
EIGHT NEW SPECIES AND ONE NEW COMBINATION OF NEOTROPICAL LAURACEAE¹

Henk van der Werff²

ABSTRACT

Work in progress on the systematics of neotropical Lauraceae had yielded several undescribed species. In this contribution, eight species (Aiouea obscura van der Werff, Aiouea vexatrix van der Werff, Caryodaphnopsis cogolloi van der Werff, Licaria velutina van der Werff, Nectandra miraffloris van der Werff, Persea pajonalis van der Werff, Phoebe elegans van der Werff, and Pleurothyrium hexaglandulosum van der Werff) are described, illustrated, and discussed. A new combination, Ocotea erectifolia (Allen) van der Werff is made.

Lauraceae are a large tropical family of trees and shrubs with the number of species in the New World estimated at 700–800. The taxonomy of the neotropical Lauraceae is poorly understood, and the entire family needs much work. The facts that many Lauraceae have small, inconspicuous flowers and are not frequently collected, that the genera are poorly defined, and that many species are known only from a few poor specimens have rendered the family almost inaccessible for the nonspecialist. Recent collections have shown that quite a few very distinct species await descriptions. In this contribution, eight species, mostly belonging to the smaller and relatively better-known genera, are described and discussed. A new combination is made and its synonymy given.

Aiouea obscura van der Werff, sp. nov.

TYPE: Costa Rica. Puntarenas: along highway from Palmar Norte to Chacarita, ca. 2 km N of Chacarita. Tree, 10 m. Flowers pale green. *B. Hammel, M. Grayum & G. de Nevers 15197* (holotype, MO; isotypes, BM, CR, F, MEXU, NY, PMA, U). Figure 1.

Arbor, 10 m. Ramuli graciles, teretes, glabri. Gemma terminalis glabra. Folia alterna, anguste elliptica, basi apiceque acuta, 15–18 × 3–4 cm, membranacea, subtriplinervia, brochidodroma, in sicco olivacea; nervi laterales 2–3. Venatio super parve elevata, subtus magis elevata. Domatia plerumque in axillis nervorum lateralium basaliium. Petioli teretes, glabri, 1–1.5 cm longi. Inflorescentiae axillis bractearum deciduarum super partem foliiferam, 15 cm longae, graciles. Pedicelli 8–10 mm longi. Tepala 6, aequalia, glabra, ca. 2 mm longa, late elliptica. Stamina 9, 2-locellata; 6 exteriora introrsa, ca. 1 mm longa, anthera parum latiore quam filamentum, apice antherae locellos excedenti, filamentum pubescenti; 3 interiora extrorsa, ca. 1.2 mm longa, apice locellos excedenti. Glandulae magnae, ca. 0.4 mm diametro, parum super basem affixae. Staminodia non visa. Ovarium glabrum, ovatum, ca. 1 mm longum, sensim in stylo brevi attenuatum. Fructus ignotus.

Tree, 10 m tall. Twigs slender, terete, glabrous. Terminal bud glabrous. Leaves alternate, narrowly elliptic, the base and tip acute, 15–18 × 3–4 cm, membranaceous, subtriplicateveined, the basal veins reaching $\pm \frac{2}{3}$ to the apex, the other 2–3 pairs of lateral veins in the upper half of the lamina, the lateral veins all curving toward the apex and loop-connected, drying olive green. Venation and reticulation slightly raised on upper surface, slightly more so on the lower surface. Domatia often present in the axils of the large lateral veins. Petioles terete, glabrous, 1–1.5 cm

¹ I thank the various botanists working in Mexico, Panama, and Colombia for their often excellent collections, sent to me for identifications. Their work is essential for a better understanding of the Lauraceae. Dr. W. Burger commented on parts of the manuscript. Dr. J. Dwyer kindly checked the Latin descriptions. John Myers made the illustrations. Loans from BR, F, G, and NY are gratefully acknowledged.

² Herbarium, Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166-0299, U.S.A.

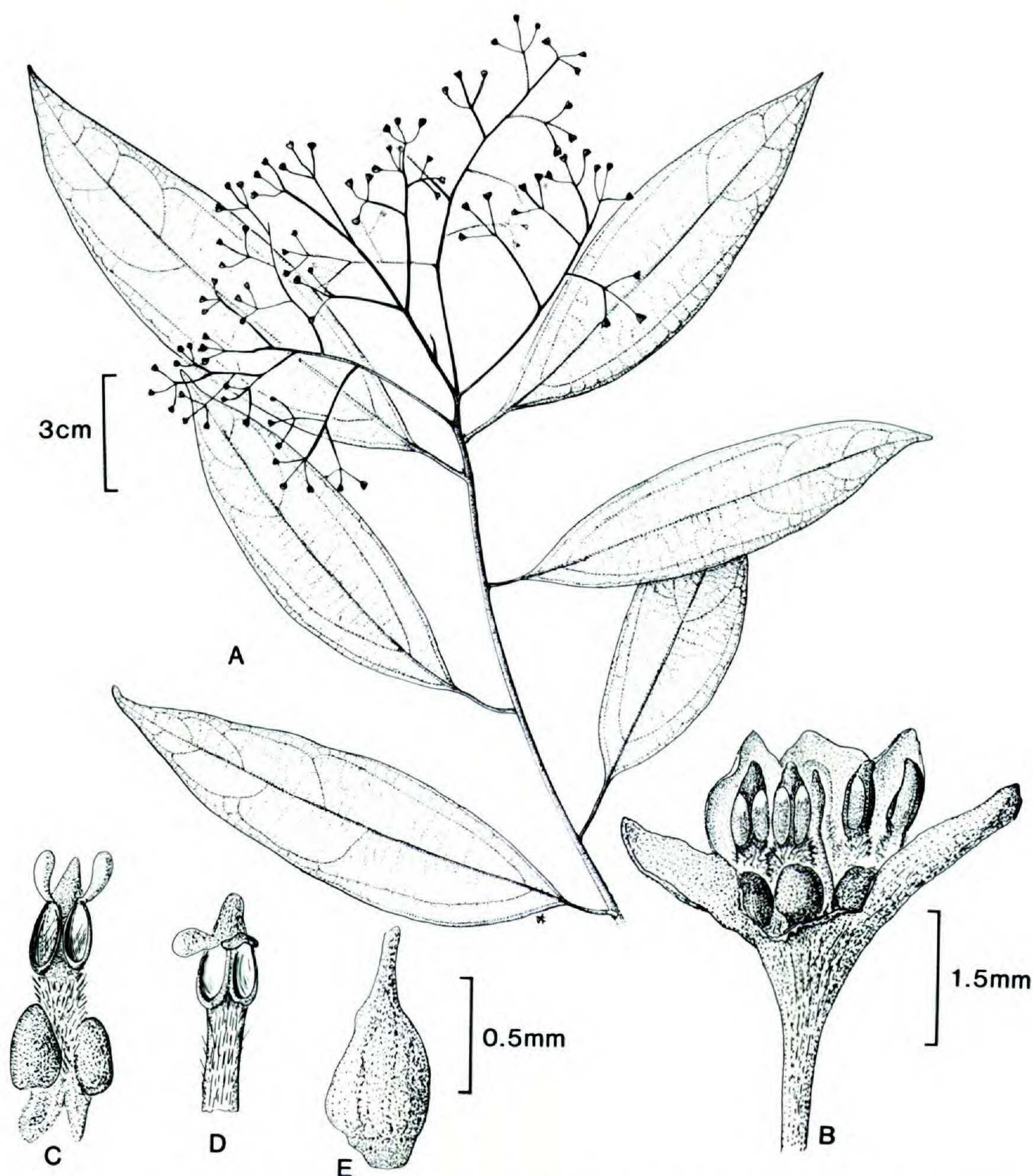


FIGURE 1. *Aiouea obscura*.—A. Flowering branch.—B. Flower.—C. Inner stamen with basal glands.—D. Outer stamen.—E. Ovary.

long. Inflorescences above the leaf-bearing part of the twigs, in the axils of deciduous bracts; terminal buds inconspicuous but always present above the lateral inflorescences. Inflorescences glabrous, to 15 cm long, slender, paniculate. Flowers pale green. Pedicels 8–10 mm long. Tepals 6, equal, glabrous, 2 mm long, broadly elliptic. Stamens 9, 2-celled; the outer 6 introrse, ca. 1 mm long, the anther slightly wider than the filament, the tip of the anther protruding beyond the anther cells, the filaments pubescent; inner 3 stamens extrorse, ca. 1.2 mm long, the glands large, ca. 0.4 mm diam., attached slightly above the base of the filaments, reaching the upper part of the filaments, leaving the anthers exposed

but shielding the ovary; connective tissue also protruding beyond anther cells. Staminodia not seen. Ovary glabrous, ovate, ca. 1 mm long, gradually narrowed into the short style. Fruit unknown.

Aiouea obscura is only known from the type collection. Characteristics are laxly flowered inflorescences, relatively long pedicels, and dark-drying, subtriplicate leaves with loop-connected lateral veins. It resembles closely several other dark-drying Lauraceae with membranaceous leaves and lax inflorescences, such as *Ocotea tenera* Mez & J. D. Smith (known from Costa Rica) and *Phoebe glabra* van der Werff (southern Mexico).

Aiouea obscura differs from both species in having two-celled anthers; from *O. tenera* it differs further in having subtripliveined leaves and from *P. glabra* in having narrower leaves with less prominently raised reticulation. None of the other Central American species are similar to *A. obscura*. These observations re-emphasize that our current generic concepts place seemingly closely related species in different genera and that these concepts urgently need re-examination.

Aiouea vexatrix van der Werff, sp. nov.

TYPE: Panama. Panamá: Cerro Campana, above Capira, elev. ca. 900 m, 8°40'N, 79°50'W. Slender treelet, 3 m tall. Stem with small red ants in center. Perianth green. *McPherson* 9226 (holotype, MO). Figure 2A–G.

