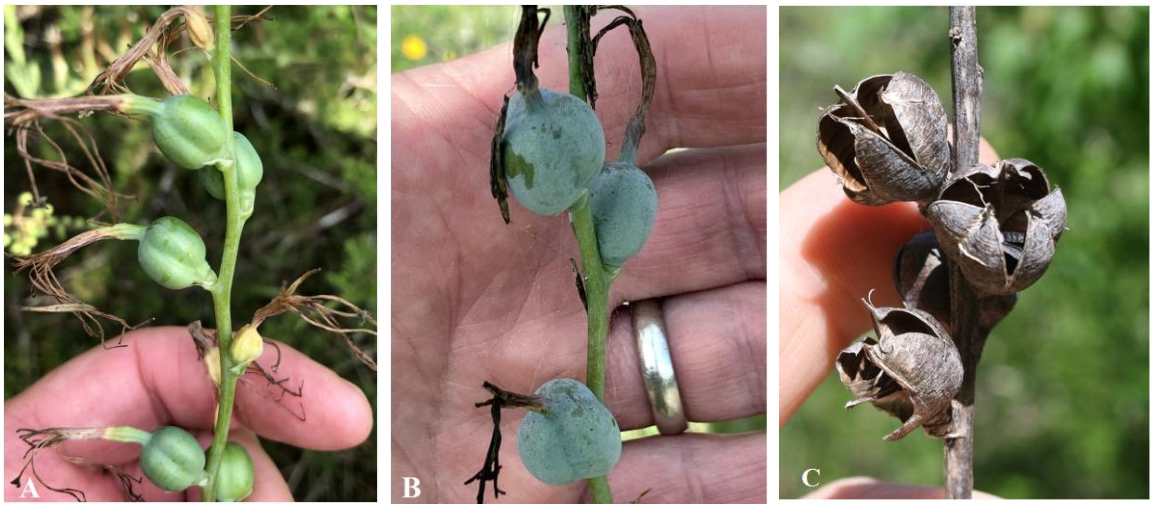

Figure 331. *Agave virginica*. A–B. Maturing capsules, Randolph Co., Alabama, 26 Jul 2020. Photos: Dan Spaulding. C. Old capsules, Limestone Co., Alabama, 20 Apr 2020. Photo: Kevin England.

Agave virginica was previously recognized in *Manfreda*, along with 25 other species (Verhoek 2002). The *Manfreda* group differs by having soft, deciduous leaves and underground stems (rhizomes); typical *Agave* species have stiff, evergreen leaves and aboveground stems (Verhoek 2002). Weakley (2020) states that "the separation of *Manfreda* is perhaps not warranted." *Polianthes* and *Prochnyanthes* have also been recognized as distinct from *Agave*, but all three genera are phylogenetically nested within the genus *Agave* (Eguiarte et al. 2013). Rocha et al. (2006) realized that the *Agave* clade is paraphyletic if the three genera are recognized. They note: "Because it is currently unclear whether paraphyly at the molecular level is caused by insufficient time for lineage sorting to have occurred, we retain the traditional genera." Bogler et al. (2006) write: "The problem is solved by recognizing the entire clade as *Agave*…or by naming some additional genera. At present, it is probably premature to name new genera, but when more molecular data become available for the groups of *Agave*, this may be an attractive option."

2. **CAMASSIA** Lindley 1832

[Shoshone name *kamas*, a variant of Quamash; bulbs were eaten by western North American Indians]

1. Camassia scilloides (Raf.) Cory {like *Scilla*} — WILD HYACINTH; ATLANTIC CAMAS; EASTERN CAMAS-LILY; QUAMASH-LILY (Fig. 332). [*Camassia esculenta* (Raf.) Cory; *Camassia hyacinthina* (Raf.) Palmer & Steyerm.; *Quamasia esculenta* (Ker Gawl.) Coville; *Quamasia hyacinthina* (Raf.) Britton]

Figure 332. *Camassia scilloides*, Lawrence Co., Alabama, 8 Apr 2020. Photos: Kevin England.

Perennial, scapose herb from a bulb. Rich woods, prairies, chalk outcrops, cedar glades, rocky woods, woodland borders, and roadsides, often over circumneutral soils. Flowers March–May, fruits April–June; uncommon in the Highland Rim, Cumberland Plateau, Ridge & Valley, and upper Coastal Plain; very rare in the Piedmont (Fig. 333). Native to central and southeastern USA and adjacent Canada, from Wisconsin and Ontario south to Texas and northwest Georgia (Kartesz 2020).

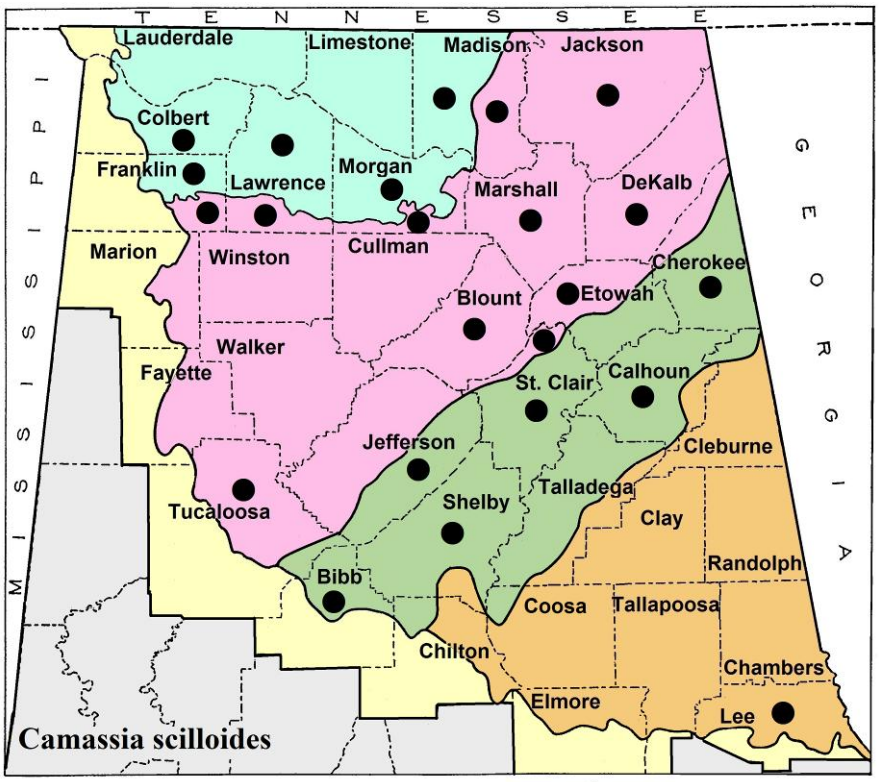

Figure 333. Distribution of *Camassia scilloides* in northern Alabama.

Figure 334. *Camassia scilloides*, limestone woods, Madison Co., Alabama, 4 Apr 2020. Photo: Brian Finzel.

Figure 335. *Camassia scilloides*. A. White flower form, Morgan Co., Alabama, 12 Apr 2007. Photo: Brian Finzel. B. Bluish flower form, Jackson Co., Alabama, 22 Apr 2009. Photo: Wayne Barger. C. Capsules, Franklin Co., Alabama, 22 Apr 2020. Photo: Dan Spaulding.

Wild Hyacinth often grows in large populations in suitable habitats (Fig. 334). Plants produce white, light blue, or violet flowers (Fig. 335a–b) and 3-lobed, subglobose capsular fruit (Fig. 335c) with 2–5 lustrous black seeds per locule (Ranker & Hogan 2002). The inflorescence somewhat resembles Garden Hyacinth (*Hyacinthus orientalis* L.); hence the common name "wild hyacinth" (Shosteck 1974). Macior (1978) demonstrated that the flowers of *Camassia scilloides* strongly reflect blue-violet, chromatically attracting pollinators such as bumblebees (*Bombus*). The onion-like bulbs are rich in sugar and were used as food by Native Americans and early explorers (Niering & Olmstead 1979). The sweet bulbs have a gummy texture and can be eaten as a vegetable after being boiled or baked (Peterson 1977).

