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REVISION OF *CHAPTALIA* (ASTERACEAE: MUTISIEAE) FROM NORTH AMERICA AND CONTINENTAL CENTRAL AMERICA

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ABSTRACT

Based on field and herbarium study, a revisionary study is presented for the species of *Chaptalia* from North and continental Central America. Six species comprise sect. *Chaptalia*; two of these are newly described, *C. estribensis* Nesom and *C. madrensis* Nesom, both from eastern México. Species of sect. *Chaptalia* are characterized by central flowers with sterile ovaries and ligules with purple midstripes and are restricted to México and the southeastern United States. The remaining six species in the present treatment belong to other sections of *Chaptalia* centered primarily in South America. Typifications are clarified for *C. pringlei*, *C. tomentosa*, and *C. nutans*; the application of the names *C. petrophila* and *C. spathulata* remains somewhat uncertain. The proper disposition of *Chaptalia lyrata* D. Don requires that a new combination be made for it, *Leibnitzia lyrata* (D. Don) Nesom, which supplants the name previously used for the same species, *Leibnitzia seemannii*.

KEY WORDS: *Chaptalia*, *Leibnitzia*, Mutisieae, Asteraceae

Chaptalia comprises about 56 species, the genus ranging widely through South America into Central America and México; one large group of species is endemic to the West Indies; a single species (*C. tomentosa* Vent.) is somewhat isolated in the southeastern United States, its closest relatives among the Mexican species. The generic boundaries between *Chaptalia* and the primarily Old World genera related to it (particularly *Gerbera* L. and *Leibnitzia* Cass., see Jeffrey 1967) are problematic. The two New World species of *Leibnitzia* (Nesom 1983) have previously been regarded as congeneric with *Chaptalia*.

The only large-scale study of *Chaptalia* (Burkart 1944) concentrated on Argentine species and provided only a synoptical treatment for the remainder of the taxa. Burkart listed 53 species; after additions and significant taxonomic realignments since Burkart's study, I find evidence for roughly the same number of species. Since 1944, six taxa have been replaced or transferred to *Chaptalia* from *Trichocline* (Zardini 1975; Cabrera 1973) and four new species have been described from South America (Cuatrecasas 1961, 1965).

Treatments of *Chaptalia* species from North America (Vuilleumier 1969; Simpson 1978; Cronquist 1980) have been limited in scope, and Central American studies (Simpson 1975) also have dealt with only a few species. Many endemic taxa have been described from the West Indies and the genus in that area is in need of study and

summary. Five taxa in Burkart's account of *Chaptalia* have been consolidated as a single species and transferred to the genus *Leibnitzia*. Finally, two new species of *Chaptalia* and a number of synonyms are recognized for the first time in the present study, which provides a systematic treatment of *Chaptalia* from North and continental Central America.

Field observations of eleven of the twelve species of *Chaptalia* recognized in the present study have provided valuable insights into species delimitations and relationships; I have not seen *C. albicans* (Sw.) Vent. ex Steudel or the problematic populations identified as *C. spatulata* (D. Don) Hemsl. and *C. petrophila* Greene. Simpson (1975, p. 1277) observed that "many specimens seem to intergrade between species," but the only instance where I have observed the possibility of such intergradation is between *C. nutans* (L.) Polak. and *C. texana* Greene, as discussed below. Because of their relatively simple habit (a rosette of basal leaves with scape, monocephalous stems), the species of *Chaptalia* are superficially similar among themselves.

Specimen citations below are abbreviated in most cases, the distributional data provided by the maps; fuller specimen information is on file in the *Chaptalia* reprint folder at TEX.

CHAPTALIA Vent., *Descript. Pl. Nouv. Jard. Cels* 61. 1802. TYPE: *Chaptalia tomentosa* Vent.

Leria DC., *Ann. Mus. Natl. Hist. Nat.* 19:68. 1812. (*non* Adanson 1763.).

Chaptalia sect. *Leria* (DC.) Burkart, *Darwiniana* 6:560. 1944. TYPE: *Leria nutans* (L.) DC., based on *Tussilago nutans* L. (= *Chaptalia nutans* [L.] Polak.).

Lieberkuhna Cass., *Dict. Sci. Nat.* 26:286. 1823. *Chaptalia* sect. *Lieberkuhna* (Cass.) Burkart, *Darwiniana* 6:539. 1944. TYPE: *Lieberkuhna bracteata* Cass., *nom. illeg.*, based on *Perdicium piloselloides* Vahl (= *Chaptalia piloselloides* [Vahl] Baker).

Loxodon Cass., *Dict. Sci. Nat.* 27:253. 1823. *Chaptalia* sect. *Loxodon* (Cass.) Burkart, *Darwiniana* 6:534. 1944. TYPE: *Loxodon brevipes* Cass., *nom. illeg.*, based on *Tussilago exscapa* Pers. (= *Chaptalia exscapa* [Pers.] Baker).

Oxydon Lessing, *Linnaea* 5:357. 1830. TYPE: *Oxydon bicolor* (Willd. ex Less.) Lessing, *nom. illeg.*, based on *Chaptalia runcinata* Kunth.

Thyrsanthema Necker ex O. Kuntze, *nom. superfl. illeg.*, *Rev. Gen. Pl.* 1:369. 1891. *Thyrsanthema* Necker, *nom. illeg.*, *Elem.* 1:6. 1790. LECTOTYPE (Kuntze 1891, but see comments below): *Thyrsanthema nutans* (L.) O. Kuntze (= *Chaptalia* [*Tussilago*] *nutans* [L.] Polak.). Necker's proposed generic name was provided with a Latin description but not with the citation of any species or any indication of a type; he mentioned only the Linnaean genus *Tussilago*. *Thyrsanthema* was not validated until 1891 by O. Kuntze (*Rev. Gen. Pl.* 1:369.); indications in various literature that *Chaptalia* is a conserved name apparently are based on the mistaken assumption that it was predated by Necker's *Thyrsanthema* (see comments by Rickett & Staffeu 1960). In contrast to Kuntze, Greene (1906) observed that the best choice for the lectotype of *Thyrsanthema* should not have been the monocephalous *Tussilago nutans* but rather some thyrsoflorous species of *Petasites*, which Linnaeus reduced to *Tussilago*. Correspondingly, in what amounts to an alternative lectotypification, Greene suggested that *Petasites* (*Tussilago*) *hybridus* (L.) Gaertn., Mey., & Scherb. is closer to Necker's intended application of

Thyrsanthera and made the nomenclatural combination as *Thyrsanthera hybrida* (L.) Greene (Leaf. Bot. Observ. 1:158. 1906.).

Perennial herbs, sometimes with a short rhizome, producing numerous, thick fibrous roots, a rosette of basal leaves, and monocephalous, bracteate or ebracteate scapes. Leaves elliptic to obovate, entire to toothed or lobed, sometimes lyrate, usually densely appressed-villous beneath, often glabrous or glabrescent above. Heads cylindrical to campanulate, erect at anthesis but either nodding or erect in bud and again in fruit; receptacles flat to shallowly convex, foveolate to smooth. Flowers dimorphic or trimorphic in 2-3 concentric zones, one zone of the pistillate flowers lacking when dimorphic. Outer flowers pistillate in 1-2(-3) series, the corollas ligulate, with or without a bifurcate inner lip, creamy-white to purple; corollas of the inner pistillate zone with a reduced ligule and inner lip, sometimes reduced to only the style and tube; style branches terete and linear to flattened and oblong. Innermost flowers bisexual, sometimes with sterile ovaries, the corollas bilabiate with recurved or coiling lobes, sometimes nearly regular with shallow lobes. Achenes fusiform, often slightly flattened, with or without a constricted neck or long beak, mostly 4-12 ribbed, glabrous or with short, inflated duplex trichomes with rounded to minutely apiculate apices; pappus bristles more than 50, minutely barbellate. Base chromosome number, $x=24$.

The inner pistillate flowers of *Chaptalia* appear to be transitional between the ligulate, outer, pistillate ones and the tubular, inner, bisexual flowers in two ways: 1) they usually are bilabiate, even if the outermost are not, and 2) in some species they sporadically produce small, abortive stamens. In none of the North and Central American *Chaptalia*, however, are these "staminodia" as large or well-developed as in the species of Old World genus *Gerbera*, where they have been used as a diagnostic character to separate the two genera (Burkart 1944; Zardini 1974).

SECTIONAL TAXONOMY

The species of *Chaptalia* were divided by Burkart (1944) into seven sections. These appear to be natural groups after the admission of several caveats (comments below). Six of the North and Central American species constitute sect. *Chaptalia*; five are members of sect. *Leria*, and one belongs with sect. *Lieberkuhna*. Sect. *Archichaptalia* Burkart and sect. *Pseudotrichocline* Burkart are confined to South America, and sect. *Microchaptalia* Burkart, which appears to be morphologically heterogeneous, is endemic to the West Indies.

Chaptalia section *Chaptalia* (species 1-6)

Scapes ebracteate (bracteate in one species), heads nodding in bud, bisexual flowers with sterile ovaries, and relatively broad ligules with a purple, abaxial midstripe. Sect. *Chaptalia* is a clearly monophyletic group of six species in México and the southeastern United States. *Chaptalia tomentosa* (southeastern U.S.) and *C. madrensis* Nesom (Sierra Madre Oriental of México) appear to be specialized within the section in their narrowly beaked achenes and pistillate ligulate corollas without an inner lip. The pattern of geographic disjunction between these apparent sister species also is found in numerous other taxa of plants and animals (e.g., Rosen 1978). *Chaptalia lyratifolia* Burkart, *C. estribensis* Nesom, and *C. hintonii* Bullock are similar

in their strongly colonial habit from long rhizomes, leaves with cordate bases and strongly mucronulate margins, pistillate flowers with markedly foreshortened style branches, and unbeaked achenes. Among these, *C. lyratifolia* and *C. estribensis* produce thick-coriaceous leaves and probably are most closely related to each other. *Chaptalia pringlei* Greene is relatively isolated within the section: the stems usually are bracteate, the heads lack a zone of eligulate pistillate flowers (all pistillate flowers are distinctly ligulate) and the achenes produce a short, slightly constricted neck.

Chaptalia section *Leria* (DC.) Burkart (species 7-11)

Scapes bracteate or ebracteate; heads nodding in bud; central flowers with fertile ovaries; and ligules narrow, without a midstripe. Jeffrey (1967) suggested that sect. *Leria* be combined with sect. *Lieberkuhna*, but I agree with Burkart (1969) the two groups are distinct. *Chaptalia nutans* and *C. texana* appear to be closely related to each other; the phyletic affinities of *C. hololeuca* Greene, *C. transiliens* Nesom, and *C. albicans* are unclear. The scapes of *C. albicans* are prominently dilated just beneath the heads, a feature found in some species of sect. *Microchaptalia*.

Chaptalia section *Lieberkuhna* (Cass.) Burkart (species 12)

Scapes bracteate, heads erect in bud, central flowers with fertile ovaries, and the heads alternating between chasmogamous and cleistogamous modes. As noted by Burkart (1969), the monotypic sect. *Loxodon* (Cass.) Burkart almost certainly belongs with this group. Taxa now treated as *Leibnitzia* are excluded from sect. *Lieberkuhna* sensu Burkart. *Chaptalia runcinata* Kunth is morphologically isolated in North America; its closest relatives are the five other South American species of the section.

ARTIFICIAL KEY TO THE *CHAPTALIA* SPECIES OF NORTH AMERICA AND CONTINENTAL CENTRAL AMERICA

1. Scapes with 1-8 bracts.....(2)
1. Scapes ebracteate.....(4)
 2. Leaf blades subcoriaceous; heads 5-8 mm wide (pressed), erect in bud; phyllaries glabrous or subglabrous; disc corollas 5.2-6.2 mm long; achene body glabrous except for carpopodial papillae.....*C. runcinata*
 2. Leaf blades herbaceous; heads 8-20 mm wide (pressed), nodding in bud; phyllaries villous; disc corollas 7.5-9.7 mm long; achene body densely papillose at least on the neck.....(3)
3. Leaf bases attenuate; heads with only one series of pistillate flowers, these prominently ligulate and with sparsely pubescent tubes; achenes papillate only on the neck..... *C. pringlei*
3. Leaf bases cordate; heads with an inner series of pistillate flowers with ligules absent or greatly reduced and with glabrous tubes; achenes papillate over the whole surface..... *C. hintonii*
 4. Pistillate flowers in a single series, these prominently ligulate and with sparsely pubescent tubes..... *C. pringlei*
 4. Pistillate flowers in two series, those of the inner with ligules absent or greatly reduced; ligulate corollas glabrous.....(5)
5. Plants commonly interconnected by rhizomes, strongly colonial; leaf bases strongly cordate, with or without lyraiform extensions below.....(6)

5. Plants solitary; leaves often lyrate, the bases attenuate to truncate, if cordate then weakly so. (8)
6. Leaf blades thin-herbaceous, sometimes reddish. *C. hintonii* (7)
6. Leaf blades thick-coriaceous, never reddish. (7)
7. Leaf blades often lyrate; ligulate flowers 12-25. *C. lyratifolia*
7. Leaf blades abruptly cordate, never with lyratiform extensions; ligulate flowers 24-35. *C. estribensis*
8. Leaves elliptic, the bases attenuate; heads erect in bud, flower, and fruit; peduncles prominently dilated beneath the heads; ligules 0.2-0.3 mm wide. *C. albicans*
8. Leaves elliptic to lyrate, the bases attenuate to truncate; heads nodding in bud and fruit; peduncles not dilated below the head; ligules 0.2-2.0 mm wide. (9)
9. Flowers trimorphic or ligulate pistillate flowers lacking and then flowers dimorphic; ligules 0.2-0.8 mm wide; disc corollas nearly regular with short, erect corolla lobes; achenes 11.5-16.6 mm long. (10)
9. Flowers trimorphic, ligulate pistillate flowers always present; ligules 0.8-2.0 mm wide; disc corollas bilabiate with prominent, coiling or recurved lobes; achenes 3.5-11.2 mm long. (11)
10. Leaves thin-herbaceous when dry; rhizome often absent; phyllaries 15-25 mm long at achene maturity; style branches of pistillate flowers 0.7-1.3(-1.5) mm long; achene body 0.6-0.8 mm wide. *C. nutans*
10. Leaves distinctly thickened when dry; lateral rhizome present; phyllaries 14-18 mm long at achene maturity; style branches of pistillate flowers (1.0-)1.6-2.3 mm long; achene body 0.8-1.0 mm wide. *C. texana*
11. Leaves mostly panduriform, basally truncate, with narrow, winged petioles; phyllaries 14-20 mm long at anthesis; ligules tightly involuted (appearing filiform) and enclosing the style. *C. transiliensis*
11. Leaves mostly elliptic, usually basally attenuate; phyllaries 8.5-13.0 mm long at anthesis; ligules not tightly (if at all) involuted. (12)
12. Phyllaries 1.8-2.8 mm wide with prominent, hyaline margins up to 0.5 mm wide; ligules purple beneath at maturity but without a midstripe; central (bisexual) flowers with fertile ovaries; achenes densely papillate; mature pappus bristles 10-13 mm long. *C. hololeuca*
12. Phyllaries 0.6-1.3 mm wide, the margins minutely stipitate-glandular, not hyaline; ligules with a purple, longitudinal midstripe beneath at maturity; central (bisexual) flowers with sterile ovaries; achenes sparsely papillate; mature pappus bristles 5.5-9.0 mm long. *C. madrensis*

1. *CHAPTALIA TOMENTOSA* Vent. (Map 1, Figure 1).

Chaptalia tomentosa Vent., *Descript. Pl. Nouv. Jard. Cels*, fasc. 7, plate 61. 1802.

Gerbera walteri Sch.-Bip. in Seemann, *nom. nov., Bot. Voy. Herald* 313. 1856.

(non *Gerbera tomentosa* DC. 1838.). TYPE (as cited by Ventenat): "Plante herbacee, vivace, tres-commune aux environs de Charles-Town et dans les grands bois de la Caroline, cultivee chez Cels, de graines rapportees par Bosc." A specimen labeled "*Perdicion semiflosculare* Walter, Carol. Bosc" in the de Candolle herbarium is perhaps the collection originally studied by Ventenat (G-DC microfiche 1238, frame 15!).

Tussilago integrifolia Michx., *Fl. Bor.-Amer.* 2:121. 1803. *Chaptalia integrifolia*

(Michx.) Nutt., *Gen. N. Amer. Pl.* 2:182. 1818. TYPE: "Amerique Septentrionale," with no other collection data, collector, or number. A

specimen of *Chaptalia tomentosa* in the Michaux herbarium (microfiche 99!) perhaps represents authentic material, but it bears no information except an annotation as "*Chaptalia!*", apparently by Asa Gray.

Thomas Walter (*Fl. Carolin.* 203-204. 1788.) identified a North American plant at his attention as *Perdicium semiflosculare* L. 1763 (an Old World species of *Gerbera*), apparently misapplying the earlier Linnaean name. Walter did not cite a specimen and gave his tentative identification simply as "*P. semiflosculare?*". Both Ventenat (1802) and Michaux (1803) referred to the identity of their proposed taxa (see above) with the plant referred to by Walter as *Perdicium semiflosculare*, but in the interpretation here, Ventenat and Michaux intended their names as the first valid description of this species, in contrast to Walter's nomenclatural misapplication. Study in the herbaria of Walter (BM), Michaux (or Richard, in P), and Ventenat (G-Delessert) ultimately may enable a more definitive discussion of these aspects of typification.

In contrast to the present interpretation, O. Kuntze and B.L. Robinson credited Walter with the legitimate authorship of the name *Perdicium semiflosculare* and proposed new combinations in *Thyrsanthema* and *Chaptalia*, respectively, based on the former. Technically, both of these later names may be interpreted as *nomina nuda* rather than new combinations, since *Perdicium semiflosculare*, if attributed to Walter, is without a type: *Thyrsanthema semifloscularis* Kuntze, *Rev. Gen. Pl.* 1:369. 1891.; *Chaptalia semifloscularis* B.L. Rob., *Proc. Amer. Acad. Arts* 45:412. 1910.

Plants produced singly; scapes ebracteate, elongating up to 40 cm in fruit. Leaves elliptic to elliptic-obovate, 5-18(-24) cm long, petiolate, densely gray-white to tawny or orangish tomentose beneath, glabrescent above. Phyllaries 1.1-2.1 mm wide, eglandular. Ligules creamy-white with a purple midstripe beneath, 0.9-1.5 mm wide, the style 4.2-7.0 mm long with narrow branches 0.5-0.8 mm long. Bisexual flowers with sterile ovaries. Fertile achenes 3.5-5.2 mm long with a slender neck 1/4-1/5 as long as the achene, the body glabrous, sparsely pubescent in the neck region with extremely minute papillae. Chromosome number, $2n=48$ (Jones 1966).

Atlantic and Gulf coastal plain of the United States, from North Carolina to Florida and west through Alabama to eastern Texas, reported to be in the West Indies (Simpson 1978) but this based on the incorrect assumption that *Chaptalia azuensis* Urban & Eckman is a synonym of *C. tomentosa*; sandy soil in grass-sedge bogs (savannas) with scattered pines, usually in open areas but sometimes in thin woods, also commonly along edges of ditches; flowering December-April (-May in North Carolina).

Representative collections examined: UNITED STATES. Alabama: *Ilitis 21538* (WIS). Florida: *Curtis 4507* (MSC,US). Georgia: *Nesom & Treiber s.n.* (NCU). Louisiana: *Allen 1805* (LSU). Mississippi: *Sargent* (WIS). North Carolina: *Nesom s.n.* (NCU). South Carolina: *Weatherby & Griscom 16654* (US). Texas: *Cory 52758* (DS,MICH,NY,SMU,US).

