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Systematics of the Octopleura Clade of *Miconia* (Melastomataceae: Miconieae) in Tropical America

DIANA GAMBA[1] & FRANK ALMEDA[2]

[1, 2] *Institute for Biodiversity Science and Sustainability, Department of Botany, California Academy of Sciences, 55 Music Concourse Drive, Golden Gate Park, San Francisco, CA 94118-4503, USA; [1] dgamba333@gmail.com, [2] falmeda@calacademy.org*

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Diana Gamba & Frank Almeda
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Table of contents

Abstract

The Octopleura clade of *Miconia* is a natural group of Neotropical subshrubs and small trees comprising some thirty-three species. These had previously been described in *Ossaea* and *Clidemia*, two traditionally recognized genera of Miconieae, but this natural group is nested within the megadiverse genus *Miconia*. This study represents the first comprehensive monograph of the clade across its entire range based on a study of over 2100 collections from seven herbaria. Thirteen new combinations are made (*Miconia aguilarii*, *M. aurantiaca*, *M. biolleyana*, *M. boekei*, *M. chocoensis*, *M. evanescens*, *M. incerta*, *M. laxivenula*, *M. palenquensis*, *M. quinquenervia*, *M. radicans*, *M. reitziana*, and *M. rufibarbis*). Thirteen new names are provided for epithets preempted in *Miconia* (*M. albertobrenesii*, *M. alboglandulosa*, *M. approximata*, *M. atropurpurea*, *M. bensparrei*, *M. bractiflora*, *M. erikasplundii*, *M. magnifolia*, *M. neocoronata*, *M. quadridomius*, *M. sessilis*, *M. spiciformis*, and *M. variabilis*). Six new species are proposed (*M. alatissima*, *M. anchicayensis*, *M. formicaria*, *M. latidecurrens*, *M. renatoi*, and *M. veraguensis*). A taxonomic key, detailed descriptions, distribution maps, and phenological and ecological information are presented for all species, along with SEM images of seed morphology for selected species. A preliminary geospatial conservation assessment is made for each species. Diagnostic illustrations are included for all new taxa and other selected species. A molecular phylogenetic analysis based on four genic loci is presented, along with a reconstruction of ancestral character states. Molecular and morphological data are used to develop a better understanding of the constituent species of the clade and their evolutionary relationships. Three subclades, Approximata, Quinquenervia, and Variabilis, are evident within the Octopleura clade, and supported by morphological synapomorphies.

Key words: Approximata, Neotropics, Phylogeny, Quinquenervia, Taxonomy, Variabilis

Resumen

El clado Octopleura de *Miconia* es un grupo natural que comprende unas treinta y tres especies de subarbustos y árboles pequeños neotropicales. Las especies del clado Octopleura habían sido descritas separadamente como miembros de *Ossaea* y *Clidemia*, pero en base a análisis moleculares preliminares de la tribu Miconieae este grupo representa un linaje dentro de *Miconia*. Esta investigación representa la primera monografía exhaustiva del clado a través de todo su rango de distribución y se basa en el estudio de más de 2100 colecciones depositadas en siete herbarios. En este estudio se proponen 13 combinaciones nuevas (*Miconia aguilarii*, *M. aurantiaca*, *M. biolleyana*, *M. boekei*, *M. chocoensis*, *M. evanescens*, *M. incerta*, *M. laxivenula*, *M. palenquensis*, *M. quinquenervia*, *M. radicans*, *M. reitziana*, and *M. rufibarbis*). Se proporcionan trece nombres nuevos para combinaciones ya existentes en *Miconia* (*M. albertobrenesii*, *M.*

alboglandulosa, *M. approximata*, *M. atropurpurea*, *M. bensparrei*, *M. bractiflora*, *M. erikasplundii*, *M. magnifolia*, *M. neocoronata*, *M. quadridomius*, *M. sessilis*, *M. spiciformis*, and *M. variabilis*). Se describen además seis especies nuevas (*M. alatissima*, *M. anchicayensis*, *M. formicaria*, *M. latidecurrens*, *M. renatoi*, and *M. veraguensis*). Se presenta una clave taxonómica, así como descripciones detalladas, mapas de distribución e información fenológica y ecológica para todas las especies. Se documenta la diversidad morfológica de las semillas por medio de microscopía electrónica de barrido. Para varias especies se incluyen fotografías e ilustraciones. Adicionalmente, se incluyen análisis filogenéticos utilizando cuatro regiones génicas, y se hace una reconstruccción de caracteres morfológicos ancestrales. Usando la reconstrucción filogenética como referencia, se analizaron los datos morfológicos para determinar la circunscripción de las especies que constituyen el clado Octopleura, así como para caracterizar los subclados dentro de este grupo monofilético.

Palabras claves: Approximata, Filogenia, Neotrópico, Quinquenervia, Taxonomía, Variabilis

Introduction

Systematic studies in the Miconieae de Candolle (1828: 152) are currently the subject of a Planetary Biodiversity Inventory (PBI) project supported by the National Science Foundation (grant DEB 0818399). Generic limits within the tribe are being evaluated and redefined and monophyletic groups are being identified. One of these is the Octopleura clade, which comprises species that have been described in *Ossaea* de Candolle (1828: 168) and *Clidemia* Don (1823: 284, 306–307). This study recognizes 33 species, six of which are newly described here. More new species in this clade will probably be discovered because many remote areas where it is expected to occur are still little-explored and poorly known, such as the biogeographic Chocó in Colombia.

The Octopleura clade is distributed from southeastern Mexico (Chiapas, Oaxaca, Veracruz) to northern-central South America (Colombia, Ecuador, Perú, Venezuela, and Brazil), with one widespread species reaching Hispaniola and Jamaica in the Caribbean. Within this range, species of this clade are frequent to rare components of primary or secondary rain or cloud forests, and are often found close to streams or river banks (Almeda 2009). Like most Miconieae, they play an important ecological role as a food resource because their fleshy berries are largely consumed by birds and other animals (Goldenberg *et al.* 2008, Stiles & Rosselli 1993). There are also many pioneer species that play an important successional role in forest regeneration in areas that have been subject to anthropogenic disturbance.

Species of the Octopleura clade are typically thinly-branched shrubs or small trees that are readily recognized by their isomorphic anthers with one or two dorsally inclined apical pore(s), connective that is prolonged dorso-basally into a deflexed gland-edged appendage, and hypanthia and mature berries that are typically ribbed. These characters constitute the morphological synapomorphies for this clade (Goldenberg *et al.* 2008, Judd & Skean 1991). Indumentum and seed morphology are quite diverse in the clade, as is the case for the Melastomataceae de Jussieu (1789: 328) generally (Ocampo & Almeda 2013, Wurdack 1986).

The taxonomic rank/ designation of the Octopleura clade within Miconieae is not resolved at present, mainly because the generic relationships within the tribe are poorly understood and the genera, as currently recognized, represent artificial assemblages (Almeda 2009, Cogniaux 1891a, Gleason 1939a, Goldenberg *et al.* 2008, Judd & Skean 1991, Michelangeli *et al.* 2004, 2008). Judd & Skean (1991) stated that several groups of species usually placed elsewhere within the tribe Miconieae need to be transferred to *Miconia* Ruiz & Pavón (1794: 60), including those in the Octopleura clade. This is because they have potential synapomorphies, and their inclusion within this genus would only slightly expand its range of morphological variation. This idea is also supported by more recent phylogenetic analyses based on molecular data, showing that *Miconia* is paraphyletic (Goldenberg *et al.* 2008, Michelangeli *et al.* 2004, 2008). Several well-supported monophyletic groups, such as the Octopleura clade, nest within *Miconia*. This clade is sister to a core of many species in *Miconia* sect. *Miconia*. The latter are referred to as *Miconia* IV in Goldenberg *et al.* (2008) and Michelangeli *et al.* (2008).

In this study, all the species in the Octopleura clade are described in, or transferred to *Miconia*. The taxonomic rank of this monophyletic group within *Miconia* is not defined, but to reflect the monophyly of this nested assemblage of species, the group is informally referred to as the Octopleura clade throughout the text. Detailed morphological data is used to define the species limits within the clade. DNA sequence data is used to test the monophyly of the clade with a more extensive taxon sampling than the one used in previous phylogenetic analyses of the Miconieae (Goldenberg *et al.* 2008, Michelangeli *et al.* 2004, 2008). Morphological and DNA sequence data are used in combination to identify valuable taxonomic characters, and to characterize species groupings within the clade.

Taxonomic history

The etymology of *Octopleura* comes from the Latin word *Oct –o* (eight), and from the Greek word *pleur –a* (the side; a rib) (Borror 1988). *Octopleura* Grisebach (1860a: 55) was originally published as a genus in the tribe Miconieae, based on a single species which was thought to be endemic to Jamaica. Diagnostic characters included flowers 4- or 5-merous, eight or ten conspicuous hypanthial ribs, and an anther connective prolonged dorso-basally into a deflexed appendage.

Triana (1871) followed Grisebach's lead in recognizing *Octopleura*. He transferred five species into the genus and newly described two others. Although Triana evaluated species limits and designated some synonyms, he did not specify the diagnostic characters of *Octopleura*. It appears that Triana relegated species to *Octopleura* solely by the presence of costate hypanthia (referred to by Triana as the calyx), which are best observed at maturity. Prominently costate fruits are also present in some species of *Miconia* that are not closely related to the Octopleura clade. Some of these species also have spurred anther connectives but their overall anther morphology and indumentum differ significantly from that of the Octopleura clade. In the same publicaton Triana (1871) newly described two other species that belong to the Octopleura clade, but for unspecified reasons they were described in *Ossaea*, an artificial assemblage of species that has long included taxa with acute petals and axillary inflorescences.

Cogniaux reduced the genus to *Ossaea sect. Octopleura* (Cogniaux 1891a: 1064). This section was characterized by 4- or 5-merous flowers, and prominently 8- or 10-costate hypanthia (referred to by Cogniaux as the calyx). Cogniaux added no new species to this section. He cited an expanded set of collections for the recognized taxa, which enlarged the geographic distribution for most of the species. In this same publication Cogniaux described *Ossaea* sect. *Bractearia* (Cogniaux 1891a: 1062), which included two species of the Octopleura clade. Cogniaux characterized this section by the sessile congested flowers subtended by numerous bracts, characters that are present in few species of the Octopleura clade. These characters can be homoplasious within the tribe Miconieae and are of little to no value as morphological synapomorphies when used alone.

Cogniaux (in Smith 1895) described two other species of the Octopleura clade in *Clidemia*. Moreover, other species of the Octopleura clade described in *Clidemia* were not seen as closely related to *Ossaea* sect. *Octopleura* by their authors. These two genera have been distinguished by inflorescence position (pseudolateral vs. axillary) and petal shape (blunt vs. acute), characters with no value for defining natural groups within the tribe Miconieae (Michelangeli *et al.* 2004). For example, in Gleason's (1939a) treatment of the genus *Clidemia* in Mexico and Central America, two species of the Octopleura clade were described, but these were difficult to relate to other *Clidemia* species. Gleason did not evaluate the significance of the dorso-basal prolongation of the anther connective in these species.

Wurdack (1960, 1973a, 1978a, 1978b, 1981) described nine species of the Octopleura clade; two in *Clidemia*, and seven in *Ossaea*. Althought he kept *Clidemia* and *Ossaea* apart, he provided important comparisons among groups of closely related species. Almeda (2004) and Kriebel & Almeda (2009) transferred one species and described three others in *Clidemia*, here considered bona fide members of the Octopleura clade. These two latter publications helped to expand the framework for understanding the morphological variation within two groups of closely related species in the Octopleura clade. Judd & Skean (1991) newly combined and named one species of *Ossaea* sect. *Octopleura* into *Miconia*, in an attempt to realign the genera within Miconieae.

Recent comprehensive floristic treatments for tropical America, particularly Wurdack's *Flora of Ecuador* (1980) and Almeda's Melastomataceae treatment for *Flora Mesoamericana* (2009), placed the described species of the Octopleura clade separately in *Clidemia* and *Ossaea*. Almeda (2009) explicitly noted that generic limits within the tribe Miconieae were artificial and were followed for practical reasons and for lack of an improved alternative circumscription.

Materials and Methods

Taxonomy:—The type specimens of new species here described were deposited in national herbaria and herbaria of the country of origin, all listed in Index Herbariorum (Thiers 2012; http://sweetgum.nybg.org/ih/). Analysis of gross morphological characters of the species in the Octopleura clade was carried out by studying a total of 2133 collections from seven herbaria (CAS, COL, F, MO, NY, S, and US). The types of almost all described species and their taxonomic synonyms were also examined. Photographs of representative species in the field were also examined. All vegetative measurements were based on dried material. Floral measurements were taken from rehydrated flowers or flower buds through boiling for a short period of time in water with a small quantity of soft soap. Measurements were taken with an Electronic Digital Caliper, and smaller features were measured with a Metric Mini Scale #3 (Electron Microscopy Sciences). A Leica MZ 12/5 dissecting microscope was used to study indumentum and floral details. Descriptive terminology for trichomes was adapted from Wurdack (1986), and for floral features from Gleason (1939a). Micromorphological characters of seeds were studied by using a Zeiss/LEO 1450VP Scanning Electron Microscope (SEM). Seed samples were taken directly from selected specimens and imaged with the SEM. The samples were mounted on SEM pin stubs with double sided tape and coated with a gold-palladium alloy in a Denton Vacuum sputter coater. This alloy is designed for a highly grained coating that does not obscure any surface details on the specimen. Sputter coating was performed under Argon for 120 seconds. The resulting coat was about 200–300 angstroms thick. Descriptive terminology for seeds was adapted from Ocampo & Almeda (2013). A search of all published literature with chromosome counts, as well as ecological information, for species of the Octopleura clade was carried out.

Phenological data were taken directly from the specimen labels. The phenological state for each specimen was recorded by using abbreviations in the Guidelines for *Flora Neotropica* Monographs ("fl" for flowering, "fr" for fruiting, and "fl/fr" for material with flowers and fruits). The phenological data are presented at the end of the corresponding description for each taxon.

Georeferencing and mapping:—An analysis of the locality data included on specimen labels was performed to assign the most accurate geographic coordinates to each collection. Completion of geographic coordinates was performed by using Google Earth, Google World Maps Gazetteer, and by comparison with the databases from Instituto de Ciencias Naturales (ICN at Universidad Nacional de Colombia), the Museo Nacional de Costa Rica (CR) and Tropicos (Missouri Botanical Garden). A total of 2106 collections were georeferenced. These data were used to produce the distribution maps in ESRI ArcMap 10.1. Each distribution map shows the elevation above sea level stretched and depicted in light gray (lower) to dark gray (highest). The elevation raster layer was downloaded from the WorldClim Global Climate Data website. Each map also shows administrative boundaries at the level of country and state/ department/ province; these vector layers were downloaded individually for each country as shapefiles from the DIVA-GIS Download data by country website.

Conservation status:—The "Guidelines for Using the IUCN Red List Categories and Criteria" (IUCN Standards and Petitions Subcommittee 2013) were consulted for assessing the conservation status of each Octopleura clade species. Based on the data available (georeferenced collections), GeoCAT (Bachman *et al.* 2011; http://geocat.kew.org/) was used to calculate extent of occurrence (EOO) and area of occupancy, based on a user defined cell width of 2 km. The category of higher extinction risk was chosen as a preliminary conservation assessment for each species. However, if the species is protected in many areas, the conservation assessment was re-evaluated. The threatened category for each species is listed in the conservation status paragraph after each description.

Molecular work:—Twenty-nine taxa were sampled from the Octopleura clade. Twenty-six of these represent distinct species and three represent entities of questionable identity with affinities to three described taxa. This sampling represents close to 79% of species in the clade. Additionally, three other *Miconia* species were used as the outgroup, on the basis of previous unpublished phylogenetic analyses of the Miconieae, for a total of thirty-two taxa in the molecular data set. All laboratory work was done at the Center of Comparative Genomics (CCG) of the California Academy of Sciences (CAS). The source of DNA used was leaves dried in silica gel. Total genomic DNA was extracted from 10 mg of dried and pulverized tissue with the modified CTAB method of Doyle & Doyle (1987). DNA concentration and quality were checked by using the Nanodrop 2000C and associated software (Thermo Fisher Scientific Inc.), and by agarose gel electrophoresis.

The loci selected for this study included two nuclear ribosomal DNA (nrDNA) regions: the internal transcribed spacer of 18S–26S (ITS, including ITS1 and ITS2), and the external transcribed spacer (ETS); and two noncoding intergenic chloroplast spacers: *accD-psa1*, and *psbK-psbL*. Polymerase Chain Reaction (PCR) amplification was carried out by using the recombinant Taq system (Invitrogen). Primers for amplification via PCR included: ITS1: F-ITS5a and R-ITSnr5.8b; ITS2: F-ITS3 and R-241r; ETS: 18S-R and Mel spec; *accD-psa1*: F and R. ITS has been used to elucidate phylogenetic relationships at the tribal and generic level in the Melastomataceae (Goldenberg *et al.* 2008, Ionta *et al.* 2007, Michelangeli *et al.* 2004, 2013, Reginato *et al.* 2010) and we used the protocols described in those publications. The nrETS region was amplified using specific primers; 18S-R (5'-AGA CAA

GCA TAT GAC TAC TGG CAG G-3'), and Mel spec (5'-ACG TGT CGC GTC TAG CAG GCT-3'). PCR was performed in a total volume of 25 µL with the following reaction components: 0.6 µL template DNA (c.30 ng mL-1), 0.25 µL 5µ/µl Invitrogen Taq, 0.25 µL of each one 25 µM primer, 0.5 µL 10 mM deoxynucleoside triphosphate (dNTP), 0.75 µL 50 mM $MgCl_2$, 1.25 µL 10× Invitrogen buffer, 19.8 µL H_2O. The PCR parameters were 94 °C for 4 min, 94 °C for 30 s, 58 °C for 30 s, 40 cycles of 72 °C for 45 s, followed by 72 °C for 7 min. The *psbK-psbL* spacer was amplified using primers designed by Kim-Joong Kim (Korea University, South Korea). The *accD-psa1* spacer was amplified using primers designed by Shaw *et al.* (2007). Protocols for amplifying both plastid markers are detailed in Reginato *et al.* (2010).

Cleaning of PCR products was done by using the ExoSAP-IT Kit (USB Corporation). Cycle sequencing was carried out in both directions with the BigDye Terminator v3.1 Cycle Sequencing Kit (Applied Biosystems). After ethanol precipitation of sequencing reactions, products were read on an ABI3130xl Genetic Analyzer (Applied Biosystems, located in the CCG lab at CAS). Sequences used for molecular work were deposited in GenBank (Appendix I).

Alignment and phylogenetic analyses:—Resulting fragments were edited by using Sequencher v4.2.2. The sequences were aligned manually in Se-Al v2.0a11 (Rambaut 2002). Gaps were coded as "–" and the missing data as "?". Individual markers were analyzed by using Bayesian inference in MrBayes v3.1.2 (Ronquist & Huelsenbeck 2003) and maximum likelihood (ML; Felsenstein 1973) in RAxML v7.2.6 (Stamatakis 2006), the programs for which are available through the CCG Phylocluster computing resource at CAS. Bayesian and ML analyses were conducted by using the best-fit model of evolution provided by MrModeltest v2.3 (Nylander 2004) under the Akaike Information Criterion (AIC; Akaike 1974). The general time reversible model (GTR; Tavaré 1986) that included parameters for the proportion of invariant sites (I; Reeves 1992) and a gamma-distributed rate variation (G; Yang 1993) was selected for ITS. For ETS the model selected was GTR+G, and for *accD-psa1* and *psbK-psbL* the model selected was GTR. Bayesian analyses were run for 10 million generations. Trees were saved every 100th generation, and the burn-in value for obtaining a 50% majority-rule consensus tree was set to ignore the first 25% of trees, to only include trees after convergence was reached. Clade support was determined by Bayesian posterior probabilities (p.p) and nonparametric bootstrap (BS) from 10,000 replicates performed simultaneously with the ML search. Because the incongruence length difference test (Farris *et al.* 1995) has been shown to be problematic (Barker & Lutzoni 2002, Ocampo & Columbus 2010, 2012), combinability of the different loci was assessed by comparing the topologies and nodal support from the ML and Bayesian analyses. Results of the individual analyses revealed no well-supported topological conflicts among individual markers (i.e. support values >75% BS and 0.95 p.p.). Thus, a combined data matrix comprising all four loci was assembled, partitioned by locus, and analyzed as above. Because RAxML can only employ one model of evolution for a partitioned data set, the ML analysis of the combined data matrix was performed by using the GTR+G model. The trees obtained from all the analyses were visualized in FigTree v1.4.0.

Character evolution:—A morphological matrix of fifty-two characters was built and scored (thirty-two binary and twenty multistates; see Appendix II and III), based on the specimens used in the phylogenetic analysis. Characters and character states were adapted from the PBI Miconieae project. The history of each character was traced separately onto the combined-data Bayesian tree and the ancestral states were evaluated by using equally weighted unordered parsimony in MacClade v4.0 (Maddison & Maddison 2000). All the characters were also mapped simultaneously onto the molecular phylogeny to detect branches that have undergone greater or fewer morphological changes.

Phylogenetic Reconstruction

Results:—The aligned molecular dataset included a total of 2632 characters partitioned as follows: nrITS, 1–953; nrETS, 954–1548; *psbK-psbL*, 1549–1923; and *accD-psa1*, 1924–2632. Analyses of the combined data resulted in a significant increase in clade support compared to analyses of combined nuclear or chloroplast genic regions. No statistically significant conflicting topologies were found between the nuclear and plastid phylogenetic reconstructions. Topologies from the Bayesian and Maximum Likelihood analyses are identical, and the branch support values are comparable as well (Fig. 1). In all topologies the Octopleura clade is monophyletic with strong support (BS=100, p.p.=1). Three well-supported subclades are evident within the Octopleura clade (BS=100, p.p.=1), here designated as Approximata, Quinquenervia, and Variabilis. Quinquenervia is sister to a clade comprising the other two.

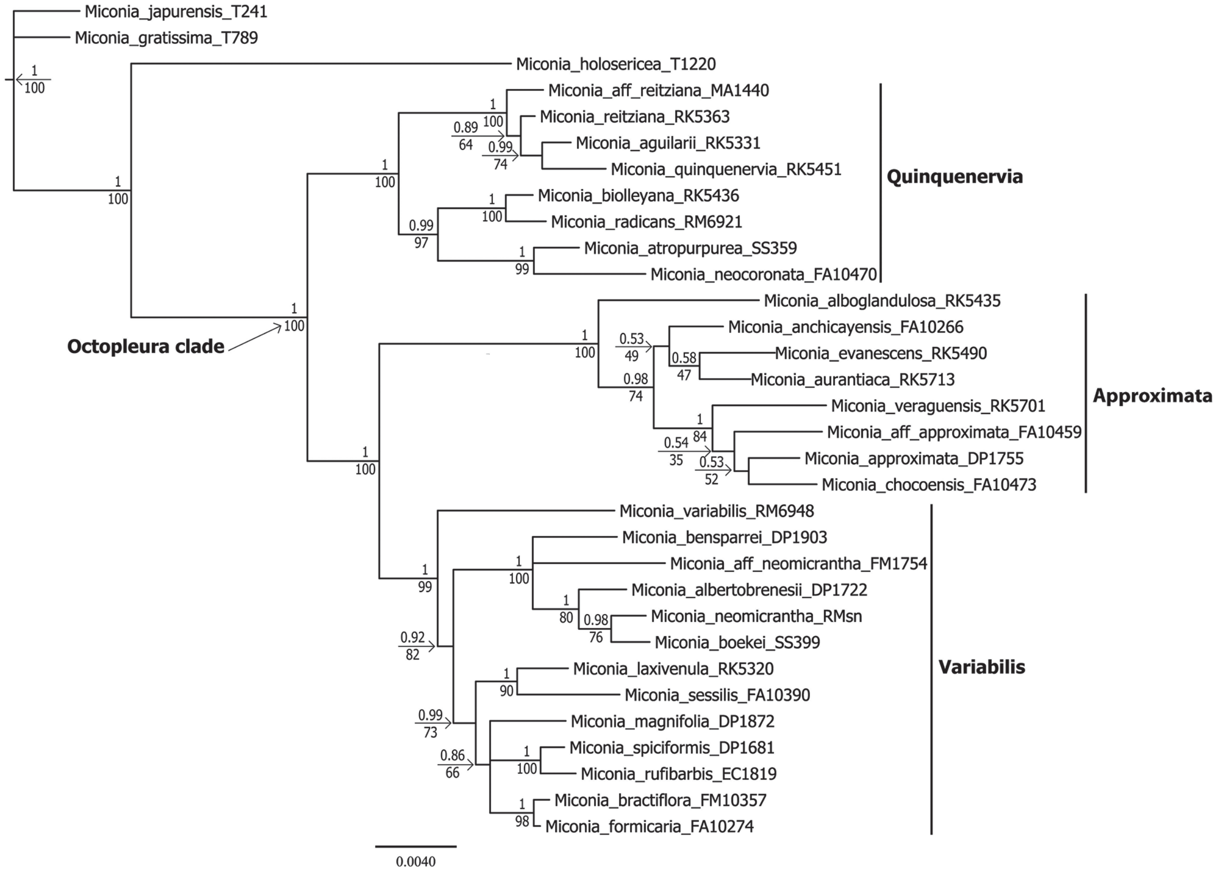

FIGURE 1. Bayesian phylogenetic tree of the Octopleura clade, resulting from a combined molecular dataset of nrITS, nrETS, *psbk-psbL*, and *accD-psa1* sequences. Numbers above branches correspond to estimated posterior probabilities. Numbers below branches correspond to estimated bootstrap support values from the Maximum Likelihood phylogenetic tree resulting from the same molecular dataset. The three black bars correspond to the three subclades within the Octopleura clade: Approximata, Quinquenervia, and Variabilis.

Based only on the number of taxa included in the phylogenetic analysis, Quinquenervia is composed of seven species: *Miconia aguilarii*, *M. atropurpurea*, *M. biolleyana*, *M. neocoronata*, *M. quinquenervia*, *M. radicans*, and *M. reitziana*. Approximata is composed of seven species: *M. alboglandulosa*, *M. anchicayensis*, *M. approximata*, *M. aurantiaca*, *M. chocoensis*, *M. evanescens*, and *M. veraguensis*. Variabilis is composed of thirteen species: *M. albertobrenesii*, *M. bensparrei*, *M. boekei*, *M. bractiflora*, *M. formicaria*, *M. laxivenula*, *M. magnifolia*, *M. neomicrantha*, *M. rufibarbis*, *M. sessilis*, *M. spiciformis*, *M. variabilis*, and a most certainly new species very similar to *M. neomicrantha* (see discussion under this species description).

Discussion:—The lack of resolution in some parts of the phylogeny might be resolved with more data, but it could also be related to the intricate, rapid and comparatively recent evolution of the Miconieae (Goldenberg *et al.* 2008, Michelangeli *et al.* 2008) and its dispersal across a topographically complex landscape (Andes, Isthmus of Panama and other Central American mountain ranges; see Distribution and Habitats section). These biogeographic hypotheses remain to be tested.

Species that were not available for DNA sequencing were assigned to one of the internal clades based on their morphology (see section below); however this was not possible for two species (*M. alatissima* and *M. incerta*) for which character variation precluded their confident placement within the Octopleura clade (see discussion under these species descriptions). Those entities of questionable identity are discussed in detail under the descriptions of their presumed relatives.

Character Evolution

Results:—Reconstruction of ancestral character states is represented by taking into account only those characters that change unambiguously on each branch (Fig. 2). Characters that are "unique, uniform above" are those that can be used to characterize the Octopleura clade and the three subclades within it (see Table 1).

TABLE 1. Summary of the three subclades (Approximata, Quinquinervia, and Variabilis) within the Octopleura clade.

	Approximata	Quinquenervia	Variabilis
Synapomorphies Based on Character Evolution Reconstruction	1. Calyxlobesconspicuouslyreflexed. 2. Pyramidal seed shape. 3. Rugulate microrelief on the seed testa.	1. Strong to moderate foliar anisophylly at each node. 2. Papillose petals. 3. Seeds with a raphal zone that is expanded ventrally and longitudinally into a skirt-like structure.	1. Mostly isophyllous leaves at each node.
Species	*M. alboglandulosa* *M. anchicayensis* *M. approximata* *M. aurantiaca* *M. chocoensis* *M. evanescens* *M. quadridomius* *M. renatoi* *M. veraguensis*	*M. aguilarii* *M. atropurpurea* *M. biolleyana* *M. erikasplundii* *M. neocoronata* *M. quinquenervia* *M. radicans* *M. reitziana*	*M. albertobrenesii* *M. bensparrei* *M. boekei* *M. bractiflora* *M. formicaria* *M. latidecurrens* *M. laxivenula* *M. magnifolia* *M. neomicrantha* *M. palenquensis* *M. rufibarbis* *M. sessilis* *M. spiciformis* *M. variabilis*

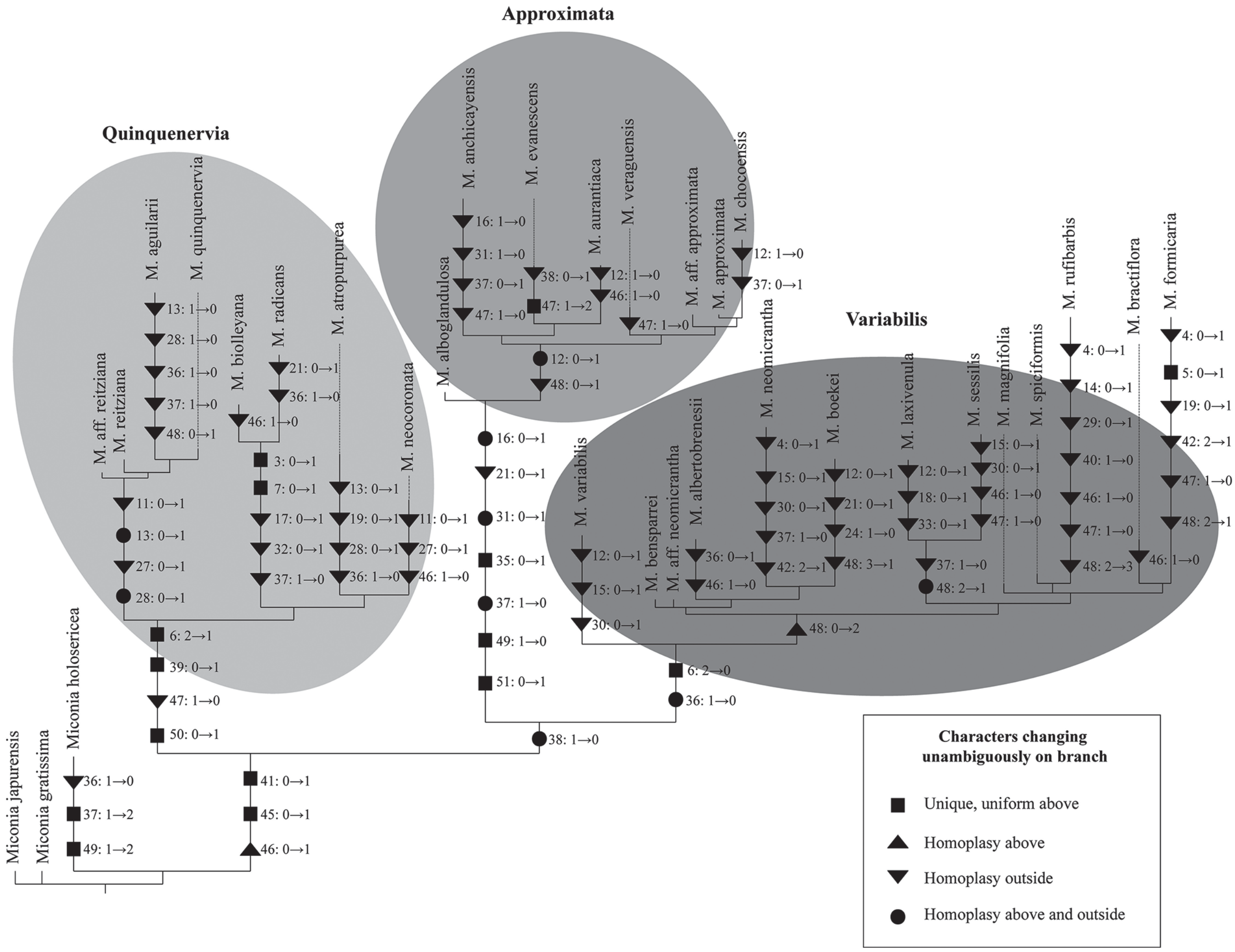

FIGURE 2. Parsimony reconstruction of ancestral character states based on the Bayesian phylogenetic tree. The gray circles correspond to the three subclades within the Octopleura clade: Approximata, Quinquenervia, and Variabilis.

Isomorphic stamens with a deflexed dorso-basal glandular connective appendage (characters 41, state 1, and 45, state 1, in Appendix II) are confirmed to be the two main synapomorphies of the Octopleura clade, and the ancestral states of these characters are dimorphic stamens with appendages not present or not as above.

The Quinquenervia subclade is characterized by strong to moderate foliar anisophylly at each node (character 6, state 1; ancestral state: 2, some pairs anisophyllous, others isophyllous), papillose petals (character 39, state 1; ancestral state: 0, smooth petals), seeds with a raphal zone that is expanded ventrally and longitudinally into a skirt-like structure (character 50, state 1; ancestral state: 0, absence of such structure). Another character that supports this clade is a punctuate microrelief of the seed testa, but the ancestral state was ambiguous in this analysis. Based on these morphological characters *M. erikasplundii* also belongs to Quinquenervia, for a total of eight species in this subclade.

The Approximata subclade is characterized by calyx lobes that are conspicuously reflexed (character 35, state 1; ancestral state: 0, erect or variously spreading but not reflexed), pyramidal seed shape (character 49, state 0; ancestral state: 1, ovoid-angled) and a rugulate microrelief on the seed testa (character 51, state 1; ancestral state: 0, smooth). In this subclade the seeds are usually >0.5 mm long, and the presence of white or resinous furrowed sessile glands on various organs is also common. Another character that supports this subclade is inflorescences that are completely sessile and unbranched or with the branching poorly developed. However, the ancestral state of the inflorescence architecture for this group is ambiguous, probably because its component species have either fasciculate glomerules, or fascicle-like groups of cymes. Other species with the above character syndrome and probably belonging to Approximata are *M. quadridomius* and *M. renatoi*, for a total of nine species in this subclade.

The Variabilis subclade includes most of the species that were recognized as *Ossaea* sect. *Octopleura*, plus a few that were placed in *Ossaea* sect. *Bractearia.* This subclade displays more morphological variation than the other two. In general it is characterized by mostly isophyllous leaves at each node (character 6, state 0; ancestral state: 2, some pairs isophyllous, others anisophyllous). Other characters that support this clade, but for which ancestral reconstruction was ambiguous, are triangular-acute petals that can be glabrous to variously pubescent, and seeds with a testa that appears smooth to the unaided eye, but with a microrelief that is striate to verrucose, and <0.5 mm long. Other species in Variabilis based on morphology are *M. latidecurrens* and *M. palenquensis*, for a total of fifteen species in this subclade.

Discussion:—Using the molecular phylogeny as a reference, the morphological differences and similarities between closely related species, as well as their intraspecific variation, are discussed in detail in the taxonomic section under the description of each species.

The Approximata subclade has the longest branch within the Octopleura clade, which suggests that it is the clade that has gone through more change. This is consistent with morphological data, because this group is very distinct from the rest of the species in the Octopleura clade. From the character evolution analysis performed here, this subclade presents the largest number of morphological changes as well (Fig. 2).

To the Variabilis subclade belongs *Miconia neomicrantha* (= *Octopleura micrantha* (Sw.) Griseb.), the type species of *Octopleura*. It is the most widespread species within the Octopleura clade. The position of *M. neomicrantha* is derived within Variabilis, which suggests that its widespread distribution is relatively recent as compared to the origin of the clade.

Comparative Morphology

The Octopleura clade is recognized by the combination of diplostemonous isomorphic stamens that open through one or two dorsally inclined apical pores, anther connectives prolonged into a deflexed dorso-basal gland-edged appendage, hypanthia with eight or ten conspicuous blunt vascular ribs, and petals that are prevailingly reflexed at anthesis.

Habit and branching:—Species of the Octopleura clade are perennial suffrutescent herbs, long-lived subshrubs, shrubs or small trees that are mostly erect but also can be sprawling or reclining to ascending with diffuse branching. The majority of species are subshrubs to small trees, but a few can flower when less than 0.5 m tall. These suffrutescent herbs can continue to grow into lax and sprawling subshrubs or shrubs.

Three habital groupings can be recognized in the Octopleura clade. The first includes species that can flower when less than 0.5 to 1 m tall and grow into much-branched subshrubs to 4 m tall. The species exhibiting this habit are *M. incerta* and those in the Quinquenervia subclade. The branching is loose, somewhat divaricate, and at times seemingly sprawling or trailing. Within this group, *M. aguilarii* and *M. quinquenervia* can form thickets in the forest understory commonly close to streams. *Miconia biolleyana*, *M. erikasplundii* and *M. radicans* are frequently saxicolous. In the second group, the Approximata subclade, species can grow into 6 m tall erect small trees and rarely flower when they are less than one meter tall. They possess a much thicker main stem than that of the species in the first group, with a monopodial pattern of growth reflected in the consistent axillary inflorescences of these species. These plants are typically much more branched distally. The last group, the Variabilis subclade and *M. alatissima*, are subshrubs to small trees between 1.5 and 12 m tall, with a rather diffuse pattern of divaricate to somewhat ascending branching. The habit of these plants is more similar to that of the species in the Quinquenervia subclade, but they never flower when less than one meter tall. These species can exhibit a sympodial or a monopodial pattern of growth. Those that present the monopodial type are usually single-stemmed with ascending branching (like *M. rufibarbis* and *M. spiciformis*). The remaining species may have a divaricate loosely branched and reclining growth.

In general, all species in the Octopleura clade have young internodes that are terete to somewhat compressed dorso-ventrally or slightly quadrate, variously pubescent, with the bark not exfoliating. The upper internodes are usually smooth, except for *M. latidecurrens* in which they are carinate, and in *M. alatissima* they are conspicuously winged. The nodes are somewhat swollen, but not conspicuously so, and they may have an interpetiolar line or small ridge as in *M. sessilis* and *M. albertobrenesii*, or a conspicuous flap-like outgrowth, a derived condition found in the closely related group of species that includes *M. bractiflora*, *M. magnifolia*, *M. rufibarbis* and *M. spiciformis*.

Leaves:—Phyllotaxy in the Octopleura clade is opposite and decussate. The opposing leaves at a node vary from essentially isophyllous in size to anisophyllous in size and shape. Extreme anisophylly (a derived state) is found in *Miconia biolleyana*, *M. erikasplundii*, and *M. radicans*, where the largest leaf of each pair is four to six times larger than the smaller one, and the lamina bases of each pair differ in shape. In *M. radicans* the shape of the leaf differs between members of a pair at each node. The rest of species in the Quinquenervia subclade also exhibit marked anisophylly, but only in size and not as pronounced as in the three species mentioned above. *Miconia evanescens* is the only species with what superficially appears as a pseudoalternate type of leaf arrangement; the smallest leaf of a pair is early deciduous leaving a single leaf at each node. The rest of the species in the Approximata subclade have anisophyllous leaves at a pair as well, but their sizes are not as markedly different as in the latter group (leaf sizes maximum 1:2 at a pair), and the anisophylly is not consistent in every leaf pair (the ancestral state), being more frequent in the older leaf pairs of lateral branches. Species in the Variabilis subclade, along with *M. alatissima* and *M. incerta*, have isophyllous leaves at a node; differences in leaf sizes are sometimes evident only on very young leaves, but not consistently so.

According to Muehlbert *et al.* (2010) only species that exhibit anisophylly consistently throughout the plant can be considered as having complete anisophylly (Quinquenervia subclade). Incomplete anisophylly occurs when it is restricted to lateral branches (Approximata subclade) and found only in vertically positioned leaf pairs. Plants in the understory of tropical rain forests commonly have limited sunlight of a heterogeneous quality. In order to improve light capture for photosynthesis it has been hypothesized that many forest floor plants have adjusted their phyllotaxy (Muehlbert *et al.* 2010). Studies have shown that opposite, decussate phyllotaxy seems to be less advantageous, since it enhances self-shading due to leaf overlap (Gálvez & Pearcy 2003). The different degrees of anisophylly as well as the pseudoalternate arrangement found in the Octopleura clade might reduce this self-shading effect. If these features are proven to optimize light capture and improve carbon assimilation through photosynthesis, anisophylly can be regarded as an adaptation for decreasing self-shading and to a more efficient biomass allocation when the plants are subject to some degree of shading (Ali & Kikuzawa 2005, Muehlbert *et al.* 2010). Mechanisms inducing incomplete lateral anisophylly may be related to auxin negative phototropism. Larger concentrations of auxins in shaded regions may cause cell expansion, which in turn can promote asymmetrical cell growth, as well as the production of ethylene, that obstructs the transversal transport of the auxins to the light poor side (Muehlbert *et al.* 2010).

The leaves of most species in the Octopleura clade have a well-differentiated blade and petiole, but some exceptions are found in *Miconia bensparrei*, *M. incerta*, and *M. palenquensis* all of which have sessile, cordate and amplexicaul leaves. Other species with sessile leaves are *M. latidecurrens* and *M. sessilis*, where the foliar base is long, widely decurrent on the petiole, and reaching the leaf node. *Miconia aguilarii*, *M. laxivenula*, and *M. quinquenervia* also have decurrent leaf bases on the petiole; part of the petiole is free hence the lamina is not completely sessile. Sessile amplexicaul leaves or decurrent leaf bases are important taxonomic characters, especially when used with other characters (ciliate margins, foliar reticulation, flower merosity, and color of mature berries). In all other species petioles are terete and canaliculate adaxially, varying from thin to somewhat thick with the thicker petioles being more common in species that have ascending leaf posture (like in *M. magnifolia* and *M. spiciformis*).

Cauline leaves are membranaceous to chartaceous in texture. Foliar morphology is variable; leaf size, shape (including base and apex), dentition, presence of marginal cilia, and indumentum, along with petiole length, provide important diagnostic characters for distinguishing species or species-groups within the Octopleura clade. They range in shape from linear-oblong to elliptic, ovate, obovate (mostly in the Approximata subclade), and suborbicular to falcate; the apex varies from bluntly acute, short- to long-acuminate, apiculate, and aristate; the base varies from acute to rounded, or attenuate, decurrent to cordate. Ciliate margins are found in the close relatives *Miconia aguilarii*, *M. atropurpurea*, *M. neocoronata*, *M. quinquenervia*, and *M. reitziana*. All other species have leaf margins that are entire or obscurely to conspicuously crenate.

As in most Melastomataceae, in the Octopleura clade the principal leaves have a primary vein (midvein) with two or more pairs of secondaries that arise at a common point at or near the base of the blade and run in convergent arches toward the apex. This condition is referred to as acrodromous, and is described as three or more primary veins that originate from a point and run in convergent arches toward the leaf apex (Ellis *et al.* 2009). Two types of acrodromous patterns can be distinguished, and both are found in Octopleura: basal acrodromous, when the primary veins radiate from the blade base, and suprabasal acrodromous, when the primary veins radiate from a point distal to the petiolar/laminar junction. We followed the terminology that has been traditionally used in other Melastomataceae treatments (Almeda & Robinson 2011), in which the basal condition is referred to as nerved, and the suprabasal condition as plinerved. In the nerved condition the innermost pair of secondary veins diverges from the primary vein at the leaf base (petiolar insertion), while in the plinerved condition the innermost pair of secondary veins diverges from the primary vein above the leaf base. These two conditions appear to be homoplasious within the Octopleura clade but they are sometimes useful characters to distinguish morphologically similar species (like *Miconia chocoensis* and *M. quadridomius*). In the species descriptions the number before nerved or plinerved corresponds to the pairs of secondary veins present plus the primary vein (midvein), which is why this number is always odd. In the Octopleura clade there are typically two to four pairs of secondary veins, and the number is consistent within each species. The marginal pair of veins is very faint, sometimes difficult to see without a stereomicroscope. The tertiary veins, the ones that interconnect the secondaries, are always present as well as one or two more orders of veins, referred to as intertertiary. The tertiary and intertertiary veins are glabrous or usually covered with various types of glands. This indumentum or lack of it is mostly consistent within each species. A diagnostic feature is the density of areoles which are best observed on the abaxial surface. This character was emphasized by Wurdack (1980) and described as laxly alveolate vs. densely alveolate.

Some species have abaxial foliar surfaces that are frequently flushed purple-red (*M. atropurpurea* and *M. latidecurrens*) or occasionally so (*M. laxivenula*). The presence of anthocyanin coloration is not uncommon among tropical plants that live in the dark forest understory, but its function remains unclear. A recent study of this concluded that anthocyanin pigmentation of abaxial foliar surfaces in understory plants represents a “best of both worlds” strategy, whereby the photoprotective benefits of anthocaynins are utilized in high-intensity sun patches, without significantly interfering with light absorption and carbon gain during low-light conditions (Hughes *et al.* 2008). This generality remains to be tested.

Indumentum:—The Melastomataceae are believed to have greater trichome diversity than any other family of flowering plants (Mentink & Baas 1992, Wurdack 1986). Variation in length, shape, location, quantity and posture of trichomes among the different species of the Octopleura clade provide useful taxonomic characters. Trichome density and to some extent trichome length is variable in several species, but the kind and distribution of trichomes tend to be consistent and diagnostic. There are two exceptions represented by *Miconia laxivenula* and *M. neomicrantha*. In both species two kinds of trichomes have been noted in different populations. The majority of species are densely pubescent with more than one type of trichome. These are frequently intermixed on the same organs (internodes, inflorescence axes and hypanthia). In *M. approximata* there are a few populations that differ from the norm in lacking one kind of trichome throughout with the vestiture consisting of only one type of trichome. In other species the indumentum consists of one kind of trichome (mostly elongate or dendritic, like that of *M. spiciformis* and *M. variabilis* respectively). Some species superficially appear glabrous (like *M. latidecurrens* and *M. laxivenula*), but they actually have sparse hyaline trichomes that are appressed and inconspicuous.

TABLE 2. Summary of trichome diversity in the Octopleura clade.

This study (following Wurdack 1986)			**Mentinck & Baas (1992)**		**Spp. (plant part)** abbreviations: **CAU** (cauline - petiole), **UL** (upper leaf surface), **LL** (lower leaf surface), **LM** (leaf margin), **INFL** (inflorescence rachis), **HYP** (hypanthium - pedicel), **TOR** (torus), **PET** (petals), **STAM** (staminal connective appendage), **OVA** (ovary apex).
Indumentum Type (appearance)	**Trichome type**	**Wurdack #: figs.**	**#. Hair type**	**figs.**	
Glandular (white or brown) or **Resinous** (hyaline or translucent yellow-brown) or **Glandular-puberulent**	1. Short-stalked glands with thin-walled elongate heads.	2: 27–32.	3. Short-stalked glandular hairs.	3 a–f, photo 2	*M. alatissima* (LL), *M. anchicayensis* (LL, TOR), *M. approximata* (LL), some populations of *M. laxivenula* (LL, OVA).
	2. Short-stalked glands with thin-walled short heads.	3: 33–40.	3. Short-stalked glandular hairs.	3 a–f, photo 2	*M. aguilarii* (STAM), *M. albertobrenesii* (STAM, OVA), *M. alboglandulosa* (STAM), *M. anchicayensis* (LL, TOR, STAM), *M. approximata* (LL, STAM), *M. aurantiaca* (STAM), *M. bractiflora* (STAM, OVA), *M. boekei* (LL, STAM, OVA), *M. chocoensis* (STAM), *M. evanescens* (LL, STAM), *M. formicaria* (STAM), *M. incerta* (OVA), *M. latidecurrens* (STAM), *M. laxivenula* (STAM), *M. magnifolia* (TOR, STAM, OVA), *M. neomicrantha* (STAM, OVA), *M. quadridomius* (TOR, STAM), *M. quinquenervia* (STAM), *M. renatoi* (LL, STAM), *M. rufibarbis* (STAM, OVA), *M. sessilis* (STAM), *M. spiciformis* (STAM, OVA), *M. variabilis* (LL, STAM), *M. veraguensis* (LL, OVA).
	3. Sessile glands with thin-walled heads.	4: 41–44.	3. Sessile glandular hairs.	3 a–f, but without stalk	*M. alatissima* (TOR, STAM), *M. atropurpurea* (STAM), *M. approximata* (LL), *M. biolleyana* (STAM), *M. erikasplundii* (STAM), *M. evanescens* (LL), *M. incerta* (STAM), *M. latidecurrens* (OVA), *M. neocoronata* (STAM), *M. neomicrantha* (TOR), *M. quadridomius* (LL), *M. quinquenervia* (STAM), *M. radicans* (STAM), *M. reitziana* (STAM), *M. renatoi* (TOR, OVA), *M. sessilis* (OVA), *M. variabilis* (TOR, OVA).
	4. Furrowed sessile or subsessile glands.	not included	not included	n/a	*M. alatissima* (CAU, LL, INFL, HYP), *M. alboglandulosa* (LL, HYP), *M. approximata* (LL), *M. aurantiaca* (LL), *M. chocoensis* (LL), *M. veraguensis* (LL).
	5. Slightly furrowed more or less stalked glands.	6: 49–56.	not included	n/a	*M. aguilarii* (LL, HYP), *M. bensparrei* (TOR, STAM, OVA), *M. erikasplundii* (HYP), *M. incerta* (LL, HYP), *M. neocoronata* (LL, HYP), *M. palenquensis* (TOR, STAM, OVA), *M. quinquenervia* (LL, HYP), *M. reitziana* (LL, HYP), *M. renatoi* (HYP).
Setose or **Strigose** or **Tomentose**	6. Elongate smooth trichomes.	11: 73–84.	6. Multiseriate unbranched non-glandular hairs— smooth.	6a	*M. aguilarii* (CAU, LM), *M. atropurpurea* (CAU, UL, LL, LM, INFL, HYP), *M. bractiflora* (TOR), *M. formicaria* (UL), *M. magnifolia* (CAU, LL, INFL, HYP, PET), *M. neocoronata* (CAU, LM, TOR), *M. quinquenervia* (CAU, LL, LM, INFL, HYP), *M. reitziana* (CAU, UL, LL, LM, INFL, HYP, TOR), *M. spiciformis* (CAU, LL, INFL, HYP).
Lanate or **Tomentose** or **Claviform-thickened**	7. Elongate slightly roughened trichomes.	16: 105–112.	6. Multiseriate unbranched non-glandular hairs— with cellular protrusions.	6b	*M. anchicayensis* (CAU, UL, LL, HYP), *M. approximata* (CAU, LL, HYP), *M. chocoensis* (CAU, UL, LL, HYP), *M. renatoi* (CAU, LL), *M. veraguensis* (CAU, UL, LL, HYP).
	8. Elongate moderately roughened trichomes.	17: 113–120.	6. Multiseriate unbranched non-glandular hairs— with cellular protrusions.	6b	*M. albertobrenesii* (CAU, LL, INFL, HYP), *M. boekei* (CAU, LL, INFL, HYP), *M. quadridomius* (CAU, UL, LL, HYP).
Hispid	9. Elongate trichomes with greatly roughened (substellate) base.	21: 133–136.	6. Multiseriate unbranched non-glandular hairs— with basal cellular protrusions.	6e	*M. quadridomius* (CAU, LL), *M. rufibarbis* (CAU, LL, INFL, HYP, TOR).
Arachnoid	10. Sessile-stellate trichomes.	23: 141–144.	12. Stellate non-glandular.	12, but sessile	*M. biolleyana* (CAU, LL, INFL, HYP), *M. erikasplundii* (LL, INF), *M. radicans* (CAU, LL, INFL, HYP).
Asperous or **Puberulent**	11. Dendritic trichomes with short axis and few–moderate number of terete arms.	25: 149–156.	not included		*M. aguilarii* (CAU, UL, LL, INFL, HYP), *M. atropurpurea* (CAU, UL, LL, INFL, HYP), *M. bensparrei* (CAU, UL, LL, INFL, HYP), *M. erikasplundii* (CAU, INFL), *M. incerta* (CAU, UL, LL, INFL, HYP), *M. neocoronata* (CAU, UL, LL, INFL, HYP), some populations of *M. neomicrantha* (CAU, LL, INFL, HYP, PET), *M. palenquensis* (CAU, UL, LL, INFL, HYP), *M. quinquenervia* (CAU, UL, LL, INFL, HYP), *M. reitziana* (CAU, UL, LL, INFL, HYP), *M. sessilis* (CAU, UL, LL, INFL, HYP, PET), *M. variabilis* (CAU, UL, LL, INFL, HYP, PET).
Fufuraceous (pulverulent, granulose)	12. Dendritic trichomes with short thin-walled arms.	30: 177–180	10. Complex multiseriate branched non-glandular hairs.	10, but the axis short	*M. alboglandulosa* (CAU, UL, LL, HYP), *M. approximata* (CAU, UL, LL, HYP), *M. aurantiaca* (CAU, UL, LL, INFL, HYP), *M. bractiflora* (CAU, LL, INFL), *M. chocoensis* (CAU, UL, LL, HYP), *M. evanescens* (CAU, UL, LL, HYP), *M. quadridomius* (CAU, UL, LL, HYP), *M. rufibarbis* (CAU, UL, LL, INFL, HYP), *M. spiciformis* (CAU, LL, INFL, HYP, PET).
	13. Dendritic trichomes with moderately long thin-walled arms.	31: 181–190.	10. Complex multiseriate branched non-glandular hairs.	10, but the axis short	*M. alboglandulosa* (CAU, UL, LL, HYP), *M. approximata* (CAU, UL, LL, HYP), *M. aurantiaca* (CAU, UL, LL, INFL, HYP), *M. bractiflora* (HYP, PET), *M. chocoensis* (CAU, UL, LL, HYP), *M. evanescens* (CAU, UL, LL, HYP), *M. formicaria* (CAU, LL, INFL, HYP, PET), *M. quadridomius* (CAU, UL, LL, HYP), *M. renatoi* (CAU, LL, INFL, HYP), *M. spiciformis* (PET), *M. veraguensis* (CAU, UL, LL, HYP).
Squamate (amorphous or stellate)	14. Lepidote trichomes with only partially fused radii.	38: 213–216.	not included		*M. boekei* (PET), *M. latidecurrens* (CAU, LL, INFL, HYP), *M. laxivenula* (CAU, LL, INFL, HYP), *M. magnifolia* (LL), *M. neomicrantha* (CAU, LL, INFL, HYP, PET).
Mealy-furfuraceous or **squamate**	15. Single-tiered lepidote trichomes, the radii nearly completely fused.	40: 221–224.	2. Non-glandular peltate scale.	2a	*M. albertobrenesii* (CAU, LL, INFL, HYP, PET), *M. boekei* (CAU, UL, LL, INFL, HYP).
Papillose	16. Papillae.	not included	not included		*M. aguilarii* (PET), *M. alatissima* (PET), *M. albertobrenesii* (PET only adaxially), *M. alboglandulosa* (LL), *M. approximata* (LL), *M. atropurpurea* (PET), *M. aurantiaca* (LL), *M. biolleyana* (PET), *M. chocoensis* (LL), *M. erikasplundii* (PET), *M. evanescens* (LL), *M. latidecurrens* (LL), *M. neocoronata* (PET), *M. quinquenervia* (PET), *M. reitziana* (PET), *M. rufibarbis* (PET), *M. veraguensis* (LL).

A large diversity of trichomes types are found among species of the Octopleura clade. Wurdack (1986) recognized forty-six different types for Neotropical representatives of the family; of these fourteen occur in the Octopleura clade, along with two other types that were not included in Wurdack's account. In the summary of trichome types found in the Octopleura clade (Table 2), there is a column for indumentum type, which is a way of describing the indumentum appearance without emphasizing micromorphological details of individual trichomes. Although this terminology is less precise and was not used in the species descriptions, it is useful for relating older descriptions of taxa in the Octopleura clade where other authors have used these terms (Almeda 2004, 2009, Gleason 1939a, Wurdack 1980).

The sixteenth type of trichome in the summary: papillae, is included here because a papillose surface has a powder-like appearance and another kind of vestiture. In the Octopleura clade papillae are present on the petals of *M. aguilarii* and allies, or on the abaxial leaf surface of species closely related to *M. aurantiaca*. They consist of short, rounded nipple-like bumps or projections that come from the surface of a single epidermal cell and usually from only a portion of that cell. The rest of the trichome types recognized in this study can be grouped into the following ten categories:

1. Sessile or short-stalked glands with thin-walled heads (Wurdack 1986: figs. 27–44) are glistening hyaline or resinous minute trichomes with globose flattened heads. The sorting of small trichomes with thin-walled glands into two categories based on head shape is perhaps artificial (Wurdack 1986). They can be scattered on the abaxial foliar surfaces, but they are more commonly produced on the torus abaxially, anther connective appendage and ovary apex of the majority of the species.

2. Furrowed sessile or subsessile glands can be white or resinous and are deeply canaliculate (see Fig. 19); *M. aurantiaca* has only white furrowed glands, while *M. alboglandulosa* and *M. renatoi* have both white and resinous ones. These glands are produced in various quantities but they are common on the venules of the abaxial foliar surfaces, and also on the hypanthia of *M. alboglandulosa* and *M. renatoi*. They are mostly present in the Approximata subclade. In *Miconia alatissima* this type of gland is produced throughout the plant; they are mostly white, but some resinous glands are present as well.

3. Slightly furrowed more or less stalked glands (Wurdack 1986: figs. 49–56) are glistening resinous with a minute stalk attached to one end of the head. They are moderate in quantity, and mostly produced on the abaxial foliar venules and hypanthia (as in *M. aguilarii*, *M. neocoronata*, *M. quinquenervia* and *M. reitziana*), but can also be present on the torus abaxially, anther connective appendage and ovary apex (as in the sister species *M. bensparrei* and *M. palenquensis*).

4. Elongate smooth trichomes (Wurdack 1986: figs. 73–84; Fig. 3 A–C) are variable in size, color, texture and abundance. These trichomes are the most widespread in all Neotropical melastomes (Wurdack 1986). In the Octopleura clade they are subulate but the base is not swollen, differentiating them from Wurdack's "conic" type. They are produced on internodes, petioles and hypanthia. Two main kinds are found within the Octopleura clade. The first is a smooth trichome found in the Quinquenervia subclade, where it is somewhat rigid and spreading giving the plants a setose to strigose appearance, and can be pink, red or brown in color; these trichomes are never found alone on any organ (Fig. 3 B). The second kind is somewhat deflexed and tangled with a tomentose appearance, white or brownish in color, and is present in *M. magnifolia* and *M. spiciformis* (Fig. 3 A, C).

5. Elongate roughened trichomes (Wurdack 1986: figs. 105–120, 133–136; Fig. 3 D–K) are variable in size (0.5–3 mm long) and to some extent in density, commonly deflexed and somewhat flattened giving them a lanate appearance. These trichomes are mainly produced on internodes and hypanthia. They can be white or rusty in color, and are present in some species of the Approximata subclade. Other species where this type of trichome is present include *M. albertobrenesii*, *M. boekei*, *M. formicaria* and where they are thicker and clavate apically. In *M. rufibarbis* these trichomes are roughened only at the base (Fig. 3 K).

6. Dendritic trichomes with short axis and few–moderate number of terete arms (Wurdack 1986: figs. 149–156; Fig. 3 M–O) are mostly inconspicuously stipitate with a stalk that consists of a thin filament and a head that is rounded and asperous and varying from 0.05–0.2 mm in diameter. They can be rusty or translucent yellowish in color, and are produced on internodes, petioles, inflorescence axes and hypanthia where they may be intermixed with elongate smooth trichomes. Their presence in the Octopleura clade seems to be homoplastic. They are found in the Quinquenervia subclade, as well as in *M. bensparrei*, *M. incerta*, *M. palenquensis*, *M. sessilis*, *M. variabilis*, and in some populations of *M. neomicrantha.* In the latter three species they are also produced on the petals abaxially. They have been referred to as "pinoid" or "stellate" in other published species descriptions within the Octopleura clade.

7. Dendritic trichomes with short or long thin-walled arms (Wurdack 1986: figs. 177–190; Fig. 3 P–T) are variable in size, 0.05–0.15 mm long, and white-translucent or brownish in color; they are mostly found in the Approximata subclade where they densely cover internodes, petioles and hypanthia. On the same organs, these trichomes are also dense to moderate and usually intermixed with another type of trichome in *M. bractiflora*, *M. rufibarbis* and *M. spiciformis*. This trichome type perhaps occurs in more species of Melastomataceae (including seven sections of *Miconia*) than any other category of roughened trichomes (Wurdack 1986).

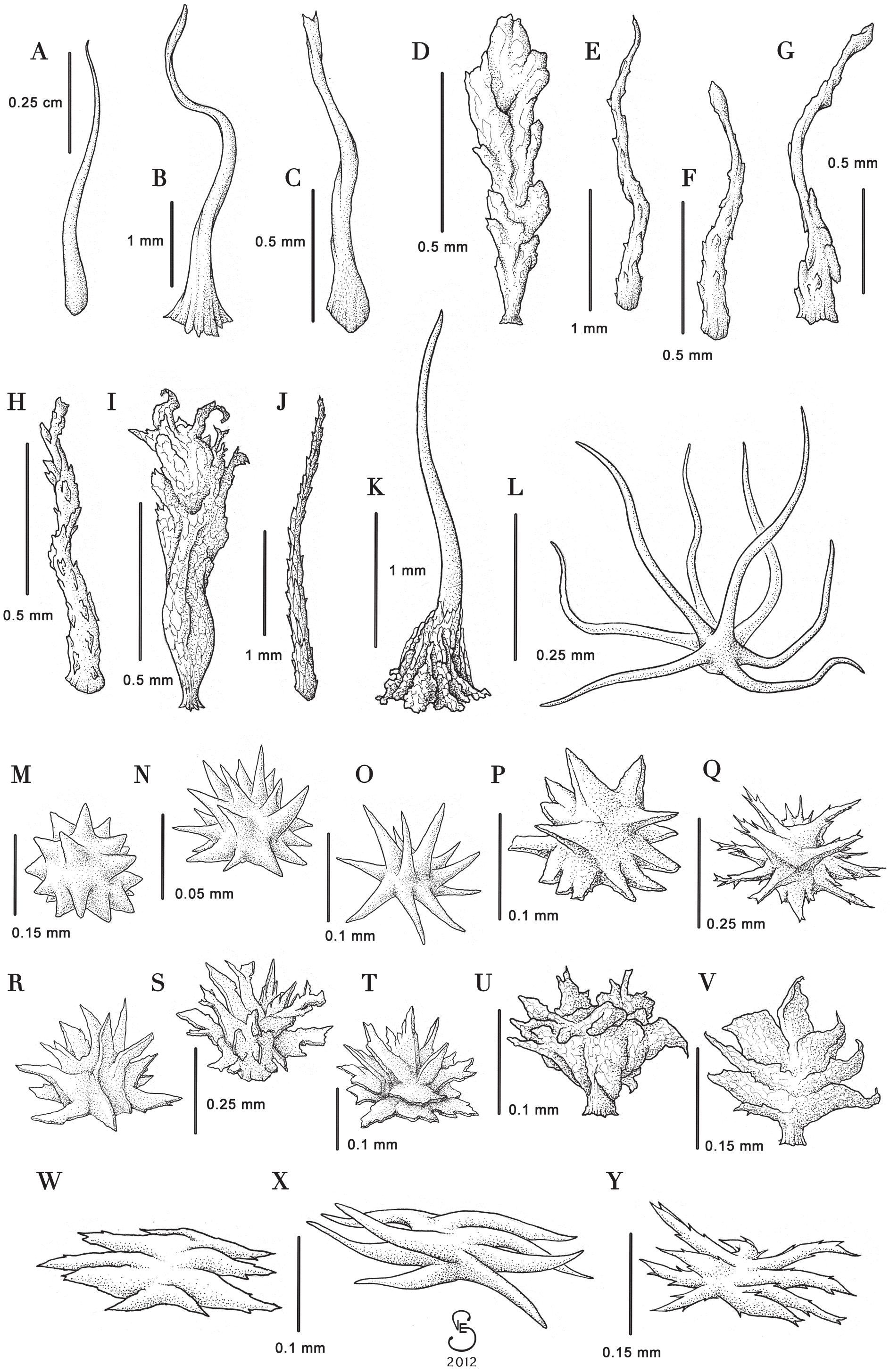

FIGURE 3. Eglandular trichomes types in the Octopleura clade. A–C. Elongate smooth trichomes. D–K. Elongate roughened trichomes. L. Sessile stellate trichome. M–O. Dendritic trichomes with short axes and few-moderate number of terete arms. P–T. Dendritic trichomes with short to moderately long thin-walled arms. U–V. Single-tiered lepidote trichomes, the radii nearly completely fused. W–Y. Lepidote trichomes with only partially fused radii. A, X. *Miconia magnifolia* (based on *Zamora 1251*, CAS). B, M. *M. reitziana* (*Hammel 8880*, CAS). C, Q. *M. spiciformis* (*McPherson 10713*, CAS). D. *M. approximata* (*Aguilar 1718*, CAS). E. *M. chocoensis* (*Killip & García 33520*, US). F, T. *M. renatoi* (*Jaramillo 8274*, *Restrepo 455*; MO). G, R. *M. veraguensis* (*Almeda et al. 7620*, *6840*; CAS). H, U. *M. albertobrenesii* (*Almeda et al. 5936*, CAS). I, V. *M. boekei* (*Dodson 7390*, MO). J. *M. quadridomius* (*Gentry 35354*, CAS). K. *M. rufibarbis* (*Neill et al. 13918*, CAS). L. *M. radicans* (*Zamora 1766*, CAS). N. *M. variabilis* (*Hammel & Trainer 13232*, CAS). O. *M. bensparrei* (*Penneys & Fernández 1903*, CAS). P. *M. evanescens* (*Croat 68793*, CAS). S. *M. formicaria* (*Almeda et al. 10274*, CAS). W. *M. laxivenula* (*Neill et al. 8518*, CAS). Y. *M. neomicrantha* (*Knapp et al. 4546*, CAS). Drawn by Sean V. Edgerton.

8. Sessile stellate trichomes (Wurdack 1986: figs. 141–144; Fig. 3 L) have a very short axis with a moderate number of long-matted arms. Although they have an arachnoid appearance, the tangled arms and point of attachment may appear as if each arm was an individual trichome. In the Octopleura clade they are only found in *M. biolleyana*, *M. erikasplundii*, and *M. radicans*. In the former two species they are the only trichome type produced on internodes, primary and secondary leaf veins abaxially, inflorescence axes, and hypanthia, while in *M. erikasplundii* they are restricted to, and intermixed with other trichome types on leaf veins abaxially and inflorescence axes.

9. Lepidote trichomes with only partially fused radii (Wurdack 1986: figs. 213–216; Fig. 3 W–Y) are mostly hyaline, rarely translucent-brown. These trichomes are mostly produced on internodes, petioles, inflorescence axes, and hypanthia, occasionally also on petals abaxially. In species like *M. latidecurrens* and *M. laxivenula* they are sparse and amorphous, giving the plant a glabrous appearance. In *M. magnifolia* they are brownish and more star-shaped, although completely appressed to the surface and restricted to the venules on the abaxial foliar surface. In *M. neomicrantha* they are hyaline with an appressed star-shape appearance as well, and are variable in density among different populations within the whole geographic range of this widespread species; they can also vary in coloration from hyaline to translucent brown.

10. Single-tiered lepidote trichomes, the radii nearly completely fused (Wurdack 1986: figs. 221–224; Fig. 3 U–V) are rare in the Octopleura clade. They are only found in *M. albertobrenesii* and *M. boekei*. They are whitish with a mealy-furfuraceous aspect, and produced on internodes, petioles, inflorescence axes and hypanthia, where they are intermixed with clavate elongate roughened trichomes. Because they are rare within the Octopleura clade, they represent an important diagnostic character.

Although the function of the different types of trichomes has not been investigated in the Melastomataceae, it is possible that trichomes with arms or protrusions (dendritic, stellate or elongate-roughened) play a role in defending the plant against herbivores. Animal associations involving acarodomatia or formicaria (discussed in a different section) are not common in the Octopleura clade, but all species occur in tropical environments with shade and intermittent light, where the arthropod community of herbivores can be abundant. It seems possible that the trichomes with arms and protrusions could act as obstacles for the free movement of herbivores within a plant, and thus herbivory could have been the selective pressure for the evolution of these types of trichomes.

Inflorescences:—Inflorescence structure and architecture have been critically studied and described in the order Myrtales (Briggs & Johnson 1979, Weberling 1988, 1989). Although there is no standardized descriptive terminology for inflorescences in the Melastomataceae, the summary by Briggs and Johnson (1979) in the Myrtaceae is one of the most useful guides for tracing the evolution of inflorescence architecture, and is applicable to angiosperms generally (Almeda & Robinson 2011). All angiosperm inflorescences are either determinate (*i.e.* anthotelic, where the terminal or central flower opens first) or indeterminate (*i.e.* blastotelic, where the main axis continues to grow and is not terminated by a flower). In the Octopleura clade the anthotelic inflorescence is based on the cyme or the three-flowered dichasium, with opposite and decussate branching, less commonly verticillate. All inflorescence types in the clade are modifications that represent a proliferation or a reduction based on the cymose or dichasial unit (Fig. 4). The inflorescence can be terminal or axillary, and this condition is consistent within each species without any apparent phylogenetic significance; the terminal inflorescence is typically deflexed to a pseudolateral position due to the rapid growth of a lateral vegetative bud, and is commonly accompanied by axillary inflorescences in the same plant. Accessory branching is common in species with well-developed branched inflorescences, but is not consistent within species of the Octopleura clade.

In a cyme (Fig. 4 A), the main and all of the subsequent axes are pronodate and each is terminated by a flower, hence the branching is strictly sympodial. A more elaborated modification of this pattern is the simple dichasium (Fig. 4 B), where the primary axis terminates in a flower at the first node. This flower is subtended by two floral bracts. A lateral branch typically arises in the axil of each of the two bracts in a symmetrical dichasium, and each lateral branch in turn terminates in a three-flowered dichasium. The two lateral flowers in each dichasium are subtended by a pair of bracteoles. The dichasial branching pattern is developed in thyrsoids or dithyrsoids (Fig. 4 C–D) in the majority of species of the Octopleura clade. These terms are used in the sense of Briggs & Johnson (1979) and also explained in Weberling (1988), where they describe a bracteose paniculiform inflorescence where a multinodate main axis bears lateral dichasia of an order of branching greater than one. The dithyrsoid is a twice compound thyrsoid where the multinodate main axis bears lateral partial thyrsoids that in their turn bear lateral dichasia. Highly bracteose and branched dithyrsoids are found in *M. aguilarii*, *M. alatissima*, *M. bensparrei*, *M.*

biolleyana, *M. boekei*, *M. erikasplundii*, *M. latidecurrens*, *M. laxivenula*, *M. magnifolia*, *M. neomicrantha*, *M. palenquensis*, *M. quinquenervia*, *M. radicans*, *M. sessilis*, and *M. variabilis*. Simple thyrsoids are less common within the Octopleura clade; they are present in *M. albertobrenesii*, *M. bractiflora*, and in some populations of *M. evanescens*, as well as in *M. formicaria*, *M. incerta*, and *M. radicans*. The presence or absence of thyrsoids or dithyrsoids does not seem to delimit natural groups within the Octopleura clade, but the modifications/reductions of this pattern are found within closely related species. The sister taxa *M. spiciformis* and *M. rufibarbis* have a distinct inflorescence that consists of one or various main axes, where the flowers are sessile and verticillate in multiple nodes of each axis, forming an interrupted spike (Fig. 4 E). In *M. atropurpurea*, *M. neocoronata*, *M. reitziana*, and also closely related species, the inflorescences consist of groups of modified dichasia (Fig. 4 F). The axes of these dichasia come from a common point at the peduncle apex and are few-flowered due to the frequent abortion of the central flower of the dichasium, or of one of the lateral branches. Further modifications and reductions of the patterns discussed above involve simple and few-flowered cymes as the principal units of the inflorescence (Fig. 4 G). These are present in *M. alboglandulosa*, *M. aurantiaca*, and *M. renatoi*, where each individual cyme has a moderately elongate main axis, and the bases of all axes are clustered in a pseudofasciculate manner. In *M. evanescens* a poorly branched inflorescence pattern is present as well, but the units that compose it are modified dichasia where the central flower is sometimes aborted, or the lateral branches are much reduced in length. The remaining species that are closely related to the four mentioned above include *M. anchicayensis*, *M. approximata*, *M. chocoensis*, *M. quadridomius*, and *M. veraguensis.* These species have a reduced pattern of inflorescence branching with the inflorescence consisting of clusters of fasciculate glomerules. The fact that the Approximata subclade has undergone more change both genetically and morphologically (Figures 1–4), seems to be consistent with the idea that high reductions of architecturally complex inflorescences are derived conditions among families of flowering plants (Briggs & Johnson 1979).

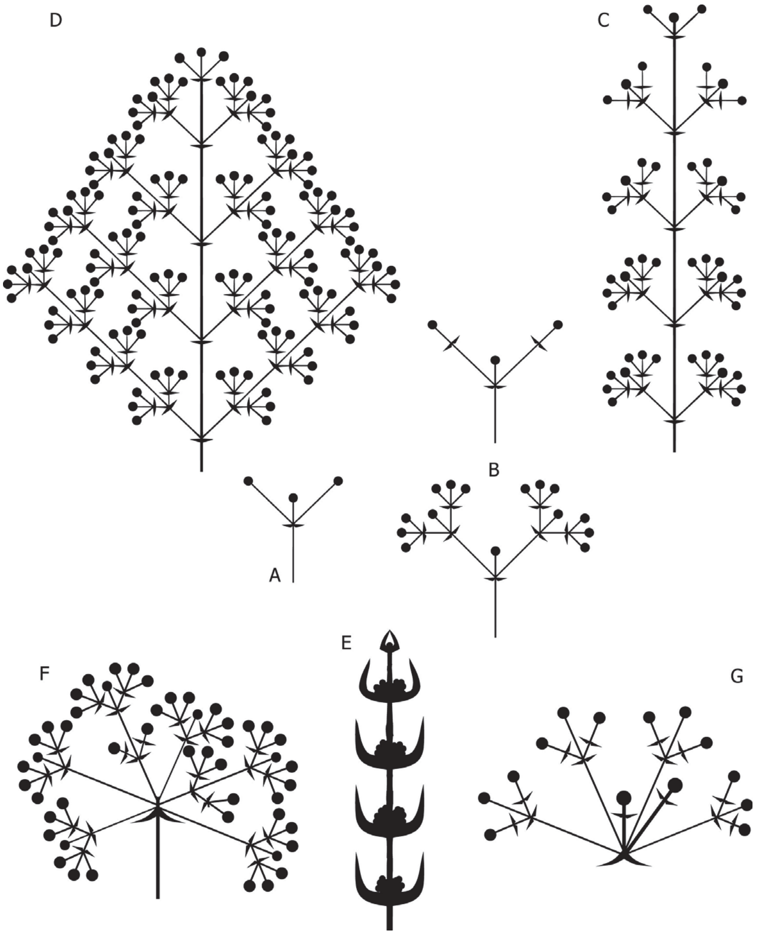

FIGURE 4. Diagrammatic representation of inflorescence arrangements in the Octopleura clade. A. Cyme. B. top, simple dichasium; bottom, twice-compound dichasium. C. Thyrsoid. D. Dithyrsoid, or once-compound thyrsoid. E. Interrupted verticillate spike. F. Group of modified dichasia. G. Pseudofasciculate cluster of cymes.

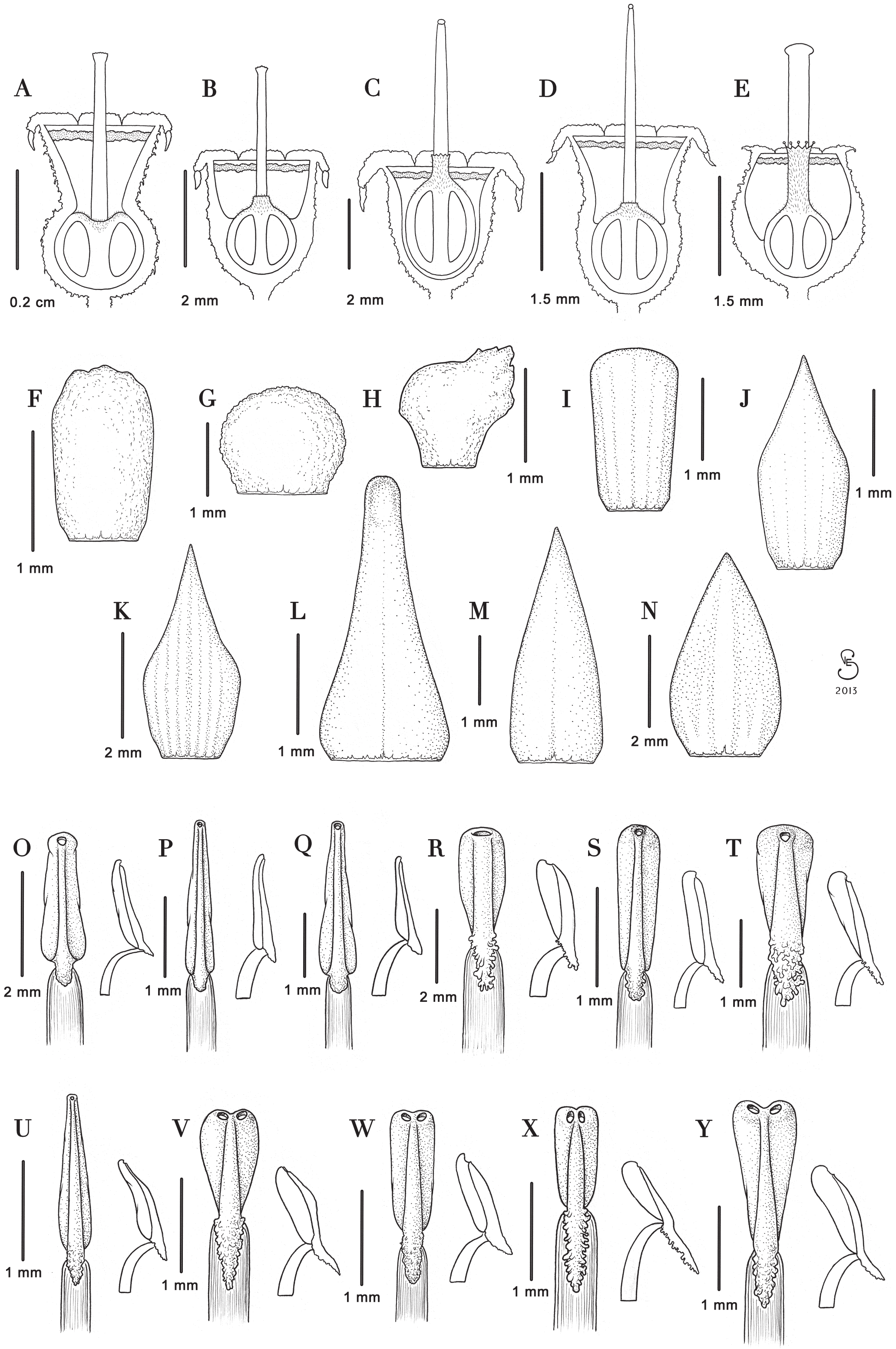

FIGURE 5. Representative examples of floral parts in species of the Octopleura clade. A–E. Flowers in longitudinal cross section. F–N. Petals. O–Y. Stamens. A, O. *Miconia biolleyana* (based on *Herrera 7991*, CAS). B, R. *M. aurantiaca* (*Kriebel 5315*, NY). C, I. *M. evanescens* (*Luteyn & Silva 13943*, CAS). D. *M. renatoi* (*Jaramillo & Zak 8036*, MO). E, X. *M. magnifolia* (*Howell 10182*, CAS). F, Q. *M. quinquenervia* (*Haught 3241*, CAS). G. *M. atropurpurea* (*Harling & Andersson 23133*, US). H, P. *M. neocoronata* (*Grayum & Hammel 5755*, CAS). J. *M. alboglandulosa* (*Sánchez & Chacón 104*, CAS). K. *M.* aff. *neomicrantha* (*Michelangeli 1754*, NY). L. *M. albertobrenesii* (*Almeda et al. 5936*, CAS). M, W. *M. laxivenula* (*Hammel 9634*, CAS). N. *M. rufibarbis* (*Penneys et al. 1574*, CAS). S. *M. approximata* (*Contreras 9959*, CAS). T. *M. anchicayensis* (*Almeda et al. 10266*, CAS). U. *M. palenquensis* (*Gentry & Dodson 6553*, US). V. *M. variabilis* (*McPherson 12168*, CAS). Y. *M. sessilis* (*Monsalve 1071*, CAS). Drawn by Sean V. Edgerton.

Hypanthium and calyx:—The flowers in the Octopleura clade can be pedicellate or sessile within the same plant; the lateral flowers of dichasia are usually pedicellate while the central ones are mostly sessile. Flowers in a secund arrangement on the dichasial branches (as in *M. formicaria*, and frequently in *M. boekei* and *M. bractiflora*) are sessile, and the floral bracts envelope the mature hypanthia. Sessile bracteose flowers are also found in the verticillate glomerules of the interrupted spikes of *M. rufibarbis* and *M. spiciformis*, as well as in the fasciculate glomerules of *M. approximata* and allies. The mature hypanthium is completely adnate to the ovary, hence the flower is epiperigynous, or a portion that varies from 1/10 to 1/2 of the hypanthium length may be free from the ovary (Fig. 5 A–E). Only in *M. evanescens* are the flowers perigynous; the hypanthium is completely free from the ovary but fully envelops it throughout floral development.

Indumentum on the abaxial surface of the mature hypanthium is variable, with intermixed trichome types to completely and variously glandular. It is essentially terete, and ranges in shape from campanulate to urceolate, globose or subcylindric (Fig. 5 A–E). Vascularization consists of eight or ten (twice the number of petals) conspicuous longitudinal blunt ribs that connect apically to the circular vascular ring called the torus (Gleason 1939a). The torus is the structure upon which the calyx, petals and stamens are inserted. This structure can be glabrous, scaly, ciliate or glandular-puberulent. In the Octopleura clade, as in many Melastomataceae, the calyx lobes are shortly connate basally to form a calyx tube, which is essentially cylindric. The calyx lobes are persistent, varying from triangular to ovate and prevailingly reflexed, or depressed-rounded to vaguely undulate and prevailingly erect to somewhat spreading. The calyx teeth are well differentiated in the Octopleura clade, varying from subulate to tuberculiform, or aristate, they are inserted at different levels on the calyx lobes abaxially and may or may not project beyond the calyx lobes. Vestiture of the abaxial surface of the calyx lobes, along with both surfaces of calyx teeth, is like that of the hypanthium but sparser. The hypanthium is glabrous within or minutely glandular-puberulent, the glandular trichomes are mainly restricted to the internal ridges, and the same vestiture is found on calyx lobes adaxially. Differences in size of calyx lobes and calyx teeth, as well as differences in their shape and orientation may be useful in the delimitation of species or allied groupings.

Corolla:—The four or five petals are free and inserted on the torus at points alternating with the four or five calyx lobes. As it is common in the Melastomataceae, the petals are dextrorsely convolute (right contort) in bud (Almeda & Robinson 2011), and in most species of the Octopleura clade they become oriented in a reflexed way or variously ascending when fully expanded (Pl. 1). Differences in petal size are not significant among several of the species, except perhaps for *M. bensparrei* and *M. palenquensis* which were differentiated in the protologue by their petal size, among other more ambiguous characters (Wurdack 1978a, see discussion under both species). Petal color ranges from white to translucent white or light shades of translucent green or pink. The petals may be papillose on both surfaces, which characterizes the Quinquenervia subclade, glabrous (mainly in the Approximata subclade), or variously pubescent on the abaxial surface. In some species of the Quinquenervia subclade there is an infraapical abaxial tooth on each petal, but this character is difficult to interpret in dried material. Differences in petal shape can be useful for delimitating species or allied groups (Fig. 5 F–N). It varies from suborbicular to oblong, ovate, elliptic-ovate or lanceolate with apices ranging from rounded to obtuse, bluntly acute or acuminate. The petals are usually delicate and can be fugacious; the petal base is invariably truncate.

Androecium:—Stamens are diplostemonous, isomorphic, evenly distributed to form a ring around the style, and strongly inflexed in bud. The oblong filaments are invariably glabrous, white and dorsoventrally compressed, inserted at the torus at the same level of each hypanthial rib. In bud the anthers lie with their ventral sides facing the adaxial surface of the filaments, and the abaxial surface of the filament abaxial lies on the free part of the inner hypanthial wall or on the inner calyx tube. The dorsal surfaces of the anthers face the ovary apex and part of the developing style. The position of the anthers in bud is such that the gland-edged dorso-basal appendages are the first staminal parts exposed at anthesis and they seem to remain in this position through the early stages of flowering even when the style is completely erect. The role of these glandular appendages in pollination, if any, remains to be studied. Upon floral expansion the stamens assume an erect position; the anthers remain close together, sometimes seemingly connate and well removed from the spreading petals, surrounding the style.

The fertile anthers in each flower are two-celled, smooth or ventrally channeled, and range in shape from subulate to linear-oblong, oblong or obovate. Depending on the species, the anther apex is tapered or emarginate with one or two dorsally inclined apical pores. The anther connective is thickened dorsally and commonly briefly prolonged beyond the thecae into a deflexed dorso-basal gland-edged appendage, which varies in size and shape from rounded to lanceolate (Fig. 5 O–Y). In some species of the Approximata subclade, the connective is also glandular throughout its dorsal surface, but it is unappendaged ventrobasally in *M. alboglandulosa*, *M. aurantiaca*, and *M. renatoi*. The glandular trichomes on the connective prolongation and appendage are usually shortly stipitate, but sessile glands are common in the Quinquenervia subclade. The anthers are generally yellow to pale yellow in species of the Quinquenervia subclade, as well as in a few other species, or they can be white to cream at anthesis, as in the rest of species. The appendages are usually the same color as the connective, but clearer and more translucent than the thecae. Nevertheless, exact colors are impossible to interpret in dried material. Thus only when several labels on specimens agreed or when the stamens were seen by the authors on field photographs were colors of androecium parts included in species descriptions.

PLATE 1. Examples of flowers in the Octopleura clade. a. *Miconia aguilarii* (*Kriebel 5072*, CR). b. *M. albertobrenesii* (*Almeda 10257*, CAS). c. *M. aurantiaca* (*Kriebel 5315*, INB). d. *M. evanescens* (*Kriebel s.n.*). e. *M. formicaria* (*Almeda 10274*, CAS). f. *M. latidecurrens* (*Martínez 880*, MO). g. *M. magnifolia* (*Kriebel 5322*, INB). h. *M. neocoronata* (*Almeda 10470*, CAS). i. *M.* aff. *neomicrantha* (*Michelangeli s.n.*). j. *M. quinquenervia* (*Kriebel 5451*, INB). k. *M. rufibarbis* (*Almeda 10430*, CAS). l. *M. variabilis* (*Goldenberg 978*, NY). Photographs taken by: a, c, d, g, j. Ricardo Kriebel; b, e. Frank Almeda; f. L. Martínez; h, k. Gilberto Ocampo; i. Fabián Michelangeli; l. Renato Goldenberg.

Gynoecium and fruits:—The inferior to partly inferior ovary is completely or partially adnate to the hypanthium. *Miconia evanescens* is the only species with a completely superior ovary, where the hypanthium is free from the ovary but tightly envelops it. The number of locules is generally the same as the number of petals, with axile placentation and numerous anatropous ovules. The straight, glabrous style arises from the summit of the ovary, and is cylindric or tapers apically terminating in a truncate, slightly expanded or capitellate stigma. The ovary apex can be slightly depressed or somewhat expanded apically into a cone. Quite a few species of the Approximata and the Variabilis subclades have well differentiated ovary apical collars (*M. albertobrenesii*, *M. anchicayensis*, *M. approximata*, *M. bensparrei*, *M. evanescens*, *M. formicaria*, *M. incerta*, *M. latidecurrens*, *M. laxivenula*, *M. magnifolia*, *M. palenquensis*, *M. quadridomius*, *M. rufibarbis*, *M. sessilis*, and *M. veraguensis*). This collar consists of a ring of tissue at the apex of the ovary with an apical depression out of which the style emerges (Fig. 5 E). This tissue is frequently glandular-puberulent as the ovary apex, and it might be developed into a crown (*i.e.* a ring of elongate trichomes) at the margin of its apical depression. The presence of this tissue might be a morphological synapomorphy of the Approximata and Variabilis subclades, which could have been lost in a few species (*e.g. M. boekei*, *M. neomicrantha*, and *M. variabilis*).

Although the floral biology of the Octopleura clade remains to be studied, most of the species seem to have protogynous flowers. The sequence of floral development is hard to determine from dried material, but dissections of old floral buds and immature flowers, as well as observations of photographs of flowers in the field, show that the style is erect and the stigma is receptive before the stamens assume a fully upright position. Asynchrony in the maturation of sexual parts is surely significant in promoting cross-pollination. Furthermore, it has been postulated that the principal mode of promoting outcrossing in Melastomataceae is spatial separation of pollen and stigma (herkogamy), achieved by the pollen being enclosed in poricidal anthers, which have to be manipulated to release the pollen (Renner 1989). In the Octopleura clade, the style is exerted beyond the upright anthers, putting a spatial distance between the stigma and the dorsally inclined pores.

Mature berries are fleshy, mostly globose-oblate or rarely globose-elliptic to globose-obovate, completely surrounded by the mature and variously pubescent hypanthium and the open calyx apically. The hypanthial ribs are conspicuous at maturity, an important character for recognizing species that belong to the Octopleura clade in concert with stamen characters. The color of mature fruits provides another important character for distinguishing between species. It can vary from white to orange, red, or blue-black (the ancestral state within the Octopleura clade). These colors are fairly consistent within each species. However, in *M. laxivenula* and *M. variabilis* white-berried populations are mainly restricted to Mesoamerica whereas South American populations more commonly have berries that gradually change in color from green to yellow, orange, red to blue-black (*M. variabilis*) or have consistently orange berries (*M. laxivenula)*. The selective forces driving this morphological and genetic differentiation remain to be studied. The fleshy berries of the Miconieae are largely consumed by different fruit eating birds throughout the year (Boyle 2006, 2010, Kessler-Rios & Kattan 2012, Loiselle & Blake 1999, 2000, Stiles & Rosselli 1993, Wheelwright *et al.* 1984). Differences in preference when selecting fleshy berries to eat, along with differences in composition of birds in Mesoamerican and South American forests, could be related to the intraspecific variation in berry coloration.

Seeds:—Although the phylogenetic significance of seed characters remains to be better understood, Ocampo & Almeda (2013) provide the most comprehensive account of seed diversity in the Miconieae to date, with a comprehensive descriptive terminology based on useful taxonomic characters and their variation (Fig. 6). Taxonomically important seed characters in the Octopleura clade include size, three dimensional shape, raphal zone expansion, multicellular sculpture and microrelief of cell walls.

The seeds of the Octopleura clade display a wide range of variation especially among its three constituent subclades (Fig. 7 and Pl. 2–Pl. 4). Variation within each of these subclades is less pronounced. Seed size ranges from 0.26–0.78 mm long and 0.14–0.62 mm wide. It can be useful for distinguishing the Approximata subclade with seeds that are 0.5 mm or longer (Pl. 2). Essentially two basic three dimensional seed shapes characterize the Octopleura clade, pyramidal and ovoid-angled. The pyramidal form is restricted to species in the Approximata subclade. Species in this subclade have a rugulose and dull testa with a rugose multicellular sculpture. Most of the rest of species have ovoid-angled seeds with seemingly smooth and glossy testas and a smooth multicellular sculpture (Pl. 3 and 4). *Miconia incerta* has seeds that are unique within the Octopleura clade (Pl. 4 E, e). They are ovoid and unangled, almost seeming half terete, and the texture is similar to that of the species in the Approximata subclade. Based on its unique seed morphology and lack of molecular data, it has been difficult to place *M. incerta* within any of the subclades of the Octopleura clade. The seed color varies from yellow to dark brown, but this character seems to change to darker tones through fruit development and maturation, which represents a difficulty for the taxonomic use of this character.

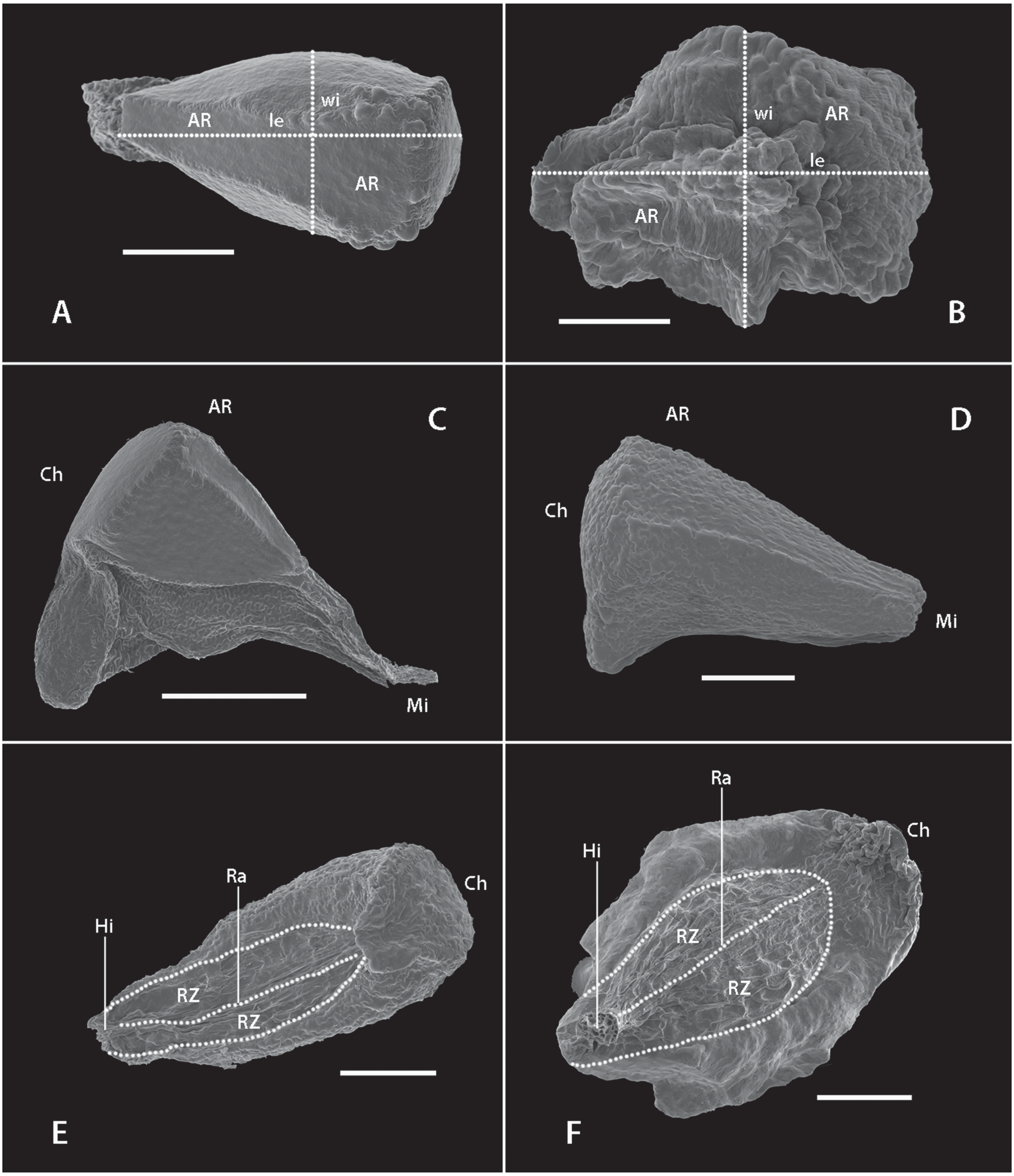

FIGURE 6. Example of seeds of the Octopleura clade and its component parts from SEM images (Redrawn from Ocampo & Almeda 2013). A, B. Anti-raphal Plane: A. *Miconia aguilarii* (from *Aranda et al. MB1345*, CAS), B. *M. quadridomius* (*Gentry 35354*, CAS). C, D. Lateral Plane: C. *M. neocoronata* (*Estrada et al. 1636*, CAS), D. *M. variabilis* (*Wallnöfer 12-25388*, CAS). E, F. Raphal Plane: E. *M. formicaria* (*Almeda et al. 10274*, CAS), F. *M. chocoensis* (*Killip & García 33520*, US). Abbreviations: AR: Anti-raphal side, Ch: Chalazal side, Hi: Hilum, le: length, Mi: Micropylar side, Ra: Raphe, RZ: Raphal Zone, wi: width. Scale bars: A, D–F=100µm; B, C=200 µm. SEM images taken by Diana Gamba.

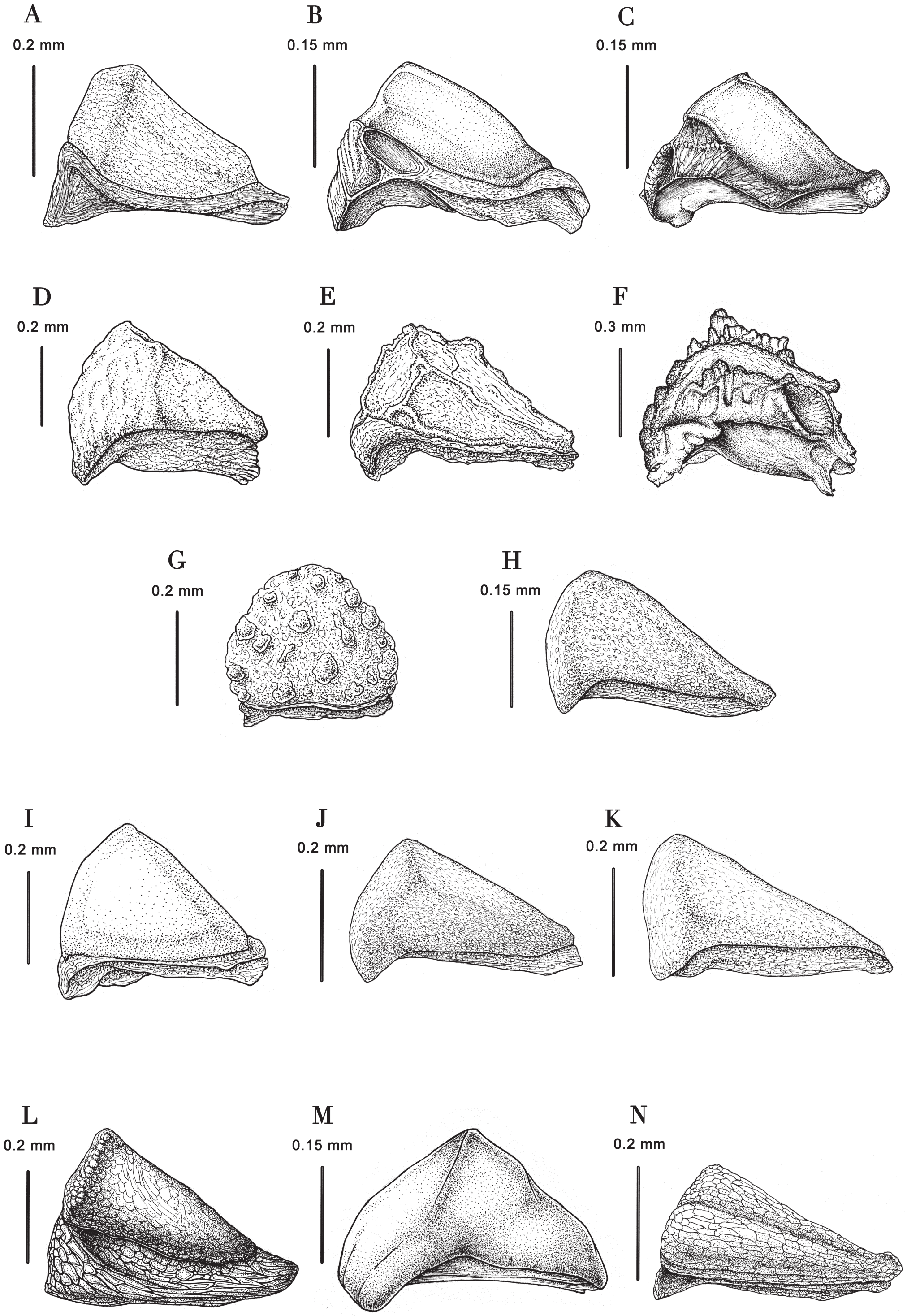

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FIGURE 7. Illustrations of representative seeds found in the Octopleura clade. A. *Miconia neocoronata* (based on *Estrada et al. 1636*, CAS). B. *M. radicans* (*Hammel et al. 12832*, CAS). C. *M. reitziana* (*Hammel 8880*, CAS). D. *M. chocoensis* (*Killip & García 33520*, US). E. *M. anchicayensis* (*Almeda et al. 10266*, CAS). F. *M. veraguensis* (*Almeda et al. 6480*, CAS). G. *M. incerta* (*Acosta Solís 12274*, F). H. *M. variabilis* (*Wallnöfer 12-25388*, CAS). I. *M. bensparrei* (*Madison et al. 4618*, F). J. *M. neomicrantha* (*Holland & Kid 94*, CAS). K. *M. albertobrenesii* (*Hammel 9633*, CAS). L. *M. latidecurrens* (*McPherson 20808*, MO). M. *M. formicaria* (*Almeda et al. 10274*). *M. spiciformis* (*McPherson & Serein 20759*, CAS). Drawn by Sean V. Edgerton.

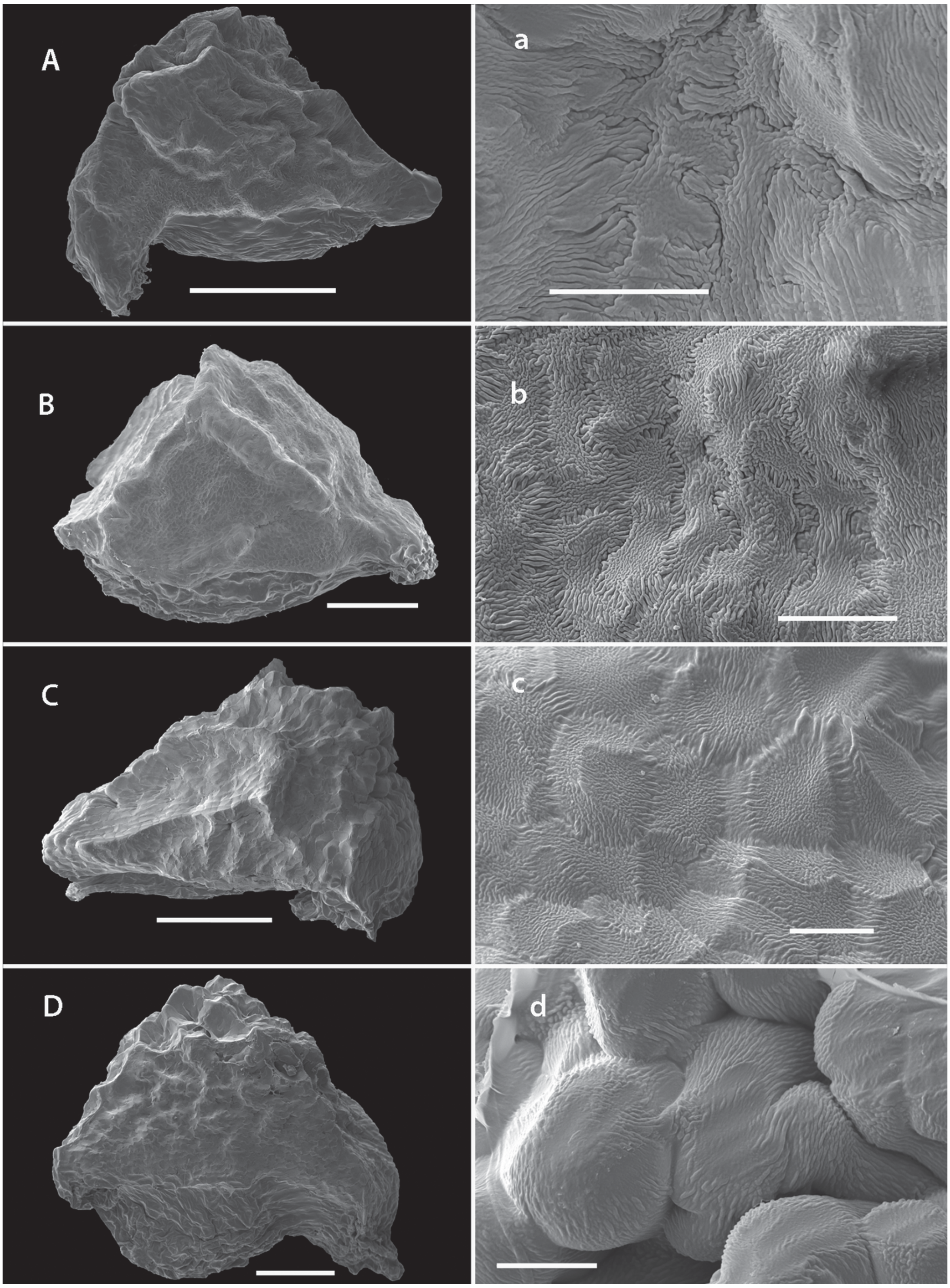


PLATE 2. SEM images of representative seeds found in the Approximata subclade. A–D. Seeds in lateral symmetrical plane. a–d. Detail of testa cells and cell wall microrelief. A, a. *M. approximata* (*Hammel 12238*, CAS). B, b. *M. chocoensis* (*Killip & García 33520*, US). C, c. *M. evanescens* (*Croat 68018*, CAS). D, d. *M. veraguensis* (*Almeda et al. 6480*, CAS). Scale bars: A, C=100µm; B, D=200 µm; a–c=20µm, d=15µm. SEM images taken by Diana Gamba.

The raphe has been considered to be the broad zone that includes the hilum and runs from it to the chalaza. The hilum is a ridge formed by the portion of the funiculus (a continuation of the funicular vascular bundle) adnate to the anatropous seeds (Harris & Harris 2001, Ocampo & Almeda 2013, Sousa & Zárate 1988). In this sense the raphal zone comprises the raphe, the hilum, and the surrounding tissue on the ventral part of the seed, which has different cell morphological features than the corpus (Fig. 6). Cell morphology of this area was not described due to the deformation it undergoes upon its compression through development. In the Octopleura clade the raphe extends for 33–100% the length of the seed, which may vary even within the same individual. The raphal zone is typically not expanded in species of the Approximata subclade. The different kinds of expansion may be important in diagnosing allied groupings in the Octopleura clade. In the Quinquenervia subclade (Pl. 3), the raphal zone is expanded ventrally and longitudinally, forming a skirt-like structure that may be larger than the corpus of the seed. In other species like *M. latidecurrens* and *M. palenquensis*, the raphal zone is only expanded ventrally; in *M. formicaria* and *M. spiciformis*, this zone is not expanded at all. The seeds of the Octopleura clade do not have appendages like those described by Ocampo & Almeda (2013)—"a conspicuous, ventrally oriented extension of the seed corpus (with variable degree of inclination with respect to the raphal zone) located at the chalazal side, with size ≥ 20% the length of the seed", but some species may have a small protuberance at the chalazal end of the raphal zone. This protuberance is common in at least fifteen species of the Octopleura clade, including all species in the Variabilis subclade (Pl. 4).

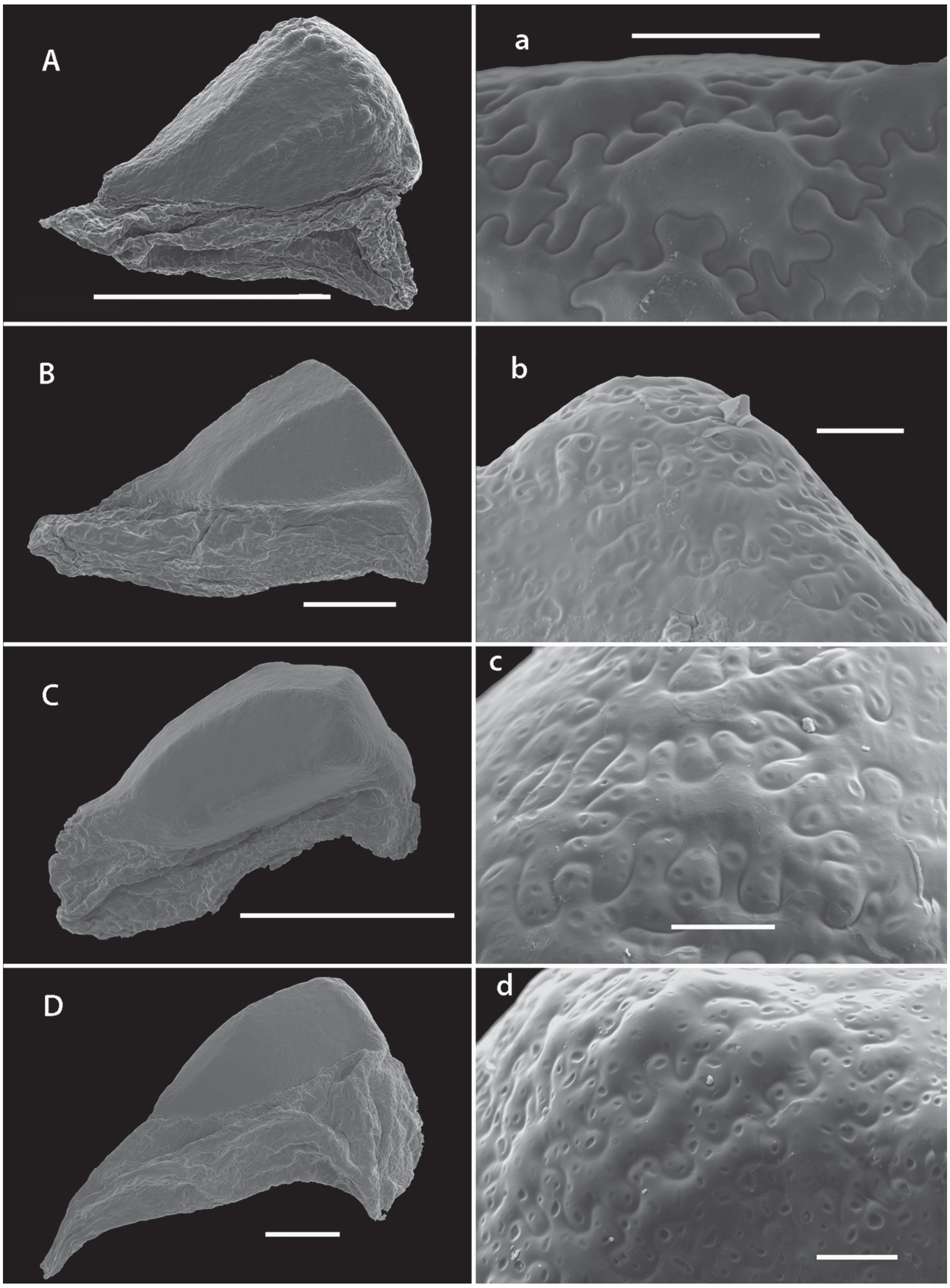
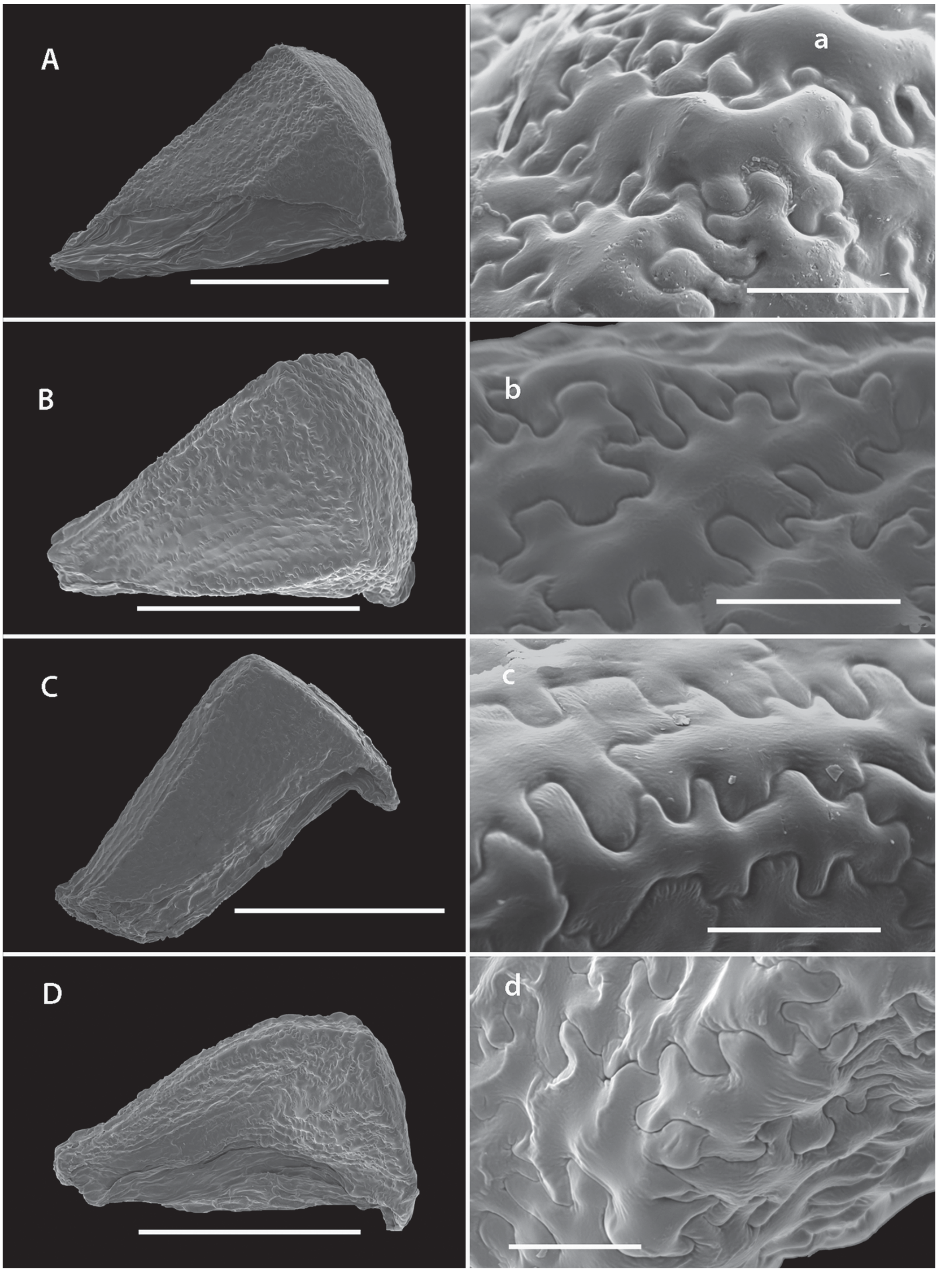


PLATE 3. SEM images of representative seeds found in the Quinquenervia subclade. A–D. Seeds in lateral symmetrical plane. a–d. Detail of testa cells and cell wall microrelief. A, a. *Miconia aguilarii* (from *Aranda et al. MB1345*, CAS). B, b. *M. erikasplundii* (*Asplund 19806*, S). C, c. *M. radicans* (*Hammel 2434*, CAS). D, d. *M. reitziana* (*Almeda & Daniel 7035*, CAS). Scale bars: A–D= 100µm; a=20µm, b–d=10µm. SEM images taken by Diana Gamba.

