

TAXONOMIC OVERVIEW OF *STEMODIA* (SCROPHULARIACEAE) FOR NORTH AMERICA AND THE WEST INDIES

Billie L. Turner & Clark C. Cowan

Department of Botany, University of Texas, Austin, Texas 78713 U.S.A.

ABSTRACT

A taxonomic study of the species of *Stemodia* occurring in North America and the West Indies is rendered. Seventeen species are recognized as native within this region. These include *Stemodia angulata*, *S. bartsioides*, *S. chiapensis*, *S. coahuilensis*, *S. durantifolia*, *S. fruticosa*, *S. jorullensis*, *S. lanata*, *S. macrantha*, *S. maritima*, *S. multifida*, *S. palmeri*, *S. peduncularis*, *S. pusilla*, *S. schottii*, *S. tenuifolia*, and *S. verticillata*. Except for *Stemodia coahuilensis* and *S. multifida*, which are currently under revision by David Keil as part of his concept of the genus *Leucospora*, a key to species, descriptions, distributional maps, and complete synonymy for each of these is provided. One new species, *Stemodia chiapensis* B.L. Turner, is proposed. The genus *Leucospora* is treated as part of *Stemodia* (s.l.) but *Schistophragma* is retained. This has necessitated the following new combinations: *Schistophragma polystachya* (Brandege) B.L. Turner and *Stemodia coahuilensis* (Henr.) B.L. Turner.

KEY WORDS: Scrophulariaceae, *Leucospora*, *Schistophragma*, *Stemodia*

Stemodia belongs to the family Scrophulariaceae, subfamily Antirrhinoideae, tribe Gratioleae, where it has been variously accepted, either as a rather large, highly variable genus *Stemodia* (s.l.) or as a less diverse, somewhat smaller genus *Stemodia* (s.s.). Most early workers more or less took the former stance (e.g., Bentham 1886; Wettstein 1891) but Minod (1918), in his revisionary study of the New World taxa, drastically reoriented taxonomic concepts or attitudes on the group by recognizing a monotypic *Stemodiaca* (typified by *Stemodia maritima* L.), an older name for *Stemodia*. *Stemodia*, however, was subsequently conserved over *Stemodiaca*. Minod also segregated out of his

Stemodia complex, four newly erected monotypic genera (*Chodaphyton*, based upon *Stemodia ericifolia* [Kuntze] Hassler; *Lindernia*, based upon *Stemodia verticillata* (Miller) Hassler; *Valeria*, based upon *Stemodia trifoliata* [Link] Reichenbach [= *Stemodia pratensis* (Aublet) C. Cowan of the present treatment]; and *Verena*, based upon *Stemodia hassleriana* Chodat). He retained most of the remaining New World taxa of *Stemodia* (s.l.) in his concept of *Stemodia*. So treated, he recognized 31 species of *Stemodia* as occurring in the New World, thirteen of these occurring in the Americas north of South America.

Most subsequent workers (e.g., Barroso 1952; Dawson 1974; D'Arcy 1979; Seymour 1976; Standley & Williams 1973) have continued to treat *Stemodia* in the broad sense, keeping in it most of the monotypic segregates proposed by Minod. We also subscribe to the wider view, with the exception that the Cuban species, *Stemodia radicans* Griseb., which was retained by Minod in *Stemodia*, is accepted as belonging to the genus *Cheilophyllum*, as first proposed by Pennell (1935). In addition, we include in *Stemodia* the genus *Leucospora*, which most recent workers have treated as distinct. Since Keil (in prep.) is currently revising *Leucospora* (including *Schistophragma*) we have not treated in detail, nor mapped, species of the latter.

We have also separated from *Stemodia* three recently described closely related species, *S. reliquiarum* D'Arcy, *S. mutisi* Fernández-Alonso, and *S. costaricensis* B.L. Turner, positioning these in a newly erected genus *Darcya* (Turner & Cowan 1993).

In summary, the present treatment recognizes seventeen species of *Stemodia* (s.l.) as native in the New World north of South America. (A single record of *S. pratensis* from Trinidad is believed to be a recent introduction from the mainland of South America). Approximately nineteen species are recognized for South America, but these will be treated in a subsequent account (Turner & Cowan 1993). In addition, some ten to fifteen species are native to the Old World (including those in the recently submerged genus *Morgania* R. Br. (cf. Barker 1981), which we do not intend to treat.

CHROMOSOME NUMBERS

Chromosome counts for two New World species of *Stemodia* have been reported, these being $2n = 44$ for *S. multifida* (Keil, pers. comm.) and $2n = 22$ for *S. verticillata* (Fedorov 1974; reported as *S. parviflora* W.T. Aiton). An additional Old World species, *Stemodia viscosa* Roxb. has been reported as $2n = 28$ (Subramanian & Pondmudi 1987) and $2n = 42$ (Fedorov 1975).

If these numbers prove correct, the genus (s.l.) is likely to prove dibasic or perhaps multibasic, with numbers of $x = 11$ and $x = 14$ (if not $x = 7$). Clearly, additional counts in the genus are sorely needed.

GENERIC CONSIDERATIONS

As already noted, *Stemodia* has been variously treated, usually in the broad sense, but Minod (1918) retained but a single species in the now conserved genus *Stemodia* (typified by *S. maritima*), which he called *Stemodiocris* P. Br. (1756). So treated, the next available generic name, *Phaelypea* P. Br. (1756) would have to be applied to the 40 or more species that make up *Stemodia* (s.l.). Regardless, if *Stemodia* were treated as monotypic, numerous new combinations under the obscure name *Phaelypea* (which is sufficiently obscure so as not to have been listed in *Index Kewensis*) would have to be made. Indeed, *Stemodia* (s.l.) appears to be a monophyletic assemblage largely composed of species having a syndrome of characters, namely: 1) opposite subpinnate or pinnately veined leaves; 2) flowers axillary or in terminal spikes; 3) calyx with sepals \pm alike and separate to the base; 4) corollas mostly lavender to purple, zygomorphic with well developed tubes; 5) anther thecae glabrous, divergent, with swollen connectives, or the thecae shortly stalked; 6) styles at anthesis 2-4 times as long as the stigmatic area; 7) stigmatic area enlarged and usually recurved, bifid; 8) capsule mostly loculicidally 4 valvate, ovoid to orbicular, 1.0-1.5 times as long as wide; 9) seeds pedicellate, ellipsoid to broadly obpyramidal, deeply 8 sulcate or not, the ridges parallel, never spiral, the surfaces variously ornate.

Most of the species of *Stemodia* (s.l.) will contain seven or more of these characters. As conceived here, the closest related taxon to *Stemodia* (s.l.) is the genus *Schistophragma* which is composed of three species, all of these native to México and distinguished by elongate capsules with septicial dehiscence and seeds with helical grooves, characters which are not found in the 50 or more species of *Stemodia* (s.l.). Beyond *Schistophragma*, the genus most closely related to *Stemodia* (s.l.) might be *Bacopa*, but this is mostly speculative. Clearly, *Stemodia* (s.s.) and its cohorts are in need of detailed character analysis, especially those derived from comparative DNA studies, before drastic generic reorganizations are made, if any. It is our personal opinion, however, that *Stemodia* (s.l.) is a monophyletic assemblage whose internal restructuring might best be shown through nomenclatural constructions at the infrageneric level.

CHEMICAL INVESTIGATIONS

Two New World species of *Stemodia*, *S. durantifolia* (L.) Swartz and *S. maritima*, have reportedly been used in herbal medicine by local peoples, at least in Haiti. Because of this, attempts have been made to elucidate any active ingredients in these species. Stemodane triterpenes and yet other compounds

were isolated but none of these appeared to possess especially significant antiviral or cytotoxicity attributes (cf. Weniger *et al.* 1982, Hufford *et al.* 1992, and references therein).

TAXONOMY

Stemodia L. (s.l.) 1759, *nom. conserv.*

Cordium Sloane 1707.

Erinus Miller 1731.

Stemodiakra P. Br. 1756.

Phaelypea P. Br. 1756.

Matourea Aublet 1775.

Adenosma R. Br. 1810, not *Adenosma* Nees.

Morgania R. Br. 1810.

Leucospora Nutt. 1834.

Chodaphyton Minod 1918.

Lendneria Minod 1918.

Valeria Minod 1918.

Verena Minod 1918.

Annual or perennial herbs, shrublets or small scrambling shrubs to 3 m high. Leaves opposite or less often verticillate, simple to bipinnately dissected, mostly subpinnately veined. Flowers axillary, arranged (1-)2-4 to a node, often densely clustered along the upper stems forming well defined, usually interrupted, spikes. Sepals 5, \pm alike, separate to the base or nearly so. Corollas mostly tubular, white to blue or violet, rarely somewhat yellowish, zygomorphic, lobes usually shorter than the tube, variously pubescent without and within, rarely glabrous, the inner surface near the throat of the tube usually bestowed with elongate hairs with spatulate apices. Anther bearing stamens usually 4, the anther thecae glabrous, not closely adjacent or parallel, usually separated by a swollen or enlarged connective, less often the thecae borne upon well developed stalks. Stylar shaft 2-10 times as long as the enlarged minutely bilobed stigmatic region, the latter usually reflexed, less often erect, or somewhat incurved, rarely markedly bilobed. Capsules ovoid, mostly somewhat longer than wide, glabrous, 4 valvate with usually loculicidal dehiscence. Seeds numerous, ellipsoid to broadly obpyramidal, deeply longitudinally 6-8 sulcate or not, usually to some extent stipitate and variously ornate. Base chromosome numbers, $x = 11$ and 14 (from only 3 species).

Type species, *Stemodia maritima* L.

KEY TO NORTH AMERICAN AND WEST INDIAN
SPECIES OF *STEMODIA*, S.L.

(with the exclusion of *Leucospora*, which has two species both with dissected leaves and both of which belong to *Stemodia* in the senior author's opinion; cf. comments under CONTROVERSIAL AND EXCLUDED NAMES at the end of this paper)

1. Leaves clearly petiolate, the blades tapering upon the petioles to the very base; calyx w/o bracts at the base; seeds deeply 6-8 sulcate. (2)
1. Leaves sessile; calyx with 1 or 2 basal bracteoles; seeds not clearly sulcate. (11)
 2. Suffruticose brittle stemmed herbs, shrublets or shrubs, mostly 0.5-2.0 m high; leaves drying black; Belize, El Salvador, Honduras. *S. fruticosa*
 2. Annual or perennial herbs (rarely suffruticose at base), mostly 0.1-1.5 m high; leaves drying green or greenish; widespread. (3)
3. Perennial herbs mostly 0.3-1.5 m high. (4)
3. Annual herbs mostly 0.1-0.3(-0.4) m high. (7)
 4. Pedicels (both flower and fruiting) 1-6 mm long. (5)
 4. Pedicels 10-40 mm long; petioles 8-20 mm long; widespread. (6)
5. Petioles 1-6 mm long; stems hirsute, the hairs 1 mm long or more; Jalisco, Michoacán, México. *S. tenuifolia*
5. Petioles 8-20 mm long; stems puberulent, the hairs 0.4 mm long or less; Chiapas. *S. chiapensis*
 6. Leaves markedly punctate beneath with amber colored glands; vestiture of stem mostly 1 mm high or less, and largely devoid of glandular hairs; eastern México (Hidalgo) to Chiapas and southwards to Panamá. *S. peduncularis*
 6. Leaves moderately to inconspicuously punctate beneath with yellow or clear glands; vestiture of stem mostly 1-2 mm high and usually beneath this copiously covered with much shorter glandular hairs; western México (Nayarit) to Chiapas and southwards to Honduras. *S. macrantha*
7. Leaves markedly glandular punctate beneath; West Indies, Central America (including Chiapas) and northwestern South America. *S. angulata*

