NOTES ON *CYNANCHUM* (ASCLEPIADACEAE)

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ABSTRACT

Preparation of a treatment of *Cynanchum* for the Chihuahuan Desert Flora resulted in a reevaluation of the varieties of *Cynanchum barbigerum* (Scheele) Shinners and recognition of a new variety of *C. maccartii* Shinners.

CYNANCHUM BARBIGERUM—In his treatment of Texas Asclepiadaceae other than *Asclepias*, Shinners (1964) recognized two varieties of *Cynanchum barbigerum*, distinguishing them in his key and discussion only on the basis of flower size. His *C. barbigerum* var. *barbigerum* was distinguished as having corollas 3.6 – 5.2 mm in length and a range from the Edwards Plateau to south Texas and into northeastern México. The new variety *C. barbigerum* var. *breviflorum* Shinners had shorter corollas, 2.8 – 3.2 mm long, and occurred largely in trans-Pecos Texas south into Chihuahua, México. His studies implied that the two taxa differed only in flower size and if that were the case they certainly could be justifiably recognized as allopatric varieties. The two taxa were accepted and similarly treated in Correll and Johnston (1970). However, my analysis of these taxa reveals that in addition to corolla length differences, the taxa also show consistent differences in 1) stem vestiture; 2) the point or origin of corona horns on the column; 3) the total length of corona horns; and 4) the amount of the corona horn's exsertion beyond the anthers. In my opinion the two taxa clearly can be recognized as distinct species separated by characters given in the following key:

A. Stem internodes with decurved hairs 0.1 – 0.2(–0.3) mm long in one line; corollas 2.8 – 3.2 mm long; corona horns 1.3 – 1.8 mm long, exserted above anthers 0.8 – 1 mm, often incurled at tips, adnate to the gynostegium ..... 1. *C. pringlei*

AA. Stem internodes glabrous; corollas (3.2 –)3.6 – 5.5 mm long; corona horns 1.0 – 1.3 mm long, exserted above anthers 0.2 – 0.3 mm, seldom incurled at tips, adnate to gynostegium and corolla at base ..... 2. *C. barbigerum*

1. CYNANCHUM **pringlei** (Gray) Henrickson, comb. nov. *Metastelma pringlei* Gray, Proc. Amer. Acad. Arts 21:397. 1886. TYPE: MÉXICO. CHIHUAHUA, 1885, *Pringle 62* (HOLOTYPE: GH!).

SIDA 12(1): 91 – 99. 1987.

Cynanchum barbigerum (Scheele) Shinners var. *breviflorum* Shinners, Sida 1(6):360. 1964. TYPE: TEXAS. Brewster Co.: Big Bend National Park, Chisos Mountains, granite peak in center of Basin, 5500 ft, 19 Jul 1952, *Grady L. Webster 4340* (HOLOTYPE: SMU!).

Twiggy-based, spreading, climbing, often mat-forming, lactiferous vines 0.5 − 1 m tall and in diameter; stem internodes 11 − 35 mm long with decurved hairs 0.1 − 0.2(−0.3) mm long arranged in one line below nodes, and this line alternating on sides of successive internodes, otherwise glabrous. Leaves mostly drooping; petioles 2 − 5(−6) mm long, pubescent adaxially along channel; leaf-blades linear-lanceolate to oblong-lanceolate, oblong-ovate, 11 − 17(−34) mm long, (2 −)3 − 8(− 10) mm wide, acute, apiculate-mucronate at tip, rounded to briefly cordate at base, at margins entire, revolute when dry, green and glabrous with 3 − 5 lateral veins beneath, usually antrorsely puberulent along margins. Inflorescences mostly of solitary umbels of 2 − 6(− 12) flowers borne on peduncles 0 − 2 mm long and pedicels 1.2 − 2.5(−4) mm long, both sparsely puberulent as stems in lines; bracts thin, lanceolate, 0.6 − 1.2 mm long; calyx lobes lance-ovate, lanceolate to slightly ovate, (0.8 −)1 − 1.5 mm long, 0.3 − 0.5 mm wide, acute, glabrous; corollas 2.8 − 3.2(−4) mm long, white, drying yellowish-cream; corolla tubes 0.9 − 1.1 mm long; corolla lobes oblong-lanceolate, 2.0 − 3.1 mm long, 0.7 − 1.2 mm wide, thickened at tip and along margins, glabrous outside, densely white bearded with erect wavy hairs 0.2 − 0.7 mm long near tip and diminishing in size along mid margins, centrally hispid with antrorse hairs 0.3 − 0.5 mm long inside; corona horns subulate to filiform, 1.3 − 1.8 mm long, 0.2 − 0.3 mm wide above base, exserted above anther head for 0.8 − 1 mm, but shorter than corolla, often somewhat incurled or coiled at tip, adnate to gynostegium 0.1 − 0.3 mm below anther head, adnate abaxially