In the Octopleura clade, cell arrangement on the seed testa is typically an irregular pattern. The individual cells are elongate with their anticlinal boundaries channeled and undulated in Ω- and U-type patterns, or irregularly curved. In *M. neomicrantha* the anticlinal boundaries of some cells may be raised, but this is not consistent throughout the corpus of the seed. The microrelief of the cell walls seems to show a pattern of differentiation among the subclades of the Octopleura clade. In the Quinquenervia subclade, the testa is characterized by cell walls with a punctuate microrelief which is sometimes inconspicuous. In the Approximata subclade the cell wall microrelief is essentially striate, while in the Variabilis subclade it may be striate varying to verrucose. The similarities between the latter two groups make sense since these two subclades are closer phylogenetically to each other than to the Quinquenervia subclade. The verrucose and striate periclinal cell wall microrelief patterns seem to be formed by cuticular folding or thickening (Ocampo & Almeda 2013), but homology of these features remains to be tested.



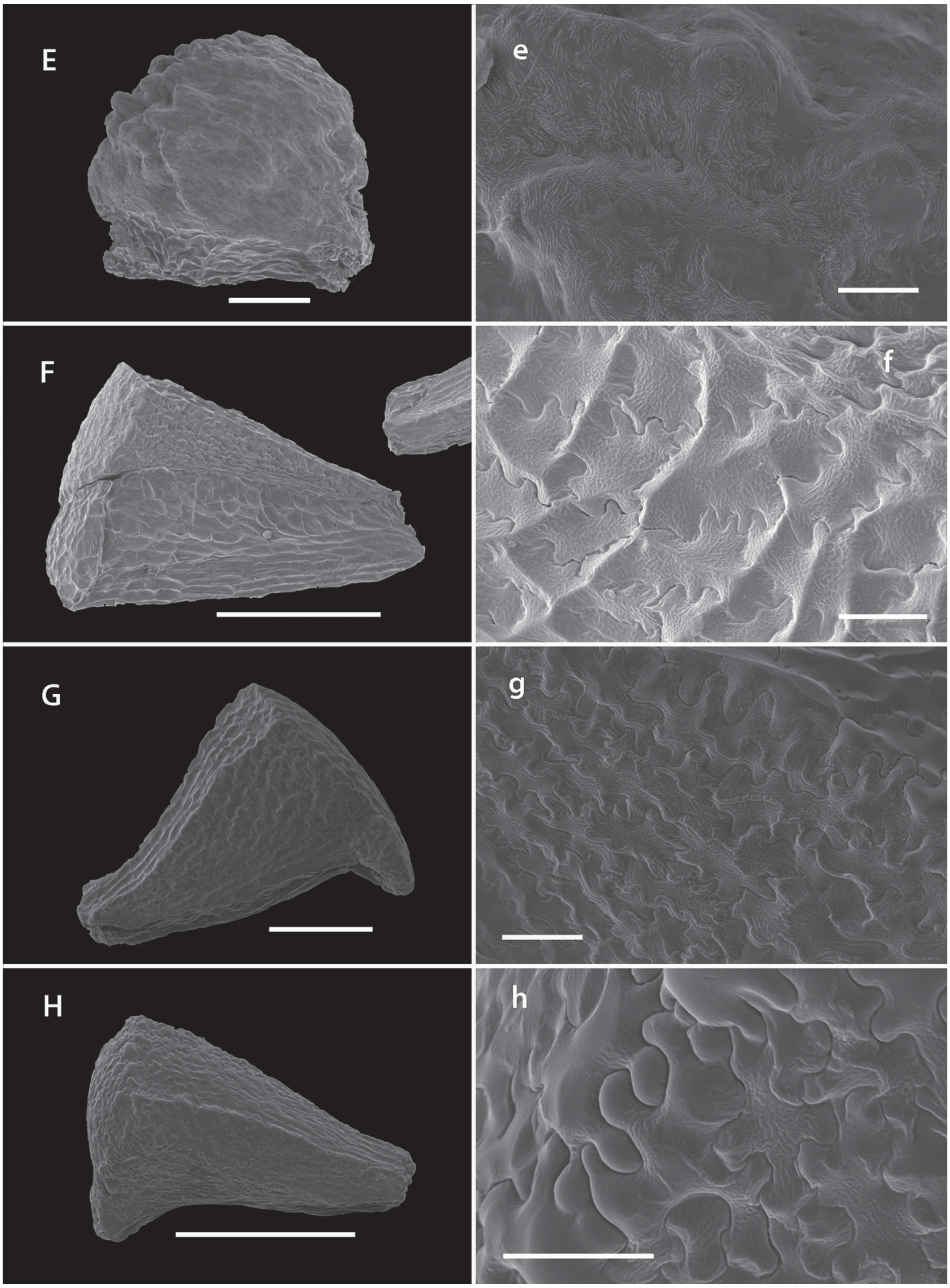


PLATE 4. SEM images of representative seeds found in the Variabilis subclade (and *M. incerta*). A–H. Seeds in lateral symmetrical plane. a–h. Detail of testa cells and cell wall microrelief. A, a. *M. albertobrenesii* (*Chacón & Herrera 1680*, CAS). B, b. *M. boekei* (*Clark et al. 1960*, US). C, c. *M. bractiflora* (*Devia & Prado 2702*, CAS). D, d. *M. formicaria* (*Almeda et al. 10274*, CAS). E, e. *M. incerta* (*Acosta Solís 12274*, F). F, f. *M. latidecurrens* (*McPherson 20808*, MO). G, g. *M. magnifolia* (*Rueda et al. 8682*, CAS). H, h. *M. variabilis* (*Wallnöfer 12-25388*, CAS). Scale bars: A–C, F, H=200µm, E, D, G=100µm; a–c, e, g, h=20µm, d, f=15µm. SEM images taken by Diana Gamba.

Chromosome Numbers

To date, chromosome numbers have been reported for about 10% of the species of Melastomataceae worldwide (Almeda 2013). Despite some notable gaps, current evidence suggests that the original basic chromosome number for the Melastomataceae and the Myrtales is x=12 (Almeda 1997a, Graham *et al.* 1993, Johnson & Briggs 1984, Raven 1975).

Chromosome numbers in the Octopleura clade have been reported for only 18% of the species (six of thirty-three, see Appendix IV). All counts are n=17 (Almeda 1997b, Almeda 2013, Solt & Wurdack 1980), a secondary base number that appears to be a dysploid reduction from n=18 (Almeda 2013). The base number of n=17 is consistent with the majority of reports for other genera in the tribe Miconieae. Almeda (2013) described the principal pattern of chromosomal evolution in the Miconieae as "paleopolyploidy followed by limited dysploidy". This pattern of cytoevolution involves a secondary base number likely derived from an ancestral base number of nine, followed by autotetraploidization to x=18 and then by a dysploid loss (2x-1) to x^2=17. An alternative scenario to account for this secondary base number could have involved ancient hybridization of species with seven and ten or eight and nine haploid numbers. A polyploid origin for the Miconieae seems certain but unlike other clades in the family, the Miconieae appear to have no extant species with lower diploid numbers that could qualify as ancestral base numbers (Almeda 2013).

Distribution, Habitats and Conservation

The distribution of the Octopleura clade extends from southern Mexico, in the states of Veracruz, Oaxaca and Chiapas, south through Central America (except for El Salvador) to the South American Andes, from central Venezuela (Aragua) to southeastern Perú (Cuzco). One species reaches Jamaica and Hispaniola in the Caribbean. Three species occur in extra-Andean floristically related regions of South America; *M. neomicrantha* and *M. quinquenervia* are found in the Sierra Nevada of Santa Marta in northern Colombia. *Miconia neomicrantha* reaches the state of Amazonas in Venezuela, and *M. variabilis* has recently been collected in the state of Acre, Brazil (Fig. 8). *Miconia neomicrantha* is the most widely distributed species, occurring in thirteen countries. Its range delimits the geographic extent of Octopleura to the North and to the East and it is the only species of the clade known from the Caribbean. *Miconia variabilis* also has an extensive range including seven countries, and represents the southernmost occurrence of Octopleura in the state of Cuzco, Perú. Two other widespread species include *M. approximata* and *M. quinquenervia* (see Table 3).

The center of diversity for the clade is in Colombia and Ecuador, where 25 and 24 of the 33 species are found respectively (Fig. 9 and Table 3). Panama and Costa Rica are a secondary center with 19 and 17 species respectively. Seven of the 33 species are endemic to one of these countries; Ecuador has the highest number of endemics (four species), followed by Colombia and Panama with two and one respectively. At least 13 species occur from Costa Rica southwestward through Ecuador, and nine of these occur outside of these countries as well. The remaining 13 species have distributions restricted to two or three countries (Costa Rica, Panama, Colombia or Ecuador). The high concentration of species, particularly in Colombia, is a common pattern for many genera in the Melastomataceae with major centers of diversity in the Andes (Cuatrecasas 1985, Gleason 1929, Todzia & Almeda 1991). The seemingly higher abundance of occurrences (based on the collections studied) in Costa Rica and Panama are probably due to a collection bias, since these countries have been more extensively explored in recent decades than others in Latin America.

Although some species are fairly widespread and co-occur in the same areas, a common pattern in the Octopleura clade is one in which sister species replace each other geographically. This is apparent in the following species pairs: *Miconia aguilarii* and *M. quinquenervia*, *M. rufibarbis* and *M. spiciformis*, *M. laxivenula* and *M. sessilis*, *M. atropurpurea* and *M. neocoronata*, *M. bensparrei* and *M. palenquensis*, *M. approximata* and *M. chocoensis*, and *M. biolleyana* and *M. erikasplundii*; few species pairs are found in the same geographic areas (like *M. aurantiaca* and *M. evanescens*), but field study is required to determine to what degree these species are sympatric or parapatric. The spatial relationships among these species pairs suggest that geographic differentiation has been a recurrent evolutionary theme in the Octopleura clade. The radiation of the Octopleura clade is most probably recent because the tropical Andes and the mountains forming the southern Central American land bridge achieved prominent uplift during the Pliocene (Raven & Axelrod 1975, Todzia & Almeda 1991). Uplift, coupled with the climatic fluctuations that resulted from Pleistocene glaciations, set the stage for speciation along a lengthy corridor of moist forest habitats. This was the environmental setting that became available to the progenitors of the Octopleura clade and other Melastomataceae, which probably migrated from Andean areas of South America (Todzia & Almeda 1991).

TABLE 3. Country distribution of Octopleura clade species.

Species	HIS	JAM	MEX	BEL	GUA	HON	NIC	CR	PAN	COL	ECU	PER	VEN	BRA
M. aguilarii								x	x					
M. alatissima											x			
M. albertobrenesii							x	x	x	x	x			
M. alboglandulosa								x	x	x	x			
M. anchicayensis										x				
M. approximata				x	x	x	x	x	x	x	x			
M. atropurpurea										x	x			
M. aurantiaca								x	x	?	x			
M. bensparrei										x	x			
M. biolleyana								x	x	x				
M. boekei											x			
M. bractiflora								x	x	x	x			
M. chocoensis										x	x			
M. erikasplundii											x			
M. evanescens								x	x	x	x			
M. formicaria										x				
M. incerta										x	x			
M. latidecurrens								x	x					
M. laxivenula							x	x	x	x	x	x		
M. magnifolia							x	x	x	x	x			
M. neocoronata								x	?	x				
M. neomicrantha	x	x	x	x	x	x	x	x	x	x	x	x	x	
M. palenquensis											x			
M. quadridomius									x	x	x			
M. quinquenervia						x	x	x	x	x	x		x	
M. radicans							x	x	x	x	x			
M. reitziana							x	x	x	x				
M. renatoi										x	x			
M. rufibarbis										x	x			
M. sessilis										x	x			
M. spiciformis							x	?	x	x				
M. variabilis							x	x	x	x	x	x		x
M. veraguensis									x					
TOTAL (*endemic spp)	1	1	1	2	2	3	10	17	19 (1*)	25 (2*)	24 (4*)	3	2	1

Throughout their range, species of the Octopleura clade occur from sea level to 3200 m, from the lowland Caribbean and Pacific slopes to moderate montane elevations through the Sierra Madre del Sur in Mexico south to the south-central Peruvian Andes (Fig. 8). These regions correspond to the tropical wet rain forest, tropical premontane rain forest, and cool montane forest (or cloud forest). The distribution of the clade is dictated by areas with heavy rainfall, mist, and fog. It is somewhat interrupted, and species of the Octopleura clade become rare to completely absent in the dry intermountain valleys and other tropical dry zones. The Octopleura clade is also found in wet lowland areas, particularly north and east of the Continental Divide in Panama (including Barro Colorado island), and in floristically similar habitats in Jamaica and Hispaniola, as well as in smaller tropical Pacific islands like Gorgona in Colombia, Coiba in Panama, and Cocos Island in Costa Rica.

The species can be found growing in the forest understory, but also along road cuts or forest margins, commonly in riparian areas and along rocky streams. All species of the Octopleura clade seem to display similar habitat preferences but some species are rare and restricted to local forested areas (*e.g. Miconia neocoronata*, *M. quadridomius*, *M. veraguensis*), while others are more frequently found in forests and also disturbed sites (*e.g. M. neomicrantha* and *M. quinquenervia*). Most of the species occur from elevations close to sea level to under 2000 m, only three species are found above 2500 m (*M. bensparrei*, *M. neomicrantha* and *M. variabilis*), and few seem to have more restricted ranges from 500–2000 m (Fig. 10). Restricted elevational ranges are probably due in part to the rarity of some species (like *M. bensparrei*, *M. boekei*, *M. neocoronata*, *M. palenquensis*), but also to the lack of collections in species-rich but poorly known localities. This is particularly the case for species described here as new.

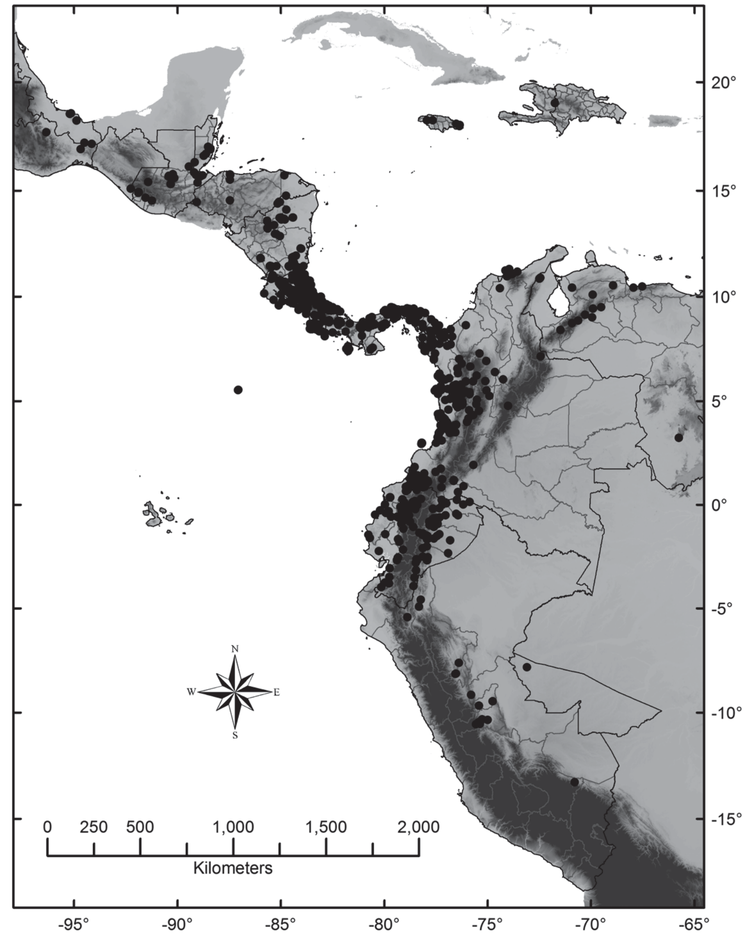


FIGURE 8. Overall distribution of the Octopleura clade. Based on 2106 georeferenced collections.

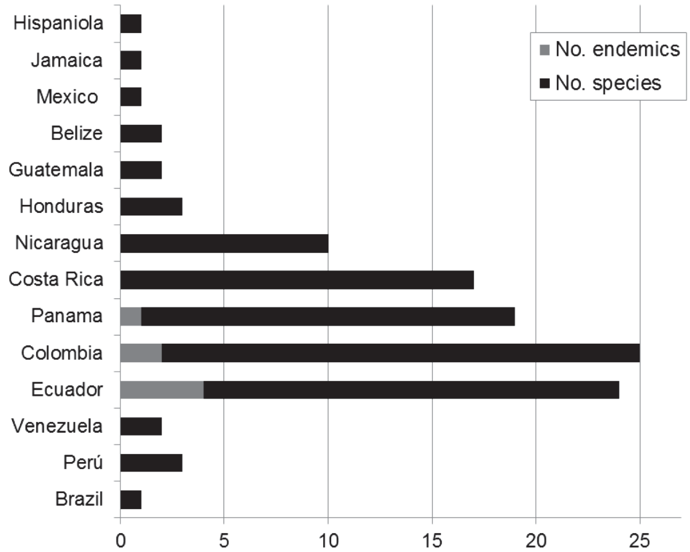


FIGURE 9. Number of species and endemics of the Octopleura clade per country.

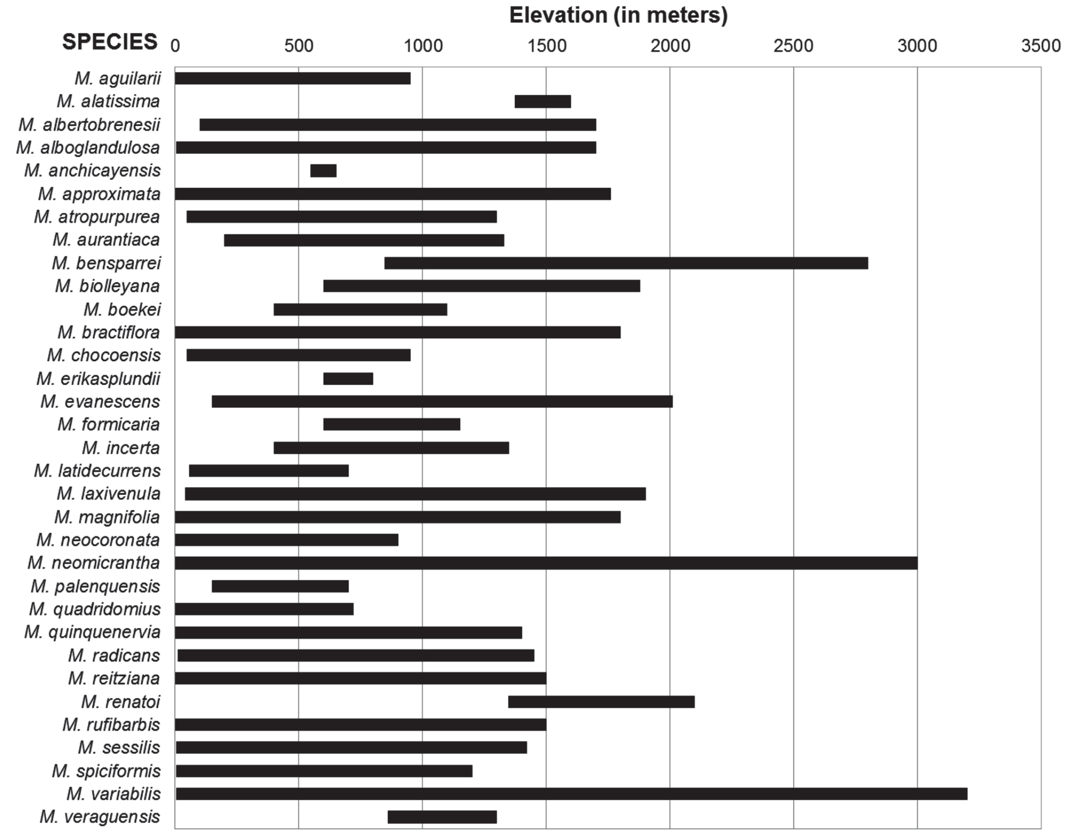


FIGURE 10. Elevation ranges of the Octopleura clade species across their range.

For those species where it was possible to calculate the geographic range, the highest extinction risk category was obtained from the area of occupancy (AOO), based on the IUCN criteria (2013). For the majority of species, a preliminary conservation assessment of endangered EN was indicated (Appendix V). Only the five most widely distributed species (*M. approximata*, *M. magnifolia*, *M. neomicrantha*, *M. quinquenervia*, and *M. variabilis*), were assessed as vulnerable (VU). For the three species with only one or two known collections (*M. alatissima*, *M. anchicayensis*, and *M. veraguensis*), the assessed category of threat was critically endangered (CR). This was obtained using criteria D: very small or restricted population, due to the presence of very few mature individuals. Although all species have individuals inside protected areas, tropical rainforests are perhaps the most endangered habitat on earth. Each day, some 323 km^2 of rainforests are destroyed and another 323 km^2 are significantly degraded. They are being felled for timber by logging companies and cleared by people for farming, resulting on the daily loss of some 135 plant, animal and insect species (Gay 2001). This scenario will ultimately affect all species in the Octopleura clade. Thus, the threatened category suggested by the area of occupancy (AOO) is supported by a severely fragmented habitat, and a continuing decline of habitat quality. Besides habitat destruction, no other threats are known.

Pollination and Seed Dispersal

In comparison with other tropical families, the Melastomataceae are exceedingly diverse in their floral morphology and pollination systems. Species in the Octopleura clade have hermaphroditic flowers with poricidal anthers and marked herkogamy, all of which favor allogamy. The majority of the species in the tribe Miconieae are pollinated by bees that are able to vibrate the poricidal anthers (buzz pollination) and extract the pollen from the nectarless flowers (Renner 1989, Goldenberg *et al.* 2008). This is probably also the case for all species in the Octopleura clade, based on their floral morphology.

Although allogamy is common in the Melastomataceae, there are also many apomictic and self-compatible species (Renner 1989). Apomixis appears to be more frequent in some groups of Melastomataceae than in the angiosperms as a whole (Goldenberg & Shepherd 1998, Goldenberg 2000). Most of the apomictic species of Melastomataceae belong to the tribe Miconieae (88%), and they have wider distributions than the sexual species of the same tribe (Goldenberg 2000, Mendes-Rodrigues & Oliveira 2012). If this relationship between breeding system and geographic distribution applies to the Octopleura clade, one would anticipate that the species of the clade with restricted distributions are likely to be sexual species, dependent on pollination for their reproductive success. However, studies on the reproductive biology of the endemic species are necessary to corroborate this hypothesis.

Berries of at least six species of the Octopleura clade (*Miconia albertobrenesii*, *M. approximata*, *M. laxivenula*, *M. magnifolia*, *M. neomicrantha*, and *M. varibilis*) have been reported to be consumed by numerous fruit-eating birds in the understories of Neotropical wet forests, particularly Manakins, Tanagers, Thrushes, and the orange-billed Sparrows. The reports are mainly from ecological studies in Costa Rica, and one study in Colombia. The complete list of birds consuming berries of the Octopleura clade includes fourteen passeriform species: *Arremon aurantiirostris, Chlorothraupis carmioli, Corapipo altera*, *C. leucorrhoa*, *Euphonia gouldi*, *Hylocichla mustelina*, *Manacus candei*, *Mionectes oleaginous*, *Myadestes melanops*, *M. ralloides*, *Pipra mentalis*, *Schiffornis turdina*, *Semnornis frantzii*, *Tachyphonus delatrii* (Boyle 2006, 2010, Kessler-Rios & Kattan 2012, Loiselle & Blake 1999, 2000, Stiles & Rosselli 1993, Wheelwright *et al.* 1984). From these reports it is known that most birds consume more than one melastome species during the fruiting season. In the Octopleura clade, species that co-occur have overlapping flowering and fruiting phenologies. Aggregated fruiting phenologies may be favored if local fruit abundance attracts more frugivores, enhancing seed dispersal (Kessler-Rios & Kattan 2012). To explain similar scenarios, other ecological studies have suggested that the benefits of attracting dispersers to a patch balance or outweigh the costs of competition for dispersers (Blendinger *et al.* 2008). In general, melastomes interact with a large number of bird species throughout their annual cycles, and seem to constitute pivotal elements that sustain the frugivore community in montane forests (Blendinger *et al.* 2008, Kessler-Rios & Kattan 2012).

Animal associations

Some individuals of *Miconia neomicrantha* and of a close relative (see discussion under *M. neomicrantha*) appear to have acarodomatia on the abaxial foliar surface, where the innermost pair of secondary veins diverges from the primary vein. These structures are small pocules formed by a membrane-like tissue made of basolaterally coalesced major veins in some glabrescent individuals. These acarodomatia can also be cavities with dense pubescence formed by the entanglement of squamate-stellate trichomes. Several mite eggs were found inside these structures in different specimens. *Miconia alatissima* has similar membrane-like pocules, but no mites were found in these cavities. *Miconia quadridomius* and *M. rufibarbis* have similar pubescent cavities, but they contained ants instead of mite eggs. *Miconia formicaria* is the only species in the Octopleura clade with a conspicuous formicarium at the blade base adaxially. The abaxial foliar surfaces of this species also have what may possibly be domatia reminiscent of those found in *M. neomicrantha* (cavities with fused trichomes). *Miconia biolleyana*, *M. erikasplundii* and *M. radicans* have callose thickened structures at the abaxial blade base where the primary veins diverge from one another. These structures are more conspicuous in the former species and may be acarodomatia of some kind derived from the point where the principal foliar veins converge with the petiole on the abaxial surface. Acarodomatia and/or formicaria occur in some Neotropical genera of Melastomataceae, including *Bellucia*, *Blakea*, *Chalybea* (including *Huilaea), Clidemia*, *Conostegia*, *Pachyanthus*, and *Tococa* (Mendoza & Ramírez 2006, Michelangeli 2010, Penneys 2007, Penneys & Judd 2011). Mite domatia like those in *M. alatissima* and *M.* aff. *neomicrantha*, have been named marsupiform pockets or coalesced veins in species of the tribe Blakeeae (Penneys 2007, Penneys & Judd 2011). On the other hand, specialized ant domatia like those seen in *M. formicaria* have been considered to be secondary or "leaf derived" (Michelangeli 2010). It has been suggested that by accumulating predatory mites and ants, leaf domatia act as a defense against potential herbivores. It has been reported that the presence of mites is beneficial because they consume fungal spores (O'Dowd & Willson 1991). Both ants and mites benefit from leaf domatia by securing a safe place for oviposition and molting, representing a mutually beneficial interaction between plants and arthropods (Michelangeli 2010, Walter 2004).

Taxonomic Treatment

Miconia Ruiz & Pavón (1794: 60). Type: *Miconia triplinervis* Ruiz & Pavón (1798: 105).

Octopleura Grisebach (1860a: 55). Type: *Octopleura micrantha* (Swartz 1788: 71) Grisebach (1860b: 260).

Ossaea* sect. *Bractearia Cogniaux (1891a: 1062).

Ossaea* sect. *Octopleura Cogniaux (1891a: 1064).

Erect to suberect, suffrutescent herbs, shrubs, or small trees (0.3–)0.5–8.5(–12) m tall, rarely vining or epiphytic. Branching commonly lax and open, ascending or divaricate, and sometimes sprawling over adjacent plants. Bark green to brown, not conspicuously exfoliating with age, variously covered with a caducous indumentum or glabrous. *Upper internodes* terete, compressed-rounded, rounded-quadrate, quadrisulcate, or quadrate, rarely prominently carinate or winged, sometimes somewhat bluntly grooved, internodes lacking longitudinal ridges or these rarely present. *Cauline nodes* terete, rounded-compressed or quadrate, somewhat swollen, nodal line absent or variously present, occasionally concealed by the dense indumentum, sometimes ridged or forming a flap-like appendage. *Principal leaves* opposite, decussate, each pair isophyllous or slightly to markedly anisophyllous in size, rarely also in shape; sessile, subsessile or petiolate; entire, ciliolate-denticulate, undulate-serrulate or crenulate, membranaceous to chartaceous; mature leaves adaxially green, abaxially frequently pale green, sometimes flushed red-purple, glabrous to variously densely pubescent; venation acrodromous, with one primary vein and two or three(–four) pairs of secondary veins, the innermost pair of secondary veins arising from the base of the blade or diverging from the primary vein above the base, the outer most (marginal) pair tenuous, tertiary veins percurrent, intertertiary veins distinct, reticulation visible on both surfaces, nerves adaxially impressed, abaxially elevated. *Inflorescences* erect or pendant, terminal but soon becoming pseudolateral by the elongation and overtopping growth of axillary buds, rarely constantly terminal, few-flowered to multiflorous, in congested fasciculate glomerules, pseudofasciculate cymes, groups of modified dichasia, thyrsoids or dithyrsoids with dichasial branching, accessory branches commonly present in the species with developed inflorescence branching, but not consistently among all individuals or specimens seen; *bracts* and *bracteoles* sessile, early deciduous after flowering to persistent in fruit. *Flowers* 4- or 5-merous, sessile, subsessile or pedicellate. *Hypanthia* completely to partly adnate to the ovary, rarely completely free from the ovary but tightly and fully enveloping it, subcylindric, campanulate, urceolate, or globose, occasionally constricted above the ovary into a subcylindric to campanulate neck, bluntly 8- or 10-ribbed, with an apical vascular ring (torus) from which arise the calyx, corolla and androecium. *Calyx* open in bud and persistent in fruit; calyx tube short to obsolete, cylindric; calyx lobes minute to conspicuous, rarely obsolete, triangular, rounded-triangular, oblong-triangular, ovate, ovate-oblong, oblate, orbicular or depressed-rounded, variously pubescent, erect, spreading or reflexed; exterior calyx teeth minute to conspicuous, subulate, bluntly triangular, linear, ovate, depressed-rounded or tuberculiform, shorter or longer than the calyx lobes. *Petals* free, oblong, obovate-oblong, ovate-oblong, suborbicular, lanceolate, lanceolate-triangular, or oblong-lanceolate, white, translucent-white, greenish-white, cream or pale pink, glabrous, densely papillose, or variously pubescent, the trichomes typically restricted to a central band or denser apically, spreading to commonly reflexed at anthesis, rarely somewhat erect. *Stamens* diplostemonous, isomorphic and usually forming a ring around the style; filaments linear and dorso-ventrally flattened, typically glabrous; anthers with two locules, thecae linear, oblong, subulate or clavate, with one or two dorsally inclined circular apical pore(s), white to yellow; staminal connective moderately to conspicuously thickened dorsally, typically somewhat darker than the thecae, prolonged dorso-basally beyond the base of the thecae into a deflexed gland-edged appendage, usually of the same color as the connective, the glands restricted to the edges of the appendage or present throughout the connective and appendage dorsally and occasionally also ventrally, the connective also uncommonly prolonged and glandular but unappendaged ventro-basally. *Ovary* 4- or 5-locular with axile placentation, completely to partly inferior and adnate to the hypanthium, rarely completely superior but tightly enveloped by the hypanthium, the apex somewhat depressed to conic, commonly glandular-puberulent, glandular-ciliate or glabrous, the apical collar absent or present; style straight or tapering distally, terete, typically glabrous; stigma truncate to expanded truncate or capitellate. *Berries* fleshy, globose to globose-oblate, bluntly 8- or 10-ribbed, with numerous seeds per locule, white, orange, blue, or blue-black at maturity. *Seeds* 0.26–0.78 × 0.14–0.62 mm, ovoid-angled or pyramidal, testa smooth and glossy or rugulose, light brown, yellow-brown or coppery; raphe extending 33 to 100% the length of the seed, the raphal zone not expanded, expanded ventrally and longitudinally, or only ventrally; multicellular sculpture smooth or rugose, cells arranged in an irregular pattern, microrelief punctate, striate or verrucose.

Key to the Species of the Octopleura Clade

1. Inflorescences a sessile cluster of fasciculate glomerules or a fascicle-like cluster of cymes with poorly developed branching; calyx lobes reflexed; seeds mostly >0.5 mm long, pyramidal with a rugose testa .... 2.
- Inflorescences a group of modified dichasia, a thyrsoid or a dithyrsoid, with moderate to highly developed branching; calyx lobes erect to spreading but not reflexed; seeds generally <0.5 mm long, ovoid or ovoid-angled with a smooth testa (except for *M. incerta* which has a rugose testa) .... 10.

2. Indumentum on uppermost internodes and hypanthia composed of somewhat flattened elongate slightly to moderately roughened trichomes (absent in some populations of *M. approximata*); inflorescences a sessile cluster of fasciculate glomerules with no developed branching .... 3.
- Indumentum on uppermost internodes and hypanthia composed of clavate dendritic trichomes with short to elongate thin-walled arms (if the indumentum consists of elongate-roughened trichomes then the inflorescences not a fasciculate cluster); inflorescences a fascicle-like cluster of cymes with poorly developed branching .... 7.

3. The elongate slightly to moderately roughened trichomes on uppermost internodes and hypanthia 1.5 to 3 mm long...... 4.
- The elongate slightly roughened trichomes on uppermost internodes and hypanthia less than 1.5 mm long (absent in some populations of *M. approximata*) .... 5.

4. Lanate indumentum white; leaves 5-nerved; flowers 5-merous; torus adaxially glabrous to somewhat scaly; ovaries 5-locular .... *M. chocoensis*
- Lanate indumentum ferruginous; leaves 5—7-plinerved; flowers 4-merous; torus covered adaxially with short-stalked glands; ovaries 4-locular .... *M. quadridomius*

5. Leaves apex bluntly apiculate, 5—7-plinerved, the foliar veins thick and succulent; berries 6.59–7.34 × 4.31–5.3 mm when dry, globose-elliptic to globose-obovate .... *M. veraguensis*
- Leaves apex gradually acuminate to long-acuminate, 5-nerved, the foliar veins thin and not succulent; berries 2–2.5 × 5–6 mm when dry, globose-oblate .... 6.

6. Hypanthium at anthesis 2.4–2.5 × 1.4–1.5(–2.2) mm; anthers 1.4–1.5 × 0.25–0.33 mm, linear-oblong; flowers 4-merous .... *M. approximata*
- Hypanthium at anthesis 2.8–3 × 1.5–1.7 mm; anthers 1.9–2 × 0.4–0.5 mm, oblong-obovate; flowers 5-merous .... *M. anchicayensis*

7. Petals triangular-subulate or narrowly lanceolate, the apex bluntly acute to acuminate; berries purple or purple black at maturity .... 8.
- Petals ovate-oblong or obovate-oblong, the apex bluntly and widely acute to obtuse-rounded; berries bright orange or reddish at maturity .... 9.

8. Indumentum on uppermost internodes pulverulent-furfuraceous with dendritic trichomes <0.1 mm long with short to moderately long flattened arms; indumentum on hypanthia consisting of white and resinous furrowed sessile glands; the deflexed dorso-basal connective appendage 0.25–0.5 mm long, lanceolate .... *M. alboglandulosa*
- Indumentum on uppermost internodes granulose-asperous with dendritic trichomes 0.15–2 mm long with moderately long flattened arms, occasionally intermixed with, or completely replaced by elongate slightly roughened trichomes 0.6–1 mm long; indumentum on hypanthia consisting of dendritic trichomes and resinous slightly furrowed more or less stalked glands; the deflexed dorso-basal connective appendage 1.2 mm long, linear-lanceolate .... *M. renatoi*

9. Petioles 0.3–1.5 cm long; blade base attenuate to acute; tertiary and higher order leaf veins abaxially copiously beset with white furrowed sessile glands; inflorescences 0.25–1.15 cm long; hypanthia 2–2.5 mm long .... *M. aurantiaca*
- Petioles 1.5–4.7 cm long; blade base obtuse to rounded; tertiary and higher order veins abaxially copiously beset with sessile to short-stalked glands with thin-walled heads; inflorescences 1–2.5(4.7) cm long; hypanthia 3.1–3.5 mm long .... *M. evanescens*

10. Indumentum on uppermost internodes, inflorescence axes, and hypanthia completely glandular; upper cauline internodes strongly quadrate and winged .... *M. alatissima*

- Indumentum on uppermost internodes, inflorescence axes, and hypanthia with different types of eglandular and glandular trichomes or if with only one type of trichome then uniformly stellate, lepidote, or dendritic but never glandular; upper cauline internodes terete or shallowly quadrate and not winged .... 11.

11. Leaves markedly to more or less anisophyllous in each pair, petiolate; indumentum on uppermost internodes asperous with dendritic trichomes or arachnoid with sessile-stellate trichomes; petals rounded to rounded-truncate at the apex, densely papillose on both surfaces; seeds with the raphal zone notably expanded ventrally and longitudinally .... 12.
- Leaves essentially isophyllous in each pair, petiolate or subsessile (if subsessile then the indumentum on uppermost internodes asperous with dendritic trichomes); indumentum on uppermost internodes puberulent-dendritic, mealy-furfuraceous, squamate, thickened-claviform, tomentose, or hispid; petals bluntly acute to acuminate at the apex, glabrous with trichomes only on the abaxial surface, or with trichomes on both surfaces but with different trichome types on each surface; seeds with the raphal zone only moderately expanded ventrally at one side (micropylar or chalazal)................ 19.

12. Leaves of each pair markedly anisophyllous in size and shape, with a thick-callose vesicular structure at the abaxial blade base where the innermost pair of secondary veins diverge from the primary vein; leaf margins eciliate; indumentum on primary and secondary abaxial foliar veins appearing arachnoid with sessile-stellate trichomes .... 13.
- Leaves of each pair slightly anisophyllous only in size, lacking callose vesicular structures at the abaxial blade base where the innermost pair of secondary veins diverge from the primary vein; leaf margins ciliate (except for some individuals of *M. atropurpurea*); indumentum on primary and secondary abaxial foliar veins asperous with dendritic trichomes that have a short axis and few-moderate number of terete arms .... 15.

13. Larger leaf at each node elliptic-oblong and falcate, 3–5-nerved .... *M. radicans*
- Larger leaf at each node broadly ovate to subrotund, or oval-orbicular, 5–7-nerved .... 14.

14. Hypanthia 2.8–2.9 mm long at anthesis, cylindric to campanulate and not constricted distally, resinous-glandular with slightly furrowed more or less stalked glands; calyx teeth to 0.2 mm long and not projecting beyond the calyx lobes. .... *M. erikasplundii*
- Hypanthia 3.2–3.4 mm long at anthesis, urceolate and constricted distally into a subcylindric neck, arachnoid with appressed matted sessile-stellate trichomes; calyx teeth 0.7–0.8 mm long and projecting beyond the calyx lobes............... .... *M. biolleyana*

15. Hypanthium at anthesis beset with asperous dendritic trichomes, densely intermixed with elongate smooth trichomes but lacking glands of any kind.. *M. atropurpurea*
- Hypanthium at anthesis copiously beset with resinous slightly furrowed more or less stalked glands intermixed with asperous dendritic and/or elongate smooth trichomes in variable quantities .... 16.

16. Blade base attenuate to oblique, conspicuously and narrowly decurrent on the petiole; torus copiously resinous-glandular adaxially .... 17.
- Blade base rounded to obtuse, not decurrent on the petiole; torus moderately to densely ciliate adaxially...................... 18.

17. Inflorescence axes greenish; flowers 4-merous; hypanthium green-whitish; ovary 4-locular; berries bright-orange at maturity .... *M. aguilarii*
- Inflorescence axes pinkish; flowers 5-merous; hypanthium yellowish becoming bright pink; ovary 5-locular; berries purple-black at maturity .... *M. quinquenervia*

18. Adaxial foliar surface sparsely to moderately strigose with pinkish subulate-smooth trichomes; hypanthium densely setose with pinkish subulate-smooth trichomes; exterior teeth ca. 1 mm long including the apical trichome, bluntly conic and 1–3-aristate .... *M. reitziana*
- Adaxial foliar surface glabrate; hypanthium not setose with only slightly furrowed more or less stalked glands; exterior teeth ca. 0.5 mm long, subulate and lacking aristae .... *M. neocoronata*

19. Leaves subsessile, the blade base cordate-amplexicaul, not decurrent on the petiole. .... 20.
- Leaves petiolate or subsessile, if subsessile the blade base decurrent on the petiole, if the base cordate then not amplexicaul and the leaves petiolate .... 22.

20. Leaves ovate-lanceolate; hypanthium at anthesis copiously resinous with slightly furrowed more or less stalked glands, the torus glabrous adaxially; exterior calyx teeth 1.3–1.5 mm long, linear-subulate and projecting beyond the calyx lobes....... .... *M. incerta*
- Leaves elliptic to oblong-elliptic; hypanthium not resinous-glandular, the torus copiously resinous-puberulent with slightly furrowed more or less stalked glands adaxially; exterior calyx teeth 0.2–0.5 mm, bluntly triangular and not projecting beyond the calyx lobes .... 21.

21. Leaves 5-plinerved; petals 2.5–4 mm long .... *M. palenquensis*
- Leaves 7- or 9-plinerved; petals 5.1–7 mm long .... *M. bensparrei*

22. Leaf blades bearing a conspicuous formicarium at the adaxial base .... *M. formicaria*
- Leaf blades lacking a formicarium at the adaxial base .... 23.

23. Indumentum on uppermost internodes and hypanthia puberulent-dendritic or squamate-amorphous but superficially appearing glabrous .... 24.
- Indumentum on uppermost internodes and hypanthia squamate-stellate, mealy-furfuraceous, thickened-claviform, tomentose or hispid .... 28.

24. Indumentum on uppermost internodes and hypanthia brownish-puberulent with dendritic trichomes <0.1 mm long that have short axes and few-moderate number of terete arms .... 25.
- Indumentum on uppermost internodes and hypanthia squamate-amorphous but superficially appearing glabrous, with lepidote trichomes 0.1–0.2 mm long with only partially fused radii .... 27.

25. Petiole 0.3–0.7 cm long, blades elliptic-oblong to elliptic-oval, the base acute to attenuate and conspicuously decurrent along the petiole; foliar veins areolae 4–5 mm long; calyx lobes 1.1–1.3 mm long .... *M. sessilis*
- Petioles more than 1 cm long; blades elliptic to elliptic-ovate, the base acute to obtuse and not decurrent along the petiole; foliar veins areolae 0.2–0.4 mm long; calyx lobes 0.2–0.5 mm long .... 26.

26. Flowers 5-merous; anther thecae oblong to oblong-obovate, emarginate at the apex; ovary 3/4 inferior; berries 10-costate .... *M. variabilis*
- Flowers 4-merous; anther thecae linear-oblong, obtuse to slightly emarginate at the apex; ovary 2/3 to completely inferior; berries 8-costate .... *M. neomicrantha*

27. Leaves with the innermost pair of secondary veins diverging from the primary vein 1–1.5 cm above the decurrent blade base; ovary 4-locular, 3/4 inferior; berries 8-ribbed .... *M. laxivenula*
- Leaves with the innermost pair of secondary veins diverging from the primary vein 5.5–9.5 cm above the decurrent blade base; ovary 5-locular, completely inferior; berries 10-ribbed .... *M. latidecurrens*

28. Indumentum on hypanthia squamate-stellate with lepidote-stellate trichomes (glabrous in some populations of *M. neomicrantha*), or mealy-furfuraceous and/or thickened-claviform, with a mixture of lepidote and elongate moderately roughened trichomes .... 29.
- Indumentum on hypanthia tomentose or hispid, with elongate subulate-smooth trichomes or with trichomes only roughened at the base .... 31.

29. Indumentum on uppermost internodes squamate-stellate (in some populations puberulent-dendritic, rarely glabrous); flowers 4-merous (rarely 5-merous, then the plants glabrous); anther thecae linear-oblong; ovary 4-locular; berries 8-ribbed .... *M. neomicrantha*
- Indumentum on uppermost internodes mealy-furfuraceous and/or thickened-claviform; flowers 5-merous; anther thecae oblong-obovate; ovary 5-, 6- or 7-locular; berries 10-ribbed .... 30.

30. Calyx tube 0.6–1 mm long, lobes broadly rounded and obtuse at the apex, exterior calyx teeth triangular and projecting beyond the calyx lobes; staminal connective appendage 0.25–0.3 mm long, lanceolate and bluntly acute at the apex .... *M. albertobrenesii*
- Calyx tube 0.3–0.5 mm long, lobes oblong-triangular and bluntly acute at the apex, exterior calyx teeth conic-thick and not projecting beyond the calyx lobes; staminal connective appendage 0.3–0.5 mm long, deltoid-spatulate and obtuse at the apex .... *M. boekei*

31. Inflorescences a multiflorous thyrsoid or dithyrsoid with dichasial or modified dichasial branching .... 32.
- Inflorescences an interrupted subverticillate or verticillate spike, each vertical more or less fasciculate-glomerulate ..... 33.

32. Indumentum on uppermost internodes consisting of matted subulate elongate smooth trichomes; bracts and bracteoles 1–3 × 0.4–1 mm, oblong-lanceolate or linear-oblong; staminal connective appendage oblong, 0.75–0.85 mm long .... *M. magnifolia*
- Indumentum on uppermost internodes sparsely and caducously furfuraceous with dendritic trichomes having short thin-walled (flattened) arms; bracts and bracteoles 3–5 × 2–4 mm, ovate to suborbicular; staminal connective appendage deltoid, (0.25–)0.3–0.4 mm long .... *M. bractiflora*

33. Indumentum on uppermost internodes, inflorescence axes, and hypanthia densely to copiously covered with white subulate elongate smooth trichomes, 1–1.2 mm long; leaves 5-nerved; ovary lacking an apical collar .... *M. spiciformis*

- Indumentum on uppermost internodes, inflorescence axes, and hypanthia densely to copiously covered with rusty elongate trichomes 2–3 mm long that have a conspicuously roughened base; leaves 5- or 7-plinerved; ovary apical collar present... .... *M. rufibarbis*

1. ***Miconia aguilarii*** (Kriebel & Almeda 2009: 207–211) Gamba & Almeda, *comb. nov.* Basionym: *Clidemia aguilarii* Kriebel & Almeda. Type: COSTA RICA. Prov. Puntarenas: along gravel road to microwave tower above Golfito, 0.7 m above main road, 08°39'N, 83°11'W, 90 m, 15 September 1987, *Croat 67598* (holotype: CAS!; isotype: MO).

Suffrutescent herb or shrub (0.3–)0.4–2(–3) m tall, densely or laxly branched, bark brownish. *Upper internodes* (0.6–)1.1–5.8(–8.5) cm long, terete like the cauline nodes, nodal line absent. *Indumentum* on branchlets, petioles, adaxial base of leaf surfaces, primary and secondary leaf veins, inflorescence axes, bracts, bracteoles, and pedicels densely to copiously composed of brownish subsessile or thin stipitate dendritic trichomes (0.1–)0.2–0.3(–0.42) mm long with short axes and few-moderate number of terete arms, sparsely intermixed with caducous elongate smooth trichomes up to 3 mm long. *Leaves* of each pair somewhat unequal in size; the semiterete petioles 0.4–2.5(–5.85) cm long, adaxially canaliculate; larger blades (6.3–)11–23 × (3.4–)5–11.5 cm, smaller blades 2.5–10 × 1.7–7 cm, elliptic-ovate, the base attenuate to oblique and narrowly decurrent along the petiole, the margins ciliolate-denticulate, the apex acuminate, membranaceous to chartaceous; mature leaves (adaxial surface) glabrescent except for a few elongate smooth trichomes near the margins 0.5–1 mm long, the primary, secondary, tertiary and higher order veins glabrous; abaxial surface together with the tertiary and higher order veins with a sparse and caducous resinous indumentum of slightly furrowed more or less stalked glands 0.1–0.2 mm long; 5- or 7-(9-)plinerved, including the tenuous marginals, innermost pair of secondary veins diverging from the primary vein 0.5–2.8 cm slightly asymmetrically above the decurrent base, areolae 0.8–1.5 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins slightly impressed, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated. *Inflorescences* a pseudolateral dithyrsoid 2.25–6.95 cm long, including a peduncle (0.2–)0.4–1.5 cm long, the central flower of some dichasia and of the main axis occasionally aborted, divaricately branched, borne on the upper leafless nodes, the rachis green; bracts 0.6–0.75(–1.2) × 0.15–0.25 mm, spatulate to subulate, spreading and somewhat concave, on both surfaces the indumentum sparse and caducous, densely intermixed with resinous slightly furrowed more or less stalked glands 0.1–0.2 mm long; bracteoles 0.2–0.6 × 0.1–0.3 mm, subulate, spreading, on both surfaces the indumentum dense, sparsely intermixed with resinous-glandular trichomes similar to those of the bracts; both persistent in flower and commonly deciduous in fruit. *Flowers* 4-merous, the central flower of each dichasium sessile to subsessile, the rest on pedicels 0.25–0.5 mm long. *Hypanthia* at anthesis 1.7–1.85(–2.1) × 0.8–1.15 mm, free portion of hypanthium 0.95–1.15(–1.4) mm long, urceolate, bluntly 8-ribbed, green-whitish, caducously resinous with slightly furrowed more or less stalked glands 0.03–0.05(–0.1) mm long, inner surface and torus ridged, sparsely and caducously resinous-glandular with glands like those of the hypanthium exterior. *Calyx* open in bud and persistent in fruit, light green; tube 0.25–0.35 mm long, adaxially with the same indumentum as the inner torus, abaxially as the hypanthium; lobes 0.2–0.4 × 0.5–0.8(–0.99) mm, broadly triangular, the margin vaguely undulate, the apex bluntly acute, caducously resinous-glandular on both surfaces; exterior teeth (0.1–)0.2–0.25 mm long, bluntly triangular, inserted near the base of the calyx lobes and rarely equaling them, caducously resinous-glandular on both surfaces. *Petals* 0.65–0.85(–1.25) × 0.75–1 mm, obovate-oblong, with a minute projecting infra-apical tooth on the abaxial surface, the margin repand-undulate, the apex obtuse to slightly truncate, dull-greenish to white, densely and caducously papillose on both surfaces, reflexed at anthesis. *Stamens* 8; filaments 0.9–1.4 × 0.25 mm, light-green to white, glabrous; anther thecae 1.25–1.95 × 0.25–0.5 mm, linear-oblong and subulate, truncate-acuminate at the apex, opening by one dorsally inclined pore 0.11–0.15 mm in diameter, whitish to yellow at anthesis; connective yellow, its prolongation and appendage 0.25–0.35 mm long, the appendage deltoid-spatulate, bluntly acute to obtuse at the apex, densely and caducously gland-edged, also sparsely and minutely glandular toward the center and throughout the connective. *Ovary* 4-locular, completely inferior, 0.7–0.75 mm long at anthesis, the apical collar absent, the apex ca. 0.6 mm in diameter, somewhat depressed, deciduously glandular-puberulent; style 3.5–5.5 mm long, narrowed distally (i.e. tapering), white, glabrous; stigma capitellate at anthesis (truncate when dry). *Berries* mostly 3–5 × 2.5–3.5 mm when dry, globose and slightly oblate, initially white turning bright orange when ripe, hypanthium indumentum somewhat persistent at maturity. *Seeds* 0.28–0.33 × 0.16–0.19 mm, ovoid, angled, light-brown; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone suboblong, nearly as large as the corpus of the seed, extending along its entire length, ventrally and longitudinally expanded, dark-brown; individual testa cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed, microrelief slightly punctate to smooth.

Additional specimens studied:—COSTA RICA. Guanacaste: (Nandayure), No protegida, Península de Nicoya, Bejuco, Pilas de Bejuco, Parche de bosque en cercanías de la carretera, 9°50'52"N, 85°21'27"W, 10 m, 10 March 1999, *Rodríguez & Hurtado 4599* (INB, MO); (Nandayure), Área no protegida, Pacífico Norte, Bejuco, Pilas de Bejuco, Finca de Abel Rodríguez, 9°51’38"N, 85°21’33"W, 60 m, 13 July 1994, *Estrada & Rodríguez* 10 (INB, MO). **Puntarenas:** Steep forested and partially disturbed sites above Golfito along the road to the television tower, 50–500 m, 16 July 1977, *Almeda et al. 3094* (CAS); Nicoya Peninsula, Curú, Canyons and ridges towards Punta Georgia, Punta Blanca Trail, 9°46–48’N, 84°54–58’W, ca. 100 m, 23 August 1995, *Sanders et al. 17706* (CAS, CR); Steep forested and partially disturbed sites above Golfito along the road to the television tower, 50–500 m, 16 July 1977, *Almeda et al. 3092* (CAS); P.N. Corcovado, Ridges above Río Claro, 8°28’N, 83°35’W, 0–100 m, 24 November 1981, *Knapp & Mallet 2209* (CAS, MO); (Golfito), P.N. Corcovado, Península de Osa, Estación Sirena, Sendero a Río Claro, arriba de la fila, 8°28’0"N, 83°35’0"W, 10 m, 14 October 1993, *Aguilar 2529* (CAS, CR); (Golfito), P.N. Corcovado, Península de Osa, Estación Sirena, Sendero Pavo, 8°28'50"N, 83°35’30"W, 10 m, 23 July 1994, *Aguilar 3507* (CAS, CR, MO); Osa Peninsula, Road to Carate from Puerto Jimenez, ca. 8 km S of Río Tamales, 185 m, 6 September 2005, *Penneys & Blanco* 1811 (NY); R.B. Carara, Sector Quebrada Bonita, sitio área administrativa, 9°46’10"N, 84°36’30"W, 50 m, 13 September 1990, *Zúñiga 256* (CR, NY, MO); (Aguirre), No protejida, Cuenca del Naranjo y Paquita, Manuel Antonio, Finca Anjalí, 9°24’16"N, 84°9’16"W, 150 m, 12 November 2006, *Solano & Solano 3527* (INB, NY); P.N. Manuel Antonio, Quebrada Camaronera, 9°23’N, 84°9’W, 1 m, 3 August 1990, *Harmon 136* (CAS, CR, MO); P.N. Corcovado, Ollas Trail, 8°27–30’N, 83°33–38’W, 0–150 m, 26 July 1988, *Kernan & Phillips 717* (CAS, CR, MO); P.N. Corcovado, Ollas trail, 8°27–30’N, 83°33–38’W, 0–100 m, 10 January 1989, *Kernan & Phillips 883* (CR, MO); (Golfito), P.N. Corcovado, Península de Osa, Estación Sirena, alrededores de la estación y del Sendero La Olla, 8°28’0"N, 83°35’0"W, 10 m, 26 October 1990, *Fonseca 9* (CR, MO); (Golfito), P.N. Corcovado, Península de Osa, Estación La Leona, junto a Río Madrigal, 8°27’0"N, 83°29’30"W, 100 m, 19 January 1993, *Aguilar 1603* (CR, MO); P.N. Corcovado, Osa Peninsula, 0 km to 2 km W of the park headquarters at Sirena, 8°29’N, 83°36’W, 0–200 m, 5 July 1977, *Liesner 2912* (MO); (Golfito), P.N. Corcovado, Península de Osa, Sendero Río Claro, 8°28’50"N, 83°35’30"W, 10 m, 12 September 1998, *Aguilar 5542* (INB, MO); Littoral woods E of Punta Voladora, near entrance to Golfito Bay, 8.38°’N, 83.11°’W, 24 July 1977, *Webster 22037* (MO); (Golfito), R.F. Golfo Dulce Los Mogos, 8°45’30"N, 83°22’30"W, 100–200 m, 5 September 1991, *Aguilar 335* (CR, MO); Along gravel road to microwave tower above Golfito, 0.7 km above main road., 8°39’N, 83°11’W, 90 m, 15 September 1987, *Croat 67598* (MO); R.N.A. Cabo Blanco, Península de Nicoya, Estación San Miguel, límite de la Reserva, 9°35’42"N, 85°7’13"W, 355 m, 10 February 1987, *Alvarado 115* (INB, MO); P.N. Corcovado, Sirena, Río Claro Trail, 8°27–30’N, 83°33–38’W, 0–150 m, 11 February 1988, *Kernan 109* (MO); Punta Catedral, ca. 7 km SE of Quepos, 9°22.5’N, 84°9’W, 20–70 m, 20 August 1985, *Grayum et al. 5896* (CAS, MO); R.B. Carara, Sendero Quebrada Bonita-Bijagual, Sitio Montaña Jamaica, 9°46’10"N, 84°33’50"W, 550 m, 8 December 1989, *Zúñiga et al. 18* (CAS, CR, MO); P.N. Corcovado, Golfito, Estación Sirena, al borde de bosque primario, 8°29’0"N, 83°36’0"W, 2 m, 1 October 1990, *Saborio et al. 78* (CAS, CR, MO); (Golfito), P.N. Corcovado, Península de Osa, Sirena, 8°28’0"N, 83°35’0"W, 1–20 m, 15 June 1990, Maass 37 (CAS, CR, MO); R.N.A. Cabo Blanco, Estación Cabo Blanco, 9°35’N, 85°6’W, 20–100 m, 4 November 1991, *Chavarría 305* (CAS, CR, MO); Punta Banco, 0–200 m, 22 August 1988, *Chavarría-Díaz et al. 266* (CR, MO); Corcovado N.P., Osa Peninsula, Primary forest on hills 0 km to 1 km W of the park headquarters at Sirena, 8°29’"N, 83°36’"W, 0–200 m, 4 July 1977, *Liesner 2834* (MO); R.B. Carara, Estación Quebreda Bonita, 30 m, 29 September 1983, *Chacón 1398* (CR, MO); (Puntarenas), R.N.A. Cabo Blanco, Península de Nicoya, Sendero Central, 9°35’0"N, 85°7’0"W, 0–200 m, 17 December 1993, *Fernández et al. 1315* (MO, INB); (Golfito), P.N. Corcovado, Península de Osa, Estación Sirena, Alrededor de Sendero Ollas, 8°28’50"N, 83°35’30"W, 10 m, 6 February 1994, *Aguilar 3076* (CAS, INB); (Puntarenas), Estación San Miguel, ca 2 km S de Malpais, 9°35’40"N, 85°7’50"W, 0 m, 18 January 1996, *Hammel 20091* (CAS). **San José:** (Turrubares), Valle del Tárcoles, SE de San Luis, entre Quebrada Zorrillal y Cerro San Luis, 9°50’20"N, 84°28’40"W, 600–950 m, 20 December 1995, *Hammel & González 20033* (CR, MO); (Ciudad Colón), Zona Protectora El Rodeo, 9°54’N, 84°16’W, 600 m, 4 August 1992, *Varela 241* (CAS, CR, MO). **PANAMA. Chiriquí:** (San Bartolo), Burica

Peninsula, Near costa Rica border, 12 mi W of puerto Armuelles, 400–500 m, 24 February 1973, *Croat 22197* (MO); Burica Peninsula, Quebrada Quanabanito, 1 km W of the dam at la Represa, 20 February 1973, *Busey 480* (MO); Vicinity of Puerto Armuelles, 0–75 m, 28 July 1940, *Woodson & Schery 855* (MO); Burica Peninsula, Quebrada Tuco, 9 mi S of Puerto Armuelles, 0–150 m, 21 February 1973, *Liesner 171* (MO); (San Bartolo), Burica Peninsula, 20 km W of Puerto Armuelles, 400–600 m, 22 February 1973, *Busey 563* (MO); Burica Peninsula, Quebrada Merida, 4mi S Puerto Armuelles, 0–100 m, 3 March 1973, *Liesner 392* (MO). **Los Santos-Veraguas:** Mountains of southern Azuero Peninsula, near proposed route of road from El Cortezo (Prov, Los Santos), to Arenas (Prov, Veraguas), 0–5 km SW of El Cortezo, 305 m, 29 October 1978, *Hammel 5461* (CAS, MO). **Veraguas:** (Isla de Coiba), Campamento de La Salina, subida hacia Río Negro, 5 m, 21 October 1995, *Aranda et al. MB1345* (CAS, MO).

Illustration:—Kriebel & Almeda (2009): 208, fig. 1.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—*Miconia aguilarii* is known from the Pacific slope of Costa Rica and Panama (Fig. 11), at 0–600(–950) m, where it grows in the understory of primary or secondary rain forest, and along banks of rocky streams. Among the collections studied, it has been considered locally common to occasional. In Costa Rica, it is widely distributed, ranging from the Nicoya Peninsula on the northern Pacific coast, through the central Pacific lowlands in El Rodeo Protected Ciudad Colón Zone, south to the Osa Peninsula. In Panama it is known from few collections in a region ranging from the Burica Peninsula south to Coiba Island, and at the border between Los Santos and Veraguas in the mountains of southern Azuero Peninsula.

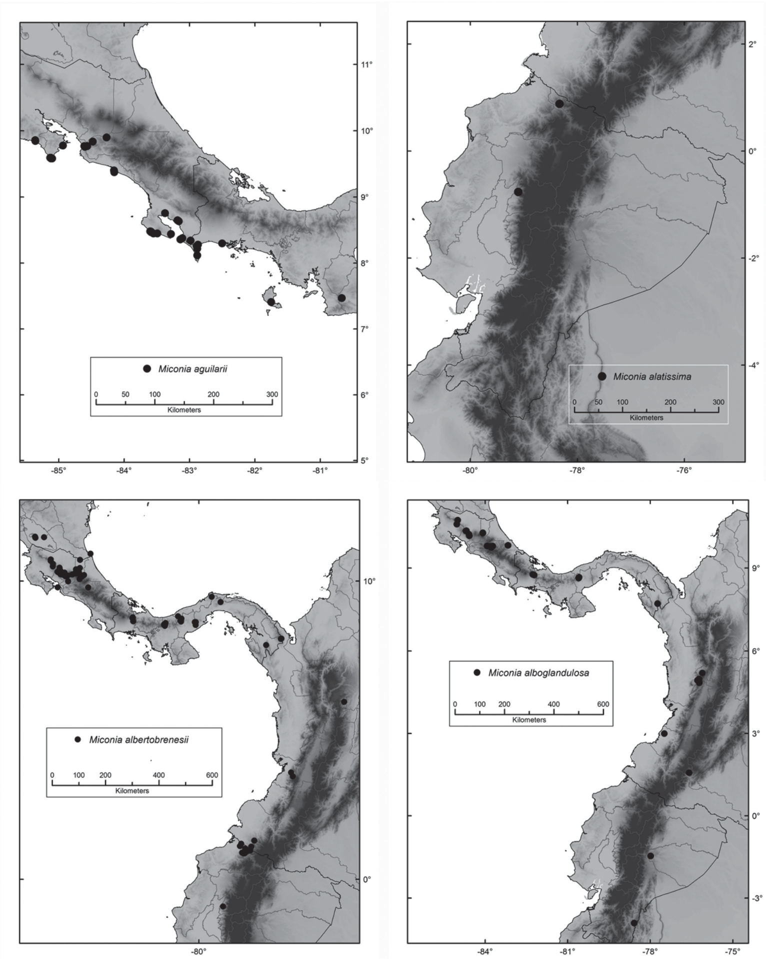


FIGURE 11. Distributions of *Miconia aguilarii*, *M. alatissima*, *M. albertobrenesii*, and *M. alboglandulosa*.

Phenology:—Collected in flower from January through March and from June through October; in fruit from July through February.

Etymology:—The specific epithet honors Costa Rican botanist Reinaldo Aguilar, whose explorations of the Osa Peninsula have contributed much to our knowledge of that region's rich rain forest flora.

Discussion:—*Miconia aguilarii* was long overlooked and commonly determined as *Ossaea quinquenervia* or *Clidemia quinquenervia*, synonyms of what is here treated as *Miconia quinquenervia*. Within the Quinquenervia subclade both are part of a closely related group of species that includes *M. reitziana* (Fig. 1). Within this subclade, *M. aguilarii* and *M. quinquenervia* are vegetatively very similar, especially in characters of pubescence (rusty-asperous indumentum mixed with simple trichomes) and leaves (margins ciliolate-denticulate, base decurrent on the petiole). Their inflorescence architecture is also identical. The consistent differences between these two species include flower merosity (4-merous in *M. aguilarii* vs. 5-merous in *M. quinquenervia*), exterior calyx teeth (not setose vs. setose), and the color of immature hypanthia (green-whitish vs. yellowish becoming bright pink). The most outstanding difference is the color of the mature berries (bright orange vs. purple-black) (Kriebel & Almeda 2009).

In this study, additional specimens belonging to *M. aguilarii* were found among collections of *M. quinquenervia* received on loan, particularly from the Burica Peninsula in Chiriquí Province (Panama, Pacific side), a locality from which *M. aguilarii* had not been reported previously. Although *M. quinquenervia* is more widespread than *M. aguilarii* (ranging from Honduras south through Central America, to Colombia, Venezuela and Ecuador), its restriction to the Caribbean slopes of Central America is consistent with its reported distribution in Costa Rica and Panama, where it is also only known from the Caribbean slope (Kriebel & Almeda 2009).

This species, which is common in the understory of tropical forests, appears to be tolerant of deep forest shade. Accordingly, it may flower when less than 1 m tall and consequently the labels on at least seven collections examined describe the habit as herbaceous. This is common among other species in the Octopleura clade, including *M. reitziana*, which is also apparently tolerant of deep shade and has been described as a suffrutescent herb.

When rehydrated buds of immature flowers where examined, it was found that in at least four (*A.C. Sanders et al. 17706*, CAS!), the undeveloped stamens ranged from nine to 11. Further studies of flower development in *M. aguilarii* would clarify if these stamens are aborted before anthesis, or if the number of stamens is variable within the species. On mature flowers, the number of stamens was consistently eight.

Conservation status:—Based on IUCN criteria (AOO), this species would be considered Endangered EN B2ab(iii). However, it occurs in many protected areas, warranting a status of Least Concern LC. In Costa Rica it is protected in the Cabo Blanco Absolute Reserve, Curú Wildlife Refuge, El Rodeo Protected Zone, and Carara, Manuel Antonio and Corcovado National Parks (Kriebel & Almeda 2009). In Panama it is only protected in the Coiba National Park.

2. ***Miconia alatissima*** Gamba & Almeda, *spec. nov.* (Fig. 19)

Distinguished by the dense vegetative and hypanthial indumentum consisting of white furrowed glands, and prominently winged internodes.

Type: ECUADOR. Prov. Carchi: Tulcán, Reserva Indígena Awá, Comunidad El Baboso, 12 km al N de Lita, 00°53’N, 78°20’W, 1600 m, 20 September 1991, *Rubio et al. 2176* (holotype: MO!; isotype: US!, QCNE-internet image!).

Tree 6 m tall. *Upper internodes* quadrate, 1.7–2.3 cm long, conspicuously winged, cauline nodes strongly quadrate with a prominent nodal ridge that is confluent with the petiole. *Indumentum* on branchlets, petioles, primary, secondary, tertiary and higher order veins abaxially, inflorescence axes, bracts, bracteoles, hypanthia, calyx lobes and calyx teeth densely to copiously composed of a mixture of white furrowed subsessile glands and a resinous-glandular squamate-amorphous indumentum (these appearing like brown amorphous glandular scales), both ca. 0.08–0.1 mm long. *Leaves* of each pair isophyllous; the quadrate petiole 1.9–3.3 cm long, deeply canaliculate adaxially, bluntly ridged abaxially; blades 16.8–22.2 × 7.2–9.9 cm, elliptic to more or less obovate-elliptic, the base acute, the margin entire to obscurely crenulate, the apex bluntly acuminate, chartaceous; adaxial surface of mature leaves, primary, secondary, tertiary and higher order veins sparsely beset with resinous short stalked glands 0.2 mm long with thin-walled elongate heads; abaxial surface glabrous except for a few glands on the venules; 5-plinerved, including the tenuous marginals, innermost pair secondary veins diverging slightly asymmetrically from the primary vein 0.5–1 cm above the base, areolae ca. 2 mm, adaxially the primary vein impressed and canaliculate, the secondary, tertiary and higher order veins impressed, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly raised. *Inflorescences* a terminal dithyrsoid 16–24.5 cm long, including a quadrate peduncle 1.81–6 cm long, the paracladia multiflorous and highly branched, erect and spreading, 3–5-furcate from the peduncle apex, the rachis and secondary axes quadrate and ridged with conspicuous linear outgrowths at the inflorescence nodes, along with bracts and bracteoles, the resinous-glandular squamate-amorphous indumentum seemingly composed of resinous slightly furrowed more or less stalked glands (probably deformed during the drying process); bracts 0.65–0.8 × 0.4–0.5 mm, oblong to oblong-triangular, the margin inconspicuously serrulate, somewhat swollen at the base to the area of insertion, the swollen bases of each pair of bracts confluent with the pedicel base to form a swollen ring, early deciduous at anthesis and leaving conspicuous scars; bracteoles 1.4 × 0.3 mm, spatulate-oblong, early deciduous at anthesis. *Flowers* 5-(6-) merous on pedicels 0.3–0.5 mm long. *Hypanthia* at anthesis 2.5–2.6 × 1 mm, free portion of hypanthium to 1 mm long, campanulate, obscurely 10-ribbed, ridged on the inner surface, glabrous, the torus adaxially sparsely glandular-puberulent, the glands rounded and sessile. *Calyx* open in bud and persistent at anthesis; tube 0.5 mm long, vaguely undulate, with the same vestiture as the torus adaxially and the hypanthium abaxially; lobes to ca. 1 mm long or obsolete, the margin vaguely undulate, the apex blunt, cream, glabrescent adaxially; exterior calyx teeth <0.1 mm long, inconspicuously linear-tuberculiform, inserted at the base of the calyx lobes or the tube, not projecting or barely equaling the lobes. *Petals* 4.5 × 0.4 mm, oblong, the margin entire, the apex rounded, cream, densely papillose on both surfaces, erect to slightly spreading at anthesis. *Stamens* 10; filaments 1.8–2 × 0.25 mm, cream, sparsely beset with short to somewhat elongate stalked glands with thin-walled short heads; anther thecae 1.5–2 × 0.3–0.5 mm, oblong-subulate, slightly compressed laterally, bluntly acuminate at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, cream; connective darker than the thecae when dry, its prolongation and appendage 0.5 mm long, the appendage oblong and somewhat enveloping the filament, the margin obscurely cleft, rounded-truncate at the apex, the surface minutely and sparsely resinous glandular, the glands covering the entire connective extension, the connective also somewhat prolonged and resinous-glandular but unappendaged ventro-basally. *Ovary* 5-locular, 3/4 inferior, 2.4–2.5 mm long at anthesis, the apical collar absent, the apex 0.3–0.4 mm in diameter, somewhat conic-truncate with a slightly raised perimeter, glandular-puberulent; style 6 mm long, parallel-sided (i.e. terete), white, glabrous; stigma expanded truncate to capitellate. *Berries* and *seeds* not seen.

Additional specimens studied:—ECUADOR. Cotopaxi: (Cantón La Maná), Reserva Ecológica Los Illinazas, Cerro Tilipulo, vertiente N, Cordillera Tilinche, bosque primario, 0°45’46”S, 79°06’14”W, 1375 m, 24 July 2003, *Silverstone-Sopkin et al. 9409* (CAS, CUVC).

Illustration:—Fig. 18.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—This species is known from only two collections, one at the Awá Reserve in Carchi and another from the Illinazas Ecological Reserve in Cotopaxi, Ecuador (Fig. 11). It grows in flat areas of primary premontane rainforests at 1375–1600 m.

Phenology:—Collected in flower in September, and in fruit in July.

Etymology:—The specific epithet refers to the prominently winged internodes.

Discussion:—*Miconia alatissima* differs in the dense indumentum on vegetative parts and hypanthia which consist of white furrowed glands combined with resinous glands or scales. It is also distinctive in having prominently winged and quadrate cauline internodes and densely papillose petals. One collection of this new species was misidentified as *M. variabilis* which has a totally different indumentum and anther morphology. The combination of furrowed glands and papillose petals may indicate that this species is more closely related to those belonging either to the Quinquenervia subclade, or to the Approximata subclade.

Conservation status:—Critically endangered CR D. Known only from two protected areas in Ecuador; in the Awá Ethnic Reserve and in the Illinazas Ecological Reserve. No recent collections from the type area locality seen in this study.

3. *Miconia albertobrenesii* Gamba & Almeda, *nom. nov.* Basionym: *Ossaea brenesii* Standley (1938: 835). Type: COSTA RICA. Prov. Alajuela: Los Ángeles de San Ramón, camino a la finca Johanson, 4 May 1928, *Brenes 6160* (holotype: F!; isotypes: CR, NY!). Nec *Miconia brenesii* Standley (1938: 816–817).

Leandra lepidota Gleason (1939b: 341). Type: COSTA RICA. Prov. Alajuela, in rain forest at Villa Quesada, 240 m, 28 February 1938, *Smith H-1735* (holotype: NY; isotype: F-internet image!).

Subshrub or tree (0.5–)1–9 m tall, moderately and openly branched, bark light green. *Upper internodes* rounded-quadrate, 1.9–4.9(–7.2) cm long, cauline nodes terete, nodal line present but concealed by the dense pubescence. *Indumentum* on branchlets, petioles, primary, secondary, tertiary and higher order veins abaxially, inflorescence axes, bracts, bracteoles, hypanthia, calyx lobes, calyx teeth, and petals abaxially densely to moderately composed of single-tiered lepidote trichomes 0.13–0.15 mm in diameter with radii nearly completely fused, seemingly mealy-furfurceous, typically copiously intermixed with elongate moderately roughened trichomes up to1 mm long, each trichome claviform and somewhat thickened. *Leaves* of each pair isophyllous; the thick petioles 1.5–2.9(–3.8) cm long, adaxially canaliculate and somewhat depressed, rounded abaxially; blades 13–25(–36) × 7.5–13.5(–22) cm, elliptic to ovate-elliptic, the base acute, the margin entire to obscurely undulate-crenulate, the apex acute to acuminate, chartaceous; mature leaves adaxially with surface at first sparsely covered with the mealy-furfuraceous general indumentum but soon becoming glabrate, primary, secondary, tertiary and higher order veins glabrous; abaxial surface glabrous, the tertiary and higher order veins completely lacking the elongate roughened trichomes; 5- or 7-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging asymmetrically from the primary vein 0.6–1.2(–6) cm above the base, areolae 0.2–0.3 mm, adaxially the primary, secondary, tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated. *Inflorescences* an erect pseudolateral thyrsoid 5.5–13 cm long, including a peduncle (1–)2(–3.3) cm long, highly and divaricately branched from the peduncle apex, borne on the upper foliar axils, the rachis thick and whitish; bracts 1.5–2 × 0.85–1 mm, elliptic ovate to lanceolate, concave, with conspicuous parallel venation, adaxially glabrate, abaxially with a denser indumentum forming a central band, becoming sparse toward the margins, early deciduous at anthesis; bracteoles 1.5–2.5 × 0.6–0.9 mm, oblong-oblanceolate, acute at the apex, concave, with conspicuous parallel venation, the indumentum like that of the bracts, early to tardily deciduous in fruit. *Flowers* 5-merous, sessile. *Hypanthia* at anthesis 2–2.7 × 1.2–1.5(–1.8) mm, free portion of hypanthium 1–1.5(–1.9) mm long, suburceolate to globose in fruit, bluntly 10-ribbed, green-white, ridged on the inner surface, minutely glandular, the glands somewhat translucent, sessile and rounded, the torus glabrous adaxially. *Calyx* open in bud and persistent in fruit, green-white; tube 0.6–1 mm long, glabrous adaxially and as the hypanthium abaxially; lobes 0.3–0.5 × 1.3–1.45 mm, broadly rounded, the margin vaguely undulate, the apex rounded-obtuse; exterior calyx teeth 1–2 mm long, triangular, inserted on the apical half of the lobes and projecting beyond them. *Petals* 2.4–2.9 × 1–1.4 mm, oblong-lanceolate, the margin entire, the apex bluntly acute, white, adaxially slightly papillose on the basal-central portion, abaxially glabrous at the margins, reflexed at anthesis. *Stamens* 10; filaments 1.5–2 × 0.25 mm, white, glabrous; anther thecae 1–1.5 × 1–1.3 mm, oblong-obovate, emarginate at the apex, opening by two dorsally inclined pores 0.15–0.2 mm in diameter, pale yellow to yellow, browning with age; connective pale yellow to greenish, its prolongation and appendage 0.25–0.3 mm long, the appendage lanceolate, bluntly acute at the apex, copiously glandular at the edges and on both surfaces, the glands rounded and stalked. *Ovary* 5-(6-) locular, completely inferior, 1–1.2 mm long at anthesis, the apical collar 0.3–0.5 × 0.25–0.32 mm, slightly depressed and bluntly ridged, sparsely glandular-puberulent; style 5.5–8 mm long, parallel sided (i.e. terete), white, glabrous; stigma expanded truncate to capitellate at anthesis. *Berries* 3–4.5 × 4–5 mm when dry, globose-oblate, white when ripe, the hypanthial indumentum persistent at maturity. *Seeds* 0.3–0.41 × 0.15–0.21 mm, ovoid, angled, brownish; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone suboblong to sublinear, ca. 90% the length of the seed, ventrally expanded toward the micropyle; appendage absent, but a small protuberance is sometimes present; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed, microrelief inconspicuously striate.

Additional specimens studied:—COLOMBIA. Antioquia: (San Francisco), Aquitania, Tierra Fría, 1150–1250 m, 5 April 1992, *Fonnegra et al. 4312* (HUA, MO, US). **Nariño:** (Barbacoas), Altaquer, El Barro, R.N. Río Ñambí, Vertiente Occidental Andina, margen derecha del Río Ñambí, 1°18’N, 78°8’W, 1325 m, 3 December 1993, *Betancur et al. 4415* (COL, NY); (Barbacoas), Altaquer, El Barro, R.N. Río Ñambí, Vertiente Occidental Andina, margen derecha del Río Ñambí, 1°18’N, 78°8’W, 1325 m, 5 December 1993, *Betancur et al. 4614* (COL, MO); (Barbacoas), Altaquer, El Barro, R.N. Río Ñambí, Vertiente occidental andina, margen derecha del Río Ñambí, 1°18’N, 78°8’W, 1325 m, 2 December 1993, *Franco et al. 4748A* (COL, US). **Valle:** Alto Yunda, Río Anchicayá, 1000 m, May 1972, *Hilty M-129* (ARIZ, US); (Dagua), Queremal, P.N.N. Farallones, Alto Anchicayá, Trail off of (upslope) Quebrada La Riqueza, Cordillera Occidental, vertiente occidental, 3°35.683’N, 76°53.521’W, 550–650 m, 6 February 2011, *Almeda et al. 10257* (CAS, COL). **COSTA RICA. Alajuela:** Forested slopes and roadside about 19 km N of San Ramón, 16 January 1968, *Wilbur & Stone 9697* (F, US); (Guatuso), No protegida, Cuenca del Zapote, Sendero Misterios del Tenorio, colectado a orillas del sendero, 10°42’52.3"N, 84°59’13"W, 708 m, 18 January 2002, *Chaves & Alvarado-Méndez 1389* (INB, NY); 17–20 km NNW of San Ramón by road on way to San Lorenzo, 4 to 7 km N of Balsa, 10°13’N, 84°32’W, 750 m, 24 April 1983, *Liesner & Judziewicz 14697*

(CAS, MO); (San Ramón), R.B. Alberto Brenes, No protegida, Cuenca del San Carlos, Estación San Lorencito, 10°13'26.63"N, 84°35'20.028"W, 900 m, 3 May 2000, *Caballero et al. 5* (INB, MO); Cordillera de Tilarán, Along road from San Ramón to Bajo Rodríguez, at Río Cataratas, 10°13'N, 84°16'W, 600–700 m, 27 September 1987, *Croat 68114* (CAS, MO); About 20–30 km SE of Cataratas de San Ramón, 655–762 m, 20 March 1978, *Almeda et al. 4313* (CAS); Monteverde R., Atlantic slope, Río Peñas Blancas valley, 1100 m, 20 November 1984, *Haber 1013* (CAS, MO, NY); Collected from a very moist upland forest along the Río La Balsa about 23 km NE of San Ramón, 850 m, 29 December 1974, *Taylor 17820* (NY, US); (Guatuso), Bijagua, P.N. Volcán Tenorio, Cuenca del Río Frío, Estación El Pilón, Bijagua, 10°42'0"N, -85°0'0.0001"W, 800 m, 22 March 2005, *Santamaría & Méndez-Briones 1230* (INB, NY); (San Ramón), Colonia Palmarena, R.B. Manuel Brenes, No protegida, Cuenca del San Carlos, Estación San Lorenzo, 10°12'55"N, 84°35'20.0001"W, 850–1100 m, 31 May 1996, *Rodríguez 1134* (INB, NY); (San Carlos), Villa Quesada, 28 February 1939, *Smith 175* (NY); (Guatuso), P.N. Volcán Tenorio, Cuenca del Río Frío, Alto Masis, 10°40'17"N, -84°59'25"W, 1200 m, 6 April 2000, *Chaves & Muñoz 325* (INB, MO, NY); Primary forest along Río Sarapiquí, near bridge on road to Colonia Virgen del Socorro, 740 m, 31 August 1969, *Lent 1771* (MO, NY); 20 February 1933, *Brenes 17108* (NY); Forest 18 km N of San Ramón on road through Los Angeles, 1200 m, 11 June 1970, *Luteyn 714* (MO, US); R.B. Monteverde, Río Peñas Blancas, Sociedad IQPSA, Ston's, 10°19'N, 84°43'W, 800 m, 1 March 1990, *Bello 1985* (CAS, CR, INB, MO); (Alajuela), Cuenca del Sarapiquí, Virgen del Socorro, 10°15'25"N, -84°10'20.0001"W, 800 m, 21 July 2002, *Kriebel 545* (INB, MO); Cordillera de Tilarán, Along road from San Ramón to Bajo Rodríguez, 17 km NW of San Ramón, 10°14'15"N, 84°33'0"W, 785 m, 27 September 1987, *Croat 68142* (CAS, MO); R.B. Monteverde, Río Peñas Blancas, Vertiente Atlántica. Finca de Klaus Stein, 10°18'N, 84°45'W, 900 m, 4 July 1988, *Bello 157* (CAS, CR, MO); Bosque Eterno de los Niños, Atlantic slope, Río Peñas Blancas valley, Laguna Poco Sol, 10°21'N, 84°40'W, 840 m, 27 April 1992, *Haber & Zuchowski 11160* (INB, MO); (San Ramón), Bosque Eterno de los Niños, Cordillera de Tilarán, Valle del Río Peñas Blancas, Refugio Fernando Villalobos, 10°22'15"N, 84°42'10"W, 1000–1100 m, 8 October 1993, *Bello & Cruz 5381* (CAS, MO); (San Ramón), No protegida, Cuenca del San Carlos, Calle principal hacia Los Lagos, 10°13'0"N, -84°35'10.0001"W, 900–1000 m, 4 May 2000, *Hernández 7* (INB, MO); (Guatuso), P.N. Volcán Tenorio, Cuenca del Río Frío, Sector Los Teñideros y Laguna La Carmela, 10°42'16.572"N, -84°59'32.294"W, 800 m, 27 June 2001, *Chaves 1221* (INB, MO); (Guatuso), P.N. Volcán Tenorio, Cuenca del Río Frío, Alto Masís, 10°40'17"N, -84°59'25"W, 1200 m, 4 November 2000, *Chaves & Muñoz 975* (INB, MO); (San Ramón), Cuenca del San Carlos, Curso de plantas, 10°13'0"N, -84°35'20.0001"W, 800–900 m, 11 August 2002, *Kriebel 886* (INB, MO); R.F.de San Ramón, In the valley of the Río Lorencito, Formations on the Caribbean slope, 10°13'N, 84°37'W, 850–950 m, 26 February 1988, *Burger et al. 12459* (MO); (Guatuso), P.N. Volcán Tenorio, Cuenca del Río Frío, Alto Masís, 10°40'17"N, -84°59'25"W, 1200 m, 13 February 2001, *Chaves 1139* (INB, MO); Along road from San Ramón northward through Balsa, ca. 13.8 km N of bridge over Quebrada Volio and ca. 4.6 km N bridge over (apparently) Río Balsa, at small stream (Río San Luis?), 10°12'N, 84°31'W, 900–1000 m, 29 August 1979, *Stevens 13752* (CAS, MO); Monteverde R., Atlantic slope, Río Peñas Blancas valley, 960 m, 22 November 1984, *Haber 984* (MO); (San Carlos), La Fortuna, Finca El Jilguero, Borde cratérico, Volcán Chato, sector S, 10°26'35"N, 84°41'25"W, 1140 m, 1 December 1992, *Herrera 5708* (CR, US); R.F.de San Ramón, Approximately 40 km by road from the church in San Ramón and about 20 km beyond the Río Cataratitas, 900–960 m, 21 March 1986, *Almeda et al. 5677* (CAS); (San Ramón), R.F.de San Ramón, 1350–1500 m, 18 February 1983, *Carvajal 337* (CAS, CR); About 9.7 km N of Los Angeles de San Ramón, Near Río La Balsa, 914 m, 23 February 1978, *Almeda & Nakai 3845* (CAS). **Cartago:** Valle Escondido, By 1.5" dbh, on A-terrace of river, 700 m, 30 March 1966, *Schnell 621* (US); (Jiménez), Turrialba, El Humo, No protegida, Cuenca del Reventazón, Albergue El Copal, 9°47'15.5377"N, -83°45'10.002"W, 1000–1100 m, 14 September 2007, *Santamaría & González 6399* (INB, NY); (Jiménez), Refugio de Vida Silvestre La Marta, No protegida, Cuenca del Reventazón, 9°47'15"N, -83°43'30"W, 700–800 m, 20 September 2003, *Solano et al. 152* (INB, MO). **Guanacaste:** (Tilarán), No protegida, Cuenca del San Carlos, Sector Lago Cote, 10°34'15"N, -84°54'50"W, 680 m, 12 March 2000, *Chaves 312* (INB, MO, NY). **Heredia:** (Sarapiquí), Rara Avis, ca 15 km al SW de Horquetas, Sendero Tigre just NE of Quebrada El Tigre, 10°17'N, 84°2'W, 400 m, 10 July 1989, *Vargas & Frazee 24* (CAS, CR, MO); In forest on ridge overlooking canyon of the Río Sarapiquí near the bridge on the road to La Virgen del Socorro, 8 May 1982, *Hammel 12128* (CAS, MO); 8 km E of San Ramón, 10°20'N, 84°4'W, 500 m, 1 September 1985, *Loiselle 110* (MO); (Sarapiquí), Along Río San Fernando between Cariblanco and Colonia del Socorro, 10°15'N, 84°10'W, 900–1000 m, 12 July 1983, *Barringer et al. 3714* (CAS, CR); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Along Quebrada El Salto S boundary, 100 m, 27 September 1980, *Hammel 9870* (CAS); (Sarapiquí), No protegida, Cuenca del Sarapiquí, Rara Avis Lodge and Atlantic slope of Costa Rica (área protegida privada), 10°16’55"N, -84°2’40.5"W, 700 m, 9 June 2001, *Boyle & Repasky 47* (INB, MO); Primary forest between Río Peje and Río Sardinalito, Atlantic slope of Volcán Barva, 10°17.5’N, 84°4.5’W, 700–750 m, 5 April 1986, *Grayum & Jermy 6807* (MO); (Sarapiquí), R. Rara Avis (área protegida privada), No protegida, Cuenca del Sarapiquí, Within 1 km of waterfall cleaning, 10°16’55.1"N, -84°2’40.5"W, 700 m, 20 June 2002, *Boyle et al. 169* (INB, MO); (Sarapiquí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Transect trail to left of trail, aprox. 45 min walk above refuge at 1070 m elevation, Transect 1250–1, 10°15’14"N, 84°4’58"W, 1070–1250 m, 8 April 1997, *Boyle et al. 4112* (INB, MO); 9 km SE of San Ramón, 10°16’N, 84°5’W, 1000 m, 1 March 1986, *Loiselle 176* (MO); (Sarapiquí), La Virgen, P.N. Braulio Carrillo, Puesto La Ceiba, Sendero Las Juntas, 10°20’N, 84°5’W, 450–500 m, 18 November 1988, *Ballestero 15* (CR, MO); 11 km E de Cariblanco, 10°16’N, 84°5’W, 1060 m, 1 April 1987, *Loiselle 309* (MO); 11 km E de Cariblanco, 10°16’N, 84°5’W, 1060 m, 1 January 1987, *Loiselle 247* (MO); (Horquetas de Sarapiquí), R. Rara Avis, Sendero Guácimo, 10°17’3"N, 84°2’47"W, 700 m, 23 July 1995, *Martén 970* (CR, MO); 8 km E of San Ramón, 10°20’N, 84°4’W, 500 m, 1 April 1986, *Loiselle 192* (MO); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Q. El Salto, at S boundary, 100 m, 30 August 1980, *Hammel 9633* (CAS); P.N. Braulio Carrillo, Sendero del transecto, Inmediately to right trail, one half hour below refugio at 1070 m, Transect 1000–1, 10°16’38"N, 84°4’57"W, 1000 m, 25 November 1992, *Boyle 1318* (CAS, INB). **Heredia or San José:** Estación Carrillo, De 700 a 450 m de la Fila al Cañón del Río Sucio, 12 November 1983, *Chacón & Herrera 1680* (CAS, CR, MO). **Limón:** (Pococí), P.N. Braulio Carrillo, Cordillera Central, Estación Quebrada González, Sendero Botarama, 10°9’20"N, 83°56’30"W, 500 m, 23 February 1994, *Hammel et al. 19462* (CAS, CR); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Sector Quebrada González, sendero Las Palmas, 10°9’20"N, -83°56’30.0017"W, 600 m, 29 July 2008, *Kriebel 5318* (INB, NY); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Estación Quebrada González, a lo largo del Sendero Palmas, 10°9’50"N, 83°56’20"W, 500 m, 22 January 1998, *Rodríguez et al. 2900* (INB, MO); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Estación Quebrada González, 10°9’50"N, -83°56’20.0001"W, 470 m, 15 May 2002, *Kriebel 205* (INB, MO); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Carretera a Braulio Carrillo, Puesto de control, Quebrada González, 10°9’50"N, 83°56’24"W, 480 m, 28 September 1999, *Acosta & Vargas 59* (INB, MO); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Estación Quebrada González, Sendero las Palmas, 10°9’50"N, 83°56’30"W, 550 m, 1 February 1999, *Rodríguez & Vargas 4334* (INB, MO); (Pococí), No protegida, Cuenca del Sarapiquí, Finca Bosque Lluvioso, propiedad del INBio, entrando por camino a mano derecha del Río Costa Rica, 10°12’0"N, -83°51’50.0002"W, 300 m, 1 December 1999, *Rodríguez et al. 5521* (INB, MO); P.N. Braulio Carrillo, Quebrada González, 10°9’N, 83°56’W, 500–600 m, 16 May 1988, *Umaña & Chavarría 225* (CAS, CR). **San José:** (Vásquez de Coronado), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Entre La Montura y La Botella, 10°9’24.8"N, 83°58’6.9"W, 828 m, 2 October 2008, *Vargas & Castillo 3492* (INB, NY); (La Hondura), 1300–1700 m, 16 March 1924, *Standley 37887* (US). **ECUADOR. Carchi:** (Gaulpi Chico), Awá encampment, Trail on Awá Reservation Border, going S, 0°58N, 78°16’W, 1330 m, 15 January 1988, *Hoover et al. 2645* (MO, US); Border area between Prov, Carchi and Esmeraldas, about 20 km past Lita on road Lita-Alto Tambo, 550 m, 24 June 1991, *van der Werff et al. 11914* (MO, NY); (Tulcán), R. Indígena Awá, Comunidad San Marcos, 25 km al NW de El Chical, parroquia Maldonado, 1°6’N, 78°14’W, 1500 m, 16 November 1990, *Rubio et al. 917* (MO, QCNE, US). **Cotopaxi:** Quevedo-Latacunga road, km 46 from Quevedo, NE-exposed slopes with rain forest, 0°55’S, 79°11’W, 600 m, 4 April 1973, *Holm-Nielsen et al. 2841* (F, US). **Esmeraldas:** Trail from Awá encampment at the Río Palaví to Awá encampment at Matahe ca 2 km, 1°7’N, 78°37’W, 150–250 m, 9 February 1988, *Hoover et al. 3287* (MO, US); (San Lorenzo), R. Indígena Awá, Comunidad”La Unión", Cañón del Río Mira, 10 km al W de Alto Tambo, 1°2’N, 78°26’W, 250 m, 16 March 1991, *Rubio et al. 1185* (CAS, MO, QCNE); (San Lorenzo), Alto Tambo, Vía Lita-San Lorenzo, 0°56’N, 78°23’W, 600 m, 1 April 1994, *Palacios 12216* (NY); Road Lita-Alto Tambo-San Lorenzo, km 6.9 from Lita, 0°52’24.6"N, 78°29’33.2"W, 720 m, 30 September 2001, *Cotton et al. 1787* (MO, QCA); Lita-San Lorenzo road, 14.2 km W of Río Lita Bridge (below Lita), 0°52’11"N, 78°27’16"W, 425 m, 4 July 1998, *Croat et al. 82340* (MO); (San Lorenzo), Vía Lita-San Lorenzo-Alto Tambo, 0°56’"N, 78°23’"W, 600 m, 1 April 1994, *Palacios 12216* (MO); (San Lorenzo), Mataje, Territorio Indígena Awá, Near Awá forestry camp, 1°11’40"N, 78°34’25"W, 200 m, 16 February 2000, *Neill et al. 12496* (MO, QCNE); Road San Lorenzo-Alto Tambo-Lita, km 60.5 from San Lorenzo, Frinnges of the R. Cotacachi-Cayapas, 0°53’47.7"N, 78°32’32.7"W, 879 m, 3 October 2001, *Cotton et al. 1820* (CAS, MO, QCA). **NICARAGUA. Rivas:**

(Isla de Ometepe), Slopes of Volcán Maderas above coffee plantations above Balgüe, 11°28'N, 85°31'W, 600–800 m, 14 September 1983, *Nee & Téllez 28058* (CAS, MO); (Isla de Ometepe), Volcán"Maderas"-Balgue, 11°26–27'N, 85°30–31'W, 1200–1260 m, 1 May 1984, *Robleto 481* (MO); (Isla de Ometepe), Volcán Maderas, localidad de la laguna, 11°26'N, 85°30'W, 1200 m, 3 June 1985, *Robleto 2021* (MO); (Isla de Ometepe), NW slope of Volcán Maderas, to rim somewhat E of Highest point, 11°26–27'N, 85°30–31'W, 1000–1350 m, 24 February 1978, *Stevens 6539* (CAS, MO); (Isla de Ometepe), Lago de Nicaragua, Volcán Maderas, N slope, 1000 m, 24 February 1978, *Neill & Vincelli 3290* (CAS). **PANAMA. Bocas del Toro:** Bosque Protector Palo Seco, Near Lago de Fortuna, Sendero Los Tucanes (Continental Divide Trail), 8°47.55'N, 82°13.51'W, 1100 m, 3 February 2005, *Penneys & Blanco 1722* (CAS, NY, US); Between Q. Gutierrez and E slope La Zorra, headwaters of Río Mali, Chiriquí Trail, 18 April 1968, *Kirkbride & Duke 731* (MO); Vicinity of Fortuna Dam, along continental divide trail, 8°45'N, 82°15'W, 1200 m, 7 August 1986, *McPherson 9868* (CAS, MO, US). **Chiriquí:** (Fortuna), Trocha Cordillera Central, cerca de la división continental, 28 October 1997, *Montenegro 1810* (CAS). **Coclé:** Forested slopes above El Cope along abandoned road leading to the Continental Divide, 700–850 m, 25 February 1988, *Almeda et al. 5936* (CAS); Alto Calvario, Above El Copé, ca. 6 km N of El Copé, atlantic slope, along trail through forest W off old lumber trail which leads down to Las Ricas, Limón and San Juan, 89°39'N, 80°36'W, 23 June 1988, *Croat 68801* (CAS, MO); (El Copé), División continental arriba de Barrigón y el aserradera viejo, Camino de caballo a Coclesito, 8°40'N, 80°36'W, 880 m, 27 April 1992, *Peña et al. 378* (F, PMA); Hills above El Valle, 1000 m, 24 December 1972, *Gentry 6903* (MO); N of El Cope on road past sawmill, 732 m, 10 January 1980, *Antonio 3280* (CAS, MO); Near El Valle de Anton, 8°37'N, 80°7'W, 600 m, 26 November 1985, *McPherson 7648* (CAS, MO); (La Mesa), 19 January 1968, *Dwyer 8332A* (MO); (La Mesa), 4 km N of El Valle, 850 m, 4 January 1974, Nee & Dwyer 9189 (MO); (El Petroso), Top to ridge N of El Copey, 9 April 1977, *D'Arcy 11322A* (MO); Omar Torrijos N.P., About 7–10.5 km beyond El Cope, along end of the rocky trail to Río Blanco and Limón beyond Alto Calvario, 770–870 m, 21 February 1996, *Almeda et al. 7666* (CAS); Caribbean side of divide at El Copé, 8°45'N, 80°35'W, 200–400 m, 3 February 1983, *Hamilton & Davidse 2661* (CAS, MO). **Colón:** (Donoso), Área del proyecto minero de Petaquilla, Valle Grande, Río Petaquilla, Coordenadas UTM E 532946, N 975688, 6 June 2009, *Araúz & Blanco 1856* (MO); S approach of Cerro Bruja from Río Escandaloso, 914 m, 18 May 1978, *Hammel 3159* (CAS, MO). **Darién:** Cerro Mali, To the Serranía del Darién, Panama/Colombia frontier, Vicinity of base camp, near colombian border, 1400 m, 23 January 1975, *Gentry & Mori 13816* (MO, US); P.N. del Darién, Cerro Mali, headwaters of S branch of Río Pucuro, ca 22 km E of Pucuro, 8°4.5'N, 77°14'W, 1250–1500 m, 20 October 1987, *de Nevers et al. 8446* (CAS, MO); Cerro Pirre, 11 April 1967, *Bristan 503* (US). **Los Santos:** Cerro Pilón, 823 m, 14 July 1968, *Dwyer & Lallathin 8587* (MO). **San Blas:** Cerro Brewster, 9°18'N, 79°16'W, 850 m, 21 April 1985, *de Nevers et al. 5455* (CAS, MO). **Veraguas:** On road from Santa Fe to Calovebora (Panamanian Hwy, 35), 16 km from Santa Fe, On Atlantic slope near Río Caloveborita, 18 June 1975, *Mori et al. 6686* (MO, US); Caribbean slope above Río Primero Brazo, 5 miles NW of Santa Fe (Below Escuela Agrícola Alta Piedra), 700–1200 m, 18 March 1973, *Croat 23241* (MO, NY); Valley of Río Dos Bocas on road between Alto Piedra (above Santa Fe) and Calovebora, 350–400 m, 29 August 1974, *Croat 27375* (MO); Headwaters of Río Coloveborita, ca 15 km past Escuela Agrícola Alto Piedra above Santa Fe, Atlantic watershed, 500 m, 15 May 1981, *Sytsma & Andersson 4736* (CAS, MO); NW of Santa Fe, 4.2 km from Escuela Agrícola Alto de Piedra, 25 February 1975, *Mori & Kallunki 4835* (MO); NW of Santa Fe, 11 km from Escuela Agrícola Alto de Piedra, in valley of Río Dos Bocas, Atlantic slope, 450–550 m, 20 December 1974, *Mori et al. 3823* (MO); 16 km NW of Santa Fe, on road to Calovebora (Panama Hwy. 35), 300–500 m, 16 May 1975, *Mori & Kallunki 6104* (MO); Valley of Río Dos Bocas, 11–13 km beyond Agriculture School at Santa Fe, 350–500 m, 25 July 1974, *Croat 25706* (MO).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Locally common in primary rain forests and cloud forests, growing in the understory usually near stream margins, from Isla de Ometepe in Nicaragua, through southern Central America becoming uncommon in Colombia and Ecuador (Fig. 11), at 100–1700 m. In Colombia and Ecuador it is known from the Pacific Andean slope, with a southernmost population from Cotopaxi in Ecuador.

Manakins, Tanagers, Thrushes, the orange-billed Sparrow (*Arremon aurantiirostris*) and *Myadestes melanops* have been reported to feed on *M. albertobrenesii* fruits in a Costa Rican rain forest (Stiles & Rosselli 1993). The following bird species have also been reported to feed on *M. albertobrenesii* fruits: *Chlorospingus opthalmicus*, *Corapipo altera*, *Schiffornis turdina*, *Tachyphonus delatrii* (Boyle 2006).

Phenology:—Collected in flower and fruit throughout the year.

Etymology:—The specific epithet commemorates Alberto Manuel Brenes (1870–1948), a school teacher in Costa Rica, who collected the type and many other flowering plants in the San Ramón area of Costa Rica over many years.

Discussion:—This species is distinguished by its dense mealy-furfuraceous indumentum, venules that are densely alveolate and conspicuously elevated abaxially, marked asymmetrical plinervation, and berries that are white at maturity. Within the Varibilis subclade, *Miconia albertobrenesii* is close morphologically and phylogenetically to *M. boekei* with which it shares the thickened-claviform indumentum and striking plinervation, but clearly distinct from it based on the color of mature berries (white in *M. albertobrenesii* vs. orange), and other vegetative characters (see *M. boekei* discussion). It is also similar and closely related to *M. neomicrantha* which also has white berries, but the flowers are 4-merous (vs. 5-merous), and the indumentum is not mealy. The indumentum of the latter two species is different in structural detail, but both types of trichomes are appressed to the surface, seeming more scale-like (as opposed to the dendritic trichomes that are not appressed and in which the arms are more conspicuous). This scale-like indumentum which is essentially squamate is also found in *M. laxivenula* (inconspicuous vegetative indumentum) and on the abaxial foliar veins in *M. magnifolia*. The presence of this kind of indumentum appears to be scattered among species of the Variabilis subclade which suggests that it has evolved several times within this clade.

Conservation status:—Following IUCN criteria (AOO), this species would be considered Endangered EN B2ab(iii). However, it occurs in many protected areas throughout its range, justifying a status of Least Concern LC. In Colombia it is proctected in the Farallones National Park (Valle) and in the Río Ñambí Natural Reserve (Nariño). In Costa Rica it is known from the Monteverde Reserve, Volcán Tenorio National Park, the San Ramón Forest Reserve, and the Alberto Brenes Biological Reserve (Alajuela); from La Marta Wild Life Refuge (Cartago); from the private protected area of Rara Avis Reserve, La Selva Biological Station (Heredia); and from the Braulio Carrillo National Park (Heredia, San José and Limón). In Ecuador it is known from the Awá Indigenous Reserva (Carchi and Esmeraldas), and from the borders of the Cotacachi-Cayapas Reserve. In Panama it is known from the Palo Seco Protected Forest (Bocas del Toro); from the Omar Torrijos National Park (Coclé); and from Darién National Park (Darién).

4. *Miconia alboglandulosa* Gamba & Almeda, *nom. nov.* Basionym: *Ossaea asplundii* Wurdack (1973a: 405–406). Type: ECUADOR. Prov. Pastaza: Mera, in forest near Alpayacu, ca. 1100 m, 23 November 1955, *Asplund 18577* (holotype: S). Nec *Miconia asplundii* Wurdack (1972: 202–203).

Subshrub or shrub 0.5–4 m tall with moderate to lax branching, bark brownish. *Upper internodes* [(0.6–)1.3–4.2 cm long] and cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, primary, secondary and tertiary veins abaxially, inflorescence axes, bracts, bracteoles, and pedicels densely to copiously composed of brownish clavate stipitate dendritic trichomes 0.053–0.093 mm long with short to moderately long thin-walled (flattened) arms. *Leaves* of each pair slightly unequal in size, the younger pairs isophyllous; the petiole 0.4–1.6 cm long, superficially canaliculate adaxially and moderately grooved abaxially, green; larger blades 8.2–10.9(–16.8) × 3.15–5 cm, smaller blades 4–10.5 × 1.5–3.6 cm, elliptic-lanceolate, the base bluntly acute to rounded, the margin entire, the apex caudate-acuminate, firm-chartaceous; mature leaves adaxially moderately to sparsely covered with the dendritic trichomes becoming glabrescent, the primary, secondary, tertiary and higher order veins glabrous; abaxial surface superficially glabrous except for a few glands on the venules, microscopically papillose with rounded glands, the tertiary and higher order veins copiously to moderately beset with white furrowed sessile glands 0.03–0.04 mm long, copiously intermixed with and occasionally replaced by resinous glands of the same type; 5-(7-) plinerved, including the tenuous marginals, innermost pair of secondary veins diverging from the primary vein somewhat asymmetrically 0.3–0.6 cm above the base, areolae 0.25–0.5 mm, adaxially the primary and secondary veins flat, the tertiary and higher order veins impressed, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated to flat. *Inflorescences* an axillary cluster of few-flowered cymes (5–7-flowered) 1.5–3.5 cm long, including a peduncle 0.13–1.13 cm or sessile, branching poorly developed with multiple axis arising from a common point at the peduncle apex or at the base (then fascicle-like), paired, borne in the upper leaf axils and also on defoliated nodes, the rachis typically pinkish; bracts 0.45–0.95 × 0.2–0.3 mm, linear-oblong and subulate, erect, bright pink, the dendritic trichomes copiously intermixed with white furrowed sessile glands; bracteoles 0.35–0.75 × 0.1–0.3 mm, linear-oblong, spreading, pinkish, along with bracts early deciduous at anthesis but occasionally persistent in fruit. *Flowers* 4-merous on pedicels 0.25–1 mm lengthening to 1.5 mm in fruit. *Hypanthia* at anthesis 1.4–1.6 × 1–1.5 mm, free portion of hypanthium 0.5–1 mm long, subcylindric to slightly campanulate, bluntly 8-ribbed, pink, copiously beset with white furrowed sessile glands 0.04–0.05 mm long, typically copiously intermixed with resinous glands of the same type, ridged on the inner surface, glabrous, the torus adaxially sparsely resinous-glandular. *Calyx* open in bud and persistent in fruit, pinkish becoming green in fruit; tube 0.09–0.27 mm long, with the same vestiture as the torus adaxially, and as the hypanthium abaxially; lobes 0.75–1.09 × 0.85 mm, broadly and bluntly triangular, the margin entire, the apex bluntly acute, glabrate, reflexed at anthesis and fruit; exterior calyx teeth 0.6–1.3 mm long, bluntly subulate, inserted half way up and projecting beyond the calyx lobes, glandular like the hypanthium. *Petals* 2.13–2.53 × 0.75–1.05 mm, narrowly lanceolate and wider at the base, the margin entire, the apex bluntly acute to acuminate, white, glabrous on both surfaces, reflexed at anthesis. *Stamens* 8; filaments ca. 1–1.5 × 0.25 mm, white, glabrous; anther thecae 1.4–1.6 × 0.31–0.43 mm, linear-oblong, truncate-emarginate at the apex, opening by one dorsally inclined pore 0.11–0.15 mm in diameter, white to light yellow at anthesis; connective white to yellow, its prolongation and appendage 0.25–0.5 mm long, the appendage lanceolate, acute at the apex, copiously beset with glandular trichomes from the edges to the center, with fewer glands of the same kind throughout the connective, which is also somewhat prolonged and gland-edged but unappendaged ventro-basally. *Ovary* 4-locular, 2/3 inferior, 0.7–1 mm long at anthesis, the apical collar absent, the apex 0.2–0.3 mm in diameter, conic, sparsely glandular-puberulent; style 3.5–3.7 mm long, parallel-sided (i.e. terete) to narrowed distally (i.e. tapering), white, glabrous; stigma capitellate at anthesis (truncate when dry). *Berries* 2.18–3.09 × 3.03–3.37 mm when dry, globose-oblate, initially bright pink, then green, ripening purple-black, the hypanthial indumentum somewhat persistent at maturity. *Seeds* 0.49–0.53 × 0.24–0.28 mm, pyramidal, brownish; lateral symmetrical plane triangular, the highest point near the central part of the seed; antiraphal symmetrical plane suboblong; raphal zone circular to suboblong, ca. 60% the length of the seed; multicellular sculpture rugose throughout the seed; individual cells and microrelief not readily discernable on any of the known collections.

