

**NEW AND RECONSIDERED
MEXICAN UMBELLIFERAE**

by

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and

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In the three decades since we attempted to summarize the Family Umbelliferae as represented in North America (Mathias & Constance, 1944–45), a great deal of material and information has accumulated, much of which pertains to Mexico. We have tried to be conservative in offering new proposals; nevertheless, one new genus and nearly a dozen new species have been described, most of them by one or both of us. Since we have not ourselves undertaken serious field work in Mexico, we are particularly grateful for the generous efforts of staff members and students from other institutions as well as our own who have provided us with a steady flow of specimens, seed, and buds. We should like to mention particularly John H. Beaman, C. Ritchie Bell, Dennis E. Breedlove, Robert W. Cruden, James A. Duke, Theodore F. Niehaus, George Pilz, Peter H. Raven, Harbert Rice, John L. Strother, Stephen G. Weller, and the late Elwood Molseed. A number of problems have been clarified by large collections made by Dr. Jerzy Rzedowski and his pupils at the Instituto Politécnico Nacional in Mexico City and by Dr. Rogers McVaugh and the large group of Ann Arbor students who have participated actively in Mexican botanical exploration at some time in their careers. We are glad to have the opportunity to record here some of our new information, as it relates to the genera *Donnellsmithia*, *Tauschia*, *Arracacia*, *Coaxana*, *Prionosciadium*, *Rhodosciadium*, and *Eryngium*.

We are grateful to the curators of the following herbaria for the opportunity to examine material: B, CAS/DS, G, ENCB, K, MICH, NCU, NY, P, UC, US, W. We wish also to express appreciation for the support of the National Science Foundation, GB 1293 and 13,393, and GB 525 and 6741, respectively.

***Donnellsmithia pinnatisecta* (Riley) Math. & Const., comb. nov.**

Musenlopsis biennis var. *pinnatisecta* Riley, Kew Bull. 1924: 222. 1924.

Stout to slender biennial or perennial from a slender or swollen taproot, 5.5–10 dm high, the foliage and often also nodes scaberulous; leaves orbicular to ovate-deltoid, 7–15 cm in diameter, 1–2-ternate, ternate-pinnate or bipinnate, the leaflets broad, ovate, 3.5–8 cm long, 1–5 cm broad, acute or acuminate at apex, cuneate to truncate at base, coarsely serrate to lobed toward base, scaberulous on veins, margins, and rachises, or glabrate; petioles 5–20 cm long, sheathing at base, the sheaths scarious-winged; cauline leaves reduced upwards with narrow, elongate, saliently lobed divisions, the uppermost opposite or alternate, ternate or entire, the scarious sheaths conspicuous; inflorescence dichotomously branched, the umbels pedunculate to sessile; involucre wanting; rays 2–9, filiform, unequal, 10–40 mm long; involucre of a single bractlet or wanting; fertile pedicels 1–4, filiform, 2–8 mm long, longer than sterile pedicels; flowers yellow; stylopodium low, scarcely evident; fruit broadly ovoid, 2 mm long, 2.5 mm broad, cordate at base, rounded but narrowed toward apex, glabrous, the ribs filiform, obscure; vittae several in intervals and on commissure; seed face sulcate.

TYPE: Sierra Madre, N. W. Mexico, *Seemann 2134* (K, type; UC, photo).

DISTRIBUTION: Pine, fir, or oak woods at 1050–2800 m altitude, Sinaloa to Guerrero.

Other collections examined:

SINALOA: Ocurahui, Sierra Surotato, 1–10 Sep 1941, *H. S. Gentry 6281* (UC).

NAYARIT: Mountains 10 mi N of Compostela, 27 Aug 1957, *McVaugh 16,470* (MICH, UC); road to lake, Santa María del Oro, 13 Oct 1963, *Schubert & Sousa 2077* (UC).

JALISCO: Sierra de Cuale, SW of Talpa de Allende, 19–21 Nov 1952, *McVaugh 14,310* (MICH, UC).

GUERRERO: Carrizal, 9 km W of Camotla, Mpio. Chichihualco, 1 Dec 1963, *J. Rzedowski* 18,047 (ENCB, MICH); 1 mi W of Omiltemi, 14 Jun 1953, *D. R. Richards* 3282 (MICH); Omiltemi, 20 km W of Chilpancingo, 1 Sep 1962, *Rzedowski* 15,954 (ENCB, UC); Toro Muerto, Mina, 29 May 1939, *Hinton et al.* 14,324 (UC); E & N slopes of Cerro Alquitrán, 12–16 km by road W of route 95, W of Mazatlán, 29 Jul 1968, *W. R. & C. Anderson* 4967 (MICH).

This taxon was based on a collection reported as *Velaea tolucensis?* in the Botany of the Herald Expedition (Seemann, 1852–57, p. 294) and as *Arracacia* sp. by Hemsley (1879–80, p. 564), although the latter subsequently indicated to Coulter and Rose that it belonged with *Pringle* 4620. This Pringle collection, from the hills of Pátzcuaro, Michoacán, was referred by Coulter and Rose in 1895 to *Museniopsis aegopodioides*, but in 1900 it became the type of their *M. biennis*, that is, *Donnellsmithia biennis* (Coulter & Rose) Math. & Const. Constance noted at Kew in 1963, "Probably an undescribed species of *Donnellsmithia*, nearest to *D. hintonii* and *D. biennis*, especially the latter."

Despite the recent collections, we cannot yet be entirely certain that all the material cited actually belongs to a single taxon or that, if it does, it is necessarily conspecific with the Seemann collection. The Guerrero material has an apparently perennial root, more scaberulous foliage, and a less diffusely branched inflorescence than more northerly material. The leaves of the Seemann collection are more dissected than those of any other specimens we have seen. In both cases, however, the similarities appear to outweigh the differences and to lend support to the taxonomic disposition proposed here. With its long fertile pedicels, several vittae, indistinct stylopodium and fruit ribs, *D. pinnatisecta* suggests *D. mexicana* and *D. hintonii*, but its much greater stature and very broad radicle leaves and leaflets give it quite a different appearance.

***Donnellsmithia ampulliformis* Math. & Const., sp. nov. FIG. 1**

Plantae perennes caulescentes alternatim ramosae 3–5 dm altae e radice magna crassa, foliis inflorescentiisque hirsutulis minute scaberulisque; folia oblongo-ovalia 3–7(–10) cm longa 2.5–5(–10) cm lata pinnata, foliolis 3–7 late ovatis orbiculatisve subsessilibus obtusis dentatis hirsutulis; petioli 3–10 cm longi anguste vaginantes; folia caulina alterna; pedunculi 2–8 cm longi alterni; involucrum nullum; involucelli bracteolae 4–6 lineares 1–2 mm longae; radii 4–7 subaequales 1–2 cm longi; pedicelli fertiles 1–3 ca 2 mm longi; flores atropurpurei; stylopodium manifestum breve, stylis ca 2 mm longis; carpophorum usque ad basim bifidum; fructus ovoideo-orbiculatus diametro 3 mm ad apicem versus attenuatus minute scaberulus, costis filiformibus; vittae commissurarum et eae in intervallis paucae; seminis superficies concava.

Slender perennials from a massive taproot, 3–5 dm high, the stem alternately branched, moderately leafy, the stems and foliage hirsutulous, the rays scaberulous; leaves oblong-oval, 3–7(–10) cm long, 2.5–5(–10) cm broad, simply pinnate with 3–7 broadly ovate to orbicular, subsessile, obtuse, dentate leaflets (or the terminal or basal occasionally 3-lobed or 3-foliolate), hirsutulous beneath at least on veins, rachis, and upper petiole; petiole 3–10 cm long, narrowly scarious-sheathing; cauline leaves alternate, reduced upward; peduncles alternate, 2–8 cm long (rarely some obsolete and umbels sessile); involucre wanting, or rarely of a leaflike bract; rays 4–7, subequal, 1–2 cm long; involucel of 4–6 linear bractlets 1–2 mm long; fertile pedicels 1–3, ca 2 mm long; flowers dark purplish-red; stylopodium low conic, evident; styles ca 1 mm long; carpophore 2-cleft to base; fruit ovoid-orbicular, 3 mm long, 3 mm broad at base, narrowed to 1.5 mm and truncate at apex, minutely scaberulous, the ribs low, filiform, a V-shaped depression separating mericarps at apex; vittae small, several in intervals and on commissure; seed face concave.

TYPE: GUERRERO: Steep-walled limestone sinks, oak woods, limestone mountains between Chilpancingo and Omiltemi, 11.5–15 mi W of former, elev. 1960–2020 m, 27–28 Jul 1968, *W. R. Anderson & C. Anderson* 4922 (MICH, type; UC).



FIG. 1. *Donnellsmithia ampulliformis*. Habit, $\times 1/2$; basal leaf, $\times 1\frac{1}{2}$; cauline leaf base, $\times 1\frac{1}{2}$; umbellet, $\times 6$; mature fruit, $\times 8$; carpophore, $\times 6$; fruit transection, $\times 13$ (all from the type collection).

Other collections examined:

MICHOACAN: Pine forest, Sierra Naranjillo, Coalcomán, 13 Jul 1939, *G. B. Hinton et al.* 13,992 (UC).

With its slender caulescent habit, simply pinnate leaves, purplish-red flowers, and stubby flask-shaped fruit, this species is unlikely to be confused with any other Mexican umbel thus far known. The immature Hinton collection of 1939 has much larger leaflets, but appears to be otherwise the same; we have seen no fruiting material from Michoacán.

Donnellsmithia juncea (Humb. & Bonpl. ex Spreng.) Math. & Const., comb. nov.

Peucedanum junceum Humb. & Bonpl. ex Spreng. in R. & S. Syst. Veg. 6: 572. 1820. Based upon *Humboldt & Bonpland 2039*: "In America Meridional." (B, type; UC, photo).

Cnidium peucedanoides Kunth in HBK. Nov. Gen. & Sp. 5: 15. 1821; *Silau ? peucedanoides* DC. in DC. Prodr. 4: 161. 1830; *Eulophus peucedanoides* Benth. & Hook. ex Hemsl. Biol. Centr. Amer. Bot. 1: 565. 1880; *Museniopsis peucedanoides* Coult. & Rose, Contr. U.S. Nat. Herb. 3: 303. 1895; *Valaea peucedanoides* Drude in E. & P. Nat. Pfl. 38: 169. 1898; *Tauschia peucedanoides* F. Macbr. Contr. Gray Herb. II. 56: 32. 1918; *Donnellsmithia peucedanoides* Math. & Const. Bull. Torrey Bot. Club 68: 122. 1941. Based upon *Humboldt & Bonpland 2039*: "Flumen Putes, Popayan" [Colombia] (P, type).

Smyrniium ? lineare Benth. Pl. Hartw. 83. 1841. Based upon *Hartweg 578*: "In arvis Tejar et Chimaltenango" [Guatemala] (K, type).

