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CIRSIUM OCHROCENTRUM VAR. *MARTINII* (ASTERACEAE) AT SPECIFIC RANK BUT WITH AN EARLIER EPITHET

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ABSTRACT

Cirsium townsendii (Petrak) Nesom, **comb. et stat. nov.**, is raised in rank (from an infraspecific taxon, as *Cirsium ochrocentrum* var. *townsendii*) to reflect its morphological and geographic coherence and its small region of intergradation with typical *C. ochrocentrum*, which is relatively constant in morphology over a wider distribution. This is the same entity recognized as *C. ochrocentrum* subsp./var. *martinii* — the type of var. *martinii* was collected in southwestern New Mexico, that of var. *townsendii* in northwestern Chihuahua. *Cirsium townsendii* occurs in southwestern New Mexico and Arizona and in northern Sonora and Chihuahua, Mexico — the USA/Mexico distribution is mapped and collections from Mexico are cited.

Petrak (1917) described *Cirsium ochrocentrum* var. *townsendii* from a collection near Colonia Garcia in northwestern Chihuahua, pointing out its solitary, ebracteate or few-bracteate heads and non-decurrent, sinuate-lobed leaves. Hsi (1960, his Ph.D. dissertation) agreed regarding the distinction of var. *townsendii* but proposed to recognize it at varietal rank within *Cirsium undulatum*, citing only three collections — *Townsend & Barber 59* (the type), *Townsend & Barber s.n.* (US), and *Nelson 6045* (GH, US), all from the same area of Chihuahua. Hsi's combination was never formally published nor was it mentioned in subsequent publication, as (apparently) he and his advisor (G.B. Ownbey) came to agree with Petrak that the variant is more closely related to *C. ochrocentrum*. In Hsi's discussion of *C. ochrocentrum*, he noted (p. 68) that "the largest flowers are found in the southern edge of its range, such as in northern Mexico, southern Arizona, and southern New Mexico," essentially the range of var. *townsendii* as recognized here.

Ownbey & Hsi (1963) reported a chromosome number of 2*n* = 32 for typical *Cirsium ochrocentrum* and for the "townsendii" variant, noting that further study might indicate the latter to be justifiably separated in taxonomy "as a distinct subspecies or species." Their counts from of 2*n* = 32 from Colorado and South Dakota represented "the typical phase of this species ranging from the Great Plains westward to Wyoming, eastern Utah, and New Mexico. This phase normally has strongly decurrent leaves and pale reddish-lavender corollas (p. 348)." The two Arizona counts (Coconino Co., 16.7 mi S of Grand Canyon City, *Ownbey 1822*-MIN, 2*n* = 30, 31, 32; Yavapai Co., 3.8 mi E of Seligman, *Ownbey 3001*-MIN, 2*n* = 32; Fig. 1) represented "the phase found in Arizona southward and eastward to New Mexico, Sonora, and Chihuahua. These plants have less strongly decurrent leaves with often broad and semi-clasping bases and bright scarlet-red corollas" (p. 348).

The same entity was recognized and formally described by Barlow (1992, 1999) as *Cirsium ochrocentrum* subsp. *martinii* with a type collection from southwestern New Mexico, emphasizing differences similar to those described by Ownbey & Hsi. It is distinguished in the field from typical *C. ochrocentrum* "by its bright-red florets, short style tips and spines, and less prominent decurrence of leaf bases." Barlow noted that Hsi (1960) discussed the same red-corolla form of *C. ochrocentrum*, but she apparently did not consider that var. *townsendii* might be the same entity, as considered here. She did not include var. *townsendii* as a synonym of subsp. *martinii*.

Barlow's "martinii" was subsequently treated at varietal rank by Keil (2004, 2006) for consistency within his Flora of North America treatment. It is treated here at specific rank using Petrak's earlier epithet.

1. CIRSIUM OCHROCENTRUM A. Gray, Mem. Amer. Acad. Arts, n.s. 4 [Plantae Fendlerianae]: 110. 1849. *Cnicus undulatus* var. *ochrocentrus* (A. Gray) A. Gray, Proc. Amer. Acad. Arts 10: 43. 1874. *Cnicus ochrocentrus* (A. Gray) A. Gray, Proc. Amer. Acad. Arts 19: 57. 1884 [1883]. *Carduus ochrocentrus* (A. Gray) Greene, Proc. Acad. Nat. Sci. Philadelphia 44(3): 363. 1892 [1893]. **TYPE**: **USA**. **New Mexico**. Mountain sides around Santa Fe, 1847, *A. Fendler 486* (holotype: GH, Fig. 2; isotype: GH).