3. **HOSTA** Trattinick 1812

[Named for Nicolaus T. Host, 1761–1834, Austrian botanist and physician to Emperor Frances II]

1. Hosta ventricosa (Salisb.) Stearn {swelling on one side} — BLUE HOSTA; BLUE PLANTAIN-LILY; (Fig. 336).

Perennial herb from short rhizomes. Waif in disturbed areas. Flowers June–July; very rare in northern Alabama (Fig. 337). Native to China, introduced chiefly in northeastern North America, cultivated as an ornamental worldwide (Utech 2002d).

Hostas are economically important ornamental plants, with numerous cultivars available throughout the nursery trade (Utech 2002d). They are hardy in temperate regions, thriving in shady areas, and often planted along walks, drives, and buildings (Bailey 1929). In East Asia, young shoots and leaves are eaten as a vegetable. The rhizomes are utilized in folk medicines for treating inflammation, pain-related diseases, and snakebites. Plants are rich in steroids, flavonoids, and alkaloids. Recent research has shown it to have anti-acetylcholinesterase (for Alzheimer's disease), antifungal, anti-tumor, anti-inflammatory, and anti-viral activities (Li et al. 2012).

Figure 336. *Hosta ventricosa*, Philadelphia Co., Pennsylvania, 15 Jul 2020. Photo: Janet Novak.

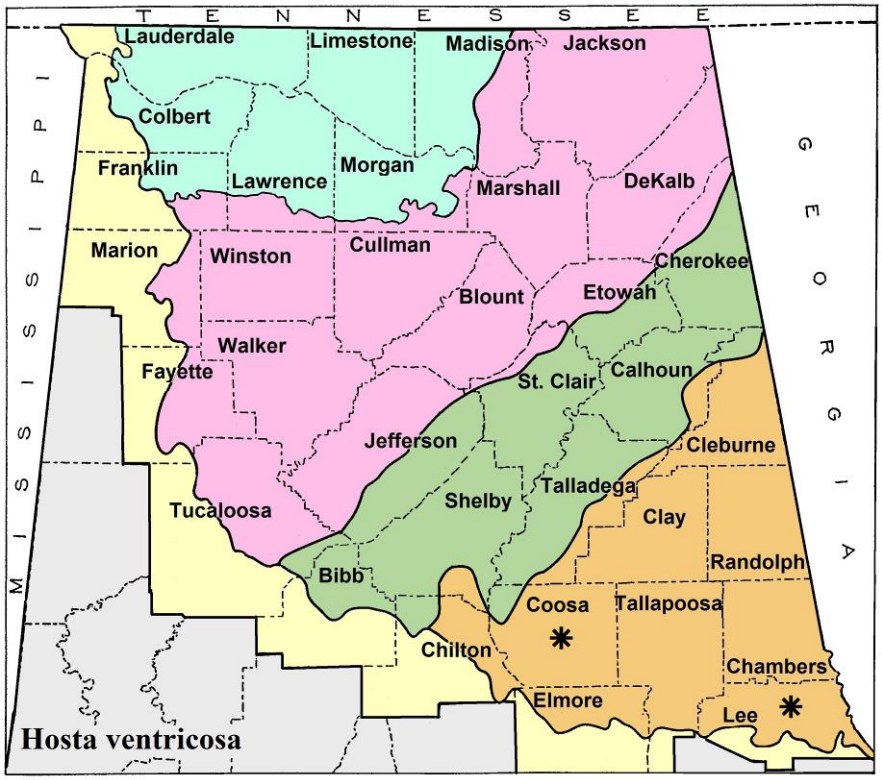

Figure 337. Distribution of *Hosta ventricosa* in northern Alabama.

According to Utech (2002d), only *Hosta ventricosa*, *H. lancifolia* (Thunb.) Engl., and *H. plantaginea* (Lam.) Aschers. are known to escape cultivation in North America. In 2013, Alvin Diamond documented *H. ventricosa* from Coosa County, Alabama (Diamond 2014). The species listed above can have solid green or variegated leaves. The key characteristics of *H. ventricosa* are broadly ovate or cordate leaves and scentless, bluish-purple, urn-shaped flowers. The other two taxa are also widely planted in Alabama and could escape cultivation. *Hosta lancifolia* has lanceolate leaves and scentless purplish-violet, bell-shaped flowers. *Hosta plantaginea* has cordate to orbiculate leaves and fragrant white, tubular flowers (Utech 2002d). Plantain-lily fruits are capsular and hang downward at maturity.

4. SCHOENOLIRION Torrey 1855

[Greek *schoenos*, rush, and *lirion*, white lily; alluding to flowers and rush-like leaves]

1. Tepals (when fresh) golden-yellow with a green or reddish stripe on outer surface; plants usually associated with cedar glades, sandstone outcrops, dolomite glades, granite flatrocks, chalk prairies, and wet pinelands in northern and central Alabama .....**Schoenolirion croceum**
1. Tepals white to greenish-white with a green stripe on outer surface; plants of seepages on sandstone outcrops, wet prairies, and bogs in northeast Alabama .....**Schoenolirion wrightii**

1. Schoenolirion croceum (Michx.) Alph. Wood {saffron colored, yellow; tepals} — YELLOW SUNNYBELL; SWAMP-CANDLE (Fig. 338). [*Oxytria crocea* (Michx.) Raf.]

Figure 338. *Schoenolirion croceum*, Lawrence Co., Alabama, 8 Apr 2020. Photos: Kevin England.

Perennial, scapose herb from a bulb. Cedar glades, sandstone outcrops, granite flatrocks, dolomite glades, chalk prairies, and roadsides adjacent to these habitats. Flowers March–May, fruits late April–June; rare in the Highland Rim, Cumberland Plateau, and Ridge & Valley; very rare in the Piedmont and upper Coastal Plain (Fig. 339). Native to the southeastern USA, with scattered populations in middle Tennessee and southern North Carolina, south to northern Florida, and eastern Texas (Sherman 2002).

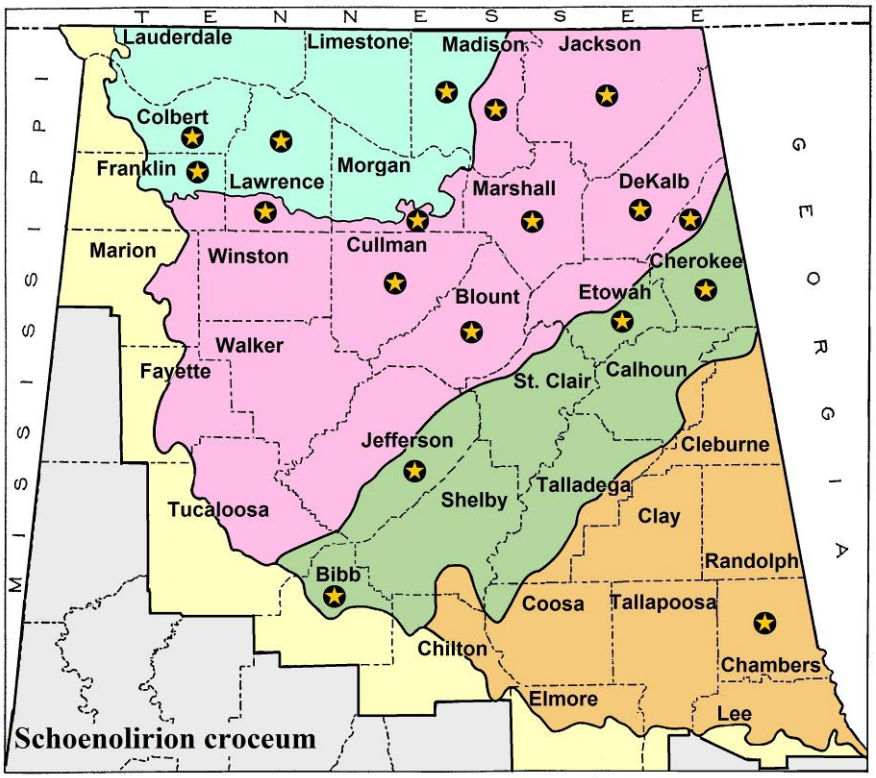

Figure 339. Distribution of *Schoenolirion croceum* in northern Alabama.

