The Flora of Pulliam Prairie, Chickasaw County, Mississippi: a Significant Remnant of Native Vegetation in the Black Belt Region

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Vascular plants are reported from ca. 250 acres [100 ha] at Pulliam Prairie in Chickasaw County, Mississippi, which is a significant remnant of pre-Columbian landscape in the Black Belt of the Upper East Gulf Coastal Plain. During 14 days of field work in 2009, 448 vascular taxa were collected (435 species plus 13 additional varieties), including only 33 (7.4%) undoubted aliens plus 17 (3.8%) with adventive or uncertain status. About 286 (72%) of the clearly native taxa are typical of grassland, totaling more than all combined prior published lists from the Black Belt prairies, and including most of the rare species known from these prairies. Problems with nomenclature and taxonomy are noted in several cases. At least ten taxa have little or no prior published record from Mississippi. At least three taxa appear to be undescribed but widely scattered within the blacklands of some southeastern states: Rudbeckia sp. (aff. tenax), a glandular variety of Symphyotrichum patens, and a narrow-leaved variety of Lysimachia ciliata. Twelve taxa are considered endangered or threatened in the region, and Agalinis auriculata (with hundreds of plants here) is globally threatened. The most common persistent aliens are Lespedeza cuneata and Sorghum halepense in grassland, plus Lonicera japonica in woodland.

The Black Belt region is readily defined in terms of its largely calcareous soils (Fig. 1), original grasslands, and history of intense agricultural uses, as reviewed by Rankin (1974), Barone (2005a), Campbell and Seymour (2011a), and many others. But the general conversion of its native vegetation presents great difficulties for botanical studies and for application of this work to conservation. Although the distinctiveness of this region’s grassland flora has been recognized since the earliest scientific surveys, details of the original flora and vegetation have remained elusive.

There have been several published efforts to collect and list the flora, starting with pioneering work by Mohr (1901) and Harper (1943) in Alabama, and by Harper (1913) and Lowe (1921) in Mississippi. Barone and Hill (2007) have recently conducted a broad review and floristic survey of native grassland remnants in the Black Belt and Jackson Prairie regions of these states. There have also been a few intensive floristic studies of specific sites, but mostly covering no more than 10–20 acres (e.g., Harper, 1920; Schuster and McDaniel, 1973; Morris et al., 1993; Leidolf and McDaniel, 1998; Hill and Seltzer, 2007; Hill et al., 2009). There have also been some relevant unpublished theses and dissertations (e.g., MacDonald, 1996; Schauwecker, 1996).

There are a few particularly significant sites with good remnants of the native grassland, covering 100s of acres in some cases. Yet, apart from the Osborn Prairie in Oktibbeha, Mississippi (Hill and Seltzer, 2007), there have been virtually no published reports on the flora of these larger sites. In Alabama, the locations of such sites were recently documented in detail by Schotz and Barbour (2009), and floristic data will become available with further field work (A. Schotz, pers. comm.). In Mississippi, no similar survey of remnants exist, though ongoing work by Barone and Hill (2007), H. Sullivan (pers. comm.) and others is leading to a much better picture.

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The subject of this paper is Pulliam Prairie, in Chickasaw County, which was recently ‘discovered’ (in biological terms) by Daniel Coggin (Wildlife Mississippi), John Gruchy (Mississippi Dept. of Wildlife, Fisheries and Parks), Heather Sullivan (Mississippi Natural Heritage Program) and others. It is among the most significant sites for native vegetation in the Black Belt of Mississippi. Our purpose here is to document all vascular plants.

Because the flora of this region is not yet thoroughly documented, it was anticipated that there would be considerable difficulties in the taxonomy and nomenclature of some plants. A central theme of this paper is to provide notes on these problems, and to seek clarification from herbaria and the literature. Accompanying papers undertake a general review of the region’s soils and vegetation types (Campbell and Seymour, 2011a), and present a survey of the vegetation types at Pulliam Prairie (Campbell and Seymour, 2011b). The classification system for vegetation types in those two papers (sequenced there under headings with “a” to “o”) is cross-referenced to some of the information presented below, especially ecological codes for species in the Appendix.

METHODS

We made six trips for collection at the Pulliam Prairie in 2009, covering 14 days: April 20–21, June 6–8, July 10–12, August 22–24, September 24–25 and October 28. During each trip, except the last, we covered the study area using an electric Stealth Predator XR vehicle for transport and a platform to work on. We made herbarium collections of all vascular plant taxa—species, varieties and hybrids—that we observed at the site and along the unpaved access road, with duplicates (or more) in about 95% of cases.

One of us (RS) mounted 1,165 herbarium sheets, including 535 collections and about 449 species or varieties. The primary set of these collections is being deposited at the herbarium of the University of Mississippi in Oxford. A secondary set remains with Wildlife Mississippi, our non-profit partner in this venture.

On each trip we visited most or all sections of the study area, defined as 15 grid units of 1000 x 1000 feet [305 x 305 m]. We made notes on the presence and abundance of each plant taxon within each grid unit. We mapped populations of most rare species more precisely, using detailed aerial photographs from USDA (MARIS 2009), with an accuracy of 10–100 feet [3–30 m]. Based on our general description and mapping of vegetation types at the site (Campbell and Seymour, 2011b), we assigned five-point rankings for each species along the two major ecological gradients (see Appendix): upland versus lowland (A to E); and closed versus open vegetation (1 to 5).

Nomenclature primarily follows the list of vascular flora in Mississippi that is being developed at the Pullen Herbarium in Oxford (McCook and Kartesz, 2010), based partly on Kartesz (1999). However, for several taxa we offer alternative names based on continuing revision, especially Flora of North America (1993–2009), Weakley (2010), and ongoing research by JC at several herbaria. In the Appendix, after our preferred alternative names, those names used by McCook and Kartesz are listed in parentheses.

Standard herbarium acronyms for the herbaria visited are as follows: APSU = Austin Peay State University (Clarksville, Tennessee); GA = University of Georgia (Athens); IBE = the Institute for Botanical Exploration (of Sidney McDaniel, near Starkville, Mississippi); MISS = University of Mississippi (the Pullen Herbarium at Oxford); MISSA = Mississippi State University (Starkville); MMNS = Mississippi Museum of Natural Science (Jackson); MO = Missouri Botanical Garden (St. Louis); MU = William Sherman Turrell Herbarium (Miami Univ., Ohio); NCU = University of North Carolina (Chapel Hill); OS = Ohio State University (Columbus); TENN = University of Tennessee (Knoxville); US = U.S. National Herbarium, Smithsonian Institution (Washington, D.C.); USCH = University of South Carolina (Columbia); WVU = West Virginia University (Morgantown).
Figure 1 (see previous page). Location of Pulliam Prairie in relation to the Black Belt and Upper East Gulf Coast Plain (UEGCP). Mapping of the UEGCP comes from The Nature Conservancy (1999; based on R. Bailey of USFS); southern boundaries are somewhat arbitrary. Mapping of calcareous parent material comes from the digitization by USGS (2005) for Mississippi (Moore, 1985) and other southeastern states. The only strata included here have “carbonate” or “limestone” as the primary rocktype, and lie within the UEGCP or its southern transitions. Mapping of historical blackland prairies across the UEGCP comes from Barone (2005a,b; together with his shared shapefile). The Black Belt is often defined as the arc of Cretaceous land that includes calcareous soils, with historical prairies, in northeast Mississippi and central Alabama. Note, however, that there is also an outer calcareous arc of Paleocene age, and there are minor extensions or disjunctions of calcareous material with various ages in Tennessee and Georgia.

RESULTS

Collections of 448 taxa—435 species plus 13 additional varieties—were made at this site of about 250 acres [100 ha]; these taxa are listed in the Appendix. They are classified into 234 genera and 74 families. Only 33 species are clearly alien, with origins only outside North America (Table 1). Another 17 may be post-settlement adventives from southern or western regions within North America, or have uncertain status, based on general knowledge (e.g., Weakley 2010). The list includes 91 composites (Asteraceae), 83 grasses (Poaceae), 36 legumes (Fabaceae, sensu lato), and 28 sedges or allies (Cyperaceae). There are remarkably few Pteridophytes (with one in Aspleniaceae, one in Ophioglossaceae, and one in Polypodiaceae), Brassicales (with one native and one alien in Brassicaceae), Caryophyllales (with one alien in Caryophyllaceae), or Ericaceae (with one in nearby upland woods). The list has 73 woody species, including 30 large trees, 27 smaller trees or shrubs, and 16 vines.

Notes on Taxonomy and Nomenclature. The taxa listed below have been assigned names in this paper that have had little or no prior usage in Mississippi (e.g., by McCook and Kartesz, 2010), or that have had little consistent usage across southeastern states (e.g., see notes of Weakley, 2010). Most of these taxa have been somewhat controversial segregates of more broadly interpreted taxa, or there has been confusion in nomenclature that is now resolvable. However, in a few cases distinction is clear but the appropriate name remains uncertain or the plant is undescribed. In the following list of 29 taxa, preferred names are listed first, then the usual synonyms are provided in brackets after “=” if there is reasonably clear equivalence.

Amorpha croceolanata Wats. [= A. fruticosa var. croceolanata (P.W. Wats.) P.W. Wats. ex Mouille; or often included with typical fruticosa].

Nomenclature follows Small (1933) and Gleason (1952). This taxon is centered in the lower Mississippi Valley and appears to be generally distinct from most other fruticosa in Mississippi, Tennessee and Kentucky. Its legumes have short stramineous hairs (versus glabrous), and tend to have fewer prominent glands or none (versus several). Its leaflets are relatively large (mostly 2.5–6 × 1–4 cm versus 1.5–4 × 0.5–1.5 cm), and less elongated (l/w = ca. 2–2.5 versus 2.5–3). Lower leaf surfaces, as well as young stems, have dense to scattered, long-sinuous spreading, pale stramineous hairs (versus usually with shorter, more appressed, greyish-white hairs or glabrate); they are not clearly glaucous (versus often glaucous), and tend to have fewer prominent glands or sometimes none (versus consistently prominent). Mature, flowering stems are generally shorter (mostly 1–2 m versus 1.5–5 m). Plants mostly occur on base-rich, clayey soils along relatively small streams or on adjacent terraces, often persisting into partial shade. In contrast, typical fruticosa in southeastern states mostly occurs along the open, scoured banks of larger streams and rivers, often with much sand.
Andropogon tenuispatheus (Nash) Nash [= A. glomeratus (Walt.) B.S.P. var. pumilus (Vasey) L.H. Dewey; or often included with glomeratus]. Nomenclature follows Weakley (2010), who modified the revision of C. Campbell (1983). This segregate of the glomeratus-virginicus complex is widespread and often weedy across southern states, especially on damp base-rich soils. Typical glomeratus is more eastern, with concentration on damp acid soils, and in Mississippi it is known only from a few southern counties. As discussed by Weakley, the two taxa are easily confused but they can be considered distinct species.

Andropogon virginicus L. var. decipiens C. Campbell [generally included with the species in previous treatments]. Based on C. Campbell (1986; and in FNA, 2003, Vol. 25) and Weakley (2010), most or all virginicus at the Pulliam Prairie is referable to var. decipiens. In addition to their distinctively narrow inflorescences, these plants are generally less robust and more slender than typical virginicus of east-central states, and old stems do not develop the distinctive orange-yellowish hue of typical virginicus in winter. Var. decipiens has been documented mostly in more eastern states, from Florida to Virginia, but it may be much more widespread. It was the only variety reported by Echols and Zomlefer (2010) from the blackland prairies of central Georgia. Further revision of Andropogon is needed in the lower Mississippi valley.

Carex cf. normalis Mackenzie.

This is a largely northeastern species of submesic woodlands with virtually no definitive record from Mississippi (C. Bryson, pers. comm.). Pending further research, our collections are tentatively distinguished from the closely related C. molesta Mackenzie ex Bright, which is a largely midwestern species that has been recorded from several locations in grasslands across the Black Belt of Mississippi and Alabama (Bryson et al., 1992; USDA, 2010). The plants from Pulliam Prairie have been difficult to identify, even with the most recent treatment (FNA, 2002, Vol. 23), and there are similar, puzzling collections from southeastern states: P. Hyatt-11,068/69/70 from Searcy Co., Arkansas; R. Kral-52,746 from Cheatham Co., Tennessee; and old sheets of Beyrich or Chapman from near Rome, Georgia (all at MO). The perigynia of these plants are relatively narrow in some cases, indicating normalis, but in some features they resemble molesta. Plants at Pulliam Prairie are locally common, but only on damp toeslopes and bottoms, transitional from grassland to relatively wet riparian woods, with some plants persisting into the shade of green ash and sugarberry. In contrast, molesta generally occurs in more open grassy vegetation, and often on drier soils. These plants at Pulliam Prairie were the only representatives of Carex section Ovales collected at the site. Others to be expected in Black Belt grasslands include: C. brevior (Dewey) Mackenzie ex Lunnell, another midwestern species typical of open, damp to dry calcareous or sandy sites; C. festuacea Schkuhr ex Wild., a widespread eastern species of open, wet areas on more acid soils; and C. longii Mackenzie, a largely southeastern species of seasonally damp acid soils (FNA, 2002; C.T. Bryson, pers. comm.).

Dichanthelium joorii (Vasey) Mohlenbrock [= Panicum joorii Vasey; D. commutatum (Schultes) Gould ssp. joorii (Vasey) Freckmann & Lelong]. Nomenclature here follows Mohlenbrock (1985), who recognized the distinct habitat of this species, in damp bottomland woods of southeastern states, and provided consistent characters that distinguish it from D. commutatum, which is typical of drier sites. Despite the attempts of Mohlenbrock and D. Ladd (pers. comm.) to revive interest in this taxon, there has continued to be rather incomplete treatment (e.g., FNA, 2003, Vol. 25) or neglect (e.g., Weakley, 2010) in most recent floras.

Elymus glabriflorus (Vasey) Scribn. & Ball [= E. virginicus L. var. glabriflorus (Vasey) Bush; or often included with typical virginicus]. Nomenclature follows Campbell (2002; and in FNA, 2007, Vol. 24). E. glabriflorus is widespread across southeastern states, usually in thin woodlands and grasslands on seasonally dry soils. Typical virginicus is a much more widespread eastern taxon, usually in seasonally damp woods and thickets. Both species are common across Mississ-
ippi, and locally abundant at the Pulliam Prairie. Occasional hybrids do occur, but none were found at this site. Most or all glabriflorus at the site is referable to the relatively smooth var. glabriflorus.

Eupatorium pubescens Muhl. ex Willd. [= E. rotundifolium L. var. ovatum (Bigelow) Torr.; or included within rotundifolium].

Nomenclature follows Small (1933), Fernald (1950) and Weakley (2010). This polyploid taxon is considered to have originated from hybridization of typical rotundifolium and another species—perhaps E. semiserratum DC; but neither of those putative parents is known from the Black Belt of Mississippi. E. pubescens is widespread in grasslands on acid soils across southeastern states, where it has generally been known as E. rotundifolium var. ovatum (K.C. Siripun and E.C. Schilling in FNA, 2006, Vol. 21). However, it may be uncommon to absent in the longleaf pine belt from southern Mississippi to eastern North Carolina, where it is replaced by typical rotundifolium (Weakley, 2010; and associated mapping at NCU, Chapel Hill). Accurate range-wide mapping of these two taxa is not yet available.

Eupatorium torreyanum Short & Peter [= E. hyssopifolium L. var. laciniatum Gray; or included within hyssopifolium].

Nomenclature follows Small (1933) and Weakley (2010). This polyploid taxon is considered to have originated from hybridization of E. hyssopifolium and another species—perhaps E. semiserratum DC. or E. altissimum L. It is widespread in southeastern states, where it has generally been known as E. hyssopifolium var. laciniatum (K.C. Siripun and E.C. Schilling in FNA, 2006, Vol. 21). There has not yet been a definitive mapping to compare ranges of the two taxa. E. torreyanum may be relatively sensitive to xeric conditions (Weakley, 2010); it is much less common than typical hyssopifolium at the Pulliam Prairie.

Fraxinus smallii Beadle [generally included with F. americana L. by previous authors].

Nomenclature follows Nesom (2010), who updated the reasonable evidence for dividing americana into three taxa: americana (2n = 46); smallii (2n = 92); and bilmoreana (2n = 138). F. americana, sensu stricto, has a relatively northern range and is generally rare to absent on the Coastal Plain of southeastern states. The other two species are widespread across southeastern states, and overlap broadly in range with americana.

Gaura longiflora Spach [= G. biennis L. var. pitcheri Torr. & Gray; or often included with G. biennis].

