

GRINDELIA (ASTERACEAE) IN NUEVO LEÓN, MEXICO: TAXONOMIC CLARIFICATIONS

GUY L. NESOM

Research Associate

Academy of Natural Sciences of Drexel University

Philadelphia, Pennsylvania 19103

guynesom@sbcglobal.net

ABSTRACT

Numerous recent collections in Nuevo León, Mexico, make it possible to clarify definitions and geographic distributions for species of *Grindelia*, including *G. greenmanii*, *G. hintoniorum*, *G. turneri*, and *G. villarrealii*. Typical *G. inuloides* does not occur in Nuevo León. Collections are cited and mapped and illustrations of representative collections are provided.

In an earlier review of the taxonomy of *Grindelia* from Texas and Mexico (Nesom 1990, 1992), I described four new species from Nuevo León — *G. turneri*, *G. hintoniorum*, *G. villarrealii*, and *G. vetimontis* — in addition to recognizing the presence of similar species, *G. greenmanii* Steyerl. and the more widespread *G. inuloides* Willd. Accumulation of additional collections in the nearly 30 intervening years makes it possible to clarify species morphological boundaries and geographical patterns.

Grindelia greenmanii is a distinctive species, but it has a slightly narrower range than recognized in 1990. *Grindelia vetimontis* is similar to *G. greenmanii* and the two perhaps have a sister relationship. Typical *G. inuloides* does not occur in Nuevo León; collections earlier identified as *G. inuloides* are recognized here mostly as *G. hintoniorum* and *G. villarrealii*. *Grindelia villarrealii* is a distinctive species of the Peña Nevada area, where it co-occurs only with *G. obovatifolia* Blake. Detailed comments are provided below.

GRINDELIA GREENMANII Steyerl., Ann. Missouri Bot. Garden 21: 460. 1934. **TYPE: MEXICO. Coahuila.** [Mpio. Arteaga:] "Lerios" [Los Lirios], 10-13 Jul 1880, *E. Palmer 471* (holotype: GH!; isotypes: K image, NY image, PH!, US!, YU image). The PH sheet has the original label by Palmer, noting the collection data as "July 10 to 13."

Grindelia greenmanii is characterized by its thick rhizomes, villous to sparsely pilose stems, stipitate-glandular vestiture (stems, leaves, involucre), and peduncles with only slightly reduced leaves extending to immediately below the heads as foliaceous bracts. The apices of foliar teeth are variable — acute and usually neither glandular nor spinulose, but sometimes with a short-indurate point, or sometimes indurate or slightly glandular — variable even on a single plant. Plants of *G. greenmanii* in the Arteaga area of Coahuila tend to have smaller involucre and smaller basal leaves than those in the Cerro Potosí area.

Flowering (Jun–)Jul–Oct(–Nov); alpine and subalpine and meadows, spruce, pine, and pine-oak woods, (1600–)2200–3650 m. *Grindelia greenmanii* is primarily a high-elevation species but plants occur lower in pine-oak areas immediately around high-elevation areas where the species is common. The lowest locality is the Cañón La Boca, between Cola de Caballo and Laguna Sánchez, at 1600 m (*Villarreal 2836*, MEXU). The species is restricted to two relatively discrete, disjunct regions: (1) the Arteaga region of Coahuila and (2) Cerro Potosí and the immediately surrounding area (Fig. 1).

