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A NEW SPECIES OF *LIPPIA* (VERBENACEAE) FROM SOUTH-CENTRAL MEXICO, WITH COMMENTS ON RELATED AND PERIPHERAL SPECIES

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ABSTRACT

A relatively widespread and well-collected species of *Lippia* in south-central México (Colima and southeastern Jalisco through Michoacán to Morelos, Edo. México, and Distrito Federal) is described here as *L. mexicana* Nesom, *sp. nov.* The new species has mistakenly been identified as *L. umbellata*, the latter in turn commonly identified by one of its synonyms, *L. pringlei*. The close and problematic similarity of *L. umbellata* and *L. torresii* is discussed.

KEY WORDS: *Lippia*, Verbenaceae, México

In his studies of Mexican Verbenaceae, Moldenke has consistently identified as *Lippia umbellata* Cav. a species with a strictly axillary inflorescence, the pedicellate heads arising in clusters of 1-4 from the upper leaf axils. Yet the illustration of *L. umbellata* by Cavanilles (see citation below) shows a plant with an inflorescence of heads in umbel-like clusters above the level of the well-developed leaves. Cavanilles's plant is unequivocally a representative of the species that Moldenke has consistently identified as *L. pringlei* Briquet; this synonymy was recognized much earlier by Standley (1924). Further, the name *L. callicarpifolia* Kunth, which has generally and consistently been applied to a distinctive species of southern México with colored bracts, must also be considered a synonym of *L. umbellata* (details below). In contrast, I have been unable to find a valid name that has been correctly applied to the plants identified by Moldenke as *L. umbellata*. This species occurs in south-central México and is formally named here for the first time.

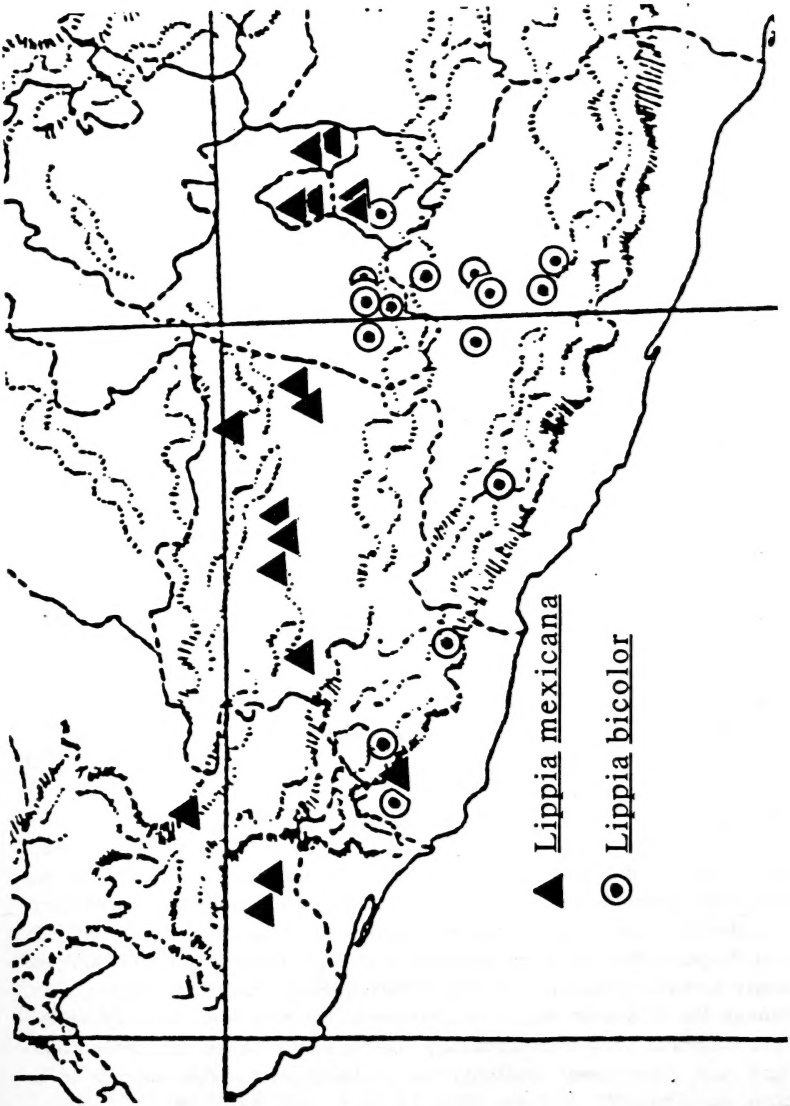
LIPPIA MEXICANA Nesom, *sp. nov.* TYPE: MEXICO. Edo. México, Mpio. Tlalmanalco, Cerro Tenayo, cerca Tlalmanalco, ladera toposa con vegetación de encinar muy perturbado, 2 Nov 1971, *J. Rzedowski 28722* (HOLOTYPE: TEX!; Isotypes: ENCB,US!).

Lippia umbellatae Cav. similis sed differt capitulis axillaribus pedicellatisque et bracteis ac pedicellis vix glandularibus. Differt a *Lippia bicolor* Kunth & Bouchet bracteis floralibus flavovirentibus (vs. purpureis) angustioribus (8-11 mm latis vs. 12-17 mm) ad maturitatem, foliis ovatis (vs. elliptici-lanceolatis apicibus acutis (vs. acuminatis), et paginis superis foliorum hirsutis (vs. rigide strigilloso vel glabris).

Shrubs or small "rounded" trees 2-8(-12) m tall, the trunk up to 15-20 cm in diameter; young stems, peduncles, and petioles sparsely strigose and glandular, older stems glabrate; plants described as "pleasantly aromatic" and with a "menthol smell." Leaves opposite, clustered toward the ends of the branches, lanceolate to elliptic-lanceolate, often broadly so, noticeably bicolored (lighter beneath), margins serrulate with 4-7 teeth per cm or sometimes the proximal 1/3-1/4 of the margins entire, upper surface smooth to distinctly rugose, petioles 1-2 cm long, blades (5-)8-12(-15) cm long, 1.5-5.5 cm wide, apex acute to acuminate, base abruptly attenuate to the petiole; surfaces sparsely to moderately strigose above and beneath with a mixture of ascending and appressed hairs, minutely granular-glandular beneath. Inflorescence of capitate heads produced in the upper leaf axils, 1-4 heads in each axil (or 2-8 per node), each head on a peduncle (10-)15-25(-40) mm long; heads spherical to depressed spherical, 6-8 mm in diameter (in flower), expanding to 10-15 mm in diameter (in fruit); receptacles 6-15 mm long; floral bracts (in flower) greenish, ovate with an obtuse to acute or acuminate apex, 3-6 mm wide, 5-7 mm long, becoming (in fruit) papery-tan, widely to depressed ovate, expanding to 7-11(-14) mm wide, sparsely strigose adaxially, the abaxial surface glabrous to sparsely strigillose and sometimes sparsely granular-glandular. Calyces sparsely to densely strigose-sericeous and glandular, 2-3 mm long, tubular, slightly compressed, bidentate, each tooth often minutely bidentate. Corollas yellow to cream or yellow-green, salverform, glabrous or glabrate to sparsely strigose, the tube straight, 2.5-4.0 mm long; stamens included.

Colima, Jalisco, Michoacán, Morelos, México, and Distrito Federal (Map 1); oak, pine, or oak-pine, to pine-fir woods, 2000-2850 m, flowering all year.

Additional collections examined: MEXICO. Distrito Federal: Cañada de Contreras, Dec 1928, *Lyonnet 457* (MO,US); Cañada de Contreras, 24 Nov 1948, *Moldenke 19853* (BRIT,LL,TEX); S of Contreras, 17 Sep 1930, *Russell & Souviron 184* (US); Cañada de Contreras, 13 Feb 1966, *Rzedowski 21961* (BRIT,TEX); Deleg. Xochimilco, Sta. Cecilia, 8 Jan 1977, *Ventura 2501* (MO); Deleg. Contreras, Los Dinos, 13 Oct 1979, *Ventura 3570* (MO). Jalisco: 20 km SSE of El Chante, E end of the Sierra Manantlán Oriental plateau, lower NW shoulders of Cerro El Muñeco, 8 Jan 1980, *Iltis et al. 2445a* (LL); Mpio. Jocotepec, Cerro Viejo, NE of Zapotitlán de Hidalgo, 11 Feb 1990, *Machuca N. 6400* (MO,TEX); NW slopes of Nevado de Colima, above Jazmin, above



Map 1. Distribution of *Lippia mexicana* and *L. bicolor*.

settlement of El Isote, 27 Mar 1949, *McVaugh 10070* (LL,TEX,US); NE slopes of Nevado de Colima, below Canoa de Leoncito, steep mountainsides in pine-oak forest, 11 Oct 1952, *McVaugh 13425* (BRIT,US); Sierra de Manantlán (15-20 mi SE of Autlán) on the bajada S and W of the divide between Aseradero San Miguel Uno and Durazno, steep slopes in cloud forest of firs and broad-leaved trees, 6 Nov 1952, *McVaugh 13935* (BRIT,US); divide above headwaters of Río Mascota (25-30 air km SE of Talpa de Allende), 11-12 road km S of El Rincón, 29 Nov 1960, *McVaugh 21511* (US). Edo. México: valle de México, Oct 1865, *Bourgeau 968* (US-2 sheets); foothills, Ixtaccihuatl, 5 Jan 1899, *Deam s.n.* (US); Amecameca, 8 Feb 1907, *Goodding 2178* (MO); Mpio. Amecameca, 1 km NE of Santo Tomas Atzingo, 18 Nov 1979, *Gutierrez G. 92* (MO,US); Mpio. Zinapécuaro, La Cañada, 500 m E de El Rincón, 6 Dec 1988, *Jasso 639* (MO-2 sheets); hills near Ozumba, 3 Nov 1902, *Pringle 11089* (US); Mpio. Amecameca, 1 km E of San Antonio, 31 Oct 1968, *Rzedowski 26456* (LL); Mpio. Tlalmanalco, cerros NE of Santo Tomas Atzingo, 20 Dec 1970, *Rzedowski 28020* (LL). Michoacán: Mpio. Cuanajo, Cerro del Burro, 2 Dec 1985, *Escobedo 746* (TEX); Dist. Zitácuaro, Zitácuaro-Macho de Agua, 6 Mar 1938, *Hinton 11910* (LL,TEX,US); Dist. Coalcomán, S. Torricillas, 19 Dec 1938, *Hinton 12791* (LL,US); Dist. Zitácuaro, Las Canoas, 6 Jan 1939, *Hinton 13550* (LL,TEX); Dist. Uruapan, Tancitaro, 18 Nov 1940, *Hinton 15706* (LL,MO,US); ca. 18 mi S of Patzcuaro, 20-25 Nov 1961, *King & Soderstrom 5161* (BRIT,TEX,US); N slope of Patambau, 28-31 Jan 1903, *Nelson 6564* (US); mountains near Patzcuaro, 23 Nov 1891, *Pringle 3948* (LL,MO,US). Morelos: near Cuernavaca, 22 Nov 1958, *Jones 23258* (LL); Sierra de Ocuila rumbo Mexicapa, 16-18 Dec 1938, *Lyonnet 2838* (US); Sierra de Tres Marias (Tres Cumbres), Jan 1941, *Lyonnet 3157* (US); mountainsides near Cuernavaca, 3 Feb 1899, *Pringle 7714* (US); Sierra de Tepoxtlán, 31 Oct 1900, *Pringle 9129* (MO); mountains above Cuernavaca, 19 Nov 1902, *Pringle 11090* (MO,US).

Plants from the Zitácuaro area of Michoacán (*Hinton 11910*, *Hinton 13550*, *Calvert s.n.*) are different from the others of *Lippia mexicana* in several features: longer peduncles (commonly 4 cm long), more densely glandular stems and peduncles, and floral bracts with glutinous, long-acuminate, recurving apices. In particular, the recurving floral bracts (in heads at anthesis) and the strongly broadened mature bracts give these plants a distinctive appearance. Although the Zitácuaro plants are interpreted here as local variants within *Lippia mexicana*, they may ultimately deserve formal taxonomic recognition. In any case, their closest similarity and probable relationship appears to be with *L. mexicana*.

In a supplemental list of collections of "*Lippia umbellata*" (mostly *L. mexicana* in the present interpretation), Moldenke (1985) listed several collections from Guatemala and El Salvador. I have not determined the identity of these, but they clearly are some other species than *L. mexicana*.

The treatment of plants in the Valley of México as *Lippia umbellata* (Arroyo Frias 1985) apparently was based on a set of specimens so identified by Moldenke, since it appears from Arroyo's description that they are *L. mexicana*. The occurrence of typical *L. umbellata*, as recognized here, has not been recorded from the Valley of México.

Pringle's collection 7714 from Morelos is tentatively identified here as *Lippia mexicana*, but it has particularly large and slightly purplish mature bracts atypical of the species. *Lippia bicolor* Kunth & Bouche, which is sympatric with *L. mexicana* in the same area of northwestern Morelos (Map 1), is characterized by its axillary heads and relatively large, reddish or purple floral bracts and may have been involved in the parentage of the plant collected by Pringle. The differences between *L. mexicana* and *L. bicolor* are summarized in the following couplet.

1. Mature floral bracts 8-11 mm wide at the base, greenish-yellow; leaves elliptic-lanceolate to lanceolate, the apex acuminate, the base acute, upper surfaces relatively flat, stiffly strigillose to glabrate. . . . *L. mexicana*
1. Mature floral bracts 12-17 mm wide at the base, rose-purple; leaves ovate, the apex acute, the base obtuse, upper surfaces deeply rugose, hirsute. *L. bicolor*

Lippia bicolor (Ind. Sem. Hort. Berol. 10. 1845) has formerly been known as *L. callicarpifolia*, but the latter is treated here as a synonym of *L. umbellata* (see below). The name *L. bicolor* has long been associated with the purple-bracted species (e.g., Loesener 1911; Standley 1924; Moldenke 1965).

The identity of *Lippia umbellata*

Lippia umbellata is an easily recognized species among its Mexican congeners but aspects of problematic variation remain to be investigated (as noted below). A tentative summary of its nomenclature is presented here in order to establish its separation from *L. mexicana*. Problems of variability within *L. umbellata* do not affect the delineation of *L. mexicana*.

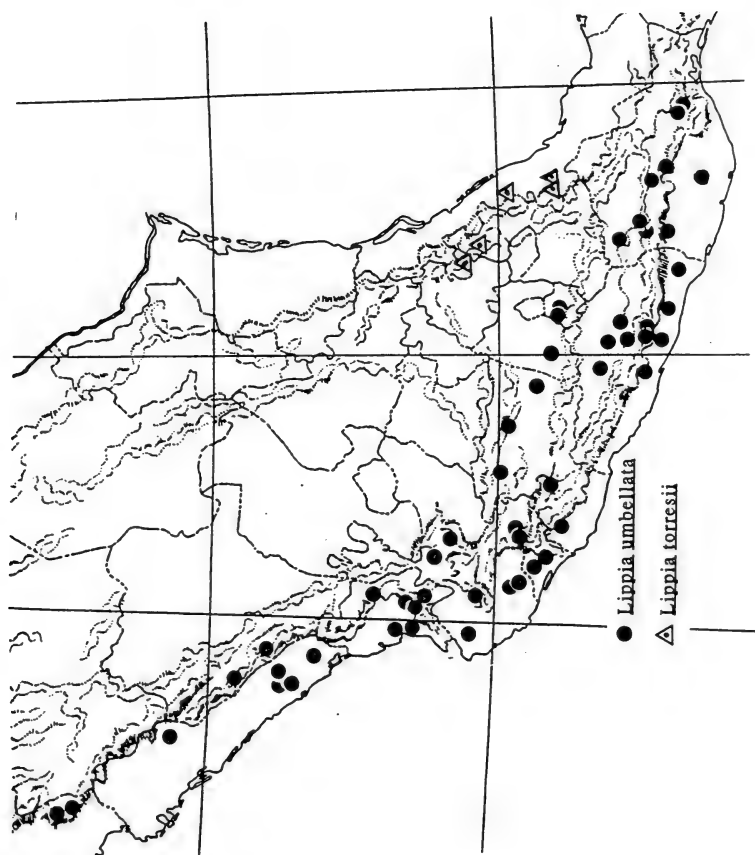
LIPPIA UMBELLATA Cav., *Içon. Pl.* 2:75, tab. 194. 1793. TYPE: MEXICO. [Protologue]: "Habitat in Imperio Mexicano, unde biennio iam introducta in regium hortum Matritensem floruit et fructificavit ultimo Decembri." The description and illustration by Cavanilles are unequivocally diagnostic.

- Lippia pringlei* Briq., Bull. Herb. Boiss. 4:340. 1896. TYPE: MEXICO. Jalisco: barranca near Guadalajara, 2 Nov 1888, *C.G. Pringle 1733* (HOLOTYPE: G; Isotypes: F,GH,US!).
- Lippia pringlei* Briq. forma *intecta* Mold., Phytologia 9:99. 1963. TYPE: MEXICO. Nayarit: El Llano, S of San Blas, 7 Jan 1944, *Hernández X. 125* (HOLOTYPE: LL!).
- Lippia callicarpifolia* Kunth, *Nov. Gen. Sp.* 2:268. 1817. TYPE: MEXICO. Crescit prope urbem Mexici, May, *Humboldt & Bonpland s.n.* (HOLOTYPE: P, photo-LL!, photo-MO!). The plant represented by the type clearly produced heads in umbellate clusters above the level of the upper leaves. This name has previously been associated with the species identified here as *L. bicolor*.
- Lippia callicarpifolia* Kunth var. *briquetiana* Loes., *Repert. Spec. Nov. Regni Veg.* 9:366. 1911. LECTOTYPE (designated here): MEXICO: Oaxaca: Ejutla, 4 Nov 1904, *Seler 4358* (US!; Isolectotype: B). Loesener also cited *Endlich 1067* (B) and *Seler 1460* (B, photo-MO!).
- Lippia jurgensenii* Briq., *Annuaire Conserv. Jard. Bot. Genève* 4:239. 1900. TYPE: MEXICO. Oaxaca: Río de Talea, ENE of Oaxaca, Jul 1845, *C. Jurgensen 431* (HOLOTYPE: G, fragment-F, photo-MO!, photo-US!).
- Lippia jaliscana* Mold., *Phytologia* 1:427. 1940. TYPE: MEXICO. Jalisco: trail from Real Alto to San Sebastián, 2000 m, 3 Feb 1927, *Y. Mezia 1636* (HOLOTYPE: NY; Isotypes: MO!, TEX!, US!).
- Lippia tepicana* Mold., *Phytologia* 1:454. 1940. TYPE: MEXICO. Nayarit: 5 Jan-6 Feb 1892, *E. Palmer 1969* (HOLOTYPE: NY; Isotype: US!; Probable isotype: LL!).

