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NEW AND NOTEWORTHY ADDITIONS TO THE MELASTOMATACEAE OF PANAMA

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ABSTRACT: Descriptions, discussions, diagnostic illustrations, and distributional notes are provided for five new species of Melastomataceae (*Clidemia tetrapetala, C. trichosantha, Graffenrieda bella, Miconia arboricola,* and *Topobea calophylla*). Based on a study of the first known flowering collections, *Topobea elliptica* is transferred to *Blakea* and provided with an amplified description. Notes are also presented on the size and delimitation of these genera with special reference to Panama.

Introduction

The first and only floristic treatment of the Panamanian Melastomataceae was published some 25 years ago (Gleason 1958). The manuscript for that study was completed several years before it appeared in print. Gleason's study is a very useful account that unfortunately suffers from a lack of adequate field study and a paucity of local material for many of the species attributed to Panama. The many new collections of Melastomataceae generated by the heightened botanical exploration of Panama during recent years has underscored the need for an updated supplement. Such an undertaking is still premature in view of the many undescribed taxa represented by collections that are too incomplete to serve as a basis for formal descriptions.

In this interim report I propose new species in *Clidemia, Graffenrieda, Miconia,* and *Topobea,* present a new combination in *Blakea,* and provide brief notes on the size and delimitation of these genera in Panama.

Blakea P. Browne

Blakea and the closely related *Topobea* constitute the tribe Blakeae, which is characterized by baccate fruits, ovoid to pyramidal seeds, and axillary, 6-merous flowers that are individually subtended by two pairs of decussate bracts inserted at the base of the hypanthium. These genera exhibit many parallel variations in foliar characters, floral bract morphology, and calyx development. The traditional distinction between *Blakea* and *Topobea* is based on the androecial characters summarized in the following couplet:

Anthers short, oval, oblong, or elliptic, blunt or broadly rounded at the summit with two typically well-separated (often minute) apical pores ..... *Blakea*

Anthers linear-oblong to lanceolate or subulate, the dorsally inclined apical pores approximate and often confluent at anthesis ..... *Topobea*

In addition to the three species of *Blakea* described by Almeda (1974, 1980) and the generic transfer presented below, *Blakea tuberculata* Donn.-Smith of Costa Rica has recently been collected in western and central Panama (Chiriquí: *Folsom et al. 4838,* CAS; Coclé: *Knapp 5334,* CAS; Panamá: *Sytsma 1154,* CAS). These additions increase the number of described Panamanian species to thirteen.

Blakea elliptica (Gleason) Almeda, comb. nov.

Topobea elliptica Gleason, Phytologia 3:353. 1950.

Type.—**Panama.** Bocas del Toro, Robalo Trail, northern slopes of Cerro Horqueta, elevation 6000–7000 ft [1828–2133 m], 5–7 Aug. 1947, *Allen 5001* (holotype MO!; photo CAS!). The type collection of this species consists of a branch with four leaves and four more or less mature berries (one of which is detached). When Gleason described this species from incomplete material he was impressed by its sessile, clasping leaves, which are reminiscent of those of *Topobea brenesii* Standley, a rare Costa Rican endemic. Two recent flowering collections from near the type locality in western Panama are an exact vegetative match for the species that Gleason placed in *Topobea.* The uniform, bluntly ovoid anthers of these new collections are characteristic of *Blakea,* thus necessitating the generic transfer proposed herein. Because all available descriptions of this taxon are based on the fragmentary type collection, an amplified description is presented below to facilitate recognition of this little-known cloud forest epiphyte.

Epiphytic shrub reportedly 2–4 m tall. Cauline internodes glabrate, terete, becoming striate to furrowed or cracked in age. Distal branchlets and floral pedicels sparsely covered with a deciduous indument of slender, spreading, glandular trichomes and stoutly conic trichomes, the latter typically copious on distal nodes and vegetative buds. Mature leaves sessile, blades chartaceous to coriaceous, entire, somewhat revolute on drying, 5–11.5 cm long and 3–7.5 cm wide, elliptic-ovate to obovate, obtuse to rounded apically and auriculate to cordate-clasping basally, 3-nerved with an additional but less conspicuous submarginal pair, essentially glabrous throughout or with a sparse scattering of conic and glandular trichomes at the base of the blade below. Flowers 6-merous, solitary or paired in the axils of distal branches, pedicels 2.5–4.3 cm long. Floral bracts foliaceous, sparsely covered with a mixture of blunt conic and spreading glandular trichomes on the inner and outer surfaces; outer bracts 3–5-nerved, essentially free to the base, 12–14 mm long and 13–15 mm wide, broadly elliptic-ovate to suborbicular, obtuse to rounded or somewhat retuse apically; inner bracts (at anthesis) connate basally for about 4–5 mm to form a collar that tightly envelops the ovary, the free lobes ± semicircular, 7 mm long and 12–13 mm wide basally between sinuses. Hypanthia (at anthesis) glabrous, campanulate, 8–11 mm long to the torus. Calyx lobes triangular, ± entire, mostly recurved, 5–6 mm long and 5 mm wide basally, apically beset with a mixture of spreading glandular and sessile globular trichomes. Petals thin and ± translucent on drying, mostly glabrous with a moderate but somewhat concentrated abaxial patch of brown verrucose excrescences, reportedly white with pink blotches, elliptic-ovate to obovate and rounded apically, entire to irregularly ciliolate, 20–23 mm long and 14–18 mm wide. Stamens isomorphic, free and declined to one side of the flower, filaments glabrous, 4.5–6 mm long and 1.5 mm wide; anthers yellow, ovoid, laterally compressed, biporose and rounded apically, 5 mm long and 1.5–2 mm wide, connective thickened dorsally and dilated basally about 0.5 mm above point of filament insertion into a short deflexed truncate appendage about 0.5–1 mm long. Style straight, glabrous, conspicuously exserted, 11–14 mm long; stigma truncate. Berry 13–15 mm long to the torus and 14–15 mm in diameter, glabrous and subglobose. Seeds beige, cuneate to clavate, or narrowly pyriform, mostly 1 mm long.

Additional Specimens Examined.—**Panama.** Chiriquí: Bocas del Toro border along Continental Divide NE of Cerro Pate Macho, above Palo Alto in windswept elfin forest. 8°47′N, 82°21′W, 2200 m, 15 Mar. 1982, *Knapp et al. 4233* (MO); end of road past Palo Alto NE of Boquete in forest along ridge; elev. 6200–6800 ft [1890–2073 m], 8 Feb. 1979, *Hammel 6048* (MO).

Distribution.—Western Panama. Known only from the northern slopes of Cerro Horqueta and the region NE of Cerro Pate Macho above Palo Alto at elevations of about 1800–2100 m.

This species is apparently rare and localized, as evidenced by the few specimens collected over the past three decades. It is among the most distinctive of the Central American species by virtue of its sessile, clasping leaves, and deciduous indument of spreading glandular and blunt conic trichomes on distal branchlets, pedicels, floral bracts, and vegetative buds. The petals of this species are remarkably thin and translucent when dry and have a peculiar abaxial cluster of brown verrucose excrescences. Additional collections and field observations will be needed to deter-

mine whether this petal feature is a consistent diagnostic character or an artifact of pressing and drying.

Clidemia D. Don

Clidemia is one of approximately 30 genera constituting the tribe Miconieae. The generic classification of this complex tribe is difficult because it contains species groups that intergrade across generic lines that have been defined on the basis of one or few characters. The evolutionary development of characters used in generic delimitation of the Miconieae is unclear, and some of the genera as currently delimited are probably polyphyletic. Until a reassessment of generic limits can be accomplished, *Clidemia* is defined in the traditional sense to include those berry-fruited species with axillary inflorescences, more or less obtuse petals, linear to subulate anthers, wingless hypanthia, and flowers that are not individually subtended by two pairs of decussate bracts.

Of the approximately 165 species of *Clidemia* recorded for tropical America, 30 are now known from Panama. This count includes the two new taxa proposed below.

