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TAXONOMY OF *CYCLANTHERA* (CUCURBITACEAE) IN THE USA

GUY L. NESOM
2925 Hartwood Drive
Fort Worth, Texas 76109
www.guynesom.com

ABSTRACT

All *Cyclanthera* in the USA has traditionally been identified as *C. dissecta* (Torr. & Gray) Arn. but populations there are recognized in the present study to comprise four morphogeographic entities. The type of *C. dissecta*, collected by Thomas Drummond in 1833 or 1834 from the coastal plain of southeastern Texas, represents a rarely collected species endemic to that region. The much more common species of central Texas northward through northeastern New Mexico, eastern Colorado, Oklahoma, Kansas, and south-central Nebraska is identified here as *C. naudiniana* Cogn. Plants in Arizona and New Mexico are identified here as *C. gracillima* Cogn., which continues southward into Mexico and is the species traditionally identified there as *C. dissecta*. *Cyclanthera micrantha* Cogn., endemic to low elevations of Sinaloa and Sonora, Mexico, has sometimes been considered conspecific with *C. gracillima* but is confirmed here as a distinct species. Populations in the trans-Pecos region of Texas are recognized here as **Cyclanthera stenura** Nesom, **sp. nov.** Lectotypes are designated for *C. gracillima*, *C. naudiniana*, and *C. naudiniana* var. *tenuifolia*.

Cyclanthera Schrader includes about 35 species distributed from the USA south through Mexico and Central America into South America. Plants are monoecious vines characterized by their mostly annual duration, relatively small flowers, androecium of a single, horizontal, continuously circular theca formed from connate anthers, and echinate, few-seeded fruits with explosive dehiscence. *Cremastopus*, comprising two species of northern Mexico, was distinguished by the production of single-seeded fruits, but in all other diagnostic features it is similar to *Cyclanthera*; Kearns and Jones (1992) transferred both species of *Cremastopus* to *Cyclanthera*.

Taxonomy of North American *Cyclanthera* has received considerable recent attention (Jones 1969; Kearns & Jones 1992; Nee 1993; Jones & Kearns 1994; Lira S. 1995, 2001; McVaugh 2001), but a species considered widespread, *C. dissecta* (Torr. & Gray) Arn., has remained heterogeneous in concept — in morphology, ecology, and geography. In the USA, all populations of *Cyclanthera*, from Arizona and New Mexico to trans-Pecos Texas and central Texas northward to Nebraska, have been identified as *C. dissecta*. Another large population system identified as *C. dissecta* is distributed in central and western Mexico, apparently disjunct from the USA plants.

Populations of *Cyclanthera* in the USA occur as four morphogeographic entities (Fig. 1). In the revised view presented here, typical *C. dissecta* is a rarely collected species endemic to the coastal plain of southeastern Texas. Plants of central Texas and south-central USA states previously known as *C. dissecta* are identified here as *C. naudiniana* Cogn. Those from southern Arizona and New Mexico are identified as *C. gracillima* Cogn., which also includes most of the Mexican plants previously identified as *C. dissecta*. Populations from the trans-Pecos region of Texas are recognized here as a previously undescribed species, *C. stenura* Nesom.

Even on a broader geographic scale, plants previously identified as *Cyclanthera dissecta* sensu lato occur mostly as relatively discrete population systems (Fig. 2). With the exception of *C. dissecta* sensu stricto, morphological differences among these systems are relatively slight, which has accounted for their conspecific treatment by recent botanists. As presented here, however, morphological distinctions of the central USA populations (*C. naudiniana*) and those of trans-Pecos

Texas (*C. stenura*), along with their allopatry, support their formal recognition as distinct taxa. The Arizona/New Mexico-northwestern Mexico system, while geographically discrete, has no obvious distinction from that of central Mexico and the two systems are treated here as conspecific (as *C. gracillima*). McVaugh (2001) recognized another Mexican system of *C. dissecta* sensu lato as potentially distinct without formally segregating it (the "upland variant," see comments below) — his observations are only reviewed here and the taxonomy remains to be worked out. With regard to the whole complex, at least it is clear that the name *C. dissecta* can be unambiguously restricted to the populations of southeastern Texas and that plants elsewhere of *C. dissecta* sensu lato should be identified by one or more different names.

Conclusions of the present report are based on study of collections from ARIZ, NMC, UNM, TEX-LL, TAES, SMU-BRIT-VDB, NLU, and MO. Diameters of staminate corollas and anther heads were measured with an ocular micrometer.

