

Distribution of *Thaspium chapmanii* and *T. barbinode* (Apiaceae) in Missouri

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ABSTRACT. — The number of species of *Thaspium* in Missouri is corrected to include *T. barbinode*, *T. chapmanii*, and *T. trifoliatum*. The distribution of the former two in the state and their different habitat preferences are discussed. A key to *Thaspium* and county level distribution maps for Missouri are included.

Thaspium Nutt. (Apiaceae) in Missouri includes three species, although Yatskievych (2006) only included *T. barbinode* (Michx.) Nutt. and *T. trifoliatum* (L.) A. Gray (including variety *flavum* S.F. Blake). A third species, *T. chapmanii* (Coul. & Rose) Small, has been included as a synonym of *T. barbinode*, although some floristic treatments in the southeastern U.S. have treated it as a species (Small 1933, Tennessee Flora Committee 2015, Weakley 2015), and it will be included as a species in the upcoming Flora of North America treatment (D. Estes & B. Mason, pers. comm.). Yatskievych (2006) provides a distribution of *T. barbinode* through much of Missouri, but mostly absent north of the Missouri River. It is reported from a wide range of edaphic conditions from bottomland forests, bluffs, fens, prairies, and glade margins. The recognition of *T. chapmanii* as distinct from the sympatric *T. barbinode* in the state requires clarification of the morphological differences between the two species, their distributions in Missouri, and clarification of individual habitat preferences.

The morphological differences separating *Thaspium chapmanii* and *T. barbinode* are slight when observed as individual characters on herbarium specimens, but as a suite of characters they differentiate the species well. Their differences are more apparent when the plants are observed in the field. *Thaspium chapmanii* is a taller, more branched plant with more divided leaves than *T. barbinode* (cauline leaves 2–3 ternate vs. 1–2 ternate in *T. barbinode*), and the margins of the leaflets are more coarsely serrate although this is not quantified here. The leaves of *T. chapmanii* are typically pubescent abaxially with trichomes present on the lamina, primary, secondary, and tertiary veins, whereas *T. barbinode* typically has abaxial pubescence, when present, restricted to the primary veins. The corollas of *T. chapmanii* are pale yellow to creamy white, while those of *T. barbinode* are golden yellow (Fig. 1). In herbarium specimens the differences in corolla color are often not as noticeable between the species, but *T. chapmanii* typically dries near white or creamy white vs. creamy yellow in *T. barbinode*. The corolla color is often not apparent on older collections due to the specimens aging brown.

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Figure 1. *Thaspium chapmanii* (left) and *T. barbinode* (right) showing the distinctive colors of the open flowers in the field. Both photos by the author.

Peduncles and umbel rays of *T. chapmanii* are scabrellous (projections with acute apices) on their adaxial side and those of *T. barbinode* are glabrous to occasionally papillose-roughened (projections with obtuse apices) (Fig. 2). Mature fruits of *T. chapmanii* are smaller than those of *T. barbinode* (4–5 mm long vs. 5–6 mm) and minutely spinulose to scabrellous between the wings of the schizocarps (vs. glabrous or rarely scabrellous), although this character can be absent in late season collections of *T. chapmanii* when the whole stem has begun to senesce. The wings of the seeds develop well before the fruits are mature and only measurements of mature fruits will fall into the ranges provided. Differences not discernible from preserved specimens that are apparent in the field are the typically multi-branched habit of *T. chapmanii* and the generally larger umbel size which is in part because of the presence of a greater number of umbellules (9–16, vs. 6–12 in *T. barbinode*).

Despite this, there is significant overlap between the two species in the umbel size, umbellule number, and flowers per umbellule. Neither character preserves well, because specimens selected for preservation are often smaller plants from a population. Furthermore, the diameter of the umbels of fresh material is not preserved when the collected plants begin to wilt, and the umbels are often distorted upon pressing. Moreover, the age of a plant and the fertility of the habitat can contribute to large plant sizes. Lastly, the flowering period of the two species

overlaps, but *T. chapmanii* is typically later in reaching peak flowering from late May through June, whereas *T. barbinode* peaks in mid-May and continues into June. A key to the species following TNFC (2015) is presented below to delimit the species of *Thaspium* in Missouri.



Figure 2. *Thaspium chapmanii* (left) showing the scabrellous umbel rays, and *T. barbinode* (right) showing the glabrous umbel rays. Scale bar 2 mm.

Optimum habitats for *Thaspium chapmanii* and *T. barbinode* differ in their preferences for moisture and light. Specimens assignable to *T. chapmanii* have been reported from glade edges, bluff tops, prairies, rocky banks, stream floodplains, and open woodlands, whereas *T. barbinode* has been collected from more mesic habitats such as steep, mesic limestone and sandstone wooded bluffs (typically north-facing), near springheads, and on river bluffs. For a few older collections, it is unclear what the habitat was, but in general the habitat preference of *T. barbinode* is for more mesic, richer, and more shaded habitats than that of *T. chapmanii*.

The treatment of *Thaspium chapmanii* as a species distinct from *T. barbinode* requires clarification of the distributions of the two species in the state (Fig. 3). *Thaspium chapmanii* is relatively common south of the Missouri River, especially in the Ozark and Big Rivers regions, with some scattered occurrences outside these regions. *Thaspium barbinode* is infrequent in Missouri and the specimens below represent the documented distribution in the state. It has been documented from scattered sites in the Ozarks, the central and eastern Big Rivers region, and the northeast corner of Missouri. The few collections, and especially the absence of many recent collections, qualify the species as worthy of conservation concern (S2 rank; < 21 populations) in Missouri. It is unlikely that it is under any natural threat and its rarity is due to the preference for mesic ravines and bluff habitats, but the limited number of occurrences in the state qualifies it for conservation concern. It is potentially naturally rare in the state with the populations likely representing the sparse western edge of its distribution. Some of the historical collections below

have been recently confirmed to be extant as part of field studies relating to the Flora of North America treatment of *Thaspium*.

