

---

# Rubiacearum Americanarum Magna Hama Pars VI: New Species of and Morphological Notes on *Psychotria* subg. *Psychotria* (Psychotrieae) from Mesoamerica and Western South America

Charlotte M. Taylor

Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166 U.S.A.

Charlotte.Taylor@mobot.org

---

**ABSTRACT.** Eight new Neotropical species of *Psychotria* subg. *Psychotria* are described and illustrated here: *P. cerrocoloradensis* of western Panama and *P. matagalpensis* of northern Nicaragua have both previously been confused with *P. sylvivaga* Standley and *P. chiriquina* Standley; *P. cornejoi* of western Ecuador has been previously confused with *P. trivialis* Rusby; *P. jefensis* of Costa Rica and Panama and *P. orosioides* of Costa Rica have both been previously confused with *P. orosiana* Standley; *P. lorenciana* of southern Mexico and Guatemala has been variously confused with *P. grandis* Swartz, *P. flava* Oersted ex Standley, and *P. costivenia* Grisebach; and *P. romolerouxiana* of Amazonian Ecuador and Peru and *P. sacciformis* of lowland Colombia, Ecuador, and Peru have both previously been confused with *P. borjensis* Kunth. The interpretations of stipule morphology and the arrangement of the flowers on the higher-order inflorescence axes as taxonomically informative characters have varied among previous authors and are re-evaluated here.

**Key words:** Neotropics, *Psychotria*, Rubiaceae.

*Psychotria* L. (Psychotrieae) in its broad sense comprises approximately 1000 species of shrubs and small trees (or much less often herbs, climbers, or epiphytes) found throughout the tropics. This genus is characterized by its usually woody habit; its relatively small, entomophilous, usually white or cream-colored flowers that are typically distylous; its valvate corolla lobe aestivation; its inferior ovary with usually two locules, each with one basal ovule; and its drupaceous fruits with usually two planoconvex pyrenes. Recently, several studies employing morphological and molecular characters have indicated that Neotropical *Psychotria* as it is currently circumscribed is systematically more complex than has usually been appreciated (Taylor, 1996; Nepokroeff et al., 1999; Andersson & Rova, 1999; Piesschaert, 2001). These studies have distinguished within traditional *Psychotria* several lineages that are not all closely related. The species discussed and described below all belong to *Psy-*

*chotria* subg. *Psychotria*; all of these studies have considered this a monophyletic group (Steyermark, 1972; Hamilton, 1989; Taylor, 1996; Nepokroeff et al., 1999; Andersson & Rova, 1999; Piesschaert, 2001).

Neotropical *Psychotria* subg. *Psychotria* is characterized by the distinctive color of its dried specimens, which usually are strongly tinged with brown, red-brown, red-gray, gray, or gray-green; its stipules of widely varied form but that are usually quickly caducous exposing a ring of well-developed infrastipular colleters (i.e., glandular trichomes), which are up to 3 mm long and typically persistent on the stem as a chestnut-brown fringe; its white flowers that are relatively short, with tubes 1–8 mm long, and pubescent in the throat and/or at the point of stamen insertion; and its orange to red fruits that bear two planoconvex, usually longitudinally ridged pyrenes. The pyrenes are characterized by an alcohol-soluble reddish pigment and a lack of preformed germination slits, and both of these characters are shared with paleotropical species of *Psychotria* subg. *Psychotria* (Petit, 1964; Nepokroeff et al., 1999; Piesschaert, 2001). In contrast, the other two large Neotropical groups within *Psychotria* s.l., section *Notopleura* [= *Notopleura* (Bentham & Hooker f.) Bremekamp; Taylor, 2001b] and subgenus *Heteropsychotria* Steyermark, have dried specimens with a usually green or brown-green color, stipules of various forms but that are usually persistent and without colleters or with these caducous or drying clear, fruits that may be orange or red at maturity but are more often white, blue, or purple, and pyrenes two to five per fruit and widely varied in form but lacking alcohol-soluble red pigments and bearing preformed germination slits.

Below I re-evaluate some morphological characters that have and also have not been emphasized by previous authors to distinguish among species of *Psychotria* subg. *Psychotria*, and describe several new species.

RECONSIDERATION OF SOME MORPHOLOGICAL  
CHARACTERS

Hamilton (1989) monographed 61 species of *Psychotria* subg. *Psychotria* found from Mexico through Panama, and contributed significantly to the knowledge of the Neotropical species of this group in several aspects. He presented the first careful consideration of morphological characters with taxonomic significance in this group, and for the most part his work is extremely useful. He relied strongly on details of inflorescence arrangement, leaf venation patterns, and specimen drying colors to separate species and delimit species groups, with much success. However, the use of these characters is problematic at times. For example, in some species there is wide variation in the pattern of leaf venation, as Hamilton noted in his descriptions (e.g., *P. panamensis* Standley). Also, the specimen drying color may depend on preparation of the material, for example, treatment of it with alcohol, as much as on the biology of the plant, and specimens of subgenus *Heteropsychotria* occasionally show the same drying colors for either of these reasons. And, Hamilton's characterization of inflorescence arrangement is based on fully developed inflorescences, so plants with poorly developed or broken inflorescences may be difficult to identify.

In the years since the publication of Hamilton's treatment, numerous additional good collections of these plants have been made, contributing much new morphological and floristic information. Study of *Psychotria* subg. *Psychotria* for the upcoming *Flora Mesoamericana* treatment incorporated these specimens and found that some of the characters Hamilton used, in particular flower arrangement, are more variable and therefore less informative than has been assumed while others, in particular stipule morphology, are more informative than has been recognized.

Much work remains to be done to understand inflorescence structure in *Psychotria*, and a detailed analysis will not be presented here, but some aspects of Hamilton's work require comment in the light of these new collections. In particular, Hamilton (1989) distinguished two general floral arrangements: "flowers sessile in glomerules" in contrast with "flowers pedicellate" in cymules, which he used to separate species and species groups. However, this distinction can be problematic to apply in many species of *Psychotria*. The flowers of these species are arranged in generally dichasial cymules that bear one sessile or subsessile terminal flower subtended by one or two developed higher-

order axes, which in turn produce another terminal flower or group of flowers and frequently also a still higher-order set of axes that in turn produce another flower or cymule. The individual flowers may be borne separately along the axes, or in some species are consistently arranged in glomerulate groups of two to several flowers. In this latter case the glomerulate arrangement recognized by Hamilton is usually clear. In the former case, the terminal flower as well as the flowers produced on the higher-order axes are sometimes clearly pedicellate, so their arrangement is clear. However, in many species the terminal flowers are subsessile and the arrangement is ambiguous for the flowers at the ends of the higher-order axes, because they are separated along these axes and the structures that support them can be, and variously have been, considered pedicels or higher-order axes. Hamilton (1989) distinguished several species groups based on whether the flowers are pedicellate or sessile, but he did not clarify his definition of these higher-order axes and seems himself to have called them pedicels in some species groups but axes in others. The position of the flowers produced on these higher-order axes has also been variously described because sometimes the higher-order axes elongate as the fruits develop, so the flowers at anthesis are subsessile in glomerules while the fruits are clearly separated on the tardily developing axes, or pedicels.

Below and in the upcoming *Flora Mesoamericana* treatment, the term "sessile" is applied to flowers that are attached directly (i.e., without a pedicel) to developed higher-order axes at anthesis and have the floral bracts borne directly at the base of the hypanthium (i.e., ovary portion; Fig. 2L). Pedicels can be distinguished from higher-order axes by the location of floral bracts at their bases or in their lower portions but not next to the flower (Figs. 2H, 3D).

Another complicating factor in the interpretation of "sessile" vs. "pedicellate" flowers in this group is the presence in some species of a stipe on the fruit (e.g., *Psychotria panamensis*) even though the flowers are sessile at anthesis. These structures have been called pedicels by most previous authors but are interpreted here instead as a stipitate prolongation of the fruit base, because the elongation begins with and parallels fruit development; because this structure elongates distally leaving the floral bracts at its base; and because the zone of fruit dehiscence is located at the base of this structure rather than at its connection to the fruit base.

Hamilton described and very nicely illustrated (1989: fig. 2) the variety of stipule forms found in this group, and for most species he described the

stipules accurately according to his classification. He commented (1989: 68) that "Stipules can provide valuable information as to interspecific relationships but prove almost worthless as a source of key characters, since in this subgenus they are usually caducous, or deciduous," and did not emphasize stipule form in the keys or descriptions. However, stipule morphology actually appears to be highly consistent within a species, highly informative taxonomically, and usually evident on herbarium specimens (and always evident on living plants). Below and in the upcoming *Flora Mesoamericana* treatment, stipule morphology is strongly emphasized in the characterization of species.

