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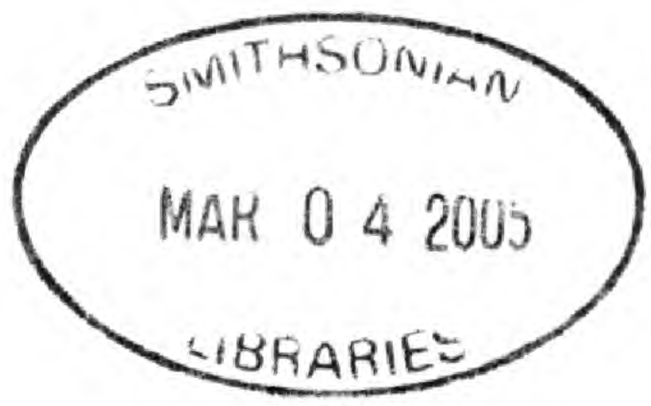
Vines and Climbing Plants of Puerto Rico and the Virgin Islands

by

Pedro Acevedo-Rodríguez



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National Museum of Natural History
Washington, DC
2005

ABSTRACT

Acevedo-Rodríguez, Pedro. Vines and Climbing plants of Puerto Rico and the Virgin Islands. *Contributions from the United States National Herbarium,* Volume 51: 483 pages (including 184 figures). The present book constitutes an illustrated field guide to the native, naturalized, or commonly cultivated vines and lianas of Puerto Rico and the Virgin Islands. It includes nomenclatural and taxonomic revisions, discussions on the distribution and conservation status, as well as full descriptions and illustrations for the species. A total of 386 species distributed in 64 families and 187 genera are treated. Of these 274 are native, 34 are endemic, 64 have been naturalized and approximately 49 are commonly cultivated in gardens. A new combination of *Aristolochia oblongata* Jacq. ssp *calciformis* (Urb.) R.Rankin & Acev.-Rodr. is made.

KEY WORDS: vines, lianas, climbing plants, scandent plants, Puerto Rico, Virgin Islands, flora, Caribbean, Greater Puerto Rico, Greater Antilles, West Indies.

RESUMEN

Acevedo-Rodríguez, Pedro. Vines and Climbing plants of Puerto Rico and the Virgin Islands. *Contributions from the United States National Herbarium,* Volume 51: 483 pages (including 184 figures). La presente obra constituye una guía para los bejucos y plantas trepadoras, nativas, naturalizadas o comúnmente cultivadas que se encuentran en Puerto Rico y las Islas Vírgenes. En ésta se han actualizado la nomenclatura y taxonomía y se incluyen datos de la distribución y estado de conservación de las especies. Cada especie es descrita e ilustrada. En total se tratan 386 especies, distribuidas en 64 familias y 187 géneros. De éstas, 274 son nativas, 34 son endémicas, 64 son naturalizadas y alrededor de 49 son comúnmente cultivadas en nuestros jardines. La nueva combinación *Aristolochia oblongata* Jacq. ssp *calciformis* (Urb.) R.Rankin & Acev.-Rodr. es efectuada.

PALABRAS CLAVES: bejucos, lianas, plantas trepadoras, plantas sarmentosas, Puerto Rico, Islas Vírgenes, flora, Caribe, Macro Puerto Rico, Antillas Mayores, Indias Occidentales.

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To the future generation
of Caribbean botanists

PREFACE

More than 15 years have passed since the publication of Los Bejucos de Puerto Rico Vol. 1., the precursor to the present edition. The original intention had been to prepare a comprehensive guide to the native and naturalized climbing plants in Puerto Rico. This task was interrupted, however, following my departure to pursue graduate studies in the area of systematic botany. Persuaded by Dr. Ariel E. Lugo, I decided to publish what at that time constituted the manuscript, and was therefore called the first volume in order to indicate its partial or incomplete character. The idea of completing the task survived various projects that required my full dedication. Having finished them, I have found the time necessary to complete this long-awaited work. Nevertheless, this has not required the preparation of a second volume, but rather a total revision, in keeping with current taxonomy, that includes all the species of climbing plants of Puerto Rico. At the same time, it has been expanded to include the species found in the Virgin Islands, a natural appendage to the Puerto Rican biota. As a result, the title of the present work reflects the botanical and geographical diversity represented here. It also contains new illustrations more in keeping with its professional character. Although the title "Climbing plants of Puerto Rico and the Virgin Islands" might seem more appropriate for this book, its present title maintains a clearer connection with its precursor.

Pedro Acevedo-Rodríguez
Washington, DC
December, 2002

The present work is a translation with corrections of the book Bejucos y plantas trepadoras de Puerto Rico e Islas Vírgenes. Most corrections deal with formatting, some with spelling, and very few with content. The major change involving content is the removal of Sabicea sp. a (Rubiaceae) as its record in Puerto Rico was based on sterile collections of Tetrapterys inaequalis. The removal of this species reduces the total number of vine species in Puerto Rico and the Virgin Islands from 386 to 385. Bibliographical citations for the accepted names of taxa have been added in order to facilitate literature searches, and a few references have been added.

Pedro Acevedo-Rodríguez
Washington, DC
September, 2004

CONTENTS

INTRODUCTION 7
General Characteristics 7
Stem Morphology 7
Climbing and Attachment Mechanisms 11
Diversity and Distribution 13
Methods 15
Acknowledgments 15
GENERAL REFERENCES 17
SYSTEMATIC TREATMENT 21
Key to the Divisions 21
Pteridophytes 21
Dicotyledons 41
Monocotyledons 403
COLLECTIONS EXAMINED 447
ILLUSTRATIONS VOUCHERS 456
GLOSSARY 465
INDEX TO SCIENTIFIC NAMES 470
INDEX TO VERNACULAR NAMES 481

Vines and Climbing Plants of Puerto Rico and the Virgin Islands

Pedro Acevedo-Rodriguez[1]

INTRODUCTION

GENERAL CHARACTERISTICS

Vines can be defined as climbing plants that are rooted in the soil and whose stems are incapable of maintaining themselves erect, so that they need external support. Although the term vine is used to describe any herbaceous or woody climber, it usually denotes an herbaceous climber with limited secondary growth. When, on the other hand, climbing plants are markedly woody, they are known as lianas.

Shrubs are distinguished from vines by having rigid stems capable of maintaining themselves erect. Nevertheless, this distinction is not always easy to make, because there are intermediate forms between lianas and shrubs that have a tendency to climb or support themselves on nearby objects. These are known as clambering, scrambling or scandent plants. These climbing plants are usually characterized as vines in the broad sense of the word, and for this reason they are included in the present book.

Climbing plants are found in numerous ecosystems, but are more abundant in low-elevation tropical forests than in any other habitat. According to Gentry (1991), climbing plants in temperate forests represent on average 7% of the local flora, while in tropical forests this number reaches 20%. Lianas are characteristic of tropical forests, where at least 50% of the trees contain lianas. These can constitute a significant portion of the biomass of the forest, since their crowns can be as large as that of the tree that supports them. In some moist forests or rain forests in continental tropical areas, lianas can represent up to 40% of the plant species present in the ecosystem (Jacobs, 1988), so that some of these forests are known locally as liana forests.

Despite the ecological importance and the great number of species of climbing plants, they have received relatively little attention on the part of ecologists and forest engineers. The objective of this book is to encourage the understanding of this interesting group of plants.

STEM MORPHOLOGY

This section does not purport to be a treatment of the morphology of climbing plants, but rather to present general characteristics that are useful in their identification. Some of the most conspicuous morphological traits found in many species of climbers that are useful in distinguishing different taxonomic groups at the level of family, genus, or species are discussed below. In general, climbing plants present numerous morphological and anatomical characteristics that distinguish them from other forms of plant life. Among these characteristics are the anatomical structure of the stems and the climbing and attachment mechanisms.

Vines have long and flexible stems that depend on external support to maintain themselves erect or to reach illuminated areas in their habitat. Their stems are characterized by the scarcity of supporting cells (fibers) and an increase in the diameter of the xylem vessels, which may be visible to the naked eye. The increase in the diameter of the xylem vessels triplicates the conduction of water, making lianas able to maintain a great quantity of leaves in relation to

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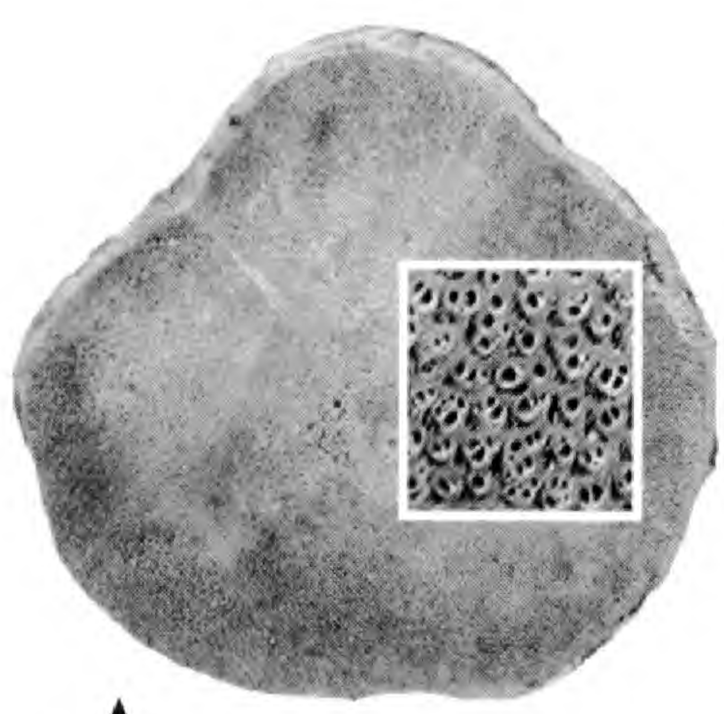

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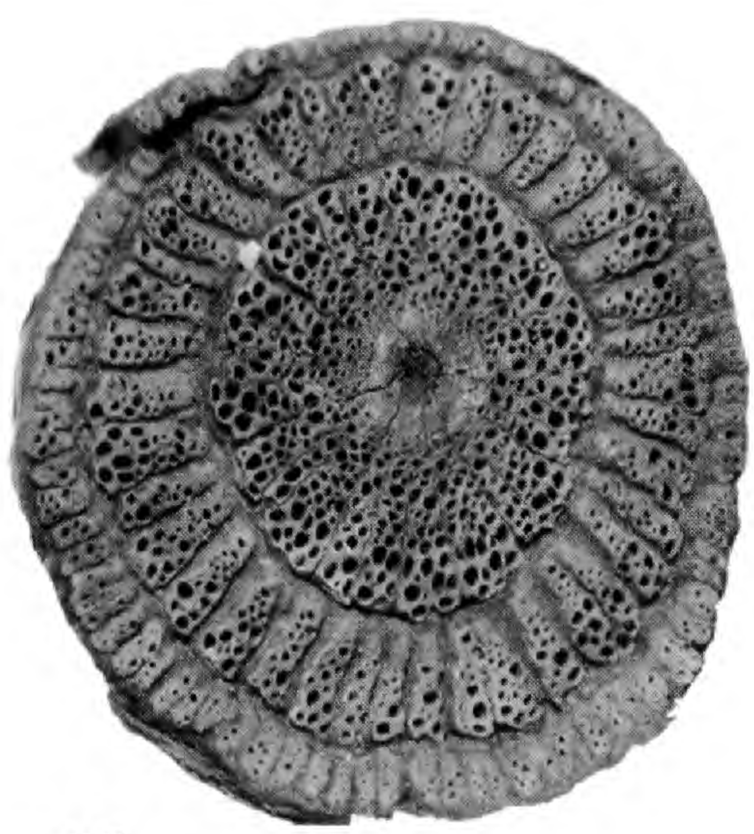

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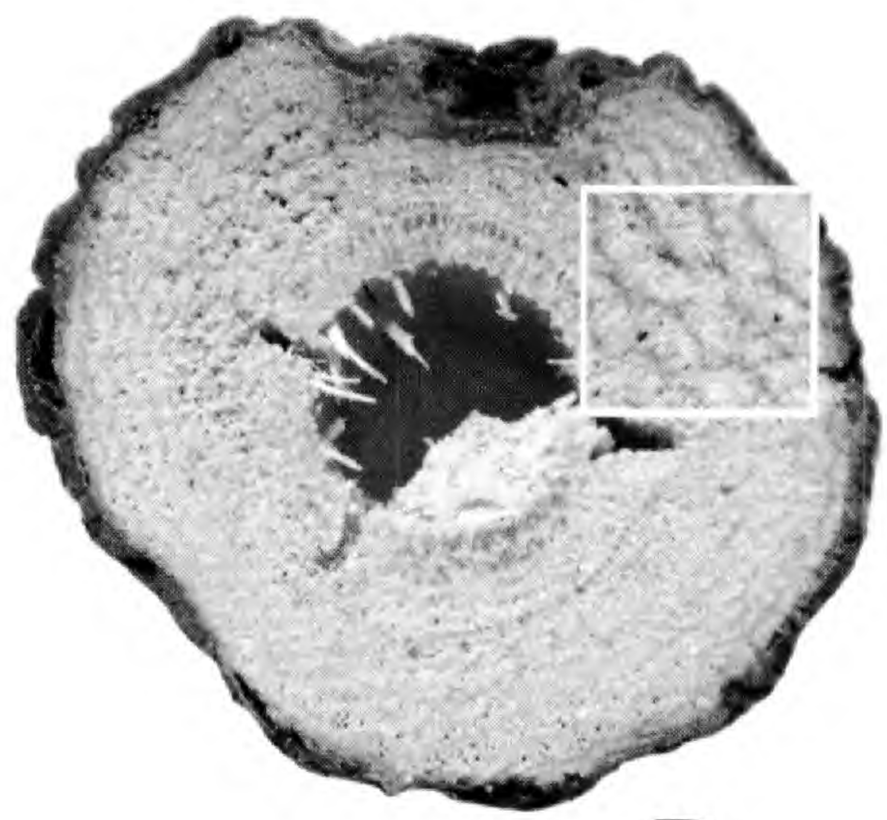

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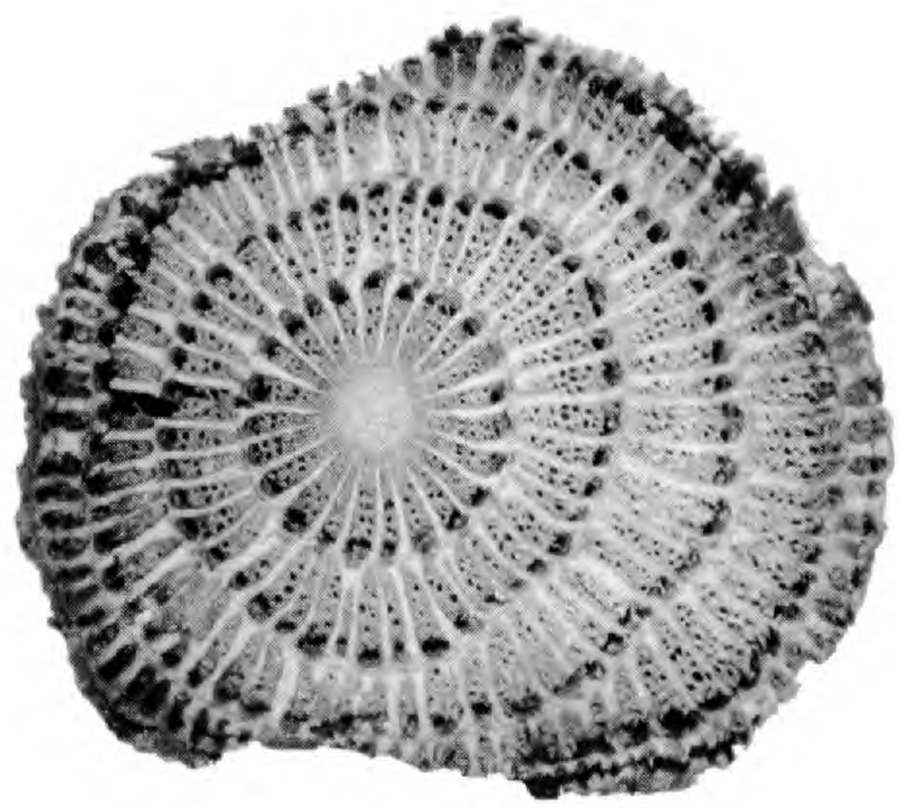

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Fig. 1. Stem cross sections. **A.** *Pisonia aculeata*. **B**. *Ipomoea violacea*. **C**. *Pinzona coriacea*. **D.** *Chamissoa altissima*. **E.** *Securidaca virgata*. **F**. *Hyperbaena domingensis*.

the total diameter of their stems. These stems that are specialized for the conduction of water are known only in plants that possess xylem vessels (elements with perforated walls), and are absent in those that have only tracheids or imperforate elements. Imperforate elements obviously represent an obstacle to the free flow of water, slowing it down and making water transport over great distances difficult.

The stems of climbing plants face structural challenges that differ from those experienced by trees and shrubs. They are subjected to tensile and compacting forces, due to the movement of the structures (usually trees) that support them. For this reason their stem construction, with an alternation of vascular and parenchymatous tissues, gives them considerable flexibility to withstand these types of pressure. In addition, the stems of climbing plants are subject to friction against the host trees that can lacerate their bark and thus wound the phloem tissue. Many lianas have encountered a solution to this problem by having phloem tissue inside the xylem (Dobbins and Fisher, 1986). The arrangement of phloem tissue in relation to the xylem can produce patterns sometimes considered anomalous, which serve to characterize families or genera of lianas (Schenk, 1893; Carlquist, 1991; Gentry, 1991; Acevedo-Rodríguez, 1993). Due to their taxonomic utility, these patterns form part of the species descriptions presented in this book.

For the purposes of this chapter, a brief summary is presented below to characterize in general terms the most common patterns that are known for the stems of the lianas of Puerto Rico and the Virgin Islands. These are described based on cross sections of mature stems, without taking developmental processes into consideration.

1. Discrete vascular bundles. This pattern is the result of the activity of successive bands of cambium, which produce discrete bundles of xylem and phloem surrounded by parenchyma cells. The resulting pattern is that of collateral bundles dispersed in connective tissue (parenchyma). Examples of this type of pattern are found in the genera *Bougainvillea* and *Pisonia* (Fig. 1A) of the family Nyctaginaceae.

2. Alternation of bands of vascular tissue with connective tissue.

Concentric bands. This pattern is the result of the activity of successive bands of cambium that produce a band of vascular tissue (xylem and phloem) accompanied by a band of connective tissue (parenchyma). The cambial activity is repeated to produce successive concentric bands of vascular tissue and connective tissue. The connective tissue can be as wide as the vascular tissue, thus producing a conspicuous pattern of alternating bands. This pattern can be observed in members of the genus *Ipomoea* (Fig. 1B) of the family Convolvulaceae and in the genera *Pinzona* (Fig. 1C) and *Doliocarpus* of the family Dilleniaceae. On the other hand, the band of connective tissue can be very narrow and hardly discernible, giving the appearance of xylem made up of successive concentric layers. Examples of this pattern can be observed in the genera *Chamissoa* (Fig. 1D) and *Pfaffia* of the family Amaranthaceae.

Non-concentric bands. This pattern, like the previous one, is the result of the activity of successive bands of cambium. In this case, however, the activity of the cambial tissue gives rise to asymmetric bands, which develop primarily toward only one sector of the stem, thus producing a stem whose pith is not in a central position. Examples of this pattern are seen in the genus *Securidaca* (Fig. 1E) of the family Polygalaceae, in the genus *Machaerium* of the family Fabaceae, and in the genus *Hyperbaena* (Fig. 1F) of the family Menispermaceae.

3. Polystelic stems.

A. These can be produced by stems with supernumerary cambial tissue whose secondary growth forms a stem composed of numerous vascular cylinders. In this pattern the peripheral vascular cylinders are of a smaller diameter than the central cylinder and can be seen both in young stems and in mature ones. Examples of this pattern are found in the genera *Paullinia* (Fig. 2A) and *Serjania* (Fig. 2B) of the family Sapindaceae.

B. These are also produced by the successive production of cambial tissue within the cortical tissue, which develops into peripheral vascular

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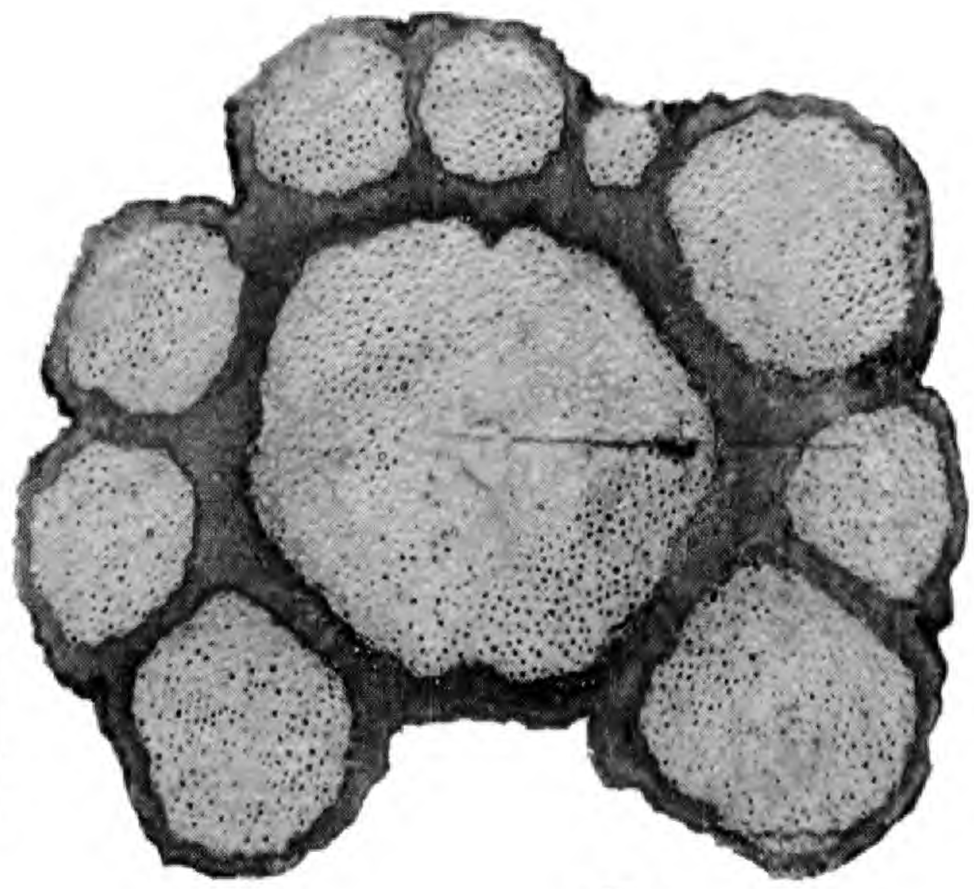

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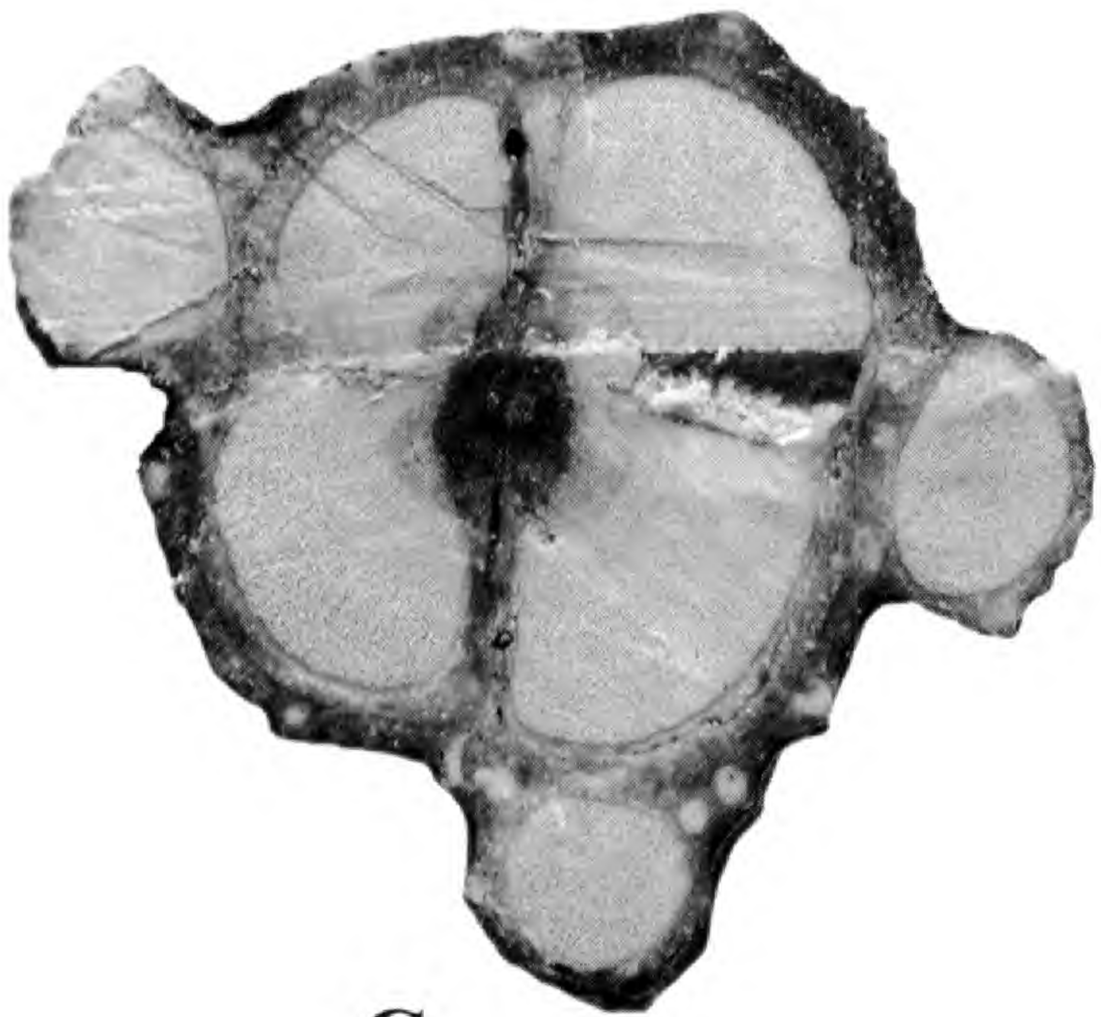

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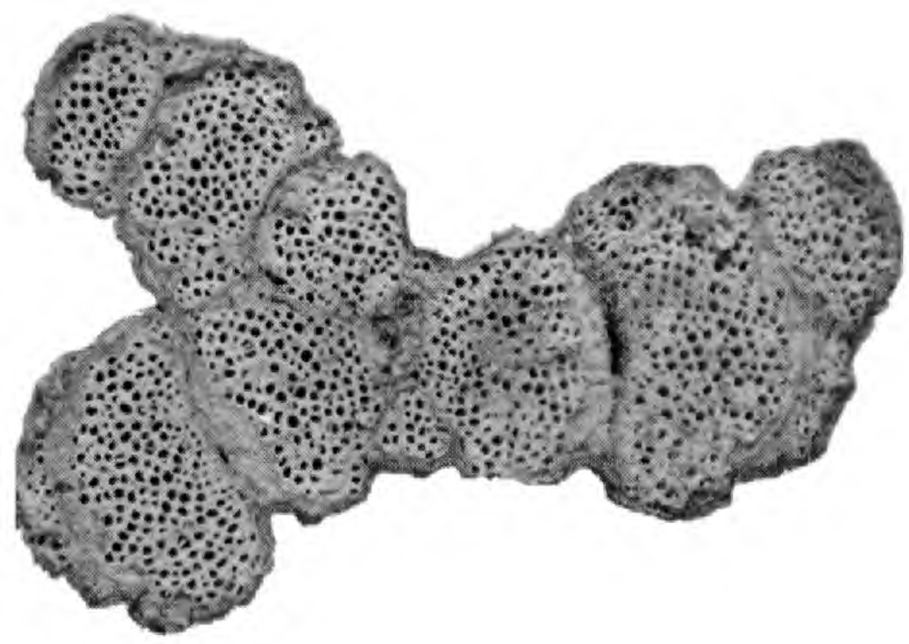

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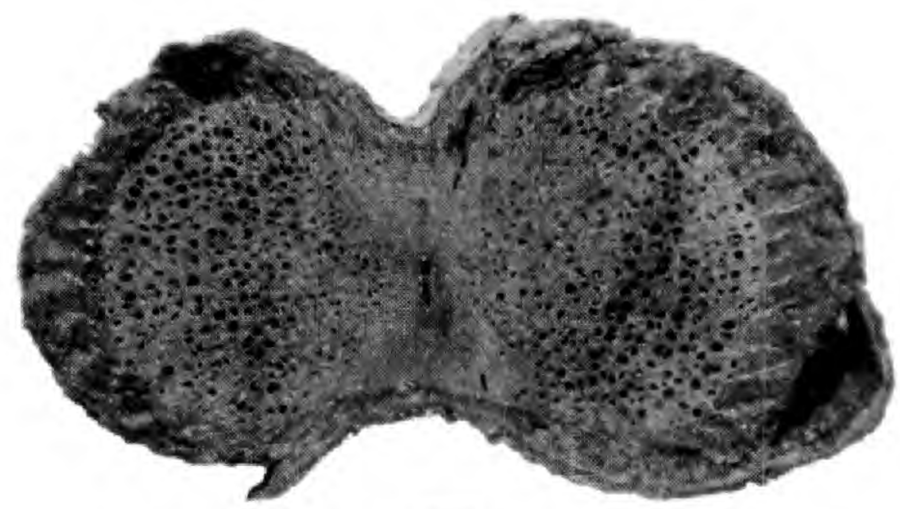

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Fig. 2. Stem cross sections. **A.** *Paullinia pinnata.* **B.** *Serjania polyphylla.* **C.** *Chiococca alba.* **D.** *Turbina corymbosa.* **E.** *Rhynchosia phaseoloides.* **F.** *Marcgravia rectiflora.*

cylinders of different diameters. This pattern is visible only in mature stems. Examples are found in the genus *Chiococca* (Fig. 2C) of the family Rubiaceae and in the genus *Turbina* (Fig. 2D) of the family Convolvulaceae.

4. Compressed stems. This pattern, with the vascular cylinder in a central position, is obtained through asymmetrical secondary growth, in which the stem grows laterally in two opposing directions. Examples of this pattern are found in the genera *Rhynchosia* (Fig. 2E) and *Dioclea* of the family Fabaceae.

5. Deeply lobed stems. This pattern is achieved by secondary growth of the stem in particular regions, giving rise to the lobes. Examples of this pattern are found in the genus *Marcgravia* (Fig. 2F) of the family Marcgraviaceae, in the genus *Distictis* (Fig. 3A) of the family Bignoniaceae, and in the genus *Passiflora* (Fig. 3F) of the family Passifloraceae.

6. Stems with the xylem forming a cross of 4-12 arms. This pattern is produced through differential secondary growth of the xylem and phloem, with the result that there is more xylem tissue in the area of the arms. This pattern is very common in climbers of the family Bignoniaceae, e.g., *Arrabidaea, Cydista* (Fig. 3B) and *Amphilophium* (Fig. 3C).

7. Cylindrical stems with lobed xylem. These are formed by the pronounced growth of xylem tissue in certain regions of the stem. This pattern can be seen in the genus *Passiflora* of the family Passifloraceae. In the genus *Macfadyena* (Fig. 3D) of the family Bignoniaceae, this pattern is obtained through differential growth of the xylem and phloem, producing more xylem in the area of the lobes.

8. Cylindrical stems with conspicuous rays. A cross section of the stem shows the presence of wide parenchymatous rays inserted in the xylem tissue. Examples of this pattern can be seen in the genera *Pristimera* (Fig. 3E) and *Hippocratea* of the family Celastraceae and in the genus *Psiguria* of the family Cucurbitaceae.

CLIMBING AND ATTACHMENT MECHANISMS

Climbing plants achieve their objective of climbing on and attaching themselves to host plants by means of different active or passive mechanisms. Some species have active mechanisms for both tasks, while others are passive in one or both of them. Twining plants, as well as those that have tendrils or sensitive stems, possess active mechanisms that permit them to achieve both objectives. Climbers with recurved spines or adventitious roots do not have active climbing mechanisms, but these structures represent an active mechanism for the task of attaching them to the host plant. Clambering plants represent an extreme case in which both mechanisms are passive. The different climbing and attachment mechanisms are listed and discussed below.

1. Tendrils. Tendrils are sensitive, usually filamentous appendages with which some plants climb on and attach themselves to host plants. These are developed from various structures of the plant body, and are discussed below under the following categories.

A. *Axillary tendrils*. These are homologous to short axillary branches; examples are found in the Cucurbitaceae (Fig. 4A) and Passifloraceae. In the genus *Gouania* (Rhamnaceae) they may develop at the end of a short axillary branch, which sometimes produces a single leaf (Fig. 4B).

B. *Tendrils opposite the leaves*. This type of tendril is probably homologous to the distal end of the main stem of the plant; consequently, the branches form a sympodial system. Examples of this type are found in the Vitaceae (Fig. 4C).

C. *Tendrils in the inflorescence*. In the climbing Sapindaceae, the tendrils are homologous to the basal lateral branches of the inflorescences. They are present in pairs in the basal flowering portion of the inflorescence. Examples of this type are found in the genera *Paullinia* and *Serjania* (Fig. 4D).

D. *Foliar tendrils*. In many climbing genera of Bignoniaceae, the tendrils are found to replace

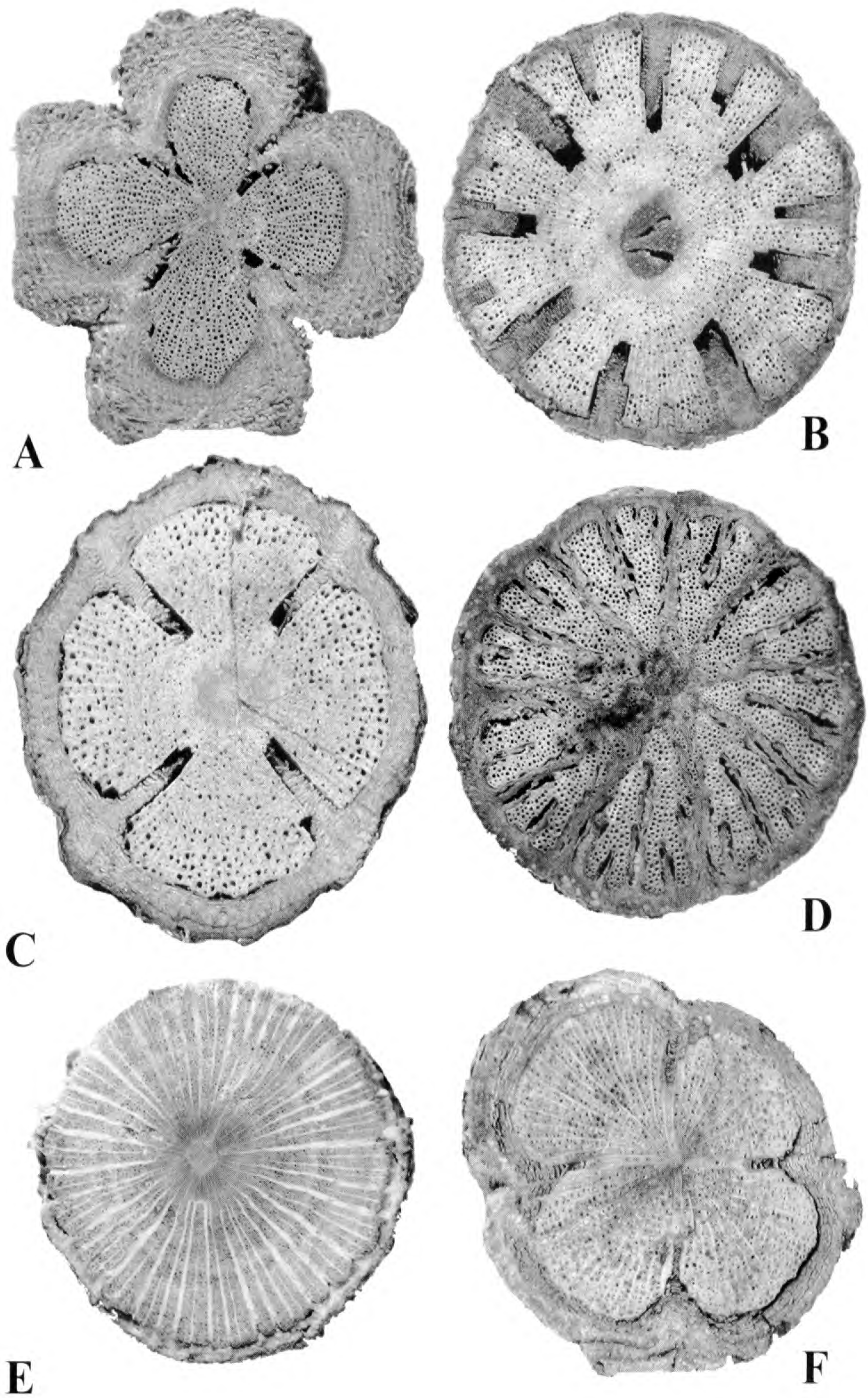

Fig. 3. Stem cross sections. **A.** *Distictis lactiflora.* **B.** *Cydista aequinoctiale.* **C.** *Amphilophium paniculatum.* **D.** *Macfadyena unguis-cati.* **E.** *Pristimera caribaea.* **F.** *Passiflora multiflora.*

the terminal leaflet of the leaves (Fig. 4E). They are simple, trifurcate, or sometimes are found to be modified into a harpidium or small claw or into small adventitious discs.

E. *Tendrils derived from the leaf sheath.* In the Smilacaceae (Fig. 4F), the tendrils represent a prolongation of the leaf sheath.

2. Twining plants (Fig. 4G). Twining plants, commonly called vines, have active mechanisms to climb on and attach themselves to the host plant. They present a circumnutational movement in which their stems, somewhat arching in the distal portion, rotate on their own axis, rather like the hands of a clock. This movement is essential so that the vine can locate a structure on which it can climb and thus use as a source of support. The principal shoot of a vine rotates freely until it runs into some structure that presents enough resistance. Once this has happened, the stem of the vine continues its rotational motion, but in a smaller spiral, thus twining around the host plant. The greater the diameter of the host structure, the more difficult is the ascent, because the vine's stem is subject to the force of gravity. Trees of excessive diameter represent an obstacle for the vine's ascent.

3. Sensitive branches or leaves. This category is analogous to tendrils, but does not present any type of modification; in this case the branches or leaves are sensitive (prehensile or twining) without having any kind of structural modification. This mechanism can be considered to be active both in the task of climbing and in that of attachment to the host plant. Examples of species with sensitive stems are found in the family Celastraceae, and species with sensitive leaves are found in the genus *Clematis* (Fig. 4H) of the family Ranunculaceae.

4. Adventitious roots. Adventitious roots do not really represent an active climbing mechanism except in young plants, but in adult plants they are very effective in the task of holding onto the host plant. Examples are found in the genus *Marcgravia* of the family Marcgraviaceae and the genus *Schlegelia* of the family Schlegeliaceae.

5. Cauline or foliar spines. The presence of spines on the stems or leaves of some climbing species may be considered to be an active mechanism for holding onto the host plant but not necessarily for the task of climbing. Examples of these structures are found in the cacti, some species of the genera *Mimosa* and *Acacia* of the family Fabaceae, the genus *Celtis* of the family Ulmaceae, and the genus *Berylsimpsonia* of the family Asteraceae.

6. Clambering plants. Clambering plants are climbing plants that manage to climb on and gain support from other plants by means of passive mechanisms, that is, leaning against and growing upon the host plant. Examples of this type of plant are found in the genus *Lepidaploa* of the Asteraceae and the genus *Senna* of the Fabaceae.

DIVERSITY AND DISTRIBUTION

The total number of species of climbing plants that are found in Puerto Rico and the Virgin Islands amounts to 386, distributed in 64 families and 187 genera. Of these, 274 are native, 34 are endemic, 64 are naturalized, and about 49 are commonly cultivated in our gardens. Among the endemic vines is *Neorudolphia*, the only plant genus endemic to Puerto Rico.

The naturalized species are usually tropical weeds with a very wide distributional range, not only in Puerto Rico and the Virgin Islands but throughout the tropics. These species are generally of rapid growth and are typically found in areas of disturbed vegetation, such as abandoned farms, roadsides, pastures, or secondary forests and thickets. Examples of these species are: *Asystasia gangetica, Thunbergia alata, Thunbergia fragrans, Cryptostegia grandiflora, Momordica charantia, Lablab purpureus, Pueraria phaseoloides, Vigna hosei,* and *Jasminum fluminense.*

The native species, as a general rule, have a less widespread distributional range than the naturalized species. The range varies from species with a widespread neotropical distribution to species that are restricted to a group of islands. Similarly, within Puerto Rico and the Virgin Islands these species can have quite a widespread range or may be restricted to particular ecosystems. Species with a widespread neotropical

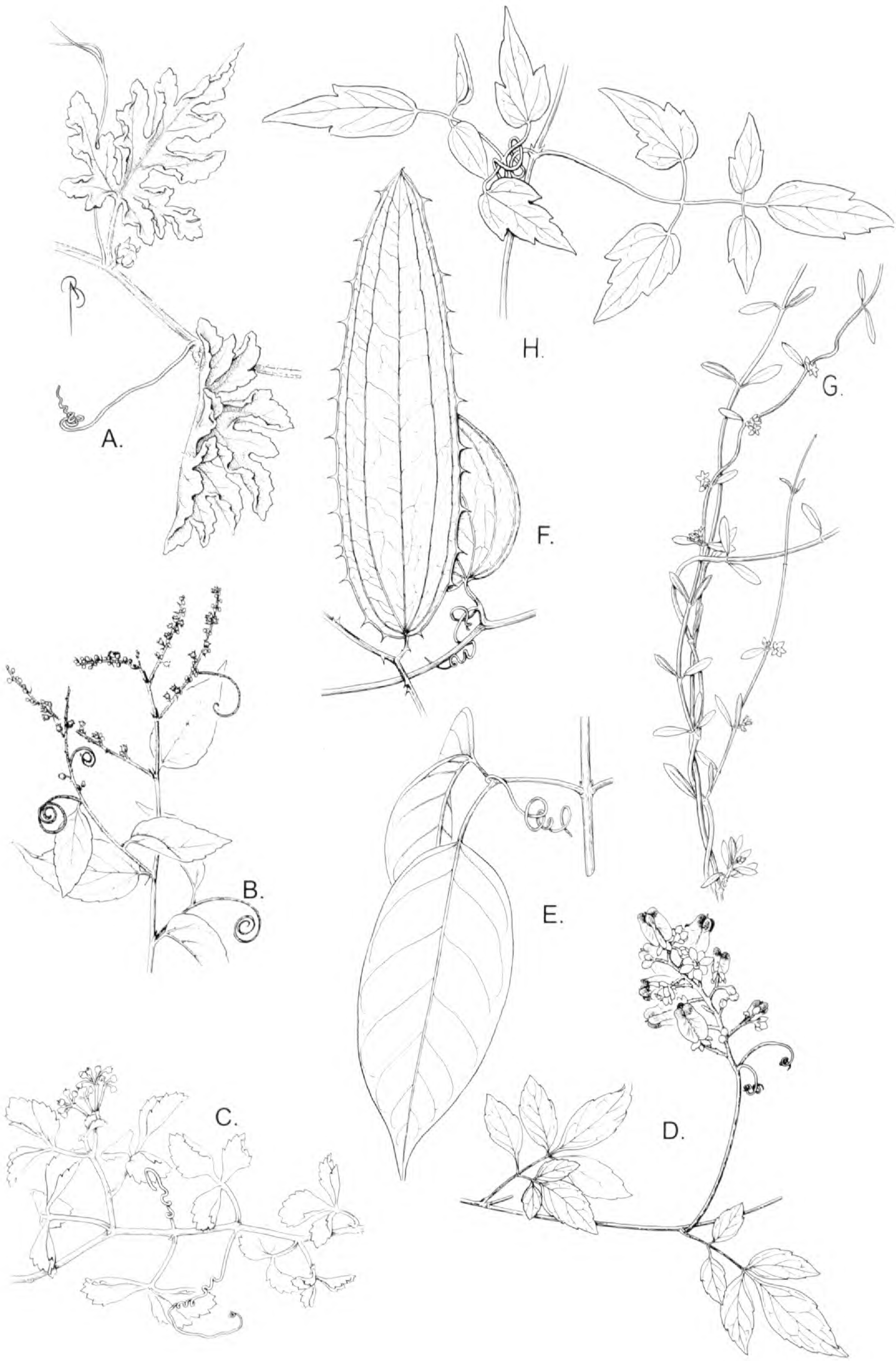

Fig. 4. Climbing and attachment mechanisms. **A.** Axillary tendrils (*Citrullus*). **B.** Axillary tendrils (*Gouania*). **C.** Tendrils opposite the leaves (*Cissus*). **D.** Tendrils on the inflorescence (*Serjania*). **E.** Foliar tendrils (*Arrabidaea*). **F.** Tendrils on the leaf sheath (*Smilax*). **G.** Twining plant (*Metastelma*). **H.** Sensitive leaves (*Clematis*).

distribution are usually found in areas of disturbed or secondary vegetation, and thus their distribution in Puerto Rico is quite widespread. Examples of species that show this distributional range are: *Mikania cordifolia, Mikania congesta, Macfadyena unguis-cati, Cayaponia americana, Melothria pendula, Ipomoea setifera, Ipomoea tiliacea, Merremia dissecta, Merremia quinquefolia, Merremia umbellata, Acacia retusa, Centrosema pubescens, Vigna luteola, Cissampelos pareira, Passiflora foetida, Passiflora rubra, Passiflora suberosa, Paullinia pinnata,* and *Cissus verticillata.*

The endemic species have, by definition, the least widespread distributional range, but their distribution varies considerably from species to species. Some are found throughout the island(s), while others are restricted to one or several localities. Examples of the former are: *Forsteronia portoricensis, Chromolaena borinquensis, Lepidaploa borinquensis, Mikania fragilis, Mikania odoratissima, Mikania pachyphylla, Piptocarpha tetrantha, Clusia gundlachii, Neorudolphia volubilis, Heteropterys wydleriana, Marcgravia sintenisii,* and *Stigmaphyllon floribundum* (shared with the Virgin Islands). Species restricted to several localities are the following: *Metastelma monense, Matelea sintenisii, Bidens urbanii, Mikania porosa, Mikania stevensiana, Passiflora tulae,* and *Rubus florulentus.* Some of the endemic vines have such a limited distributional range that they may be characterized as threatened species; these are the following: *Marsdenia elliptica, Marsdenia woodburyana, Piptocoma acevedoi, Cordia bellonis, Gonocalyx concolor,* and *Galactia eggersii* (endemic to the Virgin Islands).

METHODS

The present work is based on the study of herbarium specimens, supplemented with fresh material. This applies both to the descriptions and to the data on phenology and distribution. The descriptions and data presented come from plants collected in Puerto Rico and the Virgin Islands. On rare occasions, the descriptions or phenological data have been supplemented with material from other Caribbean islands or monographic studies of the species in question. The descriptions that are presented are quite representative, although it is possible that the study of fresh material, flowers in particular, might show larger dimensions than those mentioned here. The habit dimensions are mostly based on the study of fresh material and are estimations, since it is impractical to give absolute measurements of stem length. In cases where the species was not seen in the field, information on the habit comes exclusively from herbarium labels or literature reports. The distributions have been supplemented with various floristic publications on forests or keys and islands belonging to Puerto Rico (see general references). In particular, the publications on Cayo Santiago, Desecheo, and Vieques have been of great help, since I have not sampled any of these islands.

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SYSTEMATIC TREATMENT

KEY TO THE DIVISIONS

1a. Sexual reproduction by sporangia, clustered in sori, which are arranged on the abaxial surface or the margin of the blade of the fronds ..... **PTERIDOPHYTES** (Page 21)
1b. Sexual reproduction by flowers. 2

2a. Flowers 5-6-merous; leaf blade with reticulate venation, the last free veins of the network forming an areole; the petioles not forming a sheath around the stem ..... **DICOTYLEDONS** (Page 41)
2b. Flowers usually trimerous; leaf blade usually with parallel venation, the last-order nerves forming a network, never free within the areole; petioles sheathing, covering the stem ..... **MONOCOTYLEDONS** (Page 403)

PTERIDOPHYTES

Key to the families

1a. Fronds microphyllous (minute), with only one vein..... *Selaginellaceae*
1b. Fronds megaphyllous; venation well developed, with primary, secondary, or tertiary veins.....2

2a. Sori marginal or submarginal on the fronds ..... *Dennstaedtiaceae*
2b. Sori on the abaxial surface of the frond 3

3a. Fronds monomorphic, the fertile and sterile ones similar 4
3b. Fronds dimorphic, the fertile ones significantly different from the sterile ones 7

4a. Fern scandent or climbing by the twining leaf rachis, with indeterminate growth 5
4b. Fern climbing by adventitious roots 6

5a. Sori naked (without indusia), dispersed on the abaxial surface of the frond, usually near the midvein ..... *Gleicheniaceae*
5b. Sori covered with an indusium in the form of a pocket, produced on digitiform marginal projections of the pinnae ..... *Schizaeaceae*

6a. Blades of the fronds entire ..... *Davalliaceae*
6b. Blades of the fronds pinnatisect ..... *Polypodiaceae*

7a. Sori dispersed on the lower surface, not grouped; indusium absent. ..... *Lomariopsidaceae*
7b. Sori in elongate-linear groups, lateral to the midvein; indusium entire, elongate ..... *Blechnaceae*

1. *Family* ***BLECHNACEAE***

1. BLECHNUM

Terrestrial ferns, hemiepiphytic or less frequently epiphytic; rhizomes elongate, erect or scandent, sometimes forming a caudex or stolon, densely covered with scales. Fronds sterile or fertile, monomorphic or dimorphic; blades glabrous, pinnatisect, simple-pinnate or less frequently entire; veins free, bifurcated, except for the minor veins on the fertile fronds; pinnae entire or serrate. Sori linear, parallel to the midvein; indusia linear, opening toward the midvein. A cosmopolitan genus of about 180 species, mostly in the Southern Hemisphere.

1. Blechnum fragile (Liebm.) C. V. Morton & Lellinger, Amer. Fern J. 57: 68. 1967.

Fig. 5. A-C

BASIONYM: *Lomaria fragilis* Liebm.

Slightly woody fern, hemiepiphytic, scandent by means of adventitious roots, attaining 2 m in length. Rhizomes thick, 0.8-1.5 cm wide, densely covered with subulate, slihtly undulate, ciliate, ferruginous scales, 8-17 mm long. Fronds more or less clustered, arching, ascendent or pendulous, dimorphic; blades pinnate, membranaceous. Sterile fronds 40-60 × 4-12 cm, with an elliptical outline, the apex acuminate or caudate, the base acute (the pinnae gradually reduced in size toward the base); pinnae 25-75 pairs, oblong-deltate, the apex acuminate, the margins revolute, sometimes with minute callus-like projections; the upper surface dull, with a prominent midvein; the lower surface dull, paler than the upper surface, with a prominent midvein; stipe 10-18 cm long, blackish or brown, with some vestigial pinnae. Fertile fronds slightly smaller than the sterile ones; pinnae 28-41 pairs, linear; indusia half as wide as the pinna.

Phenology: Found in fertile condition throughout the year.

Status: Native, common.

Distribution: In moist forests at middle and upper elevations along the Cordillera Central and the Sierra de Luquillo. Also in Jamaica, Cuba, Hispaniola, southern Mexico, and Central America.

Public Forests: Carite, El Yunque, Guilarte, and Toro Negro.

2. *Family* ***DAVALLIACEAE***

1. OLEANDRA

Epiphytic or terrestrial ferns with very elongate rhizomes, erect, creeping, or climbing, sometimes branched, densely covered with peltate scales. Fronds sterile or fertile, monomorphic; blades simple, entire; veins free and parallel; stipe articulate. Sori circular, usually adjacent to the midvein; indusia circular or reniform, peltate. A tropical genus of about 40 species.

1. Oleandra articulata (Sw.) C. Presl, Tent. Pterid. 78. 1836.

Fig. 5. D-E

BASIONYM: *Aspidium articulatum* Sw.
SYNONYM: *Oleandra nodosa* (Willd.) C. Presl

Herbaceous fern, epiphytic or climbing by adventitious roots, attaining 5 m in length. Rhizomes slender, densely covered with lanceolate, ferruginous scales. Fronds pendulous; blades (15) 23-39 (42) × (2.5) 3-6 cm, membranaceous, oblong, elliptical, or sublanceolate, the apex acute, acuminate, or caudate, the base acute or acuminate, sometimes unequal, the margin crenulate or crenate, slightly revolute and ferruginous; the upper surface shiny,

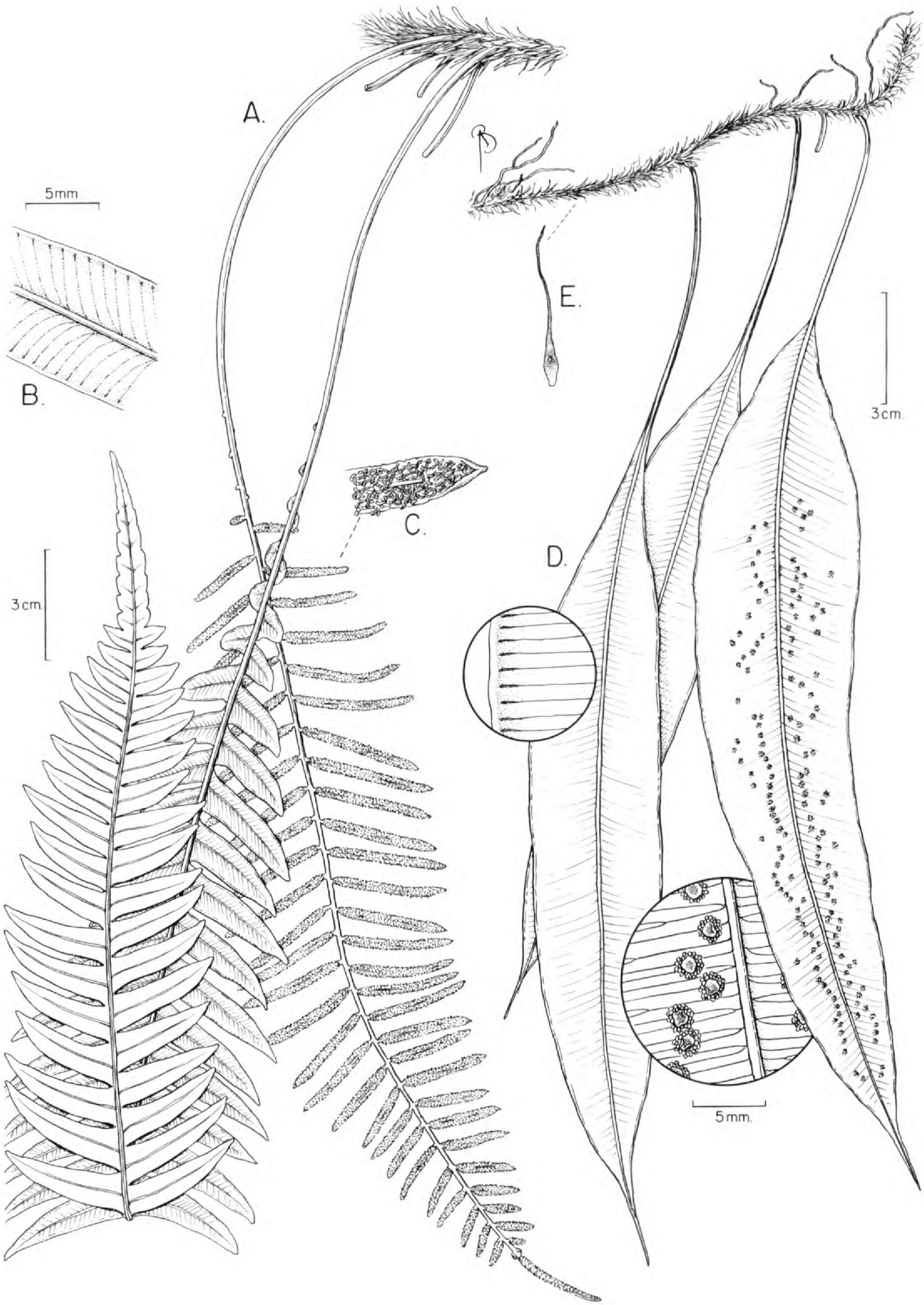

Fig. 5. A-C. *Blechnum fragile*. **A.** Habit. **B.** Detail of sterile pinna. **C.** Detail of sterile pinna. **D-E.** *Oleandra articulata*. **D.** Habit, with detail of the margin and sori. **E.** Detail of rhizome scale.

with a prominent, sulcate midvein; the lower surface dull, with a prominent, blackish or shiny gray midvein, covered with ferruginous scales; stipe (4) 8-16 cm long, blackish or gray, glabrous, articulated near the base. Sori circular, light brown, distributed along both sides of the midvein.

Phenology: Found in fertile condition throughout the year.

Status: Native, common.

Distribution: In moist forests at middle and upper elevations along the Cordillera Central and the Sierra de Luquillo. Also in Jamaica, Cuba, Hispaniola, the Lesser Antilles, and throughout the Neotropics.

Public Forests: Carite, El Yunque, Guilarte, Maricao, Río Abajo, and Toro Negro.

Reference: Maxon, W. R. 1914. The American species of *Oleandra*. Contrib. U.S. Natl. Herb. 17: 392-398.

3. *Family* ***DENNSTAEDTIACEAE***

Key to the genera

1a. Rhizomes without scales; sori marginal or submarginal, at the tips of the veins, covered by the reflexed margins of the blade ..... 1. *Hypolepis*
1b. Rhizomes covered with scales; sori in marginal pockets ..... 2. *Odontosoria*

1. HYPOLEPIS

Terrestrial ferns; rhizomes creeping, woody, elongate, quite branched, covered with multicellular hairs and without scales. Fronds monomorphic, separated, elongate, usually clambering and spiny; blades 2-5-pinnate; pinnules lobed or pinnatifid, glabrous or pubescent, sometimes with viscous glands; veins free; stipe and rachis elongate, robust, not articulate, sometimes spiny. Sori circular, marginal or submarginal, solitary at the tips of the veins; indusium false, formed by the reflexed margins of the blade. A pantropical genus of about 45 species.

Key to the species of *Hypolepis*

1a. Stipe and rachis densely spiny 2
1b. Stipe and rachis unarmed or with some scattered spines 3

2a. Leaf rachis brown, with some of the spines recurved and dark brown; blades 4-pinnate-pinnatifid; pinnules distally emarginate ..... 1. *H. nigrescens*
2b. Leaf rachis creamy yellow, with straight, pale spines; blades 3-pinnate-pinnatifid; pinnules distally obtuse, entire ..... 2. *H. repens*

3a. Leaf blade membranaceous with light brown venation; the upper surface with a flat midvein; the lower surface glabrous or puberulent ..... 3. *H. tenerrima*
3b. Leaf blade chartaceous with yellowish venation; the upper surface with a sulcate midvein; the lower surface pubescent ..... 4. *H. urbanii*

1. Hypolepis nigrescens Hook., Sp. Fil. 2: 66, t. 90c. 1852.

Fig. 6. A

Clambering fern. Rhizomes branched, dark brown, pubescent. Fronds 4-pinnate-pinnatifid, with indeterminate growth, 5-10 m long; blades chartaceous, narrowly oblong-lanceolate in outline; upper surface glabrous or less frequently puberulent; lower surface with scattered hairs along the main veins; pinnae opposite or subopposite, broadly lanceolate, up to 35 cm long; primary pinnules alternate; blades 18-24 cm long; stipe and rachis reddish to dark brown, with numerous dark brown straight or recurved spines. Sori circular, submarginal; indusia very narrow, glabrous.

Phenology: Collected in fertile condition in February, July, and September.

Status: Native, rare.

Distribution: Known from three localities in Puerto Rico, in the interior or at the edges of moist forests. Also in the Greater Antilles and from Mexico to Bolivia.

Public forest: Toro Negro.

2. Hypolepis repens (L.) C. Presl, Tent. Pterid. 162. 1836.

Fig. 6. B

BASIONYM: *Lonchitis repens* L.
SYNONYM: *Hypolepis aculeata* (Spreng.) J. Sm.

Clambering fern. Rhizome covered with brown hairs. Fronds ascending, clambering or arching, 3-pinnate-pinnatifid, 2-4 m long; blades coriaceous, triangular in outline, up to 1.5 m wide; upper surface with scattered hairs along the midvein; lower surface shiny, pubescent; pinnae lanceolate-triangular, 20-50 cm long; primary pinnules subopposite, 7-22 cm longstipe and rachis yellowish or light brown, with straight spines, the stipe darker toward the base. Sori circular, submarginal; indusia membranaceous, whitish, subentire.

Phenology: Collected in fertile condition in August and September.

Status: Native, common.

Distribution: In moist secondary and disturbed forests along the Cordillera Central and the Sierra de Luquillo. Also in the Antilles (except Jamaica) and continental tropical America.

Public forests: Carite, El Yunque, Guilarte, Maricao, and Toro Negro.

3. Hypolepis tenerrima Maxon, J. Wash. Acad. Sci. 14: 196. 1924.

Fig. 6. C

Clambering fern. Fronds weakly ascending or clambering, 2-3-pinnate-pinnatifid, up to 2.5 m in length; blades membranaceous, elongate-triangular in outline, 1-1.5 m wide at the base; glabrous or puberulent, with articulate or glandular hairs on both surfaces, the venation light brown; pinnae subopposite or alternate, up to 80 cm long, obliquely oblong-deltoid to oblong-ovate, acuminate; rachis puberulent, unarmed or with some scattered straight spines; primary pinnules subopposite or alternate, 16-20 cm long, narrowly oblong-lanceolate in outline; secondary pinnules alternate, 2.5-4 cm long, light to dark brown, oblong, obtuse; stipe and rachis light to dark brown, glabrescent, with non-pointed outgrowths. Sori submarginal; indusia membranaceous, greenish yellow, crenate.

Phenology: Collected in fertile condition in March.

Status: Native, uncommon.

Distribution: Known in Puerto Rico from two collections made by Paul Sintenis at the end of the nineteenth century from primary forests in Adjuntas (*Sintenis 4105*) and Utuado (*Sintenis 6454*). Also in Hispaniola.

Public forest: Toro Negro.

4. Hypolepis urbanii Brause in Urb., Symb. Antill. 9: 344. 1925.

Fig. 6. D

Clambering fern. Rhizomes covered with brown articulate hairs. Fronds clambering, 3-pinnate-pinnatifid, 3 m or more in length; blades coriaceous, pubescent on the lower surface, triangular in outline, up to 1 m wide at the base, the venation yellowish; pinnae subopposite, up to 50 cm long, oblong-deltoid, acuminate; rachis glabrescent or slightly muricate; primary pinnules subopposite or alternate, 3-15 cm long, narrowly oblong-deltoid in outline; stipe and rachis light brown, dark toward the base, glabrescent, unarmed. Sori submarginal; indusia membranaceous, yellowish, glabrous, crenate.

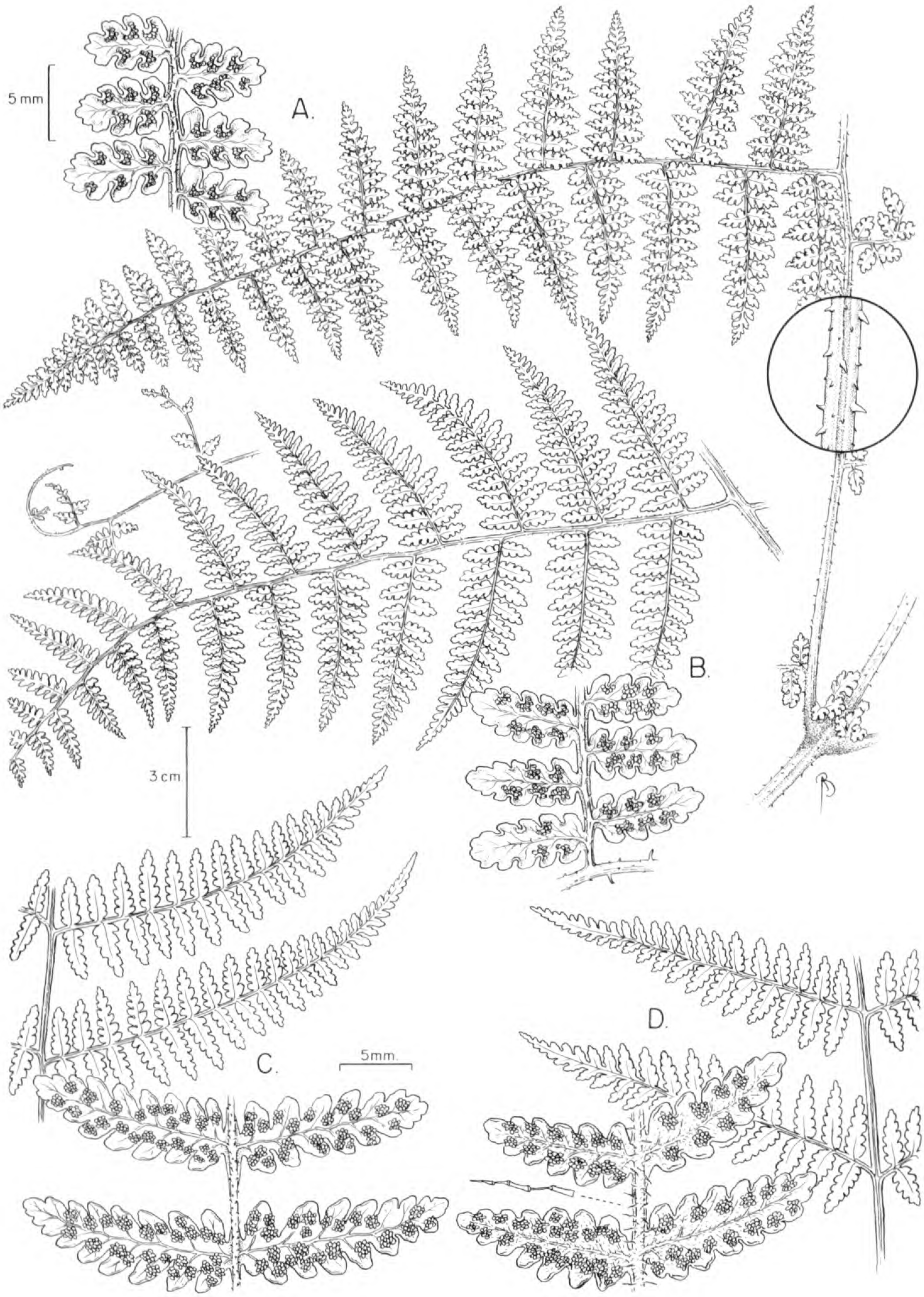

Fig. 6. A. *Hypolepis nigrescens*, detail of the rachis and fertile pinnules. **B.** *Hypolepis repens*, detail of frond and fertile pinnules. **C.** *Hypolepis tenerrima*, detail of the upper and lower surfaces of the pinnae. **D.** *Hypolepis urbanii*, detail of the upper and lower surfaces of the pinnae.

