

New additions, vouchers of old additions, and a new combination (*Dichanthelium inflatum*) for the Missouri flora

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ABSTRACT. – Thirty taxa are reported or confirmed for Missouri, along with discussions of their biogeography, ecology, taxonomy, and field characters. A new combination, *Dichanthelium inflatum*, is created to accommodate a distinct element in the state.

INTRODUCTION

Over the years, I've documented several species new to Missouri that have long been in need of reporting or vouchering. Yatskievych (2006, 2013) and Ladd and Thomas (2015) include a few of these, but without direct reference to vouchered specimens. Some of these species have clean taxonomic histories, while others have moderately convoluted taxonomic histories. In the latter case, I've provided evidence and justification for my perspective. Additionally, I've encountered a taxon of *Dichanthelium* that needs to be pulled out of *D. sphaerocarpon*. This new combination, *Dichanthelium inflatum*, is discussed and compared to related taxa. All voucher specimens are deposited in the herbarium of the Missouri Botanical Garden (MO).

FLORISTIC ENUMERATION

Agrostis scabra Willd.

This species differs from *A. perennans* in that the secondary panicle branches diverge beyond the middle of their length. It differs from *A. hyemalis* in having spikelets well separated in the inflorescence (compared to spike-like at the tips of panicle branches), longer spikelets (> 2 mm), longer pedicles and a later blooming period (mid-summer to fall compared to late spring). This species has a wide geographical range throughout North America. Barkworth et al. (2007) refer to three variants of *A. scabra*. The Missouri specimen fits into the southeastern, weedy variant.

Voucher specimen: U.S.A. MISSOURI: BARTON CO.: Shelton Cook Memorial Meadow in open flat along swale, NAD83 coordinates 15 S 399939.0, E 4141666.8, 25 Sept. 2015, Thomas #15-09-25-1.

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***Andropogon hirsutior* (Hack.) Weakley and LeBlond**

This species was discovered in Missouri in 2015 at Diamond Grove Prairie Natural Area, but the plants did not make adequate herbarium specimens. Since then, the species has been found at several other locations including Cook Meadow (Barton Co.), Prairie State Park (Barton Co.), and Carver Prairie (Newton Co.). At all three localities it was associated with wet soils in relatively intact prairie swales. Additional associated species at these sites included *Tridens strictus*, *Panicum anceps*, and *Andropogon virginicus*. It also has been observed numerous times growing as large colonies in road ditches in the southern half of the Unglaciated Plains Natural Division, suggesting that it does not necessarily exhibit fidelity to sites with high ecological integrity. Andrew Braun has also vouchered it on Crowley's Ridge in southeastern Missouri. It is similar in gross morphology to *A. virginicus* but taller, with thicker stems, slightly scabrous sheaths (Weakley et al. 2011), and more numerous and denser inflorescence branches (Hitchcock and Chase 1951). The clumps of the previous season weather to a pale gray color compared to the yellow-orange color of *A. virginicus*. This is one of several primarily southern coastal plain species that enter southwestern Missouri through the southern Tallgrass Prairie.

Voucher specimen: U.S.A. MISSOURI: NEWTON CO.: Carver Prairie, several thousand stems growing throughout large swale, with *Panicum rigidulum*, *Rhynchospora recognita*, *Persicaria hydropiperoides* and *Ludwigia palustris*, NAD83 coordinates 15 S 376258.3, E 4098037.8, 5 Sept. 2016, Thomas 16-09-05-1.

***Bothriochloa ischaemum* (L.) Keng**

This exotic species was collected or annotated from roadsides in three Missouri counties (Howell, Shannon, and Warren) in 2010 by various collectors. The specimen cited occurs in an area with heavy horse trailer traffic from “trail rides” in the Eminence area. Seed blowing from horse trailers is a likely source for this species as well as *B. bladhii*, which is also increasing in the area.

Voucher specimen: U.S.A. MISSOURI: SHANNON CO.: along the margin of state highway 19 at junction with gravel road, extending for about 100 meters, associated with *Bothriochloa bladhii* and *B. saccharoides*, NAD83 coordinates 15 S 643700.9, E 4118580.3, 23 July 2010, Thomas 2347.

***Carex woodii* Dewey**

The protected, seepy bluffs along Spring Creek harbor many rare and relictual species including *Carex woodii*. Several of these species, such as *Euonymus obovatus*, *Tilia americana*, *Phlox carolina* var. *interior*, and *Cypripedium reginae* are indicative of mesic beech-maple forest communities more common north and east of the Ozarks. This population of *C. woodii* represents a disjunction of nearly 450 miles from the nearest known population in Kankakee County, Illinois (Kartesz 2013). *Carex woodii* forms small to large, rhizomatous colonies in high quality forests and woodlands on rich, mesic to wet mesic soils. Through the efforts of Paul McKenzie, several other populations of *C. woodii* along Spring Creek have been documented.