Nomenclature follows Raven and Gregory (1972). All of the Gaura examined at Pulliam Prairie is longiflora, though G. filipes Spach may also be expected on xeric sites in the Black Belt (Barone and Hill, 2007). There has been much confusion between the largely mid-western longiflora and the more northeastern biennis. Based largely on collections at MISS, longiflora is widely distributed over much of Mississippi, but biennis is known only from a few northern counties (including Lee, Lafayette and Marshall). Although some hybridization is suspected where ranges overlap, almost all specimens examined from Kentucky, Tennessee and Mississippi are readily assignable to one species or the other. Further south, there has also been confusion with G. angustifolia Michx., which is largely restricted to sandy soils within 50-100 miles of the coast.

Gonolobus suberosus (L.) R. Brown var. granulatus (Scheele) Krings & Q.-Y. Xiang [= Matelea suberosa (L.) Shinners, sensu lato; G. gonocarpus (Walt.) Perry, sensu lato].

Nomenclature follows Krings and Xiang (2005; Krings, 2006) and Weakley (2010). There has been much confusion between this taxon of the lower Mississippi Valley and Gulf Coastal Plain, versus the more southeastern var. suberosus. Without fruit, these plants can also be confused with Matelea spp. Some non-flowering plants observed at the site may be M. obliqua (Jacq.) Woodson, but the collections are inadequate for identification.

Heliopsis gracilis Nutt. [= H. minor (Hook.) C. Mohr of Small (1933); = H. helianthoides (L.) var. gracilis (Nutt.) Gandhi & R.D. Thomas; or often included with helianthoides].

Nomenclature follows A.R. Smith (in FNA, 2006,
Vol. 21). This species occurs on the Coastal Plain from Louisiana to South Carolina, plus unconfirmed records from Oklahoma, Arkansas, and Texas (Small, 1933; FNA, 2006; USDA, 2010; Weakley, 2010). It appears to be uncommon or rare in all of these states, except perhaps Louisiana. There has been some confusion with typical *helianthoides*, which is rare to absent on the Coastal Plain, except perhaps in Louisiana. West of the Mississippi River, there has also been some confusion with *H. helianthoides* var. *scabra* (Dunal) Fern. Typical habitats for *gracilis* include relatively mesic woods of various types on base-rich soils (see also Weakley, 2010), but may also include “open wooded slopes, especially with pines” (FNA, 2006).

*Houstonia lanceolata* (Poir) Britt. [= *H. purpurea* L. var. *calycosa* Gray; *Hedyotis purpurea* (L.) Torr. & Gray var. *calycosa* (Shuttleworth ex Gray) Fosberg].

Nomenclature follows Small (1933) and Fernald (1950). This taxon is typical of thin woodland and rocky glades on dry calcareous soils in midwestern regions. There is some local intergradation with typical *purpurea* (Terrell, 1996), a more eastern plant typical of more shady habitats on relatively moist, acid soils. But experience in Kentucky, Tennessee, and Mississippi indicates that *lanceolata* is a reasonably distinct species.

*Lysimachia* aff. *ciliata* L.

*L. ciliata* is a variable species, widespread across eastern and central North America. The only *Lysimachia* found at Pulliam Prairie was one small, deer-browsed patch in thin damp riparian woods of sugarberry and green ash. It resembles typical *ciliata*, but has distinct features shared with several other collections examined in herbaria (mostly at NCU). These collections are from scattered sites across the southeastern range of *ciliata*, especially in swampy woodlands on clayey soils of the Gulf Coastal Plain. They are relatively short plants (mostly 3–9 dm versus 7–13 dm) that tend to have narrower leaf blades (mostly 1.5–3 cm wide versus 4–6 cm, and with leaf/width ca. 3–4 versus 2–2.5), inflorescences averaging smaller and with less branching into subverticillate clusters, flowers averaging smaller, with more sharply dentate petals, and with less conspicuous sepal venation. These plants may deserve taxonomic recognition, or perhaps just represent transitions to *lanceolata*. The potential for fertile hybrids among species of *Lysimachia* section *Seleucia* (= genus *Steironema*) is well known, but further documentation is needed from the field (Fernald, 1950; Coffey & Jones, 1980; Weakley, 2010). Also, more chromosome counts are needed. Each of these species contains diploids (2n = 34), but *ciliata* has diploids reported only from southeastern states and it typically has much higher numbers (2n = 92–112).


At the Pulliam Prairie, some non-flowering plants in riparian woods have completely glabrous internodes and somewhat bushy branching, indicating *frondosa* or *bushii*, as opposed to other species of the genus known from Mississippi (P.M. Peterson in FNA, 2003, Vol. 25). *M. frondosa* is widespread in riparian woods from the mid-west to northeastern states, and *bushii* is a closely related species of damp woods that occurs mostly in midwestern states. Both species are virtually unknown in Mississippi or elsewhere in southeastern coastal states: *frondosa* was mapped by FNA in one county each of Mississippi and Alabama, and *bushii* was mapped in one northern county of Georgia. However, these two species have often been confused with each other, or with two other species that were found in small numbers within woods at the Pulliam Prairie: (a) *M. sylvatica* (Torr.) Torr. ex Gray, which is a more widespread eastern species of more mesic woods that is scattered over northern Mississippi, Alabama and Georgia; and (b) *M. glabriflora* Scribn., which has a similar range to *bushii* but occurs in more seasonally xeric woods. Further complicating the situation are possible hybrids, including awned plants known as *M. frondosa* f. *commutata* (Scribn.) Fern. that appear somewhat intermediate between *frondosa* and *bushii*. In herbaria, identification of *frondosa* is confirmed here from Tunica Co. (MISS), and *commutata* is tentatively identified from Central Grove, Monroe Co. (MMNS), about 10 miles NE of the Pulliam Prairie. Also, *bushii* is confirmed.

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Rubus calcareous soils and it is unknown in Mississippi. *R. serissimus* bifrons seasonally dry or rocky ground typical of damp cultivated soils typical of *R. discolor*.

Onosmodium hispidissimum Mack. [= *O. molle* Michx. ssp. *hispidissimum* (Mackenzie) Boevin; *O. bejariense* DC. ssp. *hispidissimum* (Mackenzie) B.L. Turner]. Nomenclature follows Small (1933), Weakley (2010) and others (see citations of Weakley), but taxonomy within this genus has been somewhat unsettled. *O. hispidissimum* is a largely mid-western plant typical of relatively moist or fertile soils, often now in agricultural uses, and it has declined much after 1950 with the spread of tall fescue. At the Pulliam Prairie, a few dozen plants were found at scattered sites, most frequently on lower calcareous slopes. Typical *O. molle* [ssp. *molle*] and *O. occidentale* Mack. [= *O. molle* ssp. *occidentale* (Mack.) Cochrane] have also been reported from the Black Belt or nearby in western Alabama (USDA, 2010). Typical *molle* occurs mostly in the rocky cedar glades of central Tennessee; *occidentale* occurs mostly on dry sites in the Great Plains.

Panicum gattingeri Nash [= *P. philadelphicum* Bern. ex Trin. ssp. *gattingeri* (Nash) Freckmann & Long; = *P. capillare* L. var. *campestre* Gattinger]. Nomenclature follows Small (1933), Fernald (1950), Weakley (2010) and others. It is easy to confuse capillare, gattingeri, philadelphicum and flexile in the field, where they are often intermixed, and there may be genetic intergradation in some cases; 2n = 18 in all species. However, *gattingeri* is usually distinct and typically occurs on calcareous soils in intermediate habitats, between the damp cultivated soils typical of capillare and the seasonally dry or rocky ground typical of flexile. *P. philadelphicum* is typical of seasonally dry, non-calcareous soils and it is unknown in Mississippi.

*R.* aff. *serissimus* Bailey [= misapplied *R. bifrons* Vest or *R. discolor* Wiehe & Nees].

The correct name for this species remains uncertain, pending completion of *Rubus* for Flora of North America and associated ongoing research by L. Alice, D. Goldman, G. Yatskievych, and especially M. Widrlechner (pers. comm.). This blackberry has thin to dense gray-brown pubescence on lower leaf leaf surfaces; stems are erect at first but usually overarching, and sometimes trailing with rooting tips; plants are rarely more than 2 m tall. It has been often misidentified as the more robust alien, *bifrons*, using treatments of Gleason and Cronquist (1991) and others; *bifrons* itself has sometimes been broadly defined to include *R. armeniacus* Focke. *Rubus* aff. *serissimus* may have recent hybrid origin, and is probably at least partly alien in southeastern states, where it has become widely scattered and locally abundant during recent decades, especially along rights-of-way. “It can be quite aggressive, often forming impenetrable thickets” (as “*R. longii* Fern.” in draft of FNA Vol. 9). At the study area, it was found only near the paved road west of the chalk grassland.

*Rudbeckia* aff. *tenax* C.L. Boynt. & Beadle [R. *tenax* itself is often included in *R. fulgida* Ait., sensu lato, but it is probably closer to *R. speciosa* Wenderoth].

The treatment used here is developed from Small (1933) and Fernald (1950), based on extensive work in the field and herbaria (J. Campbell, in prep.). The *fulgida-speciosa* group contains diverse morphological types that have been variously named. Small and Fernald recognized 12 and 9 species, respectively, but L.E. Urbatsch and P.C. Cox (in FNA, 2006, Vol. 21) recognized only two species, with *fulgida* divided into seven varieties. Based on research at several herbaria, the taxon at Pulliam Prairie is largely restricted to swales and lowlands in blackland prairies of Mississippi and Alabama, with outlying records from Tennessee. It appears to be an undescribed species closely related to *tenax*, which occurs more widely across southeastern states, usually on drier or rockier calcareous soils. Both taxa share the following characters: paleas largely eciliate; distinct stoloni-ferous offsets produced; basal and lower cauline leaves ca. 2–5(–7) cm long and 1–2(–2.5) cm wide. The blackland plants differ from *tenax* as follows: heads opening mostly in early August to
mid-September (versus mid-July to mid-August), usually solitary at first but often adding 2–5+ later, on long or short peduncles mostly 10–30 cm above lowest node of inflorescence (versus usually 2–7, on long peduncles mostly 30–50 cm above lowest node of inflorescence); larger mid-stem leaves usually ascending and forming an overlapping cluster of 8–12 along 10–15 cm of stem (versus usually spreading, not distinctly clustered), mostly 2–4.5 cm wide (versus 1–2.5 cm), with l/w ca. 3–6 (versus 4–10), their distinct petiolar bases 4–8(–14) mm wide with almost parallel sides (versus less distinct, 2–4(–8) mm wide, tapering); stems and leaves rough-hirsute with spreading pustulate hairs, somewhat bluish green (versus pilose with soft hairs, usually plain green).


There has been confusion among plants known as *caroliniensis, ciliosa* and *humilis*. The provisional usage here follows Small (1933), who applied the name *ciliosa* to plants with stems 2–6 dm tall and hirsute (versus 1–3 dm and hirsute to almost glabrous on upper internodes in *humilis*); with “leaf-blades sessile or essentially so” (as in *humilis*, not “manifestly petioled” as in other taxa that have been combined with *caroliniensis*); and with corollas tending to be longer (usually ca. 5–7 cm versus 4–5 cm in the other taxa). Treatments have varied significantly: Fernald (1950), Gleason and Cronquist (1991), Wasshausen (1998), Ward (2007), and Weakley (2010). It remains possible that the “ciliosa” of less calcareous soils at Pulliam Prairie is typical *humilis*, and that the shorter, sprawling, smoother plants on dry calcareous soils—here named “humilis”—should be considered a distinct species that includes *R. humilis* var. *calvescens* Fern. Further revision is needed.

**Schizachyrium scoparium** (Michx.) var. *divergens* (Hack.) Gould [= ssp. *divergens* (Hack.) Gandhi & Smeins, or often included with *scoparium*; ? = *S. villosissimum* (Kearney) Nash].

Nomenclature follows J.K. Wipff (in FNA, 2003, Vol. 25). This taxon occurs mostly in the lower Mississippi River watershed and along the Gulf Coast, especially in pinelands. However, the full extent of its range remains somewhat uncertain. Wipff reported that it does intergrade with var. *scoparium*. At the Pulliam Prairie, var. *divergens* was found in just one patch, ca. 100 ft [30 m] across, on clayey soil above the chalk outcrops.

**Silphium glabrum** Eggert ex Small [probably = *S. trifoliatum* L. var. *latifolium* Gray].

Nomenclature follows Small (1933) and G.L. Nesom (pers. comm.). There has been much confusion between these plants and *trifoliatum*, both of which have both included within *S. asteriscus* L. by some authors (e.g., J.A. Clevinger in FNA, 2006, Vol. 21), and there may be some intergradation. There has also been confusion with less hairy forms of *S. integrifolium* Michx. Typical *glabrum* appears largely restricted to calcareous regions of the southern Appalachians, southern Interior Low Plateaus, and blacklands of the Coastal Plain, while typical *trifoliatum* occurs mostly in the Interior Low Plateaus and the valleys of Appalachian regions. *S. glabrum* differs primarily in having leaves all opposite (versus often trifoliate, at least below), and relatively broad (mostly 2–5 cm versus 1–3 cm). Also, lower leaf surfaces (except main veins) and stems are usually smooth to slightly scabrid (versus often scabrous-hispid), and plants are often relatively short. Other members of this complex have been reported from Black Belt grasslands, but need to be verified: *S. confertifolium* Small in Alabama and perhaps Mississippi (Leidolf and McDaniel, 1998); *S. asteriscus* L. in Alabama (Schuster and McDaniel, 1973). In their extensive survey of Alabama’s remnants, Schotz and Barbour (2009) indicated only *glabrum* (as “asteriscus var. latifolium” or “southern rosinweed”), and made no reference to *integrifolium*.

**Silphium integrifolium** Michx. aff. var. *laeve* Torr. & Gray [= *S. speciosum* Nutt., ?*S. trachopus* Raf.].

Usage here follows J.A. Clevinger (in FNA, 2006, Vol. 21), and to some extent previous authors (Fernald, 1950; Cronquist, 1980), but uncertainty remains. Typical *integrifolium* is a widespread mid-western plant that is uncommon to absent in south-
eastern states (Weakley, 2010). Segregates have been treated in varied ways, and different emphases placed on the supposed characters of var. *laeve*: glaucous stems, less hairy condition in general, heads with more ray and disc florets. G. Nesom (in prep.) considers that var. *laeve* is a species, primarily of the central Great Plains. Reports from Kentucky (Jones, 2005) and Tennessee (Cronquist, 1980) remain uncertain. Plants at Pulliam Prairie and elsewhere in Mississippi appear to be at least transitional to var. *laeve*, but further revision is needed. The situation is complicated by potential intergradation with *S. glabrum* (see above); *S. integrifolium* var. *gattingeri* Perry may represent intermediate plants. Another segregate has recently been described from the Black Belt of central Alabama—the distinctly glandular *S. perplexum* J. Allison (Allison and Stephens, 2001), but this needs further comparison with the largely midwestern var. *deamii* Perry (Fernald, 1950).

*Solidago rigida* L. var. *glomerata* E.L. Braun [= *S. jacksonii* (Kuntze) Fern.; *Oligoneuron ridigum* (L.) Small var. *glomeratum* (E.L. Braun) Nesom; or included with *S. rigida*].

Nomenclature follows Gleason and Cronquist (1991) and Weakley (2010), though species status may be justified. Var. *glomerata* has often been confused with typical *rigida* in reports from Mississippi. It is widely scattered over southeastern states, but generally restricted to native grassland remnants and rocky glades. In Mississippi it may be known only from counties of the Black Belt (at least Chickasaw and Oktibbeha at MMNS) and the Jackson Prairie (at least Clarke and Jasper at MMNS). At the Pulliam Prairie, only ca. 10 plants (or clonal patches) were observed, largely restricted to dry chalk grassland. Var. *rigida* has a broader northern range, being a common plant in good remnants of the original mid-western prairies. In Mississippi, it is known only from northern counties, mostly in the Black Belt (Clay, Chickasaw, Lee and Tate at MMNS), and it is locally abundant at the Pulliam Prairie. The closely related species, *S. nitida* Torr. & Gray, has a more southwestern range, and in Mississippi it is known mostly from southern counties (Greene, Hancock, Pearl River and Stone at MMNS). But *nitida* was also found at the Pulliam Prairie, with a few plants scattered mostly in dry grassland on clayey soils above the chalky slopes.

*Solidago speciosa* Nutt. var. *rigidiuscula* Torr. & Gray [= *S. rigidiuscula* (Torr. & Gray) Porter; or generally included with *S. speciosa*].

Nomenclature follows most recent treatments (e.g., J. Semple and R. Cook in FNA, 2006, Vol. 20), but species status deserves further consideration, following Small (1933). Var. *rigidiuscula* is a rather distinct taxon has often been overlooked. It has a broad mid-western range, and usually occurs in grassland; 2n = 18. Typical *speciosa* is more eastern, from the Ozarks to the Appalachians and mid-Atlantic states, and usually occurs in thin woods, thickets and edges; 2n = 18, 36 and 54. Although typical *speciosa* has been reported from Louisiana, Mississippi, Alabama and Georgia, there appear to be virtually no verified collections from those states (USDA, 2010).