At the time of preparing our revision of Umbelliferae for NORTH AMERICAN FLORA (1944-45) we were aware that *Peucedanum junceum* was an older name than *Cnidium peucedanoides*, but we had no way of confirming that both were applicable to the same taxon. A photograph of the specimen in the Willdenow Herbarium, obtained through the courtesy of Dr. Theo Eckardt, confirms the fact that the two are conspecific and based upon the same collection. Our earlier statement that "the species is not known from South America" is incorrect.

Since we have restricted somewhat the scope of this taxon by the removal of *Eulophus ternatus* S. Wats. and *Museniopsis schaffneri* Coult. & Rose, it seems appropriate to present a revised English description, viz. that of *Donnellsmithia juncea* var. *juncea*:

Slender perennial from a simple or branched taproot, the stem conspicuously fibrous at base, 3–12 dm high, the foliage minutely scaberulous; leaves deltoid to orbicular, 4–20 cm in diameter, ternately or ternate-pinnately dissected, the primary divisions petiolulate, the ultimate divisions linear to filiform, 0.5–10 cm long, 0.5–2 mm broad, acute and callous-tipped at apex, tapering at base, entire, glabrous or minutely scaberulous especially on rachis and petiolules; petioles 3–20 cm long, narrowly sheathing; cauline leaves reduced upward, mostly alternate, the uppermost ternate with filiform divisions; inflorescence cymosely branched, the peduncles opposite or alternate, 1.5–8 cm long, or infrequently one umbel sessile; involucre wanting; rays 4–6(–8), 1–3.5 cm long; involucre wanting, or occasionally of a single bractlet; fertile pedicels 1–6, 1–4 mm long, scarcely exceeding sterile pedicels; flowers yellow; stylopodium depressed, not evident; fruit ovoid, 3 mm long, 2.5–3 mm broad, narrowed at apex, cordate at base, glabrous, the ribs filiform, evident to indistinct; vittae several in intervals and on commissure; seed face sulcate.

DISTRIBUTION: In open pine and oak woods from Veracruz to Durango and Sinaloa, south to Guatemala and Honduras, and in both western Venezuela and northern Colombia, at elevations of 900–2500 m, flowering in June and July, fruiting from August to October.

Donnellsmithia juncea var. **purpurea** (Coult. & Rose) Math. & Const., comb. nov.

Museniopsis purpurea Coult. & Rose, Proc. Wash. Acad. 1: 132. 1900; *Donnellsmithia peucedanoides* var. *purpurea* Math. & Const. Bull. Torrey Bot. Club 68: 123. 1941. Based upon Rose 2974: "In the Sierra Madre, west of Bolaños," Jalisco.

We have no further information on this purple-flowered variant except that it has now been obtained as far south as Oaxaca (*R. W. Cruden* 1424, UC).

Donnellsmithia ternata (S. Wats.) Math. & Const., comb. nov.

Eulophus ternatus S. Wats. Proc. Amer. Acad. 23: 276. 1888; *Museniopsis ternata* Coult. & Rose, Contr. U.S. Nat. Herb. 3: 303. 1895; *Velaea ternata* Drude in E. & P. Nat. Pfl. 38: 169. 1898. Based upon Pringle 1252: "Pine plains at the base of the Sierra Madre, Chihuahua," Sep 1887.

Museniopsis schaffneri Coult. & Rose, Contr. U.S. Nat. Herb. 3: 303. 1895; *Velaea schaffneri* Drude in E. & P. Nat. Pfl. 38: 169. 1898. Based upon Schaffner 5, & 550: "rupestris prope San Miguelito," 1876, 1879; Parry & Palmer 293, in 1878, all from San Luis Potosí.

Museniopsis ternata var. *filifolia* Coult. & Rose, Contr. U.S. Nat. Herb. 3: 303. 1895. Based upon Pringle 1519: "in canyons, Sierra Madre, Chihuahua," 1 Oct 1887.

Slender perennial from a slender taproot, the stem without fibers at base, 2–7 dm high, glaucous and essentially glabrous throughout; leaves deltoid, 5–13 cm long, 6.5–14 cm broad, biternate or ternate-1–2-pinnate, the leaflets linear-lanceolate to filiform, 1–8(–12) cm long, 0.5–6 mm broad, acute and callous-tipped at apex, tapering at base, entire, glabrous or minutely scaberulous; petiole 3.5–17 cm long; cauline leaves alternate, the uppermost ternate with filiform divisions or entire; peduncles alternate, 2–10 cm long, usually one umbel sessile; involucre wanting, or of a single linear bract; rays 4–8, 1.5–5.5(–7.5) cm long, unequal; involucre usually wanting; fertile pedicels 1–3, 2–8(–10) mm long, longer than sterile pedicels; flowers yellow; stylopodium depressed, not evident; fruit ovoid, 2–4 mm long, 2.5–3 mm broad, slightly narrowed at apex, cordate at base, glabrous, the ribs filiform, indistinct; vittae several in intervals and on commissure; seed face sulcate.

DISTRIBUTION: In and near wooded slopes and summits, Coahuila to Chihuahua, S to Tamaulipas, Durango, and Aguascalientes, elev. 2200–3400 m, Jul-Sep.

Donnellsmithia ternata differs from *D. juncea*, with which we had previously attempted to combine it, by its lack of a conspicuous fibrous stem base, the fact that it usually has at least some umbels sessile, the tendency of the rays to be unequal, and the fact that the fertile pedicels conspicuously exceed the sterile ones. Both species are late summer-blooming and widespread inhabitants of oak-pine woodlands, *D. ternata* being somewhat northerly in its distribution and usually occurring at higher altitudes.

Donnellsmithia guatemalensis Coult. & Rose, Bot. Gaz. 15: 15. 1890.

Museniopsis scabrella Coult. & Rose, Contr. U.S. Nat. Herb. 3: 304. 1895; *Velaea scabrella* Drude in E. & P. Nat. Pfl. 38: 169. 1898; *Tauschia scabrella* F. Macbr. Contr. Gray Herb. II. 56: 33. 1918. Based upon Pringle 5550: "on the Sierra de San Felipe," 7000 feet, 10 Sep 1894, and Nelson 1900: "in oak woods on the mountain ridges on west side of Valley of Cuicatlan," 7500–8000 feet, 10 Nov 1894, both Oaxaca (US, syntypes).

Study of a recent very ample collection of *Donnellsmithia guatemalensis*, the type species of the genus, from Dept. Quezaltenango, Guatemala (*R. W. Cruden* 1566), and re-examination of the Pringle collection reveal that *Museniopsis scabrella* is synonymous with *D. guatemalensis* rather than with *D. cordata* (Coult. & Rose) Math. & Const., where we had assigned it earlier (1944–45).

Tauschia ehrenbergii (H. Wolff) Mathias, Ann. Missouri Bot. Gard. 17: 269. 1930.

Musineum ehrenbergii H. Wolff, Repert. Sp. Nov. 8: 524. 1910.

Acaulescent, erect or ascending from several elongate tuberous roots, 2–10 cm high or long, the foliage glaucous and glabrous, the inflorescence glabrous to puberulent; leaves oblong, 2–3 cm long, 1–1.5 cm broad, pinnate, the leaflets lanceolate to ovate-lanceolate, distinct or the terminal confluent, sessile, 2–6 mm long, 1–4 mm broad, subentire, the margins reflexed; petioles 1–4 cm long, wholly sheathing; peduncles 2–4 cm long; involucre wanting; rays 3–9, unequal, 3–10 mm long, winged-sulcate, squamulose-scabrid at base; involucler of 5–7 linear, acuminate, entire bractlets 3–5 mm long, exceeding flowers but shorter than fruit; pedicels thick, 1.5–2.5 mm long; flowers white; styles broad and tape-like, slender, recurved; fruit narrowly ovoid-elliptic, 4–5 mm long, 2–2.5 mm broad, the ribs thick, prominent; vittae solitary in intervals, 2 on commissure; seed face deeply sulcate.

TYPE: "Cerro Pelado," "Cerro de las Navachos," Oaxaca, *Ehrenberg 851*.

Other collections examined:

VERACRUZ: "Pr. Mirador prov. Veracruz, 3000–3800 m," Apr 1856, *C. Sartorius 138* (W).

OAXACA: From Monte Pelado and on Canetze [Tanetze] ENE from Oaxaca, Aug 1845, *C. Jurgensen 357* (G).

Examination of the two additional collections listed permits an expansion of the very skimpy descriptions provided earlier and an identification of the type locality. So far as we are aware, the species has not been collected in the past century.

Tauschia decumbens (Benth.) Coult. & Rose ex Drude in E. & P. Nat. Pfl. 38: 170. 1898.

Velaea decumbens Benth. Pl. Hartw. 38. 1840; *Arracacia decumbens* Benth. & Hook. ex Hemsl. Biol. Centr. Amer. Bot. 1: 564. 1880. Based upon *Hartweg 297*: "In arvis, Morelia" and *Graham 263*: "in planitie Topotongo et ad Tlalpuxahua" (K, syntypes).

Arracacia mariana S. Wats. Proc. Amer. Acad. 26: 136. 1891; *Tauschia mariana* Coult. & Rose ex Drude in E. & P. Nat. Pfl. 38: 170. 1898. Based upon *Pringle 3480*: "On hillsides at Flor de Maria," México.

Tauschia roseana H. Wolff, Repert. Sp. Nov. 9: 418. 1911. Based upon *Schiede 603*: "Cumbre de las papas," Aug.

Velaea decumbens Benth., which we earlier placed in synonymy under *Tauschia nudicaulis* Schlecht., lacks the conspicuously cartilaginous-margined leaflets and somewhat united, lobed, and expanded involucler bractlets of the latter species. Instead it is to be associated with *Arracacia mariana* S. Wats., which it antedates by half a century.

***Arracacia filipes* Math. & Const., sp. nov. FIG. 2**

Plantae graciles caulescentes ramosae 0.5–1.5 m altae, foliis inflorescentibusque glaucescentibus glabris vel minute scaberulis; folia triangulo-ovata biternata vel bipinnata diametro 1–6 dm, foliolis ovatis apice acuminatis basi truncatis cuneatisve duplicato-serratis 2.5–8 cm longis 1.5–5 cm latis; petioli anguste scarioso-vaginantes 8–20 cm longi; folia caulina superiora reducta plerumque ternata; inflorescentia pauciramosa terminalis lateralisve, pedunculis gracilibus 2–10 cm longis; involucre nullum; radii 4–12 (2–5 fertiles) filiformes patenti-adscendentes 2–5 cm longi; involucler bracteolae 3–5 lineares 2–3 mm longae; pedicelli filiformes patenti-adscendentes 10–20 mm longi; flores virides, petalis ovalibus; stylopodium depressum indistinctum, stylis gracilibus patenti-adscendentibus vel recurvatis usque ad 1 mm longis; carpophorum usque ad basim bipartitum divisionibus erectis; fructus oblongo-ovalis apice leviter attenuatus glaber 4.5–6 mm longus 2–2.5 mm latus, costis filiformibus; vittae magnae in intervalis tantum una et in commissuris plerumque 2; semen sub vittis canaliculatum superficie profunde sulcata; chromosomatum numerus $n = 22$.