Figure 340. *Schoenolirion croceum*, Lawrence Co., Alabama, 12 Apr 2015. Photo: Brian Finzel.

Schoenolirion croceum is listed as an imperiled species (S2) in Alabama (ALNHP 2020). It has golden-yellow flowers (Fig. 340), making it easy to distinguish it from the white-flowered *S. wrightii*. However, Yellow Sunnybell's flowers often fade to white when dried, so flower color should be noted when fresh. Some authors (Sherman & Becking 1991, Smith 1994) use characteristics such as tepal length, style length, number of perianth nerves, pistil color, and whether leaves are longer or shorter than the inflorescence. However, these features commonly overlap and are thus considered unreliable.

2. Schoenolirion wrightii Sherman {for Charles Wright, 1811–1885, Texas botanist} — TEXAS SUNNYBELL; WRIGHT'S SUNNYBELL (Fig. 341). [*Oxytria texana* (Scheele) Pollard; *Schoenolirion texanum* (Scheele) Gray]

Figure 341. *Schoenolirion wrightii*, Etowah Co., Alabama, 18 May 2008 & 5 Jun 2007. Photos: Brian Finzel.

Perennial, scapose herb from a bulb. Sandstone outcrops, moist pinelands, bogs, seeps, wet prairies, and low roadsides. Flowers April–May, fruits May–June; rare in the Cumberland Plateau; very rare in the Ridge & Valley (Fig. 342). Endemic to southeast Arkansas, west Louisiana, eastern Texas, and northeast Alabama (Weakley 2020).

Schoenolirion wrightii is a globally rare (G3) and critically imperiled (S1) species in Alabama (ALNHP 2020). It was once proposed as endangered by the U.S. Fish and Wildlife Service (Nixon & Ward 1981). For over a century, *S. wrightii* was known as *S. texanum*. However, Sherman (1979) discovered that its basionym was misapplied as a *Camassia* species; thus, the name needed to be changed. Texas Sunnybell is easily identified in Alabama by its white flowers (Fig. 343a). Nevertheless, it is sometimes confused with herbarium specimens of Yellow Sunnybell because its

flowers usually fade whitish when dried. Another species with white flowers, *S. albiflorum* (Raf.) R.R. Gates [White Sunnybell], occurs on the Coastal Plain of east Georgia into much of Florida (Kartesz 2020). *Schoenolirion albiflorum* differs from *S. wrightii* by having branched inflorescences and leaves without fleshy bases that wither to persistent fibers (Sherman 2002). The inflorescence of *S. wrightii*, like that of *S. croceum*, is rarely branched and has leaves with fleshy bases that do not become fibrous. Sunnybells have small capsules that contain glossy, black seeds (Fig. 343b).

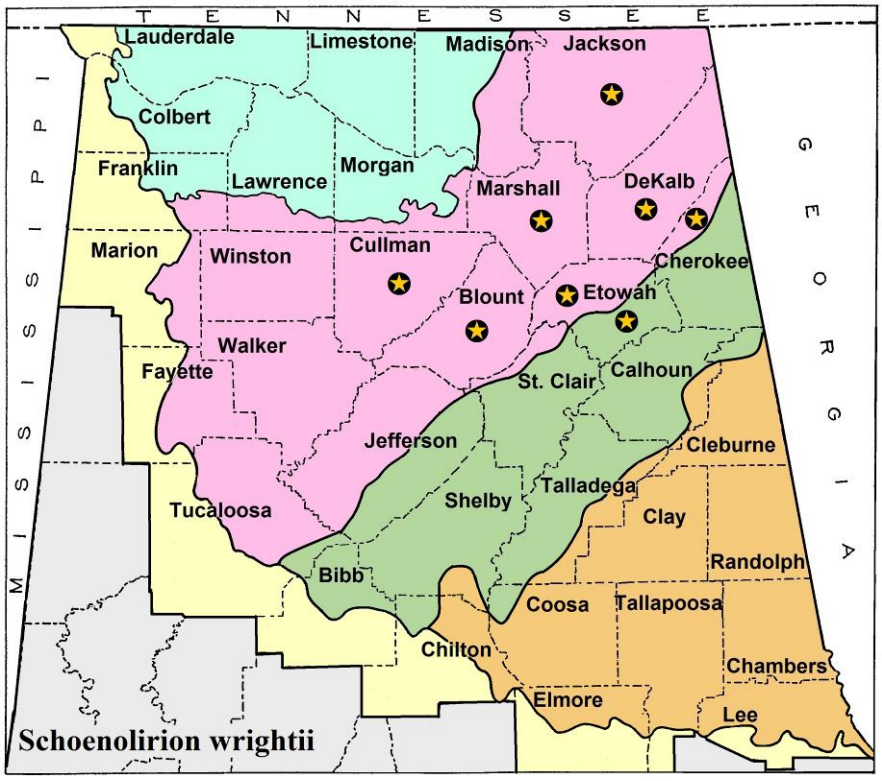

Figure 342. Distribution of *Schoenolirion wrightii* in northern Alabama.

Figure 343. *Schoenolirion wrightii*. A. Flowers, Etowah Co., Alabama, 22 Apr 2016. Photo: Brian Finzel. B. Dehiscing capsules revealing seeds, Blount Co., Alabama, 1 Jun 2019. Photo: Karen & Phillip White.

5. YUCCA Linnaeus 1753

[Caribbean Indian name for Cassava (*Manihot*); originally thought to apply to *Y. gloriosa*]

1. Leaf margins fraying into coarse, filamentous threads or fibrils; plants usually acaulescent with leaves in a basal cluster, rarely caulescent (a short trunk sometimes found on old plants).

    2. Inflorescence branches entirely glabrous; tepals 5–7 cm long; leaves somewhat thick and stiff ..... **Yucca filamentosa**
    2. Inflorescence branches pubescent (densely, moderately, or sparsely hairy); tepals 3–5 cm long; leaves mostly thin and pliable ..... **Yucca flaccida**

1. Leaf margins not fraying into coarse threads, rarely with a few slender threads on older leaves; plant arborescent with leaves in crowns on trunk-like stems (in basal rosettes when young).

    3. Leaf margins minutely spinulose-serrate, especially near the base; seeds 2.5 mm thick, marginless ..... **Yucca aloifolia**
    3. Leaf margins entire, smooth, hyaline-brown or hyaline-yellow; seeds about 1 mm thick, margined..... **Yucca gloriosa**

1. Yucca aloifolia L. {with leaves like *Aloe*} — SPANISH-BAYONET; SPANISH-DAGGER; ALOE YUCCA; DAGGER-PLANT (Fig. 344).

Figure 344. *Yucca aloifolia*, roadside, Winston Co., Alabama, 21 Jun 2020. Photos: Dan Spaulding.

Caulescent evergreen shrub. Woodland borders, roadsides, rock outcrops, disturbed areas, and coastal dunes. Flowers June–August (sporadically later), fruits September–December; rare in northern Alabama; uncommon in the Coastal Plain (Fig. 345). Native to the southeastern USA, West Indies, Mexico, and Central America. Its natural habitats are dunes or coastal shell mounds, from southeast Virginia to Texas; populations further north are escapes or persistent from cultivation (Hess & Robbins 2002).