*Sporobolus compositus* (Poir.) Merr. var. *drummondii* (Trin.) Kartesz & Gandhi [= *S. asper* (Michx.) Kunth. var. *drummondii* (Trin.) Vasey; or often included with species].

Nomenclature follows P.M. Peterson et al. (in FNA, 2003, Vol. 25). Var. *drummondii* occurs mostly on dry calcareous soils in south-central states, especially west of the Mississippi River. It may be locally abundant in Tennessee, Mississippi, Alabama and Georgia (USDA, 2010), but further verification is needed. In Mississippi, var. *drummondii* appears largely restricted to the Black Belt and Jackson Prairie; it is locally abundant at the Pulliam Prairie. Var. *compositus* [= *S. asper var. asper*] is much more widespread across North America but rare to absent on the Coastal Plain from Mississippi to Virginia (Kartesz, 1999, and distributed updates; USDA, 2010; Weakley, 2010). In Mississippi, var. *compositus* may be known only from the Jackson Prairie (USDA, 2010). Further review of collections is needed to separate these two taxa in southeastern states.

*Symphyotrichum dumosum* (L.) G.L. Nesom var. *subulifolium* (Torr. & Gray) G.L. Nesom [= *Aster dumosus* L. var. *subulifolius* Torr. & Gray; or often
included with the species]. Nomenclature here follows Small (1933), Fernald (1950), Nesom (1997) and Weakley (2010). This taxon occurs in dry sites on the Coastal Plain from east Texas to Maine. It is common at Pulliam Prairie, especially on dry clayey soils. Typical var. dumosum has a more widespread southeastern range, and occurs on relatively damp, as well as dry, non-calcareous soils. At Pulliam Prairie var. dumosum is largely restricted to high ground around the post oak woods and nearby edges. No plants were observed with intermediate morphology, supporting future recognition of these two taxa as distinct species.

**Symphyotrichum aff. patens** (Ait.) G.L. Nesom [**Aster patens** Ait.].

The treatment here is being developed from Jones (1980), Nesom (2006) and L. Brouillet et al. (in FNA, 2006, Vol. 20). **S. patens** has usually been treated as a complex species with two or more intergrading varieties. At the Pulliam Prairie, typical **patens** is largely restricted to thin oak woods on uplands with relatively acid soils. On more calcareous soils nearby, there are distinct plants with stems and leaves covered by minute stipitate glands, and some of these plants are much less hairy than typical **patens**. This general glandular condition has not been well-documented before in **patens**, but it is typical of most other species in Series *Patentes*. Leaves of these glandular plants also differ from typical **patens** in having a somewhat bluish-waxy sheen; moreover, larger mid-stem leaves tend to have relatively low length-to-width ratios, and tend to be more crowded. The ultimate inflorescence branches usually have leaves abruptly reduced at the base, and remaining so above; in typical **patens**, there is usually more gradual or irregular reduction, often with larger leaves above the base. Based on an initial survey of herbaria, similar plants are known from blackland prairies, calcareous glades, associated road-sides and woodland edges in Alabama, Georgia, Mississippi, North Carolina, Pennsylvania, South Carolina and Tennessee. Most records are from the Black Belt in Alabama and Mississippi, but this taxon does extend east onto strips of calcareous soil on the Piedmont and Coastal Plain as far as North Carolina. Also, there a few records north to the southern edge of the Interior Low Plateaus in Alabama, and into the Ridge-and-Valley region as far as Pennsylvania. It seems reasonable to recognize these plants as a new variety, though in some cases collections appear transitional to typical **patens**. Based on Jones’ (1980) and Nesom’s (2006) initial mapping of chromosome numbers, it is possible that these plants are diploids (2n = 10) that have retained an ancestral glandular condition; most plants currently included within var. **patens** are tetraploids (2n = 20).

**Viola cf. missouriensis** Greene [= **V. sororia** Willd. var. **missouriensis** (Greene) McKinney].

This is the only taxon of **Viola** found at the Pulliam Prairie. Nomenclature here follows Fernald (1950), but is uncertain. The ‘stemless blue’ complex of violets has remained controversial, with varied recent treatments (e.g., McKinney, 1992; Weakley, 2010). **V. missouriensis** appears to be typical of damp alluvial woods in the central and lower Mississippi watershed. There has been virtually no published use of the name **missouriensis** in Mississippi, but there has been much confusion across east-central states with **V. affinis** Le Conte, a more eastern species that McKinney included within **V. sororia** var. **missouriensis**. Within Mississippi, plants similar to those at Pulliam Prairie have generally been called **V. affinis** in the north and locally **V. langloisii** Greene in the south (Small 1933). **V. affinis** is most similar to **missouriensis**, and if combined the epithet **langloisii** may have priority.

**Species with little or no prior record from Mississippi**. As listed above, several of the names employed in this paper have had little or no prior usage in Mississippi, but most of the taxa they represent are well known under synonyms. In contrast, the ten taxa listed below have little or no prior record in the state under any name. Most of them appear to be uncommon or rare, but some are common and have been confused with related species. Several of the less well-documented taxa noted in the previous section could well be added to this list of ten after further review of records: including **Andropogon virginicus** var. decipiens,
Carex cf. normalis, Schizachyrium scoparium var. divergens, Solidago speciosa var. rigidiuscula, Symphyotrichum dumosum var. subulifolium, plus the suggested new taxa in Lysimachia, Rudbeckia and Symphyotrichum.

Carex aureolensis Steudel
The first published record of this widespread southern species from Mississippi was the general reference by B.A. Ford and A.A. Reznicek in FNA (2002, Vol. 23). There has been virtually no further published documentation from the state, but most records of C. frankii Kunth on the Coastal Plain are referable to aureolensis (C.T. Bryson, pers. comm.). Although aureolensis was described in 1855, it was largely ignored for 150 years.

Carex crawei Dewey
This was first reported from Mississippi by T.S. Cochrane and R.F.C. Naczi in FNA (2002, Vol. 23), based on collections of C.T. Bryson (pers. comm.) from Chickasaw County and elsewhere, but it has not yet been mapped in the state by USDA (2010) or Heritage Programs (NatureServe, 2010). It is common at Pulliam Prairie, especially on seasonally damp ground that has been burned or driven over. C. crawei is a widespread species of seasonally damp calcareous openings across northern states and adjacent Canada, but it is rare to absent in southern states. It is a complex variable species with several isolated populations (2n = 38, 59, 60). Not found at Pulliam Prairie was the more robust, closely related southern species, C. microdonta Torr. & Hook. (2n = 64), which has been reported from the same county and elsewhere in the Black Belt (see above references). C. microdonta is easy to overlook in the field and potentially intermixed: “whether or not the two taxa are ecologically distinct is a matter awaiting study” (FNA, 2002).

Dichanthelium linearifolium (Scribn.) Gould
This was reported from Mississippi by Lowe (1921) but virtually no collections in herbaria have been documented. FNA (2003, Vol. 25) mapped only one (southern) county in the state, and few counties in adjacent parts of surrounding states. At Pulliam Prairie, the species is locally frequent in dry grassland and thin burned woods, especially on clayey soils just above the chalk.

Eleocharis compressa Sullivant
This species was first reported from Mississippi by FNA (2002), based on a collection of C.T. Bryson (pers. comm.). It has not yet been mapped in the state by USDA (2010) or by Heritage Programs (NatureServe, 2010). E. compressa is widespread in seasonally wet calcareous openings across North America, except in some western and southeastern states. It is a variable species; 2n = 24 or 26. At Pulliam Prairie, only one patch was discovered, and identified as var. compressa. The closely related species, E. bifida S.G. Smith, occurs on more rocky sites in Alabama, Georgia, Tennessee and Kentucky. The collection from Pulliam Prairie does have floral scales that are mostly bifid, especially in lower parts of the spike, but they are not as deeply bifid as bifida and they do not have the other characters of bifida (FNA, 2002).

Erigeron strigosus Muhl. ex Willd. var. calcicola J. Allison
This taxon has not been recorded before in Mississippi. It was recently described from limestone glades in Alabama, Georgia and Tennessee (Allison and Stephens, 2001; see also FNA, 2006, Vol. 20). Var. calcicola is a relatively short, slender perennial, with overwintering leafy tufts, as confirmed here by a transplant from the Pulliam Prairie to cultivation during 2009–2011. While typical var. strigosus is widely scattered at the Pulliam Prairie, var. calcicola is restricted to the driest sites, especially on crests of eroding banks above exposed chalk.

Erucastrum gallicum (Willd.) O.E. Schulz
This European weed has not been recorded before in Mississippi. It is widely scattered over northern states and adjacent Canada, but uncommon to rare in southern states, and still largely unknown on the southeastern Coastal Plain (USDA, 2010; Weakley, 2010; I.A. Al-Shehbaz in FNA 2010, Vol. 7). Only one plant was found within this study area, along the dirt road into the Pulliam Prairie.
Grindelia squarrosa (Pursh) Dunal
This adventive species from the west has not been recorded before in Mississippi. It is widely distributed across North America, but rare (KY, VA, TN, MS) to absent (LA, AL, GA, FL, SC, NC) in southeastern states (FNA, 2006; USDA, 2010). Its original range was probably centered in the Great Plains, but it has expanded to other regions during the past 100–200 years (FNA, 2006). At the Pulliam Prairie, it was found at a few sites in the more disturbed upland fields.

Helianthus pauciflorus Nutt. [= H. rigidus (Cass.) Desf., H. laetiflorus Pers. var. r. (Cass.) Fern.]
There is no prior published record of this taxon from Mississippi. Based on E. Schilling (in FNA, 2006, Vol. 21), pauciflorus is a widespread variable taxon of mid-western grasslands, but with few previous records from southeastern states. It is part of a hexaploid complex that includes the more western taxon described as H. subrhomboideus Rydb., as well as the more northern H. laetiflorus Pers., which has been widely cultivated and considered by some authors to result from hybridization of pauciflorus and tuberosus. Fernald (1950) treated all three taxa as varieties of laetiflorus, which remains reasonable. In herbaria of Mississippi, only one prior collection of this complex was found, and this is referable to typical pauciflorus: L.C. Temple-6870 [as “laetiflorus”], 29 Aug 1967 (MISS, MMNS); Yalobusha Co., dry roadside, State Highway 7 just N of Water Valley City limits. At the Pulliam Prairie, which is about 50 miles east of Temple’s locality, there are two large patches of plants that are similar, but highly variable in leaf width (ca. 1.5–5 cm), pubescence, flowering head size, and degree of redness in disc flowers. The plants are clearly native, with no evidence that they have escaped from cultivation. From ongoing review of mapping efforts (e.g., Kartesz, 1999; USDA, 2010) and search of herbaria (especially at NCU), pauciflorus is probably rare in other coastal states east of the Mississippi River, with collections from only a few counties in Alabama, Georgia, North Carolina, South Carolina and Virginia. Some collections appear transitional to typical laetiflorus or hybridized with other species.

Liatris squarrosa (L.) Michx. var. glabrata (Rydib.) Gaiser
There has been no prior record of this taxon from Mississippi or anywhere else east of the Mississippi River. Nomenclature here follows recent authors, but there is continuing uncertainty about segregates of the squarrosa complex. Var. glabrata occurs mostly in the central Great Plains, while var. squarrosa has been considered largely southeastern: “they might be treated as separate species” (G.L. Nesom in FNA, 2006, Vol. 21). The plants at Pulliam Prairie are abundant in native grassland, especially on more chalky soils. They are distinct from typical squarrosa in their completely glabrous stems, leaves and phyllaries; heads are usually fewer (mostly 1 to 5) and smaller on average, with moderately elongated, non-cuspidate phyllaries; plants are relatively tall (mostly 5–7 dm), and have relatively stiff leaves that do not twist as much as typical squarrosa. Typical var. squarrosa also occurs at the site, but it is much less common and largely restricted to upper levels with less calcareous soils. Also found at the Pulliam Prairie were three clumps of the apparent hybrid between L. squarrosa var. glabrata and L. spicata, which has not been previously reported, described or named. Further revision of the squarrosa complex is needed in this region. Other potential segregates include var. alabamensis (Alexander) Gaiser of the Gulf Coastal Plain, which appears somewhat intermediate between glabrata and typical squarrosa (Small, 1933; Gaiser, 1946; Correll and Johnson, 1970).

Panicum gattingeri Nash
There are no prior published reports from Mississippi. However, it is likely that some collections of this species have been confused with P. flexile or other species. See notes on nomenclature in the previous section.

Notes on Rare Species. Table 2 lists the 57 taxa (51 species plus 6 extra varieties) found at Pulliam Prairie that appear to be rare in the region, based on a broad floristic review. Many of these are not imperiled but do have significant interest as ‘watch-list’ or ‘conservative’ plants that can provide useful indications of ecological history. Just
over half of these taxa are composites (15), sedges and allies (9), or grasses (9); they also include five of the nine Orobanchaceae at the site. As summarized in Table 1, these rare taxa are concentrated among obligate grassland plants (17.2% of the 215 certain natives) and facultative grassland plants (15.3% of 72). Several others are typical of low riparian woods (12.5% of 64), but almost none are typical of upland oak woods (0 of 21) and thickets in general (1 of 28). Across the landscape in general (Table 1), rare plants are concentrated on chalk or lowlands (17.8% of 230) versus uplands above chalk exposures (9.4% of 170). The globally rare subset shows similar concentrations (Table 1). The following twelve plants at Pulliam Prairie appear to be truly imperiled in Mississippi, generally deserving ranks of S1 (‘endangered’) or S2 (‘threatened’).

**Agalinis auriculata** (Michx.) Blake
Occasional (5/15 grid units), but locally frequent, with 100s of plants in total. It occurs mostly in moderately tall grassland, especially at lower levels (vegetation types f or g1). Some of the densest patches occur in areas that have been farmed a few decades ago, and it is locally associated with fairly dense *Lespedeza cuneata*. In less disturbed brushy areas on moist to damp ground, it appears to be shaded out.

**Agalinis heterophylla** (Nutt.) Small ex Britt.
Rare, found at only one site, with only ca. 5-10 plants noted at the edge of a low plowed area, in transitions to wet brushy grassland (vegetation type g2, more or less).

**Ambrosia psilostachya** DC.
Widespread (10/15 grid units), and locally common, with 1000s of stems. It occurs in varied grassland types, but perhaps most common in transitions from chalk to overlying clays (vegetation types c1, e, f). This widespread perennial ragweed of western North America is infrequently reported from southeastern states, but it may have been overlooked (USDA, 2010; Weakley, 2010). Schotz and Barbour (2009) described it as a “native invasive species” in the Black Belt prairies of Alabama.

**Carex crawei** Dewey
Locally common (at least 6/15 grid units). It is largely restricted here to grassland on chalky soils, in xerohydric to moderately xeric soils (vegetation types f, e, d, g1).

**Eleocharis compressa** Sullivant
Rare, found at only one site, with a few plants covering no more than 1 m² in a damp swale draining from old fields on the uplands (vegetation type c2, more or less).

**Helianthus pauciflorus** Nutt.
Infrequent (2/15 grid units), but locally common, with 100s of stems in several clonal patches. It is largely restricted to reddish clayey soils just above more chalky slopes, at edges of post oak or blackjack oak woodland and in adjacent grassland (vegetation types h1, b, f). See notes on regional distribution above.

**Liatris squarrosa** (L.) Michx. var. glabrata (Rydb.) Gaiser
Locally abundant in chalk grassland (10/15 grid units). See taxonomic notes above; this paper provides the first report for Mississippi, but the plant will probably be discovered at other sites within the northern Black Belt, and in herbaria.

**Muhlenbergia glabriflora** Scribn.
Rare, found only at only one site, with less than 10 stems noted. This species is restricted to thin oak woods on reddish clayey soils above chalky slopes (vegetation type b). It is possible that *M. frondosa* or *M. bushii* should also be considered imperiled in the state; see taxonomic notes above.

**Prenanthes aspera** Michx.
Scattered widely (at least 5/15 grid squares), and locally frequent, with ca. 100–200 stems noted. It is restricted to grassland, typically on moderately deep soils and less often at dry or damp extremes, but perhaps most frequent alongside dirt roads (especially vegetation types e, f, g).

**Solidago rigida** L. var. rigida
Widespread (11/15 grid units) and locally common. This is the dominant forb in some of the
better remnants of moderately tall grassland on lower slopes (vegetation types f, g1).

**Solidago speciosa** Nutt. var. *rigidiuscula* Torrey & Gray

Rare, noted at only one site, with ca. 5–10 plants. It is restricted to edges of thin oak woods on reddish clay soils above chalk (vegetation types b, ?f).

**Symphyotrichum ericoides** (L.) G.L. Nesom

Occasional (at least 3/15 grid units), with only ca. 10–20 plants noted, but probably overlooked earlier in the season. It is restricted to grassland and brushy edges, especially on clayey soils just above chalky slopes (vegetation types f, ?c1, ?h1).

