

NEW SPECIES OF *CIRSIIUM* (ASTERACEAE: CARDUEAE) FROM MEXICO

GUY L. NESOM

Research Associate

Academy of Natural Sciences of Drexel University

Philadelphia, Pennsylvania

guynesom@sbcglobal.net

ABSTRACT

Cirsium dasyphyllum Nesom, **sp. nov.**, from Nuevo Leon and Tamaulipas, has features suggesting a relationship with *C. undulatum*. ***Cirsium pablillo*** Nesom, **sp. nov.**, from south-central Nuevo León, has previously been identified as *C. texanum*. ***Cirsium mollissimum*** Nesom, **sp. nov.**, is nearly endemic to Coahuila — it has previously been identified mostly as *C. undulatum*. Seven new species are recognized from among plants that often have been identified as *C. mexicanum* and *C. raphilepis*: (a) ***Cirsium pacificum*** Nesom, **sp. nov.**, occurs at low elevation along the Pacific coast from southwestern Sonora to central Nayarit; (b) ***Cirsium magdalenense*** Nesom, **sp. nov.**, occurs in Baja California Sur from the Magdalena Bay area south to the Los Cabos area; (c) ***Cirsium heliorhaphis*** Nesom, **sp. nov.**, is endemic to east-central Durango and adjacent Zacatecas; ***Cirsium tenorioanum*** Nesom, **sp. nov.**, occurs in a small area of east-central Durango; (d) ***Cirsium arctorhaphis*** Nesom, **sp. nov.**, is essentially a Chihuahuan Desert species, in Coahuila, Nuevo León, San Luis Potosí, Tamaulipas, and Zacatecas; (e) ***Cirsium notorhaphis*** Nesom, **sp. nov.**, is from southeastern Puebla and western Oaxaca; (f) ***Cirsium chiapanum*** Nesom, **sp. nov.**, occurs in a small area of Chiapas. ***Cirsium macvaughii*** Nesom, **sp. nov.**, is known only from one Pringle collection, narrowly endemic to swampy meadows in central Jalisco. ***Cirsium basaseachense*** Nesom, **sp. nov.**, is known only from the steep-sided, humid canyon at the base of Cascada de Basaseachic in west-central Chihuahua. The new species are illustrated by herbarium specimens (including details) and distribution maps. The taxonomy of *C. texanum*, *C. raphilepis* sensu stricto, *C. mexicanum*, and *C. lappoides* also is considered and the species are mapped for Mexico, as they sometimes have been confused with the new species. *Cirsium limophilum* Petrak, a Veracruz endemic unrecognized since its description in 1911, is closely similar to *C. lappoides* — it is distinctive in its inner phyllaries apices with purplish, dilated, and wavy-contorted margins.

The taxonomy of Mexican species of *Cirsium* is considered in a series of papers dealing with new species and species groups. The 15 species of sect. *Erythrolaena* are treated in a paper parallel to this one (Nesom 2022) and a taxonomic study of the "Radiata" group is in progress. Other Mexican taxa have been considered in separate studies (Nesom 2018, 2021a, 2021b, 2021c; Nesom & García-Morales 2021a, 2021b) and an overview of all species occurring in Mexico (ca. 70, total) is forthcoming. The plants considered here are generally similar to *C. mexicanum*, *C. undulatum*, *C. raphilepis*, and *C. texanum* and generally have been identified as such. Some of these species form clusters in the phylogenetic analysis of Ackerfield et al. (2020) but more species need to be included before broader patterns are more clearly evident.

Key to selected *Cirsium* species

1. Phyllary apex gradually flattened into a spine-like apex.
2. Leaves not decurrent.
3. Apex of inner phyllaries loose with purplish, dilated, and wavy-contorted, smooth margins
..... ***Cirsium limophilum***
3. Apex of inner phyllaries erect-flexuous, with narrow, straight, ciliolate-serrulate margins
..... ***Cirsium lappoides***

2. Leaves decurrent
4. Stems persistently villous with long, multicellular hairs; heads 2–3.5 cm wide **Cirsium mexicanum**
4. Stems sericeous-glabrescent, without multicellular hairs; heads 1.4–2.5 cm wide.
5. Corollas white to light pink; phyllary margins glabrous, marginal areas smooth, eglandular, inner phyllaries with green apices **Cirsium pacificum**
5. Corollas purple to light pink; phyllary margins persistently arachnoid, marginal areas minutely warty-glandular, inner phyllaries with purple apices **Cirsium magdalenense**
1. Phyllary apex abruptly narrowed into a terete spine.
6. Leaves not decurrent; heads solitary.
7. Adaxial leaf surface with persistent multicellular hairs.
8. Leaves often subclasping; involucre 2–4 cm wide; corollas 20–28 mm long **Cirsium dasyphyllum**
8. Leaves not at all clasping or subclasping; involucre 1.8–2.3 cm wide; corollas 20–21 mm long **Cirsium pablillo**
7. Adaxial leaf surface without persistent multicellular hairs.
9. Leaves not at all clasping or auriculate, usually green adaxially **Cirsium arctorhaphis**
9. Leaves subclasping to auriculate-clasping, persistently gray-green adaxially.
10. Marginal leaf prickles 1–2 mm long; involucre 2 cm wide; inner phyllaries with a raised, thickened-glandular midregion; corollas (16–)28–35 mm long **Cirsium mollissimum**
10. Marginal leaf prickles 3–8 mm long; involucre 2.5–4 cm wide; inner phyllaries without a raised, thickened-glandular midregion; corollas 34–42 mm long **Cirsium undulatum** sensu stricto
6. Leaves decurrent; heads solitary or in a terminal cluster.
11. Heads solitary **Cirsium heliorhaphis**
11. Heads usually clustered, even if loosely.
12. Stems with multicellular hairs; phyllary spines 1–2 mm long; corollas 15–16 mm long, white **Cirsium chiapanum**
12. Stems without multicellular hairs; phyllary spines 3–10 mm long; corollas 21–27 mm long, purple.
13. Adaxial leaf surface densely invested with multicellular hairs; leaves decurrent for the whole internode length **Cirsium macvaughii**
13. Adaxial leaf surface without multicellular hairs; leaves decurrent for less than half the internode length.
14. Phyllary spines 3–5 mm long; Puebla and Oaxaca **Cirsium notorhaphis**
14. Phyllary spines 6–10 mm long; north of Puebla **Cirsium raphilepis**
1. **CIRSIMUM MEXICANUM** DC., Prodr. 6: 636. 1837. TYPE: MEXICO. Tamaulipas. "Tampico de Tamaulipas," 1827, J.L. Berlandier 184 (holotype: G, Figs. 12–14; isotype: P).
- Cirsium mexicanum* var. *bracteatum* Petrak, Beih. Bot. Centralbl. 27 (Abt. 2): 231. 1910. TYPE: COSTA RICA. Tuis pres Turialba, ca. 620 m, 11 May 1897, H. Pittier 11239 (holotype: "Herb. inst. phys. geogr. nat."; isotypes: M-image, US-image). Petrak's protologue cited *Cnicus costaricensis* as a synonym of this name.
- Cnicus costaricensis* Polak., Linnaea 41: 581. 1877. *Cirsium costaricense* (Polak.) Petrak, Beih. Bot. Centralbl. 27 (Abt. 2): 219. 1910. TYPE: COSTA RICA. San José, in locis incultis, 15 Jun 1852, H. Polakowsky 64 (B, photo at F-image).

Annual to short-lived perennial, taprooted. **Stems** 0.5–1.5 m tall, lightly sericeous, glabrescent, exposing sparsely to moderately villous vestiture of long, multicellular hairs. **Leaves** clasping, decurrent 5–60 mm, adaxial surface usually glabrous but sometimes with scattered multicellular hairs, sometimes only the trichome bases persistent, abaxially persistently gray-tomentose, without multicellular hairs. **Heads** usually in loose clusters, usually subtended by 1 or a few small, spiny-margined bracts. **Involucres** 2–3.5 cm wide (pressed); outer phyllaries with a dark, oblong-elliptic area and filiform, glutinous midline, outer abruptly narrowed to a long, flat, lanceolate, spreading spine, inner eglandular, erect with an acuminate, flexuous, straight-margined apex. **Corollas** 23–28 mm long, tube 13–17 mm long, throat 5–7 mm long, lobes 4.5–7.5 mm long, linear, usually with a darkened and minutely tuberculate apex; stigmatic branches 3–4 mm long. **Chromosome numbers**, $2n = 22, 24$ (vouchers not seen).

Tamaulipas, San Luis Potosí, Querétaro, Hidalgo, Veracruz, Puebla, Oaxaca, Chiapas, Tabasco, Yucatan, Campeche, Quintana Roo, through Central America to Panama, West Indies. Disturbed sites, damp or wet pastures, roadside ditches, or clearings in areas of pine or evergreen or deciduous tropical forest, thornscrub; 100–2200 m. Flowering most of the year (November–August).

Northern distribution, apparently typical *C. mexicanum*. **Nuevo León.** Ca. 20 mi SE of Monterrey on Hwy 85 to the end of road at Río Ramos, thorn forest, 28 Jul 1971, *Parker 624* (TEX). **Tamaulipas.** San José [Mpio. Gomez Farías], 17 Feb 1939, *LeSueur 494* (LL, TEX); Mpio. Gomez Farías, La Servilleta, 4 km W de La Charca, bosque tropical caducifolia, 150 m, 29 Apr 1985, *Martínez & Hernández 559* (TEX); Mpio. Santander Jiménez, 30 km SW of Santander Jiménez, "Big Bass Camp," fishing camp on NE side of Lago Vicente Guerrero, where old hwy 101 disappears beneath the lake, thornscrub, 140 m, 16 Jun 1982, *Nee & Diggs 24440* (TEX); Gomez Farías area, Rancho del Cielo, at ranch, 17 Jun 1968, *Richardson 55* (TEX); Gomez Farías area, between gate and ranch, 20 Jun 1968, *Richardson 192* (TEX).

In Tamaulipas and eastern San Luis Potosí, some plants have heads smaller than normal for *Cirsium mexicanum* elsewhere in the range. These may prove to be distinct, but more collections are needed to understand the pattern of variation. Two small-headed collections (as cited below) have heads in a loose raceme and a remarkably dense vestiture of long multicellular hairs on the adaxial leaf surfaces — I first regarded these as distinct, but they, too, are better considered within the context of a variable *C. mexicanum*. **San Luis Potosí.** [Mpio. Tamasopo]: Tamasopo Canyon, 16 Jun 1891, *Pringle 3726* (COLO, MEXU-2 sheets-Fig. 20, MO, MSC, US-Figs. 16, 18, 20). **Tamaulipas.** Mpio. Gómez Farías: Reserva de la Biosfera "El Cielo," 23° 10' N, 99° 15' W, en cuadrante de muestro, bosque de encino-pino humedo, mesclado con mesófilo, 1986 m, 31 Aug 1994, *Hernandez 3370* (MEXU-Figs. 17, 19).

2. CIRSIUM LIMOPHILUM Petrak, Bot. Tidsskr. 31: 61. 1911. **TYPE: MEXICO. Veracruz.** [Mpio. Totutla]: Mirador [of K.C. Sartorius, NE side of Coscomatepec, 6 mi SW of Huatusco], Feb 1842, *F.W. Liebmann 685* (holotype: C image!). Petrak's designation of the new taxon was "[*Cirsium*] limophilum Petrak nov. sp. hybr. x" and on the specimen label he noted "C. lappoides x mexicanum." *Liebmann 687* (US) from Mirador is typical *C. lappoides*. His protologue described the inner phyllaries as "lanceolato-linearia acuminata apice parce purpurascencia, undulato-curvata, subscariosa."

Annual to short-lived perennial (presumably, as for *C. mexicanum*). **Stems** 1–2 m tall, lightly sericeous, glabrescent, apparently without multicellular hairs. **Leaves** nearly glabrous on both surfaces, adaxially apparently with persistent bases of multicellular hairs, oblong to oblong-lanceolate in outline, sinuate-lobed to pinnatifid, subclasping, not decurrent or very slightly so, marginal prickles 3–5 mm long. **Heads** in a terminal cluster, immediately subtended by spiny-margined bracts. **Involucres** 3–3.5 cm wide (pressed); outer phyllaries with a dark, oblong-elliptic area and filiform, glutinous midline,

outer abruptly narrowed to a long, flat, lanceolate, spreading spine, inner eglandular, erect, apices loose with margins purplish, dilated, and wavy-contorted. **Corollas** violet, 22–25 mm long, tube 9–11 mm, throat 5–6 mm, lobes 5–6 mm; stigmatic branches 3.5–4 mm long.

Additional collections. **Puebla.** Mpio. Huetamalco: Campo Experimental "Las Margaritas" INIFAP, acahual joven derivado de bosque tropical perennifolio, 480 m, 2 Mar 2008, *Cornejo T. 2498* (MO). **Veracruz.** Mpio. Alto Lucero: Rancho Nuevo entre Plan de las Hayas y Tierra Blanca, terrenos desmontados para cultivo, 1200 m, 8 Apr 1981, *Castillo & Vázquez 1415* (TEX, Figs. 23-24). Mpio. Camerino Z. Mendoza: Ca. 3 km generally W of Cd. Mendoza, ca. 4400 ft, 23 May 1973, *King 6483* (US). Mpio. Coatepec: Cerro Achichuca Tuzamapan [19.375 -96.8417], veg. acahual, entre cultivos de maiz, 730 m, 21 Mar 1979, *Castillo C. & Tapia 493* (TEX-Fig. 26). Mpio. Orizaba: Just E of Orizaba along Rte 150, ca. 3200 ft, 23 May 1973, *King 6476* (US); 3 km E de Orizaba, veg. secundario (cafetales), 1150 m, 10 Mar 1983, *Torres C. 2348* (MEXU-Figs. 21-22).



Figure 1. Distribution of *Cirsium limophilum*. Also see Figure 6.

Although it is similar to typical *Cirsium lappoides* in most features, the purplish, wavy-contorted phyllary apices of *C. limophilum* are immediately distinctive. It is plausible that *C. limophilum* is a derivative of *C. lappoides* but the two occur sympatrically, at least in the region of Puebla where they have been collected (see *C. lappoides*, Gómez C. 294).

The inner phyllaries of the two more northern collections (*Castillo & Tapia 493*; *Castillo & Vázquez 1415*) have apices with broader margins than in the type and collections from closer to Orizaba but the close geography suggests that all are the same species. *Cirsium limophilum* apparently has not been recognized since its description by Petrak, but in a survey of collections those cited here are immediately distinctive.

3. **CIRSIIUM LAPPOIDES** (Less.) Sch.Bip. in Seem., Bot. Voy. Herald, 313. 1856. *Carduus lappoides* Less., Linnaea 5: 129. 1830. **TYPE: Veracruz.** **Protologue:** "In pratis pr. San Andres. Aug." In pratis prope San Andres, Aug [1828], C.J.W. Schiede 278 (probable holotype: B-photo at F image; probable isotype: HAL image).

The HAL sheet has a handwritten label, perhaps by Schiede, as "266 — Cnicus, San Andres in pratis, Aug 28" and another with "278. Carduus lappoides n. sp." and (printed) "A.v. Chamisso."

Cnicus leibmannii Klatt, Leopoldina 24: 128. 1888. *Cirsium liebmannii* (Klatt) Petrak, Beih. Bot. Centralbl. 27 (Abt. 2): 227. 1910. **TYPE: MEXICO. Veracruz.** Pic Orizaba, 8000 ft, F.W. Liebmann 681 (holotype: C?; isotype: tracing and fragment-GH!). Klatt cited "*Cirsium Liebmannii* Schultz Bip." in synonymy.

Stems ca. 0.5–1.5 m tall, villous with multicellular hairs. **Leaves** thinly persistently cottony abaxially, glabrescent adaxially, multicellular hairs prominent on both surfaces, cauline broadly ovate, clasping, not decurrent or rarely so for 1–6 mm. **Heads** often in close, terminal clusters of 2–8. **Involucres** 2–3 cm wide, immediately subtended by spiny-margined bracts; phyllaries quickly glabrescent, lower part and lateral areas yellowish and minutely tuberculate, with a prominent, dark-drying, oblong-elliptic glandular midregion on the upper 1/3–2/3, abruptly narrowed to a spreading or reflexed, flattened, spinescent tip 3–5 mm long, the inner linear-lanceolate with a flexuous apex, margins ciliolate-serrulate or the outermost with short, slender marginal spines. **Corollas** purple, 20–26 mm long, tube 9–15 mm long, throat 4–7 mm long, lobes 4–6 mm long; stigmatic branches 3.2–4.5 mm long.

Guanajuato, Querétaro, Hidalgo, Veracruz, Puebla, Morelos, Oaxaca. Clearings or roadsides in pine, pine-oak, areas of semitropical oak forests, often with other deciduous species, e.g., sweetgum, alder; (200–)900–2300(–2700) m; flowering February–May (July).

Leaves of *Cirsium lappoides* are clasping and not decurrent or only slightly so; stems and both leaf surfaces are prominently invested with multicellular hairs. The phyllaries resemble those of *C. mexicanum* but have a broader medial glandular area.

