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PRIONOPSIS (ASTERACEAE: ASTEREAЕ) UNITED WITH GRINDELIA

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ABSTRACT

The monotypic genus *Prionopsis* is distinguished from *Grindelia* only by a difference in the pappus. Studies of morphological variation show that the two taxa are otherwise identical even in micromorphological features, and recent studies of restriction site variation in chloroplast DNA further suggest *Grindelia* without *Prionopsis* is paraphyletic. The proposal is made to enlarge *Grindelia* by including *Prionopsis* as *Grindelia papposa* Nesom & Suh, *nom. nov.*

KEY WORDS: *Prionopsis*, *Grindelia*, Astereae, Asteraceae

Prionopsis ciliata (Nutt.) Nutt. is a species endemic to the south-central United States. Nuttall originally described it as a member of *Donia* R. Brown (a synonym of *Grindelia* Willd.) but later segregated the species as the monotypic genus *Prionopsis* Nutt. De Candolle regarded the species as a member of *Haplopappus* DC., and Hall maintained it there nearly a century later as the monotypic *Haplopappus* sect. *Prionopsis* (Nutt.) H.M. Hall (see citations below for references).

Several recent floristic treatments of the southeastern to midwestern and western United States (Cronquist 1980; Martin & Hutchins 1981; Barkley 1986) have without comment treated *Prionopsis ciliata* as a member of *Haplopappus*. *Haplopappus* in North America, however, is now dismantled and apportioned among genera of several major clades of Astereae (Nesom *et al.* 1990; see Nesom & Morgan 1990 for a summary). In contrast, *Prionopsis* has been maintained as a separate genus by Johnston (1970, p. 1572), who noted that "it is closely related to *Grindelia* to which genus it probably should be

referred." Another Texas botanist had difficulty in distinguishing the two genera, as a photographic guide (Warnock 1974) pictured a plant of *Prionopsis* but identified it as *G. squarrosa* (Pursh) Dunal.

Hall (1928, p. 27) observed that *Grindelia*, "because of its much narrowed and deciduous pappus awns, closely resembles section *Prionopsis*," which he regarded as "doubtfully placed in *Haplopappus*." Steyermark (1937, p. 250) did not find the pappus of *Prionopsis* to be deciduous and rejected a hypothesis of such close relationship between *Prionopsis* and *Grindelia*, although he commented that there was perhaps a "real relationship" between the two in the "reduced number of pappus bristles compared with most of the other sections [of *Haplopappus*]." His comments on the phylogenetic relationships of *Grindelia*, however, were ambiguous, because in the same discussion he concluded that the genus was a member of the tribe Heliantheae, where it represented a "connecting link" to the tribe Astereae. Steyermark's phylogenetic diagram showed *Prionopsis* most closely related to *Xanthisma* DC., but features of the latter do not place it in such a close relationship.

Phylogenetic position of *Prionopsis* and *Grindelia*

Prionopsis and *Grindelia* are integral members of the "*Xanthocephalum* group," which also includes the genera *Xanthocephalum* Willd., *Isocoma* Nutt., *Stephanodoria* E. Greene, and *Olivaea* Schultz-Bip. ex Benth., and the "phyllocephalus group" of *Haplopappus* DC. The plants of these generic-level taxa are characterized by a suite of features that we believe to be homologous and indicative of membership in a monophyletic lineage: yellow ray flowers (if present), disc corollas with the throat abruptly ampliate above the tube, deltate to ovate-lanceolate disc style appendages, and a base chromosome number of $x=6$. For the most part, these taxa have been previously hypothesized to be closely related among themselves (Jackson 1966; Jackson & Dimas 1981; Lane 1983; Lane & Hartman 1985; Hartman 1990). In a broader context, the *Xanthocephalum* group is part of the *Haplopappus* - *Machaeranthera* phylad, essentially as delimited by Morgan & Simpson (1992).

Prionopsis and *Grindelia*

Plants of *Prionopsis* are taprooted annuals with clasping, serrate-spinulose leaves, a glabrous but punctate-resinous herbage, linear-lanceolate phyllaries with spreading apices, ray flowers with yellow, weakly coiling ligules, dimorphic achenes, and pappus bristles that tend to be basally caducous. In this set of features, *Prionopsis* is morphologically indistinguishable from *Grindelia*.

The cells in the throat region of the disc corollas of *Prionopsis* and all species of *Grindelia*, including South American and even the most specialized

North American ones, produce relatively long, straight-sided crystals easily seen in whole mounts of corollas. These crystals are flat, mostly straight at the ends, and they lie at various angles within the cells, where they are mostly about as long as the cell diameter but commonly mixed with fewer, similar but smaller ones. Among the remaining members of the *Haplopappus* - *Machaer-anthera* lineage, similar crystals (although smaller and less densely arranged) have been found only in *Xylorhiza* Nutt. and some species of *Hazardia* E. Greene. Among other Astereae, such crystals occur only in the goldenaster lineage, where they are diagnostic (Nesom 1991 and an unpublished survey of the tribe). These large, distinctive corolla crystals are a specialization that distinguishes *Grindelia* and *Prionopsis* from their closest relative, *Olivaea*, as well as all other taxa of the *Xanthocephalum* group.

Grindelia, *Prionopsis*, and also *Xanthocephalum* have a tendency to produce turgid, four-angled achenes with thickened walls, a morphology not seen elsewhere in the *Xanthocephalum* group. As observed by Nesom (1990, 1992), however, the species of at least one group of *Grindelia* produce dimorphic achenes, the outer turgid and four-angled, the inner strongly compressed, with numerous, thin nerves on each of the two faces. The same dimorphism also occurs in *Prionopsis*.

Howe (1975) reported that antipodal cells of the female gametophyte of *Prionopsis* and three species of *Grindelia* produce haustorium-like outgrowths. Although such outgrowths apparently are uncommon, they are known from various other genera of North American Astereae, but comparative data from other taxa of the *Xanthocephalum* group are not available.

Prionopsis ciliata differs from species of *Grindelia* primarily in its pappus of numerous awn-like bristles connate in a ring at their base. The bristles tend to be persistent, but a basal abscission layer apparently forms on fully mature achenes, where they commonly loosen and detach basally as a unit, or more rarely, in basally united groups. The pappus of *Grindelia* achenes is composed of individual, awn-like bristles similar to those of *Prionopsis*, but they are usually fewer in number, not basally united, and easily caducous, breaking off at the slightest touch. North American species of *Grindelia* produce 2-8 pappus bristles per achene but various South American species usually produce more. *Grindelia buphthalmoides* DC., in particular, typically produces 8-12 bristles per achene, but achenes of some individuals may produce 15 or more bristles (Cabrera 1932). Such a pappus is very similar to that of *Prionopsis*, although the bristles are not basally united.

With its relatively large number of bristles, the pappus of *Prionopsis* at first consideration might appear to be primitive, but it may instead be an atavistic feature, retained in the evolutionary origin of the species, perhaps analogous to the pappus appearing sporadically in some plants of the annual species *Xanthocephalum gymnospermoides* (A. Gray) Benth. The pappus in other species of *Xanthocephalum*, including the remaining annual species (the

closest relatives of *X. gymnospermoides*) is mostly absent or represented by a low corona, sometimes with an erose or toothed margin. The pappus of typical *X. gymnospermoides* is similar, but in scattered populations from Chihuahua (e.g., Lane 2494 [TEX]; Valdes R. 18 [LL]), a ring of 15 to 20 persistent pappus bristles 0.8 to 1.4 mm high rarely occurs. As interpreted here, such a pappus probably represents the vestigial occurrence of the primitive type for the whole *Xanthocephalum* group, such as found in *Isocoma* and the phylogenetic precursors to the *Xanthocephalum* group (Nesom, Suh, & Simpson in prep.). The hypothesis that the pappus of *Prionopsis* is specialized is strengthened by the recognition of *Olivaea* as the sister group to *Grindelia* and *Prionopsis*, since the pappus of *Olivaea* comprises a few, separate, basally caducous bristles nearly identical to those of *Grindelia*.

Wide variation in pappus morphology (presence and absence, variability in the degree of elaboration) is common in many genera throughout various tribes of Asteraceae. Within American Astereae, striking examples can be found within *Townsendia* Hook., *Erigeron* L., *Chaetopappa* DC., and others. Continued recognition of *Prionopsis* as a genus separate from *Grindelia*, based solely on a difference in pappus, is inconsistent with accepted generic concepts across the tribe and family.

Prionopsis as a member of *Grindelia*

Studies in the *Xanthocephalum* group by Suh (1989) of patterns of variation in chloroplast DNA restriction sites show that *Prionopsis* is most closely related to species of *Grindelia* and that *Grindelia* is paraphyletic without the inclusion of *Prionopsis*. In addition to *Prionopsis*, Suh's study has included four species of *Grindelia*. His data strongly suggest that *Prionopsis* is the sister group of *G. microcephala* DC. and *G. adenodonta* (Steud.) Nesom; these three species in turn are the sister group of *G. lanceolata* Nutt. and *G. nuda* A. Wood, which form a more weakly supported species pair. Morphological studies (Nesom 1990, 1992) place these four species in a broader taxonomic context.

In view of (1) specialized morphological features shared by *Prionopsis* and *Grindelia*, (2) a weak and inconsistent morphological basis for maintaining *Prionopsis* as a separate genus, and (3) molecular evidence that suggests that *Grindelia* is paraphyletic without *Prionopsis*, the formal proposal is made here to submerge the latter within *Grindelia*, the earlier-named genus (1807 vs. 1841).

***Grindelia papposa* Nesom & Suh, nom. nov.** (not *Grindelia ciliata* Spreng., 1826). BASIONYM: *Donia ciliata* Nutt., J. Acad. Nat. Sci. Philadelphia

2:118. 1821. *Haplopappus ciliatus* (Nutt.) DC., *Prodr.* 5:346. 1836. *Prionopsis ciliata* (Nutt.) Nutt., *Trans. Amer. Philos. Soc.*, ser. 2. 7:329. 1841. [also the publication of *Prionopsis* as a genus]. *Aster ciliatus* (Nutt.) O. Kuntze, *Rev. Gen. Pl.* 1:317. 1891.

Grindelia papposa might be placed in a monotypic section, since no other North American species of the genus has a similar pappus. The molecular data of Suh, however, do not support such a hypothetically isolated position for the species. Until the infra-generic taxonomic structure of the entire genus is better understood, it seems superfluous to create a category for the single species, based on what appears to be a single, autapomorphic feature.

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We appreciate the review and comments of Marshall Johnston, Mark Mayfield, and Billie Turner.

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SYNOPSIS OF *PARASTREPHIA* (ASTERACEAE: ASTEREAЕ)

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ABSTRACT

Previous treatments of the South American, central Andean genus *Parastrephia* have included five species, but the present study recognizes only three: *P. lucida* (including *P. phylliciformis*), *P. quadrangularis* (including *P. lepidophylla*), and *P. teretiuscula*. Comments on generic relationships, a generic description, key, and distribution maps are provided for *Parastrephia*.

KEY WORDS: *Parastrephia*, Asteraceae, Astereae, South America

Cabrera (1945) treated the species of *Parastrephia* Nutt. within the genus *Lepidophyllum* Cass., but he later recognized the distinctiveness of *Parastrephia* and segregated five species (Cabrera 1954) from the resultant, monotypic *Lepidophyllum*. All of these species are members of the New World "*Chiliotrichum* Cass. group," which is more broadly situated within the tribe Astereae subtribe *Hinterhuberinae* Cuatrecasas (sensu Nesom 1993).

Lepidophyllum cupressiforme (Lam.) Cass. appears to be part of the phylad that includes *Parastrephia*, the north Andean *Hinterhubera* Schultz-Bip., and the North American (Mexican) *Aztecaster* Nesom (Nesom 1993). Plants of all these genera are distinguished within the South American *Hinterhuberinae* by their combination of lack of receptacular pales, consistently pseudohermaphroditic central flowers, and markedly flattened achenes. *Lepidophyllum*, however, produces peripheral, pistillate flowers with yellow, typically expanded (though rather small) ligules, while the other three genera have peripheral flowers that are pistillate but merely tubular and usually five-lobed at the apex, apparently evolutionarily derived from central ones of "hermaphroditic" morphology. I have not been able to corroborate the observation by Gray (1862) that the ligulate corollas of *Lepidophyllum* are sometimes bilabiate. *Lepidophyllum* also differs from *Parastrephia*, *Hinterhubera*, and *Aztecaster* in

its (1) leaf arrangement (opposite vs. alternate) and morphology (abaxial surface smooth and punctate vs. with a distinct, central groove, epunctate), (2) oblong-ovate phyllaries with an evenly indurate texture (vs. lanceolate, with well-defined longitudinal zones), (3) multinerved achenes (vs. 2-4 nerved), and (4) pappus of flattened, subpaleate members (vs. terete bristles). Further, *Lepidophyllum* occurs along the coast of southernmost Argentina from around San Julian to Tierra del Fuego, distantly separated from the species of *Parastrephia*. Earlier, I viewed *Lepidophyllum* and *Parastrephia* as intimately related (Nesom 1993) but with further study acknowledge that their relationship must be less immediate.

Bentham (in Bentham & Hooker 1873) is nearly the only previous botanist to clearly observe that heads of *Parastrephia* produce sterile (pseudohermaphroditic) central flowers, this not recognized in my recent overview of the Hinterhuberinae (Nesom 1993) but corroborated in the present study. Cabrera (1945) noted in the generic description of *Lepidophyllum* sensu lato that the disc flowers were sometimes sterile, but in the more specific notes regarding the species as well as in later floristic accounts (1978), he described the disc flowers of *Lepidophyllum* and *Parastrephia* as hermaphroditic.

The corollas of the peripheral flowers in *Parastrephia quadrangularis* (Meyen) Cabrera are distinctly 5-lobed in many individuals, but in other plants of all three species, the corolla apex of the peripheral flowers varies from nearly truncate to ligulate with a minute, often 3-lobed extension. In all, however, the tube is relatively broad and the venation conspicuous and continuous up to the corolla apex, more like the corollas of central, tubular (hermaphroditic) flowers than those of peripheral, ligulate (pistillate) corollas typical of Astereae.

Bentham (in Bentham & Hooker 1873) divided *Parastrephia* between *Parastrephia* (comprising the single species *P. lucida* [Meyen] Cabrera) and *Lepidophyllum* (including the single species of *Lepidophyllum* sensu stricto as well as *Baccharis acaulis* [Weddell] Cabrera and *P. quadrangularis*). He placed this heterogeneous version of *Parastrephia* in the subtribe Baccharidinae, noting that the heads were androgynous but "submonoecious." Hoffmann (1890) also placed *Parastrephia* in the Baccharidinae, describing the heads as dioecious or polygamo-dioecious; he noted, however, that *Parastrephia* perhaps would be better treated as *Lepidophyllum*, which he placed in the Solidagininae.

Parastrephia occurs in the "puna" region of Bolivia and the immediately surrounding areas of Perú, Chile, and Argentina (Maps 1- 3). Cabrera (1954, 1978) has treated the genus as comprising five species, but only three are recognized here, allowing for variation primarily in habit and vestiture within two of the species. As such, each of the three constituent species is highly distinctive. There has been no chromosome count reported for *Parastrephia*, but *Lepidophyllum* has been reported as $2n = \text{ca. } 54$ (Moore 1981). The synonymy is similar to that of Cabrera, except for the two new synonyms and a different interpretation of a *nomen novum* proposed by Asa Gray.

Parastrephia Nutt., Trans. Amer. Philos. Soc., ser. 2, 7:449. 1841. Type species: *Parastrephia ericoides* Nutt. (= *Parastrephia lucida* [Meyen] Cabrera).

Polyclados Philippi, Fl. Atacama 34. 1860. Type species: *Polyclados cupressinus* Philippi (= *Parastrephia quadrangularis* [Meyen] Cabrera).

Dolichogyne DC. sect. *Tola* Weddell, *Chloris Andina* 1:182. 1856. *Lepidophyllum* Cass. sect. *Tola* (Weddell) Cabrera, Bol. Soc. Argent. Bot. 1:50. 1945. Lectotype species (designated here): *Dolichogyne lepidophylla* Weddell (= *Parastrephia quadrangularis* [Meyen] Cabrera).

Low perennial shrubs, ca. 0.3-1.8 m tall, stems and leaves usually resinous but without apparent glands, with a white, matted or looser, arachnoid tomentum, usually quickly glabrescent. Leaves spirally arranged, crowded, coriaceous, deltate-ovate to linear-ericoid but widely flaring at the base, closely appressed to the stem (in *Parastrephia teretiuscula* [O. Kuntze] Cabrera and *P. quadrangularis*) or closely ascending (in *P. lucida*), basally adnate, the margins entire, involute. Heads discoid, solitary and terminal, sometimes clustered and loosely paniculate (in *P. lucida*); phyllaries in 2-4 graduated series, sometimes prominently glandular; receptacles epaleate, foveolate. Central flowers pseudohermaphroditic, corollas yellow-orange, sometimes reddish in *P. lucida*, 4.0-6.5 mm long, tubular, gradually ampliate into the limb, the lobes short, sharply spreading to slightly reflexed, with glandular hairs; anther thecae base rounded, not tailed; style branches short-hispid from the point of bifurcation to the apex, without collecting appendages; ovaries densely strigose, 2-nerved, sometimes elongating but not producing embryos; outer pappus of linear scales ca. 1/4 as long as the single series of inner bristles. Peripheral flowers equal or fewer than the central, in a single series, pistillate, fertile, yellow, tubular, 5-veined, usually with a minute, ligulate extension but commonly with 5 equal lobes in plants of *P. lucida*. Mature achenes oblong-oblancheolate to oblong-obovate, at least the upper third sessile-glandular, sparsely to densely strigose, (2.2-)3.0-4.0 mm long, plump but distinctly compressed, 2-3(-4) nerved; pappus of 2(-3) series of apically attenuate bristles, without a differentiated outer series.