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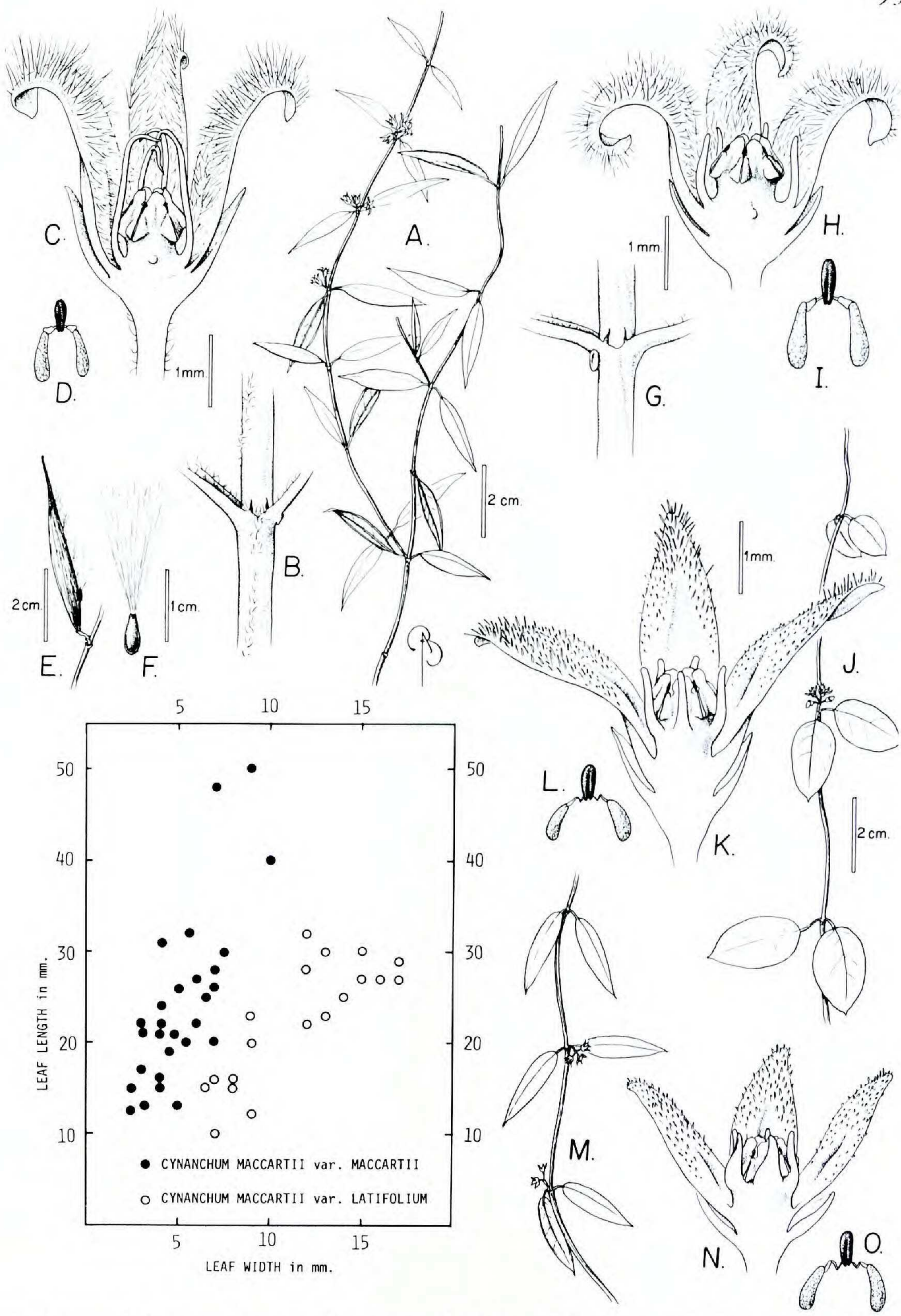
Fig. 1. *Cynanchum pringlei*, *C. barbigerum*, and *C. maccartii*. a − f. *C. pringlei*. a.—Habit showing narrow, lanceolate leaves and umbellate, interpetiolar inflorescences. b.—Node showing single line of hairs along petiole margins and along internodes. Note paired glands at node. c.—Section of flower with two petals and one corona horn removed showing densely bearded inner petal surfaces, and long, subulate, distally incurved corona horns that strongly overtop anther head. d.—Pollinarium with pollinia ca 0.4 mm long showing broad arms. (a − d. from *Henrickson & Wendt 12082*) e.—Mature follicle with smooth exocarp. f.—Mature seed with coma (e − f. from *Chiang et al., 9015f*). g − i. *C. barbigerum*. g.—Node showing sparse hairs along petiole margins but glabrous internodes. Note glands. (from *Graham & Johnston 4525*). h.—Flower with two petals and one corona horn removed showing strongly bearded inner petal surfaces, shorter corona horns that are basally adnate to petal margins. i.—Pollinarium with larger corpusculum and pollinia ca 0.38 mm long. (h − i. from *Fryxell 3651*). j − o.—*C. maccartii*. j − l.—*C. maccartii* var. *latifolium*. j.—Habit showing broad leaves, interpetiolar inflorescences. k.—Flower with two petals removed showing distinctly shorter hairs on inner petal surfaces and moderately short corona horns. l.—Pollinarium ca 0.25 mm in maximum length, note distinctive differences when compared to figs. d − i. (j − l. all from *Hinton 17935*). m − o. —*C. maccartii* var. *maccartii*. m.—Stem with leaves, inflorescences (*Henrickson 11742*). n.—Flower with two