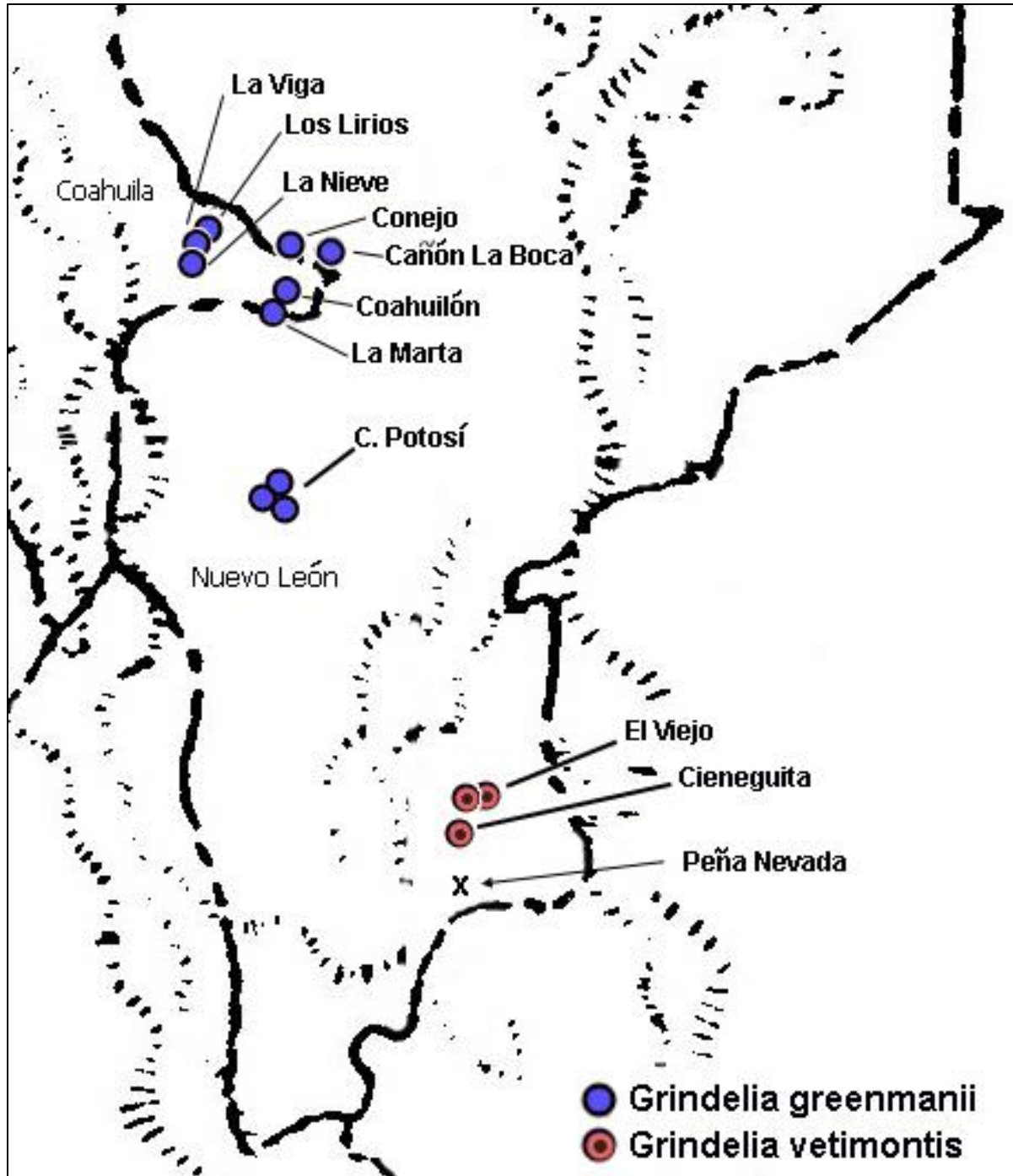


Figure 1. Distribution of *Grindelia greenmanii* (Sierra La Viga, Sierra de Los Lirios, Sierra La Nieve, Puerto Conejo, Cañón La Boca, Sierra El Coahuilón, Sierra La Marta, and Cerro Potosí and immediate vicinity) and *G. vetimontis* (Cerro El Viejo and slightly to the southwest, between Cieneguita and San Josecito). Collections in the area of Cerro Peña Nevada (Picacho San Onofre) previously identified as *G. greenmanii* and *G. inuloides* are here referred to *G. villarrealii* (see Fig. 15, text and specimen citations).



Figure 2. *Grindelia greenmanii*, Mpio. Galeana, Cerro Potosí, Hinton 17148 (GBH).



Figure 3. *Grindelia greenmanii*, Mpio. Arteaga, Sierra La Marta, Hinton 17890 (GBH).



Figure 4. *Grindelia greenmanii*, Mpio. Arteaga, El Paso, Hinton 24382 (GBH).



Figure 5. *Grindelia greenmanii*, Mpio. Arteaga, Los Lirios to El Cercado, Hinton 25428 (GBH).



Figure 6. *Grindelia greenmanii*. Mpio. Arteaga, Jamé to Rayones, Hinton 27785 (GBH).

GRINDELIA VETIMONTIS Nesom, *Phytologia* 68: 330. 1990. **TYPE: MEXICO. Nuevo León.** [Mpio. Gral. Zaragoza:] Cerro del Viejo, 15 mi W of Dulces Nombres, rocky slopes in open pine forest, 3330 m, 18 Aug 1948, *F.G. Meyer & D.J. Rogers* 2988 (holotype: MO!; isotype: F!).

Additional collections. Nuevo León. Mpio. Zaragoza: Cerro El Viejo, oak and pine woods, 3310 m, 5 Oct 1992, *Hinton et al.* 22398 (GBH, MEXU); Cerro El Viejo, pine woods, 3125 m, 6 Oct 1992, *Hinton et al.* 22434 (GBH); San Jose to La Cieneguita, oak woods, 2270 m, 3 Oct 1998, *Hinton et al.* 27274 (GBH).

Grindelia vetimontis was described as differing from *G. greenmanii* in eglandular stems, leaves with rounded apices, and phyllaries nervate in the basal, white-indurate portion. Leaf teeth have acute, non-indurate apices. Diagnostic features are detailed in the couplet below (and compare Figs. 2-6 with Figs. 7-11).

1. Stems villous, eglandular; medial cauline leaves mostly oblong, apices rounded to obtuse; phyllaries distinctly nervate in the indurate proximal portion, green distal portion triangular to narrowly oblong-lanceolate, sometimes loose but not recurving ***Grindelia vetimontis***
 1. Stems villous and stipitate-glandular; cauline leaves mostly lanceolate-triangular, apices acute to acute-acuminate; phyllaries enervate or indistinctly nervate in the indurate proximal portion, green distal portion linear-triangular to nearly linear-terete, often recurving ***Grindelia greenmanii***

The two taxa are similar in their rhizomatous habit and non-punctate leaves, the basal large and usually persistent, the cauline continuing distally little reduced in size, subtending the involucre as foliaceous bracts. Bartoli and Tortosa (2012) treated *G. vetimontis* as a synonym of *G. greenmanii*, noting that they observed intermediates in the Peña Nevada area (i.e., *Nesom 4800* and *Breedlove 63552*; without specifying the nature of the putative intermediacy) — both of these collections are taprooted, without foliaceous involucre bracts, and identified here as *G. hintoniorum*.

