

Cephalaria transylvanica new to the flora of North America, and six species new to Missouri

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ABSTRACT. — *Cephalaria transylvanica*, a tall, annual herb in the Caprifoliaceae native to the Old World, is reported from roadsides in southwestern Missouri and northwestern Arkansas. This is the first report of the species growing wild in North America. Six other species are reported new to Missouri: *Baccharis halimifolia*, *Carex pedunculata*, *Cuscuta japonica*, *Cyrtomium fortunei*, *Hydrocotyle umbellata*, and *Mosla scabra*. The status of *Mosla scabra* in eastern North America is discussed.

INTRODUCTION AND DISCUSSION

Recent field work has resulted in the discovery of seven species new to the Missouri flora, one of which – *Cephalaria transylvanica* – is also new to the North American flora. These species are discussed in detail below.

Cephalaria transylvanica (L.) Schrad. (Caprifoliaceae)

Cephalaria Schrad. includes approximately 102 annual and perennial herbaceous species native to Europe, West Asia, and Africa. The inflorescences in this genus occur as numerous tightly arranged flowers that form a capitula and can distinctly resemble inflorescences found in Asteraceae. *Cephalaria* is poorly represented in the flora of North America, with only two species known to occasionally escape cultivation. Here I report a third species, *Cephalaria transylvanica*, from Missouri and Arkansas.

I was introduced to this species in 2021 by Justin Thomas, who had noticed it along roadsides north of Springfield, Missouri. By mid-summer it is a striking annual, with distinct white, compound inflorescences at the tips of its many tall, naked branches. These plants were initially assumed to be a pincushion (*Scabiosa*, *Knautia*, or another related genus), but the fruits lacked the distinctly membranous, awned calyxes from which these plants derive their common name. Using Göktürk and Sümbül's 2014 taxonomic revision of *Cephalaria* in Turkey, the species keys well to *Cephalaria transylvanica* with this combination of characters: annual; fruiting involucre with 8 apical teeth; ciliate, awned bracts on a globose capitula. Two other species of *Cephalaria* occur in the US (Kartesz 2015): *Cephalaria gigantea* (Ledeb.) Bobr., a perennial, contrasted with the Missouri material, which is annual, and *Cephalaria syriaca* (L.) Schrad. ex Roem. & Schult., which has entire leaves, as opposed to the pinnately lobed leaves of the Missouri material. Although *Cephalaria transylvanica* is reported as being widespread and weedy in southern Europe and Turkey, the species has not been previously reported from North America.

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Fellow Missouri naturalist Blake Pagnier had also noticed this species in the region and uploaded an iNaturalist observation in 2023. In his own search for its identity, he came across an article reporting the plant along roads in northwestern Arkansas and adjacent Missouri (Ellis 2009). Ellis had taken several photographs and collections (SERNEC 2024: ANHC002358) and determined it as *Scabiosa atropurpurea* L., sweet scabious or pincushion flower. This European species is a popular cultivated annual and has escaped in several regions in the US, notably along the West Coast and the Dallas-Fort Worth area in Texas (BONAP 2024). Ellis also prepared a detailed illustration for the article, which reveals that the species is not a *Scabiosa*, since the fruits lack the distinctive awns among other morphological differences.

It is now clear that *Cephalaria transylvanica* was first collected locally by Ellis in 2008; several subsequent collections of *Cephalaria* from southwestern Missouri were also originally determined as *Scabiosa atropurpurea* (Tropicos 2024: MO-2213024). Examination of digitized images of collections of *S. atropurpurea* in the US suggests it is unlikely there are other occurrences of *C. transylvanica* misdetermined as *S. atropurpurea*. *Cephalaria transylvanica* has only been documented from degraded roadsides locally, and may be spreading via mowing given the extensive distribution along roads where it occurs. During the 2024 growing season, I observed extensive populations along many roadsides in Greene and Dade counties in Missouri. The species may have been first introduced to the country in southwestern Missouri/northwestern Arkansas. The basis for this introduction is unknown. The species does not appear to be sold by any US wildflower nurseries, although it is available online from European sources. More study is needed to monitor its spread and perhaps uncover the origin for its introduction into the flora of North America.

Voucher specimen: **U.S.A. MISSOURI:** GREENE CO.: Willard, intersection of W Jackson and US-160, common along weedy roadsides, evenly dispersed with *Lespedeza cuneata*, *Sorghum halepense*, *Dipsacus*, 37.3152°N, 93.4448°W, 2 August 2024, N. Aaron 94 (MO).