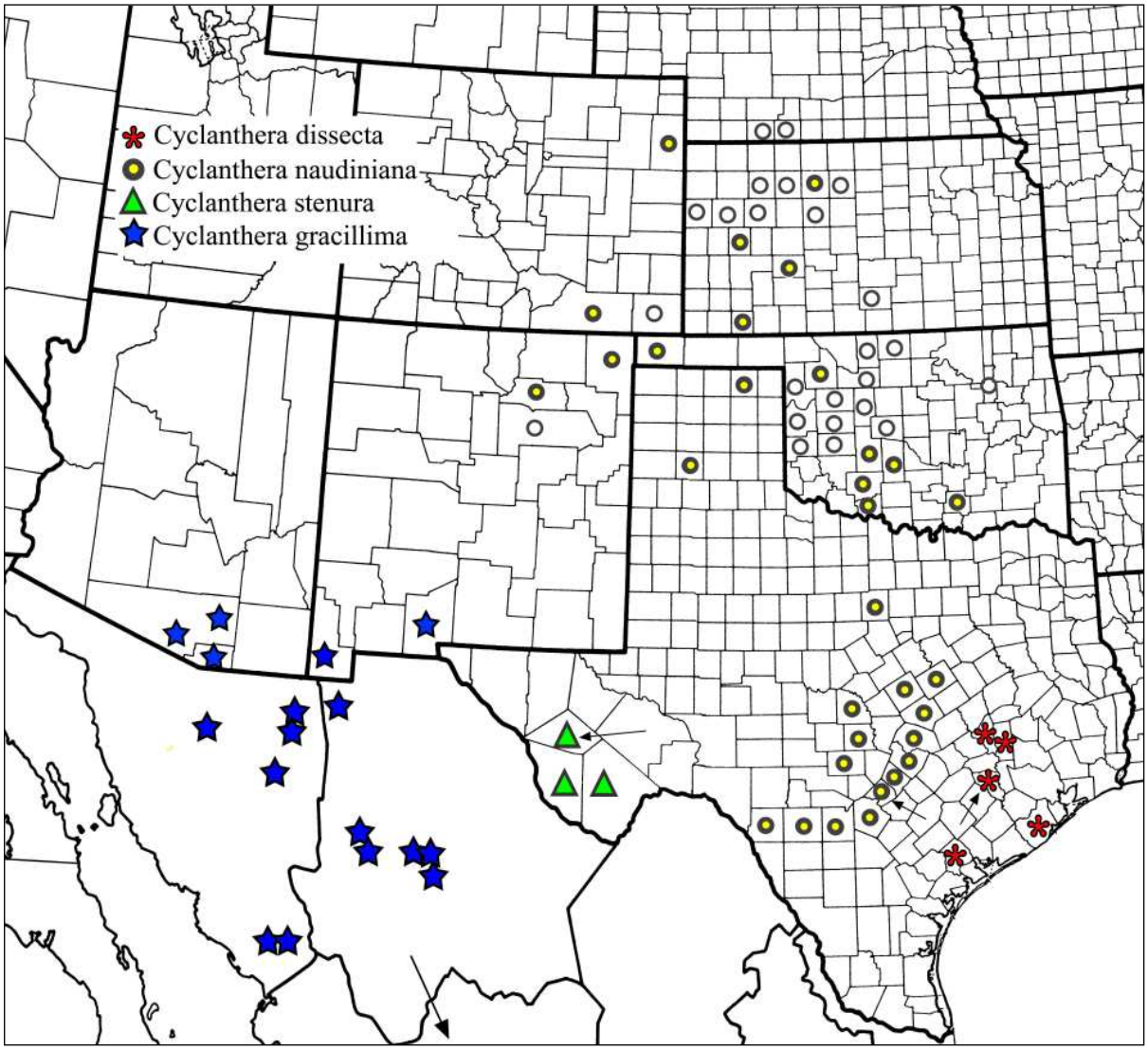

Figure 1. Distribution of *Cyclanthera* species native to the USA. Uncolored symbols are from literature. Arrows point to type localities (the type of *C. gracillima* is from Oaxaca, Mexico).

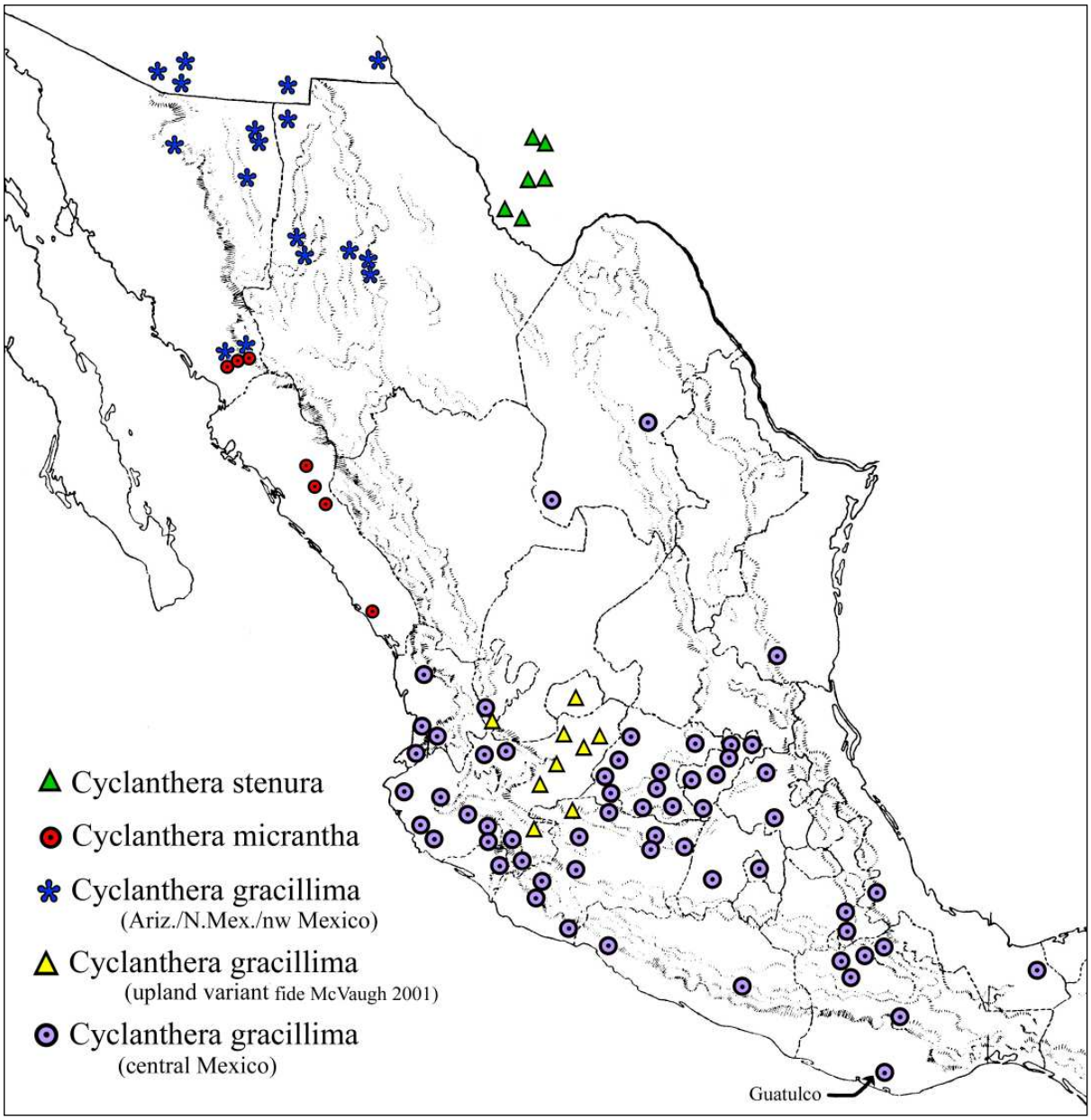

Figure 2. Distribution of *Cyclanthera stenura*, *C. micrantha*, and population systems identified here as *C. gracillima*. Guatulco, Oaxaca, is the type locality of *C. gracillima*. The "upland variant" of *C. gracillima* is mapped from citations by McVaugh (2001). *Cyclanthera gracillima* of "central Mexico" is mapped from a variety of sources: collections examined at TEX-LL and MO, citations by Jones (1969), McVaugh (2001), Lira S. 1995 and 2001, Lira S. & Rodriguez 1999, and Rodriguez 2001.