Phenology: Collected in fertile condition in February.
Status: Native, rare.
Distribution: Known in Puerto Rico from only one collection from Monte Jayuya (*Proctor 40130*). Also in Hispaniola.
Public forest: Toro Negro.

2. ODONTOSORIA

Clambering ferns, terrestrial with short, slender, creeping rhizomes, covered with scales. Fronds monomorphic, elongate, clambering, usually spiny; blades narrowly triangular to linear, 2-5-pinnate; pinnae and pinnules forming a right angle with the axis or rachis; pinnules linear to flabellate. Sori in marginal pockets, containing three sporangia; indusia absent. A neotropical genus of 12 species.

Key to the species of *Odontosoria*

1a. Rachis of the fronds spiny ..... 1. *O. aculeata*
1b. Rachis of the fronds unarmed ..... 2. *O. scandens*

1. Odontosoria aculeata (L.) J. Sm., Cult. Ferns 67. 1857.

Fig. 7. A-C

BASIONYM: *Adiantum aculeatum* L.
SYNONYMS: *Davallia aculeata* (L.) Sm.
Davallia dumosa Sw.

Clambering fern. Rhizomes short, creeping, densely covered with reddish brown scales at the apex. Fronds 2-3-pinnate, glabrous, clambering, up to 3 m in length; pinnae numerous, opposite, 20-40 cm long, ovate-deltoid; pinnules alternate; secondary pinnules (2) 3 (5) times laciniate, cuneiform, the apex usually revolute; rachis spiny.

Phenology: Probably found in fertile condition throughout the year.

Status: Native, common.

Distribution: In secondary forests and moist disturbed areas from sea level to 950 m. Also in St. John, St. Thomas, and Tortola; Cuba and Hispaniola.

Public forests: Carite, El Yunque, Guilarte, Maricao, Río Abajo, and Toro Negro.

2. Odontosoria scandens (Desv.) C. Chr., Ind. Fil. 354, 465. 1906.

Fig. 7. D-F

BASIONYM: *Humata scandens* Desv.
SYNONYM: *Odontosoria uncinella* (Kunze) Fée

Clambering fern. Rhizomes creeping, scarcely elongate, densely covered with reddish brown scales at the apex. Fronds 3-pinnate, glabrous, clambering or twining, up to 2 m in length; pinnae numerous, opposite or subopposite, 10-18 cm long, lanceolate or oblong; pinnules subopposite or alternate; secondary pinnules bilobed or laciniate, cuneiform, coriaceous, the apex not revolute; rachis yellowish, unarmed (rarely with scattered small spines), smooth.

Phenology: Found in fertile condition throughout the year.

Status: Native, uncommon.

Distribution: Sporadic along the Cordillera Central, in moist secondary and disturbed forests. Also in Cuba and Hispaniola.

Public forests: El Yunque, Guilarte, Maricao, and Toro Negro.

Reference: Barcelona, J. F. 2000. Systematics of the genus *Odontosoria* sensu lato (Lindsaeaceae). Doctoral thesis, Miami University, Oxford, Ohio

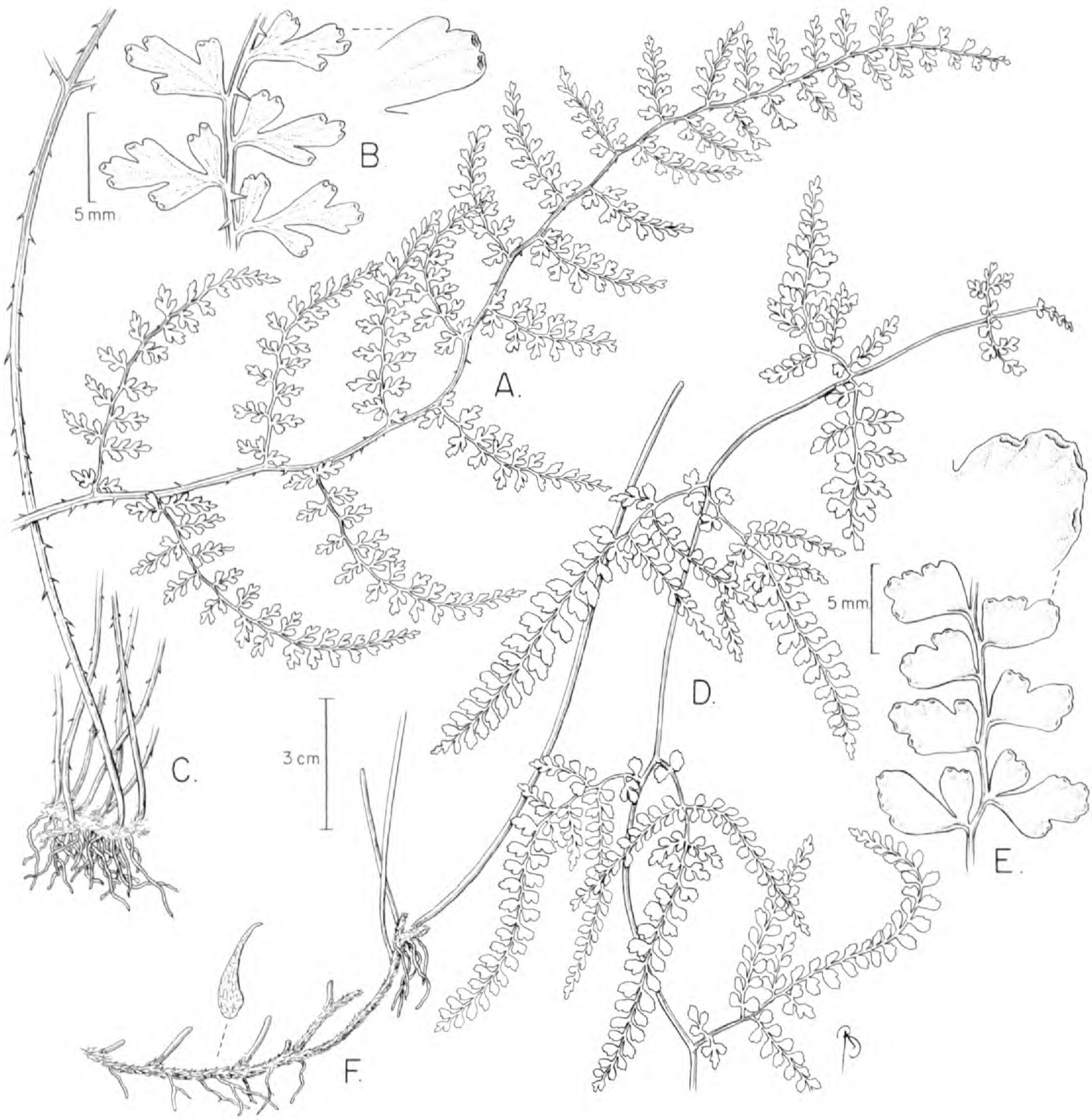

Fig. 7. A-C. *Odontosoria aculeata*. **A.** Habit. **B.** Detail of the marginal sori. **C.** Underground rhizome. **D-F.** *Odontosoria scandens*. **D.** Habit. **E.** Detail of pinnules with marginal sori. **F.** Underground rhizome, and detail of scale.

4. *Family* ***GLEICHENIACEAE***

Key to the genera

1a. Leaf blade with secondary venation (between the midvein and the margin) 2-5 times bifurcate; rhizomes and fronds without scales ..... 1. *Dicranopteris*

1b. Leaf blade with secondary venation (between the midvein and the margin) only once bifurcate; rhizomes and fronds with scales (fronds with scales at least at the apical meristems)..... 2. *Gleichenia*

1. DICRANOPTERIS

Terrestrial ferns; rhizomes elongate, creeping with setulose trichomes, without scales. Fronds monomorphic, with periodic indeterminate growth, 4-5 times bifurcate; pinnae, pinnules, and secondary pinnules opposite, the secondary venation 2-4 times bifurcate, the lower surface glaucous; petioles brittle and glabrous. Sori rounded, without an indusium, on the secondary veins, with 6-15 sessile sporangia. A tropical genus of about 10 species.

Key to the species of *Dicranopteris*

1a. Area of frond bifurcation with a pair of accessory pinnae; tertiary rachis of the fronds slightly angular; lower surface pale green, glabrous ..... 1. *D. flexuosa*

1b. Area of frond bifurcation without accessory pinnae or sometimes with accessory pinnae only in the primary bifurcations; tertiary rachis of the fronds with narrow longitudinal keels; lower surface glaucous, glabrous, or sometimes with scattered stellate hairs ..... 2. *D. pectinata*

1. Dicranopteris flexuosa (Schrad.) Underw., Bull. Torrey Bot. Club 34: 254. 1907.

Fig. 8. A-E

BASIONYM: *Mertensia flexuosa* Schrad.
SYNONYM: *Gleichenia flexuosa* (Schrad.) Mett.

Terrestrial fern. Rhizomes creeping, with deciduous setose trichomes. Fronds clambering or decumbent, 1-2 m long, forming a dense thicket difficult to penetrate; pinnae 4 times bifurcate, with a pair of accessory pinnae of reduced size and a tuft of rigid, reddish trichomes in the area of bifurcation; rachis cylindrical and brittle, the primary rachis with proleptic indeterminate growth, the secondary or tertiary rachis of determinate growth, the latter angular; secondary pinnules oblong-deltoid to linear, glabrous, the secondary venation 2-4 times bifurcate, the apex obtuse, the margins revolute; lower surface pale green, glabrous. Sori reddish brown, 0.2-0.4 mm in diameter.

Phenology: Probably found in fertile condition throughout the year.

Status: Native, very common.

Distribution: Widely distributed in moist disturbed areas along varying elevational gradients. Also in the Antilles, the United States (Florida), Central America, and tropical South America.

Public forests: Carite, El Yunque, Maricao, Río Abajo, Toro Negro, and Tortuguero.

2. Dicranopteris pectinata (Willd.) Underw., Bull. Torrey Bot. Club 34: 260. 1907.

Fig. 8. F-G

BASIONYM: *Mertensia pectinata* Willd.

Terrestrial fern. Rhizomes creeping, scabrous, light brown, with deciduous articulate hairs. Fronds clambering or decumbent, 1-2 m long, forming a dense thicket difficult to penetrate; pinnae unequally bifurcate, with a tuft of rigid, reddish trichomes in the area of bifurcation, but without accessory pinnae or these only in the primary bifurcations; axes cylindrical and brittle, primary rachis proleptic, with sympodial growth, tertiary rachis with two narrow longitudinal keels; leaf segments oblong-deltoid, the secondary venation 3-5 times bifurcate, the apex retuse, the margins revolute; lower surface glaucous, glabrous, or sometimes stellate-pubescent. Sori yellowish, 0.5-0.7 mm in diameter.

Phenology: Probably found in fertile condition throughout the year.

Status: Native, very common.

Distribution: Widely distributed in moist disturbed areas at various elevations. Of wide distribution in the Neotropics.

Public forests: Carite, El Yunque, Maricao, and Río Abajo.

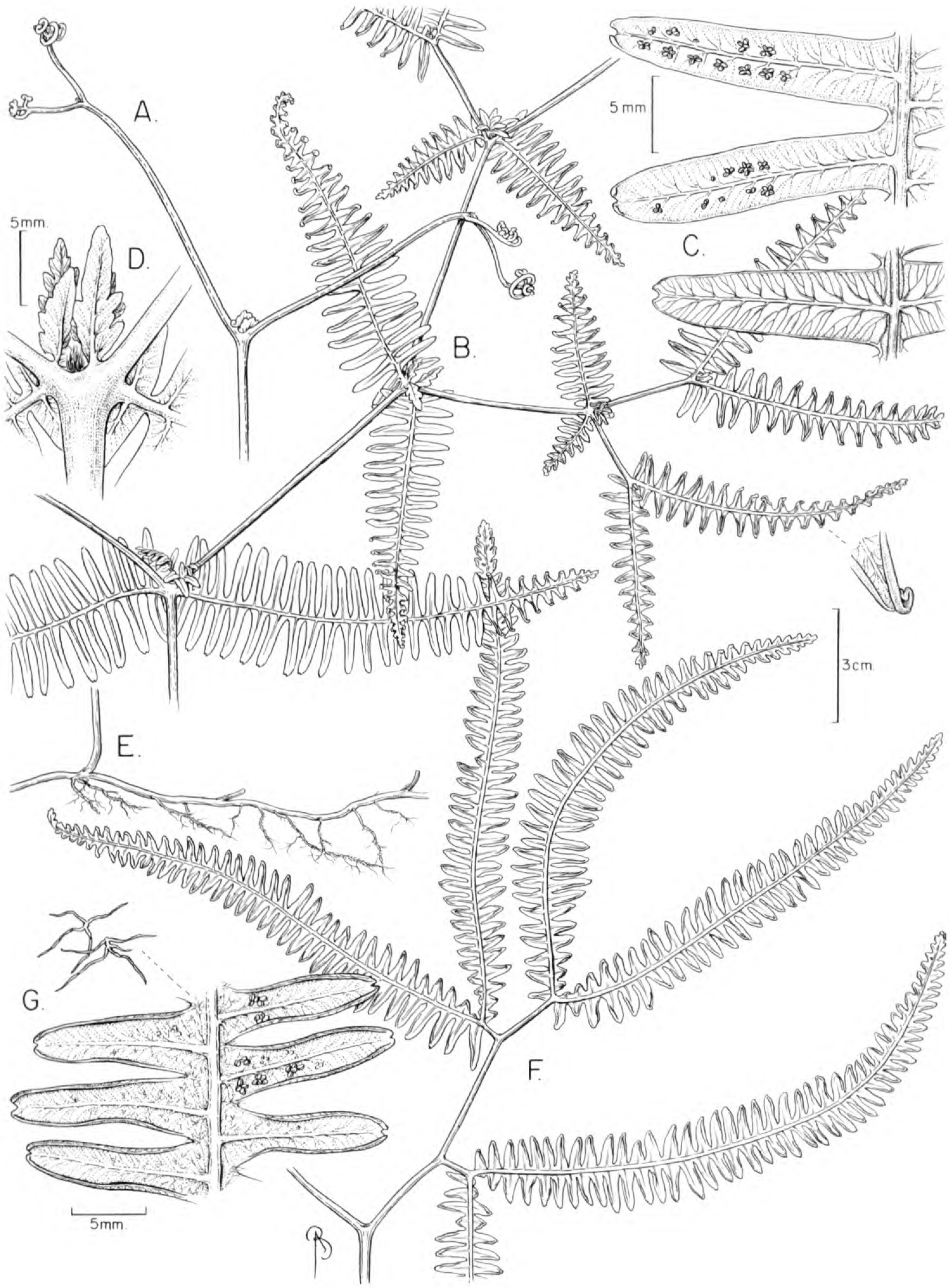

Fig. 8. A-E. *Dicranopteris flexuosa*. **A.** Habit. **B.** Detail of the bifurcation of the frond with accessory pinnae. **C.** Bifurcation of the frond. **D.** Detail of accessory pinnae. **E.** Underground rhizome. **F-G.** *Dicranopteris pectinata*. **F.** Habit. **G.** Detail of the pinna.

2. GLEICHENIA

Terrestrial ferns; rhizomes creeping, elongate, slender, covered with scales and setose or pilose trichomes. Fronds monomorphic, elongate, with indeterminate growth, bifurcate, bipinnate, usually clambering; blades with secondary veins free, only once bifurcate; area of bifurcation covered with scales; rachis elongate, cylindrical, and rigid. Sori rounded, without an indusium, containing 3-6 sporangia. A pantropical and subtropical genus of about 110 species.

Key to the species of *Gleichenia*

1a. Lower surface of the pinnae glaucous, glabrous except for the main veins, which are covered with reddish scales or cilia ..... 3. *G. rubiginosa*
1b. Lower surface of the pinnae tomentose or woolly 2

2a. Lower surface of the pinnae densely ferruginous-tomentose to woolly; principal rachis of the young pinnae densely covered with pale brown, ciliate scales on the upper surface, of woolly appearance..... 1. G. bi*fida*
2b. Lower surface of the pinnae white-woolly; principal rachis of the young pinnae covered with a few brown-purple, short-ciliate, and deciduous scales on the lower surface ..... 2. *G. brevipubis*

1. Gleichenia bifida (Willd.) Spreng., Syst. Veg. ed. 16, 4: 27. 1827.

Fig. 9. A-C

BASIONYM: *Mertensia bifida* Willd.

Terrestrial fern. Rhizomes creeping, reddish brown, with attenuate, ciliate scales at the apex. Fronds clambering or decumbent, 1-2 m in length, forming a dense thicket difficult to penetrate; pinnae 3 times bifurcate, with small accessory pinnae and densely covered with scales in the bifurcation; rachis cylindrical, those of the young pinnae covered with pale brown ciliate scales; primary rachis with proleptic indeterminate growth, the secondary ones short; terminal pinnae 20-35 × 3-5 cm, the midvein densely covered with ferruginous scales on the lower surface; secondary pinnules oblong-deltoid, the apex obtuse; upper surface glabrous; lower surface densely covered with ferruginous scales. Sori ferruginous.

Phenology: Probably found in fertile condition throughout the year.

Status: Native, very common.

Distribution: Widely distributed in Puerto Rico, in moist disturbed areas at middle to upper elevations. Also throughout the Neotropics.

Public forests: Carite, Guilarte, El Yunque, Maricao, and Río Abajo.

2. Gleichenia brevipubis C. Chr., Bull. Herb. Boissier Ser. 2, 6: 280. 1906.

Fig. 9. D

SYNONYM: *Sticherus brevipubis* (C. Chr.) A.R. Sm.

Terrestrial fern. Rhizomes creeping, reddish brown, glabrous or with some scattered short-ciliate scales. Fronds clambering or decumbent, 1-2 m in length, forming a dense thicket, difficult to penetrate; pinnae 2-3 times bifurcate, sparsely covered with scales in the bifurcation; rachis cylindrical, glabrescent, the primary rachis with proleptic indeterminate growth, the secondary ones short; terminal pinnae 20-35 cm long, with a few brown-purple, short-ciliate, and deciduous scales along the midvein on the lower surface; secondary pinnules oblong-deltoid, the apex obtuse; the upper surface glabrous; the lower surface white-woolly. Sori ferruginous.

Phenology: Collected in fertile condition in August.

Status: Native, rare.

Distribution: Known in Puerto Rico from two recent collections (*Proctor 39420* and *41419*). Also from Mexico to Costa Rica.

Public forest: Toro Negro.

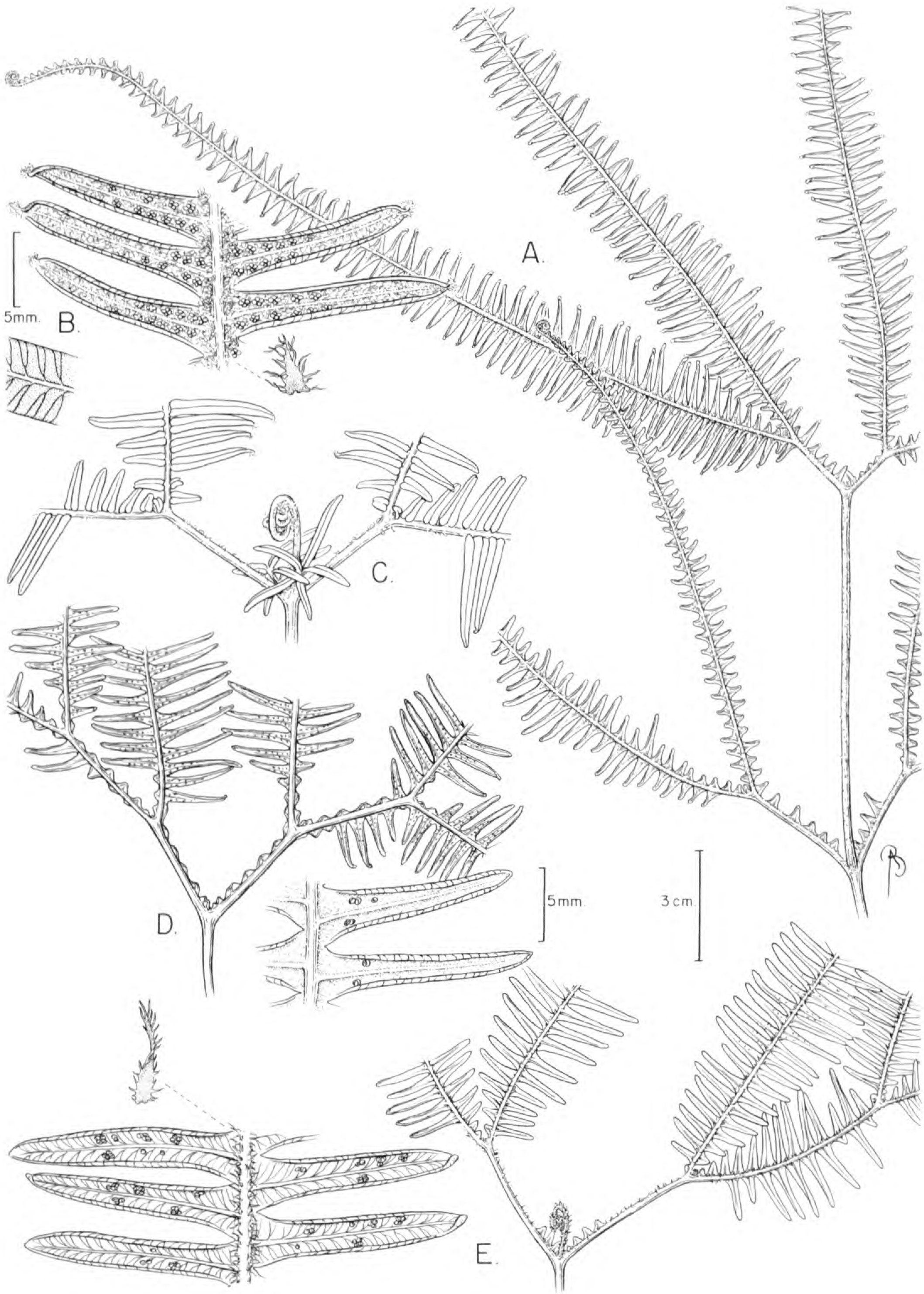

Fig. 9. A-C. *Gleichenia bifida*. **A.** Habit. **B.** Detail of the lower surface of the pinna. **C.** Detail of the bifurcation of the frond. **D.** *Gleichenia brevipubis*, detail of the frond and pinna. **E.** *Gleichenia rubiginosa*, frond, detail of the lower surface.

3. Gleichenia rubiginosa Mett., Ann. Sci. Nat. Bot. Sér. 5, 2: 267. 1864.

Fig. 9. E

SYNONYM: *Dicranopteris rubiginosa* (Mett.) Maxon

Terrestrial fern. Rhizomes creeping, reddish brown, with attenuate, ciliate scales at the apex. Fronds clambering or creeping, 1-2 m in length; pinnae 2-3 times bifurcate, with a tuft of scales in the bifurcation; rachis cylindrical, with some scattered hairs, the primary rachis with proleptic indeterminate growth, the secondary ones not developed; pinnae 10-25 cm long, the lower surface glaucous, glabrous except for the main veins, which are covered with reddish scales or cilia; secondary pinnules oblong, the apex retuse. Sori yellowish.

Phenology: Collected in fertile condition in February and August.

Status: Native, uncommon.

Distribution: Restricted to the highest areas of the Cordillera Central, in moist disturbed areas, on roadsides and in forests. Also in mountainous areas of Venezuela, Colombia, Ecuador, and Peru.

Public forests: Guilarte and Toro Negro

5. *Family* ***LOMARIOPSIDACEAE***

Key to the genera

1a. Secondary venation reticulate ..... 1. *Lomagramma*
1b. Secondary venation free ..... 2. *Lomariopsis*

1. LOMAGRAMMA

Terrestrial ferns; rhizomes elongate, climbing by adventitious roots, covered with scales. Fronds short-stipitate, dimorphic, the fertile ones with narrower pinnae than the sterile ones; blades pinnate; pinnae membranaceous, glabrous, with serrate margins and reticulate venation (free only near the margin); lateral pinnae deciduous by means of a basal articulation; terminal pinna not articulate. Fertile fronds with sporangia scattered on the abaxial surface, rarely on the margins; indusia absent. A genus of 20 species, Paleotropical with the exception of *L. guianensis*, which is widely distributed in the Neotropics.

1. Lomagramma guianensis (Aubl.) Ching, Amer. Fern J. 22: 17. 1932.

Fig. 10A-B

BASIONYM: *Polypodium guianense* Aubl.

Terrestrial fern. Rhizomes climbing by aerial roots, reddish brown, 3-7 mm wide, with deltoid-attenuate scales, 1-1.5 mm long. Fronds horizontal or pendulous. Sterile fronds 0.45-1 m long; stipes 6-20 cm long, dark brown, glabrous or with some scattered scales; rachis cylindrical toward the base, narrowly winged toward the apex; pinnae 20-50, alternate or subopposite, elliptical to lanceolate, chartaceous, 6-14 × 1-2.3 cm, the apex long-acuminate, the base cuneate, unequal, the margins serrate, glabrous or with some scattered hairs on the lower surface; midvein prominent on both surfaces, secondary venation reticulate, slightly prominent, yellowish. Fertile fronds smaller than the sterile ones; pinnae linear, 2-5 × 2-4 mm, the apex obtuse, the base obtuse; lower surface densely covered with ferruginous sporangia.

Phenology: Collected in fertile condition in May.

Status: Native, uncommon.

Distribution: In moist forests at lower and middle elevations. Also in Cuba, Hispaniola, Venezuela, French Guiana, and Brazil.

Public forest: Maricao.

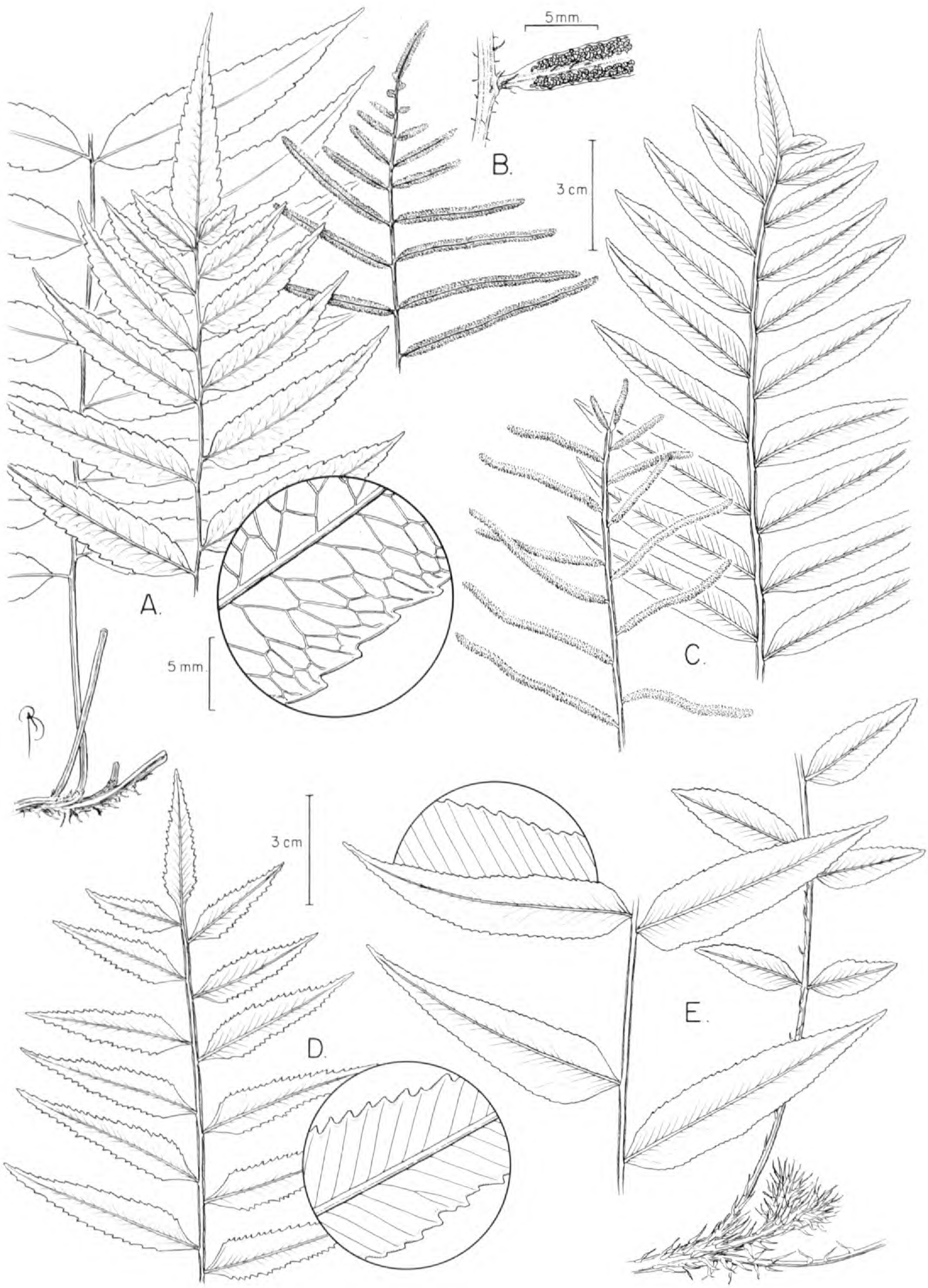

Fig. 10. A-B. *Lomagramma guianensis*. **A.** Habit showing sterile frond, with detail. **B.** Detail of the fertile frond. **C.** *Lomariopsis amydrophlebia*, detail of sterile and fertile fronds. **D.** *Lomariopsis kunzeana*, frond, with detail of pinna. **E.** *Lomariopsis sorbifolia*, habit and frond, with detail of pinna.

2. LOMARIOPSIS

Terrestrial or hemiepiphytic ferns; rhizomes climbing by aerial roots, elongate, somewhat compressed, covered with scales. Fronds short-stipitate, dimorphic, the fertile ones with narrower pinnae than the sterile ones; blades pinnate, pinnae membranaceous, with serrate margins and free venation, simple or bifurcate, the lateral pinnae deciduous by means of a basal articulation, the terminal pinna not articulate. Fertile fronds densely covered with sporangia on the lower surface; indusia absent. A pantropical genus of 45 species, 15 of which are found in the Neotropics.

Key to the species of *Lomariopsis*

1a. Pinnae of the sterile fronds unequal at the base, with inconspicuous venation; pinnae of the fertile fronds ca. 2 mm wide ..... 1. *L. amydrophlebia*
1b. Pinnae of the sterile fronds equilateral at the base, with prominent venation on the lower surface; pinnae of the fertile fronds 3-8 mm wide 2

2a. Margin of the sterile pinnae acutely incised-serrate; rhizomes sparsely covered with reddish brown, lanceolate-caudate, denticulate to ciliate scales, 2-5 mm long; pinnae 20-46 ..... 2. *L. kunzeana*
2b. Margin of the sterile pinnae finely serrate; rhizomes densely covered with light brown, narrowly lanceolate-caudate, ciliate scales, 8-12 mm long; pinnae 30-54 ..... 3. *L. sorbifolia*

1. Lomariopsis amydrophlebia (Sloss. ex Maxon) Holttum, Kew Bull. 1939: 617. 1940.

Fig. 10. C

BASIONYM: *Stenochlaena amydrophlebia* Sloss. ex Maxon

Terrestrial fern. Rhizomes climbing by aerial roots, dark brown, 4-8 mm wide, densely covered with ferruginous, lanceolate-caudate scales, 6-9 mm long. Sterile fronds 30-70 cm long; stipes 12-18 cm long, dark brown, sulcate, with some scattered glandular hairs and scales; rachis narrowly winged; pinnae 22-34, alternate, oblong-lanceolate, falcate, chartaceous, 3.5-9 × 1-1.7 cm, puberulent on both surfaces, the venation inconspicuous, parallel, free, the apex obtuse to acuminate, the base cuneate, unequal, the margins crenate to finely serrate, revolute; lower surface with the midvein lighter in color. Fertile fronds smaller than the sterile ones; pinnae linear, 4-9 cm × ca. 2 mm, the apex obtuse, the base obtuse; lower surface densely covered with light brown sporangia.

Phenology: Collected in fertile condition in April.

Status: Native, uncommon.

Distribution: In moist forests of the Cordillera Central and the Sierra de Luquillo. Also in the Dominican Republic.

Public forests: Carite, El Yunque, and Toro Negro.

2. Lomariopsis kunzeana (Underw.) Holttum, Kew Bull. 1939: 617. 1940.

Fig. 10. D

BASIONYM: *Stenochlaena kunzeana* Underw.

Terrestrial fern. Rhizomes climbing by aerial roots, light brown, slightly compressed or obtusely triangular, with longitudinal keels, 5-10 mm wide, sparsely covered with ferruginous, lanceolate-caudate scales, 2-5 mm long. Sterile fronds 40-90 cm long; stipes 8-18 cm long, light brown, sulcate, with some scattered glandular hairs and scales; rachis narrowly winged; pinnae 20-46, alternate or subopposite, lanceolate, chartaceous, 4-11 × 1-1.5 cm, the apex acuminate, the base cuneate, equilateral, the margins acutely incised-serrate, slightly revolute; the upper surface glabrous, the midvein compressed; lower surface puberulent, the midvein rather prominent, yellowish, the secondary venation conspicuous, parallel, free. Fertile fronds smaller than the sterile ones; pinnae oblong, 4-8 mm wide, the apex acute, the base obtuse; lower surface densely covered with light brown sporangia.

Phenology: Collected in fertile condition in July and August.

Status: Native, uncommon.

Distribution: Known in Puerto Rico from few collections from the region of Utuado, Lares, and Bayamón, probably from forests on mogotes. Also in the United States (Florida), Cuba, and Hispaniola.

3. Lomariopsis sorbifolia (L.) Fée, Mém. Foug. 2: 69. 1845.

Fig. 10. E

BASIONYM: *Acrostichum sorbifolium* L.

Terrestrial fern, 1-1.5 m long. Rhizomes scandent by aerial roots, light brown, slightly compressed or obtusely triangular, with longitudinal keels, sometimes sulcate, 5-10 mm wide, densely covered with light brown, narrowly lanceolate, ciliate, imbricate scales, 8-12 mm long. Sterile fronds 25-115 cm long; stipes 5-30 cm long, light brown, sulcate, with scattered scales; rachis narrowly winged; pinnae 30-52, alternate or subopposite, ovate to lanceolate, chartaceous, 6-13 × 1.5-2.3 cm, with the midvein prominent on both surfaces, the apex long-acuminate to caudate, the base cuneate, equilateral, the margins finely serrate, slightly revolute; lower surface with the secondary venation conspicuous, parallel, free. Fertile fronds smaller than the sterile ones; pinnae linear, 4-8.5 × 3-5 mm, the apex obtuse, the base cuneate; lower surface densely covered with dark brown sporangia.

Phenology: Collected in fertile condition from May to November.

Status: Native, very common.

Distribution: Of wide distribution in all of Puerto Rico, especially in the northwest. Also in St. Thomas; Hispaniola and the Lesser Antilles.

Public forests: El Yunque, Maricao, and Río Abajo.

Reference: Moran, R.C. 2000. Monograph of the neotropical species of *Lomariopsis* (Lomariopsidaceae). Brittonia 52: 55-111.

6. *Family* ***POLYPODIACEAE***

Key to the genera

1a. Blades simple, entire ..... 1. *Microgramma*
1b. Blades pinnatisect ..... 2. *Polypodium*

1. MICROGRAMMA

Epiphytic or rarely saxicolous ferns. Rhizomes elongate, creeping or climbing, covered with lanceolate or acicular scales, peltate and not clathrate. Fronds monomorphic or dimorphic, with the fertile ones narrower and longer than the sterile ones, stipitate, glabrous, pubescent or with scales; blades simple, with entire margins, the venation reticulate, the areoles with free venules. Sori rounded or oblong, in a single row between the rachis and the margin; indusia absent; paraphyses present, consisting of narrow scales or pluricellular trichomes. Spores bilateral, verrucose, rugose, or tuberculate. A genus of 25 species in the New World and 2-3 species in Africa.

Key to the species of *Microgramma*

1a. Blades with numerous minute, subulate scales; paraphyses conspicuous (longer than the sporangia) ..... 3. *M. piloselloides*
1b. Blades glabrous; paraphyses inconspicuous 2

2a. Rhizomes 0.5-2 mm wide; blades chartaceous, with deeply crenate margins... 1. *M. heterophylla*
2b. Rhizomes 2-4 mm wide; blades coriaceous, with entire or slightly crenate margins.....2. *M. lycopodioides*

1. Microgramma heterophylla (L.) Wherry, South. Fern Guide 346. 1964.

Fig. 11. A-B

BASIONYM: *Polypodium heterophyllum* L.
SYNONYM: *Polypodium serpens* Sw.
Polypodium exiguum Heward

Epiphytic or less frequently epilithic fern. Rhizomes scandent by minute aerial roots, 1-2 m long, filiform, cylindrical, 0.5-2 mm wide, densely covered with appressed, ferruginous, attenuate scales, 5-7 mm long, peltate above the base. Fronds dimorphic, 3-19 × 0.4-1.7 cm; stipes slender, 4-20 mm long, yellowish to light brown, glabrous; blades entire, chartaceous, elliptical, oblong or lanceolate, glabrous, the midvein prominent, the secondary venation conspicuous, widely reticulate, the apex obtuse or acute, the base long-attenuate, the margins crenate. Sori rounded, ferruginous, forming a row on each side of the midvein; paraphyses inconspicuous.

Phenology: Found in fertile condition throughout the year.

Status: Native, quite common.

Distribution: In moist or dry forests, in the coastal lowlands and in the zone of mogotes. Also in Vieques, St. Croix, St. John, and Virgin Gorda; the United States (Florida), the Bahamas, the Greater Antilles, the Cayman Islands, and the northern Lesser Antilles.

Public forests: El Yunque and Río Abajo.

2. Microgramma lycopodioides (L.) Copel., Gen. Fil. 185. 1947.

Fig. 11. C-D

BASIONYM: *Polypodium lycopodioides* L.

Epiphytic or less frequently epilithic fern. Rhizomes scandent by aerial roots, 1-2 m in length, more or less cylindrical, 2-4 mm wide, densely covered with appressed, ferruginous, linear-attenuate scales, 6-10 mm long, peltate above the base, caudate at the apex. Fronds 5-13 × 0.5-2 cm; stipes slender, up to 5 mm long, yellowish to light brown, glabrous; blades entire, coriaceous, lanceolate or elliptical, glabrous, the midvein prominent, the secondary venation conspicuous, loosely reticulate, the apex obtuse or acute, the base long-attenuate, the margins entire or slightly crenate. Sori rounded, ferruginous, forming a row on each side of the midvein; paraphyses inconspicuous.

Phenology: Found in fertile condition throughout the year.

Status: Native, quite common.

Distribution: In moist forests, along the cordilleras and in the zone of mogotes. Also in St. John and Tortola. Pantropical.

Public forests: Carite, El Yunque, Maricao, and Río Abajo.

3. Microgramma piloselloides (L.) Copel., Gen. Fil. 185. 1947.

Fig. 11. E-F

BASIONYM: *Polypodium piloselloides* L.

Epiphytic or less frequently terrestrial fern. Rhizomes scandent by aerial roots, up to 4 m long, more or less cylindrical, 0.5-1 mm wide, more or less covered with divaricate, ferruginous, attenuate scales that are 3-4 mm long and caudate at the apex. Fronds dimorphic, the sterile ones elliptical or elliptical-lanceolate, 1.5-8 × 1-1.8 cm. Fertile fronds 3.5-10 × 0.3-1.1 cm; stipes slender, 1.5-4 cm long, light brown, glabrous; blades entire, chartaceous, oblong or linear-lanceolate, sparsely covered with minute, ferruginous, subulate scales, the midvein prominent on the lower surface, the secondary venation conspicuous, loosely reticulate, the apex obtuse, the base long-attenuate, the margins entire or slightly crenate. Sori rounded, ferruginous, forming a row on each side of the midvein; paraphyses longer than the sporangia.

Phenology: Found in fertile condition throughout the year.

Status: Native, quite common.

Distribution: In moist forests, along the cordilleras, in the zone of mogotes, or less frequently in the coastal lowlands. Also in St. Thomas and Tortola; the Greater and Lesser Antilles and South America.

Public forests: El Yunque, Maricao, Río Abajo, and Toro Negro.

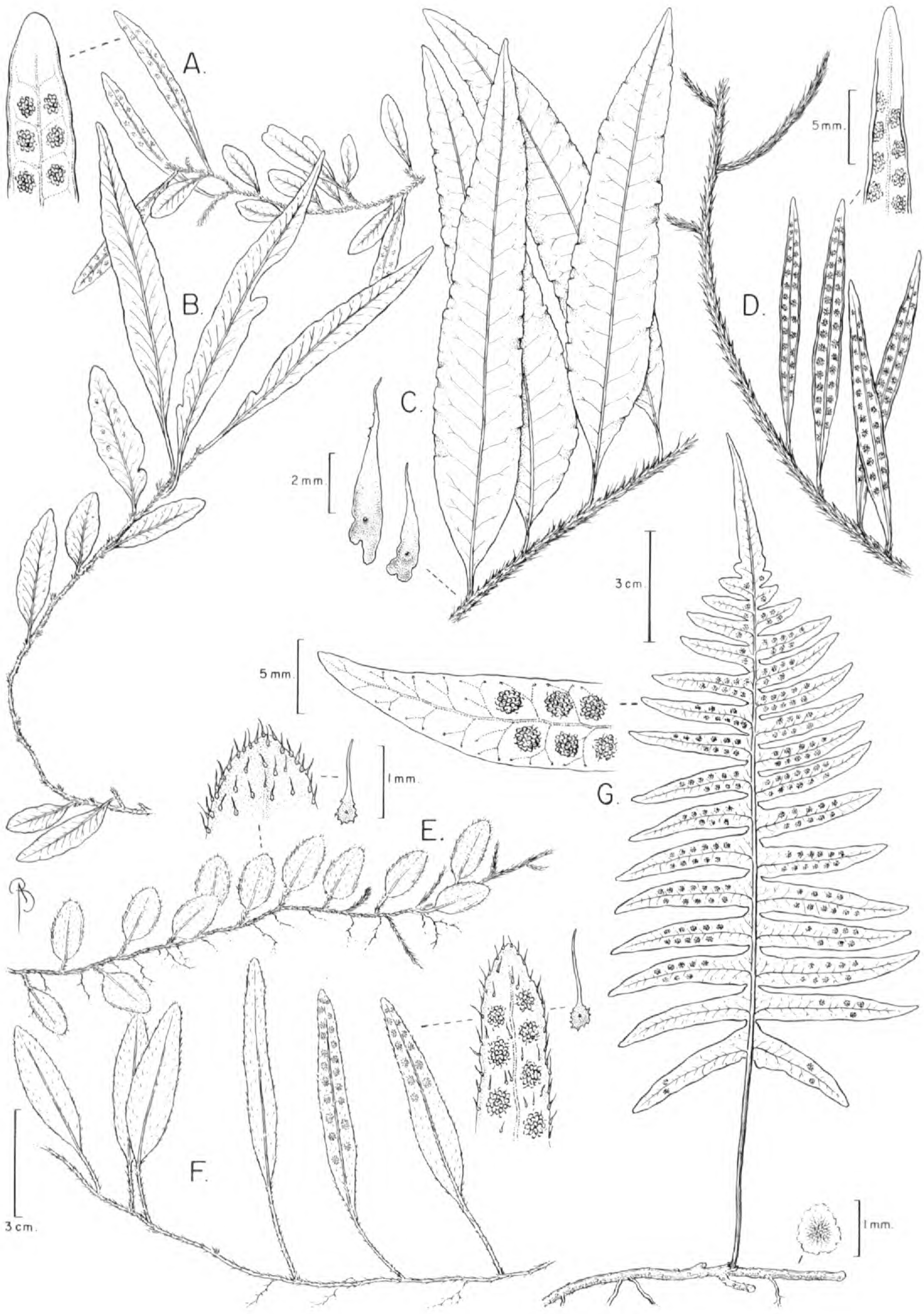

Fig. 11. A-B. *Microgramma heterophylla*. **A.** Fertile frond, and detail of sori. **B.** Sterile frond. **C-D.** *Microgramma lycopodioides*. **C.** Sterile frond, and detail of rhizome scales. **D.** Fertile frond, and detail of sori. **E-F.** *Microgramma piloselloides*. **E.** Sterile frond. **F.** Fertile frond, and detail of pinnae and scales. **G.** *Polypodium loriceum*, habit, and detail of the pinna.

2. POLYPODIUM

Epiphytic, epilithic, or rarely terrestrial ferns. Rhizomes short or elongate, creeping or less frequently climbing, covered with concolorous or discolorous scales, peltate, clathrate or not clathrate, or less frequently glabrous. Fronds articulate at the base, monomorphic, usually stipitate, glabrous, pubescent, or with scales; blades pinnatisect or simple-pinnate, the venation branched, free or reticulate, the areoles with a single free venule. Sori rounded or elliptical, usually terminal on the free venules; indusia absent; paraphyses present or absent. Spores bilateral, verrucose, rugose, or tuberculate, reniform, yellow. *Polypodium* "sensu stricto" is a cosmopolitan genus of about 125 species.

1. Polypodium loriceum L., Sp. Pl. 1086. 1753. **Fig. 11. G**

Terrestrial fern. Rhizomes scandent by aerial roots, 1-2 m in length, greenish or whitish, with light brown spots, cylindrical, 2-5 mm wide, sparsely covered with appressed, light brown, oblong-circular, peltate scales, 2-4 mm long. Fronds 30-80 × 5.5-15(25) cm; stipes 7-24(39) cm long, yellowish to light brown, slightly sulcate, glabrous; blades chartaceous, oblong-deltate or deltate-lanceolate, deeply pinnatisect; segments 15-40 pairs, alternate or subopposite, oblong-deltate, the apex acuminate, the margins entire; upper surface glabrous, the midvein compressed; lower surface glabrous or puberulent, with the venation somewhat prominent, yellowish, the secondary venation conspicuous, reticulate. Sori rounded, yellowish, forming a row (rarely two) on each side of the midvein.

Phenology: Apparently in fertile condition throughout the year.

Status: Native, common.

Distribution: In moist forests in the cordilleras. Also throughout the Antilles and continental tropical America.

Public forests: Carite, El Yunque, Guilarte, Maricao, and Toro Negro.

7. *Family* ***SCHIZAEACEAE***

1. LYGODIUM

Terrestrial ferns; rhizomes creeping, short, branched, pubescent. Fronds monomorphic, elongate, with indeterminate growth, climbing with twining rachis; pinnae bifurcate, with a latent shoot at the apex of the petiolule; secondary pinnules alternate, with free veins or areolate. Sporangia pear-shaped, with an apical annulus, individual (not clustered in sori), borne at the apices of the veins, arranged in 2 rows on marginal projections of the blade. A genus of about 40 species, the great majority tropical, 75% of them of the Old World.

1. Lygodium japonicum (Thunb. ex Murray) Sw., J. Bot. (Schrader) 1800: 106. 1802. **Fig. 12. A-C**

BASIONYM: *Ophioglossum japonicum* Thunb. ex Murray

Clambering fern. Rhizomes elongate, creeping, slender, densely pubescent. Fronds tripinnate, puberulent, clambering, 1-2 m in length; pinnae bifurcate, with a tuft of trichomes in the area of bifurcation; rachis subcylindrical, with two longitudinal keels, glabrous or puberulent, the primary rachis with indeterminate growth, the secondary ones very short, the tertiary ones narrowly winged, up to 5 cm long; secondary pinnae 5-7 cm long, the distal ones 3-5-dissected, the basal ones pinnately compound; secondary

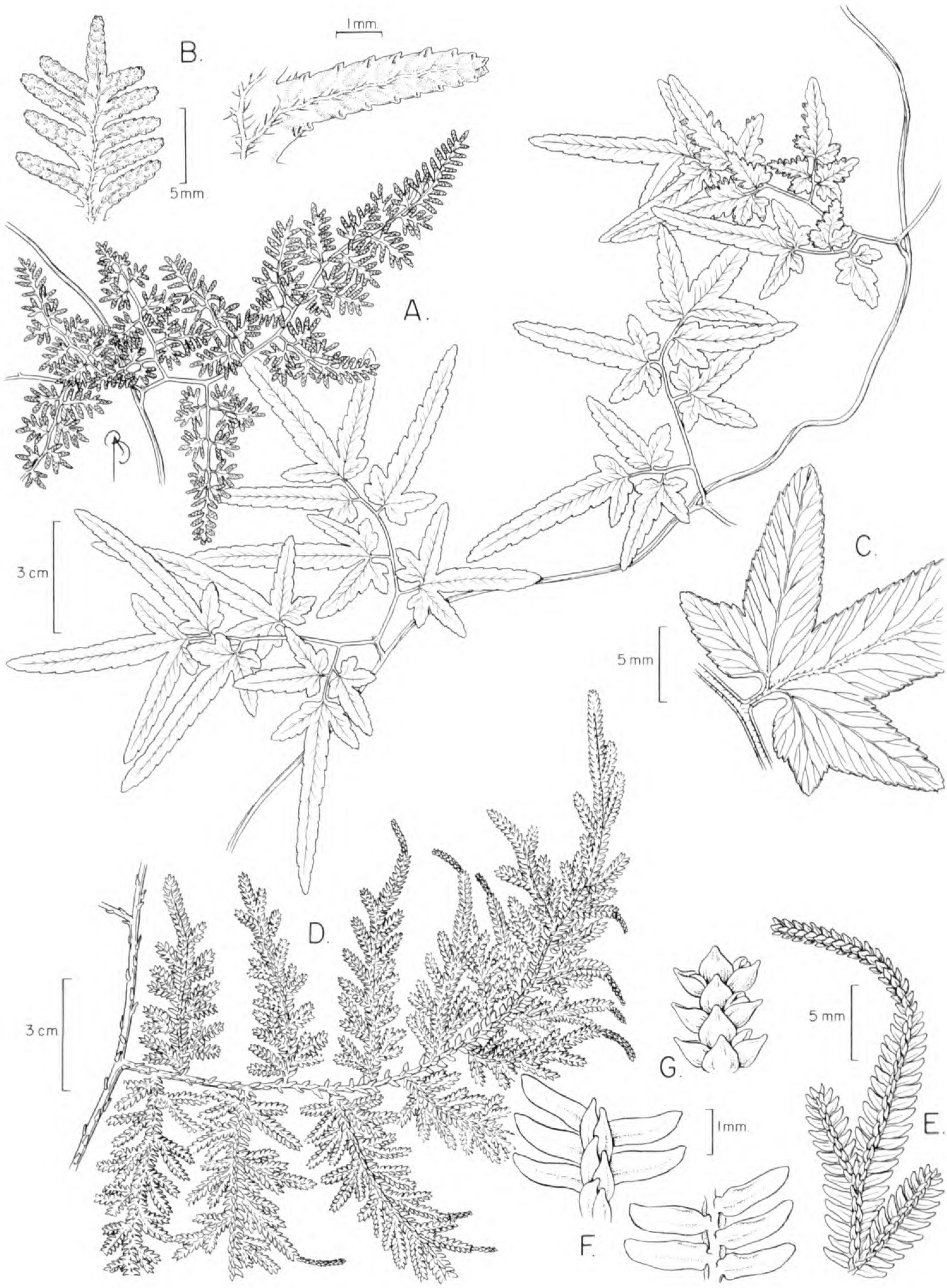

Fig. 12. A-C. *Lygodium japonicum*. **A.** Habit. **B.** Detail of fertile pinna. **C.** Detail of sterile pinna. **D-G.** *Selaginella willdenovii*. **D.** Habit. **E.** Detail of the pinna. **F.** Detail of the pinnules. **G.** Detail of the strobilus.

pinnules puberulent, oblong, elongate, with prominent venation, the apex obtuse to rounded. Sporangia on the lower surface of digitiform marginal projections of the basal secondary pinnules or on fertile pinnae, markedly dissected-lobed; indusium forming a small pocket, which opens toward the apex of the leaf blade.

Phenology: Found in fertile condition throughout the year.

Status: Exotic, naturalized, uncommon.

Distribution: Native to Japan, cultivated and apparently naturalized in several localities in Puerto Rico. Widely cultivated in tropical and subtropical areas.

Public forest: Río Abajo.

8. *Family* ***SELAGINELLACEAE***

1. SELAGINELLA

Terrestrial herbs, usually creeping or decumbent, rarely erect or clambering. Leaves numerous, microphyllous, with a single vein; monomorphic and spirally arranged or dimorphic and distichous. Sporophylls in sessile spikes, compact or separated; sporangia axillary on the sporophylls; spores dimorphic. A genus of 600-700 species, mostly tropical.

1. Selaginella willdenovii (Desv. ex Poir.) Baker, Gard. Chron. 1867: 783, 950. 1867.

Fig. 12. D-G

BASIONYM: *Lycopodium willdenovii* Desv. ex Poir.

Clambering herb, 6-10 m in length. Stems brittle, with numerous secondary branches up to 50 cm long, these again branched into short branches with determinate growth, which attain 13 cm long and give the appearance of a 3-pinnate, triangular leaf. Primary and secondary branches greenish or with a reddish shade. Leaves oblong-ovate, imbricate and in two layers, the upper layer of leaves ca. 1 mm long, the lower layer of leaves 3-4 mm long, the apex obtuse, the base auriculate to subcordiform, sessile. Strobili 1.5-2 cm long, green, at the tips of the tertiary branches.

Phenology: Collected in fertile condition in February.

Status: Exotic, naturalized, uncommon.

Distribution: Native to tropical Asia and Indonesia, introduced in Puerto Rico as an ornamental where it is found to be naturalized (Cayey, El Verde, Río Piedras, and Mayagüez). It has also become naturalized throughout the Neotropics.

Public forest: El Yunque.

DICOTYLEDONS

Key to the families of Dicotyledons

1a. Plants without leaves or with inconspicuous, minute (< 2 mm long), ovate-triangular leaves ..... **Key 1**
1b. Plants with well developed leaves (> 5 mm long), simple or compound 2

2a. Leaves compound ..... **Key 2**
2b. Leaves simple or unifoliolate ..... **Key 3**

Key 1: LEAVES ABSENT OR INCONSPICUOUS

1a. Plants not parasitic, without leaves; stems green, with clustered spines ..... *Cactaceae*
1b. Plants parasitic, with haustoria that penetrate the tissues of the host plant; leaves very reduced, ovate-triangular; stems yellow or yellowish green, without spines 2

2a. Inflorescences spicate; anthers dehiscent by two small windows that open upwards; perianth of 3 tepals; style solitary ..... *Lauraceae*
2b. Inflorescences cymose; anthers dehiscent by longitudinal sutures; perianth of a calyx and a tubular corolla; styles 2 ..... *Cuscutaceae*

Key 2: LEAVES COMPOUND

1a. Leaves alternate 2
1b. Leaves opposite 8

2a. Plants climbing by tendrils 3
2b. Plants twining or scandent, without tendrils 5

3a. Tendrils opposite the leaves ..... *Vitaceae*
3b. Tendrils axillary or lateral to the leaves 4

4a. Leaves palmately lobed or palmatifid; tendrils lateral to the leaves, filiform, simple or branched, spiral-shaped ..... *Cucurbitaceae*
4b. Leaves pinnate, biternate, or triternate; tendrils axillary, in pairs, spirally twisted, usually at the base of the inflorescence ..... *Sapindaceae*

5a. Plants clambering, with numerous recurved spines 6
5b. Plants twining or with twining branches, without spines 7

6a. Flowers with numerous pistils (apocarpous carpels) that develop into concrescent fleshy follicles to form an aggregate fruit ..... *Rosaceae*
6b. Flowers with a single unicarpellate pistil that develops into a dry fruit that dehisces by the ventral suture (legume) ..... *Fabaceae*

7a. Lateral branches sometimes twining and with determinate growth, resembling a tendril; flowers with 5 apocarpous pistils, of which usually only one develops (the rest abort) into a fleshy follicle ..... *Connaraceae*
7b. Lateral branches twining, with indeterminate growth, not forming a structure similar to a tendril (except for *Dalbergia*); flowers with a single unicarpellate pistil that develops into a dry fruit that dehisces by the ventral suture (legume) ..... *Fabaceae*

8a. Plants climbing by tendrils ..... *Bignoniaceae*
8b. Plants scandent, twining, or with the leaf rachis twining, without tendrils 9

9a. Plants scandent; flowers minute, yellow, aggregated on a common receptacle (head or capitulum) ..... *Asteraceae*
9b. Plants twining or with the leaf rachis twining 10

10a. Leaf rachis not twining; corolla gamopetalous 11
10b. Leaf rachis twining; corolla of free petals ..... *Ranunculaceae*

11a. Plant woody, 5-10 m in length, not fetid; corolla hypocrateriform, 1.5-2.5 cm long..... *Oleaceae*
11b. Plant herbaceous, 1.5-2 m in length, fetid; corolla tubular, ca. 1.5 mm long ..... *Valerianaceae*

Key 3: LEAVES SIMPLE OR UNIFOLIOLATE

1a. Leaves opposite 2
1b. Leaves alternate 23

2a. Plants scandent or clambering. 3
2b. Plants twining or climbing by adventitious roots. 8

3a. Perianth differentiated into a calyx and corolla; corolla gamopetalous. 4
3b. Perianth not differentiated into a calyx and corolla, consisting of 5 tepals. 7

4a. Stipules present (sometimes early deciduous, but leaving a scar); ovary inferior or superior 5
4b. Stipules absent; ovary superior 6

5a. Ovary inferior ..... *Rubiaceae*
5b. Ovary superior ..... *Buddlejaceae*

6a. Corolla infundibuliform, the stamens slightly or not at all exserted; fruit capsular, opening in two longitudinal halves to reveal 2-4 seeds ..... *Acanthaceae*
6b. Corolla hypocrateriform, the stamens twice as long as the corolla, exserted; fruit drupaceous, with 4 pyrenes ..... *Verbenaceae*

7a. Plant herbaceous or slightly woody, without spines; tepals in two series, free; fruit circumscissile, membranaceous, not glandular ..... *Amaranthaceae*
7b. Plant woody, with axillary spines; tepals united, forming a cone; fruit an anthocarp, with stipitate glands on its outer surface ..... *Nyctaginaceae*

8a. Plants climbing by adventitious roots 9
8b. Plants twining 10

9a. Corolla white; plants with prominently elongate stipules ..... *Rubiaceae*
9b. Corolla pink; plants without stipules ..... *Bignoniaceae*

10a. Plants with white or yellowish milky latex 11
10b. Plants without colored latex 13

11a. Latex of the plant yellowish; stamens numerous; fruit a multilocular capsule ..... *Clusiaceae*
11b. Latex of the plant white; stamens 5; fruit a unilocular follicle 12

12a. Corona present; stamens fused around the ovary and united to the stigma to form a gynostegium ..... *Asclepiadaceae*
12b. Corona absent; stamens free or concrescent around the style, without forming a gynostegium..... *Apocynaceae*

13a. Flowers with tepals (not differentiated in a calyx and corolla); cross section of the stem with areas of phloem included in the xylem ..... *Amaranthaceae*
13b. Flowers with a calyx and corolla; cross section of the stem with the phloem external to the xylem 14

14a. Corolla of free petals 15
14.a Corolla gamopetalous 17

15a. Calyx elongate, tubular; petals pink to red ..... *Combretaceae*
15b. Calyx short, not tubular; petals yellow, green, yellowish green, or pink 16

16a. Plant with short lateral branches that intertwine like tendrils; flowers minute (< 5 mm wide); calyx crateriform, with minute lobes; petals green or yellowish green; fruit capsular, with numerous winged seeds ..... *Celastraceae*
16b. Plant lacking branches that resemble tendrils; flowers medium-sized (≥ 8 mm wide); calyx reduced to a pair of glands per sepal; petals yellow or pink; fruit a samaroid schizocarp, with only one seed per mericarp ..... *Malpighiaceae*

17a. Ovary inferior 18
17b. Ovary superior 20

18a. Flowers aggregated in heads or capitula (with a receptacle in common), the heads forming a compound paniculiform or corymbiform inflorescence ..... *Asteraceae*
18b. Flowers in panicles or aggregated in the leaf axils, not clustered in heads 19

19a. Stipules present; corolla < 8 mm long, actinomorphic, with 5 similar lobes ..... *Rubiaceae*
19b. Stipules absent; corolla > 2 cm long, zygomorphic, bilabiate (4 lobes united and one separate) ..... *Caprifoliaceae*

20a. Stipules intrapetiolar, glandular; flowers or inflorescences not showy; corolla cream-colored; stamens 5, concrescent around the stigma; fruits of two follicles, with numerous seeds crowned with long, silky hairs ..... *Apocynaceae*
20b. Stipules absent; flowers or inflorescences showy; corolla of various colors, but not cream-colored; stamens 2 or 4; fruits capsular, fleshy, or dry, not follicular; seeds without long, silky hairs 21

21a. Fruits capsular, opening in two longitudinal halves; placental tissue persistent, projecting like a spur ..... *Acanthaceae*
21b. Fruits fleshy, indehiscent; placental tissue inconspicuous 22

22a. Stamens 4; fruits with 2 or 4 pyrenes, containing 2 seeds ..... *Verbenaceae*
22b. Stamens 2; fruits without pyrenes, containing a single seed ..... *Oleaceae*

23a. Plants climbing by adventitious roots 24
23b. Plants twining, scandent, clambering, or climbing by tendrils 25

24a. Plant with abundant milky latex; inflorescence a pear-shaped syconium (resembling a fruit) ..... *Moraceae*
24b. Plant without latex; inflorescence umbelliform, with large nectaries in the center of the inflorescence ..... *Marcgraviaceae*

25a. Plants climbing by tendrils 26
25b. Plants twining or scandent or clambering 30

26a. Tendrils opposite the leaves ..... *Vitaceae*
26b. Tendrils axillary (or in axillary inflorescences) or lateral to the leaves 27

27a. Tendrils lateral to or subopposite the leaves, usually branched ..... *Cucurbitaceae*
27b. Tendrils axillary 28

28a. Base of the petiole forming an ocrea around the stem; tendrils representing a modification of the distal portion of the inflorescence axis ..... *Polygonaceae*
28b. Base of the petiole not covering the stem to form an ocrea; tendrils not forming part of the inflorescences 29

29a. Tendrils spiral-shaped; flowers with a corona and an androgynophore ..... *Passifloraceae*
29b. Tendrils spirally twisted; flowers with neither a corona nor an androgynophore, stamens and ovary sessile on the receptacle ..... *Rhamnaceae*

30a. Plants clambering or scandent 31
30b. Plants twining 37

31a. Ovary inferior 32
31a. Ovary superior 33

32a. Flowers aggregated in a head or capitulum, with a receptacle in common; fruits dry, crowned with a tuft of scales or plumose hairs ..... *Asteraceae*
32b. Flowers in corymbs; fruits fleshy, crowned by the calyx lobes ..... *Ericaceae*

33a. Flowers apetalous or with tepals (not discernible as a calyx and corolla) 34
33b. Flowers with a calyx and corolla 36

34a. Branches and main stem with a pair of spines in the leaf axils; fruits orange when ripe .... *Ulmaceae*
34b. Branches without spines; fruits violet or yellowish when ripe 35

35a. Perianth of 5 yellowish tepals, ovate-lanceolate, concave, with a keel along their dorsal portion; stigmas 2, elongate, recurved; fruits membranaceous, circumscissile, yellowish ... *Amaranthaceae*
35b. Perianth of 4 white tepals, oblong-elliptical, without a dorsal keel; stigma sessile, capitate; fruits fleshy, indehiscent, dark purple ..... *Phytolaccaceae*

36a. Corolla gamopetalous; stamens 5; ovary sessile on the floral receptacle; fruit an indehiscent berry..... *Boraginaceae*
36b. Corolla of free petals; stamens numerous; ovary borne on a gynophore; fruit a dehiscent follicle ..... *Capparaceae*

37a. Corolla absent 38
37b. Corolla present 39

38a. Calyx well developed, elongate, tubular, the limb expanded or with a pendulous tail; flowers usually solitary ..... *Aristolochiaceae*
38b. Calyx minute; flowers usually aggregated in an inflorescence with showy bracts ..... *Euphorbiaceae*

39a. Corolla gamopetalous 40
39b. Corolla of free petals 43

40b. Flowers clustered in heads or capitula ..... *Asteraceae*
40b. Flowers in various kinds of inflorescences, but not in heads 41

41a. Stamens dehiscent by terminal pores ..... *Solanaceae*
41b. Stamens dehiscent by longitudinal sutures 42

42a. Fruits fleshy, indehiscent; stamens with short filaments or the anthers sessile, united to the corolla in its middle to upper portion ..... *Boraginaceae*
42b. Fruits dry, capsular; stamens with more or less long filaments, united to the base of the corolla ..... *Convolvulaceae*

43a. Flowers actinomorphic; petals white, all similar 44
43b. Flowers zygomorphic; petals pink or red, unequal, modified into a standard, wings, and a keel. 46

44a. Stamens numerous; fruit capsular ..... *Dilleniaceae*
44b. Stamens 4-6; fruit indehiscent 45

45a. Flowers unisexual; stamens 4 or 6; fruits fleshy, without a persistent style ..... *Menispermaceae*
45b. Flowers bisexual; stamens 5; fruits dry, crowned with 3 persistent styles ..... *Basellaceae*

46a. Fruit a legume ..... *Fabaceae*
46b. Fruit an indehiscent samara ..... *Polygalaceae*

1. *Family* ***ACANTHACEAE***

Key to the genera

1a. Plants with axillary spines; leaves up to 2 cm long, coriaceous; corollas 1.2-1.5 cm long; stamen 2 ..... 2. *Oplonia*
1b. Plants without spines; leaves > 2.5 cm long, chartaceous to coriaceous; corollas > 2.3 cm long; stamens 4 2

2a. Plants twining; stems cylindrical ..... 3. *Thunbergia*
2b. Plants decumbent or clambering, not twining; stems quadrangular ..... 1. *Asystasia*

1. ASYSTASIA

Perennial herbs, erect, decumbent, or clambering. Leaves opposite; blades simple, with numerous linear cystoliths on the upper surface, the secondary veins conspicuous; stipules absent. Flowers bisexual, zygomorphic, arranged in spikes or one-sided, terminal racemes, accompanied at the base by 2 small bracts and 2 bracteoles. Calyx of 5 linear or lanceolate sepals of equal size; corolla zygomorphic, pale violet, pink, white, or pale yellow, infundibuliform, with 5 rounded lobes; stamens 4, didynamous;

ovary superior, bicarpellate, bilocular, the stigmas bilobed or capitate. Capsules ellipsoid or claviform; seeds 2-4, lenticular. A genus of about 40 species, of paleotropical origin.

1. Asystasia gangetica (L.) T. Anderson in Thwaites, Enum. Pl. Zeyl. 235. 1860.

Fig. 13. A-E

BASIONYM: *Justicia gangetica* L.