Clidemia tetrapetala Almeda, sp. nov.
(Figure 1)

Frutex 1–2 m. Ramuli teretes sicut petioli inflorescentia foliorum subtus venae primariae pilis stipitato-stellatis densiuscule ornati et pilis stellatis sessilibus modice vel dense induti. Petioli 10–27 mm longi; lamina 5–9.5 × 2.1–3.9 cm ovato-elliptica apice gradatim acuminato basi rotundata vel subcordata, chartacea et integra, 5–7-plinervata. Inflorescentiae pauciflorae in foliorum superiorum axillis oppositis, axe plerumque 1.5–2.5 cm longo; flores 4-meri plerumque subsessiles (pedicellis supra articulationem 0.5 mm longis), bracteolis 1–1.5 mm longis linearibus. Hypanthium (ad torum) 1.5 mm longum dense stellato-puberulum et pilis laevibus glanduliferis patentibus 0.5–1 mm longis modice intermixtus; lobis 1 mm longis triangularibus, dentibus exterioribus subulatis 3 mm eminentibus. Petala 5–6 × 1.5–2 mm oblonga glabra (apice late obtuso). Stamina isomorphica glabra; filamenta 2 mm longa; antherarum thecae 1.5 × 0.5 mm oblongae, poro dorsaliter inclinato; connectivum nec prolongatum nec appendiculatum. Stylus 5.5 mm glaber; stigma truncatum; semina 0.5–1 mm pyriformia.

Shrubs 1–2 m tall. Older cauline internodes glabrate and terete. Distal branchlets, vegetative buds, juvenile leaves, and inflorescences copiously covered with sessile, and stipitate-stellate trichomes, the distal cauline internodes sparingly intermixed with spreading glandular hairs. Leaves of a pair slightly unequal in size, otherwise identical in shape and vestiture. Leaf blades flat to somewhat bullate above when dry, chartaceous, entire, 5–9.5 cm long and 2.1–3.9 cm wide, ovate-elliptic, acuminate apically and rounded to subcordate basally, 5–7-plinerved with a network of secondary and tertiary nerves below, sparsely pubescent above with a mixture of appressed simple trichomes and spreading stalked stellate trichomes, lower leaf surfaces copiously stellate pubescent on the elevated primary nerves but with a moderate to sparse mixture of sessile and stalked stellate trichomes on and between the secondaries; petioles 10–27 mm long and 1–1.5 mm broad. Inflorescence axillary, typically a lax few-flowered modified dichasium 1.5–2.5 cm long; bracteoles sessile, 1–1.5 mm long and mostly less than 0.5 mm wide, linear-lanceolate to linear-oblong, mucronate apically, glabrous above and sparsely stellate pubescent below. Pedicels terete, mostly less than 0.5 mm long and disarticulating at the tribracteolate node closely subtending each flower. Hypanthia (at anthesis) narrowly campanulate, 1.5 mm long to the torus, copiously covered with a mixture of stellate and spreading glandular trichomes. Calyx lobes (on fruiting hypanthia) widely spreading, persistent, triangular, entire, 1 mm long and 1 mm wide basally; exterior calyx teeth subulate, mostly 3 mm long, stellate pubescent and completely obscuring external surface of the calyx lobes. Petals 4, glabrous, reportedly white, linear-oblong, broadly obtuse apically, entire, 5–6 mm long, 1.5–2 mm wide. Stamens 8, isomorphic, erect at anthesis; filaments glabrous, ligulate but abruptly constricted distally, 2 mm long; anthers 1.5 mm long and 0.5 mm wide, yellow when dry, linear-oblong, truncate to rounded distally with a circular dorsally inclined apical pore; connective simple, somewhat thickened dorsally but not dilated or prolonged below the thecae. Ovary totally inferior, 4-celled, essentially glabrous at the summit but sparsely setose surrounding the stylar scar. Style 5.5 mm long; stigma truncate. Ber-

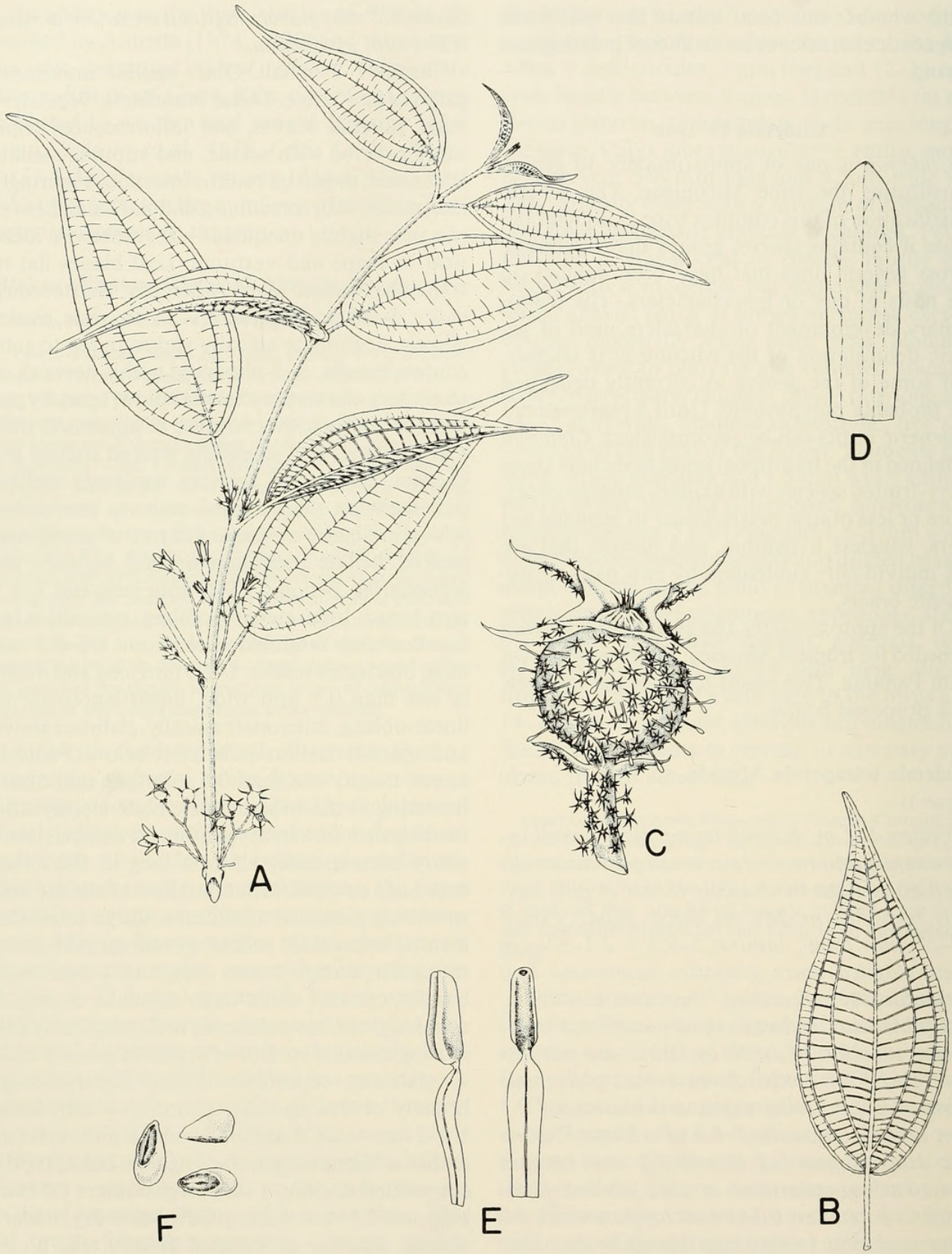

FIGURE 1. *Clidemia tetrapetala* Almeda. *A*, habit, × ca. ¾; *B*, representative leaf (lower surface), × ca. ¾; *C*, mature berry, × ca. 4; *D*, petal, × ca. 6; *E*, stamens, ¾ lateral view (left) and dorsal view (right), ×9; *F*, seeds, × ca. 7. (*A* from *Folsom 4871*; *B–F* from *Folsom 6106*.)