Additional collections. **MEXICO. Guanajuato.** Mpio. Xichú: 23–24 km de Xichú, camino a San Luis de la Paz, laderas con bosque de encino y pino, 2100 m, 3 Apr 2003, *Carranza 6479* (MEXU); carr. de San Luis de la Paz a Xichú, antes de la área montañosa-arbolada, lugar semi-árido, 12 Mar 1979, *Kishler 603* (MEXU); El Puerto Chiquito, bosque de pino, ladera de cerro, 2300 m, 23 Apr 1990 *Ventura & López 7902* (MEXU, TEX); El Ocotero, 30 km W de Xichú, ladera de cerro, veg. boscosa, 2300 m, 12 Nov 1989, *Ventura & López 7293* (TEX); El Potrerillo, ladera de cerro, matorral arbustivo, 2150 m, 9 Apr 1991, *Ventura & López 9201* (MEXU, TEX). Mpio. Victoria: 3.5 km de Joya Fría, bosque de *Pinus-Quercus*, laderas calizas, 2200 m, 19 Sep 1996, *Pérez & Carranza 3403* (MEXU); alrededores de San Agustín, bosque de encino, 2400 m, 11 Sep 1987, *Rzedowski 44736* (MEXU, TEX). **Hidalgo.** Between Pachuca and Tampico on Hwy 105, 8.8 mi NNE of Lolotla, 1650 m, 27 Feb 1987, *Croat 65847* (MO); Mpio. Tianguistengo, hacia Xochicoatlán, bosque perturbado de encinos, 1600 m, 26 Mar 1981, *Hernández 5669* (MO); Mpio. Huehuetla, 4 km E de Huehuetla, veg. secundario, 1300 m, 19 May 1982, *Hernández 7270* (MO); Mpio. Tlanchinol, Apantlazol, ca. 12 km E de Tlanchinol, bosque mesófilo de montaña, 1300 m, 7 Apr 1992, *Luna & Ocegueda 224* (MEXU); 2 mi N of Zimapan, 2nd zinc mine site, 12 mi up road W of Hwy 85, 5 Jul 1966, *Mears 320* (TEX-2 sheets); 70 km S de Tamazunchale, rumbo a Ixmiquilpan, bosque de encinos con *Juniperus*, 29 Jun 1980, *Villasenor R. 36* (MEXU). **Morelos.** Mpio. Yautepec, brecha San Carlos a Itzamatitlán, ruderal, 1210 m, 8 Mar 1988, *Fuchs Q. 1933* (MEXU). **Oaxaca.** Dto. Cuicatlán, La Loma, Cuyamecalco, 2000 m, 14 Apr 1919, *Conzatti 3467* (MEXU); Dto. Cuicatlán, Cueva de Teutila, 900 m, 20 Apr 1919, *Conzatti 3527* (US); Mpio. Ixtlán de Juárez, camino a Josaa, 1450 m, 16 Mar 1999, *García R. 347* (MO); Mpio. Huautla de Jimenez, Sierra Mazateca, 65 km de Huautla de Jimenez por la carr. de Flores Magón (Mex 182), 1229 m, 28 Apr 2001, *Munn-Estrada 1028* (TEX); Mpio. San Juan Tepeuxila, San Juan Teponaxtla, 36.9 km

NW de San Martín Buenavista, bosque mesófilo, 1846 m, 20 Jun 2002, *Torres C. 16519* (MEXU); Dto. Mixe, 12 km N por la desviación a San Andrés Yaá de la carr. a Totontepec, 9 km NE de San Miguel Metepec, bosque mesófilo de montaña, ca. 2000 m, 22 May 1984, *Villaseñor R. 660* (MEXU). **Puebla.** Presa Mazatepec, camino a Tezuitlan, 900 m, 18 Apr 1973, *Boege 2762* (MEXU); Mpio. Zacapoaxtla, Tepeixpan, bosque mesofilo, 28 Mar 2015, *Corral 20791* (MO); Mpio. Hueytamalco, 1.5 km hacia SW de las instalaciones del Campo Experimental "Las Margaritas," bosque tropical perennifolia en regeneración, 600 m, 22 Oct 2007, *Gómez C. 294* (MEXU, MO); Mpio. Xochiapulco, Rosa Chica, llamado Auapechpan, 2146 m, secundario, 21 Mar 2015, *Jiménez 30563* (TEX); Mpio. Ayotoxco de Guerrero, ca. Cuauhtemoc, llamado el Zapote negro, en la carr. que va a Ayotoxco, 225 m, 22 Oct 2015, *Jiménez 31051* (TEX); 8 km de Villa Juárez, camino a San Pedro, 1150 m, 10 Mar 1963, *Martínez 117* (MEXU); poco W de Zapotitlan, sobre la carr. a Zacatlán, ca. 100 m antes de puente río, a un lado del río, orilla de carretera, 704 m, 6 Feb 2006, *Vibrans 7929* (MEXU). **Querétaro.** Mpio. Landa: 2 km SE de Neblinas, ladera de cerro, bosque de *Heliocarpus*, *Lonchocarpus*, y *Morus*, 1000 m, 19 Apr 1989, *Rubio 577* (MEXU). Mpio. Jalpan: 6-7 km al Oriente de la Parada, ladera de cerro parcela de cultivo, 1350 m, 22 May 1990, *Servin 44* (TEX). Mpio. Pinal de Amoles: Agua Blanca, 10 km S de Pinal de Amoles, cañada, bosque mesófilo de montaña, 2700 m, 2 Apr 1982, *Fernandez & Zamudio 981* (TEX); 2 km NE de Pinal de Amoles, sobre la carr. a Jalpan, ladera caliza, bosque mesófilo de montaña en una cañada, orilla de camino, 2250 m, 27 Apr 1987, *Rzedowski 43130* (MEXU, MO, TEX); 12 km NE de Pinal de Amoles, sobre la carr. a Jalpan, orilla de la carretera, 1700 m, 15 Apr 1988, *Rzedowski 46429* (MEXU); 2 km SW de Pinal de Amoles, ladera caliza, bosque de *Pinus patula*, 2700 m, 24 Apr 1988, *Rzedowski 46860* (MEXU). **Tamaulipas.** Mpio. Gomez Farias: Rancho del Cielo, near Agua Lionda, 1 Jul 1968, *Richardson 529* (TEX); E de Julilo, pino-encino, 1800 m, 8 May 1986, *Yanez 767* (TEX). Mpio. Tula: 10.2 mi SE of Tula (centro) on road to Ocampo, NNW-facing slope, dense large oaks, many bromeliads, 1440 m, abundant in a clearing in woods, basal rosettes common without flowering stems, flring plants 4-8 ft tall, lvs to 60 cm long, 16 Jun 1987, *Nesom 6006* (TEX); 15.2 mi SE of Tula (centro) on road to Ocampo, near bottom of SW-NE trending canyon, tall oaks with many bromeliads, common along roadside, 1315 m, 16 Jun 1987, *Nesom 6037* (TEX). **Veracruz.** Mpio. Actopan, El Cerrito (Mozomboa), 100 m, 17 Mar 1985, *Acosta P. 297* (MEXU-2 sheets); Mpio. Huatusco, La Candelaria, carr. Huatusco-Coscomatepec, bosque caducifolia, 1450 m, 18 Apr 1979, *Avendaño & Ortega 236* (TEX); Mpio. Xalapa, Cerro de Macuítetel, bosque caducifolia secundario, 1520 m, 9 Mar 1978, *Calzada 4269* (TEX); 1 km S de Cd. Xalapa, bosque mesófilo, secundaria, 1300 m, 24 Mar 1986, *Chacon 14* (MEXU); Mpio. Xalapa, Parque Ecologico Fco. J. Clavijero, bosque caducifolio, primaria, 1350 m, Mar 1982, *Chazaro B. 2207* (MEXU); Mpio. Hidalgotitlán, camino viejo de Hnos. Cedillo-La Laguna, 140 m, selva alta perennifolia, secundaria, 10 Apr 1974, *Dorantes 3592* (MEXU); W de Xalapa, San Miguel del Soldado, bosque de *Quercus*, 1800 m, 8 Jul 1966, *Gómez-Pompa 1458* (MEXU); Mpio. Panuco, tramo carr. Ebano-Ejdo. San Jose, 3 km de San Jose, 29 Mar 1986, *Gutiérrez B. 1749* (MEXU); Mpio. Xalapa, El Seminario, W of Cd. Jalapa, 1500 m, 28 Jan 1985, *Gutiérrez S. 1524* (TEX); Mirador, Feb 1842, *Liebmman 687* (US); Mpio. Calcahualco, 2 km NE de Calcahualco, Barranca del Río Jamapa, bosque caducifolio, secundaria, 1600 m, 14 May 1985, *Martínez P. & Espiritu S. 176* (MEXU); Cordoba, Aug 1936, *Matuda 763* (MEXU); Mpio. Coatepec, entre Cinco Palos y Zapotales, bosque caducifolio, secundaria, 1450 m, 1 Apr 1983, *Narava 238* (MEXU); Mpio. Zontecomatlán, 1 km NE of San Antonio Ixtatetla, 1300 m, 27 Apr 1983, *Nee & Taylor 26840* (TEX); Mpio. Xico, 8 km NW of Xico, hills above and NE of Xico Viejo, cutover woods, 1700-1900 m, 5 Feb 1984, *Nee & Taylor 29375* (TEX); carr. rumbo a Cosautlán, ruderal, al lado de una pendiente, 1100 m, 8 Mar 1981, *Ortega O. 7* (TEX); Zacuapan, Mar 1913, *Purpus 6322* (MO, US); Mpio. Jilotepec, El Esquilón, pinar perturbado, Mar 2012, *Ramos 2973* (MEXU); Mpio. Zongolica, Rancho La Compañía, entre Zongolica y Tepetitlanapa, 1200 m, 10 Apr 2000, *Rincón G. 1439* (MEXU); Mpio. Ixtaczoquitlán, Zapoapan a la localidad de Cuatlapan subiendo por el cerro Chicahuaxtla, 1124 m, 18 Apr 2013, *Vargas R. 408* (MEXU); Mpio. Xalapa, Zapata, matorral en cañada, 1300 m, 16 Mar 1974, *Ventura A. 9740* (MEXU).

4. **CIRSIUM TEXANUM** Buckley, Proc. Amer. Acad. Nat. Sci. Philadelphia 13: 460. 1862. **TYPE: USA. Texas.** [Mason Co.:] Near Brady's Creek, N of Fort Mason, Jun 1861, S.B. Buckley s.n. (holotype: PH!).

Carduus helleri Small, Fl. Southeast. U.S., 1307, 1341. 1903. *Cirsium ochrocentrum* var. *helleri* (Small) Petrak, Beih. Bot. Centralbl. 35 (Abt. 2): 418. 1917. *Cirsium ochrocentrum* subsp. *helleri* (Small) Petrak, Beih. Bot. Centralbl. 35 (Abt. 2): 419. 1917. **TYPE: USA. Texas.** Kerr Co.: Kerrville, 1600-2000 ft, 7-14 May 1894, A.A. Heller 1720 (holotype: NY image; isotype: US image).

Carduus austrinus Small, Fl. Southeast. U.S., 1307, 1341. 1903. *Cirsium austrinum* (Small) E.D. Schulz, Wild Fl. S. Antonio, 242. 1922. **TYPE: USA. Texas.** 1851, C. Wright 1291 (holotype: NY image; isotypes: GH 4606, GH 4607, MO). Wright's field notes: field #377, from "low and grassy flats around Escondido Springs between the Pecos and the Limpia" — 7 Jun 1851, Pecos Co., Texas.

Cirsium greenei Petrak, Repert. Spec. Nov. Regni Veg. 9: 177. 1911. **TYPE: MEXICO. Coahuila.** Rio Grande Valley near Diaz [Piedras Negras], 700 ft, 19 Apr 1900, C.G. Pringlei 8296 (holotype: W?; isotypes: BRU, LL, MEXU-2 sheets, MIN, NY, RM, US).

This was described by Petrak as "nov. spec." but it apparently was intended to function as a replacement name for *Cirsium filipendulum* (A. Gray) Engelm. [not *C. filipendulum* Lange], which he cited in synonymy but which is now regarded as a synonym of *Cirsium engelmannii* Rydb. (Keil 2006). Petrak also cited Palmer 765 (here = *C. arctorhaphis*) and two collections by Karwinsky.

Cirsium texanum var. *stenolepis* Shinnars, Field & Lab. 19: 81. 1951. **TYPE: USA. Texas.** Van Zandt Co.: 2 1/4 mi W of Grand Saline, low ground, sandy soil, 15 May 1949, L.H. Shinnars 11192 (holotype: SMU, as 2 sheets, images).

Biennials or annuals. **Stems** (0.5–)1–2 m tall, branched near the middle and producing a number of long, spreading-ascending stems and solitary heads, permanently cottony, without multicellular hairs. **Leaves** deeply to shallowly lobed, marginal prickles 1–5 mm long, glabrous to glabrate above, without multicellular hairs, permanently cottony beneath, decurrent 0–5 cm or sometimes the whole node, particularly on the proximal portions of the stem. **Heads** solitary on long (commonly 3–12 cm), nearly naked peduncles, ebracteate. **Involucres** 1.8–4 cm wide (pressed), 15–23 mm high; phyllaries in 8–10 series, erect, narrowly lanceolate, with a narrow, medial, glandular-glutinous ridge with a thin black line in the middle, abruptly narrowed to an apical, terete, spreading spine 2–4 mm long. **Corollas** pink or purplish pink, 17–30 mm long, tube 8–13 mm long, throat 4–9 mm long, lobes 4–8 mm long; stigmatic branches 2.5–4 mm long. **Chromosome number**, $2n = 22$.

Coahuila, Nuevo León, central to southwest Texas, southern New Mexico (Chaves and Eddy cos.), southern Oklahoma, adventive in Missouri along railroad tracks in St. Louis (fide Yatskievych 2006); disturbed sites, wet fields, in areas of grassland, chaparral, juniper, oak, or pine-oak; 400–5900 m; flowering April–September (–October, –November). Keil (2006) noted that it occurs in Arkansas and Louisiana," apparently based on these vouchers (as annotated by Keil):

Arkansas. Miller Co.: Texarkana, railroad yards, 31 May 1968, Demaree 58086 (COLO).

Louisiana. Acadia Par.: Prairies near Crowley, 10 Apr 1925, Small & Wherry 11765 (NY)

Additional collections from MEXICO. Coahuila. Mpio. Musquiz: W edge of town of Musquiz, mostly cleared fields, scattered acacia and mesquite, 520 m, common in scattered but dense populations, local moist sites, 7 May 2018, Nesom 7018 (ASU, MEXU, MO, NMC, NY, TEX, UCR, UTC); Rancho Agua Dulce, shrub-covered valley floor, 1 Jul 1936, Wynd & Mueller 398 (MO, NY). Mpio. Ocampo: Cuesta Zozoya, ca. 38 km de Ocampo rumbo a Sierra Mojada, 1600 m, veg. de *Lycium*, *Acacia*, *Viguiera*, *Agave*, *Fouquieria*, 11 Sep 1991, Carranza C-1148 (MEXU); Sierra Madera del Carmen, Rancho el Secadero, cañon Poblano, bosque de *Pinus cembroides*, *Quercus grisea*, *Crataegus*, *Juniperus*, *Ungnadia*,

Fraxinus, 2100–2800 m, 20 Aug 1994, Carranza *et al.* 2037 (MEXU). Mpio. Piedras Negras: Ca. 5 mi S of Piedras Negras on Hwy 57, mostly cleared fields in the area, some *Larrea*, 270 m, large, isolated populations in wet areas, 2–4 feet tall, not decurrent, 6 May 1989, Nesom 7000 (MEXU, TEX). **Nuevo Leon**. Obispado, 1 May 1947, 1500 ft, Lacás 337 (F); mtns near Monterrey, ridge S of Puerta, Jul 1933, Mueller 232 (F); 2 mi N of Sabinas Hidalgo, sandy loam bottom, 26 Mar 1944, Heard *et al.* 14514 (F, MO, TEX). **Tamaulipas**. [Mpio. ?], no other locality data, 26 Apr [year?], Runyon & Tharp 4074 (US).

Two collections are atypical in distal branching and non-decurrent distal leaves, but the heads are long-pedunculate with narrow phyllaries — Mpio. Montemorelos: Monterrey on E side of city, dry creek bed, 1600 ft, 16 Jul 1971, Ellis 9 (TEX); El Pastor, bushy hillside, 500 m, 19 May 1994, Hinton *et al.* 24236 (GBH-Fig. 32).

Cirsium texanum is similar to *C. raphilepis* and *C. arctorhaphis*, which usually have leafy peduncles and 1–several nearly sessile buds immediately below each mature head. The involucrel spines are longer and erect to slightly divergent (vs. spreading at right angles in *C. texanum*). Leaves of *C. raphilepis* are consistently decurrent; those of *C. texanum* (especially the distal) are variably so and without a readily discernible geographical pattern of variation. *Cirsium texanum* does not overlap in distribution with *C. raphilepis* or *C. arctorhaphis*. Also see *C. pabillito*.

5. CIRSIUM DASYPHYLLUM Nesom, **sp. nov.** **TYPE: MEXICO. Nuevo León.** Mpio. Aramberri: N of Aramberri, pine woods, roadside, 1040 m, 16 Jun 1990, Hinton *et al.* 20365 (holotype: TEX; isotype: GBH).

Similar to *Cirsium texanum* in its solitary heads on long, non-leafy peduncles, heads without closely subtending bracts, and narrow phyllaries; distinct in its non-decurrent leaves, the distal cauline becoming bracteate and extending to near the heads, abaxial leaf surfaces with multicellular hairs, and larger heads.

Annual or biennial from a woody taproot. **Stems** (0.5–)1–2 m tall, branched near the middle and producing a number of long, spreading-ascending stems and solitary heads, permanently cottony, without multicellular hairs. **Leaves** mostly oblong-lanceolate, usually little constricted or narrowed at the base and sometimes subclasping, coarsely dentate to dentate-lobed, marginal spines 2–5 mm long, glabrous to glabrate above but with multicellular hairs, permanently cottony beneath, not decurrent or sometimes slightly so on proximal nodes, wings longest on proximal portions of the stem. **Heads** solitary on long (commonly 3–12 cm), nearly naked peduncles, ebracteate. **Involucres** 2–4 cm wide (pressed); phyllaries narrowly ovate-lanceolate to lanceolate, with a narrow, medial, glandular-glutinous medial ridge with a thin black line in the middle, abruptly narrowed to an apical, terete, spreading spine 2–4 mm long. **Corollas** purplish pink, 20–28 mm long, tube 8–10 mm long, throat 8–11 mm long, lobes 5–7 mm long; stigmatic branches 2.5–3.5 mm long.

Additional collections. Nuevo Leon. Mpio. Aramberri: N of Aramberri, pine woods, 950 m, 30 Nov 1989, Hinton 20017 (GBH-Fig. 30, TEX); N of Aramberri, pine woods, 1165 m, 1 Sep 2001, Hinton 20585 (GBH-Fig. 33, TEX); Agua Blanco to San Miguel, grassy hillside, 2020 m, 28 Aug 1991, Hinton *et al.* 21336 (GBH, TEX). Mpio. Galeana: Agua Blanco to San Miguel, grassy hillside, 2020 m, 28 Aug 1991, Hinton 21336 (GBH-Fig. 31). [Mpio. Santiago]: Monterrey, E side of city, dry creek bed, 1600 ft, 16 Jul 1971, Ellis 9 (TEX). **Tamaulipas.** Mpio. Gonzalez: Sierra de Tamaulipas, 2 km N del Ejido El Cabrilo, bosque de *Quercus*, 28 Sep 1984, Hernandez & Gonzalez 133 (TEX). [Mpio. Juamave], 4 mi S of Juamave, ditch bank, 5 Jul 1949, Stanford *et al.* 2276 (MO, TEX, US-2 sheets). [Mpio. Victoria], vicinity of Victoria, ca. 320 m, 1 Feb–9 Apr 1907, Palmer 178 (MO, US). [Mpio. ?], 5 km S of Hoja Verde, up arroyo, 30 Jun 1949, Stanford *et al.* 2208 (TEX, US). **San Luis Potosí.** [Mpio. Rio Verde]: Rio Verde, 2–8 Jun 1904, Palmer 47 (MO, US).

The collection from San Luis Potosí appears to be out of range but the morphology is consistent with that of the species further north.

6. CIRSIUM PABLILLO Nesom, **sp. nov.** **TYPE: MEXICO. Nuevo León.** Mpio. Galeana: Hacienda Pablillo, 8 Jul 1936, *M. Taylor 88* (holotype: TEX; isotypes: F-Figs. 34, 35, MO).