KEY TO *CYCLANTHERA* SPECIES IN THE USA

1. Staminate inflorescence (1–)7–26-flowered, not laterally branched, floriferous portion 0.2–2.2 cm long.
   2. Fruiting peduncles 10–30 mm long; staminate corollas 4.2–6.3 mm in diam.; anther head 1.4–2.2(–2.8) mm in diam., usually ciliate ..... **Cyclanthera naudiniana**
   2. Fruiting peduncles 2–6 mm long; staminate corollas 2.5–2.8 mm in diam.; anther head 0.6–0.8 mm in diam., usually glabrous ..... **Cyclanthera gracillima**

1. Staminate inflorescence (12–)18–90(–130)-flowered, laterally branched, floriferous portion 3–7 or (0.5–)1.2–6 cm long.
   3. Staminate inflorescence (50–)65–90(–130)-flowered, floriferous portion 3–7 cm long lateral branches 3–25 mm long; terminal leaflet consistently lobed ..... **Cyclanthera dissecta**
   3. Staminate inflorescence (12–)18–70-flowered, floriferous portion (0.5–)1.2–6 cm long lateral branches 3–7 mm long; terminal leaflet shallowly to coarsely serrate but not lobed ..... **Cyclanthera stenura**

1. CYCLANTHERA DISSECTA (Torr. & Gray) Arn., J. Bot. (Hooker) 3: 280. 1841. *Discanthera dissecta* Torr. & Gray, Fl. N. Amer. 1: 697. 1840. **LECTOTYPE** (McVaugh 2001, p. 531): **USA**. **Texas**. No locality, 1833 or 1834, *T. Drummond* "Coll. 2. no. 39" (NY digital image!; isolectotypes: BR digital image!-Fig. 3, GH 274888 digital image!).

Thomas Drummond explored the Texas coastal plain in 1833 and 1834, especially along the Brazos, Colorado, and Guadalupe rivers (Geiser 1949). Most of his time was around the town of San Felipe de Austin in Austin County, and the *Cyclanthera* collection probably was made from that area. The type is not specifically mapped here (Fig. 1), but a more recent collection has been made from Austin County.

Two Drummond collections at GH (31859 and 32874), apparently the same species, are noted as "87." Whether these are a separate collection of *Cyclanthera dissecta* or miscopied from "89" is not known.

Stems glabrous except for minutely villosulous ♀ nodes; tendrils 2-branched, branches unequal, rarely (shortest tendrils) unbranched. **Leaves** 3-foliolate, lateral pair of leaflets deeply divided, petiolules 3–5 mm, terminal leaflet 3–4.5 cm, blade broadly lanceolate, petiolule 7–15 mm, linear, abruptly broadening into leaflet base, leaflet margins coarsely serrate to shallowly or deeply lobed; adaxial surface scabrous with hair bases, abaxial surface glabrous; petioles 10–21 mm. **Staminate inflorescence** 5–11 cm, floriferous portion 3–7 cm, (50–)65–90(–130)-flowered, paniculate-racemoid, lateral branches 3–25 mm, longest proximally; flowers pedicellate, solitary, in fascicles of 2–4, or along short axes. **Staminate corollas** 3.5–4.9 mm in diam., white, petals evenly and densely papillate especially distally. **Anther heads** 0.6–0.8 mm in diam, subsessile, glabrous. **Fruiting peduncles** 4–6 mm. **Capsules** 15–25 mm, short-beaked, narrowly ovoid, slightly oblique, spinules 3–4 mm. Figures 3, 4, 5, 6.

Flowering Sep–Nov. Riparian woods and thickets, bottomlands; 20–70 m; Texas. Figure 1.

Additional collections examined. **USA**. **Texas**. Austin Co.: Stephen F. Austin State Historical Park, on point overlooking Brazos River, forest edge in bottom, 19 Sep 1977, *Lodwick 829* (BRIT). Brazoria Co.: Columbia, common on Bernard, 10 Nov 1899, *Bush 339* (MO); Bay Area scout camp, Camp Karankawa, bank of St. Bernard River, 3.3 mi S of intersect. of FM 1301 and FM 1459, summer 2002, *Rapstein s.n.* (mounted photo filed in BRIT herbarium). Brazos Co.: 3-4 mi N of Navasota on old Hwy 6, [Navasota River bottomland, ca. 200 ft], 16 Oct 1941, *Reeves 1216* and *1216A* (TAES). Grimes Co.: 6.2 mi SW of FR 3090 from its jct with FR 244 to Rock[y] Creek, [ca. 10 air mi N of Navasota; Rocky Creek is tributary to the Navasota River], mesic wooded creekside, with box elder, caric-sedge, elm, oak, 5 Oct 1989, *Jones 3890* (ARIZ, NLU). Victoria Co.: On high E bank of Guadalupe River in Riverside Park, 1.8 air mi NW of jct US Rte 87 and US Rte 59/77 in Victoria, 28º 49.34' N, 97º 1.305' W, locally abundant, climbing over shrubs and high into trees along margin of riparian woodland on deep silty alluvial soils, elev. 60-70 ft, associates include *Carya illinoiensis*, *Celtis laevigata*, *Ehretia anacua*, *Sapindus saponaria* var. *drummondii*, *Melia azedarach*, *Salix nigra*, *Populus deltoides*, *Gleditsia triacanthos*, *Smilax* sp., *Ipomea* sp., *Ampelopsis arborea*, and *Vitis mustangensis*, 24 Sep 2003, *Carr 22218* (TEX).