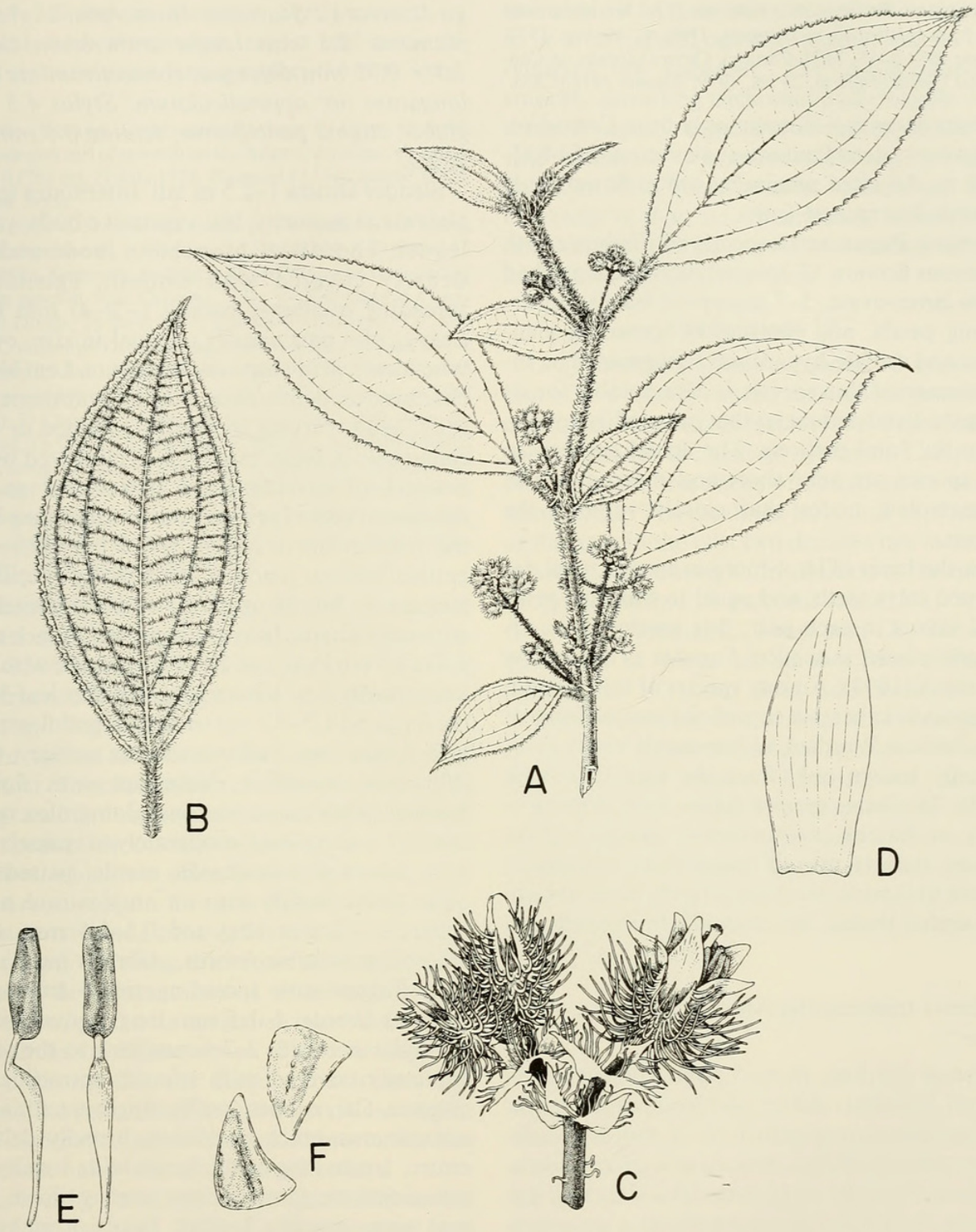

FIGURE 2. *Clidemia trichosantha* Almeda. *A*, habit, × ca. ¾; *B*, representative leaf (lower surface), × ca. ¾; *C*, representative flower, buds, bracts and bracteoles, × ca. 4; *D*, petal, ×7; *E*, stamens, lateral view (left) and ventral view (right), ×9; *F*, seeds, × ca. 14. (*A–E* from the holotype; *F* from *Hammel 965*.)

ry reportedly opaque green but turning translucent red at maturity, globose, 5–6 mm long to the torus, 5–6 mm in diameter. Seeds narrowly pyriform, brown, smooth, vernicose, and mostly 0.5–1.0 mm long.

TYPE.—**Panama.** Bocas del Toro/Chiriquí Border: Cerro Colorado, along intersection of Bocas Road with main ridge road, 11.8 km from Chami along path headed into Bocas del Toro, elevation 1400–1700 m, 24 Oct. 1977, *Folsom 6106* (holotype: CAS!; isotype: MO).

ADDITIONAL SPECIMENS EXAMINED.—**Panama.** Bocas del

Toro/Chiriquí Border: Cerro Colorado, 11.2 km along ridge road from main road to Escopeta, 1700 m, 16 Aug. 1977, *Folsom 4871* (CAS, MO). Chiriquí: Cerro Colorado on Continental Divide, 1400 m, 25 Jul. 1979, *Antonio 1416* (CAS).

DISTRIBUTION.—Known only from Cerro Colorado in western Panama at elevations of 1400–1700 m. All cited specimens are in flower; only the type has mature fruits.

Among Panamanian species of *Clidemia* with 4-merous flowers, *C. tetrapetala* is distinguished by its lance-ovate, 5–7-plinerved leaves, linear-oblong petals, and mixture of spreading glandular and stellate hypanthial trichomes. The inflorescence of this species is also notable for its elongate distal peduncles that can readily be mistaken for floral pedicels. The actual pedicels in this species are very short and disarticulate at tribracteolate nodes that closely subtend the flowers.

On the basis of its 4-merous flowers, well developed calyx teeth, and equal to subequal principal leaves in each pair, this species is provisionally placed in section *Sagraea* as defined by Cogniaux (1891). Among species of this section, *C. tetrapetala* bears a superficial resemblance to *C. saltuensis* Wurdack of Venezuela which is reportedly known only from the type (Wurdack 1973). The latter species differs most conspicuously in having ovate-elliptic, basally obtuse leaves, stellate-pinoid hypanthial trichomes, shorter (0.7 mm), erect calyx teeth, narrowly oblong anther thecae, and abaxially mucronate petals.

Clidemia trichosantha Almeda, sp. nov.
(Figure 2)

Frutex 1–2.5 m. Ramuli teretes primum sicut petioli laminae subtus inflorescentia hypanthiaque dense setosi pilis 1–3(–4) mm longis demum glabrati. Folia in quoque pari in dimensionibus disparilia (2:1); petioli 0.2–2.2 cm longi; lamina 3–14.3 × 1.5–5.8 cm elliptica apice acuminata basi interdum obtuse vel rotundata vel paulo asymmetrica, chartacea et denticulata, 5–7-plinervata, supra sparse vel modice strigosa. Inflorescentiae ca. 1.5–3 cm longae in foliorum superiorum axillis; flores 5-meri, pedicellis 1–1.5 mm longis, bracteolis 1.5–3 mm longis lanceolatis amplexicaulibus. Hypanthium (ad torum) 2–2.5 mm longum; lobis interioribus late deltoideis, dentibus exterioribus setosis 1–2 mm eminentibus. Petala glabra 4–4.5 × 1.5 mm oblongo-lanceata. Stamina isomorphica glabra; filamenta 2.5 mm longa; antherarum thecae 1.5 × 0.75 mm oblongae, connectivum nec prolongatum nec appendiculatum. Stylus 4.5 mm glaber; stigma punctiforme; semina 0.5 mm cuneata.

