

FURTHER ADDITIONS TO THE GENUS *ARDISIA* SUBGENUS *GRAPHARDISIA* (MYRSINACEAE)

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ABSTRACT

Revision of the group of species formerly placed in *Oerstedianthus* Lundell revealed that the group is synonymous with *Ardisia* subgenus *Graphardisia* Mez. This paper incorporates those taxa in the subgenus, necessitating further revision of subgenus *Graphardisia*, including an emended description of the subgenus, a key to the species and subspecies, along with updated descriptions of the four added taxa and new illustrations for each. Four additional taxa are recognized, including one new species: *Ardisia verdisejala* Ricketson & Pipoly, and one new combination: *Ardisia nigrescens* subsp. *donnellsmithii* (Mez) Ricketson & Pipoly. Seven binomials are relegated to synonymy within *A. tuerckheimii* Donn. Sm. In addition, *Ardisia nigrescens* Oerst., *A. nigrescens* subsp. *donnellsmithii* (Mez) Ricketson & Pipoly and *A. tuerckheimii* Donn. Sm. are lectotypified.

RESUMEN

Una revisión del grupo de especies anteriormente clasificadas dentro del género *Oerstedianthus* Lundell reveló que el grupo se ubica mejor dentro del género *Ardisia* subgénero *Graphardisia* Mez, y por lo tanto se relega el género a la sinonimia. El propósito del presente trabajo es para incorporar ese grupo dentro del subgénero, y actualizar su circunscripción, claves para identificar las especies y subspecies, descripciones de ellas y nuevas ilustraciones para cada una. Se reconocen cuatro taxa adicionales, que incluye una especie nueva para la ciencia: *Ardisia verdisejala* Ricketson & Pipoly, y una nueva combinación: *Ardisia nigrescens* subsp. *donnellsmithii* (Mez) Ricketson & Pipoly. Se relegan siete binomiales a la sinonimia bajo *A. tuerckheimii* Donn. Sm. Además, se lectotifican *Ardisia nigrescens* Oerst., *A. nigrescens* subsp. *donnellsmithii* (Mez) Ricketson & Pipoly y *A. tuerckheimii* Donn. Sm.

INTRODUCTION

The pantropical genus *Ardisia* Sw. is the largest within the Myrsinaceae, containing perhaps as many as 500 species (Chen & Pipoly 1996). Its circumscription has been problematic owing to a lack of comprehensive treatment since that of Mez (1902) in Engler's *Das Pflanzenreich* over a century ago. In preparation of our treatment of the Myrsinaceae for *Flora Mesoamericana*, we have critically reexamined taxa segregated by Lundell from *Ardisia*, including *Gentlea* (Ricketson & Pipoly 1997), *Graphardisia* (Pipoly & Ricketson 1998), *Chontalesia* and species related to it, now known to belong to the genus *Hymenandra* (Pipoly & Ricketson 1999a), *Zunilia* which is now known to belong to *Ardisia* subgen. *Graphardisia* (Pipoly & Ricketson 1999b), *Ardisia rarescens* Standl. which was

placed in *Amatlanian* by Lundell and is now known to belong to *Ardisia* subgen. *Acrardisia* (Pipoly & Ricketson 2000), *Auriculardisia*, *Amatlanian* and *Valerioanthus* now all belonging to *Ardisia* subgen. *Auriculardisia* (Ricketson & Pipoly 2003) and the segregate genera, *Yunckeria* Lundell (= *Ctenardisia* Ducke) and *Ibarrea* Lundell (= *Ardisia* subgen. *Ardisia*). Since our study of the subgenus *Graphardisia* (Pipoly & Ricketson 1998, 1999b), including Lundell's segregate genera *Graphardisia* and *Zunilia*, it has become evident that the taxa comprising the segregate genus *Oerstedianthus* (Lundell 1981) are best placed within *Ardisia* subgenus *Graphardisia*.

According to Lundell (1981:139–140), “The genus [*Graphardisia*] is related to *Oerstedianthus* Lundell.” He separated the two as follows:

“Filaments strictly glabrous; stems and inflorescence glabrous; punctations of all parts dense and blackish; bracts and bractlets usually foliaceous and often persistent; sepals and petals large, accrescent, usually blackened, usually ribbed or with dense elevated black glands _____ **Graphardisia**
 Filaments pubescent with gland-tipped hairs; stems and inflorescence rarely glabrous, usually puberulent, hirtellous or dense hirsute-tomentose; punctations of all parts conspicuous but not prominently raised, pellucid or rarely blackish; bracts and sepals small, not accrescent; sepals not ribbed with glands _____ **Oerstedianthus**”

However, our studies of *Ardisia* subgenus *Graphardisia* (Pipoly & Ricketson 1998, 1999b) have clearly shown the presence of raised or sessile glandular-papillate filaments in all taxa. In addition, because we are not sure of the polarity of this character state, or if it can have multiple origins, its utility is dubious. Foliar and other punctations are said to be inconspicuous in the taxa newly added in this work, but they are normally prominent and occasionally conspicuous. Finally, the sepals are generally small, but they are comparable to those found in other members of subgenus *Graphardisia*, (i.e., *Ardisia bartlettii* Lundell and *A. weberbaueri* Mez). Lundell (1981:141) also notes: “*Oerstedianthus* is related to *Graphardisia* (Mez) Lundell. Both have similar linear-lanceolate anthers which dehisce by apical pores.” Therefore, we find it necessary to relegate the genus *Oerstedianthus* Lundell to synonymy under *Ardisia* subgenus *Graphardisia*.

TAXONOMIC TREATMENT

Ardisia subgenus **Graphardisia** Mez in Engl., Pflanzenr. IV. 236 (Hef 9):78. 1902; Lundell, Wrightia 3:192–198. 1966. *Graphardisia* (Mez) Lundell, Phytologia 48:139. 1981; Lundell, Phytologia 59:429–433. 1986. TYPE: *Ardisia opegrapha* Oerst. (LECTOTYPE, designated by Lundell, Phytologia 48:139. 1981).

Oerstedianthus Lundell, Phytologia 48:141. 1981. Syn. Nov. TYPE: *Ardisia nigrescens* Oerst. 1861:130. 1862. *Oerstedianthus nigrescens* (Oerst.) Lundell, Phytologia 48:141. 1981.

Zunilia Lundell, Phytologia 49:353. 1981. TYPE: *Ardisia sexpartita* Lundell, Wrightia 3:29. 1962.

Zunilia sexpartita (Lundell) Lundell, Phytologia 49:354. 1981.

Subshrubs to trees. Branchlets mostly terete, glabrous, puberulent, hirsute or

rarely, glandular-granulose. **Leaves** petiolate; blades membranous to subcoriaceous, densely and prominently black (rarely pellucid-) punctate and punctate-lineate, the margins entire to crenulate or serrate. **Inflorescence** terminal, rarely lateral, pinnate to tripinnately paniculate, pyramidal to obpyramidal rarely globose, the ultimate branches corymbose, at times in high anthotactic spirals and thus appearing umbellate, the rachis often densely and prominently black punctate and punctate-lineate; inflorescence and floral bracts minute to foliaceous, caducous to persistent, often resembling the vegetative leaves but acropetally reduced in size. **Flowers** 5 or 6-merous, densely and prominently black punctate and punctate-lineate; calyx with sepals free or nearly free, large, accrescent and clasping fruits at maturity; corolla white, pink, lavender or purple, rotate, the lobes imbricate in bud, basally short-connate and sparsely to densely yellow glandular-granulose within at the base, densely and prominently black punctate-lineate; stamens inserted at corolla tube base, the filaments basally connate to form an inconspicuous tube, the tube free from the corolla tube, the apically free portions of the filaments with scattered yellow glandular-granulose or glandular-papillate, less than half the length of the anthers, the anthers ovoid-lanceoid, linear or lanceoid, prominently apiculate, dehiscent by subapical pores; ovary globose, the style slender, equaling the sepals, 2–3 times longer than the ovary, the placenta apiculate, the ovules pluriseriate, biseriate, or apparently uniseriate (few in number and in a very high anthotactic spiral). **Fruit** globose or oblongoid, densely punctate and punctate-lineate, basally surrounded by persistent, clasping sepals.

Distribution.—A small distinctive subgenus of seven species with nine subspecies found from Mexico to Bolivia and adjacent Brazil.

Ecology.—Members of the subgenus occur in diverse humid to pluvial vegetation types, lowland, premontane, montane, and cloud forests.

The subgenus is defined by: 1) black, or rarely, reddish-black, punctations or punctate-lineations on all leaf and floral parts; 2) sepals often accrescent and usually clasping the developing fruit; 3) linear-lanceolate, concolorous, apiculate anthers with subapical, poricidal dehiscence; and 4) styles that are 2–3 times longer than the ovary. Among the species of *Ardisia*, it is notable that the branchlets, petioles and inflorescence rachises among species of subg. *Graphardisia* are never tomentose, but may be glabrous, puberulent, rarely hirsute or glandular-granulose. Therefore multicellular trichomes are not found in the subgenus. Species of the subgenus are often used for home decoration and for use in Christian churches for religious holidays (Pipoly, pers. obs.).

KEY TO TAXA OF *ARDISIA* SUBGENUS *GRAPHARDISIA*

1. Stoloniferous subshrubs mostly less than 1(–2) m tall; leaf blade margins sharply and irregularly dentate; corolla tube and filaments yellow glandular-granulose; Amazonian Ecuador to Bolivia and adjacent Brazil. _____ **A. weberbaueri**

1. Shrubs to small trees (0.5–)2–6(–30) m tall, without stolons; leaf blade margins entire, undulate or crenulate to serrate; corolla tube yellow glandular-granulose; filaments glabrous or sessile to stalked glandular-papillate; Mexico to the Chocó Region of Colombia.
2. Sepals oblong, 4.2–8 mm long, apically broadly rounded to obtuse, the margins entire _____ **A. opegrapha**
3. Inflorescence obpyramidal; leaf blades oblanceolate or rarely obovate, 3.5–7.5(–8) cm wide, 3 or more times longer than wide.
4. Floral bracts caducous; stamens 5.2–6.5 mm long; filaments 2.5–3 mm long; sepals 5–8 mm long _____ **A. opegrapha** subsp. **opegrapha**
4. Floral bracts persistent; stamens 3.8–5 mm long; filaments 1.5–2 mm long; sepals 4.2–5.2 mm long _____ **A. opegrapha** subsp. **wagneri**
3. Inflorescence globose; leaf blades elliptic to broadly elliptic (7.5–)8–14.5 cm wide, 2–2.5 times longer than wide _____ **A. opegrapha** subsp. **paquitensis**
2. Sepals ovate, 1.5–3.2(–4) mm long, apically acute to rounded, the margins subentire to entire or erose.
5. Corolla lobes ovate, elliptic or lanceolate; filaments glabrous; Panama and Colombia _____ **A. bartlettii**
6. Sepals 1.5–1.8 mm long; petal lobes 6–6.5 mm long; stamens 3.5–4.8 mm long; style base tapering; tall wet forests _____ **A. bartlettii** subsp. **bartlettii**
6. Sepals 2–2.5 mm long; petal lobes 7–8 mm long; stamens 4.5–5.7 mm long; style base stylopodic; strand vegetation and beach forests _____ **A. bartlettii** subsp. **lilacina**
5. Corolla lobes oblong; filaments with sessile papillae to stalked-glandular-papillate; Oaxaca, Mexico to Nicaragua.
7. Branchlets and inflorescence rachis glabrous; anthers 3–3.2 mm long _____ **A. verapazensis**
8. Corolla lobes 6.5–6.7 mm long; free portion of filaments 3.3–3.4 mm long; style 3–3.1 mm long; fruit 6.5–9 mm in diam.; fruiting style 7–8.6 mm long, usually only the basal portion persistent _____ **A. verapazensis** subsp. **verapazensis**
8. Corolla lobes 5.7–5.9 mm long; free portion of filaments 2.6–2.8 mm long; style 5.5–5.9 mm long; fruit 5–6.1 mm in diam., fruiting style 8.8–9.4 mm long, the entire style usually persistent _____ **A. verapazensis** subsp. **cucullata**
7. Branchlets and inflorescence rachis long-hirsute with reddish hairs or very sparsely to densely puberulent of simple trichomes; anthers 3.2–5.1 mm long.
9. Branchlets very sparsely to densely puberulent _____ **3. A. tuerckheimii**
9. Branchlets scattered to densely long hirsute with reddish hairs.
10. Calyx lobes oblong, 3.4–3.8 mm; corolla lobes 8–8.4 mm; filaments as wide as anthers, the anthers basally hastate. _____ **2. A. verdisepta**
10. Calyx lobes ovate, 1.9–2.7 mm; corolla lobes 4.8–8 mm; filaments abruptly constricted apically, the anthers basally subcordate ___ **1. A. nigrescens**
11. Leaf margins crenulate or serrate; calyx lobes 1.9–2.1 mm _____ **1a. A. nigrescens** subsp. **nigrescens**
11. Leaf margins mostly entire to slightly crenulate or serrate; calyx lobes 2.2–2.7 mm _____ **1b. A. nigrescens** subsp. **donnellsmithii**

1. Ardisia nigrescens Oerst., Vidensk. Meddel. Dansk Naturhist. Føren

Kjøbenhavn 1861:130. 1862. *Icacorea nigrescens* (Oerst.) Standl., Contr. U.S. Natl. Herb. 23:1109. 1924. *Oerstedianthus nigrescens* (Oerst.) Lundell, Phytologia 48:142. 1981. TYPE. MEXICO. VERACRUZ: Prope Colipa, without elev., Mar 1842 (fr), *F. Liebmann 28B* (LECTOTYPE: C, here designated, F neg. # 22952, in part).