Voucher specimen: U.S.A. MISSOURI: HOWELL CO.: Mark Twain National Forest, on extremely steep slope ca. 60 meters above Spring Creek and below a large dolomite outcrop; dense colony of mostly sterile shoots growing on a sandstone-based shelf below a dolomite shelf, approximately 100 × 10-20 meters, consisting of thousands of stems, associated with *Maianthemum canadense*, *Desmodium glutinosum*, *Quercus alba*, *Geranium maculatum*, *Carex communis*, *Carex timida*, *Tilia americana*, *Staphylea trifolia*, *Adiantum pedatum*, *Euonymus obovatus*, *Acer saccharum* and *Brachyelytrum erectum*, NAD83 coordinates 15 S 582321.1, E 4085091.3, 26 May 2008, Thomas 1917.

Coleataenia longifolia (Torrey) Soreng ssp. *longifolia*

This species was originally reported by Ladd and Thomas (2015) as *Panicum longifolium* Torrey. Recent work by Zuloaga et al. (2010) support the separation of yet another distinct genus out of the traditional concept of *Panicum*, and Soreng (2010) instituted the genus as *Coleataenia*. The population cited here represents the only known location for this species in Missouri. It should be looked for in high quality wetland communities that harbor other taxa more commonly associated with the southern coastal plain. *Coleataenia longifolia* can be differentiated from *C. rigidula* in having a ciliate ligule which is greater than 1.0 mm long, compared with an erose ligule 0.3-1.0 mm long in the latter species.

Voucher specimen: U.S.A. MISSOURI: SHANNON CO.: Mark Twain National Forest, Grassy Pond Natural Area, southeast of Winona, on floating sedge mats in sinkhole pond, associated with *Rhynchospora scirpoides*, *Utricularia gibba*, *Brasenia schreberi* and *Triadenium walteri*, NAD83 coordinates 15 S 651246.1, E 4093239.5, 5 Oct. 2012, Thomas 2607.

Dichanthelium columbianum (Scribn.) Freckmann

Few remnants remain of the once extensive sand prairie communities in southeastern Missouri. Several of these remnants have large populations of *D. columbianum* which persists as a dominant component in areas with deep, well-drained, sandy soils where little else grows. This species is distinct from other Missouri *Dichanthelium* by having hairs restricted to the marginal areas of the adaxial surfaces of the vernal blades, which are glabrous down the middle (Thomas 2015). It is also unique in the way the vernal leaves curl under, nearly forming circles in late summer through winter. Missouri populations represent the southwestern extent of *D. columbianum*'s range. It is a species of deep sandy soils of dunes and deposits from the coasts of the Northeast, through the Great Lakes and down the Mississippi River with few interior localities (Thomas 2015).

This is the first verified collection of *Dichanthelium columbianum* from Missouri. Steyermark (1963) excluded a single record of *D. columbianum* (then *Panicum columbianum*) based on questionable label data. That specimen has since been determined to belong to the *D. acuminatum* complex; likely *D. lanuginosum*. A Taney County specimen collected in 1987, Ladd 12337 (MO), was initially determined as *P. columbianum*. Yatskievych later annotated the specimen as *P. portoricense* and placed *P. columbianum* under synonymy (Yatskievych 1999).

This specimen was subsequently annotated by Freckmann as *D. acuminatum*. Upon review, the specimen better fits what Thomas (2015) calls *D. lanuginosum*.

Voucher specimen: U.S.A. MISSOURI: SCOTT CO.: Sand Prairie Conservation Area, in remnant sand prairie north of Highway 77 and east of Road 333, east of Benton, NAD83 coordinates 16 S 277518.3, E 4108619.7, 21 August 2009, Thomas #09-08-21-1.

***Dichanthelium inflatum* (Scribn. & J.G. Sm.) J.R. Thomas comb. nov.**

Panicum inflatum Scribn. & J.G. Sm. Circular, Division of Agrostology, United States Department of Agriculture 16: 5. 1899. (1 Jul 1899). *Panicum sphaerocarpon* subsp. *inflatum* (Scribn. & J.G. Sm.) Hitchc. Contributions from the United States National Herbarium 15: 253, f. 275. 1910. *Panicum sphaerocarpon* var. *inflatum* (Scribn. & J.G. Sm.) Hitchc. Manual of the Grasses of the United States 643, 913. 1935. **USA. Mississippi.** Harrison Co.: Biloxi, 18 Oct 1898, S.M. Tracy #4622 (US!; isotype: MO!).

This new combination is necessary to accommodate plants that diverge significantly from the morphology of *D. sphaerocarpon*. Hitchcock and Chase (1951) and Fernald (1950) recognized *inflatum* infraspecifically (subsp. by the former and var. by the latter) as differing from typical *Panicum sphaerocarpon* by being taller, with linear-lanceolate blades that are \leq 1 cm wide, with nearly parallel margins. They also noted that *inflatum* differs in having a noticeable ligule to 1 mm long and spikelets 1.3-1.5 mm long (compared to the obsolete ligule and spikelets 1.5-1.8 mm long in *D. sphaerocarpon*). This morphology has a strong geographical component, as specimens are restricted to the southern coastal plain from Maryland to Texas. In preparation for an upcoming treatment for *Dichanthelium* in Arkansas, I conducted a thorough review of numerous specimens from Arkansas and throughout the southeast and was surprised at the consistency of these characters. Additionally, most specimens of *D. inflatum* consistently have few (\leq 15) ciliate hairs per side at the base of vernal blades, compared to *D. sphaerocarpon*. Given how consistently these characters differentiate the two taxa and given their geographical affinity, the elevation to species seems justifiable and warranted.