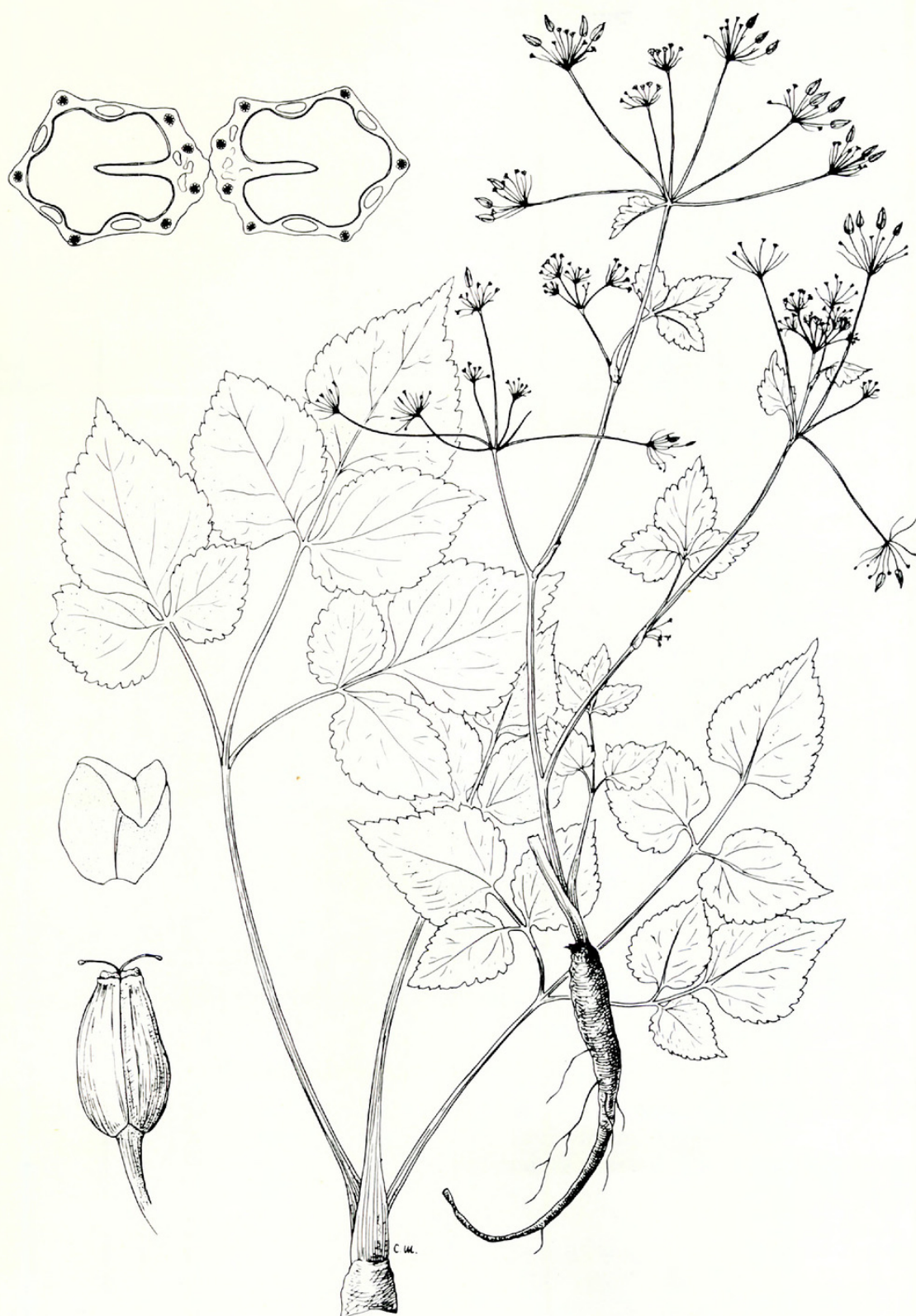


FIG. 2. *Arracacia filipes*. Habit, $\times 1/2$; basal leaf, $\times 1/2$; petal, $\times 20$; fruit, $\times 5$; fruit transection, $\times 15$ (all from the type, Gordon 51).

Slender, caulescent, branching, the stem purplish, glaucous, erect, 0.5–1.5 m tall from a taproot, the foliage and inflorescence glabrous to minutely scaberulous; leaves triangular-ovate, 1–6 dm long and broad, biternate or bipinnate, the leaflets ovate, acuminate at apex, truncate to cuneate at base, doubly serrate, 2.5–8 cm long, 1–5.5 cm broad; petioles 8–20 cm long, narrowly scarious-sheathing at base; cauline leaves reduced upward, often ternate; inflorescence few branched, terminal and lateral, the peduncles slender, 2–10 cm long; involucre lacking; rays 4–12 (2–5 fertile), filiform, 2–5 cm long, spreading-ascending; involucl of 3–5 linear bractlets 2–3 mm long; pedicels filiform, spreading-ascending, 10–20 mm long; flowers green, the petals oval; stylopodium indistinct and depressed, the styles slender, spreading-ascending to recurved, to 1 mm long; carpophore parted to base, the halves erect; fruit oblong-oval, 4.5–6 mm long, 2–2.5 mm broad, glabrous, tapering slightly at apex, the ribs filiform; vittae large, solitary in intervals, usually 2 on commissure; seed channeled under intervals, the face deeply sulcate; chromosome number $n = 22$.

TYPE: DURANGO: "Arroyo del Infierno"; deep, well-watered, rough rocky canyon W of Santa Barbara, ca 20 km S of El Salto, elev. 2550–2650 m, 23, 24 Aug 1963, *Alan G. Gordon 51* (MICH, type; UC, photo).

Other collections examined:

DURANGO: Cerro Chupadero, 45 mi S of El Salto and just W of Pueblo Nuevo, humid oak-pine forest with mosses and mesophytic herbs abundant in thick humus, 2000–2500 m, 28 Jul 1955, *J. H. Maysilles 8214* (MICH, UC); steep, moist ravine on the edge of a steep-walled barranca, 2 mi W of Revolucioneros along route 40, 7100 feet, 8 Nov 1970, *D. E. Breedlove 18,922* (CAS/DS, UC).

This well-marked species was recognized as new on the basis of Maysilles' 1955 collection, but he obtained flowering material only. With its indistinct stylopodium, green flowers, and very slender pedicels, *A. filipes* does not resemble closely any other taxon known to us. Plants were successfully grown in the greenhouses of the University of California Botanical Garden, Berkeley, from seed from the Breedlove collection, but no fruit formed under cultivation.

***Arracacia macvaughii* Math. & Const., sp. nov. FIG. 3**

Plantae graciles acaulescentes e radice tumida 10–30 cm altae, foliis glabris inflorescentia plus minusve scaberula; folia oblongo-ovalia 2–3-jugopinnata 2.5–5 cm longa 1.5–4 cm lata, foliolis oblongis orbiculatisve petiolulatis vel sessilibus dentatis vel lobatis 0.7–1.5 cm longis 0.5–1.5 cm latis; petioli graciles basi breviter scarioso-vaginantibus 3.5–6 cm longi quam laminae longiores; pedunculi graciles adscendentes 7–24 cm longi quam folia longiores; involucrum plerumque nullum; radii fertiles 3–5 patenti-adscendentes inaequales scaberulosi 1–2 cm longi; involucelli bracteolae 1–5 lineares ad 4 mm longae; pedicelli fertiles 1–5 glabri 3–4 mm longi; flores albi, petalis anguste obovatis; stylopodium conicum, stylis gracilibus recurvatis, ovario glabro; carpophorum crassum bifidum; fructus ovato-lanceolatus apice attenuatus basi rotundatus, glaber, 3 mm longus 2–2.5 mm latus, costis filiformibus; vittae in intervallis et in commissuris plures; seminum superficies concava; chromosomatum numerus $n = 22$.

Slender, acaulescent, 10–30 cm tall from a swollen taproot, the foliage glabrous, the inflorescence a little scaberulous; leaves oblong-oval, 2.5–5 cm long, 1.5–4 cm broad, pinnate with 2 or 3 pairs of leaflets, the leaflets oblong to orbicular, 0.7–1.5 cm long, 0.5–1.5 cm broad, the larger (lower) petiolulate and pinnately lobed, the upper sessile and coarsely dentate to lobed, the lobes or teeth mucronulate; petioles slender, 3.5–6 cm long, longer than blade, shortly scarious-sheathing at base; peduncles 1 to several, slender, 7–24 cm long, ascending, exceeding leaves; involucre lacking, or occasionally of a single linear bract; fertile rays 3–5, spreading-ascending, unequal, 1–2 cm long, scaberulous; involucl of 1–5 linear bractlets up to 4 mm long, about equaling flowers but shorter than fruit; fertile pedicels 1–5, 3–4 mm long,

