

***Carex planispicata*, a Widespread and Frequent New Species of
Carex section *Griseae* (Cyperaceae) from the Eastern United States of
America**

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ABSTRACT

Carex planispicata is described as new from 21 states of the eastern U.S.A., where it occurs in mesic deciduous forests. It belongs to the *C. oligocarpa* complex because of its distichous perigynia and purple-red coloration extending high on its shoot bases. Features that distinguish *Carex planispicata* from its closest relatives include perigynium shape, perigynium length relative to achene body length, achene beak length, and leaf blade width.

Carex section *Griseae* (L. H. Bailey) K n-
kenhal is a group of sedges endemic to east-
ern North America that is most diverse in mesic
deciduous forests of the southeastern United
States. Numerous (usually 40 or more) longi-
tudinal sclerenchyma traces ("nerves" of
earlier authors, e.g., Fernald 1950; Gleason
and Cronquist 1991) that are impressed in liv-
ing and dried perigynia are apomorphies di-
agnosing the section. Additional characters
shared by members of sect. *Griseae*, though
not unique to them, include glabrous leaf and
bract blades, long-sheathing lower bracts, usu-
ally unisexual spikes with only the terminal
one staminate, and glabrous perigynia with en-
tire apices. This section (including section *Oli-
gocarpae* (Carey) Mack.) contains 21 species,
one of which I describe here as new. This species
is the sixth to be described as new in sect.
Griseae in the last decade (Bridges and Orzell
1989; Naczi 1989, 1993, 1997).

***Carex planispicata* Naczi, sp. nov.—TYPE:**

U.S.A. Alabama. Lawrence County: ca. 10
mi. SW of Wren, along Borden Creek, 1.2
air mi. N of its confluence with Sipsey Fork,
T8S, R8W, NE 1/4 section 32, 25 May 1993,
Naczi 3108, Bryson, & Reznicek (holotype:
MICH; isotypes: BRIT, FLAS, FSU, GA,
GH, KNK, MO, NCU, NY, PH, TENN,
UNA, US, USCH, VDB, VPI, WIN, ctb).

Carex grisea var. *rigida* (L. H. Bailey), Mem.
Torrey Bot. Club 1:56. 1889. *Carex ampli-
bola* var. *rigida* (L. H. Bailey) Fernald, Rho-
dora 44:311. 1942.—TYPE: U.S.A. Penn-
sylvania: [Bucks Co.], Sellersville, steep hill-
side, 1884. *Fretz s.n.* (lectotype, here des-

ignated: BH!; isolectotype: GH!). Fernald's
(1942: 314) mention of "TYPE or ISOTYPE"
after his citation of the GH specimen likely
does not constitute a lectotypification, since
it apparently fails to fulfill the conditions of
article 7.11 of the *International Code of Bot-
anical Nomenclature* (Greuter et al. 1994).

Herba perennis, dense caespitosa. Rhizomata
brevia, 0.2–8.2 mm longa inter surculos
vel ramos rhizomatum; internodiis 0.2–2.2
mm longis, 1.6–2.2 mm crassis. Bases surcu-
lorum atrovinosae usque ad (3.4–) 5.5–9.6 cm.
Culmi fertiles 14–58 cm alti, 0.5–0.9 mm lati
in medio, plerumque laeves. Folia 1–4; lami-
nae 2.3–14.2 cm longae, (1.0–) 2.2–6.5 mm la-
tae, lamina latissima (3.0–) 3.5–6.5 mm lata,
virides, paginis abaxialibus laevibus; vaginae
glabrae. Surculi vegetativi 19–60 cm alti; pseu-
doculmi 4.4–11.1 cm alti. Infructescentiae 10–
48 cm longae; spicae remotae vel 2–3 superae
imbricatae. Spicae 3–6, erectae; spica termin-
alis (0.6–) 1.4–2.6 (–3.0) cm longa, (0.8–) 1.3–
2.5 (–3.0) mm lata, omnino mascula, in pe-
dunculo erecto 2.4–49 mm longo portata, spi-
cas superas laterales superans; spica infima
(0.4–) 0.9–2.1 cm longa, (1.6–) 2.9–6.0 mm
lata, omnino feminea, in pedunculo erecto
1.6–6.2 cm longo portata; spicae laterales (0.7–)
1.1–2.4 cm longae, (4.0–) 4.5–6.4 (–6.9) mm
latae, omnino femineae, in pedunculis erectis
0.4–3.8 cm longis portatae; flores feminei spi-
carum lateralium (2–) 7–14 distiche imbricati.
Squamae femineae 2.8–4.5 mm longae, (1.2–)
1.7–2.2 mm latae, aristatae; corpus 1.9–2.8
mm longum, late ovatum vel ovatum, integri-
marginatum; arista 0.3–2.5 mm longa. Peri-