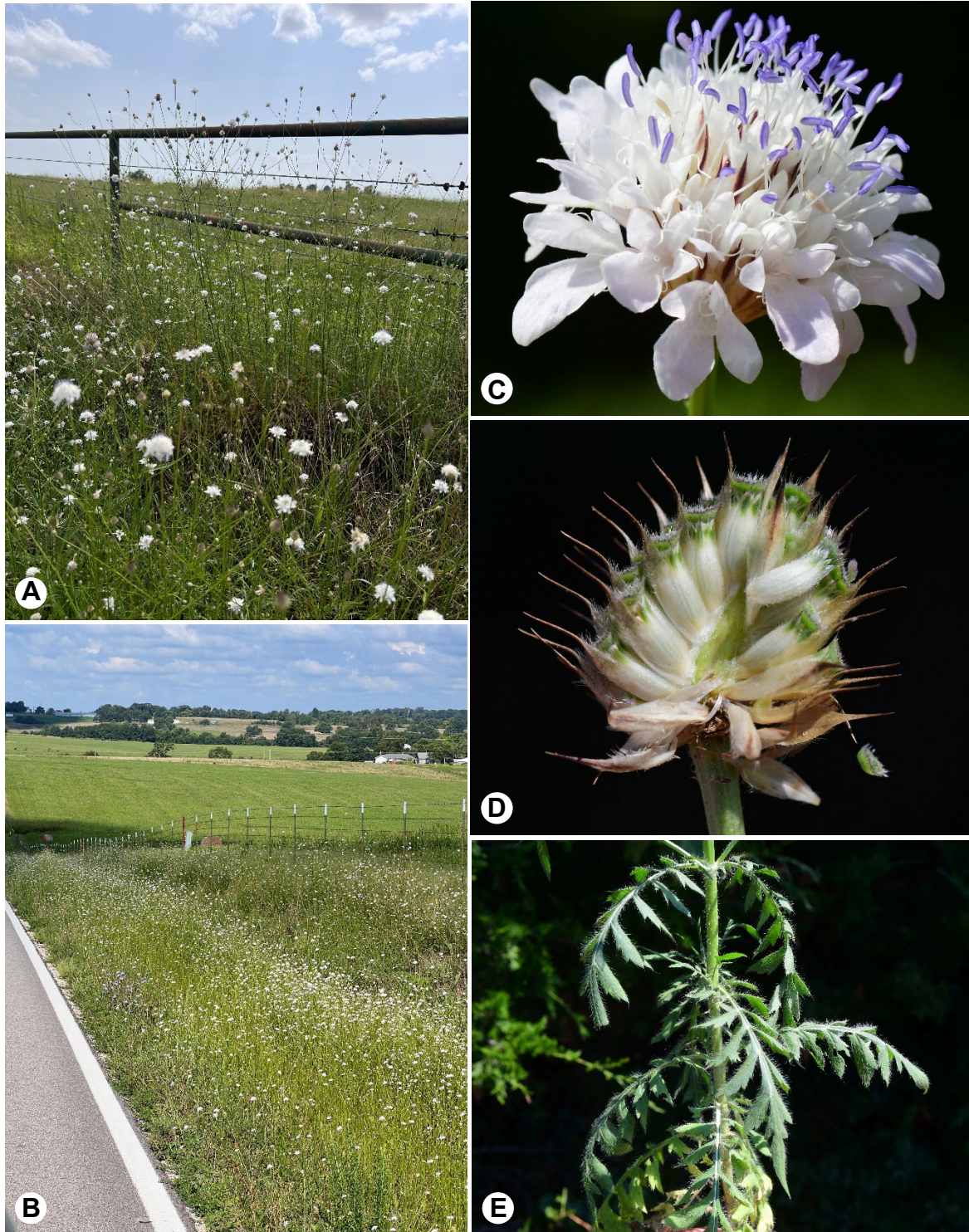


Figure 1. *Cephalaria transylvanica*. **A.** Habit. **B.** Roadside in Dade County. **C.** Inflorescence showing white corollas and purple anthers. **D.** Fruiting capitula dissected to show involuclers. **E.** Leaves. (Photos A & B by the author, C-E by Steve Turner).