Shrubs or small trees 1–12 m tall, to 7.5 cm in diam. **Branchlets** 1–5 mm in diam., densely long hirsute reddish hairs throughout. **Leaves:** with leaf blades membranous to chartaceous, ovate or elliptic to oblong, 3.5–18.2 cm long, 1.5–8.2 cm wide, with an acumen 0.8–2.1 cm long, basally obtuse, inconspicuously to conspicuously, often prominently punctate and punctate-lineate, sparsely hispid above and below, often densely hispid along the midrib above, densely hirsute along the midrib below, the secondary veins 15–24 pairs, the margins entire or crenulate to serrate; petioles 0.5–1.6 cm long, densely hispid along above, densely hirsute below. **Inflorescences** 1.5–6 cm long, 2–8 cm wide, shorter than the leaves, the rachis with dense, long hirsute with reddish hairs, the branches 3–18-flowered corymbs; peduncles nearly absent to 1.2 cm long, densely long hirsute with reddish hairs; inflorescence branch bracts oblong to oblanceolate, 4–25 mm long, 1–14 mm wide, scattered long hirsute with reddish hairs; floral bracts similar to the inflorescence bracts but, when present, to 0.3–0.8 mm long, 0.1–0.2 mm wide; pedicels 0.7–1.4 cm long, conspicuously and prominently punctate and punctate-lineate, with densely long hirsute simple reddish hairs. **Flowers** 5–6-merous; calyx lobes ovate, 1.9–2.7 mm long, 1.1–1.5 mm wide, apically acute, sparsely hirsute outside, glandular-granules within near the base, the margins entire, densely hirsute-ciliolate; corolla 6.5–10 mm long, the tube 1.2–2.4 mm long, the lobes 4.8–8 mm long, 2.2–4.8 mm wide; stamens 4.6–6 mm long, the filaments 1.5–2.8 mm long, the staminal tube 0.5–1 mm long, the apically free portion abruptly constricted 1–2.1 mm long, the anthers 3.3–4.5 mm long, 0.8–1.1 mm wide; pistil 5–6.4 mm long, the ovary 0.8–1.2 mm long, the style 4–4.7 mm long, the ovules 5–7. **Fruits** 5.5–7.3 mm in diam.

In Oersted's (1862: p. 130) original description he cites two localities, both collected by Liebmann: "*Crescit in Mexico, ubi cl. Liebmann Martio fructificantem prope Colipa et Jecaltepec legit.*" The Museum Botanicum Hauniense (C) clearly houses the two collections used by Oersted, "Mexico, Prope Jecaltepec, Mar. 1842 (fr), *F. Liebmann 28A*" and "Mexico, Prope Colipa, Mar 1842 (fr), *F. Liebmann 28B*." Both collections are in fruit, but the *28A* specimen has narrower leaves with no attached fruits and the *28B* specimen has wider leaves with many attached fruits. Unfortunately, the photograph taken by J.F. Macbride during the Field Museum of Natural History's project to photograph European types (F neg. no. 22952), is a combination of both specimens, although primarily of the *28B* specimens. Thus, because the *28B* specimen is more complete and more widely seen via the F photograph, we elect to designate the *Liebmann 28B* (C) specimen as the lectotype. Although, C.L. Lundell annotated the *28A* specimen in 1966 as the "TYPE!" he did not formally publish a lectotypification.

Within *Ardisia* subgen. *Graphardisia*, *A. nigrescens* is most closely related to *A. verdisejala*, because of the long, hirsute, with reddish trichomes throughout the vegetative parts of the plant. However, *Ardisia nigrescens* may be easily distinguished by its shorter, ovate calyx lobes (1.9–2.7 mm long), and shorter corolla lobes (4.8–8 mm long). *Ardisia verdisejala* has longer oblong calyx lobes (3.4–3.8 mm long) and longer corolla lobes (8–8.4 mm long).

1a. *Ardisia nigrescens* Oerst. subsp. *nigrescens* (Fig. 1).

Shrub or small tree 1.5–5 m tall. **Branchlet** slender, terete, 1–3 mm in diam., with dense, long hirsute simple reddish hairs throughout. **Leaves:** with leaf blades membranous, elliptic, 3.5–11.2 cm long, 1.5–5.2 cm wide, apically abruptly acuminate, the acumen 0.8–1.4 cm long, basally obtuse, midrib impressed above, prominently raised below, the secondary veins 15–24 pairs, prominent above, prominently raised below, inconspicuously to conspicuously, often prominently punctate and punctate-lineate, sparsely hispid above and below, often densely hispid along the midrib above, densely hirsute along the midrib below, the margins crenate to serrate, flat; petioles slender, canaliculate, 0.5–1.1 cm long, densely hispid along above, densely hirsute below. **Inflorescence** terminal, rarely lateral, erect, pinnate paniculate, 1.5–5 cm long, 2–5.5 cm wide, shorter than the leaves, the rachis with dense, long hirsute simple reddish hairs, the branches 3–7 flowered corymbs; peduncles nearly absent to 1 cm long, with dense, long hirsute simple reddish hairs; inflorescence branch bracts caducous, membranous, oblong to oblanceolate, 2–2.5 cm long, 0.1–0.4 cm wide, apically acute, basally acute on sessile or short petioles, the veins prominent, conspicuously and prominently punctate and punctate-lineate, with scattered, long hirsute, simple reddish hairs, the margins entire; floral bracts similar to the inflorescence bracts but, 0.3–0.8 mm long, 0.1–0.2 mm wide; pedicels slender, terete, 0.7–1.4 cm long, conspicuously and prominently punctate and punctate-lineate, with dense, long hirsute simple reddish hairs. **Flowers** 5–6-merous, white to pink; calyx lobes membranous, ovate to narrow ovate, 1.9–2.1 mm long, 1.1–1.3 mm wide, apically acute, conspicuously and prominently punctate and punctate-lineate, sparsely hirsute outside, granular-glandules within near the base, the margins entire, densely hirsute-ciliate; corolla membranous, 6.5–10 mm long, the tube 1.2–2.4 mm long, the lobes oblong, 4.8–8 mm long, 2.2–4.8 mm wide, apically acute to rounded, conspicuously and prominently punctate and punctate-lineate, glabrous except with scattered yellow papillae at the base within, the margins entire, erose; stamens 5–6 mm long, the filaments 1.9–2.8 mm long, the staminal tube 0.5–1 mm long, the apically free portions abruptly constricted, 1.3–2.1 mm long, epunctate, with scattered yellow papillae near the base, the anthers free, lanceolate, 3.5–4.4 mm long, 0.9–1.1 mm wide, apically apiculate, basally subcordate, the connective inconspicuously punctate; pistil 5–5.5 mm long, glabrous, inconspicuously punctate, the ovary ovate, 0.8–1.1 mm long, the style 4–

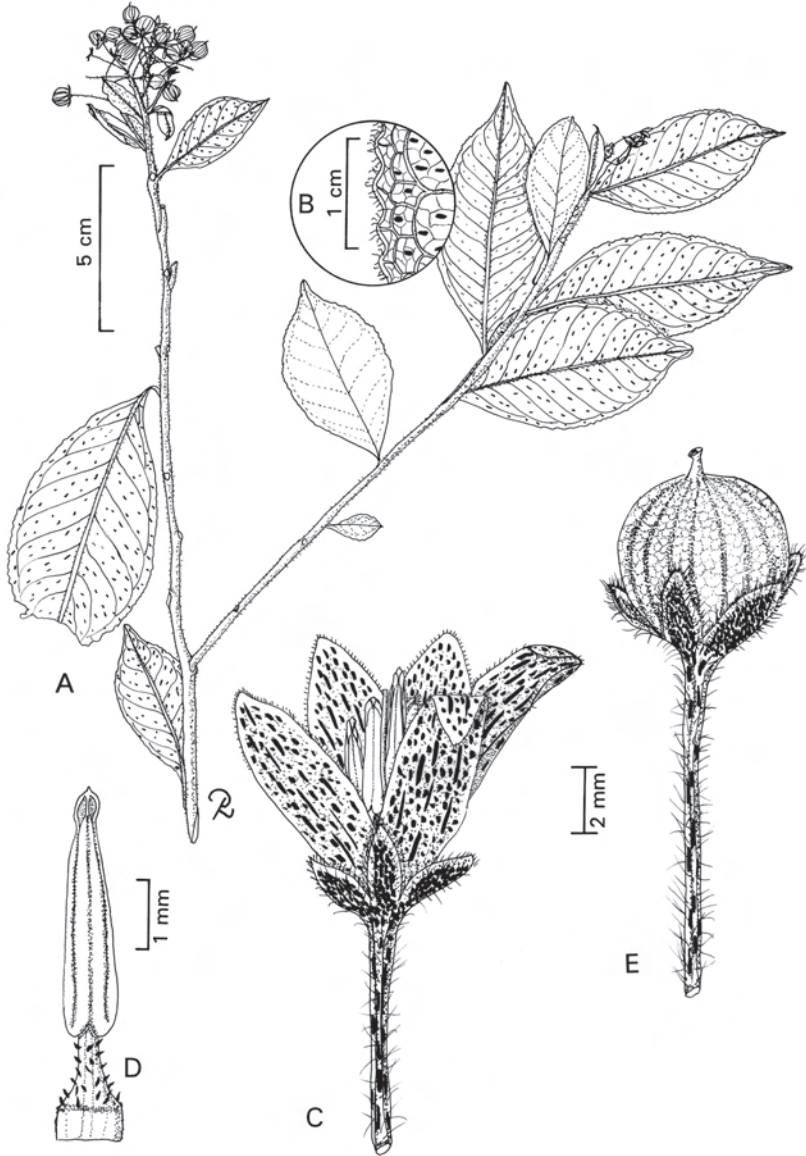


FIG. 1. *Ardisia nigrescens* Oerst. subsp. *nigrescens* A. Flowering branch. B. Detail of abaxial leaf surface. C. Flower. D. Stamen, showing adaxial surface. E. Fruit. A–B, E drawn from lectotype, *F. Liebmann 28B* (C). C & D drawn from *H. Hernández & R. Torres 813* (MO).

4.4 mm long, stylipodic, inconspicuously punctate and punctate-lineate, the ovules 5–7. **Fruit** globose to oblong, 6.9–7.3 mm long, 6.2–6.6 mm in diam., inconspicuously punctate and punctate-lineate.

Distribution.—*Ardisia nigrescens* subsp. *nigrescens* is known from Mexico (Puebla, San Luis Potosí, Oaxaca, Veracruz, Chiapas and Tabasco) and in Nicaragua (Jinotega and Zelaya). It grows at 50–1000 m elevation.

Ecology and conservation status.—Subsp. *nigrescens* occurs in primary deciduous and evergreen, lower montane rain forests. This subspecies does not appear to be threatened.

Etymology.—The epithet is based on the latin ‘niger’ or ‘nigrescens’ meaning ‘becoming black’ and refers to the black hispid trichomes.

Ardisia nigrescens subsp. *nigrescens* is most closely related to subsp. *donnellsmithii* because they have similar reddish, hirsute trichomes and ovate calyx lobes. However, subsp. *nigrescens* has crenulate or serrate leaf margins and shorter calyx lobes (1.9–2.1 mm long), whereas subsp. *donnellsmithii* has mostly entire to slightly crenulate or serrate leaf margins and longer calyx lobes (2.2–2.7 mm long).

Specimens examined: **MEXICO. Chiapas:** Mpio. Ocosingo, Laguna Ocotol Grande, 3,300 ft [1,006 m], 14 Apr 1967 (fr), *D. Breedlove* 15702 (F, LL); Mpio. Palenque, 6–12 km S of Palenque on the road to Ocosingo, 300 m, 22 Feb 1972 (fr), *D. Breedlove* 24232 (F, LL, MO, NY); Mpio. La Libertad, 15–20 km towards Chancala on road to Bonompak from the Palenque-Ocosingo road, 280 m, 4 Jan 1981 (fl), *D. Breedlove* 49112 (GH, MO, NY, TEX); Mpio. La Libertad, 10 km towards Chancala on road to Bonompak from the Palenque-Ocosingo road, 280 m, 16 Jan 1982 (fl), *D. Breedlove* & *F. Almeda* 57370 (DUKE, LL, MO, NY, TEX); Mpio. Ocosingo, near Laguna Ocotol Grande, ca 25–30 km SE of Monte (Cerro) Libano, ca. 950 m, 26 Jul 1954 (fl), *R. Dressler* 1507 (GH); Mpio. Palenque, a lo largo del Río Nututún, ca. 1 km río abajo de la carretera, without elev., 14 Jan 1985 (fl), *H. Hernández* & *R. Torres* 813 (FTG, LL, MEXU, MO); Mpio. San Cristóbal de Las Casas, Santa Cruz en San Filipe, without elev., 15 Nov 1986 (fl), *A. Mendez T.* & *M. Concepción Mtz. de López* 9499 (GH, MO, NY, TEX). **Oaxaca:** Ejido Roberto Colorado, near Tuxtepec, without elev., 9 Dec 1943 (fl-bud), *E. Hernández X. 102* (LL); District Tuxtepec, Chiltepec and vicinity, ca. 20 m, Jul 1940–Feb 1941 (ster.), *G. Martínez-Calderón* 209 (LL); ca. 200 m, 20 Nov 1941 (fr), *G. Martínez-Calderón* 828 (GH). **Puebla:** Bosque Ajenjelre, without elev., Aug 1951 (fr), *D. Ramírez C. s.n.* (MEXU); Mpio. Hueytamalco, Paxta, 250 m, 4 Nov 1983 (fr), *F. Ventura A.* 20767 (MEXU, MO). **San Luis Potosí:** Mpio. San Antonio, Lejem, without elev., 1 May 1979 (fr), *J. Alcorn* 2937 (TEX-2 sheets); Mpio. Tamazunchale, Tamazunchale, 200 m, Jul 1937 (fr), *C. Lundell* & *A. Lundell* 7130 (LL). **Tabasco:** Mpio. Tacotalpa, Cerro del Madrigal, km 7 de la E Tacotalpa hacia Tapijulapa, without elev., 17 Jun 1983 (fr), *C. Cowan et al.* 3935 (TEX-2 sheets); S side of Mex. Hwy. 186, 2.2 mi W of Tabasco-Chiapas border, ca. 33 mi E of Macuspana, without elev., 23 Dec 1973 (fl), *A. Reznicek et al.* 187 (MICH). **Veracruz:** 34 km de Tantoyuca, hacia Tuxpan, 280 m, 12 Nov 1970 (fl), *F. Chiang* 301 (F, GH); 20 km de Tepetzintla, hacia Tantoyuca, without elev., 18 Mar 1971 (fr), *F. Chiang* 377 (F, GH, MEXU); 20 km al N de Martínez de La Torre, without elev., 2 May 1963 (fr), *A. Gómez P.* 7885 (LL); Jcaltepec, without elev., Mar 1841 (fr), *F. Liebmann* 28A (C-lectoparatype); Mpio. Puente Nacional, Barranca de Palmillas, 2 km al SE de dicha población, 19°12' N, 096°45' W, 450 m, 24 Jul 1985 (fr), *M. Medina A.* & *F. Vázquez B.* 379 (F); Mpio. Misantla, Cerro Espaldilla, an old isolated volcanic plug ca. 5 km N of Misantla, 19° 58' N, 096°50' W, 400 m, 14 Jun 1986 (fr), *G. Schatz et al.* 1195 (NY, US); Without locality, without elev., without date (fr), *L. Schnée* & *P. Maury s.n.* (P-2 sheets); 6 mi N of Tuxpan on Hwy. 165, without elev., 2 Jan 1959 (fl), *B. Thompson* & *B. Fields* 379 (TEX); Mpio. Martínez de la Torre, El Mirador, 100 m, 16