Sonora, Sinaloa, Durango, Nayarit, Jalisco, Colima, Edo. México, Michoacán, Guerrero, Morelos, Puebla, and Oaxaca (Map 2); shrublands, oak-tropical deciduous transition, oak to pine-oak woods, 350-2400 m, flowering October-April.

Gibson & Nee (1984) included *Lippia umbellata* (in the sense of Cavanilles) as a member of the Veracruz flora and correctly distinguished the plants concerned from *L. myriocephala* Briq., with which it has sometimes been confused. In such plants (from Veracruz and adjacent Puebla and Hidalgo; Map 2), however, a problem arises in the distinction of *L. umbellata* from the very closely similar *L. torresii* Standley (*Field Mus. Pub. Bot.* 18:1010. 1938.) of Costa Rica and Panamá. Moldenke (1981, 1985) identified the Veracruz collections as *L. torresii*.

The leaves of *Lippia torresii* average larger and are consistently more densely and softly pubescent than in *L. umbellata*. The Mexican plants of



Map 2. Distribution of *Lippia torresii* (in México) and *L. umbellata*.

L. torresii are more like the Central American plants than other nearby Mexican ones. Leaves of *L. umbellata* from Oaxaca become larger and more densely pubescent, closely approaching *L. torresii*, and the justification for maintaining the latter at specific rank apart from *L. umbellata* is tenuous. This complex needs detailed study, but the two taxa in their typical forms can be distinguished by the following contrasts (*L. torresii* tentatively including those populations from eastern México).

1. Largest upper leaf blades (8-)12-20 cm long, with the abaxial surface densely and softly villous; heads borne below or at the same height as the upper leaves. *L. torresii*
1. Largest upper leaf blades (6-)8-14(-20) cm long, with the abaxial surface sparsely to densely hirsutulous, sometimes only along the veins; heads usually distinctly above the level of the upper leaves. *L. umbellata*

ACKNOWLEDGMENTS

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SYNOPSIS OF THE NORTH AMERICAN SPECIES OF *LOESELIA*
(POLEMONIACEAE)

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ABSTRACT

A synoptic treatment of the North American (mostly Mexican) species of *Loeselia* is presented. Fourteen species are recognized: *Loeselia caerulea*; *L. ciliata*; *L. cordifolia*; *L. glandulosa* (with two varieties, var. *glandulosa* and var. *conglomerata*); *L. grandiflora*; *L. greggii*; *L. hintoniorum* B.L. Turner, *sp. nov.*; *L. involucrata*; *L. mexicana*; *L. nepetifolia*; *L. pumila*; *L. purpusii*; *L. rupestris*; and *L. rzedowskii*. A key to species and a complete synonymy is provided, along with distributional maps.

KEY WORDS: Polemoniaceae, *Loeselia*, México

Loeselia is a taxonomically difficult genus largely confined to México, although a single species (*L. glandulosa* [Cav.] G. Don) extends southwards as far as Venezuela in South America. In Brand's (1907) account of the genus, he recognized twelve species in two sections, sect. *Loeselia* with eight species and sect. *Giliopsis* with four species. In spite of its mostly suffruticose habit, Standley (1924) provided a synopsis of the genus for the *Trees and Shrubs of Mexico* in which twelve species were recognized. Grant (1959) was the last to touch upon the genus in an inclusive sense. He removed sect. *Giliopsis* from *Loeselia*, positioning the latter in his tribe Bonplandieae, along with only one other genus, *Bonplandia*. Grant recognized nine species in *Loeselia*, eight of these placed in the section *Loeselia* and one, *L. grandiflora* Standley, making up the newly proposed section *Glumiselia*. In addition, through a lapse (1967, p. 145) he excluded *L. purpusii* T.S. Brandegee from the genus, equating this with *Gilia purpusii* T.S. Brandegee, the latter a well defined taxon unrelated to the former (*cf.* Turner 1993).

The present contribution, in which fourteen species are recognized, was stimulated by my attempts to identify a large number of unidentified sheets

of *Loeselia* from México at LL, TEX, made especially frustrating by the inadequate treatments of both Brand and Standley. My study is based upon the examination of several hundred or more sheets of *Loeselia* on file at F, LL, and TEX. These have all been annotated and serve as the basis for the distributional maps (Figures 1-6).

LOESELIA L.

Loeselia L., *Gen. Pl.*, ed. 5. 276. 1754. Type: *L. ciliata* L.

Hoitzia Juss., *Gen. Pl.* 136. 1789. Type: *H. mexicana* Lam.

My concept of the genus is essentially the same as that of Grant (1959), there being no need to modify the description which he provided.

KEY TO LOESELIA

1. Corollas scarlet or deep red. 9. *L. mexicana*
1. Corollas white, pink, lilac, blue or yellow. (2)
 2. Corollas yellow, the lobes densely arachnoid-tomentose; Nayarit, northern Jalisco. 14. *L. rzedowskii*
 2. Corollas white, pink, lilac or lavender, very rarely yellow, if so the lobes \pm glabrous. (3)
3. Flowers (with associated bracts) arranged single and axillary along the stem forming elongate, often secund racemes, the flowering units bent or reflexed from the axis of the pedicels. (4)
3. Flowers not disposed as in the above, the flowers arranged two or more in compact clusters, or if single then borne erect on the pedicels. (5)
 4. Larger floral bracts mostly ovate to oblanceolate in outline, at maturity markedly reticulate-venose, the surfaces between the veins tissue paper-like; stems eglandular, the hairs puberulous to incurved. 1. *L. caerulea*
 4. Larger floral bracts mostly lanceolate in outline, not as described in the above; stems densely glandular-pubescent. 11. *L. pumila*
5. Capsules 5-6 mm long, their apices markedly glandular-capitate; seeds markedly winged, 3-5 to each locule; southernmost Puebla. 12. *L. purpusii*

5. Capsules 2-4 mm long, their apices glabrous or obscurely pubescent; seeds not or but weakly winged, 1-2 to each locule.(6)
6. Outer or surrounding bracts of flowers or flower-clusters linear-lanceolate, mostly 0.5-1.5 mm wide.(7)
6. Outer or surrounding bracts of flowers or flower clusters ovate to orbicular, mostly 2-10 mm wide.(10)
7. Midstems to some considerable extent glandular-pubescent; corolla lobes mostly 8-16 mm long; widespread.(9)
7. Midstems mostly eglandular-pubescent; México, Veracruz, Guerrero, Oaxaca, and Chiapas.(8)
8. Flowers arranged in units of 3 or more, each borne upon pedicels 1-3 mm long; Veracruz, Oaxaca, Chiapas. 10. *L. nepetifolia*
8. Flowers single, each borne upon pedicels 5-20 mm long forming an open panicle; México, Guerrero. 5. *L. grandiflora*
9. Flowers mostly arranged in clusters of 2 or more, the pedicels mostly 1-2 mm long; mostly southern México (Figure 5).
 4b. *L. glandulosa* var. *conglomerata*
9. Flowers mostly borne single on pedicels 2-10 mm long; mostly western México (Sonora to México State) (Figure 5).
 4a. *L. glandulosa* var. *glandulosa*
10. Midstem leaves subsessile or clasping, their blades cordate at the base.(11)
10. Midstem (but not upper) leaves petiolate, not clasping, their blades acute to obtuse at the base, tapering upon the petioles.(12)
11. Ovary glabrous; upper portion of plants with mostly alternate leaves and alternate branching; interior Michoacán and Guerrero (Figure 1).
 7. *L. hintoniorum*
11. Ovary pubescent at apex; upper portion of plants with mostly opposite leaves and opposite branching; Pacific slopes of Jalisco, Colima, and Michoacán (Figure 1). 3. *L. cordifolia*
12. Suffruticose sprawling herbs 10-30 cm high; larger associated bracts of flower clusters about as long as wide, at maturity the interveinal areas markedly tissue paper-like; central Plateau of northcentral México (Figure 3).6. *L. greggii*

12. Stiffly erect brittle-stemmed suffruticose herbs 40-150 cm high; larger associated bracts of flower clusters mostly longer than wide, at maturity the interveinal areas often chartaceous but scarcely tissue paper-like (except in *L. rupestris*); westernmost and southern México. (13)
13. Longer lateral ciliations of outer floral bracts mostly 2-4 mm long; corollas white to creamy white, mostly 10-16 mm long; Veracruz, Guerrero, Oaxaca, Chiapas. 2. *L. ciliata*
13. Longer lateral ciliations of outer floral bracts mostly 1.0-1.5(-2.0) mm long; corollas mostly white, creamy white, lavender to purple; Pacific slopes of México (Baja California, Sonora, and Chihuahua south to Oaxaca). (14)
14. Floral bracts with 3-5 spinose teeth or lobes, marginal setae absent; vestiture ca. 1 mm high, the hairs glandular. 13. *L. rupestris*
14. Floral bracts not as described for *L. rupestris*; vestiture 0.2-0.5 mm high, the hairs glandular. 8. *L. involucrata*

1. *LOESELIA CAERULEA* (Cav.) G. Don, *Gen. Syst. Gard.* 4:248. 1837. BASIONYM: *Hoitzia caerulea* Cav., *Icon.* 4:45, t. 366. 1798. *Cantua caerulea* (Cav.) Poir, *Encycl. Meth. Bot.* 10:81. 1811. TYPE: MEXICO. Guanajuato: vicinity of Guanajuato, 1787-1798, *Nee s.n.* (HOLOTYPE: M; Isotype: F!). Publication date, locality, and collector from MA specimen (*cf.* Garilleti 1993).

Hoitzia scariosa Mart. & Gal., *Bull. Acad. Sci. Brux.* 12:274. 1845.
Loeselia scariosa (Mart. & Gal.) Walp., *Rep. Bot.* 6:527. 1846.
 TYPE: MEXICO. Puebla: Tehuacán, 1840, *H. Galeotti 698* (LECTOTYPE [selected here]: BR!).

This is a widespread relatively uniform species having a relatively low bushy habit and small narrowly lanceolate leaves. *Loeselia caerulea* appears closely related to *L. pumila* (Mart. & Gal.) Walp., both possessing similar habits, foliage and inflorescences.

2. *LOESELIA CILIATA* L., *Sp. Pl.* 628. 1753. \equiv *Hoitzia loeselia* Spreng., *Syst.* 1:626. 1825. TYPE: MEXICO. Veracruz: w/o locality [probably in vicinity of the coastal city of Veracruz], 1729, *Houstoun s.n.* (HOLOTYPE: L).

Hoitzia aristata H.B.K., *Nov. Gen. & Sp.* 3:164. 1818. *Loeselia aristata* (H.B.K.) G. Don, *Gen. Syst. Gard.* 4:248. 1837. TYPE: MEXICO. w/o specific locality, 1803-1804, *Humboldt & Bonpland s.n.* (HOLOTYPE: P, microfiche TEX!).

Hoitzia lupulina Hook. & Arn., *Bot. Beechey's Voy.* 441. 1841. TYPE: NICARAGUA. Realejo, 1828, *Sinclair s.n.* (LECTOTYPE [designated here]: K!). In the protologue two collections were cited (one from Realejo, the other from Acapulco), both presumably collected by Sinclair.

Loeselia ciliata L. var. *echinophylla* Brand, *Pflanzenreich* 4(250):178. 1907. TYPE: MEXICO. w/o date, w/o locality, *Seltener s.n.* (HOLOTYPE: B, destroyed).

This taxon is closely related to *Loeselia involucrata* G. Don and most workers have confused the two, except for Hemsley (1899) and Brand (1907) who maintained both species (*cf.* discussion under *L. involucrata*). *Loeselia ciliata* is apparently mostly confined to rather lowland tropical habitats from 10 to 1,000 meters, to judge by a large range of collections from southern México and Central America (Figure 2).

3. **LOESELIA CORDIFOLIA** Hemsl. & Rose, Hook. *Icon.* 26: t. 2551. 1899. *Loeselia amplexens* (Hook. & Arn.) Benth. *ex DC.* forma *cordifolia* (Hemsl. & Rose) Brand, *Pflanzenreich* 4(250):178. 1907. TYPE: MEXICO. Jalisco: Tepic, 1862, *E. Palmer s.n.* (HOLOTYPE: K; Iso-type: US).

Both Brand (1907) and Standley (1924) placed this well-marked taxon in synonymy with *Loeselia amplexens* (= *L. involucrata*) in spite of the convincing data (including illustrations) provided by Hemsley & Rose justifying its recognition. The latter workers knew *L. cordifolia* only by type material. I have examined numerous newly assembled specimens of *L. cordifolia*, all showing pubescent ovaries and midstem leaves with cordate, sessile bases. These include: Colima: *Acevedo & Lopez 1146* (TEX). Jalisco: *Panero 4597* (TEX); *Sanders 10444* (TEX). Michoacán: *Hinton et al. 19659* (LL); etc.

Loeselia cordifolia superficially resembles *L. hintoniorum* B.L. Turner, but the latter has glabrous ovaries and, of course, has the upper leaves and branching consistently alternate in arrangement, as noted in my key to species.

4. **LOESELIA GLANDULOSA** (Cav.) G. Don, *Gen. Syst. Gard.* 4:248. 1837. *Hoitzia glandulosa* Cav., *Icon.* 4:45, t. 367. 1798. *Cantua glandulosa* (Cav.) Poir., *Encycl. Meth. Bot.* 10:30. 1844. TYPE: MEXICO.

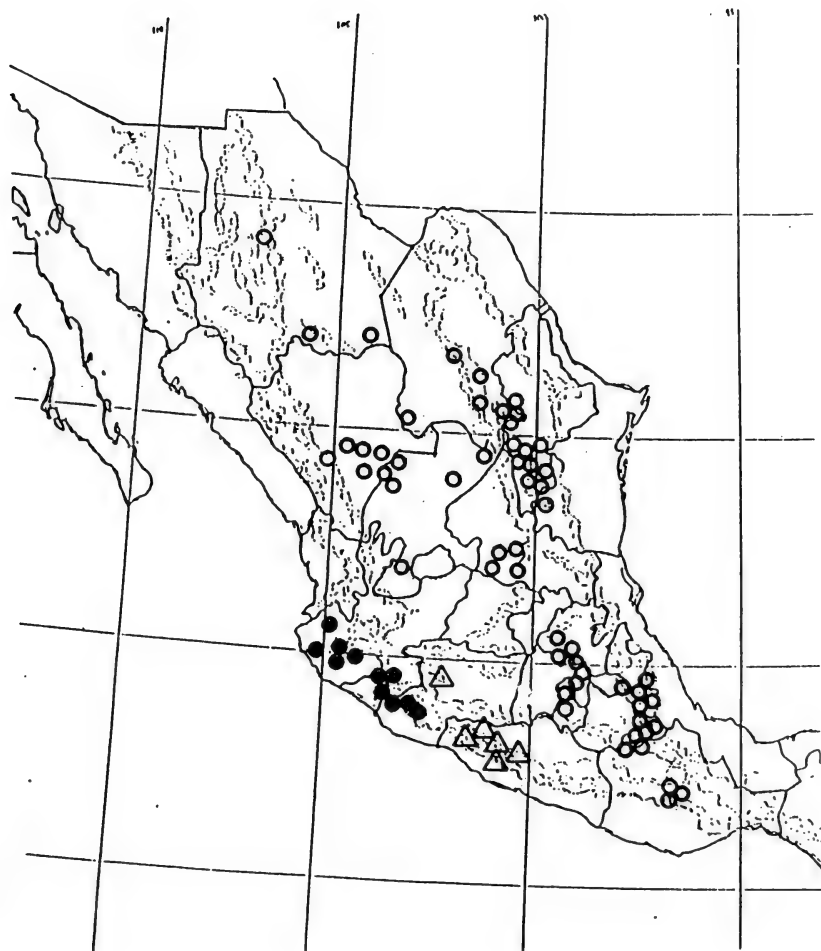


Figure 1. Distribution of *Loeselia caerulea* (open circles), *L. cordifolia* (closed circles), and *L. hintoniorum* (triangles).



Figure 2. Distribution of *Loeselia ciliata* (open circles) and *L. involucreta* (closed circles).

México [or Michoacán]: "inter Actopan et Salvadierra", 1787-1796, *Nees s.n.* (HOLOTYPE: MA, according to Garilleti 1993; Isotype: F!). Actopan is in the present state of Puebla, while Salvaterra is in Michoacán; geographical considerations (Figure 5) suggest that the plant was collected in the state of México or Michoacán.

This is a widespread highly variable taxon and was treated by Brand (1907) as comprised of four varieties occupying two subspecies as follows:

1. Flowers arranged single or in few-flowered heads; leaves lanceolate [subsp. *cervantesii*]. (2)
1. Flowers arranged in few- to numerous-flowered heads; leaves mostly ovate subsp. *conglomerata* [= subsp. *glandulosa*]. (3)
 2. Stems subsimple, glabrous or glabrate. var. *nepetifolia*
 2. Stems pubescent, much-branched. var. *ramosissima*
3. Leaves glabrous to sparsely hirsute. var. *scabra*
3. Leaves densely hirsute. var. *hirsuta*

I recognize Brand's var. *nepetifolia* as a distinct species, although Standley (1924) retained this taxon under his concept of *L. glandulosa*. As indicated in my key to taxa, only two infraspecific categories of *L. glandulosa* are recognized as follows.

4a. *LOESELIA GLANDULOSA* (Cav.) G. Don var. *GLANDULOSA*

The type of this name applies to individuals and/or populations having nonconglomerate flowers, their pedicels (1-)2-7 mm long. Early on I had intended to apply a new specific name to such populations, but examination of the type and discovery of \pm intermediate individuals from the states of Morelos, Michoacán, and Jalisco has convinced me that only two intergrading morphogeographical entities are involved, var. *glandulosa* and var. *conglomerata*.

