

**TAXONOMIC SYNOPSIS OF *BRICKELLIA* SECT. *KUHNIA*
(ASTERACEAE: EUPATORIEAE)**

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ABSTRACT

Brickellia sect. *Kuhnia* (the *Brickellia eupatorioides* group) comprises 17 species in the USA (6 species) and Mexico (12 species including *B. leptophylla*, which also occurs in the USA). The USA species are *B. eupatorioides* sensu stricto, *B. leptophylla* (including *B. chlorolepis*), ***Brickellia macranthra*** (Buckl.) Nesom, **comb. nov.** (including var. *texana*), *B. mosieri*, ***Brickellia ozarkana*** (Shinners) Nesom, **comb. et stat. nov.**, and ***Brickellia suaveolens*** (Fresen) Nesom, **comb. nov.** (including var. *corymbulosa*). Species endemic to Mexico are *Brickellia adenolepis*, *B. corymbosa*, ***Brickellia corymbosella*** Nesom, **sp. nov.**, *B. extranea*, ***Brickellia mexicana*** (Shinners) Nesom, **comb. nov.**, ***Brickellia michiliensis*** Nesom, **sp. nov.**, *B. oreithales*, *B. rosmarinifolia* (including *Kuhnia microphylla*), *B. schaffneri* (including *B. leonis*), *B. scoparia*, and ***Brickellia subauriculata*** (B.L. Rob.) Nesom, **comb. nov.** A nomenclatural summary and distribution map are provided for each species.

Brickellioid species with plumose pappus bristles were long identified within the genus *Kuhnia* L., but molecular study shows these species nested within the topology of a broader and inclusive *Brickellia* (Schilling et al. 2015a), confirming earlier surmises (e.g., Shinners 1971). Schilling et al. (2015b) have recognized them as *Brickellia* sect. *Kuhnia* (L.) Schilling & Scott, which, as identified here, comprises 17 species in the USA and Mexico. Identifications of sect. *Kuhnia* taxa have been inconsistent and morpho-geographic patterns and accompanying taxonomy have needed clarification. The patterns identified here are a step forward but field study will be critical toward understanding the complexity within *B. leptophylla* and others.

In a taxonomic overview, Turner (1989, followed by 1997 for Mexico) generally followed Shinners (1946) in recognizing *Brickellia eupatorioides* as a widespread species of the USA and adjacent Mexico, divided into varietal taxa — he emphasized intergradation in his assessment of taxonomic ranks. Turner did not, however, cite intermediates, nor did he annotate specimens as intermediates, and his distribution map of *B. eupatorioides* shows only the range outlines of varietal taxa in the USA, obscuring potential geographic discontinuities. Turner's taxonomic assessments and USA maps were based on specimen citations by Shinners and otherwise only on collections available to him at TEX-LL.

Turner's criticism of typological identifications by Shinners was justified to a degree, but Shinners was explicitly aware of regional and populational variation, observing (p. 138) that "In the High Plains, drought, grasshoppers, and grazing animals sometimes work bewildering changes in the appearance of the plant [var. *corymbulosa*]. Stem leaves may be entirely wanting at flowering time, the inflorescence variously deformed, and flowering advanced or retarded. In the southern plains especially, normal plants comparable to those found farther east are hardly ever to be found."

"These plants altho' not very conspicuous, are not destitute of beauty, by their elegant shape and plumose seeds. They are all hardy perennials with thick roots; they blossom in September, and assume their feathery appearance in October" (C.S. Rafinesque 1836, p. 78).



Figure 1. *Brickellia suaveolens*. Lime Lake Fen, Steuben Co., Indiana. Photo by Scott Namestnik, 18 Sep 2010. Posted on Morton Arboretum's "Get Your Botany On" blog.



Figure 2. *Brickellia suaveolens*. Goodwell, Texas Co., Oklahoma. Photos by Kurt Schaefer, September (top) and October (bottom) 2005.



Figure 3. Top: *Brickellia leptophylla*. Gallinas Mts., Lincoln Co., New Mexico; photo by Patrick Alexander, 10 September 2006. Bottom: *Brickellia leptophylla*. West Fork Oak Creek, Coconino Co., Arizona; photo by Max Licher.

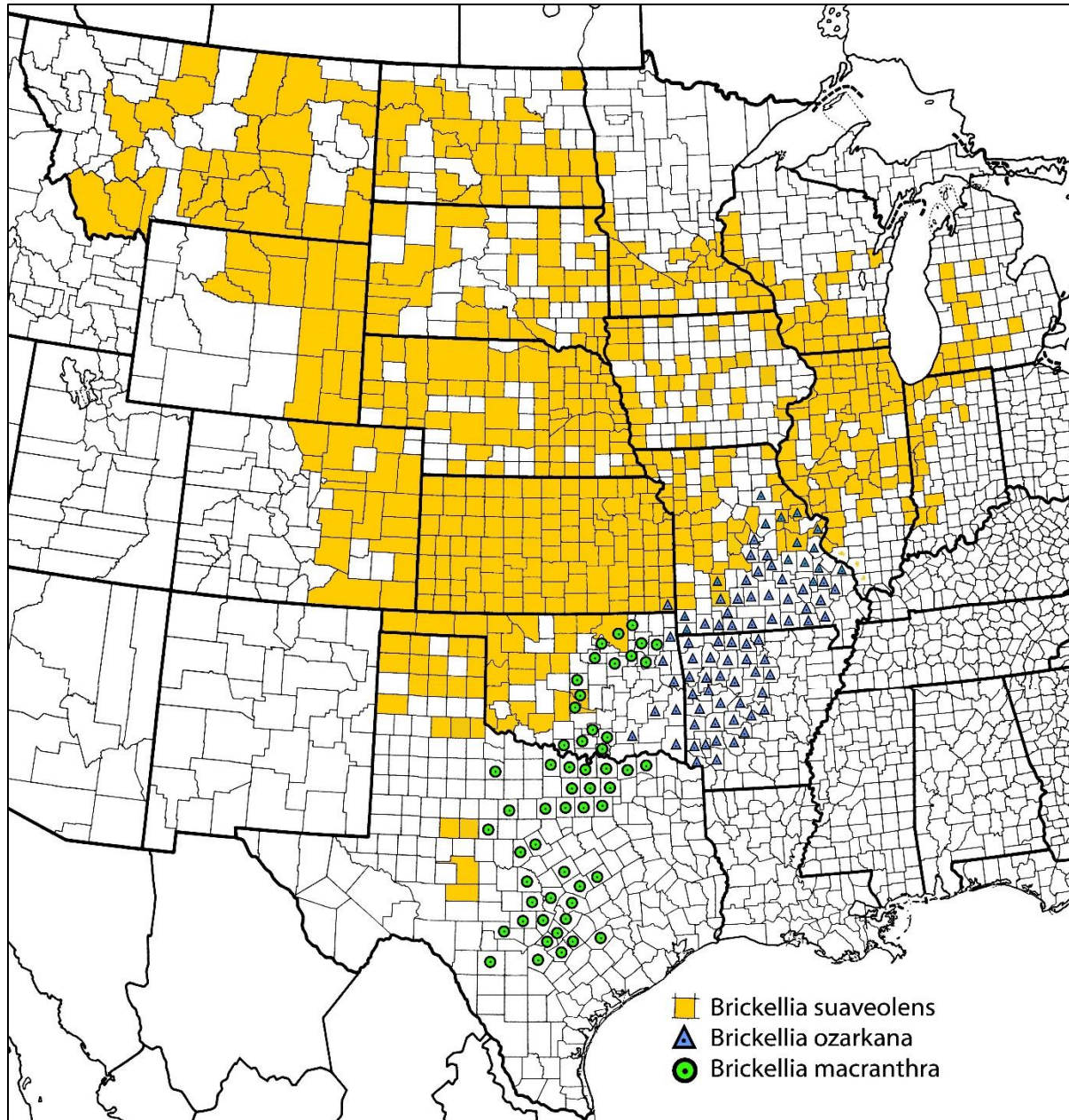


Figure 4. Distribution of *Brickellia suaveolens*, *B. ozarkana*, and *B. macranthra*.

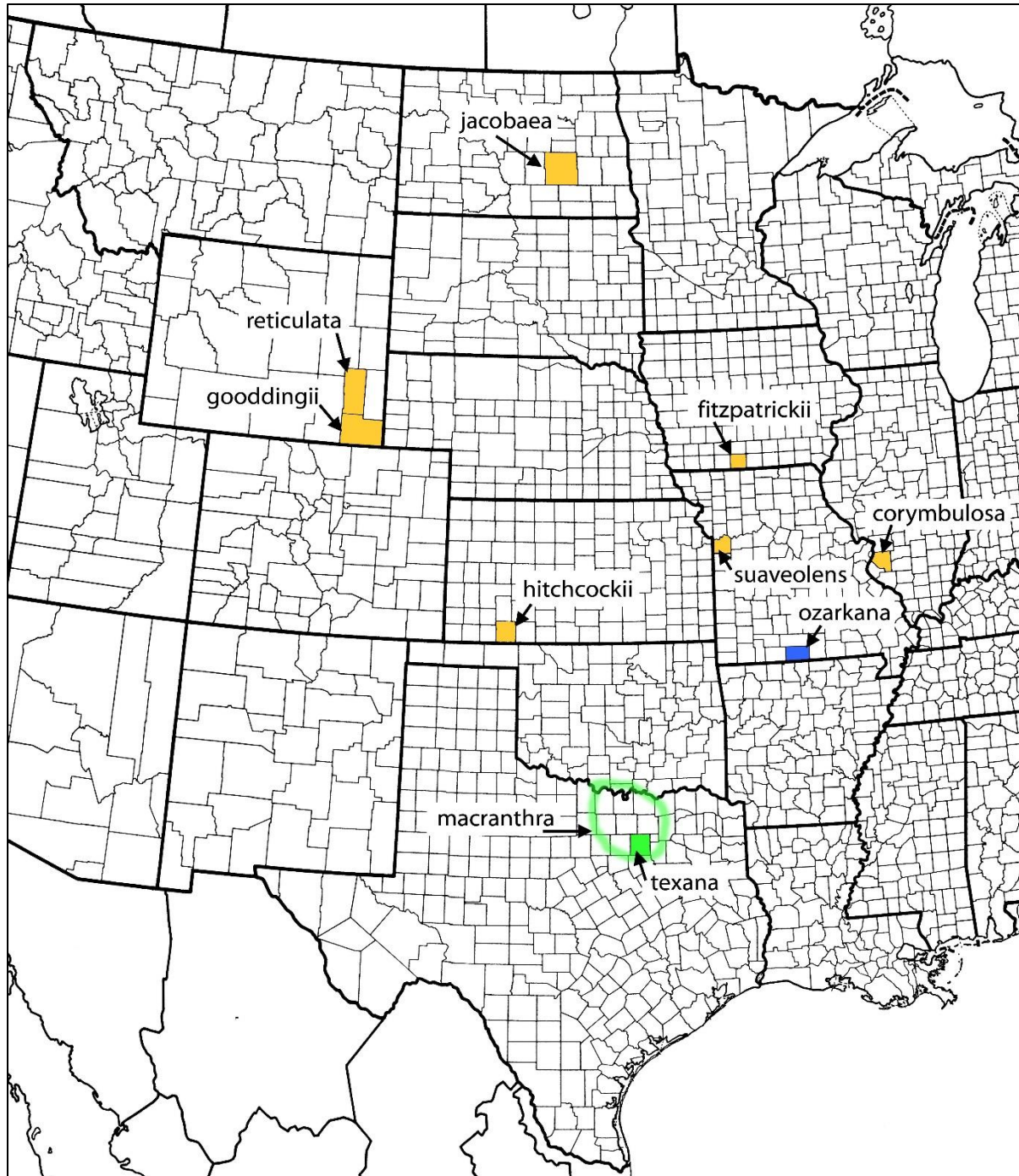


Figure 5. Type localities of *Brickellia suaveolens* and its synonyms and of *B. macranthra* and *B. texana*. The locality of *B. macranthra* was described by Buckley only as "Northern Texas."

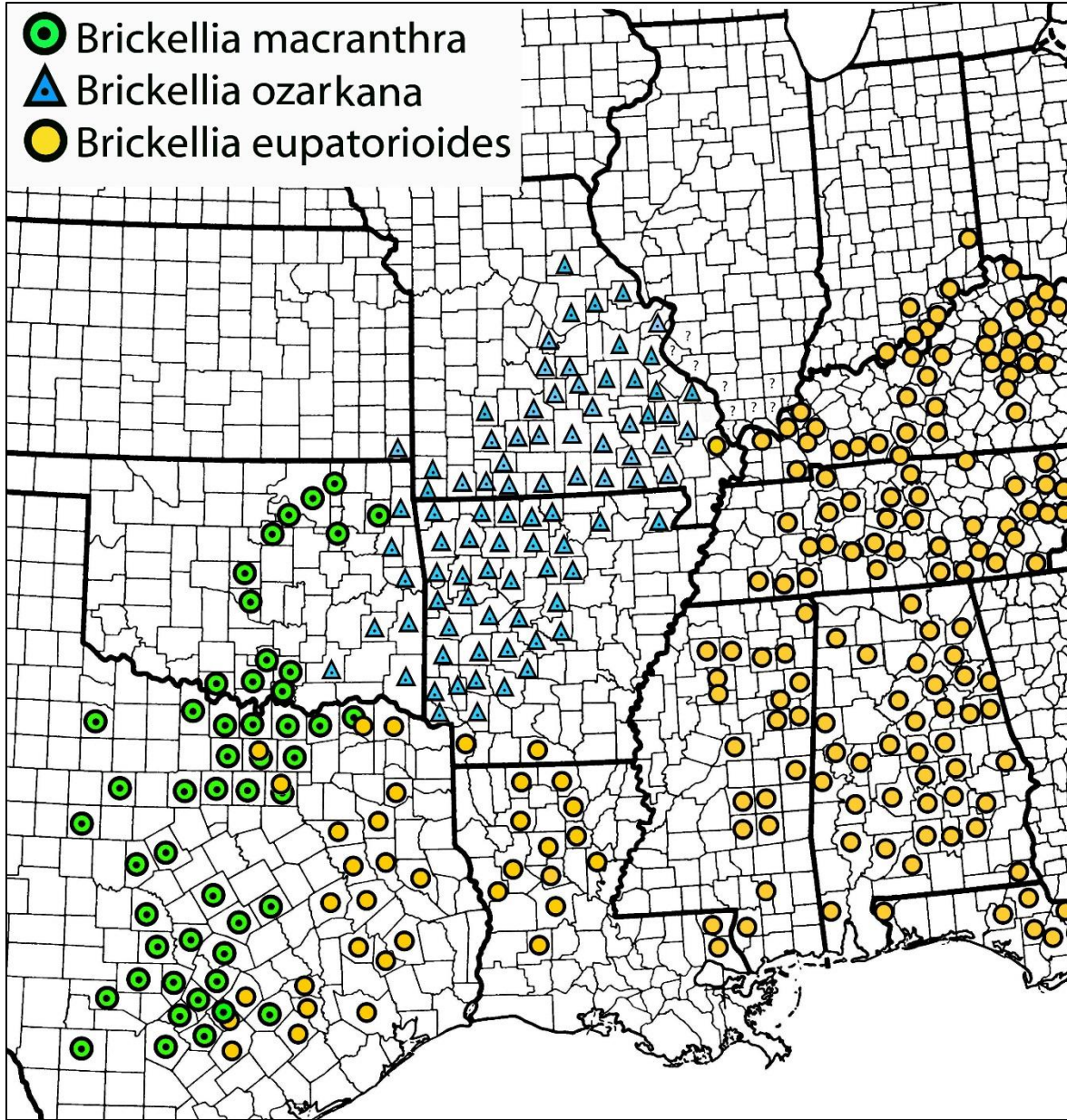


Figure 6. Distribution of *Brickellia macranthra*, *B. ozarkana*, and (in part) *B. eupatorioides*. The range of *B. eupatorioides* extends eastward to the Atlantic coast.

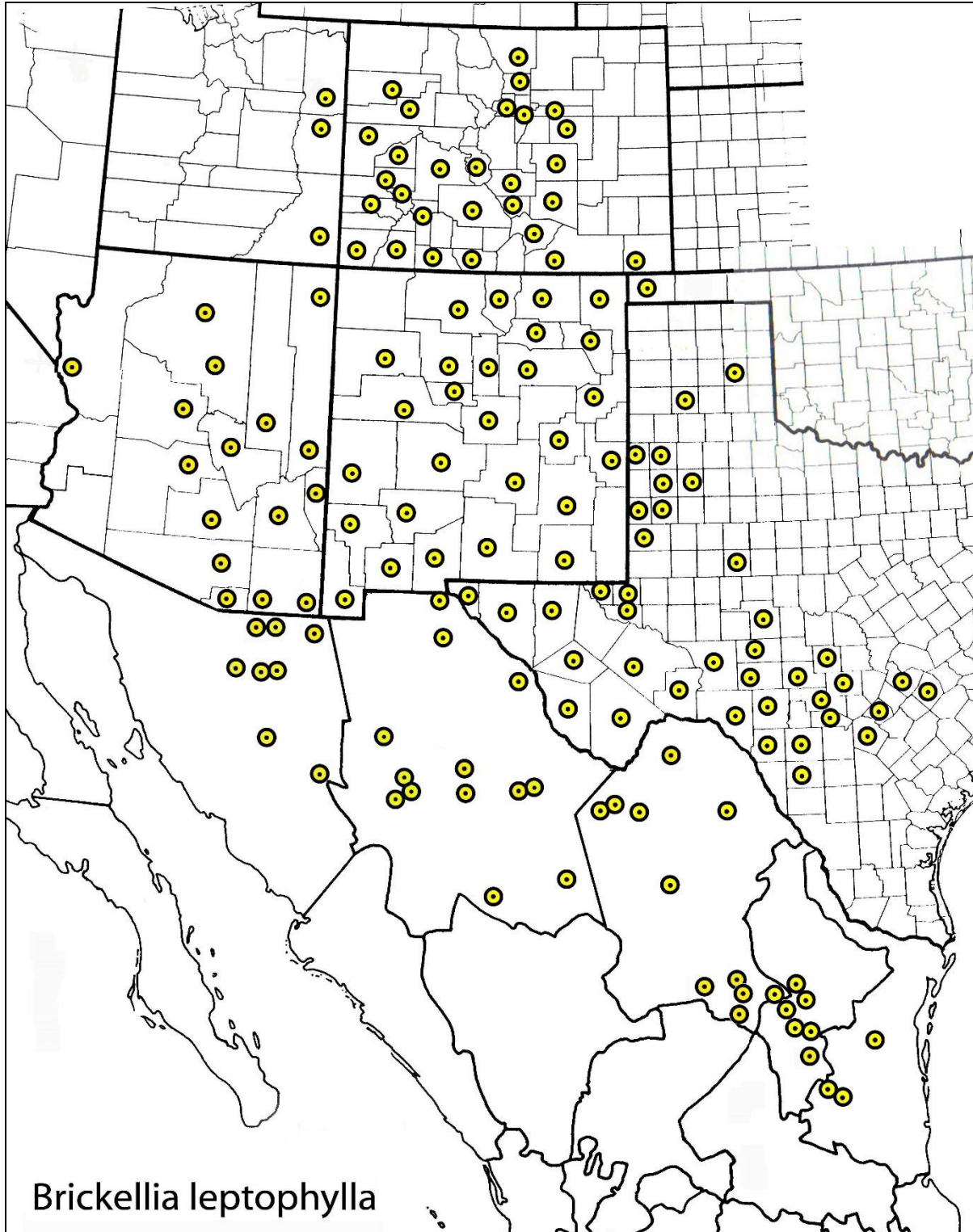


Figure 7. Distribution of *Brickellia leptophylla*.

