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EUPHORBIACEARUM SERTUM NOVO-GALICIANARUM REVISARUM

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This contribution should be regarded as complementary to a previously published paper dealing with new and otherwise interesting members of the Euphorbiaceae, of the genera *Chamaesyce* and *Euphorbia* (McVaugh 1993). As in that paper, data on some individual species are presented below essentially in the form of treatments for the *Flora Novo-Galiciana*, with concentration on the same area. A map of Nueva Galicia, and an index to localities, may be found in *Flora Novo-Galiciana*, volume 17, pp. 436-453. 1992, or in the same work, volume 13, pp. 450-467. 1993. In the following pages the citations of specimens include mention of the herbaria in which the individual specimens have been seen; these herbaria have been indicated by the appropriate acronyms, as listed in *Index Herbariorum*, edition 8 (New York 1990). For the privilege of loans of types and other critical material I am indebted to many herbaria, and especially to the curators and staffs at BH, C, CAS, CHAPA, DAV, F, G, GH, IBUG, IEB, K, MEXU, MICH, MO, P, POM, TEX, UC, US, WIS, and ZEA.

ACALYPHA

Acalypha delgadoana McVaugh, sp. nov., frutex monoicus ramosus, ramulis rufis puberulis lenticellatis; folia sparsim setulosa vel hispida, petiolis quam laminis multo brevioribus, lamina lanceolata (2.5-) 4-10 cm longis, (0.8-) 1.5-2 (-3) cm latis, 3-4-plo longioribus quam latioribus; spicae ♀ terminales solitariae, 3-6 cm longae tenues, bracteis 25-40 inter se distantibus, unifloris, hispidulis, vix minute glandulosis, 6-7-dentatis, maturitate plerumque explanatis, ca 2.5-3 mm latis, 2 (-3) mm longis, dentibus triangularibus vel deltoides, subaequalibus vel dente centrali prolongato; spicae ♂ axillares, filiformes subsessiles ca 3.5 cm longae; styli 2.5-3.7 mm longi, multifidae; capsula 3-lobata hispida ca 3 mm lata, conspicue verrucosa; semina ca 1.6 mm longa.

Hillsides in pine-oak forest, known only from foothills of the Pacific slope in western Jalisco, ca 500-750 m, flowering and fruiting in July.

Jal., Mpio. Cabo Corrientes, ca 20 km S of Puerto Vallarta and 20 km from El Tuito (A. Delgado S. 357, MICH, the holotype, MEXU, isotype; *Delgado* 355, (CHAPA, MEXU, MICH); km 4.5, road toward the mines of Zimapán [from the road-jct. N of El Tuito] (*Pérez de la Rosa & Puga* 157, IBUG).

Shrub, reported as 70-90 cm high, branched above, the woody branches up to at least 5 mm in diameter, fluted in drying, with reddish brown bark and large lenticels; branchlets finely puberulent, usually with some curved coarser hairs as well; leaf-blades setulose adaxially, the hairs up to more than 1 mm long, thickened at base and sometimes with a basal ring of thick-walled cells; abaxial surface

hispidulous, mostly on the veins; stipules conspicuous but falling before the leaves mature, narrowly triangular or triangular-subulate, scarious, reddish, 2-3 mm long, 0.5-0.7 (-1) mm wide at base; petioles stout, 10-17 (-30) mm long, much shorter than the blades; blades lanceolate, (2.5-) 4-10 cm long, (0.8-) 1.5-2 (-3) cm wide, 3-4 times as long as wide, long-acuminate and sometimes falcate at apex (seldom merely acute), shallowly cordate or emarginate at the rounded base, pinnately veined but the lateral veins steeply ascending; margins shallowly crenate-serrate with (20-) ca 30 teeth on each edge; abaxial leaf surfaces green (as in the type), or dark red; ♂ spikes [one seen, past flower] axillary, filiform, interrupted, ca 3.5 cm long, nearly sessile, the flowers and floral bracts hispidulous; ♀ spikes clearly terminal, 3-6 cm long (on peduncles 3-12 mm long), 3-4 mm in diameter, flexuous, the 2.5-40 bracts loosely scattered along the axis, often (1-) 3-5 mm apart; ♀ bracts 1-flowered, hispidulous, 1-1.5 mm long in flower; ca 6-7-toothed; fruiting bracts usually explanate, ca 2.5-3 mm wide, the teeth triangular-deltoid, acute, sometimes sparingly and finely stipitate-glandular on the margins, more or less equal and ca 1 mm high and the bract 2 mm long, or the central tooth prolonged, up to 2 mm long and 1 mm wide at base and the bract then ca 3 mm long; styles red, 2.5-3.7 mm long, multifid half their length or more; ♀ sepals persistent, membranous, sometimes reddish, triangular-ovate, ca 0.7-0.8 mm long, 0.3-0.4 mm wide at base; capsule deeply 3-lobed, hispid, ca 2 mm high and 3 mm wide, covered on the distal half by narrow fleshy erect spinelike processes up to ca 0.4 mm long; columella persistent, stout, oblong, ca 1-1.3 mm long, 0.5 mm thick, acutely 3-angled, 3-pronged at apex; seeds elliptic-ovoid, acute, gray-brown, 1.6 mm long, 1.2 mm wide, smooth, cellular-reticulate, with a fleshy oblique crest.

This species is like *Acalypha cincta* and *A. schiedeana* in its shrubby habit, its terminal, elongate and usually solitary ♀ spikes, and ♀ bracts with relatively few teeth. It is, however, as far as I can determine, unique in having the combination of very narrow leaves, sparse and mostly eglandular pubescence, and very slender ♀ spikes with short bracts exposing the capsules. The capsules in *A. cincta* normally surpass and conceal the bracts, as they do infrequently in *A. schiedeana*, but both these species are amply distinct from *A. delgadoana* in other ways, as indicated below. All the following are characterized by having long terminal ♀ spikes on stems or branches usually solitary, unaccompanied by subordinate lateral (axillary) ♀ spikes; teeth of the ♀ bracts, if more than about 10 in number, setose but not glandular-ciliate (rare exceptions in *A. schiedeana*, with rigid acicular-subulate stipules often 6-10 mm long).

1. Leaf-blades lanceolate, (2.5-) 4-10 cm long, (0.8-) 1.5-2 (-3) cm wide, 3-4 times as long as wide, thinly setulose or hispidulous; ♀ bracts in fruit 2-3 mm long, the 6-7 teeth finely and sparingly stipitate-glandular on the margins.
A. delgadoana.
1. Leaf-blades ovate or broadly ovate, commonly 3-5 cm wide or wider, and rarely more than 2-2.5 times as long as wide; ♀ bracts various.
2. ♀ bracts 2-flowered, 10-15 (-17)-toothed, setose (not glandular); young herbage and stems densely and stiffly whitish pilose.
A. mollis.
2. ♀ bracts 1-flowered, (5-) 7-9-toothed, stipitate-glandular or essentially glabrous.
3. Stipules acicular-subulate with rigid tips, (2.5-) 6-10 mm long; leaf-blades light green, membranous, strigose when young but mostly nearly glabrous at maturity, the lamina when dry copiously papillose; ♀ spikes up to 10 mm thick, the bracts in fruit 4-5 mm long, in ours 7 (-11)-toothed, sparingly stipitate-glandular on the margins or seldom on the outer surface as well.
A. schiedeana.
3. Stipules nearly linear, ribbon-like, membranous, up to 8-10 mm long and 0.8-1 mm wide at base; blades green (often drying a bronzy green), with narrow paler green margins, the abaxial surface sometimes dark red except the green margin; blades densely

pubescent and often much whitened when young, in age sometimes glabrescent, the lamina usually not noticeably papillose; ♀ spikes up to ca 6 mm thick in fruit, the bracts 2-2.5 mm long (surpassed and hidden by the capsules), (5-) 7-9-toothed, glabrous or strigose, not glandular.
A. cincta.

Acalypha gigantesca McVaugh, sp. nov., frutex subglaber, ramis glabris; petioli adaxiale pilis brevibus curvatis instructi; foliorum laminae ovatae, caudato-acuminatae, usque ad 7 cm longae, in superficibus ambabus pilis sparsis subrigidis 0.5-1 mm longis instructae, et basi in venarum axillis pilorum longiorum caespitate denso ornatae; spicae ♂ non visae; spicae ♀ terminales solitariae, bracteis subfoliaceis 1-2-floris (flore unico evolventi), glabris eglandulosisque, 10-14-dentatis, apertis 8-10 mm latis, 4.5-6 mm longis (-10) mm, dente centrali 2-2.5 mm ultra ceteris prolongato includenti; styli ca 5-6 mm longi, ramosi; ovarium glabrum; capsula tota glabra, laevis.

Known only from a single poor specimen, *A. Flores M. & Patricia Ramos G. 2901*, MICH, the holotype, collected in Jalisco, Mpio. La Huerta, Puente de Arroyo seco, ca 5 km W of Ej. Miguel Hidalgo, in tropical subdeciduous forest, with immature fruit 15 Aug 1991, 40 m elevation.

Shrub 1 m tall; branches glabrous, the leaves glabrous except for scattered stiff hairs 0.5-1 mm long on both surfaces (especially on younger leaves), a conspicuous abaxial tuft of longer hairs at the base of the blade, similar but smaller tufts in the axils of the foliar veins, and an adaxial line of stiffish curved hairs on the petiole; stipules subulate, deciduous, up to 3 mm long; petioles (probably not of full-sized leaves) 1.5-2 cm long; blades (probably not as large as ordinary cauline leaves) ovate, up to 7 cm long and 3 cm wide, caudate-acuminate, auriculate-emarginate at the rounded base; margins shallowly serrate with 15-18 teeth on each edge; blades palmately 7-9-veined at base, the veins pale abaxially and prominently convex; ♂ spikes and flowers unknown; ♀ spikes terminal, green with a reddish tinge, 2-2.5 cm long, more than 1 cm wide when pressed; ♀ bracts 1-2-flowered (1 flower developing), subfoliaceous, glabrous, not glandular, reniform (when opened), then 8-10 mm wide, serrate with 10-14 teeth, the body of the bract 4.5-6 mm long with central tooth prolonged 2-2.5 mm beyond this, falcate-acuminate, the lateral teeth sharp, antorsely curved, ca 0.5 mm high; ♀ sepals triangular-acuminate, sharp-pointed, 0.7 mm long; ovary and capsule glabrous; styles ca 5-6 mm long, with slender distal branches; capsule smooth, 3-lobed, obovate, ca 3 mm in diameter (probably slightly immature), ca 2.5 mm high; seeds not seen.

In the context of the *Flora Novo-Galiciana* this is an extraordinary species. Our other species of the genus *Acalypha* are almost never glabrous to the extent described above, a smooth and glabrous ovary is rare in *Acalypha*, the prolonged central tooth of the ♀ bracts is unusually prominent, and the large tuft of hairs at the base of the leaf-blade is a very unusual feature. In the following key it is contrasted with similar-seeming shrubby species.

1. All spikes axillary, the branches indeterminate in growth.
2. Plants eglandular or nearly so (glands, if present, sessile and inconspicuous among the hairs); ♀ bracts eglandular, seeds 1.1-1.3 mm long; veins of the abaxial leaf-surface sparingly beset with stiffish antorsely curled or straight hairs, the surface itself eglandular. *A. vagans*.
2. Plants more or less beset with gland-tipped hairs; ♀ bracts with marginal glands on the teeth and often on the abaxial surface; veins of the abaxial leaf-surface copiously fringed with soft straight hairs standing more or less at 90° from the vein, the surface itself bearing very short-stalked dark glands.

3. Seeds 1.7–2 mm long; habitat mostly 2000 m or higher; larger leaf-blades 7–13 cm long, commonly with 30–35 (–45) teeth on each edge; covering of gland-tipped hairs usually extensive, the whole plant often resinous.
3. Seeds 1–1.3 mm long; species mostly of lowlands, up to ca 1500 m; larger leaf-blades 4.7 (–7.10) cm long, commonly with 20–25 (–30) teeth on each edge; covering of gland-tipped hairs conspicuous and resinous, or often fine, pale or whitish, evident mostly on the ♀ bracts.
1. Terminal spike present, ♀ (sometimes with a few ♂ flowers or a sterile seta at the tip), usually much larger than the ♀ spikes (if any) in the upper axils; branchlets glabrous; ♀ bracts glabrous, eglabrous, up to ca 7 mm long with 10–14 teeth, including a prolonged central tooth 1–2 mm long; ovary and capsule smooth, glabrous; leaf blades ovate, thinly strigose adaxially and with a large tuft of pale hairs (mostly abaxial) at the base and smaller tufts in the larger vein-axils, otherwise glabrous.

A. gigantea.

Acalypha lagopus McVaugh, sp. nov., annua, bractearum ♀ dentibus maiori-bus 5–6, basibus deltoideis, apicibus setosis filiformibus vel subulatis 2–3 mm longis longe setosis instructis; spicae ♂ ut videtur terminales, 5–20 mm longae, pedunculis ca aequilongis suffultae; spicae ♀ axillares et ut videtur terminales, compactae, ellipsoideales vel suborbiculares, 10–28 mm longae, 8–15 mm diametro; styli indivisi; foliorum laminae ovatae vel suborbiculares, plerumque obtusae, 1–2 (–4) cm longae.

Areas of old lava flows, with *Cordia*, *Amphipterygium*, *Apollanthes*, weedy in fields and on roadsides, along irrigation ditches, 300–400 m, flowering and fruiting Aug–Sep as far as known.

S and w Michoacán in the basins of the Río Tepalcatepec and Río Balsas, reaching our area near Apatzingán (“4 mi” NW of Apatzingán, *McVaugh 17917*, MICH, the holotype; 11–13 km WSW of Apatzingán, road to Dos Aguas and Aguililla (*Dieterle 4261*, MICH; Mpio. Parícutaro [“Antúñez”], *C. Rodríguez & Quezada 1360*, CHAPA), and also known from Mpio. San Lucas [“Distr. Huetamo”], Santa Cruz (*Hinton 6434*, K).

Annual or of indefinite duration from a stout upright taproot, as far as known with short central stem up to 6–8 (–7.10) high, and longer prostrate decumbent basal branches; leaves usually opposite at the two lowest nodes, these separated by an internode 4–11 mm long, the branches from these nodes horizontally spreading, up to ca 20 cm long, with long (4–6 cm) proximal internodes and ascending tips; herbage puberulent with short curved hairs, the ♀ peduncles also hispid with stiff erect hairs up to 2 mm long, the leaf-blades mostly glabrous, ciliate-margined and with a few stiff superficial hairs; stipules triangular-subulate, caducous, strigose, less than 1 mm long; petioles filiform, 6–15 (–30) mm long; blades 0.9–2 (–4) cm long, (0.4–) 0.8–1.8 (–3) cm wide, ovate (often very nearly perfectly egg-shaped), or the lower ones suborbicular, obtuse at apex or seldom subacute, rounded at base; margins shallowly and often obscurely serrate (except in the basal third) with ca 8–15 teeth on each edge; leaves and inflorescences tending to be concentric at the approximate distal node(s) of a branch, there often with 4–5 leaves subtending 1–3 axillary (or terminal) ♀ spikes and a single (?axillary) ♂ spike; small axillary spikes, both ♀ and ♂, occur occasionally at lower nodes, at least the ♀ apparently infertile, 1-flowered on a capillary peduncle; distal ♂ spikes 0.5–2 cm long, 1.5–2 mm thick, on erect capillary peduncles about as long as the spikes; ♀ spikes very compact, multibracteate, ellipsoid to orbicular, 10–28 mm long, 8–15 mm thick, the spreading filiform setose tips of the bracts conspicuous; ♀ bracts membranous, 4.5–7 mm long, lobed about half their length or a little more, when flattened flabellate, 5–7 mm wide at the bases of the lobes; lobes 5–6 (sometimes

with 1 or 2 additional outer lobes ca 1 mm long), with deltoid base and green subulate or filiform tips 2–3 mm long, these densely setose with spreading hairs 1–2 mm long, the proximal portion of the bract more thinly setose, especially on the nerves; styles undivided, 5–6 mm long; capsule deeply 3-lobed, ca 2 mm wide, 1.5 mm high, hispidulous and distally with weak setae up to 1.3 mm long; seeds elliptic-ovoid, acute, ca 1.5 mm long, 1 mm thick, smooth, minutely cellular-reticulate, with an oblique fleshy crest.

Most of the large ♀ spikes at the tips of the branches are clearly axillary, at nodes less than 5 mm apart; the solitary ♂ spike associated with them always seems to be subtended by a leaf, but whether it is in fact always axillary, I cannot ascertain. Among the annual species of which the ♀ bracts have 3–5 (–7) teeth with prolonged filiform setose tips, this one seems most likely to be confused with *Acalypha atopeuroideae*. These may be contrasted about as follows:

1. ♂ spikes seemingly terminal, 5–20 mm long, on erect peduncles about the the same length, ♀ spikes clustered at 4–5 approximate distal nodes; styles entire as far as known; leaf-blades nearly egg-shaped or suborbicular, mostly obtuse at apex, ca 1–2 (–4) cm long; basin of Río Tepalcatepec, w Michoacán.
1. ♂ spikes axillary, (1–) 3–10 mm long, on weakly spreading peduncles mostly 2–3 mm long, usually arising in the same axils with ♀ spikes; at least some ♀ spikes appearing terminal, but most of them axillary, on peduncles 4–6 (–8) mm long; styles (in ours) mostly entire, sometimes irregularly bifid distally; leaf-blades broadly ovate to ovate-cordate, acuminate, 2.5–7 cm long, (1.3–) 1.4–1.7 (–2) times as long as wide; widespread in Nueva Galicia. *A. atopeuroideae*.

Acalypha langiana Muell. Arg. *Linnaea* 34: 159, 1865; in DC. Prodr. 15, part 2: 811, 1866.

Acalypha vagans [var.] β *glandulosa* Muell. Arg. *Linnaea* 34: 161, 1865; in DC. Prodr. 15, part 2: 829, 1866. ?*Acalypha brachyclada* Muell. Arg. in DC. Prodr. 15, part 2: 862, 1866. *Acalypha palmeri* Pax & Hoffm. *Pflanzenreich* IV, 147, xvi [Heft 85]: 157, 1924.

Steep bluffs and rocky hillsides, *matrorral subtropical*, pine-oak forest, tropical deciduous forest with *Brosimum*, *Lysitoma*, *Coccoloba*, *Hura*, thorn forest with *Haematoxylum*, sea-level to ca 1500 m in the Pacific lowlands and foothills, flowering Jun–Sep or almost throughout the year. Similar plants from higher elevations, up to ca 2350 m, are discussed below.

Son., Dgo., Nay., Jal., Col. (Manzanillo, *Palmer 941* in 1890, US!, isotype of *A. palmeri*; MICH negs. 1342!, 1343!), Mich., Gro. (Baqueta, *Langlassé 497*, syntype of *A. palmeri*), Oax. [“in valle Oaxacana prope Quilapa (*Liebm.* 1 a cl. Lange commun.)” the type; G!, a young ♀ fragment, lectotype, here designated, *Liebmann 5749*, 4 sheets, C!, isotypes; “prope Guatulco in Mexico occidentali,” *Liebmann (5782)*, C!, lectotype here designated of *A. vagans* β *glandulosa*]. The type of *A. brachyclada* was cited as “In Peruvia aut in Mexico (hb. Pavon! nunc in hb. Boiss.).” The presumed holotype, at G! ex herb. Boiss. (a fragment in G-DC!), bears a ticket (?written by Pavón), “*Croton glandulosum*,” with no indication of geographical origin. It is a flowering branch of a stipitate-glandular shrub, apparently with all spikes axillary, mostly ♂.

The specimens of *Liebmann 5749* at C bear ♀ spikes only, as indicated by the description in the protologue. Except that the spikes are younger, they are a good match for *Palmer 941* at US, the lectotype of *Acalypha palmeri*. The herbage is densely stipitate-glandular, the leaves are coarsely dentate, and many of the ♀ spikes end in a sterile seta. There is no indication that Mueller Argovienis actually

saw any of the material at Copenhagen; none of the four sheets bears his characteristic annotation-label. Mueller did not state without qualification, as he often did, that he had seen the material "in hb. copenh." Of *A. langiana* he added "a cl. Lange inter messem Euphorbiacearum copiosam a cl. Liebm. lectam benevole communicata."