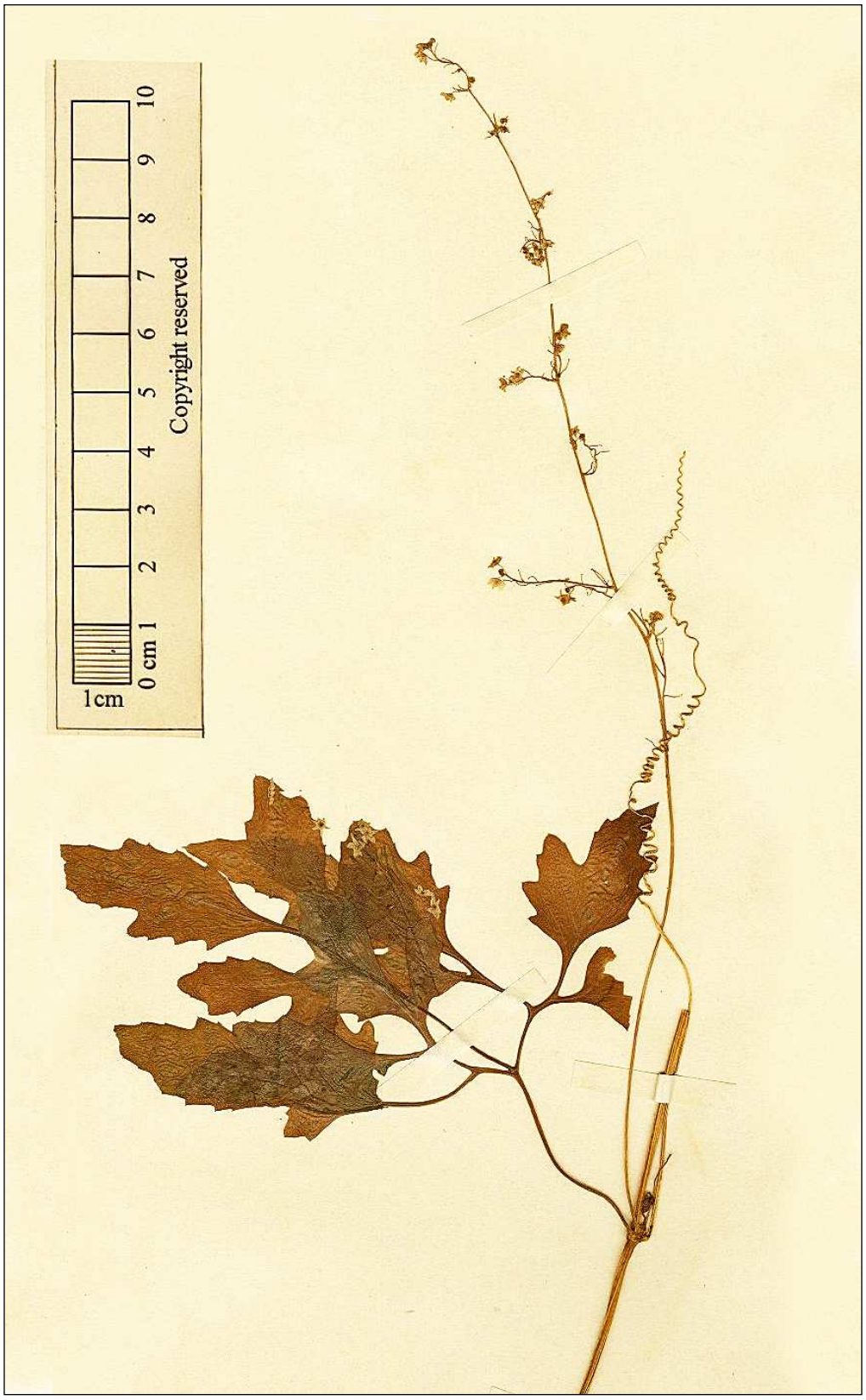

Figure 3. *Cyclanthera* (Discanthera) *dissecta*. *Drummond 39* (isolectotype, BR). Label data not included on this excerpt of the sheet.

Figure 4. *Cyclanthera* (Discanthera) *dissecta. Drummond 39* (isolectotype, GH).

Figure 5. *Cyclanthera dissecta* sensu stricto, coastal plain of southeastern Texas. *Carr 22218* (TEX).

Figure 6. *Cyclanthera dissecta* sensu stricto, coastal plain of southeastern Texas. *Reeves 1216A* (TAES).

Cyclanthera dissecta sensu stricto differs from the plants of central Texas (previously identified as *C. dissecta*, here as *C. naudiniana*) in its smaller staminate flowers and anthers, short fruiting peduncles, and especially in its long-paniculate staminate inflorescences with an abounding number of flowers (Figs. 3, 4, 5, 6). It is remarkable that so few collections have been made (1899, 1941, 1977, 1989, 2002, 2003) since than Drummond encountered it in 1833 or 1834, but this presumably is a reflection of its rarity. The collections in Brazos and Grimes counties were made from localities no more than 6 miles apart, north and northwest of the town of Navasota, suggesting that this area would be a good place to search for more of the species.

The possibility was considered that these Texas coastal plain populations represent a species dispersed northward from Mexico or South America, but I can find no species that is a match. One possibility, *Cyclanthera integrifoliola* Cogn., is relatively widespread in eastern Mexico and southward into Guatemala; the floriferous part of its staminate inflorescence is long (2.5-40 cm), like that of *C. dissecta*, but it rarely produces lateral branches and the flowers are fewer and continuously produced from base to apex of the peduncle, giving it an aspect distinctively different from *C. dissecta*.

Cyclanthera integrifoliola Cogn., Diagn. Cucurb. Nouv. 2: 63, 65. 1877. **LECTOTYPE** (Lira 1995, p. 216): **MEXICO**. **Michoacán**. Near Morelia, 6000-7500 ft, 1840, *H.G. Galeotti 7201* (K digital image!; isolectotypes: BR-2 sheets digital images!, G-DEL, P). Lira noted that Galeotti's collection had been chosen as the lectotype by Jones (1969), but the choice by Jones was never validly published.