KEY TO THE SPECIES

1. Leaves 2.0-2.5 mm long, deltate-ovate and nearly flat, tightly appressed to the stem, seemingly sunken in the dense, white cauline tomentum, the stem outline almost perfectly terete. *P. teretiuscula*
1. Leaves 2-6 mm long with revolute margins, usually distinctly linear but towards ovate in the smallest size, ascending or appressed to the stem, but if appressed, the stems distinctly angular in outline. (2)

2. Leaves 4-6 mm long, not adnate to the stem, ascending to spreading-recurving; central flowers 13-28, peripheral flowers 7-16.
 *P. lucida*
2. Leaves 2-5 mm long, straight and tightly appressed to the stem, the basal portion adnate; central flowers 3-10, peripheral flowers 3-9.
 *P. quadrangularis*

Parastrephia lucida (Meyen) Cabrera, Not. Mus. La Plata 17:57. 1954. BASIONYM: *Baccharis lucida* Meyen, *Reise Erde* 1:460. 1834. *Lepidophyllum lucidum* (Meyen) Cabrera, Bol. Soc. Argent. Bot. 1:51. 1945. TYPE: PERU. [Tacna]: near Tacora, 31 Apr 1833, *Meyen s.n.* (B, photo-F, photo-GH!, photo-US!).

Baccharis phylliciformis Meyen, *Reise Erde* 2:31. 1835. *Vernonia phylliciformis* (Meyen) Walpers, Nov. Acta. Acad. Caes. Leop. Carol. 19 (Suppl. 1):252. 1843. *Lepidophyllum phylliciforme* (Meyen) Hieronymus ex Fries, Nov. Acta Reg. Soc. Scient. Upsal., ser. 4, 1(1):77. 1905. *Parastrephia phylliciformis* (Meyen) Cabrera, Not. Mus. La Plata 17:57. 1954. TYPE: PERU. Arequipa, 31 Apr 1833, *Meyen s.n.* (B, photo-F, photo-US!).

Parastrephia ericoides Nutt., Trans. Amer. Philos. Soc., n. ser., 7:450. 1841. TYPE: PERU. near Arequipa, *Curson s.n.* (BM, *vide* Blake 1930).

Vernonia phylliciformis (Meyen) Walpers var. *resinosa* Walpers, Nov. Acta. Acad. Caes. Leop. Carol. 19 (Suppl. 1):253. 1843. *Lepidophyllum phylliciforme* (Meyen) Hieronymus ex Fries var. *resinosum* (Walpers) S.F. Blake, J. Washington Acad. Sci. 21:326. 1931.

Dolichogyne rigida Weddell, *Chloris Andina* 1:182. 1856. *Lepidophyllum rigidum* (Weddell) Benth. & Hook., *Gen. Pl.* 2(1):258. 1873. TYPE: PERU: [Tacna]: cordillera [sur le plateau] de Tacora, 1854, *Weddell s.n.* (HOLOTYPE: P, photo-GH!, photo-TEX!, photo-US!; Isotype: US!).

Dolichogyne rupestris Weddell, *Chloris Andina* 1:183. 1856. TYPE: BOLIVIA. environs de Potosí, dans la Quebrada de las lagunas, au niveau des neiges perpetuelles, March, *Orbigny 1382* (P, photo-US!).

Polyclados abietinus Philippi, Anal. Univ. Chile 43:492. 1873. *Lepidophyllum abietinum* (Philippi) Reiche, Anal. Univ. Chile 109:26. 1901. TYPE: CHILE. [Antofagasta]: Salitreras de Antofagasta, *Philippi s.n.* (HOLOTYPE: SGO, *vide* Cabrera 1945).

Dolichogyne glabra Philippi, Anal. Mus. Nac. Chile, sec. 2, Bot. 8:39. 1891. TYPE: ARGENTINA. Catamarca: Dept. Antofagasta de la Sierra, Lorohuasi, *Philippi s.n.* (HOLOTYPE: SGO, *fide* Cabrera 1945).

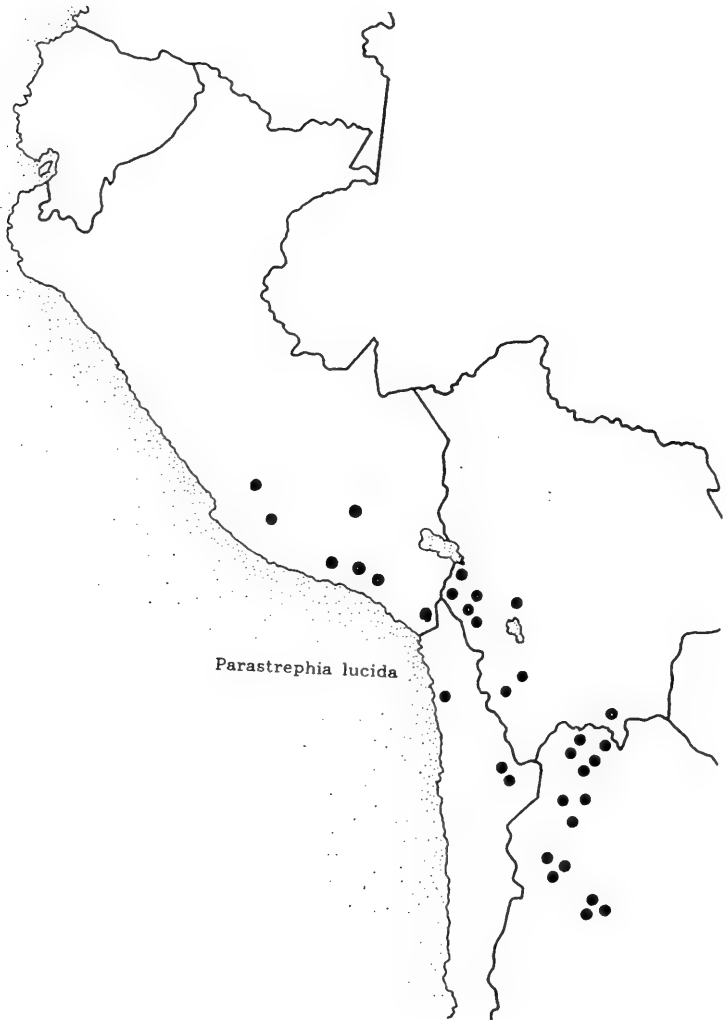
Nomenclatural combinations in *Lepidophyllum* were attributed by *Index Kewensis* to Asa Gray, based on *Dolichogyne rigida* Weddell and *Dolichogyne rupestris* Weddell, but it is clear that it was not his intention (Gray 1862) to publish these.

Perú (Arequipa, Ayacucho, Cuzco, Huancavelica, Tacna), Bolivia (La Paz, Oruro, Potosí, Tarija), Chile (Antofagasta, Tarapaca), and Argentina (Catamarca, Jujuy, Rioja, Salta, Tucumán) (Map 1); dry hills, páramo, (3200-)3500-4700 m; flowering October-April. Illustration in Cabrera (1978).

Cabrera (1945, 1954, 1978) has maintained *Parastrephia lucida* apart from *P. phylliciformis* but noted that the latter differs from the former only in its tomentose stems. The geographic ranges of these two taxa, also as outlined by Cabrera (1945, 1978), appear to be completely congruent. Blake (1931), following a much earlier publication by Walpers, regarded them as varieties of a single species, also noting that the only difference is in vestiture. Only a single species is recognized in the present treatment, with no formally designated infraspecific taxa. Plants with a slight amount of cauline tomentum or none at all (*P. lucida*) occur commonly throughout the range; plants with the most persistent and greatest density of cauline tomentum (*P. phylliciformis*) apparently are most abundant in Argentina, but persistently tomentose individuals also occur over the entire range of the species. The leaves, also, are usually initially tomentose in the ericoid groove on the abaxial surface and variably glabrescent. Plants intermediate in cauline vestiture are common, however, and there is no other way to separate them.

Nuttall described *Parastrephia ericoides* as having 5-lobed peripheral flowers in the outer series and filiform, pistillate ones in the center. Bentham (in Bentham & Hooker 1873) and Blake (1931) noted that Nuttall's type specimen may have been an abnormal plant, although the present study verifies the normal occurrence of peripheral flowers with 5-lobed corollas in *P. lucida*.

Parastrephia quadrangularis (Meyen) Cabrera, Not. Mus. La Plata 17:57. 1954. BASIONYM: *Baccharis quadrangularis* Meyen, *Reise Erde* 1:460. 1834. *Lepidophyllum quadrangulare* (Meyen) Benth. & Hook., *Gen. Pl.* 2:258. 1873. TYPE: PERU. [Tacna]: Tacora, *Meyen s.n.* (B, photo-F, photo-US!



Map 1. Distribution of *Parastrephia lucida*.

Polyclados cupressinus Philippi, *Fl. Atacama* 34, fig. 4, B. 1860. *Lepidophyllum cupressinum* (Philippi) O. Kuntze, *Rev. Gen. Pl.* 3(3):162. 1898. TYPE: CHILE. [Tarapaca]: "in monte Alto de Puquios," 12,600 ft, *Philippi s.n.* (SGO, photo-F).

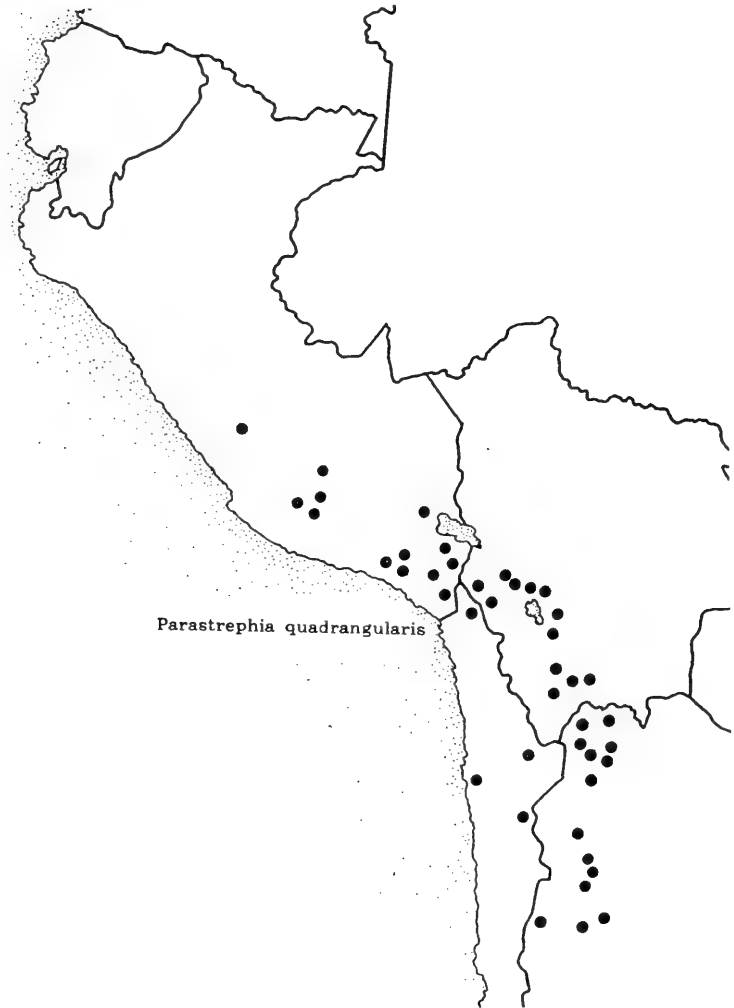
Dolichogyne lepidophylla Weddell, *Chloris Andina* 1:182. 1856. *Lepidophyllum meyenii* A. Gray [*nom. nov.*], *Proc. Amer. Acad. Arts* 5:123. 1862. *Lepidophyllum tola* Cabrera [*nom. nov. illeg.*], *Bol. Soc. Argent.* 1:56. 1945. *Parastrephia lepidophylla* (Weddell) Cabrera, *Not. Mus. La Plata* 17:57. 1954. SYNTYPES: specimens cited from Perú and Bolivia, from collections of Weddell, Pentland, Meyen, and d'Orbigny.

Cabrera (1945) noted that Gray's new name was based on *Baccharis quadrangularis*, and thus Cabrera furnished *Lepidophyllum tola*. It is much more reasonable to assume, however, that Gray's intention was to avoid a tautonym, particularly since he equated *B. quadrangularis* with *Dolichogyne lepidophylla*, as did Reiche (1902), who followed Gray's taxonomy.

Perú (Arequipa, Ayacucho, Cuzco, Lima, Moquegua, Puno, Tacna), Bolivia (La Paz, Oruro, Potosí), Chile (Antofagasta, Tarapaca), and Argentina (Catamarca, Jujuy, La Rioja, Salta, San Juan, Tucumán) (Map 2); dry, rocky, shrubby hills, sometimes with cacti, páramo, 3440-4500 m; apparently flowering all year, collections studied from every month except March. Illustration in Cabrera (1978).

Cabrera (1978) noted that *Parastrephia quadrangularis* differs from *P. lepidophylla* in its habit (low shrubs 15-20 cm tall vs. erect shrubs 1.0-1.5 m tall), thicker stems (2.0-2.5 mm wide vs. 1.0-1.5 mm), and phenology (flowering "en verano" vs. October-November), but these putative differences are greatly overlapping, and the identifications of specimens of these taxa have been markedly inconsistent. Only a single species is recognized in the present treatment. The plants of *P. lucida* range mostly from 0.25-0.80 m tall, but some occasionally reach 1.5 m; the stem thickness varies from 1.0-2.5 mm; there is no obvious correlation between phenology and any aspect of morphology. Pointed field observations of variation would be especially helpful in decisions regarding the taxonomy of these plants.

Collectors have noted that plants of this species are "resinous, highly flammable, and extensively used for firewood." The plants are "dug and tied in bundles for firewood." "A trainload of flat cars piled with bundles of this Composite was seen at La Paz," and between Arequipa and Juliaca it has been "sold in bundles along the railroad, used for fuel."



Map 2. Distribution of *Parastrephia quadrangularis*.

Parastrephia teretiuscula (O. Kuntze) Cabrera, Not. Mus. La Plata 17:57. 1954. BASIONYM: *Lepidophyllum teretiunculum* O. Kuntze, Rev. Gen. Pl. 3(3):162. 1898. TYPE: CHILE. [Tarapaca]: Conchi-Ascotan, 3000-3900 m, 7 Mar 1892, O. Kuntze s.n. (NY, *vide* Zanoni 1980, photo-US!).

Bolivia (Potosí) and Chile (Tarapaca, Antofagasta) (Map 3); dry, stony hills, ca. 3400-4000 m; flowering December-March.

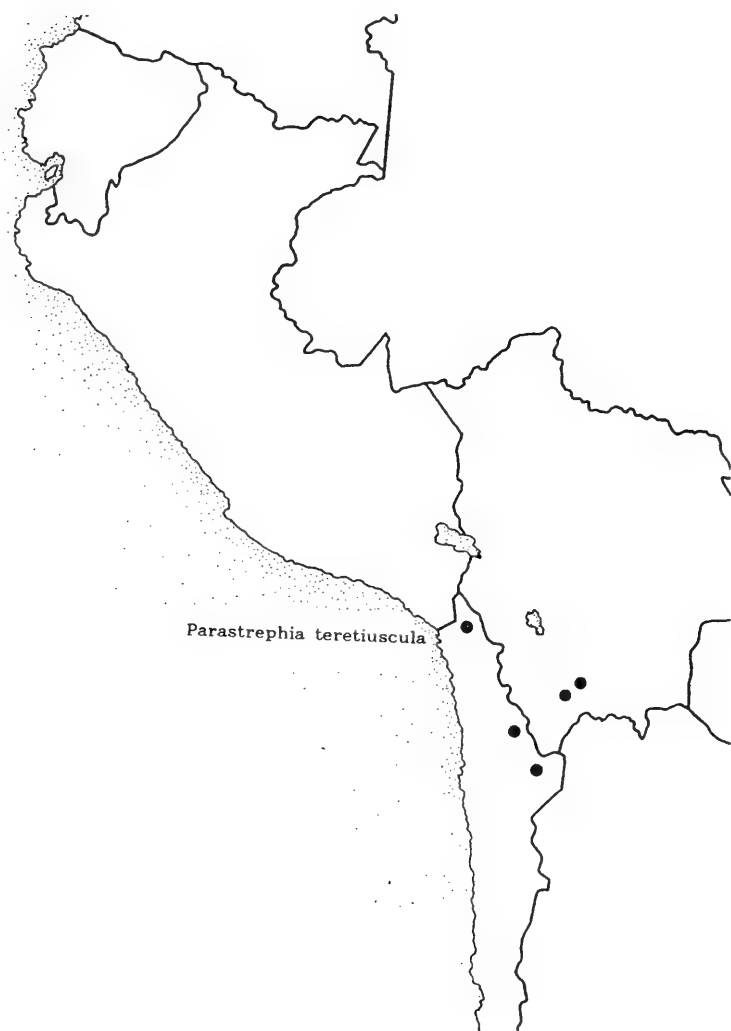
I have seen only three collections of *Parastrephia teretiuscula*. The other two species apparently are much more abundant and have been collected in close proximity at a number of localities.

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Map 3. Distribution of *Parastrephia teretiuscula*.

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TAXONOMIC STATUS OF *NARDOPHYLLUM SCOPARIUM* (ASTERACEAE:
ASTEREAE) WITH OBSERVATIONS ON THE DEFINITION OF
NARDOPHYLLUM

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ABSTRACT

Nardophyllum scoparium Philippi from northwestern Chile was transferred to *Hinterhubera* by Cabrera but it is here retained in the original position proposed by Philippi. The species is characterized by green-glutinous stems with small, widely spaced leaves and small, nearly discoid heads. The disc flowers are hermaphroditic with fertile ovaries, the few peripheral flowers are pistillate and apparently derived from hermaphroditic ones. Two other taxa also appear to be best placed within *Nardophyllum*, the southern Argentinian, monotypic genera *Aylacophora* and *Paleaepappus*. Two new combinations are proposed: *Nardophyllum* [*Aylacophora*] *deserticola* and *Nardophyllum* [*Paleaepappus*] *patagonicum*. As recognized here, *Nardophyllum* comprises ten species.