Frutex vel arbor parva, ad 7 m. Ramuli juvenales angulati, minute fusco-puberuli, vetustiores teretes glabrique. Ramuli fistulosi frequenter formicis habitati. Petioli ad 1.5 cm longi, glabri vel minute puberuli. Folia alterna, in sicco atro-olivacea, glabra, chartacea, elliptica, basi apiceque acuta, 13–27 × 5–9 cm, super costa nervisque immersis, reticulatione parve elevata, subtus costa nervisque elevatis. Nervi laterales utroque costae latere 6–8. Inflorescentiae axillares, glabrae vel minute puberulae versus basim, ad 9 cm longae; ramuli inflorescentiarum complanati in sicco. Flores in vivo virides, ad 3 mm longi. Tepala 6, aequalia, glabra, erecta per anthesin, late ovata, 2 mm longa, 1.7 mm lata. Stamina 9, 2-locellata, glabra, inclusa, 6 exteriora introrsa, 3 interiora extrorsa filamentis quam antheris angustioribus. Staminodia nulla. Ovarium glabrum, ellipsoideum, sensim in stylo attenuatum. Infructescentiae ad 7 cm longae. Cupula ca. 8 mm diametro, tepalis in margine cupulae persistentibus, pedicello paulatim in cupula dilatato. Fructus ellipsoideus, ad 2 cm longus, fere omnino exsertus.

Shrub or small tree, 5(–7) m tall. Leafy twigs angular, minutely brownish puberulous, becoming round and glabrous on older parts; twigs consistently hollow and with pores giving access to the hollow center; often ants present in the hollow twigs (fide collectors). Terminal bud small, with very fine, copper-colored pubescence. Petioles to 1.5 cm long, minutely puberulous or glabrous, the lamina decurrent as narrow ridges. Leaves drying dark olive green, rarely gray-green, glabrous, chartaceous, elliptic, rarely slightly obovate, the base and apex both acute, 13–27 × 5–9 cm, the

upper surface with immersed midrib and lateral veins, the final reticulation slightly raised; lower surface with midrib and lateral veins elevated, the final reticulation less elevated. Lateral veins 6–8 pairs. Inflorescences axillary, often seemingly terminal, glabrous or with some minute puberulence especially near the base, 6(–9) cm long, the branchlets not terete, these flattened after drying. Flower glabrous, ca. 3 mm long, on pedicels to 3 mm long; tepals 6, equal, glabrous, erect at anthesis, broadly ovate, ca. 2 mm long, 1.7 mm wide. Stamens 9, all 2-celled, the outer 6 introrse, the inner 3 extrorse. Outer stamens 1.5 mm long, the filament glabrous and ca. 0.6 mm long, the anther narrowly triangular, wider than the filament, ca. 0.9 mm long with a sterile apical section; anther cells large, ca. 0.3 mm long. Inner stamens 1.5 mm long, the anther 0.8 mm long, with sterile tip; filament slender with 2 large glands attached near the base. Glands collar-shaped, the basal part spreading horizontally, then abruptly curved inward and downward (toward the ovary), the tip of the gland flattened and resting on the upper part of the ovary. Staminodia lacking. Ovary glabrous, ellipsoid, ca. 0.8 mm long, largely sunken in the flower tube, at the tip gradually narrowed into the style, this 0.8 mm long. Infructescences to 7 cm long. Cupule ca. 8 mm diam., the tepals persistent on the rim, the pedicels gradually widened into the cupule. Fruit ellipsoid, ca. 2 cm long, almost completely exserted. Occasional stamens remaining attached to the cupule in late fruiting stage.

Paratypes (all MO). PANAMA. PANAMÁ: Cerro Campana, *Correa* 295, 1026; same locality, *Croat* 12153, 14689, 17203, 25120, 35960; same locality, *Garner* 13; same locality, *Gentry* 1832, 5776; same locality, *Hamilton* 4056, 4061; same locality, *Hammel* 3776; same locality, *Kirkbride* 245; same locality, *Luteyn* 1812; same locality, *McPherson* 7461, 7921; same locality, *Miller* 975; same locality, *Mori* 1917, 2457, 7701; same locality, *Nee* 11611; same locality, *Sytsma* 1150, 2942, 2962; Cerro Trinidad, *Kirkbride* 1656. COLÓN: Santa Rita Ridge Road, *Correa* 1056; same locality, *Dressler* 3705; same locality, *Foster* 1735; same locality, *Sytsma* 4238, 4252; Cerro Brewster, *de Nevers* 5573. COMARCA DE SAN BLAS: El Llano–Carti Road, *de Nevers* 4240.

Aiouea vexatrix has a limited distribution

TABLE 1. Diagnostic characters for *Aiouea vexatrix*, *Ocotea paulii*, *O. atirrensis*, and *O. nicaraguensis*. The numbers in parentheses given with the flowering and fruiting periods represent the number of collections examined.

	<i>Aiouea vexatrix</i>	<i>Ocotea paulii</i>	<i>Ocotea atirrensis</i>	<i>Ocotea nicaraguensis</i>
Anthers	2-celled	4-celled	4-celled	4-celled
Cupule	tepals persistent	tepals deciduous	tepals deciduous	tepals persistent
Leaf color when dry	dark olive green	green	dark olive green	green
Leaf shape	elliptic	elliptic	obovate	obovate to oblanceolate
Leaf texture	thinly chartaceous	stiffly chartaceous	thinly chartaceous	thickly chartaceous
Length of inflorescence	½ leaf length or less	± equal to leaves	± equal to leaves	± equal to leaves
Flowering period	April–July (15)	October–January (11)	January–April (22)	
Fruiting period	July–November (20)	January–May (12)	April–September (13)	

in central Panama, where the abundance of collections indicates that it is common.

The placement of this new species in the genus *Aiouea* is provisional. The Central American species of *Aiouea* are quite different morphologically from the South American species, which include the type of the genus (van der Werff, 1984, 1987). *Aiouea vexatrix* is another example of such an aberrant *Aiouea* species. It has the following characters unusual for *Aiouea*: lack of staminodia, short inflorescences with flattened axes, dark olive green leaves, and persistent tepals on the cupule. It is included in *Aiouea* solely because of its hermaphrodite flowers with nine two-celled stamens and because it does not agree with the other, much better defined genera with nine two-celled stamens (*Aniba*, *Beilschmiedia*, *Cryptocarya*, *Kubitzkia*, *Phyllostemonodaphne*, *Urbanodendron*). As discussed below, *A. vexatrix* is probably related to *Ocotea*. The current circumscriptions of the neotropical genera of Lauraceae attach much importance to the number of cells of the anthers. This is an artificial character that obscures true relationships. However, discarding the present imperfect generic classification implies its replacement with a better classification, which I cannot offer at this moment. Therefore, I place this new species in *Aiouea*, a genus consisting of a group of closely related species in the lowlands of Venezuela, the Guianas, Brazil, and Paraguay, plus several unrelated species in the Andes and Cen-

tral America. It is likely that the Andean and Central American species have been independently derived from *Ocotea* or *Nectandra* ancestors that lost two of their four anther cells.

Aiouea vexatrix is related to a group of *Ocotea* species that grow as shrubs or treelets, have angular (or almost winged), hollow twigs frequently inhabited by ants, flattened inflorescence branchlets, and glabrous flowers with erect tepals. The following names have been applied to these species: *Ocotea nicaraguensis* Mez, *O. paulii* Allen (Fig. 2H), *O. pedalifolia* Mez, *O. pentagona* Mez, *O. atirrensis* Mez & J. D. Smith and *O. wedeliana* Allen. Their distributions are in Panama, Costa Rica and Nicaragua. A survey of specimens at the Missouri Botanical Garden suggests that four species are involved, *A. vexatrix*, *O. paulii* (isotype, MO!), *O. atirrensis* (isotype, US!), and *O. nicaraguensis* (type W, probably destroyed; type photo, MO!). The main differences between these species are presented in Table 1. *Ocotea wedeliana* is known to me only from three isotypes (MAD, US, GH), all rather poor specimens from which one cannot draw firm conclusions. The flowers have four-celled anthers; the leaves are chartaceous and dry dark. A fruiting collection identified by Allen as *O. wedeliana* has the cupule of *O. paulii*, but thinner leaves.

The distributions of the four recognized species follow: *Aiouea vexatrix* is only known from areas rather close to Panama City (Pa-