Hamilton (1989) classified stipules as "sheathing" when there was any degree of union across the intrapetiolar portions of the stipules, from very short fusion at the bases to complete fusion into a single continuous structure, and whether or not the united portion breaks apart easily when the leaves expand (e.g., *P. carthagenensis* Jacquin) or remains permanently fused (e.g., *P. panamensis*). Below and in the upcoming *Flora Mesoamericana* treatment, a distinction is made among his various forms of "sheathing" stipules to recognize the following types:

- stipules that are interpetiolar and also shortly and/or weakly united in the intrapetiolar portion and quickly separate along this intrapetiolar line (e.g., *P. carthagenensis*; Hamilton 1989: fig. 2a, e), here called "interpetiolar and shortly intrapetiolar";
- stipules that are fused around the stem into a tube that is open at the top, and fall off as a tube that is complete or sometimes split open on one side (e.g., *P. chagensis* Standley; Hamilton 1989: fig. 2g), here called "tubular";
- and stipules that are completely fused into a conical cap that falls off as a single unit (e.g., *P. trichotoma* M. Martens & Galeotti; Hamilton 1989: fig. 2d), here called "calyptrate."

Hamilton (1989) used the term "biaristate" rather generally for any stipules with two aristas or narrow lobes in some part, combining under this term both the condition with the lobes solitary on each interpetiolar side for a total of two at each node and the condition with two lobes on each interpetiolar side for a total of four at each node (e.g., Hamilton, 1989: figs. 2e and 2g, both described in the respective species descriptions as "biaristate"). Below and in the upcoming *Flora Mesoamericana* treatment, the varied stipule forms in *Psychotria* subg. *Psychotria* are all considered to be derived from two interpetiolar, bilobed stipules, so the number of aristas or lobes is counted with respect to

each *interpetiolar* portion. Thus, stipules with two aristas at each node (Hamilton, 1989: fig. 2g) are here considered different from those with four aristas at each node (Hamilton, 1989: fig. 2e). No single Neotropical species of *Psychotria* subg. *Psychotria* has yet been seen with both of these stipule forms.

#### NEW SPECIES

***Psychotria cerrocoloradensis*** Dwyer ex C. M. Taylor, sp. nov. TYPE: Panama. Chiriquí: Cerro Colorado, on road, 31.6 km from Río San Félix bridge, 1690 m, 15 July 1976, G. A. Sullivan 332 (holotype, MO-2616700). Figure 1A, B.

Haec species a *Psychotria amplifronde* pedunculo longiore, a *P. rufiramea* inflorescentia ampliore atque a *P. sylvivaga* bracteis floralibus pedicellis et limbo calycino longioribus distinguitur.

Shrubs to 1.5 m tall; stems densely lanuginose-hirtellous to glabrescent. *Leaves* elliptic, 10–22 × 3–10 cm, chartaceous, at apex acuminate, at base cuneate to obtuse or truncate, above glabrous, below densely strigillose to sericeous on veins and glabrous to sparsely puberulous on lamina; secondary veins 10 to 16 pairs, united in a somewhat looping submarginal vein, abaxially without domatia in axils, adaxially venation plane or sometimes a little impressed, abaxially costa prominent and secondary and tertiary venation prominulous; petioles 1.4–3.5 cm long; *stipules* caducous, interpetiolar and shortly intrapetiolar, lanceolate, 13–17 mm long, at apex acute and shortly bidentate with the teeth to 3 mm long and ligulate to triangular, abaxially densely lanuginose to strigillose except glabrescent toward margins. *Inflorescences* terminal, strigillose to lanuginose, peduncle 3.5–7.5 cm long, branched portion 6–14 × 7–20 cm, pyramidal; secondary axes 2 per node, branched; bracts puberulous, 1.5–8 mm long, narrowly triangular, floral bracts 1.5–3 mm long, ovate to lanceolate; pedicels 0–0.5 mm long; *flowers* sessile to subsessile in dichasial to umbelliform cymes of 3 to 7; hypanthium 0.8–1 mm long, turbinate, glabrous; calyx limb 1.8–2 mm long, glabrous, lobed for ¼–½, lobes triangular, ciliate; corolla tubular-funnelform, white, externally glabrous, internally glabrous except densely pilosulous at stamen insertion, tube ca. 3.5 mm long, lobes 5, ca. 1.5 mm long, triangular; anthers ca. 1 mm long, included; stigmas ca. 0.8 mm long, exerted. *Infructescences* similar in shape and size to inflorescences; immature *fruits* ellipsoid to obovoid.

*Habitat, distribution, and phenology.* In wet montane forest, 1630–1700 m, western Panama; collected in flower in July and August.

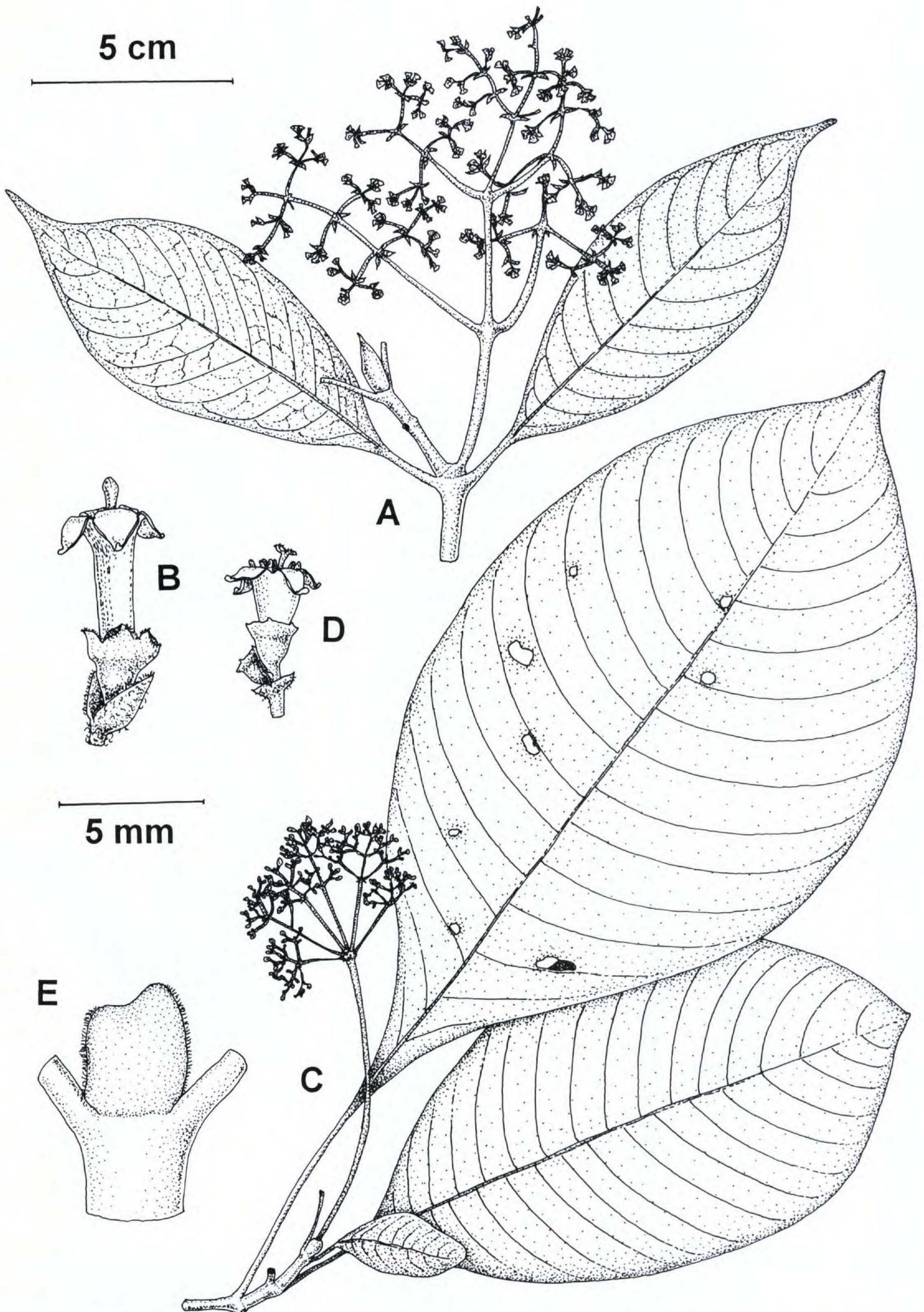


Figure 1. A, B. *Psychotria cerrocoloradensis* C. M. Taylor. —A. Flowering stem. —B. Flower at anthesis. C–E. *Psychotria lorenciana* C. M. Taylor. —C. Flowering stem. —D. Flower at anthesis. —E. Stipule. A, based on Croat 69148; B, based on Sullivan 332; C, E, based on Contreras 10014; D, based on Lundell & Contreras 19332. A, C to 5-cm scale; B, D, E to 5-mm scale.

John Dwyer originally recognized this species as new and proposed this epithet, which refers to the collection locality of the Panamanian specimens. *Psychotria cerrocoloradensis* is similar to *P. amplifrons* Standley, which differs by its shorter peduncles 0.3–2 cm long; to *P. rufiramea* Standley, which differs by its smaller inflorescences with the branched portion 1.5–4 × 2–4 cm; and to *Psychotria sylvivaga*, which differs by its shorter floral bracts 0.5–1.5 mm long, longer pedicels 0.5–2 mm long, and shorter calyx limbs 1.2–1.5 mm long. The flowers seen are all similar to the long-styled form of distylous *Psychotria* species in the arrangement of their anthers and stigmas.