2. **CHAPTALIA MADRENSIS** Nesom, *spec. nov.* (Map 1, Figure 2). TYPE: MEXICO. Nuevo León: NW slope of Cerro Peña Nevada on road to western road crest (Puerto Pinos), ca. 1.5 km directly NW of summit, ca. 35 km ENE of Dr. Arroyo; steep slope, oak-pine-juniper with *Agave*, plants abundant in rocky, open areas and in shade of woods, ca. 2400 m, 31 Jul 1983, *G. Nesom 4758A*

(HOLOTYPE: US; Isotypes: CAS, ENCB, F, GH, K, MEXU, MICH, MO, MSC, NY, TEX, UC).

Chaptaliae tomentosae Vent. sect. *Chaptaliae* proxima corollis pistillatis ligulatis labium interior carentibus et achaeniis anguste rostratis sed differt praecipue foliis brevipetiolatis phyllariis glandulati-marginatis et acheniis longioribus papillatisque.

Plants produced singly; scapes ebracteate. Leaves elliptic to elliptic-obovate, 4-20(-32) cm long, with narrowly attenuate petioles, densely gray-white to tawny-white villous above and beneath. Phyllaries 0.6-1.3 mm wide, with conspicuously, minutely stipitate-glandular margins. Ligules creamy-white with a purple midstripe beneath, 1-2 mm wide, the style 6.3-8.8 mm long with narrow branches 0.9-1.7 mm long. Bisexual flowers with sterile ovaries. Fertile achenes 6-9 mm long with a slender neck 1/3-1/2 as long as the achene, the whole surface sparsely pubescent with short trichomes with rounded apices.

Nuevo León, Tamaulipas, San Luis Potosí, Querétaro, Hidalgo; pine, pine-oak-juniper, or evergreen oak, pine woods, sometimes at transition to matorral, apparently restricted to limestone, 1050-2500 m; flowering (January-)March-July.

Collections examined: MEXICO. Hidalgo: *Manning & Manning* 53607 (GH, MEXU); *Mayfield* 830 (MEXU, TEX); *Moore & Wood* 3921 (GH, MICH); *Nesom* 4372 (CAS, ENCB, F, MEXU, NY, TEX, UC, US) and 4373 (TEX); *Roe et al. s.n.* (WIS). Nuevo León: *Hinton* 18250 (TEX), 18795 (TEX), 18958 (TEX), 20139 (TEX), 20140 (TEX), 22658 (TEX), 22750 (TEX), and 22819 (TEX); *Mueller & Mueller* 274 (F, GH, MICH, TEX); *Nesom* R575 (LL) and R581 (LL); *Patterson* 5912 (TEX). Querétaro: *Diaz Luna* 19853 (TEX). San Luis Potosí: *Fryxell & Magill* 2332 (ENCB); *McVaugh* 12284 (MICH); *Nesom* 4360 (TEX); *Palmer* 222 (CM, F, MO, NY, US); *Rzedowski* 5850 (ENCB), 6038 (ENCB, MICH), and 8738 (ENCB). Tamaulipas: *González Q.* 3870 (ENCB); *Martínez* 229 (TEX) and 1731 (TEX); *von Rozynski* 692 (F, MICH, NY); *Runyon* 842 (TEX, US); *Stanford et al.* 731 (DS, NY) and 2407 (MICH, NY, SMU, TEX, UC, US-2 sheets).

Chaptalia madrensis is a common species of the eastern Sierra Madre, very often encountered in oak and pine-oak woods, where sterile individuals usually far outnumber the reproductive ones (pers. observ.). It often resembles *C. texana*, which differs in its central flowers with fertile ovaries, achenes with a thinner and longer neck, and narrower ligules lacking a purple midstripe.

3. *CHAPTALIA LYRATIFOLIA* Burkart (Map 2, Figure 3).

Chaptalia lyratifolia Burkart, Darwiniana 6:527. 1944. TYPE: MEXICO. Nuevo León: Sierra Madre above Monterrey, limestone ledges, 750 m (2500 ft), 29 Mar 1906, *C.G. Pringle* 10207 (HOLOTYPE: SI; Isotypes: F!, GH!, GOET, MEXU-2 sheets!, MO!, MSC!, NY!, PH, UC!, US-2 sheets!, Z).

Strongly colonial, producing densely villous, scale-leaved rhizomes; scapes ebracteate, 4-20 cm tall. Leaves coriaceous, the base cordate or rounded, often lyrate with 1-4 pairs of deep lobes below the larger terminal one, the margins serrate or sinuate-serrate with slightly retrorse teeth, revolute. Heads 8-15 mm wide (pressed). Ligules creamy-white with a purple midstripe beneath. Bisexual flowers with sterile ovaries. Fertile achenes 3-4 mm long, unbeaked, pubescent over the whole surface with inflated, apiculate trichomes.

Coahuila, Nuevo León, Tamaulipas, San Luis Potosí; slopes over limestone, commonly with evergreen oaks, (750-)2100-2500 m; flowering (February-)March-August.

Collections examined: MEXICO. Coahuila: *Hinton 16706* (US), *20227* (TEX), *21074* (TEX); *Lyonnet 3490* (MEXU,US); *Palmer 544* (US). Nuevo León: *Hinton 18955* (TEX), *20195* (TEX), *22737* (TEX), *23953* (TEX); *Mayfield 1299* (TEX); *Nesom 4749* (ENCB,MEXU,TEX,US); *Pringle 2890* (GH). San Luis Potosí: *Palmer 222* (CM). Tamaulipas: *Dorr 2355* (TEX); *González Q. 3868* (ENCB); *Martínez 1732* (TEX); *Medrano et al. 8794* (MEXU) and *8835* (MEXU); *Nesom 1019* (ENCB,TEX), *1022* (TEX), *5981* (TEX); *Stanford et al. 731* (ARIZ,DS,GH,MO, NY).

Chaptalia lyratifolia is strongly colonial by thin rhizomes, but most collections have not included roots or rhizomes. Rhizome growth and plantlet production apparently peak before flowering, after which the rhizomes begin to degenerate.

4. **CHAPTALIA ESTRIBENSIS** Nesom, *spec. nov.* (Map 2, Figure 4). TYPE: MEXICO. Hidalgo: Mpio. Tenango de Doria, 8-11 km SW of Tenango de Doria, steep slope with *Quercus*; plants on cliff face, 1830-2140 m, 30 Oct 1983. *D.E. Breedlove 59571* with F. Almeda (HOLOTYPE: CAS!; Isotypes: ENCB!, MEXU!,MO!).

Chaptaliae lyratifoliae Burkart arcte affinis, a qua differt pubescentia fulvo-aurantiaca foliis ovatis nunquam lyratis phyllariis glandulati-marginatis ramis brevioribus styliorum bisexualium et acheniis longioribus.

Strongly colonial through rhizomes; scapes ebracteate. Leaves coriaceous, densely orange-tawny villous beneath, glabrescent above, the blades ovate to elliptic, with a cordate base with a sharply delimited petiole as long or longer than the blade, 20-75 mm wide, the margins coarsely serrate-apiculate, narrowly revolute. Heads 14-18 mm wide (pressed); phyllaries 10-13 mm long. Pistillate ligulate flowers 24-28 in 1(-2) series, the ligules white with a purple midstripe beneath. Bisexual flowers with sterile ovaries. Fertile achenes (2.0-)4.0-4.5 mm long, unbeaked, pubescent over the whole surface with inflated, apiculate to blunt-tipped trichomes.

Hidalgo and Veracruz, from there apparently disjunct to Cerro Azul in central Oaxaca; steep, moist banks and bases of boulders and cliffs, broad-leaved forests, sometimes with oaks and pines, 1750-2200 m; flowering February-April, October.

Collections examined: MEXICO. Hidalgo: 18 km E de Metepec hacia Tenango de Doria, 2200 m, 24 Mar 1980, *Hernández M. & Hernández V. 4124* (ENCB, MEXU-2 sheets); El Estribo, Tulancingo-Tenango de Doria highway, 9 Feb 1969, *Gimete Leyva s.n.* (ENCB); El Estribo, 21 Mar 1972, *Gimete Leyva 538* (ENCB); area of El Estribo, 20.8 km NE of Metepec, 10 Aug 1981 [past flower and fruit], *Nesom 4390* (ENCB,MEXU,MO,TEX,US); *Sharp 46195* (CAS,NY). Oaxaca: Cerro Azul (cima), near Río Grande, N of Niltepec, 2100 m, 7 Mar 1956, *T. McDougall s.n.* (CAS,MEXU). Veracruz: Mpio. Huayacocotla, road to Rancho Nuevo, Huayacocotla, 11 Feb 1972, *Hernández M. 1502* (TEX).

The northern collections of this species have been made from a small area in Hidalgo and adjacent Veracruz. The plants from the disjunct populations in Oaxaca differ slightly from the northern ones: the outer pistillate corollas are slightly smaller (9.5-12.5 mm long with ligules 0.8-1.3 mm wide vs. 12.5-19.0 mm long with ligules

1.3-2.0 mm wide) and the achenes are slightly shorter (2.0-2.5 mm long vs. 4.0-4.5 mm long). Otherwise, they are so similar that they must be considered conspecific.

5. *CHAPTALIA HINTONII* Bullock (Map 2, Figure 5).

Chaptalia hintonii Bullock, Hooker's Icon. Pl. 34:tab. 3346. 1937. TYPE: MEXICO. Edo. México: Dist. Temascaltepec, Nanchitla, cliffs, shade, 1 May 1933, G.B. Hinton 3098 (HOLOTYPE: K; Isotypes: F!,GH!,MO!,TEX!,US!).

Colonial through thin rhizomes; scapes ebracteate. Leaves thin-herbaceous, often reddish, the margins widely crenate to shallowly lobed, dentate or serrate on the crenations or lobes, sometimes with lyrateiform extensions of the blade below the cordate base. Scapes 10-37(-45) cm tall, ebracteate or with 1-3 linear bracts near the head. Heads 10-20 mm wide. Ligules whitish with a purple midstripe beneath. Bisexual flowers with sterile ovaries. Fertile achenes 4.0-4.8 mm long, not beaked, pubescent over whole surface with inflated, apiculate trichomes.

Edo. México, Guerrero; steep, moist slopes, often over rocks near water, oak or pine woods, 1700-2200 m; flowering March-May, August-November.

Collections examined: MEXICO. Locality not specified, probably 1792-1793 (see McVaugh 1977), Sessé et al. 2670 (F, identified by the herbarium name "*Hieracium pusillum*"). Edo. México: Hinton 3465 (ENCB,GH,MO,NY-2 sheets, OS,US-2 sheets); Hinton 8562 (ARIZ-2 sheets, ENCB,F,GH,MEXU-2 sheets, MICH,MO,NY-3 sheets, TEX-2 sheets, US); *Mauda* 30612 (MEXU-2 sheets). Guerrero: Nesom 4409 (CAS,ENCB,F,GH,MEXU,MICH,MO,MSC,NY,TEX,UC,US); Rzedowski 25225 (DS,ENCB,F,LL-2 sheets, MEXU,MICH,NY,US,WIS); Rzedowski 26306 (ENCB,MICH).

The strongly colonial habit of *Chaptalia hintonii* results from the production of relatively long rhizomes. Many collections of the species have not included conspicuously rhizomatous plants, but this probably is at least partly the due to the relatively fragile connections of the rhizomes, because they can be unearthed by careful digging. It also is possible, as in *C. lyratifolia*, that the rhizomes are first produced at a different season than that in which most collections have been made, the rhizomes degenerating afterwards. Rhizomes of *C. hintonii* are somewhat woodier and more deeply subterranean than those of *C. lyratifolia* and *C. estribensis*, and they appear to lack the well-developed scale leaves present on the latter two species.

6. *CHAPTALIA PRINGLEI* Greene (Map 2, Figure 6).

Chaptalia pringlei Greene, Leaf. Bot. Observ. 1:192. 1906. LECTOTYPE (designated here): MEXICO. Oaxaca: La Hoya cañon above Domingillo, oak woods, 1500 m (5000 ft), 2 Nov 1894, C.G. Pringle 5796 (US!; Isolectotype: GH!).

Simpson (1978) listed this species as a synonym of *Chaptalia dentata* (L.) Cass. and cited the type as Pringle 5776. As inferred from Pringle's journal (Davis 1936), Domingillo was near the Tomellin railroad station in north-central Oaxaca. Both type sheets bear a mixture of two species: on each sheet, one plant represents *C. pringlei* while the other two are *C. texana*. Greene's extremely abbreviated type description refers in part to *C. texana*, and the collection originally was identified as *C. nutans*, but the lectotypification here obviates the necessity of providing a new name for this species.

Plants produced singly; scapes with (1-)2-7 linear-filiform bracts 8-20 mm long, rarely ebracteate. Leaves oblanceolate, 3-24 cm long, the margins sinuate, very often shallowly retrorsely serrate or minutely denticulate, rarely entire. Heads turbinate to turbinate-cylindric, 8-14 mm wide. Flowers dimorphic, lacking a zone of eligulate pistillate ones; pistillate flowers 10-22 in 1-2 series, the ligules 1.5-2.8 mm wide, white with a purple midstripe, inner lip variable in size and presence; bisexual flowers with sterile ovaries. Fertile achenes 3.8-5.1 mm long, with a short, slightly constricted neck, prominently pubescent in the neck with spreading-ascending, swollen and apiculate trichomes.

Oaxaca, Puebla; open slopes in xerophytic matorral, often in oak-dominated vegetation, usually over limestone, 1800-2350 m; flowering May-August (-November).

Collections examined: MEXICO. Oaxaca: *Hugo & Conzatti 1866* (F,LL, MEXU); *Cruz C. 2115* (ENCB); *Mendoza 1461* (TEX); *Nesom 4405* (CAS,ENCB, GH,K,MEXU,MICH,MO,NY,TEX,UC,US); *Rzedowski 34853* (ENCB,UC,US); *Tenorio 9276* (TEX) and *18354* (TEX). Puebla: *Medrano et al. F941* (MEXU); *Purpus 1173* (F,GH,MO,NY,UC), *3128* (GH,NY,UC,US), and *3129* (F,GH,MO, NY,UC,US); *Tenorio 7998* (TEX).

7. *CHAPTALIA NUTANS* (L.) Polak. (Map 4, Figure 7).

Chaptalia nutans (L.) Polak., *Linnaea* 41:582. 1877; *non* (L.) Hemsley (1881). BASIONYM: *Tussilago nutans* L., *Syst. Nat.* (ed. 10) 2:1214. October, 1759. *Leria nutans* (L.) DC., *Ann. Mus. Natl. Hist. Nat.* 19:68. 1812. *Gerbera nutans* (L.) Sch.-Bip. in Seemann, *Bot. Voy. Herald* 313. 1856. *Thyrsanthea nutans* (L.) Kuntze, *Rev. Gen. Pl.* 1:369. 1891. TYPE: AMERICA. Linnaeus cited only an illustration of this species, without collection data, from Plumier, *Pl. Amer.*, fasc. 2, plate 41, fig. 1! (1756). *Tussilago nutans*, however, was published with a phrase-name different from that of the plant illustrated by Plumier. Further, in the Linnaean herbarium (LINN) are two sheets of *C. nutans* (cat. nos. 995.5 and 995.7, microfiche!): the first is a Patrick Browne specimen received by Linnaeus in 1758 and annotated by him (C.E. Jarvis pers. comm.). This specimen was cited (together with a Sloane collection) in a separate description of *T. nutans* (a thesis, *Pl. Jam. Pug.* 23, November, 1759), and this account was given as the basis of the name in *Sp. Pl.* (ed. 2) 2:1213. (1763). "This later evidence together with Linnaeus's new phrase-name makes it clear that the Browne material, received prior to the publication of the name, must be regarded as syntype material together with the Plumier plate" (*vide* C.E. Jarvis). The specimen is the more preferable choice for the lectotype. LECTOTYPE (designated here): *P. Browne s.n.* (LINN, cat. no. 995.5).

Tussilago lyrata Pers., *Syn. Pl.* 2:456. 1807. *Leria lyrata* (Pers.) Cass., *Dict. Sci. Nat.* 26:102. 1823. TYPE: AMERICA MERIDIONALIS. Persoon cited only "*Tussilago nutans* L., *Plum. Spec.* 14 ic. 41. f.1!" and it is not clear that he was proposing a name based on a type different from that of *Tussilago nutans* L. I have followed Cassini in treating the name as legitimate. In making the transfer of this species to *Leria*, Cassini cited the following specimen: HISPANIOLA. Santo Domingo: *Poiteau s.n.*, from the herbarium of Desfontaines (herb. DC., microfiche 1238!).

Tussilago vaccina Vell., *Fl. Flum.* 344-345. 1825. LECTOTYPE (Simpson 1975): BRAZIL. *Fl. Flum. Icon.* 8:plate 143. 1835. Illustration without collection data.

- Chaptalia diversifolia* Greene, Leaf. Bot. Observ. 1:194. 1906. TYPE: GUATEMALA. Vicinity of Mazatenango, ca. 350 m, 20 Feb 1905, *W.R. Maxon & R. Hay 3504* (HOLOTYPE: US!).
- Chaptalia subcordata* Greene, Leaf. Bot. Observ. 1:195. 1906. TYPE: ST. CROIX. Big Fountain garden, 24 Jun 1896, *A.E. Ricksecker 447* (HOLOTYPE: US!).
- Chaptalia erosa* Greene, Leaf. Bot. Observ. 1:196. 1906. TYPE: COSTA RICA. San José, bords des chemins et fosses, 1135 m, Jun 1892, *A. Tonduz 4147* (HOLOTYPE: US!).
- Chaptalia majuscula* Greene, Leaf. Bot. Observ. 1:196. 1906. TYPE: BOLIVIA. Mapiro, 5000 ft, May 1886, *H.H. Rusby 1677* (HOLOTYPE: US!).

Scapes ebracteate, 12-31 cm tall at anthesis, elongating to 22-81 cm in fruit. Leaves ovate to obovate, thin-herbaceous, 7-40 cm long with a petiolar region 1/5-3/5 as long as the leaf, thinly gray-pubescent beneath, strongly glabrescent above. Phyllaries linear-lanceolate, the inner 12-17 mm long, elongating in fruit to 15-25 mm. Flowers trimorphic, all fertile; ligules creamy, maturing to crimson, 0.2-0.5 mm wide, essentially without an inner lip; style 8.5-12.0 mm long with filiform branches (0.7)0.8-1.3(-1.5) mm long. Achenes sparsely papillate, 12-17 mm long, with a filiform neck 2-3 times as long as the body. Chromosome number, $n=24$ pairs (Baldwin & Speese 1947).

Tamaulipas, San Luis Potosí, Veracruz, Michoacán, Guerrero, Edo. México, Oaxaca, Tabasco, Chiapas, Yucatán?, Guatemala to Panamá and South America; usually in tropical or subtropical vegetation, often with evergreen oaks, less commonly with pines, 15-1500(-2200) m; flowering all year but most abundantly June-August.

Representative collections examined: BELIZE: *Lundell 6149* (F,MICH,NY,US).

COSTA RICA: *Skutch 2724* (LL,MICH,NY,US).

EL SALVADOR: *Standley 21535* (NY,US).

GUATEMALA: *Aguilar 118* (LL,MEXU,MICH).

HONDURAS. *Yuncker et al. 5639* (MICH,NY,US).

MEXICO. Chiapas: *Breedlove 39993* (DS,MEXU,MO). Dist. Federal: *Bravo s.n.* (MEXU). Guerrero: *Kruse 1184* (ENCB). Edo. México: *Hinton 1179* (MEXU, MO,NY,US-2 sheets). Michoacán: *Hinton 13919* (F,MO,NY). Oaxaca: *Martínez C. 1377* (ENCB,MEXU); *Poole 1265* (LL). Puebla: *Sharp & Miranda 3438* (MEXU). San Luis Potosí: *Edwards 635* (F,TEX); *Roe & Roe 2311* (ENCB,LL, WIS). Tabasco: *Conrad 2801* (MO); *Rovirosa 138* (MEXU-2 sheets). Tamaulipas: *Sullivan 618* (DUKE,NY,TEX); *Patterson 7327* (TEX). Veracruz: *Dressler & Jones 178* (MEXU,MICH,US); *Ventura 8104* (ENCB,MEXU,MICH,NY).