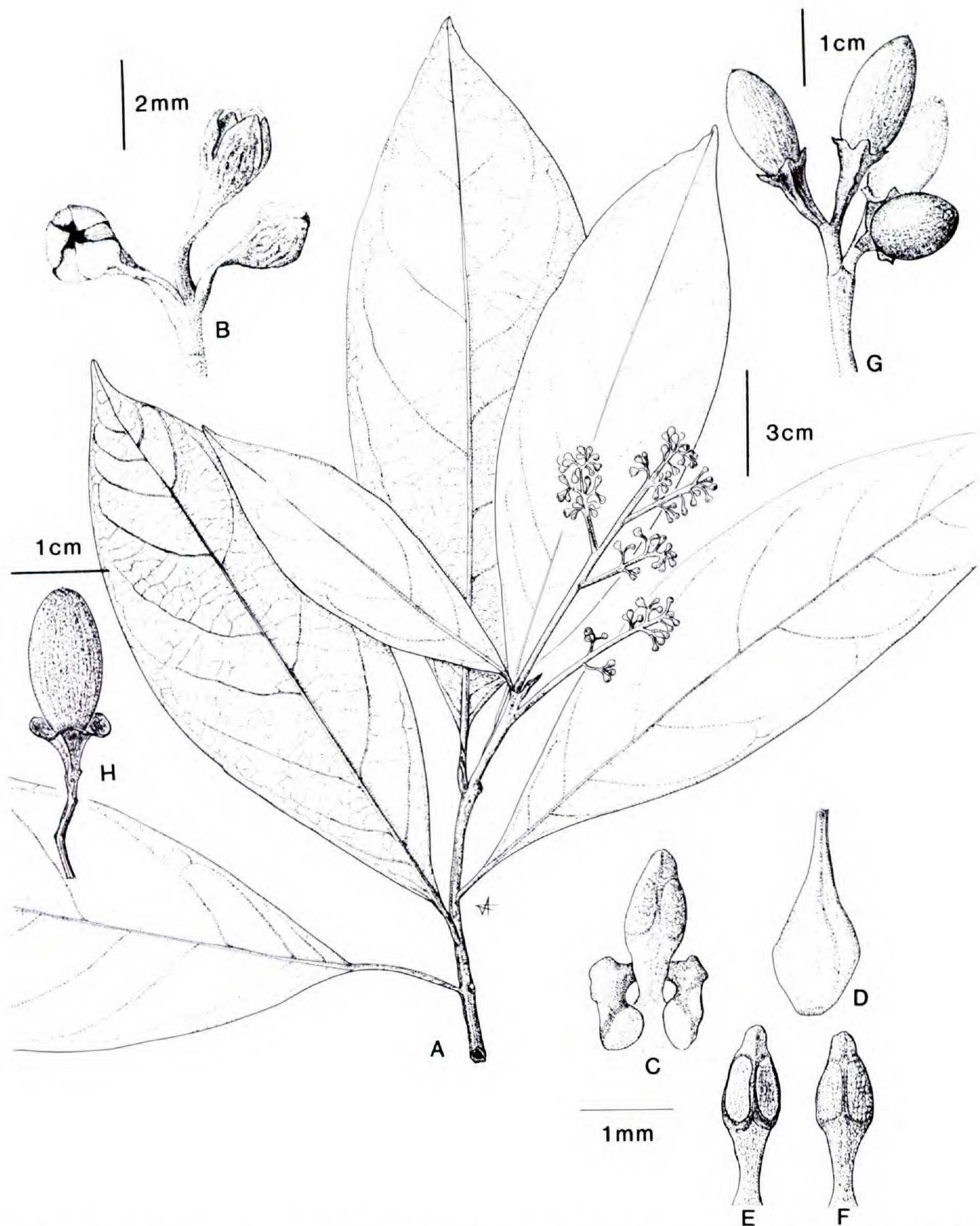


FIGURE 2. A-G. *Aiouea vexatrix*.—A. Flowering branch.—B. Flowers.—C. Inner stamen with glands.—D. Ovary.—E, F. Outer stamens seen ventrally and dorsally.—G. Fruits.—H. Fruit of *Ocotea paulii*.

namá, Colón, Comarca de San Blas). *Ocotea paulii* has a wider distribution in Panama (from Darién to Veraguas) and is uncommon in Costa Rica. It occurs with *A. vexatrix* on Cerro Campana, but no intermediates have been found there. Three collections, intermediate between *A. vexatrix* and *O. paulii*, are known from the western edge of the distribution of *A. vexatrix*. Both *Hammel 3557* (MO) and *Sytsma 4407* (MO) have leaf texture and color of *A. vexatrix*, flowers with

four-celled anthers, and inflorescences longer than typical for *A. vexatrix*, but shorter than for *O. paulii*. *Allen 3439* (AA), identified as *O. wedeliana* Allen by Allen, has the thin leaves of *A. vexatrix* and cupule shape of *O. paulii*. These specimens, as well as the type of *O. wedeliana* Allen (US!, GH!, MAD!) are probably hybrids between *A. vexatrix* and *O. paulii*.

Ocotea atirrensis has been collected frequently in Costa Rica, but I have seen only

two collections from Panama, both from Bocas del Toro. No intermediates between *O. atirrensis* and *O. paulii* are known to me. *Ocotea atirrensis* is characterized by large, obovate, chartaceous leaves that dry dark green and have acuminate tips; its tepals are not persistent on the cupule.

Ocotea nicaraguensis includes *O. pentagona* (syntypes: *Biolley* 7106, *Tonduz* 7613, 8362, all BR!) and a syntype of *O. pedalifolia* (*Pittier* 9172, BR!). The other syntype of *O. pedalifolia* (*Pittier* 9179, BR!) is *O. atirrensis*. Not as well represented as the other species, *O. nicaraguensis* awaits more specimens for a better understanding. Diagnostic characters are the strongly angled stems and stiffly chartaceous, green-drying leaves with acute tips; the cupule is crowned with persistent tepals. The few collections do not indicate a well-defined flowering period. Its obovate to oblanceolate leaves are distinct from the other species. *Ocotea nicaraguensis* is known from Costa Rica and Nicaragua.

Old collections of *A. vexatrix* have been distributed as *O. subsericea* Standley and as *O. atirrensis* and may be present in other herbaria under these names.

Caryodaphnopsis cogolloi van der Werff, sp. nov. TYPE: Colombia. Antioquia: Municipio de San Luis, left bank of Río Claro, 325–500 m, 5°53'N, 74°39'W. Tree, 15–18 m, flowers yellow. *A. Cogollo* & *R. Borjo* 2019 (holotype, JAUM, n.v.; isotype, MO). Figure 3.

Arbor, 30 m. Ramuli teretes, juniores minute ferrugineo-pubescentes, vetustiores glabrescentes. Folia opposita, decussata, venatione pinnata, nervis utroque costae latere 8–12. Laminae ellipticae, 15–20 × 5–8 cm, basi acuta, apice acuminata; super glabrae, venatione immersa; subtus glaucae, costa nervisque elevatis et minute ferrugineo-pubescentibus, nervis minoribus paucis pilis ferrugineis praeditis. Petioli teretes, 1.5–2 cm longi, minute ferrugineo-pubescentes. Inflorescenciae axillares, ramulis oppositis, pyramidato-paniculatae, foliis perbreviares, minute et dense ferrugineo-pubescentes. Flores flavi. Tepala 6, inaequalia; 3 exteriora anguste triangularia, ca. 1.5 mm longa, apicibus saepe recurvatis, minute pubescentia; 3 interiora anguste ovata, apicibus acutis recurvatisque, ca. 4 mm longa, minute pubescentia; stamina 9, 4-locellata; 6 exteriora ca. 2 mm longa, glabra, filamentis ca. 0.6 mm longis, antheris ca. 1.3 mm longis,

locellis introrsis; 3 interiora ca. 2 mm longa, glabra, filamentis ca. 1.2 mm longis, basibus 2 glandulis globosis auctis, antheris ca. 0.6 mm longis, locellis extrorsis. Stamina 3, glabra, apicibus dilatata. Ovarium globosum, ca. 0.5 mm diametro. Stylum gracile, ca. 1.2 mm longum. Fructus pyriformis, in sicco ca. 4 cm longus.

Tree, to 30 m tall. Twigs terete, the younger ones with minute, ferruginous pubescence, becoming glabrous with age. Leaves opposite, decussate, pinnately veined, lateral veins 8–12 pairs. Laminae elliptic, 15–20 × 5–8 cm, the base acute, the apex acuminate, the upper surface glabrous with immersed veins, the lower surface gray-glaucous, waxy, the midrib and lateral veins elevated and with minute, ferruginous pubescence, the smaller veins with few ferruginous hairs. Petioles 1.5–2 cm long, with minute ferruginous pubescence, terete. Inflorescences axillary, to 8 cm long, much shorter than the leaves, branched from the base, pyramidal-paniculate, minutely and densely ferruginous pubescent. Flowers yellow; pedicels 2–3 mm long. Tepals 6, unequal; the outer 3 narrowly triangular, ca. 1.5 mm long, the tip often recurved, minutely brown pubescent; inner three ca. 4 mm long, narrowly ovate, the tip acute and recurved, minutely brown pubescent. Stamens 9, all 4-celled, the outer 6 ca. 2 mm long, glabrous, filaments ca. 0.6 mm long; anthers ca. 1.3 mm long, the cells introrse; the inner 3 slender, glabrous, ca. 2 mm long, filaments ca. 1.2 mm long, with anthers ca. 0.6 mm long, the cells extrorse; the filaments with 2 rather small, globose, basal glands. Stamina 3, glabrous, ca. 1 mm long, the tip widened. Ovary globose, ca. 0.5 mm diam., the upper part with brown hairs; style slender, ca. 1.2 mm long. Fruit avocado-shaped, ca. 4 cm long when dry.

Paratype. COLOMBIA. ANTIOQUIA: Municipio de San Luis, Río Claro, 350 m (fr), *A. Cogollo et al.* 2195 (JAUM, MO).

Caryodaphnopsis cogolloi is known only from a small (± 2 km²) forest remnant in the Magdalena Valley in Colombia. This forest patch is home to, based on collections by Cogollo, two other undescribed species of *Caryodaphnopsis* (known from fruiting material)



FIGURE 3. *Caryodaphnopsis cogolloi*.—A. Flowering branch.—B. Detail of lower leaf surface.—C. Flowers.—D. Flower with several tepals removed, showing outer and inner stamens, staminodia, and ovary with slender style.—E. Outer stamen.—F. Inner stamen with basal glands.—G. Ovary.—H. Fruit.

and two undescribed species of *Licaria*. This shows how poorly collected neotropical Lauraceae are.

Caryodaphnopsis cogolloi is closely related to *C. inaequalis* (A. C. Smith) van der Werff & Richter, a species known from the Peruvian-Brazilian border area. Both species have pinnately veined leaves, a rare character in *Caryodaphnopsis* (van der Werff & Richter, 1985). The two species differ as follows: *C. cogolloi* has four-celled anthers, outer tepals 1.5 mm long having acute, recurved tips, denser tomentum on the flowers, and a glaucous undersurface of the leaves. *Caryodaphnopsis inaequalis* has two-celled anthers, outer tepals ca. 0.5 mm long with blunt tips and not recurved, rather scarce tomentum on the flowers, and leaves green below.

Recent collections of *Caryodaphnopsis* show that the neotropical species fall into two groups. One group includes the species with pinnately veined (or subtripliveined) leaves and an avocado-shaped fruit (*C. cogolloi*, *C. inaequalis*, *C. theobromifolia*); the other group includes the species with strongly three-veined leaves (the basal lateral veins reach the leaf apex) and small, round fruits (*C. fosteri* and three or four undescribed species).