petals removed. Note smaller size when compared to k. o.—Pollinarium ca 0.25 mm in maximum length. (n – o. from *Johnston et al. 11911*). p.—Bivariate graph showing comparisons of leaf length (ordinate) and leaf width (abcissa) for *C. maccartii* var. *latifolium* (open circles) and *C. maccartii* var. *maccartii* (solid circles). Delineation by Bobbi Angell. Magnifications as indicated; scale in a, holds for j, m; in c, holds for b, g.

to upper corolla tube; gynostegium stipe 0.5 −0.7 mm long; anther appendages ovate, ovate-orbicular, 0.2 − 0.3 mm long and wide, scarious, midveins thickened, anther margins 0.3 − 3.3 mm long. Follicles narrowly fusiform, 4 − 6.2 cm long, 5 mm wide, glabrous, smooth; seeds reddish-brown, 5 − 6 mm long; coma 2 −2.5 cm long, white. (Fig. 1a − f).

On rocky limestone, sandstone hillsides in *Agave* scrub, Izotal, up to oak chaparral in the Chihuahuan Desert Region from trans-Pecos Texas (Brewster, Presidio, Jeff Davis counties) south to eastern Chihuahua, northern Durango, west and central Coahuila and northern Zacatecas (Fig. 2) from 800 − 1800 m elevation, with flowers from July to September. *R.M. Steward 466* (GH, LL) reports the common name of "Corona de la Novia." Throughout its range the species shows some diversity in leaf size, along with corolla and corona horn size. Leaf size appears related to local habitat and the amount of shading. Certain collections along the eastern margin of the Chihuahuan Desert in Nuevo León, México have long corollas to 5.5 mm long (as in *C. barbigerum*) but the corona horns are also very long, measuring to 1.8 mm in length and surpassing the anther heads (as in *C. pringlei*). These plants occur in the range of *C. pringlei* and have hairy stems as in *C. pringlei* leading me to conclude they are just *C. pringlei* with very long corollas. The specimens are from western Nuevo León: *Chiang, Wendt & M.C. Johnston 7964* (LL) from 1.5 km W of El Penuelo, near 24°34′ N lat, 100°47′ W long; *Bennett, Torke, Wieder & Dunn 646* (LL) from 15 mi N of Matahuala; and *Hinton 17660* (TEX) from El Barrial, near Galeana.