7. Leaves epunctate beneath or nearly so; México. (8)
8. Stems stiffly erect, not much branched from the base; petioles mostly 3-6 mm long; Jalisco to Chiapas. *S. jorullensis*
8. Stems variously ascending to decumbent, much branched from the base; petioles mostly 6-20 mm long. (9)
9. Corollas 2-3 mm long; pedicels mostly 1-2 mm long. *S. verticillata*
9. Corollas 6-16 mm long; pedicels mostly 3-30 mm long. (10)
10. Corollas mostly 6-10 mm long; pedicels mostly 3-8 mm long; petioles mostly 3-9 mm long; coastal regions from Colima to Sinaloa, also in Cape Region of Baja California. *S. pusilla*
10. Corollas mostly 12-16 mm long; pedicels mostly 20-30 mm long; petioles mostly 9-18 mm long; inland regions of short tree forests, southern Sonora, northern Sinaloa and closely adjacent Chihuahua. *S. palmeri*
11. Stems and foliage densely white lanate. *S. tomentosa*
11. Stems and foliage otherwise. (12)
12. Annual taprooted herbs 5-25 cm high; stems \pm uniformly pubescent with short glandular hairs 0.2 mm long or less; northeastern México and closely adjacent U.S.A. *S. schottii*
12. Perennial herbs mostly 20-100 cm high, frequently forming rhizomatous colonies; stems variously pubescent with longer hairs; widespread but not overlapping the range of *S. schottii*. (13)
13. Corollas mostly 11-15 mm long; localized semiaquatic inland species of southcentral and western México (Durango to Michoacán and México). *S. bartsioides*
13. Corollas mostly 2-8 mm long; widespread weedy species. (14)
14. Corollas 2.5-4.8 mm long, the tubes glabrous or nearly so; stems suffruticose; anther thecae widely separated by pedicels up to 0.5 mm long. *S. maritima*
14. Corollas 5-8 mm long, the tubes clearly pubescent; stems herbaceous; anther thecae close, merely separated by a globose connective. *S. durantifolia*

STEMODIA ANGULATA Oerst.

Stemodia angulata Oerst., Vidensk. Meddel. Dansk. Naturhist. Foren. Kjobenhavn 1853:22. 1854. *Stemodiocra angulata* (Oerst.) Kuntze, *Rev. Gen. Pl.* 2:466. 1891. TYPE: COSTA RICA. Cartago: "prope Cartago", w/o date, Oersted 9472 (LECTOTYPE: C! [selected here]; Photolectotypes: F!,GH!; Isolectotype: K!). Oersted in his protologue also mentioned a Fendler collection which belongs to this taxon.

Stemodia ageratifolia C. Wright in Sauville, *Fl. Cubana* 99. 1873. *Stemodia angulata* Oerst. subsp. *ageratifolia* (C. Wright) Minod, Bull. Soc. Bot. Geneve, ser. II 10:191. 1918. *Lindernia ageratifolia* (C. Wright) Pennell, Proc. Acad. Nat. Sci. Phila. 75:13. 1923. TYPE: CUBA. Pinar del Río: along margin of arroyos, Luiz Lazo and Arroyo Hondo, 1860-1864, *Wright 2993* (HOLOTYPE: GH!; Isotypes: G!,GH!,MO!,NY,US!).

Stemodia jorullensis H.B.K. subsp. *reptans* Minod, Bull. Soc. Bot. Geneve, ser. II 10:190. 118. TYPE: NICARAGUA. Rivas: Ile de Omatepec, rues du village de Mayagulpa, 40 m, Oct 1869, *P. Levy 154* (HOLOTYPE: G-BOIS!; Isotypes: C!,G!).

Annual or short lived perennial (?) herbs mostly 5-30 cm high. Stems erect at first, those at the lower nodes often procumbent, moderately crinkly pilose with multiseptate hairs 1-2 mm long. Midstem leaves mostly 1.0-2.5 cm long, 0.7-1.5 cm wide; petioles 5-10 mm long; blades ovate to subdeltoid, subpinnately nerved, grading into the petioles, sparsely pilose, glandular punctate beneath, the margins crenulodentate. Flowers axillary, arranged 1-3 at a node, the peduncles ebracteate, mostly 1-2 cm long, pubescent like the stems. Sepals mostly 4-5 mm long, pilose, one of these somewhat larger and broader. Corollas mostly 7-9 mm long, white or pinkish, the tubes glabrous or nearly so, the lobes 1-2 mm long, sparsely pubescent. Anther thecae ca. 0.6 mm long, glabrous, separated by a small globose connective. Capsule ovoid, 4-5 mm high, (3-)4 valvate, the apices recurved. Seeds ca. 0.5 mm long, stipitate, longitudinally sulcate with ca. 6-8 ribs.

DISTRIBUTION (Figures 1 and 2): México (Chiapas), Cuba, Central America and northwestern South America, 100-1000 m; flowering all seasons.

Pennell (1923), treated *Stemodia ageratifolia* as a good species, believing this to be endemic to Cuba. Minod (1918) treated this as a subspecies of *S. jorullensis*. For additional discussion see the latter.

REPRESENTATIVE SPECIMENS:

MEXICO. Chiapas: Mpio. Cacahoatán, 1-2 km S of Cacahoatán, 90 m, 24 Nov 1980, *Breedlove 47760* (CAS).



Figure 1. American distribution of *Stemodia angulata*.



Figure 2. Central American distribution of *Stemodia angulata*.

WEST INDIES: CUBA. Pinar del Río: *Ekman 10638* (K).

CENTRAL AMERICA: BELIZE. pine ridge near Manatee Lagoon, 3 Jan 1903, *Peck 263* (GH).

COSTA RICA. Alajuela: 3 km E of Alajuela, 1000 m, 29 Dec 1974, *Wilbur 19048* (DUKE).

EL SALVADOR. Ahuachapán: vicinity of Ahuachapán, 800-1000 m, 9-27 Jan 1922, *Standley 20013* (GH).

GUATEMALA. Santa Ana: vicinity of Metepán, 370 m, 29 Jan-1 Feb 1947, *Standley s.n.* (F).

HONDURAS. Olancho: vicinity of Juticalpa, 380-480 m, 5-16 Mar 1949, *Standley 17490* (F).

NICARAGUA. Chontales: w/o date, *Tate 223* (K). Managua: Sierras de Managua, 800 m, 6-14 Jan 1941, *Grant 1002* (GH).

PANAMA. Darién: Río Morti, ca. 6 mi upstream from Morti Abajo, ca. 100 m, 14 Feb 1967, *Duke 10160* (DUKE,MO).

SOUTH AMERICA: COLOMBIA. Bolívar: Frasquillo, on Río Sinu, 20-100 m, 5-6 Mar 1918, *Pennell 4192* (C,K). El Valle: Cisneros, 300-500 m, 5 May 1939, *Killip 35615* (F,PH,US).

ECUADOR. Esmeraldas: Playa de Oro, Jul-Aug 1924, *Thomas L30* (K). Los Rios: 14 km SE of Quevedo, 75 m, 22 Feb 1972, *MacBryde 1122* (MO).

PERU. Amazonas: Labanda, Huampami, Río Cenepa, Chacra, 600-700 ft, 3 Aug 1974, *Ancuash 712* (F,MO,TEX).

STEMODIA BARTSIOIDES Benth.

Stemodia bartsioides Benth., Bot. Reg. t. 1470. 1831. *Stemodiacra bartsioides* (Benth.) Kuntze, *Rev. Gen. Pl.* 2:466. 1891. TYPE: MEXICO. Michoacán(?): "Plain of Popetongo", 1830, *Graham 273* (HOLOTYPE: K!; Photoholotype: NY!).

Stiffly erect perennial herbs 15-40 cm high. Stems essentially unbranched except at the very base, densely glandular pubescent, often arising from stout rhizomes. Midstem leaves mostly 2.0-3.5 cm long, 4-9 mm wide, sessile, lanceolate, widest near the middle, 2 or 3 at node, gradually reduced upwards, weakly subpinnately nervate, glandular pubescent, the surfaces also glandular punctate, the margins serrulate. Flowers mostly axillary along the upper half of the stems, arranged 2-4 at a node, the pedicels 1-8 mm long, glandular pubescent. Sepals 5-6 mm long, glandular pubescent, essentially alike, below these 1 or 2 bracts about as long or somewhat longer than the sepals. Corollas mostly 11-15 mm long, light to violet blue, sparsely pubescent, the lobes 3-6 mm long. Anther thecae purple, ca. 0.6 mm long, on minute stalks separated by a swollen connective. Capsules 3-4 mm long, broadly ovoid, 4 valvate, the

apices erect. Seeds ca. 0.4 mm long, stipitate, moderately minutely warty throughout.

DISTRIBUTION (Figure 3). Mostly semiaquatic or aquatic habitats of the Central Plateau region of México from Durango and Zacatecas to Michoacán and México, 2000-2500 m; flowering August-September.

Minod (1918) knew this species by relatively few collections. He cited a specimen from Colombia (near Bogotá) which we believe to be in error.

REPRESENTATIVE SPECIMENS:

MEXICO. Aguascalientes: 15 km E of Aguascalientes, 2100 m, 29 Aug 1960, *Rzedowski 14182* (MEXU). Durango: ca. 13 mi NE of Durango along route 31, 25 Jul 1958, *Correll 20158* (LL). Guanajuato: 1 mi NW of Salamanca, 16 Aug 1957, *Waterfall 13899* (TEX,US). Hidalgo: Mpio. de Huichapan, Atlán, ca. 2000 m, 24 Jun 1980, *Hernández 4548* (CAS,MEXU). Jalisco: just E of Aguascalientes State Line, road from Ojuelos, ca. 13 mi W of Paso de la Troje, 2000 m, 13 Aug 1958, *McVaugh 16935* (DUKE,G,LL,MEXU,MICH,TEX,US). México: w/o locality, 1839, *Hartweg 196* (G,GH). Michoacán: 5 mi W of Morelia, 22 Aug 1961, *Powell 824* (F,MICH,TEX). Querétaro: Cadereyta, 27 Jul 1952, *Kelly 715* (UC). Zacatecas: 9 mi W of Sombrerete, 2400-2500 m, 26 Sep 1948, *Gentry 8486* (GH,MEXU,MICH,UC,US).

STEMODIA CHIAPENSIS B. Turner

Stemodia chiapensis B. Turner, *sp. nov.* TYPE: MEXICO. Chiapas: Mpio. Arriaga, "Steep pacific canyon with Tropical Deciduous Forest and crest of ridge with *Pinus* and *Quercus* at La Mina Microwave Station", 980 m, 13 Nov 1983, *D.E. Breedlove & F. Almeda 60155* (HOLOTYPE: TEX!).

Stemodia tenuifolia Minod similis sed foliis longioribus (plerumque 3.0-4.5 cm longis vs. 1.5-2.5 cm) petiolis longioribus (10-20 mm longis vs. 2-6 mm), corollis longioribus (10-12 mm longis vs. ca. 8 mm), et vestimento caulino trichomatibus brevioribus (ca. 0.3 mm altis vs. 1-2 mm) plus incurvatis differt.