NICARAGUA: *Seymour 2780* (F,NY,UC).

PANAMA: *Cooper 267* (F,MICH,NY,US).

8. *CHAPTALIA TEXANA* Greene (Map 4, Figure 8).

Chaptalia texana Greene, Leaf. Bot. Observ. 1:191. 1906. *Chaptalia nutans* (L.) Polak. var. *texana* (Greene) Burkart, *Darwiniana* 6:569. 1944. TYPE: UNITED STATES. Texas: "rocky, sparsely wooded ground in western Texas," Oct 1890. *G.C. Neally 297* (HOLOTYPE: US!).

Chaptalia carduea Greene, Leaf. Bot. Observ. 1:191. 1906. TYPE: UNITED STATES. Texas: Duval Co., San Diego, 1885, *M.B. Croft 35* (HOLOTYPE: US!; Isotype: MICH!).

Chaptalia leonina Greene, Leafl. Bot. Observ. 1:193. 1906. TYPE: MEXICO. Nuevo León: Monterrey, 17-26 Feb 1880, E. Palmer 764 (HOLOTYPE: US!; Isotypes: NY!,US!).

Chaptalia petrophila Greene, Leafl. Bot. Observ. 1:193. 1906. TYPE: MEXICO. Jalisco: rocky hills near Guadalajara, 5000 ft, 22 Jul 1902, C.G. Pringle 11315 (HOLOTYPE: US!; Isotypes: F!,GH!,SI). According to Pringle's journal (Davis 1936), the type collection probably was made in "the barranca below the waterfall of Rio Blanco." This locality apparently was near the "Oblatos R.R.," northwest of Guadalajara, west of Zapopan. See further comments below.

Scapes ebracteate, 13-34 cm tall at anthesis, elongating to 16-46 cm in fruit. Leaves obovate to ovate or elliptic, relatively thick, 2.5-21.0 cm long with a petiolar region 1/8-1/3 as long as the leaf, the blade 12-35(-55) mm wide, densely gray-white pubescent beneath, glabrescent above but usually remaining sparsely pubescent until after flowering. Phyllaries linear-lanceolate, the inner 14-16(-18) mm long, not elongating in fruit. Flowers trimorphic or dimorphic (see comments below), all fertile; ligules creamy, maturing to crimson, 0.2-0.8 mm wide, essentially without an inner lip; pistillate style 8.8-12.0 mm long with filiform branches (0.7)0.8-1.3(-1.5) mm long. Achenes sparsely to moderately papillate, 11.5-13.0 mm long, with a filiform neck 1.0-1.6 times as long as the body. Chromosome number, $n=24$ pairs (Turner 1959).

United States in south-central and southwestern Texas and probably extreme south-central New Mexico (see citation of Parry *et al.* 674 below), México in Baja California Sur, Chihuahua, Coahuila, Nuevo León, Tamaulipas, San Luis Potosí, Nayarit, Jalisco (*Chaptalia petrophila*), Guanajuato, Querétaro, Hidalgo, Edo. México, Puebla, and Oaxaca; slopes in thin, rocky soil, most often in oak woods, (250-)1300-2550 m; flowering March-June in Texas (excluding Brewster Co.), all year elsewhere but most abundantly August-October. A collection from northern Aguascalientes (Rzedowski 24988) identified by McVaugh (1984) as *C. nutans* var. *texana* is instead *C. hololeuca*.

Representative collections examined: UNITED STATES. New Mexico: Mexican boundary survey, chiefly in the Valley of the Rio Grande, below Doñana, Parry *et al.* 674 (US-2 sheets). Texas: Tracy 8959 (MO, MSC, NY, US, WIS).

MEXICO. Baja California Sur: Sierra de las Palmas, La Campagne, S of Santa Rosalia, 27-29 Apr 1952, Gentry & Fox 11768 (DUKE, MEXU-2 sheets, MICH). Chihuahua: Sta. Eulalia plains, 1885, Wilkinson *s.n.* (MU); Sierra del Roque N of Julimes, 24 Aug 1973, Johnston *et al.* 12332a (LL); Mpio. Temosachi, Nabogañe, 27 Oct 1988, Laferrère 2201 (ARIZ, TEX). Coahuila: Wendt & Riskind 1659 (LL). Guanajuato: McVaugh 24175 (DUKE, ENCB, LL, MICH, NY, US). Hidalgo: González Q. 3155 (ENCB, MICH). Edo. México: Rzedowski 20902 (ENCB, MICH, MSC). Nuevo León: Pringle 10169 (ARIZ-2 sheets, ASU, CAS, C.C.L.O.F, MEXU-3 sheets, MICH, MO, MSC, NMC, NY, OKLA, SMU, TEX, UC, US). Oaxaca: Stevens 1208 (DUKE, ENCB, MICH, MO, MSC, OS). Puebla: Purpus 3127 (F, GH, MO, NY, UC, US). Querétaro: Arguelles 844 (MEXU). San Luis Potosí: Rzedowski 10233 (ENCB). Tamaulipas: Palmer 527 (F, NY, US).

Some heads of *Chaptalia texana* completely lack ligulate pistillate flowers, but this does not appear to be correlated with geography or season and is sometimes variable within populations, where ligulate and eligulate heads are both produced (e.g., Pringle 10169 - Nuevo León, Apr; Pringle 11315 - Jalisco [*C. petrophila*], Jul; Rzedowski 20902 - Edo. México, Oct; Croft 35 - Texas, without specific date).

Chaptalia texana has been considered conspecific with *C. nutans*, but the former has smaller, thicker, and fewer-lobed leaves with more silvery-white pubescence on the heads and lower leaf surfaces, more persistently pubescent, longer style branches, and other differences as in the key. They also are separated ecologically, with *C. texana* occurring in inland, relatively arid habitats and *C. nutans* typically in tropical ones.

The longest pistillate style branches in *Chaptalia texana* occur in plants from Querétaro and México (2.0-2.3 mm) and the shortest occur in plants from Puebla and Oaxaca (1.0-1.6 mm), where the style branch length overlaps with that of *C. nutans*. Even though the two taxa are clearly differentiated over most of their ranges, apparent intermediates occur in Edo. México, Puebla, and Oaxaca, where their geographic ranges appear to interdigitate.

The six plants of *Chaptalia texana* studied from Baja California Sur (Gentry & Fox 11768) are slightly differentiated from those in the rest of the range: the heads range wider (to 20 mm pressed vs. 11-17 mm) and the phyllaries average slightly longer. The outer pistillate flowers are bilabiate with an inner lip 0.5-2.0 mm long, and abortive stamens ("staminodes") were found in several inner pistillate flowers from the head of one plant. These latter structures were not observed in any other plants of *C. texana*. The differences appear to be minor, and long geographic disjunctions occur within other species of the genus, although *C. texana* seems to be the most peripherally scattered. *Chaptalia* was not included among the genera of Baja California in the recent treatment by Wiggins (1980), but these plants appear to be native elements of the flora.

The identity of *Chaptalia petrophila* is somewhat problematic. In its ebracteate scapes, phyllary morphology, and papillate achene vestiture, it is very similar to *C. texana* and *C. nutans*. The pistillate style branch length of 1.3-1.8 mm and the complete lack of ligulate pistillate flowers suggest that it is best placed with *C. texana*, but the broadly obovate-oblongate leaves with merely mucronulate margins are anomalous in that species. Further, the type collection (from near Guadalajara, Jalisco) is geographically out of range for both *C. texana* and *C. nutans* (Map 4). Like the plants from Baja California Sur, however, I am treating *C. petrophila* as a peripheral variant of *C. texana*. See further comments below regarding *C. spatulata*.

9. *CHAPTALIA TRANSILIENS* Nesom (Map 3, Figure 9).

Chaptalia transiliens Nesom, Rhodora 86:127. 1984. TYPE: MEXICO. Nuevo León: NW slope of Cerro Peña Nevada on road to western pass (Puerto Pinos), ca. 1.5 km NW of the summit, ca. 35 km ENE of Dr. Arroyo; steep slope, oak-pine-juniper with *Agave*, 31 Jul 1983, G. Nesom 4759 (HOLOTYPE: US; Isotypes: ANSM, CAS, ENCB, F, GH, K, MEXU, MICH, MO, NY, OS, SMU, TEX, UC).

Scapes ebracteate or with a linear bract within 5 mm of the head. Leaves thick, spatulate (panduriform), the blades 6-28 cm long, elliptic to ovate-elliptic, sometimes sublyrate with several shallow lobes at the base, with narrow, winged petioles, densely tawny-gray pubescent beneath, quickly glabrescent above. Phyllaries 14-20 mm long at anthesis (not elongating further), the outer with supitate-glandular margins, the inner with wide, flange-like, scarious margins. Ligules erect, 11-17 mm long, involuted (appearing filiform) and enclosing the style branches, white above and reddish-purple beneath at early anthesis, completely dark purple at maturity. Achenes

7-11 mm long, with a narrow beak about as long as the body, pubescent over the whole surface with prominently attenuate-apiculate papillae.

Coahuila, Nuevo León, Tamaulipas, San Luis Potosí, Guanajuato, Hidalgo, Edo. México, Puebla, Oaxaca, disjunct to Chiapas and Guatemala; steep, moist, shaded slopes, usually with pine, oak, pine-oak, or oak-pine-juniper, less commonly in drier habitats with thorny shrubs, 1600-2550 m; flowering (January-)April-October (-November).

Collections examined: GUATEMALA. *Johnston 1765* (F); *Standley 81939* (F); *Steyermark 50351* (F).

MEXICO. Chiapas: *Breedlove 6870* (DS) and *41026* (DS); *Breedlove & Almeda 47775* (CAS); *Laughlin 740* (DS,MICH); *Matuda 4686* (MEXU,MO,NY) and *18243* (MEXU). Coahuila: *Villarreal 5417* (TEX). Guanajuato: *Arguelles 1574* (MEXU); *McVaugh 24173* (NY). Hidalgo: *Nesom 4377* (MEXU,MICH,TEX,US). Edo. México: *Rzedowski 26002* (ENCB). Nuevo León: *Hinton 19685* (TEX), *20218* (TEX), *21328* (TEX), *21631* (TEX); *Meyer & Rogers 2575* (MO,US); *Mueller & Mueller 437* (GH,MICH,TEX,US); *Nesom 7119b* (TEX). Puebla: *Ventura 5719* (ENCB,MICH); *Beanan 3620* (MSC); *Nesom 4398* (CAS,ENCB,F,K,MEXU, MICH,NY,TEX,UC); *Purpus s.n.* (UC). San Luis Potosí: *Nesom 4361* (CAS, COLO, ENCB, K, MEXU, MICH, MSC, NY, TEX, US); *Prather 915* (TEX). Tamaulipas: *Nesom 7459* (TEX).

Chaptalia transiliens is distributed over a remarkably wide area and is amply distinct from other species, although it has been confused with *C. nutans* and *C. texana*. At the type locality, it was growing with *C. texana* and *C. madrensis*.

10. *CHAPTALIA HOLOLEUCA* Greene (Map 5, Figure 10).

Chaptalia hololeuca Greene, Leaf. Bot. Observ. 1:192. 1906. TYPE: MEXICO.

Coahuila: Saltillo, in depression on slope of stony hillside, May 1898, *E. Palmer 192* (HOLOTYPE: US!; Isotype: GH!).

Scapes ebracteate. Scapes and leaves moderately to densely silver-white villous beneath, less densely so above and tardily glabrescent. Phyllaries in 2-3(-5) series, 1.8-2.8 mm wide, with broad and prominent hyaline margins. Heads few-flowered; style branches of the pistillate flowers somewhat flattened, barely extending out of the tube. Achenes 5.5-8.0 mm long, with a short beak, 6-9-ribbed, densely papillate.

Coahuila, Nuevo León, Tamaulipas, San Luis Potosí, Querétaro, Aguascalientes, Hidalgo; dry, open slopes, usually over limestone (gypsum in Nuevo León), matorral or chaparral, often with oaks, sometimes with scattered pines or pine-juniper, 1150-2300 m; flowering February-April, July-October.

Collections examined: MEXICO. Aguascalientes: *Rzedowski 24988* (ENCB, MICH). Coahuila: *Arsene 10223* (US); *Hinton 20228* (TEX); *Johnston & Mueller 417* (GH); *Jones 298* (MO, MSC, US); *Palmer 528* (GH, NY, US); *Purpus 1019* (F, GH, MO, NY, UC) and *1019a* (UC). Hidalgo: *Purpus s.n.* (UC). Nuevo León: *Hinton 19685* (TEX), *20114* (TEX), *20121* (TEX), *21788* (TEX), *23842* (TEX); *Nesom 7698* (TEX). San Luis Potosí: *Bustos Z. s.n.* (ENCB); *Henrickson 17590d* (TEX); *Lundell 5744* (MICH, US). Tamaulipas: *Henrickson 19140* (TEX); *Martínez 1044* (TEX).

Chaptalia hololeuca has sometimes been identified as *C. texana*, but the two are clearly distinct and the former is nearly completely restricted to the Chihuahuan Desert region. The most distinctive features of *C. hololeuca* are the following: relatively short stems and small leaves with upper surface usually remaining pubescent at flowering;

phyllaries in 2-3(-5) series, broad and often with prominent, hyaline flanges; flowers relatively few; pistillate style branches somewhat flattened, barely extending out of the tube; and achenes with a short beak, 6-9 ribbed, the whole surface densely papillate. *Jones 298* differs from other plants of the species in two respects: the achene beaks are slightly longer and one of the several mounted plants has a single small bract on the stem, well below the head.

11. *CHAPTALIA ALBICANS* (Sw.) Vent. ex Steudel (Map 5, Figure 11).
Leontodon tomentosum L. f., *Suppl. Pl. Syst. Veg.* 347. 1781. [1782.]. *Tussilago albicans* Sw., *nom. nov.*, *Nov. Gen. Sp. Pl. Prodr.* 113. 1788 (not *Tussilago tomentosum* Ehrh. 1788.). *Leria albicans* (Sw.) DC., *Ann. Mus. Natl. Hist. Nat.* 19:68. 1812. *Chaptalia albicans* (Sw.) Vent. ex Steudel, *Nom. Bot.* (ed. 2) 1:344. 1840. (not *Chaptalia tomentosa* Vent. 1802.). *Gerbera albicans* (Sw.) Sch.-Bip. in Seemann, *Bot. Voy. Herald* 313. 1856. *Thyrsanthema tomentosum* (L. f.) Kuntze, *Rev. Gen. Pl.* 1:369. 1891. LECTOTYPE (Nesom 1984b): JAMAICA? *Patrick Browne s.n.* (LINN, no. 953.16, microfiche 537!).
Leria leiocarpa DC., *Prodr.* 7:42. 1838. *Gerbera leiocarpa* (DC.) Sch.-Bip. in Seemann, *Bot. Voy. Herald* 313. 1856. *Leria nutans* (L.) DC. var. *leiocarpa* (DC.) Griseb., *Cat. Pl. Cubens.* 158. 1866. *Chaptalia nutans* (L.) Polak. var. *leiocarpa* (DC.) A. Hitchc., *Ann. Rep. Missouri Bot. Gard.* 4:102. 1893. *Chaptalia leiocarpa* (DC.) Urban, *Symb. Antill.* 8:747. 1921. TYPE: CUBA. No other locality data, 1825, *Ramón de la Sagra s.n.* (HOLOTYPE: G-DC, microfiche 1239!). See Nesom 1984b.
Chaptalia obovata C. Wright in Sauvalle, *Ann. Acad. Cien. Habana* 6:212. 1870. TYPE: CUBA. En la loma Pelada, jurisdicción de los Palacios, *C. Wright 3617* (GH!, NY-2 sheets!, US!). See Nesom 1984b.
Chaptalia fallax Greene, *Leafl. Bot. Observ.* 1:195. 1906. TYPE: CUBA. Vicinity of Baracoa, 24-29 Jan 1902, *C.L. Pollard et al.* 86 (HOLOTYPE: US!; Isotypes: NY!, US!).
Chaptalia crispula Greene, *Leafl. Bot. Observ.* 1:194. 1906. TYPE: GUATEMALA. Dept. Sta. Rosa: Sta. Rosa, 3000 ft, Jun 1892, *Heyde & Lux 3433* (HOLOTYPE: US!; Isotypes: F!, GH!, NY!, US!).

Scapes 6-15 cm tall at anthesis, 12-30(-37) cm at fruiting, ebracteate, prominently dilated immediately beneath the head. Leaves 1.7-14.0 cm long, petiolate or attenuate to a short petiolar region, the margins retrorsely serrulate- to denticulate-apiculate. Heads always erect. Ligules 0.2-0.3 mm wide. Achenes 8.4-11.2 mm long, the filiform beak 1/2-2/3 as long as the achene, glabrous to sparsely glandular-pubescent, usually only along the ribs. Chromosome numbers, $n=24$, ca. 29 pairs (Torres & Liogier 1970).

San Luis Potosí, Veracruz, Yucatán, Chiapas, to Belize and Honduras, the West Indies, and southern Florida; grassy areas or open savannas, sometimes near evergreen oaks, (350-)1100-1835 m; flowering (March-)April-July(-November).

For comments and citations of collections examined, see Nesom (1984b).

12. *CHAPTALIA RUNCINATA* Kunth (Map 3, Figure 12).

- Chaptalia runcinata* Kunth, *Nov. Gen. Sp. Pl.* 4 [folio]:5. tab. 303. 1820. *Loxodon longipes* Cass., *nom. nov. illeg.*, *Dict. Sci. Nat.* 27:255. 1823. *Tussilago bicolor* Willd. ex Less. [*pro syn. sub Oxydon bicolor*], *nom. nov. illeg.*, *Linnaea* 5:357.

1830. *Oxydon bicolor* (Willd. ex Less.) Less., *nom. illeg.*, *Linnaea* 5:357. 1830. *Gerbera bicolor* (Willd. ex Less.) Sch.-Bip., *Bot. Voy. Herald* 313. 1856. *Thyrsanthema runcinata* (Kunth) Kuntze, *Rev. Gen. Pl.* 1:369. 1891. TYPE: COLOMBIA. "Crescit locis temperatis, scopulosis Andium Novo-Granatensium in ripa fluvii Smita, alt. 590 hex. Floret Octobri," *Humboldt & Bonpland 2031*. Two duplicates of the type collection are known: (1) P, herb. H.B.K. microfiche 89!, the specimen marked as number "2031," also see McVaugh (1972), and (2) herb. Willdenow, cat. no. 15714, microfiche! Neither specimen, however, matches the illustration in the original publication, which shows a single plant with three heads at anthesis. LECTOTYPE (designated here): P, the H.B.K. number 2031.

Scapes 8-15 cm tall at anthesis, to 28 cm at fruiting, with 5-8 lanceolate bracts. Leaves subcoriaceous, oblong-ovate to elliptic, 3-9 cm long, 5-15 mm wide, densely gray-white tomentose beneath, glabrous above, the margins narrowly revolute, with 4-8 shallowly serrate or dentate teeth. Heads turbinate-cylindric, 5-8 mm wide, with glabrous or glabrate phyllaries 11-16 mm long. Achenes (5.0-)6.5-7.8 mm long, beaked, basally papillate, otherwise glabrous, purple or brown at maturity.