Similar to *Cirsium dasyphyllum* in its northeastern Mexico distribution, solitary, ebracteate heads, and adaxial leaf surfaces with multicellular hairs; different in its non-clasping leaves, smaller involucre, narrower, glandular phyllaries, and shorter corollas (throat). Similar to *C. texanum* in involucre morphology but leaves with multicellular hairs on adaxial surfaces, involucre smaller, and corollas shorter.

Annuals from a woody taproot. **Stems** 0.4–0.8 cm tall, sparsely sericeous, multicellular hairs under the tomentum. **Leaves** mostly oblong-lanceolate in outline, 5–8 cm long, continuing distally to near the heads but reduced to small bracts, not clasping or weakly so, not at all decurrent, margins crenate- to deeply serrate-lobed, prickles 1–2 mm long, faces bicolor, white- to gray-tomentose abaxially, glabrescent adaxially, surface with persistent multicellular hairs. **Heads** solitary, without closely subtending bracts. **Involucre** 1.8–2.3 cm wide (pressed); phyllaries with a distinctly raised-thickened, glandular midrib just below the spine insertion, outermost minutely glandular on each side of the midrib, terminal spines 3–4 mm long, terete, apices of innermost linear-attenuate and purple. **Corolla** 20–21 mm long, tube 7 mm, throat 5–6 mm, lobes 7 mm; stigmatic branches 3–3.5 mm long.

Additional collection. Nuevo León. Mpio. Galeana: ca. 15 mi S of Galeana, fields and meadows below Encinal, common, 13 Jun 1934, *Mueller 785* (F, TEX).

Cirsium pablillo has been collected only twice, the localities in very close proximity (Fig. 2). Gypsum exposures are common in this area.

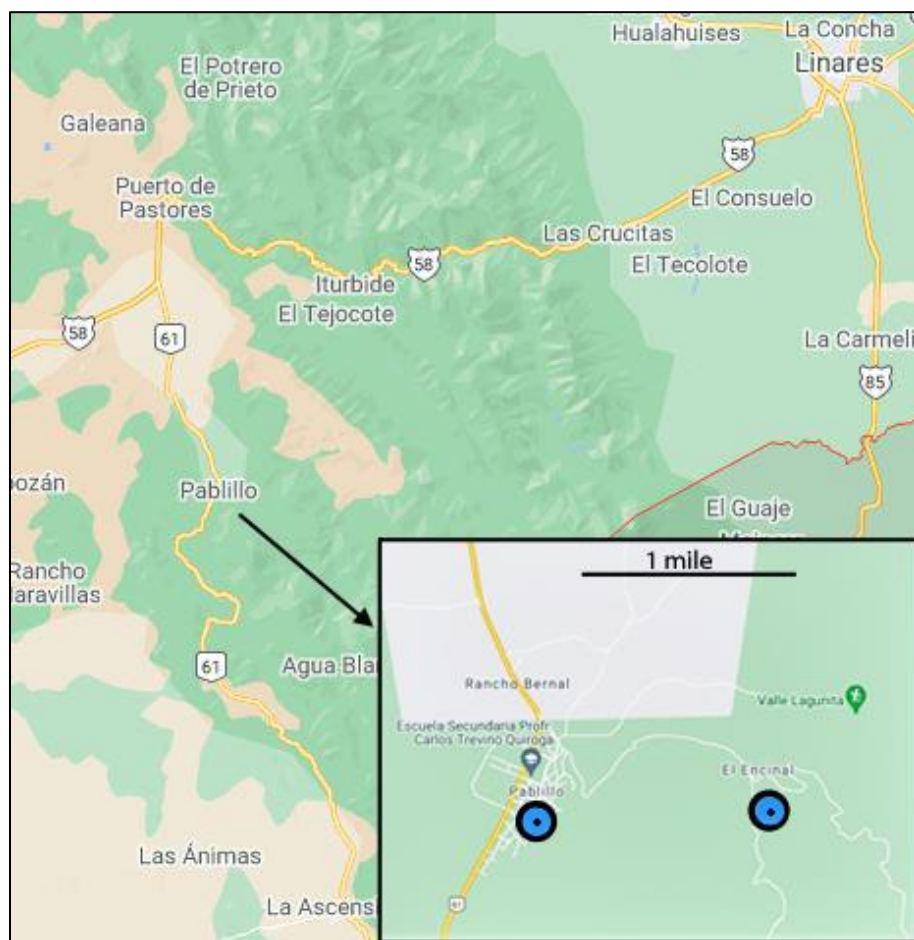


Figure 2. Distribution of *Cirsium pablillo*. Mpio. Galeana, Nuevo León.

7. CIRSIUM MOLLISSIMUM Nesom, **sp. nov.** **TYPE: MEXICO. Coahuila.** Mpio. Ocampo: Sierra del Pino, Ejido Acebuches, Cañón La Vaca, bosque disperso de *Pinus arizonica* y *Juniperus flaccida*, *Arbutus xalapensis*, *Quercus intricata*, *Q. gravesii*, *Q. glaucoides*, 1850 m, 12 Oct 1991, *M. Carranza et al.* C-900 (holotype: TEX).

Similar to *Cirsium undulatum* in its solitary heads without immediately subtending bracts, barrel-shaped involucre concave at the peduncles insertion, leaves subclasping to auriculate-clasping, persistently gray-green adaxially; different in its smaller heads, shorter corollas, and short leaf prickles. Different from *C. arctorhaphis* in its subclasping to auriculate-clasping, short-prickled leaves and in the elaborated raised-thickened midregion of the inner phyllaries.

Annual or short-lived perennial, from a thick, woody taproot. **Stems** 0.5–0.8 m tall, numerous from the base, sometimes branched distally, persistently gray-sericeous-tomentose, without multicellular hairs. **Leaves:** basal and proximal oblanceolate-obovate, petiolate, cauline becoming broadly lanceolate, midcauline 6–12 cm long, 3–4 cm wide, gradually reduced in size distally, base subclasping to auriculate-clasping, not decurrent, margins sinuate to shallowly sinuate-lobed or pinnately lobed, marginal prickles 1–2 mm long, adaxial surface persistently thinly gray-green tomentose but glabrescent, abaxially persistently gray-white tomentose. **Heads** solitary, usually without immediately subtending bracts. **Involucre** ca. 2 cm wide (pressed), abruptly concave at the peduncle insertion; phyllaries evenly graduate-imbricate, (outer) ovate to ovate-lanceolate, with spreading spines 2–3 mm long, inner becoming triangular-lanceolate, all except very innermost with a raised-thickened-glandular medial area. **Corollas** lavender, 28–33(–35) mm long [(16–)20–24(–26) mm in the small-headed form, see comments below], tube 11–15 mm, throat 8–12 mm, lobes 7–8 mm; stigmatic branches 4–5 mm long. **Achenes** 5 mm long.

Coahuila, Chihuahua. Rocky slopes, creek beds, stream sides, sandy arroyos, valley floors, grassland, matorral, chaparral, oak, oak-pine, oak-maple, pine-fir-oak, riparian and canyon bottom woods; (1200–)1600–2300(–2500) m. Flowering July–September (October).

Hsi (1960, p. 41) proposed to recognize this entity as a variety within *Cirsium undulatum*, citing *Johnston 8920* (from the Sierra de la Madera) as the type and 7 other Coahuila collections (all included in the citations here). He noted that it "differs from var. *undulatum* in having much narrower cauline leaves with heavily tomentose upper surfaces and much smaller involucre." The name, however, was never formally published and the entity apparently was never subsequently considered in publications by Ownbey or Ownbey & Hsi.

The epithet of *Cirsium mollissimum* is tongue-in-cheek but the leaf marginal prickles tend to be short and less daunting to the eye than in some other species.

Corolla size in *Cirsium mollissimum* appears to be bimodal, suggesting that aspects of the biology are not accounted for in the taxonomy. Lengths of 28–33(–35) occur over the whole range but geographic enclaves of short corollas [(16–)20–24(–26) mm long] occur without a clear geographic pattern. Collections with smaller involucre and shorter corollas are these: *Fryxell 2731*; *Henrickson 11531*, *11595*, *11779*, *11987*, *15183*; *Powell 1438*; *Riskind 23822*; *Wendt 1168*.

I have not seen *Cirsium mollissimum* from outside of Coahuila, except for the collection from the Sierra del Diablo in Chihuahua, close to the Coahuila border. The species apparently does not cross the Rio Grande into Texas.

Additional collections. MEXICO. Chihuahua. Cañon del Rayo, a large canyon on the NE side towards the N end of the Sierra del Diablo, ca. 27° 20' N, *Stewart 953* (GH). **Coahuila.** Acuña, Rancho El Rincón, on SW margin of Serranías del Burro (part of Sierra del Carmen), ca. 80 km SE of Big Bend National Park, arroyo en terreno muy pedregoso, 3 Jul 1992, *Aguilar R. 292* (TEX); Mpio. Ocampo, Cuesta Zozaya, ca. 38 km de Ocampo rumbo a Sierra Mojada, veg. de *Lycium*, *Acacia*, *Agave*, *Fouquieria*, 1600 m, 11 Sep

1991, *Carranza C-1148* (MEXU); La Cuesta del Plomo, on the Muzquiz-Boquillas hwy, steep limestone slopes and canyons, izotal or encinar (almost chaparral), with *Nolina*, *Yucca carnerosana*, *Dasyllirion*, *Quercus*, 1750-1775 m, 14 Sep 1972, *Chiang et al.* 9223E (LL); Madera del Carmen, on road from Campo Cinco toward mouth of Dos Canyon, 24 Jun 1976, *Fryxell* 2731 (TEX); ca. 66 air mi W of Cd. Acuña, 17 mi W of Rancho Chupadero de Caballo in Canyon de Colorado, with *Pistacia*, *Rhus*, *Prosopis*, *Berberis*, *Aloysia*, *Juglans*, 26 Jul 1973, *Henrickson* 11359 (LL); ca. 35 (air) mi S of Monclova, N side of Sa de la Gavia, in Canyon la Gavia, lower limestone canyon in Tamaulipan-like scrub, clearings in oak forest, with *Rhus*, *Cercis*, *Juglans*, *Prosopis*, *Berberis*, *Karwinskia*, *Aloysia*, *Fraxinus*, 3 Aug 1973, *Henrickson* 11779 (LL); 29 (air) mi WNW of Cuatro Ciénegas, on the N slope of the Sierra de la Madera, ca 7.5 (air) mi W of Rancho Sa de La Madera, at base of Cañón Desiderio, in upper Cañón Pozos, open areas along road, lower chaparral-oak scrub, with *Quercus gravesii*, *Dasyllirion*, *Garrya*, *Rhus*, *Bouvardia*, *Pinus arizonica*, *Ceanothus*, *Arbutus*, *Cercocarpus*, *Nolina*, *Agave*, 13 Aug 1967, *Henrickson* 15323 (LL); ca. 12 (air) mi E of Boquillas in Sierra del Carmen, 10.4 (rd) mi NW of Rancho El Jardin, narrow arroyo in upper mesa of igneous rocks, with *Cercocarpus*, *Quercus*, *Arbutus*, *Juniperus*, *Nolina*, *Opuntia*, 27 Jul 1973, *Henrickson* 11531 (LL); ca. 22 mi SE of La Linda, 3 mi S of Cerro Agua Chile toward Centinela, limestone arroyo, *Rhus*, *Acacia*, *Yucca*, *Prosopis*, 4000 ft, 30 Jul 1973, *Henrickson* 11595 (LL); ca. 35 (air) mi W of Cuatro Ciénegas, Canyon de la Hacienda of Sierra de la Madera, mid-canyon in disturbed area near the old first lumber campsite, with *Quercus* spp., *Pinus ponderosa*, *Acer*, *Arbutus*, *Cupressus*, *Prunus*, *Garrya*, *Cercis*, 6 Aug 1973, *Henrickson* 11987 (TEX); ca. 22 (air) mi WNW of Cuatro Ciénegas, in upper portion of limestone Canyon de la Hacienda, below 1st lumber camp in Sierra de la Madera, in arroyo, oak-pine forest with *Fraxinus*, *Cercis*, *Rhus*, *Lindleya*, *Arbutus*, *Garrya*, 28 Sep 1973, *Henrickson* 13646 (LL); 75 (air) mi S of Big Bend National Park basin, mid portion of the Valle de Pinos (Vacas) of the Sierra Santa Fe del Pino, open *Pinus arizonica*, *Juniperus deppeana*, *Quercus gravesii*, *Q. glaucoides*, *Arbutus*, woodland with *Prunus*, *Cercocarpus*, *Salvia*, *Dasyllirion*, *Nolina*, 8 Aug 1976, *Henrickson* 15183 (LL); Cañón del Cuevo Chico, ca. 16 km N of Cuesta Zozoya, ca. 27° 25' N, 11-15 Sep 1941, *Johnston* 8515 (GH); Sierra de la Madera, vicinity of "La Cueva" in Corte Blanco fork of Charretera Canyon, scrub oak zone just below the conifer forest, 5300-6500 ft, 11-15 Sep 1941, *Johnston* 8920 (F, GH-2 sheets, LL); Sierra del Pino, 2-10 mi N of camp at Noria, 23 Aug 1940, *Johnston & Muller* 584 (GH, LL); Sierra Santa Fe del Pino, near and just below the highest peaks WNW of Hacebuches and in broad canyon between the two main ridges, rather steep limestone slopes and arroyo-canyons on W side of E ridge, with *Juniperus*, *Quercus*, *Pinus*, *Dasyllirion*, *Cercocarpus*, 26 May 1973, *Johnston* 11239-K (LL); Cañón Hundido, N side of Pico de Centinela, Sierra del Jardín, 8 km E of Rancho El Jardín by winding road, steep canyon through igneous sierra, with *Quercus*, *Pinus*, *Acer*, *Tilia*, *Garrya*, *Ceanothus*, *Fendlera*, *Pseudotsuga*, 27 Jul 1973, *Johnston* 11813-B (LL); Cañón de La Gavia, above (S. of) Rancho de la Gavia, steep sided limestone mountains, permanent water in this canyon, with *Quercus*, *Dasyllirion*, *Agave*, *Cercocarpus*, *Fraxinus*, *Pinus*, 2 Aug 1973, *Johnston* 12050-A (TEX); Mpio. Múzquiz, Sierra Hermosa, Rancho La Morado, ca. 100 mi NW of Múzquiz, 4500 ft, 12 May 1968, *Latorre s.n.* (TEX); Del Carmen Mts, 12 Sep 1936, *Marsh* 625a (TEX); Sierra de Santa Rosa, S of Múzquiz, 8 Jul 1938, *Marsh* 1264 (F, GH, TEX); Monclova, Gloria Mts, 3 Aug 1939, *Marsh* 1921 (F, TEX); Sierra de la Madera, Cañada de la Hacienda, rocky creek bed, maple and oak, 1850 m, 15 May 1992, *Mayfield* 1388 (TEX); Sierra de San Marcos, top, opposite Los Fresnos, NE-facing slope, 20 Aug 1968, *Minckley s.n.* (ASU, Fig. 37); Cuatro Ciénegas Basin, Sierra de San Marcos, opposite Los Fresnos, NE-facing slope, 4-5 Apr 1969, *Pinkava et al.* 6064 (ARIZ); pass through Babia Mts, road to Rancho Las Norias from San Miguel, grassland, sotol, 21 Aug 1966, *Powell* 1438 (TEX); Sierra del Burro, canyon El Bonito, intermittent drainage, pine-oak woodland, 19 Sep 1977, *Riskind* 2222 (TEX-2 sheets); Serranías del Burro, Rancho El Bonito, canyon La Pantera, 19 Sep 1977, *Riskind* 2230 (TEX); Mpio. Ocampo, Sierra Madera del Carmen, 0.3 road mi SE of central cabin of Campo Dos, road to Campo Cinco, woods margin, pine-fir-oak, 2270 m, 11 Aug 2004, *Riskind* 23822 (TEX); 24 km NW of Fraile, 8200 ft, oak and juniper, ground cover of grass, *Yucca*, and perennial herbs, 15 Jul 1941, *Stanford et al.* 378 (MO, NY); Sierra Hechiceros, close to the Chihuahuan boundary, Cañón del Indio Felipe, deep wooded canyon with running water, dry sandy arroyos, 27 Sep 1940, *Stewart* 61 (LL); vicinity of Rancho El Tule, SE foothills of the igneous Sierra Hechiceros, ca. 24 km due N of Castillon and close to the Chihuahua boundary, 12 Jun 1941, *Stewart* 480 (GH, LL); Rincón de María, on Hacienda La Babia, ca 70 mi by road NW from Múzquiz, wet to fairly dry areas around "slump spring" along spring level road in SW part of rincón, general area of

oak woodland, limestone area, open area with *Asclepias*, *Eleocharis*, *Sorghum*, *Muhlenbergia*, *Samolus*, *Juncus*, and *Salix*, 27 Apr 1975, *Wendt* 936 (LL); Cañón de La Hacienda (N draining): ca. 0.33 mi N (down-canyon) from upper woodcutter's camp, along road to Hacienda Cerro de la Madera, canyon-bottom woods with *Quercus gravesii*, *Arbutus*, *Cupressus arizonica*, *Ceanothus*, *Prunus*, *Agave*, *Garrya*, 17 Aug 1975, *Wendt* 1168 (TEX); Cd. Múzquiz, Rancho Agua Dulce, shrub-covered valley floor, 1-18 Jul 1936, *Wynd* 397 (MO, NY, TEX); Mpio. Villa Acuña, Sierra del Carmen, Canyon de Sentinela, on hacienda Piedra Blanca, moist stream side, 8 Jul 1936, *Wynd & Muller* 596 (GH, MO, NY, US-Fig. 36).

8. **CIRSIIUM RHAPHILEPIS** (Hemsl.) Petrak, Beih. Bot. Centralbl. 27 (Abt. 2): 242. 1910. *Cnicus raphilepis* Hemsl., Biol. Centr. Amer., Bot. 2: 252. 1881. **TYPE: MEXICO. Edo. México.** Valley of Mexico, 2 May 1865, *E. Bourgeau* 141 (holotype: K-Fig. 38; isotypes: BR, GH-Figs. 39 and 40, P-3 sheets).

Cirsium reglense Sch.Bip. ex Klatt (in synonymy), Leopoldina 24: 128. 1888. *Cnicus reglensis* Klatt, Leopoldina 24: 128. 1888. **TYPE: [Hidalgo]. "Regle"** [San Miguel Regla, near Real del Monte], [1836], *C.A. Ehrenberg* 16 (holotype: B, presumably destroyed; isotype: apparent fragment at P, mounted with 3 stems of *Schaffner* 42).