The material of *A. vagans* β *glandulosa* at C bears Mueller's annotation. It is a flowering specimen consisting of three branches. I cannot distinguish it from *Acalypha langiana*. Mueller included it in an informal grouping of species that he called *Acrogyneae*, described as having "spicae foem. terminales saepeque et axillares," that is, with at least some β spikes terminal. The specimens are so young that it is difficult to be sure, but it appears that all the spikes are axillary with the younger ones toward the tips. The only species in western Mexico with which it is likely to be confused is *A. subviscida*, and in that the terminal β spikes are usually conspicuously terminal, and commonly develop at a very early stage of flowering, often ahead of the axillary spikes below them.

In the type-material of *Acalypha palmeri*, as in the majority of our specimens referred here to *A. langiana*, the terminal tooth of the β bracts is notably prolonged, whereas *A. langiana* was originally described as having the terminal tooth "reliquis nec majore productiore." This particular variation does not appear to be taxonomically significant. Both in the lowland and highland representatives of *A. langiana*, bracts with and without a prolonged central tooth may be found on the same plant.

The species-complex that in Mexico includes *Acalypha langiana* and *A. umbrosa* Brandegee, namely an assemblage of shrubby monoecious plants with all inflorescences axillary, and the herbage sparsely to densely vestite with gland-tipped resinous hairs, is in need of further study. The number of available collections is not large, and collectors need to make additional field-observations on variation in local populations. Specimens that have been called *A. langiana* vary from examples with few small pale glands and those nearly confined to the β bracts, to resinous-glandular to such an extent that the herbage is covered and darkened by the glands. This dense covering of glands is particularly noticeable in highland populations (mostly 2000 m and above), but is not confined to them. In addition to the variation in glandularity, sexual expression varies from plant to plant in ways that I cannot explain. It may be that the glandularity is controlled largely by genetic factors, but at least in some instances the sexual expression, i.e., the relative numbers of δ and β spikes produced, seems to be influenced by the environment. The most common situation seems to be that in which a majority of the plants at one locality produce mostly δ spikes, these very often bearing one or few β and fertile bracts on the peduncle near base. In at least one instance, at a lowland locality near Colima, most plants were of this description (*McVaugh & Koeltz 1086* in 1959; *McVaugh 15503* in 1957), but a single plant that had been severely clipped or browsed (*McVaugh 15512*) was producing new shoots bearing exclusively long multibracteate β spikes.

In individual plants with numerous δ spikes, these seem to develop before the β spikes in the upper axils. Some individuals with mature β spikes in the upper axils, however, may bear at the same time undeveloped δ spikes elsewhere on the plant. In an isotype of *Acalypha palmeri* (*Palmer 941*, US), one branchlet bears β spikes and another bears δ spikes with 1-2 β flowers at base. The coordinating mechanism in this and some other groups of *Acalypha* deserves some study; it is possible that the same mechanisms have been involved in the

development of the dioecious habit and in the change from indefinite to definite growth-habit.

Similar states have been observed in the closely related and scarcely distinguishable montane plant of Nueva Galicia that in 1961 (*Brittonia* 13: 148, in key) I identified as *Acalypha umbrosa* Brandegee. In general appearance and in many individual characters, this montane plant suggests a larger and more luxuriant version of the lowland *Acalypha langiana*, and I now believe it is best treated as a variety of that species. Study of the more ample material of *Acalypha umbrosa* now available shows that it is not identical with our montane plant, though surely closely related to it and to the lowland *A. langiana*. It is heavily glandular, resembling our montane plant in this respect, but the leaves in most specimens are shorter and more widely ovate, not conspicuously long-acuminate, with fewer and rounder marginal teeth, relatively longer petioles, and smaller β bracts and seeds. It is evidently a somewhat modified insular taxon, but its position with respect to *A. langiana* remains to be clarified.

I have not been able to find any satisfactory way to separate the upland from the lowland populations of *A. langiana* except by seed-size, which seems consistently larger in the montane plants. In the latter, also, the glandular covering is usually darker and denser, more resinous; the leaves tend to be longer, relatively narrower and more narrowly acuminate, and with finer and more regular marginal teeth; the β bracts at maximum size are longer and with more numerous teeth. All these characters except seed-size are somewhat subjective and inconsistent. The differences between the following two varieties are set forth in the key above, p. 176, under *Acalypha gigantesca*.

***Acalypha langiana* Muell. Arg., var. *langiana*. *Acalypha langiana* Muell. Arg., as to type.**

***Acalypha langiana* Muell. Arg., var. *vigens* McVaugh, var. nov., monticola (regiones calidas non habitat), a var. *langiana* semimibus 1.7-2 mm (non 1-1.3 mm) longis, foliorum majorum laminibus multidentatis [dentibus utroque latere plerumque 30-35 (-45), vice 20-25 (-30)], differt.**

Barrancas and steep slopes, in mixed montane forest with broad-leaved trees, or pine-fir forest with *Quercus*, *Syrax*, *Cornus disciflora*, *Meliosma*, *Terstroemia*, *Symplocos*, *Tilia*, *Carpinus*, (1500-) 2000-2600 m, flowering and fruiting Aug-Apr.

Known from Jalisco only (northeastern slopes of Nevado de Colima, below Canoa de Leoncito (*McVaugh 13436*, sheet 2, the holotype, MICH). Not *Acalypha umbrosa* Brandegee. Erythraea 7: 7, 1899, which is known from B. C. Sur, and from the Revillagigedo Islands (Socorro I., *Anthony 375*, UC; the holotype).

Jal., Mpio. San Sebastián (del Oeste), Hda. El Orotal (*Mexia 1682*): 15-30 km N of Mascota, road to San Sebastián (*Anderson & Anderson 5953*); Mpio. Talpa, km 12, *brecha* from Cuale to Talpa (*L. M. González 1104*, IBUG); n w slopes of Nevado de Colima, above Jazmín (*McVaugh 10030*); Sierra de Manantlán (many collectors: "15-20 mi" SE of Autlán, *Wilbur 1952*; steep ridge at 2160 m, road to El Guisar, *Breedlove 45728*, CAS; on the *bajada* S and W of the divide between Aserradero San Miguel Uno, and El Durazno, *McVaugh 13934*; 2-3.5 km NE of Las Joyas, *Judziwicz et al. 4913*, IBUG, WIS; on the ridge 7-8 km ESE of Las Joyas, 2400 m, *G. López & L. Guzmán 24*, ZEA); Mpio. Tecalitlán, Barranca La Resbalosa, ca 10 km SE of Llanitos, *brecha* to Plan de Lego (*Villa & Chávez 237*). (All specimens at MICH except as noted).

Slender arching shrub 1–2 m high, puberulent or hirsutulous with pale hairs, the hairs on mature branchlets often obscured by the numerous yellow or dark brown stout-stipitate glands, these especially abundant on the branchlets, inflorescence axes, petioles, and ♀ bracts, the leaf-blades sparingly or rather densely glandular, the whole plant fragrant, resinous; stipules flat, very early deciduous, narrowly triangular, 1.5–2.5 mm long, 0.7 mm wide at base; petioles 2–4 (–7) cm long, mostly less than half as long as the blades; blades ovate or long-ovate, the larger ones of the branches (below the narrower leaves of the upper nodes) 7–13 cm long, (2.5–) 3–6 cm wide, long-acuminate to caudate and commonly falcate at apex, 3-veined near base (with 1–3 pairs of smaller veins below this), rounded at base (often narrowed, then rounded and auriculate-emarginate), serrate nearly to the base, commonly with 30–35 (–45) teeth on each edge; spikes all axillary, those in the upper axils mostly ♂ with 1–2 ♀ flowers at base, or on some branches mostly or all ♀; spikes in the lower axils mostly ♂, up to 7 cm long, with one or few ♀ flowers at base; ♂ spike up to 7–10 cm long, 1.5–3 mm thick, pedunculate 1–2 cm; wholly ♀ spikes up to ca 5 cm long with up to 15 (–220) flowering bracts; bracts 2-flowered, (3.5–) 4.5–7.5 (–13) mm long including the prolonged central tooth if any, and 9–12 mm wide, with (15–) 17–23 (–30) narrowly triangular acute teeth about twice as long as wide, 0.5–1.5 mm long (or a little more including the stout glands), the middle tooth sometimes up to 2–3 mm long, or scarcely longer than the others; outer surface of the ♀ bracts usually densely stipitate-glandular, the glands most abundant on the teeth, where in young bracts they may be as large as the teeth and confused with them; ♀ calyx-lobes ovate, acute, 1 mm long, glandular-dentate on the margins; styles 3.5–5 mm long, red, lacinate; capsule depressed, strongly 3-lobed, 3 mm wide, densely short-hispidulous and verrucose; seed ovoid, 1.7–2 mm long, nearly black, smooth minutely cellular-reticulate.

Acalypha lovelandii (McVaugh) McVaugh, comb. nov. *Acalypha subviscida* var. *lovelandii* McVaugh, Brittonia 13: 153. 1961.

Though this plant was first described as a variety of *Acalypha subviscida*, the resemblances in detail are not very close, except that in both the terminal spike is ♀, some of the upper axils support additional ♀ spikes, and the ♀ bracts are usually conspicuously stipitate-glandular. Specimens in which ♀ spikes have developed can usually be distinguished at a glance, because in *A. subviscida* they are loose and flexuous, with the bracts well separated on the axis, whereas in *A. lovelandii* they are compact, almost cylindrical, with the bracts crowded tightly except sometimes the lowest. Furthermore, in *A. subviscida* the lateral ♂ and ♀ spikes often develop from the same axils, and the axis of the ♂ spike often bears one or two ♀ bracts near its base, whereas in *A. lovelandii* the spikes of the two sexes are rigorously separated as far as I have observed, with the ♂ ones below the others on the axis, and never bearing a basal ♀ bract.

Humid ravines, ("barrancas, cañadas"), precipitous wooded slopes, pine-oak forest or humid montane forest with oaks and other deciduous trees, persisting in secondary vegetation, 1200–2100 (–3100) m, flowering and fruiting Jul–Dec.

?Nay., Jal., Mpio. Tamazula, above La Garita, highway from Colima to Jiquilpan (McVaugh & Koeltz 1343, MICH); the holotype; McVaugh 18041, Col., Mich., Gro., Mor.

Jal., Mpio. Tecalitlán, 3 km SE of San Isidro, *brecha* to Plan de Lego (Villa & Chávez 285, CHAPA, MICH); Mpio. Cd. Guzmán, ca 20 km above Fresnillo,

brecha to Parque Nacional El Nevado (Villa & Koch 245, CHAPA, MICH); Col., s w foothills of the Nevado de Colima, "1–1.5 mi" above [S of] Hda. San Antonio, "ferry barrancas" (McVaugh 16990); Mpio. Comala, Rancho El Jabalí, hills above s side of Lago Calabozo (Lott 2995); Capilla la Hermita, ca 7 km W of Rancho El Jabalí, by the road from Hda. San Antonio to Comala (Phillips 1033); Mich., n w foothills of Cerro Tancitaro, 13–14 km S of Peribán de Ramos (McVaugh 24839). Probably the same species but the material imperfect, Jal., Mpio. Jocotepec, barranca de El Tezcalame, W of San Pedro Tesistán (Machuca 6831). Extralimital: Mich., Uruapan, ["northwest of town"] (Pringle 10405); Gro., Mpio. Chihuitlualco, Cruz de Ocoate, ca 43 km [airline] W of Chilpancingo (Rzedowski & McVaugh 287). (All specimens at MICH except as noted).

The one known specimen from above 3000 m on the Nevado de Colima (Villa & Koch 245) is persistently and softly hairy, to a greater extent than any of the known specimens from lower elevations.

Acalypha microphylla Klotzsch in Seem. Bot. Voy. Herald 278. 1856. *Acalypha reptans* [var.] *α genuina*, sensu Muell. Arg. Linnaea 34: 48, as to name only. 1865. *Acalypha chamaedrifolia β genuina*, sensu Muell. Arg. in DC. Prodr. 15, part 2: 879. 1866, not *Croton chamaedrifolius* Lam., 1786.

This is apparently the oldest name for a species-complex that extends from Sinaloa to Central America, on the Pacific slope at elevations of less than 1500 m, and is most commonly found between sea-level and 1000 m. Both Mueller (1866) and Pax & Hoffmann (1924) relegated *Acalypha microphylla* to the synonymy of a not very similar West Indian species, *A. chamaedrifolia* (Lam.) Muell. Arg., but in recent years much material from western Mexico has been treated as an inclusive *Acalypha microphylla*. In Nueva Galicia there are in the complex at least three recognizable extremes, treated here as two species, one with two varieties, all having different habitat-preferences and more or less restricted ranges within the area. The complex includes one of the few taxa that seem perfectly at home on the ocean dunes. This prostrate plant of the seacoast, *A. microphylla* var. *microphylla*, is very different in appearance and in technical characters from erect weedy plants, treated here as *A. microphylla* var. *interior*, which are found farther inland, though often very near the coast. A second and seemingly more distinctive member of the complex is newly described below under the name of *Acalypha vallartae*. Except for the characters noted in the following key, all members of the complex are similar in many ways.

- Plants prostrate on sea-beaches and dunes, with trailing branches up to ca 50–60 cm long; ♂ spikes dense, stout, as long (up to 1.5–2.5 times as long) as the peduncles, these (10–) 15–30 mm long.
A. microphylla var. *microphylla*.
- Plants erect or weakly so, in various habitats, sometimes near the ocean but not on the dunes; peduncles, these 5–15 mm long.
♂ spikes more or less interrupted, slender to filiform, 3–6 (–12.5) times longer than the peduncles, these 15–25 mm long (average ca 21 mm); ♀ bracts minutely hispidulous or strigulose, without conspicuous long stiff hairs; ♀ spikes linear, 3–4, 5 mm thick (average ca 4 mm); major leaf-blades 1.5–3.5 (–4.7) cm long, usually long-pointed, not abruptly acuminate; near the ocean, but above the coastal sands.
A. vallartae.
- peduncles 2–12 (–20) mm long (average ca 8 mm); ♀ bracts more or less beset with stiff straight hairs; ♀ spikes oblong or ellipsoid, 4–7 (–10) mm thick (average ca 6 mm); major leaf-blades various in size, usually abruptly acuminate; habitat and range various.
A. microphylla var. *interior*.

Acalypha microphylla var. **microphylla**. *Acalypha microphylla* Klotzsch, as to type, *Acalypha parvifolia* Muell. Arg. Linnaea 34: 161. 1865; in DC. Prodr. 15, part 2: 831. 1866. ?*Acalypha nicaraguensis* Pax & Hoffm. Pflanzenreich IV. 147. xvi [Heft 85]: 54. 1924, ex descr. and habitat.

Pacific coast, on and near the dunes and sea-beaches, sometimes with *Ziziphus*, *Capparis*, and cacti, or *Prosopis*, *Coccoloba*, *Manihot*, *Hyperbaena*, 0–2 m, flowering Jul–Oct or throughout the year. Apparently the same variety found rarely farther inland, as in Mpio. La Huerta, between Nacastillo and Los Ranchitos, “postrado en lugar arenoso,” 250 m (*A. Flores M. et al.* 3083, IBUG, WIS).

Sin. (Mazatlán, *Seemann 1521*, K! ex herb. Hook., the lectotype, *Seemann s.n.*, K! ex herb. Benth., presumed islectotype), Jal., Col., Oax. [“prope S. Agustín ad mare pacificum (Liebm. i. in herb. Hafn.)” (*Liebmann 5760*), type of *A. parvifolia*, C!, det. Muell. Arg., lectotype here designated; G-DC!, a fragment, islectotype; *Liebmann 5760* (8 sheets), C!, *Liebmann 5760*, US!, MICH negs. 1348!, 1349!, islectotypes], Chis.; Centr. Amer. (Nicaragua, Corinto, *Brenning 175*, syn-type of *A. nicaraguensis*, not seen).

The ample type-material at C of *Acalypha parvifolia* includes several specimens of the characteristic plant of coastal dunes, with thick woody root and trailing branches 30–40 cm long. The one specimen annotated by Muell. Arg. as fragment at G-DC, however, was an atypical plant, with upright much branched stems that appear somewhat woody at base, 15 cm high or less but with the basal parts wanting. This doubtless was the basis for Muell. Arg.’s description of it as “Suffrutex circiter pedalis vel humilior.”

Jal., Playa La Fortuna, on dunes, “6.7 mi” SW of the crossing of Río San Nicolás, “8.3 mi” NW of Chamela (*Keil & Luckow 15123*, CHAPA); Mpio. La Huerta, Salinas de Careyes, ca 7 km SE of the Estación de Biología Chamela (*Lott 2339*, 2774); on the beach at Barra de Navidad (*McVaugh 19737*); Col., Playa de Oro, W of Santiago, ca 25 km (airline) WNW of Manzanillo (*Stevens 1875*); w end of Bahía de Santiago, opposite Santiago (*McVaugh 15852*); opposite Manzanillo, w side of the bay (*Gregory & Eiten 328*); Mpio. Manzanillo, between El Ciruelo and Cuyutlán (*Gilly et al. 10*); dunes “1 mi” SE of Cuyutlán (*McVaugh 15598*). (All specimens at MICH except as noted).

Prostrate, many-stemmed from a deep-seated erect multicapital perennial taproot, forming circular mats up to 1 m or more across, sometimes flowering the first year and then appearing annual; herbage rather uniformly crisp-puberulent or short-pubescent with curved hairs, the leaf-blades nearly glabrous but usually bearing some short stiff appressed hairs, the ♀ bracts (especially on the lobes) usually subsetose, beset with stiff hairs up to 1.5 mm long; stipules linear-subulate, strigose, 1 mm long or less; petioles of major leaves 4–8 (–25) mm long; blades orbicular-ovate, palmately 3 (–5)-veined at base, the major ones 6–18 mm long and wide, firm in texture, acute to abruptly short-acuminate at apex, broadly rounded to cordate at base; margins dentate to acutely serrate (except at base) with 8–16 prominent teeth on each edge; ♂ inflorescences axillary, usually conspicuous, the spikes dense, dull red, (8–) 15–40 mm long, 1.5 (–2) mm thick, ca (0.5–) 1–1.5 (–2.5) times as long as the peduncles (10–) 1.5–30 mm long; ♀ spikes terminal (rarely androgynous, with a few ♂ flowers at tip), green, cylindrical, dense, when fully developed 10–25 mm long and 5–8 mm thick (not including the styles), erect, on peduncles 5–15 mm long; ♀ bracts 2.5–4.5 mm long, when unfolded flabelliform and 6–7 mm wide, with 7–9 triangular-acuminate teeth 1–2.5 mm long, up to 1.2–1.5 mm wide at base (the outer ones smaller), usually termi-

nating in a cusp 0.2–0.7 mm long; styles bright red, ca 5–6 mm long, divided two-thirds their length into slender branches; capsule obovate, ca 2.5 mm wide, distally verrucose and densely white-pubescent with partly stellate hairs; columella ca 1 mm long, prominently 3-angled; seed ellipsoid-ovoid, acute at apex, ca 1.3–1.5 mm long, 1–1.3 mm wide, dark reddish (almost black), smooth, finely cellular-reticulate, with a prominent white oblique apical/adaxial crest.

The type-fragment of *Acalypha parvifolia* at G-DC! and the type-material at C! are more nearly glabrous than most of our specimens, but two additional specimens from the Pacific beaches in Oaxaca, named by Muell. Arg. are pubescent about as in ours. These are, “Chacalaca en la playa del Mar,” SW by S from Cd. Oaxaca, Jul 1845 (*Jurgensen 115*, G!), and “Plage océan Pacifique,” Sep (*Galeotti 344*, G!). Fragments similar to the last, at K! ex herb. Hook., and K! ex herb. Benth., represent *Galeotti 322*, from “Sand hills of the Pacific,” Oax. I should refer all the above to *A. microphylla* var. *microphylla*.