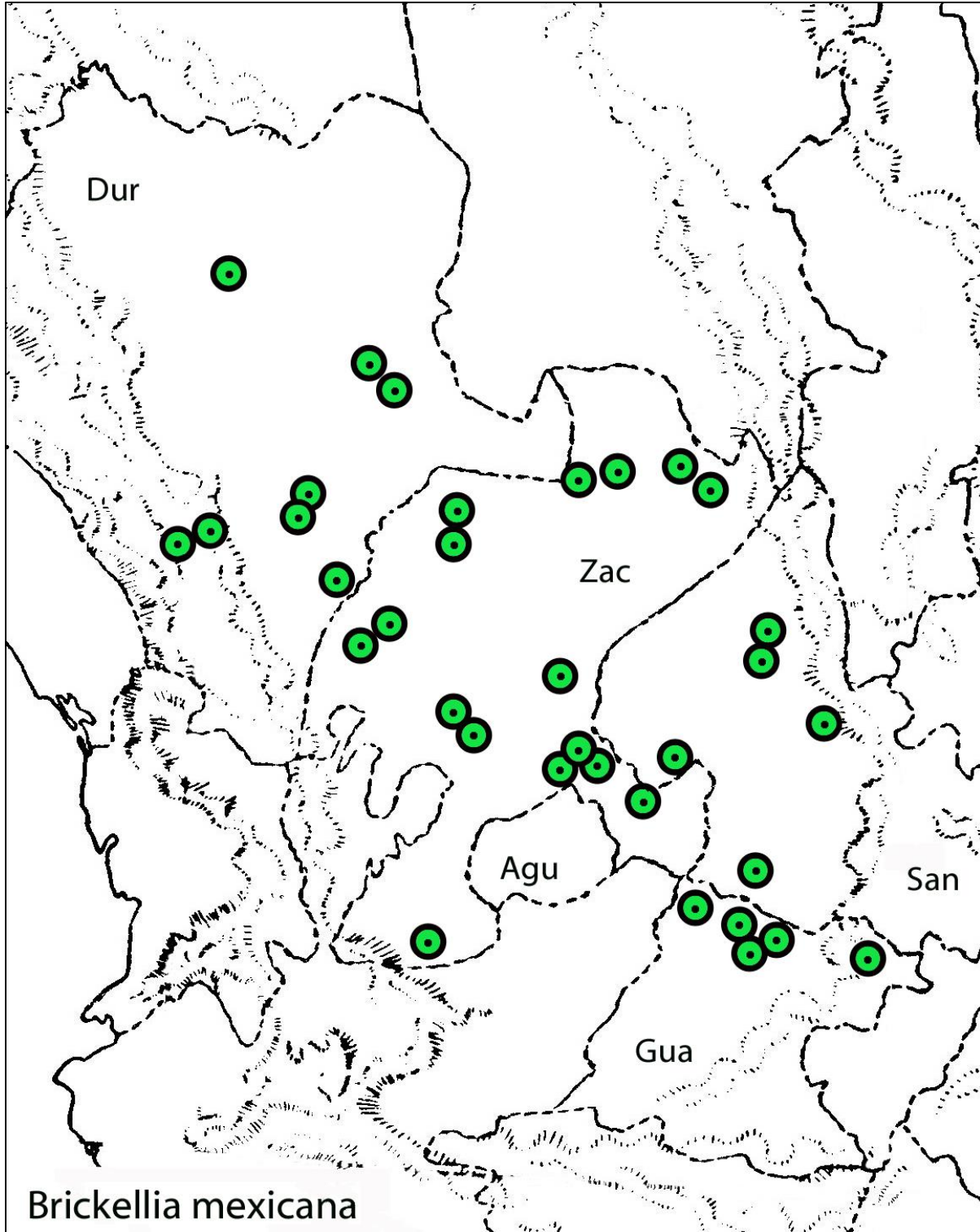


Figure 8. Distribution of *Brickellia mexicana*.

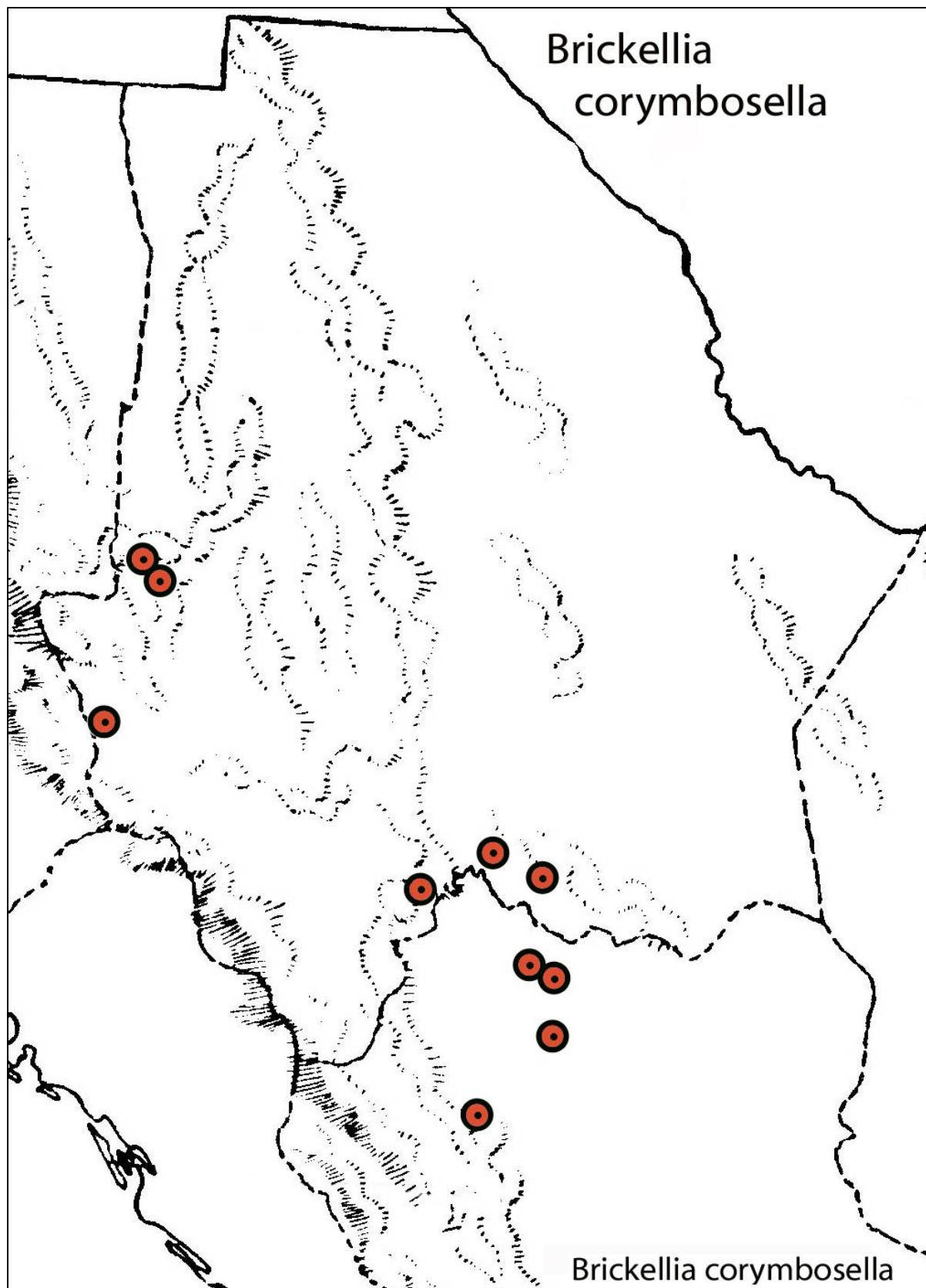
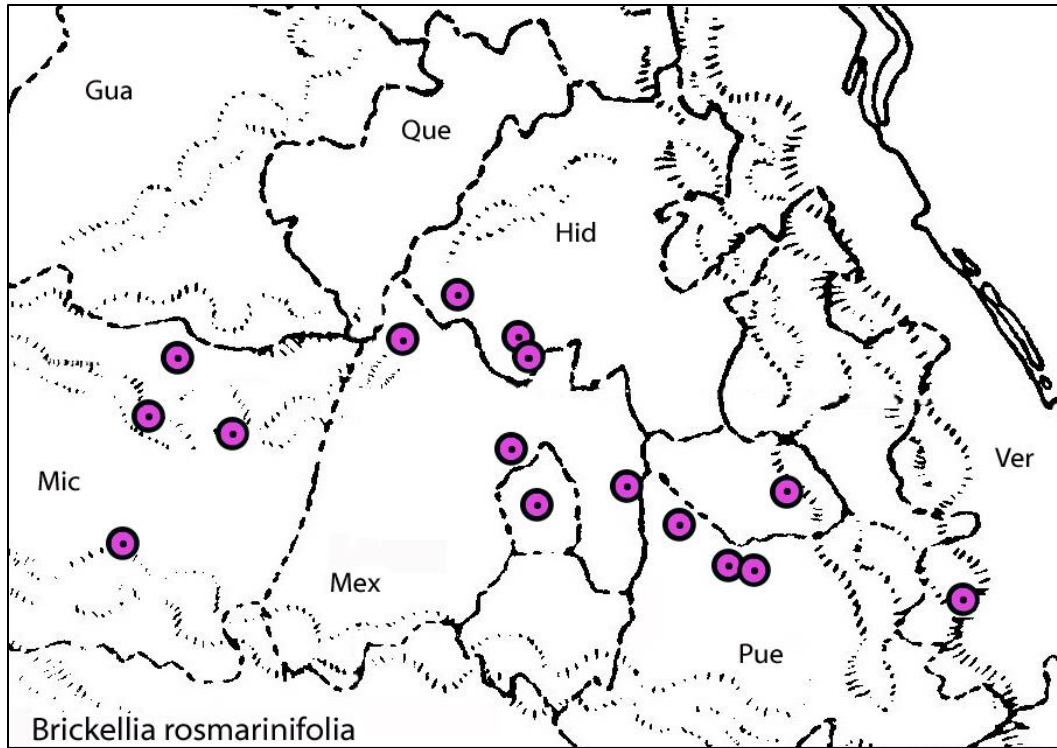
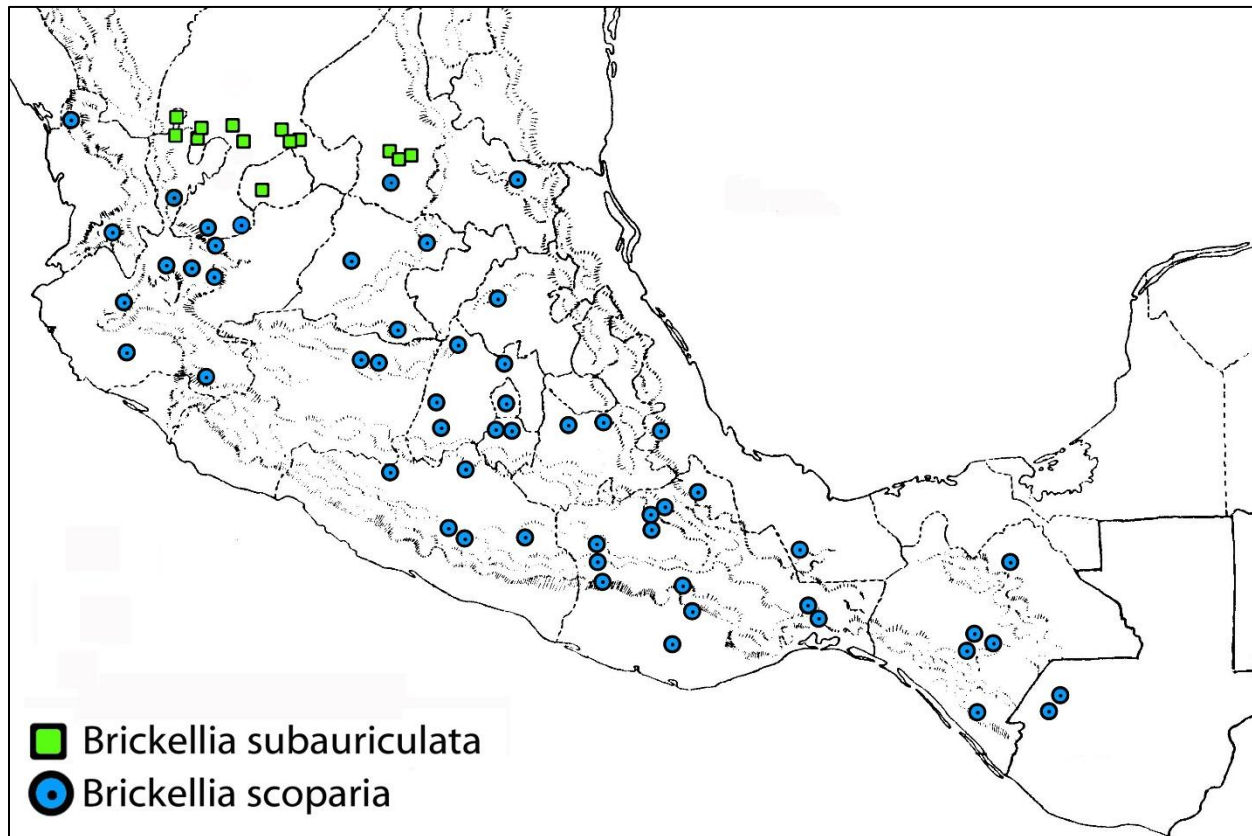


Figure 9. Distribution of *Brickellia corymbosella*.

Figure 10. Distribution of *Brickellia rosmarinifolia*.Figure 11. Distribution of *Brickellia subauriculata* and *B. scoparia*.

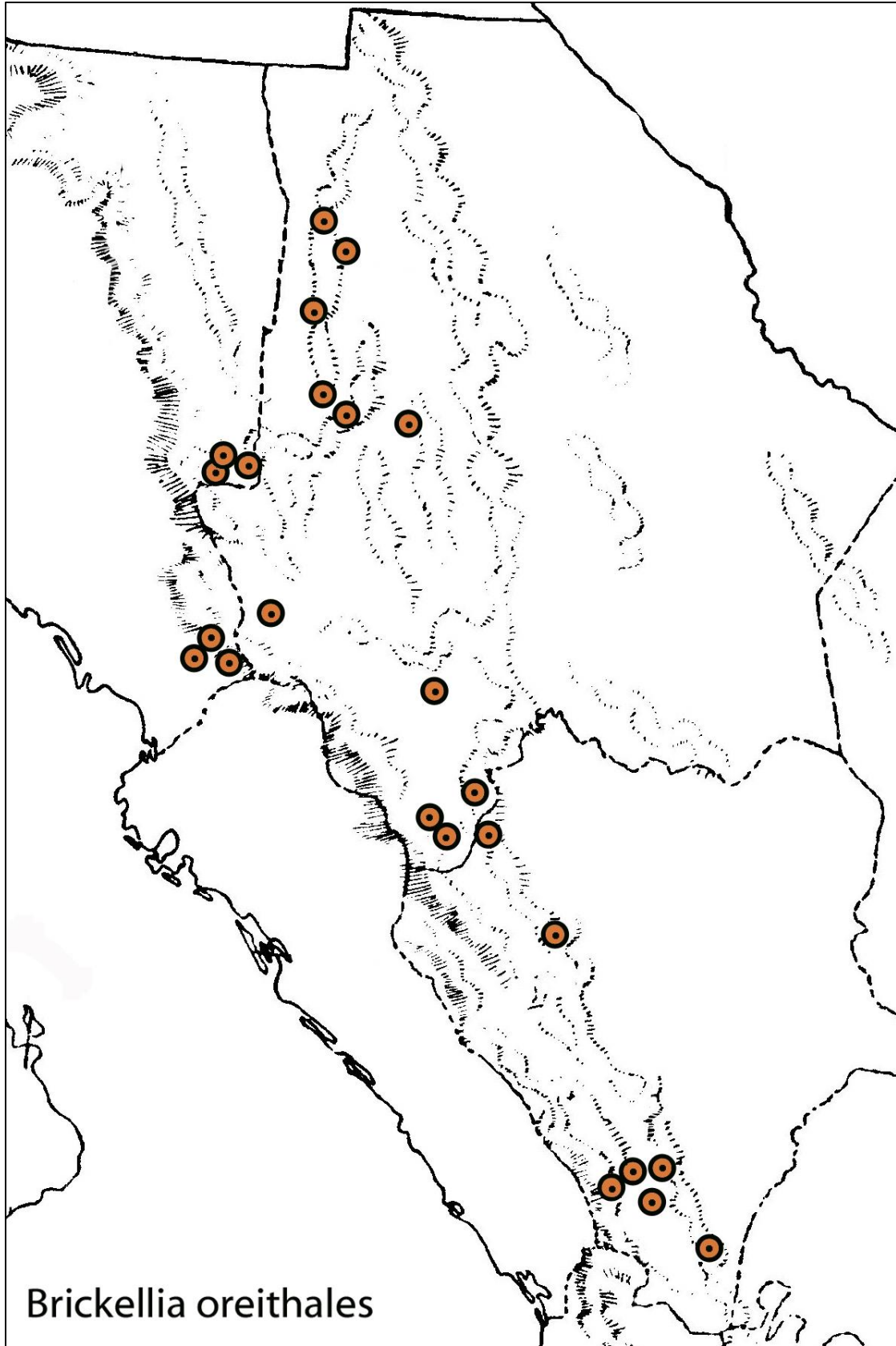


Figure 12. Distribution of *Brickellia oreithales*.

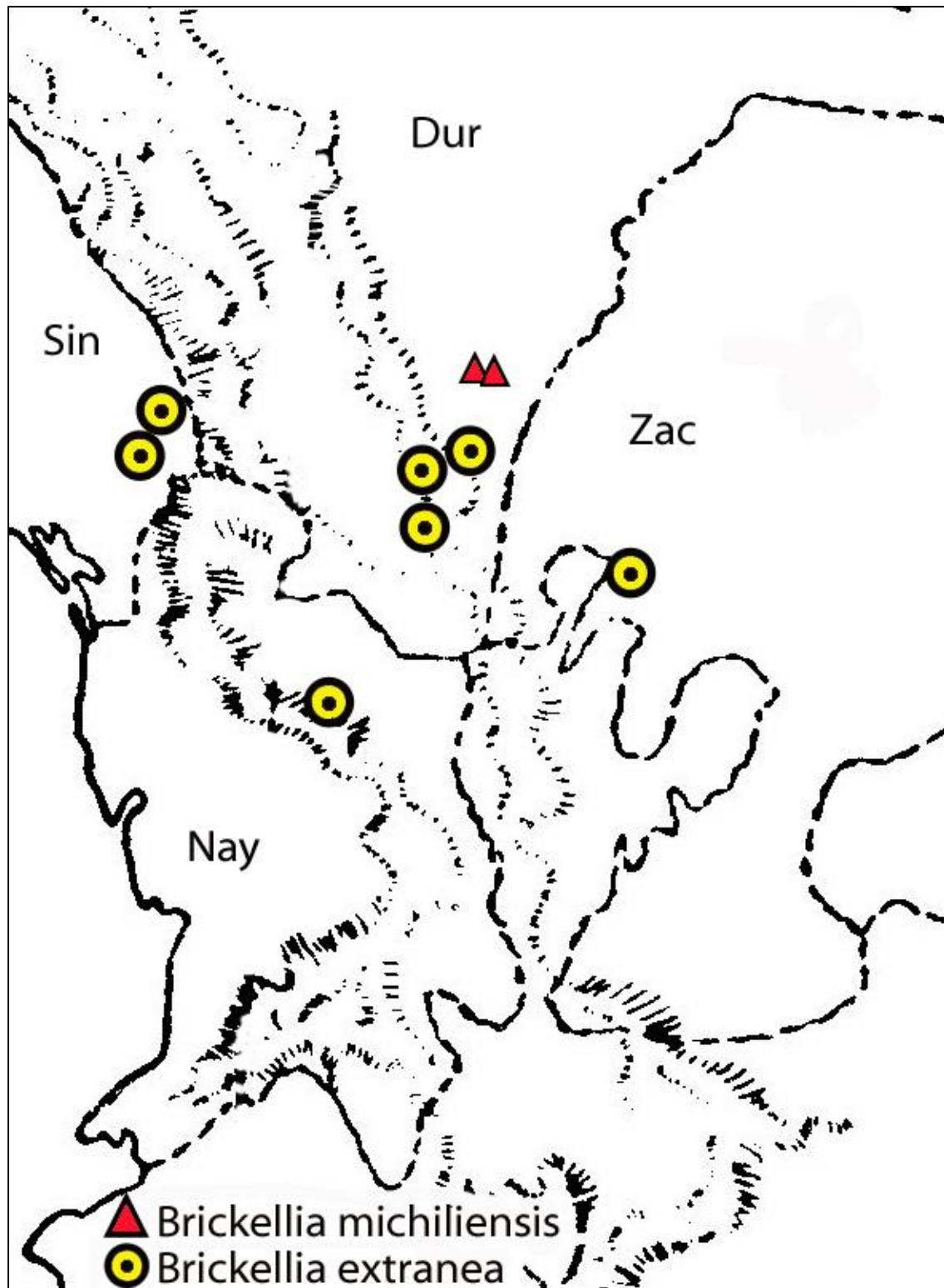


Figure 13. Distribution of *Brickellia extranea* and *Brickellia michiliensis*.