Cirsium ochrocentrum sensu stricto is known in Mexico from two collections, both very near the Texas border (Fig. 1). **Chihuahua**. SE of Sierra San Martín de Borracho, 5.5 km S of Rancho Las Vacas on the road to Rancho Los Sauces, 15 Jun 1973, *Johnston et al. 11328* (LL); Sierra de la Ranchería (on Rancho Candelaria), SW slope from the top down to a marble quarry at the base, matorral inerme, steep crumbly slopes, 29 Oct 1972, *Wendt et al. 9966* (LL, MEXU).

2. CIRSIUM TOWNSENDII (Petrak) Nesom, **comb. et stat. nov.** *Cirsium ochrocentrum* var. *townsendii* Petrak, Beih. Bot. Centralbl. (Abt. 2) 35: 420. 1917. **TYPE**: **MEXICO**. **Chihuahua**. Near Colonia Garcia in the Sierra Madre, ca. 2200 m, 2 Jun 1895, *C.H.T. Townsend & C.M. Barber 59* (holotype: WU; isotypes: GH-Figs. 9-10, MEXU-2-images, MO, NY, RM, TEX, US, VT).

Cirsium ochrocentrum subsp. *martinii* Barlow-Irick, Novon 9: 318. 1999. *Cirsium ochrocentrum* var. *martinii* (Barlow-Irick) Keil, Sida 21: 215. 2004. **TYPE**: **USA**. **New Mexico**. Catron Co.: NMex Hwy 12, 12.5 mi E of San Francisco River bridge at Reserve, 5800 ft, 28 Jul 1997, *P. Barlow-Irick 97-8* (holotype: US, as 2 sheets, Figs. 11-12; isotypes: ASU, MO, NMC, UNM).

Barlow (1996, p. 319) made the following observations.

> Morphological intermediates between typical *Cirsium ochrocentrum* and subsp. *martinii* occur "in a narrow zone along the Continental Divide. In these areas, populations may have intermediate flower colors to the red or purple phenotypes or mixed populations of both colors. Although these intermediate populations were variable in many characteristics, there is no decrease in pollen stainability or other indications of loss of fertility in these areas."
>
> Discriminant analyses "support the recognition of *Cirsium ochrocentrum* subsp. *martinii* by showing that using quantitative morphological characters alone, the two taxa can be separated with very little overlap when geographically intermediate populations are excluded. The small degree of overlap between the taxa, despite the power of CDA to divide groups, indicates that they are not divided by any discontinuous character distributions, as evidenced in Table 3. Although these taxa have different corolla colors and morphological features, they apparently intergrade in the intermediate populations along the narrow zone of contact between their geographical ranges. Some authors might rank these two taxa as separate species; however, a conservative approach, ranking them as subspecies, better reflects the close relationship and high degree of morphological similarity, relative to more differentiated congeners."

In sum, Barlow saw two morphologically and geographically discrete entities, essentially parapatric and each with a wide geographic range, hybridizing along their narrow zone of contiguity. Her choice of rank primarily reflected their relative degree of morphological difference, compared to other putatively closely related species.

As allowed both by Hsi and by Barlow, morphological and geographic evidence support an interpretation of the townsendii/martinii entity at specific rank and that is the course followed here. It *Cirsium townsendii* and *C. ochrocentrum* perhaps are sister taxa but evidence for that is ambiguous. Both are rhizomatous, in contrast to the taprooted *C. undulatum*, but *C. townsendii* has more widely spaced cauline leaves often with a distinctly broadened base, in aspect more like *C. undulatum* than

typical *C. ochrocentrum*. The couplet below, distinguishing *C. townsendii*, is essentially that in the FNANM treatment by Keil (2006).

1. Stems with crowded nodes; distal cauline leaves decurrent (wing 0.5–2 cm long), base not clasping; corollas (fresh) purple or less commonly to pale lavender or white; Figs. 2-8 ... **Cirsium ochrocentrum**

1. Stems usually with well separated nodes; distal cauline leaves not decurrent or rarely slightly so, base often clasping to subclasping; corollas (fresh) scarlet red to reddish purple, less commonly to pink, rarely white; Figs. 9-18 ..... **Cirsium townsendii**

Cirsium townsendii: Desert grassland, creosote-scrub, mesquite-grassland, matorral, areas of pine-oak and pine woods, roadsides, gravelly slopes, rocky hills, dry washes, grazed pastures; 1350–2100 (–2450) m. Flowering May-October.