Cyclanthera integrifoliola var. *angustifolia* Cogn., Diagn. Cucurb. Nouv. 2: 63, 65. 1877. **TYPE**: **MEXICO**. [**Hidalgo**]. Regla, near Rio del Monte, 6000 ft, 1840, *H.G. Galeotti 1901* (holotype: F [as holotype fide Lira & Rodriguez 1999]; isotypes: BR digital image!, G-DEL, P). As synonym of *C. integrifoliola* fide Lira (1995).

Cyclanthera integrifoliola var. *major* Cogn., Monogr. Phan. 3: 834. 1881. **TYPE**: **MEXICO**. Locality not stated, no date, *J.A. Pavon s.n.* (holotype: G [as holotype fide Lira & Rodriguez 1999]. As synonym of *C. integrifoliola* fide Lira (1995).

Cyclanthera donnell-smithii Cogn., Bot. Gaz. 20: 290. 1895. **TYPE**: **GUATEMALA**. Dept. Quiché. San Miguel Uspantán, 6000 ft, Apr 1892, *E.T. Heyde & E. Lux 3345* (holotype: F [as holotype fide Lira & Rodriguez 1999]; isotypes: GH, K digital image!, NY digital image!, US-2 sheets digital images!). As synonym of *C. integrifoliola* fide Lira (1995).

2. CYCLANTHERA NAUDINIANA Cogn., Monogr. Phan. 3: 831. 1881. **LECTOTYPE** (designated here): **USA**. **Texas**. [Comal Co.]: Margin of woods and hedges, 1846, *F. Lindheimer 398* (NY-172373; isolectotypes: GH-4 sheets, US digital image!-Fig. 6, MO! digital image!, NY-172371 digital image!, US digital image!). Jones (1969) suggested *Lindheimer 398* as the lectotype but did not choose among the herbaria he cited for the duplicates. Lira S. and Rodriguez (1999) indicated that Jones had selected a NY sheet but did not indicate which one of the two.

Echinocystis pedata Scheele, Linnaea 21: 587. 1848 (not *Cyclanthera pedata* (L.) Schrad., 1831). **TYPE**: **USA. Texas**. [Comal Co.:] Protologue: "Am Comalcreek bei Neubraunfels auf dem Boden liegend und über niederm Gesträuch rankend" [on the ground and trailing over bushes], Jun, *F. Lindheimer s.n.* (?). *Echinocystis pedata* is perhaps based on the same collection by Lindheimer as *Cyclanthera naudiniana*; Scheele gave only the information quoted here and did not refer to a specific collection number or place of deposition.

Stems glabrous except for minutely villosulous nodes; tendrils unbranched, less commonly 2-branched, branches unequal in length. **Leaves** 3-foliolate, lateral pair of leaflets deeply to nearly completely divided (appearing 5-foliolate), petiolules 1–3(–5) mm, terminal leaflet 3–7 cm, blade lanceolate to narrowly or broadly lanceolate or elliptic-lanceolate, petiolule 5–15 mm, narrowly oblanceolate, gradually broadening into leaflet base, leaflet margins coarsely serrate to shallowly or

Figure 7. *Cyclanthera naudiniana* from central Texas. *Lindheimer 398* (isolectotype, US).

deeply lobed; adaxial surface scabrous with hair bases, abaxial surface glabrous; petioles (5–)15–40 mm. **Staminate inflorescence** 1.2–10.5 cm, floriferous portion 0.3–2 cm, (on shortest axes, 1–)8–27-flowered, racemoid, without lateral branches or lateral branches rarely 2 mm; flowers pedicellate, solitary or in fascicles of 2–3. **Staminate corollas** 4.2–6.3 mm in diam., white, petals minutely and evenly papillate. **Anther heads** 1.4–2.2(–2.8) mm in diam, subsessile, consistently ciliate with a ring of short, white hairs arising just inside the thecal ring. **Fruiting peduncles** 10–30 mm. **Capsules** 15–25 mm, ovoid, barely oblique-gibbous or not at all, short-beaked, spinules 3–5 mm. Figure 7.

Flowering May–Oct. Canyons, rocky slopes, stream sides, riparian woods of elm-hackberry, sycamore, willow-cottonwood, juniper, oak-juniper, pinyon-oak-juniper, live oak, roadsides, open woods; 200–1800 m; Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Texas. Figure 1.

3. CYCLANTHERA GRACILLIMA Cogn., Diagn. Cucurb. Nouv. 2: 71. 1877. **LECTOTYPE** (designated here): **MEXICO**. **Oaxaca**. Guatulco, *F.M. Liebman 3325/43* (C digital image!; isolectotype F digital image!). Cogniaux cited *Liebman 43* and *65*; Jones (1969) cited *Liebman 43* as lectotype but did not choose between the C and F duplicates. "Liebm. Pl. Mex. nr. 3325" and "Pl. Mexic. Liebm. Cuscurbitacae N. 43" appear to be equivalent.

Cyclanthera naudiniana Cogn. var. *tenuifolia* Cogn., in Monogr. Phan. 3: 831. 1881. **LECTOTYPE** (designated here): **MÉXICO**. **Veracruz**. Orizaba, 1855, *F. Muller* 589 (K digital image!; isolectotypes: LE, NY digital image!). Lira S. and Rodriguez (1999) indicated that the K specimen was the holotype but Cogniaux cited "In Mexico prope Orizaba (Fr. Müller n. 589 in herb. Kew. et hort. Petrop.)."