Many taxa in various genera mirror the distribution pattern of *Grindelia greenmanii* (Fig. 1), divided between high elevation habitats of Cerro Potosí and the "Arteaga" mountains (McDonald 1993). McDonald also described a common disjunction pattern between Arteaga/Cerro Potosí and Peña Nevada, often between closely similar species that appear to be evolutionary vicariads. The latter probably is the case in *G. greenmanii* and *G. vetimontis*.



Figure 7. *Grindelia vetimontis*, F isotype (see Fig. 8), detail.



Figure 8. *Grindelia vetimontis*, Mpio. Gral. Zaragoza, Cerro El Viejo, F isotype.



Figure 9. *Grindelia vetimontis*, Mpio. Gral. Zaragoza, Cerro El Viejo, Hinton 22398 (GBH)



Figure 10. *Grindelia vetimontis*, Mpio. Gral. Zaragoza, Cerro El Viejo, Hinton 22434 (GBH)



Figure 11. *Grindelia vetimontis*, Mpio. Gral. Zaragoza, between San Josecito and Cieneguita, Hinton 27274 (GBH).

Grindelia obovatifolia Blake also occurs in the area of Cerro El Viejo (e.g., *Nesom* 7718–MEXU, TEX) and is similar to *G. vetimontis* in its rhizomatous habit and non-punctate, clasping leaves with rounded apices, but it differs in sparse cauline vestiture, reduced distal cauline leaves, smaller heads, strongly graduated phyllaries with abruptly acuminate-linear, recurving/recoiling apices, and achenes (at maturity) with distinct transverse furrows. See Figs. 12 and 13. Rarely confused with any other species.

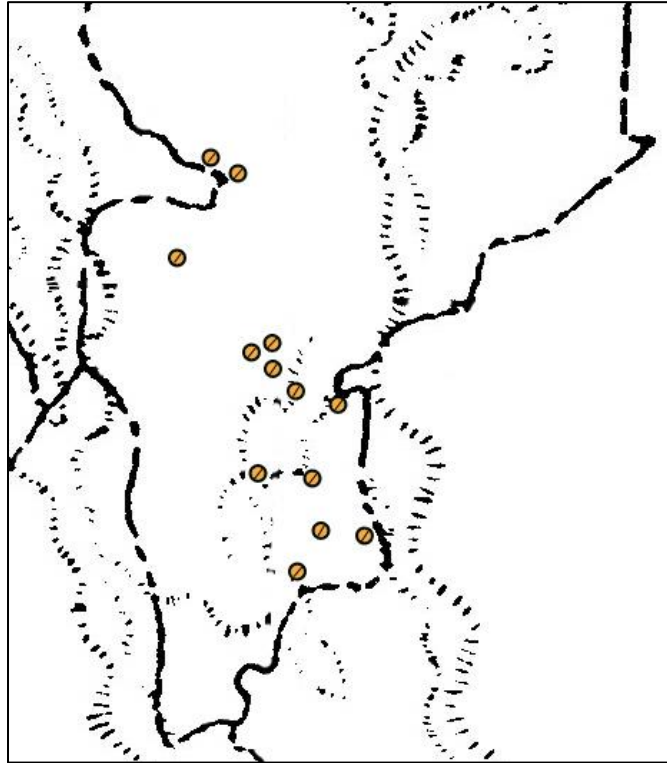


Figure 12. Distribution of *Grindelia obovatifolia*.



Figure 13. *Grindelia obovatifolia*, involucre bracts. Mpio. Iturbide, *Hinton et al.* 21231 (GBH).



Figure 14. *Grindelia obovatifolia*. Mpio. Galeana, Hinton 21316 (GBH).