Decumbent herb, creeping or clambering, 1-3 m in length. Stems quadrangular. Leaves 2.5-11 × 2.5-6.5(8) cm, ovate to lanceolate, chartaceous, pubescent on both surfaces, especially on the veins, the apex acuminate, the base obtuse, truncate, rounded, or cordiform, the margins crenulate; petioles 0.5-3(4.5) cm long. Flowers arranged in terminal spikes on axillary branches; bracts and bracteoles ovate, ciliate. Calyx green, 5-7 mm long, the sepals lanceolate; corolla light yellow or pale violet, 2.3-5 cm long, with glandular hairs on the outer surface; stamens and pistil inserted on the floral tube. Capsules 2-2.5 cm long, claviform, light brown when ripe, densely covered with glandular hairs; seeds light brown, with irregular margins.

Phenology: Collected in flower and fruit throughout the year.

Status: Exotic, ornamental, naturalized in Puerto Rico and the Virgin Islands, quite common.

Distribution: On roadsides and in open places. Also on Vieques, St. Croix, St. John, St. Thomas, and Tortola. A species of Asiatic origin, cultivated throughout the tropics.

Public forests: Ceiba, El, Yunque, Río Abajo, and Tortuguero.

2. OPLONIA

Erect or clambering shrubs, usually with opposite, axillary spines. Leaves opposite, small, with short petioles or sessile, the secondary veins inconspicuous; stipules absent. Flowers bisexual, zygomorphic, heterostylous, axillary, solitary or in short, condensed racemes. Calyx of 5 acicular sepals; corolla infundibuliform, zygomorphic, with 5 lobes, one of them wider than the others; stamens 2, inserted or exserted; ovary superior, bicarpellate, bilocular, the style filiform, the stigma bilobate. Fruit capsular, claviform; seeds 2 or 4, lenticular. A genus of 19 species, native to tropical America and Madagascar.

1. Oplonia spinosa (Jacq.) Raf., Fl. Tellur. 4: 65. 1838.

Fig. 13. F-K

BASIONYM: *Justicia spinosa* Jacq.
SYNONYM: *Anthacanthus spinosus* (Jacq.) Nees

Clambering shrub, 2-4 m in length. Stems slender, obtusely quadrangular, densely covered with minute, whitish hairs when young, with numerous lateral branches; spines axillary, 0.4-1.2 cm long, recurved or rarely straight, perpendicular to the stem. Leaves opposite, usually clustered at the nodes; blades 0.5-2.2 × 0.4-2 cm, elliptical, obovate, or narrowly elliptical, rigid-coriaceous, glabrous, the apex obtuse or rounded, slightly sulcate, usually with a tuft of minute hairs, the base cuneate or attenuate, the margins revolute; upper surface shiny, usually with cystoliths; lower surface dull, pale green; petioles minute. Flowers solitary or clustered in condensed racemes; bracts minute, triangular. Calyx green, infundibuliform, ca. 3 mm long, of 5 lanceolate sepals; corolla lilac or lavender, 1.2-1.5 cm long. Capsules 1.2 cm long, claviform, glabrous; seeds 4, brown, lenticular, 3-4 mm long.

Phenology: Flowering from December to July and fruiting from April to July.

Status: Native, common.

Distribution: In coastal thickets and in the zone of mogotes. Also on Vieques, Cayo Icacos, Buck Island, St. John, St. Croix, St. Thomas, Tortola, and Virgin Gorda; the Bahamas, Cuba, Hispaniola, and the Lesser Antilles.

Public forests: Guajataca, Guánica, Maricao, Piñones, Río Abajo, and Susúa.

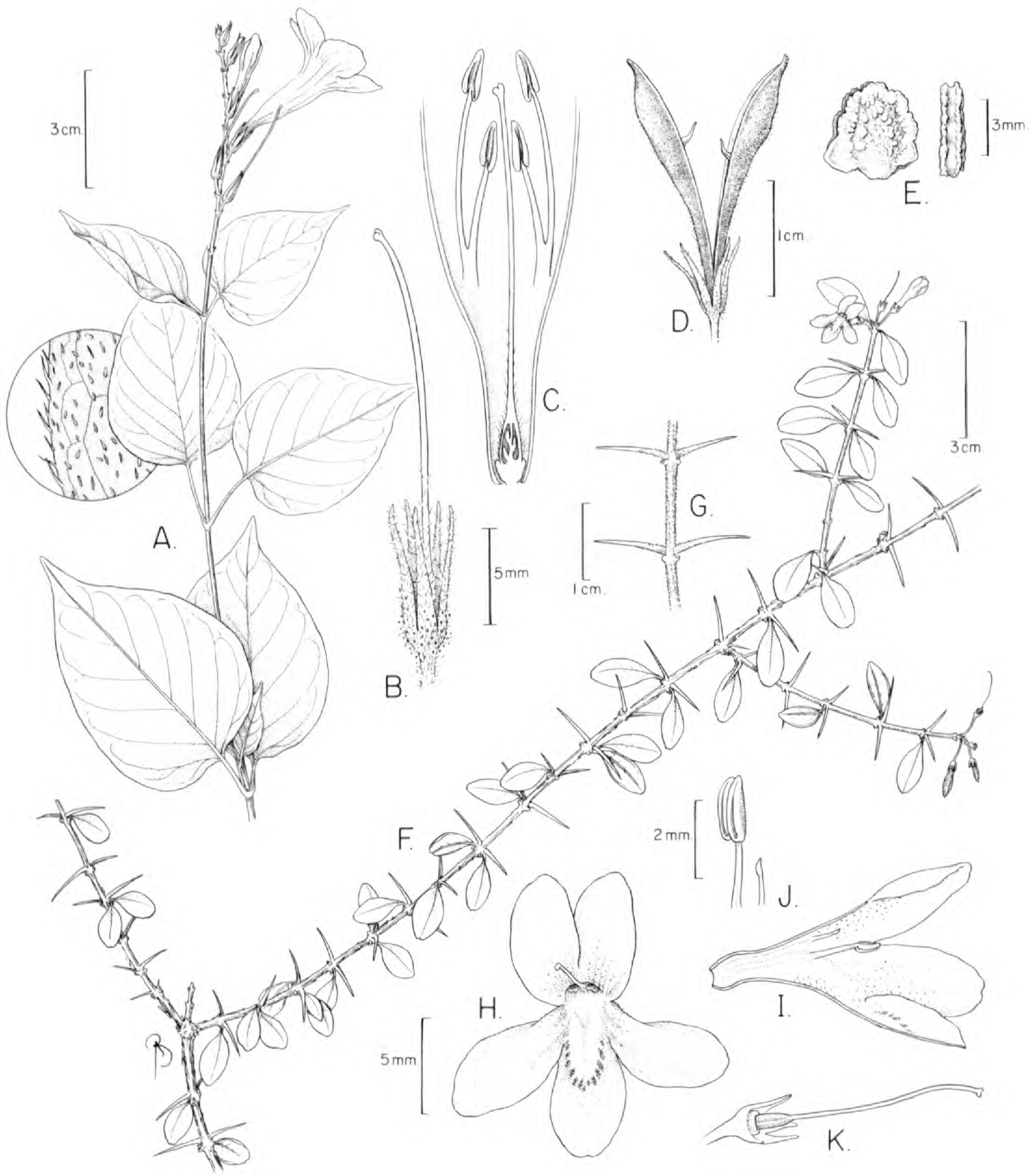

Fig. 13. A-E. *Asystasia gangetica*. **A.** Habit, with detail of leaf pubescence. **B.** Calyx and gynoecium. **C.** Longitudinal section of the flower showing stamens and gynoecium. **D.** Fruit. **E.** Seeds, front and side views. **F-K.** *Oplonia spinosa*. **F.** Habit. **G.** Detail of the spines. **H.** View of the corolla from above. **I.** Longitudinal section of the corolla showing stamen and staminode. **J.** Detail of stamen and staminode. **K.** Calyx and gynoecium.

3. THUNBERGIA

Herbaceous or woody vines or less frequently erect shrubs. Leaves opposite; blades simple; stipules absent. Flowers bisexual, zygomorphic, axillary, usually solitary, with long pedicels and a pair of foliaceous bracts covering the lower portion of the corolla. Calyx short, cupuliform, truncate or dentate; corolla infundibuliform or hypocrateriform, large and showy, regular or irregular; stamens didynamous;

ovary superior, bicarpellate, bilocular. Fruits capsular, globose at the base, with the apex in the form of a beak; seeds subglobose. Approximately 200 species of the Paleotropics, 12 of which have been cultivated and have become naturalized in the Neotropics.

Key to the species of *Thunbergia*

1a. Petioles winged; corolla orange or pale yellow, with the center dark violet ..... 1. *T. alata*
1b. Petioles not winged; corolla white or violet, with the center white or light yellow 2

2a. Herbaceous vine, 2-3 m in length; corolla white, with the limb 4-5 cm in diameter... 2. *T. fragrans*
2b. Woody vine, 10-15 m in length; corolla lilac or whitish, with the limb 6-7 cm in diameter .... 3. *T. grandiflora*

1. Thunbergia alata Bojer ex Sims, Bot. Mag. 52, t. 2591. 1825.

Fig. 14. G-L

Susana, Viuda, Black-eye susan, Clock vine

Herbaceous vine, creeping or climbing, twining, 2-3 m in length. Stems cylindrical, slender (ca. 2 mm), puberulous. Leaves opposite; blades 4.5-10.5 × 3.2-6 cm, ovate, lobed, chartaceous, the apex acute, the base subcordiform; upper surface dark green, dull, pubescent; lower surface pale green, dull, with prominent venation; petioles 4-8 cm long, winged, pubescent. Flowers axillary, solitary; pedicels pubescent, 4-5 cm long; bracts green, ovate, pubescent, 1.5 cm long, covering the calyx and the corolla tube. Calyx yellowish green, with 12 filiform lobes, ca. 4 mm long; corolla orange, pale yellow, or less frequently whitish, infundibuliform, with 5 lobes, the tube ca. 2.5 cm long, narrow at the base, dark violet inside, the lobes ca. 2.5 cm long with the apex truncate, the limb ca. 5 cm in diameter; stamens with glandular hairs on the basal portion. Capsules ca. 4 mm long, depressed-globose to 4-lobed at the base, the upper half in the form of a beak, dehiscent by two valves; seeds 2 or 4, 1.2-1.5 mm long, semicircular, reticulate.

Phenology: Flowering sporadically throughout the year.

Status: Exotic, very common, naturalized in Puerto Rico.

Distribution: Throughout Puerto Rico, especially in moist disturbed areas, at lower to upper elevations. Also on St. Croix. Native to eastern Africa, but introduced throughout the tropics.

Public forests: Cambalache, Carite, El Yunque, Guilarte, Maricao, Río Abajo, Toro Negro, and Tortuguero.

2. Thunbergia fragrans Roxb., Pl. Coromandel. 1: 47. 1796.

Fig. 14. A-F

SYNONYM: *Thunbergia volubilis* Pers.

Susana blanca, Flor de nieve

Herbaceous vine, twining, 2-3 m in length. Stems cylindrical, striate, slender, puberulous. Leaves opposite; blades 6.5-11 × 1.8-6 cm, ovate to lanceolate, chartaceous, the apex acute, the base truncate or subcordiform; margins undulate and ciliate; upper surface dark green, glabrous or somewhat scabrous; lower surface pale green, dull, puberulous, with prominent venation; petiole 2-3.5 cm long, slender, pubescent, sulcate, with the base somewhat dilated. Flowers axillary, solitary or in pairs; pedicels pubescent, 5-7 cm long, striate; bracts green, membranaceous, ovate, pubescent, 1.6-2 cm long, covering the calyx. Calyx green, of 15-20 sepals, lanceolate, 3-5 mm long; corolla white, infundibuliform, with 5 lobes, the tube 2.5-4 cm long, narrow at the base, yellow inside, the limb 4-5 cm in diameter. Capsules 1-2.5 cm long, depressed-globose at the base, the upper half in the form of a beak, dehiscent in two halves; seeds 4, globose, ca. 5 mm in diameter, pubescent, with a depression at the base.

Phenology: Flowering and fruiting throughout the year.

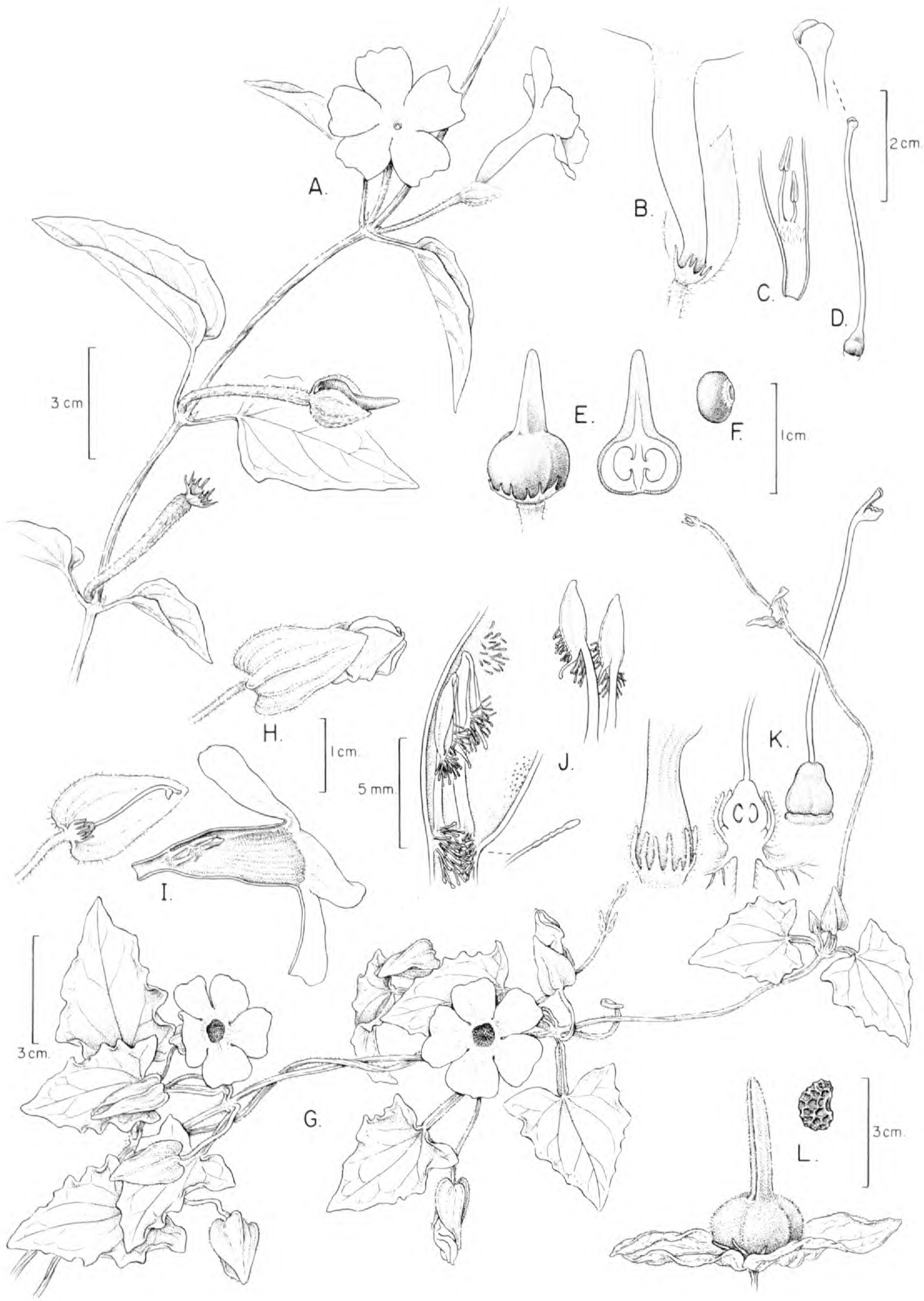

Fig. 14. A-F. *Thunbergia fragrans*. **A.** Habit. **B.** Calyx, corolla, and bract. **C.** Corolla, longitudinal section. **D.** Gynoecium, with detail of the stigma. **E.** Fruit, and longitudinal section of the fruit. **F.** Seed. **G-L.** *Thunbergia alata*. **G.** Habit. **H.** Floral bud subtended by bracts. **I.** Calyx and gynoecium subtended by bract, and longitudinal section of the corolla. **J.** Corolla, longitudinal section. **K.** Base of the flower showing calyx, longitudinal section of the calyx and the ovary, and gynoecium. **L.** Fruit subtended by bracts and seed.

Status: Exotic, common, naturalized in Puerto Rico and the Virgin Islands.

Distribution: In areas of disturbed vegetation throughout Puerto Rico. Also on Vieques, St. Croix, St. John, St. Thomas, and Tortola. Native to India and Sri Lanka, but naturalized in the tropics.

Public forests: Maricao, Piñones, Río Abajo, and Tortuguero.

3. Thunbergia grandiflora (Roxb. ex Rottler) Roxb., Hort. Geng. 45. 1814.

Fig. 15. A-F

BASIONYM: *Flemingia grandiflora* Roxb. ex Rottler

Tunbergia

Woody vine, twining, 10-15 m in length. Stems cylindrical, up to 2.5 cm in diameter, striate, puberulous; cross section of the stem with the pith hollow and the xylem tissue with wide rays. Leaves opposite; blades 15-26 × 13-30 cm, ovate or broadly ovate, chartaceous, the apex acute or acuminate, the base cordiform or subcordiform, the margins lobate-dentate, ciliate; upper surface dark green, shiny, puberulous, with slightly prominent venation; lower surface light green, dull, glabrous or puberulous, with prominent venation; petioles 6-12 cm long, sulcate. Flowers arranged in axillary cymes; pedicels robust, cylindrical, 4-6 cm long; bracts light green, membranaceous, ovate, ca. 4 cm long, covering the calyx and the corolla tube. Calyx green, in the form of a ring, 4-5 mm long; corolla lilac or white, infundibuliform, with 5 lobes, the tube 6-7 cm long, light yellow inside, narrow at the base, the limb 6-7 cm in diameter. Capsule ca. 3 cm long, subglobose at the base, the upper half in the form of a beak, dehiscent in two halves.

Phenology: Flowering throughout the year and fruiting sporadically from May to July.

Status: Exotic, very aggressive, widely cultivated and naturalized in Puerto Rico.

Distribution: In moist disturbed areas at moderately low to middle elevations. Native to India, but widely cultivated in the tropics. Cultivated on St. Croix and St. Thomas.

Public forests: Maricao and Río Abajo.

References. Stearn, W. T. 1971. A survey of the tropical genera *Oplonia* and *Psilanthele* (Acanthaceae). Bull. Br. Mus. Nat. Hist. (Bot.) 4: 261-323.

2. *Family* ***AMARANTHACEAE***

Key to the genera

1a. Leaves alternate; tepals glabrous 2
1b. Leaves opposite; tepals densely covered with tufts of long hairs on the outer surface 3

2a. Clambering herbs, 0.5-1 m in length; utricle with numerous naked seeds ..... 1. *Celosia*
2b. Scandent lianas or shrubs, 5-10 m in length; utricle with only one seed, covered by a fleshy arillode ..... 2. *Chamissoa*

3a. Clambering herbs, 1.5-2 m in length; stigma divided in 2 divergent filiform branches....3. *Iresine*
3b. Scandent shrubs or twining lianas, > 5 m in length; stigmas bilobate ..... 4. *Pfaffia*

1. CELOSIA

Herbs or shrubs, erect or sometimes clambering or scandent. Leaves alternate, petiolate; blades simple; stipules absent. Flowers bisexual, pedicellate or sessile, clustered in cymes, which are arranged along terminal or axillary spikes, panicles, or thyrses. Tepals 5, subequal, free; stamens 5, the filaments united at the base to form a short crateriform tube; interstaminal appendages dentate or absent; ovary

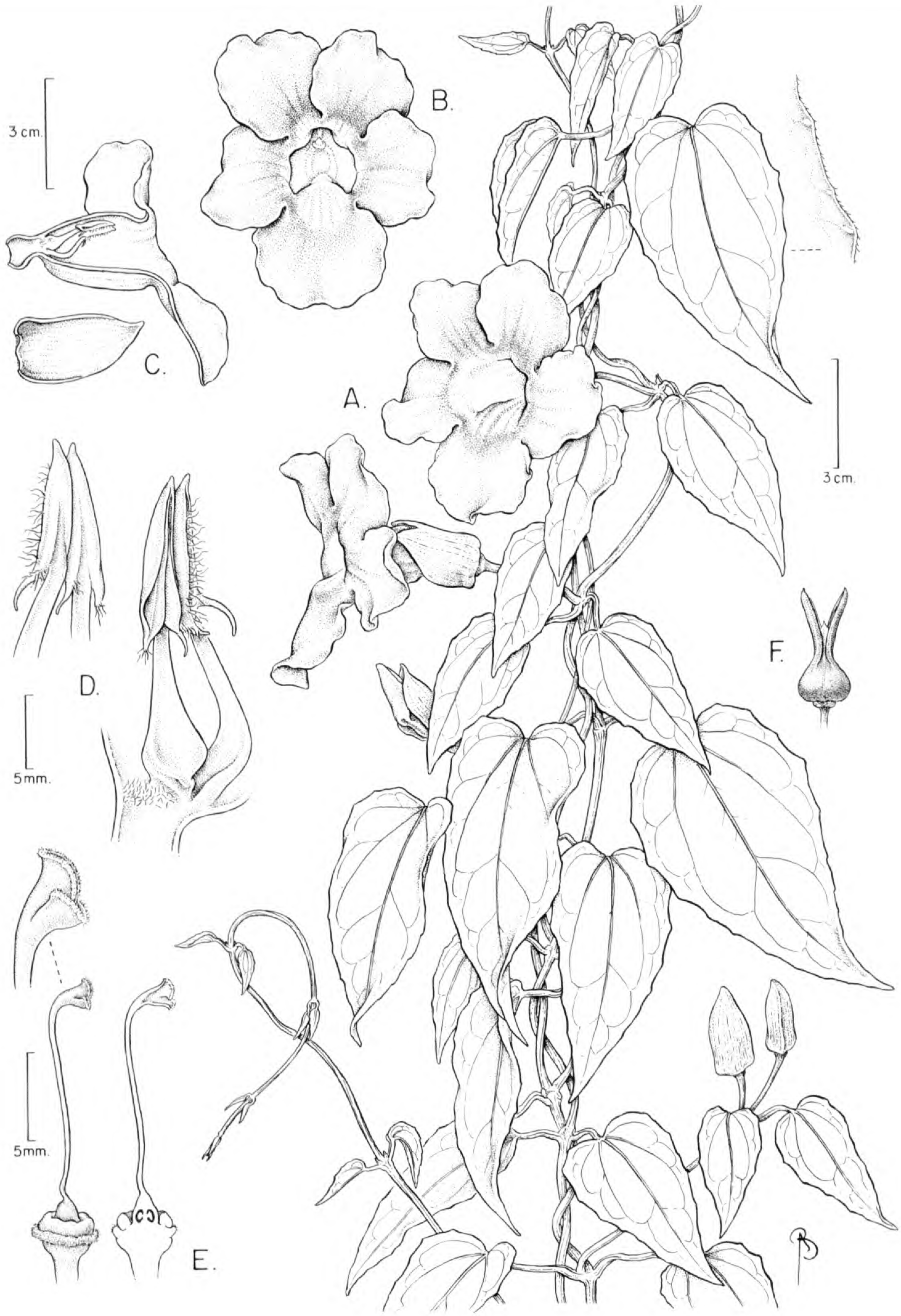

Fig. 15. A-F. *Thunbergia grandiflora*. **A.** Habit. **B.** View of the corolla from above. **C.** Longitudinal section of the corolla and bract. **D.** Stamens with anthers pubescent along the margin. **E.** Gynoecium with detail of the stigma, longitudinal section of the gynoecium. **F.** Half-opened fruit.

superior, unilocular, subglobose, ovoid or cylindrical, the style elongate or the stigmas elongate or capitate; ovules 2 or more numerous. Fruit a membranaceous, circumscissile utricle; seeds 2 to many, ellipsoidal, naked. About 50 species, widely distributed in the tropics and subtropics.

1. Celosia nitida Vahl, Symb. Bot. 2: 44. 1791.

Fig. 16. A-E

Herb or subshrub, erect or sometimes clambering, 0.5-1 m in length, with numerous branches that are borne on a woody base. Branches cylindrical, glabrous, striate. Leaves alternate; blades 2-6 × 1-3 (4) cm, deltate-lanceolate or lanceolate, chartaceous, glabrous, the apex acute, the base unequal, truncate, abruptly narrowed toward the petiole, the margins entire or slightly undulate; upper surface dull, with numerous whitish dots; petioles slender, 1-1.5 cm long. Flowers arranged in terminal, simple or branched spikes, 2-10 cm long; bracts and bracteoles triangular, with a hyaline margin. Tepals whitish with the apex somewhat reddish, oblong-lanceolate, ca. 4 mm long, glabrous; stamens 5, the filaments compressed, united at the base to form a short staminal tube; ovary ovoid, the stigmas 3, ca. 2 mm long. Capsule subglobose, somewhat compressed, ca. 3 mm long; seeds 9-19, dark brown, shiny, ca. 1.2 mm long, lenticular, naked.

Phenology: Flowering and fruiting throughout the year.

Status: Native, common.

Distribution: In understory and thickets in sandy coastal areas and in disturbed areas in the interior at middle elevations. Also on Caja de Muerto, Cayo Ratones, Culebra, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; in the southern United States (Florida), Mexico, the Antilles, and northern South America.

Public forests: Guánica, Mona, Piñones, and Río Abajo.

2. CHAMISSOA

Subshrubs, scandent shrubs, or lianas. Leaves alternate, petiolate; blades simple; stipules absent. Flowers bisexual or functionally unisexual; clustered in cymes, which are arranged in terminal or axillary panicles. Tepals 5, ovate or lanceolate, free; stamens 5, the filaments united at the base to form a short staminal tube; interstaminal appendages absent; ovary superior, unilocular, uniovulate, the style short, with 2 or 3 stigmas. Fruit a membranaceous, circumscissile utricle; seed solitary, sometimes covered by a fleshy arillode. A genus of 2 species, widely distributed in the Neotropics, from Mexico to northern Argentina, including the Antilles.

1. Chamissoa altissima (Jacq.) Kunth in Humb. Bonpl. & Kunth, Nov. Gen. Sp. (quarto ed.) 2: 197. 1817.

Fig. 1. D, 16. F-K

BASIONYM: *Achyranthes altissima* Jacq.

Liana or woody shrub, clambering, 3-15 m in length, with numerous pendulous branches. Stems angular when young and cylindrical when mature, up to 3 cm in diameter, glabrous; cross section of the stem with bands of vascular tissue alternating with very narrow bands of parenchymatous tissue. Leaves alternate; blades 8-14 × 3-7 cm, elliptical, ovate, or elliptic-ovate, chartaceous, the apex acute or acuminate, the base rounded, the margins undulate; upper surface slightly shiny, puberulous; lower surface pale green, dull, with prominent venation; petioles slender, usually reddish, 2-4.5 cm long. Flowers in terminal panicles, 4-16 cm long. Perianth white to greenish, with five ovate tepals, concave, acute, ca. 3 mm long, glabrous; stamens 5; stigma bifid. Capsule ovoid, truncate at the apex, membranaceous, turning from green to white, 3-4 mm long; seeds dark brown, shiny, completely covered by a white arillode.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

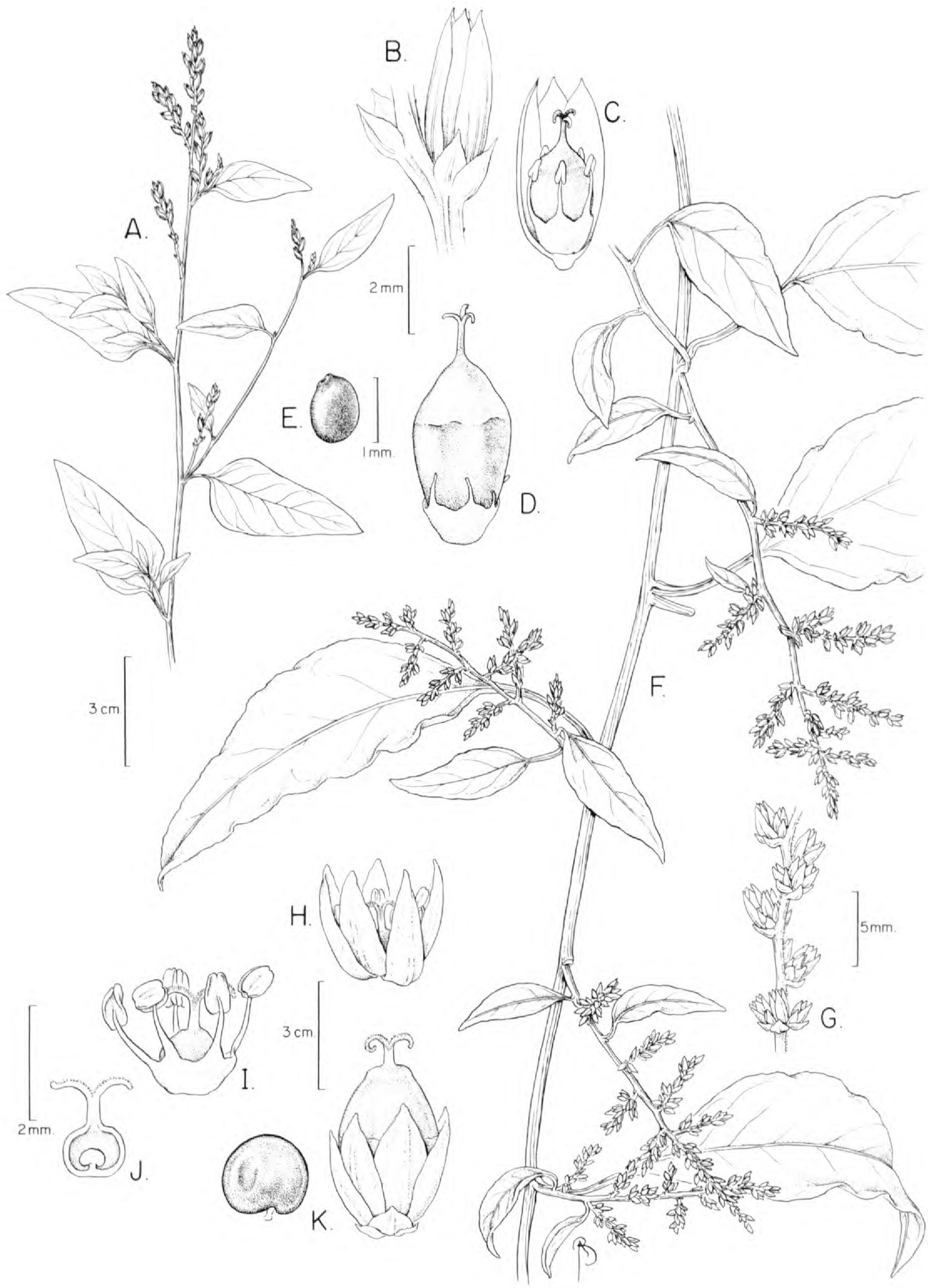

Fig. 16. A-E. *Celosia nitida*. **A.** Habit. **B.** Detail of the inflorescence. **C.** Flower with tepals removed showing stamens and pistil. **D.** Immature fruit. **E.** Seed. **F-K.** *Chamissoa altissima*. **F.** Habit. **G.** Inflorescence **H.** Flower. **I.** Stamens and gynoecium. **J.** Longitudinal section of the gynoecium. **K.** Seed and immature fruit.

Distribution: In moist secondary forests, at middle and lower elevations. Also on Vieques, St. Croix, St. Thomas, and Tortola; in the Antilles and continental tropical America.

Public forests: Cambalache, El Yunque, Guilarte, Maricao, Río Abajo, and Toro Negro.

3. IRESINE

Erect or clambering herbs, shrubs, and less frequently small trees. Leaves opposite or subopposite, petiolate; blades simple; stipules absent. Flowers unisexual or bisexual, pedicellate, clustered in cymes along axillary or terminal panicles; bracts and bracteoles persistent. Tepals 5, with a tuft of hairs at the base on the outer surface; stamens 5, the filaments united at the base to form a short staminal tube; interstaminal appendages present or absent; ovary superior, uniovulate, rounded, the stigmas divided in 2 elongate, filiform branches, sessile or subsessile. Fruit a membranaceous, subglobose, circumscissile utricle. Seed solitary, globose or lenticular, shiny, naked. A genus of approximately 40 species of neotropical distribution.

Key to the species of *Iresine*

1a. Bracts and bracteoles with a dorsal keel, aristate at the apex; bracteoles > 1.5 mm long, of the same size as the tepals; leaves lanceolate ..... 1. *I. angustifolia*
1b. Bracts and bracteoles not keeled or aristate; bracteoles < 1 mm long, smaller than the tepals; leaves lanceolate or ovate ..... 2. *I. diffusa*

1. Iresine angustifolia Euphrasén, Beskr. Ste. Barthél. 165.1795.

Fig. 17. A-F

SYNONYMS: *Iresine elatior* Rich. ex Willd.
Iresine ***celosioides*** Sw.

Herb, clambering or less frequently creeping, or sometimes a subshrub attainig 2 m in length, much branched from a woody base. Stems cylindrical, glabrous, with the nodes somewhat swollen. Leaves opposite; blades 2-13 × 0.5-4.5 cm, lanceolate, chartaceous, the apex short or long-acuminate, the base obtuse or acute, usually unequal, the margins entire, slightly revolute; upper surface glabrous or puberulous; lower surface dull, with prominent venation; petioles slender, 0.5-2 cm long. Flowers bisexual, in terminal panicles, up to 30 cm long; bracts and bracteoles lanceolate, with a dorsal keel and the apex aristate, the bracteoles of the same size as the tepals. Tepals 5, white to greenish, elliptical, ca. 1.5 mm long, with a tuft of undulate hairs at the base; stamens 5; stigma bifid. Capsule subglobose, membranaceous, ca. 1 mm long; seeds black, shiny, subglobose, 0.8-1 mm long.

Phenology: Flowering and fruiting throughout the year.

Status: Native, common.

Distribution: In disturbed areas at lower elevations. Also on Cayo Santiago, Culebra, Desecheo, Vieques, St. Croix, St. John, St. Thomas, and Tortola; from Mexico to Ecuador, including the Antilles.

Public forests: Guánica and Río Abajo.

2. Iresine diffusa Humb. & Bonpl. ex Willd., Sp. Pl. 4: 765. 1805.

Fig. 17. J-L

SYNONYMS: *Iresine paniculata* (L.) Kuntze
Iresine celosioides L.
Iresine celosia L.

Herb or subshrub, clambering or less frequently creeping, 1-3 m in length, much branched from the woody base. Stems glabrous or pubescent, with the nodes compressed, usually pilose. Leaves opposite; blades 3-9 (-11) × 1-5 cm, lanceolate or ovate, chartaceous, the apex acute or obtuse, the base obtuse, acute, or truncate, the margins slightly undulate and revolute; upper surface dull, puberulous or glabrous; lower surface dull, pubescent or glabrous, with prominent venation; petioles slender, 0.5-3.0 cm long.

Flowers unisexual, in terminal or axillary panicles, pendulous, 7-15 cm long, the axes pubescent or glabrous; bracts and bracteoles not keeled, acute or short-acuminate at the apex, the bracteoles smaller than the tepals. Tepals cream-colored or whitish; ovate or oblong, with a tuft of undulate hairs at the base, 0.5-0.8 mm long in the staminate flowers, oblong, 0.9-1.1 mm long in the pistillate flowers; stamens 5, the filaments unequal. Capsule ellipsoid, membranaceous, ca. 1 mm long; seeds reddish brown, shiny.

Phenology: Flowering and fruiting from September to May.

Status: Native, common.

Distribution: In disturbed areas at lower or middle elevations. Also on Desecheo and Vieques; the Lesser Antilles, Colombia, and Venezuela.

Public forests: Ceiba, El Yunque, Maricao, Río Abajo, Toro Negro, Tortuguero, and Vega.

4. PFAFFIA

Erect or clambering herbs, scandent shrubs, or twining lianas. Leaves opposite, petiolate; blades simple, stipules absent. Flowers bisexual, arranged in glomerules, spikes, or axillary or terminal panicles on short axillary branches; bracts and bracteoles persistent. Tepals 5, free, concave, with a tuft of hairs at the base on the outer surface or the hairs borne on the pedicel; stamens 5, the filaments united at the base to form a short staminal tube; interstaminal appendages present or absent; ovary superior, unilocular, uniovulate, ovoid, the stigma bilobed, sessile or subsessile. Fruit an indehiscent utricle, covered by the perianth. A genus of approximately 35 species of neotropical distribution.

1. Pfaffia aurata (Mart.) Borsch, Novon 5: 230. 1995.

Fig. 17. G-I

BASIONYM: *Trommsdorffia aurata* Mart.
SYNONYMS: *Trommsdorffia argentata* Mart.
Iresine argentata (Mart.) D. Dietr.
Achyranthes nodosa Bertero ex Mart. (pro syn.)
Achyranthes argentata (Mart.) Moq.
Iresine argentata var. *latifolia* Suess.
Pfaffia grandiflora sensu Alain, non (Hook.) R. E. Fr.

Twining liana, 15-20 m in length, with numerous pendulous branches. Stems cylindrical, with swollen nodes, densely silvery- pubescent when young, glabrous and lenticellate when mature, up to 10 cm in diameter; bark fissured, brown-cream; cross section of the stem with bands of vascular tissue alternating with very narrow bands of parenchymatous tissue. Leaves opposite; blades 3-10 × 2.7-4.2 cm, elliptical, ovate or lanceolate, chartaceous to coriaceous, the apex acuminate, acute, obtuse, or retuse, the base obtuse or rounded, sometimes unequal, the margins entire, slightly undulate and revolute; upper surface dull, glabrous or puberulous; lower surface dull, glabrous or puberulous, with slightly prominent venation; petioles slender, puberulous, 3-10 mm long. Flowers in panicles at the tips of short axillary branches, ascending, up to 30 cm long, the axes strigose or tomentose; bracts and bracteoles widely ovate to deltoid, hyaline, villous when young, 0.5-0.7 mm long. Tepals 5, cream-colored, oblong, 1.7-2.2 mm long, with a tuft of white, erect hairs at the base, these of the same length as or slightly longer than the tepals; stamens 5, the filaments alternating with short obtuse or rounded appendages, ca. 0.1 mm long; stigma bilobed, turbinate, papillose.

Phenology: Collected in flower in January.

Status: Native, locally common.

Distribution: In moist areas along the Cordillera Central, along rivers and at the base of mogotes in the zone where they occur. Also in the Lesser Antilles, Panama, Colombia, Venezuela, Ecuador, Peru, and Brazil.

Public forests: Maricao and Río Abajo.

Commentary: This species was originally described for Puerto Rico as *Trommsdorffia argentata* by Martius in 1826 and then transferred to *Iresine argentata*. Studies by T. Borsch in 1995 consider *T. argentata* as belonging within the variation observed in *Pfaffia aurata sensu lato* and therefore as a synonym of the latter species.

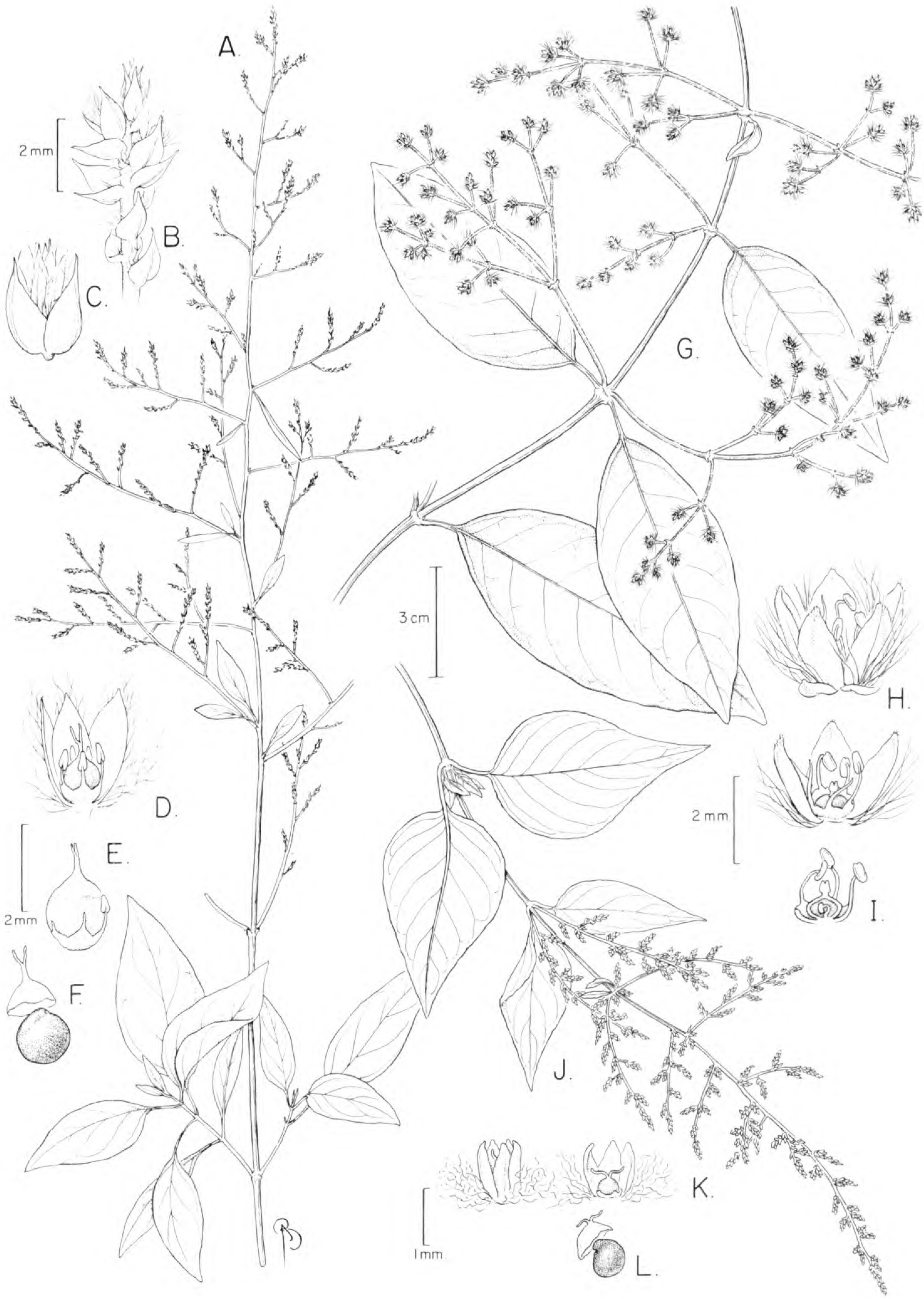

Fig. 17. A-F. *Iresine angustifolia*. **A.** Flowering branch. **B.** Detail of inflorescence. **C.** Flower. **D.** Flower with tepals removed showing stamens and gynoecium. **E.** Fruit. **F.** Seed with upper portion of the fruit. **G-I.** *Pfaffia aurata*. **G.** Flowering branch. **H.** Flower. **I.** Flower with tepals removed showing stamens and gynoecium, and longitudinal section of the gynoecium. **J-L.** *Iresine diffusa*. **J.** Flowering branch. **K.** Flower, flower with tepals removed showing gynoecium. **L.** Seed with upper portion of the fruit.

References: Borsch, T. 1995. Three new combinations in *Pfaffia* (Amaranthaceae) from the New World tropics. Novon 5: 230-233. Eliasson, U. H. 1987. Amaranthaceae. *In:* G. Harling and L. Anderson (eds.) Flora of Ecuador 28: 1-138. Sohner, S. H. 1977. *Chamissoa* (Amaranthaceae) en la República Dominicana. Moscosoa 1: 1-8.

3. *Family* ***APOCYNACEAE***

Key to the genera

1a. Upper surface of the leaves with numerous cystolithic hairs that give it a scabrous texture; inflorescence opposite the leaf ..... 2. *Anechites*
1b. Upper surface of the leaves glabrous; inflorescences axillary, terminal or pseudo-terminal..... 2

2a. Plants with watery latex; corolla cream-colored or greenish ..... 3. *Echites*
2b. Plants with abundant milky (white) latex; corolla yellow, white, red, or purple. 3

3a. Corolla < 1 cm long, cardinal red, the lobes oblong, long (as long as or longer than the tube of the corolla) ..... 4. *Forsteronia*
3b. Corolla > 2.5 cm long, white, yellow, or purple, the rounded lobes short (much shorter than the tube of the corolla). 4

4a. Corolla white, with a yellow center ..... 6. *Rhabdadenia*
4b. Corolla yellow or purple. 5

5a. Leaves opposite; stems copper-colored; corolla tube 3-6 cm long ..... 5. *Pentalinon*
5b. Leaves whorled; stems grayish; corolla tube 7-9 cm long ..... 1. *Allamanda*

1. ALLAMANDA

Lianas, shrubs, or trees, producing abundant milky latex. Leaves opposite or in whorls of 3-4 (5); blades simple; petioles more or less elongate, with intrapetiolar glands. Flowers actinomorphic, bisexual, produced on short axillary or pseudo-terminal cymes; bracts minute, deciduous. Calyx of 5 foliaceous sepals; corolla infundibuliform, showy, large, the lobes 5, rounded, contorted in the floral bud; stamens inserted, the anthers free; ovary superior, with an annular nectary at the base, of two unilocular carpels, with numerous ovules, the stigma bicapitate. Fruits capsular, globose or subglobose, with numerous spiny projections; seeds numerous, compressed, winged. A genus of approximately 18 species distributed throughout tropical South America, some of them of wide distribution.

1. Allamanda cathartica L., Mant. 214. 1771.
Fig. 18. A-D
Canaria, Cantiva, Allamanda

Shrub or woody vine, clambering or sometimes twining, much branched, 2-8 m in length, with abundant milky latex. Stems grayish, cylindrical, glabrous or puberulous. Leaves in whorls of 3 or 4; blades 8-13 × 1.5-3.5 cm, oblong, elliptical or oblanceolate, coriaceous, the apex acuminate, the base acute, the margins undulate and revolute; upper surface glabrous, dark green, shiny, with a prominent midvein; lower surface

yellowish green, with the midvein thickened, prominent, and puberulous; petioles 5-10 mm long; stipules transformed into 4 small intrapetiolar glands. Flowers in axillary cymes, few-flowered. Calyx greenish, of 5 lanceolate sepals, 12-18 mm long; corolla infundibuliform, yellow, the tube 7-9 cm long, the limb ca. 8 cm in diameter, with five rounded, revolute lobes. Capsules ellipsoid, with numerous spines on the outside, infrequent; seeds numerous, oval, compressed, 1.2-1.5 cm long, with a discolorous, wing-like margin.

Phenology: Flowering throughout the year and fruiting from April to May.

Status: Exotic, naturalized in Puerto Rico.

Distribution: Widely cultivated in Puerto Rico, Vieques, and the Virgin Islands. Native to South America, but found throughout the tropics due to its cultivation as an ornamental.

Public forests: Carite, El Yunque, Piñones, Río Abajo, and Tortuguero.

Cultivated species: *Allamanda blanchetii* DC., with a purple corolla, is often cultivated in Puerto Rico and the Virgin Islands, but apparently it has not become naturalized.

2. ANECHITES

A monotypic genus, characterized by the following species.

1. Anechites nerium (Aubl.) Urb., Repert. Sp. Nov. Regni Veg. 16: 150. 1919.

Fig. 18. E-H

BASIONYM: *Apocynum nerium* Aubl.
SYNONYMS: *Echites lappulacea* Lam.
Anechites asperuginis Griseb.

Twining vine, woody or herbaceous, attaining 10 m in length. Stems cylindrical, sparsely strigulose, glabrous and corky lines when mature. Leaves opposite or, when solitary, opposite the inflorescence; blades 5.5-10 × 2.5-4.5 cm, elliptical, oblong or ovate, chartaceous, the apex acuminate, the base obtuse, truncate, or subcordiform, the margins entire or undulate; upper surface dull, scabrous, covered with rigid cystolithic hairs; lower surface with small scattered protuberances and with the venation puberulous; petioles 15-22 mm long; stipules transformed into small intrapetiolar glands. Flowers bisexual, actinomorphic, in simple or bifurcate racemes, opposite a leaf, 6-15 (25) cm long, the axis sparsely strigulose. Calyx of 5 lanceolate sepals, 2.5-3 mm long; corolla hypocrateriform, the tube ellipsoid, ca. 6 mm long, yellowish, pilose inside, the lobes 5, white, 8-12 mm, oblong, rounded at the apex; stamens 5, the filaments short, connate with the corolla, the anthers apiculate; ovary superior, bicarpellate, the style elongate, the stigmas 2, elongate. Fruit of (1) 2 fusiform follicles, densely strigose, especially in the distal portion; seeds (according to Grisebach, 1862) numerous, with a tuft of hairs at the apex.

Phenology: Flowering from May to July and fruiting from June to July, according to the material examined (from Puerto Rico, Cuba, and Colombia).

Status: Native, extremely rare.

Distribution: Known from Puerto Rico from a single collection made by Dr. Agustín Stahl in 1888 in the area of Vega Baja. A surviving duplicate of this collection (*Stahl 870*) is deposited in the United States National Herbarium of the Smithsonian Institution. Recently recollected by C. Trejo (*2025*) in Mata de Plátano reserve in Bo. Dominguito, Arecibo. In addition, this species has been collected in Cuba, Hispaniola, Jamaica, Panama, Colombia, and Ecuador.

3. ECHITES

Twining vines or lianas, with abundant milky or watery latex. Leaves opposite; blades simple; petioles with or without glands; stipules glandular, intrapetiolar and interpetiolar. Flowers bisexual, in axillary cymes, elongate or compact. Calyx campanulate, of 5 elongate sepals, each with a glandular appendage at the base on the inner surface; corolla hypocrateriform, not ringed in the throat; stamens

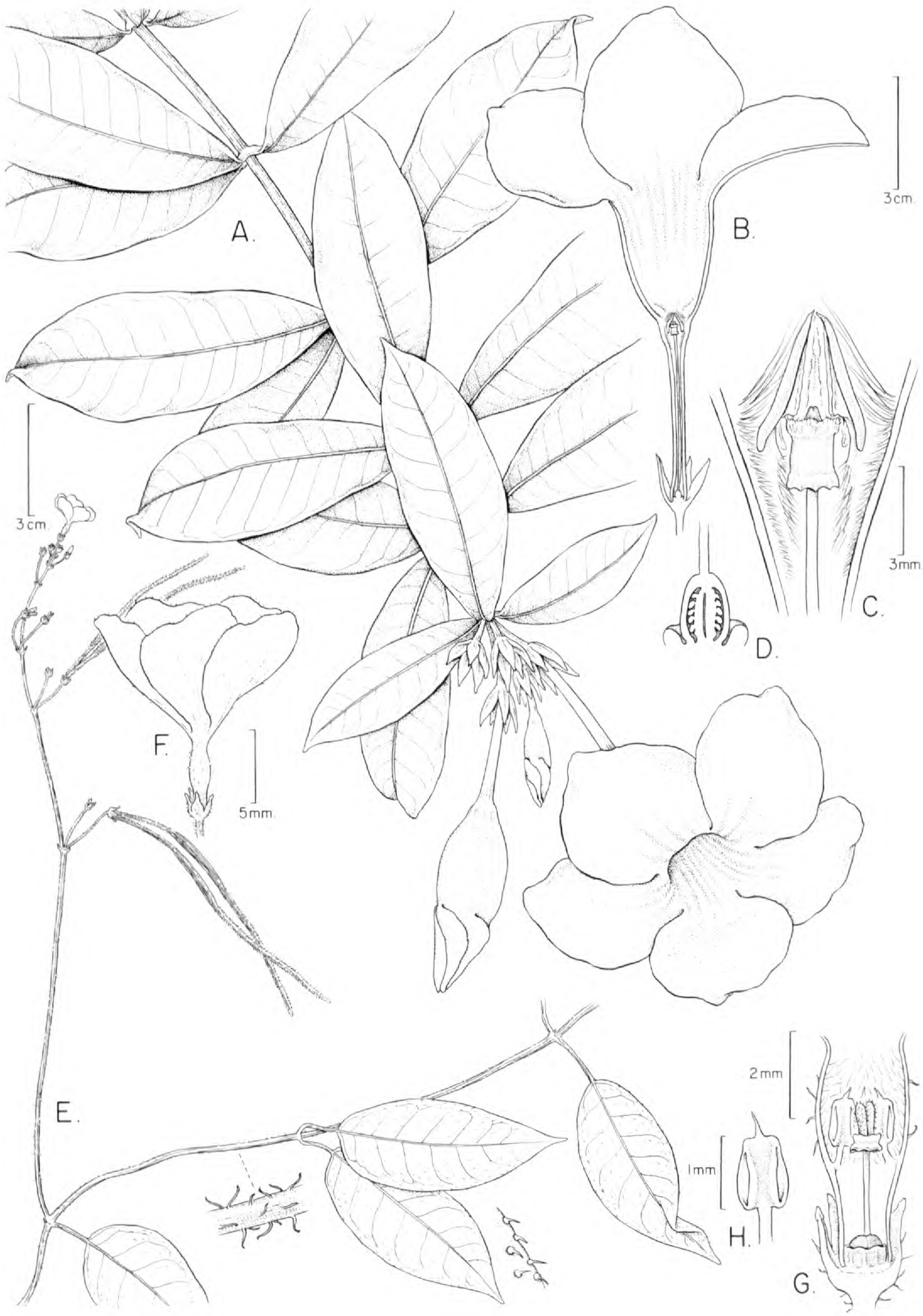

Fig. 18. A-D. *Allamanda cathartica*. **A.** Flowering branch. **B.** Longitudinal section of the flower. **C.** Detail of the anthers and stigma. **D.** Longitudinal section of the gynoecium. **E-H.** *Anechites nerium*. **E.** Fertile branch, with detail of the pubescence. **F.** Flower. **G.** Longitudinal section of the flower showing anthers and gynoecium. **H.** Anther with apiculate apex.

5, inserted, the anthers concrescent around the stigma, the filaments united to the corolla; ovary superior, with 5 glandular nectarines at the base; carpels 2, free at the base, united at the apex by a style in common. Fruits of 2 cylindrical follicles; seeds numerous, with a tuft of long hairs at the apex. A neotropical genus of approximately 35 species.

1. Echites agglutinata Jacq., Enum. Syst. Pl. 13. 1760.

Fig. 20. A-F

SYNONYM: *Prestonia agglutinata* (Jacq.) Woodson

Babeiro

Herbaceous vine, twining, 1-5 m in length, with watery latex. Stems green, cylindrical, slender, lenticellate, becoming hollow on drying. Leaves opposite; blades 4-19 × 3-9 cm, oval, ovate, rounded, or sometimes lanceolate, glabrous, chartaceous, the apex obtuse, acute, short-acuminate, or subrounded and mucronate, the base obtuse, rounded, or truncate, lacking glands and usually asymmetrical, the margins entire or undulate, revolute; upper surface dull green; lower surface pale green, dull, with a prominent midvein; petioles 0.5-4 cm long, canaliculate, pubescent; stipules intrapetiolar and interpetiolar, minute, acicular. Flowers in small axillary or terminal cymes. Calyx green, 2-3 mm long, with 5 ovate lobes, ca. 2 mm long; corolla infundibuliform, the tube greenish or cream-colored, 4-6 mm long, with 4 ribs, pilose inside, the limb pale yellow or cream-colored, with 5 oblong lobes, reflexed, 2-4 mm long. Follicles linear, 10-25 cm long, divaricate when mature; seeds numerous, 5-7 mm long, light brown, with cream-colored, silky hairs.

Phenology: Flowering from May to December and fruiting from June to March.

Status: Native, quite common.

Distribution: Abundant in thickets and coastal forests. Also on Desecheo, Mona, Vieques, Anegada, St. Croix, St. John, St. Thomas, and Tortola; Hispaniola.

Public forests: Guánica, Maricao, Mona, Piñones, Río Abajo, and Susúa.

4. FORSTERONIA

Twining vines or rarely subshrubs, with abundant milky latex. Leaves opposite or whorled in groups of 3 or 4; petiolate; blade simple, usually with domatia in the axils of the secondary veins, the midvein usually with glands at the base; stipules minute, intrapetiolar or interpetiolar. Flowers bisexual, actinomorphic, in axillary or terminal corymbiform or paniculiform cymes. Calyx of 5 sepals; corolla hypocrateriform or campanulate, with 5 lobes; stamens 5, inserted or exserted, the anthers concrescent around the stigma, with or without apical appendages; ovary superior, with 5 glandular nectarines at the base; carpels 2, free or rarely united, the stigma fusiform or subcapitate. Fruits of 2 slender follicles; seeds numerous, truncate, with a tuft of long hairs at the apex. A neotropical genus of about 50 species.

1. Forsteronia portoricensis Woodson, Ann. Missouri Bot. Gard. 21: 618. 1934.

Fig. 19. A-F

SYNONYM: *Forsteronia corymbosa* sensu Britton & P. Wilson

Bejuco de San Juan, Sanjuanera, Leche de perra

Woody vine, twining, much branched from the base, 7-15 m in length, with abundant cream-colored latex. Stems dark brown, glabrous, cylindrical, lenticellate. Leaves opposite; blades 4-8 × 1.8-3.8 cm, elliptical or broadly elliptical, coriaceous, glabrous, the apex acute, the base obtuse or rounded, the margins entire, slightly undulate, revolute; upper surface dark green, shiny, with a slightly prominent midvein, without glands; lower surface yellowish green, shiny, with a prominent midvein, domatia absent; petioles 5-7 mm long, slightly winged or sulcate; stipules interpetiolar, minute, brown, acicular. Flowers in terminal corymbiform cymes, 3-8 cm wide; pedicels pink, 7-12 mm long, with a pair of minute bracteoles at the base. Calyx cardinal red, glabrous, the sepals ovate, free to the base, 1.5-1.7 mm long, ciliate; corolla cardinal red, infundibuliform, 5-6 mm long, the lobes oblong,

as long as or longer than the tube; stamens exserted. Follicles straight, ca. 8 cm long; seeds numerous, with long, silky hairs.

Phenology: Flowering from April to January and fruiting from January to June.

Status: Endemic to Puerto Rico, quite common.

Distribution: In moist forests at middle and upper elevations, along the Cordillera Central and the Sierra de Luquillo and in the zone of mogotes.

Public forests: Carite, El Yunque, Guajataca, Guilarte, Maricao, Río Abajo, Susúa, and Vega.

5. PENTALINON

Twining vines or scandent shrubs, with abundant milky latex. Leaves opposite, petiolate; blades simple, without glands, stipules glandular, intrapetiolar. Flowers in axillary cymes. Calyx campanulate, of 5 elongate sepals, with digitiform glandular hairs (colleters) at the base; corolla infundibuliform; stamens 5, inserted, the anthers concrescent around the stigma, with apical appendages, the filaments very short; ovary superior, with 5 glandular nectaries at the base; carpels 2, free or united by a common style. Fruits of 2 cylindrical follicles, connate at the apex; seeds numerous, narrowly elliptical, with a tuft of long hairs at the apex. A neotropical genus of two species.

1. Pentalinon luteum (L.) Hansen & Wunderlin, Taxon 35: 167. 1986.

Fig. 19. G-J

BASIONYM: *Vinca lutea* L.
SYNONYM: *Urechites lutea* (L.) Britton
Babeiro amarillo, Wild allamanda

Woody vine, twining, much branched from the base, up to 5 m in length, with abundant milky latex. Stems smooth, cylindrical, pubescent when young, lenticellate; bark thin, copper-colored. Leaves opposite; blades 3-7 × 1.5-3.7 cm, elliptical or obovate, coriaceous, glabrous, the apex rounded and mucronate, the base rounded to obtuse, the margins entire, revolute; upper surface shiny with the midvein yellowish; lower surface dull, with a prominent midvein, puberulous; petioles ca. 5 mm long, cylindrical, pubescent. Flowers in axillary cymes, few-flowered; pedicels cylindrical, pubescent, 1.5-2 cm long. Calyx light green, pubescent, of five lanceolate sepals, ca. 12 mm long; corolla yellow, infundibuliform, ca. 3 cm long, with cardinal red lines inside, the limb 3 cm in diameter, with 5 rounded lobes. Follicles woody, linear, divaricate; seeds numerous, with long, silky hairs.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: Coastal forests and thickets. Also on Cayo Icacos, Culebra, Mona, Vieques, Anegada, Guana Island, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; the Antilles and the United States (Florida).

Public forests: Guánica, Mona, Piñones, and Río Abajo.

6. RHABDADENIA

Twining lianas or less frequently erect shrubs, with abundant milky latex. Leaves opposite, petiolate; blades simple, without glands; stipules interpetiolar, deciduous or persistent. Flowers bisexual, actinomorphic, in small axillary cymes. Calyx of 5 free sepals, elongate, without appendages; corolla infundibuliform; stamens 5, inserted, the anthers concrescent around the stigma, the filaments united to the corolla; ovary superior with 5 glandular nectaries at the base; carpels 2, free. Fruits of 2 cylindrical follicles; seeds numerous, linear, with a tuft of long hairs at the apex. A neotropical genus of 4 or 5 species.

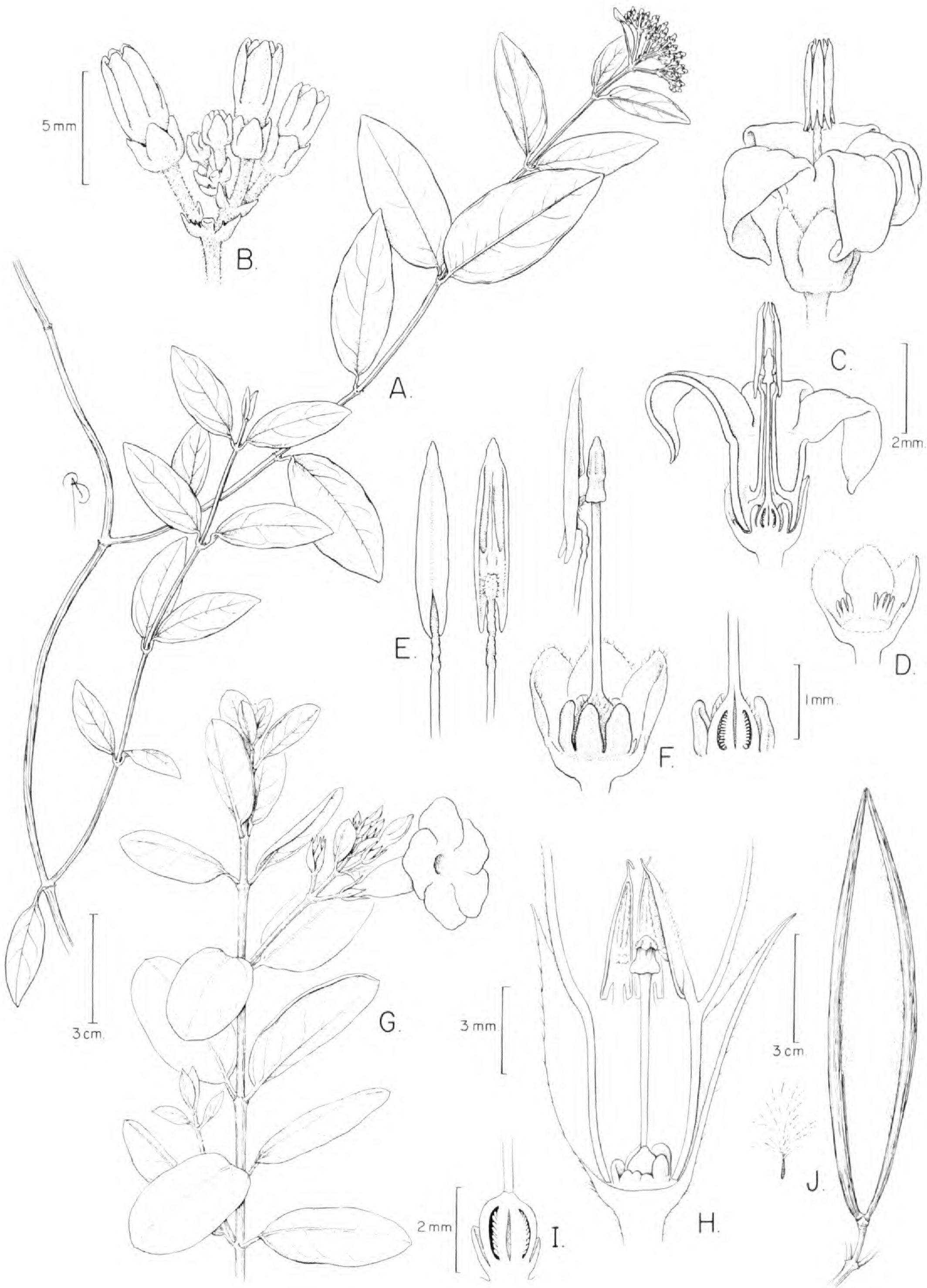

Fig. 19. A-F. *Forsteronia portoricensis*. **A.** Flowering branch. **B.** Detail of the inflorescence. **C.** Flower, longitudinal section of the flower. **D.** Calyx showing colleter. **E.** Back and front views of stamens. **F.** Flower without corolla, showing glands of the nectary, gynoecium, and position of the stamen, and longitudinal section of the ovary. **G-J.** *Pentalinon luteum*. **G.** Flowering branch. **H.** Longitudinal section of the flower showing calyx, corolla, stamens, nectary glands, and gynoecium. **I.** Longitudinal section of the ovary. **J.** Fruit with two follicles, and comose seed.

