

TAXONOMIC REVIEW OF THE *PSEUDOGNAPHALIUM PRINGLEI* GROUP (ASTERACEAE: GNAPHALIEAE)

GUY L. NESOM

Research Associate

Academy of Natural Sciences of Drexel University

Philadelphia, Pennsylvania 19103

guynesom@sbcglobal.net

ABSTRACT

Two new North American *Pseudognaphalium* species are described — ***Pseudognaphalium stereovirens*** Nesom, **sp. nov.**, endemic to a small region from east-central Sonora to northern Sinaloa, and ***Pseudognaphalium priscum*** Nesom, **sp. nov.**, Arizona and New Mexico south to western Chihuahua and Sonora. Both are similar to *Pseudognaphalium pringlei* (southwestern Texas to Coahuila, Chihuahua, east-central Sonora, and Durango). *Pseudognaphalium macounii* (widespread in the USA) has sometimes been confused with *P. priscum/pringlei* but has larger heads with more florets. *Pseudognaphalium brachypterum* (Tamaulipas, Nuevo León, Coahuila) is similar in appearance to *P. pringlei* but has larger heads with more florets and is allopatric with it. Distribution maps, specimen citations, and a key to these species are provided.

Based in part on observations and tentative (unpublished) manuscripts from several decades ago, a series of revisions to the taxonomy of *Pseudognaphalium* in Mexico and Central America (including the Caribbean) is begun here. In present accounting, species native to this region total 59 (including the two newly described here). Further studies are forthcoming in 2022, documenting at least 11 undescribed species from Mexico. A small group of species primarily of the southwestern USA and northern Mexico (maps in Figs. 1-4) is considered in the current study.

Pseudognaphalium pringlei (A. Gray) Anderb. has been recognized as occurring from Texas into Chihuahua, Durango, Sonora (Mexico), and Arizona and New Mexico (e.g., Nesom 2006). The type was collected in central Chihuahua. More detailed study indicates that the species in that concept comprises two, allopatric western and eastern entities, consistently distinguished primarily by the nature of leaf insertion — the western plants are treated here as a previously unrecognized species, *Pseudognaphalium priscum* Nesom, the eastern as *P. pringlei* sensu stricto.

Typical *Pseudognaphalium pringlei* is closely similar to *P. brachypterum* (DC.) Anderb. of northeastern Mexico, but the two are consistently distinct in head size and floret number and do not overlap in geography. *Pseudognaphalium priscum* is similar to *P. macounii* (Greene) Kartesz, which is widespread in the USA — these two are distinguished primarily by head size and floret number and also appear to be mostly in distribution, with a narrow zone of overlap in southeastern Arizona and adjacent New Mexico. These four species are similar in their primarily annual duration, stipitate-glandular vestiture, relatively small, tightly glomerate heads with whitish to tawny phyllaries, and especially in their papillate-roughened achene surfaces. The achenial papillae are not separate cells distinct from the epidermal layer, as in the American adventive, Eurasian native *Pseudognaphalium luteoalbum* (L.) Hilliard & Burt but instead are formed by uplifted ends of the elongate, overlapping epidermal cells, termed and illustrated by Anderberg (1991) as "imbricate papillae."

A rarely collected, previously unrecognized species, *Pseudognaphalium stereovirens* Nesom, from east-central Sonora to northern Sinaloa, is remarkable in its pedicellate heads in a loose panicle and outer phyllaries with a prominent green stereome. It is included here with the *P. pringlei* group because of its small, few-flowered heads, glandular stems, clasping leaves with green-glandular upper surfaces, imbricate-papillate achene surfaces, and geography, which suggest recent and shared evolutionary ancestry.

Pseudognaphalium semilanatum (DC.) Anderb. also is included in the discussion because of its resemblance to these species, especially *P. brachypterum*, but it may be more closely related to other species.

Differences between species of *Pseudognaphalium* often are subtle, and when species definitions and geographic ranges of Mexican taxa are better understood, geography will be centrally important toward enabling identifications.

Key to *Pseudognaphalium pringlei* and similar species

1. Pistillate florets 36–100(–100+), bisexual florets 4–15.
 2. Leaves decurrent; involucre 4–5 mm wide; phyllaries mostly in 4–5(–6) series; pistillate florets 47–101, bisexual florets 4–12; USA, Canada ***Pseudognaphalium macounii***
 2. Leaves not decurrent; involucre 3–4.5 mm wide; phyllaries mostly in 3–4(–5) series; pistillate florets 36–70(–100+); bisexual florets 7–15; Mexico ***Pseudognaphalium brachypterum***
1. Pistillate florets 16–40(–64), bisexual florets (1–)2–4(–6); Arizona, New Mexico, Texas, Mexico.
 3. Heads on pedicels 1–5 mm long, in a loose panicle, pedicels often with a minute, hyaline-tipped bract; leaves green on both surfaces ***Pseudognaphalium stereovirens***
 3. Heads sessile to subsessile in ebracteate glomerules; leaves bicolor, usually persistently white-tomentose abaxially.
 4. Stems densely and persistently white-tomentose from base to apex (up to the heads) ***Pseudognaphalium semilanatum***
 4. Stems green along the whole length or loosely white-tomentose distally.
 5. Leaves not decurrent or decurrent for 1–3 mm, abruptly rounded to slightly auriculate at the point of insertion, even if slightly decurrent; stems usually persistently loosely white-tomentose in the capitulescence; Texas, Mexico ***Pseudognaphalium pringlei***
 5. Leaves decurrent 3–10(–15 mm), from a gradually narrowing base, not at all rounded at the point of insertion or base of wings; stems usually green (or glabrescent and at least eventually green) along the whole length; Arizona, New Mexico, Mexico ***Pseudognaphalium priscum***

1. PSEUDOGNAPHALIUM PRINGLEI (A. Gray) Anderb., Opera Bot. 104: 147. 1991. *Gnaphalium pringlei* A. Gray, Proc. Amer. Acad. Arts 21: 387. 1886. **TYPE: MEXICO. Chihuahua.** Near Chihuahua, under cliffs, 25 Oct 1885, C.G. Pringle 305 (holotype: GH, Fig. 5; isotypes: AC, BR, CM, COLO, CORD, E, FI, GOET, JE, K, MEXU, MO, NY-2, P-3, PH-2, RSA, TEX, UC, US-2, VT; images seen of all duplicates).

Annuals or short-lived perennials, taprooted. **Stems** erect, 3–8 dm tall, green, stipitate-glandular, sometimes persistently white-tomentose in the capitulescence. **Leaves** basal and cauline, basal oblanceolate-spatulate to petiolate-spatulate, 5–10 cm long, blades 15–30 mm wide, prominently 3-nerved, often deciduous by flowering, cauline oblong to lanceolate or oblanceolate, 2.5–8 cm long, 3–10(–12) mm wide, relatively even-sized upwards, rounded to a clasping but not ampliate base, sometimes short-decurrent (1–3 mm), strongly to weakly bicolored, stipitate-glandular above but otherwise glabrous or glabrate, persistently thin-tomentose beneath. **Heads** sessile in glomerules, loosely corymboid. **Involucre** 3.5–4 mm high; phyllaries tawny, in 2–3 graduate series. **Pistillate florets** 15–40(–64). **Bisexual florets** 2–5. **Achenes** tawny-yellow, 0.6–0.8 mm long, imbricate-papillate, longitudinally ridged. Figures 5, 6.

Crevices and thin soil on cliffs, outcrops, talus, crevices, rocky slopes, stream sides, mostly in areas of oak and oak-pine; 1500–2500 m. Flowering August–October(–November).