gynia (3.9-) 4.2-4.9 (-5.1) mm longa, (1.4-) 1.6-1.8 mm lata, (2.4-) 2.5-3.3plo longiora quam latiora, (1.9-) 2.0-2.3plo longiora quam corpora acheniorum, ascendencia, obtuse triquetra, nervata, glabra, oblonga vel elliptica vel anguste oblonga vel anguste elliptica in circumscriptione, in basim truncatam gradatim contracta, in apicem subacutum rectum gradatim contracta, erostrata vel rostris minutis laevibus rectis integris usque ad 0.3 mm longis instructa; nervi 57-69 impressi. Achenia 2.8-3.7 mm longa, 1.3-1.7 mm lata, obovoidea, in stipites 0.4-1.0 mm longos abrupte contracta, in rostra (0.3-) 0.4-0.7 mm longa abrupte contracta, arcte inclusa perigyniis; corpora 1.9-2.4 mm longa.

Perennial herb, densely caespitose. **Rhizomes** short, 0.2-8.2 mm long between shoots or branches of the rhizomes, with internodes 0.2-2.2 mm long, 1.6-2.2 mm thick, covered with cataphylls 2-5 mm long. **Shoot bases** usually surrounded by cataphylls but not by bases of old leaves, strongly purple-red to (3.4-) 5.5-9.6 cm high. **Reproductive shoots** 14-58 cm tall, erect to spreading, not elongating in fruit; culms 0.5-0.9 mm wide at mid-height, usually smooth throughout but occasionally antrorsely scaberulous in uppermost portions, obtusely trigonous. **Cataphylls** glabrous, purple-red, multicostate. **Leaves** of reproductive shoots 1-4, arising in basal 0.005-0.09 of culms, the longest 0.2-0.4 times as long as culms; blades 2.3-14.2 cm long, (1.0-) 2.2-6.5 mm wide, the widest (3.0-) 3.5-6.5 mm wide, green, flat to barely plicate, margins smooth near base and antrorsely scaberulous near apex, adaxial surface smooth or antrorsely scaberulous near apex, abaxial surface smooth; leaf sheaths 0.5-6.3 cm long, tight, glabrous, green; adaxial face of sheaths with hyaline and glabrous band, hyaline band with apex slightly convex or truncate; ligules 0.6-3.3 mm long, lingulate with apex obtuse. **Vegetative shoots** 19-60 cm tall, 0.66-1.3 times as tall as culms; leaves 4-7, similar to those of culms except blades 2.6-46 cm long; pseudoculms 4.4-11.1 cm tall, 2.1-4.7 mm wide, 0.13-0.26 of vegetative shoot height. **Infructescences** 10-48 cm long, 0.55-0.96 of culm height, with the spikes widely separate or the upper 2-3 spikes overlapping, the uppermost lateral spikes 1.4-15.6 cm distant, the lowest spikes 6.4-16.2 cm distant; lowest bract with blade 4.9-28 cm

long and 0.26-0.61 times as long as culm, sheath 2.3-6.4 cm long, adaxial face of sheath with glabrous and hyaline band occupying full length of sheath or nearly its full length, hyaline band with apex truncate or slightly convex and elongated up to 3.1 (-4.8) mm above sheath apex, sheath glabrous abaxially, ligule 0.7-3.8 (-13.4) mm long; bract blade of uppermost lateral spike 2.9-13.3 cm long and usually much exceeding terminal spike, but very rarely slightly shorter than terminal spike, sheath 2.4-7.6 mm long and glabrous; uppermost bract scale-like, sheathless, body 3.8-5.7 mm long and awn 0-13 mm long. **Spikes** 3-6, simple, single at nodes, erect; terminal spike (0.6-) 1.4-2.6 (-3.0) cm long, (0.8-) 1.3-2.5 (-3.0) mm wide, entirely staminate, 3-54-flowered, on erect and smooth or barely scaberulous peduncle 2.4-49 mm long, barely to much exceeding upper lateral spikes; lowest spike (0.4-) 0.9-2.1 cm long, (1.6-) 2.9-6.0 mm wide, entirely pistillate, (2-) 5-12-flowered, the perigynia distichously imbricate, the internode between the lowest perigynia 1.1-4.2 mm long, on erect, barely scaberulous or smooth peduncle 1.6-6.2 cm long; upper lateral spikes (0.7-) 1.1-2.4 cm long, (4.0-) 4.5-6.4 (-6.9) mm wide, entirely pistillate and (2-) 7-14-flowered, the perigynia distichously imbricate, on erect and barely scaberulous or smooth peduncles 0.4-3.8 cm long. **Staminate scales** 3.3-4.9 mm long, 1.1-1.7 mm wide, lanceolate to narrowly oblong, acute, awnless, center green and 1 nerved, margins hyaline and pale red-brown to tawny. **Pistillate scales** 2.8-4.5 mm long, (1.2-) 1.7-2.2 mm wide; body 1.9-2.8 mm long, 0.39-0.60 times as long as perigynium, broadly ovate to ovate with midrib prolonged as antrorsely scaberulous awn 0.3-2.5 mm long, center green and 2-4-nerved, margins entire, hyaline, whitish or tinged with pale red-brown. **Anthers** 3, 2.2-3.2 mm long. **Styles** jointed with achenes, portion distal to achene withering with age, portion proximal to achene persistent and becoming achene beak; base 0.15-0.20 mm wide. **Stigmas** 3, 1.2-1.8 mm long, withering with age. **Perigynia** (3.9-) 4.2-4.9 (-5.1) mm long, (1.4-) 1.6-1.8 mm wide, (2.4-) 2.5-3.3 times as long as wide, (1.9-) 2.0-2.3 times as long as achene bodies, ascending, obtusely triangular in cross section, faces flat to slightly convex or adaxial face slightly concave, nerves