- 4b. *LOESELIA GLANDULOSA* (Cav.) G. Don var. *CONGLOMERATA* (H.B.K.) Brand, *Pflanzenreich* 4(250):177. 1907. BASIONYM: *Hoitzia conglomerata* H.B.K., *Nov. Gen. & Sp.* 3:164. 1818. *Loeselia conglomerata* (H.B.K.) G. Don, *Gen. Syst. Gard.* 4:248. 1837. *Loeselia glandulosa* (Cav.) G. Don var. *conglomerata* (H.B.K.) Brand, *Pflanzenreich*

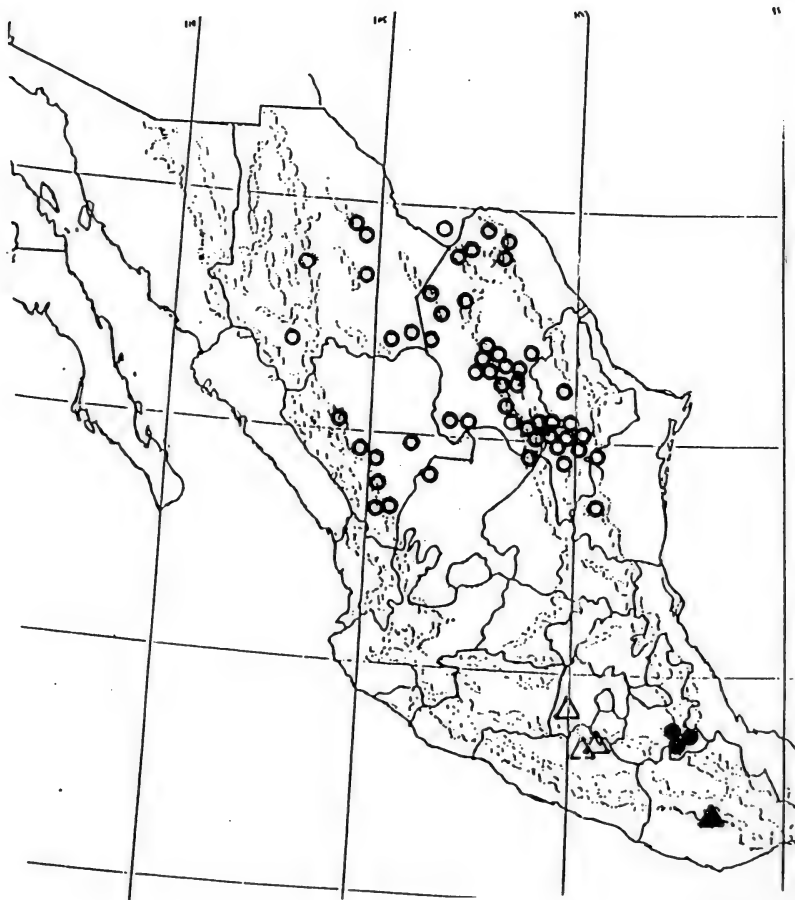


Figure 3. Distribution of *Loeselia greggii* (open circles), *L. grandiflora* (open triangles), *L. purpusii* (closed circles), and *L. rupestris* (closed triangles).

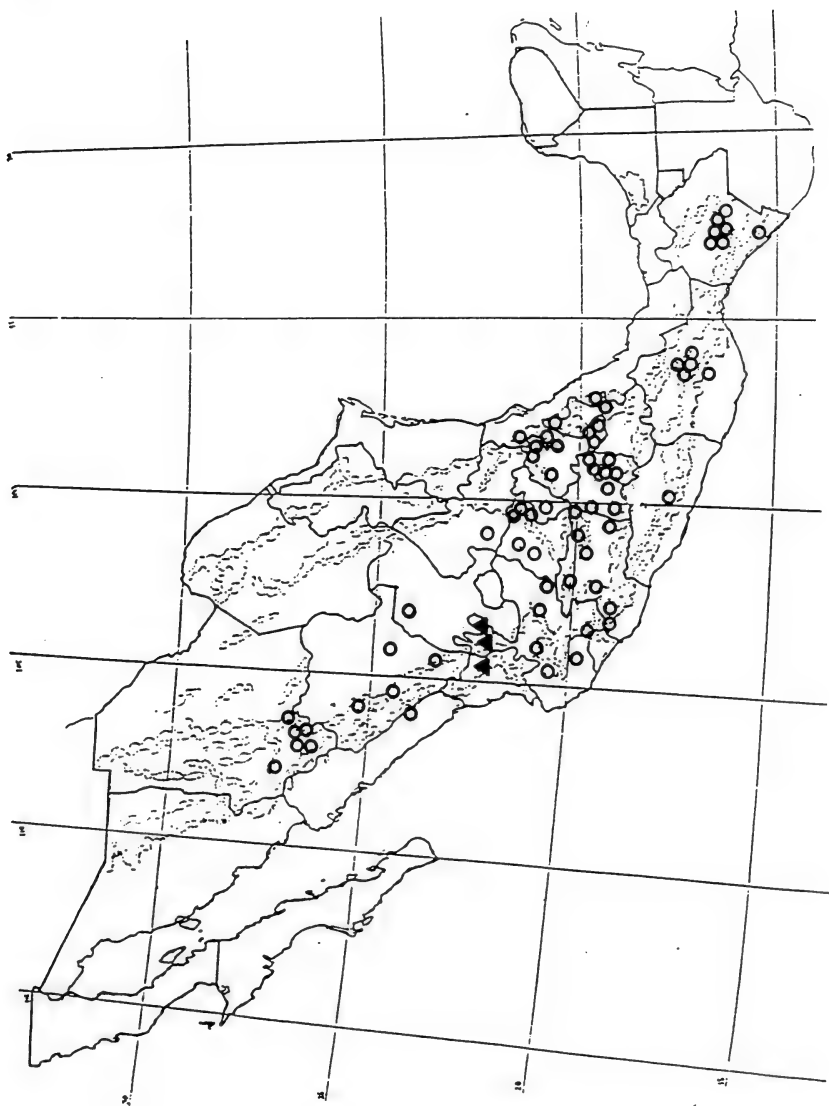


Figure 4. Distribution of *Loeselia mexicana* (circles) and *L. rzedowskii* (triangles).

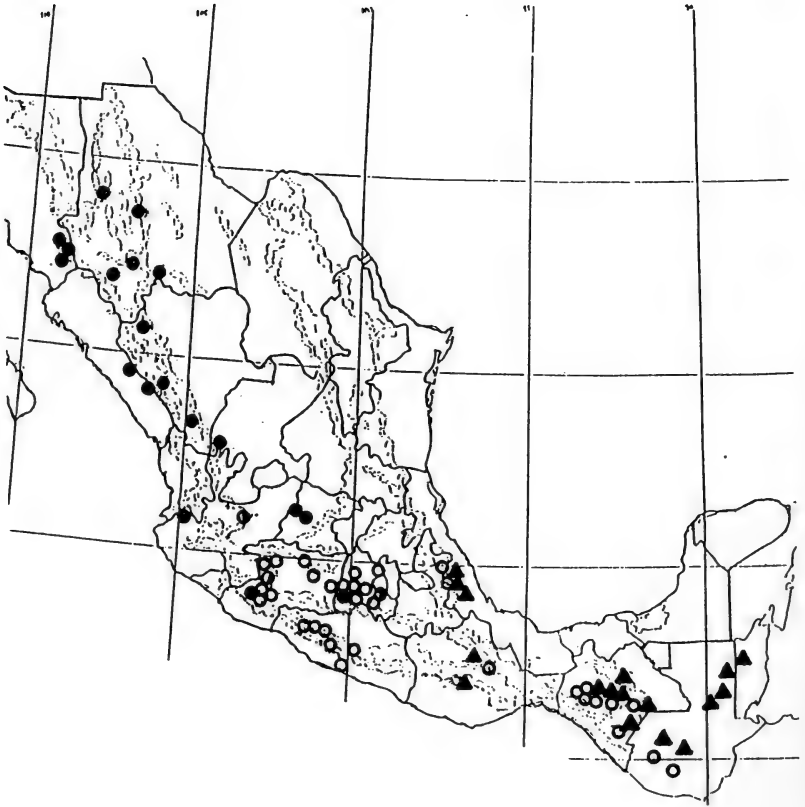


Figure 5. Distribution of *Loeselia glandulosa* var. *glandulosa* (closed circles), *L. glandulosa* var. *conglomerata* (open circles), and *L. nepetifolia* (triangles). Collections of *L. g.* var. *conglomerata* from Costa Rica and Venezuela not shown.

4(250):177. 1907. TYPE: MEXICO. w/o state, 1803-1804, *Humboldt & Bonpland s.n.* (HOLOTYPE: P?, not located; not on microfiche at TEX).

Hoitzia cervantesii H.B.K., *Nov. Gen. & Sp.* 3:164. 1818. *Loeselia cervantesii* (H.B.K.) G. Don, *Gen. Syst. Gard.* 4:248. 1837. *Loeselia glandulosa* (Cav.) G. Don subsp. *cervantesii* (H.B.K.) Brand, *Pflanzenreich* 4(250):176. 1907. TYPE: MEXICO. w/o state, 1803-1804, *Bonpland & Humboldt s.n.* (HOLOTYPE: P; microfiche TEX!).

Hoitzia spicata Willd. in Roem. & Schult., *Syst.* 4:370. 1819. TYPE: MEXICO. w/o locality, date or collector (HOLOTYPE: Willdenow Herb.; microfiche TEX!).

Hoitzia capitata Willd. in Roem. & Schult., *Syst.* 4:370. 1819. TYPE: MEXICO. w/o locality, date or collector (HOLOTYPE: Willdenow Herb.; microfiche TEX!).

Hoitzia scabra Mart. & Gal., *Bull. Acad. Brux.* 12, ser. 2:294. 1845. *Loeselia scabra* (Mart. & Gal.) Walp., *Rep. Bot.* 6:317. 1846. *Loeselia glandulosa* (Cav.) G. Don var. *scabra* (Mart. & Gal.) Brand, *Pflanzenreich* 4(250):177. 1907. TYPE: MEXICO. Veracruz: Zacaupan, Oct 1840, *H. Galeotti 7052* (HOLOTYPE: BR!).

Hoitzia ramosissima Mart. & Gal., *Bull. Acad. Sci. Brux.* 12, ser. 2:172. 1845. *Loeselia ramosissima* (Mart. & Gal.) Walp., *Rep. Bot.* 6:526. 1847. *Loeselia glandulosa* (Cav.) G. Don var. *ramosissima* (Mart. & Gal.) Brand, *Pflanzenreich* 4(250):177. 1907. TYPE: MEXICO. Oaxaca: Sierra de Yavezia, 7000 ft, Dec 1842, *Galeotti 1453* (LECTOTYPE [selected here]: BR!; Isolectotype: BR!).

Loeselia glandulosa (Cav.) G. Don var. *hirsuta* Brand, *Pflanzenreich* 4(250):177. 1907. TYPE: GUATEMALA. Fuego, w/o date, *Salvin s.n.* (LECTOTYPE: B, destroyed). Brand cited in his protologue an additional specimen from Costa Rica (*Brolley s.n.*, at G-DEL).

Loeselia columbiana Gand., *Bull. Soc. Bot. France* 65:59. 1918. TYPE: VENEZUELA. Merida: near Merida, w/o date, *Moritz 995* (HOLOTYPE: P; Xeroholotype: TEX!).

As indicated by the considerable synonymy, this is a widespread variable taxon which intergrades with var. *glandulosa*. It is largely confined to tropical and subtropical North America, except for a collection from South America described as *Loeselia columbiana*. Brand (1907) cites five collections from Costa Rica and Nicaragua which are not shown in Figure 5.

5. *LOESELIA GRANDIFLORA* Standley, J. Wash. Acad. Sci. 17:527. 1927.
TYPE: MEXICO. Guerrero: Ashotla, 700 m, Jan 1927, *B.P. Reko 5100*
(HOLOTYPE: US).

This is a very distinctive taxon as indicated by Standley in his original description, the plant known to him only by the type and an additional Reko collection (5057 [US]) from the same general area. I have examined two additional collections as follows: Guerrero: Nicolas del Oro, ca. 1200 m, 13 Jan 1938, *Mexia 9105* (F). México: Distr. Temascaltepec, Platanal, 8 Feb 1933, *Hinton 3353* (F).

In his original description Standley notes the taxon to be a suffruticose herb "probably 60 cm tall", but the *Mexia* collection, cited above, describes the plant as a "strict shrub up to 2.5 m high", while label data on the Hinton plant describe it as "1.5 m leaning". The species has a very distinct diffuse paniculate inflorescence, unlike those of any other taxon in the genus.

6. *LOESELIA GREGGII* S. Watson, Proc. Amer. Acad. Arts 18:117. 1883.
TYPE: MEXICO. Coahuila: Saltillo, 1879-1880, *E. Palmer 1063* (LECTOTYPE [selected here]: GH; Isolectotype: F!). Two collections were cited in Watson's protologue, the lectotype, and *Gregg 360*.

Most workers (e.g., Standley 1924; Correll & Johnston 1970) have followed Brand (1907) in accepting *Loeselia greggii* as synonymous with *L. scariosa*, but the type of the latter belongs to *L. caerulea*, the original material from southern Puebla.

7. *LOESELIA HINTONIORUM* B.L. Turner, *sp. nov.* TYPE: MEXICO. Guerrero: Dist. Mina, Chilacayote-Carrizal, by river, 1400 m, 2 Dec 1939, *Hinton et al. 14941* (HOLOTYPE: LL¹; Isotype: TEX!).

Loeseliae cordifoliae Hemsley & Rose similis sed ovarii glabris (vs. pubescentibus) et foliis superis plerumque alternatis (vs. oppositis) differt.

Erect suffruticose herbs mostly 0.5-1.0 m high. Stems hirsutulous, glandular or eglandular, to glabrate. Leaves (at mid-stem) mostly opposite and subsessile, broadly lanceolate, 3-5 cm long, 1.5-2.0 cm wide, serrulate; upper leaves alternate, cordate and markedly clasping. Flowers 3-10, arranged in bracteate clusters at the apices of alternate branches. Outer bracts of clusters cordate, glabrous, white-splotted below, ca. as wide as long, their marginal spines 0.5-1.5 mm long. Calyces glabrous 7-8 mm high; sepals united for 3-4 mm, the free portions 3-nervate, acuminate awned, the awns ca. 2 mm long.

Corollas white to pink, 15-25 mm long; tubes 8-12 mm long; lobes 10-15 mm long. Ovary ovoid, glabrous. Capsules obpyramidal, glabrous, ca. 3.5 mm long; seeds (immature) ca. 1 mm long.

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Guerrero: road to Cd. Altamirano from Zihuatenejo, 38 km N on Coastal hwy 200, 20 Nov 1983, *Barrie 632* (TEX); Manchon, 1700 m, 21 Apr 1937, *Hinton et al. 10078* (LL); Vallecitos, 20 Nov 1937, *Hinton et al. 11574* (LL); along route 134, 20.9 km N of San Antonio, 1950 m, 11 Jan 1992, *Prather 1219* (TEX); along hwy 134, ca. 40-50 mi NE of junction with hwy 200, 14 Jan 1989, *Woodruff 757* (TEX). Michoacán: Mpio. Uruapan, La Tzararacua, lado N de la Presa, pine-oak forest, near the river, 1600 m, *Magana 255* (F,TEX).

Loeselia hintoniorum is closely related to the lower elevational, more coastal, *L. ciliata*, (10-1000 m vs. 1000-2000 m) but is readily distinguished from the latter by its strongly clasping, alternate cordate upper leaves, the midstem leaves subsessile with blades rounded at the base. Vegetatively, it is superficially similar to *L. cordifolia*, but the latter is readily distinguished by its pubescent ovaries and upper leaves opposite throughout or nearly so.

It is a pleasure to name this taxon for the remarkable Hinton family, well known Mexican plant collectors, who first collected the species.

8. *LOESELIA INVOLUCRATA* G. Don, *Gen. Syst. Gard.* 4:248. 1837. TYPE: MEXICO. Nayarit: vicinity of Tepic, 1827-1828, *Lay s.n.* (type material not located).

Hoitzia amplexens Hook. & Arn., *Bot. Beechey's Voy.* 441. 1841.

Loeselia amplexens (Hook. & Arn.) Benth. *ex DC.*, *Prodr.* 9:320.

1845. TYPE: MEXICO. Nayarit: between San Blas and Tepic, 1828, *Sinclair s.n.* (HOLOTYPE: K!).

As noted by Hemsley (1899), most workers up to that date (and thereafter!) tended to place *Loeselia involucrata* in synonymy with *L. ciliata*. This problem (along with informative illustrations) is amply discussed by Hemsley in his description of *Loeselia cordifolia*. Nevertheless, Brand (1907) maintained both *L. involucrata* (including elements of *L. cordifolia*) and *L. ciliata*, as did Standley (1924), who opined "There does not appear to be any essential difference between the two forms". While I have maintained *L. involucrata* as distinct from the very closely related *L. ciliata*, future workers might reduce *L. involucrata* to varietal status under the latter, the two taxa largely distinguished by habit and length of ciliations on the floral bracts.

I am unable to distinguish *Loeselia amplexens* from *L. involucrata*. Hemsley & Rose, in their original description of *L. cordifolia*, compared this with *L. amplexens*, noting that the former has a pubescent ovary and cordate nearly

sessile midstem blades. Indeed, a comparative sketch of *L. amplexens* was provided by Hemsley & Rose, along with their illustration of *L. cordifolia*. Comparison of the former with their illustration of *L. involocrata* (which follows their account *L. cordifolia*) will show little difference between the two, except that the upper leaves of *L. amplexens* are shown to be amplexicaule, a characteristic also found in a wide assemblage of plants referred to as *L. involocrata* in the present treatment.

As shown in Figure 2, I include here a single late-flowering collection from Chihuahua (Mpio. Batopilas, *Bye 3574* [TEX]) having very thick, nearly enervate floral bracts that perhaps represents an undescribed taxon.

9. *LOESELIA MEXICANA* (Lam.) Brand, *Pflanzenreich* 4(250):174. 1907. *Hoitzia mexicana* Lam., *Encycl. Meth. Bot.* 3:134. 1789. TYPE: MEXICO. w/o specific locality, date or collector (HOLOTYPE: P-JU; microfiche TEX!).

Hoitzia coccinea Cav., *Icon.* 4:44, t. 365. 1797. *Cantua coccinea* (Cav.) Poir., *Encycl. Meth. Bot.* 10:80. 1811. *Loeselia coccinea* (Cav.) G. Don, *Gen. Syst. Gard.* 4:247. 1837. \equiv *Cantua hoitzia* Willd., *Sp. Pl.* 1:878. 1797. TYPE: MEXICO. w/o state, 1787-1795, *Sessé & Moçino s.n.* (HOLOTYPE: MA; Isotype: F!).

Loeselia mexicana (Lam.) Brand var. *lutea* Brand, *Pflanzenreich* 4(250):174. 1907. TYPE: MEXICO. w/o state, w/o date, *Schaffner 110* (HOLOTYPE: B, destroyed).

This is a widespread exceedingly uniform species presenting few taxonomic problems. Based upon habit and fruit structure it appears to be most closely related to the narrow endemic, *Loeselia purpusii* T.S. Brandegee.

Standley (1924) notes that "A form with yellow flowers, growing about the city of Mexico, is *L. mexicana lutea* Brand. A specimen from Tlaxcala [US!] is said to have nearly white flowers." In addition, Standley notes several common names for the species, as well as numerous economic uses, including its use by early inhabitants as a substitute for soap.

10. *LOESELIA NEPETIFOLIA* (Cham. & Schlecht.) G. Don, *Gen. Syst. Gard.* 4:248. 1837. BASIONYM: *Hoitzia nepetifolia* Cham. & Schlecht., *Linnaea* 6:385. 1834. *Loeselia glandulosa* (Cav.) G. Don var. *nepetifolia* (Cham. & Schlecht.) Brand, *Pflanzenreich* 4(250):176. 1907. TYPE: MEXICO. Veracruz: between "Misatlan" and "Calipana", Feb 1819, *Schiede & Deppe s.n.* (HOLOTYPE: B, destroyed).