Additional specimens studied:—COLOMBIA. Cauca: (Guayabal), Costa del Pacífico, Río Micay, en Guayabal, 5–20 m, 25 February 1943, *Cuatrecasas 14137* (F); (Santa Rosa), Corregimiento de San Juan de Villalobos, Vereda Palmeras, Zona amortiguadora del Parque Nacional Serranía de los Churumbelos, Camino hacia Mandiyaco, cerca del Río Villalobos, 1º30.266'N, 76º20.809'W, 1458 m, 20 February 2013, *Alvear et al. 1902* (CAS, COL). **Chocó:** (San José del Palmar), La Italia, San Antonio, Alto de Galápagos, Serranía de Los Paraguas, Sendero to Cascada San Antonio, 4°50.53'N, 76°12.991'W, 1700 m, 15 February 2011, *Almeda et al. 10353* (CAS, COL); (San José del Palmar), Hoya del Río Torito (afluente del Río Hábita), declive occidental, Finca "Los Guaduales", 630–730 m, 7 March 1980, *Forero et al. 6815* (COL, US); (San José del Palmar), Cerro al W de la población, 1300 m, 25 February 1977, *Forero et al. 3367* (COL, US); (San José del Palmar), Portachuelo, Hacienda Barro Blanco, 1350 m, 15 January 1983, *Franco et al. 1343* (COL, US). **Risaralda:** (Pueblo Rico), Vía a vereda Montebello, P.N.N. Tatamá, cerca de la Quebrada Montenegro, 5°13.563'N, 76°5.013'W, 1425 m, 5 January 2013, *Alvear et al. 1501* (CAS, COL). **COSTA RICA. Alajuela:** (San Ramón), Bosque Eterno de los Niños, Cordillera de Tilarán, valle del Río Peñas Blancas, entre Miguel Salazar y Pérez, 10°20'21"N, 84°40'38"W, 900–1000 m, 7 October 1993, *Bello & Cruz 5365* (CAS, CR, MO); Cerro Azahar, 15 km NW of San Ramón by air, headwters of Río San Juan, By road, 9 km NW of San Ramón to Piedades Norte, then 3 more km NW to La Paz, then left on jeep road 1.7 km to cluster of houses, then left again on jeep road 4–5 km to top of ridge., 10°9'30"N, 84°34–35'W, 1400–1500 m, 14 May 1983, *Liesner et al. 15531* (CAS, MO, US); (Upala), Cuenca del Zapote, Entrada La Carmela a salir a la estación, 10°43'15"N, 84°59'45.0001"W, 600–700 m, 19 May 2004, *Kriebel 4588* (INB, NY); (San Ramón), No protegida, Cuenca del San Carlos, 10°13'0"N, 84°35'20.0001"W, 800–900 m, 11 August 2002, *Kriebel 914* (INB, MO); R.B. Monteverde, Bosque de los Niños, Finca Fernando Villalobos, Quebrada Gata, Río Peñas Blancas, 10°20'N, 84°42'W, 1000 m, 28 January 1990, *Bello 1841* (CR, MO). **Cartago:** P.N. Tapantí, W of Quebrada Casa Blanca, 9°47'N, 83°48'W, ca. 1350 m, 22 June 1985, *Grayum & Warner 5432* (CAS, MO); (Paraíso), P.N. Tapantí, Macizo de la Muerte, Cuenca del reventazón, Sendero Las Pavas, 9°44'10.861"N, 83°46'50.26"W, 1400 m, 7 March 2000, *Acosta et al. 535* (INB, MO, NY); (Jiménez), R.V.S. La Marta, Cuenca del Reventazón, Pejibaye, Turrialba, 9°47'15"N, 83°43'30"W, 700–800 m, 20 September 2003, *Kriebel et al. 3915* (INB, NY); (Jiménez), R.V.S. La Marta, Cuenca del Reventazón, Pejibaye, Turrialba, 9°47'15"N, 83°43'30"W, 700–800 m, 20 September 2003, *Kriebel et al. 3916* (INB, NY); P.N. Tapantí, Sendero Árboles Caídos, 9°46'20"N, 83°48’0"W, 1200 m, 15 December 1996, *Estrada et al. 597* (CR, MO); (Paraíso), P.N. Tapantí, estación Tapantí, Valle del Reventazón, sendero Las Pavas, 9°45’20"N, 83°47’0"W, 1300 m, 21 July 1994, *Cano 104* (CAS, CR); (Paraíso), P.N. Tapantí, estación Tapantí, Valle del Reventazón, sendero Palmito, sendero La Pava, 9°45’0"N, 83°47’0"W, 1600 m, 15 July 1994, *Araya 569* (INB, MO); (Paraíso), P. N. Tapantí, Cuenca del Reventazón, en alrededores del Mirador, 9°44’53"N, 83°46’55"W, 1600 m, 4 February 1999, *Rodríguez & Vargas 4367* (INB, MO); P. N. Tapantí, Sendero Árboles Caidos about 2 km from the entrance to the park, 1550 m, 10 January 1994, *Almeda et al. 7373* (CAS, MO); P.N. Tapantí, ca. Quebrada Patillos, 8 June 1988, *Sánchez & Chacón 104* (CAS, CR). **Guanacaste:** (Tilarán), No protegida, Cuenca del Tempisque, Río Celeste, alrededores, 10°34’30"N, 85°1’50.0001"W, 600 m, 22 November 2000, *Rodríguez 6831* (INB, NY). **Heredia:** (Heredia), P.N. Braulio Carrillo, Forest between Río Peje and headwaters of Río Sardinal, Atlantic slope of Volcán Barva, 10°15.5’"N, 84°5’"W, 1200–1300 m, 12 November 1986, Grayum & Herrera 7835 (CAS, CR); (Heredia), Sarapiquí, La Virgen, P.N. Braulio Carrillo, Sendero Transecto, 10°16’N, 84°5’W, 700 m, 11 December 1988, *Ballestero 48* (CAS, CR, MO); (Sarapiquí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Near refuge at 1070 m elevation along transect trail, 10°15’20"N, 84°5’6"W, 1200 m, 8 June 2002, *Boyle et al. 140* (INB, MO). **Limón:** (Limón), Z.P. Río Banano-La Ventana, Cuenca del Banano, Valle de la Estrella, Flia Matama, ca. 11 km SW del pueblo de Aguas Zarcas, 9°48’56.412"N, 83°9’49.356"W, 1200 m, 26 October 2007, *Solano et al. 4732* (INB, NY, PMA); (Limón), Z.P. Río Banano, Cuenca del Banano, Valle de la Estrella, Flia Matama, Ca, 11 km SW del pueblo de Aguas Zarcas., 9°48’47.52"N, 83°10’5.268"W, 1200–1300 m, 21 October 2007, *Santamaría 6524* (INB, NY, PMA). **ECUADOR. Pastaza:** About 5 km E of El Puyo, 5 October 1974, *Hudson 862* (US). **Zamora-Chinchipe:** ca 4 km E of Paquishsa, 3°55’S, 78°35’W, 1250 m, 6 February 1989, *Øllgaard et al. 90456A* (MO). **PANAMA. Chiriquí:** Fortuna Dam, to N of reservoir near Quebrada Bonito, 8°45’N, 82°13’W, 1100 m, 30 July 1984, *Churchill 5786* (CAS, MO); Gualaca-Chiriquí Grande, 4.8 mi beyond IRHE facilities at Dam, 4 mi N of bridge over Bayano Lake, along gravel road which turns off main highway, 100 m beyond pipeline marker 108, 8°46’"N, 82°16’"W, 23 September 1987, *Croat 68008* (CAS, MO, US). **Coclé: (**El Copé), On Pacific side 1/2 hour walk from sawmill, 732 m, 16 October 1979, *Antonio 2145* (CAS, MO); El Copé, Sendero desde la casa del guardaparques hasta la quebrada, 8°40’N, 80°35’W, 7 July 1996, *Aranda et al. 2881* (CAS, US). **Darién:** Alturas de nique and ridge leading SW, 1250–1500 m, 31 December 1980, *Hartman 12457* (CAS, MO).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Growing in the understory, usually close to streams of primary or secondary (sometimes disturbed) cloud forests, from Costa Rica to the Atlantic slope of Panama, becoming rare in Colombia and Ecuador (Fig. 11), at (5–)600–1700 m. *Miconia alboglandulosa* is reported here for Colombia for the first time, where it is known from Chocó, Cauca, one other collection from an unusually low elevation site (five meters) on the Pacific coast in this same department, and Risaralda. It probably also occurs in the Nariño (Colombia)-Esmeraldas-Carchi region, a continuation of the Chocó.

Phenology:—Collected in flower from November through March, and May through August; in fruit from September through March, and June to July.

Etymology:—The specific epithet refers to the dense white furrowed glands present on the leaves abaxially and on the hypanthia.

Discussion:—This species is notable for its minute pulverulent dendritic trichomes on vegetative and floral parts, densely glandular abaxial foliar surfaces (with both white and resinous sessile furrowed glands), and bright pink hypanthia that turn purple-black at maturity. For unknown reasons the seeds adhere to one another in dried herbarium material in a way that makes it nearly impossible to collect and study adequately under a dissecting microcope.

From the phylogenetic analyses performed in this study it was confirmed that *M. albogalndulosa* is closer to the species in the Approximata subclade. It is in a basal position within this subclade (Fig. 1). *Miconia alboglandulosa* is more similar to *M. aurantiaca*, which shares a similar vegetative pulverulent-furfuraceous indumentum (described as granulose-furfuraceous in *M. aurantiaca* reflecting the size difference) and similar inflorescence architecture (fascicle-like cluster of cymes). Microscopically, the abaxial foliar surfaces in both species are papillose with rounded glands; more detailed foliar anatomical studies are needed to assess the consistency of this character. *Miconia alboglandulosa* differs in having a typically pink hypanthium (vs. green in *M. aurantiaca* and relatives), purple-black berries at maturity (vs. bright orange or reddish), and larger inflorescences (1.5–3.5 vs. 0.25–1.15 cm long in *M. aurantiaca*). Other microscopic differences include the dense mixture of resinous and white furrowed glands on the abaxial foliar venules and hypanthia (vs. glands prevailingly white and hypanthia pulverulent-furfuraceous and sparsely glandular).

Yet another species (*M. renatoi*) that is distinct from but probably a sister species of *M. alboglandulosa* has been collected in Ecuador (Carchi, Pichincha and Cotopaxi), and Colombia (La Planada Reserve, Nariño). Both share the pink hypanthial color and the purple-black mature berries, and in both the seeds are difficult to isolate from the dried berries for study. This latter taxon is described as a new species in this study (see citation of specimens under its description), and is clearly different from *M. alboglandulosa* in lacking the white resinous furrowed glands on the abaxial foliar venules and hypanthia. Instead it is just covered with a whitish-furfuraceous indumentum. It is also distinct in foliar details (elliptic-lanceolate and rounded in *M. alboglandulosa* vs. elliptic and acute to attenuate), and venation 5-(7-) plinerved (vs. 5-(7-) nerved). Moreover, it has a different indumentum on the cauline internodes, nodes and primary foliar veins abaxially that consists of somewhat flattened elongate slightly to moderately roughened trichomes, similar to the ones present in *M. chocoensis*.

There is another collection from Ecuador (*Clark 4676,* QCNE, MO, NY!) that most likely represents an undescribed species close to *M. alboglandulosa*. The duplicate studied has inmature fruits, which precludes the description of this taxon as a new species. The specimen is similar to *M. alboglandulosa* in its inflorescences that consist on groups of modified cymes, calyx lobes that are conspicuously reflexed, and calyx teeth that project beyond the lobes. The sparse vegetative indumentum of this individual is composed of minute dark brown dendritic trichomes with short thin-walled arms (ca. 0.1 mm long); the hypanthium and calyx lobes have few sessile resinous furrowed glands. This type of indumentum also suggests the evolutionary proximity of this species to those in the Approximata clade. This entity differs in its glabrous appearance and in having sessile leaves, some pairs being amplexicaul, a character that is present in few species of Octopleura which are not closely related to species in the Approximata clade.

It is not clear why the seeds in this species are consistently almost "glued" to each other in the berries of all collections studied. This has precluded an adequate analysis of the seed testa under a Scanning Electron Microscope, although it superficially seems to be rugulose like the other species in this complex.

Wurdack (1973, 1980) considered *M. alboglandulosa* close to *M. neomicrantha*, which somewhat resembles it in general appearance and leaf shape. Although both species are 4-merous, these two species differ in vegetative and floral vestiture and seed shape. These characters, as mentioned before, are taxonomically important for distinguishing groupings within the Octopleura clade.

Conservation status:—Endangered EN B2ab(iii), and protected only in two countries of its range. It was considered Rare in previous conservation assessments, which is not considered an IUCN Red List category at present (IUCN Standards and Petitions Subcommittee 2013). Rare taxa are usually localized within restricted geographical areas or habitats or are thinly scattered over a more extensive range (Walter & Gillett 1998). In Colombia this species is protected in Tatamá National Park (Risaralda). In Costa Rica, the protected areas from which this species is known include the Monteverde Biological Reserve (Alajuela), Tapantí National Park, La Marta Wild Life Refuge (Cartago), Braulio Carrillo National Park (Heredia), and the Río Banano Protected Zone (Limón).

5. ***Miconia anchicayensis*** Gamba & Almeda, *spec. nov.* (Fig. 20)

Related to *M. approximata*, *M. chocoensis*, and *M. quadridomius* in its densely fasciculate glomerules. It is distinguished by its tree habit, sparsely lanate vegetative indumentum, and glabrescent abaxial foliar surfaces.

Type: COLOMBIA. Dept. Valle: Mpio. Dagua, corregimiento El Queremal, P.N.N. Farallones, Alto Anchicayá. Trail off of (upslope) Quebrada La Riqueza. Cordillera Occidental, vertiente occidental, 03°35.683'N, 76°53.521'W, 550–650 m, 6 February 2011, *Almeda et al. 10266* (holotype: COL!; isotypes: CAS!, CUVC!, HUA!, NY!).

Tree 3 m tall. *Upper internodes* terete to rounded-quadrate (1–)2.5–3.7 cm long, cauline nodes terete becoming slightly compressed with age, nodal line present. *Indumentum* on branchlets, petioles, adaxial leaf surface at the base, primary and secondary veins abaxially, bracts, hypanthia, calyx lobes abaxially, and calyx teeth densely to moderately composed of whitish to brownish elongate slightly roughened trichomes 0.5–1.5 mm long, each trichome deflexed and somewhat flattened. *Leaves* of each pair somewhat anisophyllous in size; subsessile to petiolate, the terete to slightly compressed petioles 0.5–1.7 cm long, narrowly canaliculate adaxially; larger blades

22–28 × 8.2–12.3 cm, smaller blades (8.2–)14–18.5 × (4.1–)6.2–9 cm, oblong-elliptic to elliptic-obovate, some smaller blades widely elliptic, the base acute to somewhat rounded, the margin entire to obscurely crenate, the apex long-acuminate; chartaceous; adaxial surface of mature leaves, primary and secondary veins glabrescent, the indumentum denser toward the base of younger leaves, the tertiary and higher order veins glabrous; abaxial surface glabrous, the tertiary and higher order veins sparsely covered with resinous short-stalked glands to 0.1 mm long with thin-walled short to elongate heads; 5- or 7-nerved, including the tenuous marginals, areolae 0.6–0.8 mm, abaxially the primary and secondary veins impressed, the tertiary and higher order veins slightly so, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins elevated-terete to flat. *Inflorescences* a congested, axillary and fasciculate multiflorous glomerule to 1 cm long, sessile, unbranched, occasionally paired or appearing verticillate in the upper leaf axils but mainly on defoliated nodes; bracts minute and concealed by dense indumentum ca. 0.5 × 0.3 mm, narrowly ovate, the apex bluntly acute, early deciduous to persistent in fruit. *Flowers* 5-merous, sessile or on minute pedicels to 0.3 mm long. *Hypanthia* at anthesis 2.8–3 × 1.5–1.7 mm, free portion of hypanthium 1.3–1.5 mm long, suburceolate to globose, bluntly 10-ribbed, the elongate slightly roughened trichomes somewhat subulate, ridged on the inner surface, minutely glandular, the glands sessile and rounded, the torus adaxially densely covered with short-stalked glands 0.1–0.2 mm long with thin-walled short to elongate heads. *Calyx* open in bud and persistent in fruit; tube ca. 0.2–0.25 mm long, adaxially with the same vestiture as the inner surface of the hypanthium, abaxially with the same indumentum as the outer hypanthial surface; lobes 1.5 × 1 mm, rounded-ovate to triangular, the margin entire, the apex bluntly acute, adaxially moderately covered with translucent elongate slightly roughened trichomes to 0.5 mm long, densely intermixed with a hyaline understory of slightly furrowed more or less stalked glands ca. 0.08 mm long, reflexed at anthesis; exterior calyx teeth 0.7 mm long, subulate, inserted on the apical half of the calyx lobes and projecting beyond them, but frequently concealed by the dense indumentum. *Petals* 2.7–2.9 × 1.3 mm, oblong, the margin entire, the apex bluntly acute, white, glabrous on both surfaces, reflexed at anthesis. *Stamens* 10; filaments 2.2–2.7 × ca. 0.4 mm, white, glabrous; anther thecae 1.9–2 × 0.4–0.5 mm, oblong-obovate, slightly emarginate at the apex, opening by one dorsally inclined pore ca. 0.2 mm in diameter, yellow turning brown with age; connective somewhat darker than the thecae, its prolongation and appendage 0.8–0.9 mm long, the appendage lanceolate, acute at the apex, copiously gland-edged and covered with short-stalked glands 0.15–0.22 mm long with conspicuously rounded heads, denser dorsally and also present at the base of the connective. *Ovary* 5-locular, completely inferior 1–1.5 mm long at anthesis, the apical collar 0.9 × 0.9 mm, subcylindric to conic, densely glandular-puberulent, with the same glands as the torus adaxially; style 5.8–6.1 mm long, narrowed distally (i.e. tapering), white, glabrous, exserted at anthesis; stigma truncate to expanded truncate. *Berries* 4 × 5 mm when immature (on dry specimen), globose-oblate, probably orange at maturity, the hypanthial indumentum persistent on immature fruits. *Seeds* (on immature fruits) 0.41–0.51 × 0.3–0.32 mm, pyramidal, brown; lateral symmetrical plane triangular, the highest point near the central part of the seed, with a foot-like projection at the micropylar end; antirapahal symmetrical plane suboblong; raphal zone suboblong, ca. 90% the length of the seed; multicellular sculpture rugose throughout the seed; individual cells elongate, anticlinal boundaries slightly channeled, irregularly curved; periclinal walls convex, low-domed to nearly flat, microrelief striate.

Additional specimens studied:—Only the type gathering was available for study.

Illustration:—Fig. 19.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—A local and uncommon species known only from cloud forests at "Alto Anchicayá" in the department of Valle in Colombia (Fig. 12) at 550–650 m. This is a wet zone that belongs to the Chocó, a rich region in fauna and flora.

Phenology:—Collected in flower and with inmature fruits in February.

Etymology:—The specific epithet refers to the only area where this species has been collected, "Alto Anchicayá", in Valle, Colombia.

Discussion:—*Miconia anchicayensis* belongs to the Approximata subclade, and is distinct from its closest relatives by virtue of its arborescent habit, densely fasciculate glomerules, almost glabrous abaxial foliar surfaces and venules, and complete lack of dendritic trichomes with short to long thin-walled arms throughout the plant. The indumentum, althought sparser, and the flowers of this species are more similar to *M. chocoensis*; the petal and anther morphology of both are indistinguishable. However, these species are not sister to each other. The phylogenetic analyses performed here showed that *M. anchicayensis* seems to be closer to *M. aurantiaca* and *M.*

evanescens. Although more information is needed in order to better resolve the phylogenetic relationships between these three species, it is interesting to point out that the sessile fasciculate glomerules within the Approximata subclade could have evolved at least twice within this clade.

Conservation status:—Critically endangered CR D. The only locality where this plant is known from is a protected area inside the Farallones National Park in Valle, Colombia.

6. *Miconia approximata* Gamba & Almeda, *nom. nov.* Basionym: *Henriettella densiflora* Standley (1929: 247). *Clidemia densiflora* (Standl.) Gleason (1950: 346). *Henriettea densiflora* (Standl.) Williams (1963: 565). Type: PANAMA. Prov. Bocas del Toro: Region of Almirante, Buena Vista Camp, 11 March 1928, *Cooper 575* (holotype: F!; isotypes: K-internet image!, NY!, US-internet image!, WIS-internet image!). Nec *Miconia densiflora* (Gardner) Naudin (1850: 245; *M. pusilliflora* (de Candolle) Naudin (1850: 171–172)) nec *Miconia densiflora* Cogniaux (1886a: 22–23; *M. caudata* (Bonpland) de Candolle (1828: 187)).

Shrub (0.5–)1–3(–3.5) m tall, commonly forming thickets, main stem branching at around 1 m, the branches pendant and sometimes sprawling over adjacent plants, bark brownish. *Upper internodes* [(1–)1.5–6.8 cm long] and cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, primary and secondary leaf veins abaxially, bracts, hypanthia, calyx lobes abaxially, and exterior calyx teeth densely composed of brown elongate slightly roughened trichomes 0.3–0.7 mm long, each trichome clavate and somewhat thickened, sparsely intermixed with, or occasionally completely replaced by a brown understory of dendritic trichomes 0.05–0.15 mm long with short to moderately long thin-walled (flattened) arms. *Leaves* of each pair somewhat anisophyllous in size, some pairs isophyllous; the short terete petioles 0.3–0.8(–1) cm long, brownish, occasionally pink; larger blades 12–22 × 4.8–9.3 cm, smaller blades (4.5–)5–11.2 × 2–4.5 cm, narrowly elliptic to elliptic or slightly elliptic-obovate, the base acute to obtuse, the margin entire to obscurely undulate-serrulate, the apex gradually acuminate to long-acuminate, firm-membranaceous; mature leaves with adaxial surface glabrescent, in young leaves copiously covered with the general dendritic trichomes, the primary, secondary, tertiary and higher order veins glabrous; abaxial surface essentially glabrous except for a few glands coming on the venules, the tertiary veins moderately covered with the general dendritic trichomes, along with the higher order veins, copiously to sparsely beset with resinous sessile to short-stalked glands 0.05 mm long with thin-walled short to elongate heads, frequently intermixed with and occasionally replaced by white or brown-translucent furrowed sessile glands of the same length ; 5-nerved, including the tenuous marginals, areolae 0.5–1 mm, adaxially the primary, secondary, tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete toward the blade base, flat toward the apex, the tertiary and higher order veins flat. *Inflorescences* a congested axillary fasciculate glomerule <1cm long, sessile, unbranched, paired or solitary among upper leafy nodes, seeming cauliflorous on defoliated nodes; bracts 1.5–3 × 0.5–1 mm, triangular to oblong, persistent to tardily deciduous in fruit. *Flowers* 4-merous, sessile. *Hypanthia* at anthesis 2.4–2.5 × 1.4–1.5(–2.2) mm, free portion of hypanthium 1 mm long, suburceolate to more or less globose, 8-ribbed, pinkish to green, the ribs frequently concealed by the dense general indumentum, ridged on the inner surface, minutely glandular, the glands sessile and rounded, the torus densely glandular with minute sessile to short-stalked rounded glands adaxially. *Calyx* open in bud and persistent in fruit, green; tube 0.2–0.25(–0.3) mm long, adaxially with the same vestiture as the torus, abaxially with the same indumentum as the hypanthium; lobes 1–1.5 × 1–1.5 mm, rounded-ovate to triangular, the margin entire, the apex rounded-obtuse, adaxially glabrescent, reflexed at anthesis; exterior teeth 0.5–1 mm long, subulate, inserted on the apical half of the calyx lobes and slightly projecting beyond them. *Petals* 2.5–2.6 × 0.9–1 mm, ovate-oblong to linear-oblong, the margin entire, the apex rounded-obtuse, white to pale-pink, glabrous on both surfaces, reflexed at anthesis. *Stamens* 8; filaments 1–1.5 × 0.2–0.25 mm, white, glabrous; anther thecae 1.4–1.5 × 0.25–0.33 mm, linear-oblong, more or less truncate to slightly emarginate at the apex, opening by one dorsally inclined pore 0.07–0.1 mm in diameter, white or pale pink, becoming brown with age; connective white, also becoming brown with age, its prolongation and appendage 0.35–0.45(–0.5) mm long, the appendage deltoid-lanceolate, bluntly acute to obtuse at the apex, copiously gland-edged and covered with stalked or subsessile glandular trichomes to 0.15 mm long, denser dorsally and present throughout the connective. *Ovary* 4-locular, 3/4 inferior, 1.7–1.8 mm long at anthesis, the apical collar (0.3–)0.4–0.5 × 0.25 mm, conic, copiously glandular-puberulent; style 2.5–3.5 mm long, more or less parallel sided (i.e. subterete), white, glabrous or with few glands at the very base; stigma truncate to capitellate. *Berries* 2–2.5 × 5–6 mm when dry, globose-oblate, bright orange when ripe, the hypanthium indumentum somewhat persistent at maturity. *Seeds* 0.52–0.57 × 0.31–0.4 mm, pyramidal, yellow-brown; lateral symmetrical plane triangular, the highest point near the central part of the seed, with a foot-like projection at the micropylar end; antiraphal symmetrical plane suboblong; raphal zone suboblong, ca. 60–80% the length of the seed; multicellular sculpture rugose throughout the seed; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief striate. Chromosome number: n=17.

Additional specimens studied:—BELIZE. Middlesex: 61 m, 19 July 1929, *Schipp 264* (F, US). **COLOMBIA. Chocó:** (Bahía Solano), Mecana, Jardín Botánico del Pacífico, Ciudad Mutis, Sendero Jaguar (Trail # 3), 6.26435°N, -77.37045°W, 120 m, 4 February 2012, *Almeda et al. 10459* (CAS, CHOCO, COL); (Bahía Solano), P.N.N. Ensenada de Utría, Camino entre Punta Diego y Caida Cocalito, 6°21'N, 76°26'W, 0–100 m, 18 April 1990, *Espina et al. 3644* (CHOCO, MO); ca 1 mile NE of Camp Curiche, ca 3 miles E of Curiche, 21 May 1967, *Duke & Idobro 11323* (US); N ridge of Alto Buey, above Dos Bocas del Río Mutatá, tributary of Río El Valle, ESE of El Valle, 200–500 m, 8 August 1976, *Gentry & Fallen 17410* (MO, US); Hills behind Bahía Solano (Puerto Mutis), 0–250 m, 5 January 1973, *Gentry & Forero 7204* (MO); Carretera Quibdó-Guayabal, 40 m, 24 April 1975, *Forero et al. 1154* (COL, MO); Headwaters Río Salaqui, Hydro Camp 3, 335 m, 21 June 1968, *Duke 15774* (MO); (Bahía Solano), El Valle, Trocha El Valle-Boro Boro, 6°21'N, 76°26'W, 17 April 1989, *Espina et al. 2674* (CHOCO, MO). **COSTA RICA. Alajuela:** (Upala), Dos Ríos, 5 km al S de Brasilia, margen derecho del Río Pizote, 10°55'N, 85°20'W, 500 m, 29 October 1987, *Herrera 986* (CAS, CR, F, MO); (San Carlos), Entre Dulce Nombre Norte y Dulce Nombre Sur, 530 m, 23 June 1966, *Jiménez 4068* (F); 17–20 km NNW of San Ramón by road on way to San Lorenzo, 4 to 7 km N of Balsa, 10°13'N, 84°32'W, ca. 750 m, 24 April 1983, *Liesner & Judziewicz 14680* (CAS); R.B. Monteverde, Río Peñas Blancas, Laguna de Poco Sol, 10°21'N, 84°40'W, 700 m, 14 December 1989, *Bello 1633* (CAS, CR); Near Artezalea and Methodist Rural Center, about 8 km NE of Villa Quesada, 550 m, 16 February 1966, *Molina et al. 17146* (F, US); (San Carlos), Cuenca del San Carlos, Boca Tapada, Entre Santa Rita y la Curena, 10°41'25"N, 84°11'0"W, 100 m, 24 February 1999, *Rodríguez & Ramírez 4492* (INB, MO). **Cartago:** Valle Escondido, 700 m, 2 April 1966, *Schnell 672* (CR, F). **Heredia:** Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Along Far Loop Trail, about 1300 m line, 100 m, 12 July 1980, *Grayum 2966* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, S boundery-E end, 100 m, 2 May 1981, *Folsom 9991* (CAS, US); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, 2200 Holdridge Trail, 100 m, 18 February 1981, *Folsom 9020* (CAS, F); La Selva, Near Puerto Viejo, Loop Trail, 90 m, 21 May 1972, *Opler 813* (F, US); (Sarapiquí), Tirimbina, Istarú Farm, 220 m, 17 January 1970, *Lent 1872* (F); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, S boundary, E of Central Trail, 100 m, 20 February 1981, *Folsom 9047* (CAS, F); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, in SW quarter of new property, 100 m, 15 May 1982, *Hammel 12238* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, In forest on ridge W of Holdridge Trail 2200 m S, 100 m, 19 May 1982, *Hammel 12350* (CAS); Estación Biologica La Selva of the Organization for Tropical Studies, Rain forest off of the Oriental Trail, 100 m, 27 February 1986, *Almeda et al. 5096* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, In forest E of Far Loop Trail, 1100 m line, 100 m, 22 May 1980, *Hammel 8750* (CAS, F); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Central Trail, 2600 m, 100 m, 10 February 1981, *Folsom 8870* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, In forest on slopes between W boundary of La Selva proper and trail through SE section of new property at 2700 m S , 100 m, 27 May 1982, *Hammel 12553* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Pasos Perdides, 100 m, 31 March 1983, *Chacón 649* (CAS); P.N. Braulio Carrillo, Estación Penal Magsasay, Sendero Principal, 10°24'10"N, 84°3'30"W, 200 m, 20 October 1990, *Umaña & Chacón* 448 (CAS, CR); (Heredia), Sarapiquí, La Virgen, P.N. Braulio Carrillo, 200 m E del Puesto La Ceiba, sobre la Fila y rivera del Río Peje, 10°20'N, 84°5'W, 400 m, 15 October 1988, *Ballestero 9* (CAS, CR, MO); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, 3600 NS × 1350 EW m line, 100 m, 11 December 1982, *McDowell 1104* (CAS, F); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, 2800 m, Central Trail, along path, 100 m, 29 August 1981, *Smith 143* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Central Trail, 1400 m, 100 m, 6 February 1981, *Folsom 8794* (CAS); (Tirimbina), 213 m, 29 May 1971, *Proctor 32122* (F, GH, MO); La Selva, Near Puerto Viejo, Loop Trail, Shrub K 10, 90 m, 16 April 1972, *Opler 703* (F); La Selva de Sarapiquí, 500 m, 31 October 1965, *Schnell 330* (CR, F, US); Río Sarapiquí above Cariblanco, 15 September 1965, *Schnell 99* (CR, F); La Selva de Sarapiquí, 200 m, 4 February 1966, *Schnell 415* (CR, US); N of Puerto Viejo, 12 km to ferry, over ferry, 6 km along road, 100 m, 3 February 1983, *Garwood et al. 990* (MO); S of Puerto Viejo, 2 km S of Magsasay Penal Colony, W of the road, 200 m, 5 February 1983, *Garwood et al. 1117* (MO); (Sarapiquí), No protegida, Cuenca del Sarapiquí, Finca Aracuak, Río Frío, Senderos Pilón y Oropendula, 10°13'0"N, -85°55'0.0001"W, 200–300 m, 1 August 2002, *Kriebel 709* (INB, MO); (Sarapiquí), OET La Selva, Sendero SSA, 950 m, 2 June 2004, *Aguilar 8751* (MO); (Sarapiquí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Estación El Ceibo, camino al Río Peje, 10°19'37.697"N, -84°4'39.669"W, 500–546 m, 12 March 2003, *González 3076* (INB, MO). **Limón:** (Limón), El Progreso, Cordillera de Talamanca. entre Cerro Muchilla y Cerro Avioneta, Fila Matama, siguiendo la fila y los flancos, 9°47'40"N, 83°6'30"W, 850 m, 8 April 1989, Herrera & Madrigal 2555 (INB, MO); 7 km SW of Bribrí, 100–250 m, 4 May 1983, *Gómez et al. 20432* (CAS, CR); 7 km SW of Bribrí, 100–250 m, 4 May 1983, *Gómez et al.* 20432 (CAS, CR); P.N. Braulio Carrillo, Puesto Quebrada González, desde los alrededores de la casa hacia el bosque junto a la Quebrada González, 10°9'N, 85°56'W, 500–600 m, 18 May 1988, *Umaña & Chavarría 244* (CAS, CR); Cerro Coronel, E of Laguna Danto, 10°41'N, 83°38'W, 20–170 m, 16 January 1986, *Stevens 23655* (CAS, MO); R.B. Hitoy Cerere, From Río Cerere to Cerro Bobókara, 100–600 m, 26 February 1991, *Almeda et al. 6824* (CAS); (Pococí), R.N.F.S. Barra del Colorado, Llanura de Tortuguero, Sardinas, 10°38'38"N, 83°44'10"W, 15–20 m, 12 December 1992, *Araya 176* (CAS, CR); P.N. Tortuguero, Estación Cuatro Esquinas, 400 m al E de la casa-estación, 10°31'N, 83°30'W, 2 m, 28 November 1987, *Robles 1378* (CAS, CR, MO); Lomas de Sierpe, 5 km NE de La Aurora, Guápiles, Límite S P.N, Tortuguero, junto al Río Sierpe, 10°22'N, 83°31'W, 30 m, 5 December 1988, *Robles 2215* (CAS, CR, F, MO); (Tortuguero), Suretka, 200 m from RECOPE oil drilling platform, 9°34'N, 82°56'W, 27 June 1984, *Barringer et al. 3573* (CAS, CR, F); Hacienda Tapezco-Hacienda La Suerte, 29 air km W of Tortuguero, 10°30'N, 83°47'W, 40 m, 16 August 1979, *Davidson & Donahue 8401* (CAS); P.N. Tortuguero, Estación Agua Fría, 6 km al SE (aprox), sobre los Cerros Azules, 10°27'N, 83°34'W, 70 m, 19 January 1988, *Robles 1532* (CAS, CR, MO); (Puerto Viejo de Limón), 100 m, 24 March 1966, *Schnell 603* (CR, F, US); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Estación Quebrada González, Sendero Las Palmas, 10°9'48"N, 83°56'20"W, 500 m, 11 September 1996, *Rodríguez et al. 1508* (F, INB, MO); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Estación Quebrada González, Sendero Las Palmas, 10°9'48"N, 83°56'20"W, 500 m, 11 September 1996, *Rodríguez et al. 1506* (INB, MO); (Talamanca), San Miguel, Cuenca del Sixaola, Bosque sometidos a explotación de madera entre San Miguel y Gandoca. siguiendo el curso de quebrada innominada (aparentemente Mile Creek), 9°34'30"N, 82°40'0"W, 30–100 m, 21 January 1997, *González et al. 1708* (F, INB); (Barra de Colorado), 0 m, 2 March 1966, *Schnell 550* (CR, F, US); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Estación Quebrada González, Sendero Las Palmas, 10°9'50"N, 83°56'30"W, 550 m, 3 April 1997, *Rodríguez et al. 2099* (INB, MO); (Matina), Z.P. Pacuare, Cuenca del Matina, Sendero Topoyiyo, 9°59'25"N, 83°26'30"W, 300 m, 23 June 1999, *Mora-Castro 375* (INB, MO). **Puntarenas:** (Golfito), P.N. Corcovado, Valle del Coto Colorado, Alrededores de la Estación Esquinas, 8°46'0"N, 83°15'0"W, 100 m, 19 April 1993, *Aguilar 1718* (CAS, CR, MO); (Golfito), R.N.V.S. Golfito, 3–6 km from Zona Franca near Golfito along the road to La Esquina, 8°38'45"N, 83°10'44"W, 100–120 m, 30 June 1994, *Kress & Runk 94-4651* (US); Eastern Osa Peninsula, More than 500 m from edge of primary moist tropical forest, 8.69539°'N, -83.58246°'W, 25 July 2001, *Mayfield 911-1647-1487* (MO); Osa Peninsula, Along road from Panamerican Hwy at Piedras Blancas to Rincón, 3.7 mi W of Panamerican Hwy, 8°46'N, 83°18'W, 90–105 m, 16 September 1987, *Croat 67666* (CAS); Marenco Biological Station, On the NW coast of the Osa Peninsula, Unnamed trail leading due S of the Rainforest trail Tacotal Trail, 60–120 m, 14 March 1986, *Almeda et al. 5580* (CAS); Marenco Biological Station, On the NW coast of the Osa Peninsula, NE sector of the Sendero Camino Publico, 60–120 m, 13 March 1986, *Almeda et al. 5554* (CAS); (Golfito), , P.N. Corcovado, Península de Osa, Manglar del Río Corcovado, Estación Sirena, Playa Llorona, 8°31'35"N, 83°39'10"W, 0 m, 15 May 1995, *Churchill a 174* (CAS, CR); (Sirena), Los Patos, P.N. Corcovado, Sirena, Los Patos, Trail to Río Pavon, 8°28'N, 83°35'W, 1–50 m, 26 June 1989, *Kernan 1184* (CAS, CR, MO); (Golfito), P.N. Corcovado, Península de Osa, Estación Los Patos, alrededores, 8°34'0"N, 83°31'0"W, 200 m, 1 September 1993, *Aguilar 2143* (CAS, CR, MO); (Rincón de Osa), Osa Peninsula, Along the Camino de Altura, 2 to 5 miles W of Rincón de Osa, Osa Peninsula, Trail to airfield from Mile 4 at about 500 ft, 122–305 m, 9 August 1967, *Raven 21670* (F, MO); (Rincón de Osa), Osa Peninsula, Region to W of airstrip, 40–100 m, 21 July 1974, *Utley & Utley 1099* (CR, F); (Rincón de Osa), Osa

Peninsula, Trail from Rincón de Osa to Rancho Quemado, 13 November 1972, *Kennedy 1952* (F, MO); Top of"Ridge Road", Near Rincón de Osa, 13 November 1972, *Kennedy 1971* (MO); 4–6 km from Golfito on road to TV tower and tele-communications center, 400 m, 14 May 1976, *Utley & Utley 4873* (F); (Osa), No protegida, Ballena, Playa Hermosa, Dominical, 9°11'30"N, -83°46'23.0001", 0–100 m, 28 June 2002, *Kriebel 347* (INB, MO); (Golfito), Península de Osa, Estero guerra de Sierpe, 8°46'0"N, 83°35'10"W, 200 m, 5 June 1995, *Rodríguez 768* (INB, MO); (Osa), Rancho Quemado, 8°43'10"N, 83°34'50"W, 150 m, 13 January 1991, *Lobo 48* (INB, MO); (Sirena), P.N. Corcovado, Los Patos Forest, 8°27–30'N, 83°33–38'W, 150–200 m, 18 February 1988, *Kernan 183* (CR, MO); (Golfito), P.N. Piedras Blancas, Serranías de Golfito, Cerros frente a la Estación, 8°41'10"N, -83°13'20"W, 200 m, 8 June 2000, *Acosta et al. 1609* (INB, MO). **San José:** Z.P. La Cangreja, Santa Rosa de Puriscal, Bosque primario en las márgenes del Río Negro, SE de la Fila de La Cangreja, 9°42'50"N, 84°23'30"W, 400 m, 8 May 1993, *Morales 1451* (CAS, CR); (Vasquez de Coronado), P.N. Braulio Carrillo, Along Hwy San José to Siquerres Hwy, along trail to Río Sucio, site of the Old Carillo Station, 10°9'50"N, 83°57'10"W, 600–700 m, 30 August 1996, *Croat 78780* (CAS); (Dota), Zona protectora Cerro Nara, Faldas, 9°29'40"N, 84°0'50"W, 800–900 m, 4 December 1997, *Estrada et al. 1400* (CR, F, MO); (Tarrazú), Faldas del cerro Nara, ca Esquipulas, límite Quepos (Puntarenas) y Tarrazú, 9°29'N, 84°3'W, 350–400 m, 11 July 1987, *Gómez-Laurito et al. 11590* (CR, F); (Mastatal de Puriscal), 400 m, 4 December 1986, *Zamora & Jiménez. 1314* (CR, MO); P.N. Carrillo, Bosque cerca del Río Sucio, Estación Carrillo, 25 April 1984, *Sánchez et al. 497* (MO). **ECUADOR. Napo-Pastaza:** (Mera), 1100 m, 25 November 1955, *Asplund 18620* (NY, US). **Pastaza:** Along road to Río Anzu, 17.1 km N of Mera, 3.5 km N of Río Anzu, trail W into montains, 1°23'26"S, 78°3'19"W, 1238–1400 m, 6 May 2003, *Croat et al. 88712* (CAS). **GUATEMALA. Alta Vera Paz:** Near The Finca Sepacuite, 23 April 1902, *Cook & Griggs 747* (US). **Izabal:** (Puerto Mendez), Puerto Mendez, 18 km on Poquela Road, 5 June 1970, *Contreras 9959* (CAS, MO, UTD); (Puerto Mendez), Puerto Mendez, 7 km on Toquela Road, 8 September 1970, *Contreras 10226* (CAS, GH, MO); Montaña del Mico, Between Virginia and Lago Izabal, 50 m, 5 April 1940, *Steyermark 38865* (NY); Puerto Mendez, On Toquela River Road, 5 km from the village, 6 September 1969, *Contreras 9081* (CAS, GH, MO); Along trail beginning from mile 33.23 between Darthmouth and Morales towards Lago Izabal, Montaña del Mico, 35–150 m, 7 April 1940, *Steyermark 39042* (F); Cerro San Gil, Along Río Frío, 75 m, 17 December 1941, *Steyermark 39946* (F); (Cadenas), On Toquela River Road, 5 km from the village, 6 September 1969, *Contreras 9077* (GH, MO, US). **HONDURAS. Atlántida:** Southern boundary of Lancetilla Valley, On ridge separating Lancetilla watershed from the watershed to the S, around San Francisco, 15°41'30"N, 87°28'0"W, 380–420 m, 8 November 1988, *MacDougal et al. 3377* (CAS, MO); Lancetilla mountain, 100 m, 8 April 1970, *Molina & Molina 25610* (F, NY, US); Lancetilla Valley, Near Tela, 20–600 m, 6 December 1927, *Standley 52936* (F); Lancetilla Valley, near Tela, 20–600 m, 6 December 1927, *Standley 56796* (F); Lancetilla Valley, near Tela, 20–600 m, 6 December 1927, *Standley 53107* (F). **Gracias a Dios:** Camp Tiro, 2 mi NW of Bulebar on third northern branch of Quebrada Tiro, tributary of Río Plátano, Along walk 1 km of camp, 15°43'N, 84°50'W, ca. 61 m, 22 March 1981, *Saunders 1087* (CAS, F, UNM); Between Rancho Chico and Cockscomb, Monkey River, 31 March 1943, *Gentle 4373* (CAS, UTD). **NICARAGUA. Atlántico Norte:** (Bonanza), R. de Bosawas, Comunidad de Musawas, SW de Musawas, 14°6'59"N, 84°43'49"W, 50–200 m, 20 September 2003, *Coronado & Gurdian 278* (CAS). **Bluefields:** 1.4 km N of base camp, Base Camp 3.6 km SE Cerro San Isidro, Río Kama, Río Escondido, 12°05–15'N, 83–84°45–20'W, 0–65 m, 6 March 1966, *Proctor et al. 27001* (CAS, US). **Matagalpa:** (Río Blanco), R.N. Cerro Musún, 12°58'N, 85°13'W, 500–1400 m, 15 July 2000, *Rueda & Caballero 14171* (CAS, MO). **Río San Juan:** (El Castillo), R. Indio-Maíz, a lo largo del caño el Pavon, a 3 km de su desembocadura en el Río Bartola, 11°1'N, 84°16'W, 31 December 1996, *Rueda et al. 5136* (CAS, MO); Río Pigibaye, 18 February 1995, *Rueda et al. 3197* (CAS); (El Castillo), R. Indio-Maíz, Cerro El Diablo, 11°1'N, 84°13'W, 100–200 m, 7 December 1998, *Rueda et al. 9550* (CAS, MO); (El Castillo), R. Indio-Maíz, 3 km al N de la desembocadura del Caño Chontaleño, 11°5'N, 84°15'W, 24 February 1997, *Rueda et al. 6308* (MO). **Zelaya:** Caño Zamora on Río Rama, 11°57'N, 84°16'W, 10 m, 16 May 1978, *Stevens 8828* (CAS); Caño El Hormiguero, On E slope of El Hormiguero, 13°46'N, 84°59'W, 750–800 m, 17 March 1980, *Pipoly 6107* (CAS); Caño Costa Riquita , ca. 1.8 km SW of Colonia Naciones Unidas, above (S of) road between Colonia Nueva León and Colonia Naciones Unidas, 11°43'N, 84°18'W, 150–180 m, 6 November 1977, *Stevens 5080* (CAS); (Siuna), R. Bosawas, Cerro Saslaya, 13°47'N, 84°59'W, 300–400 m, 10 April 1999, *Rueda et al. 10567* (CAS, MO); (Nueva Guinea), R. Indio-Maíz, 11°25'N, 84°13'W, 200–300 m, 5 January 1999, *Rueda et al. 9829* (CAS, MO); Costado SW de Cerro El Hormiguero, 13°44'10"N, 84°59'50"W, 900–1000 m, 18 April 1979, *Grijalva 463* (MO); Along road to Colonia Yolawa, Colonia La Esperanza of Nueva

Guinea, inmediatly upriver from bridge over Cano Sardina, 180–200 m, 11 February 1978, *Vincelli 144* (MO). **PANAMA. Bocas del Toro:** Between Quebrada Logrom and Cerro Bonyc, near Río Terebe, 91–274 m, 13 April 1968, *Kirkbride & Duke 638* (MO). **Coclé:** P.N. Omar Torrijos, Road to La Rica. ca. 0.5–1.5 km beyond pass on Atlantic slope, 8°40.76'N, 80°35.84'W, 700–800 m, 12 February 2005, *Penneys & Blanco 1755* (CAS, US); Alto Calvario, Area surrounding Rivera Sawmill, 7 km N of El Cope, continental divide, 700–850 m, 25 November 1977, *Folsom & Collins 6536* (CAS, MO); Alto Calvario, 7 km N of El Copé de Veraquas, lumber camp at circa 900 m, Continental Divide at 1300 m, Circa Rivera sawmill, 900–1300 m, 11 January 1977, *Folsom 1213* (CAS, MO); Near continental divide along lumbering road 8.4 km above El Cope (1 km beyond sawmill), 900 m, 19 January 1978, *Hammel 964* (CAS, MO); Alto Calvario, Forest above sawmill, on continetal divide, 5.2 mi above El Cope, 930 m, 6 December 1979, *Croat 49187* (CAS); Small patch of forest on continental divide ridge along road to Coclecito, between La Pintada and Cascajal, 488 m, 6 March 1982, *Hammel & Kress 11283* (CAS). **Colón:** Santa Rita Ridge, along road, ca. 1 mi from Boyd-Roosevelt hwy, 9 July 1971, *Croat 15302* (MO, NY, US); Santa Rita Ridge, along road, ca 1 mi from Boyd-Roosevelt Hwy, 9 July 1971, *Croat 15332* (F, MO); Río Guanche, ca 2.5 km upriver from bridge on road to Portobelo, Along small quebrada to the S of the river, 10–100 m, 14 December 1974, *Mori & Kallunki 3694* (MO); In forest at Loma La Toba, Off Hwy, 5–8 (82), ca 4 km NE of Pina, 0–20 m, 17 September 1974, *Mori & Kallunki 1982* (MO); Along Río Guanche ca 3–5 mi inland, 10–100 m, 3 August 1974, *Croat 26160* (MO). **Comarca de San Blas:** El Llano-Carti Road, 19 km from Interamerican Hwy, Ridge down to creek on Atlantic side, 9°19'N, 78°55'W, 130–350 m, 4 September 1984, *de Nevers & Herman 3836* (CAS, MO); Cerro Habú, Trail from Río Sidro, 9°23'N, 78°49'W, 427–762 m, 18 December 1980, *Sytsma et al. 2663* (CAS, MO); Cerro Habú, Vicinity of peak, 9°23'N, 78°49'W, 762 m, 19 December 1980, *Sytsma et al. 2741* (CAS, MO). **Darién:** 10 km NE of Jaqué, slopes of Río Tabuelitas above Birogueirá, Indian village on Río Jaqué below mouth of Río Pavarandó., 122 m, 30 January 1981, *Sytsma & D'Arcy 3302* (CAS, MO); Rancho Frio, 7°58'N, 77°42'W, 600 m, 9 August 1986, *McDonagh et al. 597* (MO); (Mamey), 6 March 1982, *Whitefoord & Eddy 383* (CAS, MO); Serranía de Pirre, along ascent of Serranía de Pirre above Cana Gold Mine between Río Cana and Río Ascucha Ruido, 600–1000 m, 27 July 1970, *Croat 37690* (CAS, MO); Serranía del Sapo, Area surrounding Río Chado, 7°40'N, 78°10'W, 350 m, 2 January 1981, *Hahn 282* (CAS, MO); 0.5 to 1.5 mi E of Manene, 21 December 1980, *Hartman 12077* (CAS, MO); (Chipigana), Canal-Cuasi trail (camp 2), 610 m, 9 March 1940, *Terry & Terry 1424* (F, MO); S of El Real, on slopes of Cerro Pirre about 3 miles E of Dos Bocas of the Río Pirre, 500–1000 m, 26 September 1969, *Foster & Kennedy 1267* (MO, US); Río Balsa, between Río Areti and Nanane, 14 September 1966, *Duke 8766* (MO, US); Elfin Forest, Cerro Campamento (S of Cerro Pirre), 20 March 1968, *Duke 15647* (MO). **Panamá:** Cerro Jefe, Along trail off Pacora Rd, 750 m, 21 February 1988, *Almeda et al. 5845* (CAS); Road past Altos de Pacora, 3–3.5 mi NE of Altos de Pacora, 7.8–8.2 mi above Panamerican Hwy, 11.1–11.6 mi beyond Lago Cerro Azul, 9°15'N, 79°25'W, 700–750 m, 19 June 1988, *Croat 68622* (CAS, MO); Along trail to Cerro Brewster from Río Pacora valley, 9°20'N, 79°15'W, 670 m, 19 November 1985, *McPherson 7515* (MO); Cerro Jefe, Forest on trail around summit tower, Trail around summit tower, 9°15'4"N, 79°30'4"W, 900 m, 1 March 1987, *McPherson 10595* (MO); Cerro Jefe, 1.5 mi down right turnoff 6.7 mi past Goofy Lake, 700 m, 27 December 1980, *Sytsma et al. 2866* (CAS, MO); Cerro Pelón, About 23 km from the Interamerican Hwy off of a dirt road toward Cerro Jefe, 675 m, 26 February 1996, *Almeda et al. 7692* (CAS); P.N. Chagres, Sendero "El Cantar", Cerro Azul, 5 December 1991, *Carrasquilla et al. 3334* (CAS, PMA); Altos de Pacora, 9°16'N, 79°20'W, ca. 700 m, 26 February 1996, *Galdames et al. 2545* (CAS, F); Cerro Jefe, 945 m, 5 January 1972, *Dwyer & Gentry 9462* (MO). **Veraguas:** (Isla de Coiba), P.N. Coiba, Subida por Río Escondido, 17NMU1341, 40 m, 11 March 1996, *Castroviejo & Velayos 8145MV* (CAS); (Isla de Coiba), Distrito de Montijo, N de la isla, Sendero Yuma, 7°35'N, 81°43'W, 30 m, 22 February 1995, *Galdames et al. 2166* (CAS, PMA); (Isla de Coiba), Siguiendo la Quebrada del Río Escondido, 1341, 19 November 1994, *Espinosa et al. MB535* (CAS); (Isla de Coiba), Río de la Boa, márgenes del río, 23 November 1994, *Espinosa et al. MB649* (CAS); (Isla de Coiba), Ensenada al N de Punta Cirilo, playa de las Boyas, 17NMU1139, 25 m, 27 November 1994, *J. Cuadras et al. 8069MV* (CAS); (Isla de Coiba), Distrito de Montijo, Playa Rosario, 8 March 1996, *Galdames et al. 2580* (CAS, F, MO, PMA); (Isla de Coiba), Distrito de Montijo, Punta Cirilo, 17 March 1996, *Galdames et al. 2819* (CAS, PMA); (Isla de Coiba), Distrito de Montijo, Playa Rosario, 8 March 1996, *Galdames et al. 2575* (CAS, PMA); (Isla de Coiba), Distrito de Montijo, Río Escondido, corriente arriba hasta la caida de agua, 11 March 1996, *Galdames et al. 2686* (CAS, PMA); (Isla de Coiba), Distrito de Montijo, Desde Playa Hermosa hacia el borde superior de la falla geológica, 18 March 1996, *Galdames et al. 2857* (CAS, PMA); (Isla de Coiba), Playa Rosario, northern tip of Coiba Island, 26 August 1970, *Foster 1611* (F, MO, US); (Isla de Coiba), Penal Colony, 8 July 1962, *Dwyer 2401* (MO, US); (Isla de Coiba), 28 July 1962, *Dwyer 2330* (MO). Hills N of Frijoles, Canal Zone, 19 December 1923, *Standley 27554* (US); N of Punta Guayabo Grande, NW of Ensenada El Guayabo, 7°24'N, 78°7'W, 0–200 m, 25 January 1982, *Knapp & Mallet 3151* (MO).

Illustration:—None found.

Common names and documented uses:—Honduras: "sirin" (*Standley 52936* and *Gentle 4373*).

Habitat, distribution and ecology:—This is a locally common species in the understory of primary rain forests where it also colonizes disturbed sites throughout Central America from Belize and Guatemala (except El Salvador), to southern Panama, and extending to Colombia and Ecuador (Fig. 12), at 0–1400(–1759) m. In the TROPICOS database there are two Ecuadorian specimens that were not examined in this study. One is from Pichincha (*Øllgaard 37630,* AAU), and the other from Esmeraldas (*Holm-Nielsen 25472,* AAU). *Miconia approximata* is one of the most widespread species in the Octopleura clade. It appears to be especially common in Central America.

White-ruffed Manakins (*Corapipo altera*) have been reported to feed on *M. approximata* berries in a wet forest of northeastern Costa Rica (Boyle 2010). Other fruit-eating birds of the tropical forest understory (at Estación Biológica La Selva, Costa Rica) have been reported to consume *M. approximata* berries, including *Chlorothraupis carmioli*, *Corapipo leucorrhoa*, *Euphonia gouldi*, *Hylocichla mustelina*, *Mionectes oleaginous*, and *Pipra mentalis* (Loiselle & Blake 1999, 2000).

Phenology:—Collected in flower and fruit throughout the year.

Etymology:—The specific epithet refers to the close proximity of the flowers in the congested glomerules that characterize this species.

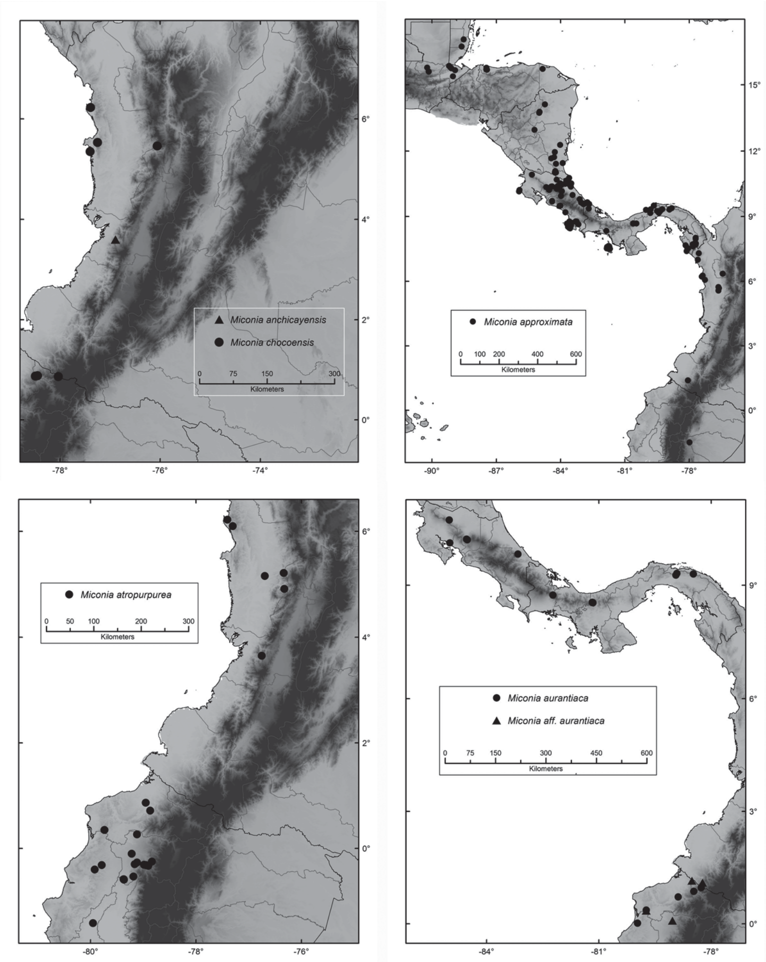


FIGURE 12. Distributions of *Miconia anchicayensis* and *M. chocoensis*, *M. approximata*, *M. atropurpurea*, *M. aurantiaca* and *M.* aff. *aurantiaca.*

Discussion:—This species is readily distinguished by its brownish thickened-clavate elongate trichomes mixed with a furfuraceous indumentum of dendritic trichomes, short and pubescent petioles, narrowly elliptic to elliptic leaves, and sessile congested fasciculate glomerules. Its closest relatives include species that share the congested fasciculate glomerules (*M. chocoensis*, *M. quadridomius*, and *M. veraguensis*) and also have elongate roughened trichomes (but different sizes and colors). Wurdack (1981) provides a detailed summary of similarities and differences between *M. approximata* and *M. quadridomius* (which he treated as *Clidemia densiflora* and *C. cuatrecasasii* respectively). *Miconia veraguensis*, a new species from Veraguas, differs primarily in berry dimensions which are bigger and modal differences in leaf shape.

Miconia evanescens, which is also closely related and somewhat similar to *M. approximata*, has been confused in the past with this species, probably due to the poorly developed inflorescences in both, especially in Colombian material, where *M. approximata* only occurs in Chocó, and *M. evanescens* in Nariño. Although both species present abaxial foliar venules densely resinous-glandular, in *M. evanescens* the indumentum is whitish (vs. brownish), the hypanthium is green-whitish (vs. pinkisk green), and the ovary is completely superior (free from the hypanthium vs. 3/4 inferior).

Quite a few populations from Costa Rica (Limón, Heredia/San José), Panama (Bocas del Toro, Coclé, Darién, Panama), Colombia (Chocó) and Ecuador (Pastaza), lack the claviform elongate slightly roughened trichomes, the vestiture being only composed of a dense to moderate brown furfuraceous indumentum of dendritic trichomes with short to moderately long thin-walled (flattened) arms. These pubescence variants do not appear to correlate with geography or elevation since these populations occur throughout the elevational range of the species and appear to be sympatric with typical forms of *M. approximata*. In all other vegetative and floral features *M. approximata* is quite uniform.

A closely related taxon, and possibly distinct, was recently collected from the department of Chocó in Colombia (*Almeda et al. 10459*, CAS!, COL). It has narrower elliptic leaves, fewer flowers per node, and abaxial foliar venules densely covered with white furrowed sessile glands that are also sparsely present on the hypanthium and exterior calyx teeth. Superficially it is easily confused with *M. approximata*, but the white furrowed glands in the latter are fewer, although common not consistently present, and restricted to the leaves abaxially. This specimen only has immature fruits, making floral comparisons impossible. It is probable that the indumentum differences, specifically the location of these white furrowed glands (vegetatively or/and on hypanthia/calyx) is taxonomically significant, but it is premature to describe this entity based on the one imcomplete collection. Based on molecular data these two species are close to one another.

Conservation status:—Vulnerable VU B2ab(iii), based on IUCN criteria (AOO). However, this species occurs in many protected areas, warranting a status of Least Concern LC. *Miconia approximata* is protected in Colombia in the Ensenada de Utría National Park. In Costa Rica in the Monteverde Biological Reserve (Alajuela and Cartago); in La Selva Biological Reserve and the Braulio Carrillo National Park (Cartago, the latter also in Limón and San José); in the Hitoy Cerere Biological Reserve, Barra del Colorado Wild Life Refuge, the Pacuare Protected Zone, and the Tortuguero Nationl Park (Limón); in the Corcovado National Park, the Golfito Wild Life Refuge, the Piedras Blancas National Park, the Marenco Biological Station (Puntarenas); and in La Cangreja the Cerro Nara Protected Zones (San José). In Nicaragua it is protected in the Indio-Maíz Reserve (Río San Juan). In Panama it is protected in the Omar Torrijos National Park (Coclé); in the Chagres National Park (Panama); and in the Coiba National Park (Veraguas).

7. *Miconia atropurpurea* Gamba & Almeda, *nom. nov.* Basionym: *Melastoma purpurea* Pavón, Mss. *Clidemia purpurea* Pav. ex Don (1823: 308). Type: ECUADOR (In Peruviâ). Guayaquil (In Huayaquil), 1899, *Tafalla s.n.* (not *Pavón s.n.*) (holotype: BM; isotypes: F-internet image!, MA). Nec *Miconia purpurea* (Don) Judd & Skean (1991: 62).

Clidemia cyanocarpa Bentham (1844: 94). Type: ECUADOR-COLOMBIA border (Grenada), Tumaco, December 1836, *Barclay 879* (holotype: K-internet image!; isotype: BM-internet image!).

Clidemia haughtii Wurdack (1960: 238–239). Type: COLOMBIA. Dept. Santander: vicinity of Puerto Berrio between Carare and Magdalena rivers, headwaters of Dorada Creek, 12 km S of Raizudo, 300 m, 6 May 1937, *Haught 2193* (holotype: US-internet image!; isotypes: NY-internet image!, COL-internet image!).

Suffrutescent diffusely branched herb or shrub 0.5–4 m tall. *Upper internodes* [3.1–7.1(–9.3) cm long] and cauline nodes terete, nodal line absent. Indumentum on branchlets, petioles, primary, secondary, tertiary and higher order veins abaxially, inflorescence axes, pedicels, bracts, bracteoles, hypanthia, calyx lobes abaxially, and exterior calyx teeth densely to moderately composed of brownish sessile or thinly stipitate dendritic trichomes 0.1–0.2 mm long with short axes and few-moderate number of terete arms, typically copiously to sparsely intermixed with elongate smooth trichomes 1–3 mm long occasionally early caducous. *Leaves* of each pair notably anisophyllous in size (ca. 1:2), some pairs more or less isophyllous; the petiole 0.4–2 cm long, canaliculate adaxially and shallowly to moderately grooved abaxially; larger blades 10–14(–22) × 5–7 cm, smaller blades 4–7 × 2.5–3.5 cm, elliptic to elliptic-ovate, the base broadly acute to obtuse and slightly oblique, the margin ciliate (cilia to 1 mm) or eciliate, distantly undulate-serrulate, the apex short-acuminate to acuminate, membranaceous; mature leaves adaxially sparsely strigose with red-pink elongate smooth trichomes 1.5–3 mm long or glabrous, the primary, secondary, tertiary and higher order veins glabrous; abaxial surface typically flushed red-purple, sparsely strigillose with red-pink elongate smooth trichomes 0.5–1 mm long to glabrescent, the tertiary and higher order veins glabrescent; 5- or 7-nerved to 5- or 7-plinerved, including the tenuous marginals, innermost pair of secondary veins separating asymmetrically from the primary vein at ca. 0.3 cm above the base, areolae 0.5–1 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins flat. *Inflorescences* a pseudolateral group of few-flowered modified dichasia 2–3 cm long, sessile or including a peduncle to 0.25 cm long, branching poorly developed with two to three paracladia from a short axis, borne on the upper foliar nodes; bracts 0.2–0.4 × 0.25 mm, bracteoles 0.3–0.5 × 0.25 mm, minute, lanceolate and shortly aristate at the apex, commonly early deciduous at anthesis. *Flowers* 5-merous, subsessile or on pedicels 0.3–0.4 mm long. *Hypanthia* at anthesis 2.9–3.2 × 1.5–1.7 mm, free portion of hypanthium 1.7–2 mm long, suburceolate, bluntly 10-ribbed, red to purple, the dendritic trichomes sparse and early caducous, the elongate smooth trichomes 1–1.3 mm long persistent and spreading, ridged on the inner surface, along with the torus minutely and densely glandular adaxially, the glands rounded and sessile, the torus (adaxially) rarely glabrous. *Calyx* open in bud and persistent in fruit; tube ca. 0.2 mm long, with the same vestiture as the torus adaxially and as the hypanthia abaxially; lobes 0.3–0.5 × ca. 1 mm, oblate, the margin vaguely undulate, the apex obtuse, copiously papillose adaxially; exterior calyx teeth 0.1–0.15 mm long, minute, bluntly conic and aristate, inserted at the basal half of the calyx lobes and not projecting beyond them. *Petals* 1.3–1.6(–1.8) × 1.2–1.5 mm, broadly obovate to suborbicular, the margin entire, the apex obtuse to slightly truncate, white, densely papillose on both surfaces, reflexed at anthesis. *Stamens* 10; filaments 1.5–2 × 0.25 mm, white, glabrous; anther thecae 1.5–1.8 × 0.4–0.5 mm, linear-oblong and moderately subulate, obtuse at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, cream to light yellow at anthesis; connective yellow, its prolongation and appendage 0.25–0.35 mm long, the appendage orbicular, obtuse at the apex, moderately gland-edged and sparsely beset with minute sessile rounded glands also present throughout the connective. *Ovary* 5-locular, completely inferior, 1.2–1.5 mm long at anthesis, the apical collar absent, the apex 0.35 mm in diameter, truncate to slightly depressed, densely glandular-puberulent; style 3.5–4 mm long, narrowed distally (i.e. tapering), white, glabrous; stigma truncate to expanded truncate when dry. *Berries* 4.11–4.4 × 4.24–4.9 mm when dry, globose and somewhat oblate, initially red, turning red-purple and ultimately blue when ripe, the hypanthial indumentum somewhat persistent at maturity. *Seeds* 0.33–0.57 × 0.17–0.19 mm, ovoid, angled, light-brown; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone suboblong, ca. 60–70% larger than the corpus of the seed, extending along its entire length, ventrally and longitudinally expanded, occasionally also expanding along the chalazal side beyond the highest point of the seed, dark-brown; individual cells elongate, anticlinal boundaries inconspicuous; periclinal walls flat, microrelief punctate.

Additional specimens studied:—COLOMBIA. Chocó: (San José del Palmar-Nóvita), Alrededores del campamento de Curundó, fin de la carretera en construcción cerca al Río Ingará, 450 m, 30 August 1976, *Forero et al. 2370* (COL, MO); Río San Juan just above Istmina, 100 m, 14 August 1976, *Gentry & Fallen 17652* (MO, US); Río Mutatá, tributary of Río El Valle, between base of Alto Buey and mouth of river, 100–150 m, 9 August 1976, *Gentry & Fallen 17473* (COL, MO, NY, US); Río Mutatá, tributary of Río El Valle, between base of Alto Buey and mouth of river, 100–150 m, 7 August 1976, *Gentry & Fallen 17299* (COL, MO, NY); Vicinity of Bahia Solano on steep slopes S of town, 5°13'N, 76°20'W, 50 m, 14 March 1984, *Croat 57439* (US); (Bahía Solano), 13 February 1947, *Haught 5572* (US). **Valle:** (Buenaventura), Vereda Bellavista, P.N.N. Farallones, Sector Bajo Anchicayá, Zona en cercanías de la Draga, 3°36.906'N, 76°54.107'W, 225 m, 11 January 2013, *Alvear et al. 1568* (CAS, COL). **ECUADOR. Esmeraldas:** (Quininde), The Mache-Chindul Ecological R., Bilsa Biological Station, Mache mountains, 35 km W of Quinindé, 0°21'N, 79°44'W, 500 m, 6 January 1997, *Clark et al. 3749* (MO, NY, QCNE); (San José de Cayapas), 0°52'N, 78°57'W, 80 m, 2 September 1980, *Holm-Nielsen et al. 25680* (MO, NY, QCA, QNA); (San José de Cayapas), 0°52'N, 78°57'W, 80 m, 2 September 1980, *Holm-Nielsen et al. 25625* (CAS, F, MO); Río San Miguel, one hour upstream from San Miguel de Cayapas, 0°43'N, 78°52'W, 220 m, 1 September

1980, *Holm-Nielsen et al. 25501* (MO, QCA, QNA); (San José de Cayapas), 0°52'N, 78°57'W, 80 m, 2 September 1980, *Holm-Nielsen et al. 25640* (QCA, QNA, US); (Quinindé), Bilsa Biological Station, Montañas de Mache, 35 km W of Quinindé, 5 km W of Santa Isabel, Dogola Trails, 0°21'N, 79°44'W, 400–600 m, 6 December 1994, *Baas & Pitman 284* (QCNE, US). **Guayas:** Río Daule below Pichincha, Hacienda Santa Barbarita, 18 April 1959, *Harling 4733* (MO). **Los Ríos:** Río Palenque B.R., Km, 56 Rd, Quevedo-Sto Domingo, 150–220 m, 24 November 1979, *Schupp 60* (F); Río Palenque B.R., Sendero 3 and 4, 0°35'37"S, 79°21'44"W, 215 m, 5 February 2009, *Stern & Tepe 359* (NY); Río Palenque B.R., Halfway between Quevedo and Santo Domingo, 200 m, 4 October 1976, *Gentry & Dodson 17975* (MO); Río Palenque B.R., Halfway between Quevado and Santo Domingo de los Colorados, 200 m, 13 February 1974, *Gentry 9906* (MO, US); Río Palenque B.R., Km 56 Quevedo to Sto, Domingo , 220 m, 11 December 1971, *Dodson & McMahon 4253* (MO); (Santo Domingo), Río Palenque B.R., km 56 Quevedo-Santo Domingo, 150–220 m, 5 September 1972, *Dodson & McMahon 5098* (US). **Manabí:** Chone-Santo Domingo road, near Río La Morena ca. 15 km NNE of Flavio Alfaro, 100 m, 7 May 1980, *Harling & Andersson 18906* (F, US); (Flavio Alfaro), Road Sto Domingo-Chone, 100 m, 11 May 1968, *Harling et al. 9431* (F, MO, US). **Pichincha:** Road La Unión del Toachi-San Francisco de las Pampas, km 3., 1100–1200 m, 19 March 1985, *Harling & Andersson 23133* (NY, US); Right side of Río Toachi opposite Alluriquin, 800–900 m, 20 March 1985, *Harling & Andersson 23175* (CAS); On ridge c, 10 km E of Patricia Pilar, 0.3°S, 79.16°W, 300 m, 20 July 1978, *Webster et al. 22771* (US); Virgin forest along Río Toachi near santo Domingo, 700 m, 3 August 1962, *Jávita & Epling 334* (NY, US); Carretera Quito-Chiriboga-Empalme, km 92, desvio a Mulaulte, en borde del carretero y en quebrada de Mulaulte, 0°15'S, 78°50'W, 1200–1300 m, 13 December 1987, *Zak & Jaramillo 3182* (MO); (Santo Domingo), Centinela, 12 km E of Patricia Pilar, Along path on ridge line, 600 m, 23 August 1978, *Dodson et al. 7216* (MO, US); 31 km from Santo Domingo de los Colorados towards Quito, 925 m, 3 December 1970, *Ellenberg 3117* (US); Tinalandia, Property of Hotel Tinalandia, 9.6 km E of Santo Domingo de los Colorados, S of hwy to Aloag & Quito, above Río Toachi, 0°16'S, 79°7'W, 700 m, 3 April 1983, *Croat 55692* (MO); ca. 10 km from Santo Domingo de los Colorados, property of Tinlandia, 10 May 1980, *Sobel & Strudwick 2334* (CAS, NY).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Uncommon to occasional in coastal to montane primary and secondary rain forests, in deep shade and along creeks, along the Pacific Andean slope of Colombia and Ecuador (Fig. 12), at 50–1300 m.

Phenology:—Collected in flower from December through April, and from August through October; in fruit from November through May, and from July through September.

Etymology:—The specific epithet refers to the dark purple color present throughout this species (indumentum, hypanthium, leaves abaxially, and berries).

Discussion:—*Miconia atropurpurea*, although distinct, is often difficult to distinguish from its close relatives. This is reflected in the fact that most of the specimens of this species have been determined as *Clidemia* cf. or aff. *purpurea*, or confused with *M. quinquenervia* or *M. reitziana*. The latter species has distinctive leaf bases decurrent on the petiole. Although *M. atropurpurea* is sister to *M. neocoronata* on the basis of molecular data, *M. atropurpurea* and *M. reitziana* are convergent in their dense vegetative pubescence of pink-red smooth trichomes that are present on both foliar surfaces and hypanthia, and in their inflorescence architecture (groups of modified dichasia). The material from Colombia is the most difficult to interpret, where the two species (*M. atropurpurea* and *M. reitziana*) co-occur in the department of Chocó, and are very similar vegetatively (variation in leaf shape and slight to moderate anisophylly), as well as in hypanthium and calyx color at anthesis and maturity (red or pink). However *M. atropurpurea* has a slightly wider hypanthium at the torus level (1.5–1.7 mm vs. 1–1.2 mm), which is suburceolate to campanulate (vs. subcylindric to campanulate). More importantly, *M. atropurpurea* lacks the characteristic hypanthial resinous-glandular vestiture present in *M. reitziana.* In the former it consists of rusty-asperous and elongate trichomes. It also lacks the densely to sparsely ciliate torus (vs. sessile-glandular to glabrous). On the other hand, the elongate smooth trichomes in *M. atropurpurea* seem to be very variable in quantity and location as noted by Wurdack (1980).

We agree with Wurdack (1980) who considered *Clidemia cyanocarpa* and *C. haughtii* to be conspecific with *M. atropurpurea*. However, indumentum details (especially of the hypanthia and torus) of these two named species will need to be examined when better topotypical material becomes available for study.

Conservation status:—Endangered EN B2ab(iii). In Colombia it is protected in Farallones National Park (Valle). In Ecuador it is protected in the Río Palenque Private Reserve (Los Ríos), in the Mache-Chindul Ecological Reserve (Esmeraldas), and may also be in the Cotacachi-Cayapas Ecological Reserve. Considered Vulnerable is previous assessments due to a geographical range that is apparently smaller than 20000 km² (but AOO ≤500 km² from this study) and to massive alteration of its habitat over the last 50 years. Apart from habitat destruction, no specific threats are known (Cotton & Pitman 2004).

8. *Miconia aurantiaca* (Almeda & Kriebel 2009: 211–214) Gamba & Almeda, *comb. nov.* Basionym: *Clidemia aurantiaca* Almeda & Kriebel. Type: COSTA RICA. Prov. Limón: Pococí. P.N. Braulio Carrillo. Cuenca del Sarapiquí. Estación Quebrada González, sendero Las Palmas, 10°09'50"N, 83°56'24"W, 400–500 m, 6 June 2003, *Kriebel 3342* (holotype: INB-internet image!; isotypes: CAS-2 sheets!, CR, INB, MO, NY-internet image!, PMA).

Shrub or small tree (1.25–)1.5–4 m tall with lax branching, bark green-brownish. *Upper internodes* 1–4 cm long, terete like the nodes, nodal line absent. *Indumentum* on branchlets, petioles, surface and primary vein of young leaves adaxially, primary, secondary and tertiary leaf veins abaxially, inflorescence axes, bracts, bracteoles, hypanthia, calyx lobes and calyx teeth densely to copiously composed of brownish clavate stipitate dendritic trichomes 0.15–0.25 mm long with short to moderately long thin-walled (flattened) arms, on the older internodes, nodes and petioles sparsely intermixed with elongate smooth trichomes 2.5–7 mm long. *Leaves* of each mature pair slightly unequal in size; the semiterete petioles 0.3–1.5 cm long, canaliculate adaxially, convexly following the primary vein abaxially, greenish; larger blades 7.5–17(–19.5) × 3.5–6.5 cm, smaller blades 4.8–9.8 × 2.1–4 cm, elliptic or rarely obovate-elliptic, the base attenuate to acute, the margin entire, the apex acuminate to gradually long acuminate, membranaceous; adaxial surface of mature leaves with the primary vein glabrescent, the secondary, tertiary and higher order veins glabrous; abaxial surface superficially glabrous except for a few glands on the venules, microscopically papillose with rounded glands, the tertiary and higher order veins densely to sparsely beset with white furrowed sessile glands 0.03–0.04 mm long, typically intermixed with fewer resinous glands of the same type; 5-nerved, including the tenuous marginals, areolae 0.25–0.3 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins slightly impressed, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated to flat. *Inflorescences* an axillary cluster of pseudofasciculate cymes 0.25–1.15 cm long, sessile, branching poorly developed with multiple axes arising from a common point at the base (fascicle-like) and elongating in fruit, paired mainly on defoliated nodes, the rachis green; bracts and bracteoles 0.2–0.65 × 0.2–0.4 mm, thick-triangular, erect and somewhat concave, green, early deciduous at anthesis but occasionally persistent in fruit. *Flowers* 4-merous, sessile at anthesis, pedicels somewhat elongating in fruit to 0.2 mm long, densely covered with the same type of trichomes as the general indumentum. *Hypanthia* at anthesis 2–2.5 × 1.2–1.5 mm, free portion of hypanthium (0.9–)1.25–1.5 mm long, subcylindric and narrowly campanulate above the ovary apex, bluntly 8-ribbed, green, the indumentum frequently sparsely intermixed with caducous white furrowed sessile glands 0.03–0.04 mm long, inner surface ridged, glabrescent with a sparse indumentum like the hypanthium, torus adaxially sparsely and minutely resinous-glandular. *Calyx* open in bud and persistent in fruit, green, becoming brownish in fruit; tube 0.25 mm long (to 0.5 mm long in fruit), with the same vestiture as the inner torus, and outer hypanthium; lobes 0.75–1.35 × 0.75–1.25 mm, triangular, the margin entire to vaguely undulate, the apex acute to rounded, reflexed at anthesis; exterior calyx teeth 0.85–1.45 mm long, subulate, inserted half way up the calyx lobes and widely spreading. *Petals* 2.65–3.5 × 0.85–1.5 mm, ovate-oblong, with a minute and inconspicuous subapical abaxial tooth, the margin entire, the apex bluntly and widely acute to rounded, translucent-white, glabrous on both surfaces, conspicuously reflexed at anthesis. *Stamens* 8; filaments ca. 1.5 × 0.25 mm, white, glabrous; anther thecae 2.85–3 × ca. 0.5 mm, linear-oblong and clavate, emarginate at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, light green to white at anthesis, turning brown with age; connective light green to white, its prolongation and appendage 0.4–0.5 mm long, the appendage oblong-lanceolate, bluntly acute to obtuse at the apex, copiously beset with glandular trichomes from the edges to the center, with fewer glands of the same type throughout the connective, the latter also somewhat prolonged and gland-edged but unappendaged ventro-basally. *Ovary* 4-locular, 2/3 inferior, 0.85–1.2 mm long at anthesis, the apical collar absent, the apex 0.25–0.35 mm in diameter, shallowly bowl-like with a slightly raised perimeter, moderately but inconspicuously glandular-puberulent; style 3.5–5 mm long, parallel-sided (i.e. terete), white, glabrous; stigma capitellate at anthesis (truncate when dry). *Berries* 3–4 × 3.5–4.5

mm when dry, globose-oblate, bright orange when mature, the hypanthial indumentum persistent at maturity. *Seeds* 0.54–0.57 × 0.5–0.6 mm, pyramidal, yellow-brown; lateral symmetrical plane triangular, the highest point near the central part of the seed, with a foot-like projection near the raphal zone toward the micropylar side; antiraphal symmetrical plane suboblong; raphal zone circular to suboblong, ca. 33 % the length of the seed; multicellular sculpture rugose throughout the seed; individual cells elongate, anticlinal boundaries channeled, somewhat undulate to irregularly curved; periclinal walls convex, low to high-domed, microrelief striate.

Additional specimens studied:—COSTA RICA. Alajuela: Along road from San Ramón northward through Balsa, ca 4.6 km N of bridge over Quebrada Volio and ca 4.6 km N of bridge over Río Balsa?, at small stream (Río San Luis?), 10°12'N, 84°31'W, 900–1000 m, 29 August 1979, *Stevens 13794* (CAS); (Upala), No protegida, Cuenca del Zapote, Entrada La Carmela a salir a la estación, 10°43'15"N, 84°59'45"W, 600–700 m, 19 May 2004, *Kriebel 4608* (NY); 17–20 km NNW of San Ramón by road on way to San Lorenzo, 4 to 7 km N of Balsa, 10°13'N, 84°32'W, 750 m, 24 April 1983, *Liesner & Judziewicz 14680* (MO). **Limón:** (Limón), Valle de la Estrella, Z.P, Río Banano, Cuenca del Banano, Fila Matama, cerca de 9 km SW del pueblo de Aguas Zarcas, Sitio El Hotel, Alrededores del campamento, Faldas de la Flla Matama, 9°49'26.976"N, 83°9'42.012"W, 700–800 m, 31 October 2007, *Solano et al. 4858* (INB, NY, PMA). **San José:** P.N. Braulio Carrillo, La Montura, 1100 m, 25 July 1982, *Todzia 2004* (NY). **ECUADOR. Carchi:** Gualpi Chico, Awá encampment, trail on Awá reservation border, going S, 0°58'N, 78°16'W, 1330 m, 15 January 1988, *Hoover et al. 2622* (MO, US); Near encampment in Gualpi Chico area of Awá Reserve, 0°58'N, 78°16'W, 1330 m, 20 January 1988, *Hoover et al. 2864* (MO, US); (Tulcán), Reserva Etnica Awá. Comunidad San Marcos, 25 km al NW de El Chical, parroquia Maldonado, 1500 m, 16–30 November 1990, *Rubio et al. 1069* (MO, US). **Carchi/Esmeraldas:** Near Lita, 600 m, 19 May 1987, *van der Werff et al. 9487* (MO). **Esmeraldas:** (Eloy Alfaro), R.E. Cotacachi-Cayapas, Charco Vicente, Río San Miguel, Bosque húmedo tropical, bosque primario, 0°43'N, 78°53'W, 200 m, 20–31 September 1993, *Tirado et al. 376* (US); (Quininde), Bilsa Biological Station, R.E. Mache-Chindul, 40 km NW of Quinindé, Loma de los Guerrilleros, Permanent plot #2, 0°22'N, 79°44'W, 650 m, 12 March 1997, *Clark et al. 4032* (CAS, QCNE); (Quininde), Bilsa Biological Station, Mache mountains, 35 km W of Quinindé 5 km W of Santa Isabel, SE ridge trail, 0°21'N, 79°44'W, 400–600 m, 20 September 1994, *Clark & Adnepos 87* (CAS); (Quininde), Bilsa Biological Station, Montañas de Mache, 35 km W of Quinindé, 5 km W of Santa Isabel, Behind Manuel's house, 0°21'N, 79°44'W, 400–600 m, 16 May 1995, *Clark & Watt 885* (CAS); (San Lorenzo), R. Indígena Awá, Parroquia Ricaurte, Comunidad Balsareño, Río Palabí, 1°9'N, 78°31'W, 100 m, 15 April 1991, *Rubio & Quelal 1391* (CAS, MO, QCNE). **Manabí:** (Pedernales), Cerro Pata de Pájaro, A 10 km al E de Pedernales, A 5 km del rancho de la familia Arroyo, 0°1'N, 79°58'W, 850 m, 11 March 1997, *Vargas et al. 1334* (MO, QCNE); (Pedernales), Cerro Pata de Pájaro, 10 km E of Pedernales, Finca of the family Arroyo, 0°1'N, 79°58'W, 300–700 m, 21 June 1996, *Clark et al. 2730* (CAS). **Pichincha:** Carretera Quito-Pto. Quito, km 113, 10 km al N de la carrtera principal, bosque virgen y alrededores de la reserva, 0°5'N, 79°2'W, 800 m, 7 April 1984, *Betancourt 174* (US); Carretera Quito-Pto. Quito, km 113, 10 km al N de la carrtera principal, bosque virgen y alrededores de la reserva, 0°5'N, 79°2'W, 800 m, 29 February 1984, *Betancourt 149* (US). **PANAMA. Bocas del Toro:** Fortuna Dam, Pipeline road off Chiriquí Grande road at Continental Divide, 2–8 road miles from divide point, 25 June 1986, *D'Arcy 16400* (CAS). **Panamá:** El Llano-Carti Road in vicinity of Gorgas Lao Mosquito Control Project Site at km 12, 1 August 1974, *Croat 26064* (MO). **San Blas:** Nusagandi, El Llano-Carti Road, 19 km from Interamerican Hwy, Along tho old road parallel to the new one, E of camp, 9°19'N, 78°55'W, 350 m, 26 August 1984, *de Nevers & de León 3768* (CAS, MO); Along newly cut road from El Llano to Carti-Tupile, Continental Divide to 1 mi from divide, 300–500 m, 30 March 1973, *Liesner 1281* (MO). **Veraguas:** NW of Santa Fe, 8.8 km from Escuela Agrícola Alto de Piedra, Pacific slope, 25 February 1975, *Mori & Kallunki 4852* (CAS); Valley of Río Dos Bocas, 11–13 km beyond Agriculture School at Santa Fe, 350–500 m, 25 July 1974, *Croat 25764* (CAS, NY); Valley of Río Dos Bocas along road between Escuela Agrícola Alto Piedra and Calovebora, 15.6 km NW of Santa Fe, along trail to Santa Fe, steep forested hill E of river, 450–550 m, 31 August 1974, *Croat 27667* (CAS); Valley of Río Dos Bocas on road between Alto Piedra (above Santa Fe) and Calovebora, 350–400 m, 29 August 1974, *Croat 27371* (CAS, NY); NW of Santa Fe, 11 km from Escuela Agrícola Alto de Piedra, in valley of Río Dos Bocas, Atlantic slope, 450–550 m, 20 December 1974, *Mori et al. 3811* (CAS).

Illustration:—Kriebel & Almeda 2009: 212, fig. 4.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—*Miconia aurantiaca* is known from primary rain or cloud forest understory on the Caribbean slope of Costa Rica from the Cordillera de Tilarán, Cordillera Central and Cordillera de Talamanca to the Carribean slope in Panama, disjunctly south to the Pacific slope of the Andes in Ecuador (Fig. 12), at 200–1330 m. This species has been considered uncommon throughout its range. Although it has been poorly collected in northwestern Ecuador, where it is probably rare, *M. aurantiaca* is certainly expected in the southwestern part of the Chocó in Colombia.

Phenology:—Collected in flower intermittently throughout the year, from February through March, May through August, October and December; in fruit from February through August and in October.

Etymology:—The specific epithet refers to the mature orange berries that characterize this species.

Discussion:—*Miconia aurantiaca* is characterized by tertiary veins on the abaxial leaf surface that are copiously beset with white furrowed sessile glands, granulose-furfuraceous vegetative indumentum, fascicle-like short inflorescences mainly on defoliated nodes, and anther connective also somewhat prolonged and gland-edged but unappendaged ventro-basally. Within the Approximata subclade, *M. aurantiaca* is more similar to *M. evanescens* with which it has been confused; a detailed discussion of similarities and differences between these species is given in Kriebel & Almeda (2009). In *M. alboglandulosa*, as in *M. aurantiaca*, the anther connective is also prolonged and gland-edged ventrobasally. However, these two species are clearly different in leaf shape (elliptic, rarely obovate-elliptic with attenuate to acute base in *M. aurantiaca* vs. elliptic-lanceolate with broadly and bluntly acute to rounded base in *M. alboglandulosa*). Moreover, in *M. alboglandulosa*, the glands on the abaxial leaf tertiary veins are densely intermixed, and frequently replaced by resinous glands of the same type, the granulose furfuraceous indumentum is notably smaller (0.053–0.093 mm vs. 0.15–0.25 mm), the inflorescences are longer (1.5–3.5 cm vs. 0.25–1.15 cm). *Miconia alboglandulosa* and *M. renatoi* are more similar to each other, and distinguishable from *M. aurantiaca* by their bright pink hypanthium at anthesis (vs. green) and purple-black mature berries (vs. bright orange).

The presence of white furrowed glands on the abaxial tertiary and higher order leaf veins is fairly consistent in *M. aurantiaca*, but the quantity (dense vs. moderate) and color (white vs. resinous) of these glands is variable. A moderate number of resinous glands was found in specimens at 600–700 m (*Kriebel 4608*, *Clark et al. 4032* and *van der Werff et al. 9487*), but no thorough studies have been conducted on the variation of this character with respect to elevation. These glands are also present, typically in lesser quantity, in other species of this complex, including *M. alboglandulosa*, *M. approximata*, and *M. chocoensis.*

In the protologue there is mention of an additional perhaps new species belonging to this complex that is close to *M. aurantiaca.* It is represented by seven specimens: *Betancourt 149* (US!), *Betancourt 174* (US!), *Clark & Adnepos 87* (CAS!, MO, US!), *Clark & Watt 885* (CAS!, MO, US!), *Rubio et al. 1069* (US!), *Rubio & Quelal 1391* (CAS!, MO!, US!, QCNE), and *Sparre 18048* (S, US), from the province of Esmeraldas in Ecuador. Although the second specimen mentioned was collected with flowers, all the floral parts except for the calyx and hypanthium have fallen away. This entity is indistinguishable macroscopically from *M. aurantiaca*, but consistently differs in lacking the white furrowed glands on the abaxial tertiary leaf veins, and has fimbriate scales on the torus. These distinctions were noted by Kriebel & Almeda (2009) and confirmed in this study. We agree that the description of this taxon as a new species should be postponed until more specimens are collected, especially with good mature flowers and fruits. Taking into account the variability in the quantity of the white glands mentioned above, population studies (morphological and genetic) may be needed to better understand the geographic variation in this character.

In the Flora of Ecuador (1980) Wurdack cited various specimens under *M. approximata* that he thought represented a related undescribed taxon. The specimens cited by Wurdack are a mixture of *M. aurantiaca* and other taxa in this species grouping. Among these collections, the ones that correspond to *M. aurantiaca* are *Croat 25764*, *Mori & Kallunki 4852*, and *Sparre 17268*. *Romero-Castañeda 2800* (COL-internet image!) and *Schnell 99* (F!) most certainly correspond to *M. evanescens*. *Asplund 10104* (S), with more developed inflorescences (Wurdack 1980), was not examined in the course of this study.

Conservation status:—This species would be considered Endangered EN B2ab(iii) based on IUCN criteria. A status of Vulnerable VU is warranted, because it occurs in few protected areas of Costa Rica and Ecuador, but it is not protected in Panama. Protected in Costa Rica in the Río Banano Protected Zone (Limón) and in the Braulio Carrillo National Park (San José). In Ecuador it is protected in the Cotacachi-Cayapas Ecological Reserve, in the Mache-Chindul Ecological Reserve, and in the Awá Indigenous Reserve (Esmeraldas).

9. *Miconia bensparrei* Gamba & Almeda, *nom. nov.* Basionym: *Ossaea sparrei* Wurdack (1978a: 301). Type: ECUADOR. Prov. Pichincha: Toáchi, Along-Santo Domingo road, at the confluence between Río Pilatón and Río Toáchi, 850 m, 9 September 1967, *Sparre 18460* (holotype: S!). Nec *Miconia sparrei* Wurdack (1977: 245–246).

Shrub 2.5–4 m tall, more or less erect and laxly branched, bark rusty-brown. *Upper internodes* [3.2–7.2(–17.4) cm long] and cauline nodes terete, nodal line absent. Indumentum on branchlets, petioles (when present), adaxial surface of young leaves, primary, secondary, tertiary and higher order veins abaxially, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, and exterior calyx teeth densely to moderately composed of brownish-translucent dendritic trichomes 0.1–0.15 mm long with short axes and few-moderate number of terete arms. *Leaves* of each pair isophyllous; sessile or with an inconspicuous terete petiole 0.1–0.3 cm long; blades 13–27 × 7–13 cm, elliptic to slightly obovate-elliptic, the base rounded-cordate and amplexicaul, the margin distantly undulate-serrulate, the apex bluntly acute to obtuse, firm-chartaceous; mature leaves adaxially glabrescent, the primary, secondary, tertiary and higher order veins glabrous; abaxial surface glabrous, the indumentum caducous on the tertiary and higher order veins; 7- or 9-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging symmetrically from the primary vein <1 cm above the base, areolae 0.5–1 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins slightly impressed to flat, abaxially the primary and secondary veins elevated, canaliculate to terete, the tertiary and higher order veins slightly elevated. *Inflorescences* typically an axillary and terminal dithyrsoid 19–26 cm long, including a terete peduncle 5–6.7 cm long, pendant, laxly and divaricately branched from the peduncle apex, paired or solitary in the upper leaf axils, the rachis brownish; bracts and bracteoles 1–1.2 × 0.3–0.5 mm, linear-subulate to oblong, the apex occasionally ciliate-aristate, green-reddish, the indumentum caducous on both surfaces, deciduous to subpersistent in immature fruit. *Flowers* 5-merous on pedicels 0.5–1 mm long. *Hypanthia* at anthesis 2.4–2.5 × 2.5–2.9 mm, free portion of hypanthium 1.4–1.5 mm long, subcylindric to campanulate, bluntly 10-ribbed, green, the indumentum caducous and becoming sparse, the dendritic trichomes with somewhat longer arms than on the rest of the plant, ridged on the inner surface, densely and minutely glandular, the glands rounded and sessile, the torus densely glandular-puberulent adaxially, the glands rounded-flattened and slightly furrowed. *Calyx* open in bud and persistent in fruit, white to green; tube 0.5–0.8 mm long, with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 0.9–1 × 0.9–1 mm, depressed-rotund, the margin entire, the apex obtuse, glabrous on both surfaces; exterior calyx teeth 0.4–0.5 mm long, minute and bluntly triangular, inserted at the base of the calyx lobes and not projecting beyond them. *Petals* 5.1–7 × 2–2.3 mm, oblong-lanceolate, the margin entire, the apex bluntly acuminate, white but drying orange, glabrous on both surfaces, slightly spreading at anthesis. *Stamens* 10; filaments 2.3–2.6 × 0.25 mm, whitish, glabrous; anther thecae 2.2–2.8 × 0.45–0.55 mm, linear-lanceolate, bluntly acuminate at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, white; connective darker than the thecae when dry, its prolongation and appendage 0.4–0.45 mm long, the appendage oblong to subulate, bluntly acute to obtuse at the apex, bearing conspicuous glandular trichomes at the apical edge, the glands with flattened rounded heads, slightly furrowed and minutely stalked, the stalks subulate. *Ovary* 5-locular, 1/2 to 2/3 inferior, 2–2.1 mm long at anthesis, the apical collar 0.1–0.2 × 0.4–0.5 mm, conic-truncate, densely to moderately glandular-puberulent; style 6–6.5 mm long, straight, moderately narrowed distally, white, glabrous; stigma expanded truncate to capitellate. *Berries* 6.5–7.5 × 7.5–8.5 mm when dry, globose and slightly oblate, first yellowish turning orange to red when ripe, the hypanthial indumentum somewhat persistent at maturity. *Seeds* 0.4–0.45 × 0.2–0.25 mm, ovoid, angled; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone suboblong, ca. 90 % the length of the seed, ventrally expanded toward the micropyle; appendage absent but a small protuberance present; individual cells elongate, some anticlinal boundaries channeled, others raised, undulate, with U-type patterns; periclinal walls flat, microrelief verrucose to somewhat striate.

Additional specimens studied:—COLOMBIA. Nariño: (Ricaurte), R.N. La Planada, entre Santa Rosa y El Rollo, al lado del camino, 1700 m, 23 February 1995, *Mendoza 790* (FMB). **ECUADOR. Carchi:** (Chical), 0°56'N, 78°11'W, 1200–1250 m, 3 July 1983, *Thompson & Rawlins 736* (F); (Mira), La Primavera, Parroquia Jacinto Jijón y Caamaño, 0°60'N, 78°15'W, 1500 m, 23 July 1991, *Cuamacás 31* (MO, QCNE); (Peñas Blancas), 20 km below Maldonado on the Río San Juan, 900–1000 m, 27 May 1978, *Madison et al. 4618* (F, QCA, US). **Esmeraldas:** environs of Lita, on the Ibarra-San Lorenzo R.R., Wet submontane forest, 550–650 m, 10 June 1978, *Madison et al. 5185* (US). **Pichincha:** Km 87–84 old road Quito-Sto Domingo, 1200–1300 m, 21 March 1980, *Dodson & Gentry 9729* (MO, US); (Quito), R. Maquipucuna, Hacienda El Carmen, trail up Gregoire's Hill, ca, 6 km from airline SE of Nanegal, 0°7.5'N, 78°38'W, 1400–1500 m, 30 August 1989, *Webster et al. 27182* (US); (Pichincha), 5 km N of Tandaya on road to Nanegalito, 2800 m, 21 January 1981, *Clemants & Luteyn 1694* (NY); (Mindo), Jardín de Orquídeas-Cabañas Armonía, 0°3.3'9"S, 78°46.5'88"W, 1270 m, 6 December 2005, *Penneys & Fernández 1903* (CAS, MO, NY).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—This uncommon species occurs in primary or disturbed rainforests and cloud forests, on steep slopes or along streams in the northwestern foothills of the Ecuadorean Andes, with one record from southwestern Andean Colombia (Fig. 13), at 850–2800 m. The single record from Colombia is from Reserva Natural La Planada, in the southwestern department of Nariño.

Phenology:—Collected in flower from December through March, in May, and from July through September; in fruit in January, March, May and July.

Etymology:—The specific epithet is dedicated to Benkt Sparre (1918–1986), a Swedish botanist and museum curator who collected the holotype of this species.

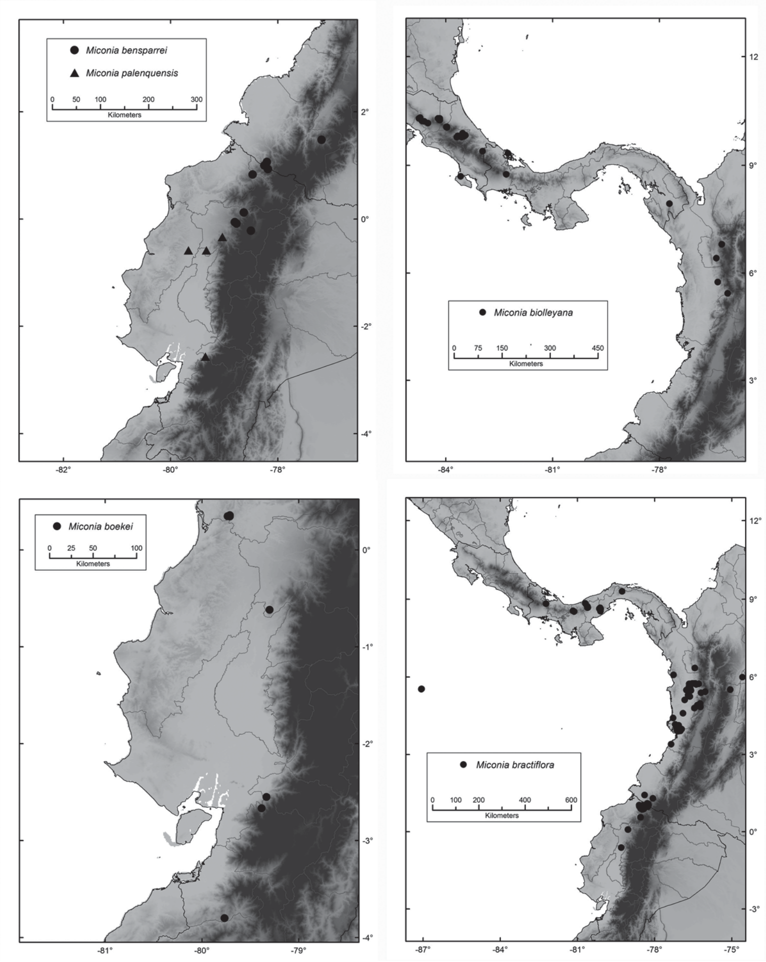


FIGURE 13. Distributions of *Miconia bensparrei* and *M. palenquensis*, *M. biolleyana*, *M. boekei*, and *M. bractiflora*.

Discussion:—This species has brownish-asperous indumentum on vegetative and floral organs, 7- or 9-plinerved, elliptic to obelliptic leaves that are sessile and amplexicaul. It is strikingly similar to *M. palenquensis*, from which it differs in having larger flowers and different venation (5-plinerved in *M. palenquensis*). As noted under the discussion of *M. palenquensis*, these differences may not be taxonomically significant and as more collections of these two species come to light they may prove to be conspecific. *Miconia bensparrei* is also similar to *M. variabilis* in having 5-merous flowers and a dendritc indumentum but both flowers and trichomes are consistently smaller in *M. variabilis*. *Miconia variabilis* differs most notably from *M. bensparrei* in having petiolate leaves. Phylogenetically *M. bensparrei* is basal to a subclade containing *M. albertobrenesii*, *M. boekei*, and *M. neomicrantha* (Fig. 1). The flowers of these four species have a similar oblong-lanceolate petal shape and ovoid-angled seeds but are different in vegetative and floral vestiture.

The asperous-dendritic indumentum of this species is identical to that found in *M. quinquenervia* and its allies which may have led Wurdack (1978a) to suggest that the latter is a close relative. Indumentum characters, although very important taxonomically, can also be convergent and thus should be used in combination with other characters (like seeds and inflorescence architecture) to distinguish allied groupings within the Octopleura clade. *Miconia* *incerta* also seems close to *M. bensparrei.* It has the same vegetative indumentum and sessile-amplexicaul leaves, but *M. bensparrei* lacks the resinous-glands on the hypanthium. The seeds in *M. incerta* are also very different and its position within Octopleura is unclear at this time.

Conservation status:—Endangered EN B2ab(iii). It was considered Vulnerable in previous assessments (Cotton & Pitman 2004). *Miconia bensparrei* was thought to be endemic to Ecuador, where it is known from eight collections. It is not known from any protected area in Ecuador. It likely occurs in the Awá Indigenous Reserve, the Cotacachi-Cayapas and the Mache-Chindul Ecological Reserves but no collections are yet known from these protected sites. In Colombia it is protected in La Planada Natural Reserve. Apart from habitat destruction, no specific threats are known.

10. *Miconia biolleyana* (Cogniaux 1891a: 1193) Gamba & Almeda, *comb. nov.* Basionym: *Clidemia biolleyana* Cogn. Type: COSTA RICA. Bord de la route à Carrillo, 12 May 1890, *Pittier & Durand 2537* (holotype: BR-internet image!; isotypes: BR-internet image!, CR).

Suffrutescent herb or shrub 0.3–1.5(–3) m tall, rupiculous or terrestrial, diffusely branched and sometimes prostrate. *Upper internodes* [(2.2–)4.6–8.7(–14.7) cm long] and cauline nodes terete, nodal line present as a moderate ridge. *Indumentum* on branchlets, petioles, primary, secondary, tertiary and higher order leaf veins abaxially, inflorescence axes, bracts and bracteoles abaxially, pedicels, hypanthia, and exterior calyx teeth densely to moderately composed of sessile-stellate trichomes 0.4–0.8 mm in diameter that superficially resemble simple trichomes. *Leaves* of each pair frequently markedly anisophyllous (1:2); the petiole 0.5–2 cm long (on larger leaves) or 0.2–0.3 cm long (on smaller leaves), adaxially canaliculate, the channel obscured by the dense arachnoid tomentum, abaxially grooved, brown; larger blades 13.7–22.5 × 9.8–14.2 cm, broadly ovate to subrotund, the base rounded, the margin entire, the apex acuminate to attenuate; smaller blades 3.6–10.7 × 2.5–7.9 cm, ovate, the base rounded to somewhat truncate, the margin entire, the apex acuminate; chartaceous; mature leaves with adaxial surface glabrous, as well as the primary, secondary, tertiary and higher order veins; abaxial surface glabrous; 5- or 7-nerved (larger leaves) or 5-(7-)nerved (smaller leaves), including the tenuous marginals, with a thick-callose vesicular structure (acarodomatium?) formed at the base of the leaves abaxially where the innermost pair of secondary veins diverge from the primary vein, areolae 1–2 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins slightly impressed to flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated to flat. *Inflorescences* a pseudolateral dithyrsoid (3–)6–11 cm, including a peduncle (0.7–)1.64–3.6 cm or occasionally sessile, divaricately branched from the peduncle apex, when sessile bifurcate or trifurcate and openly branched from the base, each furcation with the same architecture as the pedunculate dithyrsoid, borne on the upper leafy nodes and on defoliated ones; bracts and bracteoles 0.5–1 × 0.25–0.3 mm, subulate, the bracts more or less erect, the bracteoles spreading, glabrous on the adaxial surface, persistent to tardily deciduous in fruit. *Flowers* 4-merous, subsessile to shortly pedicellate, pedicels to 0.4 mm long when present. *Hypanthia* at anthesis 3.2–3.4 × 0.75–0.85 mm, free portion of hypanthium 1.4–1.5 mm long, urceolate and constricted distally into a subcylindric neck, bluntly 8-ribbed, ridged on the inner surface, along with torus adaxially minutely and sparsely glandular. *Calyx* open in bud and persistent in fruit, green to pinkish; tube 0.2 mm long, abaxial surface with the same vestiture as the hypanthium, adaxial surface minutely and sparsely glandular; lobes 0.35–0.4(–0.5) × 0.8–1 mm, broadly triangular, the margin entire, the apex rounded to obtuse, glabrous on both surfaces and often obscured by the exterior calyx teeth; exterior teeth (0.5–)0.7–0.8 mm long, subulate, inserted at the base of the calyx lobes and exceeding them in length. *Petals* (1.5–)1.8–2 × 1.2–1.5 mm, oblong-obovate, with a minute projecting infra-apical abaxial tooth, the margin entire, the apex rounded-obtuse to somewhat truncate, white to greenish-white, minutely and distally papillose on both surfaces, slightly spreading to erect at anthesis. *Stamens* 8; filaments 1.3–1.5 × 0.25 mm, whitish, glabrous; anther thecae 1.8–2.5 × 0.35–0.4 mm, linear-oblong, obtuse to emarginate at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, cream; connective cream-yellowish, its prolongation and appendage 0.2–0.35(–0.5) mm long, the appendage deltoid to orbicular, rounded at the apex, copiously gland-edged, the glands subsessile and rounded, sparsely distributed throughout the connective. *Ovary* 4-locular, completely inferior, 1.8–1.9 mm long at anthesis, the apical collar absent, the apex ca. 0.2 mm in diameter, slightly depressed, glabrous; style 3.2–3.8 mm long, parallel-sided (i.e. terete), glabrous; stigma truncate to expanded-truncate. *Berries* 3–4 × 3–4 mm when dry, globose, red to red-purple turning blue-purple when fully ripe, the hypanthium indumentum persistent at maturity. *Seeds* 0.39–0.43 × 0.17–0.19 mm, ovoid, angled, light-brown; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side or near the central part of the seed; raphal zone suboblong, nearly as large as the corpus of the seed, extending along its entire length, ventrally and longitudinally expanded, dark-brown; individual cells elongate, anticlinal boundaries inconspicuous; periclinal walls flat, microrelief punctate.

Additional specimens studied:—COLOMBIA. Antioquia: (Frontino), Nutibara, Cuenca alta del Río Cuevas, 1880 m, 19 November 1986, *Sánchez et al. 657* (HUA, MO); (Frontino), Nutibara, Cuenca alta del Río Cuevas, 1720 m, 13 July 1986, *Sánchez et al. 353* (HUA, US). **Chocó:** Road between Bolívar and Quibdó between km 137 and 138 markers, 79–80 km E of Quibdó, 5°45'N, 76°21'30"W, 910–920 m, 11 March 1984, *Croat 57340* (US). **Risaralda:** (Mistrató), Jeguadas, En la vía Río Mistrató-Puerto de Oro, Camino Pisones-Río Currumay, 5°26'N, 76°5'W, 1100–1150 m, 26 April 1991, *Franco et al. 3441* (US). **COSTA RICA. Alajuela:** (San Ramón), R.B. Monteverde, Cordillera de Tilarán, Estación Eladio's, 10°18'30"N, 84°43'10"W, 820 m, 2 October 1990, *Obando et al. 174* (CAS, INB, MO); Along road to Colonia Virgen del Socorro, barranca of Río Sarapiquí, 10°15'N, 84°10'W, 700–800 m, 8 August 1979, *Stevens 13577* (CAS, F, MO); Evergreen premontane forest formations along the upper Río Sarapiquí, near Cariblanco and along the road to Colonia Virgen del Socorro, 10°18'N, 84°10'W, ca. 800 m, 17 September 1978, *Burger & Antonio 11134* (CAS); R.B. Monteverde, Río Peñas Blancas, Vertiente Atlántica. Finca de Klaus Stein, 10°18'N, 84°45'W, 900 m, 4 July 1988, *Bello 159* (CR, MO); R.B. Monteverde, Río Peñas Blancas, Estación Eladio's, 10°19'N, 84°43'W, 820 m, 24 June 1991, *Bello & Cruz 2788* (CAS, INB, MO); R.B. Monteverde, Río Peñas Blancas, 10°19'N, 84°43' W, 1000 m, 1 November 1988, *Bello 524* (CR, MO); R.B. Monteverde, Río Peñas Blancas, Estación Eladio's, 10°18'N, 84°45'W, 900 m, 21 December 1990, *Bello & Monge 2582* (INB, MO); R.B. Monteverde, Peñas Blancas river valley, Refugio El Alemán, 10°18'N, 84°45'W, 900 m, 30 November 1990, *Haber & Ivey 10226* (CR, MO); (Grecia), R.V.S. Bosque Alegre, Cuenca del Sarapiquí, Laguna Hule, 10°17'55.456"N, -84°12'54.057"W, 700–800 m, 28 July 2002, *Kriebel & Larraguivel 690* (INB, MO); (San Ramón), R.B. Alberto Manuel Brenes, Cuenca del San carlos, La Catarata, colectado en orillas del sendero, 10°13'0"N, -84°36'0"W, 1000 m, 14 August 2002, *Alfaro 4077* (INB, MO); (San Ramón), reserva forestal, 1300–1500 m, 18 February 1983, *Carvajal 345* (MO); (Virgen del Socorro), No protegida, Cuenca del Sarapiquí, En paredon al lado del camino, 10°15'25"N, -84°10'20"W, 800 m, 21 July 2002, *Kriebel 541* (INB, MO); Virgen del Socorro-Río Sarapiquí-Cariblanco, 600–800 m, 31 August 1983, *Chacón & Herrera 1216* (CAS, CR, MO, US). **Cartago:** (Turrialba), Tayutic, Jicotea, Cuenca media del Río Jicotea, 9°46'55"N, 83°33'15"W, 1200 m, 19 June 1995, *Herrera 7991* (CAS, CR); In forest S of Moravia de Chirripó, 1125 m, 9 August 1968, *Davidse & Pohl 1187* (ISC, US); (Turrialba), Pejibaye, Jiménez R.V.S. La Marta, Cuenca del Reventazón, La Marta, Centro Histórico, 9°46'55.4"N, 83°41'19.8"W, 781 m, 4 January 2010, *Kriebel et al. 5436* (INB, NY); (Turrialba), Tayutic, Grano de Oro, Cuenca superior Quebrada Molejones, 9°48'5"N, 83°29'30"W, 800 m, 29 July 1995, *Herrera & Cascante 8188* (CR, F, MO); (Jiménez), Cuenca del Reventazón, Tuis, a 4 km sobre la calle Rivel, siguiendo sobre el margen del Río Tuis, 9°49'0"N, 83°39'40"W, 1400 m, 24 November 1996, *Rodríguez 1764* (INB, MO). **Heredia:** ca. 3 km S of Cariblanco on the road to Colonia Virgen de Socorro, ca. 800 m, 23 July 1977, *Almeda et al. 3193* (CAS); Canyon of the Río Sarapiquí, about 10 km from Cariblanco, upstream from bridge on road to La Virgen del Socorro, 10 June 1982, *Hammel et al. 12833* (CAS). **Limón:** (Limón), R. Indígena Talamanca Sukut, Desembocadura del Río Sukut en el Río Urén, Camino al SE, hacia Purisqui, 9°23'30"N, 82°58'0"W, 650 m, 7 July 1989, *Hammel et al. 17581* (CAS, CR, MO). **Puntarenas:** (Puntarenas), R.B. Monteverde, Cordillera de Tilarán, Piedades del Norte, Burial, R.B, de Oberdorsf, 10°10'0"N, 84°30'0"W, 1500–1600 m, 6 September 1993, *Bello & Cruz 5327* (CAS, INB, MO); E Osa peninsula, more than 500 m from edge of primary moist tropical forest, 8.69539°N, -83.58246°W, 25 July 2001, *Mayfield 1640-1640-1123* (MO). **San José:** Alond the hillside just above the Río Hondura at Baja La Hondura, 1150 m, 31 December 1974, *Taylor 17896* (NY, US); Along the Río Clara Valley (Bajo La Hondura) below La Palma NE of San Jeronimo, 10°3'N, 83°58'W, 1000–1200 m, 23 October 1975, *Burger et al. 9407* (F); Along the Río Claro valley (Río La Hondura drainage) below La Palma NE of San Jerónimo, 10°3'N, 83°58' W, 1000–1200 m, 23 July 1971, *Burger & Burger 7639* (NY, US); Monte Hondura, Along the hillshade just above the Río Hondura at Baja La Hondura, 1150 m, 31 December 1974, *Taylor 17949* (NY); (Coronado), P.N. Braulio Carrillo, Camino histórico a Carrillo, 10°4'0"N, 83°58'0"W, 700–1500 m, 25 March 1992, *Ballestero & Barquero* 125A (CR, F, MO); Río Claro valley (Río La Hondura drainage) below La Palma NE of San Jerónimo, 10°3'N, 83°58'W, 1000–1200 m, 19 November 1969, *Burger & Liesner 6288* (F); (La Hondura), Tropical Science Center, 1200 m, 20 February 1966, *Schnell 510* (CR, US); (La Hondura), 1300–1700 m, 16 March 1924, *Standley 37930* (US); Below La Palma, Río Claro (upper Río La Hondura) along the trail to Guapiles, 10°3'N, 83°58'W, 1100–1200 m, 16 December 1966, *Burger 3904* (F).