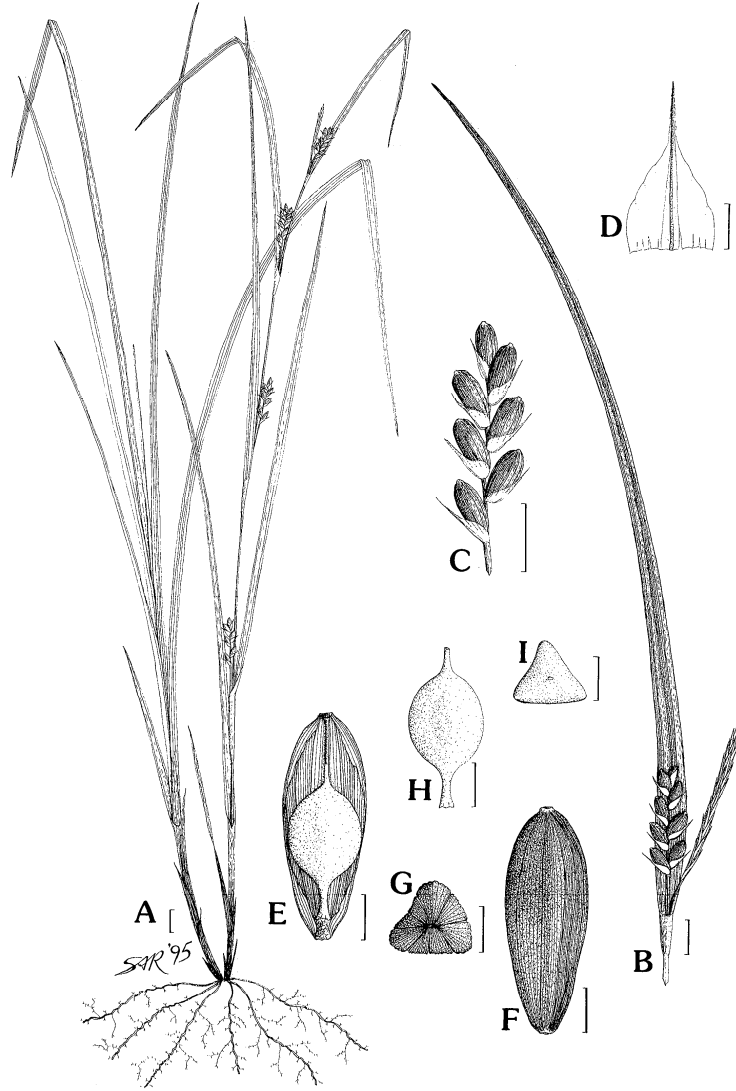
deeply impressed and 57–69, glabrous, green to red-brown, oblong or elliptic to narrowly oblong or narrowly elliptic in outline, very gradually tapered from widest point to truncate base, gradually tapered to straight and subacute apex, beakless or with a minute beak; beaks 0–0.3 mm long, 0–0.06 of perigynium length, straight, smooth, entire. **Achenes** 2.8–3.7 mm long, 1.3–1.7 mm wide, faces tightly enveloped by perigynia, obovoid, obtusely trigonous, faces slightly concave to flat, brown, basally abruptly contracted to stipe, apically abruptly contracted to beak; stipe 0.4–1.0 mm long, vertical; body 1.9–2.4 mm long, with widest point 0.6–1.0 mm from body apex; beak (0.3–) 0.4–0.7 mm long, vertical.

Carex planispicata belongs to a lineage that also includes *C. bulbostylis* Mack., *C. edwardsiana* E. L. Bridges & Orzell, and *C. oligocarpa* Willd. Morphologic apomorphies that diagnose this lineage, the *C. oligocarpa* complex, are distichously imbricate perigynia and purple-red coloration on the proximal 3.0–12 cm of the shoot bases (Naczi unpubl., phylogenetic analysis of *Carex* sect. *Griseae*). The rest of the members of sect. *Griseae* possess the plesiomorphic spirally imbricate perigynia and brown shoot bases or, if the bases are purple-red, the coloration is usually 3.6 cm high or less. When the coloration is higher, as in *C. godfreyi* Naczi (to 7.3 cm high) and *C. ouachitana* Kral, Manhart, & Bryson (to 10 cm high), it appears to represent a parallelism with its presence in the *C. oligocarpa* complex.