Nov 1976 (fl, fr), *F. Ventura* A. 13621 (MEXU, MO). **Without further locality in Mexico:** Without locality, without elev., 1865–1866 (fr), *M. Hahn* 21 (K); San Pablo, without elev., Jun 1841 (fr), *F. Liebmann* 15341 (F); Without locality, without elev., 1841–1842 (fr), *W. Karwinsky* 450 (H); 1787–1804 (fl), *M. Sessé et al.* 679 (F, F neg. no. 47119); 730 (F, F neg. no. 47121). **NICARAGUA, Jinotega:** Cerro San Pedro, Comarca Kilambe, 13°36' N, 085°38–39' W, 820 m, 21 Jul 1980 (fl), *J. Sandino* 181 (MO). **Zelaya:** 20 km NW de Alamicamba, 13°36' N, 084°22' W, 50 m, 16 Apr 1971 (fr), *E. Little* 25392 (MO, US).

1b. *Ardisia nigrescens* Oerst. subsp. *donnellsmithii* (Mez) Ricketson & Pipoly, comb. et stat. nov. (Fig. 2). *Ardisia donnellsmithii* Mez, Bull. Herb. Boiss. ser. II, 3:235. 1903. *Ardisia nigrescens* Oerst. var. *donnellsmithii* (Mez) Lundell, *Wrightia* 3:99. 1964. *Oerstedianthus donnellsmithii* (Mez) Lundell, *Phytologia* 48:141. 1981. *Ardisia multilineata* Mez, *Repert. Spec. Nov. Regni. Veg.* 16:311. 1920, nom. superfl. TYPE. GUATEMALA. ALTA VERAPAZ: Cubilquitz, 350 m, Sep 1900 (fl), *H. von Türckheim* 7766 (HOLOTYPE: B-destroyed; LECTOTYPE: here designated, US; ISOLECTOTYPES: GH, LL, F neg. no. 55603).

Shrub or small tree 0.9–6–(12) m tall, 2.5–7.5 cm in diam. **Branchlets** slender, terete, 2–5 mm in diam., with dense, long hirsute simple reddish hairs throughout. **Leaves:** with leaf blades membranous to chartaceous, ovate or elliptic to oblong, 5–18.2 cm long, 2.1–8.2 cm wide, apically abruptly acuminate, the acumens 1.2–2.1 cm long, basally obtuse, the midrib impressed above, prominently raised below, the secondary veins 15–24 pairs, prominulous above, prominently raised below, inconspicuously to conspicuously, often prominently punctate and punctate-lineate, sparsely hispid above and below, often densely hispid along the midrib above, densely hirsute along the midrib below, the margins mostly entire or slightly crenate to slightly serrate, flat; petioles slender, canaliculate, 0.6–1.6 cm long, densely hispid along above, densely hirsute below. **Inflorescences** terminal, rarely lateral, erect, pinnately panicle, 3–6 cm long, 4–8 cm wide, shorter than the leaves, the rachis with dense, long hirsute, simple reddish hairs, the branches 14–18 flowered corymbs; peduncles nearly absent to 1.2 cm long, with dense, long hirsute, simple reddish hairs; inflorescence branch bracts caducous, membranous, oblong to oblanceolate, 0.4–2.5 cm long, 0.1–1.4 cm wide, apically acute, basally acute on sessile or short petioles, the veins prominent, conspicuously and prominently punctate and punctate-lineate, with scattered, long hirsute, simple reddish hairs, the margins entire; floral bracts apparently absent, with no apparent scars; pedicels slender, terete, 0.7–1.3 cm long, conspicuously and prominently punctate and punctate-lineate, with dense, long hirsute, simple reddish hairs. **Flowers** 5-merous, white to pink; calyx lobes membranous, ovate, 2.2–2.7 mm long, 1.2–1.5 mm wide, apically acute, conspicuously and prominently punctate and punctate-lineate, sparsely hirsute outside, granular-glandules within near the base, the margins entire, densely hirsute-ciliolate; corolla membranous, 7.8–8.7 mm long, the tube 1.6–2 mm long, the lobes oblong, 6.3–7.5 mm long, 2.8–3.3 mm wide, apically acute to rounded, conspicuously and prominently punctate and punctate-lineate, glabrous except with scattered yellow papillae at the base within, the

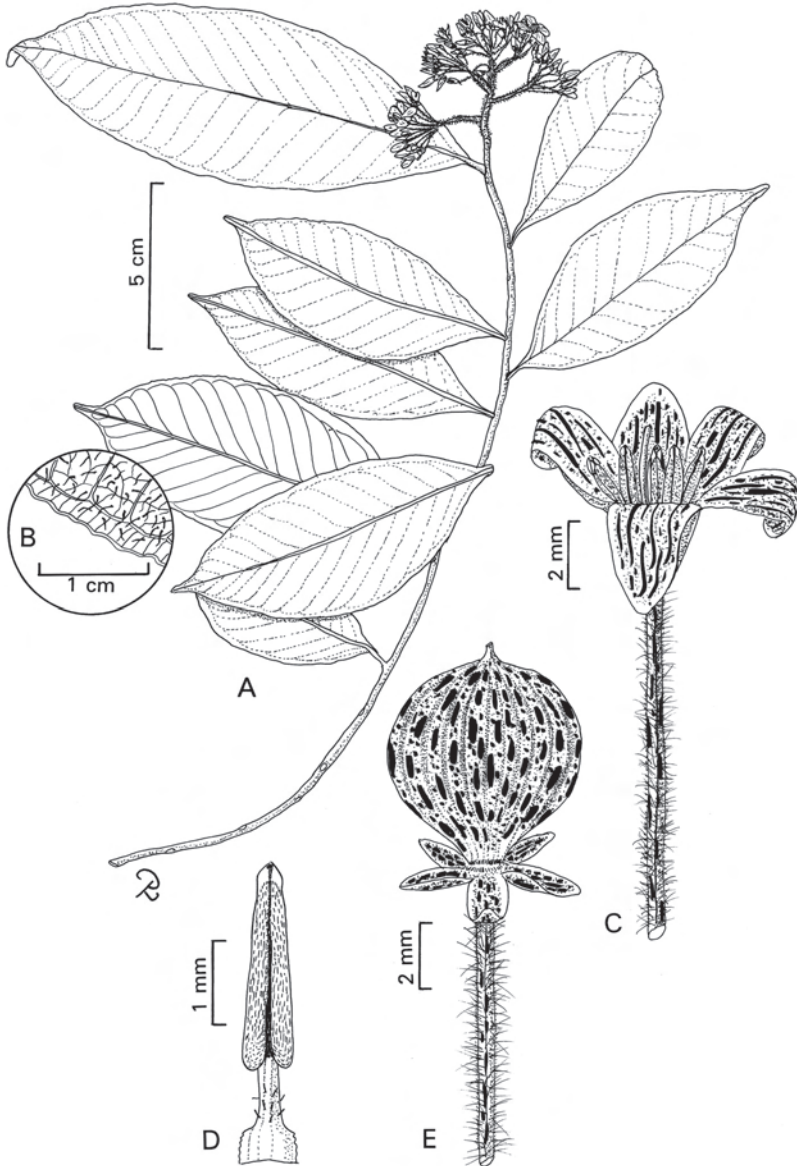


FIG. 2. *Ardisia nigrescens* Oerst. subsp. *donnellsmithii* (Mez) Ricketson & Pipoly. A. Flowering branch. B. Detail of abaxial leaf surface. C. Flower. D. Stamen, showing adaxial surface. E. Fruit. A–D drawn from lectotype, *H. von Türckheim* 7766 (US). E drawn from *G. Davidse & A. Brant* 32362 (MO).

margins entire, erose; stamens 4.6–5.5 mm long, the filaments 1.5–2 mm long, the staminal tube 0.5–0.7 mm long, the apically free portions abruptly constricted, 1–1.5 mm long, epunctate, with scattered yellow papillae near the base, the anthers free, lanceolate, 3.3–4.5 mm long, 0.8–1.1 mm wide, apically apiculate, basally subcordate, the connective inconspicuously punctate; pistil 5.4–6.4 mm long, glabrous, inconspicuously punctate, the ovary ovate, 0.8–1.2 mm long, the style 4–4.7 mm long, inconspicuously punctate and punctate-lineate, the ovules 12–15. **Fruit** globose, 5.5–7.2 mm long, 6.2–6.6 mm in diam., inconspicuously punctate and punctate-lineate.

Distribution.—*Ardisia nigrescens* subsp. *donnellsmithii* is known from Mexico (Chiapas), Belize (Stann Creek and Toledo) and Guatemala (Alta Verapaz, Huehuetenango and Petén). It grows from 50–950 m.

Ecology and conservation status.—Subsp. *donnellsmithii* occurs in lower montane rain forest.

Etymology.—This taxon was dedicated to John Donnell Smith (1829–1928), who collected extensively in Guatemala and Central America.

In Mez's (1903) original description he lists two collections by *H. von Türckheim* numbers 7766 and 7918, both in the Mez Herbarium (B). These original collections were destroyed in 1943 during WWII, necessitating the need to select a lectotype. Although, C.L. Lundell labeled the US sheet of *H. von Türckheim* 7766 as the "Holotype," he failed to actually publish a lectotypification of the collection. However, from the available material, the US sheet is the best material, and we here select it as the lectotype for this taxon. The only known sheet of *H. von Türckheim* 7918 is also at US but is missing the inflorescence and has only a few loose fruits. Unfortunately, Mez (1920) re-described this same material as *Ardisia multilineata* using the same *H. von Türckheim* collections, thus making this name superfluous.

Specimens examined. **MEXICO. Chiapas:** Mpio. Ocozocoautla, 46 km N of Ocozocoautla on road to Mal Paso, 700 m, 8 Oct 1974 (fr), *D. Breedlove* 38709 (DS, LL-2 sheets); Mpio. Palenque, 50 km SW of Palenque on road to Ocosingo near Colonia Úrsulo Galvano, 370 m, 9 Nov 1980 (fr), *D. Breedlove* 47348 (CAS); Mpio. La Libertad, 15–20 km towards Chancala on road to Bonampak from the Palenque-Ocosingo road, 280 m, 4 Jan 1981 (fr), *D. Breedlove* 49160 (LL, NY); Mpio. Ocosingo, on ridges near lake at Naja, 300 m, 3 Mar 1981 (fr), *D. Breedlove* 49970 (LL, MO, NY); Mpio. Chilón, near and along road to Pozo Cuevas above Agua Azul, 600 m, 14 Jan 1982 (fr), *D. Breedlove & F. Almeda* 57228 (LL, MO); Mpio., La Independencia, ridges 45–50 km E of Lagos de Montebello National Park on road to Ixcán from Santa Elena, 760 m, 22 Jan 1982 (f), *D. Breedlove* 57759 (CAS); Mpio. Ocosingo, S of Santo Domingo on road to Bonampak and Echeverría from Chancala, 455 m, 25 Jan 1982 (fr), *D. Breedlove & F. Almeda* 57927 (MO); Mpio. Ocosingo, near Laguna Ocotol Grande, ca. 25–30 km SE of Monte (Cerro) Libano, ca. 950 m, 10 Aug 1954 (fl), *R. Dressler* 1637 (GH, US); Río Salinas, without elev., 8 Feb 1964 (fl), *C. Lundell* 17823 (LL); Mpio. Ocosingo, Bonampak, 350 m, 12 Jun 1984 (fr), *E. Martínez* S. 6523 (MO); 6537 (MO); Mpio., 4 km W of Crucero Corozal along Palenque road, Boca Lacantum, 180 m, 10 Aug 1984 (fr), *E. Martínez* S. 6901 (MEXU); 19 Sep 1984 (fl), *E. Martínez* S. 7622 (MO, TEX); Mpio. Ocosingo, Sierra la Cojolite, 8 km W of Crucero Corozal 7 km E of Bonampak, 540 m, 20 Sep 1984 (fl), *E. Martínez* S. 7658 (MEXU); Mpio. Ocosingo, 10 km SE of Crucero Corozal, road to Boca