Additional collections. USA. Texas. Brewster Co.: Big Bend Natl. Park, Lost Mine Peak, ca 7300 ft, 12 Sep 1961, *Correll & Johnston 24515* (TEX); Chisos Mts, Emory Peak, 14 Aug 1931, *Mueller s.n.* (GH, TEX); Chisos Mts, Big Bend Natl. Park, steep upper NE slopes of Casa Grande, 11 Sep 1982, *Powell 3962* (TEX); in Laguna of Chisos area, infrequent, 25 Aug 1937, *Warnock 1127* (BRIT, SRSC, TEX); Chisos Mts, on trail down from head of Pine Canyon in head of Green Gulch, 6500 ft, 1 Sep 1947, *Warnock 4056* (NY); Chisos Mts, on trail up Mt. Emory to the Laguna, 7000 ft, 2 Sep 1947, *Warnock 4064* (NY); Chisos Mts, N slope of Mt. Emory, infrequent perennial in igneous soil, N slope, 7500 ft, 10 Sep 1950, *Warnock 9704* (BRIT); Mt. Emory, talus slope in canyon, 10 Sep 1915, *Young s.n.* (MO, TEX). **Jeff Davis Co.:** Davis Mts: More mesophytic lower portion of wall of Limpia Cañon near Fort Davis, rich loam and lava rock, 2 Oct 1944, *Barkley 14T831* (TEX); base of very peak of Mt. Livermore, 20 Sep 1966, *Correll 33765* (GH, LL); upper slopes and summit of Sawtooth Mt., 11 Sep 1967, *Correll 34989* (GH, TEX); Fort Davis, 1500 m, 19 Sep 1920, *Eggleston 17400* (GH, NY); summit of Mt. Livermore, Baldy, 8382 ft, 4 Aug 1936, *Hinckley 619* (NY-2 sheets); Mt. Livermore, NE slopes, in and near Madera Canyon on the peak, 1 Sep 1984, *Powell 4931* (SRSC, TEX); above upper springs in Madera Canyon on Mt. Livermore, 7800 ft, igneous soil, 11 Sep 1947, *Warnock 7462* (SRSC); along Limpia Canyon stream, igneous soil 1 mi above Ft. Davis, 20 Oct 1947, *Warnock 7649* (SRSC, TEX); Madera State Park, igneous soil, 5500 ft, 14 Sep 1959, *Warnock 17384* (SRSC); crown of Mt. Livermore, 13 Sep 1918, *Young 265* (SRSC, TEX); Davis Mts, 13 Jul 1918, *Young 268* (SRSC, TEX). **Llano Co.:** Lower slopes of Enchanted Rock, granite crevices, 1 Oct 1976, *Butterwick & Lamb 3361* (TEX); Enchanted Rock, 24 Oct 1930, *Tharp s.n.* (GH, TEX); slopes of Enchanted Rock, cracks on W slopes, 2 Oct 1930, *Whitehouse 10985* (BRIT). **MEXICO. Chihuahua.** Southwestern Chihuahua, Aug–Nov 1885, *Palmer 443* (GH). **Mpio. Bocoyna:** Cusarare, along arroyo NW of church, trail just S of Arichicki, pine-oak with *Arctostaphylos*, *Vaccinium*, 27 Oct 1990, *Bye 18067* (MEXU). **Mpio. Chihuahua:** Parque Cumbres de Majalca, oak-pine, 2065 m, 26 Sep 1997, *Estrada 8724* (TEX); Parque Cumbres de Majalca, oak-pine, 2100 m, 4 Oct 1997, *Estrada 8877* (TEX); Mapula Mts, under shade of cliffs, 28 Oct 1886, *Pringle 936* (US); Portrero Mts [near Mapula Station], Potrero Peak, cool shaded slopes, 12 Oct 1886, *Pringle 980* (MEXU, NY). **Mpio. Guachochi:** S of Humira, on N overlook of Barranca del Cobre, KM 56-57 on Hwy 127 (SE of Creel), oak woodland with *Yucca*, *Agave*, area grazed by cattle and goats, ca. 1880 m, 24 Oct 1990, *Bye 17999* (MEXU); Simuchichi, ca. 13 km SE of Norogachi, pino y encino, 18 Oct 2006, *Bye 34815* (MEXU); Parque Nacional Barranca del Cobre, 6 km S of Samachique toward Batopilas, pine-oak woodland with scattered madrone, rocky area on ridge, 2300 m, 3 Nov 1992, *Soule 3425* (TEX). **Mpio. Guadalupe y Calvo:** NW side of Cerro Mohinora, ca 12.5 mi SW of Guadalupe y Calvo, past turnoff to peak, downslope on road toward Sinaloa, area of oak-pine with fir and scattered madronos, 2470 m, 21 Aug 1988, *Nesom 6483b* (TEX). **Mpio. Madera:** Ejido El Largo, proximidades al campo 1, pino-encino, 2100 m, 26 Aug 1990, *Benítez 1981* (MEXU); Ejido El Largo, Mesa del Yerbanís, bosque de encino con *Opuntia* y *Agave*, 1900 m, 12 Dec 1990, *Benítez 2800* (MEXU). Ejido El Largo, Cienega Ojo de la Víbora, bosque de pino-encino, 2300 m, 14 Oct 1990, *Benítez P. 2874* (MEXU); Laguna de Babícora, 18 Aug 1994, *Lebgue 3129* (NY); Laguna de Babícora, 4 km N of Ejido La Raíz, pine-oak, 2300 m, 10 Sep 1994, *Quintana & Estrada 3708* (TEX). **Mpio. Ocampo:** Memelichi, Río Mayo, 15 Sep 1936, *Gentry 2737* (MEXU); Parque Nacional Cascada de Basaseachi, Canon La Zorra, bottom of drainage, pine-oak forest, 6 Oct 2009, *Joe & Cortes 706* (TEX); Huajumar, pine-oak forest with rock cliff, SW of lumber mill, 7000 ft, 17 Sep 1972, *Martin s.n.* (ARIZ); Basaseachic Falls, pine-oak forest, above falls, 2000 m, 2 Oct 1983, *Martin & O'Rourke s.n.* (ARIZ); 3 km S of San Isidro Huajumar, Rio Mayo region, cut-over pine-oak-alder forest, 2100 m, 14 Oct 1985, *Martin et al. s.n.* (ARIZ); area of Cascada de Basaseachic at confluence of Rio Basaseachic and Rio Durazno, ca. 2 mi S of village of Basaseachic, open areas among pines, 2100 m, 17-20 Oct 1986, *Nesom 5555* (TEX); area of Cascada de Basaseachic, near riverbank, 1950 m, 17-20 Oct 1986, *Nesom 5615* (TEX); below Cascada de Basaseachic, pine-oak with maple, rocky area, 1 Nov 1992, *Soule 3388* (TEX); Parque Nacional 'Cascada de Basaseachic,' on road between the Basaseachic-San Juanito Road and the Divisadero on the S side of the park, W of

Rancho San Lorenzo, soil pockets on exposed bedrock, open area, pine-oak, 2000 m, 25 Sep 1994, *Spellenberg et al. 12234* (MEXU, TEX). **Mpio. Urique:** Tejeban, N side of Barranca del Cobre, pine-oak forest, 2200 m, 22 Oct 1973, *Bye 5502* (MEXU); Sierra Tarahumara, Cuiteco, 1732 m, Nov 2001, *Guerrero 524* (MEXU). **Durango.** City of Durango and vicinity, Apr–Nov 1896, *Palmer 846* (US); Mesa de Sandia, 12 Oct 1905, *Pringle 13648* (ARIZ, GH, LL, NMC, SMU, US). **Sonora.** Mpio. Yecora: 1.1 km N of El Llano on Mesa del Campanero, pine-oak, disturbed roadside, 2150 m, 18 Sep 1999, *Reina 99-738* (TEX);

Plants with both leaf surfaces green occur in southeastern Chihuahua — Mpio. Guachochic (*Bye 17999*), Mpio. Bocoyna (*Bye 18067*). They are similar in this respect to *P. stereovirens*.