The new species is named after its collector, Alvaro Cogollo, who collected several undescribed species of Lauraceae in the Magdalena Valley in Colombia.

Licaria velutina van der Werff, sp. nov.

TYPE: Mexico. Veracruz: Mpio. San Andres Tuxtlas, Cerro Vigía near Estación de Biología Tropical Las Tuxtlas, 300 m, tree 18 m with yellowish flowers, G. Ibarra M. & S. Sinaca C. 100 (holotype, MEXU; isotypes, CHAPA, HBG, MO). Figure 4.

Arbor, 8–20 metralis. Ramuli obtuse angulati, lenticellati, juveniles albido-vel bubalino-velutini, veteres fusco-pubescentes. Folia alterna, anguste elliptica vel anguste ovata, apice basique acuta, 12–30 × 2.5–6.5 cm; glabrescentia, nervis lateralibus 10–14, venatione super immersa vel perobscure elevata, subtus costa manifeste elevata, nervis et venatione elevata. Petioli 1–2 cm longi. Inflorescentiae foliis perbreviores, paniculatae, in axillis bractearum deciduarum, ad 13 cm longae, immaturae

velutinae, veteres pubescentes sparsiore. Flores pedicellis 2–4 mm longis, glabri, globosi vel late elliptici, ca. 2 mm longi, 1.5 mm lati; tepala 6, exteriora parum majoria interioribus, incurvata, ca. 0.3 mm longa, ca. 0.5 mm lata; stamina 3, 2-locellata, connata, ca. 1 mm longa, inclusa; locelli extrorsi, aperientes ad apicem antherarum. Glandulae staminum praesentes. Ovarium glabrum, ellipsoideum, sensim in stylum attenuatum, ca. 1.3 mm longum. Infructescentia ad 7 cm longa, plerumque solo fructu. Cupula cylindrica, ad 2 cm longa, 2.5 cm lata, 1.5 cm profunda margine simplici; fructus (in sicco) cupula ca. 1 cm longior.

Tree, 8–20 m tall. Twigs obtusely angled, with gray lenticels, the inflorescence-bearing part covered with white or yellowish velutinous pubescence, this changing to very short, brown pubescence on fruiting twigs. Leaves alternate, narrowly elliptic or narrowly ovate, the tip gradually acute or narrowly rounded, the base acute, 12–30 × 2.5–6.5 cm, when young with appressed pubescence, but soon glabrescent, with 10–14 pairs of lateral veins, the venation immersed or faintly elevated above, the midrib prominently raised below, the lateral veins and tertiary venation raised below. Petioles 1–2 cm long. Inflorescences much shorter than leaves, paniculate, in the axils of deciduous bracts, to 13 cm long; immature inflorescences velutinous; older inflorescences with sparser pubescence; bracts of the inflorescence with white pubescence on the outside, glabrous inside, ovate, ca. 2.5 mm long, deciduous at anthesis. Flowers on glabrous pedicels, these 2–4 mm long; flowers glabrous, globose or broadly elliptic, ca. 2 mm long and 1.5 mm wide; tepals 6, incurved, the outer 3 broader than the inner 3, ca. 0.3 mm long, 0.5 mm wide; fertile stamens 3, their tips just exposed; anther cells almost apical, small, opening toward the tip and extrorse. Stamens fully connate, forming a dome ca. 1 mm high and ca. 1.3 mm wide at the base; ovary globose, ellipsoid, gradually narrowed into style, ca. 1.3 mm long. Staminal glands 6, reduced to small flaps, ca. 0.3 mm tall, visible at the base of the anthers. Infructescences to 7 cm long, usually with only one fruit. Cupule deeply cup-shaped, 2 cm long, 2.5 cm wide, the cup ca. 1.5 cm deep with gray lenticels, rather thin, ca. 1 mm thick at the margin, not double-rimmed, often

with dried stamens attached to the margin. Fruit to 1 cm longer than the cupule when dry, ovoid, ca. 2.5 cm long.

Common names. Laurel baboso, Laurel pimienta.

Paratypes. MEXICO. CHIAPAS: Mpio. Tecpatán, Colonia El Diamante, cerce del punto Trine de Chiapas-Tabasco-Vera Cruz, Aug. 1984 (fr), *Serrano B. & Rojas s.n.* (CHAPA, HBG, MEXU, MO). VERACRUZ: Mpio. San Andres Tuxtlas, Estación de Biología Tropical Las Tuxtlas (fr), *Calzada 178* (F, MO); same locality (fr), *Calzada 695* (F, MO); same locality, May 1981 (fr), *Gentry & Lott 32260* (MO); same locality, June 1981 (st), *Gentry & Lott 32521* (MO); same locality, April 1984 (fr), *Ibarra M. 1462* (CHAPA, HBG, MEXU, MO); same locality, lote 67, July 1984 (fr), *Ibarra M. & Sinaca C. 1916* (CHAPA, HBG, MEXU, MO); Laguna Escondida, 3 km NW of Estación Las Tuxtlas, 200 m, June 1985 (fl), *Sinaca C. 107, 110, 111* (CHAPA, HBG, MEXU, MO); Camino a Cárdenas, 4.5 km de la Estación Las Tuxtlas, June 1985 (fl), *Sinaca C. 114* (MO); lote 71, Estación Las Tuxtlas, 350 m, Aug. 1985 (fr), *Sinaca C. 207* (CHAPA, HBG, MEXU, MO); Estación Las Tuxtlas, June 1981 (fr), *Wendt et al. 3418* (CHAPA, CAS, LL, MEXU, MO).

Licaria velutina is closely related to *L. excelsa*, known from southern Mexico and Panama. *Licaria velutina* differs by having narrow leaves 4–6 times longer than wide, densely pubescent young twigs, less pubescent inflorescences, the pubescence contrasting with the glabrous flowers, and large cupules with simple margins (our fruiting material of *L. excelsa* shows always double-rimmed cupules). All collections of *L. excelsa* are from above 1,000 m elevation, whereas *L. velutina* is only known from elevations of 200–300 m.

Measurements and illustrations of stamens, staminal glands, and ovary are based on boiled parts, which shrink and change shape while drying.

Nectandra mirafioris van der Werff, sp. nov. TYPE: Nicaragua. Jinotega: Laguna de Miraflores, small tree at edge of swamp, 12 May 1976, 1,200 m, *Neill 329* (distributed by Seymour as no. 7204), (holotype, MO). Figure 5.

Arbor parva, 2–8(–15) m. Ramuli modice appresse strigosi, glabrescentes, vetustiores lenticellati. Folia alterna, elliptica, firme chartacea, 15–20 × 7–10 cm, apice obtuse acuta, basi acuta vel obtusa; petioli 1–1.5 cm longi; laminae super nitidae, reticulatione elevata sed costa

nervisque immersis, glabra; subtus opacae, leviter adpresse pubescentes, praesertim prope basim, domitiis axillaribus, costa manifeste elevata, nervis reticulationeque elevatis; nervi 6–9 jugi. Inflorescentiae in axillis foliorum vel bractearum deciduarum, foliis perbreviares; axes centrales adpresse pubescentes, ramuli pubescentia densiore, saepe albo-pubescentes. Flores pedicellati, extus dense albo-pubescentes; tepala 6, aequalia, basi connata, intus dense papillosa, ca. 3 mm longa; stamina 9, 4-loculata, 6 exteriora ca. 0.9 mm longa filamentis brevissimis, antheris quadrangularibus, locellis introrsis; 3 interiora ca. 1.2 mm longa, filamentis ca. 0.3 mm longis, 2 glandulis magnis munitis, locellis lateralibus; staminodia 3, ca. 0.8 mm longa, claviformia. Ovarium globosum, glabrum; stylus ovario perbrevior. Fructus late ellipticus, 2 × 1.5 cm, cupula parva, discoidea; pedicellus frugifer inflatus.

Small tree, 2–8(–15) m tall. Twigs gray, with small, appressed hairs, becoming glabrous, often developing lenticels after the first year. Leaves alternate, elliptic, firmly chartaceous, 15–20 × 7–10 cm, the tip bluntly acute, the base acute to obtuse, petioles 1–1.5 cm long, laminae shiny above, glabrous with raised reticulation, but with immersed midvein and lateral veins, these in 6–9 pairs, opaque below, these with some appressed short hairs (especially near the base) and frequently tufts of axillary hairs, the midvein prominently raised, the lateral veins and final reticulation raised. Inflorescences in the axils of persistent leaves or deciduous bracts, 6–12 cm long, paniculate, the main axis with some appressed pubescence, the branchlets with much denser pubescence, sometimes appearing white pubescent. Flowers pedicellate, the pedicels ca. 2 mm long, densely white-pubescent; tepals 6, all equal, united at their bases, densely white pubescent outside, densely papillose inside, ca. 3 mm long; stamens, 9, 4-celled, the outer 6 with a very short filament, appearing sessile, quadrangular, ca. 0.9 mm long, the anther cells introrse, occupying almost the entire anther and arranged ± in an arc, papillose; the inner 3 anthers ca. 1.2 mm long, with lateral anther cells, the filament ca. 0.3 mm long, each with 2 large glands near the base; staminodia present, club-shaped, ca. 0.8 mm long. Ovary globose, glabrous; style much shorter than ovary, glabrous. Fruit broadly ellipsoid, 2 × 1.5 cm, seated on a small, platelike cupule; pedicel swollen in fruit.