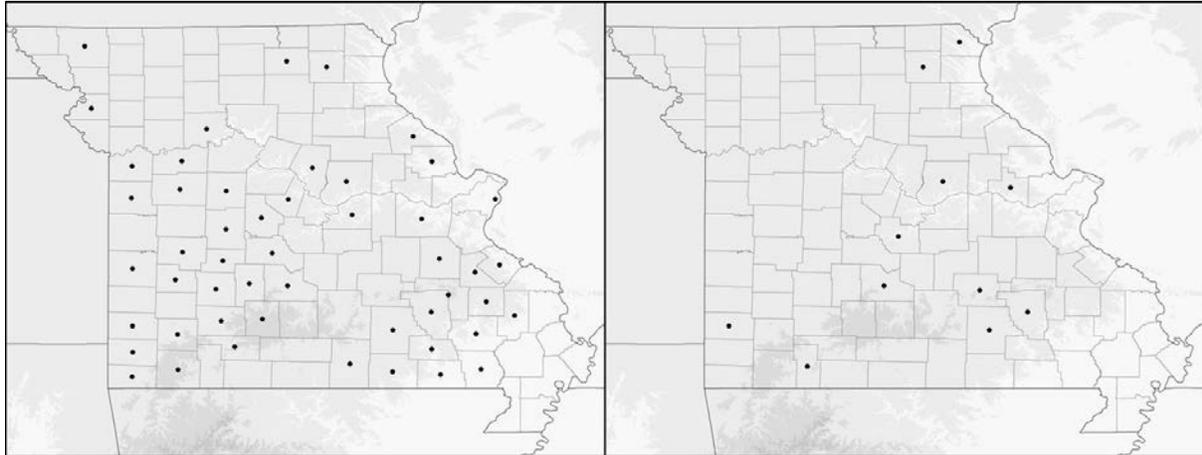


Figure 3. County level distributions of *Thaspium chapmanii* (left) and *Thaspium barbinode* (right) in Missouri with occurrences as centroids. Specimens mapped using centroid data (<https://data.mo.gov/Geography/Missouri-county-centroid-map>) and specimens at MO and UMO using DIVA-GIS.

Thaspium barbinode specimens examined [all other Missouri material labelled as *T. barbinode* at MO are *T. chapmanii*]: **U.S.A. MISSOURI:** CALLAWAY CO.: hanging over steep limestone bluff along Stinson Creek, sec. 34 T47N, R9W, 3 mi SE of Fulton, 10 Sep 1937, *J.A. Steyermark* 26098 (MO). **CLARK CO.: 25 Aug 1892, *B.F. Bush s.n.* (MO). *DENT CO.: around north-facing lime wooded outcrops along spring branch of Montauk Spring, Montauk State Park, 9 Aug 1936, *J.A. Steyermark* 12773 (MO). **JASPER CO.: Webb City, frequent in rich woods [duplicate specimen with handwritten label says “prairies”], 7 Jun 1903, *E.J. Palmer* 533 (MO). KNOX CO.: Newark Cliffs, ca. 1/2 mi SW of Newark; Newark Quad.; top of bluff; flowers bright yellow; N1/2 NE1/4 sec. 23 T60N R10W, 13 May 1999, *M. McHale* 99-087 (MO). LACLEDE CO.: Bennet Spring, 14 May 1939, *A. Chandler* 841 (MO). MILLER CO.: limestone slopes along Osage River south of Mary’s Home, 5 Jul 1934, *J.A. Steyermark* 13118 (MO). REYNOLDS CO.: Suttons Bluff Campground, 3 Jul 1970, *W.G. D’Arcy* 4658 (MO). SHANNON CO.: 17 Sep 1888, *B.F. Bush* (MO). STONE CO.: rocky woods, 1 Aug 1935, *B.F. Bush* 15061 (MO). TEXAS CO.: steep rocky slope & dolomitic bluff above Jacks Fork River, ca. 1 mi. s. of Harlow Ford, NW1/4 sec. 34 T28N R7W, station 14, 1 Aug 1969, *Redfearn et al.* 901 (MO). WARREN CO.: moist shaded St. Peter sandstone cliffs in ravine near Charrette Creek, about 9 mi. southeast of Warrenton, 4 Oct 1934, *J.A. Steyermark* 15861 (MO); **SE of Daniel Boone Conservation Area; NW1/4 sec. 9 T46N R04W, 16 Jul 1999, *M. Leahy* 9 (MO).

* sites visited by the author with D. Estes in 2010 as part of a survey for the FNA project.

** specimens annotated “*T. cf. barbinode*” by D. Estes.

KEY TO THE GENUS *THASPIUM* IN MISSOURI

- 1 Basal leaves 2–3 ternately compound, the margins hairy or ciliate, without a white border.
 - 2 Cauline leaves 1–2-ternate, glabrous or glabrate abaxially except for primary veins; corolla golden yellow; peduncles and umbel rays glabrous or papillose-roughened on upper surface; fruits glabrous between and on the wings, mature fruit 5–6 mm long *T. barbinode*
 - 2 Cauline leaves 2–3-ternate, puberulent on abaxial veins and lamina; corolla pale yellow to creamy white; peduncles and umbel rays scabrellous on upper surface; fruits scabrellous between and sometimes on several wings, mature fruit 4–5 mm long *T. chapmanii*
- 1 Basal leaves simple or ternately lobed or compound, the margins glabrous, with a narrow, white border *T. trifoliatum*

LITERATURE CITED

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