Mature complete plants of this variety are unmistakable because of the prostrate habit, the many long branches arising from a multicapital crown, and the long-peduncled ♂ spikes. Short detached branches, often collected, are easily confused with examples of var. *interior*, especially if these are immature, or taken from malnourished plants, or deprived of some or most of the spikes of either sex. The lectotype of var. *microphylla*, *Seemann 1521*, consists of a detached leafy branch almost 60 cm long, with ovate obtusely pointed to acuminate leaf-blades 1–2.5 cm long, a few short ♀ spikes, and a few somewhat battered ♂ spikes 1–2 times as long as the filiform peduncles 10–15 mm long. The length of the type-branch, and the appearance of its base, suggest that it was originally a part of a large prostrate plant, and taken from a multicapital crown. All this in despite of the confusing description in the protologue of *A. microphylla*, where the plant is characterized as erect [!], “suffruticose,” with leaves ovate to subrhombic, 4–6 inches [sic!] long and 3–4 lines wide, obtuse [!].

Acalypha microphylla var. **interior** McVaugh, var. nov., herba annua vel subperennis, plerumque erecta, copiose ramosa e radice tenui, caulibus usque ad 30–100 cm longis; raro valde hirsuta; folia parva vel mediocria, petiolis (7–) 25–60 mm longis, laminis majoribus 25–60 (–70) mm longis, latisque 17–35 mm; spicae ♂ filiformes, quam pedunculis brevibus multo longiores; spicae ♀ hispidulae, 8–16 (–23) mm longae, (3.5–) 5 (–7) mm latae, pedunculis 2–12 (–20) mm longis; bracte-arum ♀ dentes cuspidati, cuspidate 0.3–0.7 mm longa, dentibus majoribus 5–6 (–7), longitudine (0.6–) 1–2 mm. *Acalypha rhombifolia*?, sensu Hook. & Arn. Bot. Beech. Voy. 310, name only. 1838. *Acalypha nicaraguensis* Pax & Hoffm. Pflanzenreich IV. 147. xvi [Heft 85]: 54. 1924, quoad pl. *Palmeri* no. 935. *Bernardia mazatlanana* M. E. Jones, Extr. from Contr. West. Bot. 18: 49. 1933.

The specimen cited by name only, and with an indication of doubt, by Hooker & Arnott (Bot. Beech. Voy. 310. 1838) as *Acalypha rhombifolia* Schlecht., is at K!, marked “Mexico Beechey.” It consists of branches of two (or perhaps three) small plants of *A. microphylla* var. *interior*, and two longer branches, perhaps from a single plant, of the hirsute variant of that variety.

Primarily a plant of moist shady forests and forest edges, hillsides and barrancas, in the Pacific lowlands often in palm [*Orbignya*] forest, or subdeciduous forest with *Orbignya*, *Brosimum*, *Psidium sartorianum*, spreading to roadsides and banana plantations, cultivated fields and orchards, sea-level to 700–800 m,

flowering Jul–Nov (–Mar); also apparently the same plant known from a few localities at higher elevations on the Pacific slope, in barrancas and stream valleys in areas of oak forest or humid montane forest supporting many epiphytes, 900–1450 m, flowering more or less throughout the year.

Fields, roadsides, forest edges, mostly in the Pacific lowlands, sea-level to 300 m, but apparently the same plant in disturbed places up to 1450 m, flowering Jul–Apr or throughout the year.

Sin. (Mazatlán, "on hillsides among rocks." *M. E. Jones 22626*, the cited type of *B. mazatlanana*, POMI). Nay., Jal. (coastal highway 20 km SE of Tomatlán, 25 km NW of the bridge of Río San Nicolás, *McVaugh 25309*, MICH, the holotype). Col. (Manzanillo, *Palmer 935* in 1890, K, syntype of *A. nicaraguensis*), Mich. Perhaps also near the coast southeastward to Oaxaca, and in Central America, but this not verified.

Nay., Mpio. San Blas, roadside through mangrove (*Norris & Taranto 13344*); San Blas, weed in town (*Clarke et al. 681231-18*); "2–9" mi W of Jalcoacán, road to Miramar (*McVaugh & Koelz 685*); Mpio. Pochotitlán, km 10–20 on road to Aguamilpa, disturbed deciduous forest (*Téllez 10834*); forested valley in oak zone, "9 mi" N of Compostela (*McVaugh 16448*; *McVaugh & Koelz 505*); sandbar in dry creek bed, 1 km N of El Cuatante, ca 40 km NNE of Puerto Vallarta, Jal. (*Feddema 2617*); Jal., Mpio. Cabo Corrientes, valley of Río Las Juntas, 10–13 km SE of El Tuito, weedy (*McVaugh 25356*); Mpio. Tomatlán, road to Llano Grande, 800 m (*Vázquez García 1122*, IBUG); Mpio. La Huerta (Hotel Careyes, a garden weed, *Lott 2843*; Estación de Biología Chamela, roadsides, *Lott 2315*); Mpio. Cihuatlán, ca "1 mi" NW of Melaque, road to Puerto Salud (*Webster & Breckon 16078*); coastal plain and stream-valley N of Barra de Navidad, road to Autlán (*McVaugh 20834*; *McVaugh & Koelz 1736*); Rancho El Alehuatl, 36 km W of V. Purificación, 400 m (*Ornelas U. & Luquín 1302*, IBUG); 500 m S of Tala, 1200 m, ruderal (*Montes Rodríguez 6*, IBUG); Col., littoral thickets near El Tesoro Beach on Manzanillo bay (*Webster & Breckon 16089*); cliffs W of Cuyutlán lagoon, near Manzanillo (*Ferris 6181*, MEXU); Mpio. Comala, Rancho Jabali, road to Comala, ca 5 km SE of Hda. San Antonio, disturbed soil in road (*Sanders 10267*); Colima (*Palmer 1251* in 1891, K). (All specimens at MICH except as noted).

The following description applies especially to the variety *interior*, but in general to all members of the complex, including *A. vallartae*:

Annual or of indefinite duration, from an erect annual or perennial taproot, sprawling or often erect and up to 50–100 cm high, or sometimes trailing and rooting along the stems; plants varying from nearly glabrous or puberulent to pubescent (see below for a variant densely hirsute with numerous fine straight hairs up to 6 mm long), the herbage usually pubescent with curved antrorse tapering colorless hairs, the abaxial leaf-surface and the ♀ bracts often with some stouter setae up to 1.2 mm long; stipules triangular-subulate, up to ca 2 mm long, early caducous; petioles 2–3 (–6) cm long, often as long as the blades or up to more than half as long; blades often as wide as long, (0.6–) 2.5–4 (–7) cm long, 2–2.8 (–5.3) cm wide, usually abruptly acuminate at apex, cordate to truncate or rounded at base, bluntly serrate except on the margins near base, with (8–) 11–18 (–21) teeth on each side; ♂ spikes axillary, often reddish, 1–4 (–7) cm long, 1–1.5 mm thick, often much longer than [up to 3–6 (–12.5) times as long as] the peduncles (these 5–15 mm long), often interrupted and the flowers in small well-separated clusters along the filiform axis, the sepals acute, often with projecting glands on the midrib near the tip; ♀ spikes terminal, often tipped with a sterile seta 5–6 mm long, stiff and densely bracteate, 1–3 (–4.5) cm long, 4–7 (–10) mm thick (ave. ca 6

mm), pedunculate, the peduncles 2–12 (–20) mm long (ave. ca 8 mm); ♀ bracts green or often reddish, (1.5–) 3–4 mm long, mostly 5–7-toothed (a few with 9–10 teeth, but some of these usually formed by division of the principal teeth), the teeth 1–1.2 mm long, deltoid-acuminate, or narrowly triangular and up to 2.2 mm long, all more or less (usually densely) pubescent and often with some setae, often with a very few stalked glands; styles red, (4.5–) 6–8 (–11) mm long, about 5-laciniate more than half their length; capsule densely white-setose or nearly glabrous, tuberculate, the hairs clustered at the tubercles and appearing stellate or dendritic; seeds plump, ovoid, 0.8–1.4 mm long, dark purplish red (almost black), smooth but minutely areolate in longitudinal rows.

Throughout the range of the above there is a superficially striking variant, indistinguishable except that some or all plants in a local population may be coarsely and often densely hirsute with stiff spreading pale yellowish 1-celled hairs up to 5–6 mm long (in some roadside populations, e.g. Nay., W of Jalcoacán, *McVaugh & Koelz 685*, cited above, strongly hispid plants are almost as abundant as those having appressed hairs only). The following are representative:

Nay., E of San Blas (*Clarke et al. 1669-2*, in *Orbignya* forest, *Norris & Taranto 13397*); "Tepic" (*Beechey, K!*); Mpio. Tepic, km 20–30 on road to El Cuarenteño and Jalcoacán (*Téllez 11147*); "2–9 mi" W of Jalcoacán, road to Miramar (*McVaugh & Koelz 685*, in part); near Miramar, ca 1 km from the beach, roadside weed (*Feddema 957*); "ca 1.5 mi" W of Mazatlán, on the old [1959] road to Las Varas (*Feddema 1120*); above La Cucaracha, "12–14 mi" S of Las Varas (*McVaugh 19241*); Mpio. Tecuala, campo experimental "El Macho" (*A. Rodríguez C. s.n.*, IBUG); Jal., Mpio. V. Purificación, Jirosito, Cerro de la Mina, 650 m in oak forest (*Domitila de Niz et al. 62*, IBUG); Mpio. La Huerta, campos experimentales de la Esc. de Agricultura, weed in cultivated lands (*Carvajal 767* in 1978, *Ornelas U. 166* in 1981, both IBUG); [seaward-facing slopes], "semi-evergreen forest ca 20 mi" SW of Autlán (*Webster & Breckon 16061*); road to La Huertita, 1.5 km SSE of Casimiro Castillo, 350 m (*Pérez de la Rosa s.n.*, IBUG); Mpio. Tuxpan, barranca W of Atenique (*Rzedowski 21908*, juvenile apparently this form); Col., Colima (*Palmer 125* in 1897; Hda. Albarradita, 1 km W of Cd. Colima, *Gilly et al. 38*); Mpio. Comala, 22 km NNW of Cd. Colima, Rancho El Jabali, road to Lago Calabozo (*Rothschild 022*); Mich., Aquila, 250 m (*Hinton 16030*, K, MICH); Coahuila, 1000 m (*Hinton 12201*, K). (All specimens at MICH except as noted).

Another variant, perhaps of some taxonomic significance but insufficiently known, is one in which the teeth of the ♀ bracts end in narrow subulate tips 1.5–2 mm long, longer than the triangular proximal portion of the tooth:

Jal., Mpio. Pihuamo, 700 m, in tall valley-forest "3 mi" N of Pihuamo, with *Cecropia*, *Tabebuia*, *Ficus*, *Bumelia*, in deep shade (*McVaugh & Koelz 1417*, MICH); Mpio. Tecalitlán, ca 15 km E of Pihuamo, Sierra de los Corales, barranca San Juan de Dios, 1200–1300 m, in shade near the river (*Feddema 2141*, MICH); Col., Mpio. Coahuimatlán, barranca Alcaparrasa, 15 km NW of Pueblo Juárez, 500 m, in subdeciduous forest with *Brosimum* (*Santana & Cervantes 944*, IBUG).

Acalypha neomexicana Muell. Arg. *Linnaea* 34: 19, 1865; in DC. Prodr. 15, pt. 2: 874, 1866.

In typical form a characteristic plant of moist shaded conditions in mountains and uplands from western Texas to Arizona, south into Mexico as far as southern Zacatecas, Aguascalientes, and northern Jalisco. A rather distinctive variety, here noted for the first time, is common in central and south-central Jalisco and adjacent Michoacán.

1. Branchlets and petioles rather densely puberulent with mostly curved hairs, at least the distal portions of the petioles also bearing numerous gland-tipped hairs; ♀ bracts slenderly glandulopilose and hispidulous abaxially, with many glistening eglandular hairs 0.2-0.5 mm long and usually also with some larger hairs 1-2 (-3) mm long especially near the tips of the teeth; inner (adaxial) surfaces of the bracts with short hairs on the teeth and at their bases, but longer hairs and glands usually wanting; teeth of the ♀ bracts (7-9-10, all alike and triangular, 0.6-1.2 mm long, or the central one deltoid (as wide as long), or somewhat longer than the rest, up to 2 mm long, 1.5-1.7 mm wide at base).
- A. neomexicana* var. *jalsicana*.
1. Branchlets and petioles sparingly to moderately puberulent with mostly curved hairs, the petioles essentially without gland-tipped hairs; ♀ bracts mostly sparingly hispidulous abaxially, all or most hairs ca 0.5 mm long or less; gland-tipped hairs (if any) essentially marginal, the inner surface of the bracts sparingly hispidulous (not glandular) on the teeth only; teeth of the bracts (5-) 8-12, mostly ca 0.6-1.2 mm long, but the whole tip of the bract often prolonged, and the central tooth notably prolonged, up to 3-3.5 mm long, often 2-3 times as long as the lateral teeth.
- A. neomexicana* var. *neomexicana*.

Acalypha neomexicana* var. *jalsicana McVaugh, var. nov., a var. *neomexicana* differt ramulis petiolisque dense puberulis, petiolis saltem distaliter glandulopilosis, bracteis ♀ abaxiale glandulopilosis hispidulisque, bractearum dentibus plusminusve aequalibus, dente centrali haud vel interdum vix prolongato. *Acalypha salvadorensis* Standl. J. Washington Acad. Sci. 14: 96. 1924, saltem quoad plantas mexicanas.

Ravines, shady slopes, grasslands, oak forest, tropical deciduous forest with *Bursera*, *Eysenhardtia*, *Heliocharpus*, grazed pastures with *Acacia*, moist places in cultivated fields and orchards, and borders of irrigation canals, roadsides, 1200-1850 m, mostly in the interior basins and the upper basin of the Rio Santiago, flowering Sep-Nov.

Jal., Mich. (Mpio. Cojumatlán, near km 543, steep rocky slopes above Lake Chapala, ca "8 mi" NW of Sahuayo (*McVaugh 18162*, MICH, the holotype). The type of *A. salvadorensis* was from San Salvador (*Calderón 1741*, US, the holotype). Jal., "about rocks in ungrazed grassland," "2 mi" NW of Tequila (*McVaugh 18620*, MICH); Mpio. Hostotipaquillo, Tequesquite (*Prado Aguilar s.n.*, IBUG); Mpio. Antonio Escobedo, "El Cerrito" in the town (*Olivia Montes F. s.n.*, IBUG); potrero La Higuera, S of Ameca (*Sánchez Ramos 2*, IBUG); Mpio. Cuquío, Rancho S. José de Buena Vista, NE of Ixtlahuacán del Río (*Sánchez Sánchez 18*, IBUG); Mpio. Tala, La Primavera, pine plantation on University land (*A. Rodríguez & Reynoso 1574*, IBUG); Guadalajara [probably in the barranca of the Río Santiago], 24 Nov 1930 (*M. E. Jones 27466*, US; *Jones s.n.*, same date and place, MICH); Mpios. Guadalajara, Tlaquepaque, Zapopan (*many collectors*); Mpio. Villa Obregón, cañada del Rancho El Salto (*Puga 8952*, IBUG); Tototlán, on a *cerro* (*Covarrubias L. 6*, IBUG); Mpio. Jesús María, Rancho Paso de Guadalupe (*Olazaba Becerra s.n.*, IBUG); Mpio. Tlajomulco, in the settlement of San Sebastián el Alto (*Lepe Becerra s.n.*, IBUG); Mpio. Ixtlahuacán de los Membrillos, near Río Lerma, 20 km S of Atequiza (*Puga & Carvajal 14307*, IBUG); in an orchard N of Villa Corona (*Mendoza M. s.n.*, IBUG); Mpio. not ascertained, 1 km from La Mora, 1300 m (*Reyes Rosales 3*, IBUG); Mpio. Tenamaxtlán, Aguatitlán, 15 km S of Tenamaxtlán (*Soltero Quintana 3*, IBUG); mountains N of Autlán, "3-5 mi" above Mina San Francisco (*McVaugh 19689*, MICH); before las Canoas, outlying spurs (*escribaciones*) of the Nevado de Colima, 1800 m (*Santana Michel 1365*, IBUG); Mich., Mpio. Briseñas, Ibarra (*Avalos Trujillo*, "Gpo. A." IBUG).

Annual from a slender taproot, erect, (10-) 30-60 (-80) cm tall, noticeably soft-pubescent, the branchlets rather densely crisp-puberulent with mostly incurved hairs, a few short gland-tipped hairs intermingled; petioles similarly vestite, but

with more numerous gland-tipped hairs, these usually plentiful near the blade; stipules scarious, caducous, subulate or triangular, 0.5-1.2 mm long; petioles long and slender, (1.5-) 3-6.5 cm long, in well-grown plants often about as long as the blades; blades ovate, (2-) 4-7 cm long, up to 4 cm wide, blunt-pointed to acute or acuminate, rounded at base, the margins rather coarsely dentate; both surfaces hispidulous on the veins and, especially on the adaxial surfaces, on the lamina, commonly hispidulous and with some gland-tipped hairs on and near the margins; ♀ spikes terminal on the stem and branches, the central one largest, 3-6 (-12) cm long with up to ca 50 conspicuously leafy 1-2-flowered bracts, these suborbicular to flabellate or wider, 4-8 (-12) mm long, 8-12 (-15) mm wide, slenderly glandular-pilose on the outer (abaxial) surface and there also hispidulous with many straight glistening eglandular hairs 0.2-0.5 mm long, as well as (usually) scattered larger straight hairs 1-2 (-3) mm long especially on the margins and at the tips of the teeth; inner surface of the bracts commonly hispidulous on the teeth and below their bases, and often bearing gland-tipped hairs and scattered long straight hairs; teeth of the ♀ bracts (7-) 9-10, all alike and triangular, 0.6-1.2 mm long, or the central one wider, deltoid, the same length or somewhat prolonged up to 2 (-2.5) mm long, 1.2-1.5 mm wide at base, but the bract as a whole seldom notably prolonged at apex; ♂ spikes inconspicuous, 3-6 mm long including a short peduncle, axillary, arising at the bases of the ♀ spikes and commonly from the same axis; styles pale, lacinate, 2.5-4 mm long; capsule 3-lobed, obovate, 1.7-2 mm wide, short-setose, weakly fleshy-tuberculate; seed ovoid, plump, 1.2-1.3 mm long, 0.9 mm wide, gray or reddish, coarsely (for this genus) concave-reticulate, the individual areolae up to 0.1 mm wide or more.

Although this plant differs markedly from *Acalypha neomexicana* in geographical range, in abundance and quality of the vestiture, and in general appearance, it is so similar to that species in most qualitative characters that a close relationship between the two taxa seems certain. Particularly striking is the "excavato-foveolato-punctulate" surface of the seeds, a feature (as long ago noted by Mueller) that sets *A. neomexicana* apart from all other herbaceous annual Mexican species of the genus. In another weedy species of similar aspect, *Acalypha indica*, the seeds are essentially smooth, with very fine cellular reticulations. The var. *jalsicana* may be much more abundant and widely distributed than is now known. It was long known only from about four Mexican specimens collected prior to 1961. Not until the collectors of the Instituto de Botánica (Universidad de Guadalajara) began an intensive program of exploration in Jalisco in the 1970s did its abundance there become apparent.

***Acalypha neomexicana* var. *neomexicana*.** *Acalypha neomexicana* Muell. Arg., as to type.

Meadows and seeps, grassy openings, canyons and dry woodlands, oak forest, often in partial shade, 1200-2500 m, flowering Aug-Nov.

S w U. S. ("Novo Mexico," *Wright 1817*, 1818, syntypes; *Wright 1817*, G1, was named lectotype by G. L. Webster in 1964); Son., Sin., Chih., Dgo., Zac., Ags., Gto., Jal., Mich., S. L. P., Coah.

Acalypha vallartae McVaugh, sp. nov., *Acalypha microphyllae* similis, sed foliorum lamina longe acutis non abrupte acuminatis; spicis ♀ linearibus, 3-4.5 mm diametro [non oblongis vel ellipsoideis 4-7 (-10) mm diametro]; pedunculis ♀ 15-25 mm long (plerumque ca 20 mm) [non 2-12 (-20) mm, plerumque ca 8 mm]; bracteis ♀ minute hispidulis strigulosis, sine pilis rigidis longis conspicuis, differt.

Deciduous woodlands, borders of subdeciduous forest, coastal thickets and rocky slopes facing the ocean, always near the Pacific ocean but above the coastal sands, 2–30 m, flowering and fruiting Oct–Mar as far as known.