2. CYNANCHUM BARBIGERUM (Scheele) Shinners, Field & Lab. 19:65. 1951. *Metastelma barbigerum* Scheele, Linnaea 21:760. 1848 (Jan 1849). TYPE: TEXAS. Comal Co.: cedar woods in rocky soil, New Braunfels, Jun − Aug 1846, *Lindheimer 459* (HOLOTYPE: unknown; ISOTYPES: GH − two sheets!). The location of Scheele types is unknown (Stafleu & Cowan 1985).

Twiggy based, spreading to climbing, mat-forming, lactiferous vines 0.5 − 1 m tall and in diameter; stem internodes 12 − 42 mm long, glabrous. Leaves mostly drooping with sparsely curled-puberulent petioles 1.5 − 4(−8) mm long; leaf-blades lanceolate to oblong-lanceolate, 10 − 30(−54) mm long, 3 − 8(−15) mm wide, tapering to an acute, apiculate tip, rounded to slightly cordate at base, at margins entire, drying revolute, green, closely bullate, glabrous except along sunken midvein above, sometimes sparsely pubescent with upcurved hairs 0.1 − 0.3 mm long above, more gray-yellow green beneath, lateral veins 5 − 6, evident only when leaves are over 4 mm wide. Inflorescences mostly of solitary

umbels of 2 – 6(– 9) flowers borne on peduncles 0.2 – 1.5(– 3) mm long, pedicels 2 – 3 mm long, both glabrous; bracts thin, lanceolate, 0.6 – 1.0 mm long; calyx lobes ovate, oblong-ovate, (0.6 –)0.8 – 1.3 mm long, 0.4 – 0.6 mm wide, acute, scarious margined, glabrous; corollas 3.2 – 5.2 mm long, white, drying yellowish outside; corolla tubes 0.8 – 1 mm long; corolla lobes oblong-lanceolate, (2.2 –)2.8 – 3.6 mm long, 0.8 – 0.9 mm wide at base, strongly bearded inside near tip with dense woolly hairs 0.2 – 0.5 mm long, hispid at mid corolla lobes with stiff, erect to declined, transparent hairs 0.3 – 0.5 mm long; corona horns borne 0.1 – 0.2 mm below anther heads, linear-acicular, 1.0 – 1.3 mm long, 0.1 – 0.2 mm wide, attached to midline of corolla lobe and gynostegial tube at about the same level, extending ca 0.2 – 0.3(– 0.5) mm above anther head; gynostegium stipe 0.5 – 0.6(– 0.7) mm long; anther appendages ovate, ovate-orbicular, 0.2 – 0.3 mm long and wide, scarious, midvein thickened; anther margins 0.3 mm long. Follicles narrowly fusiform, 4.5 – 6.7 cm long, 5 – 6 mm wide, glabrous, smooth, dark brown; seeds reddish-brown, 5 – 6 mm long, coma 2 – 2.5 cm long, white. (Fig. 1g – i).

In clay, caliche, limestone and granite flats, slopes, banks in coastal scrub, Tamaulipan scrub, mesquite thickets, chaparral, and disturbed areas from central and south Texas from Terrell and Val Verde counties east to Llano and Travis counties south along coast from Nueces County south into Nuevo León and Tamaulipas (Fig. 2) from sea level to about 850 m elevation, with flowers from (March) June to September.

Though there is some variation in flower characters the species can be reliably distinguished by its glabrous stems. In addition to the characters given above, minor differences also occur in the shape of the translators and pollinia.

Both species have been described in the genus *Metastelma* on the basis of their umbelliform cymes, and ascending to spreading corolla lobes. *Metastelma* and many other genera were combined into *Cynanchum* L. by Woodson (1941) [see also the discussions in Sundell (1981)].

While recognizing the taxa as distinct species, the relationship of *Cynanchum pringlei* to *C. barbigerum* basically remains the same. Both species tie into a group of species with densely bearded inner corolla surfaces and an earlier version of this paper combined the above species as subspecies of *Cynanchum schlechtendalii* (Dcne.) Standl. & Steyerm. along with *C. trichophyllum* L. Williams, and *C. chiapensis* (Gray) L. Williams as they all seem to form a wide ranging complex extending from Central America into Mexico. It was eventually realized, however, that although the taxa shared certain distinctive characters they each have distinct

character states and are probably best recognized as distinct species. *Cynanchum schlectendalii* has short flowers as in *C. pringlei*, but also has short coronas and long gynostegia, and though somewhat similar to *C. barbigerum*, the latter had much longer corollas. *Cynanchum trichophyllum*, in contrast, has densely vestitured leaves.