Carex planispicata differs from the other members of the *C. oligocarpa* complex in several ways (Figure 1). First, the perigynia of *C. planispicata* are (2.4–) 2.5–3.3 times as long as wide, while the perigynia of *C. bulbostylis*, *C. edwardsiana*, and *C. oligocarpa* are 1.6–2.6 times as long as wide. Second, the perigynia of *C. planispicata* are (1.9–) 2.0–2.3 times as long as their achene bodies. The other species have perigynia 1.5–1.9 (–2.0) times as long as their achene bodies. Third, the achenes of *C. planispicata* have beaks (0.3–) 0.4–0.7 mm long, while the other species have achene beaks 0.05–0.3 (–0.5) mm long. Fourth, the widest leaf of *C. planispicata* is (3.0–) 3.5–6.5 mm wide, whereas the other species have their widest leaves 1.8–4.0 mm wide. Addi-

tional differences between *C. planispicata* and particular species of the *C. oligocarpa* complex exist. Perigynium width, degree of inflation, and cross-sectional shape distinguish *C. planispicata* and *C. bulbostylis*. While *C. planispicata* has relatively narrow perigynia (1.4–1.8 mm wide) that are only slightly wider than their included achenes (perigynium width minus achene width = 0.1–0.3 mm) and obtusely triangular in cross section, *C. bulbostylis* has wider perigynia (1.8–2.8 mm wide) that are inflated around their included achenes (perigynium width minus achene width = 0.2–0.8 mm) and orbicular or suborbicular in cross-section. Perigynium beak length and number of perigynia per spike separate *C. planispicata* from both *C. edwardsiana* and *C. oligocarpa*. *Carex planispicata* has beakless or minutely beaked perigynia (beaks 0.1–0.3 mm long) and spikes containing relatively many perigynia (longest spikes usually with 7–14 perigynia). *Carex edwardsiana* and *C. oligocarpa*, on the other hand, have conspicuously beaked perigynia (beaks 0.4–1.0 mm long) and spikes with fewer perigynia (longest spikes usually with 4–8 perigynia). The key below highlights the distinctive features of *C. planispicata*. Given the numerous characters that diagnose *C. planispicata*, even depauperate specimens can be relatively easy to identify, though such specimens often have narrower leaves and fewer perigynia per spike than is usual.

Botanists have long recognized what is now called *C. planispicata*. Bailey (1889) was the first to describe it, as *C. grisea* Wahlenb. var. *rigida* L. H. Bailey. Shortly afterward, Bailey (1894a, 1894b) synonymized this variety with *C. amphibola* Steud. For the next 50 years, authors accepted Bailey's synonymy (e.g., Mackenzie 1935). Fernald (1942) resurrected the variety, but transferred it to *C. amphibola*. Though Bailey and Fernald brought recognition to the taxon, their circumscriptions obscured its identity, for at least three reasons. First, *C. planispicata* belongs to the *C. oligocarpa* complex, not the lineage that includes *C. grisea* and *C. amphibola* (the *C. grisea* complex, which also includes *C. corrugata* Fernald and *C. godfreyi*). Second, the rank of variety obscures the distinctive nature of *C. planispicata*. A suite of several characters distinguishes this taxon from its closest relatives. Thus, it is best considered a species. Third,



Fernald's specimen citations and key also obscure the identity of *C. planispicata*. Fernald (1942) cited specimens as exemplars of *C. amphibola* var. *amphibola* sensu Fernald (not *C. amphibola* Steud.) and *C. amphibola* var. *rigida*. Both sets of citations represent mixtures of *C. planispicata* with at least two other species. Most of the specimens cited as *C. amphibola* var. *amphibola* are *C. planispicata* (e.g., Fernald & Long 9874), though *C. bulbostylis* (e.g., Bush 1351) and *C. godfreyi* (e.g., Harper 60) are also present. Most of the specimens cited as *C. amphibola* var. *rigida* are *C. amphibola* Steud. (e.g., Wiegand 6072), though *C. corrugata* (e.g., Fernald & Long 11786), *C. godfreyi* (e.g., Curtiss 6356), and *C. planispicata* (e.g., Fretz s.n., 1884) are also included. Because of his mixture of species, Fernald (1950) wrote a key that will identify some specimens of *C. planispicata* as *C. amphibola* var. *amphibola* sensu Fernald and others as *C. amphibola* var. *rigida*. As a consequence of former circumscriptions, *C. planispicata*, with *C. amphibola*, has been passing as *C. amphibola* in the literature and herbarium for the past century.