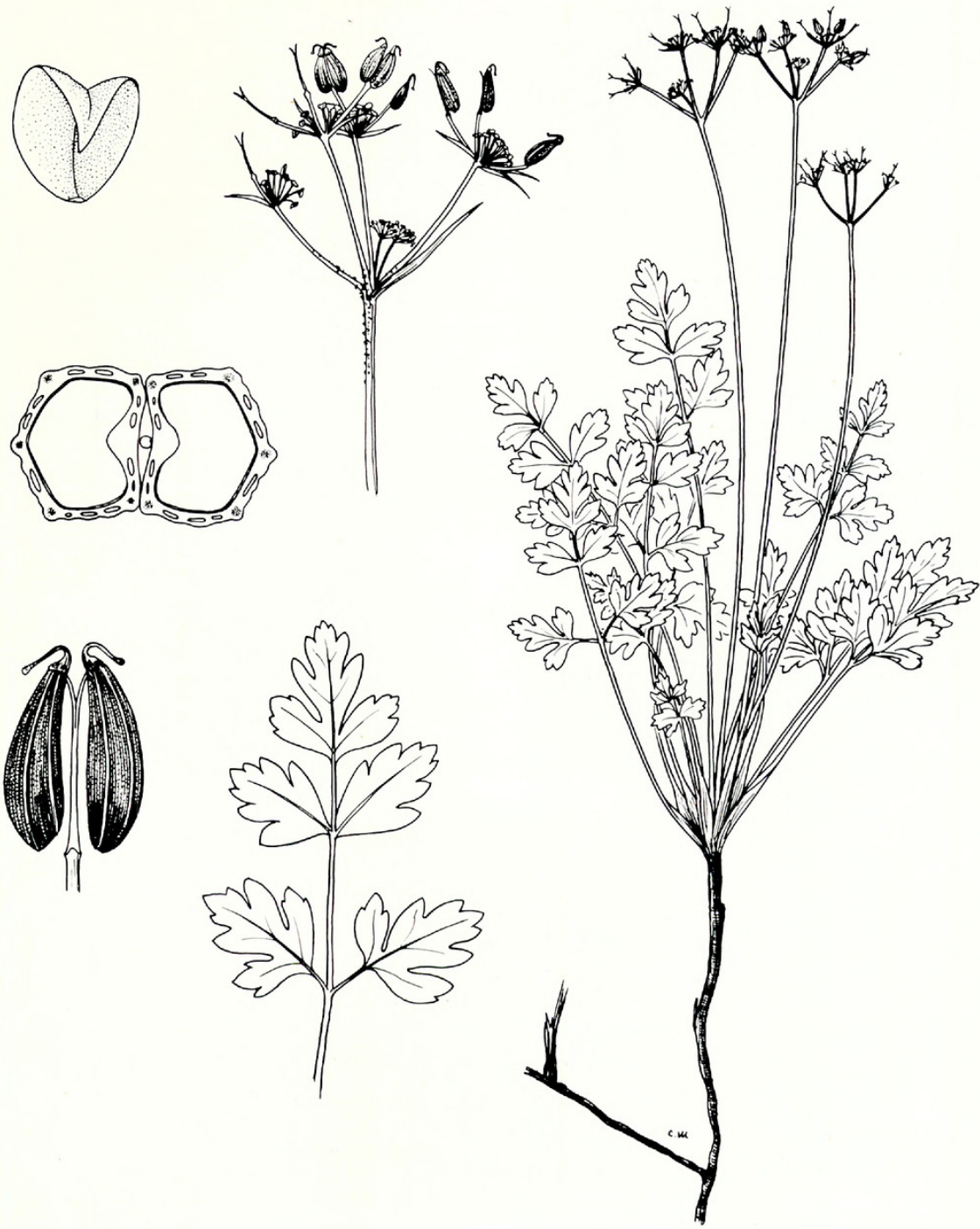


FIG. 3. *Arracacia macvaughii*. Habit, $\times 1/2$; basal leaf blade, $\times 1$; fruiting umbel, $\times 1\frac{1}{2}$; petal, $\times 20$; fruit, $\times 8$; fruit transection, $\times 13$ (all from the type).

glabrous; flowers white, the petals narrowly obovate; stylopodium conic, the styles slender, recurved, the ovary glabrous; carpophore stout, merely bifid at apex; fruit ovate-lanceolate, 3 mm long, 2–2.5 mm broad, tapering toward apex, rounded at base, glabrous, the ribs filiform; vittae several in intervals and on commissure; seed face concave; chromosome number $n = 22$.

TYPE: QUERETARO: Cerro Zamorano, Mpio. de Colón, 1 km al SW de la cumbre, elev. 3100 m, bosque de *Abies*, 13 Nov. 1971, J. Rzedowski & R. McVaugh 409 (MICH, type).

Other collections examined:

QUERETARO: Type locality, 3 Aug 1972, S. G. Weller 628 (UC).

With its low, acaulescent habit, thickened root, and particularly the shallowly divided carpophore, this species has the aspect of the genus *Tauschia*, to which the collectors tentatively referred it. However, the tapering fruit surmounted by a conical stylopodium necessitates its referral to *Arracacia*, where it most closely approaches the recently described *A. molseedii* Math. & Const. from Oaxaca.

***Arracacia papillosa* Math. & Const., sp. nov. FIG. 4**

Plantae crassae caulescentes papilloso-hispidae vel papilloso-hispidulosae 0.85–1 m altae; folia basalia ignota; folia caulina inferiora ovato-deltaidea 18–20 cm longa 20–25 cm lata ternato-bipinnata, foliolis ovatis breve petiolatis sessilibusve 2–7.5 cm longis 1–4 cm latis minute serratis; petioli basales ignoti; petioli caulini inferiores late dilatati et scarioso-vaginantibus; folia caulina ternata, superiora reducta; inflorescentia pauciramosa, pedunculis gracilibus 3–8 cm longis; involucre nullum; radii fertiles 8–12 graciles patenti-adscendentes inaequales sparsim hispiduli 1.5–3 cm longi; involucelli bracteolae 5 vel 6 lineares papillosae 2–5 mm longae; pedicelli fertiles 1–5 patenti-adscendentes hispiduli; flores purpurei, petalis obovatis; stylopodium conicum, stylis brevibus divergentibus, ovario hispiduloso; carpophorum usque ad basim bipartitum; fructus ovoideus apice basique attenuatus 5–6 mm longus 3–4 mm latus, costis prominentibus subaequalibus anguste alatis hispidulosis; vittae magnae in intervallis 2 vel 3 in commissuris 2–4; semen sub vittis canaliculatum superficie involuta.

Stout, caulescent, 0.85–1 m tall, hispidulous-papillose; basal leaves not seen, the lower cauline leaves ovate-deltoid, 18–20 cm long, 20–25 cm broad, ternate-bipinnate, the leaflets ovate, acute to obtuse, rounded to subcuneate at base, distinct, short-petiolulate to sessile, 2–7.5 cm long, 1–4 cm broad, finely serrate; basal petioles not seen, the lower cauline broadly dilated and wholly scarious-sheathing; cauline leaves reduced upward, ternate with narrow divisions; inflorescence few branched, the peduncles slender, 3–8 cm long; involucre lacking; fertile rays 8–12, slender, spreading-ascending, unequal, 1.5–3 cm long, sparsely hispidulous; involucel of 5 or 6 linear, papillose bractlets 2–5 mm long, about equaling flowers but shorter than fruit; fertile pedicels 1–5, spreading-ascending, 3–7 mm long, hispidulous; flowers purplish, the petals obovate; stylopodium conic, the styles short, spreading, the ovary hispidulous; carpophore 2-cleft to base; fruit ovoid, 5–6 mm long, 3–4 mm broad, hispidulous on the narrowly and equally winged prominent ribs; vittae large, 2 or 3 in intervals, 2–4 on commissure; seed channeled under tubes, the face involute.

TYPE: JALISCO: Precipitous mountainside N of Lake Chapala, 3–5 km NE of San Juan Cozalá, abundant on N slopes in oak forest with heavy bunch-grass cover, elev. 2000–2300 m, 11 Sep 1967, R. McVaugh 23,856 (MICH, type).

Other collections examined:

JALISCO: Zacatonales y zonas peñascosas, Cerro Viejo cerca de la cumbre, Mpio. de Tlajomulco, elev. 2950 m, 15 Aug 1970, J. Rzedowski 27,550 (MICH).

The only described species of *Arracacia* with pubescent ovaries and fruit are *A. pubescens* H. Wolff from Hidalgo and *A. anomala* Math. & Const. from Chihuahua, and the plants under study do not closely resemble either of them. Aside from this feature, *A. papillosa* appears to resemble most closely *A. ovata* Coult. & Rose, known only from the Nelson collection made in Guerrero. Since this collection was obtained in December and the Rzedowski and McVaugh specimens in August and September, respectively, detailed comparison is difficult. However, the material of *A. ovata* shows no trace of the hispidulosity of the gynoeceium, the leaves are merely puberulent on the veins beneath, and the whole plant is stouter and coarser with stouter peduncles, more numerous and longer rays, shorter pedicels, and narrower and longer fruit. We are indebted to the Smithsonian Institution for the opportunity to make the necessary comparison.



FIG. 4. *Arracacia papillosa*. Habit, $\times 1/6$; lower cauline leaf, $\times 1/2$; fruiting umbel, $\times 1$; fruiting umbellet, $\times 6$; fruit transection, $\times 12$ (all from the type); flower, $\times 18$; details of abaxial and adaxial leaf surface, $\times 2$; detail of leaf papillosity, $\times 30$ (all from Rzedowski 27,550).

Arracacia ebracteata (Rose) Math. & Const., comb. nov. FIG. 5

Coaxana ebracteata Rose, Contr. U.S. Nat. Herb. 8: 337. 1905.

Slender, caulescent, branching, from a woody base, 1–4 m high, glaucous and purplish, essentially glabrous; leaves triangular-ovate, 10–20 cm in diameter, bipinnate or ternate-pinnate, the leaflets ovate, the terminal acute to acuminate, cuneate to



FIG. 5. *Arracacia ebracteata*. Habit, $\times 1/8$; part of basal leaf, $\times 1/2$ (both from *Breedlove* 7061, C-652); umbellet, $\times 2$; fruit, $\times 3$ (both from *Breedlove* 9262); fruit transection, $\times 10$ (from *Raven & Breedlove* 20,057).

truncate at base, the lower petiolulate, the upper confluent, 1.5–5 cm long, 1–3 cm wide, finely doubly spinulose-serrate and lobed toward base; petioles slender, 6–12 cm long, broadly sheathing at base; cauline leaves reduced upward, wholly sheathing with strongly inflated purplish sheaths; inflorescence branched, the peduncles 5–15 cm long; involucre wanting; fertile rays 2–10, slender, spreading, unequal, scaberulous, 2–6 cm long; involucre wanting; fertile pedicels 1–10, spreading, 2–5 mm long; flowers purplish-red, the petals obovate; stylopodium depressed but evident, the styles slender, spreading or recurved; carpophore 2-cleft to base, slender; fruit oblong-oval, 6–10 mm long, 3–4 mm broad, tapering to a truncate apex, rounded at base, glabrous, the ribs prominent, subequal, acute but unwinged; vittae unequal, usually several in intervals and on commissure; seed channeled under larger vittae, the face sulcate; chromosome number $n = 22$.

TYPE: CHIAPAS: "between Hurtztan [Huistán] and Oxchuc," 11 Mar 1896, C. & E. Seler 2148 (US, type).

Other collections examined:

CHIAPAS: Forêts de pins de Pueblo nuevo, Oct 1839, Feb 1840, J. Linden 586 (G, K, P; UC, photo); ridge near boundary of Chamula on road to Zinacantan, Mpio. Chamula, elev. 7500 feet, 17 Aug 1964, D. E. Breedlove 7061 (CAS/DS; UC, cult. in U.C. Bot. Gard. as C-650, 652); slope with *Quercus* beside small lake near boundary of Mpios. Zinacantan and Chamula, trail from San Cristóbal de las Casas to Zinacantan Center, elev. 7800 feet, 11 Mar 1965, Breedlove 9262 (CAS/DS, UC); slope with *Quercus*, trail to ridge N of Clínica Yerba Buena near Pueblo Nuevo Solistahuacán, Mpio. Pueblo Nuevo Solistahuacán, elev. 6000 feet, 25 Jan 1965, P. H. Raven & D. E. Breedlove 20,057 (CAS/DS, UC); slope 3 km NW of Pueblo Nuevo Solistahuacán, elev. 5800 feet, 28 Jul 1970, H. Zuill 203 (UC); pine-oak woods with ericaceous shrubs, among rocks in exposed part of woods, on route 190, 3.5 mi W of San Cristóbal de las Casas, elev. 2300 m, 10 May 1970, Melinda Denton 1666 (MICH).