PANAMA. Bocas del Toro: De la cabaña de Jaramillo bajando hasta la Qda., y regresando por el camino, 29 November 1990, *Aranda et al. 1705* (CAS, PMA); Along road between Gualaca and Chiriquí Grande, 6.6 mi N of middle of bridge over Fortuna Lake, 8°45'N, 82°18'W, 780 m, 25 June 1987, *Croat 66757* (MO). **Darién:** Cerro Pirre, Top of mountain and ridge just south of Pirre, visible from Pirre clearing, 10 July 1977, *Folsom 4516* (CAS).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—*Miconia biolleyana* has been collected in the understory of rain, cloud or riparian forests, where it has been considered fairly common in part of its range. It usually occurs on steep banks and slopes, or near riverbanks, at 600–1880 m from Costa Rica, Panama, and Colombia where it is known from fewer collections (Fig. 13).

Phenology:—Collected in flower from March through April, June through August and in November; in fruit from June through March.

Etymology:—The specific epithet is dedicated to the Swiss botanist and tropical plant collector Paul Biolley (1862–1908).

Discussion:—A distinctive species easily recognized by the 8-costate hypanthium, which is constricted above the ovary apex, arachnoid-stellate indumentum, foliar dimorphism at each node, and gland-edged dorso-basal appendage on each stamen. It is most similar to *M. erikasplundii* (see discussion under that species). It is also similar and most closely related to *M. radicans*, with which it shares the facultative rupiculous habit, similar vegetative and floral pubescence (arachnoid tomentum of sessile-stellate trichomes), and strongly dimorphic leaves at each node. It has a different leaf shape, especially in the larger leaves (broadly ovate to subrotund in *M. biolleyana* vs. elliptic-oblong and falcate in *M. radicans*), and flower dimensions (all floral characters smaller in *M. radicans*). The callose thickened structures at the abaxial blade base where the primary veins diverge from one another may be acarodomatia of some kind reminiscent of those also found, but not as conspicuous, in *M. erikasplundii* and *M. radicans*. The three species belong to the Quinquenervia subclade, and are more closely related to *M. atropurpurea* and *M. neocoronata*.

Conservation status:—Considered Endangered EN B2ab(iii) based on IUCN criteria (AOO). However, it is protected in Costa Rica but not in Panama or Colombia, which warrants a status of Vulnerable VU. Protected in Costa Rica in the Monteverde Biological Reserve, in the Alberto Manuel Brenes Biological Reserve, and in the Bosque Alegre Wild Life Refuge (Alajuela, the former also in Puntarenas); in La Marta Wild Life Refuge (Cartago); in the Braulio Carrillo National Park (San José); and in the Talamanca Sukut Indigenous Reserve (Limón).

11. *Miconia boekei* (Wurdack 1978b: 9–10) Gamba & Almeda, *comb. nov.* Basionym: *Ossaea boekei* Wurdack. Type: ECUADOR. Prov. Azuay: Jesús María–Molleturo road, about 10 km from Guayas border, *ca.* 1100 m, 16 July 1977, *Boeke & Loyola 2171* (holotype: US!; isotypes: MO!, NY-internet image!).

Subshrub or shrub (1.5–)3–5 m tall, sparingly branched. *Upper internodes* compressed-rounded, (1–)5.7–8.4 cm long, cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, primary and secondary leaf veins abaxially, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, calyx lobes abaxially, and exterior calyx teeth copiously covered with whitish elongate moderately roughened trichomes to 1 mm long, each trichome claviform and somewhat thickened, copiously intermixed with a whitish understory of single-tiered lepidote trichomes 0.15–0.23 mm in diameter with the radii nearly completely fused. *Leaves* of each pair typically equal in size; petiole 2–3 cm long, canaliculate and depressed adaxially, quadrate-grooved abaxially; blades 18–30 × 7–13 cm, elliptic, the base acute, the margin obscurely undulate-serrulate, the apex shortly to abruptly acuminate, chartaceous; mature leaves adaxially with surface and primary vein at first sparsely covered with the whitish lepidote general trichomes but soon becoming glabrous, the secondary, tertiary and higher order veins glabrous; abaxial surface, essentially glabrous with age, with caducous lepidote trichomes similar to those on the adaxial surface, the tertiary and higher order veins sparsely beset with short-stalked glands 0.1 mm long with thin-walled short heads to glabrescent; 5-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging asymmetrically from the primary vein 1.5–3 cm above the base, areolae 0.5–0.7 mm, adaxially the primary and secondary veins slightly impressed, the tertiary and higher order veins flat, adaxially the primary and secondary veins elevated and terete toward the base, the tertiary and higher order veins flat. *Inflorescences* an axillary dithyrsoid 5–8 cm long, including a peduncle 0.5–1 cm long, occasionally the lateral branches of the dichasia with secund flowers, divaricately branched from the peduncle apex, paired among the upper leaves; bracts and bracteoles 1.5–2 × 1.8–2.2 mm, broadly ovate, the margins sparsely denticulate, acute to aristulate at the apex, concave, with conspicuous parallel venation, the indumentum caducous, the bracts somewhat spreading, the bracteoles erect, occasionally alternately positioned along the inflorescence branchlets, both persistent in fruit. *Flowers* 5-merous, subsessile or on pedicels 0.3–2 mm long. *Hypanthia* at anthesis 2.3–2.9 × 2–2.2 mm, free portion of hypanthium 0.9–1.2 mm long, subcylindric becoming globose in fruit, obscurely 10-ribbed, ridged on the inner surface, glabrous, the torus sparsely and minutely resinous-glandular adaxially. *Calyx* open in bud and persistent in fruit; tube 0.3–0.5 mm long, with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 0.5–0.7 × 0.8–1 mm, oblong-triangular, the margin entire, the apex bluntly acute, glabrescent abaxially; exterior calyx teeth to 1 mm long at anthesis, conic-thick, inserted inframarginally and not projecting beyond the lobes. *Petals* 5–5.8 × 1.7–2.1 mm, oblong-lanceolate, the margin entire, the apex acute, cream to white, glabrous adaxially, abaxially with a copious squamate-stellate central band of lepidote trichomes with only partially fused radii, reflexed at anthesis but often appearing somewhat erect when dry. *Stamens* 10; filaments 2–2.5 × 0.25 mm, white, glabrous; anther thecae 1.5–2 × 0.5–0.7 mm, oblong, somewhat clavate and emarginate at the apex, opening by two dorsally inclined pores 0.15 mm in diameter; connective darker than the thecae when dry, its prolongation and appendage 0.3–0.5 mm long, the appendage deltoid to somewhat spatulate, obtuse-rounded at the apex, copiously gland-edged, the glands conspicuously stalked and rounded, the stalks linear to subulate to 0.2 mm long, the connective also somewhat prolonged and gland-edged but unappendaged ventro-basally. *Ovary* (6-) 7-locular, completely inferior, 1.4–1.7 mm long at anthesis, the apical collar absent, the apex 0.25 mm in diameter, truncate, sparsely glandular-granulose; style 6.5–7 mm long, narrowed distally (i.e. tapering), white, glabrous; stigma truncate to expanded truncate at anthesis. *Berries* 4–4.3 × 5–5.2 mm when dry, globose and slightly oblate, initially pale green, ripening orange, the hypanthial indumentum persistent at maturity. *Seeds* 0.43–0.48 × 0.17–0.2 mm, ovoid, angled, brownish; lateral and antiraphal planes ovate, the highest point toward the chalazal side; raphal zone sublinear, nearly as long as the seed, somewhat ventrally expanded toward the micropyle; appendage absent but a small protuberance may be present; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief inconspicuously striate.

Additional specimens studied:—ECUADOR. Azuay/Cañar: Manta Real, Río Patul, S de la carretera La Troncal-Zhud, camino entre Zhucay y Río Patul en la base de los Andes, Trocha subiendo el piedemonte hasta 1200 m, atrás (E) del pueblo Manta Real, 2°33'S, 79°20'W, 450–800 m, 13 July 1991, *Foster & Mitsui 13553* (F, QCA). **El Oro:** Hacienda Buanventura, 12 km W Piñas on road to Machala, 3°48'S, 79°46'W, 900 m, 25 February 1991, *Kessler 2553* (US). **Esmeraldas:** (Quininde), Estación Biológica Bilsa, Carretera Herrera-El Páramo (Sat, Isabel), 0°21'36"N, 79°42'40.4"W, 580 m, 18 February 1995, *Palacios et al. 13565* (MO); (Quininde), Estación Biológica Bilsa, Carretera Herrera-El Páramo (Sat, Isabel), 0°21'36"N, 79°42'40.4"W, 580 m, 18 February 1995, *Palacios et al. 13572* (MO); (Quininde), Mache-Chindul Ecological R., Bilsa Biological Station, Mache Mountains, 35 km W of Quinindé, Ramon Loor's property, 0°21'N, 79°44'W, 500 m, 22 October 1996, *Clark 3076* (MO); R.B. Bilsa, Sendero Amarillo, 0°20'49"N, 79°42'41"W, 540 m, 13 February 2009, *Stern & Tepe 399* (CAS); (Quininde), Bilsa Biological Station, Montañas de Mache, 35 km W of Quinindé, 5 km W of Santa Isabel, N-bearing border of R., between the Station road and the E-bearing border crossing the Río Cube, 0°21'N, 79°44'W, 400–600 m, 23 September 1994, *Baas & Clark 59* (MO); (Quininde), Mache-Chindul Ecological R., Bilsa Biological Station, Mache Mountains, 35 km W of Quinindé, 5 km W of Santa Isabel, Near permanent plot #1, 0°21'N, 79°44'W, 500 m, 6 February 1996, *Clark et al. 1960* (MO, QCNE, US). **Los Ríos:** (Quevedo), Cerro Centinela, el Mirador, A 12 km al E de Patricia Pilar y Centro Cientifico Río Palenque, 0°37'S, 79°18'W, 540 m, 3 June 1990, *Rubio & Alverson 410* (QCNE, US). **Los Ríos-Pichincha:** Path following ridge line at El Centinela at crest of Montanas de Olla on road from Patricia Pilar to 24 de Mayo at km 12, Patricia Pilar is at km 45 on road from Sto Domingo to Quevedo, 600 m, 28 July 1979, *Dodson et al. 8611* (MO, US); Path following ridge line at El Centinela at crest of Montanas de Olla on road from Patricia Pilar to 24 de Mayo at km 12, Patricia Pilar is at km 45 on road from Sto Domingo to Quevedo, 600 m, 6 February 1979, *Dodson 7390* (MO).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Endemic to Ecuador where it is rare in primary or secondary cloud and premontane wet forests and disturbed sites throughout the western foothills of the Ecuadorean Andes (Fig. 13), at 400–1100 m.

Phenology:—Collected in flower and fruit in February, from June through July, and from September through October.

Etymology:—The specific epithet is dedicated to the collector of the type, Jef D. Boeke, a molecular biologist and geneticist, currently at the Johns Hopkins University School of Medicine in Baltimore, Maryland, United States.

Discussion:—This species is readily recognized by the dense claviform-thickened vegetative indumentum that also covers the hypanthium and calyx, markedly asymmetrical plinervation, and conspicuous bracteoles that are occasionally present subalternately around the ultimate dichasial branching of the inflorescence. In the protologue, Wurdack suggested that it is closest is *M. variabilis*, a species with somewhat similar foliar plinervation and laxly reticulate and elevated foliar veins abaxially. Apart from the deflexed gland-edged dorso-basal staminal connective appendage and the conspicuous hypanthial ribs (synapomorphies for the entire Octopleura clade); these two species do not seem to have much else in common morphologically. *Miconia boekei* is sister to *M. neomicrantha* (Fig. 1), a species with very different vegetative indumentum and overall general appearance. Another close relative is *M. albertobrenesii*, as noted by Wurdack (1978b), which differs in having shorter vegetative and floral indumentum, foliar areoles more densely arranged (0.2–0.3 mm in *M. albertobrenesii* vs. 0.5–0.7 mm), plinervation asymmetrical but less striking (0.6–1.2 cm vs. 1.5–3 cm), and different berry color at maturity (white vs. orange). Both *M. albertobrenesii* and *M. boekii* have a similar anther shape (rather clavate-emarginate) and ovaries that are occasionally 6-locular.

Based on available collections, the northernmost occurrence of this species is in the southwest part of the Esmeraldas province. The southernmost is in the central-south of El Oro province. This distribution suggests that the range of this species is definitely centered in Ecuador, because the aforementioned points are far removed from the Colombian and Peruvian borders.

Conservation status:—Endangered EN B2ab(iii). It was considered Vulnerable in previous assessments (Cotton & Pitman 2004). In northern Ecuador, at least one population is protected inside the Reserva Ecológica Mache-Chindul (Esmeraldas). Three specimens are housed in Ecuadorian herbaria: *Clark et al. 1960* (QCNE), *Foster & Mitsui 13553* (QCA), *Rubio & Alverson 510* (QCNE). Habitat destruction is the only known threat.

12. *Miconia bractiflora* Gamba & Almeda, *nom. nov.* Basionym: *Ossaea bracteata* Triana (1871: 147). Type: COLOMBIA (Nouvelle Grenade). Nariño: Barbacoas, Arrastradero, 10 m, April 1853, *Triana s.n.* (holotype: BM-internet image!; isotypes: BR-2 sheets-internet images!, COL-internet image!, NY-2 sheets!). Nec *Miconia bracteata* (de Candolle) Triana (1871: 111).

Shrub or small tree (0.7–)1–8 m tall with erect, rigid branching. *Upper internodes* compressed-rounded, (1–)3.2–7.1 cm long, cauline nodes terete, bearing a well-defined nodal ridge forming a deflexed flaplike outgrowth confluent with the abaxial bases of the petioles. *Indumentum* on branchlets, primary and secondary leaf veins abaxially, inflorescence axes, bracts and bracteoles, sparsely composed of caducous somewhat translucent dendritic trichomes 0.15–0.2 mm long with short thin-walled (flattened) arms. *Leaves* of each pair isophyllous; the semiterete petiole 1.5–4(–6) cm long, widely and deeply canaliculate adaxially, glabrous; blades 15–28(–35) × 5.5–16 cm, oblong-elliptic to obovate, the base acute to cuneate, narrowly decurrent on the petiole, the margin entire or obscurely undulate-crenate to crenate, the apex acute to short-acuminate, chartaceous; mature leaves adaxially with surface, primary, secondary, tertiary and higher order veins glabrous; abaxial surface occasionally red-flushed, glabrous like the tertiary and higher order veins; 5-(7-) plinerved, including the tenuous marginals, innermost pair of secondary veins diverging equilaterally or inequilaterally from the primary vein 0.6–1.2 cm above the base, areolae 0.5–1 mm, adaxially the primary, secondary, tertiary and higher order veins impressed, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated. *Inflorescences* a pseudolateral multiflorous thyrsoid 3–7 cm long, including a peduncle 1–1.5(–2) cm long, the flowers congested in the paracladia, with a secund/scorpioid arrangement, pendant, divaricately branched from the peduncle apex among the upper foliar nodes; bracts and bracteoles 3–5 × 2–4 mm, the bracts ovate to suborbicular, acute at the apex, each pair imbricate, commonly more than one pair present, the bracteoles ovate-oblong to suborbicular, bluntly and widely acuminate at the apex, both concave, with conspicuous parallel venation, green-orange, glabrescent to sparsely furfuraceous on both surfaces, persistent to tardily deciduous in fruit. *Flowers* 5-merous, sessile. *Hypanthia* at anthesis 2.5–2.7 × 1.3–1.5 mm, free portion of hypanthium 1–1.2 mm long, campanulate to subglobose, bluntly 10-ribbed, greenish to orange, with a copious matted indumentum of dendritic trichomes 0.15–0.2 mm long with moderately long thin-walled arms, ridged and glabrous on the inner surface, the torus sparsely ciliate to glabrous adaxially. *Calyx* open in bud and persistent in fruit, green; tube 0.4–0.5 mm long, with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 0.5–0.7 × 0.7–0.9 mm, broadly depressed triangular, the margin vaguely undulate, the apex bluntly acute, moderately to copiously covered on both surfaces with the same type of vestiture as the hypanthium; exterior calyx teeth up to 0.25 mm long in fruit, short-linear and blunt, with the same vestiture as the hypanthium, inserted at the base of the calyx lobes and not projecting beyond them. *Petals* 2–3.2 × 0.75–1 mm, oblong-lanceolate, the margin entire, the apex bluntly acute, white to translucent white, glabrous adaxially, abaxially with a copious central band of matted dendritic trichomes to 0.25 mm long with moderately long thin-walled (flattened) arms, reflexed at anthesis. *Stamens* 10; filaments 2–2.5 × 0.25 mm, white, glabrous; anther thecae 1.5–2.2 × 0.3–0.4 mm, linear-oblong, slightly clavate and emarginate at the apex, opening by two dorsally inclined pores, 0.11–0.13 mm in diameter, white to pale yellow; connective pale yellow, its prolongation and appendage (0.25–)0.3–0.4 mm long, the appendage deltoid, bluntly acute at the apex, copiously gland-edged, the glands short-stalked, also present on the dorsal side of the appendage and connective. *Ovary* 5-locular, 2/3 to 3/4 inferior, 1.9–2.1 mm long at anthesis, the apical collar absent, the apex 0.25–0.35 mm in diameter, conic-truncate, sparsely glandular-puberulent; style 3.8–4.5(–5) mm long, parallel sided (i.e. terete), white, glabrous; stigma expanded truncate to capitellate at anthesis. *Berries* 1.8–2.5 × 2.5–3 mm when dry, globose-oblate, initially green, then orange, ripening red-orange to red-purple, the hypanthial indumentum persistent at maturity. *Seeds* 0.37–0.4 × 0.13–0.17 mm, ovoid, angled, brownish; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone triangular to suboblong, nearly as long as the seed, somewhat ventrally expanded toward the micropyle; appendage absent but a small protuberance present; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief inconspicuously striate.

Additional specimens studied:—COLOMBIA. Boyacá: (Puerto Boyacá), corregimiento de Puerto Romero, Hda. Los Balcones, 5°50'30.1"N, 74°22'22.2"W, 350 m, 18 September 1996, *Rangel et al. 13398* (COL). **Caldas:** (Samaná), Florencia, P.N.N. Selva de Florencia, Sendero a San Lucas, Cordillera Central, vertiente oriental, 5°30.96'N, 75°3.59'W, 1206 m, 3 March 2011, *Alvear et al. 1474* (CAS, COL). **Chocó:** Vicinity of Guayabal, 21 April 1982, *Prance 28023* (NY); New road being built from S of Yuto to Lloró, 100 m, 17 August 1976, *Gentry & Fallen 17831* (MO); (San José del Palmar), La Italia, San Antonio, Alto de Galápagos, Serranía de Los Paraguas, Sendero to Cascada San Antonio, 4°50.53'N, 76°12.991'W, 1700 m, 15 February 2011, *Almeda et al. 10357* (CAS, COL); (Tadó), Marmolejo, 15 km adelante de Guarató (Risaralda) en la carretera Cecilia-Tadó (Chocó), 450 m, 25 April 1991, *Fernández et al. 8786* (NY); (Quibdó), Tutunendo, Alto del Veinte, 25 km N de Quibdó, 450 m, 19 October 1986, *Callejas & Jangoux 2663* (HUA, MO, NY); km 17 road from Quibdó to Istmina, 23 April 1982, *Prance 28039* (COL, NY); (San José del Palmar), El Tabor, 1540 m, 18 January 1983, *Franco et al. 1477* (COL, NY); (Nóvita), Llanadas, Ladera N del Cerro Torrá, Filo al W del Río Surama, Camino al Alto del Oso, 600–900 m, 22 February 1977, *Forero et al. 3103* (COL, MO, NY); (San José del Palmar), Hoya del Río Torito (afluente del Río Hábita), declive occidental, Finca"Los Guaduales", 730–830 m, 2 March 1980, *Forero et al. 6494* (COL, MO); 7 km W of Tutenendo on road to Quibdó, 100 m, 12 August 1976, *Gentry & Fallen 17589* (COL, MO); 11 km E of Tutunendo on Quibdó-Medellín road, 100–200 m, 12 August 1976, *Gentry & Fallen 17570* (COL, MO); (Quibdó), Carretre Quibdó-Yuto, km 6, 31 March 1984, *García-Cossio 51* (CHOCO, MO); Vicinity of"La Equis" mine, short road N of Bolivar-Quibdó hwy, around km 182–3, 300 m, 31 October 1983, *Juncosa 1167* (MO); (San José del Palmar), Portachuelo, Hacienda Barro Blanco, 1350 m, 15 January 1983, *Franco et al. 1386* (COL, MO); (Quibdó), Carretera San José de Purre, 25 April 1987, *Moreno 6* (CHOCO, MO); Along road between Quibdó and Istmina, at 14 km S of Quibdó, 5°32'N, 67°37'W, 100 m, 17 December 1980, *Croat & Cogollo 52192* (MO); Quebrada Peña Negra, 8 km W of Quibdó-Istmina road on new Pan American Hwy, 90 m, 10 January 1979, *Gentry & Renteria 23936* (COL, MO); Serranía del Baudó, along road between Las Animas and Pato on Río Pato, ca 4 km SW of Pato on property of Sr. Gutierrez, 5°30'N, 76°46'W, 150 m, 18 April 1983, *Croat 56117* (MO); (San José del Palmar), Hoya del Río Torito (afluente del Río Hábita), declive occidental, 850–950 m, 16 March 1980, *Forero et al. 7412* (COL, MO); (Quibdó), Carretera Quibdó-Medellin, entre el Veinte y la Playa, 28 August 1985, *García-Cossio 131* (CHOCO, MO); Comunidad Indígena Waunana, Región del Río Pichimá, 4°25'N, 77°17'W, 100 m, 11 November 1976, *Forero 634* (COL, MO); (Quibdó), Carretera Yuto-Lloró, 80 m, 30 June 1983, *Forero et al. 9693* (COL, MO); (Quibdó), Tutunendo, Carretera Quibdó, 6 September 1976, *Forero 2529* (COL, MO); Margen izquierdo del Río Atrato, Carretera Tutunendo-El Carmen, Alrededores del campamento "El 12", 600 m, 27 April 1979, *Forero et al. 5970* (COL, MO); (Istmina), Quebrada Raspadura, entre Raspadura y Quibdó, Divorcio de aguas de las Hoyas del Río Atrato y del Río San Juan, 5°15'N, 76°38'W, 18 April 1979, *Forero & Jaramillo 5311* (COL, MO); Río Serrano, afluente del Río Atrato, 4–6 km arriba de Guayabal, 50 m, 29 April 1975, *Forero et al. 1332* (COL, MO); Río Serrano, afluente del Río Atrato, 4–6 km arriba de Guayabal, 50 m, 30 April 1975, *Forero et al. 1390* (COL, MO); (Alto de Buey), Alto de Buey, 1200–1800 m, 8 January 1973, *Gentry & Forero 7301* (MO); Río Serrano, afluente del Río Atrato, Arriba de Guayabal, 40 m, 26 April 1975, *Forero et al. 1306* (COL, MO); (Bahia Solano), P.N.N. Ensenada de Utría, En la trocha que va de la ensenada a Boroboro, 6°21'N, 76°26'W, 0–100 m, 22 April 1990, *Espina et al. 3815* (CHOCO, MO); (Quibdó), Carretera Yuto-Lloró, 80 m, 30 June 1983, *Forero et al. 9641* (COL, MO); (Pizarro), Km 24–26 de la carretera Pie de Pepé-Berrecul, 18 November 1985, *Espina 1948* (MO); Along road between Quibdó and Yuto, 12 km S of Quibdó, 5°38'N, 76°40'W, 60 m, 21 April 1983, *Croat 56242* (MO); Along ropad between Quibdó and Lloró ca 5 km E of turnoff along Quibdo-Las Animas road ca 1 km S of ferry over Río Atrato, 5°29'N, 76°35'W, 150 m, 16 April 1983, *Croat 56002* (MO); Hoya del Río San Juan, Río Fujiadó, afluente del Río San Juan, 4°36'N, 76°54'W, 7 April 1979, *Forero et al. 4806* (COL, MO). **Chocó-Valle:** Río Calima (región del Chocó), margen izquierda, bosques junto a Quebrada de la Brea, 25–40 m, 19 May 1946, *Cuatrecasas 21132* (NY). **Nariño:** (Tumaco), La Guayacana, 24 June 1951, *Romero-Castañeda 2857* (NY); (Ricaurte), Along road between Altaquer and Tumaco, between Altaquer and Junín, 7 km W of Altaquer, Río Ñambí, 1°18'N, 78°4'W, 1100 m, 21 March 1990, *Croat 71680* (MO). **Risaralda:** (Mistrató), Jeguadas, Cordillera Occidental, Vertiente Occidental, 5°26'N, 76°2'W, 1500 m, 28 March 1992, *Betancur et al. 3185* (NY). **Valle:** La Trojita, Río Calima (región del Chocó), 5–50 m, 19 February 1944, *Cuatrecasas 16384* (F, NY); (Buenaventura), San Isidro, La Trojita, 7 March 1989, *Devia & Prado 2702* (CAS, MO, TULV); Rio Calima, Quebrada de La Brea, 30–40 m, 19 May 1946, *Schultes & Villareal 7365* (NY); (Buenaventura), Bajo Calima, Within Forestry Concession of Cartón de Colombia, between Buenaventura and Río Calima, 6.3 km N of Frente La Brea, km 18 on main road, about 6 km SE of San Isidro village on Río Calima, 40°2'N, 77°3'W, 50 m, 7 July 1986, *Croat 61346* (CAS, MO); N shore of Buenventura Bay, 16 February 1939, *Killip & García 33345* (NY); Bajo Calima, Concesión Pulpapel, 100 m, 20 January 1988, *van der Werff & Monsalve 9662* (MO, NY); (Buenaventura), San Isidro, In and around camp of INDERENA-FAO, 3°59'N, 76°57'W, 236 m, 15 November 1979, *van Rooden et al. 610* (MO, NY); El Papayo, Costa del Pacífico, Río Yurumanguí, 10–20 m, 5 February 1944, *Cuatrecasas 15990* (COL, NY); Bajo Calima, Concesión Pulpapel/Buenaventura, Carretera Canalete PS1 , 3°55'N, 77°'W, 100 m, 22 October 1987, *Monsalve 2037* (CUVC, MO); Bajo Calima, ca 10 km due N of Buenaventura, Carton de Colombia concession, 3°56'N, 77°8'W, 50 m, 10 December 1981, *Gentry 35576* (COL, MO); Bajo Calima, Estación Agroforestal del Bajo Calima, Secretaría de agricultura y fomento, 40–60 m, 4 August 1979, *Cabrera 5158* (CUVC, MO); Bajo Calima, Concesión Pulpapel/Buenaventura, Carretera Canalete PS1 , 3°55'N, 77°'W, 100 m, 22 October 1987, *Monsalve 2018* (MO); (Buenaventura), Bajo Calima Region, Along road between Buenventura and Malaga, between km 65 and 66, 4°10'N, 77°12'W, 40–65 m, 28 February 1990, *Croat 71039* (MO); Bajo Calima Region, Concesión Pupapel/Buenaventura, 3°55'N, 77°'W, 100 m, 8 May 1985, *Monsalve 856* (MO, CUVC); (Buenaventura), Bajo Calima Region, Along road between Buenaventura and Malaga, at km 31.5, virgin forest along road, 4°1'N, 77°5'W, 100 m, 6 February 1990, *Croat & Watt 70269* (MO); Bajo Calima, Along road between Buenaventura and Málaga, km 51.7 from main Cali-Buenventura Hwy, 4°3'N, 77°5'W, 16 July 1993, *Croat & Bay 75767* (MO). **COSTA RICA. Puntarenas:** (Puntarenas), Isla del Coco, P.N. Isla del Coco, Sendero de Bahía Wafer al Cerro Yglesias, 5°32'40"N, 87°3'20"W, 0–600 m, 19 August 1996, *González 1179* (INB, MO); (Puntarenas), Isla del Coco, P.N. Isla del Coco, Sendero a Cerro Iglesias, 5°32'40"N, 87°3'20"W, 400–600 m, 22 September 1994, *Quesada 1006* (INB, MO); (Cocos Island), High ridgetop between Wafer Bay and Cerro Iglesias, 9 April 1979, *Foster 4168* (CAS, CR, F, MO, US); (Cocos Island), Along brook flowing into Wafer Bay, 19 April 1930, *Svenson 404* (F). **ECUADOR. Carchi:** (Gaulpi Chico), Awá encampment, Trail on Awá Reservation Border, going S, 0°58'N, 78°16'W, 1330 m, 15 January 1988, *Hoover et al. 2615* (CAS, MO); (Gualpi Chico), Vicinity of Awá encampment, 0°58'N, 78°16'W, 1330 m, 17 January 1988, *Hoover et al. 2685* (MO); (Gualpi Chico), Awá R., Near encampment, 0°58'N, 78°16'W, 1330 m, 20 January 1988, *Hoover et al. 2867* (MO); (Gualpi Chico), Awá Encampment, Trail on reservation border going N, 0°58'N, 78°16'W, 1330 m, 15 January 1988, *Hoover et al. 2491* (MO); (Tulcán), R. Étnica Awá, Comunidad de "Gualpi Medio", 1°1'N, 78°16'W, 900 m, 21 May 1992, *Quelal et al. 750* (MO, QCNE); (Gualpi Chico), Awá R., SE Trail, near encampment, 0°58'N, 78°16'W, 1330 m, 19 January 1988, *Hoover et al. 2767* (MO); Perhumid forest on wet plateau above San Marcos de los Coaiqueres, on trail towards Gualpí Bajo, 1°6’N, 78°17’W, 1000 m, 7 February 1985, *Øllgaard et al. 57498* (MO); (San Marcos), R. Étnica y Forestal Awá, Around the village, 1°5’N, 78°15’W, 1000 m, 11 March 1988, *Jorgensen et al. 65200* (MO); (Tulcán), R. Indígena Awá, Comunidad de “Gualpi Alto”, Parroquia Chical, 1°2’N, 78°14’W, 1800 m, 15 June 1991, *Rubio et al. 1727* (MO, QCNE); (Tulcán), R. Indígena Awá, Centro El Baboso, Parroquia Tobar Donoso, 0°53’N, 78°25’W, 1800 m, 17 August 1992, *Tipaz et al. 1764* (MO, QCNE); (Maldonado), R. Étnica Awá, Parroquia Tobar Donoso, Sabalera, 0°55’N, 78°32’W, 900 m, 22 November 1992, *Aulestia et al. 630* (MO, QCNE). **Esmeraldas:** (Lita), Río Lita and tributaries (affluent of Río Mira), 117 km NW of Ibarra, 12 km N of Lita, 0°52’N, 78°29’W, 600 m, 10 May 1987, *Daly & Acevedo 5177* (MO, NY); Lita-San Lorenzo road, 26.9 km W of Río Lita, 13.2 km E of El Durango, 0°58’6"N, 78°33’45"W, 735 m, 17 October 1999, *Croat et al. 83390* (MO); (San Lorenzo), R. Indígena Awá, Comunidad “La Unión”, Cañón del Río Mira, 10 km al W de Alto Tambo, 1°2’N, 78°26’W, 250 m, 16 March 1991, *Rubio et al. 1111* (MO, QCNE); Lita-San Lorenzo road, 14.2 km W of Río Lita Bridge (below Lita), vicinity of Alto Tambo, near sign for Ecological R., 6.6 km of Río Chuchubí, 0°52’11"N, 78°27’16"W, 425 m, 10 July 1998, *Croat et al. 82644* (MO); Along road between Lita and San Lorenzo, 0.7 km N of Alto Tambo, 0°54’30"N, 78°32’37"W, 800 m, 20 July 2000, *Croat et al. 84198* (MO); Road San Lorenzo-Alto Tambo-Lita, 60.5 km from San Lorenzo, Fringes of the R.Cotacachi-Cayapas, 0°53’47.7"N, 78°32’32.7"W, 879 m, 3 October 2001, *Cotton et al. 1814* (MO, QCA); (San Lorenzo), San Francisco, Recinto Durango, Sector Colinado, Terrenos propiedad Sr, Demetrio Paez, 1 km al E de la carretera Lita-San Lorenzo, 1°2’N, 78°36’W, 256 m, 17 October 1999, *Valenzuela & Freire 456* (MO); Lita-San Lorenzo Road, 18 km W of Río Lita Bridge (on old road between Lita), 6.6 km W of bridge over Río Chuchubí, site near Alto Tambo, 0°52’11"N, 78°27’16"W, 425 m, 10 July 1998, *Croat et al. 82625* (MO); Lita-San Lorenzo Road, 13 km W of Río Lita Bridge (new road) near Lita, 0°54’6"N, 78°32’27"W, 814 m, 11 October 1999, *Croat et al. 83233* (MO). **Los Ríos:** (Quevedo), Centro Científico Río Palenque, Cerro Centinela, el Mirador, A 12 km al E de Patricia Pilar y Centro Cientifico Río Palenque, 0°37’S, 79°18’W, 540 m, 3 June 1990, *Rubio & Alverson 410* (MO, QCNE). **Pichincha:** Carretera Quito-Puerto Quito, km 113, 10 km al N de la carretera principal, Bosque virgen y alrededores de la reserva, 0°5’N, 79°2’W, 800 m, 19 February 1984, *Betancourt 105* (F, NY, QCA); Carretera Quito-Puerto Quito, km 113, 10 km al N de la carretera principal, Bosque virgen y alrededores de la reserva, 0°5’N, 79°2’W, 800 m, 26 February 1984, *Betancourt 132* (F, NY, QCA); Carretera Quito-Puerto Quito, km 113, 10 km al N de la carretera principal, Bosque virgen y alrededores de la reserva, 0°5’N, 79°2’W, 800 m, 29 February 1984, *Betancourt 151* (CAS, F, NY, QCA); Carretera Quito- Puerto Quito, km 113, 10 km al N de la carretera principal, bosque virgen y alrededores de la reserva, 0°5’N, 79°2’W, 800 m, 25 February 1984, *Betancourt 128* (F, MO, NY, QCA). **PANAMA. Bocas del Toro:** Along road to Chiriquí Grande, 8°45’N, 82°15’W, ca 450 m, 26 October 1985, *McPherson 7378* (CAS, MO). **Coclé:** (Alto Calvario), Alto Calvario, Above El Copé, ca 6 km N of El Copé, atlantic slope, along trail which leads W off old lumber trail which leads down to Las Ricas, Limón and San Juan, 89°39’N, 80°36’W, 710–800 m, 22 June 1988, *Croat 68715* (CAS, MO); Hills N of El Valle, E slopes and ridges leading to Cerro Gaital, 8°40’N, 80°7’W, 900–1000 m, 27 June 1982, *Knapp 5773* (CAS, MO); Vicinity of La Mesa, beyond El Valle, Slopes of Cerro Gaital, 8°37’N, 80°7’W, 800–900 m, 11 July 1987, *McPherson 11215* (CAS, MO); Between Río Blanco and Caña Susio 1 hr hike to the W, Río Blanco is ca 5 hr hike N down from the Continental Divide above El Copé and El Petroso sawmill, 8°38’N, 80°36’W, 107–122 m, 13 December 1980, *Sytsma et al. 2479* (MO); El Valle de Antón, Cerro Gaital, 8°37’N, 80°6’W, 26 November 1985, *de Nevers et al. 6356* (CAS, MO); On the Atlantic side, ca 5 hr walk from sawmill at El Cope, Along slopes above Norte Río Blanco near small village of Caño Sucio, 122–152 m, 2 February 1980, *Antonio 3641* (CAS); NE slopes of Cerro Caracoral, N rim of El Valle, 823–975 m, 12 March 1981, *Sytsma 3769* (CAS, MO); Hills N of El Valle, E slopes and ridges leading to Cerro Gaital, 8°40’N, 80°7’W, 900–1000 m, 30 May 1982, *Knapp 5352* (CAS, MO); Vicinity of La Mesa, N of El Vallede Antón, along N slope of Cerro Gaital, 8°37’N, 80°8’W, 850–950 m, 14 July 1987, *Croat 67290* (CAS, MO); Area between Caño Blanco del Norte, Caño Sucio and Chorro del Río Tife, 8°42–43’19–06"N, 80°36–38’30"W, 200–400 m, 3 February 1983, *Davidse & Hamilton 23553* (CAS, MO); Foothills and summit of Cerro Caracoral, near La Mesa N of El Valle de Antón, 800–1100 m, 10 September 1981, *Knapp 1106* (CAS, MO); NE slopes and summit of Cerro Caracoral, N rim of El Valle, 823–975 m, 22 April 1981, *Sytsma 4079* (CAS, MO); Above El Potroso sawmill at Continental Divide, 8°38’N, 80°36’W, 1200–1300 m, 25 October 1980, *Sytsma 1861* (CAS, MO); N slope and summit of Cerro Pilon, 900–1173 m, 16 March 1973, *Croat 23239* (CAS, MO); Alto Calvario, Lumper camp, 7 km N of El Copé, ca 900 m, 14 January 1977, *Folsom 1268* (CAS, MO); Vicinity of La Mesa, N of El Valle de Antón, along steep slopes above water reservoirs, ca 1 km W of road between Finca Manadarinas and Finca Furlong, 8°38'N, 80°9'W, 800–900 m, 12 July 1987, *Croat 67188* (MO); Trail from Caño Sucio to the waterfall of the Río Tife, base of Cerro Tife, 8°44'N, 81°40'W, 400–500 m, 21 February 1982, *Knapp 3766* (MO); Cerro Gaital Caracoral, 823–914 m, 25 July 1968, *Dwyer & Correa 8938* (MO); Cerro Pilon, 5 km NE of El Valle, 800–1045 m, 13 June 1975, *Mori et al. 6569* (MO); Cerro Gaital Caracoral, 823–975 m, 25 July 1968, *Dwyer & Correa 8909* (MO); Along road past Furlong's Finca. due N of Cerro Pilon, 880 m, 22 July 1976, *Croat 37566* (MO); Mountains of N of Valle de Antón, 762–914 m, 28 May 1967, *Lewis et al. 1719* (MO); Cerro Pilón, 19 January 1968, *Dwyer 8334* (MO). **Colón:** Teck Cominco Petaquilla mining concession, Streamside forest by old Petaquilla camp, 8°50'16"N, 80°41'38"W, 120 m, 5 December 2007, *McPherson & van der Werff 19975* (CAS, MO). **Comarca de San Blas:** Cerro Brewster, 9°18'N, 79°16'W, 850 m, 21 April 1985, *de Nevers et al. 5404* (MO). **Veraguas:** NW of Santa Fe, 2.7 km from Escuela Agrícola Alto Piedra, on road to Calovebora, 30 March 1975, *Mori & Kallunki 5341* (MO); Valley of Río Tercero Braso beyond Escuela Agrícola Alto Piedra above Santa Fe, 29 August 1974, *Croat 27334* (MO); Valley of Río Dos Bocas on road between Alto Piedra (above Santa Fe) and Calovebora, 350–400 m, 29 August 1974, *Croat 27452* (MO).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Locally common in primary or somewhat disturbed lowland rain forests and cloud forests, growing close to streams or river banks, from Cocos Island (Costa Rica), through Panama, to the Colombian Andes and northern Ecuador (Fig. 13), at 0–1800 m. In Panama it occurs on both the Atlantic slope and the Pacific slopes. In Colombia it has been collected throughout the Pacific coast/western Andean slope and in the Central Andean Cordillera. In Ecuador it is known from the northwestern provinces of Esmeraldas and Carchi, with a southernmost occurrence in Los Ríos (Cerro Centinela). There are three specimens at COL identified as this species (*Ruiz 376*, *377* and *396*) from Cauca (to 2450 m), Colombia, where it is certainly expected, but we cannot confirm that these correspond to this species based on the images in the IUCN portal.

Phenology:—Collected in flower and fruit throughout the year.

Etymology:—The specific epithet refers to the numerous bracts subtending the flowers on the inflorescences of this species.

Discussion:—This species is easily separated from its closest relatives by the congested flowers surrounded by conspicuous green-orange imbricate bracts and bracteoles throughout its short thyrsoid inflorescence. Cogniaux (1891a) assigned it to *Ossaea* section *Bractearia*, along with *M. rufibarbis*, which also has conspicuous bracts and bracteoles arranged along a verticillate interrupted spike. Both species, together with *M. magnifolia*, a new Colombian species described here (*M. formicaria*), and *M. spiciformis* form a clade that shares 5-merous flowers and multiflorous, copiously bracteate inflorescences (but with different architectures). *Miconia bractiflora* is sister to *M. formicaria* which has similar bracteate inflorescences with secund dichasial branching. The latter, however has conspicuous formicaria at the blade base adaxially, a unique character within the Octopleura clade.

This species is known in Costa Rica only from Cocos Island (Trusty *et al.* 2006), where it is common (from 0–550 m) and probably arrived through bird dispersal. At present there are no studies documenting the bird species that feed on *M. bractiflora* berries. In Colombia it might be more widely distributed than present collections indicate since it was recently discovered on the eastern slope of the Central Cordillera (*Alvear et al. 1474*, CAS!, COL!).

Conservation status:—Based on IUCN criteria (AOO), this species would be considered Endangered EN B2ab(iii). However, a status of Least Concern LC is justified because it occurs in quite a few protected areas. Protected in Colombia in the Selva de Florencia National Park (Caldas) and in the Ensenada de Utría National Park (Chocó). In Costa Rica it is protected in the Isla del Coco National Park (Puntarenas). In Ecuador it is protected in the Awá Indigenous Reserve (Carchi and Esmeraldas) and in the Río Palenque Biological Station (Los Ríos).

13. *Miconia chocoensis* (Wurdack 1960: 237–238) Gamba & Almeda, *comb. nov.* Basionym: *Clidemia chocoensis* Wurdack. Type: COLOMBIA. Intendencia El Chocó: Bahía Solano, dense forest along Quebrada Jellita, 50–100 m, 22 February 1939, *Killip & García 33520* (holotype: US!; isotypes: MO!, NY!).

Shrub with lax branches 1–3.5 m tall, bark green to brownish. *Upper internodes* rounded-quadrate, 1.6–4.3 cm long, cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, leaf surfaces, primary and secondary veins of young leaves adaxially, primary leaf veins abaxially, bracts, hypanthia, calyx lobes and exterior calyx teeth densely to copiously covered with white elongate slightly roughened trichomes 1.5–2.5 mm long, each trichome deflexed and somewhat flattened, densely intermixed with an understory of clavate dendritic trichomes 0.1–0.15 mm long with short to moderately long thin-walled (flattened) arms. *Leaves* of each pair slightly to markedly anisophyllous in size; the semiterete short petioles 0.4–1.7 cm long, superficially canaliculate adaxially, the channel obscured by dense indumentum; larger blades 11.5–25.5 × 5–10 cm, smaller blades 4–15 × 2–7 cm, elliptic-obovate, the base acute-rounded, the margin entire to sinuate or entire to obscurely and distantly undulate-serrulate, the apex acuminate-caudate, chartaceous; mature leaves adaxially with both the elongate and dendritic trichomes on the surface, primary and secondary veins becoming sparse to caducous with age, the tertiary and higher order veins glabrescent; abaxial surface essentially glabrous except for few glands on the venules, the secondary veins copiously covered with the dendritic trichomes, frequently intermixed with white furrowed sessile glands ca. 0.025 mm long, and with fewer resinous glands of the same type, the tertiary and higher order veins sparsely and caducously beset with the same type of glands; 5-nerved, including the tenuous marginals, areolae 0.4–0.6 mm, adaxially the primary, secondary, tertiary and higher order veins flat, abaxially the primary, secondary, tertiary and higher order veins slightly to shallowly elevated and terete. *Inflorescences* a congested axillary fasciculate glomerule 1–1.4 cm long, sessile, unbranched, typically paired and appearing cauliflorous on defoliated nodes; bracts (seen in field photographs) minutely subulate-triangular, rather spreading below the hypanthium, green, concealed by the dense indumentum at anthesis, early deciduous in fruit. *Flowers* 5-merous, sessile. *Hypanthia* at anthesis 3–3.3 × 2–2.9 mm, free portion of the hypanthium 1.5–1.8 mm long, suburceolate to globose, bluntly 10-ribbed, the ribs and green color obscured by the white dense indumentum, ridged on the inner surface, glabrous to somewhat scaly like the torus adaxially. *Calyx* open in bud and persistent in fruit, green; tube 0.35–0.45 mm long, glabrous on the inner surface and with the same vestiture as the outer hypanthial surface; lobes 1.3 × 1.2 mm, ovate, the margin entire, the apex rounded, reflexed at anthesis; exterior calyx teeth 0.5–1 mm long, subulate, inserted near the base of the calyx lobes and barely exceeding them in length. *Petals* 1.5–2.5 × 0.5–1 mm, oblong-ovate, the margin entire, the apex rounded-obtuse, white, glabrous on both surfaces, reflexed at anthesis. *Stamens* 10; filaments 1–1.2 × 0.25 mm, white, glabrous; anther thecae 0.75–1.2 × 0.38–0.45 mm, linear-oblong and widely clavate, emarginate at the apex, opening by one dorsally inclined pore 0.1–0.15 mm in diameter, pale yellow at anthesis and turning brown with age; connective darker than the thecae, its prolongation and appendage 0.3–0.5 mm long, the appendage oblong, bluntly acute to acuminate at the apex, densely and conspicuously glandular, the glands sessile or short-stalked and rounded, denser on the appendage and becoming fewer toward the connective apex. *Ovary* 5-locular, 1/2 to 2/3 inferior, 1.7–1.9 mm long at anthesis, the apical collar absent, the apex 0.2–0.3 mm in diameter, conic to somewhat truncate with a slightly raised perimeter, densely covered with minute sessile glands; style 2.9–3.1 mm long, parallel-sided (i.e. terete), white, glabrous; stigma truncate when dry. *Berries* 2–2.5 × 2.9–3.2 mm when dry, globose-oblate, green-yellow becoming bright orange when ripe, the hypanthium indumentum persistent at maturity. *Seeds* 0.48–0.53 × 0.28–0.31 mm, pyramidal, brown; lateral symmetrical plane triangular, the highest point near the central part of the seed, with a foot-like projection at the micropylar end; antiraphal symmetrical plane suboblong; raphal zone suboblong, ca. 80 % the length of the seed; multicellular sculpture rugose throughout the seed; individual cells elongate, anticlinal boundaries somewhat channeled, undulate, with Ω- and U-type patterns, others raised, more or less straight; periclinal walls convex, low-domed to nearly flat, others concave, microrelief striate.

Additional specimens studied:—COLOMBIA. Chocó: (Nuquí), Coquí, Quebrada Trapiche al sureste de Coquí, 5°32'N, 77°15'W, 100–160 m, February 1994, *Galeano et al. 5565* (COL, US); Río Pavasa, near Espejo waterfalls, 50–100 m, 18 May 1974, *Warner 259* (MO); (Bahía Solano), Ciudad Mutis, Jardín Botánico del Pacífico, Cerro Palo on trail to cell phone antenna (on Cerro Mecana), 6.248°N, -77.35°W, 8 February 2012, *Almeda et al. 10473* (CAS, CHOCO, COL). **Risaralda:** (Mistrató), Puerto de Oro, Chirrincha, Margen izquierdo del Río Aguita, 950 m, 11 April 1991, *Franco et al. 3581* (US). **ECUADOR. Carchi:** N side of Río Mira, across from Lita, Steep N-facing slope directly across from (S of) community of Barboso, on S side of Río Barboso, Transect 750-2, 0°53'N, 78°27'W, 750 m, 11 August 1994, *Boyle & Boyle 3565* (MO); Property of Humberto Rosero, on N side of Río Mira, Just above cable crossing upstream from Lita and downstream from Cachaco, On steep W-facing slope, 0°52'N, 78°2'6"W, 760–780 m, 20 August 1994, *Boyle et al. 3652* (MO). **Esmeraldas:** Road Lita-Alto Tambo-San Lorenzo, km 6.9 from Lita, Wet forest by river on side of road, 0°52'24.6"N, 78°29'33.2"W, 720 m, 30 September 2001, *Cotton et al. 1794* (CAS, MO, QCA).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—*Miconia chocoensis* is known from primary rain or premontane forest understory, commonly close to streams or rivers in the Biogeographic Chocó, from Colombia to Ecuador (Fig. 12), at 50–950 m. It has been poorly collected but is probably not uncommon. Prior to this study it had not been reported from Ecuador where it occurs at 720–780 m.

Phenology:—Collected in flower and fruit in February; in fruit in May, and from August to September.

Etymology:—The specific epithet refers to the type locality of the species: the department of Chocó in Colombia.

Discussion:—*Miconia chocoensis* has distinct white lanate vegetative and floral indumentum, congested fasciculate glomerules of sessile flowers, fugacious or concealed bracts, and consistently 5-merous flowers. It is most similar, and probably sister to *M. quadridomius* with which it has been confused, and shares similar dense-lanate pubescence and inflorescence architecture (sessile congested fasciculate glomerules). In *M. quadridomius* the indumentum is rather ferrugineous. On the other hand, in *M. quadridomius* the leaves are strikingly 5-(7-) plinerved (vs. 5-nerved), with the possibly tufted-trichome domatia lacking in *M. chocoensis*, the bracts are persistent and rather conspicuous, and the flowers are consistently 4-merous. Within the Approximata subclade, both belong to a group of closely related species along with *M. approximata* and *M. veraguensis*, all of which share a similar clavate-furfuraceous vegetative indumentum (at least in the understory), sessile inflorescences, conspicuously reflexed ovate-triangular to subulate calyx lobes at anthesis, bright orange berries at maturity, and pyramidal rugulose seeds.

Miconia chocoensis is reported here from Ecuador for the first time. It was thought to be endemic in Colombia. The Ecuadorian material was erroneously identified as *M. quadridomius*, which is understandable because the two species are easily confused for the reasons mentioned above. However, these specimens (*Boyle 3565* MO!, *3652*, MO!, and *Cotton 1794* CAS!, MO!), have clearly 5-merous flowers, longer indumentum and the leaves are 5-nerved.

Conservation status:—Endangered EN B2ab(iii). In Colombia it is only protected in the Jardín Botánico del Pacífico (Chocó).

14. *Miconia erikasplundii* Gamba & Almeda, *nom. nov.* Basionym: *Clidemia asplundii* Wurdack (1973a: 404–405). Type: ECUADOR. Prov. Morona-Santiago (Santiago-Zamora on original label): Macas, wooded bank of the Río Upano, ca. 800 m, 18 March 1956, *Asplund 19806* (holotype: S!). Nec *Miconia asplundii* Wurdack (1972: 202–203).

Slender shrub or small tree to 3 m tall, commonly sparingly branched. *Upper internodes* [3–15.4 cm long] and cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, inflorescence axes, bracts, and bracteoles densely and copiously composed of resinous sessile dendritic trichomes 0.1–0.2 mm in diameter with short axes and few-moderate number of terete arms. *Leaves* of a pair conspicuously anisophyllous (2:3–6); the terete petiole 1.9–2.95 cm long, (on larger leaves) or 0.58–1.41 cm long (on smaller leaves), slightly canaliculate adaxially from the primary leaf vein throughout its entire length; larger blades 13.5–20.4 × 8.9–13.8 cm, oval-orbicular, the base rounded-obtuse, the margin distantly undulate-serrulate, the apex bluntly acuminate; smaller blades 6.9–12.2 × 6.6–10.3 cm, orbicular, the base rounded to slightly cordate, the margin distantly undulate-serrulate, the apex shortly and bluntly acuminate; membranaceous; adaxial surface of mature leaves glabrous except for a few sessile-stellate trichomes at the base of the blade, the primary, secondary, tertiary and higher order veins glabrous; abaxial surface glabrous except for a few sessile-stellate trichomes coming from the venules, the primary, secondary, tertiary and higher order veins densely to copiously covered with resinous sessile-stellate trichomes 0.25–0.3 mm in diameter; 5-(7-)nerved (larger leaves) or 5-nerved (smaller leaves), including the tenuous marginals, with a thick-callose vesicular structure formed at the blade base abaxially where the innermost pair of secondary veins diverge from the primary vein, areolae 0.2–0.3 mm, adaxially the primary, secondary, tertiary and higher order veins conspicuously impressed, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated. *Inflorescences* a pseudolateral dithyrsoid (6–)7–10 cm long, including a peduncle 1.6–2.8 cm long, divaricately branched from the peduncle apex, the dendritic indumentum on the axes sparse and densely intermixed with resinous sessile-stellate trichomes 0.25–0.3 mm in diameter; bracts 0.5–0.6 × 0.25 mm, oblong-obovate, somewhat erect, deciduous in fruit; bracteoles 1–1.5(–2.5) × 0.3 mm, oblong-obovate, patent, persistent in fruit. *Flowers* 4-merous on pedicels 0.5–0.8 mm long, densely to copiously resinous with slightly furrowed more or less stalked glands to 0.1 mm long. *Hypanthia* at anthesis

2.8–2.9 × 1.7–1.9 mm, free portion of hypanthium 1–1.2 mm long, urceolate, bluntly 8-ribbed, densely to copiously resinous with slightly furrowed more or less stalked glands to 0.1 mm long, ridged inside, the inner vestiture not seen, torus adaxially not seen. *Calyx* open in bud and persistent in fruit; tube 0.2 mm long, the calyx lobes and exterior calyx teeth copiously resinous-glandular like the hypanthium, inner surface and vestiture not seen; lobes 0.35 × 0.8–0.9 mm, ovate, the margin entire, the apex rounded; exterior calyx teeth 0.2 mm long, ovate and thick, inserted near the base of the calyx lobes, divergent but not projecting beyond the lobes. *Petals* 1.6 × 1.6–1.7 mm, suborbicular, the margin entire, the apex rounded, white, densely papillose on both surfaces, reflexed at anthesis. *Stamens* 8; filaments 1.5–1.6 × 0.2 mm, white, glabrous; anther thecae 1.9 × 0.25 mm, linear-oblong and slightly subulate, obtuse at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, yellow at anthesis; connective darker than the thecae, its prolongation and appendage 0.35–0.4 mm long, the appendage oblong to deltoid, rounded at the apex, copiously gland-edged, the glands subsessile, minute, rounded and distributed throughout the connective and its prolongation. *Ovary* 4-locular, completely inferior, 1.7–1.8 mm long at anthesis, apical collar absent, the apex 0.35–0.4 mm in diameter, slightly depressed, moderately glandular-puberulent; style 5.5–6 mm long, parallel sided (i.e. terete), white, glabrous; stigma truncate to expanded-truncate when dry. *Berries* 3.55–4.55 × 4.05 mm when dry, globose and slightly oblate, ripening red and probably becoming blue-purple when fully mature, the hypanthium indumentum more or less persistent at maturity. *Seeds* 0.29–0.33 × 0.14–0.15 mm, ovoid, angled, light brown; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side or near the central part of the seed; raphal zone suboblong, as large to 50% larger than the corpus of the seed, extending along its entire length, ventrally and longitudinally expanded, dark-brown; individual cells elongate, anticlinal boundaries inconspicuously channeled and undulate; periclinal walls nearly flat, microrelief punctate.

Additional specimens studied:—Only the type was available for study.

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—*Miconia erikasplundii* is endemic to eastern Ecuador where it is only known from near Tena (Napo Province) and from the banks of the Río Upano near Macas (Morona-Santiago Province) (Fig. 14) at 600–800 m. It occurs in the understory of riparian tropical forests along river banks. In its restricted range, it is considered a rare species.

Phenology:—The holotype was collected in flower and fruit in March.

Etymology:—The specific epithet commemorates the Swedish botanist Erik Asplund (1888–1974) who botanized in Andean South America. He collected in Ecuador, Perú and Colombia in 1939–1940, and again in 1955–1956 in Ecuador, Perú and Venezuela. The first set of his collections are deposited at S.

Discussion:—*Miconia erikasplundii* is more similar to *M. biolleyana* in the anisophylly and leaf shape, but the vegetative pubescence of *M. biolleyana* consists of only sessile-stellate trichomes, with none of the peculiar resinous-asperous dendritic trichomes present in *M. erikasplundii*. Furthermore, the vestiture of hypanthia and calyx teeth is clearly different. In *M. biolleyana* it consists of the same arachnoid vegetative tomentum of sessile-stellate trichomes (vs. resinous-glandular in *M. erikasplundii*). The rest of the floral characters (petals, stamens and style) are similar in the two species.

The current geographic ranges of *M. biolleyana* and *M. erikasplundii* do not overlap, the former is not known from Ecuador. It is known from Costa Rica, Panama and as far south as the department of Risaralda in Colombia.

Conservation status:—Endangered EN B2ab(iii). It was considered Vulnerable in past assessments (Cotton & Pitman 2004). This Ecuadorian endemic is known only from three collections. The most recent is from 1960. It has not been collected in any of Ecuador's protected areas but it could potentially occur in the Sangay National Park. Apart from habitat destruction, no specific threats are known.

15. *Miconia evanescens* (Almeda 2004: 98–101) Gamba & Almeda, *comb. nov.* Basionym: *Clidemia evanescens* Almeda. Type: PANAMA. Coclé Prov.: Forested slopes above El Cope along abandoned road leading to the Continental Divide, 700–850 m, 25 February 1988, *Almeda et al. 5933* (holotype: CAS!; isotypes: INB-internet image!, MO!, NY!, PMA-internet image!, US-internet image!).

Subshrub or shrub 0.5–4 m tall, occasionally forming thickets, scraggly branched, the branches often pendant, bark red-purple to brown. *Upper internodes* [(1–)2–2.9 cm long] and cauline nodes terete, nodal line absent.

Indumentum on branchlets, petioles, adaxial surface of young leaves, primary, secondary, tertiary leaf veins abaxially, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, calyx lobes, and exterior calyx teeth copiously to moderately covered with whitish dendritic trichomes 0.1–0.15 mm long with short to moderately long thin-walled (flattened) arms, each trichome clavate and somewhat thickened. *Leaves* of each pair somewhat anisophyllous in size at maturity, one leaf of a pair commonly early deciduous, the phyllotaxy thus appearing pseudoalternate; the semiterete petioles 1.5–4.7 cm long, adaxially canaliculate, green-brownish; larger blades (8.5–)13–28 × (5–)6–14 cm, smaller leaves 4–12.2 × 2–4.8 cm, elliptic to elliptic-ovate, the base obtuse to rounded, the margin entire to slightly sinuate, the apex acuminate to caudate, chartaceous; mature leaves adaxially glabrescent, the primary, secondary, tertiary and higher order veins glabrous; abaxial surface along with the tertiary and higher order veins copiously beset with minute resinous sessile to short-stalked glands ca. 0.05 mm long with thin-walled short heads; 5- or 7-nerved, including the tenuous marginals, areolae 0.2–0.25 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated to flat. *Inflorescences* typically an axillary cluster of dichasia, or terminal with both lateral buds at a node elongating and overtopping the inflorescence (pseudolateral), 1–2.5(–4.7) cm long, sessile, typically poorly branched with multiple axes arising from a common point (fascicle-like) at the base, occasionally appearing as a short and multiflorous thyrsoid, commonly paired, the rachis light green; bracts and bracteoles 1.5–3 × 1–2 mm, triangular, thick, spreading, persistent in fruit. *Flowers* 4-(5-) merous on pedicels 0.5–1 mm long. *Hypanthia* at anthesis 3.1–3.5 × 1–1.2 mm, completely free but tightly enveloping the ovary, subcylindric to campanulate, bluntly 8-ribbed, light green, ridged on the inner surface, along with the torus adaxially densely and minutely glandular, the glands sessile and rounded. *Calyx* open in bud and persistent in fruit, light green; tube obsolete; lobes 1.5–2.5 × 1–1.5 mm, oblong-triangular, the margin entire, the apex bluntly acute, brownish at the margin, reflexed at anthesis; calyx teeth 0.5–1.2 mm long, subulate, inserted at the apical half of the calyx lobes and spreading beyond them. *Petals* 1.5–2 × 0.5–1 mm, obovate-oblong, the margin entire, the apex rounded-obtuse to slightly emarginate, white to translucent white, glabrous on both surfaces, reflexed at anthesis and early deciduous. *Stamens* 8; filaments 1.5 × 0.25 mm, white, glabrous; anther thecae 1.5 × 0.5 mm, linear-oblong, more or less truncate to somewhat emarginate at the apex, opening by one dorsally inclined pore 0.1–0.2 mm in diameter, yellow or white; connective white, its prolongation and appendage 0.5 mm long, the appendage oblong-lanceolate, bluntly acute to obtuse at the apex, copiously gland-edged with short-stalked glands to 0.15 mm long with thin-walled short heads. *Ovary* 4-locular, completely superior but tightly enveloped by the hypanthium, ca. 2.5 mm long at anthesis, the apical collar 0.4–0.5 × 0.2–0.25 mm, conic, copiously glandular-puberulent; style 6 mm long, narrowed distally (i.e. tapering), white, glabrous; stigma truncate to capitellate. *Berries* 6 × 6 mm when dry, globose, green, then bright orange to reddish when ripe, the hypanthial indumentum persistent at maturity. *Seeds* 0.54–0.62 × 0.27–0.33 mm, pyramidal, brown; lateral symmetrical plane triangular, the highest point toward the chalazal side, with a foot-like projection at the chalazal end; antiraphal symmetrical plane suboblong; raphal zone circular to suboblong, ca. 50–60% the length of the seed; multicellular sculpture rugose throughout the seed; individual cells elongate, anticlinal boundaries channeled or raised, irregularly curved; periclinal walls convex, low-domed to nearly flat, microrelief striate. Chromosome number: n=17.

Additional specimens studied:—COLOMBIA. Cauca: (Isla Gorgona), 152 m, 7 October 1924, *"St. George" Expedition 526* (F). **Chocó:** N ridge of Alto Buey, premontane rain forest, E-SW of El Valle, 500–1150 m, 8 August 1976, *Gentry & Fallen 17363* (US). **Nariño:** R.N. La Planada, 7 km above Chucunes (along road between Tuquerres and Ricaurte) along trail to El Hondón, beginning at Quebrada Tejón and for 0.5 km beyond, 1°8'N, 77°54'W, 780–800 m, 15 March 1990, *Croat 71473* (MO, US); La Planada B.R., ca. 7 km S of Chucunes, along trail to Pialapi beyond Quebrada La Calledita, 1°10'N, 77°55'W, 1800–1900 m, 8 August 1990, *Luteyn & Sylva 13943* (CAS); La Planada B.R., 7 km above Chucunes on road between Tuquerres and Ricaurte, above "La Posada" building, 1780 m, 27 July 1988, *Croat 69609* (US); Trail from la Planada to Pielapi, 1°4'N, 78°2'W, 1600–1800 m, 22 July 1988, *Gentry et al. 63589* (US); La Planada, Trail to El Hondón, 6–12 km SW of La Planada, 1°4'N, 78°2'W, 1750–1800 m, 5 January 1988, *Gentry et al. 60383* (US); La Planada B.R., Near Ricaurte, 1°5'N, 78°1'W, 1800 m, 21 December 1987, *Gentry et al. 59678* (US); La Planada, S of Ricaurte, 7 km from Tumaco-Pasto road, 1°10'N, 77°158'W, 1800 m, 25 July 1986, *Gentry et al. 55120* (MO, US); La Planada B.R., 7 km from Chucunes, 1°5'N, 78°1'W, 1800 m, 3 January 1988, *Gentry & Keating 60310* (US); Trail to El Hondón, 5–12 km SW of La Planada, 1°4'N, 78°2'W, 1750–1800 m, 6 January 1988, *Gentry et al. 60490* (US); (Barbacoas), Altaquer, El Barro, El Barro, 1300 m, 1 March 1995, *Fernández et al. 12391* (COL, MO); R.N. La Planada, 7 km above Chucunes (on road between Tuquerres and Ricaurte), along Sendero Vieja, along ridge top in direction of La Pina, 1°6'N, 77°54'W, 1950–2010 m, 9 March 1990, *Croat 71210* (MO); La Planada B.R., ca. 7 km S of Chucunes, along trail opposite the posada, 1°10'N, 77°55'W, 1800–1900 m, 9 August 1990, *Luteyn & Sylva 13974* (CAS). **Risaralda:** (Mistrató), Jeguadas, bosque primario poco perturbado a la orilla del camino, Cordillera Occidental, vertiente occidental, 5°26'N, 76°02'W, 1500 m, 28 March–2 April 1992, *Betancur et al. 3252* (US). **Valle:** (Dagua), Corregimiento Queremal, P.N.N. Farallones, Sector Alto Anchicayá, Sendero de la quebrada La Riqueza, 3°36.081'N, 76°53.758'W, 910 m, 10 January 2013, *Alvear et al. 1553* (CAS, COL). **COSTA RICA. Alajuela:** (Upala), Bijagua, El Pilón, Subiendo por la margen derecha del Río El Roble hasta el Volcán Tenorio, 10°41'N, 85°0'20"W, 1000–1400 m, 9 July 1988, *Herrera et al. 2037* (CAS, CR); (Guatuso), P.N. Volcán Tenorio, Cuenca del Río Frío, Estación El Pilón, Sendero hacia Cerro Montezuma, 10°42'0"N, 85°0'0"W, 800 m, 14 January 2010, *Kriebel et al. 5490* (INB, NY); R.B. Monteverde, Río Peñas Blancas, Finca de Jesús Rojas, 10°18'N, 84°44'W, 850–900 m, 4 December 1989, *Bello 1540* (CAS, CR, MO); (San Ramón), No protegida, Cuenca del San carlos, Curso de Plantas, Al lado del sendero Zaíno, 10°13'0"N, 84°35'20"W, 800–900 m, 11 August 2002, *Kriebel 939* (INB, MO). **Heredia:** (Sarapiquí), Horquetas de Sarapiquí, R.Rara Avis, Sendero Guácimo, 10°17'3"N, 84°2'47"W, 700 m, 23 July 1995, *Martén 971* (CR, F, MO); Río Sarapiquí above Cariblanco, 15 September 1965, *Schnell 99* (CR, F). **ECUADOR. Carchi:** Trail along ridge and forest slope to NW of Awá encampment, Gualpi Chico area near Rodriguez finca, 0°58'N, 78°16'W, 1258–1323 m, 19 January 1988, *Hoover et al. 3323* (US); (Tulcán), R. Étnica Awá-Camumbi, 0°53'N, 78°16'W, 1700–1900 m, 20 July 1991, *Quelal et al. 164* (MO, QCNE); (Espejo), R. Golondrinas, El Corazón, recorrido por el sendero a La Cortadera hasta El Mirador, 2390 m, 23 January 2004, *Vargas et al. 4362* (CAS). **Esmeraldas:** (Quininde), Estación Biológica Bilsa, Carretera Herrera-El Páramo (Sta. Isabel), 0°4'N, 79°5'W, 580 m, 18 February 1995, *Palacios et al. 13507* (MO); (San Lorenzo), Ricaurte, R. Indígena Awá, 1°10'N, 78°32'W, 300 m, 19–24 October 1992, *Tipaz et al. 2095* (US); R.B. Bilsa, Sendero Amarillo, 0°20'49"N, 79°42'41"W, 540 m, 13 February 2009, *Stern & Tepe 397* (NY). **PANAMA. Chiriquí:** Edwin Fabrega Dam and R. in Fortuna, Along trail to hydrological station along Río Hornito below forestry house along the road, 8°45'N, 82°5'W, 1150–1200 m, 20 January 1989, *Almeda et al. 6348* (CAS, PMA); (Gualaca-Chiriquí Grande), 4.8 mi beyond IRHE facilities at Dam, 4 mi N of bridge over Bayano Lake, along gravel road which turns off main highway, 100 m beyond pipeline marker 108, 8°46'"N, 82°16'"W, 23 September 1987, *Croat 68018* (CAS); Fortuna Dam Project area, Slope NW of confluence of Río Hornito and Río Chiriquí, 8°44'N, 82°13'W, 1050–1100 m, 11 November 1980, *Sytsma & Stevens 2260* (CAS); Fortuna Dam area, To N of reservoir near Quebrada Bonito, 8°45'N, 82°13'W, 1100 m, 30 July 1984, *Churchill 5787* (CAS); Edwin Fabrega Dam and R. in Fortuna, Quebrada Arena, the first creek S of the Continental Divide on the road to Chiriquí Grande, 8°45'N, 82°5'W, ca. 1075 m, 15 January 1989, *Almeda et al. 6217* (CAS). **Coclé:** Omar Torrijos N.P., About 7–10.5 km beyond El Copé in Omar Torrijos N.P, along end of the rocky trail to Río Blanco and Limón beyond Alto Calvario, 770–870 m, 21 February 1996, *Almeda et al. 7660* (CAS, PMA); Alto Calvario, Above El Copé, ca 6 km N of El Copé, Atlantic slope, along trail through forest W off old lumber trail which leads down to Las Ricas, Limón and San Juan., 89°39'N, 80°36'W, 23 June 1988, *Croat 68793* (CAS); (El Copé), División continental arriba de Barrigón y el aserradero viejo, Camino de caballo a Coclesito, 8°40'N, 80°36'W, 880 m, 27 April 1992, *Peña et al. 469* (CAS, F, PMA); (El Copé), División continental arriba de Barrigón y el aserradero viejo, Camino de caballo a Coclesito, 8°40'N, 80°36'W, 880 m, 27 April 1992, *Peña et al. 469* (CAS, PMA); Along continental divide above El Cope, 8°38'N, 80°35'W, 850 m, 7 April 1988, *McPherson 12417* (MO); Forested slopes above El Copé along abandoned road leading to the Continental Divide, 8°38'N, 80°38'W, 700–850 m, 24 January 1989, *Almeda et al. 6386* (BM, CAS, INB, MEXU, MO, PMA). **Comarca de San Blas:** Cerro Brewster, 9°18'N, 79°16'W, 800–850 m, 20 November 1985, *de Nevers et al. 6273* (CAS); Cerro Brewster, 9°18'N, 79°16'W, 850 m, 21 April 1985, *de Nevers et al. 5452* (CAS); Cerro Habú, Vicinity of peak, 9°23'N, 78°49'W, 762 m, 19 December 1980, *Sytsma et al. 2694* (CAS); Cerro Habú, Vicinity of peak, 9°23'N, 78°49'W, 762 m, 19 December 1980, *Sytsma et al. 2717* (CAS). **Veraguas:** Along trail to summit of Cerro Tute about 1/2 mile above the Escuela Agricultura Alto Piedra near Santa Fe, 900–1100 m, 29 January 1989, *Almeda et al. 6490* (CAS, PMA); Trail to R.B, Serrania de Tute and the summit of Cerro Tute, about 0.7 km beyond the Escuela Agrícola Río Piedra just outside Santa Fe, 860–1300 m, 18 February 1996, *Almeda et al. 7613* (CAS, PMA).

Illustration:—Almeda 2004: 100, fig. 4.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Locally common in primary and secondary rain forests and cloud forests from north-central Costa Rica disjunctly to western Panama, southwestern Colombia, and northwestern Ecuador (Fig. 14), at 150–2010 m. In Colombia it is known from the western slope of the western Andean cordillera in Chocó, Risaralda, and Valle, and disjunctly in the southern Pacific in the Planada Natural Reserve, Barbacoas and Isla Gorgona. In this study several specimens of this species were newly identified from Ecuador (Carchi and Esmeraldas).

Phenology:—Collected in flower from January through April, July through October and December; in fruit from June through April.

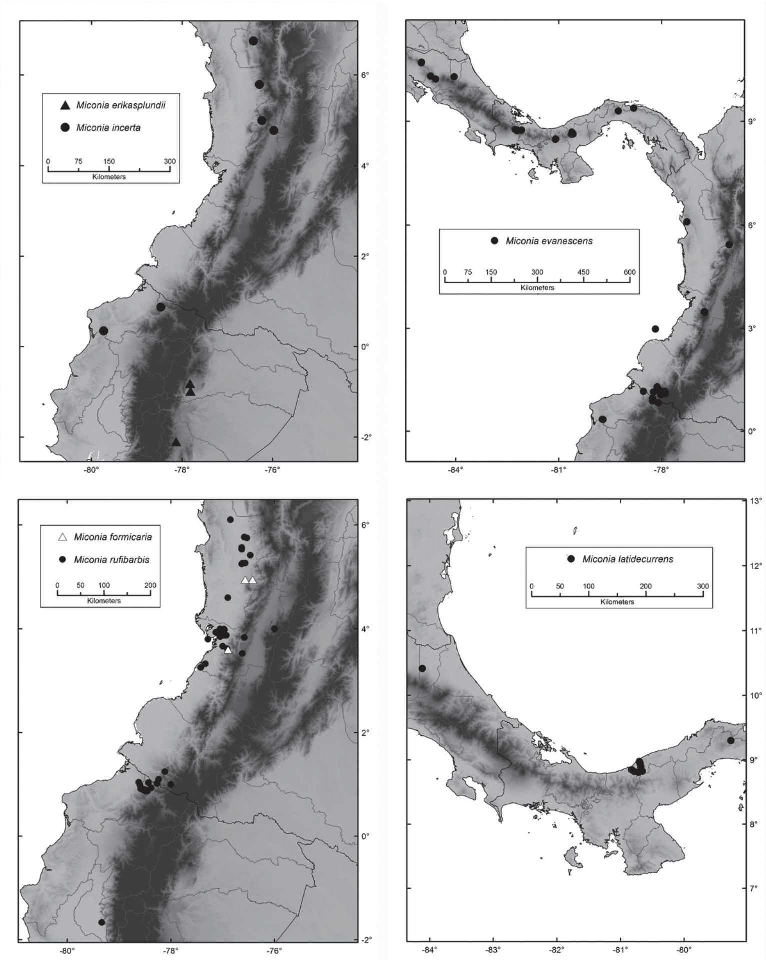


FIGURE 14. Distributions of *Miconia erikasplundii* and *M. incerta*, *M. evanescens*, *M. formicaria* and *M. rufibarbis*, and *M. latidecurrens.*

Etymology:—The specific epithet, meaning quickly disappearing or fading, refers to the fugacious petals at anthesis.

Discussion:—Among its closer relatives and within the Octopleura clade, *M. evanescens* is the only species consistently characterized by a completely superior ovary that is tightly enveloped but completely free from the hypanthium. It is also distinct in its whitish thickened furfuraceous indumentum of dendritic trichomes and the pseudo-alternate foliar arrangement. The anisophylly in this species when present is pronounced but is not constant in all the pairs of mature leaves. The mature leaves at some nodes are isophyllous with measurements comparable to those of the larger leaves. Along with *M. approximata*, it has a glandular-puberulent apical ovary collar, and the foliar venules abaxially are copiously beset with a resinous indumentum of minute sessile to short-stalked glands with thin-walled short heads, but it differs from this taxon in the characters mentioned under the discussion of *M. approximata*. Phylogenetically, *M. evanescens* is sister to *M. aurantiaca*, with similar inflorescence architecture, but different in floral and indumentum characters (see *M. aurantica* discussion).

The inflorescence branching is often poorly developed, but this character is variable and sometimes the inflorescence appears thyrsoid and rather short and dense. The more developed inflorescences which appear to be restricted to South American material are commonly associated with larger leaves; these occur within the normal elevational range for the species.

A collection from Carchi, Ecuador, (*Vargas et al. 4362)*, is indistinguishable from *M. evanescens*, but the hypanthium is densely resinous-glandular (vs. furfuraceous in *M. evanescens*), with the same type of glands that are produced on the abaxial leaf venules. This specimen was collected in a high montane forest, at 2390 m, higher than where *M. evanescens* normally occurs, so it might represent an elevational variant.

Conservation status:—This species would be considered Endangered EN B2ab(iii) based on IUCN criteria (AOO). However, it occurs in many protected areas, which justifies a status of Least Concern LC. Protected in Colombia in Reserva Natural La Planada (Nariño), and in Farallones National Park (Valle). In Ecuador in the Mache-Chindul Ecological Reserve (Bilsa Biological Station, Esmeraldas), the Golondrinas Reserve (Carchi), and the Awá-Camumbi Ethnic Reserve (Esmeraldas and Carchi). In Costa Rica it is protected in the Rara Avis Private Reserve, in Volcán Tenorio National Park and in Monteverde Biological Reserve (Alajuela).

16. ***Miconia formicaria*** Gamba & Almeda, *spec. nov.* (Fig. 21)

Related to *M. bractiflora* in having the secund arrangement of flowers in the dichasial ramifications of the paracladia. It is distinct in the presence of a conspicuous formicarium at the blade base adaxially.

Type: COLOMBIA. Dept. Valle: Mpio. Dagua, corregimiento El Queremal, P.N.N. Farallones, Alto Anchicayá. Trail off of (upslope) Quebrada La Riqueza. Cordillera Occidental, vertiente occidental, 03°39.998'N, 76°53.609'W, 600–810 m, 6 February 2011, *Almeda et al. 10274* (holotype: COL!; isotypes: CAS!, CAUP!, CUVC!, FMB!, HUA!, NY!, PSO!).

Subshrub 1 m tall, little-branched, bark green-brownish. *Upper internodes* rounded-quadrate and somewhat grooved, ca. 3 cm long, cauline nodes terete, nodal line present and frequently obscured by the dense indumentum. *Indumentum* on branchlets, primary and secondary leaf veins abaxially, and inflorescence axes densely composed of brown-translucent somewhat flattened, slightly elongate moderately roughened trichomes 0.2–0.4 mm long, copiously to moderately intermixed with, and replaced on petioles, tertiary leaf veins abaxially, bracts, bracteoles, hypanthia, exterior calyx teeth, and petals abaxially by resinous-whitish dendritic trichomes 0.1–0.2 mm long with moderately long thin-walled (flattened) arms. *Leaves* of each pair isophyllous; the petiole 0.76–0.89 cm long, deeply and narrowly canaliculate adaxially, irregularly grooved abaxially, greenish, the dense dendritic indumentum moderately intermixed with resinous slightly furrowed more or less stalked glands ca. 0.05 mm long; blades 15–23.6 × 8.2–11.1 cm, ovate, tapering to a rounded-cordate base, the margin vaguely crenate, the apex bluntly long-acuminate, chartaceous; mature leaves adaxially glabrous with conspicuous formicaria ca. 8 × 2.5 mm at the base, the formicaria forming two half-oval sacs, moderately setose with elongate smooth trichomes 4–5 mm long, the primary, secondary, tertiary and higher order veins glabrous; adaxial surface superficially glabrous, microscopically papillose with brown to resinous rounded glands ca. 0.05 mm in diameter, the indumentum on the primary, secondary and tertiary veins somewhat caducous, the higher order veins glabrous; 7-nerved to 7-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging from the primary vein 0.5–0.6 cm above the base, abaxially forming a deep pocket-like space (acarodomatium?) covered with trichomes like those of the the general indumentum on the primary and innermost pair of secondary veins, areolae 0.5–1 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins barely impressed, abaxially the primary, secondary, tertiary and higher order veins elevated and terete. *Inflorescences* an erect pseudolateral multiflorous thyrsoid 3.2 × 5.66 cm, including a peduncle 0.54–0.83 cm long, the dichasial ramifications of the paracladia with secund flowers, divaricately branched from the peduncle apex, borne on the upper foliar axils, the rachis yellowish-green, the dense dendritic indumentum sparsely intermixed with slightly furrowed more or less stalked glands ca. 0.05 mm long; bracts 3.5–4.2 × 1.8–2.5 mm, spatulate-oblong or rhombic, the margins ciliolate, cilia 1.5–2 mm long, the apex rounded, yellowish-green, the dendritic indumentum sparse adaxially, dense abaxially, whitish-translucent, persistent in fruit; bracteoles 5.5–7 × 2–2.2 mm, spatulate-obovate, ciliolate at the rounded apex, the cilia becoming less numerous basally in the rest of the margin, 1.5–2 mm long, yellowish-green, the dendritic indumentum dense on both surfaces, persistent in fruit. *Flowers* 5-merous, sessile. *Hypanthia* at anthesis 2.5–2.6 × 1.2 mm, free portion of hypanthium 0.9–1 mm long, subcylindric to campanulate, bluntly10-ribbed, yellowish-green, the dendritic indumentum dense, ridged on the inner surface, moderately glandular, the glands sessile and rounded, the torus thickened adaxially, obscurely 10-lobed, densely ciliolate, the trichomes translucent-brown and somewhat flattened, sparsely intermixed with subsessile glands. *Calyx* open in bud and persistent in fruit, green; tube 0.7 mm long, vaguely undulate, adaxially sparsely and minutely glandular to glabrescent, abaxially with the same vestiture as the hypanthium; lobes obsolete; exterior calyx teeth 0.5 mm long, bluntly tuberculiform, erect to somewhat spreading, inserted at the basal half of the calyx tube and equaling its length. *Petals* 3.5 × 1.5 mm, subulate to rhombic, the margin entire, the apex bluntly acute, white to translucent-white, glabrous adaxially, abaxially the indumentum resinous and restricted to a median band, each trichome to 0.35 mm long. *Stamens* 10; filaments 1–1.5 × 0.25 mm, white, glabrous; anther thecae 1.6–1.7 × 0.3 mm, linear-oblong, slightly emarginate at the apex, opening by one dorsally inclined pore 0.15 mm in diameter, white becoming brown with age; connective somewhat darker than the thecae, its prolongation and appendage 0.8–1 mm long, the appendage oblong-subulate, bluntly acute at the apex, conspicuously and densely gland-edged, the glands short-stalked and also present on the dorsal side of the appendage and throughout the connective. *Ovary* 5-locular, completely inferior, 1.5–1.6 mm long at anthesis, the apical collar 0.5 × 0.8 mm, conic-truncate, sparsely to moderately covered with glandular-puberulent; style 4.8–5 mm long, narrowed distally (i.e. tapering), white, glabrous; stigma truncate to expanded truncate at anthesis. *Berries* 3.5 × 3 mm when dry, globose-elliptic to globose-obovate, initially green, becoming orange when ripe, the hypanthial indumentum persistent at maturity. Seeds 0.38–0.41 × 0.17–0.18 mm, ovoid, angled, brownish; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone suboblong, nearly as long as the seed and somewhat ventrally expanded; appendage absent but a small protuberance present; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief striate to inconspicuous.

Additional specimens studied:—COLOMBIA. Chocó: (Nóvita), Llanadas, ladera N del Cerro Torrá, filo al W del Río Surama, Alto del Oso, 1000–1150 m, 22 February 1977, *Forero et al. 3223* (MO, US); Llanadas, ladera N del Cerro Torrá, filo al W del Río Surama, Alto del Oso, 600–900 m, 22 February 1977, *Forero et al. 3170* (COL, MO, US). Valle: (Dagua), Corregimiento Queremal, P.N.N. Farallones, Sector Alto Anchicayá, Sendero de la quebrada La Riqueza, 3°36'N, 76°53.541'W, 686 m, 10 January 2013, *Alvear et al. 1541* (CAS, COL).

Illustration:—Fig. 20.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Local and uncommon in the cloud forests of Valle department in Colombia, in the area known as "Alto Anchicayá". Also known from Cerro Torrá in the department of Chocó (Fig. 14). These are wet zones which form part of the Chocó, at 600–1150 m.

Phenology:—Collected in flower and fruit in February.

Etymology:—The specific epithet refers to the conspicuous formicarium at the blade base adaxially, a unique character among species of the Octopleura clade and otherwise known in the genus *Tococa* and a few other species of *Miconia* in the Miconieae.

Discussion:—This species is readily recognized by the conspicuous formicarium on the foliar bases adaxially. *Miconia formicaria* is sister to *M. bractiflora.* Both of these species have conspicuously bracteate multiflorous thyrsoid inflorescences with secund congested flowers. No populations of the latter are known to produce formicaria.

The formicaria in this species can be considered secondary because they are leaf derived. Foliar formicaria are the most common type of ant-domatia among Melastomataceae (Michelangeli 2010). Several hypothesis have been proposed for explaining the function of these structures, including protection against herbivory and as a source of nutrients from ants wastes (especially nitrogen), but these remain to be tested for most species. In Michelangeli's (2010) artificial key to myrmecophilous Melastomataceae, this species would be included in Subkey 4 (domatia at the apex of the petiole, or the base of the leaf blade), and would key out in the first couplet (domatia formed by saccate ascidia). The presence of formicaria in this species shows that they might be more common in the tribe Miconieae than expected, and confirms that they have evolved independently across distinct lineages of the Melastomataceae.

Conservation status:—Endangered EN B2ab(iii). Protected inside the Farallones National Park, in a pristine trail of the "Alto Anchicayá", located in the western slope of the Western Cordillera of the Andes in Valle, Colombia. The flora of this natural zone is related to that of northwestern Ecuador. However, based on current data this species appears to be endemic to Colombia.

17. *Miconia incerta* (Wurdack 1978a: 302–303) Gamba & Almeda, *comb. nov.* Basionym: *Ossaea incerta* Wurdack. Type: ECUADOR. Prov. Imbabura: Lita, 501 m, 25 April 1949, *Acosta-Solís 12274* (holotype: F!).

Small shrub 1–1.5 m tall, laxly and weakly branched. *Upper internodes* quadrisulcate, 2.9–7.4 cm long, cauline nodes terete, nodal line absent. Indumentum on branchlets, primary and secondary leaf veins abaxially, inflorescence axes, and pedicels densely to moderately composed of translucent-yellowish dendritic trichomes 0.05–0.1 mm long with short axes and few-moderate number of terete arms. *Leaves* of a pair isophyllous; sessile; blades (2.7–)5.5–15 × (1.1–)1.9–9.8 cm, ovate to lanceolate, the base cordate and amplexicaul, the margin crenate-serrate, the apex bluntly acuminate, chartaceous; mature leaves adaxially soon glabrous, at first sparsely covered with the general dendritic trichomes, the primary, secondary, tertiary and higher order veins glabrous; the abaxial surface glabrescent with a sparse resinous indumentum of slightly furrowed more or less stalked glands 0.04–0.05 mm long, the same type of glands sparsely present on the secondary, tertiary and higher order veins abaxially; 5-7-nerved, including the tenuous marginals, areolae 0.4–0.5 mm, adaxially the primary and secondary veins slightly impressed, the tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the primary vein canaliculate, the tertiary and higher order veins slightly elevated. *Inflorescences* an axillary few-flowered thyrsoid 8–11 cm long, including a thin reddish peduncle 3–4 cm long, pendant and laxly divaricate from the peduncle apex, paired on the upper and lateral leaves; bracts 0.25–0.35 × 0.15–0.2 mm, subulate-linear, erect, glabrous, persistent in fruit; bracteoles 0.2–0.3 × 0.1–0.2 mm, linear, somewhat spreading, glabrous, persistent in fruit. *Flowers* (4-)5-merous on thin pedicels 1–1.5 mm long. *Hypanthia* at anthesis 2.7–2.9 × 2 mm, free portion of hypanthium 0.8–1.2(–1.5) mm long, campanulate to subcylindric, bluntly (8-)10-ribbed, copiously resinous-glandular with slightly furrowed more or less stalked glands 0.05–0.1 mm long, occasionally intermixed with caducous dendritic trichomes, ridged on the inner surface, glabrous like the torus adaxially. *Calyx* open in bud and persistent in fruit; tube 0.2 mm long, glabrous inside, resinous-glandular like the hypanthium; lobes (0.5–)0.6–0.8 × 0.3–0.5 mm, broadly and bluntly triangular, the margin vaguely undulate, the apex rounded, adaxially glabrous, abaxially moderately resinous-glandular; exterior calyx teeth 1.3–1.5 mm long, linear-subulate, inserted on the apical half of the calyx lobes and projecting beyond them, copiously resinous-glandular. *Petals* 6–6.3 × 0.75 mm, lanceolate, the margin entire, the apex bluntly acute to acuminate, greenish to white, glabrous on both surfaces, reflexed at anthesis. *Stamens* 10; filaments 1.5–2.5 × 0.25 mm, white, glabrous; anther thecae 1.9–2.5 × 0.3–0.35 mm, linear-oblong and subulate, truncate-acuminate at the apex, opening by one dorsally inclined pore 0.1 mm in diameter; connective slightly darker than the thecae, its prolongation and appendage 0.6–0.75 mm long, the appendage lanceolate, acute at the apex, minutely and copiously glandular, the glands rounded and sessile. *Ovary* (4-)5-locular, 9/10 inferior, 2.2–2.4 mm long at anthesis, the apical collar 0.2–0.3 × 0.2–0.25 mm, conic-depressed, with a corona of ca. 10 resinous-glandular setulae; style not seen at anthesis, parallel sided (i.e. terete), white, glabrous; stigma truncate when dry. *Berries* 3.5–4 × 2 mm when dry, globose, red when ripe, the hypanthial indumentum somewhat persistent at maturity. *Seeds* 0.33–0.37 × 0.27–0.3 mm, ovoid, not angled, dark-brown; lateral and antiraphal symmetrical planes ovate, the highest point near the central part of the seed; raphal zone ovate to suboblong, ca. 80% the length of the seed, ventrally expanded toward the micropyle; multicellular sculpture rugose throughout the seed; individual cells elongate, anticlinal boundaries channeled, somewhat undulate to irregularly curved; periclinal walls convex, low to high-domed, microrelief striate.

Additional specimens studied:—COLOMBIA. Antioquia: (Frontino), Nutibara, Cuenca alta del Río Cuevas, carretera a la Blanquita, 1350 m, 18 July 1987, *Sánchez et al. 1485* (HUA, US). **Chocó:** Carretera Tutunendo-El Carmen, Entre kms 135 y 120, Alto Río Atrato, Orilla de la carretera, 800–1200 m, 29 April 1979, *Forero et al. 6148* (COL, MO); (San José del Palmar), escuela antigua de Galapagos, cascadas al final de la trocha de la escuela, 1300 m, 20 February 2011, *Mendoza 17636* (FMB). **Valle:** Río El Chanco, márgen izquierda, camino que conduce a Aguabonita, subiendo hacia la cabecera del Río El Chanco, 400 m, 3 April 1985, *Ruiz et al. 111* (COL, CUVC). **ECUADOR. Esmeraldas:** (Quininde), Bilsa Biological Station, Montañas de Mache, 35 km W of Quininde, 5 km W of Sta Isabela, 0°21'N, 79°44'W, 400–600 m, 30 December 1994, *Pitman & Marsh 1130* (MO).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Rare in primary wet forests, also in disturbed sites, on the Pacific Andean slope of Colombia and Ecuador (Fig. 14), at 400–1350 m.

Phenology:—Collected in bud in July. In flower and fruit in April and December.

Etymology:—The specific epithet is derived from the Latin word *incert* (= uncertain), probably referring to the rarity of this species or its uncertain affinities.

Discussion:—The style description is based on the protologue and Flora of Ecuador treatment (Wurdack 1980), because this floral part was missing on the few specimens available for study.

Miconia incerta has distinctive sessile, amplexicaul ovate-lanceolate leaves, and a copiously resinous-glandular hypanthium. Morphologically it is very similar to *M. bensparrei* and *M. palenquensis* especially with respect to the asperous vegetative indumentum, which in *M. incerta* is somewhat yellowish-translucent (vs. brownish), and in the sessile-amplexicaul leaves, which are very distinct in shape (ovate-lanceolate vs. elliptic or elliptic-obovate); the inflorescence architecture is also somewhat comparable, although less elaborated in *M. incerta* (thyrsoid vs. dithyrsoid). On the other hand, the hypanthial indumentum and anther morphology is clearly distinct, as well as the seed shape and micromorphology of the testa. The latter characters make it difficult to assess the systematic position of this species among described species in the Octopleura clade. In *M. incerta*, the multicellular seed sculpture (rugose) and its microrelief (striate) are similar to those found in the species of the Approximata subclade. However, other vegetative characters (complete lack of anisophylly, inflorescence architecture) and floral features (anther morphology) seem to negate any likely affinities to species of the Approximata subclade. Wurdack described the petals as ovate based on rehydrated buds, but they are actually lanceolate and similar to those in *M. variabilis*, which he considered close to *M. incerta*. Phylogenetically *M. variabilis* has a basal position among species of the Variabilis subclade, so they would be definitely be closely related if *M. incerta* is ultimately shown to belong to this subclade as well. Wurdack (1978a) also compared *M. incerta* with *M. albertobrenesii* but these two species are unquestionably distinct and not readily confused.

Conservation status:—Endangered EN B2ab(iii). Habitat destruction is the only known threat. This species was thought to be endemic to western Ecuador (but here it is reported from Colombia as well), where it is known from two collections (in Esmeraldas and Imbabura provinces). Discovered in 1949 near Lita and rediscovered in 1994 in the Bilsa private reserve, in the Reserva Ecológica Mache-Chindul (Esmeraldas). It may also occur in the Reserva Ecológica Cotacachi-Cayapas (Cotton & Pitman 2004).

18. ***Miconia latidecurrens*** Gamba & Almeda, *spec. nov.* (Fig. 22)

Related to *M. laxivenula* with which it shares the glabresecent appearance and laxly reticulate leaves. Distinguished by its widely decurrent leaf bases all along the petioles, and 5-merous flowers.

Type: PANAMA. Prov. Colón: Donoso, Coclé del Norte, área del helipad TO2A, tomando la ruta S, a orilla de una trocha, 08°53'28"N, 80°40'42"W, 110 m, 18 July 2012, *Martínez 880* (holotype: CAS!; isotype: PMA).

Slender treelet to 3 m. *Upper internodes* 3.35–6.61 cm long, compressed-rounded and weakly to moderately carinate, cauline nodes rounded-compressed, nodal line present as a minute ridge. *Indumentum* on branchlets, primary and secondary leaf veins abaxially, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, calyx lobes and calyx teeth sparsely and caducously composed of resinous amorphous lepidote trichomes ca. 0.2 mm long with only partially fused radii. *Leaves* of each pair isophyllous; sessile; blades 29.2–43.8 × 11.5–13.8 cm, oblong-elliptic, the base attenuate and widely decurrent on the petiole extending to the node, the margin entire, the apex bluntly short-acuminate, chartaceous; mature leaves adaxially glabrous like the primary, secondary, tertiary and higher order veins; abaxial surface reddish, superficially glabrous, microscopically papillose with rounded glands ca. 0.02 mm in diameter, the tertiary and higher order veins glabrous; 5-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging asymmetrically from the primary vein 5.5–9.5 cm above the decurrent base, areolae 2–5 mm, adaxially the primary, secondary and tertiary veins impressed, the higher order veins flat, abaxially the primary and secondary veins elevated and prominently carinate, the tertiary and higher order veins slightly elevated to flat. *Inflorescences* an erect pseudolateral dithyrsoid 12–13.5 cm long, including a compressed-rounded peduncle 2.8 cm long, divaricately branched from the peduncle apex, borne in the upper foliar axils; bracts 0.8–1 × 0.7 mm, bracteoles 1–1.2 × 1 mm, deltoid-concave, with the bases of each pair confluent to form a well-defined deflexed flaplike outgrowth that encircles the pedicel base and nodes of the inflorescence axes, persistent in fruit. Flowers 5-merous on pedicels 0.3 lengthening 0.5 mm long in fruit, the central flower of each dichasium sessile. *Hypanthia* at anthesis 2.2–2.3 × 1.6–1.8 mm, free portion of hypanthium ca. 1 mm long, globose to somewhat urceolate, bluntly 10-ribbed, ridged on the inner surface, minutely beset with sessile translucent glands, the torus adaxially puberulent with subulate fine trichomes. *Calyx* open in bud and persistent in fruit; tube 0.3–0.4 mm long, glabrous adaxially, with the same vestiture as the hypanthium abaxially; lobes 0.2–0.3 × 0.6 mm, vaguely undulate, the margin entire, the apex rounded-truncate; exterior calyx teeth to ca. 0.3 mm long, tuberculiform, inserted at the base of the lobes and barely projecting beyond them. *Petals* 4–4.2 × 1.5 mm, oblong, the margin entire, the apex rounded, white, glabrous on both surfaces, erect to somewhat spreading at anthesis. *Stamens* 10; filaments 1.6–1.7 × 0.3–0.4 mm, white, glabrous; anther thecae 1.5–1.7 × 0.4 mm, oblong and slightly clavate, emarginate at the apex, opening by two dorsally inclined pores 0.1–0.2 mm in diameter, white and browning with age; connective somewhat darker than the thecae, its prolongation and appendage 0.4–0.5 mm long, the appendage oblong, rounded at the apex, copiously gland-edged, the glands stalked with rounded-flattened heads, becoming sparse on the rest of the connective dorsally, white. *Ovary* 5-locular, 2/3 inferior, 1.7–1.8 mm long at anthesis, the apical collar 0.5 × 0.3–0.4 mm, conic, minutely glandular-puberulent apically; style 6–6.5 mm long at anthesis, narrowed distally (i.e. tapering), white, glabrous; stigma expanded-truncate. *Berries* 3.32–3.42 × 3.6–4.43 mm when dry, globose-oblate, white when ripe, the hypanthial indumentum subpersistent at maturity. *Seeds* 0.49–0.55 × 0.16–0.18 mm, ovoid-angled to somewhat pyramidal, shiny-brown; lateral and antiraphal symmetrical planes triangular to suboblong, the highest point toward the chalazal side; raphal zone suboblong, as large as to 100% larger than the corpus of the seed, ventrally expanded throughout its length becoming larger at the chalazal end, shiny-whitish; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief verrucose to somewhat striate.

Additional specimens studied:—COSTA RICA. Heredia: (Sarapiquí), La Virgen, Estación Biológica La Tirimbina, Sendero Hunter, 10°25'02"N, 84°07'00"W, 184 m, *González 10598* (CR, NY); (Sarapiquí), La Virgen, Estación Biológica La Tirimbina, Sendero Hunter, 10°25'02"N, 84°07'00"W, 184 m, *González 10615* (CR, NY). **PANAMA. Colón:** Tevk Cominco Petaquilla mining concession, collected in and near transect C006, 8.82°N, -80.66°W, 155 m, 20 September 2012, *McPherson 19727* (MO); W-most part of province, site of proposed copper mine (INMET), Along proposed road to coast, 8.97°N, -80.71°W, 130 m, 9 April 2012, *McPherson & Serein 20808* (MO); (Donoso), Coclé del Norte, área del helipad CR10, tomando hacia el S, 8°56'30"N, 80°41'33"W, 18 July 2012, *Aranda et al. 4226* (CAS, PMA); (Donoso), Coclé del Norte, área del helipad TO2A, caminando hacia la ruta W, 8°53'58"N, 80°40'86"W, 143 m, 19 July 2012, *Espinosa et al. 6010* (CAS); (Donoso), Coclé del Norte, área del helipad TO2A, caminando hacia la ruta N, 8°53'79"N, 80°40'80"W, 77 m, 17 July 2012, *Espinosa et al. 5998* (CAS); (Donoso), Site of proposed copper mine (MPSA), 8°57'55"N, 80°41'59"W, 70 m, 3 December 2009, *McPherson & Merello 21035* (CAS); (Donoso), area fuera de la concesión de Minera Panama, Helipad C10, area del Río Belencillo, 8°48'26"N, 80°43'08"W, 102 m, 28 August 2012, *Ortiz et al. 871* (CAS, MO); (Donoso), Coclé del Norte, Helipad C13, rumbo N, cerca del Río Belencillo, 8°49'09"N, 80°47'11"W, 26 August 2012, *Zapata et al. 3034* (CAS, MO); (Donoso), Coclé del Norte, cerca del Río Escribano, area del helipad BL03, 8°50'44"N, 80°49'31"W, 60 m, 23 August 2012, *Martínez et al. 952* (CAS, MO). **Colón-Panamá:** Trail from Alto Pacora to Cerro Brewster, 9°18'N, 79°16'W, 700 m, 18 November 1985, *de Nevers et al. 6233* (CAS, MO).

Illustration:—Fig. 21.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Known from the westernmost part of the province of Colón in Panama, disjunctly to Alto Pacora, and in La Virgen in Costa Rica (Fig. 14), at 60–700 m. Most of the collections are from lowland forests on steep slopes near the site of a copper mine in Panama (60–155 m), and there is one record from a higher elevation (700 m) tropical wet forest on a trail that connects Alto Pacora with Cerro Brewster. In its restricted range this species is commonly found close to streams.

Phenology:—Collected in flower and fruit in July and August; with inmature flowers in August, and only in fruit in April, September and November.

Etymology:—The specific epithet refers to the large widely decurrent leaf bases of this species.

Discussion:—This species can be readily recognized by its widely decurrent foliar bases that extend all the way to the node, superficial glabrosity throughout, and 5-merous flowers. The Panamanian individuals have leaves that are laxly reticulate and reddish abaxially. This coloration is not present in the one Costa Rican collection. It most resembles *M. laxivenula* which has similar caducous squamate-amorphous indumentum and laxly reticulate leaves, but with prevailingly 4-merous flowers and leaves that are never sessile. The decurrent leaf bases and large leaves are similar to *M. sessilis*, which has a more obvious puberulent indumentum and 4-merous flowers.

Conservation status:—This species would be considered Endangered EN B2ab(iii) based on IUCN criteria (AOO). Althought it occurs in an area that will become protected, the AOO, its fragmented habitat and its destruction result in this taxon being relegated to the threatened category of Vulnerable VU. This species is considered not endangered by the MPSA database. The MPSA is a mining concession in Panama that is currently evaluating the plant diversity around the mine areas with assistance from staff botanists at the Missouri Botanical Garden and collaborating specialists. This species was recently collected in what would become a protected area around the mine.

19. *Miconia laxivenula* (Wurdack 1973a: 407–408) Gamba & Almeda, *comb. nov.* Basionym: *Ossaea laxivenula* Wurdack. Type: COLOMBIA. Comisaría del Putumayo: Umbría, 0°54'N, 76°10'W, 325 m, October–November 1930, *Klug 1816* (holotype: US!; isotypes: F!, MO!, NY!).

Shrub or small tree 1.5–5(–9) m tall, main stem laxly and poorly branched, bark green to green-brownish, smooth. *Upper internodes* compressed-rounded, (1.9–)3.2–6.9 cm long, cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, primary and secondary leaf veins abaxially, inflorescence axes, bracts, bracteoles, pedicels when present, hypanthia, calyx lobes and calyx teeth sparsely composed of caducous amorphous lepidote trichomes <0.1 mm long with only partially fused radii that superficially resemble minute glandular scales. *Leaves* of each pair commonly isophyllous, occasionally slightly anisophyllous in size; the semiterete petiole (1–)1.5–3 cm long, moderately canaliculate abaxially; blades 9–29 × 3.4–13.5(–14) cm, elliptic to oblong-elliptic, or elliptic to elliptic-obovate, the base acute, commonly but not exclusively decurrent on the petiole, the margin entire to obscurely crenulate, the apex acute to bluntly short-acuminate, chartaceous; mature leaves adaxially with surface, primary, secondary, tertiary and higher order veins glabrous; abaxial surface occasionally to rarely flushed red-purple, completely glabrous or glabrescent to sparsely and distantly puncticulate, the points superficially black and consisting of resinous short-stalked glands with thin-walled elongate heads, the tertiary and higher order veins glabrous; 5-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging from the primary vein 1–1.5 cm above the base, areolae 2–3 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins slightly impressed to flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated. *Inflorescences* a pseudolateral multiflorous dithyrsoid 7–11 cm long, including a peduncle <1 cm long or sessile, divaricately and highly branched from the peduncle apex, with somewhat deflexed lower most branches, when sessile bifurcate or trifurcate from the base, each furcation with the same architecture as the pedunculate dithyrsoid, borne in the upper leafy nodes, the rachis red-purplish; bracts and bracteoles 0.5–1 × 0.25 mm, the bracts triangular-concave, the bracteoles subulate, green-reddish, glabrescent on both surfaces, persistent to tardily deciduous in fruit. *Flowers* 4-(5-) merous sessile or subsessile, the pedicels 0.1–0.2 mm long when present. *Hypanthia* at anthesis 1.7–2 × 1.2–1.3 mm, free portion of hypanthium 0.6–0.8 mm long, globose to urceolate, becoming dorso-ventrally compressed in fruit, bluntly 8-(10-)ribbed, green-whitish, ridged on the inner surface, sparsely beset with conspicuous brown rounded glands, the torus adaxially minutely glandular. *Calyx* open in bud and persistent in fruit, green; tube 0.2–0.3(–0.5) mm long, with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 0.1 × 0.75–0.85 mm, or if obsolete then just the tube present, depressed-rounded, the margin vaguely and obscurely undulate, the apex obtuse; exterior calyx teeth 0.2 mm long, minutely depressed-rounded, inserted at the base of the calyx lobes or tube, not projecting beyond the lobes but covering their entire dorsal surface. *Petals* 2.5–3.5 × 0.5–1 mm, lanceolate-triangular, the margin entire, the apex bluntly acute, white to translucent white, glabrous, reflexed at anthesis. *Stamens* 8; filaments 1.2–2 × 0.25 mm, white-yellowish, glabrous; anther thecae 1–1.25 × 0.3–0.4 mm, oblong-obovate, truncate to emarginate at the apex, opening by two dorsally inclined pores 0.1–0.15 mm in diameter, white-yellowish; connective pale yellow, its prolongation and appendage (0.5–)0.6–0.8 mm long, the appendage oblong-deltoid or orbicular, obtuse or rounded-truncate at the apex, copiously and conspicuously gland-edged, the glands stalked and apically rounded. *Ovary* 4-locular, 3/4 inferior, 1.3–1.5(–1.7) mm long at anthesis, the apical collar 0.3–0.4 × 0.17–0.19 mm, conic, conspicuously glandular-puberulent; style 3–3.3 mm long, narrowed distally (i.e. tapering), white, glabrous; stigma expanded truncate to capitellate. *Berries* 2–2.5 × 3–3.8 mm when dry, globose-oblate, white or orange when fully ripe, the hypanthium indumentum persistent at maturity. *Seeds* 0.44–0.5 × 0.16–0.19 mm, typically pyramidal, occasionally ovoid and angled, brownish; lateral and antiraphal symmetrical planes triangular, the highest point toward the chalazal side;

raphal zone suboblong to sublinear, ca. 90% the length of the seed, somewhat ventrally expanded toward the micropyle or from the chalazal side to the micropyle; appendage absent but a small protuberance present; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief verrucose to somewhat striate.