*Paratypes.* PANAMA. **Bocas del Toro:** Cerro Colorado, 6.5 mi. W of Chamé, steep forested slopes N of road, 8°35'N, 81°50'W, *Croat 69148* (MO). **Bocas del Toro/Chiriquí Border:** Cerro Colorado, 11.2 km along ridge road from main road to Escopeta, *Folsom 4888* (MO). **Chiriquí:** Cerro Colorado, along mining road 31.6 km beyond bridge over Río San Félix (10.6 km beyond turnoff to Escopeta), *Croat 37158* (MO).

***Psychotria cornejoi*** C. M. Taylor, sp. nov. TYPE: Ecuador. Guayas: 3 km E of Olón (5 km N of Manglarolto, on the beach), 75–190 m, 20 Dec. 1961, C. H. Dodson & L. B. Thien 1669 (holotype, MO-3849660). Figure 2A–D.

Haec species a congeneris stipulis interpetiolaribus uniaristatis ac plerumque dense hirtellis atque foliorum sat parvorum supra medium latiorum nervis secundariis camptodromis distinguitur.

Shrubs and small trees to 6 m tall; stems glabrous. *Leaves* elliptic to usually obovate or oblanceolate, 2.5–11.5 × 1.5–5 cm, papyraceous, at apex acute to a little acuminate, at base cuneate to acute and attenuate, adaxially glabrous, abaxially glabrous except sometimes hirtellous on costa and occasionally also secondary veins; secondary veins 4 to 6 pairs, not looping to interconnect, abaxially without or often with pit domatia in axils of 2 or 3 apical pairs of secondary veins, domatia sacciform, 0.5–1.5 mm long, a little elongated, generally appressed to blade, adaxially costa prominulous and remaining venation plane, abaxially costa and secondary veins prominulous and remaining venation plane; petioles 1.5–20 mm long; *stipules* caducous, interpetiolar, lanceolate to triangular, 3–4 mm long (excluding aristas), glabrous to densely hirtellous and often becoming glabrescent, acute to obtuse and 1-aristate, aristas 0.8–3 mm long, puberulous to hirtellous. *Inflorescences* terminal, glabrous, peduncles 0.2–6 cm long, branched portion 2.5–9 × 3–10 cm, pyramidal, secondary axes 2 per node, branched; bracts 0.3–1.5 mm long, elliptic to tri-

angular or linear, ciliolate; pedicels 1–2 mm long; *flowers* pedicellate in umbelliform cymes of 2 to 5; hypanthium turbinate to cylindrical, ca. 0.8 mm long, glabrous; calyx limb 0.5–0.8 mm long, glabrous, entire to denticulate; corolla funnelform, white, externally glabrous, barbate in throat, tube 1.5–2 mm long, lobes 5, 1.5–2 mm long, narrowly triangular; anthers ca. 1.2 mm long, exerted; stigmas ca. 1 mm long, partially exerted. *Fruits* ellipsoid, ca. 5 × 4 mm, apparently red; pyrenes 2, planoconvex, dorsally with ca. 5 rounded longitudinal ridges.

*Habitat, distribution, and phenology.* In premontane dry forest and seasonal cloud forest at 50–1155 m, central western Ecuador; collected in flower in January, March, September, November, and December, in fruit July through September and in November.

This species is distinguished by its combination of interpetiolar stipules that are aristate and usually densely hirtellous, its relatively small leaves that are broadest above the middle, its secondary leaf veins not looping to interconnect, and its elongated sacciform domatia. In form these domatia are unusual in this genus but somewhat similar to those of *Psychotria sacciformis* of Amazonian Ecuador and Peru; they are discussed further under that species, below. The flowers seen are generally similar to the short-styled form of distylous *Psychotria* species in the arrangement of their anthers and stigmas, except the stigmas appear to be partially exerted. The specific epithet honors Xavier Cornejo, an Ecuadorian botanist who is exploring extensively in the western part of the country and documenting its flora, including this new species.

*Paratypes.* ECUADOR. Without location, “Coast plain,” *Rimbach 99* (F). **El Oro:** Hacienda Daucay, 3°29'S, 79°45'W, *Cornejo & Bonifaz 2537* (MO); Hacienda Buenaventura, 12 km W of Piñas on road to Machala, 3°48'S, 79°46'W, *Kessler 2588* (MO); trail between Portovelo and Zaruma, *Steyermark 53984* (F). **Guayas:** Cordillera Chongón-Colonche, Bosque Protector Loma Alta, 1°48'S, 80°47'W, *Cornejo & Bonifaz 5242* (MO); Cerro de Caña, Cordillera de Colonche, *Valverde 1014* (MO). **Los Ríos:** near Quevedo, Cantón Vinces, *Méxia 6602A* (F). **Manabí:** San Sebastián, Parque Nacional Machalilla, 1°35'S, 80°42'W, *Cornejo & Bonifaz 1235* (MO), 1°36'S, 80°42'W, *Gentry et al. 72502* (MO); Cerro Montecristi, *Dodson & Thien 1720* (MO), *Gilmartin 326* (MO); cantón Montecristi, Cerro Montecristi, carretera Manta–Jipijapa, entrada por Montecristi o El Chorrillo, 1°02'S, 80°41'W, *Núñez et al. 391* (MO); cantón Pedernales, Cerro Pata de Pájaro a 10 km al E de Pedernales, a 5 km del rancho de la familia Arroyo, 00°01'N, 79°57'W, *Vargas 1289* (MO).