While type material was not located, there is little doubt that the plant described is that of the eglandular, small-flowered taxon recognized here, this being abundant in the vicinity of Xalapa, Veracruz, where the type was obtained.

This taxon is closely related to *Loeselia glandulosa* and is distinguished from the latter by its eglandular stems, mostly smaller deep pink or lavender flowers, and geography (Figure 5). More intensive field studies may show the taxon to be worthy of only varietal rank under *L. glandulosa*, as treated by Brand.

11. *LOESELIA PUMILA* (Mart. & Gal.) Walp., *Rep. Bot.* 6:527. 1846. *Hoitzia pumila* Mart. & Gal., *Bull. Acad. Brux.* 12, ser. 2:275. 1845. TYPE: MEXICO. Oaxaca: Sola, Nov 1840, *H. Galeotti 7132* (HOLOTYPE: BR!; Isotype: BR!).

Loeselia intermedia Loes., *Bull. Herb. Boissier* 7:567. 1899. TYPE: MEXICO. Oaxaca: Cerro de la Soledad, Nov 1889, *Seler 1343, 1343G* (type material not located), Loesener cited two collections in his protologue, as noted in the above. Type material should be at G-BOISS but communication with that institution revealed no such collections (L. Gautier, pers. comm. 1 Nov 1994).

This is a widely distributed variable species but readily distinguished from its closest relative, *Loeselia caerulea*, by its densely glandular-pilose vestiture. The disjunct collections of *L. pumila* from Sonora, as shown in Figure 6, is based upon *Gentry 1101* (F); there is little doubt as to its identity.

12. *LOESELIA PURPUSII* T.S. Brandege, *Univ. Calif. Publ. Bot.* 3:389. 1909. TYPE: MEXICO. Puebla: vicinity of San Luis Tultitlanapa, rocks and cliffs, Apr 1908, *Purpus 3118* (HOLOTYPE: UC; Isotype: F!).

This is a well-marked taxon readily recognized by its subshrubby habit, glossy rigid foliage and large multiovulate capsules. It is seemingly most closely related to *Loeselia mexicana* (based mainly upon fruit characters) and apparently confined to the drier regions of southernmost Puebla and probably closely adjacent Oaxaca. Originally known only by type material, it is now well represented in many herbaria, some of these cited here (LL, TEX): Puebla: Mpio. Caltepec, *Tenoria 5064, 12469, 12476, Villaseñor 625*; Mpio. Santiago, *Liston 622-5*.



Figure 6. Distribution of *Loeselia pumila*.

13. *LOESELIA RUPESTRIS* Benth. in DC., *Prodr.* 9:319. 1845. *Loeselia caerulea* (Cav.) G. Don var. *rupestris* (Benth.) Brand, *Pflanzenreich* 4(250):278. 1907. TYPE: MEXICO. Oaxaca: Gneissfeisen von Penoles, 2300 m, Nov or Apr 1840, *H. Galeotti 1448* (HOLOTYPE: K!; Photoisotype: F!).

Hoitzia floribunda Mart. & Gal., Bull. Acad. Sci. Brux. 12, ser. 2:275. 1845. TYPE: MEXICO. Oaxaca: Yavezia, Nov-Apr 1840, *H. Galeotti s.n.* (HOLOTYPE: BR!). This sheet is possibly from the same collection described by Bentham as *Loeselia rupestris*. While a collection of *Loeselia* with the number 1448 was not located at BR it seems likely that a duplicate of the present type was sent to K where it was described by Bentham, just prior to the publication of *Hoitzia floribunda*.

Loeselia rupestris is known to me only by type material of the above two names. In habit and foliage it much resembles *L. involucrata*, but the floral bracts are markedly 3-5 toothed and lack the fine marginal ciliations found in that species; additionally the stems are densely puberulopilose, the vestiture mostly 0.8-1.0 mm high.

14. *LOESELIA RZEDOWSKII* R. McVaugh, *Acta Bot. Mex.* 11:11. 1990. TYPE: MEXICO. Jalisco: above the mines N of Bolaños, precipitous west slopes, on rocks and cliff-faces, 17-18 Jan 1975, *R. McVaugh 25830* (HOLOTYPE: MICH).

This very distinctive taxon was first collected by Diguët in the late 1800's, as noted by McVaugh in his original description, which is accompanied by an excellent illustration. A recent subsequent collection has been that of *Flores & Flores 2692* (TEX) from Mpio. Totatiche, ca. 2000 m, 28 Jun 1991, where it is said to be a "frecuente" shrub 60-80 cm high.

Vegetatively the taxon superficially resembles a species of *Trixis*. It is unique in *Loeselia* in possessing yellow, arachnoid-tomentose, corolla lobes.

EXCLUDED NAMES

(Largely adopted from Grant 1959)

Hoitzia linearis Spreng. = *Collomia linearis* Nutt.

Hoitzia squarrosa Eschsch. = *Navarretia squarrosa* (Eschsch.) Hook. & Arn.

Loeselia carionis Peter = (not *Loeselia*, possibly Scrophulariaceae; cf. Brand 1907)

Loeselia effusa A. Gray = *Gilia effusa*

Loeselia gloriosa (T.S. Brandege) I.M. Johnst. = *Ipomopsis gloriosa* (= *Acanthogilia*)

Loeselia guttata A. Gray = *Ipomopsis tenuifolia* (A. Gray) V. Grant

Loeselia havardii A. Gray = *Ipomopsis havardii*

Loeselia matthewsii A. Gray = *Langloisia matthewsii* (A. Gray) E. Greene
(= *Loeseliastrum*)

Loeselia schottii A. Gray = *Langloisia schottii* (Torrey) E. Greene (= *Loeseliastrum*)

Loeselia setosissima A. Gray = *Langloisia setosissima* (Torrey & A. Gray)
E. Greene

Loeselia tenuifolia A. Gray = *Ipomopsis tenuifolia* (A. Gray) V. Grant

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INDEX TO NAMES WITHIN *LOESELIA* (SYNONYMS IN ITALICS)

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<i>Cantua glandulosa</i>	4a	<i>Loeselia glandulosa</i> subsp. <i>cervantesii</i>	4a
<i>Cantua hoitzia</i>	9	<i>Loeselia glandulosa</i> var. <i>conglomerata</i>	4b
<i>Hoitzia amplexens</i>	8	<i>Loeselia glandulosa</i> var. <i>hirsuta</i>	4b
<i>Hoitzia aristata</i>	2	<i>Loeselia glandulosa</i> var. <i>nepetifolia</i>	10
<i>Hoitzia capitata</i>	4b	<i>Loeselia glandulosa</i> var. <i>ramosissima</i>	4b
<i>Hoitzia cervantesii</i>	4b	<i>Loeselia glandulosa</i> var. <i>scabra</i>	4b
<i>Hoitzia coccinea</i>	9	<i>Loeselia grandiflora</i>	5
<i>Hoitzia caerulea</i>	1	<i>Loeselia greggii</i>	6
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<i>Hoitzia loeselia</i>	2	<i>Loeselia mexicana</i>	9
<i>Hoitzia lupulina</i>	2	<i>Loeselia mexicana</i> var. <i>lutea</i>	9
<i>Hoitzia mexicana</i>	9	<i>Loeselia nepetifolia</i>	10
<i>Hoitzia nepetifolia</i>	10	<i>Loeselia pumila</i>	11
<i>Hoitzia pumila</i>	11	<i>Loeselia purpusii</i>	12
<i>Hoitzia ramosissima</i>	4b	<i>Loeselia rupestris</i>	13
<i>Hoitzia scabra</i>	4b	<i>Loeselia ramosissima</i>	4b
<i>Hoitzia scariosa</i>	1	<i>Loeselia scariosa</i>	1
<i>Hoitzia spicata</i>	4b		
<i>Loeselia amplexens</i>	8		
<i>Loeselia amplexens</i> f. <i>cordifolia</i>	3		
<i>Loeselia aristata</i>	2		
<i>Loeselia caerulea</i>	1		
<i>Loeselia caerulea</i> var. <i>rupestris</i>	13		
<i>Loeselia cervantesii</i>	4b		
<i>Loeselia ciliata</i>	2		
<i>Loeselia ciliata</i> var. <i>echinophylla</i>	2		
<i>Loeselia coccinea</i>	9		
<i>Loeselia columbiana</i>	4		
<i>Loeselia conglomerata</i>	4b		

**SYNOPSIS OF MEXICAN AND CENTRAL AMERICAN SPECIES OF *STACHYS*
(LAMIACEAE)**

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ABSTRACT

A synoptical study of the Mexican and Central American species of *Stachys* is rendered. Thirty-eight species are recognized, as follows: *S. agraria*, widespread and weedy; *S. ajugoides*, Baja California and U.S.A.; *S. albotomentosa*, with two varieties, var. *albotomentosa* (from Hidalgo) and var. *potosina* B.L. Turner (from San Luis Potosí); *S. aristata*, endemic to Jalisco; *S. arriagana* B.L. Turner, *sp. nov.*, endemic to San Luis Potosí; *S. bigelovii*, northcentral México and closely adjacent U.S.A.; *S. boraginoides*, southcentral México; *S. calcicola*, Guatemala highlands; *S. coccinea*, widespread and common; *S. collina*, southernmost Puebla; *S. drummondii*, border regions of northeastern México and U.S.A.; *S. eriantha*, mostly eastcentral México; *S. globosa*, southcentral México; *S. grahamii*, widespread and common; *S. herrerana*, endemic to Hidalgo; *S. hintoniorum* B.L. Turner, *sp. nov.*, southeastern Coahuila and closely adjacent Nuevo León; *S. inclusa*, southern Puebla and closely adjacent Oaxaca; *S. jaimehintonii*, endemic to eastern Michoacán; *S. keertii*, southcentral México; *S. langmaniae*, southern Nuevo León and closely adjacent Tamaulipas; *S. lindensii*, southcentral México and Guatemala; *S. mohinora* B.L. Turner, *sp. nov.*, southern Chihuahua; *S. moorei* B.L. Turner, *sp. nov.*, endemic to Hidalgo; *S. nepetifolia*, eastcentral México; *S. nubilorum*, Guatemala; *S. pacifica*, westernmost México; *S. penanevada* B.L. Turner, *sp. nov.*, endemic to southernmost Nuevo León and closely adjacent Tamaulipas; *S. pilosissima*, widespread from southern México to Costa Rica; *S. pittieri*, Costa Rica; *S. pringlei*, Hidalgo and Querétaro; *S. radicans*, southern México; *S. rotundifolia*, southern México; *S. sanchezii*, southcentral México; *S. sandersii* B.L. Turner, *sp. nov.*, endemic to western San Luis Potosí; *S. tenerrima*, Cape region of Baja California; *S. torresii*, endemic to Oaxaca; *S. venulosa*, endemic to western Durango; *S. vulnerabilis*, endemic to Cerro Potosí, Nuevo León. A key to the 38 species is provided, along

with complete synonymy. Distributional maps are constructed for all taxa, except for those populations occurring in Costa Rica (namely *S. pilosissima* and *S. pittieri*).

KEY WORDS: Lamiaceae, *Stachys*, México, Guatemala, Costa Rica

Stachys (s.l.) is a large, widely distributed, difficult genus occurring throughout the temperate and subtropical regions of the world. Epling (1934) provided a revisional treatment of the North American elements in which 28 species were recognized as occurring in México and Central America. Nelson (1981) treated the species of the southeastern U.S.A. (although definitive, some of his varietal taxa appear to lack morphogeographical coherence), while Mulligan & Munro (1989) provided an excellent taxonomic account of the North American species north of México, the latter buttressed by considerable field study, including chromosomal work. Mulligan & Munro concluded that 32 species of *Stachys* occurred in North America, north of México: 25 native species, the remainder introduced. In the present synopsis, which began as an attempt to identify various Mexican taxa related to *S. agraria*, I recognize 38 species, all believed to be native, as occurring in México and Central America, bringing to about 60 the number of species that appear to be native to North America. In that I have described a number of new species, both in a previous (Turner 1993) and the present paper from relatively limited herbarium material, it is highly likely that additional new species will come to the fore, since it is clear that many of the taxa are localized montane endemics (e.g., *S. albotomentosa*, *S. aristata*, *S. arriagana*, *S. calcicola*, *S. collina*, *S. herrerana*, *S. hintoniorum*, etc.).

ARTIFICIAL KEY TO MEXICAN AND CENTRAL AMERICAN *STACHYS*

1. Corolla tubes 12-25 mm long, orangish-red to red. (2)
1. Corolla tubes 2-12(-13) mm long, white, pink, pale blue to lavender. . (7)
 2. Leaves densely white-velvety beneath; San Luis Potosí, Hidalgo. 3. *S. albotomentosa*
 2. Leaves variously pubescent beneath, but not velvety. (3)
3. Angles of stem beset with stiff, retrorse, broad-based prickles. 21. *S. lindeni*
3. Angles of stem variously pubescent but prickles absent. (4)

4. Bracts of inflorescence thin, broad, and leafy, 15-25 mm wide and about as long as wide; Michoacán. 18. *S. jaimehintonii*
4. Bracts of inflorescence not as described in the above. (5)
5. Midstem leaves large and thin, mostly 8-15 cm long, their petioles mostly (3-)4-10 cm long; calyx tube 3-5(-6) mm long; mostly Pacific-side of México. 26. *S. pacifica*
5. Midstem leaves smaller and thicker, mostly 6-10(-12) cm long, their petioles 2-3(-4) cm long; calyx tube 6-10 mm long. (6)
6. Calyx lobes 6-7 mm long; longer than the tube; Oaxaca.
..... 35. *S. torresii*
6. Calyx lobes 2-5 mm long, shorter than the tube; widespread.
..... 9. *S. coccinea*
- 7(1). Stamens included within the tube, only slightly extending beyond the orifice, if at all. (8)
7. Stamens exerted beyond the orifice of the tube for 0.5-6.0 mm. (11)
8. Corolla tubes 7-8 mm long. 24. *S. nepetifolia*
8. Corolla tubes (2-)3-6 mm long. (9)
9. Corolla tubes 2-4 mm long; Nuevo León. 16. *S. hintoniorum*
9. Corolla tubes 4-6 mm long; southern México. (10)
10. Midstem vestiture 0.3 mm high or less; Puebla, Oaxaca.
..... 17. *S. inclusa*
10. Midstem vestiture 0.5-1.0 mm high; Michoacán, Oaxaca.
..... 19. *S. keerlii*
11. Corolla tubes 2-4 mm long. 1. *S. agraria*
11. Corolla tubes (4-)5-12 mm long. (12)
12. Upper lips 2.0-2.9 mm long. (13)
12. Upper lips 3.0-6.5 mm long. (22)
13. Plants of Costa Rica. 29. *S. pittieri*
13. Plants of Nicaragua and northwards. (14)
14. Corollas w/o a well-defined annulus within the lower portion of the tubes. (15)

14. Corollas with a well-defined annulus within the lower portion of the tubes. (17)
15. Corolla tubes 4-7 mm long. (16)
15. Corolla tubes 10-12 mm long; Chihuahua. 6. *S. bigelovii*
16. Leaves 3-4 times as long as wide; lower lips 5-7 mm long; Nuevo León and Tamaulipas. 27. *S. penanevada*
16. Leaves 1.0-2.5 times as long as wide; lower lips 3-4 mm long; widespread. 12. *S. eriantha*
17. Nutlets pubescent; San Luis Potosí, Hidalgo. (18)
17. Nutlets glabrous. (19)
18. Calyx 6-7 mm long; corolla tubes 5-9 mm long; Hidalgo. 23. *S. moorei*
18. Calyx 9-10 mm long; corolla tubes 10-11 mm long; San Luis Potosí. 5. *S. arriagana*
19. Flowers 4-8 to a node, the nodal clusters at maturity (after corolla loss) 10-15 mm across, not patently globose. (21)
19. Flowers 10-20 to a node, the nodal clusters at maturity 20-25 mm across, patently globose in fruit. (20)
20. Flowers mostly 10-12 to a node; vestiture sparse, ca. 0.5 mm high; calyx lobes contorting with age. 13. *S. globosa*
20. Flowers (12-)14-20 to a node; vestiture conspicuous, 1.0-1.5 mm high; calyx not much contorting with age. 34. *S. sandersii*
21. Midstems (and leaves) glabrous or nearly so; Jalisco. 4. *S. aristata*
21. Midstems conspicuously pubescent; widespread. 14. *S. grahamii*
- 22(12). Stems elongate, reclining or scrambling, beset with broad-based spreading hairs or prickles, or else the hairs densely retrorse and confined to angles of the stem. (23)
22. Stems not as described in the above, the hairs not broad-based or prickly. (24)
23. Hairs broad-based; corolla tubes mostly 11-13 mm long; Guatemala. 25. *S. nubilorum*

- 23. Hairs not broad-based; corolla tubes mostly 9-10 mm long; México. ...
 7. *S. boraginoides*
- 24. Plants of Baja California. (25)
- 24. Plants not of Baja California. (27)
- 25. Corolla tubes 9-14 mm long. 35. *S. tenerrima*
- 25. Corolla tubes 6-9 mm long. (26)
- 26. Plants annual.35. *S. tenerrima*
- 26. Plants perennial.2. *S. ajugoides*
- 27(24). Calyces 3-4 mm long; southern Puebla. 10. *S. collina*
- 27. Calyces 4-9 mm long. (28)
- 28. Flowers 10-20 per node, arranged in globose clusters. (29)
- 28. Flowers 1-8 per node, not in globose clusters. (30)
- 29. Flowers mostly 10-12 to a node; vestiture sparse, ca. 0.5 mm high; calyx lobes contorting with age. 13. *S. globosa*
- 29. Flowers (12-)14-20 to a node; vestiture conspicuous, 1.0-1.5 mm high; calyx not much contorting with age. 33. *S. sandersii*
- 30. Plants of Guatemala and southwards. (31)
- 30. Plants of México. (33)
- 31. Leaves mostly 3-5 cm long. 28. *S. pilosissima*
- 31. Leaves mostly 1-3 cm long; upper lips 5-6 mm long. (32)
- 32. Calyces densely pilose with hairs 0.5-1.0 mm long; subalpine plants (3000-3500 m). 8. *S. calcicola*
- 32. Calyces sparsely strigose to subglabrous, the hairs 0.1-0.3 mm long; lower to mid-elevational montane plants (2000-3000 m, rarely higher). 30. *S. radicans*
- 33. Flowers mostly 1 or 2 to a node. 32. *S. rotundifolia*
- 33. Flowers mostly 4-8 to a node. (34)
- 34. Corolla tubes w/o an annulus. (35)
- 34. Corolla tubes annulate. (38)

35. Corolla tubes 7-8 mm long; Cerro El Potosí, Nuevo León.
38. *S. vulnerabilis*
35. Corolla tubes 5-7 mm long; not on Cerro El Potosí, Nuevo León. ..(36)
36. Calyces 3-4 mm long; southern Pueblo. 10. *S. collina*
36. Calyces 5-6 mm long; Chihuahua, Jalisco.(37)
37. Upper lip of corollas ca. 3 mm long; Jalisco. 4. *S. aristata*
37. Upper lip of corollas 5-6 mm long; Chihuahua. 22. *S. mohinora*
- 38(34). Stems prostrate, rooting at the nodes; leaves mostly 1.0-2.3 cm
 long. 31. *S. radicans*
38. Stems ascending to erect; leaves mostly 3-6 cm long. (39)
39. Corolla tubes 5.0-6.5 mm long; northern Nuevo León and northern
 Tamaulipas. 11. *S. drummondii*
39. Corolla tubes 6-11 mm long. (40)
40. Corolla tubes mostly 6-7 mm long.(41)
40. Corolla tubes mostly 7-11 mm long. (42)
41. Flowers mostly 6-10 to a node; Durango.37. *S. venulosa*
41. Flowers mostly 4-6 to a node; Hidalgo.15. *S. herrrerana*
42. Petioles of midstem leaves mostly 3.5-4.5 cm long; Michoacán,
 México to Veracruz, Oaxaca, Chiapas, and Guatemala southwards.
 28. *S. pilosissima*
42. Petioles of midstem leaves mostly 0.5-2.5 cm long. (43)
43. Calyx tubes 6-7 mm long; stems trailing to semi-erect; México state,
 Pueblo, Veracruz. 33. *S. sanchezii*
43. Calyx tubes 5-6 mm long; stems \pm erect; Nuevo León to Hidalgo. .(44)
44. Calyx lobes mostly 3.0-3.5 mm long; the calyx tubes with hairs
 mostly 0.1-0.2 mm long; Hidalgo. 30. *S. pringlei*
44. Calyx lobes 2.0-2.8 mm long; calyx tube with hairs 0.4-0.8 mm
 long; Nuevo León. 20. *S. langmaniae*

1. *STACHYS AGRARIA* Cham. & Schlecht., *Linnaea* 5:100. 1830. TYPE: MEXICO. Veracruz: vicinity of Xalapa, 1819, *Schiede 143* (HOLOTYPE: destroyed; Isotype: HAL).