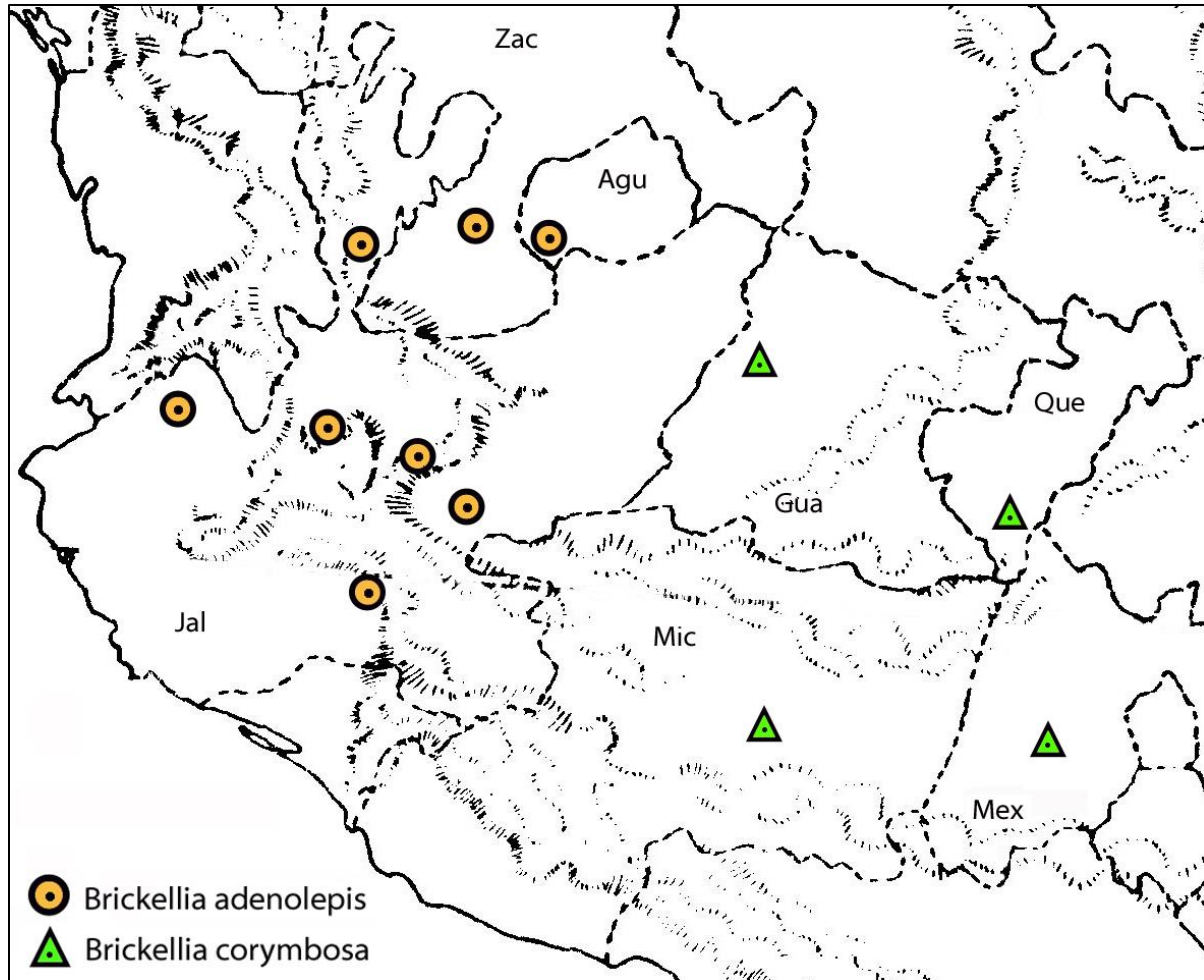


Figure 14. Distribution of *Brickellia adenolepis* and *B. corymbosa*.

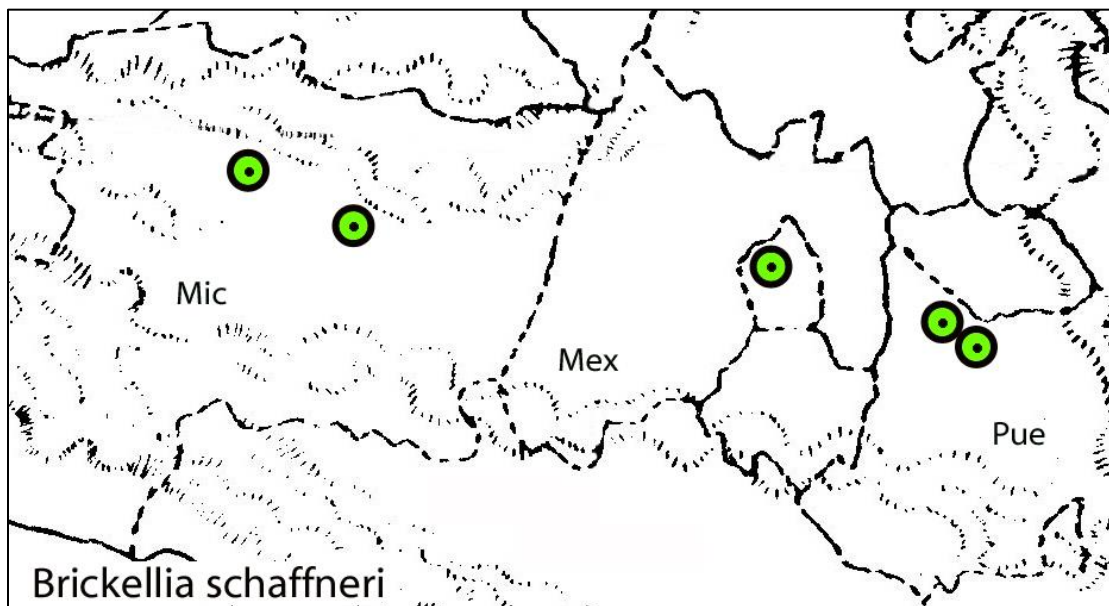


Figure 15. Distribution of *Brickellia schaffneri*.

Key to USA species

1. Florets 6–15 per head.
 2. Outer and middle phyllaries often nearly equalling the inner in length, with apices long-attenuate into falcate or twisted, filiform tips **Brickellia ozarkana**
 2. Outer and middle phyllaries graduate in length, with apices apices appressed, acute to short-acuminate, similar to the inner.
 3. Leaves (all of the stem) linear, 6–18(–25) mm long, 1–2(–3) mm wide **Brickellia mosieri**
 3. Leaves (below the inflorescence) lanceolate-ovate to lanceolate or narrowly lanceolate, mostly 25–100 mm long, 5–40 mm wide, rarely linear as populational variants, if linear (as in var. *gracilis*-Fig. 0 and *Anderson 20487*-Fig. 0) then 15–30 mm long, 2–3 mm wide **Brickellia eupatorioides** sensu stricto
1. Florets (12–)14–35 per head.
 4. Leaves linear; florets 15–35 per head **Brickellia leptophylla**
 4. Leaves broader; florets (12–)14–24 (–29) per head
 5. Outer and middle phyllaries often nearly equalling the inner in length, with apices long-attenuate into loose and spreading, falcate or twisted, filiform tips **Brickellia macranthra**
 5. Outer and middle phyllaries graduate in length, with apices appressed, acute to short-acuminate, caevate **Brickellia suaveolens**

Key to species of Mexico

1. Stems from tuberous roots; heads on long peduncles **Brickellia schaffneri**
1. Stems from thick taproots; heads of peduncles of varying length.
 2. Leaves relatively broad, not linear
 3. Phyllary margins glandular; florets ca. 22 per head **Brickellia adenolepis**
 3. Phyllary margins eglandular; florets 11–12 per head **Brickellia extranea**
 2. Leaves mostly linear.
 4. Heads on filiform peduncles.
 5. Heads stiffly erect, in a terminal corymb **Brickellia corymbosa**
 5. Heads nodding, in elongate arrangements.
 6. Leaves subauriculate; florets 9–13(14) per head **Brickellia corymbosella**
 6. Leaves not subauriculate.
 7. Florets 21–26 per head **Brickellia oreithales**
 7. Florets 10–11 per head **Brickellia michiliensis**
 4. Heads on thicker peduncles.
 8. Heads solitary on long peduncles **Brickellia rosmarinifolia**
 8. Heads loosely clustered, not appearing solitary.
 9. Florets 15–36 per head.
 10. Leaves not subauriculate; florets 15–36 per head **Brickellia leptophylla**
 10. Leaves subauriculate; florets 20–26 per head **Brickellia mexicana**
 9. Florets 9–12 per head.

11. Heads in a bottlebrush arrangement; leaves glabrous, veins distinctly raised
 **Brickellia scoparia**
11. Heads in a more open arrangement; leaves hirtellous, veins not raised
 **Brickellia subauriculata**

The most efficient way to identify these species is by using the maps to start, then checking the text for details. A count of florets per head divides the species into two groups.

1. **BRICKELLIA EUPATORIODES** (L.) Shinnars, Sida. 4: 274. 1971. *Kuhnia eupatorioides* L., Sp. Pl. (ed. 2) 2: 1662. 1763. **TYPE: Pennsylvania.** [Philadelphia]. Protologue: "Habitat in Pennsylvania, unde vivam attulit Adam Kuhn." **Lectotype** (Reveal 1993): *Arduino* 53, Herb. Linn. No. 238.2 (LINN, Fig. 16). Grown from plants procured by Adam Kuhn, who lived in Philadelphia.

Rafinesque (1836) reckoned that he had found "the very spot where Dr. Kuhn probably procured the specimen he took to Linnaeus" — (p. 75) "W.P.C. Barton in his flora philadelphica 1817, states to have found the linnean plant on the rocks of the Schuylkill R. above Lemonhill; but Nuttall in 1819 ascribes that very same locality for the sp. *K. critonia*: and it is there also that in 1836 has been found by Mr. Durand and myself the Linnean plant" Rafinesque also noted that he had learned from correspondence of J.D. Schoepf that Kuhn himself did not make the collection and did not know its specific locality.

Critonia kuhnia Gaertn., Fruct. Sem. Pl. 2: 411. 1791. Illegitimate name, an alternative for *Kuhnia eupatorioides* L., which is cited in synonymy.

Kuhnia critonia Willd., Sp. Pl., ed. 4 [Willdenow] 3(3): 1773. 1803. Illegitimate name, a renaming of *Critonia kuhnia* Gaertn., which is cited in synonymy.

Kuhnia paniculata Cass., Dict. Sci. Nat. 24: 516. 1822. **TYPE:** Not located. Protologue: "Nous avons fait cette description sur un échantillon de l'herbier de M. de Jussieu, recueilli en Caroline par Michaux, qui a cru cette plante étoit le *critonia kuhnia* de Gaertner, et qui l'a nommée ainsi dans sa Flore." A plant collected in North Carolina (e.g., Figs. 0-0) or South Carolina would be typical *Brickellia eupatorioides*.

Kuhnia glutinosa Ell., Sketch Bot. S. Carolina 2: 292. 1823. *Kuhnia eupatorioides* var. *glutinosa* (Elliott) Hitchc., Trans. Acad. Sci. St. Louis 5: 498. 1891. **TYPE: Alabama.** Protologue: "Grows in the prairies of the Alabama. **Possible type material:** Possibly collected by William Baldwin, PH 16749! image). Shinnars in 1945 annotated this sheet as an "isotype" of *Kuhnia glutinosa*; he did not cite type specimens for *K. glutinosa* in his published revision.

Elliott's account of *Kuhnia* included three species — *K. eupatorioides* (as "2. EUPATORIODES?") with lanceolate, serrate leaves, *K. critonia* (citing "*Critonia kuhnia*" as a synonym) with linear, nearly entire leaves, and *K. glutinosa* with "leaves lanceolate, tapering towards the summit, notched and toothed, crowded." Weatherby (1942) did not find a specimen in Elliott's herbarium. de Candolle (1836) indicated that he saw an authentic specimen of *K. glutinosa* ("v.s. comm. à cl. Elliott" — apparently sent to him by Elliott) and there is a G-DC specimen identified as such (a handwritten label has "Caroline ... Elliot 1827," and it does not match the description and perhaps is not even a plant of the same species (pilose-villous stem vestiture, apparently barbellate pappus).

Kuhnia eupatorioides var. *pyramidalis* Raf., New Fl. N. Amer. 1: 78. 1836. **TYPE: Pennsylvania.** Protologue: "Rocky banks of the R. Schuylkill near Philadelphia, in a single spot near the railroad bridge: 3 varieties 1 *Pyramidalis* tripedal, lower leaves lanceolate, entire at both ends, branches lanceolate, pyramidal with entire narrow leaves," 1836, *C.S. Rafinesque s.n.* (not located). Shinnars (1946) used this name for typical plants of *B. eupatorioides*.

Kuhnia eupatorioides var. *angustifolia* Raf., New Fl. N. Amer. 1: 79. 1836. **TYPE: Pennsylvania.** Protologue: "Rocky banks of the R. Schuylkill near Philadelphia, in a single spot near the

railroad bridge: 3 varieties ... 3 Var. *angustifolia*, stem simple pedal leaves linear lanceolate entire, flowers in a simple pauciflore corymb," 1836, *C.S. Rafinesque s.n.* (not located). Shinners (1964) pointed out typological misapplications of this name.

Kuhnia eupatorioides var. *gracilis* Torr. & Gray, Fl. N. Amer. 2: 78. 1841. **LECTOYPE** (Kartesz & Gandhi 1991, p. 271): **Alabama**. No other collection data, *H. Gates s.n.* (GH-Fig. 17). Annotated by Shinners in 1945 as "Type" and noted by him to be "*K. eupatorioides* L. (var. *typica*) slender form."

Florets 6–15 per head.

In synonymy of *Kuhnia eupatorioides*, Shinners (1945) listed 19 names published by Rafinesque in 1833 and 1836. Two of those names that have been used are included above; the status of others should be investigated and typified if any were to be used unambiguously.

The geographic overlap of *Brickellia eupatorioides* with *B. macranthra* in Texas is documented by these (*B. eupatorioides*). Dallas Co.: Dallas station, sandy soils, 24 Jul 1899, *Reverchon 2335* (MO); Dallas, sands, 17 Oct 1902, *Reverchon 3300* (MO-2 sheets).

2. **BRICKELLIA MOSIERI** (Small) Shinners, Sida 4: 274. 1971. *Kuhnia mosieri* Small, Man. S.E. Fl., 1329, 1508. 1933. **TYPE: Florida**. Miami-Dade Co.: Pinelands about Ross-Costello Hammock, 24 Jun 1915, *J.K. Small, C.A. Mosier, & G.K. Small 6544* (holotype: NY-Fig. 18).

Kuhnia eupatorioides var. *floridana* R.W. Long, Rhodora 72: 39. 1970. *Brickellia eupatorioides* var. *floridana* (R.W. Long) B.L. Turner, Phytologia. 67: 130. 1989. **TYPE: Florida**. Dade Co.: No other locality data, 13 May 1904, *S.M. Tracy 9046* (holotype: GH; isotype: MO).

Florida botanists (e.g., Wunderlin et al. 2021) and the current assessment by Weakley (2020) recognize *Brickellia mosieri* at specific rank but Shinners (1946), Long (1970), Cronquist (1980), and Turner (1989) have reckoned that the Miami-Dade plants are conspecific with typical *B. eupatorioides*. The linear leaves characteristic of *B. mosieri* are approached by narrow-leaved variants in some populations of *B. eupatorioides*, but as can be seen in the specimens shown here (Figs. 19-24), the short leaves of *B. mosieri* appear to be consistent. With the geographic disjunction and specialized habitat (pine-rockland), the Miami-Dade plants are justifiably treated at specific rank. Florets 9–13 per head.

The type of *Kuhnia eupatorioides* var. *gracilis* is a narrow-leaved collection from Alabama (Fig. 17), but evidence indicates that only a single species exists there and in other Gulf Coast states (see examples from Florida, Figs. 25-30, and Mississippi, Figs. 31-35) — these plants are not distinct from those of *B. eupatorioides* farther north. The type of var. *gracilis* (from only the top of a plant) is interpreted here as a populational variant of typical *B. eupatorioides*.

3. **BRICKELLIA MACRANTHRA** (Buckley) Nesom, **comb. nov.** *Kuhnia macranthra* Buckley, Proc. Acad. Nat. Sci. Philad. 13: 456. 1861. **TYPE: Texas**. Northern Texas, May 1861" no other collection data, *S.B. Buckley s.n.* (holotype: PH 26207, 2nd plant from right, Fig. 36). One of the handwritten labels (both in Buckley's hand) with the type specimen has *Kuhnia macranthra* while the other has *Kuhnia macranthra*; the protologue spelled the epithet as "macranthra."

Kuhnia eupatorioides var. *texana* Shinners, Wrightia 1: 136. 1946. *Brickellia eupatorioides* var. *texana* (Shinners) Shinners, Sida 4: 274. 1971. **TYPE: Texas**. Dallas Co.: Coit Road, 2.5 mi N of University Park (N side of Dallas), thin clay soil over limestone, prairie, common, 21 Sep 1945, *L.H. Shinners 8475* (holotype: MO; isotypes: GH-Figs. 37-39, SMU).

Shinners (1946) placed Buckley's *Kuhnia macranthra* as a synonym of var. *corymbulosa* rather than with his var. *texana*. He commented (p. 138) that the type sheet "contains some fragments belonging to var. *texana*. The description, of a purple-flowered plant blooming in spring, could not

possibly have been drawn from a *Kuhnia*." The "type sheet," however, holds three separate collections, each separately labeled, and the type of *K. macranthra* (apparently the "fragments" referred to by Shinners) is a full, leafy branch with an inflorescence — its identity is unambiguous.

Turner (1989, p. 123) noted that var. *texana* and var. *ozarkana* were distinguished by Shinners "largely by floret number ... and little else. Because of this, I see no point in the recognition of 2 taxa" — Turner thus included var. *ozarkana* within his concept of var. *texana*, characterized by phyllaries with elongate, filiform apices. But his dismissal of the potential usefulness of floret numbers was unjustified, as there is a discontinuity between the two entities in involucre morphology and floret number, as seen by Shinners and as mapped here in Figs. 4 and 6. Their evolutionary independence is reflected in the taxonomy here.

Both species characteristically have outer and middle phyllaries with apices long-attenuate into long, falcate or twisted, filiform tips, but in addition to the floret number distinction, they differ in other ways and may not be sister species.

1. Stems and leaves puberulent; leaves relatively thin, margins not revolute except in very narrow blades, abaxial veins usually dark and in a close reticulum, not raised; florets 9–15 per head
..... **Brickellia ozarkana**
1. Stems and leaves mostly glabrous to glabrate; leaves relatively thick, margins revolute, abaxial veins whitish, conspicuous veins distinctly raised; florets (13– in Fannin Co.) 17–24 per head
..... **Brickellia macranthra**

4. **BRICKELLIA OZARKANA** (Shinners) Nesom, **comb. et stat. nov.** *Brickellia eupatorioides* var. *ozarkana* (Shinners) Shinners, *Sida* 4: 274. 1971. *Kuhnia eupatorioides* var. *ozarkana* Shinners, *Wrightia* 1: 136. 1946. **TYPE: Missouri.** Ozark Co.: Near Gainesville, rocky slopes (dolomite) of "Bald Jesse," bald knobs, 10 Oct 1927, *E.J. Palmer* 33075 (holotype: MO-Fig. 40; isotype: A).

Numerous collections of *Brickellia ozarkana* have been made from the southeastern corner of Cherokee Co., Kansas, mostly in the area of Shoal Creek, a tributary of Spring River. Cherokee Co.: *McGregor* 33770 (GA, KANU); *McGregor* 35001 (KANU); *McGregor* 35792 (GH, KANU); *McGregor* 36702 (GA); *McGregor* 40144 (GA, KANU); *Morse* 11800 (KANU); *Richards* 1896 (KANU). From the same area, plants with thick leaves and raised veins (*McGregor* 4425 and 31302) perhaps are hybrids or introgressants with *B. suaveolens* at the very edge of its range, but field observations are needed where they may be sympatric. Other eastern Kansas collections identified as var. *texana* or var. *ozarkana* (Bourbon, Crawford, Douglas, Johnson, Linn, Miami counties) are *B. suaveolens*.