CYNANCHUM MACCARTII—Dr. B.L. Turner, during a late-night study of *Cynanchum*, recognized a broad-leaved, geographical race of *C. maccartii* as a distinct variety. *Cynanchum maccartii* is similar to *C. barbigerum* but differs in the very short, thick, matted hairs on the inner surface of the corolla lobes that are only 0.1 – 0.2 mm long as compared to 0.2 – 0.5 mm long for *C. barbigerum*. The broad leaved variety recognized by Turner is described below.

CYNANCHUM MACCARTII Shinners

Twiggy-based, twining-climbing lactiferous vines 0.5 – 2(– 4) m tall; stem internodes 13 – 45 mm long, glabrous or with decurved hairs 0.2 – 0.3 mm long in one line. Leaves mostly drooping; petioles 2 – 5(– 11) mm long, mostly pilose in adaxial channel with curved hairs or glabrous; leaf-blades linear-lanceolate, oblong-lanceolate, oblong-ovate to ovate, 10 – 32(– 50) mm long, 2 – 8(– 17) mm wide, acute to rounded, apiculate at tip, broadly cuneate, rounded to briefly cordate at base, at margins entire, revolute when dry, dark green, finely bullate-granulate, mostly pilose with curved hairs along midvein and along proximal margins or sparsely so throughout above, glabrous, more gray-green, with lateral veins visible beneath. Inflorescences mostly of solitary umbels of 3 – 8 flowers borne on peduncles 0.5 – 1.5 mm long, pedicels 0.2 – 4 mm long, both glabrous, occasionally pilose; bracts thin, lanceolate to deltate, 0.4 – 0.7 mm long, 0.2 – 0.4 mm wide; calyx lobes ovate to lance-ovate, 0.5 – 1.3 mm long, 0.4 – 0.6 mm wide, acute to obtuse, glabrous; corollas 1.8 – 3(– 4) mm long, white to cream-white, tubes 0.5 – 1.5 mm long, corolla lobes oblong-lanceolate, 1.3 – 2.6 mm, 0.6 – 1.0 mm wide, thickish with scarious margins, reflexed-spreading, inner surface uniformly pubescent-canescent with thick hairs to 0.1 mm long, or the distal hairs to 0.2 mm long, with central lower portions obscurely hispid with transparent, deflexed, stiff hairs to 0.1 mm long, glabrous outside; corona horns separate, narrowly deltate to lanceolate, 0.7 – 1.0 mm long, 0.2 – 0.45 mm wide and clasping and decurrent at base, tapering to a narrow attenuate to acuminate tip, surpassing anther head by 0.3 mm, adnate to gynostegium immediately below anther head; gynostegium 0.7 – 1.0 mm long. Follicles narrowly fusiform, 4 – 6 cm