Stems glabrous; tendrils unbranched, less commonly 2-branched, branches unequal. **Leaves** 3- or 5-foliolate, lateral pair of leaflets completely or nearly completely divided to base, petiolules 1–4 mm, terminal leaflet 3–5 cm, blade lanceolate to broadly lanceolate or elliptic-lanceolate, petiolule 5–10 mm, linear, abruptly broadening into leaflet base, leaflet margins coarsely serrate to shallowly lobed; adaxial surface scabrous with hair bases, abaxial surface glabrous; petioles 5–10 mm. **Staminate inflorescence** 1.5–10.5 cm, floriferous portion 0.2–2.2 cm, 7–26-flowered, racemoid, without lateral branches; flowers pedicellate, solitary or in fascicles of 2–3. **Staminate corollas** 2.5–2.8 mm in diam., white, petals minutely and evenly papillate. **Anther heads** 0.6–0.8 mm in diam, subsessile, glabrous. **Fruiting peduncles** 2–6 mm. **Capsules** 12–25 mm, short-beaked, narrowly ovoid, slightly oblique, spinules 2–4 mm. Figure 8.

Flowering Aug–Oct. Canyons, arroyos, canyon walls, slopes, stream sides, riparian woods sycamore, cottonwood-sycamore-willow, sycamore-Arizona cypress-oak; 1400–2000 m in the USA, 400–2000 m in northwestern Mexico; Arizona, New Mexico; northwestern Mexico (Chihuahua, Sonora); central Mexico (Nayarit, Jalisco, Michoacan, Colima, Guerrero, Aguascalientes, Guanajuato, Querétaro, Hidalgo, Zacatecas?, Nuevo León?, Coahuila, San Luis Potosí, Tamaulipas, Veracruz, Mexico, Puebla, Oaxaca). Figures 1, 2.

USA collections examined. **Arizona**. Pima Co.: **Baboquivari Mountains**: South Canyon, 15 Sep 1931, *French Gilman B-198* (ARIZ-2 sheets, US); Sycamore Canyon, 22 Oct 1945, *Goodding 237-45* (ARIZ-2 sheets); Moristo Canyon, steep, rocky, N-facing slopes, 23 Oct 1945, *Goodding 250-45* (ARIZ-2 sheets, NY); Toro Canyon, 30 Sep 1934, *Kearney & Peebles 10436* (ARIZ, DS, US); Brown Canyon, above arch, 1460 m, with sycamore, *Muhlenbergia rigens*, *Erythrina*, *Eysenhardtia*, 27 Sep 1997, *McLaughlin 7263* (ARIZ-2 sheets). **Santa Rita Mts.**: Canyon, *Engelmann 92* (MO); *Griffiths & Thornber 143* (US). Cañon of the Santa Rita Mountains, shady damp places, 26 Sep 1880, *Engelmann s.n.* (MO); thickets along creek in Cañon, Santa Rita Mountains, 26 Sep 1880, *Engelmann s.n.* (MO). Santa Cruz Co.: Florida Canyon, 22 Oct 1933, *Harrison & Kearney 9171* (ARIZ, US); Coronado National Forest, basin, left fork, 1 mi S of Florida Station, steep N slope, loam

Figure 8. *Cyclanthera gracillima* from southwestern New Mexico. *Wagner 1570* (UNM). Arrow points to staminate inflorescence.

soil, with *Bouteloua*, *Hilaria*, *Prosopis*, 4600 ft.,13 Aug 1925, *Magee 258* (RM, fide SEINET). **New Mexico**. [Doña Ana Co.]: Valley of the Rio Grande, below Doñana, *Parry, Bigelow, Wright, & Schott 396* (US). Hidalgo Co.: Animas Mountains, Lower Indian Creek Canyon, streamside, 6000 ft, 13 Sep 1975, *Wagner 1519* and *1570* (NMC). Citations from DS, NY, and US are added from Jones (1969).

Collections examined and mapped from **northwestern MEXICO. Chihuahua**. Mpio. Temosachi, Nabogame, pine/oak/*Cupressus arizonica* forest, 1800 m, 13 Aug 1988, *Laferriere 1604* (NMC, TEX); near Chihuahua, *Pringle 569* (NY, US, fide Jones 1969); mountains near Chihuahua, shaded most bank, 18 Oct 1886, *Pringle 735* (LL, MO; also F, GH, NY, US, fide Jones 1969); ca. 2 air mi S of US border, extreme NW corner of Chihuahua in the N end of the San Luis Mts, W slope of mts. in canyon at end of ranch road, gravelly creek bed, shaded canyon walls, *Cupressus*, *Acer glabrum*, *Quercus hypoleucoides* to 60 ft tall, also with madrone, Apache pine, 9 Oct 1982, *Spellenberg and Soreng 6813* (NMC); Mpio. Madera, Rio Sirupa, 44 km SE de Madera, encinar, 1640 m, 29 Sep 1982, *Tenorio L. 1882* (TEX); Sierra del Nido complex, 20-25 mi NW of Cd. Chihuahua, 1.3 road mi E of Bella Vista, rocky hillside, 6000 ft, 7 Sep 1981, *Worthington 7758* (ARIZ). **Sonora**. Rancho Toma de Agua near San Bernardo, short tree forest, dry canyon bottom, in forest shade, 1500 ft, 13 Sep 1959, *Gentry s.n.* (ARIZ); Sierra de las Gronillas, 2 Oct 1890, *Hartman 98* (GH, US); 15 km E of Navojoa above road to Alamos, summit of Cerro Prieta in the vicinity of the microwave station, thorn forest with *Acacia*, *Bursera*, etc., 400 m, 5 Sep 1989, *Sanders 9259* (ARIZ, TEX); Mpio. Agua Prieta, Rancho El Pinito, Arroyo Cajón Bonito, Sierra San Luis, 56.5 km (by air) ESE of Agua Prieta, Cuenca Los Ojos Foundation conservation area, sycamore-Arizona cypress-oak canyon forest, 1432 m, 23 Sep 2009, *Van Devender 2009-1406* (ARIZ); Mpio. Agua Prieta, Rancho El Diablo, Arroyo Cajón Bonito, ca. 45.7 km (by air) E of Agua Prieta, Cuenca Los Ojos Conservation Area, cottonwood-sycamore-willow riparian forest, 4100 ft, 1 Oct 2009, *Van Devender 2009-1786* (ARIZ); Rio de Bavispe, Cañon de los Apaches, N of Aribabi, *White 2754* (GH, fide Jones 1969).