Sonora, Sinaloa, Durango, Nayarit, apparently disjunct to Edo. México and Hidalgo, again disjunct to Costa Rica (as reported by Simpson 1975) and Panamá, more widespread at high altitudes in South America (Venezuela and Colombia southward along the Andes to Bolivia, Paraguay, southern Brazil, Uruguay, and Argentina); moist or wet meadows, often at the edge of the wettest part, areas of oak, pine, fir, or mixtures, (990-)2100-3100 m; flowering June-October (January in Hidalgo).

Collections examined: MEXICO. Dist. Federal: *Rzedowski 35360* (ENCB). Durango: *Breedlove 44171* (CAS,ENCB); *Cronquist 9560* (MICH,NY); *Detling 8437* (US); *Fryxell 3034* (ENCB,OS); *González & Rzedowski 2343* (TEX); *LeDoux & Dunn 1960* (ENCB, NY); *Maysilles 7809* (ENCB,MICH), 7848 (MICH-2 sheets) and 7452 (ENCB,MICH); *Mick & Roe 68* (ENCB,WIS-2 sheets); *Nesom 4432* (CAS,ENCB, F, GH, GUADA, MEXU, MICH, MO, NY, TEX, UC, US) and 4439 (ENCB,MEXU,MICH,TEX); *Parker 645* (LL); *Ripley & Barneby 13990* (NY); *Waterfall & Wallis 13583* (OKLA,SMU); *Worthington 8810* (TEX,UTEP). Hidalgo: *Rzedowski 32698* (ENCB). Edo. México: *Hinton 8478* (GH,US); *Poole 1567* (MEXU,TEX); *Rzedowski 36288* (ENCB). Nayarit: *Rose 2022* (GH,NY,US); *Breedlove 44497* (CAS). Sinaloa: *Pennell 20142* (US). Sonora: *Pennell 19647* (GH,MICH,NY,US).

PANAMA. *Stearn et al. 1189* (MO).

Burkart (1944) considered *Chaptalia runcinata* to have two varieties in South America, var. *runcinata* and var. *graminifolia* Dusen. More recently, Cabrera (in Cabrera & Klein 1973) elevated the latter to specific rank as *C. graminifolia* (Dusen) Cabrera.

Chaptalia runcinata from Argentina was reported by Burkart (1944) to produce chasmogamous and cleistogamous heads in seasonal alternation, as occurs in plants of the genus *Leibnitzia* (e.g., see Nesom 1983). I have not observed this phenomenon among collections of *C. runcinata* made from México or Central America, all of which have been chasmogamous.

UNCERTAIN OR EXCLUDED TAXA

The status of *Chaptalia spathulata* (D. Don) Hemsl.

Chaptalia spathulata has ebracteate stems and strongly bicolorous, elliptic, essentially entire leaves. It is similar to *C. nutans* and *C. texana*, but the leaves are more similar in shape to those of *C. petrophila* than to typical forms of either of the former, and the heads are atypically small for *C. nutans* or *C. texana*. Further, the type locality of *C. spathulata* is an area where neither *C. nutans* nor *C. texana* has been collected but where both might reasonably be expected (Map 4).

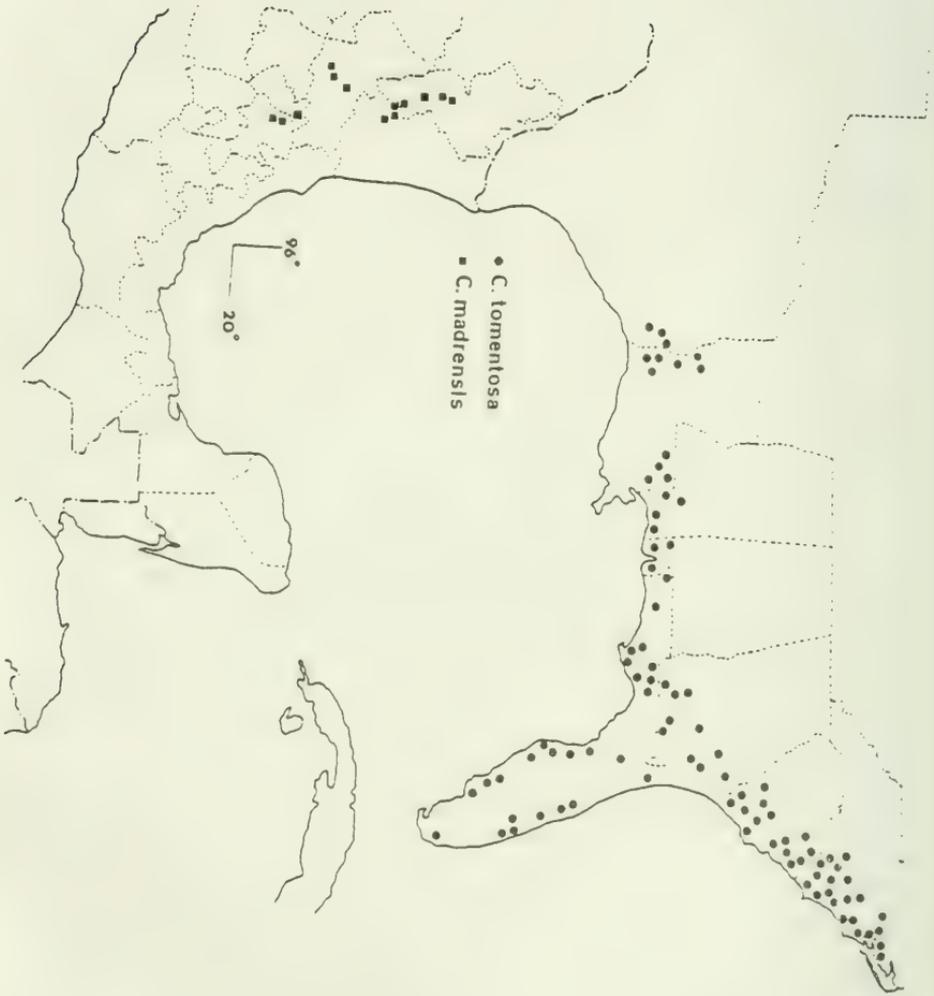
Don noted that the central flowers of *Chaptalia spathulata* were "masculine." I believe this may have been a mistaken conclusion based on observation of immature achenes, but if such proves to be true, *C. spathulata* would have to be interpreted as a rare species of sect. *Chaptalia*. A definite decision regarding disposition of *C. spathulata* must await an examination of the type specimens.

CHAPTALIA SPATHULATA (D. Don) Hemsl., Biol. Centr.-Amer., Bot. 2:255, 1881. BASIONYM: *Leria spathulata* D. Don, Trans. Linn. Soc. London 16:249, 1833. *Lieberkuhna spathulata* (D. Don) DC., Prodr. 7:43, 1838. *Gerbera spathulata* (D. Don) Sch.-Bip. in Seemann, Bot. Voy. Herald 313, 1856. *Thyrsanthema spathulata* (D. Don) Kuntze, Rev. Gen. Pl. 1:369, 1891. *Cacalia spathulata* Sessé & Moçino ex D. Don [pro syn. sub *Leria spathulata* D. Don], Trans. Linn. Soc. London 16:249, 1833. *Cacalia spathulata* Sessé & Moçino, nom. illeg. Naturaleza (México City) ser. 2, 1:132, 1890. PROBABLE TYPE: MEXICO. [Guerrero]: in the Mazatlán mountains, July [1797], Sessé & Moçino 2028 (MA, photo-F!). Other Sessé & Moçino collections of this taxon are the following: s.n. (Fl herb. Webb, marked by Pavón as "*Cacalia spathulata* N.E.," photo-US!); 3370 (MA, photo-F!); 4062 (MA, photo-F!). The collection locality (except for the state) and date were cited by Sessé & Moçino in the publication of *Cacalia spathulata*. According to McVaugh (1977), the collection was made in the autumn of 1789 near what is now called Chilpancingo. McVaugh (pers. comm.) could not locate a specimen of this at Oxford [herb. OXF].

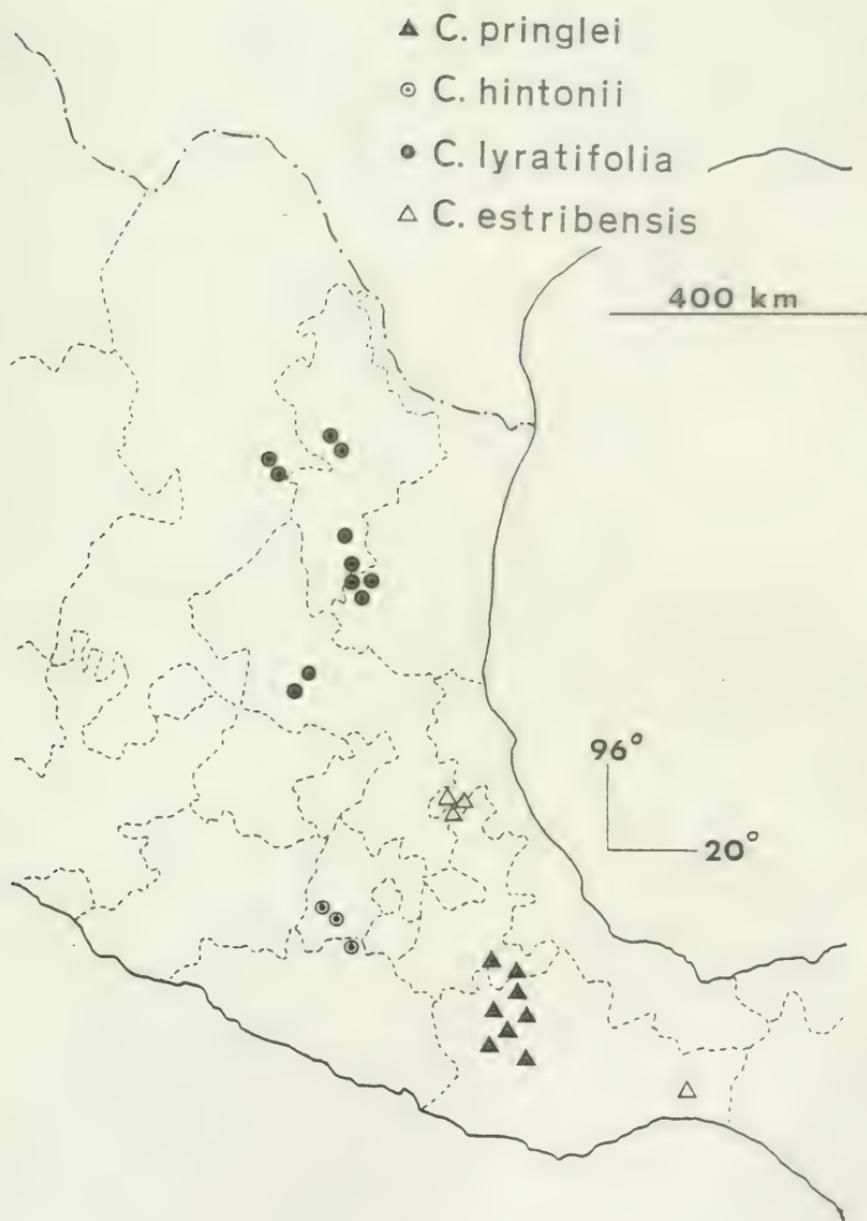
The status of *Chaptalia lyrata* D. Don

After locating the type specimens of *Chaptalia lyrata* D. Don at OXF and receiving photographs and detailed observations of micromorphology, it is clear that it is the earliest named taxon representing what I have previously identified as *Leibnitzia seemannii* (Sch.-Bip.) Nesom. For additional synonymy, see Nesom (1983).

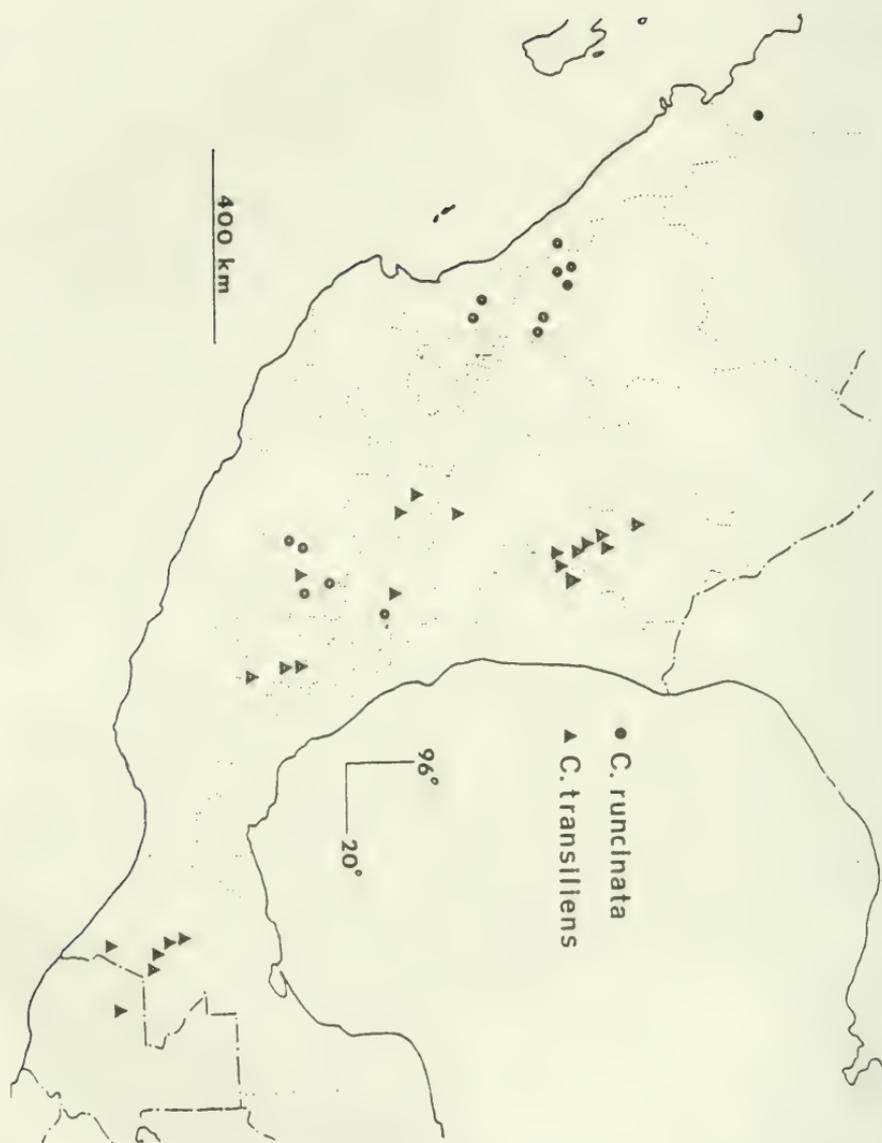
LEIBNITZIA LYRATA (D. Don) Nesom, comb. nov. BASIONYM: *Chaptalia lyrata* D. Don, Trans. Linn. Soc. London 16:243, 1833. *Gerbera lyrata* (D. Don) Sch.-Bip. in Seemann, Bot. Voy. Herald 313, 1856. *Thyrsanthema lyrata* (D. Don) Kuntze, Rev. Gen. Pl. 1:369, 1891. *Hieracium stipitanum* Sessé & Moçino ex Don [pro syn. sub *Chaptalia lyrata* D. Don], Trans. Linn. Soc. London 16:243, 1833. Not *Leria lyrata* (Pers.) Cass. = *Chaptalia nutans* (L.) Polak., not *Tussilago lyrata* Willd. (1803) = *Chaptalia lyrata* (Willd.) Spreng. (1826) = *Leibnitzia anandria* (L.) Turcz.; not *Perdicionium lyratum* R. Br. ex Steud., Nom. Bot. (ed. 2) 2:203, 1841. (illegitimate combination or new name based simply on "*Chaptalia lyrata*"). TYPE: MEXICO. No other locality data or date. Sessé & Moçino s.n.



Map 1. Distribution of *Chaptalia tomentosa* and *C. madrensis*.



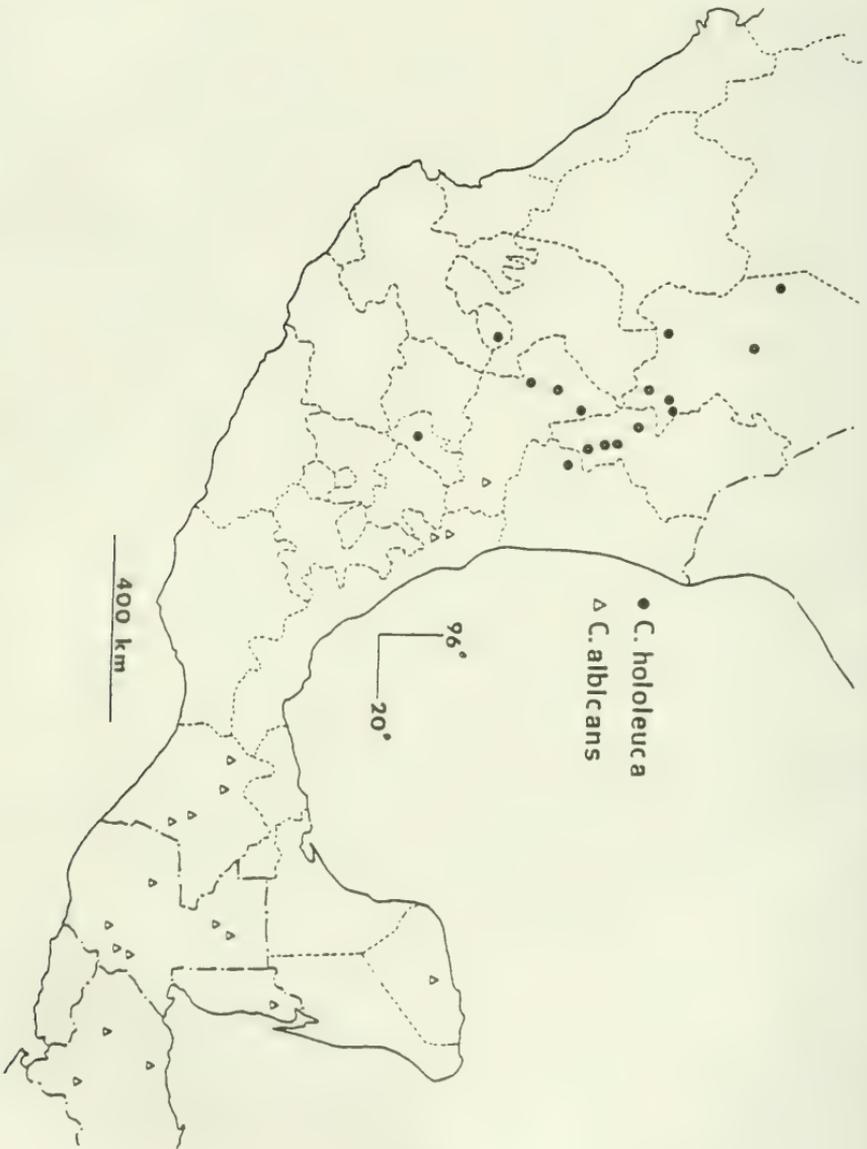
Map 2. Distribution of *Chaptalia lyratifolia*, *C. estribensis*, *C. hintonii*, and *C. pringlei*.



Map 3. Distribution of *Chaptalia runcinata* and *C. transiliensis*.



Map 4. Distribution of *Chaptalia nutans* and *C. texana*. The "S" shows the locality of *C. spathulata* (see comments in text).



Map 5. Distribution of *Chaptalia hololeuca* and *C. albicans*.



Figure 1. Habit of *Chaptalia tomentosa* (Iltis 25151).



Figure 2. Habit and leaf variation of *Chaptalia madrensis* (Nesom 4758). Disconnected leaves show species variability at $\times 2/3$ scale of full plant.

