

CIRSIUM UNDULATUM (ASTERACEAE) IN MEXICO

GUY L. NESOM

Research Associate

Academy of Natural Sciences of Drexel University

Philadelphia, Pennsylvania

guynesom@sbcglobal.net

ABSTRACT

The type of *Cirsium undulatum* was collected by Nuttall from along the Missouri River (probably in South Dakota) and the typical form occurs southward into central Texas. Typical *C. undulatum* in Mexico (Nuevo León and Coahuila, mostly in the area of Saltillo and Monterrey) is geographically disjunct from typical plants in the USA but nearly identical in morphology. The earliest known collections from Mexico were made in 1980-1983 and it is hypothesized here that the Mexican plants were established from Texas propagules and have spread rapidly since then. Other Mexican plants identified as *C. undulatum* (Coahuila, Chihuahua, Sonora) are different species. Illustrations and a brief description of typical *C. undulatum* are provided and localities in Texas and Mexico are mapped. Formal typification includes designation of an epitype from South Dakota.

"*Cirsium undulatum* is both widespread and variable. ... A detailed study of this species might reveal races worthy of recognition as infraspecific taxa" (Keil 2006, p. 121). Toward a further understanding of the variation and taxonomy, formal typification is reviewed here and its typical expression described.

The type collection of *Cirsium undulatum* was made by Thomas Nuttall somewhere along the Missouri River, probably in central South Dakota, where he collected in the spring and summer of 1811 as part of the Astor Expedition. From there the species ranges southward into central Texas and north and westward into Oregon, Washington, and southwestern Canada. Recorded occurrences of *C. undulatum* in the trans-Pecos region of Texas and in adjacent New Mexico, as well as in most of Coahuila, are considered here to represent different species (Nesom, in prep.). And as noted by Keil (2006), those in the Pacific Northwest also appear to be an atypical variant. Plants in the Monterrey-Saltillo area of Nuevo León and Coahuila, however, appear to be indistinguishable from typical *C. undulatum*.

CIRSIUM UNDULATUM (Nutt.) Spreng., Syst. Veg., ed. 16 [Sprengel] 3: 374. 1826. *Carduus undulatus* Nutt., Gen. N. Amer. Pl. 2: 130. 1818. *Cnicus undulatus* (Nutt.) A. Gray, Proc. Amer. Acad. Arts 10: 42. 1874. **TYPE**: "Missouri," [1811], *T. Nuttall s.n.* (holotype: PH-Figs. 5, 6). A "SYN. FL. N. AMER." annotation by Asa Gray says "The authentic original representative (and all of it)."

Protologue: "On the calcareous islands of lake Huron, and on the plains of Upper Louisiana" — this may reflect confusion by Nuttall about the type locality (see 1946 note by Shinnors on the PH type sheet; Ownbey 1952; Stuckey 1967), but "Missouri" on the type label is clear.

Because Nuttall's type of *Cirsium undulatum* comprises only a single leaf, an epitype is designated here, in order to more clearly define the species in its strict sense.

EPITYPE (designated here): **South Dakota**. Bennett Co.: 2 mi E of Martin, upland prairie pasture, thin grass, limestone, clay soil, 14 Jul 1971, *S. Stephens 49366* (KANU-Figs. 7, 8).

Cnicus undulatus var. *megacephalus* A. Gray, Proc. Amer. Acad. Arts 10: 42. 1874. *Carduus undulatus* var. *megacephalus* (A. Gray) Greene, Proc. Acad. Nat. Sci. Philad. 1892. 360. 1893. *Carduus megacephalus* (A. Gray) Smyth, Trans. Kansas Acad. Sci. 16: 160. 1899. *Cirsium megacephalum* (A. Gray) Cockerell, Univ. Missouri Stud., Sci. Ser. 2: 254. 1911. *Cirsium undulatum* var. *megacephalum* (A. Gray) Fernald, Rhodora 10: 94. 1908. **TYPE:** "Missouri," [ca. 1810], *T. Nuttall s.n.* (holotype: PH-Figs. 5, 6).

In Gray's synopsis of the North American thistles (1874), he divided *Cnicus undulatus* into 4 varieties (var. *canescens*, var. *megacephalus*, var. *ochrocentrus*, var. *grahamii*) — Nuttall's typical element was included in var. *megacephalus*. Var. *megacephalus* is homotypic with Nuttall's original entity. Ownbey (1952) treated var. *megacephalus* as a synonym of typical *C. undulatum*.