Stachys umbrosa Scheele, *Linnaea* 22:595. 1849. TYPE: U.S.A. Texas: Comal Co., near New Braunfels, 1846-1847, *Roemer s.n.* (HOLOTYPE: not located).

Stachys confusa Briq., *Annuaire Conserv. Jard. Bot. Genève* 2:122. 1898. TYPE: U.S.A. Texas: "Brazos River", 1833-1835, *Drummond s.n.* (HOLOTYPE: G; Isotypes: GH!, K).

Stachys polysegia Briq., *Annuaire Conserv. Jard. Bot. Genève* 13:385. 1911. TYPE: MEXICO. Tamaulipas: near San Juan, 1902, *Kemp s.n.* (HOLOTYPE: NY).

Stachys agraria is a common annual weedy species over most of eastern Texas, extending eastwards into the southeastern U.S.A. and southwards into México (Figure 1) where it becomes quite variable, especially as to habit. It is usually readily identified by its small annulate corollas which barely emerge from their calyces. The above synonymy follows, in part, the account of Mulligan & Munro (1989). They note that some workers have used the name *S. crenata* Raf. for this taxon, which appears ill-advised since that name is poorly described and cannot be typified.

2. *STACHYS AJUGOIDES* Benth., *Linnaea* 6:80. 1831. TYPE: U.S.A. California: w/o specific locality, 1830, *Chamisso s.n.* (HOLOTYPE: K).

Stachys mexicana Moçoiño & Sessé *ex* Benth., *Lab. Gen. & Sp.* 541. 1834. (*cf.* Mulligan & Munro 1989, re typification).

Stachys rigida Nutt. *ex* Benth. *in* DC., *Prodr.* 12:472. 1848. TYPE: U.S.A. Oregon/Washington (?): Columbia River, 1810-1812, *Nuttall s.n.* (LECTOTYPE: PHIL, designated by Mulligan & Munro 1989, although the lectotype should reside at K).

This widespread, variable species of westernmost U.S.A. extends into northern Baja California (Figure 4). Mulligan & Munro (1989) recognized the Mexican material as belonging to *Stachys rigida*, as did Epling (1935). I follow the treatment of Anderson & Tanowitz (1994) in the Jepson Manual, who subsume *S. rigida* (and its numerous segregates and synonyms) and *S. mexicana* under *S. ajugoides*.

Epling (1935) placed *Stachys ajugoides* in his group "X" of *Stachys*, which was largely distinguished by its saccate corollas with an oblique annulus. The relationship of the group was thought to be with European species (as opposed

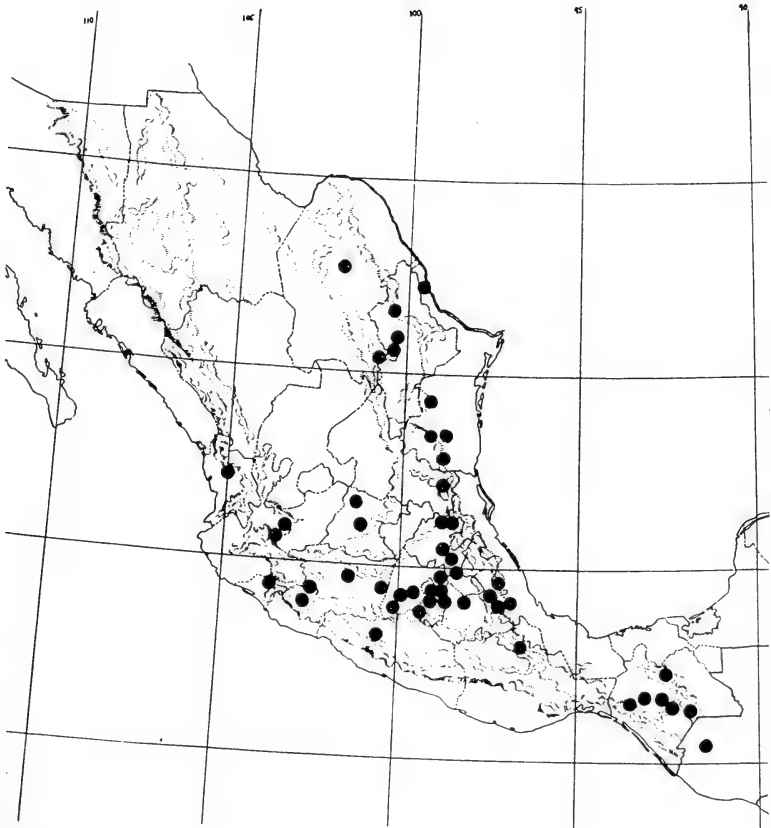


Figure 1. Distribution of *Stachys agraria* in México.

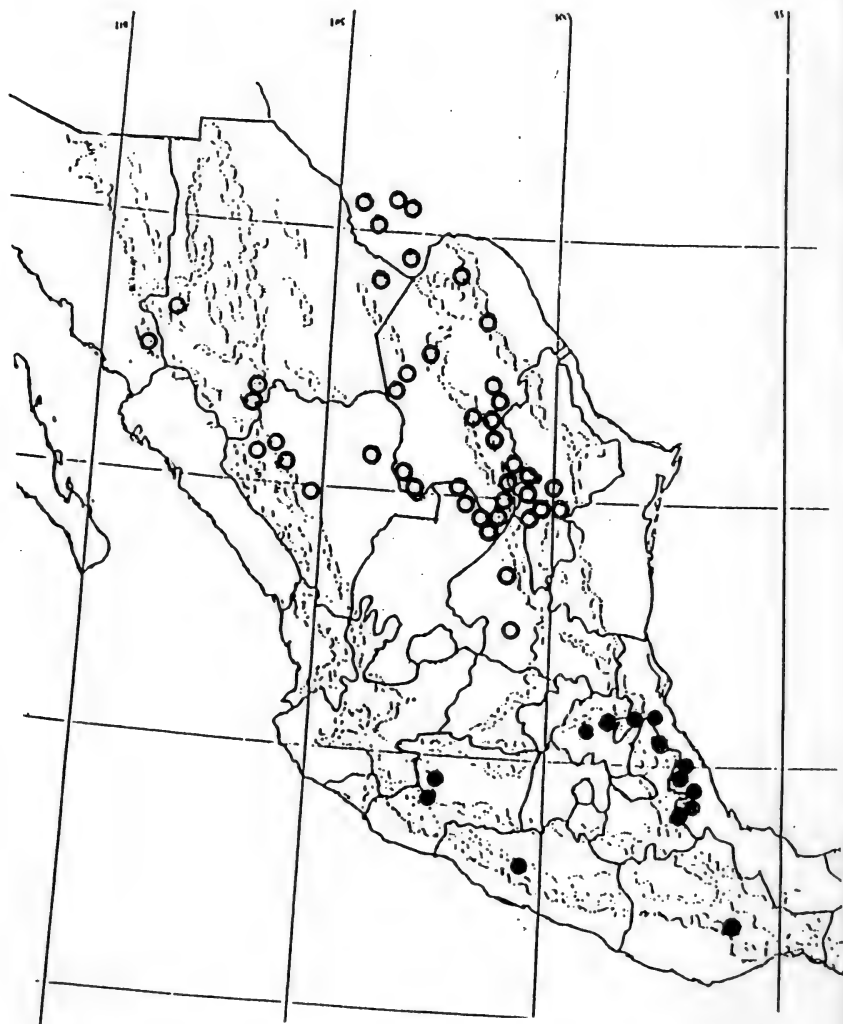


Figure 2. Distribution of *Stachys bigelovii* (open circles); *S. boraginoides* (closed circles).

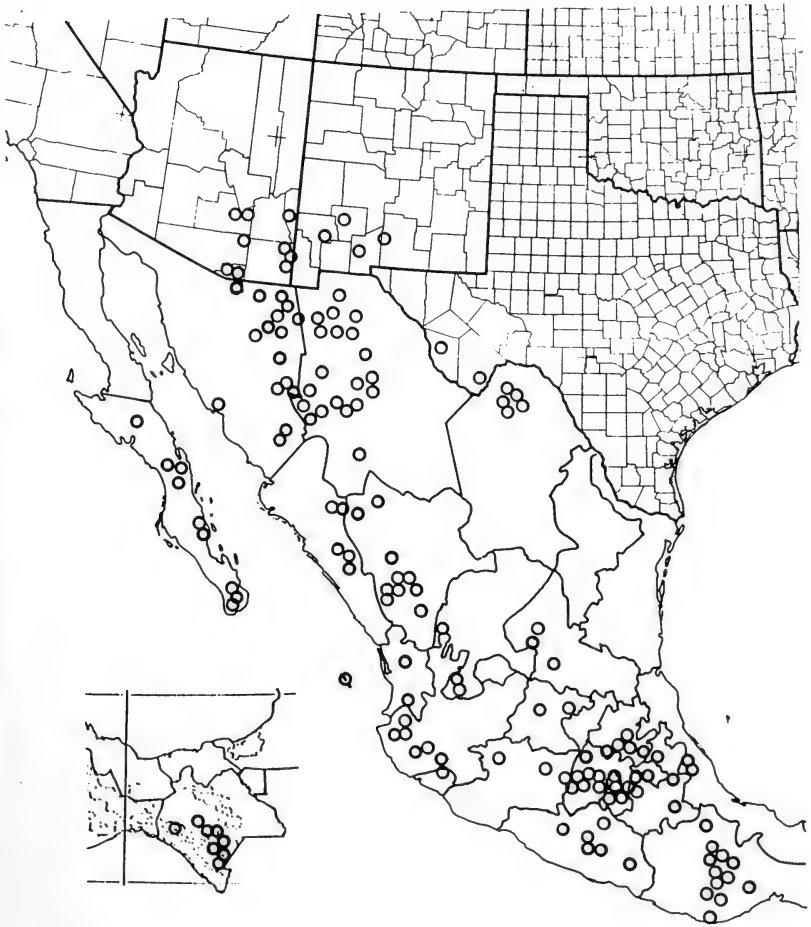


Figure 3. Distribution of *Stachys coccinea* in México and U.S.A.

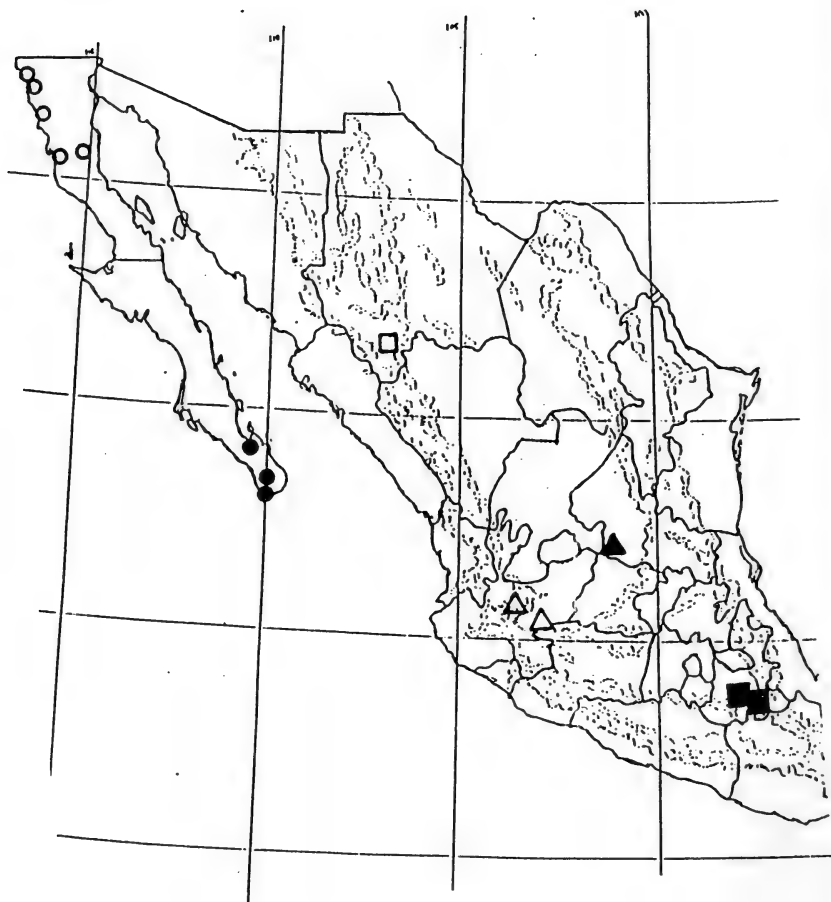


Figure 4. Distribution of *Stachys ajugoides* (open circles), *S. arriagana* (closed triangle), *S. aristata* (open triangles), *S. collina* (closed squares), *S. mohinora* (open square), and *S. tenerrima* (closed circles).

to Mexican). Mulligan & Munro (1989) reported haploid chromosome counts of $n = 33$ for *S. ajugoides* and seven other closely related species (including *S. mexicana*), this contrasting with the few Mexican taxa which have been reported to date, these having haploid numbers of $n = 32$ (*S. agraria*), $n = 41$ (*S. coccinea*) and $n = \text{ca. } 41$ (*S. drummondii*). Other chromosome numbers of *Stachys* from the U.S.A. have haploid numbers of $n = 32$ (*S. chamissonis* Benth.) or $n = 34$ (several species).

3. *STACHYS ALBOTOMENTOSA* Ramamoorthy, An. Inst. Biol. Univ. Nac. Auton. Mex. Bot. 34:158. 1987. TYPE: MEXICO. Hidalgo: Jacala, 9 Sep 1940, H.E. Moore 12 (HOLOTYPE: MEXU; Isotype: GH!).

Two varieties of this taxon are recognized by Turner (1994), as follows:

1. Midstem leaves mostly 8-12 cm long; stems silky-pilose, scarcely tomentose; San Luis Potosí. var. *potosina*
1. Midstem leaves mostly 3-5 cm long; stems densely tomentose to merely pilose; N Hidalgo. var. *albotomentosa*

- 3a. *STACHYS ALBOTOMENTOSA* Ramamoorthy var. *ALBOTOMENTOSA*

Recent collections housed at GH show this taxon to be exceedingly variable. The extremes (all from near Jacala, Hidalgo) would appear to represent two taxa. The type material has very large leaves (4.0-4.5 cm wide, less than twice as long as wide) and stems which are densely white-tomentose throughout. Two additional sheets from the same region (Moore 1316, 3794 [GH]) have leaves mostly 1.0-1.5 cm wide, 2-3 times as long as wide, with stems only moderately pilose. A collection by Hitchcock & Stanford (7278 [GH]) from the same region is more or less intermediate to these and it seems likely that all belong to a single variable taxon.

- 3b. *STACHYS ALBOTOMENTOSA* Ramamoorthy var. *POTOSINA* B.L. Turner, Phytologia 76:343. 1994. TYPE: MEXICO. San Luis Potosí: 30 mi E of San Luis Potosí along Hwy 86 to Río Verde, rocky open oak-wooded hillside, 13 Jul 1963, R.L. McGregor 631, with L.J. Harms, A.J. Robinson, R. del Rosario, & R. Segal (HOLOTYPE: LL!).

Turner (1994) cited additional collections, all from a small area to the east of San Luis Potosí. The biological status of this taxon is moot, considering the variation now known to exist in var. *albotomentosa* in the area about Jacala, Hidalgo, discussed in the above. Either a single variable taxon is involved or several localized varietal taxa.

4. *STACHYS ARISTATA* Greenm., Proc. Amer. Acad. Arts 39:87. 1903. TYPE: MEXICO. Jalisco: River ledges along the cataract of Guanaxatlán, 6 Aug 1902, C.G. Pringle 8623 (HOLOTYPE: GH!; Isotype: LL!).

This taxon is known by relatively few collections, all from the state of Jalisco (Figure 4). It superficially resembles *Stachys bigelovii* A. Gray and *S. mohinora* B.L. Turner, both of which occur in northwestern México, but both of the latter have nonannulate corollas; the holotype of *S. aristata* possesses a well-developed annulus in the corolla tube, although Epling described the corollas as exannulate.

5. *STACHYS ARRIAGANA* B.L. Turner, *sp. nov.* TYPE: MEXICO. San Luis Potosí: Mpio. Villa de Arriaga, Rancho "El Palmar", Potrero "Tortugas", al SO del Edo., "Materral crassicaule con nopalera. Suelo litosol eutricto.", 2150 m, 22 Jul 1983, I.V. Rivas M. & M. González E. 62 (HOLOTYPE: TEX!).