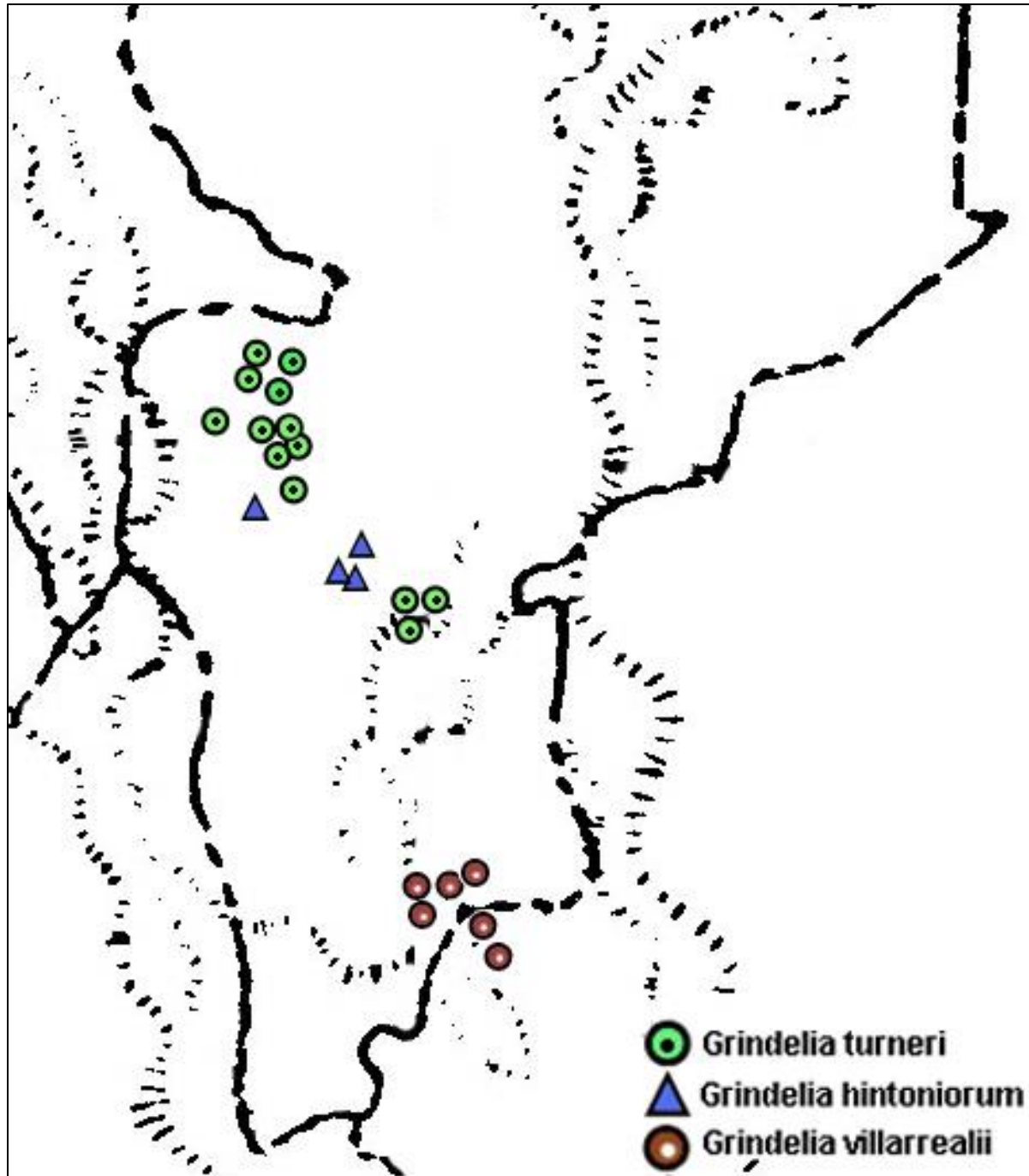


Figure 15. Distribution of *Grindelia turneri*, *G. hintoniorum*, and *G. villarrealii*.

GRINDELIA TURNERI Nesom, *Phytologia* 68: 313. 1990. **TYPE: MEXICO. Nuevo León.** Mpio. Galeana: Between San Pablo and Tanquecillos, 0.5 mi S of San Pablo, on the road between San Rafael Jct and Galeana, fallow fields in valley, area of pines on high slopes of valley margins, 2320 m, 27 Aug 1989, *G.L. Nesom 7189* (holotype: TEX; isotypes: ANSM, COLO, ENCB, F, GH, KANU, MEXU, MO, NY, RM, US, WAT, WIS).

Flowering (May–)Jul–Oct(–Nov). Oak and oak-pine areas, meadows in pine woods, grassy slopes, edge of cultivated fields, roadsides and disturbed sites; 1450–2600 m.

Grindelia turneri is characterized by a perennial, taprooted habit, relatively short, few-branched stems, leaves with blunt, gland-tipped teeth, and pappus awns 2, as long or longer than the disc corollas. Mature achenes "wrinkled" with short, shallow, transverse furrows.