Additional specimens studied:—COLOMBIA. Nariño: (Tumaco), Chajal, 13 June 1951, *Romero-Castañeda 2726* (NY). **Putumayo:** 15 km NW of Puerto Asís, 305 m, 6 August 1965, *King & Guevara 6205* (COL, F, NY, US); 15 km NW of Puerto Asís, 305 m, 6 August 1965, *King & Guevara 6234* (COL, F, NY, US); Selva higrófila del Río San Miguel, entre las quebradas de Sipenae y de Churruyaco, 400 m, 11 December 1940, *Cuatrecasas 10945* (COL, F, US). **COSTA RICA. Alajuela:** (Upala), Dos Ríos, 5 km al S de Brasilia, margen derecha del Río Pizote, 10°55'N, 85°20'W, 500 m, 29 October 1987, *Herrera 995* (CAS, CR, MO); (Upala), Bijagua, El Pilón, Cabeceras del Río Celeste, 10°49'N, 84°27'W, 700 m, 14 November 1987, *Herrera 1265* (CAS, CR, MO); R.B. Monteverde, Río Peñas Blancas, 10°19'N, 84°43'W, 850 m, 6 August 1988, *Bello 253* (CAS, CR, MO). **Guanacaste:** P.N. Guanacaste, Estación Pitilla y Sendero El Mismo, 10°59'26"N, 85°25'40"W, 700 m, 15 June 1991, *Ríos 380* (MO). **Heredia:** Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Q. El Salto, at S, Boundary, 100 m, 30 August 1980, *Hammel 9634* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Along Loop Trail, between Central Trail and Q. El Saltito, 100 m, 15 July 1980, *Grayum 2979* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Central Trail, about 2800 m S, 100 m, 1 August 1980, *Hammel 9408* (CAS); P.N. Braulio Carrillo, Puesto El Ceibo, Gently sloping area just above the steep rim of the Río Peje gorge on the w side, along side path that goes from guard house to water supply intake, about 15 minutes uphill, Transect 500–1, 10°19'18"N, 84°4'44"W, 520 m, 9 December 1992, *Boyle 1415* (CAS, CR); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, SW Trail, 1400–1600 m line, 100 m, 7 March 1981, *Folsom 9262* (CAS, F); 9 km E of San Ramon, 10°20'N, 84°3'W, 425 m, 1 December 1986, *Loiselle 211* (MO); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, 2600 NS survey cut, E of 1050 to 850 EW m line, Camino Central, new property, 100 m, 7 October 1982, *McDowell 396* (CAS, MO); Cerros Sardinal, ca. 2–2.5 km N of Chilamate de Sarapiquí, 10°28'N, 84°4'W, 80–160 m, 21 January 1986, *Grayum et al. 6158* (MO); (Sarapiquí), La Virgen, P.N. Braulio Carrillo, Puesto La Ceiba, 500 m S sendero El Ceibo, 10°20'N, 84°5'W, 500 m, 21 November 1988, *Ballestero 21* (CR, MO); Finca La Selva, Confluence of Río Puerto Viejo and Río Sarapiquí, to Puerto Viejo de Sarapiquí, 10°25'N, 84°0'W, 80 m, 16 October 1979, *Denslow 79-30* (CAS); (Sarapiquí), Horquetas, Rara Avis, Cerca del Plástico, 10°18'N, 84°2'W, 550–600 m, 24 December 1994, *Knapstein 21* (CAS, CR); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Long spot along Q. El Saltito, back of Loop Trail, 950 m E, 100 m, 9 September 1980, *Hammel 9723* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Central Trail, Río Salto at 2500 m, 100 m, 10 February 1981, *Folsom 8875* (CAS); Estación Carrillo de 700 a 450 m de la Fila al Cañón del R, Sucio, 12 November 1983, *Chacón & Herrera 1678* (CAS, CR, MO). **Limón:** (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Estación Quebrada González, a lo largo del sendero Las Palmas, 10°9'50"N, 83°56'20"W, 500 m, 20 January 1998, *Rodríguez et al. 2865* (INB, MO); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Estación Quebrada González, Sendero Las Palmas, 10°9'48"N, 83°56'20"W, 500 m, 11 September 1996, *Rodríguez et al. 1527* (INB, MO). **Puntarenas:** (Golfito), R.F. Golfo Dulce, Península de Osa, Cerro Rincón, Puerto Jiménez, Cabeceras de los Ríos Tigre y Rincón, 8°30'50"N, 83°28'20"W, 700 m, 7 May 1993, *Aguilar 1870* (CAS, INB, MO); P.N. Corcovado, Cerro Brujo, Quebrada Vaquedano, 8°38'N, 83°35'W, 400 m, 22 January 1991, *Castro 224* (CR, MO). **ECUADOR. Carchi:** N side of Río Mira, across from Lita, Steep N-facing slope directly across from (S of) community of Baboso, on S side of Río Baboso, Transect 750–2, 0°53'N, 78°27'W, 750 m, 11 August 1994, *Boyle & Boyle 3562* (MO); (Tulcán), R. Étnica Awá, Comunidad de Gualpi Medio, 1°1'N, 78°16'W, 900 m, 21 May 1992, *Quelal et al. 539* (MO); (Tulcán), R. Indígena Awá, Comunidad El Baboso, 8 km al N de Lita, 0°50'N, 78°20'W, 800 m, 15 October 1991, *Rubio et al. 2135* (MO, QCNE, US); (Tulcán), R. Indígena Awá, Parroquia Tobar Donoso, Sector Sabalera, Bosque primario NE de casa comunal, 1°0'N, 78°24'W, 50–100 m, 19 June 1992, *Tipaz et al. 1445* (MO, QCNE); Prominent hillcrest directly N of Lita, on N side of Río Mira and just to E of Río Baboso, On steep W-facing slope, Transect 750–1, 0°53'N, 78°27'W, 760 m, 1 July 1994, *Boyle & Boyle 3277* (MO); (Tulcán), Chical, R. Étnica Awá-Camumbí, 0°53'N, 78°16'W, 1700–1900 m, 20 July 1991, *Quelal et al. 143* (MO, QCNE). **El Oro:** Hacienda

Daucay, 600 m, 12 October 1993, *Cornejo 470* (MO). **Esmeraldas:** (San Lorenzo), R. Indígena Awá, Parroquia Ricaurte, Comunidad Balsareño, Río Palabí, 1°9'N, 78°31'W, 100 m, 15 April 1991, *Rubio & Quelal 1310* (MO, US); (San Lorenzo), Comunidad Awá Guadalito, 1°16'N, 78°45'W, 125 m, 6 June 1996, *Cerón et al. 31347* (MO, QAP); (Lita), Río Lita and tributaries (affluent of Río Mira), 110 km NW of Ibarra, 4.5 km WNW of Lita, 0°52'N, 78°29'W, 600 m, 8 May 1987, *Daly & Acevedo 5154* (F, MO, NY, US); (Eloy Alfaro), R.E. Cotacachi-Cayapas, Parroquia Luis Vargas Torres, Río Santiago, Estero Angostura, 0°49'S, 78°45'W, 250 m, 8 December 1993, *Tirado et al. 793* (MO, QCNE); Environs of Lita, on the Ibarra-San Lorenzo R.N., 550–650 m, 11 June 1978, *Madison et al. 5206* (F, QCA, US); Cayapas-Cotacachi area, San Miguel and Santiago river, 0°75'N, 78°50'W, 100 m, 1 July 1977, *Rodriguez-Carrasquero 5587* (MO, US); Along road between main Lita-San Lorenzo Hwy, and village of la Ceiba, 2.1 km W of main hwy, 1°6'38"N, 78°41'33"W, 141 m, 16 July 2000, *Croat et al. 84068* (MO); (Eloy Alfaro), Selva Alegre, Estero Gasparito y Estero Felipe, 0°56'N, 78°50'W, 100 m, 21 January 1993, *Álvarez et al. 805* (MO); (Eloy Alfaro), Selva Alegre, Estero Gasparito y Estero Felipe, 0°56'N, 78°50'W, 100 m, 21 January 1993, *Álvarez et al. 793* (MO, QCNE); (San Lorenzo), Finca La Chiquita, 1°13'N, 78°49'W, 80 m, 8 July 1988, *Palacios 2666* (MO); (San Lorenzo), Carretera Lita-Alto Tambo-La Punta, 1°0'N, 78°35'W, 400 m, 6 February 1991, *Gudiño & Moran 1289* (MO, QCNE); (San Lorenzo), San Francisco, Recinto Durango, Loma del Rey, Camino al Valle de la Virgen, 2 km al SE de la carretera Lita-San Lorenzo, 1°2'N, 78°37'W, 350 m, 18 October 1999, *Valenzuela & Freire 513* (MO); Zapallo Grande, a mixed black and Cayapa Amerindian community along Río Cayapa, 0°48'N, 78°54'W, 200 m, 11 October 1983, *Barfod et al. 48173* (MO); (San Lorenzo), Alto Tambo, A 15 km al W de Lita, 0°50'N, 78°32'W, 400 m, 9 September 1990, *Rubio & Quelal 625* (MO, QCNE); (Eloy Alfaro), R.E. Cotacachi-Cayapas, Río San Miguel, Charco Vicente, 0°43'N, 78°53'W, 200 m, 20 September 1993, *Tirado et al. 289* (CAS, MO, QCNE); (San Lorenzo), R. Étnica Awá, Parroquia Mataje, Centro Mataje, 1°8'N, 78°33'W, 200 m, 21 September 1992, *Aulestia et al. 345* (MO, QCNE); Further along trail to Río Mataje (beginning at point where collecting ended previous day), Awa encampment from Río Palavi encampment, 1°7'N, 78°37'W, 200–230 m, 11 February 1988, *Hoover et al. 3929* (MO); (Eloy Alfaro), R.E. Cotacachi-Cayapas, Río Bravo Grando, margen derecha, a 1/2 km del Centro Chachi de Corriente Grande, 0°40'N, 78°57'W, 280 m, 3 October 1992, *Álvarez & Herrera 709* (MO, QCNE); Trail from Awá encampment on Río Palaví to Awá encampment on Río Mataje, begining about 1.5 km from Río Palaví, 1°7'N, 78°37'S, 200 m, 10 February 1988, *Hoover et al. 3872* (MO); (Eloy Alfaro), San Miguel, Río Cayapas, Propiedad del Sr Miguel Chapiro, Parcela permanente 07 y alrededores, 0°45'N, 78°55'W, 130 m, 3 September 1993, *Palacios & Tirado 11137* (MO, QCNE); Cerro de Río Bravo de Cayapas, 0°41'N, 78°56'W, 250 m, 1 September 1980, *Holm-Nielsen et al. 25523* (CAS, MO). **Imbabura:** (Lita), 540 m, 28 May 1949, *Acosta-Solís 12537* (F); (Lita), 501 m, 14 April 1949, *Acosta-Solís 12215* (F); (Lita), 501 m, 28 April 1949, *Acosta-Solís 12312* (F). **Morona-Santiago:** Centro Shuar Yukutais, W of Pedro Kunkumas'house and S of school, 2°30'S, 78°8'W, 900 m, 12 March 1990, *Bennett et al. 4046* (NY, US); (Morona), Cordillera de Cutucú, Centro Shuar Uunsuants/TransKutuku, 2°32'S, 77°54'W, 650 m, 18 January 2002, *Toasa & Paque 8566* (MO). **Napo:** Carretera Hollín-Loreto, 3 km al E del Río Pucuno, camico al caserío El Pacto, 0°42'S, 77°35'W, 1200 m, 15 July 1988, *Neill et al. 8518* (CAS, MO); (Orellana), Zona de amortiguamiento del P.N, Sumaco, Río Bigal, Líneas sísmicas de la compañía petrolera Amoco, Bloque 18, 0°29'S, 77°21'W, 400 m, 9 November 1996, *Revelo 125* (MO); (Archidona), S slopes of Volcán Sumaco, 4 km N of Huahua Sumaco community, Near Río Huataraco, 0°43'S, 77°32'W, 1000 m, 13 December 1989, *Neill et al. 9160* (MO, US); (Loreto), Al N de la carretera Campo Alegre, carretera Hollín-Loreto-Coca. Bloque 19, linea sismica 4, Compañía Triton, 0°36'S, 77°19'W, 420 m, 19 January 1996, *Vargas & Cerda 548* (MO); Road to Bermejo oil field, 35 km N of"km 46" of Lago Agrio-Quito road, ridge top, 10 km W of Lumbaque, 0°10'S, 77°20'W, 950 m, 21 July 1986, *Gentry & Miller 54969* (MO); Carretera Hollín-Loreto, km 25, entre el Río Hollín y el Río Guamaní, 0°43'S, 77°40'W, 1200 m, 17 May 1988, *Neill 8417* (MO); (Archidona), Comuna Huahua Sumaco, Faldas al S del volcán Sumaco, Carretera Hollín-Loreto, km 50, 0°43'S, 77°345'W, 1000 m, 1 May 1989, *Hurtado et al. 2124* (MO); (Archidona), Comunidad Guagua Sumaco, Carretera Hollín-Loreto, km 50, Faldas al S del volcán Sumaco, 0°38'S, 77°27'W, 1000 m, 29 April 1989, *Cerón & Hurtado 6686* (CAS, MO); (Archidona), Comuna Huahua Sumaco, Faldas al S del volcán Sumaco, Carretera Hollín-Loreto, km 50, 0°44'S, 77°34'W, 1100 m, 3 May 1989, *Alvarado 281* (MO); (Archidona), Comuna Huahua Sumaco, Faldas al S del volcán Sumaco, Carretera Hollín-Loreto, km 50, 0°43'S, 77°34'W, 1000 m, 29 April 1989, *Hurtado et al. 2004* (MO); Entre el Río Pucuno y el Río Guamaní, Carretera Hollín-Loreto-Coca, 0°46'S, 77°26'W, 1100–1200 m, 11 December 1987, *Cerón 2892* (MO); (Archidona), R. de Biósfera Sumaco, Comunidad Mushullacta, Bosque protector, 0°49'39"S, 77°33’47"W, 1160 m, 26 February 2003, *Cevallos 42* (CAS). **Napo-Pastaza:** (Veracruz), 900 m, 18 February 1956, Asplund 19461 (NY). **Pastaza:** (Pastaza), Edge of Plateau on S side of Río Arajuno, above river canyon, Proposed ARCO oil pipeline route, km 16, 1°20’S, 77°49’W, 1000 m, 7 September 1997, *Neill et al. 10953* (MO, NY, QCNE); (Pastaza), Pozo petrolero”Corrientes" de UNOCAL, 1°43’S, 76°49’W, 300 m, 1 August 1990, *Gudiño 630* (CAS, MO, QCNE); (Pastaza), Villano-Pandanuque, Junto al Río Villano, Terraza de Río Villano, 1°30’S, 77°27’W, 340 m, 26 July 1992, *Palacios 10361* (MO, QCNE). **Pichincha:** Carretera Quito-Puerto Quito, km 113, 10 km al N de la carretera principal, Bosque virgen y alrededores de la reserva, 0°5’N, 79°2’W, 800 m, 23 February 1984, *Betancourt 121* (F, MO, NY, QCA, US); (Quito), R.F. ENDESA: “Corporación Forestal Juan Manuel Durini”, Río Silanche, km 113 de la carretera Quito-Pto Quito, faldas occidentales, a 10 km N de la carretera principal, 0°5"N, 79°2’0"W, 650–700 m, 20 February 1984, *Jaramillo 6380* (NY, QCA); R.F. ENDESA: “Corporación Forestal Juan Manuel Durini”, Río Silanche, km 113 de la carretera Quito-Pto Quito, faldas occidentales, a 10 km N de la carretera principal, 0°5’N, 79°2’0"W, 650–700 m, 9 June 1984, *Jaramillo 6627* (NY, QCA); R.F. ENDESA: “Corporación Forestal Juan Manuel Durini”, Carretera Quito-Puerto Quito, km 113, 10 km al N de la carretera principal, 0°5’N, 79°2’0"W, 800 m, 19 February 1984, *Betancourt 102* (F, NY, QCA). **Sucumbíos:** (Gonzalo Pizarro), Campo Bermejo 6 N, 30 km al NW de Lago Agrio, 0°14’N, 77°13’W, 1050 m, 23 March 1990, *Cerón et al. 9339* (MO, QCNE, US); (Cascales), Parroquia El Dorado, Cooperativa Los Angeles, Bloque 11 Compañía Santa Fe, Coleccion 3 km entre La Trocal y Los Angeles, 0°0’S, 77°12’W, 250 m, 3 May 1997, *Freire et al. 2166* (MO, QCNE). **NICARAGUA. Río San Juan:** (El Castillo), R. Indio-Maíz, Cerro El Diablo, 11°1’N, 84°12’W, 350–609 m, 9 December 1998, *Rueda et al. 9644* (CAS, MO); (El Castillo), Comunidad Aguas Zarcas, 2.5 km al S del puesto de guardaparques, 11°14’22"N, 84°14’16"W, 350 m, 10 March 2005, *Urbina 160* (CAS). **PANAMA. Bocas del Toro:** Vicinity of Fortuna Dam, Near road to Chiriquí Grande, 8°45’N, 82°15’W, 650 m, 10 August 1986, *McPherson 9924* (MO). **Coclé:** Near El Valle de Anton, 8°37’N, 80°7’W, 600 m, 26 November 1985, *McPherson 7640* (CAS, MO); (El Copé), Cerca del aserradero, 31 August 1996, *Montenegro 1477* (CAS); (Anton), La Mesa, 800 m, 17 January 1973, *Kennedy et al. 2109* (MO); Alto Calvario Region, Vivinity of old saw mill works, 4.5 mi N of El Copé, 2.5 mi N of Escuela Barrigón, 8°38’N, 80°36’W, 580–740 m, 12 September 1987, *Croat 67510* (CAS, MO); (El Copé), On Pacific side 1/2 hour walk from sawmill, 732 m, 16 October 1979, *Antonio 2164* (CAS, MO); In mountains near continental divide, 8 km above El Cope (ca. 0.5 km down logging trail going NE from sawmill), 610 m, 10 January 1978, *Hammel 816* (CAS); (El Copé), Sendero desde la casa de los guardaparques hasta la quebrada, 8°40’N, 80°35’W, 7 July 1996, *Aranda et al. 2855* (CAS); Forested slopes above El Copé off of the abandoned road leading to the Contienetal Divide, 8°38’N, 80°38’W, 800 m, 25 January 1989, *Almeda et al. 6400* (CAS); NE slopes of Cerro Caracoral, N rim of El Valle, 823–975 m, 12 March 1981, *Sytsma 3774* (CAS); 7.2 km from El Valle main road along the Mesa Road, 700 m, 18 December 1977, *Folsom et al. 6936* (CAS, MO, NY); In mountains near continental divide, 8 km above El Copé (ca 5 km down logging trail going NE from sawmill), 610 m, 10 January 1978, *Hammel sn* (MO); Colón: Trail from Alto Pacora to Cerro Brewster, 9°18’N, 79°16’W, 700 m, 18 November 1985, *de Nevers et al. 6237* (CAS, MO). **Veraguas:** Valley of Río Dos Bocas on road between Alto Piedra (above Santa Fe) and Calovebora, 350–400 m, 29 August 1974, *Croat 27469* (MO); Along road between Escuela Agrícola Alto Piedra (above Santa Fe) and Río Dos Bocas, ca 10 km from the Escuela, 530–620 m, 26 July 1974, *Croat 25895* (MO); Valley of Río Dos Bocas along road between Escuela Agrícola Alto Piedra and Calovebora, 15.6 km NW of Santa Fe, Along trail to Santa Fe, E of river, 450–550 m, 31 August 1974, *Croat 27628* (MO); Valley of Río Dos Bocas along road between Escuela Agrícola Alto Piedra and Calovebora, 15.6 km NW of Santa Fe, Along trail to Santa Fe, E of river, 450–550 m, 31 August 1974, *Croat 27623* (MO). **PERÚ. Amazonas:** (Bagua), Imaza, Comunidad Samaria, Río Cenepa region, Región NE del Marion, 4°51’S, 78°18’W, 300 m, 1 January 1995, *Hodges & Gorham 209* (CAS, MO); (Bagua), Imaza, Comunidad Aguaruna de Putuim, Arriba (W) Pueblo de Putuim, 4°55’S, 78°19’W, 680 m, 12 June 1996, *Rodríguez et al. 962* (CAS, MO); (El Cenepa), Comunidad de Mamayaque, Cerro Sakee-gaig, 4°34’49"S, 78°14’1"W, 600–800 m, 14 February 1997, *Rodríguez et al. 1511* (CAS, F, MO). **Huánuco:** (Pachitea), Codo de Pozuzo, Alluvial fan floodplain of Río Pozuzo after it emerges from mountains, Trail to NW behind settlement, 9°40’S, 75°25’W, 450 m, 18 October 1982, *Foster 9253* (F, MO, US). **San Martín:** Along road between Tocache Nuevo, 114.5 km S of Juanjui, 16 km S of Río Pulcache and village of San Martín, 7°50’S, 70°40’30"W, 700 m, 8 April 1984, *Croat 58071* (CAS, MO, US).

Illustration:—Wurdack 1980: 346, fig. 38.

Common names and documented uses:—Ecuador: "cayapa", for curing cramps and epilepsy (*Barfod et al. 48173*, MO!); "chicnul" (*Quelal et al. 539*, MO!); "engal chignul", for making traps (*Tipaz et al. 1445*, MO!); "uvitilla" (*Quelal et al. 143*, MO!); "payatzi" (*Vargas & Cerda 548*, MO!). The first common name is used by the Cayapa Amerindian community; the next three common names are used by the Awá ethnic community.

Habitat, distribution and ecology:—Locally common in primary or secondary lowland rain forests and montane forests, growing on flat areas or steep slopes, commonly in the understory and near streams, from southern Nicaragua through southern Central America, to Colombia, Ecuador and Perú (Fig. 15), at 42–1200(–1900) m. In Nicaragua it is only known from the Reserva Natural Indio-Maíz; it occurs throughout Costa Rica and in Panama it is known from central areas of the country. In South America the distribution is disjunct. In Colombia it is only known from the southern departments of Nariño and Putumayo, and it occurs throughout Ecuador to northern Perú.

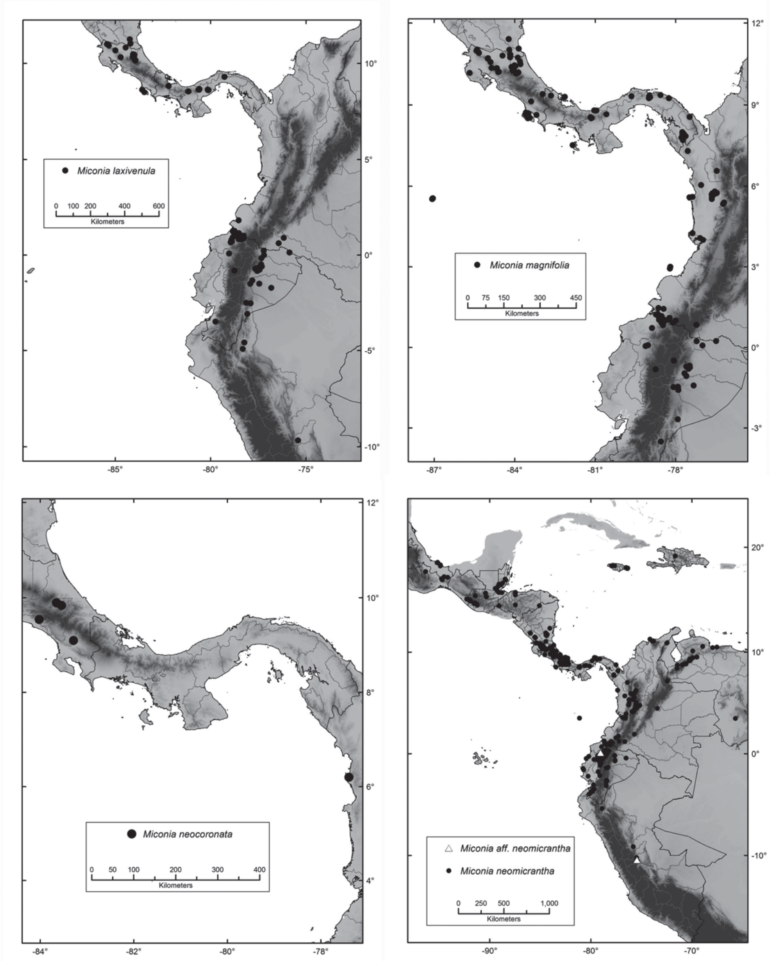


FIGURE 15. Distributions of *Miconia laxivenula*, *M. magnifolia*, *M. neocoronata*, *M. neomicrantha* and *M.* aff. *neomicrantha*.

Manakins, Tanagers, Thrushes, the orange-billed Sparrows (*Arremon aurantiirostris*) and *Myadestes melanops* have been reported to feed on *M. laxivenula* berries in a Costa Rican premontane wet forest (Stiles & Rosselli 1993).

Phenology:—Collected in flower and fruit throughout the year, but only flowering material has been collected in March.

Etymology:—The specific epithet refers to the lax (loose) reticulation on the abaxial surfaces of leaves.

Discussion:—*Miconia laxivenula* has lax foliar reticulation in which the areoles are conspicuously bigger than in other species of the Octopleura clade (2–3 mm vs. commonly <2 mm) and its leaves are commonly narrowly decurrent on the petiole. In the protologue Wurdack (1973a) recognized *M. sessilis* as the closest relative of *M. laxivenula*, which is confirmed on the basis of molecular data showing that *M. laxivenula* is sister to *M. sessilis* (Fig. 1). Both have a basal position among some species within the Variabilis subclade, including *M. magnifolia* and allies. Morphologically *M. sessilis* has similar lax venule reticulation (areoles 3–5 mm) and 4-merous flowers, but its leaf blades are long decurrent at the base (leaves sessile), it has more prominent foliar plinervation (innermost pair of secondaries diverging 3–5 cm vs. 1–1.5 cm above the base), and the petals are densely puberulent abaxially (vs. glabrous). *Miconia variabilis* is similar in appearance and inflorescence architecture but differs in the much denser foliar venule reticulation (areoles ca. 0.2 mm), densely puberulent vegetative and floral indumentum, and 5-merous flowers. The flowers in *M. laxivenula* are predominantly 4-merous. One specimen from the province of Coclé in Panama (*Hammel s.n.*, MO-2686219!) has fruits that are uniformly 10-costate (and thus 5-merous flowers), a rare and unusual variant.

Wurdack (1973a) suspected that *O. robusta* (Triana) Cogn. fma. *glabrata* Mgf., which was described as a glabrous population from eastern Ecuador (Pacapaca region, apparently in the province of Pastaza), is the same taxon as *M. laxivenula*. The holotype chosen by Wurdack was previously determined as *O. robusta* fma. *glabrata* Mgf., but it was not cited by Markgraf (1941) in the protologue. The only specimen that Markgraf (1941) based this form on (*Schultze-Rhonhof 2717*) was not seen; all the Pastaza specimens of *M. laxivenula* studied have 4-merous flowers and were not glabrous, but covered with the squamate-amorphous indumentum that characterizes this species. Markgraf (1941) did not specify the merosity of the specimen he cited, and no records from that region (locality details are not clear) were seen. Specimens of *M. variabilis* examined for this study have 5-merous flowers, and those from the province of Pastaza had the normal *M. variabilis* indumentum. The taxon described by Markgraf (1941) will probably remain unknown based on available evidence. The only specimen cited by Markgraf was probably deposited in B along with the other Schultze collections. It was destroyed during the Second World War.

The lax foliar reticulation and squamate-amorphous indumentum of *M. laxivenula* are consistent throughout its geographic range. However, two distinguishable morphological variants have come to light in the course of this study. The type of this species was collected in Colombia (Putumayo) and in accord with South American specimens, has leaves that are elliptic to oblong-elliptic with the base acute and not decurrent along the petiole, or only slightly so. The abaxial leaf surfaces are completely glabrous, and the berries are orange at maturity, which can change to purple-black according to some specimen labels (*Acosta-Solís 12215*, F!). These populations are known from Colombia (Nariño, Putumayo), Ecuador (Esmeraldas, Napo, Pastaza, and Sucumbíos) and Perú (Huánuco), at 250–1200 m. The second morphological variant includes specimens with leaves that are elliptic to elliptic-obovate. The blade base is acute and conspicuously decurrent on part of the petiole, the abaxial leaf surfaces are black-puncticulate (with minute resinous trichomes), and the berries are white at maturity. Populations with these characteristics have been collected more abundantly than those that conform to type material. These populations are found where the species has been collected in Mesoamerica, and also in Ecuador (Carchi, Cotopaxi, El Oro, Esmeraldas, Pichincha, and Morona-Santiago) and Perú (departments of Amazonas, and San Martín), at 42–975(–1900) m. The floral morphology and measurements of these two morphological variants are consistent, as are the characters mentioned above which supports the view that they belong to the same taxon. The fact that they co-occur in the province of Esmeraldas in Ecuador would prohibit recognizing them as subspecies, since there is no geographic isolation. Field work and population studies are needed to determine how these two variants are interacting where they are sympatric.

Several Ecuadorian specimens have been reported to have the abaxial surface of the leaves red-purple, which might be another kind of morphological variation within this species. This foliar coloration occurs in individuals of both variants described above. The presence of this coloration is not uncommon among tropical plants that live in the dark forest understory, but the function of this anthocyanin pigmentation remains unclear.

Conservation status:—This species would be considered Endangered EN B2ab(iii) based on IUCN criteria (AOO). However, it occurs in many protected areas throughout its range, which warrants a status of Least Concern LC. Protected in Costa Rica in the Monteverde Biological Reserve (Alajuela); in the Guanacaste National Park (Guanacaste); in La Selva Biological Station and the Braulio Carrillo National Park (Heredia, the latter also in Limón); in the Golfo Dulce Forest Reserve and in the Corcovado National Park (Puntarenas). In Ecuador it is protected in the Awá Indigenous Reserve (Carchi and Esmeraldas); in the Cotacachi-Cayapas Ecological Reserve (Esmeraldas); and in the ENDESA Forest Reserve (Pichincha). In Nicaragua it is protected in the Indio-Maíz Reserve (Río San Juan).

20. *Miconia magnifolia* Gamba & Almeda, *nom. nov.* Basionym: *Oxymeris macrophylla* Bentham (1844: 95–96). *Clidemia macrophylla* (Benth.) Naudin (1852: 375). *Octopleura macrophylla* (Benth.) Triana (1871: 145). *Ossaea macrophylla* (Benth.) Cogniaux (1891a: 1064). Type: COSTA RICA. Cocos Island, *Hinds s.n.* (holotype: K-internet image!). Nec *Miconia macrophylla* Steudel (1844: 723; *M. prasina* (Swartz) de Candolle (1828: 188)) nec *M. macrophylla* Macfadyen (1850: 84; *M. impetiolaris* (Swartz) Don ex de Candolle (1828: 183)) nec *M. macrophylla* (Pavón ex Don) Triana (1871: 103; *M. serrulata* (de Candolle) Naudin (1850: 118)).

Clidemia solearis Naudin (1851: 339–340). Type: COSTA RICA. Cocos Island, *Barclay s.n.* (holotype: K-internet image!).

Subshrub to tree (1–)2–6(–12) m tall, moderately branched, bark brown-reddish. *Upper internodes* rounded-quadrate, 1.2–5 cm long, cauline nodes terete, bearing a well-defined nodal line forming a slightly deflexed flaplike outgrowth confluent with the abaxial bases of the petioles. *Indumentum* on branchlets, petioles, primary and secondary leaf veins abaxially, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, calyx lobes and calyx teeth densely composed of brown matted subulate elongate smooth trichomes 0.4–0.7 mm long. *Leaves* of each pair isophyllous; the petiole 2.5–8 cm long, canaliculate adaxially, moderately grooved abaxially; blades 16–40(–50) × 9–18 cm, elliptic to oblong-elliptic, the base broadly acute, the margin subentire to denticulate, the apex bluntly short-acuminate, firm-chartaceous; adaxial surface of mature leaves, primary, secondary, tertiary and higher order veins glabrous; abaxial surface glabrous, the secondary, tertiary and higher order veins sparsely covered with caducous stellate lepidote trichomes 0.1–0.2 mm in diameter with only partially fused radii; 5-nerved, including the tenuous marginals, areolae 1–2 mm, adaxially the primary and secondary veins deeply impressed, the tertiary and higher order veins flat, abaxially the primary, secondary, tertiary and higher order veins prominently elevated and terete. *Inflorescences* a pseudolateral multiflorous dithyrsoid 4–12 cm long, including a rounded-quadrate peduncle 0.5–1(–3) cm long, divaricately and highly branched from the peduncle apex, borne in the upper foliar axils, the rachis green, the inflorescence nodes densely covered with the general tomentum but longer, each trichome up to 1 mm long; bracts 1–3 × 0.4–0.6 mm, oblong-lanceolate, concave, early deciduous at anthesis; bracteoles 1–3 × 0.7–1 mm, linear-oblong, concave, early to tardily deciduous in fruit. *Flowers* 5-merous on pedicels 0.25–0.5 mm long or subsessile. *Hypanthia* at anthesis 1.5–2 × 0.9–1.1 mm, free portion of hypanthium 0.9–1(–1.3) mm long, globose to urceolate, bluntly 10-ribbed, green-yellowish to reddish, ridged on the inner surface, smooth and minutely glandular, the glands sessile and somewhat translucent, the torus adaxially glandular-puberulent, the setae <0.3 mm long. *Calyx* open in bud and persistent in fruit, green; tube 0.15–0.3 mm long, with the same vestiture as the torus adaxially and the hypanthium abaxially; lobes 0.1–0.2 × 0.5–0.8 mm, minutely triangular, the margin vaguely undulate, the apex blunt; exterior calyx teeth 0.25–0.5 mm long, tuberculiform or obsolete, inserted at the base of the calyx lobes, equaling or slightly exceeding the lobes. *Petals* 2.5–4.6 × 1–1.9 mm, lanceolate or lanceolate-triangular, the margin entire, the apex bluntly acute, white to translucent white, drying orange, glabrous adaxially, abaxially with a thinly median line of matted elongate smooth trichomes <0.2 mm long, reflexed at anthesis. *Stamens* 10; filaments 1.5–2 × 0.25 mm, white to cream, glabrous; anther thecae 0.75–1 × 0.4 mm, oblong, obtuse to rounded at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, white-yellowish; connective white-yellowish, its prolongation and appendage 0.75–0.85 mm long, the appendage oblong, obtuse to rounded at the apex, copiously and conspicuously gland-edged, the glands rounded and stalked, the stalks linear to subulate. *Ovary* typically 5-locular, occasionally 4-locular, 1/2 to 2/3 inferior, 1.1–1.5 mm long at anthesis, the apical collar 0.5–0.8(–1) × 0.2–0.3 mm, conic-truncate, sparsely to moderately glandular-puberulent; style (2.5–)3.5–4.5 mm long, moderately narrowed distally (i.e. tapering), white, glabrous; stigma capitellate to capitate. *Berries* 4–6 × 4–6 mm when dry, globose-oblate, yellow-orange then pink-red to red-purple when fully ripe, the hypanthial indumentum persistent at maturity. *Seeds* 0.31–0.43 × 0.12–0.18 mm, typically pyramidal, occasionally ovoid and angled, brownish; lateral and antiraphal symmetrical planes triangular, the highest point toward the chalazal side; raphal zone suboblong to sublinear, ca. 80% the length of the seed; appendage absent, but a small protuberance present; individual cells elongate, anticlinal boundaries channeled, undulate, with U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief verrucose.

Additional specimens studied:—COLOMBIA. Antioquia: (Frontino), Venados, P.N. de las Orquídeas, Sector Venados abajo, Cabaña del INDERENA, en Río Venados, 6.567°N, -76.47°W, 830 m, 28 October 1986, *Callejas et al. 2726* (HUA, MO, NY, US). **Cauca:** P.N.N. Isla Gorgona, Costado oriental, 3°N, -78.2°W, 22 June 1950, *Fernández 403* (COL, MO, US); (Guapi), P.N.N. Gorgona, 2.94°N, -78.21°W, 230 m, 31 May 1986, *Lozano* *et al. 5079* (CAS, COL, US). **Chocó:** 11 km S of Quibdó on road to Yuto, 5.58°N, -76.65°W, 50 m, 7 January 1979, *Gentry & Renteria 23723* (COL, MO, US); Carretera Quibdó-Istmina, km 36 entre Yuto y Cértegui, Río Paimadó, 5.52°N, -76.65°W, 70 m, 8 September 1976, *Forero & Jaramillo 2657* (COL, MO, US); (Tadó), Marmolejo, 5.39°N, -76.19°W, 500–520 m, 25 April 1991, *González 2396* (COL, NY); (Quibdó), San Francisco de Ichó, Carretera Ichó-Tutunendo, 5.8°N, -76.54°W, 150 m, 8 July 1981, *Galeano Lozano 409* (COL, NY); (Nuquí), Arusí, E.B. El Amargal, 5.58°N, -77.48°W, 80 m, February 1992, *Galeano 3205* (COL, F); (Quibdó), Pacurita, Camino Quebrada Río Claro, 5.68°N, -76.59°W, 71 m, 26 January 2012, *Almeda et al. 10407* (CAS, CHOCO, COL). **Nariño:** (Tumaco), La Guayacana, 1.43°N, -78.45°W, 220 m, 27 June 1951, *Romero-Castañeda 2949* (NY); (Tumaco), Espriella, 1.47°N, -78.64°W, 50 m, 20 June 1951, *Romero-Castañeda 2791* (NY). **Putumayo:** Selva higrófila del Río San Miguel, entre las quebradas de Sipenae y de Churrucayo, 0.24°N, -76.49°W, 294–400 m, 11 December 1940, *Cuatrecasas 10946* (COL, F, MO, US). **Valle:** La Trojita, Río Calima (región del Chocó), 4.07°N, -77.09°W, 19-10 February–March 1944, *Cuatrecasas 16834* (F, NY, US); (Buenaventura), Bajo Calima, 20 m, 12 June 1988, *Cabrera 16000* (CAS, CUVC). **COSTA RICA. Alajuela:** (Upala), P.N. Volcán Tenorio, No protegida, Cuenca del Zapote, Bijagua, Sendero a ala catarata Río Celeste, 10.719°N, -84.99°W, 600 m, 21 March 2005, *Santamaría 1178* (INB, MO, NY); (San Carlos), Boca Tapada, R.N.V.S.M. Maquenque, No protegida, Cuenca del San Carlos, San Jorge, Parcela #8, 10.748°N, -84.17°W, 100 m, 25 November 2007, *Solano & Mena 4933* (INB, MO, NY); Pocosol B.S., Sendero Catarata, 10.34°N, -84.67°W, 820 m, 1 September 2005, *Penneys 1803* (CAS); R.B. Monteverde, Cordillera de Tilarán, Bosque Eterno de los Niños, Laguna de Pocosol, Río Peñas Blancas, 10.35°N, -84.66°W, 820 m, 15 June 1991, *Bello & Haber 2892* (CAS, CR, MO); (Guatuso), P.N. Tenorio, Cuenca del Río Frío, Bijaqua, El pilón, , 10.7°N, -85°W, 800 m, 10 January 2000, *Alfaro et al. 2654* (MO); R.F. San Ramón, Sendero Miramar, 10.21°N, -84.61°W, 800–1000 m, 2 November 1986, *Herrera et al. 147* (CAS, MO, US); 15 km NW of Nuevo Arenal on road to Tilarán, then 3 km NE on road to San Rafael de Guatuso, then 2 km W on road to Finca Cote, On N side of road, SE side of Lago Cote, 10.575°N, -84.9°W, 700 m, 30 April 1983, *Liesner et al. 15079* (CAS, MO). **Guanacaste:** P.N. Guanacaste, La Cruz, 9 Km al S de Santa Cecília, Estación Pitilla., 10.99°N, -85.42°W, 700 m, 13 September 1990, *Chávez et al. 72* (MO, NY); P.N. Guanacaste Estación Pitilla, alrededores., 11.03°N, -85.4°W, 600 m, 15 June 1989, *Chavarría et al. II INBio 20* (MO); P.N. Guanacaste, Estación Pitilla y Sendero El Mismo, 10.99°N, -85.42°W, 700 m, 15 June 1991, *Ríos 379* (CAS, MO); P.N. Guanacaste, Estación Pitilla, Fila Orosilito y Sendero Nacho, 11.03°N, -85.4°W, 700 m, 12 November 1990, *Ríos 174* (MO); Río Chiquito de Tilarán, Río Negro valley, Atlantic slope, 10.36°N, -84.86°W, 1400 m, 30 July 1986, *Haber 5900* (CAS, MO). **Heredia:** (Sarapiquí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Estación El Ceibo, bosques residuales camino al Río Peje, 10.33°N, -84.08°W, 500–546 m, 12 March 2003, *González 3064* (MO); Finca La Selva, Confluence of Río Puerto Viejo and Río Sarapiquí, vic, Puerto Viejo de Sarapiquí, 10.416°N, -84°W, 80 m, 16 October 1979, *Denslow 79-29* (CAS); (Sarapiquí), Rara Avis, ca. 15 km al SW de Horquetas, sendero Levi, 10.28°N, -84.03°W, 400 m, 9 July 1989, *Vargas & Frazee 20* (CAS, INB, MO); (Sarapiquí), La Selva Biological Station, Alrededores de LS, 10.43°N, -84°W, 100 m, 25 July 2003, *Aguilar RA007981* (MO); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, On slope leading down into the swamp along the Swamp Trail, 10.43°N, -84°W, 100 m, 19 July 1996, *Wilbur 66238* (MO, NY); Near Tirimbina E of the Río Sarapiquí, 10.4°N, -84.12°W, 150–250 m, 12–15 August 1971, *Burger & Burger 8023* (F, US). **Limón:** (Pococí), No protegida, Cuenca del Sarapiquí, Finca Bosque Lluvioso, propiedad del INBio, entrando por camino a mano derecha del Río Costa Rica, 10.2°N, -83.86°W, 300 m, 30 November 1999, *Rodríguez et al. 5500* (MO); Hacienda Tapezco-Had, La Suerte, 29 air km W of Tortuguero, 10.5°N, -83.78°W, 40 m, 16 August 1979, *Davidson & Donahue 8395* (US); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Quebrada González, 10.164°N, -83.94°W, 500 m, 20 October 2006, *Solano et al. 3505* (INB, MO, NY); (Pococí), R.N.F.S. Barra del Colorado, Llanura de Tortuguero, Sector Cocorí, 10.59°N, -83.8°W, 100 m, 21 November 1990, *Rojas 152* (CAS, INB, MO); (Talamanca), Sukut, De las juntas de Río Urén y Río Sukut 1.5 Km aguas arriba sobre éste, margen derecha siguiendo el sendero hacia Boca de Río Buruy, 9.4°N, -82.96°W, 450 m, 8 July 1989, *Herrera 3200* (CAS, CR, MO); (Pococí), R. Bosque Lluvioso, No protegida, Cuenca del Sarapiquí, Alrededores de la Estación, 10.191°N, -83.86°W, 350 m, 30 September 2005, Vargas & *Villalobos 923* (INB, MO, NY); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Sector Quebrada González, sendero Las Palmas, 10.156°N, -83.94°W, 600 m, 29 July 2008, *Kriebel 5322* (INB, MO, NY). **Puntarenas:** (Osa), R.F. Golfo Dulce, Península de Osa, Rancho Quemado, Quebrada El Bote, 8.72°N, -83.58°W, 200–350 m, 10 September 1993, *Quesada & Segura 761* (CAS); (Puntarenas), P.N. Isla del Coco, Isla del Coco, 5.52°N, -87.07°W, 0–300 m, 1 November 1997, *González*

635 (INB, MO, NY); El General Valley, Along the Río Cacao above Pan American Highway, 9.13°N, -83.38°W, 900 m, 30 January 1965, *Williams et al. 28676* (F, US); Cocos Island, 5.52°N, -87.07°W, 80–100 m, 9 March 1964, *Fournier 340* (CAS); (Golfito), P.N. Corcovado, Península de Osa, Estación Los Patos, cerca de la estación, 8.57°N, -83.51°W, 250 m, 25 May 1995, *Moraga 196* (CAS, INB, MO); (Golfito), R.F.S. Golfito, 8.63°N, -83.19°W, 100 m, 13 May 1986, *Zamora 1251* (CAS, CR, MO); (Puntarenas), Cocos Island, Steep ridges SE of Chatham Bay, 5.55°N, -87.05°W, 9–11 April 1979, *Foster 4128* (CAS, F, MO, US); (Cocos Island), Wafer Bay, 5.54°N, -87.07°W, 28 June 1932, *Howell 10182* (CAS). **San José:** P.N. Braulio Carrillo, Alrededores Estación Carrillo, hasta Quebrada Sanguijuela, Sendero hacia Quebrada Sanguijuela, 10.15°N, -85.95°W, 500–700 m, 17 May 1988, *Umaña 235* (CAS); (Vazquez de Coronado), P.N. Braulio Carrillo, Cerca del Río Sucio, 10.16°N, -83.95°W, 17 January 1984, *Sánchez & Zamora 373* (CAS, MO). **ECUADOR. Carchi:** (Tulcán), Reserva Etnica Awá, Parroquia El Chical, Centro San Marcos, Bosque muy húmedo Premontano, Bosque primario alterado, terreno plano inundable, 1.1°N, -78.23°W, 750 m, 20 April 1993, *Méndez et al. 167* (MO); (Lita), Collections made in front of bulldozers constructing the Lita-San Lorenzo road, 5 km from Lita, Primary rain forest on terra firme, 0.83°N, -78.47°W, 600 m, 17 December 1982, *Barfod et al. 41352* (MO); (Maldonado), R. Étnica Awá, Parroquia Tobar Donoso, Sabalera, 0.92°N, -78.53°W, 900 m, 22 November 1992, *Aulestia et al. 668* (MO, NY, QCNE); (Tulcán), Parroquia Tobar Donoso, Sector Sabalera, Reserva Indígena Awá, NE Casa Comunal, Bosque primario, Bosque muy húmedo premontano, 1°N, -78.4°W, 100–650 m, 19 June 1992, *Tipaz et al. 1231* (MO); (El Pailon), ca. 45 km below Maldonado along foot path to Tobar Donoso, 0.92°N, -78.1°W, 800 m, 28 November 1979, *Madison & Besse 7097* (MO, US). **Esmeraldas:** (San Lorenzo), Ricaurte, Reserva Indígena Awá, Bosque primario, Bosque húmedo Tropical, 1.17°N, -78.53°W, 300 m, 18 October 1992, *Tipaz et al. 2112* (MO 336031); (San Lorenzo), San Francisco, Recinto Durango, Loma del Rey, Bosque húmedo Tropical, Sector colinado, Bosque maduro, Camino al Valle de la Virgen, 2 km al SE de la Carretera Lita-San Lorenzo, 1.03°N, -78.62°W, 350 m, 18 October 1999, *Valenzuela & Freire 516* (MO 336032); (Eloy Alfaro), R.E. Cotacachi-Cayapas, Charco vicente, Río San Miguel, 0.72°N, -78.88°W, 200 m, 20–30 September 1993, *Tirado et al. 437* (MO, QCNE, US). **Morona-Santiago:** (Logroño), Región de la Cordillera de Cutucú, Centro Shuar Tumpaim, Cordillera de Saunto y Satap, -2.68°S, -77.92°W, 540 m, 11 December 2003, *Toasa et al. 9399* (MO); El centro Shuar Kankaimi (Cangaime) y alredadores, 6 horas a pie al W Taisha, -3.51°S, -78.55°W, 13 September 1985, *Baker et al. 6365* (MO, NY, US). **Napo:** (Mondaña), Reserva Yachana, márgen izquierdo del Río Napo, aguas abajo, Muestreo A, Bosque de Colina, Sendero Azul, 0.84°N, -77.23°W, 400 m, 15 March 2007, *Cerón et al. 58209* (MO); (Loreto), Faldas del volcán Sumaco, 2 km al W del Río Huataraco, Bloque 19, línea sísmica 16, Helipuerto 1, Compañía Triton, -0.7°S, -77.5°W, 870 m, 21 March 1996, *Freire & Cerda 170* (MO); (Loreto), Faldas del volcán Sumaco, A 1.4 Km al sureste del nacimiento del Río Huataraco, Bloque 19, línea sísmica 14, DZ 8, Compañía Triton Bosque primario, Suelo con roca sedimentaria., -0.68°S, -77.48°W, 690 m, 1 March 1996, *Vargas & Grefa 749* (MO); (Tena), Estacion Biologica Jatún-Sacha, along S bank of Río Napo, 8 km E of Puerto Misahualii, -1.06°S, -77.6°W, 450 m, 2 April 1992, *Croat 73403* (MO); (Archidona), Along road between Coca (San Francisco de Orellana) and the Baeza-Tena road, via Loreto and Hollin, 82.5 km W of Río Payamino, 6 km W of Juticocha, 28.3 km W of Loreto, 58 km E of Tena-Baeza Highway, -0.8°S, -77.52°W, 925 m, 2 March 1992, *Croat 72618* (MO); 31 mi W of lago Agrio, 0.07°N, -77°W, 640 m, 1974, *Plowman et al. 3972* (US). **Pastaza:** (Puyo), Los Vencedores, E.E. E.S.P.O.C.H, About 30 minutes by car S of Puyo, Virgin forest at far end on W border of Field Station, -1.5°S, -77.93°W, 800–1040 m, 12 December 1995, *Soejarto et al. 9332* (F); (Puyo), Parroquia Tarqui, Sector Communa San Jacinto de Pindo, Road to Cotococha, off Puyo-Macas road, -1.58°S, -77.9°W, 890 m, 19 November 2005, *Penneys & Fernández 1872* (CAS, MO, NY); (Pastaza), Pozo Villano 2 de Arco, 2 km del pueblo de Villano, -1.42°S, -77.33°W, 400 m, 3 December 1991, *Tipaz et al. 507* (F, MO, QCNE); (Pastaza), E.E. Pastaza, km 32, vía Puyo-Macas, Tramo desde la Estación hacia el Río Pacayacu, -1.5°S, -77.93°W, 1040 m, 14 February 2002, *Caranqui et al. 366* (MO 5853443); Vicinity of Shell, along road N to Río Alpayacu, 0.8 km, -1.48°S, -78.08°W, 1121 m, 9 May 2003, *Croat et al. 88884* (CAS, MO); Vicinity of Shell, along Río Pindo, ca 1.5 km N of Shell, -0.49°S, -78.06°W, 1085 m, 5 May 2003, *Croat et al. 88535* (CAS, MO). **Pichincha:** (Quito), Parroquia Puerto Quito, Reserva Forestal de ENDESA, 10 km al norte de Alvaro Pérez Intriago, 0.05°N, -79.12°W, 650–800 m, 11 June 1990, *Cerón & Ayala 10149* (MO); R. de ENDESA "Corporación Forestal Juan manuel Durini", Río Silanche, Carretera Quito-Puerto Quito, km 113, 10 km al N de la carretera principal, Faldas occidentales, Bosque primario y alrededores de la reserva, 0.08°N, -79.03°W, 650–700 m, 8 July 1984, *Jaramillo 6736* (CAS, F, NY, QCA**). Sucumbíos:** (Gonzalo Pizarro), Campo Bermejo 6 N, 30 km al NW de Lago Agrio, Transectos, 0.23°N, -

77.22°W, 1050 m, 23 March 1990, *Cerón et al. 9358* (CAS, MO). **NICARAGUA. Atlántico Sur:** (Nueva Guinea), R. Indio-Maíz, Zelaya, Colinas de piedra fina, 11.42°N, -84.22°W, 200–300 m, 5 January 1999, *Rueda et al. 9812* (MO). **Río San Juan:** (San Juan del Norte), R. Indio-Maíz, Río Indio, Cerro Canta Gallo, 11.07°N, -83.85°W, 150–200 m, 16 September 1998, *Rueda et al. 8682* (CAS, MO); (El Castillo), R. Indio-Maíz, Cerro Bolivar, 10.85°N, -84.16°W, 150–280 m, 28 November 1998, *Rueda et al. 9196* (CAS, MO). **PANAMA. Bocas del Toro:** Cloud forest above Quebrada Huron on Cerro Bonyic, 9.35°N, -82.65°W, 152–365 m, 13 April 1968, *Kirkbride & Duke 595* (MO); (Isla Bastimentos), Lado E de la Isla, Sendero de Quebrada Sal hasta la playa al lado N, 9.3°N, -82.13°W, 10 m, 22 March 1993, *Foster & Herre 14725* (F, PMA). **Coclé:** (El Copé), Sendero desde la casa de los guardaparques hasta la quebrada, 8.66°N, -80.58°W, 7 July 1996, *Aranda et al. 2868* (CAS). **Colón:** Santa Rita Ridge, 9.32°N, -79.65°W, 28 July 1972, *D'Arcy & D'Arcy 6148* (CAS, MO). **Darién:** S of El Real, on slopes de Cerro Pirre, above RENARE camp, 7.93°N, -77.7°W, 800–1070 m, 29 June 1988, *McPherson 12673* (CAS, MO); S of El Real on trail up Cerro Pirre, Forest, 8°N, -77.75°W, 550–1030 m, 29 March 1985, *McPherson 7022* (MO); Trocha desde Cana hasta la toma de agua, 7.85°N, -77.63°W, 711 m, 1 September 1990, *Aranda et al. 1560* (CAS, PMA); P.N. Darién, Camino que va de la Estación de Pirre hacia Rancho Frío, cerca de la estación, 7.93°N, -77.72°W, 13 October 1989, *Polanco & Palacios 504* (CAS, PMA); Top of ridge leading to Cerro Pirre, area near Rancho Plastico, 7.85°N, -77.7°W, 1200–1400 m, 13 November 1977, *Folsom et al. 6272* (CAS, MO); Cerro Campamento, S of Cerro Pirre, Elfin forest, 7.78°N, -77.72°W, 20–22 March 1968, *Duke 15735* (MO, US); Río Cuasí, main stream 0–2.5 mi S of Tres Bocas, 7.8°N, -77.78°W, 28 April 1968, *Kirkbride & Duke 1135* (MO, NY); 0–2 miles E of Tres Bocas along the shortest headwater of Río Cuasí, 7.73°N, -77.73°W, 240–500 m, 28 April 1968, *Kirkbride & Duke 1167* (CAS, MO); Lower slopes of alturas de Nique along Río Cuasí, 7.7°N, -77.73°W, 1000–1067 m, 26 December 1980, *Hartman 12250* (CAS, MO); Middle slopes on W side of Cerro Pirre, [Original coordinates 7º56'N, 77º45'W], 7.93°N, -77.75°W, 800 m, 29 June 1988, *Croat 68935* (MO). **Panamá:** Near border with Comarca de San Blas, along El Llano- Carti road, c, 9º15'N, 79º00'W, Forest ca. 350 m, 9.25°N, -79°W, 350 m, 22 July 1986, *McPherson 9786* (MO). **San Blas:** Cordillera frente a Isla Narganá, Ribera de Río Diablo, 9.37°N, -78.57°W, 65 m, 9 August 1994, *Galdames et al. 1482* (CAS, US); Playón Chico, Río Ukupseni, caminando por el Río Ukupseni, desde el campamento Neba Dummat hasta la cascada., 9.25°N, -78.25°W, 50–100 m, 30 October 1991, *Herrera et al. 1036* (CAS, MO); Nusagandi, On road to Carti, 9.33°N, -78.98°W, 400 m, 18 July 1986, *McDonagh et al. 152* (MO). **Veraguas:** (Montijo), Parque Nacional Coiba, Playa Hermosa, La Falla parcela, orilla de quebrada, en área de bosque maduro, 17 NMU 0330, 7.52°N, -81.84°W, 200 m, 29 September 2004, *Ibáñez et al. 4013AI* (MO); (Santa Fe), Atlantic slope, Río Concepción to Río Barrera, 8.79°N, -80.96°W, 60 m, 16 October 1978, *Hammel 5146* (MO); (Boca de Concepción), In Golfo de los Mosquitos, 8.8°N, -81.03°W, 10 m, 6 August 1987, *McPherson 11382* (CAS, MO); (Santa Fe), NW of Santa Fe, 4.2 km from Escuela Argicolo Alto de Piedra, 8.51°N, -81.14°W, 1000 m, 25 February 1975, *Mori & Kallunki 4840* (MO).

Illustration:—Mendoza & Ramírez 2006: 200, fig. 1.95.

Common names and documented uses:—Colombia: "sietecueros" (Guaviare); "cenicero" (Chocó) (Bernal *et al.* 2011).

Habitat, distribution and ecology:—Occasional in primary or secondary rainforests and disturbed sites. It commonly grows in swampy areas and light gaps, from southern Nicaragua through southern Central America, to Colombia and Ecuador (Fig. 15), at 0–1400(–1800) m. In Costa Rica it occurs throughout its territory, including Cocos Island down to Isla de Coiba, south to the Atlantic slope of Panama. In Colombia it is known from the lowland Pacific slopes and premontane forested slopes of the Andes to Isla Gorgona in the Pacific Ocean, south to the Andean forested slopes in Ecuador.

White-ruffed Manakins (*Corapipo altera*) have been reported to feed on *M. magnifolia* fruits in a wet forest of northeastern Costa Rica (Boyle 2010). Manakins, Tanagers, Thrushes, the orange-billed Sparrow (*Arremon aurantiirostris*) and *Myadestes melanops* have been reported to feed on *M. magnifolia* berries in a Costa Rican premontane wet forest (Stiles & Rosselli 1993). Other fruit-eating birds of the tropical forest understory (at Estación Biológica La Selva, Costa Rica) that have been reported to consume *M. magnifolia* fruits include *Chlorothraupis carmioli*, *Corapipo leucorrhoa*, *Euphonia gouldi*, *Hylocichla mustelina*, *Mionectes oleaginous*, and *Pipra mentalis* (Loiselle & Blake 1999, 2000). The tawny-crested Tanager, *Tachyphonus delatrii* was also observed to feed on mature berries of *M. magnifolia* in Costa Rica (*Solano 3505*, NY!).

Phenology:—Collected in flower and fruit throughout the year.

Etymology:—The specific epithet refers to the large leaves of this species.

Discussion:—The combination of large leaves, tomentose indumentum on vegetative and floral parts, and conspicuous leaf reticulation makes *M. magnifolia* readily recognizable among species of the Octopleura clade. This species has copious stalked glands on the long (0.75–0.85 mm) staminal connective appendage and prolongation, a toral corona that is densely glandular adaxially, and an apical ovary collar that is densely glandular-puberulent. Wurdack (1973a) noted that the matted indumentum on the petals is rather sparse in Central American and Pacific Colombian slope individuals, but moderately dense in collections from the the rest of Colombia and Ecuador. It is most closely related to *M. bractiflora*, *M. formicaria*, *M. rufibarbis*, and *M. spiciformis* with a basal position among this group of species (Fig. 1), which share a tomentose hypanthial indumentum and similar seeds. *Miconia magnifolia* most resembles *M. bractiflora* in foliage details, especially the tertiary/intertertiary vein reticulation but the latter lacks the tomentose-matted caducous cauline pubescence and has broader bracts, thicker hypanthial pubescence, and shorter stamen connectives that are barely (0.1 mm) prolonged (Wurdack 1973a).

Conservation status:—Considered Vulnerable VU B2ab(iii) following IUCN criteria (AOO). However, a status of Least Concern is justified based on the fact that it is protected in many areas. Protected in Colombia in Las Orquídeas National Park (Antioquia); in the Gorgona National Park (Cauca); and in the Amargal Biological Station (Chocó). In Costa Rica it is protected throughout its territory in different National Parks and Reserves. In Ecuador it is protected in the Awá Indigenous Reserve (Carchi and Esmeraldas, and in the Cotocachi-Cayapas Ecological Reserve (Esmeraldas); in the Yachana Reserve and in the Jatún-Sacha Biological Station (Napo); in the ENDESA Forest Reserve (Pichincha). In Nicaragua it is protected in the Indio-Maíz Reserve (Atlántico Sur and Río San Juan). In Panama it is only protected in the Darién National Park.

21. *Miconia neocoronata* Gamba & Almeda, *nom. nov.* Basionym: *Clidemia coronata* Gleason (1939a: 114–115). Type: COSTA RICA. Bords du Río Tuis, July 1893, *Pittier 8080* (holotype: US-internet image!; isotypes: BR-3 sheets-internet images!). Nec *Miconia coronata* (Bonpland) de Candolle (1828: 187).

Small shrub, rarely epiphytic, (0.5–)1–2(–2.75) m tall, loosely and irregularly branched. *Upper internodes* [1.75–4.25 cm long] and cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, primary, secondary, tertiary leaf veins abaxially, inflorescence axes, bracts, bracteoles, and pedicels (when present) densely to copiously composed of brownish sessile or thinly stipitate dendritic trichomes 0.2–0. 5(–1.9) mm long with short axes and few-moderate number of terete arms, rarely sparsely intermixed with caducous elongate smooth trichomes 1–1.5 mm long. *Leaves* of each pair somewhat anisophyllous in size; the petiole 0.5–3.9 cm long, canaliculate adaxially and shallowly grooved abaxially; larger blades 9–16 × 5–9.5 cm, smaller blades 3.5–10 × 2.1–5.5 cm, ovate to elliptic-ovate, the base rounded to obtuse, the margin ciliate and repand-entire, the apex short-acuminate, chartaceous; mature leaves with adaxial surface, primary, secondary, tertiary and higher order veins glabrous; abaxial surface essentially glabrous except for a few dendritic trichomes and resinous glands on the venules, the dendritic trichomes on the secondary and tertiary veins sparsely intermixed with caducous resinous slightly furrowed more or less stalked glands ca. 0.08 mm long, the higher order veins moderately beset with the same type of resinous glands; 5- or 7-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging slightly to notably asymmetrically from the primary vein 0.25–0.35 cm above the base, areolae 0.5–0.75 mm, adaxially the primary and secondary veins slightly impressed to flat, the tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated. *Inflorescences* a pseudolateral group of few-flowered modified dichasia 1.5–4 cm long, sessile, commonly with three or more paracladia arising from the base, borne on the upper foliar nodes, the rachis together with bracts and bracteoles pale magenta; bracts 0.65–0.75 × ca. 0.25 mm, spatulate-oblong, aristate at the apex, decurrent at the base, sometimes with a swollen glabrous structure at the base abaxially, both surfaces glabrescent with age, persistent in flower and tardily deciduous in fruit; bracteoles 0.65–0.95 × 0.21–0.49 mm, sessile, spatulate-oblong or triangular, the apex aristate-ciliate, the base decurrent, with one visible central vein, both surfaces glabrescent with age, persistent in fruit. *Flowers* 5-merous, sessile or on pedicels <0.4 mm long. *Hypanthia* at anthesis 3–3.2 × 0.95–1.25 mm, free portion of hypanthium 0.8–1 mm long, urceolate and constricted distally into a cylindric neck, bluntly 10-ribbed, bright pink, copiously and caducously resinous with slightly furrowed more or less stalked glands ca. 0.05 mm long, sparsely intermixed with the general and caducous dendritic trichomes, ridged on the inner surface, glabrous, the torus densely to moderately ciliolate adaxially, rarely glabrous. *Calyx* open in bud and deciduous on fruiting hypanthia; tube 0.15–0.3 mm long, adaxially sparsely ciliolate to glabrescent, abaxially sparsely resinous glandular with the same type of glands as the hypanthium; lobes 0.15–0.45 × 0.65–0.85 mm, rounded-triangular, the margin entire to vaguely undulate, the apex subacute, sparsely and caducously papillose on both surfaces; exterior calyx teeth ca. 0.5 mm long, subulate, inserted at the base of the calyx lobes, equaling or occasionally exceeding the lobes in length, caducously resinous-glandular on both surfaces. *Petals* 0.75–1.15 × 0.65–0.85 mm, obovate and somewhat asymmetrical, the margin entire to sinuate, the apex rounded-obtuse, rather asymmetric, cream to white, densely papillose on both surfaces, reflexed at anthesis. *Stamens* 10; filaments 0.95–1.25 × 0.25 mm, whitish, glabrous; anther thecae ca. 2 × 0.33–0.34 mm, linear-oblong and subulate, truncate-acuminate at the apex, opening by one dorsally inclined pore 0.11–0.13 mm in diameter, pale yellow to yellow at anthesis; connective yellow, its prolongation and appendage 0.35–0.45 mm long, the appendage oblong-spatulate to somewhat deltoid, obtuse to truncate at the apex, minutely and caducously glandular, the glands sessile and rounded. *Ovary* 5-locular, completely inferior, 2–2.2 mm long at anthesis, the apical collar absent, the apex 0.13–0.2 mm in diameter, slightly depressed, caducously glandular-puberulent; style ca. 5 mm long, parallel-sided (i.e. terete), white, glabrous; stigma truncate to expanded truncate at anthesis. *Berries* 3.1–4.1 × 3–3.9 mm when dry, globose, initially bright pink but ripening bright purple-black, the hypanthium indumentum subpersistent at maturity. *Seeds* 0.3–0.45 × 0.16–0.18 mm, ovoid, angled, light-brown; lateral and antiraphal symmetrical planes ovate, the highest point near the central part of the seed; raphal zone suboblong, ca. 20% larger than the corpus of the seed, extending along its entire length, ventrally and longitudinally expanded, dark-brown; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief punctate.

Additional specimens studied:—COLOMBIA. Chocó: (Bahía Solano), Ciudad Mutis, Quebrada Seca, at waterfall near by, 29 m, 6.2°N, -77.4°W, 6 February 2012, *Almeda et al. 10470* (CAS, CHOCO, COL). **COSTA RICA. Cartago:** In forest in mountains above the Río Pacuare, near Platanillo, 800 m, 3 May 1956, *Williams 19517* (EAP, US); Pendiente muy empinada que va desde los edificios del Instituto Interamericano de Ciencias Agrícolas de Turrialba hacia el Río Reventazón, 600 m, 19 September 1964, *Jiménez 2380* (CR, NY); (Turrialba), Forested slope leading down to the Río Reventazón behind main building of CATIE, 9°53.5'N, 83°39'W, 560–600 m, 30 July 1985, *Grayum & Hammel 5755* (CAS, MO); (Turrialba), Across the Río Reventazón from Interamerican Institute in Turrialba, 610 m, 21 July 1947, *DeWolf 369* (US); Bosque húmedo y empinado entre el Inst, de Turrialba y el Río Reventazón., 600 m, 12 July 1965, *Jiménez 3276* (CR, F, NY, US). **San José:** (Tarrazu), Estribaciones del Cerro Diamante, 9°32'30"N, 84°1'20"W, 500–600 m, 23 June 1998, *Estrada et al. 1636* (CAS, CR); (Pérez Zeledón), Basin of El General, 9.1°N, -83.29°W, 675–900 m, May 1940, *Skutch 4948* (MO, US).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—This is a rare species known from few collections in the low-elevation forested slopes of primary rain and riparian forests, commonly near rivers, in Costa Rica at 560–900 m. Although *M. neocoronata* has long been considered to be endemic in Costa Rica, it was recently collected in Colombia, from the tropical wet forest in the department of Chocó at 29 m (*Almeda et al. 10470*, CAS!, CHOCO, COL). This occurrence suggests that the geographic and elevational range of this species is more extensive than expected. It probably occurs in suitable habitats in intervening areas of Panama (Fig. 15).

Phenology:—Collected in flower and fruit in February, from May through July, and in September.

Etymology:—The specific epithet comes from the Greek word *neo* (new), in reference to this new combination, and from the Latin word *coron* (a crown), that probably refers to the minute pubescence in the ovary apex. Gleason did not explain the designation of the name *coronata* in the protologue.

Discussion:—*Miconia neocoronata* is distinct from its closest relatives by elimination of characters, particularly indumentum details. It differs from *M. atropurpurea*, its sister species, in hypanthial indumentum; in *M. atropurpurea* it consists of elongate smooth pinkish trichomes, and in *M. neocoronata* by the slightly furrowed more or less stalked resinous glands. Vegetatively and in floral characters *M. neocoronata* is very similar to *M. quinquenervia*. See Almeda (2004) for a thorough discussion of differences. Almeda (2004) commented on the slight difference in their connective appendages; although they are similar in shape and both are glandular, in *M. neocoronata* the edge is entire (vs. gland-edged). These two species are also close to *M. reitziana*, which shares the rusty-asperous vegetative indumentum and the resinous-glandular hypanthium, but lacks the decurrent leaf bases present in *M. quinquenervia* and its venation is prevailingly 7-plinerved (vs. 9-plinerved). *Miconia quinquenervia* is also distinct in its inflorescence architecture (dichasial dithyrsoid vs. groups of modified dichasia). The rusty-asperous trichomes in *M. reitziana* are almost concealed by the typically dense pink or red indumentum, rarely present throughout and completely absent on the foliar surfaces except for the margins in *M. neocoronata*. *Miconia neocoronata* has unique petal morphology, being obovate and somewhat asymmetrical (vs. more oblong in *M. quinquenervia* and *M. reitziana*), and its hypanthium is constricted above the ovary into a neck (vs. subcylindric to campanulate in *M. reitziana* and urceolate to campanulate in *M. quinquenervia*).

Conservation status:—Endangered EN B2ab(iii). This species is rare and not known from any protected areas in Costa Rica.

22. *Miconia neomicrantha* Judd & Skean (1991: 62). Basionym: *Melastoma micranthum* Swartz (1788: 71). *Octopleura micrantha* (Sw.) Grisebach (1860b: 260). *Ossaea micrantha* (Sw.) Macfadyen (1850: 49–50). Type: JAMAICA. *Swartz s.n.* (holotype: S-internet image!; isotype: LD-internet image!). Nec *Miconia micrantha* Cogniaux (1896: 12) nec *M. micrantha* Pilger (1905: 173; *M. witii* Ule (1915: 367)) nec *M. micrantha* Pittier (1947: 27; *M. tabayensis* Wurdack (1971: 359)).

Sagraea neurocarpa Naudin (1852: 94). Type: not found among digital images online but surely at P. In the protologue, Naudin cited *Goudot s.n.* and *Bonpland s.n.* from Colombia and *Swartz s.n.* from Jamaica.

Ossaea caudata Cogniaux (1891a: 1066). Type: ECUADOR. Prope Quito, September, *Jameson 390* (holotype: BR-internet image!; isotypes: E-internet image!, BM-internet image!).

Ossaea tetragona Cogniaux (1891b: 265). Type: COSTA RICA. Chemin de Carrillo, versant Atlantique, 300 m, 25 November 1890, *Biolley 3148* (holotype: BR-internet image!; isotypes: BR-2 sheets-images!).

Octopleura rubescens Triana (1871: 146). *Ossaea rubescens* (Triana) Cogniaux (1891a: 1067). Type: COLOMBIA. Prov. Barbacoas: Arrastradero, 10 m, April 1853, *Triana 6258/73* (holotype: BM-internet image!; isotypes: BR-internet image!, COL-internet image!).

Shrub or small tree 1–7 m tall with erect, open branching, bark green to light brown. *Upper internodes* rounded-quadrate to quadrate 1–4.2(–6.6) cm long, cauline nodes terete, nodal line frequently present as a ridge, occasionally not very evident or absent. *Indumentum* on branchlets, petioles, adaxial surface of young leaves, surface, primary, secondary, tertiary and higher order veins abaxially, inflorescence axes, bracts and bracteoles abaxially, pedicels, hypanthia, calyx lobes, calyx teeth, and petals abaxially copiously to sparsely covered with with hyaline or brownish stellate lepidote trichomes 0.15–0.25 mm long with only partially fused radii, occasionally completely replaced by dendritic trichomes 0.05–0.08 mm long with short axes and few-moderate number of terete arms. *Leaves* of each pair isophyllous; the semiterete thin petiole (0.5–)1–5.5 cm, narrowly sulcate adaxially; blades 6.5–20 × 5–8 cm, elliptic to elliptic-ovate, the base acute to narrowly obtuse, occasionally rounded, the margin entire to obscurely and distantly undulate-serrulate, the apex gradually short- to long-acuminate to aristate-caudate, chartaceous; mature leaves adaxially glabrescent with the primary, secondary, tertiary and higher order veins glabrous; abaxial surface along with the primary, secondary, tertiary and higher order veins glabrous with age; 5-nerved or 5-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging from the primary vein symmetrically or asymmetrically 0.3–1.5 cm above the base, with a membrane-like structure or with trichomes like the general indumentum in the spaces where the innermost pair of secondary veins diverge from the primary (mite-domatia?), areolae 0.3–0.4 mm, adaxially the primary, secondary, tertiary and higher order veins flat, abaxially raised and terete. *Inflorescences* a pseudolateral dithyrsoid 3–6 cm long, including a rounded-quadrate to quadrate peduncle 0.75–1.25 cm long or sessile, divaricately and highly branched from the peduncle apex or the base, borne on the upper foliar nodes, the rachis green; bracts 0.2–0.4 × 0.1–0.3 mm, narrowly triangular to oblong-linear, pale green, adaxially glabrous, tardily deciduous at anthesis; bracteoles 0.3–0.5 × 0.2–0.3 mm, narrowly triangular, pale green, abaxially glabrous, deciduous to subpersistent in fruit. *Flowers* 4-(5-) merous, sessile. *Hypanthia* at anthesis 1.6–1.7 × 1.3–1.4(–1.6) mm, free portion of hypanthium 0.5–0.6(–0.8) mm long, globose to urceolate, bluntly 8-ribbed, green-yellowish, ridged on the inner surface, sparsely beset with sessile glands, the torus sparsely glandular and moderately scaly adaxially. *Calyx* open in bud and persistent in fruit, green; tube 0.3–0.4 mm long, with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 0.2–0.4 × 1–1.3 mm, depressed-rounded, erect to flange-like, the margin vaguely undulate, the apex obtuse; exterior calyx teeth 0.15–0.4 mm long, deltoid, merely thickened and inconspicuous, inserted on the apical half of the lobes and not projecting beyond them. *Petals* 3–4(–5) × 0.8–1.5(–1.7) mm, lanceolate, the margin entire, the apex bluntly acute to acuminate, white to pinkish, occasionally with red spots or red distally, glabrous adaxially, glabrescent abaxially, reflexed at anthesis. *Stamens* 8; filaments 1.3–2 × 0.2–0.23 mm, white to cream, glabrous; anther thecae 1–1.5 × 0.25–0.3 mm, linear-oblong, obtuse to slightly emarginate at the apex, opening by (one–)two dorsally inclined pores 0.1–0.2 mm in diameter, cream to yellow, brown-red with age; connective yellow to orange, its prolongation and appendage 0.4–0.9 mm long, the appendage subulate to oblong, bluntly acute to rounded at the apex, copiously gland-edged, the glands rounded and stalked, the stalks linear to subulate. *Ovary* 4-locular, 2/3 to completely inferior, 1.3–1.6 mm long at anthesis, the apical collar absent, the apex 0.2–0.3 mm in diameter, conic-truncate, sparsely glandular-puberulent, the trichomes to 0.1 mm long; style 3.5–4.5 mm long, narrowed distally (i.e. tapering), white, glabrous to somewhat glandular; stigma capitellate. *Berries* 4–5 × 4–5 mm when dry, globose-oblate, green turning white when fully ripe, the hypanthial indumentum persistent at maturity. *Seeds* 0.32–0.43 × 0.13–0.2 mm, ovoid, angled, brownish; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone ovate, nearly as long as the seed, usually ventrally expanded toward the micropyle; appendage absent, but a small protuberance present; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief verrucose. Chromosome number: n=17.

Additional specimens studied:—BELIZE. Middlesex: 200 ft, 12 July 1929, *Schipp 235* (US). **Toledo:** Bladen Nature R., Southern Maya Mountains, trail between Roochire Selipan archeological site and "AC Camp", 16°27’54"N, 88°52’49"W 450 m, 2 June 1997, *Davidse 36978* (CAS, MO); Bladen Nature R., Southern Maya Mountains, W Snake Creek, 16°27’24"N, 89°1’1"W, 500 m, 28 May 1997, *Holland & Kid 94* (CAS, MO); On hillside beyond Pate's Camp, Edwards Road beyond Columbia, 28 November 1950, *Gentle 7174* (US). **COLOMBIA. Antioquia:** (Caramanta), Hojas Anchas, Cerro Viringo, 9.8 km de Caramanta hacia Supía, Cordillera Occidental, 5°31.8’N, 75° 40.69’W, 2140–2420 m, 16 October 1988, *Betancur et al. 1098* (HUA, MO); (Caldas), La Corrala, Finca "La Zarza", 2240 m, 30 March 1985, *Palacio & Vallejo 6* (NY); (Fredonia), Cerro Bravo, Finca de los Betancur, camino hacia la toma de agua, 1770–1900 m, 7 June 1992, *Fonnegra et al. 4432* (HUA, MO); (Medellín), La Cascada, Carretera a Rionegro vía Santa Helena, 6°14’N, 75°32’W, 1500–1700 m, 11 August 1991, *Gómez et al. 58* (MO); (Dabeiba), 32 km SE de Mutatá en la via Mutatá-Dabeiba, Río Chever, sitio Chever, 280 m, 5 August 1987, *Callejas et al. 5065* (HUA, MO, US); (Salgar), Camono de ascenso a Cerro Plateado, quebrada La Liboriana, 2200–2400 m, 3 November 1985, *Franco et al. 2284* (MO). **Caldas:** (Manizales), Alrededor de la cañada entre helados La Fuente y tuburio, 11 June 1985, *Escobar-Cardona 35* (US); (Salento), Río Santa Rita, 1600–1800 m, 26 August 1922, *Killip & Hazen 10127* (NY, US); Finca La Oculta, 2020 m, 14 January 1983, *de Escobar & Uribe 3640* (HUA, US); (Manizales), Monteleón, Cordillera Central, 2250 m, 16 February 1985, *de Fraume et al. 363* (US). **Chocó:** (Bahía Solano), Mecana, On Pacific Coast, Quebrada Resquiata, 6°16’N, 77°21’W, 2 m, 2 January 1984, *Juncosa 1640* (MO, US); Carretera Ansermanuevo-San José del Palmar, Alto del Galápago, Límite con el Valle del Cauca, 2000 m, 19 February 1977, *Forero et al. 2910* (COL, MO, US); Along road between Pueblo Rico (Risaralda) and Istmina (Chocó), along Quebrada Antón, 15 km W of Santa Cecilia, 6 km W of Chocó-Risaralda border, ca 20 km E of Playa del Oro, 5°20’30"N, 76°13’45"W, 240 m, 22 February 1990, *Croat 70914* (MO); Río Quito, 5 km above junction with Río Atrato, 22 April 1982, *Prance 28029* (NY). **Cundinamarca:** (Medina), Farallones de Medina, 4°35’09”N, 73°23’06”W, 1000 m, 25 February 1997, Mendoza 2160 (COL, FMB). **Magdalena:** (Santa Marta), 200 ft, November 1898, *Smith 457* (F, MO, NY, US); (Santa Marta), Sierra Nevada de Santa Marta, Alto Río Buritaca, Alto de Mira, por el camino a la Quebrada Julepia, 11°5’N, 73°48’W, 700–1100 m, 13 July 1989, *Madriñán & Barbosa 198* (F, GH, MO, NY); (Santa Marta), Sierra Nevada de Santa Marta, Alto Río Guachaca, Escuela La María (Macho Solo), al margen izquierdo del Río Guachaca, 11°4’N, 73°55’W, 800 m, 11 July 1989, *Madriñán & Barbosa 130* (F, GH, MO); (Santa Marta), Sierra Nevada de Santa Marta, Alto Río Buritaca, Alto de Mira, por el camino a la Cascada del Caño Negro, 11°5’N, 73°48’W, 1000–1100 m, 14 July 1989, *Madriñán & Barbosa 230* (GH, MO). **Nariño:** (Ricaurte), 1300 m, 24 April 1941, *von Sneidern A.623* (US); (Ricaurte), km 200 carretera Tumaco-Pasto, 2000 m, 20 November 1982, *de Benavides 4109* (MO); R.N. La Planada, 7 km above Chucunes (on road between Tuquerres and Ricaurte), along trail to Pialapí, past entrance to La Planada field station, 1°6’N, 77°53’W, 150–200 m, 10 March 1990, *Croat 71255* (MO); Trail to El Hondón, 5–12 km SW of La Planada, 1°4’N, 78°2’W, 1750–1800 m, 6 January 1988, *Gentry et al. 60454* (MO); (Ricaurte), R.N. La Planada, Vertiente occidental, Cordillera Occidental, 1800 m, 22 May 1989, *Restrepo 472* (MO); R.N. La Planada, A 7 km de Chucunes, 1°10’N, 77°58’W, 1800 m, 14 November

1987, *de Benavides 8871* (MO, PSO); R.N. La Planada, Isla de los Osos, 1°10'N, 77°58'W, 1500–1800 m, 1 May 1988, *de Benavides 9746* (MO, PSO); (Ricaurte), Trayecto San Isidro-La Planada, 1°10'N, 77°58'W, 1500–1800 m, 13 February 1988, *de Benavides 9246* (MO, PSO); La Planada, Trail to El Hondón, 6–12 km SW of La Planada, 1°4'N, 78°2'W, 1750–1800 m, 5 January 1988, *Gentry et al. 60386* (MO, US). **Norte de Santander:** Cordillera Oriental, Región del Sarare, Hoya del Río Margua, cabeceras del Río Negro, ladera N entre El Amparo y La Mesa, 1400–1700 m, 7 November 1941, *Cuatrecasas 12874* (COL, US). **Putumayo:** (Mocoa), San Antonio, Alto Campucana, Finca La Mariposa, Vertiente amazónica de Colombia, 1°12'N, 76°38'W, 1350–1420 m, 20–1 April-May 1994, *Fernández 10756* (COL, US). **Quindio:** (Pijao), Arenales, Bosque ubicado en la intersección de las carreteras hacia los Juanes, margen izquierda, 1850 m, 19 November 1987, *Arbeláez et al. 2388* (HUA, US). **Risaralda:** (Pereira), La Florida, S.F.F. Otún Quimbaya, 4°44'17"N, 75°34'1"W, 1900 m, 22–28 February 2004, *Alzate et al. 2108* (F, HUCO); (Pereira), Bajada de "La Pastora" a "El Cedral", 17 October 1989, *Rangel et al. 5961* (MO); (Pereira), Bajada de "La Pastora" a "El Cedral", 17 October 1989, *Rangel et al. 5970* (MO); (Pereira), El Cedral, Trocha a El Silento, 20 km de Pereira, 2140 m, 16 October 1989, *Rangel et al. 5894* (MO). **Tolima:** (Santa Isabel), Vereda Guaimaral, 4° 35'58.7"N, 74°49'44"W, 2100 m, 9 May 2007, *Pava & Esquivel 40* (COL, TOLI); (Toche), 2300 m, 20 May 1942, *von Sneidern 3085* (US). **Valle:** (Cali), Cordillera Occidental, vertiente oriental, Hoya del Río Cali, vertiente derecha: Quebradahonda, arriba de La Glorieta, camino a Miralindo, 2100–2250 m, 31–1 October-November 1944, *Cuatrecasas 18434* (F, NY, US); (La Cumbre), Bitaco, Chicoral, Detrás de Dapa, en los nacimientos del Río Bitaco, vertiente del Pacífico, bosque arriba del cultivo de Té, 2000 m, 14 January 1990, *Ramos 2412* (CAS, CUVC); (Cali), La Elvira, Finca Los Sauces, km 4 on the road to Dapa (km 18 on the road from Cali to Buenaventura), near Quebrada Aguas Claras, Cordillera Occidental, vertiente oriental, 3°32.424'N, 76°36.107'W, 1890 m, 2 February 2011, *Almeda et al. 10223* (CAS, COL, CUVC); (Dagua), Queremal, P.N.N. Farallones, Along the road from vereda El Danubio to Campamento EPSA (Yatacue), Cordillera Occidental, vertiente occidental, 3°35.277'N, 76°52.352'W, 580 m, 7 February 2011, *Almeda et al. 10284* (CAS, COL); La Laguna, Cordillera Occidental, vertiente occidental, Hoya del Río Sanjuniquín, lado izquierdo, 1250–1400 m, 10–20 December 1943, *Cuatrecasas 15482* (F, NY); (Cali), Bosque de San Antonio, W of Cali, near television tower, 1950–2050 m, 15 July 1984, *Gentry et al. 48168* (MO); (Sevilla), Vía Sevilla-Barragán, a 28 km de Sevilla, finca Alsanieves, 2400 m, 11 October 1981, *Silverstone-Sopkin 783* (MO, TULV); Alto Mercedes - Carretera al March, 2200 m, 1–30 September 1939, *Dryander 2433* (US); (Cali), La Elvira, Finca Zingara, km 18 de la carretera Cali-Buenaventura, km 4 vía a Dapa, cordillera Occidental, 3°30'N, 76°34'W, 1900 m, 18 April 1994, *Giraldo-Gensisni 280* (TULV, US); (La Cumbre), 1800–2200 m, 14–19 May 1922, *Killip 5570* (NY, US); Costa del Pacífico, Río Cajambre, Barco, 5–80 m, 21–30 April 1944, *Cuatrecasas 17113* (US). **COSTA RICA.** Monteverde Cloud Forest R., Border of Guanacaste, Puntarenas & Alajuela Provinces, Cordillera de Tilarán, along the Sendero El Valle, 1550–1640 m, 7 March 1986, *Almeda & Anderson 5433* (CAS). **Alajuela:** (San Carlos), Villa Quesada, Caribbean Coast, 840 m, 28 February 1939, *Smith 1732* (NY); Approx, 17 km N, of Río Naranjo on the road to Upala, 300 m, 5 February 1976, *Utley & Utley 4017* (CAS, US); (Alfaro Ruiz), La Peña, 1400 m, 2 January 1941, *Smith 10019* (NY); (Upala), San Cristóbal, C.B. Guanacaste, Rincón de la Vieja, Cuenca del Pizote, Sendero El Pinal, 10°52.00'58.474"N, -85°24'5.946"W, 500 m, 1 July 1998, *Espinoza 1747* (NY). **Bocas del Toro:** On Chiriquí trail between Buena vista coffee finca and Cerro Pilón, 17 April 1968, *Kirkbride & Duke 685* (NY). **Cartago:** Near and along crest of ridge S of Alto Patillos (and a continuation of the latter), ca 6 km SE of Tapantí, 9°43'N, 83°46.5'W, 1700–1840 m, 9 October 1986, *Grayum & Herrera 7727* (CAS, MO). **Guanacaste:** 10 km E of Quebrada Grande, 580 m, 18 August 1968, *Davidse & Pohl 1220* (ISC, US); La Tejona, N of Tilarán, 600–700 m, 25 January 1926, *Standley & Valerio 45843* (US). **Heredia:** Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, W Line, Quebrada el Sura, 5 m, N of creek, 100 m, 30 September 1982, *McDowell 276* (NY, US); (Sarapiquí), Z.P. La Selva, Cuenca del Sarapiquí, 10°26'0"N, 84°2'0.0001"W, 100 m, 8 February 2003, *Boyle et al. 225* (INB, MO, NY); (Sarapiquí), La Selva de Sarapiquí, 200 m, 4 February 1966, *Schnell 416* (CR, US); La Selva, near Puerto Viejo, El Salto bridge, 90 m, 21 April 1972, *Opler 749* (US); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, 100 m, 26 July 1980, *Hammel 9330* (CAS, NY). **Limón:** (Barra de Colorado), 0 m, 3 March 1966, *Schnell 530* (US); (Talamanca), Amubri, Camino entre Amubri y Soki, Siguiendo el Río Ñabri hacia Alto Soki, 9°29'50"N, 82°59'10"W, 150 m, 1 July 1989, *Herrera 3096* (CAS, CR); Drenaje de Río Valle Estrella, Montaña Andromeda, 26–28 October 1951, *Shank & Molina 4540* (US); (Barra de Colorado), 0 m, 5 March 1966, *Schnell 583* (CR, US); (Baja Talamanca), Crece en playón asoleado del Río Lari en su confluencia con el Río D'pari, 700–800 m, 19 March 1964, *Jiménez 1865* (CR, F, NY); A 2 millas de Diamantes, Guápiles, 150 m, 9 August 1963, *Jiménez 1048* (F, NY); (Siquirres), R.B. Barbilla, Cuenca del Matina, Sendero Valle Escondido, 9°59.00'3"N, 83°28'W, 400–500 m, 21 July 1999, *Mora-Castro 424* (NY). **Puntarenas:** Above coffee fincas along Río Coto Brus, near Coton, 23 km N of La Union (on Panama border), 9 August 1974, *Croat 26606* (US); Monteverde R., 1550 m, 13 January 1979, *Lumer 1003* (NY); Monteverde, Lower community, 1300 m, 29 November 1984, *Haber 1082* (NY); (Golfito), P.N. Corcovado, Península de Osa, Estación Agujas, alrededores de la estación, 8°31.00'52.786"N, -83°26'0.991"W, 300 m, 6 November 1999, *Mora et al. 653* (NY); (Coto Brus), R. de la Biósfera de la Amistad, cerca Estación Biológica Las Alturas de Coton, 8°57'0.3"N, 82°49'56.8"W, 1455–2100 m, 8 July 1994, *Kress & Sawyer 94-4956* (US); Lumber road along Fila Tigre, S and E of Las Alturas between Río Cotón and Río Quebrada Nochebuena, 1400 m, 14 February 1991, *Almeda et al. 6587* (CAS). **San José:** Carara R., Hills at SW part of Montañas Jamaica ca 2.5 km NE of Bijagual de Turrubares, (lower slopes and small creek draining to Río Tarcolitos system) to 575 m, (top of ridge), 9°45'N, 84°33.5'W, 460–520 m, 26 June 1985, *Grayum et al. 5497* (CAS, MO); (Alto La Palma), 1500 m, 17 October 1969, *Schnell 1085* (F). **ECUADOR. Azoques:** On highway from Guayaquil to Machala, 1 km S of Ponce Enriques & 2 km in from road on low hill, 70 m, 9 October 1979, *Dodson et al. 9187* (F, MO). **Bucay:** Chimbo River Valley, In western Cordillera, lower valley of Chimbo river, 1000 m, 1–30 June 1934, *Rimbach 189* (F). **Carchi:** Ascent up main river, Medium Cerro Golondrinas beginning at principal stream division, 0°52'N, 78°7'W, 2030 m, 2 December 1987, *Hoover 2228* (CAS, MO); Environs of Maldonado, 1450–1650 m, 1 June 1978, *Madison et al. 4869* (F, QCA, US); (Mira), N del Carmen, Camino a Chical, 0°17'N, 78°13'W, 2000–2200 m, 10 February 1992, *Palacios et al. 9774* (MO, QCNE); (Espejo), Faldas del Cerro Golondrinas Hembra, 0°51'N, 78°7'W, 2300–2400 m, 20 August 1994, *Palacios 12737* (MO, QCNE); (Maldonado), 1500 m, 1 March 1974, *Harling & Andersson 12394* (US); N side of Río Mira, across from Lita, Steep N-facing slope directly across from (S of) community of Baboso, on S side of Río Baboso, Transect 750-2, 0°53'N, 78°27'W, 750 m, 11 August 1994, *Boyle & Boyle 3561* (MO). **Cotopaxi:** (Tenefuerste), Río Pilalo, km 52–53, Quevedo-Latacunga, 750–900 m, 2 October 1981, *Dodson & Dodson 12002* (MO, US); (La Mana), Along road between Guayacán (13.1 km NE of La Mana) and Montenuevo (N of Pucayacu), 0.8 km N of Pucayacu, 0°41'S, 79°6'W, 760 m, 20 March 1992, *Croat 73259* (MO); 3 km E of El Palmar on road Quevedo-Latacunga, 800 m, 5 April 1980, *Dodson & Gentry 10256* (MO); (Latacunga), Quevado, Tenefuerste, Río Pilalo, km 52–53, 750–1300 m, 7 February 1982, *Dodson & Gentry 12281* (MO). **El Oro:** 20 km W Piñas on road to Machala, 3°43'S, 79°49'W, 600 m, 3 February 1991, *Kessler 2662* (US); 15 km NW of Paccha on the road to Pasaje, 3°30'S, 79°40'W, 1800 m, 29 September 1983, *Brandbyge 42364* (MO, NY, QCA); Return trip from Hacienda Ingenio to Piedras over Cordillera Marcabeli, 666 ft, 21 June 1943, *Little 6679* (F, US); Hacienda Daucay, 3°29'S, 79°45'W, 600 m, 12 October 1993, *Cornejo 497* (MO). **Esmeraldas:** (San Lorenzo), R. Etnica Awá, Centro Guadalito, 1°15'N, 78°40'W, 80 m, 20–29 July 1992, *Aulestia et al. 176* (MO, QCNE); Lita-San Lorenzo road, 18 km W of Río Lita Bridge (on old road below Lita), 6.6 km W of bridge over Río Chuchubí, site near Alto Tambo, 0°52'11"N, 78°27'16"W, 425 m, 10 July 1998, *Croat et al. 82628* (MO); Cerro de Río Bravo de Cayapas, 0°41'N, 78°56'W, 250 m, 1 September 1980, *Holm-Nielsen et al. 25559* (MO, US); (San Lorenzo), R. Etnica Awá, Centro Guadalito, 1°15'N, 78°40'W, 80 m, 20–29 July 1992, *Aulestia et al. 47* (MO, NY, QCNE). **Guayas:** (Teresita), 3 km W of Bucay, 270 m, 5–7 July 1923, *Hitchcock 20414* (NY, US). **Imbabura:** (Lita), 501 m, 28 April 1949, *Acosta Solís 12297* (F); (Cotacachi), R. Privada Intag, Parroquia Intag, Comuna Santa Rosa de Pucurá, 0°22'N, 78°28'W, 1850 m, 6 March 2002, *Caranqui et al. 520* (MO, NY); (Cotacachi), Carretera de Cotacachi a Nangulbí y Apuela, 0°20'N, 78°35'W, 3000 m, 11–14 August 1990, *Rubio & Quelal 603* (MO, QCNE). **Loja:** (Loja), El Limo, Alamor-Cazaderos road, El Limo, 1000 m, 3 April 1980, *Harling & Andersson 17842* (F, MO, NY, US). **Los Ríos:** Bosque de Oro, Hacienda Las Balsas near Montalvo, 300–400 m, 27 July 1962, *Javita & Epling 227* (US); Río Palenque B.S., km 56 road Quevedo-Santo Domingo, 150–220 m, 4 November 1979, *Schupp 82* (F); Río Palenque B.S., Halfway between Quevedo and Santo Domingo de los Colorados, 200 m, 6 February 1974, *Gentry 9682* (MO, US); Río Palenque B.S., km 47, Santo Domingo-Quevedo, 150–220 m, 2 August 1984, *Dodson & Gentry 14826* (MO); Río Palenque B.S., Halfway between Quevedo and Santo Domingo, 200 m, 4 October 1976, *Gentry & Dodson 17986* (MO); Trails of Río Palenque Biological Station, 0°35'37"S, 79°21'44"W, 215 m, 6 February 2009, *Stern & Tepe 372* (NY); Río Palenque B.S., Halfway between Quevedo and Santo Domingo, 200 m, 9 October 1976, *Gentry & Dodson 18041* (MO); Centinela ridge area, 12.5 km E of Patricia Pilar, 1400 ft, 28 July 1980, *Hansen et al. 7737* (MO). **Manabi:** Machalilla N.P., Zona de San Sebastián, ridgetop, 1°36'S, 80°42'W, 600–700 m, 21 January 1991, *Gentry et al. 72518* (F, MO); Machalilla N.P., Zona de

San Sebastián, ridgetop, Transect #6–8, 1°36’S, 80°42’W, 550 m, 21 January 1991, *Gentry & Josse 72543* (F, MO); (Jama), Cordillera de Jama (coastal range), Cerro Nueve, 15 km E of Jama, N of Río Jama, below microwave tower, 0°16’S, 80°12’W, 600 m, 16 December 1998, *Neill et al. 11585* (MO, QCNE). **Morona-Santiago:** Loma San José Grande-Sendero San José-Río Bomboiza, Transecto 50 × 2 m, 2°38’S, 78°27’W, 1700–1750 m, 19 April 1991, *Cerón 14330* (MO); (Tumbes), 17–18 km N, of Gualaquiza on road to Indanza, 1700–1800 m, 17 April 1985, *Harling & Andersson 24248* (CAS, NY). **Napo:** (Archidona), Comunidad de Pacto Sumaco, sector SE, 0°38’56"S, 77°35’49"W, 1550 m, 25 April 1997, *Alvarez et al. 1968* (MO, QCNE); Carretera Hollín-Loreto, km 40–50, Alrededores de comunidad Huamaní y del Río Pucuno, 0°43’S, 77°36’W, 1200 m, 10–22 October 1988, *Hurtado 606* (MO); (El Chaco), Margen derecha del Río Quijos, Finca "La Ave Brava" de Segundo Pacheco, 0°12’S, 77°39’W, 1800–1900 m, 7–10 September 1990, *Palacios 5337* (MO); (El Chaco), Proyecto hidroeléctrico Coca Punto ST3, Margen derecha del Río Quijos, ca 10 km al S de Reventador, 0°11’S, 77°39’W, 1500 m, 3–5 October 1990, *Palacios 5823* (MO, QCNE). **Orellana:** (Orellana), Comunidad Indillama, a 30 min en deslizador del Puerto Pompeya aguas abajo por el Río Napo, 0°26’S, 76°31’W, 280 m, 6 May 2004, *Reyes & Carrillo 538* (MO). **Pichincha:** Reserva ENDESA, 9 km N of km 113 on Quito–Pto. Quito Highway, 0°5’N, 79°2’W, 750 m, 15 July 1986, *Croat & Rodríguez 61491* (US); Carretera Quito–Pto Quito, km 113, 10 km al N de la carretera ppal, 0°5’N, 79°2’W, 800 m, 27 December 1983, *Balslev & Balseca 4753* (CAS, NY, QCA); Wet luxuriant forested slopes of barrancos between km 37 and 50 along Río Saloya (between Volcán Atacaso and Volcán Pichincha), 1830–2430 m, 22–23 April 1943, *Steyermark 52584* (F, NY); Carretera Quito-Pto Quito, km 113, 10 km al N de la carretera ppal, 0°5’N, 79°2’W, 800 m, 18 February 1984, *Betancourt 93* (F, MO, NY); (Quito), R. Ecológica Maquipucuna, Parroquia Nanegal, 0°10’N, 78°40’W, 1250 m, 9 January 1992, *Quelal 90* (MO, QCNE); (Quito), El Recreo, *Eggers 15635* (F); Via Calacali-Nanegalito, 0°3’N, 78°35’W, 2100 m, 24 January 1989, *Palacios & van der Werff 3605* (CAS, MO); R. Florística-Ecológica "Río Guajalito", Km 59 de la carretera antigua Quito-Sto Domingo de los Colorados, 3.5 km al NE de la carretera, estribaciones occidentales del volcán Pichincha, 0°13’53"S, 78°48’10"W, 1800–2200 m, 22 June 1985, *Jaramillo & Zak 7779* (MO, NY, US); (Santo Domingo de Colorado), 0.5 km N of town, 4 April 1943, *Little 6166* (F, NY, US); km 40–51 on road Santo Domingo de los Colorados-Quito, Forested slopes along Río Pilatón, 0°22’S, 78°55’W, 1100–1400 m, 14 June 1973, *Holm-Nielsen et al. 7165* (NY, US); On ridge ca 10 km E of Patricia Pilar, 0.3°S, 79.16°W, 300 m, 20 July 1978, *Webster et al. 22772* (MO); R. Florística-Ecológica Río Guajalito, km 59 de la carretera antigua Quito-Sto Domingo de los Colorados, 3.5 km al NE de la carretera, estribaciones occidentales del volcán Pichincha, 0°13’53"S, 78°48’10"W, 1800–2200 m, 29 June 1985, *Jaramillo & Zak 7884* (MO, NY); Las Palmeras, Quito-Sto Domingo old road, ca 59 km WSW of Quito, Pablo Feret trail above Río Guajalito, 0°18’S, 78°43’W, 1900–2000 m, 16 December 1990, *Luteyn & Berg 14374* (MO, NY); (Maquipucuna), 5 km E of Nanegal, Transect 3, 0°7’N, 78°37’W, 1550 m, 10 February 1991, *Gentry & Valencia 73117* (MO, US); (Quito), Parroquia de San José de Minas, Sector Las Palmas, margen derecha del Río Cambugán, propiedad del investigador, Parcela permanente 10 × 1000 m, 0° 11’N, 78° 31’W, 1800–2200 m, 1 April 1999, *Jiménez et al. 1125* (MO, QCNE); (Quito), R. Orquideológica El Pahuma, Carretera Calacalí-Los Bancos km 22, 0°1’42"N, 78°37’50"W, 2000 m, 19 October 1999, *Rojas et al. 398* (MO); (Quito), San José de Minas, Cordillera paso Alto, cuenca del Río Cambugán, 0°11’N, 78°30’W, 1980 m, 27 December 2002, *Fernández et al. 770* (MO, QCNE); Chiriboga on road from Quito to Santo Domingo de los Colorados, 1800 m, 11 September 1939, *Asplund 8703.bis* (MO, NY); (Maquipucuna), 5 km E of Nanegal, Transect 1, 0°7’N, 78°37’W, 1630 m, 9 May 1990, *Gentry et al. 69926* (MO); Road El Paraiso-Saguangal, 3 km from El Paraiso, 0°10’N, 78°46’W, 1500 m, 2 May 1982, *Øllgaard et al. 37804* (MO, NY); (Nanegalito), 0°4’S, 78°41’W, 1600 m, 16 March 1967, *Sparre 14886* (MO); R. Florística-Ecológica "Río Guajalito", km 59 de la carretera antigua Quito-Sto. Dimingo de los Colorados, a 3.5 km al NE de la carretera, estribaciones occidentales del Volcán Pichincha, 0°31’S, 78°48’W, 1800–2200 m, 13 August 1986, *Zak 1104* (MO); R.N. Río Guajalito, Along main entrance from Quito-Chiriboga-Santo Domingo Road, 3.5 km from highway, departing highway at km 59, 0°13’53"S, 78°48’10”W, 1800 m, 9 February 1992, *Croat 75025* (MO); (Quito), R. Ecológica Maquipucuna, Parroquia Nanegal, 0°10’N, 78°40’W, 1250 m, 9 January 1992, *Quelal 8* (MO, NY, QCNE); R. Maquipucuna, Vía Nanegalito-Marianitas, desde la casa por la trocha principal, 0°7’26"N, 78°37’44"W, 1300 m, 25 June 2009, *Ulloa et al. 1755* (MO); Along road between Nono and Nanegal NW of Quito, 17 km NW of Nono, (9 km SE of Tandayapa), 2000 m, 4 September 1976, *Croat 38853* (MO); Trail along Río Chictoa, tributary of Río Pilatón, 2–8 km NE of Quito-Sto, Domingo Road, 11 km W of Tandapi, 1500–1600 m, 27 October 1974, *Gentry et al. 12142* (MO, US); R. Forestal ENDESA, Río Silanche: "Corporación Forestal Juan Manuel Durini", km 113 de la carretera

Quito-Pto. Quito, faldas occidentales, a 10 km al N de la carretera principal, 0°5.00’N, 79°2’W, 650–700 m, 18 February 1984, *Jaramillo 6351* (NY); R. Forestal ENDESA, ca 8 km E de Pedro Vicente Maldonado, 0°5.00’N, 79°1’W, 780 m, 28 February 2004, *Moran et al. 6944* (NY); Old road from Santo Domingo to Quito, 8 km E of junction with new road (approximately 13 km E from La Union del Toachi), 0°15’55"S, 78°50’60"W, 1950 m, 10 February 2009, *Stern & Tepe 386* (CAS, NY); Carretera Quito-Chiriboga-Empalme, km 92, desvio a Mulaulte, en borde de carretera y en quebrada de Mulaulte, 0°15’S, 78°50’W, 1200–1300 m, 13 December 1987, *Zak & Jaramillo 3198* (MO, NY); (Quito), Chiriboga, R. Forestal "La Favorita", En la carretera vieja Quito-Sto. Domingo, Al borde del Río Saloya, Transecto de 50X2 m, 0°12’S, 78°47’W, 1600–1800 m, 8 February 1990, *Cerón & Iguago 8631* (MO, QCNE); (Quito), Chiriboga, R. Forestal "La Favorita", Minist. de Agriculatura, En la carretera vieja Quito-Sto. Domingo, Río Saloya, sendero hacia la cuchilla de los Yumbos, 0°12’S, 78°47’W, 1600–1600 m, 7 December 1989, *Cerón et al. 7977* (MO); (Quito), R. Orquideológica El Pahuma, Parroquia Nono, carretera Calacalí-Nanegalito, km 30, sendero hacia la cascada, pendiente 50%, Transecto 4, 0°1’N, 78°38’W, 1940 m, 13–14 January 1996, *Freire et al. 1094* (MO); Road El Paraiso-Saguangal, 11 km from El Paraiso, 0°12’N, 78°46’W, 1200 m, 2 May 1982, *Øllgaard et al. 37697* (MO, NY); R. Forestal ENDESA, Corporación Juan Manuel Durini, km 113 road Quito-Pto. Quito, about 4 km from take-off from main road, Protected area of the reserve, 0°7.785’N, 79°2.573’W, 530 m, 16 September 2001, *Cotton et al. 1725* (MO, QCA); (San Miguel de los Bancos), Nanegalito-Mindo Road, 16.5 km SSW of Nanegalito, 0°1’14"S, 78°24’23"W, 1500 m, 21 July 1998, *Croat 82782* (MO, NY); (Quito), R. Orquideológica El Pahuma, Parroquia Nono, carretera Calacalí-Nanegalito, km 30, Sendero hacia la cascada, pendiente 40%, Transecto 1, 0°1’N, 78°38’W, 1885 m, 23–25 December 1995, *Freire et al. 1007* (MO). **Tungurahua:** (Banos), Los Llaganates, Colonia México, A 18 km del Topo, 1°21’S, 78°18’W, 1800–2000 m, 9 March 1995, *Vargas & Sandoval 334* (MO, QCNE). **Zamora-Chinchipe:** ("Oriente") E slopes of the cordillera, valley of the Río Negro, down to the Río Pailas (on the trail to Mendez), Near junction of rios Pailas and Negro, 6000–7500 ft, 20–24 August 1945, *Prieto 4918* (MO, US). **GUATEMALA. Alta Verapaz:** Mountains E of Tactic, on road to Tamahú, 1500–1650 m, 9 April 1939, *Standley 71192* (NY); (Cubilquitz), 350 m, 1–31 August 1903, *von Tuerckheim 8518* (NY, US). **Izabal:** (Cienaga), On Peten-Guatemala Road, 24 May 1971, *Contreras 10832* (US). **Peten:** (Chinchila), In high forest 6 km from San Luis, W of Sebol Road, 11 October 1966, *Contreras 6374* (NY, US); Cadenas Road, W of km 142, 6 November 1966, *Contreras 6529* (US); (La Cumbre), E about 4 km on Río Purula Road, in zapotal on top of hill, 19 September 1975, *Lundell & Contreras 19879* (US). **Quezaltenango:** Volcán Zunil, 5600 ft, 7 August 1934, *Skutch 964* (NY). **San Marcos:** (San Marcos), Finca Armenia, Rafael de Cuesta, 5000 ft, 6–7 July 1977, *Dwyer 14407* (MO, NY). **Suchitepequez:** Finca Moca, 3300 ft, 20 October 1934, *Skutch 1473* (NY). **HONDURAS. Atlántida:** Lancetilla Valley, near Tela, 20–600 m, 6–20 December-March 1927, *Standley 54163* (US); Lancetilla Valley, near Tela, 20–600 m, 6–20 December-March 1927, *Standley 55595* (US); Lancetilla Valley, near Tela, 20–600 m, 6–20 December-March 1927, *Standley 52931* (US); Mancetilla Mountain, 100 m, 8 April 1970, *Molina & Molina 25614* (F, US); Lancetilla near Tela, cerca del Río Lancetilla, arriba de la Estación Experimental, 15°43.00’0"N, 87°27’30"W, 40–180 m, 7 November 1988, *MacDougal et al. 3321* (MO, NY); (Lancetilla), 50 m, 1–30 April 1947, *Williams & Molina 13004* (NY). **JAMAICA. Blue Mountains:** (Portland), Stony River base camp, 1250 ft, 30 December 1973, *Morley & Whitefoord 912* (MO). **Ecclesdown:** (Portland), 1400 ft, 25 August 1962, *Adams 11573* (MO). **St. Thomas:** Along track between House Hill & Cuna Cuna Pass, 2000–2500 ft, 26 December 1969, *Proctor 31156* (MO). **Trelawny:** 5 miles W NW of Troy on Crown Lands Road, 2100–2300 ft, 14 August 1965, *Hespenheide et al. 1153* (MO). **Westmoreland:** Copse Mt, Woods, c 1 mile SW of RAT TRAP, 1200–1300 ft, 23 October 1960, *Proctor 21475* (MO). **MÉXICO. Chiapas:** On the SE side of Volcán Tacaná above Talquian, 2200 m, 16 January 1973, *Breedlove & Smith 31674* (DS, NY, US). **Oaxaca:** (Santa María), ca 6 km al N de Sta. María por la vereda al Río Verde, al N del Río Corte, 16°56’30"N, 94°41’0"W, 220 m, 19 May 1987, *Hernández 2467* (CAS, US). **Veracruz:** (Catemaco), Cumbres de bastonal, 500 m, 19 November 1974, *Cedillo 427* (CAS, MEXU); (Minatitlán), Río Uxpanapa, cerca del límite con Oaxaca, 17°11’N, 94°8’45”W, 180 m, 27 September 1980, *Wendt et al. 2774* (US); (Minatitlán), Lomas del S del Pob. 11, ± 27 km al E de La Laguna, cañón arriba de "La Cascada", 17°14’N, 94°30’W, 250 m, 26 April 1985, *Wendt et al. 4839* (US); (San Andrés Tuxtla), Steep forested slopes on SE side of Volcán San Martín Tuxtla, 13 km N, of San Andrés Tuxtla, 18°33.00’30"N, 95°12’W, 1150–1350 m, 1 July 1982, *Diggs et al. 2689* (NY). **NICARAGUA. Rivas:** Isla de Ometepe, Slopes of Volcán Maderas above coffee plantations above Balgue, 11°28.00’N, 85°31’W, 600–800 m, 14 September 1983, *Nee & Téllez 28039* (MO, NY). **PANAMA. Bocas del Toro:** Changuinola Valley, 18 January 1924, *Dunlap 363* (US); (Isla Colon), 1.5 km N of La

Gruta, 10 m, 29 January 1989, *Peterson 6406* (MO, US); Campamento Forestal, Boca Chica Changuinola (IRHE), 22 February 1980, *Correa et al. 3547* (MO, NY, PMA); Río Teribe between Q. Huron and Q. Schlunjik, 12 April 1968, *Kirkbride & Duke 469* (MO); Vicinity of Chiriquí lagoon, Fish Creek Mts., 28 April 1941, *von Wedel 2354* (MO, NY); Río Terebe foorthills of Cerro Bonyic, 400–800 ft; 11 April 1968; *Kirkbride & Duke 420* (MO, NY); 29 July 1940, *Wedel 192* (NY); Al SE y NE del campamento Changuinola 1 del IRHE, 19 January 1980, *Correa et al. 3386* (MO, PMA, US); Palo Seco R., Carribbean slopes of Cerro Fábrega at foot of "Falso Fábrega" in Palo Seco Reserve, second N most tributary (on map) of Culubre River, Pavón Camp, 9°9'54"N, 82°40'45"W, 980 m, 19 March 2005, *Monro & Cafferty 4723* (INB, MEXU, MO, PMA). **Canal Zone:** (Barro Colorado Island), Edge of wooded bank of stream near Fuertes House, W part of Island, 3 July 1940, *Chrysler & Roever 4871* (NY). **Chiriquí:** (Jurutungo), De la Finca de Los Quetzales siguiendo el curso del Río Candela, luego hacia la derecha, para luego bajar por el río, 8°54'N, 82°43'W, 1900 m, 24 September 1996, *Aranda et al. 3245* (F, MO); Forests and edges of cafetales along Río Chevo, 8°51'N, 82°47'W, 1150–1200 m, 13 October 1981, *Knapp 1569* (MO); ca 0.5 km E of Cerro Pate Macho, headwaters of Río Palo Alto, 8° 47'N, 82° 21'W 1800–2100 m, 12 November 1981, *Knapp et al. 2125* (MO); Along road between Volcán and Serrano, 7 mi N of Volcán, remnants of primary forest on steep slopes above Highway, 8°50'N, 82°38'W, 15 June 1987, *Croat 66234* (MO); Trail to Cerro Pate Macho, 8°50'N, 82°25'W, 1500–1900 m, 7 January 1983, *Stein et al. 1247* (MO); (Boquete), Bajo Chorro, 6000 ft, 11 January 1938, *Davidson 105* (MO); Quebrada Velo, 1800 m, 8 July 1940, *Woodson & Schery 267* (MO); Vicinity of Boquete, Cerro Pate de Macho, SW slope, 8°46'N, 82°25'W, 1800–1950 m, 19 June 1987, *Croat 66429* (MO); Las Lagunas area, W of El Hato del Volcán, 8°47'N, 82°40'W, 1400 m, 23 August 1982, *Hamilton et al. 940* (MO); On NW side of Cerro Pando cloud forest, 21 July 1971, *Croat 15960* (MO); Cerro Horqueta, 4500–5500 ft, 20 July 1968, *Dwyer Lallathin 8773* (MO); SE slopes and summit of Cerro Pate Macho, trail from Río Palo Alto, 4 km NE of Boquete, 1700–2100 m, 26 May 1981, *Sytsma et al. 4861* (MO). **Coclé:** Area surrounding Rivera Sawmill, 7 km N of El Cope, continental divide, 750–850 m, 24 November 1977, *Folsom & Collins 6439* (MO). **Colón:** Forest and fields to 3 miles upstream from sea, Río Iguanita, 0–500 m, 4 April 1980, *D'Arcy & Croat 13591* (MO); Along the Río Escandalosa, 19 mi E of the Transisthmian Highway on the road to Salamanca, 160–180 m, 28 March 1982, *Huft & Knapp 1632* (MO); Along the Río Escandalosa, 19 mi E of the Transisthmian Highway on the road to Salamanca, 160–180 m, 28 March 1982, *Huft & Knapp 1647* (MO). **Comarca de San Blas:** Headwaters of Río Nergala along continental divide, 350 m, 11 January 1985, *de Nevers & Herrera 4520* (MO). **Darién:** Cerro Tacarcuna massif between summit camp on W most ridge and Pico Tacarcuna mostly elfin forest, (Colombia on some maps), 1650–1800 m, 22 July 1976, *Gentry et al. 16929* (MO, US); 0.2 miles E of Tres Bocas, along the shortest headwater of Río Cuasí, 28 April 1968, *Kirkbride & Duke 1169* (MO, NY); Cerro Campamento (S of Cerro Pirre), 20–22 March 1968, *Duke 15616* (MO); Cerro Campamento (S of Cerro Pirre), 20–22 March 1968, *Duke 15582* (MO, US). **Panamá:** Gorgas Memorial Labs yellow fever research camp, ca 25 km NE of Cerro Azul on Río Piedras, 550 m, 20–22 November 1974, *Mori & Kallunki 3310* (MO); Serranía de Maje, In ravines and along seasonal streams among ridges S of Ipetí 5 hours walk from Chocó village, 8°45'N, 77°30'W, 450–600 m, 1 April 1982, *Knapp et al. 4546* (CAS, MO). **Veraguas:** Trail on ridge to summit to Cerro Tute, Cordillera de Tute, 1 km past Escuela Agrícola Altos de Piedras, W of Santa Fe, 8°36'N, 81°6'W, 750–950 m, 15 December 1981, *Knapp & Sytsma 2526* (MO); Along base of Cerro Tute, just past Escuela Agrícola, up from Santa Fe, 8°32'N, 81°7'W, 1200 m, 10 September 1982, *Hamilton et al. 1309* (MO); Mts. 3-5 mi, N of Santa Fe, 500–1000 m, 12 December 1971, *Gentry 3022* (MO); Along trail to summit of Cerro Tute, ca 3 km above Escuela Agrícola Alto Piedra near Santa Fe, 2600–2800 ft, 4 January 1981, *Sytsma & Antonio 2985* (MO); Vicinity of Escuela Agrícola Alto Piedra, near Santa Fe, Along trail to top of Cerro Tute, 3500 ft, 29 June 1980, *Antonio 4937* (MO, NY); Vicinity of Escuela Agrícola Alto Piedra, near Santa Fe, 3 mi beyond fork in road near the school toward Atlantic coast, Near trail to top of Cerro Tute, 2200–2400 ft, 26 January 1980, *Antonio 3520* (MO); 5 mi W of Santa Fe on road past Escuela Agrícola Alto Piedra on Pacific side of divide, 800–1200 m, 18 March 1973, *Croat 22988* (NY); (Santa Fe), Altos de Piedra, Trail leading circling around base of Cerro Mariposa (=Cerro Arizona) about 1 km past the Escuela Agrícola, 3°30.70'N, 81°7.03'W, 800 m, 29 January 2005, *Penneys & Blanco-Coto 1701* (NY); Forested mountains W of Alto de Piedras W of Santa Fe, 3200–5600 ft, 8 September 1978, *Hammel 4598* (MO); Cerro Tute, ca 10 km NW of Santa Fe, <1000 m, 19 June 1975, *Mori 6774* (CAS, MO); Lower montane wet forest 6–7 km W of Santa Fe on new road past agriculture school, 2900 ft, 16 February 1974, *Nee 9775* (MO); NW of Santa Fe, 2.6 km from Escuela Agrícola Alto de Piedra, 23 February 1975, *Mori & Kallunki 4744* (MO); Río Segundo Braso, 8 km beyond Escuela Agrícola Alto Piedra beyond Santa Fe, 750 m, 24 July 1974, *Croat 25552*

(MO); Forest along Río Gatu above Chitra Bajo, NW of Laguna La Yeguada, 8°42'N, 80°28'W, 650 m, 14 January 1986, *McPherson 8014* (MO, US); Valley of Río Dos Bocas, 11 km from Escuela Agrícola Alto Piedra (above Santa Fe) on road to Calovebora, 450 m, 30 August 1974, *Croat 27518* (MO); Vicinity of Escuela Agrícola Alto Piedra near Santa Fe, 0.3 mi beyond fork in road near school toward Atlantic coast, along trail to top of Cerro Tute, 1050–1150 m, 29 November 1979, *Antonio 2919* (MO); Vicinity of Escuela Agrícola Alto Piedra, near Santa Fe along trail to top of Cerro Tute, 2200 ft, 4 April 1980, *Antonio 4034* (MO). **PERÚ. Cajamarca:** (La Palma), 10 km NW de Chirinos, 5°25'S, 78°53'W, 1780 m, 5 February 1988, *Gentry et al. 61219* (F, MO, NY, US); (La Palma), 10 km NW de Chirinos, Transect 1, 5°25'S, 78°53'W, 1780 m, 4 February 1988, *Gentry & Diaz 61119* (MO). **Huánuco:** (Leoncio Prado), Hermilio Valdizán, La Divisoria, 1600 m, 18 April 1980, *Schunke-Vigo 11287* (MO, US). **Junín:** (Puerto Bermúdez), 375 m, 14–17 July 1929, *Killip & Smith 26503* (NY); (Puerto Bermúdez), 375 m, 14–17 July 1929, *Killip & Smith 26425* (F, NY); (San Nicolás), Pichis Trail, 1100 m, 4–5 July 1929, *Killip & Smith 25974* (NY). **Loreto:** (Alto Río Itayá), Forest of San Antonio, 145 m, 7 October 1929, *Williams 3465* (F). **Pasco:** (Oxapampa), Huancabamba, Cordillera Yanachaga, W slope at base of highest peaks, Side road to NE, halfway between Oxapampa and Huancabamba, Sector Santadela, ridge SE of Cooperativa 3 de Mayo, 10°27'S, 75°26'W, 2000–2500 m, 18–21 September 1984, *Foster et al. 11200* (F); (Oxapampa), Headwaters of Río Tunqui, Trail to Chuchurras-Palcazu, 10°14'S, 75°28'W, 1850 m, 2 January 1984, *Foster et al. 7762* (F, MO, NY); (Oxapampa), Palmazú, 10°32'S, 75°23'W, 2100 m, 19 September 1984, *Smith et al. 8507* (MO). **VENEZUELA. Aragua:** (Chuao), El Medio, Forests of Valle en El Medio, 600–800 m, 15 March 1926, *Pittier 12123* (US). **Barinas:** (Bolivar), Altamira, La Gallineta, El Celoso, Near feldspar mine, Forest and road near waterfall and mouth of tunnel leading to dam, 8°50'N, 70°35'W, 1500–1700 m, 6 June 1988, *Dorr et al. 5447* (NY, US). **Carabobo:** En las laderas arriba de las cabeceras del Río San Gián, arriba de Los Tanques y La Toma, entre Quebrada No. 2 y Quebrada de los Verros, al S de Borburata, 750–900 m, 29 March 1966, *Steyermark & Steyermark 95245* (NY, US, VEN). **Mérida:** 22.7 km E of Santo Domingo on the road to Barinas, 1585 m, 27 January 1993, *King et al. 10559* (CAS, F, MO, US); Rich forest above Hacienda Agua Blanca above La Azulita, 1375–1920 m, 25 April 1944, *Steyermark 56085* (F, NY); Along highway between Merida and La Azulita, 9 km above Plaza Bolivar in La Azulita, SE of La Azulita, 8°44'N, 71°26'W, 1590 m, 8 August 1982, *Croat 54840* (MO); Vertientes del Río Capaz, arriba de La Azulita, 2100–2400 m, 1 September 1966, *Steyermark & Rabe 97117* (NY, US, VEN); (Rangel), Mucuchíes, Quebrada de Los Chochos, unos 2 km antes de la aldea El Carrizal, 1520 m, 27 June 1966, *Ruiz-Terán 3348* (US). **Portuguesa:** (Ospino), P.N. Guache, Sector Santa Rosa de Guache, Orilla de Quebrada intermitente, 9°30'42.03"N, 69°30'37.93"W, 14 April 1996, *Licata et al. 704* (MO); 15 km al E de Chabasquén, 67 km al NNW de Guanare, 9°26–27'N, 69°54–55'W, 1450–1520 m, 29–31 October 1982, *Steyermark et al. 126873* (MO, US, VEN). **Trujillo:** 13 km ESE of Bocono, 1 km W of Guaramecal, 9°11'N, 70°9'W, 1600 m, 16 March 1982, *Liesner et al. 12864* (MO); (Boconó), P.N. Guaramacal, Sector Occidental Qda. Honda, Parcela de estudio fitosociológico No. 21, UTM 359185E, 1012298N, 1880 m, 14–15 November 2001, *Cuello et al. 2168* (MO); 13 km ESE of Bocono, 1 km W of Guaramecal, 9°11'N, 70°9'W, 1600 m, 16 March 1982, *Liesner et al. 12883* (MO); (Boconó), P.N. Guaramacal, Montane forest near Quebrada Honda, UTM: 19–359029E, 1011815N, 1900–2000 m, 28–29 December 2000, *Dorr & Stergios 8750* (F, MO, NY, US); (Boconó), P.N. Guaramacal, Sector Quebrada Honda-Pele Ojo, El Santuario, 1850–1950 m, 1–31 January 2001, *Stergios & Caracas 18892* (NY). **Yaracuy:** (Bruzual), Montaña de María Lionza, Quebrada Quibayo, desde abajo hasta casi la cumbre, 10°6–7'‘N, 69°55'W, 250–1000 m, 14 March 1981, *Steyermark et al. 125045* (US, VEN). **Zulia:** (Mara), Cuenca del Río Guasare, alrededores del Destacamento Guasare #1 (La Yolanda), en las laderas del cerro ca 5 km al SSE del Destacamento, entre el caño Indio y la fila arriba de su orilla izquierda, 10° 52.00'10"N, 72°29'30"W, 700–800 m, 7 December 1982, *Bunting et al. 12711* (NY); (Mara), Vicinity of Río Guasare, between Rancho 505 and Cerro Yolanda, 10°53–56'N, 72°26–28'W, 200–270 m, 29 May 1980, *Steyermark et al. 122879* (MO).