Stachydi moorei B.L. Turner similis sed foliis multo majoribus (4-6 cm longis vs. 8-13 cm longis) et floribus calycibus majoribus (9-10 mm longis vs. 6-7 mm longis) et tubis corollarum majoribus (10-11 mm longis vs. 4.5-5.5 mm longis).

Perennial erect or ascending herbs 60-70 cm high. Midstems 3-4 mm thick, decidedly herbaceous, minutely recurved-pilose throughout, the vestiture ca. 0.25 mm high. Midstem leaves thin, mostly 8-13 cm long, 3-4 cm wide; petioles 3-4 cm long; blades broadly ovate to subcordate, minutely but sparsely pubescent on both surfaces, the margins crenate. Flowers 6 to a node, axillary, the broad thin leaves much exceeding the flowering clusters, the pedicels ca. 1 mm long. Calyces 9-10 mm long; tubes 5.0-5.5 mm long, minutely hirsutulous with both glandular and eglandular hairs; lobes 4-5 mm long, linear-lanceolate, gradually tapering into terminal stiff awns. Corollas reportedly "de color lila", the tubes arcuate, 10-11 mm long, not annulate within, the upper lips 2.5-3.0 mm long, the lower lips ca. 6 mm long. Stamens 4, subequal, the filaments 4-5 mm long, pubescent, the anthers purple, exserted for 2-3 mm. Ovary

pubescent apically with 30-50 stiff hairs ca. 0.25 mm long, otherwise glabrous. Nutlets immature.

What with its pubescent nutlets, there is little doubt that this taxon relates to *Stachys moorei* B.L. Turner, described below. It is readily distinguished from the latter by its much larger leaves, calyces and corollas, as noted in the key to species.

6. *STACHYS BIGELOVII* A. Gray, Proc. Amer. Acad. Arts 8:371. 1872. TYPE: U.S.A. Texas: Jeff Davis Co., "Crevices of rocks (basaltic), Mountains of the Limpio, Texas", [Limpia Creek, near Fort Davis], 13 Jun 1851, *C. Wright 1595* (LECTOTYPE [designated here]: GH!; Isolectotypes: GH!, NY). Mulligan & Munro (1989), incorrectly I think, placed the holotype at NY; from the two sheets at GH I have selected the specimen bearing Gray's annotation, "*Stachys bigelovii* n. sp.", as lectotype, the other sheet lacking such notation.

This relatively uniform taxon occurs in northcentral México and closely adjacent U.S.A. (Figure 2). It superficially resembles *Stachys aristata*, *S. langmaniae* Rzed. & Rzed., and *S. vulnerabilis* Rzed. & Rzed. but is readily distinguished from all of these by having longer nonannulate corollas.

7. *STACHYS BORAGINOIDES* Cham. & Schlecht., Linnaea 5:100. 1830. TYPE: MEXICO. Veracruz: vicinity of Xalapa, May 1829, *Schiede 144* (LECTOTYPE: B, selected by Epling!, 1934, now destroyed).

Stachys boraginoides Cham. & Schlecht. var. *glandulosa* Greenm., Proc. Amer. Acad. Arts 41:245. 1905. TYPE: MEXICO. Hidalgo: baranca below Trinidad, 5 May 1904, *C.G. Pringle 8894* (HOLOTYPE: GH!; Isotypes: CAS!).

This taxon is readily recognized by its decumbent or trailing habit, relatively large rose-lavender to purple corollas, and broad-based stem hairs; 8 specimens from the state of Veracruz have all of these characters, but those from Guerrero (e.g., *Hinton 14108* [F, TEX]) and Michoacán (e.g., *Hinton 15501* [F, TEX]), while possessing similar habits and corollas, do not have markedly broad-based hairs, and their calyx lobes are mostly 2-3 mm long (vs. 3-5 mm). These more western populations may represent a different taxon.

8. *STACHYS CALCICOLA* Epling, Bull. Torrey Bot. Club 71:484. 1944. TYPE: GUATEMALA. Huehuetenango: vicinity of Chemal, summit of Sierra de los Cuchumatanes, 3700-3750 m, 8 Aug 1943, *J. Steyermark 50266* (HOLOTYPE: UC-UCLA; Isotype: F!).

Epling (1944) and Standley & Williams (1973) recognized this species. It much resembles *Stachys radicans* Epling and may be but a short-shooted form of that taxon. Interestingly, Epling (1944) recognized both *S. calcicola* and *S. radicans* as occurring in alpine areas in the Sierra de los Cuchumatanes, but Standley & Williams recognized only the former. It is likely that additional study will show the two taxa to be the same.

9. *STACHYS COCCINEA* Ort., *Nov. Pl. Descr.* Dec. 20, 1797. TYPE: MEXICO. Grown in Spain from seed reportedly collected in Cuba by Sessé (HOLOTYPE: MA; Probable isotype: F! [Ex antiguo herbaria generali, Hort Madrid ex "Nova Hispania"]). Since this taxon does not occur in Cuba, it is likely that the type was obtained in México.

Turner (1994) has provided complete synonymy in a revisionary treatment of the *Stachys coccinea* complex which includes *S. albotomentosa*, *S. jaimehintonii* B.L. Turner, *S. lindenii* Benth. in DC., and *S. pacifica* B.L. Turner. The distribution maps for these taxa in the present paper show additional collections from GH.

10. *STACHYS COLLINA* Brandege, *Univ. Calif. Publ. Bot.* 3:391. 1909. TYPE: MEXICO. Puebla: near San Luis Tultitlanapa, Jun 1908, *Purpus* 2576 (HOLOTYPE: UC!; Isotypes: F!,GH!). An isotype (F) bears the date "July 1907-8."

This taxon, known only from southern Puebla (Figure 4), superficially resembles *Stachys grahamii* Benth. but is readily distinguished from it by having much longer midstem and inflorescence internodes, leaves somewhat velvety-puberulous beneath, and corollas with an annulus 2.5-3.0 mm above the base (vs. 1.0-1.5 mm above the base). Epling (1934) described the upper lips of *S. collina* as being 3-4 mm long, but the sheets I examined, including several annotated by Epling, reveal the upper lips to be 2.5-3.0 mm long.

11. *STACHYS DRUMMONDII* Benth., *Lab. Gen. et Sp.* 551. 1834. TYPE: U.S.A. Texas: "Brazos River" [probably in westernmost Harris Co.], 1833, *Drummond s.n.* (HOLOTYPE: K).

Only two collections of this species are known from México (Tamaulipas, San José, 17 Feb 1939, *Le Sueur* 407 [TEX]; and Nuevo León, near Monterrey, *Ferguson* 7 [TEX]), although it is abundant along the Rio Grande River on the Texas side (Hidalgo and Cameron counties).

Stachys drummondii much resembles *S. grahamii* but is distinguished from the latter by having longer upper lips of the corollas, longer calyx lobes (mostly 3.5-4.5 mm vs. 2.0-3.0 mm) and longer-petiolate leaves.

12. *STACHYS ERIANTHA* Benth., *Lab. Gen. et Sp.* 549. 1834. TYPE: MEXICO. w/o locality but probably México State, 1797-1801, *Moçiño & Sessé s.n.* (HOLOTYPE: reportedly in the Lambert Herb.).

Stachys repens Mart. & Gal., *Bull. Acad. Brux.* 11, ser. 2:194. 1844. TYPE: MEXICO. Veracruz: Vaqueria del Jacal, 10,000 ft, Jun-Oct 1840, *Galeotti 682* (LECTOTYPE [selected here]: BR!; Isolectotype: K). Type material at BR (3 sheets!) consists of mixed material, all with the collection number 682 of Galeotti.

Epling (1934) treated *Stachys repens* as a synonym of *S. eriantha* but Zuniga (1985) retained the former without explanation. After examination of type material of *S. repens* I agree with Epling's assessment. It would appear that the two names both apply to the high elevational (3000-4000 m) populations of *Stachys* having prostrate stems, relatively small leaves and corollas with tubes lacking a well-defined basal annulus. The latter character readily separates *S. eriantha* from the superficially similar *S. radicans*.

As noted in the above synonymy, three sheets of *Galeotti 682* were located at BR. One of these gave as its locality "Pie d' Orizaba", 9000 ft, August 1840; this specimen was designated as the type by Epling (1934). A second sheet's label bore as its locality "Vaqueria del Jacal", 18,000 ft, Jun-Oct 1840; this sheet was examined by John Beaman in 1963 and annotated "apparently the holotype of *Stachys repens* Mart. & Gal." A third sheet bearing the number 682 but without additional specific data, was annotated by Epling in 1938 as an isotype. The latter would have been a good selection for the lectotype since it bore mature flowers (the other two sheets essentially sterile), but there is no evidence that the authors of *S. repens* actually saw the sheet concerned. All of these are unquestionably the same species but I have selected as lectotype that sheet singled out by Beaman as "holotype".

13. *STACHYS GLOBOSA* Epling, *Repert. Spec. Nov. Regni Veg. Beih.* 80:24. 1935. TYPE: MEXICO. San Luis Potosí: vicinity of Las Canoas, 15 Jul 1890, *C.G. Pringle 3217* (HOLOTYPE: UC-UCLA; Isotypes: F!,GH!).

I have separated specimens from western San Luis Potosí, which were treated by Epling as belonging to this taxon, calling these *Stachys sander-sii* B.L. Turner (discussed in more detail under the latter name).

14. *STACHYS GRAHAMII* Benth., *Lab. Gen. et Sp.* 551. 1834. TYPE: MEXICO. México State: vicinity of Tlalpujahua, 1830, *Graham 106* (HOLOTYPE: K).

Stachys parvifolia Mart. & Gal., *Bull. Acad. Brux.* 11, ser. 2:193. 1844. TYPE: MEXICO. Hidalgo: Real del Monte, 8000 ft, Jun-Oct 1840, *H. Galeotti 701* (HOLOTYPE: BR!).

?*Stachys biflora* Hook. & Arn., *Bot. Voy. Beechey* 155. 1841. TYPE: MEXICO. Nayarit(?): 1817-1828, *Lay & Collie s.n.* (HOLOTYPE: K).

Stachys agraria Cham. & Schlecht. var. *glabrior* Benth. in DC., *Prodr.* 12:479. 1848. TYPES: MEXICO. Nayarit(?): 1845-1840, *Hartweg 167* (HOLOTYPE: K).

Stachys camporum M.E. Jones, *Contr. W. Bot.* 12:70. 1908. TYPE: MEXICO. Chihuahua: Mound Valley, 18 Sep 1903, *M.E. Jones s.n.* (HOLOTYPE: CSPU; Isotypes: CAS!, GH!).

Stachys latipes Greenm., *Proc. Amer. Acad. Arts* 39:87. 1903. TYPE: MEXICO. Chihuahua: near Colonia García, 8000 ft, 17 Jul 1899, *H.T. Townsend & Barber 128* (HOLOTYPE: GH!; Isotype: F!).

Zuniga (1985) considered *Stachys grahamii* to be a synonym of *S. agraria*. I follow Epling (1935) in recognizing *S. grahamii*, distinguishing it from *S. agraria* by its seemingly perennial habit and larger corollas, the lips large and tubes well-exserted from the calyx. Both taxa are more or less sympatric (Figure 1 and Figure 7) but *S. agraria* is a more delicate plant than *S. grahamii*, having thinner, broader, leaves and much smaller corollas, as already noted. Epling (1934), Epling & Játiva (1966), and Zuniga (1985) maintained *S. parvifolia* but after examining its type I conclude that the latter name is a synonym of *S. grahamii*. Epling keyed *S. grahamii* and *S. parvifolia* next to each other, distinguishing the latter by its unequal stamens (vs. subequal), characters which I could not find reliable.

15. *STACHYS HERRERANA* Rzed. & Rzed., *Acta Bot. Mex.* 3:1. 1988. TYPE: MEXICO. Hidalgo: Mpio. de Epazoyucan, 1 km al S de El Guajolote, 3800 m, 25 Aug 1984, *Rzedowski 38464* (HOLOTYPE: ENCB; Isotype: TEX!).

Known only from type material, this species is readily recognized by its relatively narrow \pm dentate leaves and corollas with large upper lips.



Figure 5. Distribution of *Stachys globosa* (open circles), *S. langmaniae* (closed square), *S. moorei* (closed triangle), *S. sandersii* (closed circles), and *S. vulnerabilis* (open triangle).

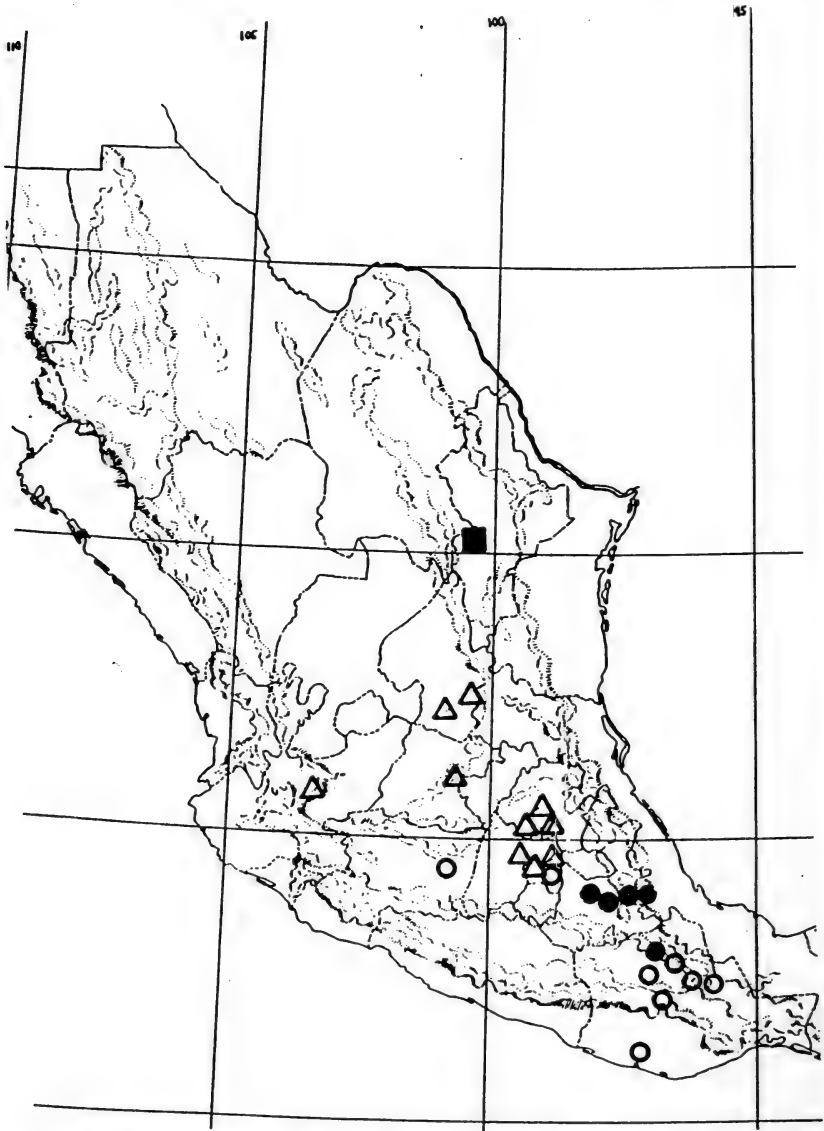


Figure 6. Distribution of *Stachys hintoniorum* (closed square), *S. inclusa* (closed circle), *S. keerlii* (open circles), and *S. nepetifolia* (open triangles).

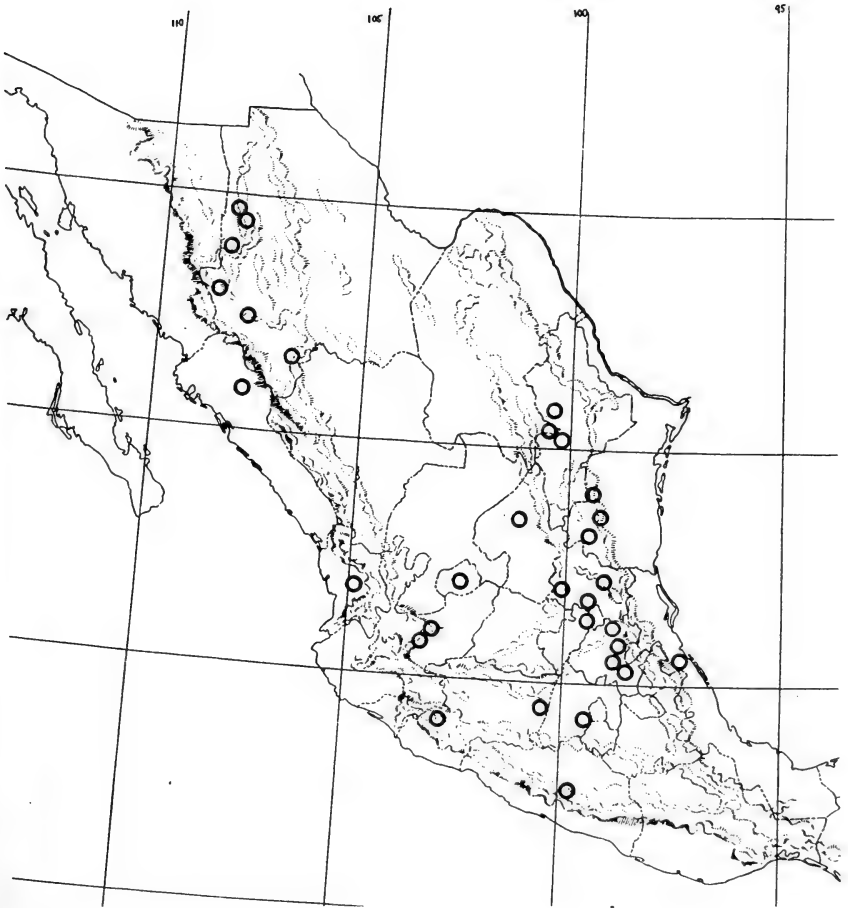


Figure 7. Distribution of *Stachys grahamii* (open circles).

16. **STACHYS HINTONIORUM** B.L. Turner, *sp. nov.* TYPE: MEXICO. Nuevo León: Mpio. Galeana, Sierra La Marta, rocky mountain side, 2900 m, 13 Jun 1981, *Hinton et al. 18294* (HOLOTYPE: TEX!; Isotype: TEX!).

Stachydi erianthae Benth. similis sed caulibus erectis (vs. prostratis), corollis minoribus (1.5-5.0 mm longis vs. 8-10 mm longis), et antheribus inclusis (vs. exsertis per ca. 1 mm).