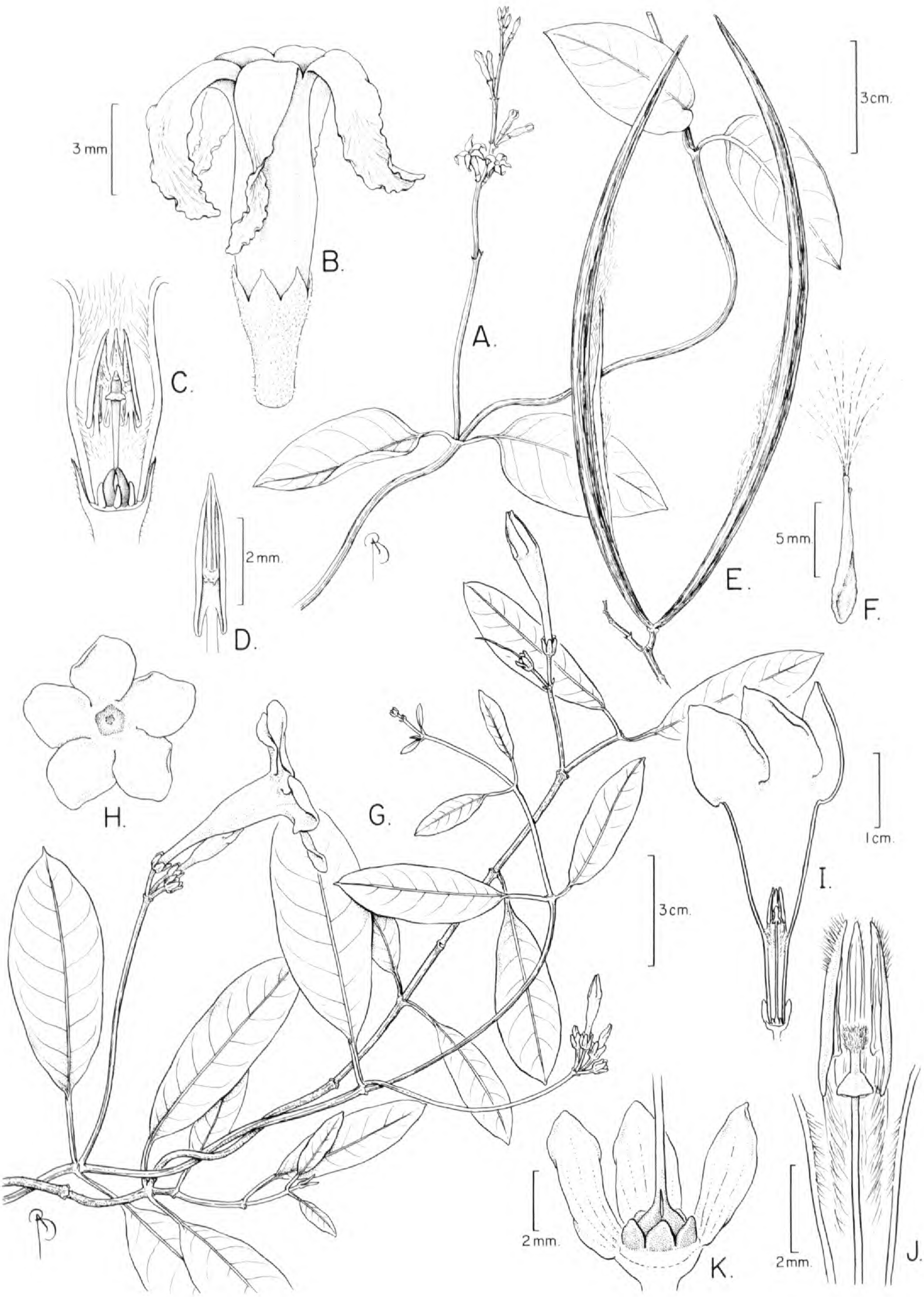

Fig. 20. A-F. *Echites agglutinata.* **A.** Flowering branch. **B.** Flower. **C.** Longitudinal section of the flower showing calyx, corolla, stamens, nectary glands, and gynoecium. **D.** Front view of an anther. **E.** Fruit with two follicles. **F.** Comose seed. **G-K.** *Rhabdadenia biflora.* **G.** Fertile branch. **H.** View of flower from above. **I.** Longitudinal section of flower. **J.** Detail showing pubescent stamens, style, and stigmatic head. **K.** Calyx, glands of the nectary, and base of the gynoecium.

1. Rhabdadenia biflora (Jacq.) Müll. Arg. in Mart., Fl. Bras. 6(1): 175. 1860.

Fig. 20. G-K

BASIONYM: *Echites biflora* Jacq.
SYNONYM: *Rhabdadenia paludosa* (Vahl) Miers

Twining liana, glabrous, 7-10 m in length, with abundant milky latex. Stems green, cylindrical, smooth. Leaves opposite; blades 5-8 × 1.5-4.5 cm, elliptical, obovate, oblong, oblanceolate, and sometimes ovate, glabrous, the apex mucronate, obtuse, truncate, or sometimes retuse, the base obtuse or attenuate, the margins entire, slightly revolute; upper surface dull green; lower surface glaucous, with obscure venation; petioles 0.5-2 cm long; stipules not visible. Flowers in short axillary cymes. Calyx of oblong, mucronate sepals, 5-5.5 mm long, green; corolla infundibuliform, white, sometimes tinged with pink, with the center yellow inside, 4.5-5.7 cm long. Follicles linear, 6-10 cm long, parallel or slightly divaricate when mature; seeds numerous, linear, ca. 2.5 cm long, with a tuft of silky hairs at the apex.

Phenology: Flowering throughout the year and fruiting mostly from March to September.

Status: Native, common.

Distribution: Abundant in mangroves and marshy coastal forests. Cited for St. Thomas by Britton, but probably extirpated since most of its mangroves have been destroyed. Also in the Antilles, the United States (Florida), Mexico, Central America, and South America.

Public forest: Piñones.

References: Morales, J. F. 1997. A reevaluation of *Echites* and *Prestonia* sect. *Coalitae* (Apocynaceae). Brittonia 49: 328-336. Sakane, M. and G. J. Shepherd. 1986. Uma revisão do gênero *Allamanda* (Apocynaceae). Rev. Brazil. Bot. 9: 125-149.

4. *Family* ***ARISTOLOCHIACEAE***

1. ARISTOLOCHIA

Herbaceous or woody vines, less frequently herbs or shrubs. Leaves alternate, petiolate; blades simple, entire or trilobed; pseudostipules usually present. Flowers bisexual, zygomorphic, solitary and axillary or clustered and cauliflorous. Calyx inflated in the basal portion (utricle), the apex of the utricle narrow, forming a tube that expands toward the margins into an entire, circular or bilobed limb, the lobes generally unequal, some forming a long tail; corolla absent; stamens 5-6, sessile; ovary inferior or half-inferior, of 5-6 united carpels; ovules numerous; styles 5-6, connate, the stigma capitate. Fruit a septicidal capsule, with numerous light, compressed seeds. A tropical genus of 450-550 species.

Key to the species of *Aristolochia*

1a. Leaves trilobed ..... 7. *A. trilobata*
1b. Leaves entire, not lobed 2

2a. Pseudostipules absent 3
2a. Pseudostipules present 4

3a. Leaves lanceolate, hastate, or less frequently ovate; floral limb 4-6 cm in diameter, without a tail ..... 5. *A. odoratissima*
3b. Leaves ovate or broadly ovate; floral limb 12-31 cm in diameter with a long tail, 7-150 cm long ..... 3. *A. grandiflora*

4a. Leaves oblong, oblong-lanceolate, lanceolate-deltoid or less frequently ovate; floral limb 2.5 cm wide or smaller 5
4b. Leaves broadly ovate, reniform or orbicular; floral limb > 5 cm wide 6

5a. Leaves oblong or oblong-lanceolate, the apex obtuse to rounded; lower surface tomentulose, with prominently reticulate venation; limb sub-bilabiate, the lower lip not well developed, the upper lip laterally expanded ..... 4. *A. oblongata* subsp. *calceiformis*
5b. Leaves lanceolate-deltoid or ovate, the apex acute to obtuse; lower surface puberulous, the venation not prominent; floral limb unilabiate, the erect lip forming a right angle with the tube..1. *A. anguicida*

6a. Limb of the flower bilabiate (the lips elongate); pseudostipules 2.5-5 cm long ..... 6. *A. ringens*
6b. Limb of the flower peltate, crateriform, the lower margin retuse; pseudostipules 1-1.5 cm long.. 7

7a. Limb of the flower concave; capsules straight, 5-6 cm long ..... 2. *A. elegans*
7b. Limb of the flower flat to convex; capsules curved, 7-10 cm long ..... 5. *A. odoratissima*

1. Aristolochia anguicida Jacq., Enum. Syst. Pl. 30. 1760.

Fig. 21. A-D

Slightly woody vine, twining, attaining 5 m in length. Branches puberulous, sulcate. Leaves alternate; blades 4.5-15 × 3.5-9 cm, lanceolate-deltoid or ovate, chartaceous, the apex acute to obtuse, the base cordiform or subtruncate, the margins entire; upper surface glabrous or puberulous; lower surface puberulous, the venation not prominent; petioles 2-6.5 cm long, puberulous; pseudostipules reniform or circular, 1.5-3.5 cm long. Flowers cream-colored with cardinal red spots, solitary; peduncle ca. 4.5 cm long; utricle obovoid, 6-13 mm long, the tube 1-2 cm long, expanding toward the limb into an infundibuliform structure, with one lobe or elongate lip erect on the upper margin, the limb up to 2.5 cm wide. Capsule cylindrical, 2.2-3.8 cm long; seeds membranaceous, broadly ovate, 5.5-6.8 mm long, with a surrounding wing.

Phenology: Flowering and fruiting throughout the year.

Status: Native to South America, apparently cultivated on St. Croix.

Distribution: Known from St. Croix from a single collection; Central America, Colombia, Trinidad, and Martinique.

2. Aristolochia elegans Mast, Gard. Chron. II, 24: 301. 1885.

Fig. 22. A-F

SYNONYM: *Aristolochia littoralis* sensu Pfeifer, non Parodi

Woody vine, twining, attaining 7 m in length. Stems glabrous, cylindrical. Leaves alternate; blades 7-9 × 6-10 cm, reniform or broadly ovate, chartaceous, the venation palmate, the apex obtuse or rounded, the base cordiform, the margins entire; upper surface glabrous, shiny; lower surface with prominent venation, glaucous; petioles 1-3 cm long, glabrous; pseudostipules reniform, 1-1.5 cm long. Flowers solitary, pendulous; peduncle ca. 5 cm long; utricle ellipsoid-cylindrical, ca. 3 cm long, the tube 2.5-3.5 cm long, curved at the base, ascending, the limb asymmetrically peltate, crateriform, the lower margin retuse, 5-7 cm in diameter, light green or cream-colored with a cardinal red reticulum. Capsule cylindrical with 5 longitudinal ribs, 5-6 cm long; seeds membranaceous, triangular or ovate, 6-7 mm long.

Phenology: Collected in flower in February and March and in fruit in February.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: On the edge of dry secondary forests. Native of South America but cultivated throughout the Antilles. Naturalized on St. John and Tortola, cultivated on St. Croix.

3. Aristolochia grandiflora Sw., Prodr. 126. 1788.

Fig. 23. A-C

Woody vine, twining, glabrescent, 5-7 m in length. Stems cylindrical. Leaves alternate; blades

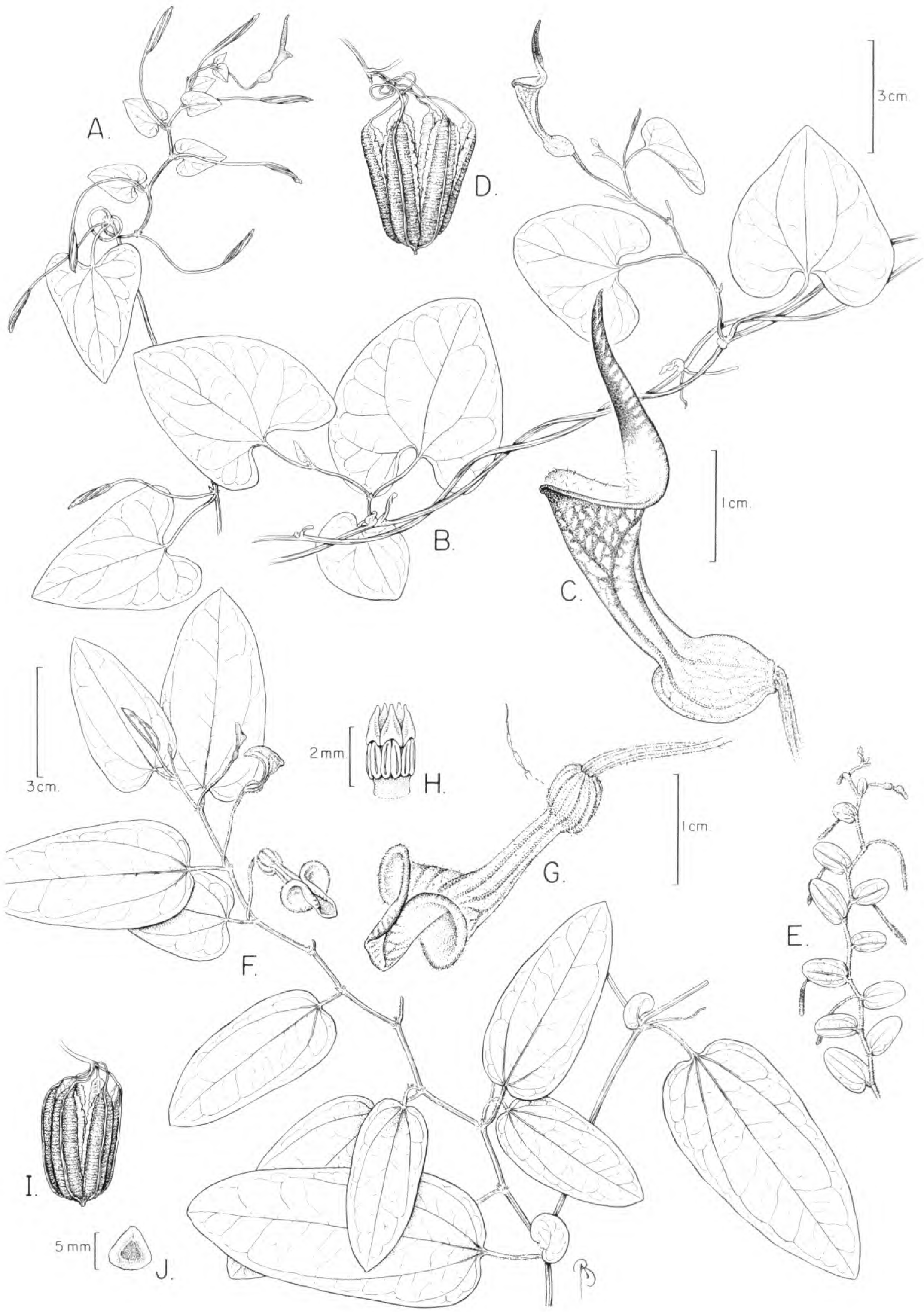

Fig. 21. A-D. *Aristolochia anguicida*. **A-B.** Flowering branch. **C.** Flower. **D.** Capsular fruit. **E-J.** *Aristolochia oblongata* subsp. *calceiformis*. **E-F.** Flowering branch. **G.** Flower. **H.** Detail of the connivent anthers. **I.** Capsular fruit. **J.** Seed.

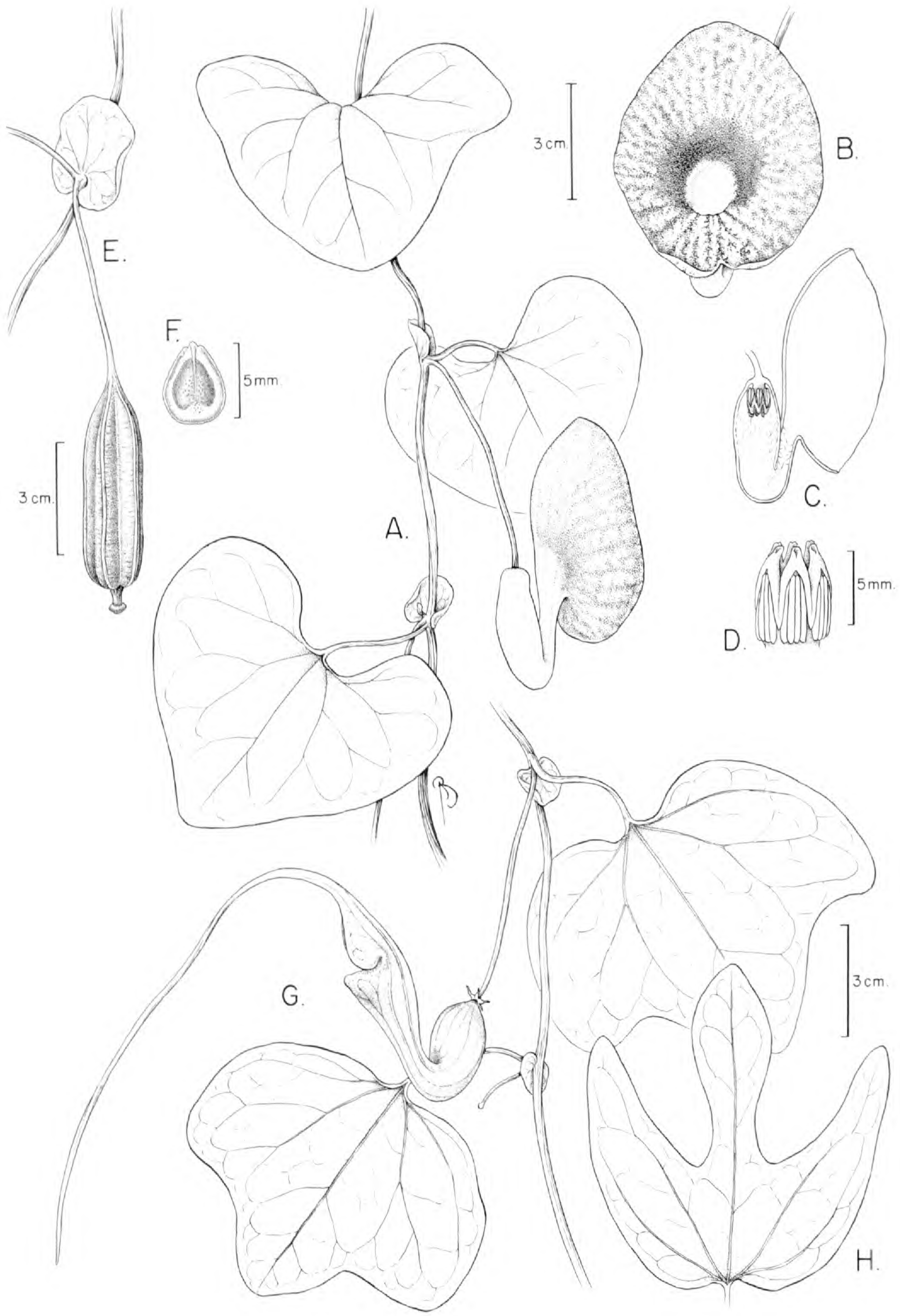

Fig. 22. A-F. *Aristolochia elegans*. **A.** Flowering branch. **B.** Flower, front view. **C.** Longitudinal section of the flower. **D.** Connivent anthers. **E.** Capsular fruit. **F.** Seed. **G-H.** *Aristolochia trilobata*. **G.** Flowering branch. **H.** Deeply trilobate leaf. From Acevedo-Rodríguez et al. 1996. Flora of St. John, U. S. Virgin Islands. Mem. NYBG Vol. 78.

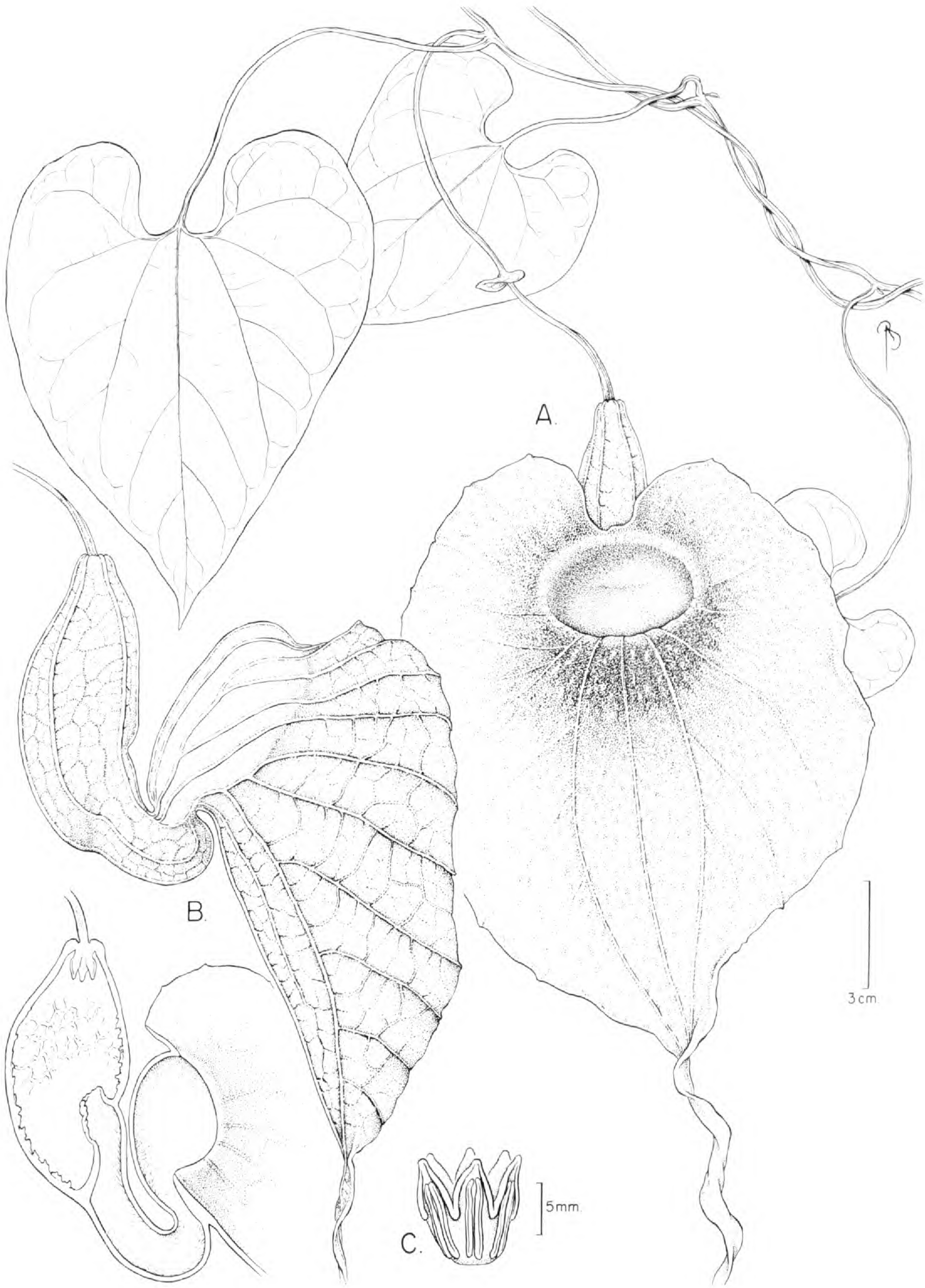

Fig. 23. A-C. *Aristolochia grandiflora*. **A.** Flowering branch. **B.** Side view and longitudinal section of the flower. **C.** Connivent anthers.

6-20 × 6-16 cm, ovate or broadly ovate, chartaceous, the venation semi-palmate (with three main veins), the apex acute or acuminate, the base cordiform-sagittate, the margins undulate; upper surface glabrous, dull; lower surface with prominent venation, glaucous, puberulent; petioles 5-11 cm long, glabrous; pseudostipules absent. Flowers solitary, pendulous; peduncle 12-23 cm long; utricle asymmetrically obovoid, 6-12 × 2-3.5 cm, the tube 8-13 cm long, curved, broadened toward the apex; limb peltate, obovate to elliptical, 12-31 cm in diameter, cream-colored with a cardinal red reticulum, the apex cordate, the base with an appendage or tail, 7-150 cm long, the throat cardinal red. Capsule more or less cylindrical, with 5 longitudinal ribs, 13-15.5 cm long; seeds membranaceous, broadly ovate, 1-1.3 cm long.

Phenology: Collected in flower in December, February, April, May, and August and in fruit in April.

Status: Exotic, cultivated and escaped from cultivation, uncommon.

Distribution: In areas of secondary vegetation. Also in Jamaica, Cuba, Mexico, Central America, Colombia, and Ecuador; cultivated throughout the tropics.

4. Aristolochia oblongata Jacq. subsp. **calceiformis** (Urb.) R. Rankin & Acev.-Rodr., comb.nov.

Fig. 21. E-J

BASIONYM: *Aristolochia calceiformis* Urb., Symb. Antill. 1: 300. 1899.

SYNONYMS: *Aristolochia bilabiata* sensu Pfeifer, non L.

Slightly woody vine, twining, 10-15 m in length. Stems subcylindrical, attaining 4 cm in diameter, the bark corky with numerous longitudinal furrows; cross section of the stem showing a xylem dissected by multicellular rays. Branches puberulous, sulcate. Leaves alternate; blades 5-13 × 2.4-3.6 cm, oblong, oblong-lanceolate, or less frequently elliptical, chartaceous, venation reticulate, the apex obtuse or rounded, the base subcordiform or subtruncate, the margins entire, slightly revolute; upper surface glabrous, with some scattered resinous dots; lower surface with prominent venation, tomentulose; petioles 1-1.5 cm long, puberulous; pseudostipules reniform, 0.8-1 cm long. Flowers solitary or in axillary racemes; peduncle ca. 3 cm long; utricle ellipsoid, brown, ca. 1 cm long, geniculate at the base, the tube ca. 1.5 cm long, expanding toward the limb into an infundibuliform structure, sub-bilabiate, with two short lobes, of which the upper lobe is larger and folded, covering the throat after anthesis, the throat bright yellow, pubescent. Capsule ellipsoid or subglobose, 2-2.5 cm long; seeds membranaceous, triangular, ca. 5 mm long.

Phenology: Collected in flower in February, March, and September and in fruit from March to September and in December.

Status: Native, uncommon.

Distribution: In moist forests at lower and middle elevations in the Cordillera Central and in the northern limestone zone. Also in Cuba and Hispaniola.

Public forest: Río Abajo.

5. Aristolochia odoratissima L., Sp. Pl. ed. 2, 1362. 1763.

Fig. 24. A-B

SYNONYM: *Aristolochia pandurata* Jacq.

Woody vine, twining, attaining 5 m in length. Stems cylindrical, glabrous, smooth. Leaves alternate; blades 6.5-11 × 3.5-6 cm, lanceolate, hastate, or less frequently ovate, chartaceous or coriaceous, the venation palmate, the apex acuminate, the base deeply cordate, the margins entire; upper surface dull, glabrous; lower surface puberulous, the venation not prominent; petioles 1-3.5 cm long; pseudostipules inconspicuous or ovate, up to 1.5 cm long. Flowers solitary, yellowish with a cardinal red reticulum; peduncle ca. 3 cm long; utricle obovoid, ca. 1 × 0.5 cm; tube slightly curved, 0.7-1.7 cm long, almost forming a right angle with the utricle; limb 4-6 cm in diameter. Capsule curved, 7-10 cm long, subcylindrical, with 5 longitudinal ribs, the apex and base acute; seeds numerous, membranaceous, triangular, ca. 3 mm long.

Phenology: Flowering and fruiting throughout the year.

Status: Apparently exotic, naturalized on St. John; uncommon.

Distribution: In areas of secondary vegetation, in coastal thickets on St. John. Collected on St. Thomas but possibly from a cultivated individual; Mexico, Central America, and South America.

6. Aristolochia ringens Vahl, Symb. Bot. 3: 99. 1794.

Fig. 24. C-F

SYNONYMS: *Aristolochia grandiflora* sensu Vahl, non Sw. *Aristolochia galeata* sensu authors, non Mart. & Zucc.

Gallito, Panitos, Pelicanos

Slightly woody vine, twining, attaining 5 m in length. Stems cylindrical, slender, glabrous, with the pith hollow. Leaves alternate; blades 5-16 × 6-18 cm, broadly ovate, reniform or orbicular, chartaceous, with prominently reticulate venation, the apex obtuse or rounded, the base deeply cordate, the margins entire; upper surface dark green, dull; lower surface glaucous, glabrous, with numerous scattered dots; petioles 3-11 cm long, sulcate or compressed, broadened at the base; pseudostipules foliaceous, ovate-rounded, 2.5-5 cm long. Flowers solitary, pendulous; peduncle 7.5-17 cm long; utricle obovoid, 5-7 × 2.5-4 cm, the tube straight, 3-4 cm long, almost forming a right angle with the utricle; limb bilabiate, yellowish with a cardinal red reticulum, the upper lip spathulate, 6-9 cm long, the lower lip lanceolate, 10-15 cm long. Capsule 6-11 cm long, oblong or oblanceolate, with 6 ribs, the apex mucronate, the base acute; seeds numerous, rhomboid, winged, 7-15 mm long.

Phenology: Flowering and fruiting throughout the year.

Status: Exotic, uncommon, cultivated and escaped.

Distribution: On roadsides and in open areas. Native to Brazil; widely cultivated in the Neotropics.

7. Aristolochia trilobata L., Sp. Pl. 960. 1753.

Fig. 22. G-H

Bejuco de Santiago, Cachimbo, Panitos, Tobacco pipe

Slightly woody vine, twining, 3-5 m in length. Stems slender, shiny, cylindrical, glabrous, pink on the younger portions. Leaves alternate; blades trilobed, 8-14 × 10-16 cm, coriaceous, the lobes shallow to quite deep, the apex rounded or obtuse, the base subcordiform or truncate, the margins entire or sinuate; upper surface dark green, shiny, glabrous, with palmate venation, somewhat sunken and yellowish; lower surface pale green, puberulous, the venation reticulate, prominent and puberulous; petioles robust, cylindrical, 2-4.5 cm long, glabrous, dilated at the base; pseudostipules rounded or reniform, 1-1.5 cm long, covering the stem. Flowers solitary, pendulous; peduncle up to 7 cm long; utricle ellipsoid, 2.5-4 cm long; tube straight, 4.5-7.5 cm long, ascending, forming an angle of 50° to 60° with the utricle; limb unilobed, greenish yellow with dark violet spots, the upper lobe with a caudate appendage, 10-31 cm long, ascending-arcuate. Capsules oblong, 6-8 cm long, with 6 longitudinal ribs; seeds numerous, membranaceous, triangular, ca. 7 mm long, compressed.

Phenology: Flowering and fruiting almost throughout the year.

Status: Native, locally common.

Distribution: In forests and coastal thickets. Also on Cayo Santiago, Vieques, and St. John; along the Antilles, from Belize to Panama, Colombia, and the Guiana's.

Public forest: Piñones.

References: González, F. A. 1990. Aristolochiaceae. Flora de Colombia. 12: 1-185; Rankin Rodríguez, R., 1998. Aristolochiaceae. Flora de la República de Cuba. Fascículo 1-2, 29 pp; Rankin Rodríguez, R. & W. Greuter. 1999. Taxon 48: 677-688. Rankin Rodríguez, R. 2001. La familia Aristolochiaceae en Cuba. Ph. D. Thesis, Universidad de La Habana, Cuba.

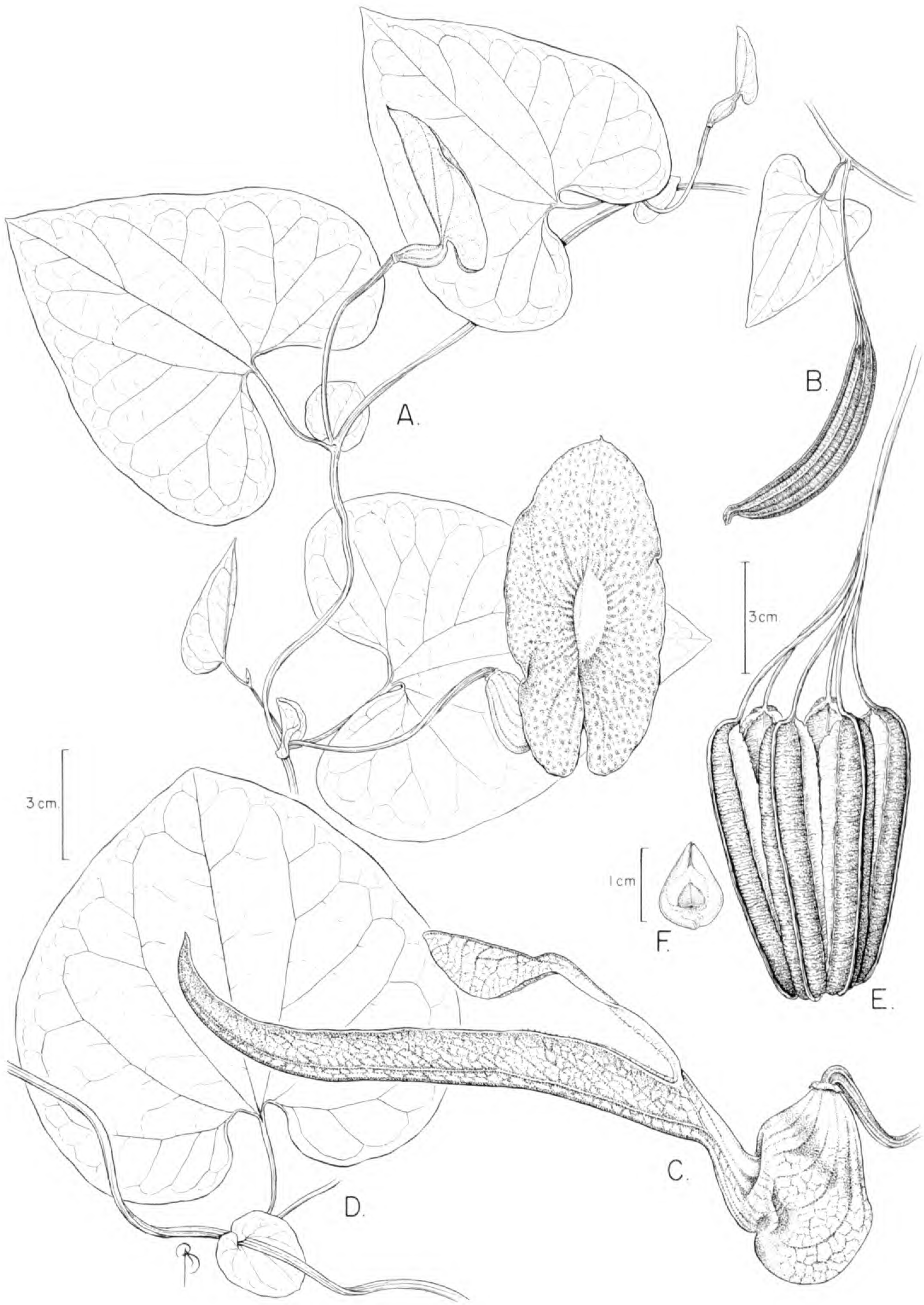

Fig. 24. A-B. *Aristolochia odoratissima*. **A.** Flowering branch. **B.** Branch with immature fruit. **C-F.** *Aristolochia ringens*. **C.** Flower, side view. **D.** Branch with leaf and pseudostipule. **E.** Open fruit. **F.** Seed.

5. *Family* ***ASCLEPIADACEAE***

Key to the genera

1a. Stamens with the filaments free; corolla violet, 5 cm long or longer, the floral tube 2 cm long or longer ..... 1. *Cryptostegia*
1b. Stamens with the filaments connate into a tube that is united to the style or to the stigma to form a gynostegium; corolla white, cream-colored, pale yellow, or pale green, < 2.5 cm long, the floral tube < 5 mm long 2

2a. Pollinium erect 3
2b. Pollinium horizontal or pendulous 4

3a. Leaves fleshy, broadly elliptical; inflorescences of 25 or more flowers; lobes of the corona horizontal, adnate to the staminal tube ..... 4. *Hoya*
3b. Leaves coriaceous, elliptical; inflorescence of 8-20 flowers; lobes of the corona erect, each of them borne on the basal portion of the dorsal side of the anthers ..... 5. *Marsdenia*

4a. Petals 1.5-2 cm long, lanceolate or oblong 5
4b. Petals < 0.5 cm long, ovate, lanceolate, oblong, or deltoid 6

5a. Petals ca. 1.5 mm wide at the base; stems with soft, whitish hairs; leaves cordiform at the base, with 5 acicular glands at the union with the petiole ..... 8. *Oxypetalum*
5b. Petals ca. 4 mm wide at the base; stems with reflexed, somewhat rough hairs, glabrous when mature; leaves deeply cordiform at the base, with 2 triangular glands at the union with the petiole ..... 3. *Gonolobus*

6a. Inflorescences with peduncles 1.5 cm long or longer; pedicels 1 cm long or longer..2. *Funastrum*
6b. Inflorescences with short or subsessile peduncles; pedicels < 1 cm long 7

7a. Corolla rotate; pollinium horizontal ..... 6. *Matelea*
7b. Corolla campanulate; pollinium pendulous ..... 7. *Metastelma*

1. CRYPTOSTEGIA

Twining lianas or scandent shrubs, producing abundant milky latex. Stems cylindrical, glabrous, lenticellate. Leaves opposite, petiolate; blades simple, without glands; stipules interpetiolar, minute. Flowers in terminal cymes. Calyx campanulate, of 5 more or less elongate sepals; corolla infundibuliform; corona of 5 filiform lobes; stamens 5, inserted at the base of the corolla, the filaments short and free, the anthers lanceolate, concrescent around the stigma; ovary superior, bicarpellate, the stigma capitate. Fruit of 2 divergent, woody, boat-shaped follicles, with numerous ovate seeds, crowned with a tuft of long hairs. A genus of 2 species, native to the Old World tropics.

Key to the species of *Cryptostegia*

1a. Corona with bifid lobes; follicles 10-15.4 cm long ..... 1. *C. grandiflora*
1b. Corona with simple lobes; follicles 5.8-13 cm long ..... 2. *C. madagascariensis*

1. Cryptostegia grandiflora R. Br., Bot. Reg. tab. 435. 1820.

Fig. 25. E-H

Canario morado falso, Purple alamanda, Rubber vine

Woody vine, twining, attaining 6 m in length, with abundant milky latex. Stems cylindrical, glabrous or pilose in the area of the nodes, dark brown, with numerous minute lenticels. Leaves opposite; blades 5-10 × 2-6.3 cm, elliptical to rounded, membranaceous, glabrous, the apex acute or obtuse, the base obtuse to rounded, decurrent on the petiole, without glands at the union with the petiole, the margins entire; venation pinnate, with 11-13 pairs of secondary veins; upper surface dull; lower surface pale, with obscure venation; petioles glabrous, 17-10 mm long; stipules interpetiolar and intrapetiolar. Flowers 6-9, arranged in dichasial cymes, pedunculate; bracts foliaceous, ovate, 1-1.2 cm long. Calyx green, campanulate, the sepals ovate, pubescent, 1-1.5 cm long; corolla infundibuliform, 5-7 cm long, violet, whitish inside, the tube ca. 2 cm long; corona with bifid, lanceolate lobes, ca. 1.5 cm long. Follicles 2, divergent, brown when mature, 10-15.4 cm long, boat-shaped (keeled), woody; seeds reddish brown, ovate-lanceolate, 3-4 mm long, with long, white, silky hairs.

Phenology: Flowering and fruiting throughout the year.

Status: Exotic, uncommon, cultivated and naturalized.

Distribution: Along the coast. Also on Vieques. Native to Madagascar, but widely cultivated in the Neotropics.

2. Cryptostegia madagascariensis Bojer ex Decne. in DC., Prodr. 8: 492. 1844.

Fig. 25. A-D

Rubber vine

Twining woody vine or scandent shrub, 6-8 m in length, with abundant milky latex. Stems cylindrical, glabrous, reddish brown, with few lenticels. Leaves opposite; blades 4-10 × 2-4.7 cm, elliptical, oblong, or ovate, coriaceous, glabrous, the apex short-acuminate, obtuse, or rounded, the base obtuse to rounded, short- decurrent on the petiole, without glands at the union with the petiole, the margins entire; venation pinnate, with 14-16 pairs of secondary veins; upper surface dull; lower surface pale, with obscure venation; petioles glabrous, 0.6-1.5 cm long; stipules minute, intrapetiolar. Flowers few or many in pedunculate cymes; bracts foliaceous, lanceolate, ca. 5 mm long. Calyx green, campanulate, the sepals ovate, pubescent, 0.5-1.5 cm long; corolla infundibuliform, 3-6 cm long, violet, the tube darker inside, the lobes abaxially whitish in the overlapping portion; corona violet, with subulate, simple lobes, ca. 1 cm long. Follicles 2, divergent, brown when mature, 5.8-13 cm long, winged or keeled, woody; seeds reddish brown, ovate-lanceolate, ca. 3 mm long, with long, cream-colored, silky hairs.

Phenology: Collected in flower in August and from December to February and in fruit in August.

Status: Exotic, common, cultivated and naturalized in Puerto Rico and the Virgin Islands.

Distribution: In thickets and coastal forests. Also on Vieques, St. Croix, St. John, St. Thomas, and Tortola; native to Madagascar, but of wide distribution in the Neotropics.

Public forests: Guánica and Río Abajo.

Commentary: This species was treated erroneously for the flora of St. John (Acevedo-Rodríguez, 1996) under the name of *Cryptostegia grandiflora* R.Br.

2. FUNASTRUM

Herbaceous or slightly woody vines, twining, with abundant milky latex. Stems slender, glabrous or puberulous. Leaves opposite, petiolate; blades simple, the upper surface with 2-8 glands at the union with the petiole; pseudo-stipules absent. Inflorescences of subaxillary umbelliform cymes. Calyx deeply lobed, the sepals with or without glands at the base on the inner surface; corolla rotate, slightly campanulate, the lobes short; corona of 5 inflated, ovoid or ellipsoid, free and erect vescicles; stamens 5, erect, with distal appendages adpressed to the apex of the stigma; pollinium pendulous; ovary superior,

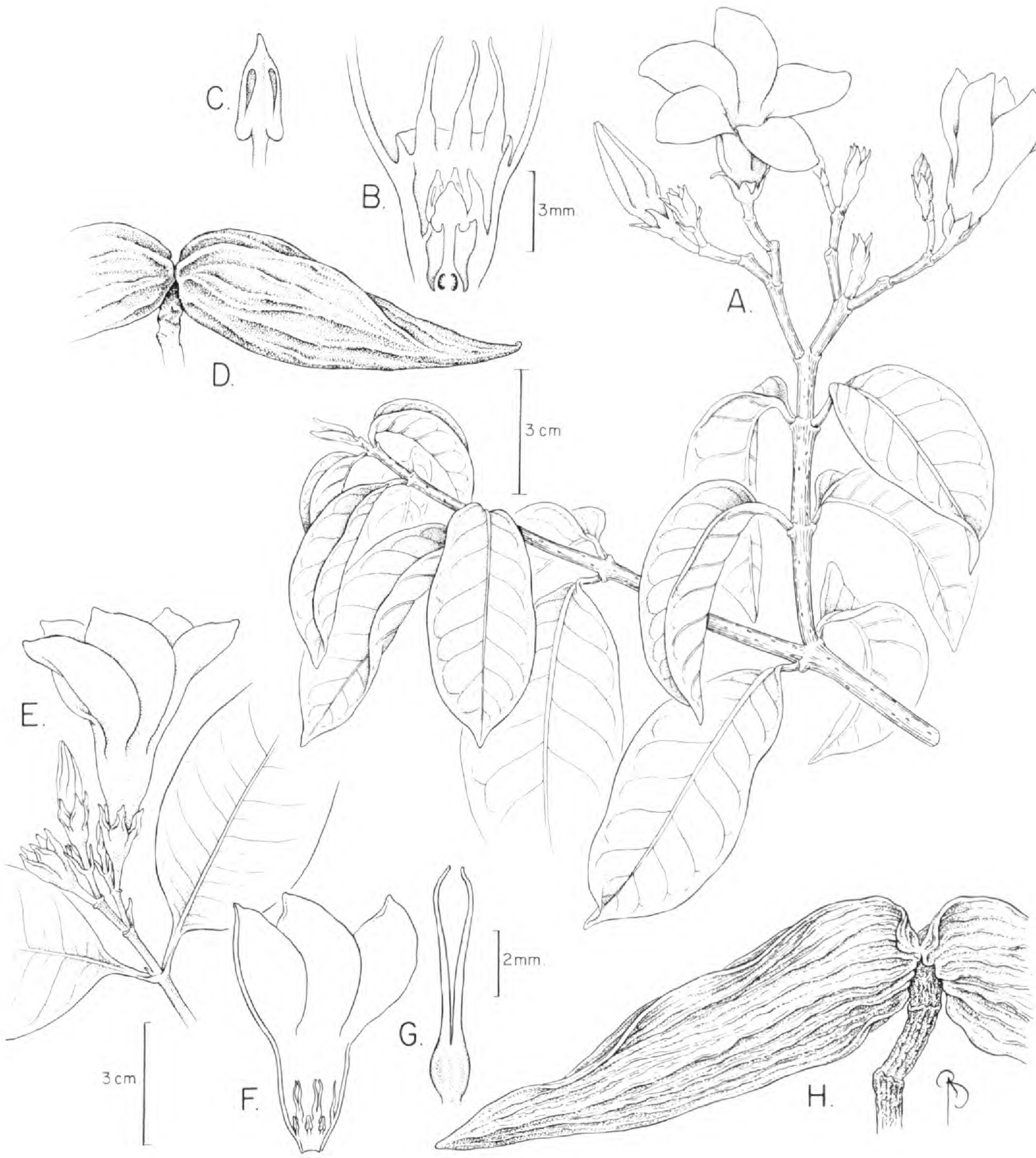

Fig. 25. A-D. *Cryptostegia madagascariensis*. **A.** Flowering branch. **B.** Detail of the longitudinal section of the flower showing staminodia, stamens, and gynoecium. **C.** Detail of an anther. **D.** Fruit with two divaricate follicles. **E-H.** *Cryptostegia grandiflora*. **E.** Flowering branch. **F.** Longitudinal section of the flower showing staminodia and stamens. **G.** Gynoecium. **H.** Fruit with two divaricate follicles.

bicarpellate, the gynostegium sessile or stipitate, the stigma forming a conical or apiculate head. Fruit of (1) 2 follicles, asymmetrically fusiform; seeds usually numerous, obovate, flattened, with a tuft of hairs on the apical portion. A genus of about 15 species, of tropical and subtropical areas of the New World.

1. Funastrum clausum (Jacq.) Schltr., Repert. Spec. Nov. Regni Veg. 13: 283. 1914.

Fig. 32. G-J

BASIONYM: *Asclepias clausa* Jacq.

SYNONYM: *Sarcostemma clausum* (Jacq.) Schult.

Herbaceous vine, twining, 4-5 m in length, with abundant milky latex. Stems cylindrical, glabrous, slender. Leaves opposite; blades 3-6 × 0.8-2 cm, elliptical or elliptic-lanceolate, the apex obtuse with a small, tapering point, the base obtuse or rounded, the margins entire; upper surface puberulous, with a prominent midvein, with a pair of triangular glands at the union with the petiole; lower surface pale green, dull, puberulous, with a prominent midvein; petioles 0.5-3 mm long, pubescent; stipules triangular, minute. Flowers numerous (10-20), arranged in umbelliform cymes; peduncle 4-12 cm long; pedicels 1-2 cm long, pubescent. Calyx green, the sepals triangular, pubescent on the outer surface, ca. 3 mm long; corolla rotate, white, pubescent outside, the lobes ovate, ca. 7 mm long; corona of oblong-obovoid vescicles, white. Follicles cylindrical, 5-8 × 1 cm.

Phenology: Flowering from January to October and fruiting from November to January.

Status: Exotic, cultivated, although uncommon in the Virgin Islands.

Distribution: Cited from St. Croix by West (1793) and by Eggers (1879) and from St. Thomas by Krebs (1847). From southern North America to Argentina, including the Antilles.

3. GONOLOBUS

Herbaceous or slightly woody vines, twining, with abundant milky latex. Leaves opposite, petiolate; blades simple, the upper surface with minute triangular glands where they join the petiole; intrapetiolar stipules minute. Flowers in axillary, umbelliform, or racemose, pedunculate or subsessile cymes. Calyx of 5 elongated sepals, with a gland at the base on the inner surface; corolla rotate or subcampanulate, sometimes forming a short tube at the base, the petals linear, oblong, lanceolate, or rounded; corona with a single series of lobes; stamens 5, inserted at the base of the corolla, the filaments connate at the base to form a short tube, the anthers with a fleshy dorsal appendage, pollinia horizontal or pendulous; ovary superior, bicarpellate, the stigma 5-angled, depressed. Fruit of 1 angular or winged follicle; seeds numerous, crowned with a tuft of long hairs. A genus of approximately 100 species, mostly native to Mexico and Central America, with several species in the Antilles.

1. Gonolobus stephanotrichus Griseb., Cat. Pl. Cub. 177: 1866.

Fig. 26. A-G

SYNONYM: *Vincetoxicum stephanotrichum* (Griseb.) Britton

Herbaceous or slightly woody vine, twining, attaining 10 m in length, with abundant milky latex. Stems cylindrical, pubescent with reflexed, somewhat rough hairs, glabrescent when mature. Leaves opposite, pendulous; blades 3.5-12 × 1.5-5.5 cm, ovate or oblong-ovate, membranaceous, glabrous, the apex acuminate, the base deeply cordiform, with a pair of minute triangular glands at the union with the petiole, the margins entire or crenate; upper surface dark green, dull; lower surface pale, dull, with a prominent midvein; petioles cylindrical, 4-6 cm long, pubescent. Flowers 2 or more in sessile or subsessile cymes; pedicels pilose, ca. 5 mm long. Calyx green, tinged with pink, the sepals ovate-lanceolate, ca. 5 mm long; corolla rotate, pale purple or green tinged with purple on both surfaces, the petals narrowly lanceolate, ca. 15 mm long, abaxially pilose; corona purple, double, with 5 outer lobes and 2 short inner lobes; pollinium pendulous; ovary sessile, the stigma purple. Follicles green, fusiform, 15-17 cm long, with 5 longitudinal ribs; seeds light brown, ovate, ca. 6.5 mm long, with long, silky hairs at the apex.

Phenology: Collected in flower in October and January and in fruit in April, September, and November.

Status: Native, uncommon.

Distribution: In moist or wet forests of the Cordillera Central, the Sierra de Luquillo, and the zone of mogotes. Also in Cuba and Hispaniola.

Public forests: El Yunque, Guilarte, Río Abajo, and Toro Negro.

4. HOYA

Twining vines or epiphytes, herbaceous or slightly woody, sometimes subshrubs, producing abundant milky latex. Leaves opposite; blades simple, fleshy, the upper surface with minute triangular glands where they join the petiole; intrapetiolar stipules minute or absent. Flowers usually numerous, in axillary, umbelliform, pedunculate or sessile racemes. Calyx of 5 free sepals that have a gland at the base on the inner surface; corolla rotate or campanulate, the tube short, cylindrical or urceolate, the petals fleshy or waxy; corona simple, with 5 horizontal segments adnate to the staminal tube; stamens 5, inserted at the base of the corolla, the filaments fused to a gynostegium, which is not markedly capitate, the anthers with a distal appendage; pollinium erect and solitary; ovary superior, bicarpellate, the stigma conical. Fruit of 2 slender follicles; seeds numerous, crowned with a tuft of long hairs. A genus of approximately 300 species, native to southern Asia, Malaysia, and Australia, some of which are cultivated as ornamentals throughout the tropics.

1. Hoya australis R. Br. ex Traill, Trans. Hort. Soc. London 7: 28. 1830.

Fig. 26. H-K

Mata de cera, Wax plant

Slightly woody vine, twining, 6-7 m in length, with abundant milky latex. Stems cylindrical, puberulous, green. Leaves opposite; blades 5-12 × 2.5-5.5 cm, oval, elliptical, or ovate, fleshy, glabrous, acute, acuminate, or subrounded at the apex, the base obtuse or rounded, with 3-5 minute triangular glands at the union with the petiole, the margins entire, the venation pinnate; upper surface dull, the midvein sunken; lower surface dull, with a prominent midvein and puberulous; petioles subcylindrical, 1-2 cm long, pubescent. Flowers numerous, arranged in umbelliform racemes, clustered at the tip of a peduncle; basal flowers early deciduous; bracts overlapping and persistent on the peduncle; peduncle 1.5-3 cm long; pedicels 2-4 cm long, pale green. Calyx whitish green, of lanceolate sepals, ca. 3 mm long; corolla rotate, white, with a bright pink to purple center, the lobes broadly ovate, 4-5 mm long, densely papillose inside; corona white, the segments 3 mm long. Follicles linear, cylindrical, 6-13 cm long; seeds oblong, ca. 4 mm long, with long, whitish, silky hairs.

Phenology: Collected in flower in December.

Status: Exotic, commonly cultivated in Puerto Rico and the Virgin Islands.

Distribution: Native to Australia; widely cultivated in the Neotropics.

Commentary: This species has been cited as *Hoya carnosa* (L.) R.Br. by Britton and P. Wilson (1925) and by Liogier (1995).

5. MARSDENIA

Herbaceous or woody vines, twining, less frequently erect shrubs, with abundant milky latex. Stems cylindrical or angular, lenticellate or with abundant cork when mature. Leaves usually opposite, petiolate; blades simple, the upper surface with 2 or more minute glands where they join the petiole; intrapetiolar stipules minute. Flowers in subaxillary or terminal, umbelliform or racemose, dichasial or paniculiform cymes, with few to many flowers. Calyx of 5 deep or short sepals, with 1-2 (3-5) glands at the base on the inner surface, or without glands; corolla rotate, campanulate, urceolate, or hypocrateriform; corona absent or of 5 segments, each of them borne on the basal portion of the dorsal side of the anthers; stamens with the filaments fused to a sessile or stipitate gynostegium; stamens 5, the anthers erect, usually rectangular; pollinia erect; ovary superior, bicarpellate, the stigma conical or depressed. Fruit a fusiform or ovoid, ellipsoid, or angular follicle, winged at the margin; seeds numerous, crowned with a tuft of long hairs. A tropical and subtropical genus of approximately 300 species.

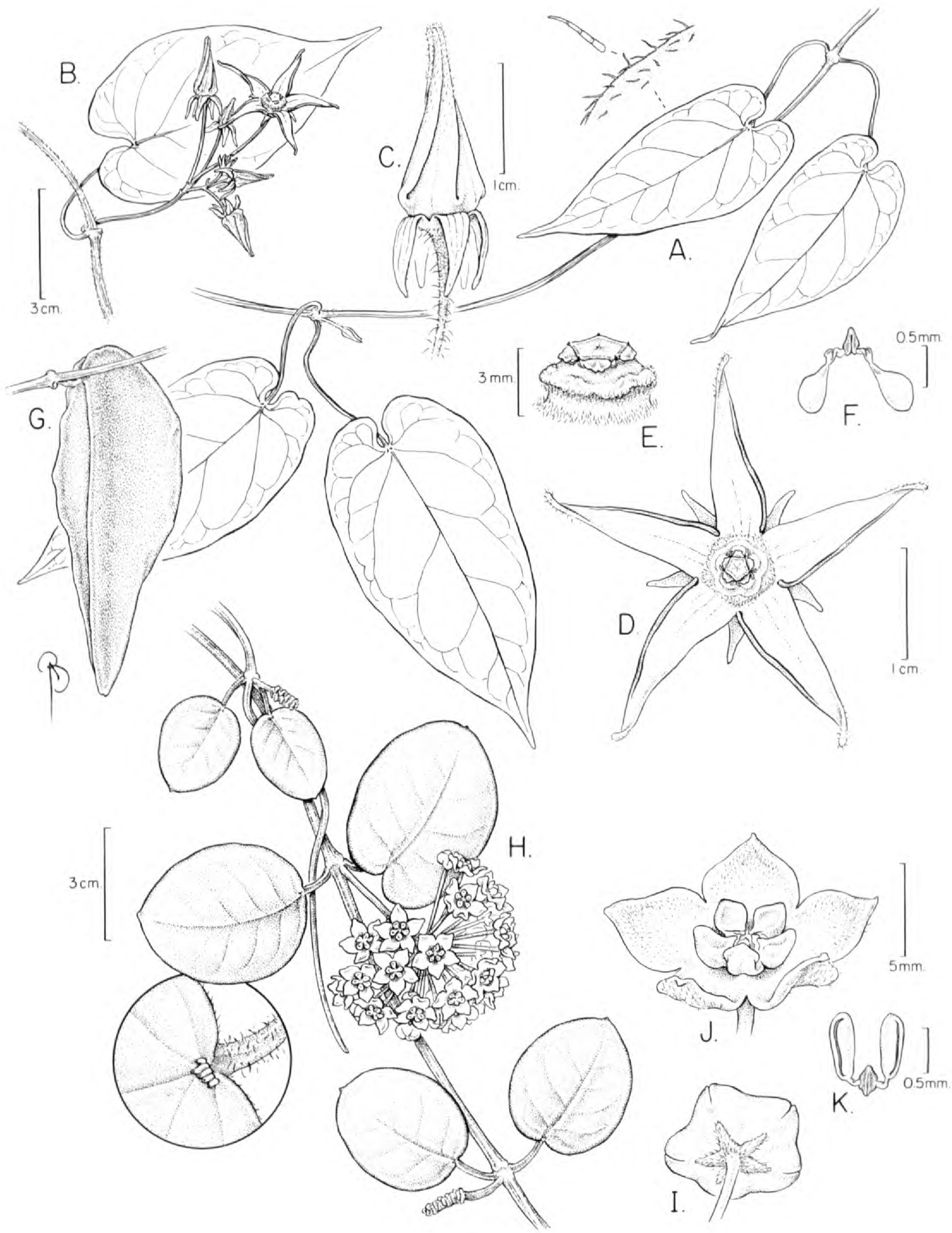

Fig. 26. A-G. *Gonolobus stephanotrichus*. **A-B.** Fertile branch, with details of the pubescence. **C.** Floral bud. **D.** View of the flower from above. **E.** Stigmatic head. **F.** Pollinium. **G.** Fruit. **H-K.** *Hoya australis*. **H.** Flowering branch. **I.** Floral bud. **J.** Flower. **K.** Pollinia.

Key to the species of *Marsdenia*

1a. Leaves with 5 or more minute glands on the portion adjacent to the petiole; corolla hypocrateriform or campanulate, white 2
1b. Leaves with 2 acicular glands on the portion adjacent to the petiole; corolla rotate, purple-pink ..... 3. *M. woodburyana*

2a. Leaves usually obovate; corolla campanulate, the tube ca. 3 mm long, the lobes ca. 5 mm long ..... 1. *M. elliptica*
2b. Leaves elliptical; corolla hypocrateriform, the tube 2-2.5 cm long, the lobes ca. 1 cm long ..... 2. *M. floribunda*

1. Marsdenia elliptica Decne. in DC., Prodr. 8: 616. 1844.

Fig. 27. A-D

Slightly woody vine, twining, 3-5 m in length, with abundant milky latex. Stems cylindrical, glabrous, dark brown, with some scattered lenticels. Leaves opposite; blades 5-13 × 2-6 cm, obovate or less frequently elliptical or oblong-elliptical, coriaceous, glabrous, the venation not prominent, the apex short-acuminate, the base obtuse to rounded, the margins entire, revolute; upper surface dull, with 5-10 minute, dark brown glands on the portion adjacent to the petiole; lower surface pale; petioles glabrous, 1-2 cm long. Flowers 8-15, arranged in subaxillary cymes, glabrous, shorter than the petiole; peduncles ca. 5 mm long; pedicels ca. 3 mm long. Calyx crateriform, the sepals ovate, obtuse, ca. 3 mm long, glabrous, ciliate on the margin; corolla campanulate, white, ca. 8 mm long, glabrous, short-tubular (ca. 3 mm) at the base, the lobes ovate, obtuse, ca. 5 mm long; corona of simple, subulate, erect, connivent segments; stigma turbinate. Follicles fusiform, green, ca. 15 x 1 cm.

Phenology: Collected in flower in June and in fruit in November.

Status: Endemic to Puerto Rico, very rare.

Distribution: Originally known from two collections, the type collection, made by *Wydler (no. 308)* in 1827 but without a specific locality, and the second collection, made by *Sintenis (no. 1452)* in June of 1885 from Monte Jiménez in the Sierra de Luquillo. Recently rediscovered in the Río Abajo Forest, Monte Torresilla and in Sabana Hoyos.

Public forests: El Yunque and Río Abajo.

Commentary: In sterile condition, this species can be confused with *Matelea variifolia*; nevertheless, *Marsdenia elliptica* is distinguished by the presence of coriaceous leaves with 5-10 glands of various forms on the upper surface in the portion where they join the petiole (vs. membranaceous with 2 acicular glands in *M. variifolia*).

2. Marsdenia floribunda (Brongn.) Schltr. in Urb., Symb. Antill. 1: 275. 1899.

Fig. 27. E-H

BASIONYM: *Stephanotis floribunda* Brongn.

Estefanotis, Florador, Madagascar jasmine, Wax plant

Woody vine, twining, 3-5 m in length, with abundant milky latex. Stems cylindrical, glabrous, striate, lenticellate. Leaves opposite; blades 5-12 × 2.2-3.5 cm, elliptical, coriaceous, glabrous, the apex short-acuminate, the base rounded to subcordiform, the margins entire, markedly revolute; upper surface dull, with 5 minute, conical glands, on the portion adjacent to the petiole; lower surface pale green, dull, with a prominent midvein; petioles 1-2 cm long, glabrous; intrapetiolar stipules acicular, minute. Flowers numerous, fragrant, in axillary umbels, ascending; peduncle 2-2.5 cm long; pedicels 2.5-3 cm long. Calyx crateriform to rotate, green, the sepals oblong, obtuse, sometimes minutely ciliate, glabrous; corolla white or cream-colored, hypocrateriform, 2.5-5 cm long, glabrous, the lobes oblong, obtuse, ca. 1 cm long; corona absent;

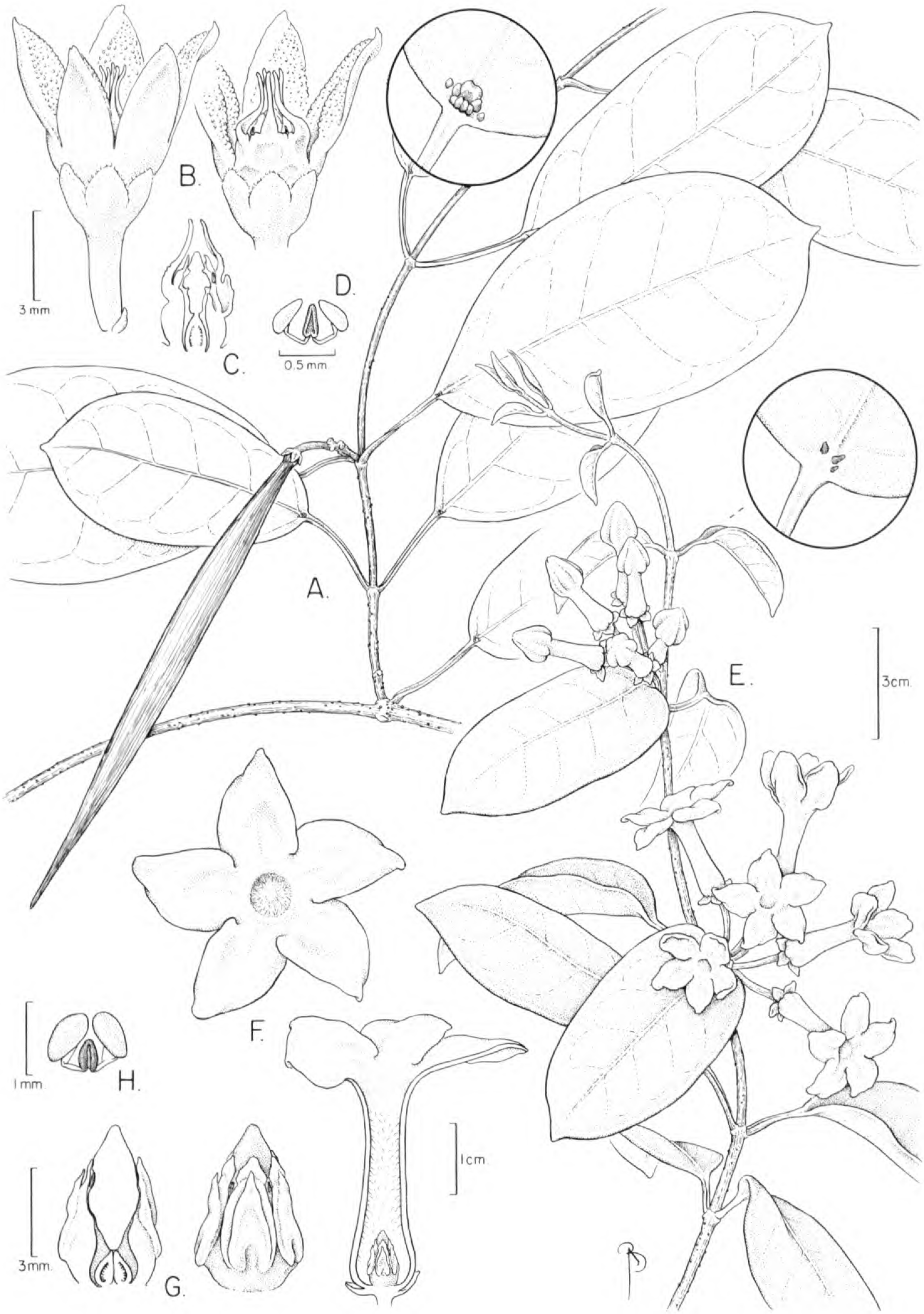

Fig. 27. A-D. *Marsdenia elliptica*. **A.** Fertile branch. **B.** Flower, and flower with two petals removed showing the connivent stamens. **C.** Gynoecium and stamens in longitudinal section. **D.** Pollinia. **E-H.** *Marsdenia floribunda*. **E.** Fertile branch. **F.** Flower, top view. **G.** Gynoecium and stamens, longitudinal section of the flower. **H.** Pollinia.

anthers sessile, lanceolate; stigma conical. Follicles 7.5-10 cm long.

Phenology: Collected in flower in September.

Status: Exotic, common, cultivated.

Distribution: Native to Madagascar. Commonly cultivated in gardens for its attractive, fragrant flowers. Also in St. Croix.

3. Marsdenia woodburyana Acev.-Rodr., Brittonia 51: 167. 1999.

Fig. 28. A-F

Woody vine, twining, 5-8 m in length, with abundant milky latex. Stems thick, cylindrical, glabrous, sparsely lenticellate, grayish, attaining ca. 3 cm in diameter at the base. Leaves opposite; blades 6-6.5 × 3.5-4 cm, ovate, coriaceous, the apex acute, obtuse, or short-acuminate, the base rounded, the margins entire, markedly revolute; upper surface glabrous, with 2 acicular glands on the portion adjacent to the petiole; lower surface pale green, glabrous or minutely puberulous; petioles 1.5-2 cm long, glabrous, sulcate on the upper surface; stipules absent. Flowers about 20, arranged in umbelliform racemes; peduncles ca. 1 cm long; pedicels 7-10 mm long. Calyx light green, rotate, of 5 imbricate sepals, ovate-rounded, obtuse, 3-3.5 mm long, puberulous on the abaxial surface, ciliate on the margins; corolla rotate, the lobes ovate, 5.5-7 mm long, glabrous, light green in the central portion, purple-pink toward the markedly revolute margins, the apex reflexed; corona with segments of staminal origin (the distal portion of the filaments), fleshy, asymmetric-pyramidal, ca. 3 mm long, projecting into a short distal appendage, triangular, inflexed, pink; anthers oblong, ca. 2 mm long; stigma flat. Follicle lanceolate-fusiform, slightly compressed, woody, 11-13 × 2-3 cm; seeds numerous, membranaceous, ovate, ca. 1 cm long, with a long tuft of brown-cream hairs.

Phenology: Collected in flower in May and in fruit in January and July.

Status: Endemic to Puerto Rico, extremely rare or threatened.

Distribution: Known only from Caña Gorda, Guánica (*Acevedo-Rdgz. and L. Ramírez 10174*; *Proctor 39358*; *L. Ramírez 48*).