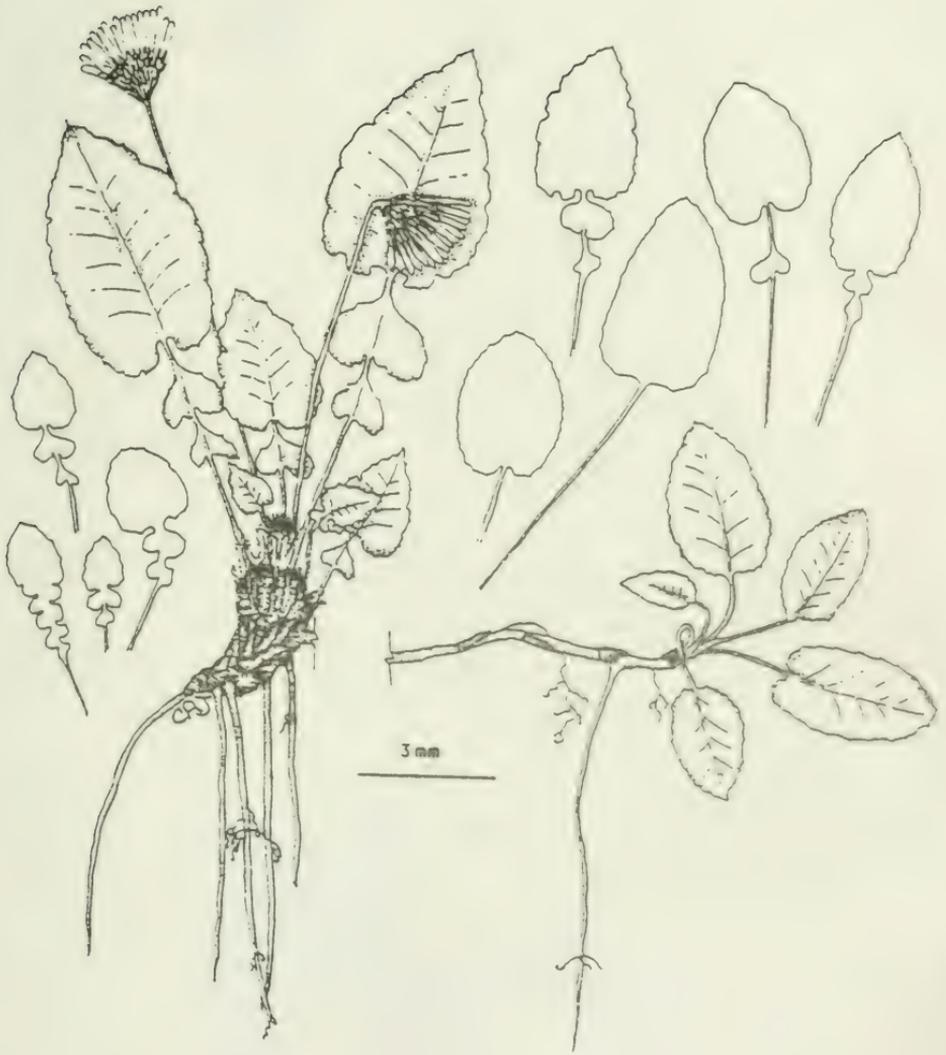


Figure 3. Habit of *Chaptalia lyratifolia* (Lyonnet 3490) with stoloniferous branch of Nesom 1019). Disconnected leaves show species variability at $\times 2/3$ scale of full plant.



Figure 4. Habit and leaf variation of *Chaptalia estribensis* (Gimite L. s.n.).

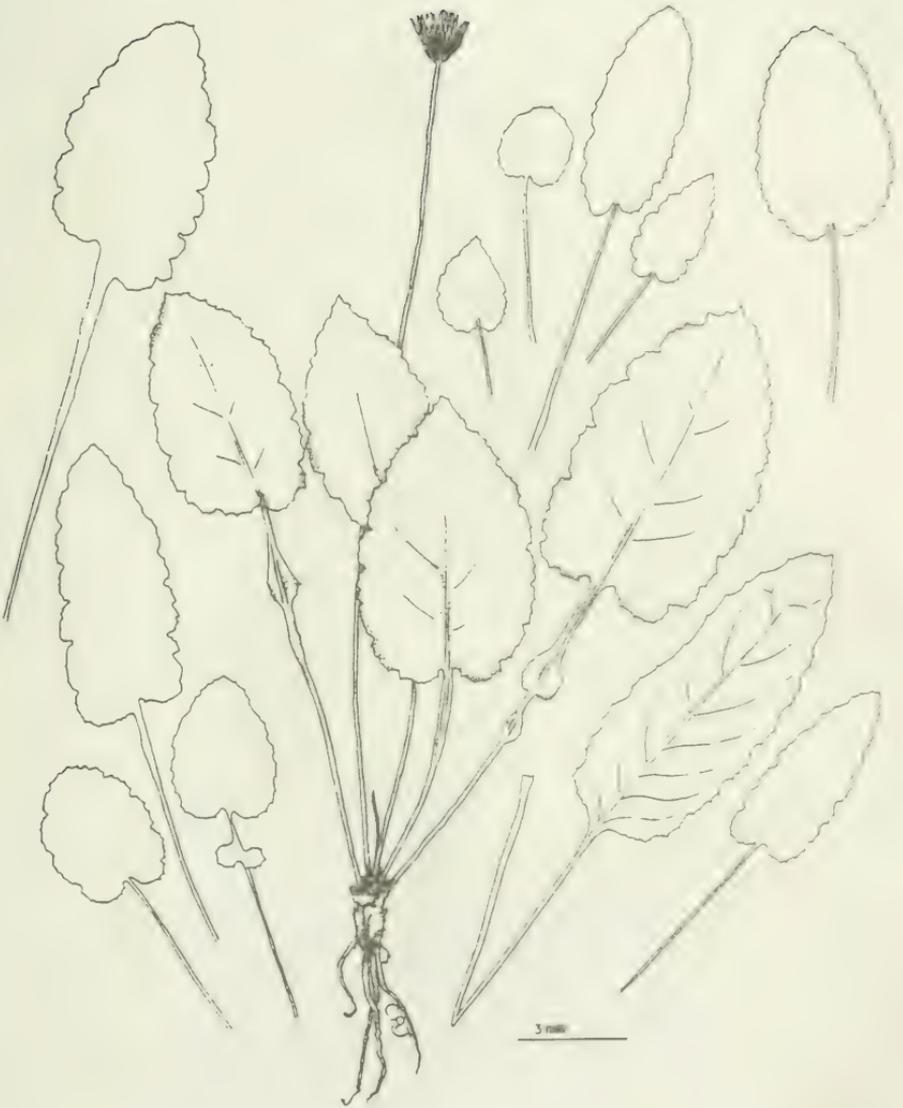


Figure 5. Habit and leaf variation of *Chaptalia hintonii* (Hinton 8562). Disconnected leaves show species variability at $\times 2/3$ scale of full plant.

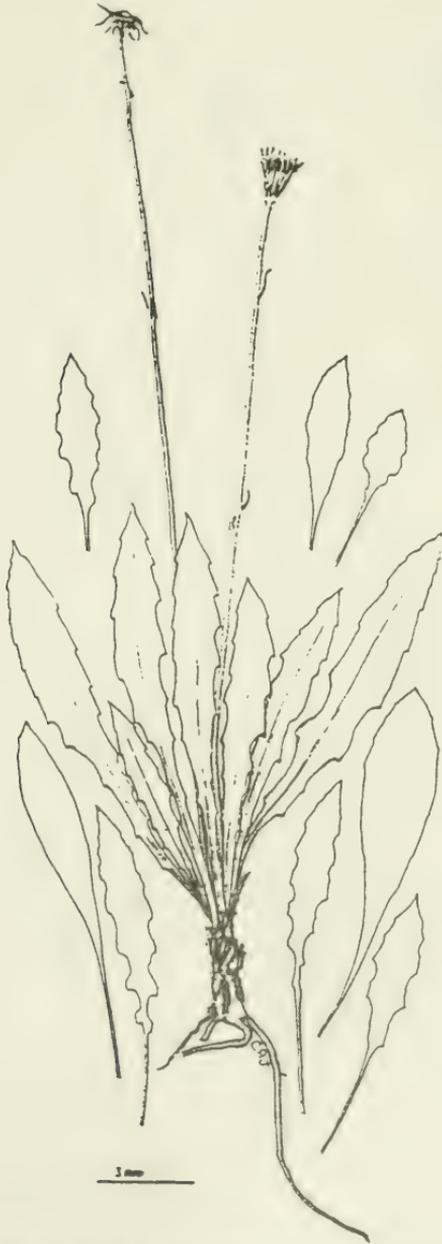


Figure 6. Habit and leaf variation of *Chaptalia pringlei* (Nesom 4405). Disconnected leaves show species variability at $\times 2/3$ scale of full plant.

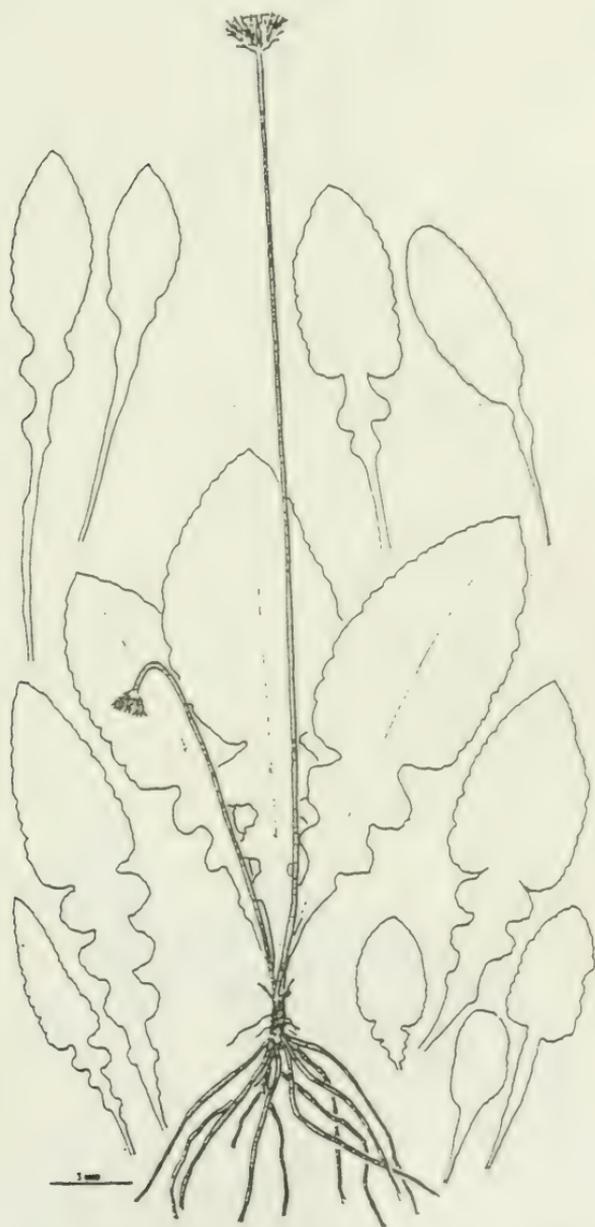


Figure 7. Habit and leaf variation of *Chaptalia nutans* (Ventura A. 12763). Disconnected leaves show species variability at $\times 2/3$ scale of full plant.



Figure 8. Habit and leaf variation of *Chaptalia texana* (Nesom 4758-B). Disconnected leaves show species variability at $\times 2/3$ scale of full plant. Leaves marked "P" are from *C. petrophila*.

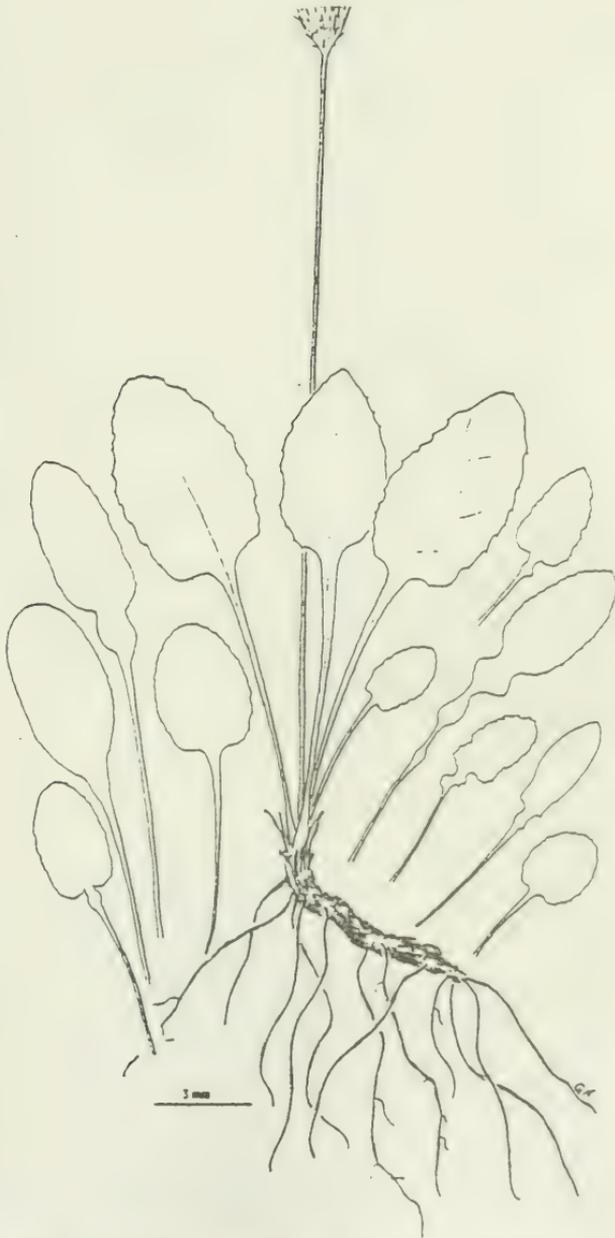


Figure 9. Habit and leaf variation of *Chaptalia transiliens* (Nesom 4759). Disconnected leaves show species variability at $\times 2/3$ scale of full plant.



Figure 10. Habit and leaf variation of *Chaptalia hololeuca* (Palmer 298). Disconnected leaves show species variability at $\times 2/3$ scale of full plant.



Figure 11. Habit of *Chaptalia albicans* (Ventura A. 8381).



Figure 12. Habit of *Chaptalia runcinata* (Nesom 4439).

(HOLOTYPE: OXF ex herb. Lambert, marked by Pavón as "*Hieracium stipitatum* N.E.", photo-US!).

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MALAGASY ASCLEPIADACEAE: REINSTATEMENT OF THE
GENUS *PERVILLEA* AND TWO NEW COMBINATIONS

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ABSTRACT

A species previously placed in *Toxocarpus* Wight & Arnott (Asclepiadaceae, Secamoneae), *T. decaryi* Choux, is outside the morphologic and phylogenetic bounds of this genus. In contrast, it is more closely related to the Malagasy endemic *Pervillea* Decaisne (Secamoneae), a hitherto monotypic genus usually included in *Toxocarpus*, but here reinstated as a separate genus. *Toxocarpus decaryi* is transferred to *Pervillea*. Furthermore, the Malagasy monotypic genus *Menabea* (Secamoneae) shares several advanced androecium characters with *Pervillea* and is merged with this genus.

KEY WORDS: *Pervillea*, *Toxocarpus*, *Menabea*, Secamoneae, Madagascar

During a survey of the tribe Secamoneae in Madagascar for "Flore de Madagascar et des Comores", I have come across three taxa that have been misplaced, viz. *Toxocarpus tomentosus* (Decne.) Jum. & Perr., *T. decaryi* Choux, and the monotypic *Menabea venenata* Baillon.

Toxocarpus Wight & Arnott is a mainly Asian genus with a few species also described from the African mainland and Madagascar. The type species, *T. kleinii* Wight & Arnott, distributed in India and Sri Lanka, is characterized by a two-parted dorsiventrally flattened corona lobe, a stigma head placed directly on the ovary with a thick lower part and a long, thin upper part distinctly projecting above the staminal column. The Asian *Toxocarpus* constitute a fairly well circumscribed group. However, in Madagascar *Toxocarpus* is not unambiguously distinguished from *Secamone*, the other large genus within the tribe Secamoneae. With stress on different features, *Secamone* has been characterized by the minute flowers with ovate corolla lobes overlapping to the right, the coronal folioles with 5 free falcinate or ligulate appendages projecting outwards, the globose pollinia, the broad retinaculum with involute base, and mucous stigmatic apex (Tsiang 1939: 54, see also Klackenberg 1992: 8 for references). However, none of these characters hold true for Malagasy Secamoneae. Most of the Malagasy taxa belonging to the tribe Secamoneae have been placed in the genus *Secamone* although several exhibit characters said to be restricted to *Toxocarpus*, such as dorsiventrally flattened corona lobes, long stigma head, large flowers with the corolla overlapping to the left (see Klackenberg 1992) or ellipsoid pollinia

(see Civeyrel 1994). These characters have been variously combined with the features mentioned above, used to circumscribe *Secamone*. However, a handful of distinctly deviating taxa with large flowers and dorsiventrally flattened corona lobes have been considered to be congeneric with the Asian *Toxocarpus*. Two of those, *T. tomentosus* and *T. decaryi*, plus the monotypic genus *Menabea*, will be discussed below.

Toxocarpus tomentosus was described by Decaisne (1844: 613) as *Pervillea tomentosa* Decne. and placed in the tribe Marsdenieae. This opinion was followed by Schumann (1895: 291), but later it was transferred to *Toxocarpus* by Jumelle & Perrier (1907: 389; 1908: 214), who correctly stated that each corpuscule has four pollinia. It has dorsiventrally flattened corona lobes and large flowers, characteristic for *Toxocarpus*, but is, however, furnished with long projecting connectives. These prolonged connectives should be compared to the anthers in *Secamone/Toxocarpus* that lack any processes at the thecae or are topped by a membranaceous film or some papillae only. *Toxocarpus tomentosus* is also distinguished from *Secamone/Toxocarpus* by its discoid stigma head rather abruptly narrowed into a style and topped by a short and broad upper part. This structure is found also in, e.g., Periplocaceae, but not in *Secamone/Toxocarpus*, which are characterized by a stigma head with a thick lower part situated directly on the ovary without a style. The four ellipsoid pollinia are glued to a very thin U-like folded corpusculum without caudicle. The leaves are covered by an indumentum of curled hairs with very small lumen. These hairs are not found elsewhere in *Secamone/Toxocarpus*. Consequently, this species does not fit in *Toxocarpus* s. str. as it is circumscribed in Asia, nor in *Secamone* s. l. as it is known in Madagascar, and the original name, *Pervillea*, must be reinstated for this taxon.

Toxocarpus decaryi, described by Choux (1927: 197) is characterized by the same structure of the connectives, stigma head, pollinarium, and indumentum as *Pervillea tomentosa*, mentioned above. *Toxocarpus decaryi* must hence be excluded from *Toxocarpus*, and transferred to *Pervillea*.

A third taxon, *Menabea venenata*, exhibits the same structure of the connectives, stigma head, pollinarium, and indumentum present in *Pervillea tomentosa* and *P. decaryi*. It was described, however, as a monotypic genus by Baillon (1890: 825) placed in the Periplocoideae. *Menabea* was not mentioned in Schumann's treatment for *Die Natürlichen Pflanzenfamilien* (Schumann 1895). A few years later it was transferred to the tribe Asclepiadeae ("Cynanchées") by Heckel (1902: 366) who pointed out the presence of pollinia. It was correctly placed in tribe Secamoneae by Jumelle & Perrier (1908: 215), who observed 20 pollinia in each gynostegium, a key character for this tribe. Jumelle & Perrier, however, calling the attention to the similarity between *Menabea* and *Pervillea (Toxocarpus)*, did not merge these genera, due to a supposed absence of a corpusculum. This observation has been repeated by others, e.g. recently by Verhoeven & Venter (1994: 305, 307), who furthermore due to this supposed missing corpusculum placed *Menabea* in Periplocaceae. However, according to my studies, a corpusculum is present, and has the same structure as in *P. tomentosa* and *P. decaryi*, and *Menabea* should thus be merged with *Pervillea*. Being the older name, *Pervillea* has priority. The necessary nomenclature follows:

PERVILLEA DECARYI (Choux) Klack., *comb. nov.* BASIONYM: *Toxocarpus decaryi* Choux, Bull. Mus. Hist. Nat. (Paris) 33:197. 1927. ("decaryi" sphalm.). TYPE: *Decary* 2853 (LECTOTYPE [here selected]: P).