Carex planispicata is relatively wide-ranging, occurring in much of the eastern U.S.A. It ranges from central New Jersey southwestward to southern Indiana, southeastern Missouri, and southeastern Oklahoma south to central Georgia, southern Mississippi, and southeastern Texas. Within this range, it grows in the District of Columbia and 21 states: Alabama, Arkansas, Delaware, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maryland, Mississippi, Missouri, New Jersey, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *Carex planispicata* is frequent through most of its range. The specimens cited below are a representative sample of 405 records (about 925 total specimens) I have seen. *Carex planispicata* inhabits mesic deciduous forests, usually on the lower portions of slopes adjacent to streams and on the upper portions of

floodplains. It usually grows in acidic to nearly neutral loams, silt loams, and sandy loams. *Carex planispicata* is sympatric with *C. bulbostylis* and *C. oligocarpa* but allopatric with the more western *C. edwardsiana*. Infrequently, *C. planispicata* grows syntopically with *C. bulbostylis*. When they do occur together, *C. planispicata* and *C. bulbostylis* usually grow intermingled. More frequently, *C. planispicata* and *C. oligocarpa* are syntopic. In such situations, *C. planispicata* usually occurs lower on slopes than *C. oligocarpa*, apparently in moister soils, though the two species can grow intermingled. Despite several observations of syntopy, I have not detected intermediates or hybrids between *C. planispicata* and *C. bulbostylis* or between *C. planispicata* and *C. oligocarpa*.

All the members of the *C. oligocarpa* complex bear distichously imbricate perigynia, causing the spikes to be more or less flat. The flat spikes are particularly noticeable in *C. planispicata* because of its relatively long perigynia that are relatively numerous in each spike. Thus, the epithet "*planispicata*," meaning "flat-spiked," is especially appropriate for this species.

Identification Key to *Carex planispicata* and Closely Related Species (members of *Carex* sect. *Griseae* with distichous perigynia and purple-red shoot bases)

- 1a. Perigynia tightly enveloping achene or slightly inflated, obtusely triangular in cross-section, 1.4–1.9 (–2.3) mm wide, (1.8–) 2.1–3.3 times as long as wide.
- 2a. Perigynia (2.4–) 2.5–3.3 times as long as wide, with bodies gradually tapering to apices and thus beakless or with beaks 0.1–0.3 mm long; perigynia (1.9–) 2.0–2.3 times as long as achene bodies; achene beaks (0.3–) 0.4–0.7 mm long; widest leaf (3.0–) 3.5–6.5 mm wide; longest pistillate spikes with (5–) 7–14 perigynia. *C. planispicata*
- 2b. Perigynia (1.8–) 2.1–2.6 times as long as wide, with bodies usually abruptly contracted near apices to beaks (0.4–) 0.5–1.0 mm long.

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Figure 1. *Carex planispicata* Naczi.—A. Habit.—B. Upper portion of infructescence.—C. Pistillate spike.—D. Pistillate scale.—E. Perigynium, side view, dissected to reveal achene.—F. Perigynium, side view.—G. Perigynium, top view.—H. Achene, side view.—I. Achene, top view. Bar equals 1 cm in A, 5 mm in B–C, and 1 mm in D–I. Drawn from the holotype.

perigynia 1.5–1.9 (–2.0) times as long as achene bodies; achene beaks 0.05–0.3 (–0.5) mm long; widest leaf 1.8–4.0 mm wide; longest pistillate spikes with 4–8 (–10) perigynia.

3a. Lowest spike usually considerably above base of shoot, inflorescence 0.46–0.94 (–0.99) of culm height; vegetative shoots exceeded by culms or slightly exceeding culms, tallest vegetative shoot 0.88–1.4 times as tall as tallest culm; hyaline band of sheaths of lower bracts apically convex and elongated (0.8–) 1.1–4.0 mm above sheath apex. *C. oligocarpa*

3b. Lowest spike usually at base of shoot, inflorescence (0.88–) 0.94–0.99 of culm height; vegetative shoots usually greatly exceeding culms, tallest vegetative shoot (0.80–) 1.4–4.4 times as tall as tallest culm; hyaline band of sheaths of lower bracts apically concave or truncate. *C. edwardsiana*

1b. Perigynia much inflated, orbicular or suborbicular in cross-section, (1.8–) 2.0–2.5 (–2.8) mm wide, 1.6–2.0 (–2.1) times as long as wide. *C. bulbostylis*