2. *Pseudognaphalium priscum* Nesom, sp. nov. TYPE: USA. Arizona. Santa Cruz Co.: Santa Rita Mtns, Madera Canyon near Amphitheater Trail, Coronado Natl Forest, pinyon-oak-juniper woodland, 5110 ft, 13 Sep 2017, *S. Carnahan 2708* (holotype: ARIZ, Fig. 7).

Similar to *Pseudognaphalium pringlei* in its small, few-flowered heads, basal leaves much larger than the cauline, leaves bicolored (green-glandular above, white-tomentose beneath), and mostly green-glandular stems; distinct in its mostly oblong to oblanceolate leaves with attenuate, decurrent base (vs. basally rounded-ampliate and clasping, non-decurrent).

Annuals or short-lived perennials, taproot thin to thick. **Stems** erect, 3–8 dm tall, lightly white-tomentose above, green near the base (without the tomentum or glabrescent), minutely stipitate- or sessile-glandular beneath the other vestiture. **Leaves** basal and cauline, basal obovate-spatulate, 5–10 cm long, prominently 3-nerved, commonly deciduous by flowering, cauline mostly smaller and oblong to oblanceolate, apically acute, widest near the middle, 2–6 cm long, 4–14 mm wide, slightly reduced upwards, gradually narrowed to the base, decurrent 3–20 mm, bicolored, green above, minutely stipitate- or sessile-glandular above but otherwise glabrous or glabrate, with persistent, enlarged bases of deciduous trichomes, persistently thinly white-tomentose beneath. **Heads** sessile in glomerules, loosely corymboid. **Involucres** 3.5–4 mm high, 3–3.5 mm wide; phyllaries silvery-white, translucent, in 2–3 graduate series, the inner oblong to oblong-ovate, apically rounded to obtuse or acute, sometimes minutely apiculate, the outer ovate, half as long as the inner. **Pistillate florets** 21–39. **Bisexual florets** (1–)2–6. **Achenes** oblong, tawny-yellow to whitish, 0.6–0.8 mm long, imbricate-papillate, longitudinally ridged; pappus of separate, fragile, basally caducous, barbellate bristles. Figures 7–14.

Rock outcrops and slopes in oak and oak-pine woodlands; 1500–2300 m. Flowering September–November.

The epithet of *Pseudognaphalium priscum* (Latin, *priscum* – former, previous, venerable) alludes to the former recognition of this taxon within a more broadly defined *P. pringlei* and to place it alphabetically close to *P. pringlei* (in the “pr’s”). In early stages of this study, I annotated specimens using the names in reverse (i.e., “pringlei” for the western entity, “priscum” for the eastern).

Additional collections. USA. Arizona. Cochise Co.: Dragoon Mts, Stronghold Canyon, E along USFS trail 279, 5000–5200 ft, 7 Sep 1983, *Daniel 3047* (ASU); Winchester Mts, Reily Canyon, oak woods along creek with *Acer grandidentatum* and *Quercus hypoleucoides*, 5250 ft, 5 Sep 1992, *Fishbein 524* (ARIZ); Huachuca Mts, Garden Canyon, Huachuca Game Preserve, roadside in timber, 21 Sep 1949, *Goodding 566-49* (ARIZ); Huachuca Mts, Ramsey Canyon, 28 Sep 1929, *Jones 25051* (MO); Huachuca Mts, Miller Canyon Road, 3 mi from Arizona Hwy 92, 10 Nov 1976, *Lehto L20417* (ASU); Chiricahua Mts, Chiricahua Wilderness Area, Rucker Canyon, 7450 ft, 17 Sep 1976, *Leithliter 726* (ASU); Huachuca Mts, Bear Canyon, Coronado Natl Forest, dense *Juniperus deppeana*–*Quercus emoryi* woodland, 5900 ft, 29 Sep 1991, *McLaughlin 6568* (ARIZ); Huachuca