PERVILLEA VENENATA (Baillon) Klack., *comb. nov.* BASIONYM: *Menabea venenata* Baillon, Bull. Mens. Soc. Linn. Paris 104:825. 1890. TYPE: S. coll. (Grandidier), Tanghin de Ménabé, MADAGASCAR. (LECTOTYPE [here selected]: P).

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EVALUACION DEL GENERO *ALSTONIA* (APOCYNACEAE) EN CENTRO AMERICA

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ABSTRACT

Species of *Alstonia* are evaluated. Incorrect applications of the names *A. longifolia* and *A. pittieri* are clarified.

RESUMEN

Las especies del género *Alstonia* son evaluadas: se aclara la confusión respecto a la incorrecta aplicación de *Alstonia longifolia* y *Alstonia pittieri*.

KEY WORDS: Central America, Apocynaceae, *Alstonia*

El género *Tonduzia* fue creado por Pittier en 1908, caracterizado por sus folículos secos, no carnosos, semillas secas, aladas y el cáliz eglandular. En 1938, en la Flora de Norte América, Woodson reportó tres especies: *T. longifolia* (A. DC.) Woodson, *T. pittieri* J.D. Smith y *T. macrantha* Woodson.

Posteriormente en 1948, Pichon en su monografía sobre la clasificación sistemática de la familia, colocó dicho género bajo la sinonimia (reduciendolo a una sección) del género *Alstonia*, ampliamente distribuido en el Paleotrópico, ya que ambas eran coespecíficos; sin embargo, únicamente transfirió una especie (*Tonduzia longifolia*) de las tres especies de *Tonduzia* aceptadas. Dicha proposición fue prácticamente ignorada por consecuentes tratamientos y *Tonduzia* siguió siendo aceptado como un género válido.

Posteriormente, en 1983 Gentry transfirió el resto, pero evidentemente el no observo los tipos, pues asumió como válidas la aceptación de las especies publicadas por Woodson.

Una examinación detallada de los ejemplares tipos de todas las especies de *Tonduzia* descritas en Centro América y México, reveló una mala aplicación del nombre *Alstonia longifolia* (A. DC.) Pichon para la mayoría del material depositado en herbarios. El tipo de *Rauvolfia longifolia* A. DC., descrito por Alphonse De Candolle a partir de una colección de Hartweg proveniente de México, presenta inflorescencias cortas, con pocas flores, con el tubo de la corola de 8-10 mm, con los lóbulos también muy desarrollados (5-6 mm × 2-3 mm); sin embargo, el ejemplar tipo de *Alstonia macrantha* (Woodson) A. Gentry, considerado por Gentry como una especie diferente,

presenta exactamente las mismas características descritas anteriormente, por lo que debe ser considerado como un sinónimo de dicha especie.

Asimismo, la mayoría del material que ha sido identificado como *Alstonia longifolia*, realmente pertenece a *Alstonia pittieri* (J.D. Smith) A. Gentry, especie que se caracteriza por presentar inflorescencias generalmente desarrolladas, con muchas flores, estas con el tubo 4-6 mm y los lóbulos 3-5 mm × 1-2 mm.

La identificación de especímenes de *Alstonia* con frutos es en algunos casos difícil, sobre todo para plantas provenientes de Guatemala y México, pero en todo caso, *A. longifolia* presenta inflorescencias y pedúnculos mucho más cortos que *A. pittieri*.

Clave para las especies de *Alstonia* en Mesoamérica

1. Tubo de la corola 7-10 mm, lóbulos obovados, 5-6 mm × 2-3 mm; inflorescencia con pocas flores; México y Guatemala.....*A. longifolia*
1. Tubo de la corola 4-6 mm, lóbulos oblongos u obovado-oblongos, 3-5 mm × 1-2 mm; inflorescencias generalmente densas, con muchas flores; México hasta Costa Rica. *A. pittieri*

Alstonia longifolia (A. DC.) Pichon, Bull. Mus. Nac. Hist. Nat. Paris ser. 2, 19:297. 1947. BASIONYM: *Rauvolfia longifolia* A. DC., *Prodr.* 8:338. 1844. TIPO: MEXICO. Hartweg 491 (HOLOTIPO: V, foto F!,MO!,NY!,US! ex V). *Tonduzia longifolia* (A. DC.) Woodson, N. Amer. Fl. 29:122. 1938. *Tonduzia macrantha* Woodson, Ann. Missouri Bot. Gard. 24:12. 1937. TIPO: GUATEMALA. Quezaltenango: Volcán Zunil, 9 July 1930, Skutch 871 (HOLOTIPO: MO!; Isotipo: US!). *Alstonia macrantha* (Woodson) A. Gentry, *syn. nov.* Ann. Missouri Bot. Gard. 70:206. 1983.

Arboles 6-11 m, ramitas algo triangulares cuando jóvenes, teretes después. Hojas en verticilos de 3, raramente 2, 6.5-16.0 cm × 1.4-3.4 cm, oblongo-elípticas, largamente acuminadas, cuneadas o atenuadas en la base, eglandulares, venación conspicua y prominente, peciolo canaliculado, 0.5-2.0 cm, glandular en las axilas. Inflorescencia cyma corymbosa terminal, más corta que las hojas adyacentes, aglomerada, con muchas flores, pedúnculo 0.2-2.8 cm, bracteolas ovadas, escariosas, ± 1 mm; lóbulos del cáliz ovados, 0.8-1.0 mm, iguales, redondeados o agudos en el ápice, imbricados en la base, eglandulares; corola hipocrateriforme, blanca o crema, tubo 7-10 mm, piloso en el interior bajo la posición de los estambres, 1.5 mm diámetro, lóbulos obovados, 5-6 mm × 2-3 mm, glabros; estambres insertos ± en la mitad del tubo, filamentos glabros, ± 0.5 mm, anteras ca. 1.5 mm, acuminadas, apenas sagitadas en la base, gineceo glabro, ca. 1 mm, estigma capitado-fusiforme. Folículos leñosos, delgados, 8.5-12.5 cm × 0.6-0.8 cm, teretes, rugosos. Semillas desconocidas.

Distribución. Sur de México (*Matuda 18134* [MEXU,MO]), Guatemala (*Skutch 871* [MO,US]). Creciendo entre los 1400-1800 metros.

Raramente colectada, es conocida por menos de cinco colecciones; se desarrolla en bosques húmedos. El tamaño de la inflorescencia y los lóbulos de la corola la separan fácilmente de la otra especie.

- Alstonia pittieri* (J.D. Smith) A. Gentry, Ann. Missouri Bot. Gard. 70:206. 1983. BASIONYM: *Tonduzia pittierii* J.D. Smith., Bot. Gaz (Crawfordsville). 49:4567. 1910. TIPO: GUATEMALA. *Dean 6098* (HOLOTIPO: US!).
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- Tonduzia parvifolia* Pittier, Contr. U.S. Nat. Herb. 12:103. 1908. TIPO: SAN SALVADOR. *Doyle 33* (HOLOTIPO: US!; Isotipo: MO!).
- Tonduzia longipedunculata* Woodson, in Standl. & Steyer., Field Mus. Bot. 23:78. 1944. TIPO: GUATEMALA. *Steyermark 47313* (HOLCTIPO: MO!; Isotipo: FI, foto INB! ex MO).

Arboles a arbustos, 3-18 m, ramitas algo triangulares cuando juvenes, teretes luego. Hojas en verticilos de (2-)3(-4), 3-16 cm × 0.6-2.5 cm, oblongo-elípticas, largamente acuminadas, cuneadas o atenuadas en la base, eglandulares, venación conspicua y prominente, peciolo canaliculado, 0.5-2.5 cm, glandular en las axilas. Inflorescencia cyma corymbosa, terminal o subterminal, aglomerada, con muchas flores, más corta o igual que las hojas adyacentes, pedúnculo 0.5-3.0(-15.0) cm, pedicelos 2-7 mm, bracteolas ovadas, menos 0.5 mm, escariosas; lóbulos del cáliz ovados, agudos, ca. 1 mm, algo imbricados en la base, ± iguales; corola hipocrateriforme, blanca, tubo 4-6 mm, pubescente o glabrada en el interior, lóbulos obovados u oblongo-obovados, 3-5 mm × 1-2 mm, glabros o glabrados; estambres insertos ± en la mitad del tubo, filamentos glabros, ca. 0.5 mm, anteras sagitadas en la base, ca. 1.5 mm, agudas, gineceo glabro, estigma fusiforme, nectarios inconspicuos. Folículos delgados y leñosos, 7.5-18.0 cm × 5-6 mm, rectos o algo curvos, rugosos; semillas ovoides, ciliadas en los márgenes, ± 1 cm.

Distribución. México (*Breedlove et al. 30598* [DUKE,F,NY]), Guatemala (*Standley 87127* [F, MO]), El Salvador (*Berendsohn 389* [MO]), Honduras (*Echvards 448* [MO]), Nicaragua (*Grijalva et al. 1381* [MO]), Costa Rica (*Morales J.F. 2776* [INB,MO,NY]), Panamá (*Kirkbride et al. 1031* [MO]).

Creciendo entre los 700-2000 metros, pero es más común entre los 900-1500 metros, en bosques húmedos, aunque se localiza también en sitios algo secos.

La mayoría del material perteneciente a esta especie se encuentra identificado en los herbarios como *Alstonia longifolia*, de la que se puede diferenciar fácilmente por los caracteres dados en la clave. En algunos sitios llega a formar poblaciones muy abundantes, sobre todo en asociaciones riparias.

Tonduzia longipedunculata difiere del tipo de *T. pittieri* únicamente en los largos pedúnculos de las inflorescencias y sus hojas en verticilos de 4; sin embargo, condiciones similares pueden ser encontradas en otras muestras (*Stevens et al. 20318* [MO]) y corresponden probablemente a crecimientos anormales; dicho carácter es solo una tendencia morfológica y no puede ser tomado para justificar la validez de *T. longipedunculata* como una especie aceptada de *Alstonia*.

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A NEW SPECIES OF *FORSTERONIA* (APOCYNACEAE) FROM COSTA RICA

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ABSTRACT

A new species of *Forsteronia* from Costa Rica, is described and the relationships are discussed.

KEY WORDS: Costa Rica, Apocynaceae, *Forsteronia*

During preparation of the treatment of Apocynaceae for the "Manual de Plantas de Costa Rica", I detected an undescribed species of *Forsteronia* with straight secondary nerves, a very unusual character within the genus.

Forsteronia monteverdensis J.F. Morales, *spec. nov.* TYPE: COSTA RICA, Alajuela: Cantón de San Ramón, Reserva Biológica Monteverde, Cordillera de Tilarán, bosque primario en la fila Cerros Centinela, 1600 m, 10°17'55" N, 84°47'23" W, 6 June 1994, (fl, fr), J.F. Morales & G. Carnevali 3349 (HOLOTYPE: INB).

Frutex scandens, ramulis teretibus, glabrus. Foliae elliptica vel oblanceolata, 5.5-12.5 cm longa, 1.5-3.5 cm lata, glabra, apice acuminata, basi cuneata, venis secundariis rectis, petioli glabrus. Lobis calycis acuminatis, 1.5-2.0 mm longus, puberulis; corolla alba, tubo extus glabra, lobis puberulis, 3-4 mm longus. Folliculis glabrus, 18-28 cm longus.

Liana, branchlets terete, glabrous, smooth or sparsely lenticellate. Leaves opposite, 5.5-12.5 cm long, 1.5-3.5 cm wide, elliptic, oblong-elliptic or oblong-lanceolate, glabrous with domatia in the midvein axils below, acuminate to caudate-acuminate at apex, acute to cuneate at base, membranaceous, eglandular, midvein impressed above, prominent and conspicuous below, secondary veins impressed on both sides, brochidodromous, tertiary venation scarcely impressed; petioles canaliculate, glabrous, 5-11 mm long, glandular in the axils. Inflorescence corymbose to subcorymbose, terminal, shorter than the subtending leaves, puberulent, 14-35-flowered, peduncle 4-6(-9) mm long, pedicels 4-6 mm long, bracts ovate, 1-2 mm long, scarious; calyx lobes ovate, ca. 2 mm long, margins sparsely ciliate, squamellae 1-4 per lobe, scarious, corolla cream to white-cream, tube 2.0-2.5 mm long, glabrous

outside, pubescent within near the throat; corolla lobes oblong-obovate, 3-4 mm long, puberulent; stamens exerted, 3.0-3.5 mm long, anthers glabrous, ca. 3 mm long, sagittate; nectary 5-lobed, ca. 0.5 mm long, ovary puberulent to glabrate, style ca. 3 mm long. Follicles thin, 14-28 cm long, glabrous, smooth and terete; seeds oblong-elliptic to elliptic, puberulent to glabrate, 1.0-1.5 cm long, coma 2.6-3.0 cm long, tan to cream.

Distribution. Only known from wet premontane and montane tropical forest in the Monteverde Cloud Forest Reserve and Volcán Tenorio region, near Tilarán, Province Guanacaste, at elevations of 650-1600 m.

Forsteronia monteverdensis is closely related to *F. floribunda* (Sw.) A.DC. from Jamaica, which also has straight secondary nerves. However, the puberulent corolla lobes and larger leaves easily distinguish *F. monteverdensis*. *Forsteronia peninsularis* differs from this new species in its arcuate secondary venation.

Additional specimens examined: COSTA RICA. Guanacaste: Zona Protectora Tenorio, Tierras Morenas, 685 m, 10 Aug. 1993 (fr), *Rodríguez G. et al.* 201 (CR,INB,MO).

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AN EVALUATION OF THE *MANDEVILLA BOLIVIENSIS* COMPLEX

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ABSTRACT

The relationships of *Mandevilla boliviensis* (Hook. f.) Woodson with *M. cereola* Woodson and *M. pittieri* Woodson are discussed.

KEY WORDS: Neotropics, Apocynaceae, Apocynoideae, *Mandevilla*

In 1933, in the monograph of the genus *Mandevilla*, Woodson reduced the genus *Dipladenia*, created by Alphonse De Candolle in 1844, to a synonym of the former and transferred *Dipladenia boliviensis* Hook. f. to *Mandevilla*. At the same time, Woodson described *Mandevilla cereola* Woodson, which he separated from *M. boliviensis* (Hook. f.) Woodson on the basis of its membranaceous foliage and the form of the corolla throat. Woodson later (1936), described *Mandevilla pittieri* Woodson as closely related to the two preceding species, best separated on the basis of the foliar glands in the base of the midrib and the narrower corolla throat.

However, the foliar glands supposedly restricted to *Mandevilla pittieri* are present in the types of the other two species. Furthermore, additional collections show that variation in corolla shape and length cannot be used to separate this species.

It thus becomes necessary to place *Mandevilla cereola* and *M. pittieri* into synonymy of *M. boliviensis*.

Mandevilla boliviensis (Hook. f.) Woodson, Ann. Missouri Bot. Gard. 20:716. 1933. BASIONYM: *Dipladenia boliviensis* Hook. f., Bot. Mag. 111 25: pl. 5783. 1869. TYPE. BOLIVIA. without data, Pearce 708 (HOLOTYPE: K - not seen, photo MO! ex K).

Mandevilla cereola Woodson, Ann. Missouri Bot. Gard. 20:712. 1933, *syn. nov.* TYPE: BOLIVIA. Mapiri Región: San Carlos, Jan. 29, 1929, Buchtien 1737 (HOLOTYPE: US!).

Mandevilla pittieri Woodson, Ann. Missouri Bot. Gard. 23:379. 1936, *syn. nov.* TYPE: COSTA RICA. Forests de Tuis, Nov. 1897, Pittier 11551 (HOLOTYPE: B - probably destroyed; Isotypes: US! - 2 sheets, photo INB! ex US).

Liana or vine, sometimes epiphytic, stems terete, glabrous. Leaves oblong-elliptic, (3.5-)5.0-10.0 cm long × 1.4-4.0 cm wide, membranaceous to chartaceous, acute to somewhat acuminate in the apex, obtuse to cuneate at the base, with 2-4 glands above, in the base of the midrib, glabrous, petioles 0.8-2.0 cm long, glabrous.

Inflorescence cymose, reduced, axilar, mostly subterminal, 2-5-flowered, peduncle 1-2 cm long, pedicels 1.0-2.7 cm long, bracts scarious, ca. 1 mm long; calyx lobes ovate, 6-8 mm long, long-acuminate, imbricate at the base, bearing within 4-6 glands in the base; corolla infundibuliform, white, the throat yellow within, tube 1.2-1.8 cm long, glabrous, throat conic, 1.7-2.3 cm long, 1.0-1.3 cm in diam., lobes obovate, 2.3-3.0 cm long \times 1.7-2.0 cm wide, stamens inserted, anthers 8-10 mm long, auricles thick; ovary 2-3 mm long; nectaries 2, inconspicuous, entire. Follicles unknown.

Known in Costa Rica, Ecuador, and Bolivia, where it can be found in forest and open areas, from 200-800 meters elevation. Rarely collected, only a few collections are found in herbaria.

Additional specimens examined: COSTA RICA. Alajuela: between Cañas and Upala, Jun. 26, 1976, *Croat 36511* (MO). Limón: W of Tortuguero, Aug. 21, 1979, *Davidson et al 8601* (F,MO); Talamanca, Cañabral, Sept. 6, 1988, *Grayum et al 8835* (MO).

ECUADOR. Chimborazo: Huigra vicinity, Sept. 8, 1918, *Rose & Rose 22592* (US). Tungurahua: Río Pastaza, 1924, *Tate 669* (NY,US).

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TWO NEW SPECIES OF *DRYMARIA* (CARYOPHYLLACEAE) FROM GYPSEOUS SOILS IN NORTHERN NUEVO LEON, MEXICO

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ABSTRACT

Two new species of *Drymaria*, *D. pattersonii* B.L. Turner and *D. pratheri* B.L. Turner, are described from northern Nuevo León, Mexico. The former belongs to the series *Arenarioides* of *Drymaria* where it relates to *D. axillaris*; the latter belongs to the series *Lyropetala* where it relates to *D. lyropetala*. The herbaceous elements most closely related to the latter taxon are reviewed, resulting in the elevation of *D. l.* var. *coahuilana* to specific rank as *D. coahuilana* (I.M. Johnst.) B.L. Turner. Three species of the *D. lyropetala* complex are reviewed and keyed, and detailed maps showing the distribution of each are provided.