Lacantum, 200 m, 18 Aug 1984 (fl), *E. Martínez S. 7411* (FTG, MO); Mpio. Ocosingo, near Marqués de Comillas, 6 km SE of Ejido Benemérito de las Americas, toward Flor de Cacao, 160 m, 8 Oct 1984 (fr), *E. Martínez S. 8059* (MO); Mpio. Ocosingo, 6 km S of Campamento COFOLASA, and 24 km SE of Crucero Corozal, Palenque-Boca Lacantum road, 200 m, 17 Oct 1984 (fl), *E. Martínez S. 8427* (MO); Mpio. Ocosingo, 5 km S of Crucero Corozal, on road to Boca Lacantum, 250 m, 22 Oct 1984 (fl), *E. Martínez S. & G. Aguilar 8630* (MO); Mpio. Ocosingo, Boca Lacantum, 120 m, 28 Oct 1984 (fr), *E. Martínez S. & G. Aguilar 8790* (MO); Mpio. Ocosingo, Campamento COFOLASA 24 km SE of El Crucero Corozal, on Palenque-Boca Lacantum road, 220 m, 7 Dec 1984 (fl), *E. Martínez S. 9318* (MO); Mpio. Ocosingo, 10 km S of Ejido Benemérito de Las Americas, road to Flor de Cacao, Zona Marquez de Comillas, 120 m, 9 Dec 1984 (fl), *E. Martínez S. 9361* (MO); Mpio. Ocosingo, Boca Lacantum, along Rio Lacantum, 120 m, 10 Dec 1984 (fr), *E. Martínez S. 9581* (MEXU); Mpio. Ocosingo, 2 km W of Crucero Corozal, Palenque-Boca Lacantum road, 180 m, 13 Feb 1985 (fr), *E. Martínez S. 10106* (MO, TEX); 10132 (MO); 22 Feb 1985 (fr), *E. Martínez S. 11075* (MEXU); Mpio. Ocosingo, Crucero Corozal, 180 m, 5 Apr 1985 (fr), *E. Martínez S. 11531* (MEXU); Mpio. Ocosingo, 19 km NW of Crucero Corozal, road to Palenque, 600 m, 8 Sep 1985 (fl), *E. Martínez S. 13454* (MO, TEX); Mpio. Ocosingo, a 3 km NW of Vertice del Chixoy road a Boca Lacantum, 120 m, 11 Sep 1985 (fr), *E. Martínez S. 13616* (MO); Mpio. Ocosingo, 15 km NW of Boca Lacantum, road to Palenque, 220 m, 13 Sep 1985 (fr), *E. Martínez S. & G. Aguilar 13707* (MO); Mpio. Ocosingo, Neuvo Veracruz, 33 km W of Vertice del Rio Chixoy, road to Chajul, Marqués de Comillas, 130 m, 10 Jan 1986 (fr), *E. Martínez S. 15982* (MEXU); Mpio. Ocosingo, 2 km N of Naja, road to Chancala, 900 m, 24 May 1987 (fr), *E. Martínez S. 21333* (MO); Mpio. Ocosingo, 2 km S of Naja, 16°58' N, 091°36' W, 940 m, 24 Sep 1988 (fl, fr), *W. Stevens & E. Martínez S. 25849* (FTG, MO); Mpio. Ocosingo, near Chamisal, 760 m, 3 Dec 1976 (fl), *P. Valdivia Q. 2407* (LL, MO). **BELIZE. Stann Creek:** Middlesex, without elev., 25 May 1939 (fr), *P. Gentle 2798* (A, F, MO, NY, US); 200 ft [61 m], 24 Jul 1929 (fr), *W. Schipp 287* (A, F, GH, MO, NY); 23 Nov 1929 (fl), *W. Schipp 478* (A, BM, F, G, GH, K, MO, NY, TEX); 1928 (fr), *N. Stevenson V* (US). **Toledo:** Maya Mountains, canyon along Bladen Branch from Richardson Creek to Quebrada de Oro, 16°31-33' N, 088°46-49' W, 100-200 m, 12 Mar 1987 (fr), *G. Davidse & A. Brant 32362* (BRH, F, FTG, LL, MO); Maya Mountains, Bladen Nature Reserve, Ek Xux canyon, 1.8 airline km NW of the Ek Xux archeological site, 16°30' 57" N, 088°55' 10" W, 320 m, 18 May 1996 (fr), *G. Davidse 36051* (BRH, MO, SEL); Balo Camp, upper reach of Golden Stream, without elev., 12 Apr 1944 (fr), *P. Gentle 4522* (LL-2 sheets); Jacinto Creek, Rio Grande, without elev., 18 Oct 1944 (fl), *P. Gentle 4895* (LL-2 sheets); Temash River, without elev., 27 Feb 1945 (fr), *P. Gentle 5231* (LL-2 sheets, PH, TEX); Ridge beyond Columbia, without elev., 25 Feb 1947 (fr), *P. Gentle 6177* (LL-2 sheets, TEX); Feeders Road, 14 Miles, San Antonio-Punta Gorda Road, without elev., 5 May 1949 (fr), *P. Gentle 6729* (LL-3 sheets); Cero, without elev., 15 Feb 1950 (fr), *P. Gentle 6980* (LL-2 sheets, TEX); Between Orange Point and Moho River, without elev., 7 Apr 1952 (fr), *P. Gentle 7639* (F, LL-2 sheets, US); Camp 3, 6-8 km SE of Union Camp, trail from Camp 3 toward the Jimmy cut trail, 16°23' 14" N, 089°04' 37" W, 665-700 m, 16 Feb 1997 (fr), *T. Hawkins 1443A* (MO); Toledo, without elev., 10 Nov 1906 (fl), *M. Peck 576* (GH, K, NY); Forest Home, 200 ft [61 m], 2 Nov 1933 (fl), *W. Schipp 482* (F, MO). **GUATEMALA. Alta Verapaz:** Sebol, ca. 6 km from village near Rubelquiche, without elev., 13 Apr 1964 (fr), *E. Contreras 4254* (LL-2 sheets, TEX); Sebol, on old Petén road, without elev., 14 Apr 1964 (fr), *E. Contreras 4291* (GH, LL-2 sheets, TEX); Sebol, without elev., May 1964 (fr), *E. Contreras 4667* (LL); Sebol and vicinity, without elev., Jul 1964 (fl), *E. Contreras 5414* (LL-3 sheets); Near Finca Sepacuite, near Cajabón, without elev., 26 Apr 1902 (fr), *O. Cook & R. Griggs 767* (US); Semacoch, without elev., 8 Mar 1905 (fr), *G. Goll 261* (US); Xalavé, 1,500 ft [457 m], 25 Jun 1920 (fl), *H. Johnson 228* (A, F, US); Forest in valley, "pantano," 2.5 mi W of Cubilgüitz, 250-300 m, 28 Feb 1942 (fr), *J. Steyermark 44284* (F); 44322 (F); 1.5-2 mi S of Cubilgüitz, 300-350 m, 1 Mar 1942 (fr), *J. Steyermark 44383* (F, US); S side of Cerro Chinajá, between Sachaj and Sacacac, 150-180 m, 20 Mar 1942 (fr), *J. Steyermark 45161* (F); Cubilgüitz, 350 m, Dec 1900 (fr), *H. von Tuerckheim 7918* (US-isolectotype); Aug 1904 (fl), *H. von Tuerckheim 8707* [1978] (US-3 sheets); Oct 1906 (fl), *H. von Tuerckheim III63* (BR-2 sheets, F, G-3 sheets, LL, MO). **Huehuetenango:** Between Ixcán & Río Ixcán, Sierra de los Cuchumatanes, 150-200 m, 23 Jul 1942

(fr), *J. Steyermark* 49253 (F). **Petén:** La Cumbre, without elev., 30 Sep 1966 (fr), *E. Contreras* 6290 (LL-2 sheets, TEX); La Cumbre, bordering Río Chacte, E of km 135, without elev., 19 Jul 1976 (fr), *E. Contreras* & *C. Lundell* 20069 (LL-2 sheets); Sayaxche, around airport, without elev., 9 Feb 1964 (fr), *C. Lundell* 17923 (LL); Sayaxche, on Arroyo Santa Cruz trail, without elev., 11 Feb 1964 (fl), *C. Lundell* 17978 (LL); Sayaxche, in cañada 2 km NE of village on Santa Cruz trail, without elev., Feb 1964 (fr), *C. Lundell* 18039 (LL); (fl), *C. Lundell* 18040 (LL-2 sheets, TEX); Laguna Petexbatun, forest bordering the lake, without elev., 2 Apr 1964 (fr), *C. Lundell* 18133 (LL-2 sheets); Between Finca Yalpemech & Chinajá, 50–100 m, 28 Mar 1942 (fr), *J. Steyermark* 45427 (F, US); W & NW of Chinajá, between Río Chinajá & 6 mi W of Río San Ramón, 50–70 m, 29 Mar 1942 (fl), *J. Steyermark* 45493 (F).

2. *Ardisia verdisejala* Ricketson & Pipoly, sp. nov. (**Fig. 3**). TYPE. MEXICO. CHIAPAS: Mpio. Ocosingo, 15 km SW of Ocosingo on road to San Cristóbal Las Casas, 1,372 m, 1 Sep 1981 (fl), *D. Breedlove* 52591 (HOLOTYPE: MO; ISOTYPES: CAS, GH, LL, NY).

Propter ramulosque rhachides inflorescentiarum longi-hirsutos *A. nigrescens* valde arcte affinis sed ab ea lobis calycinis oblongisque (non ovatisque) 3.4–3.8 (nec 1.9–2.7) mm longis praeclare distat.

Shrub to small tree 1.2–6.1 m tall. **Branchlets** slender, terete, 1–2.5 mm in diam., with dense, long hirsute simple reddish hairs throughout. **Leaves:** with leaf blades, membranous, elliptic to oblong, 3.3–10.2 cm long, 1.5–4.8 cm wide, apically abruptly acuminate, the acumen 0.5–1.6 cm long, basally acute to obtuse, the midrib impressed above, prominently raised below, the secondary veins 12–19 pairs, prominulous above, prominently raised below, conspicuously and prominently punctate and punctate-lineate, sparsely hispid above and below, often densely hispid along the midrib above, densely hirsute along the midrib below, the margins serrate, flat; petioles slender, canaliculate, 3.5–8 mm long, with dense, long hispid reddish hairs above and below. **Inflorescences** terminal, rarely lateral, erect, pinnately paniculate, 3–6 cm long, 3–6.5 cm wide, shorter than the leaves, the rachis with dense, long hirsute, simple reddish hairs, the branches 5–7 flowered corymbs; peduncles nearly absent to 1.5 cm long, with dense, long hirsute, simple reddish hairs; inflorescence branch bracts caducous, membranous, oblong to obovate or oblanceolate, 7.5–15.5 mm long, 3.5–6 mm wide, apically acute, basally acute on sessile or short petioles, the veins prominent, conspicuously and prominently punctate and punctate-lineate, with scattered to dense, long hirsute, simple reddish hairs, the margins entire; floral bracts apparently absent above, with no apparent scars, below similar to the inflorescence branch bracts but, early caducous, usually linear, 3.8–6.6 mm long, 1.3–1.5 mm wide; pedicels slender, terete, 1.5–2.5 cm long, conspicuously and prominently punctate and punctate-lineate, with dense, long hirsute, simple reddish hairs. **Flowers** 5-merous, white to pink or reddish; calyx lobes membranous, narrowly oblong, 3.4–3.8 mm long, 1.2–1.7 mm wide, apically acute to rounded, conspicuously and prominently punctate and punctate-lineate, sparsely hirsute outside, glabrous within, the margins entire, scattered hirsute-ciliolate; corolla membranous, 9.2–9.8 mm long, the tube 1.2–1.4 mm long, the lobes oblong, 8–8.4 mm long, 3.2–5.4 mm wide, apically acute to rounded, conspicuously and prominently punctate and punctate-lineate, glabrous except with

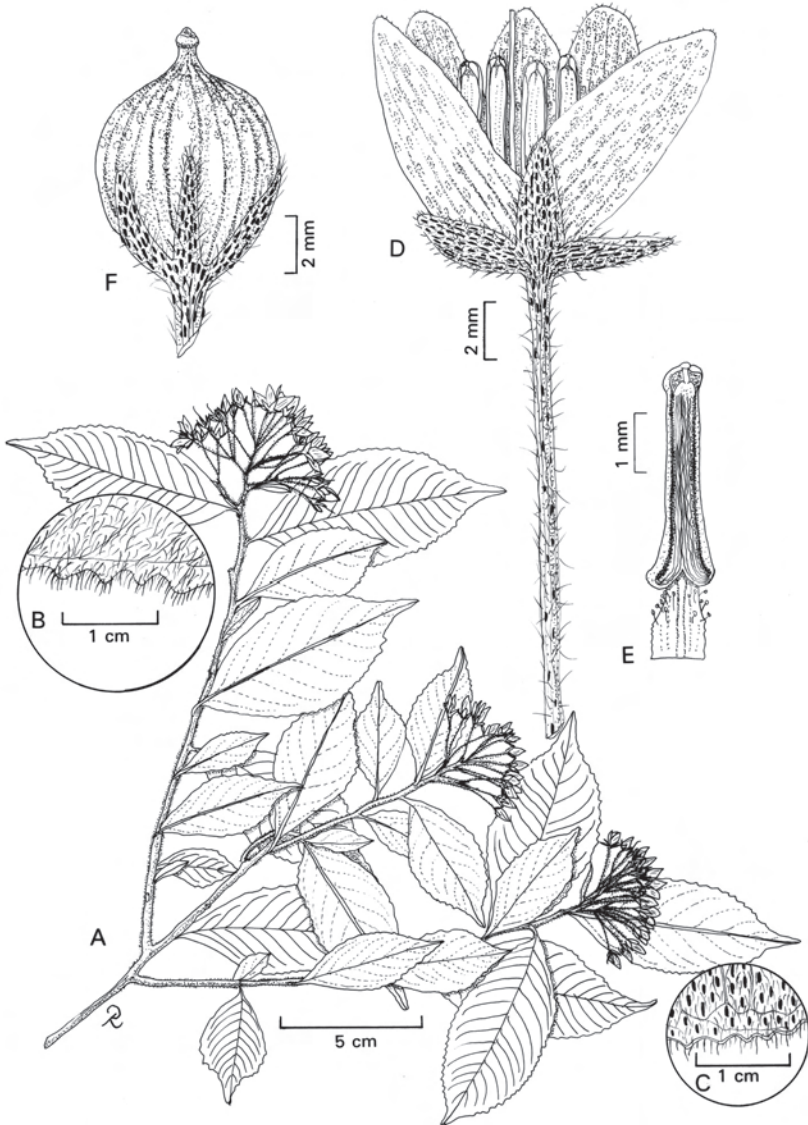


FIG. 3. *Ardisia verdisepala* Ricketson & Pipoly. **A**. Flowering branch. **B**. Detail of adaxial leaf surface. **C**. Detail of abaxial leaf surface. **D**. Flower. **E**. Stamen, showing adaxial surface. **F**. Fruit. A–D drawn from holotype, *D. Breedlove* 52591 (MO). F drawn from *A. Méndez Ton* 5667 (MO).

scattered yellow papillae at the base within, the margins entire, erose; stamens 5–5.8 mm long, the filaments 1.7–2.2 mm long, the staminal tube 0.5–0.7 mm long, the apically free portions as wide as the anthers, 1.4–1.7 mm long, epunctate, with scattered yellow papillae near the base, the anthers free, lanceolate, 3.8–4.3 mm long, 1–1.2 mm wide, apically apiculate, basally hastate, the connective inconspicuously punctate; pistil 5.5–6.8 mm long, glabrous, inconspicuously punctate, the ovary ovate, 1–1.5 mm long, the style 4.5–5.6 mm long, inconspicuously punctate and punctate-lineate, the ovules 14–17. **Fruit** globose, 5.4–7 mm long, inconspicuously punctate and punctate-lineate.