Mts, Upper Ramsey Canyon, ca. 1/2 mi below Hamburg Mine, common in canyon bottom near stream, under mixed conifer-hardwoods, ca. 6650 ft, 11 Nov 1979, *Yatskievych 79-820* (ARIZ). Pima Co.: Saguaro National Park, Rincon Mts, Upper Posta Quemada Canyon, 0.9 mi SW of Rincon Peak and 0.2 mi N of park boundary, shaded rocky creek bank in pine oak forest, 7160 ft, 1 Oct 2020, *Beckman 119* (SEINet, General Research Observation); Santa Catalina Mts, Finger Rock Canyon Trail, deeply shaded area at bottom of N-facing cliff, 6040 feet, 21 Oct 1990, *Bertelsen 90-258* (ARIZ); Baboquivari Mts, base of steep cliff near lower ladder on trail to top of Mt. Baboquivari, 6500 ft, 7 Oct 1944, *Gould, Darrow, & Haskell 2737* (ARIZ, LL); N slope of Santa Rita Mts, 13-21 Sep 1904, *Griffiths 7268* (MO); Baboquivari Mts, South Canyon, 3600-4000 ft, 31 Aug 1940, *Kearney & Peebles 14955* (ARIZ); Baboquivari Mts, Sabino Canyon, Baboquivari Peak, with *Pinus discolor*, *Vauquelinia*, *Quercus*, 7600 ft, among granitic boulders in canyon, 21 Sep 1982, *Mittleman 489* (ASU, DES); Santa Catalina Mts, Bear Canyon, 5500 ft, 12 Oct 1962, *Niering & Whittaker s.n.* (ARIZ); Santa Catalina Mts, Box Springs, 10 Aug 1908, *Thorner & Livingstons s.n.* (ARIZ); Santa Catalina Mts, Bear Canyon, 18-22 Sep 1913, *Thorner 7659* (ARIZ). Santa Cruz Co.: Santa Rita Mts, pinyon-oak-juniper woodland, Madera Canyon near Amphitheater Trail, 5110 ft, 13 Sep 2017, *Carnahan 2708* (ARIZ); Santa Rita Mts, Gardner Canyon Trail vicinity, E side of Mt. Wrightson, pine-oak woodland, 6915 ft, 17 Sep 2017, *Carnahan 2734* (ARIZ); Santa Rita Mts, E side of Mt. Wrightson, pine-oak woodland, 8266 ft, 17 Sep 2017, *Carnahan 2741* (ARIZ); Sycamore Canyon, near Ruby, infrequent in open grassy canyon bottom, 4000 ft, 30 Sep 1944, *Darrow & Haskell 2056* (ARIZ); Santa Rita Mts, along Chinaman Trail, descending into Casa Blanca Canyon and Casa Blanca Creek, pine-oak woodland, 1715 m, 8 Sep 2000, *Hodgson 12697* (DES); Patagonia Mts, 15 Sep 1934, *Kearney & Peebles 10095* (ARIZ); Whitehouse Canyon, oak-sycamore, 5500 ft, 8 Oct 1952, *Shellhorn 164* (BRY); Santa Rita Mts, along trail from Madera Canyon to Josephine Saddle, pine-oak woodland, 6300 ft, 3 Sep 1981, *Toolin 1716* (ARIZ); Santa Rita Mts, Gardner Canyon, 1/2 mi above Tunnel Springs, cliff face, ca. 5500 ft, 11 Nov 1978, *Van Devender & Kirby s.n.* (ARIZ); Santa Rita Mts, upper Gardner Canyon Trail, rocky slopes in pine forest, 7350 ft, 10 Sep 2017, *Verrier 1217* (ARIZ); Santa Rita Mts, Baldy Saddle Trail, E of Baldy Spring, N-facing slope in pine forest, 17 Sep 2017, *Verrier 1281* (ARIZ). New Mexico. Catron Co.: Saddle Mtn region, S-facing slope of Brushy Mtn, below the cliff dwelling, pine-juniper-oak, 2300 m, 6 Aug 2001, *Johnson 563* (NMCR). Cibola Co.: El Morro Natl. Monument, near inside wall of Box Canyon, under *Pinus ponderosa*, 7200 ft, 9 Sep 1979, *McCallum 609* (UNM); El Morro Natl. Monument, Box Canyon, pine-juniper, 7250 ft, 3 Sep 2006, *Rink 5275* (ASC, SJNM). Grant Co.: Gila Forest, Big Burros Ranger Station [14 air mi SW of Silver City], pasture, 6300 ft, 19 Oct 1915, *Chapline 498* (NMC); top of Trout Creek Canyon drainage (E Fork), grassy opening, 7390 ft, 26 Sep 2004, *Hunter 350* (SNM); Cherry Creek Canyon near Hwy 15, edge of meadow near Cherry Creek, under *Pinus ponderosa*, 7200 ft, 18 Sep 1991, *Zimmerman 3406* (SNM); Pinos Altos Range, NE foothills near Sapillo Creek, 6074 ft, pine-oak-juniper, 19 Sep 2004, *Zimmerman 5158* (SNM). Hidalgo Co.: Animas Peak foothills, Gray Ranch, 15 Sep 1990, *Ivey s.n.* (UNM); Animas Mts, ridge along Indian Creek Canyon, Animas Peak, 27 Oct 1960, *Martin 4630* (UNM); N end of Animas Mountains, vicinity of Upper Creek Canyon, canyon bottom, 7000 ft, 4 Oct 1975, *Wagner 1729* (UNM). **MEXICO. Chihuahua. Mpio. Casas Grandes:** Near Colonia Garcia in the Sierra Madres, 7500 ft, 16 Sep 1899, *Townsend & Barber 334* (US). [Mpio. Janos]: N end of San Luis Mts, W slope, extreme NW corner of Chihuahua, ca. 2 mi S of US border, in canyon at end of ranch road, shade at cliff base, scrub oak, 9 Oct 1982, *Spellenberg & Soreng 6821* (NMC). Mpio. Madera: Proximidades al campo 1, ejido El Largo, bosque de pino-encino, 2100 m, 26 Aug 1990, *Benítez 1981* (MEXU); Nabogame, field, 13 Oct 1988, *Laferrière 2048* (TEX); Nabogame, "aquatic," 1800 m, 18 Oct 1988, *Laferrière 2121* (TEX); Nabogame, oak woodland, 20 Oct 1988, *Laferrière 2151* (TEX). Mpio. Ocampo: Basaseachic Falls, steep canyon, 15 Jul 1997, *Atwood & Spencer 23008* (BRY). **Sonora. Mpio. de Alamos:** Saguariño, Rio Mayo, transition, tolerant pine slopes, humus on boulder tops or hillside forest floor, 3 Nov 1935, *Gentry 2140* (GH, TEX); Sierra de Alamos, ca. 5.5 km SW of Alamos along the trail from La Huerta to Pico de Aguila, N-facing slope, pine-oak, 24 Nov 1997, *Steinmann 1330*

(MEXU). Mpio. Nacozari de Garcia: 28.3 air km WNW of Bavispe, 2 km SE of Rancho el Tigre, ENE of Mina el Tigre, Sierra el Tigre, steep NE-facing slope in pine-oak woodland, 7483 ft, 11 Aug 2015, *Carnahan 1347* (ARIZ); N slope of Cerro del Tigre, 32.1 air mi ENE of Nacozari de García, NW-descending canyon tributary to Arroyo la Bota/Canyon las Carabinas, Rancho El Tigre, disturbed berm of dirt road in mountainous Arizona pine-dominated Madrean evergreen woodland, 6610 ft, 12 Aug 2015, *Hale 5250* (ARIZ). Mpio. Cananea: Sierra de los Ajos, Hoya del Packard, N-facing slope with pine forest (*Pinus ponderosa*), 2250 m, 10 Oct 1992, *Felger 92-910* (ARIZ, MEXU); Sierra la Mariquita, 9.4 air km NNW of Cananea, vicinity of Observatorio Astrofísico "Guillermo Haro," pine-oak, 2422 m, 19 Sep 2010, *Reina 2010-848* (USON). Mpio. Yecora: 12.4 km E of Yecora on Mex. 16, pine-oak forest on steep cliff base, 1600 m, 13 Sep 1999, *Reina G. 99-545* (TEX); 4 km W de Talayote, camino a Yécora, 35 km E de Yécora, límites de Sonora y Chihuahua, bosque de pino-encino, 27 Sep 1983, *Torres C. 3822* (MEXU); Cañada La Ventana (Arroyo El Otro Lado), 2.5 km (by air) ESE of Yecora, rocky stream canyon in pine-oak forest, 1520 m, 18 Sep 1998, *Van Devender 98-1341* (TEX).

3. PSEUDOGNAPHALIUM MACOUNII (Greene) Kartesz, Synth. N. Amer. Fl. nomencl. innov. 30. 1999. *Gnaphalium macounii* Greene, Ottawa Nat. 15: 278. 1902. **TYPE: CANADA. British Columbia.** Chilliwack Valley, between 49°–49° 10' and between 121° 25'–122°, 2500 ft, 29 Jul 1901, *J.M. Macoun 26847* (holotype: NDG 59133, Figs. 15, 16).

Gnaphalium decurrens Ives, Amer. J. Sci. (New York) 1(4): 381 (fig., p. 380). 1819 (not *Gnaphalium decurrens* L. 1759). **TYPE: USA. New York.** [Oswego Co.]: Protologue: "Near New Haven ... by the margin of a brook, a few rods north of Mr. E. Whitney's gun manufactory," Jul 1817, *E. Ives s.n.* (not located).

Gnaphalium decurrens var. *glandulosum* Osterh., Muhlenbergia 8: 45. 1912. **TYPE: USA. Colorado.** Larimer Co.: Estes Park, Aug 1895, *G.E. Osterhout 547* (holotype: RM image). The RM sheet was accessioned from the Osterhout herbarium in 1938 and has a 'TYPE' label. The leaves are green on both surfaces and the main axis is white-tomentose near the inflorescence.

Annuals or biennials, taprooted, often sweetly fragrant. **Stems** 40–90 cm tall, stipitate-glandular throughout, usually also persistently and white-tomentose at least distally. **Leaves** mostly oblanceolate but varying to lanceolate, 3–10 cm long, 3–13 mm wide (distal linear), relatively even-sized from the proximal to distal, distal or sometimes all clasping and auriculate, not decurrent or only 1–2 mm, proximal clasping but not basally broadened, decurrent 5–10 mm, margins flat to slightly revolute, faces weakly bicolor, abaxial tomentose, adaxial stipitate-glandular, otherwise glabrescent or glabrous. **Heads** sessile in glomerules, corymbiform arrays. **Involucre** 4.5–5.5 mm high; phyllaries in 4–5 series, stramineous to creamy (hyaline, shiny), glabrous, ovate to ovate-oblong, inner sharply acute apically. **Pistillate florets** 47–101(–156). **Bisexual florets** 5–12[–21]. **Achenes** imbricate-papillate, not longitudinally ridged. Figures 15-18.