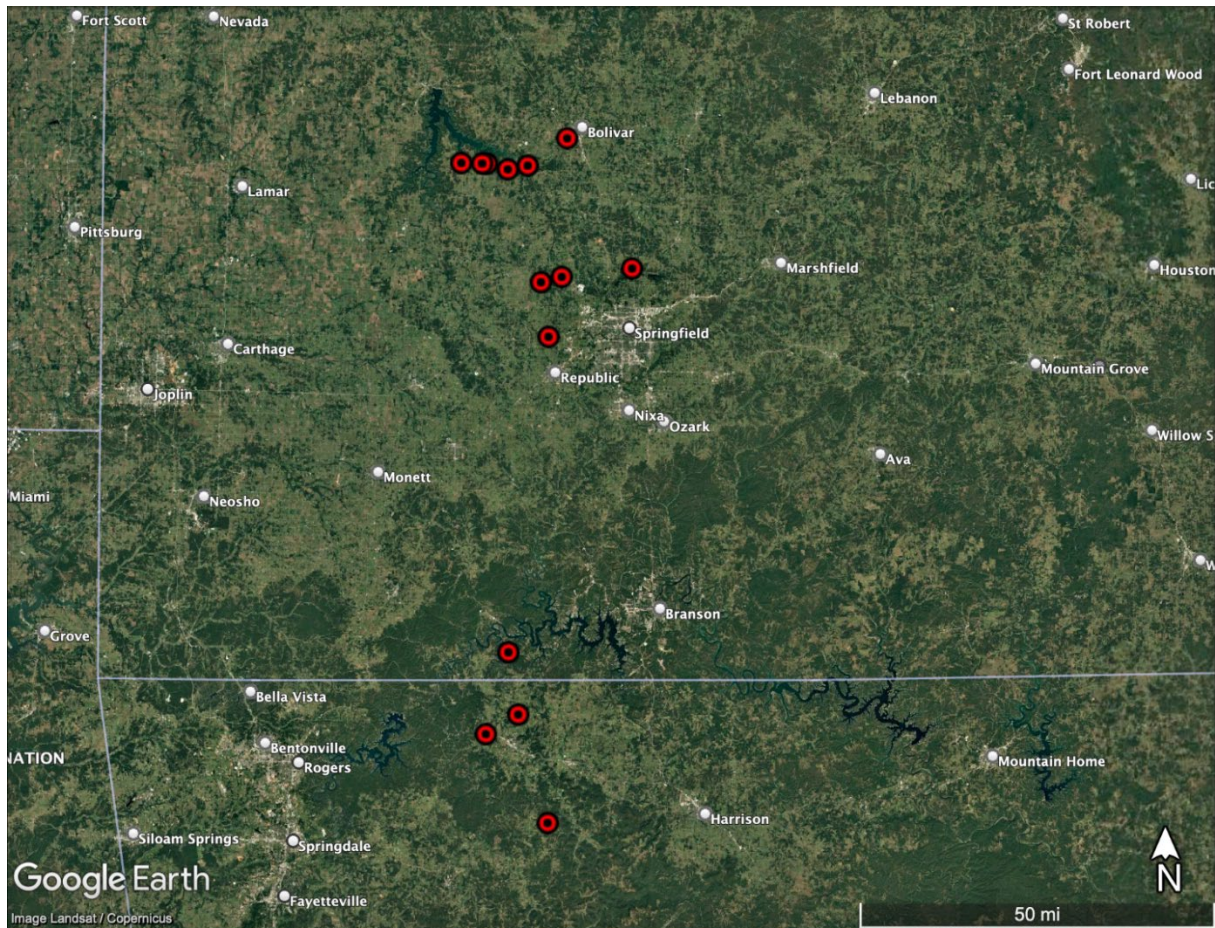


Figure 2. Known occurrences of *Cephalaria transylvanica* in Missouri and Arkansas (Map Data: Google).

***Baccharis halimifolia* L. (Asteraceae)**

In April 2023, I found this shrub in the lake community of Indian Point, west of Branson. This small community lies on a north-south oriented ridge that gradually descends into Table Rock Lake. Historically, this ridge would have been occupied by a mosaic of calcareous glades and woodlands. Presently it is mostly developed, although there are remnants of native habitats along roadsides and between developed areas. One such remnant community exists as a narrow, fragmented glade between the main road and a wooded subdivision. *Baccharis halimifolia* occurs here, growing profusely on a ca. 0.25-acre section of degraded dolomite glade.

The site lies immediately below a small RV park and shows clear evidence of runoff or chemical spill. Other glade remnants occurring in the immediate area were searched but no additional populations of *Baccharis* were found, and it is reasonable to assume its presence is correlated with the severe disturbance occurring on the glade. This behavior is corroborated by Weakley (2024), who describes recent occurrences along the northern range of this species as introductions. As such, *Baccharis halimifolia* should be considered introduced in Missouri.

Voucher specimen: **U.S.A. MISSOURI:** STONE CO.: Calcareous glade along E side of Indian Point Rd., ca. 1000 ft. S of Stillwater Trail Rd. intersection; 100+ shrubs in 0.25-acre opening of impacted glade, with *Schizachyrium scoparium*, *Bouteloua curtipendula*, *Sporobolus clandestinus*, *Solidago radula*, *Croton willdenowii*, 36.6343°N, -93.3450°W, 24 July 2024, N. Aaron 76 (MO).