KEY WORDS: *Nardophyllum*, *Hinterhubera*, *Aylacophora*, *Paleaepappus*, Asteraceae, Astereae, South America

Nardophyllum scoparium Philippi was described by Philippi in 1894 from a collection near Coquimbo in northwestern Chile, where it apparently is endemic. The plants of this species produce green-glutinous, thornless, and nearly leafless stems, small and nearly discoid heads, central flowers relatively few (7-12) and with fertile ovaries, glandular achenes, and disc style branches with long, minutely papillate collecting appendages. In his conspectus of the genus *Nardophyllum* Hook. & Arn., Cabrera (1954; also see 1971, 1978) excluded *N. scoparium* on the basis of its pistillate peripheral flowers, as the seven species of *Nardophyllum* accepted by Cabrera produce discoid heads with only hermaphroditic flowers. In most respects, however, *N. scoparium* is similar to other species of *Nardophyllum* but distinctly different from the genus

Hinterhubera Schultz-Bip. ex Weddell (see below), where Cabrera placed *N. scoparium*. Reiche (1902) suggested that *N. scoparium* is a synonym of *Baccharis* (*Heterothalamus*) *spartioides* (Hook. & Arn. ex DC.) Remy but their resemblance is primarily restricted to similarity in habit.

Characteristics of *Nardophyllum*

Plants of all species of *Nardophyllum* are small shrubs; *N. chiliotrichoides* (Remy) A. Gray and *N. armatum* (Weddell) Reiche produce thorny branches. The leaves of *Nardophyllum* tend to be widely separated and quickly caducous (*N. bryoides* [Lam.] Cabrera and *N. obtusifolium* Hook. & Arn. are exceptional in their more densely arranged and persistent leaves). Heads are solitary, discoid (without ray flowers), relatively few-flowered (mostly 5-20), and those of *N. bracteolatum* Hauman, *N. bryoides*, and *N. chiliotrichoides* produce receptacular paleae. Phyllaries are ovate-triangular, strongly graduated in length, and strongly and evenly indurated. The collecting appendages of the style branches are as long or longer than the stigmatic portions (*N. armatum* is unusual in its short collecting appendages), and the collecting hairs are reduced to obovoid papillae densely and evenly set along the appendages. The achenes are plump to nearly terete and mostly 5-8 nerved but vary to 2-nerved and flattened; they are commonly sessile-glandular but otherwise densely strigose-sericeous to sparsely strigose with non-glandular hairs. The pappus occurs in 2-4 (or more) series commonly graduated in length but without a distinctly shorter, outer series. The pappus elements vary from slender and nearly terete (in *N. obtusifolium* and *N. armatum*) to broad and prominently flattened (in *N. chiliotrichoides*, *N. lanatum* (Meyen) Cabrera, *N. bracteolatum*, and *N. bryoides*); the more slender pappus elements tend to be dilated near the apex.

The species of *Nardophyllum* (as recognized here, see list below) occur from the Tierra del Fuego region northward along the coast of southern Argentina and through Chile into northeastern Argentina and Bolivia. The genotype is *N. lanatum*.

Characteristics of *Hinterhubera*

Hinterhubera differs from *Nardophyllum* in a number of significant features: the leaves are densely arranged on the stems; the phyllaries are persistent, subequal in length, and portions are distinctly herbaceous rather than evenly indurated; the flowers are more numerous, the pistillate in an outer zone of several series; the central flowers are pseudohermaphroditic (with sterile ovaries); and the pappus is composed of a single inner series with a few, short bristles or setae in an outer series.

Hinterhubera is endemic to the northern Andes, its seven species restricted to Colombia and Venezuela (Cuatrecasas & Aristeguieta 1956; Aristeguieta 1964; Cuatrecasas 1969). The generitype is *H. columbica* Schultz-Bip. ex Weddell. Other genera of the subtribe *Hinterhuberinae* also produce pseudohermaphroditic flowers and pistillate flowers with 5-lobed corollas, and they have been hypothesized to be closely related to *Hinterhubera*: *Aztecaster* Nesom and *Parastrephia* Nutt. (Nesom 1993a, 1993c) and a group of more highly specialized genera of the northern Andes: *Flosmutisia* Cuatrecasas, *Laestadia* Kunth ex Less., *Floscaldasia* Cuatrecasas, and *Westoniella* Cuatrecasas (Nesom 1993b).

Nardophyllum scoparium or *Hinterhubera scoparia*?

Nardophyllum scoparium is similar to accepted species of *Nardophyllum* in its widely spaced, caducous leaves, small, few-flowered heads, the morphology of its phyllaries, collecting appendages, and pappus, and in its geographic position. The open, loosely paniculate capitulescence, punctate glands, resinous covering and complete lack of tomentum on the stems and leaves, and the flat, 2-4 nerved achenes of *N. scoparium* are unusual, but *N. chiliotrichoides* also produces flattened achenes, and the vestiture of *N. scoparium* is approached by the glandular vegetative parts of *N. genistoides* (Philippi) A. Gray, also a rare species of central Chile. Cabrera (1954) noted that *N. genistoides* differs from the rest of the genus in "aspect," presumably referring at least partly to its vestiture.

The peripheral flowers of *Nardophyllum scoparium* are pistillate with fertile ovaries, but they are very few in number, ranging from none to one or two. The corollas of these flowers are narrowly tubular with five apical lobes ca. 0.5 mm long, and their style branches are ca. 2.5 mm long, each bearing lateral stigmatic lines but also a papillate apical appendage 0.5 mm long. Pistillate style branches with apical appendages are otherwise unknown in the *Astereae* but are typical in morphology for fertile hermaphroditic (disc) flowers. Because of the overall similarity of *N. scoparium* to other species of *Nardophyllum*, it is probable that these sporadically occurring peripheral flowers are homologous with the hermaphroditic flowers of *Nardophyllum* (sensu Cabrera) and derived from them. A similar origin for the peripheral pistillate flowers of the genus *Aztecaster* has also been postulated (Nesom 1993a), and this also is probably true for the peripheral flowers in *Hinterhubera*, *Parastrephia*, and other related genera (see below).

Nardophyllum scoparium is isolated in *Hinterhubera*, but it is reasonably accepted as a member of *Nardophyllum*. The unusual features of *N. scoparium* can be regarded as specializations within the genus, and the production of secondarily derived, peripheral pistillate flowers is viewed here as a tendency

in parallel with species of genera in the *Hinterhubera* group. If the peripheral flowers were absent, *N. scoparium* surely would have been accepted as *Nardophyllum*. If not treated within that genus, *N. scoparium* would have to be segregated as a monotypic genus.

Nardophyllum scoparium Philippi, Anal. Univ. Chile 87:435. 1894. *Hinterhubera scoparia* (Philippi) Cabrera, Notas Mus. La Plata [Univ. Eva Peron, Bot.] 17:65. 1954. TYPE: CHILE. Prov. Coquimbo, "in parte superiore vallis de Huanta," *F. Philippi* (HOLOTYPE: SGO, *vide* Cabrera 1954).

Specimens examined: CHILE. Prov. Coquimbo, Huanta, valley S of Juntas, ca. 3000 m, 4 Jun 1975, *Grau 1656* (MO,UC).

Phylogenetic position of *Aylacophora* and *Paleaeppus*

Two monotypic genera of southern Argentina, *Aylacophora* Cabrera (endemic to Prov. Neuquen) and *Paleaeppus* Cabrera (endemic to Prov. Chubut), are closely similar to *Nardophyllum*. As noted by Cabrera (1969), plants of both are similar in habit to *N. chilotrichoides*, *N. armatum*, and other *Nardophyllum*. *Aylacophora* and *Paleaeppus* produce solitary, discoid heads with paleate receptacles and phyllaries that are caducous and similar in other respects to those in *Nardophyllum*. The morphology of the style branch collecting appendages also is similar to that of *Nardophyllum*, and the pappus occurs in several series.

The pappus of both *Aylacophora* and *Paleaeppus* is reduced to flattened paleate or subpaleate elements. Cabrera (1969, 1971) noted explicitly that *Paleaeppus* differs from *Nardophyllum chilotrichoides* principally in its paleaceous pappus; in fact, the two appear so similar in other aspects that it is conceivable that they may be sister species. There is a strong tendency for flattening of pappus elements in accepted species of *Nardophyllum*, and various degrees of pappus reduction and modification occur and are accepted within many genera of *Astereae*.

Aylacophora has flattened and strongly shortened pappus elements (ca. 1.0-1.5 mm long) and differs further from most *Nardophyllum* in its achenes, which are 2-nerved, flattened, and sericeous along the margins, the faces glabrous. An extra nerve, however, is occasionally produced on the faces, and *N. scoparium* also produces flattened, 2-nerved achenes. Other species of *Nardophyllum* produce achenes with a densely strigose-sericeous vestiture of long, ascending-appressed hairs. Parallel variability in achene shape and nervation occurs within the closely related genus *Ericameria* (Nesom 1990; Nesom & Baird 1993), as well as within *Oritrophium* (Kunth) Cabrera, and the exclusion of *Aylacophora* from *Nardophyllum* on such a basis appears to be artificial.

The narrow, internally tomentose, cauline sulcae emphasized by Cabrera (1953) as a distinctive feature of *Aylacophora* appear to be homologous with ribbing found in most species of *Nardophyllum*. In *Nardophyllum*, the stems have broad, tomentose strips alternating with narrow, glabrous-viscid ribs. Young stems of *Aylacophora*, however, are identical to those of *Nardophyllum*, but on older stems of the former, the glabrous portions broaden and the tomentose bands become correspondingly narrower and appear as depressed sulcae between the raised, glabrous-viscid portions.

While *Aylacophora* is further removed phenetically than *Paleaepappus* from the morphology of most species of *Nardophyllum*, both of the former elements, along with *N. scoparium*, are more reasonably treated as specialized elements within *Nardophyllum* than as monotypic genera. *Nardophyllum*, even without these species, is heterogeneous, and if the peculiarities of *Nardophyllum* species (*sensu* Cabrera) are emphasized, yet others might justifiably be segregated at generic rank.

***Nardophyllum patagonicum* (Cabrera) Nesom, *comb. nov.* BASIONYM:**
Paleaepappus patagonicus Cabrera, Bol. Soc. Argent. Bot. 11:273. 1969.
TYPE: ARGENTINA. Prov. Chubut: Río Chico, 1900, C. Ameghino
s.n. (HOLOTYPE: LP).

***Nardophyllum deserticola* (Cabrera) Nesom, *comb. nov.* BASIONYM:**
Aylacophora deserticola Cabrera, Bol. Soc. Argent. Bot. 4:268. 1953.
TYPE: ARGENTINA. Neuquen, Plaza Huinul, A.L. Cabrera 11053
(HOLOTYPE: LP; Isotype: US!).

With the inclusion of these two species, *Nardophyllum* comprises ten species:

- N. armatum* (Weddell) Reiche
- N. bracteolatum* Hauman
- N. bryoides* (Lam.) Cabrera
- N. chiliotrichoides* (Remy) A. Gray
- N. deserticola* (Cabrera) Nesom
- N. genistoides* (Philippi) A. Gray
- N. lanatum* (Meyen) Cabrera
- N. obtusifolium* Hook. & Arn.
- N. patagonicum* (Cabrera) Nesom
- N. scoparium* Philippi

Excluded from *Nardophyllum*:

Nardophyllum paniculatum Philippi = *Baccharis philippii* Heering

Phylogenetic position of *Nardophyllum*

Asa Gray (1862) suggested that the closest relative of *Nardophyllum* might prove to be the North American taxon widely known as *Chrysothamnus nauseosus* (Pallas) Britt. but recently placed instead as a species of *Ericameria* Nutt. sect. *Macronema* (Nutt.) Nesom (Nesom & Baird 1993). Correspondingly, Gray suggested that the closest relative of the South American *Lepidophyllum* Cass. (including *Parastrephia* in Gray's view) might be *Ericameria* sect. *Ericameria*. Before learning of Gray's much earlier hypothesis, I also suggested that *Ericameria* (sensu Nesom 1990) should be investigated for polyphyly, based on an understanding of its relationships in a broader context (Nesom 1993a). Gray's ideas regarding the interrelatedness of these South American taxa with *Ericameria* as well as the African genus *Pteronia* L. were evidently corroborated by Bentham (in Bentham & Hooker 1873) and by Cabrera (1954).

The nature of the relationship among *Nardophyllum*, *Pteronia*, and *Ericameria* remains obscure. The first two genera both produce glandular achenes, apparently a primitive feature within the subtribe; achenes are consistently eglandular in *Ericameria*. The heads in *Nardophyllum* and *Pteronia* are discoid (vs. variably radiate in *Ericameria*), but the loss of rays can only be tenuously interpreted as homologous in the two southern genera, since the loss apparently has occurred independently within *Ericameria*. *Parastrephia*, *Aztecaste*, and *Hinterhubera* also have become rayless independently of *Nardophyllum* and *Pteronia*. The only genera of *Hinterhuberinae* with paleate receptacles occur in South America (see Nesom 1993a). Some species of *Nardophyllum* are paleate, and the loss of pales is interpreted here as a specialization within the genus. The closest relationships of *Nardophyllum* almost certainly lie with radiate South American genera that have paleate receptacles and a similar habit, *Chiliophyllum* Philippi, *Chiliotrichum* Cass., and *Chiliotrichopsis* Cabrera. Further investigation of phylogenetic relationships within the subtribe will have to proceed in the context of these taxa.

It is clear that the *Hinterhuberinae* originated in the Southern Hemisphere, and most of the diversity of the subtribe remains centered in South America. *Pteronia* is geographically isolated in Africa and is more closely similar to South American genera than to its Madagascan relatives, while *Ericameria*, *Aztecaste*, and *Westoniella* Cuatrecasas represent independent introductions of the tribe into North America. The latter two represent northward intrusions of the specialized, primarily north Andean group of genera related to *Hinterhubera*, but *Ericameria* appears to be more primitive, perhaps most closely related to *Nardophyllum*, and its origin in North America must have been relatively earlier and via a different pathway. *Ericameria*, like *Pteronia*, can be divided into infrageneric subgroups, but the morphological overlap among the subgroups and the geographical coherence of each of these two genera, as well as within *Nardophyllum*, indicate that all can reasonably be considered

monophyletic.

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**FLOSCALDASIA (ASTERACEAE: ASTEREAEE): FIRST RECORD FROM
ECUADOR AND COMMENTS ON ITS CLASSIFICATION**

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ABSTRACT

Floscaldasia hypsophila, previously known only from Colombia, is here added to the flora of Ecuador, where it is known by a single collection from Imbabura Province. Contrary to a recent alignment, the North Andean and Central American genera *Floscaldasia*, *Laestadia*, *Westoniella*, and *Flosmutisia* are hypothesized to be specialized members of the subtribe Hinterhuberinae.

KEY WORDS: *Floscaldasia*, Hinterhuberinae, Astereae, Asteraceae, Ecuador

Study of collections at US has brought to light the first known collection of *Floscaldasia hypsophila* Cuatrecasas from Ecuador.

ECUADOR. Prov. Imbabura, NE side of Cayambe Mountain, 13,500 ft, forming small mats on topmost sides of *Azorella* hummocks, 12 Dec 1961, *Cazalet & Pennington 5751* (US!, distributed to K, NY, and B).

The species constitutes a monotypic genus of the subtribe Hinterhuberinae that has previously been known only from the Cordillera Central and Cordillera Oriental of Colombia: the type was collected in Páramo del Quindío (Depto. Caldas) and other collections (US) are known from Nevado del Ruiz (Depto. Caldas) and the Sierra Nevada del Cocuy (Depto. Boyacá). Plants of *Floscaldasia hypsophila* occur in páramo at elevations of 4100-4550 meters, forming cushions on wet rocks or intermixed with other species of cushion plants. These Colombian localities are more than 600 kilometers from the one known in Ecuador.

The genus *Floscaldasia* Cuatrecasas was originally placed within the subtribe Asterinae by Cuatrecasas (1969), later suggested to be a member of the Grangeinae (Robinson & Brettell 1973), and tentatively maintained there or in the Bellidinae by Cuatrecasas (1986). In a recent circumscription of the

subtribe *Hinterhuberinae* (Nesom 1993), I excluded all of the genera placed there by Cuatrecasas (1986), except the genotype, and then repopulated the subtribe with a different set of genera apparently closely related to *Hinterhubera*. However, at the end of my review of *Astereae* classification (Nesom in prep.) and after studying a large set of specimens of the North Andean and Central American genera *Floscaldasia*, *Laestadia* Kunth ex Less., *Westoniella* Cuatrecasas, and *Flosmutisia* Cuatrecasas, I conclude that these indeed belong with *Hinterhubera*, where they are among the most highly specialized elements in the subtribe.

Floscaldasia is remarkably similar in its creeping habit and reduced leaves to *Laestadia* and both have pseudohermaphroditic central flowers; in fact, the Ecuadorian collection cited above has lain unrecognized because it was inadvertently annotated as a species of *Laestadia*. Plants of *Laestadia*, however, have punctate-glandular leaves, tubular-actinomorphic peripheral flowers, and epappose achenes. The thick, entire, linear leaves, and the 6-10-nerved achenes suggest that it belongs with the *Hinterhuberinae*, and I regard its similarities to genera of *Grangeinae* as convergent. The morphological and geographic proximity of *Laestadia* to other genera here regarded as *Hinterhuberinae* add weight to this hypothesis.

The monotypic *Flosmutisia* Cuatrecasas is similar in habit to *Oritrophium* (Kunth) Cuatrecasas, another highly reduced, North Andean genus of *Hinterhuberinae*. *Flosmutisia*, however, has flat achenes and highly modified peripheral corollas derived from central flowers, and it is almost certainly closely related to *Hinterhubera*, *Westoniella*, and the Mexican genus *Aztecaster* Nesom. *Westoniella* (Cuatrecasas 1977) is similar to *Hinterhubera* in its ericoid leaves, pseudohermaphroditic central flowers, modified peripheral flowers, and flattened achenes, and one group of its species are similar in habit as well.

Blakiella Cuatrecasas, which Cuatrecasas has included in the *Hinterhuberinae*, belongs with a group of *Astereacean* genera separate from the *Hinterhuberinae* (Nesom in prep.).