**Notes on Alien Species.** The 33 clearly alien species, plus the 17 species with adventive or uncertain status, are concentrated in grassland or other non-woody vegetation (Table 1). Among plants largely restricted to full sun (250 taxa), 14.8% are clearly alien (28) or adventive/uncertain (9). Among plants of transitional habitats and deeper woods (198 taxa), only 6.6% are clearly alien (5) or adventive/uncertain (8). There is also some concentration of aliens plus adventives on uplands above the chalk exposures: they comprise 15.2% of typically “upland” taxa versus 8.0% of typically “chalk/lowland” taxa (Table 1). About 13 of all 50 aliens plus adventives are largely restricted to the access roads west of the main study area (coded “nea” in the Appendix). Almost half of the aliens plus adventives are grasses (14) or legumes (9). The composites include only two certain aliens but four with potential adventive status.

There is uncertainty about the native or alien status of some species, as indicated by asterisks at left margin in the Appendix. Among the most frequent of these species, Osage orange (*Maclura pomifera*) has generally been considered adventive from west of the Mississippi River. However, there is recent archaeological and entomological evidence that this tree was present in the Black Belt of Mississippi before European settlement (Brown, 2003; J.L. Seltzer and J.G. Hill, pers. comm.). The silvery bluestem grasses (*Bothriochloa* spp.) may be adventive from south-western regions, but their status remains somewhat unclear (FNA, 2003, Vol. 25; compare Weakley, 2010). They are locally frequent, especially on disturbed soil, and deserve deeper study as potential problems.

The following fourteen aliens are locally frequent at the Pulliam Prairie or present a significant invasive threat for the future. The three species indicated by asterisks (*) are currently the most common and persistent aliens in more native vegetation at this site.

**Bromus japonicus** Thunb. ex Murr.

This annual Eurasian grass (a ‘cheat’ or ‘chess’ grass) is widespread on disturbed ground and locally abundant, especially in recently plowed areas. It is possible that the closely related European species, *B. commutatus* L., is also present or intergrades with *japonicus*.

**Cynodon dactylon** (L.) Pers.

This creeping perennial grass (Bermuda-grass) from warm regions of Eurasia was found only along the access road into the prairie. It has been widespread and locally problematic in natural areas of southeastern states for over a century, but it does not appear to be a persistent invader of drier native grassland within the Black Belt (Schotz and Barbour, 2009; Campbell and Seymour, 2011a,b).

**Festuca arundinacea** Schreb.  
[*F. elatior* L. var. *arundinacea* (Schreb.) Wimmer; = *Schedonorus phoenix* (Scop.) Holub]

This perennial European grass (tall fescue) is widely scattered at the site and locally frequent, especially on damper disturbed ground at lower levels, just above the woody riparian zones. Tall fescue does not appear to spread significantly into native grassland on drier sites at this site, but Schotz and Barbour (2009) considered it a serious problem in Alabama.

**Imperata cylindrica** (L.) Palisot

This widespread, weedy tropical grass (cogon grass) is near the northern edge of its range in Chickasaw County (FNA 2003, Vol. 25), but climatic warming is expected to push the species further north (Bradley et al., 2009). Only two clonal patches were found, each with diameter of ca. 15–30 ft [5–10 m]. Both patches were in slightly
ponded swales near the edges of areas that have been used for crops within the past decade.

*Lathyrus hirsutus* L.
This annual European vetch is widely scattered at the site, especially on roadsides and old fields. However, it is not common and may not pose a severe threat.

*Lespedeza cuneata* (Dum.-Cours.) G. Don
This East Asian perennial (sericea lespedeza) is widespread at the site and locally dominant in some old fields, probably spreading from plantings, especially on disturbed ground. It also persists into some young thickets, where light is sufficient, including spaces between red cedar trees (Campbell and Seymour, 2011a,b). *L. cuneata* has been widely planted for reclamation of eroded soils in the region, and it has become a serious problem for restoration of native vegetation.

*Ligustrum sinense* Lour.
This East Asian shrub (Chinese privet) is scattered at the site but not generally common. It is locally frequent in a few areas of riparian woods, especially under sugarberry.

*Lolium perenne* L.
This European grass (perennial rye) has been sown for cover in some plowed areas at Pulliam Prairie, where it has remained locally abundant for a few years. However, it does not seem to persist or to invade native grassland.

*Lonicera japonica* Thunb.
This woody vine from East Asia (Japanese honeysuckle) is widespread and locally abundant in thickets at Pulliam Prairie, especially in riparian zones. However, it is generally absent from the grasslands here, and burning is well known to keep this species from invading grasslands.

*Melilotus alba* Medik.
This tall European biennial (white sweet clover) became widely sown for hay and forage over a century ago, and it has become a common plant in the Black Belt (Campbell and Seymour, 2011a). It is widely scattered at the site and locally frequent, especially in disturbed areas at upper elevations. Although locally problematic, it does not seem to be a persistent invader of well-established grassland dominated by native species at this site or elsewhere in the Black Belt; see also Schotz and Barbour (2009).

*Paspalum dilatatum* Poir.
This South American perennial grass (Dallis grass) is common along roads near the Pulliam Prairie. It is also scattered within the site, especially in old fields at upper elevations, but it does not seem to be a serious invasive threat within native grassland at this site. It has been widely sown for forage in the Black Belt, and is considered locally problematic for restoration in Alabama (Schotz and Barbour, 2009).

*Torilis arvensis* (Huds.) Link
This European weed (hedge-parsley) is locally frequent in one recently plowed area. It is not clear if the species is increasing at the site or just a temporary problem.

*Setaria pumila* (Poir.) Roem. & Schult. [= *S. glauca* (L.) P. Beauv.]
This weedy annual grass from Europe (yellow foxtail) is widespread at the site, especially on disturbed ground at lower elevations. However, it is generally not abundant, and it does not appear to invade native grassland.

*Sorghum halepense* (L.) Pers.
This aggressive perennial grass from the Mediterranean region (Johnson grass) is widespread at the site and locally dominant in some formerly plowed areas. It was promoted for forage across the region over a century ago, as reviewed by Campbell and Seymour (2011a).
Table 1. Approximate division of the flora at Pulliam Prairie into typical habitat classes.
Each taxon is assigned to one of the eight typical habitat classes below. See Appendix for details; 13 varieties or subspecies are added here to the species but hybrids are excluded. Subsets within grassland, thickets or woods are based on our provisional distinction of vegetation above chalk exposures versus on or below; there is much overlap in composition. Codes in brackets [ ] under “Typical Habitat” refer to those in the Appendix. The species enumerated under “Aliens” include those that may be adventive species from further west or south within North America, or that have uncertain status; numbers for these adventive-or-uncertain subsets are in parentheses. The 57 “rare natives” are listed in Table 2; numbers in parentheses refer to the subsets that appear to be globally rare (GL in Table 2).

<table>
<thead>
<tr>
<th>Typical Habitat</th>
<th>Total Species</th>
<th>Aliens</th>
<th>Rare Natives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grassland: obligate, with little or no occurrence in thicket or woods [4/5]</td>
<td>250</td>
<td>37 (9)</td>
<td>37 (10)</td>
</tr>
<tr>
<td>Uplands/clay-chalk transitions [A/B]</td>
<td>120</td>
<td>24 (6)</td>
<td>10 (2)</td>
</tr>
<tr>
<td>Chalk slopes/lowlands [C/D/E]</td>
<td>130</td>
<td>13 (3)</td>
<td>27 (7)</td>
</tr>
<tr>
<td>Grassland: facultative, with some occurrence in thickets or woods [3, herbaceous/low shrubby]</td>
<td>75</td>
<td>1 (0)</td>
<td>11 (3)</td>
</tr>
<tr>
<td>Uplands/clay-chalk transitions [A/B]</td>
<td>42</td>
<td>1 (0)</td>
<td>6 (1)</td>
</tr>
<tr>
<td>Chalk slopes/lowlands [C/D/E]</td>
<td>33</td>
<td>0 (0)</td>
<td>5 (2)</td>
</tr>
<tr>
<td>Thickets and other vegetation between grassland and woodland [3, mostly woody/vining species]</td>
<td>33</td>
<td>7 (6)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Uplands/clay-chalk transitions [A/B]</td>
<td>13</td>
<td>3 (3)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Chalk slopes/lowlands [C/D/E]</td>
<td>20</td>
<td>4 (3)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Woods, with more or less shady interiors but excluding denser thickets [1/2]</td>
<td>90</td>
<td>5 (2)</td>
<td>8 (2)</td>
</tr>
<tr>
<td>Uplands/clay-chalk transitions [A/B]</td>
<td>23</td>
<td>2 (1)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Chalk slopes/lowlands [C/D/E]</td>
<td>67</td>
<td>3 (1)</td>
<td>8 (2)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>448</strong></td>
<td><strong>50 (17)</strong></td>
<td><strong>57 (15)</strong></td>
</tr>
</tbody>
</table>
Table 2. Plant taxa (species, subspecies or varieties) of the study area at Pulliam Prairie (PP),
including thickets and woods, that appear rare in the whole Black Belt (BB) region.
BR = estimated rank in BB: 1 = B1; 2 = B2; 3 = B3; 34 = B3S4 (as in Natural Heritage codes).
GR = estimated global rank: 1 = G1; 2 = G2; 3 = G3; 34 = G3G4 (as in NatureServe codes).
These 57 taxa (51 species and 6 extra varieties for the site) are listed as endangered (S1) to
“watch-list” (usually S3S4) by Natural Heritage Programs in Alabama or Mississippi, or deserve
to be considered for such listing in the region based on our general review (see text).
Question marks after ranks (?) indicate uncertainty. Asterisks (*) indicate that the species is offi-
cially listed for “tracking” or “watch-list” by Missississppi Natural Heritage Progam (2006).

<table>
<thead>
<tr>
<th>Species and Variety Names</th>
<th>BR</th>
<th>GR</th>
<th>Notes on occurrence at Pulliam Prairie; also range, status and name</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Agalinis auriculata</em></td>
<td>12*</td>
<td>23</td>
<td>locally frequent</td>
</tr>
<tr>
<td><em>Agalinis gattingeri</em></td>
<td>34?</td>
<td></td>
<td>few in drier grassland; only in north part of BB?</td>
</tr>
<tr>
<td><em>Agalinis heterophylla</em></td>
<td>2?</td>
<td></td>
<td>few seen in low grassland; only north part of BB?</td>
</tr>
<tr>
<td><em>Agalinis oligophylla</em></td>
<td>3?</td>
<td>34</td>
<td>scattered in grassland; includes <em>A. pseudophylla</em></td>
</tr>
<tr>
<td><em>Ambrosia psilostachya</em></td>
<td>3?</td>
<td>3?</td>
<td>locally common in grassland; but perhaps adventive in Atlantic states</td>
</tr>
<tr>
<td><em>Amorpha croceolanata</em></td>
<td>3?</td>
<td>34?</td>
<td>rare in riparian woods; poorly known taxon of lower Miss. Valley</td>
</tr>
<tr>
<td><em>Andropogon gyrans</em> var. gyrans*</td>
<td>34?</td>
<td></td>
<td>scattered in grassland; var. <em>stenophyllus</em> is more southern</td>
</tr>
<tr>
<td><em>Anemone berlandieri</em></td>
<td>3?*</td>
<td>34</td>
<td>few in grassland and woods; on more calcareous soils than <em>A. caroliniana</em></td>
</tr>
<tr>
<td><em>Campanulastrum americanum</em></td>
<td>34*</td>
<td></td>
<td>local in riparian woods</td>
</tr>
<tr>
<td><em>Carex annectans</em></td>
<td>34?</td>
<td></td>
<td>local in damp to dry grassland</td>
</tr>
<tr>
<td><em>Carex crawei</em></td>
<td>2?</td>
<td></td>
<td>common in dry to damp grassland; see text for details</td>
</tr>
<tr>
<td><em>Carex meadii</em></td>
<td>34*</td>
<td></td>
<td>common in dry grassland</td>
</tr>
<tr>
<td><em>Carex oxylepis</em></td>
<td>34?</td>
<td></td>
<td>common in riparian woods</td>
</tr>
<tr>
<td><em>Carex texensis</em></td>
<td>34?</td>
<td></td>
<td>thicket in swale</td>
</tr>
<tr>
<td><em>Carya myristicformis</em></td>
<td>3?</td>
<td>34</td>
<td>small group in riparian woods; rare except in AR and LA</td>
</tr>
<tr>
<td><em>Comandra umbellata</em></td>
<td>3?*</td>
<td></td>
<td>one patch in open, near woods</td>
</tr>
<tr>
<td><em>Dasystoma macrophylla</em></td>
<td>34*</td>
<td></td>
<td>scattered in wooded riparian zone</td>
</tr>
<tr>
<td><em>Desmodium sessilifolium</em></td>
<td>3?</td>
<td></td>
<td>scattered in taller grassland; rare in states east of Miss. Rv.</td>
</tr>
<tr>
<td><em>Dichanthelium linearifolium</em></td>
<td>3?</td>
<td></td>
<td>locally frequent in dry grassland; almost unknown/overlooked in MS?</td>
</tr>
<tr>
<td><em>Eleocharis compressa</em></td>
<td>2?</td>
<td></td>
<td>local in grassland swale</td>
</tr>
<tr>
<td><em>Eleocharis erythropoda</em></td>
<td>3?*</td>
<td></td>
<td>local in grassland swale</td>
</tr>
<tr>
<td>Species</td>
<td>Locality/Location</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><em>Erigeron strigosus</em> var. <em>calcicola</em></td>
<td>3? 3?</td>
<td>local in drier/eroded grassland; see text for details</td>
<td></td>
</tr>
<tr>
<td><em>Eupatorium altissimum</em></td>
<td>34?</td>
<td>locally frequent, grassland; rare in SE states east of Miss. Rv.</td>
<td></td>
</tr>
<tr>
<td><em>Festuca paradoxa</em></td>
<td>34?</td>
<td>common in low thickets/edges; rare in MS, AL, TN?</td>
<td></td>
</tr>
<tr>
<td><em>Glandularia bipinnatifida</em></td>
<td>34?</td>
<td>local, lower level in baked clay; rare/adventive east of Miss. Rv.?</td>
<td></td>
</tr>
<tr>
<td><em>Glandularia canadensis</em></td>
<td>34?</td>
<td>local at upper level by woods; rare east of Miss. Rv.?</td>
<td></td>
</tr>
<tr>
<td><em>Helianthus pauciflorus</em></td>
<td>12?</td>
<td>two localities, dry grass/woods; rare east of Miss. Rv.</td>
<td></td>
</tr>
<tr>
<td><em>Heliopsis gracilis</em></td>
<td>23? 3</td>
<td>one patch in riparian woods; see notes in text</td>
<td></td>
</tr>
<tr>
<td><em>Isanthus brachiatius</em></td>
<td>23?</td>
<td>scattered in drier grassland; rare on SE Coastal Plain</td>
<td></td>
</tr>
<tr>
<td><em>Liatris squarrosa</em> var. <em>glabrata</em></td>
<td>2?</td>
<td>abundant in dry grassland; disjunct from west of Miss. Rv.</td>
<td></td>
</tr>
<tr>
<td><em>Linum sulcatum</em></td>
<td>23?*</td>
<td>common in drier grassland</td>
<td></td>
</tr>
<tr>
<td><em>Lithospermum canescens</em></td>
<td>34?</td>
<td>uncommon in drier grassland; rare on SE Coastal Plain</td>
<td></td>
</tr>
<tr>
<td><em>Muhlenbergia glabriflora</em></td>
<td>12? 3</td>
<td>one site in dry oak woodland; wooded flats in Monroe Co.</td>
<td></td>
</tr>
<tr>
<td><em>Muhlenbergia cf. frondosa/bushii</em></td>
<td>23?</td>
<td>few in drier riparian woods; see text for details</td>
<td></td>
</tr>
<tr>
<td><em>Muhlenbergia sylvatica</em></td>
<td>3?*</td>
<td>few in wooded riparian zone</td>
<td></td>
</tr>
<tr>
<td><em>Oenothera triloba</em></td>
<td>3?</td>
<td>patch in low area by bean field</td>
<td></td>
</tr>
<tr>
<td><em>Onosmodium hispidissimum</em> (= <em>O. molle ssp. h.</em>)</td>
<td>23</td>
<td>scattered in moister grassland; typical <em>O. molle</em> is unknown in MS</td>
<td></td>
</tr>
<tr>
<td><em>Panicum flexile</em></td>
<td>34?</td>
<td>locally abundant in grassland; in MS just blackland prairies?</td>
<td></td>
</tr>
<tr>
<td><em>Panicum gattingeri</em></td>
<td>3?</td>
<td>locally common, especially old fields; almost unknown/overlooked in MS?</td>
<td></td>
</tr>
<tr>
<td><em>Phlox cf. carolina</em> var. <em>carolina</em></td>
<td>3?</td>
<td>only one site by oak woods; local in blacklands of MS and AL</td>
<td></td>
</tr>
<tr>
<td><em>Polytaenia nuttallii</em></td>
<td>23*</td>
<td>scattered in grassland; very rare in southeastern states outside BB</td>
<td></td>
</tr>
<tr>
<td><em>Prenanthes aspera</em></td>
<td>2* 34</td>
<td>locally common in grassland; rare east of Miss. Rv.</td>
<td></td>
</tr>
<tr>
<td><em>Rudbeckia sp. nov.</em> aff. <em>tenax</em></td>
<td>3? 3?</td>
<td>locally common, low grassland; blackland prairie endemic</td>
<td></td>
</tr>
<tr>
<td><em>Schizachyrium scoparium</em> var. <em>dvergens</em></td>
<td>3?</td>
<td>only one patch noted; taxonomy needs more work</td>
<td></td>
</tr>
<tr>
<td><em>Scirpus pendulus</em></td>
<td>34?</td>
<td>common in damp grassland</td>
<td></td>
</tr>
<tr>
<td><em>Scleria ciliata</em> var. <em>ciliata</em></td>
<td>3?</td>
<td>one site on eroded brown clay; rare north of longleaf pine belt</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3. Native plants reported from grasslands of the Black Belt (BB) in Alabama (A) or Mississippi (M), broadly defined, but not found at the Pulliam Prairie (PP) in 2009.