Almost all few-flowered collections from southeastern Missouri are mapped here as *Brickellia ozarkana*, but the sand prairie habitats in Scott County are strikingly different from the limestone characteristic of the species. The Scott County plants are identified here as *B. eupatorioides*. The interface between *B. eupatorioides* sensu stricto and *B. ozarkana* in Missouri and Illinois needs to be studied more carefully. Yatskievych (2006) recognized the existence of *Kuhnia* entities within Missouri but saw range overlap, particularly between var. *corymbosula* and var. *texana*.

The geographical overlap in Missouri between *Brickellia ozarkana* and *B. suaveolens* is documented here. Examples. Greene Co.: **OZARKANA:** ledges of limestone bluffs along James River, below Lake Springfield Dam, 1 Sep 1975, *Summers* 179 (MO). **SUAVEOLENS:** NW city limits of Willard, 23 Sep 1980, *Summers* 811 (MO). St. Louis Co.: **OZARKANA:** Greensfelder County Park, glade, 20 Jul 1995, *Darigo* 2185 (MO); Clayton, 1 Oct 1888, *Goehring* 264 (MO). **SUAVEOLENS:** many collections.

5. **BRICKELLIA SUAVEOLENS** (Fresen) Nesom, **comb. nov.** *Kuhnia suaveolens* Fresen, Enum. Sem. Hort. Francof. [4]. 1838; the same text later published in *Linnaea* (Litteratur - Bericht) 13: 94. [17-23 March] 1839. **TYPE: USA.** Label: "Culta in hort. bot. e semin. a Princ. Maximiliano Neovid. in Amer. bor. lecta." (holotype: FR-0031523, Figs. 41-42). Grown from seeds sent to Frankfurt by George Engelmann and cultivated by Prince Maximilian. **Missouri.** Jackson Co.: Near Fort Clark on the Missouri River (see type of *Kuhnia maximiliani*). Fort Clark is in what is now the town of Sibley.

The name was validly published in the 1838 seed list — "Semina in horto botanico Francofurtensi anno 1838 collecta" (fide Naturalis Biodiversity Center; <https://seedlists.naturalis.nl/content/kuhnia-suaveolens-fresen>). Fresen cited the type collection and gave a full description, diagnosis (comparing it with typical *B. eupatorioides*), and commentary. He did not comment about the choice of epithet.

Kuhnia maximiliani Sinning [nom. superfl.], Allgem. Gartenzeit. (Otto & Dietrich) 7: 138. 1839.

This was a renaming by Sinning of *Kuhnia suaveolens*, but he added more precise information about the collection locality: "Habitat in sylvis, fructicetis et in collibus ad Missouri fluvium superiorem prope Fort Clark."

Kuhnia eupatorioides var. *corymbulosa* Torr. & Gray, Fl. N. Amer. 2: 78. 1841. *Brickellia eupatorioides* var. *corymbulosa* (Torr. & Gray) Shinnars, Sida. 4: 274. 1971. **LECTOTYPE** (Shinnars 1946, p. 139): **Illinois.** St. Clair Co.: Near Lebanon, no date, *S.B. Buckley s.n.* (GH-Fig. 43; possible isotype: PH 26206, mounted on the same sheet as the type of *Kuhnia macranthra*).

Kuhnia fitzpatrickii A. Nels., Bot. Gaz. 31: 402. 1901. **TYPE: Iowa.** Decatur Co.: Prairies, common, 25 Sep 1899, *T.J. Fitzpatrick s.n.* (holotype: RM-Fig. 44).

Kuhnia gooddingii A. Nels., Bot. Gaz. 31: 402. 1901. **TYPE: Wyoming.** Laramie Co.: Dry Creek, stony valleys, 28 Aug 1900, *L. Goodding 8202* (holotype: RM-Fig. 45; isotypes: CM, GH, K, MIN, MO, NEB, US, VT — images all).

Kuhnia reticulata A. Nels., Bot. Gaz. 31: 403. 1901 (not *Brickellia reticulata* A. Gray 1852). **TYPE: Wyoming.** Platte Co.: Platte Cañon, 27 Aug 1896, *A. Nelson 2771* (holotype: RM-Fig. 46).

Kuhnia hitchcockii A. Nels., Bot. Gaz. 31: 403. 1901. **TYPE: Kansas.** Meade Co.: Plains, 1 Sep 1897, *A.S. Hitchcock 211-a* (holotype: RM; isotypes: GH-Fig. 47, MO, NY, US).

Nelson also cited Kansas collections by Hitchcock from Barton, Clark, Edwards, Kiowa, and Stafford counties as *Kuhnia hitchcockii*.

Kuhnia jacobaea Lunell, Amer. Midl. Nat. 5: 36: 1917. **TYPE: North Dakota.** Stutsman Co.: Jamestown, along James River, 24 Aug 1913, *J. Lunell 1013* (holotype: MINN-Fig. 48).

Florets (12–)14–24(–35) per head.

The type of *Kuhnia suaveolens* (Missouri) is unusually broad-leaved, as is the type of *Kuhnia jacobaea* (North Dakota), but such plants occur throughout the range of the species. Plants in Dane Co., Wisconsin, show a wide range of leaf morphology, including some that approach the "suaveolens" shape (see Figs. 49-56). Similar variation occurs in Kansas (Figs. 57-62) and elsewhere.

The demarcation between *Brickellia suaveolens* and *B. ozarkana*, like that between *B. ozarkana* and *B. macranthra*, appears to be without a region of intergradation. Shinnars noted in his key to USA *Kuhnia* (1946, pp. 124-125) that "intermediates between [var. *ozarkana*] and var. *corymbulosa* in Arkansas and Missouri simulate var. *texana*" (couplet 7a). He also observed (p. 136) that occasional plants with more than 14 florets per head, and rather broad leaves, are probably to be considered hybrids between var. *ozarkana* and var. *corymbulosa*." He did not cite specimens as examples, but these references probably are to *B. suaveolens*, where *texana/ozarkana* phyllary morphology sometimes occurs in otherwise typical populations. Shinnars himself observed (key couplet 5a) that phyllary

apices may be "very slender and loose in occasional forms of [var. *corymbulosa*] in the Middle West." Thus phyllary morphology alone is not consistently diagnostic in distinguishing *B. ozarkana* from *B. suaveolens*.

Brickellia ozarkana in southeastern Missouri (where it approaches the distribution of *B. suaveolens*) is relatively rare and sporadically distributed (pers. observ., September 2021), perhaps with no opportunities for gene exchange. Within the range of *B. ozarkana* as mapped here, variants appear to be populational and part of the species rather than a reflection of hybridization or introgression with *B. suaveolens*.

6. **BRICKELLIA LEPTOPHYLLA** (Scheele) Shinnars, Sida 4: 274. 1971. *Kuhnia leptophylla* Scheele, Linnaea 21: 598. 1848. **TYPE: Texas.** [Comal Co.:] 15 mi W of New Braunfels, dry river bed of the Cibolo on limestone scree, Oct 1846, *F. Lindheimer 411* (holotype: not located; isotypes: GH image, K image, MO-Fig. 63, NY image, PH-Fig. 64, US image). **Protologue:** "Im trocknen Flussbette des Cibolo auf Kalksteingeröll, 15 Miles von Neubraunfels, Lindheimer, October." The NY label says "gravelly bed of the Pierdenales River" — the handwritten label on the MO sheet mentions both the Piedernales and Cibolo rivers.

Kuhnia chlorolepis Woot. & Standl., Contr. U.S. Natl. Herb. 16: 177. 1913. *Brickellia chlorolepis* (Woot. & Standl.) Shinnars, Sida 4: 274. 1971. *Brickellia rosmarinifolia* subsp. *chlorolepis* (Woot. & Standl.) W.A. Weber, Phytologia 53: 187. 1983. *Brickellia eupatorioides* var. *chlorolepis* (Woot. & Standl.) B.L. Turner, Phytologia. 67: 129. 1989. *Kuhnia eupatorioides* var. *chlorolepis* (Woot. & Standl.) Cronq., Intermountain Fl. 5: 384. 1994. **TYPE: New Mexico.** [Grant Co.:] Mangas Springs, 2 Jun 1903, *O.B. Metcalfe 104* (holotype: US-Fig. 65; isotypes: ARIZ, CAS, COLO, NMC, NY, PH, RENO-Fig. 00, RM, TEX).

Kuhnia eupatorioides var. *gracillima* A. Gray, Boston J. Nat. Hist. 6 (Pl. Lindh. II): 218. 1850. *Kuhnia rosmarinifolia* var. *gracillima* (A. Gray) Blankinship, Rep. (Annual) Missouri Bot. Gard. 18: 178. 1907. *Brickellia eupatorioides* var. *gracillima* (A. Gray) B.L. Turner, Phytologia 67: 130. 1989. **TYPE: Texas.** [Comal Co.:] Protologue: "Dry, gravelly bed of the Pierdenales and Cibolo Rivers, October," *F. Lindheimer 411* (holotype: GH image; isotypes: K image, MO-Fig. 63, NY image, PH-2 sheets! images, US image). Gray's protologue observation: "I notice that it is the *Kuhnia leptophylla*, Scheele in Linnaea, 21. p. 598, described from Lindheimer's specimens."

Stems and leaves evenly scabridulous to short-strigose-hirtellous with upturned hairs. Leaves linear to broader. Florets 15-36 per head. See Figs. 66-68 (Texas), Figs. 69-73 (Colorado), and Figs. 74-83 (New Mexico).

I am unable to find a morphological discontinuity between plants previously identified as *Brickellia chlorolepis* and *B. leptophylla* (as a putative Edwards Plateau endemic). Contrasts said to distinguish them (e.g., Shinnars 1946; Scott 2006) — leaf width and length, involucre height — are of variable and overlapping features. Further, west Texas plants identified and mapped by Turner (1989) and Turner et al. (2003) as *B. eupatorioides* var. *corymbulosa* also are indistinguishable from the leptophylla/chlorolepis morphology.

Turner (1989, p. 130, 131) noted that "The var. *gracillima* is clearly closely related to, and probably derived from, the var. *chlorolepis*" and ... "var. *gracillima* appears to intergrade westward into the var. *chlorolepis* and I can see little justification in its recognition at the species level, since there is little other than leaf width to distinguish between the two." He also noted that var. *gracillima* and var. *corymbulosa*, as he identified them, occur sympatrically but with ecological separation. TEX-LL collections annotated by Turner, however, do not confirm that var. *gracillima* is restricted to stream

beds (as was claimed), nor do his Texas Atlas maps or annotations support his observation that the two entities occur sympatrically.

Scott (2006) described the range of the taxon he identified as *Brickellia eupatorioides* var. *gracillima* (with *B. leptophylla* as a synonym) as from Texas to Oklahoma, Arkansas, and Missouri (and as shown by the accompanying dot map) — the rationale for this geographical concept is obscure.

Southern Arizona variant

Plants from Santa Cruz Co., Arizona, and along the southern boundary of Cochise County have atypically hairy phyllaries, especially the outer series, and large heads with 29–35 florets. These appear to be discontinuous in morphology from surrounding populations but they do not appear to be ecologically isolated. It is inconsistent not to recognize these taxonomically, when compared to the recognition here of *Brickellia mexicana*, which is distinguished here from *B. leptophylla* by a relatively small difference in leaf morphology. Field observations might be easily decisive.

Representative collections. Cochise Co.: 5 mi S of corner [of county] near Fry on Hwy 92, grassland, 4700 ft, 8 Sep 1944, *Darrow et al. 1357* (LL); 7 mi N of Douglas along Hwy 80, dry rangeland, 5000 ft, 3 May 1990, *Helmkamp 167* (TEX); Douglas, 24 May 1928, *Peebles 5363* (LL). Santa Cruz Co.: Lochiel, 28 Jun 1967, *Moldenke 1865* (LL); NW of Sonoita, 5.2 m up the road to Gardner Canyon, open field, 14 Aug 1982, *Sundberg 1594* (TEX).

7. **BRICKELLIA MEXICANA** (Shinners) Nesom, **comb. et stat. nov.** *Kuhnia leptophylla* var. *mexicana* Shinners, *Wrightia* 21: 128. 1946. *Brickellia leptophylla* var. *mexicana* (Shinners) Shinners, *Sida* 4: 274. 1971. **TYPE: MEXICO. Durango.** Durango and vicinity, 1896, *E. Palmer 935* (holotype: GH-Figs. 84-85; isotypes: G, MICH-Fig. 86, MO, UC).

Shinners also cited *Palmer 568, 569, 934* and *936*, (see below), all from the vicinity of Durango.

Stems and leaves hispidulous to strigillose-hispidulous to strigillose with sharply upturned hairs. Leaf base often subauriculate (like *B. subauriculata*). **Heads** mostly in loose corymbs of 2–7 (see Palmer collections). **Florets** 20–26 per head; corollas yellow, sometimes drying reddish.

Areas of *Agave*, *Acacia*, *Flourensia*, *Larrea*, *Opuntia*, *Yucca*, roadsides, disturbed areas, cultivated areas; 2000–2400 m. Flowering July–October.

Additional collections. Durango. Mpio. Suchil, SW de Suchil, en los limites con el estado de Zacatecas, cerca de cultivo, 8 Oct 1980, *González & Herrera 1363* (TEX); Mpio. Pueblo Nuevo, 12.5 mi E of El Salto, 0.3 mi W of Llano Grande on Hwy 40, rocky grassy slopes, 2520 m, 5 Oct 1989, *King 9932* (MO); Tepehuanes, 4-25 Jun 1896, *Palmer 318* (MO); city of Durango and vicinity, Apr–Nov 1896, *Palmer 568* (MO), *569* (MO), *934* (MO); Mpio. Mapimi, 50 km due W of Torreon, Sierra del Rosario, 4 km S of Linda Vista and 12 km S of Santa Ines, where the road down the W side of Sierra del Rosario drops into a canyon between low mesas, desert scrub with *Yucca*, *Dasylyrion*, *Parthenium*, *Ziziphus*, *Rhus*, 5501 ft, 3 Jul 1986, *Sanders 6746* (UCR); Mpio. Durango, 4.5 mi E of El Pino, W of Cd. Durango on Hwy 40, 27 Sep 1984, *Sundberg 2899* (MO); N end of Sierra del Rosario, about 20 Km crowflight SW of Mapimí (approach from mine 3 Km E of Santa Librada), steep limestone slopes, in places heavily mineralized (fluorite etc.), *Agave*, *Yucca*, *Fouquieria*, *Quercus*, *Rhus*, 2 Nov 1972, *Wendt et al. 10018-C* (LL, MEXU). **Guanajuato.** 76 mi N of Querétaro on Hwy 57, 5 mi S of Santo Domingo, rocky hillside, 10 Sep 1962, *Turner & Powell 1121* (TEX) — inflorescence and vestiture close to *B. scoparia* but 21–24 florets/head, perhaps *B. mexicana* x *B. scoparia*; Mpio. San Diego de la Unión, 96 km S de SLP, *García P. 669* (TEX); Mpio. San Luis de la Paz, paso del Colorado por Pozos, *Ventura & Lopez 9681* (TEX); Mpio. San Luis de la Paz, Presa del Chupadero, *Ventura & Lopez 9544* (TEX); Mpio. Ocampo, 8 km NW de Ocampo, *Zamudio & Pérez 7650* (TEX). **San Luis Potosí.** 16.5 road mi N of Charcas, *Henrickson B6390* (LL); 5.7 road mi E of Salinas on Hwy 49 near border, *Henrickson 17541* (TEX); Charcas, *Lundell 5209* (LL), *5293* (TEX-2 sheets); en route from San Luis

Potosí to Tampico, Dec 1878-Feb 1879, *Palmer 1077* (US-2, images); region of San Luis Potosí, 1878, *Parry & Palmer 364* (MO-2 sheets); Mpio. Santo Domingo, 5 km N de Sabino, *Rzedowski 12048* (TEX); 42 mi S of Huizache Junction, *Smith et al. 796* (LL). **Zacatecas.** Mpio. Río Grande, carr. a Torreon, KM 33, entre Rancho Grande y Río Grande, matorral desértico espinoso con abundantes yucas, orilla de la carretera, 2130 m, 24 May 1997, *Balleza 5681* (MEXU); Mpio. Villa de Cos, carr. Zac.-C. del Oro, KM 125, matorral desértico microfilo con abundantes yucas, 2160 m, 24 Jul 1997, *Balleza 6199* (MEXU); Mpio. Miguel Auza, por la carretera de terracería a Ramón Corona Dgo. y después por el camino a Pastorcitos, pastizal a la orilla de un rio de agua termal, 2160 m, 12 Sep 1997, *Balleza 6877* (MEXU); Mpio. Miguel Auza, entre 20 de Noviembre y Tierra Generosa, por la terracería a Tierra Generosa, pastizal, 2171 m, 12 Sep 1997, *Balleza 6916* (MEXU); Mpio. Jerez, Sierra Los Cardos, terracería Parral de las Huertas-Monte de los Garcia, pastizal inducido, 2610 m, 25 Sep 1997, *Balleza 7058* (MEXU); Mpio. Sombrerete, KM 145, carretera a Zacatecas, matorral desértico espinoso, 2400 m, 27 Sep 1997, *Balleza 7217* (MEXU); Mpio. Mazapil, La Palmillas, entronque con la carretera a Camacho, matorral desértico espinoso, 1680 m, 5 May 1998, *Balleza 8334* (MEXU); Mpio. Villa González Ortega, ca. 10 km al SE de Panfilo Natera, matorral xerófilo, 2072 m, 27 Aug 1999, *Balleza 10568* (MEXU); Mpio. Villa de Cos, por la terracería a Sarteneja, matorral xerófilo, 2287 m, 8 Sep 1999, *Balleza 10625* (MEXU); Mpio. Río Grande, 500 m al E del entronque con la carretera Zacatecas-Río Grande, por la terracería a Tetillas, matorral xerófilo, 2045 m, 9 Oct 1999, *Balleza 10721* (MEXU); Mpio. Mazapil, KM 80, carretera San Tiburcio-Matehuala, matorral xerófilo, 2000 m, 22 Sep 1999, *Balleza 11098* (MEXU); Mpio. Mazapil, 2 km al este de Salaverna, por la terracería Concepción del Oro-Mazapil, pastizal, 2496 m, 23 Sep 1999, *Balleza 11125* (MEXU); Mpio. Fresnillo, 15 km N de Fresnillo, matorral xerófilo, 2000 m, 25 Oct 1968, *Díaz L. 993* (TEX); Guadalupe, 8 km al E de Zacatecas por la carr que va hacia Aguascalientes, area bastante perturbada entre la carretera y cultivos de maíz, 2190 m, 8 Oct 1978, *García P. 806* (MEXU, MO, TEX); 4 mi SE of Hwy 54 along Hwy 41 just N of Zacatecas, roadside, 7600 ft, 13 Sep 1971, *Henrickson 6662* (LL); 3.1 road mi above Concepción del Oro, ridge W of city, S-facing granite slopes, 8000 ft, 30 Aug 1971, *Henrickson 6288b* (LL); 15 air mi NE of Estación Camacho, NW slopes of Pico de Teyra, rocky granite boulder area, 7100 ft, 23 Sep 1973, *Henrickson 13428* (LL); KM 20 de la carr. Zac.-SLP, matorral microfilo, 8 Oct 1972, *Hernández X. s.n.* (TEX); Mpio. Trancoso, KM 106 de la carr. SLP-Zacatecas, matorral de *Acacia* con pastizal, 25 Sep 1983, *Romero M. s.n.* (TEX); between Fresnillo and Sombrerete along Hwy 45, 6.0 mi W of turnoff to Santa Rosa, dry grassy area with *Opuntia*, *Acacia*, 28 Sep 1984, *Sundberg 2912* (MEXU, TEX); desviación a José María Morelos 56 km, SE de Sombrerete, 55 km NW de Fresnillo, ruderal, 2130 m, 18 Oct 1982, *Tenorio L. 2189* (TEX).