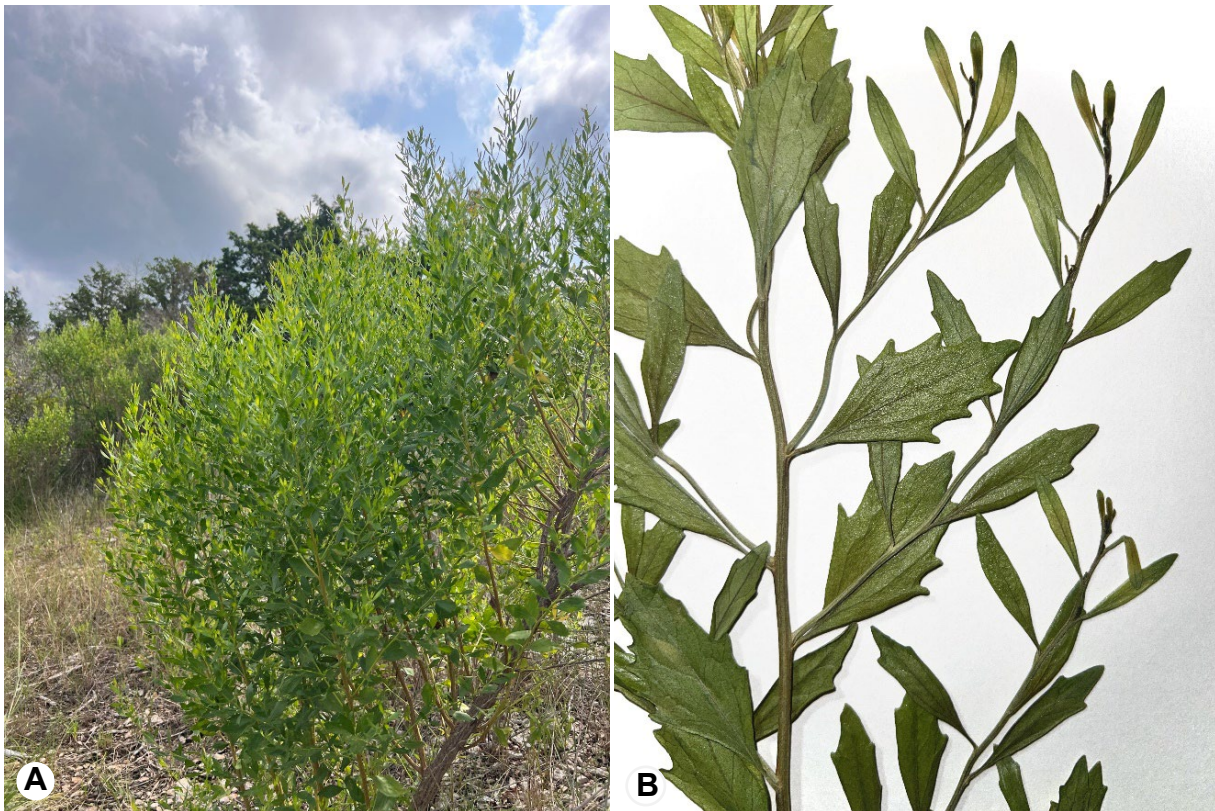


Figure 3. *Baccharis halimifolia*. **A.** Habitat. **B.** Leaf detail (N. Aaron 76).

Carex pedunculata Muhl. ex Willd. (Cyperaceae)

In April 2022, Justin Thomas, Neal Humke, and I conducted a survey of Leatherwood Creek, a tributary of the Jacks Fork River in Shannon County. While surveying along the bottom of a nearby drainage, a caespitose *Carex* was observed growing prolifically along a seepy ledge of a steep, north-facing embankment and was determined to be *C. pedunculata*, a northern and eastern species with the nearest records in northern Illinois and central Tennessee. The population here was estimated to be several thousand individuals, though no additional populations were found in searches of the immediate area. The seepy ledge ran for roughly 100 meters, with *Carex pedunculata* along most of its length. Associates in this damp, shaded slope just above the creek included *Asarum acuminatum* (Ashe) E.P. Bicknell, *Geranium maculatum*, *Carex timida* Naczi & B.A. Ford, and *Hepatica americana* (DC.) Ker Gawl.

Given the range of this species and the north-facing, shaded habitat in which it was found locally, it is likely this population is a relict of cooler Pleistocene climates. New populations of *Carex woodii* Dewey, another inhabitant of northeastern deciduous forests, were also discovered within a few hundred meters of the *C. pedunculata* site. *Carex woodii* was first documented in Missouri in 2008 ca. 30 miles to the southwest in Howell County (Thomas 2017). Another population of *Carex woodii* was found in 2020 by Susan Farrington ca. 3 miles to the east in an ecologically similar ravine along Allen Branch. I discovered a population of yet another eastern species, *C. willdenowii*, along Allen Branch in 2024; this sedge was previously known in Missouri from a single large population in Reynolds County. These deep, shaded ravines fed by numerous springs are ecological hotspots for unusual and disjunct species; more populations, and potentially new species, are likely to be revealed.

Voucher specimen: **U.S.A. MISSOURI:** SHANNON CO.: Rough Hollow, just off of Leatherwood Hollow above its confluence with Jacks Fork River; large, healthy population mostly restricted to an ephemerally seepy rim of a north-facing dolomite outcrop. 37.1020°N, -91.5339°W, 19 April 2022, *Thomas 2790* (hb. Thomas).



Figure 4. *Carex pedunculata*. A. Habitat, showing previous season's growth and new growth. B. Inflorescence detail.

***Cuscuta japonica* Choisy var. *japonica* (Convolvulaceae)**

In September 2024, I discovered a population of *Cuscuta japonica* along the Gasconade River in western Phelps County. Here it parasitized a young sycamore near the abandoned boat ramp at the old MDC River Access just north of Jerome. This Asian species belongs to the subgenus *Monogynella* (Des Moul.) Peter, and is readily differentiated from all other Missouri *Cuscuta* by the singular, united style for which the subgenus is named; all other Missouri dodders belong to subgenus *Grammica* (Lour.) Peter and have two clearly differentiated styles. There is a report of *C. epithymum* (L.) L. from Christian County (BONAP 2024), which belongs to subgenus *Cuscuta*, but this collection could not be found or verified by the author. *C. japonica* is further differentiated from other Missouri dodders by the distinct brown or purple spots scattered across the stem, pedicels, and calyces; erect inflorescences that appear racemose; and basally circumsessile capsules. The Missouri population of *C. japonica* appears to be more robust than our native dodders. The distinct dark spots scattered across the plant facilitate identification regardless of the presence of flowers.

Voucher specimen: **U.S.A. MISSOURI:** PHELPS CO.: S side of old MDC boat ramp along the Gasconade River, N of Jerome; in weedy, overgrown regeneration from historic flood of May 2017; host is a young *Platanus occidentalis*, 37.9347°N, -91.9778°W, 14 September 2024, N. Aaron 260 (MO).