REPRESENTATIVE SPECIMENS. U.S.A. ALABAMA. Colbert Co.: ca. 4 mi. S of Allsboro, *Bryson 4400* (FLAS, MICH, VDB, VSC, WARM, etb). Conecuh Co.: ca. 5 mi. SSE of center of Evergreen, *Naczi 4693* (KNK, MICH, etb). Crenshaw Co.: 1.9 mi. S of center of Luverne, *Naczi 4681* (KNK, MICH, etb). Dallas Co.: ca. 9 mi. SE of Selma, *Naczi 4651* (KNK, MICH, UNA, etb). Hale Co.: vicinity of Gallion, *Naczi 4641* (KNK, MICH, etb). Lawrence Co.: Brazier Creek, Bankhead National Forest, sect. 18, *Bryson 2543* (etb). Marshall Co.: 0.4 mi. SW of Guntersville Dam, *Meigs 581* (UNA). Morgan Co.: 1.6 mi. N of Florette, *Naczi 1031* (KNK, MICH). Wilcox Co.: ca. 2 mi. S of Ackerville, *Naczi 5182* (KNK, etb). Winston Co.: ca. 10 mi. N of Double Springs, *Naczi 2869* (KNK, MICH, etb).—ARKANSAS. Cross Co.: W of Bird-eye, along S side of rte. 42, 0.5 mi. W of its jct. with rte. 163, *Naczi 2440* (MICH). Franklin Co.: ca. 3 mi. E of Cass, Redding Recreation Area, *Naczi 2154* (MICH). Garland Co.: Goat Island in Lake Hamilton, *Rettig 874* (VDB). Greene Co.: Crowley's Ridge State Park, *Castaner 9114* (MICH, WARM). Howard Co.: W of Umpire, just E of Cossatot River, *Davis 2113* (VDB). Madison Co.: 2.1 mi. S of routes 23–16 junction in Brashears, *Naczi 2157* (MICH). Montgomery Co.: 1 mi. E of Cox Springs, along Caddo River, *Bryson 4279* (VDB, etb). Phillips Co.: 1.5 mi. N of West Helena, St. Francis National Forest, *Naczi 1597* (MICH). Polk Co.: ca. 8 mi. E of Vandervoort, E side of Cossatot River, N of route 246, *Naczi 1580* (MICH). Scott Co.: ca. 2 mi. N of Y City, along W side of rte. 71, just S of Fourche LaFave River, *Naczi 2130* (MICH). Searcy Co.: ca. 1 mi. N of Silver Hill, rte. 65 crossing of Buffalo River, *Naczi 2162* (MICH). Sevier Co.: 8 mi. E of DeQueen, along W side of rte. 71 just S of its

jet. with rte. 70, *Naczi 2120* (MICH). Sharp Co.: N of Cave City, along rte. 167, *Castaner 5666* (WARM). Stone Co.: Fifty Six, Blanchard Springs Recreation Area, *Naczi 1951* (MICH). Van Buren Co.: Shirley, along E side of rte. 9, just N of Middle Fork of Little Red River, *Naczi 2167* (MICH).—DELAWARE. New Castle Co.: Faulkland, 6 June 1884, *Commons s.n.* (BH, NY).—DISTRICT OF COLUMBIA. Washington, 1887, *Vasey s.n.* (DOV).—GEORGIA. Elbert Co.: near Anthony Shoals of Broad River, *Manhart 228 & Garland* (etb). Jasper Co.: ca. 14 mi. SW of Monticello, ca. 1 mi. NE of Oemulgee River crossing by route 83, *Naczi 6045* (KNK, etb).—ILLINOIS. Jackson Co.: Cedar Lake Reservoir, *Heineke 1520* (SIU). Johnson Co.: 3 mi. S of Vienna, *White 958* (NLU). Massac Co.: W of Metropolis, along Ohio River, *Schwegman 1658* (SIU). Pope Co.: Dixon Springs, 0.3 mi. E of jet. of rtes. 146 & 145 along S side of rte. 146, *Naczi 2494* (MICH). Pulaski Co.: 2.1 mi. SW of Olmsted along E side of rte. 37, *Naczi 2491* (MICH).—INDIANA. Clarke Co.: 1.5 mi. NW of Henryville, *Hermann 6747* (BH, F, GH, MICH, MO, NY). Crawford Co.: 1 mi. SW of Wyandotte Cave, bank of Blue River, *Deam 35622* (NY). Harrison Co.: ca. 1.5 mi. SW of New Middletown, *Deam 27655* (GH, PH). Perry Co.: 4.9 mi. N of Bristow along E side of rte. 145, *Naczi 2505* (MICH). Scott Co.: ca. 1.5 mi. W of Lexington, *Deam 44243* (NY, PH).—KENTUCKY. Adair Co.: ca. 9 mi. S of Columbia, along W side of route 704, *Naczi 7400 & Reznicek* (KNK). Barren Co.: ca. 3 mi. SSW of Haywood, Brigadoon State Nature Preserve, *Naczi 6468 & Heeg* (KNK). Clinton Co.: ca. 4 mi. NE of Albany, along E side of route 350, *Naczi 7171 & Ford* (KNK, WIN). Crittenden Co.: Marion, *Athey 3341* (VDB). Cumberland Co.: 3.0 road mi. SW of Amandaville, along W side of rte. 704, *Naczi 2894* (MICH). Estill Co.: 5 mi. N of Irvine, *Guetig 6384* (EKY). Fleming Co.: ca. 4 mi. E of Hillsboro, along N side of route 1013, *Naczi 7345 & Ford* (KNK, WIN). Graves Co.: NE of Mayfield, *McKinney 4179* (EKY, MUR). Hardin Co.: ca. 8.5 mi. ENE of center of Elizabethtown, Vernon-Douglas State Nature Preserve, *Naczi 6508 & Heeg* (KNK). Harrison Co.: ca. 1.5 mi. NE of Sunrise, Quiet Trails State Nature Preserve, *Naczi 6598* (KNK). Kenton Co.: ca. 2.8 mi. SSW of Nicholson, *Naczi 4598* (KNK, WIN). Lyon Co.: Eddyville, *Athey 3330* (SIU, VDB). Monroe Co.: ca. 8 mi. SE of Tompkinsville, S of route 216, *Naczi 7224 & Ford* (KNK, WIN). Nelson Co.: Jerry Hollow, *Sister Rose Agnes 1274* (SB). Pendleton Co.: 3.5 mi. NE of Falmouth, *Naczi 4057 & Thieret* (KNK, MICH, MO, NY, PH, etb). Robertson Co.: ca. 4 mi. SE of Piqua, *Naczi 7350 & Ford* (KNK). Rockcastle Co.: 1.8 mi. NE of Disputanta, *Fleming AF-49 & Allen* (BEREA, KNK). Rowan Co.: ca. 6 air mi. S of center of Morehead, *Naczi 5614 & Trauth* (KNK). Trigg Co.: Land between the Lakes, bordering Hematite Lake, 27 Apr 1976, *Athey s.n.* (SIU). Warren Co.: 3 mi. NE of Bowling Green, *Conrad 963* (KY, MO, NCU, OKL).—LOUISIANA. Red River Parish: ca. 2 mi. SE of Crossroads, along Chicot Bayou, *Nixon 9229 et al.* (SBSC). Sabine Parish: 5 mi. SW of Noble, *Carroll 2579*