Although Rose's original description of this taxon omitted any characterization of the fruit, the habit is very reminiscent of that of *Coaxana purpurea* Coult. & Rose, the conspicuously flaring cauline leaf sheaths and flower color are similar, and it never occurred to us to question its generic placement. When we began to compare carefully the purple-flowered material of *Arracacia* with *Coaxana*, however, it became clear that two strikingly different expressions of fruit ribs were involved. If *Coaxana* is to be maintained as a distinct genus, we think it must be on this carpological basis. This necessitates transfer of Rose's species to *Arracacia*. It is interesting that the Linden collection in the Boissier Herbarium, Geneva, bears the determination "*Arracacia* indet." Since no complete description or any illustration has been provided hitherto, it seems appropriate to remedy that omission here.

***Coaxana bambusioides* Math. & Const., sp. nov. FIG. 6**

Plantae crassae caulescentes purpurascens praeter inflorescentiam papillosam glabrae 2.5–5 m altae; folia basalia ignota; folia caulina inferiora ovato-deltoides 3 dm longa 4 dm lata ternato-bipinnata, foliolis ovato-lanceolatis petiolatis sessilibusve 1–4 cm longis 0.5–1.5 cm latis subtiliter spinoso-serratis; petioli basales ignoti; petioli caulini inferiores latissime dilatati purpurei; folia caulina superiora reducta; inflorescentia ramosa, pedunculis apice papillosis 10–20 cm longis; involucre nullum; radii fertiles 30–45 graciles patentes inaequales papilloso 3–8 cm longi; involucellum nullum; pedicelli fertiles 2–12 patentes papilloso 5–10 mm longi; flores atropurpurei, petalis ovalibus; stylopodium conicum, stylis gracilibus patentibus recurvatisve; carpophorum ad basim bipartitum; fructus ovoideus 7–9 mm longus 4–6 mm latus glaber, 3 vel 4 costis in quoque mericarpio conspicue tenuialatis; vittae inaequales in intervallis 2–4 in commissuris plures; semen sub vittis depressum superficie sulcata; chromosomatum numerus $n = 22$.

Stout, caulescent, branching, 2.5–5 m high, purplish, glabrous except in inflorescence; basal leaves unknown, the lower cauline leaves triangular-ovate, 3 dm long, 4 dm broad, ternate-bipinnate, the leaflets ovate-lanceolate, the terminal acuminate, cuneate



FIG. 6. *Coaxana bambusioides*. Habit, $\times 1/2$ (from Rzedowski & McVaugh 247); leaf margin, $\times 4$; peduncle apex and base of rays, $\times 4$; fruiting umbellet, $\times 1$; fruit and carpophore, $\times 3$; fruit transection, $\times 8$ (all from type collection).

at base, the lower petiolulate, the upper confluent, 1–4 cm long, 0.5–1.5 cm wide, finely spinose-serrate, paler and reticulate beneath; basal petioles not seen; cauline leaves reduced upward, wholly sheathing with conspicuously inflated purplish sheaths; inflorescence branched, the peduncles 10–20 cm long, papillose at apex; involucre wanting; fertile rays 30–45, slender, spreading, unequal, papillose, 3–8 cm long; involucre wanting; fertile pedicels 2–12, spreading, papillose, 5–10 mm long; flowers

dark purple, the petals oval; stylopodium conical, the styles slender, spreading or recurved; carpophore 2-cleft to base, slender; fruit ovoid, 7–9 mm long, 4–6 mm broad, glabrous, 1 or 2 of dorsal and 2 lateral ribs of each mericarp conspicuously thin-winged; vittae unequal, 2–4 in intervals, several on commissure; seed depressed under larger vittae, the face sulcate; chromosome number $n = 22$.

TYPE: GUERRERO: Cloud forest of *Pinus*, *Abies*, and *Lobelia* with abundant epiphytes, SW slope of Cerro Teotepec near summit, elev. 10,750 feet, 21 Jul 1969, Theodore F. Niehaus, R. W. & Diane Cruden 901 (UC, type).

Other collections examined:

GUERRERO: Pine forest, Teotepec, Distr. Galeana, elev. 3220 m, 25 Dec 1937, G. B. Hinton et al. 11,128 (G, K, NY, P, UC, US—distributed as *Angelica polymorpha* C. & R.); vertiente SW del Cerro Teotepec, Mpio. de Tlacotepec, elev. 2920 m, 29 Jan 1965, J. Rzedowski & R. McVaugh 247 (ENCB).

The genus *Coaxana*, as indicated above (p. 13), was based upon *C. purpurea* from Oaxaca, a species that has been found subsequently also in Guatemala. *Coaxana ebracteata* Rose, the second species, although vegetatively very similar, has proven to be an *Arracacia* now that ripe fruit is available for comparison. The present taxon, which has been long known to the authors through the Hinton collection, proves to have fruit almost identical with the very distinctive fruit of the type species, that is with the costae of the two mericarps unequally winged. *Coaxana bambusioides* differs from *C. purpurea* by its larger and more dissected leaves, much more conspicuous leaf sheaths, papillose peduncles, rays and pedicels, more numerous and unequal rays, conical stylopodium, and lack of an involucl. Hinton referred to the plant as having a purple bamboo-like stalk, hence the specific epithet.

***Prionosciadium bellii* Math. & Const., sp. nov. FIG. 7**

Plantae validae inflorescentia foliisque scaberulis vel villosis vel glabris 2–3 m altae; folia basalia ovata bipinnatifida diametro ca 4 dm, foliolis lanceolatis acuminatis subtiliter duplo-serratis plerumque basi lobatis 1–8 cm longis 1–3 cm latis sinus angustis rhachidi serrato-alata confluentibus; petioli supra basim vaginantem breve alati ca 2 dm longi; folia caulina opposita verticillatae pinnata vel ternata vel ternato-pinnato-decomposita vaginis brevibus angustisque, foliolis elongato-angustis petiolatis; pedunculi crassi verticillati 3–8 cm longi; involucri bractae plures vel unica, filiformae, usque ad 1 cm longae vel obsoetae; radii fertiles 10–35 patentes subaequales 1–4 cm longi; involucellorum bracteolae 2–5, lineares filiformesve, flores subaequantes quam fructus breviores; pedicelli fertiles 1–7, 3–5 mm longi; flores atropurpurei vel flavo-virides, ovario glabro; fructus late ovalis apice rotundatus basi leviter retusus glaber 10–12 mm longus 7–9 mm latus, costis dorsalibus prominentibus peranguste alatis, lateralibus late tenuialatis alis corpus subaequantibus; vittae in intervallis 2 vel 3 in commissuris 4–6; seminum superficies involuta; chromosomatum numerus $n = 21$.

Plants stout, 2–3 m high, the inflorescence ± scaberulous, the juvenile foliage decidedly villous, scaberulous on veins beneath to glabrate; basal leaves ovate, ca 4 dm long and broad, bipinnatifid, the leaf divisions lanceolate, acuminate, 1–8 cm long, 1–3 cm broad, finely doubly serrate and often lobed toward base, the sinuses narrow, confluent by a similarly serrate winged rachis; petiole winged above the short, sheathing base, ca 2 dm long; cauline leaves opposite or whorled, pinnate or ternate or ternate-pinnately decomposed, the sheaths becoming small and narrow, the elongate-acuminate leaflets petiolulate; inflorescence of successive whorls of stout peduncles 3–8 cm long, each of the lateral subtended by a pair of leaves; involucre of 1 to several filiform bracts up to 1 cm long, or wanting; fertile rays 10–35, spreading, subequal, 1–4 cm long; involucl of 2–5 linear or filiform bractlets about equaling flowers but usually shorter than fruit; fertile pedicels 1–7, 3–5 mm long; flowers reddish-purple or greenish-yellow, the ovary glabrous; fruit broadly oval, 10–12 mm

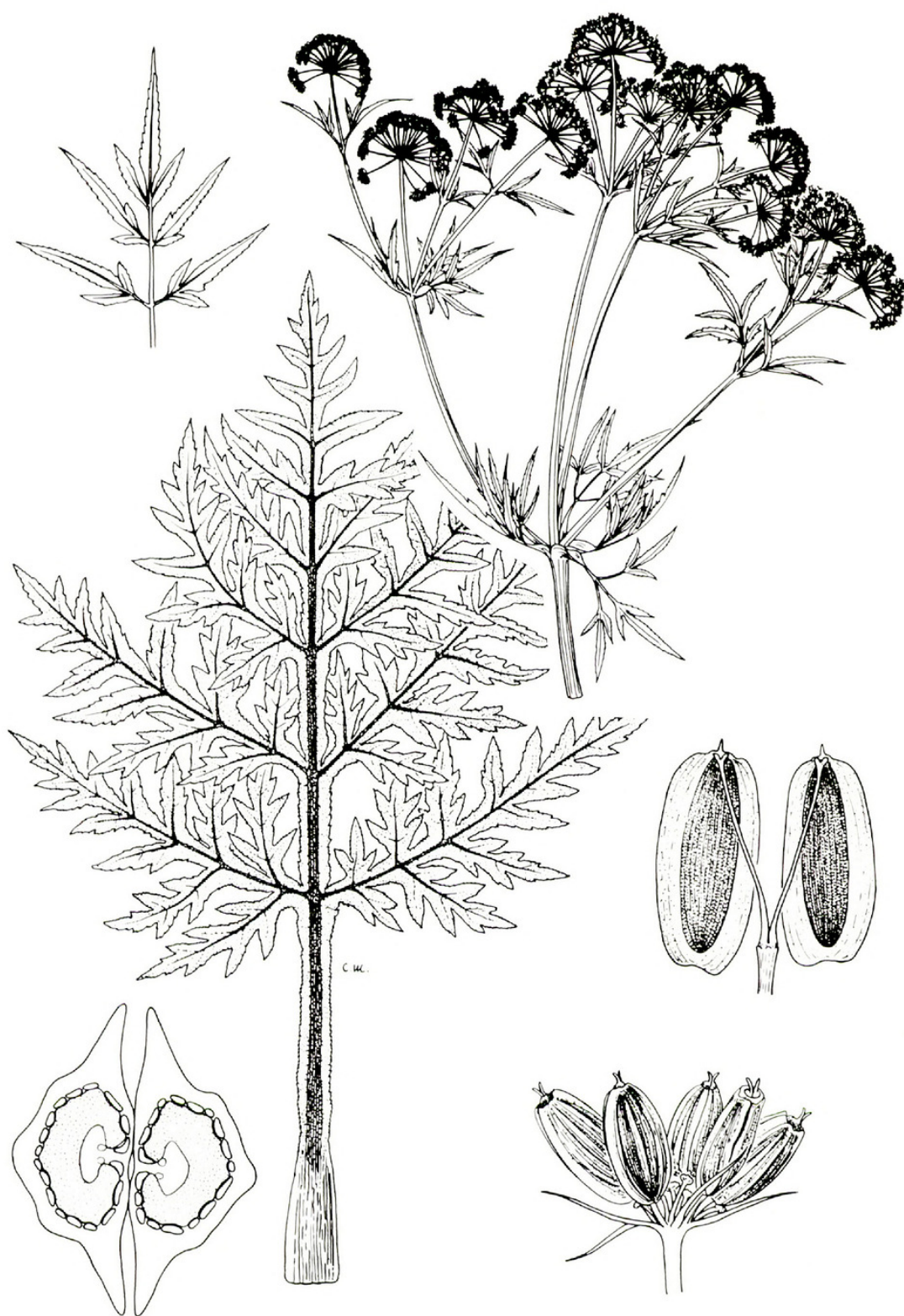


FIG. 7. *Prionosciadium bellii*. Basal leaf, $\times 1/4$ (from *Molseed & Rice 230*); part of inflorescence, $\times 1/4$ (from *Pilz & Strother 669*); part of cauline leaf, $\times 1/2$ (from *Bell & Duke 16,729*); umbellet, $\times 2$; fruit, $\times 3$; fruit transection, $\times 6$ (all from type collection).

long, 7–9 mm broad, rounded at apex, a little retuse at base, glabrous, the dorsal ribs prominent to very narrowly winged, the lateral broadly thin-winged, the wings about equaling body; vittae 2 or 3 in intervals, 4–6 on commissure; seed dorsally compressed in transection, scarcely channeled, the face involute; chromosome number $n = 21$.