ACKNOWLEDGMENTS

I thank Billie Turner and Mark Mayfield for their reviews of the manuscript, and the staff of US for their help during a recent visit. Dr. José Cuatrecasas confirmed the identification of the Ecuadorian collection of *Floscaldasia*.

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**SAGERETIA MEXICANA (RHAMNACEAE), A NEW SPECIES FROM
SOUTHWESTERN MEXICO**

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ABSTRACT

A new species of Rhamnaceae from southwestern México (the states of Jalisco, Michoacán, and México) is described: *Sageretia mexicana* Nesom. It is distinguished from the widespread *S. elegans* by its smaller, lanceolate leaves and its abbreviated inflorescence with a short, unbranched, terminal rachis and 1-3 axillary floral clusters. Also provided are an illustration of the new species, a key to the four New World species of *Sageretia*, with notes on their variability and distribution, and a distribution map for the three species that occur in México. It is suggested that the New World species may not form a monophyletic group but instead may have at least two separate lines of relationship to Old World species.

KEY WORDS: *Sageretia*, Rhamnaceae, México

Several particularly small-leaved collections of the genus *Sageretia* Brongn. have been made from the Mexican states of Jalisco, Michoacán, and México. These have been identified as *S. elegans* (Kunth) Brongn., a widespread species ranging from México southward as far as Argentina. On comparison, however, of both the leaves and inflorescence of these small-leaved plants with *S. elegans*, as well as with the two other New World species of *Sageretia*, *S. minutiflora* (Michx.) Trel. and *S. wrightii* S. Wats., the plants from southwestern México appear to represent a previously undescribed species.

***Sageretia mexicana* Nesom, sp. nov.** (Fig. 1; Map 1) TYPE: MEXICO. Michoacán. Balneario Huapamacataro, 10 km al SE de Maravatio, orilla de un estanque y canales adyacentes, 2050 m, 31 Mar 1988, J. Rzedowski 46308 (HOLOTYPE: TEX!; Isotypes: IBE, TEX!).

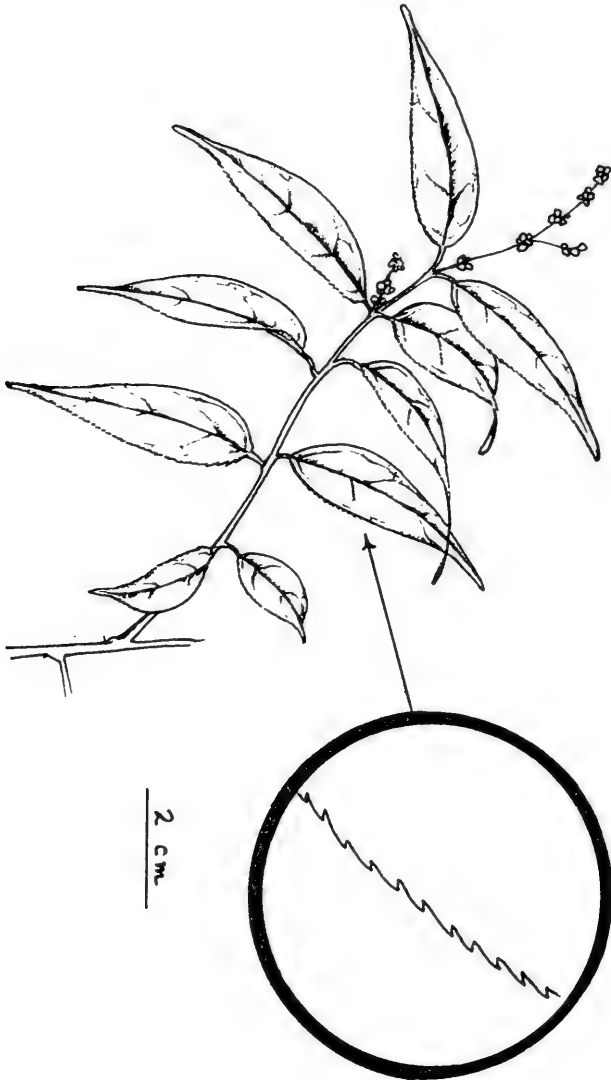
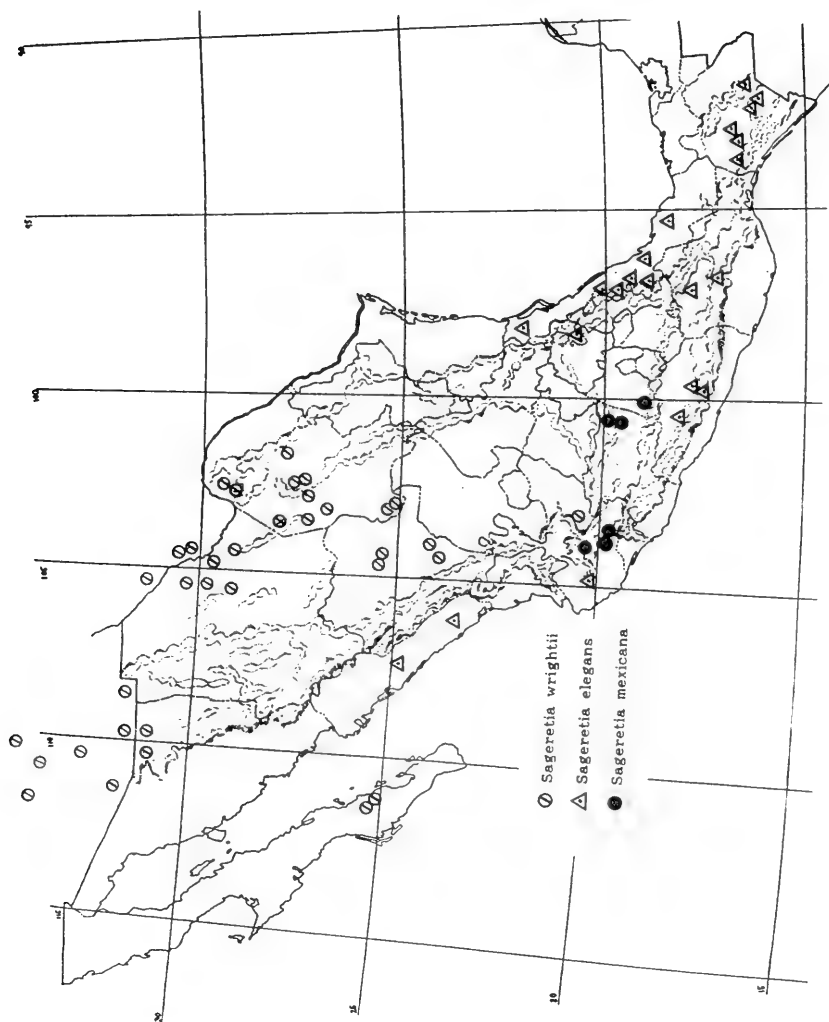


Figure 1. Habit illustration of *Sageretia mexicana*.



Map 1. Geographic distribution of *Sageretia* species in México and adjacent southwestern United States. The range of *S. elegans* continues southward into Central and South America.

Differt a *Sageretia eleganti* (Kunth) Brongn. foliis lanceolatis minoribusque et inflorescentia valde abbreviata rachidi brevi simplici terminali ac fasciculis 1-3 floralibus axillaribus.

Perennial shrubs 1.5-2.0 m tall with weak, subscaudent branches, probably producing short thorns but these not seen on the specimens available. Leaves opposite, tardily deciduous or perhaps evergreen, thin-coriaceous, slightly villos when young but quickly glabrescent, both surfaces glabrous and glossy-green at maturity, petioles 1-2 mm long, the blades lanceolate, 2-5 cm long, 5-15 mm wide, 2.5-3.0 times longer than wide, with 4-7 pairs of primary lateral veins, apex acute to acuminate, base rounded to obtuse or slightly cordate, margins serrulate. Inflorescence a terminal, simple branch 1.5-3.4 cm long, with widely separated fascicles of sessile flowers at 3-5 nodes, additional sessile fascicles or short branches (0.5-3.0 cm long) commonly in the axils of the upper 1-3 pairs of fully developed leaves. Flowers 5-merous, perfect; calyx ca. 1 mm long with triangular lobes equaling the tube; petals shorter than the calyx, whitish. Fruit a subglobose drupe, purplish-black to reddish at maturity, with 3, 1-seeded nutlets. Apparently flowering at least January-June, the fruits maturing slowly and long-persistent; e.g., the holotype bears only flowers, but the TEX isotype is fruiting.

Additional collections examined: MEXICO. Jalisco: Barranca del Nogal, 15 km SE de Tapalpa, bosque tropical caducifolio, 2100 m, 14 Oct 1990 (frt), *Flores 2540* (TEX); Salcillo, 1 Jun 1892 (fr), *Jones 75* (US); Zona Arqueologica del Sur de Tapalpa, 9 May 1965 (fr, frt), *Villarreal de Puga 97* (TEX). México: Dist. Temascaltepec, Ypericones, wet barranca, 1500 m, 4 May 1933 (fr), *Hinton 3891* (US); Dist. Temascaltepec, Ypericones, 5 Jan 1935 (fr), *Hinton 7720* (US-2 sheets). Michoacán: Senguio, 15 Apr 1979 (fr), *Calvert s.n.* (TEX).

The new species has mostly been identified as *Sageretia elegans*, which has a broad geographic range and is particularly variable in leaf size, but the large inflorescence and ovate-shaped leaves are relatively constant features of this species. In fact, *S. elegans* is most similar among the New World taxa to *S. minutiflora*, the two differing almost exclusively in leaf size. Further, some specimens of small-leaved plants of *S. elegans* from central Veracruz (see below) certainly would be identified as *S. minutiflora* if they had been collected in the southeastern United States. While these latter two taxa might be combined as a single species, their geographic disjunction and their essentially different leaf sizes justify the maintenance of two distinct taxa.

The only other North American species with an abbreviated inflorescence similar to that of *Sageretia mexicana* is *S. wrightii*. The two species, however, are distinct in geography (Map 1) and habitat as well as the size and the shape of their leaves. *Sageretia wrightii* appears to be morphologically isolated among the New World species; *S. mexicana* is more similar to *S. elegans* and

S. minutiflora in habit, leaf shape and size, and habitat. As further noted below, at least *S. elegans* and *S. wrightii* may be independently related to Old World species rather than constituting a monophyletic American group.

Key to the New World species of *Sageretia*

1. Densely and compactly branched shrubs; leaves mostly oblong-elliptic, 5-22 mm long, 4-11 mm wide, obtuse, retuse, or rounded at the apex.
..... *S. wrightii*
1. Loosely to compactly branched shrubs, branches often becoming trailing or viny; leaves ovate to lanceolate, acute to acuminate at the apex, 15-115 mm long, 12-60 mm wide. (2)
 2. Flowers borne on a single, short, terminal branch and several, axillary, sessile to short ones; leaves lanceolate, 2.5-3.0 times longer than wide. *S. mexicana*
 2. Flowers borne in broad, highly branched, terminal and lateral panicles; leaves ovate to elliptic-ovate, mostly 1.4-2.2 times longer than wide. (3)
3. Leaves 15-38 mm long, 12-20 mm wide, 1.4-2.1 times longer than wide.
..... *S. minutiflora*
3. Leaves (30-)40-115 mm long, (14-)20-40(-60) mm wide, (1.3-)1.7-2.2(-2.8) times longer than wide. *S. elegans*

Summary of the New World species

Sageretia mexicana Nesom.

See above.

Sageretia elegans (Kunth) Brongn., Ann. Sci. Nat. (Paris) 10:359. 1827.

Weak shrubs with long, subscaudent branches, commonly leaning on larger trees, with widely spaced thorns. Leaves tardily deciduous, mostly 20-40(-60) mm wide, on a few plants of several collections from central Veracruz (e.g., Ventura 5986 [TEX]) as small as 28 mm long and 14 mm wide. Inflorescence terminal and lateral, branches 5-15 cm long, with 4-8 lateral branches 2-6 cm

long, several inflorescence branches often arising from the apex of the leafy stem. Illustration: Fernández N. (1986).

Veracruz and Sinaloa to Chiapas, México, southward through Central America and the Andean region of South America to Bolivia and Perú, and into Paraguay and Argentina; matorral and thorn forest to oak and tropical deciduous woods.

Sageretia minutiflora (Michx.) Trel., Trans. Acad. Sci. St. Louis 5:367. 1889.

Sprawling shrubs with drooping or vine-like branches, sometimes climbing into overstory, with widely spaced thorns. Leaves evergreen or tardily deciduous, mostly 15-38 mm long, 12-20 mm wide, 1.4-2.1 times longer than wide. Inflorescence similar to that of *Sageretia elegans* but averaging slightly smaller. Illustrations: Gray & Sprague (1849); Radford *et al.* (1968).

Southeastern United States in coastal South Carolina and Georgia, scattered coastal localities along Gulf of Mexico, from Florida to Alabama and Mississippi; hammocks, shell mounds, beach borders, live oak, oak-palm, oak-hickory, or beech-magnolia woods (see Kral 1983 for further details on habitat and distribution).

Sageretia wrightii S. Watson, Proc. Amer. Acad. Arts 20:358. 1885.

Densely and intricately branched shrubs, sometimes tall and narrow but usually weak and straggly, stems commonly arching or arcuate-decumbent, with numerous, long thorns. Leaves persistent-evergreen, mostly broadly oblanceolate to oblong-elliptic, 5-22 mm long, 4-11 mm wide, 1.5-2.1(-2.8) times longer than wide, obtuse, retuse, or rounded at the apex. Inflorescence branches usually simple or nearly so, 5-10 mm long, terminal or in the axils of the uppermost, well-developed leaves. Illustrations: Johnston & Johnston (1969); Powell (1988).

Southwestern United States from trans-Pecos Texas (Hudspeth and Presidio cos.) to New Mexico (Hidalgo Co.) and southeastern Arizona (Cochise, Pima, Graham, Maricopa, Pinal, and Gila cos.), south in México to Sonora, Chihuahua, Coahuila, Durango, Jalisco, and Baja California Sur; the disjunction (Map 1) between the main range of this species and populations in the Sierra de la Giganta (Baja California Sur) appears to be real; matorral, chaparral (oak with *Agave*, *Yucca*, *Rhus*, etc.), to open pine woodlands.

Overview of the genus

Sageretia is primarily a genus of the Old World, where it is distributed from Turkey southward into the Arabian peninsula and Ethiopia, eastward across the Himalayan region from northwestern India and Tibet to southeastern China, Laos, Taiwan, Java, and northern Australia. The generic type and most widespread species, *S. thea* (Osbeck) M.C. Johnston (Johnston 1968), or the *S. thea* complex (see Zielinski 1977), is distributed across nearly the entire Old World range of the genus, from Africa, Arabia, and Asia Minor to southeastern China and the Philippines.

Relatively recent estimates of the number of species of *Sageretia* have mostly ranged from about 10 to 20 (e.g., Grubov 1949; Johnston & Johnston 1969; Li 1977). The recent treatments of Chinese *Sageretia* (Chen & Zhou 1982, 1986), however, have confirmed the existence of high species diversity in south-central and southeastern China. I count about 15 Old World species, although that number might be reduced by two or three if Zielinski's (1977) conservative view of *S. thea* is followed. It is reasonably clear that only a single species (*S. elegans*) exists in Central and South America, where seven species names have been proposed, bringing the number of New World species to four and the total number of *sageretias* to about 19.

Technical, generic descriptions of *Sageretia* and a summary of relevant literature are provided by Brizicky (1964) and Johnston & Johnston (1969). The genus is notably uniform in floral morphology as well as habit; distinctions between species are drawn primarily on features of the leaf size and shape and the degree of elaboration and position of the inflorescence. While such differentiation might seem to occur easily among closely related species, *S. wrightii* appears to be more similar to the Old World *S. thea* in habit and leaf morphology than to the other New World species, particularly some of the small-leaved, compact forms of the *S. thea* complex in Saudi Arabia, Iran, Afghanistan, and Pakistan. Old World analogs also can be found for *S. elegans*/*S. minutiflora* and *S. mexicana*. In view of this, there is no compelling reason to hypothesize that the New World species form a monophyletic group. Given the difficulty of recognizing morphological homologies among these taxa, other lines of data, particularly those from molecular and anatomical analyses, probably will be necessary to delineate the patterns of evolutionary relationship within *Sageretia*.

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I thank Billie Turner and Marshall Johnston for their comments on the manuscript and the staff of US for their assistance during a recent visit. The

distribution maps were prepared from records at LL, TEX, and US. The habit illustration was drawn by Angelo Mitchell.

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A NEW SPECIES AND NEW VARIETY OF *HYPOXIS* (HYPOXIDACEAE)
FROM NORTHEASTERN MEXICO

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ABSTRACT

Hypoxis pulchella, *sp. nov.*, is described from the sierra of central Nuevo León and west-central Tamaulipas; it apparently is most closely related to *H. hirsuta* of the southeastern United States. *Hypoxis decumbens* var. *dolichocarpa* (*var. nov.*) is described from northeastern México (Nuevo León, Tamaulipas, and San Luis Potosí); it differs from typical *H. decumbens* L. in its longer fruits. The distributions of the new taxa are mapped.

KEY WORDS: *Hypoxis*, Hypoxidaceae, México

Study of *Hypoxis* L. from northern México has indicated that two entities need to be formally described, each represented by a series of populations. The first is recognized as a species, the second as a variety.

Hypoxis pulchella Nesom, *sp. nov.* TYPE: MEXICO. Nuevo León: Mpio. Villa Santiago, area near Cola de Caballo, near running water, woods of *Pinus*, *Quercus*, *Platanus rzedowskii*, *Populus tremuloides*, *Colubrina greggii*, 800 m, 20 Jun 1984, J.A. Villarreal 2774 with M.A. Carranza and M. Vasquez R. (HOLOTYPE: TEX!; Isotype: ANSM).

Hypozi hirsutae (L.) Coville similis et ut videtur arcte affinis sed seminibus papillis distincte discretis conicisque apicibus rotundatis differt. Differt a *H. decumbenti* L. floribus majoribus (segmentis perianthii latoribus, antheris thecis longioribus), fructibus brevioribus, et morphologia seminum.