Dry, open habitats, pastures, open woods or edges, roadsides; 50–2600(–3000) m. Flowering July–October.

Pseudognaphalium macounii is distributed across northeastern states of the USA and across Canada, then into the western and southwestern USA states, oddly seeming to skip the Midwest (including Texas) and the Southeast. It perhaps is adventive on one or the other side of the continent; its closest relatives are on the western side. **Canada** (Alta., B.C., Man., N.B., N.S., Ont., P.E.I., Que., Sask.); **USA** (Ariz., Calif., Colo., Conn., Idaho, Ill., Ind., Maine, Mass., Mich., Minn., Mont., N.H., N.Mex., N.Y., Ohio, Oreg., Pa., S.Dak., Tenn., Utah, Vt., Va., Wash., W.Va., Wis., Wyo.).

Pseudognaphalium macounii is recognized by its stipitate-glandular, proximally glabrescent stems, bicolor and decurrent proximal leaves, relatively large and many-flowered heads, and shiny,

hyaline phyllaries. It differs from *P. priscum* primarily by head size and floret number. Basal and proximal cauline leaves of *P. macounii* are little different in size from those more distal, contrasting with *P. priscum* (and *P. pringlei*), where the basal leaves are much larger than those distal.

4. PSEUDOGNAPHALIUM BRACHYPTERUM (DC.) Anderb., Opera Bot. 104: 147. 1991. *Gnaphalium brachypterum* DC., Prodr. 6: 226. 1838. **TYPE: MEXICO. Tamaulipas.** Cerca Victoria, pie la cuesta, Nov 1830, *J.L. Berlandier* "2189 = 769" (holotype: GDC-image; isotypes: GH-image, P-image, PH-Fig. 22).

Gnaphalium semiamplexicaule DC., Prodr. 6: 228. 1838. *Pseudognaphalium semiamplexicaule* (DC.) Anderb., Opera Bot. 104: 148. 1991. **LECTOTYPE** (designated here): **MEXICO. Tamaulipas.** De Victoria a Tula, Nov 1830, *J.L. Berlandier* 2188 (GDC-469541; isolectotypes: G, GDC-469542, GH, K, P-704575, PH!). See text comment following *P. semilanatum*.

Annuals or short-lived perennials. **Stems** 0.4–0.6 m tall, persistently white-sericeous-tomentose in the capitulescence, with thick, viscid hairs beneath and visible through the tomentum, usually green-glabrescent (tomentum) proximally but occasionally persistently tomentose. **Leaves** slightly auriculate-clasping, not decurrent, strongly bicolor, abaxial surfaces densely tawny-tomentose with the epidermis obscured, adaxial surfaces glabrate (tomentum), persistently stipitate-glandular. **Heads** sessile in glomerules. **Invlucre**s 4.5-5 mm high; phyllaries white, middle with a distally glandular stereome. **Pistillate florets** 36–70(–100+). **Bisexual florets** 7–15. **Achenes** weakly imbricate-papillate, longitudinally 4–6-ridged. Figures 22, 23.

Pine, pine-oak, oak woodland, brushy chaparral, rocky soil, grassy openings; (1050–)1200–2200(–2450) m. Flowering (June–)July–November(–December).

Additional collections. Coahuila. Mpio. Villa Acuña. Serranias del Burro, Rancho El Bonito, head of canyon El Bonito, plateau of open pine-oak woodland, 2300 m, 20 Sep 1977, *Riskind* 2264 (TEX). Mpio. Arteaga: summit of Microwave Mariposa, 20 mi E of Ford Clock in Saltillo, Hwy 40, 10 Nov 1976, *Smith et al.* 776 (LL). Mpio. Cuatro Ciénegas: Sierra de la Madera, vicinity of La Cueva in Corte Blanca fork of Charretera Canyon, 11-15 Sep 1941, *Johnston* 8895A (GH). Mpio. General Cepeda: General Cepeda, ledges, 5500 ft, 8 Oct 1905, *Pringle* 13557 (LL). Mpio. Monclova: N side of Sierra de la Gavia, Canyon La Gavia, rocky outcroppings, scrub of oak, *Rhus*, *Ceanothus*, 5900 ft, 3 Aug 1973, *Henrickson* 11815 (LL); Cañon de la Gavia, S of Rancho de la Gavia, chaparral, oak, *Dasyllirion*, *Agave*, *Cercocarpus*, 2-3 Aug 1973, *Johnston et al.* 12024 (LL) and 12038 (LL); Gloria Mts, 31 Jul 1939, *Marsh* 1853 (TEX). Mpio. Muzquiz: Sierra de la Babia, Cañon Rincon de Maria, oak-pine-maple-arbutus, 1450 m, 21 Aug 1999, *Carranza C-3072* (TEX-2 sheets); ca. 54 air mi NW of Muzquiz, Rincon de Maria of the Sierra de la Encantada (Sierra de Santa Rosa), N-facing woodland of oak, fir, pine, *Arbutus*, *Yucca*, *Dasyllirion*, 1960 m, 17 Sep 1999, *Henrickson* 22515 (TEX); La Mariposa Ranch, 5 Dec 1936, *Marsh* 1022 (GH, SMU); Sierra la Babia, Rincon de Maria, matorral de *Quercus-Juniperus*, *Yucca*, 1040 m, 16 Sep 1999, *Villarreal* 8840 (TEX). Mpio. Ocampo: W slope of Sierra del Jardin, E of Rancho El Caballo, steep slopes of igneous rock, oak, *Nolina*, *Dasyllirion*, 16 Sep 1972, *Chiang et al.* 9294 (MEXU). Mpio. Saltillo: Carneros Pass, 7 Sep 1889, *Pringle* 2858 (GH). **Nuevo León** (representative). Mpio. Aramberri: N of Aramberri, pine woods, 30 Nov 1989, *Hinton* 20027 (TEX). Mpio. Galeana: Above La Becerra, 2230 m, clearing in pine forest, 29 Oct 1981, *Hinton* 19917 (MEXU, TEX); Galeana toward Rayones + 6 Km, bushy ravine, 12 Nov 1989, *Hinton* 19930 (TEX); Rancho Aguililla, edge of cultivated field, 31 Jul 1990, *Hinton* 20749 (TEX); Hacienda Pablillo 3 Aug 1936, *Taylor* 50 (TEX); ca. 1 mi WSW of San Pablo in small valley, 15 mi E of San Rafael off Hwy 57, pine forest with pine-yucca on higher and drier slopes, 23 Jul 1977, *Wells & Nesom* 74 (LL). Mpio. Mina: 36 mi SE of Saltillo on Hwy 57, gypsum soil among shrubs, 10 Aug 1977, *Turner s.n.* (LL). Mpio. Montemorelos: 15 mi up Cola de Caballo road, S of Monterrey, *Quercus-Pinus* forest, *Symphoricarpos* understory 27 Aug 1984, *Lavin et al.*

4891 (TEX); Chipinque Mt., pine-oak forest 24 Jul 1971, *Parker 566* (TEX). Mpio. Santiago: Los Lirios toward El Cercado, oak woods, 29 Jul 1995, *Hinton 25473* (TEX). Mpio. Villaldama: Summit of Sierra Gomas, pine-oak woodland on limestone, 15 Aug 1988, *Patterson 6761* (TEX). **Tamaulipas.** Mpio. Hidalgo: Road from Sta. Engracia toward Dulces Nombres (N.L.), 1.6 road mi W of Paraje de Los Caballos, 10.1 mi E of Dulces Nombres, 3.9 road mi from crossing of deep canyon of Arroyo Ramirez Luna, pine-oak, 1820 m, 22 Sep 1994, *Nesom 7484* (TEX). Mpio. Palmillas: 14 km S de Palmillas, pine-oak with *Rhus*, *Juniper*, 28 Sep 1984, *McDonald 997* (TEX). Mpio. San Carlos: Sierra de San Carlos, N side of Bufa El Diente, mixed oak-deciduous woods, along roadside, 17 Jun 1987, *Nesom 6170* (TEX).