TYPE: MICHOACAN: Brushy roadside on route 15, 13.3 mi N of km 165 in center of Zitácuaro, elev. ca 6500 feet, 23 Aug 1959, *C. Ritchie Bell & James A. Duke 16,731* (NCU, type; UC, isotype).

Other collections examined:

MICHOACAN: Along rocky cut above and below route 15 just E of bridge near river 0.9 mi NW of Turundeo, near Tuxpan, elev. ca 7000 feet, 22 Aug 1959, *Bell & Duke 16,729* (NCU, UC); SW-facing rock and talus slope at El Salto on route 15, 0.1 mi E of Temescal, 0.5 mi W of La Pol Villa (E of Morelia), elev. ca 8100 feet, 22 Aug 1959, *Bell & Duke 16,712* (NCU, UC); undergrowth in more open areas in forest on steep cliff, Los Cantiles, km 287 on route 15 (ca 26 km E of Morelia), 14 Jul 1963, *Molseed & Rice 230* (UC); 4 mi E of Tuxpan along Morelia-Toluca highway, route 15, elev. ca 6200 feet, growing in thick shrubby vegetation above roadcut, 2 Jul 1971, *Pilz & Strother 669* (UC); route 15, 5 mi N & W of Tuxpan, near Puente Río Turundeo, elev. 1850 m, weedy roadside banks, 3 Aug 1968, *W. R. & C. Anderson 5000* (MICH, UC).

In our key (Math. & Const. 1944–45, pp. 205–206) this taxon would be identified with *P. townsendii* Rose and *P. diversifolium* Rose. From the latter *P. bellii* differs in its finely serrate and much narrower leaf divisions, more numerous rays, flower color, and larger fruit. The similarity to the Chihuahuan *P. townsendii* is much greater; in general, the Chihuahuan plant can be distinguished by its glabrous foliage, fewer rays, and smaller and narrower fruit, in addition to its much more northerly distribution. However, the larger cauline leaves, which are decompound and lack a winged rachis, are often the only conspicuous foliage when the plant is in fruit. These give *P. bellii* a closer resemblance to *P. linearifolium* (S. Wats.) Coult. & Rose and *P. watsoni* Coult. & Rose, from which it differs by its apparently quite different basal leaves, more numerous rays, and differently proportioned mericarps. *Molseed & Rice 230* served as the voucher specimen for the published chromosome number of $n = 21$ for *Prinosciadium megacarpum* C. & R. (Bell & Constance, 1966), and this unusual count was confirmed by *Pilz & Strother 669*. The chromosome number of the true *P. megacarpum* remains to be determined.

***Prinosciadium lilacinum* Math. & Const., sp. nov. FIG. 8**

Plantae validae foliis inflorescentisque glaucis scaberulis vel hispidulis 2–4 m altae; folia basalia ovata ternato-pinnata diametro 3–3.5 dm, foliolis ovatis apice abrupte acutis vel obtusis basi cuneatis grosse duploserratis interdum lobatis scaberulis vel hispidulis, 6–10 cm longis 3–6 cm latis sinubus angustis rhachidi lata integra vel sparsim serrato-alata leniter vaginanti; petioli 2–2.5 dm longi ei foliorum caulinorum omnino vaginantes; folia caulina opposita ternata, divisionibus elongato-lanceolatis acuminatis rhachidi sensim alata vagina inconspicua; pedunculi graciles oppositi vel verticillati 3–10 cm longi; involucrum deficiens; radii fertiles 5–8 patentes inaequales 1–2 cm longi; involucellorum bracteolae 5 vel 6 lanceolatae acuminatae glabrae quam flores longiores quam fructus breviores 5–6 mm longae; pedicelli fertiles 2–5, 2–3 mm longi; flores lilacino-purpurei, sepalis visibilibus, ovario glabro; fructus ovoideus apice rotundatus basi retusus glaber 6–9 mm longus 5–7 mm latus, costis dorsalibus filiformibus eis lateralibus quam corpore latioribus; vittae in intervallis 2 vel 3 in commissuris plures; seminum superficies sulcata vel involuta; chromosomatum numerus $n = 22$.

Plants stout, 2–4 m high, glaucous, the foliage and inflorescence scaberulous to hispidulous; basal leaves ovate, 3–3.5 dm long and broad, ternate-pinnate, the leaflets ovate, abruptly acute to obtuse, cuneate at base, 6–10 cm long, 3–6 cm broad, coarsely doubly serrate, the larger lobed, scaberulous to hispidulous on veins beneath,



FIG. 8. *Prinosciadium lilacinum*. Leaf, $\times 1/2$; inflorescence, $\times 1/2$; abaxial leaf surface, $\times 3$; umbellet, $\times 2$ (all from Cruden 1050); fruit, $\times 3$; carpophore, $\times 3$; fruit transection, $\times 9$ (all from Weller 685).

the sinuses narrow, confluent by the broad, entire or sparsely serrate winged rachis; petioles 2–2.5 dm long, the cauline petioles wholly sheathing; uppermost cauline leaves opposite, ternate with elongate lanceolate-acuminate divisions, weakly winged rachis, and inconspicuous sheaths; inflorescence of several pairs or whorls of peduncles, the peduncles slender, 3–10 cm long, subtended by opposite leaves; involucre wanting; fertile rays 5–8, spreading, unequal, 1–2 cm long; involucl of 5 or 6 lanceolate, acuminate, glabrous bractlets 5–6 mm long, longer than flowers but shorter than fruit;

fertile pedicles 2–5, 2–3 mm long; flowers lilac-purple, the sepals evident, the ovary glabrous; fruit ovoid, rounded at apex, retuse at base, 6–9 mm long, 5–7 mm broad, glabrous, the dorsal ribs filiform, the lateral wings broader than body; vittae 2 or 3 in intervals, several on commissure; seed flattened dorsally, the face sulcate to involute; chromosome number $n = 22$.

TYPE: JALISCO: Common along weedy roadside in full sun, 13.3 mi E of Jalisco-Nayarit border on route 15 [i.e., near Plan de Barrancas], elev. 3300 feet, 18 Aug 1972, *Stephen G. Weller 682* (UC, type).

Other collections examined:

NAYARIT: Route 15, 2 mi S of Ocotillo (27 mi SE of Tepic), 12 Jul 1963, *Molseed & Rice 217* (UC); among rocks, route 15, 0.4 km N of km 931, ca 26 km NW of Tepic, 12 Jul 1966, *R. W. Cruden 1050* (UC); route 15 at Jalisco border, 17 Jul 1971, *Strother & Pilz 1069* (UC); 15 mi NW of Tepic, 19 Aug 1972, *Weller 685* (UC).

Prionosciadium lilacinum appears to be closest to *P. cuneatum* Coult. & Rose, with which it shares the characters of a winged foliar rachis, abruptly acute leaflets, an evident calyx, and lilac-purple flowers. It differs from this species, however, in its broader, doubly serrate, and differently shaped leaflets, less strongly winged rachis, fewer rays, broader and longer bractlets, smaller and differently shaped fruit, and less prominent dorsal fruit ribs. In foliage it is most like *P. diversifolium* and shows comparable variability. However, in *P. lilacinum* the cauline leaves are wholly sheathing, the rays are glabrous, and the green bractlets are differently shaped.

***Rhodosciadium rzedowskii* Math. & Const., sp. nov. FIG. 9**

Plantae graciles glaucae glabrae ad basim umbellarum tantum parum puberulentae ex basi tuberosa 0.8–1 m altae; folia basalia ovata ternato-pinnato-decomposita 6–20 cm longa 8–10 cm lata, divisionibus ultimis linearibus, 5–50 mm longis 1–3 mm latis, eis terminalibus elongato-attenuatis regulatim dentatis basin versus lobatis, eis distalibus confluentibus, rhachidi primaria exalata; petioli basi late scarioso-vaginantibus 4–8 cm longi; folia caulina alterna oppositave ternata, vagina parva dilatata instructa; pedunculi plures verticillati 3–5 cm longi; involucrum nullum; radii fertiles 3–5 patenti-adscendentes subaequales 1–1.5 cm longi; bracteolae involucellorum 2–5 lineari-filiformes quam fructus breviores 2–4 mm longae; pedicelli fertiles 1–5, ca 2 mm longi; flores flavi, stylis ca 1 mm longis, ovario glabro; fructus ovalis orbiculatusve glaber, apice rotundatus basi retusus, 8–11 mm longus 6–8 mm latus, costis dorsalibus filiformibus eis lateralibus late tenuialatis alis quam corpore latioribus; vittae parvae in intervallis 3 vel 4 in commissuris 6–8; semen dorsaliter compressum vix canaliculatum superficie involuta.

Plants slender, 0.8–1 m high, glabrous and glaucous, a little puberulent at base of umbels, from a tuberous base; basal leaves ovate, 6–20 cm long, 8–10 cm broad, ternate-pinnately decompose, the ultimate divisions linear, 0.5–5 cm long, 1–3 mm broad, the terminal elongate-attenuate, regularly dentate to lobed toward base, the distal confluent, but the primary rachis unwinged; petiole 4–8 cm long, broadly scarioso-sheathing at base; cauline leaves alternate or opposite, ternate, with a small, broadly flaring sheath; inflorescence of several verticels of slender peduncles, 3–5 cm long, subtended by a single reduced leaf; involucre wanting; fertile rays 3–5, spreading-ascending, subequal, 1–1.5 cm long; involucel of 2–5 linear-filiform bractlets 2–4 mm long, shorter than fruit; fertile pedicels 1–5, ca 2 mm long; flowers yellow, the styles ca 1 mm long, the ovary glabrous; mature fruit oval to orbicular, rounded at apex, retuse at base, 8–11 mm long, 6–8 mm broad, glabrous, the dorsal ribs filiform, the lateral broadly thin-winged, the wings broader than body; vittae small, 3 or 4 in intervals, 6–8 on commissure; seed dorsally compressed in transection, scarcely channeled, the face involute.