Perennial, stemless herbs with a rosette of leaves, the corm elongate, ca. 2 cm long, with membranaceous bases, these not disintegrating into stiff, fibrous bristles; leaves, scapes, pedicels, abaxial surface of perianth segments, and ovary and fruit sparsely to moderately pilose. Leaves lax, linear, 15-50 cm long, 1.5-4.0 mm wide, commonly with 3, raised nerves. Scapes filiform, erect, 15-20 cm long, 2(-4) flowered; pedicels mostly 1.5-4.0 cm long. Perianth segments yellow above, greenish beneath, narrowly elliptic to broadly lanceolate-elliptic, 8-13 mm long, (2.5-)3.2-4.0 mm wide; anther thecae versatile, 2.5-3.8 mm long. Capsule indehiscent, 4-5 mm long, crowned by the persistent, erect, perianth segments; seeds globose, ca. 1.5 mm in diameter, beak and rostrate hilum subterminal, surface black, muricate with elongate, conical but blunt-tipped, distinctly separated papillae.

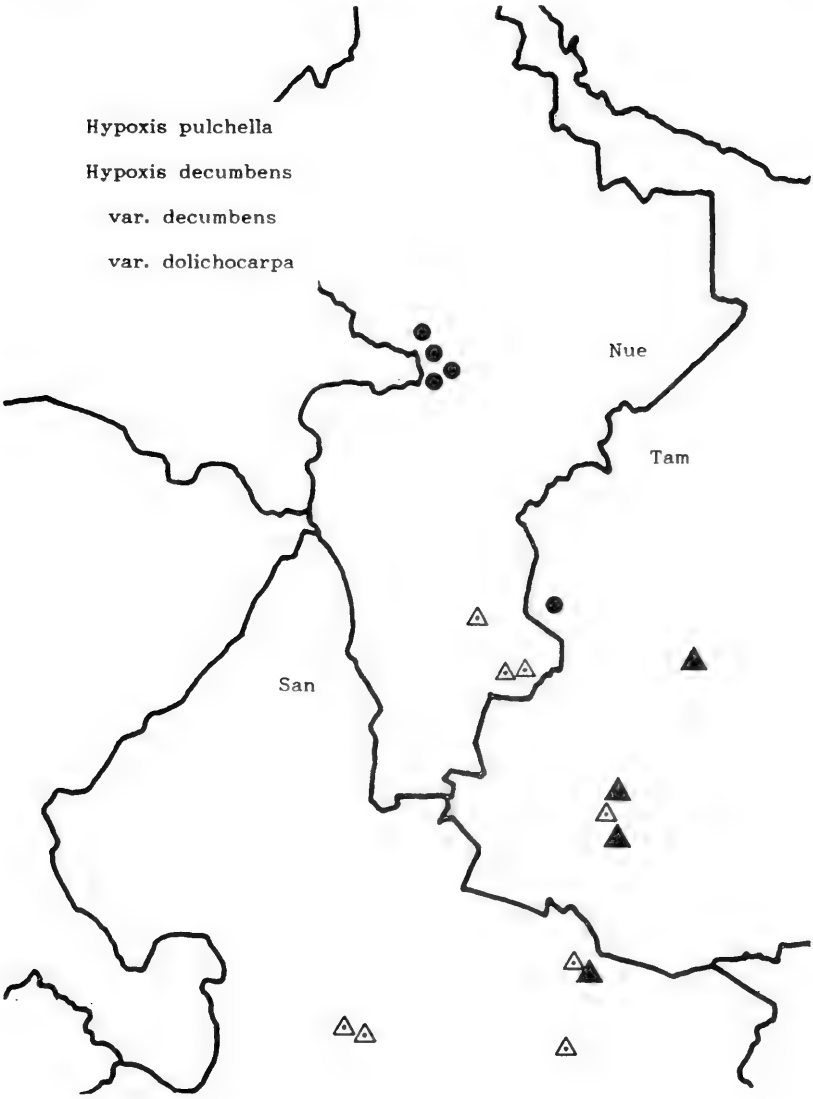
Nuevo León and Tamaulipas (Map 1); thorn forest, pine to pine-oak or oak woods, 550-1700 m; flowering April-September.

Additional collections examined: MEXICO. Nuevo León: Mpio. Villa Santiago: trail between Potrero Redondo and Laguna Sanchez, open pine forest, 16 Aug 1939, Müller 2726 (LL); ca. 20 mi SE of Monterrey on Hwy 85, W to the end of road at the Río Ramos, thorn forest, 28 Jul 1971, Parker 614 (LL); S of Villa Santiago, 800-900 m, 22 Jun 1934, moist gravelly soil, Pennell 16928 (US); 5.2 road mi W of Cola de Caballo at developed picnic area near crest of steep limestone mountain, pine-oak woodland, 3 Jun 1982, Worthington 8406 (TEX). Mpio. Montemorelos, trail up Sierra Cebolla from La Trinidad in pine-oak-hickory woodland, 1600-1700 m, 6 Sep 1992, Patterson 7175 (TEX). Tamaulipas: Mpio. Hidalgo, into the sierra 14.9 mi W of Hotel Santa Engracia, 4.3 mi W of the Adelaida-Guayabas jct, side of steep canyon, NW-facing slope, area of primarily oaks (*Quercus rysophylla* dominant) with Lauraceae and *Ungnadia*, 560 m, 17 Apr 1988, Nesom 6341 (TEX).

Hypoxis pulchella resembles and apparently is most closely related to *H. hirsuta* (L.) Coville of the eastern United States. Plants of both species produce non-fibrous leaf bases, similarly large flowers, short capsules, and black, densely elongate-muricate seeds. In *H. hirsuta*, however, the seed surfaces are densely covered with sharply conical, almost spine-like murications, while the murications of *H. pulchella* are much less dense, distinctly separated at their base, and broader with rounded apices. *Hypoxis hirsuta* occurs throughout the eastern United States and into east Texas, but there is no record of its occurrence in México.

Specimens of *Hypoxis pulchella* have been previously identified mostly as *H. decumbens* L. Plants of the latter species, however, produce smaller flowers (narrower perianth segments, shorter anther thecae), longer fruits, and seed surfaces with broad, rounded, confluent pebbling.

Hypoxis decumbens L. var. *dolichocarpa* Nesom, var. nov. TYPE: MEX-



Map 1. Geographic distribution of *Hypoxis pulchella*, typical *H. decumbens*, and *H. decumbens* var. *dolichocarpa* in northeastern México.

ICO. Tamaulipas: Mpio. Tula, 10.2 mi SE of Tula (centro) on road to Ocampo, plants common along roadside and edge of dense oak woods, 1440 m, 16 Jun 1987, *G. Nesom 6007* with M. Martínez, J. Norris, and L. Woodruff (HOLOTYPE: TEX; Isotype: MEXU).

Differt a *Hypoze decumbenti* L. typica fructibus longioribus ([14-]16-26 mm longis vs. [5-]7-14 mm).

Additional collections examined: MEXICO. Nuevo León: Mpio. Aramberri: Cerro El Viejo, oak and pine woods, 1725 m, 24 May 1993, *Hinton et al. 22813* (TEX,UAT); Cerro El Viejo, oak woods, 2130 m, 24 May 1993, *Hinton et al. 22828* (TEX,US); Cerro El Viejo, pine woods, 2085 m, 16 Jun 1993, *Hinton et al. 22916* (TEX,UAT); La Escondida to San Francisco, pine and oak woods, 1795 m, 23 Jul 1993, *Hinton et al. 29085* (TEX,UAT). San Luis Potosí: El Salto Falls, river bank, 9 Jan 1966, *Ernst 2194* (US); near waterfall at El Salto, 20 Feb 1961, *King 3883* (TEX,US); Alvarez, 13-23 Jul 1904, *Palmer 292* (US); Alvarez, 19-22 May 1905, *Palmer 581* (US); Espinazo del Diablo, Tamasopa Canyon, crevices of limestone cliffs, 800-1000 m, 7 Aug 1934, *Pennell 17978* (US).

This taxon is similar to typical *Hypozeis decumbens* in seed and floral morphology; lack of fibrous leaf bases also place the two as closely similar. Typical *H. decumbens*, however, produces mature fruits (5-)7-14 mm long, while var. *dolichocarpa* produces mature fruits (14-)16-26 mm long. Such long-fruited plants apparently are restricted to southern Nuevo León, Tamaulipas, and San Luis Potosí (Map 1), where they occur in close proximity to plants with fruits typical of the species over the remainder of its considerable geographic range (southeastern México, Central America, West Indies, and South America south to Argentina). The contrast between the var. *decumbens* and var. *dolichocarpa* can be seen in the following collections: *Ernst 2194* and *King 3883* of var. *dolichocarpa* from El Salto in San Luis Potosí to apparently typical *H. decumbens* from the same locality (*Turner 80-24M* [TEX]); the type of var. *dolichocarpa* to apparently typical *H. decumbens* from near the same locality (1 km E of boundary between mpios. Tula and Ocampo, *Hernández 949* [TEX]).

Several other Mexican collections of *Hypozeis decumbens* produce mature fruit 12-15 mm long and appear to be nearly intermediate between var. *decumbens* and var. *dolichocarpa*. These are well within the geographic range of typical *H. decumbens*: Hidalgo: between Tianguistengo and La Pagua, 24 Apr 1891, *Manry 5936* (US). Veracruz: near Jalapa, 17-22 May 1899, *Rose & Hough 4926* (US); RR banks near Jalapa, 10 Sep 1906, *Barnes et al. 31* (US). In further evaluation of the biological and taxonomic status of these two taxa, field observations will be critical.

Brackett (1923, p. 132) identified as *Hypozeis decumbens* var. *major* Seubert a set of plants scattered over practically the entire range of *H. decumbens*, dis-

tinguished by her from the typical variety only by the phrase "plants coarser." One collection cited by Brackett as var. *major* (Palmer 581 from San Luis Potosí) is among those I have included with var. *dolichocarpa*. The type of var. *major*, however, was collected in South America, where only plants with typical-sized fruits occur.

Besides *Hypoxis decumbens* and *H. pulchella*, which are discussed in detail in the present paper, one other species of *Hypoxis* from Nuevo León and Tamaulipas is represented in LL,TEX, tentatively identified here as *H. mexicana* Schultes. These plants are sometimes slightly fibrous at the base, with short pedicels, very small flowers, and brownish seeds densely and minutely papillate with very short, sharply conical papillae. *Hypoxis mexicana* is wide spread in México, from southeastern Nuevo León and Tamaulipas south to Edo. México and Morelos and in western México northward to Durango and Chihuahua.

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MILDELLA INTRAMARGINALIS VAR. SERRATIFOLIA (ADIANTACEAE)
ELEVATED TO SPECIES RANK

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ABSTRACT

Mildella intramarginalis var. *serratifolia* is elevated in rank to species as *Mildella (Pteris) fallax* (Mart. & Gal.) Nesom, *comb. nov.* This taxon is consistently different from typical *M. intramarginalis* in several morphological features and the two taxa are broadly sympatric.

KEY WORDS: *Mildella*, Adiantaceae

The fern genus *Mildella* Trevisan (Adiantaceae) is primarily distributed in southeast Asia but also has one species in Haiti of the West Indies (*M. leonardii* [Maxon] Hall & Lellinger) and two taxa in México and Central America. The North American taxa have been recognized as varieties of *M. intramarginalis* (Kaulf. ex Link) Trevisan: var. *intramarginalis* and var. *serratifolia* (Hooker & Baker) Hall & Lellinger. A taxonomic account of the genus has been provided by Hall & Lellinger (1967).

Var. *intramarginalis* and var. *serratifolia* are sympatric over a large area of their range, primarily eastern and southern México and into Guatemala. The typical variety extends southward through Central America to Panamá while var. *serratifolia* occurs southward only into Guatemala; at their northern limit, the former has been documented from the Sierra de Guatemala in southwestern Tamaulipas, and from southeastern Nuevo León, while the latter apparently is more common and extends further northward to the Sierra San Carlos, Tamaulipas, and along the sierra to the vicinity of Monterrey, Nuevo León.

"Throughout most of their ranges the var. *serratifolia* is found at somewhat higher elevations than var. *intramarginalis*" (Mickel 1992, p. 304). In the state of Oaxaca, where both taxa are relatively abundant, var. *serratifolia* grows at 1800-3400 meters and var. *intramarginalis* at 900-1900 meters (Mickel & Beitel 1988). This separation in elevation is generally consistent in other parts of the range, but var. *serratifolia* ranges down to 1350 meters and

var. *intramarginalis* ranges up to 2400 meters (the greatest elevational overlap apparently in Chiapas and Guatemala).

The two varieties of *Mildella intramarginalis* are distinguished by morphological contrasts in the following couplet (modified from Mickel 1992 p. 304 and Mickel & Beitel 1988 p. 252):

1. Blade margins entire or much less commonly slightly serrate or crenate; rhizome scales castaneous to atropurpureous, the margins nearly as wide as the central portion; indusial margin entire or rarely erose-crenate. var. *intramarginalis*
1. Blade margins strongly serrate; rhizome scales black-centered, the margins very narrow; indusial margin ciliate with hairs 0.3-0.5 mm long. var. *serratifolia*

The treatment of these as varieties apparently is based on the observation by Hall & Lellinger (p. 116) that "There does exist something of a continuum in marginal overgrowth [of the blade] between var. *intramarginalis* and var. *serratifolia*; because of this and the juvenile crenulations found in some sterile blades, the character of the blade margin is not entirely reliable for separating the two varieties." And (p. 120) "Most of the specimens of var. *intramarginalis* are entire-margined, but there is a continuum between these specimens and a few, mostly small, crenate-margined specimens (*Purpus* 2843, UC,US). Some of the latter kind of specimens look much like subserrate specimens of var. *serratifolia*." Nevertheless, by comparing the blade margins of mature, fertile fronds, in combination with the features of the rhizome scales and indusial margins, every specimen I have studied can be unequivocally placed in one taxon or the other. Further, no intermediates have been cited in previous studies.

Mickel (1992 p. 304) noted that "the two varieties have not been found growing together," despite their overlap in geographic range. It is significant, however, that Hall & Lellinger cited a collection of each taxon made on 3 Jul 1964 by G.R. Proctor at the same site in Guatemala: Dept. El Quiche, valley of Río de las Violetas, N of Nebaj, on crumbling shale bank, 5800-6000 feet. Proctor 25367 comprises 9 plants mounted on 4 sheets (LL-2 sheets, TEX,US): all are typical var. *serratifolia*. Proctor 25370 comprises 4 plants mounted on 4 sheets (LL-2 sheets, TEX,US): all are typical var. *intramarginalis*.

Mildella leonardii of Haiti is the only other taxon of the genus with serrate blade margins besides var. *serratifolia*. These two taxa also are more similar to each other in rhizome scale morphology than either is to var. *intramarginalis*, but *M. leonardii* is similar to var. *intramarginalis* in its entire indusial margins. The only other taxa besides var. *serratifolia* with ciliate indusial margins occur in China. *Mildella leonardii* differs from both of the North American taxa in

its slender stipes and long terminal segment of the fronds, but there is no compelling evidence to reject a hypothesis of sister relationship between *M. leonardii* and one of the North American taxa.

In summary, there is evidence to view the two "varieties" of *Mildella intramarginalis* as reproductively isolated species, distinct in ecological preference and morphology, with no indication of morphological intergradation. Further, the nature of the evolutionary relationship among the Haitian *M. leonardii* and the two North American taxa is unresolved. As separate species, the taxonomy of North American *Mildella* may be represented as follows.

1. *Mildella intramarginalis* (Kaulf. ex Link) Trevisan, Rendic. Ist. Lombardo, Milano II, 9:810. 1876. *Pteris intramarginalis* Kaulf. ex Link, Hort. Berol. 2:34. 1833. *Pellaea intramarginalis* (Kaulf. ex Link) J. Smith, Cat. Kew Ferns 4. 1856.
2. *Mildella fallax* (Mart. & Gal.) Nesom, comb. nov. BASIONYM: *Pteris fallax* Mart. & Gal., Mem. Foug. Meziqne 53, t.14, f.2. 1842.

Pellaea intramarginalis (Kaulf. ex Link) J. Smith var. *serratifolia* Hooker & Baker, Syn. Fil. 149. 1867. *Mildella intramarginalis* (Kaulf. ex Link) Trevisan var. *serratifolia* (Hooker & Baker) Hall & Lellinger, Amer. Fern J. 57:124. 1967.

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A NEW SPECIES OF *DESMODIUM* (FABACEAE) FROM NORTHEASTERN MEXICO, WITH COMMENTS ON THE GENUS IN NUEVO LEON

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ABSTRACT

A new species of *Desmodium*, *D. subrosum* Nesom, is described from northern Zacatecas and immediately adjacent Nuevo León in northeastern México. Fourteen species of *Desmodium* are recorded from Nuevo León, México.

KEY WORDS: *Desmodium*, Fabaceae, Nuevo León, México

In identification of LL,TEX *Desmodium* of northeastern México, one previously unidentified species has come to light.

***Desmodium subrosum* Nesom, sp. nov.** TYPE: MEXICO. Zacatecas: near Concepción del Oro, 11-14 Aug 1904, *Palmer 288* (HOLOTYPE: US!; Duplicates at GH and NY, *fide* Schubert 1940).

Desmodium rosei Schubert similis sed differt duratione perenni, caulibus procumbentibus ad basim ligneisque, et pedicellibus brevioribus.

Perennial, suffrutescent herbs arising from a woody root. Stems highly branched, procumbent, up to 50 cm long, glabrous to sparsely pubescent with minutely uncinulate hairs. Leaves trifoliolate, leaflets linear to linear-lanceolate, 1-5 mm wide, 1-5 cm long, acute to obtuse, minutely apiculate at the apex, rounded at the base, reticulate venation distinctly evident, green above and usually with minute, appressed hairs, paler beneath and strigose. Stipules and floral bracts narrowly triangular-lanceolate, reflexed. Inflorescence racemose-paniculate, mostly 8-20 cm long, sparsely floriferous; pedicels filiform, 5-10 mm long, sparsely pubescent to glabrate; calyces minutely strigose, 1.3-1.5 mm long, the lobes triangular; corollas ca. 2 mm long, whitish to pink,

blue, or purple. Loment on a basal stipe 1-2 mm long; articles 1-4, flat or biconvex, 3.0-3.5 mm broad, 3-5 mm long, glabrous, with prominent reticulate venation and minutely but distinctly undulate margins.