Slender shrubs 1–2.5 m tall. Internodes terete, glabrate at maturity, but vegetative buds, young leaves, and distal branchlets moderately to densely covered with smooth, eglandular, spreading trichomes mostly 1–3(–4) mm long. Leaves of a pair usually unequal in size, otherwise identical in shape and vestiture. Leaf blades chartaceous, denticulate, elliptic, acuminate apically, acute varying to obtuse, rounded or conspicuously oblique basally, 5–7-plinerved with a network of secondary and tertiary nerves, the innermost pair of primary nerves diverging from the median nerve (0.6–)1.0–1.6 cm above the petiole/laminar junction, moderately to sparsely strigose or hirtellous above and moderately to copiously hirsute below. Larger leaf at each node 5.8–14.3 cm long and 2.5–5.8 cm wide with petioles mostly 0.5–2.2 cm long. Smaller leaf 3–9.5 cm long and 1.5–4.1 cm wide with petioles mostly 2–4 mm long. Inflorescence an axillary, multiflowered, modified dichasium with flowers borne in pedunculate terminal glomerules; rachis terete, 1.5–3 cm long, moderately to sparsely hirsute; bracts and bracteoles sessile, paired and often fused basally into an amplexicaul nodal collar, 1.5–3 mm long and 0.5–1.5 mm wide, lanceolate to naviculiform, glabrous but irregularly fringed with spreading setose trichomes. Pedicels hirsute, 1–1.5 mm long. Hypanthia (at anthesis) ± ovoid, 2–2.5 mm long to the torus, copiously covered with smooth spreading trichomes. Calyx lobes (on fruiting hypanthia) inconspicuous, erect, persistent, broadly deltoid, entire, 1 mm long and 1.5 mm wide basally between sinuses; exterior calyx teeth setiform, 1–2 mm long, sparsely hirsute. Petals 5, glabrous, reportedly translucent white, elliptic-lanceolate, acute apically, entire, 4–4.5 mm long, 1.5 mm wide. Stamens 10, isomorphic, apparently erect at anthesis; filaments glabrous, ± linear-oblong but constricted distally, 2.5 mm long; anthers 1.5 mm long and 0.75 mm wide, linear-oblong, truncate distally; connective simple, not dilated or prolonged below the thecae. Ovary ca. ⅔ inferior, 5-celled. Style 4.5 mm long; stigma punctiform. Berry purple at maturity, globose, 4–6 mm long

and 4–5.5 mm in diameter. Seeds cuneate, ± smooth with verruculose angles and a prominent ± translucent lateral raphe, 0.5 mm long.

TYPE.—**Panama.** Coclé: sawmill above El Cope, in forest along stream east of sawmill on the Atlantic drainage, elevation 2300 ft (701 m), 27 July 1978, *Hammel 4133* (holotype, CAS!; isotype, MO).

ADDITIONAL SPECIMENS EXAMINED.—**Panama.** Coclé: above El Petroso sawmill at Continental Divide, N of El Cope, 13 May 1981, *Sytsma & Andersson 4624* (CAS); area surrounding Rivera sawmill, Alto Calvario, 7 km N of El Cope at Continental Divide, 25 Nov. 1977, *Folsom & Collins 6473* (CAS); near Continental Divide along lumbering road 8.4 km above El Cope, 19 Jan. 1978, *Hammel 965* (CAS); 7 km N of El Cope around Rivera sawmill, 21 Dec. 1977, *Folsom et al. 7093* (CAS); El Cope on Pacific side about ½ hour walk from the sawmill, 16 Oct. 1979, *Antonio 2116* (CAS). Panamá: forested slope along El Llano-Cartí road, 12 km from Panamerican Highway, 10 Sept. 1976, *D'Arcy 10617* (CAS). San Blas: El Llano-Cartí road, 12 mi from Panamerican Highway, 10 May 1981, *Sytsma & Andersson 4493* (CAS). Veraguas: Cerro Tute, 30 Nov. 1979, *Antonio 2928* (CAS).

DISTRIBUTION.—Presently known from wet forests and stream margins at elevations from 700–1300 meters in central Panama. Flowering specimens have been gathered in January, May, July, and September.

The epithet for this species draws attention to its most remarkable feature—the dense covering of spreading, lustrous trichomes on the flowers and peduncles of the inflorescence. The trichomes, which are often basally flattened when dry, are so copious that it is difficult to examine the structure and posture of bracteoles and other floral parts without a dissection of hydrated material. Other characters that readily separate *C. trichosantha* from its congeners include the modified dichasial inflorescence of pedunculate terminal glomerules, the distally constricted filaments, the cuneate seeds with verruculose angles, and the sessile, paired bracts and bracteoles that are often fused into amplexicaul collars.

A fruiting collection from Cerro Habú, San Blas (*Sytsma et al. 2673,* CAS) appears to be a variant or closely related, undescribed taxon but its essentially glabrous leaves, glabrate berries, and short (0.5 mm) calyx teeth fall outside the range of variation here attributed to *C. trichosantha.*

The 5-merous, short-pedicellate flowers and anisophylly of the new species dictate placement into Cogniaux's section *Calophysoides. Clidemia trichosantha* is unlike any of the species currently placed in that section. I am, therefore, reluctant to include it with an assemblage that may prove to be artificial and can only suggest that no close relatives are apparent. The combination of smooth, spreading trichomes and elongate calyx teeth is vaguely suggestive of the copiously hirsute variants of *C. petiolaris* (Schlecht. & Cham.) Schlecht. ex Triana which, otherwise, differ markedly in their lax, divaricately branched inflorescence, subulate, apically notched anthers, and pyriform, papillate seeds.

Graffenrieda DC.

Graffenrieda, a genus of about 40 species, is one of five closely related merianioid genera occurring in Panama. Gleason (1958) reported one species (under the generic synonym *Calyptrella* Naud.) in his treatment of Panamanian Melastomataceae. The escalated botanical exploration of Panama in the past two decades has increased this total to about eight. In addition to the species proposed below, *G. galeottii* (Naud.) L. Wms., *G. gracilis* (Triana) L. Wms., and *G. micrantha* (Gleason) L. Wms. are known from Panama. Collections of about four additional entities probably represent undescribed taxa or range extensions of South American species. These remain unnamed because of incomplete material.

In the field, the superficial resemblance of Panamanian species of *Graffenrieda* to *Miconia* is striking. *Graffenrieda* is readily distinguished by the combination of capsular fruits, calyptrate calyx, dorsally spurred, arcuate anthers, and linear, pyramidate seeds.

Graffenrieda bella Almeda, sp. nov.

(Figure 3)

Arbor parva 5 m. Ramuli glabri et teretes. Petioli 0.5–1.6 cm; lamina 4.7–8 × 2.1–4 cm elliptica apice breviter subabrupteque acuminato basi acuta vel cuneata vel biauriculata, supra glabra vel sparse lepidota, subtus modice lepidota, 3(–5)-nervata, coriacea et integra. Panicula 5–7 cm longa multiflora; flores 5(–6)-meri subsessiles (vel pedicellis 0.5–1 mm longis) ad ramulorum apices glomerati (floribus ca. 3–6 in quoque glomerulo), bracteolis 0.5–1 mm longis subulato-setosis evidenter mox caducis. Hypanthium (ad torum) 3 mm longum; calyx in alabastris maturis clausus 3–3.5 mm longus ad anthesim irregulariter supra torum dehiscens. Petala 7–9 × 4–6 mm elliptico-ovata glabra. Stamina isomorphica glabra; filamenta 2.5–3 mm longa; an-