Erect suffruticose perennial herbs to 30 cm high. Stems terete, evenly pubescent with an incurved puberulous vestiture ca. 0.3 mm high or less, glabrescent with age. Midstem leaves drying green, mostly 3.0-4.5 cm long, 1.5-2.5 cm wide; petioles 10-20 mm long, grading into the blades; blades ovate, subpinnately nerved, sparsely pubescent like the stems, especially along the veins, the margins crenulodentate. Flowers axillary, 2-4 to a node, arranged

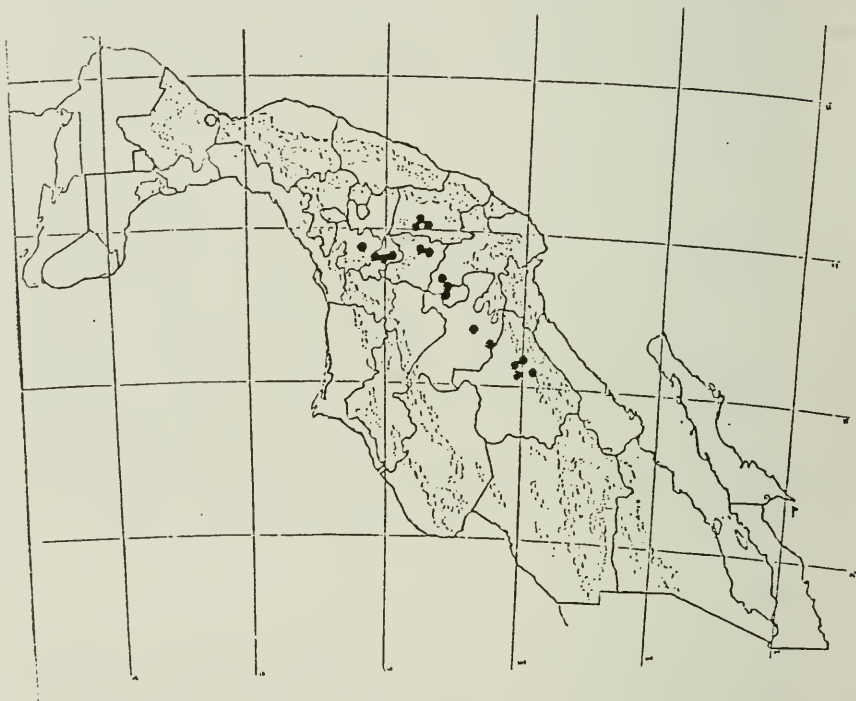


Figure 3. Distribution of *Stemodia bartsioides* (closed circles) and *S. chiapensis* (open circle).

in terminal foreshortened stems, the pedicels mostly 2-4 mm long, puberulent. Sepals 5, \pm all alike, 5-6 mm long, linear-lanceolate, strigose, ebracteate. Corollas mostly 10-12 mm long, drying yellow but described as "white with yellow" or "with pale yellow throat", the lobes 1.5-3.0 mm long, the tube cylindrical, pubescent throughout externally, long pilose within near the orifice, the latter hairs with spatulate apices. Anther thecae ca. 0.5 mm long, separated by a well developed ovoid connective. Capsule ovoid, 4.5-5.5 mm high, 4 valvate, the valves erect. Seeds ca. 0.8 mm long, 6-8 sulcate, stipitate.

DISTRIBUTION (Figure 3). Known only from the type locality, Mpio. Arriaga, Chiapas, pine-oak forests, 900-1000 m; flowering November-December.

Stemodia chiapensis is closely related to *S. tenuifolia* but is readily distinguished from the latter by its mostly longer leaves (3.0-4.5 cm long vs. 1.5-2.5 cm) with longer petioles (10-20 mm long vs. 2-6 mm), longer corollas (10-12 mm long vs. ca. 8 mm), and a shorter, more incurved vestiture on the stems. In habit, the species superficially resembles *Capraria saxifragaefolia* Cham. & Schlecht., but is easily distinguished from the latter by its opposite leaves.

ADDITIONAL SPECIMEN EXAMINED: MEXICO. Chiapas: Mpio. Arriaga, La Mina Microwave Station, 915 m, 21 Dec 1981, *Breedlove 56329* (TEX).

STEMODIA DURANTIFOLIA (L.) Swartz

Stemodia durantifolia (L.) Swartz, *Obs. Bot.* 240. 1791.

This is an extremely weedy, widespread species, as noted in more detail below. We recognize two regionally differentiated varieties, as follows:

1. Corollas mostly 9-11 mm long; stems with predominantly crinkly hairs, with intermixed glandular hairs; Chile. var. *chilensis*
1. Corollas mostly 5-8 mm long; stems variously pubescent, but mostly glandular pubescent; widespread. var. *durantifolia*

STEMODIA DURANTIFOLIA (L.) Swartz var. *DURANTIFOLIA*

Stemodia durantifolia (L.) Swartz, *Obs. Bot.* 240. 1791. BASIONYM: *Capraria durantifolia* L., *Syst. Nat.*, ed. 10. 1116. 1759 (May-Jun). *Stemodiocris durantifolia* (L.) Morong, *Pl. Coll. Paraguay* 183. 1880-1893. According to D'Arcy (1979), with whom we agree, this name is based upon *Lysimachia coerulea galericulata* ... Sloane, *Cat. Pl. Jamaic.* 66. 1696 (LECTOTYPE: BM! [selected here]).

- Capraria oppositifolia* L., *Fl. Jamaic.* 380. 1759. *Stemodia erecta* (P. Br.) Minod, *Bull. Soc. Bot. Geneve*, ser. II, 10:212. 1918. Both based on the same type. TYPE: JAMAICA. According to D'Arcy, with whom we agree, this name is based, in part, upon *Phaelypea erecta*; *foliis sessilibus* . . . R. Br. (LECTOTYPE: BM! [selected here]). Browne also cited *Lysimachia coerulea galericuta* . . . Sloane, which has been selected as the lectotype for *Capraria durantifolia* L., as noted above.
- Conobea verticillaris* Spreng., *Novi Prov. Hort. Acad. Hal.* 13. 1818. *Stemodia verticillaris* (Spreng.) Link, *Enum. Pl. Hort. Berol.* 2:144. 1822. TYPE: BRAZIL: from material cultivated in the Berlin Botanical Garden (HOLOTYPE: B, destroyed; Photoholotypes: G!,GH!,MO!; Isotype: LE!).
- Scrophularia subhastata* J. Velloso, *Fl. Flumin.* 6: t. 88, 264. 1827. *Stemodia subhastata* (J. Velloso) Benth. in DC., *Prodr.* 10:381. 1846. *Stemodia subhastata* (J. Velloso) Kuntze, *Rev. Gen. Pl.* 2:466. 1891. TYPE: BRAZIL: "prope Rio de Janeiro", 1782-1789, *Velloso s.n.?* (LECTOTYPE: K! [designated here]). The lectotype is w/o collector but is said to be from "Rio Jan" in what is thought to be the script of Velloso.
- Stemodia ehrenbergiana* Schlecht., *Bot. Zeit.* 1:169. 1843. TYPE: MEXICO. grown from seeds in 1842 provided by Ehrenberg, probably from Veracruz (HOLOTYPE: HAL, not located). The taxon was originally compared with *S. durantifolia*, otherwise it is essentially without description.
- Stemodia berteroaana* Benth. in DC., *Prodr.* 10:384. 1846. *Stemodiocrac berteroaana* (Benth.) Kuntze, *Rev. Gen. Pl.* 2:466. 1891. TYPE: DOMINICAN REPUBLIC [Hispaniola]. *Bertero s.n.* (HOLOTYPE: K, not located; Isotype: M!; Photoisotypes: F!,GH!,MO!).
- Stemodia durantifolia* (L.) Swartz var. *angustifolia* Griseb., *Fl. Br. West Ind.* 429. 1861. TYPE: JAMAICA. w/o locality, 1858, *March 826* (LECTOTYPE: K! [selected here]). Grisebach describes this taxon as being densely pubescent and devoid of eglandular hairs, the leaves linear-lanceolate and tapering nearly to the base, such as found in the lectotype and which bears the handwritten notation, *Beta angustifolia*. On the same sheet is mounted the typical form of the species.
- Stemodia arizonica* Pennell, *Not. Nat. Acad. Nat. Sci. Phil.* 43:3. 1940. TYPE: UNITED STATES. Arizona: Pima Co., by streams of the Santa Catalina Mts., 2000-3000 ft, 11 Apr 1881, *C.G. Pringle s.n.* (HOLOTYPE: PH!; Isotypes: F!,G-DC!,GH!,MICH!,MO!,US!,WIS!).

Stemodia bissei Tsvelev, Bot. Zh. (Leningrad) 72:1662. 1987. TYPE: CUBA. Prov. Pinar del Río: Matahambre, Halas Aguas, Monte al Fote de la desembocadura del Río Malas Aguas, 28 Mar 1982, J. Bisse et al. s.n. (HOLOTYPE: HAJB).

Erect mostly perennial viscid herbs 20-100 cm high. Stems usually stiffly erect or ascending, variously pubescent with either pilose eglandular or glandular hairs 1-2 mm long, or both, below these a more uniform vestiture of short glandular hairs 1 mm long or less, sometimes only short glandular hairs are found. Midstem leaves 2 or 3 to a node, sessile, mostly 2-7 cm long, 0.5-2.0 cm wide, usually clasping at the base, pinnately nerved, glandular pubescent on both surfaces, the margins serrate. Flowers 2-4 at a node, axillary, usually forming pronounced terminal bracteate interrupted spikes, the pedicels usually less than 1 mm long, but occasionally up to 8 mm long. Sepals 3-5 mm long, \pm alike, variously pubescent, subtended by 1 or 2 basal bracts as long as or somewhat longer than the sepals. Corollas blue to purplish, minutely pubescent, mostly 5-8 mm long, the lobes 1-2 mm long. Anther thecae ca. 0.5 mm long, separated by a globose connective. Capsule ovoid, 4-5 mm long, 4 valvate, their apices merely somewhat dorsally arcuate. Seeds ellipsoid, ca. 0.3 mm long, weakly 5 ribbed at best, pedicellate, bearing minute well separated warts in longitudinal lines.

DISTRIBUTION (Figures 4, 5, and 6): A weedy species found throughout much of the tropical and subtropical regions of the New World, extending into the drier more temperate regions of western North and South America from California, U.S.A., to Brazil and Perú; recent introductions also occur elsewhere; flowering all seasons.

Minod (1918) treated *Stemodia durantifolia* within his concept of *S. erecta*, not appreciating or being aware of the priority of the former name. D'Arcy (1979) has treated in some detail most of the nomenclature accounted for in the above. He did not, however, distinguish var. *chilensis*.

Stemodia durantifolia is an exceedingly variable species and its separation into the two varieties recognized here is largely based upon the geographical isolation of Chilean populations having larger corollas and more often verticillate leaves than occur elsewhere. Because of the 1000 or more sheets examined, we have abbreviated the cited collections that follow.

The recently described *Stemodia bissei* appears to be a form of the present with somewhat longer pedicels. Pedicel length is quite variable in *S. durantifolia*; although it mostly varies between 1-8 mm, occasionally plants may have pedicels up to 20 mm long (e.g., México, Baja California, Turner 3643, TEX).

REPRESENTATIVE SPECIMENS (from among 1500 or more):

MEXICO. Baja California Sur: Gentry 4344 (ARIZ,K). Campeche: Lundell 1372 (DS,F,MICH,MO,US). Chiapas: Cowan 5017 (MEXU,TEX). Chihuahua: Palmer 74 (GH,K,US). Colima: Palmer 112 (GH,US). Durango:



Figure 4. Distribution of *Stemodia durantifolia* in U.S.A. (inset) and México.



Figure 5. Distribution of *Stemodia durantifolia* in West Indies.



Figure 6. Distribution of *Stemodia durantifolia* in Central America.

Herrera 572 (TEX). Guanajuato: Kishler 911 (MEXU). Guerrero: Hinton 5437 (GH,K). Hidalgo: Rzedowski 25427 (ENCB). Jalisco: Ayala 722 (MEXU,TEX). México: Hinton 5296 (GH,US). Michoacán: Cowan 4917 (MEXU,TEX). Morelos: Pringle 9510 (GH,US). Nayarit: Cowan 4795 (TEX). Nuevo León: Smith M45 (TEX). Oaxaca: Pringle 6035 (GH,K). Puebla: Rzedowski 28951 (ENCB,TEX). Querétaro: Rose 9755 (US). Quintana Roo: Olmstead 720 (MEXU). San Luis Potosí: Schaffner 714 (GH,K). Sinaloa: Ortega 647 (K). Sonora: Cowan 5559 (MEXU,TEX). Tabasco: Ventura 21048 (ENCB,TEX). Tamaulipas: Johnston 5026A (TEX). Yucatán: Steere 2009 (MICH). Zacatecas: McVaugh 17655 (MICH).