Erect perennial herbs 15-35 cm high. Midstems moderately to densely evenly pilose, the hairs mostly 0.8-2.0 mm long, below these often occur much smaller glandular hairs. Midstem leaves mostly 3-4 cm long, 0.7-1.5 cm wide; petioles 4-10 mm long; blades lanceolate-elliptic to elliptic-lanceolate, 3-4 times as long as wide, appressed-pilose on both surfaces, the margins crenulate. Flowers mostly arranged 4 or 6 to a node on pedicels 1.0-1.5 mm long, forming interrupted bracteate spikes, the bracts obtuse, not apiculate. Calyces 4-5 mm long, pubescent like the stems, the lobes 1.5-2.0 mm long, spinose apically, the calyx tube pubescent within for ca. 1/3 its upper length. Corollas 4.5-5.0 mm long, exannulate, pink to lavender, the tube ca. 3 mm long, the upper lip 1.5-2.0 mm long, the lower lips 2-3 mm long. Anthers not exerted or only slightly so. Nutlets ovoid, brown, ca. 1.5 mm long, 1.2 mm wide, glabrous, the surfaces minutely rugose ($\times 40$).

ADDITIONAL SPECIMENS EXAMINED: MEXICO. Coahuila: Mpio. Arteaga, Sierra el Coahuilón, "vale in pine forest", 3250 m, 23 Jun 1985, *Hinton et al. 18885* (TEX). Nuevo León: Mpio. Galeana, 11.4 km S of San Pedro, along stream in pine-oak woodlands, 31 May 1983, *Cowan 3861* (TEX).

The small nonannulate corollas with stamens included or nearly so readily distinguish this taxon from most species of *Stachys* in northeastern México. Because of its small flowers it superficially resembles *S. agraria*, the latter distinguished by its yet smaller annulate corollas and annual habit. *Stachys hintoniorum* is probably closest to *S. eriantha*, a subalpine species of south-central México having \pm prostrate stems, larger corollas, and exerted anthers.

17. **STACHYS INCLUSA** Epling, *Repert. Spec. Nov. Regni Veg. Beih.* 80:25. 1935. TYPE: MEXICO. Puebla: vicinity of Mayorazgo, 2120 m, 4 Jul 1907, *Arsene 1338* (HOLOTYPE: US; Isotype: MO).

This taxon is known only from southern Puebla and closely adjacent Oaxaca (Figure 6). It superficially resembles *Stachys agraria* but is readily distinguished by its strongly perennial habit, larger nonannulate corollas, and included stamens.

18. *STACHYS JAIMEHINTONII* B.L. Turner, *Phytologia* 76:395. 1994. TYPE: MEXICO. Michoacán: Zitácuaro, Salto de Nandia, bushy bank by orchard, 1500 m, 26 Dec 1938, *Jaime Hinton 13489* (HOLOTYPE: LL!; Isotypes: GH!,TEX!).

This taxon is known only by type material and relates to the *Stachys coccinea* complex (Turner 1994).

19. *STACHYS KEERLII* Benth., *Lab. Gen. et Sp.* 551. 1834. TYPE: MEXICO. Michoacán: vicinity of Talpujahua, 1833, *Keerl s.n.* (HOLOTYPE: K).

Stachys excelsa Mart. & Gal., *Bull. Acad. Brux.* 11, ser. 2:194. 1844. TYPE: MEXICO. Oaxaca: savannas in the vicinity of Juquila, 8000 ft, Sep-Nov 1840, *Galeotti 662* (HOLOTYPE: BR!; Isotypes: BR!,K!).

This taxon is distinguished from the closely related *Stachys nepetifolia* Desf. ex Pers. by its short corolla tubes (4-5 mm long vs. 6-8 mm) and lilac flowers (vs. white or rose-colored). It is known to occur in Michoacán, México State, and Oaxaca (Figure 6).

Stachys excelsa was placed in synonymy with the present species by Epling (1934); after examination of type material I agree with his disposition.

20. *STACHYS LANGMANIAE* Rzed. & Rzed., *Acta Bot. Mex.* 3:1. 1988. TYPE: MEXICO. Nuevo León: Mpio. Zaragoza, Encantada, 2320 m, pine-oak forests, 17 Jun 1979, *Hinton et al. 17545* (HOLOTYPE: ENCB; Isotypes: CAS!,TEX!).

This taxon, confined to southern Nuevo León and closely adjacent Tamaulipas (Figure 5), is closely related to *Stachys pringlei* Greenm. of western Hidalgo, but is readily distinguished from it by having smaller calyces with shorter lobes.

21. *STACHYS LINDENII* Benth., in DC., *Prodr.* 12:467. 1848. TYPE: MEXICO. Tabasco: vicinity of Teapa, 1843-1844, *Linden 127* (LECTO-TYPE: K, selected by Epling 1934).

This taxon belongs to the *Stachys coccinea* complex and is treated in more detail by Turner (1994). Epling (1934) designated from among three different collections examined, *Linden 127* as lectotype; Munro (by annotation) erroneously labeled this sheet as "holotype".

22. **STACHYS MOHINORA** B.L. Turner, *sp. nov.* TYPE: MEXICO. Chihuahua: summit of Sierra Mohinora, in conifer forest, 10,000-10,300 ft, 16-17 Oct 1959, *D.S. Correll & H.S. Gentry 23181* (HOLOTYPE: LL!).

Stachydi vulnerabili Rzed. & Rzed. similis sed calycibus apiculatis (vs. spinosis) minoribus (5-6 mm longis vs. 7-8 mm longis) lobis latioribus (loborum latitudine longitudinem aequanti vs. lobis 2-3 plo longioribus quam latioribus) et corolla absque annule prope basim interiorem tubi differt.

Perennial erect or ascending herbs 10-30 cm high. Midstems 1-2 mm across, sparsely to moderately pilose with hairs 0.5-1.0 mm long. Midstem leaves mostly 3-6 cm long, 1.5-2.5 cm wide; petioles 0.8-2.0 cm long; blades ovate to subdeltoïd, pilose beneath like the stems, the margins crenate. Flowers 4-6 to a node, arranged in terminal bracteate interrupted spikes, the pedicels ca. 1 mm long. Calyces 5-6 mm long; tubes 3.0-3.5 mm long, pilose like the stems; lobes triangular, about as wide as long, apiculate, scarcely spinose. Corollas reportedly "salmon-red"; tubes 7-8 mm long, not annulate within; upper lips ca. 4 mm long; lower lips 7-9 mm long. Nutlets ovoid, brown, ca. 3 mm long, 1.5 mm wide, glabrous, the surface minutely rugose ($\times 40$).

ADDITIONAL COLLECTION EXAMINED: MEXICO. Chihuahua: Mpio. Guadalupe y Calvo, Cerro de Mohinora, Sierra de Guadalupe y Calvo, 3300 m, 27 Aug 1987, *McDonald & Martínez 2387* (TEX).

This subalpine taxon is seemingly most closely related to the recently described *Stachys vulnerabilis*, a subalpine endemic confined to Cerro Potosí, Nuevo León. *Stachys mohinora* is readily distinguished from *S. vulnerabilis* in having smaller calyces (5-6 mm long vs. 6-7 mm long) with broader lobes (ca. as long as broad), and apiculate apices (vs. 2-3 times as long as broad with spinose tips).

23. **STACHYS MOOREI** B.L. Turner, *sp. nov.* TYPE: MEXICO. Hidalgo: District Metztitlán, "Steep rocky, volcanic outcrops at head of descent into Barranca de Metztitlán, between Zoquital and Los Venados," ca. 2000 m, 31 Jul 1948, *H.E. Moore & C.E. Wood, Jr. 4199* (HOLOTYPE: TEX!).

Stachydi grahamii Benth. similis sed floribus 6 per nodum (vs. 8-10) et nuculis valde pubescentibus ad apices (vs. glabris).

Perennial (?) erect suffruticose herbs 30-50 cm high. Midstems ca. 2 mm thick, brittle, moderately pilose with spreading hairs 0.5-1.0 mm long. Midstem leaves thin, 4-6 cm long, 1.7-2.5 mm wide; petioles mostly 2.0-3.5 cm

long; blades broadly ovate to triangular, rarely subcordate, sparsely pilose beneath, 3-nervate, the margins crenate. Flowers 6 to a node, arranged in terminal bracteate interrupted spikes, their pedicels 1-2 mm long. Calyces 6-7 mm long; tubes 3-4 mm long, pilose with both eglandular and glandular hairs, the lobes lanceolate, 2.5-3.5 mm long, gradually narrowed to a terminal spine. Corollas reportedly "pink", the tubes 5-9 mm long, not annulate within, the upper lips 2.5-3.5 mm long, the lower lips 4-6 mm long. Stamens 4, subequal, the filaments ca. 2.5 mm long, pubescent, the anthers purple, exerted for ca. 1.5 mm. Ovary markedly pubescent at the apex with 40-60 trichomes ca. 0.25 mm long, otherwise glabrous. Nutlets (immature), broadly oblanceolate in outline, glabrous, ca. 2 mm long, 1.2 mm wide.

ADDITIONAL COLLECTION EXAMINED: MEXICO. Hidalgo: Mpio. Zimapan, 12 km N of Zimapan, ca. 170 m, 5 Sep 1979, *Hernández M. 3672* (CAS).

Stachys moorei superficially resembles *S. grahamii*, and the holotype was annotated in 1965 with that name by Epling (albeit with a query). It differs from all other Mexican species of my acquaintance except for *S. arriagana*, described above, in having a markedly pubescent ovary, the erect stiff hairs persisting upon the young nutlets. The specimen from near Zimapan has corolla tubes nearly twice as long as type material, otherwise the two collections cited are very similar.

It is a pleasure to name this taxon for Dr. H.E. Moore, longtime Professor at Cornell University and ardent collector in Hidalgo, México.

24. *STACHYS NEPETIFOLIA* Desf. *ex Pers.*, *Syn. Pl.* 2(1):123. 1807. TYPE: MEXICO. México State (?): probably collected by Sessé & Moçino during the period 1797-1801; presumably grown in the Royal Botanical Garden Madrid, from whence dried plants were distributed (HOLOTYPE: P?).

Stachys nepetifolia Cav., *Descr. Pl.* 1:74. 1802. TYPE: probably original source of above material, but this is uncertain (HOLOTYPE: MA).

Epling (1935) included this name as questionably synonymous with *Stachys nepetifolia* Desf. *ex Pers.*, but I suspect that both names are based upon the same "ultimate" types, as noted in the above. Regardless, Garilleti (1993) could not locate type material in Madrid.

Stachys nepetifolia is known to occur in the states of México, Hidalgo, and San Luis Potosí (Figure 6). Zuniga (1985) noted that *S. nepetifolia* is distinguished from the closely related *S. keerlii* by its larger white corollas.

25. *STACHYS NUBILORUM* Epling, Repert. Spec. Nov. Regni Veg. Beih. 80:48. 1934. TYPE: GUATEMALA. Chimaltenango: vicinity of Santa Elena, 2400-2700 m, 18 Jul 1933, *Skutch 209* (HOLOTYPE: US; Isotype: F!).

This taxon is probably closest to the Mexican *Stachys boraginoides*, having the habit and general pubescence of that species, but differs in having larger flowers and a much less prickly pubescence, if at all. Epling (1944) reported a collection from the Department of Huehuetenango (Sierra de los Cuchumatanes) with characters approaching those of *S. boraginoides* (s.l.). Standley & Williams (1973) suggested that *S. nubilorum* is "very closely allied to *S. coccinea* and perhaps only a variety of it." Turner (1994), however, excluded *S. nubilorum* from the *S. coccinea* complex, largely because of its blue or purple corollas (vs. red or orange-red).

26. *STACHYS PACIFICA* B.L. Turner, *Phytologia* 76:396. 1994. TYPE: MEXICO. Michoacán: Distr. Apatzingan, Aguililla, on cliffs, 12 Oct 1930, *Hinton et al. 15319* (HOLOTYPE: LL!; Isotype: F!).

This taxon is largely confined to western México (Figure 11). It is part of the *Stachys coccinea* complex and is treated in more detail by Turner (1994).

27. *STACHYS PENANEVADA* B.L. Turner, *sp. nov.* TYPE: MEXICO. Tamaulipas: en route to Peña Nevada out of Hermosa, 18 Jul 1949, *Stanford, Lauber, & Taylor 2515* (HOLOTYPE: GH!).

Stachydi vulnerabili Rzed. & Rzed. similis sed foliis plerumque basalibus ovati-ellipticis vel ellipticis 3-4-plo longioribus quam latioribus (vs. plerumque late ovatis vel subcordatis, 1.0-2.5 plo longioribus quam latioribus), in amplitudine sursum abrupte deminutis, foliis midcaulinis sessilibus (vs. petiolatis), et lobis superis corollae minoribus (2.0-2.5 mm longis vs. 3-4 mm longis).

Erect or ascending herbs 15-30 cm high. Midstems pubescent with pilose delicate hairs 0.5-1.0 mm long, \pm glabrous with age. Basal leaves mostly 6-8 cm long, abruptly reduced upwards, 1.5-2.0 cm wide, their petioles 2-3 cm long. Midstem leaves linear-elliptic, sessile, 1.5-5.0 cm long, 0.4-0.9 cm wide. Flowers arranged in clusters forming terminal interrupted spikes, each cluster with 4-6 flowers on pedicels 0.5-1.0 mm long. Calyces 5-6 mm long; tubes 3.5-4.0 mm long, pubescent like the stems with either eglandular or both glandular and eglandular hairs; lobes deltoid, apiculate, ca. as long as wide. Corollas lavender with white throats; tubes 4-5 mm long, nonannulate; upper

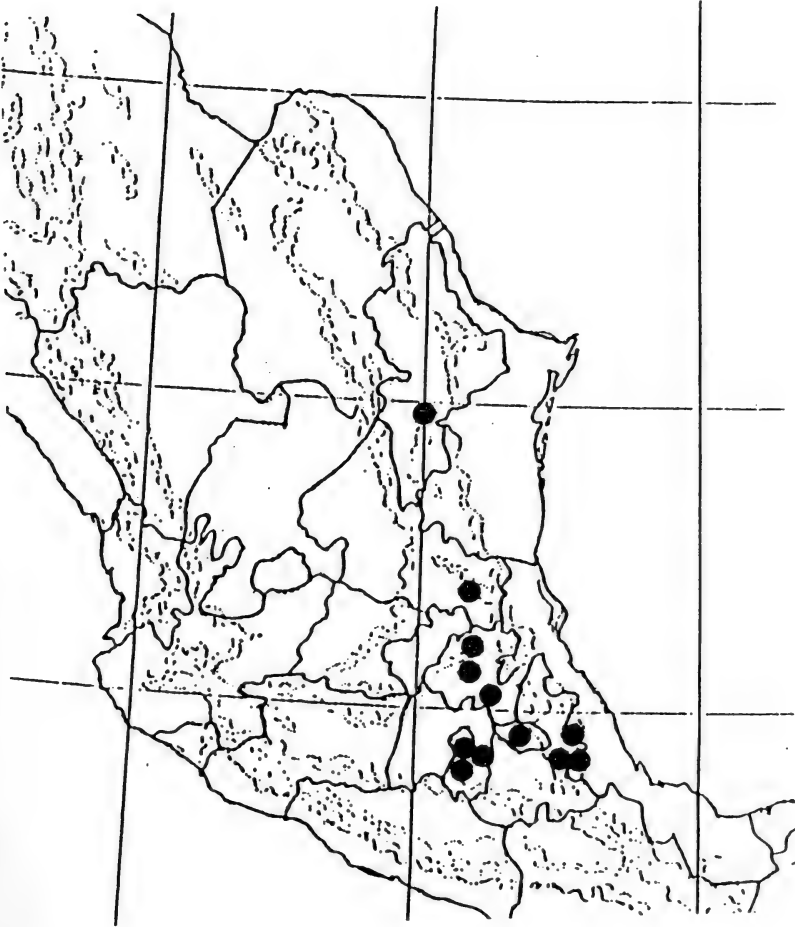


Figure 8. Distribution of *Stachys eriantha* (closed circles).



Figure 9. Distribution of *Stachys rotundifolia* (open circles) and *S. sanchezii* (closed circles).



Figure 10. Distribution of *Stachys lindenii* (closed circles), *S. albotomentosa* var. *albotomentosa* (open triangles), and *S. a.* var. *potosina* (closed triangle).

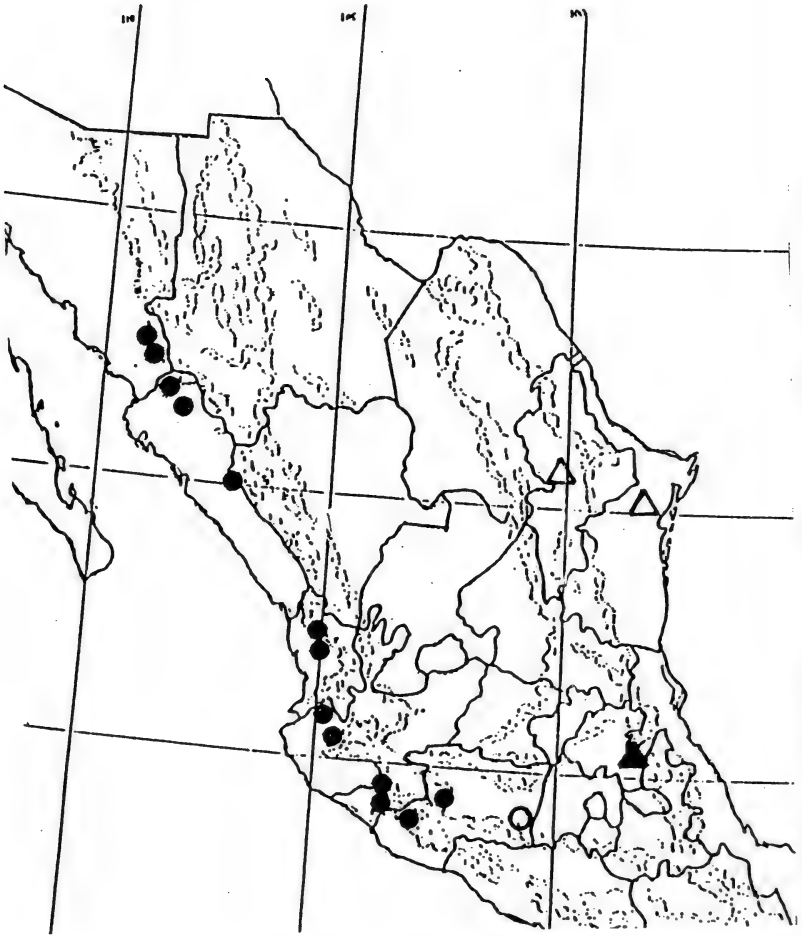


Figure 11. Distribution of *Stachys drummondii* (open triangles), *S. herrerana* (closed triangle), *S. jaimehintonii* (open circle), and *S. pacifica* (closed circles).

lips 2.0-2.5 mm long; lower lips 6-7 mm long. Nutlets ovoid, brown, somewhat compressed, ca. 1.5 mm long, 1.5 mm wide, glabrous, finely reticulate ($\times 40$).