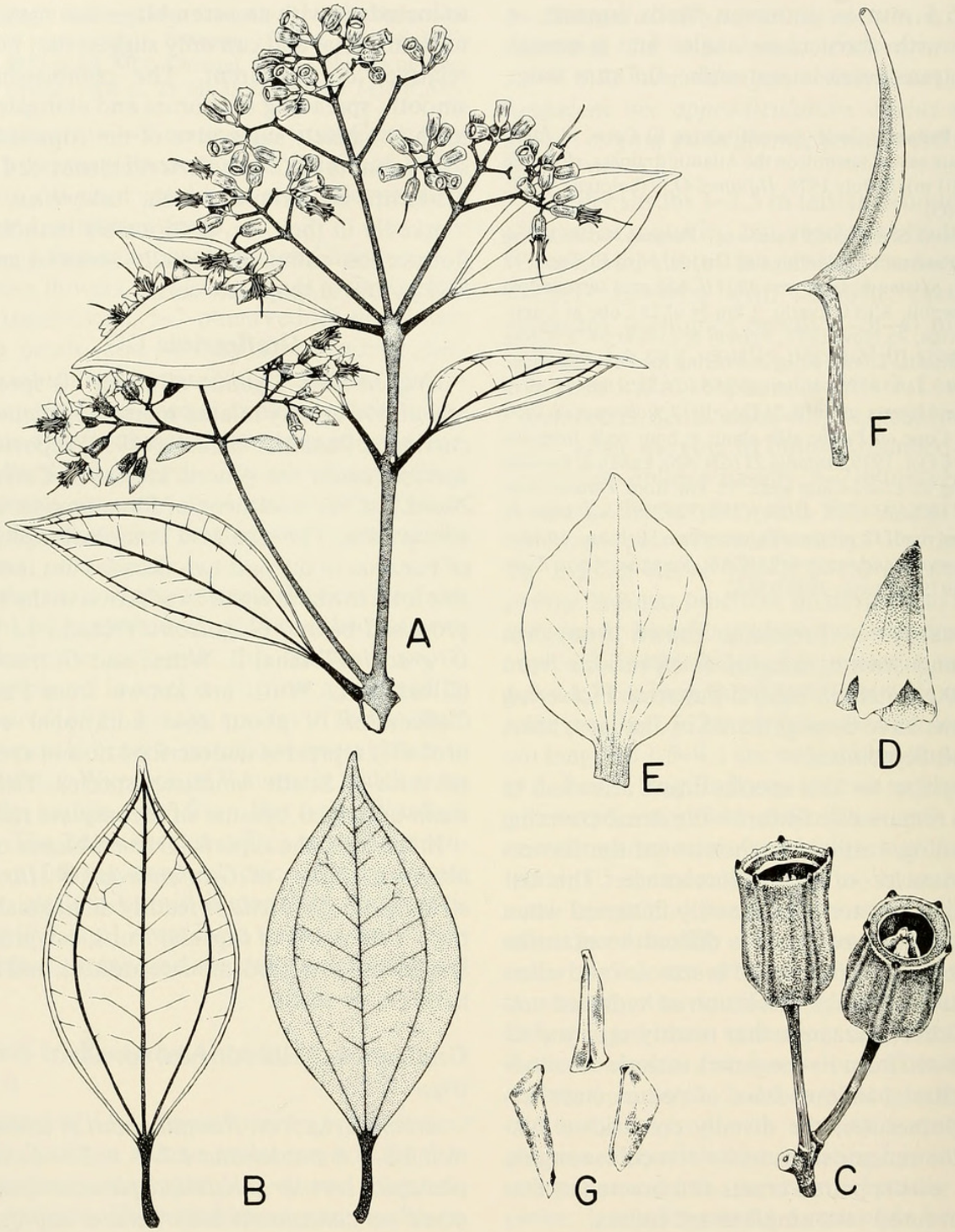

FIGURE 3. *Graffenrieda bella* Almeda. *A*, habit, ×¾; *B*, representative leaves, lower surface (left) and upper surface (right), × ca. ¾; *C*, mature hypanthia, × ca. 4; *D*, calyptrate calyx, × ca. 8; *E*, petal, × ca. 5; *F*, stamen (lateral view), × ca. 10; *G*, seeds, × ca. 14. (*A–B*, *D–F* from the holotype; *C* & *G* from *Mori et al. 7581*.)

therarum thecae 3–4.5 × 0.5 mm oblongo-subulatae; connectivum vix (0.25 mm) prolongatum, dente dorsali 0.5 mm longo acuto. Stylus 7.5–9.5 mm glaber; stigma punctiforme; semina numerosa 1 mm longa, recta paulo angulata.

Trees to 5 m tall. Cauline internodes glabrous and terete; the nodes on defoliated branchlets somewhat swollen with age. Leaf blades coriaceous, entire, 4.7–8 cm long and 2.1–4 cm wide, broadly elliptic, apically acuminate basally acute to cuneate or biauriculate with well-developed reflexed marginal lobes ca. 2 mm above the petiole-laminar junction, glabrous to sparsely lepidote above and moderately lepidote below at

maturity, uniformly 3-nerved (excluding the inconspicuous submarginal pair); petioles 0.5–1.6 cm long and 1–1.5 mm broad. Inflorescence a multiflowered panicle mostly 5–7 cm long (including the peduncle), the uppermost units commonly glomerulate; bracteoles sessile, narrowly subulate to acicular, 0.5–1 mm long, apparently early deciduous and mostly absent at anthesis. Pedicels 0.5–1 mm long. Hypanthia (at anthesis) narrowly campanulate to subcylindric, 3 mm long to the torus. Calyx acute, apiculate and closed in bud, 3–3.5 mm long rupturing near the torus and falling away as a unit at anthesis. Calyx teeth (on mature hypanthia) evident as blunt tuberculiform projections mostly 0.25–0.5 mm long. Petals mostly 5, but varying to 6 in some flowers, glabrous, white, elliptic to ovate, entire, acute apically, cuneate to clawed basally, 7–9 mm long and 4–6 mm wide. Stamens mostly 10 but sometimes 12, isomorphic; filaments glabrous, ligulate, 2.5–3 mm long and 0.5 mm wide; anthers 3–4.5 mm long and 0.5 mm wide, yellow, subulate, the apical pore ± truncate; connective prolonged ca. 0.25 mm below the thecae and modified dorsally (at filament insertion) into an acute spur mostly 0.5 mm long. Ovary ¼ inferior, 3-celled, ovoid, glabrate but copiously lepidote distally. Style straight to somewhat curved, glabrous, 7.5–9.5 mm long; stigma punctiform. Hypanthia (at maturity) prominently costate, 5 mm long and 3 mm wide. Seeds linear-pyramidate, brown, mostly 1 mm long.

TYPE.—**Panama.** Chiriquí: along road between Gualaca and the Fortuna Dam site at 10.1 m; NW of Los Planes de Hornito, elev. 1300 m, 8 Apr. 1980, *Antonio 4078* (holotype: CAS!; isotype: MO).

ADDITIONAL SPECIMENS EXAMINED.—**Panama.** Chiriquí: Cerro Hornitos, 40 km NW of Gualaca in cloud forest dominated by *Quercus* spp., *Podocarpus*, and *Drimys*, 26 Jul. 1975, *Mori & Bolten 7486* (CAS). Veraguas: Cerro Tute, ca. 10 km NW of Santa Fe on ridgetop in cloud forest, 19 May 1975, *Mori 6255* (CAS), 3 Aug. 1975, *Mori et al. 7581* (CAS).

DISTRIBUTION.—Known only from cloud forests on Cerro Tute in Veraguas province and Cerro Hornitos and vicinity in Chiriquí province at elevations from 1000–2238 m. Flowering specimens have been collected in April, May, and July. This species is reportedly (fide *Mori 6255*) one of the most common trees in an area about 10 km northwest of Santa Fe on Cerro Tute.

Graffenrieda bella is most closely related to *G. micrantha* (Gleason) L. Wms. which differs in its longer leaf blades (13–20 cm) with five prominently elevated abaxial nerves, longer petioles (2.5–5 mm), shorter (2–3 mm) narrowly lanceolate petals, and smaller fruiting hypanthia (2–2.5 mm). My circumscription of *G. bella* includes two morphological entities representing geographically distinct populations. The collections from Chiriquí in western Panama have 5-merous flowers and foliar margins with bilaterally developed reflexed auricles about 2 mm above the petiole/laminar junction. Collections from Veraguas in central Panama have 5(–6)-merous flowers and lack the conspicuous foliar auricles. Except for these differences, the few available specimens from each area are identical and exhibit parallel ranges in foliar size, hypanthial and staminal length, and petal width. More collections, especially from intervening areas, are needed to determine whether this bimodal variation shows a consistent geographical correlation.