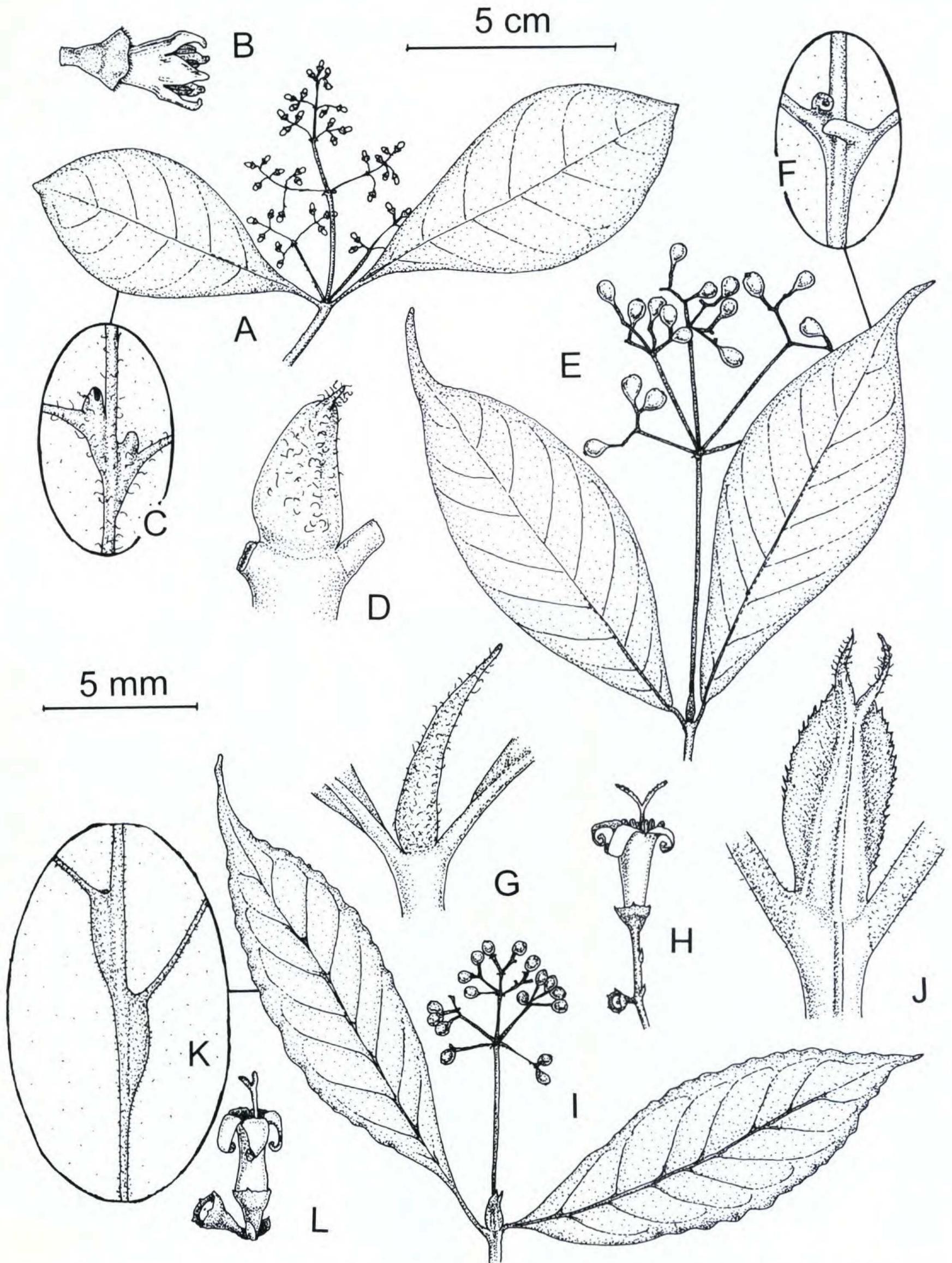


Figure 2. A–D. *Psychotria cornejoi* C. M. Taylor. —A. Flowering branch. —B. Flower bud, partially opened. —C. Detail of abaxial leaf surface, showing two domatia situated in the abaxial axils of two secondary veins with the costa. —D. Stipule. E–H. *Psychotria sacciformis* C. M. Taylor. —E. Fruiting stem. —F. Detail of abaxial leaf surface, showing two domatia situated in the abaxial axils of the secondary veins with the costa. —G. Stipule. —H. Detail of cymule with flower at anthesis. I–L. *Psychotria romolerouxiana* C. M. Taylor. —I. Fruiting stem. —J. Stipule. —K. Detail of abaxial leaf surface, showing two domatia situated in the abaxial axils of two secondary veins with the costa. —L. Detail of cymule with flower at anthesis. A, based on Gentry *et al.* 72502; B, C, D, based on Dodson & Thien 1669; E, based on Alvarez *et al.* 36; F, H, G, based on Romoleroux *et al.* 2575; I, based on Croat 19475; J–L, based on Romoleroux & Foster 1684. A, E, I, to 5-cm scale; all others to 5-mm scale.

**Psychotria jefensis** Dwyer ex C. M. Taylor, sp. nov. TYPE: Costa Rica. Puntarenas: cantón de Osa, Fila Costeña, Fila Cruces, cabeceras del Río Piedras Blancas, Cerro Anguciana, faldas al O, 8°49'N, 83°11'W, 1000–1400 m, 8 Dec. 1988, B. Hammel, R. Aguilar & M. Grayum 19214 (holotype, INB; isotype, MO-5169726). Figure 3F, G.

Haec species a *Psychotria orosiana* et *P. laselvensi* lobulis stipularibus hirtellis, foliis domatiis foveolatis carentibus atque limbo calycino longiore distinguitur.

Small trees to 4 m tall; stems glabrous. *Leaves* narrowly elliptic-oblong, 6.5–19.5 × 2–4.5 cm, papyraceous to chartaceous, at apex acute to somewhat acuminate, at base acute to cuneate, adaxially and abaxially glabrous; secondary veins 10 to 21 pairs, looping at least loosely to interconnect, abaxially without domatia, adaxially costa plane to thickened and remaining venation plane, abaxially costa prominulous, secondary veins thickened, and remaining venation plane; petioles 5–8 mm long, glabrous; *stipules* caducous, interpetiolar, lanceolate, ca. 6 mm long, glabrous, acute and 1-aristate, aristas ca. 3 mm long, hirtellous. *Inflorescences* not seen. *Infructescences* terminal, glabrous, peduncle 1.5–6.5 cm long, branched portion 4–9 × 6–10 cm, pyramidal; secondary axes 2 per node, branched; bracts 0.5–2 mm long, deltoid, glabrous, deciduous; pedicels 1–3 mm long; *fruits* pedicellate in umbelliform cymules of 3 to 8, subglobose, 4 × 4–4.5 mm, glabrous, with persistent calyx limb 1–1.2 mm long, shallowly lobed, glabrous; pyrenes 2, planoconvex, dorsally with 4 to 5 rounded longitudinal ribs.

*Habitat, distribution, and phenology.* In wet forest at 650–900 m, Osa Peninsula of Costa Rica and central to eastern Panama; collected in fruit in April and December.

This new species is similar to *Psychotria orosiana* and *P. laselvensis* C. W. Hamilton, both of which can be distinguished from this new species by their glabrous to puberulous stipule lobes, leaves usually with foveolate domatia in the abaxial vein axils, and shorter calyx limbs 0.2–0.8 mm long. Although flowers have not been seen, the fruiting collections show adequate morphological features to distinguish this species. John Dwyer originally recognized this species as new and proposed this epithet, which refers to the collection locality of one of the Panamanian specimens.

*Paratypes.* PANAMA. **Panamá:** vicinity of Cerro Jefe, Altos de Pacora, Antonio 3228 (MO). **San Blas:** Cerro Brewster, headwaters of Río Cangandí, 9°18'N, 79°16'W, de Nevers et al. 5489 (MO).

**Psychotria lorenciana** C. M. Taylor, sp. nov. TYPE: Guatemala. Izabal: El Estor, bordering Río Sarco, El Milagro Ranch, 22 May 1975, C. L. Lundell & E. Contreras 19332 (holotype, MO-3763295; isotype, F). Figure 1C–E.

Haec species a *Psychotria grandis*, *P. costivenia* et *P. flava* fructu subglobose in diam. 4–5 mm atque inflorescentiae rotundato-corymbiformis axibus secundariis imis insigniter bene evolutis distinguitur.

Shrubs or small trees to 15 m tall; stems glabrous. *Leaves* elliptic to oblanceolate or obovate, 15–25 × 5.5–11 cm, papyraceous, glabrous above and below or sometimes below puberulous on costa and less often also on secondary veins, at apex obtuse to deltoid, at base cuneate to acute; secondary veins 14 to 19 pairs, sometimes looping to interconnect at least in distal portion of blade, abaxially without domatia, adaxially venation plane or costa sometimes prominulous, abaxially costa prominent, secondary veins prominulous and lesser venation plane; petioles 1.5–5 cm long; *stipules* interpetiolar, caducous, 5–12 mm long, ovate to elliptic, glabrous except margins ciliolate, rounded to usually emarginate or sometimes 1-aristate with aristas to 2 mm long and inserted at or below apex. *Inflorescences* terminal, glabrous, paniculate, peduncles 4–14 cm long, branched portion 4–17 × 5–26 cm, rounded-corymbiform, secondary axes 2 per node or often 4 and subequal, extensively branched with first internode usually well developed; bracts 0.5–5 mm long, triangular to rounded; pedicels to 1 mm long; *flowers* distylous, mixed sessile and pedicellate in dichasial cymules of 2 to 11; hypanthium turbinate, ca. 0.8 mm long, glabrous; calyx limb truncate to denticulate, ca. 0.5 mm long, glabrous; corolla tubular-infundibuliform, white, externally glabrous, barbate in throat, tube 2–2.5 mm long, lobes 5, deltoid to narrowly triangular, 1.2–2 mm long, acute, smooth abaxially; anthers ca. 1 mm long, included; stigmas ca. 0.5 mm long, exserted. *Fruits* subglobose, 4–5 mm diam., color unknown; pyrenes 2, planoconvex, dorsally slightly ridged to smooth.

*Habitat, distribution, and phenology.* In wet forests of southern Mexico and Guatemala at 120–800 m, collected in flower in March and May through July, in fruit in February, March, and May.

This new species has previously been confused with the sympatric species *Psychotria grandis*, *P. costivenia*, and *P. flava*, by both Standley and Williams (1972) and Hamilton (1989). *Psychotria lorenciana* is distinguished from these three species by its subglobose fruits 4–5 mm in diameter and its different inflorescence arrangement, with the secondary axes two at each node or often four, in

either case with the secondary axes all ascending and with their basalmost internodes all generally as well developed as the comparable internode of the primary axis. In contrast, these other species have subglobose to usually ellipsoid fruits  $5\text{--}13 \times 4\text{--}9$  mm and corymbiform to usually pyramidal inflorescences with the secondary axes two at each node or usually four or six, with all of the secondary axes less well developed than the primary axis and when four or six, then also markedly unequal in pairs. The flowers seen are all similar to the long-styled form of distylous *Psychotria* species in the arrangement of their anthers and stigmas. It is a pleasure to dedicate this species to David H. Lorence, a long-time and distinguished student of the Mexican and Mesoamerican Rubiaceae.

*Paratypes.* GUATEMALA. **Alta Verapaz:** 9 mi. uproad to Oxec along gravel road which turns N off Highway 7E between Tucúru and El Estor ca. 6 km NE of Panzós, *Croat 41672* (MO); between Finca Cubilgüitz and Hacienda Yaxcabanal, *Steyermark 44833* (F), *Steyermark 44837* (F). **Huehuetenango:** around Ixcan at Pateushís, Sierra de los Cuchumatanes, *Steyermark 49197* (F). **Izabal:** Cadenas/Puerto Méndez, bordering Río Dulce, *Contreras 9887* (F); Puerto Méndez/Cadenas, on Río Dulce Road, 19 km, *Contreras 10014* (MO); Puerto Méndez on Río Dulce Road, *Contreras 10309* (F); between Seja/Ciénaga, 5 km from Seja, 200 m E from Río Dulce Road, *Contreras 10204* (F, MO); between Ciénaga/Seja, on Petén/Guatemala Road, *Contreras 10728* (F); El Estor, bordering Lake Izabal, E, in El Zapotillo, *Lundell & Contreras 19299* (F); La Jagua Creek, Murciélago, ca. 10 mi. E of El Estor, Lake Izabal, *Rowland & Snedaker B-5* (F), *Snedaker D-127* (F). **Petén:** La Cumbre, on old Pusila Road, 3 km, top of hill, *Lundell & Contreras 20011* (F). MEXICO. **Chiapas:** mpio. Las Margaritas, western side of Laguna Miramar E of San Quintín, *Breedlove 33160* (MO); mpio. Ocosingo, en el vértice del Río Chixoy, *E. Martínez S. 18941* (F, MO).