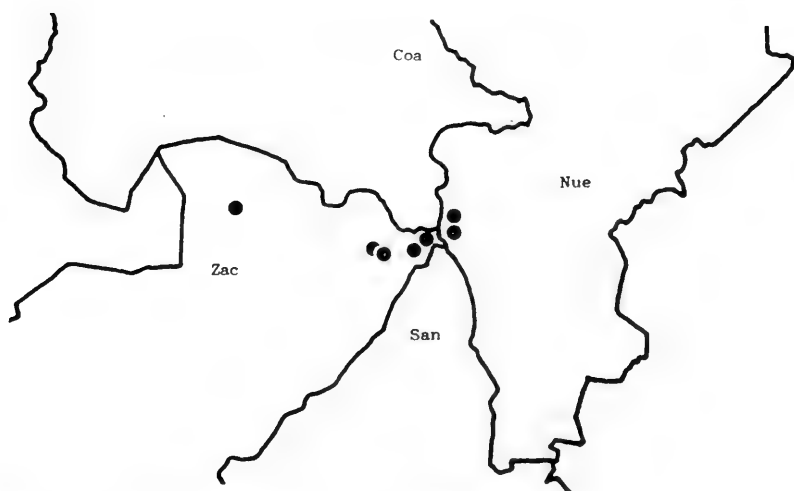
Mostly on igneous substrate, rarely limestone, growing in various mixtures of *Yucca*, *Opuntia*, *Agave*, *Dasyllirion*, *Mimosa*, *Fouquieria*, *Salvia*, *Aloysia*, *Artemisia*, grasses, sometimes reaching oak chaparral, ca. 1850-2600 m; flowering June-September.

Additional collections examined: MEXICO. Nuevo León: Mpio. Galeana: S part of Cerro Pedregoso [or Sierra del Astillero], 1.5 km W of El Penuelo, steep, eroded slopes of igneous rock, 1850-2300 m, 18 Jun 1972, *Chiang et al.* 7963 (LL); El Penuelo, top of hill, 2130 m, 24 Jul 1991, *Hinton et al.* 21193 (TEX). Zacatecas: 3.1 (road) mi above Concepción del Oro, on ridge W of city, S-facing granite slopes, 8000 ft, 30 Aug 1971, *Henrickson* 6286 (LL); 16 (air) mi E of Concepción del Oro, just below and W of ridge of igneous Sierra del Astillero, ca. 1/2 mi W of summit, ca. 3 mi NE of Guadalupe Garcerón, 7200 ft, 22 Sep 1973, *Henrickson* 13391 (LL); 15 (air) mi NE of Estación Camacho on NW slopes of Pico de Teyra, rocky granite boulder area, 7100 ft, 23 Sep 1973, *Henrickson* 13434 (LL); Sierra del Astillero (approached from SE, from Tanque El Alto), limestone, [ca. 2500 m], 2 Jul 1973, *Johnston et al.* 11565A (LL).

Desmodium subrosus is an endemic of the Chihuahuan Desert Region (CDR) (Map 1) quickly recognized by its trifoliolate leaves with linear leaflets, small flowers, and short-stipitate loment of 3-4 orbicular articles with slightly undulate margins. *Desmodium neomexicanum* A. Gray, which occurs sporadically in the CDR, is closely related (Schubert 1940), but the plants are annual and have broader leaflets. The new species is most closely related to *D. rosei* Schubert, which it resembles in leaf and fruit morphology.

The type collection of *Desmodium subrosus* was identified by Schubert (1940) as *D. rosei*, but it stands apart from the latter in morphology as well as geographic distribution. Plants of *D. rosei* are annual, with 1-few erect to ascending, herbaceous stems arising from a slender taproot, and with pedicels mostly 15-25 mm long, while those of *D. subrosus* are perennial, with procumbent, basally woody stems from a woody and distinctly thickened taproot, and with pedicels mostly 5-10 mm long. Schubert's addition of the term "suffrutescens" to the description of *D. rosei* surely referred to the plants of Palmer's collection, as typical *D. rosei* is strictly herbaceous. *Desmodium rosei* occurs in southern Arizona, southwestern New Mexico, Sonora, and western Chihuahua, distantly separated from the populations of *D. subrosus* in Zacatecas and Nuevo León. The close morphology of the members of this allopatric, annual/perennial pair marks them as sister species.

Desmodium subrosus is one of fourteen species known from the state of Nuevo León, each listed below with a brief description of its geographic range. Many species of *Desmodium* have wide ranges; eight of those from Nuevo León



Map 1. Geographic distribution of *Desmodium subrosom*.

occur in the region of Novo-Galiciana and are treated in detail by McVaugh (1987), these marked with an asterisk in the following account. Six of these species also have been included by Estrada & Marroquin (1992) in their account of Fabaceae from south-central Nuevo León.

1. *Desmodium aparines* (Link) DC.*

Apparently rare in Nuevo León, south to Puebla, Oaxaca, Chiapas, and Central America, west to Michoacán and Jalisco.

2. *Desmodium caripense* (Kunth) G. Don

The reference to *Desmodium paniculatum* (L.) DC. in México by Estrada & Marroquin (1992), and perhaps also by Schubert (1970), were in regard to this species, which ranges from sierran Nuevo León (as far north as Monterrey) and Tamaulipas southward through San Luis Potosí and Veracruz to Central and South America (the type from Venezuela). Compared to *D. paniculatum*, plants of *D. caripense* have shorter, basally ascending stems often arising from slender rhizomes, with the leaves clustered toward the stem base.

3. *Desmodium glutinosum* (Muhl. ex Willd.) A. Wood

Known from several collections in the sierra of Nuevo León (vicinity of Monterrey southward) and adjacent Tamaulipas, extending southward in México through San Luis Potosí into Puebla (Schubert 1970). This species is widespread in rich woods in the eastern United States, as far west as Kansas, Oklahoma, and northeast Texas (see Turner 1959), where it is more than 800 kilometers disjunct from the nearest populations in México.

4. *Desmodium grahamii* A. Gray*

Common in the sierra of Nuevo León and adjacent Tamaulipas, northward through Coahuila to trans-Pecos Texas and in Arizona; widespread in México.

5. *Desmodium hartwegianum* Hemsley var. *amans* (S. Wats.) Schubert*

Scattered at low elevation in sierran Nuevo León, south through San Luis Potosí (the type locality of var. *amans*) to Guatemala, west to Nayarit and Durango. The status of the two, broadly sympatric varieties of this species needs to be re-evaluated.

6. *Desmodium lindheimeri* Vail

Relatively common in Nuevo León, south into San Luis Potosí, northwest to Coahuila; also on the Edwards Plateau of south-central Texas, where it has been known only from the type locality (see Turner 1959) until recently.

7. *Desmodium lineatum* DC.

Noted by Schubert (1970) to occur in Nuevo León; otherwise in sandy woods on the United States coastal plain from east Texas to Florida and Maryland.

8. *Desmodium molliculum* (Kunth) DC.*

Scattered in the sierra of Nuevo León and adjacent Tamaulipas, mostly on the eastern slope; more common across south-central México, into Central and South America.

9. *Desmodium macrostachyum* Hemsley*

Uncommon in sierran Nuevo León, south to Guerrero and Oaxaca and then northwestward to Jalisco and Chihuahua.

10. *Desmodium neomexicanum* A. Gray*

Apparently rare in Nuevo León, but much more abundant westward in México, northwestward into trans-Pecos Texas, New México, and Arizona.

11. *Desmodium psilophyllum* Schlecht.

Common in Nuevo León, south through eastern México to Guatemala, west and northwest to trans-Pecos Texas and Arizona, Coahuila, Chihuahua, and Durango.

12. *Desmodium subrosum* Nesom

This species has the most restricted geographic range of those from Nuevo León (see detailed comments above and Map 1).

13. *Desmodium tortuosum* (Sw.) DC.*

Rare in central Nuevo León; scattered across the southeastern United States from east Texas and scattered through México into Central and South America.

14. *Desmodium retinens* Schlecht.*

Common in the sierra of Nuevo León and adjacent Tamaulipas, extending southward to Hidalgo, westward from there into the Novo-Galiciana area (McVaugh 1987) and then northward into Arizona. This species was identified as *Desmodium neomexicanum* by Estrada & Marroquin (1992).

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**RANUNCULUS (RANUNCULACEAE) IN NUEVO LEÓN, MEXICO, WITH
COMMENTS ON THE *R. PETIOLARIS* GROUP**

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ABSTRACT

Three relatively widespread taxa of *Ranunculus* are recorded from Nuevo León, México: *R. peruvianus*, *R. petiolaris* var. *arsenei*, and *R. petiolaris* var. *sierrae-orientalis*. A rationale is presented for recognizing both of the latter as distinct species: *R. fasciculatus* Sessé & Moc. and *R. sierrae-orientalis* (Benson) Nesom, *comb. nov.*, respectively. The primarily Mexican *R. petiolaris* var. *trahens* is broadly sympatric in south-central México with *R. petiolaris* (var. *petiolaris sensu lato*) as well as *R. fasciculatus* and consistently distinguished from both; var. *trahens* is elevated to specific rank as *R. trahens* (T. Duncan) Nesom, *comb. nov.* The remainder of the *R. petiolaris* complex in México is a variable group of plants that appears to comprise more than one evolutionary entity.

KEY WORDS: *Ranunculus*, Ranunculaceae, Nuevo León, México

In curation and identification of LL,TEX *Ranunculus* from northeastern México, the occurrence of three taxa is recorded from the state of Nuevo León: *R. peruvianus* Pers., *R. petiolaris* Kunth ex DC. var. *sierrae-orientalis* Benson, and *R. petiolaris* var. *arsenei* (Benson) T. Duncan. *Ranunculus cymbalaria* Pursh was collected in 1898 immediately adjacent to Nuevo León in the vicinity of Saltillo, Coahuila (*Palmer 178* [US!]), and it might be expected to occur in the area of high peaks immediately to the east of that city. The distribution of *R. cymbalaria* is primarily circumboreal in the northern hemisphere, occurring sporadically at high elevations into the western United States, southward into México, and extending into the Andean region of South America. *Ranunculus peruvianus* occurs in the areas of highest elevation in Nuevo León and southeastern Coahuila (Map 1). From that region, it is disjunct to the northern limit of its distribution in the Sierra del Carmen in northwestern

Coahuila. South from Nuevo León, it occurs in the Sierra de Guatemala of Tamaulipas, the high volcanic peaks of southeastern México (Veracruz, Edo. México, Oaxaca) and scattered localities through Central America into its primary range in Andean South America.

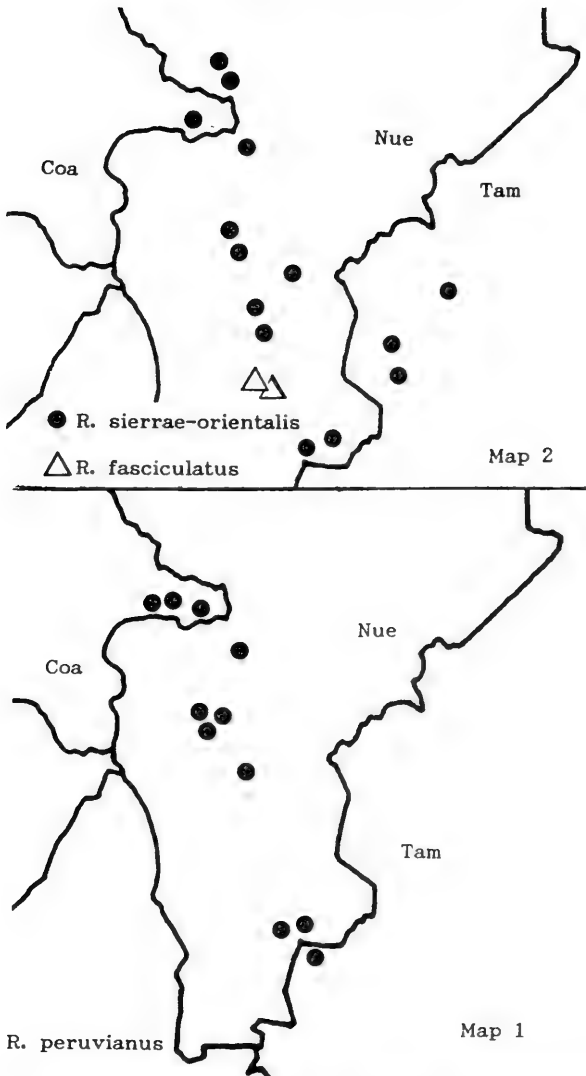
In contrast to the distinctive *Ranunculus cymbalaria* and *R. peruvianus*, the biological limits and taxonomy of the varieties of *R. petiolaris*, a member of the *R. hispidus* Michx. complex (*sensu* Duncan 1980), are subject to somewhat broad reinterpretation. Benson's concepts (1948) of *R. petiolaris* and taxa closely resembling it were significantly altered by Duncan (1980). It is difficult to reconcile the nomenclature of these two students of the genus, but Duncan's simpler treatment appears to be mostly effective in dealing with the patterns of variation. Duncan's conceptual modification of typical *R. petiolaris* appears to be justifiable (at least in part), but it is suggested below that var. *petiolaris sensu* Duncan may be more complex than allowed by him. The concept of var. *sierrae-orientalis* is returned to the strict sense originally proposed by Benson.

Status of *Ranunculus petiolaris* var. *sierrae-orientalis* :

Var. *sierrae-orientalis* in Coahuila, Nuevo León, and Tamaulipas (Map 2) is notably constant in morphology. The type of the taxon is from Tamaulipas (Map 2), and populations from this region of northeastern México constitute var. *sierrae-orientalis sensu stricto* (see further comments below). The strong contrast between var. *sierrae-orientalis* and var. *arsenei* is outlined in the following couplet, which also serves as a summary of their morphology. These characterizations are drawn from 30 specimens (LL,TEX,US) of var. *sierrae-orientalis* (from Coahuila, Nuevo León, and Tamaulipas), 2 (TEX) of var. *arsenei* (from Nuevo León), and many of the latter from over its range.

1. Leaves 3-parted or 3-foliolate, if compound then leaflets sessile or nearly so, main segments broadly ovate to obovate, coarsely toothed to shallowly lobed; petals 5-6; achene faces with numerous low papillae, each papilla producing a minute, erect hair; style slender from the base, arising almost immediately from the achene margin. var. *sierrae-orientalis*
1. Leaves (3-)5 foliolate, terminal leaflets almost always distinctly stalked, main segments narrowly rectangular to linear, deeply lobed; petals 10-16(-18); achene faces smooth, rarely with papillae; style arising from a thickened, triangular-deltate base. var. *arsenei*

Benson (1948) defined var. *sierrae-orientalis* as an endemic of northeastern México, but Duncan (1980) viewed it as continuing southward into Guanajuato, Hidalgo, Veracruz, Puebla, and Oaxaca. Plants of the *Ranunculus*



Map 1 (above). Distribution of *Ranunculus peruvianus* in northeastern México. The northernmost populations in northwestern Coahuila are not shown.
Map 2 (below). Distribution of *Ranunculus sierrae-orientalis* and *R. fasciculatus* in northeastern México. See text for further comments.

petiolaris complex from this more southern region (including the type locality of *R. petiolaris* in Veracruz), have been annotated by Duncan both as var. *sierrae-orientalis* and var. *petiolaris*. These plants are non-stoloniferous and produce achenes with relatively few papillae and thin-based styles as in var. *sierrae-orientalis*, but the leaves have stalked, narrow, deeply lobed segments similar to var. *arsenei*, and the flowers produce (5-)8-12 petals. The specimen of "var. *sierrae-orientalis*" illustrated by Duncan (Fig. 47) is from Puebla and is atypical of var. *sierrae-orientalis* sensu stricto in its large number of petals as well as its leaf morphology. Such plants are also outside the limits of var. *petiolaris* sensu Duncan, which Duncan (p. 74) noted has "petals 5, rarely greater than 5;" his annotations create a strong inconsistency with this characterization. It appears that there may be more than one evolutionary entity among these plants (*R. petiolaris* sensu stricto and some other), but their identification is unclear and needs to be reinvestigated.

Var. *sierrae-orientalis* was distinguished by Duncan (1980) from var. *petiolaris* by a receptacular ridge at the base of the gynoeceal region (vs. unridged in var. *petiolaris*) and an obovate (vs. flabellate) nectary scale. The small receptacular difference, however, appears to be inconsistent, and it is observed only on receptacles from which achenes have been released, a relatively uncommon characteristic of most collections. Further, the nectary scales in most plants of both varieties appear to be more obovate than flabellate, and Duncan's own illustrations of the nectary scales of these two taxa (Figs. 41c and 47c) also appear to contradict the putative distinction.

In summary, var. *sierrae-orientalis* is viewed here as a distinct species, clearly a member of the *Ranunculus petiolaris* complex but highly consistent in its own morphology while morphologically and geographically separated from its closest relatives.

Ranunculus sierrae-orientalis (Benson) Nesom, *comb. et stat. nov.* BA-
 SIONYM: *Ranunculus petiolaris* Kunth ex DC. var. *sierrae-orientalis*
 Benson, Amer. Midl. Naturalist 40:89. 1948.

Status of *Ranunculus petiolaris* var. *arsenei* and var. *trahens*

Ranunculus petiolaris var. *arsenei* from Nuevo León (Map 2) is represented by two collections, which significantly increase its geographic range past that shown by the distribution map in Duncan (1980): Nuevo León. Mpio. Aramberri: El Barreno, swamp in cedar forest, 1535 m, 5 Jul 1980, *Hinton 17863* (TEX); San Juan de Aviles, marsh in oak woods, 1480 m, 13 May 1992, *Hinton 21954* (TEX). Several general collections (LL, TEX) of var. *arsenei* from San Luis Potosí make its range more continuous southward from Nuevo León; Duncan did not map specimens of this taxon from San Luis Potosí, although

the type of *R. pringlei* Briq., which he cited as a synonym of var. *arsenei*, was collected from that state. The range of var. *arsenei* extends southward into Puebla and central Oaxaca, westward to Jalisco and Nayarit, and then northward up the sierra through Durango, Sonora, and Chihuahua into Arizona and the Davis Mountains of trans-Pecos Texas. The number of petals in var. *arsenei* commonly ranges up to 18, and this feature usually provides an immediate clue to the identity of this taxon.