Miconia Ruiz & Pavon

As presently circumscribed, *Miconia* with approximately 1000 species is the largest genus in the family and one of the largest among flowering plants. It is generally characterized by its terminal inflorescences and apically rounded, obtuse, or retuse petals. *Miconia* occupies a central position in the complex of genera comprising the taxonomically difficult tribe Miconieae. Through its broad neotropical range *Miconia* displays great diversity in habit, foliar characters, inflorescence organization, trichome and androecial morphology, and seed structure. Success in identifying species, however, inevitably requires examination of anther structure because the current sectional classification relies heavily on this character. *Miconia* is greatly in need of monographic study to evaluate character variation, assess the status of satellite groups, and redefine sectional limits based on character correlations. Some 60 species of *Miconia* occur in Panama. These represent all twelve currently recognized sections. In addition to the species proposed below, several new taxa await formal description pending collection of complete material.

Miconia arboricola Almeda, sp. nov.

(Figure 4)

Caulis scandens primum sicut foliorum subtus venae primariae inflorescentia hypanthiaque dense vel modice pilis stipitato-stellatis 0.5–1 mm

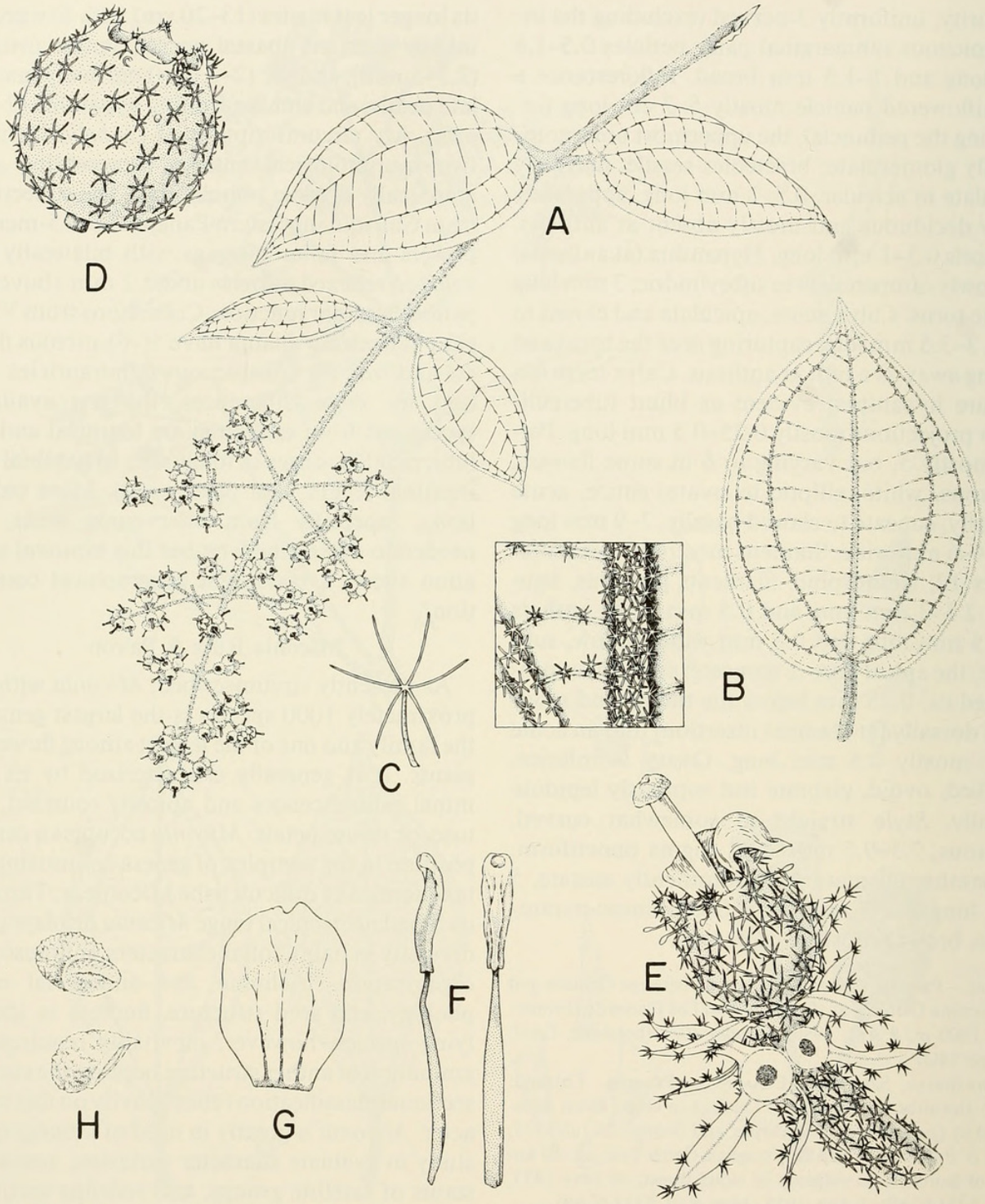

FIGURE 4. *Miconia arboricola* Almeda. *A*, habit, × ca. ⅓; *B*, representative leaf (lower surface) with enlargement (left), × ca. ½; *C*, stipitate-stellate trichome, × ca. 17; *D*, mature berry, × ca. 5; *E*, representative flower showing young hypanthium, two petals, style, bracteoles, and pedicellar scars, × ca. 7; *F*, stamens, lateral view (left) and dorsal view (right), × ca. 9; *G*, petal, × ca. 7; *H*, seeds, × ca. 20. (*A–C* from the holotype; *D, F, G* from *Knapp 5735*; *E* & *H* from *Croat 49151*.)

latis indutus. Petioli 8–23 mm longi; lamina 5.5–11.4 × 3.5–7.1 cm late ovata vel cordata, apice breviter acuminato basi subcordata vel cordata, 5–7-nervata, firme coriacea et integra. Panicula 11.5–25 cm longa multiflora; flores 5-meri subsessiles in glomerulis interruptis vel ad ramulorum apices aggregati, bracteolis 1–2.5 × 0.25–0.5 mm anguste oblongis persistentibus. Hypanthium (ad torum) 1.5–2 mm longum; calycis tubus non eminentibus, lobis interioribus 0.5 mm longis deltoideis, dentibus exterioribus crassis lobos interiores aequantibus. Petala 2–3 × 1.5–2 mm glabra obovata apice retuso. Stamina isomorphica glabra; filamenta 2.5 mm longa;

antherarum thecae 1.5 × 0.5 mm oblongo-cuneatae; connectivum nec prolongatum nec appendiculatum. Stylus 4 mm glaber; stigma capitatum; semina 0.5 mm galeiformia.