Illustration:—Berry *et al.* 2001: 485, fig. 404; Gleason 1958: 263, fig. 87; Wurdack 1973b: 719, fig. 64.

Common names and documented uses:—Belize: "mountain sirin" (*Gentle 7174*, CAS!); "sirin" (*Gentle 4281*, CAS!). Ecuador: "palo hueso" (Pichincha, *Jiménez 1125*, MO!); "quiliyuyo" (Morona-Santiago, *Cerón 14330*, MO!) "taja sangre" (Manabí, *Gentry 72543*, F!, MO-2 sheets!); "yuturi caspi" (in Quechua, Orellana, *Reyes 538,* MO!). México: "jeepe" (Oaxaca, *Hernández 2467*, US!). Perú: "tiri" (Pasco, *Smith 8507*, MO!).

Habitat, distribution and ecology:—This is a widespread locally common species of primary and secondary rain forest, cloud forest and swamp forest, or disturbed sites, on steep slopes or near streams, in the understory or forest margins, throughout southern Mexico and Mesoamerica and in two Caribbean islands (Jamaica and

Hispaniola), south to Colombia, Venezuela (including the Venezuelan Guayana), Ecuador and Perú (Fig. 15), at 0–2500(–3000) m. In México it has been collected in the southern states of Chiapas, Oaxaca and Veracruz, south to Belize and throughout the lowlands (except for El Salvador) and the Pacific and Atlantic slopes of Central America. In the Caribbean islands of Jamaica and Hispaniola (Liogier 2000) it is less frequent at low to median elevations. In Colombia it has been collected in the Sierra Nevada de Santa Marta, the three Andean Cordilleras, including the Biogeographic Chocó premontane areas (Pacific and Andean regions), and south to Putumayo. Its range extends east to Venezuela in the valleys of the Aragua state to the Venezuelan Guayana (known from Capibara, Tamatama, Río Atabapo, San Carlos de Río Negro) (Berry *et al.* 2001). Further south *M. neomicrantha* extends throughout Ecuador and western Perú to Oxapampa. It is not known from any island in the Pacific or from Panama's Barro Colorado Island (Croat 1978).

In Costa Rica *Corapipo altera*, *Manacus candei*, and *Tachyphonus delatrii* have been reported to feed on *M. neomicrantha* fruits (Boyle 2006), as well as *Semnornis frantzii* (Wheelwright *et al.* 1984). In a montane forest in Colombia (Santuario de Fauna y Flora Otún-Quimbaya), *Myadestes ralloides* has also been reported to consume berries of *M. neomicrantha* (Kessler-Rios & Kattan 2012).

Phenology:—Collected in flower and fruit throughout the year.

Etymology:—The specific epithet refers to the small flowers of this species.

Discussion:—This species is distinguished by its superficially glabrous appearance, commonly caudate foliar apex, and prominently 8-ribbed berries that are white at maturity. It is closely related to *M. albertobrenesii* and *M. boekei*, both of which have a dense conspicuous indumentum and larger flowers. *Miconia alboglandulosa* has occasionally been confused with *M. neomicrantha*, perhaps because of the foliar shape and overall appearance. However, the inflorescence architecture of the former consists of a cluster of cymes (vs. dithyrsoids) and *M. neomicrantha* lacks the white-translucent furrowed glands that are so typical of the leaves and floral organs of *M. alboglandulosa*.

Throughout its extensive range, this species is uniform in floral and fruit characters; all the flowers examined were 4-merous (except for two 5-merous populations discussed below). Anther shape, the glandular anther appendages and the white color of mature berries were consistent for all collections studied throughout its range. Although Wurdack (1973a) synonymized *O. caudata* and *O. tetragona* under *M. neomicrantha* he noted that two micromorphological variants occur in Central America. One has somewhat tetragonal cauline internodes, leaf apices generally only shortly and gradually acuminate, and petals usually 1 mm or less wide and externally moderately squamate. This variant mostly occurs at 0–700 m and matches the Caribbean and lowland continental Atlantic slope material (including the Sierra Nevada de Santa Marta populations in Colombia). The other variant usually has terete branchlets, leaf apices more or less long-acuminate to caudate, petal width 1.3–1.7 mm and rather glabrescent abaxially. These collections are from more montane areas in Central America, at (1100–)1500–2400 m; but the modal differences that appear to have some elevational correlation in Central America breaks down in South America. Furthermore, the squamate-stellate vegetative and floral indumentum of this species varies greatly in quantity throughout the range as does foliage shape. Some collectors have also reported the petals to have red apices (Ecuador, *Rimbach 66*, *189*, *226*, F!, US!, NY!) or red bases and spots (Jamaica, *Morley 912*, MO!). This color anomaly appears to be rare.

Indumentum characters can be quite variable in this species. At least three micromorphological variants are evident. The typical indumentum in this species is squamate-stellate composed by hyaline lepidote trichomes with only partially fused radii (see Fig. 213 in Wurdack 1986). This indumentum which is present throughout a plant is occasionally very sparse. These typical individuals are present throughout the geographic and elevational range of the species. However, in South America some populations have a puberulent indumentum similar to that in *M. variabilis* that is composed of minute brownish dendritic trichomes with short axes and few-moderate number of terete arms instead of the squamate-stellate trichomes on vegetative parts, hypanthia, and petals. These plants are known from southern Colombia (Nariño and Putumayo) through the lowlands and Andean slopes of Ecuador (Carchi, Esmeraldas, Imbabura, Napo, Pastaza, Pichincha, and Los Ríos), at (150–)200–2000(–3000) m. Superficially they look like typical *M. neomicrantha* because the indumentum details are only visible with the stereomicroscope or with a powerful hand lens in the field.

In addition, a rare variant known from five specimens has similar stellate-squamate general indumentum like that of typical *M. neomicrantha.* However the trichomes are stellate and brownish-translucent in color. Due to their coloration they are visible to the naked eye, especially on the leaves abaxially. This variant occurs from the southern provinces of Ecuador (Morona-Santiago and Zamora-Chinchipe) to the department of Cajamarca in Perú, at 1700–2300 m. These populations are rather isolated both elevationally and geographically. More typical *M. neomicrantha* occurs at lower elevations.

In the past, some inividuals represented by a few collections that are genetically distinct (based on DNA sequence data) from *M. neomicrantha*, have been determined as this species. These are gabresecent or with the typical but sparser indumentum of *M. neomicrantha* and with a well-developed membrane at the point where secondary veins diverge from the midvein at the abaxial base of the leaf blade (evident mite-domatia). These individuals have been collected in the low elevation Andean forests of Ecuador (Pichincha) disjunctly to northern Perú and then south to Oxapampa in Pasco, Perú at 530–2500 m. The highest elevational records for these specimens are in Perú (2000–2500 m) and the lowest in Ecuador (530–800 m). In the phylogenetic analysis performed here one of these individuals was included. In the resulting cladogram this taxon branches apart from *M. neomicratha*, in a basal position of the clade containing it. This variant may represent a new species (Fig. 1). The only character that would differentiate it from typical *M. neomicrantha* is the presence of an evident mite-domatium. This distinction is not taxonomically practical due to an occasional presence in typical *M. neomicrantha* of a fusion of trichomes to form a conical chamber in the same area where the named mite-domatia occurs. For this reason, a taxonomic evaluation of this species must be postponed until more collections come to light. The available material for study showed that individuals with mite-domatia occur sympatrically with the typical forms of *M. neomicrantha.*

The membrane-like structure and associated cavity formed at the point where the secondary and primary veins diverge from one another is surely some kind of mite domatium. In several specimens with these structures, mite eggs were found in small numbers but the mites and eggs rarely survive the drying process. Eggs were also found on specimens with a fusion of trichomes to form a conical chamber in the area where the secondary veins diverge from the primary vein.

The floral merosity of *M. neomicrantha* is also variable in this species but it is only evident in a few specimens from disjunct areas. First, in the departments of Junín (*Killip & Smith 26503*, *26425*, *25974*, NY!) and Loreto (*Williams 3465*, F!) in Perú, the cited specimens of *M. neomicrantha* have 5-merous flowers and are rather glabrous on vegetative and floral parts and without the evident mite-domatia described above. Nevertheless, their leaf morphology (with a broadly obtuse base) and anther morphology is consistent with typical *M. neomicrantha.* Other specimens that probably have 5-merous flowers were examined from Veraguas province in Panama (*Hammel 4598*, CAS!, and *Mori 6774*, CAS!, MO!). These plants which are only in fruit have 10-ribbed hypanthia and likely 5-merous flowers. Their morphology is also consistent with all the other collections of *M. neomicrantha* examined for this study, although these plants are squamate-glabrescent, without mite-domatia. They also have a visible nodal line, the foliar bases are acute to attenuate, and the inflorescences are multiflorous. The area of Panama where they were collected is well known, and the fact that there are only two collections showing this variation indicates that it is probably rare.

No specimens of this species were examined from the Caribbean Island of Hispaniola or from the Venezuelan Guayana (state of Amazonas in southern Venezuela) for this study. However this species appears in the flora treatments for these regions (Berry *et al.* 2001, Liogier 2000), and in other treatments it has been reported from Hispaniola (Almeda 2009, Wurdack 1980).

Conservation status:—This species would be considered Vulnerable VU B2ab(iii) based on IUCN criteria (AOO). A status of Least Concern LC is warranted because it occurs in many protected sites throughout its range. Protected in Belize in the Bladen Nature Reserve (Toledo). In Colombia it is protected in the Sierra Nevada de Santa Marta National Park (Magdalena); in La Planada Nature Reserve (Nariño); in the Otún-Quimbaya Sanctuary of Fauna and Flora (Risaralda); in the Farallones National Park and in the Finca Los Sauces private protected area (Valle). In Costa Rica it is protected in the major Natural Parks and Reserves. In Ecuador it is protectd in the Awá Indigenous Reserve (Esmeraldas); in the Intag Private Reserve (Imbabura); in the Río Palenque Biological Station (Los Ríos); in Machalilla National park (Manabí); protected in the major Parks and Reserves in Pichincha Province. In Venezuela it is protected in the Guache and the Guaramacal National Parks (Portuguesa and Trujillo respectively).

23. *Miconia palenquensis* (Wurdack 1978: 302) Gamba & Almeda, *comb. nov.* Basionym: *Ossaea palenquensis* Wurdack. Type: ECUADOR. Prov. Los Ríos: km 56 Quevedo-Santo Domingo, Río Palenque Biological Station, Trail 1, 150–220 m, 7 October 1976, *Dodson & Gentry 6553* (holotype: US!; isotypes: MO!, QCA-2 sheets-internet images!, UC-internet image!).

Shrub to 2.5–3 m tall. *Upper internodes* (3.4–7.4 cm long) and cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles when present, adaxial surface of young leaves, primary, secondary, tertiary and higher order veins abaxially, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, and exterior calyx teeth copiously to moderately composed of brownish dendritic trichomes 0.1 mm long with short axes and few-moderate number of terete arms. *Leaves* of each pair isophyllous; sessile or with an inconspicuous terete petiole 0.2–0.3 cm long; blades 16–23 × 8–11 cm, oblong-elliptic to slightly obovate-elliptic, the base rounded-cordate and amplexicaul, the margin distantly undulate-serrulate, the apex bluntly acute, firm-chartaceous; mature leaf surface adaxially glabrescent, the primary, secondary, tertiary and higher order veins glabrous; abaxial surface glabrous, the indumentum caducous on the tertiary and higher order veins; 5-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging rather symmetrically from the primary vein 0.5–0.6 cm above the base, areolae 0.9–1 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins flat, abaxially the primary and secondary veins elevated, canaliculate to terete, the tertiary and higher order veins slightly elevated. *Inflorescences* an axillary and terminal dithyrsoid 16–18 cm long, including a terete peduncle 6–7 cm long, pendant, laxly and divaricately branched from the peduncle apex, paired or solitary in the axils of upper leaves; bracts 0.3–0.4 × 0.15–0.2 mm, bracteoles 0.5–0.7 × 0.2–0.3 mm, linear-subulate, green-reddish, the indumentum caducous on both surfaces, deciduous to subpersistent on immature fruit. *Flowers* 5-merous on pedicels 0.5–0.6 mm long. *Hypanthia* at anthesis 1.9–2.1 × 1.5 mm, free portion of hypanthium 0.9–1 mm long, subcylindric to campanulate, bluntly 10-ribbed, greenish, the indumentum caducous becoming sparse, ridged on the inner surface, densely glandular-puberulent, some of the glands stalked with rounded-flattened heads, intermixed with a dense understory of sessile minute rounded glands, the torus adaxially glandular-puberulent, the glands with rounded-flattened and slightly furrowed heads. *Calyx* open in bud and persistent in fruit, whitish; tube 0.4–0.5 mm long, with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 1.1–1.2 × 1.1 mm, depressed-rotund, the margin entire, the apex obtuse, glabrous on both surfaces; exterior calyx teeth 0.2–0.3 mm long, minute and bluntly triangular, inserted inframarginally at the base of the calyx lobes and not projecting beyond them. *Petals* 2.5–4 × 0.7–1 mm, oblong-lanceolate, the margin entire, the apex bluntly acuminate, white, glabrous on both surfaces, somewhat spreading at anthesis. *Stamens* 10; filaments 1–1.3 × 0.25 mm, whitish, glabrous; anther thecae 1.4–1.6 × 0.3–0.5 mm, oblong-lanceolate, bluntly acuminate at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, whitish; connective darker than the thecae when dry, its prolongation and appendage 0.25–0.45 mm long, the appendage subulate, bluntly acute to obtuse at the apex, bearing conspicuous glandular trichomes at the apical edge, the glands with flattened rounded heads, slightly furrowed and minutely stalked, the stalks subulate. *Ovary* 5-locular, 9/10 to completely inferior, 1.2–1.4 mm long at anthesis, the apical collar 0.2–0.3 × 0.4 mm, conic-truncate, densely glandular-puberulent with the same kind of glands as the torus adaxially and the staminal appendage; style 5–6 mm long, moderately narrowed distally (i.e. tapering), white, glabrous; stigma expanded truncate to capitellate. *Berries* 6.5–7.5 × 7.5–8.5 mm when dry, globose and slightly oblate, orange to red when ripe, the hypanthial indumentum subpersistent at maturity. *Seeds* 0.3–0.35 × 0.21–0.24 mm, ovoid, angled; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone suboblong, ca. 90 % the length of the seed, ventrally expanded toward the micropyle; appendage absent but a small protuberance present; individual cells elongate, some anticlinal boundaries channeled, others raised, undulate, with U-type patterns; periclinal walls flat, microrelief verrucose to somewhat striate.

Additional specimens studied:—ECUADOR. Azuay: 21 km SE of Troncal, track from Zuchay to manta Real, 1.5 km above Manta Real, above Río Patúl, 2°34'S, 79°21'W, 450 m, 14 August 1997, *Lewis et al. 3450* (NY). **Pichincha:** Santo Domingo de los Colorados to Quito, ca 15 km E of Santo Domingo, in woods along small stream S of road, 0°20'S, 79°2'W, 700 m, 6 December 1986, *Hammel & Trainer 15884* (MO). **Los Ríos**: Río Palenque B.R., km 56 Road Quevedo-Sto, Domingo, Along trail 1 about 200 m from junction with entrance road, 150–220 m, 5 March 1977, *Dodson 6650* (MO).

Illustration:*et al.*None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—This rarely collected species is known only from humid lowland Andean forests on the Pacific slope of Ecuador (Fig. 13), at 150–700 m. It has been collected at the Río Palenque Biological Station (Los Ríos) and in primary forest remnants on steep slopes along the Santo Domingo de los Colorados—Quito Road (Pichincha). The most recent collection is from the province of Azuay, representing the first record for this area in Ecuador.

Phenology:—Collected in flower and fruit in August, October and December; only in fruit in March.

Etymology:—The specific epithet refers to the area where this species grows, close to the Palenque River in Ecuador.

Discussion:—This species appears to be most closely related to *M. bensparrei.* Both are characterized by sessile, amplexicaul, oblong-elliptic leaves, and the brownish asperous indumentum on vegetative parts and hypanthia. In describing these two species in the same publication, Wurdack (1978a) differentiated them principally by their venation (5-plinerved vs. 7- or 9-plinerved in *M. bensparrei*) and differences in floral size (larger in *M. bensparrei*). He mentioned other characters, including pedicel size and inflorescence position. However, the inflorescences are terminal (eventually pseudolateral) in both, and the pedicel size is so small in both taxa that these differences seem insignificant. A single flower was dissected from the little available material in the fragment folder of the holotype. It has a well-developed, glandular apical collar on the ovary which Wurdack made no mention of. This glandular ovary collar is also present in *M. bensparrei*. The differences suggest that these two species may be conspecific but we have refrained from combining them until more collections come to light.

Conservation status:—Endangered EN B2ab(iii). This species is endemic to the western foothills of the Ecuadorean Andes, where habitat destruction is the major threat (Cotton & Pitman 2004). It is protected in the Río Palenque Biological Station (Los Ríos).

24. *Miconia quadridomius* Gamba & Almeda, *nom. nov.* Basionym: *Clidemia cuatrecasasii* Wurdack (1981: 248–249). Type: COLOMBIA. Dept. Valle: Puerto Merizalde, costa del pacífico, Río Naya, 5–20 m, 20–23 February 1943, *Cuatrecasas 13957* (holotype: US!). Nec *Miconia cuatrecasae* Markgraf in Cuatrecasas (1933: 27).

Openly branched shrub or small tree (1.5–)2–6 m tall. *Upper internodes* rounded-quadrate, (2.1–) 3.2–4.9 cm long, cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, surface of young leaves, primary and secondary veins adaxially, primary and secondary leaf veins abaxially, bracts apically, pedicels, hypanthia, calyx lobes abaxially, and exterior calyx teeth densely to copiously composed of ferruginous elongate slightly or moderately roughened trichomes 2–3 mm long, each trichome deflexed and somewhat flattened, densely intermixed with an understory of clavate dendritic trichomes 0.1–0.3 mm long with short to moderately long thin-walled (flattened) arms. *Leaves* of each pair slightly to commonly anisophyllous in size; the semiterete short petioles 0.8–1.5 mm long, superficially canaliculate adaxially; larger blades 18–27 × 6.7–10.2 cm, smaller blades 7–16 × 2.5–6.5 cm, elliptic to elliptic-obovate, the base typically rounded, frequently becoming attenuate but ending in a rounded-cordate base, the margin serrulate to crenulate, the apex acuminate to caudate-acuminate, chartaceous; mature leaves adaxially with both the dendritic and elongate trichomes on the surface, primary and secondary veins becoming sparse to caducous with age, the tertiary and higher order veins glabrescent; abaxial surface glabrous, the tertiary and higher order veins sparsely and caducously covered with the general dendritic trichomes; 5-(7-)plinerved, including the tenuous marginals, innermost pair of secondary veins diverging from the primary vein 0.3–2 cm above the base, forming a deeply tufted cavity beset with the general indumentum (acarodomatia?), areolae 0.3–0.4 mm, reticulation visible on both surfaces, adaxially the primary and secondary veins slightly impressed, the tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated. *Inflorescences* a congested axillary fasciculate glomerule 1–1.5 cm long, sessile, unbranched, typically paired and seemingly cauliflorous on defoliated nodes; bracts 1.5–7 × 0.4–0.6 mm, subulate, thin, erect, with inconspicuous parallel venation, glabrous on the main surfaces but the general elongate roughened indumentum present at the apex, each bract seemingly branched, persistent to tardily deciduous in fruit. *Flowers* 4-merous on thick pedicels 0.4–1 mm long. *Hypanthia* at anthesis 2.7–3 × 0.9–1 mm, free portion of hypanthium 1.3–1.7 mm long, tubular to suburceolate, bluntly 8-ribbed, ridged on the inner surface, moderately scaly, the torus adaxially copiously beset with short-stalked glands with thin-walled short heads. *Calyx* open in bud and persistent in fruit; tube 0.1–0.3 mm long, adaxially with the same type of glands as the torus, abaxially with the same vestiture as the hypanthium; lobes 1.5–2 × 0.8–1.1 mm, ovate-oblong, the margin entire, the apex retuse to obtuse, the adaxial surface glabrous or minutely resinous-puberulent, reflexed at anthesis; exterior calyx teeth 1–1.5 mm long, subulate, inserted at the base of the calyx lobes and barely spreading beyond them. *Petals* 1.5–3.5 × 0.6–1 mm, oblong to linear-oblong, the margin entire, the apex rounded-obtuse, white, glabrous on both surfaces, reflexed at anthesis. *Stamens* 8; filaments 1.4–1.5 × ca. 0.2 mm, white, glabrous; anther thecae 1.3–1.5 × 0.23–0.36 mm, linear-oblong and slightly clavate, somewhat emarginate at the apex, opening by one dorsally inclined pore 0.1 mm; connective darker than the thecae, its prolongation and appendage 0.2–0.3(–0.5) mm long, the appendage lanceolate, bluntly acute at the apex, copiously gland-edged, the glands rounded and conspicuously stalked to 0.2 mm long. *Ovary* 4-locular, 3/4 to completely inferior, 1.3–1.45 mm long at anthesis, the apical collar 0.3–0.4 × 0.55–0.65 mm, conic, copiously glandular-ciliate; style 5–7 mm long, parallel-sided (i.e. terete), white, glabrous; stigma truncate to capitellate when dry. *Berries* 2–2.5 × 2 mm when dry, globose and slightly oblate, bright orange when ripe, the hypanthium indumentum persistent in fruit. *Seeds* 0.68–0.79 × 0.5–0.65 mm, pyramidal, brown; lateral symmetrical plane triangular, the highest point near the central part of the seed; antiraphal symmetrical plane suboblong; raphal zone circular to suboblong, ca. 40% the length of the seed; multicellular sculpture rugose throughout the seed; individual cells elongate, anticlinal boundaries channeled, irregularly curved; periclinal walls convex, low-domed to nearly flat, microrelief striate.

Additional specimens studied:—COLOMBIA. Chocó: Vía de Morro de Mico al "Mirador" por el camino hacia "Jurubidá" en dirección S y posteriormente hacia "Copete de Pava" en dirección N, 6°5'N, 77°10'W, 0–100 m, 15 May 1990, *Barbosa 6598* (MO, US); P.N. de Utría, Serranía ubicada al NE de la Ensenada de Utría por la trocha llamada del M-19, 6°20'N, 77°20'W, 0–100 m, 12 June 1990, *García-Cossio & Agualimpia 500* (CHOCO, MO); Hoya del Río San Juan, Quebrada Taparal, afluente del Río San Juan, 4°12'N, 77°8'W, 5–10 m, 28 March 1979, *Forero et al. 4247* (COL, MO). **Valle:** (Buenaventura), Along road between Buenaventura and Málaga vicinity of Bajo Calima, km 3.5.2 from main Cali-Buenaventura Hwy, at Gallinero, 4°0'N, 77°3'W, 100 m, 15 July 1993, *Croat & Bay 75749* (MO); (Buenaventura), Bajo Calima, Ca, 15 km N of Buenaventura, Cartón de Colombia concession, Dindo area, 3°59'N, 77°2'W, 50 m, 26 March 1986, *Gentry et al. 53646* (MO, US); (Buenaventura), Bajo Calima, ca. 10 km due N of Buenaventura, Cartón de Colombia concession, 3°56'N, 77°8'W, ca. 50 m, 5 December 1981, *Gentry 35354* (CAS, MO); (Buenaventura), Bajo Calima, ca. 15 km N of Buenventura, Cartón de Colombia concession, 3°56'N, 77°8'W, ca. 50 m, 18 February 1983, *Gentry & Juncosa 40492* (MO); (Buenaventura), Bajo Calima, Granja Agroforestal, 40 m, 29 March 1984, *Devia 491* (MO, TULV); (Buenaventura), Bajo Calima, Estación Agroforestal, Secretaría de Agricultura y fomento, Parte NE del campamento, 40–60 m, 5 August 1979, *Cabrera 5181* (CUVC, MO); (Buenaventura), San Isidro, Bosque INDERENA-CONIF, 40 m, 5 March 1989, *Devia & Prado 2641* (CAS, TULV); (Cordoba), Dagua Valley, 80–100 m, 6 May 1922, *Killip 5119* (US); La Trojita, Río Calima (región del Chocó), 5–50 m, 19 February 1944, *Cuatrecasas 16623* (US). **ECUADOR. Esmeraldas:** Road Lita-Alto Tambo-San Lorenzo, km 6.9 from Lita, 0°52'24.6"N, 78°29'33.2"W, 720 m, 30 September 2001, *Cotton et al. 1794* (CAS, QCA). **PANAMA. Comarca de San Blás:** Headwaters of Río Nergala along continental divide, 350 m, 11 January 1985, *de Nevers & Herrera 4515* (CAS, MO); Llano-Cartí Road, km 16, trail to creek on Atlantic drainage, 250–350 m, 2 February 1989, *Almeda et al. 6522* (CAS, MO, NY, PMA); Nusagandi, Along continental divide on El Llano-Carti road, Headwaters of Atlantic draining creeks, 9°19'N, 78°15'W, 320 m, 12 August 1984, *de Nevers & Pérez 3694* (CAS). **Panamá:** Along El Llano Carti-Tupile road, 12 mi above Pan-Am Hwy, 200–500 m, 26 March 1973, *Liesner 1135* (CAS, NY).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Local and uncommon in understories of rain forests, typically in deep shade and/or along streams in Panama, Colombia and Ecuador (Fig. 16), at 0–720 m. It is most common in the Bajo Calima region (part of the Chocó) in the department of Valle in Colombia. It was recently reported from Panama (Almeda 2009). Specimens from Ecuador that were previously attributed to this species are *M. chocoensis*.

Phenology:—Collected in flower from January through March and from May through August; in fruit from February through March, June through September, and in December.

Etymology:—The specific epithet honors José Cuatrecasas (1903–1996), Spanish botanist and prolific collector of Colombian plants.

Discussion:—This distinctive species has an indumentum of elongate-roughened trichomes on vegetative and hypanthial parts, conspicuous 5-plinerved leaves and a poorly developed-sessile inflorescence. Almeda (2009) noted that the Panamanian populations differ from those in Colombia by the presence of shorter bracts to 2 mm long (vs. 6–7 mm long) calyx lobes adaxially glabrous (vs. resinous-puberulent); we agree with these observations. In all other characters, the material from both countries is similar in foliar shape, indumentum details, and staminal and seed morphology.

In *M. quadridomius* the leaves are plinerved, but there is a space formed in between the innermost pair of secondary veins and the primary vein before the point of divergence. This space may serve to house insects. Althought some ants were found in this leaf area among different specimens from the Bajo Calima region (Colombia), the morphology of this structure is not a usual ant-domatium. It is more similar to an acarodomatium; further natural history studies are required in order to elucidate the function of this structure. This species is similar to *M. chocoensis*, but differs in the foliar plinervation and in lacking white furrowed glands on the leaves abaxially. In *M. quadridomius* the vegetative and hypanthial indumentum is ferrugineous (vs. white), and consists of prominently roughened flattened-deflexed trichomes (vs. slightly roughened). *Miconia quadridomius* is also similar to *M. approximata*, which has vegetative pubescence that is shorter (0.3–0.7 mm long vs. 2–3 mm long), and the abaxial tertiary and higher order foliar veins densely resinous-glandular (vs. furfuraceous). In the protologue, Wurdack (1981) provides a detailed enumeration of the differences between these species.

Conservation status:—Endangered EN B2ab(iii). Protected only in Colombia in the Ensenada de Utría National Park (Chocó); the threats include destruction of its natural habitat and the fact that it is not protected in other parts of its range.

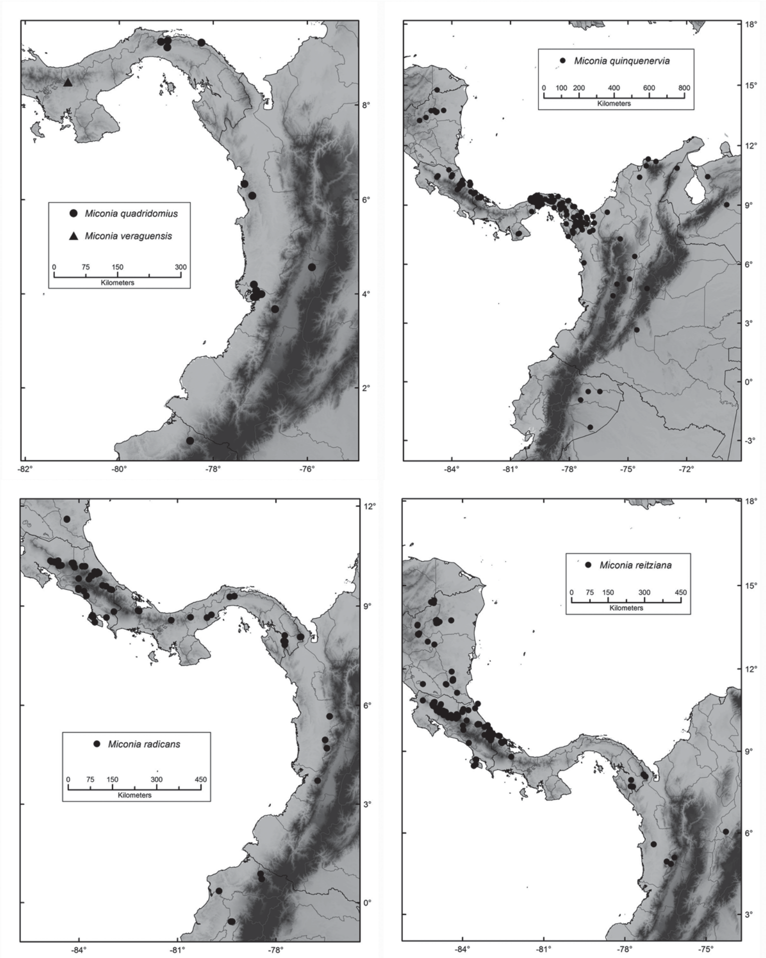


FIGURE 16. Distributions of *Miconia quadridomius and M. veraguensis*, *M. quinquenervia*, *M. radicans*, and *M. reitziana*.

25. *Miconia quinquenervia* (Miller 1768: 735) Gamba & Almeda, *comb. nov.* Basionym: *Melastoma quinquenervium* Miller. *Octopleura quinquenervia* (Mill.) Triana (1871: 145). *Ossaea quinquenervia* (Mill.) Cogniaux (1891a: 1064). *Clidemia quinquenervia* (Mill.) Almeda (2004: 112–114). Type: Exact locality not legible, *Miller s.n.* (holotype: BM-internet image!).

Clidemia decurrens Beurling (1854: 127–128). Type: PANAMA. Portobello, in silvis ad viam versus Panama, April 1826, *Billberg 280* (holotype: S-internet image!; isotypes: F-internet image!, MO!).

Melastoma diversifolium Bonpland (1816: 138–140). *Clidemia diversifolia* (Bonpl.) de Candolle (1828: 159). *Staphidium diversifolium* (Bonpl.) Naudin (1851: 322). *Octopleura diversifolia* (Bonpl.) Triana (1871: 145). *Ossaea diversifolia* (Bonpl.) Cogniaux (1887a: 968). Type: COLOMBIA. Habitat ad ripas fluvii Magdalenae, frequens juxta S. Bartholomé, *Bonpland 1617* (holotype: P; isotypes: P-3 sheets, US).

Subshrub or shrub 0.5–4(–6) m tall with slender erect branching, bark green-brownish. *Upper internodes* [(2.6–)3.8–5.3(–11.1) cm] and cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, adaxial surface of young leaves, primary and secondary leaf veins abaxially, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, calyx lobes, and calyx teeth densely to moderately composed of brownish sessile to thin-stipitate-dendritic trichomes 0.1–0.2 mm long with short axes and few-moderate number of terete arms, sparsely intermixed with caducous elongate smooth trichomes 1–1.3 mm long. *Leaves* of each mature pair somewhat anisophyllous in size, the younger pairs being more or less isophyllous; the semiterete petiole 0.3–1 cm, deeply canaliculate adaxially, green-brownish; larger blades (10.2–)12–25 × (6.5–)7.5–15 cm, smaller blades (4.5–)5–10.5 × (2.5–)3–6 cm, broadly elliptic to ovate, the base rounded to abruptly attenuate and slightly oblique, narrowly long-decurrent on the petiole, the margin ciliolate-denticulate, the apex bluntly acute to short-acuminate, or obtuse, chartaceous; the adaxial surface flushed pink at the base of juvenile leaves, at maturity the adaxial surface rapidly becoming glabrate, or moderately to sparsely strigose with brownish elongate smooth trichomes 0.5–1.5 mm long, the primary and secondary veins on young leaves copiously covered with the general dendritic trichomes, becoming glabrate, the tertiary and higher order veins glabrous; abaxial surface occasionally flushed red or chocolate brown when dry, glabrate except for a few dendritic trichomes and resinous glands on the venules, the tertiary and higher order veins sparsely beset with caducous resinous slightly furrowed more or less stalked glands <0.05 mm long; 7- or 9-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging asymmetrically from the primary vein 0.5–3.5 cm above the decurrent base, areolae 1–1.5 mm, adaxially the primary, secondary, tertiary and higher order veins impressed, abaxially the primary, secondary, tertiary and higher order veins elevated and terete. *Inflorescences* a pseudolateral multiflorous dithyrsoid 2–4 cm long, including a peduncle 0.2–0.5 cm long or sessile, highly and divaricately branched from the peduncle apex or the base, borne on the upper foliar nodes, rachis bright pink; bracts and bracteoles 0.5–0.7 × 0.2 mm, subulate-apiculate, occasionally with two thick trichomes projecting from the base, pink, the bracts spreading, the bracteoles spreading to erect, persistent in fruit. *Flowers* 5-merous on pedicels 0.25–0.5 mm long. *Hypanthia* at anthesis 2.5–2.7 × 1 mm, free portion of hypanthium 1.3–1.5 mm long, suburceolate to campanulate, bluntly 10-ribbed, yellowish becoming bright pink, copiously to sparsely resinous-glandular with slightly furrowed more or less stalked glands <0.05 mm long, caducously intermixed with the dendritic and elongate trichomes, ridged on the inner surface and like the torus adaxially sparsely and caducously resinous-glandular. *Calyx* open in bud and persistent in fruit, pinkish-green; tube 0.1–0.3 mm long, with the same vestiture of the torus adaxially and of the hypanthium abaxially; lobes 0.1–0.25 × 0.25 mm, broadly triangular, the margin vaguely undulate, the apex bluntly acute, glabrescent with few resinous glands; exterior calyx teeth 0.5–1 mm long including the apical trichome, bluntly conic and >3 aristate, the aristae brownish, inserted at the base of the calyx lobes and projecting beyond them, glabrescent. *Petals* 0.75–1.5(–1.7) × 0.75–1 mm, obovate-oblong, with a projecting infra-apical abaxial tooth, the margin entire, the apex rounded-obtuse, white, densely papillose on both surfaces, reflexed at anthesis. *Stamens* 10; filaments 1–1.5(–1.7) × 0.25 mm, white, glabrous; anther thecae 1.5–2.4 × 0.25–0.35 mm, linear-oblong and subulate, truncate to emarginate and short-acuminate at the apex, opening by one dorsally inclined pore 0.1–0.15 mm in diameter, cream to light yellow at anthesis; connective yellow, its prolongation and appendage 0.25–0.45 mm long, the appendage oblong-spatulate, obtuse at the apex, copiously gland-edged, the glands sessile to shortly stalked and rounded. *Ovary* 5-locular, completely inferior, ca. 1.2 mm long at anthesis, the apical collar absent, the apex 0.3 mm in diameter, somewhat depressed, caducously glandular-puberulent; style 5.5–6 mm long, narrowed distally (i.e. tapering), white, glabrous or rarely sparsely to copiously glandular-puberulent at the base; stigma expanded truncate to capitellate. *Berries* 4–5 × 4.5 mm when dry, globose-oblate, bright pink, then green, and ultimately ripening purple-black, the hypanthial indumentum somewhat persistent at maturity. *Seeds* 0.33–0.54 × 0.16–0.2 mm, ovoid, angled, light-brown; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone suboblong, ca. 10–20% larger than the corpus of the seed, extending along its entire length, ventrally and longitudinally expanded, dark-brown; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief inconspicuously punctate. Chromosome number: n=17.

Additional specimens studied:—COLOMBIA. Antioquia: (Nicocli), <50 m, 27 June 1946, *Haught 4924* (US); (Turbo), Quebrada Isaías, E of Turbo, 50 m, 8 July 1946, *Haught 4946* (US); Cauca Valley, vicinity of Puerto Valdivia, Roadside vegetation, 300 m, 19 August 1976, *Gentry et al. 17927* (COL, MO, NY). **Bolívar:** Boca Verde, Río Sinú, 8.64°N, -76.06°W, 13–14 February 1918, *Pennel 4227* (US). Caldas: (Chinchiná), orilla Quebrada Campo Alegre, 1200 m, 17 February 1990, *Aguirre et al. 12* (COL). **Chocó:** Río El Valle, Cerca a la desembocadura del Río Miniquía, entre éste y el Río Mutatá, 7 January 1973, *Forero & Gentry 742* (COL, F); Río Ciego, 17 June 1967, *Duke 13290* (NY); Trail from Unguía along Río Tigre toward base of Serranía del Darién, 200–300 m, 16 July 1975, *Gentry & Aguirre 15208* (MO, NY). **Cundinamarca:** (San Antonio), 200 m, 14 June 1948, *Haught 6241* (CAS, F, NY, US). **Magdalena:** P.N. Tayrona, Along mule trail from Pueblito to Calabazo, 11°19'N, 73°58'W, 250–450 m, 26 October 1972, *Kirkbride 2565* (F, NY, US); Alto Río Frío, Cabeceras del Río Congo, Ciudad Antigua, por el camino al río , 10°59'N, 74°4'W, 1000–1100 m, 25 July 1989, *Madriñán & Barbosa 497* (NY). **Meta:** P.N.N. Tinigua, Río Duda, Serranía Chamusa, Centro de Investigaciones Ecológicas La Macarena, Trocha a Puerto de Invierno, 350 m, Julio 1996, *Stevenson 1818* (COL). **Quindio:** (Montenegro), Vereda La Montaña, finca El Reflejo, 1090 m, 30 October 1990, *Vélez et al. 2611* (COL). **Tolima:** (Mariquita), 500 m, 10 November 1938, *Haught 2429* (CAS, US). **COSTA RICA. Cartago:** (Atirro), 600 m, April 1896, *Smith 6547* (US); (Jiménez), No protegida, Cuenca del Reventazón, Pelibaye, Turrialba, camino a El Copal, del Humo al Copal, 9°47'0"N, 83°43'13"W, 760 m, 5 January 2010, *Kriebel et al. 5451* (INB, MO, NY). **Heredia:** At confluence of Ríos Sarapiquí and Puerto Viejo, 100 m, 1–6 August 1968, *Schnell 1015* (F, US). **Limón:** Vicinity of Moin, 3 km W of Limón, 19 July 1974, *Utley & Utley 5548* (CAS); Along Highway 32 from Turrialba to Limón, ca. 11 miles S of Siquerres, 650 m, 13 August 1977, *Croat 43352* (CAS, MO); About 2 km N of Bribri along banks of the Río Sand Box, 100 m, 17 July 1976, *Utley & Utley 5495* (CAS); ca. 7 km SSW of Home Creek on the road to Bribri, 200 m, 26 July 1977, *Almeda et al. 3256* (CAS, CR); Near Carmen Station on Indiana Branch, 30 m, 20 February 1926, *Standley & Valerio 48361* (US); Goldengrove, drenaje de Río Reventazón, 15 m, 23 October 1951, *Shank & Molina 4375* (EAP, US); (Piuta), Adjacent to Limón, 5 m, 18 September 1968, *Davidse & Pohl 1249* (ISC, US); Hamburg Finca, On the Río Reventazón below Cairo, 55 m, 19 February 1926, *Standley & Valerio 48677* (US); Approximately 4.5 km NE of Bribri and 15 km S of Cahuita along road to Bribri, 100 m, 12 March 1978, *Utley 6048* (CAS); ca 5.5 km W of Limón on the road to Siquirres, Along the road, 27 July 1977, *Almeda et al. 3261* (CAS, CR); Río Catarata, 1 to 3 km N of Bribri, Río Sixaola drainage, 9°38'N, 82°50'W, 20–200 m, 9–10 September 1978, *Burger & Antonio 10977* (CAS, F). **ECUADOR. Napo:** Río Zumino (Sumino), tributary of the Río Napo, ca 5 km NE of Santa Rosa, 8 August 1968, Lugo 202 (F, NY, US); Río Napo between Coca (Puerto Francisco de Orellana) and Armenia Vieja, -0.5°S, -77.03°W, 250–350 m, 15 February 1974, *Harling & Andersson 11986* (MO, US); Sacha Lodge, 3 km NW of the village Anangu, near the Napo river., -0.5°S, -76.43°W, 200 m, 5 June 1995, *Clark et al. 969* (MO). **Pastaza:** Río Pastaza, between Destacamento Chiriboga and Apachi Entza, 2°20–35'S, 76–77°55–8'W, 285 m, 24 July 1980, *Øllgaard et al. 35173* (CAS, US). **HONDURAS. Gracias a Dios (La Mosquitia):** (Ahuas Bila), 200 km SW de Puerto Lempira, orilla del Río Wankí, Coco o Segovia, 100 m, 5–13 May 1985, *Nelson & Cruz 9345* (CAS, UNAH). **NICARAGUA. Jinotega:** Macizos de Peñas Blancas, 1400 m, 5 May 1976, Neill 7127 (CAS). **Zelaya:** Sector de Negro Wás, entre El Empalme y Rosita, 13°45'N, 84°25'W, 200 m, 5 September 1984, *Ortiz 2123* (CAS, HULE); (Siuna), Wany, 27 August 1982, *Ortiz 47* (CAS, HULE); Río Kusulí, 13°24'N, 85°19'W, 200 m, 4 March 1981, *Stevens & Moreno 19258* (CAS, MO); Caño Matis (El Cianuro) cruce la carretera Wany-Siuna, ca 2 km W de Siuna, 13°40'30"N, 85°45'40"W, 26 October 1982, *Grijalva & Burgos 1578* (CAS, HULE). **PANAMA. Bocas del Toro:** Lincoln Creek, 28 June 1921, Carleton 87 (F, US). **Canal Zone:** Pipeline road near Río Agua Salud, 21 October 1972, *Kennedy & Redemsky-Young 1833* (MO, NY); (Barro Colorado Island), 18 September 1982, *Schmalzel & Schupp 955* (CAS, MO); Las Cascadas Plantation, near Summit, 2 December 1923, *Standley 25688* (US); Vicinity of Madden Dam, 90 m, 8 October 1939, *Allen 2009* (MO, US); (Barro Colorado Island), 25 August 1929, *Bangham 374* (US); Along Changuinola River, 8 January 1924, *Dunlap 296* (US); (Barro Colorado Island), Shoreline between Dock and Dump Cove, 13 September 1968, *Croat 6050* (F, MO); George W. Green Park, E of Summit Garden, in Madden Forest Preserve, Pacific Water Shed, near Continental Divide, 91 m, 10 August 1961, *Welch 19632* (NY); Pipeline Road, 6 km along road, 9°13'N, 79°43'W, 100–200 m, 27 October 1980, *Systma 1940* (CAS, MO); P.N. Soberanía, Madden Forest, las Cruces

Trail, 3.6 mi N of Gamboa Road turn-off, 9°26’20"N, 79°37’20"W, 140 m, 23 July 1994, *Croat & Zhu 77060* (CAS, MO); (Barro Colorado Island), Lutz creek near Donate Trail, 100–300 m, 8 October 1968, *Croat 6792* (MO). **Colón:** N of Diamante, ridge NW of abandoned mine on Quebrada de la Mina, 9°24’N, 79°35’W, 600–700 m, 11 January 1984, *Churchill & de Nevers 4216* (CAS, MO); 1–2 km from the Portobelo Highway up the Río Guanche, 9°30’N, 79°40’W, 0–50 m, 17 February 1982, *Knapp 3641* (CAS, MO); (Peluca), ca 27 km from Transistmian Highway on road to Nombre de Dios, Trail to Río Boquerón and along bank, 25 February 1973, *Kennedy 2635* (CAS, MO); Along Río Boquerón near N.1 (manganese mine), E of Salamanca, 9°35’N, 79°32’W, 50 m, 3 July 1982, *Knapp et al. 5804* (CAS, MO); Forest and forest edge from Portobelo Highway to 4 km up Río Guanche, 9°30’N, 79°40’W, 0–50 m, 30 August 1981, *Knapp 990* (CAS, MO); Along Río Boquerón above Mina Boquerón #1 (manganese mine), main valley of Río Boquerón, 9°20’N, 79°35’W, 100–200 m, 13 December 1981, *Knapp & Sytsma 2448* (CAS, MO); Río Guanche, 9°30’N, 79°39’W, 0–75 m, 16 October 1980, *Systma 1712* (CAS, MO). **Darién:** Mannene to the mouth of the Río Cuasí, 28 April 1968, *Kirkbride & Bristan 1496* (NY); Subiendo por el Río Peresénico desde la Estación de Pirre, 28 September 1989, *Palacios et al. 402* (CAS, PMA); De la estación de Cruce Mono hasta la quebrada Ipelisa (límite del parque), 28 August 1990, *Aranda et al. 1517* (CAS, PMA). **Panamá:** Forests between Juan Mina, Canal Zone, and El Virgía, 20–80 m, 11–12 January 1911, *Pittier 2401* (US); Isla Majé, Bayano, Trocha C, campamento del G.M.L, 20 August 1976, *Garibaldi 208* (NY, PMA, US); Area around Torti Arriba, 31 August 1977, *Folsom 5153* (CAS, MO); Patch of forest along Panamerican Highway, 5 mi W of bridge over Bayano lake, 200 m, 14 October 1978, *Hammel & D'Arcy 5109* (CAS, MO); 3.4 mi E of Cañasas, checkpoint on PanAm. Hwy. in selectively cut forest ca. 4.5 km from road, Panamá-Darién border, foothills of Serranía de Cañas, 8°52’N, 78°15’W, 100 m, 12 September 1981, *Knapp 1160* (CAS, MO); Along stream 1 mi N of Summit Gardens towards Gamboa, 11 February 1981, *Systma 3497* (CAS, MO); Canal Area, Boy Scout camp near Lake Madden, 100 m, 29 August 1982, *Hamilton & Stockwell 1149* (CAS, MO); Serranía de Majé, ridges S of Choco village of Ipetí, Río Ipetí drainage system, 8°47’N, 78°27’W, 500–600 m, 11 December 1981, *Knapp & Sytsma 2365* (CAS, MO); Cañitas near dam site, just S of Panamerican Highway, 9°10’N, 78°52’W, 150 m, 19 September 1982, *Hamilton & D'Arcy 1415* (CAS, MO); (Piriatí), S of Pan-Am Highway, 9°0’N, 78°30’W, 200–400 m, 8 August 1982, *Hamilton 538* (CAS, MO); Serranía de Majé, Trail along Río Ipetí, near confluence with Río Ambroino, 8°57’N, 79°32’W, 100 m, 29 January 1984, *Churchill & de Nevers 4475* (CAS, MO); Río Ipetí, S of Panamerican Highway, 9°3’N, 78°25’W, 100 m, 17 September 1982, *Hamilton & D'Arcy 1329* (CAS, MO); Hills S of Guacuco, 8 km E of Ipetí, 8°55’N, 78°20’W, 300 m, 18 September 1982, *Hamilton & D'Arcy 1353* (CAS, MO); Pipeline Road, 10 to 15 km N of Gamboa, 9°10’N, 73°45’W, 50 m, 16 September 1984, *de Nevers 3892* (CAS, MO). **San Blas:** Ailigandi area, Along trail from ocean to waterfall on river, 0–61 m, 7 October 1978, *Hammel & D'Arcy 4989* (CAS, MO); Tierra firme frente a Isla Miria Ubigandup, camino Digole, 9°26’N, 78°54’W, 0–20 m, 19 July 1987, *Herrera 265* (CAS, PMA); Ailigandi cutover area along river feeding town water supply, At base of and on large (ca 50 m tall) limestone outcrop approximately 3 km inland, 8 October 1978, *Hammel & D'Arcy 5014* (CAS, MO). **VENEZUELA. Portuguesa:** (Guanare), 17 km NW of Tucupido by road, future basin of Represa Tucupido and lower forested, N slope of Fila Las Palmas, 9°1’N, 69°57’W, 200–400 m, 30 October 1982, *Davidse et al. 21455* (CAS, MO, NY). **Zulia:** (Bolívar), Cuenca del Embalse Burro Negro (Pueblo Viejo): sector entre Quirós-El Pensado y el pie de Cerro Socopo, en el área aprox, 10 km en línea recta al E de Churuguarita, 250–300 m, 5–8 August 1980, *Bunting 9508* (NY); (Mara), La Yolanda, Cuenca del Río Guasare, alrededores del Destacamento Guasare N.1, 10°52’10"N, 72°29’30"W, 200–250 m, 9 November 1982, *Bunting et al. 11977* (CAS, US).

Illustration:—Bonpland (1816): Pl. 59.

Common names and documented uses:—Ecuador: “paichi panga”, for curing fevers (*Clark et al. 969*, MO!). Panama (Barro Colorado Island): “fruta de pava” (Croat 1978).

Habitat, distribution, and ecology:—Uncommon to locally common in gallery forests, semideciduous forests, rain forests margins, river or stream banks, pasture margins and disturbed sites, often in deep or partial shade from Honduras south through southern Central America to Colombia, Venezuela (Portuguesa, Zulia), and Ecuador (Napo, Pastaza) (Fig. 16), at 0–700(–1400) m. In Nicaragua it occurs in the “zona Atlántica” (Almeda 2001). In Costa Rica it is mostly restricted to the Caribbean slope. In Panama, it is known principally from tropical wet forests in the Canal Zone, all along the Atlantic slope, and in Panama and Darién, on the Pacific slope; also known from humid forests in Panama (Panama City), Colón and Darien (Croat 1978). In Colombia it is found throughout the Andes (Western, Central and Eastern Cordilleras), from low to premontane elevations, and in the Sierra Nevada de Santa Marta.

Phenology:—Collected in flower and fruit throughout the year.

Etymology:—The specific epithet refers to the five noticeable longitudinal foliar nerves.

Discussion:—This species is characterized by the conspicuous decurrent leaf base, multiflorous dichasial thyrsoid inflorescence, and setose calyx teeth. Its sister species is *M. aguilarii*, which is strikingly similar vegetatively (including the decurrent leaf base), but differs in floral characters (merosity and hypanthium color at anthesis and maturity). Both species are allopatric geographically (see *M. aguilarii* discussion).

As mentioned under the discussion of *M. neocoronata*, *M. quinquenervia* is very similar to this species as well. The distinctions between *M. neocoronata* and *M. quinquenervia* are discussed in detail in Almeda (2004). Another closely related species is *M. reitziana*, from which it is easily distinguished vegetatively by its lack of decurrent leaf bases. The inflorescence architecture is also different (not multiflorous groups of modified dichasia), and the elongate smooth trichomes are more abundant in *M. reitziana*, and completely lacking on the abaxial foliar surface of *M. quinquenervia*. Both share similar setose exterior calyx teeth, and the glands at the edges of the dorso-basal connective appendage.

Along with *M. aguilarii*, *M. neocoronata* and *M. reitziana*, this species is conspicuously anisophyllous. However, the anisophylly does not seem to be consistent in every mature leaf pair and the younger leaves are isophyllous.

The rusty-asperous general indumentum of dendritic trichomes in *M. quinquenervia* resembles that of *M. bensparrei*, which was considered to be its closest relative by Wurdack (1980). This type of indumentum which is also present in *M. palenquensis* and *M. incerta*, and in smaller versions in *M. sessilis*, *M. variabilis*, and some populations of *M. neomicrantha*, is common among closely related species in Octopleura, but not exclusive to these taxa. Therefore, the taxonomic importance of this character is best appreciated when used along with other diagnostic features like seed characters, when assessing relationships among species groups within the Octopleura clade.

Conservation status:—Vulnerable VU B2ab(iii). Althought this species is widely distributed geographically, it is not known from many protected areas. In Colombia it is known from Tayrona National Park (Magdalena) and Tinigua National Park (Meta). In Panama it is common in the Canal Zone and protected in the Chagres and Soberanía National Parks.

26. *Miconia radicans* (Cogn. in Smith 1895: 288–289) Gamba & Almeda, *comb. nov.* Basionym: *Clidemia radicans* Cogn. in Smith. Type: COSTA RICA. Comarca de Limón, Llanos de Santa Clara, Río Jiménez, 650 ft, 11 April 1894, *Donnell Smith 4789* (isotypes: BR-2 sheets-internet images!, US-internet image!).

Suffrutescent herb or subshrub 0.2–1 m tall, occasionally rupicolous, suberect and sparingly branched. *Upper internodes* (1.6–3.8 cm long) and cauline nodes terete, nodal line present as a moderate ridge. *Indumentum* on branchlets, petioles, adaxial surface of young leaves, primary, secondary, tertiary and higher order veins abaxially, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, calyx lobes abaxially, and exterior calyx teeth densely to moderately covered with brownish-translucent sessile-stellate trichomes 0.35–0.45 in diameter, superficially appearing simple. *Leaves* of each pair strongly dimorphic (1:6–8); the semiterete petioles 0.1–0.8 cm long, narrowly canaliculate adaxially, the channel obscured by the dense indumentum; larger blades 8.5–20 × 3–7.7(–9) cm, elliptic-oblong and somewhat falcate, the base obtuse to rounded and slightly oblique, the margin entire, the apex bluntly acute to rounded; smaller blades 1.5–2.7 × 0.9–4 cm, ovate to ovate-elliptic or subrotund, the base obtuse to cordate, the margin entire, the apex acute to short-acuminate; firm-membranaceous; mature leaves adaxially occasionally flushed red-purple on the surface and primary vein, glabrate, the primary, secondary, tertiary and higher order veins glabrous; abaxial surface glabrate; 3- or 5-nerved, including the tenuous marginals, with a moderate thick-callose vesicular structure at the base of the leaves abaxially where the innermost pair of secondary veins diverge from the primary vein (domatia?), areolae 1–2 mm, adaxially the primary, secondary, tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins flat. *Inflorescences* an axillary few-flowered thyrsoid or dithyrsoid 3.5–8.3 cm long, typically including a peduncle 1.5–2.6 cm long, rarely sessile, somewhat divaricately branched from the peduncle apex, when sessile openly bifurcate from the base, solitary or paired in the axils of the smaller leaves at the upper nodes, the rachis pink-reddish to brown; bracts and bracteoles 0.3–0.5 × 0.5 mm, narrowly triangular, somewhat spreading, persistent to tardily deciduous in fruit. *Flowers* 4-merous on pedicels (0.3–)0.5–1 mm long. *Hypanthia* at anthesis 2.6–2.75 × 1–1.5 mm, free portion of hypanthium 1 mm long, urceolate, constricted distally into a subcylindric neck, bluntly 8-ribbed, reddish, the indumentum sparse, ridged on the inner surface, glabrous, the torus adaxially sparsely glandular-puberulent becoming glabrous, the glands stalked or subsessile and rounded. *Calyx* open in bud and persistent in fruit, pink-red; tube 0.19–0.27 mm long, abaxially with the same vestiture as the hypanthium, adaxially minutely and sparsely glandular; lobes 0.3–0.5 × 1 mm, ovate, the margin entire, the apex rounded, adaxially glabrescent with a few papillae; exterior calyx teeth 0.29–0.34 mm long, bluntly triangular to subulate, callose, inserted at the base of the lobes and not projecting beyond them. *Petals* 1.5–2 × 1.4–1.5 mm, obovate, the margin entire, the apex rounded-obtuse to somewhat truncate, white, copiously and minutely papillose on both surfaces, slightly spreading to erect at anthesis. *Stamens* 8; filaments 1.5–2 × ca. 0.22 mm, white, glabrous; anther thecae 2 × 0.25–0.29 mm, linear-oblong, obtuse-emarginate at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, cream to yellow; connective yellow, its prolongation and appendage 0.2–0.4(–0.5) mm long, the appendage oblong, obtuse at the apex, copiously gland-edged, the glands minute and rounded, mostly sessile, sparsely distributed throughout the connective. *Ovary* 4-locular, completely inferior, 1.6–1.75 mm long at anthesis, the apical collar absent, the apex 0.15 mm in diameter, somewhat depressed, glabrous to inconspicuously glandular-puberulent; style 4–4.5 mm long, tapering distally, glabrous; stigma truncate to expanded-truncate. *Berries* 3.8–4.2 × 4–5 mm when dry, globose-oblate, bright pink ripening bright blue, the hypanthial indumentum early caducous at maturity. *Seeds* 0.33–0.38 × 0.14–0.16 mm, ovoid, angled, light brown; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side or near the central part of the seed; raphal zone suboblong, nearly as long as the corpus of the seed, extending along its entire length, ventrally and longitudinally expanded, dark brown; individual cells elongate, anticlinal boundaries moderately channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief punctate.

Additional specimens studied:—COLOMBIA. Chocó: (San José del Palmar), San José del Palmar-Corondoto road, ca. 16–25 km W of San José del Palmar, 4°42'N, 76°27'W, 300–366 m, 14 May 1984, *Luteyn et al. 10482* (MO, NY, US); Hwy Bolivar-Quibdó, Around km 155 by Río Atrato, 5°40'N, 76°22'W, 500 m, 11 March 1984, *Juncosa 2427* (MO); Along road between San José del Palmar and Novita, vicinity of Santa Rosa at end of existing road, 4°57'N, 76°30'W, 350 m, 11 May 1983, *Croat 56612* (MO). **Valle:** (Buenaventura), Vereda Bellavista, P.N.N. Farallones, Sector Bajo Anchicayá, Zona en cercanías de la Draga, 3°36.906'N, 76°54.107'W, 225 m, 11 January 2013, *Alvear et al. 1567* (CAS, COL). **COSTA RICA.** Bois de la vallée de Tuis, 600 m, 1 November 1893, *Pittier 8123* (US). **Alajuela:** Cataratas de San Ramón, 20 February 1931, *Brenes 13520* (F, NY); R.F. de San Ramón, Quebrada Cacical, 10°14'13"N, 84°36'22"W, 2 May 1987, *Herrera et al. 588* (CAS, MO); Along road to Colonia Virgen del Socorro, barranca of Río Sarapiquí , 10°15'N, 84°10W, 700–800 m, 8 August 1979, *Stevens 13536* (CAS, F, MO); Cataratas de San Ramón, 1 May 1931, *Brenes 13691* (CR, F, NY); (San Ramón), R.F.Camino, Entrada cerca a la Estación, 10°13'N, 84°37'W, 900 m, 4 May 1991, *Gómez-Laurito & Mora 12056* (CR, F); R.B. Monteverde, Río Peñas Blancas, Quebrada Azufre, 10°19'N, 84°42'W, 800 m, 22 December 1990, *Bello 2598* (INB, MO); Monteverde R., Peñas Blancas river valley, Atlantic slope rain forest, 10°20'N, 84°43'W, 800–900 m, 3 October 1986, *Haber et al. 6077* (MO); Monteverde Cloud Forest R., Peñas Blancas river valley, Atlantic slope rain forest, Farms of Jesus Rojas and Alejandro García, 10°20'N, 84°45'W, 900 m, 28 November 1986, *Haber & Bello 6435* (MO); (Río Peñas Blancas), R.Monteverde, Vertiente Atlántica. Sendero a Finca de Jesús de Novo, 10°19'N, 84°44'W, 950 m, 24 July 1987, *Haber & Bello 7364* (CR, MO); (Grecia), R.V.S. Bosque Alegre, Cuenca del Sarapiquí, Laguna Hule, 10°17'55.456"N, -84°12'54.057"W, 700–800 m, 28 July 2002, *Kriebel & Larraguivel 676* (INB, MO); (San Ramón), No protegida, Cuenca del San Carlos, Curso de plantas, 10°13'0"N, -84°35'20.0001"W, 800–900 m, 11 August 2002, *Kriebel 908* (INB, MO); Peñas Blancas river valley NE of San Carlos , along road from Jabillos, 10°22'N, 84°38'W, 650 m, 29 June 1985, *Hammel et al. 14076* (MO); (Alajuela), Virgen del Socorro, No protegida, Cuenca del Sarapiquí, 10°15'25"N, -84°10'20.0001"W, 800 m, 21 July 2002, *Kriebel 538* (INB, MO); Cataratas de San Ramón (desecho babezas), 28 February 1931, *Brenes 13553* (CR, F); Cataratas de San Ramón, 19 February 1931, *Brenes 13424* (CR, F). **Cartago:** Area near Pavones, about 15 km E of Turrialba, 600 m, 7 May 1956, *Williams 19715* (F, NY); 13 km E of Turrialba on the hwy to Limón, Canyon of Río Chitaría, 9°55'N, 83°36'W, 750–800 m, 10 May 1983, *Liesner et al. 15417* (CAS); Vicinity of Pejivalle, 900 m, 7 February 1926, *Standley & Valerio 47078* (US); (Turrialba), R.B. Barbilla, Cuenca del Matina, Sendero Las Quebradas, 9°57'48"N, 83°27'51"W, 500 m, 8 October 1999, *Mora-Rojas & Rojas 511* (INB, MO). **Guanacaste:** (Río Chiquito de Tilarán), Río Negro valley, Atlantic slope, lower montane wet forest, 10°22'N, 84°52'W, 1400 m, 30 July 1986, Haber Bello 5837 (MO). **Heredia:** In forest along canyon of the Río Sarapiquí, about 10 km from Cariblanco, upstream from bridge on road to La Virgen del

Socorro, 10 June 1982, *Hammel et al. 12832* (CAS); (Colonia Virgen del Socorro), Ca, 5 km E of Cariblanco, 850 m, 13 August 1974, *Maas 1287* (F, US); (Virgen del Socorro), Barranca del Río Sarapiquí, 700 m, 3 February 1984, *Gómez-Laurito 9873* (F); (Colonia Virgen del Socorro), Virgen del Socorro–Río Sarapiquí–Cariblanco, 600–800 m, 31 August 1983, *Chacón & Herrera 1221* (CAS, CR, F). **Limón:** (Siquirres), Las Brisas de Pacuarito, 500 m, 17 April 1985, *Gómez et al. 23375* (CAS, CR); Rainforest slopes of Cerro Skopte just W of Río Siori about 7 km beyond Coroma, 450–700 m, 18 February 1992, *Almeda & Daniel 7031* (CAS, CR); Flood plain of the Río Toro Amarillo ca. 6–7 km S of Guápiles, S of the suspension bridge, 420–440 m, 22 June 1975, *Lellinger et al. 1840* (F); Cordillera de Talamanca, Ridge separating Quebrada Cañabral from Río Barbilla, and slope leading down to the latter, 10°2'N, 83°26'W, 200–400 m, 4 September 1988, *Grayum et al. 8750* (CAS, CR, MO); Ridge between Río Chirripó and Quebrada El Molinete, W of new highway, 10°12'N, 83°54'W, ca. 400 m, 19 July 1984, *Grayum et al. 3558* (CAS, MO); (Talamanca), Amubri, Camino entre Amubri y Cachabri, margen derecha del Río Labri, 9°29'40"N, 82°59'40"W, 100–200 m, 27 June 1989, *Herrera 3033* (CAS, CR); Along a stream by trail between, Sitio Rangalle and Cuen, Between Cerros Jacrón & Bitarkara, 700–900 m, 25 March 1983, *Hazlett 5146* (CAS, F, NY); (Talamanca), P.N. La Amistad, Cuenca del Sixaola, Bratsl, Punto 10 NE de Laguna Sacabico, 9°37'22.15"N, -83°16'43.53"W, 1000–1100 m, 27 July 2007, *Solano et al. 4542* (INB, NY, PMA); (Matina), P.N. Barbilla, Cuenca del Matina, Colonia Puriscaleña, Sendero Cerro Azul, 9°59'44.9069"N, -83°23'8.4987"W, 400 m, 7 March 2000, *Mora 872* (INB, MO). **Puntarenas:** (Golfito), R.N.V.S. Golfito, Camino a las torres del ICE, cabecera del Río Sorpresa, 5 km al E, 8°39'25"N, 83°9'44"W, 300–400 m, 1 February 1992, *Zamora et al. 1766* (CAS, INB, MO); 4 km NE of Escuela Santa Constanza, N of San Vito de Java, 760 m, 27 September 1968, *Davidse & Pohl 1275* (F, ISC, US); (Osa), R.F. Golfo Dulce, Península de Osa, Rancho Quemado, Tierra de Conservación, 8°43'0"N, 83°34'50"W, 200–350 m, 11 July 1993, *Aguilar 1969* (CAS, CR, MO); (Osa), Rancho Quemado, Fila División, Entre Rancho Quemado y junta de quebrada, 8°41'40"N, 83°36'30"W, 350 m, 18 July 1991, *Marín 25* (CR, MO); Monteverde community, Windbreak next to road, 10°20'N, 84°50'W, 1450 m, 22 July 1986, *Haber 5733* (MO); (Osa Peninsula), Corcovado N.P., 0 km to 1 km upstream from Los Chiles, 8°31'N, 83°31'W, 300–400 m, 10 July 1977, *Liesner 3120* (MO); (Osa), R.F.Golfo Dulce, En el valle de Rancho Quemado, ca. 15 km al W de Rincón, en el S del valle por la Quebrada Quebradona y Río Riyito, 8°40'0"N, 83°34'0"W, 200 m, 13 September 1990, *Hammel et al. 17855* (CR, MO); Eastern Osa Peninsula, more than 500 m from forest edge on the E coast of the Osa Penninsula, 8.70681°N, -83.59142°W, 25 January 2003, *Mayfield s.n.* (MO). **San José:** (Pérez de Zeledón), Cuenca del Barú, Fila Tinamastes, por la carretera entre Dominical y San Isidro, 9°18'43"N, 83°46'19"W, 950 m, 9 September 1996, *Hammel et al. 20440* (INB, MO); (Pérez de Zeledón), No protegida, Cuenca del Savegre, Savegre Abajo, 3 km N y 500 m W, de Savegre Abajo, 9°26'59"N, -83°50'55"W, 800 m, 7 February 2001, *Rodríguez et al. 6998* (INB, MO, NY); (Tarrazú), Zona Protectora Cerro Nara, 9°29'40"N, 84°1'0"W, 840 m, 13 Mayo 1997, *Estrada & Sánchez 784* (CR, F, MO); (Tarrazú), Los Llanos de Santa María, Filas Las Rejas, 9°32'30"N, 84°1'0"W, 700 m, 9 July 1997, *Valverde et al. 84* (CR, MO). **ECUADOR. Esmeraldas:** Environs of Lita, on the Ibarra-San Lorenzo RR, 550–650 m, 9 June 1978, *Madison et al. 5098* (F, QCA, US); (Quinindé), Bilsa Biological Station, Mache mountains, 35 km W of Quinindé, 5 km W of Santa Isabel, Near the Station's shower, 0°21'N, 79°44'W, 400–600 m, 10 April 1995, *Clark & Troya 677* (MO, QCNE, US); (Quinindé), Bilsa Biological Station, Montañas de Mache, 35 km W of Quinindé, 5 km W of Santa Isabel, Mature forest in property of Sr. Rios, S of Station, 0°21'N, 79°44'W, 400–600 m, 9 May 1995, *Clark & Watt 821* (CAS, MO, NY, QCNE); (Quinindé), Bilsa Biological Station, Montañas de Mache, 35 km W of Quinindé, 5 km W of Santa Isabel, Steep muddy slope near large waterfall SE of Station, upstream of Station shower, 0°21'N, 79°44'W, 400–600 m, 22 September 1994, *Baas & Abbott 48* (MO, NY). **Imbabura:** (Lita), 501 m, 23 April 1949, *Acosta-Solís 12195* (F). **Los Ríos:** Río Palenque B.R., Km 56 Quevedo to Sto. Domingo, 220 m, 15 December 1971, *McMahon 4280* (US); Río Palenque B.R., km 56 Quevedo to Sto. Domingo, near creek SW of station, 220 m, 31 March 1972, *Vrieze et al. 4312* (NY, QCA); Río Palenque B.R., km 56 Quevedo to Sto, Domingo, 150–220 m, 5 September 1972, *Dodson & McMahon 5099* (MO, NY, QCA). **NICARAGUA. Zelaya:** ca. 6.3 km S of bridge at Colonia Yolaina and ca. 0.8 km S of ridge of Serranias de Yolaina on road to Colonia Manantiales (Colonia Somoza), 11°36–37'N, 84°22'W, 200–300 m, 13 February 1978, *Stevens 6418* (CAS, MO); 6.3 km S of bridge at Colonia Yolania on road to Colonia Manantiales of Nueva Guinea, 200–300 m, 13 February 1978, *Vincelli 244* (MO). **PANAMA. Bocas del Toro:** Road from Fortuna Dam to Chiriquí Grande, 10 mi from Continental Divide, 8°51'N, 82°10'W, 400 m, 2 August 1984, *Churchill 5931* (CAS, MO); Along oleoducto road between contienetal divide and Chiriquí Grande, 8°50–55'N, 82°9–15'‘W, 350–400 m, 30 April 1985, *Hammel 13692* (MO). **Coclé:** (El Copé), on slope and ridge W of sawmill, 5 April

1978, *Hammel 2434* (CAS, MO). **Colón:** Trail from Alto Pacora to Cerro Brewster, 9°18'N, 79°16'W, 700 m, 18 November 1985, *de Nevers et al. 6229* (CAS, MO). **Darién:** Cerro Pirre, 762–1372 m, 9 August 1967, *Duke & Elias 13790* (MO); Trocha desde "Rancho Frío 2" hasta un poco más abajo de "Rancho Frío 1", Cerro Pirre, 13 October 1989, *Palacios et al. 503* (CAS, PMA); P.N. del Darién, Slopes of Cerro Mali, head waters of S branch of Río Pucuru, ca. 22 km E of Pucuru, 8°4.5'N, 77°14'W, 1300–1400 m, 21 October 1987, *Cuadros et al. 3935* (CAS, MO); P.N. del Darién, Along S branch of Río Pucuro, forest and ridge S of river & up river from old village of Tacarcuna, ca. 18 km E of Pucuro, 8°4'N, 77°16'W, 600–800 m, 21 October 1987, *Hammel et al. 16389* (CAS, MO); Cercanías de "Rancho Frío 2", trocha hacia la cima de Cerro Pirre, 12 October 1989, *Palacios & Polanco 468* (CAS, PMA); Bank above the Río Paca, 26 June 1959, *Stern et al. 594* (MO, NY, US); Middle slopes on W side of Cerro Pirre, 7°57'N, 77°46'W, 550–760 m, 28 June 1988, *Croat 68878* (MO). **Panamá:** (Distrito de Capira), Cerro Trinidad, Límite E del P.N, Campana, 8°44'30"N, 79°57'45"W, 800–900 m, 24 June 1994, *Galdames et al. 1169* (CAS, US); Gorgas Memorial Labs yellow fever research camp, ca 25 km NE of Cerro Azul on Río Piedras, 550 m, 20 November 1974, *Mori & Kallunki 3291* (MO); Trail to top of Cerro Pelado, 1000 m, 16 June 1979, *Antonio 1108* (MO). **Veraguas:** (Guabal), Río Dos Bocas, about 16 km NW of Santa Fe, ca. 500 m, 30 March 1975, *Dressler 5013* (CAS, US).

Illustration:—Fig. 22.

Common names and documented uses:—Ecuador: "blueberry" (*Vrieze et al. 4312*, NY!).

Habitat, distribution and ecology:—Rare to common, usually found on steep riparian rocky banks in rain forests and cloud forests, from Nicaragua south through southern Central America to Colombia and Ecuador (Fig. 16), at (12–)100–1450 m. In Nicaragua it is only known from the former department of Zelaya. It is more common throughout Costa Rica and Panama. In Colombia it has only been collected in Chocó; in Ecuador it is known from the Pacific Andean slope.

Phenology:—Collected in flower from December through October; in fruit throughout the year.

Etymology:—The specific epithet comes from the Latin *radic* (= a root), and might refer to the numerous aerial roots on the type specimens.

Discussion:—This species is distinguished by its prevailingly rupicolous habit, pronounced foliar dimorphism, and dense sessile-stellate indumentum. These features are also present in its closest relative *M. biolleyana*, but in *M. radicans* the foliar dimorphism is more striking (1:6–8 vs. 1:2), and the blade shape is different (elliptic-oblong and falcate vs. broadly ovate to subrotund). The inflorescences, although architecturally similar are fewer flowered in *M. radicans* than they are in *M. biolleyana.*

The thickened callose structure produced at the abaxial foliar base might be an acarodomatium, although it is less prominent than in *M. biolleyana* and no insects or eggs of any kind where found in the specimens studied. This domatium appears to be both taxonomically and phylogenetically significant since it is present in the trio of closely related species including *M. biolleyana*, *M. erikasplundii*, and *M. radicans*.

Conservation status:—This species would be considered Endangered EN B2ab(iii) based on IUCN criteria (AOO). However, because it occurs in many protected zones, a status of Least Concern LC is justified. In Colombia it is protected in Farallones National Park (Valle). In Costa Rica it is protected in the San Ramón Forest Reserve and in the Monteverde Biological Reserve (Alajuela); in the Barbilla and La Amistad National Parks (Limón); in the Golfo Dulce Forest Reserve and the Golfito Wild Life Reserve (Puntarenas); in the Cerro Nara Portected Zone. In Ecuador it is protected in the Mache-Chindul Ecological Reserve (Esmeraldas); and in the Río Palenque Biological Station (Los Ríos). Protected in Panama in Darién National Park (Darién).

27. *Miconia reitziana* (Cogn. & Gleason ex Gleason 1939a: 115–116) Gamba & Almeda, *comb. nov.* Basionym: *Clidemia reitziana* Cogn. & Gleason ex Gleason. Type: COSTA RICA. Puerto Viejo, 1893, *Biolley 7452* (holotype: US-internet image!; isotypes: BR-3 sheets-internet images!, CAS!).

Suffrutescent herb or shrub (0.35–)0.5–4(–6) m tall with open and lax branching, bark green-brown. *Upper internodes* (3.1–4.5 cm long) and cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, primary and secondary leaf veins abaxially, inflorescence axes, bracts, bracteoles, pedicels, and hypanthia densely to moderately composed of brownish sessile to thin-stipitate dendritic trichomes 0.15–0.23 mm long with short axes and few-moderate number of terete arms, copiously intermixed with red or pink elongate smooth trichomes mostly 1.5–3(–4) mm long. *Leaves* of each pair isophyllous in size when young, the older pairs becoming somewhat anisophyllous; the petiole (1–)1.5–6 cm long, canaliculate adaxially, shallowly to moderately grooved abaxially, green-brownish; larger leaves 10–22 × 7.8–11 cm, smaller leaves (4.5–)6.5–9 × (2.5–)4–6.6 cm, ovate to ovate-elliptic, the base broadly rounded to obtuse or slightly cordate, somewhat oblique, the margin vaguely undulate, ciliate-crenulate or ciliate-entire, the apex short-acuminate, chartaceous; mature leaves adaxially moderately to sparsely strigose with pink-red elongate smooth trichomes 1.5–2.5 mm long, the primary, secondary, tertiary and higher order veins glabrous; abaxially sparsely and caducously strigillose with pink-red elongate smooth trichomes 0.7–1.5 mm long, the tertiary and higher order veins glabrescent with a sparse mixture of the general vestiture, occasionally obscuring a sparse resinous indumentum of slightly furrowed sessile glands ca. 0.05 mm long; 5- or 7-plinerved to 5- or 7-nerved, including the tenuous marginals, when plinerved the innermost pair of secondary veins diverging asymmetrically from the primary vein 0.5–0.7 cm above the base, areolae 0.5–1 mm, adaxially the primary, secondary, tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated and terete. *Inflorescences* a pseudolateral group of multiflorous to few-flowered modified dichasia (1.5–)2–3 cm long, sessile or with a short peduncle to 0.5 cm long, with two or three paracladia from a somewhat elongate axis, moderately to little branched, borne on the upper leafy axils, the rachis light pink to red; bracts and bracteoles 1 × 0.5 mm, subulate to oblong-apiculate, somewhat thick, pink-red, the smooth trichomes absent, spreading, persistent in fruit. *Flowers* 5-merous sessile or on pedicels to 0.5 mm long. *Hypanthia* at anthesis 2.5–2.8 × 1–1.2 mm, free portion of hypanthium 1.2–1.5 mm long, subcylindric to campanulate, bluntly 10-ribbed, white to pink or red, the brownish dendritic trichomes sparse and caducous, the red or pink elongate smooth trichomes 0.9–1.2 mm long persistent and spreading, copiously intermixed with resinous slightly furrowed more or less stalked glands ca. 0.05 mm long, ridged on the inner surface, glabrous, the torus adaxially densely to moderately ciliate, the cilia 0.25–0.3 mm long. *Calyx* open in bud and persistent in fruit, red to pink; tube 0.1–0.2 mm long, adaxially sparsely ciliate to glabrous, abaxially with the same vestiture as the hypanthium; lobes 0.2–0.4(–0.5) × 1 mm, depressed-triangular, the margin entire to vaguely sinuate, the apex bluntly acute to rounded; exterior calyx teeth ca. 1 mm long including the apical trichome, bluntly conic and 1–3–aristate, the aristae pink or red, glabrescent with a few resinous glands and dendritic trichomes, inserted at the base of the calyx lobes and projecting beyond them. *Petals* 1.2–1.5 × 0.8–1.2(–1.5) mm, oblong, the margin entire, the apex rounded-obtuse, white, densely papillose on both surfaces, reflexed at anthesis. *Stamens* 10; filaments 1.2–1.5 × 0.22–0.25 mm, white to yellowish, glabrous; anther thecae 1.8–2.5 × 0.25–0.28 mm, linear-oblong and subulate, truncate-acuminate at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, light yellow at anthesis; connective yellow, its prolongation and appendage 0.3–0.4(–0.45) mm long, the appendage oblong-spatulate, obtuse at the apex, moderately gland-edged, the glands sessile, minute and rounded. *Ovary* 5-locular, completely inferior, ca. 1.3 mm long at anthesis, the apical collar absent, the apex 0.3 mm in diameter, somewhat depressed, sparsely ciliate and inconspicuously glandular-puberulent; style 3.8–4.7 mm long, parallel sided (i.e. terete) to tapered distally, white, glabrous; stigma truncate to expanded truncate. *Berries* 5–6 × 5–6 mm when dry, globose, bright pink turning purple-black when ripe, the hypanthial indumentum persistent in fruit. *Seeds* 0.29–0.36(–0.6) × 0.12–0.2 mm, ovoid, angled, light-brown; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone suboblong, ca. 60% larger than the corpus of the seed, extending along its entire length, ventrally and longitudinally expanded; individual cells elongate, anticlinal boundaries moderately channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief punctate.

Additional specimens studied:—COLOMBIA. Boyacá: (Puerto Boyacá), Puerto Pinzón, R.N de Aves El Paujíl, Cordillera Oriental, vertiente occidental, Serranía de Las Quinchas, Sendero El Pescadero, 6°2.98’N, 74°15.685’W, 206 m, 26 February 2011, *Alvear et al. 1440* (CAS). **Chocó:** Carretera San José del Palmar-Nóvita, Cerca del campamento de Orundó, Quebrada Guayacana, Río Ingará, 450 m, 31 August 1976, *Forero et al. 2395* (COL, MO, US); (San José del Palmar), Hoya del Río Torito (afluente del Río Hábita), declive occidental, Finca "Los Guaduales", 630–730 m, 7 March 1980, *Forero et al. 6855* (COL, MO); Carretera Panamericana (en construcción), Río Pató, 5°35’N, 76°56’W, 21 April 1979, *Forero et al. 5452* (COL, MO). **Risaralda:** (Pueblo Rico), corregimiento Santa Cecilia, Quebrada Amurrapa, 540–740 m, 23 October 1991, *Lozano et al. 6188* (COL). **COSTA RICA.** Hacienda de Tent, *Tonduz 314* (US); Remontando de la cuenca del Río Uren, saliendo de la casa de Calixto Kiamble, hasta la finca de Valerio Morales, 1030 m, 25 October 1985, *Gómez et al. 23827* (CAS, CR, MO). **Alajuela:** On the Caribbean slope between San Lorenzo and Los Angeles de San Ramón, above the Río San Lorenzo, 10°14’N, 84°32’W, 620 m, 20 September 1978, *Burger & Antonio 11202* (F, MO, NY); (Guatuso), San

Rafael, Grecia, Bosque frente a cueva de Venado y Quebrada del Tunel, al N del Volcán Arenal, 280 m, 20 August 1963, *Jiménez 1083* (CR, F, NY); Near La Laguna, 6 to 8 km S of Villa Quesada, 1200 m, 19 February 1966, *Molina et al. 17521* (F, NY); (San Carlos), Buena Vista, 850 m, 14 August 1964, *Jiménez 2290* (CR, F, NY); Near La Laguna, 6 to 8 km S of Villa Quesada, 1200 m, 19 February 1966, *Molina et al. 17540* (F, NY, US); 3.5 km W of fortuna, 2.5 km NW of New Volcán Arenal along sloping base, 10°28’N, 84°41’W, 1500 m, 5 August 1972, *Taylor & Taylor 11555* (NY); (San Carlos), San Isidro, San Miguel, 600 m, 29 June 1985, *Haber & Bello 1705* (MO); R. Monteverde, Poco Sol 13 km S Fortuna, 10°21’N, 84°41’W, 700–900 m, 20 August 1989, *Haber & Zuchowski 9370* (MO); (San Carlos), Villa Quesada, 530–550 m, 15 March 1939, *Smith 1791* (F, NY); Vicinity of Guatuso de San Rafael (on Río Frío), 10°43’N, 84°48’W, 80–100 m, 4 August 1949, *Holm & Iltis 847* (NY); (San Ramón), R.B. Dendrobates, No protegida, Cuenca del San Carlos, Fortuna, El Bosque (San Martín, El Burrito), Alrededores de Quebrada Piedrita, 10°26’30"N, -84°37’10"W, 150–1500 m, 26 May 2007, *Rodríguez 11128* (NY); About 5 km S of El Canalete near the Río Zapate and along the new road to Upala, 10°48’N, 85°2’W, 100–200 m, 12 November 1975, *Burger & Baker 9981* (CAS, F); (Sarapiquí), Laguna de Río Cuarto, 400 m, 27 August 1984, *Gómez-Laurito 10109* (F); 8 km S of Canalete on road to Upala, 300 m, 2 February 1976, *Utley & Utley 3974* (CAS, F); About 8 to 10 km NNW of Bijagua along the road to Canalete and Upala, 10°48’N, 85°2’W, 250 m, 13 February 1982, *Burger et al. 11740* (F); About 3 km NNE of Bijagua along the new road to Upala, 10°45’N, 85°3’W, 450 m, 7 November 1975, *Burger & Baker 9830* (CAS, F); (San Carlos), La Tigra, Concepción, R.B. Bosque Eterno de los Niños, 10°19’0"N, 84°36’50"W, 700 m, 7 August 2000, *Estrada 2381* (F); Monteverde R., Peñas Blancas river valley, Atlantic slope rain forest, 10°20’N, 84°43’W, 800–900 m, 17 September 1986, *Haber & Cruz 5652* (CAS, MO); About 9 km N of Río Naranjo along road to Upala, 400–500 m, 8 July 1976, *Utley & Utley 5348* (CAS, MO); Along road between Canas and Upala 4 km NNE of Bijagua on slopes leading into Río Zapote, 400 m, 24 June 1976, *Croat 36250* (MO); Along road between Cañas and Upala, 10km N of Bijagua , 200 m, 26 June 1976, *Croat 36468* (MO); Finca Los Ensayos ca. 11 miles NW of Zarcero, 850 m, 15 August 1977, *Croat 43576* (MO); (Alajuela), Virgen del Socorro, No protegida, Cuenca del Sarapiquí, 10°15’25"N, -84°10’20.0001"W, 800 m, 21 July 2002, *Kriebel 547* (INB, MO); R.B. Monteverde, Río Peñas Blancas, Parcela de Manuel Rojas, 850 m, 8 August 1988, *Bello 279* (CAS, CR, MO); (Grecia), R.V.S. Bosque Alegre, Cuenca del Sarapiquí, Laguna Hule, 10°17’55.456"N, -84°12’54.057"W, 700–800 m, 28 July 2002, *Kriebel & Larraguivel 651* (INB, MO); (San Ramón), Río Balsa, 7 km antes de Bajo Rodríguez, 10°15’N, 84°31’W, 500 m, 12 July 1991, *Jiménez & Soto 979* (CAS, INB, MO); 4 km SE of Fortuna, then 2.5 km SW on jeep road, 10°29’"N, 84°43’"W, 400–500 m, 29 April 1983, *Liesner et al. 15207* (CAS); Río Chiquito, apx, 40 km Road to Upala, 800 m, 1 October 1982, *Gómez 18632* (CAS, CR); (Upala), Cordillera de Guanacaste, 4 km W of Bijagua, Canyon of Río Bijagua, 10°43’0"N, 85°6’0"W, 600–700 m, 21 August 1995, *Penneys et al. 695* (CAS, INB). **Cartago:** Valle Escondido, 730 m, 30 March 1966, *Schnell 627* (F); (Turrialba), P.N. Barbilla, Cuenca del Matina, Entrada principal, Sendero El Felino, 9°58’20"N, -83°27’10"W, 300–400 m, 16 August 2000, *Mora & Rojas 1362* (INB, MO); Guanacaste: Rincón de la Vieja, Cordillera de Guanacaste, near refugee camp, along road NW of Quebrada Grande, 85–27 N, 500 m, 25 July 1983, *Barringer et al. 4073* (CAS, F, MO); Río Chiquito, 6 km NE, next to lake Arenal, On Atlantic side, 10°27’N, 84°48’W, 600 m, 8 May 1986, *Haber et al. 4787* (MO); El Arenal, 485–600 m, 18 January 1926, *Standley & Valerio 45185* (US); Los Ayotes, Near Tilarán, 600–700 m, 21 January 1926, *Standley & Valerio 45376* (US); A 2 km al NE de Tilarán, 850 m, 4 December 1963, *Jiménez 1338* (F); (Tilarán), Quebrada Grande, Río Chiquito, 10°25’N, 84°51’W, 750 m, 10 June 1989, *Bello 935* (CR, MO); (Bagaces), Z.P. Miravalles, Cuenca del Tempisque, Sector Caralampio, 10°42’33.062"N, -85°7’3.614"W, 1250 m, 8 March 2000, *Chaves 242* (INB, MO); (Tilarán), P.N. Volcán Tenorio, Cuenca del San Carlos, Sector Rancho Capú, 10°34’48"N, -84°59’1"W, 700 m, 9 April 2000, *Chaves et al. 386* (INB, MO). **Heredia:** Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, West River Road, 0–200 m line, in a light gap, 100 m, 17 March 1981, *Folsom 9373* (CAS, F); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, W River Road, 400 m line, 100 m, 30 May 1980, *Hammel 8880* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, trail opposite Plot I trail, 100 m, 29 May 1980, *Hammel 8841* (CAS); (La Virgen del Socorro), Ca, 5 km E of Cariblanco, 850 m, 13 August 1974, *Maas 1286* (F, US); La Selva, Near Puerto Viejo, River Road, 90 m, 21 May 1972, *Opler 825* (F, MO, US); La Selva de la Sarapiquí, 500 m, 31 October 1965, *Schnell 308* (F); (Colonia Virgen del Socorro), Barranca del Río Sarapiquí, 3 February 1984, *Gómez-Laurito 9866* (F); (Puerto Viejo de Sarapiquí), Finca La Selva, Along W River Road, 12 July 1979, *Grayum 1787* (F, MO); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Sendero Tres Ríos, 100–400 m, 25 June 1995, *Whitson 266* (MO); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, On steep slope along Río Sarapiquí on E bank of River at the crossing of new property, 100 m, 20 April 1982, *Hammel 11767* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Sendero W near Quebrada Leonel about 0200 m line, 100 m, 24 May 1985, *Wilbur 37347* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, W River Road to the point, 31 July 1980, *Wilbur 30134* (CAS); Near confluences of Ríos Sarapiquí and Puerto Viejo, 100 m, 1 August 1968, *Schnell 1016* (US). **Limón:** (Limón), Santa Rosa, Santa Rosa near Limón, 20 m, 17 September 1968, *Davidse & Pohl 1244* (US); (Matina), Cordillara de Talamanca, 200 m abajo de la confluencia de Quebrada Cañabral con Río Barbilla, margen derecha, siguiendo el curso de la Quebrada Camagre, 10°0'10"N, 83°25'30"W, 100 m, 5 November 1988, *Herrera 2288* (CAS, CR, F, MO, US); (Talamanca), Sixaola, Gandoca, 1.5 km al NW de la Escuela de Mata de Limón, 9°33'30"N, 82°37'25"W, 10 m, 5 April 1995, *Herrera 7716* (CR, F, MO); (Talamanca), Bribri, 7 km NW del pueblo, en dirección hacia la Fila Carbón, Bosques aledaños a la nueva toma de agua, 9°39'0"N, 82°53'0"W, 100–200 m, 18 July 1995, *Cascante et al. 542* (CR, F); Rainforest slopes of Cerro Skopte W of Río Coén about 7 km beyond Coroma, 450–700 m, 19 February 1992, *Almeda & Daniel 7035* (CAS, MO); (Talamanca), Sur les rives de l'Amoura à Shirores, 100 m, 1 February 1895, *Tonduz 9349* (F, US); (Talamanca), Sur les rives de l'Amoura à Shirores, 100 m, 1 February 1895, *Tonduz* 7266 (F, US); (Talamanca), Tsaki, Forêts de Tsâki, 200 m, 1 April 1895, *Tonduz 9603* (F, US); Hacienda Tapezco-Had La Suerte, 29 air km W of Tortuguero, 10°30'N, 83°47'W, 40 m, 14 August 1979, *Davidson & Donahue 8267* (US); (Matina), P.N. Barbilla, Cuenca del Matina, Sendero Las Pitas, Quebrada El Dulce, 9°59'5"N, 83°23'50"W, 600–700 m, 10 April 2000, *Mora 1024* (INB, MO, NY); Less than 1 mile SW of Bribri near Paramanian frontier, <50 m, 12 August 1977, *Croat 43232* (CAS, MO); 5 miles up from mouth of the Estrella River, 18 April 1952, *Stork 4600* (NY); (Tortuguero), Suretka, 200 m from RECOPE oil drilling platform, 9°34'N, 82°56'W, 27 June 1984, *Barringer et al. 3589* (CAS, F); N end of Tortugureo N.P, and near the Boca de las Lagunas de Tortuguero, 10°34'N, 83°32'W, 0–30 m, 23 September 1978, *Burger & Antonio 11239* (CAS, F); Hitoy Cerere R., Vicinity in Valle La Estrella S of Finca Concepción, in woods on slope along Río Cerere, 9°42'N, 83°2'W, 100–200 m, 31 July 1985, *Hammel & Grayum 14303* (CAS, MO); R.B. Hitoy Cerere, Subiendo las filas entre el margen izquierdo del Río Cerere y las cabeceras del Río Moín, 9°39'50"N, 83°1'50"W, 400 m, 2 June 1990, *Herrera 3945* (MO); (Guápiles), Los Angeles, San Miguel, Bosque aledaño a la catarata, Río Blanco, 10°7'30"N, 83°50'45"W, 700 m, 24 February 1990, *Herrera & Schik 3794* (CAS, MO); (Limón), R.B. Hitoy Cerere, Cuenca del Estrella, Sendero Bobocara, 9°40'25"N, -83°1'35.0001"W, 100–200 m, 5 November 1999, *Rodríguez et al. 4886* (INB, MO); (Matina), P.N. Barbilla, Cuenca del Matina, Entrada principal, 9°59'30"N, -83°22'40"W, 300–400 m, 21 August 2000, *Mora 1418* (INB, MO); Hacienda Tapezco-Hda, La Suerte, 29 air km W of Tortuguero, 10°30'N, 83°47'W, 40 m, 18 August 1979, *Davidson & Donahue 8495* (MO); (Bajo Telire), Río Telire, 400–600 m, 1 July 1984, *Gómez 24130* (CAS, CR, MO); (Talamanca), San Miguel, Cuenca del Sixaola, Bosques sometidos a explotación de madera entre San Miguel y Gandoca. siguiendo el curso de Quebrada innominada (aparentemente Mile Creek), 9°34'30"N, 82°40'0"W, 30–100 m, 21 January 1997, *González et al. 1692* (INB, MO); (Limón), R.B. Hitoy Cerere, Cuenca del Estrella, margenes de la Quebrada Barrera, en cercanías de la Estación, 9°40'15"N, 83°1'34"W, 160 m, 24 June 1998, *Rodríguez & González 3528* (INB, MO); R.B. Hitoy Cerere, Rainforest along the sloping banks of Río Cerere from the R, Station to the big waterfall, 100 m, 27 February 1991, *Almeda et al. 6830* (CAS, CR); (Limón), Faja costeña de Limón, San Rafael de Pandora, 9°48'10"N, 82°59'50"W, 220 m, 10 September 1995, *Rodríguez 854* (CAS, INB); (Talamanca), Amubri, Camino entre Amubri y Soki, Siguiendo el Río Ñabri hacia Alto Soki, 9°29'50"N, 82°59'10"W, 150 m, 1 July 1989, *Herrera 3122* (CAS, CR); (Pococí), La Bomba, Asunción, Llanura de Santa Clara, Fila de Matama, 9°53'30"N, 83°11'30"W, 400 m, 5 September 1995, *Rodríguez & Abarca 902* (CAS, INB); Hacienda Tapezco-Hda, La Suerte, 29 air km W of Tortuguero, 10°30'N, 83°47'W, 40 m, 28 August 1979, *Davidson & Donahue 8893B* (CAS). **Puntarenas:** Osa Península, Near the airfield about 4 miles W of Rincón de Osa, 8°42'N, 83°31'W, 30 m, 4 June 1968, *Burger & Stolze 5526* (F, MO, NY); Osa Peninsula, Corcovado N.P., near Los Chiles, 8°31'N, 83°31'W, 300–400 m, 10 July 1977, *Liesner 3158* (MO); (Ricon de Osa), Ridge trail above field station, Rincon de Osa, 50–200 m, 17 May 1971, *Burch 4469* (MO); P.N. Corcovado, Sirena, Ollas Trail, 8°28'N, 83°35'W, 1–20 m, 12 September 1989, *Kernan 1273* (CR, MO). **San José:** (Pérez de Zeledón), Along road between San Isidro General and Dominical, Fila Tinamastes, 9°18'24"N, 83°46'11"W, 990–1100 m, 9 September 1996, *Croat & Hannon 79128* (CAS). **NICARAGUA. Jinotega:** (Bocaycito), Cordillera Isabelia, 117 km from Matagalpa, Near Río Bote, 6 May 1976, *Neill 298 (7173)* (CAS, MO); (Santa Cruz), El Calvario, Al SW del Cerro Kilambé, 13°34'N, 85°40'W, 900–1000 m, 27 March 1981, *Moreno 7712* (MO); Cara E del Macizo Kilambé, 13°35'36"N, 85°39'40"W, 1200–1300 m, 26 July 1980, *Sandino 241* (CAS, MO); (Cua Bocay), Comunidad de San Andrés, R. de Bosawas, Caño Susumwas, transecto 4 en zona de Conservación, Mari Ilkara, 14°22'21"N, 85°3'50"W, 185 m, 27 June 2005, *Coronado et al. 1822* (MO); (Wiwili), Zona de amortiguamiento Bosawas, Comunidad Aniwas, Transecto 10 en zona agrícola (was Ulwa Sirpi tingni), 14°28'15"N, 85°2'48"W, 170 m, 22 November 2005, *Coronado et al. 2854* (CAS); (Wiwili), R. de Bosawas, Comunidad de Inipuwas, Caño Wayawas, 14°24'16"N, 85°9'46"W, 135 m, 13 November 2005, *Coronado et al. 2656* (CAS). **Matagalpa:** Macizos de Peñas Blancas, SE side, drainage of Quebrada El Qubradón, slopes N of Hda, San Martín, 13°14–15'N, 85°39'W, 950–1000 m, 24 November 1981, *Stevens & Riviere 20883* (CAS, MO); Falda NW del Cerro Musún, trocha de Palán, 300–600 m, 14 May 1980, *Araquistain & Moreno 2424* (MO); Macizos de Peñas Blancas, SE side, drainage of Quebrada El Qubradon, slopes N and W of Had, San Martín, 13°14–15'N, 85°38–39'W, 1000–1400 m, 18 January 1982, *Stevens et al. 20992* (MO). **Río San Juan:** Near Caño Chontale, 20 km NE of El Castillo, 200 m, 18 April 1978, *Neill & Vincelli 3500* (MO); (El Tambor), A lo largo de 15 km al N del Puesto MARENA, 10°44'0"N, 83°26'0"W, 50–200 m, 9 July 1994, *Rueda et al. 1891* (MO); Near Caño Chontaleño, 20 km NE of El Castillo, 200 m, 18 April 1978, *Neill & Vincelli 3523* (MO). **Rivas:** (Isla Omepete), localidad de "Las Cuchillas", Volcán Maderas, 11°27'N, 85°28'W, 400–800 m, 2 June 1985, *Robleto 1984* (MO). **Zelaya:** ca. 6.3 km S of bridge at Colonia Yolania and ca. 0.8 km S of ridge of Serranías de Yolania on road to Colonia Manantiales (Colonia Somoza), 11°36–37'N, 84°22'W, 200–300 m, 29 October 1977, *Stevens 4801* (CAS, MO); Bosque lluvioso de montañas de Esquipulas y Alemán, drenaje de Río Alemán, 150 m, 27 November 1951, *Shank & Molina 4767* (F, US); Cuesta El Bálsamo, 13°39'N, 84°58'W, 200 m, 24 February 1983, *Moreno & Robleto 20671* (MO); 6.3 km S of bridge at Colonia Manantiales of Nueva Guinea, 200–300 m, 13 February 1978, *Vincelli 215* (CAS, MO); Along trail from Cerro Saslaya to San Jose del Hormiguero, between Caño Majagua and Caño Sucio, 13°45'N, 84–85°59–0'W, 600–800 m, 10 March 1978, *Stevens 6865* (CAS, MO); ca. 6.3 km S of bridge at Colonia Yolaina on road to Colonia Manantiales (Colonia Somoza), 11°36–37'N, 84°22'W, 200–300 m, 13 February 1978, *Stevens 6425* (CAS, MO); Bosque lluvioso de montañas de Esquipulas y Alemán, drenaje de Río Alemán, 150 m, 27 November 1951, *Shank & Molina 4865* (F); Montañas y bosques lluviosos entre Toro Bayo y Esquipulas, Drenajes de los Ríos Jícaro y Esquipulas, 130 m, 20 November 1951, *Shank & Molina 4094* (F); 6.3 km S of bridge at Colonia Yolaina on road to Colonia Manatiales of Nueva Guinea, 200–300 m, 13 February 1978, *Vincelli 244-A* (CAS, MO); Along new road from Río Blanco to Río Copalar, ca 26 km E of Río Blanco, 12°50–55'N, 85°00–05'W, 200–400 m, 14 February 1979, *Stevens 12219* (MO); Cerro Saslaya, 20 km W of Siuna, along E ridge of mountain, 1100–1400 m, 5 May 1977, *Neill 1873* (MO); 5 km N de Colonia Jacinto Baca Jerez, 11°54'N, 84°24'W, 160 m, 20 October 1984, *Sandino 4664* (CAS, MO); 2 km de Colonia Serrano, Comarca El Escobillo, 11°34–35'N, 84°21'W, 80–100 m, 28 July 1982, *Sandino 3314* (CAS, MO); Sector de Negro Wás, entre El Empalme y Rosita, 13°45'"N, 84°25'"W, 200 m, 30 September 1984, *Ortiz 2190* (MO); Vecindades de Waní, 1 March 1983, *Ortiz 890* (MO); Cerro El Escobín, 4 km de Colonia Serrano, 11°33–34'N, 84°21–22'W, 120–130 m, 30 July 1982, *Sandino 3379* (CAS, MO); (Nueva Guinea), Cerro cerca de Colonia Yolaina, 11°38'N, 84°21'W, 300 m, 13 August 1982, *Araquistain 3113* (CAS, MO); (Siuna), Santa Rosa, 6 September 1982, *Ortiz 75* (CAS, MO). **PANAMA. Bocas del Toro:** Ca, 15 km up the Changuinola River to I.R.H.E, Damsite #1, Near campside on trail to ridge NE of campsite, 244–274 m, 12 December 1979, *Antonio 3072* (CAS); Río Changuinola, alrededor del campamento del IRHE, 16 December 1979, *Carrasquilla & Mendoza 1149* (CAS, MO); Forest on hill above RR station at Milla 7.5, 27 July 1971, *Croat & Porter 16380* (MO); Forest above RR stop at Milla, 7.5, 26 July 1971, *Croat & Porter 16285* (MO); On slope above Milla 7.5 railroad stop, 10 km, NW of Almirante, 100 m, 2 January 1975, *Nee & Hansen 14088* (MO); Fish Creek Mts., 22 April 1941, *von Wedel 2307* (NY); (Alto Río Guabo), Atlantic slope N of Fortuna Dam site, 4–5 km upriver (S) from crossing (no bridge) of road to Chiriquí Grande, 8°48'N, 82°12'W, 500–650 m, 27 July 1997, *Foster & Torres 15800* (F); Sitio de presa campamento del IRHE, 29 March 1980, *Carrasquilla & Mendoza 1338* (CAS, PMA); Al NW del campamento Changuinola 1 de Corriente Grande, Cerro Bracha, 18 January 1980, *Correa et al. 3095* (CAS, PMA); Al NW del campamento Changuinola 1 de Corriente Grande, Cerro Bracha, 18 January 1980, *Correa et al. 3156* (CAS, PMA); Darién S slope of W most summit of Cerro Tacarcuna massif between Pucro base camp & Tacarcuna summit camp, 1400–1600 m, 21 July 1976, *Gentry et al. 16868* (MO, NY, US); P.N. del Darién, Cerro Mali, head waters of S branch of Río Pucuro, ca. 22 km E of Pucuro, 8°4.5'N, 77°14'W, 1250–1500 m, 20 October 1987, *de*

Nevers et al. 8449 (CAS); P.N. del Darién, Slopes of Cerro Mali, head waters of S branch of Río Pucuro, ca 22 km E of Pucuro, 8°4.5'N, 77°14'W, 1300–1400 m, 21 October 1987, *Cuadros et al. 3940* (CAS, MO, US); Between Tres Bocas and Cerro Campamiento on Cuasi-Cana Trail, 1 May 1968, *Kirkbride & Duke 1355* (MO, NY); Cana-Cuasi Trail (Camp 2), Chepijana, 1219 m, 10 March 1940, *Terry & Terry 1460* (F, MO); P. N. del Darién, Cerro Mali, headwaters of S branch of Río Pucuro, ca. 22 km E of Pucuro, 8°4.5'N, 77°14'W, 1250–1500 m, 20 October 1987, *de Nevers et al. 8449* (MO); Middle slopes on W side of Cerro Pirre, 7°57'N, 77°46'W, 550–760 m, 28 June 1988, *Croat 68879* (MO).

Illustration:—Fig. 23.

Common names and documented uses:—Colombia: "morita" (*Galeano et al. 3622*, COL-internet image!); Nicaragua: "jaboncillo" (*Ortiz 75*, CAS!, MO!).

Habitat, distribution and ecology:—Local, on river banks, understories and disturbed sites in lowland rain forests and premontane wet forests, usually found in deep shade, from Nicaragua through southern Central America to Colombia (Fig. 16), at 0–1500 m. In Nicaragua it is found in the Atlantic and North-central zones (Almeda 2001), in Costa Rica it is present throughout the country, and it has been collected in Panama (Bocas del Toro and Darién) south to Colombia, where it is only known from the San José del Palmar region (Chocó and Risaralda), and was recently collected in the Eastern Cordillera of the Andes.