S Nay., Jal., where known only from coastal areas, Mpio. Puerto Vallarta and Tomatlán (vicinity of Los Arcos, "3.5 mi" S of Río de Cuale in Puerto Vallarta (Webster & Breckon 15797, MICH, sheet 1, the holotype; MEXU, isotype!)).

Nay., Mpio. Compostela (2 km S of Lo de Marcos, Playa Vendados, "selva mediana, secundaria," *Tellez 12726*, MEXU; Pátzcuaro, en un arroyo, *S. Martínez 1023*, IBUG, MEXU); Mpio. Puerto Vallarta, on slope in slide area S of Playa Los Muertos (Carter & Chisaki 1190); "2.5 mi" S of Río de Cuale in Puerto Vallarta (Webster & Breckon 15779, MEXU, MICH); ca 2 km S of Puerto Vallarta, base of hills near rocks (*Feddema 2500*); s e shore of Bahía de Banderas, 9–12 km by road from [ca S of] Puerto Vallarta (Anderson & Anderson 6037); Mpio. Tomatlán, along Highway 200, "0.4 mi" N of the bridge at Playa Mismaloya, elev. 20 m (*Daniel 1079*). (All specimens at MICH except as noted).

Bushy annual or of indefinite duration (referred to by one collector as a "subshrub"), from a perennial multipital taproot; stems mostly with several branches from the base, also branched above, 1.5–60 cm long, erect or sprawling; herbage sparsely fine-puberulent or the stems essentially glabrous, the leaves glabrous or puberulent on the veins or thinly strigose, the ♀ bracts minutely hispidulous or strigulose; stipules triangular or subulate, 0.3–1 (–3) mm long, caducous; petioles of major leaves very slender, 10–20 (–35) mm long; blades ovate, 1.5–3.5 (–7.5) cm long, 1–2 (–5) cm wide, acute at tip or (usually) prolonged distally, gradually acuminate from above the middle or (more often) from a broad rounded (rarely subcordate) base to a narrow tip; margins finely crenate-serrulate with 13–17 (–21) teeth on each edge, the rounded base of the blade entire; ♂ spikes axillary, when mature (20–) 30–70 mm long, 1.5–2 mm thick, the bracts not crowded on the axis, often separated by intervals about as long as the flowering unit, and more widely spaced toward the base of the spike; spikes much longer than the peduncles, these 5–15 (–30) mm long; ♀ spikes terminal and axillary, linear, at maturity 10–30 (–55) mm long, 3–4.5 mm thick (rarely –10 mm when pressed), often several together from approximate nodes at the tip of a branch, sometimes interrupted at base, often with a terminal seta terminated by a rudimentary ♀ bract and flower; peduncles filiform, 15–25 mm long; ♀ bracts (15–) 40–75, (1–) 1.5–2 mm long (–5 mm long in rare forms with a central prolonged tooth), when flattened flabelliform and ca 3 (–4) mm wide, ca 7-toothed, the teeth more or less triangular, up to ca 0.7–0.8 (–1.5) mm long, and at base about as wide (the 2 outer ones much smaller), acute or short-acuminate with cusp ca 0.2 (rarely –1) mm long; styles ca 6 mm long; capsule deeply 3-lobed, obovate, ca 1.5 mm in diameter, 1–1.2 mm high, distally verrucose and white-hispidulous with partly stellate or apparently dendritic hairs; seeds ovoid, acute, ca 0.8–0.9 mm long, nearly black, smooth, cellular-reticulate, with an oblique apical/adaxial crest.

This is perhaps the most distinctive of the segregates from the complex of *Acalypha microphylla*. It is contrasted with the varieties of that species in the key above, p. 181. It is unique in the combination of small, long-pointed (not abruptly acuminate) leaves, generally scanty pubescence, mostly short and relatively blunt and puberulent (not setose) ♀ bracts, and long-pedunculate and (for this group of species) slender ♀ spikes. It also appears to have a rather restricted habitat-preference, in its short known distribution along the coast of Jalisco and southern Nayarit. Almost all collectors have remarked upon the red color of the flowering spikes.

ARGYTHAMNIA

In this paper and – according to present plans – in the *Flora Novo-Galiciana*, *Argythamnia* will be treated in the broad sense, as a genus comprising the three subgenera *Argythamnia*, *Chitropetalum*, and *Ditaxis*. John Ingram (1967, 1980) published revisions of the first two, but a modern revision of *Ditaxis* is much to be desired. Ingram (1980) argued that as the so-called genera have been separated almost exclusively on the characters of the ♂ flowers, and as these characters intergrade widely among species that have been assigned to one group or another, they are essentially useless as indicators of generic differences. Very recently, however, Webster (1994), in a general review of the classification of the Euphorbiaceae, recognized the same three groups as independent genera, separated in his opinion not only by characters of the petals but those of the styles, and most tellingly by those of the pollen grains.

The following key contrasts the taxa of subgenus *Ditaxis* that are known to occur in Nueva Galicia. It is presented in full here in order to place two newly described taxa in proper perspective. In both the stamens are usually 10, in two whorls; inflorescences essentially sessile, congested, subglomerate; seeds with small depressions, pitted-reticulate, or appearing irregularly tuberculate.

1. Upper whorl of stamens usually exerted from the inflorescence; staminodia 5, conspicuous at the apex of the staminal column, more or less erect, 0.7 mm long, evidently plumose; both ♂ and ♀ petals with ovate-sagittate blade and slender claw; seeds 2.1–2.5 mm long, reticulate-pitted, with flat-bottomed or shallowly crateriform bordered depressions; near the Pacific coast, sea-level to 200 m.
A. manzanilloana.
1. Stamens not or only obscurely visible in the inflorescence; staminodia inconspicuous, usually 3 (sometimes apparently wanting), peglike or reduced to mere tubercles, glabrous; petals various, often narrowly lanceolate; seeds (2–) 2.5–2.8 (–3) mm long.
2. Branchlets and both surfaces of the leaves rather sparingly beset with stiff coarse straight or slightly curved malpighiaceae hairs 1.5–2.5 mm long, the individual hairs mostly evident and distant except on growing tips; ♀ petals spatulate, 1–1.3 mm long; ♂ petals not adherent to the staminal column, seeming to arise between and alternating with the glands; lowlands of the Balsas depression, E to Oaxaca.
A. micrandra.
2. Branchlets and leaves not as above, the pubescence at least partly of soft flexuous to matted hairs, the straighter malpighiaceae hairs if present usually soft and flexuous, 1 (–1.5) mm long or less and the individual hairs not readily identified; ♀ petals narrowly lanceolate to ovate-lanceolate, narrowly long-acute, in ours 3.5–5.5 (–7) mm long; ♂ petals adherent to the staminal column at base, seeming to arise at the top of the glands.
3. Entire plant gray, covered with crowded soft delicate flexuous hairs; leaf-blades subcoriaceous, broadly elliptic-ovate, 1.4–1.7 times as long as wide, abruptly and prominently short-acuminate, distinctly serrulate with ca 20 teeth on each edge; ♂ petals with ovate blade 2.3 mm long and a fleshy basal adaxial protuberance, abruptly contracted at base; staminodia apparently none; seed pitted-reticulate with mostly crateriform bordered depressions; Colima, Río Salado, 400 m.
A. sp., aff. *A. discolor* Brandg.
3. Plants gray or canescent when young, the stems and leaves at maturity commonly green but often densely pilose; leaf-blades various, in ours commonly twice as long as wide or longer, lance-ovate or ovate, gradually pointed, not abruptly acuminate, minutely denticulate but usually appearing entire to the unaided eye; ♂ petals in ours 4–5.5 mm long, lance-ovate to rhombic-ovate; staminodia commonly present; seeds various; widespread at middle elevations.
4. Seeds pitted-reticulate, with distinct bordered depressions. *A. guatemalensis*, sens. lat.
4. Seeds without obvious pits, the very shallow depressions without defined borders, covered with thick radiating striae that obscure the surface.
A. guatemalensis var. *barrancana*.

Argythamnia ["*Argyrothamnia*"] **guatemalensis** Muell. Arg. Linnaea 34: 145. 1865; in DC. Prodr. 15, pt. 2: 736. 1866. *Ditaxis guatemalensis* (Muell. Arg.) Pax & Hoffm. Pflanzenreich IV. 147. vi. [Heft 57]: 59. 1912. *Argythamnia guatemalensis* var. **guatemalensis** (*A. guatemalensis* Muell. Arg., as to type).

Primarily a Central American species, the type (and type of var. *guatemalensis*) from "Guatemala" (*Friedrichthal*, in herb. Lenormand, now at L.?, not seen). The species is well known and fairly uniform at low and middle elevations from Guatemala to Costa Rica, and ranges northward to Chiapas, Oaxaca, Morelos, and probably Puebla. A young flowering specimen from Colima (summits ca "11 mi" SSW of Colima on the Manzanillo road, 500 m, *McVaugh 18063*, MICH), may belong here but in the absence of seeds and of adequate flowering material I cannot be sure. Material from Veraacruz and San Luis Potosí that has been called *A. guatemalensis*, as far as I have observed it, appears to belong to a different though related taxon. A revision of the entire complex would be desirable. The Central American form in the strict sense appears not to have been collected in Nueva Galicia, though scattered collections have been referred to it. In our area *Argythamnia guatemalensis*, *sensu lato*, is not likely to be confused with any other species of the genus except *A. manzanilloana*, which as far as known is confined to the Pacific lowlands.

P. C. Standley, who was well acquainted with the living plant in the field, described *Argythamnia (Ditaxis) guatemalensis* as an annual (Fl. Guatemala, Fieldiana Bot. 24, pt. 6: 88. 1949), but this is a somewhat misleading statement. It seems sometimes to flower the first year, when it has only a small taproot, but the plant is commonly described by collectors as a shrub or subshrub. I have seen seven collections of what I take to be *A. guatemalensis (sens. lat.)* from Nueva Galicia, and of these six were definitely described by the collectors as "shrubs" or "arbuscens" 1-2 m tall, and the seventh as "sufruticosa de 1 m." Most herbarium specimens are woody at base, branched and with all appearances of a real shrub, often collected with portions of a thick attached woody root, and at least the older branches having a thin corky bark.

Argythamnia guatemalensis var. **barrancana** McVaugh, var. nov., a var. *guatemalensis [sensu Florae Guatemalae et sensu Muell. Arg. in DC. Prodr.]* floribus majoribus semibusque non distincte foveolatis, differt.

Steep slopes and barrancas, tropical deciduous forest with *Acacia*, *Bauhinia*, *Alvaradoa*, open grassy slopes with *Acacia*, *Croton*, *Wimmeria*, transition zone between *materral* and forest with *Bursera*, *Jatropha*, and arborescent *Ipomoea*, sometimes in secondary forest, often in calcareous soils, 500-1500 m in the northern barranca-systems of the Santiago basin, flowering and fruiting Jun-Nov.

S Zac. (Valley of the Río Juchipila), 20-21 km S of Jalpa, *McVaugh 23801*, MICH (the holotype), n Nay., n Jal., Oro.

Zac., "5 mi" NE of Jalpa (*McVaugh 18480*); Nay., Mpio. Nayar., along the river 500 m S of Jesús María (*Flores F. 1779*, without seeds but perhaps this variety); Mpio. Nayar., 2 km N of Rancho Viejo, road to San Juan Peyotán (*Tenorio 16328*, with immature seeds but perhaps this variety); Jal., "2 mi" N of San Cristóbal de la Barranca, [near jct. of Ríos Juchipila and Santiago] (*McVaugh 22145*). Apparently identical is a specimen from Querétaro, Mpio. Tolimán, 3 km S of Camargo (*Fernández N. 2884*, MEXU). (All specimens at MICH except as noted).

Shrub (or sufruticose) with ascending branches, 1-2 m high; leaf-blades prevalently ovate, sharply and narrowly acute or acuminate, subentire (obscurely

serrulate); bracts subtending ♂ flowers as far as known narrow and attenuate; ♂ sepals lance-attenuate, 4.5-5.5 mm long, 0.8-1.4 mm wide; ♂ petals narrowly rhombic-ovate, 4-5.5 mm long, the blade 1-1.8 mm wide, contracted to a substipitate base; ♀ sepals linear-acute or linear-attenuate, 4.5-7 mm long, 1.2-1.7 mm wide; ♀ petals narrowly lanceolate, 3.5-5.5 mm long, 0.7-1 mm wide; seeds without obvious pits, the very shallow depressions without defined borders, covered with thick radiating striae that obscure the surface.

A specimen from somewhat farther south than the locality near San Cristóbal de la Barranca, taken in the barranca of the Río Santiago (N of Guadaluajara, "1.2 mi by road" above Puente Guadalupe, *Anderson & Anderson 5112*, MICH), has the acute ovate leaves and the attenuate ♂ bracts of var. *barrancana*, and the flowers are about as long as in that variety (the ♀ flowers even longer, with sepals 7-8 mm long, and petals 4.5-7 mm long), but the seeds are reticulate-foveolate, about as in the Central American race of *A. guatemalensis*.

BERNARDIA

In 1961 (*McVaugh 1961*), in a synoptic account of the five species of *Bernardia* then known to me from Nueva Galicia, I noted that the Mexican species were not well understood taxonomically, for a variety of reasons. This is still true. Very little Mexican material was available 80 years ago at the time of the last general revision of the genus (*Pax & Hoffmann 1914*) and additional collections are still much needed. The casual collector may be deterred by the relative infrequency with which the plants occur, by the fact that most of our species are dioecious, most have very inconspicuous flowers, most species flower (often when leafless) in the dry winter and spring months when plant-collectors are least likely to be active, and most species occur in areas where high summer temperatures, heavy summer rains, rugged topography and tangled thorny vegetation combine to discourage the faint-hearted. Leafy ♀ specimens in fruit are almost impossible to associate with leafless ♂ material in flower. For many species ♂ material is unknown, or if specimens are known they are unidentifiable as to species.

The taxonomy of our species can hardly be well understood until an effort is made to secure adequate samples of both ♂ and ♀ material from the same populations at different times of year, including leafy and leafless, and flowering and fruiting, specimens from the same plants. Doubtless various hitherto unrecognized species will be found when more complete specimens are available. Fortunately, in Nueva Galicia most members of the genus may usually be recognized as such, even in the sterile condition, by the combination of stellate or fasciculate hairs and the presence of the characteristic annular glands (hereafter called "ring-glands") at the bases of the leaves. These glands, called "maculiform" by *Pax & Hoffmann*, and "cicatricoso-crateriform" by *Croizat*, are unique in the local Euphorbiaceae as far as I know.

It appears that a significant number of species (and perhaps of infraspecific taxa) of *Bernardia*, at least in our area, have very limited geographical ranges. One species that I described in 1961, *B. spongiosa*, has proven to be abundant in several localities in the Pacific lowlands, but the two other species described at the same time, *B. heteropilosa* and *B. wilburii*, seem to be still unknown except from the types. A very distinct species described below, *B. kochii*, seems to have been found but once, in spite of intensive exploration in the same general area over the

last decade. A second species described below, *B. santanae*, is known only from the foothills of the Sierra de Manantlán.

The following key contrasts and places in perspective all the species now known to me from Nueva Galicia.

1. Plants annual, monoecious; pubescence of simple hairs; seeds sharply trigonous; stamens 4-6; styles simple, deeply bifid, the branches subulate, entire or roughened on the adaxial face.
 - a. *B. stidoidea*.
1. Plants shrubs or small trees, dioecious (rarely monoecious in *B. santanae*); pubescence at least mostly of stellate or fasciculate hairs; seeds not trigonous, variously rounded, sometimes with a single sharp abaxio-apical keel; stamens commonly 10-17 (-38), styles flattened, recurved or spreading.
 - a. *B. heteropilosa*.
2. Leaves (at least when young) finely stellate-pubescent or fasciculate-pubescent adaxially, sometimes with a few additional simple hairs.
 - a. Petioles of major leaves 25-65 mm long, with a conspicuous abaxial brush of stiff erect whitish hairs 1-1.5 mm long extending from the distal end of the petiole onto the midvein, and a similar brush extending down the twig from the base of the petiole; stamens ca 35-38; styles bifid with thick linear blunt branches; seeds ellipsoid with rounded ends, 12-13 mm long.
 - a. *B. kochii*.
 - a. Petioles of major leaves (1-) 5-15 (-25) mm long, uniformly pubescent to nearly glabrous, without tufts of larger hairs at base and apex; stamens 15 or fewer; styles more or less lacinate; seeds various, as far as known globose; and 10-11 mm in diameter, or cordiform and 7-8 mm long or less.
 - a. Leaf-blades 1.5-2.5 cm long on petioles 1-3 mm long, obovate, 1-1.7 cm wide near the blunt or rounded apex, the margins with 15-20 hairy-tufted teeth on each edge, these conspicuous chiefly across the distal margin of the blade; δ material unknown; immature fruit terminal, sessile and solitary, densely tomentose, the 3 styles thick, rigidly recurved, involute with jagged margins, attenuate to narrow toothed tips; n Jalisco only.
 - a. *Bernardia* sp.
 - a. Leaf-blades 3-10 (-22) cm long, 2-8.5 cm wide, the petioles mostly 5-15 mm long; blades lanceolate to ovate, elliptic or elliptic-obovate, with mostly acute or acuminate tips, the margins finely or coarsely toothed; fruit various.
 - a. Carpels and styles usually 2; fruit globose, 2 cm in diameter, soft and spongy, indehiscent; styles with a terminal many-parted flabellate fringe 2-2.5 mm long; seeds hemispheric, 10-11 mm in diameter; flowers produced on leafless branches, or with the leaves; bracts of the δ aments 3 (-2)-flowered; pedicels of δ flowers 2-3 mm long; stamens 8-10 (-12); Pacific lowlands, 500 m or usually lower.
 - a. *B. spongiosa*.
 - a. Carpels and styles 3; fruit a woody and elastically dehiscent capsule, obovate, strongly 3-lobed, 0.7-1.5 cm wide; styles various, many-branched; seeds 4-8 mm long, cordiform; flowers produced on leafy branches or occasionally with immature leaves; bracts of δ aments (unknown in *B. wilburii*) (2-) 3- or 5- or mostly ca 10-flowered; δ flowers sessile or on pedicels up to 1.8 mm long; stamens (10-) 12-15; mostly species of the Pacific foothills, but ranging from sea-level to 1500 m.
 - a. Major leaf-blades 20-22 cm long, prominently and sharply acuminate, primary lateral veins 7-9 (-12) on each side of the midrib, essentially equal, the basal pair often ascending more steeply than the others, but shorter and weaker in comparison, the blade not triplinerved; δ bracts ca (6-) 10-flowered, all but 2-3 flowers often aborting before opening; styles involute, ca 2 mm long, erect, each divided into 30 or more unequal subulate divisions.
 - a. *B. santanae*.
 7. Abaxial surface of the leaf-blades copiously beset with pale minimally overlapping stellae, these with ca 5-8 rays 0.3-0.8 mm long; hairs of the

capsule 1 mm long or more, upstanding; seeds 7-8 mm long; δ material unknown; known only from the type-collection, "2 miles west" of Autlán.

B. wilburii.

7. Abaxial surface of the leaf-blade thinly to densely beset with minute stellulae, or nearly glabrous with larger stellae on the principal veins, or in age essentially glabrous; capsule minutely stellulate, the rays of the hairs mostly 0.1-0.3 mm long; seeds 4-6.5 mm long.

8. Abaxial surface except when very young with few stellae except on the larger veins, and tufts of pale hairs up to 0.5 mm long in the axils of the principal veins, these hairs considerably larger than the few superficial hairs and those on the veins above the axils; teeth of the blade commonly 2-4 (-6) per cm of margin; δ bracts (2-) 3-flowered; seeds 4-5.5 mm long.

B. geniryana.

8. Abaxial surface beset (usually very densely) with minute stellulae, often scurfy and whitened when young, often glabrescent in age, the axils of the principal veins with no tufts of longer hairs; teeth of the blades commonly 8-12 per cm of margin, sometimes fewer in old leaves; δ bracts (4-) 5 (-6)-flowered; seeds 5.5-6.5 mm long.