Distribution.—*Ardisia verdisepala* is endemic to the area around Ocosingo, Chiapas, Mexico. It grows from 550–1,372 m.

Ecology and conservation status.—*Ardisia verdisepala* occurs in evergreen pine-oak, lower montane and montane rain forests. Although, no specimens have been collected since the 1980s, it seems to be locally common and not presently threatened.

Etymology.—The epithet *verdisepala* comes from the greenish color of the sepals, which is evident because of the reduced number of punctations on the calyx lobes.

Ardisia verdisepala has affinities to *A. nigrescens* because of the similar vestiture, but is easily separated by the narrowly oblong calyx lobes versus the ovate lobes of *A. nigrescens*. *Ardisia verdisepala* also has affinities to *A. tuerckheimii*, because both have narrow calyx lobes; however, *A. verdisepala* is immediately separated from the virtually glabrous *A. tuerckheimii*, by the well-developed vestiture.

PARATYPES. **MEXICO. Chiapas:** Mpio. Ocosingo, 6–8 km N of Ocosingo along road to Bachajón, 900 m, 9 Nov 1971 (fl), *D. Breedlove & A. Smith* 22120 (MO); 22121 (LL, MO, NY); 24 Sep 1972 (fl), *D. Breedlove* 27927 (LL, MO, NY); Mpio. Ocosingo, adjacent to Laguna Ocotol Grande, 800 m, 6 Feb 1973 (fr), *D. Breedlove* 33006 (LL, MO); Mpio. Bachajón, 3 km N Bachajón-Ocosingo road on road to Palenque, 1,170 m, 13 Jan 1981 (fr), *D. Breedlove* 49445 (CAS, DUKE, LL, MO, NY, TEX); Mpio. Ocosingo, 70 km SW of Palenque on road to Ocosingo along the Jol Uk'um, 550 m, 14 Jan 1981 (fl), *D. Breedlove & B. Keller* 49485 (DUKE, LL, MO, NY, TEX); Mpio. Bachajón, 3 km N of Bachajón-Ocosingo road at Temo on road to Palenque, 1,170 m, 31 Aug 1981 (fl), *D. Breedlove* 52487 (CAS, DUKE, F. LL, MO, NY); Mpio. Ocosingo, 80 km SW of Palenque on road to Ocosingo along the Jol Uk'um, 760 m, 14 Jan 1982 (fl), *D. Breedlove & F. Almeda* 57210 (CAS, GH, LL, MO, NY); Mpio. Yajalón, K'ak'ate'l, 1,100 m, 15 Jul 1982 (fr), *A. Méndez G.* 4445 (MEXU, MO); Mpio. Oxchuc, La Cascada de Mesbija, 1,300 m, 29 Nov 1982 (fl), *A. Méndez T.* 5097 (MEXU, MO); Mpio. Yajalón, Rancho San Luis, 1,000 m, 10 Feb 1983 (fr), *A. Méndez T.* 5469 (ASU, MEXU, MO, TEX); Mpio. Yajalón, Banco de grava, 1,000 m, 10 Mar 1983 (fr), *A. Méndez T.* 5640 (MEXU, MO, TEX); Mpio. Yajalón, Rancho San Luis, 900 m, 15 Mar 1983 (fr), *A. Méndez T.* 5667 (MEXU, MO, TEX); 15 Apr 1983 (fr), *A. Méndez T.* 5837 (MEXU, MO); 15 Apr 1983 (fr), *A. Méndez T.* 5842 (MEXU, MO); Mpio. Yajalón, Arroyo en la Graba, 800 m, 16 May 1983 (fr), *A. Méndez T.* 6052 (MEXU, MO, TEX); Mpio. Sabanilla, Finca Morelia, 650 m, 5 Jun 1983 (fr), *A. Méndez T.* 6112 (MEXU, MO, TEX); Mpio. Yajalón, El Azufre, 700 m, 20 Jun 1983 (fr), *A. Méndez T.* 6211 (MEXU, MO, TEX).

3. *Ardisia tuerckheimii* Donn. Sm., Bot. Gaz. 13:74. 1888. (**Fig. 4**). *Oerstedianthus tuerckheimii* (Donn. Sm.) Lundell, Phytologia 48:142. 1981. TYPE. GUATEMALA.

ALTA VERAPAZ: Pansamalá, mountain forests, 3,800 ft [1,158 m], Aug 1886 (fl), *H. von Türckheim 1035* (LECTOTYPE: US sheet no. 40099, here designated, US neg. no. 2390; ISOLECTOTYPES: F (F neg. no. 68257), G-4 sheets, GH-2 sheets, K, LL (F neg. no. 55673), M, MO (LL neg. no. 71-116), NY-2 sheets, PH, US sheet no. 1339942 (US neg. no. 2391)).

Ardisia mitchellae I.M. Johnst., Contr. Gray Herb. 81:96. 1928. *Oerstedianthus mitchellae* (I.M. Johnst.) Lundell, Phytologia 48:142. 1981. TYPE. HONDURAS. ATLÁNTIDA: vicinity of Tela, near a river, 50 ft. [15 m], 4 Apr 1926 (fl), *E. Mitchell 66* (HOLOTYPE: GH; ISOTYPE: US).

Ardisia carlsonae Steyererm., Ceiba 4:301. 1955. *Oerstedianthus carlsonae* (Steyererm.) Lundell, Phytologia 54:285. 1983. TYPE. MEXICO. CHIAPAS: Around Los Arcos, Los Lagos, 3 mi NW of Rancho San José and 34 mi SE of Comitán, 1,600 m, 15–20 Apr 1949 (fl), *M. Carlson 1744* (HOLOTYPE: F; ISOTYPE: EAP, not seen).

Ardisia erythrocarpus Lundell, Wrightia 2:59. 1960. *Oerstedianthus erythrocarpus* (Lundell) Lundell, Phytologia 48:141. 1981. TYPE. GUATEMALA. PETÉN: San Luis, km 52 of road S of village, without elev., 10 Jul 1959 (fr), *C. Lundell 16267* (HOLOTYPE: LL-TEX (F neg. no. 55604); ISOTYPES: LL-TEX, TEX, US).

Ardisia brevipes Lundell, Wrightia 3:97. 1964. *Oerstedianthus brevipes* (Lundell) Lundell, Phytologia 48:141. 1981. TYPE. MEXICO. VERACRUZ: Suchilapa, without elev., 10 Mar 1930 (fl), *C. Mell 576* (HOLOTYPE: US; ISOTYPE: F (F neg. no. 68136, LL neg. no. 1971-24), LL-TEX (F neg. no. 55610), NY).

Ardisia hirtella Lundell, Wrightia 3:98. 1964. *Oerstedianthus hirtella* (Lundell) Lundell, Phytologia 48:141. 1981. TYPE. BELIZE. EL CAYO: Retiro, without elev., 30 Jun–Aug 1936 (fl), *C. Lundell 6302* (HOLOTYPE: LL-TEX (F neg. no. 55615; ISOTYPES: F (F neg. no. 68223), GH-2 sheets, LL, MEXU, NY-2 sheets, TEX, US).

Ardisia trinitariae Lundell, Wrightia 5:62. 1974. *Oerstedianthus trinitariae* (Lundell) Lundell, Phytologia 48:142. 1981. TYPE. MEXICO. CHIAPAS: Municipio de La Trinitaria, slope at the Lago de Monte Bello, 25 mi E of La Trinitaria, 5,100 ft [1,554 m], 13 Apr 1965 (fl), *D. Breedlove 9721* (HOLOTYPE: LL-TEX, (F neg. no. 55631); ISOTYPES: CAS-DS, F (F neg. no. 68449).

Ardisia tuxtepecana Lundell, Wrightia 5:63. 1974. *Oerstedianthus tuxtepecanus* (Lundell) Lundell, Phytologia 48:142. 1981. TYPE. MEXICO. OAXACA: Rancho “Los Caracoles,” ca. de Tuxtepec, without elev., Jul 1963 (fr), *J. Alcocer y C. Morales s.n.* (HOLOTYPE: LL, (F neg. no. 55632).

Shrubs to small trees 0.5–15 m tall, 2.5–25 cm in diam. **Branchlets** slender, terete, 1–3 mm in diam., very sparsely to densely puberulent of simple trichomes. **Leaves:** with leaf blades membranous, elliptic, 2.8–12.5 cm long, 0.9–5.8 cm wide, apically abruptly long acuminate, the acumen 0.5–2.2 cm long, basally obtuse, the midrib impressed above, prominently raised below, the secondary veins 14–30 pairs, prominulous above, prominently raised below, inconspicuously to conspicuously punctate and punctate-lineate, glabrous to scattered puberulent of simple trichomes on the upper and lower surface, especially along the midvein, the margins entire to crenate or serrate, flat; petiole slender, canaliculate, 0.5–1.1 cm long, glabrous. **Inflorescences** terminal, erect, pinnately paniculate, 1.5–12 cm long, 1.5–7 cm wide, shorter to slightly longer than the leaves, the rachis glabrous to densely puberulent of simple trichomes, the branches 4–9-flowered corymbs; peduncles nearly absent to 1 cm long, glabrous; inflorescence branch bracts caducous, membranous, oblong to obovate or oblanceolate, 3–9 mm long, 1–3 mm wide, apically acute, basally acute on sessile or short peti-

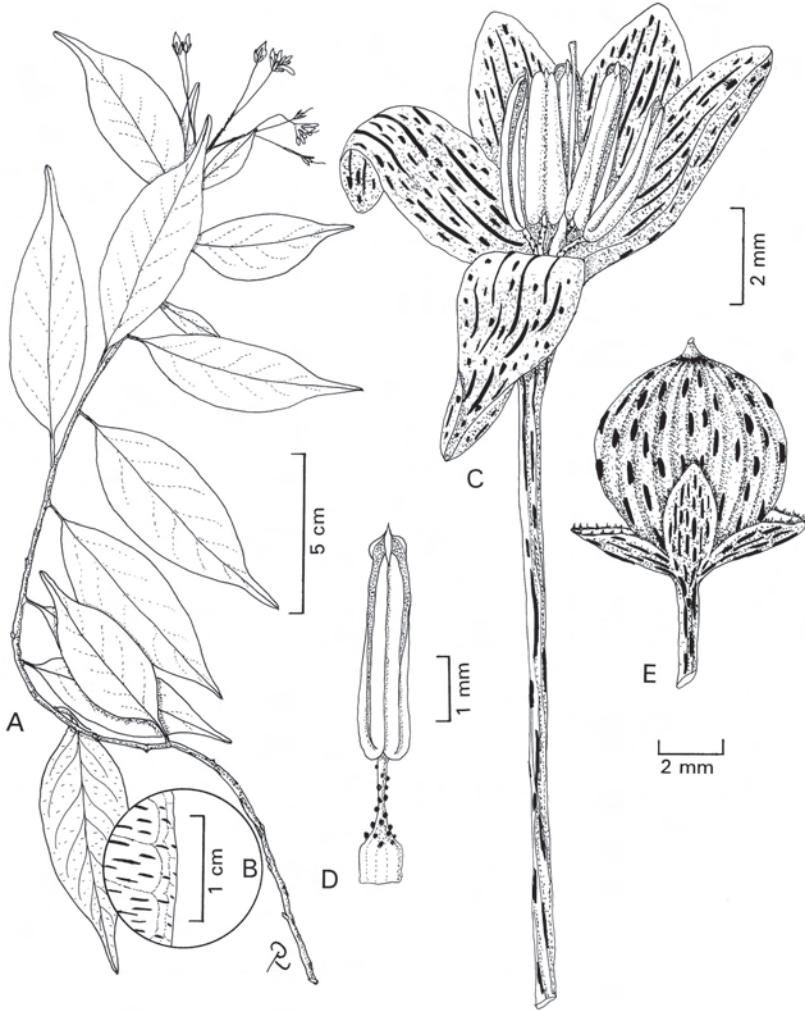


FIG. 4. *Ardisia tuerckheimii* Donn. Sm. A. Flowering branch. B. Detail of abaxial leaf surface. C. Flower. D. Stamen, showing adaxial surface. E. Fruit. A–D drawn from lectotype, *H. von Türckheim* 1035 (US). E drawn from *E. Contreras* 6668 (LL).

oles, the veins prominent, conspicuously and prominently punctate and punctate-lineate, glabrous, the margins entire; floral bracts apparently absent in the upper portion of the inflorescence with no apparent scars; pedicels slender, terete, 1.1–1.8 cm long, conspicuously and prominently punctate and punctate-lineate, glabrous to densely puberulent with simple trichomes. **Flowers** 5-

merous, white to pinkish; calyx lobes membranous, ovate to narrow oblong or oblanceolate, 1.5–3 mm long, 0.6–2 mm wide, apically acute to rounded, conspicuously and prominently punctate and punctate-lineate, glabrous to scattered papillae inside and out, the margins entire, scattered hirsute-ciliolate; corolla membranous, 4–10.2 mm long, the tube 0.7–1.9 mm long, the lobes oblong, 4.5–9.1 mm long, 1.6–5 mm wide, apically acute to rounded, conspicuously and prominently punctate and punctate-lineate, glabrous except rarely with a few yellow papillae at the base within, the margins entire, erose; stamens 4.7–6.2 mm long, the filaments 1.8–2.9 mm long, the staminal tube 0.2–0.9 mm long, the apically free portion 1.7–2.5 mm long, epunctate, with scattered yellow papillae near the base, the anthers free, lanceolate, 3.2–5.1 mm long, 0.6–1.6 mm wide, apically apiculate, basally subcordate, the connective inconspicuously punctate; pistil 5.2–8.3 mm long, glabrous, inconspicuously punctate, the ovary ovate, 0.8–1.5 mm long, the style 4.2–6.7 mm long, inconspicuously punctate and punctate-lineate, the ovules 8–15. **Fruit** globose, 5–6.4 mm long, inconspicuously punctate and punctate-lineate.