***Cirsium townsendii* in Mexico. Chihuahua**. Mpio. Madera, prox. al entronque del camino a las Escobas, Ejido El Largo, 23 Jun 1990, *Benítez 1359* (MEXU); Mpio. Madera, Arroyo de la Quinta, antes del entronque los Marranos, Ejido El Largo, 24 Jun 1990, *Bravo B. 849* (MEXU); N of Aldama, ca. KM 33.5 MexHwy 16, carr. Cd. Chihuahua a Ojinaga, 7 May 1998, *Bye 22589* (MEXU); 10-15 mi SE of Nuevo Casas Grandes, 9 May 1959, *Correll & Johnston 21672* (LL, NY); 6 mi SE of Sacramento on Hwy 45, 19 May 1959, *Correll & Johnston 21741* (LL); Casas Grandes, 2 Jun 1899, *Goldman 434* (US); 19 mi NE of Ascención towards Nuevo Casas Grandes, 18 Aug 1971, *Henrickson 5735* (LL); 31 air mi SSW of Columbus, NMex, 4000 ft, 22 Jul 1973, *Henrickson 11224* (LL); Mesa Prieta, 11 Sep 2009, *Joe 161* (TEX); 16.8 mi SSE of Nuevo Casas Grandes, Hwy 10, roadside, dwarfed mesquite, 4750 ft, 25 May 1978, *Lehto L22816* (ARIZ); SW of Chihuahua, 18 Aug 1936, *LeSueur s.n.* (MEXU); Rancho Experimental La Campana, Sep 1958, *Martínez 137* (TEX); Madera, cercanías de Río Colorado, 2250 m, 7 Jun 1958, *Matuda 32641* (MEXU); SW of San Buenaventura, 31 Aug 1989, *Mayfield 237* (LL); Mexican boundary line, near White Water, 18 Jun 1892, *Mearns 332* (US); Sierra Madre, 11 Jun-29 Jul 1899, *Nelson 6045* (US); 3.5 mi NW of Meoqui, wet soil, road embankment in a flat, irrigated valley, 29 Jul 1950, *Ownbey 1461* (MEXU, US); 12 mi S of El Sueco, Rte 45, 21 Jun 1965, *Ownbey 3694* (US); vicinity of Chihuahua, ca. 1300 m, 5 Jun 1910, *Palmer 334* (US); Talamentes, 20 May 1955, *Pennington 352* (TEX); valley near Chihuahua, 23 Jul 1886, *Pringle 870* (MEXU, US); 90 mi S of Cd. Juarez on Hwy 45, 12 Jul 1975, *Seigler DS9174* (LL); 4.5 mi SW of Casas Grandes, 10 Jul 1997, *Spencer 426* (TEX); flat E of Sierra La Brena, just S of Hacienda San Diego, rocky slopes, 14 Aug 1999, *Spencer 1470* (BRY); 36 km SW de Colonia Juárez, 16 Jul 1984, *Tenorio L. 6508* (MEXU-2, TEX); 17 km NW de Janos, 15 Jul 1984, *Tenorio L. 6474* (MEXU-2, TEX); KM 16 N of Cd. Chihuahua, 29 May 1974, *Valdez R. 475* (LL); KM 91 por la carr. Chihuahua-Villa Ahumada, 7 Jun 1997, *Yen & Estrada 7196* (TEX); Mpio. Chihuahua, KM 7 carr. El Sueco-Flores Magón, 22 Aug 1997, *Yen & Estrada 8082* (TEX). **Eastern Chihuahua**. Sierra de Carrasco, SW-facing canyon above Rancho El Recuerdo, 15 Sep 1973, *Henrickson 13006* (LL); Sierra de Almagre, canyon in E face, 5 May 1973, *Johnston et al. 10807* (LL); Sierra del Roque, N of Julimes, NNW of Rancho el Sauz, 24 Aug 1973, *Johnston et al. 12327* (LL); Meoqui, 24-30 Aug 1935, *LeSueur 43* (LL); Mpio. Julimes, Banos de San Diego, 1.8 km E of San Diego de Alcala, 23 Aug 1988, *Nesom 6542b* (TEX); Sierra de Encinillas, vic. of Fierro, 4 km SE of Rancho Encinillas, 8-9 Jun 1941, *Stewart 786* (LL); Sierra del Diablo, Canon del Rayo, large canyon on NE side toward the N end of the sierra, 25-29 Jul 1941, *Stewart 953* (LL). **Coahuila**. [Mpio. Sierra Mojada:] Sierra de las Cruces, eastern foothills, road from Castillon to San José, 7 mi N of Santa Elena Mines, along gravelly dry arroyo, 15 Aug 1940, *Johnston & Mueller 313* (LL). **Durango**. 59.8 mi SE of turnoff to Villa Ocampo, 11.2 mi NW of La Zarca, common on hwy embankment, 28 Jul 1950, *Ownbey 1454* (MEXU). **Sonora**. Mpio. Agua Prieta: Rancho El Valle, S extension of the Animas Valley, Cuenca Los Ojos conservation area, ca. 59 km E of Agua Prieta on Hwy 2, plains grassland, 1592 m, 15 Aug 2007, *Van Devender 2007-777* (TEX); Rancho El Valle, S extension of the Animas Valley, Cuenca Los Ojos conservation area, 25 May 2008, *Van Devender 2008-263* (TEX). Mpio. Altar: region of the Rio de Bavispe, between Las Tierritas and El Tigre, pine land, 22 Aug 1940, *White 3449* (MEXU). Mpio. Cananea: Rancho Los Fresnos Grassland Preserve, upper Rio San Pedro drainage adjacent to US border, oak-mesquite grassland, 4780 ft, 24 May 2008, *Boyle 9000* (MEXU); Sierra de los Ajos, Los Ajos Nuevos, Cañon de Evans, level area ca 8 m above canyon bottom, 8 Oct 1992, *Felger 92-826-A* (ARIZ); San Pedro,