B. mexicana.

Bernardia kochii McVaugh, sp. nov., frutex ut videtur dioicus, 3 m altus, juvenute minute stellulato-pilosus, maturitate fere glaber; petiolus basi apiceque pilis creberrimis erectis 1-1.5 mm longis ornatus; folia petiolis 2-6.5 cm longis, laminis (8-) 12-18 cm longis, anguste acuminatis; δ inflorescentia grandiflora, 3.5-4.5 cm longa, bracteis 10-15 viridibus, deltoideis, 1 mm longis, (2-) 3-5-floris, floribus fere glabris, sparsim strigosus, sepalis 3, 3 mm longis, staminibus 35-38; spica δ 3 cm longa, 2-4-flora; ovarium strigosum, stylis 3, bifidis, ramulis linearibus obtusis integris; capsula 3-lobata, ca 1.5-1.7 cm longa, 2 cm lata, sparsissime strigosa; semina ellipsoidalia, laevia, 12-12 mm longa.

Known only from the type collection, Jalisco, Mpio. Zapotitlán, 11 km N of Hacienda San Antonio [Col. J. brecha to El Borbollón, 1600 m, common in mixed broadleaf forest, with flower and fruit 21 Apr 1990 (*J. Villa C., S. D. Koch & J. Chávez L. 702*, CHAPA, the holotype).

Shrub 3 m high, apparently dioecious; young herbage and inflorescences rather thinly beset with pale, mostly appressed, 2-3-raved stellulae 0.1-0.2 mm long, or longer on the foliar veins abaxially; leaves and the smooth terete branches essentially glabrous at maturity, the leaves glabrous adaxially from the first except for lines of stellulae on the veins, the abaxial surface with longer and more numerous stellulae, also with a conspicuous brush of straight stiff erect whitish hairs 1-1.5 mm long, extending from near the distal end of the petiole along the midvein (sometimes for half the length of the blade), and a similar but smaller brush down the twig from the base of the petiole; stipules subulate, strigose, deciduous, up to 1-1.5 mm long; petioles stellulate (in age mostly glabrous) but without long hairs except at base and apex, relatively thick and stiff, 0.6-1 mm thick even in very young leaves, in major leaves 2.5-6.5 cm long, 1.5-1.8 mm thick; blades green, coriaceous, elliptic to lanceolate or oblanceolate, (8-) 12-18 cm long, 3.6-6.5 cm wide, narrowly acuminate, the whitish slightly thickened margins usually abruptly incurved at base and shortly decurrent on the petiole; ring-glands on the abaxial surface 1-3 on each side of the midrib; veins whitish and conspicuous, the lateral ones 5-ca 8 on each side without smaller intermediate veins except those connecting the principal pairs; margins pale, coarsely low-serrate, each edge with ca 13-25 low teeth with blunt and often incurved callus-tipped teeth; δ inflorescences 1 or more from the upper axils, spike-like, 3.5-4.5 cm long, 5-7 mm in diameter before

the flowers open (–10 mm or more afterward), on peduncles 7–10 mm long and 1 mm thick, spike interrupted, the bracts 10–15, green, rigid, deltoid, 1 mm long, 1.5 mm wide at base, (2–) 3–5-flowered; pedicels ca 1.3–1.5 mm long; buds suborbicular, apiculate, very thinly strigose, 1.8–2.3 mm in diameter; δ sepals 3, elliptic-ovate, apiculate, 3 mm long, 2–2.5 mm wide; stamens ca 35–38, the filaments (?pale reddish) 1.5–2 mm long; anthers didymous, ca 0.5 mm long; η spike terminal, ca 3 cm long, 2–4-flowered, the axis slightly zigzag between flowers; bracts about as in the δ inflorescence, 1-flowered; η flowers sessile, the sepals ca 4 (–5), green, broadly rotund, ca 1.5–1.8 mm long, 2 mm wide or more, ciliate; disk apparently continuous, lobulate, ca 2 mm wide; ovary ellipsoid, ca 6 mm long and 4.5 mm wide, obtusely angled, thinly stellulate, the styles 3, thick, strigose, contiguous at base with deep sulci between them, ca 2–2.5 mm long, bifid about half their length with thick linear blunt branches, strongly recurved against the tip of the ovary; fruit (described as “2 cm diam.”) with 3 low rounded lobes, almost smooth with few very scattered stellulae, probably ca 1.5–1.7 cm long (high), the persistent styles strigose, 2.5–3.5 mm long, 1 mm thick at base and evidently not united there; columella 13–14 mm long, thin-winged, dilated at apex and there 5–6 mm wide; seed brown, ellipsoid with rounded ends, brown, smooth with separable papery outer layer, 12–13 mm long, ca 9 mm wide, with small apical scar and inconspicuous adaxial line.

This species is remarkably different from any other *Bernardia* in our flora, by virtue of its nearly glabrous and long-petiolate leaves with their distinctive tufts of hair at base, by its large δ flowers with very numerous stamens, and by its bifid styles with entire branches. The type-collection of *B. kochii* was originally identified as *B. interrupta* (Schlecht.) Muell.Arg., a much more heavily vestite plant of the Atlantic slope of Mexico in which the styles are similarly branched.

Bernardia santanae McVaugh, sp. nov., frutex vel arbor parva, monoica vel ut videtur dioica *B. mexicanae* similis, sed maturitate glabruscula, foliis longioribus usque ad 20–22 cm longis, 7–8.5 cm latis, valde acuminatis acutissimis, laminis non triplinerviis sed nervis primariis lateralibus subaequalibus utroque latere 7–9 (–11), bracteis δ ca (6–) 10-floris, floribus apertientibus plerumque 2–3, stylis suberectis ca 2 mm longis, basi 3 distinctis sed approximatis, utroque stylo irregulariter ca 30-fido.

Hillsides in humid tropical subdeciduous forest with *Brosimum*, *Hura*, *Annona*, *Randia*, *Cecropia*, or more open forest with *Astronium*, *Passiflora*, *Begonia*, *Cenrosema*, 400–800 m in the foothills of the Pacific slope, flowering Feb–May as far as known.

Jal. (2 km SE of Casimiro Castillo, Cerro La Petaca, *Santana & Benz 5710* in 1992, δ η , WIS, the holotype; ZEA, isotype). Known only from this collection and the two following.

Jal., 1–4 km E of Casimiro Castillo (*Santana & L. Guzmán 3370* in 1988, δ & η , WIS, ZEA; Arroyo Tacubaya, *Cochrane, Wetter & Santana 11700* in 1989, η , DAV, WIS).

Shrub or small tree 2–7 m high, dioecious or (as in the type-collection) monoecious, ?evergreen with lustrous green leaves; young herbage and twigs, and inflorescences, densely beset with pale minutely scurfy-stellate hairs, the leaves glabrescent, the blades at maturity essentially glabrous, usually slightly rough on the adaxial surface; stipules pale or whitish, strigose, rigid, appressed, subulate, thick (rounded) at base, rather tardily deciduous, 1.5–3 mm long; petioles thinly

scurfy, stout, straight, (6–) 10–14 mm long, cylindrical, not or scarcely sulcate adaxially, seemingly prolonged onto the abaxial surface of the blade, where at once diminished in diameter; blades elliptic or oblanceolate, prominently and sharply acuminate, narrowed from the middle or above to an acute or abruptly rounded or subtruncate base, those of major cauline leaves up to 20–22 cm long and 7–8.5 cm wide, those on flowering branchlets mostly smaller, 8–15 cm long, 3–5 cm wide; margins uneven, appearing erose, antrorsely low-serrulate with 3–5 teeth per cm of margin, often with 1–2 smaller teeth between the larger ones; rings glands 1–5 near the base of the blade on the adaxial surface, small, mostly ca 0.3 (–0.5) mm in diameter; occasional additional glands sometimes few and scattered on both surfaces; venation pale and conspicuous on both surfaces, pinnate, the lateral veins 7–9 (–12) on each side of the midvein, essentially equal, the basal pair often ascending more steeply than the others but shorter and weaker in comparison, the blade not triplinerved; δ spikes axillary, at anthesis 1–3 cm long, 3–4 mm in diameter, flexuous, the 10–20 bracts well separated on the axis; bracts ca (6–) 10-flowered (all but 2–3 of the buds usually aborting before opening), coriaceous, green, erect from the base, broadly deltoid-ovate or reniform-ovate, apiculate, 1.5–2 mm long, 2–2.5 mm wide, becoming cup-shaped, the lateral margins upcurving and infolding the buds; δ flowers nearly sessile, the sepals valvate, 3, elliptic, boat-shaped, ca 2 mm long, 1.5 mm wide; stamens 13 (two counts), the stout pinkish fleshy subulate filaments 1.5–1.8 mm long, inserted between and among small glands; anthers ca 0.4 mm long; η spikes terminal (on separate branches in *Cochrane et al. 11700* and *Santana & Guzmán 3370*), flexuous, 1–3 cm long on stout peduncles 5–8 mm long; bracts 4–7, 1-flowered, soon reflexed by the pressure of the developing ovary; flowers sessile, the sepals 5, imbricate, coriaceous, pubescent on both surfaces, broadly ovate, acuminate, unequal, 3 mm long, 1.5–2 mm wide, in fruit scarcely larger; disk flat, obscurely 5-angled, 2 mm wide; ovary densely stellulate, deeply 3-lobed, ca 2.5 mm long and 3 mm wide, the styles forming an erect terminal brush ca 2 mm high; style of each carpel irregularly divided and subdivided into 30 or more subulate divisions of unequal lengths and thicknesses, the 3 groups seemingly tightly coherent but each distinct above a short pedestal-like base; capsule (not seen intact) stellulate-hispidulous, probably ca 6–7 mm high and 10 mm wide, deeply 3-lobed; columella ca 4 mm long, 3-angled, irregularly winged and dilated at apex; seeds cordiform, obscurely wrinkled, dull gray brown with lustrous chestnut-colored blotches, ca 6.5 mm long, abaxially keeled, ca 4 mm wide, 4.5 mm thick (radial measurement), somewhat flattened on the adaxial face and squared or with projecting shoulders at the truncate base.

The epithet is intended to honor Francisco J. Santana Michel, who was involved in all three of the original collections made in Jalisco. The species resembles *Bernardia mexicana* in many respects, but the leaves of *B. santanae* are distinctly different in shape, in texture and in venation, the pubescence is very much sparser, the δ flowers are almost twice as many in the axil of each bract.

Bernardia sp.

The plant so identified in the key above is a freely branched shrub that is apparently well adapted to a very dry habitat. It is known so far only from specimens with immature fruits, collected in the desert-like area in northern Jalisco, where many other species are identical with, or seem to have affinities with, desert-inhabiting species from farther north. Superficially similar specimens are

known from Durango, but I have never found one that matched our plant in detail, and in the absence of mature fruit and of all ♂ material, I cannot give the Jalisco plant a name.

Jal., Rancho Los Arroyos del Agua, 15 km NW of Huejuquilla El Alto, "matorral subtropical con elementos de matorral xerófilo, *Lycium minimum*, *Leucophyllum*, *Jatropha*," 1550 m, immature fruit 4 Aug 1990 (A. Flores M. 1989, MICH, WIS).

Young twigs, stipules, petioles, and to lesser extent the abaxial leaf-surfaces, whitened by a dense covering of somewhat upstanding hairs; petioles 1–3 mm long; blades 15–25 mm long, obovate, rounded or occasionally broadly pointed at apex, where 10–17 mm wide, the hairs of the abaxial surfaces overlapping, mostly 8–12-rayed stipitate or substipitate stellae, the rays mostly 0.4–0.8 mm long, or shorter on the principal veins; adaxial surface green, the stellae not overlapping; marginal teeth ca 15–20 on each edge, the teeth hairy-tufted, conspicuous chiefly across the rounded end of the blade; immature fruit terminal, sessile, solitary, ca 7 mm wide, 6 mm long, densely tomentose.

CHAMAESYCE

Chamaesyce salsuginosa McVaugh, sp. nov., annua, erecta vel suberecta, caulis (5–) 10–20 cm altis, ramis glabris vel interdum linea adaxiali puberula ornatis, foliis junioribus interdum pilosis; stipulae pallidae, membranaceae, laciniatae, divisionum apicibus plerumque albidis, filiformibus; foliorum laminae 5–9 mm longae, 2–4 mm latae, oblongae vel lanceolatae vel inferiores ellipticae, basi rotundatae vel subcordatae, parum inaequilaterales, apice abrupte acutae vel obtusae, marginibus dentibus minutis, interdum remotis vel obscuris munitis; cyathia solitaria vel 2–5, terminalia vel bracteata in axillis distalibus, pedunculis usque ad 1 mm longis; involucrem 0.5–1 mm longum, lobis 0.4 mm longis, triangularibus, laciniatis; glandulae minutae, appendicum superficiei interiore erectae exstantes; appendices albae vel roseae, parvi, rotundatae vel obovatae, interdum rudimentales; flores ♂ plerumque 4–5; styli ca 0.5 mm longi, bifidi; capsula glabra, trilobata, 1.5–1.8 mm longa, ca 1.7 mm lata, columella 1.2–1.5 mm longa; semina brunnea (fumosa vel lurida), ovoideo-quadrangularia, 1.1–1.3 mm longa, obscure rugosa vel alveolata, superficiei micro-reticulata, cellulis lucentibus. Species *C. nuttarii* similis, sed partibus pro parte maxima minoribus, seminibus brunnetis non nigricantibus, habitatio salina differt.

Wet saline meadows, salt-flats, and borders of pools, 1350–1500 m in the interior basins of Jalisco, apparently the same species in similar habitats in Michoacán and Guanajuato at 1750–1900 m, collected with flowers and fruit Aug–Oct (once in May).

Jal., Mpio. Villa Corona, wet pasture near Villa Corona (*Dieterle* 3492, MICH, the holotype); Mpio. Zacoalco de Torres (salt flats, road to Acatlán, ca "4.5 mi" from Zacoalco, *Dieterle* 3463, MICH; pastizal salino, La Playita, orilla de la Laguna de San Marcos, *Zamudio & Guevara* 4217, IEB); between Zacoalco and Sayula (*Puga* 2971, IBUG, IEB).

Slender diffusely branched erect annual (5–) 10–20 cm high, forking from near base to apex, glabrous, or some plants in a population with branchlets (or some of them) crisp-pubescent in an adaxial line, and the young leaves sparsely and softly pilose; stipules weakly glandular at base with an intrastipular line of small glands, distinct, or united at least near base into a whitish or pinkish membranous scale

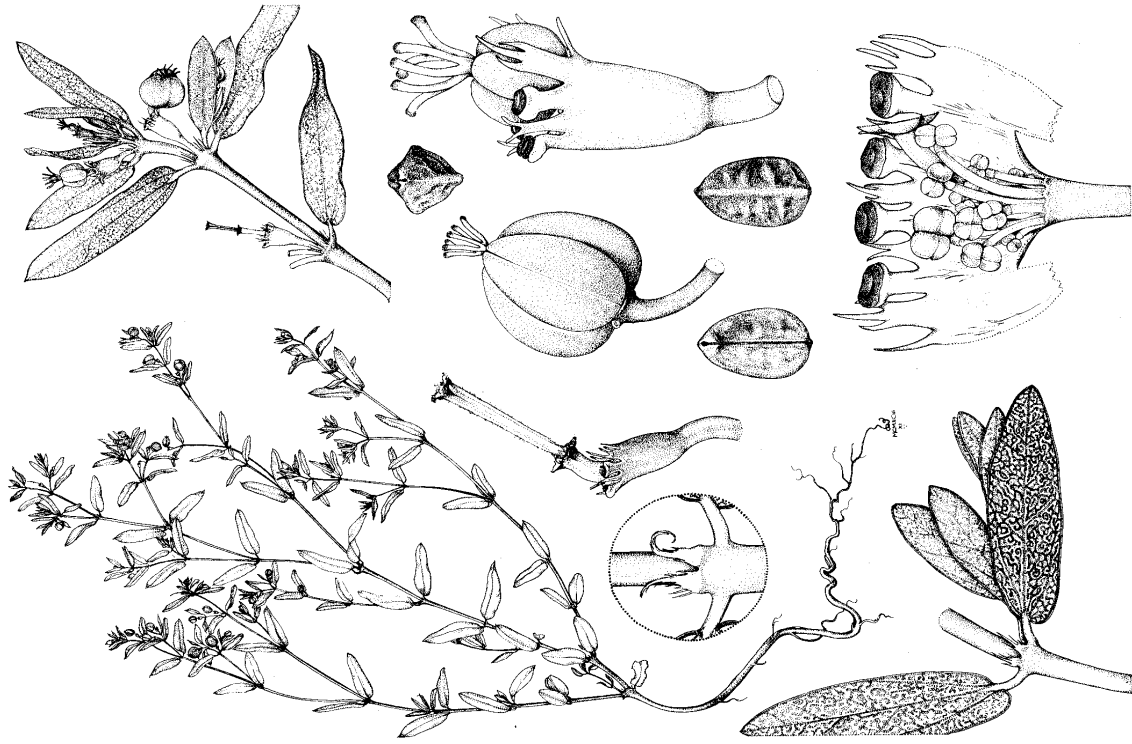


FIG. 1. *Chamaesyce salsuginosa*. Habit, $\times 1$; tip of flowering branch, $\times 5$; capsule node, $\times 10$; node with leaves showing venation, $\times 5$ (all from *Dieterle* 3463); cyathium at anthesis, and the same laid open, both $\times 30$; capsule, and columella after dehiscence of capsule, all $\times 15$ (all from the holotype).

0.5–1 mm long, usually deeply cut or lobed, the divisions with prolonged filiform tips; petioles 0.5–0.7 (–1.2) mm long; blades at major nodes 5–9 mm long, 2–4 mm wide, oblong or lanceolate or at the lower nodes elliptic, at base rounded to subcordate, slightly inaequilateral and manifestly 3-nerved, at apex abruptly pointed or obtuse and finely but sometimes distantly or obscurely crenate-serrulate; leaves of the branches commonly narrower, and successively shorter distally, often entire, narrowly lanceolate to linear; distal internodes short, the bracteal leaves subtending solitary cyathia or small sessile clusters of 1–5 cyathia at the forks and in the axils; peduncles at major forks up to 1 mm long, others shorter; involucre funneliform or campanulate, 0.5–1 mm long exclusive of the glands, often reddish; lobes triangular, ca 0.4 mm long, laciniate-toothed, often about as long as the stipitate gland/appendage; glands transversely elliptic, folded, 0.2 mm long, to rotund, ca 0.1–0.2 mm in diameter, standing erect on the inner surface of the appendage; appendages white or pinkish, rotund or obovate (or sometimes a mere external rudiment), as seen from outside usually ca 0.3–0.5 mm long, surpassing the gland by about the width of the latter; ♂ flowers 4–5 (–?10); styles ca 0.5 mm long, bifid ca one-half to two-thirds their length, not or scarcely capitate; gynophore 1.3–1.5 (–2) mm long, straight or bent, usually not strongly recurved; capsule glabrous, deeply 3-lobed, 1.5–1.8 mm long, ca 1.7 mm wide; columella 1.2–1.5 mm long; seeds light brown to dusky medium brown, ovoid-quadrangular, 1.1–1.3 mm long, truncate or rounded at base, obliquely obtuse at apex, the abaxial faces convex, ca 0.6–0.7 mm wide, the adaxial faces flatter and a little narrower, separated by a prominent adaxial line; all faces dimpled or with obscure transverse ridges, the surface microreticulate with glistening cells.

Like *Chamaesyce feddema* and *C. potosina*, this species appears to be closely akin to the more widespread *C. nutans*, and is separable from *C. nutans* by a suite of characters, none of which is individually completely exclusive. As far as known, *C. salsuginosa* is confined to moist saline soils of marshes and lake-borders; it is usually a much smaller plant than *C. nutans*, with smaller leaves, stipules usually with more prominent hair-tipped divisions and less conspicuous basal glands, slightly smaller flowering and fruiting structures, fewer ♂ flowers, and dusky brown (rather than blackish) seeds.

The color of the seeds of *C. salsuginosa*, once seen, is unmistakable, but it is difficult to describe. It is not a clear brown, not yellowish, not reddish like the color of the seeds of *C. hypericifolia*, but a dusky or smoky brown, sometimes seeming gray, but never black. The very similar seeds of *C. nutans* are almost invariably blackish, and often with a visible pattern of irregular pits, suggesting those of the seeds of *C. potosina* but far less distinct.