Public forest: Guánica.

6. MATELEA

Erect subshrubs or twining vines, with abundant milky latex; with or without an indumentum of glandular hairs. Leaves opposite, petiolate; blades simple, with glands at the base; stipules absent. Flowers in axillary cymes, with short peduncles or subsessile. Calyx with 5 elongated sepals, usually glandular inside at the base; corolla subrotate, more or less lobed; corona annular, of staminal origin; stamens 5, inserted at the base of the corolla, the filaments connate, forming a short tube, the anthers concrescent around the style, pollinia horizontal or subpendulous; ovary superior, of two free carpels, the stigma capitate, projecting beyond the anthers. Fruit a fusiform to ovoid follicle, smooth or muricate; seeds numerous, with a tuft of hairs at the apex. A genus of 300 species, distributed from southern North America to South America, including the Antilles.

Key to the species of *Matelea*

1a. Plants robust, slightly woody; stems 4 mm or more in diameter; leaves densely pubescent on the lower surface; follicles ovoid-fusiform, verrucose ..... 1. *M. maritima*

1b. Plants herbaceous; stems 2 mm or less in diameter; leaves glabrous or puberulous on the lower surface; follicles elongate-fusiform, smooth 2

2a. Leaves rounded, truncate, or subcordiform at the base, never obtuse or acute; sepals ovate, ca. 1.5 mm long; lobes of the corolla lanceolate-triangular, not overlapping ..... 2. *M. sintenisii*

2b. Leaves variable at the base, sometimes rounded, but always with some obtuse or acute; sepals oblong-ovate, 2-2.5 mm long; lobes of the corolla rounded, imbricate ..... 3. *M. variifolia*

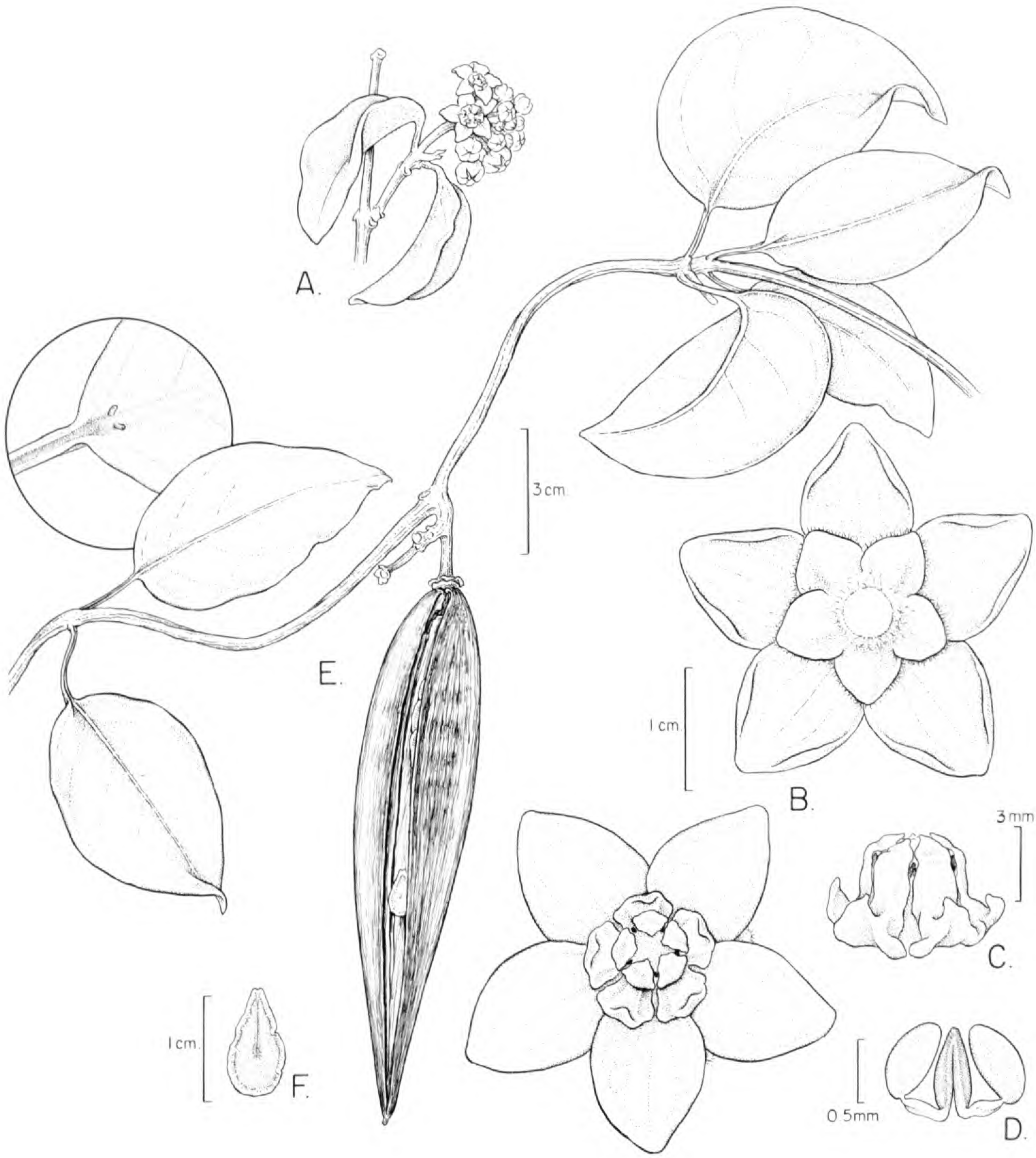

Fig. 28. A-F. *Marsdenia woodburyana*. **A.** Flowering branch. **B.** Flower, views from above and below. **C.** Anthers. **D.** Pollinia. **E.** Fertile branch. **F.** Seed.

1. Matelea maritima (Jacq.) Woodson, Ann. Missouri Bot. Gard. 28: 222. 1941.

Fig. 29. A-D

BASIONYM: *Asclepias maritima* Jacq.
SYNONYM: *Ibatia maritima* (Jacq.) Decne.

Guanabanilla cimarróna, Pompón, Beach milk vine

Slightly woody vine, twining, 5-7 m in length, with abundant milky latex. Stems densely pubescent and sulcate when young, whitish and corky when mature, 4 mm or more in diameter. Leaves opposite; blades 4-10.5 × 3-7.5 cm, ovate, chartaceous, the apex acute or acuminate, the base cordiform, the margins entire; upper surface dull, pubescent, with 2 (3-7) acicular glands in the area adjacent to the petiole; lower surface pale, densely pubescent, the venation yellowish; petioles cylindrical, densely pubescent, 2-7 cm long. Flowers few, in small axillary cymes. Calyx green,

rotate, ca. 2 mm in diameter, the sepals ovate or lanceolate, pubescent; corolla rotate, greenish, 4-6 mm in diameter, the petals ovate, not imbricate; corona yellowish green, with short and rounded lobes. Follicles ovoid-fusiform, green, 5-8 × 3.5-4.5 cm, pubescent, verrocose; seeds numerous, brown, with long, white, silky hairs.

Phenology: Flowering from October to November and fruiting from December to March.

Status: Native, very common.

Distribution: In thickets and coastal forests. Also on Culebra, Desecheo, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; Cuba, Hispaniola, the Lesser Antilles, and from Panama to northern South America.

Public forests: Guánica, Mona, Piñones, and Susúa.

2. Matelea sintenisii (Schltr.) Woodson, Ann. Missouri Bot. Gard. 28: 226. 1941.

Fig. 29. E-H

BASIONYM: *Gonolobus sintenisii* Schltr.
SYNONYM: *Vincetoxicum sintenisii* (Schltr.) Britton

Herbaceous vine, twining, 3-4 m in length, with little or no milky latex. Stems slender, cylindrical, pubescent with retrorse hairs, 2 mm or less in diameter. Leaves opposite; blades 3-6.5 × 1-3 cm, ovate or ovate-lanceolate, membranaceous, the apex acute or acuminate, the base rounded, truncate, or subcordiform, the margins entire or crenate; upper surface dark green, with two acicular glands at the union with the petiole; lower surface light green, glabrous or puberulous, with notable reticulate venation; petioles 1-2 cm long, with 2 lines of hairs along the upper surface. Flowers few, arranged in sessile or subsessile cymes; pedicels ca. 5 mm long, pubescent. Calyx green, crateriform, of 5 ovate sepals, ca. 1.5 mm long; corolla rotate, light green, the petals free to the base, lanceolate-triangular, not imbricate, 3.5-5 mm long; corona annular. Fruits fusiform, green, to 14 cm long, smooth; seeds numerous, spathulate, dark brown, ca. 4 mm long, with the margin verrocose and a long tuft of white hairs.

Phenology: Collected in flower in March and April.

Status: Endemic to Puerto Rico, uncommon.

Distribution: In moist forests in the cordilleras and the zone of mogotes.

Public forests: El Yunque, Maricao, Río Abajo, and Toro Negro.

3. Matelea variifolia (Schltr.) Woodson, Ann. Missouri Bot. Gard. 28: 226. 1941.

Fig. 29. I-L

BASIONYM: *Gonolobus variifolius* Schltr.
SYNONYMS: *Vincetoxicum variifolium* (Schltr.) Britton
Matelea borinquensis Alain

Herbaceous vine, twining, 3-4 m in length, with abundant milky latex. Stems slender, cylindrical, puberulous, glabrescent, 2 mm or less in diameter; pubescence of curved, reflexed hairs. Leaves opposite; blades 4.5-10 × 2-4.5 cm, lanceolate, elliptical, or oblong, membranaceous, the apex acute or acuminate, the base acute, rounded, or cordiform, the margins entire; upper surface dark green, glabrous, with 2 acicular glands at the union with the petiole; lower surface pale green, glaucous, glabrous; petioles 0.8-4 cm long, with 2 lines of hairs along the upper surface. Flowers few, arranged in short-pedunculate cymes; pedicels 6-8 mm long. Calyx green, rotate, of 5 oblong-ovate sepals, 2-2.5 mm long; corolla rotate, pale green with dark green venation, 10-14 mm in diameter, the lobes rounded, imbricate, ca. 5 mm long; corona annular, green. Fruits unknown.

Phenology: Flowering from May to October.

Status: Endemic to Puerto Rico, uncommon.

Distribution: In moist forests in the cordilleras and on mogotes.

Public forests: El Yunque, Guilarte, Maricao, Río Abajo, and Toro Negro.

Commentary: After a careful study of the type specimen of *Matelea borinquensis* Alain, I have come to the conclusion that it represents *Matelea variifolia*. The type specimen of *M. borinquensis* (*Alain et al. 35111*) is too poor to characterize its morphology adequately. The size and shape given for the petals cannot be considered as valid because they are based on floral buds. In addition, the characterization of the corona ("*lobis triangularibus 1.5 mm longis*") can not be critically evaluated because it is not discernible on the specimen.

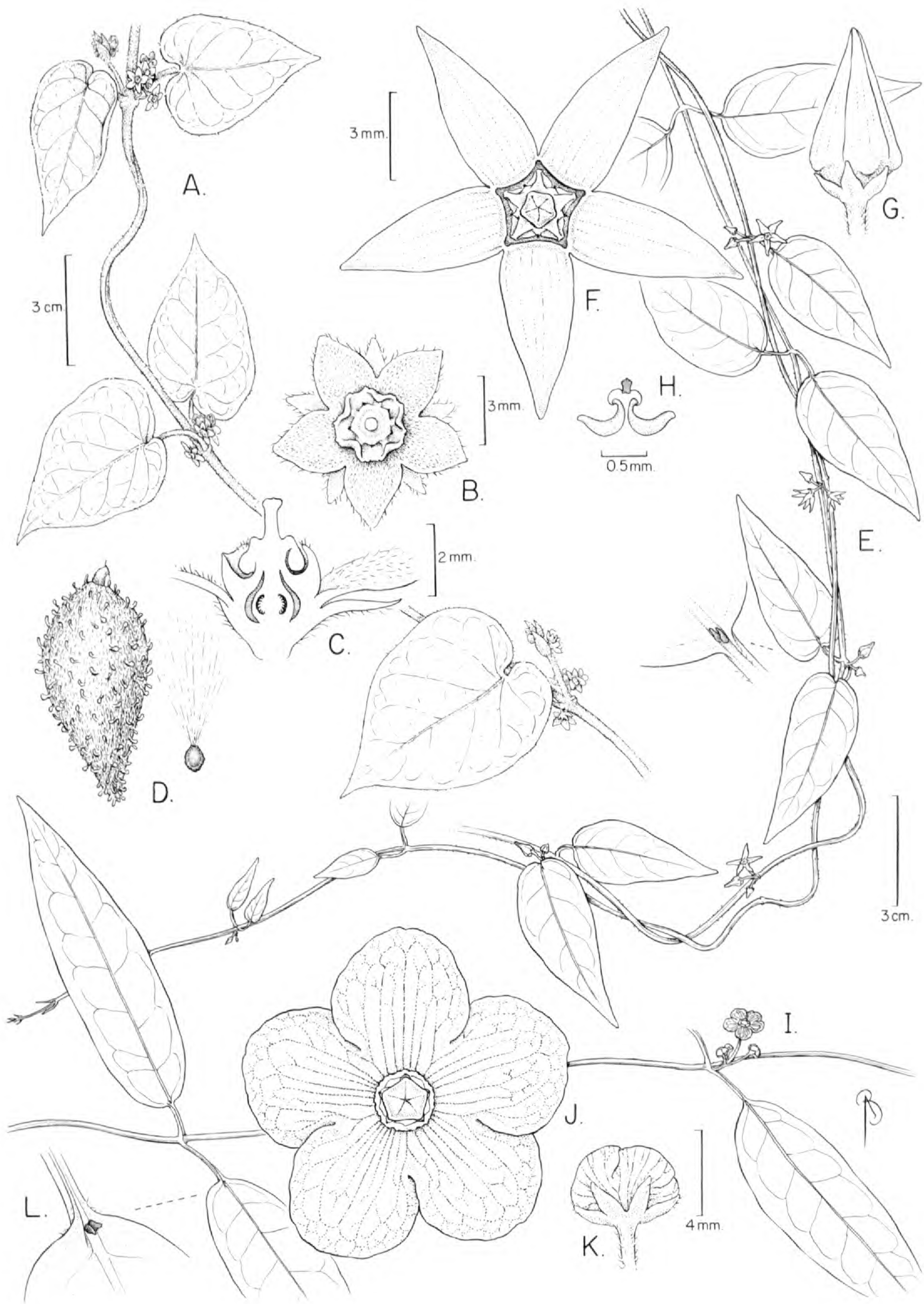

Fig. 29. A-D. *Matelea maritima*. **A.** Flowering branch. **B.** Flower, top view. **C.** Flower, longitudinal section. **D.** Fruit and seed. **E-H.** *Matelea sintenisii*. **E.** Flowering branch. **F.** Flower, top view. **G.** Floral bud. **H.** Pollinium. **I-L.** *Matelea variifolia*. **I.** Flowering branch. **J.** Flower, top view. **K.** Floral bud. **L.** Leaf blade with basal glands.

7. METASTELMA

Herbaceous vines, twining, with abundant milky latex. Leaves opposite, small, petiolate, persistent or deciduous; blades simple, the portion of the upper surface adjacent to the petiole glandular or not, the glands (if present) sometimes deciduous; stipules minute, interpetiolar. Flowers small, produced in axillary, sessile or pedunculate cymes. Calyx of 5 more or less deep sepals, usually with glands at the base on the inner surface; corolla campanulate, the petals usually pubescent on the inner surface; corona of 5 lobes; stamens 5, inserted at the base of the corolla, concrescent around a conical style; pollinia pendulous. Fruit of 2 linear or fusiform follicles, divaricate, with numerous seeds, with a tuft of hairs at the apex. A neotropical genus of about 150 species.

Commentary: The distinction between *Metastelma* and *Cynanchum* is somewhat imprecise, because the majority of the characters used to distinguish them overlap. The characters of the corona are the only ones that permit a clear differentiation. *Metastelma* has the corona lobes fused to the corolla, alternate with the petals, and not fused to the gynostegium, while *Cynanchum* has the corona lobes fused only to the gynostegium. *Metastelma* is restricted to the New World; *Cynanchum*, on the other hand, is found in the Old World. This distinction is not recognized by all authors, and in some floristic works *Metastelma* is considered to be a synonym of *Cynanchum*. In this book, both genera are recognized as valid to maintain concordance with other floristic works for the Caribbean region.

Key to the species of *Metastelma*

1a. Vine deciduous or with very few leaves during the flowering period; leaves without glands at the union with the petiole 2
1b. Vine with abundant leaves during the flowering period; leaves with or without glands at the union with the petiole 3

2a. Lobes of the corolla glabrous ..... 3. *M. leptocladon*
2b. Lobes of the corolla strigulose on the inner surface ..... 5. *M. monense*

3a. Upper surface without glands at the union with the petiole 4
3b. Upper surface with acicular glands at the union with the petiole 6

4a. Leaves linear ..... 4. *M. lineare*
4b. Leaves oblong or oblanceolate 5

5a. Leaves oblong to oblanceolate; lobes of the corolla ovate-lanceolate, acute to obtuse; gynostegium sessile; segments of the corona lanceolate, almost as long as the lobes of the corolla... 5. *M. monense*
5b. Leaves oblanceolate; lobes of the corolla lanceolate, acuminate; gynostegium stipitate; segments of the corona spiniform, much shorter than the lobes of the corolla ..... 1. *M. anegadense*

6a. Leaves ovate, oblong-ovate, or lanceolate 7
6b. Leaves linear ..... 4. *M. lineare*

7a. Gynostegium long-stipitate (1.5-2 mm long); corolla 3-3.5 mm long ..... 6. *M. parviflorum*
7b. Gynostegium sessile or short-stipitate (< 0.3 mm long); corolla ca. 2 mm long ... 2. *M. decipiens*

1. Metastelma anegadense Britton, Bot. Porto Rico. 6: 97. 1925.

Fig. 30. A-D

SYNONYM: *Cynanchum anegadense* (Britton) Alain

Herbaceous vine, twining, glabrous, attaining 1 m in length, with abundant milky latex. Stems with branches that intertwine like a braid; branches green, cylindrical, smooth, < 1 mm in diameter. Leaves perennial, opposite, usually clustered on short lateral branches; blades 1-3.5 × 0.2-0.8 cm, oblong to oblanceolate, coriaceous, the apex rounded to apiculate, the base acute, the margins entire, revolute; upper surface dull, with the midvein sunken, without glands at the union with the petiole; lower surface pale, with a prominent midvein, the secondary veins not visible; petioles 2-3 mm long; stipules interpetiolar, triangular, 0.5 mm long. Flowers few, in sessile cymes. Calyx green, crateriform, the sepals ovate-lanceolate, ca. 1 mm long; corolla yellowish, the lobes lanceolate, acuminate, 2-4 mm long, puberulous toward the apex, strigose in the center on the inner surface; corona with spiniform lobes, ca. 0.5 mm long; gynostegium short-stipitate, ca. 0.7 mm long. Follicles fusiform, 4-5 cm long, glabrous; seeds numerous, light brown, ca. 4 mm long, elliptical, with a tuft of long hairs at the apex.

Phenology: Collected in flower in January, February, and July and in fruit in June.

Status: Endemic to Anegada and Tortola, uncommon.

Distribution: Known from few collections from the sandy coasts of Anegada and Tortola.

Commentary: This species was cited by Woodbury et al. (1977) and by Liogier and Martorell (1982) for Mona Island based on the erroneous identification of *Metastelma monense*.

2. Metastelma decipiens Schltr. in Urb., Symb. Antill. 1: 249. 1899.

Fig. 30. E-H

SYNONYMS: *Cynanchum decipiens* (Schltr.) Alain, non C.K. Schneid.
Metastelma fallax Schltr.
Metastelma grisebachianum Schltr.
Cynanchum grisebachianum (Schltr.) Alain
Metastelma albiflorum Schltr.
Metastelma decaisneanum Schltr.
Cynanchum decaisneanum (Schltr.) Alain
Cynanchum cheesmanii Woodson

Herbaceous vine, twining, 3-6 m in length, with abundant milky latex. Stems green, cylindrical, puberulous, glabrous when mature, 1-2 mm in diameter, much branched, intertwining like a braid. Leaves perennial, opposite; 1-3(5) × 0.5-1.5(2.5) cm, oblong-ovate, ovate or lanceolate, chartaceous, the venation pinnate, the apex acute or obtuse and apiculate, the base rounded, subcordiform, or truncate, the margins entire, revolute, and usually ciliate; upper surface dull, the venation flat, with a pair of acicular glands at the union with the petiole; lower surface pale, usually punctate, with slightly prominent venation; petioles 0.2-1 cm long; stipules interpetiolar, deltoid, ca. 0.4 mm long. Flowers few, in sessile or short-pedunculate cymes; pedicels 1.5-2 mm long. Calyx crateriform, green, the sepals ovate, ca. 1 mm long, more or less ciliate; corolla campanulate, light green outside, white or cream-colored inside, ca. 2 mm long, the lobes oblong-lanceolate, ca. 1.5 mm long, puberulous in the interior and on the margins, usually strigose toward the center; corona white, with linear or linear-spathulate segments, ca. 1.5 mm long; gynostegium sessile (< 0.3 mm long), green in the stigmatic portion. Follicle fusiform, 3.5-5.5 cm long, glabrous; seeds numerous, with a long tuft of hairs at the apex.

Phenology: Flowering and fruiting throughout the year.

Status: Native, quite common.

Distribution: Common in coastal thickets and in the zone of mogotes. Also on Culebra, Desecheo, Cayo Icacos, Cayo Lobos, Cayo Luis Peña, Vieques, St. Croix, St. John, St. Thomas, and Virgin Gorda; Cuba, Hispaniola, the Lesser Antilles, and Tobago.

Public forests: Boquerón, Ceiba, Guajataca, Maricao, Piñones, Río Abajo, and Tortuguero.

Commentary: *Metastelma decipiens* and *M. fallax* were described by Schlechter in 1899 in the same publication, as doubtfully different. These two entities cannot be maintained as different species, because the characters used to distinguish them overlap. For this reason, Britton and P. Wilson (1923) placed *M. fallax* in synonymy with *M. decipiens*. Since neither specific epithet was previously used in the genus *Metastelma*, the decision of Britton and P. Wilson, to apply the name *M. decipiens* to this taxon, should be maintained, obviously having priority

over the decision of Liogier (1995) to place *M. decipiens* in synonymy under *M. fallax*.

I have decided to place *Metastelma grisebachianum* Schltr. in synonymy under *M. decipiens*, because the characters used to separate the two species also overlap. These include the pubescence on the petals and the form of the corona segments, which in my view are not sufficient to distinguish two biological entities. In addition, the disjunction in the distribution of *M. decipiens* does not make biological sense, because it has only been cited for Puerto Rico, St. Thomas, and Tobago, being absent in the Lesser Antilles. By recognizing *M. grisebachianum* as a synonym of *M. decipiens*, the distribution of *M. decipiens* is expanded to include the Lesser Antilles.

3. Metastelma leptocladum (Decne.) Schltr. in Urb., Symb. Antill. 1: 261. 1899.

Fig. 30. I-O

BASIONYM: *Vincetoxicum leptocladum* Decne.
SYNONYMS: *Cynanchum leptocladum* (Decne.) Jiménez
Metastelma ephedroides (Griseb.) Schltr.
Amphistelma ephedroides Griseb.
Cynanchum ephedroides (Griseb.) Alain

Herbaceous vine, twining, 5-7 m in length, with abundant milky latex. Stems green, cylindrical, glabrous, ca. 1 mm in diameter, with numerous pendulous branches, which sometimes intertwine like braids. Leaves opposite, deciduous during the flowering period; blades 0.4-1.5 cm × ca. 0.7 mm, narrowly elliptical to linear, the secondary venation not visible, the apex acute, the base attenuate, the margins entire, revolute; upper surface glabrous, without glands at the union with the petiole; lower surface puberulous; petioles ca. 1.5 mm long; intrapetiolar stipules acicular, ca. 0.2 mm long. Flowers few, in axillary cymes; pedicels 3.5-4.5 mm long. Calyx crateriform, green, the sepals oblong, puberulous, 0.5-0.7 mm long; corolla creamy yellow, ca. 2 mm long, the lobes oblong, glabrous, free to the base; corona crateriform, with triangular segments, ca. 0.3 mm long, shorter than the gynostegium; gynostegium sessile. Follicles fusiform, glabrous, 4-6 cm long; seeds numerous, with a tuft of hairs at the apex.

Phenology: Collected in flower in March and from July to November.

Status: Native, relatively common.

Distribution: In moist or dry forests in central and western Puerto Rico. Also in Cuba, Jamaica, and Hispaniola.

Public forests: Guilarte, Maricao, Río Abajo, and Toro Negro.

4. Metastelma lineare Bello, Anales Soc. Esp. Hist. Nat. 10: 292. 1881.

Fig. 31. A-F

SYNONYM: *Cynanchum lineare* (Bello) Alain

Slender vine, twining, 2-5 m in length, with abundant milky latex. Stems green, cylindrical, more or less glabrous, 1 mm or less in diameter. Leaves perennial, opposite or subwhorled; blades 1.5-4.5 cm × 1.5-2 mm, linear, the apex acute or obtuse, subapiculate, the base obtuse or acute, the margins entire, revolute; upper surface glabrous with the midvein sunken, with a short acicular gland (or sometimes without a gland) where it joins the petiole; lower surface pale, with a prominent midvein, the secondary venation inconspicuous; petioles ca. 2 mm long, slender; intrapetiolar stipules acicular, 0.2 mm long. Flowers few, in subsessile cymes; pedicels slender, 1.5-2.5 mm long. Calyx green, crateriform, the sepals ovate, ca. 1 mm long; corolla white inside, yellowish green outside, 3.5 mm long, the lobes lanceolate, 2.5-3 mm long, reflexed at the apex, the inner surface puberulous from the middle portion toward the apex, strigose from the middle portion toward the base; corona white, the segments narrowly lanceolate, 1.2-2 mm long, longer than the gynostegium; gynostegium sessile. Follicles linear, 3-5 cm long, glabrous, splitting in half to expose numerous dark brown, ovate seeds, 5-5.5 mm long, with long, silky hairs at the apex.

Phenology: Flowering throughout the year and fruiting from September to March.

Status: Native, relatively common.

Distribution: In secondary forests at middle and upper elevations, in central and western Puerto Rico. Also on Mona and St. Thomas; Cuba.

Public forests: Guánica, Maricao, Mona, Río Abajo, Susúa, and Toro Negro.

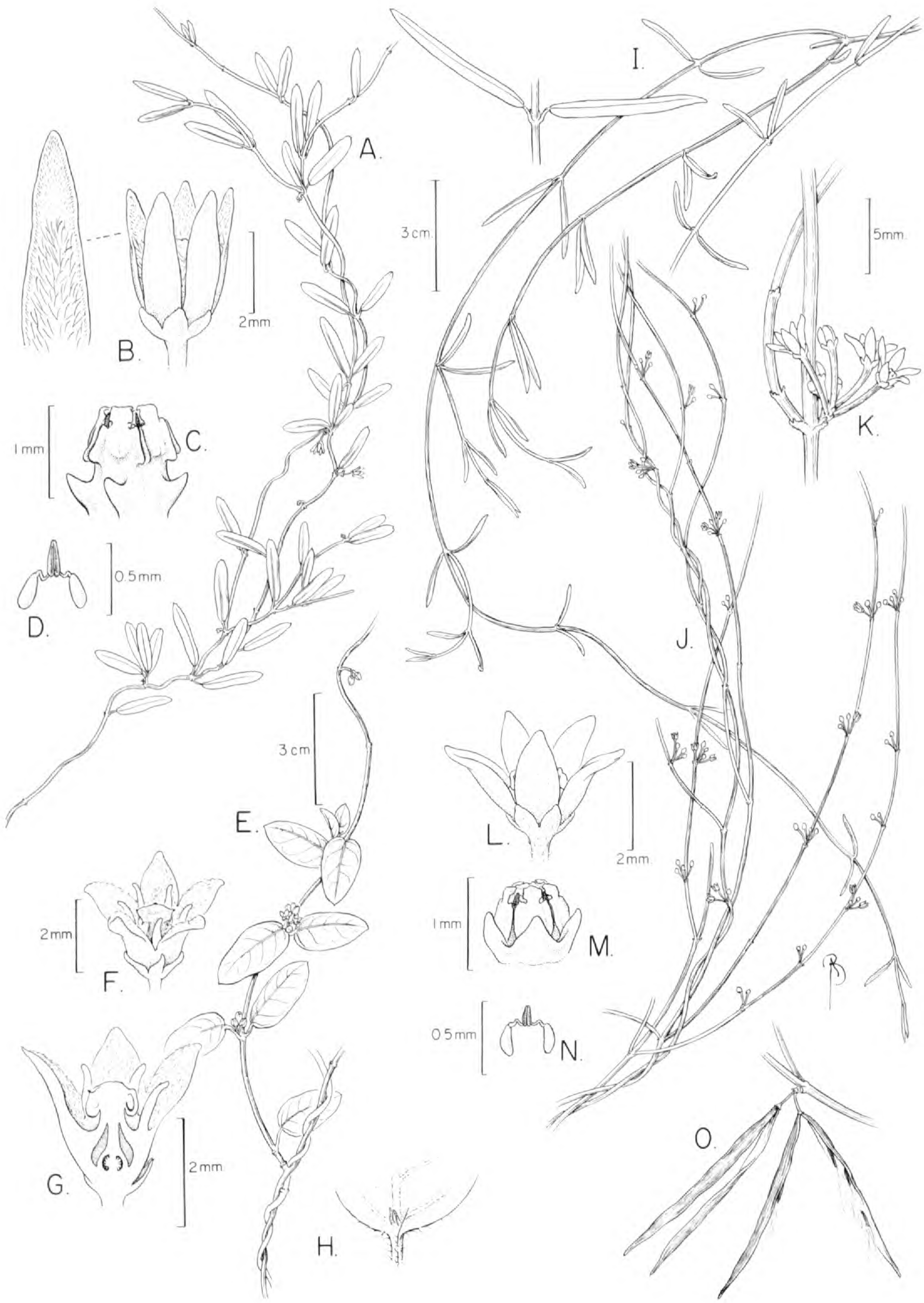

Fig. 30. A-D. *Metastelma anegadense*. **A.** Habit. **B.** Flower and detail of the petal. **C.** Corona and gynostegium. **D.** Pollinium. **E-H.** *Metastelma decipiens*. **E.** Habit. **F.** Flower. **G.** Flower, longitudinal section. **H.** Base of the leaf with acicular glands. **I-O.** *Metastelma leptocladon*. **I.** Vegetative branch. **J.** Flowering branch. **K.** Detail of the inflorescence. **L.** Flower. **M.** Corona and gynostegium. **N.** Pollinium. **O.** Open follicles.

5. Metastelma monense Britton, Bot. Porto Rico 6: 97. 1925.

Fig. 31. G-K

SYNONYM: *Cynanchum monense* (Britton) Alain

Herbaceous vine, twining, evergreen or partially deciduous during the flowering period, much branched, attaining 5 m in length, with abundant milky latex. Stems green, slender, cylindrical, glabrous, 1 mm or less in diameter. Leaves opposite or clustered on short axillary branches; blades 7-16 × 1.5-3 mm, oblanceolate, oblong or obovate, coriaceous, glabrous, the apex obtuse, rounded, or truncate and apiculate, the base obtuse or attenuate, the margins entire, revolute, slightly ciliate; upper surface dull, with the midvein sunken and whitish, without glands at the union with the petiole; lower surface pale green, with a prominent midvein, the secondary venation slightly conspicuous; petioles light green or yellowish, compressed and sulcate, 1.5-2 mm long; stipules interpetiolar, triangular, ca. 0.4 mm long. Flowers few, fragrant, arranged in sessile cymes; pedicels 1-1.5 mm long. Calyx crateriform, green, the sepals ovate, ca. 1 mm long, papillose or glabrous outside; corolla white, ca. 2.5 mm long, the lobes ovate-lanceolate, free to the base, the inner surface densely short-pubescent from the middle to the distal portion, strigulose in the central basal portion; corona white, with lanceolate segments, fleshy, almost as long as the lobes of the corolla; gynostegium sessile. Follicles fusiform, ca. 2.5 cm long, glabrous.

Phenology: Collected in flower from December to May.

Status: Endemic to Puerto Rico.

Distribution: Locally common on Mona Island and recently discovered by Franklin Axelrod (UPRRP) in the Guánica Forest.

Public forests: Guánica and Mona.

6. Metastelma parviflorum (Sw.) R. Br., Mem. Wern. Soc. 1: 52. 1809.

Fig. 31. L-P

BASIONYM: *Cynanchum parviflorum* Sw.

SYNONYM: *Cynanchum parviflorum* (R. Br.) Alain, nom. illegit.

Herbaceous vine, twining, 5-6 m in length, with abundant milky latex. Stems green, cylindrical, glabrous or puberulous, 2-3 mm in diameter. Leaves perennial, opposite; blades 1.4-3.5 × 0.8-1.5 cm, lanceolate or ovate, chartaceous, the venation pinnate, the apex acute or obtuse, usually mucronate, the base rounded, the margins entire or slightly undulate, revolute; upper surface glabrous, green, dull, with the midvein sunken, with a pair of acicular glands at the union with the petiole, these sometimes deciduous; lower surface pale green, dull, glabrous, with prominent venation. Flowers few, in sessile or short-pedicellate cymes; pedicels 1- 2.5 mm long. Calyx crateriform, green, puberulous, the sepals ovate, ca. 1 mm long, ciliate; corolla campanulate, 3-3.5 mm long, greenish outside, the lobes oblong, acute, ca. 2 mm long, pubescent inside, white along the margin and green in the central portion; corona white, the segments linear, ca. 2 mm long; gynostegium stipitate (1.5-2 mm long). Follicles fusiform, 4-6 cm long, divaricate, glabrous; seeds numerous, lanceolate, brown, ca. 5 mm long, with a tuft of silky hairs at the apex.

Phenology: Flowering from October to May and fruiting from October to April.

Status: Native, quite common.

Distribution: Throughout Puerto Rico in areas of secondary or disturbed vegetation, at lower elevations. Also on St. Croix, St. Thomas, Tortola, and Virgin Gorda; the Lesser Antilles, Trinidad, and Isla Margarita.

Public forests: Guánica, Piñones, Río Abajo, and Tortuguero.

8. OXYPETALUM

Twining, herbaceous vines or subshrubs, with abundant milky latex. Leaves opposite, small, petiolate; blades simple, glandular at the union of the petiole with the upper surface; stipules interpetiolar, minute. Flowers small, produced in axillary or terminal, umbelliform, sessile or pedunculate cymes. Calyx of 5 sepals, with or without glands at the base on the inner surface; corolla campanulate, the petals usually elongate; corona of 5 segments adnate to the corolla or free from it; stamens 5, inserted at the base of the corolla, the filaments connate at the base, forming a short tube; pollinium solitary, pendulous; stigma usually bifid. Fruit of 1-2 follicles, commonly ovate or ventricose, ribbed or winged,

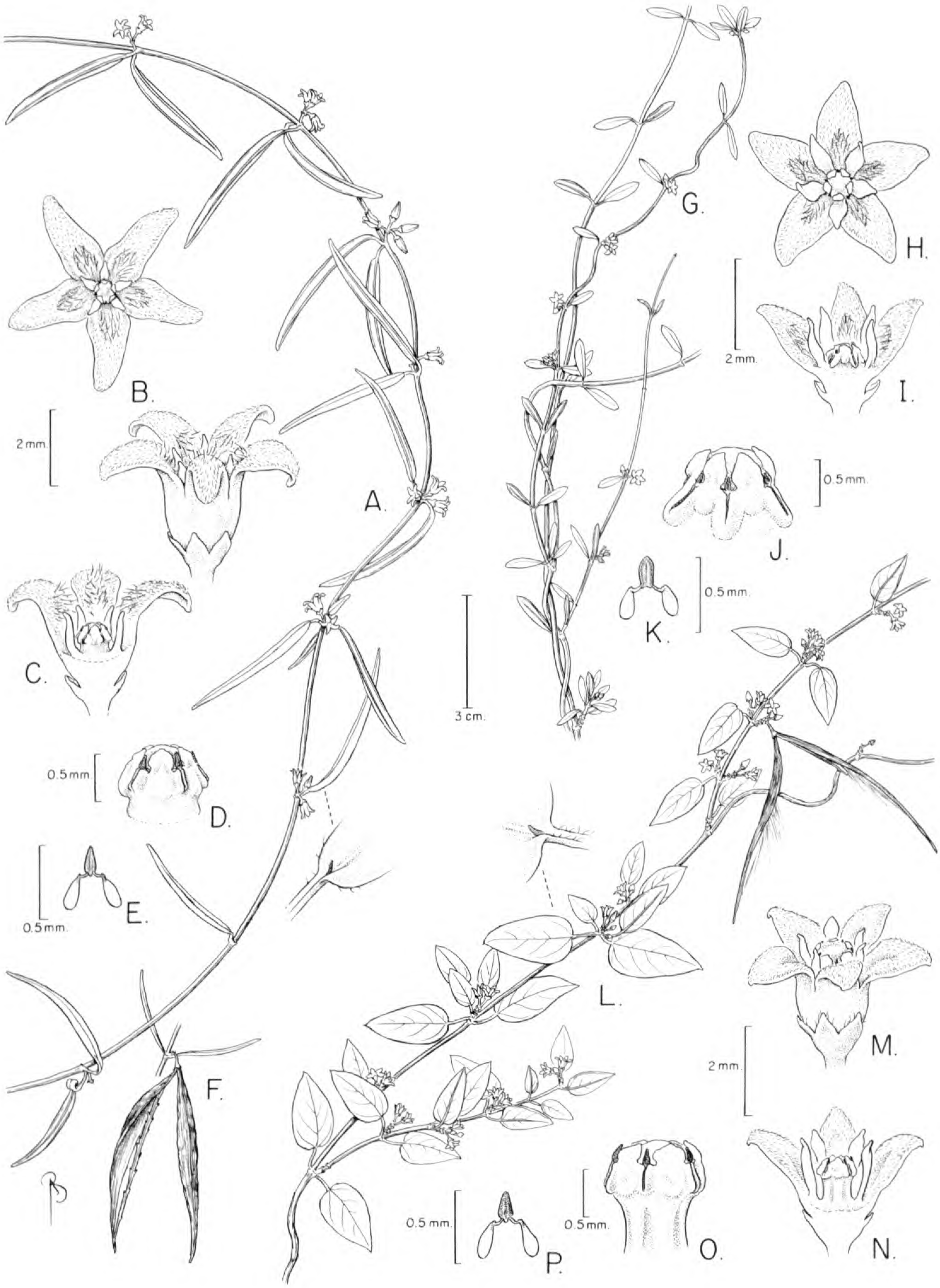

Fig. 31. A-F. *Metastelma lineare*. **A.** Habit, with detail of the leaf. **B.** Flower, top and side views. **C.** Flower, longitudinal section. **D.** Gynostegium. **E.** Pollinium. **F.** Follicles. **G-K.** *Metastelma monense*. **G.** Habit. **H.** Flower, top view. **I.** Flower, longitudinal section. **J.** Gynostegium. **K.** Pollinium. **L-P.** *Metastelma parviflorum*. **L.** Fertile branch. **M.** Flower. **N.** Flower, longitudinal section. **O.** Gynostegium. **P.** Pollinium.

with numerous ovate or elliptical seeds, marginally dentate, with a tuft of hairs at the apex. A genus of about 100 species, distributed in the subtropics and temperate zones of the New World.

1. Oxypetalum cordifolium (Vent.) Schltr. in Urb., Symb. Antill. 1: 269. 1899.

Fig. 32 A-F

BASIONYM: *Gothofreda cordifolia* Vent.

Herbaceous vine, twining, attaining 4 m in length, with abundant milky latex. Stems cylindrical, pubescent, ca. 3 mm in diameter. Leaves opposite; blades 4-10 × 4-6 cm, ovate, pubescent, the apex acuminate or cuspidate, the base deeply cordiform, the margins entire; upper surface dull green, with 5 acicular glands at the union with the petiole; lower surface pale green, dull, with slightly prominent venation; petioles pubescent, slender, 2-3 cm long. Flowers few, arranged in umbelliform cymes; peduncle ca. 2 cm long; pedicels 1-1.5 cm long. Calyx crateriform, green, the sepals linear-lanceolate, subulate, pubescent on the outer surface, 3.5-4 mm long; corolla campanulate, yellowish or light green, pubescent outside, the tube ca. 4 mm long, the lobes linear-attenuate, 1.5-2 cm long; corona of cuneate-spathulate segments, fleshy, ca. 2.5 mm long; pollinia with an acicular appendage in the area where they connect to the translator arms; stigmatic branches ca. 5 mm long. Follicles fusiform, ca. 8 cm long.

Phenology: Collected in flower in May.

Status: Native, extremely rare.

Distribution: Known from Puerto Rico from a single collection of Read (according to Urban, 1910). Also on St. Thomas (according to Urban, 1910); Cuba, Hispaniola, Jamaica, and from Mexico to South America.

References: Forster, P. I., 1990. *Hoya* R. Br. (Asclepiadaceae) in Australia - an alternative classification. Austrobaileya 3: 217-234; Forster, P. I. and D. J. Liddle, 1991. Variation in *Hoya australis* R. Br. ex Traill (Asclepiadaceae). Austrobaileya 3: 503-521; Marohasy J. and P. I. Forster, 1991. A taxonomic revision of *Cryptostegia* R. Br. (Asclepiadaceae: Periplocoideae). Stevens, W. D. 2001. Asclepiadaceae. pags. 234-270, in: Stevens, W. D. et al. (eds.), Flora de Nicaragua. Mon. Syst. Bot. Missouri Bot. Gard. 85(1).

6. *Family* ***ASTERACEAE***

Key to the genera

1a. Leaves opposite 2
1b. Leaves alternate 7

2a. Capitula heterogamous, radiate, the central flowers with actinomorphic, tubular corollas, the peripheral ones zygomorphic, ligulate (with one of the lobules elongate in the form of a ligule). 3
2b. Capitula homogamous, discoid, with all the flowers actinomorphic, tubular. 4

3a. Leaves compound ..... 2. *Bidens*
3b. Leaves simple ..... 11. *Sphagneticola*

4a. Capitula of 4 phyllaries and 4 flowers ..... 6. *Mikania*
4b. Capitula of more than 4 phyllaries and more than 4 flowers 5

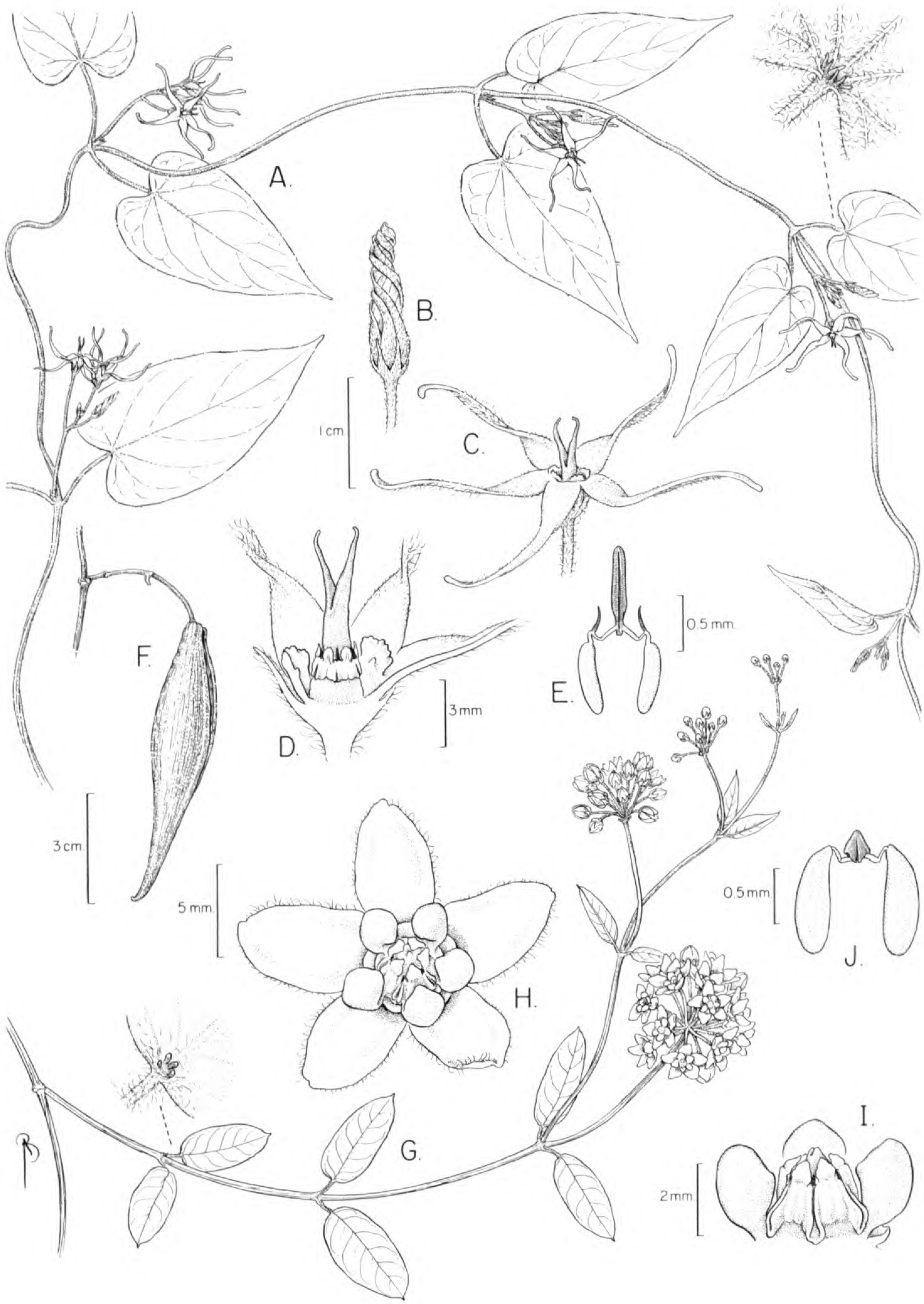

Fig. 32. A-F. *Oxypetalum cordifolium.* **A.** Flowering branch. **B.** Floral bud. **C.** Flower. **D.** Flower, longitudinal section. **E.** Pollinium. **F.** Follicle. **G-J.** *Funastrum clausum.* **G.** Flowering branch, with detail of leaf. **H.** Flower, top view. **I.** Corona and gynostegium. **J.** Pollinia.

5a. Receptacle (of the capitulum) with paleas at the base of each flower; branches of the style with 2 stigmatic lines along their entire length ..... 10. *Salmea*
5b. Receptacle without paleas; branches of the style with one stigmatic line, only on the lower half, or stigmatic lines absent 6

6a. Capitula with several series of deciduous phyllaries, overlapping to form a cylindrical involucre; receptacle conical ..... 3. *Chromolaena*
6b. Capitula with persistent phyllaries, in 1-2 series, forming a crateriform involucre; receptacle flat or convex ..... 4. *Koanophyllon*

7a. Capitula heterogamous, radiate, the peripheral flowers zygomorphic, with orange ligules, the central flowers actinomorphic, with yellow corollas ..... 9. *Pseudogynoxys*
7b. Capitula homogamous, discoid, with all the flowers tubular 8

8a. Corollas bilabiate; margin of the leaves usually spinulose; stem with an obtuse or spiny, usually bifurcate, hardened or thickened area (callosity) at the base of the leaf ..... 1. *Berylsimpsonia*
8b. Corollas tubular, 4-5-lobed; margin of the leaves entire, crenate, or denticulate; stem not forming a callosity nor spiny 9

9a. Leaves with scales or with stellate hairs 10
9b. Leaves with simple hairs ..... 5. *Lepidaploa*

10a. Pappus composed of bristles and short, irregular scales; corollas pale violet ..... 8. *Piptocoma*
10b. Pappus composed exclusively of bristles, without scales; corollas white ..... 7. *Piptocarpha*

1. BERYLSIMPSONIA

Woody shrubs, clambering, with spiny pseudostipules, bifurcate and recurved, at the nodes. Leaves alternate, petiolate; blades simple, with entire, serrate, or spinulose margins. Inflorescences of capitula arranged in axillary cymes. Capitula homogamous, discoid, of 3-6 flowers; involucre turbinate, formed by 3-4 series of phyllaries; receptacle pubescent, without paleas. Flowers bisexual; corollas yellow, bilabiate; stamens 5, the anthers connate, exserted, the apex acute; ovary inferior, bicarpellate, unilocular, the style filiform, with 2 reflexed stigmatic branches. Fruit a fusiform or oblanceolate achene, pubescent, pilose, or glandular; pappus composed exclusively of barbate bristles. A genus of 2 species, distributed in Cuba, Hispaniola, and Puerto Rico.

1. Berylsimpsonia vanillosma (C. Wright) B. L. Turner, Phytologia 74: 352. 1993.

Fig. 33. A-C

BASIONYM: *Proustia vanillosma* C. Wright
SYNONYMS: *Proustia krugiana* Urb.
Proustia stenophylla Urb. & Ekman

Clambering shrub, woody, 2-5 m in length. Stems cylindrical, broadened at the base of the leaf to form an obtuse or spiny, usually bifurcate, hardened or thickened area (callosity). Leaves alternate, distichous; blades 4-7.5 × 1.5-3.7 cm, elliptical, oblong or ovate, chartaceous or subcoriaceous, the apex acute, obtuse, or acuminate, the base acute to subcordiform, the margins denticulate or spinulose or less frequently entire; upper surface scabrous, (strigulose), the venation somewhat sunken; lower surface appressed-pubescent (sericeous), with prominent venation; petioles 1-3 mm long, puberulous. Capitula of few flowers, subsessile, clustered in cymes to form a paniculiform or racemiform inflorescence; involucre cylindrical, ca. 1 cm high, phyllaries in 3-4 series. Corollas bilabiate, yellow, 8-10 mm long, the inner lip 2-dentate, the outer one 3-dentate. Achene 3-6 mm long, linear, papillose; pappus of numerous barbate setae, yellowish, 6-8 mm long.

Phenology: Flowering from November to July and fruiting from February to September.
Status: Native, locally common.

Distribution: In forests and pastures on the southern slope of the Cordillera Central and in southwestern Puerto Rico, at middle and lower elevations. Also in Cuba and Hispaniola.

2. BIDENS

Annual or perennial herbs, less frequently shrubs or vines. Stems usually striate. Leaves opposite; blades simple or compound; petioles and rachis narrowly winged or absent. Inflorescences terminal, with one to numerous pedunculate capitula; capitula heterogamous, generally radiate or discoid, with numerous flowers; involucre crateriform, with 2 series of unequal phyllaries, the outer ones green and narrow, the inner ones brown, with hyaline margins. Marginal flowers 5-12, usually sterile, with the corolla ligulate, yellow, white, or orange. Disc flowers few or numerous, bisexual, usually yellow, tubular; stamens 5, the anthers generally black, connate, exserted; ovary inferior, unilocular, the style filiform, with 2 stigmatic branches. Achenes slightly compressed, glabrous or pubescent; pappus composed of 1-6 erect bristles, retrorsely barbate. A genus of about 75 species, mostly of Mexico, also from North America to South America and in the Antilles.

Key to the species of *Bidens*

1a. Leaves 3-5-lobed or 3-5-foliolate, slightly pubescent; involucre ca. 7 mm high ..... 1. *B. reptans*
1b. Leaves 2-3 times pinnatisect, glabrous; involucre 8-10 mm high ..... 2. *B. urbanii*

1. Bidens reptans (L.) G. Don. in Sweet, Hort. Brit. ed. 3, 360. 1839.

Fig. 33. D-G

BASIONYM: *Coreopsis reptans* L.

Herbaceous vine, climbing or clambering, 2-5 m in length. Stems cylindrical, glabrous or puberulous, striate. Leaves opposite, 3-5-foliolate or 3-5-lobed; leaflets lanceolate or elliptical, membranaceous, the apex acuminate, the base acute in the terminal leaflet and unequal in the lateral ones, the margins serrate; upper and lower surface puberulous; petioles 1-1.8 cm long, glabrous. Capitula (1-3) in corymbs, produced at the tips of short axillary branches; involucre ca. 7 mm high, phyllaries in two series, revolute; corollas yellow, those of the margin with ligules ca. 1 cm long; anthers dark brown; stigmas yellow. Achenes linear, 6-10 mm long, compressed, 4-angled, with ascending hairs on the margins; pappus of 2 setae with retroflexed hairs.

Phenology: Flowering from October to July.

Status: Native, quite common.

Distribution: Abundant in forests in the Cordillera Central, also in the zone of mogotes, in moist areas at middle and upper elevations. Also in Cuba, Jamaica, the Lesser Antilles to St. Vincent, and from Mexico to Venezuela.

Public forests: Guajataca, Maricao, Río Abajo, and Susúa.

2. Bidens urbanii Greenm., Field Mus. Bot. 2: 271. 1907.

Fig. 33. H-J

SYNONYM: *Bidens reptans* var. *urbanii* (Greenm.) O.E. Schulz
Bidens portoricensis Bello, non Spreng. ex DC.

Herbaceous vine, climbing or clambering, 4-5 m in length. Main stem cylindrical, glabrous or puberulous, with numerous lateral branches along its length. Leaves opposite; blades simple, 2-3 times pinnatisect, the segments chartaceous, long-acuminate at the apex, the margins serrate, revolute; upper surface green, shiny, glabrous; lower surface pale green, dull, glabrous, pitted, with the pinnate venation darker, forming a marginal vein; rachis slender, marginate; petioles 2-3.5 cm long, slender, sulcate, puberulous. Capitula (1-3) in corymbs, produced at the tips of short axillary branches; involucre 8-10 mm high,

Fig. 33. A-C. *Berylsimpsonia vanillosma*. **A.** Fertile branch. **B.** Head. **C.** Corolla, stamens, and stigmas, and flower showing ovary and pappus. **D-G.** *Bidens reptans*. **D.** Fertile branch. **E.** Head. **F.** Flower. **G.** Stigmas. **H-J.** *Bidens urbanii*. **H.** Flowering branch. **I.** Head. **J.** Achene.

the phyllaries in 2 series, revolute; corollas yellow, those of the margin with ligules ca. 1.7 cm long; anthers dark brown; stigmas yellow, reflexed. Achenes linear, ca. 10 mm long, compressed, 4-angled, with ascending trichomes on the margins; pappus of 2 retrorsely barbate setae.

Phenology: Flowering from November to February.

Status: Native, uncommon.

Distribution: In thickets and disturbed areas on serpentine soil. Known from Puerto Rico, eastern Cuba, and Campeche in Mexico. Has been cited erroneously for Jamaica, based on *B. dissecta* (O.E. Schultz) Sherff.

Public forests: Maricao and Susúa.

Commentary: I agree with Greenman in recognizing this biological entity at the species level, because it is sufficiently different from *B. reptans* (see key). The argument presented by O.E. Schultz to recognize this entity at the level of subspecies is based on the variation presented by the leaves of other species of *Bidens*, specifically *B. alba* (L.) DC.; nevertheless, since the latter species is not close to *B. reptans*, the knowledge of its leaf morphology should not be applied to taxonomic decisions in *B. reptans* "sensu lato" (H. Robinson, pers. comm.). The characters that are used here to recognize *B. urbanii* at the specific level have likewise been used to recognize *B. dissecta* (from Jamaica), another species closely related to *B. reptans*.

3. CHROMOLAENA

Erect or clambering herbs or shrubs. Stems usually pubescent. Leaves opposite, petiolate; blades simple, usually trinerved from the base. Capitula homogamous, discoid, with 10-40 flowers, arranged in corymbiform cymes. Involucre cylindrical; phyllaries deciduous, overlapping in 4-7 series. Flowers bisexual; corollas actinomorphic, tubular, shortly 5-lobed, the lobes usually papillose or glandular; stamens 5, the anthers inserted, connate; ovary inferior, the style filiform, with two linear stigmatic branches, elongate, exserted, usually with a sterile papillose appendage. Fruit a turbinate achene, usually with 5 longitudinal ribs; pappus with ca. 40 filiform bristles without scales. A genus of 166 species distributed from the southern United States to southern South America, including the Antilles.

1. Chromolaena borinquensis (Britton) H. Rob., Phytologia 20: 199. 1970.

Fig. 34. A-D

BASIONYM: *Osmia borinquensis* Britton
SYNONYM: *Eupatorium borinquense* (Britton) B.L. Rob.

Clambering shrub, slightly woody, much branched, 1.5-2.5 m in length. Stems cylindrical, glabrous, and smooth. Leaves opposite; blades 3-5 × 0.5-2 cm, chartaceous, deltate-lanceolate or narrowly lanceolate, 3-nerved from the base, the apex acuminate, the base cuneate or rounded, the margins with a marginal vein, revolute, remotely dentate-serrate; upper surface glabrous, with the venation sunken; lower surface glabrous, glandular-punctate; petioles 2-5 mm long, glabrous. Capitula numerous, arranged in corymbiform cymes; peduncles 1-2 cm long; involucre cylindrical, 0.5-1 cm high; phyllaries green, in 5 series, the outer much shorter than the inner, ovate, glabrous. Corollas pale violet, tubular, ca. 5 mm long, glabrous; anthers almost white, stigmatic branches pale violet. Achenes cuneiform, 3.5-4 mm long, triangular in cross section, glabrous, black, with the margins white; pappus of numerous white barbate setae, 3-3.5 mm long.

Phenology: Flowering and fruiting from November to April.

Status: Endemic to Puerto Rico, uncommon.

Distribution: On slopes of forests or thickets in the zone of mogotes.

Public forest: Río Abajo.

4. KOANOPHYLLON

Erect or scandent shrubs, small trees, or less frequently vines. Stems little or much branched, cylindrical. Leaves opposite or rarely alternate, petiolate; blade simple, with entire or serrate margins, with pinnate or trinerved venation. Capitula homogamous, discoid, with 5-20 flowers, arranged in pyramidal panicles or corymbs; involucre campanulate, with 2-4 unequal or subequal series of persistent phyllaries; receptacle without paleas. Flowers bisexual; corollas pale yellow or greenish or less frequently violet, actinomorphic, infundibuliform or tubular, glandular-pubescent on both surfaces or pubescent on the outer surface; stamens 5, the anthers connate; ovary inferior, the style filiform, with thickened branches, usually without glands, with or without a stigmatic line on the lower half. Fruit a prismatic achene, with 5 longitudinal ribs; pappus composed exclusively of bristles. A neotropical genus of about 114 species.

1. Koanophyllon polyodon (Urb.) R. King & H. Rob., Phytologia 32: 262. 1975.

Fig. 34. E-F

BASIONYM: *Eupatorium polyodon* Urb.
SYNONYM: *Eupatorium cordifolium* sensu Bello, non Sw.

Erect or clambering shrub, scarcely branched, 1-1.5 m in length. Stems cylindrical, ferruginous-pubescent, striate. Leaves opposite; blades 3-7 × 1.8-4.5 cm, chartaceous, ovate, 3-nerved from the base, the apex acute, the base obtuse, rounded or cordiform, the margins denticulate-serrate; upper surface scabrid, with the venation sunken; lower surface ferruginous-puberulous, with prominent venation; petioles 3-7 mm long, puberulous. Capitula numerous in terminal corymbs; peduncles 1-2.5 cm long, ferruginous-pubescent. Involucre campanulate, ca. 2.5 mm high; phyllaries green, in 1(2) series, of equal size, puberulous. Corollas whitish, tubular, ca. 3 mm long, the lobes papillose; stigmatic branches exserted. Achenes prismatic, ca. 2 mm long, pentagonal in cross section, papillose, light brown; pappus of numerous white setae, barbate, 3-3.5 mm long.

Phenology: Collected in flower and fruit from November to January and in June.

Status: Endemic to Puerto Rico, uncommon.

Distribution: On slopes in forests or thickets in the zone of mogotes and serpentine.

Public forests: Maricao, Río Abajo, and Susúa.

5. LEPIDAPLOA

Annual or perennial herbs or subshrubs, erect or less frequently clambering. Stems usually much branched. Leaves alternate, sessile or petiolate; blades simple. Capitula homogamous, discoid, with 8-35 flowers, each more or less sessile, solitary or in terminal or axillary cymes; involucre campanulate, the phyllaries persistent, in 3-6 series. Flowers bisexual; corollas actinomorphic, narrowly campanulate, violet or less frequently white, usually pubescent or glandular, especially on the lobes; stamens 5, the anthers connate; ovary inferior, the style usually hispidulous, with 2 stigmatic branches. Fruit an angular achene, usually with 8-10 longitudinal ribs; pappus in 2 series, the inner of bristles and the outer of short, irregular scales. A neotropical genus of about 120 species.

1. Lepidaploa borinquensis (Urb.) H. Rob., Proc. Biol. Soc. Wash. 103: 483. 1990.

Fig. 34. G-K

BASIONYM: *Vernonia borinquensis* Urb.
SYNONYMS: *Vernonia borinquensis* Urb. var. *stahlii* Urb.
Vernonia borinquensis Urb. var. *hirsuta* Gleason
Vernonia borinquensis Urb. var. *resinosa* Gleason

Slightly woody shrub, usually clambering, 1-4 (5) m in length. Stems slender, cylindrical, densely pubescent and striate when young, glabrescent. Leaves alternate, distichous; blades 3-6 × 1.8-2.8 cm, coriaceous or rigid-coriaceous, ovate to lanceolate, the apex acute or acuminate, the base rounded or subcordiform, the margins

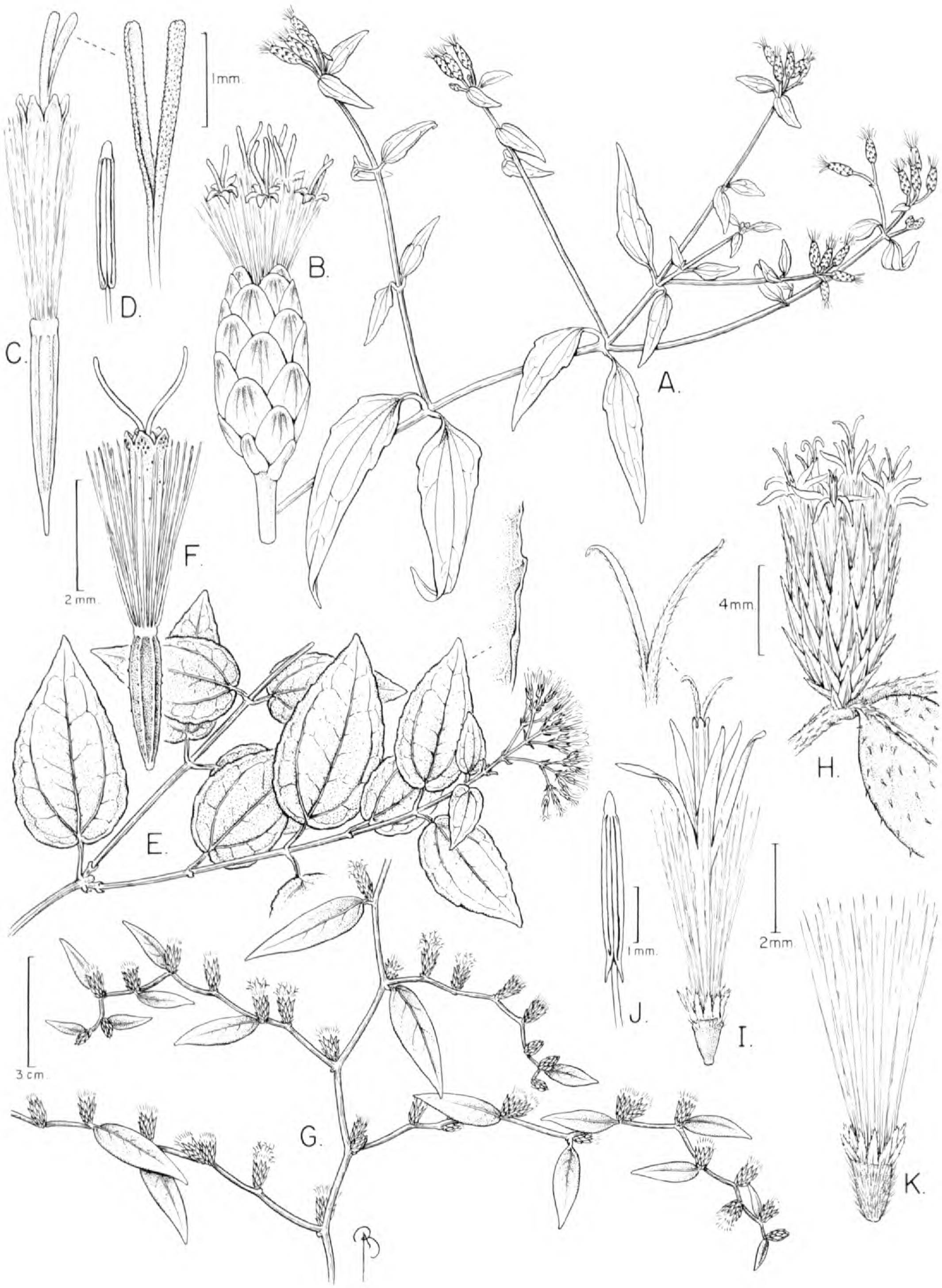

Fig. 34. A-D. *Chromolaena borinquensis*. **A.** Fertile branch. **B.** Head. **C.** Flower. **D.** Anther and stigmas. **E-F.** *Koanophyllon polyodon*. **E.** Fertile branch. **F.** Flower. **G-K.** *Lepidaploa borinquensis*. **G.** Fertile branch. **H.** Head. **I.** Flower. **J.** Anther. **K.** Achene.

ciliate, slightly undulate, and revolute; upper surface shiny, pubescent, scabrid, the venation usually sunken, covered with yellowish simple hairs; lower surface pale green, dull, with glandular dots, pubescent or sericeous, the venation prominent and pubescent; petioles 2-4 mm long, pubescent. Capitula of 13-22 flowers, sessile or short-pedunculate, solitary, axillary at the end of short and flexuous branches; involucre campanulate, 5-9 mm high; phyllaries subulate, the basal series smaller than the distal ones. Corollas white or pale violet, 5-6 mm long, with five lanceolate to linear petals; anthers exserted; style pubescent, bifid. Achene ca. 1.3 mm long, conical, pubescent; pappus of bristles 5-6 mm long and scales ca. 0.8 mm long.

Phenology: Flowering from November to July and fruiting from February to September.

Status: Endemic to Puerto Rico, common.

Distribution: In forests and pastures of the Cordillera Central and the zone of mogotes.

Public forests: Carite, Guajataca, Guilarte, Maricao, Río Abajo, and Toro Negro.