A New Mexico collection from Sierra County (*Carter & Stevens 3516*, NMC) previously identified as *Cyclanthera dissecta* (as reflected in SEINET) proves instead to be *Echinopepon coulteri* (A. Gray) Rose. I have not been able to examine a similarly identified collection from Grant County (*Huff & Williams 2583*, SNM), but it also may be *Echinopepon* — at least 2583 is out-of-range and out-of-habitat for *Cyclanthera*.

Cyclanthera dissecta in broad sense also has been recognized as a widespread species of Mexico (e.g., Nee 1993; Lira S. 2001; McVaugh 2001; Rodríguez 2001), but these Mexican plants are identified here as *C. gracillima*. Wunderlin (1978) included *C. dissecta* as a disjunct element in the Panama flora, noting that there it "is known only from the Canal Zone, but doubtless occurs elsewhere. It was previously reported from Panama by Cogniaux (1881) as *C. naudiniana*." The plants from Arizona-New Mexico-Chihuahua-Sonora apparently are disjunct from those of central Mexico but apparently indistinguishable in morphology — all are identified here as *C. gracillima* but need for a more detailed study is suggested by the geography.

Gentry's morphological description of *Cyclanthera gracillima* (as *C. dissecta*) for the Sonoran Desert flora (1964) was generalized, as have been others for that region (e.g., Kearney & Peebles 1960; Martin & Hutchins 1981). Descriptions in more recent floristic studies have been more detailed, especially where comparisons of congeneric taxa are involved (e.g., Nee 1993; Lira S. 2001; McVaugh 2001; Rodríguez 2001).

According to McVaugh (2001, p. 534), "In Nueva Galicia there appear to be several regional variants of *Cyclanthera dissecta*, often recognizable but difficult to characterize. It seems that these "variants" differ in habitat preference and in geographical range, as well as in characters of the leaves

and [staminate] inflorescences. I am reluctant to give them names as varieties, because although in the main they are easily recognized, they are based almost wholly on vegetative features, which sometimes vary unpredictably even between leaves or inflorescences on the same plant. There appear to be some differences in flowers and fruits, but the number of observations on these has been so small that no real conclusions can be drawn from them."

McVaugh provided separate descriptions for an "upland variant" and "variants of middle and low elevations" (both variants mapped in Fig. 2). His characterization (p. 535) of one extreme of the middle and low elevation variant apparently is equivalent to what is identified here as *C. gracillima* – – "the central leaflet is often both actually and relatively wider, commonly about twice as long as wide; the ♂ inflorescence tends to be a little longer, mostly 5–10 cm long, the flowers often in a single compact terminal 10–15-flowered cluster."

McVaugh's upland variant was characterized as follows, and in addition to the morphological distinctions it indeed does show a distinct geographical range, essentially allopatric with typical *C. dissecta*. "In moderately arid habitats, 1650–2400 m on the Central Plateau and in adjoining territory. Often marked by a conspicuous many-flowered ♂ inflorescence (6–)9–15 cm long, the flowers often partly in a short terminal raceme, but mostly in sessile lateral fascicles or on lateral branches up to 1.5 cm long, and fruits 20–30 mm long; unfortunately I have not seen the seeds; the central leaflets are relatively narrow, on the average ca 2.8 times as long as wide." The upland variant is similar in its elongate staminate inflorescence to the *Cyclanthera* populations in trans-Pecos Texas described here as *C. stenura*.

Jones (1969) viewed *Cyclanthera dissecta* as "extremely variable in leaf morphology, in the position of the flowers on the peduncle of the male inflorescence, and in the length of the prickles on the fruit" (p. 53). Even so, he proposed to recognize a small group of Pacific Coast plants (Sinaloa and southern Sonora) with relatively long capsular prickles and abbreviated inflorescences at subspecific rank within *C. dissecta*. (as subsp. *micrantha*; McVaugh 2001 treated the same entity, *C. micrantha* Cogn., merely as a synonym of *C. dissecta*). Jones noted that "Taxonomic recognition has been given only to the geographically isolated variant which has extremely long prickles and which occurs only in Mexico in the states of Sinaloa and Sonora" (p. 53). The present study confirms the distinctiveness of these plants, which appear to be appropriately maintained at specific rank (see below for nomenclature and specimens examined; mapped in Fig. 2). The capsular spinules of *C. micrantha* are 6–12 mm long (vs. 2–4 in *C. gracillima*) and their relatively long length is apparent even early in fruit development.

Cyclanthera micrantha Cogn., Contr. U.S. Natl. Herb. 3: 318. 1895. **HOLOTYPE**: **MEXICO**. **Sinaloa**. Ymala, 25 Sep–8 Oct 1891, *E. Palmer 1706* (US digital image!; isotypes: F-3 sheets digital images!, NY digital image!, UC digital image!). Jones (1969), in his dissertation, proposed to treat *C. micrantha* at subspecific rank within *C. dissecta*, but the nomenclatural combination was never validly published.

Collections examined. **MEXICO**. **Sinaloa**. Vicinity of Culiacan, 30 Aug 1904, *Brandegee s.n.* (GH, US, as cited by Jones 1969); Palmar, 50-70 mi N of Guamuchil, *Gentry 6103* (MO; also GH and US, as cited by Jones 1969); Culiacan and vicinity, volcanic cerro and valley, thorn forest, heavy clay soil, 150-500 ft, [no date,] *Gentry 7075* (ARIZ); 30 mi by road NW of Mazatlan, hillsides of volcanic rock with deciduous woodland of acacias, columnar cacti, and *Cnidosculus*, ca. 300 ft, 16 Oct 1970, *Webster & Breckson 15642* (ARIZ, TEX). **Sonora**. San Bernardo, Rio Mayo, tropical Sonoran, valley, forest, 24 Aug 1935, *Gentry 1625* (ARIZ, MO; also F and GH, as cited by Jones 1969); stream of the Francas, San Ignacio, *Montes & Salazar 11* (US, as cited by Jones 1969); Mpio. Alamos, Arroyo el Huirotal, E side of the Sierra de Alamos, canyon bottom, riparian tropical deciduous forest, ca. 600 m, 25 Nov 1993, *Steinmann 93-391* (ARIZ); Rio Mayo region, Arroyo de Mentidero at El Chinal road, 11.3 km S of Alamos, arroyo bottom, 240 m, 5 Oct 1992, *Van Devender 92-993* (ARIZ).