0. PSEUDOGNAPHALIUM SEMILANATUM (DC.) Anderb., *Opera Bot.* 104: 148. 1991. *Gnaphalium oxyphyllum* β [var.] *semilanatum* DC., *Prodr.* 6: 225. 1837[1838]. *Gnaphalium semilanatum* (DC.) McVaugh, *Contr. Univ. Mich. Herb.* 9: 465. 1972. **TYPE: MEXICO. Guanajuato.** Near Villalpando, [1829-1830], *Méndez s.n.* (holotype: G-DC, Figs. 19, 20, 21).

Annual to biennial or short-lived perennial, taprooted. **Stems** erect, 3–10(–20) dm high, closely and usually evenly white-tomentose but sometimes glabrescent, eglandular. **Leaves** basal and cauline, basal usually deciduous by flowering, cauline lanceolate-oblong to oblanceolate, 5–10 cm long, 8–16 mm wide, relatively even-sized upwards, with rounded basal lobes, clasping but not basally ampliate, rarely short-decurrent (1–3 mm), strongly bicolored, bright green and stipitate-glandular adaxially but otherwise glabrous or glabrate, persistently closely white-tomentose abaxially. **Heads** sessile in glomerules, loosely corymboid or of corymboid clusters and elongate-paniculate. **Involucres** 3.5–4(–4.5) mm high; phyllaries slightly hyaline, white-shiny, in 2–3 graduate series. **Pistillate florets** 19–36. **Bisexual florets** 2–5(–6). **Achene** epidermis smooth (not papillate), not longitudinally ridged.

Grasslands, thickets, oak, pine-oak, and pine woodlands, lava beds; 1700–2700(–2900) m. Flowering August–December(–March).

Pseudognaphalium semilanatum is included in this account because of its similarity to species of the *P. pringlei* group (small, heads, leaves clasping, bicolored, with glandular adaxial surface), especially *P. brachypterum*, but its non-papillate achenes (epidermis smooth) and geographical distinction suggest that it may not be not closely related. Leaves of *P. semilanatum* from Edo. Mexico (e.g. *Pringle 9178*) occasionally are slightly decurrent; upper leaf surfaces are bright pastel-green in the western part of the range. Further study of the species as identified here is necessary.

Some collections from central Nuevo Leon have relatively large heads and stems that are persistently white-lanate, with the aspect of *Pseudognaphalium semilanatum* — these appear to be an undescribed species. The type of *Gnaphalium semiamplexicaule*, placed here as a synonym of *P. brachypterum*, may prove to be the same entity.

0. Pseudognaphalium stereovirens Nesom, **sp. nov.** **TYPE: MEXICO. Sonora.** Mpio. Yecora: 24.7 km W of Maycoba on Mexico Hwy 16, tributary of Arroyo Los Pilares near bridge, 28° 23' 40" N, 108° 47' 35" W, oak woodland with scattered pines shady, narrow, steep stream canyon, 1300 m, very common herb in shady forest, 26 Sep 1998, *A.L. Reina G. 98-1885* (holotype: TEX, Figs. 24, 25).

Similar to *Pseudognaphalium pringlei* in its small, few-flowered heads, stipitate-glandular stems, leaves with a rounded-clasping, non-decurrent base and green-glandular upper surfaces, and achenes with imbricate-papillate surface. Different from both *P. pringlei* and *P. priscum* in its green-glabrate (vs white-tomentose) abaxial leaf surfaces, pedicellate heads in a loose capitulescence (vs. heads sessile to subsessile in glomerate clusters), and inner phyllaries with a prominent green stereome.

Annuals, slender-taprooted. **Stems** 5–10 dm tall, stipitate-glandular, lightly arachnoid-tomentose but green (glabrescent or without prominent tomentum). **Leaves** mostly cauline, triangular-lanceolate, narrowly acute at the apex, the largest at midstem 3.5–5 cm long, 8–14 mm wide, wide-spreading to ascending, becoming slightly smaller upwards, base rounded-clasping but not strongly auriculate, not decurrent, upper and lower surfaces green (without tomentum) and minutely stipitate-glandular. **Heads** in loose, open-paniculiform and somewhat elongate clusters at the ends of lateral branches from the upper portion of the main stem, pedicels 1–5 mm long, often with a minute, hyaline-tipped bract. **Involucres** 3–4 mm high, 2.5–3 mm wide; phyllaries silvery-white, translucent, in 2–3 graduate series, the inner oblong-ovate, apiculate, the outer ovate, half as long as the inner, medial portion (stereome) of the inner narrowly oblong-lanceolate to narrowly elliptic-oblong-lanceolate, green and glandular and conspicuously coloring the head. **Pistillate florets** 30–41. **Bisexual florets** 4–6. **Achenes** oblong, brown to tawny-yellow, 0.6–0.7 mm long, imbricate-papillate, weakly longitudinally ridged; pappus of 10–12 separate, fragile, basally caducous, barbellate bristles.

Additional collections examined. **MEXICO. Sonora. Mpio. Yecora:** Maycoba, 28° 23' 30" N, 108° 39' 07" W, oak-juniper woodland on hillside, 1550 m, 21 Nov 1997, *Van Devender 97-1560* (TEX). **Sinaloa.** Valley of Rio del Fuerte, 17 Oct 1898, *Goldman 266* (GH).

The geographic range of *Pseudognaphalium stereovirens* is limited compared to its putatively close relatives. The type collection was noted to have been a “very common herb in [a] shady forest; the other Sonoran collection was made in “disturbed sandy soils.”

Goldman's collections on October 14–18, 1898, were made in the area of the Sierra de Choix — images of his numbers 245, 253, 255, 258, 264, 267, and 269 (made on these days) are shown via SERNEC. Three duplicates of his collection 258 from 15 October are shown, each with a label apparently handwritten by Goldman, each with a different locality description, but all apparently referring to the same place: “Sierra de Choix” (GH), “Valley of Rio del Fuerte” (GH), and “50 mi NE of Choix” (NY). 50 miles NE of Choix is far inside Chihuahua and apparently a mis-estimate of distance if indeed Goldman was in the Sierra de Choix. The map point (Fig. 4) is placed here inside Sinaloa at the Chihuahua border, along the river about 12 air miles N of Choix.

Apparently among all American species, *Pseudognaphalium stereovirens* is unique in its pedicellate heads in a loosely paniculate capitulescence. The epithet alludes to another diagnostic feature, the prominent green stereome of the inner phyllaries. The vegetative morphology, diminutive heads, imbricate-papillate achene surfaces, and geography suggest that the species is derived from the ancestral matrix of the *P. pringlei* group.

ACKNOWLEDGEMENTS

Loans from ARIZ, ASU, GH, and NMC made to TEX and from SRSC made to BRIT. Studies were made in the TEX-LL and BRIT-SMU herbaria.

LITERATURE CITED

- Anderberg, A.A. 1991. Taxonomy and phylogeny of the tribe Gnaphalieae (Asteraceae). *Opera Bot.* 104: 1–195.
- Nesom, G.L. 2006. *Pseudognaphalium*. Pp. 415–425, *in* *Flora of North America North of Mexico*. Vol. 19. Oxford Univ. Press, New York and Oxford.