6. MIKANIA

Twining herbaceous or woody vines or less frequently erect shrubs. Stems cylindrical or hexagonal. Leaves opposite, petiolate; blades simple; pseudostipules present or absent. Capitula homogamous, discoid, numerous, composed of 4 flowers, arranged in spicate, paniculiform, or corymbiform, terminal or axillary cymes; involucre cylindrical with subequal and overlapping phyllaries, subtended by a subinvolucral bract, which is usually narrower than the phyllaries. Flowers bisexual; corollas actinomorphic, tubular, or infundibuliform, cream-colored or white; stamens 5, the anthers connate, exserted; ovary inferior, the style elongate, ascending, cream-colored, the apical portion with a long sterile appendage. Fruit a usually prismatic achene with 5 ribs, brown or black; pappus numerous, composed of bristles, without scales. A genus of about 400 neotropical species, only several in North America and the Old World tropics. About 10% of the species are shrubby; the great majority of these are found in the shrubby savannas of central and southern Brazil.

Key to the species of *Mikania*

1a. Pseudostipules present 2
1b. Pseudostipules absent 7

2a. Pseudostipules entire, rounded, reflexed, 8-10 mm wide; leaves thick, fragile, slightly aromatic ..... 3. *M. fragilis*
2b. Pseudostipules divided into lanceolate or filiform segments 3

3a. Capitula arranged in glomerules; lower surface densely covered with resinous dots. 1. *M. congesta*
3b. Capitula arranged in corymbs; lower surface without dots or sparsely punctate 4

4a. Involucre 3-4 mm high ..... 4. *M. micrantha*
4b. Involucre 6-9 mm high 5

5a. Leaves pubescent on both surfaces; stems hexagonal ..... 2. *M. cordifolia*
5b. Leaves glabrous or puberulous; stems subcylindrical or obscurely angular 6

6a. Leaves coriaceous, the upper surface scabrid, the lower surface puberulous ..... 8. *M. stevensiana*
6b. Leaves membranaceous, glabrous ..... 5. *M. odoratissima*

7a. Blade of the leaves 3-6 cm long, with the venation pinnate, the margins entire ..... 7. *M. porosa*
7b. Blade of the leaves 5-9 cm long, with 3 main veins from the base, the margins denticulate ..... 6. *M. pachyphylla*

1. Mikania congesta DC., Prodr. 5: 197. 1836.

Fig. 35. A-D

SYNONYMS: *Mikania micrantha* var. *congesta* (DC.) L. B. Rob.
Mikania scandens sensu A. Stahl, non Willd.

Guaco falso

Herbaceous vine, twining, 2-5 m in length. Stems cylindrical or angular, striate, puberulous, or pilose. Leaves opposite; blades 2.5-14 × 1-10 cm, deltate-ovate or oblong-ovate, chartaceous, with 3-5 main veins, the apex acute or acuminate, the base cordiform, the margins entire or weakly dentate or undulate; upper surface dull green, glabrous or puberulous; lower surface puberulous, densely covered with resinous dots; petioles 1.5-14 cm long, puberulous; pseudostipules forming a ring of lanceolate segments, early deciduous. Capitula numerous, sessile or short-pedunculate (4-5 mm long), arranged in dense, globose or corymbiform glomerules, terminal or at the end of short lateral branches; subinvolucral bract acicular, 2.5-4 mm long, puberulous; phyllaries oblong, 3-4 mm long, pilose, light green. Corollas white, infundibuliform, 2.5-3.5 mm long, with resinous dots at the apex. Achenes 3-3.5 mm long, black, cuneiform, with resinous dots; pappus of 33-37 bristles, white, scabrous, ca. 3 mm long.

Phenology: Flowering and fruiting from November to March.

Status: Native, relatively common.

Distribution: Of wide distribution, in disturbed areas at lower and middle elevations. Also in Jamaica, Martinique, northern South America, Peru, Bolivia, and Brazil.

Public forests: Guánica, Maricao, Piñones, Río Abajo, and Susúa.

Commentary: *Mikania congesta* is very similar to *M. micrantha*; nevertheless, it can be distinguished from *M. micrantha* by the subinvolucral bracts usually of the same length or longer than the phyllaries (vs. shorter) and by the capitula arranged in subglobose glomerules (vs. capitula in corymbs).

2. Mikania cordifolia (L.f.) Willd., Sp. Pl. 3: 1746. 1804.

Fig. 35. E-H

BASIONYM: *Cacalia cordifolia* L.f.
SYNONYMS: *Mikania gonoclada* DC.
Mikania convolvulacea DC.

Guaco

Slightly woody vine, twining, 2-5 m in length. Stems pubescent, octagonal, striate. Leaves opposite; blades 7-12 × 3.5-7.4 (9) cm, ovate, slightly aromatic, chartaceous, the apex acute, the base cordiform or subcordiform, the venation with three main veins, the margins serrate, upper surface dull green, puberulous; lower surface glaucous, densely pubescent, with prominent venation; petioles 5-4 cm long, sulcate; pseudostipules divided in lanceolate segments, whitish. Capitula numerous, arranged in axillary corymbiform cymes; subinvolucral bract linear to lanceolate, 4-5 mm long, pilose; phyllaries elliptical or narrowly ovate, 6-8 mm long, green, pubescent; corollas white, infundibuliform, aromatic; anthers brown, connate, exserted. Achenes prismatic, with 5 longitudinal ribs, ca. 3 mm long, grayish, scabrid; pappus of numerous white setae, scabrous, ca. 4.5 mm long.

Phenology: Flowering and fruiting from November to March.

Status: Native, very common.

Distribution: In pastures or along rivers or roads, at middle and lower elevations. Also on Vieques and the Virgin Islands; throughout the Neotropics.

Public forests: Carite, El Yunque, Guilarte, Maricao, Río Abajo, Toro Negro, Tortuguero, and Vega.

3. Mikania fragilis Urb., Symb. Antill. 1: 464. 1899.

Fig. 36. A-D

SYNONYMS: *Mikania fragilis* Urb. var. *leptodon* Urb.
Mikania rotunda sensu A. Stahl, non Griseb.

*Guaco redondo**

Herbaceous vine, twining, 6-8 m in length. Stems angular, with numerous lateral branches, pubescent when young, grayish with numerous lenticels when mature, the inner bark reddish, aromatic. Leaves opposite; blade 5-11 × 4-10 cm, broadly ovate, fragile, fleshy, slightly aromatic, not glandular, the apex acute, obtuse, or rounded, the base cordiform, the margins serrate, revolute; upper surface dark green, shiny, with the reticulate venation sunken, scabrid; lower surface pale green, dull, sometimes with some resinous dots, venation prominent; petioles thick, 2-4 cm long, pubescent, sulcate; pseudostipules broadly ovate,

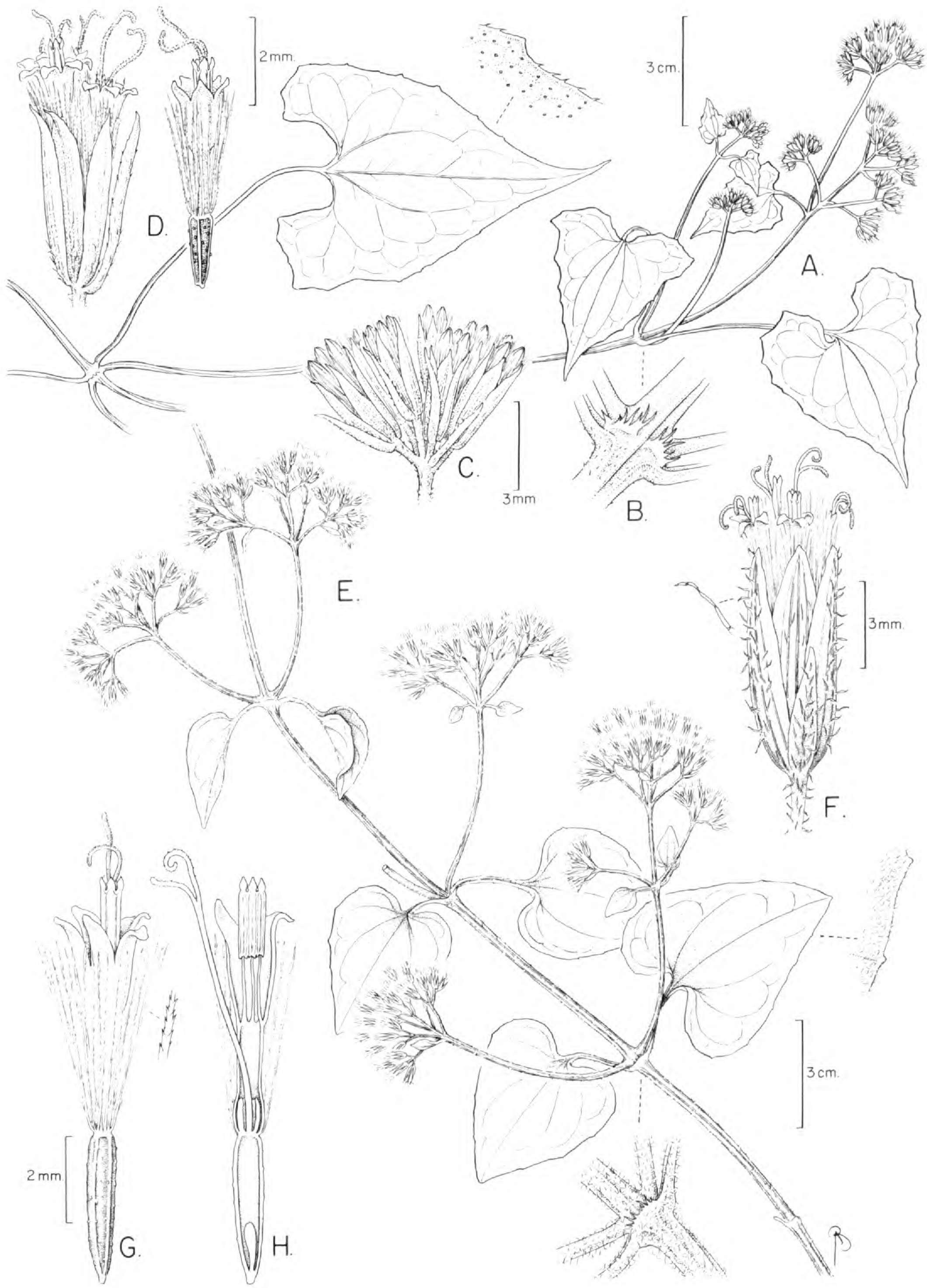

Fig. 35. A-D. *Mikania congesta*. **A.** Fertile branch. **B.** Detail of the pseudostipules. **C.** Inflorescence. **D.** Head and flower. **E-H.** *Mikania cordifolia*. **E.** Fertile branch. **F.** Head. **G.** Flower. **H.** Flower, longitudinal section.

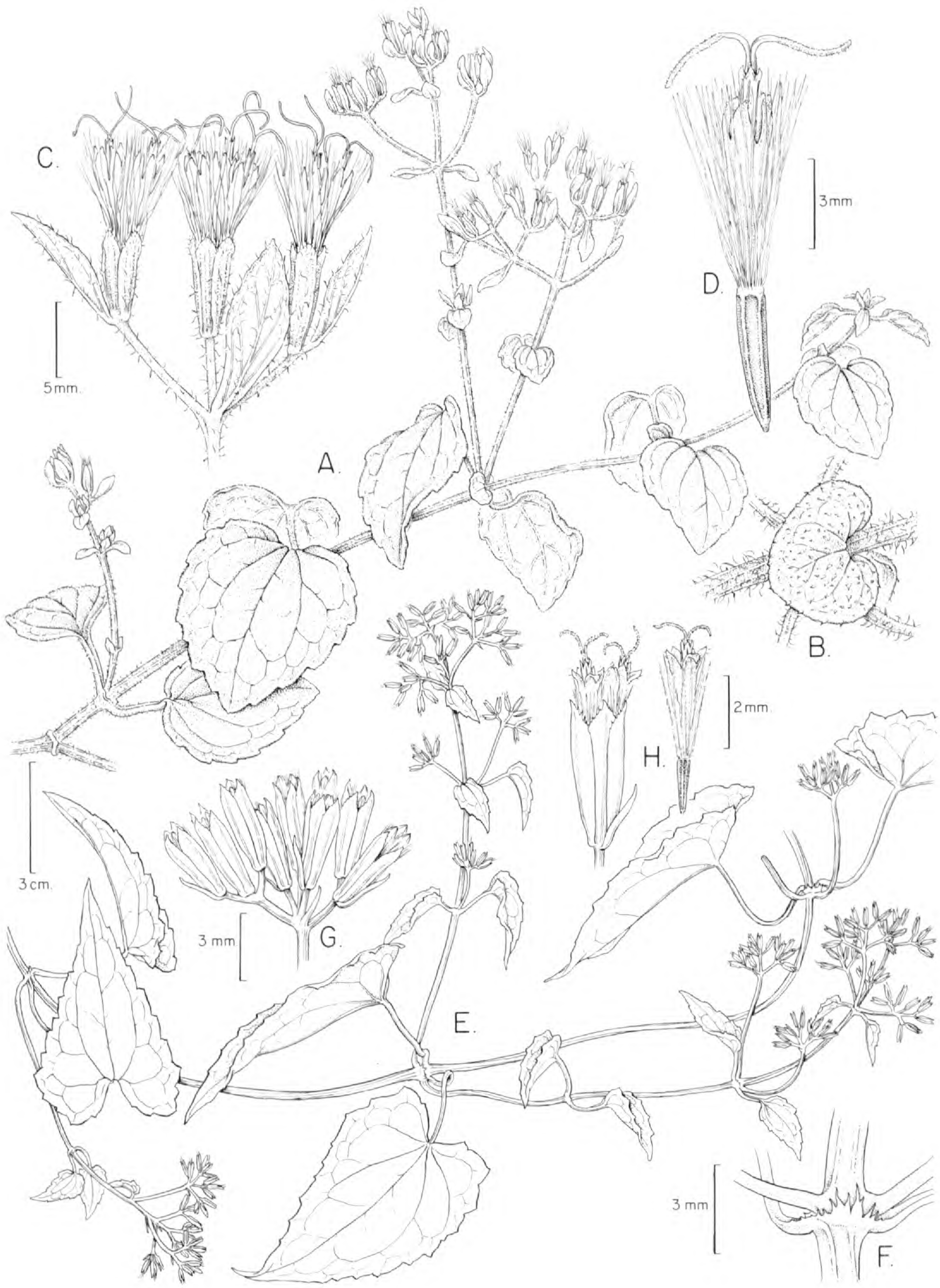

Fig. 36. A-D. *Mikania fragilis*. **A.** Fertile branch. **B.** Detail of the pseudostipules. **C.** Inflorescence. **D.** Flower. **E-H.** *Mikania micrantha*. **E.** Fertile branch. **F.** Detail of the pseudostipules. **G.** Inflorescence. **H.** Head and flower.

reflexed, 8-10 mm wide. Capitula few, pedunculate, in axillary corymbiform cymes; bracts of the involucre lanceolate to narrowly ovate, ca. 12 mm long, green to whitish; corollas white or with a reddish or greenish tinge, infundibuliform; anthers violet, connate, exserted. Achenes cuneiform, ca. 3.5 mm long, with 5 longitudinal ribs, glabrous; pappus of numerous bristles, 7-8 mm long.

Phenology: Flowering from September to April.

Status: Endemic to Puerto Rico, rather common.

Distribution: In forests of the cordilleras, at middle and upper elevations.

Public forests: Carite, El Yunque, Guilarte, Maricao, and Toro Negro.

* Common name taken from the work of Dr. Agustín Stahl (1937).

4. Mikania micrantha Kunth in Humb. Bonpl. & Kunth, Nov. Gen. Sp. (quarto ed.) 4: 134. 1818.

Fig. 36. E-H

Guaco falso

Herbaceous vine, twining, attaining 10 m or more in length. Stems pubescent, angular, striate. Leaves opposite; blades 6-13 × 3-8 cm, ovate, chartaceous, 3-5-nerved, the apex acuminate, the base cordiform, the margins dentate; upper surface slightly shiny, puberulous; lower surface puberulous, with the venation somewhat prominent; petioles sulcate, glabrous or puberulous, as long as or shorter than the blade; pseudostipules forming an interpetiolar ring of lanceolate segments, early deciduous. Capitula numerous, pedunculate, arranged in corymbiform or paniculiform cymes, terminal on short lateral branches; subinvolucral bracts subulate, 2-3 mm long, glabrous; phyllaries ovate-oblong or elliptical, green, 3-4 mm long; corolla white, infundibuliform, slightly fragrant, 2.5-3 mm long; anthers exserted. Achenes ca. 1.2 mm long, dark gray to black, pentagonal; pappus of numerous white bristles, 2-3 mm long.

Phenology: Collected in flower and fruit from November to February.

Status: Native, locally common.

Distribution: In disturbed areas, such as pastures, along rivers, and marshy areas, at low elevation. Also throughout tropical America.

Public forest: Maricao, Río Abajo, and Susúa.

5. Mikania odoratissima Urb., Symb. Antill. 1: 464. 1899.

Fig. 37. A-C

Slightly woody vine, twining, 3-5 m in length. Stems slender, striate, puberulous, aromatic. Leaves opposite; blades 4-10 × 3-8.5 cm, chartaceous, aromatic, ovate, triangular, or trilobed, glabrous or puberulous, 3-nerved, the apex acute or acuminate, the base truncate to cordiform, the margins dentate; upper surface dark green, shiny, with the venation flat or slightly sunken; lower surface light green, dull, venation prominent; petioles 1.5-3.5 cm long, sulcate, puberulous; pseudostipules forming a ring of lanceolate segments, pubescent, deciduous. Capitula in groups of 3, pedunculate to subsessile, arranged in terminal corymbiform cymes; subinvolucral bract obovate to oblong, 3-4 mm long; phyllaries 7-9 mm long, oblong-elliptical, green, puberulous; corollas white or pale green, infundibuliform, ca. 6.5 mm long. Achenes 4-4.5 mm long, prismatic, scabrid, cream-colored; pappus of numerous scabrous bristles, cream-colored or light brown, 6.5-7 mm long.

Phenology: Flowering and fruiting from November to March.

Status: Endemic to Puerto Rico, uncommon.

Distribution: In moist forests, at middle and upper elevations, along the Cordillera Central.

Public forests: Maricao and Río Abajo.

6. Mikania pachyphylla Urb., Symb. Antill. 1: 463. 1899.

Fig. 37. D-G

Slightly woody vine, twining, 4-8 m in length. Stems hexagonal, 8-10 mm in diameter, glabrous, with numerous lateral branches, the bark grayish, smooth, and aromatic. Leaves opposite; blades 3.5-9 × 2-3 cm, ovate, fleshy, brittle, slightly aromatic, 3-nerved, the apex acuminate, the base obtuse or rounded, the margins serrate-mucronate; upper surface pale green, shiny, glabrous, foveate, with the venation sunken; lower surface pale green, dull, glabrous, with prominent venation and whitish; petioles 1-2 cm long, glabrous,

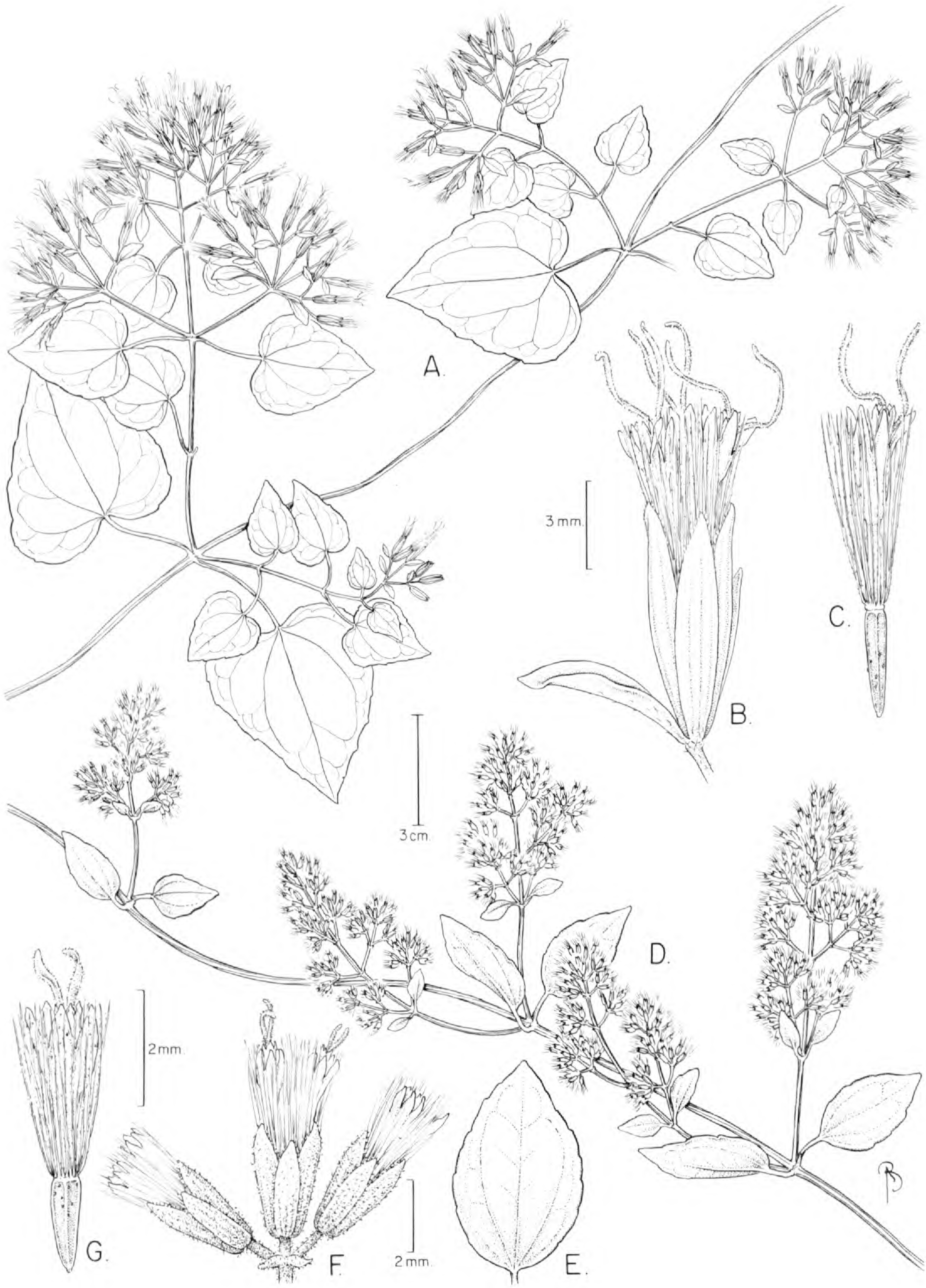

Fig. 37. A-C. *Mikania odoratissima*. **A.** Fertile branch. **B.** Head. **C.** Flower. **D-G.** *Mikania pachyphylla*. **D.** Fertile branch. **E.** Leaf. **F.** Inflorescence. **G.** Flower.

yellowish; pseudostipules absent. Capitula numerous, sessile or subsessile, arranged in terminal or axillary paniculiform cymes; subinvolucral bracts ovate, involute, 0.6-0.7 mm long, with some scattered reddish hairs; phyllaries oblong, 3-4.5 mm long, puberulous. Corollas white, infundibuliform, 3-3.2 mm long, with scattered resinous dots. Achenes cuneiform, 2-2.3 mm long, light brown; pappus of numerous cream-colored bristles, ca. 2.7 mm long.

Phenology. Flowering and fruiting throughout the year, especially from April to July.

Status: Endemic to Puerto Rico, uncommon.

Distribution: In forests at upper elevations along the Cordillera Central and the Sierra de Luquillo.

Public forests: Carite, El Yunque, Guilarte, and Toro Negro.

7. Mikania porosa Urb., Symb. Antill. 1: 465. 1899.

Fig. 38. A-C

SYNONYM: *Mikania swartziana* sensu A. Stahl, non Griseb.

Guaco de cabra

Herbaceous vine, twining, deciduous, attaining 8 m in length. Stems slender, 4-6-angled, glabrous, aromatic, with numerous pores. Leaves opposite; blades 1.5-6 × 0.7-2.5 cm, ovate, oblong, lanceolate, or sometimes trilobed or trifoliolate, the apex acute or acuminate, the base rounded or slightly cuneate, the margins entire, revolute, the venation pinnate, with 2 basal veins united to the midvein; upper surface dull or slightly shiny, glabrous, with numerous pores or sparse resinous dots; lower surface pale, dull, with numerous pores or resinous dots, the venation slightly prominent; petioles 5-15 mm long; pseudostipules absent. Capitula sessile or subsessile in subglobose or spiciform units, arranged in terminal paniculiform cymes; subinvolucral bracts ovate, ca. 0.5 mm long, puberulous; phyllaries oblong or subelliptical, 2.5-2.7 mm long, puberulous. Corollas white, infundibuliform, ca. 2.8 mm long. Achenes cuneiform, prismatic, 1.7-2.2 mm long, light brown or cream-colored; pappus of numerous bristles, white or cream-colored, scabrous, 2-3 mm long.

Phenology: Flowering from November to February and fruiting in January and February.

Status: Endemic to Puerto Rico, uncommon.

Distribution: In moist forests, in the zone of mogotes and on serpentinitic soils.

Public forests: Maricao and Río Abajo.

8. Mikania stevensiana Britton, Bull. Torrey Bot. Club 43: 458. 1916.

Fig. 38. D-F

Guaco

Herbaceous vine, twining, 4-5 m in length. Stems slender, striate or angular, glabrous or puberulous. Leaves opposite; blades 3-5 × 1.9-4 cm, 3-lobed, triangular-ovate or less frequently 5-lobed, coriaceous, brittle, aromatic, trinerved, the apex acuminate or acute, the base subcordiform, the margins dentate, revolute, ciliate; upper surface dark green, shiny, with short bulbous hairs that give it a rough texture, the venation sunken; lower surface slightly shiny, puberulous, with prominent venation; petioles ca. 3 cm long, sulcate, puberulous; pseudostipules forming a ring of filiform segments, deciduous. Capitula 3, forming pedunculate cymes that form a terminal corymbiform cyme; subinvolucral bracts oblanceolate, puberulous, 3-3.5 mm long; phyllaries oblong, 6-7 mm long, green or with a reddish tinge. Corollas white, infundibuliform, ca. 6.5 mm long; anthers inserted; stigmatic branches long-exserted. Achenes cuneiform, ca. 5 mm long; pappus whitish, ca. 7 mm long, scabrous.

Phenology: Flowering in August and from December to February.

Status: Endemic to Puerto Rico, known from very few localities.

Distribution: Uncommon in moist forests on serpentine soils.

Public forest: Maricao.

7. PIPTOCARPHA

Lianas or woody shrubs, erect or clambering, with stellate or scaly pubescence. Leaves alternate, petiolate; blades simple. Capitula homogamous, discoid, with 2-20 flowers, arranged in corymbiform,

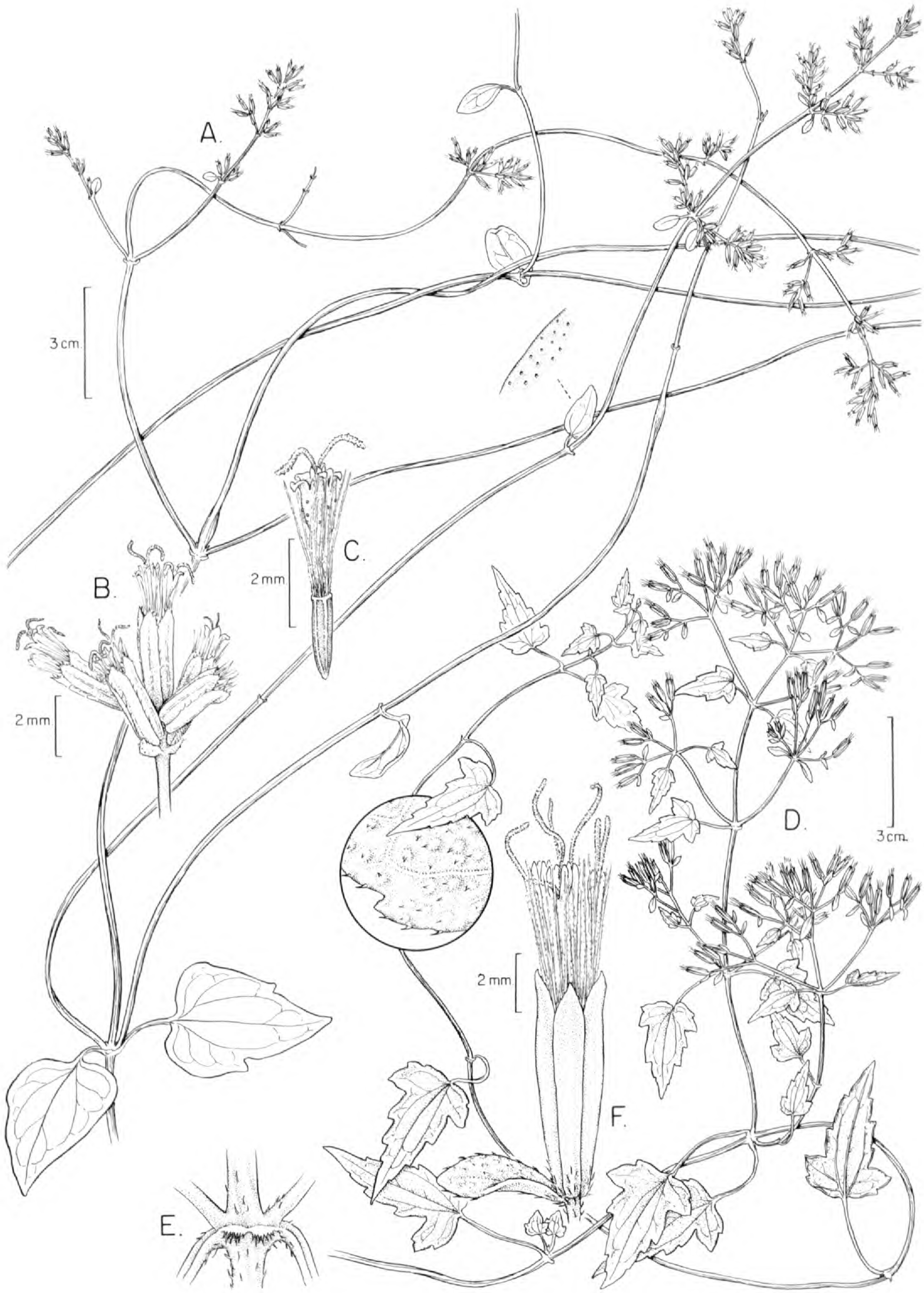

Fig. 38. A-C. *Mikania porosa*. **A.** Fertile branch. **B.** Inflorescence. **C.** Flower. **D-F.** *Mikania stevensiana*. **D.** Fertile branch. **E.** Detail of the pseudostipules. **F.** Head.

umbelliform, spicate, or paniculiform cymes; involucre campanulate or cylindrical-campanulate, with several series of phyllaries. Flowers bisexual; corollas actinomorphic, tubular, 5-lobed; stamens 5, connate, the anthers sagittate; ovary inferior, the style slender with 2 stigmatic branches. Achenes with 10 ribs, glabrous, truncate; pappus composed exclusively of bristles, without scales. A genus of 40 species, distributed in the Neotropics.

1. Piptocarpha tetrantha Urb., Symb. Antill. 1: 457. 1899.

Fig. 39. A-C

Liana or clambering shrub, 10 m or more in length. Stems pendulous, flexible, with numerous white scales when young, slightly compressed, striate and lenticellate when mature, attaining 2.5 cm in diameter. Leaves alternate, distichous; blades 6-12 × 2-5 cm, oblong, oblanceolate, or elliptical, coriaceous, the apex acute or obtuse, the base unequal, obtuse-acute, the margins smooth or denticulate; upper surface light green, slightly shiny, with reticulate venation, covered with small scales; lower surface completely covered with white scales, venation prominent; petioles 1-1.6 cm long, sulcate, whitish. Capitula in cymes, forming a compound axillary or terminal racemiform inflorescence; involucre tubular, 7-8 mm long; phyllaries in 6 series, green, pilose at the apex and ciliate at the margins, the series gradually increasing in size toward the interior. Corolla white, infundibuliform, 5-6 mm long. Achenes cuneiform, cream-colored, 4-4.5 mm long; pappus of numerous cream-colored bristles, ca. 5.8 mm long.

Phenology: Flowering and fruiting probably throughout the year, but with more intensity from January to March.

Status: Endemic to Puerto Rico, common.

Distribution: In forests and on forest margins along the Cordillera Central and the Sierra de Luquillo.

Public forests: Carite, Guilarte, El Yunque, Maricao, and Toro Negro.

8. PIPTOCOMA

Woody shrubs, erect or clambering. Stems angular, tomentose, glabrescent. Leaves alternate, petiolate; blades simple, the lower surface with stellate trichomes. Capitula homogamous, discoid, with 4-12 flowers, clustered in short-pedunculate glomerules to form corymbiform cymes; involucre cylindrical; the phyllaries, in several series, graduated; paleas present or not. Flowers bisexual; corollas actinomorphic, infundibuliform, 5-lobed; stamens 5, the anthers connate, spurred; ovary inferior, the style filiform, with 2 stigmatic branches, abaxially hispidulous. Fruit a turbinate achene, 5-angled, glabrous; pappus composed of bristles and short, irregular scales. A genus of 18 species, distributed in the Neotropics.

1. Piptocoma acevedoi Pruski, Novon 6: 98. 1996.

Fig. 40. A-H

Woody vine or clambering shrub, 3-7 m in length. Stems much branched, pendulous, tomentose. Leaves alternate; blades 2-9.5 × 1-4.3 cm, elliptical to obovate, chartaceous, the apex acute, obtuse, or rounded, the base acute or attenuate, the margins entire or undulate; upper surface glandular-punctate; lower surface whitish, densely stellate-tomentose; petioles 5-6 mm long, slightly winged, whitish. Capitula 4-9, with 6-10 flowers each, in glomerules arranged in terminal cymes; involucre cylindrical or campanulate, 5-6.5 mm high, the phyllaries imbricate, in 3-4 graduated series, green, pubescent; paleas present or not. Corollas pale violet, tubular, 5-6-lobed, 5-6.3 mm long, with glandular papillae on the tube and the apex of the lobes; anthers exserted, cream-colored; style with two recurved stigmatic branches, abaxially hispidulous. Achene turbinate, with 10 slight ribs, glabrous, 2.5-4 m long, light brown; pappus biseriate, the outer series of minute irregular-dentiform scales, the inner series of barbate bristles, 2.5-3.5 mm long.

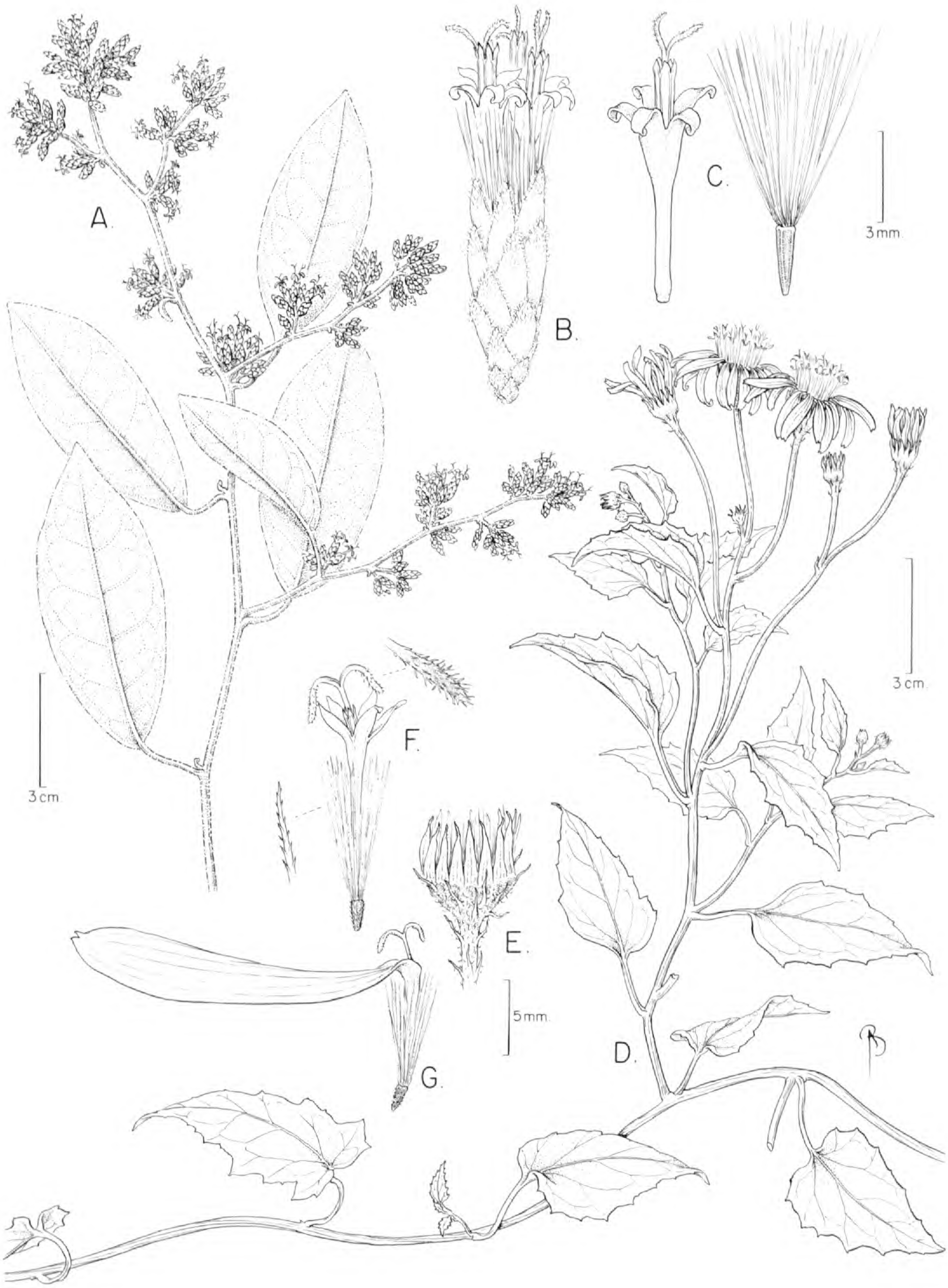

Fig. 39. A-C. *Piptocarpha tetrantha*. **A.** Fertile branch. **B.** Head. **C.** Corolla with anthers and stigmas, and achene. **D-G.** *Pseudogynoxys chenopodioides*. **D.** Fertile branch. **E.** Head. **F.** Disc flower with detail of pappus. **G.** Ray flower.

Phenology: Flowering and fruiting from October to January.

Status: Endemic to Puerto Rico, extremely rare.

Distribution: Known from two localities in Puerto Rico, in forests on limestone or serpentine substrate.

Public forests: Guajataca and Maricao.

9. PSEUDOGYNOXYS

Twining, herbaceous vines. Stems striate, puberulous. Leaves alternate, petiolate; blades simple, entire or serrate. Capitula heterogamous, radiate, long- pedunculate, with numerous flowers, solitary or in terminal cymes; involucre campanulate or hemispherical, canaliculate; phyllaries uniseriate, oblong. Disc flowers bisexual; corollas actinomorphic, yellow, long-tubular, 5-lobed; stamens 5, the anthers connate, sagittate; ovary inferior, the style filiform, with 2 hirsute stigmatic branches on the distal portion. Ray flowers pistillate; corollas zygomorphic, ligulate, the ligules orange. Fruit a cylindrical achene; pappus of numerous bristles, without scales. A genus of 14 species, distributed in the Neotropics.

1. Pseudogynoxys chenopodioides (Kunth) Cabrera, Brittonia 7: 54. 1950.

Fig. 39. D-G

BASIONYM: *Senecio chenopodioides* Kunth
SYNONYM: *Senecio confusus* Britten

Herbaceous vine, twining, 10-12 m in length. Stems striate, subcylindrical, glabrous or puberulous. Leaves alternate; blades 5-8 × 2.5-5 cm, lanceolate, membranaceous, the apex acuminate or acute, the base truncate, obtuse, or slightly cordiform, frequently unequal, the margins dentate-mucronate; upper surface dull, glabrous; lower surface dull, glabrous, with prominent venation; petioles 1.5-2.2 cm long. Capitula 2-6, pedunculate, in terminal corymbiform cymes; peduncles 2-5 cm long, puberulous; involucre crateriform, ca. 6 mm long, the phyllaries green, lanceolate, ca. 4 mm long. Disc flowers with yellow tubular corollas, 9-10 mm long; stigmatic branches yellow. Ray flowers with orange corollas, ligulate, the ligule elliptical, retuse at the apex, 2-2.5 cm long. Achenes turbinate, hispidulous, ca. 4 mm long; pappus of numerous white bristles, 5-7 mm long, scabrous.

Phenology: Collected in flower and fruit from January to April.

Status: Naturalized exotic, uncommon.

Distribution: Exotic species, cultivated for its showy flowers; naturalized in more or less moist areas in Puerto Rico. Native to Central America, cultivated and naturalized in the tropics and subtemperate climates. Also on St. Croix and St. Thomas.

Public forests: El Yunque, Río Abajo, and Vega.

10. SALMEA

Erect or clambering shrubs. Stems striate, cylindrical. Leaves opposite, petiolate; blades simple, entire or dentate. Capitula homogamous, discoid, with numerous flowers, in terminal, pedunculate cymes; phyllaries in 1-6 series; receptacle conical, paleate. Flowers bisexual, each subtended by a palea; corollas actinomorphic, tubular, 5-lobed; stamens 5, the anthers connate, sagittate; ovary inferior, the style filiform, with 2 papillose-hirtellous stigmatic branches. Fruit a compressed, cuneiform achene; pappus of 2 short bristles. A genus of 2-4 species, distributed in the Neotropics.

1. Salmea scandens (L.) DC., Cat. Hort. Monspel. 141. 1813.

Fig. 41. A-C

BASIONYM: *Bidens scandens* L.

Bejuco de miel, Bejuco de muela

Clambering shrub, 2-3 m in length. Stems striate, cylindrical, glabrous or puberulous. Leaves opposite; blades 4.5-9.5 × 1.7-4.2 cm, lanceolate, chartaceous, the apex acute or acuminate, the base obtuse, attenuate, or rounded, the margins

Fig. 40. A-H. *Piptocoma acevedoi*. **A.** Fertile branch. **B.** Inflorescence. **C.** Head. **D.** Head, longitudinal section showing flowers. **E.** Ligules. **F.** Flower, with detail of the pappus and petals. **G.** Anthers and stigma, and detail of the style with stigmas. **H.** Achene.

revolute, entire, denticulate to dentate; upper surface dull, glabrous; lower surface dull, glabrous, with prominent venation; petioles 6-17 mm long, glabrous. Capitula numerous, of few flowers, in terminal, pedunculate, corymbiform cymes; peduncles 1-10 mm long, puberulous; phyllaries 2-4-seriate, green, the outer elliptical, ca. 2 mm long, the inner spathulate, ca. 5 mm long; corollas white, tubular, 2.5-3 mm long; anthers exserted. Achenes cuneiform, compressed, ca. 2 mm long, glabrous, strigose on the margins; pappus of 2 barbate bristles, 1.5-1.7 mm long.

Phenology: Collected in flower and fruit from November to April.

Status: Native, locally common.

Distribution: Uncommon in moist thickets and forests at lower and middle elevations; locally common in the area of mogotes. Also in the Greater Antilles, Trinidad, and continental tropical America.

Public forests: Carite, El Yunque, and Río Abajo.

11. SPHAGNETICOLA

Decumbent herbs, sometimes scandent. Stems with adventitious roots at the nodes. Leaves opposite, petiolate; blades simple and serrate. Capitula heterogamous, radiate, with numerous flowers, pedunculate, solitary or clustered in a secondary terminal inflorescence; phyllaries in 2-3 series, foliaceous; receptacle paleaceous. Disc flowers bisexual, subtended by a palea; corollas yellow or orange, actinomorphic, tubular, 5-lobed; stamens 5, the anthers black, connate; ovary inferior, the style filiform, with 2 papillose-hirtellous stigmatic branches. Ray flowers pistillate; corollas zygomorphic, ligulate, yellow or orange. Fruit a tuberculate achene, black; pappus forming a fimbriate "corona," minute. A genus of 4 species, 3 of them native to the New World.

1. Sphagneticola trilobata (L.) Pruski in Acev.-Rodr., Mem. New York Bot. Gard. 78: 114. 1996.

Fig. 41. D-I

BASIONYM: *Silphium trilobatum* L.
SYNONYM: *Wedelia trilobata* (L.) Hitchc.

Wedelia, Wild marigold

Creeping or decumbent herb, sometimes scandent, attaining 2 m in length. Stems obtusely quadrangular or cylindrical, puberulous. Leaves opposite; blades 3-10 × 2.5-6 cm, oblanceolate or rhombic, usually 3-lobed, chartaceous, the apex obtuse or acute, the base obtuse or attenuate, the margins serrate; upper surface pubescent or puberulous; lower surface pubescent or puberulous, with glandular dots, with prominent venation and pubescent; petioles 0-5 mm long. Capitula of numerous flowers, solitary, terminal; peduncles 3.5-14 cm long, puberulous; involucre turbinate; phyllaries in one series, 12-14, unequal, 10-14 cm long, oblanceolate or oblong, green; disc corollas tubular, yellow, 4.5-5.5 mm long, papillose on the outer surface of the lobes; ray corollas ligulate, the ligules ca. 15 mm long, subelliptical, trilobed at the apex. Achenes pyriform, ca. 2 mm long; pappus forming a corona, ca. 1 mm high.

Phenology: Flowering and fruiting throughout the year.

Status: Ornamental, cultivated and naturalized, very common.

Distribution: Cultivated in gardens and parks in Puerto Rico and the Virgin Islands. Native to the New World, but naturalized throughout the tropics and subtropics.

Public forests: El Yunque, Maricao, and Río Abajo.

References: Holmes, W. C. 1993. The genus *Mikania* (Compositae: Eupatorieae) in the Greater Antilles. Sida Bot. Misc. 9: 1-69. Keeley, S. C. 1978. A revision of the West Indian *Vernonias* (Compositae). J. Arnold Arb. 59: 360-413. Pruski, J. F. 1996. Compositae of the Guayana highland-X. Reduction of *Pollalesta* to *Piptocoma* (Vernoniae: Piptocarphinae) and consequent nomenclatural adjustments. Novon 6: 96-102. Turner, B. L. (1993) *Berylsimpsonia* (Asteraceae: Mutisieae), a new genus of the Greater Antilles. Phytologia 74: 349-355.

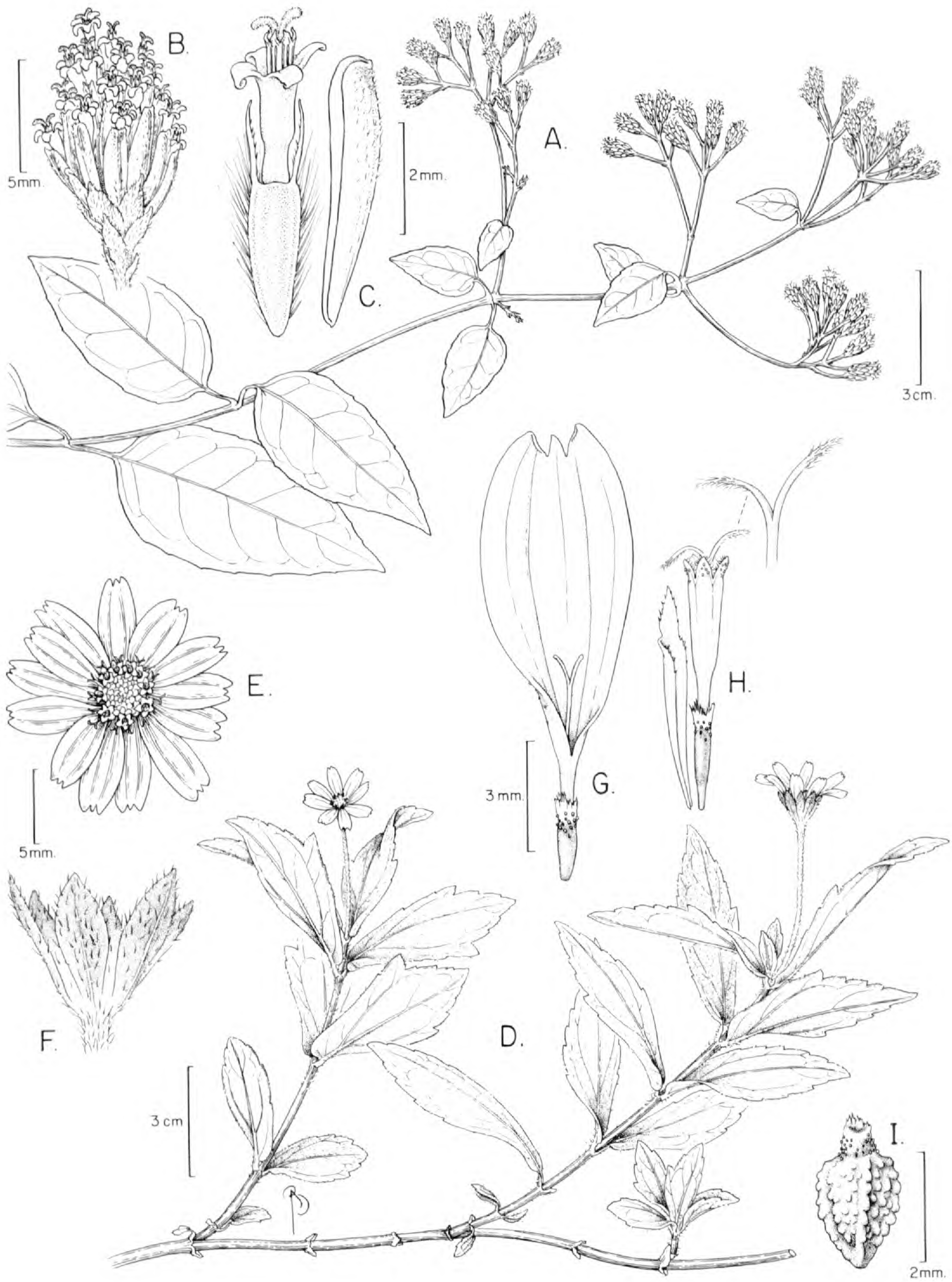

Fig. 41. A-C. *Salmea scandens*. **A.** Fertile branch. **B.** Inflorescence. **C.** Flower and ligule. **D-I.** *Sphagneticola trilobata*. **D.** Fertile branch. **E.** Head, top view. **F.** Involucral bracts. **G.** Ray flower. **H.** Disc flower and ligule, with detail of the stigma. **I.** Achene.

7. *Family* ***BASELLACEAE***

Key to the genera

1a. Corolla with petals connate only at the base, neither accrescent nor fleshy; stamens inserted at the base of the corolla ..... 1. *Anredera*
1b. Corolla urceolate, tubular, 5-lobed, accrescent, fleshy, surrounding the fruit; stamens inserted on the upper portion of the corolla tube ..... 2. *Basella*

1. ANREDERA

Herbaceous vines, clambering or twining. Stems usually fleshy. Leaves alternate, slightly succulent, petiolate; blades simple; stipules absent. Flowers actinomorphic, bisexual or functionally unisexual, produced in pendulous, axillary or terminal racemes. Calyx of 2 free sepals, much shorter than the corolla, united to the petals at the base; corolla not accrescent, with 5 petals connate at the base; stamens 5, the filaments free or connate and united to the petals, the anthers oblong, dehiscent by longitudinal sutures; ovary superior, of 3 carpels, the styles 3, free or connate at the base, as long as the ovary. Fruit a utricle. A New World genus of about 12 species.

Key to the species of *Anredera*

1a. Pedicellar glands persistent; petals 2-3 mm long, turning blackish on drying; stigmatic branches as long as the style ..... 1. *A. cordifolia*
1b. Pedicellar glands deciduous; petals 1.5-2.2 mm long, turning cream-colored on drying; stigmatic branches 2 times as long as the style ..... 2. *A. vesicaria*

1. Anredera cordifolia (Ten.) Steenis, Fl. Males., Ser. 1, 5: 303. 1957.

Fig. 42. H-J

BASIONYM: *Boussingaultia cordifolia* Ten.

Madeira vine

Herbaceous vine, fleshy, twining, attaining 5 m in length. Roots tuberous. Stems glabrous, cylindrical, up to 2.5 cm in diameter, producing solitary or clustered bulbils. Leaves alternate; blades 2.2-10 × 1.4-6.2 cm, ovate or broadly ovate, glabrous, fleshy, the apex obtuse or acute, the base cordiform, decurrent on the petiole, the margins entire, hyaline or reddish; upper surface dull, waxy, with the venation somewhat sunken; lower surface lighter than the upper surface, with the venation slightly prominent; petioles 6-12 mm long, slightly winged. Flowers aromatic, turning blackish on drying, apparently bisexual, in terminal or axillary racemes or pendulous panicles, up to 65 cm long; pedicels with persistent bracts. Calyx of 2 white sepals, ovate or broadly elliptical, 1.3-2.2 mm long; corolla of 5 white petals, ovate or elliptical, 2-3 mm long, connate at the base; stamens 5, the filaments connate at the base, 2-3.5 mm long, the anthers lanceolate, 0.7-0.8 mm long; ovary globose or obovoid, glabrous, stigmatic branches 3, as long as the style. Utricles globose, slightly compressed or triangular, 0.9-1.1 mm long, crowned by the base of the fleshy style.

Phenology: Collected in flower in August and September. Rarely produces fruits in Puerto Rico; propagated by means of bulbils or underground tubers.

Status: Exotic, cultivated as an ornamental, naturalized, uncommon.

Distribution: In disturbed areas, at middle and lower elevations. Native to the New World, but extensively cultivated and naturalized throughout the tropics and subtemperate zones.

Public forests: Guánica and Susúa.

Commentary: This species has been identified erroneously as *Anredera baselloides* (Kunth) Baill. by many botanists of the Caribbean flora. *Anredera baselloides* is a different species, which

is neither found either in Puerto Rico or the Virgin Islands.

2. Anredera vesicaria (Lam.) C.F. Gaertn, Suppl. Carp. 176, t. 213. 1807.

Fig. 42. A-G

BASIONYM: *Basella vesicaria* Lam.
SYNONYMS: *Boussingaultia leptostachys* Moq.
Anredera leptostachys (Moq.) Steenis

Suelda con suelda, Consuelda, Madera vine

Herbaceous vine, twining, attaining 15 m in length. Roots tuberous. Stems slender, glabrous, cylindrical, sometimes with a reddish tonality. Leaves alternate; blades 3-11 × 2-6.5 cm, ovate, glabrous, fleshy, the apex acute or acuminate, the base rounded, obtuse, or cordiform, the margins entire or crenate; upper surface dull, with subconspicuous venation; lower surface slightly shiny, with prominent venation; petioles 0.4-2 cm long, slightly winged. Flowers aromatic, functionally unisexual, in axillary pendulous racemes, 10-20 cm long, or in terminal pendulous panicles, 30-50 cm long; pedicels with deciduous bracts. Calyx white, of ovate sepals, ca. 0.4 mm long; corolla white, the petals ovate, 1.5-2.2 mm long, turning cream-colored or remaining white on drying; stamens 5, the filaments connate at the base, 3-4 mm long, the anthers lanceolate, 0.2-0.4 mm long; ovary glabrous, globose, stigmatic branches twice as long as the style. Utricles obovoid, slightly triangular, 1-1.3 mm long, crowned by the fleshy style.

Phenology: Flowering from September to April. The populations of this species in Hispaniola, Puerto Rico, the Virgin Islands, and the Lesser Antilles contain staminate flowers only and never produce fruits. The reproduction of this species on the islands mentioned seems to be exclusively asexual by means of underground tubers (Sperling, 1987).

Status: Exotic, cultivated and naturalized, rather common.

Distribution: In disturbed areas, at middle and lower elevations. Also on Cayo Santiago, Vieques, St. Croix, St. John, St. Thomas, and Tortola; from the southern United States to northern South America, including the Antilles.

Public forests: Susúa and Tortuguero.

2. BASELLA

Herbaceous, succulent, twining vines or decumbent or creeping herbs. Stems fleshy, much branched. Leaves alternate, succulent, petiolate; blades simple; stipules absent. Flowers bisexual, produced in axillary, simple or branched spikes. Flowers actinomorphic, bisexual, without aroma. Calyx of 2 white or pale green sepals, free to the base, much shorter than the corolla, united to the petals at the base; corolla tubular, urceolate, 5-lobed, succulent; stamens 5, with short filaments, inserted on the upper portion of the corolla tube, the anthers dehiscent by longitudinal sutures; ovary superior, globose or pyriform, of 3 carpels, uniovulate, the styles 3, free to the base. Fruit a utricle, completely covered by the persistent or accrescent corolla. A genus of 5 species native to Africa or Madagascar.

1. Basella alba L., Sp. Pl. 272. 1753.

Fig. 42. K-N

SYNONYM: *Basella rubra* L.

Espinaca de Nueva Zelandia, Acelga trepadora

Twining vine, climbing or creeping, herbaceous, glabrous, attaining 10 m in length. Stems somewhat succulent, cylindrical, usually with a reddish to purple tonality, up to 2.5 cm in diameter. Leaves alternate; blades 3-15 × 1.2-14 cm, green, reddish, or purple, ovate, orbicular, or oblong, fleshy, the apex obtuse, rounded, or acute, the base acute, subtruncate, rounded, or cordiform, decurrent on the petiole, the margins entire, undulate, usually reddish or purple; upper surface dull, with slightly conspicuous venation; lower surface dull, with slightly prominent venation; petioles green or reddish, 0.5-5 cm long, slightly winged. Flowers arranged in simple or branched spikes, axillary, erect, 15-25 cm long. Calyx white or with a reddish tinge, the sepals 2, ovate or elliptical, 3.2-4 mm long; corolla fleshy, white, with a reddish or violet tinge toward the apex, 3.3-4.1 mm long. Utricles purple, fleshy, 4-lobate, 4-5 mm long, covered by the accrescent corolla, 5-7 mm long.

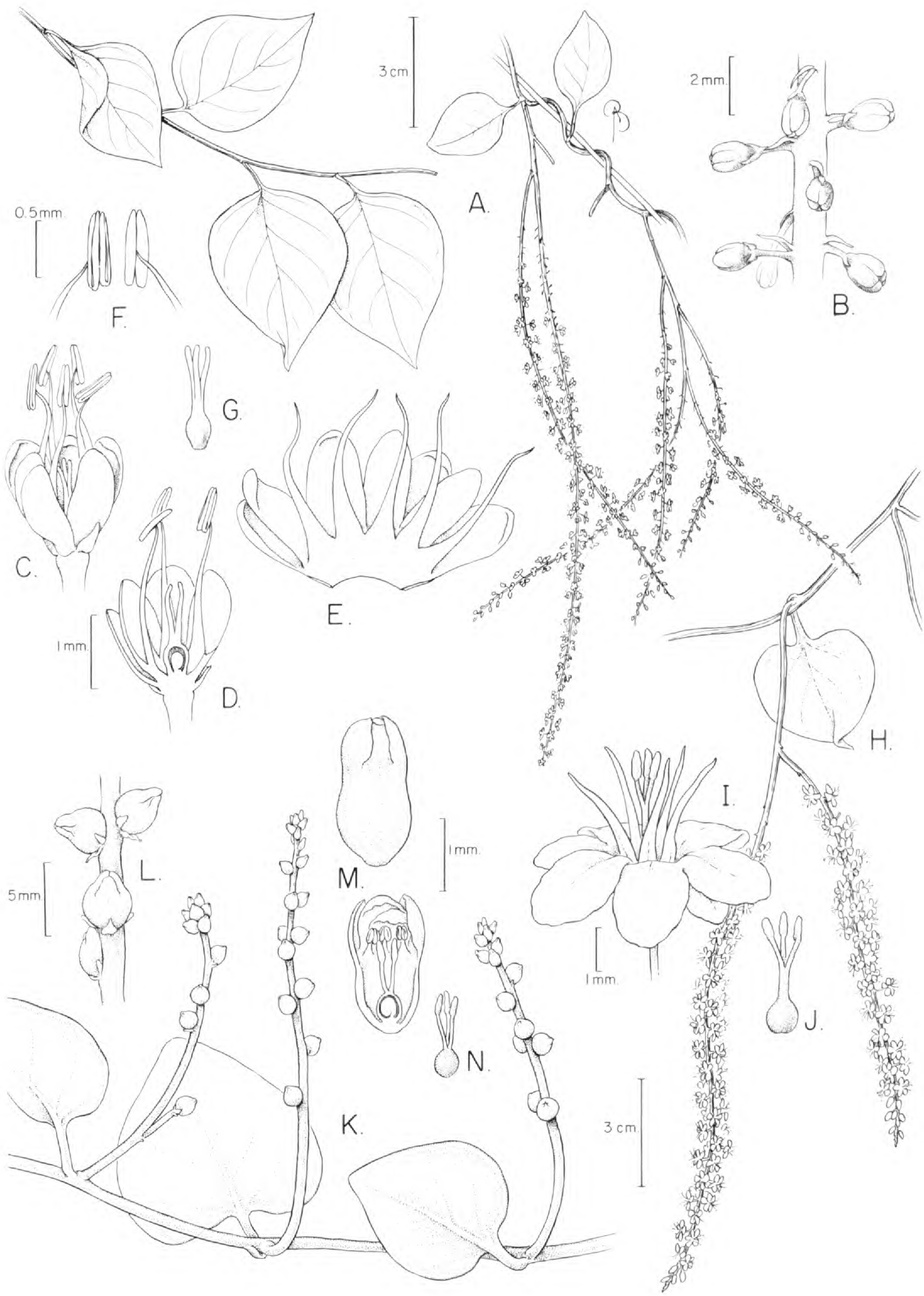

Fig. 42. A-G. *Anredera vesicaria.* **A.** Branch with leaves, and flowering branch. **B.** Detail of the inflorescence. **C.** Flower. **D.** Flower, longitudinal section. **E.** Perianth and filaments. **F.** Stamens. **G.** Gynoecium. **H-J.** *Anredera cordifolia.* **H.** Fertile branch. **I.** Flower. **J.** Gynoecium. **K-N.** *Basella alba.* **K.** Fertile branch. **L.** Detail of the inflorescence. **M.** Whole flower and longitudinal section. **N.** Gynoecium.

Phenology: Collected in flower and fruit from August to March.

Status: Exotic, widely cultivated as a vegetable, because its leaves are edible, like spinach.

Distribution: Probably native to Africa, but widely cultivated and naturalized throughout the tropics.

Reference: Sperling, C. R. 1987. Systematics of the Basellaceae. Doctoral thesis, Harvard University.

8. *Family* ***BIGNONIACEAE***

Key to the genera

1a. Leaves imparipinnate, without tendrils 2
1b. Leaves 2- or 3-foliolate, usually with a terminal tendril 4

2a. Corolla violet-pink; stamens inserted; calyx > 10 mm long ..... 8. *Podranea*
2b. Corolla orange or reddish orange; stamens exserted; calyx < 8 mm long ..... 11. *Tecomaria*

4a. Tendrils bifid or trifid 5
4b. Tendrils simple, spiral or spiral-shaped, sometimes absent 9

5a. Branches acutely hexagonal, with obtuse ribs 6
5b. Branches cylindrical or quadrangular 7

6a. Leaflets cordiform or truncate at the base; calyx double, the interior margin short, the exterior margin undulate, elongate; corolla white with a purple tinge ..... 1. *Amphilophium*
6b. Leaflets rounded at the base; calyx simple; corolla orange ..... 9. *Pyrostegia*

7a. Tendrils trifid, forming a small claw (harpidium); corolla yellow ..... 5. *Macfadyena*
7b. Tendrils bifid or trifid, not forming a claw; corolla white, lilac, or purple 8

8a. Branches quadrangular; interpetiolar zones not glandular; leaves without odor; tendrils trifid, with one division deciduous and two developing into an adventitious disc; corolla white, with the tube yellow inside ..... 4. *Distictis*
8b. Branches cylindrical; interpetiolar zones glandular; leaves usually with a strong garlic odor; tendrils trifid, each division simple, perennial, without an adventitious disc; corollas lilac or purple ..... 6. *Mansoa*

9a. Corolla bilabiate, white, ca. 4 mm long ..... 12. *Tynanthus*
9b. Corolla with 5 lobes of similar size, lilac, violet, or purple, > 1.5 cm long 10

10a. Stems lepidote, with pseudostipules; leaflets cuneate at the base, upper and lower surface lepidote, with domatia in the axils of the basal secondary veins; corolla 8-9 cm long ..... 10. *Saritaea*
10b. Stems glabrous, without pseudostipules or these inconspicuous; leaflets truncate, rounded, or subcordiform at the base; upper surface glabrous, lower surface glabrous or lepidote, without domatia; corolla < 8 cm long 11

11a. Calyx 2.1-4.1 cm long, in the form of a spathe, open distally along 2/3 of its length; corolla lilac with the lobes purple and the center white or purple ..... 7. *Phryganocydia*
11b. Calyx 3-10 mm long, crateriform, truncate or denticulate at the apex; corolla violet or lilac with the center yellow 12

12a. Corolla infundibuliform, 1.5-3 cm long, violet; mature stems quadrangular, sulcate; cross section of the stem with 4 dark arms formed by the phloem tissue; foliage turning reddish on drying ..... 2. *Arrabidaea*
12b. Corolla tubular-campanulate, 2.5-7.5 cm long, lilac with the center yellow; mature stems cylindrical; cross section of the stem with 8 dark arms formed by the phloem tissue; foliage remaining green or turning brown on drying ..... 3. *Cydista*

1. AMPHILOPHIUM

Lianas. Stems hexagonal with conspicuous obtuse ribs; cross section of the mature stem with a cross of 4 (-5) arms formed by the phloem tissue; interpetiolar zones not glandular; pseudostipules foliaceous, persistent or deciduous. Leaves usually 3-foliolate, with the terminal leaflet replaced by a trifid tendril. Flowers produced in terminal panicles, usually on short axillary branches. Calyx campanulate, double, with the inner margin thick, short and the outer undulate; corolla purple, tubular, bilabiate; stamens 4, didynamous, the anthers glabrous; ovary superior, ovate-cylindrical, with 2 locules. Fruit an oblong-elliptical capsule, the valves parallel to the septum; seeds with 2 hyaline wings not very differentiated from the body. A neotropical genus of 7 species distributed from Mexico to northern Argentina, including the Antilles.

1. Amphilophium paniculatum (L.) Kunth in Humb. Bonpl. & Kunth, Nov. Gen. Sp. (quarto ed.) 3: 149. 1819.

Fig. 3. C, 43. A-C

BASIONYM: *Bignonia paniculata* L.