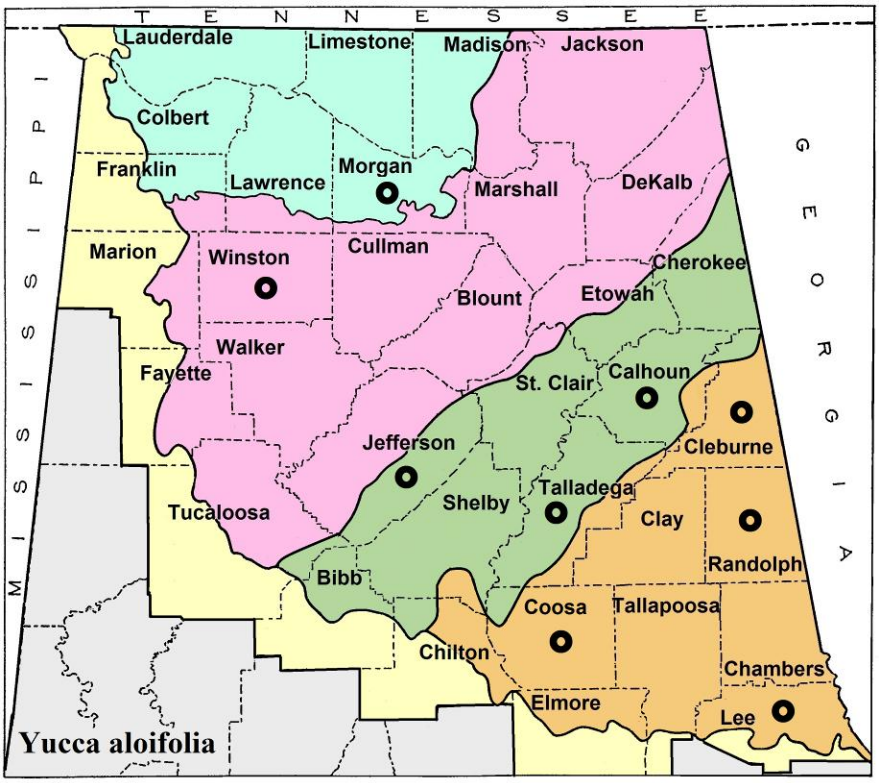

Figure 345. Distribution of *Yucca aloifolia* in northern Alabama.

Figure 346. *Yucca aloifolia*, woodland border, Calhoun Co., Alabama, 19 Apr 2021. Photos: Dan Spaulding.

Most yuccas share an obligate pollination mutualism with yucca moths (Prodoxidae) and are dependent upon them to set fruit (Pellmyr 2003). However, pollination studies demonstrated that *Yucca aloifolia* is not always reliant on yucca moths (Rentsch & Leebens-Mack 2014). In the plant's native habitat, yucca moths (*Tegeticula yuccasella*) typically pollinate their flowers, but in cultivation, honeybees (*Apis mellifera*) also serve as pollinators.

Figure 347. *Yucca aloifolia*. A. Dunes, Baldwin Co., Alabama, 19 Apr 2020. Photo: Suzanne Jensen Pendley. B. Sandy flatwoods, Mobile Co., Alabama, 15 Dec 2020. Photo: Tom Feild.

Yucca aloifolia forms a trunk (Fig. 346a) like *Y. gloriosa* but differs primarily by its finely serrated lower leaf margins (Fig. 346b). Both yuccas are sometimes called Spanish-Dagger because of their spine-tipped leaves (Fig. 346c). The two species are native to coastal dunes (Fig. 347a) of the southeastern USA. The fruits of *Y. aloifolia* are initially green, ripening purple (Fig. 347b) to nearly black at maturity, becoming soft. Webber (1895) noted that mockingbirds (*Mimus polyglottos*) are influential in promoting long-distance dissemination. The birds are attracted to and feed on the sticky pulp in which the seeds are embedded.

Choctaw Indians used *Yucca aloifolia* medicinally as a dermatological aid. They boiled the roots with tallow to make an ointment for wounds (Moerman 1998). Extract from *Y. aloifolia* yielded bioactive chemicals (e.g., alkaloids, steroids, saponins) that showed considerable antioxidant and antimicrobial activity comparable to standard antibiotics (Sobia et al. 2012).

2. Yucca filamentosa L. {bearing slender threads} — EASTERN YUCCA; ADAM' S-NEEDLE; BEAR-GRASS; CURLY-LEAF YUCCA; SPOON-LEAF YUCCA (Fig. 348). [*Yucca concava* Haw.]

Acaulescent to rarely short-caulescent evergreen shrub. Roadsides, open woodlands, pine savannas, sandhills, and coastal dunes. Flowers May–July, fruits September–October; rare in northern Alabama; uncommon on the Coastal Plain (Fig. 349). Chiefly native to the southeastern USA but spreading beyond its native range by escaping cultivation (Hess & Robbins 2002).

Figure 348. *Yucca filamentosa*, Emanuel Co., Georgia, 28 Jun 2014. Photos: Brian Finzel.

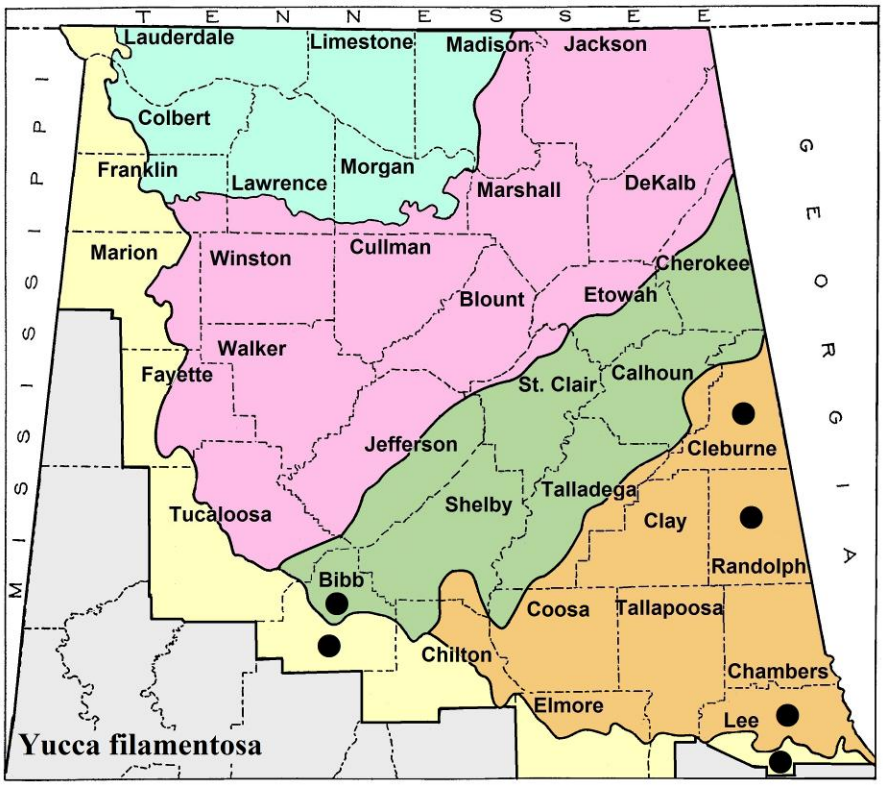

Figure 349. Distribution of *Yucca filamentosa* in northern Alabama.

Figure 350. *Yucca filamentosa*. A. Flowers, Emanuel Co., Georgia, 28 Jun 2014. Photo: Brian Finzel. B. Plant in fruit (Melanie Spaulding & Kailey Hendrix), Walton, Co., Florida, 31 Jul 2014. Photo: Dan Spaulding.

Yucca filamentosa is similar to *Y. flaccida* but has smooth inflorescences (Fig. 350a) with larger flowers (5–7 cm long), whereas *Y. flaccida* has pubescent pedicels and branches with smaller flowers (3–5 cm long). The flower stalks of *Y. filamentosa* are often taller (Fig. 350b), up to 4.5 meters (vs. 3 m). Weakley (2020) includes leaf morphology in his key to separate the two species, but such traits are variable. Leaves of *Y. filamentosa* tend to be broader (2–6 wide), stiff, concave upward, often having acute-acuminate to obtuse tips. *Yucca flaccida* leaves are frequently narrower (1–4 cm), pliable, not concave, and have attenuate-acuminate tips. Hess & Robbins (2002) state that "*Yucca filamentosa* and *Y. flaccida* are very closely related and perhaps are not distinct species."