15 Sep 1890, *Hartman 836* (US); 10 km al S de Cananea, carr. a Arizpe, 20 May 1987, *Tenorio L. 13586* (MEXU, MSC); Cananea, 25 May 2005, 2005-*Van Devender 869* (TEX). Mpio. Cumpas: Antenna, above Rancho La Cieneguita, 20.3 air km ENE of Cumpas, 2 Aug 2010, *Van Devender 2010-739* (ARIZ, TEX, USON). Mpio. Fronteras: Cerro de las Flores, N-facing slope just below summit, 8528 ft, 9 Oct 1992, *Fishbein 686* (ARIZ); Fronteras, Jun 1851, *Thurber 433* (GH). Mpio. Imuris: Sierra Azul, 27.4 air km ESE of Imuris, antenna area, Rancho El Salto, 4 Oct 2010, *Van Devender 2010-1036* (TEX). Mpio. Janos: San José Mts, 8400 ft, 7 Aug 1893, *Mearns 1669* (US); Mpio. Naco: 8.3 km SE of Naco on road to Cananea, 14 Aug 2002, *Reina 2002-285* (ARIZ, TEX). Mpio. Sta. Cruz: 5 km N of Sta. Cruz, E side of the Santa Cruz River, 15 May 2002, *Van Devender 2002-311* (ASU, MEXU, NMC, TEX, USON); ca. 5 km S of La Noria (Ariz-Sonora border opposite Lochiel), 15 May 2002, *Van Devender 2002-319* (TEX).