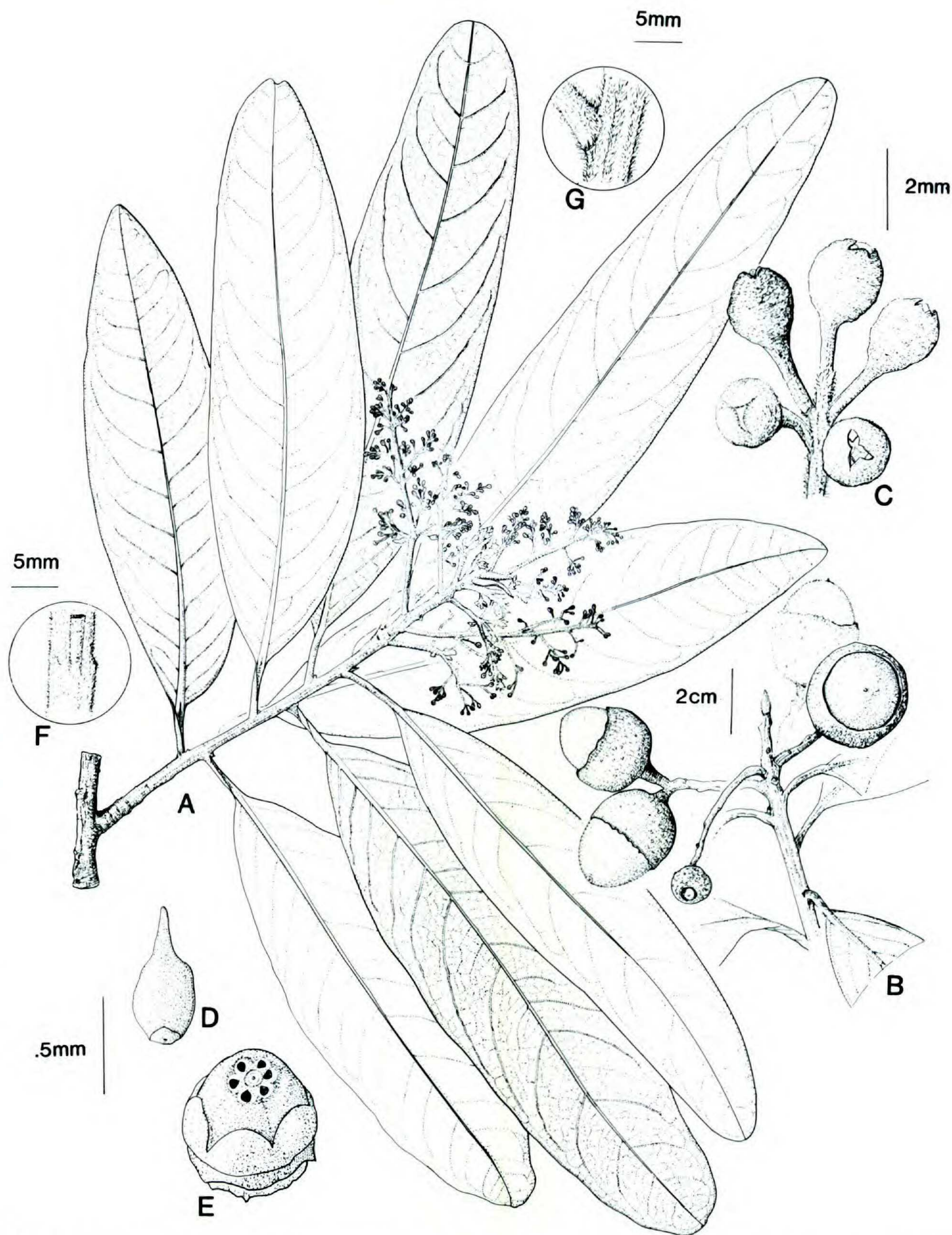


FIGURE 4. *Licaria velutina*.—A. Flowering branch.—B. Fruits.—C. Flowers.—D. Ovary.—E. Flower with tepals removed, showing three two-celled stamens with fused filaments and lobe-shaped basal glands.—F. Detail of twig, showing pubescence.—G. Detail of inflorescence branch, showing pubescence.

Paratypes. NICARAGUA. ESTELI: Laguna Mirafior, Laguna 336 (MO); same location, *Moreno* 19434, 21118, 8227 (MO); Cerro Quiabú, *Stevens* 16918, 16247 (MO); same locality, *Grijalva & Araquistain* 641 (MO); same locality, *Moreno* 1309, 19266, 21185A (MO); Mesas Plan Helado, 2 km from Laguna Mirafior, *Moreno* 15846 (MO); El Chaparral, 1 km W of Laguna Mirafior, *Moreno* 22382 (MO); Mesas Plan Helado, 21.5 km E of Esteli,

Moreno 15410 (MO). JINOTEGA: km 150 de la carretera Matagalpa-Jinotega, *Moreno* 472 (MO); Laguna de Mirafiores, *Neill* 339 (MO) (distributed by Seymour as *Neill* 7198).

Nectandra mirafioris is only known from an area with cloud forest on the border of the

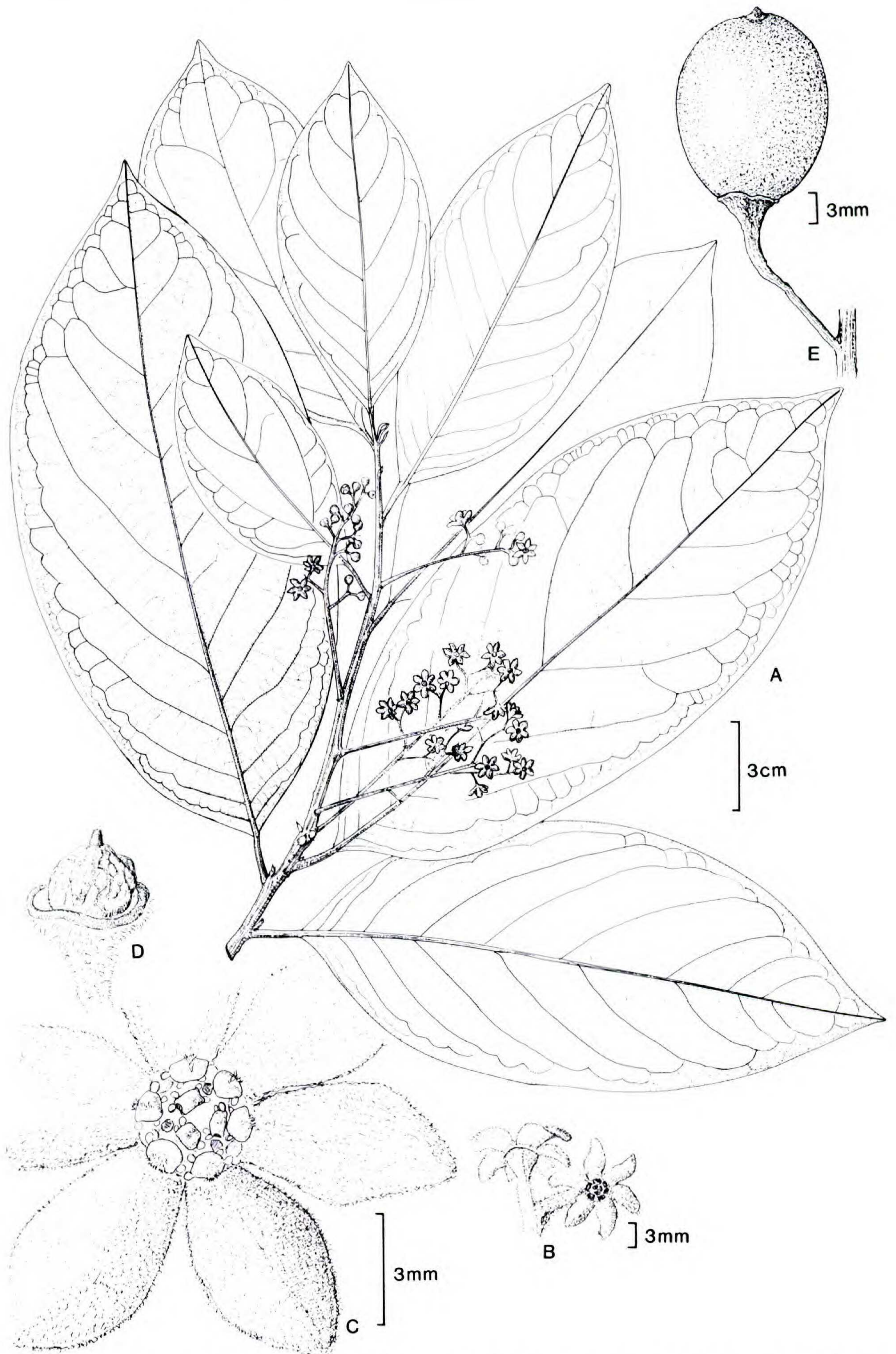


FIGURE 5. *Nectandra miraffloris*.—A. Flowering branch.—B. Flowers.—C. Dehiscent tepals with attached stamens.—D. Young fruit, showing abscission line of tepals.—E. Fruit.

departamentos of Esteli and Jinotega. This is one of the best-developed montane areas in Nicaragua and is inhabited by several species otherwise unknown in Nicaragua, such as *Osmunda regalis* (W. D. Stevens, pers. comm.). Specimens with buds or flowers have been collected from late December to May; the fruiting collection (Stevens 16347) was made in November.

Nectandra and *Ocotea* are the two largest genera of neotropical Lauraceae. The differences between the two genera are not always easy to see and some authors have proposed to merge them under *Ocotea* (Kostermans, 1957; Howard, 1981; Liogier, 1982; the last-mentioned two transferred several West Indian *Nectandra* species to *Ocotea*). The character most frequently mentioned in the literature as separating the two genera is the position of the anther cells; they are arranged in an arc in *Nectandra* and in two rows in *Ocotea*. This character separates most species quite readily but is intermediate in some. Two additional characters help separate *Nectandra* from *Ocotea*. In *Nectandra* the inner faces of the tepals and the anthers have papillose pubescence; in *Ocotea* these surfaces are either glabrous or strigose. Also, in *Nectandra* the tepals are usually basally connivent, and in older flowers an abscission line forms underneath the tepals, which fall off as a unit together with all anthers. In *Ocotea* the tepals are free and fall off individually, often leaving stamens attached to the floral tube. Thus, on the young cupules of *Nectandra* species, one never finds stamens, but in *Ocotea* very frequently a few stamens can be found on young cupules.