The yucca moth (*Tegeticula yuccasella*) is the chief pollinator of the southeastern *Yucca* species. Being obligate mutualists, neither plant nor moth could perpetuate itself without this special relationship (Pellmyr 2003). Adult moths do not feed on flowers but are attracted to the scent and breed within them. Females lay their eggs inside the plant's ovary and stuff pollen into the stigmas, ensuring seed availability for her young. The larvae do not eat all the growing ovules, leaving some for reproduction (Rau 1945). The fruits (Fig. 350b) are large, oblong capsules (3.8–5 × 2 cm).

3. Yucca flaccida Haw. {flaccid} — WEAK-LEAF YUCCA; FLACCID-LEAF YUCCA (Fig. 351). [*Yucca filamentosa* L. var. *smalliana* (Fernald) H.E. Ahles; *Yucca smalliana* Fernald]

Acaulescent to rarely short-caulescent evergreen shrub. Roadsides, dry to moist woodlands, rock outcrops, pine plantations, river/streambanks, woodland borders, fence rows, clear-cuts, fields, and coastal sands. Flowers May–July, fruits September–October; frequent throughout Alabama (Fig. 352). Native to the southeastern USA, expanding its range in the central and eastern USA due to escapes from cultivation (Kartesz 2020).

Figure 351. *Yucca flaccida*, Calhoun Co., Alabama, 25 May 2020. Photos: Dan Spaulding.

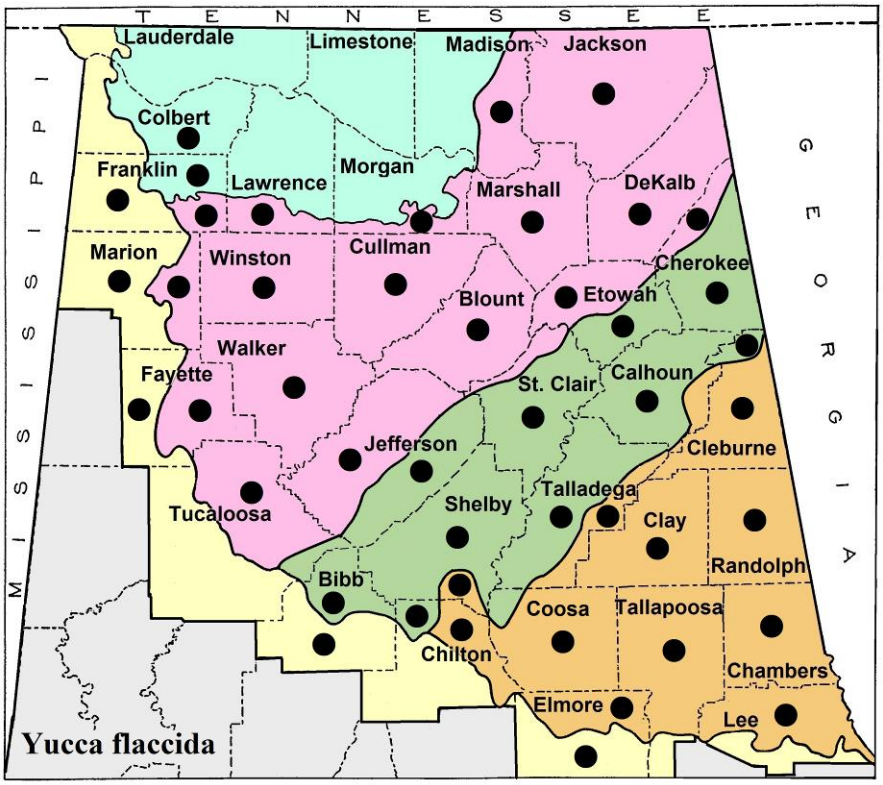

Figure 352. Distribution of *Yucca flaccida* in northern Alabama.

Figure 353. *Yucca flaccida*. A. Bracts, Randolph Co., Alabama, 13 Apr 2019. B. Flowering branch, Calhoun Co., Alabama, 25 May 2020. C. Fruiting branch, Winston Co., Alabama, 21 Jun 2020. Photos: Dan Spaulding.

Figure 354. *Yucca flaccida* with rare trunks, Cleburne Co., Alabama, 29 Feb 2020. Photos: Dan Spaulding. Hayes Jackson (pers. comm. 2021) wondered "if old plants have had roots exposed due to flooding or erosion or if the trunking trait is local to this population."

Yucca flaccida is often confused with *Y. filamentosa* throughout its range. Sterile plants of *Y. filamentosa* reported from northern Alabama are most likely based on misidentification of *Y. flaccida*. Both species have coarse filamentous threads on their leaf margins. Ross Clark (1971) documented only *Y. flaccida* [=*Y. filamentosa* var. *smalliana*] in our state, and said, "specimens of *Y. filamentosa* L. var. *filamentosa* reported for Alabama have not been seen by the writer." However, the senior author has examined valid *Y. filamentosa* from a few Alabama counties, mainly on the Coastal Plain.

The easiest way to identify the two filamentous-leaved yuccas is by their flower stalks. *Yucca flaccida* has hairy branches, pedicels, and bracts (Fig. 353a–c), whereas the inflorescence of *Y. filamentosa* is entirely glabrous. Hess & Robbins (2002) noted that "perhaps *Yucca flaccida* should be considered a variety of *Y. filamentosa*. The morphological differences are minor. The former has thinner, narrower leaves, and smaller, narrower flowers 4–5 cm long, whereas *Y. filamentosa* has thick, rigid leaves and flowers 5–7 cm long." Ward (2011) believes the two taxa "differ markedly in a number of characteristics…and be retained at specific rank." Both species are typically acaulescent, rarely very mature plants become caulescent, forming a short trunk (Fig. 354).

Various Native American tribes such as the Cherokee, Catawba, and Nanticoke used filamentous-leaved yucca roots to make soaps and medicines (Patel 2012). Cherokee Indians crushed them to make a poultice for sores and created a fishing aid by putting a mixture of pounded roots into water to intoxicate fish (Moerman 1998). Indigenous people removed the fibers from the leaves and used them for various purposes. During the 19th Century, an industry arose in the South to extract leaf fiber for fabric production, but it failed (Bell & Castetter 1941).

4. Yucca gloriosa L. {glorious; for showy panicle of flowers} — MOUND-LILY YUCCA; CURVE-LEAF YUCCA; SPANISH-DAGGER (Fig. 355).

Figure 355. *Yucca gloriosa* var. *recurvifolia*, Baldwin Co., Alabama, 20 Jul 2019. Photos: Howard Horne.

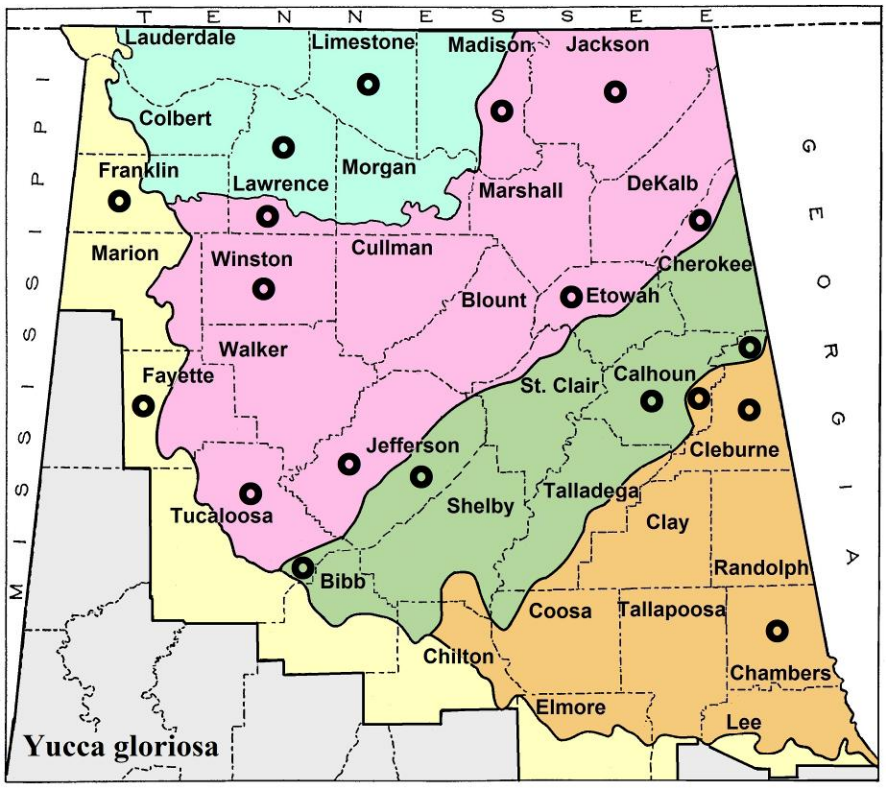

Figure 356. Distribution of *Yucca gloriosa* in northern Alabama.