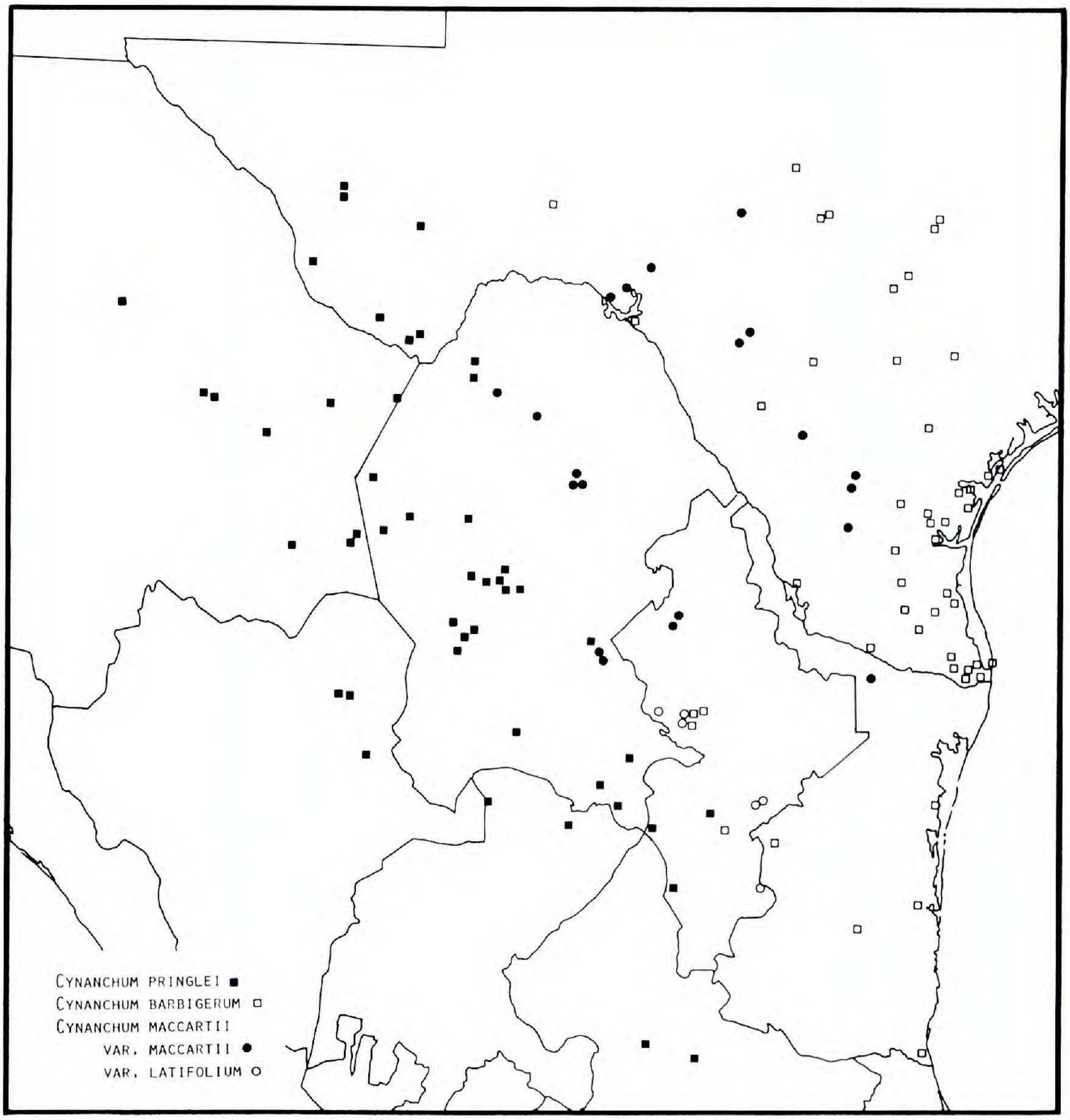


Fig. 2. Distribution of *Cynanchum pringlei*, *C. barbigerum*, *C. maccartii* var. *latifolium*, and *C. maccartii* var. *maccartii* in Texas and adjacent México.

long, 5 – 5.5 mm wide, glabrous, smooth; seeds ca 6 mm long and wide; coma 2 – 2.5 cm long, white.

KEY TO VARIETIES OF CYNANCHUM MACCARTII

A. Leaves oblong-lanceolate to lanceolate, 2.5 – 7(– 10) mm wide; flowers 2.2 – 3.0 mm long; corolla tubes 0.5 – 0.7 mm long; corolla lobes uniformly puberulent inside with hairs 0.03 – 0.1 mm long . . . . . *C. maccartii* var. *maccartii*

AA. Leaves oblong-ovate, (6.5 –)7 – 15(– 17) mm wide; flowers 3 – 4.2 mm long; corolla tubes 1 – 1.5 mm long; corolla lobes puberulent-papillose throughout except for hairs to 0.2 mm long near tip . . *C. maccartii* var. *latifolium*

CYNANCHUM MACCARTII Shinners var. MACCARTII, Sida 1(6):360. 1964, based on *Metastelma palmeri* S. Wats. Proc. Amer. Acad. Arts 18:115. 1883. *Cynanchum palmeri* (S. Wats.) Shinners, Field & Lab 19:65. 1951. [non *Cynanchum palmeri* (S. Wats.) Blake 1917, based on *Pattalias palmeri* S. Wats.]. TYPE: TEXAS. Webb Co.: Laredo on the Rio Grande, Aug 1879, *E. Palmer 824* [LECTOTYPE: (A type was mechanically implied by Standley (1924) as the first among four specimens cited by Watson. This, however, is contrary to International Code of Botanical Nomenclature Art. 8.1. However, the same specimen is accepted here as lectotype as it fits the protologue well) GH!]