***Psychotria matagalpensis*** C. M. Taylor, sp. nov.

TYPE: Nicaragua. Matagalpa: ridge between Cerro Bravo and Cerro Picacho, mountains N of Hotel Selva Negra,  $13^{\circ}01'N$ ,  $85^{\circ}55'W$ , 1490–1550 m, 26 May 1985, *G. Davidse, A. Grijalva & M. Sousa 30484* (holotype, MO-5059845). Figure 3A, B.

Haec species a *Psychotria chiriquina* et *P. sylvivaga* limbo calycino ac corolla brevioribus atque foliis domatiis foveolatis munitis distinguitur.

Shrubs or small trees to 8 m tall; stems glabrous. Leaves elliptic,  $4\text{--}10.5 \times 1\text{--}3$  cm, papyraceous, at apex acute to acuminate, at base acute, abaxially and adaxially glabrous; secondary veins 4 to 5 pairs, not looping to interconnect, abaxially with 2 to 4 pairs of veins bearing well developed, glabrous to occasionally pilosulous, foveolate domatia, adaxially venation plane, abaxially costa and secondary

veins thickened and remaining venation plane; petioles 1–2.5 cm long, glabrous; stipules caducous, interpetiolar and shortly also intrapetiolar, elliptic to obovate, 4–18 mm long, obtuse to acute and sometimes shortly bidentate, glabrous, margins ciliate and often membranaceous. Inflorescences terminal, glabrous, sessile or subsessile and appearing fasciculate,  $3\text{--}5 \times 3\text{--}5$  cm, broadly pyramidal to corymbiform-rounded; secondary axes 2 per node, branched, with basalmost pair generally equally well developed as primary axis; bracts 0.2–0.5 mm long; pedicels 1–3 mm long; flowers pedicellate in umbelliform cymes of 3 to 7; hypanthium 0.8–1 mm long, glabrous, turbinate; calyx limb 0.6–1 mm long, glabrous, subtruncate to broadly and shallowly dentate; corolla salverform, white, externally glabrous, internally densely pilosulous at stamen insertion, tube ca. 3 mm long, lobes 5, ca. 2 mm long, triangular to narrowly so; anthers ca. 0.8 mm long, exerted; stigmas ca. 0.8 mm long, exerted. Infructescences similar in size and shape to inflorescences; fruits ellipsoid to ellipsoid-obovoid,  $6\text{--}7 \times 4.5\text{--}5$  mm, red; pyrenes 2, planoconvex, dorsally with 4 to 5 rounded longitudinal ribs.

*Habitat, distribution, and phenology.* In wet montane, cloud, and dwarf forest with boreal elements at 920–1700 m, central-western Nicaragua; collected in flower May through August, in fruit January through May and August through December.

This new species is similar to *Psychotria chiriquina* of Costa Rica and Panama, with which it was confused by Hamilton (1989) and Taylor (2001a); *P. chiriquina* differs from this new species by its longer calyx limbs 1–1.6 mm long, its longer corolla tubes 4–7 mm long, and its leaves without domatia in the abaxial vein axils or with only a tuft of pubescence here. The specific epithet refers to the region from which this new species is known. The flowers seen are all similar to the short-styled form of distylous *Psychotria* species in the arrangement of their anthers and stigmas. This new species is also similar to *P. sylvivaga*, also of Costa Rica and Panama, which differs from *P. matagalpensis* by its longer calyx limbs 1.2–1.5 mm long, its longer corolla tubes 4–5 mm long, and its leaves without domatia in the abaxial vein axils or with only a tuft of pubescence here.

*Paratypes.* NICARAGUA. **Jinotega:** la entrada a “Aranjuez”,  $13^{\circ}01'\text{--}02'N$ ,  $85^{\circ}55'\text{--}56'W$ , *Araquistain 3645* (MO); carretera Matagalpa–Jinotega, entre el Km 133–134, a 10 km al SE de la ciudad de Jinotega,  $13^{\circ}01'30'N$ ,  $85^{\circ}55'W$ , *Grijalva & Araquistain 175* (MO); Kilambé, “Paricutín”, 4 km al SE del Cerro Kilambé,  $13^{\circ}35'N$ ,  $85^{\circ}40'W$ , *Moreno 7459* (MO); Cerro Kilambé,

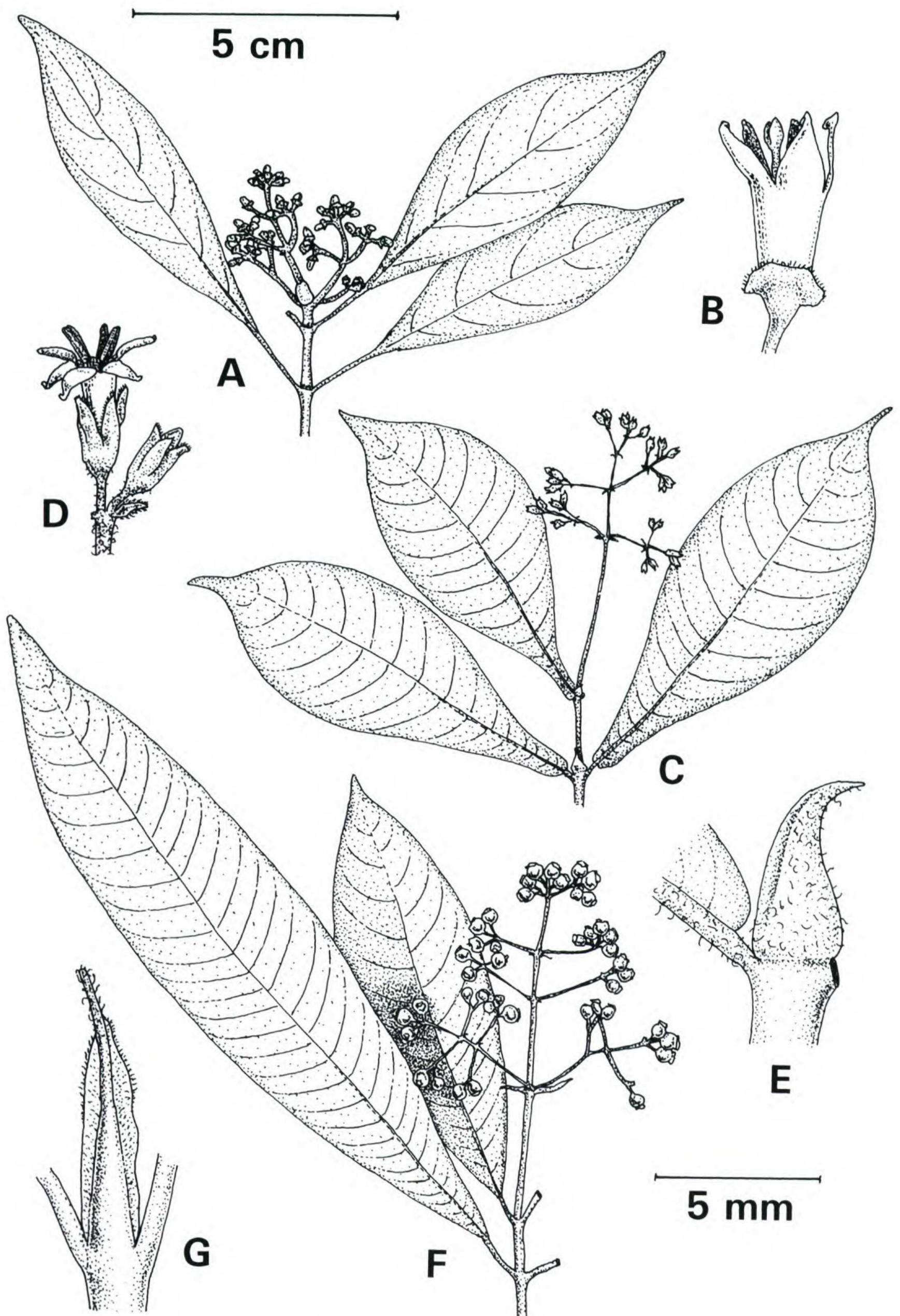


Figure 3. A, B. *Psychotria matagalpensis* C. M. Taylor. —A. Flowering branch. —B. Mature flower bud, partially opened. C–E. *Psychotria orosioides* C. M. Taylor. —C. Flowering branch. —D. Detail of cymule with flower at anthesis.