8. **BRICKELLIA SUBAURICULATA** (B.L. Rob.) Nesom, **comb. et stat. nov.** *Brickellia scoparia* var. *subauriculata* B.L. Rob., Proc. Amer. Acad. Arts 47: 201. 1911. **TYPE: MEXICO. Zacatecas.** Hills of Zacatecas, 25 Oct 1888, *C.G. Pringle 1766* (holotype: GH-Fig. 87; isotypes: F, K, MEXU, NDG, NY-2, P, UC, US-Fig. 88).

Robinson emphasized the flaring leaf base of var. *subauriculata* as distinguishing it from typical *Brickellia scoparia*, but this also is a feature of *B. mexicana*, which is essentially parapatric with *B. subauriculata*. While *B. scoparia* is completely glabrous, *B. subauriculata* is consistently hirtellous and it lacks the prominently raised veins of the leaf surfaces. Florets per head 10–11.

Additional collections. Aguascalientes. 19-20 mi W of Aguascalientes, road to Calvillo, summits of hills, 2100 m, 3 Nov 1959, *McVaugh & Koelz 106* (LL, NY). **Zacatecas.** Mpio. Tepetongo, 5.6 km NE of Tepetongo, road to Garcia Salinas, disturbed roadside, 2000 m, 15 Nov (past flr) 1984, *Barrie 1105* (TEX); Mpio. Huejuquilla, ca. 2-3 km E of Huejuquilla el Alto, occasional along roadside, ca. 1900 m, 1 Nov 1963, *Feddema 2347* (TEX); Mpio. Huejuquilla, 4 km SW de Tenzompa al corral blanco, encino-pino, 1800 m, 8 Oct 1990, *Flores 2120* (TEX).

9. **BRICKELLIA ROSMARINIFOLIA** (Vent.) Weber, *Phytologia* 53: 187. 1983. *Kuhnia rosmarinifolia* Vent., *Descr. Pl. Nouv.*, t. 91. 1803. **TYPE:** The handwritten specimen label says only "ex Hort. Cels" and gives two names: "Eupatorium canescens Ortega Decas 3, p. 34" and *Kuhnia rosmarinifolia* Hort. Cels. pl." Printed is "Herbier de Ventenat" Holotype, as specified on the sheet: G 00341474-Fig. 92; probable isotypes: G 00465367 image, G 00465366, image. Plate from the protologue - Fig. 93.

Eupatorium canescens Ortega, *Nov. Rar. Pl. Descr. Dec.*, 34. 1797 (not *Eupatorium canescens* Vahl 1793). **TYPE. MEXICO.** Hort. Cels, 8 Aug, no other collection data (type material: MA images, *Sessé & Mociño* 2687, 2717, 2744, 3385 — Figure 94 shows one of the MA sheets (2717). Cited in synonymy of *Kuhnia rosmarinifolia* by Ventenat, who surely recognized that *Eupatorium canescens* was a later homonym.

The protologue of *Kuhnia rosmarinifolia* says the plant was cultivated in Paris by Cels from seeds originally sent from the royal garden of Madrid by "M. Ortega" (Casimiro Gómez Ortega, 1741-1818, director of the Real Jardín Botánico de Madrid). "Plante herbacée, vivace, originaire de l'Isle de Cuba, cultivée chez Cels de graines envoyées du jardin royal de Madrid, par M. Ortega. Elle passe l'hiver dans l'orangerie, et fleurit sur la fin de l'été." Attribution of its origin to Cuba, however, reflected a misunderstanding, as it surely came from Mexico. The Cuban flora checklist (Greuter & Rodríguez 2016) includes no species of Eupatorieae with a plumose pappus, but exploration of Mexico was underway during Ortega's tenure, commissioned from the Madrid Botanical Garden and led by Martín Sessé, a correspondent of Ortega, and Mexican collections were accumulating at MA (e.g., Sessé and Mociño collections cited above as type material of *Eupatorium canescens*).

- Kuhnia microphylla* Shinnery, *Wrightia* 1: 127. 1946. **TYPE: MEXICO. Puebla.** Vicinity of Puebla, Fort de Loretto [Loreto], 2200 m, 5 Aug 1911, *Bro. Nicolas* 5932 (holotype: GH-Fig. 95); isotypes: MO-2 sheets!, US-2 sheets). Not *Brickellia microphylla* (Nutt.) A. Gray.

Distinguished by linear leaves, solitary heads on long, leafy/bracteate peduncles, and thin-membranous phyllaries. Florets 16–30 per head.

Shinnery (1946) believed the plants of the type collection of *Kuhnia schaffneri* to be a "damaged growth form" of the plants he identified as *K. microphylla*. He coined the new name (*K. microphylla*) with a new type because he believed that two swollen roots on the *K. schaffneri* type sheet belonged to a different species than the two leafy plants, and thus "the name *Kuhnia schaffneri*, being based on a mixture, must be rejected." His surmise about the root variation was incorrect (see Fig. 124 for attached, swollen-bulbous roots) and the morphology of *K. schaffneri* sensu stricto is distinct from *Kuhnia microphylla* Shinnery (= *B. rosmarinifolia*).

Major references have used the name *Kuhnia rosmarinifolia* to identify widely distributed, narrow-leaved plants of Mexico and the USA — e.g., Hemsley (1881-1882: as synonym of *K. eupatorioides*), Wootton & Standley (1915: *K. rosmarinifolia* and *K. chlorolepis*), and Kearney & Peebles (1942: var. *rosmarinifolia* and var. *chlorolepis*). Weber transferred the name to *Brickellia* to include southwestern USA plants as *B. rosmarinifolia* subsp. *chlorolepis*. King & Robinson (1987) listed *K. rosmarinifolia* as "ignota" in their Nomenclator, perhaps having not seen the type.

Following the taxonomy of Shinnery, *Brickellia rosmarinifolia* is the species identified by McVaugh (1984), and apparently by Rzedowski & Calderón (2013) as *B. schaffneri*. The collection cited by McVaugh, however, from Jalisco (SW of Ojuelos, *McVaugh & Koelz* 21) is identified here as *B. mexicana* — other collections of *B. mexicana* have been made from the same area: e.g., *Alcocer* 142 and 166 (MEXU), *Harker & Carillo* 1266 (MEXU).

Additional collections. Hidalgo. *Johnston* 4022A (MEXU, TEX); *Pringle* 9932 (MEXU, MO, US), 11545 (US); *Seler* 623 (US). **México.** *Balls* 4074 (US); *Hinton* 3067 (MEXU); *Lyonnet* 783 (LL, MEXU, MO, US); *Matuda* 21993 (MEXU); *Rzedowski* 26852 (LL), 30741 (MEXU), 31944 (MEXU). **Michoacan.** *Arsène* 5127 (MO, US), 5824 (MO, US), 7248 (US), 9012 (MO, US), 9929 (MO, US); *Diaz-*

Barriga 6880 (MEXU); *Iltis et al.* 28788 (TEX); *Rzedowski* 49574 (MEXU, TEX); *Soto N.* 6463 (MEXU). **Puebla.** *Arsène* 308 (US), 1539 (US), 7163 (US); *Vibrans* 7118 (MEXU). **Tlaxcala.** *Vibrans* 872 (MEXU). **Veracruz.** *Nee* 33162 (MO, TEX); *Sharp* 44806 (MEXU); *Villasenor* 1660 (MEXU).

10. **BRICKELLIA CORYMBOSELLA** Nesom, **sp. nov.** **TYPE: MEXICO. Durango. Mpio. Ocampo:** 70 mi SE of Parral, 23 mi SE of Las Nieves, rocky alluvium along a dry wash, grassy savanna country, ca. 6000 ft, stems clustered on a stout taproot and branched caudex, 1 Oct 1965, *Cronquist 10255* (holotype: MEXU; isotypes: NY, TEX, US-Fig. 97).

Distinct from *Brickellia leptophylla* in its heads in corymboid clusters on short peduncles, smaller heads with fewer florets (9–14 vs. 15–36), and shorter achenes. Similar to *Brickellia oreithales* in its tendency for nodding heads, filiform peduncles, and nearly glabrous phyllaries; different in its dilated leaf bases, compactly clustered heads on shorter peduncles and fewer florets (9–14 vs. 21–26).

Leaves linear-oblong, blade slightly dilated (subauriculate) at the base. **Heads** on filiform peduncles in terminal clusters of 3–6. **Involucres** 4–10 mm long, 4–6 mm wide; phyllaries glabrous or sparsely and minutely glandular along the midrib at the apex. **Florets** 9–13(–14) per head, corollas cream.

Additional collections. Chihuahua. [Mpio. Chínipas]: Sierra Charuco, Rio Mayo, pine woods, rocky eminence in open woods, 1 Oct 1936, *Gentry 2912* (MO). Mpio. Matamoros: 4 mi SW of Villa Matamoros, tuffaceous monadnock (Sierra de Sta. Barbara), 6000–6300 ft, 4 Oct 1959, *Correll & Gentry 22767* (LL, NY). Mpio. San Fco. de Oro: 15.4 mi SW of Parral on Hwy 24 toward El Vergel, heavily grazed area of scattered oaks with *Acacia*, uncommon on road bank, 1890 m, 22 Oct 1987, *Nesom 5476* (TEX). Mpio. San Pablo Balleza: SW of Parral on Hwy 24, ca. 37.7 mi NE of El Vergel, grassland with scattered oaks, near bottom of valley, 1970 m, common perennial up to 1.3 m tall, forming clumps with numerous stems from the base, heads nodding on some plants, much variation among individuals in red pigmentation of involucre, 21 Oct 1987, *Nesom 5740* (TEX). Mpio. Temósachi: Nabogame, field, 20 Oct 1988, *Laferrière 2167* (TEX); Nabogame, pine-oak-*Cupressus arizonica* forest, 1800 m, 28 Oct 1988, *Laferrière 2220* (TEX); Nabogame, field, 28 Oct 1988, *Laferrière 2232* (TEX). **Durango. Mpio. Hidalgo:** La Zarca, grama grassland, ca. 7000 ft, 11 Nov 1959, *Gentry & Arguelles 18141* (ARIZ, LL, US). Mpio. Ocampo: Near Torreón de las Cañas, grama grassland, ca. 6500 ft, 24 Oct 1959, *Gentry & Arguelles 18049* (ARIZ, LL). Mpio. Santiago Papasquiaro: 9 km E de Santiago Papasquiaro, carr. a Durango, pastizal on *Opuntia*, *Quercus*, 1950 m, 14 Oct 1982, *Tenorio L. 2121* (MO, TEX-2 sheets).

The relatively distant separation of the plants from Nabogame from those around Parral suggests that populations in the intervening area are uncollected or perhaps that the Nabogame plants may be differentiated in other ways and may prove to be a different species.

11. **BRICKELLIA SCOPARIA** (DC.) A.Gray, Smithsonian Contr. Knowl. 3(5): 84. 1852. *Clavigera scoparia* DC., Prodr. 5: 128. 1836. *Coleosanthus scoparius* (DC.) Kuntze, Revis. Gen. Pl. 1: 328. 1891. **LECTOTYPE** (McVaugh 1984, p. 178): **MEXICO. Guanajuato.** Leon ("prov. Leonensi"), à l'ouest de Guanajuato, 1829, *J. Mendez s.n.* (G-DC, G00465330-Fig. 98).

Clavigera scabra Benth., Pl. Hartweg. 19. 1839. **TYPE: MEXICO. Jalisco.** Bolaños, 1838, *C.T. Hartweg 138* (holotype: K image; isotypes: E image, LD image, NY image, P image).

Distinguished by a long, nearly cylindrical inflorescence or an aggregation of cylinders and 9–12 florets per head. Glabrous leaves with prominently raised-reticulate venation are a constant feature over the whole range of *Brickellia scoparia*. Leaves mostly are crowded, glabrous, and linear with raised-reticulate venation and narrowly revolute margins (uncommon variants have narrowly oblong blades).

For the Valley of Mexico, Tancredi (1985) treated *Brickellia scoparia* within *Brickellia* apart from sect. *Kuhnia*, which was treated as the genus *Kuhnia* (Espinosa G. 1985).

Additional collections. Jalisco. Mpio. Huejuquilla, 4 km SW de Tenzompa rumbo al corral blanco, bosque de encino-pino, 1800 m, 8 Oct 1990, *Flores M. 2120* (TEX). **Zacatecas.** Mpio. Nochistlán, Nochistlán, salida oeste, rumbo a Tlachichila, zona urbana, orilla de la carretera, 1890 m, 17 May 1997, *Balleza 5627* (MEXU); Mpio. Monte Escobedo, carretera Huejucar (Jal) - Monte Escobedo, cultivo de sorgo, 2050 m, 10 Oct 1997, *Balleza 7437* (MEXU); Mpio. Tepetongo, 5.6 km NE of Tepetongo on road to García Salinas, disturbed roadside, 2000 m, 15 Nov 1984 [past flower], *Barrie 1105* (TEX, UCR); KM 20 de la carr. Zacatecas-SLP, matorral micrófilo, con manchones de *Bouteloua curtipendula*, 8 Oct 1972, *Hernández X. s.n.* (TEX). **San Luis Potosí.** 5 km al S de Cd. del Maíz, 1400 m, 27 Oct 1956, *Rzedowski 8286* (MEXU). **Veracruz.** Région d'Orizaba, 19 Sep 1865-1866, *Bourgeau 3345* (US); Santa Lucrecia, Isthmus of Tehuantepec, Apr 1895, *Smith 581* (MEXU). **Zacatecas.** Mpio. Villanueva, carretera Zacatecas-Guadalajara, desviación a Laguna del Carretero, pastizal inducido, 2220 m, 1 Oct 1997, *Balleza 7245* (MEXU); Mpio. Joaquín Amaro, por la terracería Tabasco-Joaquín Amaro, 500 m al sur de Joaquín Amaro, bosque de encino, zona agrícola, 14 Oct 1998, *Balleza 9517* (MEXU); ca. 7.5 road mi SW of Mezquital del Oro, less than 1 mi from Jalisco boundary, open grass-oak-*Acacia* country, ca. 4500 ft, 10 Nov 1962, *Cronquist 9827* (MEXU, NY, TEX).

12. **BRICKELLIA CORYMBOSA** (DC.) A. Gray, Smithsonian Contr. Knowl. 3(5): 84. 1852. *Clavigera corymbosa* DC., Prodr. 5: 128. 1836. *Coleosanthus corymbosus* (DC.) Kuntze, Rev. Gen. Pl. 1: 328. 1891. **LECTOTYPE** (designated here): **MEXICO. Guanajuato.** Leon, 1829, *J. Mendez s.n.* (G-DC sheet 2, 00465343-Fig. 103; isolectotypes: sheets 1, 3, and 4 at G-DC, images!).

Additional collections. MEXICO. México. Mpio. Temascaltepec: Ypericones top, 1 Jan 1933, *Hinton 3067* (MEXU). **Michoacan.** Mpio. Tacámbaro: Cerro El Paile, camino a la Chicharronera, 8 Nov 1986, *Diaz-Barriga 3364* (MEXU). **Querétaro.** Camino entre carr. a Mexico y San Miguel de Allende, KM 10 approx., 25 Oct 1976, *Arguelles 622* (MEXU-Fig. 104); Mpio. San Juan del Río, alrededores de Cazadero, pastizal sobre ladera poco inclinada, 2250 m, 23 Nov 1991, *Rzedowski 51040* (TEX).

Brickellia corymbosa was recognized by McVaugh (1984), who knew it from only the type collection, but apparently not recently by others beyond B.L. Robinson in 1917. Shinnars (1946) did not include it even as a synonym; Tancredi (1985) treated it as a synonym of *B. scoparia*. Judging from the few collections, it apparently is uncommon but the four cited here are in an area of ca. 90 mile radius. The filiform leaves and corymboid arrangement of heads on filiform, minutely bracteate peduncles are distinctive. Floret number per head is ca. 20, in contrast to the lower number in *B. scoparia* (9–12).

13. **BRICKELLIA MICHILIENSIS** Nesom, **sp. nov.** **TYPE: MEXICO. Durango.** Mpio. Suchil: Reserva de la Michilía, bosque de encino-pino, junto al arroyo, 20 Sep 1985, *J. Alvarado 51* (holotype: TEX-Fig. 105).

Similar to *Brickellia oreithales* in its nodding heads on filiform peduncles. Similar to *Brickellia scoparia* and *B. subauriculata* in its densely leafy stems, columnar inflorescence, few-flowered (10–11) heads, and barbellate pappus bristles. Distinct from *B. scoparia* in its leaves glandular only abaxially and without raised venation. Distinct from *B. subauriculata* in its vestiture of much shorter hairs and leaf blades without a flaring base. *Brickellia extranea* is the only other entity in southern Durango with few-flowered heads.

Stems 0.8–1 m tall, erect, minutely puberulent. **Leaves** linear-lanceolate, densely arranged, axillary shoots at all nodes to the distal portion, densely sessile-glandular abaxially, glabrous to

minutely hispidulous adaxially, venation not raised, base of blades not subauriculate. **Heads** in a columnar-paniculate to subracemose thyrse, on filiform peduncles 5–10 mm long, slightly nodding. **Involucres** obtriangular, 4–5 mm wide (pressed); phyllaries glabrous, purplish, minutely glandular in vertical lines, margins eglandular. **Florets** 10–11 per head; corollas 5–6 mm long, yellow, tube and throat sometimes drying reddish. **Achenes** 3–3.5 mm long, sparsely hairy on the distal 1/3; pappus bristles slightly shorter than the corollas, barbellate to barely plumose (barbels 0.01 mm long at base of bristle).

Additional collection. Durango. Mpio. Suchil: Reserva de la Michilía, Arroyo El Taray, bosque de encino-pino, 2400 m, 1 Oct 1983, *González & Tena 2528* (TEX-Fig. 106).

14. **BRICKELLIA OREITHALES** (B.L. Rob.) Shinnars, *Sida* 4: 274. 1971. *Kuhnia oreithales* B.L. Rob., *Proc. Amer. Acad. Arts* 54: 263. 1918. **TYPE: MEXICO. Chihuahua.** Near Colonia Garcia in the Sierra Madres, 7500 ft, 16 Aug 1899, *C.H.T. Townsend & C.M. Barber 260* (holotype: GH; isotypes: GH, MEXU, MO!, NY-Fig. 107, TEX!, US). Images of all.

Kuhnia triplinervis Blake, *Contr. U.S. Natl. Herb.* 22: 591. 1924. **TYPE: MEXICO. Chihuahua.** 15 mi S of Guadalupe y Calvo, 2285–2440 m, 22 Aug 1898, *E.W. Nelson 4825* (holotype: US-Fig. 108).

Florets 21–26 per head. Peduncles filiform, nodding. Phyllaries sparsely and minutely hirtellous. Corollas cream white.

Collections examined. Chihuahua. Mpio. Bocoyna, mesa W of Creel between Creel and Rio Oteros, pine-oak, 2360 m, 16 Oct 1977, *Bye & Weber 8193* (LL); Agua Amarillo, ca. 5 mi NW of Chinatú, wooded slope, 7800 ft, 10 Oct 1959, *Correll 22991* (TEX-3 sheets); Sierra Mohinora, La Rocha, along tributary of Rio del Soldado, N-facing conifer slope, 7500 ft, 14–15 Oct 1959, *Correll & Gentry 23129* (LL); Rio Mayo, Memelichi, pine, meadow margin, 7500 ft, 16 Sep 1936, *Gentry 2767* (MO); 34 mi W of La Junta on road to Parque Nacional Cascada de Basaseachic, 2100 m, 10 Oct 1989, *King 9889* (MO); near tourist cabins at Tonachic, Arroyo Chorro de Agua, 2200 m, 30 Sep 1986, *Martin & O'Rourke s.n.* (TEX); Mpio. Ocampo, area of Cascada de Basaseachic, steep E-facing slope with large boulders and rock faces above river and trail to falls, moist bank above trail, *Pinus-Cupressus-Quercus-Garrya*, 17–20 Oct 1986, *Nesom 5679* (TEX); Mpio. Madera, 3.1 mi W of Hwy 16 along road to Rio Papigochic, oak-pine with *Ceanothus*, 22 Sep 1984, *Sundberg 2784* (TEX). **Durango.** 54 mi NE of Estacion Coyotes, just E of Guachichilas, along a lumber road, 9000 ft, steep slope with *Abies*, 5 Nov 1970, *Breedlove 18800* (MICH); Mpio. El Mezquital, 3 km NE de Pajaritos, encinos con pinos, 2800 m, 31 Oct 1982, *Gonzalez & Rzedowski 2305* (MEXU, TEX); along Hwy 40 W of Durango, near KM 63, ca. 2662 m, 1 Oct 2004, *King & Garvey 13589* (TEX); along Hwy 40 W of Durango, near KM 84, ca. 2500 m, 4 Oct 2004, *King & Garvey 13636* (TEX); Santiago Papasquiario, 43 km E de Altares sobre la carr. a Durango, pino-encino, 2350 m, 31 Aug 1991, *Panero 2263* (TEX); along dirt road from Hidalgo del Parral to El Vergel, ca. 49 mi W of Parral and 13.2 mi W of Ojito, limestone outcrops, 8400 ft, 13 Sep 1972, *Reveal 3059* (MEX); along Hwy 40, 9.0 mi W of Las Adjuntas, 20.5 mi W of El Salto, moist slopes with banks with pine-oak, 26 Sep 1973, *Reveal 3493* (TEX). **Sonora. Mpio. Alamos:** Sierra de Alamos, ca. 5.5 km SW of Alamos along the trail from La Huerta to Pico de Aguila, 1600 m, pine-oak woodland, 24 Nov 1997, *Steinmann 1329* (ASC). **Mpio. Yecora:** 1.1 km N of El Llano on Mesa del Campanero, disturbed roadside, 2150 m, 18 Sep 1999, *Reina G. 99-750* (TEX); El Kipor (Quipor), rare in field 1680 m, 11 Sep 1996, *Van Devender 96-528* (TEX); N end of Mesa del Campanero, near microwave tower, edge of mesa, pine-oak, 2240 m, 1 Oct 2000, *Van Devender 2000-803* (TEX); Rancho La Cuevita, Mesa del Campanero, above Puerto de la Cruz, pine-oak, corn field, 2131 m, 1 Oct 2003, *Van Devender 2003-1135A* (TEX).