The cited voucher of *D. inflatum* was collected in an acidic prairie in southwestern Missouri where it occurred with other species typical of the southern coastal plain and southern Tallgrass Prairie, including *Marshallia caespitosa*, *Rhynchospora recognita*, *Dichanthelium neuranthum*, *Andropogon hirsutior*, and *Ludwigia linearis*. Another population of *D. inflatum* was found several miles away at another prairie remnant with many of the same associates. Both of these sites differ from most prairie remnants in the area in their abundance of *Sporobolus heterolepis* and *Rhynchospora recognita*. Such prairies are colloquially referred to as “dropseed prairies”. Both *D. inflatum* and *D. sphaerocarpon* thrive in seasonally moist and slightly disturbed soils with light to moderate interspecific competition.

Voucher specimen: U.S.A. MISSOURI: NEWTON CO.: Diamond Grove Prairie Natural Area, NAD83 coordinates 15 S376816.7, E 4097401.8, 17 July 2014, *Thomas 14-07-17-1*(MO).

***Dichanthelium joorii* (Vasey) Mohlenbr.**

As stated in Ladd and Thomas (2015), this has been a largely overlooked species in Missouri. Because of its intermediate morphology, it initially appears to represent hybridization or introgression between *D. ashei* and *D. commutatum*. However, it forms distinct populations with unique characters throughout eastern, southern, and southeastern North America. It has an erect habit with more evenly distributed leaves than either *D. ashei* or *D. commutatum*. *Dichanthelium joorii* also tends to branch more, is more erect, and has leaves that are nearly symmetrical at the base and taper to nearly acuminate tips, compared to *D. commutatum*. This is contrary to the keys and descriptions in many floras including Hitchcock and Chase (1951), Fernald (1950), and Flora of North America (Barkworth et al. 2007) which, based on a review of the type material, appear to have these characters reversed. One wonders if this reversal has added to the confusion in the group. Plants tend to be lighter green than those of *D. ashei* or *D. commutatum*, and occur in more mesic habitats than those of *D. ashei*. Field familiarity with this species alleviates impressions of morphological intermediacy between *D. ashei* and *D. commutatum*, and brings resolution to the group.

Voucher specimen: U.S.A. MISSOURI: CARTER CO.: Chilton Creek Preserve, near western entrance to south side of the property, associated with *Phryma leptostachya*, *Ageratina altissima*, *Dichanthelium boscii*, *Solidago ulmifolia*, *Ulmus alata*, and *Quercus alba*, NAD83 coordinates 15 S 763005.8, E 4103350.3 8 June 2012, *Thomas 12-06-08-1*.

***Dichanthelium longiligulatum* (Nash) Freckmann**

This species usually occurs along the draw-down zone of ephemeral wetlands, ditches, and pond margins. It appears to have a proclivity for acidic, sandy-clay and clay soils with little competition, where it forms large populations of well-spaced clumps. It is a morphological diminutive within Section *Lanuginosa*. Thomas (2015) discusses the details of distinction between *D. longiligulatum* and other members of section *Lanuginosa*. This species has recently been documented at numerous locations across the state.

Voucher specimen: U.S.A. MISSOURI: HARRISON CO.: Dunn Ranch Prairie, large population on the upstream side of swale feeding into pond, NAD83 coordinates 15 S 406509.8, E 4483757.5, 11 August 2014, *Thomas 2715*.

***Dichanthelium neuranthum* (Griseb.) LeBlond**

Despite being a common and situationally dominant component of prairies in the Osage Plains Natural Division that have southern coastal plain floristic elements, this species was long undetected in Missouri. Specimens collected in the early 2000s were misidentified as *D. portoricense*. Ladd and Thomas (2015) referred to this taxon as *D. angustifolium* in a “broad sense” application of that name. Since then, work throughout the southeastern U.S. combined with

herbarium research has demonstrated that the Missouri material clearly represents *D. neuranthum* and that *D. angustifolium*, in the strict sense, although found in nearby Arkansas counties, is yet to be found in Missouri.

This species only occurs in prairie communities in Missouri. I have observed a strong correlation between disturbance (induced by intense fires, grazing or growing season fire) and rampant hybridization between this species and *D. lanuginosum*; “growing season” is defined as any point at which plants have either entered into or have broken from their winter dormancy. In such situations, it is often difficult to find plants that have not introgressed to some degree. This is a profound phenomenon of some concern witnessed in many species in several genera in prairies and woodlands including *Dichanthelium*, *Desmodium*, *Lespedeza* and *Elymus*, and certainly requires further study.

Voucher specimen: U.S.A. MISSOURI: NEWTON CO.: Diamond Grove Prairie Natural Area, associated with *Rhynchospora recognita*, *Andropogon gerardii*, *Viola sagittata*, *Dichanthelium lanuginosum*, *Scleria triglomerata*, and *Elymus jejunus*, NAD83 coordinates 15 S376816.7, E 4097401.8. 17 June 2015, Thomas 15-06-17-1.