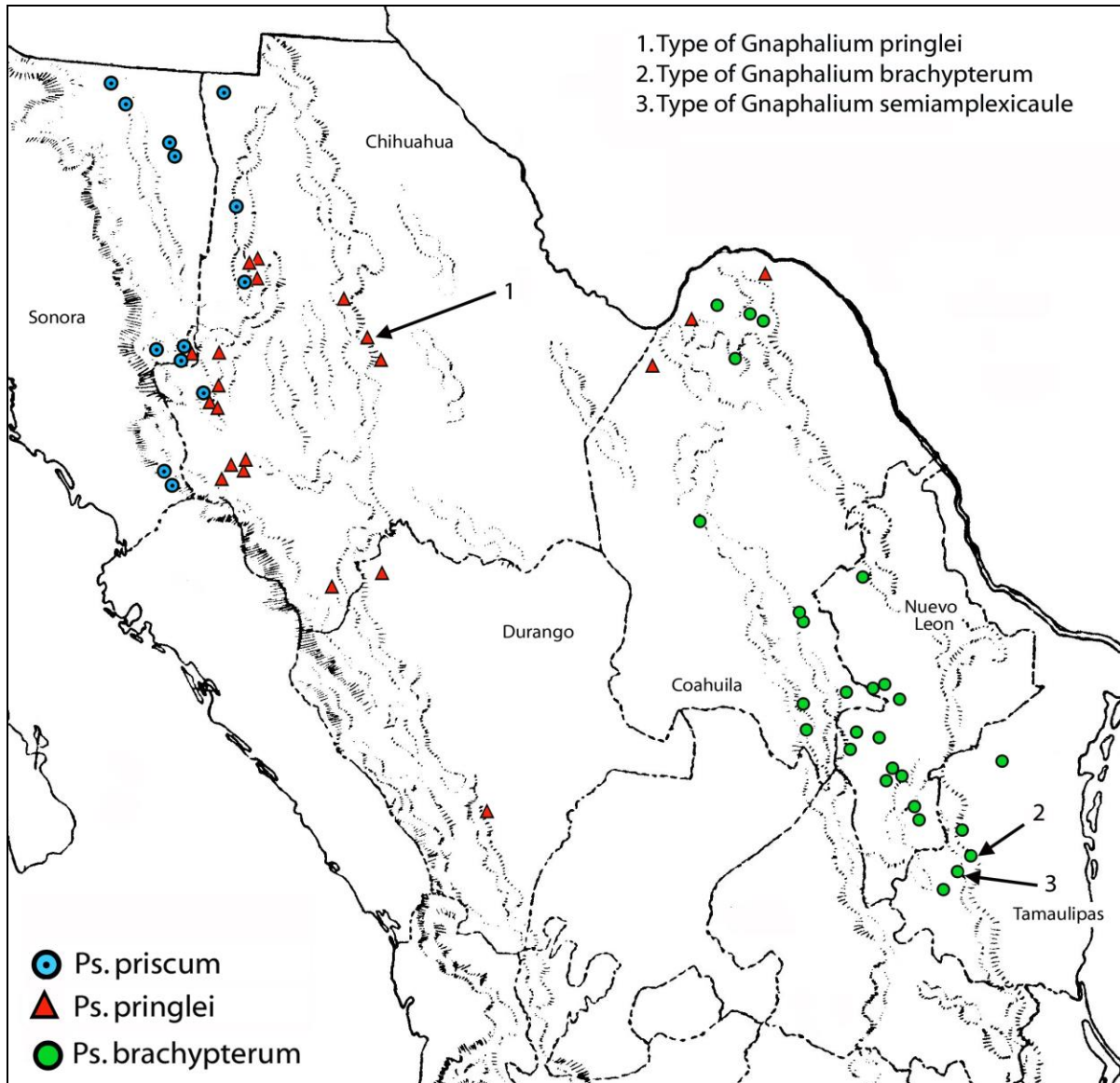


Figure 1. Distribution of *Pseudognaphalium priscum*, *P. pringlei*, and *P. brachypterum*.

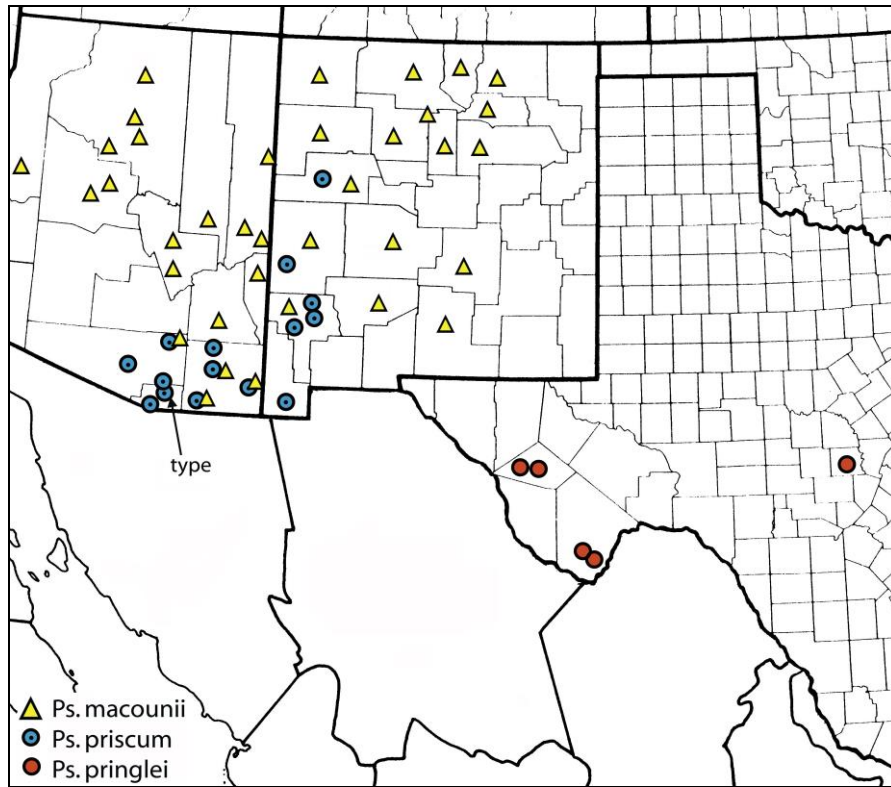


Figure 2. Distribution of *Pseudognaphalium priscum*, *P. pringlei*, and *P. macounii* in the USA. The range of *P. macounii* is shown only for Arizona and New Mexico; it ranges much more widely (see text; it does not occur in Texas nor is it known from Mexico).