Description from typical plants of *Cirsium undulatum* in Texas and Mexico

Plants perennial, taprooted. **Stems** 0.3–0.8 m tall, sometimes several from the base, lightly but persistently sericeous-tomentose, without multicellular hairs, commonly unbranched from the branch, occasionally with 1–2 distal branches. **Leaves** mostly lanceolate in outline, pinnately lobed to coarsely sinuate-dentate, basal not distinctly different in morphology from the cauline, cauline gradually decreasing in size distally, not decurrent, variably subclasping to not clasping (often becoming consistently clasping distally), marginal spines 3–8 mm long, stout and yellowish, abaxial surface persistently white-tomentose, adaxial surface glabrescent but remaining gray in color, without multicellular hairs. **Heads** solitary, without subtending bracts. **Involucre**s broadly cylindrical, abruptly concave at the peduncle insertion, 2.5–4 cm wide (pressed); phyllaries evenly graduate-imbricate, glabrous or the distal margins slightly but persistently white-tomentose, outer ovate to ovate-lanceolate, stramineous with a dark-drying midregion and a linear-glandular midline, abruptly flattened into a spreading or reflexing spine 3–6 mm long, inner becoming triangular-lanceolate, striate and without a dark midregion. **Corollas** lavender, (Mexico) 34–42 mm long, tube 17–22 mm, throat 8–10 mm, lobes 7–12 mm; stigmatic branches 5–7 mm long; **corollas** (central Texas, from 6 counties) 45–46 mm long, tube 21–23 mm, throat 8–10 mm, lobes 9–11 mm; stigmatic branches 6–8 mm long. **Achenes** 5–7 mm long; Yatskievych (2006) noted that the achenes are unusual among closely related species as they become "mucilaginous externally when moistened." **Chromosome number**, $2n = 26$ (eg., Frankton & Moore 1961; Gardner 1974).

Typical *Cirsium undulatum* in Mexico

The plants in central Nuevo León and Coahuila are similar in aspect and floral details to typical *Cirsium undulatum* (compare Figs. 9–12 from Texas and Figs. 13–19 from Mexico). Corollas are more variable in size than those of central Texas, as noted in the description, but nothing else other than the geographic disjunction suggests that more than a single species is present. Descriptions from Canada (Frankton & Moore 1961), Wyoming (Gardner 1974) the Great Plains (Barkley 1986; but corolla length ranging shorter than described here), and Nebraska (Kaul et al. 2006) suggest that they also refer to *C. undulatum* in the strict sense.

The earliest collections from Mexico seen in this study were made in 1980, 1981, and 1983, seemingly late for such a conspicuous species in populated areas where botanists have been collecting since the 1800's. A few of the collections appear to be from non-ruderal habitats, but most are from disturbed areas and along roadsides. It is hypothesized here that the Mexican plants were recently established as a result of travel between central Texas and the Monterrey/Salttillo area. If only a single dispersal event occurred, the species has spread rapidly.

Coahuila, Nuevo León. Roadsides and disturbed areas, grassland, llanos, rocky hills and mountain slopes, gypsum, limestone, shale, areas of pine-oak, oak-juniper, yucca; 1950–2500 m. Flowering May–November.

Collections. MEXICO. Coahuila. Mpio. Arteaga: San Antonio de las Alazanas, rocky mountainside, 2540 m, 4 Aug 1980, *Hinton 17927* (GBH, MEXU, TEX); Sierra Zapaliname, edge of cultivated field, 2050 m, 27 Jun 1990, *Hinton 20470* (GBH, MEXU, TEX); above Chapultepec, llano, 2060 m, 25 May 1991, *Hinton 20968* (GBH, TEX); Jáme to Rayones, roadside, oak and pine woods, 2350 m, 16 Nov 2002, *Hinton 27807* (GBH); SW of Arteaga on Hwy 57, 1 mi E of jct of E-Salttillo bypass and Hwy 57, area of arborescent *Yucca* and shrubs, grassy area, 10 Sep 1988, *Nesom 6601* (TEX). **Mpio. Saltillo:** Ejido Chapultepec, area natural protegida Sierra de Zapalinamé, bosque de *Pinus cembroides*, 2245 m, 22 Nov 2008, *Gómez 634* (TEX); Saltillo, "Lomas de Lourdes," zona de disturbio, 25 May 1985, *Viesca E. s.n.* (TEX); Buenavista, terrenos de la UAAAN, areas cercanas a cultivos, 14 May 1981, *Villarreal 1214* (TEX); Sierra Coahuilon, entronque de Sierra Coahuilon y Sierra La Marta con carr. Saltillo-Coahuila, 19 Jun 1985, *Yáñez 182* (MEXU, TEX). **Nuevo León. Mpio. Galeana:** San José de Las Joyas, llano, 2350 m, 9 Aug 1983, *Hinton 18561* (GBH, MEXU, TEX); Matehuala to Saltillo + 203 km, grassy roadside, 2100 m, 1 May 1990, *Hinton 20246* (GBH, MEXU, TEX); Hwy 57 near Puerto México, roadside, with *Larrea*, *Yucca*, 1965 m, 24 Jun 2004, *Hinton 28287* (GBH, TEX); road to 18 de Marzo, 11.5 mi E of jct with Hwy 57 at San Rafael, 28 mi NW of 18 de Marzo, rocky, limestone soil, portrero grassland with *Stipa*, *Sitanion*, *Aristida*, 4 Jul 1985, *Luckow 2649* (TEX); 1 mi E of Hwy 57 on dirt rd to village of El Potosí, small gypsum hillocks along roadway, 11 Oct 1985, *Turner 15603* (TEX). **Mpio. Santiago:** 14 km E of Los Lirios, on the dirt road over the mountains to Monterrey, near Rancho Graciela, just E of the state line, Sierra Rancho Nuevo, Canyon de Los Lirios, pine-oak woodland on mtn slopes of limestone and shale, with *Pinus*, *Quercus*, *Agave*, *Mimosa*, *Flourensia monticola*, 7200 ft, 7 Jun 1986, *Sanders 6771* (UCR).