(MSC, ctb).—MARYLAND. Montgomery Co.: Plummers Island, *Blake 8715* (LL).—MISSISSIPPI. Holmes Co.: 6.2 mi. E of Thornton, *Bryson 11228* (KNK, ctb). Jefferson Co.: ca. 3 mi. S of Church Hill and 3.3 mi. N of Adams Co. border along E side rte. 553, *Naczi 2117* (MICH). Lowndes Co.: 1.8 mi. W of Mayhew, *Naczi 2173 & Bryson* (MICH). Madison Co.: ca. 2 mi. N of Madison-Hinds county line, W side of rte. 49, *McDearman 3104* (ctb). Oktibbeha Co.: Starkville, *Bryson 2879* (FSU, MICH, VDB, WARM, ctb). Panola Co.: 1.0 mi. W of Pleasant Grove along S side of rte. 315, *Naczi 2438* (MICH). Tallahatchie Co.: ca. 5.8 mi. S of Charleston (Paynes Community), *Bryson 7285* (MICH, ctb). Tishomingo Co.: ca. 1.3 mi. S of Mingo, *Bryson 11690 & Warren* (ctb). Washington Co.: ca. 3.5 mi. E of Helm, *Naczi 2460 & Bryson* (MICH). Yalobusha Co.: ca. 6 air mi. NE of Oakland, *Bryson 10625* (MICH, ctb).—MISSOURI. Bollinger Co.: 3.5 mi. NW of Buchanan, along tributary to Castor River, *Steyermark 84222* (GA). Carter Co.: ca. 7 mi. SE of Van Buren, along S bank of Current River, *Naczi 1954* (MICH). Howell Co.: 5 mi. W of Willow Springs, Indian Creek, T27N, R10W, sect. 20, *Summers 4869* (MO). Scott Co.: just N of Morley, *Reznicek 10177 et al.* (KNK, MICH). Shannon Co.: hwy 19 at Current River bridge, *Castaner 3652 & Bevard* (MICH, WARM). Stoddard Co.: Dudley, Crowley Ridge Roadside Park, along N side of route 60, *Naczi 1956* (MICH).—NEW JERSEY. Hunterdon Co.: Lambertville, 28 May 1921, *Mackenzie s.n.* (DUKE, NY, PH).—NORTH CAROLINA. Alamance Co.: 11 mi. W of Chapel Hill, near Haw River, *Radford 43064* (LL). Anson Co.: 2.5 mi. N of Burnsville, near Richardson Creek, *Radford 43575* (FARM, NCU). Chatham Co.: 4.5 mi. ESE of Pittsboro, *Radford 42889* (NCU). Durham Co.: 5 mi. WNW of Bragtown, near Eno River, *Radford 34145* (NCU). Lee Co.: ca. 6 mi. ENE of Colon, along S side of Hughes Creek at rd. 1500 crossing, *Naczi 2210* (MICH). Montgomery Co.: 2 mi. NW of Uwaharrie, below Falls Dam on Yadkin River, *Wells 2998 & Radford* (NCU). Moore Co.: near Deep River, at High Falls, *Radford 43358* (NCU). Orange Co.: Chapel Hill, *Ashe 2005* (DOV, MO, NCU, US, WARM). Rockingham Co.: 1.5 mi. SE of Leaksville, near Dan River, *Radford 43867* (NCU). Wake Co.: along county rte. 1127, 2.1 mi. N of jct. with county rte. 1128, *Leonard 1513 & Radford* (NCU). Warren Co.: 4 mi. NW of Oakville, near Roanoke River, *Radford 43785* (ILL, UARK, UNA, US).—OHIO. Adams Co.: ca. 3 air mi. NE of Peebles, E of route 32, N of Plum Run, *Naczi 5492 et al.* (KNK). Jackson Co.: Liberty Twp., *Bartley & Pontius 281* (OS).—OKLAHOMA. Choctaw Co.: ca. 8 mi. SSE of Hugo along S side of rte. 109, *Naczi 2425* (MICH). Latimer Co.: 7.5 mi. SW of Wilburton, *Means 3089* (OKLA). McCurtain Co.: ca. 7 mi. NE of Broken Bow, along W side of Mountain Fork River, *Naczi 1901* (KNK). Pittsburg Co.: 6 mi. SW of Halesville, *Mitchell 3403* (LL, NY). Pushmataha Co.: NE of Snow, *Jones & Jones 6783* (MICH).—PENNSYLVANIA. Bedford Co.: 7.8 mi. NE of Ott Town, *Berkheimer 6136* (FARM, GH, PENN). Berks Co.: 0.25 mi.