***Digitaria violascens* Link**

In Missouri, this species superficially resembles *D. ischaemum* but has spikelets <2.0 mm long, often with fewer racemes and is generally smaller in stature. It has since been found at two other locations and is likely more common in southern Missouri than collections currently indicate. It occurs in heavily disturbed areas with fairly open canopy and should especially be looked for along logging roads. *Digitaria violascens* is a non-native species that has become established in the southeastern United States.

Voucher specimen: U.S.A. MISSOURI: BUTLER CO.: Mark Twain National Forest. Cane Ridge management area, associated with *Solidago nemoralis*, *Solidago longipetiolata*, *Rubus roribaccus* and *Digitaria ischaemum*, NAD83 coordinates 15 S 715457.9, E 4087804.6, 12 Sept. 2012, Thomas 2614.

***Eleocharis acutisquamata* Buckley**

This taxon has consistently been encountered in vegetation sampling projects in glaciated and unglaciated prairies in Missouri. It differs strikingly from *E. compressa*, under which it has been treated as a variety (FNA 2002), by having narrower culms that are less flattened and darker green. Additionally, the scales of the spike have less hyaline tips that are notched instead of the more deeply cut tips typical of *E. compressa*. In Missouri, *E. compressa* appears to be restricted to the high calcium soils of dolomite and limestone glades and fens, whereas *E. acutisquamata* is found in acidic to circumneutral soils of prairies. *Eleocharis acutisquamata* also resembles *E. elliptica*. The two can be difficult to distinguish but *E. elliptica* tends to have blunt-tipped scales that are merely notched, compared to the pointed, deeply bifid scales of *E. acutisquamata* and *E.*

compressa. *Eleocharis acutisquamata* occurs in wet to mesic grasslands, meadows, and open oak woods throughout the Great Plains.

Voucher specimen: U.S.A. MISSOURI: BARTON CO.: Golden Prairie, in prairie swale, NAD83 coordinates 15 S 397987.9, E 4135973.2, 9 July 2013, Thomas 13-07-09-1.

***Eleocharis bifida* S.G. Smith**

A small population of *Eleocharis bifida* was discovered while visiting a population of *Dalea gattingeri* on a small glade in Howell County. Being intimately familiar with *E. compressa*, which occurs in seasonally wet zones on many calcareous glades in the Ozarks, I immediately realized that these plants were different. Compared to *E. compressa*, *E. bifida* typically has wider stems, a deeper green color, more deeply bifid basal scales and thicker rhizomes. *Eleocharis bifida* and *Dalea gattingeri* also co-occur on limestone glades in the Central Basin of Tennessee and both have restricted geographical ranges.

Voucher specimen: U.S.A. MISSOURI: HOWELL CO.: White Ranch Conservation Area, in degraded glade, associated with *Dalea gattingeri*, *Carex crawei*, and *Houstonia nigricans*, NAD83 coordinates 15 S 611457.4, E 4042821.8, 3 June 2017, Thomas 17-06-03-1.

***Eupatorium album* L.**

Several stems of *E. album* were found in a fire-scorched area of Mark Twain National Forest in 2012. Given that other species of *Eupatorium* have been spreading their ranges into southeastern Missouri from southeastern states, there is no reason to believe that the intensity of fire is responsible for the occurrence of *E. album*, as has been speculated. Schilling (2011) conducted a molecular investigation into the *E. album* complex which resulted in a nuanced perspective of the underlying systematics and some nomenclatural changes. Considering this treatment, the Missouri material safely fits the morphology of typical *E. album*. Outside of Missouri, *E. album* occurs in central Mississippi, Kentucky, and Tennessee east to the Atlantic and Gulf coasts (Schilling 2011).

Voucher specimen: U.S.A. MISSOURI: CARTER CO.: Mark Twain National Forest. South of Fremont, in gravel wash community and uplands of recently severely burned woodland, associated with *Panicum virgatum*, *Andropogon gerardii*, *Brickellia eupatorioides*, *Elymus glabriflorus* and *Physostegia virginiana*, NAD83 coordinates 15 S 662276.1, E 4082931.3, 22 August 2012, Thomas 2621.

***Heliopsis gracilis* Nutt.**

Fisher (1957) conducted a thorough investigation into the taxonomy of *Heliopsis*, but left many unanswered questions. Chief among them is the relationship of *H. gracilis* with the *H. helianthoides* complex. By providing no narrative comparison, we are forced to separate them based on the character provided in his key; 6-8 rays for *H. gracilis* and 10-12 rays for *H. helianthoides*. Under *H. gracilis* Fisher states the following:

"The original description adequately agrees with the specimens examined except for a reference made concerning the indument of the leaves and peduncles which is described as being scabrous or smooth. The description may have been compiled from a single plant specimen. All the herbarium specimens examined are glabrous, or essentially so, certainly not scabrous. The most logical explanation of this discrepancy lies in the fact that the range of the species, as cited in the original description, is Georgia to Louisiana to Arkansas. This range would overlap that of the newly described taxon *H. helianthoides* ssp. *scabra*, which does have scabrous leaves. All specimens from Louisiana to Arkansas have been determined *H. helianthoides* ssp. *scabra*, not *H. gracilis*. Therefore, the original description by Nuttall may have been broadened to include those plants which are now determined *H. helianthoides* ssp. *scabra*."