Distribution.—*Ardisia tuerckheimii* is known from southern Mexico (Oaxaca, Veracruz and Chiapas), southern Belize (Cayo and Toledo), northern Guatemala (Petén, Huehuetenango, Baja Verapaz, Alta Verapaz and Izabal) and northeastern Honduras (Cortés, Atlántida and Yoro). It grows from 800–1,500 m.

Ecology and conservation status.—*Ardisia tuerckheimii* occurs in primary and secondary, pine-oak-Liquidambar, lower montane and montane forests. This species appears to be quite common and not in any immediate danger.

Etymology.—This taxon was named in honor of the German-born collector Hans von Türckheim (1853–1920), who collected extensively in Guatemala and Santo Domingo.

In John Donnell Smith's (1888) original description he clearly based this taxon on the *H. von Türckheim 1035* collection, and it is agreed that his types are housed at the Smithsonian Institution (US). However, three specimens are housed at US with no indication as to which sheet is the holotype, thus necessitating the need to select a lectotype. One of these sheets US no. 1339941 was photographed by the Field Museum (F neg. no. 55673) and was de-accessioned and sent as a gift to C.L. Lundell (LL-TEX). The remaining two US sheets are of approximately equal value, one labeled as US no. 40099 and the other US as no. 1339942; the latter appears to have an original hand written label. Although C.L. Lundell labeled the US no. 40099 sheet as the "Type," he did not formally lectotypify the collection. Because the US no. 40099 sheet is of slightly better quality and has a lower accession number, making it more likely that John Donnell Smith used this material, at least in part, for his original description, we designate this sheet as the lectotype.

Ardisia tuerckheimii is an extremely variable species, which has led to its over description. Many of the collections from Mexico are glabrous or nearly so,

and gradually become more puberulent, as one moves south towards Honduras. However, because of this gradual gradation from glabrous to densely puberulent no clear justification can be found to recognize any of these proposed species and all are synonymized here. In fact the types of *Ardisia mitchellae* and *A. hirtella* were originally compared to *A. nigrescens* (including subsp. *donnellsmithii*), and not even compared to *A. tuerckheimii*, and separated based mostly on the differences in the indument, which is clearly different. *A. erythrocarpa* is unique only for its slightly larger fruits and slightly ciliated larger sepals. Populations of *A. brevipes* are unique only for their apparent subsessile fasciculate inflorescences with shorter peduncles, and with what are described as “bulbous” anther bases, and involuted petals apically. Populations of *A. carlsonae* are unique only for their slightly larger flowers, slightly smaller leaves and slightly obtuse anther. The type of *A. trinitariae* has slightly longer pedicels, slightly larger flowers, “bulbous” anthers bases and slightly oblong leaves. Finally, *A. tuxtepecana* differs slightly by its slender habit and smaller more densely puberulent leaves with slightly longer pedicels. Close examination of the total variation in this species shows that the slight differences, displayed by the synonymied taxa are not discontinuous but fall within the range of variation of *A. tuerckheimii*.

Specimens examined. **MEXICO. Chiapas:** Mpio. La Trinitaria, slope at the Lago of Monte Bello, 25 mi E of La Trinitaria, 5,100 ft [1,554 m], 13 Apr 1965 (fr), *D. Breedlove* 9733 (F, LL); 5,200 ft [1,585 m], 17 Aug 1966 (fl, fr), *D. Breedlove* 14978 (F, LL, US); Mpio. La Trinitaria, forest along the Comitán River at its sumidero, Lagos de Montebello, 42 km NE of La Trinitaria, 1,300 m, 23 Oct 1971 (fl), *D. Breedlove* & *R. Thorne* 21166 (F, LL, MO, NY); Mpio. La Trinitaria, slopes E of Laguna Tzikaw, Monte Bello National Park, 1,300 m, 16 Nov 1972 (fl), *D. Breedlove* & *R. Dressler* 29601 (MO, TEX); Mpio. Las Margaritas, on the W side of Laguna Miramar E of San Quintín, 350 m, 11 Feb 1973 (fr), *D. Breedlove* 33302 (MO); Mpio. Ocozocoautla de Espinosa, 32 km N of Ocozocoautla on road to Mal Paso, 800 m, 6 Oct 1974 (fr), *D. Breedlove* 38200 (DS, LL, MO); Mpio. La Trinitaria, 4 km E of Laguna Tsiskaw near Dos Lagos, 1,300 m, 19 Oct 1974 (fl), *D. Breedlove* 38764 (CAS, MO); Mpio. La Trinitaria, E of Laguna Tziscoa, Monte Bello National Park, 1,380 m, 18 Dec 1980 (fr), *D. Breedlove* 48740 (LL, MO); Mpio. La Trinitaria, Near Cinco Lagos, Lagos de Montebello National Park, 1,372 m, 5 Oct 1981 (fl), *D. Breedlove* 53339 (DUKE, F, GH, LL, MO, NY); 13 Oct 1981 (fr), *D. Breedlove* 53425 (LL); Mpio. La Trinitaria, Cinco Lagunas, Lagos de Montebello National Park, 1,600 m, 24 May 1988 (fr), *D. Breedlove* 68667 (CAS); A Jatu del Tigre, 30 km NW Ocozocuantla, without elev., 26 May 1950 (fr), *F. Miranda* 6289 (MEXU); Mpio. Ocosingo, a los lados de la carretera, without elev., 7 Dec 1980 (fl), *T. Ramamoorthy et al.* 1356 (MEXU, MO); Mpio. La Trinitaria, slope on the E side of Lago Tsikaw in the region of the Lagos de Montebello, 4,800 ft [1,463 m], 5 Jul 1967 (fr), *A. Shilom* T. 2599 (F, LL); Mpio. La Trinitaria, near Parque Nacional Lagunas de Monte Bello, 40 km E of La Trinitaria, 1,470 m, 26 Oct 1989 (fl), *J. Soto et al.* 13479 (BM).

Oaxaca: Mpio. Santa María Chimalapa, Dto. Juchitán, Los Angeles, before Arroyo Seco, to Santa María Chimalapa, 33 km E of Mezquite, 16°52' N, 94°44' W, 250 m, 24 Mar 1988 (fr), *A. Campos et al.* 1702 (MEXU, MO); 1715 (MEXU, MO); 2 km before Cuauhtemoc along Uxpanapa Road, 12°06' N, 094°54' W, 120 m, 4 Nov 1978 (fr), *G. Castillo* C. 408 (LL, MEXU); Mpio. Juchitán, 24 km SE of Lázaro Cardenas, Santa María Chimalapa Road, 330 m, 11 Mar 1982 (fl), *R. Cedillo* T. & *R. Torres* 1144 (LL, MEXU); Mpio. Santa María Chimalapa, near Santa María, 16°55' N, 094°40' 30" W, 300 m, 15 Sep 1984 (fr), *H. Hernández* G. 433 (LL, MO); Mpio. Santa María Chimalapa, Rio Milagro, ca. 3 km W of Santa María, 16°55' N, 094°42' W, 190 m, 13 Feb 1985 (fr), *H. Hernández* G. 842 (LL, MO); Mpio. Santa María

Chimalapa, Arroyo Palomares, ca. 2.5 km N of Santa María, 16°55' N, 094°41' W, 250 m, 19 Feb 1985 (fl), *H. Hernández G.* 896 (LL, MO); Mpio. Santa María Chimalapa, ca. 1.5 km NE of Santa María through Paso Tzajinmjeun del Río del Cortes, at junction of Paso Lagarto, 16°55' N, 094°40' 30" W, 250 m, 27 Feb 1985 (fl), *H. Hernández G.* 935 (LL, MO); Mpio. Santa María Chimalapa, Arroyo Sangre, ca. 2 km al E de Santa María, 16°54' 30" N, 094°40' W, 250 m, 12 Mar 1985 (fl), *H. Hernández G.* 985 (LL); Mpio. Santa María Chimalapa, ca. 10 km W of Santa María via Chicosaja, 16°53' N, 094°46' W, 250 m, 30 Mar 1985 (fl), *H. Hernández G.* 1056 (LL, MO); Mpio. Santa María Chimalapa, Cañada del Río Negro, at Arroyo Huapond's mouth, ca. 15 km S de Santa María, 16°56' N, 094°39' 30" W, 300 m, 14 Oct 1985 (fr), *H. Hernández G. & C. González L.* 1637 (FTG); Mpio. Santa María Chimalapa, Cerro Azul-Escolapa, ca. 8 km SW of Santa María, S of road to Lázaro Cardenas, 16°51' 30" N, 094°43' W, 400 m, 19 Oct 1985 (fr), *H. Hernández G. & C. González L.* 1681 (FTG); Mpio. Santa María Chimalapa, mountain range at Paso Jugcuypac del Río Verde, ca. 8 km N of Santa María, 16°57' 30" N, 094°41' W, 500 m, 29 Oct 1985 (fr), *H. Hernández G. & C. González L.* 1769 (FTG); Mpio. Santa María Chimalapa, Arroyo Sangre, ca. 0.2–0.5 km from mouth of Río Milagro, ca. 3 km SE of Santa María, 16°54' N, 094°40' 30" W, 200 m, 28 Dec 1985 (fr), *H. Hernández G.* 1994 (FTG, LL); Mpio. Valle Nacional, 2 km W of Arroyo Seco, 17°54' N, 096°18' W, 200–300 m, 12 Oct 1992 (fl), *J. Meave del Castillo et al.* 1480 (MEXU, MO); Mpio. Santa María Jacatepec, Dtto. Tuxtepec, Predio El Aguila, W of San Agustín, entering by La Reforma, 28 km SW de Tuxtepec, road to Matías Romero, 17°50' N, 096°06' W, 550 m, 19 Jan 1988 (fr), *R. Torres C.* 11039 (MEXU, MO); Mpio. Santa María Chimalapa, Dtto. Juchitán, Los Angeles before Arroyo Seco, 23.3 km E of Lázaro Cárdenas, toward Santa María Chimalapa, entering from El Mezquite, 16°50' N, 094°45' W, 400 m, 21 Jan 1988 (fr), *R. Torres C. & E. Martínez S.* 11163 (MEXU, MO); Mpio. Santa María Jacatepec, Dtto. Tuxtepec, Predio del Aguila, at San Agustín, 25 km W of la Reforma, Ayoziotepec highway, 17° 50' N, 096°06' W, without elev., 21 Feb 1988 (fr), *R. Torres C. & L. Cortes A.* 11500 (MEXU, MO); Mpio. San Juan Guichicobi, 7 km E of Sarabia, without elev., 6 Dec 1974 (fr), *M. Vázquez T.* 1395 (FTG, MEXU, MO); Mpio. Matías Romero, ca. 22 km S of Esmeralda, ca. 9 km S of La Floresta sawmill, hills S of Río Verde, 17°01' N, 094°49' W, 290 m, 26 Mar 1981 (fl), *T. Wendt et al.* 3081 (LL-2 sheets, MO); Mpio. Matías Romero, 7.2 km W of Esmeralda, along La Laguna-Sarabia, then 2.6 km S, 17°07' N, 094°49' W, 200 m, 8 Mar 1982 (fl), *T. Wendt et al.* 3623 (LL). **Veracruz:** Mpio. Catemaco, Lado NE of Lago Catemaco E of Coyame, ca. 450 m, 27 Oct 1971 (fr), *J. Beaman* 5186 (F, LL); Mpio. San Andrés Tuxtla, Estación Biológica de Los Tuxtlas, ca. 20 km N of Catemaco, "Eblotrolotu," without elev., ca. 1970 (fl), *J. Calzada* 227 (F, LL, MEXU); 6 Apr 1972 (fl), *J. Calzada* 723 (F, MEXU); Mpio. San Andrés Tuxtla, Estación Biológica de Los Tuxtlas, without elev., 26 Oct 1972 (fr), *R. Cedillo T. & J. Calzada* 48 (F, LL, MEXU); 500 m, 8 Apr 1972 (fl), *R. Cedillo T.* 164 (F, LL, NY-2 sheets); Mpio. Catemaco, Estación Biológica Tropical Los Tuxtlas, 150 m, 16 May 1981 (fl), *R. Cedillo T. & D. Lorence* 702 (F, LL); Mpio. San Andrés Tuxtla, Estación Biológica de Los Tuxtlas, UNAM road to La Laguna Escondida, 18°35' N, 095°04' W, without elev., 29 Mar 1979 (fl), *M. Dillon et al.* 1831 (F, MO, NY, TEX); Mpio. Hidalgotitlan, kms 0–2 del camino Plan de Arroyos-Alvaro Obregon, 17°15' N, 094°40' W, 130–150 m, 14 Apr 1974 (fr), *B. Dorantes* 2802 (MEXU, MO); Mpio. Hidalgotitlan, Cedillo-La Escudra road, 150 m, 30 Sep 1974 (fr), *B. Dorantes* 3576 (MEXU, MO); Mpio. Hidalgotitlan, road from Hermanos Cedillo to la Laguna, 17°15' N, 094°40' W, 140 m, 9 Oct 1974 (fr), *B. Dorantes* 3617 (MEXU, MO); Mpio. Jesus Carranza, km 10 Cedillo-Francisco Villa road, 17°20' N, 094°40' W, 150 m, 18 Jan 1975 (fr), *B. Dorantes* 3941 (F, LL, MEXU, MO); Hills between Playa Escondida and Estación Biológica Los Tuxtlas, 50–100 m, 27 May 1981 (fr), *A. Gentry et al.* 32337 (MO); Coatzacoalcos-Las Choapas, 2 km from the exit, 50 m, 18 Nov 1968 (fr), *A. Gómez P.* 3909 (MEXU); Mpio. San Andrés Tuxtla, Lote 67, Estación Biológica Tropical Los Tuxtlas, 350 m, 28 Mar 1983 (fl), *G. Ibarra M. & L. Córtes A.* 523 (MEXU, MO); 18°34–36' N, 095°04–09' W, 160 m, 3 Nov 1983 (fr), *G. Ibarra M. & C. Lundell* 990 (MEXU, MO); 200 m, 18 Apr 1987 (fl), *G. Ibarra M. & N. Pérez N.* 3092 (FTG, MEXU, MO); 300 m, 13 Apr 1991 (fl), *G. Ibarra M. & S. Sinaca C.* 3554 (MEXU, NY); Mpio. Mecayapan-Soteapan border, ridge top of spur on N side of Volcán San Martín Pajapan, ca. 100 m below the summit ridge, 6 km NE of Pajapan, 18°18' 30" N, 094°43' 30" W, 1,100 m, 15 Jul 1982 (ster.), *M. Nee et al.* 25027 (F); Mpio. Catemaco, along road from Catemaco to Coyame, 2.5 km E of junction with road to Sontecomapan