Liana that climbs by tendrils and attains 5-10 m in length. Stems up to 10 cm in diameter, the bark fibrous, vertically striate; cross section of the mature stem cylindrical, with a cross of 4(-5) dark arms, formed by the phloem tissue; branches acutely hexagonal, with ribbed margins, lepidote or with dendroid pubescence; pseudostipules foliaceous, 3-10 mm long, early deciduous. Leaves 2-foliolate, with a terminal tendril, filiform, trifid, early deciduous; leaflets 2.5-16 × 2.1-10.7 cm, ovate to suborbicular, membranaceous, the apex acuminate or obtuse, the base truncate or asymmetrically cordiform, the margins entire; upper surface with minute, discoid, peltate scales, sometimes pubescent; lower surface with minute discoid, peltate scales, with the veins pubescent; petioles and petiolules hexagonal, with lepidote or dendroid pubescence; petiole 2.3-7.1 cm long; petiolules 0.6-4.3 cm long. Flowers fragrant, produced in terminal panicles, with deciduous bracts, the axes lepidote or with dendroid pubescence. Calyx double, the interior margin 2- or 3-labiate, short, the outer 5-labiate, undulate, 7-12 mm long, densely lepidote; corolla white with a purple tinge, tubular, bilabiate, 2.4-3.5 cm long, the tube split for 1/3 - 2/3 of its length, the 2 upper lobes united, ca. 1 mm long, the 3 lower lobes united, 1.3-1.8 cm long; stamens inserted; ovary ovate-cylindrical, 2-3 mm long, with an annular-pulvinate disc at the base. Capsules elliptical, compressed, 3.9-9.5 cm long, verrucose-lenticellate, lepidote; seeds numerous, 1-1.9 cm wide, with a membranaceous wing on each side.

Phenology: Collected in flower from August to October.

Status: Native, uncommon.

Distribution: In secondary forests and thickets, at middle to upper elevations, especially in the zone of mogotes. From Mexico to northern Argentina, including the Antilles.

Public forest: Río Abajo.

2. ARRABIDAEA

Lianas or less frequently small trees or shrubs. Stems quadrangular or cylindrical; cross section of the mature stem with a cross of 4 arms formed by phloem tissue; interpetiolar zones usually glandular; pseudostipules small and inconspicuous. Leaves opposite, usually 3-foliolate, with the terminal leaflet replaced by a long, filiform, spiral-shaped tendril. Flowers produced in long axillary or terminal panicles. Calyx crateriform, simple, truncate, bilabiate or minutely 5-denticulate at the apex; corolla reddish, pink, or violet, hypocrateriform, infundibuliform, or campanulate, pubescent outside; stamens 4, didynamous; ovary superior, with 2 locules and a crateriform disc at the base. Fruit a linear capsule, compressed, with the valves parallel to the septum; seeds with 2 hyaline wings. A neotropical genus of about 70 species.

1. Arrabidaea chica (Humb. & Bonpl.) Verl., Rev. Hort. 40: 154. 1868.

Fig. 43. D-G

BASIONYM: *Bignonia chica* Humb. & Bonpl.
SYNONYM: *Adenocalymna portoricensis* A. Stahl

Liana that climbs by tendrils and attains 15 m in length. Stems quadrangular, striate, glabrous, 4-sulcate, up to 6 cm in diameter; cross section of the mature stem with a cross of 4 dark arms, formed by the phloem tissue. Pseudostipules inconspicuous. Leaves turning reddish on drying, 2-3-foliolate, the terminal leaflet replaced by a simple, deciduous, filiform, spiral-shaped tendril; lateral leaflets 3.4-11 × 1.5-5 cm, ovate, chartaceous, glabrous or with some scattered hairs, the apex acuminate or acute, the base truncate, rounded, or cordiform, the margins entire; lower surface with a prominent midvein; petioles 1.5-7 cm long, petiolules 0.3-4.5 cm long, both cylindrical and turning blackish on drying. Flowers fragrant, produced in terminal panicles. Calyx simple, 3-5 mm long, puberulent, crateriform, truncate or minutely denticulate; corolla violet, zygomorphic, infundibuliform, 1.5-3 cm long, with the lobes rounded; stamens and staminodia inserted, borne near the base of the corolla; ovary cylindrical, lepidote, with a small annular disc at the base. Capsules linear or narrowly elliptical, 12-23 cm long, smooth, glabrous, semi-woody, acute or obtuse at both ends; seeds numerous, 7-9 mm long, the wings lateral.

Phenology: Collected in fruit in March.

Status: Native, rare, probably extirpated in Puerto Rico, since it has not been collected there in more than a century.

Distribution: Known from Puerto Rico from two collections made in 1885 in Bayamón, *Stahl 79* and *Sintenis 1096*. Also on St. John; throughout the Neotropics.

3. CYDISTA

Lianas with tendrils. Stems cylindrical or quadrangular; cross section of the mature stem with a cross of 8 dark arms formed by the phloem tissue; interpetiolar zone not glandular; pseudostipules present or absent. Leaves opposite, simple or 2-foliolate, with a filiform, terminal tendril. Flowers in terminal or axillary racemes or panicles. Calyx crateriform, simple, truncate or slightly bilobate at the apex; corolla white, pink, lilac, or purple, tubular or infundibuliform; stamens 4, didynamous; ovary superior, cylindrical, with 2 locules, without a disc. Fruit a linear capsule, compressed, with the valves parallel to the septum; seeds compressed, with 2 brown wings. A neotropical genus of 6 species.

1. Cydista aequinoctialis (L.) Miers, Proc. Roy. Hort. Soc. London 3: 191. 1863.

Fig. 3. B; 44. A-D

BASIONYM: *Bignonia aequinoctialis* L.

Bejuco blanco, Liana de la sierra, Guard wiss

Liana that climbs by tendrils and attains 15 m in length. Stems cylindrical, up to 6 cm in diameter, the bark grayish, vertically striate; cross

Fig. 43. A-C. *Amphilophium paniculatum*. **A.** Flowering branch. **B.** Flower, longitudinal section. **C.** Corolla, longitudinal section, with detail of stamens. **D-G.** *Arrabidaea chica*. **D.** Flowering branch. **E.** Corolla, longitudinal section, with detail of stamens. **F.** Flower, longitudinal section showing calyx and gynoecium. **G.** Fruit and winged seed.

section of the mature stem with a cross of 8 dark, marginal arms, formed by the phloem tissue; branches quadrangular, glabrous, pseudostipules absent. Leaves opposite, 2-foliolate, with a terminal tendril, simple, filiform, early deciduous; lateral leaflets 5.5-16 × 2.5-9 cm, ovate, oblong, or elliptical, chartaceous, the apex obtuse, acute, or acuminate, the base obtuse to subcordiform, the margins entire; upper surface glabrous; lower surface with punctiform scales, without domatia; petioles and petiolules quadrangular, pubescent or glabrous, the petiole 0.9-4.5 cm long, the petiolules 0.8-4 cm long. Flowers fragrant, produced in axillary or terminal panicles. Calyx yellowish, crateriform, simple, 4-10 mm long, pubescent or with punctiform scales, the apex truncate or denticulate; corolla zygomorphic, tubular-campanulate, 2.5-7.5 cm long, the tube slightly compressed, narrow at the base, white, yellow inside, the lobes rounded, lilac, the throat yellow with violet lines; stamens inserted; ovary cylindrical, 2-3 mm long, without a disc at the base. Capsules linear, 21-43 × 1.5-2.4 cm, prominent on the margins; seeds numerous, semicircular, membranaceous, 1.5-3.8 cm long, with two membranaceous wings.

Phenology: Flowering throughout the year.

Status: Native, common.

Distribution: In river-bank forests, on the edges of mangrove swamps, and in coastal forests. Also on St. Croix, St. John, and St. Thomas; Cuba, Hispaniola, the Lesser Antilles, and continental tropical America.

Public forest: Guánica.

4. DISTICTIS

Lianas with tendrils. Stems hexagonal or quadrangular, cross section of the mature stem with peripheral phloem forming a cross of 4 arms, or cylindrical and not forming a cross; interpetiolar zone not glandular; pseudostipules present. Leaves opposite, 2-foliolate, frequently with a terminal trifid tendril. Flowers in terminal racemes or panicles. Calyx crateriform, simple, more or less truncate, usually glandular near the apex; corolla white, cream-colored, or red-violet, tubular-campanulate or broadly tubular, pubescent outside; stamens 4, didynamous; ovary superior, oblong, with 2 locules and an annular-patelliform disc at the base. Fruit a convex or biconvex capsule, elliptic-oblong, with the valves parallel to the septum; seeds compressed, with elongate irregular protuberances, in 2 rows. A genus of 6 species distributed from Mexico to Brazil, including the Antilles.

1. Distictis lactiflora (Vahl) DC., Prodr. 9: 191. 1845.

Fig. 3. A; 44. E-H

BASIONYM: *Bignonia lactiflora* Vahl
SYNONYM: *Macrodiscus lactiflorus* (Vahl) Bureau

Pega palo, Liana fragante, Viuda

Woody vine that climbs by tendrils with adhesive discs and attains 5 m or more in length. Mature stems cylindrical with the bark light brown, shredded; cross section with peripheral phloem forming a cross of 4 arms. Branches quadrangular, striate, puberulous, with thickened nodes; pseudostipules foliaceous, 3-4 mm long, deciduous. Leaves opposite, 2-foliolate, with a terminal tendril with 3 branches, 2 of them modified into an adhesive disc; leaflets 2.7-8 × 2-4.5 cm, oblong, elliptical to subrounded, coriaceous, with the reticulate venation conspicuous, the apex obtuse, acute, or acuminate, the base rounded or acute, unequal; upper surface shiny, glabrous, puberulous, or minutely lepidote; lower surface pale green, dull, covered with minute transparent scales, venation prominent; petioles 1-2 cm long, the petiolules 5-10 mm long, both with 2 rows of crimped hairs. Flowers fragrant, in pendulous, terminal racemes or panicles, 10-30 cm long; peduncles and pedicels pubescent. Calyx simple, green, crateriform, 5-7 mm long, truncate at the apex or minutely denticulate; corolla white, infundibuliform, 2.5-5.5 cm long, the tube yellow inside, the lobes 5, rounded, ca. 1.5 cm long. Capsule woody, elliptical, 6.5-13 × 1.7-3.5 cm, somewhat compressed or subcylindrical, with the apex and base acute; seeds numerous, compressed, ca. 2.5 cm long, the central circular body ca. 7 mm in diameter, with a surrounding marginal hyaline wing.

Fig. 44. A-D. *Cydista aequinoctialis*. **A.** Flowering branch. **B.** Stamens and staminodium. **C.** Flower, longitudinal section showing calyx and gynoecium. **D.** Fruit. **E-H.** *Distictis lactiflora*. **E.** Flowering branch. **F.** Stamens, staminodium, and calyx with gynoecium. **G.** Fruit. **H.** Winged seed.

Phenology: Flowering and fruiting almost throughout the year, especially from November to July.

Status: Native, very common in southwestern Puerto Rico.

Distribution: In forests and coastal thickets. Also on Cayo Luis Peña, Vieques, St. Croix, and St. Thomas; Cuba and Hispaniola.

Public forests: Cambalache, Ceiba, Guajataca, Guánica, Río Abajo, Susúa, and Vega.

5. MACFADYENA

Lianas with tendrils. Stems cylindrical or quadrangular; cross section of the mature stem with multilobed xylem, the lobes alternating with radially arranged phloem tissue; glandular interpetiolar zone present or absent; pseudostipules small, lanceolate to ovate. Leaves opposite, 2-foliolate, with a terminal trifid tendril in the form of a claw. Flowers in axillary cymes or panicles. Calyx campanulate, simple; corolla yellow, zygomorphic, tubular or campanulate; stamens 4, didynamous; ovary superior, linear-cylindrical, with 2 locules and an annular disc at the base. Fruit a narrow capsule, elongate and compressed, with the valves parallel to the septum; seeds numerous, with 2 wings. A genus of 4 species of neotropical distribution.

1. Macfadyena unguis-cati (L.) A. H. Gentry, Brittonia 25: 236. 1973.

Fig. 3. D; 45. A-C

BASIONYM: *Bignonia unguis-cati* L.
SYNONYMS: *Batocydia unguis* (L.) DC.
Doxantha unguis-cati (L.) Miers

Uña de gato, Liana uñada, Cat-claw

Woody vine, which climbs by tendrils and attains 10-15 m in length. Stems cylindrical, lenticellate, up to 6 cm in diameter; cross section of the mature stem with multilobed xylem, the lobes alternating with radially arranged phloem tissue; nodes thickened; interpetiolar zone not glandular. Pseudostipules ovate, ca. 5 mm long. Leaves opposite, 2-foliolate, with a terminal tendril, trifid like a claw, generally of short duration; leaflets 6-16 × 1.2-7 cm, elliptical, oblong, or obovate, chartaceous or coriaceous, glabrous or with punctiform scales, the apex acute or acuminate, the base acute, rounded, or unequal, the margins undulate or rarely denticulate; upper surface dark, shiny, with sunken venation; lower surface light green, dull, with prominent venation; petioles 1-4.5 cm long, petiolules 0.5-2.5 cm long, both glabrous. Flowers solitary or in pairs, axillary; pedicel ca. 2 cm long. Calyx green, campanulate, 12-16 mm long, with 5 unequal lobes; corolla brilliant yellow, infundibuliform, 4-8 cm long, the limb 3-6 cm in diameter, with 5 unequal lobes, rounded; stamens 4, didynamous, inserted; ovary covered with punctiform scales. Capsule linear, somewhat woody, brown, 25-95 cm long; seeds numerous, 1-3.5 cm long, with 2 membranaceous wings.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: In moist forests at middle and lower elevations, from the coast to the Cordillera Central. Also on Culebra, Desecheo, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Antilles and tropical and subtropical America.

Public forests: Cambalache, Ceiba, Desecheo, El Yunque, Guánica, Maricao, Río Abajo, Susúa, Toro Negro, and Vega.

6. MANSOA

Lianas with tendrils. Stems cylindrical or subquadrangular; cross section of the mature stem with a cross of 4 or 8 dark arms formed by the phloem tissue; interpetiolar zone glandular or not; pseudostipules short, conical-obtuse. Leaves opposite, 2- or 3-foliolate, with a terminal trifid or simple tendril; petioles sometimes with an apical glandular zone. Flowers in terminal panicles or racemes or in axillary corymbs. Calyx crateriform, tubular, or campanulate, simple, truncate or 5-dentate; corolla white, lilac, purple, or reddish, zygomorphic, tubular-campanulate or infundibuliform; stamens 4, didynamous; ovary

superior, cylindrical, glandular-papillose, puberulent, with 2 locules, the ovules 2(3-4) seriate. Fruit a linear-oblong capsule, compressed or convex, sometimes tuberculate, with the valves parallel to the septum; seeds numerous, with 2 membranaceous wings or without wings. A genus of 15 species distributed from Mexico to Brazil.

Key to the species of *Mansoa*

1a. Leaflets 9-30 cm long; lower surface with a group of minute punctiform glands in the axils of the secondary veins (frequently of the basal and sub-basal veins); corolla 7.5-9 cm long; fruit 30-35 cm long, woody, swollen, with a very prominent rib along each valve ..... 1. *M. alliacea*

1b. Leaflets 6-10 cm long; lower surface without glands in the axils of the secondary veins; corolla 4.5-6.5 cm long; fruits 15-25 cm long, coriaceous, compressed, with a slight rib along each valve .....2. *M. hymenaea*

1. Mansoa alliacea (Lam.) A. H. Gentry, Ann. Missouri Bot. Gard. 66: 782. 1979.

Fig. 45. H

BASIONYM: *Bignonia alliacea* Lam.
SYNONYM: *Adenocalymna obovatum* Urb.

Bejuco de ajo, Mata de ajo

Woody vine, which climbs by tendrils and attains 10-15 m in length. Young stems quadrangular, with the angles ribbed; mature stems cylindrical or subcylindrical, lenticellate; cross section with a cross of 4 arms, formed by the phloem tissue; nodes slightly compressed with a glandular interpetiolar zone; pseudostipules ovate, ca. 5 mm long. Leaves opposite, 2-foliolate, sometimes with a terminal tendril, trifid, deciduous, 20-25 cm long; leaflets 9-30 × 4.5-18 cm, elliptical or broadly elliptical, chartaceous, the apex obtuse or obtusely acuminate, the base acute, rounded, or obtuse and sometimes unequal, the margins undulate or crenate; upper surface dull, glabrous, with the venation slightly prominent; lower surface light green, dull, minutely lepidote, with the venation slightly prominent, the axils of the secondary veins with a group of minute punctiform glands; petioles and petiolules glabrous, the petioles 7-30 mm long, the petiolules with two keels formed by the decurrent base of the blade, 7-30 mm long. Flowers few, in axillary racemes; pedicels 7-15 mm long. Calyx green, campanulate or broadly campanulate, simple, puberulous, 5-8 mm long, truncate, slightly crenate at the apex; corolla violet-pink or lavender, infundibuliform, 7.5-9 cm long, the limb 4-5 cm in diameter, with five rounded lobes; stamens inserted; ovary cylindrical, lepidote. Capsule oblong, woody, light brown, 30-35 × 2.5- 3 cm, swollen, with a longitudinal rib on the middle portion of each of the valves; seeds asymmetrically ovate, compressed, thick, woody, 1.5-2 cm long.

Phenology: Collected in flower from October to May and in fruit in October.

Status: Exotic, cultivated in Puerto Rico.

Distribution: Cited by Britton and P. Wilson (1925) for the Agricultural Experiment Station in Trujillo Alto. Species native to central South America, from the Amazonian regions of Peru and Brazil, also in Guyana.

2. Mansoa hymenaea (DC.) A. H. Gentry, Ann. Missouri Bot. Gard. 66: 782. 1979.

Fig. 45. D-G

BASIONYM: *Bignonia hymenaea* DC.

Bejuco de ajo, Mata de ajo

Woody vine, with a strong odor of garlic, which climbs by tendrils, 3-5 m in length. Young stems angular to subcylindrical, striate, puberulous to glabrous; mature stems cylindrical, lenticellate; cross section with a cross of four arms, formed by the phloem tissue; nodes slightly compressed, with a glandular interpetiolar zone; pseudostipules keeled, 2-3 mm long. Leaves opposite, 2-foliolate, with a terminal trifid tendril, early deciduous; leaflets 6-10 × 2.5-6 cm, elliptical or ovate, chartaceous, the apex acute, obtuse, or acuminate, the base acute, obtuse, or rounded, sometimes unequal, the margins undulate; upper surface dull, glabrous, with the venation slightly prominent; lower surface light green, dull, sparsely punctate-glandular, without glands in the axils of the secondary veins, the venation slightly

prominent; petioles and petiolules puberulous; petioles 1.3-3.5 cm long, the petiolules slightly keeled by the decurrent base of the blade, 1-2.6 cm long. Flowers few in axillary racemes, 5-20 cm long; peduncles keeled. Calyx green, campanulate, puberulous, 8-9 mm long, truncate or denticulate, ciliate and with a purple tinge at the apex; corolla violet-pink or lavender, infundibuliform, 4.5-6.5 cm long, the tube lighter than the lobes, the limb 2.5-4 cm in diameter, with 5 rounded lobes; stamens inserted; ovary cylindrical, lepidote. Capsule linear, long-acuminate, compressed, coriaceous, light brown, 15-25 × 1.7-2 cm, with a longitudinal vein in the middle portion of each of the valves; seeds numerous, 2-winged, oblong, membranaceous, ca. 3.3 cm long.

Phenology: Flowering from December to May and fruiting from January to May.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: Along roads. Species native to the Neotropics, distributed from Mexico to southeastern Brazil.

7. PHRYGANOCYDIA

Lianas with tendrils. Stems cylindrical, glabrous or lepidote; cross section of the mature stem with phloem forming a cross of 8 (4) arms; interpetiolar zone not glandular; pseudostipules inconspicuous or absent. Leaves opposite, simple or 2-foliolate, usually with a terminal simple tendril. Flowers few, in terminal or axillary panicles, scarcely branched. Calyx simple, in the form of a spathe, split along T‡of its length; corolla lilac to purple, infundibuliform, lepidote outside; stamens 4, didynamous, the anthers glabrous; ovary superior, conical or cylindrical, lepidote, with 2 locules, the ovules 2-seriate per locule; disc absent. Fruit a linear capsule, oblong or ovoid (slightly compressed), coriaceous, with valves parallel to the septum; seeds numerous, with or without 2 membranaceous wings. A genus of 3 species of tropical America, distributed from Costa Rica to Bolivia.

1. Phryganocydia corymbosa (Vent) Bureau ex K.Schum. in Engl. & Prantl, Nat. Pflanzenfam. 4, Abt. 3b: 224, fig. 89H. 1894. **Fig. 46. A-C**

BASIONYM: *Spathodea corymbosa* Vent.

Liana that climbs by tendrils, attaining 10 m in length. Stems subcylindrical, finely striate, glabrous, up to 5 cm in diameter; cross section of the mature stem with a cross of 8 arms formed by the phloem tissue. Leaves opposite, 2-foliolate and sometimes with a terminal, simple tendril, 7-16 cm long; leaflets 4-22 × 1.9-11 cm, elliptical or ovate-elliptical, chartaceous or coriaceous, glabrous, the apex acute, obtuse, or acuminate, the base obtuse or rounded, usually trinerved, the margins undulate; upper surface dark, shiny, with the venation somewhat sunken; lower surface slightly shiny, punctate, with prominent venation; petioles 0.6-3.3 cm long, the petiolules 0.5-3 cm long, slightly winged, both finely lepidote; pseudostipules absent or inconspicuous and early deciduous. Flowers in terminal or axillary panicles, the axes finely lepidote and somewhat compressed. Calyx green, in the form of a spathe, split along 2/3 of its length, 2.1-4.1 cm long; corolla lilac with the center white or purple, infundibuliform, 4.6-9.5 cm long, the limb 4-8 cm in diameter, the lobes purple, crenate; stamens 4, didynamous, inserted; ovary cylindrical, covered with punctiform scales. Capsule linear-oblong, subwoody, grayish, 13-53 cm long, densely lepidote; seeds numerous, 1.5-2 cm long, with a membranaceous wing, not differentiated from the body of the seed

Phenology: Collected in flower in January.

Status: Exotic, cultivated, uncommon.

Distribution: Native to continental tropical America, from Costa Rica to Bolivia. Cultivated on St. Croix and St. Thomas.

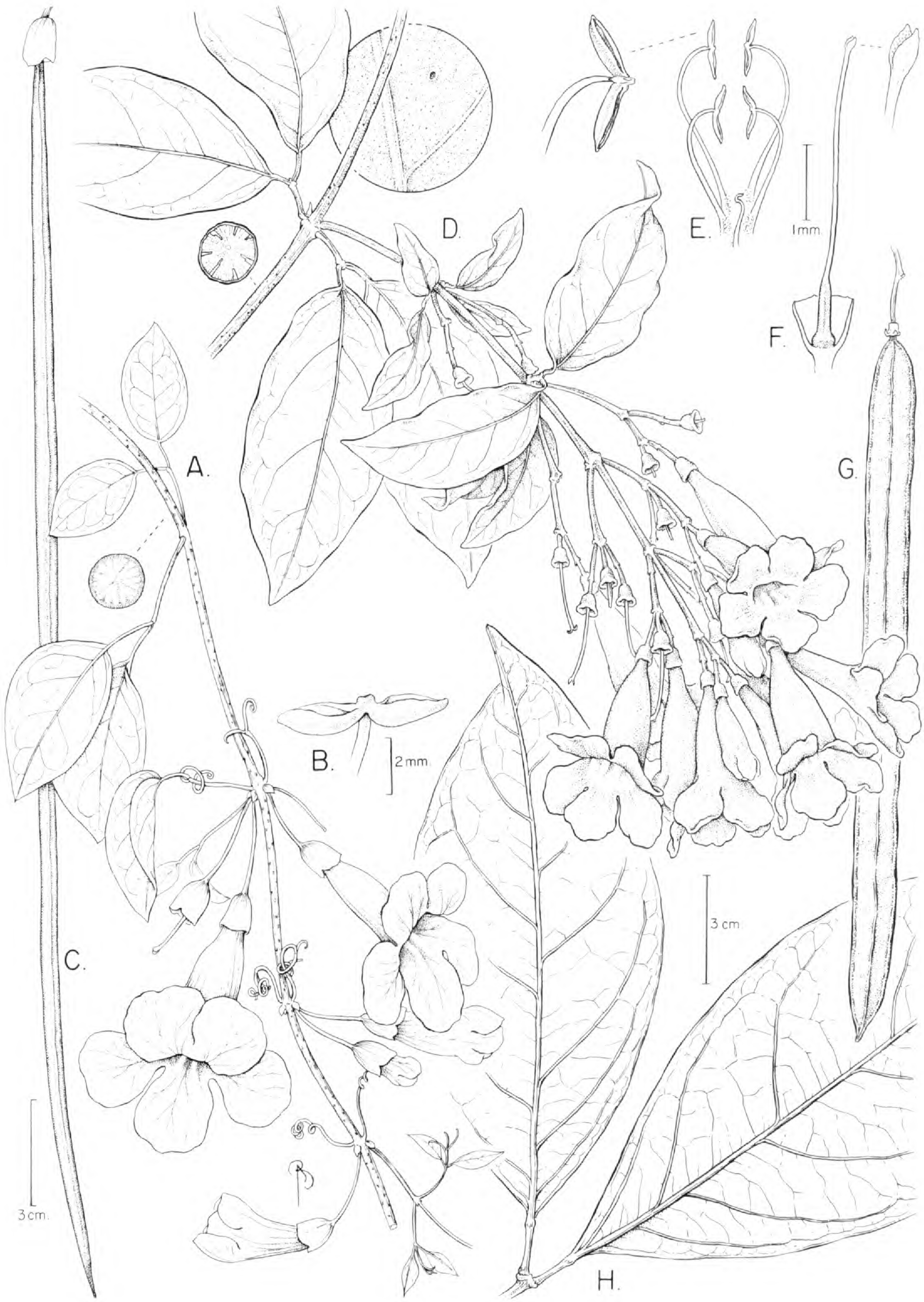

Fig. 45. A-C. *Macfadyena unguis-cati*. **A.** Flowering branch. **B.** Stamen. **C.** Fruit. **D-G.** *Mansoa hymenaea*. **D.** Flowering branch, with detail of the stem and foliar glands. **E.** Didynamous stamens and staminodium. **F.** Calyx and gynoecium, with detail of the stigma. **G.** Fruit. **H.** *Mansoa alliacea*, leaf with two leaflets.

8. PODRANEA

Lianas or climbing shrubs. Stems cylindrical; cross section of the mature stem with normal peripheral phloem; interpetiolar zone not glandular; pseudostipules absent. Leaves opposite, pinnately compound, imparipinnate, without tendrils. Flowers in terminal panicles. Calyx simple, campanulate, 5-dentate; corolla zygomorphic, violet-pink, tubular-campanulate; stamens 4, didynamous; ovary superior, linear, tetragonal, glabrous, with 2 locules and an annular disc at the base, the ovules 6-seriate per locule. Fruit a linear capsule, coriaceous, with valves perpendicular to the septum; seeds numerous, with membranaceous wings at the ends. A genus of 1 or 2 species of tropical eastern and southern Africa.

1. Podranea ricasoliana (Tanfani) Sprague in Thiselton-Dyer, Fl. Cap. 4 (2): 450. 1904.

Fig. 46. D-G

BASIONYM: *Tecoma ricasoliana* Tanfani

Liana or clambering shrub, 3-4 m in length. Stems cylindrical, smooth; cross section with peripheral phloem not forming a cross. Leaves opposite, imparipinnate, 7-9-foliolate, without tendrils; leaflets 2.5-3.8 × 1.5-2.0 cm, ovate, chartaceous, glabrous, the apex obtuse or short-acuminate, the base truncate, cuneate, or attenuate, the margins serrate; upper surface dull, with the venation flat, dark; lower surface light green, punctate, dull, with prominent venation; rachis glabrous, marginate, petioles and petiolules glabrous, the petioles 2.5-5 cm long, the petiolules 4-8 mm long; pseudostipules absent. Flowers in terminal panicles; pedicels 1.5-2 cm long. Calyx green with a pink tinge, campanulate, 1.5-2 cm long, with 5 apiculate lobes; corolla violet-pink, campanulate, 5-7 cm long, the tube white with reddish purple lines, the limb ca. 5 cm in diameter, with 5 rounded lobes, unequal, stamens inserted; ovary glabrous. Capsule linear, coriaceous, cylindrical, 25-30 cm long; seeds numerous, ca. 1.5 cm long, brown, with 2 marginal wings, ca. 5 mm long.

Phenology: Collected in flower from August to May and in fruit in February.

Status: Exotic, cultivated and sometimes naturalized.

Distribution: Native to South Africa, but widely cultivated throughout the tropics. Cultivated along the Cordillera Central. Cultivated and possibly naturalized on St. Croix, St. John, and St. Thomas.

9. PYROSTEGIA

Lianas with tendrils. Stems obtusely hexagonal or subangular with 6-8 prominences; cross section of the mature stem with normal peripheral phloem; interpetiolar zone not glandular; pseudostipules inconspicuous. Leaves opposite, 2-3-foliolate, with a terminal trifid tendril. Flowers in terminal or axillary panicles. Calyx simple, crateriform, truncate or 5-denticulate, more or less glandular-lepidote; corolla red-orange, zygomorphic, narrowly tubular-infundibuliform; stamens 4, didynamous, exserted; ovary superior, bicarpellate, linear-tetragonal, lepidote, with an annular-pulvinate disc at the base. Fruit a linear capsule, compressed, smooth, with the valves parallel to the septum; seeds numerous, with 2 brown wings with hyaline margins. A genus of 3 or 4 species naturally distributed from southern Colombia to Brazil and Paraguay.

1. Pyrostegia venusta (Ker Gawl.) Miers, Proc. Roy. Hort. Soc. 3: 188. 1863.

Fig. 47. A-E

BASIONYM: *Bignonia venusta* Ker Gawl.
SYNONYM: *Pyrostegia ignea* (Vell.) K. Presl

Liana that climbs by tendrils, 5-7 m in length. Stems angular to subcylindrical, striate, puberulent or lepidote, interpetiolar zone not glandular; cross section of the mature stem with peripheral phloem tissue not forming a cross. Leaves opposite, 2- or 3-foliolate, sometimes with

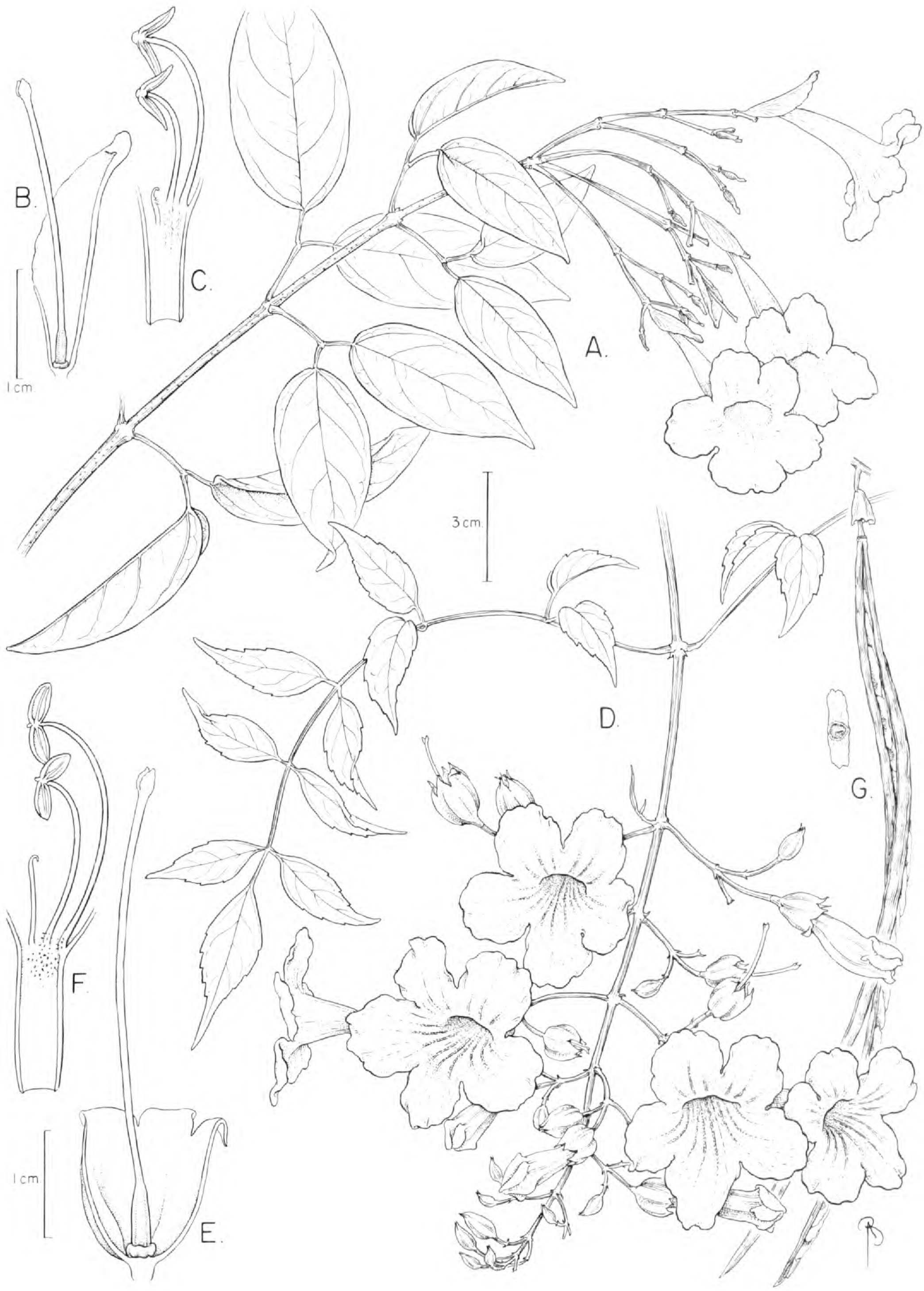

Fig. 46. A-C. *Phryganocydia corymbosa*. **A.** Flowering branch. **B.** Calyx and gynoecium. **C.** Stamens and staminodium. **D-G.** *Podranea ricasoliana*. **D.** Flowering branch. **E.** Calyx and gynoecium. **F.** Stamens and staminodium. **G.** Fruit and winged seed.

a trifid, deciduous tendril; leaflets 4-6 × 2.5-4 cm, ovate, chartaceous, lepidote or puberulent, with numerous resinous dots on both surfaces, the apex acute, the base rounded, the margins undulate, revolute; upper surface dark, slightly shiny, with the venation slightly prominent; lower surface light green, dull, with a prominent midvein, without domatia; petioles and petiolules glabrous or puberulous, the petioles 1.5-2.5 cm long, angular, the petiolules 1-1.5 cm long, sulcate on the upper surface; pseudostipules inconspicuous. Flowers numerous in terminal panicles; pedicels 0.6-15 cm long. Calyx green, broadly campanulate, 4-4.5 mm long, subtruncate or 5-denticulate and ciliate at the apex; corolla red-orange, tubular, 5.5-6.5 cm long, the tube glabrous externally, puberulent inside, the limb 2.9-4 cm in diameter, with 5 lobes, 1-1.5 cm long; stamens exserted, yellow; ovary oblong, ca. 4 mm long, glabrous or lepidote. Capsule linear, compressed, coriaceous, light brown, 25-30 cm long, with the midvein slightly prominent; seeds numerous, 1.2-1.4 cm long, the wings brown with the margins hyaline.

Phenology: Collected in flower in January and February.

Status: Exotic, cultivated, common.

Distribution: Native to southern Brazil, Paraguay, and northern Argentina; cultivated throughout the tropics. Widely cultivated along the Cordillera Central.

10. SARITAEA

A monospecific genus native to Colombia and Ecuador, characterized by the following species.

1. Saritaea magnifica (W. Bull) Dugand, Caldasia 3: 263. 1945.

Fig. 47. F-H

BASIONYM: *Bignonia magnifica* W. Bull

Liana that climbs by tendrils, 3-7 m in length. Stems cylindrical, lepidote, compressed at the nodes, interpetiolar zone not glandular; cross section of the mature stem normal. Leaves opposite, 2-foliolate, sometimes with a simple tendril, of short duration; leaflets 4.2-11.5 × 3.1-6.4 cm, obovate, chartaceous, with the venation slightly prominent on both surfaces, the apex obtuse, the base cuneate or decurrent, the margins entire; upper surface dull, minutely lepidote; lower surface dull, sparsely lepidote, with domatia in the axils of the basal secondary veins; petioles and petiolules lepidote, the petioles 1.7-2.8 cm long, the petiolules 0.3-1.6 cm long; pseudostipules foliaceous, 0.6-4.2 cm long. Flowers few, in corymbiform panicles, usually terminal; pedicels 4-6 mm long. Calyx yellowish green, simple, crateriform, 7-8 mm long, truncate, lepidote; corolla purple-pink, tubular-campanulate, 8-9 cm long, glabrous or minutely glandular, the tube pubescent inside, the throat white inside with purple-pink lines, the lobes unequal, 2.2-3.1 cm long; stamens 4, didynamous, inserted; ovary linear, ca. 4 mm long, glandular-lepidote, with two locules, the ovules in 2 series per locule; disc hypocrateriform-pulviniform, 1 mm high. Capsule linear, compressed, coriaceous, brown, 20-25 × 1-1.2 cm; seeds numerous, oblong, 2-winged, the hyaline wings membranaceous.

Phenology: Collected in flower from September to December.

Status: Exotic, cultivated, uncommon in Puerto Rico.

Distribution: Native to Colombia and Ecuador but cultivated throughout the tropics.

11. TECOMARIA

Lianas or climbing shrubs. Stems cylindrical, interpetiolar zone not glandular; pseudostipules absent; cross section of the mature stem with normal peripheral phloem. Leaves opposite, pinnately compound, imparipinnate, without tendrils. Flowers in axillary racemes. Calyx simple, campanulate, 5-dentate; corolla orange or bright red, zygomorphic, tubular, curved; stamens 4, of the same length, exserted;

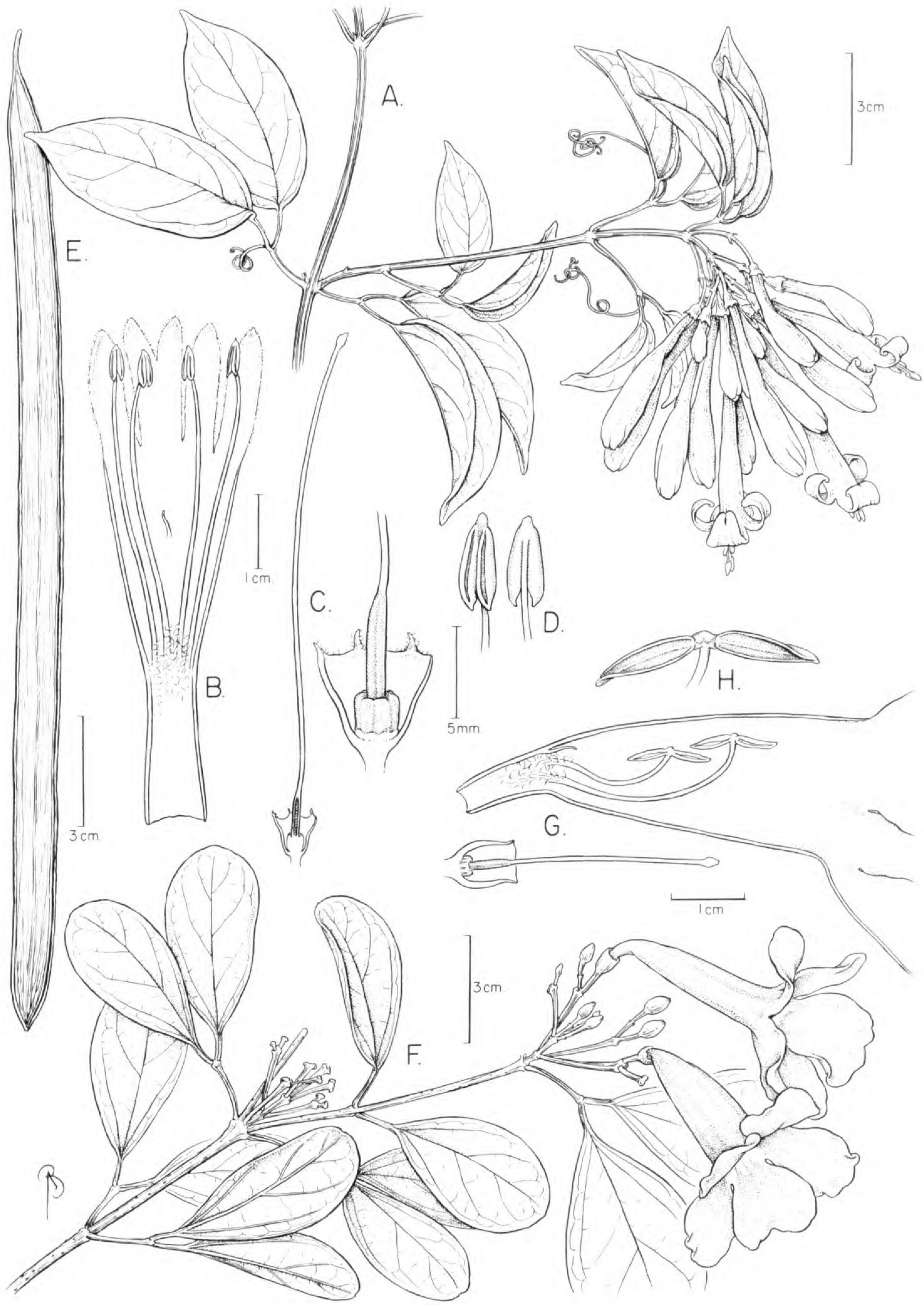

Fig. 47. A-E. *Pyrostegia venusta.* **A.** Fertile branch. **B.** Corolla, longitudinal section showing stamens and staminodium. **C.** Calyx and gynoecium, and detail. **D.** Anthers, front and back views. **E.** Fruit. **F-H.** *Saritaea magnifica.* **F.** Flowering branch. **G.** Corolla, longitudinal section showing stamens and staminodium; calyx and gynoecium. **H.** Anther.

ovary superior, oblong, glabrous, with 2 locules. Fruit a linear capsule, coriaceous, with valves perpendicular to the septum; seeds numerous, flat, with 2 hyaline-membranaceous wings. A genus of 2 species of tropical eastern and southern Africa.

1. Tecomaria capensis (Thunb.) Spach, Hist. Nat. Veg. Phan. 9: 137. 1840.

Fig. 48. A-C

BASIONYM: *Bignonia capensis* Thunb.
SYNONYM: *Tecoma capensis* (Thunb.) Lindl.

Clambering or semi-erect shrub, 3-4 m in length. Stems cylindrical, lenticellate, puberulous; cross section of the mature stem with peripheral phloem not forming a cross. Leaves opposite, imparipinnate, 7-11-foliolate, without tendrils; leaflets 1.5-4.2 × 1-3 cm, elliptical to subrounded, membranaceous, sessile, puberulent, the apex rounded, the base rounded or abruptly cuneate, the margins serrate; upper surface dull, pale, with slightly prominent venation; lower surface light green, dull, punctate, with slightly prominent venation, forming a conspicuous network, with tufts of hairs in the axils; petioles 1.5-2.5 cm long; pseudostipules absent. Flowers numerous, in axillary racemes; pedicel 6-10 mm long. Calyx green, crateriform, 5-7 mm long, 5-dentate, ciliate, puberulent; corolla orange or reddish orange, tubular, curved, 3.5-5 cm long, with 5 oblong, unequal lobes, the 2 upper lobes smaller than the 3 lower; stamens 4, of equal length, exserted; ovary superior, oblong, glabrous, with a crateriform disc at the base. Capsule linear, 5-11 cm long and 7-8 mm wide; seeds in 2 rows, slender, 2-winged, the wings hyaline-membranaceous.

Phenology: Collected in flower in February and March.

Status: Exotic, cultivated, uncommon.

Distribution: Cultivated in gardens along the Cordillera Central, also on St. Croix and St. Thomas. Native to South Africa, but widely cultivated throughout the tropics.

12. TYNANTHUS

Small trees or lianas with tendrils. Stems cylindrical or occasionally quadrangular, interpetiolar zone not glandular; pseudostipules absent or foliaceous but early deciduous; cross section of the mature stem with a cross of 4 arms formed by the phloem tissue. Leaves opposite, 2- or 3-foliolate, the terminal leaflet usually replaced by a terminal, simple or trifid tendril. Flowers numerous, in terminal or axillary panicles. Calyx simple, crateriform, subtruncate, usually 5-denticulate; corolla white, zygomorphic, infundibuliform, bilabiate, divided up to half its length, pubescent outside; stamens 4, didynamous, subexserted; ovary superior, bicarpellate, conical, densely pubescent, the ovules in 2-4-series per locule. Fruit a linear capsule, compressed, smooth, with the valves parallel to the septum; seeds numerous, flat, with 2 hyaline-membranaceous wings. A genus of 14 species of tropical America distributed from southern Mexico to Brazil and Bolivia.

1. Tynanthus polyanthus (Bur.) Sandw., Kew Bull. 1953: 465. 1954.

Fig. 48. D-I

BASIONYM: *Schizopsis polyanthus* Bur.
SYNONYMS: *Bignonia caryophyllea* Bello
Tynanthus caryophylleus (Bello) Alain

Bejuco de clavo

Liana that climbs by tendrils, 10-20 m in length. Stems more or less quadrangular, tomentose, interpetiolar zone not glandular, usually with an interpetiolar line, attaining 3 cm or more in diameter; cross section of the mature stem with a cross of 4 arms formed by the phloem tissue, with a strong odor of cloves; pseudostipules foliaceous, ca. 1 cm long, deciduous. Leaves opposite, 2-foliolate, sometimes with a simple tendril, in the form of a spiral, up to 15 cm long; leaflets 6-13 × 3.5-10 cm, broadly ovate to subcircular, membranaceous, the apex cuspidate or short-acuminate, the base truncate, rounded, or subcordiform, the margins entire, undulate or crenulate; upper surface with the venation flat, glabrous; lower surface puberulent, especially on

Fig. 48. A-C. *Tecomaria capensis*. **A.** Flowering branch. **B.** Corolla, longitudinal section, showing stamens, and calyx and gynoecium. **C.** Anthers. **D-I.** *Tynanthus polyanthus*. **D.** Branch showing tendril. **E.** Cross section of the mature stem. **F.** Flowering branch. **G.** Flower. **H.** Corolla, longitudinal section showing stamens and staminodium; calyx and gynoecium. **I.** Stamen.

the veins; petioles and petiolules puberulent or short-pubescent, the petioles 1.7-4 cm long, deeply canaliculate, the petiolules 1.2-3 (-5) cm long. Flowers numerous in terminal or axillary panicles, bracteate, the axes pubescent; pedicels ca. 1 mm long. Calyx green, crateriform, 1-1.5 mm long, subtruncate, minutely 5-denticulate, puberulent; corolla white, tubular, bilabiate, ca. 4 mm long, puberulent outside, the 2 upper lobes smaller than the lower, the 3 lower lobes 2-3 mm long; stamens didynamous, inserted; ovary conical, ca. 0.8 mm long, densely appressed- pubescent; annular disc pubescent. Capsule linear, compressed, somewhat woody, dark brown, 15-27 × 0.5-0.7 cm, with the midvein inconspicuous; seeds numerous, brown, 4-5 mm long, the wings hyaline-membranaceous.

Phenology: Collected in flower in July and in fruit in April.

Status: Exotic, cultivated, uncommon.

Distribution: Native to western Amazonia, sporadically cultivated in Puerto Rico, Jamaica, Cuba, and the Dominican Republic.

References: Gentry, A. H. 1982. Bignoniaceae. Flora de Venezuela. Ediciones Fundación. Venezuela. Hawk, W. D. 1997. A review of the genus *Cydista*. Ann. Missouri Bot. Gard. 84: 815-840.

9. *Family* ***BORAGINACEAE***

Key to the genera

1a. Corolla campanulate; style bifid, each branch again bifid, for a total of 4 stigmas ..... 1. *Cordia*
1b. Corolla infundibuliform; style simple, bilobed ..... 2. *Tournefortia*

1. CORDIA

Shrubs or trees and sometimes scandent shrubs. Leaves alternate, petiolate; blades simple; stipules absent. Flowers bisexual, usually heterostylous, in axillary or terminal cymes, panicles, corymbs, or spikes. Calyx campanulate or tubular, 5-dentate or 5-10 lobed, usually striate and accrescent in the fruit; corolla actinomorphic, campanulate or hypocrateriform; stamens 5, inserted on the corolla tube, shorter or longer than the corolla tube; ovary superior, bicarpellate, each carpel with 2 uniovulate chambers, the style branched into 4 stigmatic branches. Fruit a globose, fleshy drupe, with 1-4 pyrenes. A genus of about 300 species of pantropical distribution.

Key to the species of *Cordia*

1a. Inflorescences of unbranched glomerules; lobes of the corolla almost as long as the tube ..... 1. *C. bellonis*
1b. Inflorescences of paniculate or corymbose heads; lobes of the corolla much shorter than the tube ..... 2. *C. polycephala*

1. Cordia bellonis Urb., Symb. Antill. 1: 393. 1899.

Fig. 49. A-F

SYNONYM: *Varronia bellonis* (Urb.) Britton

Clambering or recumbent shrub, 2-3 m in length. Stems appressed-pubescent when young, glabrous when mature. Leaves alternate; blades 2-6 × 1-2 cm, elliptical, oblong to sublanceolate, chartaceous, the apex acute, the base acute or obtuse, the margins dentate or denticulate, especially on the distal portion; upper surface with short appressed hairs that give it a scabrid texture, the midvein slightly prominent; lower surface pale

green, strigulose-puberulous, with the venation slightly prominent; petioles appressed-pubescent, 4-7 mm long. Flowers few, sessile, arranged in short axillary cymes; peduncle < 6 mm long. Calyx green, turbinate, strigulose, 2-2.5 mm long; corolla white, infundibuliform, glabrous, ca. 4 mm long, the lobes ovate to oblong, almost as long as the tube; stamens and stigmas inserted. Drupe red, ovoid, ca. 3 mm in diameter, with the persistent accrescent calyx covering the lower 1/3 of the fruit.

Phenology: Collected in flower from October to January and in fruit from November to January.

Status: Endemic, listed in the Federal Register of the United States as an endangered species. Locally common at the base of mogotes.

Distribution: Along the banks of rivers and streams or in the interior of forests on substrates of limestone (mogotes) or serpentine.

Public forests: Maricao, Río Abajo, and Susúa.

2. Cordia polycephala (Lam.) I.M. Johnst., J. Arnold Arbor. 16: 33. 1935.

Fig. 49. G-L

BASIONYM: *Varronia polycephala* Lam.
SYNONYM: *Varronia corymbosa* (L.) Desv.
Basora, Palo de perico, Saragüero, Black sage

Woody shrub, clambering, up to 5 m in length. Stems pubescent when young, cylindrical, attaining 1.5 cm in diameter. Leaves alternate; blades 4-15 × 2-5.5 cm, ovate, lanceolate, or elliptical, coriaceous, the apex acute or acuminate, the base obtuse or rounded, sometimes unequal, the margins serrate; upper surface scabrous, the venation sunken; lower surface pale green, more or less pubescent, with prominent reticulate venation; petioles pubescent, 5-10 mm long. Flowers numerous, sessile, arranged in terminal or axillary paniculate or corymbose heads. Calyx yellowish green, crateriform, pubescent, 2.5-3 mm long; corolla white, campanulate, 4-5 mm long, the lobes much shorter than the tube, the tube pubescent inside; stamens and stigmas inserted. Drupe red, globose, 3-4 mm in diameter, completely covered by the accrescent calyx.

Phenology: Flowering and fruiting throughout the year, particularly in June and July.

Status: Native, very common.

Distribution: In weedy areas and along paths, at lower and middle elevations. Also on Vieques, St. Croix, St. Thomas, Tortola, and Virgin Gorda; Hispaniola, the Lesser Antilles, and northern South America.

Public forests: Cambalache, Carite, Ceiba, El Yunque, Guajataca, Guánica, Maricao, Río Abajo, Susúa, Toro Negro, and Tortuguero.

Commentary: *Cordia wagnerorum* Howard was originally described as a clambering shrub; nevertheless, the clambering habit seems to be the exception to the rule, since I have only observed this species as an erect shrub. For this reason, this species has been excluded from the present work.

2. TOURNEFORTIA

Vines, lianas, shrubs, or trees. Leaves alternate, petiolate; blades simple; stipules absent. Flowers actinomorphic, bisexual, in terminal scorpioid cymes. Calyx crateriform, with 5 deep lobes; corolla hypocrateriform, the tube slightly broadened at the base, the lobes reflexed; stamens 5, inserted on the corolla tube, shorter than the corolla; ovary superior, with 2 carpels, each carpel with 2 uniovulate chambers, the style simple, bilobed. Fruit a fleshy drupe, globose or 2- or 4- lobed, with 1-4 pyrenes. A genus of about 150 species of pantropical distribution.

Key to the species of *Tournefortia*

1a. Leaves rigid-coriaceous, scabrous on the upper surface ..... 5. *T. scabra*
1b. Leaves chartaceous or coriaceous, not rigid, pubescent, hirsute or glabrous on the upper surface, not scabrous 2

2a. Twining vines; fruits white 3
2b. Clambering subshrubs; fruits orange ..... 3. *T. maculata*

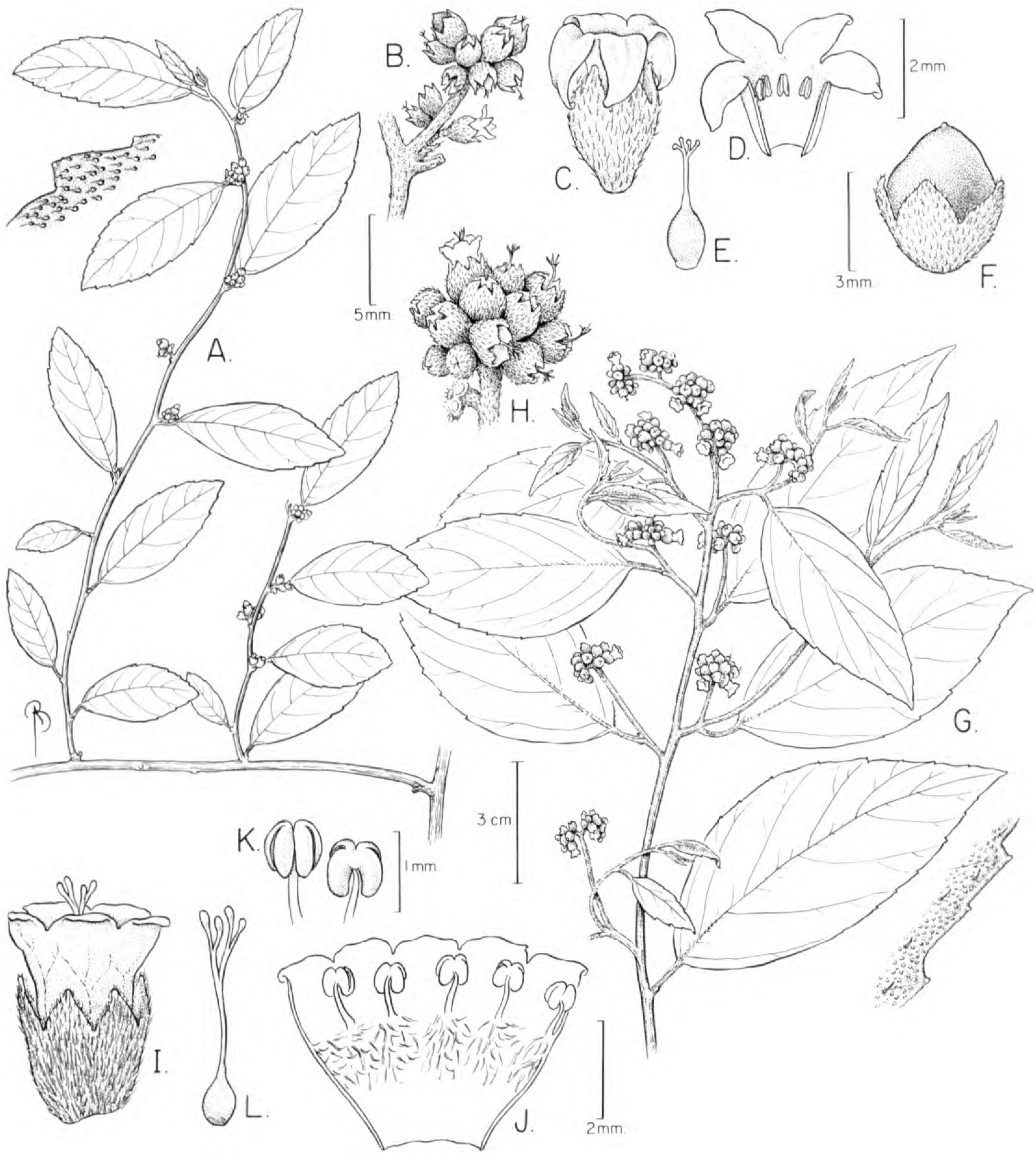

Fig. 49. A-F. *Cordia bellonis*. **A.** Fertile branch. **B.** Detail of inflorescence. **C.** Flower. **D.** Corolla, longitudinal section showing stamens. **E.** Gynoecium. **F.** Fruit. **G-L.** *Cordia polycephala*. **G.** Flowering branch. **H.** Inflorescence. **I.** Flower. **J.** Corolla, longitudinal section showing stamens. **K.** Detail of anthers. **L.** Gynoecium.

3a. Fruits completely white. 4
3b. Fruits with 2-4 circular black spots. 5

4a. Stems, leaves, and inflorescences hirsute or tomentose ..... 2. *T. hirsutissima*
4b. Stems strigose, becoming glabrous when mature; leaves glabrous or puberulous on the venation; inflorescences strigose ..... 1. *T. bicolor*

5a. Leaves 1.5-3 (3.5) cm long, the apex acute or obtuse ..... 4. *T. microphylla*
5b. Leaves (3.5) 4-10 cm long, the apex acute or acuminate ..... 6. *T. volubilis*

1. Tournefortia bicolor Sw., Prodr. 40. 1788.

Fig. 50. A-E

SYNONYM: *Tournefortia laevigata* Lam.

Woody vine, twining, attaining 10 m in length. Stems cylindrical, strigose, glabrous when mature, attaining 4-5 cm in diameter. Leaves alternate; blades 4-15 × 2.5-8 cm, lanceolate or elliptical, chartaceous, the apex acute or short-acuminate, the base cuneate or obtuse, the margins entire or crenulate; upper surface glabrous or appressed-pubescent or scabrid, puberulous on the venation, lower surface glabrous, with prominent puberulous venation; petioles sulcate, strigulose, 5-25 mm long. Flowers numerous, sessile, in scorpioid cymes, branched, the axes strigose. Calyx green, crateriform, strigose, the sepals subulate, 1.5-2 mm long; corolla white, hypocrateriform, 4-6 mm long, strigose outside, the lobes ovate, spreading, ca. 1 mm long; stamens inserted; ovary ovoid, with 4 chambers, the stigma sessile. Drupe globose, white, ca. 8 mm in diameter, separating into 4 pyrenes on drying.

Phenology: Flowering and fruiting from February to August.

Status: Native, uncommon.

Distribution: In moist forests and along stream banks. Also on St. John and St. Thomas; throughout tropical America.

Public forests: El Yunque, Río Abajo, and Toro Negro.

2. Tournefortia hirsutissima L., Sp. Pl. 140. 1753.

Fig. 50. F-J

Nigua, Chiggernit, Chiggernit grape, Giniper

Twining liana or climbing shrub, 6-10 m in length. Stems woody, up to 2 cm in diameter, the bark somewhat corky, cream-colored, usually with persistent petioles; branches fragile, cylindrical, hirsute or tomentose, usually hollow in the center on drying. Leaves alternate; blades 12-22 × 2-11 cm, elliptical, oblong, or sometimes obovate, chartaceous, the apex acute or acuminate, the base acute, the margins entire, ciliate; upper surface dark, dull, hirsute, with the venation sunken; lower surface pale green, dull, hirsute, with prominent venation; petioles cylindrical, hispid, 10-12 mm long. Flowers numerous, fragrant, subsessile, in branched scorpioid cymes, corymbiform, terminal. Calyx green, crateriform, pubescent, of 5 lanceolate sepals, ca. 3 mm long; corolla white, hypocrateriform, 4-5 mm long, strigose outside. Drupe white, subglobose, 5-6 mm in diameter.

Phenology: Flowering and fruiting from November to September.

Status: Native, very common.

Distribution: In pastures or areas of disturbed vegetation, in moist zones at middle and lower elevations. Also on Mona, Vieques, St. Croix, St. John, St. Thomas, and Tortola; the Greater and Lesser Antilles, Central America, South America, and the United States (Florida).

Public forests: El Yunque, Guilarte, Maricao, Mona, Piñones, Río Abajo, Toro Negro, Tortuguero, and Vega.

3. Tournefortia maculata Jacq., Enum. Syst. Pl. 14. 1760.

Fig. 51. A-F

SYNONYM: *Tournefortia laurifolia* Vent.
Tournefortia peruviana Poir.

Bejuco de masa

Vine or clambering or arcuate subshrub, 2-5 m in length. Stems cylindrical, glabrous, not lenticellate. Leaves alternate; blades 5-12 (16) × 2.8-8 cm, elliptical, oblong, ovate, broadly ovate, or lanceolate, chartaceous or membranaceous, the apex acute, the base rounded, acute, or sometimes unequal, the margins entire; upper surface glabrous, shiny, with a prominent midvein; lower surface glabrous, shiny with the venation slightly prominent; petioles 1-1.8 cm long. Flowers numerous, pedicellate, in cymes with scorpioid branches, terminal, with puberulous axes. Calyx green, crateriform, 2-3 mm long, the sepals ovate or lanceolate, puberulous; corolla yellow, infundibuliform, 5-6 mm long, puberulous or glabrescent outside, minutely pubescent-papillose inside, the lobes subulate, long-acuminate, slightly reflexed; stamens inserted, the filaments very short, the anthers apiculate at the apex. Drupes depressed-globose, 2-4-lobed, ca. 8 mm in diameter, orange, sometimes with 2 or 4 circular black spots.

Phenology: Flowering from February to August and fruiting from March to August.

Status: Native, locally common.

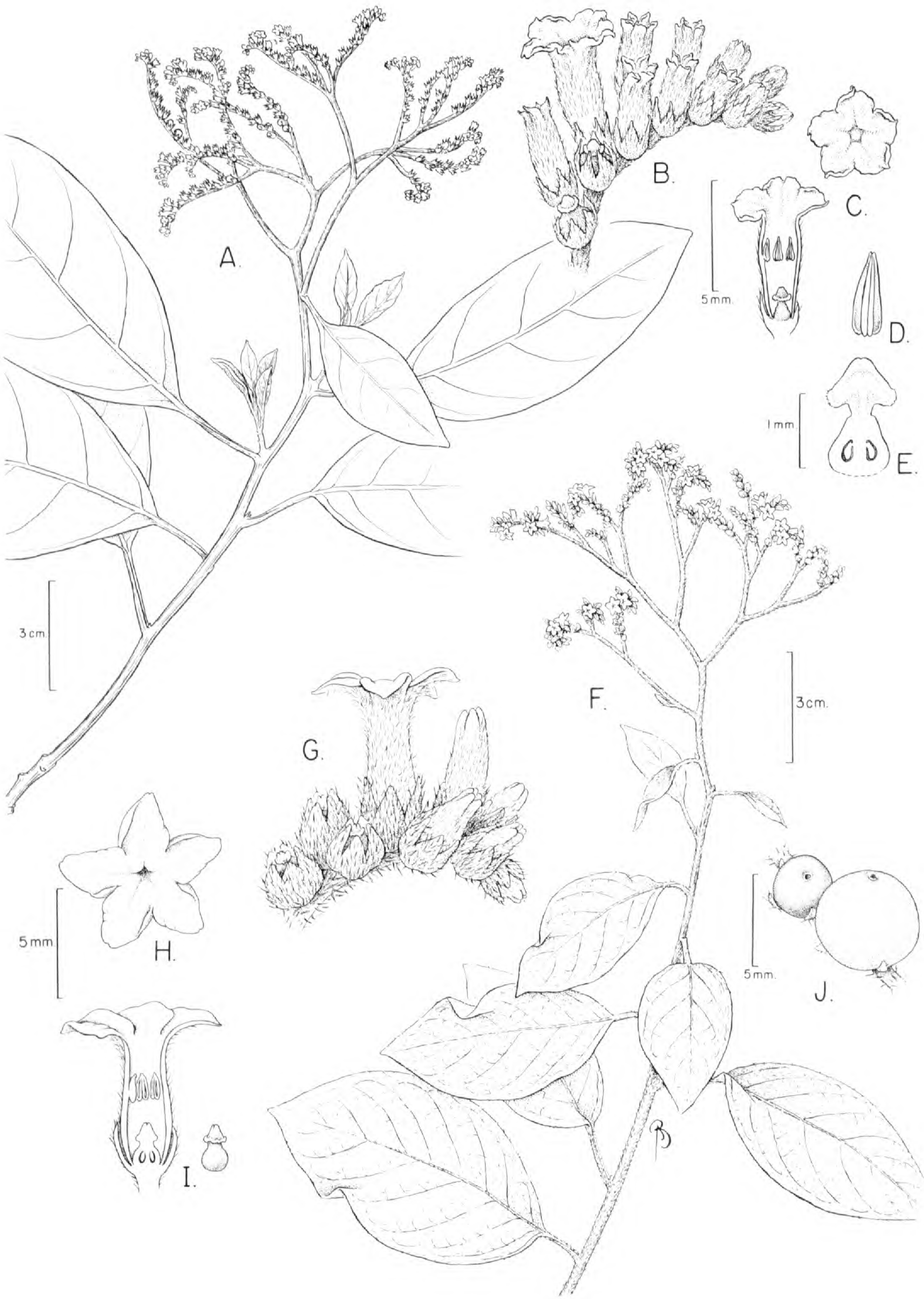

Fig. 50. A-E. *Tournefortia bicolor*. **A.** Flowering branch. **B.** Detail of the inflorescence. **C.** Flower, longitudinal section and top view. **D.** Anther. **E.** Gynoecium, longitudinal section. **F-J.** *Tournefortia hirsutissima*. **F.** Flowering branch. **G.** Detail of the inflorescence. **H.** Flower, top view. **I.** Flower, longitudinal section, and detail of the gynoecium. **J.** Fruits.

Distribution: In moist forests on substrates of limestone or serpentine. Also in Jamaica and Hispaniola.

Public forests: Guajataca, Guilarte, Maricao, Río Abajo, and Susúa.

Commentary: The populations of this species in Puerto Rico and the Dominican Republic have been considered as a distinct species (*T. laurifolia*) based on the relative length of the corolla lobes. Nevertheless, this character is very variable across the range of distribution of *T. maculata*, and therefore the recognition of these populations at the species level is not justified.