In Duncan's view (1980, p. 74), "The varieties in *Ranunculus petiolaris* are recognized on the basis of minor morphological differences which correlate with altitudinal and/or habitat differences. In general, strong geographical overlap occurs in México and Guatemala between the wide-ranging *R. petiolaris* var. *petiolaris* and other varieties." Indeed, *R. petiolaris* var. *petiolaris* (sensu Duncan, and including a portion of var. *sierrae-orientalis* sensu Duncan) and var. *arsenei*, as well as var. *trahens* Duncan, are all broadly sympatric across the Mexican trans-volcanic region in the states of México, Michoacán, and Jalisco, but I have found no indication of the existence of ecological or phenological differences on numerous specimens of these taxa at LL, TEX, and US. Nor did Duncan (1980) provide any such indication in his characterizations of these taxa.

A partial clarification of the biological and taxonomic problem implied here can be provided by recognition of *Ranunculus petiolaris* var. *arsenei* as a distinct species. It has been described at that rank at least five times by previous botanists, according to the synonymy listed by Duncan. Benson (1948) treated it at varietal rank, but within *R. macranthus* Scheele, removed from the *R. petiolaris* complex. It is notable that Duncan found that var. *arsenei* and *R. macranthus* produce a flavonoid compound not found in any other species of the *R. hispidus* complex. According to Duncan (1980), the earliest name for var. *arsenei* at the higher rank is *R. fasciculatus* Sessé & Moçino (in contrast to *R. fascicularis* Muhl. ex Bigel., a widespread species of the eastern United States).

As a further taxonomic modification within this primarily Mexican group of broadly sympatric entities, the proposal is made here to recognize *Ranunculus petiolaris* var. *trahens* at specific rank. These plants are similar to *R. petiolaris* (sensu stricto) in achene morphology, but their flowers produce 8-11 petals (apparently never 5), and they are consistently different from typical *R. petiolaris* in their stoloniferous habit, producing no erect stems. Benson (1948) treated stoloniferous plants of this species complex (sensu Duncan) as *R. petiolaris*, assigning the non-stoloniferous forms mostly to categories within *R. geoides* Kunth and *R. pilosus* Kunth, but the original illustration of *R. petiolaris* by Kunth (in H.B.K., *Nov. Gen. Sp.*, 1821, pl. 428) gives no indication that the plant produced stolons. Duncan's var. *trahens* produces slender, lateral, stoloniform branches and apparently can be recognized even from herbarium specimens where the plants lack the basal portions. As ob-

served by Benson (1948, p. 87), "capability of the plants to produce roots at the nodes of the stems or lack of it is a character of unfailing constancy in all of the cases the writer has had an opportunity to investigate thoroughly in the field."

Ranunculus trahens (T. Duncan) Nesom, *comb. nov.* BASIONYM: *Ranunculus petiolaris* Kunth ex DC. var. *trahens* T. Duncan, Univ. Calif. Publ. Bot. 77:78. 1980.

The following key summarizes the morphology and taxonomy of the Mexican taxa of the *Ranunculus petiolaris* complex, according to their definitions as suggested in the present study.

1. Plants stoloniferous, stems all lateral; petals 8-11; achene faces papillate; style arising from a slender base. *R. trahens*
1. Plants not stoloniferous, stems erect; petals 5-16; achene faces smooth or papillate; style arising from a slender or broadly thickened base. ... (2)
 2. Petals 10-16(-18); achene faces smooth, rarely with papillae; style arising from a thickened, triangular-deltate base. .. *R. fasciculatus*
 2. Petals 5-12; achene faces with low papillae, each papilla producing a minute, erect hair; style slender from the base, arising almost immediately from the achene margin. (3)
3. Leaves 3-parted or 3-foliolate, if compound then leaflets sessile or nearly so, main segments broadly ovate to obovate, coarsely toothed to shallowly lobed; petals 5-6. *R. sierrae-orientalis*
3. Leaves (3-)5 foliolate, terminal leaflets almost always distinctly stalked, main segments narrowly rectangular to linear, deeply lobed; petals (5-) 8-12. *R. petiolaris* s.l.

Comments on the *Ranunculus hispidus* complex

A situation apparently analogous to that of the sympatric varieties of *Ranunculus petiolaris* exists within *R. hispidus* Michx. of the eastern United States (both species *sensu* Duncan 1980). *Ranunculus hispidus* var. *hispidus* and var. *caricetorum* (E. Greene) T. Duncan are relatively similar and have mostly separate (though somewhat overlapping) geographic ranges. *Ranunculus hispidus* var. *nitidus* (Ell.) T. Duncan, however, is morphologically separated from both var. *hispidus* and var. *caricetorum* by its production of

stolons, reflexed sepals, and distinctly wide-margined achenes. Var. *nitidus* is a widespread taxon broadly sympatric with var. *hispidus*, although, as noted by Duncan, the two differ in ecological preference and the margins of their ranges are different in extent. Duncan did not mention the occurrence of intermediates between these two taxa and there are relatively few problems in separating them when full plants or fruiting specimens are available. Var. *nitidus* was treated as *R. septentrionalis* Poir. var. *pteroctopus* Benson by Gleason & Cronquist (1963) but as *R. carolinianus* DC. by Radford *et al.* (1964), both of the latter listed as synonyms of var. *nitidus* by Duncan (1980). Gleason & Cronquist (1991) later adopted Duncan's treatment of *R. hispidus* as comprising three varieties, including var. *nitidus*. Evidence suggests, however, that var. *nitidus* and var. *hispidus* are closely similar entities but geographically overlapping and genetically isolated. Their broad sympatry and relatively constant morphology imply that even if the isolation is not complete, it is effective to a significant degree, and treatment of "var. *nitidus*" at specific rank appears to be justified (although what name should apply to the species is not clear). As surmised in the present paper, taxonomic difficulties in more than one group of *Ranunculus* are correlated with small morphological differences among closely related but distinct species.

ACKNOWLEDGMENTS

I thank the staff of US for help during a recent visit, Billie Turner for his review of the manuscript, and especially Alan Whittemore for his detailed comments.

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LECTOTYPIFICATION OF *AEGINETIA SACCHARICOLA*
(OROBANCHACEAE)

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ABSTRACT

A lectotype is designated for *Aeginetia saccharicola* Bakh. (Orobanchaceae).

KEY WORDS: *Aeginetia*, Orobanchaceae, Indonesia

In describing *Aeginetia saccharicola* Bakh. as a new species in the family Orobanchaceae, Bakhuizen van den Brink (1933) designated four syntypes but no holotype. All are housed at the Herbarium Bogoriense (BO) in Bogor, Indonesia, where I observed them. *Kobus 1910* is hereby designated as lectotype because of the better condition and greater quantity of preserved material.

Aeginetia saccharicola Bakh., Bull. Jard. Bot. Buitenzorg, ser. III, 13:87. 1933. LECTOTYPE: Java, Res. Soerakarta, Radjatawa, 1905, *Kobus 1910* (BO!). PARATYPES: Res. Madioen, Poerwodadi, prope Magetan, alt. 400 m, 31 May 1924, *J.H. Koert s.n.* (BO!); same site, 11 June 1924, *R. van Iterson A* (BO!); same site, 30 June 1924, *R. van Iterson B* (BO!).

ACKNOWLEDGMENTS

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ARENARIA HINTONIORUM (CARYOPHYLLACEAE), A NEW GYPSEOUS SPECIES FROM SOUTHERN NUEVO LEON, MEXICO

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ABSTRACT

A new species of *Arenaria*, *A. hintoniorum* B.L. Turner, is described from southern Nuevo León, where it is confined to gypseous outcrops. It is related to *A. lanuginosa* but differs in having nearly glabrous foliage and essentially linear leaves (1.0 mm wide or less).

KEY WORDS: Caryophyllaceae, *Arenaria*, gypsum, México

Routine identification of Mexican plants has revealed the following novelty.

***Arenaria hintoniorum* B.L. Turner, sp. nov.** TYPE: MEXICO. Nuevo León: Mpio. Aramberri, along road from La Escondida to Aramberri, scattered plants on gypsum hillsides, 1330 m, 23 Oct 1993, *G.B. Hinton et al.* 29706 (HOLOTYPE: TEX).

Arenariae lanuginosae (Michx.) Rohrb. similis sed foliis linearibus vel anguste lineari-lanceolatis 0.5-1.0 mm latis marginibus glabris vel minute hispidis, floribus minoribus, et seminibus minoribus brunneisque differt.

Stiffly erect or sprawling perennial herbs 1-2 dm high. Stems minutely hispidulous with downcurved hairs, appearing glabrous to the unaided eye. Leaves linear to linear-lanceolate, 10-15 mm long, 0.1-1.0 mm wide, glabrous or nearly so, the margins entire. Flowers mostly arranged 5-11 in rather strict terminal cymes, the pedicels glabrous, 10-25 mm long. Sepals ca. 2.5 mm long, glabrous, the margins scariosus. Petals 4-5, narrowly ovate, white, 2.5-3.0 mm long, the apices often revolute. Stamens 8-10, ca. 3 mm long, the anthers white. Ovary ovoid, ca. 2 mm long, glabrous; styles 2-3, separate ca. 1.5 mm

long. Capsule 5-valvate, ca. 3 mm long. Seeds brown, 0.5-0.6 mm long, ca. 0.5 mm wide, the lateral surfaces smooth, the dorsal sides \pm granular ornate, especially near the hilum.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Nuevo León: Mpio. Aramberri, gypsum hillside, 1145 m, 16 Jun 1990, *G.B. Hinton et al. 20383* (TEX). Tamaulipas: 18 mi SE of Bustamante towards Tula, 1700 m, "possibly slightly gypseous" soils, 1700 m, 20 May 1973, *Johnston et al. 11159A* (LL).

This taxon is superficially similar to *Arenaria lanuginosa* (Michx.) Rohrb., and when first encountered (*Hinton 20383*) I took the plants concerned to be depauperate or freak forms of that species. The more recent collections clearly differ from *A. lanuginosa* in having essentially linear, nearly glabrous leaves (vs. elliptic to lance-elliptic), minutely hispidulous vestiture (vs. puberulous or pilose), and smaller brown seeds (ca. 0.5-0.6 mm long vs. 0.7-0.8 mm). *Arenaria lanuginosa* occurs in the general region of *A. hintoniorum*, but so far as known the former occurs in pine-oak forests at higher elevations (1600-3200 m) in calcareous soils or among limestone outcrops.

The collection from Tamaulipas cited above has somewhat broader leaves than the Nuevo León collections (0.5-1.0 mm wide vs. 0.1-0.5 mm) with a more hispidulous pubescence, but it has the flowers and seeds of *Arenaria hintoniorum*, hence its inclusion here.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnosis, and to him and Alan Prather for reviewing the manuscript.

**AGERATINA ACEVEDOANA (ASTERACEAE, EUPATORIEAE), A NEW
SPECIES FROM NORTHERN DURANGO**

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ABSTRACT

A new species of *Ageratina*, *A. acevedoana* B.L. Turner, is described from northern Durango, México. It belongs to the subgenus *Ageratina* and relates to a group of glandular-pubescent taxa centering about *A. parryana*.

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

Routine identification of Mexican Asteraceae has revealed the following novelty.

***Ageratina acevedoana* B.L. Turner, sp. nov.** TYPE: MEXICO. Durango: 10 km de Canelas, por la camino a Santiago Papasquiario, "Laderas sombreadas en bosque alto de pino-encino", 1060 m, *S. Acevedo y D. Bayona 190* (HOLOTYPE: TEX!; Isotype: CIIDIR).

Ageratinae parryanae (Espinosa) B.L. Turner similis sed foliis midcaulinis minoribus late ovatis vel deltoideis (vs. cordatis), capitulis congestioribus (3-4 cm latis vs. 10-15 cm), et vestimento trichomatibus glandulosis 0.5-1.0 mm altis (vs. 0.2-0.4 mm).

Perennial herbs 30-50 cm high. Stems densely glandular-pilose, the hairs 0.6-1.3 mm long. Leaves opposite throughout, gradually reduced upwards, those at midstem 10-15 cm long, 4-5 cm wide; petioles 4-6 cm long, pubescent like the stem; blades broadly ovate to deltoid, 3-5 nervate from the base, glandular-pilose, more so above, the margins coarsely crenulodentate. Heads 5-20 in terminal corymbs, the ultimate peduncles glandular-pilose, mostly 3-10 mm long. Involucres turbocampanulate, 5-6 mm high, 6-10 mm wide (pressed),

glandular-pubescent, the bracts linear-lanceolate with acute apices. Receptacle convex, epaleate, glabrous. Florets numerous (80+), the corollas 3.5-4.0 mm long; tubes ca. 1.5 mm long, glabrous; throats abruptly ampliate, ca. 2 mm long, the lobes mostly with at least a few multiseptate trichomes. Achenes fusiform, ca. 1.6 mm long, sparsely hispidulous, the pappus of numerous readily deciduous bristles ca. 3 mm long.

ADDITIONAL SPECIMEN EXAMINED: MEXICO. Durango: Same locality as type, 2060 m, 10 Mar 1987, *S. Acevedo 199* (TEX).

Ageratina acevedoana belongs to the subgenus *Ageratina* where it relates to a number of glandular-pubescent species of western México including *A. gentryana* B.L. Turner, *A. warnockii* B.L. Turner, and *A. parryana* (Espinosa) B.L. Turner. It appears most closely related to the latter, which occurs in the states of Michoacán, México, and Guerrero, in having similar long-petiolate leaves with a similar glandular-pubescent vestiture. It differs in having smaller ovate to subcordate leaves and much-reduced capitulescences.

It is a pleasure to name this taxon for its principal collector Ms. S. Acevedo, one of the more active collectors of Durango and associated areas.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnosis, and to him and T.P. Ramamoorthy for reviewing the manuscript.

A NEW SPECIES OF *ACOURTIA* (ASTERACEAE, MUTISIEAE) FROM
NUEVO LEON, MEXICO

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ABSTRACT

A new species of *Acourtia*, *A. hintoniorum* B.L. Turner, is described from southern Nuevo León, México. It is closely related to *A. tomentosa* from southern Puebla, México but differs in being a robust herb 0.6-1.5 m high (vs. 0.2-0.4 m high) with larger heads, more numerous florets, and larger nearly glabrate achenes.

KEY WORDS: Asteraceae, Mutisieae, *Acourtia*, México, Nuevo León

Identification of newly assembled plants from Nuevo León, México has revealed the following novelty.

Acourtia hintoniorum B.L. Turner, *sp. nov.* TYPE: MEXICO. Nuevo León: Mpio. Aramberri, between La Escondida and Josecito, large colony along roadside in cultivated field among open areas of oak woodland, 2340 m, 13 Nov 1993, *G.B. Hinton et al. 29994* (HOLOTYPE: TEX).

Acourtiæ tomentosæ (Brandeg.) King & Robins. similis sed plantis robustioribus (0.6-1.0 m altis vs. 0.2-0.4 m) foliis ad midcaulem majoribus (5-60 cm longis vs. 3-5 cm) et capitulis majoribus flosculis numerosioribus (ca. 50 vs. plus quam 100) acheniis 8-10 mm longis fere glabris (vs. 5-6 mm longis dense glandulosis) differt.

Stiffly erect suffruticose herbs 0.6-1.5 m high. Midstems densely tomentose, 5-6 mm across. Leaves numerous, gradually reduced upwards, not much overlapping, those at midstem elliptic to ovate-elliptic, mostly 5-10 cm long, 3-5 cm wide, glabrate above, densely tomentose beneath, the margins serrulate. Heads very large, terminal, nearly sessile, forming 1-5 headed cymes by

branching of upper primary shoots. Involucres tomentose, campanulate, 2-3 seriate, the bracts subequal, 2.0-2.5 cm high, 2.3-3.0 cm wide, the outer series ovate and grading into the leaves. The inner series linear-lanceolate, gradually acuminate. Receptacle convex, epaleate, glabrous, 6-8 mm across, ca. 3 mm high. Florets numerous (100 +), the corollas purple, bilabiate. Achenes fusiform, ca. 9-ribbed, 8-10 mm long, glabrous except for a few minute atomiferous-glandular hairs near their apices.

ADDITIONAL SPECIMEN EXAMINED: MEXICO. Nuevo León: Mpio. Zaragoza, N side of Peña Nevada at "Puerto Pinos" and junction with road to Joya de San Diego, oak woods, 2560 m, 23 Aug 1989, *Nesom 7106* (TEX).

This taxon was first collected by Dr. Guy Nesom in 1989 and distributed as *Acourtia tomentosa* Brandeg. (known only from southern Pueblo, México), which it superficially resembles. The following couplet will distinguish between these:

Robust herbs 0.6-1.5 m high; midstem leaves mostly elliptic, 5-10 cm long; achenes 8-10 mm long; S Nuevo León. *A. hintoniorum*

Low herbs 0.2-0.4 m high; midstem leaves mostly ovate to ovate-elliptic, 3-5 cm long; achenes 5-6 mm long; S Puebla. *A. tomentosa*

According to Nesom (pers. comm.) *Acourtia hintoniorum* is a very robust plant up to 1.5 m high, although label data on the type specimen reports the height as ca. 0.6 m. Regardless, the taxon is clearly much taller and more robust than the type of *A. tomentosa* (UC!). *Acourtia hintoniorum* has midstems 5-6 mm thick (vs. 2-3 mm); in addition, the heads are larger with more numerous florets (ca. 100 + vs. ca. 50), and possess larger nearly glabrous achenes.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnosis, and to him and Mark Mayfield for reviewing the manuscript.