4. CYCLANTHERA STENURA Nesom, **sp. nov. TYPE**: **USA**. **Texas**. Jeff Davis Co.: ca. 11 mi from Ft. Davis, across road from "Point of Rocks" roadside park on scenic drive, on granite mountain (Woolsack formation), 19 Sep 1966, *D.S. Correll 33710* (holotype: LL!, Fig. 7).

Distinct from *Cyclanthera gracillima* in the more elongate, laterally branched, and profusely flowered floriferous portion of its staminate inflorescence, larger staminate corollas, and narrower and more elongate-attenuate petiolule of the terminal leaflet.

Stems glabrous; tendrils unbranched. **Leaves** 3-foliolate, lateral pair of leaflets deeply lobed, petiolules 2–5 mm, terminal leaflet 3–5 cm, blade narrowly lanceolate, petiolule 3–12 mm, narrowly oblanceolate, gradually broadening into leaflet base, leaflet margins coarsely serrate, adaxial surfaces scabrous with hair bases, abaxial surface glabrous; petioles 16–28 mm. **Staminate inflorescence** (0.5–)2–12 cm, floriferous portion (0.5–)1.2–6 cm, (12–)18–70-flowered, narrowly racemoid, with racemose or fasciculate lateral branches 3–7 mm. **Staminate corollas** 3.8–6.3 mm in diam., white; petals evenly papillate, often indistinctly so. **Anther heads** 0.6–1.0 mm in diam., sessile, glabrous. **Fruiting peduncles** 2–7 mm. **Capsules** (12–)15–20 mm, ovoid, distinctly oblique-gibbous, short-beaked, spinules (2–)3–5 mm. Figure 9. The epithet alludes to the long, narrow, tail-like staminate inflorescence (Greek, *stenos*, narrow, and *oura*, tail).

Flowering (May–)Aug–Oct. Canyons, rocky slopes, among boulders, igneous soil, roadsides, pinyon-oak-juniper; 1150–1800 m; Texas. Figures 1, 2.

Specimens examined. **USA**. **Texas**. Brewster Co.: Sunny Glen, ca. 5 mi NW of Alpine, 29 Sep 1935, *Sperry T196* (TAES-2 sheets); Sunny Glen, shaded woody slope, 9 Oct 1938, *Sperry T541* (ARIZ, TAES); at Sunny Glen, ca. 6 mi W of Alpine, shaded areas, 29 Sep 1935, *Warnock T31* (TEX); Lover's Rock near Toronto by railroad, ca. 3 mi W of Alpine, 4700 ft, igneous soil, 15 Sep 1964, *Warnock 20496* (TEX). Jeff Davis Co.: SE of Point of Rocks Roadside Park ca. 10 mi W of Ft. Davis, Rte 166, among boulders, small wool sack mountain formation, 10 May 1967, *Correll 34164* (LL); Fern Canyon, 18 Aug 1927, *Cory s.n.* (TAES); Mt. Livermore, Oct 1936, *Hinckley s.n.* (ARIZ); head of Fern Canyon, Mitre Peak Girl Scout Camp, igneous soil, above pool, 4800 ft, 30 Sep 1964, *Keough 245* (TEX); Davis Mountains, rocky slopes, climbing over shrubs and herbs, 5 Oct 1926, *Palmer 31981* (MO, TEX); Lower Madera Canyon ca. 6.5 mi NE of Madera Canyon Roadside Park, Eppenhauer Ranch, slopes above creek, with lichens, mosses, liverworts, *Selaginella*, *Galium*, and *Heterotheca* in pinyon-oak-juniper woodland, 1 Sep 1984, *Poole 2587* (TEX); Mt. Livermore, 21 Aug 1935, *Hinckley s.n.* (TEX); Davis Mountains, scenic drive S from Kent to HO Canyon, Point of Rocks, 22 Aug 1949, *Tharp & Janszen 49-1132* (TEX); in Fern Canyon, 10 mi N of Alpine, 10 Sep 1941, *Warnock 21438* (TEX); Davis Mountains, Little Aguja Canyon near calf slide, Buffalo Trail Scout ranch, 5300 ft, igneous soil, 8 Aug 1948, *Warnock & Turner 8059* (SMU, TEX); Davis Mts., Point of Rocks Roadside Park along Hwy 166, base of igneous boulders, 5460 ft, 4 Oct 1980, *Worthington 6715* (ARIZ). Presidio Co.: Sierra Tierra Vieja, small canyon just SW of old army post at mouth of ZH Canyon, Espy Miller Ranch, ca. 5000 ft, 7 Sep 1941, *Hinckley 2121* (SMU); Big Canyon above the Fred Shely ranch house; North Chinati Mountains, igneous soil, 3500 ft, 16 Sep 1963, *Warnock 19230* (TEX); Sierra Viaje Mts., Vieja Pass, back of Box Canyon, 4700 ft, growing over shrubs on steep side of canyon, 6 Oct 1979, *Worthington 5411* (TEX).

Additional collections cited by Jones (1969; as *C. dissecta*). **Texas**. Brewster Co.: N of Alpine, Fern Canyon, *Steiger 563* (NY); Alpine, *Steiger 1085* (NY). Jeff Davis Co.: Davis Mts., Mount Livermore, *Hinckley 524* (F, NY); Davis Mts., Mount Livermore, Aug 1936, *Hinckley s.n.* (GH); Limpia Canyon, *Nealley 652* (F); rocky slopes of Davis Mts., *Palmer 31981* (MO); Davis Mts., *Steiger 472* (NY). Presidio Co.: Chinati Mts., *Havard 228* (GH); Sierra Tierra Vieja, Joe Sitter's Canyon, *Hinckley 3377* (GH).

Figure 9. *Cyclanthera stenura* from Jeff Davis County in trans-Pecos Texas. *Correll 33710* (LL).

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