faldas E del Pico Piedra Pelona, 13°34'N, 85°40'W, *Moreno* 7752 (MO), *Moreno* 7759 (MO); Montaña Cuspire, 13°17'N, 86°09'W, *Moreno* 8036 (MO); along Hwy. 3 ca. 1.9 km NW of Aranjuez road entrance, 13°02'N, 85°56'W, *Stevens* 5625 (BM, MO), *Stevens* 9178 (BM, MO); Macizos de Peñas Blancas, along trail between finca of Socorro Mejía and finca of Luis Manzanares, 13°16'–17'N, 85°40'–41'W, *Stevens* 11317 (MO); along Hwy. 3 ca. 1 km NW of La Fundadora entrance, unnamed peak ca. 500 m W of hwy., 13°01'N, 85°56'W, *Stevens & Henrich* 20445 (MO), *Stevens & Miller* 22461 (BM, MO). **Madriz:** Cerro Pataste, *Neill* 129 (MO); Cerro Volcán Somoto (Volcán Tepesomoto), 13°26'N, 86°35'W, *Moreno* 2870 (MO), 13°25'N, 86°34'W, *Moreno* 20073 (MO). **Matagalpa:** Finca Los Alpes, 9 km NE de Matagalpa, 12°57'N, 85°21'W, *D. Castro* 2536B (MO); El Porvenir, Cordillera Central of Nicaragua, *A. Molina R.* 20516 (F); Cordillera Central of Nicaragua, vicinity El Porvenir 4 km E of Santa María de Ostuma, *A. Molina R.* 22920 (F, MO); El Picacho, E of Santa María de Ostuma, Cordillera Dariense, *A. Molina R. & A. R. Molina* 30521 (F); Cerro El Picacho, N del Hotel Selva Negra, 13°00'N, 85°55'W, *Moreno* 21678 (MO), *Nee* 27621 (MO), *Nee* 27633 (MO); Cordillera Dariense, Hacienda Santa María de Ostuma, 10 km N of Matagalpa, *Neill* 2304 (BM, MO), *Neill* 3167 (BM, MO), *Tomlin* 24 (MO), *Tomlin* 60 (BM, MO), *Tomlin* 126 (MO), *Tomlin* 145 (MO), *Tomlin* 157 (MO); Macizos de Peñas Blancas, SE side, drainage of Quebrada El Quebradón, slopes N and W of Hacienda San Martín, 13°14'–15'N, 85°38'–39'W, *Stevens et al.* 21145B (MO); NW slope of Cerro El Picacho, 13°00'N, 85°55'W, *Stevens* 22157 (MO); "Disparate de Potter," Santa María de Ostuma, Cordillera Central of Nicaragua, *L. O. Williams & T. P. Williams* 25051 (F), *Williams et al.* 27594 (BM, F), *Williams et al.* 29176 (F); Santa María de Ostuma, Cordillera Central de Nicaragua between Matagalpa and Jinotega, *Williams et al.* 23342 (F); Finca Santa María de Ostuma, Cordillera Central of Nicaragua, *L. O. Williams & A. Molina R.* 42652 (BM, F).

***Psychotria orosioides*** C. M. Taylor, sp. nov. TYPE:

Costa Rica. Alajuela: Reserva Forestal de Arrenal, Quebrada San Gerardo, Río Caño Negro, Finca de los Mejías, 10°22'N, 84°48'W, 1200 m, 17 Feb. 1990, *E. Bello* 1894 (holotype, CR; isotype, MO-4362126). Figure 3C–E.

Haec species a *Psychotria orosiana* limbo calycino longiore distinguitur.

Shrubs to 2 m; stems hirtellous to glabrescent or glabrous, somewhat flattened. *Leaves* oblanceolate, 8–17 × 3–6 cm, papyraceous, adaxially glabrous, abaxially glabrous except hirtellous on costa and sometimes also secondary veins, at apex acuminate, at base narrowed then abruptly truncate to rounded; secondary veins 10 to 13 pairs, united in a continuous, slightly looping submarginal vein, abaxially

with domatia, adaxially and abaxially costa prominent, secondary veins thickened, and remaining venation plane; petioles 0.5–2 mm long, hirtellous to glabrous; *stipules* caducous, interpetiolar and shortly intrapetiolar, hirtellous, ovate to lanceolate, 5–8 mm long, interpetiolarly 2-aristate, aristas 0.5–2 mm long, hirtellous. *Inflorescences* terminal, puberulous to pilosulous, peduncles 4–10 cm long, branched portion 2–5.5 × 3–10 cm, pyramidal to rounded-corymbiform, secondary axes 2 or 4 per node, branched; bracts 0.5–3 mm long, lanceolate to narrowly triangular; pedicels 0.5–1 mm long; *flowers* pedicellate in umbelliform to dichasial cymes of 3 to 7; hypanthium ca. 0.5 mm long, puberulous to hirtellous, cupuliform to turbinate; calyx limb 1.2–2 mm long, puberulous, lobed for 1/2–2/3, lobes sometimes rather unequal in length on a single flower, narrowly triangular, acute to acuminate, entire to ciliolate; corolla tubular to funnel-form, apparently white, externally glabrous, internally densely pilosulous at stamen insertion, tube 2.5–3 mm long, lobes 5, ca. 1.2 mm long, triangular, thickened to shortly hooked at adaxial apex; anthers in short-styled form ca. 1.2 mm long, partially exerted, in long-styled form not seen; stigmas in short-styled form ca. 0.5 mm long and included, in long-styled form ca. 0.8 mm long and exerted. *Fruits* ellipsoid to subglobose, 4–5 × 4–5 mm, red; pyrenes 2, planoconvex, dorsally with 4 to 5 rounded longitudinal ridges.

*Habitat, distribution, and phenology.* In understory of wet lower montane forest at 900–1400 m in northwestern Costa Rica; collected in flower in February, June, and July, in fruit in April and May.

This new species is similar in overall aspect to *Psychotria orosiana*, which has been collected in the same region and can be distinguished by its shorter calyx limb 0.5–0.8 mm long. The specific epithet refers to the similarity between these species.

*Paratypes.* COSTA RICA. **Alajuela:** Reserva Biológica Monteverde, Río Peñas Blancas, Altos de Quebrada Portal, 10°17'N, 84°43'W, *Bello* 902 (MO); Reserva Biológica Monteverde, Río Peñas Blancas, parcela de Alemán, 10°18'N, 84°45'W, *Bello* 962 (MO); Bosque Eterno de los Niños, valley of Río Agua Gata, Atlantic slope, 13 km NE of Monteverde, 10°23'N, 84°42'W, *Haber & Zuchowski* 10550 (MO). **Guanacaste:** Río Chiquito de Tilarán, Río Negro valley, Atlantic slope, 10°22'N, 84°52'W, *Haber ex Bello* 5879 (MO).

←

—E. Stipule and adjacent leaf base. F, G. *Psychotria jefensis* C. M. Taylor. —F. Fruiting branch. —G. Stipule. A, based on *Neill* 2304; B, based on *Davidse et al.* 30484; C, based on *Bello* 962; D, E, based on *Bello* 1894; F, G, based on *Hammel et al.* 19214. A, C, F, to 5-cm scale; all others to 5-mm scale.

***Psychotria romolerouxiana*** C. M. Taylor, sp. nov. TYPE: Ecuador. Napo: Estación Científica Yasuní, parcela de 50 ha, Placa #50094, 00°38'S, 76°30'W, 200–300 m, 10 June [without year; 1995], K. Romoleroux & R. Foster 1684 (holotype, QCA; isotype, MO-4933514). Figure 2G, I, J, K.

Haec species a *Psychotria borjensis* domatiis foveolatis bene evolutis atque stipulis bilobis longioribus distinguitur.

Shrubs to 2.5 m; stems puberulous to glabrescent. *Leaves* elliptic to narrowly elliptic or oblanceolate, 4.5–20 × 0.9–7 cm, at apex slenderly acuminate, at base acute to sometimes abruptly and shortly obtuse, adaxially glabrous, abaxially glabrous on lamina and densely spreading-puberulous on costa and secondary veins, margins undulate at least when dry; secondary veins 6 to 10 pairs, looping broadly to interconnect with 1 to 2 secondary loops, abaxially 2 to 5 secondary veins near apex usually with domatia in axils, domatia foveolate, 2–5 mm long, with swollen portion fused to costa, adaxially venation plane or costa prominulous, abaxially costa prominulous, secondary veins thickened to prominulous, and higher-order venation plane; petioles 2–6 mm long, sometimes slightly winged; *stipules* persistent on 2 to 5 most distal nodes, interpetiolar and shortly intrapetiolar, obovate to elliptic, 6.5–14 mm long, glabrous except sometimes hirtellous to puberulous in a central line and/or with margins ciliolate to ciliate, at apex bidentate with teeth narrowly triangular, 1–4 mm long, acute to acuminate. *Inflorescences* terminal, puberulous, peduncles 2–4 cm long, branched portion 1–4 × 1.2–8 cm, ovoid to broadly pyramidal or subglobose, secondary axes 4 or 6 per node, shorter and reflexed in pairs, branched one time or terminating in a glomerule; bracts reduced or to 0.8 mm long, triangular; *flowers* sessile in glomerules of 2 to 3, these glomerules often arranged on short dichasial axes; hypanthium ca. 0.5 mm long, cylindrical to turbinate, puberulous; calyx limb ca. 0.5 mm long, denticulate, puberulous; corolla funnel-form, white, externally glabrous, internally densely hirtellous at stamen attachment, tube ca. 2.5 mm long, lobes 5, ca. 1.5 mm long, triangular; anthers ca. 1 mm long, included; stigmas 0.8–1 mm long, exerted. *Fruits* ellipsoid, 5–6 × 4.5–5.5 mm, red; pyrenes 2, planoconvex, dorsally with 4 to 5 reduced, rounded to acute, longitudinal ridges.