**TWO NEW SPECIES OF *GIBASIS* (COMMELINACEAE) FROM NUEVO LEÓN,
MEXICO**

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ABSTRACT

Two new species of *Gibasis*, *G. gypsophila* B.L. Turner and *G. hintoniorum* B.L. Turner, are described from southern Nuevo León, México, the former occurring in gypseous soils, the latter in calcareous.

KEY WORDS: Commelinaceae, *Gibasis*, México, Nuevo León

Routine identification of collections by Hinton *et al.* from southern Nuevo León, México has revealed the following novelties.

Gibasis gypsophila B.L. Turner, *sp. nov.* TYPE: MEXICO. Nuevo León: Mpio. Galeana, along road between La Poza and Río de San José, gypsum cliff, 1365 m, 1 Jul 1992, *G.B. Hinton et al.* 22082 (HOLOTYPE: TEX!).

Gibasi pellucidae (Mart. & Gal.) D.R. Hunt similis sed petalis caeruleis vel modice caeruleis (vs. albis) et foliis latioribus penitus glabris subsucculentisque differt.

Perennial, glabrous herbs 40-60 cm high, the roots unknown. Stems erect, glabrous. Midstem leaves succulent, glabrous, mostly broadly ovate-lanceolate to subcordate, spirally arranged, 4-7 cm long, 2-4 cm wide, the apices acute, sheathing for 2-6 mm. Flowers arranged terminal or subterminal, 3-5-nate, the pedicels glabrous mostly 6-10 mm long. Sepals 3, ovate to ovate-elliptic, glabrous, 5-6 mm long. Petals 3, blue or bluish-white, separate, obovate, 6-7 mm long. Stamens 6, ca. as long as or somewhat shorter than the petals; filaments moderately pubescent with long, uniseriate trichomes; anthers ca. 1.5 mm across, the connective ca. 1 mm wide, 0.4 mm high. Ovary ca. 3

mm high, sparsely pubescent near apex, style ca. 4 mm long; stigma capitate. Fruiting material absent.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Nuevo León: Mpio. Aramberri, along road between Aramberri and El Saitre, gypsum hillside, 1325 m, 26 Oct 1993, *Hinton et al.* 23758 (TEX). Mpio. Galeana, along road between La Poza and San José, by stream in gypsum hills, 1320 m, 1 Sep 1992, *Hinton et al.* 22376 (TEX). Mpio. Zaragoza, Cerro Viejo, pine-oak woods, 1685 m, 22 Sep 1993, *Hinton et al.* 23406 (TEX); Cerro Viejo, pine-oak woods, 1990 m, 22 Sep 1993, *Hinton et al.* 23482 (TEX).

This species superficially resembles *Gibasis pellucida* (Mart. & Gal.) D.R. Hunt but is substantially different in possessing much broader, absolutely glabrous, subsucculent leaves and blue or bluish petals. Excepting the two collections from Cerro Viejo (cited above), for which substrate data are lacking, this taxon appears to be largely confined to gypseous soils. In Hunt's (1986) treatment, *Gibasis gypsophila* will not key to *G. pellucida* because of its bluish corollas, but in spite of their corolla and vegetative differences, as noted above, the two species seem closely related by inflorescence and floral characters.

Gibasis hintoniorum B.L. Turner, *sp. nov.* TYPE: MEXICO. Nuevo León: Mpio. Aramberri, W of La Soledad, shrubby limestone hillside, 1670 m, 23 Jul 1993, *G.B. Hinton et al.* 23019 (HOLOTYPE: TEX).

Gibasi karwinskyanae (Schultes) Rohw. similis sed plantis subacaulescentibus (ca. 10 cm altis) foliis paucioribus subsucculentis penitus glabrisque differt.

Perennial, tuberous-rooted, glabrous herbs ca. 10 cm high. Roots forming a fasciculum of ca. 20 fusiform tubers, after drying the tubers 3-6 cm long, ca. 0.8 cm wide. Primary stem ca. 4 cm long, glabrous. Leaves lanceolate, 6-8 cm long, 1.6-2.0 cm wide. Inflorescences both pseudoterminal and axillary, the common peduncles 3-4 cm long, these terminated by two much-reduced, leaf-like bracts 1-2 cm long. Flowers mostly 3-8, arranged in fasciculate, umbel-like units, the ultimate pedicels mostly 6-10 mm long. Sepals green with scarious margins, broadly ovate, ca. 6 mm long, 3-5 mm wide, glabrous. Petals "blue" to "purple-pink", broadly obovate, 8-9 mm long, 6-7 mm wide, not clawed. Stamens 6, the filaments ca. 4 mm long, densely pubescent for ca. 2/3 of their lower length with purple multiseptate trichomes, the anther thecae oval, yellow, their connectives trapezoidal, ca. 0.6 mm broad, ca. 0.3 mm high. Ovary glabrous, the style ca. 2 mm long, the stigma penicellate-capitate. Mature capsules not available.

At first glance, because of its dwarf habit and succulent basal leaves, this species looks to be a *Tradescantia*. However, it has the inflorescence of *Gibasis*

as delimited by Hunt (1986). In the latter treatment, *G. hintoniorum* will key, if at all, to *G. consobrina* D.R. Hunt to which it bears little resemblance. In the diagnosis, I have compared *G. hintoniorum* with *G. karwinskyana* (Schultes) Roem., because both species occur in the vicinity of Aramberri and both possess tuberous roots, but habitally and in branching patterns of the inflorescence they seem markedly different. While numerous collections of *G. karwinskyana* are known from southern Nuevo León and closely adjacent Tamaulipas (LL,TEX), none of these approaches *G. hintoniorum*, the latter known only from type material.

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnoses, and to him and John Clement for reviewing the manuscript.

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A NEW SPECIES OF *LOTUS* SECT. *HOSACKIA* (FABACEAE) FROM NUEVO LEON, MEXICO

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ABSTRACT

A new species of *Lotus*, *L. hintoniorum* B.L. Turner, is described from southern Nuevo León, México. It belongs to the section *Hosackia* where it apparently has no especially close relatives.

KEY WORDS: Fabaceae, *Lotus*, *Hosackia*, México

Identification of miscellaneous legumes from northeastern México has revealed the following novelty.

***Lotus hintoniorum* B.L. Turner, *sp. nov.* TYPE: MEXICO. Nuevo León: Mpio. Zaragoza, Cerro El Viejo, 2200 m, oak and pine woods, 7 Jul 1992, *Hinton et al. 72118* (HOLOTYPE: TEX!).**

Herbae strictae 30-40 cm altae. Folia imparipinnata foliolis 7-11. Stipulae lanceolatae persistentes. Flores 2-5 umbellulis axillaribus, in pedunculis 10-15 cm longis. Legumina stricta 4.0-4.5 cm longa, 0.2-0.3 cm lata; semina in quoque legumine 12-16.

Stiffly erect perennial herbs 30-40 cm high. Stems green, striate, sparsely pilose. Midstem leaves mostly 4-6 cm long, 2.5-3.5 cm across, odd-pinnate with 7-11 leaflets, the leaflets elliptic to obovate, mostly 1.2-1.6 cm long, 0.6-0.8 cm wide, sparsely appressed-pilose. Stipules herbaceous, lanceolate, 4-6 mm long, ca. 2 mm wide, persistent, the apices not deciduous. Flowers 2-5, arranged in axillary umbels, the peduncles mostly 10-15 cm long, the ultimate pedicels strigose, 1-2 mm long. Bracts at base of pedicels 0.5-1.5 mm long, narrowly lanceolate. Calyces 6-7 mm long, 2.5-3.5 mm wide, sparsely pilose, the lobes ca. 2 mm long. Corollas reportedly "pale red" or "purple", 10-14 mm long, the claws extending beyond the calyx with age; banner broadly ovate 7-8

mm high, 5-7 mm wide, the claws ca. 6 mm long; wings ca. 12 mm long, 2-3 mm wide, the claws ca. 6 mm long; keels ca. 11 mm long, connivent apically. Anthers yellow, ca. 0.5 mm long. Stigma capitate. Pods stiffly erect, mostly 4.0-4.5 cm long, 0.2-0.3 cm wide, dehiscent at maturity, the valves somewhat twisting. Seeds 12-16 per pod, the seeds maculate, kidney-shaped, 2.0-2.5 mm long, ca. 1.5 mm wide.

ADDITIONAL SPECIMEN EXAMINED: MEXICO. Nuevo León: Mpio. Zaragoza, 2300 m, roadside mixed forests, 23 Jun 1993, *Hinton et al.* 22962 (TEX).

This markedly distinct species belongs to the section *Hosackia* (sensu Isely 1981) where it appears to have no especially close relatives. Its habit, large leaves and more numerous flowers on much longer peduncles readily distinguish it from the widespread relatively common North American *Lotus oroboides* (H.B.K.) Ottley.

ACKNOWLEDGMENTS.

I am grateful to Guy Nesom for the Latin description, and to him and Mark Mayfield for reviewing the manuscript.

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**A NEW SPECIES OF *SATUREJA* (LAMIACEAE) FROM NUEVO LEÓN,
MEXICO**

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ABSTRACT

A new species of the section *Gardoquia* of *Satureja*, *S. hintoniorum* B.L. Turner, is described and illustrated from southern Nuevo León, México. It is most closely related to *S. maderensis* Henrickson, of central Coahuila, México, both possessing purplish flowers, the remaining six North American species having yellowish-red to red or orange flowers.

KEY WORDS: *Satureja*, *Gardoquia*, Lamiaceae, México

Routine identification of Mexican of plants has revealed the following novelty.

Satureja hintoniorum B.L. Turner, *sp. nov.* Figure 1. TYPE: MEXICO. Nuevo León: Mpio. Aramberri, along road from La Escondida to San Francisco, "road cliff in shrubby hills", 2410 m, 23 Jul 1993, *Hinton et al.* 29059 (HOLOTYPE: TEX!; Isotype: MEXU).

Saturejae maderensi Henrickson similis sed differt habitu sigillatim fruticoso (vs. herbaceo), floribus minoribus in pedicellis brevioribus (1-3 mm longis vs. 3-7 mm), et pubescentia caulium pilis plerumque patenti-hispidulis (vs. valde deorsum curvatis).

Shrublets to 0.6 m high. Stems stiffly erect, brittle, the new growth brown, minutely hispidulous, the hairs ca. 0.1 mm long, the older growth (at midstem) ca. 5 mm across, with rough-shedding fissured bark. Leaves glaucous, mostly 1.5-2.0 cm long, 0.6-0.8 cm wide; petioles 4-7 mm long, hispidulous like the stems; blades ovate, abruptly tapered upon the petioles, the margins entire,

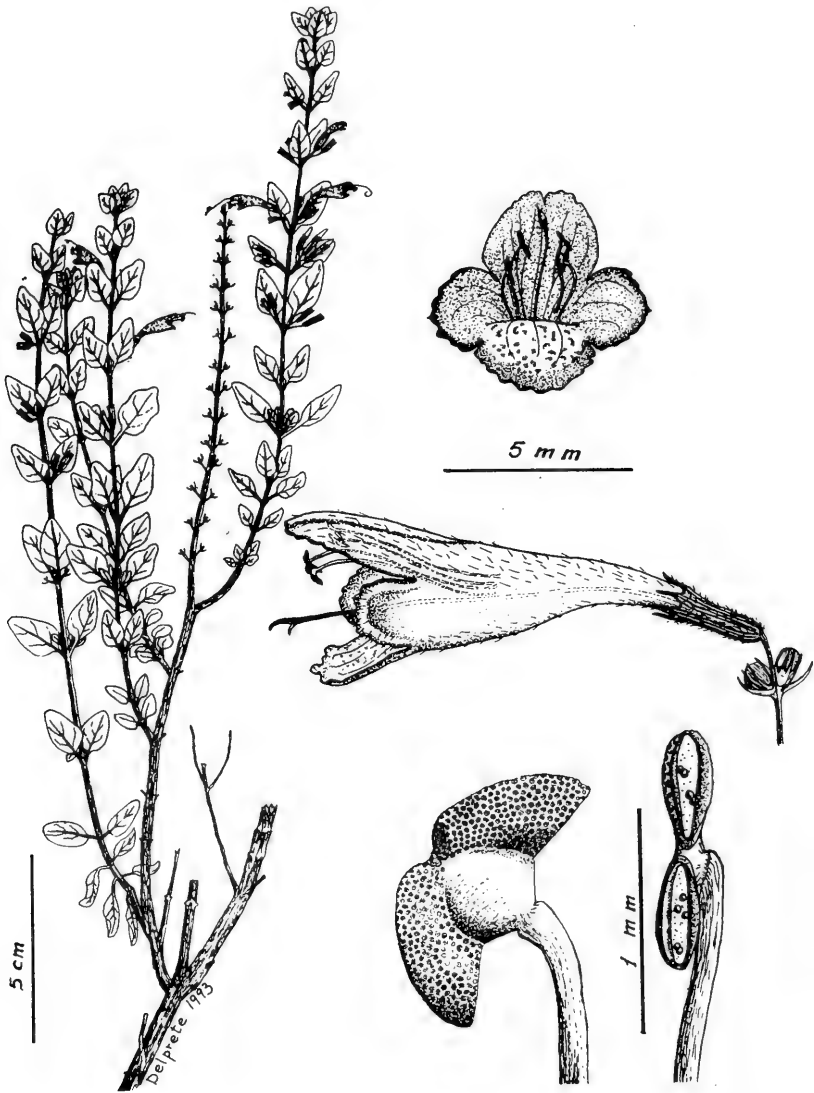


Figure 1. *Satureja hintoniorum*, from holotype.

minutely scabridulous, the lower surfaces weakly pinnately nervate, glandular-punctate. Flowers arranged on short, opposite, 3-flowered cymes along the upper branches, the common peduncles 3-4 mm long, the ultimate pedicels 1-3 mm long, the bractlets lanceolate, 1.0-1.5 mm long. Calyx cylindrical, 5-6 mm long, ca. 1 mm wide at base, ca. 1.5 mm wide just below the lobes, ca. 10-ribbed, pubescent with upturned hairs, the 5 teeth ca. 1 mm long, \pm similar, acute, inner surfaces of the lobes markedly strigose with white stiff hairs, these extending beyond the tube proper. Corolla ascending, purple, puberulent, 18-22 mm long, weakly zygomorphic, the upper 2 lobes ca. 4 mm long, fused, the lower 3 lobes 2-3 mm long. Stamens 4, at anthesis the longer pair exerted, the shorter pair about as long as the corolla or somewhat less; filaments glabrous; anther thecae divergent, purplish, ca. 0.5 mm long, separated by a triangular connective. Nutlets 4, immature.

Satureja hintoniorum is apparently most closely related to the recently described *S. maderensis* Henrickson (1981), a perennial herbaceous species of Coahuila, México, the two having very similar floral features, each with 4 stamens and nearly identical anthers. *Satureja hintoniorum*, in habit, superficially resembles members of the genus *Poliomintha*, but is readily distinguished from the latter by its 4 stamens (vs. 2) and markedly different anthers.

Satureja, as recognized by Epling & Jativa (1966), is a diverse assemblage of taxa and it is doubtful that the genus as delimited by them will withstand a more rigidly reasoned phyletic analysis, especially one based upon strongly formulated cladistic theory. Henrickson (1986) positioned *Satureja maderensis* in the small section *Gardoquia* (Ruiz & Pavon) Briq. of *Satureja* (cf. Epling & Jativa 1966; McVaugh & Schmid 1967). I can suggest no better position for *S. hintoniorum* at the present time; indeed, the species has the habit and foliage of *S. mexicana* (Benth.) Briq. and *S. seleriana* Loes., but it differs from both in having lavender or purple corollas arranged in 3-flowered cymes. More detailed analyses may show that the section *Gardoquia* is perhaps deserving of generic rank as first proposed by Ruiz & Pavon. With description of the present species, sect. *Gardoquia* in North America comprises eight species: six in México and closely adjacent Guatemala, and two in the West Indies. Of these, only *S. maderensis* and *S. hintoniorum* possess blue or lavender corollas; the remainder possess large yellowish red to orange-colored corollas.

ACKNOWLEDGMENTS

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BOOKS RECEIVED

Paleobotany and the Evolution of Plants, second edition. Wilson N. Stewart & Gar W. Rothwell. Cambridge University Press, 40 West 20th Street, New York, New York 10011-4211. xii. 521 pp. \$49.95 (hardcover). ISBN 0-521-38294-7.

Beginning with the very basic question of "What is a fossil?", this book is written as a text for upper division and graduate level university students. It is packed full with textual information supplemented by drawings and black and white photographs. After three introductory chapters that discuss fossilization processes and types, geologic time, fossil dating, and general taxonomic concepts, the book follows essentially a chronological overview of plants (also some fungi) found in the fossil record. The general chronological treatment is punctuated by discussions of the major plant taxonomic units in the order in which they appear as dominant members of any particular fossil flora. For example, essentially all discussion of ferns appears near the middle of the book with a discussion of Paleozoic ferns, this in turn followed by examination of later fern taxa, culminating with the modern fern representatives. Once the fern discussion is completed, the text returns to the Devonian Period for discussion of progymnosperms. In all, the book seems well organized and filled with information.

The Cut-Flower Garden, How to Grow your Own Flowers for Bouquets and Arrangements All Year Long. Theodore James, Jr. Photographs by Harry Haralambou. MacMillan Publishing Company, 866 Third Avenue, New York, New York 10022. xiv. 146 pp. \$30.00 (hardcover); \$37.95 in Canada. ISBN 0-02-558912-1.

This book has information on arranging flowers, which flowers might be available at any given time of year (without purchasing them from a florist), processing and preserving cut flowers, and growing flowers to place in arrangements. The bulk of the book

deals with the latter topic, and includes much information also found in many other books on flower gardening. The most valuable (because the information is not often found elsewhere) portions of the book are the chapters on cutting and conditioning flowers for lengthened vase life, forcing for early spring blooms, and drying and preservation methods. The photographs illustrating the text are excellent.

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Authors should arrange for two workers in the appropriate field to review the manuscript before submission. Copies of reviews should be forwarded to the editor with the manuscript. Manuscripts will not be published without review.

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