TYPE: SAN LUIS POTOSI: Rocky limestone, San Pedro, Sierra Madre Oriental, elev. 2150–2200 m, 29 Jul 1934, *Francis W. Pennell 17,734* (UC, type).

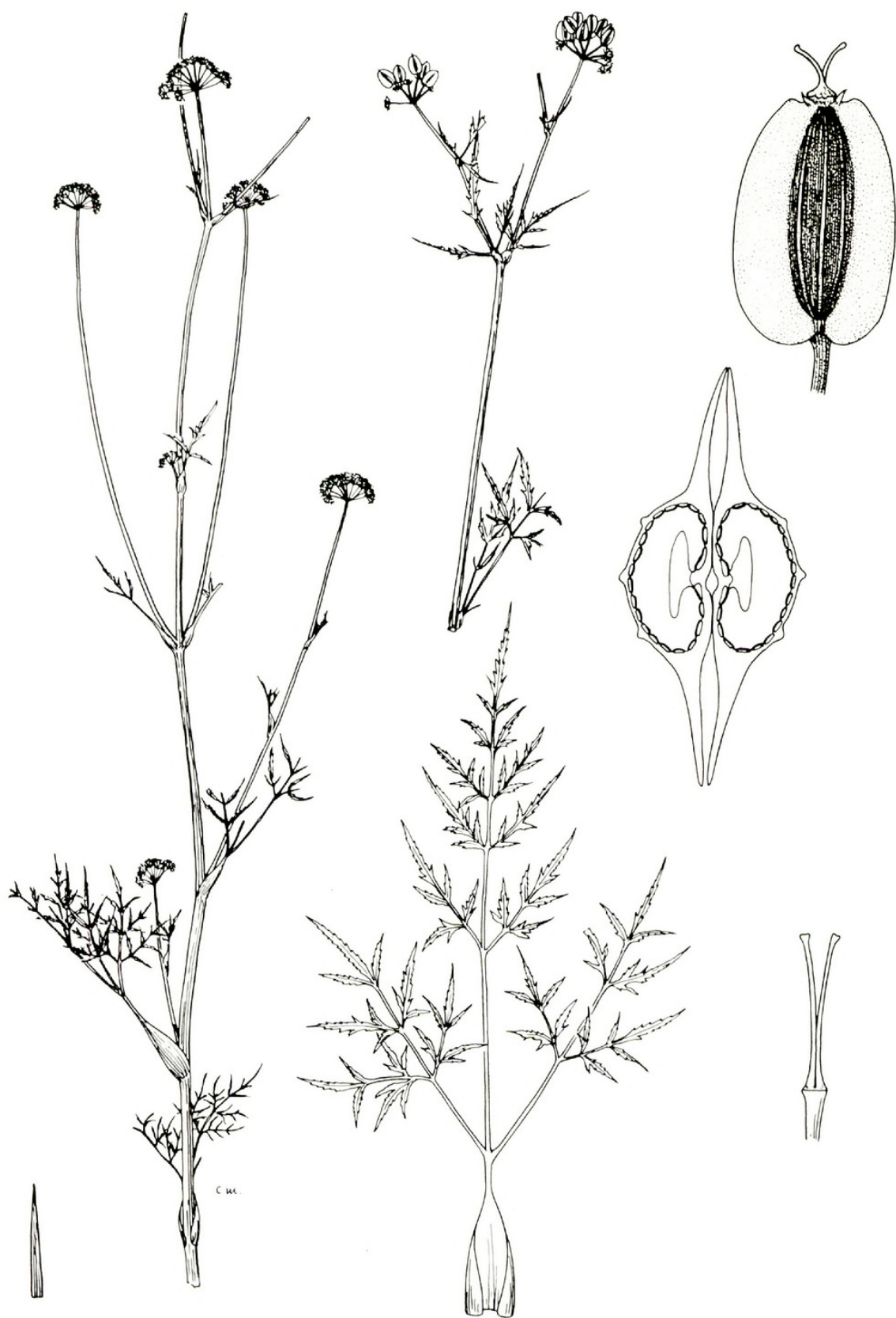


FIG. 9. *Rhodosciadium rzedowskii*. Habit, $\times 1/4$; lower cauline leaf, $\times 1/2$; carpopore, $\times 3$; bractlet, $\times 5$; fruit, $\times 3$; fruit transection, $\times 8$ (all from *Rzedowski 3381, 6198*).

Other collections examined:

SAN LUIS POTOSI: Encinar chaparro sobre cerro riolítico, Villa de Arriaga, elev. 2200 m, 5 Aug 1954, *J. Rzedowski* 3381 (UC); ladera riolítica con vegetación de zacatal, Sierra de San Miguelito, al W de Terrero, elev. 2050 m, *Rzedowski* 6198 (ENCB, UC).

This and the following species, which are much more similar to each other than to any other members of *Rhodosciadium*, have been overlooked partly because of the difficulty of correlating flowering and fruiting material and thus of making assignment to the proper genus. The type of *R. rzedowskii*, for example, was one of the several elements we (Mathias & Constance, 1944-45, p. 210) combined and cited under *Prionosciadium watsoni* Coult. & Rose. The two new taxa may be distinguished from each other as follows:

Plants glaucous and glabrous; flowers yellow; fruit 8-11 mm long, 6-8 mm broad; vittae small, 3 or 4 in intervals; seed face involute; San Luis Potosí.	<i>R. rzedowskii</i> .
Plants not glaucous, a little scaberulous; flowers lilac; fruit 5-8 mm long, 4-6 mm broad; vittae rather large, 1 or 2 in intervals; seed face plane; Jalisco.	<i>R. macvaughiae</i> .

***Rhodosciadium macvaughiae* Math. & Const., sp. nov. FIG. 10**

Plantae graciles glabrae foliis inflorescentiaque parum scaberula 0.4-1 m altae; folia basalia deltoideo-ovata ternato-pinnato-decomposita diametro 5-15 cm, divisionibus ultimis linearibus 1-15 mm longis vix 1 mm latis, eis terminalibus elongatis integris eis distalibus confluentibus rhachidi primaria exalata; petioli anguste vaginantes 4-9 cm longi; folia caulina alterna vel opposita insuper gradatim ternata vel integra, segmentis elongatis et inconspicue vaginantibus; pedunculi graciles alterni verticillati 4-10 cm longi; involucrum nullum; radii fertiles 2-5 patenti-adscendentes subaequales 2-3(-4) cm longi; bracteolae involucellorum 1-3 lineari-filiformes quam fructus breviores 1-4 mm longae; pedicelli fertiles 1-3, 1.5-2.5 mm longi; flores lilacini, stylis ca 1 mm longis, ovario glabro; fructus ovalis orbiculatusve apice rotundatus basi retusus glaber 5-8 mm longus 4-6 mm latus, costis dorsalibus filiformibus eis lateralibus late tenuialatis alis quam corpore latioribus; vittae magnae 1 vel 2 in intervallis in commissuris 8; semen dorsaliter compressum vix canaliculatum superficie plana.

Plants slender, 0.4-1 m high, glabrous, the foliage and inflorescence a little scaberulous; basal leaves deltoid-ovate, 5-15 cm in diameter, ternate-pinnately decomposed, the ultimate divisions linear, 1-15 mm long, less than 1 mm broad, the terminal elongate, entire, the distal confluent, but the primary rachis unwinged; petiole 4-9 cm long, rather narrowly sheathing; cauline leaves alternate to opposite, the uppermost ternate to entire with elongate segments and inconspicuous sheaths; inflorescence of slender peduncles alternate below, verticillate above, 4-10 cm long; involucre wanting; fertile rays 2-5, spreading-ascending, subequal, 2-3(-4) cm long; involucre of 1-3 linear-filiform bractlets 1-4 mm long, shorter than fruit; fertile pedicels 1-3, 1.5-2.5 mm long; flowers lilac (bluish-pink), the styles ca 1 mm long, the ovary glabrous; mature fruit oval to orbicular, rounded at apex, retuse at base, 5-8 mm long, 4-6 mm broad, glabrous, the dorsal ribs filiform, the lateral broadly thin-winged, the wings broader than body; vittae rather large, 1 or 2 in intervals, 8 on commissure; seed dorsally compressed in transection, scarcely channeled, the face plane.

TYPE: JALISCO: Abundant, upper slopes of Cerro Tequila about 10 km S of Tequila, steep mountainside in mature oak forest with many epiphytes, elev. 2400-2800 m, 14 Sep 1967, *R. McVaugh* 23,905 (MICH, type; UC).

Other collections examined:

JALISCO: Bosque de *Pinus* y *Quercus*, Cerro de Tequila, elev. 2750 m, 11 Aug 1968, *L. M. Villarreal de Puga* 1622 (ENCB); bosque de encino en ladera de cerro, Cerro de Tequila, Mpio. de Tequila, elev. 2750 m, 13 Jul 1971, *R. González T.* 224 (MICH); type locality, 18 Aug 1972, *S. G. Weller* 680 (UC).