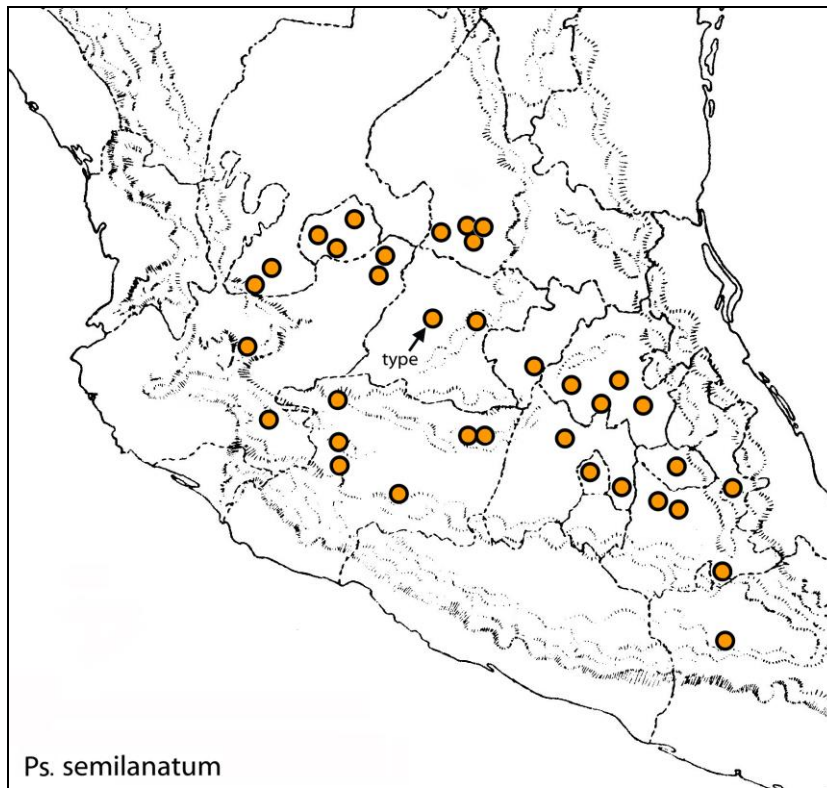


Figure 3. Distribution of *Pseudognaphalium semilanatum*.

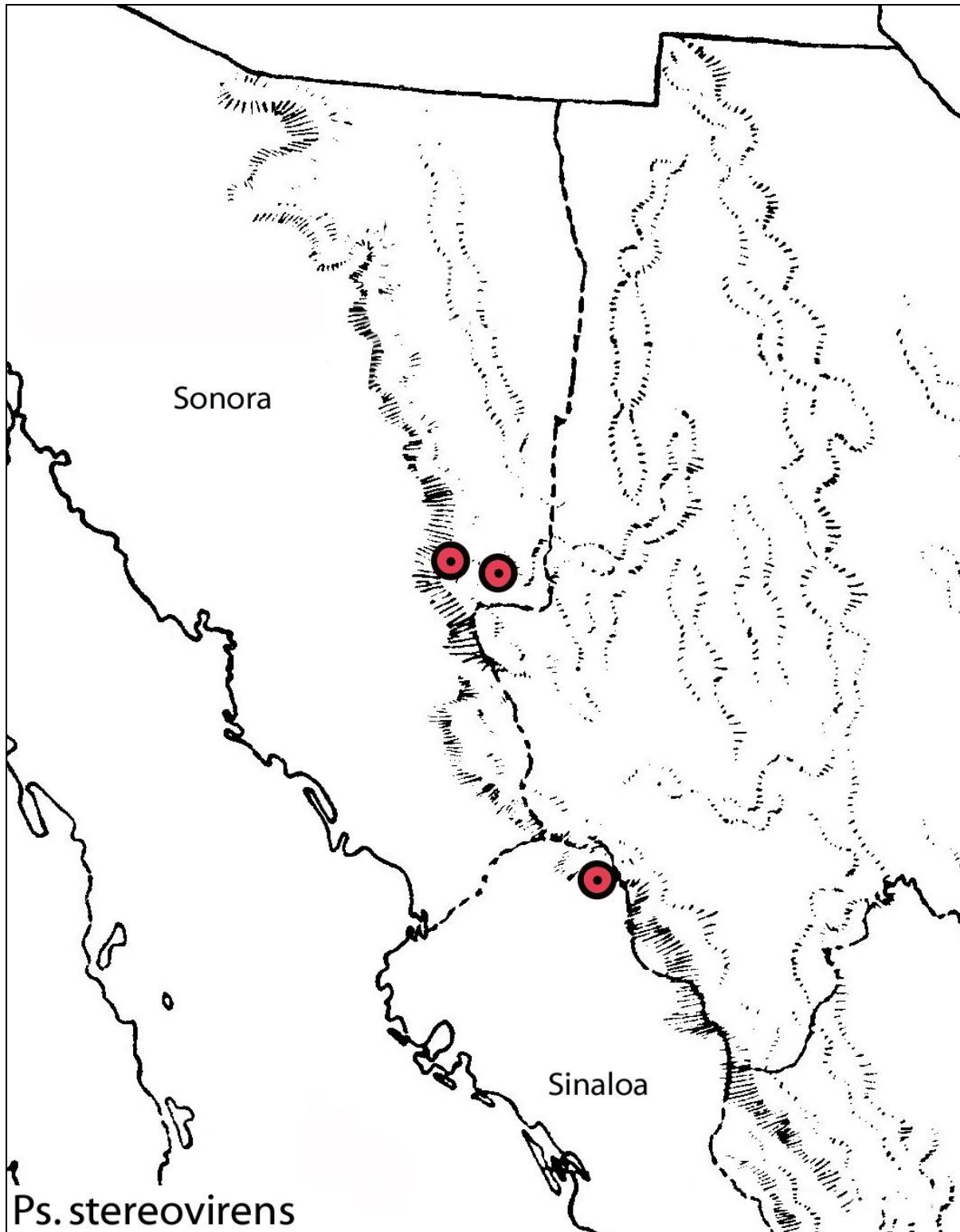


Figure 4. Distribution of *Pseudognaphalium stereovirens*.



Figure 5. *Pseudognaphalium pringlei*. Near Cd. Chihuahua, Chihuahua, holotype (GH).



Figure 6. *Pseudognaphalium pringlei*. Brewster Co., Texas, Warnock 9704 (SMU).



Figure 7. *Pseudognaphalium priscum*. Santa Cruz Co., Arizona, holotype (ARIZ).



Figure 8. *Pseudognaphalium priscum*. Cochise Co., Arizona. Leithliter 726 (ASU).



Figure 9. *Pseudognaphalium priscum*. Cochise Co., Arizona. Keil 23738 (ASU).



Figure 10. *Pseudognaphalium priscum*. Cochise Co., Arizona. Detail from Keil 23738, Fig. 8 (ASU).



Figure 11. *Pseudognaphalium priscum*. Saguaro National Park, Rincon Mts, Pima Co., Arizona. Beckman 119 (SEINet observation). Photo by Dan Beckman, 1 Oct 2020.



Figure 12. *Pseudognaphalium priscum*. Saguaro National Park, Rincon Mts, Pima Co., Arizona. Beckman 119 (SEINet observation). Photo by Dan Beckman, 1 Oct 2020.



Figure 13. *Pseudognaphalium priscum*. Near Colonia García, Chihuahua, Townsend & Barber 334 (US).



Figure 14. *Pseudognaphalium priscum*. Basaseachic Falls, Chihuahua, Atwood & Spencer 23008 (BRY).



Figure 15. *Pseudognaphalium macounii*. British Columbia, Canada, holotype (NDG).



Figure 16. *Pseudognaphalium macounii*. Detail from holotype (Fig. 10).



Figure 17. *Pseudognaphalium macounii*. Maryland, USA, Curtice s.n. (MISSA).



Figure 18. *Pseudognaphalium macounii*. Cochise Co., Arizona, Cazier 814 (ASU).



Figure 19. *Pseudognaphalium semilanatum*. Holotype (G-DC) of *Gnaphalium semilanatum*.



Figure 20 *Pseudognaphalium semilanatum*. Detail from holotype.



Figure 21. *Pseudognaphalium semilanatum*. Detail from holotype.



Figure 22. *Pseudognaphalium brachypterum*. Tamaulipas, isotype (PH).



Figure 23. *Pseudognaphalium brachypterum*. Nuevo Leon, Palmer 553 (US).



Figure 24. *Pseudognaphalium stereovirens*. Mpio. Yecora, Sonora. Holotype (TEX).



Figure 25. *Pseudognaphalium stereovirens*. Mpio. Yecora, Sonora. Details from holotype (TEX).