EL SALVADOR. Santa Ana: Standley 3122 (F). San Miguel: Standley 21076 (F). San Vicente: Standley 3376 (F). Sonsonate: Standley 22109 (F).

BELIZE. Distr. Belize: Croat 23327A (MO). El Cayo: Gentle 9660 (DUKE,F,MEXU,US).

GUATEMALA. Chiquimula: Steyermark 30143 (F). Izabal: Blake 7287 (US). Jutiapa: Standley 76001 (F). Petén: Contreras 2313 (DUKE,LL,TEX). Progreso: Standley 69005 (F). Retalhuleu: Harmon s.n. (MO). Zacapa: Standley 72045 (F).

HONDURAS. Comayagua: Standley 5253 (F). Copán: Molina 24692 (F). Cortez: Standley 7192 (F). Morazán: Molina 25949 (F). Yoro: Standley 53893 (F).

NICARAGUA. Boaca: Seymour 6076 (F). Chontales: Standley 9243 (F). Estelí: Standley 20193 (F). Managua: Grant 1108 (GH!). Matagalpa: Williams 23758 (F). Zelaya: Molina 2289 (F).

PANAMA Canal Zone: McDaniel 12665 (DUKE). Los Santos: Butch 1555 (MO). Panamá: McDaniel 10322 (MO).

COSTA RICA. Guanacaste: Liesner 4421 (MO). Puntarenas: Quiros 15 (F). San José: Jiménez 1295 (US).

WEST INDIES: ANTIGUA. Boz 1018 (F).

BONAIRE. Arnoldo 3787 (AA).

CUBA. Curtis 529 (BM,G,PHIL,US).

CURACAO. Arnoldo 1626 (F).

DOMINICAN REPUBLIC. Allard 15697 (US).

GRENADA. Broadway 1761 (F).

HAITI. Leonard 7727 (UC,US).

JAMAICA. Proctor 34865 (BM).

PUERTO RICO: Urban 1057 (G,GH,LIL,US).

TRINIDAD: Barnard 274 (MO).

UNITED STATES. Arizona: Gila Co.: Niles 368 (ARIZ); Maricopa Co.: Pennell 24970 (ARIZ,F,PH,UC,US); Navajo Co.: Girard s.n. (MICH); Pima Co.: Thurber 320 (ARIZ,MO,US); Pinal Co.: Crutchfield 261 (LL); Santa Cruz Co.: Kaiser 1291 (ARIZ); Yavapai Co.: Foster 327 (DS,GH,PH,US).

California: Riverside Co.: *Parish 4135* (DS,GH,MO,PH,UC,US); San Diego Co.: *Palmer 284* (F,G,MO,PH).

STEMODIA FRUTICOSA Lundell

Stemodia fruticosa Lundell, Contr. Univ. Michigan Herb. 4:27. 1940. TYPE: BELIZE. El Cayo District: Vaca, 24 Feb 1938, *Percy H. Gentle 2252* (HOLOTYPE: MICH!; Isotype: LL!).

Stemodia glabra Oerst. in Benth. & Oerst., Kjoebenh. Vidensk. Meddel 21. 1853. *Stemodiocra glabra* (Oerst.) Kuntze, *Rev. Gen. Pl.* 2:166. 1891. Not *Stemodia glabra* Spreng. 1825. TYPE: NICARAGUA. "Prov. Segovia", 1852, *Oersted 9474* (HOLOTYPE: C!; Photoholotypes: F!,GH!,MO!; Isotypes: C!,K!).

Stemodia hondurensis Standl. & Williams, *Ceiba* 3:60. 1952. TYPE: HONDURAS. Olancho: vicinity of Juticalpa, 380-480 m, 5-16 Mar 1949, *Paul C. Standley 17812* (HOLOTYPE: US!; Photoholotypes: F!,GH!,LL!,UC!,US!; Isotype F!). The holotype was originally deposited in the "Herb. Esc. Agr. Panam." but subsequently transferred to US.

Suffruticose perennial herbs, shrublets, or shrubs (0.3-)1.0-2.0 m high. Stems brownish, brittle, densely short puberulent or sparsely pilose at first but glabrescent and corky white with age. Midstem leaves mostly 5-8 cm long, 2.0-3.5 cm wide, drying black; petioles 0.3-1.0 cm long; blades ovate-lanceolate, pinnately nervate, moderately hirsute to glabrate, the surfaces epunctate or nearly so, the margins serrate. Flowers axillary, arranged 2-4 at a node, the peduncles ebracteate, 5-20 mm long, pubescent like the stems. Sepals \pm alike, mostly 6-9 mm long, puberulent with short incurved eglandular hairs, or occasionally both glandular pubescent and puberulent. Corollas 14-18 mm long, white to lilac, the tube sparsely pubescent, the lobes 2-5 mm long. Anther thecae glabrous, ca. 0.7 mm long, separated by a globose connective, ca. 0.5 mm across. Capsules broadly ovate, 4-6 mm high, 4 valvate, the apices not erect. Mature seeds not available.

DISTRIBUTION (Figure 7): Belize, Honduras and El Salvador, dry rocky forests, 500-1600 m; flowering January-April.

REPRESENTATIVE SPECIMENS:

EL SALVADOR. Morazán: south side of Montes de Cacaquatique, ca. 1500 m, 7 Jan 1942, *Tucker 740* (F,G-DEL,LL,MICH,UC). Santa Ana: Hacienda San Miguel near Metapán, 600-1380 m, 22 Feb 1946, *Carlson 804* (F).

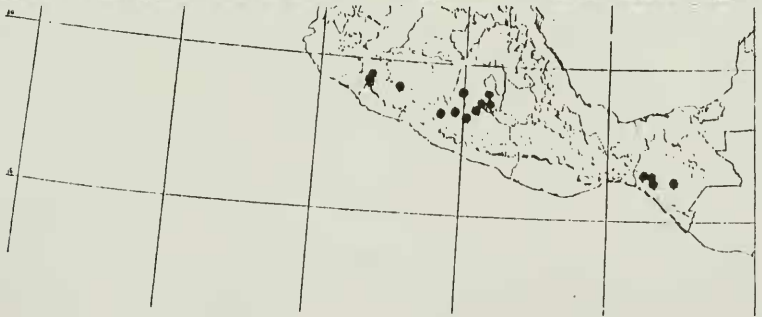


Figure 7. Distribution of *Stemodia fruticosa* (upper figure) and *S. jorullensis* (lower figure).

HONDURAS. El Paraiso: 12 km NE of Yuscaran, 900 m, 30 Jun 1961, *Molina 10040* (F,GH,US). Olancho: vicinity of Juticalpa, 380-480 m, 5-16 Mar 1949, *Standley 18132* (A,F,US).

NICARAGUA. Matagalpa: along Río Las Canas, 10-15 km NE of Matagalpa, 600-700 m, 16 Jan 1963, *Williams 24021* (F,MEXU).

STEMODIA JORULLENSIS H.B.K.

Stemodia jorullensis H.B.K., *Nov. Gen. & Sp.* 2:358. 1817. *Stemodiocris jorullensis* (H.B.K.) Kuntze, *Rev. Gen. Pl.* 2:166. 1891. TYPE: MEXICO. Michoacán: Volcán Jorullo, "490 hex", 19 Sep 1803, *Humboldt & Bonpland s.n.* (HOLOTYPE: P; Photoholotypes: F!,GH!,MO!).

Stemodia micrantha Brandegee, *Univ. Calif. Publ. Bot.* 6:63. 1914. Not *Stemodia micrantha* Benth. TYPE: MEXICO. Chiapas: Cerro de Tonalá, Sep 1913, *C.A. Purpus 6806* (HOLOTYPE: UC!; Isotypes: F!,GH!,MO!,US!).

Stemodia neglecta Minod, *Bull. Soc. Bot. Geneve, ser. II*, 10:195. 1918: TYPE: MEXICO. w/o locality, w/o date, *Sessé & Moçino s.n.* (HOLOTYPE: G!; Photoholotypes: F!,GH!,MO!). The type is from "Nueva España" where Minod thought it to have been collected by Pavon. But the latter collector was never in México, although the sheet concerned was once part of Pavon's herbarium. McVaugh correctly notes, by annotation on the type sheet, that a descriptive account that accompanies the type is written in the hand of Sessé. Thus the Pavon notation is probably an error. Regardless, the plant concerned, with its broad, shortly petiolate leaves and hirsute vestiture, closely matches what is here recognized as *S. jorullensis*.

Annual herbs mostly 20-30 cm high, stems stiffly erect, simple, not branched at the base. Stems pilose with multiseptate stiff hairs 1-2 mm long, beneath this a vestiture of shorter glandular trichomes. Midstem leaves mostly 1-2 cm long, 1.0-1.5 cm wide; petioles mostly 3-6 mm long; blades broadly ovate to deltoid, pubescent like the stems, subpinnately veined, epunctate or nearly so, the margins irregularly crenulodentate. Flowers axillary, arranged 2-3 at a node, the peduncles ebracteate, mostly 5-10 mm long, pubescent like the stems. Sepals 5, mostly 4-6 mm long, pilose. Corollas mostly 6-9 mm long, violet, the tubes sparsely pubescent, the lobes 2-3 mm long, glabrous or nearly so. Anther thecae ca. 0.5 mm long, glabrous, separated by an oval connective. Capsule narrowly ovoid, 5-6 mm high, 2 valvate, the apices somewhat recurved. Seeds ca. 0.5 mm long, ellipsoid, stipitate, longitudinally sulcate with 6-8 ribs.

DISTRIBUTION (Figure 7): known only from southern México in montane wooded areas, mostly 1000-2000 m; flowering September-November.

This taxon has long been confused with *Stemodia angulata* but is readily distinguished from the latter in having stems with glandular pubescence, and epunctate leaves with shorter petioles. Its closest relationship appears to be with *S. pusilla* Benth., differing from the latter in having more stiffly erect primary stems with little branching from the base; in addition the blades are more commonly deltoid with shorter petioles.

Immature specimens of *Stemodia jorullensis* from Chiapas with somewhat smaller corollas were called *S. micrantha* by Brandegee.

Minod's broad treatment of *Stemodia jorullensis* included three subspecies: 1) subsp. *jorullensis* (his subsp. *genuina*) of which he cited two specimens, the type and *Seler 4981* from México, San Andres Tuxtla, Veracruz; the latter specimen, however, appears to be *S. angulata*; 2) subsp. *reptans*, the type from Costa Rica; this appears to be *S. angulata*; 3) subsp. *ageratifolia*, the type from Cuba; this also appears to *S. angulata*.

REPRESENTATIVE SPECIMENS:

MEXICO. Chiapas: Mpio. Cintalapa, Cerro Baul to Colonia Figaroa, 100 m, 7 Jan 1973, *Breedlove 31272* (DS). Colima: Tuxpan, 11 Apr 1910, *Orcutt 4704* (F). Guerrero: Distr. Adama, Temisco, Barranca del Consuelo, 520 m, 15 Nov 1937, *Mezias 8816* (B,F,G,GH,MO,PH,UC). Jalisco: Tonalita, 5 Nov 1910, *Orcutt 6481* (TEX).

STEMODIA LANATA Sessé & Moçño ex Benth.

Stemodia lanata Sessé & Moçño ex Benth. in DC., *Prodr.* 10:363. 1846.

TYPE: MEXICO. Veracruz: beach sand near Tecolutla, 1837, *Schiede & Deppe s.n.* (LECTOTYPE: K! [selected here]; Isolectotype: LE!).