15. **BRICKELLIA EXTRANEA** McVaugh, Fl. Novo-Galiciana 12: 161, fig. 24. 1984. **TYPE: MEXICO. Jalisco.** Mpio. Mezquitic: 5 km al E del Rancho El Mortero, bosque de *Quercus macrophylla* y *Pinus lumholtzii*, 2200 m, 5 Nov 1963, *J. Rzedowski 17698* (holotype: MICH, Figs. 112-113; isotype: ENCB image).

Leaves lanceolate to elliptic-lanceolate, surfaces with prominently raised veins. Phyllary margins eglandular. Florets 11–12 per head. Figs. 112-117.

In the protologue, McVaugh noted that "This is superficially much like *Brickellia adenolepis*, with which it is sufficiently contrasted in the key." He described the pappus bristles of *B. extranea* as "subplumose," with the "barbs toward the bases of the bristles 1.5–2 times as long as the thickness of the bristles." Shinnars (1946, p. 142) earlier had noted that the pappus of *B. adenolepis* is "less strongly plumose than in most species of the genus" and other features indicate that similarities of these two species are more than superficial.

Additional collections. Durango. Mpio. Mezquitil, 48 km WNW of Huejuquilla El Alto, Jal., on road to Canoas, Dur., crest of ridge, *Pinus-Arbutus-Quercus* with steep slopes to north and south, 2530 m, 21 Oct 1983, *Breedlove 59040* (TEX); ca. 26 mi S of Durango (at bridge over river) on road to La Flor, 23° 42.304 N, 104° 44.182 W, ca. 2400 m, 17 Nov 2006, *Scott 1412* (ASC); Mpio. Mezquitil, ca. 11 km de La Guajolota, quebrada con bosque de encino con pino, 29 Nov 1985, *Solis 366* (TEX); 29.5 km SW of San Juan de Michis, 68.2 km from Suchil, on the way to Mezquitil, open rocky slopes, 11 Oct 1997, *Yahara et al. 889* (MO). **Nayarit.** Mpio. El Nayar, along the Arroyo Santa Rosa W of Santa Teresa 100 air km NNE of Tepic, rocky ridge with *Pinus*, *Quercus*, and *Arbutus* dissected by a grassy spring-filled valley, 2095 m, 21-24 Oct 1979, *Breedlove 44506* (MEXU). **Sinaloa.** Mpio. Concordia, carretera Maz.-Dgo. entre Potrerillos y La Petaca, bosque de pino con encino con presencia de *Pinus tenuifolia* y *P. oocarpa*, 1500 m, 24 Oct 1986, *Vega 2176* (MEXU); 3 km al sur de El Palmito, por la carr. Durango-Mazatlán, bosque mixto de *Pinus-Quercus*, 2340 m, 7 Nov 1986, *Villasenor 1022bis* (RSA).

16. **BRICKELLIA ADENOLEPIS** (B.L. Rob.) Shinnars, Sida 4: 274. 1971. *Kuhnia adenolepis* B.L. Rob., Proc. Amer. Acad. Arts 47: 201. 1911. **TYPE: MEXICO. Jalisco.** Chapala Mts., near Guadalajara, 13 Dec 1889, *C.G. Pringle 2933* (holotype: GH-Fig. 118).

Stems and leaves glabrous. Leaves narrowly lanceolate to lanceolate or elliptic-lanceolate, margins often coarsely toothed, surfaces with prominently raised venation. Phyllary margins with scattered, protruding glands. Florets "(10) 22" (McVaugh 1984) per head. From images, the heads appear relatively large and the low floret number of "10" given in parenthesis by McVaugh seems out of place.

17. **BRICKELLIA SCHAFFNERI** (A. Gray) Shinnars, Sida 4: 274. 1971. *Kuhnia schaffneri* A. Gray, Proc. Amer. Acad. Arts 17: 207. 1882. **TYPE: MEXICO. [Mexico.]** "Valley of Mexico," no date, *J.W. Schaffner s.n.* (holotype: GH-Fig. 120). Gray noted that it had been "Sent by the discoverer, without a name, to Dr. Cosson of Paris."

Brickellia leonis Rzed. & Calderón, Acta Bot. Mex. 103: 12. 2013. **TYPE: MEXICO. Michoacan.** Mpio. Lagunillas: Cerca de Fontezuelas, bosque de encino y claros adyacentes, 2100 m, 2 Jun 1990, *J. Rzedowski 49357* (holotype: IEB not seen, line drawing in protologue!).

Distinguished by its thickened, punctate-glandular leaves and solitary heads on long, ebracteate or minutely bracteate peduncles. Florets 20-23 per head. The plant shown in the line drawing of *B. leonis* (protologue) is unambiguously the same species as the type of *Kuhnia schaffnerii*. The relatively early flowering period (April-July) of *B. schaffneri* also appears to be distinctive among its congeners.

Compared to *Brickellia schaffneri*, *B. rosmarinifolia* has more numerous heads (peduncles on branching stems) in a loosely corymboid arrangement, thinner leaves, and the ebracteate or bracteate peduncles are much shorter. The two are distinct in aspect. Rzedowski & Calderón (2013) compared *B. leonis* to *B. adenolepis*, based on a perceived similarity in scapiform peduncles.

Additional collections. Puebla. Vicinity of Puebla, Laguna de San Baltasar, 9 May 1907, *Arsène 1091* (US); Mayorazgo, sur l'Atoyac, 2120 m, 20 May 1907, *Arsène 1129* (MEXU, US); vicinity of Puebla, Hacienda Batan, near Totimehuacan, 2120 m, 16 May 1907, *Arsène 1152* (US); vicinity of Puebla, Hacienda Guadalupe, barranca de la Alseseca, 2130 m, 17 Apr 1907, *Arsène 1166* (US). **Michoacan.** Mpio. Tzintzuntzan: Rancho Ziranga, sobre la carretera a Ihuatzio, pastizal secundario, 2100 m, 24 Jul 1986, *Díaz B. & López 2335* (IEB, as cited by Rzedowski & Calderón 2013).

See *Brickellia rosmarinifolia* for comments regarding confusion by Shinners between *Kuhnia microphylla* and *Kuhnia schaffneri*.

DOUBTFUL NAME

Kuhnia pyrifolia Martius, Pl. Hort. Erlang., 175. 1814. Type not located.

The entire protologue entry is this: "4 C. † n. fl." Symbols (according to the publication) indicate perennial, hot habitat, name of the plant doubtful, and not in flower. King & Robinson's 1987 nomenclator lists the name as a "nom. nud." and "= *Kuhnia rosmarinifolia*."

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Figure 16. *Brickellia eupatorioides*. Lectotype, Arduino 53, Herb. Linn. No. 238.2 (LINN).

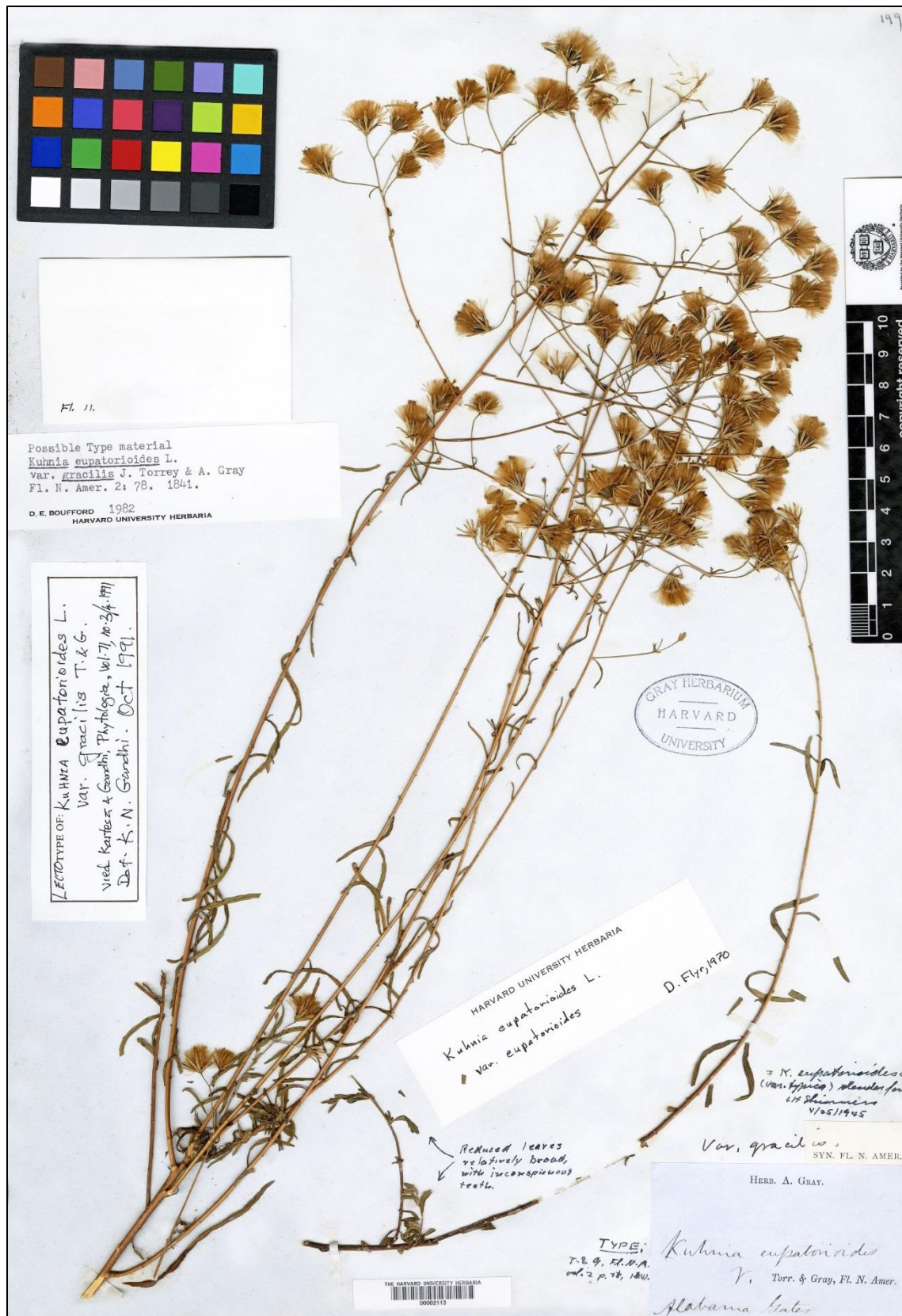


Figure 17. *Kuhn timeria eupatorioides* var. *gracilis*. Lectotype, Alabama, Gates s.n. (GH).

Figure 18. *Kuhnia mosieri*. Holotype, Florida, Small et al. 6544 (NY).

Figure 19. *Brickellia mosieri*. Curtiss 1187 (GH).



Figure 20. *Brickellia mosieri*. Curtiss 1187 (MISSA).

Figure 21. *Brickellia mosieri*. Sargent 6597 (NCSC).



Figure 22. *Brickellia mosieri*. Orzell & Bridges 20422 (USF).



Figure 23. *Brickellia mosieri*. Avery 459 (USF).



Figure 24. *Brickellia mosieri*. Lakela 26137 (USF).



Figure 25. *Brickellia eupatorioides*. Brevard Co., Florida, Schmalzer & Foster 06-144 (USF).



Figure 26. *Brickellia eupatorioides*. Wakulla Co., Florida, Godfrey 68985 (GA).



Figure 27. *Brickellia eupatorioides*. Leon Co., Florida, Komarek s.n. (TTRS).



Figure 28. *Brickellia eupatorioides*. Leon Co., Florida, Godfrey 72808 (TTRS).



Figure 29. *Brickellia eupatorioides*. Leon Co., Florida, Anderson 20487 (BRY).



Figure 30. *Brickellia eupatorioides*. Escambia Co., Florida, *Burkhalter & Hedges 9731* (UWF).



Figure 31. *Brickellia eupatorioides*. Lamar Co., Mississippi, Rogers 1674 (GH).



Figure 32. *Brickellia eupatorioides*. Perry Co., Mississippi, McDonald et al. 95224 (USMS).



Figure 33. *Brickellia eupatorioides*. Scott Co., Mississippi, Wieland 6812 (MISS).



Figure 34. *Brickellia eupatorioides*. Chickasaw Co., Mississippi, *Campbell & Seymour 1425-1-0474* (MISS).



Figure 35. *Brickellia eupatorioides*. Lafayette Co., Mississippi, Temple 2421A (GA).



Figure 36. *Kuhnia macrantha*. "Northern Texas." Holotype, Buckley s.n. (PH). Details on right.



Figure 37. *Kuhnia eupatorioides* var. *texana*. Isotype, Dallas Co., Texas, *Shinnery* 8475 (GH).



Figure 38. *Kuhnia eupatorioides* var. *texana*. Details from GH isotype.



Figure 39. *Kuhnia eupatorioides* var. *texana*. Details from GH isotype.



Figure 40. *Kuhnia eupatorioides* var. *ozarkana*. Holotype, Palmer 33075 (MO)



Figure 41. *Kuhnia suaveolens*. Holotypus, cultivated by Prince Maximilian (FR).



Figure 42. *Kuhnia suaveolens*. Detail from holotype.



Figure 43. *Kuhnia eupatorioides* var. *corymbulosa*. Lectotype (GH).

Figure 44. *Kuhnia fitzpatrickii*. Holotype (RM).



Figure 45. *Kuhn timeria gooddingii*. Holotype (RM).



Figure 46. *Kuhnia reticulata*. Holotype (RM).

Figure 47. *Kuhnia hitchcockii*. Isotype (GH).

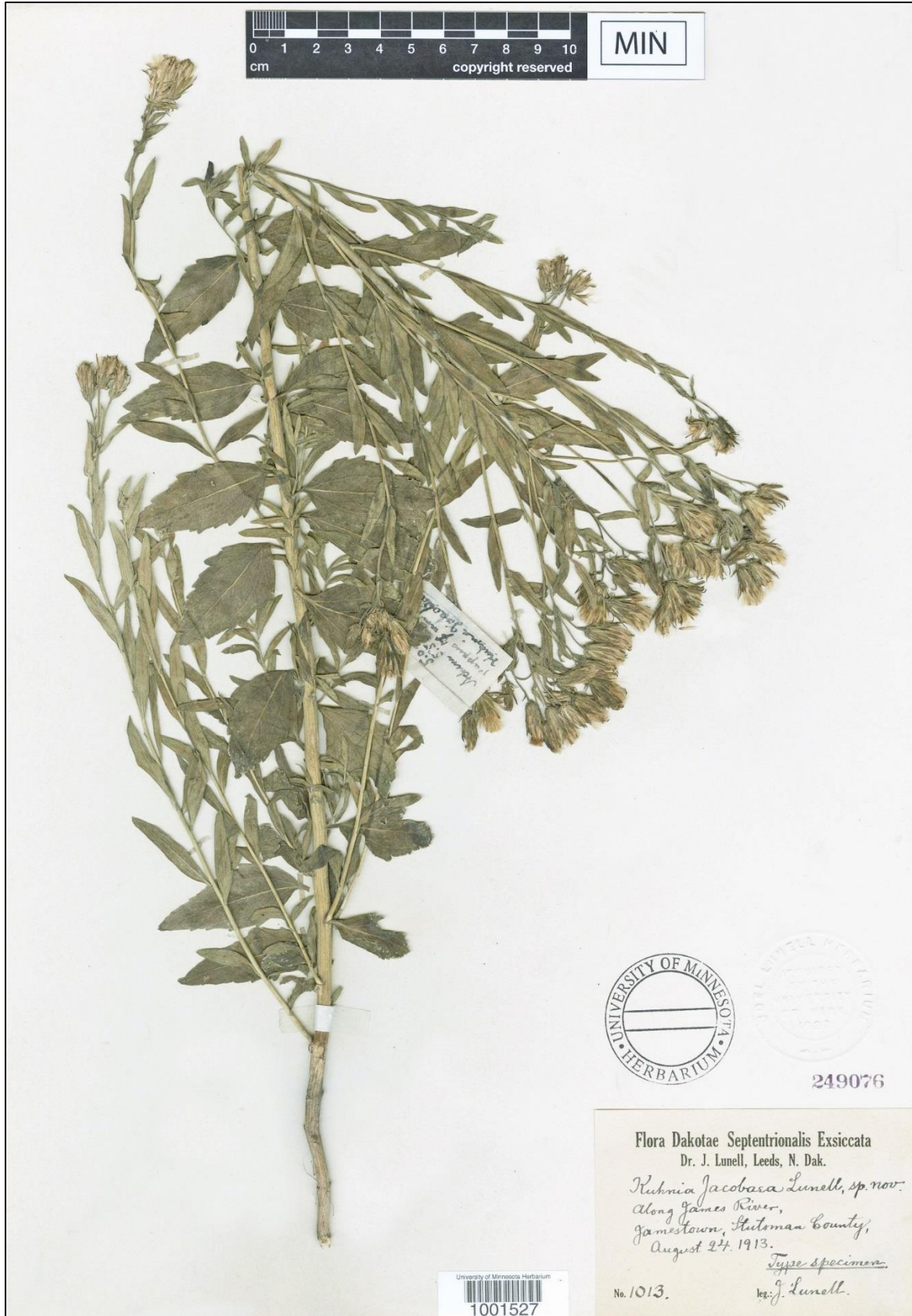


Figure 48. *Kuhnia jacobaea*. Holotype (MINN).



Figure 49. *Brickellia suaveolens*. Dane Co., Wisconsin (WIS).



Figure 50. *Brickellia suaveolens*. Dane Co., Wisconsin (WIS).



Figure 51. *Brickellia suaveolens*. Dane Co., Wisconsin (WIS).



Figure 52. *Brickellia suaveolens*. Dane Co., Wisconsin (WIS).

Figure 53. *Brickellia suaveolens*. Dane Co., Wisconsin (WIS).



Figure 54. *Brickellia suaveolens*. Dane Co., Wisconsin (WIS).



Figure 55. *Brickellia suaveolens*. Dane Co., Wisconsin (WIS).



Figure 56. *Brickellia suaveolens*. Dane Co., Wisconsin (WIS).



Figure 57. *Brickellia suaveolens*. Wabaunsee Co., Kansas (LSU).



Figure 58. *Brickellia suaveolens*. Norton Co., Kansas (KANU).



Figure 59. *Brickellia suaveolens*. Ellis Co., Kansas (KANU).



Figure 60. *Brickellia suaveolens*. Lyon Co., Kansas (KANU).



Figure 61. *Brickellia suaveolens*. Brown Co., Kansas (GA).



Figure 62. *Brickellia suaveolens*. Bourbon Co., Kansas (KANU).