ACKNOWLEDGEMENTS

Recent study was done at PH and TEX-LL. Other records for Texas distribution are from images via SERNEC, mostly from BRIT-SMU. Some records from Mexico are from MEXU images, via Portal Datos Abiertos UNAM. Many thanks to George Hinton for hi-res images of his collections at GBH.

LITERATURE CITED

- Barkley, T.M. 1986. Asteraceae. Pp. 838–1021, *in* Great Plains Flora Association. Flora of the Great Plains. Univ. Press of Kansas, Lawrence.
- Frankton, C. and R.J. Moore. 1961. Cytotaxonomy, phylogeny, and Canadian distribution of *Cirsium undulatum* and *Cirsium flodmanii*. *Canad. J. Bot.* 39: 21–33.
- Gardner, R.C. 1974. Systematics of *Cirsium* (Compositae) in Wyoming. *Madroño* 22: 239–265.
- Gray, A. 1874. A synopsis of the North American thistles. *Proc. Amer. Acad. Arts* 10: 39–48.
- Kaul, R.B., D.M. Sutherland, and S.B. Rolfsmeier. 2006. The Flora of Nebraska. School of Natural Resources, Univ. of Nebraska-Lincoln.
- Keil, D.J. 2006. *Cirsium*. Pp. 95–164, *in* Flora of North American North of Mexico, Vol. 19. Oxford Univ. Press, New York and Oxford.
- Ownbey, G.B. 1952. Nuttall's Great Plains species of *Cirsium*: *C. undulatum* and *C. canescens*. *Rhoadora* 54: 29–35.
- Stuckey, R.L. 1967. The "lost" plants of Thomas Nuttall's 1810 expedition into the old Northwest. *Michigan Bot.* 6: 81–94.
- Yatskievych, G. 2006. Steyermark's Flora of Missouri, Vol. 2, Rev. Edition. Missouri Botanical Garden Press, St. Louis, and Missouri Dept. of Conservation, Jefferson City.