Klatt took Schultz's unpublished epithet (in the genus *Cirsium*) from the Ehrenberg specimen (*Ehrenberg* 16, B) and used it for his 1888 name as "*Cnicus reglensis* Klatt." His listing of *Cirsium reglense* in synonymy, referring directly to the B specimen, can be taken as validation of the Schultz name, with *Ehrenberg* 16 as the type.

Petrak (1910) listed "*Cirsium reglense* Schz. Bip. in Ehrenberg nr. 16" and *Cnicus reglensis* Klatt under "**21. Cirsium reglense.**" In 1911, he used the name "**21. Cirsium reglense** Schz. Bip." (suggesting that such also was his intention in 1910) and his handwritten annotation of the C specimen noted "Das Original (Ehrenb. Nr. 16) habe ich nicht gesehen." Petrak regarded the Ehrenberg collection as the type.

Gen. 634. *Cnicus* Linn. Gen. No. 926. (Bentham et Hooker, Genera Plantarum, Vol. II, pag. 468.)

1. *C. reglensis* F. W. Klatt. (*Cirsium reglense* Schultz Bip. in Ehrenberg No. 16.) *C. caule sulcato araneoso, foliis decurrentibus oblongis sinuatis supra glabris subtus cano-tomentosis dentato-spinosis, pedunculis elongatis tomentosis unicephalis, capitulis campanulatis, involucri squamis lanceolatis adpressis mucrone spinuloso apiculatis, floribus purpureiscentibus.* Mexico, Tehuacan, leg. Liebmann No. 648. Herb. Hort. Bot. Hafn. Folia 2½ poll. longa, 9 lin. lata.

Klatt's 1888 protologue (p. 128)

21. Cirsium reglense.

Cirsium reglense Schz. Bip. in Ehrenberg nr. 16.
Cnicus reglensis F. W. Klatt in Leopoldina 1888, XXIV.
nr. 13—14, p. 128.

Petrak's 1910 entry (p. 241)

21. C. reglense Schz. Bip. — Mex. zentral-amer. Cirs. p. 241—242.

Petrak's 1911 entry (p. 64)

Annual to short-lived perennial, from a woody taproot. **Stems** 0.6–1.8 m tall, lightly sericeous, glabrescent, without multicellular hairs. **Leaves** slightly subclasping, mid-cauline decurrent in narrow wings 5–30 mm or sometimes the full internode, marginal prickles mostly 5–7 mm long, abaxially persistently tomentose, adaxially dark green and quickly glabrescent, without multicellular hairs. **Heads** in loose terminal clusters of 2–5 near the top of the stem on short peduncles, ebracteate or with 1–2 small, spiny-margined bracts. **Involucre**s 2–3 cm wide (pressed), slightly concave at the peduncle insertion; phyllaries evenly graduate-imbricate, narrowly ovate-lanceolate, mostly 1.5 mm wide, with a raised-thickened-glandular medial portion on the distal 1/3, outer and middle abruptly narrowed to a stout, erect to slightly spreading, terminal spine 6–10 mm long (longest on middle phyllaries), innermost with a herbaceous, long-acuminate, flexuous apex. **Corollas** purple, 21–25 mm long, tube 7–10 mm, throat 6–8 mm, lobes 7–8 mm; stigmatic branches 3.5–4 mm long.

Dist. Federal, Guanajuato, Hidalgo, Jalisco, Michoacan, Edo. Mexico, Morelos, Querétaro. Fields, grassland, roadsides, along canals, cultivated areas, and other disturbed sites; 200–2600 m. Flowering April–September.

Cirsium raphilepis sensu stricto is distinct in its combination of small heads in loose clusters, decurrent leaves, narrow phyllaries with a long erect, terminal spine, and its generally arid habitats. It differs from *C. mexicanum* in its lack of multicellular hairs on stems, phyllaries with a prominent, raised, medial gland narrower and an abruptly formed, terete, apical spine, and shorter corolla tube but longer throat and lobes. A series of geographically and morphologically separate population systems with relatively small heads and phyllary morphology (raised-glandular midregion, spinose tips) generally similar to *C. raphilepis* have sometimes been identified as the latter (or as *C. mexicanum*) but are recognized here as distinct species (*C. arctorhaphis*, *C. notorhaphis*, *C. chiapanum*, *C. heliorhaphis*, and *C. pacificum*, and *C. magdalenense*).

9. CIRSIUM ARCTORHAPHIS Nesom, sp. nov. TYPE: MEXICO. San Luis Potosí. Mpio. Matehuala: Ca 13.8 mi NE of Matehuala, Rte 57, dry roadside in desert hills, ca. 5500 ft, 7 Sep 1966, G.B. Ownbey 4012, voucher for $2n = 24$ (holotype: MEXU; isotype: TEX).

Similar to *Cirsium raphilepis* but distinct in its non-decurrent leaves, solitary heads (vs. usually in terminal clusters), and terminal spine 4–6 mm long (vs. 6–10 mm).

Annual. **Stems** (0.6–) 1–3 m tall, sericeous, glabrescent, without multicellular hairs. **Leaves** lanceolate in outline, sinuate-lobed, not clasping, not decurrent, marginal prickles 3–6 mm long, adaxially glabrescent to glabrous, without persistent multicellular hairs, abaxially persistently white-tomentose. **Heads** solitary, without immediately subtending bracts. **Involucre**s 1.5–2.5 cm wide (pressed) slightly concave at peduncle insertion; phyllaries glabrous, evenly graduate-imbricate, outermost narrowly oblong-lanceolate, ca. 1 mm wide, becoming ovate-lanceolate inward and 1.5–2 mm wide, outer with a spreading to slightly reflexing terminal spine 4–6 mm long, with a raised-thickened-glandular medial area along the distal half, inner eglandular with a herbaceous, loose, linear-attenuate apex. **Corollas** purple, 18–24 mm long, tube 7–9 mm, throat 6–9 mm, lobes 6–7 mm; stigmatic branches 2.5–3 mm long. **Chromosome number**, $2n = 24$ (Ownbey 4012–San Luis Potosí, the type; Ownbey 3712–Nuevo León).

Coahuila, Nuevo León, San Luis Potosí, Zacatecas. Chaparral, grassland, oak matorral, microphyllous matorral, pine, oak, and oak-juniper woodland, cultivated areas, mesquite-acacia, limestone and gypsum; (400–) 1000–2600 (–3000) m. Flowering (April–) May–September.

Additional collections. **Coahuila.** Mpio. Arteaga: Sierra Zapalinamé, pies del Muerto, 2480–2560 m, matorral de *Quercus greggii*, *Q. hypoxantha*, y *Fendlerella lasiopetala*, 4 Aug 2000, Encina 542 (MEXU); Sierra Zapalinamé, limestone hill slope, pine woods, 3000 m, 27 Jun 1990, Hinton 20448 (GBH). Mpio. Castaños: Castaños, Monclova–Saltillo hwy, llano, 400 m, 15 May 1949, Hinton 16785 (GBH). Mpio. Parras: Parras, 22–30 Apr 1880, Palmer 765 (NY, US-2 sheets); 24 km NW of Fraile, oak and juniper,

ground cover of grass, *Yucca* and perennial herbs, 8200 ft, 15 Jul 1941, *Stanford* 378 (NY). **Mpio. Ramos Arizpe:** N side of Sierra de la Paila, Mina El Aguirreño, steep limestone slopes, chaparral, 1700-2200 m, 5 Jul 1973, *Johnston et al.* 11695A (LL). **Mpio. Saltillo:** 6 mi N of Saltillo on road to Monclova, weed in cultivated field, 23 Jun 1968, *Ownbey* 4175 (TEX); Saltillo and vicinity, Jun 1898, *Palmer* 313 (US). **Nuevo León.** **Mpio. Aramberri:** N of Aramberri, roadside at cultivated field, 975 m, 14 May 1991, *Hinton* 20918 (GBH-Fig. 44, TEX). **Mpio. Dr. Arroyo:** 2 km SE of El Canelito on road to San Juan de Dios, low, flat valley bottom between gentle hills, izotal de *Yucca filifera*, with *Flourensia* and *Larrea*, 1925 m, 19 Jun 1972, *Chiang et al.* 7999 (LL, MEXU); Matehuala-Dr. Arroyo hwy, at SLP-NL state border, 21 Jun 1972, *Chiang et al.* 8079 (MEXU, TEX); El Charquillo, limestone hillside, 1720 m, 1 Aug 1990, *Hinton* 20614 (GBH-Figs. 41, 42, TEX); El Tajo to San José del Palmar, chaparral with *Larrea* and *Yucca*, 1736 m, 4 Aug 2008, *Hinton* 28655 (GBH-Fig. 43, TEX). **Mpio. Dr. González:** 12 mi NE of Dr. González on road to Cerralvo, 24 Apr 1960, *Johnston* 5312 (TEX). **Mpio. Galeana:** Rancho Aguililla, 1850 m, 19 Jun 1989, *Hinton* 19479 (GBH, TEX); Rancho Aguililla, edge of cultivated field, 1850 m, 9 Aug 1989, *Hinton* 19486 (GBH, TEX); Rancho Aguililla, gypseous llano, 1900 m, 7 Jul 2000, *Hinton* 27609 (GBH, TEX); 39 mi S of San Roberto, 7 Nov 1960, *Johnston* 6043 (TEX); 10 mi S of San Roberto Jct, *Ownbey* 3712, voucher for $2n = 24$ (MIN, as cited, not seen). **Mpio. Linares:** WSW of Linares on Hwy 58, 18.2 mi E of jct in Iturbide, roadside, mesquite-acacia, 460 m, 19 Jun 1987, *Nesom* 6191 (TEX). **Mpio. Santiago:** Monterrey, near bridge at N end of La Boca reservoir, Apr 1961, *Smith* M524 (TEX). **San Luis Potosí.** **Mpio. Charcas:** Charcas, Jul-Aug 1934, *Lundell* 5380 (LL); Sierra de Monte Grande, arroyo que corre por el costado E de la Mesa de La Venganza, 21 Sep 1989, *Reyes A.* 554 (TEX). **Mpio. Guadalcázar:** Cerro de la Mes, 9 km SW de Guadalcázar entrando por el Aguaje, bosque de *Quercus* con *Juniperus*, 16 Aug 1996, *Torres C.* 14556 (TEX). **Mpio. Matehuala:** Cercanías de Matehuala, zona árida, 1800 m, 21 Sep 1956, *Matuda* 38591 (MEXU, MO-2 sheets). **Mpio. Salinas:** Carr. SLP-Zacatecas, Km 99, 2 km SE de Salinas, matorral xerófilo, 2370 m, 2 Aug 1999, *Balleza C.* 10273 (MEXU-2 sheets). **Mpio. Venado:** 24 km SW de Venado, orillas de la Presa Don Juan, pastizal, 10 Sep 1973, *Banda s.n.* (MEXU). **Tamaulipas.** **Mpio. Villa Mainero:** 4 km SW of Villa Mainero, by river, 450 m, 11 May 1995, *Hinton* 25246 (GBH, TEX). **Zacatecas.** **Mpio. Mazapil:** San Tiburcio, carretera Zacatecas-Concepción del Oro, entronque con la carretera a Matehuala, 25 Jul 1997, *Balleza C.* 6292 (MEXU); 88 m W de Mazapil por la carretera a Concepción del Oro, matorral xerófilo, 2377 m, 23 Sep 1999, *Balleza C.* 11135 (MEXU); Salaverna, bosque de *Pinus johannis* 19 Dec 1988, *Díaz Luna* 20203 (TEX); Caopas, 4 Jun 1979, *Ibarra C.* 501 (MEXU). **Mpio. Villa de Cos:** Carr. Zacatecas-Concepción del Oro, Km 125, matorral desértico microfilo con abundantes yucas, orilla de la carretera, 2160 m, 24 Jul 1997, *Balleza C.* 6200 (MEXU); ca. 1 km E del entronque con la carretera a Concepción del Oro, por la terracería a Sarteneja, matorral xerófilo, 2265 m, 9 Aug 1999, *Balleza C.* 10652 (MEXU); 15 km W of Concepción del Oro, just on Coah-Zac border, valley floor sparsely covered by *Yucca*, *Larrea*, 2300 m, 20 Jul 1941, *Stanford et al.* 513 (MO).

Ownbey (1968) reported the chromosome number ($2n = 24$) for two collections of *Cirsium arctorhaphis* and noted that they represent a variant of the "*C. mexicanum* alliance" but differ in chromosome number from typical *C. mexicanum* ($2n = 22$). Typical *C. raphilepis* also has a chromosome number of $2n = 22$ (*Ownbey* 1968, counts from Guanajuato, Michoacán, Querétaro).

10. CIRSIUM NOTORHAPHIS Nesom, **sp. nov.** **TYPE: MEXICO. Puebla.** 8.2 mi NW of Tehuacan turnoff, Rte 150, 10 Jul 1965, *G.B. Ownbey* 3761, voucher for $n=11$ (holotype: MEXU; isotypes: TEX, US-Fig. 45).

Similar to *Cirsium raphilepis* in most features but distinct in its shorter phyllary spines and disjunct geographical distribution.

Perennial, from a thick, woody taproot. **Stems** 1–2 m tall, lightly sericeous, glabrescent, without multicellular hairs. **Leaves:** basal deciduous by flowering, cauline lanceolate to oblanceolate in outline, mostly 10–18 cm long, gradually decreasing in size distally, sinuate-lobed, major marginal prickles 2–5 mm long, not clasping to slightly subclasping, distal not decurrent, proximal decurrent with wings 1–3 cm long, sparsely tomentose and glabrescent to glabrate adaxially, without multicellular hairs, densely and persistently white-silvery-tomentose abaxially, without multicellular hairs. **Heads**

in loose terminal clusters, peduncles 1–6 cm long, usually immediately subtended by small, spiny bracts. **Involucre**s 1.5–3 cm wide (pressed); phyllaries glabrous, evenly graduate-imbricate, narrowly oblong-lanceolate, mostly 1.5 mm wide, outer with a spreading, terminal spine 3–5 mm long and a glandular-thickened medial area in the distal 1/3, inner with a long, loose, linear apex. **Corollas** purple, 23–27 mm long, tube 8–11 mm, throat 6–9 mm, lobes 7–8 mm; stigmatic branches 3–4 mm. **Chromosome numbers**, $2n = 20$ (King 3532, Oaxaca), $2n = 22$ (Ownbey 3761, Puebla).

Puebla, Oaxaca. Matorral, oak woods, deciduous woods, secondary woods, riparian areas, cultivated areas, road banks, irrigation ditch sides, arroyos; 1600–2500(–2900) m. Flowering (March) May–October (November).

Additional collections. **Puebla.** Tehuacán, 2 Jun 1974, *Boege 3131* (MEXU); Tehuacán, El Riego, 2000 m, 10 Aug 1912, *Conzatti s.n.* (MEXU); 5 km NE de San Nicolás Tepoztitlán, laderas calizas, matorral secundario en el pie del monte y matorral esclerófilo arriba, 2060 m, 24 Aug 1980, *González F-1391* (MEXU); ca. 1 mi N of Tehuacan, open fields along Rte 150, 5 Jun 1960, *King 2646* (TEX); ca. 2 mi NW of Tehuacan, fields along Rte 150, 29 Jul 1960, *King 3551* (TEX, US-Fig. 48); Tehuacan, [1841–42], *Liebmann 684* (C, GH-tracing and fragment); Mpio. San Martín Atexcal, 4 km NE de Santo Tomás Otlaltepec, matorral subtropical, ladera caliza, 23 Aug 1980, *Medrano F-1278* (MEXU); vicinity of San Luis Tultitlanapa [now San Luis Atolotitlán], along irrigating ditch, Aug 1905, *Purpus 3124* (MO, US); Tehuacan, fields, Apr 1912, *Purpus 5815* (MO); Mpio. Caltepec, Barranca de los Membrillos, El Zapote, matorral subtropical, 1860 m, 6 May 1983, *Tenorio L. 3832* (MEXU); Mpio. Caltepec, Barranca de los Membrillos, matorral subtropical, 1860 m, 21 Oct 1983, *Tenorio L. 4802* (MEXU-2 sheets); Mpio. Caltepec, Barranca de los Membrillos, matorral, 1860 m, 19 Jul 1984, *Tenorio L. 6696* (TEX); Mpio. Caltepec, Callejón del Casahuico al S de Caltepec, matorral subtropical, 1730 m, 11 Ago 1984, *Tenorio L. 6825* (MEXU, TEX); Mpio. Coyomeapan, Cerro Mototepec, 4 km SE de Coyomeapan, bosque mesófilo, 2350 m, 20 May 1986, *Tenorio 11328* (MEXU); Mpio. Tehuacan, 5 km W de Teontepec, brecha a Santiago Nopapa, terrenos cultivados, 16 Oct 1990, *Tenorio L. 17258* (MEXU); Mpio. San Martín Atexcal, ca. 5 km NE de San Nicolás Tepoxtitlán, rumbo a Santiago Nopala, orilla de un arroyo, matorral, 11 Nov 1983, *Villaseñor 606* (MEXU). **Oaxaca.** 3 km NE de Tlacotepec Plumas, por la terracería rumbo a Concepción Buenavista, orillas de cultivos de maíz, 2000 m, 28 Sep 1985, *Dorado R. F-2890* (MEXU, MO); Mpio. Santa María Chimalapa, Palomares, ca. 2 km NE de Santa María, acahualera en cultivo de maíz, 7 Mar 2000, *Hernández G. 3036* (TEX); Mpio. Santo Domingo Tonalá, selva seca, orilla de arroyo, 1415 m, 28 Aug 2008, *Hernández P. 270* (MEXU, TEX); ca. 1 mi N of Tamazulapam, fields along Rte 190, 20 Jun 1960, *King 2926* (TEX); 8 mi NW of Nochistlan, mtns along Rte 190, 27 Jul 1960, *King 3532*, voucher for $n=10$ (TEX); Mpio. Huajuapam de León, Santo Domingo Yodohino, 3.5 km NW de Barranca el Hueso, veg. secundaria de selva baja caducifolia, 1680 m, 7 Jul 2004, *López M. 84* (MEXU); 1 km E de San Isidro Lagunas, llano grande, sitios secos de la zona pantanosa, 2290 m, 11 Oct 1981, *Mendoza 729* (MEXU, MO); Dto. Teposcolula, Río del Oro, 5 km NW de Tamazulapam, restos de selva baja caducifolia, 2900 m, 9 Aug 1985, *Mendoza 1935* (MEXU, NY); Dto. Tepocolula, 500 m S de San Felipe Ixtapa, zona lacustre, salina, 2160 m, 13 Jul 1986, *Mendoza 2590* (MEXU, MO); Huajuapam de León, Sep 1937, *Matuda(?) 9479* (MEXU); 3 mi W of Nochixtlán, Rte 190, road bank, 6900 ft, 14 Jul 1965, *Ownbey 3771* (MEXU, TEX, US-Figs. 46, 47); 1.5 mi N of Tamazulapam, along irrigation ditch, 5550 ft, 14 Jul 1965, *Ownbey 3772* (MEXU, US); Mpio. Santiago Tilantongo, 2162 m, 24 Apr 2013, *Piastczynska AP229* (MEXU); Dto. Juchitán, Mpio. San Juan Mixtepec, Cañada de San Isidro, 1 km NW de Xucu Shuun, limite con San Martín Itanyoso, en cañada, bosque de *Quercus*, 2500 m, 21 Oct 1990, *Reyes S. 2560* (MEXU); Dto. Nochixtlán, 2 km S de San Mateo Etlatongo, matorral xerófilo, 2200 m, 24 Oct 1990, *Reyes S. 2626* (MEXU); Mpio. Villa Tepelmeme de Morelos, "Agua El Guayabo" en Cerro Paraje Ladrón (subiendo por La Esaclera), selva baja caducifolia, 1570 m, 16 Sep 1994, *Salinas T. 7865* (MEXU); Mpio. Tepelmeme, Cañada de Carrizalillo, Cerro Verde, matorral calcicola mixto, 1600–1820 m, 17 Jul 1984, *Tenorio L. 6978* (MEXU); Dto. Mixe, 7 km NE de la desviación a Zacatepec, veg. riparia, 2380 m, 23 Apr 1983, *Torres C. 2715* (MEXU).