and 0.5 km from N edge of Laguna de Catemáco, 6 km NE of Catemáco, 18°27' N, 095°03' 30" W, 350 m, 20 Apr 1983 (fl), *M. Nee et al.* 26675 (F, LL, MO, NY); Mpio. San Andrés Tuxtla, Estación Biológica de Los Tuxtlas, "Ebitrolotu, without elev, 10 Mar 1976 (fr), *D. Piñero* 15B (MEXU, MO); Mpio. San Andrés Tuxtla, Estación Biológica de Los Tuxtlas, without elev, 28 Oct 1981 (fr), *T. Ramamoorthy* 2617 (MEXU, MO); 25 Mar 1982 (fl), *T. Ramamoorthy* 3457 (MEXU, MO); 17 Sep 1982 (fr), *T. Ramamoorthy* 4148 (MEXU, MO); 22 Apr 1970 (fl), *M. Rosas* 1879 (MEXU); Mpio. San Andrés Tuxtla, Estación Biológica de Los Tuxtlas, Laguna Zacatal 2.5 km NW, 18°34–36' N, 095°04–09' W, 200 m, 9 Apr 1985 (fl), *S. Sinaca C. & E. Aparicio* 31 (MEXU, MO); Mpio. Hidalgotitlán, brecha Hnos. Cedillo-La Escuadra, 200 m, 7 Mar 1974 (fl), *M. Vázquez T. et al.* 125 (BM, MEXU); Mpio. Hidalgotitlán, Río Soloxuchil between Hermanos Cedillo and La Escuadra, 17°17' N, 094°38' W, 150 m, 3 Apr 1974 (fl), *M. Vázquez T. et al.* 333 (F); Mpio. Hidalgotitlán, Hermanos Cedillo-La Escuadra por El Camino a Pancho Villa, 17°16' N, 094°37' W, 152 m, 20 Oct 1974 (fr), *M. Vázquez T. et al.* 1241 (F); Mpio. Jesús Carranza, 2 km N of Poblado, 17°16' N, 094°40' W, 120 m, 1 Nov 1983 (fr), *M. Vázquez T. et al.* 2654 (LL); 17 Apr 1983 (fl), *A. Villalobos C. et al.* 28 (LL, MO); Mpio. San Andrés Tuxtla, Estación Biológica de Los Tuxtlas, ca. 20 km N of Catemáco, 140 m, 6 Apr 1973 (fl), *A. Villegas H.* 84 (F, LL); Mpio. hills S of Minatitlán, ca. 27 km E of La Laguna, 17°14' N, 094°18' W, 250 m, 21 Feb 1981 (fr), *T. Wendt et al.* 2911 (LL); Mpio. Hidalgotitlán, Laguna-Sarabia, 1 km W of Río Chachijalpa, 30 km al W de La Laguna, 17°12' N, 094°46' W, 100 m, 26 Feb 1981 (fl), *T. Wendt et al.* 2935 (LL); Mpio. Hidalgotitlán, Cenotes 0.3 km W of La Raya, 6.5 km N of La Laguna, along road to Poblado 7, 17°19' N, 094°30' W, 130 m, 30 Mar 1981 (fl), *T. Wendt et al.* 3106 (LL); Mpio. Minatitlán, hills S of Poblado 11, ca. 27 km E of La Laguna, 17°14' N, 094°17' W, 300 m, 3 Jun 1981 (fr), *T. Wendt et al.* 3407 (LL); Mpio. Minatitlán, 2 km N of Uxpanapa, Poblado 12, along road to Poblado 13, 17°14' N, 094°13' W, 130 m, 17 May 1983 (fr), *T. Wendt et al.* 4107 (LL); Mpio. Minatitlán, hills S of Poblado 11, ca. 27 km E of La Laguna, 17°14' N, 094°30' W, 250 m, 26 Apr 1985 (fr), *T. Wendt et al.* 4841 (LL, NY). **BELIZE.** **Cayo:** Mountain Pine Ridge, without elev, 24 Feb 1931 (fr), *H. Bartlett* 11742 (F); El Cayo, without elev, 13 Apr 1931 (fr), *H. Bartlett* 12926 (F, NY); San Antonio, without elev, 6 May 1931 (fr), *H. Bartlett* 13076 (F); Vicinity of La Flor at Río de la Flor, 6 mi S of Grand de Oro, 1,700–2,000 ft [518–610 m], 3 Jun 1973 (fr), *T. Croat* 23750 (MO); Along road between Millionario and Grand de Oro, 1,700 ft [518 m], 2–3 Jun 1973 (fr), *T. Croat* 23689 (LL, MO); El Cayo road, without elev, 16 Feb 1938 (fr), *P. Gentle* 2181 (LL, NY); Vaca, without elev, 11 Apr 1938 (fr), *P. Gentle* 2476 (A, F, NY); Humming Bird Highway, without elev, 24 Mar 1955 (fr), *P. Gentle* 8637 (LL-2 sheets, TEX); Río Frio Caves road, Augustine, Mountain Pine Ridge Forest Reserve, 460 m, 26 May 1989 (fr), *J. Meave & A. Howe* 1404 (MO); María Camp, 800 m, 24 Mar 1954 (fr), *A. Molina R.* 103 (F); At Río Frio Cave near Augustine, ca. 300 m, 5 Jul 1970 (fr), *D. Spellman* 1583 (MO); Vicinity of Puente natural, Chiquibul Forest Reserve, 1,700–1,800 ft [518–549 m], 26 Apr 1969 (fr), *G. Proctor* 30122 (LL); Millionario, 2,000 ft [610 m], 12 Dec 1968 (fl), *G. Proctor* 29864 (LL); San Pastor track, 450 m, 15 Apr 1995 (fr), *C. Whitefoord* 9014 (BR); Chiquibul Forest Reserve, Engineers' Camp, 500 m, 27 Apr 1998 (fr), *C. Whitefoord* 10378 (MO). **Toledo:** Ca. 40 km SW of Punta Gorda Dolores Estate, 15°59' N, 089°13' W, without elev, 30 Jan 1990 (fr), *M. Balick et al.* 2500 (TEX); First and second bridges near Columbia Forest Station, without elev, 26 Jun 1972 (fr), *J. Dwyer* 9954 (LL, MO); Edwards Road beyond Columbia, without elev, 8 Jun 1947 (fr), *P. Gentle* 6226 (GH, LL-2 sheets, PH, TEX); Near San Antonio, without elev, 22 Nov 1951 (fl), *P. Gentle* 7525 (GH, LL-2 sheets, PH, TEX); SW-ern Maya Mountains, Columbia River Forest Reserve, Union Camp, 16°23' N, 098°09' W, 700–750 m, 5 Apr 1992 (fr), *B. Holst* 4015 (MO); Columbia River Forest Reserve, Union Camp, ca. 3 km W of SW end of Little Quartz Ridge, 16°23' 53" N, 089°07.34" W, 700–750 m, 22 Feb 1997 (fr), *B. Holst* 5975 (BRH, F, FTG, MO, SEL); Temash River, Pueblo Birejo, 1,700 ft [518 m], 19 Feb 1934 (fl, fr), *W. Schipp* S-692 (A, BM, F, GH, K, MO, NY-2 sheets); Union Camp, 750 m, 15 May 1979 (fr), *C. Whitefoord* 1739 (MO); Blue Creek, without elev, 12 Jun 1981 (fr), *C. Whitefoord* 3208 (MO); 2 Oct 1992 (fl), *C. Whitefoord* 8275 (BM). **GUATEMALA.** **Alta Verapaz:** Tucuru, Finca de Remedios, without elev, 20 Aug 1979 (fl), *J. Boeke & S. Utschneider* 2948 (NY); On Cobán Road, km 285–286, between Chiracte and Chapultepec farm, without elev, 24 May 1964 (fr), *E. Contreras* 4773 (LL-2 sheets); 4775 (LL-2 sheets); Chapultepec farm, ca. 1 km N, without elev, 26 May 1964 (fr), *E. Contreras*

4809 (GH, LL-2 sheets, TEX); Chahal, bordering Río Chiyú, 3.5 km NWW, 28 Sep 1968 (fl), *E. Contreras* 7742 (DUKE, F, G, LL-3 sheets); Chahal, on Sepur Ranch, bordering Río Chahal, 2 km S, without elev., 8 Oct 1968 (fl), *E. Contreras* 7860 (F, LL-3 sheets); Secoyoeti, near the Finca Sepacuite, without elev., 14 Apr 1902 (fr), *O. Cook & R. Griggs* 611 (US); Tamahú, 2,500 ft [m], 17 Nov 1920 (fl), *H. Johnson* 1007 (F, US); Between Cobán and Finca Chimoté, near Rubeltein, 800–1,500 m, 25 Feb 1942 (fl, fr), *J. Steyermark* 44205 (F). **Baja Verapaz:** Niño Perdido, bordering Río San Jose, 8 km N, without elev., 26 May 1977 (fl-bud), *C. Lundell & E. Contreras* 20986 (LL-2 sheets, PH); 28 May 1977 (fr), *C. Lundell & E. Contreras* 21012 (LL-2 sheets, PH); Paujal, 1,000 m, Oct 1912 (fl), *H. von Türckheim* 3922 (US). **Huehuetenango:** Cerro Jolomtac, above Finca San Rafael, Sierra de los Cuchumatanes, 900–1,200 m, 22 Jul 1942 (fr), *J. Steyermark* 49143 (F); Between Cerro Chiblac and Finca San Rafael, between Ixcan and Finca San Rafael, Sierra de los Cuchumatanes, 200–800 m, 24 Jul 1942 (fr), *J. Steyermark* 49475 (F); Cerro Victoria, across river from Finca San Rafael, Sierra de los Cuchumatanes, 800 m, 27 Jul 1942 (fl), *J. Steyermark* 49644 (F). **Izabal:** El Estor, without elev., 5 Mar 1972 (fr), *E. Contreras* 11145 (DUKE, LL-2 sheets); 17 Mar 1972 (fr), *E. Contreras* 11357 (DUKE, LL-2 sheets); Jocolo, without elev., 25 Nov 1920 (fl), *H. Johnson* 1024 (F); Cadenas, ca 6 km S of the village, on old brecha to Río Chocho Arriba, without elev., 20 Feb 1975 (fr), *C. Lundell & E. Contreras* 19016 (LL-3 sheets); El Estor, bordering Río Sarco, without elev., 26 May 1975 (fr), *C. Lundell & E. Contreras* 19358 (LL-2 sheets); Carosal bordeando Río Sorstún, without elev., 21 Jan 1969 (fr), *R. Tún O.* 120 (F, LL); Entre caserios Ceja y Cienaga, 15°40' N, 089°W, without elev., 9 Mar 1972 (fr), *R. Tún O.* 2300 (F, LL). **Petén:** Remate, on Tikal Road ca. 6 km NE of village, without elev., 16 Mar 1960 (fr), *E. Contreras* 678 (LL-2 sheets, TEX); Dolores, bordering Arroyo Ixcol, E of village, 800 m, 14 Apr 1961 (fr), *E. Contreras* 2071 (LL-3 sheets, TEX); Dolores, between kms 83–84 of Machaquila Road, without elev., 24 Apr 1961 (fr), *E. Contreras* 2171 (G, LL-2 sheets); Dolores, bordering pineland ca 2 km south of village, without elev., 3 May 1961 (fr), *E. Contreras* 2243 (DUKE, LL-2 sheets, PH, TEX); Dolores, km 79 of Machaquila Road, without elev., 14 Jul 1961 (fl), *E. Contreras* 2605 (DUKE, LL-2 sheets, TEX); Dolores, ca. 2 km S, without elev., 18 Jul 1961 (fl), *E. Contreras* 2625 (LL-2 sheets); Santo Toribio, bordering the village, without elev., 28 Jul 1961 (fl), *E. Contreras* 2703 (LL-2 sheets, TEX); Milpa Grande at Macanché, without elev., 5 Mar 1966 (fr), *E. Contreras* 5511 (F, LL); Cadenas, W of km 166–167 of Poptun Road, without elev., 12 Aug 1966 (fl, fr), *E. Contreras* 5956 (GH, LL-2 sheets, TEX); Chinchila, 3 km from San Luis on Sebol Road, without elev., 12 Oct 1966 (fl), *E. Contreras* 6384 (G, LL-3 sheets); Poptun Road, km 82, without elev., 14 Nov 1966 (fr), *E. Contreras* 6595 (LL-3 sheets); La Cumbre, at km 142 of road, without elev., 2 Mar 1967 (fr), *E. Contreras* 6634 (LL-2 sheets); Seamay, without elev., 6 Mar 1967 (fr), *E. Contreras* 6668 (F, G, LL-3 sheets); San Pedro on Cadenas Road, without elev., 13 Aug 1967 (fr), *E. Contreras* 7018 (F, G-2 sheets, LL-3 sheets); San Pedro on Cadenas Road, bordering river, without elev., 9 Jan 1970 (fr), *E. Contreras* 9481 (DUKE, LL-3 sheets); Ca 5 mi S of Tikal National Park, without elev., 19 Jun 1973 (fr), *J. Dwyer* 11262 (LL, MO); San Luis, km 52 of road S of village, without elev., 12 Jul 1959 (fr), *C. Lundell* 16382 (F, LL-3 sheets, TEX); Cadenas, bordering Río Gracias a Dios, without elev., 7 Sep 1975 (fr), *C. Lundell & E. Contreras* 19805 (LL-2 sheets, NY, PH); La Cumbre, on Pusila Road, N ca. 4.5 km, without elev., 30 Aug 1976 (fl), *C. Lundell & E. Contreras* 20283 (GH, LL-2 sheets); La Cumbre, Sapurul, without elev., 18 Apr 1977 (fr), *C. Lundell & E. Contreras* 20829 (LL-2 sheets); Santa Elena a Petén en orillando camino para Puerto Mendez, lado N km 164, without elev., 17 Mar 1970 (fr), *R. Tún O.* 774a (F, LL); 777 (F, LL, MO, NY); Santa Elena, behind the school at Colpeten, ca. 200 m, 5 Jun 1970 (fr), *R. Tún O.* 1182 (F, LL); San Luis, along road to Poptún, km 119, without elev., 3 Dec 1970 (fl), *R. Tún O.* 1451 (F, LL, MO, NY); 117, without elev., 6 Dec 1970 (fr), *R. Tún O.* 1479 (F, LL); Along road to Arroyo Dolores, ca 300 m S of Dolores, without elev., 16 Feb 1971 (fr), *R. Tún O.* 1587 (F, LL); Dolores, without elev., 14 Feb 1971 (fr), *R. Tún O.* 1563 (F, LL); Santa Elena, along road to La Libertad, km 9, SE side, without elev., 8 May 1971 (fr), *R. Tún O.* 1753 (F, LL, MO); Poptún, along road to San Luis, km 117, ca 125 m W of road, without elev., 7 Jan 1972 (fr), *R. Tún O.* 2158 (F, LL, MO, NY). **HONDURAS. Atlántida:** Mpio. Esparta, 19.2 km E of Tela on the Tela-Ceiba Hwy., ca. 1.5 km S of the hwy., near San Francisco de Soco, 15°44' N, 087°21' W, 50–100 m, 15 Apr 1994