The problem is that many small statured, small flowered plants with long, narrow leaves occur west to Texas and north into the Ozarks of Arkansas and Missouri. Many of these specimens have 6-8 rays and are identical to Fisher's narrow concept of *H. gracilis* except for their slightly scabrous adaxial leaf surfaces. Fisher reported clinal variation in several characters among his subspecies of *H. helianthoides*, with the typical subspecies in the east being glabrous on the adaxial leaf surfaces, the central range subspecies *scabra* being slightly scabrous, and the northwestern subspecies *occidentalis* being very scabrous. After examining specimens, I concur with this finding in regard to the variation in indument of the adaxial leaf surfaces of *H. helianthoides*, among other characters. However, I believe that affording this same degree of clinal variation to *H. gracilis* serves to confirm Nuttall's original description and geographical range better than Fisher's alternative hypothesis that Nuttall described the species more broadly, morphologically and geographically, than he intended. This broadened concept of *H. gracilis*, which seems more likely to be Nuttall's intent, is certainly more distinct than *H. helianthoides* subsp. *scabra* and subsp. *helianthoides* are from each other. Admittedly, some specimens are difficult to place as *H. gracilis* or *H. helianthoides* subsp. *scabra*, with absolute confidence, but by allowing the leaves of *H. gracilis* to be scabrous or glabrous, as in Nuttall's original description, a cleaner, more satisfying *H. gracilis* emerges. This also lends clarity to *H. helianthoides* subsp. *scabra* which is hereby better united with the typical glabrous subspecies and severed from the many troublesome Interior Highlands populations that, besides having a subtle difference in leaf pubescence, are better considered to be *H. gracilis*.

In Missouri, *H. gracilis* occurs in slightly more mesic and shaded habitats than *H. helianthoides*. It also seems to have an affinity, if not dependence, on calcareous soils. It is especially fond of mesic rocky dolomite outcrops and mesic bottoms. I have annotated specimens of *H. gracilis* from the following Missouri counties: Carter, Crawford, Madison, Oregon, Ozark, St. Louis, Shannon and Taney. It is worth noting that *H. helianthoides* is also common throughout Missouri including the Ozarks.

Voucher specimen: U.S.A. MISSOURI: MADISON CO.: Mark Twain National Forest, on floodplain of Peters Creek in disturbed bottomland forest with open canopy, associated with *Coreopsis pubescens*, 37.4248° N, 90.3333° W, 24 July 2014, Brant 7693 (MO).

***Houstonia canadensis* Willd. ex Roem. and Schult.**

For several years I have encountered an odd *Houstonia* on dolomite glades and glade-like bluffs in the northeastern Ozarks. These plants are all morphologically very similar to *H. canadensis* in that they are short, relatively few branched, and have conspicuous basal rosettes and larger flowers compared to *H. longifolia* or *H. tenuifolia*. The large basal rosettes led me to believe that they were *H. canadensis*, but they lacked the ciliate margins that most treatments attribute to *H. canadensis*. Upon review of herbarium specimens, I found that some plants from Missouri populations have very short ciliate margins on some basal leaves and not on others. I also found that a few specimens of *H. canadensis* in the heart of its range (east-central Kentucky to south central Ohio) also lack ciliate hairs. Additionally, although the key in Terrell's (1996) treatment of the group includes ciliate margins for *H. canadensis*, his description admits "or rarely glabrate" margins. Other than *H. nigricans*, which these plants are clearly not, no other *Houstonia* consistently occurs in open calcareous habitats in Missouri. These specimens occur in Cape Girardeau, Franklin, Jefferson, and St. Louis counties. The review also led to a new county record for St. Clair County, Illinois. *Houstonia canadensis* is also known from several Illinois counties just across the Mississippi River from the new Missouri sites, which makes the Missouri plants a slight range extension rather than a disjunction.

Voucher specimen: U.S.A. MISSOURI: FRANKLIN CO.: Shaw Nature Reserve, Dana Brown Woods, at edge of glade area, in dry oak/hickory woods, associated with *Plantago pusilla*, *Galium virginatum* and *Arenaria patula*, 38.4703° N, 90.8172° W, 11 May 2004, Holmberg 468.

***Hypericum lobocarpum* Gatt. ex. J.M. Coulter.**

Both Steyermark (1963) and Yatskievych (2006) attributed *Hypericum lobocarpum* (the former as a variety of *H. densiflorum*) to Missouri based on two specimens (*Bush* 282 and *Steyermark* 40010) that Adams, in conjunction with his monograph of section *Myriandra* (Adams 1962), annotated as being most like *H. lobocarpum* but possibly hybridized with *H. prolificum*. Tim Smith (2006) relocated the population of *H. lobocarpum* that Bush collected in Ripley County. These plants also resemble the putative hybrid plants in that they are often tricarpellate and the pistils are more shallowly lobed than the deeply pentacarpellate pistils of typical *H. lobocarpum*. In 2012, Jacob Hadle and I encountered a population of plants that fit the typical morphology of *H. lobocarpum*. Upon review of herbarium specimens at MO, we found other collections of typical *H. lobocarpum* (Butler County: *Summers* #8293; *Hudson* s.n.; Stoddard County: *Holmes* 1005) that were previously treated as *H. prolificum*. Thus, while *H. lobocarpum* is not necessarily new to Missouri's flora, these more typical populations are noteworthy.