Pubescence in *Chamaesyce salsuginosa* appears to be even more variable than in *C. nutans* or in other species with which it may be confused. In the material from the interior basins of Jalisco, most plants are glabrous or essentially so, a seeming minority having the branchlets puberulent along an adaxial line and/or the young leaves sparingly pilose. In an ample series of specimens collected by Dr. J. Rzedowski from the saline borders of Lake Cuitzeo in north-central Michoacán, it seems that plants with glabrous and puberulent branchlets are more evenly distributed, and in two of the collections from Lake Cuitzeo (*Rzedowski 39206* and *40287*) the branchlets are softly pilose as well as unilaterally puberulent. In specimens from similar habitats from east-central Guanajuato, for which I am also indebted to Dr. Rzedowski, both glabrous and puberulent forms occur. I should refer all the following to *C. salsuginosa*:

Gto., 17 km S of Dolores Hidalgo, highway to San Miguel de Allende (*Rzedowski 41077*, puberulent); 9 km E of Yuriria, highway to Salvatierra (*Rzedowski 40955*, glabrous); Mpio. Salvatierra, near Cupareo (*Rzedowski 39812*, mostly glabrous); Mich., vicinity of Lake Cuitzeo (*Rzedowski 39191*, glabrous; *Rzedowski 40272*, glabrous or puberulent). (All specimens at MICH.)

The treatment of the next species was provided by Dr. Michael J. Huft, who some years ago recognized this very distinctive plant as an undescribed species, and has kindly agreed to publish his account here, in advance of the *Flora Novo-Galiciana*.

Chamaesyce trialata Huft, sp. nov., annua prostrata, caulibus supra linea puberula ornatis, cetera glabra; caules dorsiventraliter appianati, subulati; stipulae distinctae, subulatae, inferiores 0.7–1.2 (–1.7) mm longae; petioli 1–1.3 mm longi purpurei; laminae oblique elliptici-oblongae, foliorum majorum (3–) 5–7 mm longae, (1.5–) 3–4 mm latae, apice rotundatae, basi valde inaequilaterales hemicordatae, marginibus grosse serratis dentatis; cyathia solitaria vel in ramis brevissimis lateralibus fasciculata; involucrea campanulata atrorubra, glandulis exceptis 0.5–0.7 mm longa, lobis 5 inconspicuis, glandulis 4 atrorubris, transversim reniformibus ca 0.3–0.5 mm longis, appendicibus suborbicularibus vel ovalibus, integris, rubris, 0.4–0.6 mm latis, quam glandulis longioribus; flores ♂ ca 10; styli tenues, ca 0.5 mm longi, distincti, integri vel apice breviter bifidi; gynophorum quam involucreum longius; capsula exserta, recurvata, leviter trilobata, 1–1.3 mm longa, inter carpellos in quoque sinu ala longitudinali carnosa ad 0.2 mm lata instructa, carpellis tricotatis; columella ca 1 mm longa; semina ferruginea, 0.8–1 mm longa, subtrigona, angulosa, transversim 4–5-sulcata.

Fig. 2.

Known only from two collections at middle or low elevations, probably both in disturbed habitats on calcareous substrata, flowering Sep.

Col., 8 km "E" [i.e., nearly S] of Cd. Colima, disused quarry along route 110 (*Burch 2790*, MO 2238588, the holotype); Gro., Mpio. Ometépec, Los Amates [*R.R. station*] near Iguala (*Pringle 13682*, CAS, F, MICH).

Annual, prostrate, forming a mat up to 20 cm in diameter, the stems purplish, strongly dorsiventrally flattened except near the base, the internodes up to 0.8–1.2 mm wide, their edges strongly wing-angled; plants entirely glabrous except for a sparse or dense strip of puberulence along the upper (adaxial) side of the internodes; stipules distinct, apparently fleshy, subulate, the upper pair mostly 0.5–0.7 mm long, the lower ones 0.7–1.2 (–1.7) mm long; petioles purplish, 1–1.3 mm long; blades obliquely elliptic-oblong, those of major leaves (3–) 5–7 mm long, (1.5–) 3–4 mm wide, 1.6–2 times as long as wide, green and often with a red central blotch, rounded at apex, strongly inaequilateral and hemicordate at base; margins coarsely serrate or dentate, usually with 5–7 prominent sharp or blunt to rounded teeth across the apex and additional teeth along the longer edge; cyathia solitary or in small clusters on congested lateral branches shorter than the leaves; involucre campanulate, dark red, 0.5–0.7 mm long exclusive of the glands, 0.5–0.7 mm wide below the glands, 0.7–1.2 (–1.5) mm across the appendages; lobes 5, dark in color, inconspicuous, triangular-subulate, ca 0.3–0.5 mm long; glands 4, dark red, ca 0.3–0.5 mm long, reniform with a conspicuous transverse (tangential) trough, commonly forming a nearly continuous ring at the margin of the involucre; appendages semicircular to oval, entire, red, 0.4–0.6 mm wide, in length exceeding the width of the gland by (0.2–) 0.3–0.5 mm; ♂ flowers ca 10, the bracteoles very narrow, fimbriate at apex, not plumose; styles slender, ca 0.5 mm long, free to the base, essentially entire and subcapitate or very shortly bifid at the tips; gynophore stout, ca 1 mm long, projecting about half its length from the involucre, strongly

recurved; capsules ovoid, 1–1.3 mm long, 1–1.2 mm wide, somewhat 3-lobed, with a fleshy longitudinal wing up to 0.2 mm wide, at or below the middle in each sinus between carpels, and each carpel longitudinally 3-ribbed; columella ca 1 mm long; seeds pinkish brown, 0.8–1 mm long, quadrate-ovoid (nearly trigonous in cross-section), with prominent keel-like lateral and abaxial angles, acute at apex, subtruncate at base, the abaxial faces subconcave, 0.3 mm wide, the adaxial ones nearly flat, 0.4–0.5 mm wide, separated by a narrow adaxial furrow; all faces transversely 4–5-sulcate, the furrows contracted to a mere line at bottom, the intervening ridges broad and round.

The very short crowded flowering branches appear to be lateral, but the persistent stub of an aborted terminal peduncle, indicating the dichasial nature of the branching, is usually present though somewhat laterally displaced, on the upper side of at least the distal nodes. The seeds are unusual in that the adaxial faces are wider than the abaxial ones, and the 3-ribbed carpels alternating with fleshy wings are unique among our species of *Chamaesyce*.

CNIDOSCOLLUS

The following species was recognized and named about 20 years ago by Dr. Gary J. Breckon, and the name has been used in some regional publications, but has never been validly published. Dr. Breckon has very kindly consented to publish it here, in anticipation of an extended treatment of this and other species in the *Flora Novo-Galiciana*.

Cnidoscolus autlanensis Breckon, sp. nov., arbor decidua 5–6 m alta, ramulorum medulla lamellata; pili stimulosi plerumque sparsi, usque 3–3.5 mm longi, pedunculi petiolique interdum pilis brunneolis stimulosi 1.5–3 mm longis dense ornati; glandula petiolaris non sessilis, lateraliter elevata, instar litterae C; folia (4–) 5-lobata, marginibus integris vel remote dentatis, venis majoribus in superficie abaxiali rufo-strigosis; flores ♂ 12–14 mm longi; stamina 10; filamentis superioribus 10–12 mm longis, inferioribus 4–4.5 mm longis antherisque in tubo pro-funde inclusis; flores ♀ 11.5–13 mm longi, perianthii lobis angustiusculis 2–3 mm latis, post anthesin secedentibus et seorsim deciduis; ovarium ovoideum subglabrum, non stimulosum, apice acuminato 1 mm longo, in fructu stylopodio persistenti rostriforme constanti; capsula ca 12–14 mm longa, rostrata; columella 10–11 mm longa; semina 10–11.5 mm longa, caruncula pallida, plerumque appressa, 1–1.5 mm longa, 1.5–2 mm lata.

Mexico: Jalisco and Colima, seaward-facing slopes, in open oak-dominated forests, mixed broad-leaved forest, or tropical deciduous forest with *Quercus*, *Croton*, *Ptelea*, *Heliocarpus*, (200–) 1200–1600 (–2000) m on the Pacific slope, flowering June–Aug. The type is from Jalisco, oak-dominated slopes facing the Pacific, “10 mi” S of Autlán, *Wilbur 2185*, MICH, the holotype; MEXU, WIS, isotypes), Col.

Jal., region of the type-locality (*McVaugh 14205*; *Wilbur 2154*; *Wilbur 1396*, MEXU, US); Mpio. Autlán, 2–3 km SW of Ahuacapán (*Cuevas & Núñez 3189*, WIS); Mpio. Zapotitlán, 24 km from San Antonio, Col., *brecha* to Las Moras (*Fuentes O. 389*); Col., gorge of Río Cihuatlán, near bridge “13 mi” N of Santiago, 200 m (*McVaugh 15802*, MEXU); Mpio. Comala, 5–6 km NW of Zacualpan, 5–7 km N of Campo Cuatro (*Cuevas & L. Guzmán 3937*, WIS); bluffs of Río Salado, “5 mi” S of Cd. Colima, 400 m (*McVaugh 15510*, MEXU). All specimens at MICH unless otherwise specified.

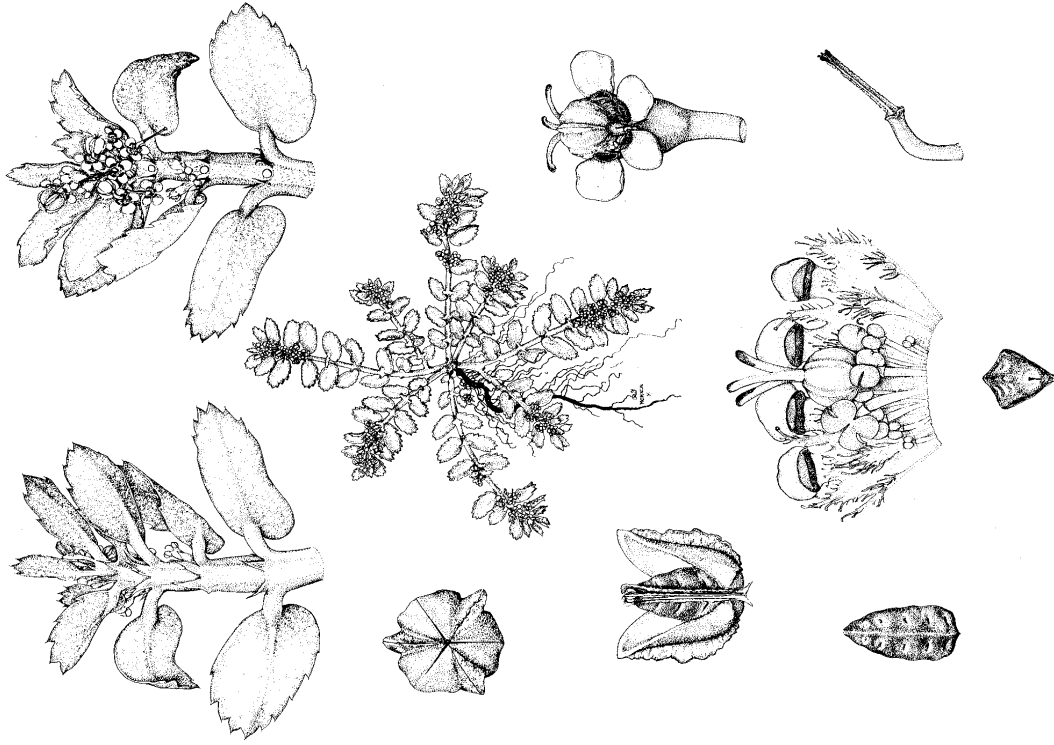


FIG. 2. *Chamaesyce triolata* (all from the holotype). Habit, $\times 1$; tips of flowering branches from below (left) and above, $\times 5$; involucre laid open, $\times 25$; involucre with partly grown capsule extruded, $\times 15$; capsule before dehiscence, basal view, $\times 20$; seed in place in opening capsule, and seed in adaxial and apical views, $\times 20$; columella after dehiscence of capsule, $\times 15$.

Deciduous tree 5–6 m tall, with short trunk up to 6–12 cm in diameter, the older bark brown; branches of the current year 5–10 mm in diameter; pith well-developed, lamellate; herbage thinly pubescent, moderately to scarcely at all stimulus, the stinging hairs mostly short, up to 3.5 mm long on the fruit, or the peduncles and sometimes petioles densely hispid with often brownish stinging hairs 1.5–3 mm long; stipules soon deciduous, 11–13 mm long, 3–5 mm wide, deltoid, few-toothed; petioles up to ca 30 cm long, appressed-tomentose near the apex; petiolar gland a fleshy C-shaped band borne laterally around the edge of a glandular platform, sometimes with additional adaxial orbicular glands; blades thin, (4–) 5-lobed, up to ca 30 cm long and 35 cm wide, the margins entire to remotely dentate, the major veins not strongly excurrent at the tips of the lobes; major veins reddish strigose abaxially; inflorescence a simple dichasium up to more than 30 cm long, forking 2–4 times; bracts 4–7 mm long; bracteoles 1.5–2 mm long, deltoid, greenish; ♂ flowers funnelform, 12–14 mm long, lobed one-fourth to more than one-third their length, the lobes 3–5 mm wide; buds clavate, typically constricted between the anther whorls when dry; stamens 10; upper filaments 10–12 mm long, those of the lower whorl 4–4.5 mm long, their anthers 2.5 mm long, deeply included in the tube and vertically appressed to the staminal column; disk 0.75 mm in diameter; ♀ flowers 11.5–13 mm long, narrowly campanulate, the lobes linear to narrowly obovate, 2–3 mm wide, at first shortly connate at base, separating after anthesis and in age falling separately; ovary ovoid, glabrous except for scattered striae, not stimulous, ca 3 mm long including the acuminate apex 1 mm long, this forming an abrupt beak in fruit; styles 5–6 mm long; capsule ellipsoid, when slightly immature 12–14 mm long, (8–) 11–12 mm in diameter, the apex with a pronounced abrupt beak developed from the stylopodium; columella 10–11 mm long; seeds 10–11.5 mm long, gray to brown, elliptic to obovate in outline, plano-convex with a low abaxial ridge, 5–6.7 mm wide, up to 3.9 mm thick, acute, cordate at base; caruncle dull yellow, smooth, small, often thin and tightly appressed, 1–1.5 mm long, 1.5–2 mm wide.

Species with which *Chidocolus autlanensis* may be confused locally include *C. tepiquensis* (Cost. & Gall.) McVaugh, which has much larger seeds (22–32 mm long), lower anthers 3.6–4.5 mm long, and connate perianth lobes in the ♀ flower. Another species that may be mistaken for *C. autlanensis* is *C. spinosus* Lundell, in which the ♀ sepals do not separate completely after anthesis, the stinging hairs are larger, the foliar veins lack the abaxial reddish hairs that characterize *C. autlanensis*, the petiolar glands are sessile, the seeds are smaller (ca 7.5–10 mm long), and the fruit lacks a stylopodium. In a little-known subspecies of *C. multilobus* (Pax) I. M. Johnston that is reported from western Michoacán, both anther-whorls are exerted, the ovary is yellow-velvety, and the style-base is soon deciduous, not leaving a scar on the ovary.

EUPHORBIA

The following species is included here with the permission of Dr. J. Rzedowski, who kindly loaned his unmounted specimens in order to facilitate the preparation of the drawing (our Fig. 3) that accompanies this account. It is a pleasure to associate with this interesting plant the name of its discoverer, the author of so many important and influential books and articles on Mexican plants.

Euphorbia rzedowskii McVaugh, sp. nov., subg. *Agalomatia* pertinens, annua, tenuis, 20–40 cm alta, diffuse ramosa, subglabra, cymulis involucriisque et ramulis

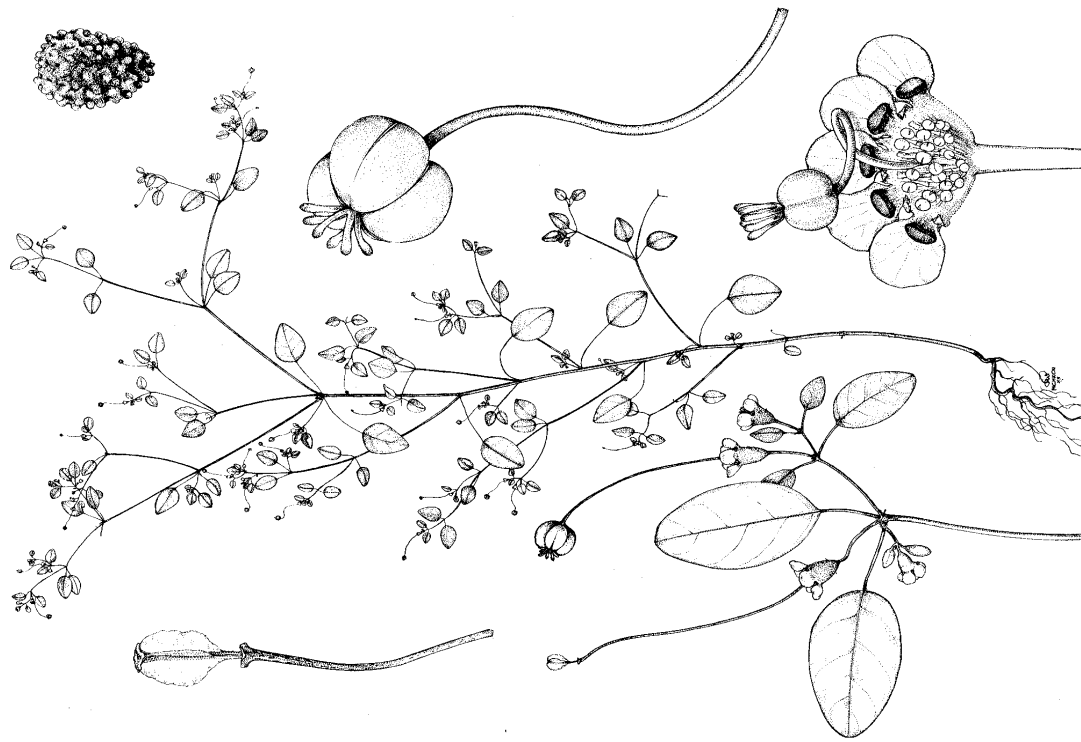


FIG. 3. *Euphorbia rzedowskii* (all from the holotype). Habit, $\times 0.5$; portion of flowering and fruiting tip of a branch, $\times 5$; cyathium, laid open, $\times 15$; including distal portion of gynophore; seed, $\times 20$; columella after fall of capsule, $\times 15$.

junioribus sparse pilis brevibus paucicellularibus instructis; folia alterna, vel prope caulis basin minima, opposita, et sub inflorescentiae ramibus opposita; stipulae non visae; petioli filiformes, foliorum majorum ca 1-2 cm longi; laminae delicatae, ellipticae vel ovatae, apice obtusae vel rotundatae, basi obtusae vel late acutae, integrae, foliorum majorum 0.8-1.8 cm longae, quam petioli plerumque breviores, subtus minute et irregulariter sphaecelati; caules in parte superiore pedunculati sed non dichotomi, cyathis paucis in cymulis laxis apicalibus; pedunculi filiformes, usque ad 3.5 mm longi; bracteae foliaceae, 2-4 (-8) mm longae; involucri campanulata, extus strigosa, glandulis exceptis ca 1 mm longa; lobi inconspicui, triangulares; glandulae 5, transverse elongatae, 0.3-0.6 mm longae, appendicibus ut videtur albis, patentibus, late ovatis vel suborbicularibus, (0.5-) 0.7-1.2 mm longis latisque; flores ♂ ca 10; styli sub anthesi 0.6-0.7 mm longi, erecti vel suberecti, fere ad basin bifidi; gynophorum capillare, post anthesin mox multum elongatum, usque ad 8-10 mm longum; capsula valde trilobata, diametro 1.5-2 mm; columella ca 1 mm longa, apicem versus late triangulari; semina ovoidea, ecarunculata, ca 1 mm longa, foveis crateriformibus profundis satis grandibus conspicue obsitis, fovearum marginibus valde tuberculatis. Fig. 3.

Disturbed tropical deciduous forest on granitic hillsides, known only from the type-locality, Michoacán, 7 km W of La Huacana, on the road to Cuatro Caminos, elevation 500 m, with flowers and fruit 18 Oct 1975 (*Rzedowski 33682*, IEB, the holotype; MICH, isotype; *Rzedowski 33673*, IEB, MICH).