Pendent woody vines or hemiepiphytes adhering to bark of host tree by adventitious roots. Older cauline internodes terete and ± glabrate. Distal branchlets, petioles, vegetative buds, juvenile leaves, and inflorescences moderately to copiously covered with ferrugineous stipitate-stellate trichomes. Leaves of a pair essentially equal in size; blades coriaceous at maturity, entire, 5.5–11.4 cm long and 3.5–7.1 cm wide, broadly ovate to cordate, short acuminate apically and subcordate to cordate basally, 5–7-nerved with a prominulous reticulate network of secondaries and tertiaries below, mostly glabrate and vernicose above at maturity or with stipitate-stellate trichomes persisting to varying degrees in the furrows created by the impressed primary nerves, sparsely to moderately stipitate-stellate below; petioles 8–23 mm long and 2–2.5 mm wide. Inflorescence basically paniculiform with ultimate branchlets terminating in multiflowered congested glomerules; bracts of the rachis nodes paired, linear-oblong, 2.5–5(–10) mm long, 1–1.5 mm wide, glabrous adaxially and stipitate-stellate to glabrate abaxially; bracteoles 3–5 per pedicel, sessile, linear-oblong, acute to obtuse or rounded apically, 1–2.5 mm long, 0.25–0.5 mm wide, entire, glabrous adaxially and stipitate-stellate abaxially. Pedicels 0.5 mm long but typically inconspicuous and concealed by congested glomerules. Hypanthia (at anthesis) subcylindric to narrowly campanulate, 1.5–2 mm long to the torus, moderately to copiously beset with short stalked-stellate trichomes and occasionally with a sparse scattering of spreading glandular trichomes on or near basal portions of the calyx teeth; adaxial rim of the torus minutely glandular-puberulent. Calyx lobes (on young fruiting hypanthia), glabrous, hyaline, and erect, deltoid, 0.5 mm long and 1 mm wide basally; calyx teeth bluntly subulate, copiously stellate, adnate to and ± equaling subtending calyx lobes. Petals 5, glabrous, white, obovate to oblong-obovate, strongly reflexed, irregularly retuse apically, 2–3 mm long and 1.5–2 mm wide. Stamens 10, isomorphic, filaments straight to somewhat incurved distally, glabrous, subulate, 2.5 mm long; anthers 1.5 mm long and 0.5 mm wide distally, linear-oblong to narrowly cuneate, typically recurved distally; connective thickened dorsally but not dilated or prolonged below the point of filament insertion. Ovary (young fruiting hypanthia) ca. ⅓ to ¼ inferior, 3-celled, coarsely papillate to farinaceous, caducously glandular-puberulent along the bluntly fluted stylar collar that becomes depressed and inconspicuous on mature fruits. Style straight, glabrous, 4 mm long; stigma broadly capitate. Berry reportedly blue at maturity, globose, 3–4 mm long and 3–4 mm in diameter. Seeds galeiform, white, papillate to costate-papillate, 0.5 mm long.

TYPE.—**Panama.** Chiriquí: slope NW of confluence of Río Hornito and Río Chiriquí, ca. 8°44′N, 80°07′W, elev. 1050–1100 m, 11 Nov. 1980, *Stevens 18266* (holotype: CAS!; isotype: MO).

ADDITIONAL SPECIMENS EXAMINED.—**Costa Rica.** Cartago: Pejibaye, 30 May 1924, *Lankester 877* (US). Limon: Cerro Urén, Cordillera Talamanca, 1 Sept. 1898, *Pittier 12683* (US). **Panama.** Coclé: hills N of El Valle, E slope and ridges leading to Cerro Gaital, 8°40′N, 80°07′W, 27 June 1982, *Knapp 5735* (MO); Alto Calvario, above sawmill on Continental Divide, 5.2 mi above El Cope, 6 Dec. 1979, *Croat 49151* (CAS).

DISTRIBUTION.—This little-collected cloud forest species ranges from the Caribbean slopes of the Cordillera Talamanca in south-central Costa Rica south and east to the hills surrounding El Valle de Anton in central Panama at elevations from 300–1100 m. Flowering specimens have been collected in June, September, and November.

Labels on collections of this species describe it as a pendent woody vine. The notes on *Croat 49151* describe it as a hemiepiphyte with the stem rooted in the ground but closely attached to a tree trunk. It seems likely that plants of this species are typically hemiepiphytes that ultimately become scandent vines requiring the support of host trees. The specific epithet refers to this discordant habit among species of *Miconia.*

Miconia arboricola is quite unlike all other species of *Miconia* from Central America. In addition to the unusual habit, it is distinctive in its coriaceous leaves, stipitate-stellate pubescence, paniculiform inflorescence, congested, polybracteolate flowers, and sculptured, galeiform seeds. As pointed out on the label of *Pittier 12683,* in Cogniaux's monograph, this species comes closest to *M. mollicula* Triana and *M. cordata* Triana in section *Miconia.* In foliar shape, internodal pubescence, and inflorescence structure, *M. ar-*

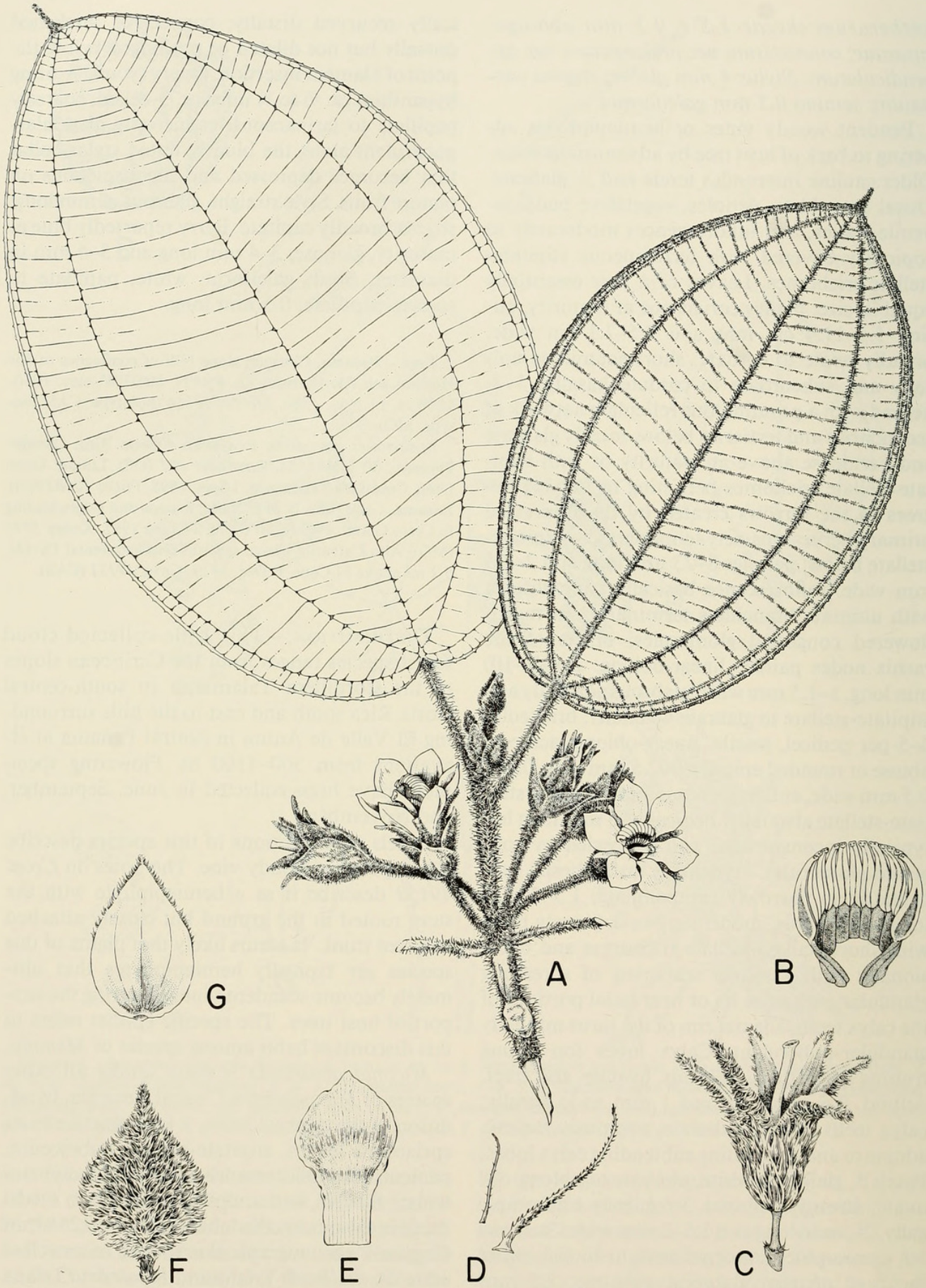

FIGURE 5. *Topobea calophylla* Almeda. *A*, habit, ×½; *B*, stamens, ventral view, ×1; *C*, hypanthium with floral bracts removed, × ca. 1½; *D*, cauline trichomes, × ca. 4; *E*, petal, × ca. 1¼; *F*, outer floral bract (outer surface), × ca. 1; *G*, inner floral bract (inner surface), × ca. 1. (*A* & *D* from *Nee 9873*; *B*, *C* & *E* from *Mori* & *Kallunki 5353*; *F–G* from the holotype.)

boricola resembles these two shrubby species. They differ most notably from the new species in having irregularly denticulate leaves, sessile stellate or stellate-furfuraceous hypanthial pubescence, and a differentiated androecium in which the larger stamens are inserted opposite the petals.