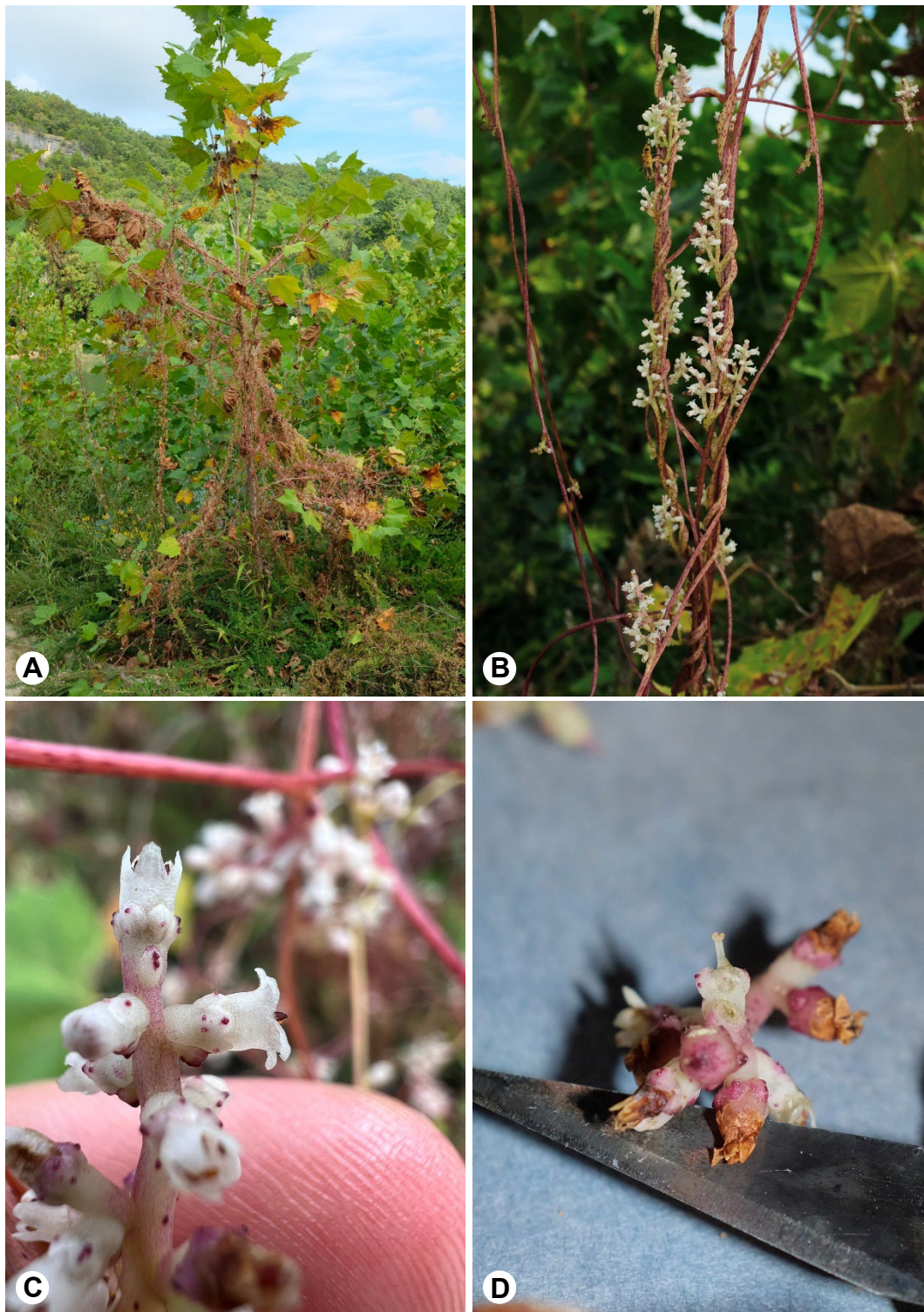


Figure 5. *Cuscuta japonica*. **A.** Habit, on *Platanus occidentalis*. **B.** Flowering. **C.** Inflorescence detail showing calyx and corolla. **D.** Detail showing fused styles (N. Aaron 260).

***Cyrtomium fortunei* J. Sm. (Dryopteridaceae)**

Since 2020, four populations of *Cyrtomium fortunei*, Japanese holly fern, have been documented escaping cultivation in southern Missouri. This evergreen species is popular in the houseplant trade and is native to East Asia. The species has escaped cultivation sporadically in the southern and eastern US. It has been collected in the deep south since at least the 1960s (Duncan and Blake 1965) but has only recently been observed increasing its northern range, e.g. in Kentucky in 2009 (Hulsey & Meier 2011) and southern Illinois in 2013 (Benda 2018). Although it is a recent introduction to the region, all but one of the new Missouri populations occur in relatively isolated habitats.

I first encountered this fern in March 2020 in King Sink, a deep, forested sinkhole in southern Phelps County, where a single individual grew on a dolomite bench near the bottom. This site is characterized by the talus and mesic plant communities that are frequently encountered in deep Missouri sinkholes. Later that year, another individual was found about five miles to the east on a mossy dolomite outcrop in an upper drainage near Corn Creek. Both of these sites are on federal land and not near any ongoing human activity.

Two more populations were discovered in 2024. In Wayne County, David Siripoonsup found scattered individuals “on rich mesic outcrops growing in crevices” at the southwest corner of Mingo Wilderness (personal communication, 11 July 2024). A month later in Texas County, Claire Ciafré found an individual in Barn Hollow Natural Area “in cracks at the base of calcareous bluffs immediately above a spring-fed tributary of the Jack’s Fork River, in a narrow gorge” (personal communication, 7 July 2024). Given the recency of the Missouri, Kentucky, and Illinois records, plus many recent observations (iNaturalist 2024), this species appears to be expanding its range northward.