Voucher specimen: U.S.A. MISSOURI: BUTLER CO.: Big Cane Conservation Area, numerous plants along forest edge, associated with *Crataegus marshalli*, *Amorpha nitens*, and *Amorpha fruticosa*, NAD83 coordinates 15 S 726048.7, E 4042275.2, 18, July 2012, Thomas 2617.

***Juncus filipendulus* Buckley**

This species has an odd distribution. It is found in central Texas, Alabama, and central Tennessee, with a few outliers in surrounding states. It resembles *Juncus marginatus* in silhouette but has fewer heads (1-5) and thicker, more pointed tepals. It typically is found on calcareous substrates. More populations should be looked for in the White River Hills of the western Ozarks.

Voucher specimen: U.S.A. MISSOURI: TANEY CO.: Mark Twain National Forest, Hercules Glades Wilderness Area, in expansive glade opening surrounded by high quality native vegetation, approximately 20 plants on wet seepy shelves, especially where puddles have formed, NAD83 coordinates 15 S 510697.3, E 4061368.3, 24 June 2009, Thomas 2000.

***Knautia arvensis* (L.) Coul.**

This is a sporadic escapee from gardens into weedy areas throughout North America. It is questionable whether populations persist. From a distance it resembles a slightly off-color and leggy *Cichorium intybus* or *Centaurea maculata*.

Voucher specimen: U.S.A. MISSOURI: DADE CO.: In roadside ditches at highway intersection, NAD83 coordinates 15 S 4249828.8, E 4138372.1, 17 July 2014, Thomas 14-07-17-1.

Linum floridanum* (Planch.) Trel. var. *floridanum

At Shut-in Mountain Fens in the spring of 2010, Scott Namestnik, Brad Slaughter and I encountered three species new to Missouri. Two of them, *Cladonia jamaicense* and *Utricularia minor*, were reported by Namestnik et al. (2012). The third species initially appeared to be a very odd *Linum medium* var. *texanum*. Further investigation resulted in its identification as *L. floridanum* var. *floridanum*; a species of southeastern North America. A subsequent review of Missouri material at MO resulted in the discovery of another record from a calcareous fen in Howell County (Summers 3388). Since then, *L. floridanum* has been found at several fens in the Ozarks.

Voucher specimen: U.S.A. MISSOURI: SHANNON CO.: Shut-in Mountain Fens Preserve, in small fen with abundant exposed dolomite bedrock, associated with *Andropogon gerardii*, *Sorghastrum nutans*, *Andropogon scoparius*, *Oxypolis rigidior*, *Rudbeckia fulgida*, *Vernonia baldwinii* var. *interior*, *Lysimachia quadriflora*, *Helenium autumnale*, *Liatis pycnostachya*, *Furina simplex*, *Eupatorium perfoliatum*, *Sympyotrichum lateriflorum*, *Panicum virgatum*, *Rhynchospora capillacea* and *Pycnathemum virginianum*. NAD83 coordinates 15 S 657489.3, E 4108526.9 28, August 2012, Thomas #12-08-28-1.

***Listera australis* Lindl.**

A single stem of *Listera australis* was found on a Missouri Native Plant Society field trip. It is distinct from other species of orchid in Missouri in having two leaves nearly opposite each other on the middle of the stem. *Listera australis* ranges from central Arkansas, south to eastern Texas, east to Florida and north along the Atlantic Coast into New York and Vermont.

Voucher specimen: U.S.A. MISSOURI: STODDARD CO.: Holly Ridge Conservation Area, on Crowley's Ridge, in moist sandy soil near acid seep meander, 1 plant at base of oak tree, ca. 30 feet west of *Isotria verticillata* colony, 36.8442° N, 89.9078° W, 19 April 2009, Yatskievych 09-36.

Ludwigia linearis* Walter var. *linearis

This species is included for Missouri based on an 1894 collection of *Ludwigia linearis* from Allenton, St. Louis County by George Letterman (Yatskievych 2013). This collection is one of several collections by Letterman of species that have never been relocated in the area and lack detailed location information. Given the uncertainty of these collections, there is no way to be sure if the current discovery of *L. linearis* is new to the state or just a new collection of a locally extirpated species; I suspect the former. *Ludwigia linearis* differs from other species in Missouri (Yatskievych 2013) by having as many stamens as sepals (as opposed to twice as many) and having alternate, linear leaves. Both the Letterman collection and specimens from the new population fit Peng's (1989) "completely glabrous morph" which he interprets as an often-sympatric glabrous expression of his "densely strigillose morph". *Ludwigia linearis* is most commonly associated with the coastal plain, extending north into central Arkansas. At the new Missouri station, it occurs with other coast plain species such as *Andropogon hirsutior*, *Rhynchospora recognita* and *Dichanthelium neuranthum*. This small population occurs in an intact swale community that transects the site.