Slender delicate annual from a small taproot, openly branched with few ascending branches 5-15 cm long, forked repeatedly at the tips of the branches, the forks commonly asymmetrical but including the base of an aborted terminal pedicel (such a pedicel may appear at the base of what seems to be a lateral branch, above the middle of the stem); petioles exceptionally slender, but still mostly thicker than the capillary gynophores, blades very thin, most notable for the abaxial surface, this thickly and very irregularly beset with minute roundish or somewhat elongated or angular brown specks; cyathia as many as about 5 associated in loose clusters near the tips of the filiform branches; glands always 5 as far as known, slightly elevated above the surface, transversely furrowed at apex, usually wider (measured tangentially) than high, much surpassed by the white thin rotund appendages; styles pale, apparently whitish, linear, erect or the 6 divisions ascending-spreading from near the base, becoming ca 1 mm long in age; gynophore elongating soon after anthesis, at maturity greatly exceeding the involucre, straight or nearly so, not recurved, up to 8-10 mm long, remarkable for its extreme thinness; capsule probably a little wider than high, with 3 distinct rounded lobes; seeds ca 1 mm long, light gray or pale brown, ovoid, subtruncate at base, pitted over the entire surface with about 10-12 irregular longitudinal rows of more or less isodiametric and very deep crateriform pits, these conspicuously tuberculate on the margins at the angles between pits.

This species somewhat resembles *Euphorbia humayensis* Brandg., especially in the deeply pitted seeds. From *E. humayensis* it is at once distinguished by the lack of general glandularity of the branches, by the differently colored and larger appendages of the glands, and by the extremely long and slender gynophore.

SEBASTIANA

In our euphorbiaceous flora, the genera *Sapium*, *Sebastiania*, and *Stillingia* are separable without much difficulty if good fruiting material is available. The seeds of *Sapium*, with their red fleshy covering, are unmistakable, as are the

enlarged hornlike arms of the gynobase in *Stillingia*. *Sebastiania*, by default, is recognizable by not showing either of the above features. The identification of sterile or flowering material, or of specimens with immature fruit, may be more difficult, as the inflorescence is always a tight spike-like thyrs with one or few (or no) ♀ flowers at the base, and numerous ♂ flowers above, in bracteate flowered fascicles. In *Sebastiania* the stamens and sepals of the ♂ flowers are usually 3, whereas in *Sapium* and *Stillingia* the number is usually 2 of each, but this is not infallible. Some reliable features providing generic identifications are found in the leaves. Our representatives of *Sapium* are almost invariably identifiable by the prominent pair of oblong-cylindric or bluntly conic glands 1-2 mm long, which project laterally from the margins of the petiole just below the decurrent base of the blade. Among our species, most of the leaves and branchlets are opposite in the truly shrubby members of *Stillingia*, but not in *Sebastiania*. As far as I have observed, the paired glands at the base of the ♂ bracts provide the most reliable mean of separation of those two genera. In *Stillingia*, as in *Sapium*, these glands are simple and undivided, flat or patelliform or sometimes convex; in our shrubby species of *Sebastiania* (i.e., all except *S. corniculata*), they are variously parted or faceted, with somewhat fleshy divisions that often shrink and become flattened upon drying and sometimes appear to be sunken beneath the two sides of the bract, then resembling a mosaic of small scales. In the first of the two species described below, they are commonly 5-8-parted, in the second 30- or more-parted.

Sebastiania cornuta McVaugh, sp. nov., arbor vel frutex arborescens, glaber, foliis spiralter dispositis, viridibus, longipetiolatis, laminis juvenilibus arcte involutis; stipulae ovatae, supra basin membranaceae, 1.5-3 mm longae, basi 1.5 mm latae, marginibus fimbriatis; petioli 1.5-2.7 cm longi, involuti (teretes), glandulas geminatas (vel 3-5) annulatas planas vel patelliformes sub apicem adaxiale gerentes; laminae ellipticae vel elliptico-ovatae, 7-10 (-13) cm longae, 3-5 cm latae, planae (non revolutae), valde acuminatae, basi rotundatae vel interdum acutae non decurrentes, plerumque eglandulosae, marginibus pallide cartilagineis ad basin exceptis crenato-dentatis; inflorescentiae terminales spiciformes, floribus ♀ basilartibus 1-3, spicae parte distali multiflora; bracteae ♂ 5-10-florae, spiralter dispositae; glandulae geminatae infra bractearum basin sitae, compositae, ex partibus 5-8 constantes; sepala ♂ 3, incurvata, late ovata, erosa, 1 mm longa; stamina 3, filamentis divergentibus 1 mm longis, pro parte tertia comatis; sepala ♀ imbricata 3, ovato-orbicularia, 2.5 mm longa; ovarium ellipsoideale teres (non trilobatum) 3-3.5 mm longum, 1.4-1.5 mm diametro, distaliter styliorum basi 1 mm diametro; stylus 3-3.5 mm longi, vix connati, dorsiventraliter compressi, cornuti, basi abrupte patentis, 1 mm lati, 0.5 mm crassi, ad apicem curvatum gradatim angustati, marginibus stigmaticis crassis revolutis; capsula submatura late ovoidea, acuta non rostrata, ca 15 mm longa, matura non visa. Fig. 4.

Ravines in dry tropical deciduous forest, 600-1700 m (970 m as known in the northern part of the Santiago basin), mostly in the Sierra Madre Occidental, flowering Apr.-Jul.

S. Son., Chih., Dgo. (Mpio. Otaez, Otaez, frente al Rancho La Lechuguilla, 1270-1700 m, steep slopes in tropical deciduous forest with columnar cacti, *E. Guízar N. 2347*, MEXU, the holotype), n. Nay.

Nay., Mpio. Nayar., 12 km W of Jesús María, road to Mesa del Nayar, not yet in flower Sep 28 (*Flores F. 1520*, DAVI, MEXU); 19 km SW of Jesús María (*Flores F. 2129*).

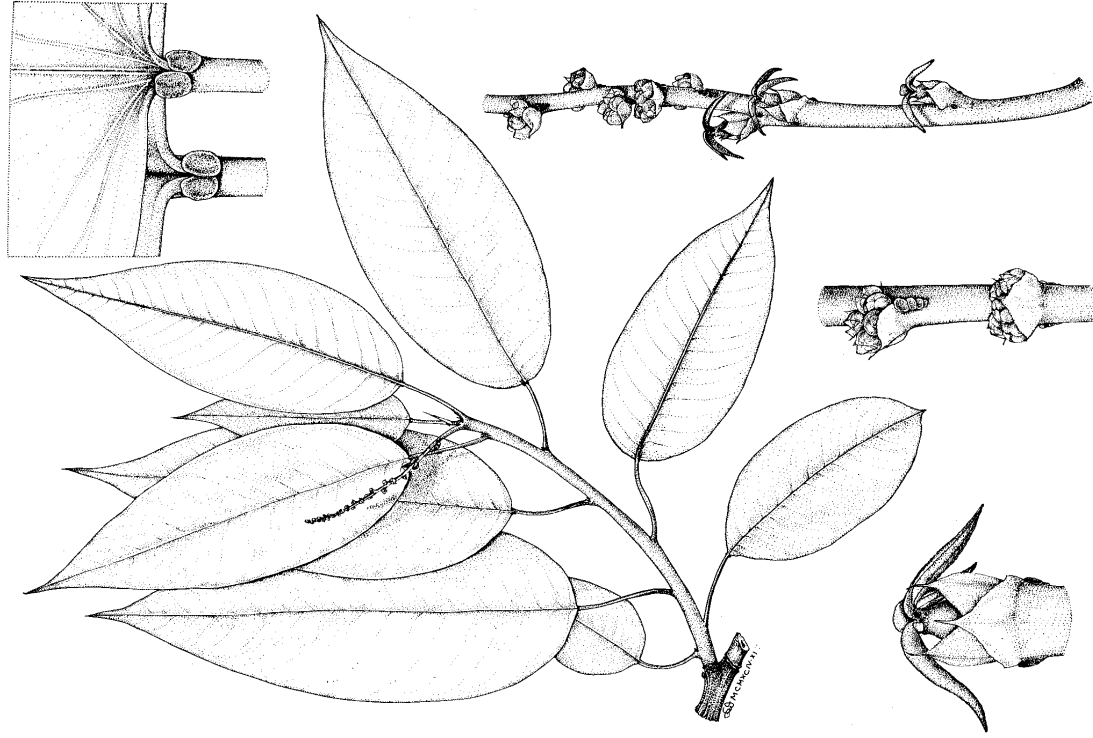


FIG. 4. *Sebastiania cornuta* (all from Flores F. 2129). Flowering branch, $\times 0.5$; two leaf-bases showing paired petiolar glands, $\times 5$; inflorescence, $\times 2.5$; portion of inflorescence, $\times 5$, showing bracts, faceted gland at base of bract, and several δ flowers in each bract; δ flower, $\times 5$, showing bract and comparatively large sepals.

Chih., Mpio. Batopilas, along Río Batopilas between La Junta and La Bufa (Bye 3541, MEXU); between La Bufa and Batopilas (Bye 3959, MEXU).

Tree or tree-like shrub 2–6 m high, glabrous, the young stems thinly pale-scurfy with an evanescent waxlike layer; leaves spirally arranged, in development tightly involute; stipules ovate (sometimes asymmetrical), papery above the thickened base, dark in color, erose-margined, acute, 1.5–3 mm long, 1.5 mm wide at base, the margins delicately membranous and fimbriate; petioles 1.5–2.7 cm long, tightly involute; blades elliptic to elliptic-ovate, 7.5–10 (–13) cm long, 3–5 cm wide, 2–2.5 (–3.3) times as long as wide, strongly acuminate at apex, rounded or occasionally acute at base, not decurrent onto the petiole, the margins pale-cartilaginous, not revolute, shallowly crenate-dentate or -serrulate, with 30–35 teeth along each edge except near the base; foliar glands none, or rarely solitary, patelliform, on the margin near base; petiolar glands mostly 2, adaxial, annular, flat or shallowly patelliform, paired (collateral) and appressed immediately below the junction with the blade, ca 1–1.3 mm long, the two together 1.5–1.7 mm wide, or often 2 pairs (one above the other) or with a third gland on one side, or sometimes united into a single gland; inflorescences terminal, spiciform, up to at least 6.5 cm long, the peduncle below the proximal δ flower ca 5 mm long; δ portion up to ca 6 cm long, very slender, erect, loosely flowered, ca 3.5 mm thick, the 30–35 δ bracts spirally arranged, 1.5–3 mm apart on the axis, ca $\frac{2}{5}$ –10-flowered, membranous, reniform, 2–2.3 mm wide, 0.7–1 mm high, obtuse, or sometimes ovate and cuspidate; glands paired beneath the bracts with a strong decurrent ridge between them, compound with 5–8 facets (units), the whole 0.7–1 mm long, somewhat triangular, widest distally, often with 2 collateral units there, and a single unit wide below; δ flowers on pedicels ca 0.4–0.5 mm long, the sepals 3, broadly ovate, membranous, erose-margined, 1 mm long, alternate with the filaments and incurved between them; stamens 3, the filaments divergent, ca 1 mm long, connivent ca one-third their length; anthers very broad, 0.4–0.5 mm long, 0.6–0.7 mm wide, the thecae plump, divergent from apex toward base; δ bracts like the δ but larger, their glands similar, suborbicular, ca 1 mm wide; δ flowers 1–3, the sepals 3, imbricate, ovate-orbicular, ca 2.5 mm long, 2 mm wide, erose-margined, apiculate, not long-pointed; ovary ellipsoid, terete (not lobed), 3–3.5 mm long, 1.4–1.5 mm in diameter, ca 1 mm in diameter distally at the bases of the styles, these abruptly laterally spreading from the base without any perceptible column, 3–3.5 mm long, cornute, dorsiventrally compressed, ca 1 mm wide and 0.5 mm thick at base, tapering to the slightly upcurved tips, the rough stigmatic margins revolute, brownish; nearly mature fruit broadly ovoid, ca 15 mm long and 13 mm wide at base, tapering to an acute (not prolonged nor beak-like) tip, the tightly outcurved styles subsistent, the capsule seemingly leaf-opposed on a divergent peduncle 3–5 mm long; columella, mature fruit, and seeds not seen.

It seems probable that in this species, as in *Sebastiania lottiae*, the spikes are always terminal, but the capsule in age may appear to be lateral and leaf-opposed if an axillary bud at the base of the δ flower develops into a leafy branch and displaces the δ peduncle laterally after the fall of the δ part of the spike. The leaf of *Sebastiania cornuta*, with non-decurrent blade, and large adaxial petiolar glands, is distinctive, much suggesting the leaf of *Hippomane mancinella*.

The specimen from Nayarit (Flores F. 1520) was once identified with *Sapium appendiculatum* (Muell. Arg.) Pax & Hoffm., but that appears to have been an error. The holotype of *S. appendiculatum* (*Stillingia appendiculata* Muell. Arg.) is in G-DCI, with printed label "Nueva España. Herb. Pavon," and a contemporary

Sessé & Mocifio label with the name "Hippomane glandulosa" in printed and written versions. At G in 1993 I could find nothing like it from Nueva Galicia. In its decurrent leaf-margins and the want of large patelliform paired petiolar glands, it is very unlike *Sebastiania cornuta*.

In the "Pavón" specimen the stipules are triangular-falcate, 1.3 mm long, glandular above the base. The petioles are 0.5–1 cm long; the blades are elliptic to obovate, 3–6 cm long, 1.7–3.5 cm wide, as long as wide or up to ca twice as long as wide, as base rounded to acute and definitely but shortly decurrent on the petiole; the margins are serrulate with ca 50 sharp saw-teeth on each edge, often including 2 thicker gland-teeth as the lowest pair on the decurrent base, and often with 1–3 small blunt gland-teeth scattered along each edge; glands of the δ bracts simple, flat, ca 2 mm long; free style-tips subulate or laterally flattened; style-column as long as the ovary.

Sebastiania lotifolia McVaugh, sp. nov., arbor mediocris, glabra, ramulis hirsutis e bracteis sublineis imbricatis amentaceis oriundis; folia longipetiolata, ambis superficiebus viridibus, plerumque eglandulosis, laminis elliptico-ovatis, apice basique plerumque subaequaliter acuminatis, marginibus (ad basin exceptis, vel in eo loco dentibus obscuris) minute crenato-serrulatis; inflorescentiae terminales coactaneae, parte δ distali, bracteis ca 35 vel ultra, 5–6-floris; glandulae compositae, ex 30–35 partibus vel ultra constantes, sub bracteis basi oppositae sitae; sepala δ 3 (–2) oblonga vel anguste triangularia, usque ad 1 mm longa; stamina 3 (–2), fere distincta; flos δ basi spicae solitariae stylis 3 basi coalitis, sub anthesi haud elongatis, columna post anthesin (6–) 8–9 mm longa, stylosum partibus liberis (5–) 7.5–9 mm long, ascendentibus non valde spiralliter curvatis, basi crassis, ad apicem gradatim angustatis; capsula perlignea, valde rostrata, rostro incluso (8–) 10–14 mm longa, semina 6–6.5 mm longa, (6–) 6.5–7 mm lata; caruncula non visa. *Sebastiania* cf. *hintonii*, sensu Lott (1986, p. 34; 1993, p. 28), not *S. hintonii* Lunell.

Subdeciduous forest with *Ficus*, *Jacaratia*, *Guapira*, *Astronium*, *Coccoloba*, *Esenbeckia*, *Erythroxylum*, *Tabebuia*, or second-growth deciduous forest with *Cordia*, *Ficus*, *Caesalpinia*, 60 mm or less on the Pacific coastal plains, collected once with δ flowers in July, and once with over-ripe capsules in August. In Guerrero flowers May–Jun.

Jal. (Mpio. La Huerta, Estación Biológica Chamela, Arroyo Colorado, *Ayala & Lott 37*, with δ fls 9 Jul, MICH, the holotype), Mich., Gro., Mor., Oax.

Jal., Mpio. La Huerta, Arroyo Chamela (*Magallanes 4407*, with fruit dehiscent, and seed, MICH); Arroyo Colorado, E of Cerro Colorado (*Ayala 89*, young fr July, MEXU, MICH; *Lott 1766*, MEXU, MICH; *Magallanes 4383*, reported by Lott, 1993, not seen); Mpio. Chihuahán, "5 mi" N of Bahía de Navidad (*McVaugh 20870*, MICH, sterile Nov., fr on ground presumably from the same tree). Emily Lott informs me that all the collections made by her and her associates at Chamela were taken from a single tree, the only one known.

Mich., Arroyo del Chivo ["Chibo"], sterile 30 Nov (R. D. Bratz *M675A*, MEXU); Gro., [Puentec] Mexcala, 600 m, fl [photo] 6 Jun, imm fr 15 Jun (*Halbinger 281*, MEXU; imm fr 29 Jun, *Halbinger 281*, MEXU); Xochipala, old fr 4 Oct (*Halbinger s.n.*, MEXU); Mor., Cañón Lobo, 1500 m, young fl 7 Jun (*Halbinger 135*, MEXU); Oax., Mpio. San Juan Lajarcia, Distr. Yautepac, 8.8 km NW of La Reforma, road from Tehuantepec to Oaxaca, 570 m, imm fr 3 Jul (R. Torres C. 9836, MEXU).

Glabrous tree 5–12 m high and with trunk up to 30 cm in diameter; bark gray, when cut yellowish-pink (?) (*mamey-rosado*); latex yellowish-white, copious; branchlets often arising from the tips of ament-like clusters 5–15 mm long and 3–5 mm thick, these formed of broad rigid 3–5-ranked and long-persistent subwoody bracts, up to ca 15 in a rank; branchlets in drying shrinking, becoming fluted, reddish, with rather large scattered lenticels; stipules subsistent, deltoid, thickish at base, 1–1.5 mm long and about as wide, with fragile scarious tip and broad whitish margins; petioles of major leaves 1–2 cm long, neatly channeled adaxially; petiolar glands wanting; foliar glands wanting or commonly 1–3 near the base of the blade on one or both sides of the petiole, saucer-shaped, round and 0.5–1.3 mm in diameter or elliptic, up to 2 mm long in the larger dimension, all sitting astride the edge of the blade and facing outward; blades of major leaves elliptic-ovate, 5–9 cm long, ca 1.5–3.5 cm wide, ca 2–2.7 (rarely 4) times as long as wide, with narrowly acuminate to caudate tip up to 1 (–2) cm long; base rounded, then acutely narrowed and prolonged, decurrent onto the petiole; margins finely but evidently crenate-serrulate except at the very base, the teeth with minute deciduous gland-tips; inflorescences produced with the developing leaves, terminal on young short branches, but mostly soon displaced laterally by growth of an axillary branch at their base and the solitary sessile δ flower (after the abscission of the δ axis and flowers) appearing pedunculate and leaf-opposed; δ flowers solitary (or 2), basal, the δ portion of the inflorescence distal, 2 (–?4) cm long, with up to 35 or more crowded spirally arranged 5–6-flowered bracts; bracts whitish, membranous, subclasp, ca 1–1.5 mm wide and 0.7–1 mm long, the margins undulate or erose-dentate, or prolonged centrally with a short median cusp; glands paired beneath the base of the bract (at its proximal edge) with a decurrent ridge between them, multi-faceted, in all up to ca 1 mm long and 0.7–1 mm wide, consisting of 30 or more quadrate or oblong units in ca 10 longitudinal rows of 4–5 each; δ flowers crowded, the abaxial and lateral ones sometimes with reduced numbers of sepals and stamens; calyx deeply 3 (–2)-cleft, the lobes oblong or narrowly triangular, up to 1 mm long; stamens 3 (–2), nearly sessile in bud, the anthers (then fully developed) plump, ca 0.7 mm long and about as wide, the two locules divergent from the apex downward; δ flower(s) sessile at anthesis, the subtending bract and glands like those of the δ flowers but the bract larger, clasping-triangular, at least 2 mm long including the central cusp; 2 smaller, lateral bracts (?bractlets) quadrate, less than 1 mm long and wide with a small glandular platelet on the side next to the axis, flanking the base of the calyx; sepals 3, imbricate, enclosing the ovary, membranous or fleshy at base, ovate, acuminate, cuspidate, ca 2 mm long, 1.5 mm wide; ovary at anthesis 3-lobed, narrowed distally to a short isthmus, the thick base of the united styles; free parts of the styles somewhat spirally outcurved, fleshy, terete with an abaxial groove, gradually tapering to an acute tip, ca 2.5 mm long, 0.5 mm in diameter; δ flowers after anthesis, with enlarging ovary, seeming solitary and leaf-opposed on apparent peduncles 4.5–7 mm long, 0.7–1.3 mm thick; style thick, gradually dilated toward base, the column (6–) 8–9 mm long, the 3 branches entire, (5–) 7.5–9 mm long, thick at base, subulate, appressed-ascending (not strongly recurved), abaxially grooved, adaxially thickened and apparently fleshy, papillose-roughened; capsule very woody, dehiscent loculicidally and septically, long-beaked, (8–) 10–14 mm long including the beak; columella not seen entire, the tip greatly and abruptly dilated, with 3 short thick spreading to recurved radiating horns ca 1.7–2 mm long, alternating with 3 oblong spreading structures 3 mm long, which apparently terminate the wings of the

columella; seed (the color not known) smooth (at least without ornamentation), rounded on all sides but slightly compressed and evidently wider than long, 6–6.5 mm long, (6–) 6.5–7 mm wide, ca 5 mm thick, with two broad flat oblique apical/adaxial facets; caruncle not seen.