I visited both Phelps County sites in October 2024 to obtain a better collection and to determine if the populations had increased in the past four years. The King Sink individual appeared to be slightly better established, and two additional small ferns were growing in crevices just beneath the parent. The fertile fronds of the mature fern appeared to be at peak fertility, with brown sporangia clearly evident around the indusia. The individual near Corn Creek did not appear to have further established itself nor create any offspring. Additionally, it appeared to have been browsed.

Cyrtomium fortunei is morphologically similar to the closely related *C. falcatum* (L.f.) C. Presl, known as Japanese holly fern or house-holly fern. *Cyrtomium falcatum* is more popular in the ornamental trade, but is less cold hardy (George Yatskievych, personal communication, 2024). It has also escaped in the southern US, but is much more limited by cold climates. It has fewer, wider pinnae per frond than *C. fortunei*, and the margins are coarsely toothed (vs. denticulate in *C. fortunei*). Due to its comparatively wide pinnae and evergreen habit, *Cyrtomium* is unlikely to be confused with any other Missouri ferns, although there is a passing resemblance to *Polystichum acrostichoides*, to which it is closely related (Le Péchon et al. 2016).

The fact that *C. fortunei* has been present in the south for at least 60 years, but is only recently expanding northwards, suggests potential influence of climate change on this species' range. It may prove a useful model for the phytogeographical effects of warming winters.

Voucher specimen: **U.S.A. MISSOURI:** PHELPS CO.: Mark Twain National Forest, King Sink, ca. 0.3 miles SW of intersection of Hartung and Dewitt roads; one mature (fertile) and two immature plants on lower Gasconade Dolomite terrace in deep sinkhole, with *Hydrophyllum virginianum*, *Cystopteris bulbifera*, *Aquilegia canadensis*, *Stellaria media*, *Borodinia canadensis* (L.) P.J. Alex. & Wind., *Dicentra cucullaria*, 37.7951°N, 91.9834°W, 29 October 2024, N. Aaron 371 (MO).