Figure 357. *Yucca gloriosa* var. *gloriosa*. A. Fence row, Winston Co., Alabama, 16 Sept 2020. Photo: Kevin England. B. Roadside, Winston Co., Alabama, 27 Apr 2020. Photo: Dan Spaulding.

Caulescent evergreen shrub. Roadsides, fence rows, old homesites, woodland borders, dunes, and dry sandy soils along the coast. Flowers May–October, fruits September–December; rare throughout Alabama (Fig. 356). Native to the coastal regions from North Carolina to northern Florida, west to Louisiana (Hess & Robbins 2002). It is widely cultivated and persistent around old homesites or elsewhere from discarded plants.

Figure 358. *Yucca gloriosa* var. *recurvifolia*. A. Cleburne Co., Alabama, 1 Feb 2020. B. Tuscaloosa Co., Alabama, 28 Jan 2020. Photos: Dan Spaulding.

Hess & Robbins (2002) recognize two varieties of *Yucca gloriosa*, but Weakley (2020) treats these entities as separate species. *Yucca gloriosa* var. *gloriosa* (Fig. 357a–b) is endemic to the Atlantic Coastal Plain from North Carolina to Georgia. It has predominantly straight, rigid leaf blades, larger pendulous fruits (5.5–8 cm long), and grows up to 5 meters (16.5 feet) tall. *Yucca gloriosa* L. var. *recurvifolia* (Salisb.) Engelm. [=*Yucca recurvifolia* Salisb.] (Fig. 358a–b) is endemic to the Gulf Coastal Plain from the Florida Panhandle to Louisiana. It typically has recurved, flexible leaf blades, smaller, erect fruits (2.5–4.5 cm long), and only grows up to 2 meters (6.5 feet) tall. We prefer to treat Alabama plants as a single species since both taxa are cultivated in northern Alabama, and it is difficult to determine the species or variety from herbarium specimens.

Yucca gloriosa is often mistaken for *Y. aloifolia*, but its leaf margins are smooth, the blades are often plicate with low parallel ridges, and the ripe fruits are leathery (Vines 1960). The leaf margins of *Y. aloifolia* are sharply serrated, blade surfaces are smooth, and the ripe fruits are fleshy.

20. HYACINTHACEAE (Hyacinth Family) – in ASPARAGALES

1. Tepals fused into a tube most of their length; flowers tightly clustered, subtended by inconspicuous bracts ..... **Muscari**
1. Tepals separate or fused only at the base; flowers loosely clustered, subtended by conspicuous bracts.

    2. Inflorescence an umbel; flowers erect; tepals white with a wide green stripe externally, tips not recurved; leaves with a narrow white central stripe on the upper surface (best observed when fresh); bracts 0–1 per flower ..... **Ornithogalum**
    2. Inflorescence a raceme; flowers mostly nodding or horizontal (erect when in bud); tepals usually blue or violet, rarely pink or pinkish-white, tips recurved; leaves solid green; bracts 2 per flower (each of different lengths)..... **Hyacinthoides**

1. HYACINTHOIDES Heister ex Fabricius 1759
[Resembling Hyacinth, *Hyacinthus orientalis*]

1. Hyacinthoides ×massartiana Geerinck {in honor of Jean Massart (1865–1925), Belgian botanist — HYBRID-BLUEBELL; GARDEN-BLUEBELL (Fig. 359). [*Hyacinthoides ×variabilis* P. D. Sell]

Figure 359. *Hyacinthoides ×massartiana*, Cleburne Co., Alabama, 21 Mar 2020. Photos: Melanie T. Spaulding.

Perennial, scapose herb from a bulb. Woodland borders and shaded roadsides. Flowers late March–May; very rare in northern Alabama (Fig. 360). Parents of this hybrid are *Hyacinthoides non-scripta* (L.) Chouard ex Rothm. [English bluebell] and *H. hispanica* (P. Mill.) Rothm. [Spanish-Bluebell]. Hybrid-Bluebell is weakly naturalized in North America, and within the USA, it is known from Washington, North Carolina, and Illinois (McNeill 2002, Poindexter et al. 2011, Kartesz 2020).

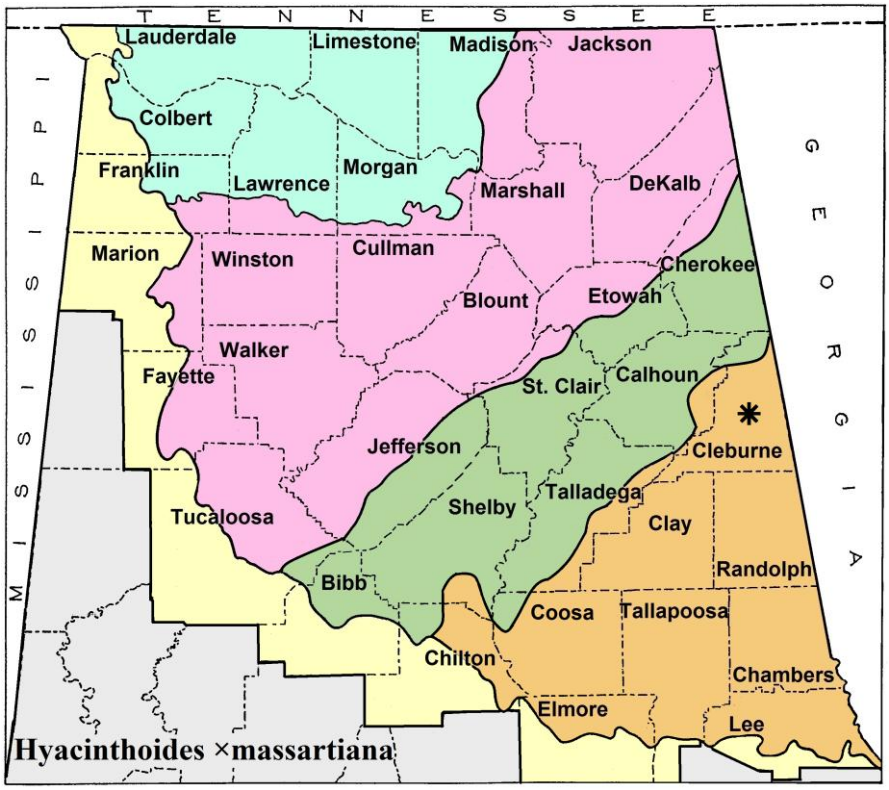

Figure 360. Distribution of *Hyacinthoides* ×*massartiana* in northern Alabama.

Figure 361. *Hyacinthoides* ×*massartiana*, Cleburne Co., Alabama, 21 Mar 2020. Photos: Dan Spaulding.

Hybrid-Bluebell escapes cultivation in Europe and North America, often occurring in the absence of its parents (McNeill 2002). It spreads primarily by bulb division (Fig. 361a) but also by seeds since plants are usually fertile (Rix 2004). Its flowers are bell-shaped, violet-blue, rarely white or pink (Fig. 361b-c), and slightly fragrant (Geerinck 1996).