This list of 87–94 native species excludes those typical of deeper woods or wetlands; question marks at left margin indicate the six species that are adventive or have uncertain status. This is not an exhaustive list; further attention to graminoids is much needed. Most data are from Barone and Hill (2007). For other sources, see first paragraph of Discussion; most general information for the region comes from Schotz and Barbour (2009; = “SB”), USDA (2010), and Kartesz (1999, and updating releases). Species added from the somewhat anomalous site of Schuster and McDaniel (1973) are referenced to “SM” at right. Notes on ranges and habitats are also supported by Weakley (2010). Asterisks (*) after “A” or “M” indicate species that appear to be rare in the Black Belt of each state (estimated S1, S2 or S3), or perhaps just poorly documented; double asterisks (**) indicate globally rare (estimated G1, G2 or G3).

<table>
<thead>
<tr>
<th>Species</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agalinis tenuifolia (Vahl) Raf.</td>
<td>A M: expected on acid soils</td>
</tr>
<tr>
<td>Amsonia sp. nov. (aff. rigida Shuttleworth)</td>
<td>AM**: lowlands, often wooded (taxonomic issues)</td>
</tr>
<tr>
<td>Anemone caroliniana L.</td>
<td>A* M*: oak woodland on damp acid clays?</td>
</tr>
<tr>
<td>Apios priceana B.L. Rob.</td>
<td>AM**: edges of low BB woods (SB)</td>
</tr>
<tr>
<td>Arabis georgianus R.M. Harper</td>
<td>A**: thin rocky woods/edges; only AL and GA.</td>
</tr>
<tr>
<td>Aristida virgata Trin.</td>
<td>A ?M*: on damp acid soils to south (SB)</td>
</tr>
<tr>
<td>Asclepias obovata Ell.</td>
<td>(?A)M**: on sandy soils to south</td>
</tr>
<tr>
<td>Asclepias purpurascens L.</td>
<td>A* M*: on lowlands, often wooded</td>
</tr>
<tr>
<td>Asclepias verticillata L.</td>
<td>A M: expected, generally on xeric sites</td>
</tr>
<tr>
<td>Astragalus canadensis L.</td>
<td>A* M*: thin BB woods on damper soils (SB)</td>
</tr>
<tr>
<td>Baptisia leucantha Torr. &amp; Gray</td>
<td>M*: expected on lowlands, often wooded</td>
</tr>
<tr>
<td>= B. alba var. macrophylla (Larisey) Isely</td>
<td></td>
</tr>
</tbody>
</table>
**Bouteloua curtipendula** (Michx.) Torr.  
A* M*: on xeric sites

**Carex albicans** Willd. ex Spreng  
A M*: on xeric sites

[and related taxa]

**Carex brevior** (Dewey) Mack. ex Lunnell  
M*: expected on damp to dry ground

**Carex microdonta** Torr. & Hook.  
A M*: expected on xeric sites to south

**Carex pigra** Naczi  
A M*: on xeric sites, often wooded

**Coreopsis** cf. *grandiflora* Hogg ex Sweet  
A*: on xeric sites (taxonomic issues)

**Coreopsis tripteris** L.  
A M*: expected locally on more acid soils

**Crotalaria rotundifolia** Walter  
A M: on more sandy soils to south (SB)

**Cuscuta pentagona** Engelm.  
A M: curious absence of *Cuscuta* at PP in 2009

**Dalea gattingeri** (A. Heller) Barneby  
A*: historical records only in BB; xeric sites

**Delphinium alabamicum** Kral  
A**: historical records only in BB; xeric sites

**Delphinium carolinianum** Walt.  
A M: expected on dry sandy soils

**Desmodium obtusum** (Muhl. ex Willd.) DC  
A M: expected on dry sandy soils

**Desmodium ochroleucum** M.A. Curtis  
AM**: usually suppressed in BB woods (SB)

**Doellingeria** cf. *umbellata* (P. Mill.) Nees  
A*: generally on xeric sites

**Draba cuneifolia** Nutt. ex Torr. & Gray  
A*: mid-western species; on xeric sites (SB)

**Echinacea pallida** (Nutt.) Nutt.  
A*: on xeric sites

**Echinacea purpurea** (L.) Moench  
A*: uncertain sight record from PP

**Erythrina herbacea** L.  
A: glade in pine-oak (SM) (uncertain status/ident.)

**Evax prolifera** Nutt. ex DC.  
A M: perhaps adventive from Great Plains

**Fimbristylis dichotoma** (L.) Vahl.  
A*: xeric sites; *hispida* on sandier soils (ident. issues)

**Gaillardia** cf. *aestivalis* (Walt.) H. Rock  
A M: perhaps adventive, sandy soils (ident. issues)

**Galium virgatum** Nutt.  
A*: on xeric sites

**Gaura filipes** Spach  
A M: expected on xeric sites

**Hedeoma drummondii** Benth.  
A M*: xeric sites; *hispida* on sandier soils but perhaps adventive (identification issues)

**Helianthus angustifolius** L.  
A M: expected in damp weedy/grazed areas (SB)

**Helianthus giganteus** L.  
A M: more acid soils; on roadsides near PP

**Helianthus silphioides** Nutt.  
A* M*: on lowlands; southern edge of range

**Helenium autumnale** L.  
A* M*: expected on sandy soils (ident. issues)

**Hypoxis hirsuta** (L.) Cov.  
A M: on more sandy soils

**Lactuca canadensis** L.  
A M: common in glade within pine-oak (SM)

**Leptoloma cognatum** (Schult.) Chase  
A*: xeric sites; var. *gattingeri* (Gray) McVaugh is verified from A but not M

**Linum flavum** (L.) Trel.  
A M: weed but curiously uncommon in BB region

**Lobelia appendiculata** DC.  
A*: xeric sites; var. *gattingeri* (Gray) McVaugh is verified from A but not M

**Lobelia puberula** Michx.  
A M: expected on more acid soils

**Mirabilis albida** (Walt.) Heimerl  
A* M*: expected on sandy soils?

**Monarda citriodora** Cerv. ex Lag.  
A M: perhaps adventive east of Miss. Rv.

**Nemastylis geminifolia** Nutt.  
A* M*: disjunct in BB from southwest (SB)
Oenothera biennis L.
?Oenothera pilosella Raf.
Oxalis cf. priceae Small
Packera cf. paucipetala
(Michx.) A. & D. Löve
Paniceum rigidulum Bosc ex Nees
Penstemon cf. alluviorum Pennell
Penstemon tenuiflorus Pennell
Penstemon tubiflorus Nutt.
Physalis carpenteri Riddell ex Rydb.
Physostegia cf. virginiana (L.) Benth.
Polygala boykii Nutt.
Polygala grandiflora Walt.
Ponthieva racemosa (Walt.) C. Mohr
Prenanthes barbata (T. & G.) Milstead
Pycnanthemum flexuosum (Walt.) BSP
Rhynchosia tomentosa (L.) Hook. & Am.
Rhynchospora caduca Ell.
and other Rhynchospora spp.
Rudbeckia fulgida Ait.
Rudbeckia laciniata L.
Ruellia caroliniensis (J.F. Gmel.) Steud.
Sabatia brachiata Ell.
Salvia azurea Michx. & Lam. var. azurea
Schoenolirion croceum (Michx.) Gray
Scirpus cyperinus (L.) Kunth.
Scleria pauciflora Muhl. ex Willd.
Silphium asteriscus L.
Silphium confertifolium Small

Silphium perplexum J. Allison
Solidago odora Ait.
Solidago puberula Nutt.
var. pulverulenta (Nutt.) Chapm.
Solidago rugosa P. Mill.
Spiranthes lacera (Raf.) Raf.
var. gracilis (Bigelow) Luer
Sporobolus junceus (P. Beauv.) Kunth
Strophostyles umbellata (Muhl.) Britton
Symphyotrichum oblongifolium
(Nutt.) Nesom
Symphyotrichum pratense (Raf.) Nesom
Thalictrum debile Buckley
Tragia cordata Michx.
Vernonia missurica Raf.
Veronicastrum virginicum (L.) Farw.

A M: common weed curiously absent at PP
A* M*: expected with red cedar (tax. issues)
AM**: see Uttal (1983); revision is pending
A M: expected on marshy acid soils
M: expected on lowlands (taxonomic issues)
A M: generally on xeric sites (identification issues)
?A M: note other species expected (ident. issues)
A*: expected on sandy soils to south (SB)
A M: see also P. praemorsa Shinners (tax. issues)
A* M: glade within pine-oak (SM)
A M: generally on more sandy soils to south
A* M*: associated with red cedar thickets
AM**: possible confusion with P. aspera
A* M: expected on sandy soils
A*: glade in pine-oak (SM) (possible tax. issues)
A M: expected on dry acid soils
A M: expected on damp acid soils; see also NatureServe (2010; CEGL 4664)
A: glade within pine-oak (SM) (taxonomic issues)
A: glade within pine-oak (SM) (taxonomic issues)
A M: expected on more acid soils
A M: expected on sandy soils
A M: expected to south
A*: common in glade within pine-oak (SM)
A ?M: glade within pine-oak (SM) (ident. issues)
A M: expected on dry acid soils
A ?M: glade within pine-oak (SM) (tax. issues)
AM**: see Leidoff & McDaniel (1999) for ?M (note taxonomic issues; close to S. glabrum)
A**: endemic to central AL on chalk (SM)
A M: expected on dry acid soils
A: glade within pine-oak (SM)
(note identification issues)
A M: expected on damp acid soils
A M: expected on medium acid soils
A M: expected on sandy soils (SB)
A M: expected on sandy soils (SB)
A M*: on xeric sites
A* M*: on xeric sites; mostly in LA, TX
AM**: thin BB woods on damp soils (SB)
A* M*: rare across BB region; often in woods
M*: reported from Chickasaw Co. near PP
A* M*: low areas in taller brush/grass (SB)
DISCUSSION

Representation of Native Grassland Flora. Based on recent field work, Barone and Hill (2007) documented 196 plant species from 19 remnants of Black Belt Prairies in northeastern Mississippi and central Alabama, plus the Jackson Prairies in central Mississippi. Their list included only species typical of grassland, and excluded woody species other than a few small shrubs (*Ceanothus americanus*, *Rosa carolina*) and vines (*Campsis radicans*, *Rubus trivialis*, *Vitis aestivalis*) that often extend into grassland. Of these species, 28 (15%) were clearly alien; 6 (3%) had adventive or uncertain status; and 162 (83%) were clearly native. For the Black Belt Prairies alone, they documented 141 clearly native species. About 90 additional native species (Table 3) have been reported from the Black Belt prairies by Mohr (1901), Lowe (1921), Schuster and McDaniel (1973), Leidolf and McDaniel (1998), Baskin and Baskin (2003), McDonald et al. (2008), Schotz and Barbour (2009), bringing the total reported species to ca. 220–240, depending on definitions of habitat and native status. The Osborn Prairie is one of the best known remnants and relatively extensive, with ca. 100–200 acres [40–80 ha] of restorable habitat including transitional woods and adjacent rights-of-ways. At least 130 native species have been recorded there (Leidolf and McDaniel, 1998; Hill and Seltzer, 2007; Wiygul et al., 2003).

The Pulliam Prairie overlaps in ecological conditions with other remnants of Black Belt Prairie, such as the Osborn Prairie. However, it has relatively gentle topography, supporting extensive areas of taller grassland with big bluestem (*Andropogon gerardii*) plus scattered gamagrass (*Tripsacum dactyloides*) and other associates on deeper, damper soils. At the Pulliam Prairie alone, we found 325 plant taxa—312 species plus 13 additional varieties or subspecies—that are typically found in grassland. This number includes those largely restricted to full sun (250) plus those frequent in full sun but also extending into some shade (75)—with a classification as similar as possible to the list of Barone and Hill (2007). Of these 325 taxa, only 28 (8.6%) are clearly alien; 11 have uncertain status or may be adventive (from west or south); and 286 are clearly native (Table 1). Thus it appears that the Pulliam Prairie has the most diverse documented flora of any grassland remnant in the Black Belt, with more native grassland species at this one site than all previously documented sites in Mississippi and Alabama combined: 286–297 compared to ca. 220–240 (from Barone and Hill, 2007; plus those in Table 3). The upper numbers in these ranges include species with adventive or uncertain status.

As noted by Hill and Seltzer (2007) at the Osborn Prairie, repeated field work is needed for full coverage of the flora in these grassland remnants. Many of the additions in our list of 286 native grassland taxa reflect attention to graminoids and other plants that require more intense study for identification. Also, we did include plants typical of adjacent old fields on more acid soils above the chalk (coded A in the Appendix), and those of marshy areas below the chalk (coded E), which may extend the ecological range of previous authors. But such taxa amount to only 35 of our total (28 A + 7 E), and several of them have been recorded in previously published lists from the region’s grasslands.

There are about 87–93 native species of grassland or open woodland that are on various published lists from the Black Belt, or inferred from floristic mapping of the region, that were not found at the Pulliam Prairie in 2009 (Table 3). It is likely that several more missing species will be added after deeper floristic review, but mostly from peripheral regions or habitats. Just over a third (ca. 35–40) of these missing species are typical of relatively acid or sandy soil types that have little or no representation in the primary study area at Pulliam Prairie, but that are expected in adjacent landscapes with more oaks and pines, especially to the west. Another 10–15 or so missing species are typical of relatively xeric sites well within the Black Belt, especially on the crests of steeper hills and bluffs, and often associated with more stable red cedar woodland. Slopes of the Pulliam Prairie are relatively gentle except for the eroding gullies, which may have increased after attempts at farming. About 5–10 of the missing species are typical of deeper lowland or wetland soils, with little representation in our study area. Subtracting these
three groups, there are only about 30 undocumented species at the site that are typical of grasslands in the Black Belt on largely calcareous soils, between dry, wet and acid extremes.

The relatively low percentage of aliens in the whole flora of this site is remarkable: 7.4–11.2%, the upper range here including all species with uncertain or adventive status. Most aliens are concentrated in open habitats, and several are largely restricted to access roads. Of the 14 aliens noted above as current or potential problems at the Pulliam Prairie, 8 are shared with the 17 species considered invasive or potentially invasive for the Black Belt prairies in Alabama by Schotz and Barbour (2009, their Table 22). They considered the most serious invaders, which are already Barbour (2009, their Table 22). They considered invasive or potentially invasive for the Pulliam Prairie, 8 are shared with the 17 species noted above as current or potential problems at the site that are typical of grassland, disturbance-dependant thickets of rough-leaf dogwood (Cornus drummondi), Chickasaw plum (Prunus angustifolia) and red cedar on chalky soils (mostly at intermediate elevation), plus varied patches of upland oak woods or associated thickets on more acid clayey soils (mostly at higher elevation). Many species occur in more than one of these habitat types, and several often extend into grassland. But an approximate division of species can be made (under Totals in Table 1) into those typical of riparian woods (67), upland oak woods (23), and thickets of varied composition on (33, on lowlands plus uplands).

The typical species of these three woody habitats total 123, or 27.5% of the total flora for the site (448). Only four of these species are clearly aliens, and another eight have adventive or uncertain status. The total percentage of aliens plus adventives in the flora of wooded habitats (3.3 + 6.5 = 9.8%) is similar to that in grassland (combining obligate and facultative grassland species, 8.0 + 3.4 = 11.4%). But in woody habitats, there is a notable shift away from clearly alien species to those that have more adventive or uncertain status, including the cluster of trees, shrubs and climbers in transitional thickets (Table 1).