Additional collections. **MEXICO. Nuevo León. Mpio. Galeana:** Along gravel road to 18 de Marzo, 8.7 mi E of the jct of the gravel road and Mex Hwy 57, open pine forest, locally common in disturbed habitats along road, rocky loamy soil, probably on gypsum, 5 Aug 1983, *Freeman & Wetter 2056* (MEXU, TEX, WIS-2 sheets); along the road from San Rafael to Derecho de Marzo and Galeana, ca. 8 mi E of San Rafael, 4.4 mi E of La Boca, 6200 ft, 22 Oct 1982, *Grimes 2278* (MEXU, TEX); Tanquecillos, field, 2430 m, 11 May 1980, *Hinton et al. 17760* (GBH); Rancho Aguililla, orchard, 1850 m, 3 Jul 1989, *Hinton et al. 19481* (GBH, MEXU); below Agua Blanca, oak woods, 2270 m, 4 Jul 1992, *Hinton et al. 22268* (GBH); Socorro to San Pablo, meadow, 2355 m, 25 Jul 1995, *Hinton et al. 25402* (GBH, MEXU); San Pablo to San Pedro Sotolar, edge of cultivated field, 2425 m, 11 Jul 1998, *Hinton et al. 27192* (GBH); La Boca to San Pablo, meadow in pine woods, 2420 m, 1 Aug 2001, *Hinton et al. 27681* (GBH); San Pedro Sotolar to San Pablo, roadside meadow in pine woods, 2621 m, 22 May 2005, *Hinton et al. 28344* (GBH); E of San Rafael, 5.6 mi ESE of San Pablo, 30 Nov 1986, *Nesom 5281* (MEXU, TEX); ca. 2 mi W of San Pablo, overlooking the town, open, grassy slopes at edge of pine woods, 2300 m, 27 Aug 1980, *Nesom 7184* (ANSM, KANY, MEXU, MO, NY, RM, TEX, WIS); ca. 2 mi S of Tanquecillos, on road between San Rafael Jct and Galeana, open area of shaly limestone with scattered pines, pine woods on slopes, 2450 m, 27 Aug 1989, *Nesom 7192* (MEXU, TEX); ca. 5 mi S of Tanquecillos on road between San Rafael Jct & Galeana, 27 Aug 1989, *Nesom 7194* (TEX); ca. 9 km S of San Rafael along Hwy 57 toward San Rafael Jct, broad valley (Valle de Potosí), gypseous soil, area mostly cultivated, 18 Sep 1993, *Nesom 7587* (MEXU, MO, TEX); ca. 2.6 mi W of 18 de Marzo, on road to Cerro Potosí, limestone rockland with gypsum, *Pinus*, *Quercus*, *Arbutus*, 7600 ft, 25 Oct 1981, *Poole 2490* (MEXU); 20.6 mi N of San Roberto Jct on Hwy 57, 12 Oct 1984, *Sundberg 3131* (TEX, WIS). **Mpio. Iturbide:** Iturbide to Agua Blanca, edge of cultivated field, 1460 m, 21 Aug 1991, *Hinton et al. 21193* (GBH, MEXU); La Purisima to Bella Vista, oak and pine woods, 1700 m, 6 Sep 1991, *Hinton et al. 21428* (GBH).



Figure 16. *Grindelia turneri*, from isotype, *Nesom 7189* (RM).

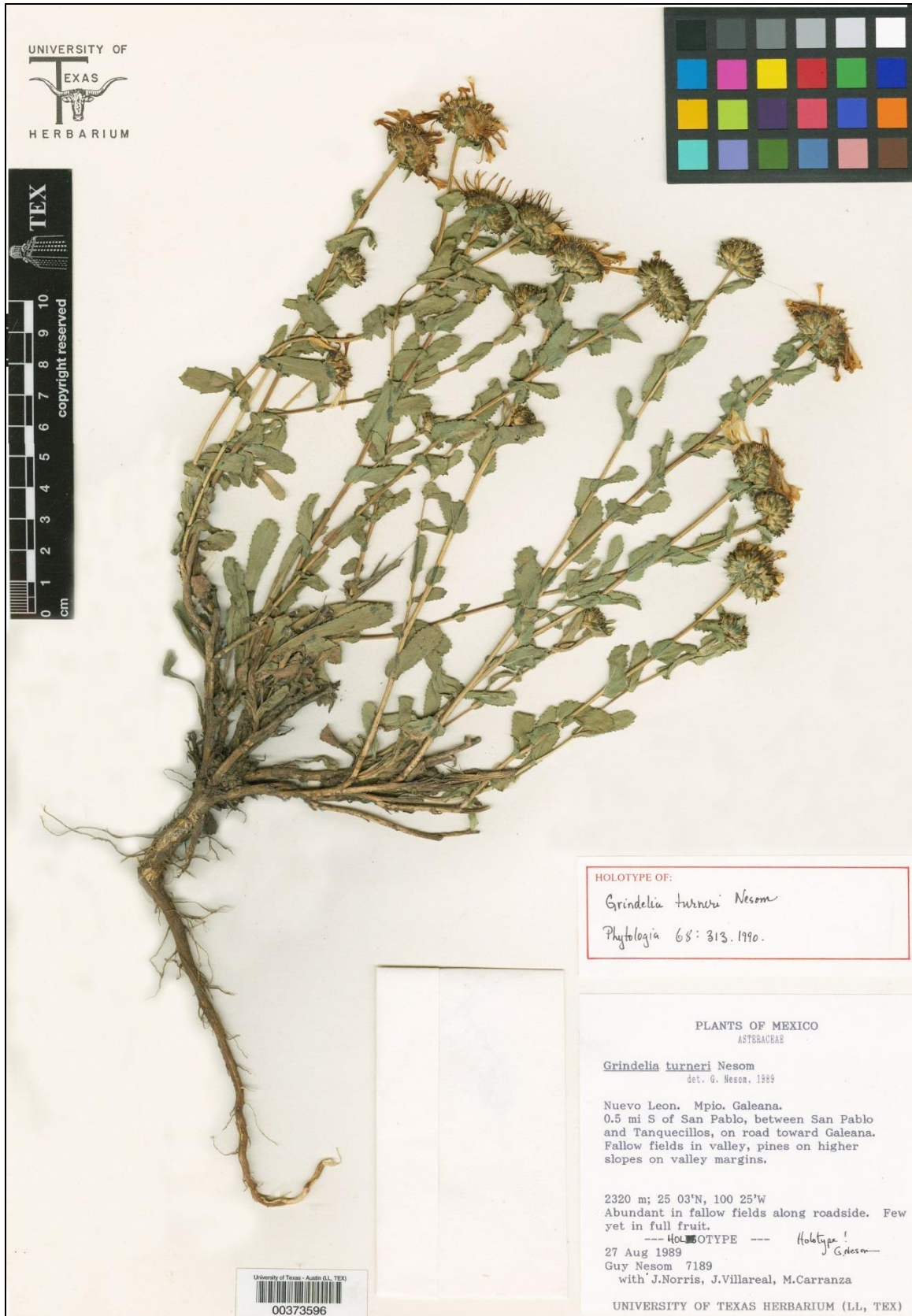


Figure 17. *Grindelia turneri*, holotype, Mpio. Galeana, Nesom 7189 (TEX).