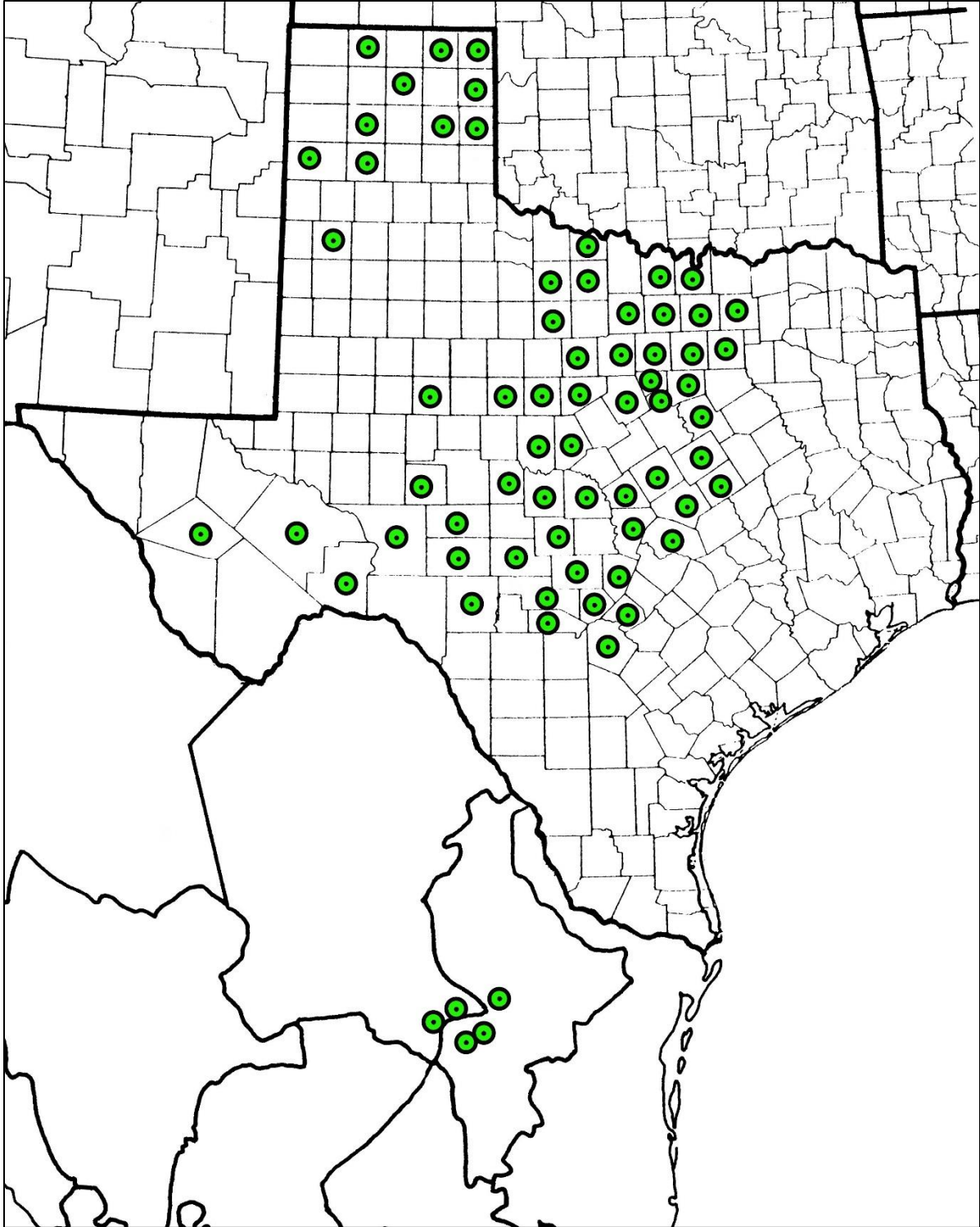


Figure 1. Distribution of *Cirsium undulatum* sensu stricto in Texas and Mexico.



Figure 2. *Cirsium undulatum*. Tarrant Co., Texas. Photo by Bob O'Kennon, inaturalist, 30 May 2019. Unusually robust plant with multiple stems from the base.



Figure 3. *Cirsium undulatum*. Tarrant Co., Texas. Photo by "tinyadventurer," inaturalist, 30 May 2019. Head is pre-anthesis.



Figure 4. *Cirsium undulatum*. Black Hills National Forest, South Dakota. Photo by Jill Larson Welborn.



Figure 5. *Cirsium undulatum*. Holotype (PH) of *Carduus undulatus* Nutt. — leaf in center.



Figure 6. *Cirsium undulatum*. Detail from PH holotype,



Figure 7. *Cirsium undulatum*, epitype. Bennett Co., South Dakota, Stephens 49366 (KANU).



Figure 8. *Cirsium undulatum*, detail from epitype (Fig. 3).



Figure 9. *Cirsium undulatum*. Bell Co., Texas, Correll 12663 (SMU).



Figure 10. *Cirsium undulatum*. Detail from Figure 5 (Bell Co., Texas).

Figure 11. *Cirsium undulatum*. Dallas Co., Texas, Sanders 167 (SMU).



Figure 12. *Cirsium undulatum*. Detail from Figure 7 (Dallas Co., Texas).



Figure 13. *Cirsium undulatum*. Mpio. Galeana, Nuevo León. Hinton 20246 (MEXU).



Figure 14. *Cirsium undulatum*. Mpio. Arteaga, Coahuila, Hinton 17927 (GBH).



Figure 15. *Cirsium undulatum*. Mpio. Arteaga, Coahuila, Hinton 20470 (GBH).



Figure 16. *Cirsium undulatum*. Head from *Hinton et al.* 20246 (detail from Fig. 9).



Figure 17. *Cirsium undulatum*. Head from *Hinton 17927* (detail from Fig. 10).



Figure 18. *Cirsium undulatum*. Head from *Hinton 20470* (detail from Fig. 11).



Figure 19. *Cirsium undulatum*. Mpio. Arteaga, Coahuila. Head from *Hinton 20968*.