A thorough analysis of woodland flora in the Black Belt region is not attempted here, but there is much complexity to unravel. The ecological conditions in these woods and thickets vary much in relation to geology, topography, soils and disturbance history. In the riparian zones, this variation can be intense at relatively small spatial scales, with several vegetation types dominated by distinct groups of species often present within an acre (Campbell and Seymour, 2011b). Several characteristic species in these riparian zones or along their sunny edges have rather poor documentation, uncertain native status, fragmented ranges or un-settled taxonomy across southeastern states: Amor-phacrococlanata, Carex aureolensis, Carex cf. normalis, Caryya myristiciformis, Dichanthelium jorii, Heliopsis gracilis, Lysimachia aff. ciliata (narrow-leaved segregate), Machula pomifera, Muhlenbergia cf. frondosa/bushii, Quercus durandii, Rudbeckia sp. nov., Silphium glabrum and Viola cf. missouriensis.

**Rare or Conservative Species at the Pulliam Prairie.** Pulliam Prairie may contain most of the regionally rare plant species known in Black Belt Prairies and adjacent woodlands (Tables 1–3). At least 70–90 species, subspecies or varieties reported from this landscape appear to be rare in Mississippi or Alabama, including those on informal ‘watch-lists’ or with the S3S4 ranking of Natural Heritage Programs. Suggested additions or changes here to current official listings are based on a general review of Kartesz (1999, and distributed updates), USDA (2010), NatureServe (2010), FNA (1993–2010), Weakley (2010), and on other ongoing synthesis. About 57 of these taxa have been found at Pulliam Prairie, including 11 that are estimated to be endangered (S1) or threatened (S2) in Mississippi (Table 2). Several of these species are also rare globally or have relatively small global ranges (deserving the G3 or G3G4 design-
ation). A few may deserve globally threatened status (G2 or G2G3): e.g. *Agalinis auriculata*, *Rudbeckia* sp. nov., and perhaps *Symphyotrichum patens* var. nov. However, none appear to deserve consideration for globally endangered status (G1 or G1G2).

Given that there are several rare species at the Pulliam Prairie that have little or no previous documentation in the region, it is clearly important for conservation to continue with intensive botanical exploration of this site and other remnants. Moreover, at present it is difficult or impossible to estimate precisely which rare species are truly imperiled, in terms of endangered, declining or threatened populations. Within the list from the Pulliam Prairie, *Agalinis auriculata* appears to be one of the most generally uncommon species in the region and across its range. It has a relatively healthy population at the Pulliam Prairie, although some of the best clusters are growing in or near large patches of the alien *Lespedeza cuneata*. Some species are less critically rare at regional or global levels, but we found less than 10 plants or clonal patches: *Anemone berlandieri*, *Comandra umbellata*, *Heliopsis gracilis*, *Phlox* cf. *carolina*, *Schizachyrium scoparium* var. *divergens*, *Solidago rigida* var. *glabrata*, *Solidago speciosa* var. *rigidiuscula*, *Spiranthes ovalis*, and *Triosteum angustifolium*.

An integrated program is needed for recovery of imperiled species in the region and for deeper exploration of the flora. The Pulliam Prairie could act as an important site for trials. There are several areas where invasive aliens should be reduced, or where the rare natives should be promoted. In addition to continued observations of populations under management for recovery, there should be experimental plantings of selected rare species within restored areas. Ultimately, a center for botanical research in the Black Belt is needed through partnership of conservationists with Mississippi State University, perhaps extending the vision of Sidney McDaniel at his prospective site for a garden near Starkville. The herbarium there (IBE) is an invaluable base for identification and documentation of rare species, greatly extending the more historical collection at the university (MISSA).

Several additional undescribed species of Mississippi undoubtedly exist within his collection.

**ACKNOWLEDGMENTS**

This study would not have been possible without permission of the landowner, Dr. Joe Pulliam, and his father, Sam D. Pulliam. We are deeply grateful for this opportunity to explore the ‘lost world’ of their Black Belt heritage. Also invaluable was the introduction to this site and continual guidance by Daniel Coggin of Wildlife Mississippi, plus the fundamental support of Roundstone Native Seed, Inc. Other people have provided significant further assistance, including some anonymous reviewers (see also, Campbell and Seymour 2011b). The curators of several herbaria helped greatly with access to their collections and floristic data: Dwayne Estes (APSU), Laura Lukas and Wendy Zomlefer (GA), Greg Wheeler and Sidney McDaniel (IBE), Lucille McCook (MISS), Jim Solomon and George Yatskievych (MO), Heather Sullivan (MMNS), Lisa Wallace (MIS), Michael Vincent (MU), Carol-Ann McCormick and Alan Weakley (NCU), Mesfin Tadesse (OS), Harvey Ballard and Jason Lasson (BHO), John Nelson (USCH), Aaron Floden, Victor Ma and Eugene Wofford (TENN), Donna Ford-Werntz (WVU), Deborah Bell, Harold Robinson, and Rusty Russell (US).

**LITERATURE CITED**


APPENDIX

Following is an annotated list of vascular taxa at Pulliam Prairie, arranged alphabetically by families, generally following Weakley (2010). Varietal names are added based on recent treatments; absence of a varietal name generally implies that only typical plants were found. In brackets, we add brief notes on names, including common synonyms used by McCook and Kartesz (2010) or others; see text above for more explanation in some cases.

At left margin, double asterisks at left margin indicate species that are clearly alien, originating from outside North America. Single asterisks indicate species that may be adventive species from southern or western regions in North America or that have uncertain status.

Collection numbers follow the names and “SC” (R. Seymour & J. Campbell), then codes for frequency and habitat. The 23 “sight” records are partly based on poor or unprocessed collections; those in brackets { } are not counted in the totals for this paper (Table 1).
For frequency: nea = nearby (at paved road parking or along access road but not seen within
the main site block); rar = rare (< 5 observations); occ = occasional; sca = scattered; loc =
local/locally; wid = widespread; fre = frequent; com = common; abu = abundant; dom = dominant.
In parentheses are the numbers of 1000 x 1000 feet [305 x 305 m] grid units where the taxon was
recorded; + indicates that the plant probably occurs in several additional grid units but was
overlooked.

Final items are codes for habitat, as follows.

Codes for the elevation-related gradient are as follows.
A = largely restricted to more acid clayey soils on ridges
B = more frequent on upper slopes and ridges than chalk slopes and below
C = most frequent on chalky soils between ridges and bottoms
D = more frequent on lower slopes and bottoms than above
E = largely restricted to riparian zones and adjacent bottoms
+ indicates that the species has a wide range, more than one class either side of the mode

Codes for the gradient from woodland to grassland are as follows.
1 = most frequent in woods with closed canopy
2 = most frequent in thin woods and on the inside of edges
3 = most frequent in transitions from grassland to woodland, thickets or edges
4 = most frequent in grassland with little or no woody cover
5 = most frequent on partly bare ground with little or no woody cover
+ indicates that the species has a wide range, more than one class either side of the mode

Xeric/Hydric: see vegetation notes for outline of types
X = most frequent on distinctly xeric sites; XX = extremely xeric sites
H = most frequent on distinctly hydric sites; HH = extremely hydric sites
XH = xerohydric sites; puddling in spring but droughty for most of growing season
HX = hydroxeric sites; puddling well into the growing season, but often drying out

Lower case indicates less pronounced or less certain trends.

<table>
<thead>
<tr>
<th>ACANTHACEAE</th>
<th>ALLIACEAE</th>
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<tbody>
<tr>
<td><em>Ruellia cf. ciliosa</em> Pursh [see notes in text], SC-107, 288, 289, 340: loc fre (5+); B 3 x</td>
<td><em>Allium canadense</em> L. var. canadense, SC-012, 162: loc? (&lt;7); D? 4</td>
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<tr>
<td><em>Ruellia cf. humilis</em> Nutt. [short glabrate form], SC-152, 339: loc (4+); C 4 X</td>
<td><em>Allium canadense</em> L. var. mobilense (Regel.) Owenby [= <em>A. mutabile</em> Michx.], SC-228: sca-loc fre (7); C 4</td>
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<tr>
<td><em>Ruellia strepens</em> L., SC-206: loc (3); D 3</td>
<td><strong>Allium vineale</strong> L., SC-207: rar? (1); B? 3</td>
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<td></td>
<td><em>Nothoscordium bivalve</em> (L.) Britt., SC-007: wid-loc fre (10); B+ 4 x</td>
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<td>ANACARDIACEAE</td>
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<td><em>Rhus copallinum</em> L. var. <em>latifolia</em> Engl., SC-284: occ-loc fre (3); A? 3</td>
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<td></td>
<td><em>Rhus glabra</em> L., SC-287: occ (2); D? 3</td>
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**Cryptotaenia canadensis** (L.) Kuntze ssp. *pubens* (Engelm. ex S. Wats.) Gillis, SC-183: wid-loc pubens (9); D+ 2

**ANNONACEAE**

**Asimina triloba** (L.) Dunal, SC-260: loc? (1); E 2

**APIACEAE**

*Chaerophyllum tainturieri* Hook., SC-028: occ-loc fre (2); D+ 2

*Cryptotaenia canadensis* (L.) DC., SC-132: occ-loc fre? (1+); E 1

**Daucus carota** L., SC-sight: nea (1); B+? 5

*Eryngium yuccifolium* Michx., SC-105: loc com (4); B+ 4

*Polytaenia nuttallii* DC., SC-038: occ (4); C 4 x

*Ptitimium capillaceum* (Michx.) Raf., SC-123: occ-loc fre (3); D 4 H

*Sanicula canadensis* L., SC-198, 324, 329: occ? (3+); B+ 3

*Sanicula odorata* (Raf.) K.M. Pryer & L.R. Phillippe [= *S. gregaria* Bickn.], SC-025, 119, 252: sca-loc abu (8+); E 2

**Torilis arvensis** (Huds.) Link, SC-180: occ-loc fre (1?); B+ 5

*Trepocarpus aethusae* Nutt. ex DC., SC-298: occ-loc fre (2); D 3 H

*Zizia aurea* (L.) W.D.J. Koch, SC-042: occ-loc com (1+); D 3

**APOCYNACEAE**

*Apocynum cannabinum* L., SC-049: occ-loc fre? (1); D+ 2 h

**ARACEAE**

*Arisaema dracontium* (L.) Schott, SC-127: rar? (1); E 5

**ARISTOLOCHIACEAE**

*Aristolochia serpentaria* L. [= *Endodeca serpentaria* (L.) Raf.], SC-466: rar (1); E 2

**ASPLENIACEAE**

*Asplenium platynodon* (B.S.P.), SC-214: occ (1+); D 2

**ASTERACEAE**

*Ambrosia artemisiifolia* L., SC-397: sca-loc fre (8); C+ 5

*Ambrosia bidentata* Michx., SC-351: occ (4); D+ 5

*Ambrosia psilostachya* DC. [= *A. rugelii* Rydb.], SC-365: wid-loc com (10); B+ 4

*Ambrosia trifida* L., SC-382: occ-loc fre (5); D 5

*Arnoglossum plantagineum* Raf. [= *Cacalia tuberosa* Nutt.], SC-095, 215: wid-loc fre (9); C? 4

*Baccharis halimifolia* L., SC-285: nea-loc fre (1); B? 3

*Bidens aristosa* (Michx.) Britt., SC-514: occ (2); B+? 5 h

*Boltonia asteroides* (L.) L’Her. var. *glutifolia* (Hill) Fern., SC-516: nea (1); B+? 5

*Boltonia diffusa* Ell., SC-414: occ (3); B+? 5

*Brickellia eupatorioides* (L.) Shinners, SC-474: wid-loc fre (12); B? 4 x

*Cirsium discolor* (Muhl. ex Willd.) Spreng., SC-395: sca-loc fre (6); B+ 4

*Cirsium horridulum* Michx., SC-044: occ (5); B+ 5

**Cirsium vulgaris** (Savi) Tenore, SC-323: nea-rar (1); B+ 5

*Conyza canadensis* (L.) Cronq., SC-275: occ-loc fre (1+); B+ 5

*Coreopsis lanceolata* L., SC-147: occ-loc fre (5); C 4 X

**Crepis pulchra** L., SC-209: nea-occ (1+); A? 5

*Dracopis amplexicaulis* (Vahl) Cass. [= *Rudbeckia amplexicaulis* Vahl.], SC-128: loc abu (7); D+ 5

*Erechtites hieraciifolia* L., SC-095, 215: occ-loc fre (1); D+ 2

*Erigeron annuus* (L.) Pers., SC-151: occ? (1); D 5

*Erigeron philadelphicus* L., SC-027: occ-loc fre (5); D 2

*Erigeron strigosus* Muhl. ex Willd. var. *calcicola* J. Allison, SC-051: occ-loc fre (3); C 5 XX

*Erigeron strigosus* Muhl. ex Willd. var. *strigosus*, SC-099: wid-loc com (9); B+ 5

*Eupatorium altissimum* L., SC-336: wid-loc fre (12); C 4

*Eupatorium coelestinum* L. [= *Conoclinium coelestinum* (L.) DC.], SC-369: sca (9); D 4 H

*Eupatorium fistulosum* Barratt, SC-sight: rar? (1?); D? 3 H

*Eupatorium hyssopifolium* L. [sensu stricto], SC-411, 452: loc fre (5); A 4 XH

*Eupatorium incarnatum* Walt. [= *Fleischmannia incarnatum* (Walt.) King & H.E. Robins.], SC-sight: rar (1); D? 3

*Eupatorium pubescens* Muhl. ex Willd. [= *E. rotundifolium* L. var. *ovatum* (Bigelow) Torr.], SC-315, 391: occ (4); A 4