- 11. CIRSIUM CHIAPANUM** Nesom, **sp. nov.** TYPE: **MEXICO. Chiapas.** Mpio. La Independencia: 3rd ridge along logging road from Las Margaritas to Campo Alegre, broad ridge with evergreen cloud forest, *Pinus*, *Quercus*, *Magnolia*, *Podocarpus*, *Photinia*, *Olmediella*, 2300 m, 18 Feb 1973, *D.E. Breedlove* 33647 (holotype: MEXU, Figs. 49, 52; isotype: NY).

Distinct in its villous (multicellular hairs) stems, short-winged-decurrent, nearly glabrous (both surfaces) leaves, small heads in terminal clusters, narrow phyllaries, and short, white corollas.

Duration unknown. **Stems** ca. 1 m tall, very sparsely sericeous, glabrescent-glabrate (tomentum), sparsely villous with persistent, long, multicellular hairs with dark cross-walls. **Leaves** (mid to distal cauline) lanceolate-triangular, gradually reduced in size distally and continuing to the heads, grading into involucral bracts, not clasping, decurrent with wings 5–10 mm long, marginal prickles 5–8 mm, completely glabrous abaxially, glabrous adaxially except for long, multicellular hairs along the proximal region of the midvein. **Heads** in terminal clusters, immediately subtended by small, spiny bracts. **Involucre**s 1.5–2 cm wide; phyllaries glabrous, evenly graduate-imbricate, narrowly oblong-lanceolate, 1–1.3 mm wide, all erect, outer with an erect or slightly spreading terminal spine 1–2 mm long, inner with a herbaceous, loose, attenuate apex becoming purplish. **Corollas** white, 15–16 mm long, tube 7–8 mm, throat 4 mm, lobes 3–3.5 mm.

Chiapas. Pine-oak woods, evergreen cloud forest; 2300–2800 m. Flowering July–August (February), or perhaps all year.

Additional collections. **Chiapas.** Mpio. San Juan Chamula: Yok Milbil Tulan, bosque tierra, 7800 ft, 30 Aug 1987, *Santíz R. 84* (MEXU-Fig. 54). Mpio. Tenejapa: Paraje Winikton, cerca de 4 km S de pueblo, 2880 m, 10 Jul 1986, *Mendez Girón 9119* (MEXU-2 sheets, Figs. 50, 53); Rancho Banabil, 20 Jul 1984, *Méndez Ton 7772* (MEXU-2 sheets, Fig. 51). Mpio. Zinacantan: Near Paraje Pasté, pine-oak forest, 2438 m, 7 Jul 1981, *Breedlove 51368* (TEX).

No species similar to *Cirsium chiapanum* occurs in Chiapas. Presumably these plants might be identified as *C. raphilepis* (sensu lato) because of the terete, prominent (though short) phyllary spines.

- 12. CIRSIUM HELIORHAPHIS** Nesom, **sp. nov.** TYPE: **MEXICO. Durango.** Mpio. Poanas: 2 km SE de 18 de Agosto, matorral xerófilo (*Opuntia*, *Acacia*, *Condalia* en malpais) bajo inundable, entre el matorral y el bajo, 1850 m, 14 Sep 1982, *S. Gonzalez 2114* (holotype: TEX; isotype: MEXU).

Similar in involucral morphology to *Cirsium arctorhaphis* but leaves decurrent, phyllaries distinctly broader at the base (more like *C. undulatum*), corollas longer, and separate in geography. Similar to *C. notorhaphis* but phyllaries broader and the apex more gradually narrowed into the terminal spine. Distinct from *C. tenorioanum* in its decurrent leaves and longer phyllary spines.

Perennial from a woody taproot. **Stems** 0.6–1.6 m tall, lightly sericeous, glabrescent, without multicellular hairs. **Leaves** oblong to oblanceolate or lanceolate in outline, sinuate-lobed to pinnatifid, slightly decreasing in size distally, not clasping, decurrent 5–20 mm or sometimes the whole internode proximally, marginal prickles mostly 2–4 mm long, adaxially glabrescent to glabrous, without multicellular hairs, abaxially persistently white-tomentose. **Heads** solitary or in loose clusters on peduncles 1–10 cm long, usually immediately subtended by small, spiny-margined bracts. **Involucre**s 2–2.5 cm wide (pressed), distinctly concave at the peduncle insertion; phyllaries evenly graduate-imbricate, outer narrowly oblong-ovate to elliptic-ovate, 1–1.5 mm wide, becoming ovate-lanceolate inward and to 2 mm wide, all with wide, stramineous margins, terminal spine terete, 4–5 mm long. **Corollas** purple to lavender, 25–26 mm long, tube 10 mm, throat 8–12 mm, lobes 6–8 mm; stigmatic branches 3.5–4 mm long.

Durango. Matorral, river edges, canyon bottoms, roadsides; 1450–1900 m. Flowering July–October.

Additional collections. Durango. Mpio. Nombre de Dios: 1 km al N del puente del Río de Nombre de Dios, orilla del río, con sabino, 16 Oct 1984, *Jimenez 201* (MEXU, TEX); márgenes del Río El Tunal, vegas arboladas, 1750 m, Ago 1993, *Soria G. 10* (MEXU). Mpio. Poanas: Camino a 18 de Agosto, orilla del camino, en terreno pedregoso, con nopal, huizache, y mezquite, 27 Sep 1984, *Jimenez & Acevedo 120* (MEXU, TEX). Mpio. Rodeo: Mina la Amparo, 6 km al NW de Las Higueras, 1470 m, matorral espinoso, 5 Sep 1983, *Tenorio L. 4241* (MEXU-3 sheets). Mpio. Santiago Papasquiaro: 11 km NW of Santiago Papasquiaro, 3.5 km W of La Soledad, rocky canyon bottom, 1900–2100 meters, 7 Jul 1983, *Corral 133* (COLO, NY, TEX, UTEP).

13. CIRSIUM PACIFICUM Nesom, **sp. nov.** **TYPE: MEXICO. Sonora.** [Mpio Navojoa]: 4.3 km SW of Huasaguari on Masiaca-San Antonio del Las Ibarra road, large riparian wash, disturbed roadside, 100 m, 13 Apr 1995, *T. Van Devender 95-271* (holotype: TEX; isotypes: ASU-Figs. 58, 59; isotypes: UCR, USON).

Similar to *Cirsium mexicanum* in phyllary morphology and decurrent leaves, different in its longer and terete phyllary spines and leaves decurrent along the entire internode, smaller heads, and shorter, white to light pink corollas.

Plants "annual?" (label of *Felger 85-388*). **Stems** mostly 1–2 m tall, sparsely sericeous, glabrescent, without multicellular hairs, often with numerous, distal, flowering bearing branches. **Leaves** oblong-triangular in outline, lower cauline 14–18 cm long, 4–5 cm wide (across the lobes), with triangular to deltate or oblong lobes, reduced in size above the middle, mostly 4–5 cm long, densely and persistently white-cottony abaxially, glabrous or glabrate adaxially, without multicellular hairs, not expanded at the base but extending as decurrent wings often for a full internode, marginal prickles 5–11 mm long, yellow-orange. **Heads** 1.4–2.5 cm wide, in a loose terminal cluster on ultimate peduncles 2–10 cm long, ebracteate or subtended by small, decurrent bracts. **Phyllaries** glabrous to glabrate or the margins lightly tomentose-glabrescent, erect, greenish to greenish-yellow, narrowly ovate-lanceolate with entire margins, evenly graduate in length, outer and middle with a yellowish to yellow-orange, erect, terete, spreading, or slightly reflexing terminal spine 3–6 mm long, green medial region raised-glandular in the apical 2–3 mm, often distinctly darkened at the spine insertion, innermost 22–24 mm long, spinose, apex thin, linear, and loosely wavy or slightly contorted. **Corollas** white to light pink, 23–25 mm long, tube 9–11 mm long, throat 6–7 mm long, lobes 5–6 mm long; stigmatic branches 2–2.2 mm long. **Achenes** tan, 4.5–5 mm long.

Nayarit, Sinaloa, Sonora. Thorn scrub, *Guazuma-Acacia-Prosopis*, roadsides, moist and dry fields, arroyo banks, alluvial areas; 20–100 m. Flowering March–June.

Additional collections. Nayarit. Laguna del Mamey, 20 m, 1923, *Ortega 101* (US); Acaponeta, Territorio de Tepic, 29 Jun 1897, *Rose 1495* (US); vicinity of Acaponeta, Tepic, dry field, 10 Apr 1910, *Rose 14278* (US). **Sinaloa.** Cerrito de Caymanero, thorn forest, bottom land, 100–200 ft, 28 Apr 1944, *Gentry 7029* (US, Fig. 61); Mpio. de Elota, al NE de la Cruz de Elota y alrededores, ca. 30 m, 3 Jun 1988, *Hernández 758* (US); La Constancia, 1924, *Ortega 5463* (US); Agua Caliente de Zevoda [Cebada], 21 Apr 1975, *Shapiro 71* (MEXU); vicinity of Villa Unión, moist field, 2 Apr 1910, *Rose 13945* (US); vicinity of Culiacan, moist field, 21 Apr 1910, *Rose 14861* (US). **Sonora.** Mpio Guaymas, 0.8 km E of Las Guásimas, ca. 30 km E of Guaymas, ca. 10 m, arroyo bank, 2 Mar 1985, *Felger 85-388* (MEXU, Fig. 60); Mpio. Etchojoa, NE side of Cerro Bayajuri, NE of Buaysiacobe, canal at edge between remnant marsh and agricultural areas, Sinaloan thorn scrub but most of the area converted to agriculture, 7 Apr 1994, *Sanders 14462* (TEX, UCR); Las Islitas, a 5 km al SE de San Blas, camino a Miramar, veg. halófitas entre dunas y manglar, 20 Jun 1987, *Tellez V. 10510* (MEXU).

Presumably because of the long involucre spines, *Cirsium pacificum* sometimes has been identified as *C. raphilepis*. With its decurrent leaves and numerous heads, it also sometimes been identified as *C. mexicanum* — specimens were annotated by G.B. Ownbey in 1990 (e.g., Fig. 61) as a "var. nov." of *Cirsium mexicanum* or "sp. nov." Neither *C. mexicanum* nor *C. raphilepis* occurs along the Pacific coast.

14. CIRSIUM MAGDALENENSE Nesom, **sp. nov.** **TYPE:** **Baja California Sur.** Mpio. Comondú: Arroyo near El Medano, S of Cd. Constitución, between Santa Rita and Puerto Chale, riparian/canyon vegetation with *Prosopis articulata*, *Vachellia farnesiana*, *Ambrosia ambrosioides*, *Vallesia glabra*, *Baccharis salicifolia*, 15 m, 7 Mar 2016, J. Rebman 31141 (holotype: SD, Figs. 63, 64, and in situ photos-Figs. 66-69).

Similar to *Cirsium pacificum* Nesom in its vestiture without multicellular hairs, long-decurrent leaves, small heads in a terminal cluster, and corolla dimensions; distinct in its light pink to lavender corollas, thicker and more rigid, purple phyllaries with persistently arachnoid margins and with minutely warty-glandular-marginal areas.

Plants annual (label of *Rebman 31662*) from a woody taproot. **Stems** ca. 1 m tall (estimated), lightly arachnoid-sericeous, without multicellular hairs. **Leaves** mostly oblong-lanceolate in outline, lower cauline 7–29 cm long, 2–7 cm wide (across the lobes) with deltate-triangular lobes, slightly reduced in size distally, persistently gray-tomentose abaxially, glabrous adaxially or sparsely sericeous-glabrescent along the proximal midvein, without multicellular hairs, not expanded at the base, decurrent-winged 2–7 cm or often the whole internode, marginal prickles 3–10 mm long, yellow-orange. **Heads** in terminal clusters on peduncles 1–3 cm long, immediately subtended by small, spiny-margined bracts. **Involucres** mostly 2 cm wide (pressed); outer phyllaries narrowly oblong-ovate, apically flattening into a spreading, terminal spine 5–6 mm long, glabrous except for the persistently arachnoid margins and minutely warty-glandular marginal areas, inner phyllaries 20–22 mm long, espinose, becoming narrowly triangular-acuminate, dark purple distally, faces and margins glabrous. **Corollas** light pink to lavender, 22–23 mm long, tube 9–10 mm, throat 7–8 mm, lobes 6–7 mm; stigmatic branches 2–2.5 mm long.

Baja California Sur. Riparian/canyon vegetation, disturbed areas; 10–15 m. Flowering March–December or perhaps all year.

Additional collections. **Baja California Sur.** Mpio. Los Cabos: San José del Cabo, 1897, *Anthony 431* (DS, UC); San José del Cabo, 27 Apr 1897, *Brandeggee s.n.* (MO); Santa Rita, Puente Santa Rita, 28 May 2015, *Medel Narvaez 799* (SD). Mpio. Comondú: Bahía Magdalena, Arroyo del Rancho El Medano, vado del arroyo, veg. secundario, elev. 11 m, 15 Dec 2009, *Leon de la Luz 1220* (SD, Figs. 62, 65); arroyo near El Medano, S of Cd. Constitución, between Santa Rita and Puerto Chale, 11 May 2016, *Rebman 31662* (SD).

The collections are from separated areas (Fig. 3) but all are similar in diagnostic morphology and appear to represent a single species.



Figure 3. Distribution of *Cirsium magdalenense*.

15. **CIRSIMUM TENORIOANUM** Nesom, **sp. nov.** **TYPE: Durango.** [Mpio. Durango]: ca. 4 mi W of the Barranca de los Mimbres, Rte 40, ca. 9000 ft, wet soil, road bank, 8 Aug 1966, *G.B. Ownbey* 3920a, voucher for "2n=11" [presumably n=11] (holotype: MEXU, Fig. 72; isotype: US, Figs. 70, 71, 73).

Similar to *Cirsium heliorhaphis* in its solitary heads and relatively narrow leaves; distinct in its non-decurrent leaves, narrower phyllaries with a broader glandular midregion, the outer and middle with shorter terminal spines, the inner with loose, purplish, long-attenuate apices.

Annual (? base not seen). **Stems** ca. 0.5–1.2 m tall, loosely but persistently tomentose, without multicellular hairs. **Leaves** mostly lanceolate to oblanceolate, sinuate-lobed to coarsely dentate-lobed, not basally dilated, not clasping, not decurrent, strongly reduced in size distally, mostly 5–12 (–20) cm long at midstem, marginal prickles mostly 1–3 mm long, abaxial surface densely and persistently white-to gray-tomentose, glabrescent adaxially, both surfaces without multicellular hairs. **Heads** solitary, ebracteate or sometimes with small peduncular bracts approaching the involucre. **Involucre** 4–4.5 cm wide (pressed); phyllaries triangular-ovate, mostly thick and stramineous except for a light-colored (drying), narrowly diamond-ovate apical zone with a thin, central, raised-glandular line, terminal spine ca. 2 mm long, terete, spreading; inner phyllaries with loose, long-attenuate, purplish apices. **Corollas** purple to dark purple, 28–30 mm long, tube 9 mm, throat ca. 12 mm, lobes 7–9 mm; stigmatic branches ca. 3 mm long. **Chromosome number**, $2n = 22$ (*Ownbey* 3920a, the type).

Durango. Pine-oak woods, sparsely wooded grassland, along streams, roadbanks; 2100–2400 m. Flowering July–September.

The epithet commemorates Pedro Tenorio Lezama, a principal investigator in the Department of Botany at UNAM, whose interesting and beautifully prepared collections seem to appear in every taxonomic group, from every corner of the country.

Additional collections. Durango. Mpio. Durango: Cía. Gan. El Carmen, KM 46, carr. Dgo.-Mazatlán, 23° 40' 50" N, 104° 45' 05" W, bosque aciculifolia, 2400 m, Sep 1998, *Aguirre 303* (MEXU); Microondas El Pino, carr. Dgo-Mazatlan, bosque aciculi-esclerofilo, 2200 m, Sep 1992, *Casas S. 26* (MEXU-2 sheets, Fig. 74); 46 km from Durango on Hwy 40, Rio Mimbres, along stream in canyon, 17 Aug 1975, *Gillett 17037* (MEXU); 34 mi W of Cd. Durango on hwy to El Salto, plateau W of Arroyo Mimbres, sparsely wooded grasslands, 2300-2400 m, 8 Aug 1952, *Maysilles 7665* (MEXU, MICH). **Mpio. El Salto:** 27 km N de Coyotes, brecha a San Miguel de Cruces, 24 01' N, 105 27' W, bosque de pino-encino, 2100 m, 8 Jul 1984, *Tenorio L. 6343* (MEXU). **Mpio. Súchil:** 1 km al NW de El Sorruedo, cañada con *Quercus* y *Cupressus*, 27 Nov 1985, *Gonzalez et al. 3692* (MEXU). **Zacatecas. Mpio. Sombrerete:** ca. 5 km N de Cd. Sombrerete, por la carretera a Durango, bosque de *Juniperus*, orilla de la carretera, 2340 m, 18 Jul 1997, *Balleza 6153* (MEXU).

Earlier (Nesom 2021a), I cited *Aguirre 303* and *Gillett 17037* as *Cirsium hygropodum*, but the loose, purple, long-attenuate phyllary apices place those collections with *C. tenorioanum*.