ADDITIONAL SPECIMEN EXAMINED: MEXICO. Nuevo León: area of Peña Nevada, ca. 12 km NE of San Antonio Peña Nevada, ca. 30 km E of Doctor Arroyo, N and NW slopes of mountain locally known as Picacho Onofre, ridges and valleys ca. 5 km to the NW of this peak, Jul 1977, *Wells & Nesom 339* (LL).

This taxon is closely related to *Stachys vulnerabilis* but the latter is markedly different in both habit and corolla shape, as noted in the above diagnosis. It might also be confused with *S. eriantha*, the latter also having nonannulate corolla tubes and relatively small upper lips. *Stachys penanevada* is readily distinguished from the latter by its habit, leaf shape, and corollas with longer tubes.

28. *STACHYS PILOSISSIMA* Mart. & Gal., Bull. Acad. Brux. 11, ser. 2., 194. 1844. TYPE: MEXICO. Oaxaca: savannas about Cd. San Felipe, "Yavezia et Sierria," 7000-8000 ft, May-Sep 1840, *H. Galeotti 647* (HOLOTYPE: BR!; Isotype: BR!).

Stachys flaccida Fernald, Proc. Amer. Acad. Arts 35:563. 1900. TYPE: MEXICO. Oaxaca: Hacienda de Caciques, "Distr. of Cuicatlan," 2150 m, 4 Aug 1895, *L.C. Smith 612* (HOLOTYPE: GH!).

Stachys exilis Epling, Repert. Spec. Nov. Regni Veg. Beih. 80:25. 1935. TYPE: MEXICO. Oaxaca: Cerro Verde, Jul 1908, *C. Purpus 3298* (HOLOTYPE: GH!; Isotypes: F!,MO).

?*Stachys costaricensis* Briq. ex Dur. & Pittier, Bull. Soc. Bot. Belg. 30:340. 1892. TYPE: COSTA RICA. San José: vicinity of San José, "ad S. du Barba", 2050 m, w/o date, *Tónduz 279* (HOLOTYPE: BR).

Stachys guatemalensis Epling, Repert. Spec. Nov. Regni Veg. Beih. 80:34. 1934. TYPE: GUATEMALA. Alta Verapaz: vicinity of Cobán, 1300 m, Nov 1902, *Turckheim 8445* (HOLOTYPE: US; Isotypes: F!,GH!).

?*Stachys vulcanica* Epling, Repert. Spec. Nov. Regni Veg. Beih. 80:33. 1934. TYPE: MEXICO. Oaxaca: Monte Zempoallepeque, 10,000-11,000 ft, 9 Jul 1894, *Nelson 696* (US).

Stachys glechomoides Epling, Bull. Torr. Bot. Club 71:484. 1944. TYPE: GUATEMALA. Huehuetenango: cloud forest at Cruz de Simón, Sierra de los Cuchumatanes, 2600-3000 m, 31 Jul 1942, *Steyermark 49789* (HOLOTYPE: CAS-UCLA!).

Epling (1934) placed *Stachys pilosissima* in synonymy with *S. mexicana* but later (Epling & Játiva 1966) retracted his error. The latter name applies to Californian (U.S.A.) plants, as noted by Mulligan & Munro (1989).

So as to prevent needless reexaminations of type material, I provide below a brief description of the holotype of *Stachys pilosissima*:

Perennial seemingly erect rhizomatous herb to 40 cm high. Stems moderately pubescent throughout with spreading eglandular trichomes 1-2 mm long, below these often a few short glandular hairs or a display of crinkly short hairs, but most of the surface glabrous. Midstem leaves 9-10 cm long, 3.5-4.0 cm wide; petioles 3.0-4.5 cm long, pubescent like the stems. Flowers 4-6 to a node, the pedicels ca. 1 mm long. Calyces ca. 6 mm long; tubes ca. 3.5 mm long, pilose; lobes ca. 3 mm long. Corolla tubes 7-8 mm long; upper lip ca. 3.5 mm long; annulus present. Nutlets immature or absent.

My concept of *Stachys pilosissima* is quite broad, as evident by the synonymy listed. In his account *S. costaricensis*, Epling (1934) reported collections from Mt. Orizaba (from whence the type of *S. pilosissima*) and Chiapas, but noted that "It is doubtful whether the Mexican specimens are properly associated with this [*S. costaricensis*] species". Standley & Williams (1973), while maintaining *S. guatemalensis*, sank Epling's *S. glechomoides* under the latter, noting at the same time that "this species [*S. guatemalensis*] . . . may prove to be a synonym [of *S. costaricensis*]". I take the oldest legitimate name for this exceedingly variable widespread species (Figure 13) to be *S. pilosissima*, the latter distinguished from most of the related Mexican species by its large leaves with long petioles and generally pilose vestiture (the hairs mostly 0.5-1.5 mm long).

29. *STACHYS PITTIERI* Briq., *Annuaire Conserv. Jard. Bot. Genève* 2:119. 1898. TYPE: COSTA RICA. Massif Iscazu, valle de los Archangles, w/o date, Pittier & Durand 240 (HOLOTYPE: BR).

I have not examined material of this species, information as to type obtained from Epling (1934), who maintained the taxon. The plants concerned are apparently closely related to *Stachys pilosissima*, to judge from Epling's description, but apparently differ from the latter in being a much taller plant (ca. 1 m high) with somewhat smaller flowers, the upper lips ca. 2 mm long (vs. ca. 3.5 mm long).



Figure 12. Distribution of *Stachys penanevada* (open circles), *S. radicans* (closed circles), and *S. torresii* (open square).

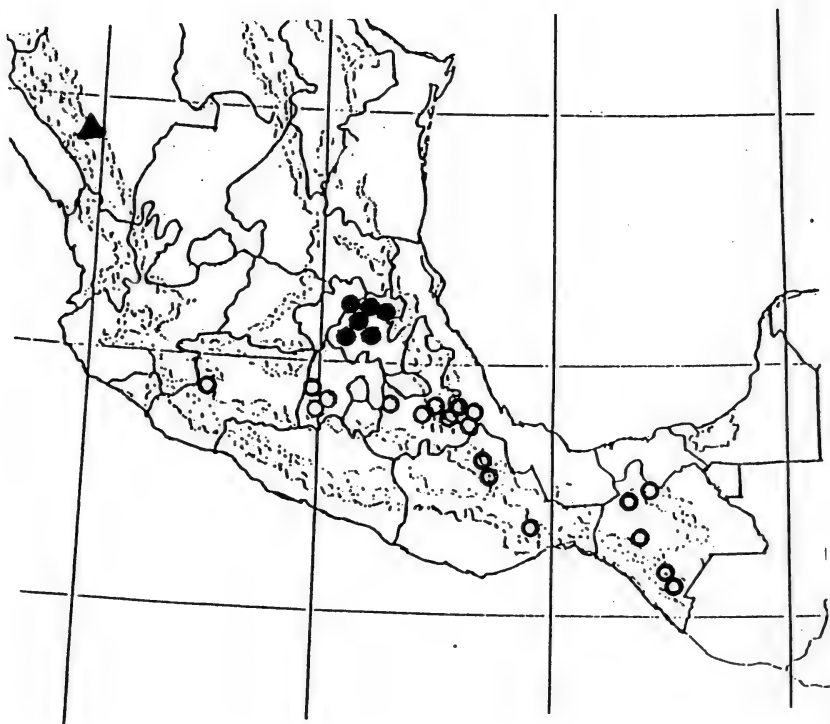


Figure 13. Distribution of *Stachys pilosissima* (open circles), *S. pringlei* (closed circles), and *S. venulosa* (closed triangle).

30. *STACHYS PRINGLEI* Greenm., Proc. Amer. Acad. Arts 41:305. 1905.
TYPE: MEXICO. Hidalgo: near Trinidad Iron Works, 5700 ft, 11 Jul
1920, *C.G. Pringle 8941* (HOLOTYPE: GH!; Isotypes: CAS!, F!).

This relatively localized taxon (Figure 13) is superficially similar to *Stachys bigelovii* of northcentral México but is readily distinguished from that species by its well-developed corolla-annulus. It also resembles *S. langmaniae* of southern Nuevo León but is readily distinguished from the latter by characters of the calyx, as noted in my key, and by Rzedowski & Rzedowski in their description of the latter. Occasional plants with large, long-petiolate leaves superficially resemble *S. pilosissima*.

Epling (1935) examined only two collections of *Stachys pringlei*, both from western Hidalgo; several collections have been made since his study, all from this same region.

31. *STACHYS RADICANS* Epling, Repert. Spec. Nov. Regni Veg. Beih. 80:26. 1935. TYPE: MEXICO. México State: Sierra de las Cruces, 9800 ft, 29 Aug 1904, *C.G. Pringle 13174* (HOLOTYPE: UC-UCLA!; Isotypes: F!, GH!).

This taxon superficially resembles *Stachys sanchezii* Rzed. & Zuniga but possesses smaller corollas and smaller leaves on shorter stems. It might also be confused with *S. eriantha*, the latter distinguished from *S. radicans* by its nonannulate corollas. As noted under *S. calcicola* (from Guatemala), it is likely that the latter is synonymous with *S. radicans*, both being high-elevational prostrate perennials with annulate corollas.

32. *STACHYS ROTUNDIFOLIA* Moçño & Sessé ex Benth., *Lab. Gen. et Sp.* 548. 1834. TYPE: MEXICO. w/o locality [but probably collected in the vicinity of México City], 1795-1804. *Sessé & Moçño 1113 [2479]* (HOLOTYPE: reportedly Lambert Herb.; Isotypes: F!, MA).

This species, while widespread (Figure 9), is relatively rare in herbaria. It is rather easily identified in having only 1-2 flowers to a node, and by its broadly cordate, long-petiolate leaves. Epling & Játiva (1966) placed Epling's *Stachys guatemalensis* and *S. vulcanica* in synonymy under *S. rotundifolia* but I believe the types concerned belong to *S. pilosissima*.

33. *STACHYS SANCHEZII* Rzed. & Zuniga, *Phytologia* 56:321. 1984.
TYPE: MEXICO. México State: Mpio. Zinacantepec, 3400 m, 1 Jul
1984, *J. Rzedowski 38408* (HOLOTYPE: ENCB).

This high elevational (mostly 3000-3400 m) taxon is closely related to *Stachys pringlei* of western Hidalgo but is readily distinguished from it by having shorter calyx lobes and a pronounced trailing habit. *Stachys sanchezii* is largely confined to México State, but its original authors also cited a single collection from El Chico, Hidalgo (Figure 9).

34. **STACHYS SANDERSII** B.L. Turner, *sp. nov.* TYPE: MEXICO. San Luis Potosí: ca. 40 km E of San Luis Potosí along the highway to Río Verde, edge of open oak woodland along N slope of mountain, limestone outcrops, 18 Aug 1977, *R.W. Sanders 1069* (HOLOTYPE: TEX!).

Stachydi globosae Epling similis sed differt floribus numerosioribus per fasciculum (10-16 vs. 8-10), vestimento caulino piloso trichomatibus longioribus (1.0-1.5 mm altis vs. 0.5 mm altis), et calycibus sericei-pilosis valde contortis.

Perennial erect herbs 30-50 cm high. Midstems pilose, the vestiture 1.0-1.8 mm high, glandular hairs absent, the internodes 2-3 times as long as the leaves. Midstem leaves mostly 3-5 cm long, 1.5-2.5 cm wide; petioles 0.3-1.5 cm long; blades broadly ovate to subdeltoid, evenly appressed pilose on both surfaces, the margins crenate. Flowers arranged in (2-)3-4 globose clusters at the apices of stems, each subtended by much-reduced leaf-like bracts. Flowers per node mostly 10-16, the pedicels 1-2 mm long. Calyces 6-7 mm long; tubes 3.5-4.0 mm long, pubescent like the stems, the lobes narrowly deltoid, 3-4 mm long, 1.0-1.5 mm wide at the base, gradually tapered into subulate-awns, the latter contorting but little with age, if at all. Corollas "pinkish-purple [with a] darker reticulum in throat and lower lip" (*Sanders 74034* [TEX]); tubes 6-7 mm long, annulate within ca. 1.5 mm from the base; upper lips 2.0-2.5 mm long; lower lips 3-4 mm long. Anthers 4, purplish, exerted for 0.5-1.0 mm, the outer pair ca. 0.5 mm longer than the inner and reflexed at maturity. Nutlets ovoid ca. 1.5 mm long, 1.1 mm wide, brown, glabrous, the surfaces finely reticulate ($\times 40$).

ADDITIONAL COLLECTIONS EXAMINED: MEXICO. San Luis Potosí: same area as the type but 4 km along side road to microwave tower, near crest, 2700 m, 29 May 1974, *Sanders 74034* (TEX); Alvarez, 19-31 Dec 1934, *Orcutt 1972* (CAS); region of San Luis Potosí, 1878, *Parry & Palmer 795* (GH); in sandy soils near San Luis Potosí, 1876, *Schaffner 684* (GH).

This taxon is closely related to *Stachys globosa* but differs from the latter in having more numerous florets to a node, much longer pilose vestiture and calyces with lobes which do not display much contortion at maturity. Because of its numerous flowers per cluster and pilose vestiture, which enhances the globosity of each cluster of flowers, the taxon might be more deserving of

the epithet "globosa" than *S. globosa* itself, the latter typified by plants from easternmost San Luis Potosí. Epling included specimens of *S. sandersii* in his concept of *S. globosa* (e.g., *Parry & Palmer 735, Schaffner 684*, cited above).

I have opted to name this fine looking species for Dr. Roger Sanders, an academic son of mine who rendered an excellent monograph of the difficult section *Brittoniastrum* of *Agastache* (Lamiaceae).

35. *STACHYS TENERRIMA* Epling, Repert. Spec. Nov. Regni Veg. Beih. 79:32. 1935. TYPE: MEXICO. Baja California Sur: San José del Cabo, vicinity of San Bartolome, 23 Oct 1890, *T.S. Brandegees s.n.* (HOLOTYPE: UC-UCLA!).

The larger corollas readily distinguishes this Cape species from *Stachys ajugoides*, the latter extending into northern Baja California from the U.S.A.

Epling (1935) described this well-marked taxon as annual, but it looks to be perennial, or it persists so as to appear perennial. It seems largely confined to the Cape Region (Figure 4) being readily distinguished from most Mexican species by its long-pedicelled flowers with weakly annulate corollas and nearly glabrous calyces.

36. *STACHYS TORRESII* B.L. Turner, Phytologia 76:397. 1994. TYPE: MEXICO. Oaxaca: Distr. Mixe, "En los primeros 5 km de el camino a Villa Alta, entrado por la desviación que esta aprox. a 10 km de Totontepec . . . Veg. Ruderal de bosque mesófilo con neblina"., 13 Dec 1985, *R. Torres C. 7925* (HOLOTYPE: F!; Isotype: MEXU).

This taxon is known only by type material. It belongs to the *Stachys coccinea* complex, which is treated in more detail by Turner (1994).

37. *STACHYS VENULOSA* E. Greene, Pittonia 1:157. 1888. TYPE: MEXICO. Durango: Sierra Madre, W of Durango, 8100 ft, Sep-Oct 1881, *A. Forrer s.n.* (LECTOTYPE [designated here]: UC-UCLA!; Isolectotypes: GH!).

Known to me only by type material.

38. *STACHYS VULNERABILIS* Rzed. & Rzed., Acta Bot. Mex. 3:3. 1988. TYPE: MEXICO. Nuevo León: Mpio. Galeana, Cerro El Potosí, cerca de la cima, 3460 m, 7 Jul 1987, *S. González 4029* (HOLOTYPE: ENCB).



Figure 14. Distribution of *Stachys calcicola* (open circles) and *S. nubilorum* (closed circles).

This taxon is confined to the subalpine and alpine regions (3000-3600 m) of Cerro Potosí, Nuevo León (Figure 5). It is known by 20 or more collections (LL, TEX), and was apparently first collected by Beaman (TEX) in 1961, the latter identified as *Stachys eriantha* by Epling. The original authors thought *S. vulnerabilis* to relate closely to *S. langmaniae*, which it surely does, but the latter can be distinguished by having a more strongly developed corolla-annulus, less coarsely developed calyx hairs, and longer-exserted anthers (2-3 mm vs. 0.5-1.5 mm).

ACKNOWLEDGMENTS

I am grateful to Guy Nesom for the Latin diagnoses and to him and Piero Delprete for reviewing the manuscript. Thanks are also due Carolyn Ferguson and Mark Mayfield for making selected collections of *Stachys* in northeastern México, namely *S. drummondii* and *S. agraria*. I am especially grateful for the loan of relevant collections and type material from the following herbaria: BR, CAS, F, GH, LL, TEX, and UC. All of these collections were annotated and serve as the basis for the maps showing distribution (Figures 1-14).

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INDEX TO NAMES (SYNONYMS IN ITALICS)

Numbers refer to sequence of treatment in the text.

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BOOKS RECEIVED

Ferns for American Gardens. John T. Mickel. Macmillan Publishing Company, 866 Third Avenue, New York, New York 10022. 1994. ix. 370 pp. \$60.00 (\$77.95 in Canada) ISBN 0-02-584491-1 (hardcover).

The bulk of this work is an alphabetical listing of ferns that may be cultivated in North America. A broad interpretation of "ferns" is taken as *Equisetum*, *Lycopodium*, and *Selaginella* are also included. This section includes Latin and common name (no synonyms or authorities); brief descriptions of the plants, their availability, hardiness, and ease of cultivation; and color photographs of most. Also in the book are information on propagation, general fern morphology, sources of material, and a bibliography.

McGraw-Hill Dictionary of Scientific and Technical Terms, 5th ed. Sybil P. Parker (ed.). McGraw-Hill, Inc., Professional Book Group, 11 West 19th Street, New York, New York 10011. 1994. xx. 2194 pp. + 48 pp. Appendix. \$110.50 ISBN 0-07-042333-4 (hardcover).

The fifth edition of this work includes more entries and disciplines than its predecessors. Line drawings associated with many entries are found in the page margins throughout the text. In addition to the main body of the work, an appendix records biographical information on over 1500 scientists and engineers. Additional appendices include biological classifications, geologic time scale, mathematical symbols, conversion factors, and other useful information.

Plant Growth and Development, A Molecular Approach. Donald E. Fosket. Academic Press, Inc., Harcourt Brace & Company, 525 B Street, Suite 1900, San Diego, California 92101-4495. 1994. xx. 580 pp. \$49.95 ISBN 0-12-262430-0 (hardcover).

An advanced undergraduate text, Fosket's book combines classical plant physiology, plant anatomy, plant ontogeny, plant ultrastructure, and plant genetics into a single volume. Traditionally each of these topics is presented in a separate university course, and textbooks for each topic usually give at most, cursory treatment of the others. The integrated approach is refreshing and it will be interesting to see whether or not it is widely embraced. Both the author and publisher should be commended for taking the risk to publish such a book.

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