Figure 18. *Grindelia turneri*, Mpio. Galeana, north of San Pablo, *Hinton 27192* (GBH).



Figure 19. *Grindelia turneri*, Mpio. Galeana, north of San Pablo, *Hinton* 28344 (GBH).

GRINDELIA HINTONIORUM Nesom, *Phytologia* 68: 328. 1990. **TYPE: MEXICO. Nuevo León.** Mpio. Galeana: 5 km E of Pablillo, oak woods, 1940 m, 15 May 1984, *Hinton et al.* 18666 (holotype: TEX; isotypes: GBH, MEXU, NY, WIS).

Flowering Jul–Oct (–Nov). Llanos, meadows in pine woods areas, limestone; 2000–2500 m.

Grindelia hintoniorum is characterized by relatively short, unbranched or few-branched stems arising from a taproot, leaves with epunctate surfaces and teeth with acute, eglandular apices, and pappus awns 2–3, as long or slightly longer than the disc corollas. Stems and leaves of the type are densely stipitate-glandular but the glandularity is variable and less dense on other collections (e.g., stems and leaves are densely short-villous-pubescent and eglandular on *Pennell* 17006 and *Taylor* 24; on *Pennell* 17098, stems are sparsely villous and eglandular, leaves are glabrate). Mature achenes essentially smooth-surfaced. *Grindelia hintoniorum* is similar in duration and habit to *G. turneri* and both produce elongate pappus awns. The two species apparently are allopatric/parapatric.

Most of the collections of *Grindelia hintoniorum* have been from the vicinity of Pablillo. The collection from San José de las Joyas (just north of Cerro Potosí) is separated by about 25 miles from the Pablillo system but shares the diagnostic features — George Hinton (pers. comm, Oct 28 2019) notes that the San José de las Joyas llano has now been turned completely to agriculture and that grindelias no longer exist there.

Additional collections. **MEXICO. Nuevo León. Mpio. Galeana:** Campos de Encinal, abundante en praderas y lomas cerca de Encinal [1 mi E of Pablillo], 1934, *Herbario Inst. de Biología* 8833 (MEXU-2 sheets); San José de Las Joyas, vast colonies in llano, 2500 m, 23 Jul 1983, *Hinton et al. 18531* (GBH); Pablillo to El Carrizo, meadow in pine woods, 2036 m, 26 Aug 2000, *Hinton et al. 27661* (GBH, MEXU); E of Pablillo, llano at edge of cultivated field, 2018 m, 30 Oct 2009, *Hinton et al. 29061* (GBH); "Encinal," Pablillo, SE of Galeana, 26-30 Jun 1934, *Pennell 17006* (PH); "Cieneguillas," Pablillo, SE of Galeana, grassy woods, 2450-2550 m, 28-30 Jun 1934, *Pennell 17098* (PH); Hacienda Pablillo, 31 Jul 1936, *Taylor 24* (MEXU, PH).



Figure 20. *Grindelia hintoniorum*. Mpio. Galeana, San José de Las Joyas, *Hinton 18531* (GBH).



Figure 21. *Grindelia hintoniorum*, Mpio. Galeana, east of Pabllillo, *Hinton 29061* (GBH).



Figure 22. *Grindelia hintoniorum*, Mpio. Galeana, Pablillo to El Carrizo, Hinton 27661 (GBH).



Figure 23. *Grindelia hintoniorum*. Mpio. Galeana, Encinal, E of Pablillo, Herbario Inst. de Biología 8833 (MEXU).



Figure 24. *Grindelia hintoniorum* from the Pablillo area, 27 October 2019. Photo by George Hinton.



Figure 25. *Grindelia hintoniorum* from the Pablillo area, 27 October 2019. Photo by George Hinton.