Collections by Gerald Ownbey from west of Cd. Durango include the type of *Cirsium tenorioanum* (Ownbey 3920a) and two others that he identified as hybrids with *C. durangense*, without identifying the other parent. **Mpio. Durango:** ca. 11 mi W of Durango, Rte 40, ca. 7000 ft, 8 Aug 1966, Ownbey 3917, hybrid with *C. durangense* (MEXU, US); 27.5 mi W of Durango, Rte 40, Barranca de los Mimbres, ca. 8500 ft, 8 Aug 1966, Ownbey 3919, hybrid with *C. durangense*, pollen 100% abortive (MEXU, US). If he made a collection of the suspected second parent from this area, I have not seen it, but *C. tenorioanum* occurs in the area and probably is it.

16. CIRSIUM MACVAUGHII Nesom, **sp. nov.** **TYPE: MEXICO. Jalisco.** Santa Ana [1-2 km S of Acatlán de Juárez], swampy meadows [bordering shallow interior basins, 1300 m], in large perennial clumps, 16 Jun 1893, *C.G. Pringle 4406* (holotype: GH; isotypes: F!, MEXU-3 sheets, MICH-2 sheets, MIN-Figs. 75-77, MSC, US, VT).

Similar to *Cirsium wrightii* A. Gray but distinct in its narrower leaves, permanently pubescent abaxial leaf surfaces, longer corollas, and longer stigmatic branches.

Plants "in large perennial clumps." **Stems** 1 m or more tall, cottony, without multicellular hairs. **Leaves** elliptic-lanceolate in outline, 10–35 cm long, 2.5–7 cm wide, with numerous, regularly spaced, triangular lobes, densely and persistently cottony abaxially, without tomentum adaxially but with a dense covering of multicellular hairs, somewhat clasping but not auriculate, decurrent for a full internode, strongly reduced in size upwards. **Heads** in a loose terminal cluster of 5–6, sometimes 2 sessile heads terminating a single branch, ebracteate or immediately subtended by several small bracts; **Involucres** 1.5–1.8 cm wide (pressed); phyllaries glabrous to glabrate, erect, yellowish, ovate-lanceolate with entire margins, evenly graduate in length, the outer with a yellowish, erect, terete spine 0.5–2 mm long and a dark, thick, longitudinal medial gland, grading toward a thin, glandular ridge on the inner phyllaries, the innermost eglandular, 18–21 mm long, often with slightly contorted-dilated and purplish apices, base and lateral areas of all minutely papillate-roughened. **Corollas** purple, 20–24 mm long, tube 7–10 mm, throat 5–6 mm, lobes 7 mm; stigmatic branches 3.5–4.1 mm long.

Known only from the type collection.

This species, noted by McVaugh (1984) at the end of his treatment as "*Cirsium* sp. (2)," is particularly distinctive in its narrowly elliptic-lanceolate, long-decurrent leaves that are densely and persistently tomentose abaxially and densely invested with multicellular hairs adaxially, its glandular phyllaries with a very short apical spine, the inner with dilated apices, and its relatively short corollas. According to McVaugh, "apparently nothing like Pringle's plant has been collected in Nueva Galicia since his visit in 1893. It may well be extinct in the area, as most of the shallow marshes near Acatlán are now given over to the cultivation of sugar cane."

The geography and morphological features of *Cirsium macvaughii* suggest that it is related to the *C. raphilepis* group — long-decurrent leaves, heads in a loose terminal cluster, and relatively narrow, glandular-ridged phyllaries with terete apical spines. The abundant multicellular hairs on the upper surface are distinctive in the group. A relationship with *C. coahuilense*, *C. excelsior*, and *C. lomatolepis*, which are similar in habit and overall appearance and have narrow distributions in marshy habitats, might be considered.

17. CIRSIUM BASASEACHENSE Nesom, **sp. nov.** **TYPE: MEXICO. Chihuahua.** Mpio. Ocampo: Area of Cascada de Basaseachic at the confluence of Rio Basaseachic and Rio Durazno, ca. 2 mi S of the village of Basaseachic, abundant in open, grassy area in large basin at base of falls in steep canyon, ca. 1800 m, 27 Apr 1986, G. Nesom 5435 (holotype: TEX: isotypes: ARIZ-Figs. 78-81, GH, MEXU, MIN).

Cirsium basaseachense has broad, somewhat indurate phyllaries apparently with no medial glutinous area or ridge. Among similar species, it shares with *C. wheeleri* of the southwestern USA inner phyllary apices that are purplish and somewhat dilated with ciliate-erose margins. It differs from *C. wheeleri* in its much broader leaves (6–8 cm vs. 1.2–4 cm) with shallower lobes, stems and leaves without cottony pubescence but with multicellular hairs, larger involucre (3.2–4 cm wide vs. 1.4–3 cm), and shorter phyllary spines (1–1.5 mm vs. 3–5 mm).

Plants probably perennial, underground portion not seen. **Stems** 0.5–1.5 m tall, with up to 15 branches, mostly near the top, each terminating in a head, prominently pubescent with multicellular hairs, cottony pubescence absent or barely present just under the heads. **Leaves** green above and beneath, without cottony pubescence but with multicellular hairs prominent along the veins of both surfaces; basal not in a rosette, lower cauline 28–33 cm long, 6–8 cm wide, oblong-elliptic, deeply pinnatifid, lobes deltate to triangular, secondarily lobed or toothed, base auriculate-clasping, not decurrent, with very slender marginal prickles 1–2.5 mm long, upper progressively reduced in size but similar in shape, uppermost 4–8 cm long. **Heads** ca. 3–8 per plant in loose panicle, immediately subtended by 1–3 narrow, leaf-like, spiny-margined bracts. **Involucre** 3.2–4 cm wide (pressed), phyllaries evenly graduate in 5–6 series, margins entire, erect, eglandular, yellow-green, those of the outer 2 series ovate-lanceolate, 8–10 mm long, with yellowish spinose tips 1–1.5 mm long, glabrous or slightly cottony, those of the inner series lanceolate, 1.8–2.5 mm long, spineless, glabrous except for the minutely ciliolate margins, apices purplish, attenuate, somewhat dilated and erose-ciliate. **Corollas** purple, 28–30 mm long, tube 12 mm, throat 6–7 mm, lobes 8.5–10.5 mm, lobe:throat ratio 1.2–1.6; anthers white to pink, 10 mm long including the appendages 2 mm long and tails 1 mm long; filaments glandular-hairy; style pink, stigmatic branches 4–5 mm long. **Achenes** (mature) not observed; pappus of ca. 22–28 bristles 21–23 mm long.

Known only from the type locality.

Additional collection examined. Type locality, *Spellenberg 8842* (MEXU, NMC, TEX).

The broad phyllaries without a prominent eglandular midregion are similar to those of sect. *Erythrolaena*, but they are not arranged in two regions of different length, as characteristic of sect. *Erythrolaena*. The long stigmatic branches of *Cirsium basaseachense*, also, indicate that its relationships are not closely aligned with the sect. *Erythrolaena* species.

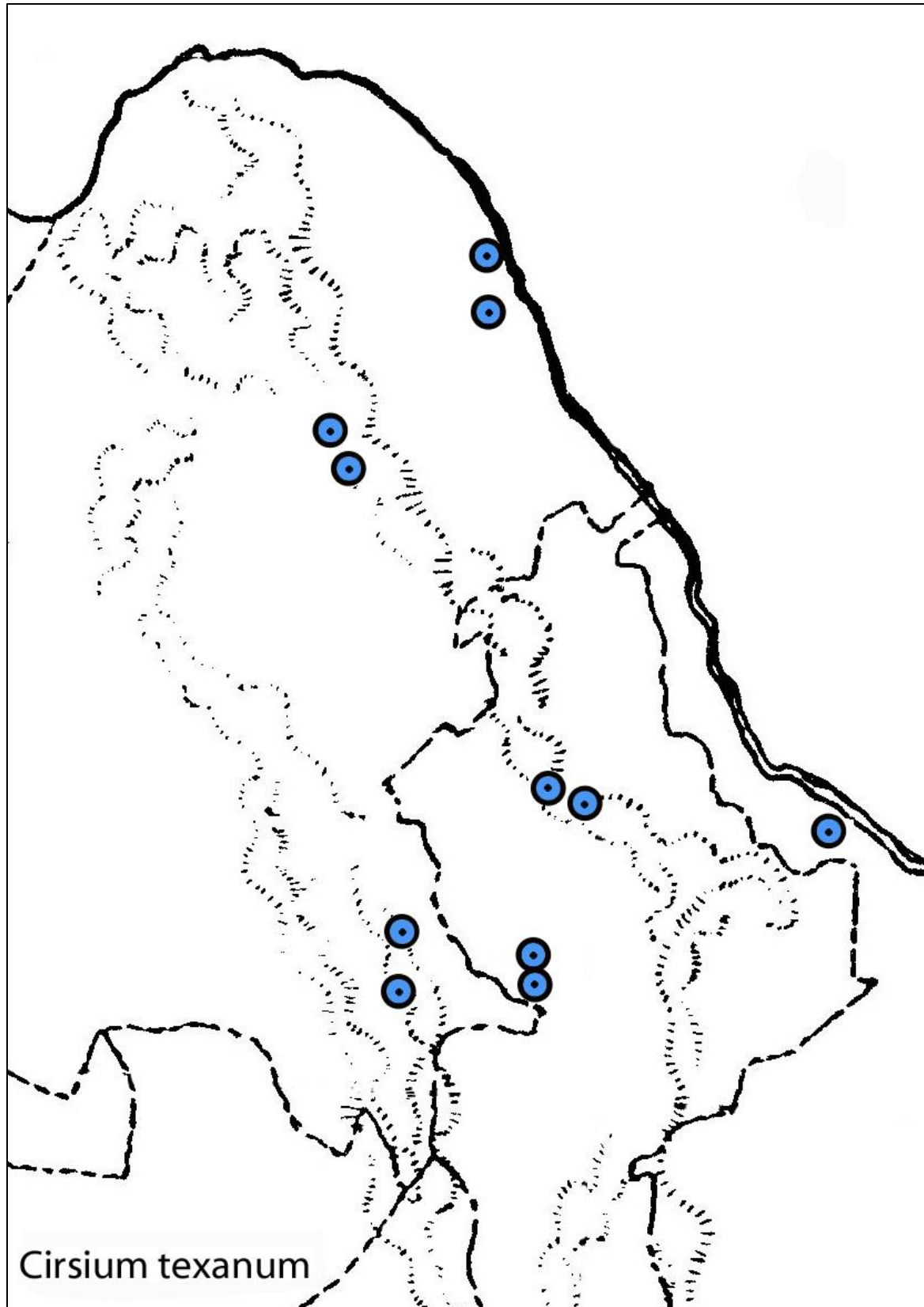


Figure 4. Distribution of *Cirsium texanum*. The collection locality of Runyon & Tharp 4074 is given only as "Tamaulipas" and is placed here speculatively.

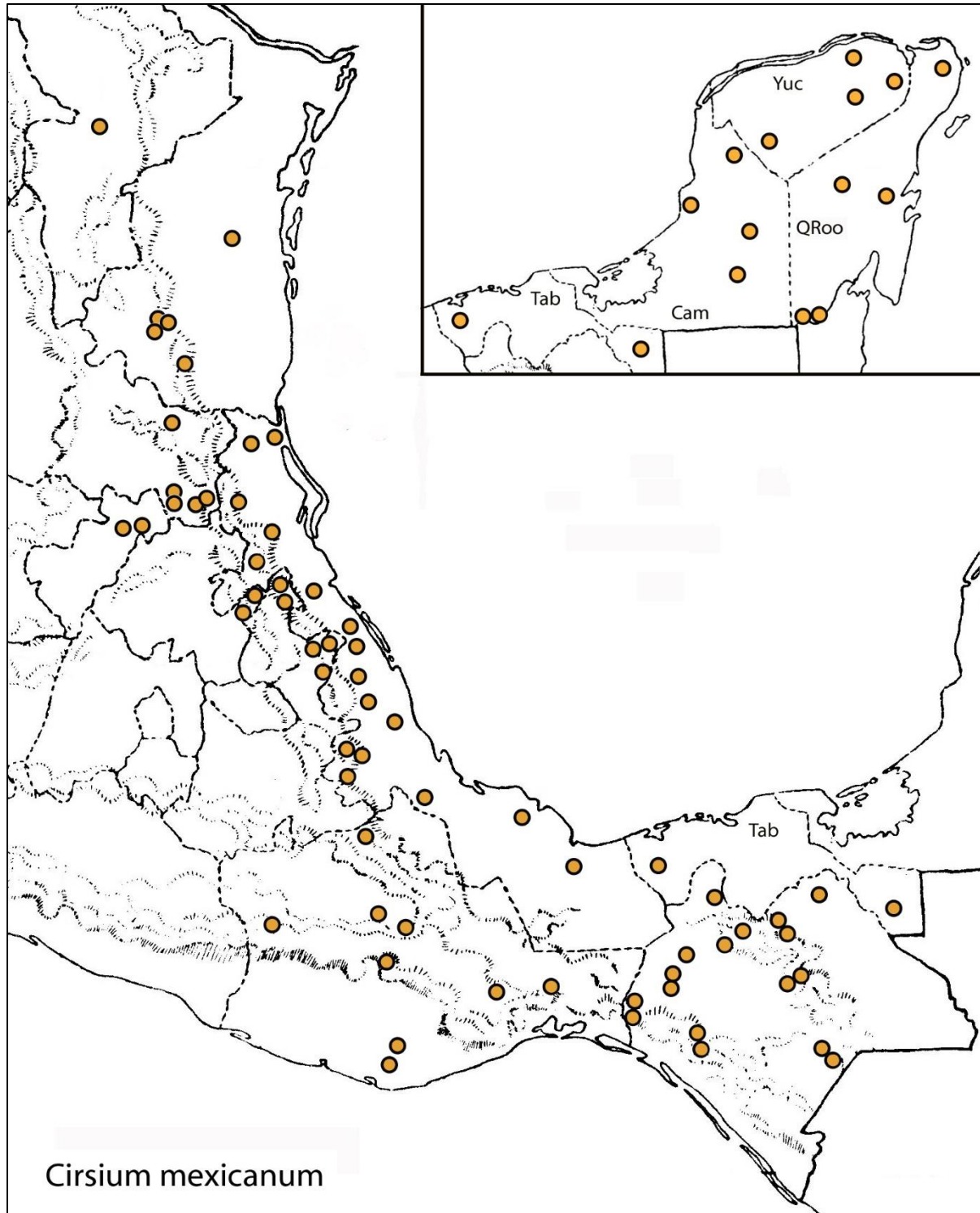


Figure 5. Distribution of *Cirsium mexicanum* in Mexico.

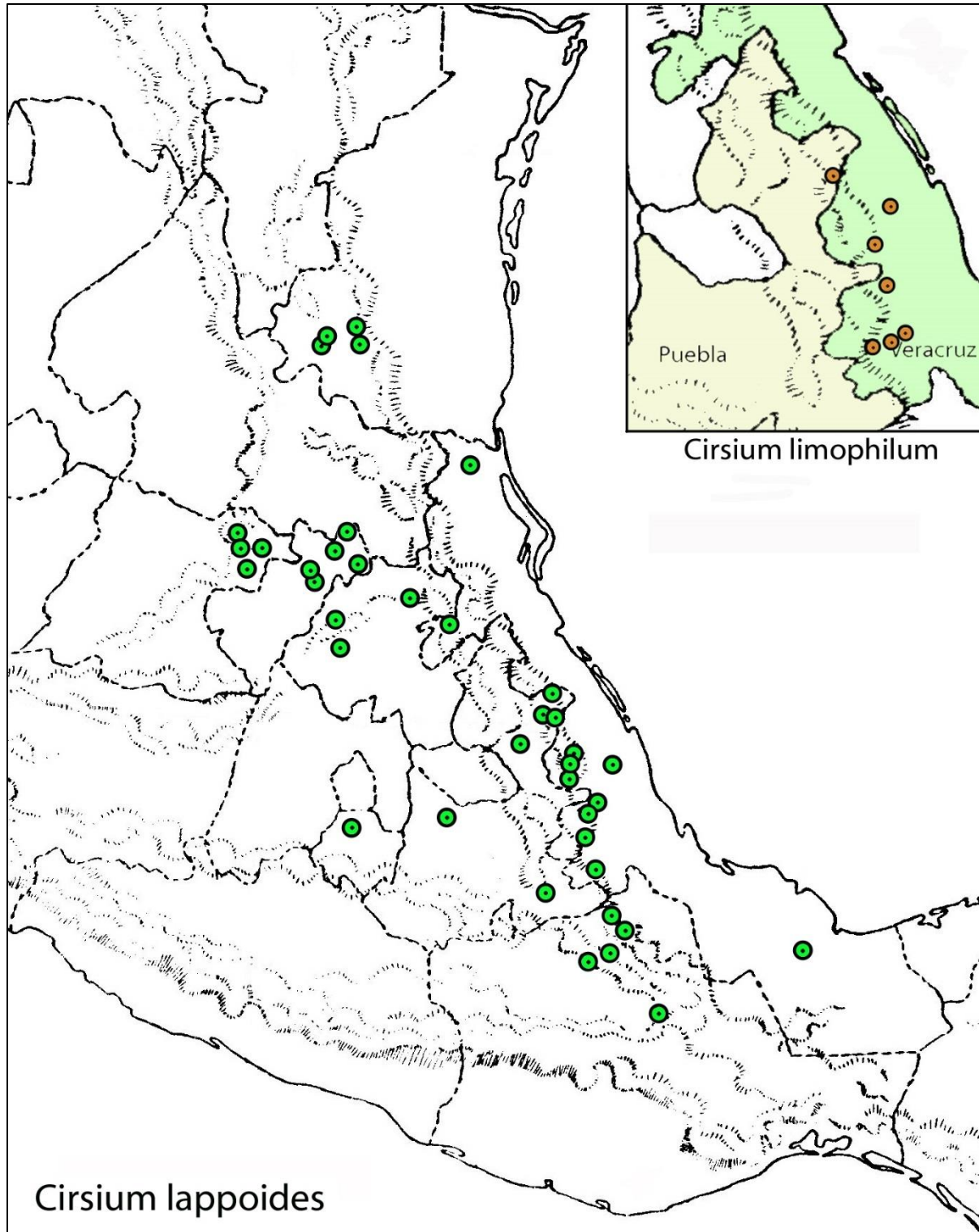


Figure 6. Distribution of *Cirsium lappoides* and *C. limophilum* (inset; see Fig. 1 for detail).