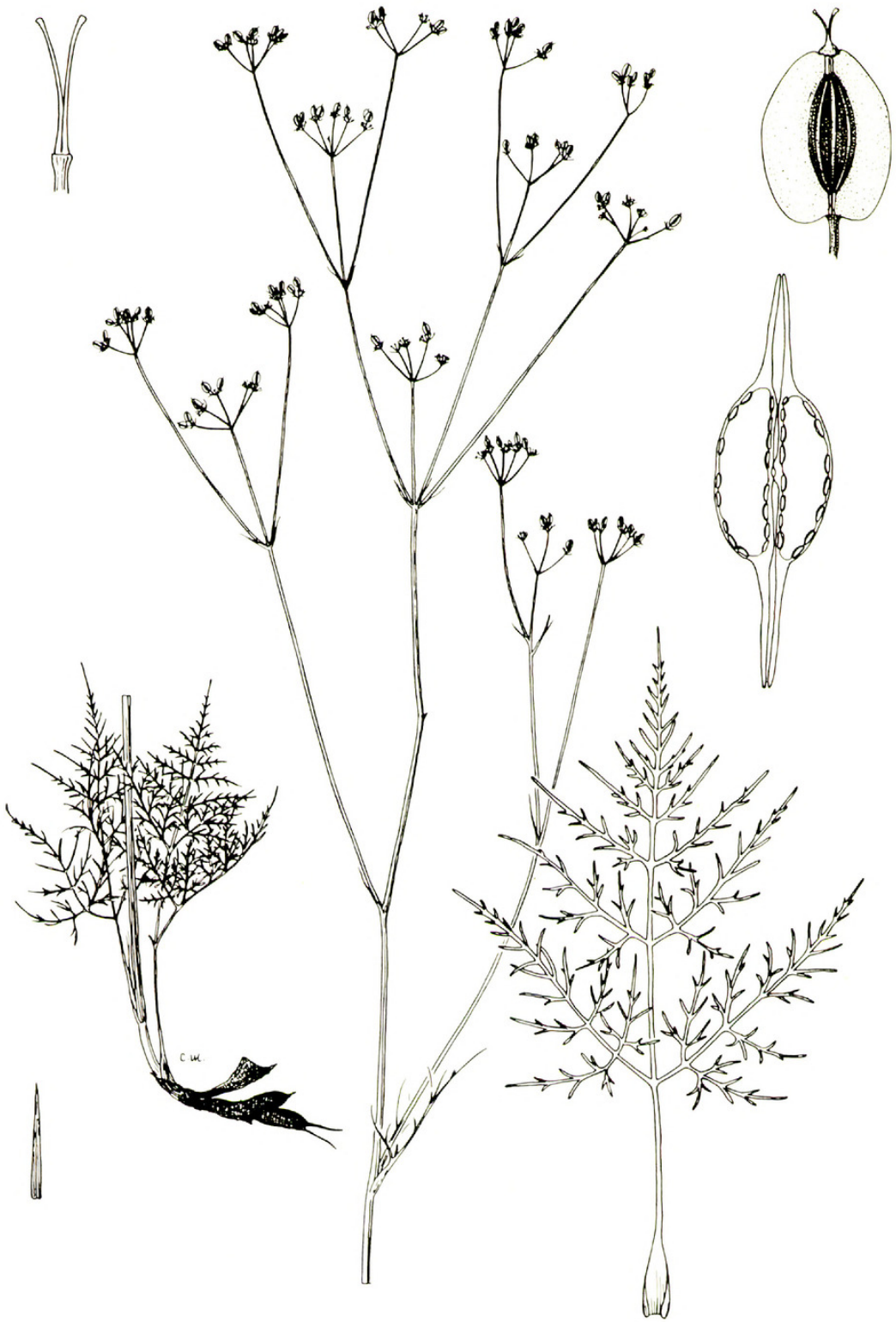


FIG. 10. *Rhodosciadium macvaughiae*. Habit, $\times 1/4$; basal leaf, $\times 1/2$; carpophore, $\times 3$; bractlet, $\times 5$; fruit, $\times 3$; fruit transection, $\times 9$ (all from type collection).

We are happy to dedicate this attractive plant to Ruth Beall McVaugh, who has been an active participant in her husband's Mexican floristic studies.

Eryngium jaliscense Math. & Const., sp. nov. FIG. 11

Plantae perennes graciles caulescentes 8–14 dm altae ex caudice verticali, scapo solitario erecto simplici; folia basalia numerosa disticha lineari-acuminata 25–55 cm longa 2–8 mm lata, margine tota setoso-ciliata densissime prope basin, setis basalibus quam latitudine foliorum multo longioribus, venis parallelis, vaginis latitudine laminae aequantibus 2–4 cm longis; folia caulina basalibus similia alterna reductaque; inflores-

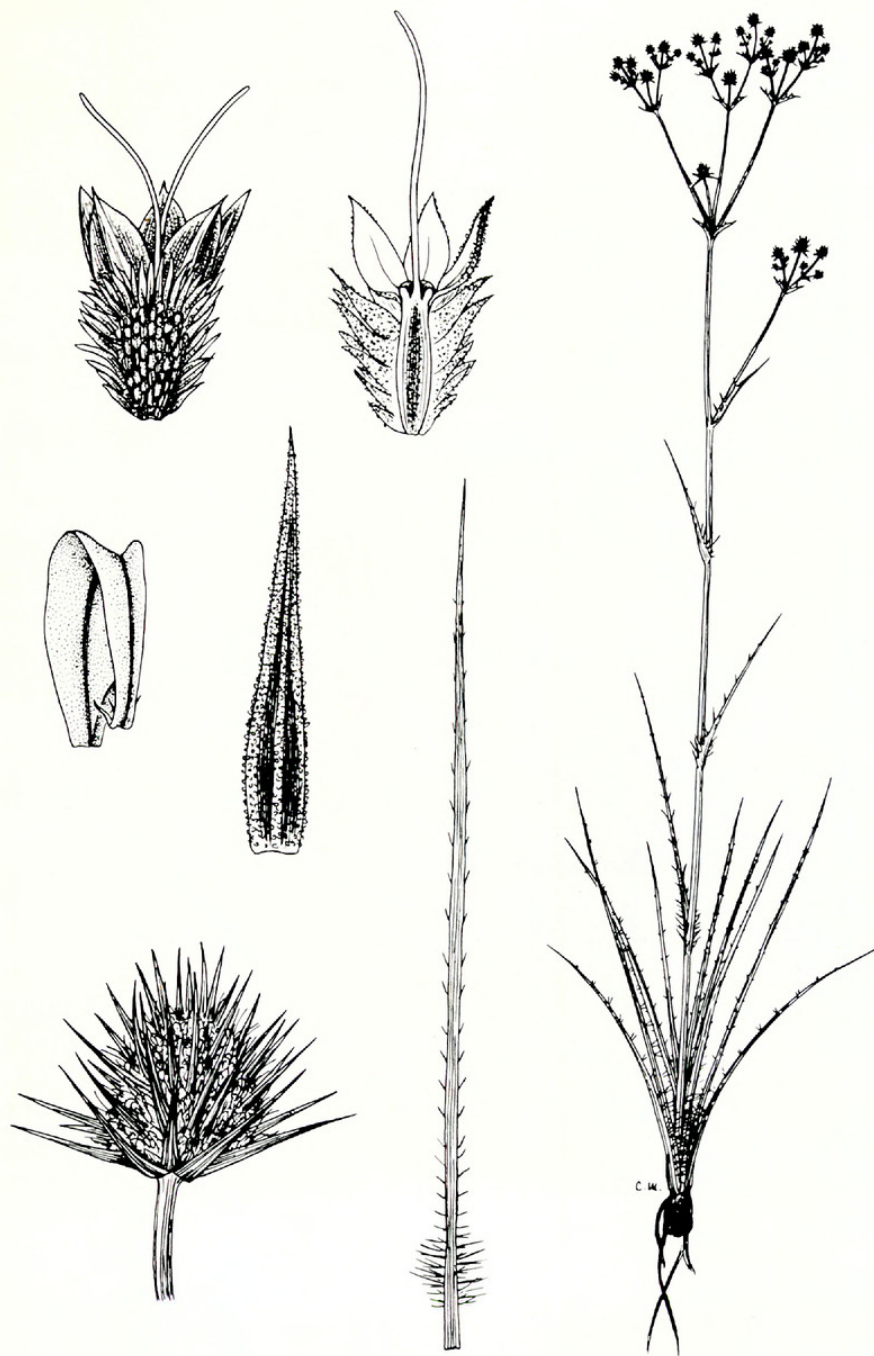


FIG. 11. *Eryngium jaliscense*. Habit, $\times 1/8$; basal leaf, $\times 1/4$; fruit, commissural view, $\times 12$ (all from Feddema 2189); head, $\times 2$; petal, $\times 25$; fruit, dorsal view, $\times 12$; bractlet, $\times 10$ (all from type collection).

centia dichotomo-cymosa ramosa; capitula globoso-ovoidea usque ad hemisphaerica pedunculata viridi-alba diametro 8–10 mm, floribus numerosis; bracteae involucales 5 vel 6 rigidae ovato-acuminatae integrae 5–7 mm longae, 1.5–2 mm latae quam capitulum breviores; bracteae florales eis involucribus similes scarioso-marginatae valde puberulentes fructum multo excedentes; sepala ovata apiculata puberulenta 1–1.5 mm longa; petala oblonga 1 mm longa apice fimbriata; styli graciles 3 mm longi quam calyces duplo longiores; fructus ovoideus diametro 1.5–2 mm, superficiebus mericarpiorum papillatis, squamis lateralibus calycinisque integris.

Plants slender caulescent perennials 8–14 dm high from a short vertical caudex bearing fleshy-fibrous roots, the stem solitary, erect, unbranched below inflorescence; basal leaves numerous, distichous, linear-acuminate, 25–55 cm long, 2–8 mm broad, acuminate at apex, setose-ciliate throughout, densely so at base, some auxiliary setae present, the basal setae much longer than leaf width, the venation parallel, the sheaths as broad as blades, 2–4 cm long; cauline leaves few, like basal, alternate, reduced; inflorescence dichotomously cymose, the heads rather small, numerous, pedunculate, the flowers numerous; heads globose-ovoid to hemispheric, greenish-white, 8–10 mm in diameter; involucrial bracts 5 or 6, rigid, spreading-ascending, ovate-acuminate, 5–7 mm long, 1.5–2 mm broad, acuminate, entire, puberulent, shorter than heads; bractlets like bracts in size and shape, scarious margined, strongly puberulent, much longer than fruit; sepals ovate, 1–1.5 mm long, apiculate, puberulent; petals oblong, ca 1 mm long, with a narrower fimbriate tip; styles slender, ca 3 mm long, twice as long as sepals; fruit ovoid, 1.5–2 mm long and broad, the calycine and marginal squamae flattened, lanceolate, the dorsal faces densely papillate.

TYPE: JALISCO: Occasional, eastern foothills of the Sierra del Halo, ca 25 km W of Jilotlán de los Dolores (56 km from road-junction 11–12 km SW of Tecalitlán) in pine forest, deep sandy granitic soils in stream valley, elev. 1600 m, 21–21 Nov 1970, R. McVaugh 25,559 (MICH, type).

Other collections examined:

JALISCO: Common on shaded lower slopes, Barranca de San Juan de Dios, ca 15 km E of Pihuamo, E slopes of Sierra de los Corales, Mpio. de Tecalitlán, elev. 1200–1300 m, 24 Oct 1963, C. Feddema 2189 (MICH, UC).

This undoubtedly is closest to *E. pringlei* Hemsl. & Rose of San Luis Potosí, with which it agrees in the distichous, setose-ciliate foliage, the strongly puberulent heads, and details of flowers and mericarp ornamentation. It differs strikingly by its larger size, longer and differently shaped leaves (which are prominently setose throughout), and by its much larger, more acuminate, and very prominent bracts and bractlets, which give the much more numerous heads an entirely different aspect. *Eryngium pringlei* is reported to occur in alkaline meadows and salt marshes at lower altitudes while *E. jaliscense* is known from forested slopes at slightly higher elevations. Fruiting material of *E. pringlei* has been collected from June to early August; *E. jaliscense* appears not to fruit until late October or November.

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