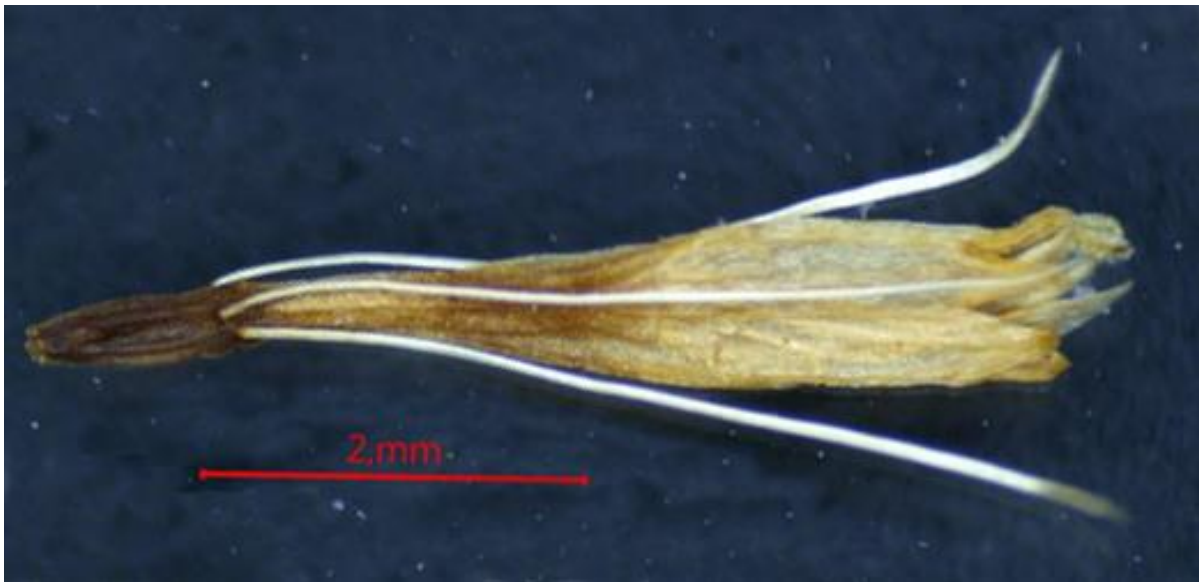


Figure 26. *Grindelia hintoniorum* from isotype: disc corolla, maturing achene, and pappus awns, *Hinton 18666* (GBH). Photo by George Hinton.

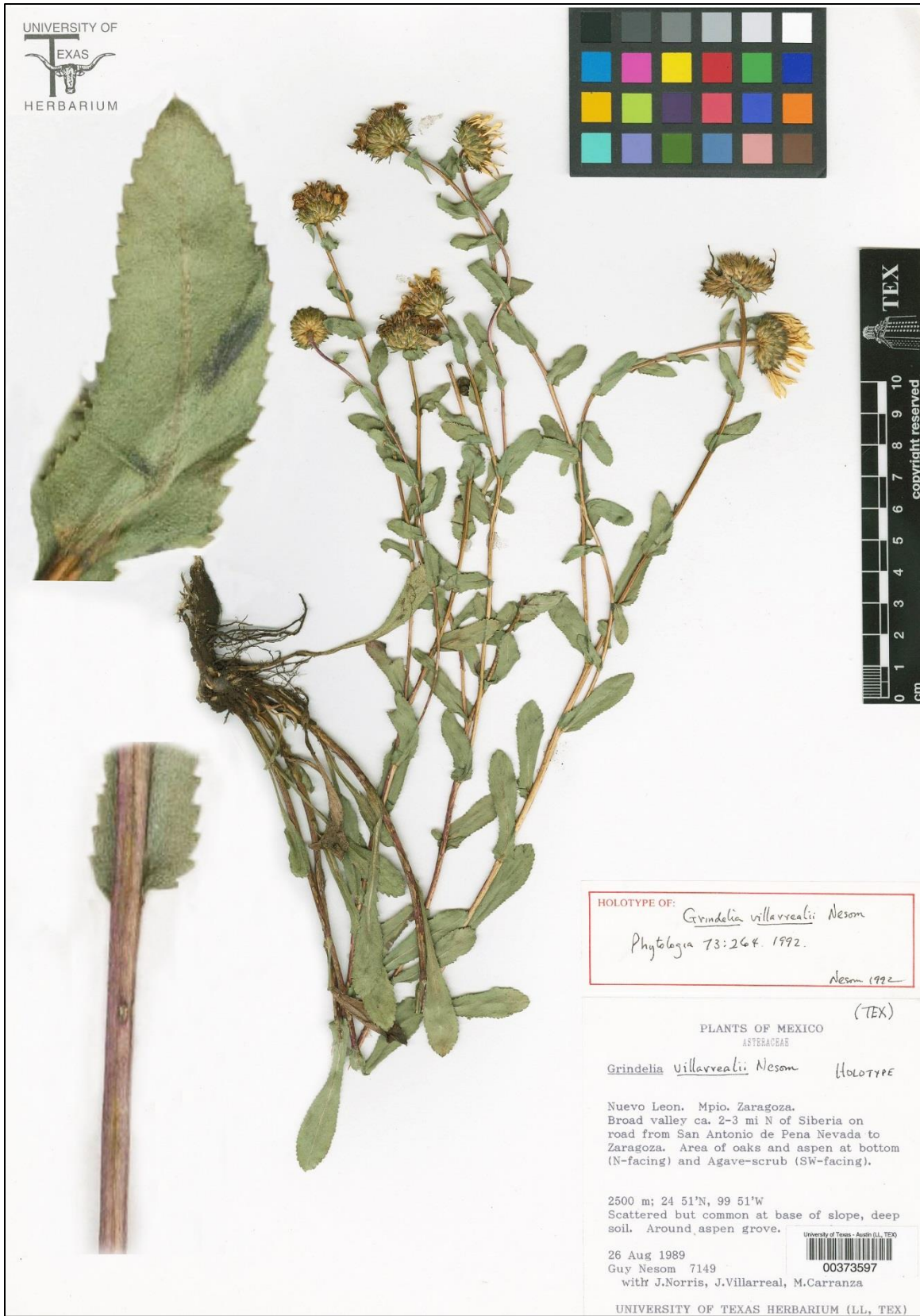


Figure 27. *Grindelia villarrealii*, holotype. Mpio. Gral. Zaragoza, Peña Nevada area. Details show acute leaf teeth and glabrous stem.