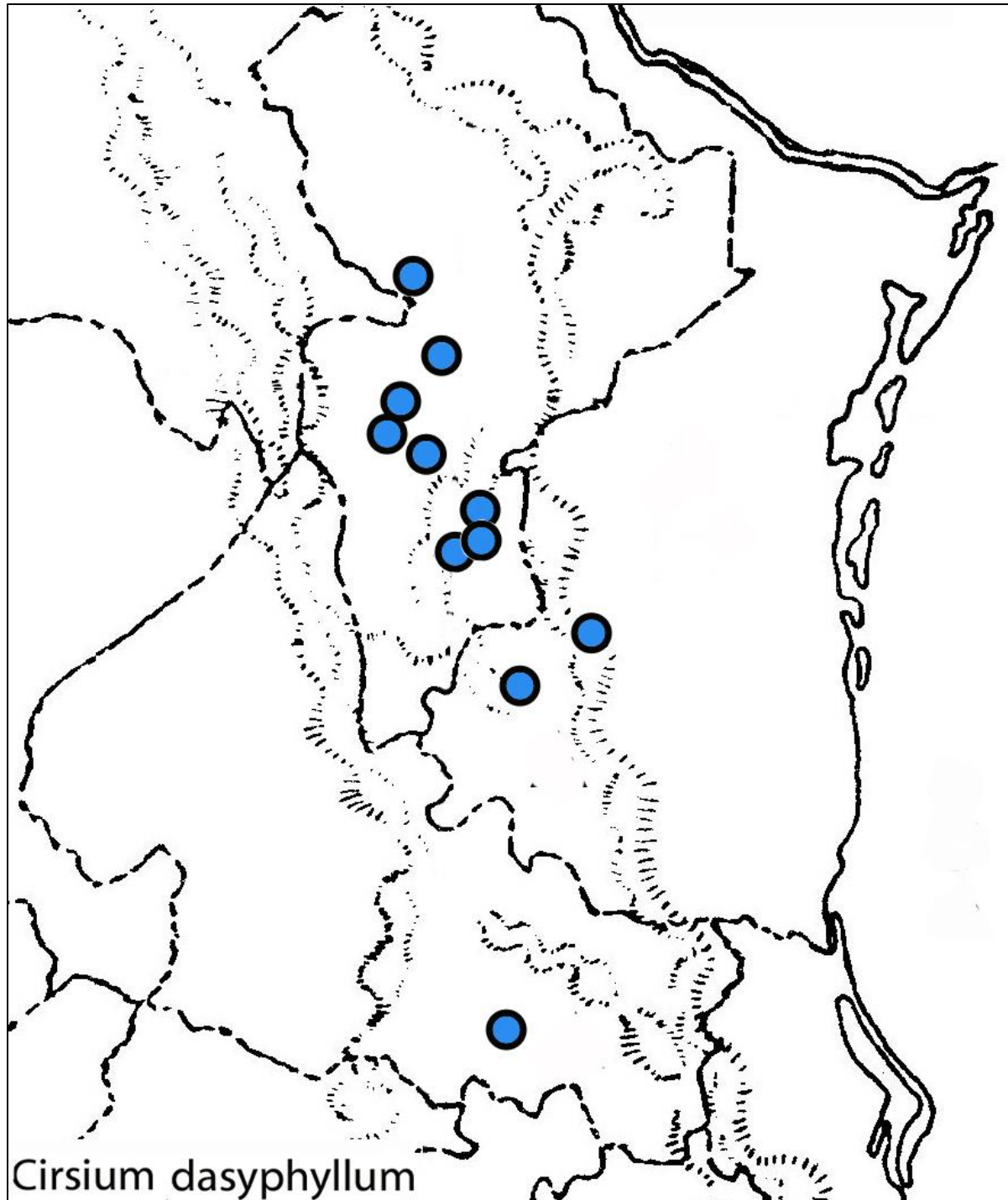


Figure 7. Distribution of *Cirsium dasyphyllum*.

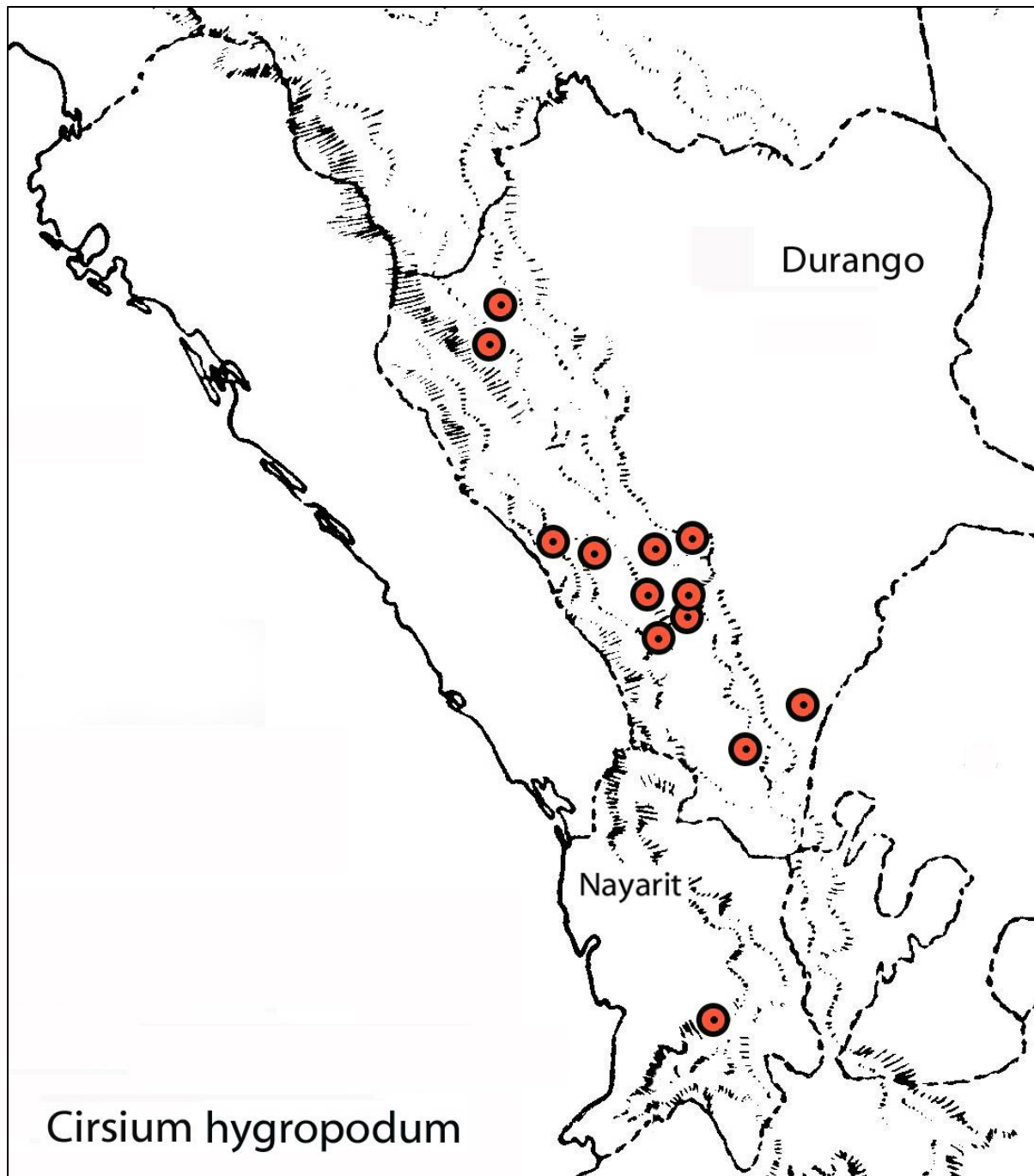


Figure 8. Distribution of *Cirsium hygropodum*, amended from the map in Nesom (2021a) by addition of two records from northwestern Durango. Mpio. Canelas: 0.5 km de Canelas, sobre el camino Canelas-Cuevecillas, matorral de compuestas y elementos bosque tropical caducifolio, 1430 m, 20 Mar 1990, Benítez 1079a (MEXU); on the road to Topia and Canelas, 12 km E of Canelas, 19 km E of jct of this road with road to Topia (at Cuevacillas), pine-oak forest, 2070 m, 29 Jun 1992, Spellenberg 11051 (NMC).

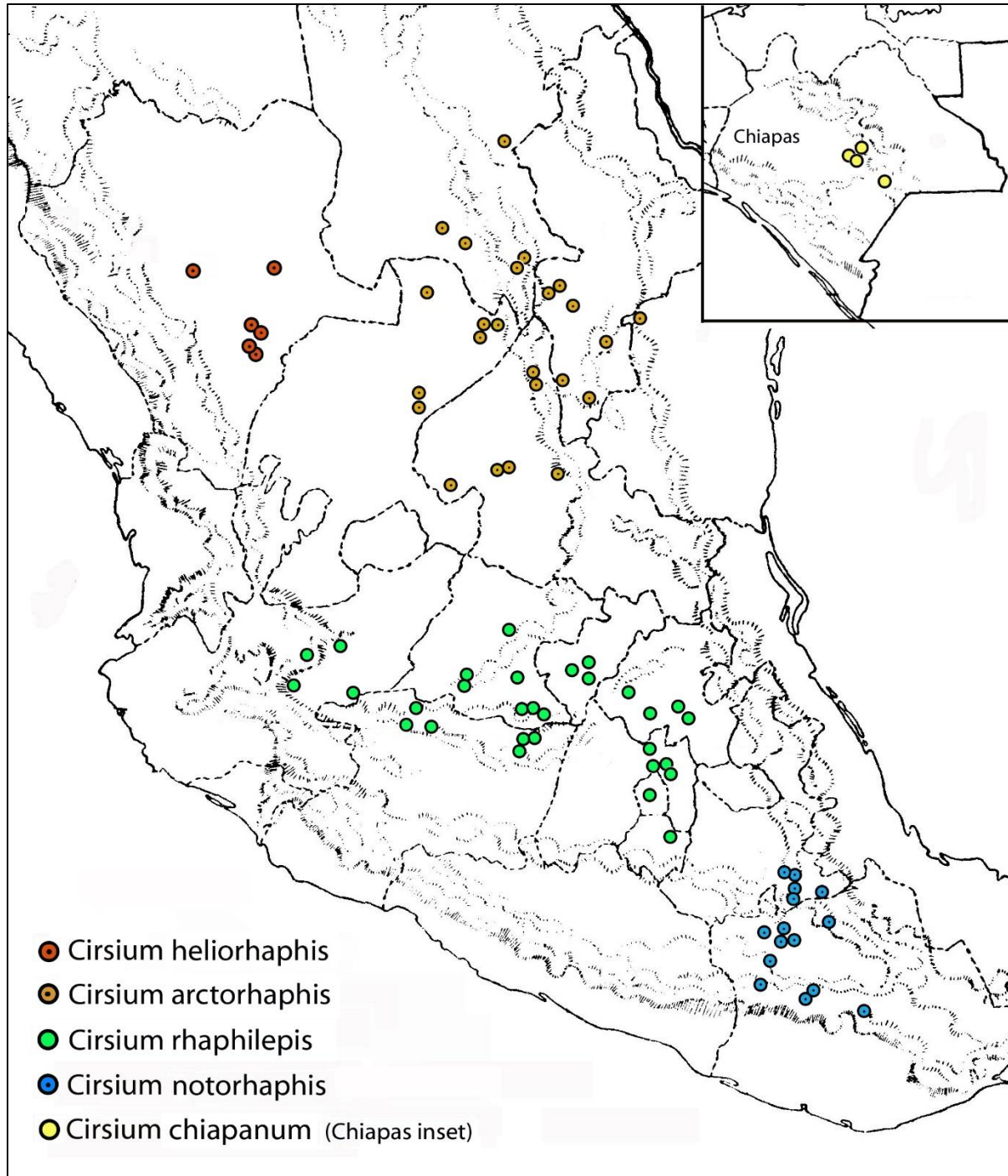


Figure 9. Distribution of *Cirsium raphilepis*, *C. arctorhaphis*, *C. heliorhaphis*, *C. notorhaphis*, and *C. chiapanum*.

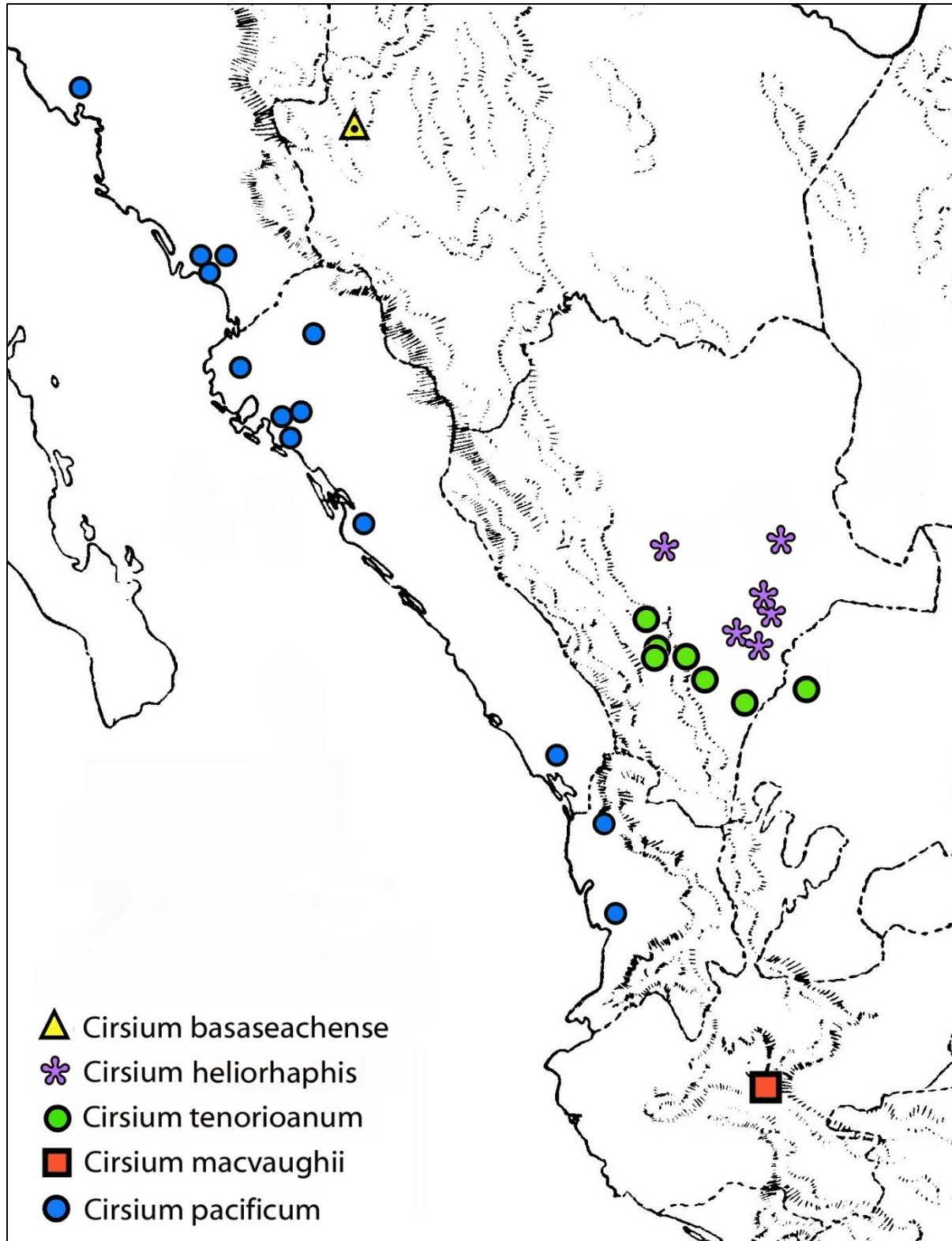


Figure 10. Distribution of *Cirsium basaseachense*, *C. heliorhaphis*, *C. tenorioanum*, *C. macvaughii*, and *C. pacificum*.

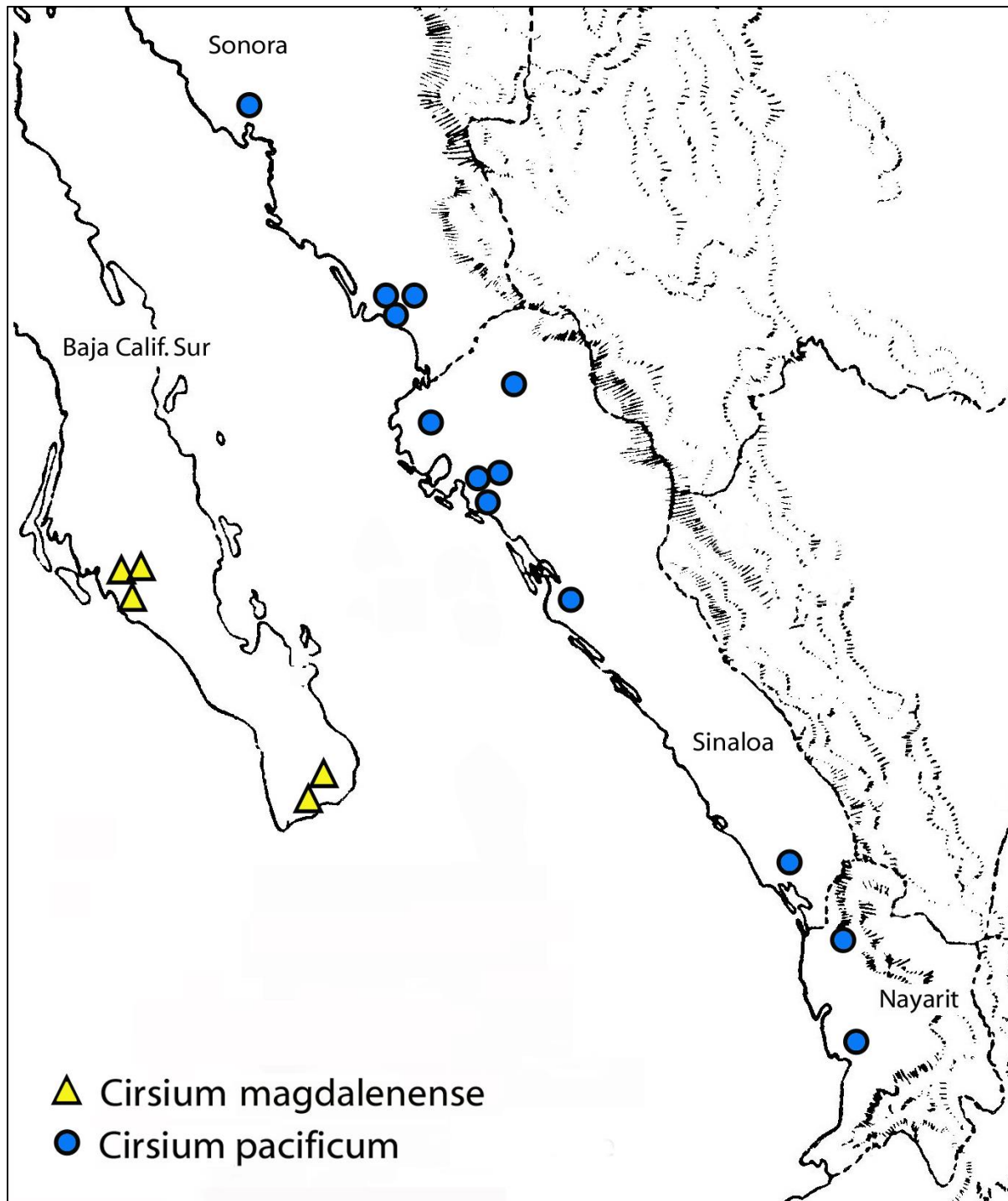


Figure 11. Distribution of *Cirsium magdalenense* and *C. pacificum*.