KEY WORDS: Caryophyllaceae, *Drymaria*, Mexico

Duke (1961) provided an excellent revisionary study of the genus *Drymaria* in which 48 species were recognized; these were distributed among seventeen series. The two novelties described below belong to the series *Arenarioides* and *Lyropetala*. Since the latter series is a poorly known difficult group, I have attempted to reevaluate those taxa centering about *D. lyropetala* I.M. Johnst., to which *D. pratheri* B.L. Turner seems closely related. Johnston (1950), having relatively few collections at his disposal at the time of his treatment, recognized *D. lyropetala* as a variable complex with two varieties (he had no material of what is here named *D. pratheri*); var. *lyropetala*, a northern race, and var. *coahuilana* I.M. Johnst., a southern race. After examination of a much larger suite of specimens, and with some field work of my own, I conclude that the *D. lyropetala* grouping is best treated as composed of three morphogeographical taxa: *D. lyropetala*, *D. coahuilana* (I.M. Johnst.) B.L. Turner and *D. pratheri*. A key to these three taxa follows:

- 1. Midstem leaves mostly 3-6 mm long; seeds sparsely to moderately hispidulous, the hairs ca. 0.1 mm long or less; southern Nuevo León and northern San Luis Potosí. *D. lyropetala*
- 1. Midstem leaves mostly 8-15 mm long; seeds moderately to densely "wirey", the hairs mostly 0.15-0.40 mm long; northern Nuevo León westwards to eastern Chihuahua. (2)
- 2. Sepals mostly 4-5 mm long; stems (new growth) with lower portions glandular-pubescent; seeds moderately pubescent with hairs mostly 0.1-0.2 mm long; stems strongly perennial with stout lignescent tap roots; northern

- Coahuila and closely adjacent eastern Chihuahua. *D. coahuilana*
 2. Sepals mostly 3-4 mm long; stems glabrous; seeds densely pubescent with hairs mostly 0.3-0.5 mm long; stems weakly perennial with slender (seemingly annual) tap roots; northern Nuevo León. *D. pratheri*

DRYMARIA COAHUILANA (I.M. Johnst.) B.L. Turner, *stat. & comb. nov.*
 BASIONYM: *Drymaria lyropetala* I.M. Johnst. var. *coahuilana* I.M. Johnst., J. Arnold Arb. 31:189. 1950. TYPE: MEXICO. Coahuila: 2 km S of Santa Elena, Sierra de las Cruces, R.N. Stewart 567 (HOLOTYPE: GH).

Johnston, with his original description of var. *coahuilana*, noted that the stems of var. *lyropetala*, while mostly glabrous, occasionally have glandular hairs, citing the type itself as possessing these. While a smattering of hairs occur on the latter, compared to *Drymaria coahuilana* the plants are essentially glabrous, as are the other specimens I have examined of the taxon. Regardless, the seeds and smaller leaves readily distinguish *D. lyropetala* from both *D. coahuilana* and *D. pratheri*.

DRYMARIA PRATHERI B.L. Turner, *spec. nov.* TYPE: MEXICO. Nuevo León: 7 mi NE of "Las Estacas" (ca. midway between Monclova and Minas along hwy 53) on ranch road towards Lechugillal (ca. 26° 15' N, 100° 48' W), gypsum flats with *Larrea*, *Fouquieria*, *Opuntia*, and scattered *Yucca*, ca. 650 m, 18 Oct 1993, Alan Prather 1483 (with T. Patterson and A. Hempel) (UNICATE HOLOTYPE: TEX!; FRAGMENT HOLOTYPE: MEXU!).

Drymariae lyropetalae I.M. Johnst. similis sed differt pedicellis ad maturitatum longioribus (6-10 mm longis vs. 3-6 mm longis), sepalis minoribus (ca. 3 mm longis vs. 3-5 mm longis), et seminibus dorsaliter dense pilosis trichomatibus ca. 0.3 mm longis (vs. moderate hispidulis trichomatibus ca. 0.1 mm longis vel minus).

Annual (?), weakly perennial, or seemingly annual, intricately branched herbs 15-20 cm high. Stems green, glabrous or nearly so (except for sparse scattered tub-like enations), the internodes relatively short (less than 1.5 cm long) on young shoots, 1.5-2.5 cm long on older shoots, much-branched from below and arising from very slender somewhat ligneous taproots. Leaves pseudoverticillate, linear-oblongate, those at midstem mostly 8-14 mm long, 0.5-1.0 mm wide, glabrous or nearly so, a pair of white lanceolate stipules at the base ca. 0.3 mm long. Flowers 5-10, arranged in terminal bracteate cymes, the pedicels 4-10 mm long, deflexed at maturity, glabrous. Sepals 5, ovate, 3-4 mm long, 2 mm wide, the margins scarious. Petals 3-5, white, ca. 2.5 mm long, 0.8 mm wide, broadly ovate in outline, the terminal portion with 8-12 lacerations, the lateral pair more pronounced, ca. 0.7 mm long. Stamens 5, ca. as long as the petals. Ovary ca. 1.5 mm high, glabrous, the styles trifid, ca. 1 mm long. Capsule globose, ca. 1.5 mm across, containing ca. 25 seeds. Seeds ca. 2.5 mm long, densely pilose dorsally with white stiff hairs ca. 0.4 mm long. Chromosome number, $n = 12$ pairs.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Nuevo León: 14 km N of Rancho Las Estacas, on road to Rancho Lechugillal, gypsum flat, 680 m, 16 Mar 1973, Johnston et al. 10220 (LL); 30 mi SE of junction of highways 53 and 57, along highway 53 to Monterrey, gypsum flats, 22 May 1972, Powell & Turner 2304

(TEX); along dirt road to Espinoza from hiway 53, WNW of Monterrey, gypsum flats, 22 May 1972, *Powell & Turner 2313* (TEX); 6 mi NE of Las Estacas, on dirt road toward Lechugillal, ca. 650 m, 18 Oct 1993, *Prather 1488* (TEX).

Drymaria pratheri was first collected by the present author and A.M. Powell in 1972; the latter's collection 2304 (cited above) serves as the voucher for the chromosome number ($n = 12$ pairs) given in the above description. Hartman (by annotation) identified this material, and some of the other collections cited, as *D. lyropetala* var. *lyropetala*. The latter taxon is readily distinguished from *D. pratheri* by its smaller leaves and merely hispidulous achenes, as noted in the above key, but the two taxa are habitally similar, both being weakly developed glabrous perennials with slender tap roots. The seeds of *D. pratheri* are remarkably like those of *D. elata* I.M. Johnst. (ser. *Lyropetala*) and closely related suffruticose taxa (cf. Figure 2, Duke 1961). I have described *D. pratheri* as questionably annual, based upon the weakly developed tap root found in several collections, including the holotype, but it is probably perennial since the other taxa of the series *Lyropetala* are clearly perennial.

Drymaria pratheri occurs in gypseous soils in northeastern Mexico, as do the five other species (*D. elata*, *D. subumbellata* I.M. Johnst., *D. suffruticosa* S. Wats., *D. lyropetala*, and *D. coahuilana*) assigned to the series *Lyropetala*. The distributional relationships of three of the five taxa of this series are shown in Figure 1.

DRYMARIA PATTERSONII B.L. Turner, *spec. nov.* TYPE: MEXICO.

Coahuila: ca. 1 km E of the hwy at Rancho Santa Lucia along hwy 30 between Monclova and Candela, where the road turns SE, 2.3 mi NW of the turnoff to La Carrosa, 23 mi W of the intersection with hwy 1 (ca. 26° 50' N, 100° 47' W), SW facing gypsum slopes along base of mountains, 800-900 m, 18 Oct 1993, A. Prather 1496, with Tom Patterson (HOLOTYPE: TEX!; Isotype: MEXU).

Drymaria axillari Brandegeae similis sed differt plantis altioribus (15-20 cm altis vs. 8-10 cm altis) magis divaricate ramosisque, caulibus glabris (vs. dense glandulosis), et floribus minoribus sepalis brevioribus (2.5-3.5 mm longis vs. 3.8-5.0 mm longis).

Perennial divaricately branched glaucous herbs 15-30 cm high. Stems glabrous, usually 3-8 arising from ligneous branched roots. Leaves ovate-falcate to elliptic-lanceolate, mostly 4-6 mm long, 1.5-2.5 mm wide, glabrous except for a smattering of glands along the margins near the apices. Stipules white, lanceolate-triangular, mostly 0.5 mm long or less, glandular along the margins. Flowers axillary along the upper branches, 1 to a node, the pedicels mostly 4-6 mm long, sparsely glandular-pubescent. Sepals 2.5-3.5 mm long, 1.0-1.3 mm wide, sparsely glandular-pubescent, the margins white-scarious. Petals ca. 2.5 mm long, the basal claw ca. 1 mm long, entire, ca. 1 mm wide, the lobes ca. 1.2 mm long. Anthers cream-colored, ca. 0.7 mm long. Ovary glabrous; style ca. 0.8 mm long, 3-branched apically, the stigmas ca. 0.3 mm long. Capsules ca. 2.5 mm long; seeds hippocrepiform, ca. 0.75 mm long, 0.3 mm wide, minutely rugose-striate, more so along the medial ridge.

Drymaria pattersonii belongs to the series *Arenarioides* (containing five species, *sensu* Duke 1961) where it relates to the poorly collected *D. axillaris* Brandegeae, the latter known only from Sierra de la Pala of southernmost Coahuila, where it



Figure 1. Distribution of *Drymaria coahuilana* (open circles), *D. lyropetalata* (open triangles), and *D. pratheri* (closed triangle).

reportedly occurs among xeric shrubs and succulents dominated by *Agave lechugilla* Torrey, *Fouquieria splendens* Engelm., and *Larrea tridentata* (DC.) Cov. *Drymaria pattersonii* might also be compared with *D. barkleyi* Duke & Steyerl. of the ser. *Arenarioides*, but the latter is smaller, having narrower more linear-oblongate, glabrous, leaves.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnoses, and to him and Piero Delprete for reviewing the manuscript. Additionally, I thank Tom Patterson and A. Prather, both currently graduate students in systematics at TEX, for useful information regarding habits and habitats of the taxa concerned.

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SYNOPSIS OF *AGERATELLA* (ASTERACEAE, EUPATORIEAE)

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ABSTRACT

The genus *Ageratella* is confined to México and is treated as monotypic, its sole species, *A. microphylla*, comprising of three intergrading varieties: var. *microphylla*, largely confined to the border regions of southern Sinaloa-Durango and closely adjacent Nayarit and Jalisco; var. *palmeri*, largely confined to central Jalisco; and a newly described var. *sonorana* B.L. Turner, largely confined to southern Sonora and northern Sinaloa. A key is constructed to these taxa, along with a map showing their distribution.

KEY WORDS: Asteraceae, Eupatorieae, *Ageratella*, México

Gray first proposed the genus *Ageratella* without a formal description, basing this upon two plants which he regarded as varieties of a single species: *A. microphylla* (Sch.-Bip.) A. Gray ex S. Wats. var. *seemannii* (Benth. & Hook. f.) A. Gray and *A. m.* var. *palmeri* A. Gray ex S. Wats. The type of *Ageratella* is based upon *Ageratum microphyllum* Sch.-Bip., which was first collected by Seemann in Sinaloa or Durango in the mid 1800's while traversing the Sierra Madre Occidental along the road from Mazatlán, Sinaloa, to Cd. Durango (cf. Turner 1992).

Robinson (1905) subsequently provided a formal description of the genus *Ageratella*, treating the two taxa proposed by Gray as distinct species, *A. microphyllum* (Sch.-Bip.) A. Gray ex S. Wats and *A. palmeri* (A. Gray ex S. Wats.) B.L. Rob. This treatment was followed by Blake in his treatment of the Compositae for the *Trees and Shrubs of México*. Robinson also briefly reviewed the history of *Ageratella*, providing a complete synonymy. McVaugh (1971), however, treated the genus as monotypic, not recognizing Gray's varieties, noting that "various intermediates can be demonstrated" between these two taxa. McVaugh (1984) maintained this stance in his *Flora Novo-Galiciana*.

In my forthcoming treatment of *Ageratella* for the Asteraceae of México (Turner & Nesom, in prep.) I intend to recognize the genus as monotypic, but find it expedient and meaningful to recognize three infraspecific morphogeographical taxa.

AGERATELLA A. Gray

Suffruticose perennial herbs 30-60 cm high. Stems brittle, stiffly erect, puberulent, arising from stout rhizomes, forming clumps. Leaves opposite below, alternate above, often markedly so, 1.5-3.0 cm long, 0.1-1.5 cm wide; petioles indistinct, 1-3 mm long; blades flabellate, ovate to oblanceolate in outline, entire to

crenate or rarely deeply dissected, 3-nervate from near the base, puberulent and punctate-glandular beneath. Heads arranged axillary and sessile along the stem, or in both axillary and terminal, often lax, corymbose panicles. Involucres cylindrical to turbinate, 4-6 seriate, graduate; bracts 2-4 nervate, scarious along the margins. Receptacle convex, naked. Florets 6-18 per head; corollas whitish, tubular, glabrous above, atomiferous-glandular below, the lobes 5, acute. Anthers included, the appendages vestigial. Style branches linear-oblancoolate, smooth. Achenes narrowly prismatic, 5-ribbed; pappus of 5 scales, the mid-ribs extending as pronounced barbellate bristles.

Type species, *Ageratella microphylla* (Sch.-Bip.) A. Gray ex S. Wats.

AGERATELLA MICROPHYLLA (Sch.-Bip.) A. Gray ex S. Wats., Proc. Amer. Acad. Arts 22:419. 1887.

A single variable species, as described for the genus above.

Three regional varieties of this species are recognized, as follows:

1. All of the heads on ultimate peduncles 3-10 mm long; southern Sonora, northern Sinaloa.....var. *sonorana*
1. Most or many of the heads sessile or subsessile; southern Sinaloa, Durango, Nayarit, Jalisco.....(2)
 2. Leaves flabellate to obovate in outline, broadest at or above the middle; border regions of southern Sinaloa-Durango and closely adjacent Nayarit and Jalisco.var. *microphylla*
 2. Leaves linear to ovate in outline; central Jalisco.....var. *palmeri*

AGERATELLA MICROPHYLLA (Sch.-Bip.) A. Gray ex S. Wats. var. *MICROPHYLLA* BASIONYM: *Ageratum microphyllum* Sch.-Bip in Seemann, Bot. Voy. Herald 298. 1856. *Ageratella microphyllum* (Sch.-Bip. in Seemann) A. Gray ex S. Wats., Proc. Amer. Acad. Arts 22:419. 1887.

≠*Decachaeta seemanii* Benth. & Hook. f., Gen. Pl. 2:239. 1873. *Ageratella microphylla* (Sch.-Bip.) A. Gray ex S. Wats. var. *seemannii* (Benth. & Hook. f.) A. Gray, Proc. Amer. Acad. Arts 22:419. 1887. TYPE: MEXICO. Sinaloa(?): "Sierra Madre", 1838-1839, Seemann 2043 (HOLOTYPE: K!; Isotype: GH!). McVaugh (1984) thought the type to have been collected in Sinaloa, near Cerro del Pinal, which is probably the case since the species has been collected several times (TEX) in the vicinity of this locality, but not as yet in the state of Durango along the route (mainly present day Highway 40 between Mazatlán and Cd. Durango) which Seemann took to cross the "Sierra Madres" (cf. Turner 1992).

This, the most common populational form of the species, is easily recognized by its broadly obovate to flabellate leaves. It is largely confined to pine-oak woodlands to the areas east of Mazatlán, Sinaloa and southwards into Durango, Nayarit, and northern Jalisco.

REPRESENTATIVE SPECIMENS: MEXICO. Durango: Mpio. Mezquital, 45 mi WNW of Huejuquilla El Alto [Jalisco], 1830-2150 m, 23 Oct 1893, *Breedlove 59251* (TEX). Jalisco: Mpio. Bolaños, 11.5 km W of Bolaños on the road to

Tuxpan, 1680 m, 19 Oct 1983, *Lott 2051* (TEX). Nayarit: Mpio. La Yesca, 3 km N of Amatlán de Jora, 1600 m, 15 Oct 1990, *Flores M. 2209* (TEX). Sinaloa: Mpio. de Concordia, ca. 60 km NE of Villa Unión, ca. 1300 m, 4 Nov 1980, *Cronquist 11763* (TEX).

AGERATELLA MICROPHYLLA (Sch.-Bip.) A. Gray ex S. Wats. var. PALMERI A. Gray ex S. Wats., Proc. Amer. Acad. Arts 22:419. 1887. *Ageratella palmeri* (A. Gray) B.L. Rob., Proc. Amer. Acad. Arts 41:272. 1905. TYPE: MEXICO. Jalisco: Río Blanco, 1886, *Palmer 537* (HOLOTYPE: GH!).
Stevia bisecta M.E. Jones, Extr. Contr. West. Bot. 18:70. 1933. TYPE: MEXICO. Jalisco. Orendain, 27 Nov 1930, *M.E. Jones 27800* (HOLOTYPE: POM).

This variety is well described by Robinson (1905) and is confined to the more inland areas of Jalisco, mainly in the vicinity of Guadalajara. Nearly all of the ten or more separate collections (LL, TEX) from this region display linear leaves and semipaniculate capitulescences, although the occasional "intermediate" between var. *microphylla* and var. *palmeri* can be noted (e.g., 4.5 mi NNE of Talpa de Allende, *McVaugh 20336* [TEX]).

AGERATELLA MICROPHYLLA (Sch.-Bip.) A. Gray ex S. Wats. var. SONORANA B.L. Turner, var. nov. TYPE: MEXICO. Sonora: Río Mayo, Curohui, 4 Nov 1935, *Howard Scott Gentry 2149* (HOLOTYPE: TEX!; Isotype: ARIZ).

Differt a *Ageratellae microphyllae* (Sch.-Bip.) A. Gray ex S. Wats. var. *microphyllae* foliis midcaulinis plerumque anguste linearibus (vs. late flabellatis vel obovatis) et capitulescentibus corymbosi-paniculatis pedunculis ultimis plerumque 8-18 mm longis (vs. plerumque sessilibus vel 1-6 mm longis).

Differing from *Ageratella microphylla* var. *microphylla* in having midstem leaves mostly narrowly linear (vs. broadly flabellate to obovate) and capitulescences corymbose-paniculate, the ultimate peduncles mostly 8-18 mm long (vs. mostly sessile or 1-6 mm long).

ADDITIONAL SPECIMEN EXAMINED: MEXICO. SINALOA: Mpio. Surutato, 1600 m, 8 Dec 1987, *Rito Vega 2477* (TEX).

This taxon is distinguished by its linear leaves and elongate ultimate peduncles, combining features of varieties *microphylla* and *palmeri*, but vegetatively closer to the latter. It is seemingly confined to the Pacific coast ranges of southern Sonora and northern Sinaloa, where it reportedly occurs in oak (*Gentry 2149*) or pine (*Vega 2477*) forests.

The distribution of these three varieties is shown in Figure 1, which is based upon collections at LL, TEX. Finally, it should be noted that several excellent line drawings of the species have been made, as follows: var. *microphylla* (Hemsley, Biol. Centr. Amer., t. 42. 1880.); and var. *palmeri* (McVaugh 1984, Figure 2; King & Robinson

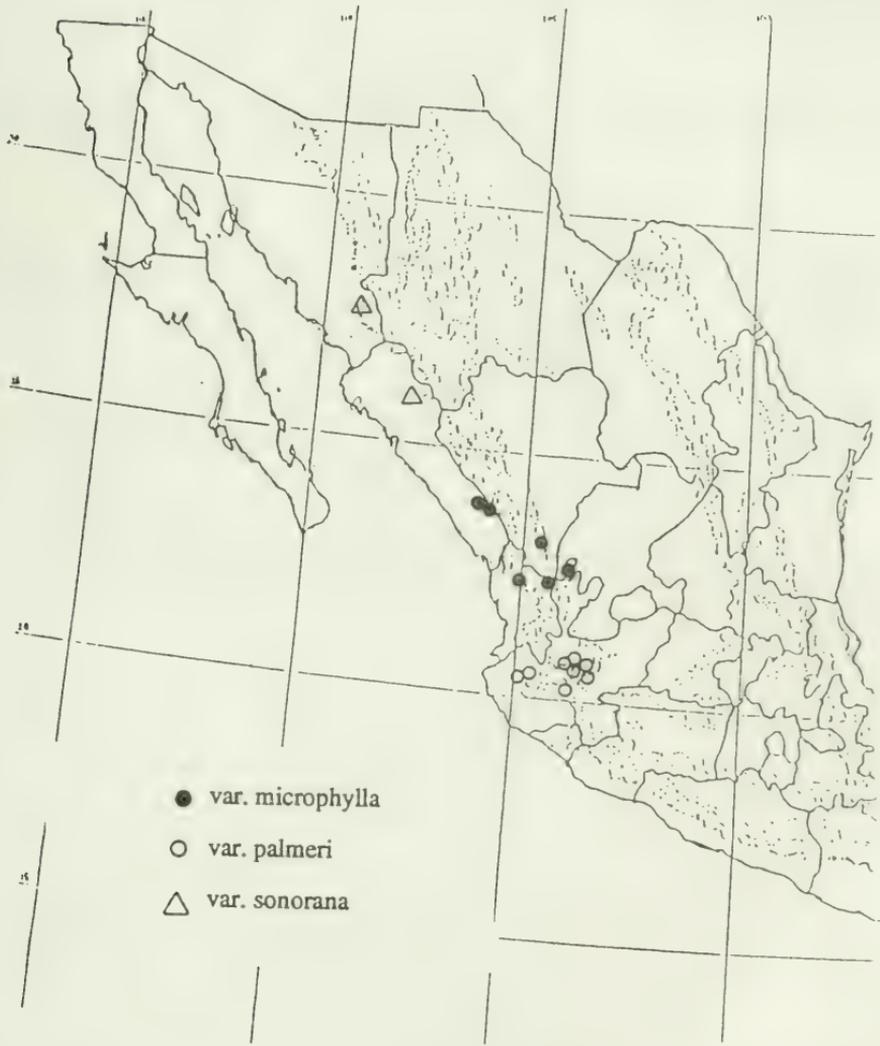


Figure 1. Distribution of the varieties of *Ageratella microphylla*.