Voucher specimen: U.S.A. MISSOURI: NEWTON CO.: Missouri Prairie Foundation Carver Prairie, in meandering swale community, NAD83 coordinates 15 S 376190.8, E 4098031.1, 28 August 2016, Thomas 16-08-28-1.

***Lycopus uniflorus* Michx.**

A few swale communities of Dunn Ranch and Pawnee Prairie Preserves in Harrison County have small populations of *Lycopus uniflorus*, a species commonly encountered in the northern Midwest and northeastern North America. The Missouri populations, discovered during vegetation sampling in 2000, co-occur with *Lythrum alatum*, *Eleocharis wolfii*, *Carex lacustris*, and *Scirpus georgianus*. Several other specimens located in herbarium collections have been determined as *L. uniflorus* by Henderson (1962) and Yatskievych (2013) but are better treated as either *L. virginicus* or *L. x sherardii*, the putative hybrid of *L. virginicus* and *L. uniflorus*. These aberrant specimens occur mostly in the Ozarks, south of the range Henderson established for *L. uniflorus*, and well within the range of *L. x sherardii*, which Henderson mapped as potentially occurring statewide in Missouri. A more detailed investigation of the extent and overlap of these taxa is needed.

Voucher specimen: U.S.A. MISSOURI: HARRISON CO.: Dunn Ranch Prairie, in moist drainage, associated with *Vernonia fasciculata*, *Arnoglossum tuberosum* and *Spartina pectinata*, also occasional in swales throughout area, NAD83 coordinates 15 T 405310.44, E 4480770.5, 11 August 2000, *Thomas* 1360.

***Quercus similis* Ashe**

As reported by Yatskievych (2013), Missouri specimens determined as *Quercus similis* morphologically, ecologically and geographically resemble *Q. similis* occurring farther south into the Mississippi alluvial plain. For these reasons, it is included here as an addition to the Missouri flora. However, the distinctness of *Q. similis* throughout its relatively limited range is unsatisfying. Although it occurs in seasonally wet bottomland habitats, it often occurs with species that also co-occur with *Q. stellata* in dry upland habitats, such as *Ulmus alata* and *Carya texana*. Additionally, some populations of *Q. stellata* in uplands of the Ozarks and beyond lack the classic pronounced perpendicular leaf lobes of *Q. stellata*. Are these ascending-lobed upland plants also *Q. similis*? Until this matter is better resolved, it seems best to maintain *Q. similis* rather than discount it without sufficient evidence.

Voucher specimen: U.S.A. MISSOURI: STODDARD CO.: Otter Slough Conservation Area, Bradyville Natural Area, dominant in flatwoods community, associated with *Quercus pagoda*, *Quercus lyrata*, *Ulmus alata*, *Carya texana*, *Carex hyalinolepis*, and *Hymenocallis occidentalis*, NAD83 coordinates 15 S 757798.9, E 4067853.0, 18 July 2012, *Thomas* 2603.

Rhynchospora globularis* (Chapm.) Small var. *globularis

Both Steyermark (1963) and Yatskievych (1999) included *Rhynchospora globularis* var. *recognita* in Missouri's flora. Kral (1999), with good reason, reinstated the species status of *R. recognita*. While investigating the morphological limits of *R. recognita* populations in western Missouri, I ran across two collections of typical *R. globularis* that had been misidentified. Both of these specimens came from the same population at a sinkhole pond in southeast Missouri. Most notably, *R. globularis* differs from *R. recognita* in having a smaller stature and fewer, more conspicuous spikelets arranged in less bristly clusters (Kral 1999). The larger geographical range of *Rhynchospora globularis* is the southern and southeastern United States.

Voucher specimen: U.S.A. MISSOURI: HOWELL CO.: along rocky shores of Myatt Pond, a natural sinkhole pond, T23N R8W S 36, 4 July 1990, *Summers* 3421.

***Rhynchospora scirpoides* (Torr.) Griseb.**

In North America, *Rhynchospora scirpoides* occurs primarily along the southern and eastern coastal plains and south and east of Lake Michigan. The single Missouri population occurred in a sinkhole pond in extensive floating sedge mats, of which it was the primary constituent. It is known from 21 states and listed as a species of conservation concern in 15 of them (NatureServe 2017).

Voucher specimen: U.S.A. MISSOURI: SHANNON CO.; Mark Twain National Forest, Grassy Pond Natural Area, abundant on floating sedge mats in the sinkhole pond, associated with *Panicum longifolium*, *Utricularia gibba*, *Brasenia schreberi* and *Triadenium walteri*, NAD83 coordinates 15 S 651246.1, E 4093239.5, 9 Oct. 2012, Thomas 2604.

***Rosa foliolosa* Nutt.**

This population of *Rosa foliolosa* comprised thousands of plants in a swale extending a few hundred meters to the margins of a shrubby intermittent waterway. The margins of the population coincided with the margins of the swale. Where these margins came into contact with *R. carolina* there was pronounced introgression. Prior to the discovery of *R. foliolosa*, I had noted occasional populations of *R. carolina* at various location in the Unglaciated Plains Natural Division with morphological tendencies toward *R. foliolosa*. The two species differ in that *R. foliolosa* normally has white petals, is often smaller and has smaller leaves with narrower leaflets. It also has smaller and fewer prickles on the stem. This is one of several species of the southern Tallgrass Prairie that find the northernmost extent of their range in western and southwestern Missouri.