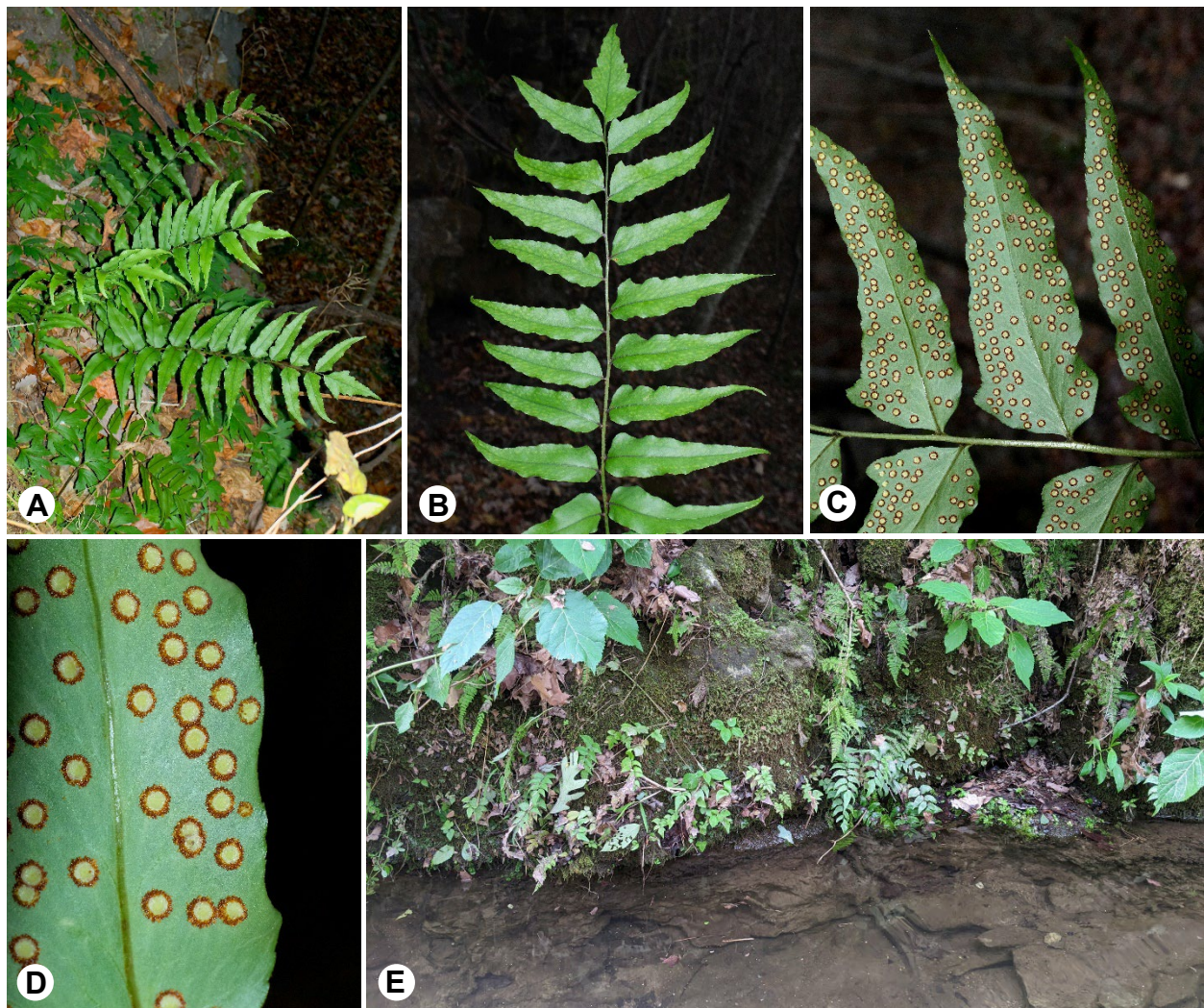


Figure 6. *Cyrtomium fortunei*. **A.** Habit. **B.** Frond. **C.** Abaxial pinnae showing sori and denticulate margins. **D.** Sori in detail, showing circular indusia and sporangia. **E.** Habit in Barn Hollow Natural Area (Photo: Claire Ciafré).

***Hydrocotyle umbellata* L. (Apiaceae)**

I collected this semi-aquatic coastal plain species in 2020, growing along the margins of Little Prairie Lake, an artificial reservoir in Phelps County. Here it is extensively distributed and a common member of the shoreline plant communities. A 2015 collection from this site by Ron Burk had been incorrectly determined as *H. ranunculoides* (Tropicos 2024: MO6669068). In *H. ranunculoides*, the sinus extends from the leaf margin to the attachment of the petiole (cordate), whereas in *H. umbellata* the leaves are peltate. *Hydrocotyle verticillata* is also known from a few populations in southern Missouri, but it is differentiated by its whorled, not umbellate, inflorescence along an extended rachis (although individuals may appear umbellate if containing only a single whorl).

This population of *H. umbellata* represents a relatively recent introduction to the area as it occurs along an artificial reservoir, and was likely introduced by waterfowl or human activity. Further introductions will likely be encountered. Given that the species is present in northern Arkansas (BONAP 2024), a native population may yet be discovered in southern Missouri. An updated Missouri key to the genus is provided below, adapted from Weakley (2024).

- 1. Leaves peltate.
 - 2. Inflorescence umbellate, leaves oriented $\pm$ vertically *H. umbellata*.
 - 2. Inflorescence verticillate (sometimes appearing umbellate), leaves oriented $\pm$ horizontally *H. verticillata*.
- 1. Leaves deeply cordate *H. ranunculoides*.

Voucher specimen: **U.S.A. MISSOURI:** PHELPS CO.: Little Prairie Lake, growing prolifically along lake margin near N parking area and boat ramp, with *Eleocharis*, *Justicia*, *Setaria*, *Periscaria*, *Lycopus*, *Ludwigia*, 37.9980°N, 91.6925°W, 29 June 2024, N. Aaron 46 (MO).