*Eupatorium serotinum* Michx., SC-357: wid-loc fre (8); B+ 4 H

*Eupatorium torreyanum* Short & Peter [= *E. hyssopifolium* L. var. *laciniatum* Gray], SC-501: rar? (1); B? 4 xh
Eurybia hemispherica (Alexander) Nesom, SC-408: sca-loc com (4); C 4 X
Euthamia leptocephala (Torr. & Gray) Greene, SC-393: sca (6); B+ 4
Ganocantha argyrolea Nesom [segregate of Gnaphalium purpureum L.], SC-062: occ (1); B+ 4
*Grindelia squarrosa (Pursh.) Dunal, SC-520: occ-loc fre (2); B+ 4
*Helianthus amarum (Raf.) H. Rock, SC-470: rar (1); B+ 5
Helianthus flexuoflorus Raf., SC-404; sca-loc fre (8); D+ 4 hx
Helianthus pumilus Nutt., SC-291a, 292, 389a; SC-291b, 361, 389b; SC-370; 400; loc fre (2); B 4 X
Helianthus hirsutus Raf., SC-280, 379, 400: loc fre (6); B 3 X
Helianthus mollis Lam., SC-380: occ-loc fre (2); B 4
Helianthus resinosus Small [= H. tomentosus auct.], SC-370: wid-loc abu (7); D 4
Heliopsis gracilis Nutt. [= H. helianthoides (L.) var. gracilis (Nutt.) Gandhi & R.D. Thomas], SC-538: rar (1); E 2
Heterotheca camporum (Greene) Shinners var. glandulissimum Semple, SC-402, 463, 489: occ-loc fre (4); C 4 X
Iva annua L., SC-398: sca-loc abu (7); D 5
Krigia cespitosa (Raf.) Chambers [= K. oppositifolia Raf.], SC-001: sca (8); B+ 5
Lactuca floridana (L.) Gaertn., SC-446; occ (1); E 2
Liatris aspera Michx., SC-343: wid-loc abu (12); C 4 X
Liatris spicata (L.) Willd., SC-233: fre-loc com (11); D 4
Liatris spicata (L.) Willd. x squarrosa (L.) Michx, SC-234; occ (?); D 4
Liatris squarrosa (L.) Michx. var. glabra (Ryd.) Gaiser [see notes in text], SC-232: fre-loc abu (10); C 4 X
Liatris squarrosa (L.) Michx. var. squarrosa, SC-233: occ (2); A 4 x
Liatris squarrosula Michx., SC-413: occ (1); A? 3
Packera anonyma (Wood) W.A. Weber & Á. Löve, SC-200: rar? (1); A? 4 x
Packera glabella (Poir.) C. Jeffrey, SC-017; sca (5); D 3 h
Packera obovata (Muhl. ex Willd.) W.A. Weber & A. Löve, SC-011: occ-loc com (4); D 2
Pluchea camphorata (L.) DC., SC-457; occ (2); E 3 H
Prenanthes aspera Michx. [= Nabalus asper (Michx.) Hook.], SC-423, 477; sca-loc fre (5); C 4
Pseudognaphalium obtusifolium (L.) Hilliard & Burtt [= Gnaphalium obtusifolium L.], SC-519; sca? (2); B+ 4 X
Pyrrhopappus carolinianus (Walt.) DC., SC-059, 186; occ (4); B+ 4
Ratibida pinnata (Vent.) Barnh., SC-244: fre-loc com (11); C 4 X
Rudbeckia hirta L. var. pulcherrima Farw. [= R. serotina Nutt.], SC-102: wid-loc fre (9); B+ 4
Rudbeckia sp. nov. [aff. R. tenax C.L. Boynt. & Beadle; see notes in text], SC-390, 427; sca-loc fre (10); D 3 hx
Sericocarpus linifolius (L.) B.S.P., SC-217; occ? (1); A? 3 x
Silphium glabrum Eggert ex Small [= S. trifoliatum L. var. latifolium Gray], SC-464: occ (2); D? 2
Silphium integrifolium Michx. [at least tending to var. laeve Torr. & Gray], SC-323: fre-loc fre (1+); D 4
Silphium laciniatum L. var. robinsonii L.M. Perry, SC-250: fre-loc com (11); C 4 X
Silphium terebinthinaceum Jacq. [at least tending to var. luciae-brauniae Steyermark], SC-352: fre-loc abu (12); D 4 X
Solidago altissima L. [= S. canadensis L. var. scabra Torr. & Gray], SC-476: wid-loc fre? (11); D+ 4
Solidago gigantea Ait., SC-378: sca-loc com (5); D 4 X
Solidago nemoralis Ait., SC-392: fre-loc com (9); C 4 X
Solidago nitida Torr. & Gray [= Oligoneuron nitidum (Torr. & Gray) Small], SC-338, 364: occ (1+); B 4 X
Solidago rigidida L. var. glabrata E.L. Braun [= Oligoneuron jacksonii (Kuntze) Small], SC-433: rar? (1+); C 4 X
Solidago rigidida L. var. rigidida [= Oligoneuron rigidum (L.) Small], SC-350: fre-loc com (11); D 4
Solidago speciosa Nutt. var. rigidiuscula Torr. & Gray [= S. rigidiuscula (Torr. & Gray) Porter], SC-487: rar? (1); B? 3?
Solidago ulmifolia Muhl. ex Willd., SC-385: loc (2); D 2
Symphyotrichum cf. undulatum (L.) G.L. Nesom, SC-sight: nec? (1); A? 2
*Symphyotrichum divaricatum (Nutt.) G.L. Nesom [Aster subulatum Michx. var. ligulatus Shinners], SC-515: nea-loc (1); B? 5
Symphyotrichum dumosum (L.) G.L. Nesom var. dumosum, SC-512, 533: occ (3); A? 4 x
Symphyotrichum dumosum (L.) G.L. Nesom var. subulifolium (Torr. & Gray) G.L. Nesom, SC-307, 480, 492, 523: sca-loc com (12); B+ 4 X
Symphyotrichum ericoides (L.) G.L. Nesom, SC-517, 540: occ (3); B? 4 X
Symphyotrichum laeve (L.) G.L. Nesom var. laeve, SC-484, 526: sca (<8?); B? 3 x
Symphyotrichum laeve (L.) G.L. Nesom var. purpuratum (Nees) G.L. Nesom, SC-491, 524: loc fre (5+?); C 4 X
Symphyotrichum lateriflorum (L.) Á. & D. Löve, SC-sight: loc? (1+); D? 2
Symphyotrichum novae-angliae (L.) G.L. Nesom, SC-499: sca-loc fre (3); D 4
Symphyotrichum ontarionis (Wiegand) G.L. Nesom, SC-sight: occ? (1+); D 3
Symphyotrichum patens (Ait.) G.L. Nesom var. nov., SC-482a, 483: loc fre (5); C 4 X
Symphyotrichum patens (Ait.) G.L. Nesom var. patens, SC-290, 492b: loc fre (?); A 3 X
Symphyotrichum pilosum (Willd.) G.L. Nesom, SC-513: occ (1+); B+ 4
Symphyotrichum praetextum (Poir.) G.L. Nesom, SC-490, 539: occ-loc fre (2); D? 4 hx
Verbesina helianthoides Michx., SC-115: loc abu (2); B 3 X
Verbesina virginica L., SC-445: occ (2); D 3
Vernonia gigantea (Walt.) Trel., SC-296: sca (5); D 3

BIGNONIACEAE

Campsis radicans (L.) Seem. ex Bureau, SC-441: loc (3); E 3
BORAGINACEAE

Hypericum sphaerocarpum (Michx.) Lehms., SC-316: occ-loc fre (1); C 5 XX
Lithospermum canescens (Michx.) Rugel, SC-121: occ (1?); D 2
Lithospermum tuberosum (Michx.) Boevin., SC-018: occ-loc fre (2); D 2
Myosotis macroserpa (Lam.) Engelm., SC-041, 387: occ (3+); D 4

CORNACEAE

Cornus drummondii C.A. Mey., SC-046: wid-loc dom (9); C+ 3
Cornus florida L., SC-311: occ (1); D+? 2

CUPRESSACEAE

Juniperus virginiana L., SC-143: wid-loc dom (9); C+ 3

CYPARISACEAE

Carex annectens (Britt.) O.E. Schulz, SC-073: occ-loc com (1); D 4 HX
Carex aureolens Steud., SC-169: occ-loc fre (4); E 2+ H
Carex glaucoidea (Tuckerman ex Olney) Kukenthe. [C. pigra Naczi also expected], SC-058, 080: occ (2); A? 5 HX
Carex granulatricis (Willd. ex Willd. [including an unusually robust variant], SC-045, 078: loc abu (7+); D+ 4 HX
Carex hirsutella Mackenzie, SC-069: occ-loc fre (2+); B+ 4 HX
Carex leavenworthii Dewey, SC-200, 077: occ? (3+); A? 2 HX
Carex meadii Dewey, SC-060: loc fre (1); C 4 HX
Carex mullenbergii Schkuhr ex Willd., SC-158: occ (1+); A? 2 HX
Carex cf. normalis Mackenzie [see notes in text], SC-068, 070: loc com (3); E 3 H
Carex oxylepis Torr. & Hook., SC-031: occ-loc fre? (4); E 2
Carex cf. socialis Mohlenbrock & Schwegenman, SC-sight: occ? (1?); E 2 H
Carex texensis (Torr.) Bailey, SC-064: occ (1); B+? 3 HX
Carex cf. umbellata Schkuhr ex Willd., SC-033: occ (1); B? 3 HX
Carex vulpinoidea Michx., SC-181: occ-loc com (1); D 4 H
Cyperus echinatus (L.) Wood, SC-096: sca-loc fre (3); D+? 4 HX
Cyperus pseudoviroarbus Steud., SC-176: occ? (1); B? 4 HX
Eleocharis compressa Sullivant, SC-055: loc (1); C? 4 HX
Eleocharis erythropoda Steud., SC-079: occ-loc fre (1); C? 4 HX
Eleocharis cf. tenuis (Willd.) J.A. Schultes, SC-sight: nea (1?); A? 3 HX
Fimbristylis puberula (Michx.) Vahl, SC-157: occ? (4); C 4 HX
Scirpus pendulus Muhl., SC-024, 164: sca-loc com (7); D+ 4 HX
Scleria ciliata Michx., SC-111: rar-loc fre (1); A+ 4 HX
Scleria oligantha Michx., SC-224: loc (1); D+? 3

CISTACEAE

Lechea tenuifolia Michx., SC-109: rar (1); A? 5 X

CLUSIACEAE

Hypericum hypericoides (L.) Crantz [not H. stragalum P. Adams & N. Robson], SC-410: occ (2?); A 3 xh
Hypericum punctatum Lam., SC-193: occ (3); D+ 4 HX
Hypericum sphaerocarpum Michx., SC-122: loc fre (5); C 4 HX

CONVOLVULACEAE

Ipomaea lacunosa L., SC-525: occ (3); D 3
Ipomaea pandurata (L.) G.F.W. Mey, SC-297: occ? (1); B+ 5

CARYOPHYLLACEAE

**Cardamine parviflora L. var. arenicola (Britt.) O.E. Schulz, SC-203: rar? (1); A 3 x
**Ericastrum gallicum (Willd.) O.E. Schulz, SC-087: nea-rar (1); B? 5

CAMPANULACEAE

Campanulastrum americanum (L.) Small, SC-259: loc fre (2); E 2
**Lobelia spicata Lam. [much at least tending to var. leptostachya (DC.) Mack. & Bush], SC-092, 341: wid-loc fre (7+); C 4 X
trioidanis perfoliata (L.) Nieuw., SC-sight: pre? (); D? 5?

CAPRIFOLIACEAE

**Lonicera japonica Thunb., SC-043: loc abu (6); D+ 2
Lonicera sempervirens L., SC-040: occ (2); D+? 2
Symphoricarpus orbiculatus Moench, SC-sight: loc (1+); D 2
Triosteum angustifolium L. var. eamesii Wieg, SC-465: rar (1); D 2

CARYOPHYLLACEAE

**Cerastium glomeratum Thuill., SC-052, 075: occ-loc fre? (3); D+ 5

CISTACEAE

Lechea tenuifolia Michx., SC-109: rar (1); A? 5 X

CLUSIACEAE

Hypericum hypericoides (L.) Crantz [not H. stragalum P. Adams & N. Robson], SC-410: occ (2?); A 3 xh
Hypericum punctatum Lam., SC-193: occ (3); D+ 4 HX
Hypericum sphaerocarpum Michx., SC-122: loc fre (5); C 4 HX

CONVOLVULACEAE

*Ipomaea hederacea Jacq., SC-456, 518, 537: occ (3); D+ 3

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Scleria triglomerata Michx., SC-083: occ-loc fre (2+); B+?
3 x

EBENACEAE

Desmodium ciliare

Desmodium canescens

Desmanthus illinoensis

Desmodium glabellum

Dalea candida

Dalea purpurea

Desmodium laevigatum

Desmodium marilandicum

Crotolaria sagittalis

Clitoria mariana

Chamaesyce maculata

Cercis canadensis

Amorpha croceolanata

Diospyros virginiana

Acalypha virginica

Vaccinium arboreum

Desmodium sessilifolium

Euphorbia dentata

Croton capitatus

Galactia regularis

Acalypha ostryifolia

Diospyros virginiana

Tragia urticifolia

Croton monanthogynus

Gleditsia triacanthos

Scleria triglomerata

**Kummerowia striata** (Thunb.) Schindl. [= Lespedeza striata Thunb.], SC-sight: occ (1+); B+ 5

**Lathyrus hirsutus** L., SC-146: sca (2); B+ 4

Lespedeza capitata Michx., SC-371: rar? (1); B? 4 xh

**Lespedeza cuneata** (Dum.-Cours.) G. Don, SC-353: wid-loc dom (11); C+ 4+

Lespedeza intermedia (S. Wats.) Britt. [= true L. violacea
fide Kartesz (1999), Weakley (2010)], SC-372: occ (2); A 3

Lespedeza procumbens Michx., SC-417: occ (2); A 3+ X

Lespedeza violacea (L.) Pers. [sensu Fernald (1950) and
most authors in 1950-2000; = L. frutescens (L.) Ell.],
SC-373: occ-loc fre (2); B 2

Lespedeza virginica (L.) Britt., SC-363: sca-loc fre (5); B+ 4 x

**Medicago lupulina** L., SC-050: loc (1); B+ 4

**Melilotus alba** Medikus, SC-150: loc (5); B+ 4

Neptunia lutea (Leavenworth) Bentham., SC-129: wid-loc com
(4+); C 5 xh

*Robinia pseudoacacia* L., SC-312: nea-loc (1); B+ 3 x

Senna marilandica (L.) Link, SC-sight: rar? (1’); D’ 3

*Senna obtusifolia* (L.) Irwin & Barneby [= S. tora auct.],
SC-300: occ-loc com (1+); B+ 5

Stylosanthes biflora (L.) B.S.P., SC-112: loc (2); A? 3 x

Tephrosia virginiana (L.) Pers., SC-113: occ-loc com (2); A 3 X

**Vicia sativa** L. ssp. nigra (L.) Ehrh. [= V. angustifolia L.],
SC-057?: occ (1); B+? 4

FABACEAE (sensu lato)

**Albizia julibrissin** Durazz., SC-sight: nea-occ (1+); A 2

Amorpha croceolanata P.W. Wats. [= A. fruticosa L. var.
croceolanata (P.W. Wats.) P.W. Wats. ex Mouille],
SC-138, 458: rar (2); E 3

Cercis canadensis L., SC-247: wid-loc com (11); D+ 3

Chamaescrista fasciculata (Michx.) Greene, SC-327: wid-loc
fre (11); B+ 5

Citron mariana L., SC-331: occ (1); A? 3 x

Crotolaria sagittalis L., SC-416: rar-loc fre? (1); B? 3 x

Dalea candida Michx. ex Willd., SC-229: sca-loc fre (1+); C 4

Dalea purpurea Vent., SC-148: wid-loc abu (7); C 4 xh

Desmanthus illinoensis (Michx.) MacM. ex B.L. Robbins. &
Fern., SC-189: wid-loc abu (9); C+ 4 xh

Desmodium canescens (L.) DC., SC-407, 447: occ (3); B? 4

Desmodium ciliare (Muhl. ex Willd.) DC., SC-384: wid-loc
fre (7); B+? 4 X

Desmodium glabellum (Michx.) DC., SC-364, 394, 439 &[ 
450, perhaps tending to D. obtusum (Muhl. ex Willd.)
DC]: sca-loc fre? (8); B+? 3

Desmodium laevigatum (Nutt.) DC., SC-508: nea (1); A 3

Desmodium marilandicum (L.) DC., SC-468: occ (1); A? 3 X

Desmodium paniculatum (L.) DC., SC-437: loc (2); D? 3

Desmodium perplexum Schub. [probably grading into D.
glabellum (Michx.) DC.], SC-438: loc (1’); E+ 3

Desmodium sessilifolium (Torr.) Torr. & Gray, SC-236: sca-
loc fre (8); B+ 4

Galactia regularis (L.) B.S.P. [= G. volubilis auct.,
misapplied], SC-255, 293: sca-loc com (7); B+ 4

Gleditsia triacanthos L., SC-246: sca (6); D 3

FAGACEAE

Quercus falcata Michx., SC-303: loc-loc com (2); A 1 xh

Quercus marilandica Muenchh., SC-305: sca-loc com (7);
A? 2 X

Quercus muehlenbergii Engelm., SC-261: occ-loc fre (4); D 1

Quercus nigra L., SC-276: occ (3); B+ 1 XH

Quercus cf. pagoda Raf., SC-sight: rar (1); E 1 xh

Quercus phellos L., SC-322: loc abu (1+); D+ 1 XH

Quercus stellata Wangenh., SC-304: sca-loc dom (6); B+ 1

GENTIANACEAE

Sabatia angularis (L.) Pursh, SC-171: wid-loc com (7); B+ 4

GERANIACEAE

Geranium carolinianum L., SC-084: occ (1+); B+ 5

HAMAMELIDACEAE

Liquidambar styraciflua L., SC-279: loc (1+); D+ 2 xh

IRIDACEAE

Sisyrinchium albidum Raf., SC-009: com (10); C 4 x
JUGLANDACEAE

*Carya glabra* (P. Mill.) Sweet [mixed or grading into *C. carolinae-septentrionalis* (Ashe) Engl. & Graebn.], SC-286: loc (1); A 1

*Carya illinoinensis* (Wangenh.) K. Koch, SC-262, 459: rar (2); E 1 h

*Carya myristiciformis* (Michx. f.) Nutt. [suggesting hybrid of *illinoinensis* and *ovata*], SC-401: rar (1); E 1 h

*Carya ovata* (P. Mill.) K. Koch, SC-sight: nea-loc fre (1); B?