Phenology:—Collected in flower and fruit throughout the year.

Etymology:—From a family name (Reitz). Gleason did not specify derivation of this epithet in the protologue.

Discussion:—This species is distinguished by the dense pink-setose pubescence on internodes, inflorescence rachis, foliar surfaces and hypanthium. *Miconia quinquenervia* shares similar setose exterior calyx teeth and gland-edged staminal connective appendage. *Miconia neocoronata* also has an adaxially ciliate torus like *M. reitziana* and resinous-glandular hypanthium, but lacks elongate trichomes on the foliar surfaces and hypanthium. Phylogenetically, *M. reitziana* is sister to both *M. aguilarii* and *M. quinquenervia* (Fig. 1), both of which differ from the former in having foliar bases decurrent on the petioles.

Occasionally but not consistently, in all the material studied, the resinous-glandular vestiture is also present on the upper internodes, veins and venules abaxially, but obscured by the more conspicuous asperous indumentum as noted by Almeda (2009). The anisophylly in this species is not present in every pair of leaves of an individual. Some leaf pairs are isophyllous, but every individual has several pair of anisophyllous leaves.

There is a recent collection from the department of Boyacá (*Alvear et al. 1440*, CAS!, COL) that certainly belongs to the *M. reitziana* alliance. The vegetative and floral dimensions are congruent, as well as floral characters, and the adaxial torus is ciliate although sparsely so. The hypanthium vestiture consists of rusty asperous trichomes and resinous-glandular trichomes, but with a few smooth pinkish trichomes. Phylogenetically this taxon branches before *M. reitziana*, but both belong to the same clade. In this part of the tree (Fig. 1) there is not enough statistical support to separate *M. reitziana* from this Boyacá population; therefore the exact relationship between these two entities remains to be resolved. The Alvear collection is from the western slope of the Eastern Cordillera of the Andes, a region from which no previous collections of *M. reitziana* are known. Considering the distance between the known populations of *M. reitziana* in Colombia, this specimen would represent the easternmost occurrence of this taxon; therefore, the slight morphological differences may be associated with its geographic isolation. More collections are needed for a better understanding of the distribution of this species in the Colombian Andes.

Conservation status:—This species would be considered Endangered EN B2ab(iii) according to IUCN criteria (AOO). Because it occurs in many protected areas, a status of Least Concern LC is warranted. Protected in Colombia in the Aves El Paujil Natural Reserve (Boyacá). In Costa Rica it is protected throughout the country in several National Parks and Reserves. In Nicaragua it is protected in the Bosaws Reserve (Jinotega). In Panama it is protected in the Darién National Park (Darién).

28. ***Miconia renatoi*** Gamba & Almeda, *spec. nov.* (Fig. 24)

Related to *M. alboglandulosa* which it resembles in flower morphology and hypanthial coloration. Distinguished by the clavate dendritic trichomes with moderately long thin-walled arms, which are 0.5–2 mm long and present throughout the plant.

Type: ECUADOR. Prov. Pichincha: Reserva Florística-Ecológica "Río Guajalito", km 59 de la carretera Antigua Quito-Sto. Domingo de los Colorados, a 3.5 km al NE de la carretera, estribaciones occidenatles del Volcán Pichincha, 0°13'S, 78°48' W, 1800–2200 m, 27 December 1985, *Jaramillo 8274* (holotype: NY!, isotype: MO!).

Laxly branched subshrub or shrub 1–4 m tall. *Upper internodes* compressed-rounded to rounded-quadrate, (0.3–)2.5–6.6 cm long, cauline nodes terete, nodal line absent. *Indumentum* on branchlets, petioles, primary, secondary and tertiary foliar veins abaxially, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, calyx lobes and calyx teeth densely to copiously covered with whitish-translucent clavate dendritic trichomes 0.15–2 mm long with moderately long thin-walled arms, on branchlets, petioles, primary and secondary leaf vein abaxially, occasionally intermixed, or completely replaced by, whitish-translucent deflexed-elongate slightly roughened trichomes 0.6–1 mm long. *Leaves* of each pair somewhat unequal in size at maturity; petioles 0.5–2.1 cm (on larger leaves) or 0.3–0.8 cm (on smaller leaves), canaliculate adaxially, rounded or bluntly grooved abaxially; larger blades 8.3–14.5 × 2.8–6.5 cm, smaller blades 5.3–8.5 × 2.1–3 cm, elliptic to oval, the base acute-attenuate, the margin entire to obscurely crenate, the apex aristate-caudate, firm-chartaceous; mature leaves adaxially glabrescent, along with the primary vein, at first with the dendritic indumentum or with a mixture of dendritic and elongate slightly roughened trichomes, mainly toward the blade base, the secondary, tertiary and higher order veins glabrous; abaxial surface glabrous, except for a few glands on the venules, the tertiary and higher order veins copiously to moderately beset with resinous slightly furrowed more or less stalked glands, occasionally sparsely intermixed with white furrowed sessile glands, both ca. 0.08 mm long; 5-nerved to shortly 5-plinerved, including the tenuous marginals, when slightly plinerved, the innermost pair of secondary veins diverging symmetrically from the primary vein 0.2 cm above the base, areolae 0.5–1 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly raised. *Inflorescences* an axillary cluster of cymes 1.3–2.8 cm long, including a peduncle 0.2–0.3 cm long, branching poorly developed with multiple axes arising from a common point at the peduncle apex (fascicle-like), paired on the upper defoliated axils; bracts 1.1–1.6 × ca. 0.3 mm, linear-subulate, erect and somewhat concave, persistent to tardily deciduous in fruit; bracteoles 0.4–0.5 × 0.2 mm, triangular and thick at the base, concave, somewhat persistent in fruit. *Flowers* 4-merous on pedicels 0.5–0.7 mm to 1 mm long in fruit. *Hypanthia* at anthesis 2.5 × 1.5 mm, free portion of hypanthium ca. 1 mm long, subcylindric to campanulate, bluntly 8-ribbed, red-pink, the dendritic trichomes densely to moderately mixed with resinous subsessile furrowed glands ca. 0.03–0.05 mm long, inner surface ridged, along with the torus densely covered with rounded sessile glands, each ridge sparsely beset with short-stalked glands with thin-walled short heads. *Calyx* open in bud and persistent in fruit, red-pinkish; tube ca. 0.3 mm long, with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 0.8–1 × 0.5 mm, broadly and bluntly triangular, the margin entire, the apex bluntly acute, glabrescent with age, reflexed at anthesis and fruit; exterior calyx teeth 0.9–1.1 mm long, bluntly linear-subulate, inserted at the apex of the calyx lobes and widely projecting beyond them, resinous-glandular as the hypanthium outside. *Petals* 3.5–4 × 1.5 mm, triangular-subulate, the margin entire, the apex bluntly acuminate, white, glabrous on both surfaces, reflexed at anthesis. *Stamens* 8; filaments 1.7 × 0.3 mm, white, glabrous; anther thecae 2.2 × 0.4 mm, linear-oblong, rounded at the apex, opening by one dorsally inclined pore 0.15 mm in diameter, white to yellow at anthesis; connective darker than the thecae, its prolongations and appendage 1.2 mm long, the appendage linear-lanceolate, acute at the apex, copiously gland-edged with short stalked glands with thin-walled short heads, also somewhat prolonged and gland-edged but unappendaged ventro-basally. *Ovary* 4-locular, 2/3 inferior, 1.5 mm long at anthesis, the apical collar absent, the apex ca. 0.25 mm in diameter, conic, copiously glandular-puberulent; style 4.5 mm long, tapering distally, white, glabrous; stigma capitellate at anthesis. *Berries* 3–3.5 × 4 mm when dry, globose to slightly oblate, purple when ripe, the hypanthial indumentum persistent at maturity. *Seeds* 0.61–0.62 × ca. 0.3 mm, pyramidal, brownish; lateral symmetrical plane triangular, the highest point near the central part of the seed; antiraphal symmetrical plane suboblong; raphal zone circular to suboblong, ca. 60% the length of the seed; multicellular sculpture rugose throughout the seed; individual cells and microrelief not discernible on material available for study.

Additional specimens studied:—COLOMBIA. Cauca: (Santa Rosa), Corregimiento de San Juan de Villalobos, Vereda Palmeras, Zona amortiguadora del P.N.N. Serranía de Los Churumbelos, Camino hacia Mandiyaco, cerca del Río Villalobos, 1°30.266'N, 76°20.809'W, 1458 m, 20 February 2013, *Alvear et al. 1905* (CAS, COL). **Chocó:** Carretera Ansermanuevo-San José del Palmar, límite con el Valle del Cauca, Alto del Galápago, 2050–2100 m, 25 August 1976, *Forero et al. 2060* (US). **Nariño:** (Ricaurte), R.N. La Planada, Vertiente Occidental, Cordillera Occidental, 1.2°N, -77.95°W, 1800 m, 2 May 1989, *Restrepo 455* (MO). **ECUADOR. Carchi:** Awá R., Trail to Pailon encampment, Gualpi Chico area of Awá R., 0.97°N, -78.27°W, 1350–1400 m, 21 January 1988, *Hoover et al. 3621* (MO, US). **Cotopaxi:** R.E. Los Illinazas, Cerro Tilipulo, filo de cumbre, Cordillera Tilinche, -0.775°S, -79.096°W, 2022 m, 25 July 2003, *Silverstone-Sopkin et al. 9539* (CAS, CUVC). **Pichincha:** R. Florística Ecológica Río Guajalito, km 59 de la carretera antigua Quito-Sto Domingo de los Colorados, 3.5 km al NE de la carretera, Estribaciones occidentales del Volcán Pichincha, -0.2314°S, -78.8028°W, 1800–2200 m, 12 August 1985, *Jaramillo & Zak 8036* (MO, US).

Illustration:—Fig. 24.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—Uncommon species in primary cloud forests from the Pacific Andean slopes of southern Colombia through northwestern Ecuador (Fig. 17), at 1350–2100 m. In Colombia it is known from the Department of Chocó, close to the limits with Valle, and from La Planada Reserve in Nariño. It appears to be more common in Ecuador.

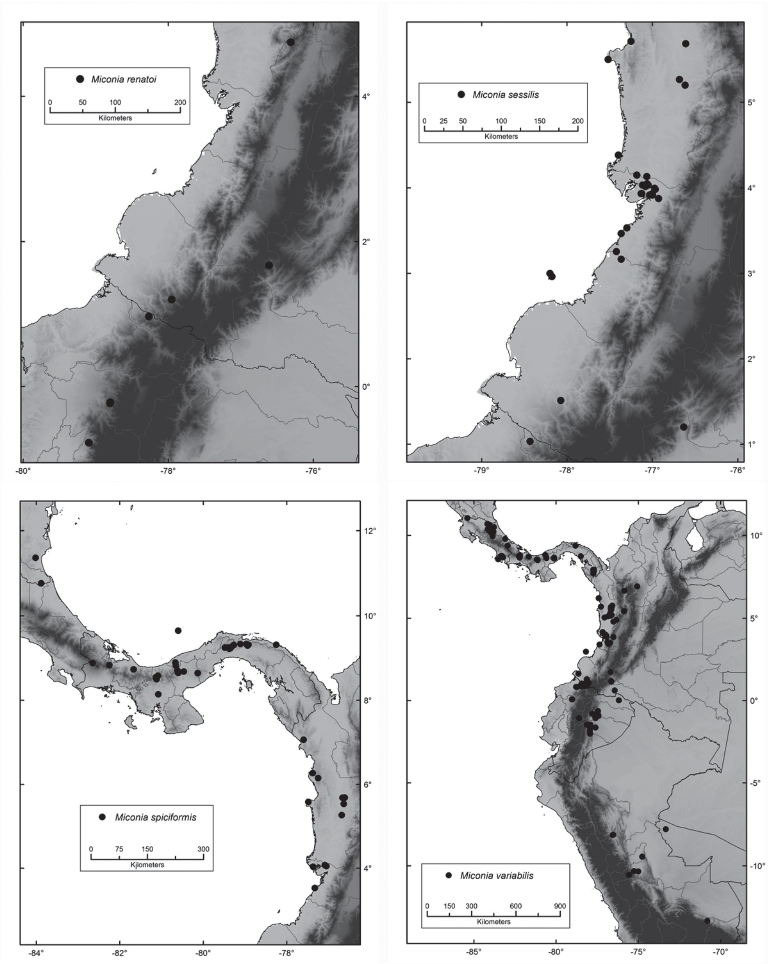


FIGURE 17. Distributions of *Miconia renatoi*, *M. sessilis*, *M. spiciformis*, and *M. variabilis.*

Phenology:—Collected in flower and fruit from December through January, in May, and from July through August, but fruiting material has been collected only in July.

Etymology:—The specific epithet is dedicated to Renato Goldenberg (1968–), an active Brazilian botanist and collector. He is a specialist in tropical and Brazilian Melastomataceae. Currently, he is an associate professor at the Universidade Federal do Paraná in Curitiba, Brazil.

Discussion:—The distinctive features of this species include its dense whitish-translucent granulose-asperous vegetative indumentum of clavate dendritic trichomes with moderately long thin-walled arms, fascicle-like cluster of cymes, white flowers with pink hypanthia, and pink-red costate berries turning purple at maturity. It is similar to *M. alboglandulosa*, which is probably the sister species, differing in indumentum size (0.15–2 mm long vs. 0.053–0.093 mm long in *M. alboglandulosa*) and foliar shape (elliptic to oval with acute-attenuate base vs. elliptic-lanceolate with rounded base). This new species also lacks the resinous and white sessile furrowed glands on vegetative parts which characterize *M. alboglandulosa*, but these glands are present on the hypanthium, intermixed with the dendritic trichomes (which are lacking in *M. alboglandulosa* hypanthium).

There are few collections of this new species. However the vegetative indumentum is rather variable and the specimens from the province of Carchi and Cotopaxi have elongate slightly roughened trichomes in addition to the dendritic ones. These trichomes seem to be a longer version of the dendritic ones. These specimens also have the same kind of indumentum on the hypanthium, but the slightly furrowed glands are more abundant than the dendritic trichomes, which is the reverse for the collections from Pichincha, which lack the elongate trichomes mentioned above. The rest of vegetative and floral characters are uniform among the collections studied, and for this reason we consider all the material a single species with two indumentum variants on the vegetative parts.

Conservation status:—This species would be considered Endangered EN B2ab(iii) based on IUCN criteria (AOO). However, it is protected in most of its range, justifying a status of Least Concern LC. This species is protected in the areas where it has been collected (all natural reserves). These areas include La Planada Natural Reserve in Colombia (Nariño). In Ecuador it is protected in the Awá Indigenour Reserve (Carchi), Los Illinazas Ecological Reserve (Cotopaxi), and in the Río Guajalito Ecological Reserve (Pichincha).

29. *Miconia rufibarbis* (Triana 1871: 147) Gamba & Almeda, *comb. nov.* Basionym: *Ossaea rufibarbis* Triana. Type: COLOMBIA (Novae Granatae). Nariño (Prov. de Barbacoas), 800 m, May 1853, *Triana 3929* (holotype: BM-internet image!; isotypes: COL-internet image!, BR-internet image!, P; fragment: US; photographs: F!, MO!).

Shrub or small little-branched tree, rarely epiphytic, (1.2–)1.5–5 m tall, bark rusty-green. *Upper internodes* [(2–)2.8–8.5 cm long] and cauline nodes terete, bearing a well defined nodal ridge that is confluent with the abaxial bases of the petioles. *Indumentum* on branchlets, petioles, adaxial surface of young leaves, primary and secondary leaf veins abaxially, inflorescence axes, bracts and bracteoles abaxially, hypanthia, calyx lobes and calyx teeth copiously to moderately covered with hispid elongate trichomes 2–3 mm long with greatly roughened (substellate) bases, sparsely intermixed with an understory of dendritic trichomes ca. 0.2 mm long with short thin-walled (flattened) arms. *Leaves* of each pair isophyllous; the petiole 0.5–2.5 cm long, widely canaliculate and depressed adaxially, erect and nearly parallel to the subtending internode, the adaxial canaliculate surface densely and caducously covered with hispid trichomes; blades 14–41.8 × 6.8–15.5 cm, oblong-elliptic to oblanceolate, the base cuneate to slightly rounded or tapering to become rounded-cordate, shortly decurrent on the petiole, the margin caducously ciliate, entire to denticulate, the apex acuminate, firm-chartaceous; mature leaves adaxially glabrescent, the primary, secondary, tertiary and higher order veins glabrous; abaxial surface yellowish-green, occasionally brown to purple, glabrous, the tertiary and higher order veins with an indumentum like that of the primary and secondary veins, but sparser and shorter; 5- or 7-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging from the primary vein 1.2–3 cm above the base, areolae 0.4–0.5 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins slightly impressed to flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly elevated to flat. *Inflorescences* an erect pseudolateral interrupted verticillate spike 6.5–16.1 cm long, each verticil appearing glomerulate-fasciculate, the unbranched peduncle 1.4–5.3 cm long, borne in the axils of upper leaves, the rachis rusty-green; bracts 3–3.5 × 4.5 mm, ovate-triangular to suborbicular, with conspicuous parallel venation, rusty-translucent, glabrous adaxially except for the hispid margins, persistent in fruit; bracteoles 5–5.5 × 2–3 mm, subulate, with conspicuous parallel venation, rusty-translucent, glabrous adaxially, glabrescent abaxially, the indumentum mostly restricted to a center band, persistent in fruit. *Flowers* 5-merous, sessile. *Hypanthia* at anthesis 1.8–2 × 1 mm, free portion of hypanthium 0.8–1 mm long, subcylindric to campanulate, bluntly 10-ribbed, green, ridged on the inner surface, copiously beset with sessile rounded glands sparsely intermixed with caducous hispid trichomes like those of the general indumentum, the torus densely glandular-puberulent and scaly adaxially. *Calyx* open in bud and persistent in fruit, green-brown; tube 0.5 mm long, with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 0.5 × 0.8 mm, depressed-rounded, the margin vaguely undulate, the apex obtuse; exterior calyx teeth 0.2 mm long, inconspicuously bluntly triangular, inserted at the base of the lobes and not projecting beyond them. *Petals* 4–4.5 × 1.1–1.3 mm, lanceolate-triangular, the margin entire, the apex bluntly acute, translucent light green to white, adaxially sparsely papillose, abaxially glabrous, reflexed at anthesis. *Stamens* 10; filaments 1.6–1.8 × 0.25 mm, white-greenish, glabrous; anther thecae 1.5 × 0.3 mm, oblong-clavate, emarginate at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, white to pale yellow; connective yellow, its prolongation and appendage 0.4–0.6 mm long, the appendage oblong, obtuse-rounded at the apex, copiously glandular on the edges and on both surfaces of the appendage and throughout the connective, the glands on linear to subulate stalks. *Ovary* 5-locular, completely inferior, ca. 1 mm long at anthesis, the apical collar 0.9 × 0.7 mm, urceolate, sparsely to moderately glandular-puberulent; style 4.5 mm long at early anthesis, parallel-sided (i.e. terete), white, glabrous; stigma truncate. *Berries* 3–4 × 2–2.5 mm when dry, globose, green to orange, turning white when ripe, the hypanthial indumentum persistent at maturity. *Seeds* 0.32–0.37 × 0.19–0.22 mm, ovoid, angled, occasionally pyramidal, brownish; lateral symmetrical plane typically ovoid, occasionally triangular, the highest point toward the chalazal side; antiraphal symmetrical plane suboblong; raphal zone suboblong, nearly as long as the seed; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief slightly striate or absent.

Additional specimens studied:—COLOMBIA. Chocó: Hills near highest point of Bagado-Certegui trail, 5°25'N, 76°28'W, 130–180 m, 8 December 1983, *Juncosa 1544* (MO, US); (Tado), Gingaraba, 25 April 1991, *Lozano et al. 6090* (COL); Along road between Quibdó and Istmina, at 14 km S of Quibdó, 5°32'N, 67°37'W, <100 m, 17 December 1980, *Croat & Cogollo 52186* (COL); 2 km S of Las Animas on road to Istmina, 150 m, 13 August 1976, *Gentry & Fallen 17618* (MO, US); Hoya del Río San Juan, Río Fujiadó, afluente del Río San Juan, 4°36'N, 76°54'W, 7 April 1979, *Forero et al. 4824* (COL, MO, US); 6–10 km E of Quibdó on road to Tutunendo, 180 m, 12 June 1982, *Gentry & Brand 36761* (COL, MO); Quibdó-Tutunendo road ca. 3 km W of Tutunendo, 5°46'N, 76°35'W, 80 m, 5 January 1981, *Gentry et al. 20162* (MO); Road to Lloró (under construction) 1–2 km SE of Yuto, ca 30 km S of Quibdó, 80 m, 7 January 1979, *Gentry & Renteria 23756* (COL, MO); (Quibdó), Carretera Yuto-Lloró, 80 m, 30 June 1983, *Forero et al. 9642* (COL, MO); (Istmina), Quebrada Raspadura, entre Raspadura y Quibdó, Divorcio de aguas de las Hoyas del Río Atrato y del Río San Juan, 5°15'N, 76°38'W, 18 April 1979, *Forero & Jaramillo 5320* (COL, MO); Trail from Tutunendo-Quibdó road to Tubadó, ca 14 km NE of Quibdó, Transect line 3, 90 m, 19 January 1979, *Gentry & Renteria 24479* (COL, MO). **Nariño:** (Barbacoas), Diviso, Vía El Diviso-Tumaco a 27 km, Altaquer, 680 m, 12 March 1995, *Lozano et al. 6922* (COL). **Valle:** (Darién), Bajo Calima, Granja agroforestal, camino hacia el Jardín Botánico, E casa hacia el Jardín Botánico, 40 m, 26 October 1983, *Devia 426* (CAS, COL, MO, TULV); Bajo Calima, Concesión Pulpapel, ca 100 m, 20 January 1988, *van der Werff & Monsalve 9670* (CAS, MO); Bajo Calima, Cartón Colombia transect "El Dindo", 30–50 m, 26 May 1982, *Murphy et al. 515* (CAS, MO); (Buenaventura), About 18 km E of Buenaventura, 50 m, 14 February 1939, *Killip & García 33274* (US); (Buenaventura), Anchicayá, E of Buenaventura, across river from power plant, 22 January 1971, *Kennedy 735* (US); (Buenaventura), Along highway, 10–15 km E of Buenaventura, near 0 m, 12 April 1939, *Killip 34920* (COL, NY, US); (Buenaventura), Chanco, Orilla Río Calima, campamento CVC, 600 m, 18 February 1989, *Devia & Prado 2504* (TULV, US); (Buenaventura), Bajo Calima, ca 10 km due N of Buenaventura, Cartón de Colombia concession, Transect 5, 3°56'N, 77°8'W, 50 m, 10 December 1981, *Gentry 35559* (COL, US); (Buenaventura), Bajo Calima, Concesión Pulpapel/Buenaventura, 3°55'N, 77°W, 100 m, 14 August 1986, *Monsalve 1051* (CUVC, F); Costa del Pacífico, Río Yurumanguí, Veneral, 5–50 m, 28 January 1944, *Cuatrecasas 15747* (F, US); (Buenaventura), Bahía de Buenaventura, Costa del Pacífico, Bahía de Buenventura, Quebrada de San Joaquín, 0–10 m, 21 February 1946, *Cuatrecasas 19902* (F, NY); (Córdoba), Cordillera Occidental, vertiente occidental, Hoya del Río Dagua, 39–60 m, 14 November 1945, *Cuatrecasas 19840* (F); Puerto Merizalde, Costa del Pacífico, Río Naya, 5–20 m, 20 February 1943, *Cuatrecasas 13985* (F, NY); R.N. del Río Escalerete, 100 m, 16 September 1993, *Devia et al. 4461* (COL, TULV); (Buenaventura), Km 14 Carretera Cali - Buenaventura, 14 August 1959, *Maguire & Maguire 44006* (COL, NY); Estación Agroforestal del Bajo Calima, Secretaría de Agricultura y Fomento, Parte NE del campamento, 40–60 m, 5 August 1979, *Cabrera 5182* (CUVC, MO,); (Buenaventura), Bajo Calima Region, Along road from Buenaventura to Malaga vicinity, Pulpapel Headquarters (located at km 11), at km 9, 3°56'N, 77°1'W, 185 m, 3 February 1990, *Croat 70102* (MO); Bajo Calima Region, Dindo area, 3°59'N, 76°58'W, 100 m, 11 July 1984, *Gentry et al. 47890* (MO); (Buenaventura), San Cipriano, R.N. de Escalerete, Transecto B, 100 m, 26 March 1993, *Devia et al. 3828* (COL); (Buenaventura), Bajo Calima, Concesión Pulpapel/Buenaventura, 3°55'N, 77°W, 100 m, 29 August 1984, *Monsalve 262* (COL, MO); (Buenaventura), Bajo Calima, Cartón de Colombia lumber concession area, Carretera Gasolina 6 km S of main road Cali–Buenaventura highway and Canalete, 3°56'N, 77°7'30"W, 50–80 m, 19 July 1988, *Croat 69393* (CAS, MO); Bajo Calima, Dindo area, 3°59'N, 76°58'W, 100 m, 20 July 1984, *Gentry & Monsalve 48408* (MO); (Buenaventura), In regione torrida et pluviali S, Bonaventura, de Queremal ad Agua Clara (A), in silva prope "trazado Juanchaco-Pacifico" (B), Locus B, 50 m, 1965, *Bernardi 10685* (CJB, MO); (Buenaventura), Bajo Calima, Concesión Pulpapel/Buenaventura, Carretera La Gasolina, PT3, 3°55'N, 77°W, 100 m, 19 Agosto 1987, *Monsalve 1630* (MO); Bajo Calima, ca 10 km due N of Buenaventura, Carton de Colombia concession, 3°56'N, 77°8’W, 50 m, 5 December 1981, *Gentry 35343* (MO); Gallinero, Along road between Buenaventura and Málaga vicinity of Bajo Calima, km 3.5.2 from main Cali- Buenaventura Hwy, 4°0’N, 77°3’W, 100 m, 15 July 1993, *Croat & Bay 75741* (MO); Bajo Calima, Concesión Pulpapel/Buenaventura, Carretera La Gasolina, Punto final colectados dentro de la parcela, 3°55’N, 77°’W, 100 m, 26 May 1987, *Monsalve 1472* (MO). **Valle-Cauca-Nariño:** Carretera Cali-Pasto, 1000–2000 m, 26 November 1962, *Saravia & Jaramillo 1776* (COL). **ECUADOR. Carchi:** Border area between Prov. Carchi and Esmeraldas, about 20 km past Lita on Road Lita-Alto Tambo, 550 m, 25 June 1991, *van der Werff et al. 11986* (CAS, MO); (Tulcán), R. Indígena Awá, Comunidad San Marcos, 25 km al NW de El Chical, parroquia Maldonado, 1°6’N, 78°14’W, 1500 m, 16 November 1990, *Rubio et al. 1066* (MO, QCNE, US); Border area between Prov. Carchi and Esmeraldas, about 20 km past Lita on road Lita-Alto Tambo, 550 m, 24 June 1991, *van der Werff et al. 11910* (MO, NY); (Tulcán), R. Étnica Awá, Comunidad de Gualpi Medio, 1°1’N, 78°16’W, 900 m, 21 May 1992, *Quelal et al. 725* (MO, NY, QCNE). **Esmeraldas:** S of bridge S of Lita-Alto Tambo road, 0°53’19"N, 78°31’43"W, 900 m, 21 September 2003, *Penneys et al. 1574* (CAS, NY, US); (San Lorenzo), Awá Indigenous Territory, Río Bogotá community, 2 km S of Lita-San Lorenzo road, 0°59’11"N, 78°35’50"W, 350 m, 6 April 2002, *Neill et al. 13918* (CAS); Road San Lorenzo-Alto Tambo-Lita, km 60.5 from San Lorenzo, Fringes of the R. Cotacachi-Cayapas, 0°53’47.7"N, 78°32’7"W, 879 m, 3 October 2001, *Cotton et al. 1819* (CAS, MO, NY, QCA); (San José), km 321 along railroad from Ibarra to San Lorenzo, 1°N, 78°W, 350 m, 2 May 1982, *Boom 1290* (MO, NY, US); Along road between Lita and San Lorenzo , 0°52’15"N, 78°27’10"W, 425 m, 13 October 2007, *Croat et al. 99711* (CAS); Along road between Lita and San Lorenzo, 0.7 km N of Alto Tambo, 0°54’30"N, 78°32’37"W, 800 m, 20 July 2000, *Croat et al. 84199* (MO); Lita-San Lorenzo road, 10–20 km NW of Lita, 0°55’N, 78°35’W, 800 m, 12 May 1991, *Gentry et al. 70147* (MO); (San Lorenzo), Via Lita-San Lorenzo, Alto Tambo, 0°56’N, 78°23’W, 600 m, 1 April 1994, *Palacios 12203* (MO, QCNE); (San Lorenzo), R. Étnica Awá, Comunidad "La Unión", Cañon del Río Mira, 10 km W de Alto Tambo, 1°2’N, 78°26’W, 250 m, 16 March 1991, *Rubio et al. 1114* (MO, QCNE); km 8 Lita-Alto Tambo, 740 m, 19 July 1988, *Dodson & Gentry 17531* (MO, NY, QCNE); Lita-San Lorenzo road, 11 km W of El Durango, 9.7 km W of Alto Tambo, 1°2’31"N, 78°37’3"W, 380 m, 8 July 1998, *Croat et al. 82564* (MO); Lita-San Lorenzo road, 14.2 km W of Río Lita Bridge (below Lita), 0°52’11"N, 78°27’16"W, 425 m, 4 July 1998, *Croat et al. 82329* (MO). **Los Ríos:** (Quevedo), Parroquia Centinela - La Pirámide, Vía Santo Domingo de los Colorados-Quevedo entrando por Patricia Pilar km 41, 1°40’S, 79°20’W, 650 m, 25 February 1992, *Quelal & Tipaz 202* (MO, QCNE).

Illustration:—None found.

Common names and documented uses:—Ecuador: “hojita lanuda” (Los Ríos, *Quelal 202*, MO!); “chinul” (Carchi, *Quelal 725*, MO!).

Habitat, distribution and ecology:—Locally common in pristine to disturbed lowland rainforests where it grows in flat sites or steep slopes in the Biogeographic Chocó region of Colombia and Ecuador (Fig. 14), at 0–900(–1500) m.

Phenology:—Collected in flower throughout the year; in fruit from November through May, July and September.

Etymology:—The specific epithet refers to the dense rusty brown indumentum of this species.

Discussion:—This species is characterized by the dense rusty-hispid indumentum throughout the plant, and the 5-plinerved leaves. The trichomes are roughened at the base but otherwise smooth, a unique character within the Octopleura clade. Its interrupted spicate-verticillate bracteate inflorescence is reminiscent of *M. spiciformis*, which is a much more slender plant with 5-nerved leaves, an inflorescence with a tomentose indumentum, and much smaller bracts. Phylogenetically these species belong to a well supported subclade that includes *M. bractiflora*, *M. formicaria*, and *M. magnifolia* (Fig. 1).

The dense indumentum at the point where the secondary veins diverge from the primary vein on abaxial foliar surfaces appears to be a domatium exploited by ants. Some ants were found in these structures.

Conservation status:—This species would be considered Endangered EN B2ab(iii) according to IUCN criteria (AOO). A status of Vulnerable VU is warranted, because it is protected in few parts of its range. Protected in Colombia in the Farallones National Park and in the Río Escalarete Natural Reserve (Valle). In Ecuador it is protected in the Awá Indigenous Reserve (Carchi and Esmeraldas).

30. *Miconia sessilis* Gamba & Almeda, *nom. nov.* Basionym: *Oxymeris sessilifolia* Triana (1871: 93). *Leandra sessilifolia* (Triana) Cogniaux (1886b: 75). *Ossaea sessilifolia* (Triana) Wurdack (1973a: 407). Type: COLOMBIA.

Nariño (Prov. Barbacoas), versus littus maris Pacifici, May 1853, *Triana 4075* (holotype: BM-internet image!; isotype: COL-internet image!). Nec *Miconia sessilifolia* Naudin (1850: 181).

Ossaea grandifolia Gleason (1925: 457). Type: COLOMBIA. Dept. Valle: Cordoba, Dagua valley, 80–100 m, 6 May 1922, *Killip 5120* (holotype: NY-internet image!; isotype: PH-internet image!).

Shrub or little-branched small tree 1.5–5 m tall. *Upper internodes* compressed-rounded (1.3–)6.7–12.9 cm long, cauline nodes terete, nodal line absent but each node with a pair of conspicuous short appendages under the petioles. *Indumentum* on branchlets, petioles, adaxial surface and primary vein of young leaves, abaxial surface, primary and secondary leaf veins, inflorescence axes, bracts, bracteoles, pedicels, hypanthia, calyx lobes, calyx teeth, and petals abaxially copiously to moderately and caducously covered with brownish-translucent dendritic trichomes 0.05–0.08 mm long with short axes and few-moderate number of terete arms. *Leaves* of each pair isophyllous; petiole 0.3–0.7 cm long, adaxially canaliculate, abaxially shallowly grooved; blades 17.5–38 × 6.7–17.7 cm, elliptic-oblong to elliptic-ovate, the base acute to attenuate and conspicuously decurrent on the petiole, the margin obscurely denticulate, the apex short-acuminate to acuminate, chartaceous; mature leaves adaxially (including primary and secondary veins) glabrescent, the tertiary and higher order veins glabrous; abaxial surface yellowish-green, occasionally flushed purple, soon glabrous, the tertiary and higher order veins glabrous; 5-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging asymmetrically from the primary vein 3–5 cm above the base, areolae 4–5 mm, adaxially the primary and secondary veins slightly impressed, the tertiary and higher order veins flat, abaxially the primary and secondary veins elevated, canaliculate to terete, the tertiary and higher order veins slightly elevated to flat. *Inflorescences* an erect pseudolateral multiflorous dithyrsoid 13–27 cm long, including a rounded-quadrate peduncle 3.6–7 cm long, laxly and divaricately branched from the peduncle apex, the rachis green-yellowish to pink-purple; bracts and bracteoles 0.8–1 × 0.35–0.5 mm, subulate and concave, the bracts spreading, the bracteoles somewhat erect, subpersistent at anthesis. *Flowers* 4-merous sessile to subsessile, pedicels less than 0.2 mm long when present. *Hypanthia* at anthesis 1.5–1.9 × 1.6 mm, free portion of hypanthium 0.7–0.9 mm long, campanulate to subglobose, bluntly 8-ribbed, green-yellowish to red-purplish, ridged on the inner surface, glabrous, the torus adaxially sparsely resinous-glandular. *Calyx* open in bud and persistent in fruit, light pink-purplish; tube (0.1–)0.2–0.5 mm long, glabrous adaxially and with the same vestiture as the hypanthium abaxially; lobes 1.1–1.3 × 1.5 mm, broadly triangular and somewhat spreading, the margin obscurely undulate, the apex bluntly acute; exterior calyx teeth 0.2–0.3 mm long, tuberculiform, inserted half way up the calyx lobes and not projecting beyond them. *Petals* 1.8–2 × 1 mm, lanceolate, the margin entire, the apex bluntly acute, whitish to pale pink, glabrous adaxially, the abaxial indumentum more abundant toward the apex, reflexed at anthesis. *Stamens* 8; filaments 1–1.1 × 0.25 mm, white, yellowish, glabrous; anther thecae 1.6–1.7 × 0.5 mm, oblong-obovate, emarginate at the apex, opening by two dorsally inclined pores 0.15 mm in diameter, yellowish; connective yellowish, its prolongation and appendage 0.6–0.7 mm long, the appendage subulate-triangular, bluntly acute at the apex, copiously gland-edged throughout the connective and on both sides of its prolongation and appendage, the glands with linear to subulate stalks. *Ovary* 4-locular, completely inferior, 0.9–1.1 mm long at anthesis, the apical collar 0.2–0.3 × 0.4 mm, conic, sparsely glandular-puberulent to glabrous; style 4–4.2 mm long at anthesis, parallel-sided (i.e. terete), white to cream, glabrous; stigma expanded truncate. *Berries* 4–7 × 4 mm when dry, globose-oblate, at first green, then turning green-yellow to orange and ultimately ripening red-orange, the hypanthium indumentum persistent at maturity. *Seeds* 0.4–0.43 × 0.19–0.21 mm, ovoid, angled, brownish; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone suboblong, ca. 90% to nearly as long as the seed, somewhat ventrally expanded toward the micropyle; individual cells elongate, anticlinal boundaries (some channeled, others raised), undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed, microrelief verrucose.

Additional specimens studied:—COLOMBIA. Cauca: (Guapi), P.N.N. Isla Gorgona, 30 May 1986, *Lozano & Rangel 5044* (CAS, COL); (Guapi), P.N.N. Isla Gorgona, Camino a Pablo VI y cabo Hornos, 30–50 m, 4 June 1986, *Lozano & Rangel 5256* (COL, US); (Guapi), P.N.N. Gorgona, Alto de Los Micos, 8 September 1987, *Lozano & Rangel 5699* (COL, MO); Río Naya near El Pastico, 3.1°N, 77.22°W, 20–100 m, 23 February 1983, *Gentry & Juncosa 40607* (MO, US); Gorgona Island, E side of Gorgona Island, 50–100 m, 11 February 1939, *Killip & García 33186* (US). **Chocó:** (Nuquí), Alto de Buey, 1000 m, 8 June 1940, *von Sneidern A.41* (US); (Istmina), Alto Río San Juan, estribaciones de los Cerros La Mojarra, 100–120 m, 26 June 1983, *Espina et al. 1386* (CHOCO, MO, US); Banks of Quebrada Togoromá, 13 June 1944, *Killip & Cuatrecasas 39147* (US); (Cabo Corrientes), Río

Parguera, at foot of Janano mountain, 50–100 m, 27 May 1974, *Warner 300* (F, MO); Serranía del Baudó, Along road between Las Animas and Río Pato, along valley of Río Animas, 5 km from beginning of road, 5°16'N, 76°41'W, 100 m, 17 April 1983, *Croat 56042* (MO); Serranía del Baudó, Along road between Las Animas and Río Pato, along valley of Río Animas, 5 km from beginning of road, 5°16'N, 76°41'W, 100 m, 17 April 1983, *Croat 56047* (US); (Quibdó) Pacurita, Corporación Michitá, Estación Ambiental Pandó, Sendero Ecológico, 5.69°N, -71.61°W, 90 m, 25 January 2012, *Almeda et al. 10390* (CAS, CHOCO, COL). **Nariño:** (Barbacoas), El Diviso, A 27 km del Diviso, quebrada La Angosta margen izquierdo de la carretera via Diviso-Tumaco, 650 m, March 1995, *Fernández 12500* (COL, US). **Putumayo:** (Mocoa), San Antonio, Alto Campucana, Finca la Mariposa, Vertiente amazónica de Colombia, 1°12'N, 76°38'W, 1350–1420 m, 20 April 1994, *Fernández et al. 11038* (COL, NY). **Valle:** (Buenaventura), Bajo Calima, Concesión Pulpapel, Carretera a Juanchaco 6 km de la portada, 3°55'N, 77°W, 100 m, 23 August 1986, *Monsalve 1071* (CAS, CUVC, MO); (Buenaventura), Bajo Calima, along road between Buenaventura and Malaga, at km 51.3, deep gorge, 4°9'N, 77°11'W, <100 m, 27 February 1990, *Croat 71021* (CAS, MO); (Buenaventura), Bajo Calima, Concesión Pulpapel, 3°55'N, 77°, 100 m, 23 August 1984, *Monsalve 228* (CAS, CUVC, MO); Río Calima, Quebrada de La Brea, 30–40 m, 19 May 1946, *Schultes & Villareal 7352* (US); Costa del Pacífico, Río Yurumanguí, Veneral, 5–50 m, 28 January 1944, *Cuatrecasas 15711* (F, US); Puerto Merizalde, Costa del Pacífico, Río Naya, 5–20 m, 20 February 1943, *Cuatrecasas 13984* (F); (Córdoba), 50–100 m, 17 February 1939, *Killip & García 33429* (NY); La Trojita, Río Calima (región del Chocó), 5–50 m, 19 February 1944, *Cuatrecasas 16540* (F, NY); Silva, Costa del Pacífico, Río Cajambre, 5–80 m, 5 May 1944, *Cuatrecasas 17420* (F, NY); (Buenaventura), Bajo Calima Region, Along road between Buenaventura and Malaga, at km 31.5, 4°1'N, 77°5'W, <100 m, 6 February 1990, *Croat & Watt 70277* (MO); (Buenaventura), Bajo Calima Region, Concesión Pulpapel/Buenaventura, 100 m, 11 March 1986, *Monsalve 957* (MO); (Buenaventura), Bajo Calima Region, within Forestry Concession of Cartón de Colombia, between Buenaventura and Río Calima, 6.3 km N of Frente La Brea, km 18 on main road, about 6 km SE of village of San Isidro on Río Calima, 4°2'N, 77°3'W, 50 m, 7 July 1986, *Croat 61307* (MO); Bajo Calima Region, Road to Juanchaco Palmeras, 3°55'N, 77°2'W, 100 m, 10 July 1984, *Gentry et al. 47817* (MO); (Buenaventura), Bajo Calima Region, Concesión Pulpapel, Carretera a San Isidro, 3°55'N, 77°W, 100 m, 30 September 1987, *Monsalve 1860* (MO); (Buenaventura), Bajo Calima Region, ca 10 km due N of Buenaventura, carton de Colombia Concession, 3°56'N, 77°8'W, 50 m, 5 December 1981, *Gentry 35348* (MO); (Buenaventura), Bajo Calima Region, Vicinity of Buenaventura, along road from Buenaventura to Málaga, km 11 at Pulpapel headquarters, 3°56'N, 77°0'W, 130 m, 10 July 1993, *Croat & Bay 75610* (MO); (Buenaventura), Bajo Calima Region, within forestry Concession of Cartón de Colombia, between Buenaventura and Río Calima, 6.5 km beyond Porton tomar (at km 27), 22.3 km beyond Camp Portada Pulpapel, 33.3 km beyond main Cali-Buenaventura Hwy, 4°2'N, 77°7'W, 50 m, 8 July 1986, *Croat 61367* (MO, US); (Buenaventura), Bajo Calima Region, Road to Juanchaco Palmeras, 3°55'N, 77°2'W, 100 m, 10 July 1984, *Gentry et al. 47824* (MO); (Buenaventura), Bajo Calima Region, Conseción Pulpapel/Buenaventura, Carretera La Gasolina PD12, 3°55'N, 77°'W, 100 m, 1 September 1987, *Monsalve 1692* (MO); (Buenaventura), Bajo Calima Region, Carton de Colombia lumber concession area, Carretera Gasolina 6 km S of main road between Cali-Buenaventura hwy and Canalete, 1 km W of Carretera Gasolina, 3°56'0"N, 77°7'30"W, 50–80 m, 19 July 1988, *Croat 69392* (MO); (Buenaventura), Bajo Calima Region, Granja Agroforestal, 40 m, 14 December 1984, *Devia 461* (MO, TULV); (Buenaventura), Bajo Calima Region, Concesión Pulpapel/Buenaventura, 3°55'N, 77°W, 100 m, 31 August 1984, *Monsalve 321* (CUVC, MO); (Buenaventura), Bajo Calima Region, Dindo area, 3°59'N, 76°58'W, 100 m, 20 July 1984, *Gentry & Monsalve 48401* (MO, US); (Buenaventura), San Isidro, Quebrada Ordoñez, 40 m, 6 March 1989, *Devia & Prado 2670* (TULV, US). **ECUADOR. Esmeraldas:** (San Lorenzo), R. Indígena Awá, Cañón del Río Mira, 10 km al W de Alto Tambo, Comunidad "La Union", 1°2'N, 78°26'W, 250 m, 16 March 1997, *Rubio et al. 1239* (MO, QCNE, US).

Illustration:—None found.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—This is a locally common to infrequent species in primary and secondary rainforests and disturbed sites, growing along streams, on steep slopes or at forest margins, in the lowlands of the Biogeographic Chocó in Colombia, and with one record from Esmeraldas (Ecuador) (Fig. 17), at 5–1000 (1420) m, but more common between 5–250 m. In Colombia it has been most commonly collected in the Bajo Calima area (Valle), with populations in the departments of Chocó and Cauca (Isla Gorgona).

Phenology:—Collected in flower and fruit from December through September.

Etymology:—The specific epithet refers to the distinctive sessile leaves of this species.

Discussion:—This species is distinct in its leaf blades that are long decurrent on the petioles, striking asymmetrical plinervation, 4-merous flowers, and petals that are puberulent-dendritic abaxially. *Miconia laxivenula,* its sister species, has similar lax abaxial foliar reticulation, leaf bases somewhat decurrent on the petiole, and 4-merous flowers. The latter differs primarily in its vegetative vestiture (squamate-amorphous). Moreover, *M. sessilis* has a distinctly lobed calyx (broadly triangular vs. depressed-rounded) and smaller petals. Also close is *M. variabilis,* which differs in the much denser tertiary/intertertiary reticulation (areoles ca. 0.2 mm wide), much denser cauline and inflorescence pubescence, and 5-merous flowers.

Conservation status:—This species would be considered Endangered EN B2ab(iii) following IUCN criteria (AOO). However, a status of Vulnerable VU is warranted because it occurs in some protected areas within its range. Protected in Colombia in the Isla Gorgona National Park (Cauca), and in the Pandó Environmental Station (Chocó). In Ecuador it is protected in the Awá Indigenous Reserve (Esmeradas).

31. *Miconia spiciformis* Gamba & Almeda, *nom. nov.* Basionym: *Ossaea spicata* Gleason (1941: 253). Type: COLOMBIA. Intendencia El Chocó: dense forest south of Río Condoto, between Quebrada Guarapo and Mandinga, 120–180 m, 22–28 April 1939, *Killip 35166* (holotype: NY!; isotypes: BM-internet image!, COL-2 sheets-internet images!, US-internet image!). Nec *Miconia spicata* Macfadyen ex Grisebach (1860b: 257; *M. triplinervis* Ruiz & Pavón (1798: 105)).

Shrub or tree 2–8.5 m tall with more or less lax branching, bark green-brown. *Upper internodes* terete to rounded-quadrate, (1.5–)2.5–4.9 cm long, cauline nodes terete with a prominent nodal ridge that is confluent with the abaxial bases of the petioles but frequently obscured by the dense tomentum. Indumentum on branchlets, petioles, primary veins abaxially, inflorescence axes, bracts, bracteoles, hypanthia, calyx lobes abaxially, and exterior calyx teeth densely covered with white subulate-matted elongate smooth trichomes 1–1.2 mm long, intermixed with or occasionally replaced by a dense to moderate whitish understory of dendritic trichomes 0.2–0.3 mm long with short to moderately long thin-walled (flattened) arms. *Leaves* of each pair isophyllous; the petioles 0.3–0.8 cm long, erect and nearly parallel to the subtending internode, the adaxial canaliculate surface densely and caducously tomentose; blades 14–22.5(–28.4) × 4–6.5(–8.5) cm, oblong-elliptic to oblanceolate, the base acute, the margin repand-denticulate to subentire, the apex acuminate, chartaceous; mature leaves adaxially with actual surface, primary, secondary, tertiary and higher order veins glabrous; abaxial surface glabrous, the secondary and tertiary veins moderately covered with the same dendritic trichomes of the general indumentum; 5-nerved, including the tenuous marginals, areolae 0.4–0.5 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly raised. *Inflorescences* a pendant unbranched pseudolateral interrupted subverticillate spike 9–14.5 cm long, each verticil appearing fasciculate-glomerulate, including a compressed-rounded to rounded-quadrate peduncle 0.7–1 cm long, solitary or with multiple spikes arising from the upper leaf axils, the rachis green; bracts 6–8 × 3–5 mm, triangular and somewhat concave, green-brown, early deciduous at anthesis; bracteoles 2–4 × 0.6–0.8 mm, ovate-oblong to triangular, green-brown, early to tardily deciduous at anthesis. *Flowers* 5-merous, sessile. *Hypanthia* at anthesis 2–2.5 × 1.5–2(–2.3) mm, free portion of hypanthium 1–1.3 mm long, globose, bluntly 10-ribbed, green turning brown, ridged on the inner surface, glabrous, the torus adaxially sparsely glandular, the glands rounded and sessile. *Calyx* open in bud and persistent in fruit, green becoming orange; tube 0.3–0.5 mm long, with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 0.5–1 × 1 mm, depressed-rounded, the margin vaguely undulate, the apex obtuse; exterior teeth calyx 0.25 mm long, bluntly triangular, inconspicuous, inserted at the base of the calyx lobes and not projecting beyond them. *Petals* 3–4 × 1–1.5 mm, lanceolate, the margin entire, the apex bluntly acute, white, adaxially moderately papillose, abaxially covered with a copious indumentum of dendritic trichomes 0.3–0.4 mm long with short to moderately elongate thin-walled (flattened) arms, spreading to reflexed at anthesis. *Stamens* 10; filaments 2–2.25 × 0.25 mm, yellowish-brown, glabrous; anther thecae 1.5–1.75 × 0.4–0.5 mm, oblong-clavate, emarginate at the apex, opening by one dorsally inclined pore 0.1 mm in diameter, white to pale yellow; connective yellowish-brown, its prolongation and appendage 0.6–0.75 mm long, the appendage oblong, bluntly acute to obtuse at the apex, white, copiously gland-edged, the glands rounded and stalked, the connective also somewhat prolonged and gland-edged but unappendaged ventro-basally. *Ovary* 5-locular, 3/4 to completely inferior, 1.3–1.6 mm long at anthesis, the apical collar absent, the apex 0.35 mm in diameter, slightly depressed to conic, sparsely glandular-puberulent; style 5.5–7 mm long at anthesis, moderately narrowed distally (i.e. tapering), white, glabrous; stigma truncate to expanded truncate. *Berries* 3–4 × 3–4 mm when dry, globose, green to white, turning reddish when ripe, the hypanthial indumentum persistent at maturity. *Seeds* 0.33–0.43 × 0.15–0.24 mm, typically ovoid, angled, occasionally pyramidal, brownish; lateral and antiraphal symmetrical planes rather ovate, sometimes the lateral one slightly triangular, the highest point toward the chalazal side; raphal zone suboblong, comprising ca. 90% the length of the seed; appendage absent but a small protuberance may be present; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief verrucose or smooth. Chromosome number: n=17.

Additional specimens studied:—COLOMBIA. Chocó: Carretera (en construcción) Yuto-Lloró, 1 km de Yuto, 70 m, 9 September 1976, *Forero & Jaramillo 2708* (COL, MO, US); Serranía de Baudó, Along road between Las Animas and Río Pato, along valley of Río Animas, 5 km from beginning of road, 5°16'N, 76°41'W, 100 m, 17 April 1983, *Croat 56032* (MO, US); (Nuquí), Arusí, Estación Biológica El Amargal, 80 m, February 1992, *Pardo et al. 143* (COL, F); (Quibdó), Río Cabi, 20 April 1982, *Prance 28008A* (NY); Río Mecana ca. 10 km E of Mecana, 6.15°N, 77.25°W, 100 m, 7 March 1983, *Gentry & Juncosa* 41088 (MO); Rain forest on hill N of Altos Curiche, 300 m, 19 May 1967, *Duke & Idrobo 11226* (US-3 sheets). **Valle:** (Bahía Málaga) Quebrada Alegría, trail from creek along proposed route of new road to Military Base, 04°02'N, 077°22'W, 50 m, 15 December 1985, *Gentry et al. 53339* (MO, US); (Buenaventura), Bajo Calima, along road between Buenaventura and Malaga, on carretera Hanz (lumber extraction road N of main Buenaventura-Malaga Road), 6.5 km N of main road, 4°3'N, 77°3'W, 40 m, 2 March 1990, *Croat 71106* (MO, US); La Trojita, Río Calima (región del Chocó), 5–50 m, 19 February 1944, *Cuatrecasas 16297* (F); Costa del Pacífico, Río Yurumanguí, entre Isla de Golondro y La Amargura, 10–40 m, 7 February 1944, *Cuatrecasas 16027* (F). **NICARAGUA. Río San Juan:** (San Juan del Norte), R. Indio-Maíz, Cerro El Gigante, 5 km del Río San Juan, 10°46'N, 83°53'W, 100–200 m, 21 September 1998, *Rueda et al. 8896* (CAS). **Zelaya:** (Nueva Guinea), R. Indio-Maíz, Río Pijibaye entre el caño Bijagua y el Cerro Chiripa, 11°22'N, 84°1'W, 50–200 m, 13 January 1999, *Rueda et al. 10050* (CAS). **PANAMA. Bocas del Toro:** 8.5 road-miles from bridge near Fortuna Dam on road towards Chiriquí Grande (4.3 miles N of continental divide), 8°50'N, 82°15'W, 600 m, 10 March 1985, *McPherson 6757* (CAS). **Coclé:** 27 km N of Penome on road to Coclesito in forest R, at continental divide, 457 m, 20 February 1978, *Hammel 1637* (CAS); (La Mesa), Above El Valle de Antón, 13 April 1971, *Croat 14401* (NY); Along road and in woods about 6 mi N of El Valle de Antón, 1 August 1970, *Luteyn & Kennedy 1605* (US); Alto Calvario above El Copé, ca 6 km N of El Copé, Atlantic slope, along trail through forest W off old lumber trail which leads down to Las Ricas, Limón and San Juan, 9°39'N, 80°36'W, 23 June 1988, *Croat 68784* (CAS, US); Area between Caño Blanco del Norte, Caño Sucio and Chorro del Río Tife, 8.42–8.43°19–06'N, 80.36–80.38°30'W, 200–400 m, 3 February 1983, *Davidse & Hamilton 23528* (CAS); (Alto Calvario), along summit of continental divide 5.5 mi N of El Copé, 3.5 mi N of Escuela Barrigón, 8°39'N, 80°36'W, 850 m, 13 September 1987, *Croat 67559* (CAS); (Alto Calvario), Lumber camp at Alto Calvario, 7 km N of El Copé, 900 m, 14 January 1977, *Folsom 1307* (CAS); (El Copé), División continental arriba de Barrigón y el aserradero viejo, Camino de caballo a Coclesito, 8°40'N, 80°36'W, 880 m, 27 April 1992, *Peña et al. 395* (CAS, PMA); Trail from Río Blanco del Norte to Caño Sucio, 8°44'N, 81°40'W, 350–400 m, 21 February 1982, *Knapp 3735* (CAS); Forested slopes above El Copé along abandoned road leading to the Continental Divide, 700–850 m, 25 February 1988, *Almeda et al. 5937* (CAS, PMA). **Colón:** W most part of province, site of proposed copper mine (INMET), N end of Trailings Area, 8°53'42"N, 80°40'9"W, 100 m, 8 April 2009, *McPherson & Serein 20759* (CAS); Teck Cominco Petaquilla mining concession, Forested slopes below ridgetop road, 8°49'28"N, 80°39'29"W, 180 m, 19 September 2007, *McPherson 19717* (CAS). **Comarca de San Blas:** (Nusagandi), Along continental divide on the El Llano-Carti road, 9°19'N, 78°15'W, 350 m, 30 July 1984, *de Nevers & Pérez 3576* (CAS); El Llano-Carti road, km 22, 9°19'N, 78°55'W, 350 m, 17 June 1986, *de Nevers & Herrera 7852* (CAS); Headwaters of Río Nergala along continental divide, 350 m, 11 January 1985, *de Nevers & Herrera 4518* (CAS); El Llano-Carti road, km 18.3, 9°19'N, 78°55'W, 350 m, 1 April 1985, *de Nevers et al. 5212* (CAS); PEMASKY Nature Park, Entrada de Nergan Igar, Km 15 de la carretera Llano-Carti., 9°20'N, 78°58'W, 350 m, 2 July 1994, *Galdames et al. 1239* (CAS). **Panamá:** P.N. Chagres, Cerro Jefe region, 0.8 mi beyond turn-off to Altos de Pacora (near branch in road to antennas to Cerro Jefe), 9°15'N, 79°29'W, 770 m, 4 July 1994, *Croat & Zhu 76641* (CAS); P.N. Chagres, Cerro Jefe, Trail leading into forest from these coordinates, off the road to Altos de Pacora, 9°13.41'N, 79°22.26'W, 900 m, 25 January 2005, *Penneys & Blanco 1681* (CAS, US); Campo 3, 5 km NE of Altos de Pacora, 700 m, 9 March 1973, *Busey 840* (NY, US); P.N. Chagres, Cerro Jefe., 10–13 miles beyond Goofy Lake, 12 February 1966, *Duke 8004* (US); Along newly cut road from El Llano to Carti-Tupile, 12 mi above Pan-Am Highway, 200–500 m, 13 March 1973, *Liesner 674* (F, NY, US); Vicinity of Altos Pacora, 15–20 km WNW of Cerro Azul, 800 m, 30 June 1975, *Mori et al. 6916* (US); Road past Altos de Pacora, 3–3.5 mi NE of Altos de Pacora, 7.8–8.2 mi above Pan Am Highway, 11.1–11.6 mi beyond Lago Cerro Azul, 9°15'N, 79°25'W, 700–750 m, 19 June 1988, *Croat 68623* (CAS, NY); Along El Llano-Carti road, 10.1 mi above Inter-American Hwy, along trail on steep slopes W of Hwy, 325–350 m, 16 July 1987, *Croat 67361* (CAS); Road N from Summit of Cerro Jefe, 9°14'N, 79°23'W, 900 m, 20 January 1984, *Churchill 4295* (CAS); Summit of Cerro Jefe (1000 m) down to ca. 900 m, 900–1000 m, 4 April 1982, *Huft & Knapp 1712* (CAS); About 23 km from Interamerican Hwy off of a dirt road toward Cerro Jefe, On Cerro Pelón, 675 m, 26 February 1996, *Almeda et al. 7691* (CAS, PMA). **Veraguas:** Along road toward Calovebora, 8°30'N, 81°7'W, 380 m, 20 March 1987, *McPherson 10713* (CAS); (Santa Fe), "Cerro Tute" ridge up from former Escuela Agrícola, 8°35'N, 81°5'W, 800–1000 m, 20 February 1983, *Hamilton & Dressler 3019* (CAS); Along dirt road between Santa Fe and Río San Luis, beyond Escuela Circlo Alto de Piedra 5.9 mi N of school, 8°33'N, 81°8'W, 480 m, 28 June 1987, *Croat 66934* (CAS, US); On Carribbean slope above Río Primero Brazo 5 mi NW of Santa Fe, 700–1200 m, 18 March 1973, *Liesner 811* (NY, US); On Carribbean slope above Río Primero Brazo 5 mi NW of Santa Fe, 700–1200 m, 18 March 1973, *Croat 23206* (CAS); Unpaved rutted and very muddy road about 1.7 km beyond the Escuela Agrícola Río Piedra outside Santa Fe, Vicinity and beyond the Río Mulaba enroute to Calovebora, 600 m, 19 February 1996, *Almeda et al. 7638* (CAS, PMA).

Illustration:—Fig. 25.

Common names and documented uses:—Colombia: "mora" (Pacific region) (Bernal *et al.* 2011).

Habitat, distribution and ecology:—Locally common to infrequent in pristine and disturbed primary and secondary rainforests and low cloud forests; commonly growing on steep slopes, from the Biogeographic Chocó region in Colombia throughout the Caribbean slope of Panama, disjunctly to southern Nicaragua in the Indio-Maíz Reserve (Fig. 17), at 5–1200 m. To be expected in Costa Rica.

Phenology:—Collected in flower and fruit from January through September; only flowering collections have been made in August.

Etymology:—The specific epithet refers to the spiciform subverticillate inflorescence.

Discussion:—The distinctive features of this species are the whitish tomentose indumentum and subverticillate spicate inflorescence. In the protologue, Gleason (1941) described the ovary of this species as 3-celled based on Colombian material. All Central American specimens (Almeda 2009) examined have 5-celled ovaries like those examined from Colombia. No 3–celled ovaries were seen in any of the material assembled for this study, which suggests that Gleason's observation is probably erroneous.

In its spicate bracteate inflorescence *Miconia spiciformis* is reminiscent of *M. rufibarbis*, which is a much coarser plant with plinerved leaves, copious indumentum on the inflorescence and internodes, and larger bracts. Phylogenetically these taxa are sister species and belong to a clade containing *M. bractiflora*, *M. formicaria*, and *M. magnifolia*.

Conservation status:—This species would be considered Endangered EN B2ab(iii) based on IUCN criteria. However, this fairly rare species occurs in some protected areas within its range, so a status of Vulnerable VU is warranted. It is protected in Colombia inside El Amargal Biological Station (Chocó). In Nicaragua it is protected in the Indio-Maíz Reserve (Río San Juan and Zelaya). In Panama it is protected in the Chagres National Park (Panama) and in the PEMASKY Nature Park (San Blas).

32. *Miconia variabilis* Gamba & Almeda, *nom. nov.* Basionym: *Octopleura robusta* Triana (1871: 146). *Ossaea robusta* (Triana) Cogniaux (1891a: 1065). Type: COLOMBIA (Nouvelle Grenade). Dept. Nariño (Prov. de Barbacoas): Chutucal, 600 m, 1851–1857, *Triana 4035* (holotype: BM-internet image!; isotypes: BR-internet image!, COL-internet image!, K-internet image!, NY!). Nec *Miconia robusta* Cogniaux (1887b: 270; *M. tschudyoides* Cogniaux (1887b: 327–328)).

Shrub or small tree (1.2–)1.5–6(–7) m tall with branching from the upper nodes, bark green to brown-rusty. *Upper internodes* terete to compressed-rounded to rounded-quadrate 1.5–9 cm long, cauline nodes terete, nodal line present but faint and typically concealed by the dense indumentum. *Indumentum* on branchlets, petioles, blade bases of young leaves and primary veins adaxially, primary and secondary leaf veins abaxially, inflorescence axes, bracts and bracteoles abaxially, pedicels, hypanthia, calyx lobes, calyx teeth, and petals abaxially copiously to moderately covered with brownish dendritic trichomes 0.05–0.08 mm long with short axes and few-moderate number of terete arms. *Leaves* of each pair isophyllous; the semiterete petiole 1–4.5 cm long, canaliculate adaxially; blades (6–)8.5–34.5 × (2.2–)3.8–15 cm, elliptic to elliptic-ovate, the base broadly acute to obtuse, occasionally somewhat decurrent on petiole, the margin obscurely and distantly undulate-denticulate to denticulate, the apex acuminate, rarely caudate, chartaceous; mature leaves adaxially with surface and primary vein glabrescent, the secondary, tertiary and higher order veins glabrous; abaxial surface glabrous except for a few minute resinous short-stalked glands 0.015 mm long with thin-walled short heads, the secondary, tertiary and higher order veins sparsely beset with resinous glands of the same type and size; 5-plinerved, including the tenuous marginals, innermost pair of secondary veins diverging from the primary vein asymmetrically (occasionally symmetrically) 0.5–2 cm above the blade base, areolae 0.2–0.3 mm, adaxially the primary and secondary veins impressed, the tertiary and higher order veins flat, abaxially the primary and secondary veins elevated and terete, the tertiary and higher order veins slightly raised. *Inflorescences* a pseudolateral multiflorous dithyrsoid 4–10 cm long, including a compressed-rounded to rounded-quadrate peduncle 0.5–0.8 cm long, divaricately branched from the peduncle apex, borne in the upper leaf axils, the rachis green; bracts and bracteoles 0.4–0.7 × 0.3–0.5 mm, the bracts narrowly triangular to linear-oblong, the bracteoles triangular, green-brownish, glabrous adaxially, glabrescent abaxially, the bracts early deciduous, the bracteoles persistent in fruit. *Flowers* 5-merous, sessile or subsessile, pedicels 0.2–0.4 mm long when present. *Hypanthia* at anthesis 1.1–1.5 × 1.1–1.3 mm, free portion of hypanthium 0.8–1(–1.2) mm long, globose to suburceolate, bluntly 10-ribbed, green-whitish, ridged on the inner surface, sparsely beset with resinous glands as well as the torus adaxially. *Calyx* open in bud and persistent in fruit, light green; tube 0.2–0.3 mm long with the same vestiture as the torus adaxially and as the hypanthium abaxially; lobes 0.2–0.5 × 0.7–0.9 mm, depressed-rounded, the margin entire, the apex obtuse; exterior calyx teeth 0.1–0.3 mm long, minute, tuberculiform, somewhat perpendicular to the calyx lobes, inserted at the apical half of the lobes and typically not projecting beyond them. *Petals* 2–4.5 × 0.75–1 mm, lanceolate-triangular, the margin entire, the apex bluntly acute, white, glabrous adaxially, the indumentum abaxially present mainly apically and along the costa, spreading to reflexed at anthesis. *Stamens* 10; filaments 1.5–2 × 0.25 mm, white, drying yellow to light orange, glabrous; anther thecae 0.75–1.1 × 0.3–0.4 mm, oblong to oblong-obovate, emarginate at the apex, opening by two dorsally inclined pores 0.1–0.2 mm in diameter, pale yellow or white; connective pale yellow or white, its prolongation and appendage 0.4–0.75 mm long, the appendage oblong-lanceolate, bluntly acute at the apex, copiously gland-edged with short-stalked glands throughout the connective and its appendage. *Ovary* (4-)5-locular, 3/4 inferior, 0.65–0.85 mm long at anthesis, the apical collar absent, the apex 0.3–0.45 mm in diameter, conic, sparsely glandular-puberulent to glabrous; style 3.5–4 mm long, moderately tapered distally, white, glabrous; stigma expanded truncate to capitellate. *Berries* 2.5–3 × 3–4 mm when dry, globose-oblate, green and ripening white or green and changing to yellow, orange and ultimately purple when fully ripe, the hypanthial indumentum persistent at maturity. *Seeds* 0.26–0.36 × 0.13–0.21 mm, ovoid, angled, brownish; lateral and antiraphal symmetrical planes ovate, the highest point toward the chalazal side; raphal zone suboblong to sublinear, ca. 80% the length of the seed; appendage absent, but a small protuberance present; individual cells elongate, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low-domed to nearly flat, microrelief verrucose. Chromosome number n=17.

Additional specimens studied:—BRAZIL. Acre: (Mancio Lima), P.N. da Serra do Divisor, Serra do Moa, Trilha para a cachoeira do Formoso (Igarapé do Anil), 13 November 2007, *Goldenberg et al. 978* (CAS, NY). **COLOMBIA. Antioquia:** (Amalfi), 8–27 km NE de Amalfi en la via Vetilla-Fraguas, sitios Salazar y Marengo, 6°56’N, 75°4’W, 1150–1450 m, 7 December 1989, *Callejas & et al. 9119* (HUA, MO, NY). **Cauca:** (Gorgona Island), "St, George", 91 m, 10 October 1924, *S.E.R.A. 562* (US); (Santa Rosa), 1 km arriba de la desembocadura del Indiyaco en el Caquetá, 600 m, 15 October 1996, *Sánchez et al. 3036* (COL). **Chocó:** (Quibdó), En el sitio de La Platina, 60 m, 29 March 1958, *Uribe-Uribe 3135* (MO, US); Serranía de Baudó, along road between Las Animas and Río Pato, along valley of Río Animas, 5 km from beginning of road, 5°16’N, 76°41’W, 100 m, 17 April 1983, *Croat 56047* (MO); (Nuquí), Alto de Buey, Alto de Buey, 1000 m, 1 June 1940, *von Sneidern A12* (NY); (Quibdó), Río Cabi, 20 April 1982, *Prance 28008* (NY); Corcovada Region, upper Río San Juan, ridge along Yeracüí Valley, 200–275 m, 24 April 1939, *Killip 35252* (NY, US); Pan American Highway (under construction) ca 10 km W of Las Animas, 100 m, 12 January 1979, *Gentry & Renteria 24068* (MO, US); (Nuquí), Alto de Buey, Alto de Buey, 1000 m, 12 June 1940, *von Sneidern A51* (US); Hoya del Río San Juan, Pequeño cerro al frente de Palestina, 4°10'N, 77°10'W, 30–40 m, 26 March 1979, *Forero et al. 4083* (COL, MO, US); (La Mojarra), Just upriver from Istmina, Trail through secondary vegetation to nearly primary forest on hills, 5°12'N, 76°37'W, 30–60 m, 5 November 1983, *Juncosa 1260* (MO, US); (Nóvita), Llanadas, Ladera N del Cerro Torra, Filo W del Río Surama, Camino al Alto del Oso, 600–900 m, 22 February 1977, *Forero et al. 3086* (MO); (Bahía Solano), 25 July 1973, *Warner & White 51* (MO); (Quibdó), Carretera Quibdó-Yutó, Río Cabí, 24 March 1984, *García-Cossio 25* (CAS, CHOCO, MO); (Pizarro), km 30–33 de la carretera Pie de Pepé-Puerto Meluk, 16 November 1985, *Espina 1830* (CAS, CHOCO, MO); (San José del Palmar), El Tabor, Finca "El Tabor", 1650 m, 17 January 1983, *Franco et al. 1453* (COL, MO); (Pizarro), Margen izquierdo del Río Pepé, entre Boca de Pepé y Pié de Pepé, 19 November 1985, *Espina 2019* (CHOCO, MO); (Quibdó), Carretera Yuto-Lloró, 80 m, 30 June 1983, *Forero et al. 9696* (COL, MO); Río San Juan, Estribaciones de La Mojarra (ca. 30 min de Istmina en lancha con motor fuera de borda), 80–120 m, 25 June 1983, *Forero et al. 9520* (COL, MO); Along road between Las Animas and Pato (on Río Pato) 16 km NW of the jct, with main Quibdó-Istmina road, near Las Animas, 5°20'N, 76°42'W, 100 m, 18 April 1983, *Croat 56163* (MO); Medellín-Quibdó road, ca. 3 km W of Tutunendó, 5°46'N, 76°35'W, 80 m, 7 January 1981, *Gentry et al. 30331* (MO). **Nariño:** La Planada R., 7 km from Chucunes, 1°5'N, 78°1'W, 1800 m, 22 December 1987, *Gentry & Keating 59686* (MO); (Barbacoas), Altaquer, El Barro, R.N. Río Ñambí, Vertiente occidental andina, margen derecha del Río Ñambí, 1°18'N, 78°8'W, 1325 m, 1 December 1993, *Franco et al. 4721* (CAS). **Putumayo:** (Mocoa), Quebrada del Río Afán, 570–680 m, 27 December 1940, *Cuatrecasas 11336* (COL, US); 15 km NW of Puerto Asís, 305 m, 6 August 1965, *King & Guevara 6236* (CAS, COL, NY); (Mocoa), El Medio Afán, El Medio Afán, ca 2 horas arriba del Río Afán, 1200–1600 m, 24 January 1990, *Ramos et al. 2465* (CAS, CUVC, NY). **Risaralda:** (Mistrató), Entre los corregimientos de Geguadas y Puerto de Oro, selva de Pisones, 1550 m, 30 March 1992, *Fernández et al. 9657* (US). **Valle:** Costa del Pacífico, Río Cajambre, Barco, 5–80 m, 21 April 1944, *Cuatrecasas 17033* (F, NY, US); La Trojita, Río Calima (región del Chocó), 5–50 m, 19 February 1944, *Cuatrecasas 16535* (F, NY, US); Hacienda La Florencia, Río Calima, margen derecha, frente a la Base, 10 m, 21 February 1969, *Cuatrecasas & Platino 27461* (US); Alto Yunda, Río Anchicayá, 1000 m, March 1973, *Hilty Mr-9* (ARIZ, US); (Córdoba), Dagua Valley, , 80–100 m, 6 May 1922, *Killip 5124* (NY, US); Veneral, Costa del Pacífico, Río Yurumanguí, 5–50 m, 28 January 1944, *Cuatrecasas 15872* (F, NY); Queremal, Cordillera Occidental, vertiente occidental, Hoya del Río Dagua, lado izquierdo del Río San Juan en la región del Queremal, Quebradito del km 51, 1540–1650 m, 25 February 1947, *Cuatrecasas 23715* (F, US); (Dagua), Queremal, El Danubio, P.N.N. Farallones, Alto Anchicayá, Road from campamento EPSA, Yatacue to the dam, Cordillera Occidental, vertiente occidental, 3°33.632'N, 76°52.598'W, 625 m, 5 February 2011, *Almeda et al. 10242* (CAS, COL); La Trojita, Río Calima (región del Chocó), La Trojita, 5–50 m, 19 February 1944, *Cuatrecasas 16378* (NY); Pacific Coast, Río Calima, Quebrada de López, 20–40 m, 23 September 1961, *Cuatrecasas & Willard 26041* (US); Vicinity of bajo Calima, along road from Buenventura to Málaga, km 49, 4°2'N, 77°4'W, 150 m, 17 July 1993, *Croat & Bay 75807* (MO); Bajo Calima, Concesión Pulpapel/Buenaventura, Carretera Canalete PS2, 3°55'N, 77°'W, 100 m, 13 October 1987, *Monsalve 1921* (CUVC, MO); Bajo Calima, Concesión Pulpapel/Buenaventura, Carretera Canalete PS2, 3°55'N, 77°W, 100 m, 22 October 1987, *Monsalve 2023* (CUVC, MO); Bajo Calima, Dindo area, 3°59'N, 76°58'W, 100 m, 20 July 1984, *Gentry & Monsalve 48427* (MO); Bajo Calima, Concesión Pulpapel, 100 m, 20 January 1988, *van der Werff & Monsalve 9664* (CAS, MO); Bajo Calima, Concesión Pulpapel/Buenaventura, Carretera a Juanchaco N, 3°55'N, 77°'W, 100 m, 21 September 1987, *Monsalve 1752* (CUVC, MO). **COSTA RICA. Alajuela:** (San Carlos), No protegida, Cuenca del San Carlos, Boca Tapada, Laguna Lagarto Lodge, cerca de la laguna, 10°41'10"N, -84°10'50.0001"W, 50–100 m, 23 February 2004, *Solano & Kriebel 907* (INB, NY). **Cartago:** (Valle Escondido), 700 m, 30 March 1966, *Schnell 620* (US); (Valle Escondido), 700 m, 30 March 1966, *Schnell 614* (US); (Oreamuno), P.N. Volcán Irazú, Cordillera Central, San Juan de Chicuá, carretera al Volcán Irazú, 9°57'0"N, 83°51'45"W, 2800 m, 14 October 1993, *Ramírez et al. 165* (CAS, INB). **Guanacaste:** P.N. Guanacaste, Estación Pitilla, alrededores, 11°2'N, 85°24'W, 600 m, 15 June 1989, *II INBio et al. 21* (CAS, CR, INB). **Heredia:** Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, S Boundary, W end, 100 m, 4 May 1981, *Folsom 10009* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, At first stream crossing on Central Trail after Loop Trail, 100 m, 15 July 1980, *Grayum 2980* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Along Q. Paralela at crossing with 3600 m S line, new property, 100 m, 18 July 1982, *Hammel & Trainer 13235* (CAS); Finca La Selva, Puerto Viejo de Sarapiquí, F, Almedar Loop, 1300 m line, 15 July 1979, *Grayum 1830* (CAS); (Sarapiquí), La Virgen, Golfito, No protegida, Cuenca del Sarapiquí, parcela del señor Miguel Angel Picado, 10°38'40.0636"N, 84°3’25.1215"W, 0–100 m, 10 December 2005, *Santamaría & Solano 3596* (INB, NY); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Central Trail, 180 m line, 100 m, 28 November 1982, *McDowell 969* (CAS, NY, US); (Sarapiquí), No protegida, Cuenca del Sarapiquí, Rara Avis Lodge and R., Atlantic slope of Costa Rica. (area protegida privada), 10°16’55"N, 84°2’40.5"W, 700 m, 19 June 2001, *Boyle et al. 80* (INB, MO); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, 1520 m line, S Boundary Line, 100 m, 29 October 1982, *McDowell 681* (CAS, NY, US); (Puerto Viejo), La Selva, Loop Trail, 90 m, 16 April 1972, *Opler 702* (US); La Selva, 3 km SE of Puerto Viejo, Loop Trail, 45 m, 13 April 1973, *Opler 1721* (US); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, 180 m line, Central Trail, 100 m, 28 October 1982, *McDowell 642* (CAS); (Sarapiquí), La Virgen, P.N. Braulio Carrillo, 600 m S del Puesto La Ceiba, sobre La Fila, 10°20’N, 84°5’W, 550 m, 14 October 1988, *Ballestero 5* (CAS); (Magsay), Borde de la Quebrada Canta Rana, 400 m, 17 January 1983, *Chacón 108* (CAS, CR); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Along Q. Saltito at back of loop, 100 m, 13 June 1982, *Hammel & Trainer 12857* (CAS); (Sarapiquí), Rara Avis, ca 15 km al SW de Horquetas, Camino Leví hacia Catarata y Río Atelopus, aguas arriba, 10°17’N, 84°2’W, 400 m, 19 September 1989, *Vargas 121* (CAS, CR, INB); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Central trail 1500 m S, 100 m, 4 May 1982, *Hammel 12000* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Along small water course in SW quarter of new property, 100 m, 18 May 1982, *Hammel 12311* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Pantano ridge about 1950 m S, 1820 m E, 100 m, 1 September 1981, *Smith 157* (CAS); Finca La Selva, The OTS Field Station on the Río Puerto Viejo just E of its junction with the Río Sarapiquí, Central Trail, 2600 m line-W boundary, 3000 m line, 100 m, 24 April 1981, *Folsom 9854* (CAS); (Puerto Viejo de Sarapiquí) Finca La Selva, First forest, Sabalo-Esquina Trail, 9 July 1979, *Sperry 863* (CAS); Estación Biológica La Selva, R. of the Organization for Tropical Studies, Vicinity of the first swamp on the Central Trail, 100 m, 27 February 1986, *Almeda & Anderson 5106* (CAS, CR). **Limón:** Hacienda Tapezco-Hacienda La Suerte, 29 air km W of Tortuguero, 10°30’N, 83°47’W, 40 m, 29 August 1979, *Davidson & Donahue 8933* (CAS, US); (Pococí), P.N. Braulio Carrillo, Cuenca del Sarapiquí, Sector Quebrada González, sendero Las Palmas, 10°9’20"N, 83°56’30.0017"W, 600 m, 29 July 2008, *Kriebel 5313* (INB, NY); (Toro Amarillo), 300–350 m, 18 July 1964, *Ferreyra 15912* (US); (Limón), Cerro Muchilla, Fila Matama, Cordillera de Talamanca, 9°47’50"N, 83°5’30"W, 850 m, 6 April 1989, *Robles & Chacón 2676* (CAS); (Talamanca), Fila de exploración minera entre Río Sukut y Río Carbri, Muragubishi, 9°22’50"N, 82°56’50"W, 700 m, 14 July 1989, *Herrera 3290* (CAS, CR). **Puntarenas:** R.N.V.S. Golfito, Ca, 6 km NW of campo aterrizaje de Golfito, 8°41’0"N, 83°13’10"W, 100 m, 28 January 1992, *Hammel & Aguilar 18403* (CAS, CR); Between Golfo Dulce and Río Térraba 30 m, 5 December 1947, *Skutch 5309* (F, US); (Golfito), P.N. Corcovado, Península de Osa, Estación Los Patos, alrededores, 8°34’0"N, 83°31’0"W, 200 m, 6 September 1993, *Aguilar 2259* (CAS); Along road from Panamerican Hwy, at Piedras Blancas to Rincón (on Osa Peninsula), 3.7 mi W of Panamerican Hwy, 8°46’N, 83°18’W, 90–105 m, 16 September 1987, *Croat 67670* (CAS). **ECUADOR. Carchi:** (El Pailón), ca 45 km below Maldonado along a foot path to Tobar Donoso, 800 m, 26 November 1979, *Madison & Besse 7006* (US); (Tulcán), R. Étnica Awá, Comunidad de Gualpi Medio, 1°1’N, 78°16’W, 900 m, 21 May 1992, *Quelal et al. 694* (CAS, MO, QCNE); (Gualpi Chico), Vicinity of Awá encampment, 0°58’N, 78°16’W, 1330 m, 17 January 1988, *Hoover et al. 2699* (MO); NW side of Río Gualpi Chico, heading N down river, 0°58’N, 78°16’W, 1100–1200 m, 25 January 1988, *Hoover et al. 3025* (MO); (Tulcán), R. Indígena Awá, Parroquia Tobar Donoso, Sector Sabalera, NE Casa Comunal, 1°0’N, 78°24’W, 100–650 m, 19 June 1992, *Tipaz et al. 1310* (MO, QCNE); Border area between Prov, Carchi and Esmeraldas, about 20 km past Lita on Road Lita-Alto Tambo, 550 m, 26 June 1991, *van der Werff et al. 12040* (CAS, MO); (Tulcán), R. Étnica Awá, Parroquia El Chical, Sector Gualpí Medio, Río Canumbí, 1°2’N, 78°15’W, 1150 m, 19 February 1993, *Grijalva et al. 506* (MO, QCNE); (Tulcán), R. Indígena Awá, Parroquia El Chical, Sector Gualpí Medio, Sendero a San Marcos al N de la casa comunal, 1°2’N, 78°16’W, 3200 m, 23 May 1992, *Tipaz et al. 1118* (MO, QCNE); (Tulcán), Chical, R. Étnica Awá-Camumbí, 0°53’N, 78°16’W, 1700–1900 m, 20 July 1991, *Quelal et al. 163* (MO, QCNE); (Tulcán), R. Étnica Awá, Parroquia Chical, Centro Gualpi Medio, 1°2’N, 78°16’W, 900 m, 18 February 1993, *Aulestia & Grijalva 1099* (MO); Border area between Prov, Carchi and Esmeraldas, about 20 km past Lita on Road Lita-Alto Tambo, 550 m, 26 June 1991, *van der Werff et al. 12048* (MO). **Esmeraldas:** Road Lita-Alto Tambo-San Lorenzo, km 6.9 from Lita, 0°52’24.6"N, 78°29’33.2"W, 720 m, 30 September 2001, *Cotton et al. 1790* (MO, NY, QCA); Along road between Lita and San Lorenzo, 36.6 km N of Gasolinera San Lorenzo, 12.6 km N of Río Tulubí, 1.7 km S of

El Durango, 1°38'1"N, 78°38'1"W, 204 m, 18 July 2000, *Croat et al. 84147* (MO); Parroquia de Concepción, Playa Rica, 105 m, 10 December 1936, *Mexía 8428* (F, MO, NY, US); Along road between Lita and San Lorenzo, 36.6 km N of Gasolinera San Lorenzo, 12.6 km N of Río Tulubí, 1.7 km S of El Durango, 1°38'1"N, 78°38'1"W, 204 m, 18 July 2000, *Croat et al. 84160* (MO); S of bridge S of Lita on Lita-Alto Tambo road, 0°53'19"N, 78°31'43"W, 900 m, 21 September 2003, *Penneys et al. 1576* (CAS, NY, US); (Eloy Alfaro), R.E. Cotacachi-Cayapas, Parroquia Luis Vargas Torres, Río Santiago, estero Pote, 0°49'N, 78°45'W, 250 m, 23 October 1993, *Tirado et al. 545* (MO, NY); (San Lorenzo), R. Indígena Awá, Comunidad "La Unión", Cañón del Río Mira, 10 km al W de Alto Tambo, 1°2'N, 78°26'W, 250 m, 16 March 1991, *Rubio et al. 1240* (QCNE, US); Road San Lorenzo-Alto Tambo-Lita, km 60.5 from San Lorenzo, fringes of the R. Cotacachi-Cayapas, 0°53'47.7"N, 78°32'32.7"W, 879 m, 3 October 2001, *Cotton et al. 1822* (CAS, MO, QCA); (San Lorenzo), R. Étnica Awá, Parroquia Alto Tambo, Centro de La Unión, Cañón del Río Mira, 0°52'N, 78°26'W, 250 m, 22 March 1993, *Aulestia & Aulestia 1340* (MO, QCNE); (San Lorenzo), R. Étnica Awá, Parroquia Alto Tambo, Centro de La Unión, Cañón del Río Mira, 0°52'N, 78°26'W, 250 m, 22 March 1993, *Aulestia & Aulestia 1276* (MO, QCNE). **Morona-Santiago:** (Morona), Along road between Macas and Puyo, 31 km N of Macas, 28.5 km N of bridge over Río Upano, 2°1'S, 77°56'W, 1125 m, 7 March 1992, *Croat 72801* (MO); Along Río Palora 2–5 km downstream from Arapicos, 800–900 m, 9 April 1981, *Lugo 6056* (CAS). **Napo:** Baeza-Tena Road, between Osayacu and Jondachi, 10–20 km N of Archidona, 900 m, 5 February 1980, *Harling & Andersson 16237* (F, MO, US); 8 km río abajo de Puerto Misahualli, por el Río Napo y 1.5 km al S, 1°4'S, 77°36'W, 450 m, 18 May 1985, *Palacios et al. 435* (F); Hacienda Cotapino (Concepción), 550 m, 19 February 1968, *Harling et al. 7095* (F, US); P.N. Sumaco-Napo-Galeras, Estribaciones occidentales de la cordillera Galeras, Bosque maduro a 100 m de la casa flia Mamallacta, tierra firme a orillas del Río Pusuno, 0°56'S, 77°38'W, 950 m, 27 December 2002, *Guevara 601* (F, QCA); Estación Biológica Jatún-Sacha, Río Napo, 8 km al E de Misahualli, 1°4'S, 77°36'W, 450 m, 17 February 1988, *Cerón 3588* (CAS, MO, NY); Estación Biológica Jatún-Sacha, Río Napo, 8 km al E de Misahualli, 1°4'S, 77°36'W, 450 m, 8 September 1987, *Neill et al. 7816* (MO, NY); (Loreto), Faldas del Volcán Sumaco, Al W de Avila Viejo, Bloque 19, línea sísmica 8, Compañía Tritón, 0°38'S, 77°27'W, 750 m, 14 February 1996, *Freire & Cerda 97* (MO, NY); Estación Biológica Jatún-Sacha, Río Napo, 8 km al E de Misahualli, 1°4'S, 77°36'W, 450 m, 22 February 1988, *Palacios 2439* (MO, NY); R.B. Jatún-Sacha, Margen derecha del Río Napo, 8 km abajo de Misahualli, 1°4'S, 77°36'W, 450 m, 13 February 1987, *Palacios & Neill 1534* (MO, US); Estación Biológica Jatún-Sacha, 8 km al E del Puerto Misahualli, Por los senderos de la estación, 1°4'S, 78°36'W, 450 m, 25 March 1989, *Macías & Bensman 54* (MO, QCNE); R.B. Jatún-Sacha, Río Napo, 8 km abajo de Misahuallí, 1°4'S, 77°36'W, 450 m, 17 January 1987, *Cerón 574* (MO); Estación Biológica Jatún-Sacha, 8 km al E del Puerto Misahualli, Por los senderos de la estación, 1°4'S, 78°36'W, 450 m, 22 March 1991, *Macías 98* (MO, QCNE); (Tena), Construcción de carretera Campococha-Chontapunta, Variante Selva Viva-Bosque Protector, abscisas 4+500–12+020, 0°55'S, 77°25'W, 300–500 m, 23 August 1997, *Núñez & Tapuy 556* (MO, QCNE). **Napo-Pastaza:** Vicinity of Puyo, Eastern foothills of the Andes, 750–1000 m, September 1939, *Skutch 4487* (F); Near Puyo, Puyo forest, 17 February 1953, *Prescott 885* (CAS, NY); (Mera), Forest near Mangayacu, 1100 m, 14 November 1955, *Asplund 18432* (US); (Mera), 4 March 1940, *Lugo 17* (MO). **Pastaza:** Pacayacu on the Río Bobonaza, c, 16 km NW of Sarayacu, 10 August 1979, *Lugo 5241* (F, MO); Along road from Puyo to Macas, ca 33 km S of Puyo, 24.9 km S of Veracruz, 16 km S of Escuela Fiscal Cotopaxi, 1°38'S, 77°52'W, 900 m, 3 May 1984, *Croat 58939* (CAS, MO); 1 km al S de Mera, vega a la orilla del Río Pastaza, cerca de la boca del Río Aldayacu, 1°28'S, 78°7'W, 6 March 1984, *Baker et al. 5553* (NY); (Puyopungu), 15 September 1976, *Lugo 4823* (MO, US); (Pastaza), Between Shell and Mera, 5.3 km NW of center Shell, along gravel road, 1.1 km N of highway, disturbed virgin forest at the end of boardcover path, E end of road, 1°27'S, 78°4'W, 1180 m, 3 April 1992, *Croat 73456* (MO); Puyo-Arajuno Road, 1–5 km SW Diez de Agosto, 900 m, 4 March 1980, *Harling & Andersson 16864* (CAS, MO). **Pichincha:** R.F. ENDESA, ca. 8 km E de pedro Vicente Maldonado, 0°5'N, 79°1'W, 780 m, 28 February 2004, *Moran et al. 6948* (NY); R.F. ENDESA. "Corporación Forestal Juan Manuel Durini", Río Silanche, km 113 de la carretera Quito-Pto, Quito, faldas occidentales, a 10 km al N de la carretera principal, 0°5'N, 79°2'W, 650–700 m, 16 December 1984, *Cueva 5* (F, QCA); R.F. ENDESA. "Corporación Forestal Juan Manuel Durini", Carretera Quito-Pto Quito, km 113, 10 km al N de la carretera principal, 0°5'N, 79°2'W, 800 m, 25 February 1984, *Betancourt 126* (F, QCA); Carretera Quito-Puerto Quito, km 113, 10 km al N de la carretera principal, 0°5'N, 79°2'W, 800 m, 27 December 1983, *Balslev & Balseca 4665* (NY, QCA, US). **Sucumbíos:** Estación Científica Cuyabeno, Colecciones en el cuadrante de sendero línea B, 220 m, 28 March 1992, *Jaramillo & Grijalva 14671* (QCA, US); Estación Científica Cuyabeno, en el cuadrante de sendero línea B, 220 m, 30 March 1992, *Jaramillo & Grijalva 14703* (MO, QCA). **Zamora-**

Chinchipe: Shore of Río Pastaza opposite Mera, 1000 m, 6 February 1956, *Asplund 19257* (NY, US). **PANAMA. Bocas del Toro:** Region of Almirante, Cricamola Valley, January–March 1928, *Proctor 478* (NY); Oleoducto Road, near Continental Divide, Fortuna Dam area, 8°48’N, 82°12’W, 1000 m, 5 February 1984, *Churchill et al. 4511* (CAS). **Chiriquí:** (Boquete), Fortuna dam site, 1200 m, 7 February 1985, *van der Werff & van Hardeveld 6683* (CAS); Gualaca-Chiriquí Grande 8 mi beyond Los Planes de Hornito, 6.9 mi beyond road turnoff to Caldera, 1.4 mi to W of Centro de Operaciones, along trail to Río Hornito and meteological station, 8°44’"N, 82°14’30"W, 1010–1130 m, 21 September 1987, *Croat 67915* (CAS); (Gualaca - Chiriquí Grande), 8 mi beyond Los Planes de Hornito, 6.9 mi beyond road turnoff to Caldera, 1.4 mi to W of Centro de Operaciones, along trail to Río Hornito and meteological station, 8°44’N, 82°14’30"W, 1010–1130 m, 21 September 1987, *Croat 67889* (CAS); Fortuna Dam Area, Slope NW of confluence of Río Hornito and Río Chiriquí, 8°44’N, 82°13’W, 1050–1100 m, 10 November 1980, *Sytsma & Stevens 2210* (CAS); Upriver from the main camp, Fortuna dam site, 1200–1400 m, 15 September 1977, *Folsom et al. 5501* (CAS, MO); Edwin Fabrega Dam and R, in Fortuna, Quebrada Christina ca 7.4 km N of the Dam site (Sitio de Presa offices) enroute to Chiriquí Grande, 1060 m, 5 February 1996, *Almeda et al. 7508* (CAS, PMA); (Fortuna), Trocha Cordillera Central, cerca de la división continental, 28 October 1997, *Montenegro 1808* (CAS); Road to Fortuna Dam site N of Gualaca. 22.7 mi beyond the bridge over Río Estí, 1400 m, 22 November 1979, *Antonio 2777* (CAS); Slope NW of confluence of Río Hornito and Río Chiriquí, 8°44’N, 82°13’W, 1050–1100 m, 11 November 1980, *Stevens 18263* (CAS). **Coclé:** Above El Copé and Barrigón, near continental divide, 8°38’N, 80°35’W, 850 m, 25 February 1988, *McPherson 12168* (CAS); Woods adjacent to chicken farm, La Mesa, above El Valle, 3 January 1974, *Dwyer 11906* (NY, US); Elfin Forest, Cerro Caracoral, 1000 m, 19 January 1968, *Duke & Dwyer 15095* (NY); (El Valle), 800–1000 m, 28 June 1967, *Duke 13157* (US); On slopes of Cerro Pilón near El Valle, 700–900 m, 10 June 1967, *Duke 12136* (NY); Cerro Gaital, E slope and ridges leading to the summit with montane rainforest and elfin woodland, 8°40’N, 80°7’W, 1050–1100 m, 24 February 1988, *Almeda et al. 5904* (CAS, PMA); New works, 7 km N of El Cope, 750–800 m, 18 August 1977, *Folsom 4956* (CAS); (Alto Calvario), Above El Copé, ca 6 km N of El Copé, Atlantic slope, along trail which leads W off old lumber trail which leads down to Las Ricas, Limón and San Juan, 8 or 9°39’N, 80°36’W, 710–800 m, 22 June 1988, *Croat 68717* (CAS); Vicinity of La Mesa, N of El Valle de Antón, along steep slopes above water reservoirs, ca 1 km W of road between Finca Manadarinas and Finca Furlong, 8°38’N, 80°9’W, 800–900 m, 12 July 1987, *Croat 67168* (CAS); Ridge NW of village of Río Blanco de Norte, between Caño Sucio and Río Blanco de Norte, Señor Dideymo Olivera's finca, 8°44’N, 81°40’W, 350 m, 20 February 1982, *Knapp 3674* (CAS). **Colón:** Teck Cominco Petaquilla mining concession, Forested slopes below ridgetop road, 8°49’28"N, 80°39’29"W, 180 m, 19 September 2007, *McPherson 19716* (CAS). **Darién:** Cerro Pirre, 762–1372 m, 9 August 1967, *Duke & Elias 13838* (US); Trocha Río Frío hacia la cima más allá de Rancho Tuque (3h de camino), Trocha de Rancho Frío hacia Rancho tigre, hacia la cima de Cerro Pirre, 1000–1200 m, 21 September 1989, *Aranda et al. 891* (CAS, PMA); Trocha Río Frío hacia la cima más allá de Rancho Tuque (3h de camino), Trocha de Rancho Frío hacia Rancho tigre, hacia la cima de Cerro Pirre, 1000–1200 m, 21 September 1989, *Aranda et al. 908* (CAS, PMA); Cerro Pirre, ridge top near Rancho Plástico, 1200 m, 10 July 1977, *Folsom 4247* (CAS); Top of ridge leading to Cerro Pirre, Area near Rancho Plastico, 1200–1400 m, 13 November 1977, *Folsom et al. 6278* (CAS); SW ridge leading to Alturas de Nique on the Colombian border, 800–900 m, 28 December 1980, *Hartman 12352* (CAS); Middle slopes on W side of Cerro Pirre, 7°56’N, 77°45’W, 800–1050 m, 29 June 1988, *Croat 68937* (CAS). **Panamá:** High point of ridges S of Ipetí, 5–6 hours walk from Chocó Village, Serranía de Maje, 8°45’N, 77°30’W, 650–800 m, 31 March 1982, *Knapp et al. 4495* (CAS). **San Blas:** Cerro Habú, trail from Río Sidro, 9°23’N, 78°49’W, 427–610 m, 20 December 1980, *Sytsma et al. 2777* (CAS). **Veraguas:** Valley of Río Dos Bocas along road between Escuela Agrícola Alto Piedra and Calovebora, 15.6 km NW of Santa Fe, along trail to Santa Fe, E of river, 450–550 m, 31 August 1974, *Croat 27624* (NY); ca 10 km NW of Santa Fe, on road to Calovebora (Panama Hwy 35), at first branch of Río Santa Maria, 4 August 1975, *Mori & Bolten 7640* (US); Beyond Río Tres Brazos, 9 km from Santa Fe, 24 July 1974, *Croat 25590* (MO); Beyond Río Tres Brazos, along steep descent 11 km beyond Santa Fe, 650 m, 24 July 1974, *Croat 25639* (MO); 2–5 km NW de Santa Fe por el camino a Río Calovebora, 500–700 m, 26 August 1984, *Hernández et al. 748* (CAS); Vicinity of Santa Fe, along dirt road between Santa Fe and Río San Luis, past Escuela Circlo Alto de Piedra, ca 5 mi N of school, 8°33’N, 81°8’W, 670 m, 28 June 1987, *Croat 66961* (CAS). **PERÚ. Cuzco:** (Quispicanchi), Camanti, Maniri, 8 km W de Quincemil, A lo largo de la quebrada Yanamayo, 13°17’S, 70°48’W, 720 m, 16 July 1990, *Timaná & Astete 610* (MO). **Huánuco:** (Pachitea), Pucallpa region, W part of the "Sira mountains" and adjacent lowland, c, 24 km SE to c, 26 km ESE of Purto Inca. from the beginning of the mountain rain forest next to the "Campamento Pato Rojo" along the mountain crest to the beginning of the elfin forest after the "Campamento Peligroso", 9°27'S, 74°46'W, 1350 m, 25 March 1988, *Wallnöfer 12-25388* (CAS). **Pasco:** (Oxapampa), Valle del Palcazu, Cordillera de San Matías, Camino de Loma Linda, 700 m, 22 July 1981, *Foster 4521* (F); (Oxapampa), Palcazu, Río Alto Iscazacin, Ozuz to Río Pescado, 10°19'S, 75°16'W, 400–500 m, 12 May 1985, *Foster & d'Achille 10125B* (F); (Oxapampa), Pichis Valley, San Matias Ridge, 10–12 km SW of Puerto Bermúdez, above Santa Rosa de Chivis, trail to Puerto Nuevo, 10°20'S, 75°0'W, 500–900 m, 8 September 1982, *Foster 8640* (MO). **San Martín:** (Mariscal Cáceres), Tocache Nuevo, Palo Alto, Al W del Puente, 600–700 m, 26 November 1972, *Schunke 5602* (F, NY, US); (Mariscal Cáceres), Tocache Nuevo, Cerro Sinsín, 15 km W of Tacache Nuevo, along road to Puerto Pizana, 8°9'S, 76°34'W, 550–580 m, 17 December 1981, *Plowman & Schunke 11480* (F); (Mariscal Cáceres), Tocache Nuevo, Cerro de Palo Blanco, márgen izquierda del Río Tocache, 600–700 m, 9 July 1974, *Schunke 7256* (MO).

Illustration:—Almeda *et al.* 2007: 555.

Common names and documented uses:—Ecuador: "chignul" used as pitchforks (*Aulestia 1276*, *1099*, MO!, *Quelal et al. 694*, CAS!, *Tipaz 1310*, *1118*, MO!); "mora" (*Mexia 8428*, CAS!).

Habitat, distribution and ecology:—This species is common to occasional in primary and secondary rainforests, cloud forests, swamp forests, and disturbed sites, growing in the understory, in light gaps or near streams in flat areas, from Costa Rica throughout southern Central America south to Colombia, Ecuador, Perú, and with one record from western Brazil (Fig. 17), at 5–2800(–3200) m. In Costa Rica it grows on the Caribbean slope along all the principal Cordilleras, to the Tortuguero plain, and south to the Golfo Dulce region on the Pacific slope. In Panama it is present throughout the country, both on the Pacific and Atlantic slopes. In Colombia it occurs on the Pacific slope of the Western Cordillera of the Andes, encompassing the Biogeographic Chocó Region, with fewer collections from the Central Cordillera. In Ecuador it is common throughout ranging south to Perú. In this study *M. variabilis* is reported for the first time in Brazil, where it occurs in the western region of Acre close to the Peruvian border.

Manakins, Tanagers, Thrushes, the orange-billed Sparrow (*Arremon aurantiirostris*) and *Myadestes melanops* (in a Costa Rican premontane wet forest) have been reported to feed on *M. variabilis* berries (Stiles & Rosselli 1993). The White-ruffed Manakin (*Corapipo altera*) has also been reported to feed on *M. variabilis* fruits (Boyle 2006).

Phenology:—Collected in flower and fruit throughout the year.

Etymology:—The specific epithet refers to the variable colors of the mature fruits of this species.

Discussion:—*Miconia variabilis* has a distinctive puberulent indumentum of dendritic trichomes on the petals abaxially, petiolate 5-plinerved leaves, 5-merous flowers, tuberculiform exterior calyx teeth that do not project, and oblong-obovate anthers that are emarginate at the apex. *Miconia sessilis* has similar vegetative and floral pubescence, and anther shape, but differs in having 4-merous flowers and leaf bases that are conspicuously decurrent on the petioles. The indumentum is also somewhat similar to that in *M. bensparrei*, *M. incerta*, and *M. palenquensis*, which collectively differ in their sessile, amplexicaul leaves. *Miconia variabilis* is the most basal species within the Variabilis subclade.

This species is fairly consistent in indumentum and floral characters but the pubescence varies in quantity without any apparent correlation with elevation or other characters. The color of mature berries is highly variable in this species as well. There are at least two variants across its geographic and elevational range. The first variant has berries that are consistently white at maturity. These plants which are probably found throughout the species range are more abundant on the Atlantic slope of Costa Rica south to the Pacific slope in Panama (Bocas del Toro down to Darién) with populations also in Colombia, Ecuador and Perú, at 5–2800 m. It is difficult to delimit the exact geographic extent of this variant because collectors do not always record mature berry colors on specimens labels. The other variant includes individuals in which mature berries undergo a change of color through the maturation process. The fruits are initially green or green-white, then turning yellow, orange and in some cases red-purple. Berries with different colors can be seen on the same plant. The geographic distribution of this variant is clearer than the one with white berries. It occurs on the Pacific coast of Costa Rica (Parque Nacional Corcovado), south to Panama in the Atlantic province of San Blás to Darién. In Colombia, Ecuador and Perú this is the predominant variant, at 5–1325(–3200) m. From these distributions it appears that in Central America the two variants are clearly separated, but this is not clear in South America where both variants may be sympatric.

The only record from Brazil was reported to have white berries at maturity. These two variants appear to represent divergent lineages within the same species. It would be of interest to learn whether the two berry color variants are selectively favored by the bird species that feed on them.

There is one collection (*Cuatrecasas 17033,* F!, NY!, US!) that probably represents a rare variant from lowland Pacific Colombia (Valle), at 5–80 m. This specimen has smaller leaves than usual (mostly 6 × 2.2 cm), larger exterior calyx teeth (to 0.8 mm), and floral parts that are smaller overall than the norm. This collection is otherwise identical to *M. variabilis* in the puberulent indumentum and leaf venation, which are consistent diagnostic characters of this species.

As discussed under *M. laxivenula*, the vegetatively glabrous population from eastern Ecuador described as *Ossaea robusta* f. *glabrata* Markgraf, will probably remain unknown until the "Pacapaca" region is more thoroughly explored (Wurdack 1973a).

The only illustration of this species (Almeda *et al.* 2007), is accurate except that the seed looks cochleate and the testa appears verrucose. Cochleate seeds are not present in the tribe Miconieae, and in *M. variabilis* they are clearly ovoid, with the testa seemingly smooth and glossy, the verrucose microrelief is only visible with a SEM.

Conservation status:—This species would be considered Vulnerable VU B2ab(iii) according to IUCN criteria (AOO). However, because it occurs in many protected areas, a status of Least Concern LC is justified. It is protected in Brazil in the Serra do Divisor National Park (Acre). In Colombia it is protected in the Isla Gorgona National Park (Cauca); in La Planada Reserve (Nariño); and in in the Farallones National Park (Valle). In Costa Rica it is protected in the Volcán Irazú National Park (Cartago); in the Guanacaste National Park (Guanacaste); in La Selva Biological Station (Heredia); in the Braulio Carrillo National Park (Limón); in the Golfito Wild Life Reserve and in Corcovado National Park (Puntarenas). In Ecuador it is protected in the Awá Indigenous Reserve (Carchi and Esmeraldas); in the Sumaco-Napo-Galeras National Park and in the Jatún-Sacha Ecological Reserve (Napo); in ENDESA Forest Reserve (Pichincha); and in the Cuyabeno Scientific Station (Sucumbíos).

33. *Miconia veraguensis* Gamba & Almeda, *spec. nov.* (Fig. 26)

Related to *M. approximata* by virtue of the densely fasciculate glomerules. Distinguished by the elliptic ovate berries which are larger than in its closest relatives; 6.59–7.34 × 4.31–5.3 mm.

Type: PANAMA. Prov. Veraguas: Trail to Reserva Biológica Serranía de Tute and the summit of Cerro Tute about 0.7 km beyond the Escuela Agrícola Río Piedra just outside Santa Fe, 860–1300 m, 18 February 1996, *Almeda et al. 7620* (holotype: CAS!; isotype MO!, NY!, PMA!).

Little-branched shrub 1–1.5 m tall, bark green-brown. *Upper internodes* rounded-quadrate 1.09–1.91 cm long, cauline nodes slightly compressed becoming terete with age, nodal line present. *Indumentum* on branchlets, petioles, adaxial leaf surface, primary, secondary and tertiary veins adaxially and abaxially, bracts, bracteoles, pedicels, hypanthia, calyx lobes and calyx teeth densely covered with caducous white-translucent elongate slightly roughened trichomes 1–1.5 mm long, each trichome deflexed and somewhat flattened, intermixed with a dense understory of dendritic trichomes 0.2–0.5 mm long with moderately long thin-walled arms. *Leaves* of each pair slightly anisophyllous in size; subsessile to short-petiolate, the free rounded-quadrate petioles 0.42–0.95 cm long (on larger leaves) or 0.21–0.4 cm long (on smaller leaves), widely canaliculate adaxially, convexly 3-grooved abaxially, succulent, brownish; larger blades 12.5–20.5 × 6–9 cm, elliptic-obovate, the base acute or rounded-cordate, shortly decurrent on the petiole, the margin crenulate to subentire, the apex bluntly apiculate; smaller blades 6.5–14 × 4.75–8.7 cm, elliptic-obovate to obovate, the base slightly rounded to attenuate, shortly decurrent on the petiole, the margin crenulate to subentire, the apex bluntly apiculate; chartaceous; adaxial surface of mature leaves, primary, secondary and tertiary veins glabrescent, the elongate roughened trichomes denser toward the base, the higher order veins glabrous; abaxial surface superficially glabrous, microscopically papillose with resinous unfurrowed or slightly furrowed glands to 0.1 mm in diameter, the indumentum on the secondary veins intermixed with a resinous understory of minute sessile to short-stalked glands 0.1 mm long with thin-walled short heads, these glands also present on the tertiary and higher order veins, sparsely intermixed with white furrowed sessile glands ca. 0.1 mm long; 5–(7-) plinerved, including the tenuous marginals, innermost pair of secondary veins diverging symmetrically from the primary vein 0.5–3 cm above the base, areolae 0.3–0.4 mm, adaxially the primary, secondary and tertiary veins deeply impressed, the higher order veins slightly so, abaxially the primary and secondary veins elevated and terete, somewhat succulent, the tertiary and higher order veins slightly raised to flat. *Inflorescences* a congested, axillary and fasciculate many-bracted glomerule 1.22–2.18 cm long, sessile, unbranched, paired or appearing verticillate in the upper leaf axils and at defoliated nodes; bracts 5.43–7.04 × 2.75–3.95 mm, elliptic to elliptic-ovate, concave, the apex acute, greenish, glabrescent, persistent in fruit. *Flowers* not seen, probably 4-merous based on persistent calyx lobes in fruit, sessile. *Hypanthia* in fruit 6.4–6.85 × 1.5–2 mm, free portion of hypanthium 1.6–1.8 mm long, subcylindric to urceolate, bluntly 8-ribbed, green, the indumentum mostly consisting of dendritic trichomes to 0.3 mm long, intermixed with minute sessile glands and with white furrowed sessile glands, both ca. 0.1 mm long, ridged on the inner surface, glabrous, the torus adaxially glabrous, somewhat glossy. *Calyx* persistent in fruit, green to brown; tube 0.3–0.5 mm long, glabrous adaxially, with the same vestiture as the hypanthium abaxially; lobes 2–2.5 × 1.5–1.8 mm, triangular, slightly concave, the margin entire, the apex bluntly acute, the indumentum intermixed with the same two types of glands present on the hypanthium, spreading to reflexed in fruit; exterior calyx teeth to 1.8 mm long, linear-deltoid, thick, inserted half way up the lobes and projecting beyond them. *Ovary* (in fruit) 4-locular, completely inferior, 4.8–5 mm long, the apical collar 1 × 0.8–1 mm, conic, glandular-puberulent. *Berries* 6.59–7.34 × 4.31–5.3 mm when dry, globose-elliptic to globose-obovate, light green, ripening orange, the hypanthial indumentum persistent at maturity. *Seeds* 0.57–0.75 × 0.39–0.44 mm, pyramidal, yellow-brown; lateral symmetrical plane triangular, the highest point near the central part of the seed, with a foot-like projection at the micropylar end; antiraphal symmetrical plane suboblong; raphal zone suboblong, ca. 80% the length of the seed; multicellular sculpture rugose throughout the seed. Individual cells elongate and isodiametric, the latter found at the highest point of the seed, anticlinal boundaries channeled, undulate, with Ω- and U-type patterns; periclinal walls convex, low- to high-domed, microrelief striate.

Additional specimens studied:—PANAMA. Veraguas: Along trail to summit of Cerro Tute about 1/2 mile above the Escuela Agrícola Alto Piedra near Santa Fe, 8.48222°N, -1.09805°W, 900–1100 m, 29 January 1989, *Almeda et al. 6480* (CAS, MO, NY, PMA).

Illustration:—Fig. 26.

Common names and documented uses:—None recorded.

Habitat, distribution and ecology:—A local and uncommon species known only from cloud forests of Cerro Tute in the province of Veraguas, Panama (Fig. 16), at 860–1300 m.

Phenology:—Collected in fruit in January and February.

Etymology:—The specific epithet refers to the province of Veraguas in Panama, where this species appears to be endemic.

Discussion:—This species has a distinctive white-translucent lanate vegetative indumentum, flowers that are congested in fasciculate glomerules with conspicuous bracts, and large bright orange mature berries. In its poorly developed inflorescences and rugose seeds, *M. veraguensis* is most similar, and also most closely related, to those species in the Approximata subclade that have sessile fasciculate glomerules. *Miconia approximata* which occurs nearly throughout Central America south to Ecuador has a thicker and darker vestiture, shorter, globose-oblate fruits at maturity (2–2.5 × 5–6 mm vs. 6.59–7.34 × 4.31–5.3 mm that is globose-elliptic to globose-obovate). In Veraguas province, *M. approximata* is only known from Isla de Coiba. *Miconia veraguensis* is also similar to *M. chocoensis* and *M. quadridomius*, two South American species that have a longer lanate indumentum (1.5–3 mm vs. 1–1.5 mm) and smaller berries. Although flowers of this species remain unknown, it is clearly distinct from its close relatives in the characters mentioned above.

Conservation status:—This species would be considered Critically endangered CR D based on IUCN criteria. Because this species is rare and local in a protected area of the Cerro Tute in Veraguas, Panama, a status of Vulnerable VU is warranted.