(fl), A. Brant & R. Zúñiga 2842 (F, MEXU, MO); Along road for municipal water supply of Tela, Lancetilla Botanical Gardens, on road ca. 2 mi WSW of Tela and S of main hwy., 15°44' N, 087°27' W, 70–90 m, 9 Feb 1987 (fr), T. Croat & D. Hannon 64596 (FTG, MO); Tela, Lancetilla Valley, valley above Experiment Station, along stream and slopes above stream but below the dam, 15°43' 00" N, 087°27' 30" W, 30–60 m, 4 Nov 1988 (fr), J. MacDougal *et al.* 3159 (MO); Vicinity of Tela, 500 ft [152 m], 6 May 1926 (fl), E. Mitchell 98 (GH); Lancetilla, 7 km SW de Tela, 150 m, 3 Feb 1986 (fr), E. Mondragón 128 (MO); Vicinity of San Alejo, at base of hills S of San Alejo near Río San Alejo, 150–270 m, 22–27 Apr 1947 (fl), P. Standley 7616 (F); Lancetilla Valley, near Tela, 20–600 m, 6 Dec 1927–20 Mar 1928 (fr), P. Standley 52643 (A, F, US); 52983 (A, F, US); 53120 (A, F, US); 55598 (F); 56563 (A, F, US); 56803 (A, F, US); 56882 (F, GH, US). **Cortés:** Along Río Lindo near Carrizal, 550 m, 12 Apr 1951 (fl), L. Williams & A. Molina R. 17804 (F, GH, US). **Yoro:** Río Texiguat watershed, 15°30' 10" N, 087°26' 32" W, 220 m, 18 Apr 1995 (fl), T. Hawkins & M. Merello 767 (F, MEXU, MO, NY, TEX); Near Progreso, without elev., 26 Mar 1929 (fl), W. Hottel 26 (F). **Unknown locality in Honduras:** Puerto Sierra, forest along Highland Creek, without elev., 18 Jan 1903 (fr), P. Wilson 69 (NY, US).

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NUMERICAL LIST OF TAXA

- 1a. *Ardisia nigrescens* Oerst. subsp. *nigrescens*
- 1b. *Ardisia nigrescens* Oerst. subsp. *donnellsmithii* (Mez) Ricketson & Pipoly
2. *Ardisia verdisejala* Ricketson & Pipoly
3. *Ardisia tuerckheimii* Donn. Sm.

LIST OF EXSICCATAE

The figures in parentheses refer to the numbers from the numerical list of taxa. Collection numbers in **boldface** type indicate type specimens.

- J. Alcocer**, J. & C. Morales s.n. (3); Alcorn, J. 2937 (1a).
Balick, M. et al. 2500 (3); Bartlett, H. 11742 (3); 12926 (3); 13076 (3); Beaman, J. 5186 (3); Boeke, J. & S. Utzschneider 2948 (3); Brant, A. & R. Zúniga 2842 (3); Breedlove, D. 9721 (3); 9733 (3); 14978 (3); 15702 (1a); 24232 (1a); 27927 (2); 33006 (2); 33302 (3); 38200 (3); 38709 (1b); 38764 (3); 47348 (1b); 48740 (3); 49112 (1a); 49160 (1b); 49445 (2); 49970 (1b); 52487 (2); 52591 (2); 53339 (3); 53425 (3); 57759 (1b); 68667 (3); Breedlove, D. & F. Almeda 57228 (1b); 57210 (2); 57370 (1a); 57927 (1b); Breedlove, D. & R. Dressler 29601 (3); Breedlove, D. & B. Keller 49485 (2); Breedlove, D. & A. Smith 22120 (2); 22121 (2); Breedlove, D. & R. Thorne 21166 (3).
Calzada, J. 227 (3); 723 (3); Campos, A. et al. 1702 (3); 1715 (3); Carlson, M. 1744 (3); Castillo C., G. 408 (3); Cedillo T., R. 164 (3); Cedillo T., R. & J. Calzada 48 (3); Cedillo T., R. & D. Lorence 702 (3); Cedillo T., R. & R. Torres 1144 (3); Chiang, F. 301 (1a); 377 (1a); Contreras, E. 678 (3); 2071 (3); 2171 (3); 2243 (3); 2605 (3); 2625 (3); 2703 (3); 4254 (1b); 4291 (1b); 4667 (1b); 4773 (3); 4775 (3); 4809 (3); 5414 (1b); 5511 (3); 5956 (3); 6290 (1b); 6384 (3); 6595 (3); 6634 (3); 6668 (3); 7018 (3); 7742 (3); 7860 (3); 9481 (3); 11145 (3); 11357 (3); Contreras, E. & C. Lundell 20069 (1b); Cook, O. & R. Griggs 611 (3); 767 (1b); Cowan, C. et al. 3935 (1a); Croat, T. 23689 (3); 23750 (3); Croat, T. & D. Hannon 64596 (3).
Davidse, G. 36051 (1b); Davidse, G. & A. Brant 32362 (1b); Dillon, M. et al. 1831 (3); Dorantes, B. 2802 (3); 3576 (3); 3617 (3); 3941 (3); Dressler, R. 1507 (1a); 1637 (1b); Dwyer, J. 9954 (3); 11262 (3).
Gentle, P. 2181 (3); 2476 (3); 2798 (1b); 4522 (1b); 4895 (1b); 5231 (1b); 6177 (1b); 6226 (3); 6729 (1b); 6980 (1b); 7525 (3); 7639 (1b); 8637 (3); Gentry, A. et al. 32337 (3); Goll, G. 261 (1b); Gómez P, A. 3909 (3); 7885 (1a).
Hahn, M. 21 (1a); Hawkins, T. 1443A (1b); Hawkins, T. & M. Merello 767 (3); Hernández X., E. 102 (1a); Hernández G., H. 433 (3); 842 (3); 896 (3); 935 (3); 985 (3); 1056 (3); 1994 (3); Hernández G., H. & C. González L. 1637 (3); 1681 (3); 1769 (3); Hernández G., H. & R. Torres 813 (1a); Holst, B. 4015 (3); 5975 (3); Hottle, W. 26 (3).
Ibarra M., G. & L. Córtes A. 523 (3); Ibarra M., G. & C. Lundell 990 (3); Ibarra M., G. & N. Pérez N. 3092 (3); Ibarra M., G. & S. Sinaca C. 3554 (3).
Johnson, H. 228 (1b); 1007 (3); 1024 (3).

Karwinsky, W. 450 (1a).

Liebmann, F. 28A (1a); 28B (1a); 15341 (1a); Little, E. 25392 (1a); Lundell, C. 6302 (3); 16267 (3); 16382 (3); 17823 (1b); 17923 (1b); 17978 (1b); 18039 (1b); 18040 (1b); 18133 (1b); C. Lundell & E. Contreras 19016 (3); 19358 (3); 19805 (3); 20283 (3); 20829 (3); 20986 (3); 21012 (3); Lundell, C. & A. Lundell 7130 (1a).

MacDougal, J. et al. 3159 (3); Martínez S., E. 6523 (1b); 6537 (1b); 6901 (1b); 7411 (1b); 7622 (1b); 7658 (1b); 8059 (1b); 8427 (1b); 9318 (1b); 9361 (1b); 9581 (1b); 10106 (1b); 10132 (1b); 11075 (1b); 11531 (1b); 13454 (1b); 13616 (1b); 15982 (1b); 21333 (1b); Martínez S., E. & G. Aguilar 8630 (1b); 8790 (1b); 13707 (1b); Martínez-Calderón, G. 209 (1a); 828 (1a); Meave, J. & A. Howe 1404 (3); Meave del Castillo, J. et al. 1480 (3); Medina A., M. & F. Vázquez B. 379 (1a); Mell, C. 576 (3); Méndez G., A. 4445 (2); Méndez T., A. 5097 (2); 5469 (2); 5640 (2); 5667 (2); 5837 (2); 5842 (2); 6052 (2); 6112 (2); 6211 (2); Mendez T., A. & M. Concepcion Mtz. de Lopez 9499 (1a); Miranda, F. 6289 (3); Mitchell, E. 66 (3); 98 (3); Molina R., A. 103 (3); Mondragón, E. 128 (3).

Nee, M. et al. 25027 (3); 26675 (3).

Peck, M. 576 (1b); Piñero, D. 15B (3); Proctor, G. 29864 (3); 30122 (3).

Ramamoorthy, T. 2617 (3); 3457 (3); 4148 (3); Ramamoorthy, T. et al. 1356 (3); Ramírez C., D. s.n. (1a); Reznicek, A. et al. 187 (1a); Rosas, M. 1879 (3).

Sandino, J. 181 (1a); Sessé, M. et al. 679 (1a); 730 (1a); Schatz, G. et al. 1195 (1a); Schipp, W. 287 (1b); 478 (1b); 482 (1b); S-692 (3); Schnée, L. & P. Maury s.n. (1a); Shilom T., A. 2599 (3); Sinaca C., S. & E. Aparicio 31 (3); Soto, J. et al. 13479 (3); Spellman, D. 1583 (3); Standley, P. 7616 (3); 52643 (3); 52983 (3); 53120 (3); 55598 (3); 56563 (3); 56803 (3); 56882 (3); Stevens, W. & E. Martínez S. 25849 (1b); Stevenson V., N. (1b); Steyermark, J. 44284 (1b); 44383 (1b); 45161 (1b); 49253 (1b); 45427 (1b); 45493 (1b); 44205 (3); 49143 (3); 49475 (3); 49644 (3).

Thompson, B. & B. Fields 379 (1a); Torres C., R. 11039 (3); Torres C., R. & L. Cortes A. 11500 (3); Torres C., R. & E. Martínez S. 11163 (3); Tún O., R. 120 (3); 774a (3); 777 (3); 1182 (3); 1451 (3); 1479 (3); 1587 (3); 1563 (3); 1753 (3); 2158 (3); 2300 (3); Türkheim, H. von 1035 (3); 3922 (3); 7766 (1b); 7918 (1b); 8707 [11978] (1b); 1163 (1b).

Valdivia Q., P. 2407 (1b); Vázquez T., M. 1395 (3); Vázquez T., M. et al. 125 (3); 333 (3); 1241 (3); 2654 (3); Ventura A., F. 13621 (1a); 20767 (1a); Villalobos C., A. et al. 28 (3); Villegas H., A. 84 (3).

Wendt, T. et al. 2911 (3); 2935 (3); 3081 (3); 3106 (3); 3407 (3); 3623 (3); 4107 (3); 4841 (3); Whitefoord, C. 1739 (3); 3208 (3); 8275 (3); 9014 (3); 10378 (3); Williams, L. & A. Molina R. 17804 (3); Wilson, P. 69 (3).