Figure 28. *Grindelia villarrealii*, Mpio. Gral. Zaragoza, Peña Nevada area. A. Nesom 4800 (MEXU). B. Nesom 7105 (MEXU). Collector's label observations for 7105 note that the plants were "taprooted with numerous, ascending stems from the base."



Figure 29. *Grindelia villarrealii*, from isotype (ANSM). Mpio. Gral. Zaragoza, Peña Nevada area.



Figure 30. *Grindelia villarrealii*, from isotype (ANSM). Mpio. Gral. Zaragoza, Peña Nevada area. Leaf teeth with acute, non-glandular apices.



Figure 31. *Grindelia villarrealii*, from isotype (ANSM). Taproot.

GRINDELIA VILLARREALII Nesom, *Phytologia* 73: 264. 1992. **TYPE: MEXICO. Nuevo León.** Mpio. Zaragoza: Ca. 2-3 mi N of Siberia on road to Zaragoza from San Antonio de Peña Nevada, broad valley, ca. 2500 m, area of oaks and aspen at the bottom (N-facing margin) and agave-scrub on the SW-facing slope, plants around the aspen grove, scattered but common at base of slope in deep soil, 26 Aug 1989, *G.L. Nesom 7149* (holotype: TEX; isotypes: ANSM, MEXU).

Flowering Jul–Sep. Margins of cultivated areas and disturbed sites, oak woods with juniper, *Nolina*, pine woods, fir woods; 2500–3050 m.

Grindelia villarrealii is characterized by perennial, taprooted, relatively tall plants (30–50 cm) with glabrous to glabrate stems. Leaves are gradually reduced distally, not forming foliaceous involucre bracts, with glabrous to minutely glandular-puberulent surfaces and acute-indurate, non-glandular teeth. Phyllary apices are triangular and loosely erect. Pappus awns are about as long as the disc corollas, with scabrous-ciliate margins.

The species is endemic to the Peña Nevada area of southeastern Nuevo Leon and immediately adjacent Tamaulipas. The only other *Grindelia* species in this area apparently is *G. obovatifolia* Blake, which is rhizomatous and with linear-filiform, recurving-recoiling phyllary apices (Figs. 12-14). *Grindelia vetimontis* occurs slightly to the north — it is rhizomatous, with villous stems and foliaceous involucre bracts.

Additional collections. **Nuevo León. Mpio. Gral. Zaragoza:** Ca. 37 km ENE of Dr. Arroyo, S-trending trail to summit of Cerro Peña Nevada beginning near road junction, zone of firs, 2700-2900 m, protected in brush, others in vicinity much smaller, 5 Aug 1983, *Nesom 4800* (MEXU, TEX); S side of Peña Nevada at "Puerto Pinos" and jct with road to Joya de San Diego, on road up from San Antonio de Peña Nevada, area of oak woods with scattered juniper, small area of cultivated fields, few plants inside fenced area, 2560 m, 23 Aug 1980, *Nesom 7105* (MEXU, TEX); 1.5 mi al NE Puerto Pinos, camino a Zaragoza, bosque esparcido de *Nolina* y plantas méxicas, cultivo de maíz, 2550 m, 24 Aug 1989, *Villarreal 4892* (MEXU). **Tamaulipas. Mpio. Miquihuana:** Along logging road E of Miquihuana on ridge SE of Cerro Peña Nevada, crest of ridge with *Pinus*, *Populus*, *Arctostaphylos*, *Quercus*, *Agave*, and *Ceanothus*, 3050 m, 1 Sep 1986, *Breedlove 63552* (MEXU, TEX); La Marcela, matorral rosetofilo, con *Polyaster* [*sic*], *Nolina*, *Mimosa*, 16 Jul 1990, *Mora-Olivo 02179* (MEXU).

ACKNOWLEDGEMENTS

I'm grateful to George Hinton for providing high resolution images of his full set of *Grindelia* collections and his comments on the manuscript, and to PH and BRIT for hospitality during recent study. Notes and records from earlier study at TEX were significant in preparing this manuscript.

LITERATURE CITED

- Bartoli, A. and R.D. Tortosa. 2012. Revision of the North American species of *Grindelia* (Asteraceae). *Ann. Missouri Bot. Gard.* 98: 447–513.
- McDonald, J.A. 1993. Phytogeography of the alpine-subalpine flora of northeastern Mexico. Pp. 681–703, in T.P. Ramamoorthy, R. Bye, A. Lot, and J. Fa (eds.). *Biological Diversity of Mexico: Origins and Distribution*. Oxford Univ. Press, New York.
- Nesom, G.L. 1990. Studies in the systematics of Mexican and Texan *Grindelia* (Asteraceae: Astereae). *Phytologia* 68: 303–332.
- Nesom, G.L. 1992. *Grindelia villarrealii* (Asteraceae: Astereae), a new species from northeastern Mexico. *Phytologia* 73: 264–266.
- Nesom, G.L. 2019. Taxonomic notes on Mexican *Grindelia* (Asteraceae). *Phytoneuron* 2019-33: 1–14.