Erinus tomentosus Miller, *Gard. Dict.*, ed. 1, no. 2, 1731. *Stemodiocrata tomentosa* (Miller) Kuntze, *Rev. Gen. Pl.* 2:466. 1891. *Stemodia tomentosus* (Miller) Greenm. & Thompson, *Ann. Missouri Bot. Gard.* 1:409. 1914. TYPE: MEXICO. Veracruz: Veracruz, 1730, *Hous-toun s.n.* (HOLOTYPE: BM!; Photoholotype: UC!). Not *Stemodia tomentosa* (Roxb.) G. Don 1838.

Herpestis tomentosa Schlecht. & Cham., *Linnaea* 5:106. 1830. TYPE: MEXICO. Veracruz: sandy areas about Veracruz, 1837, *Schiede & Deppe 175* (HOLOTYPE: HAL; Isotypes: BM!,LE!).



Figure 8. Distribution of *Stemodia macrantha* (open circles), *S. maritima* (closed circles), and *S. palmeri* (open triangles).



Figure 9. Distribution of *Stemodia peduncularis*.

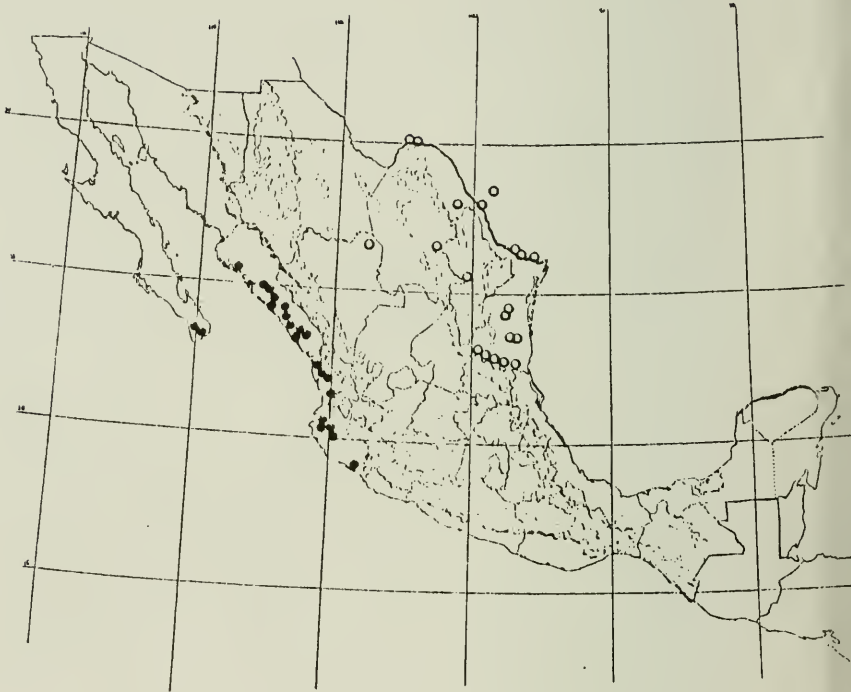


Figure 10. Distribution of *Stemodia pusilla* (closed circles) and *S. schottii* (open circles).



Figure 11. Distribution of *Stemodia tenuifolia* (open circles) and *S. lanata* (closed circles); inset, distribution in Texas.

DISTRIBUTION (Figure 11): Mostly sandy seashores or alluvial sands along coastal rivers, central and northeastern coastal México and adjacent U.S.A. (southernmost Texas), 0-50 m; flowering all seasons.

Prostrate, white tomentose or lanate perennials 5-10 cm high. Stems tomentose, rooting at the nodes. Midstem leaves mostly 1.0-2.5 cm long, 0.5-1.0 cm wide, pinnately nervate, elliptic lanceolate to obovate, sessile, white tomentose, the margins denticulate. Flowers axillary, relatively few, arranged 1 or 2 at a node, sessile or nearly so. Sepals \pm alike, 4-5 mm long, white tomentose, bounded by 1 or 2 short basal bracts. Corollas 6-7 mm long, the tube minutely puberulent, the lobes 1-2 mm long, not especially zygomorphic. Anther thecae ca. 0.6 mm long, white or beige, separated by a small globose connective. Capsules ovoid, 2-3 mm long, 4 valvate, the apices mostly erect. Seeds, ca. 0.3 mm long, weakly ellipsoid, stipitate if at all, ornamented with a mesh of low ridges arranged in 5-7 sided figures, not at all warty.

Because of its tomentose vestiture this is the most easily recognized of all *Stemodia* species. It is seemingly closely related to the *S. durantifolia* complex (by leaves and anther shape) but is readily separated by seed ornamentation.

REPRESENTATIVE SPECIMENS:

UNITED STATES. Texas: Aransas Co.: Aransas National Wildlife Refuge, ca. 3 m, 8 May 1959, *Traverse 1314* (F,GH,LL,MO); Brooks Co.: 23 mi E of Hebbronville, 18 Nov 1962, *Solis 67* (LL,TEX); Cameron Co.: Boca Chica, Clarke Island, 7 Jun 1943, *Clover 1254* (ARIZ,MICH,MO); Goliad Co.: Goliad, Jun 1927, *Williams 177* (PH,TEX,US); Hidalgo Co.: ca. 8 mi N of San Manuel, 9 Apr 1944, *Lundell 12797* (LL,MEXU,UC); Kenedy Co.: beach ridge along Laguna Madre, 20 Apr 1954, *Johnston 54599* (TEX); Kleberg Co.: near coast, King Ranch, 3 Jul 1953, *Johnston 54445* (TEX); Nueces Co.: Mustang Island, 29 Jul 1967, *Gillespie 300* (TEX); San Patricio Co.: 8 mi SW of Aransas Pass, 22 Apr 1947, *Whitehouse 18207* (ARIZ,MICH,TEX); Willacy Co.: Sandy flats near Port Mansfield, 27 Jun 1950, *Webster 3077* (MICH,US).

MEXICO. Tamaulipas: Sand dunes, 1 mi N of Cd. Madero, 1 Mar 1961, *King 3991* (F,MICH,TEX,US). Veracruz: along shore near Veracruz, 24 Jan 1906, *Greenman 106* (F,GH).

STEMODIA MACRANTHA B. Robinson

Stemodia macrantha B. Robinson, Proc. Amer. Acad. Arts 34:27. 1907
 TYPE: MEXICO. Michoacán: near the foot of the falls of Tzararacua below Uruapan, 28 Jan 1907, *C.G. Pringle 10356* (HOLOTYPE: GH!
 Isotypes: ARIZ!,C!,F!,G-BOIS!,G-DC!,G-DEL!,K!,LE!,MICH!,M!,MO!
 PH!,UC!,US!).

Trevirania parviflora Hook. & Arn., *Bot. Beechey Voy.* 302. 1839.
Dicyrlla parviflora (Hook. & Arn.) Seemann, *Bot. Voy. Herald* 326.
1856. *Anetanthus parviflorus* (Hook. & Arn.) Benth. & Hook. f.,
Gen. Pl. 2:1025. 1876. Not *Stemodia parviflora* W.T. Aiton, 1789.
TYPE: MEXICO. Nayarit(?): w/o specific locality, *Beechey s.n.*
(HOLOTYPE: K!).

Suffruticose perennial herbs 0.5-1.5 m high. Stems sparsely to moderately pilose with multiseptate hairs 1-2 mm long, beneath these a finer array of short glandular trichomes. Midstem leaves mostly 3-7 cm long, 2-3 cm wide; petioles 1.0-1.5 cm long; blades broadly ovate, sparsely pilose to both pilose and glandular pilose, especially along the veins, the undersurfaces glandular punctate. Flowers axillary, mostly arranged 2-4 at a node, the peduncles ebracteate, mostly 2-4 cm long, pubescent like the stems. Sepals mostly 7-10 mm long, pilose with both nonglandular and glandular hairs. Corollas mostly 14-20 mm long, reportedly white, yellow, or purple (yellow tube with white lobes, according to *Anderson 5986, TEX*), the tube sparsely pubescent, the lobes 3-5 mm long. Anther thecae ca. 0.5 mm long, glabrous, separated by an ovoid connective ca. 0.4 mm across. Capsules ovoid, 5-7 mm high, (3-)4 valvate, somewhat recurved apically. Seeds ca. 0.8 mm long, ellipsoid, stipitate, 6-8 sulcate, finely muricate along the ribs.

DISTRIBUTION (Figure 8): Mainly Pacific Coastal Region from Nayarit, México to Honduras, mostly pine-oak forests, 1000-1800 m; flowering November-March.

This taxon is closely related to *Stemodia peduncularis* of eastern México; it is readily distinguished from the latter by its spreading pilose vestiture (the hairs mostly 1-2 mm long) beneath which usually occurs a much shorter layer of glandular tipped hairs (mostly 0.5 mm long or less), rarely not. In addition, the leaf blades are only sparsely or weakly glandular punctate beneath, the latter usually pale yellowish in color (vs. abundantly endowed with amber to brown punctations in *S. peduncularis*).

We include here collections from Chiapas (e.g., Vol. Tacana, *Matuda 2962* [MICH 3 sheets]) which differ somewhat from typical forms in having creeping stems, somewhat broader, darkly punctate, more elliptic leaves, otherwise they differ but little from other material of this species from Chiapas.

Richard Howard (1974) annotated the holotype of *Trevirania parviflora* as *Stemodia peduncularis* Benth., but the latter is a species of eastern México, as noted in the above.

REPRESENTATIVE SPECIMENS:

MEXICO. Chiapas: Mt. Ovando, Dec 1937, *Matuda 2090* (GH,LL,MICH, PH,US). Guerrero: Distr. Mina, Río Frio, 21 Nov 1936, *Hinton 9877* (G,GH,LL,

MICH,UC,US). Jalisco: 15-30 km N of Mascota, Sierra de San Sebastián, 1200-1300 m, 1-3 Mar 1970, *Anderson 5986* (CAS,MEXU,MICH,TEX). México: Distr. Temascaltepec, Nanchititla, 15 Feb 1935, *Hinton 7382* (LL). Michoacán: Coalcomán, 1000 m, 2 Jan 1939, *Hinton 12924* (ARIZ,LL,MEXU,PH,TEX,US). Nayarit: near Villa Caranza, along route 28, 7 Jan 1979, *Croat 45143* (MO).

GUATEMALA. Alta Verapaz: 2-4 km SW of Cobán, 1300-1400 m, 8 Feb 1969, *Williams 40718* (DUKE,F). Zacapa: upper reaches of Río Sitio, 1500-1800 m, 25 Jan 1943, *Steyermark 43197* (F,PH).

HONDURAS. Atlantida: near Tela, 20-600 m, 6 Dec 1927, *Standley 54805* (F). Copán: 5 km SE of Santa Rosa de Copán, 29 Mar 1963, *Molina 11665* (F,LL,US).

STEMODIA MARITIMA L.

Stemodia maritima L., *Syst. Nat.*, ed. 10, 2:1118. 1759. *Scordium maritimum fruticosum procumbens, flore coeruleo* ... Sloane. 1696. *Stemodi-acra maritima* (L.) P. Br., *Hist. Jamaica* 261. 1756. TYPE: JAMAICA: *Scordium maritimum fruticosum procumbens, flore coeruleo* ... Sloane *Houston s.n.* (LECTOTYPE: BM! [selected here], mounted on same sheet with sprigs of *S. maritima* collected by *Shakespear s.n.* and *Wright s.n.*).

Stemodia maritima L. var. *rigida* J.A. Schmidt in Martius, *Fl. Bras.* 8:299. 1862. TYPE: BRAZIL: Pernambuco, seashore, Island of "Itamarica" [Itamaraca], Dec 1897, *Gardner 1088* (LECTOTYPE: HBG? [selected here]; Isolectotypes: BM!,GH!). Specific locality and date from specimen at BM.

Stemodia piurensis Pennell, *Not. Nat. Acad. Nat. Sci. Philadelphia* 179:2. 1946. TYPE: PERU. Piura: river gravels, Quebrada Mogollon, Amotape Hill, 28-30 Mar. 1941, *O. Haught & H.K. Svenson 11542* (HOLOTYPE: BKL!).