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MISSOURI
BOTANICAL
GARDEN

1999. Texas Coll. 1866.
Erigeron
 A. Lindheimer's *multiflorus* var.
leptophyllus (Nesom) 433
 Type name *pedunculatus* var. *leptophyllus*
 (Nesom) 433
 Type: *Stemmatocarpus* var. *leptophyllus*
 (Nesom) 433
 15 miles west of Brownsville.
 F. Lindheimer

3533007
 MISSOURI
 BOTANICAL GARDEN
 HERBARIUM

Type Specimen
 HFRB. M. E. G.

TROPICOS
 Image/

Isotype
Kuhnia leptophylla Scheele
 Linnaea 21: 598. 1846. Lindheimer 433/435
 MISSOURI BOTANICAL GARDEN

Flora Texana exsiccata,
 411.
 Fasc. III. leg. F. Lindheimer, 1846.

Figure 63. *Kuhnia leptophylla*. Comal Co., Texas, isotype (MO).



Figure 64. *Kuhnia leptophylla*. Comal Co., Texas, isotype (PH).

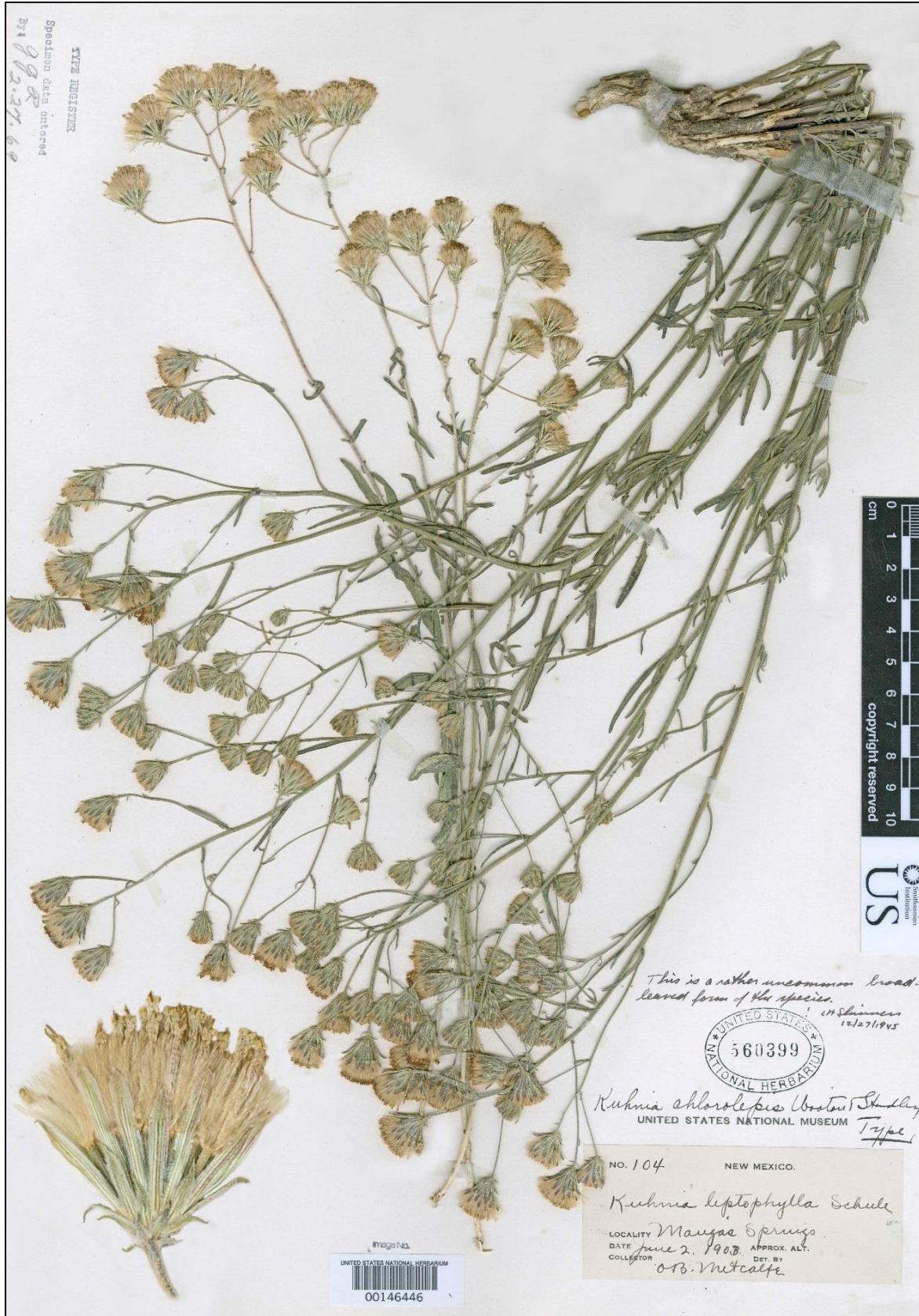


Figure 65. *Kuhnia chlorolepis*. Grant Co., New Mexico, holotype (US).

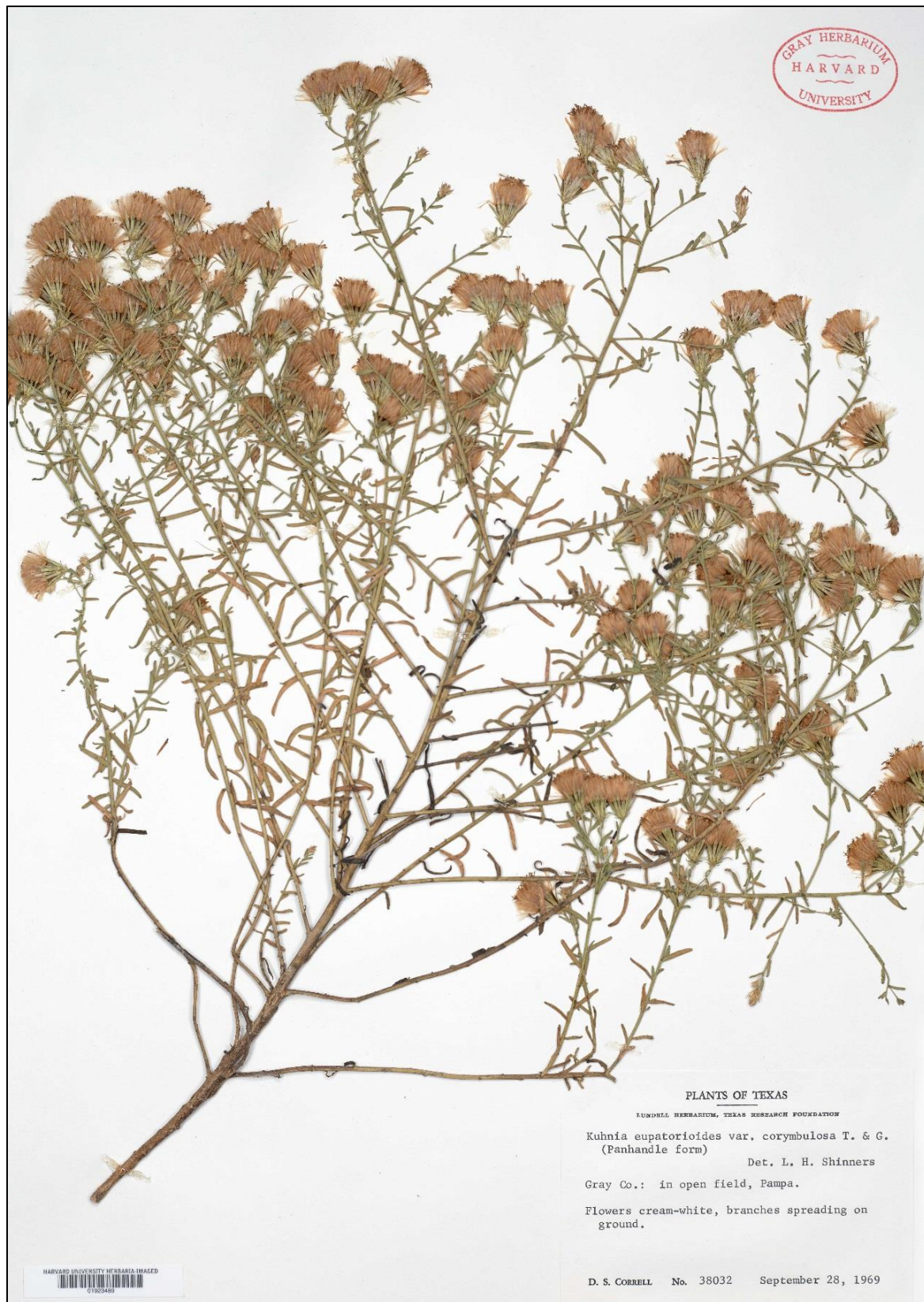


Figure 66. *Brickellia leptophylla*. Zavalla Co., Texas (GH).

Figure 67. *Brickellia leptophylla*. Zavalla Co., Texas (GH).



Figure 68. *Brickellia leptophylla*. Zavalla Co., Texas (GH).

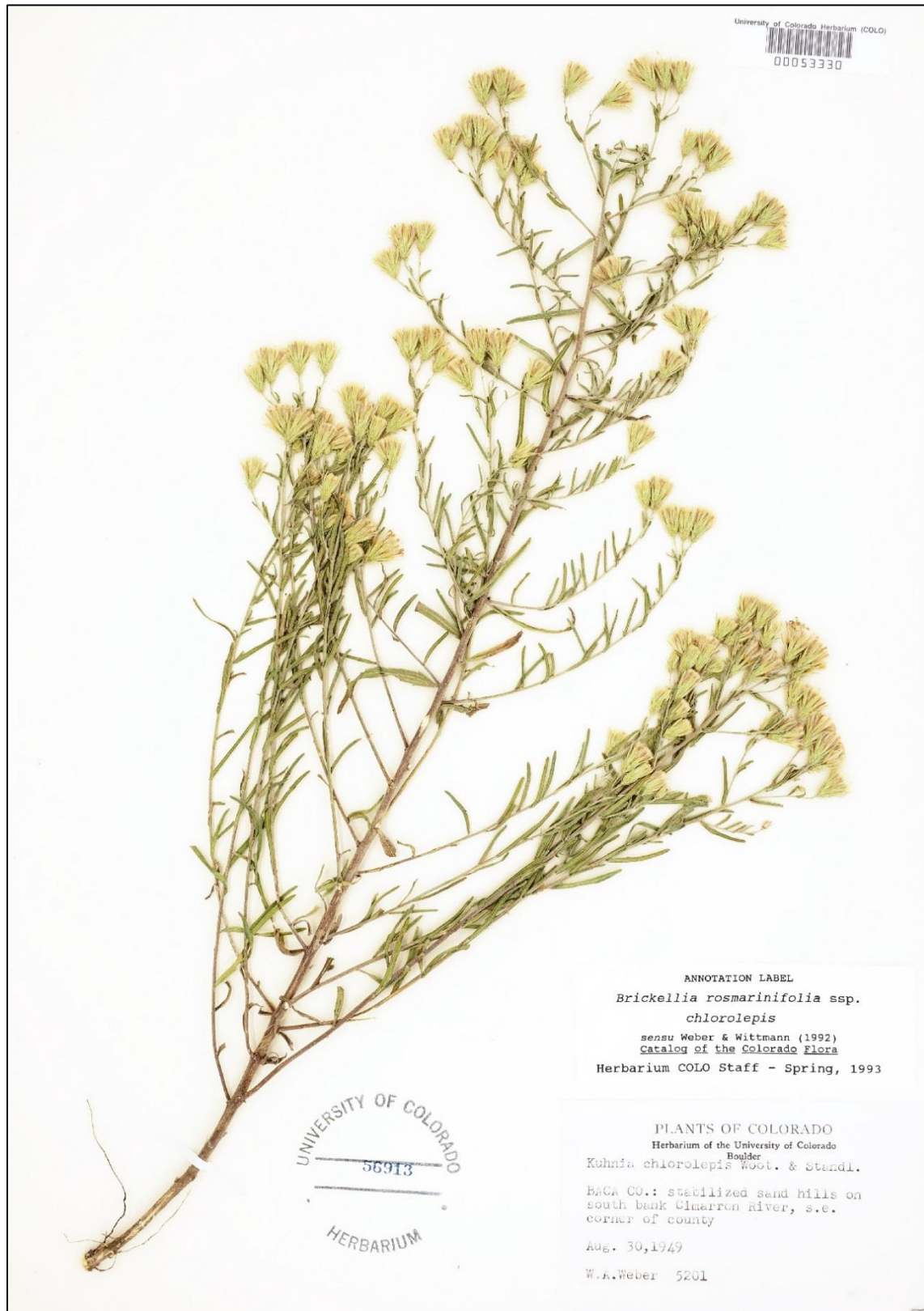


Figure 69. *Brickellia leptophylla*. Baca Co., Colorado (COLO).



Figure 70. *Brickellia leptophylla*. Archuleta Co., Colorado (SJC).



Figure 71. *Brickellia leptophylla*. Saguache Co., Colorado (COLO).



Figure 72. *Brickellia leptophylla*. Jefferson Co., Colorado (COLO).



Figure 73. *Brickellia leptophylla*. Jefferson Co., Colorado (KANU).



Figure 74. *Brickellia leptophylla*. Eddy Co., New Mexico (BRY).



Figure 75. *Brickellia leptophylla*. Roosevelt Co., New Mexico (COLO).



Figure 76. *Brickellia leptophylla*. San Miguel Co., New Mexico (BRY).

Figure 77. *Brickellia leptophylla*. Taos Co., New Mexico (RM).

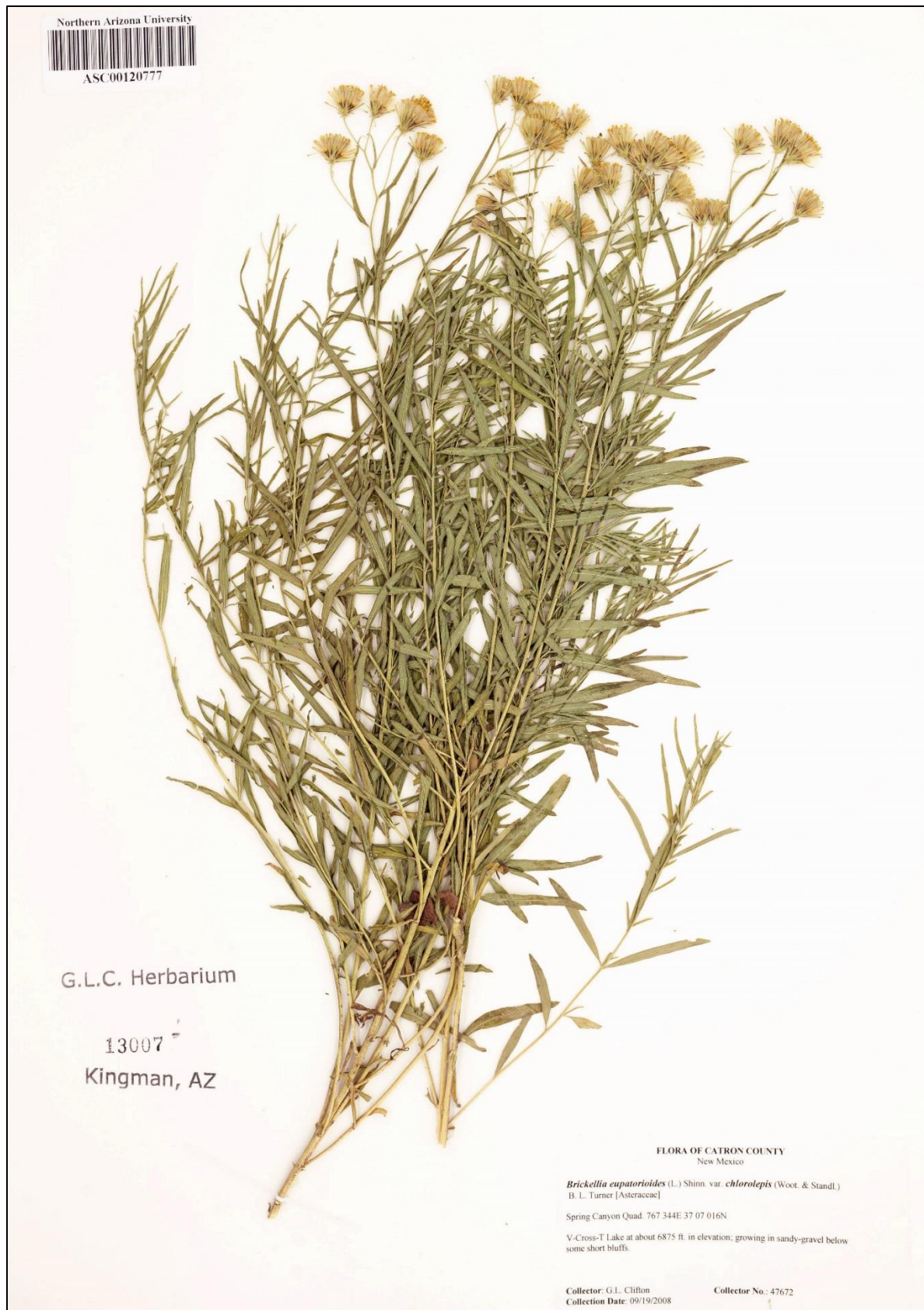


Figure 78. *Brickellia leptophylla*. Catron Co., New Mexico (ASC).



Figure 79. *Brickellia leptophylla*. Catron Co., New Mexico (GH).



Figure 80. *Brickellia leptophylla*. Colfax Co., New Mexico (BRY).



Figure 81. *Brickellia leptophylla*. Grant Co., New Mexico, isotype (BRY).



Figure 82. *Brickellia leptophylla*. Grant Co., New Mexico (KANU).

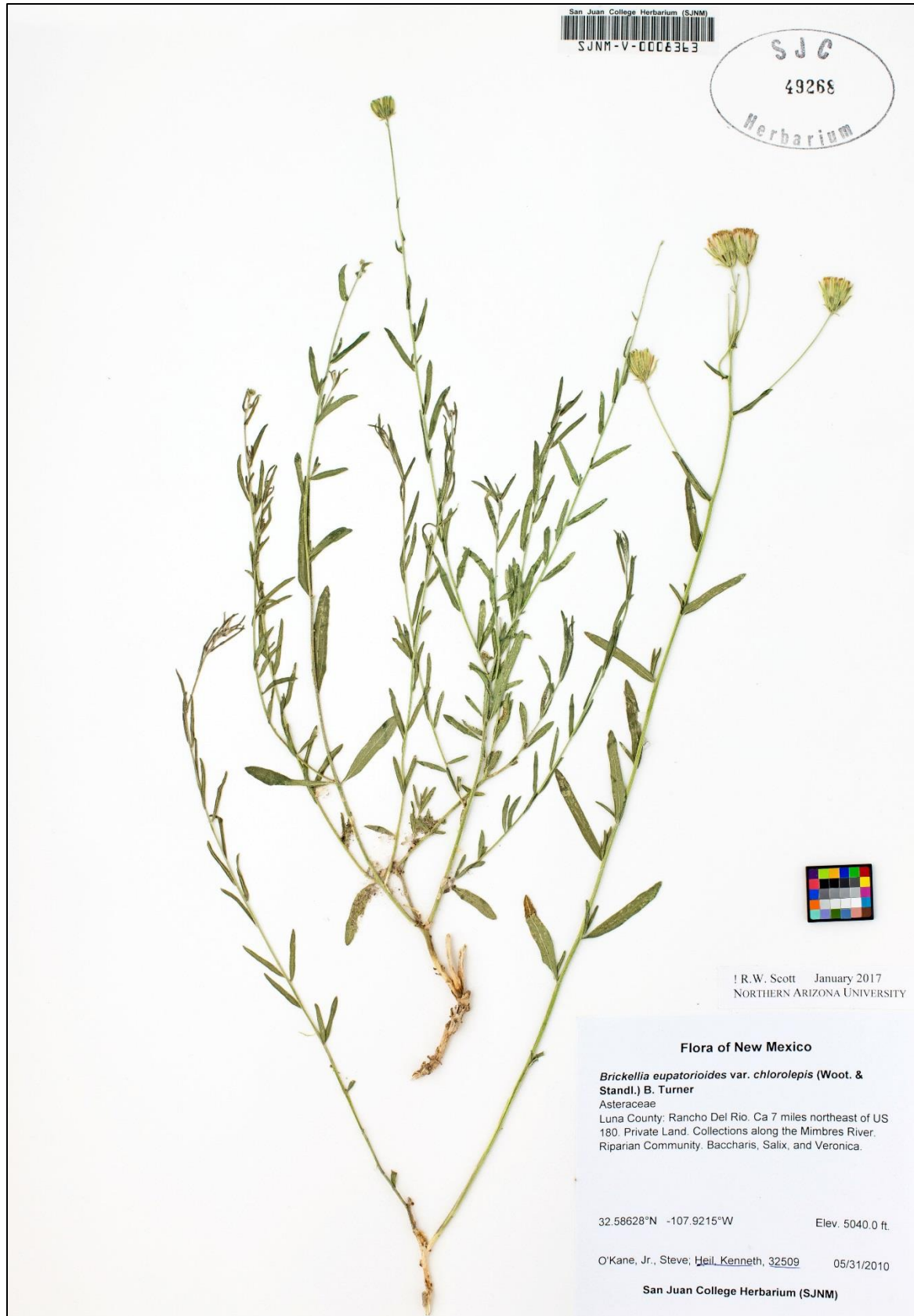


Figure 83. *Brickellia leptophylla*. Luna Co., New Mexico (SJC).