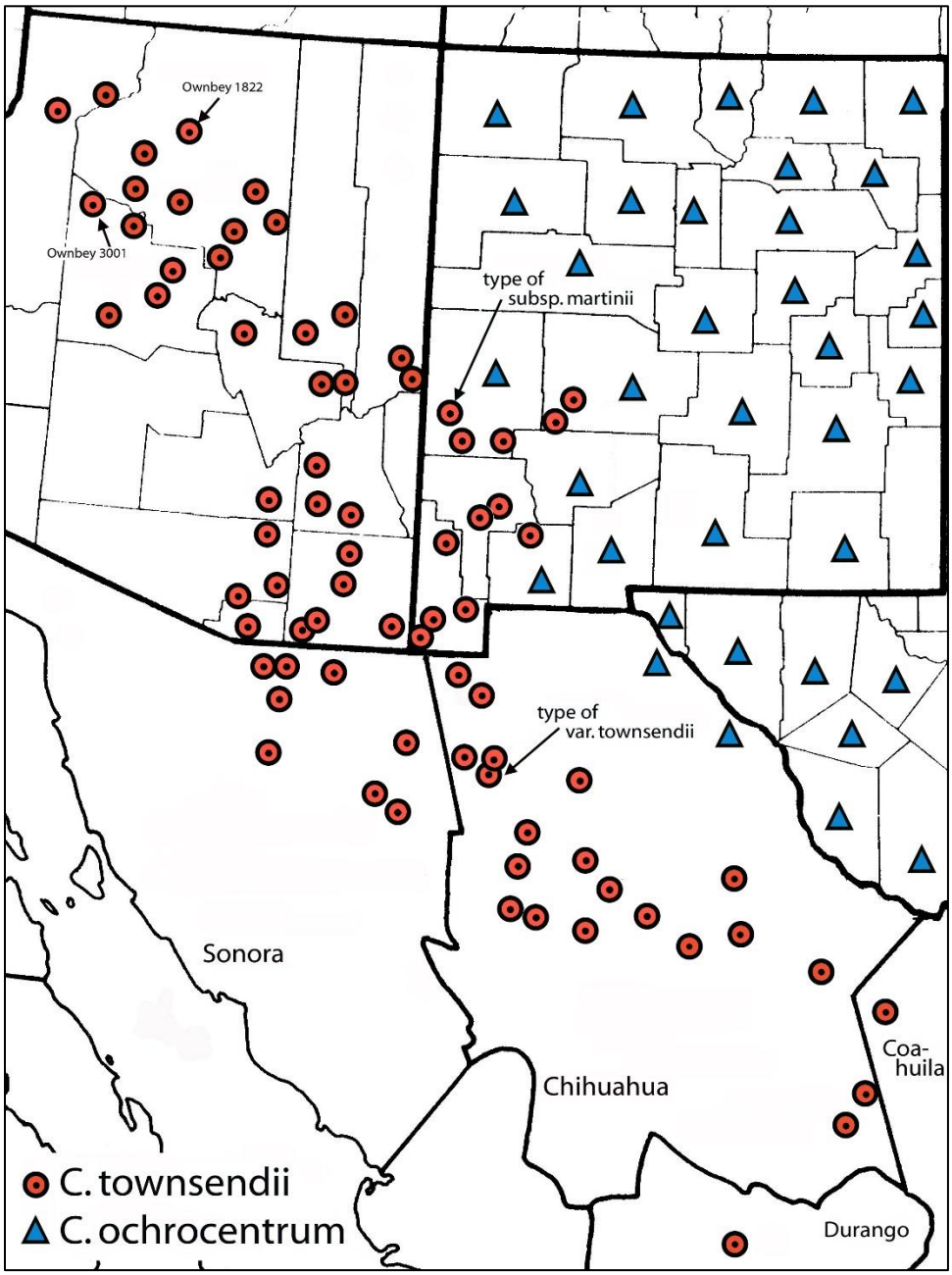

Figure 1. Distribution of *Cirsium townsendii* (USA records include specimen citations by Barlow-Irick 1999) and of *Cirsium ochrocentrum* sensu stricto in New Mexico, southwestern Texas, and Mexico.

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Figure 2. *Cirsium ochrocentrum*. Santa Fe Co., New Mexico. Holotype (GH).

Figure 3. *Cirsium ochrocentrum*. Roosevelt Co., New Mexico. *Parmer 190* (SAT).

Figure 4. *Cirsium ochrocentrum*. San Miguel Co., New Mexico. *Standley 4995* (NY).

Figure 5. *Cirsium ochrocentrum*. Socorro Co., New Mexico. *Lundblad 34* (BRY).

Figure 6. *Cirsium ochrocentrum*. El Paso Co., Texas. *Cross 50* (UTEP).

Figure 7. *Cirsium ochrocentrum*. Presidio Co., Texas. *Correll & Johnston 19310* (LL).

Figure 8. *Cirsium ochrocentrum*. Presidio Co., Texas. *Carr 19995* (TEX).

Figure 9. *Cirsium townsendii*. Chihuahua, Mexico. Isotype (GH).

Figure 10. *Cirsium townsendii*. Chihuahua, Mexico. Head from GH isotype, Figure 9.

Figure 11. *Cirsium townsendii*. Catron Co., New Mexico. Holotype (US, sheet 1).

Figure 12. *Cirsium townsendii*. Catron Co., New Mexico. Holotype (US, sheet 2).

Figure 13. *Cirsium townsendii*. Santa Cruz Co., Arizona. *McGill & Pinkava 6703* (ASU).

Figure 14. *Cirsium townsendii*. Sonora. *Hartman 836* (US).

Figure 15. *Cirsium townsendii*. Chihuahua. *Spencer 1470* (BRY).

Figure 16. *Cirsium townsendii*. Chihuahua. *Ownbey 3694* (US).

Figure 17. *Cirsium townsendii*. Chihuahua. *Owbey 1461* (US).

Figure 18. *Cirsium townsendii*. Durango. *Ownbey 1454* (US).