Stemodia fruticulosa Tsvelev, *Bot. Zh. (Leningrad)* 72:1663. 1987. TYPE: CUBA. Prov. Pinar del Río: Las Martinas, 10 May 1938, *J. Acuña & J. Roig 10845* (HOLOTYPE: HAC; Isotype: HAC).

Suffruticose prostrate or sprawling glandular viscid perennial herbs, shrublets or shrubs mostly 0.3-1.5 m high. Stems erect to recumbent, variously pubescent with both long crisp uniseriate hairs and much shorter glandular trichomes. Midstem leaves ovate, lanceolate, or elliptical, sessile, mostly 1.5-3.0 cm long, 0.5-1.2 cm wide, clasping, subpinnately nervate, glandular viscid, the margins denticulate to entire. Flowers axillary, arranged 1 or 2 to a node, sessile, mostly covered by the leaves. Sepals 5, \pm alike, linear lanceolate to

linear oblanceolate, more or less scarious along the margins, subtended by 1 or 2 basal bracts (rarely not). Corollas 2.5-5.0 mm long, more or less glabrous throughout, the lobes 1-3 mm long, sparsely pubescent. Anther thecae ca. 0.5 mm long, glabrous, both of these well separated by their slender stalks which are ca. 0.5 mm long. Style with an erect bilobed unexpanded stigmatic region. Capsules ovoid, 2-3 mm long, 4 valvate, the apices erect. Seeds ca. 0.4 mm long, ovoid, black, stipitate, ornamented with a crossmesh of raised ridges.

DISTRIBUTION (Figure 8). México (Quintana Roo) and Belize where perhaps introduced, West Indies and South America (Brazil and Perú; perhaps recently introduced to the latter), mostly occurring in saline beach sands and along estuaries in alluvial soils, 0-100 m; flowering all seasons.

Minod (1918) treated this taxon as the only member of the genus *Stemodi-acra* P. Br., which predates *Stemodia*. If combined, *Stemodia* has legitimacy, being conserved. Because of the large number of specimens available only abbreviated citations are presented below.

The recently described *Stemodia fruticulosa* appears to be a late flowering form of the present species with somewhat smaller leaves (ca. 3-7 mm long vs. mostly 15-20 mm long).

REPRESENTATIVE SPECIMENS:

NORTH AMERICA: BELIZE. seashore, N of Manatee River, 1906, *Peck 404* (GH); Turneffe, 1965, *Stoddart 459* (US).

MEXICO: Quintana Roo: Mpio. Carillo Puerto, Mahahual, 1985, *Cowan 5102* (TEX); *Olmstead 5102* (MEXU); Cozumel, 1899, *Millspough 1535* (F).

WEST INDIES: BAHAMA ISLANDS. Acklins: *Brace 4418* (F). Andros: *Brace 6734* (F). Cat Island: *Hitchcock s.n.* (F). Eleuthera: *Lewis 7188* (MO). Exumas: *Nickerson 2771* (A,MO). Grand Caymen: *Sauer 4067* (F). Great Abaco: *Sauleda 2292* (F). Great Exuma: *Eldrige s.n.* (MO). Inagua: *Porter 33991* (A,MO,BER). Long Island: *Eggers 4016* (US). Mayaguana: *Wilson 7496* (F,MO). New Providence: *Gillis 5348* (DUKE).

CURACAO. *Arnoldo-Broeders 3755* (A); *Potter 5120* (GH); *Stoffers 310* (A).

CUBA. Camaguey, *Schafer 635* (F); Habana, *Wilson 2289* (F, US); Isle of Pines, *Britton 25395* (F,MO,US); Las Villas, *Webster 167* (A); Oriente, *Ekman 2438* (US); Pinar del Río, *Ekman 18792* (MICH).

DOMINICAN REPUBLIC. *Abbott 1987, 1999* (US); *Ekman 16537* (US); *Zanoni 24790* (TEX).

HAITI. *Ekman 8498* (G-DEL); *Leonard 3536, 11768, 12822* (US).

STEMODIA PALMERI A. Gray

Stemodia palmeri A. Gray, Proc. Amer. Acad. Arts 21:403. 1886. TYPE: MEXICO. Chihuahua: near Batopilas, Aug-Nov 1885, *E. Palmer 221* (LECTOTYPE: GH! [selected here]; Isotypes: K!,LE!,US!).

Annual or short lived perennial herbs mostly 20-40 cm high. Stems mostly pubescent with pilose hairs 1-2 mm long, often with shorter glandular trichomes intermixed, stems erect or ascending at first but with age much branched and procumbent at the base. Midstem leaves mostly 2-4 cm long, 1-2 cm wide; petioles mostly 8-18 mm long; blades ovate, subpinnately veined, epunctate, the margins irregularly crenulodentate. Flowers axillary, arranged 1 or 2 at a node, the peduncles ebracteate, mostly 2-3 cm long. Sepals \pm alike, 6-8 mm long, sparsely pilose. Corollas mostly 12-16 mm long, blue to purple, the tubes sparsely pubescent, the lobes 2-4 mm long. Anther thecae ca. 0.5 mm long, separated by a globose connective. Capsule ovoid, ca. 5 mm high, 2 valvate, the apices erect. Seeds ca. 0.5 mm long, stipitate, longitudinally sulcate with 6-8 ribs.

DISTRIBUTION (Figure 8): Northwestern México (Sonora, Chihuahua, and N Sinaloa) in mostly dry short tree forests from 300-1800 m; flowering August-March.

This taxon is closely related to *Stemodia pusilla* but is readily separated by its more robust habit, larger leaves and much larger corollas (mostly 10-16 mm long vs. 6-10 mm).

REPRESENTATIVE SPECIMENS:

MEXICO. Chihuahua: Sierra Orejon, Río Mayo, 1 Jan 1935, *Gentry 1212* (MICH). Sinaloa: Dept. de Badiraguato, Arroyo de Carrisal, 3000 ft, 4 Mar 1940, *Gentry 5802* (ARIZ,DS,GH,MEXU,MICH,MO,UC). Sonora: Quirocaba, Río Fuerte, 7 Mar 1935, *Gentry 1436* (ARIZ,GH,MO,PH).

STEMODIA PEDUNCULARIS Benth. in DC.

Stemodia peduncularis Benth. in DC., *Prodr.* 10:382. 1846. *Stemodiocras peduncularis* (Benth.) Kuntze, *Rev. Gen. Pl.* 2:466. 1891. TYPE: MEXICO. Veracruz: Mirador, 1838, *J. Linden 1098* (LECTOTYPE: K! [selected here = the lower specimen - the upper specimen is a *Galeotti* collection]; Isolectotypes: G!,G-BOIS!,G-DC!,G-DEL!,LE!,MICH!). Bentham also cited the Galeotti collection in his protologue.

Suffruticose erect or scrambling perennial herbs (0.3-)0.8-1.0(-2.5) m high. Upper stems usually somewhat square and frequently with narrow wings along

the angles, pubescent with short puberulent hairs, mostly 0.5-1.0 mm long, the latter rarely interspersed with short glandular hairs. Midstem leaves mostly 3-6 cm long, 1.5-4.0 cm wide; petioles 1.0-1.5 cm long; blades broadly ovate, sparsely puberulent, especially along the veins, the undersurfaces markedly glandular punctate with amber to brown dots, the margins irregular crenulodentate. Flowers axillary, mostly arranged 2-4 at a node, the peduncles ebracteate, mostly 3-4 cm long, pubescent like the stems. Sepals mostly 6-8 mm long, puberulous and markedly glandular punctate like the leaves. Corollas mostly 12-15 mm long, reportedly white to blue, the tubes sparsely pubescent, the lobes 2-4 mm long. Anther thecae ca. 0.6 mm long, glabrous, separated by an ovoid connective ca. 0.4 mm across. Capsules broadly ovoid, 6-7 mm high, (3-)4 valvate, scarcely recurved apically. Seeds ca. 0.7 mm long, ellipsoid, stipitate, 6-8 sulcate.

DISTRIBUTION (Figure 9): Mostly eastern México from Hidalgo to Chiapas, and southwards to Panamá, mixed montane cloud forests, mostly 500-2000 m; flowering July-March.

This species is represented among the collections borrowed by 50 or more specimens from 20 or more localities, mostly from Veracruz, México. All of these are remarkably similar, possessing a short crisp puberulence on the stems and mostly lacking short glandular hairs as commonly occurs in its more western cohort, *Stemodia macrantha*. In addition the leaves of *S. peduncularis* have markedly brown or amber colored punctate glands on their undersurfaces, and often the calyx. Plants from Chiapas, México and Central America, tend to have somewhat smaller corollas on shorter peduncles, otherwise these are quite similar to typical material.

Stemodia peduncularis is readily distinguished from *S. macrantha* by its mostly shorter eglandular puberulence and markedly amber colored glandular punctate leaves and sepals.

REPRESENTATIVE SPECIMENS:

MEXICO. Chiapas: Mpio. Ocozocoautla, 4.9 km de Malpaso, ca. 140 m, 20 Jun 1980, *Cowan 3065* (MEXU). Hidalgo: trail by Lake Atexa below Molango, 1400 m, 22 Mar 1947, *Moore 2457* (GH). Oaxaca: Cañada de San Gabriel Etna, 2000 m, 8 Aug 1897, *Conzatti 319* (GH). Puebla: Mpio. de Hueytamalco, El Reparo, 1050 m, 30 Jan 1970, *Ventura 416* (DS,MEXU,MICH). Veracruz: Mpio. de Atzalán, Arroyo, 800 m, 12 Nov 1970, *Ventura 510* (ARIZ,DS,ENCB,F,MICH).

CENTRAL AMERICA: COSTA RICA. Cartago: ca. 4.2 km NE of Torito, ca. 1500 m, 9 Mar 1978, *Wilbur 25513* (DUKE). San José: ca. 3 km W of Coscajal, 17 Feb 1978, *Almeda 3634* (CAS,MO).

GUATEMALA. Alta Verapaz: Cobán, 1350 m, Feb 1908, *Tuerckheim II 1658* (C). Quezaltenango: Finca Helvetia, 3100 ft, 8 Oct 1934 (GH).

HONDURAS. Cortez: Montaña Santa Ana, 210 m, 6 Dec 1950, *Molina 3598* (F).

PANAMA. Chiriquí: NE slopes of Cerro Pando, ca. 1500 m, 15 Jan 1970 *Wilbur 11017* (DUKE, F, MICH, MO).

STEMODIA PUSILLA Benth.

Stemodia pusilla Benth., *Bot. Sulph.* 144. 1844. *Stemodiacra pusilla* (Benth.) Kuntze, *Rev. Gen. Pl.* 2:466. 1891. TYPE: MEXICO. Nayarit: Tepic, w/o date, *Barclay s.n.* (HOLOTYPE: K!; Photoholotype: MICH!).

Stemodia humilis Pavon *ex* Minod, *Bull. Soc. Bot. Geneve*, ser. II, 10:197. 1918. TYPE: MEXICO. w/o locality; w/o date, *Sessé & Moçino s.n.* [numbered 2853 on printed isotype label at F] (HOLOTYPE: G!; Isotypes: F!, OXF!). Minod reported the collector to be Pavon but the latter never collected in México. The sheets concerned were presumably in the Pavon herbarium; the isotypes match the holotype precisely and are annotated "*Stemodia littoralis*"; the holotype bears an annotation label that reads "*Stemodia humilis* herb. Pavon".