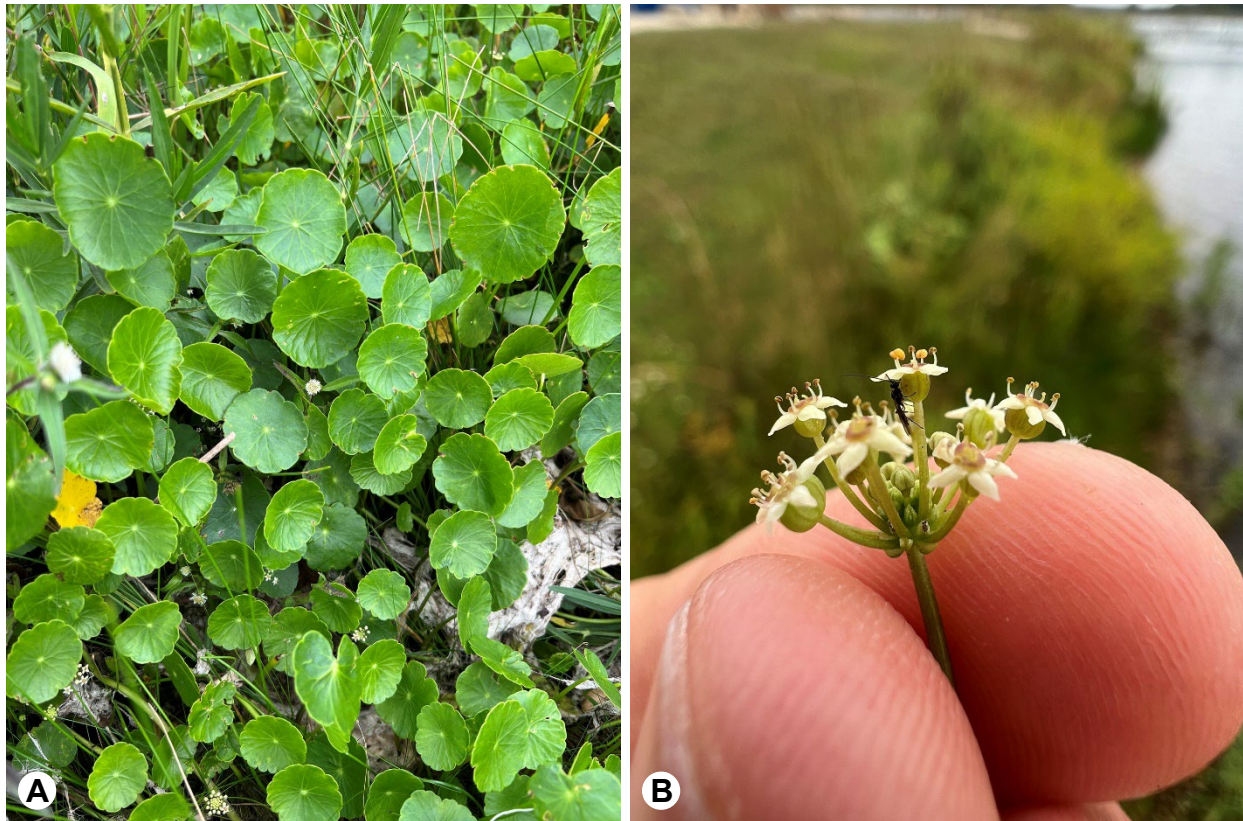


Figure 7. *Hydrocotyle umbellata*. A. Habit. B. Inflorescence

Mosla scabra (Thunb.) C.Y. Wu & H.W. Li (Lamiaceae)

Mosla scabra is an annual native to temperate and tropical Asia. In 2024, a population was found along a logging road in the Roger Pryor Backcountry in Shannon County. While only a single population of a few dozen stems was encountered, given the many miles of similar ridgetop roads it may be more widely distributed in the region. The *Mosla* was found growing intermixed with *Perilla frutescens* (beefsteak plant), its closest relative occurring in the region. *Mosla scabra* is readily differentiated from *P. frutescens* by its much smaller, narrower leaves that are not distinctly rugose, and its 2 fertile stamens (compared to 4 in *Perilla*).

This species was introduced in the southeastern United States and is recently expanding in range (iNaturalist 2024). Its exact range is uncertain, since until recently all US occurrences were considered to be *Mosla dianthera* (Buch.-Ham. ex Roxb.) Maxim, a closely related species. *Mosla dianthera* was first collected in McCreary County, Kentucky in 1939 (Keener et al. 2024). Curiously, the plants in this location were collected both as *M. dianthera* (SERNEC 2024: IND-0115061) and as *M. scabra* (synonym *M. lanceolata*) (SERNEC 2024: NCSC00022839) in late 1941. There is a lack of *M. scabra* collections through the rest of the century, and only recently have botanists begun calling some new populations *M. scabra* and correcting old collections initially determined as *M. dianthera* (Virginia Botanical Associates 2024).

Both species are accepted as occurring in the US. I have reviewed many US collections (SERNEC 2024) and observations (iNaturalist 2024) and concluded they likely all are referable to *M. scabra*. The exact status and range of the two taxa is uncertain given the confusing taxonomy of *Mosla* and morphologically variable characters used in keys. The key in *The Flora of the Southeastern United States* (Weakley 2024), based on Hsieh & Huang (1999), focuses on the number of teeth along the leaf margins. This character can be deceiving, since leaves occurring along the upper branches are often much reduced and with fewer teeth, and there appears to be plasticity in leaf morphology among individuals. Additionally, the key makes a determination between calyx lobes that are either “shallowly” or “deeply” toothed. In my examination of material, there is confusing variation in the calyx lobes, which leads to potential error. The only conclusive character is whether the surface of the nutlet is densely (*M. scabra*) or loosely (*M. dianthera*) reticulate. Hsieh & Huang (1999) provide helpful SEM micrographs of nutlets. It is likely that the other US material is the same species as the Missouri material given the similarity in leaf morphology.

However, online comparisons made with Chinese collections from the species’ native range (Chinese Virtual Herbarium 2024) reveal that both leaf and calyx lobe characters are not satisfyingly sorted by Hsieh & Huang’s 1999 key. Furthermore, Li & Hedge (1994) include *M. grosseserrata* Maxim. (now considered a synonym of *M. dianthera* fide [POWO 2024]), in a key couplet with *M. scabra*. This couplet focuses on the quality of stem pubescence: retrorsely fine puberulent in *M. grosseserrata*, and densely pubescent in *M. scabra*. Much of the US material reviewed appears to be intermediate between these characters, and few were densely pubescent. Two syntypes of *M. scabra* are accessible on the Chinese Virtual Herbarium (CVH [2024]: E00275749 and E00275760). Leaves of these specimens are distinctly narrowly lanceolate to narrowly elliptic, a morphology that was not replicated in any US material reviewed. The image resolution of these digitized collections did not permit inspection of the calyx lobes or stem pubescence.

Confusion notwithstanding, I believe it is most practical to default the US material to what is regarded as *M. scabra* in its native range, since the digitized recent collections reviewed on CVH (2024) appear to match. The overall taxonomy and species concepts of *M. scabra* and *M. dianthera* would benefit from critical review.

Voucher specimen: **U.S.A. MISSOURI:** SHANNON CO.: Roger Pryor Backcountry 1.25mi SE of Big Creek crossing; small clump of ca. 10 stems growing between tracks of logging road, with *Perilla*, *Conyza*, *Erechtites*, 37.2970°N, -91.3075°W, 11 September 2024, N. Aaron 238 & 239 (both MO).



Figure 8. *Mosla scabra*. A. Habit. B. Leaves and stem. C. Inflorescence. D. Nutlets (N. Aaron 238).

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