In *Nectandra miraflores* the position of the anther cells is intermediate between *Nectandra* and *Ocotea*, but the papillose indumentum on the tepals and anthers and the dehiscence of the tepals as a unit lead me to place this species in *Nectandra*. I regard a montane species from Panama and Costa Rica, *Nectandra cufodontisii* (O. Schmidt) Allen (basonym: *Ocotea cufodontisii* O. Schmidt; heterotypic synonym: *Ocotea seibertii* Allen according to W. Burger in litt.), as its closest

relative. This species is very similar in leaf shape, venation type, and fruit shape but differs by lacking white pubescence on flowers and buds; its flowers are slightly larger, as are the leaves; and the outer stamens have anthers on filaments ca. 0.3 mm long, contrasted with nearly sessile anthers in *N. miraflores*. Several collections of *N. miraflores* were annotated as *Persea*, one as *Nectandra sanguinea* and one (the type) as *Anacardium occidentale*.

The epithet *miraflores* refers to the type locality and is a reminder to collectors to look out for flowering Lauraceae.

***Persea pajonalis* van der Werff, sp. nov.**

TYPE: Peru. Boundary of provinces Oaxapampa and Pasco: San Gotardo; 3 m shrub in pajonal, 2,500–3,000 m, 29 Dec. 1983, Foster, Chanco & Alban 7647 (holotype, MO). Figure 6A–E.

Frutex vel arbor parva. Ramuli crassi, 5–8 mm in diametro, angulares, hornotini sparsim adpresse cinereo-pubescentes, vetustiores glabri; cicatricibus conspicuis aggregatis. Folia alterna, coriacea, obovata, apice rotundata vel subacuta, basi obtusa vel subcordata, 10–17 × 4–8 cm; super glabra costa nervisque (10–12 jugis) immersis; subtus sparsim adpresse pubescentia, praecipue secus costam nervosque; costa, nervis venationeque elevata. Petioli crassi, 5–8 mm longi. Inflorescentiae axillares, 5–18 cm longae, paniculatae; flores pedicellique aeneo-puberuli, pubescentia evanescente versus basim inflorescentiae. Tepala 6, inaequalia, 3 exteriora ovata, 3 × 3 mm, 3 interiora ellipsoidea, 4.5 × 2.5 mm, aeneo-puberula. Stamina 9, 4-locellata, 6 exteriora introrsa, 3 mm longa; 3 interiora extrorsa, 3.5 mm longa, basi filamentorum 2 glandulis sessilibus praedita. Staminodia 3, 1.5 mm longa, pubescentia. Ovarium glabrum subobovatum, 2 mm longum. Fructus immaturus viridis, magnopere tepalis persistentibus obtectus.

Shrub or small tree, 2–6 m tall. Twigs thick, 5–8 mm diam. during first year, angled, hollow, when young with gray appressed pubescence, glabrescent, 2-year-old twigs glabrous. Terminal buds with appressed gray pubescence, usually hidden by the leaves. Twigs with conspicuous clusters of scars from bracts of old terminal buds. Leaves alternate, evenly distributed along twigs, coriaceous, obovate, the tip rounded or slightly acute, the base obtuse or subcordate, 10–17 × 4–8 cm; laminae glabrous above, sparsely ap-

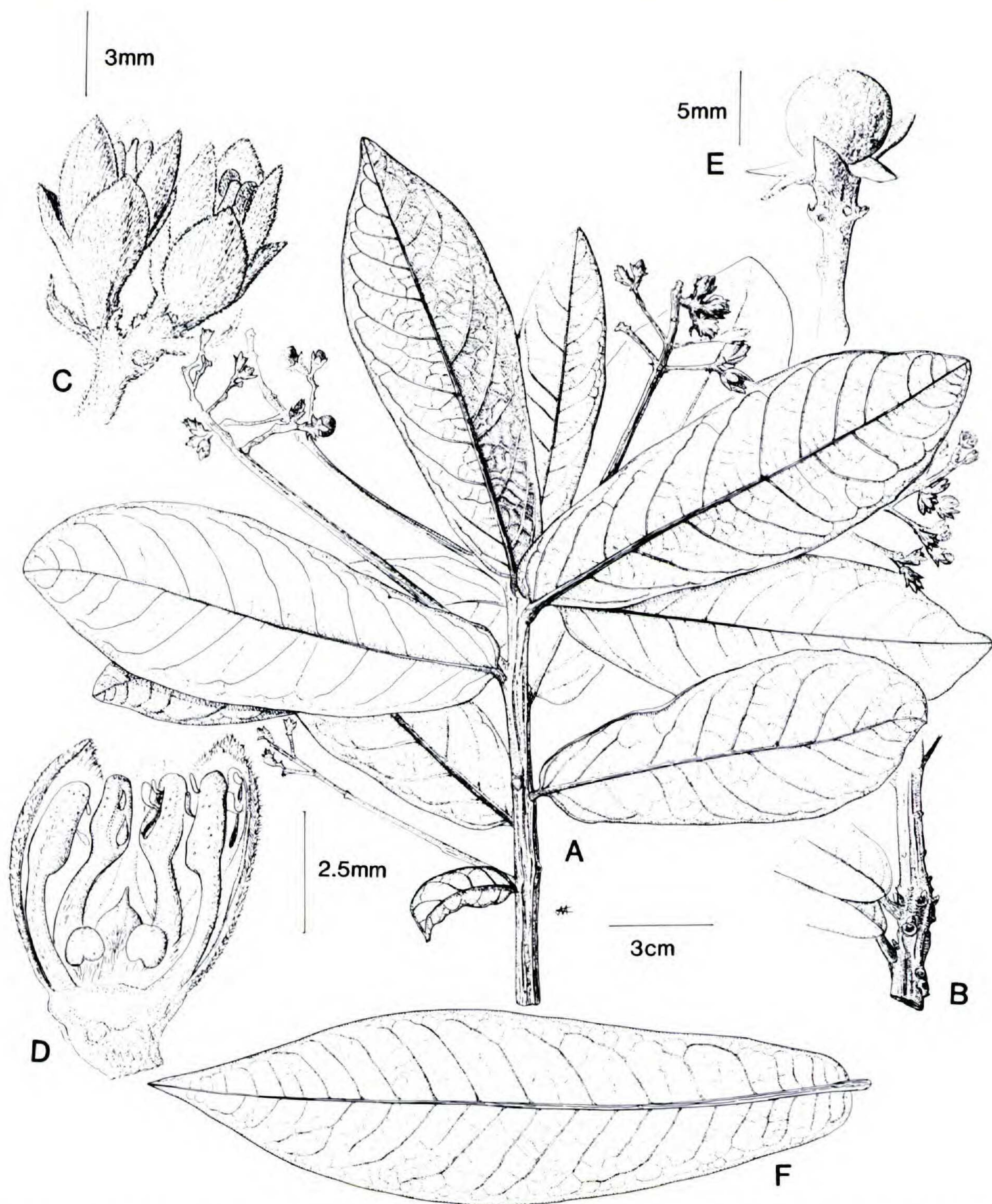


FIGURE 6. A-E. *Persea pajonalis*.—A. Flowering branch.—B. Detail of twig with scars from bracts.—C. Flowers.—D. Flower with tepals removed, showing stamens, two basal glands, and staminode.—E. Fruit.—F. Leaf of *Persea sessilis*.

pressed pubescent below, especially along major veins; midrib and lateral veins (10–12 pairs) immersed above, prominently raised on lower surface, tertiary venation also raised on lower surface. Petioles thick, 5–8 mm long. Inflorescences in axils of persistent leaves, 5–18 cm long, shorter than or about as long as the subtending leaves; paniculately branched, the peduncle to 12 cm long; flowers and pedicels with dense, bronze-colored puberulence, this becoming much sparser toward the base

of the inflorescence. Tepals 6, unequal, the outer 3 ovate, ca. 3×3 mm, the inner 3 ellipsoid, ca. 4.5×2.5 mm, bronze-puberulent outside. Stamens 9, all 4-celled, the outer 6 introrse, ca. 3 mm long, the filaments ca. 1.5 mm long, narrower than the anther; the anther cells arranged in 2 rows; inner 3 stamens extrorse, ca. 3.5 mm long, with 2 globose glands attached near the base of the filaments. Staminodia 3, ca. 1.5 mm long, pubescent, with a broad triangular head. Ovary

glabrous, round or slightly obovate, ca. 2 mm long; style distinct, ca. 1.5 mm long. Immature fruits green, largely hidden by persistent tepals.

Paratypes. PERU. BOUNDARY OF OXAPAMPA AND PASCO: San Gotardo, in dwarf forest, 2,650–2,800 m, *Gentry et al.* 39998 (MO); same locality, *van der Werff et al.* 8578 (MO).

Persea pajonalis is only known from a few collections from the San Gotardo area west of Oxapampa at rather high elevations. It is restricted to a vegetation type called *pajonal*, a name used for open, nonforest vegetation. Some of the pajonales seem to have an edaphic origin (only found on nutrient-poor sandstone), but in the San Gotardo area the pajonal represents a subparamo scrub rich in Ericaceae and Myrsinaceae; other taxa frequently found in high-elevation vegetation (Araliaceae, *Jamesonia*, *Weinmannia*) were present as well. However, groups indicative of nutrient-poor soil, such as Eriocaulaceae, terrestrial *Utricularia*, and *Pinguicula*, were found in the area too.