Weak stemmed semi-erect to prostrate annual herbs 5-20 cm high. Stems usually much branched from the base, pubescent with widely spreading mostly crinkly multiseptate trichomes 1-2 mm long, these often intermixed with glandular tipped hairs. Midstem leaves mostly 1.5-2.5 cm long, 0.8-1.2 cm wide; petioles mostly 3-9 mm long; blades ovate to subdeltoid, subpalmately nerved, epunctate, sparsely pubescent, the margins irregularly crenulodentate. Flowers axillary, arranged 1-2 at a node, the peduncles ebracteate, mostly 3-8 mm long. Sepals mostly 3-4 mm long, pilose, one of these somewhat different than the rest. Corollas 6-10 mm long, purplish to blue with yellow throats, the tube sparsely pubescent, the lobes 1-3 mm long. Anther thecae ca. 0.4 mm long, glabrous, separated by an ovoid connective. Capsule ovoid, 4-5 mm high, 2 valvate, the apices erect. Seeds ca. 0.4 mm long, ellipsoid, stipitate, longitudinally sulcate with 6-8 ribs.

DISTRIBUTION (Figure 10): Coastal regions of northwestern México from Colima to N Sinaloa with outlier populations in the Cape Region of Baja California, 100-400 m; flowering May-September.

This species is closely related to *Stemodia jorullensis* and *S. palmeri*. It differs from *S. palmeri* in having generally smaller corollas (6-10 mm long vs. 12-16 mm) and smaller leaves with shorter petioles (3-9 mm vs. 8-18 mm). Populations from the Cape Region of Baja California differ from mainland populations in having somewhat larger corollas (8-10 mm long vs. 6-8 mm); otherwise these differ but little from typical *S. pusilla*.

Minod treated Central American elements of *Stemodia angulata* within this taxon. He also cited a collection of *S. pusilla* from San Bernardo Canyon, California, presumably introduced, which we have not examined.

REPRESENTATIVE SPECIMENS:

MEXICO. Baja California Sur: Arroyo San Pedro at Rancho Cayuco, moist sand along stream, 1000 ft, 7 May 1959, *Thomas 7806* (CAS,DS,MEXU). Colima: w/o locality, 9 Jan-6 Feb 1891, *Palmer 1252* (K). Jalisco: Cerro de la Cruz, 20 m, 27 Nov 1926, *Mezra 1152* (CAS,G,GH,MICH,MO,UC). Nayarit: San José del Conde, ca. 1000 m, in wet sand, 29 Mar 1927, *Mezra 1931* (CAS,F,G,GH,MO,UC). Sinaloa: Villa Unión, Jan 1895, *Lamb 439* (DS,F,GH,MO).

STEMODIA SCHOTTII Holzinger

Stemodia schottii Holzinger, Contr. U.S. Nat. Herb. 286. 1893. TYPE: UNITED STATES. Texas: Starr Co., Rio Grande City, 1853, *A. Schott s.n.* (LECTOTYPE: US! [selected here]; Photolectotypes: F!,GH!,UC). In his original description Holzinger cited two collections, the lectotype and *Nealley 305* (US) from Val Verde Co., Texas. Pennell (1935) indirectly selected the lectotype, formalized here; he also noted that a presumed isolectotype (F!) gives collection data as Ringgold Barracks [Starr Co.], beach of the Bravo del Norte [Rio Grande], 29 May 1893, *Schott 29*. The latter collection is probably an isolectotype, but this is not certain.

Stemodia purpusii Brandegee, Univ. Calif. Publ. Bot. 4:189. 1911.

TYPE: MEXICO. Coahuila: Movano, Jun 1910, *C.A. Purpus 4456* (HOLOTYPE: UC!; Isotypes: F!,G!,GH!,US!).

DISTRIBUTION (Figure 10): Northeastern México and closely adjacent U.S.A. (Texas), mostly in silty or clay, alluvial soils, 5-1000 m; flowering October-April.

Annual or short lived perennial herbs 5-25 cm high. Stems erect at first but soon much branched and recumbent at base, densely glandular pubescent with short hairs 0.2 mm long or less. Midstem leaves sessile, thickish, mostly 10-30 mm long, 5-12 mm wide, obovate to oblanceolate, auricled at the base, weakly pinnately nervate, if at all, the surfaces glandular pubescent like the stems, the margins denticulate. Flowers axillary, arranged 1 or 2 at a node, the peduncles glandular pubescent, bracteate, mostly 2-6 mm long. Sepals \pm alike, 4.5-6.5 mm long, glandular pubescent, subtended by 1 or 2 basal bracts, the latter somewhat shorter than the sepals. Corollas mostly 10-13 mm long,

blue to purple, the tube minutely pubescent, the lobes 2-4 mm long, not strongly 2 lipped. Anther thecae glabrous, purple, ca. 0.5 mm long, separated by a globose connective. Capsules ovoid, 5-6 mm high, 4 valvate, the apices erect or nearly so. Seeds ovoid, stipitate, ca. 0.3 mm long, the surfaces with scattered minute warts, arranged in ca. 12 longitudinal lines.

Plants from the more eastern parts of Texas and Tamaulipas tend to have somewhat larger thinner leaves than those to the west, to which the name *Stemodia purpusii* has been applied, otherwise there is relatively little variation in the taxon.

REPRESENTATIVE SPECIMENS:

UNITED STATES. Texas: Cameron Co.: In open fields, Arroyo Colorado Bridge, 19 Mar 1937, *Runyon 1614* (TEX,US). Hidalgo Co.: 5 mi N of McAllen, 29 Feb 1944, *Painter 14469* (TEX). La Salle Co.: open ground near river, Cotulla, 16 Mar 1917, *Palmer 11296* (MO,PH,UC,US). Starr Co.: 10.7 mi NE of Rio Grande City on road 755, 9 Oct 1954, *Tharp 541901* (CAS,LL,TEX). Val Verde Co.: just E of Langtry, rim rock above Mile Canyon, overflow area near windmill, 29 Apr 1979, *Johnston 12449* (TEX). Webb Co.: sandbars of Rio Grande, near Laredo, Aug 1899, *Mackenzie 90* (PH).

MEXICO. Coahuila: 7.5 mi W of Nuevo Rosita, ca. 1500 ft, 11 Jun 1955, *Johnston 2568* (TEX). Durango: 1.5 mi NW of Yermo, 4 May 1959, *Correll 21443* (LL). Nuevo León: Battlefield between Citadel and Teneria, 29 Jan 1847, *Gregg 194* (MO). Tamaulipas: 4-5 mi S of Cd. Mante, 18 Feb 1961, *King 3784* (MICH,TEX,UC). Veracruz: 3 km N of Chijol, 26 Jan 1970, *Gomez-Pompa 4760* (MEXU).

STEMODIA TENUIFOLIA Minod

Stemodia tenuifolia Minod, Bull. Soc. Bot. Geneve, ser. II, 10:185. 1918.

TYPE: MEXICO. w/o state or locality, w/o date, *Sessé & Moçino s.n.* (?) (HOLOTYPE: G-DC; Photoholotypes: F!,GH!,MO!). Minod thought the type was collected by Pavon; actually the sheet concerned was probably a collection of Sessé which was part of the Pavon herbarium, much as explained for *Stemodia neglecta* Minod, cf. *S. jorullensis* (although no manuscript validates the interpretation offered here, the type matches material from México and Michoacán, a region where the collectors visited, and duplicates of Sessé & Moçino collections were known to be in the Pavon herbarium, some of which reside at G).

Prostrate or sprawling perennial herbs 15-45 cm high, sometimes with slender rhizomes, these forming small patches or colonies. Stems pilose with

crinkly spreading multiseptate hairs 1 mm long or more. Midstem leaves 2 or 3 to a node, mostly 1.5-2.5 cm long, 1.0-2.5 cm wide; petioles 2-6 mm long; blades broadly ovate to ovate-elliptic, sparsely pilose, especially along the veins, the lower surfaces weakly glandular punctate, the margins rather evenly crenulodentate. Flowers axillary, arranged 2-4 at a node, the peduncles ebracteate, 1-6 mm long, sparsely pilose. Sepals \pm alike, 6-8 mm long, pilose, linear-lanceolate. Corollas ca. 8 mm long, sparsely pilose, white or whitish, the tubes greenish yellow within, the lobes 1-2 mm long. Anther thecae glabrous, ca. 0.5 mm long, separated by an oval connective ca. 0.2 mm across. Capsule broadly ovoid, ca. 6 mm high, 4 valvate, the apices erect. Seeds ca. 0.8 mm long, ellipsoid, stipitate, longitudinally sulcate with 6-8 ribs.

DISTRIBUTION (Figure 11): Western México in montane areas along Pacific slopes in pine forests, 1100-1700 m; flowering August-November.

Because of its low sprawling perennial habit, relatively short broad leaves and very short peduncles, a relatively easily identified taxon. It seems clearly related to *Stemodia chiapensis* in nearly all of its characters except those discussed under the latter.

SPECIMENS EXAMINED:

MEXICO. Jalisco: Sierra del Halo, near a lumber road leaving the Colima highway 7 mi SSW of Tecalitlán and extending SE toward San Isidro, 3 mi from the highway in red clay soil on steep slopes, 1530 m, 14 Aug 1957, *McVaugh 16177* (MICH); 11-12 km SW of Tecalitlán, 1600-1650 m, 19 Nov 1970, *McVaugh 24480* (MICH); 16-18 km ENE of Cuautitlán, 1750 m, 27 Nov 1988, *Santana 4213* (WIS). México: Temascaltepec, Acatitlán, 1130 m, 16 Nov 1933, *Hinton 5218* (K). Michoacán: foothills of Cerro Tancitaro, NW slopes, 6-7 km S of Periban de Ramos, 1600 m, 29 Nov 1970, *McVaugh 24856* (MICH).

STEMODIA VERTICILLATA (Miller) Hassler

Stemodia verticillata (Miller) Hassler, *Contr. Fl. Chaco*. 110. 1909. BASSIONOMY: *Erinus verticillatus* Miller, *Gard. Dict.*, ed. 8. 1768. *Stemodia parviflora* W.T. Aiton, *Hortus Kew.*, ed. 2. 4:52. 1812 (based upon *Erinus verticillatus* Miller). *Stemodiocris verticillata* (Miller) Kuntze, *Rev. Gen. Pl.* 2:466. 1891. *Lindernia verticillata* (Miller) Britton in Britton & Wilson, *Bot. Porto Rico* 6:184. 1925. TYPE: MEXICO. Veracruz: 1731, *Houstoun s.n.* (HOLOTYPE: BM!).

Capraria humilis Solander in W.T. Aiton, *Hortus Kew.*, ed. 2:46. 1789.

Lindernia humilis (Solander) Minod, *Bull. Soc. Bot. Geneve*, ser.

II 10:241. 1918. *Stemodia humilis* (Solander) Dawson, *Rev. Mus.*

La Plata, Sec. Bot. 8:14. 1956. (Not *Stemodia humilis* Pavon ex Minod, 1918). TYPE: East Indies, 1781, *Sir Joseph Banks s.n.* (HOLOTYPE: K).

Stemodia arenaria H.B.K., *Nov. Gen. Pl.* 2:357. 1817. TYPE: COLOMBIA. "Crescit in ripa mundata fluminis Magdalenae prope Banco", 1801, *Humboldt & Bonpland s.n.* (LECTOTYPE: P [selected here]).

?*Poarium veronicoides* Desvauz ex Hamilton, *Prodr. Pl. Ind. Occ.* 46. 1825. TYPE: DOMINICAN REPUBLIC [Hispañola]: w/o specific locality, w/o date, *Desvauz s.n.* (HOLOTYPE: P).

Stemodia macrotricha Colla, *Herb. Pedem.* 4:327. 1835. TYPE: BRAZIL: "Arenosis ad Rio Belmonte", w/o date, *Martins s.n.* (HOLOTYPE: TO).

Herpestis diffusa Willd. ex Cham. & Schlecht., *Linnaea* 3:6. 1878. TYPE: *Herb. Willd.* 11444 (B-WILLD, Microfiche!). Cited in synonymy.