1987, Plate 86 -- the latter being an atypical element tending towards var. *microphylla*).

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnosis, and to him and Piero Delprete for reviewing the paper.

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A NEW SPECIES OF *STACHYS* (LAMIACEAE) FROM THE SIERRA DE
MANANTLAN OF JALISCO, MEXICO

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ABSTRACT

A new species, *Stachys manantlanensis* B.L. Turner, is described from Jalisco, México. It belongs to the *S. coccinea* Ort. complex, where it relates to the recently described *S. pacifica* B.L. Turner.

KEY WORDS: Lamiaceae, *Stachys*, México

Hugh Iltis (WIS) has called to my attention a number of sheets of a species of *Stachys* from western Jalisco which he took to be a "new species"; at least he could not determine these from my recent account of the genus for México (Turner 1994b). In the preparation of my treatment I saw none of this material and agree with Hugh that the plants concerned belong to an undescribed taxon. I would have preferred to name the species for this perceptive worker, but Hugh modestly requested that I name the plant for the region to which it seems endemic, so much his dedication and fascination with this zeac garden, Sierra de Manantlán.

STACHYS MANANTLANENSIS B.L. Turner, *spec. nov.* TYPE: MEXICO.

Jalisco: "cool valley at headwaters of Arroyo Las Joyas ... 6 km WSW of Rincón de Manantlán, 17 km SSW of El Chante", (19° 35' 15-45" N, 104° 15' 30-45" W), "badly burned-over dense stands of *Pinus oocarpa*, on upper slopes and ridges of Cerro La Piedra Bola," 2100-2200 m, 1 Jan 1984, *Hugh H. Iltis & Rafael Guzman M. 29063* (HOLOTYPE: WIS!; Isotype: TEX!).

Stachydi pacificae B.L. Turner similis sed differt plantis humilibus caulibus tenuibus 20-40 cm altis (vs. robustioribus caulibus crassioribus 40-150 cm altis) et stolones foliatis efferentibus (vs. rhizomata), calycibus eglandulosi-pubescentibus (vs. glandulosis), et corollis roseis vel lilacinis (vs. rubris vel coccineis).

Low mostly spindly herbs 20-40 cm high, erect at first but the lower laterals soon forming stoloniferous offshoots which root at the nodes. Midstems 1-2 mm across, sparsely to moderately pubescent with downcurved glandular hairs 0.1-0.6 mm long. Midstem leaves mostly 4-10 cm long, 1.5-4.0 cm wide; petioles 1.5-4.0 cm long; blades broadly ovate, 3-5 nervate from the base, sparsely pilose, the margins crenulodentate. Flowers arranged (2-)4-6 in the axils of the uppermost reduced

leaves, the peduncles mostly 1-4 mm long. Calyces 6-8 mm long; tubes 4-5 mm long, sparsely pilose; lobes lanceolate-aristate, 2-3 mm long, the upper lobes longer than the lower. Corollas 12-20 mm long, reportedly "brilliant magenta" (from the type); tubes 10-13 mm long, markedly annulate within ca. 2.5 mm from the base; upper lip ca. 4 mm long; lower lip 3-lobed, 5-8 mm long. Anthers purple, exserted from the throat for ca. 4 mm. Nutlets ovoid, somewhat 3-sided, ca. 2 mm long, 1.6-1.7 mm wide, at maturity the surfaces adorned with wart-like excrescences.

ADDITIONAL SPECIMENS EXAMINED (all at WIS!): MEXICO. Jalisco: top of Sierra de Manantlán, 1.0-1.5 km SE of Estación Biológica along road to Los Cumbres, 1970-2000 m, 8 Mar 1987, *Iltis et al.* 29354; about Las Joyas Biological Station, 1900-1950 m, 12 Jun 1994, *Iltis* 31124; 2-4 km WNW Estación Biológica Las Joyas, 1900-1950 m, 21 Dec 1984, *Judziwicz & Cochrane* 4754; 10 km SW of Autlán, 1800 m, 13 Jul 1992, *Leinberger* 61; El Zarzamoro, Las Joyas, Autlán, 1940 m, 25 Aug 1985, *Vázquez* 3535; 0.6 km by main lumber road N of Cerro El Almeal, 2140 m, 19 Mar 1989, *Wetter et al.* 1088.

Because of its large, bright magenta to lilac corollas, this taxon will not key in my recent treatment of the Mexican species of *Stachys*. If the corolla of *S. manantlanensis* is assumed to be "orangish-red to red" then it will key to *S. pacifica* B.L. Turner to which it seems most closely related. According to label data on the type, and on *Vázquez* 3535, cited above, the color of its corollas are described as "bright magenta" and "lilas" respectively. The remaining sheets lack information relating to corolla color, but these appear in the dried state to have been pink or deep pink. Regardless, with its large annulate corollas *S. manantlanensis* appears to belong to the *S. coccinea* Ort. complex (*sensu* Turner 1994a). Among this group it would appear to relate closest to *S. pacifica* B.L. Turner, distinguished from the latter by its semi-prostrate spindly habit (20-40 cm high, vs. 40-150 cm high), stoloniferous stems (vs. rhizomatous stems), and eglandular-pubescent calyces (vs. glandular calyces); otherwise the two species are fairly similar.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnosis, to him and Piero Delprete for reviewing the manuscript and, of course, to the old lion himself for calling to my attention the taxon concerned.

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RESUBMERGENCE OF *HYDRODYSSODIA* B.L. TURNER INTO
HYDROPECTIS MCVAUGH (ASTERACEAE, TAGETEAE), WITH
DESCRIPTION OF A NEW SPECIES, *HYDROPECTIS ESTRADII*, FROM
CHIHUAHUA, MEXICO

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ABSTRACT

Description of a new species, *Hydropectis estradii* B.L. Turner, has led to the reexamination of its relationship to *H. aquatica* (S. Wats.) Rydb. and *H. stevensii* McVaugh, the latter positioned in a monotypic genus, *Hydrodyssodia*, by Turner in 1988. It is concluded that creation of the latter genus on morphological grounds was ill-considered; this conclusion is also supported by preliminary DNA data (Loockerman & Jansen, unpubl.). As currently circumscribed, *Hydropectis* is composed of three aquatic or subaquatic species: *H. aquatica*, *H. stevensii*, and *H. estradii*. A key to these species is provided along with an illustration of their achenes.

KEY WORDS: Asteraceae, Tageteae, *Hydrodyssodia*, *Hydropectis*, México

Routine identification of Mexican Asteraceae has revealed the following novelty.

HYDROPECTIS ESTRADII B.L. Turner, *spec. nov.* TYPE: MEXICO. Chihuahua: Mpio. Gomez Farias, Laguna de Babicora, "pastizal inundable, 2150 msnm", 9 Sep 1994, T. Lebgue & E. Estrada 3499 (HOLOTYPE: TEX!; Isotypes to be distributed).

Hydropectis stevensii McVaugh similis sed differt foliis simplicibus (vs. pinnatum dissectis), capitulis in pedunculis brevioribus (1-3 mm longis vs. 5-15 mm longis), et corpore acheniorum majore (ca. 3.5 mm longo vs. 2.5-3.0 mm longo) ac perspicue omnino pubescenti (vs. glabro supra basim).

Aquatic or subaquatic tap-rooted, glabrous herbs to 15 cm high. Midstems simple, seemingly procumbent, linear-lanceolate to nearly filiform, epustulate or nearly so, 3-5 cm long, 0.5-1.0 mm wide. Heads axillary, arranged one to a node on glabrous peduncles 1-3 mm long. Involucres broadly turbinate (at anthesis) to ovoid (in fruit), 4-5 mm high, 4-5 mm wide; involucre bracts 5, separate, broadly obovate, glabrous, seemingly devoid of pustules, the apices red-scarious and mostly rounded. Receptacle convex, glabrous, epaleate, knobby. Ray florets pistillate, fertile, 5-8 per head, the corollas ca. 1.5 mm long, the ligules short, ca. 0.5 mm long, purplish or yellowish. Disk florets numerous, perfect, fertile, the corollas mostly yellow, ca. 1.5 mm long,

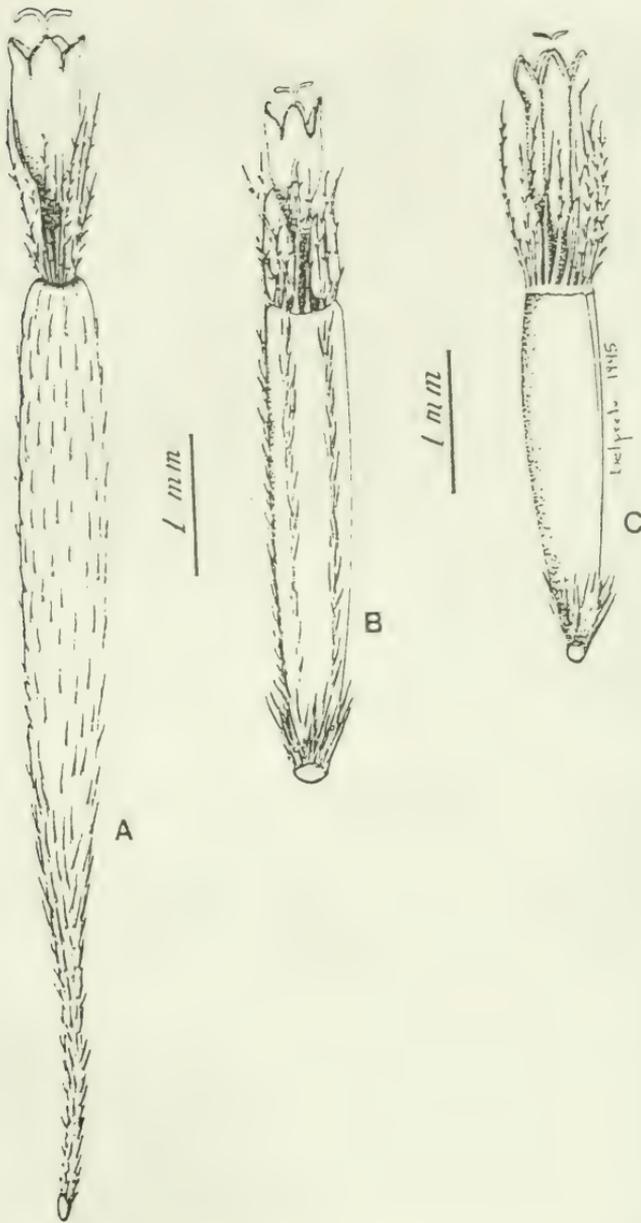


Figure 1. Achenes of *Hydropectis* species: a. *H. aquatica*; b. *H. estradii*; c. *H. stevensii* (type material). Voucher specimens marked and on file at TEX.

4-lobed, glabrous, the tube poorly developed if at all, the lobes ca. 0.5 mm long. Achenes of the ray and disk similar, linear-oblongate, ca. 3.5 mm long, 0.5 mm wide, tangentially compressed, carbonized, minutely striate, appressed-pubescent from top to bottom, with a denser tuft at the very base; pappus of numerous, variable, mostly purplish, ciliate or lacerate scales 1.0-1.5 mm high, arranged in a single series.

Label data states that the plants concerned are "stoloniferous", but the root on the holotype appears to be a weakly developed taproot. Perhaps the collectors were misled by the plant's procumbent primary stem.

Hydropectis estradii is vegetatively similar to *H. stevensii* McVaugh, the latter known only by collections from northeastern Jalisco and closely adjacent Guanajuato (McVaugh 1984; Turner 1988). It is readily distinguished from the latter by the achenal characters called to the fore in the above diagnosis (cf. Figure 1).

A key to the species of *Hydropectis* follows:

1. Involucral bracts united for ca. 4/5 their length; achenes 8-9 mm long, stipitate for 1-2 mm at their base (Figure 1a).*H. aquatica*
1. Involucral bracts free throughout; achenes 2-4 mm long, estipitate or nearly so. ... (2)
 2. Body of achene glabrous throughout, except for a basal tuft of hairs; peduncles 5-15 mm long; Jalisco and Guanajuato (Figure 1c).*H. stevensii*
 2. Body of achene pubescent throughout (Figure 1b); peduncles 1-3 mm long; Chihuahua.*H. estradii*

The treatment of *Hydropectis stevensii* as the monotypic genus *Hydrodyssodia* (Turner 1988) was ill-considered. My previous judgment heavily weighted the morphology of the involucral bracts, which in *H. stevensii* are free from base to tip, as in *Dyssodia*, but which in *H. aquatica* are nearly completely united, as in *Tagetes*. Based on this, I hypothesized that *H. aquatica* (S. Wats.) Rydb. and *H. stevensii* are not most closely related to each other, but preliminary DNA data from the current studies of Dennis Loockerman (unpubl.) strongly suggests that they should be considered congeneric and more closely related to *Tagetes* than *Dyssodia*. The new species is thus added here to *Hydropectis*.

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LECTOTYPES OF *BERBERIS CHOCHOCO* AND ITS SYNONYMS

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ABSTRACT

Lectotypes are designated for *Berberis chochoco* and its synonyms *Chrysodendron tinctorium* var. *oblongifolium*, *C. tinctorium* var. *latifolium*, and *C. tinctorium* var. *longifolium*. The species is a member of the Berberidaceae native to central and northeastern México.

KEY WORDS: *Berberis*, *Mahonia*, *Chrysodendron*, México, lectotype

Berberis chochoco Schltdl. is a member of the Berberidaceae common in central and northeastern México. Lectotypes of *B. chochoco* and three of its four published synonyms have either never been designated or have been designated incorrectly. Correct designations are given below.

Schlechtendal (1854) mentioned that the material on which he based his description of *Berberis chochoco* was collected by Ehrenberg. He mentioned that Ehrenberg had recorded the local common name as "Schoschoko," which Schlechtendal used as the basis of his specific epithet. He did not, however, mention any particular specimen. There is therefore no holotype. Fedde (1901) mentioned *Ehrenberg 1250* and another specimen, but did not designate either as type. The specimen of *Ehrenberg 1250* at HAL bears an annotation label on which Fedde renumbered the specimen with his own number, *1034*. The duplicate at US also bears Fedde's number *1034*. Fedde (1901) used both numbers in referring to the same specimen, thus creating some confusion. Ahrendt (1961) and Marroquín (1972) both gave *Ehrenberg 1034/1250* as type. Both, however, erroneously listed BM as the place of deposit. A search of type and general collections at BM yielded no such specimen. The specimen at HAL is designated lectotype below because Schlechtendal was located there. It does bear a note from Ehrenberg mentioning the common name "Schoschoko."

Four synonyms of *Berberis chochoco* were published prior to 1854, all in the same place. *Chrysodendron tinctorium* Terán & Berland. and three varietal names based on this specific name were published in a 16-page pamphlet in Matamoros, Tamaulipas, México (Terán & Berlandier 1832). The name remained unknown and unused until Johnston (1924) discovered a copy of the pamphlet in the Gray Herbarium Library at Harvard University. Johnston identified Berlandier's vouchers as *Mahonia chochoco* (Schltdl.) Fedde, a species common in central and northeastern México. Johnston's recombination, *Mahonia tinctoria* (Terán & Berland.) I.M. Johnst., has not been used by any subsequent author. A formal proposal to permanently reject the name is in press in *Taxon* (Laferrière 1995).

Berlandier provided *Chrysodendron tinctorium* with full descriptions in Spanish and Latin. This was followed by very brief descriptions of three varieties, containing information only on leaf shape. Johnston declared these to be trivial leaf variations and made no attempt to formally recombine the epithets. One of the three, var. *oblongifolium* Terán & Berland., appears to include the type specimen of the specific name, but is nevertheless validly published and legitimate. The other two are represented by two specimens on the same sheet bearing the varietal names on Berlandier's original labels. These are designated lectotypes below.

Berberis chochoco Schldl., Bot. Zeit. 12:652. 1854. --- *Mahonia chochoco* (Schldl.) Fedde, Bot. Jahrb. 31:103. 1901. TYPE: MEXICO. in barranca near Minoschta, "Schoschoko," Jan 1840, *Ehrenberg 1250* (LECTOTYPE [here designated]: HAL!; Isolectotypes: B!,US! [pro "1034;" US #617126]; WRSL! [fide Fedde 1901; now destroyed fide W. Stojanowska, pers. comm.]).

(=) *Chrysodendron tinctorium* Terán & Berland., Mem. Comis. límites: 7. 1832, pro "tinctoria," nom. rej. prop. --- *Mahonia tinctoria* (Terán & Berland.) I.M. Johnst., Contr. Gray Herb. 70:89. 1924, non *Berberis tinctoria* Lesch., Mem. Mus. Paris 9:306. 1822. TYPE: MEXICO. Tamaulipas: "in montibus prope San Carlos" [c. 100 km N of Ciudad Victoria], Nov 1831, *Berlandier 927* (LECTOTYPE [vide Marroquín in Cuad. Inst. Invest. Cient. Univ. Autón. Nuevo León 15:12. 1972.]: GH!; Isolectotype: US [fide Marroquín 1972]).

(=) *Chrysodendron tinctorium* Terán & Berland. var. *oblongifolium* Terán & Berland., Mem. Comis. límites: 7. 1832, pro "oblongifolia." TYPE: MEXICO. Tamaulipas: "in montibus prope San Carlos" [c. 100 km N of Ciudad Victoria], Nov 1831, *Berlandier 927* (LECTOTYPE [here designated]: GH!; Isolectotype: US [fide Marroquín 1972]).

(=) *Chrysodendron tinctorium* Terán & Berland. var. *latifolium* Terán & Berland., Mem. Comis. límites: 7. 1832, pro "latifolia." TYPE: MEXICO. Tamaulipas: in montibus prope San Carlos, *Berlandier 2357 pro parte* (LECTOTYPE [here designated]: upper right corner of sheet at GH!).

(=) *Chrysodendron tinctorium* Terán & Berland. var. *longifolium* Terán & Berland., Mem. Comis. límites: 7. 1832, pro "longifolia." TYPE: MEXICO. Tamaulipas: in montibus prope San Carlos, *Berlandier 2357 pro parte* (LECTOTYPE [here designated]: lower left corner of sheet at GH!; Isolectotype: specimen on right side of sheet at US! [US #2779]).

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