ACKNOWLEDGEMENTS

I thank DUKE, F, GH, MEXU, MO, MSC, NMC, SMU, UTEP, VT, WIS, and XAL for loans (to TEX) of specimens and staffs of MO, SD, and TEX for their recent hospitality. Thanks to Dr. Olof Ryding (C) for sending hi-res images of a Liebmann collection of *Cirsium notorhaphis* and the holotype of *C. limophilum*, to Dr. John Strother (UC) for discussion of typifications, and to Dr. Jon Rebman (SD) for photos of *C. magdalenense*.

LITERATURE CITED

- Ackerfield, J.R., D.J. Keil, W.C. Hodgson, M.P. Simmons, S.D. Fehlbeg, and V.A. Funk. 2020. Thistle be a mess: Untangling the taxonomy of *Cirsium* (Cardueae: Compositae) in North America. *J. Syst. Evol.* 58: 881–912.
- Allred, K.W. and E.M. Jercinovic. Illustrated by R.D. Ivey. 2020. *Flora Neomexicana III: An Illustrated Identification Manual* (ed. 2). Part 2 : Dicotyledonous Plants. Lulu.com.
- Hsi, Y. 1960. Taxonomy, distribution and relationships of the species of *Cirsium* belonging to the Series *Undulata*, Ph.D. diss., Univ. of Minnesota, Saint Paul.
- Keil, D.J. 2004. New taxa and new combinations in North American *Cirsium* (Astereaceae: Cardueae). *Sida* 21: 207–219.
- 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.
- McVaugh, R. 1984. *Cirsium*. *Flora Novo-Galiciana* 12: 229–239.
- Nesom, G.L. 2021a. *Cirsium grahamii* (Asteraceae) and a putative sister species from Durango and Nayarit, *Cirsium hydropodum*, sp. nov. *Phytoneuron* 2021-69: 1–24.
- Nesom, G.L. 2021b. *Cirsium undulatum* (Asteraceae) in Mexico. *Phytoneuron* 2021-71: 1–23.
- Nesom, G.L. 2021c. *Cirsium ochrocentrum* var. *martinii* (Asteraceae) at specific rank but with an earlier epithet. *Phytoneuron* 2021-72: 1–22.
- Nesom, G.L. 2022. Taxonomic revision of *Cirsium* sect. *Erythrolaena* (Asteraceae: Cardueae). *Phytoneuron* 2022-23: 1–100.
- Nesom, G.L. and L.J. García M. 2021a. *Cirsium novoleonense*, sp. nov. (Asteraceae), from northeastern Mexico. *Phytoneuron* 2021-61: 1–13.
- Nesom, G.L. and L.J. García Morales. 2021b. A narrowly endemic, white-flowered *Cirsium* (Asteraceae) in northeastern México. *Phytoneuron* 2021-68: 1–15.
- Ownbey, G.B. and Y.-t. Hsi. 1963. Chromosome numbers in some North American species of the genus *Cirsium*. *Rhodora* 65: 339–354.
- Ownbey, G.B. 1968. Cytotaxonomic notes on eleven species of *Cirsium* native to Mexico. *Brittonia* 20: 336–342.
- Ownbey, G.B., P.H. Raven, and D.W. Kyhos. 1975. Chromosome numbers in some North American species of the genus *Cirsium*. III. Western United States, Mexico, and Guatemala. *Brittonia* 27: 297–304.
- Ownbey, G.B. 1982. A study of four species of *Cirsium* native to Mexico. *Phytologia* 50: 317–326.
- Petrak, F. 1910. Die mexikanischen und zentral-amerikanischen Arten der Gattung *Cirsium*. *Beih. Bot. Centralbl.* 27 (Abt. 2): 207–255.
- Petrak, F. 1911. Beiträge zur Kenntnis der mexikanischen und zentral-amerikanischen Cirsien. *Bot. Tidsskr.* 31: 57–72.
- Powell, A.M. and R.D. Worthington. 2018. *Flowering Plants of Trans-Pecos Texas and Adjacent Areas*. BRIT Press, Fort Worth, Texas.
- Yatskievich, 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 12. *Cirsium mexicanum*. "Tampico de Tamaulipas," holotype (G).



Figure 13. *Cirsium mexicanum*. Details from holotype.



Figure 14. *Cirsium mexicanum*. Details from holotype.



Figure 15. *Cirsium* aff. *mexicanum*. Tamasopo Canyon form, Pringle 3726 (MEXU).



Figure 16. *Cirsium* aff. *mexicanum*. Tamasopo Canyon form, Pringle 3726 (US).



Figure. 17. *Cirsium* aff. *mexicanum*. Tamasopo Canyon form, Tamaulipas, Hernandez 1994 (MEXU).



Figure 18. *Cirsium* aff. *mexicanum*. Tamasopo Canyon form, showing densely hairy adaxial leaf surface. Pringle 3726 (US).



Figure. 19. *Cirsium* aff. *mexicanum*. Tamasopo Canyon form, head and adaxial leaf surface. Tamaulipas, Hernandez 1994 (MEXU).



Figure. 20. *Cirsium* aff. *mexicanum*. Tamasopo Canyon form, heads. Above: MEXU. Below: US.



Figure. 21. *Cirsium limophilum*. Veracruz. Torres C. 2348 (MEXU).



Figure. 22. *Cirsium limophilum*. Detail from Torres C. 2348 (MEXU).



Figure. 23. *Cirsium limophilum*. Veracruz. Castillo & Vázquez 1415 (TEX).



Figure. 24. *Cirsium limophilum*. Closer view of Castillo & Vázquez 1415 (TEX).



Figure. 25. *Cirsium limophilum*. Detail from Castillo & Vázquez 1415 (TEX).



Figure. 26. *Cirsium limophilum*. Veracruz. Detail from Castillo C. & Tapia 493 (TEX).



Figure. 27. *Cirsium lappoides*. Querétaro. Rzedowski 46860 (MEXU).



Figure 28. *Cirsium lappoides*. Oaxaca. Conzatti 3527 (US).



Figure. 29. *Cirsium lappoides*. Hidalgo. Luna & Ocegueda 224 (MEXU).



Figure 30. *Cirsium dasyphyllum*. Nuevo León. Hinton 20017 (GBH).



Figure 31. *Cirsium dasyphyllum*. Nuevo León. Hinton 21336 (GBH).



Figure 32. *Cirsium dasyphyllum*. Nuevo León. Hinton 24236 (GBH).



Figure 33. *Cirsium dasyphyllum*. Nuevo León. Detail from *Hinton 20585* (GBH).



Figure 34. *Cirsium dasyphyllum*. Isotype, Taylor 88 (F).



Figure 35. *Cirsium pablillo*. Detail from isotype (F).



Figure 36. *Cirsium mollissimum*. Coahuila. Wynd & Mueller 596 (US).



Figure 37. *Cirsium mollissimum*. Coahuila. Minckley s.n. (ASU).



Figure 38. *Cirsium raphilepis*. Mexico D.F. Holotype, Bourgeau 141 (K).



Figure 39. *Cirsium raphilepis*. Heads from isotype (GH).



Figure 40. *Cirsium raphilepis*. Head from isotype (GH).



Figure 41. *Cirsium arctorhaphis*. Nuevo León. Hinton 20614 (GBH).



Figure 42. *Cirsium arctorhaphis*. Head from Hinton 20614.



Figure 43. *Cirsium arctorhaphis*. Nuevo León. Hinton 28655 (GBH).



Figure 44. *Cirsium arctorhaphis*. Nuevo León. Hinton 20918 (GBH).



Figure 45. *Cirsium notorhaphis*. Puebla. Isotype, Ownbey 3761 (US).



Figure 46. *Cirsium notorhaphis*. Oaxaca. Ownbey 3771 (US).



Figure 47. *Cirsium notorhaphis*. Heads from Ownbey 3771 (US).



Figure 48. *Cirsium notorhaphis*. Puebla. King 3551 (US).



Figure 49. *Cirsium chiapanum*. Holotype, Breedlove 33647 (MEXU).



Figure 50. *Cirsium chiapanum*. Méndez Girón 9119 (MEXU).



Figure 51. *Cirsium chiapanum*. Méndez Ton 7772 (MEXU).



Figure 52. *Cirsium chiapanum*. Detail from holotype (MEXU).



Figure 53. *Cirsium chiapanum*. Detail from Méndez Girón 9119 (MEXU).



Figure 54. *Cirsium chiapanum*. Detail from Santiz R. 84 (MEXU).

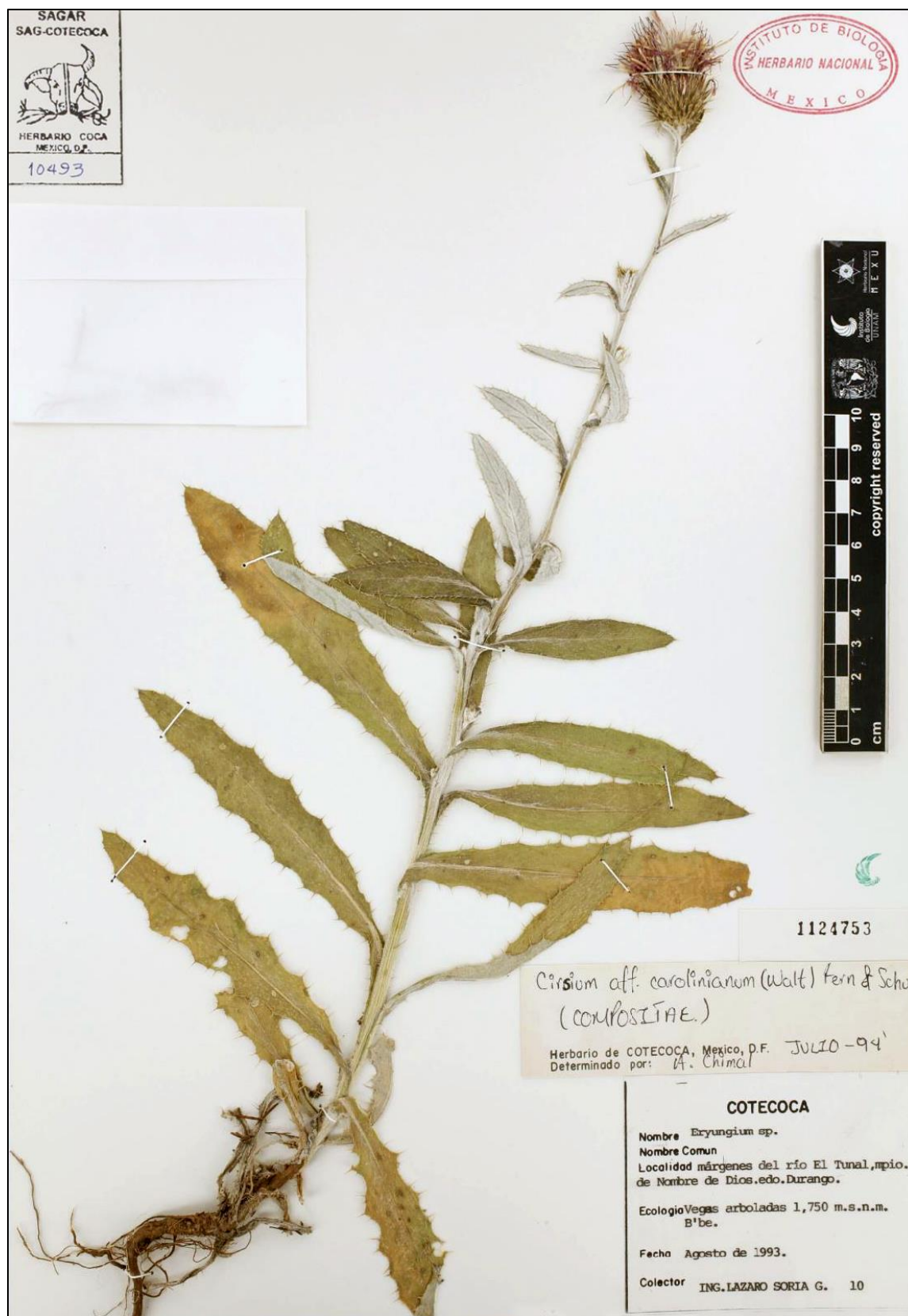
Figure 55. *Cirsium heliorhaphis*. Durango. Soria G. 10 (MEXU).

Figure 56. *Cirsium heliorhaphis*. Durango. Jimenez 201 (MEXU).



Figure 57. *Cirsium heliorhaphis*. Head from Jimenez 201 (MEXU).



Figure 58. *Cirsium pacificum*. Isotype, Van Devender 95-271 (ASU).



Figure 59. *Cirsium pacificum*. Detail from isotype (ASU).



Figure 60. *Cirsium pacificum*. Sonora, Felger 85-388 (MEXU).

Figure 61. *Cirsium pacificum*. Sinaloa, Gentry 7029 (US).

Figure 62. *Cirsium magdalenense*. Baja California Sur, Leon de la Luz 1220 (SD).

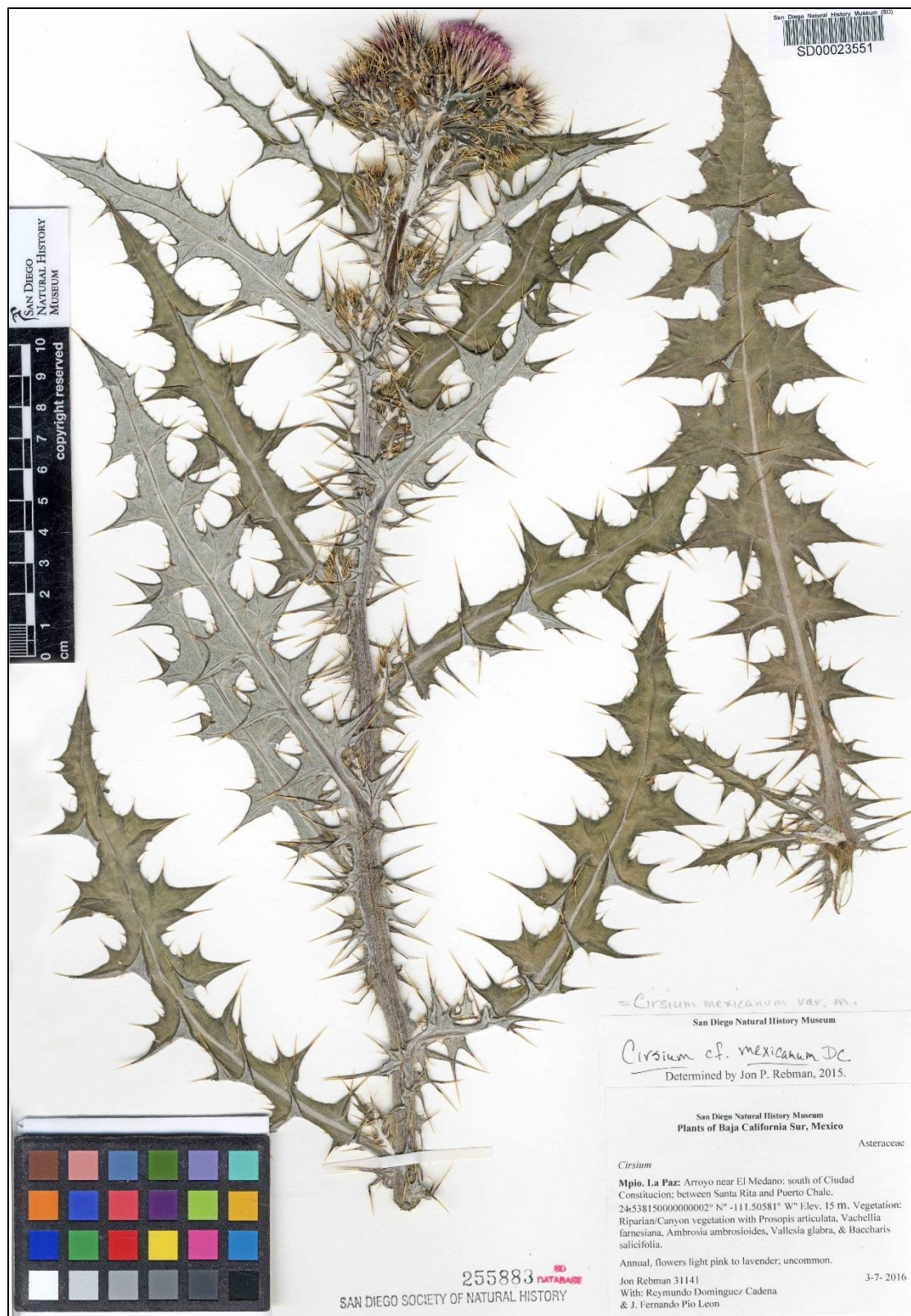


Figure 63. *Cirsium magdalenense*. Baja California Sur, holotype, Rebman 31141 (SD).



Figure 64. *Cirsium magdalenense*. Heads from the holotype (Rebman 31141, SD).



Figure 65. *Cirsium magdalenense*. Head from *Leon de la Luz* 1220 (SD).



Figure 66. *Cirsium magdalenense*. Mpio. Comondú. Photo by Jon Rebman at collection site of Rebman 31141



Figure 67. *Cirsium magdalenense*. Mpio. Comondú. Photo by Jon Rebman at collection site of Rebman 31141



Figure 68. *Cirsium magdalenense*. Mpio. Comondú. Photo by Jon Rebman at collection site of Rebman 31141



Figure 69. *Cirsium magdalenense*. Mpio. Comondú. Photo by Jon Rebman at collection site of Rebman 31141.



Figure 70. *Cirsium tenorioanum*. Isotype (US).



Figure 71. *Cirsium tenorioanum*. Detail from isotype (US).



Figure 72. *Cirsium tenorioanum*. Detail from holotype (MEXU).



Figure 73. *Cirsium tenorioanum*. Detail from isotype (US).



Figure 74. *Cirsium tenorioanum*. Involucre. Casas 26 (MEXU).

Figure 75. *Cirsium macvaughii*. Isotype (MIN).



Figure 76. *Cirsium macvaughii*. Heads from MIN isotype.



Figure 77. *Cirsium macvaughii*. Head from MIN isotype.



Figure 78. *Cirsium basaseachense*. Isotype (ARIZ).



Figure 79. *Cirsium basaseachense*. Detail from isotype (ARIZ).



Figure 80. *Cirsium basaseachense*. Head from isotype (ARIZ).



Figure 81. *Cirsium basaseachense*. Heads from isotype (ARIZ).