Erect or sprawling rather delicate annual herbs 5-25 cm high. Stems variously pubescent with both glandular or eglandular pilose hairs. Midstem leaves mostly 10-18 mm long, 6-14 mm wide; petioles 5-10 mm long, pilose, grading into the blades; blades ovate, subpalmately nervate, pilose, the surfaces inconspicuously punctate, the margins crenulodentate. Flowers axillary, arranged 2-4 at a node, the pedicels ebracteate, mostly 1-2 mm long. Sepals 5, \pm alike, 3-4 mm long, pilose. Corollas 2-3 mm long, blue to purplish, the tubes nearly glabrous, 2 lipped, the lobes ca. 1 mm long, sparsely pubescent. Anther thecae glabrous, ca. 0.2 mm long, separated by an enlarged connective ca. 0.3 mm across. Capsules nearly globose, mostly 1.5-2.0 mm high, 2(-4) valvate, the apices erect. Seeds broadly obpyramidal to ellipsoid, ca. 0.5 mm long, stipitate, longitudinally sulcate with 6-8 ribs. Chromosome number, $2n = 22$.

DISTRIBUTION (Figures 12, 13): Widespread and common weed throughout most of tropical America; flowering all seasons.

This is an easily recognized weedy species. Minod (1918) treated it as the only member of the genus *Lindernia*. Because of the 2000 or more sheets available in many herbaria we have abbreviated the citations that follow.

REPRESENTATIVE SPECIMENS:

MEXICO. Chiapas: *Breedlove 16160* (CAS,F). Colima: *Palmer 1178* (GH). Guerrero: *Hinton 6010* (GH). Hidalgo: *Seler 628* (GH). Jalisco: *Meria 1886* (CAS,US). México: *Hinton 2966* (F,GH,MEXU,MO,PH,US). Oaxaca: *Martínez 407* (GH). Tabasco: *Cowan 4665* (TEX,MEXU). Veracruz: *Purpus 2444* (F,GH,MO,UC).

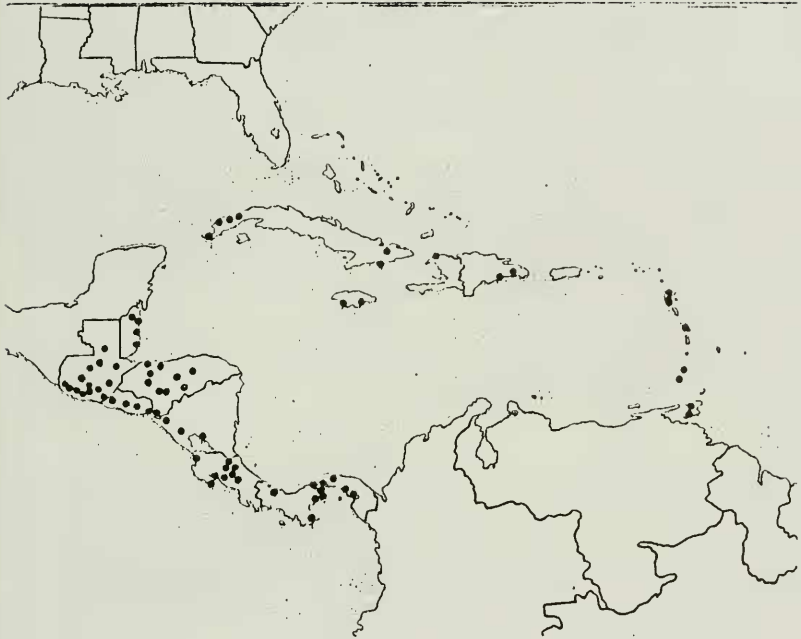


Figure 12. Distribution of *Stemodia verticillata* in West Indies and Central America.

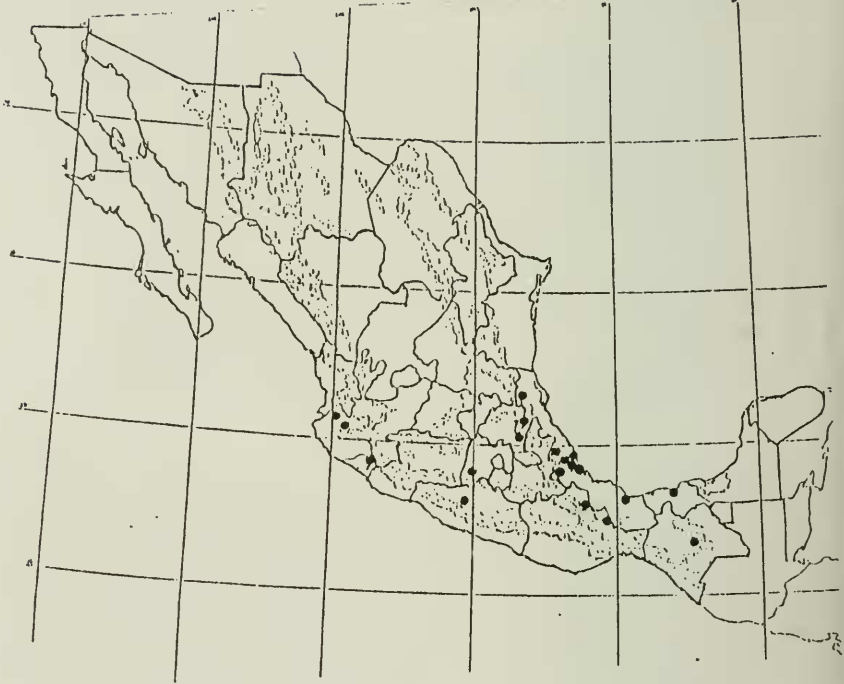


Figure 13. Distribution of *Stemodia verticillata* in México.

CENTRAL AMERICA: COSTA RICA. Cartago: *Holm 69* (A,PH). Guanacaste: *Morley 757* (F). Heredia: *Grayum 1771* (DUKE). Limón: *Cowan 4574* (TEX). Puntarenas: *Wilbur 27615* (DUKE). San José: *Cowan 4530* (TEX).

EL SALVADOR. Ahuachapán: *Standley 20259* (GH). Santa Ana: *Standley 3124* (F).

GUATEMALA. Alta Verapaz: *Steyermark 46320* (F). Chiquimula: *Standley 71930* (F). Escuintla: *Standley 64599* (F). Izabal: *Standley 24070* (F). Jutiapa: *Standley 75822* (F). Petén: *Lundell 3415* (TEX). Quezaltenango: *Standley 67891* (F). Retalhuleu: *Standley 88377* (F). Sacatepequez: *Steyermark 60843* (F). Santa Rosa: *Standley 77809* (F). Solola: *Steyermark 47493* (F).

HONDURAS. Atlantida: *Standley 54302* (F). El Paraiso: *Standley 26998* (F). Morazán: *Standley 18865* (F). Olancho: *Standley 17615* (F). Yoro: *Hernández 1065* (MO).

CONTROVERSIAL AND EXCLUDED NAMES (for the area concerned)

Schistophragma intermedia (A. Gray in Torr.) Pennell - Keil (pers. comm.) would position this taxon in his concept of *Leucospora*. We believe it should remain where Pennell positioned it.

Schistophragma mezicana D. Dietr. This is the generic type of *Schistophragma*. Keil (pers. comm.) would position this taxon along with *S. intermedia* in his concept of *Leucospora*. We believe both species, along with *S. polystachya*, should be retained within *Schistophragma*.

Schistophragma pusilla Benth. = *Schistophragma mezicana* D. Dietr.

Stemodia coahuilensis (J. Henr.) B.L. Turner, *comb. nov.* - based upon *Leucospora coahuilensis* J. Henr., *Aliso* 12:435. 1989. This taxon is closely related to *Stemodia multifida*, as noted by its original author. For additional comments see *S. multifida*, below.

Stemodia costaricensis B.L. Turner = *Darcya costaricensis* (B.L. Turner) B.L. Turner (in prep.).

Stemodia multifida (Michx.) Spreng. = *Leucospora multifida* (Michx.) Nutt. In the senior author's opinion this taxon belongs within his concept of *Stemodia* (s.l.). It has no unique features which might distinguish it from yet other species of the group; this is discussed in more detail in our discussion of generic relationships. Keil (pers. comm.) is currently undertaking a systematic study of *Leucospora* and has retained the latter, within which he positions the very different *Schistophragma*. So treated,

Leucospora would be grossly aphyletic. Since Keil's work is awaiting publication, and because he has had most of the materials concerned on loan for some time, we have not included *Leucospora*, sensu Keil, in our treatment, which is of little moment since only two closely related taxa are involved.

Stemodia polystachya Brandegee, Proc. Calif. Acad., ser. 2, 2: 1889. =
Schistophragma polystachya (Brandegee) B.L. Turner, *comb. nov.*

Stemodia radicans Griseb. = *Chelophyllum radicans* (Griseb.) Pennell.

Stemodia reliquiarum D'Arcy = *Darcya reliquiarum* (D'Arcy) B.L. Turner (in prep.).

Stemodia siliquosa Sessé & Moçoiño = *Schistophragma mexicana* D. Dietr.

ACKNOWLEDGMENTS

This study is based upon the examination of approximately 6,300 specimens from 34 herbaria as follows (numbers in parentheses refer to sheets concerned): ARIZ (75), B (38), BAF (19), BKL (6), BM (131), C (160), CAS (122), CTES (221), DUKE (52), ENCB (87), F (522), G (481), GH (443), HAL (15), K (241), LE (88), LIL (514), LL (98), M (102), MBM (23), MEXU (114), MICH (184), MO (404), NY (634), OXF (39), P (3), PH (267), RB (91), SGO (13), SI (149), TEX (240), UC (179), US (448), WIS (59). We are grateful to the Directors of these institutions for the loan of material. In addition, the junior author studied and collected most of the species in the field, including populations in both North and South America. We would also like to acknowledge the assistance of J. Grimes, D. Kearns, D. Keil, and L. Woodruff in matters bibliographic. Dr. Guy Nesom provided the Latin diagnosis and both he and T.P. Ramamoorthy reviewed the manuscript.

LITERATURE CITED

Barker, W.R. 1981. *Stemodia*, in *Fl. Central Australia*. 326.

Barroso, G.M. 1952. Scrophulariaceae indigenas e exoticas no Brasil. *Rodriguesia* 15:9-64.

Bentham, G. 1846. *Stemodia*, in DC., *Prodr.* 10:380-385.

- D'Arcy, W. 1979. *Stemodia*, in Flora of Panama, Ann. Missouri Bot. Gard. 66:252-262.
- Dawson, G. 1979. *Stemodia*, in *Fl. Illustr. Entre Rios* 5:462-471.
- Fedorov, G. [ed.] 1967. *Chromosome Numbers of Flowering Plants*. Moscow, USSR.
- Hufford, C.D., B. Oguntimein, & I. Muhammed. 1992. New stemodane diterpenes from *Stemodia maritima*. *Lloydia* 55:48-52.
- Minod, M. 1918. Contribution à l'étude du genre *Stemodia* et du groupe des Stémodiées en Amérique. *Bull. Soc. Bot. Geneve*, ser. II, 10:155-252.
- Pennell, F.W. 1923. Scrophulariaceae of Cuba. *Proc. Acad. Nat. Sci. Philadelphia* 75:1-21.
- . 1935. The Scrophulariaceae of eastern temperate North America, *Acad. Nat. Sci. Philadelphia Monogr.* 1:1-650.
- Seymour, F.C. 1976. *Stemodia*, in Scrophulariaceae in Nicaragua. *Phytologia* 35:152-153.
- Standley, P.C. & L.O. Williams. 1973. *Stemodia*, in Flora of Guatemala, *Fieldiana: Bot.* 24:403-407.
- Subramanian, D. & R. Pondmudi. 1987. Cytotaxonomical studies of South Indian Scrophulariaceae. *Cytologia* 52:529-541.
- von Wettstein, R. 1891. *Stemodia*, in *Natur. Pflanzen* 4:36-74.
- Weniger, B., M. Haag-Berrurier, & R. Anton. 1982. Plants of Haiti used as antifertility agents. *J. Ethnopharmacol.* 6:67-84.