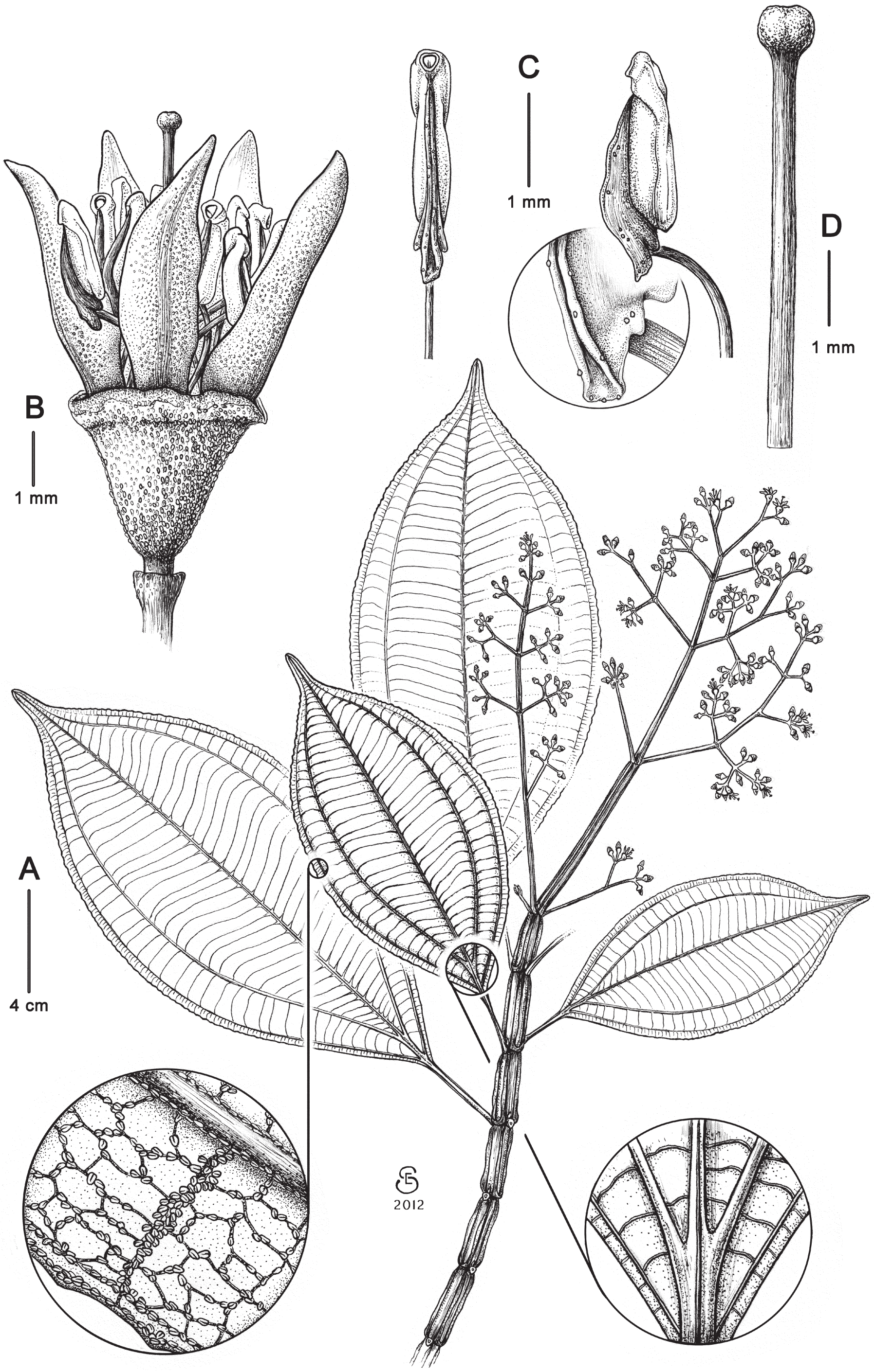


FIGURE 18. *Miconia alatissima*. A. Habit, showing details of abaxial foliar surface. B. Flower. C. Stamen, abaxial view (left), lateral view (right) with detail of anther connective appendage. D. Style. Based on *Rubio et al. 2176*, MO. Drawn by Sean V. Edgerton.

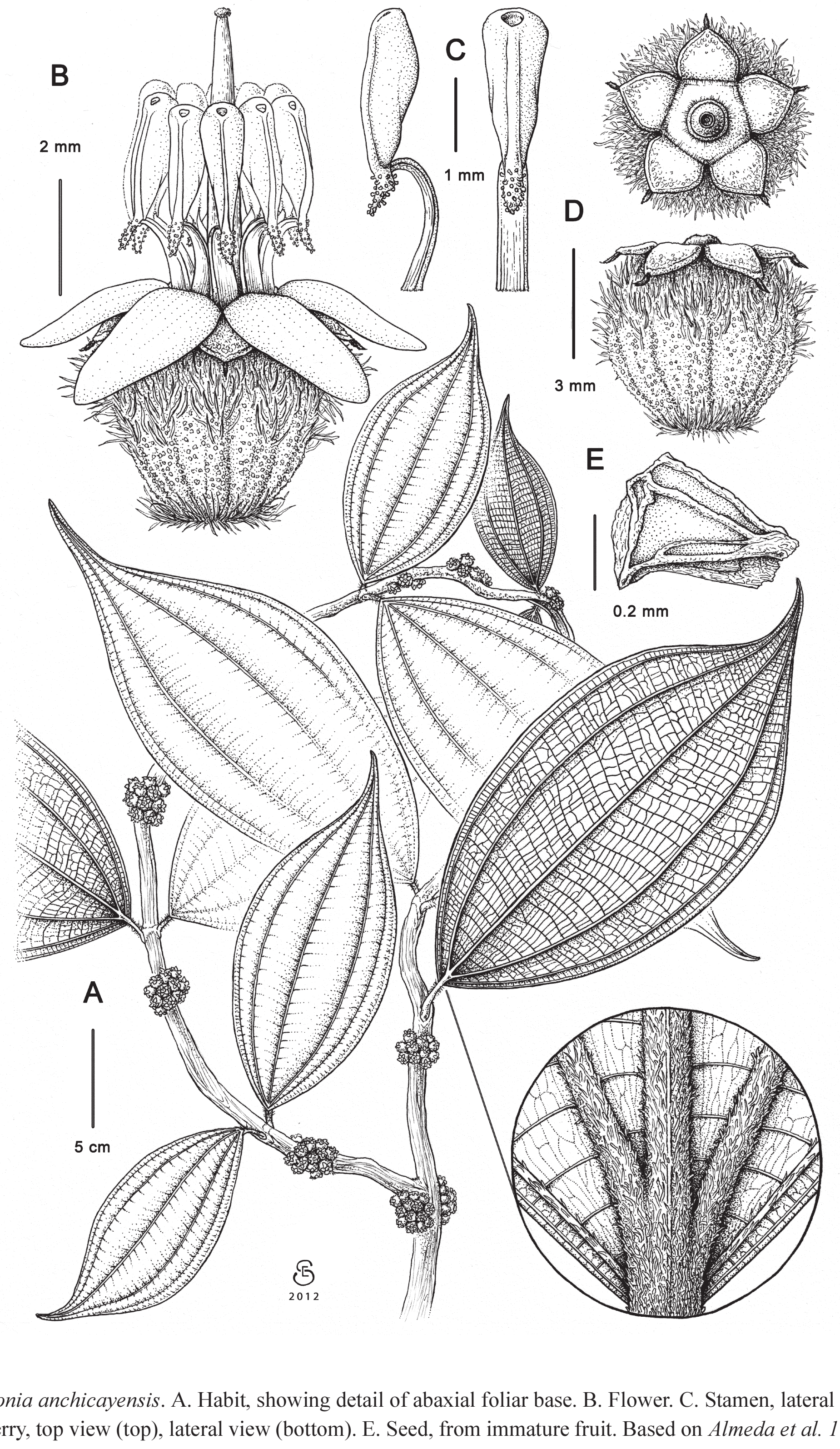


FIGURE 19. *Miconia anchicayensis*. A. Habit, showing detail of abaxial foliar base. B. Flower. C. Stamen, lateral view (left), abaxial view (right). D. Berry, top view (top), lateral view (bottom). E. Seed, from immature fruit. Based on *Almeda et al. 10266*, CAS. Drawn by Sean V. Edgerton.

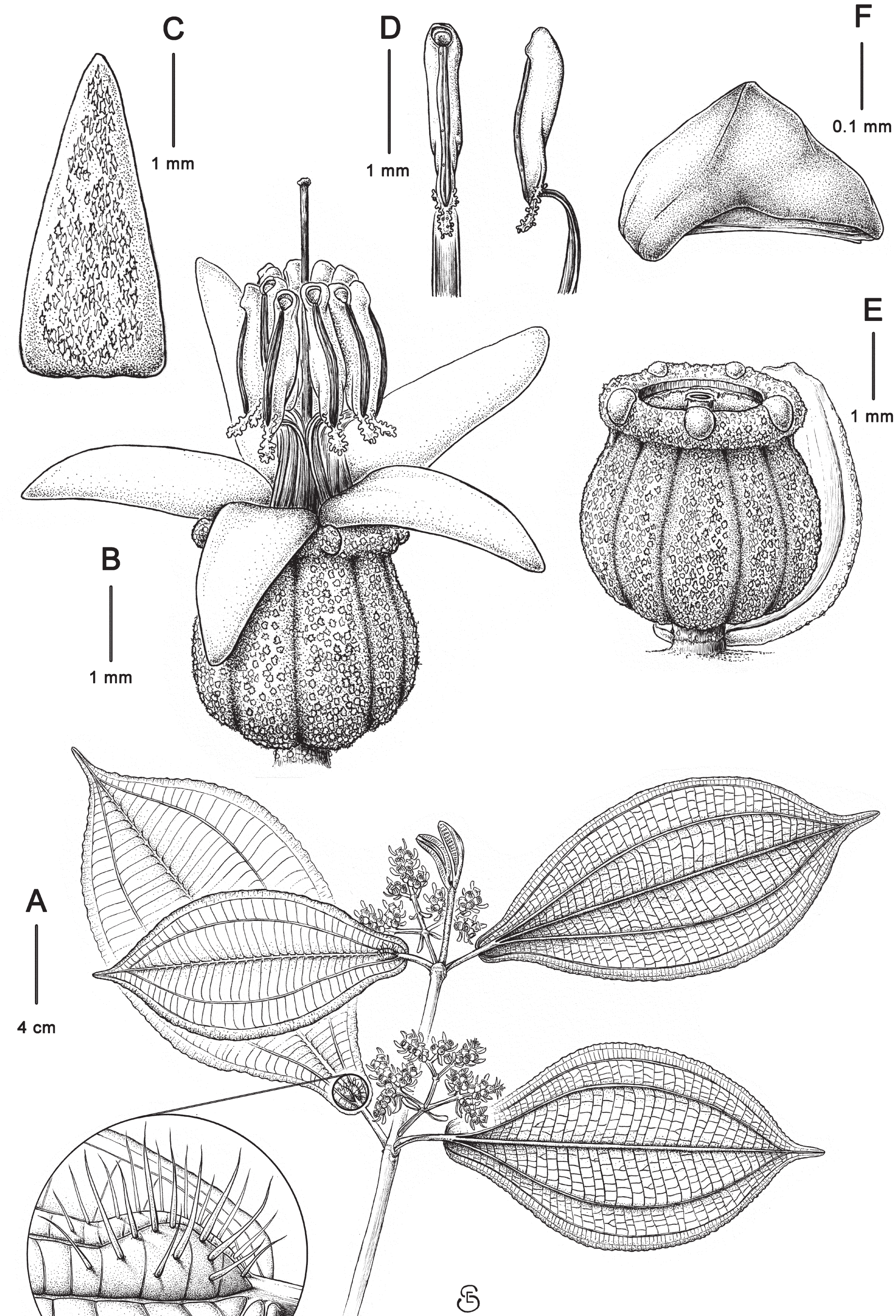


FIGURE 20. *Miconia formicaria*. A. Habit, showing detail of formicarium at adaxial foliar base. B. Flower. C. Petal, abaxial view. D. Stamen, abaxial view (left), lateral view (right). E. Berry. F. Seed. Based on *Almeda et al. 10274*, CAS. Drawn by Sean V. Edgerton.

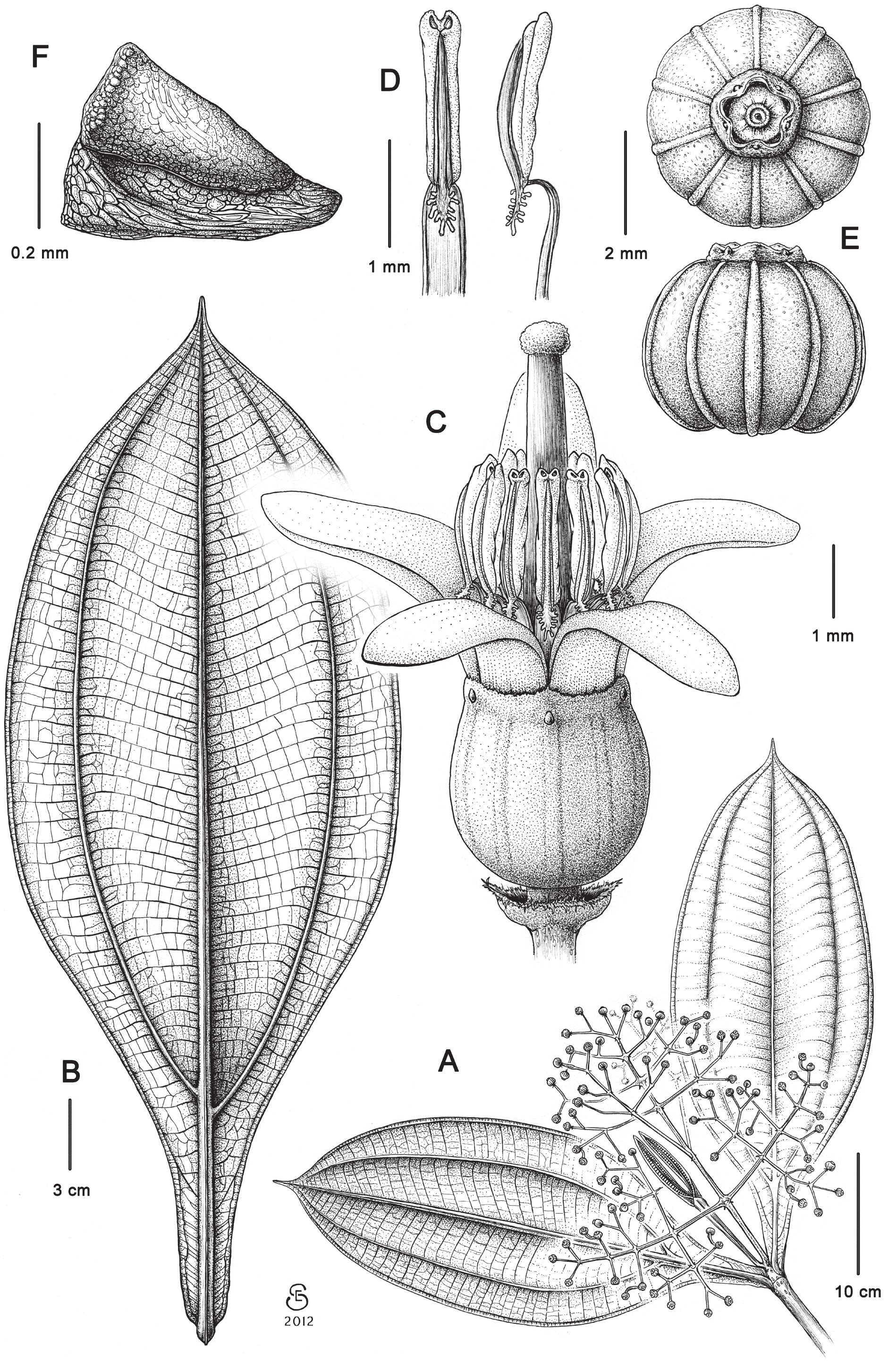


FIGURE 21. *Miconia latidecurrens*. A. Habit. B. Cauline leaf (abaxial view). C. Flower. D. Stamen, abaxial view (left), lateral view (right). E. Berry, top view (top), lateral view (bottom). F. Seed. Based on: A, B, E, F, *McPherson 20808*, MO; C, D, *Aranda et al. 4226*, CAS. Drawn by Sean V. Edgerton.

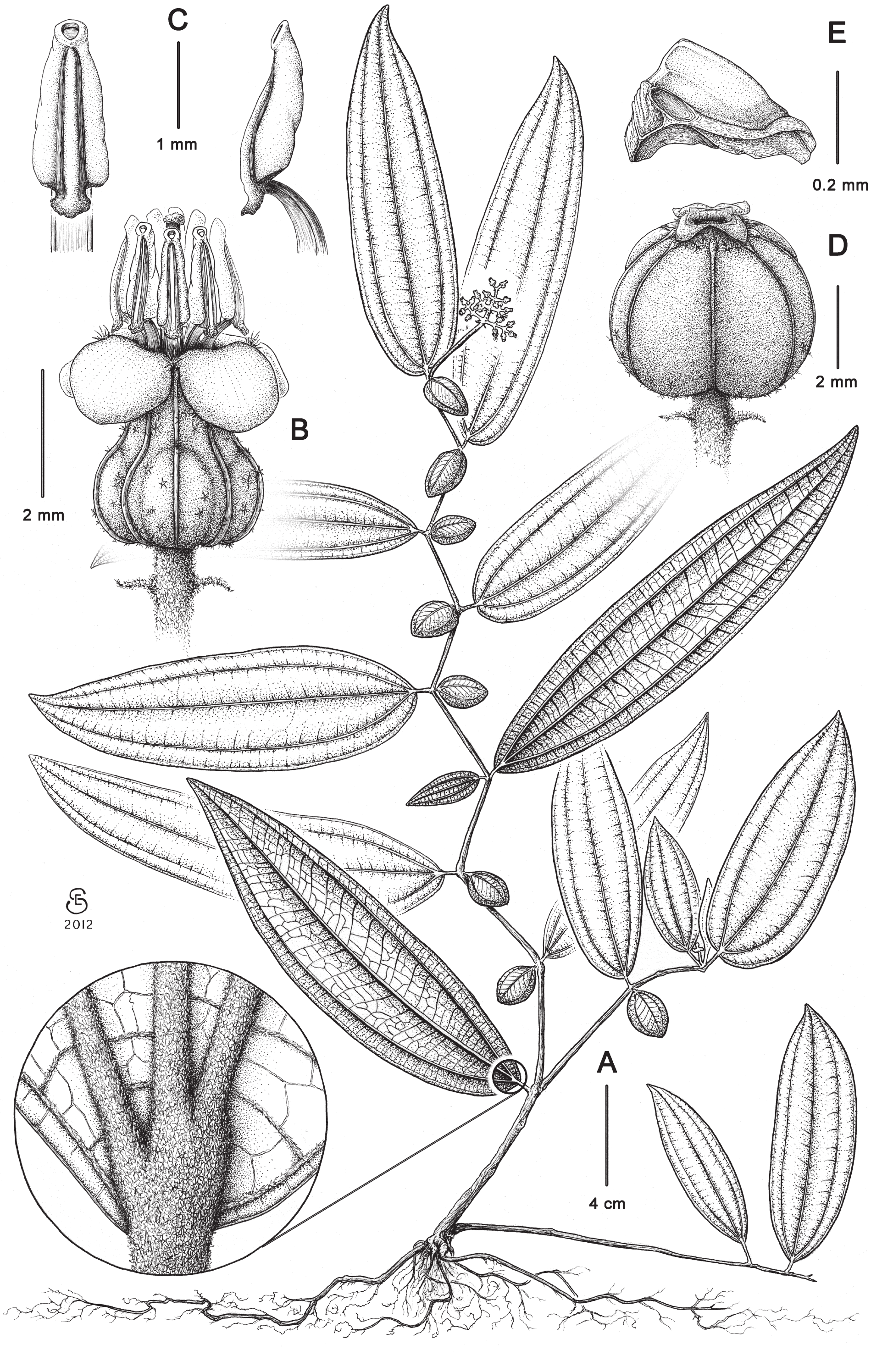


FIGURE 22. *Miconia radicans*. A. Habit, with detail of abaxial foliar base. B. Flower. C. Stamen, abaxial view (left), lateral view (right). D. Berry. E. Seed. Based on *Zamora 1766*, CAS. Drawn by Sean V. Edgerton.

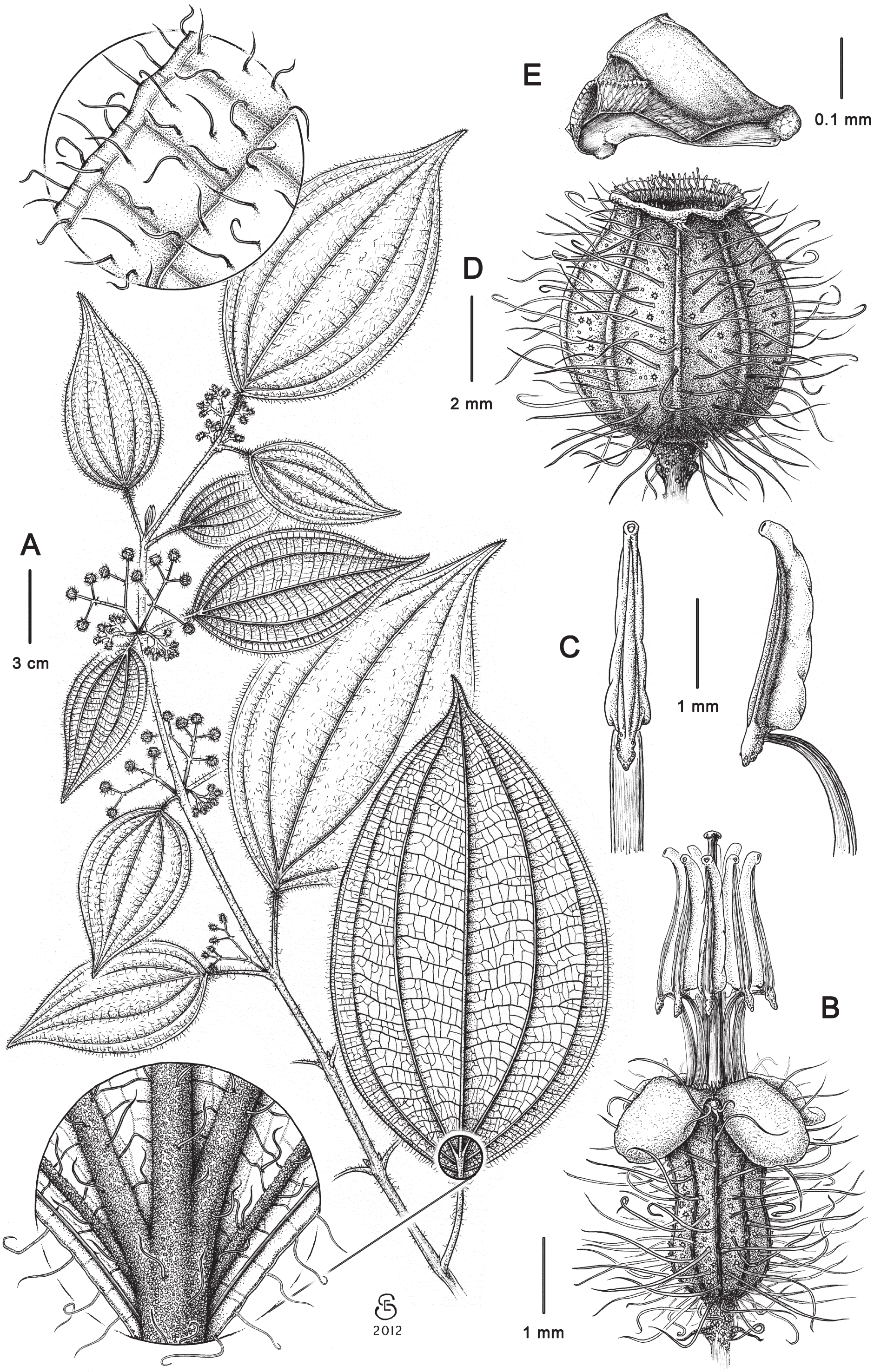


FIGURE 23. *Miconia reitziana*. A. Habit, showing detail of abaxial foliar base (bottom), and adaxial foliar surface (top). B. Flower. C. Stamen, abaxial view (left), lateral view (right). D. Berry. E. Seed. Based on *Hammel 8880*, CAS. Drawn by Sean V. Edgerton.

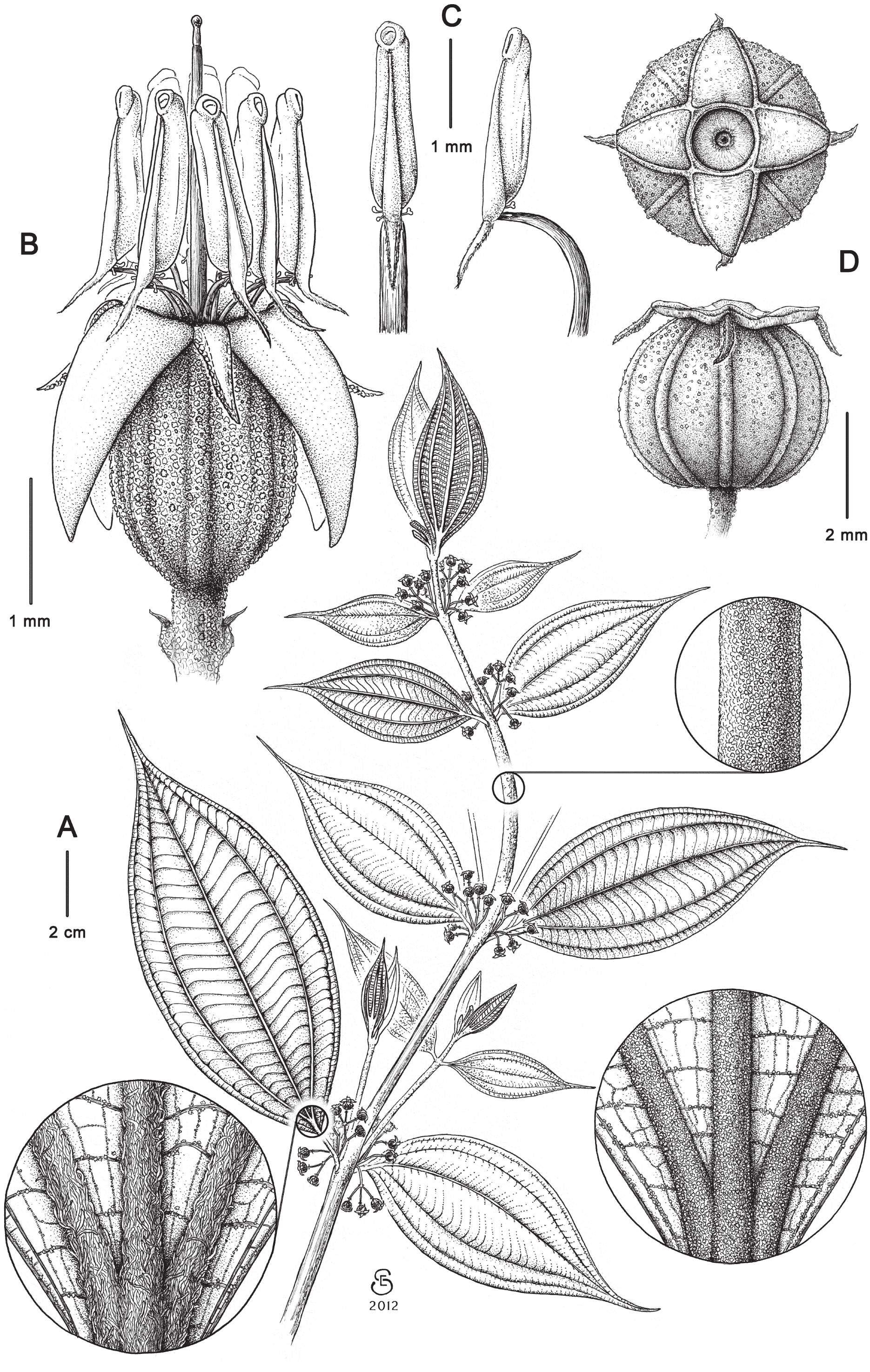


FIGURE 24. *Miconia renatoi*. A. Habit, showing details on abaxial foliar principal veins, with elongate roughened trichomes (left), dendritic trichomes (right). B.Flower. C. Stamen, abaxial view (left), lateral view (right). D. Berry, top view (top), lateral view (bottom). Based on *Jaramillo 8274*, MO; detail of abaxial leaf on left, *Hoover et al. 3621*, US. Drawn by Sean V. Edgerton.

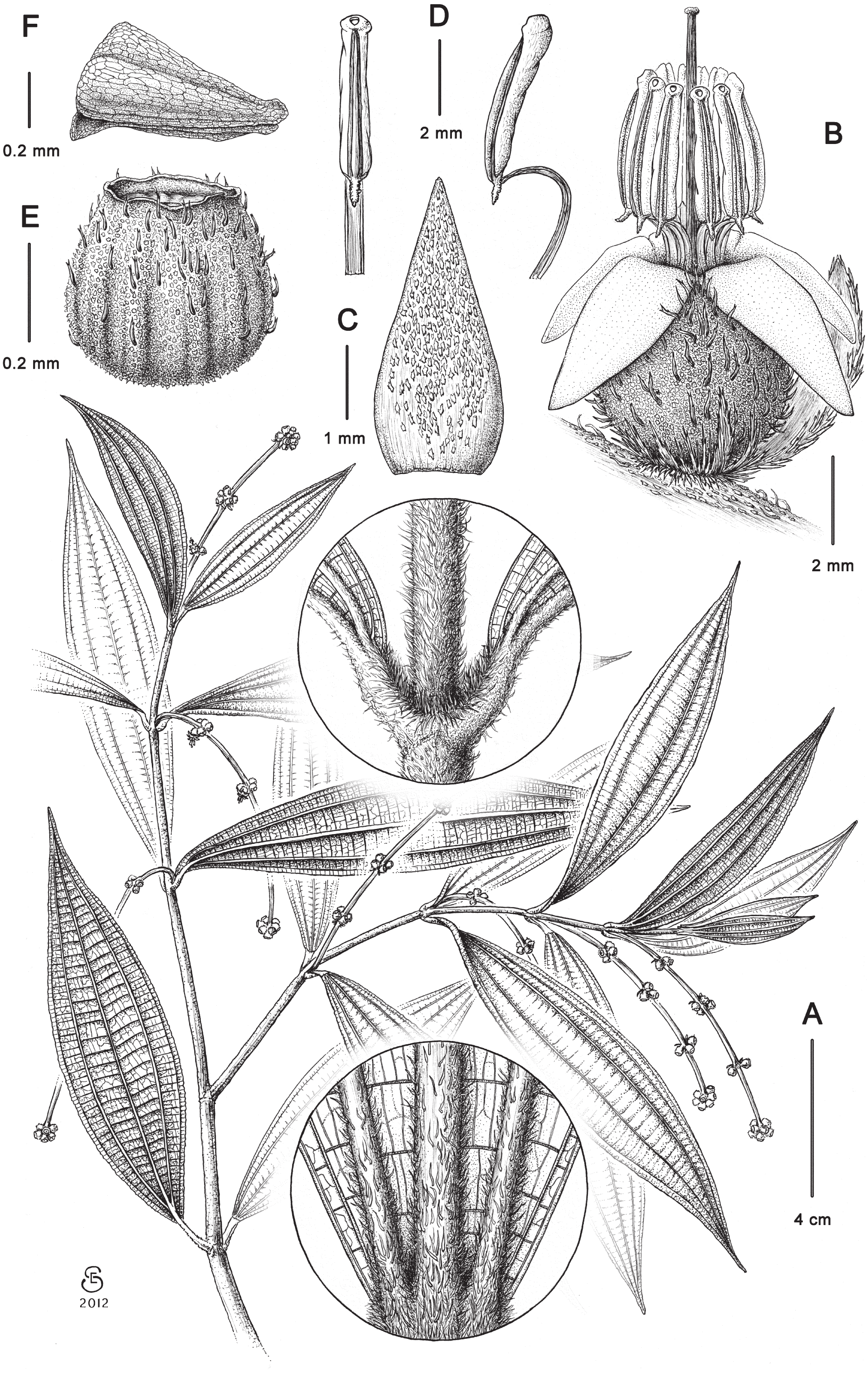


FIGURE 25. *Miconia spiciformis*. A. Habit, showing detail of cauline nodes (top), and abaxial foliar venation (bottom). B. Flower. C. Petal, abaxial view. D. Stamen, abaxial view (left), lateral view (right). E. Berry. F. Seed. Based on *McPherson & Serein 20759*, CAS. Drawn by Sean V. Edgerton.

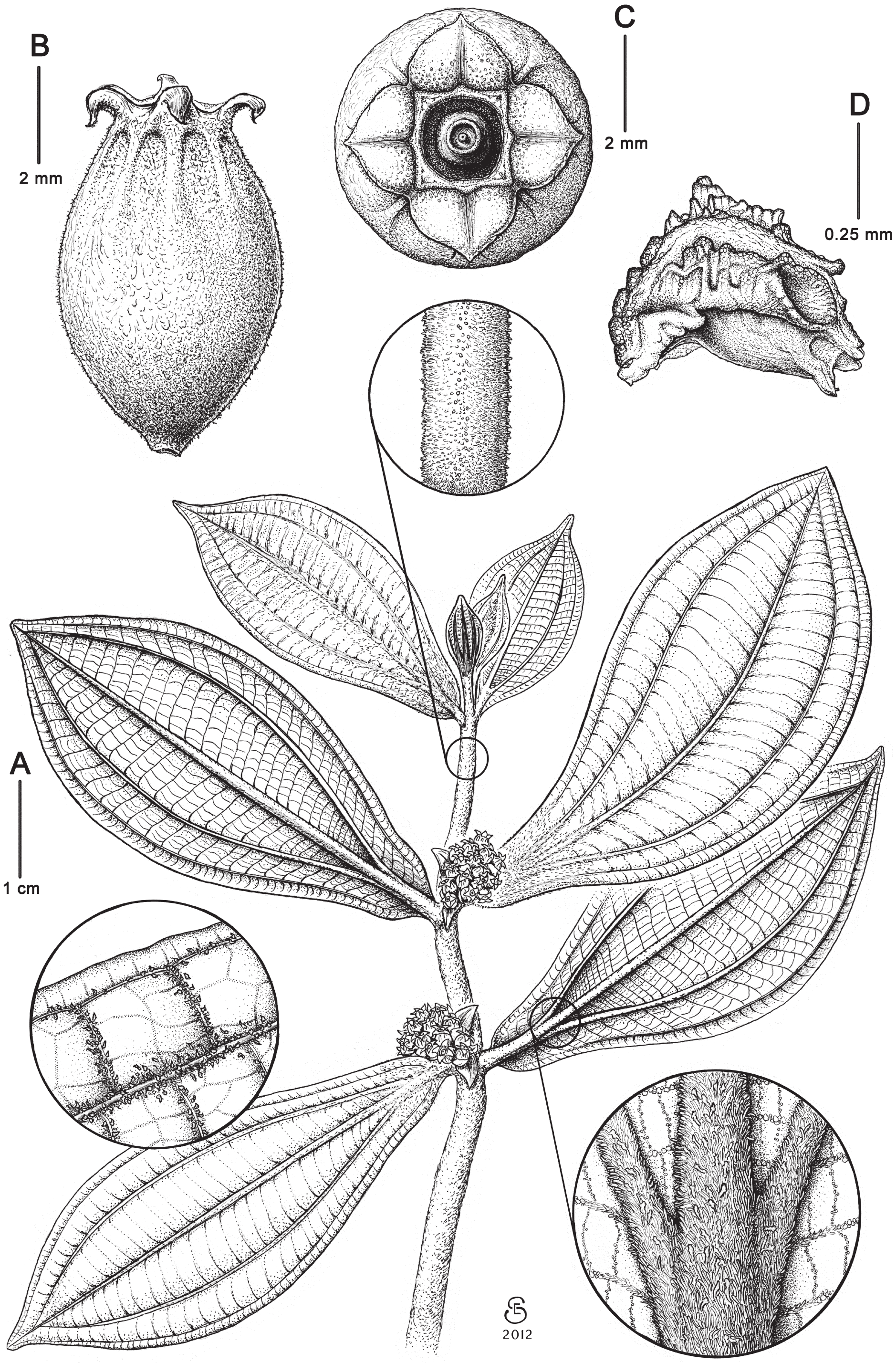


FIGURE 26. *Miconia veraguensis*. A. Habit, showing detail of cauline internodes (top), abaxial foliar indumentum (bottom left), and abaxial foliar venation (bottom right). B. Berry, lateral view. C. Berry, top view. D. Seed. Based on *Almeda et al. 6480*, CAS. Drawn by Sean V. Edgerton.

Excluded species

Clidemia radicans Pilger (1905: 179). Type: PERÚ. Amazonia: close to Leticia, *Ule 6869* (holotype: MG; isotype: B-internet image!, photograph: F!). = *Clidemia epiphytica* var. *trichocalyx* (Blake) Wurdack (1964: 215–216).

Ossaea ciliata (Triana) Cogniaux (1891a: 1067). *Davya ciliata* Grisebach (1860b: 265). *Octopleura ciliata* Triana (1871: 146). Type: In insula TRINITATIS, *Crueger s.n.* (holotype: BR-internet image!). = *Miconia lateriflora* Cogniaux (1909: 255).

Ossaea involucrata (Grisebach) Triana (1871: 147). Type: CUBA. Prope Monte Verde, 1856–1857, *Wright 194* (holotype: BR-2 sheets-internet images!). = *Calycogonium involucratum* Grisebach (1860c: 184).

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APPENDIX I. Registration Numbers of GenBank Sequences (n/a= not applicable).

Species	Collection Country & Voucher	Project source	ITS	ETS	*accD-psa1*	*psbK-psbL*
M. aguilarii	Costa Rica, *Kriebel 5331* (NY)	PBI Miconieae	KF821420	KF820614	KF819894	KF821817
M. albertobrenesii	Panamá, *Penneys 1722* (NY)	PBI Miconieae	EU055860	KF821284	KF820480	KF822470
M. alboglandulosa	Costa Rica, *Kriebel 5435* (NY)	PBI Miconieae	KF821733	KF821280	KF820476	KF822466
M. anchicayensis	Colombia, *Almeda 10266* (CAS)	This study	KJ361775	KJ361793	KJ361783	n/a
M. approximata	Panamá, *Penneys 1755* (NY)	PBI Miconieae	EU055658	KF820643	KF819917	KF821843
M. atropurpurea	Ecuador, *Stern 359* (NY)	PBI Miconieae	KF821454	KF820686	KF819947	KF821886
M. aurantiaca	Costa Rica, *Kriebel 5713* (NY)	This study	KJ361770	n/a	n/a	n/a
M. bensparrei	Ecuador, *Penneys 1903* (NY)	PBI Miconieae	EU055867	KF821314	KF820506	KF822498
M. biolleyana	Costa Rica, *Kriebel 5436* (NY)	PBI Miconieae	KF821425	KF820624	KF819902	KF821827
M. boekei	Ecuador, *Stern 399* (NY)	PBI Miconieae	KF821735	KF821282	KF820478	KF822468
M. bractiflora	Colombia, *Almeda 10357* (CAS)	This study	KJ361766	KJ361785	KJ361777	*n/a*
M. chocoensis	Colombia, *Almeda 10473* (CAS)	This study	KJ361768	KJ361787	KJ361779	n/a
M. evanescens	Costa Rica, *Kriebel 5490* (NY)	PBI Miconieae	KF821436	KF820653	KF819925	KF821853
M. formicaria	Colombia, *Almeda 10274* (CAS)	This study	KJ361767	KJ361786	KJ361778	n/a
M. laxivenula	Costa Rica, *Kriebel 5320* (NY)	PBI Miconieae	KF821744	KF821295	KF820489	KF822481
M. magnifolia	Ecuador, *Penneys 1872* (NY)	PBI Miconieae	EU055863	KF821296	KF820490	n/a
M. neocoronata	Colombia, *Almeda 10470* (CAS)	This study	KJ361771	KJ361789	n/a	n/a
M. neomicrantha	Costa Rica, *Moran s.n.* (NY)	PBI Miconieae	AY460539	KF821299	KF820493	KF822484
M. quinquenervia	Costa Rica, *Kriebel 5451* (NY)	PBI Miconieae	KF821456	KF820688	KF819949	KF821888
M. radicans	Costa Rica, *Moran 6921* (NY)	PBI Miconieae	EU055670	KF820689	KF819950	KF821889
M. reitziana	Costa Rica, *Kriebel 5363* (NY)	PBI Miconieae	KF821457	KF820690	KF819951	KF821890
M. rufibarbis	Ecuador, *Cotton 1819* (NY)	PBI Miconieae	EF418916	KF821312	KF820504	KF822497
M. sessilis	Colombia, *Almeda 10390* (CAS)	This study	KJ361769	KJ361788	KJ361780	n/a
M. spiciformis	Panamá, *Penneys 1681* (NY)	PBI Miconieae	EU055868	KF821315	KF820507	KF822499
M. variabilis	Ecuador, *Moran 6948* (NY)	PBI Miconieae	AY460538	KF821309	KF820503	KF822494
M. veraguensis	Panamá, *Kriebel 5701* (NY)	This study	KJ361772	KJ361790	KJ361781	n/a
M. aff. *approximata*	Colombia, *Almeda 10459* (CAS)	This study	KJ361773	KJ361791	n/a	n/a
M. aff. *neomicrantha*	Perú, *Michelangeli 1754* (NY)	This study	KJ361774	KJ361792	KJ361782	n/a
M. aff. *reitziana*	Colombia, *Alvear 1440* (CAS)	This study	KJ361776	KJ361794	KJ361784	n/a
M. gratissima	Brazil, *Goldenberg 1001* (UPCB)	PBI Miconieae	KF821620	KF821054	KF820269	KF822238
M. holosericea	Guyana, *Redden 5667* (US)	PBI Miconieae	KF821623	KF821057	n/a	KF822242
M. japurensis	Brazil, *Renner 80* (MO)	PBI Miconieae	EF418891	KF821070	KF820285	KF822256

APPENDIX II. Characters and Character States used for tracing Character Evolution

1. Nodal flange or outgrowth: absent (0); present (1).
2. Pocket-like (membrane) mite domatia: absent (0); present (1).
3. Thick-callose structure at abaxial leaf base: absent (0); present (1).
4. Trichome-tuft domatia, fusion of trichomes: not fused (0); trichomes fused to form conical chamber (1).
5. Leaf ant domatia (at adaxial leaf base): absent (0); present (1).
6. Leaf size: leaves ± isophyllous in all pairs (0); leaves anisophyllous in all pairs (1); leaves anisophyllous, not in every pair (2).
7. Leaf base shape in anisophyllous leaf pairs (n/a if leaves isophyllous): leaves in pair with same base shapes (0), leaves in pair with different base shapes (1).
8. Innermost pair of secondary veins branching: nerved (0); plinerved (1).
9. Abaxial leaf surface, sessile to more or less stalked furrowed glands: absent (0); present (1).
10. Furrowed gland pigmentation (n/a if 9 absent): translucent*et al.*hyaline or resinous (0); pigmented*et al.*white (1).
11. Abaxial leaf surface, slightly furrowed more or less stalked glands: absent (0); present (1).
12. Abaxial leaf surface, short-stalked glands with thin-walled heads: absent (0); present (1).
13. Abaxial leaf surface, elongate smooth trichomes: absent (0); present*et al.*eglandular (1); present*et al.*glandular (2).
14. Abaxial leaf surface, short to elongate roughened trichomes: absent (0); present (1).
15. Abaxial leaf surface, dendritic trichomes with short axis and terete arms: absent (0); present (1).
16. Abaxial leaf surface, dendritic trichomes with short to long thin-walled arms: absent (0); present (1).
17. Abaxial leaf surface, sessile stellate trichomes: absent (0); present (1).
18. Abaxial leaf surface, lepidote trichomes: absent (0); present (1).
19. Abaxial leaf surface, elongate smooth trichomes: absent (0); present-eglandular (1); present-glandular (2).
20. Leaf margin: eciliate (0); ciliate-eglandular (1); ciliate-glandular (2).
21. Inflorescence position: inflorescence terminal (0); inflorescence axillary (1).
22. Terminal inflorescence type (n/a if inflorescence axillary): inflorescence deflexed to a seemingly lateral position (0); inflorescence not deflexed (1).
23. Inflorescence type: fasciculate glomerules (0); group of modified cymes (1); thyrsoids or dithyrsoids (2); verticillate spike (3).
24. Inflorescence architecture (n/a if 23 is fasciculate glomerules): secund (0); variously cymose but not secund (1).
25. Hypanthium abaxially, sessile furrowed glands: absent (0); present (1).
26. Hypanthium abaxially, (code as n/a if 25 absent): translucent*et al.*hyaline or resinous (0); pigmented*et al.*white (1).
27. Hypanthium abaxially, short-stalked slightly furrowed glands: absent (0); present (1).
28. Hypanthium abaxially, elongate smooth or fluted trichomes: absent (0); present*et al.*eglandular (1); present*et al.*glandular (2).
29. Hypanthium abaxially, short to elongate roughened trichomes: absent (0); present (1).
30. Hypanthium abaxially, dendritic trichomes with short axis and terete arms: absent (0); present (1).
31. Hypanthium abaxially, dendritic trichomes with short to long thin-walled arms: absent (0); present (1).
32. Hypanthium abaxially, sessile stellate trichomes: absent (0); present (1).
33. Hypanthium abaxially, lepidote trichomes: absent (0); present (1).
34. Hypanthium external ribs: absent (0); shallowly present (1); conspicuously present (2).
35. Calyx lobes: not reflexed in fruit, might be somewhat spreading (0); conspicuously reflexed in fruit (1).
36. Calyx teeth length: vestigial to merely equaling the calyx lobes (0); longer than calyx lobes and projecting beyond them (1).
37. Flower merosity: 4-merous (0); 5-merous (1); 6-merous (2).
38. Petal apex: acute to acuminate (0); truncate to rounded (1).
39. Petal epidermal cells (assess on abaxial surface): smooth (0); papillose (1).
40. Petal indumentum (abaxial, n/a if papillose): glabrous (0); variously pubescent (1).
41. Stamens, arrangement: dimorphic (0); isomorphic (1).
42. Anther thecae, shape: subulate*et al.*tapering to the tip (0); ± oblong or elliptic (1); obovate (2).
43. Anther thecae, number of pores (assessed at apex of fertile locule): 1 pore (0); 2 pores (1).
44. Anther thecae, pore inclination: ventrally and dorsally inclined*et al.*dimorphic stamens (0); dorsally inclined (1); ventrally inclined (2).
45. Anther connective, prolonged dorso-basally into a glandular appendage: absent (0); present (1).
46. Style shape: style ± parallel sided (0); style narrowed distally*et al.*tapering (1).
47. Ovary position: completely inferior (0); partly inferior (1); completely superior (2).
48. Fruit color (at maturity): purple to black or blue-black (0); orange or orange-red (1); red-purple (2); white (3).
49. Seed, shape (3-D): pyramidal (0); ovoid and angled (1); ovoid (2).
50. Seed, raphal zone expanded as a skirt-like structure: skirt-like structure absent (0); skirt-like structure present (1).
51. Seed, multicellular sculpture: smooth (0); rugose (1); tuberculate (2).
52. Seed, cellular microrelief: punctate (0); striate (1); verrucose (2); absent (3).

APPENDIX III. Character States for Taxa in the Octopleura clade and Outgroup (gray box).

Species / Character	1	2	3	4	5	6	7	8	9	10	11	12	13
M. japurensis	0	0	0	0	0	2	0	1	0	n/a	1	0	2
M. gratissima	0	0	0	0	0	2	0	0	0	n/a	0	0	0
M. holosericea	0	0	0	0	0	2	0	1	0	n/a	0	0	0
M. aguilarii	0	0	0	0	0	1	0	1	0	n/a	1	0	0
M. albertobrenesii	0	0	0	0	0	0	n/a	1	0	n/a	0	0	0
M. alboglandulosa	0	0	0	0	0	2	0	0&1	1	0&1	0	0	0
M. anchicayensis	0	0	0	0	0	2	0	0	0	n/a	0	1	0
M. approximata	0	0	0	0	0	2	0	0	1	1	0	1	0
M. aff. *approximata*	0	0	0	0	0	2	0	0	1	1	0	1	0
M. atropurpurea	0	0	0	0	0	1	0	0	0	n/a	0	0	1
M. aurantiaca	0	0	0	0	0	2	0	0	1	1	0	0	0
M. bensparrei	0	0	0	0	0	0	n/a	0&1	0	n/a	0	0	0
M. biolleyana	0	0	1	0	0	1	1	0	0	n/a	0	0	0
M. boekei	0	0	0	0	0	0	n/a	1	0	n/a	0	1	0
M. bractiflora	1	0	0	0	0	0	n/a	1	0	n/a	0	0	0
M. chocoensis	0	0	0	0	0	2	0	0	1	0&1	0	0	0
M. evanescens	0	0	0	0	0	2	0	0	0	n/a	0	1	0
M. formicaria	0	0	0	1	1	0	n/a	0&1	0	n/a	0	0	0
M. laxivenula	0	0	0	0	0	0	n/a	1	0	n/a	0	1	0
M. magnifolia	1	0	0	0	0	0	n/a	0	0	n/a	0	0	1
M. neocoronata	0	0	0	0	0	1	0	1	0	n/a	1	0	0
M. neomicrantha	0	0	0	1	0	0	n/a	1	0	n/a	0	0	0
M. aff. *neomicrantha*	0	1	0	0	0	0	n/a	1	0	n/a	0	0	0
M. quinquenervia	0	0	0	0	0	1	0	1	0	n/a	1	0	1
M. radicans	0	0	1	0	0	1	1	0	0	n/a	0	0	0
M. reitziana	0	0	0	0	0	1	0	0&1	0	n/a	1	0	1
M. aff. *reitziana*	0	0	0	0	0	1	0	0&1	0	n/a	1	0	1
M. rufibarbis	1	0	0	1	0	0	n/a	1	0	n/a	0	0	0
M. sessilis	1	0	0	0	0	0	n/a	1	0	n/a	0	0	0
M. spiciformis	1	0	0	0	0	0	n/a	0	0	n/a	0	0	1
M. variabilis	0	0	0	0	0	0	n/a	0&1	0	n/a	0	1	0
M. veraguensis	0	0	0	0	0	2	0	1	1	1	0	1	0

[?=missing data; n/a=not applicable]

APPENDIX III (cont.).

Species / Character	14	15	16	17	18	19	20	21	22	23	24	25	26
M. japurensis	0	0	0	0	0	2	2	0	0	2	1	0	n/a
M. gratissima	0	0	0	1	0	0	0	0	1	2	1	0	n/a
M. holosericea	0	0	0	1	0	0	0	0	1	2	1	0	n/a
M. aguilarii	0	1	0	0	0	0	1	0	0	2	1	0	n/a
M. albertobrenesii	1	0	0	0	1	0	0	0	0	2	1	0	n/a
M. alboglandulosa	0	0	1	0	0	0	0	1	n/a	1	1	1	0&1
M. anchicayensis	1	0	0	0	0	0	0	1	n/a	0	n/a	0	n/a
M. approximata	1	0	1	0	0	0	0	1	n/a	0	n/a	0	n/a
M. aff. *approximata*	0	0	1	0	0	0	0	1	n/a	0	n/a	1	1
M. atropurpurea	0	1	0	0	0	1	0&1	0	0	1	1	0	n/a
M. aurantiaca	0	0	1	0	0	0	0	1	n/a	1	1	1	1
M. bensparrei	0	1	0	0	0	0	0	0	0	2	1	0	n/a
M. biolleyana	0	0	0	1	0	0	0	0	0	2	1	0	n/a
M. boekei	1	0	0	0	1	0	0	1	n/a	2	0	0	n/a
M. bractiflora	0	0	1	0	0	0	0	0	0	2	0	0	n/a
M. chocoensis	1	0	1	0	0	0	0	1	n/a	0	n/a	0	n/a
M. evanescens	0	0	1	0	0	0	0	1	n/a	1	1	0	n/a
M. formicaria	0	0	1	0	0	1	0	0	0	2	0	0	n/a
M. laxivenula	0	0	0	0	1	0	0	0	0	2	1	0	n/a
M. magnifolia	0	0	0	0	1	0	0	0	0	2	1	0	n/a
M. neocoronata	0	1	0	0	0	0	1	0	0	1	1	0	n/a
M. neomicrantha	0	1	0	0	1	0	0	0	0	2	1	0	n/a
M. aff. *neomicrantha*	0	0	0	0	1	0	0	0	0	2	1	0	n/a
M. quinquenervia	0	1	0	0	0	0	1	0	0	2	1	0	n/a
M. radicans	0	0	0	1	0	0	0	1	n/a	2	1	0	n/a
M. reitziana	0	1	0	0	0	1	1	0	0	1	1	0	n/a
M. aff. *reitziana*	0	1	0	0	0	1	1	0	0	1	1	0	n/a
M. rufibarbis	1	0	1	0	0	0	0	0	0	3	n/a	0	n/a
M. sessilis	0	1	0	0	0	0	0	0	0	2	1	0	n/a
M. spiciformis	0	0	1	0	0	0	0	0	0	3	n/a	0	n/a
M. variabilis	0	1	0	0	0	0	0	0	0	2	1	0	n/a
M. veraguensis	1	0	1	0	0	0	0	1	n/a	0	n/a	1	1

[?=missing data; n/a=not applicable]

APPENDIX III (cont.).

Species / Character	27	28	29	30	31	32	33	34	35	36	37	38	39
M. japurensis	1	2	0	0	0	0	0	1	0	1	1	0	0
M. gratissima	0	0	0	0	0	1	0	1	0	1	1	1	0
M. holosericea	0	0	0	0	0	1	0	0	0	0	2	1	0
M. aguilarii	1	0	0	1	0	0	0	2	0	0	0	1	1
M. albertobrenesii	0	0	1	0	0	0	1	2	0	1	1	0	0
M. alboglandulosa	0	0	0	0	1	0	0	2	1	1	0	0	0
M. anchicayensis	0	0	1	0	0	0	0	2	1	1	1	0	0
M. approximata	0	0	1	0	1	0	0	2	1	1	0	1	0
M. aff. *approximata*	0	0	0	0	1	0	0	2	1	1	0	1	0
M. atropurpurea	0	1	0	1	0	0	0	2	0	0	1	1	1
M. aurantiaca	0	0	0	0	1	0	0	2	1	1	0	0	0
M. bensparrei	0	0	0	1	0	0	0	2	0	0	1	0	0
M. biolleyana	0	0	0	0	0	1	0	2	0	1	0	1	1
M. boekei	0	0	1	0	0	0	1	2	0	0	1	0	0
M. bractiflora	0	0	0	0	1	0	0	2	0	0	1	0	0
M. chocoensis	0	0	1	0	1	0	0	2	1	1	1	1	0
M. evanescens	0	0	0	0	1	0	0	2	1	1	0	1	0
M. formicaria	0	0	0	0	1	0	0	2	0	0	1	0	0
M. laxivenula	0	0	0	0	0	0	1	2	0	0	0	0	0
M. magnifolia	0	1	0	0	0	0	0	2	0	0	1	0	0
M. neocoronata	1	0	0	1	0	0	0	2	0	1	1	1	1
M. neomicrantha	0	0	0	1	0	0	1	2	0	0	0	0	0
M. aff. *neomicrantha*	0	0	0	0	0	0	1	2	0	0	0	0	0
M. quinquenervia	1	1	0	1	0	0	0	2	0	1	1	1	1
M. radicans	0	0	0	0	0	1	0	2	0	0	0	1	1
M. reitziana	1	1	0	1	0	0	0	2	0	1	1	1	1
M. aff. *reitziana*	1	1	0	1	0	0	0	2	0	1	1	1	1
M. rufibarbis	0	0	1	0	1	0	0	2	0	0	1	0	0
M. sessilis	0	0	0	1	0	0	0	2	0	0	0	0	0
M. spiciformis	0	1	0	0	1	0	0	2	0	0	1	0	0
M. variabilis	0	0	0	1	0	0	0	2	0	0	1	0	0
M. veraguensis	0	0	1	0	1	0	0	2	1	1	0	?	?

[?=missing data; n/a=not applicable]

APPENDIX III (cont.).

Species / Character	40	41	42	43	44	45	46	47	48	49	50	51	52
M. japurensis	n/a	0	0	0	2	0	0	1	0	1	0	2	?
M. gratissima	n/a	0	0	0	0	0	0	1	0	1	0	0	?
M. holosericea	1	0	0	0	0	0	0	1	0	2	0	2	?
M. aguilarii	n/a	1	0	0	1	1	1	0	1	1	1	0	0
M. albertobrenesii	1	1	2	1	1	1	0	0	3	1	0	0	1
M. alboglandulosa	0	1	1	0	1	1	1	1	0	0	0	1	?
M. anchicayensis	0	1	2	0	1	1	1	0	1	0	0	1	1
M. approximata	0	1	1	0	1	1	0	1	1	0	0	1	1
M. aff. *approximata*	0	1	1	0	1	1	0	1	1	0	0	1	1
M. atropurpurea	n/a	1	0	0	1	1	1	0	0	1	1	0	0
M. aurantiaca	0	1	2	0	1	1	0	1	1	0	0	1	1
M. bensparrei	0	1	0	0	1	1	1	1	2	1	0	0	2
M. biolleyana	n/a	1	0	0	1	1	0	0	0	1	1	0	0
M. boekei	1	1	2	1	1	1	1	0	1	1	0	0	1
M. bractiflora	1	1	2	1	1	1	0	1	2	1	0	0	1
M. chocoensis	0	1	2	0	1	1	0	1	1	0	0	1	1
M. evanescens	0	1	1	0	1	1	1	2	1	0	0	1	1
M. formicaria	1	1	1	0	1	1	1	0	1	1	0	0	1
M. laxivenula	1	1	2	1	1	1	1	1	3	1	0	0	2
M. magnifolia	1	1	2	0	1	1	1	1	2	1	0	0	2
M. neocoronata	n/a	1	0	0	1	1	0	0	0	1	1	0	0
M. neomicrantha	1	1	1	1	1	1	1	1	3	1	0	0	2
M. aff. *neomicrantha*	1	1	1	1	1	1	1	1	3	1	0	0	2
M. quinquenervia	n/a	1	0	0	1	1	1	0	0	1	1	0	0
M. radicans	n/a	1	0	0	1	1	1	0	0	1	1	0	0
M. reitziana	n/a	1	0	0	1	1	1	0	0	1	1	0	0
M. aff. *reitziana*	n/a	1	0	0	1	1	1	0	0	1	1	0	0
M. rufibarbis	0	1	2	0	1	1	0	0	3	1	0	0	1
M. sessilis	1	1	2	1	1	1	0	0	1	1	0	0	2
M. spiciformis	1	1	2	0	1	1	1	1	2	1	0	0	2
M. variabilis	1	1	2	1	1	1	1	1	3	1	0	0	2
M. veraguensis	?	1	?	?	1	1	?	0	1	0	0	1	1

[?=missing data; n/a=not applicable]

APPENDIX IV. Chromosome counts for species in the Octopleura clade.

M. approximata: n= 17, Panama (Almeda 2013).
M. evanescens: n= 17, Panama (Almeda 2013).
M. neomicrantha: n= 17, Costa Rica and Venezuela (Almeda 1997b, 2013).
M. quinquenervia: n= 17, Costa Rica (Solt & Wurdack 1980).
M. spiciformis: n= 17, Panama (Almeda 2013).
M. variabilis: n= 17, Panama (Almeda 2013).

APPENDIX V. Conservation Status for species in the Octopleura clade. According to the IUCN Red List *categories and criteria. Based on extent of occurrence (EOO) and area of occupancy (AOO), calculated from georeferenced collections of each species. *(LC = least concern; NT = near threatened; VU = vulnerable; EN = endangered; CR = critically endangered).

Species	EOO (IUCN category)	AOO (IUCN category)
M. aguilarii	39985.08063 km^2 (NT)	132 km^2 (EN)
M. alatissima	n/a; only 2 known collections from 2 localities (CR)	
M. albertobrenesii	676928.88488 km^2 (LC)	360 km^2 (EN)
M. alboglandulosa	669008.01 km^2 (LC)	104 km^2 (EN)
M. anchicayensis	n/a; only 1 known collection from 1 locality (CR)	
M. approximata	1106430.58 km^2 (LC)	528 km^2 (VU)
M. atropurpurea	109799.85 km^2 (LC)	88 km^2 (EN)
M. aurantiaca	491008.19 km^2 (LC)	68 km^2 (EN)
M. bensparrei	17090.97 km^2 (VU)	40 km^2 (EN)
M. biolleyana	154039.05 km^2 (LC)	116 km^2 (EN)
M. boekei	16426.59 km^2 (VU)	28 km^2 (EN)
M. bractiflora	780704.93 km^2 (LC)	336 km^2 (EN)
M. chocoensis	62415.40 km^2 (LC)	32 km^2 (EN)
M. erikasplundii	384.33 km^2 (EN)	12 km^2 (EN)
M. evanescens	570571.89 km^2 (LC)	140 km^2 (EN)
M. formicaria	1198.07 km^2 (EN)	12 km^2 (EN)
M. incerta	80870.04 km^2 (LC)	24 km^2 (EN)
M. latidecurrens	25176.81 km^2 (NT)	40 km^2 (EN)
M. laxivenula	1686289.83 km^2 (LC)	360 km^2 (EN)
M. magnifolia	1232993.02 km^2 (LC)	544 km^2 (VU)
M. neocoronata	25359.76 km^2 (NT)	24 km^2 (EN)
M. neomicrantha	5085658.37 km^2 (LC)	1164 km^2 (VU)
M. palenquensis	8274.78 km^2 (VU)	16 km^2 (EN)
M. quadridomius	174339.57 km^2 (LC)	60 km^2 (EN)
M. quinquenervia	1609942.16 km^2 (LC)	656 km^2 (VU)
M. radicans	610066.64 km^2 (LC)	268 km^2 (EN)
M. reitziana	485227.16 km^2 (LC)	428 km^2 (EN)
M. renatoi	6817.73 km^2 (VU)	24 km^2 (EN)
M. rufibarbis	82608.93 km^2 (LC)	188 km^2 (EN)
M. sessilis	80380.18 km^2 (LC)	116 km^2 (EN)
M. spiciformis	271929.74 km^2 (LC)	176 km^2 (EN)
M. variabilis	1706291.00 km^2 (LC)	532 km^2 (VU)
M. veraguensis	n/a; only 2 known collections from 2 localities (CR)	

APPENDIX VI. Numerical List of Species & Index to Numbered Collections Studied

Numerical List of Species

1. *M. aguilarii*
2. *M. alatissima*
3. *M. albertobrenesii*
4. *M. alboglandulosa*
5. *M. anchicayensis*
6. *M. approximata*
7. *M. atropurpurea*
8. *M. aurantiaca*
9. *M. bensparrei*
10. *M. biolleyana*
11. *M. boekei*
12. *M. bractiflora*
13. *M. chocoensis*
14. *M. erikasplundii*
15. *M. evanescens*
16. *M. formicaria*
17. *M. incerta*
18. *M. latidecurrens*
19. *M. laxivenula*
20. *M. magnifolia*
21. *M. neocoronata*
22. *M. neomicrantha*
23. *M. palenquensis*
24. *M. quadridomius*
25. *M. quinquenervia*
26. *M. radicans*
27. *M. reitziana*
28. *M. renatoi*
29. *M. rufibarbis*
30. *M. sessilis*
31. *M. spiciformis*
32. *M. variabilis*
33. *M. veraguensis*

Index to Numbered Collections Studied

The numbers in parenthesis refer to the corresponding species in the text and in the Numerical List of Species presented above.

Baas, M.S., & J. Clark 59 (11).
Baas, M.S., & N. Pitman 284 (7).
Baker, M.A., *et al.* 5553 (32); 6365 (20).
Ballestero, M. 5 (32); 9 (6); 15 (3); 21 (19); 45 (20); 48 (4).
Ballestero, M., & S. Barquero 125A (10).
Balslev, H., & S. Balseca 4665 (32); 4753 (22).
Bangham, W.N. 374 (25).
Barbosa, C. 6598 (24).
Barfod, A., *et al.* 41352 (20); 48173 (19).
Barringer, K., *et al.* 3573 (6); 3589 (27); 3714 (3); 4073 (27).
Bartlett, H.H., & T. Lasser 16627 (25).
Beaman, J.H., & C. Álvarez 5370 (22).
Bello, E. 157 (3); 159 (10); 253 (19); 279 (27); 524 (10); 935 (27); 1540 (15); 1633 (6); 1841 (4); 1985 (3); 2598 (26).
Bello, E., & E. Cruz 2788 (10); 5327 (10); 5365 (4); 5381 (3).
Bello, E., & W. Haber 2892 (20).
Bello, E., & S. Monge 2582 (10).
Benavides de, O. 4109 (22); 8871 (22); 9246 (22); 9746 (22).
Bennett, B.C., *et al.* 4046 (19).
Bernardi, A.L. 2036 (22); 10685 (29).
Betancourt, N. 93 (aff. 22, probably new); 102 (19); 105 (12); 121 (19); 126 (32); 128 (12); 132 (12); 149 (aff. 8, probably new); 151 (12); 162 (20); 174 (aff. 8, probably new); 204 (20).
Betancur, J., *et al.* 1098 (22); 1191 (25); 1250 (25); 3185 (12); 3252 (15); 4415 (3); 4614 (3).
Billberg, J.I. 280 (25).
Biolley, P. 7450 (22); 10659 (22).
Blum, K.E., & J.D. Dwyer 2110 (25).
Blum, K.E., & E.L. Tyson 527 (25).
Boeke, J.D., & H. Loyola 2171 (11).
Boom, B.M. 1290 (29); 1291 (20).
Boyle, A., & R. Repasky 47 (3).
Boyle, A., *et al.* 80 (32); 140 (4); 169 (3); 225 (22).
Boyle, B. 1318 (3); 1415 (19).
Boyle, B., & A. Boyle 3277 (19); 3561 (22); 3565 (13).
Boyle, B., *et al.* 3652 (13); 4112 (3).
Brand, J., & M. González 946 (25).
Brandbyge, J. 42364 (22).
Breedlove, D.E., & A.R. Smith 31674 (22).
Brenes, A.M. 6160 (3); 13424 (26); 13520 (26); 13527 (22); 13553 (26); 13691 (26); 17108 (3).
Bristan, N. 503 (3); 1032 (25); 1343 (25); 1406 (25).
Bunting, G.S. 9508 (25); 9546 (25).
Bunting, G.S., *et al.* 11977 (25); 12359 (25); 12711 (22).
Burch, D. 4469 (27).
Burger, W.C. 3904 (10).
Burger, W.C., & T. Antonio 10977 (25); 11134 (10); 11202 (27); 11239 (27).
Burger, W.C., & R. Baker 9830 (27); 9981 (27).
Burger, W.C., & M. Burger 7639 (10); 8023 (20).
Burger, W.C., & R. Liesner 6288 (10).
Burger, W.C., & G. Matta 4488 (22).
Burger, W.C., & R.G. Stolze 5526 (27).
Burger, W.C., *et al.* 9407 (10); 11740 (27); 12459 (3).
Busey, P. 480 (1); 563 (1); 840 (31).
Caballero, K., *et al.* 5 (3).
Cabrera, I. 5158 (12); 5181 (24); 5182 (29); 16000 (20).
Callejas, R., & J. Jangoux 2663 (12).
Callejas, R., *et al.* 2726 (20); 5065 (22); 9119 (32).
Camp, W.H. E-3651 (22); E-4918 (22).
Cano, C. 104 (4).
Caranqui, J., *et al.* 366 (20); 520 (22).
Carleton, M.A. 87 (25).
Carrasquilla, L., & R. Mendoza 1149 (27); 1338 (27).
Carrasquilla, L., *et al.* 3334 (6).
Carvajal, A. 337 (3); 345 (10).
Cascante, A., *et al.* 542 (27).
Casimiro, V. 20 (25).
Castro, E. 224 (19).

Castroviejo, S., & M. Velayos 8145 MV (6).
Cazalet, P.C.D., & T.D. Pennington 5008 (22).
Cedillo, R. 427 (22).
Cerón, C.E. 574 (32); 1066 (20); 2892 (19); 3588 (32); 14330 (22).
Cerón, C.E., & J. Ayala 10149 (20).
Cerón, C.E., & M. Factos 7654 (20).
Cerón, C.E., & F. Hurtado 6686 (19).
Cerón, C.E., & C. Iguago 8510 (22); 8631 (22).
Cerón, C.E., *et al.* 7977 (22); 9339 (19); 9358 (20); 31347 (19); 58209 (20).
Cevallos, J. 42 (19).
Chacón, I.A. 108 (32); 649 (6); 1059 (20); 1398 (1).
Chacón, I.A., & G. Herrera 1216 (10); 1221 (26); 1678 (19); 1680 (3).
Chavarría, M.M, *et al.* 266 (1); II INBio 20 (20).
Chavarría, U. 305 (1).
Chaves, J.L. 242 (27); 312 (3); 1139 (3); 1221 (3).
Chaves, J.L., & A. Alvarado Mendez 1387 (19); 1389 (3).
Chaves, J.L., & E. Muñoz 325 (3); 975 (3).
Chaves, J.L., *et al.* 386 (27).
Chávez , C., *et al.* 72 (20).
Chrysler, M.A., & W.E. Roever 4871 (22).
Churchill, H.W. 4295 (31); 5786 (4); 5787 (15); 5931 (26).
Churchill, H.W., & G. de Nevers 4216 (25); 4475 (25).
Churchill, H.W., *et al.* 4511 (32).
Churchilla, M. 174 (6).
Clark, J.L. 3076 (11).
Clark, J.L., & B. Adnepos 87 (aff. 8, probably new).
Clark, J.L., & Y. Troya 677 (26).
Clark, J.L., & C. Watt 821 (26); 885 (aff. 8, probably new).
Clark, J.L., *et al.* 969 (25); 1960 (11); 2730 (8); 3749 (7); 4032 (8).
Clemants, S.E., & J.L. Luteyn 1694 (9).
Contreras, E. 6374 (22); 6529 (22); 9077 (6); 9081 (6); 9312 (22); 9959 (6); 10226 (6); 10832 (22).
Cook, O.F., & C.B. Doyle 516 (22).
Cook, O.F., & R.F. Griggs 747 (6).
Cornejo, X. 470 (19); 497 (22).
Coronado, I., & C. Gurdian 278 (6).
Coronado, I., *et al.* 1822 (27); 2240 (22); 2656 (27); 2854 (27).
Correa, M.D., & R.L. Dressler 219 (25).
Correa, M.D., *et al.* 3095 (27); 3156 (27); 3386 (22); 3547 (22).
Cotton, E., *et al.* 1725 (aff. 22, probably new); 1787 (3); 1790 (32); 1794 (13); 1814 (12); 1819 (29); 1820 (3); 1822 (32).
Croat, T.B. 4325 (25); 4587 (25); 5783 (25); 5788 (25); 5802 (25); 6050 (25); 6218 (25); 6479 (25); 6486 (25); 6735 (25); 6792 (25); 6990 (25); 7067 (25); 8594 (25); 8673 (25); 9204 (25); 10764 (25); 11269 (25); 11355 (25); 11429 (25); 11706 (25); 14401 (31); 15143 (25); 15302 (6); 15332 (6); 15960 (22); 16732 (25); 22197 (1); 22988 (22); 23206 (31); 23239 (12); 23241 (3); 25552 (22); 25590 (32); 25639 (32); 25706 (3); 25764 (8); 25895 (19); 26064 (8); 26096 (25); 26160 (6); 26225 (25); 26606 (22); 27279 (20); 27334 (12); 27371 (8); 27375 (3); 27452 (12); 27469 (19); 27518 (22); 27623 (19); 27624 (32); 27628 (19); 27667 (8); 27668 (20); 36250 (27); 36468 (27); 37566 (12); 37690 (6); 38270 (25); 38853 (22); 40831 (22); 43232 (27); 43352 (25); 43576 (27); 49187 (6); 54840 (22); 55692 (7); 56002 (12); 56032 (31); 56047 (32); 56117 (12); 56163 (32); 56231 (20); 56242 (12); 56612 (26); 57340 (10); 57439 (7); 58071 (19); 58939 (32); 61346 (12); 66234 (22); 66429 (22); 66757 (10); 66934 (31); 66961 (32); 67168 (32); 67188 (12); 67290 (12); 67361 (31); 67510 (19); 67559 (31); 67598 (1); 67598 (1); 67666 (6); 67670 (32); 67889 (32); 67915 (32); 68008 (4); 68018 (15); 68114 (3); 68142 (3); 68622 (6); 68623 (31); 68715 (12); 68717 (32); 68784 (31); 68793 (15); 68801 (3); 68878 (26); 68879 (27); 68935 (20); 68937 (32); 69392 (30); 69393 (29); 69609 (15); 70102 (29); 70914 (22); 70945 (20); 71039 (12); 71106 (31); 71210 (15); 71255 (22); 71473 (15); 71680 (12); 72618 (20); 72801 (32); 73259 (22); 73403 (20); 73428 (20); 73456 (32); 75025 (22); 78780 (6); 82782 (22); 4021A (25).
Croat, T.B., & D. Bay 75741 (29); 75749 (24); 75767 (12); 75807 (32).
Croat, T.B., & A. Cogollo 52186 (29); 52192 (12).
Croat, T.B., & D. Hannon 79128 (27).
Croat, T.B., & D.M. Porter 16285 (27); 16380 (27).
Croat, T.B., & J. Rodríguez 61491 (aff. 22, probably new).
Croat, T.B., & J. Watt 70269 (12); 70277 (30).
Croat, T.B., & G. Zhu 76641 (31); 76994 (20); 77060 (25).
Croat, T.B., *et al.* 82329 (29); 82340 (3); 82564 (29); 82625 (12); 82628 (22); 82644 (12); 83233 (12); 83390 (12); 84068 (19); 84147 (32); 84160 (32); 84198 (12); 84199 (29); 88535 (20); 88712 (6); 88884 (20); 90401 (22); 99711 (29); 99741 (12); 88884A (32).
Cuadras, J., *et al.* 8069 MV (6).

Cuadros, H., *et al.* 3935 (26); 3940 (27).
Cuamacás, B. 31 (9).
Cuatrecasas, J. 10945 (19); 10946 (20); 11336 (32); 12874 (22); 13957 (24); 13985 (29); 14137 (4); 15482 (22); 15747 (29); 15872 (32); 15990 (12); 16027 (31); 16297 (31); 16378 (32); 16384 (12); 16535 (32); 16540 (30); 16623 (24); 16834 (20); 17033 (32); 17113 (22); 17420 (30); 18434 (22); 19840 (29); 19902 (29); 21132 (12); 23715 (32).
Cuatrecasas, J., & V.M. Platino 27461 (32).
Cuatrecasas, J., & L. Willard 26041 (32).
Cuello, N., *et al.* 2168 (22).
Cueva, T. 5 (32).
Daly, D.C., & P. Acevedo 5154 (19); 5177 (12).
D'Arcy, W.G. 14208 (25); 14229 (25); 15150 (25); 16400 (8); 11322A (3).
D'Arcy, W.G., & T.B. Croat 13591 (22).
D'Arcy, W.G., & J.J. D'Arcy 6148 (20).
Davidse, G. 36978 (22).
Davidse, G., & C.W. Hamilton 23528 (31); 23553 (12).
Davidse, G., & R.W. Pohl 1187 (10); 1220 (22); 1244 (27); 1249 (25); 1275 (26).
Davidse, G., *et al.* 21455 (25).
Davidson, C., & J. Donahue 8267 (27); 8395 (20); 8401 (6); 8495 (27); 8584 (20); 8933 (32); 8893B (27).
Davidson, M.E. 105 (22).
de Nevers, G. 3892 (25).
de Nevers, G., & R. Herman 3833 (20); 3836 (6).
de Nevers, G., & H. Herrera 4515 (24); 4518 (31); 4520 (22); 7852 (31).
de Nevers, G., & C. de León 3610 (20); 3768 (8).
de Nevers, G., & B. Pérez 3576 (31).
de Nevers, G., & H. Pérez 3694 (24).
de Nevers, G., *et al.* 5212 (31); 5404 (12); 5452 (15); 5455 (3); 6229 (26); 6233 (18); 6237 (19); 6273 (15); 6356 (12); 8446 (3); 8449 (27).
Denslow, J.S. 79-29 (20); 79-30 (19).
Devia, W. 426 (29); 439 (20); 461 (30); 491 (24).
Devia, W., & F. Prado 2504 (29); 2641 (24); 2702 (12).
Devia, W., *et al.* 3828 (29); 4461 (29).
DeWolf, G.P. 369 (21).
Diggs, G., *et al.* 2689 (22).
Dodson, C.H. 5015 (22); 6650 (23); 7390 (11).
Dodson, C.H., & P.M. Dodson 12002 (22).
Dodson, C.H., & A.H. Gentry 6240 (22); 9729 (9); 10256 (22); 12281 (22); 14826 (22); 17531 (29).
Dodson, C.H., & M.P. McMahon 4253 (7); 5098 (7); 5099 (26).
Dodson, C.H., *et al.* 7216 (7); 8611 (11); 9187 (22).
Dorr, L.J., & B. Stergios 8707 (22); 8750 (22).
Dorr, L.J., *et al.* 5447 (22).
Dressler, R.L. 5013 (26).
Dryander, E. 2433 (22).
Duke, J.A. 3863 (25); 4078 (25); 4958 (25); 5149 (25); 5161 (25); 5554 (25); 8004 (31); 8766 (6); 9248 (25); 11366 (20); 12136 (32); 13025 (25); 13157 (32); 13290 (25); 13539 (25); 14293 (25); 14320 (25); 14508 (25); 14880 (25); 15582 (22); 15616 (22); 15647 (6); 15735 (20); 15774 (6).
Duke, J.A., & N. Bristan 439 (25).
Duke, J.A., & J.D. Dwyer 15095 (32).
Duke, J.A., & T.S. Elias 13790 (26); 13838 (32).
Duke, J.A., & J. Idobro 11226 (31); 11323 (6).
Duke, J.A., *et al.* 3625 (25).
Dunlap, V.C. 296 (25); 363 (22).
Dwyer, J.D. 1468 (25); 1779 (25); 2330 (6); 2401 (6); 4078 (25); 7181 (25); 8334 (12); 11906 (32); 14407 (22); 8332A (3); 8592A (25).
Dwyer, J.D., & A.H. Gentry 9462 (6).
Dwyer, J.D., & M. Correa 8909 (12); 8938 (12).
Dwyer, J.D., & J.A. Duke 7918 (25).
Dwyer, J.D., & B. Lallathin 8587 (3); 8773 (22).
Eggers, H.F.A. 15635 (22); 15177=15307 (22).
Elias, T.S. 1782 (25).
Ellenberg, H. 3117 (7).
Escobar Cardona, F. 35 (22).
Espina, J. 1830 (32); 1948 (12); 2019 (32).
Espina, J., *et al.* 2674 (6); 3644 (6); 3815 (12).
Espinosa, A., *et al.* 5998 (18); 6010 (18); MB535 (6); MB649 (6).

Espinoza, R. 1747 (22).
Estrada, A. 2381 (27).
Estrada, A., & A. Rodríguez 10 (1).
Estrada, A., & J. Sánchez 784 (26).
Estrada, A., *et al.* 597 (4); 1400 (6); 1636 (21).
Fernández Alonso, J.L. 10756 (22); 12500 (30).
Fernández Alonso, J.L., *et al.* 8786 (12); 9657 (32); 11308 (22); 12391 (15).
Fernández, A. 403 (20).
Fernández, A., *et al.* 1315 (1).
Fernández, D., *et al.* 770 (22).
Ferreyra, R. 15912 (32).
Flórez, C. 50 (25).
Folsom, J.P. 1213 (6); 1268 (12); 1307 (31); 4247 (32); 4516 (10); 4956 (32); 5153 (25); 8794 (6); 8870 (6); 8875 (19); 9020 (6); 9047 (6); 9058 (20); 9262 (19); 9373 (27); 9854 (32); 9991 (6); 10009 (32).
Folsom, J.P., & L. Collins 6439 (22); 6536 (6).
Folsom, J.P., *et al.* 5501 (32); 6272 (20); 6278 (32); 6936 (19).
Fonnegra, R., *et al.* 4312 (3); 4432 (22).
Fonseca, G. 9 (1).
Forero, E. 2529 (12); 634 (12).
Forero, E., & A.H. Gentry 742 (25).
Forero, E., & R. Jaramillo 2657 (20); 2708 (31); 5311 (12); 5320 (29).
Forero, E., *et al.* 1154 (6); 1201 (20); 1306 (12); 1332 (12); 1390 (12); 2060 (28); 2370 (7); 2395 (27); 2910 (22); 3086 (32); 3103 (12); 3170 (16); 3223 (16); 3367 (4); 4083 (32); 4247 (24); 4366 (20); 4806 (12); 4824 (29); 5452 (27); 5970 (12); 6148 (17); 6494 (12); 6815 (4); 6855 (27); 7412 (12); 9520 (32); 9641 (12); 9642 (29); 9693 (12); 9696 (32).
Foster, R.B. 1611 (6); 4128 (20); 4168 (12); 4521 (32); 8640 (32); 9253 (19).
Foster, R.B., & B. d'Achille 10125B (32).
Foster, R.B., & A. Herre 14725 (20).
Foster, R.B., & H. Kennedy 1267 (6).
Foster, R.B., & B. Mitsui 13553 (11).
Foster, R.B., & L. Torres 15800 (27).
Foster, R.B., *et al.* 7762 (22); 11200 (aff. 22, probably new).
Fournier, L.A. 340 (20).
Franco, P., *et al.* 1343 (4); 1386 (12); 1453 (32); 1477 (12); 2284 (22); 3441 (10); 3581 (13); 4721 (32); 4748 A (3).
Fraume de, M., *et al.* 363 (22).
Freire, E., & J.P. Cerda 97 (32); 170 (20).
Freire, E., *et al.* 1007 (22); 1073 (22); 1094 (22); 2166 (19); 2273 (20).
Galdames, C., *et al.* 1169 (26); 1239 (31); 1482 (20); 2166 (6); 2545 (6); 2575 (6); 2580 (6); 2686 (6); 2819 (6); 2857 (6).
Galeano, G. 3205 (20).
Galeano, G., & Lozano 409 (20).
Galeano, G., *et al.* 2562 (22); 5565 (13).
García Cossio, F. 25 (32); 51 (12); 131 (12).
García Cossio, F., & E.D. Agualimpia 500 (24).
García, L., *et al.* 71 (20).
Garibaldi, C. 208 (25); 251 (25).
Garwood, N., *et al.* 40 (25); 990 (6); 1117 (6).
Gentle, P.H. 3212 (22); 4281 (22); 4373 (6); 7174 (22).
Gentry, A.H. 2332 (25); 3022 (22); 3757 (25); 6492 (25); 6652 (25); 6903 (3); 8785 (25); 9682 (22); 9906 (7); 35343 (29); 35354 (24); 35559 (29); 35576 (12).
Gentry, A.H., & L.E. Aguirre 15208 (25).
Gentry, A.H., & J. Brand 36761 (29).
Gentry, A.H., & C. Diaz 61119 (22).
Gentry, A.H., & C.H. Dodson 6553 (23); 17975 (7); 17986 (22); 18041 (22).
Gentry, A.H., & M. Fallen 17299 (7); 17363 (15); 17410 (6); 17473 (7); 17552 (20); 17570 (12); 17589 (12); 17618 (29); 17652 (7); 17831 (12).
Gentry, A.H., & E. Forero 7204 (6); 7301 (12).
Gentry, A.H., & C. Josse 72543 (22).
Gentry, A.H., & A. Juncosa 40492 (24); 40607 (30); 41088 (31).
Gentry, A.H., & P. Keating 59686 (32); 60310 (15).
Gentry, A.H., & J. Miller 54969 (19).
Gentry, A.H., & M. Monsalve 48401 (30); 48408 (29); 48427 (32).
Gentry, A.H., & S. Mori 13816 (3).
Gentry, A.H., & M. Nee 8675 (25); 8694 (25).
Gentry, A.H., & E. Renteria 23723 (20); 23756 (29); 23936 (12); 24068 (32); 24479 (29).
Gentry, A.H., & R. Valencia 73117 (22).

Gentry, A.H., *et al.* 12142 (22); 16868 (27); 16929 (22); 17927 (25); 20162 (29); 30331 (32); 47824 (30); 47890 (29); 48168 (22); 53339 (31); 53646 (24); 55120 (15); 59678 (15); 60383 (15); 60386 (22); 60454 (22); 60490 (15); 61219 (22); 63589 (15); 69926 (22); 70147 (29); 72518 (22).
Giraldo-Gensisni, J. 280 (22).
Goldenberg, R., *et al.* 978 (32).
Gómez, A., *et al.* 58 (22).
Gómez, L.D. 18632 (27); 24130 (27).
Gómez, L.D., *et al.* 20432 (6); 23375 (26); 23827 (27).
Gómez-Laurito, J. 9866 (27); 9873 (26); 10109 (27).
Gómez-Laurito, J., & V. Mora 12056 (26).
Gómez-Laurito, J., *et al.* 11590 (6).
González, E. 21 (25).
González, F. 2396 (20).
González, J. 10598 (18); 10615 (18); 1179 (12); 3064 (20); 3076 (6).
González, J., *et al.* 1708 (6); 1692 (27).
González, L. 635 (20).
Grayum, M.H. 2966 (6); 2979 (19); 2980 (32); 1787 (27); 1830 (32).
Grayum, M.H., & B. Hammel 5755 (21).
Grayum, M.H., & G. Herrera 7727 (22); 7835 (4).
Grayum, M.H., & C. Jermy 6807 (3).
Grayum, M.H., & P. Sleeper 5896 (1).
Grayum, M.H., & R. Warner 5432 (4).
Grayum, M.H., *et al.* 3558 (26); 5497 (22); 6158 (19); 8688 (25); 8750 (26).
Grijalva, A. 463 (6).
Grijalva, A., & F. Burgos 1578 (25); 1703 (25).
Grijalva, A., *et al.* 506 (32).
Gudiño, E. 630 (19).
Gudiño, E., & R.C. Moran 1289 (19).
Guevara, J.E. 601 (32).
Haber, W.A. 984 (3); 1013 (3); 1082 (22); 5733 (26).
Haber, W.A., & E. Bello 1705 (27); 5837 (26); 5900 (20); 6435 (26); 7364 (26).
Haber, W.A., & E. Cruz 5652 (27).
Haber, W.A., & C. Ivey 10226 (10).
Haber, W.A., & W. Zuchowski 9370 (27); 11160 (3).
Haber, W.A., *et al.* 4787 (27); 4835 (25); 6077 (26).
Hahn, W. 152 (25); 282 (6); 478 (22).
Hamilton, C. 538 (25).
Hamilton, C., & W.G. D'Arcy 1329 (25); 1353 (25); 1415 (25).
Hamilton, C., & G. Davidse 2661 (3).
Hamilton, C., & R.L. Dressler 3019 (31).
Hamilton, C., & H. Stockwell 1149 (25).
Hamilton, C., *et al.* 940 (22); 1309 (22).
Hammel, B. 816 (19); 964 (6); 1637 (31); 2434 (26); 3159 (3); 4598 (22); 5146 (20); 5461 (1); 8619 (20); 8750 (6); 8841 (27); 8880 (27); 9330 (22); 9408 (19); 9424 (20); 9633 (3); 9634 (19); 9723 (19); 9870 (3); 11767 (27); 12000 (32); 12128 (3); 12238 (6); 12258 (20); 12311 (32); 12318 (20); 12350 (6); 12553 (6); 13692 (26); 20091 (1).
Hammel, B., & R. Aguilar 18403 (32).
Hammel, B., & W.G. D'Arcy 4989 (25); 5014 (25); 5109 (25).
Hammel, B., & J. González 20033 (1).
Hammel, B., & M. Grayum 14303 (27).
Hammel, B., & W.J. Kress 11283 (6).
Hammel, B., & J. Trainer 12856 (20); 12857 (32); 13235 (32); 13239 (20); 15884 (23).
Hammel, B., *et al.* 12832 (26); 12833 (10); 14076 (26); 16389 (26); 17581 (10); 17855 (26); 19462 (3); 19463 (20); 20440 (26).
Hansen, B., *et al.* 7737 (22).
Harling, G.W. 4733 (7).
Harling, G.W., & L. Andersson 11986 (25); 12394 (22); 16237 (32); 16864 (32); 17842 (22); 18906 (7); 23133 (7); 23175 (7); 24248 (22); 19250 (22).
Harling, G.W., *et al.* 7095 (32); 9431 (7).
Harmon, P. 136 (1).
Hartman, R.L. 12077 (6); 12247 (22); 12250 (20); 12352 (32); 12457 (4).
Haught, O. 2429 (25); 4924 (25); 4946 (25); 5572 (7); 6241 (25).
Hazlett, D.L. 5146 (26).
Hazlett, D.L., *et al.* 8004 (22).
Hekker, F., & W.H.A Hekking 10249 (22).
Hernández, B.H. 7 (3).

Hernández, H. 2467 (22).
Hernández, H., *et al.* 748 (32).
Herrera, G. 948 (20); 986 (6); 995 (19); 1264 (20); 1265 (19); 2288 (27); 3033 (26); 3096 (22); 3122 (27); 3200 (20); 3290 (32); 3945 (27); 5708 (3); 7716 (27); 7991 (10).
Herrera, G., & A. Cascante 8188 (10).
Herrera, G., & E. Madrigal 2555 (6).
Herrera, G., & S. Schik 3794 (27).
Herrera, G., *et al.* 147 (20); 588 (26); 2037 (15); 3975 (20).
Herrera, H. 265 (25).
Herrera, H., *et al.* 1036 (20).
Hespenheide, H.A, *et al.* 1153 (22).
Hilty, S. M-129 (3); Mr-9 (32).
Hitchcock, A.S. 20414 (22).
Holdridge, L.R. 5171 (20).
Holland, D.L., & B. Kid 94 (22).
Holm, R.W., & H.H. Iltis 847 (27); 891 (22).
Holm-Nielsen, L., *et al.* 2841 (3); 7165 (22); 25501 (7); 25523 (19); 25559 (22); 25625 (7); 25640 (7); 25680 (7).
Homeier, J., *et al.* 3624 (19).
Hoover, W.S. 2228 (22).
Hoover, W.S., *et al.* 2491 (12); 2615 (12); 2622 (8); 2645 (3); 2685 (12); 2699 (32); 2767 (12); 2864 (8); 2867 (12); 3025 (32); 3135 (20); 3287 (3); 3291 (20); 3323 (15); 3621 (28); 3829 (20); 3872 (19); 3929 (19).
Howell, J.T. 10182 (20).
Hudson, J. 862 (4).
Huft, M., & S. Knapp 1632 (22); 1647 (22); 1712 (31); 1781 (25).
Hurtado, F. 606 (22); 841 (20); 2358 (20).
Hurtado, F., *et al.* 2004 (19); 2124 (19).
Ibáñez, A., *et al.* 4013AI (20).
II INBio, *et al.* 21 (32).
Jaramillo, J. 6351 (aff. 22, probably new); 6380 (19); 6627 (19); 6736 (20); 8274 (28); 8338 (22).
Jaramillo, J., & E. Grijalva 14671 (32); 14703 (32).
Jaramillo, J., & V. Zak 7779 (22); 7884 (22); 8036 (28); 8062 (22).
Jávita, C., & C. Epling 227 (22); 334 (7).
Jiménez, A. 1048 (22); 1083 (27); 1338 (27); 1865 (22); 2290 (27); 2380 (21); 3161 (20); 3276 (21); 4068 (6).
Jiménez, E., *et al.* 1125 (22).
Jiménez, Q., & R. Soto 979 (27).
Jorgensen, P.M., *et al.* 65200 (12).
Juncosa, A. 1167 (12); 1260 (32); 1544 (29); 1640 (22); 2427 (26).
Juzepczuk, S.V. 6561 (22).
Kennedy, H. 735 (29); 1952 (6); 1970 (20); 1971 (6); 2635 (25).
Kennedy, H., & J. Redemsky-Young 1833 (25).
Kennedy, H., *et al.* 2043 (25); 2109 (19).
Kernan, C. 109 (1); 183 (6); 1184 (6); 1273 (27).
Kernan, C., & P. Phillips 717 (1); 883 (1).
Kessler, M. 2553 (11); 2662 (22).
Killip, E.P. 5119 (24); 5124 (32); 5570 (22); 34920 (29); 35166 (31); 35252 (32); 40016 (25); 40035 (25).
Killip, E.P., & H. García 33274 (29); 33345 (12); 33429 (30); 33520 (13).
Killip, E.P., & T.E. Hazen 10127 (22).
Killip, E.P., & A.C. Smith 25974 (22); 26425 (22); 26503 (22).
King, R.M, & A.E. Guevara 6205 (19); 6234 (19); 6236 (32).
King, R.M, *et al.* 10559 (22).
Kirkbride Jr., J.H. 2565 (25).
Kirkbride Jr., J.H., & N. Bristan 1496 (25).
Kirkbride Jr., J.H., & J.A. Duke 420 (22); 469 (22); 507 (25); 595 (20); 638 (6); 685 (22); 731 (3); 1135 (20); 1167 (20); 1169 (22); 1355 (27).
Klug, G. 1816 (19).
Knapp, S. 990 (25); 1047 (25); 1106 (12); 1160 (25); 1283 (25); 1569 (22); 3674 (32); 3735 (31); 3766 (12); 5352 (12); 5773 (12).
Knapp, S., & J. Mallet 2209 (1); 3151 (6).
Knapp, S., & R. Schmalzel 3641 (25).
Knapp, S., & K. Sytsma 2365 (25); 2448 (25); 2526 (22).
Knapp, S., *et al.* 2125 (22); 4495 (32); 4546 (22); 5804 (25).
Knapstein, J.C. 21 (19).
Kress, W.J., & T.C. Flores 94-4280 (22).
Kress, W.J., & J.L. Runk 94-4651 (6).
Kress, W.J., & N.W. Sawyer 94-4956 (22).

Montenegro, E. 1477 (19); 1808 (32); 1810 (3).
Mora Castro, E. 375 (6); 424 (22).
Mora, E. 872 (26); 1024 (27); 1418 (27).
Mora, E., & E. Rojas 511 (26); 1362 (27).
Mora, E., *et al.* 636 (20); 653 (22); 752 (20).
Moraga, M. 196 (20).
Morales, J.F. 1451 (6); 7877 (25).
Moran, R.C., *et al.* 6944 (aff. 22, probably new); 6948 (32).
Moreno, L.J. 6 (12).
Moreno, P.P. 7712 (27); 23191 (22).
Moreno, P.P., & W. Robleto Téllez 20671 (27).
Mori, S.A. 6774 (22).
Mori, S.A., & A. Bolten 7640 (32).
Mori, S.A., & J.A. Kallunki 1763 (25); 1982 (6); 2050 (25); 2641 (20); 2666 (25); 3291 (26); 3310 (22); 3694 (6); 4744 (22); 4835 (3); 4840 (20); 4852 (8); 5341 (12); 6104 (3).
Mori, S.A., *et al.* 3811 (8); 3823 (3); 6569 (12); 6686 (3); 6916 (31).
Morley, B.D., & C. Whitefoord 912 (22).
Morley, T. 779 (25).
Murphy, H., *et al.* 515 (29).
Nee, M. 7635 (25); 9080 (25); 9775 (22).
Nee, M., & J.D. Dwyer 9189 (3).
Nee, M., & B. Hansen 14088 (27).
Nee, M., & W. Robleto Téllez 28039 (22); 28058 (3).
Nee, M., *et al.* 24671 (22).
Neill, D.A. 783 (22); 1873 (27); 8417 (19); 249 (7127) (25); 298 (7173) (27).
Neill, D.A., & P.C. Vincelli 3290 (3); 3500 (27); 3523 (27).
Neill, D.A., *et al.* 7816 (32); 8518 (19); 9160 (19); 10953 (19); 11585 (22); 12496 (3); 13861 (12); 13918 (29).
Nelson, C., & G. Cruz 9345 (25).
Nevling, L.I., & A. Gómez-Pompa 2502 (22).
Nuñez, T., & C. Tapuy 556 (32).
Obando, N., *et al.* 174 (10).
Øllgaard, B., *et al.* 35173 (25); 37697 (22); 37804 (22); 57498 (12); 90456A (4).
Opler, P.A. 702 (32); 703 (6); 704 (20); 749 (22); 813 (6); 825 (27); 826 (25); 1721 (32); 1959 (20).
Ortega, F.J., & R. Ford Smith 2457 (22).
Ortiz, F. 47 (25); 75 (27); 312 (25); 859 (25); 890 (27); 2123 (25); 2190 (27).
Ortiz, O., *et al.* 871 (18).
Palacios, G., & J. Polanco 468 (26).
Palacios, G., *et al.* 402 (25); 503 (26).
Palacio, M., & E. Vallejo 6 (22).
Palacios, W. 2439 (32); 2666 (19); 5227 (20); 5337 (22); 5823 (22); 10361 (19); 12203 (29); 12216 (3); 12737 (22).
Palacios, W., & D. Neill 1534 (32).
Palacios, W., & M. Tirado 11137 (19).
Palacios, W., & H. van der Werff 3605 (22).
Palacios, W., *et al.* 9774 (22); 435 (32); 13507 (15); 13565 (11); 13572 (11).
Pardo, M., *et al.* 143 (31).
Pava, D., & H. Esquivel 40 (22).
Peña, M., *et al.* 378 (3); 395 (31); 469 (15).
Pennel, F.W. 4227 (25).
Penneys, D.S. 457 (22); 1803 (20).
Penneys, D.S., & M.A. Blanco Coto 1701 (22); 1722 (3); 1755 (6); 1811 (1).
Penneys, D.S., & D. Fernández 1872 (20); 1903 (9).
Penneys, D.S., *et al.* 695 (27); 1574 (29); 1576 (32); 1681 (31).
Peterson, P.M. 6406 (22).
Pipoly, J.J. 6107 (6).
Pitman, N., & M. Baas 1013 (15).
Pitman, N., & D. Marsh 1130 (17).
Pittier, H. 2401 (25); 4049 (25); 4799 (25); 8123 (26); 9649 (25); 10291 (22); 12123 (22).
Pittier, H., & T.H. Durand 7452 (27).
Plowman, T., & J. Schunke Vigo 11480 (32).
Plowman, T., *et al.* 3972 (20).
Poeppig, E.F. 1596 (22).
Polanco, J., & G. Palacios 504 (20).
Prance, G.T. 28008 (32); 28023 (12); 28029 (22); 28039 (12); 28008A (31).
Prescott, G.W. 885 (32).

Prieto, F. 4918 (22).
Proctor Cooper, G.R. 478 (32); 575 (6); 21475 (22); 31156 (22); 32122 (6); 32204 (20).
Proctor Cooper, G.R., & G.M. Slater 115 (22).
Proctor Cooper, G.R., *et al.* 27001 (6); 27230 (22).
Purpus, C.A. 7009 (22).
Quelal, C. 8 (22); 90 (22).
Quelal, C., & G. Tipaz 202 (29).
Quelal, C., *et al.* 143 (19); 163 (32); 164 (15); 539 (19); 694 (32); 725 (29); 750 (12).
Quesada, F. 1006 (12).
Quesada, F., & M. Segura 761 (20).
Ramírez, V., *et al.* 165 (32).
Ramos, J.E. 2412 (22).
Ramos, J.E., *et al.* 2465 (32).
Rangel, O., *et al.* 5894 (22); 5961 (22); 5970 (22); 13398 (12).
Raven, P.H. 21670 (6).
Restrepo, C. 455 (28); 472 (22).
Revelo, N. 125 (19).
Reyes, D., & L. Carrillo 538 (22).
Rimbach, A. 66 (22); 189 (22); 225 (22); 226 (22).
Ríos, P. 174 (20); 379 (20); 380 (19).
Robles, R. 1378 (6); 1532 (6); 2215 (6).
Robles, R., & A. Chacón 2676 (32).
Robleto, W. 481 (3); 1760 (22); 1984 (27); 2021 (3).
Rodríguez, A. 768 (6); 854 (27); 1134 (3); 1764 (10); 6831 (4); 8909 (22); 11128 (27).
Rodríguez, A., & C. Abarca 902 (27).
Rodríguez, A., & J. González 3528 (27).
Rodríguez, A., & P. Hurtado 4599 (1).
Rodríguez, A., & V.H. Ramírez 4492 (6).
Rodríguez, A., & L.D. Vargas 4334 (3); 4367 (4).
Rodríguez, A., *et al.* 1506 (6); 1508 (6); 1527 (19); 2099 (6); 2865 (19); 2900 (3); 4885 (25); 4886 (27); 5500 (20); 5521 (3); 6041 (22); 6133 (22); 6998 (26); 11248 (22); 962 (19); 1511 (19).
Rodríguez-Carrasquero, H.A. 5587 (19).
Roi Leopold III, S.M. 187 (25).
Rojas, E. 152 (20).
Rojas, W., *et al.* 398 (22).
Romero Castañeda, R. 746 (25); 2726 (19); 2791 (20); 2857 (12); 2949 (20).
Rubio, D., & W.S. Alverson 410 (11); 410 (12).
Rubio, D., & C. Quelal 603 (22); 625 (19); 1310 (19); 1386 (20); 1391 (aff. 8, probably new); 1571 (20).
Rubio, D., *et al.* 917 (3); 1066 (29); 1069 (aff. 8, probably new); 1111 (12); 1114 (29); 1140 (20); 1185 (3); 1239 (30); 1240 (32); 1727 (12); 2135 (19); 2176 (2).
Rueda, R.M., & O. Caballero 14171 (6).
Rueda, R.M., *et al.* 1891 (27); 3197 (6); 5136 (6); 5460 (20); 6308 (6); 8682 (20); 8896 (31); 9196 (20); 9550 (6); 9644 (19); 9812 (20); 9829 (6); 10050 (31); 10567 (6); 9196 (20).
Ruiz Terán, L. 3348 (22).
Ruiz, R., *et al.* 111 (17).
S.E.R.A. 562 (32).
Saborio, C., *et al.* 78 (1).
Sánchez, D., *et al.* 353 (10); 657 (10); 1485 (17).
Sánchez, J.E., & R. Chacón 104 (4).
Sánchez, P., & N. Zamora 373 (20).
Sánchez, P., *et al.* 497 (6).
Sánchez, R., *et al.* 3036 (32).
Sanders, A.C., *et al.* 17706 (1).
Sandino, J.C. 241 (27); 3314 (27); 3379 (27); 4647 (22); 4664 (27).
Santamaría, D. 1178 (20); 6524 (4).
Santamaría, D., & R. González 6399 (3).
Santamaría, D., & L. Méndez Briones 1230 (3).
Santamaría, D., & J. Morales 4368 (22).
Santamaría, D., & D. Solano 3596 (32).
Santamaría, D., & *et al.* 2207 (22).
Saravia, C., & R. Jaramillo 1776 (29).
Saunders, J. 1087 (6).
Schipp, W.A. 235 (22); 264 (6).
Schmalzel, R.J., & G. Schupp 955 (25).

Schnell, C.E. 99 (15); 308 (27); 330 (6); 415 (6); 416 (22); 510 (10); 530 (22); 550 (6); 583 (22); 603 (6); 614 (32); 620 (32); 621 (3); 627 (27); 672 (6); 1015 (25); 1016 (27); 1085 (22); 1350 (20).
Schultes, R.E., & M. Villareal 7365 (12).
Schunke Vigo, J. 5602 (32); 7256 (32); 11287 (22).
Schupp, E. 60 (7); 82 (22).
Seler, C., & G.E. Seler 2525 (22).
Shank, P.J., & A. Molina 4094 (27); 4375 (25); 4540 (22); 4767 (27); 4865 (27).
Shattuck, O.E. 38 (25); 978 (25).
Silverstone-Sopkin, P. 783 (22).
Silverstone-Sopkin, P., *et al.* 9539 (28); 9409 (2).
Skutch, A.F. 964 (22); 1473 (22); 4487 (32); 4948 (21); 5309 (32).
Smith, A. 175 (3); 1732 (22); 1791 (27); 10019 (22); P2218 (22); P2276 (22).
Smith, D.N., *et al.* 8507 (22).
Smith, H.H. 4 (25); 457 (22).
Smith, J.D. 143 (6); 157 (32); 6547 (25).
Sobel, G.L., & J. Strudwick 2334 (7).
Soejarto, D.D., *et al.* 9332 (20).
Solano, D., & I. Mena 4933 (20).
Solano, D., & R. Kriebel 907 (32).
Solano, D., & R. Solano 3527 (1).
Solano, D., *et al.* 145 (25); 152 (3); 2116 (22); 3505 (20); 3538 (22); 4542 (26); 4732 (4); 4858 (8); 5044 (22).
Sparre, B. 14886 (22); 15212 (22); 18460 (9).
Sperry, J. 775 (20); 863 (32).
"St. George" Expedition 526 (15).
Standley, P.C. 25688 (25); 26632 (25); 27554 (6); 29347 (25); 37887 (3); 37930 (10); 52931 (22); 52936 (6); 53107 (6); 54163 (22); 55595 (22); 56796 (6); 71192 (22); 71427 (22); 90589 (22).
Standley, P.C., & J. Valerio 45185 (27); 45376 (27); 45843 (22); 47078 (26); 48361 (25); 48677 (25); 48848 (25).
Starry, D.E. 58 (25).
Stein, B.A. 1350 (25).
Stein, B.A., *et al.* 1247 (22).
Stergios, B.G., & R. Caracas 18892 (22); 18937 (22).
Stern, S., & E.J. Tepe 359 (7); 372 (22); 386 (22); 397 (15); 399 (11).
Stern, W.L., *et al.* 165 (25); 262 (25); 442 (25); 443 (25); 594 (26); 733 (25); 816 (25).
Stevens, W.D. 4801 (27); 4973 (22); 5080 (6); 6388 (22); 6418 (26); 6425 (27); 6538 (22); 6539 (3); 6865 (27); 8828 (6); 12219 (27); 13536 (26); 13577 (10); 13752 (3); 13794 (8); 18263 (32); 23655 (6).
Stevens, W.D., & P.P. Moreno 19258 (25).
Stevens, W.D., & R. Riviere 20883 (27).
Stevens, W.D., *et al.* 20992 (27).
Stevenson, P. 1818 (25).
Steyermark, J.A. 33808 (22); 37150 (22); 38865 (6); 39042 (6); 39946 (6); 41810 (22); 44886 (22); 46842 (22); 47896 (22); 49370 (22); 52584 (22); 56085 (22).
Steyermark, J.A., & M. Rabe 97117 (22).
Steyermark, J.A., & C. Steyermark 95245 (22).
Steyermark, J.A., *et al.* 122879 (22); 125045 (22); 126873 (22).
Stork, H.E. 4600 (27).
Sucre, D. 58 (25).
Svenson, H.K. 404 (12).
Sytsma, K.J. 1712 (25); 1861 (12); 1940 (25); 3497 (25); 3769 (12); 3774 (19); 4079 (12).
Sytsma, K.J., & L. Andersson 4736 (3).
Sytsma, K.J., & T. Antonio 2985 (22).
Sytsma, K.J., & W.G. D'Arcy 3302 (6).
Sytsma, K.J., & W.D. Stevens 2210 (32); 2260 (15).
Sytsma, K.J., *et al.* 2479 (12); 2663 (6); 2694 (15); 2717 (15); 2741 (6); 2777 (32); 2866 (6); 4861 (22).
Taylor, J. 17820 (3); 17896 (10); 17949 (10).
Taylor, J., & C. Taylor 11555 (27).
Terry, M.E., & R.A. Terry 1424 (6); 1460 (27).
Thompson, S.A., & J.E. Rawlins 736 (9).
Timaná, M., & H. Astete 610 (32).
Tipaz, G., *et al.* 507 (20); 1118 (32); 1231 (20); 1310 (32); 1445 (19); 1764 (12); 2095 (15); 2112 (20).
Tirado, M., *et al.* 289 (19); 355 (20); 376 (8); 437 (20); 545 (32); 700 (20); 793 (19).
Toasa, G., & A. Paque 8566 (19).
Toasa, G., *et al.* 9399 (20).
Todzia, C.A. 2004 (8).
Tonduz, A.O. 314 (27); 7266 (27); 9340 (22); 9342 (25); 9349 (27); 9603 (27); 11445 (22).

Torres , R., & E. Martínez 11373 (22).
Triana, J. 4035 (32); s.n. (12).
Tyson, E.L. 1500 (25); 1552 (25); 1637 (25); 1754 (25).
Tyson, E.L., & K.E. Blum 1678 (25).
Tyson, E.L., *et al.* 2912 (25); 3098 (25); 4623 (25).
Ulloa, C., *et al.* 1755 (22).
Umaña, G. 235 (20).
Umaña, G., & R. Chacón 448 (6).
Umaña, G., & M.M. Chavarría 225 (3); 244 (6).
Urbina, A. 160 (19).
Uribe Uribe, L. 3135 (32).
Utley, J.F., & K. Utley 1099 (6); 3974 (27); 4017 (22); 4873 (6); 5348 (27); 5495 (25); 5548 (25); 5321 (22).
Utley, K. 6048 (25).
Valenzuela, J.C., & E. Freire 456 (12); 502 (22); 513 (19); 516 (20).
Valverde, O., *et al.* 84 (26).
van der Werff, H., & M. Monsalve 9662 (12); 9664 (32); 9670 (29).
van der Werff, H., & C. van Hardeveld 6683 (32).
van der Werff, H., *et al.* 9487 (8); 11910 (29); 11914 (3); 11986 (29); 12040 (32); 12048 (32).
van Rooden, J., *et al.* 610 (12).
Varela, G. 241 (1).
Vargas, H., & J.P. Cerda 548 (19).
Vargas, H., & T. Núñez 496 (22).
Vargas, H., & D. Sandoval 334 (22).
Vargas, H., & P. Grefa 749 (20).
Vargas, H., *et al.* 1334 (8); 4362 (15).
Vargas, L.D., & D. Castillo 3003 (22); 3492 (3).
Vargas, L.D., & G. Villalobos 923 (20).
Vargas, O. 121 (32).
Vargas, O., & J. Frazee 20 (20); 24 (3).
Vega, S., & E. Grijalva 17 (22).
Vélez, M.C., *et al.* 2611 (25).
Vincelli, P.C. 144 (6); 215 (27); 244 (26); 244-A (27).
von Sneidern, K. 3085 (22); A.51 (20); A.623 (22); A12 (32); A51 (32).
von Türckheim, H. 8518 (22).
von Wedel, H. 192 (22); 2307 (27); 2354 (22).
Vrieze, J., *et al.* 4312 (26).
Wallnöfer, B. 12-25388 (32).
Warner, R.H. 259 (13).
Warner, R.H., & J.W. White 51 (32).
Webster, G.L. 16894 (25); 22037 (1).
Webster, G.L., *et al.* 22771 (7); 22772 (22); 27182 (9).
Welch, W.H. 19632 (25).
Wendt, T., *et al.* 2774 (22); 3561 (22); 4839 (22).
Wetmore, R.H., & E.C. Abbe 144 (25).
Whitefoord, C., & A. Eddy 383 (6).
Whitmore, J.L. 107 (25).
Whitson, M.K. 266 (27).
Wilbur, R.L. 30134 (27); 30358 (20); 36925 (20); 37347 (27); 66184 (20); 66238 (20).
Wilbur, R.L., & D.E. Stone 9697 (3); 10669 (22).
Williams, L.O. 3465 (22); 19517 (21); 19715 (26).
Williams, L.O., & A. Molina 13004 (22).
Williams, L.O., *et al.* 28607 (22); 28676 (20).
Wisum, A., & C. Kajekai 473 (19).
Woodson Jr., R.E., & R.W. Schery 267 (22); 855 (1).
Zak, V. 1104 (22).
Zak, V., & J. Jaramillo 3182 (7); 3198 (22).
Zamora, N. 1251 (20).
Zamora, N., & Q. Jiménez 1314 (6).
Zamora, N., *et al.* 1766 (26).
Zapata, A., *et al.* 3034 (18).
Zúñiga, R. 256 (1).
Zúñiga, R., & Q. Jiménez 18 (1).