McNeill (2002) notes that the hybrids "show a range of intermediacy between the parents, and, in particular, have slightly one-sided racemes, slightly recurved tepals, stamens that are variable in length, and bluish or whitish anthers (Fig. 361c)." In comparison, *Hyacinthoides non-scripta* produces one-sided racemes, sweetly-scented, tubular flowers with strongly recurved tepals, and unequal stamens with white or cream anthers. *Hyacinthoides hispanica* produces racemes with scentless, bell-shaped flowers found throughout the inflorescence, spreading tepals, and stamens nearly equal in length with blue anthers (Rix 2004). English Bluebell is native to Western Europe, while Spanish-Bluebell is native to Spain, Portugal, and North Africa (McNeill 2002). Both species are cultivated in North America and elsewhere. In March 2020, Melanie Taylor Spaulding was the first to document *H.* ×*massartiana* in Alabama from Cleburne County (Spaulding & Triplett 2021).

2. MUSCARI P. Miller 1754

[Greek *moschos*, musk; alluding to the scent of flowers in some species]

1. Leaves 1–4 mm wide, rounded below, slenderly channeled (grooved) above; perianth tube typically cylindric, obovoid, or oblong-urceolate, and usually blue-violet, purple, or blackish-blue (upper sterile flowers often lighter).....**Muscari neglectum**
1. Leaves 3–9 mm wide, flat or broadly channeled; perianth tube mostly globose or ovoid, and usually blue to sky blue.....**Muscari botryoides**

1. Muscari botryoides (L.) P. Mill. {like a cluster of grapes; the flowers} — COMMON GRAPE-HYACINTH (Fig. 362). [*Hyacinthus botryoides* L.]

Figure 362. *Muscari botryoides*, roadside, Whatcom Co., Washington, 4 Apr 2021. Photo: T. Abe Lloyd.

Perennial, scapose herb from a bulb. Fields, lawns, roadsides, and other disturbed areas. Flowers March–April; fruits May–June; very rare throughout Alabama (Fig. 363). A native of Europe and naturalized in the USA and Canada (Straley & Utech 2002e).

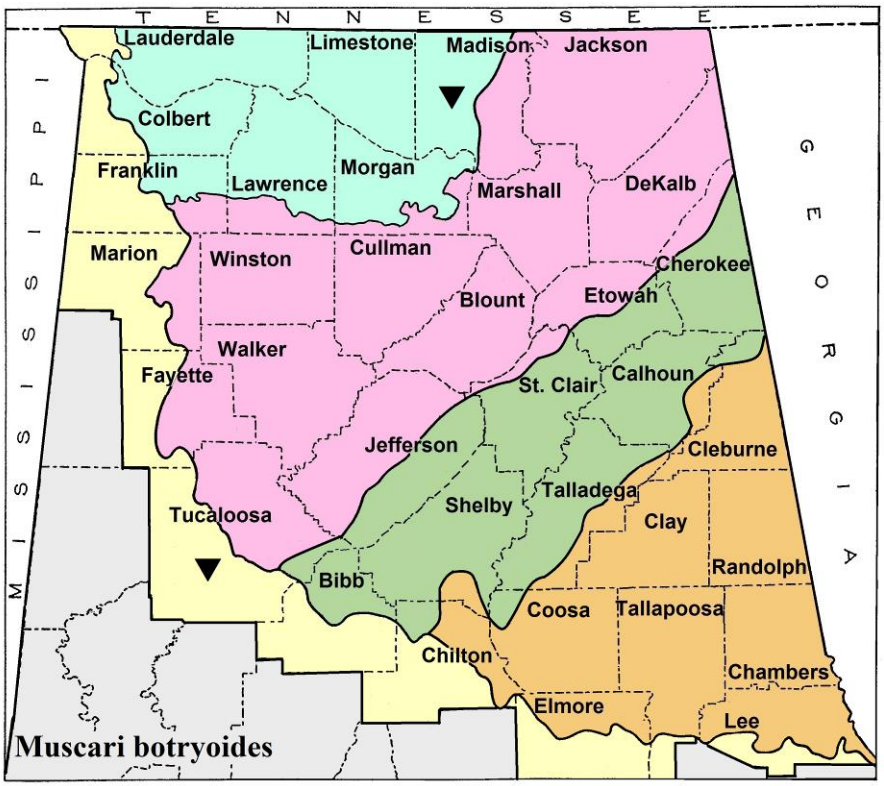

Figure 363. Distribution of *Muscari botryoides* in northern Alabama.

Figure 364. *Muscari botryoides*. A–B. Disturbed area, Middlesex Co., Massachusetts, 24 Mar 2020. Photo: Claire O'Neill. C. Woodland, Barry Co., Michigan, 25 Apr 2019. Photo: Jack Rosenhauer.

Although rare in Alabama, *Muscari botryoides* is the most common cold-hardy grape-hyacinth in North America (Straley & Utech 2002e). It is frequently grown as an ornamental for its cluster of blue, fragrant flowers. It occasionally escapes cultivation, infesting agricultural fields and interfering with crop harvests in some regions (Beam et al. 2019). It is similar to *M. neglectum* but has broader leaves and globose flowers (Fig. 364a–c). Some authors (Gleason & Cronquist 1963, Straley & Utech 2002e, Jones 2005) use additional characters to identify the two species, but these traits are somewhat variable and less reliable. Leaf tips of *M. botryoides* are usually erect (vs. recurved), its flowers are often sky blue (vs. dark blue to purple), and its racemes have around 12–20 flowers (vs. 20–40).

Muscari comosum (L.) P. Mill. [Tassel Grape-Hyacinth] has been reported for Alabama (Kral et al. 2011); however, the lone specimen from Lee County was cultivated (pers. comm. Curtis Hansen 2019). The species is native to southern Europe, North Africa, and southwest Asia, sparingly naturalized in the USA (Straley & Utech 2002e). Tassel Grape-Hyacinth can be identified by its long brown-flowered racemes (10–20 cm long) with violet tips. The tassel-like tips of the racemes are composed of small infertile flowers with long stalks; the lower fertile flowers are brown with yellowish-brown teeth (Doussi & Thanos 2002).

2. Muscari neglectum Guss. ex Ten. {overlooked} — STARCH GRAPE-HYACINTH; BLUE-BOTTLES; SOUTHERN GRAPE-HYACINTH; CLUSTERED GRAPE-HYACINTH (Fig. 365). [*Muscari racemosum* (L.) Lam. & DC.]

Figure 365. *Muscari neglectum*, Calhoun Co., Alabama, 24 Mar 2021. Photo: Melanie Taylor Spaulding.

Perennial, scapose herb from a bulb. Lawns, roadsides, fields, cemeteries, pastures, prairies, suburban forests, woodland borders, and other disturbed habitats. Flowers late January–May, fruits April–June; uncommon in northern Alabama; rare in the Coastal Plain (Fig. 366). A native of Europe, North Africa, and western Asia (Straley & Utech 2002e), naturalizing primarily in the southeastern USA, with scattered populations in other portions of North America (Kartesz 2020).