Voucher specimen: U.S.A. MISSOURI: ST. CLAIR CO.: Wah'Kon-Tah Prairie, The Nature Conservancy tract, extending through a swale, NAD83 coordinates 15 S 413196.7, E 4197165.9, 8 July 2016, Thomas 16-07-08-1.

***Rudbeckia bicolor* Nutt.**

This new *Rudbeckia*, found in profusion at Lichen Glade, is clearly an annual. It has a smaller stature, smaller heads, more ovate-elliptic to oblong leaves and a different pubescence than can be comfortably attributed to the regionally ubiquitous *R. serotina* (used here in the sense of Fernald (1950), which is a synonym for *R. hirta* var. *pulcherrima* - the only member of the *R. hirta* complex attributed to Missouri). These plants also grow in a density that is unlike *R. serotina*, on extremely shallow sandstone glade soils uncharacteristic of *R. serotina* and are at their peak bloom just as *R. serotina* begins blooming in the surrounding landscape. The Lichen Glade plants key to *R. bicolor* in Fernald (1950) and Mohlenbrock (2014), but Nuttall described *R. bicolor* as having bi-colored rays (glossy brown-black in the proximal half). Because there is no designated type with which to compare the Missouri material, this identification is not wholly satisfying. Fernald's (1950) description of *R. bicolor* includes plants with completely yellow rays and bi-color rays. Bi-colored variations are also known from other species of *Rudbeckia* that principally have yellow rays in the wild. The use of the name *R. bicolor* serves as a "best fit" to distinguish this unique entity from the broader *R. hirta* complex until the matter is better investigated.

Voucher specimen: U.S.A. MISSOURI: ST. CLAIR CO.: Lichen Glade Conservation Area, seasonally abundant in very shallow soil on sandstone glades, associated with *Phemeranthus calycinus*, *Phemeranthus parviflora*, *Croton wildenowii*, *Allium lavendulare*, *Diodia teres*, and *Oenothera linifolia*, NAD83 coordinates 15 S 430394.5, E 4212200.4, 20 June 2015, Thomas 15-06-20-1.

***Styrax grandifolius* Aiton**

Despite the large size of this population and its proximity to a road, *Styrax grandifolius* had not been documented from Missouri. It is found in many counties in Arkansas and west-central Tennessee, as well as throughout the southeastern U.S. It is an arborescent shrub or small tree that forms an umbrella-like canopy (much like *Cornus florida*). It has alternate, elliptic to obovate leaves with occasional teeth along the margins and rounded tips. The flowers are white, fragrant, and occur in racemes. In the vegetative state it can superficially resemble a young Persimmon (*Diospyros virginiana*). It is found in mesic to dry-mesic woodlands.

Voucher specimen: U.S.A. MISSOURI: SHANNON CO.: Mark Twain National Forest, southeast of Winona, potentially thousands of plants ranging from seedlings to mature plants scattered across an area approximately 0.5 x 0.5 kilometers, in Shortleaf Pine/mixed oak upland, associated with *Vaccinium pallidum*, *Quercus alba*, *Quercus velutina*, *Crataegus spathulata*, and *Pinus echinata*, NAD83 coordinates 15 S 655602.7, E 4090855.9, 2 Oct. 2012, Thomas 2611.

***Urochloa ramosa* (L.) Nguyen**

Both known Missouri populations occurred along highway medians where they were likely seeded as part of soil erosion control efforts. However, each population of this annual grass consists of many thousands of stems that have persisted for more than two years. Subsequent cursory surveys for *U. ramosa* at these locations four years later resulted in very few relocated stems. It is unlikely that the populations will persist. *Urochloa ramosa* superficially resembles a large *Dichanthelium* with large spikelets on raceiform branches.

Voucher specimens: U.S.A. MISSOURI: SHANNON CO.: locally dominant in median along U.S. Highway 60 east of Winona; apparently planted for erosion control along construction that took place the previous year; population extending east into Carter Co., [36.949° N, 91.161° W], 15 Sept. 2010, Thomas 2344. GREENE CO.: along highway intersection in Springfield, NAD83 coordinates 15 S 477531.1, E 4110153.0, 18 Oct. 2010, Thomas 2345.

ACKNOWLEDGMENTS

This list covers 17 years of field work in Missouri and involved numerous people along the way. Jacob Hadle was present for many of these discoveries and we spent many a jovial evening keying and pressing plants together. George Yatskievych was instrumental in suggesting literature, critically reviewing identifications and providing insight and advice. I'd also like to thank my staff at the Institute of Botanical Training, Andrew Braun, Brett Budach, Claire Ciafre, Calvin Maginel and Tesa Madsen-McQueen, for their assistance, as well as their eagerness to spontaneously stop by interesting places even after long days in the field. The Missouri Botanical Garden and its staff deserve high praise and hearty thanks as well. Lastly, I would like to thank my most notorious conspirator, my wife Dana Thomas. Without her encouragement, critical eye, understanding, selflessness and behind the scenes support, nothing I have done or will do would be possible.

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