*Habitat, distribution, and phenology.* In wet “tierra firme” forest and seasonally inundated “várzea” forest at 100–300 m, Amazonian Colombia to Peru; collected in flower in April, June through Au-

gust, October, and November, in fruit January through March and May through December.

This new species keys out to *Psychotria borjensis* in several flora treatments (e.g., Steyermark, 1972, 1974), and has been combined with this species in recent works (Taylor & Pool, 1993; Taylor, 1997, 1999). However, *P. borjensis* is apparently allopatric in the northeastern Amazon basin and differs from this new species by the combination of its leaves abaxially without domatia or with only a few flat foveolate domatia up to 1 mm long and its acute triangular stipules 5–8 mm long. This new species is also similar to *P. sacciformis*; see the discussion under the description of this latter species below. The flowers seen are all similar to the long-styled form of distylous *Psychotria* species in the arrangement of the anthers and stigmas. The specific epithet honors Katya Romoleroux, an Ecuadorian botanist who is studying the Ecuadorian flora.

*Paratypes.* COLOMBIA. **Amazonas:** Parque Nacional Natural Amacayacu, Centro Administrativo Amacayacu INDERENA, a la orilla del Río Amacayacu, 3°47'S, 70°15'W, *Pipoly* 15309 (MO); Parque Nacional Natural Amacayacu, Quebrada de Agua Pudre, ca. 1.5 km NE de desembocadura sobre el Río Amacayacu, Muestreo Permanente Estratégica del MO, 3°47'S, 70°15'W, *Pipoly et al.* 16005 (MO), 16519 (MO); Parque Nacional Natural Amacayacu, Mata-Matá, en trocha hacia donde el “Abuelo Panduro”, 3°47'S, 70°15'W, *Rudas & del Aguila* 1383 (MO). ECUADOR. **Napo:** Yasuní Forest reserve, 1–3 km E of Pontificia Universidad Católica del Ecuador Science Station, by Tiputini River, 00°41'S, 76°24'W, *Acevedo-Rodriguez & Cedeño* 7344 (MO), sendero atrás de la casa, *Jaramillo* 8514 (F); Estación Científica Yasuní, Río Tiputini, al NO de la confluencia con el Río Tivacuno, 6 km E de la carretera Maxus, Km 44, desvío hacia el pozo, 00°38'S, 76°30'W, *Romoleroux* 2230 (F), *Romoleroux & Foster* 2134 (F, MO). **Pastaza:** Lorocachi, ca. 5 km SSW of the military camp, 1°38'S, 75°58'W, *Brandbyge & Asanza* 31051 (MO); Curaray, SE of the airstrip, 1°22'S, 76°57'W, *Holm-Nielsen et al.* 22274 (MO). PERU. **Loreto:** Prov. Maynas, Varadero de Mazán from Río Amazonas to Río Napo, *Croat* 19475 (F, MO), *Croat* 20762 (MO); Santa María del Ojeal on Río Amazonas, ca. 15 km downriver from Iquitos, *Davidson* 5328 (MO); Río Gueppi [sic; Guepí], tributary of Río Putumayo, northernmost tip of Peru on border with Ecuador, trail from Puerto Perú (8 km from mouth of river) toward Río Napo, *Gentry et al.* 21946 (F, MO); Quebrada Sucusari, Llachapa camp of Explorama, N side of Río Napo below Mazán, *Gentry et al.* 27576 (MO); Yanomono, Explorama Tourist Camp, 25 km NE of Iquitos along Río Amazonas between Indiana and mouth of Río Napo, 3°28'–30'S, 72°48'–50'W, *Gentry et al.* 31466 (F, MO), *Gentry et al.* 37213 (MO), *Gentry et al.* 37987 (MO), *Gentry et al.* 39718 (MO), *Gentry et al.* 42253 (MO), *Gentry et al.* 42438 (MO), *Pipoly et al.* 12427 (MO), *Pipoly et al.* 12485 (MO), *Vásquez et al.* 4699 (MO), *Vásquez et al.* 5166 (MO), *Vásquez et al.* 14102 (MO), *Vásquez et al.* 14142 (MO), Bushmaster Trail, *Webster* 23334 (MO); Río Ampiyacu, Pebas and vicinity, near town, 3°10'S, 71°49'W, *Plowman et al.* 6538 (F); Cahuide (Río Itaya), *Vásquez & Jaramillo* 5635 (F, MO); Iquitos,

Allpahuayo, Estación Experimental del Instituto de Investigaciones de la Amazonía Peruana (IIAP), *Vásquez & Jaramillo 14477* (MO); Nanay, Monte real [sic], *Woytkowski 5154* (MO); Prov. Requena: Sinchicuy, Río Amazonas, 3°35'S, 73°15'W, *Vásquez et al. 7801* (F).

***Psychotria sacciformis*** C. M. Taylor, sp. nov.

TYPE: Ecuador. Napo: Estación Científica Yasuní, Río Tiputini, al NO de la confluencia con el Río Tivacuno, 6 km E de la carretera Maxus, Km 44, desvío hacia el pozo, 00°38'S, 76°30'W, 200–300 m, 8 Oct. 1996, *K. Romoleroux, M. Bass, R. Foster & G. Villa 2575* (holotype, QCA; isotypes, F, MO-5094912). Figure 2E, F, G, H.

Haec species a congeneris foliis domatiis foveolatis in saccum clausum 0.5–2.0 mm longum prolongatis munitis distinguitur.

Shrubs or small trees to 4 m; stems glabrous or sometimes hirtellous in a longitudinal interpetiolar line. *Leaves* oblanceolate to elliptic-oblanceolate or elliptic, 6–14 × 1.8–6 cm, papyraceous, adaxially and abaxially glabrous or adaxially hirtellous along costa, at apex acuminate, at base cuneate to obtuse or acute; secondary veins 3 to 9 pairs, united in a looping, weak to well developed submarginal vein, abaxially with domatia in axils, domatia foveolate, 0.5–2 mm long, tubular to sacciform and prolonged, emergent, adaxially venation plane or costa sometimes prominulous, abaxially costa prominent, secondary veins prominulous, and remaining venation plane; petioles 3–6 mm long, glabrous to sparsely hirtellous; *stipules* caducous, interpetiolar and shortly intrapetiolar, narrowly lanceolate to narrowly triangular, 3–12 mm long, glabrous or usually hirtellous at least in a central interpetiolar line, slenderly acuminate. *Inflorescences* terminal, glabrous to puberulous, peduncles 3.5–7.5 cm long, flexuous, branched portion 3.5–6 × 3.5–6 cm, ovoid to rounded-corymbiform, secondary axes 4 per node with 2 shorter and reflexed, branched 1–3 times, with higher-order axes and pedicels spreading to 90°–100°; bracts reduced or to 1 mm long, triangular, glabrous; pedicels 1–2 mm long; *flowers* in umbelliform cymules of 3 to 7; hypanthium ca. 0.5 mm long, turbinate to somewhat cupuliform, glabrous; calyx limb 0.5–0.8 mm long, glabrous, denticulate; corolla tubular, cream to white, externally glabrous, barbate in throat, tube ca. 2.5 mm long, lobes 5, ca. 1.5 mm long, triangular; anthers in both forms ca. 1 mm long, in short-styled form exerted, in long-styled form included to partially exerted; stigmas in short-styled form ca. 0.8 mm long and included, in long-styled form ca. 1 mm long and exerted. *Fruit* ellipsoid to

obovoid, 5–5.5 × 4 mm, red to purple, with stipes to 4 mm long; pyrenes 2, planoconvex, dorsally with 4 to 5 rounded longitudinal ridges.

*Habitat, distribution, and phenology.* In wet forest at 200–750 m in Amazonian Ecuador and Peru; collected in flower in January, July, October, September, and November, in fruit March through May and in September.