Figure 84. *Kuhnía leptophylla* var. *mexicana*. Palmer 935, holotype (GH).



Figure 85. *Kuhnia leptophylla* var. *mexicana*. Detail from holotype.



Figure 86. *Kuhnia leptophylla* var. *mexicana*. Isotype (MICH).

Figure 87. *Kuhnia scoparia* var. *subauriculata*. Holotype (GH).



Figure 88. *Kuhnia scoparia* var. *subauriculata*. Isotype (US).



Figure 89. *Brickellia subauriculata*. Detail of vestiture and leaf insertion.



Figure 90. *Brickellia subauriculata*. Detail of vestiture and leaf insertion.



Figure 91. *Brickellia subauriculata*. Detail of vestiture and leaf insertion.



Figure 92. *Brickellia rosmarinifolia*. Holotype of *Kuhnia rosmarinifolia*, Ventenat Herbarium (G).



Figure 93. *Brickellia rosmarinifolia*. Plate 91 from the protologue of *Kuhnia rosmarinifolia*, "Description des Plantes Nouvelles et peu connues, cultivées dans le jardin de J. M. Cels. Paris." See Figures 1-4 to see that involucre is cylindrical before pressing.



Figure 94. *Brickellia rosmarinifolia*. Type material of *Eupatorium canescens* (MA 605941).



Figure 95. *Brickellia rosmarinifolia*. Holotype of *Kuhnia microphylla* (GH).



Figure 96. *Brickellia rosmarinifolia*. Puebla, Vibrans 2003 (MEXU).



Figure 97. *Brickellia corymbosella*. Durango, Cronquist 10255, isotype (US).



Figure 98. *Clavigera scoparia*. Guanajuato, G (lectotype).



Figure 99. *Brickellia scoparia*. Puebla, Arsène 2091 (US).



Figure 100. *Brickellia scoparia*. Puebla, Arsène 5517 (US).

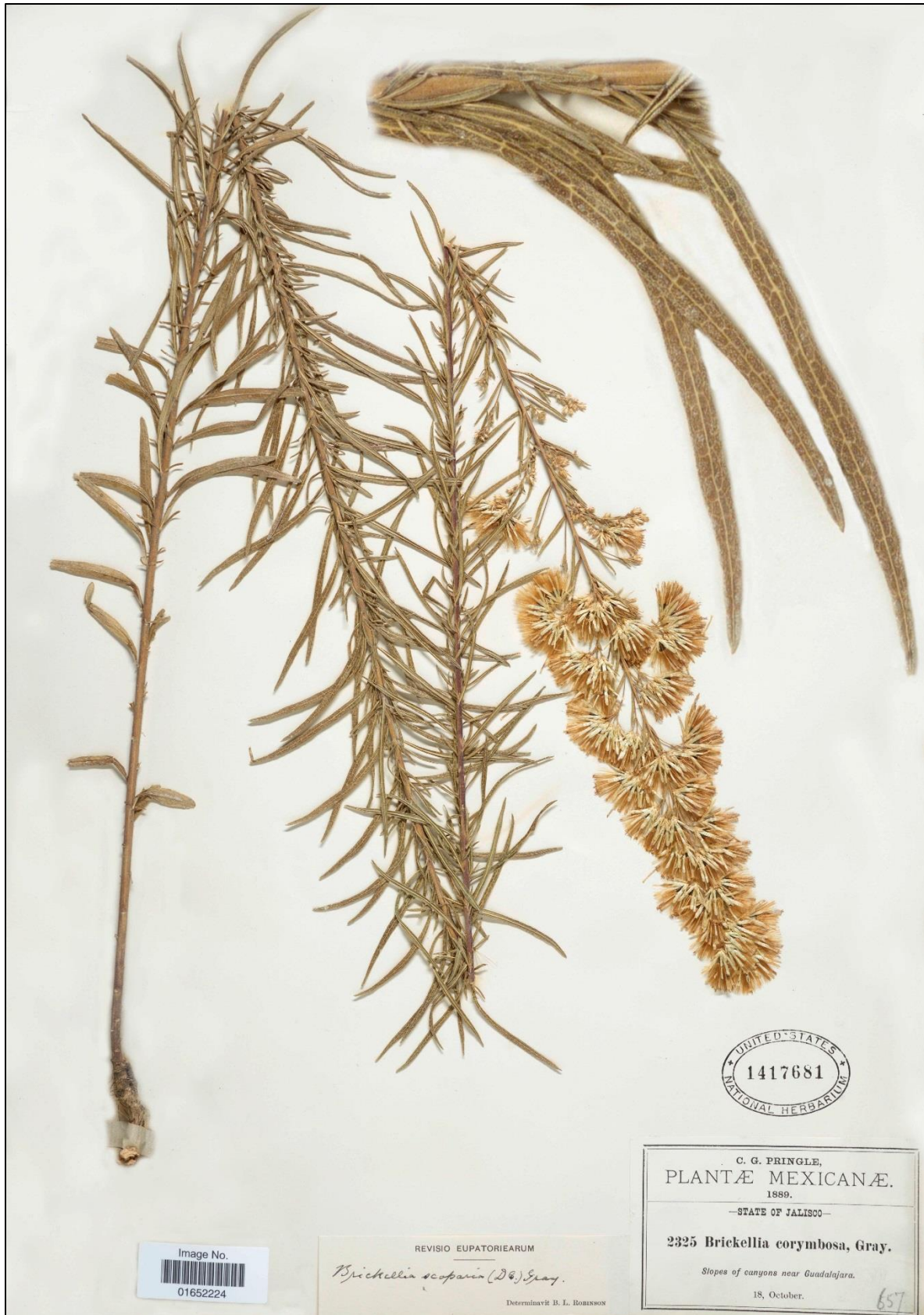


Figure 101. *Brickellia scoparia*. Jalisco, Pringle 2325 (US).



Figure 102. *Brickellia scoparia*. Details of leaf venation and vestiture.



Figure 103. *Brickellia corymbosa*. Lectotype of *Clavigera corymbosa* (G-DC).

Figure 104. *Brickellia corymbosa*. Querétaro, Argüelles 622 (MEXU).



Figure 105. *Brickellia michiliensis*. Durango, Mpio. SÚchil, Alvarado 51, holotype (TEX).



Figure 106. *Brickellia michiliensis*. Durango, Mpio. Súchil, González & Tena 2528 (TEX).



Figure 107. *Brickellia oreithales*. Chihuahua. Isotype (NY) of *Kuhnia oreithales*.



Figure 108. *Brickellia oreithales*. Chihuahua. Holotype (US) of *Kuhnia triplinervis*.



Figure 109. *Brickellia oreithales*. Durango, Reveal 3059 (US).

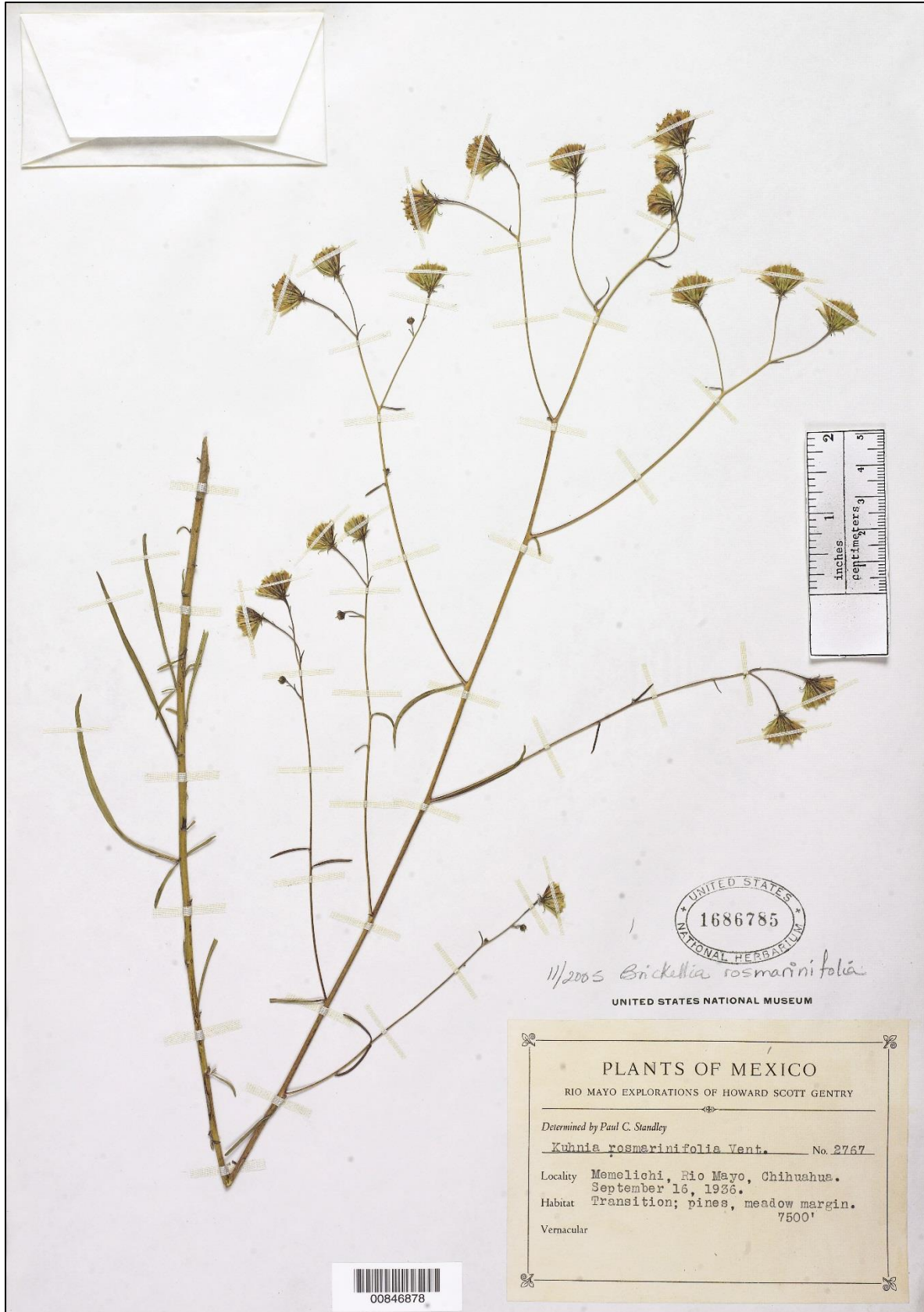
Figure 110. *Brickellia oreithales*. Chihuahua, Gentry 2767 (US).



Figure 111. *Brickellia oreithales*. Durango, King & Peterson 9932 (US).

Figure 112. *Brickellia extranea*. Jalisco. Holotype (MICH).



Figure 113. *Brickellia extranea*. Leaves from holotype (MICH).

Figure 114. *Brickellia extranea*. Jalisco, Vega 2176 (MEXU).



Figure 115. *Brickellia extranea*. Leaves from Vega 2176 (MEXU).



Figure 116. *Brickellia extranea*. Sinaloa, Villaseñor 1022bis (MEXU).

Figure 117. *Brickellia extranea*. Nayarit, Breedlove 44506 (MEXU).



Figure 118. *Brickellia adenolepis*. Jalisco. Holotype (GH) of *Kuhnia adenolepis*.



Figure 119. *Brickellia adenolepis*. Jalisco, Mexia 1665 (US).



Figure 120. *Brickellia schaffneri*. Holotype of *Kuhnia schaffneri* (GH).



Figure 121. *Brickellia schaffneri*. Puebla, Arséne 1129 (MEXU).



Figure 122. *Brickellia schaffneri*. Puebla, Arséne 1129 (MEXU). Expanded view of plant in Figure 121.

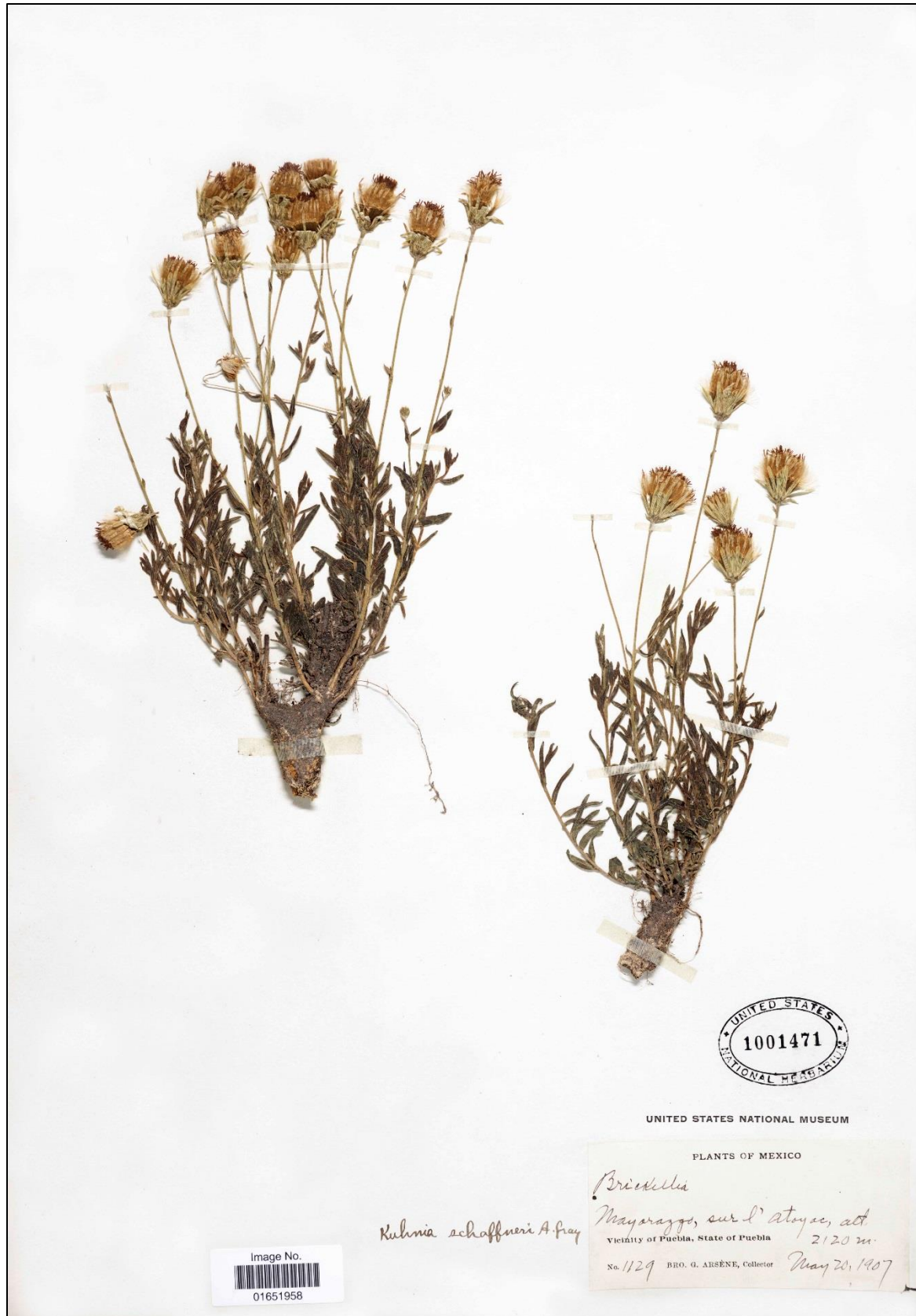


Figure 123. *Brickellia schaffneri*. Puebla, Arsène 1129 (US).

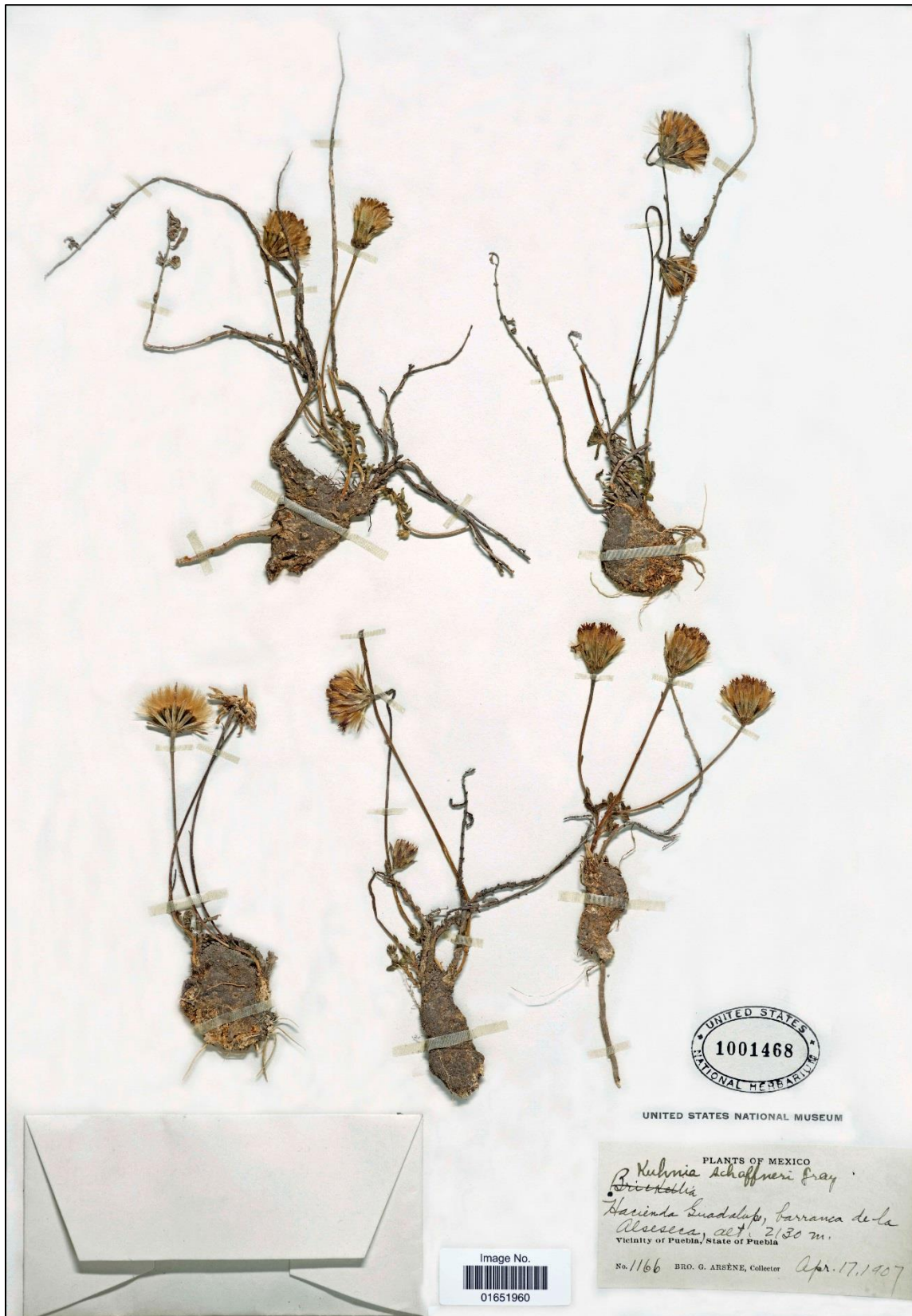


Figure 124. *Brickellia schaffneri*. Puebla, Arséne 1166 (US).