Persea pajonalis belongs to subg. *Eriodaphne* sect. *Eriodaphne*, using Kopp's (1966) classification. Among the South American species of this subgenus, *Persea pajonalis* can be immediately recognized by its nearly sessile leaves with rounded or subcordate base. *Persea sessilis* Standley & Steyerl., a Guatemalan species only known from the fruiting type collection, has similar leaves (Fig. 6F) The holotype (F!) consists of good vegetative material and remnants of infructescences. The following differences are evident between *P. pajonalis* and *P. sessilis*: in *P. pajonalis* the leaves have scarce scattered hairs on the lower surface, 10–12 pairs of lateral veins, and rounded or slightly acute tips, and the twigs are hollow; in *P. sessilis* the leaves have glabrous lower surfaces, acute to acuminate tips, and 15 or more pairs of lateral veins, and the twigs are solid. I expect that when flowers of *P. sessilis* become available, additional differences will be found and that the striking leaf shape is more a habitat adaptation (both are shrubs occurring on high-

elevation mountain ridges) than an indication of close relationship.

Phoebe elegans van der Werff, sp. nov.
TYPE: Mexico. Oaxaca: Mpio. San Miguel Chimalapa, Cima del Cerro Salomón, 16°46'15"N, 94°11'45"W, 1,770 m, 3 m tree, flowers green with red margin, pedicels reddish. Abundant. 11 Apr. 1986 (fl, fr) *M. Ishiki 1501* (holotype, MO; isotypes, CHAPA, HBG, LL, MEXU, n.v.). Figure 7.

Arbor parva, ad 6 m. Ramuli tenues, teretes, glabri; gemma terminalis glabra vel aliquot pilis adpressis aucta. Petioli glabri, 1–2 cm longi, leviter canaliculati. Folia alterna, glabra, ovata, 5–9 × 2–3 cm, basi obtusa vel rotundata, apice valde acuminata; acumine ad 2 cm longo; laminae trinerves, ceteris nervis lateralibus (3–4 jugis) debilibus; super venatione immersa subtus venatione leviter elevata; minute sub lente punctatae. Inflorescentiae axillares, glabrae, 2.5–4 cm longae, pauciflorae. Flores glabrae. Tepala 6, aequalia, per anthesin erecta, ca. 1.5 mm longa, ca. 2 mm lata, apice rotundata. Stamina 9, quadrilocellata, 6 exteriora introrsa, ca. 1.2 mm longa; 3 interiora extrorsa, ca. 1.5 mm longa, omnia basi filamentorum pilis translucetibus aucta; glandula staminum interiorum parva; staminodia 3 ca. 1 mm longa, apice triangulari. Ovarium globosum, glabrum, stylo ca. 0.8 mm longo. Fructus ellipsoideus, ca. 1 cm longus, 0.7 cm latus; cupula parva, non profunda, sensim in pedicello attenuata tepalis persistentibus.

Small tree, 3–6 m tall, the main stem thin, ca. 1 cm diam., branches smooth, delicate, horizontal. Twigs slender, terete, glabrous, the terminal bud with few appressed hairs or glabrous. Petioles glabrous, 1–2 cm long, the margins of the laminae decurrent as narrow ridges and the petioles thus slightly canaliculate. Leaves alternate, glabrous, ovate, mostly 5–9 × 2–3 cm, the base obtuse or rounded, the apex strongly acuminate, the acumine to 2 cm long, often falcate; laminae tripliveined, the basal laterals leaving the midvein at or very near the base of the laminae; other laterals (3–4 pairs) weakly developed; upper leaf surface with immersed venation, the lower surface with slightly raised venation; numerous small oil cells present on lower surface; margins of laminae smooth and slightly thickened. Inflorescences in the axils of normal leaves, glabrous, 2.5–4 cm long, shorter than the leaves, once or twice cymosely branched,

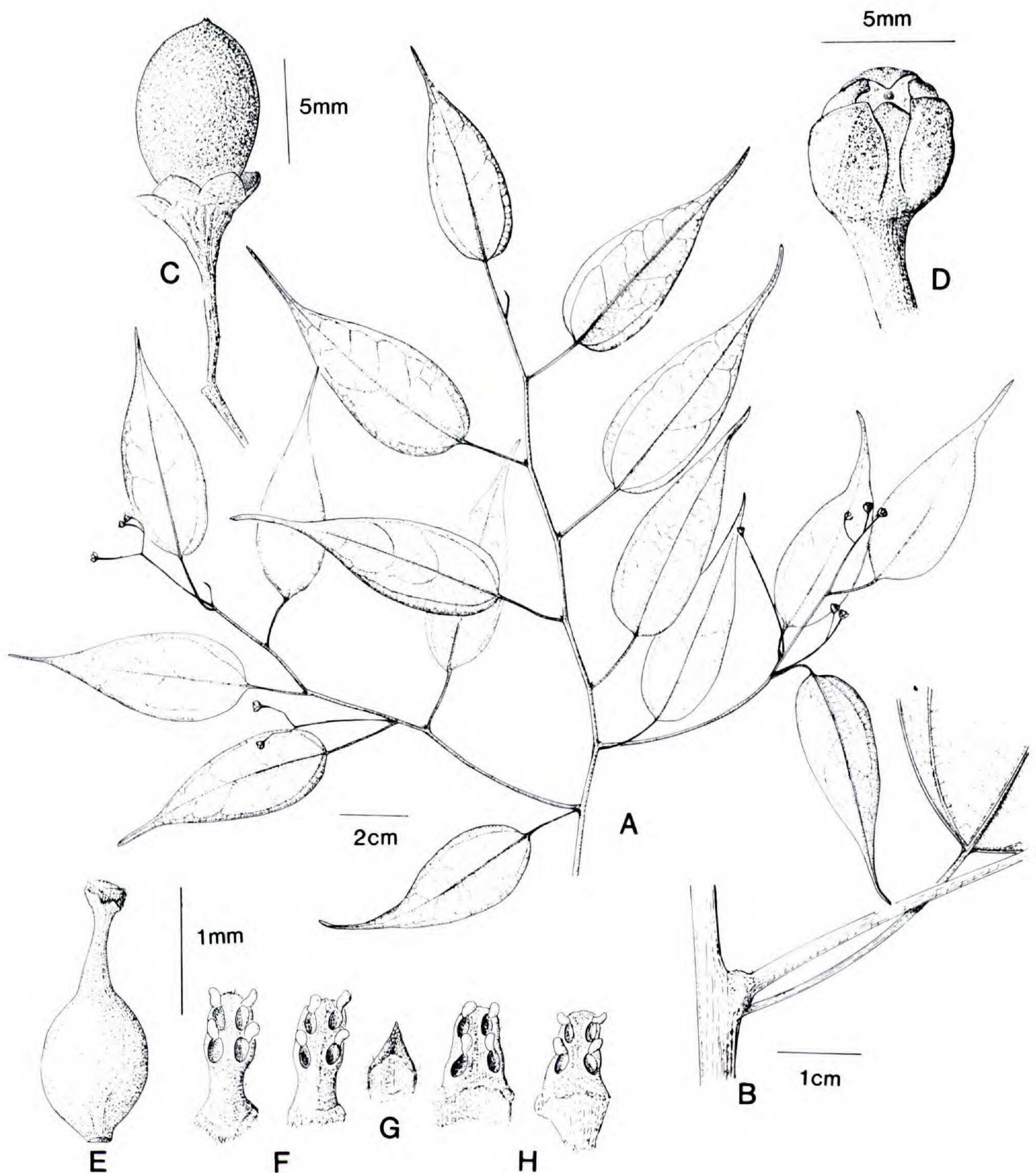


FIGURE 7. *Phoebe elegans*.—A. Flowering branch.—B. Detail of twig showing petiole and base of inflorescence.—C. Fruit.—D. Flower.—E. Ovary.—F. Outer stamens.—G. Staminode.—H. Inner stamens with small basal glands.

but on each inflorescence usually 2 or 3 flowers; bracts present in young inflorescences, linear, ca. 1.5 mm long, deciduous with age; pedicels slender, to 1 cm long. Flowers glabrous, ca. 2 mm long, 3.5 mm wide. Tepals 6, equal, erect at anthesis, rounded at tip, ca. 1.5 mm long and 2 mm wide. Fertile stamens 9, all 4-celled, glabrous, the outer 6 ca. 1.2 mm long, the filament slightly wider than the anther, the locelli arranged in 2 rows,

introrse; the inner 3 stamens with extrorse cells, the filaments wider than the anthers, ca. 1.5 mm long; staminal glands small and visible as two small bulges at the base of the inner anthers. Staminodia 3, ca. 1 mm long, with a triangular head. Ovary globose, glabrous, ca. 1 mm diam. Style distinct, ca. 0.8 mm long with a large stigma. Base of the floral tube and base of the stamens covered with stiff, translucent hairs. Fruit an ellipsoid

berry, ca. 1 cm long, 0.7 cm wide; cupule small plate, gradually narrowed into the pedicel and crowned with persistent tepals.

Paratypes. MEXICO. OAXACA: Mpio. San Miguel Chimalapa, Cima del Cerro Salomón, (buds) *Ishiki 1454*, (fr) *1529* (MO, CHAPA), (fl) *Ishiki 1616* (CHAPA, MEXU, MO).

Phoebe elegans is a very delicate and attractive species, so far only known from one mountain in Oaxaca, Mexico, near the border with Chiapas; it is said to be abundant in elfin forest and transition into cloud forest. The relatively long, spreading petioles, and the ovate, long-acuminate, triveined leaves separate it at once from the other neotropical *Phoebe* species, although it possesses all diagnostic characters for the group: tepals erect at anthesis, tepals persistent in fruit, flowers with long pedicels, staminodia present, and tripliveined leaves.

Phoebe, as accepted here, is a large (at least 180 binomials) genus occurring in the Asian and American tropics. Agreement on the generic boundaries of *Phoebe* has not yet been reached, and it is not clear how and if *Phoebe* can be separated from *Cinnamomum* and *Ocotea* (Kostermans, 1961; van der Werff, 1987). Until a careful study of these three groups has been made, I will continue the traditional usage of *Phoebe* for a heterogeneous group of species in the Neotropics. I realize that the discordant species have to be transferred to other genera, and earlier (van der Werff, 1987) I discussed the characters I consider diagnostic for neotropical *Phoebe*. Altogether, the neotropical *Phoebe* species form a large group to which more than 70 species have been attributed.