*Carya tomentosa* (Lam. ex Poir.) Nutt., SC-sight: nea? (1); A 1 xh

*Juglans nigra* L., SC-443: occ-loc fre (2); E 3

LYTHRACEAE

*Lythrum alatum* Pursh var. *lanceolatum* (Ell.) Torr. & Gray ex Rothrock [= *L. lanceolatum* Ell.], SC-238: wid-loc dom (11); D 4 HX

MALVACEAE

*Sida spinosa* L., SC-440: occ? (1); B+ 5

MENISPERMACEAE

*Cocculus carolinus* (L.) DC., SC-302: sca (1+); B+ 3

MORACEAE

*Maclura pomifera* (Raf.) Schneid., SC-243: occ-loc com (6); D+ 3

*Morus rubra* L., SC-081: rar (1+); D 2

OLEACEAE

*Fraxinus pennsylvanica* Marsh. [all may be var. *subintegerrima* (Vahl.) Fern.], SC-241: wid-loc abu (8); E 2 H

*Fraxinus cf. smallii* Beadle [or mixed with *F. americana* L. sensu stricto; see notes in text], SC-278: occ (1+); D+ 1

**Ligustrum sinense* Lour., SC-179: occ-loc fre? (2); D+ 2

ONAGRACEAE

*Gaura longiflora* Spach, SC-381, 396, 435, 451: sca-loc fre (7); D+ 4 HX

*Oenothera speciosa* Nutt., SC-170: occ (3); B+ 5

*Oenothera triloba* Nutt., SC-326: rar (1); D? 5 xh

ORCHIDACEAE

*Spiranthes magnicamporum* Sheviak, SC-535: occ-loc fre (2+); C 4 XH

*Spiranthes ovalis* Lindl. [probably var. *ovalis*], SC-504: rar (2); C+? 3

*Spiranthes vernalis* Engelm. & Gray, SC-216: occ (2); B+? 4

OROBLANCHACEAE

*Agalinis auriculata* (Michx.) Blake [= *Tomanthera auriculata* (Michx.) Raf.], SC-368, 448: occ-loc fre (5); D 4

*Agalinis cf. fasciculata* (Ell.) Raf. [or just transitions to *purpurea*], SC-444: occ? (2?); B? 4 xh

*Agalinis gattingeri* (Small) Small ex Britt., SC-545: occ (1+); C? 4 X
Aristida longespica (Nutt.) Small ex. Britt., SC-533: rar? (1); D? 4
Aristida oligophylla Pennell, SC-448: occ-loc fre? (6+); C? 4 x
Aristida purpurea (L.) Pennell, SC-510: wid-loc fre (11); D+? 4 hx
Buchnera americana L., SC-126: wid-loc fre (9); B+ 4 x
Dasistoma macrophylla (Nutt.) Raf., SC-265, 425: occ (4?); D 2
Mecardonia acuminata (Walt.) Small, SC-506: occ (2); B+ 4 HX

OXALIDACEAE

*Oxalis dillenii Jacq., SC-304, 074: occ (3); D+? 5
Oxalis violacea L., SC-307, 454: occ-loc com (3); B+? 3+ x

PASSIFLORACEAE

Passiflora incarnata L., SC-242: occ (3); D+ 3

PINACEAE

*Pinus taeda L., SC-240: sca-loc abu (8); A 2

PLANTAGINACEAE (= Veronicaceae)

Leucospora multifida (Michx.) Nutt., SC-319: occ-loc fre (1+); D+ 5

Penstemon cf. laevisgatus Ait., SC-273: rar (1); B? 3
Plantago aristata Michx., SC-160: loc (3); A? 5 X
**Plantago lanceolata L., SC-223: nea-loc (1+); B+? 5
Plantago rugelii Dene., SC-442, occ (1); E 2
Plantago virginica L., SC-014: occ-loc fre (6); B+ 4 x
**Veronica arvensis L., SC-085: nea (1); B+ 5

PLATANACEAE

Platanus occidentalis L., SC-308: sca (1+); E 2 h

POACEAE

Agrostis hyemalis (Walt.) B.S.P., SC-088: occ-loc com (1+); A? 5 X
Andropogon gerardii Vitman, SC-362: wid-loc dom (11); D 4
Andropogon gyrans Ashe var. gyrans, SC-461, 498, 502: occ? (3?); B? 4 x
Andropogon teniemuspathes (Nash) Nash [= A. glomeratus (Walt.) B.S.P. var. pumilus (Vasey) L.H. Dewey], SC-406, 543: sca-loc com (7); D 4 hx
Andropogon virginicus L. var. decipiens C. Campbell, SC-486, 541, 542, 543: sca-loc abu (7); B+ 4 xh
Aristida longespica Poir. var. geniculata (Raf.) Fern., SC-429, 511: sca-loc fre (4?); C+ 5 X
Aristida longespica Poir. var. longespica, SC-375, 399, 494, 500: sca-loc fre (4?); C+ 5 X
Aristida oligantha Michx., SC-348: occ-loc fre (5); B+ 5 X

*Plantago lanceolata L., SC-240: sca-loc abu (8); A 2

Dichanthelium acuminatum (Sw.) Gould & C.A. Clark var. acuminatum, SC-169a, 219b, 231: sca? (2+); D+? 4 xh
Dichanthelium acuminatum (Sw.) Gould & C.A. Clark var. fasciculatum (Tuck.) Freckmann, SC-094: sca-loc fre (2+); B+? 4
Dichanthelium cf. meridionale (Ashe) Freckmann [perhaps grading into acuminatum], SC-213: sca? (2?); B? 3
Dichanthelium dichotomum (L.) Gould [sensu stricto], SC-219c: occ-loc fre (4); A 2
Dichanthelium joorii (Vasey) Mohlenbrock [= D. commutatum (Schultes) Gould ssp. joorii (Vasey) Freckmann & Lelong], SC-142: occ (?); E 1
Dichanthelium laxiflorum (Lam.) Gould, SC-436: occ (1?); B? 3
Dichanthelium longiligulatum (Nash) Freckmann, SC-175, 219a: occ? (2?); B+? 4 HX
Dichanthelium microporcarpum (Muhl. ex Ell.) Mohlenbrock, SC-104: loc fre? (1+); B+? 3 H
Dichanthelium oligosanthes (J.A. Schultes) Gould var. scribnerianum (Nash) Gould, SC-061, 211: sca-loc fre? (2+); C 4 x
Dichanthelium scoparium (Lam.) Gould, SC-222: occ-loc fre (1); A 4 HX
Dichanthelium sphaerocarpum (Ell.) Gould, SC-168, 317: loc fre (2); A 3 X
Digitaria ciliaris (Retz.) Koel., SC-467: rar? (1); B+? 5
**Digitaria ischaemum (Schreb.) Schreb. ex Muhl., SC-999: rar? (1); D+? 5
*Digitaria violascens Link, SC-318: rar? (1); A+? 5 X
Elymus glabriflorus (Vasey) Scribn. & Ball [= E. virgincicus L. var. glabriflorus (Vasey) Bush], SC-183: sca-loc com (5); D 3
Elymus virginicus L. [sensu stricto], SC-174: loc abu (6); E 2
Eragrostis capillaris (L.) Nees, SC-347: occ (2); D+? 5
Eragrostis hirsuta (Michx.) Nees, SC-117: occ? (1+); B+? 4 X
Eragrostis pilosa (L.) Beauv., SC-422: occ? (2); B+? 5 x
Eragrostis spectabilis (Pursh) Steud., SC-421: occ (2); D+ 4
**Pascopyrum smithii** (Pursh) Steudl. [= *Schedonorus arundinaceus* (Schreber.) Dumort.], SC-101: sca-loc fre? (6); D+ 4
Festuca paradoxa Desv., SC-139: loc com (6); D 3
Festuca subverticillata (Pers.) Alexeev, SC-sight: loc com (1+); E 2
Glyceria striata (Lam.) A.S. Hitchc., SC-177: occ-loc fre (2); E 2 H
Gymnophorum ambiguus (Michx.) B.S.P., SC-495: rar-loc fre (1); A 4 XH
*Hordeum pusillum* Nutt., SC-204: occ (3); C+? 5 X
**Imperata cylindrica** (L.) Palisot, SC-334, 522: occ (2); B? 4
Leersia virginica Willd., SC-249: occ-loc fre (3); E 2
Leptochloa panicea (Retz.) Ohwi ssp. *brachia* (Steudl.) N. Snow [= *L. filiformis* (Lam.) Beauv.], SC-532: rar? (1); D+ 5
**Lolium perenne** L., SC-190: occ-loc com (4); B+ 5
Muhlenbergia capillaris (L.) Trin., SC-495: occ (4); B? 4 x
Muhlenbergia cf. frondosa (Poir.) Fern. [or perhaps *M. hushii* R.W. Pohl], SC-337: occ? (1); D? 2
Muhlenbergia glabriflora Scribn., SC-336: rar? (1); B? 3 xh
Muhlenbergia sylvatica (Torr.) Torr. ex Gray, SC-530: rar? (1); E 1

**Panicum anceps** Michx. var. *anceps*, SC-359: wid (12); B+ 4
Panicum anceps Michx. var. *rhizomatum* (Hitche. & Chase) Fern., SC-237: loc (6); B+? 3 xh
Panicum capillare L., SC-281, 426: occ (3); D+ 5
Panicum flexile (Gattinger) Scribn., SC-320, 376: sca-loc abu (9?); C+ 5 X
Panicum gattingeri Nash, SC-172, 299, 346: sca (9?); B+? 5
Panicum virgatum L., SC-358, 360: wid-loc fre (12); C+ 4 xh
**Paspalum dilatatum** Poir., SC-116, 354; occ (3); B+ 5
Paspalum floridanum Michx. var. *glabratum* Engelm. ex Vasey, SC-355: sca-loc fre? (5); D+? 4
Paspalum laeve Michx. var. *circulare* (Nash) Stone, SC-432: occ (1+); D+? 4
Paspalum laeve Michx. var. *laeve*, SC-239: occ (1+); B+? 4
Phalaris caroliniana Nash. [including depauperate form with spike ca. 1 cm long], SC-065: loc (1+); B+? 5
Poa autumnalis Muhl. ex Ell., SC-030, 182: occ-loc fre? (2); D 2
Sacccharum brevirbarbe (Michx.) Pers. var. *contortum* (Ell.) R. Webster [= *Erianthus contortus* Ell.], SC-472: loc? (1+); B? 4 xh
Sacccharum giganteum (Walt.) Pers. [= *Erianthus giganteus* (Walt.) Beauv.], SC-509: loc fre (5); D+? 4 xh
Schizachyrium scoparium (Michx.) Nash var. *divergens* (Hack.) Gould, SC-460: rar (1); B? 4 xh
Schizachyrium scoparium (Michx.) Nash var. *scoparium*, SC-344: com-loc dom (12); C 4 X
Setaria parviflora (Poir.) Kerguelen [= *S. geniculata* auct.], SC-091: sca-loc fre (3); B+ 4

**Setaria pumila** (Poir.) Roemer & J.A. Schultes [= *S. glauca* auct.], SC-345: wid (9); D+ 5
*Sorghastrum nutans* (L.) Nash, SC-481: wid-loc com (12); B+ 4
**Sorghum halepense** (L.) Pers., SC-100: wid-loc abu (9); D+ 4
Sphenopholis intermedia (Rydb.) Rydb., SC-029, 063: loc abu (6); D 2
Sphenopholis obtusata (Michx.) Scribn., SC-056, 067, 098: loc com (2+); C+ 4 xh
*Sporobolus clandestinus* (Biehler) A.S. Hitchc., SC-471, 485: sca-loc fre? (1+); B 4 X
*Sporobolus compositus* (Poir.) Merr. var. *drummondii* (Trin.) Kartesz & Gandhi [= *Sporobolus asper* (Michx.) Kunth var. *drummondii* (Trin.) Vasey], SC-488: wid-loc abu (12?); C 4 xh
*Sporobolus vaginiferus* (Torr. ex Gray) Wood, SC-349: fre-loc abu (8); C 5 XH
*Tridens flavus* (L.) A.S. Hitchc., SC-245: occ (1); D 4
*Tridens strictus* (Nutt.) Nash, SC-497: loc (3); B? 4 xh
*Tripsacum dactyloides* (L.) L., SC-208: occ-loc fre (3?); D+ 4 XH

**POLEMONIACEAE**

Phlox cf. *carolina* L. var. *carolina* [or transition to *P. pilosa*], SC-201: occ (1); A? 3 xh
Phlox pilosa L. [probably var. *pilosa*], SC-089: occ (1); B? 4 x

**POLYGALACEAE**

Polygala verticillata L. [sensu stricto], SC-159: occ-loc fre (2); B? 5 X

**POLYPODIACEAE**


**POTAMOGETONACEAE**

Potamogeton diversifolius Raf., SC-220: rar (1); B 3 HH

**PRIMULACEAE**

Lysimachia aff. *ciliata* L. [but dentate-fimbriate petals, narrow cuneate leaves; see notes in text], SC-192: rar (1); E 2
*Samolus floribundus* Kunth, SC-166: rar (1); E 2

**RANUNCULACEAE**

Anemone berlandieri Pritz., SC-071: rar (2); C? 3 xh
Anemone virginiana L., SC-388: rar (1); E 2
Ranunculus fascicularis Muhl. ex Bigelow, SC-023: occ (2); C+? 3 X
**Ranunculus sardous** Crantz, SC-033: occ (3); D+ 5

**Rhamnaceae**

Berchemia scandens (Hill) K. Koch, SC-144: wid-loc abu (8); D+ 2
Ceanothus americanus L., SC-114: occ (3); B? 3 X
Frangula caroliniana (Walter) Gray [= Rhamnus caroliniana Walt.], SC-196: occ (1+); D? 3

**Rosaceae**

Crataegus crus-galli L. [probably var. pyracanthifolia Ait.], SC-282: rar (2); D+? 3
Crataegus engelmannii Sarg. [= C. berberifolia Torr. & Gray var. engelmannii (Sarg.) Eggle., SC-269, 420: rar (2); B+? 3 X
Fragaria virginiana Duchesne, SC-013: sca-loc fre (8); B+ 5
Geum canadense Jacq., SC-165, 0198b: occ (2); D+ 3
Potentilla simplex Michx., SC-178: occ? (1); B? 3
Prunus angustifolia Marsh., SC-047: occ-loc abu (5); B+ 3
Prunus serotina Ehrh., SC-313: sca-loc fre (6+); B+ 5 x
Rubus cf. argutus Link, SC-sight: nea (1?); B+? 3
Rubus cf. flagellaris Willd., SC-210, 301: loc? (1); B+? 3 X
Rubus cf. serissimus Bailey [= R. bicolor auct., see notes in text], SC-161: nea (1); A+? 3
Rubus trivialis Michx., SC-016: wid-loc fre (10); B+ 3

**Rubiaceae**

Diodia teres Walt., SC-453: rar? (1); B+ 5 XH
*Diodia parviflora* (Michx., SC-026: occ (2); D 2
Galium circaezans Michx., SC-124: sce (3); D 1
Galium pilosum Ait., SC-321: rar (1); B? 3 X
Houstonia lanceolata (Poir.) Britt. [= Houstonia purpurea L. var. calycosa Gray], SC-005: wid-loc fre (9); C 4 X
Houstonia nigricans (Lam.) Fern. [= *Hedyotis nigricans* (Lam.) A.S. Hitchc.], SC-272: loc fre (3); C 5 X
*Spermacoce glabra* Michx., SC-187: occ? (1); D? 5? h

**Salicaceae**

Populus deltoides Bartr. ex Marsh., SC-256: occ (1); E 2
Salix nigra Marsh., SC-283: rar (1); E 2 H

**Santalaceae**

Comandra umbellata (L.) Nutt., SC-527: loc fre (1); C+? 3

**Sapindaceae**

*Cardiospermum halicacabum* L., SC-403: rar (1); D 3 h

**Sapotaceae**

Sideroxylon lycioides L. [= *Bumelia lycioides* (L.) Pers.], SC-271, 310: occ (1+); C+ 3

**Smilacaceae**

Smilax bona-nox L., SC-263, 455: fre (9); B+ 3
Smilax hispida Muhl. ex Torr., SC-264: occ (3); E 2
[Smilax lasioneura Hook., added in press: rar (1); E 2]
Smilax rotundifolia L., SC-sight: loc (1); A 2

**Solanaeaceae**

Physalis angulata L., SC-529: rar? (1); D 5
Physalis longifolia Nutt. var. subglabrata (Mackenzie & Bush) Cronq. [= *Physalis subglabrata* Mackenzie & Bush], SC-197, 333: sce (2+); D+ 4
Physalis virginiana P. Mill., SC-194: sce (4); B+ 4 X
Solanum carolinense L., SC-153: occ (5); B+ 5

**Ulmaeaceae** (sensu lato)

Celtis laevigata Willd., SC-248: loc abu (9); E 2 h
Ulmus alata Michx., SC-274: loc com (3); B+ 1 X
Ulmus americana L., SC-277: occ (4); E 1 H
Ulmus rubra Muhl., SC-145: occ (1); D 1

**Valerianaceae**

Valerianella radiata (L.) Dufr., SC-004, 021: loc com (9);
C+ 3+ hx

**Verbenaceae**

*Glandularia bipinnatifida* (Nutt.) Nutt., SC-048: rar-loc fre (1); D? 4
Glandularia canadensis (L.) Nutt., SC-383: rar? (1); B? 4
Phyla lanceolata (Michx.) Greene, SC-295: rar (1); E 5 h
**Verbenas brasiliensis** Vell., SC-415: nea-occ (1); B? 4
Verbenas simplex Lehm., SC-120: sce-loc fre (6+); B+ 5 x
Verbenas urticifolia L., SC-sight: occ (1); D? 3

**Violaceae**

Viola cf. missouriensis Greene [see notes in text], SC-022: loc com (6); D 2 hx

**Vitaceae**

*Amelopsis arborea* (L.) Koehne, SC-137: loc fre (4); D+ 3 hx
Amelopsis cordata Michx., SC-136: loc (3); E 3
Parthenocissus quinqufolia (L.) Planch., SC-082, 133: occ (3+); B+ 3
Vitis aestivalis Michx., SC-419: nea (1); A 2
Vitis vulpina L., SC-315: occ-loc fre (1); D 3