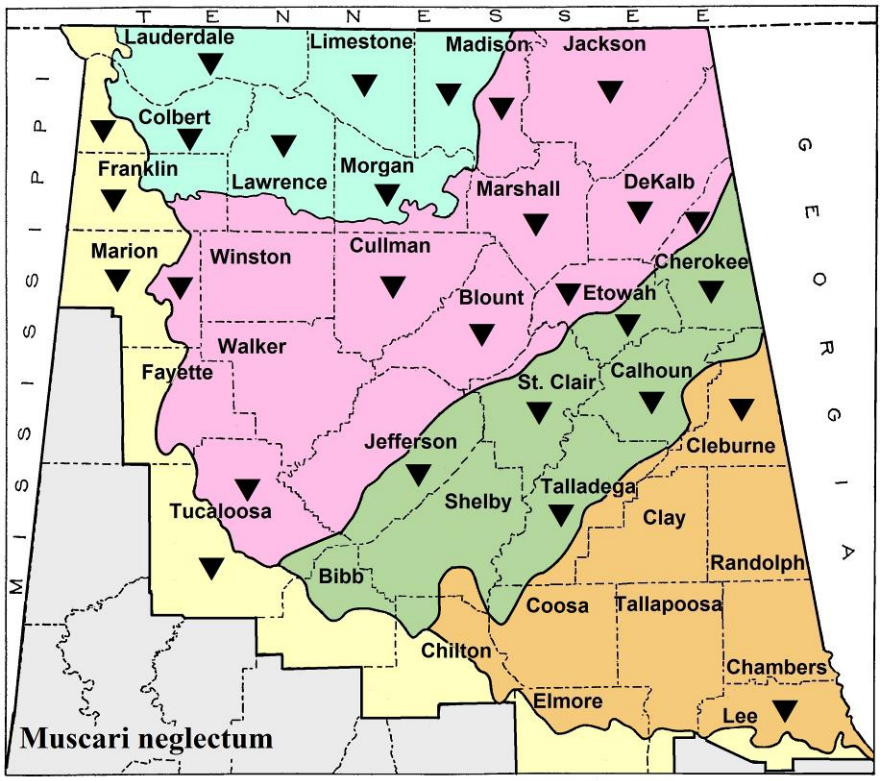

Figure 366. Distribution of *Muscari neglectum* in northern Alabama.

Figure 367. *Muscari neglectum*. A. Calhoun Co., Alabama, 24 Mar 2021. B. Cleburne Co., Alabama, 17 Mar 2019. Photos: Melanie Taylor Spaulding. C. Madison Co., Alabama, 28 Mar 2007. Photo: Brian Finzel.

Muscari neglectum is a very polymorphic species (Webb 1980). Its flowers range from blue to almost black, most commonly dark blue, violet-blue, purple, or blackish-blue (Fig. 367a–c). The perianth is typically cylindric, egg-shaped (obovoid), or urn-shaped (oblong-urceolate), often white-

tipped (with white teeth or lobes). The uppermost flowers are sterile, smaller, and frequently lighter blue. Its leaves are slender, somewhat cylindrical, narrowly channeled above, and rounded below (Fig. 368a–b). *Muscari neglectum* bulbs have a dark brown outer coat (tunic) and usually some bulblets (offsets). *Muscari botryoides* is often confused with *M. neglectum*, but Common Grape-Hyacinth differs by having globose, blue flowers, wider leaves (broadly channeled or flat). Its bulbs have a translucent or light brown tunic and lack offsets (Straley & Utech 2002e). Both grape-hyacinths have capsular, obtusely 3-angled fruit (Fig. 368c).

Figure 368. *Muscari neglectum*. A. Cleburne Co., Alabama, 2 Feb 2020. B. Cleburne Co., Alabama, 15 Mar 2020. C. Cleburne Co., Alabama, 27 Mar 2020. Photos: Dan Spaulding.

Bulbs and flower buds of Starch Grape-Hyacinth have been used in Mediterranean cooking, mainly as a flavoring agent. Its starchy bulbs, which can be pickled or boiled, are reported to taste like garlic or a slightly bitter onion. Its flowers are said to have a nutty, sweet flavor. Leaves and bulbs contain various essential oils that possess antimicrobial activity and can be used as a wood preservative to protect against fungi (Bokov & Riethmüller 2020). Caution is advised because Garden Hyacinth, *Hyacinthus orientalis*, looks very similar to grape-hyacinth but is toxic (Kingsbury 1964).

3. **ORNITHOGALUM** Linnaeus 1753

[Greek, *ornis*, bird, and *gala*, milk; a whimsical reference to the flowers]

1. Ornithogalum umbellatum L. {umbellate; the inflorescence} — STAR-OF-BETHLEHEM; NAP-AT-NOON; GRASS-LILY; ELEVEN-O'CLOCK LADY; SLEEPY-DICK; SNOWFLAKE; DOVE'S-DUNG (Fig. 369).

Perennial, scapose herb from a bulb. Lawns, roadsides, old fields, cemeteries, old home sites, pastures, alluvial woods, vacant lots, fence rows, riverbanks, and limestone woods. Flowers March –early June; uncommon in northern Alabama; rare in the Coastal Plain (Fig. 370). Native to south and central Europe (Zahariadi 1980), widely naturalized in North Africa, Asia, the Middle East, Canada, and much of the USA (Straley & Utech 2002g).

Figure 369. *Ornithogalum umbellatum*, Calhoun Co., Alabama, 30 Mar 2020. Photo: Emily Spaulding.

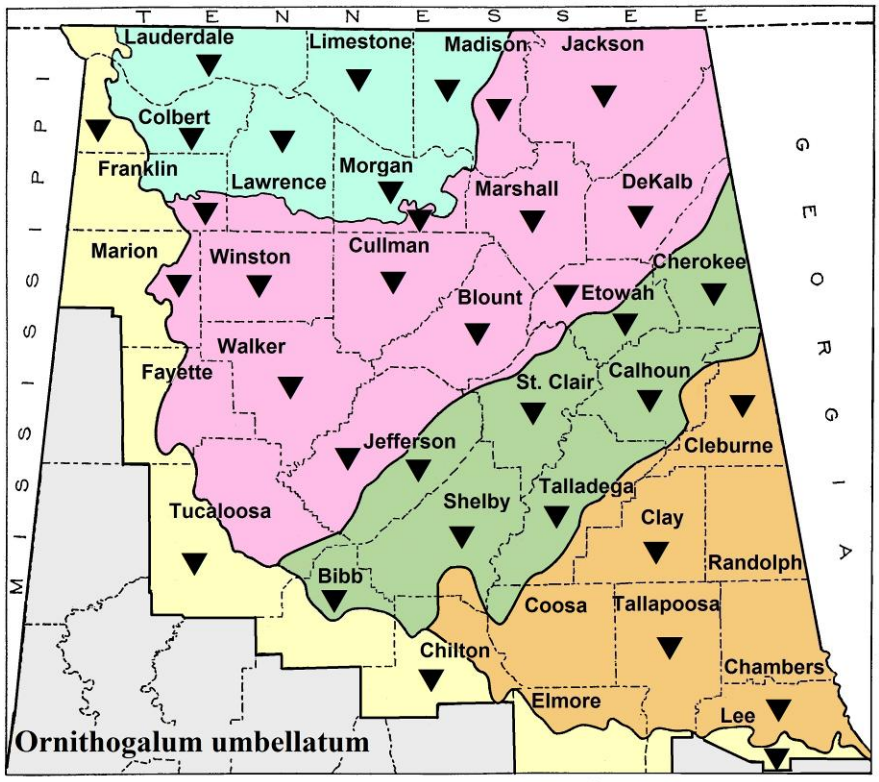

Figure 370. Distribution of *Ornithogalum umbellatum* in northern Alabama.

Plants produce a characteristic flatted-topped flower cluster (Fig. 371a) with white tepals bearing a broad green stripe on their undersurface (Fig. 371b). The common name, Star-of-Bethlehem, applies to the stellate flowers, which supposedly resemble the star indicating Jesus' birthplace (Shosteck 1974). Its other common names refer to the flowers opening later in the day and closing at dusk. On a cloudy day, the flowers might not open at all or close early during overcast conditions. The name "dove's dung" from the Old Testament alludes to the cluster of white flowers, suggesting bird droppings (Coffey 1993).

Figure 371. *Ornithogalum umbellatum*. A. Calhoun Co., Alabama, 30 Mar 2020. Photo: Emily Spaulding. B–C. Cherokee Co., Alabama, 27 Mar 2020. Photos: Dan Spaulding.

Star-of-Bethlehem is toxic, with various alkaloids concentrated within the bulbs (Fig. 371c). Livestock, including sheep and cattle, can experience depression, excess salivation, bloating, and death after consuming the bulbs (Kingsbury 1964). Children have been poisoned after eating the onion-like leaves and bulbs (Westbrooks & Preacher 1986). The bulbs are allegedly edible and nutritious, following proper cooking or boiling, and have been reportedly used in Oriental cuisine. Fernald & Kinsey (1943) noted that Dove's-Dung of the Bible was eaten only during a great famine.

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