Pleurothyrium hexaglandulosum van der Werff, sp. nov. TYPE: Panama. Colón: Río Guanche, ca. 5 km upstream from Portobelo, 50 m, tree, 5 m, inflorescence pendent, flowers green, becoming yellow. *Hammel & Trainer 14781* (holotype, MO; isotype, BR, others to be distributed). Figure 8.

Arbor parva, 5 m. Folia alterna, chartacea; petioli dense tomentelli; laminae anguste obovatae, 30–45 × 10–15 cm, versus basim sensim attenuatae, basi abrupte rotundatae vel subcordatae, apice acuminatae; super venatione immersa, subtus elevata; nervi secundarii sursum curvati et in nervo submarginili uniti. Inflorescentiae axillares, puberulae, paniculatae, 40–65 cm longae. Pedicelli cinereo-pubescentes, 1.5–2 cm longi. Flores virides, 8–9 mm diametro. Tepala 6, aequalia, extus cinereo-pubescentia, intus glabra ubicumque in alabastro antheras glandulasque staminum contingentia, demum pubescentia. Stamina 4-locellata, 6 exteriora locellis lateralibus, 3 interiora locellis extrorso-lateralibus. Filamenta staminum interiorum 2 glandulis magnis, stamina exteriora cingentibus aucta. Ovarium late globosum, pubescens. Fructus ignotus.

Small tree, 5 m tall. Twigs terete, densely brown tomentellous, 5 cm below the tip 4–5 m diam. Leaves alternate, chartaceous; the petioles ca. 5 mm long, densely tomentellous; laminae narrowly obovate, 30–45 × 10–15 cm, gradually narrowed toward the base, there abruptly rounded to subcordate, the tip acuminate; glabrous above, with appressed hairs on main veins below, especially near the base, otherwise glabrous; venation immersed above, midvein prominently raised below, secondary veins (14–18 pairs) raised and the final reticulation slightly less raised; secondary veins arching upward near the margin and prominently loop-connected in the upper 2/3 of the lamina. Inflorescences axillary, 40–65 cm long, brown puberulous, paniculate, laxly branched, the basal lateral branches 20–25 cm long, the upper ones gradually shorter. Pedicels 1.5–2 cm long, densely gray-pubescent. Flowers ca. 8–9 mm diam., greenish becoming yellow (fide collector). Tepals 6, equal, 4 mm long, glabrous inside except where in bud the glands and stamens not pressed against tepals, thus showing a narrow line of hairs central in the lower part of the tepal (the 6 glands not completely fused in this species), this line expanded in a diamond-shaped outline marking the space between anther and glands and with lines to the margin and tip of the tepal. Glands of the inner 3 stamens prominent, surrounding the outer stamens, but not becoming fused. Stamens 9, raised above the glands, the filament with some hairs on the back, 0.8–1 mm long; anthers 4-celled, the outer 6 anthers curved

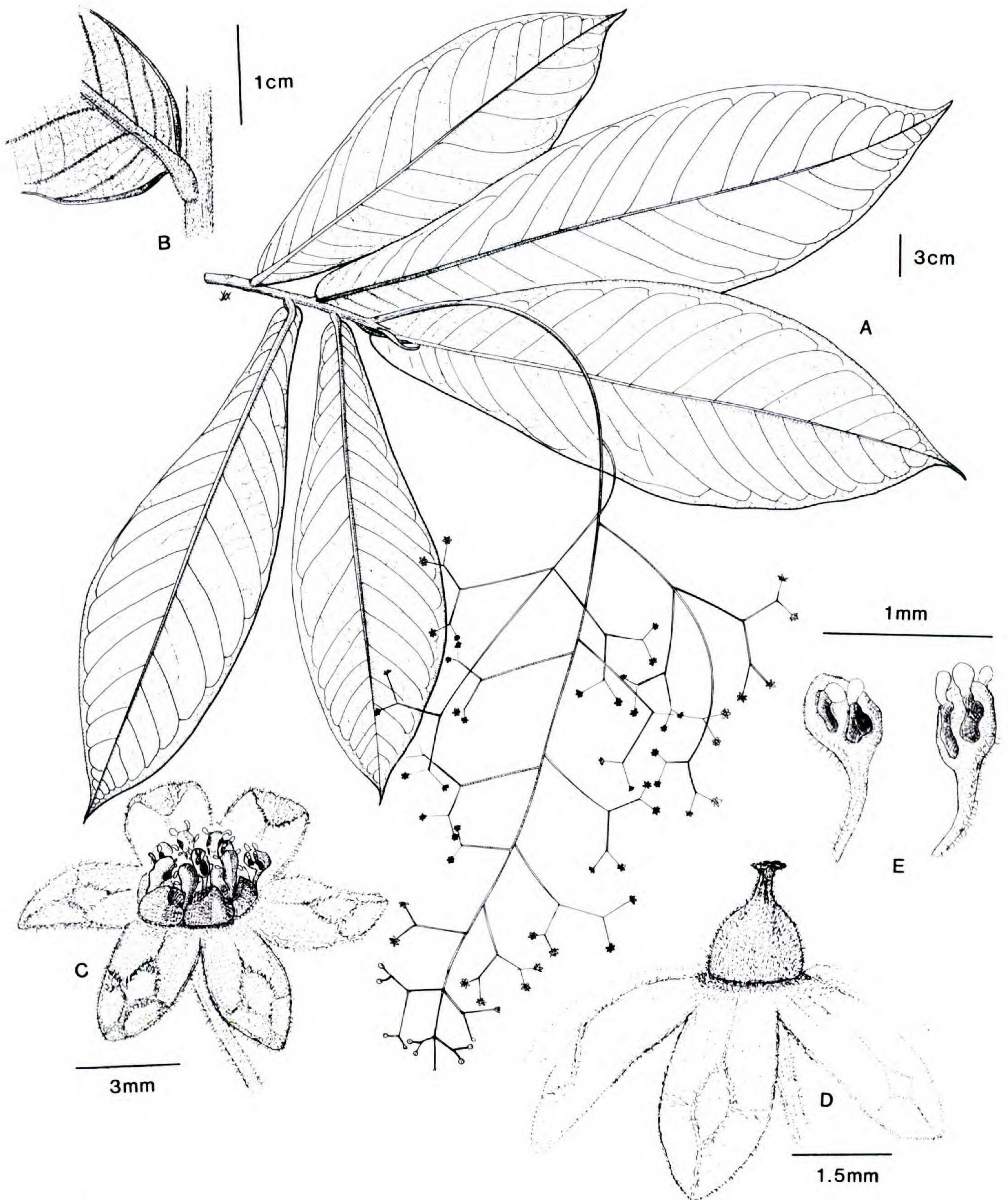


FIGURE 8. *Pleurothyrium hexaglandulosum*.—A. Flowering branch.—B. Detail of leaf base and petiole.—C. Flower, showing pubescence pattern on tepals, large staminal glands, and stamens.—D. Old flower, glands and stamens fallen off.—E. Outer (left) and inner (right) stamen.

inward, the anther cells lateral; inner anthers shorter, the anther cells lateral. No staminodia seen. Ovary broadly ovate, 1 mm long, 1.5 mm wide, with short, gray pubescence. Style short, 0.2–0.3 mm long, gray pubescent. Stigma platelike. Glands and stamens deciduous in older flowers and the tepals be-

coming reflexed, thus fully exposing the ovary. Fruit unknown.

Pleurothyrium hexaglandulosum is only known from two collections. It is closely related to *P. maximum* O. Schmidt from Amazonian Peru. Shared characters are large

inflorescences, oblanceolate-obovate leaves with thick, short petioles, and loop-connected secondary veins, forming a submarginal vein. It differs in having gray or brown pubescence (rufous in *P. maximum*), much smaller flowers with dense gray pubescence (rufous in *P. maximum*), and more widely branched inflorescence (lateral branches ca. 2 cm long in *P. maximum*, to 20 cm long in *P. hexaglandulosum*). Schmidt (1933) noted a relationship between *P. maximum* and *P. williamsii* O. Schmidt. I have not seen material of the latter species; it differs from *P. hexaglandulosum*, according to its description, in the shorter inflorescences (to 12 cm long), shorter pedicels (4–6 mm long), and brown-tomentose flowers.

Pleurothyrium hexaglandulosum is the first record of *Pleurothyrium* in Panama. Its specific epithet refers to the six glands of the inner three stamens. In nearly all *Pleurothyrium* species these are fused and cannot be recognized individually, and for a long time it was assumed that in *Pleurothyrium* all nine stamens had two glands. In *Pleurothyrium hexaglandulosum* (and to a lesser degree in *P. maximum*), the glands remain separated and show clearly that in *Pleurothyrium* only the inner stamens have glands, as Rohwer & Kubitzki (1985) stated.

Croat & Grayum 59792 (F, MO), collected in Costa Rica, Puntarenas, along road between Rincón de Osa and Rancho Quemado, is provisionally placed here. It differs from the type collection in being less pubescent.

Ocotea erectifolia (Allen) van der Werff,
comb. nov. BASIONYM: *Phoebe erectifolia*

Allen, Mem. New York Bot. Garden 23: 860. 1972. TYPE: Venezuela. Bolívar: Meseta del Jaua, *Steyermark 97926* (holotype, NY!).

Ocotea budowskiana Bernardi, Candollea 30: 256. 1975. TYPE: Venezuela. Bolívar: Meseta de Jaua, *Steyermark 109330* (holotype, G!; isotype, F!).

Ocotea erectifolia is very distinct with coriaceous, few-veined, ascending leaves. It was first published as a *Phoebe* species. When Bernardi later recognized it as an undescribed *Ocotea* species, he overlooked the earlier description of *Phoebe erectifolia*. However, there is no doubt that the two species are the same, and hence the new combination in *Ocotea* is made.

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