The above descriptions of both ♂ and ♀ flowers and inflorescences at the time of anthesis were taken from *Halbinger 135*, a specimen from Morelos. All the material cited above, including these flowering branches as well as fruiting or sterile specimens from Jalisco and elsewhere, is so much alike in all other characters that it surely all represents the same species-complex. It is possible that additional collections of good flowering and fruiting material will show that there are infraspecific taxa or even more than one species in the complex, but for the present I have no hesitation in treating our plant as conspecific with the others.

The long style-column and the many-faceted glands of the ♂ bracts are unlike those of any other species of *Sebastiania* in our flora. The resemblance between this plant and *Sebastiania hintonii*, with which it has been identified in the past, is in fact not very close except that the major leaves are about the same size, both long-petiolate, similarly dentate, and both with long-acuminate tips. The blades in *S. hintonii*, even after drying, are usually markedly glaucous beneath, not noticeably decurrent at base, with stipules elongate, thin and scarious and deciduous almost before they expand, and the foliar glands, if any, flat or short-cylindric. In *S. hintonii* the glands of the ♂ bracts have fewer and more prominently displayed facets, the styles are little more than 2 mm long, never with a prolonged column, divided half their length and with branches strongly recurved. The seeds are elongate, evidently longer than wide, with a flat conspicuous caruncle.

STILLINGIA

The following key includes all the species of *Stillingia* known to me from Nueva Galicia.

1. Aerial stems mostly annual, herbaceous or subherbaceous, arising from an enlarged woody base, usually without lenticels; leaves and branches mostly alternate, sometimes subopposite or verticillate in the inflorescence; seeds 5.5–8 mm long including the caruncle.
 2. ♂ bracts 1-flowered; seeds 5.5–6 mm long; horns (lobes) of the gynobase 3–4.5 mm long, not upcurved-falcate but laterally spreading; free portions of styles 4.5–5 mm long; known only from Cerro Grande, SW of La Piedad.

S. pietatis.
 2. ♂ bracts 3–5-flowered; seeds 7–8 mm long; horns (lobes) of the gynobase (3–) to 9 mm long, falcately upcurved; free portions of styles ca 2.5 mm long; uplands, widespread.

S. zelayensis.
1. Plants shrubby, with slender perennial woody mostly opposite branches, often with some or many conspicuous lenticels, and opposite leaves; seeds 4–5 mm long including the caruncle.
 3. Petioles (3–) 6–9 mm long; blades 3–4.5 (–7.5) cm long, lanceolate with narrowly prolonged and subacuminate tips; large glands at junction of blade and petiole usually present, 0.5–1.3 mm long, 0.5–0.8 mm wide.

S. querceticola.
 3. Petioles 0.5–1 (–1.5) mm long; blades (0.8–) 1.5–2.5 (–3.5) cm long, very narrowly elliptic or lanceolate, blunt or short-acute at apex; glands near base of blade usually wanting, if rarely present 0.1–0.3 mm wide.

S. sanguinolenta.

Stillingia pietatis McVaugh, sp. nov. *S. zelayensis* ut videtur similis suffruticosa sed cymulis ♂ unifloris, calyce ♂ infundibuliformi compresso margine integro, partibus stylosum liberis 4.5–5 mm longis, foliis late ovatis valde acuminatis, petiolis brevioribus latioribusque, gynobasi sub columellam encrassata convexa, lobis non falcatis, lateraliter patentibus, differt.

Fig. 5.

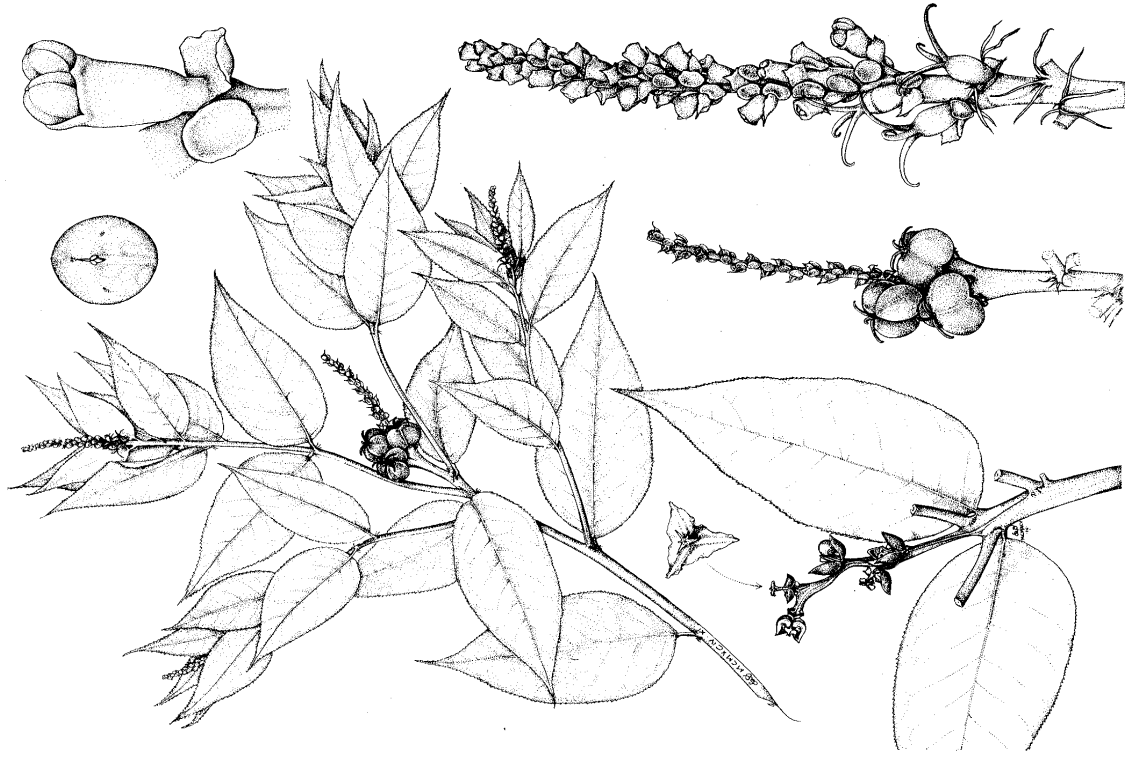


FIG. 5. *Stillingia pietatis* (all from an isotype, MICH). Flowering branch with young capsules, $\times 0.5$; seed, $\times 5$; bract in ♂ part of inflorescence, $\times 7.5$, turned back in early anthesis showing solitary stipitate flower with 2 anthers extruded from the calyx; inflorescence at anthesis (lower right), $\times 2.5$, with most ♂ flowers still in bud; inflorescence with nearly mature capsules and filiform persistent styles, $\times 1$, the distal part of the ♂ spike missing; ♀ portion of spike after dehiscence of capsules, $\times 0.5$; apical view of gynobase from terminal node of ♀ spike, $\times 1.5$.

Dry open oak forests, rocky summits, 2400–2500 m, collected with flowers May–Aug, with mature fruit Aug–Nov.

Known from a single locality in Michoacán, where abundant: Mpio. Yurécuaro or La Piedad, near summit of Cerro Grande de Cujarato, SW of La Piedad (*Zamudio 9352*, with R. González T. and E. Pérez, with fls and fr, IEB); the holotype; MICH; isotype; *Labat 1590*; tips of branches with δ spikes, IEB, MEXU; *Cházaro 5158*, tip of branch with fruit, IEB, MEXU; *Rzedowski & McVaugh 513*, fruiting branch with full-sized leaves, ENCB, MICH).

Described as a shrub up to 1 m high, or an herb 1–1.3 m high, with white latex, branching at least near the tips of the stems, the basal parts unknown; leafy stems green or reddish, smooth, subherbaceous, with no trace of lenticels; leaves alternate, or opposite at some distal nodes; stipules membranous, subulate-attenuate, commonly 2–3 (4–5) mm long and 0.3–0.5 mm wide at base, often bisected or trisected with 2 or 3 unequal segments, the whole up to 1 mm wide at base; petioles 1–4 mm long, stout, thin-edged and 1–2 mm wide; blades dark green adaxially, paler abaxially, ovate (narrowly so on some younger branches), those of cauline leaves 5–13 cm long, 2.5–6 cm wide, 1.6–2.2 times as long as wide (or up to 2.7 times on some leaves near tips of branches), prominently long-acuminate and sometimes falcate at apex, broadly rounded at base and there decurrent on the petiole; margins finely (but conspicuously) and closely antrorsely serrulate with ca (7–) 10–15 teeth per cm, the teeth mostly broad-based and with blunt swollen tip, often incurved, sometimes with a small sessile deciduous glandular body on the distal side of the tooth near the tip; cupuliform marginal laminar or petiolar glands none; inflorescences up to 5–8 cm long, thickened proximally (up to 4 mm thick in fruit), sessile or the peduncle 1–2 cm long; δ flowers 1–4 at intervals of 5–12 mm along the axis; δ portion of the spike 1.5–4 cm long, the cymes crowded or up to 1–2 mm apart, spirally arranged, 1-flowered; glands of the bracts fleshy, rotund or somewhat elongated, often 1–1.5 mm in diameter, flat or patelliform; bracts pinkish or whitish, somewhat enfolding the flower and pedicel, ovate, 1.5–2 mm long and wide, apiculate, with erose margins; flowers on thick articulate pedicels 0.5–1 mm long; calyx short-stipitate, above the stipe funnelliform, strongly compressed, 2 mm long, somewhat 2-lobed, open but the lobes infolded, the whole ca 2.8 mm wide at the margin, with 1 stamen curved out and exerted from each corner of the calyx; filaments ca 3 mm long, the anthers 1 mm long, wider than long, the two locules divergent from the apex downward; δ flowers apparently naked, the ovary broadly ovoid, tapering to an acute apex, the styles 4.5–5 mm long, filiform, very slightly united at base, straight or gradually recurved; fruits solitary, sessile, subtended by flat rounded glands ca 1.5–1.8 mm in diameter; capsule not seen intact, rotund, 3-lobed, somewhat pointed at apex, ca 1 cm in diameter; columella 5.5–8.5 mm long (measured from the base of the gynobase), sharply 3-angled, ca 1–1.5 mm thick at the midpoint, thence abruptly expanded toward both ends, 4–5 mm wide at the apex, where 3 flat winglike angles alternate with 3 peglike projections (?remains of the funicles); gynobase thickened distally, becoming convex below the base of the columella, its lobes 3–4.5 mm long, up to 4 high at base, and 2 mm thick, not upcurved-falcate, but laterally spreading with short upcurved points, the points of adjacent lobes 8–8.5 mm apart; seeds ellipsoid-ovoid or commonly subglobose with well-marked adaxial line, oblique at apex, gray or brown, 5.5–6 mm long, ca 5–5.5 mm wide, 4.5 mm thick, smooth or the outer layers seemingly wrinkled as if shrunken in drying; aruncle inconspicuous, whitish, with 2 adaxially oriented nearly parallel lobes 0.5 mm long.

All the known material of this species was originally identified with *Stillingia zelayensis*, which it much resembles in habit and size and in its subherbaceous growth and probably annual aerial stems. The leaf-blades, however, are sufficiently broadly ovate and short-petiolate to look out of place in *S. zelayensis*, the marginal teeth of the blades are differently shaped, often with thicker tips and wider bases, and as far as I have observed there are no cupuliform glands at the leaf-bases, as there often are in *S. zelayensis*. There are subjective but clearly real differences between the gynobases of the two taxa, and the caruncle of the seed is much smaller and flatter in *S. pietatis*. In spite of these and other small differences between the two entities, they seem almost too close to be called distinct species, except for the difference in the number of δ flowers in a cymule, which according to the system advocated by Rogers (1951) puts them in different subgenera of *Stillingia*! The Mexican species of the group with a single stamen are referred to subgenus *Gymnostillingia*, series *Treculianae*. If one includes *S. pietatis*, there are three rather dissimilar species in series *Treculianae*, one in southern California, one in Texas and the northeastern border states of Mexico, and one in western Michoacán.

Cerro Grande, the type-locality of *Stillingia pietatis*, is an isolated volcanic cone rising conspicuously above the valley of the Río Lerma. It supports a dry oak forest with a seemingly limited flora, but among the abundant plants is a white-flowered species of *Ceanothus* (*C. buxifolius* Humb. & Bonpl. ex J. A. Schult.), which in Nueva Galicia is rare except in similarly isolated dry mountains. Another apparently endemic species, the composite *Verbesina pietatis* McVaugh, was described from the same mountain (Contr. Univ. Michigan Herb. 15: 191, fig. 1, 1982).

Stillingia querceticola McVaugh, sp. nov., Ser. *Oppositifoliarum*, frutex ramosis ad 1.5–2 m altus, foliis ramisque superioribus oppositis vel suboppositis; foliis (in eodem ramo infimis exceptis) lanceolatis apice anguste prolongatis subacuminatisque, 3–4.5 (–7.5) cm longis, 0.8–1.4 (–1.8) cm latis, plerumque 3–4 (–5)-plongioribus quam latioribus, petiolis gracilibus (3–) 6–9 mm longis; margines minute serrulatae, dentibus pro cm 12–16, valde ascendentibus vel appressis, apicibus subulatis saepe glandiferis 0.2–0.5 mm longis; dentes marginales interdum in glandulas patelliformes 0.1–0.5 mm latae transientes; glandulae duae patelliformes 0.5–1.3 mm longae, 0.5–0.8 mm latae prominentes laminae basi; spica terminalis crassipedunculata ad 5 cm longa, floribus basalibus δ 2–5, parte δ multiflora plusminusve interrupta, bracteis ca 15–25, ca 10-floris; bractearum glandulae cyathiformes, 0.5–1.5 mm latae, ad 1–1.5 mm profundae; flores δ 1.5 mm longi campanulati sepals 3; stamina 2, filamentis 1.5 mm longis divergentibus; sepala δ suborbicularia 1 mm longa; styli basi in columnam 1.2 mm longam, 0.7 mm diametro connati, supra columnam valde recurvati 3–4 mm longi; capsula ut videtur ca 10 mm diametro, 8 mm alta; gynobasis lobi 3–3.8 mm longi; semina grisea vel nigricantia, 4–4.5 mm longa (aruncula carnosula inclusa).

Hillsides in oak forest, in region of deciduous forest, ca 800 m, collected in flower 6 Aug, in fruit 12 Sep.

Known only from north-central Nayarit in the basin of Río San Pedro (Mpio. Acaponeta, road to San Blasito, 2–3 km from the Mesa de Pedro y Pablo, old fruit, *Téllez 12080*, MICH, the holotype; DAV, MEXU, isotypes; *vereda* to San Blasito, 1–2 km SE of Mesa de Pedro y Pablo, fl, *Téllez 10689*, MEXU).

Woody shrub 1.5–2 m high, with latex, well-branched, the upper branches and leaves opposite; branches of the second year 4 mm thick or more, with thin gray-brown roughish and sparingly lenticellate bark; branchlets copiously leafy, the internodes 1–2.5 cm long; stipules ca 0.6 mm long, triangular, the tips soon darkening and deciduous, the persistent bases yellow-brown, 0.5 mm wide; petioles (3–6) 9 mm long, 0.4–0.7 mm thick, deeply sulcate adaxially, abaxially seeming to be prolonged under the blade and prominent its whole length, diminishing very gradually to the apex; foliar glands conspicuous, patelliform, 0.5–1.3 mm long and 0.5–0.8 mm wide, usually one on each margin, sitting astride at or just below the junction of the petiole with the base of the blade; blades chartaceous or coriaceous, all except those at the lower nodes of branches lanceolate with narrowly prolonged and subacuminate tips, acute or slightly rounded at base and there decurrent on the adaxial margins of the petiole, almost all opposite or subopposite on branches of the first year, 3–4.5 (–7.5) cm long, 0.8–1.4 (–1.8) cm wide, 3–4 (–5) times as long as wide; lowest leaves on branches elliptic to obovate, obtuse to rounded or emarginate at apex, acute to truncate at base, 1–3 cm long, 0.5–1.5 cm wide; blades apparently green on both surfaces, not much paler abaxially; small veins evident on both surfaces, on the adaxial surface subimpressed, concolorous, the primary lateral veins inconspicuous in dried leaves; margins slightly revolute, finely antrorsely serrulate with 12–16 teeth per cm, the teeth strongly ascending to appressed, 0.5 mm high or less, with subulate and often gland-tipped points 0.2–0.5 mm long, 1 (or few) of the teeth on each edge sometimes transformed into patelliform glands 0.1–0.5 mm wide; inflorescences terminal, on swollen peduncles 10–17 mm long, the distal portion ♂, yellow, 2–3 cm long, somewhat interrupted toward base, the proximal portion bearing 2–5 ♀ flowers along an axis up to 3–5 cm long, the axis between and below the flowers up to 5 mm wide, 1.5 mm thick (branchlets below the swollen portion 1.2–1.6 mm thick); ♂ bracts ca 1.5–2.5, scarious, ca 10-flowered; glands lateral, paired, deeply cup-shaped, 0.5–1.5 mm wide, up to 1–1.5 mm deep; ♂ flowers nearly sessile, ca 1.5 mm long, the calyx campanulate, the sepals imbricate in bud with free tips, splitting irregularly into ca 3 members; stamens 2, the filaments ca 1.5 mm long, divergent, the anthers ca 0.6 mm long, the two locules plump, divergent from the apex downward; ♀ flowers sessile, the sepals thin, scarious, suborbicular, ca 1 mm long and wide; ovary subglobose, narrowing into the thick style-column 1.2 mm long, 0.7 mm thick, the free parts of the styles strongly outcurved, 3–4 mm long, rough adaxially; capsule (not seen mature in place) estimated to have been ca 10 mm in diameter and 8 mm high, with woody endocarp, septical and tardily loculicidal, the fallen carpels with a flat broad scar at base showing the broken margins of the exocarp, the scar ca 6 mm wide; outer surface slightly roughened when dry; gynobase sessile, 3-horned, 5–7 mm wide between the tips of adjacent lobes, 2.5–3 mm high, the lobes 3–3.8 mm long, ca 1–1.5 mm thick near base, gradually upcurved to a somewhat more abruptly upturned hard conical tip ca 1 mm long; margins between the horns nearly horizontal with a short central obtuse lobe; columella (not seen complete) thin-winged at base, ca 5 mm long, 3-angled, the terminal portion apparently abruptly expanded and ca 4 mm wide; seeds smooth, dark steel gray to almost black with dull surface, short-ellipsoid, somewhat compressed, 4–4.5 mm long including the caruncle, 3.5–4 mm wide, 3 mm thick, abaxially rounded, weakly rounded adaxially with a strong central line, oblique and flattened toward the apex above the hilum, the caruncle whitish or yellowish, fungoid, depressed-pyramidal, up to ca 1 mm high and 2 mm wide.

This plant was originally identified as *Stillingia zelayensis*, but its affinities are surely with the opposite-leaved shrubs in the genus, including in our flora only *S. sanguinolenta*.

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