WSW of Lobachsville, *Berkheimer 3709* (CM, ILL, PENN, PH). Chester Co.: above Lenape along Brandywine Creek at Shaws Bridge, 20 Jun 1926, *Stone s.n.* (PH). Fayette Co.: Ohiopyle, Cucumber Run, *Bright 1892* (CM, WVA). Montgomery Co.: 1.5 mi. WSW of Fagleyville, *Berkheimer 5854* (CM).—SOUTH CAROLINA. Anderson Co.: ESE of Fair Play, along Rocky Creek, *Ahles 13426 & Radford* (NCU). Dorchester Co.: W of Givhans, Givhans Ferry State Park, bluff above Edisto River, *Naczi 2762* (KNK, MICH, USCH, ctb). Edgefield Co.: 3.5 mi. W of Cleora, *Radford 22593* (NCU). Kershaw Co.: ca. 8 mi. NW of Camden, W of rte. 97 just N of Grannies Quarter Creek, *Naczi 2203* (MICH).—TENNESSEE. Cheatham Co.: Pegram, *Stenson 10352* (BH, DUKE, GH, MO, NY, PH, TENN, US, VDB). Davidson Co.: 7.8 mi. W of jct. Tenn. 12 and US 41A at Bordeaux, above Cumberland River, *Kral 42637* (MO, VDB, ctb). Decatur Co.: [no additional locality information], *Ames s.n.*, 1855 (MICH). DeKalb Co.: hwy. 56 and 1-40, off hwy. 56, *Rogers 41217* (NY, TENN). Grundy Co.: Savage Gulf Natural Area, *Patrick 117 & Phillippe* (TENN). Hickman Co.: N of Centerville, *Kral 52598* (VDB). Knox Co.: near Mascot, *DeSelm 31325 & Underwood* (TENN). Montgomery Co.: near Clarksville, *Palmer 17586* (GH). Perry Co.: ca. 1 mi. NE of Lobeville, *Kral 68222* (VDB). Shelby Co.: near Memphis, *Palmer 17444* (GH). Wayne Co.: along Natchez Trace, just S of Cypress Creek stop, *Kral 55461* (MICH, VDB). Williamson Co.: ca. 4 air mi. S of Fairview, *Kral 85896* (KNK, VDB). Wilson Co.: 5 mi. S of Gallatin, *Rogers 44635* (FLAS, SMU, TENN).—TEXAS. Gregg Co.: ca. 5 mi. W of Longview, *Haynes 4780* (UNA). Harris Co.: Houston, *Hall 741* (NY). Polk Co.: Livingston, *Palmer 5267* (US). Sabine Co.: E of Hemphill, *Jones 6395 et al.* (MICH). Smith Co.: ca. 15 mi. N of Tyler, W side of farm road 14, *Naczi 1536* (MICH). Walker Co.: Huntsville, 29 Mar 1935, *Tharp s.n.* (GH).—VIRGINIA. Amelia Co.: ca. 7 km E of Mannboro, along tributary of Wintcomack Creek, *Wieboldt 8585* (KNK, VPI). Brunswick Co.: near Triplett, *Fernald 14575 & Lewis* (GH). Culpepper Co.: 1.5 mi. S of Culpepper, *Allard 1506* (GH). Cumberland Co.: 14 mi. NE of Farmville, S side of Big Guinea Creek along W side rte. 620, *Wieboldt 5503* (MICH, ctb). Halifax Co.: S of Brookneal, *Boufford 13851 & Schram* (NCU). Surry Co.: Claremont Wharf, along James River, *Fernald & Long 9874* (GH, PH).—WEST VIRGINIA. Mineral Co.: Burlington, 18 Jun 1933, *Cordray s.n.* (WVA).

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