Topobea Aublet

The species proposed below represents the first new *Topobea* to be described from Panama since the appearance of Gleason's (1958) summary. The following description of *T. calophylla,* the transfer of *T. elliptica* to *Blakea* (also proposed herein) and the discovery of *T. pittieri* Cogn. in Chiriquí province (Cerro Colorado, *Folsom & Collins 1770,* CAS) now brings the number of Panamanian species to nine.

Topobea calophylla Almeda, sp. nov.
(Figure 5)

Frutex epiphyticus. Ramuli primum obscure quadrangulati demum teretes sicut petioli laminarum subtus venae primariae pedicelli bracteaeque pilis barbellatis ca. (1–)3–9 mm longis induti. Petioli 2.2–5 cm longi; lamina 14.5–37.5 × 8.6–17.8 cm, elliptico-ovata, apice abrupte caudato-acuminato basi rotundata vel paulo cordata, supra ad maturitatem glabra, subtus modice setosa (pilis ca. 1–3 mm longis). Flores 6-meri in foliorum superiorem axillis oppositis plerumque 2–4; bracteae liberae; bracteae exteriores 1.7–2.3 × 1.5–1.7 cm late ovatae; bracteae interiores 1.6–1.9 × 1.3–1.7 cm elliptico-ovatae. Hypanthium (ad torum) 1.1–1.3 cm longum extus dense strigosum pilis 2–4 mm longis, calycis lobis 14–17 mm longis triangularibus. Petala glabra 2 × 1 cm spathulata apice hebeti-acuto vel obtuso. Filamenta 5 mm longa; antherae 8 × 1.5 mm subulatae inter se cohaerentes, poris binis terminalibus; connectivum ad basim dorsaliter minute calcaratum. Stigma capitellatum vel truncatum; stylus 11–14 mm glaber in ovarii collo 5–6 mm immersus.

Coarse spreading epiphytic shrub. Cauline internodes ± terete to subquadrangular. Distal branchlets, vegetative buds, pedicels, and floral bracts covered with a hirsute indument of rusty brown barbellate trichomes mostly 3–9 mm long. Mature leaves firmly chartaceous to coriaceous, inconspicuously dentate, 14.5–37.5 × 8.6–17.8 cm, elliptic-ovate, abruptly caudate-acuminate apically, rounded to subcordate basally, 5–7-nerved with conspicuous elevated secondaries, glabrous above, moderately hirsute below with barbellate trichomes mostly 1–3 mm long; petioles 2.2–5 cm long and 3–5 mm diam. Flowers 6-merous, erect to widely spreading, paired or borne in clusters of three or four in axils of the distal branches; pedicels 2.8–4 cm long. Floral bracts foliaceous, entire, 3–5-nerved free basally, each pair closely subtending one another or separated on the pedicel by a distance of 3–4 mm, outer bracts 1.7–2.3 × 1.5–1.7 cm, broadly ovate, acuminate apically; inner bracts 1.6–1.9 × 1.3–1.7 cm, elliptic-ovate, acute to acuminate apically. Hypanthia (at anthesis) campanulate, 1.1–1.3 cm long to the torus, copiously appressed-strigose with barbellate trichomes 2–4 mm long. Calyx lobes lance-triangular, often involute to uncinate apically when dry, entire, hirsute to hirtellous, 14–17 mm long and 5–6 mm wide basally between sinuses. Petals glabrous, reportedly pink, ± spathulate but acute to obtuse apically, entire to sparingly glandular-ciliate, 2 cm long and 1 cm broad distally. Stamens isomorphic and strongly declined to one side of the flower, filaments glabrous, connivent, 5 × 1.5 mm; anthers linear-subulate, 8 × 1.5 mm, laterally coherent but free distally, strongly incurved at anthesis, each anther tipped with two somewhat dorsally inclined confluent pores; connective thickened dorsally near the point of filament insertion into a blunt callosity. Style ± straight, glabrous, 11–14 mm long and 1 mm wide; stigma capitellate to truncate, the surface appearing somewhat crateriform. Ovary inferior, 6-celled, distended apically into a glandular puberulent fluted cone and stylar collar mostly 7–9 mm long. Mature berry not seen.

TYPE.—**Panama.** Veraguas: 5 mi W of Santa Fe on road past Escuela Agricola Alto Piedra on Pacific side of divide, elev. 800–1200 m, 18 Mar. 1973, *Croat 23000* (holotype: CAS!; isotype: MO).

ADDITIONAL SPECIMENS EXAMINED.—**Panama.** Veraguas: 6–7 km W of Santa Fe on new road past agriculture school, 18 Feb. 1974, *Nee 9873* (CAS); NW of Santa Fe, 4.2 km from Escuela Agricola Alto de Piedra, 25 Feb. 1975, *Mori & Kallunki 4833* (CAS); NW of Santa Fe, 2.7 km from Escuela Agricola Alto de Piedra along stream on road to Calovebora, 30 Mar. 1975, *Mori & Kallunki 5353* (CAS).

DISTRIBUTION.—Known only from montane forests NW of Santa Fe in Veraguas province at elevations of 800–1200 m. Available material,

all of which is in flower, was collected in February and March.

Like so many epiphytic species in the Blakeae that grow in wet forests, this species has a restricted distribution and does not appear to be closely related to any described taxon in *Topobea*. As emphasized by the specific epithet, *T. calophylla* has large, handsome leaves that are glabrous above and moderately hirsute below. It is also striking because of the copious indument of brown barbellate trichomes that gives distal branches, floral bracts, and hypanthia a coarse bristly appearance.

Among the species of *Topobea* recorded for Panama by Gleason (1958), this species also differs in the following combination of characters: its leaves are inconspicuously dentate; the inner and outer floral bracts are separate to the base, copiously pubescent abaxially, and essentially equal in length; and the ovary is elaborated apically into a prominent glandular-puberulent, fluted cone crowned by several setiform lobules that envelop the style basally for 5–6 mm.

No information is available on the size of individual plants in this species. Judging from foliar size and the coarseness of its branches, I suspect that *T. calophylla* can become an epiphyte of massive proportions comparable to *Topobea durandiana* Cogn. and *Blakea tuberculata* Donn.-Smith, both of which can obscure and overtake the crowns of their host trees. Casual collectors unfamiliar with the propensity for epiphytism in *Topobea* and *Blakea* frequently describe the epiphytic species in these genera as trees. Labels for all except one of the few available collections of *T. calophylla* indicate that it is an epiphyte. Although *Nee 9873* is described as a small tree, additional field study is needed to confirm this observation.

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Literature Cited

Almeda, F. 1974. A new epiphytic *Blakea* (Melastomataceae) from Panama. Brittonia 26:393–97.

———. 1980. Central American novelties in the genus *Blakea* (Melastomataceae). Rhodora 82:609–15.

Cogniaux, C. A. 1891. Melastomaceae. Pages 1–1256. *In* A. and C. de Candolle, eds., Monographiae phanerogamarum, vol. 7. G. Masson, Paris.

Gleason, H. A. 1958. Melastomataceae. *In* R. E. Woodson, Jr. and R. W. Schery, Flora of Panama. Ann. Missouri Bot. Gard. 45:203–304.

Wurdack, J. J. 1973. Melastomataceae. *In* T. Lasser, ed., Flora de Venezuela 8:1–819.

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