Stem internodes glabrous, rarely pubescent in one line with decurved hairs 0.2 − 0.3 mm long; leaves linear-lanceolate to lanceolate, oblong-lanceolate, (12 −)16 − 33(− 50) mm long, 2.5 − 7(− 10) mm wide; flowers 2.2 − 3 mm long; corolla tubes 0.5 − 0.7 mm long; corolla lobes uniformly puberulent inside with hairs 0.03 − 0.1 mm long.

Distinguished from *Cynanchum barbigerum* and *C. pringlei* by the much shorter somewhat matted, thickened hairs on the inner surface of the corolla lobes and from *C. maccartii* var. *latifolium* by the characters given in the key. Occurring in southern Edwards plateau across the south Texas plains from Kimble south to Val Verde, Uvalde, La Salle, Duval and Starr counties in Texas south to eastern Coahuila (Muzquiz, Cuesta de Plomo, Rincón de Maria, Sierra de Gavia), northern Nuevo León (Bustamente), Tamaulipas (near Reynosa), (Fig. 2), from 340 − 1400 m, flowering from May to October. The plants are relatively uniform in their characteristics. One specimen (*L.J. Dorr 2359* from Tamaulipas, road to Bustamente 2.7 mi N of Hwy 70) differs from all others in having the single line of hairs on stem internodes as in var. *latifolia* but flowers are short and leaves are relatively narrow.

CYNANCHUM MACCARTII var. **latifolium** Turner ex Henrickson var. nov.

Differt a *C. maccartio* var. *maccartio* internodiis puberulis constanter foliis magis oblongo-ovatis versus ovatum (6.5 −)7 − 15(− 17) mm latis [non 2.5 − 7(− 10) mm latis] et floribus 3 − 4.2 mm longis (non 2.2 − 3 mm longis) tubis corollarum 1 − 1.5 mm longis (non 0.5 − 0.67 mm longis).

Stem internodes always pubescent in one line with decurved hairs 0.2 − 0.3 mm long; leaves oblong-ovate to ovate, (10 −)15 − 32 mm long, (6.5 −)7 − 15(− 17) mm wide; flowers 3.0 − 4.2 mm long; corolla tubes 1 − 1.5 mm long; corolla lobes 2 − 2.5 mm long, 0.8 − 1.1 mm wide, closely puberulent-papillose inside along margins with hairs 0.1 mm long, but more strongly villous with hairs to 0.2 mm long near tip.

TYPE: MÉXICO. NUEVO LEÓN, Las Anacuas, Mcpio. Linares, 640 m, 5 Aug 1980, *Hinton 17935* (HOLOTYPE: TEX!).

The above variety differs from *C. maccartii* var. *maccartii* mainly in the

broader, more oblong-ovate to ovate leaves, in the consistently vestitured stem internodes and in the larger flowers having longer corolla tubes and longer and denser hairs on the inner tips of the corolla lobes. It appears as an allopatric variety found in the eastern foothills of the Sierra Madre Oriental near Monterrey and southward towards Linares. In all other technical features of the flowers it agrees well with the typical variety.

Additional collections. MÉXICO. NUEVO LEÓN: Sierra Madre above Monterrey, 17 Aug 1903, *C.G. Pringle 11841* (LL, TEX); Sierra Madre, Monterrey, 23 Jul 1933, *C.H. & M.T. Muller 188* (TEX); xeric west wall of Cañon de Potrero Redondo, Mcpio. de Villa Santiago, 4 Jul 1935, *C.H. Muller 2099* (TEX); Las Anacuas, Mcpio. Linares, 670 m, 12 May 1980, *Hinton 17776* (TEX).

ACKNOWLEDGMENTS

I thank Guy Nesom for comments on the manuscript and for the Latin description, GH for loan of significant type specimens, the University of Texas Plant Resources Center for use of facilities, Bobbi Angell for delineation of Fig. 1 and the reviewer for cleaning up the manuscript.

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