This new species is distinguished by its leaves abaxially with foveolate domatia that are prolonged into tubular, emergent sacs 0.5–2 mm long and completely closed or sometimes open tardily at the very top; the specific epithet refers to these structures. These structures are highly unusual among the South American Rubiaceae. Similar domatia are known to me only in *Psychotria cornejoi* of South America (described above), and have been reported from one African species, *Coffea dactylifera* Robbrecht & Stoffelen, where they are also considered unusual (Stoffelen et al., 1999). *Psychotria sacciformis* will key out to *Psychotria borjensis* in several flora treatments (Steyermark, 1972, 1974; Taylor, 1997), and has been confused with this species in other recent works (Taylor & Pool, 1993; Taylor, 1999). However, *P. borjensis* is apparently allopatric in the northeastern Amazon basin, and differs from this new species by the combination of its leaves abaxially without domatia or with only a few flat foveolate domatia up to 1 mm long and its acute stipules. This new species is also similar to *P. romolerouxiana*, described above, which differs in its domatia that are fused along their lengths with the costa and its bidentate stipules.

*Paratypes.* COLOMBIA. **Antioquia:** mpio. San Luis, Quebrada La Cristalina, 6°N, 74°45'W, *J. G. Ramírez & Cárdenas L. 1923* (JAUM, MO); mpio. de San Luis, corregimiento El Prodigio, vereda Las Confusas, hacienda La Esperanza, margen izquierda del Río El Tigre, *Toro 15* (MEDEL, MO). **Caquetá:** mpio. San Vicente del Caguán, trazado de la carretera entre Neiva y San Vicente, vereda Las Perlas, bajo Río Pato, finca Galicia, en la vega del Río Pato, *Betancur et al. 2266* (HUA, MO). **Chocó:** E side of Serranía del Darién, from Acandí, 8°30'N, 77°20'S, *Juncosa 655* (MO). **Meta:** mpio. La Macarena, 1 hora sobre el Río Guayabero en la desembocadura del Río Losada, 2°20'N, 74°60'W, *Callejas & Marulanda 7074* (HUA, MO). **Putumayo:** mpio. Mocoa, El Afán, *B. R. Ramírez P. 769* (MO, PSO). ECUADOR. **Morona-Santiago:** pozo petrolero "Garza" de TENNECO, 35 km (approx.) al NE de Montalvo, 1°49'S, 76°42'W, *Zak & Espinoza 4767* (MO). **Napo:** Loreto, al N de Galeras, Bloque 19, línea sísmica 22, helipuerto 3, Compañía Triton, 00°47'S, 77°28'W, *Freire & Cerda 220* (MO); vía Payamino-Loreto, 4–6 km del río, 00°26'S, 77°02'W, *Zaruma 733* (MO); cantón Aguarico, Parque Nacional Yasuní, Lagunas de Garza Cocha, 01°01'S, 75°47'W, *Cerón & Gallo 4962* (MO); cantón Archidona, Parque Nacional Sumaco,

carretera Hollín-Loreto, comunidad Avila Vieja, 00°38'S, 77°26'W, *Alvarado 485* (MO); Avila Viejo, 00°38'S, 77°25'S, *Kohn & Alvarado 1581* (MO); cantón La Joya de los Sachas, comunidad de Pompeya, lado S del Río Napo, campamento de Maxus, Río Jivino, carretera de Maxus, Km 1–5, 00°25'S, 76°37'W, *Grijalva et al. 217* (MO); cantón Orellana, Parque Nacional Yasuní, carretera y oleoducto de Maxus, Km 40, parcela permanente #10, 00°39'S, 76°26'S, *Aulestia 2715* (MO, QCNE); Parque Nacional Yasuní, carretera y oleoducto de Maxus en construcción, Km 53–54, *Dik 416* (MO); Parque Nacional Yasuní, Tiputini Km 41, parcela 1, *Macía et al. 3074* (MO); Estación Científica Yasuní, Río Tiputini, al NO de la confluencia con el Río Tivacuno, E de la carretera Maxus, Km 44, desvío hacia el pozo Ivacuno, Sendero Dicaron, entre la carretera y la parcela de 50 ha, 00°38'S, 76°30'W, *Romoleroux & Foster 1632* (F, MO, QCA); Estación Científica Yasuní, parcela de 50 ha, Sendero Saino, 00°38'S, 76°30'W, *Romoleroux & Foster 1909* (F, MO, QCA); Estación Científica Yasuní, Río Tiputini, al NO de la confluencia con el Río Tivacuno, 6 km E de la carretera Maxus, Km 44, desvío hacia el pozo Tivacuno, parcela de 50 ha, 00°38'S, 76°30'W, *Romoleroux et al. 2191* (MO, QCA), 2231 (F, QCA), 2271 (F, MO, QCA); Estación Científica Yasuní, Río Tiputini, al NO de la confluencia con el Río Tivacuno, 6 km E de la carretera Maxus, Km 44, desvío hacia el pozo, 00°38'S, 76°30'W, *Romoleroux et al. 2645* (F, MO, QCA); cantón Tena, Reserva Biológica Jatun Sacha, Río Napo, 8 km al E de Misahuallí, 1°04'S, 77°36'W, *Alvarez 25* (MO), *Alvarez et al. 36* (MO), *Cerón 946* (MO), 1222 (MO), *Cerón & Iguago 5548* (MO), *Palacios 4216* (MO); Parque Nacional Yasuní, pozo petrolero Daimi I, CONOCO, 1°02'S, 76°10'W, *Hurtado et al. 42* (MO). **Pastaza:** Lorocachi, zona O del campamento militar, a 3 km del Río Curaray, 1°38'S, 75°58'W, *Jaramillo et al. 30796* (MO).

**Acknowledgments.** I thank the curators of BM, CR, DUKE, F, HUA, INB, JAUM, MEDEL, NY, PMA, and PSO for access to specimens and information, and in particular M. Correa; R. E. Gereau for preparation of the Latin diagnoses; D. Lorence, W. D. Stevens, C. Ulloa U., R. Foster, and T. Wachter for helpful discussions; S. Knapp, G. Davidse, O. M. Montiel, and R. Magill for significant encouragement of this work; and the Andrew Mellon Foundation through a grant to the Field Museum of Natural History for support for travel to consult that collection.

#### Literature Cited

- Andersson, L. & J. H. E. Rova. 1999. The *rps16* intron and the phylogeny of the Rubioideae (Rubiaceae). *Pl. Syst. Evol.* 214: 161–186.
- Hamilton, C. W. 1989. A revision of Mesoamerican *Psychotria* subg. *Psychotria* (Rubiaceae). *Ann. Missouri Bot. Gard.* 76: 67–111, 386–429, 886–916.
- Nepokroeff, M., B. Bremer & K. J. Sytsma. 1999. Reorganization of the genus *Psychotria* and tribe Psychotrieae (Rubiaceae) inferred from ITS and *rbcL* sequence data. *Syst. Bot.* 24: 5–17.
- Petit, E. 1964. Les espèces africaines du genre *Psychotria* L. (Rubiaceae)—I. *Bull. Jard. Bot. État, Bruxelles* 34: 1–228.
- Piesschaert, F. 2001. Carpology and Pollen Morphology of the Psychotrieae (Rubiaceae–Rubioideae), Towards a New Tribal and Generic Delimitation. Dissertation, Catholic University of Leuven, Belgium.
- Standley, P. C. & L. O. Williams. 1972. Rubiaceae. *Flora of Guatemala. Part XI(1–3): Fieldiana, Bot.* 24(9): 1–274.
- Steyermark, J. A. 1972. *Psychotria*. In: B. M. Maguire & Collaborators, *Flora of the Guyana Highlands, Part IX. Mem. New York Bot. Gard.* 23: 406–717.
- . 1974. *Psychotria*. In: T. Lasser (editor), *Flora de Venezuela* 9(1): 1111–1683.
- Stoffelen, P., E. Robbrecht & E. Smets. 1999. A new species of *Coffea* (Rubiaceae) from Central Africa, with notes on tentative other taxa. *Syst. Geogr. Pl.* 69: 119–124.
- Taylor, C. M. 1996. Overview of the Psychotrieae (Rubiaceae) in the neotropics. *Opera Bot. Belg.* 7: 261–270.
- . 1997. Rubiaceae. In: R. Vásquez M., *Flórlula de las Reservas Biológicas de Iquitos, Perú, Monogr. Syst. Bot. Missouri Bot. Gard.* 63: 602–637.
- . 1999. Rubiaceae. In: P. Jørgensen & S. León-Yáñez, *Catalogue of the Vascular Plants of Ecuador. Monogr. Syst. Bot. Missouri Bot. Gard.* 75: 855–878.
- . 2001a. Rubiaceae. In: W. D. Stevens, C. Ulloa U., A. Pool & O. M. Montiel (editors), *Flora de Nicaragua* 3: 2206–2284.
- . 2001b. Overview of the Neotropical genus *Notopleura* (Rubiaceae: Psychotrieae), with the description of some new species. *Ann. Missouri Bot. Gard.* 88: 478–515.
- & A. Pool. 1993. Rubiaceae. In: L. Brako & J. Zarucchi, *Catalogue of the Flowering Plants and Gymnosperms of Peru. Monogr. Syst. Bot. Missouri Bot. Gard.* 45: 1010–1053.