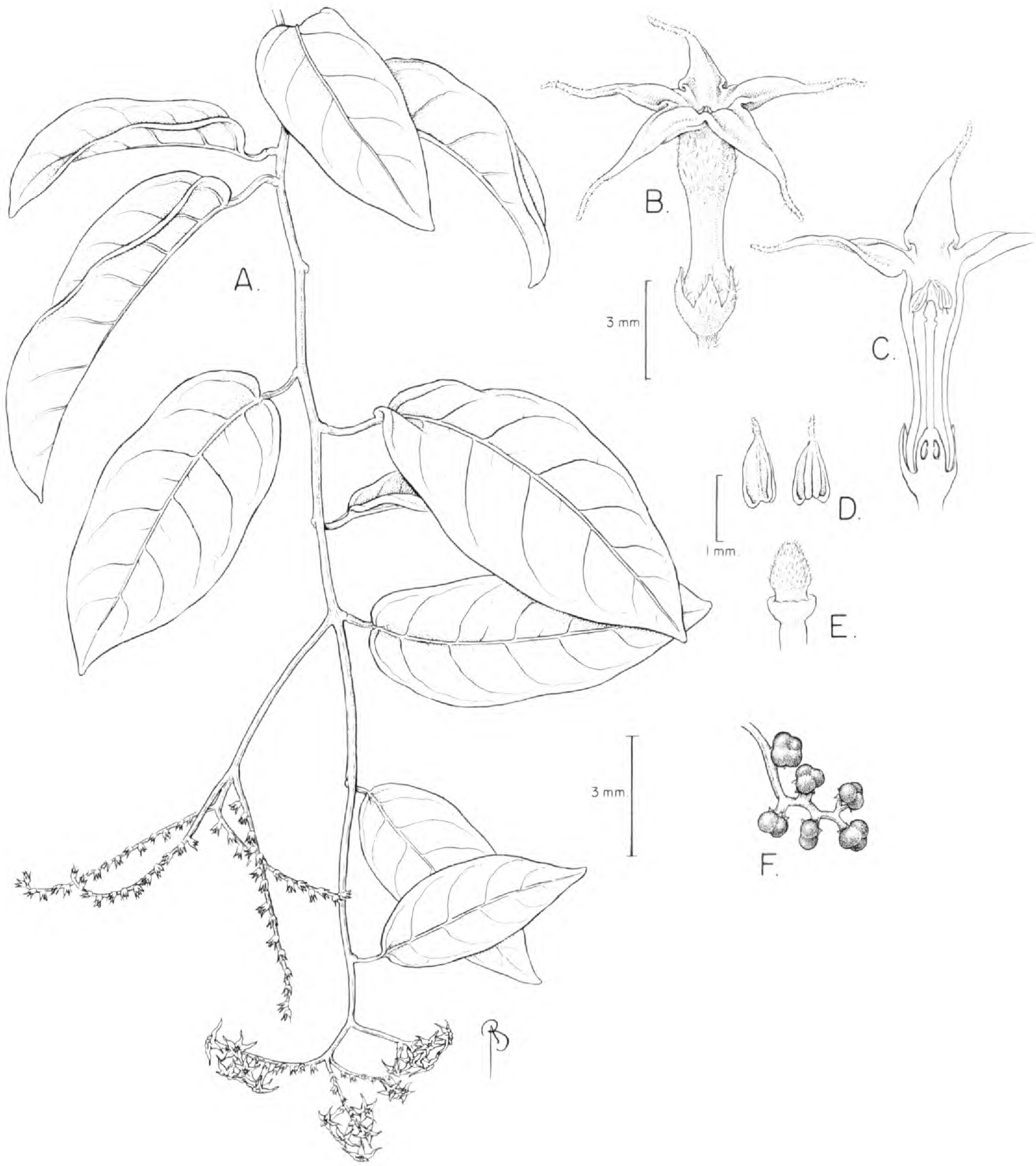

Fig. 51. A-F. *Tournefortia maculata*. **A.** Flowering branch. **B.** Flower. **C.** Flower, longitudinal section. **D.** Anthers, back and front views. **E.** Gynoecium. **F.** Infructescence.

4. Tournefortia microphylla Bertero ex Spreng., Syst. Veg. 1: 644. 1824.

Fig. 52. A-D

SYNONYM: *Tournefortia volubilis* L. var. *microphylla* (Bertero ex Spreng.) A. DC.

Twining vine, 2-5 m in length. Stems cylindrical, slender, < 8 mm in diameter, pubescent or glabrescent, lenticellate when mature. Leaves alternate; blades 1.5-3.5 × 0.5-1.5 cm, elliptical, ovate, or lanceolate, chartaceous, the apex acute or obtuse, usually mucronate, the base obtuse or rounded, usually unequal, the margins entire; upper surface puberulous, with the venation flat; lower surface puberulous, with the venation slightly prominent; petioles cylindrical, glabrous, ca. 4 mm long. Flowers numerous, pedicellate, in scorpioid cymes, branched, terminal. Calyx green, crateriform or urceolate, pubescent, 1-1.5 mm long, the sepals subulate, 0.8-1 mm long; corolla white, hypocrateriform, 2-3 mm long, the tube narrow in the middle, strigulose outside, the lobes linear to subulate, 1-1.5 mm long; stamens inserted, the anthers sessile. Drupes ovoid, globose or 4-lobed, ca. 4 mm in diameter, white, with 2-4 circular black spots.

Phenology: Flowering and fruiting apparently throughout the year.

Status: Native, very common.

Distribution: In thickets and dry forests at lower elevations. Also on Culebra, Culebrita, Desecheo, Mona, Vieques, Anegada, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; Hispaniola and the Lesser Antilles.

Public forests: Boquerón, Guánica, and Mona.

5. Tournefortia scabra Lam., Ill. 1: 417. 1791.

Fig. 52. E-G

Erect to scandent shrub, 2-5 m in length. Stems cylindrical, slender, < 5 mm in diameter, strigose when young, striate and glabrescent when mature. Leaves alternate; blades 2-5 × 0.5-1.2(1.7) cm, linear, oblong, or narrowly lanceolate, rigid-coriaceous, the apex acute, obtuse, rounded, or retuse, the base obtuse, rounded, or subcordiform, the margins revolute, undulate; upper surface scabrous, with the venation sunken; lower surface scabrous-pubescent, with the reticulate venation prominent; petioles strigose, 1.5-5 mm long. Flowers few, sessile, in scorpioid cymes, scarcely branched, terminal, 5 cm or less long, with strigose axes. Calyx green, crateriform, strigulose, the sepals ovate, ca. 2 mm long; corolla white or yellowish, urceolate-tubular, ca. 2.5 mm long, the tube strigose on the distal portion, the lobes ovate, very short. Drupes subovoid, 5-6 mm in diameter, white.

Phenology: Flowering and fruiting from November to March.

Status: Native; uncommon.

Distribution: In thickets and dry forests at lower elevations in southern and northwestern Puerto Rico. Also in Cuba and Hispaniola.

Public forests: Guajataca and Guánica.

6. Tournefortia volubilis L., Sp. Pl. 140. 1753.

Fig. 52. H-K

SYNONYM: *Tournefortia ferruginea* Lam.

Twining vine, 2-7 m in length. Stems cylindrical, slender, ferruginous-pubescent to glabrous, lineate-lenticellate when mature. Leaves alternate; blades 3.5-10 × 0.6-3.5 cm, lanceolate, ovate, or less frequently oblong, chartaceous, the apex acuminate or less frequently acute, the base rounded, subcordiform, or less frequently obtuse, sometimes unequal, the margins entire; upper surface pubescent or glabrous, sometimes pustulose, with the venation slightly sunken; lower surface pubescent or less frequently glabrous, pale, with prominent venation; petioles 2-7 mm long. Flowers numerous, sessile or subsessile, in terminal branched scorpioid cymes. Calyx green, crateriform, the sepals subulate, 1-2 mm long, strigose; corolla greenish white or greenish yellow, hypocrateriform, ca. 2 mm long, the tube pubescent outside, the lobes subulate, 1-1.5 mm long; stamens inserted, the anthers sessile. Drupes ovoid, usually 2-4-lobed, ca. 3 mm in diameter, white, with 2-4 circular black spots.

Phenology: Flowering and fruiting throughout the year.

Status: Native, common.

Distribution: In coastal thickets and dry forests, in southern Puerto Rico, at lower and middle elevations. Also on Vieques, St. Croix, and Virgin Gorda; throughout tropical America, including the Antilles.

Public forest: Guánica.

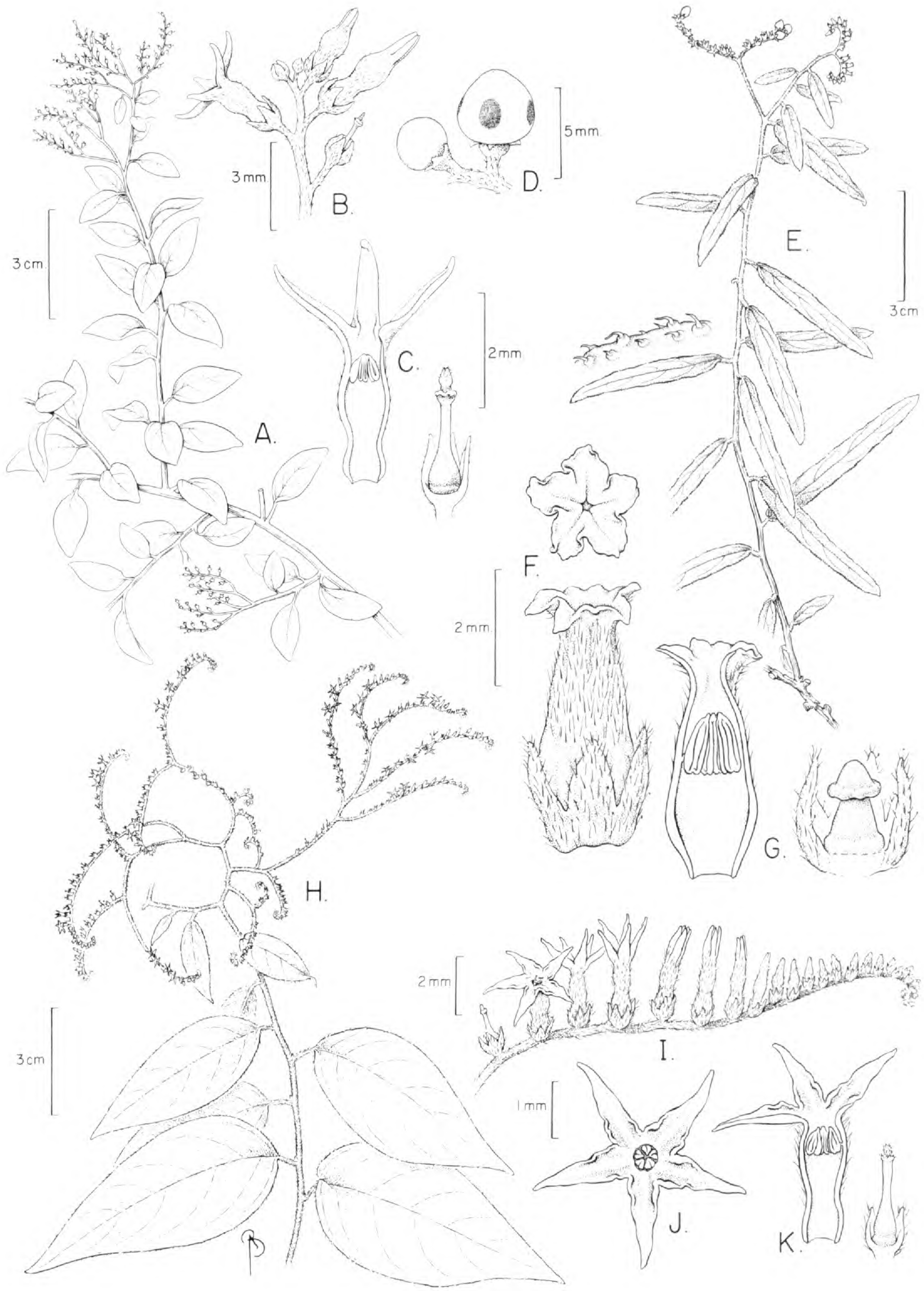

Fig. 52. A-D. *Tournefortia microphylla*. **A.** Flowering branch. **B.** Detail of the inflorescence. **C.** Corolla, longitudinal section, and calyx with gynoecium. **D.** Fruits. **E-G.** *Tournefortia scabra*. **E.** Fertile branch. **F.** Flower, top and side views. **G.** Corolla, longitudinal section, and calyx with gynoecium. **H-K.** *Tournefortia volubilis*. **H.** Flowering branch. **I.** Inflorescence. **J.** Flower, top view. **K.** Corolla, longitudinal section, and calyx with gynoecium.

Commentary: This species can be distinguished with certainty from *T. microphylla* by the presence of at least some leaves with acuminate apices (some individuals present leaves with acute apices, but leaves with acuminate apices will always be found). *Tournefortia volubilis*, as a general rule, has the lower surface of the leaves with rather conspicuous venation, while *T. microphylla*, on the contrary, has inconspicuous venation.

Fig. 53. A-E. *Buddleja madagascariensis*. **A.** Habit. **B.** Flower, top and side views. **C.** Corolla, longitudinal section showing stamens. **D.** Corolla, longitudinal section showing ovary. **E.** Ovary, cross section, and flower, longitudinal section showing placentation.

10. *Family* ***BUDDLEJACEAE***

1. BUDDLEJA

Erect, sometimes scandent shrubs, or less frequently trees, pubescent with simple, stellate trichomes or peltate scales. Leaves opposite or sometimes alternate, petiolate or sessile; blades simple, serrate or less frequently entire or lobed; stipules present or absent. Flowers usually functionally unisexual, 4-merous, arranged in cymes that in turn form terminal or axillary heads or panicles. Calyx campanulate or tubular, of short sepals; corolla gamopetalous, white, yellow, orange, pink, or purple, the lobes shorter than the tube; stamens 4, inserted on the upper portion of the corolla tube, the anthers linear, inserted; ovary superior with 2 connate carpels, the style short, the stigma claviform or globose. Fruit a septicidal capsule or less frequently a berry. A genus of about 100 species of amphitropical distribution.

1. Buddleja madagascariensis Lam., Encycl. 1: 513. 1785.

Fig. 53. A-E

Scandent shrub, sometimes twining, 2-5(10) m in length. Branches obtusely quadrangular, tomentose, glabrescent. Leaves opposite; blades 8-16 × 2.7-4.5(6.2) cm, lanceolate, ovate, or elliptical, coriaceous, the apex acuminate or less frequently acute, the base rounded, the margins entire or denticulate; upper surface sparsely tomentulose; lower surface lanate-tomentose, whitish or ferruginous, with prominent venation; petioles 5-15 mm long; stipules early deciduous. Flowers short-pedicellate to subsessile, in dichasia grouped in terminal thyrses, 5-25 cm long. Calyx campanulate or broadly campanulate, white-tomentose, 2.5-4 mm long, the sepals deltate, 0.5-1 mm long; corolla yellow-orange, tubular, 8.5-11 mm long, white-tomentose outside. Fruit unknown in the collections from Puerto Rico.

Phenology: Collected in flower in April and September.

Status: Exotic, cultivated, escaped or persistent, uncommon.

Distribution: Ornamental, cultivated in the gardens of the Cordillera Central, escaped or persistent in the Villalba area. Native to Madagascar, but widely cultivated in the subtropics.

Public forest: Toro Negro.

Reference: Norman, E., 2000. Buddlejaceae. Flora Neotropica Monograph 81. 225 pp.

11. *Family* ***CACTACEAE***

Key to the genera

1a. Stems dark brown, cylindrical, without ribs; leaves present ..... 2. *Pereskia*
1b. Stems green, angular, compressed, or cylindrical, but then with longitudinal ribs; leaves absent. 2

2a. Stems cylindrical, with 5-8 slightly prominent ribs; spines acicular; hypanthium densely lanate-pubescent ..... 3. *Selenicereus*
2b. Stems angular, with 3-4 prominent ribs; spines conical or subconical; hypanthium glabrous ..... 1. *Hylocereus*

1. HYLOCEREUS

Lianas, climbing by adventitious roots, with numerous lateral branches. Stems green, angular, with 3 or 4 prominent longitudinal ribs. Leaves absent; areoles surrounded by conical spines along the margin of the ribs. Flowers bisexual, actinomorphic, solitary, sessile, usually at the ends of the branches; outer tepals scale-like; inner tepals petaliferous; stamens numerous, the filaments shorter than the perianth; ovary inferior, forming an elongate, infundibuliform hypanthium, the style elongate, not exserted, the stigmas numerous, filiform. Fruit a berry with persistent tepals; seeds numerous, minute. A Caribbean genus of about 20 species.

Key to the species of *Hylocereus*

1a. Stems with 3 or 4 longitudinal ribs, with the groups of spines on small mounds ..... 1. *H. trigonus*
1b. Stems with 3 longitudinal ribs, forming a depression in the areas where the groups of spines are borne ..... 2. *H. undatus*

1. Hylocereus trigonus (Haw.) Saff., Annual Rep. Board Regents Smithsonian Inst. 1908: 553. 1909.

Fig. 54. A-C

BASIONYM: *Cereus trigonus* Haw.

Pitahaya, Chickenet, Strawberry pear

Much branched vine, which climbs by aerial roots and attains 10 m in length. Stems fleshy, 1.4-2 cm wide, lenticellate, triangular, with 3 or 4 prominent, undulate, longitudinal ribs, with a group of spines on each of the protuberances that are found along the margin; spines conical, 4-7 mm long, grayish or brown, usually in groups of 8. Flowers solitary, pendulous, 20-24 cm long, axillary to the group of spines or terminal on the branches; perianth infundibuliform; outer tepals fleshy, green, the basal ones ovate, ca. 2 cm long, the distal ones oblong, 3.5-7.5 cm long, the inner tepals white, turning yellowish when mature. Berries ovoid, pink-purple, 12-14 × 5-7 cm, with tepals of the hypanthium persistent; seeds numerous, minute, black, covered with a white gelatinous matrix.

Phenology: Flowering and fruiting from July to December.

Status: Native, very common.

Distribution: In dry forests or coastal thickets. Also on Culebra, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; Hispaniola.

Public forests: Ceiba, Guajataca, Guánica, and Río Abajo.

2. Hylocereus undatus (Haw.) Britton & Rose in Britton, Fl. Berm. 256. 1918.

Fig. 54. D-E

BASIONYM: *Cereus undatus* Haw.

Pitahaya

Much branched vine, creeping or climbing by aerial roots, attaining 7 m in length. Stems fleshy, 2-5 cm wide, trigonal, with 3 longitudinal ribs with undulate margins, with depressions in which are found groups of 1-5 subconical brown spines, 3-4 mm long. Flowers solitary, up to 30 cm long, axillary to the group of spines or terminal on the branch; perianth glabrous, infundibuliform; outer tepals greenish yellow, sometimes with a reddish tinge, those of the hypanthium ovate-lanceolate, the distal ones linear-lanceolate, the inner tepals petaliferous, white, longer than the outer ones; stamens yellow; inserted; stigmas greenish yellow. Berry red, ellipsoid, fleshy, 6-12 × 5-7 cm, with persistent tepals; seeds numerous, minute, black, covered with a red pulp.

Phenology: Flowering from July to September and fruiting from September to December.

Status: Exotic, uncommon, cultivated and naturalized.

Distribution: Cultivated from the coast to the Cordillera Central, naturalized in dry or coastal areas. Native to Mexico, but widely cultivated in the tropics. Also on St. John and St. Thomas.

Public forest: Guánica.

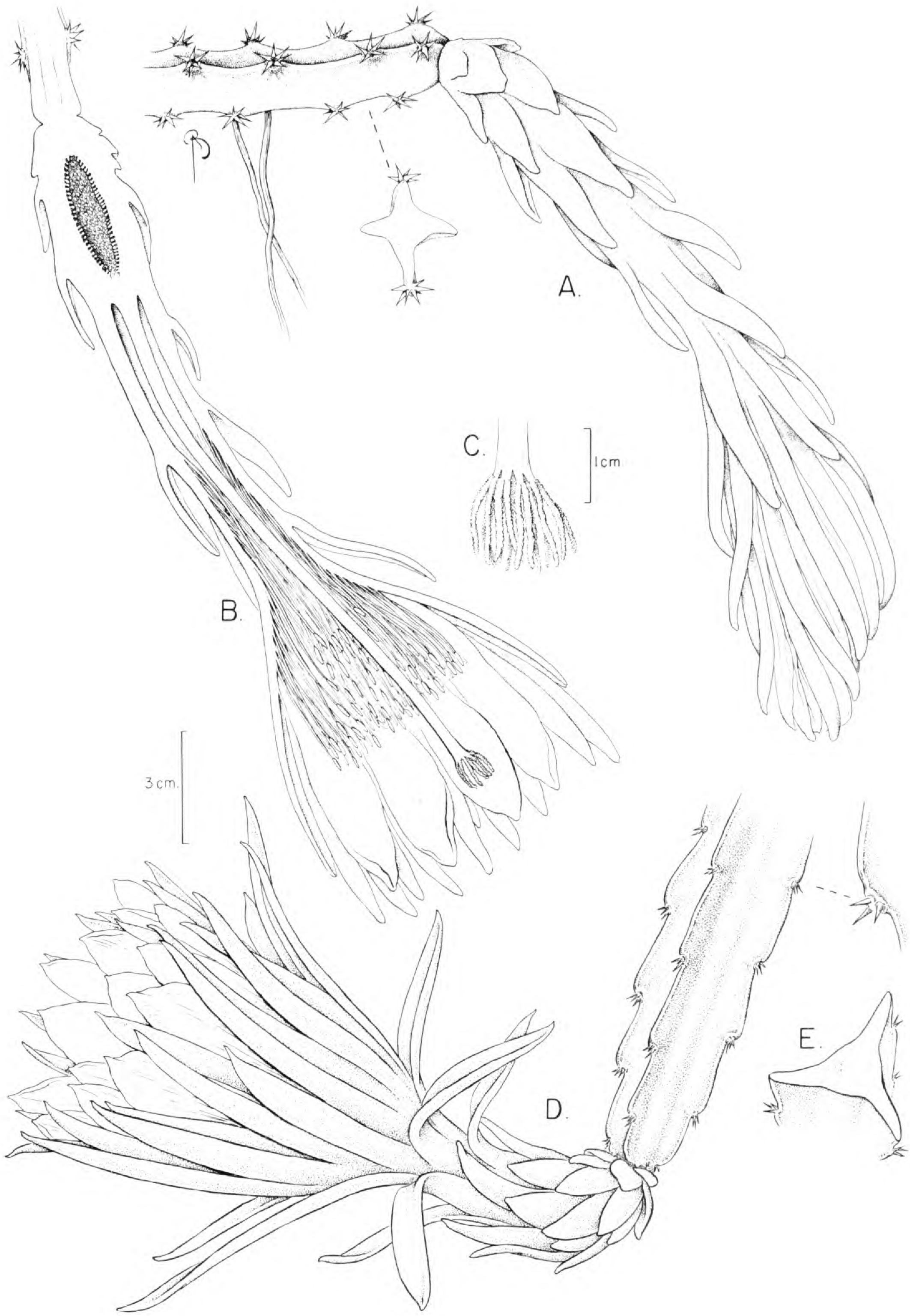

Fig. 54. A-C. *Hylocereus trigonus*. **A.** Flowering branch, with detail of stem cross section. **B.** Flower, longitudinal section. **C.** Stigmas. **D-E.** *Hylocereus undatus*. **D.** Flowering branch. **E.** Stem, cross section.

2. PERESKIA

Shrubs, trees or scandent shrubs. Stems cylindrical, without ribs, with axial areoles surrounded by spines; glochids absent. Leaves alternate, persistent, succulent, petiolate; blades simple. Flowers actinomorphic, unisexual, solitary or in racemes, panicles, or cymes; receptacle with areoles and bracteoles in 2 series; perianth of sepaloid and petaloid tepals; stamens numerous, the filaments usually unequal, shorter than the perianth; ovary inferior or half-inferior, the style thick, the stigmas numerous, digitiform, papillose. Fruit a berry with persistent bracts and areoles; seeds few, small. A neotropical genus of approximately 17 species.

1. Pereskia aculeata Miller, Gard. Dict. ed. 8. 1768.

Fig. 55. A-E

Hortensia de bejuco, Barbados gooseberry, Lemon vine

Clambering shrub or liana attaining 15 m in length, much branched from a woody base. Stems woody, dark brown, cylindrical, without ribs, 2-3 cm in diameter, with numerous areoles; spines dimorphic, up to 1.5 cm long, usually deciduous; branches scandent or pendulous. Leaves alternate, persistent; blades 4-7 × 1.5-5 cm, lanceolate, ovate, or oblong, fleshy, glabrous, the apex short-acuminate, the base cuneate or rounded, the margins entire; upper and lower surface glabrous; petioles 3-7 mm long, with a pair of stipular spines, recurved at the base. Flowers few, in terminal racemes; hypanthium crateriform, with several bracteoles and areoles with acicular spines. Tepals white, 2.5-3 cm long; stamens numerous, in two series, yellow; ovary inferior. Berry yellow or orange, globose, ca. 2 cm in diameter, with several bracteoles and persistent spines; seeds few, 4-5 mm wide, lenticular or rounded, dark brown.

Phenology: Collected in flower in October and in fruit in January and February.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: In dry thickets. Also on Vieques, St. Croix, St. John, and St. Thomas; throughout the Neotropics, its place of origin unknown.

3. SELENICEREUS

Lianas or creeping shrubs, which climb by adventitious roots. Stems green, elongate, with 4-12 angles or ribs. Leaves absent; areoles minute, usually forming a small promontory, densely covered with lanate hairs and acicular spines. Flowers actinomorphic, bisexual, nocturnal, solitary; perianth elongate, infundibuliform; outer tepals scale-like, with areoles densely covered with long, lanate hairs; inner tepals petaliferous; stamens numerous, inserted on the perianth; ovary inferior, the style thick, the stigmas numerous; ovary inferior. Fruit a large, reddish berry, covered by basal bracts and several spines; seeds numerous, minute. A Caribbean genus of about 16 species.

1. Selenicereus grandiflorus (L.) Britton & Rose, Contr. U.S. Natl. Herb. 12: 430. 1909.

Fig. 55. F-G

BASIONYM: *Cactus grandiflorus* L.

Liana with numerous lateral branches, which climbs by aerial roots, attaining 6 m in length. Stems fleshy, 2-2.5 cm in diameter, cylindrical, with 5-8 ribs; areoles prominent, along the ribs, covered with spines and whitish lanate hairs, the spines acicular, 5-8 mm long, yellowish, in groups of 5. Flowers solitary, pendulous, axillary to the group of spines or terminal, 15-18 cm long; perianth infundibuliform, the tube elongate, densely lanate outside; outer tepals linear, salmon-colored; inner tepals whitish, obovate; stamens numerous, in two series, inserted. Berry ovoid, red or yellowish, ca. 8 cm long; seeds numerous, minute, black, covered with a white pulp.

Phenology: Collected in flower in June.

Status: Exotic, cultivated and naturalized, locally common.

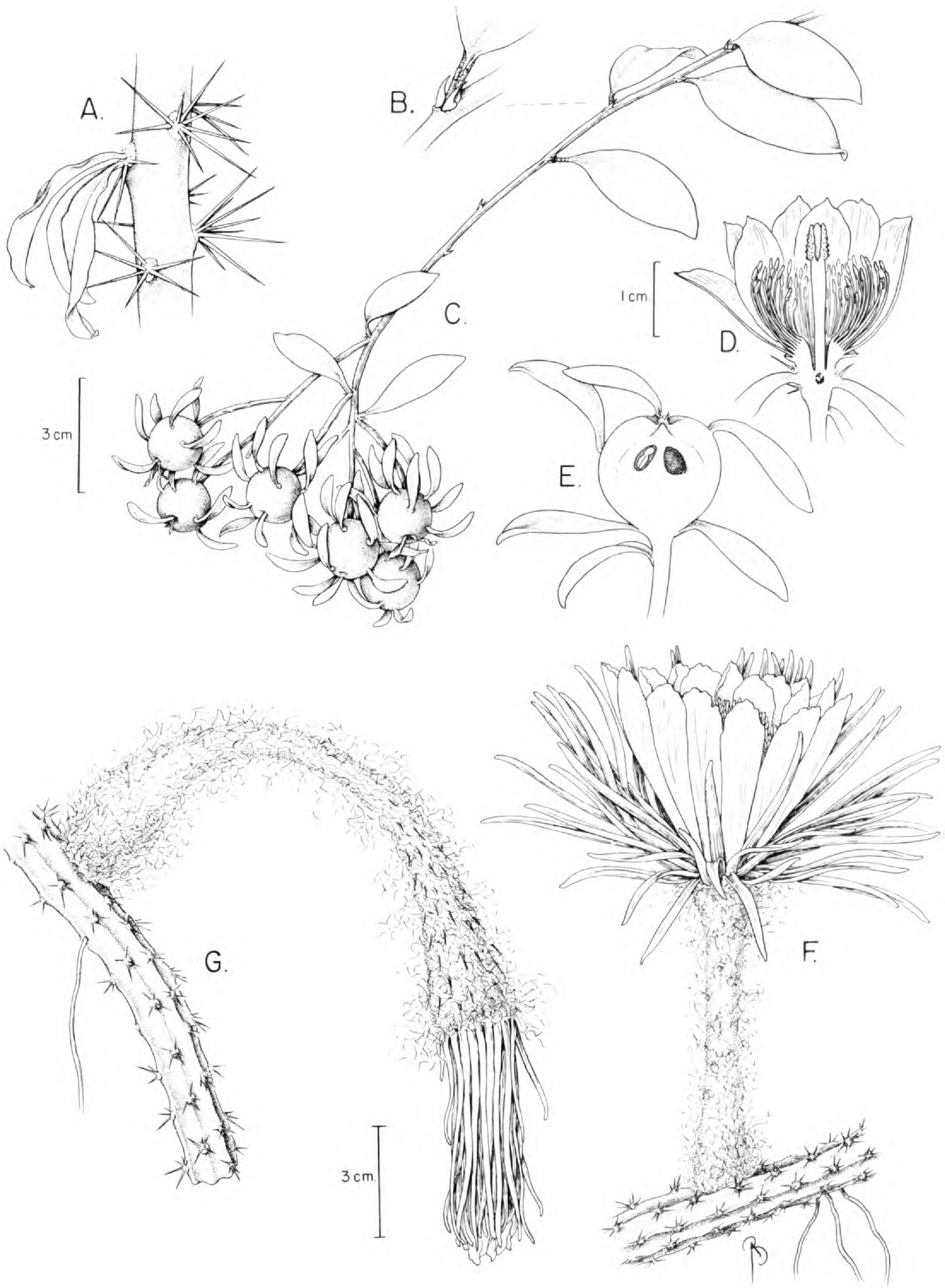

Fig. 55. A-E. *Pereskia aculeata*. **A.** Stem with spines and leaves. **B.** Detail of spines at the base of the petiole. **C.** Fruiting branch. **D.** Flower, longitudinal section. **E.** Fruit, longitudinal section. **F-G.** *Selenicereus grandiflorus*. **F.** Portion of the branch with flower. **G.** Portion of the branch with senescent flower.

Distribution: In coastal forests and thickets. Also on St. Croix, St. John, St. Thomas, and Tortola; species native to Jamaica and Cuba, but widely cultivated throughout the tropics.

12. *Family* ***CAPPARACEAE***

1. CAPPARIS

Small trees or shrubs, erect or exceptionally scandent. Leaves alternate, petiolate; blades simple, usually lepidote; axillary extrafloral nectaries usually present; stipules absent. Flowers actinomorphic, 4-merous, bisexual, pedunculate, solitary or in short axillary racemes; sepals valvate or imbricate; petals free, white, pink, or yellowish; stamens numerous, much longer than the petals; ovary superior, with two carpels, borne on a gynophore; ovules few or numerous, with parietal placentation. Fruit an elongate follicle, woody or coriaceous, indehiscent or irregularly dehiscent; seeds numerous, in 2 rows, with a fleshy covering. A tropical and subtropical genus of 150-350 species.

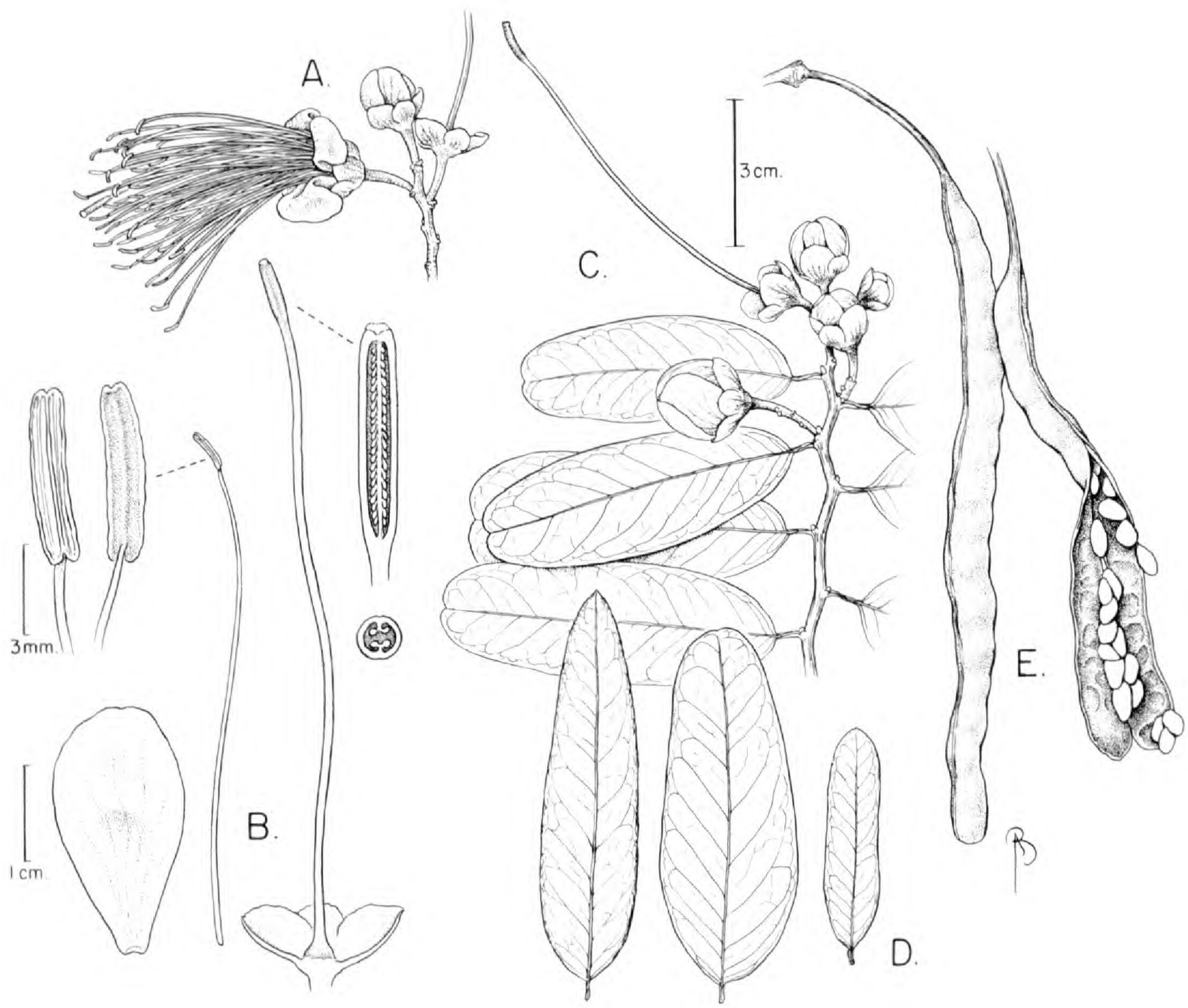

Fig. 56. A-E. *Capparis flexuosa*. **A.** Inflorescence. **B.** Floral parts, stamens, petal, calyx with androgynophore, and gynoecium, with detail of the ovary. **C.** Flowering branch. **D.** Variation in the form of the leaves. **E.** Fruits, one of which shows the seeds.

1. Capparis flexuosa (L.) L., Sp. Pl. ed. 2, 722. 1762.

Fig. 56. A-E

BASIONYM: *Morisonia flexuosa* L.
SYNONYM: *Capparis saligna* Vahl

Burro, Palo de burro, Palinguam, Palawang, Black witty, Bottle wiss, Goat wiss, Limber caper

Woody shrub, erect or clambering, much branched from the base, 2-10 m in length. Branches pendulous, glabrous, light brown, smooth, attaining 20 cm in diameter at the base. Leaves alternate; blades 4-10 × 1.5-2.5 cm, oblong or linear, coriaceous, glabrous, the apex rounded or emarginate, the base rounded, the margins entire, revolute; upper surface yellowish green, shiny or dull; lower surface pale green, dull, with a prominent midvein; petioles 5-8 mm long, light brown. Flowers fragrant, nocturnal, clustered in terminal corymbs. Calyx yellowish green, of 4 imbricate sepals, rounded, fleshy, 6-10 mm long; petals green or yellowish green, 4, elliptical, 1.5-3 cm long, concave; stamens numerous, white, 4-6 cm long. Follicles fleshy, cylindrical-torulose, 6-8 cm long, light brown, with longitudinal dehiscence, the inner walls red-orange; seeds pendulous from the parietal placenta, oblong, ca. 1 cm long, with a white, fleshy covering.

Phenology: Flowering from March to October and fruiting in August and September.

Status: Native, very common.

Distribution: In coastal forests and thickets or in semi-humid forests on karst limestone. Also on Culebra, Desecheo, Vieques, Mona, and the Virgin Islands; the Antilles and from the United States (Florida) to South America.

Public forests: Ceiba, Guánica, Mona, Piñones, and Susúa.

13. *Family* ***CAPRIFOLIACEAE***

1. LONICERA

Vines, shrubs, or trees. Leaves opposite or rarely in whorls of 3, sessile or petiolate; blades simple; stipules absent. Flowers bisexual, 5-merous, 2 or 3 in axillary cymes. Calyx tubular, 5-dentate or rarely truncate at the apex, adnate to the ovary; corolla zygomorphic, tubular, infundibuliform, or campanulate, with the limb bilabiate, with 2 long lobes and 3 short lobes; stamens 5, subequal, exserted; ovary inferior, with 2-3(-5) locules, with axile or rarely parietal placentation, the ovules pendulous, 3-8 per locule. Fruit a fleshy berry, with few ovate seeds. A genus of about 200 species, the majority of the Northern Hemisphere.

1. Lonicera japonica Thunb. ex Murray, Syst. Veg. (ed. 14), 216. 1784.

Fig. 57. A-E

Madreselva, Honeysuckle

Woody vine, twining or clambering, much branched, 5-8 m in length. Stems strong, flexible, cylindrical, pilose, brown, smooth. Leaves opposite; blades 4-7.5 × 1.2-3 cm, lanceolate, oblong-lanceolate, or elliptic-lanceolate, chartaceous, glabrous except for some hairs on the midvein, the apex acute or obtuse, abruptly acuminate or mucronate, the base rounded, subtruncate, or obtuse, the margins entire, revolute, ciliate; upper surface dark green, dull; lower surface pale green, dull, with a prominent midvein; petioles 5-12 mm long, brown, pubescent. Flowers fragrant, sessile, in pairs at the end of short axillary branches; bracts 2, at the base of each flower, ovate, rounded, ca. 0.7 mm long, ciliate. Calyx green, tubular, ca. 3 mm long, the sepals 5, subulate, ca. 1 mm long; corolla white, turning yellowish when mature, 2.2-2.5 cm long, infundibuliform, the tube puberulous outside; the limb with 5 lobes, one of which is longer (ca. 2.2 cm) and free; stamens 4, exserted; style exserted, with the stigmatic surface claviform. Berry black, 6-7 mm long, ellipsoid,

although in the Americas it apparently does not frequently produce fruits.

Phenology: Flowering sporadically throughout the year.

Status: Exotic, cultivated and naturalized, locally common.

Distribution: Native of Asia, but naturalized in the Cordillera Central in Puerto Rico in the Villalba area (Cerro Maravilla sector) and throughout the New World. This species seems not to have been naturalized in Puerto Rico at the end of the nineteenth century, because it was only known from a single collection made by *Sintenis* in 1886 from a plant cultivated in the Adjuntas area. At present this species is naturalized along Highway 143 in the Toro Negro Forest Reserve. It seems to reproduce in Puerto Rico exclusively by vegetative means, since it has never been collected with fruits.

Public forest: Toro Negro.

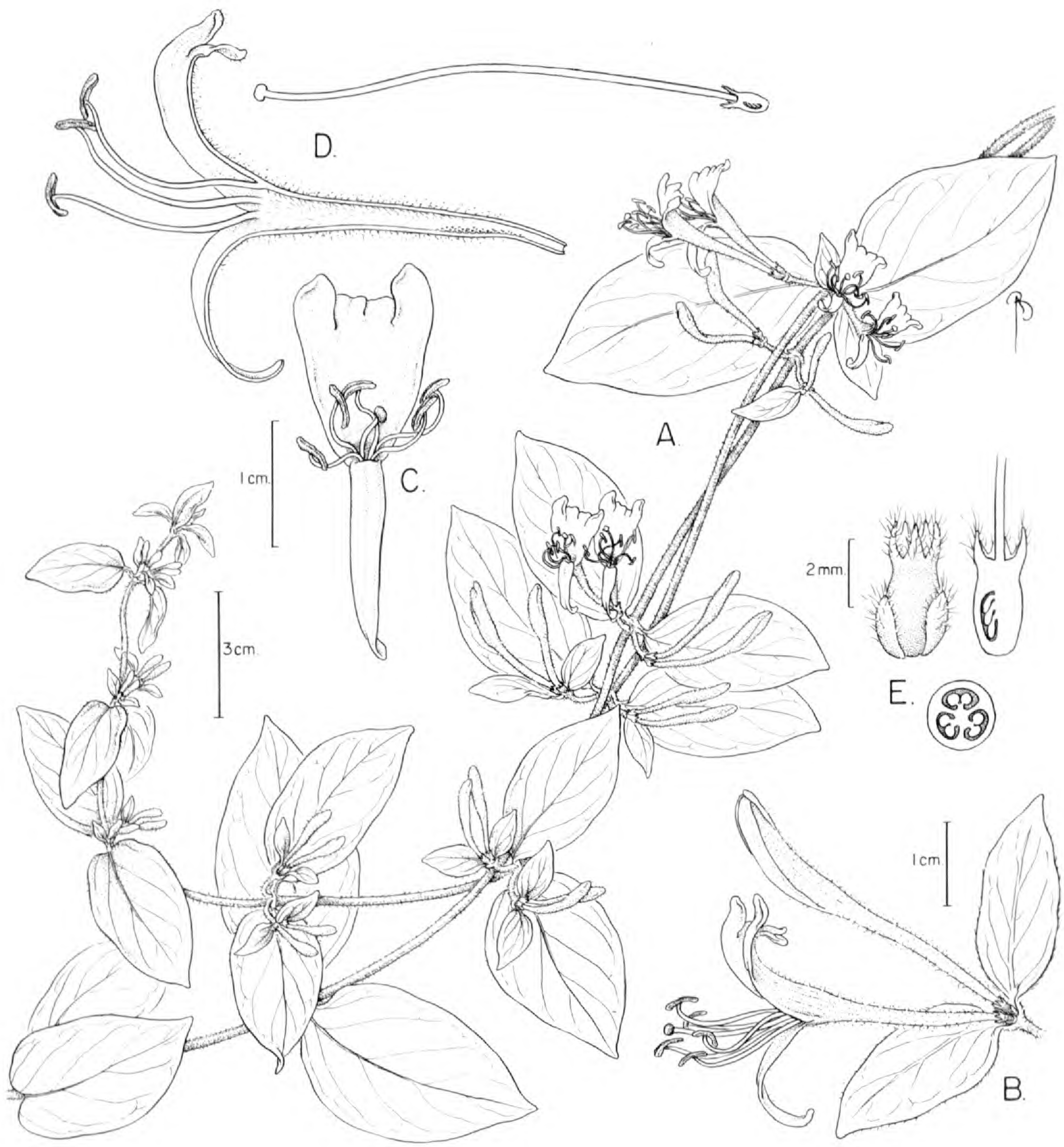

Fig. 57. A-E. *Lonicera japonica*. **A.** Flowering branch. **B.** Detail of the inflorescence. **C.** Flower, top view. **D.** Corolla, longitudinal section, and gynoecium. **E.** Whole fruit, longitudinal section, and cross section.

14. *Family* ***CELASTRACEAE***

Key to the genera

1a. Leaves slightly shiny on the upper surface, chartaceous, the margins crenulate or serrate, the tertiary veins inconspicuous; filaments of the stamens broadened gradually toward the base, adnate to the floral disc; petals pubescent on the distal portion ..... 1. *Hippocratea*

1b. Leaves dull on the upper surface, coriaceous, the margins subentire, denticulate, or crenulate, the tertiary veins conspicuous; filaments of the stamens more or less of the same width along their length, inserted on the floral disc; petals glabrous ..... 2. *Pristimera*

1. HIPPOCRATEA

Lianas with opposite branches, elongate, twining. Leaves opposite, petiolate; blades simple, crenate, or serrulate; petioles slender; stipules absent. Flowers minute, bisexual, actinomorphic, in axillary cymes, panicles, corymbs, or pseudoracemes; bracts small, chartaceous. Calyx rotate, of 5 rounded sepals; corolla of 5 free petals; disc fleshy, pulviniform; stamens 3, the filaments adnate to the upper portion of the disc; ovary superior, 3-carpellate, obtusely triangular, trilocular, with 4-6 ovules per locule, the style subulate, the stigma inconspicuous. Fruit of 3 divergent, flattened mericarps, each dehiscent by a medial suture; seeds compressed, with a basal wing. A genus of 3 species, 2 in Africa and 1 in the Neotropics.

1. Hippocratea volubilis L., Sp. Pl. 1191. 1753. **Fig. 58. A-H**

SYNONYM: *Hippocratea ovata* Lam.

Bejuco prieto

Woody vine, climbing, which supports itself on other plants by twining lateral branches and attains 10-15 m in length. Stems green, quadrangular, becoming grayish and cylindrical when mature; branches opposite, twining, developing before the leaves. Leaves opposite; blades 4-17 × 2-8 cm, elliptical or oblong, coriaceous, the apex acute or acuminate, the base obtuse or rounded, sometimes unequal, the margins crenulate or slightly serrate; upper surface shiny, glabrous, with the veins slightly sunken; lower surface pale green, dull, glabrous, with the venation slightly prominent; petioles 3-7 mm long; stipules absent. Flowers numerous, in axillary corymbs. Calyx yellowish green, of 5 rounded sepals, ca. 1 mm long; corolla of 5 yellowish or whitish petals, free, oblanceolate, 2.5-3 mm long, pubescent on the distal portion; stamens 3, the filaments connate into a conical disc, which almost totally surrounds the ovary; ovary superior, tricarpellate, the style one, with a punctiform stigma. Mericarps 3, divergent, flattened, conspicuously veined, 4-8 cm long; seeds few, winged, ca. 4 cm long, the seed-bearing portion elliptical, the wing oblong.

Phenology: Flowering throughout the year and fruiting from October to January.

Status: Native, very common.

Distribution: In secondary forests and along roadsides at middle and lower elevations in moist areas. Also on Vieques; the Antilles, Central America, South America, and the United States (Florida).

Public forests: Cambalache, Ceiba, El Yunque, Guajataca, Maricao, Río Abajo, Susúa, and Vega.

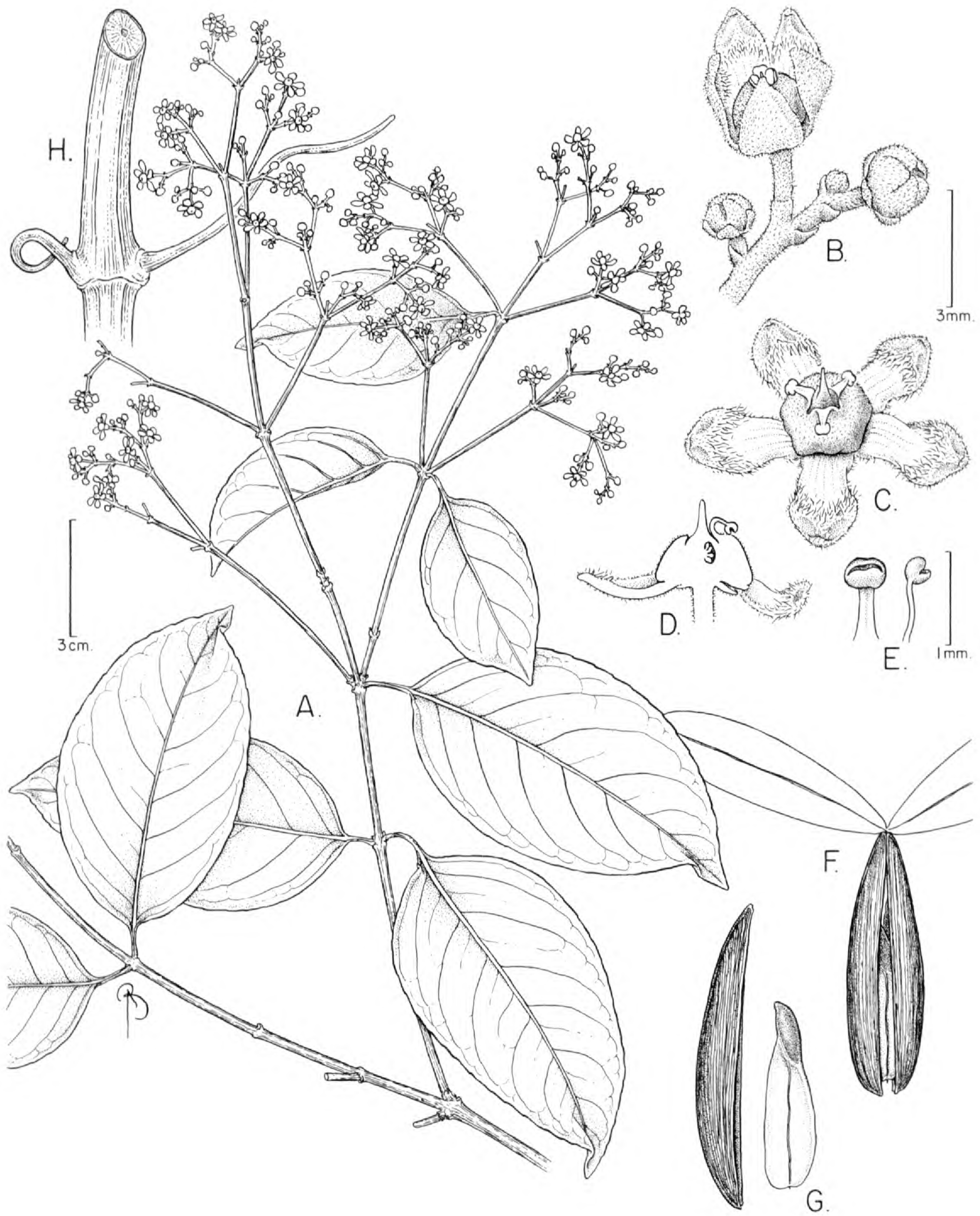

Fig. 58. A-H. *Hippocratea volubilis*. **A.** Flowering branch. **B.** Detail of the inflorescence. **C.** Flower, top view. **D.** Flower, longitudinal section. **E.** Stamens, back and side views. **F.** Fruit. **G.** Carpellary wall and seed. **H.** Node with prehensile branches. From Mori, S. A. et al. 2003. Vascular plants of central French Guiana. Mem. NYBG Vol. 76(2).

2. PRISTIMERA

Lianas or scandent shrubs; glabrous, branches usually opposite. Leaves opposite, petiolate; blades simple; petioles slender; stipules absent. Flowers minute, bisexual, in axillary panicles, corymbs, or pseudoracemes; bracts small, chartaceous. Calyx rotate, of 5 rounded sepals; corolla of 5 free petals; disc annular, inconspicuous; stamens 3; ovary superior, 3-carpellate, obtusely triangular, trilocular, with 2-8 ovules per locule, the style short, the stigma obtuse or capitate. Fruit of 3 divergent, flattened mericarps, each dehiscent by a medial suture; seeds compressed, with a basal wing. A genus of 24 species of pantropical distribution.

1. Pristimera caribaea (Urb.) A. C. Sm., Brittonia 3: 378. 1940.

Fig. 59. A-F

BASIONYM: *Hippocratea caribaea* Urb.

SYNONYM: *Hippocratea domingensis* Urb. & Ekman

Woody vine, climbing, which supports itself on other plants by twining lateral branches and attains 10 m or more in length. Stems grayish, dark brown and lenticellate when mature. Leaves opposite; blades 6-11 × 2-6 cm, elliptical or ovate-elliptical, coriaceous, glabrous, the apex acute or acuminate, the base acute to obtuse, the margins entire, denticulate or crenulate, the veins prominent on both surfaces. Flowers numerous, in dichasial cymes, dichotomous, axillary, 1.5-4 cm long; pedicels ca. 1 mm long. Calyx greenish yellow, of 5 triangular or broadly ovate sepals, 0.5-0.8 mm long, erose or ciliate-glandular at the margin; petals 5, elliptical or oblong, greenish yellow, 1.5-2.6 mm long; disc annular, 0.8-1.2 mm wide; stamens ca. 1 mm long; ovary glabrous, conical. Mericarps 3, compressed, elliptical, 3.5-5 cm long; seeds usually 4 per locule, ca. 1.5 cm long, winged.

Phenology: Collected in flower from November to January.

Status: Native, locally common.

Distribution: Of wide distribution in Puerto Rico, in forests in the zone of mogotes, the Cordillera Central, Sierra Bermeja, and Cerro de La Pandura. Also in Hispaniola, the Lesser Antilles, and Guyana.

Public forests: Guajataca, Maricao, and Río Abajo.

Commentary: *Hippocratea*, *Pristimera*, and various genera have been considered as belonging to the Family Hippocrateaceae. Nevertheless, recent taxonomic evidence suggests that the Hippocrateaceae is an artificial group not distinguishable from the Celastraceae. For this reason, these have been added to the Celastraceae.

References: Smith, A. C. 1940. The American species of Hippocrateaceae. Brittonia 3: 341-555. van Gorts, A. R. A. and A. M. W. Mennega. 1994. Hippocrateaceae. Flora of the Guianas. 16: 1-81.

15. *Family* ***CLUSIACEAE***

1. CLUSIA

Trees or erect shrubs, usually stranglers or less frequently scandent, dioecious, with abundant yellowish or cream-colored latex. Leaves opposite, usually petiolate; blades simple, thick, coriaceous. Flowers unisexual, actinomorphic, solitary or in terminal cymes. Calyx of 4-6 sepals; corolla of 4-9 free petals; stamens numerous, fertile in the staminate flowers, sterile (staminodia) in the pistillate flowers, the filaments usually united at the base; ovary superior, with 4-12 carpels, the ovules numerous, with axile placentation, the stigma peltate. Fruit a fleshy capsule, valvicidally dehiscent; seeds numerous, with a fleshy, reddish covering. A neotropical genus of about 150 species.

Fig. 59. A-F. *Pristimera caribaea.* **A.** Sterile branch. **B.** Node with opposite leaves. **C.** Flowering branch. **D.** Detail of the inflorescence. **E.** Flower, whole and with two petals removed showing stamens and gynoecium. **F.** Stamens and gynoecium, whole and longitudinal section, with detail of stamen.

1. Clusia gundlachii A. Stahl, Estud. 2: 122. 1884.

Fig. 60. A-G

Cupey de altura, Bejuco de cupey, Cupeillo de altura

Clambering shrub attaining 7 m in length, with abundant cream-colored latex. Trunk cylindrical, up to 10 cm in diameter at the base; branches pendulous, opposite, subcylindrical or slightly compressed, glabrous, with long, pendulous aerial roots. Leaves opposite; blades 5.5-10 × 2.1-6 cm, oblanceolate, elliptical, oval, or ovate, coriaceous, glabrous, the apex acute or obtuse, the base cuneiforme to obtuse, the margins entire, revolute; upper surface dark, slightly shiny,

with the midvein yellowish; lower surface yellowish green, with a prominent midvein; petioles thick, 1-2 cm long. Flowers numerous, unisexual, arranged in dichasial cymes to form a terminal thyrse, as long as wide. Calyx green, crateriform, of 4 sepals, concave, rounded, in 2 series, the 2 outer sepals ca. 3 mm long, the inner ones ca. 4 mm long; corolla tubular, ellipsoid or ovoid, 2-3 mm long; staminate flowers with 10 stamens included within the corolla; pistillate flowers with sterile stamens, ovary urceolate, 4-5-locular, the stigmas sessile. In addition to the fertile inflorescences, this species produces sterile inflorescences, pendulous, much branched, with numerous green bracts, opposite and decussate along the axes. Capsule fleshy, ovoid or ellipsoid, 1.6-2 cm long, greenish, opening by 4-5 valves, each of which contains a row of minute, elliptical seeds, covered with a sticky orange matrix.

Phenology: Flowering and fruiting throughout the year.

Status: Endemic to Puerto Rico, rather common.

Distribution: Principally in moist forests along the Cordillera Central and the Sierra de Luquillo, but extending toward the dry forests of the south coast.

Public forests: Carite, El Yunque, Guánica, Guilarte, Maricao, Río Abajo, Susúa, and Toro Negro.

Commentary: This species, described by Dr. Agustín Stahl, was dedicated to Dr. Juan Gundlach, a German naturalist resident in Cuba, who had visited Puerto Rico in 1873 and in 1875-76. This species is superficially similar to *Clusia minor* L., which can be distinguished from *C. gundlachii* by the following key.

1a. Clambering shrub with long, pendulous branches; leaves oblanceolate, elliptical, oval, or ovate, the apex acute or less frequently obtuse; flowers functionally unisexual, the pistillate ones with staminodia; corolla tubular, ellipsoid or ovoid, 2-3 mm long, closed at the apex to form a calyptra; fruit ovoid or ellipsoid ..... *C. gundlachii*

1b. Erect shrub; leaves oblanceolate or spathulate, the apex rounded or obtuse; flowers hermaphroditic or pistillate (the latter with a resinous ring in place of the staminodia); corolla of free petals, rounded, ca. 1.5 cm long; fruit ovoid or subglobose..... *C. minor*

16. *Family* ***COMBRETACEAE***

1. COMBRETUM

Trees, erect or scandent shrubs, or lianas. Leaves opposite or sometimes alternate or whorled; blades simple; petioles articulated at the base. Flowers 4-5-merous, bisexual, sessile or short-pedicellate, arranged in heads, racemes, spikes, or compound paniculiform inflorescences; bracts foliaceous or reduced. Calyx forming an infundibuliform, tubular, or cupular hypanthium that projects beyond the ovary, with the sepals on the distal portion of the hypanthium; corolla of free petals or absent; stamens 8-10, in one or two whorls, exserted or inserted; ovary inferior, with 2-6 ovules, the style simple, free or adnate to the hypanthium. Fruit dry, indehiscent or dehiscent, with 4 or 5 wings or ribs; seed one. About 270 species of tropical distribution, with numerous species in Africa.

Key to the species of *Combretum*

1a. Hypanthium infundibuliform, red-purple; stamens exserted, in a single whorl; inflorescences spicate, with the flowers densely clustered ..... 1. *C. grandiflorum*

1b. Hypanthium long-tubular, green; stamens inserted in two whorls; inflorescences racemose, with the flowers dispersed ..... 2. *C. indicum*

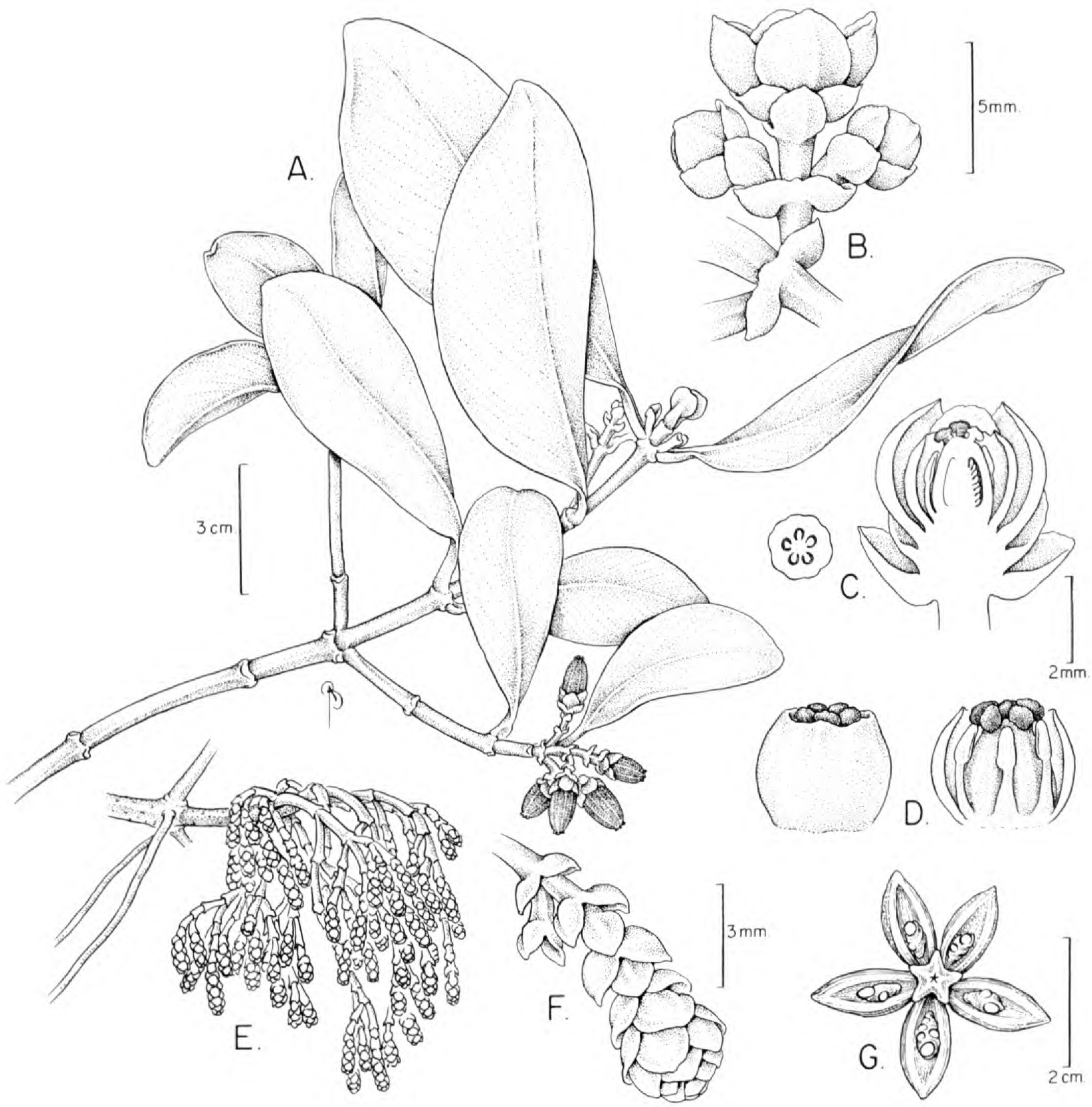

Fig. 60. A-G. *Clusia gundlachii*. **A.** Fertile branch. **B.** Portion of inflorescence. **C.** Pistillate flower, longitudinal section, and cross section of the ovary. **D.** Whole corolla, and corolla dissected to show staminodia and gynoecium. **E.** Sterile inflorescence. **F.** Detail of sterile inflorescence. **G.** Open fruit.

1. Combretum grandiflorum G. Don, Edinburgh Philos. J. 346. 1824.

Fig. 61. A-D

Twining liana, 3-10 m in length. Branches cylindrical, somewhat compressed in the area of the nodes, sparsely pilose or glabrous, usually with the pith hollow. Leaves opposite; blades 7.5-14.5 (25) × 3.5-7(12) cm, elliptical, obovate, or ovate, chartaceous or coriaceous, the apex obtuse or rounded, the base obtuse, slightly asymmetrical, the margins entire; upper surface glabrous, with the midvein appressed-pubescent; lower surface glabrous except for some papillae along the primary and secondary veins, with prominent

venation; petioles 10-13 mm long, geniculate at the base, appressed-pubescent. Flowers 4-5-merous, ascending, numerous, in axillary racemes, horizontal, 6-12 cm long; pedicels 3-6 mm long. Hypanthium infundibuliform, 8-12 mm long, glabrous, red-purple, puberulous; sepals triangular, ca. 3 mm long; petals red-purple, spathulate, 1-1.2 cm long; stamens exserted, the filaments unequal; style simple, free, exserted. Fruit oval in outline, retuse at the apex, 5-winged, pale yellow or stramineous, 3-4 cm long, stipitate at the base. Seed one, pentagonal, 7-10 mm long.

Phenology: Collected in fruit in February.

Status: Exotic, cultivated, locally naturalized, uncommon.

Distribution: Ornamental plant, native to central Africa, cultivated, naturalized in the Cerro Las Mesas area in Mayagüez.

2. Combretum indicum (L.) Jongkind, Fl. Gabon 35: 48. 1999.

BASIONYM: *Quisqualis indica* L.

Fig. 61. E-G

Twining liana, attaining 6 m in length. Stem much branched from the base; branches cylindrical, somewhat compressed in the area of the nodes, glabrous or puberulous, usually with the pith hollow; adult stems deciduous, with 3 persistent spines at the nodes. Leaves opposite or subopposite; blades 6-17.5 × 2.2-7 cm, elliptical, oblong, or lanceolate, chartaceous, the apex acuminate, the base rounded, the margins entire; upper surface glabrous, with a prominent midvein; lower surface ferruginous-tomentulose or puberulous, with prominent venation; petioles 5-12 mm long. Flowers sessile or subsessile, in terminal spikes or racemes on short lateral branches. Hypanthium green, tubular, 4-6.5 mm long, pubescent; sepals green, triangular, ca. 2 mm long; petals 5, oblong or oblanceolate, 1-1.5 cm long, pink, turning red when mature; stamens exserted, the filaments unequal; disc absent; style exserted. Fruit elliptical in outline, angular, with 5 narrow wings, ca. 3 cm long.

Phenology: Flowering from July to March.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: Ornamental plant, native to tropical Asia, naturalized along roadsides. Also on St. Croix, St. John, and St. Thomas.

Public forest: Río Abajo.

References: Jongkind, C. C. H. 1991. Novitates Gabonenses 6. Some critical observations on *Combretum* versus *Quisqualis* (Combretaceae) and description of two new species of *Combretum*. Bull. Mus. Natn. Hist. Nat., Paris, Ser. 4 12: 275-280; Jongkind, C. C. H. 1999. Combretaceae. *In:* Flora du Gabon. Vol. 35. 115 pp. París.

17. *Family* ***CONNARACEAE***

1. ROUREA

Vines, shrubs, or trees. Leaves alternate, compound, imparipinnate or unifoliolate, petiolate; stipules present. Flowers 5-merous, bisexual, actinomorphic, in terminal, subterminal, or axillary panicles. Calyx of imbricate sepals, usually glandular; corolla of 5 petals, free or connate at the base; stamens 10, in two series, the filaments glabrous, connate at the base to form a short tube, the anthers dehiscent by longitudinal sutures; ovary superior, with 5 free carpels, each with two ovules, the stigma capitate. Fruit a follicle, dehiscent by a longitudinal suture, with the calyx accrescent and persistent at the base; seed one, black, arillate at the base. A pantropical genus of about 85 species, 42 of which are distributed throughout tropical America.

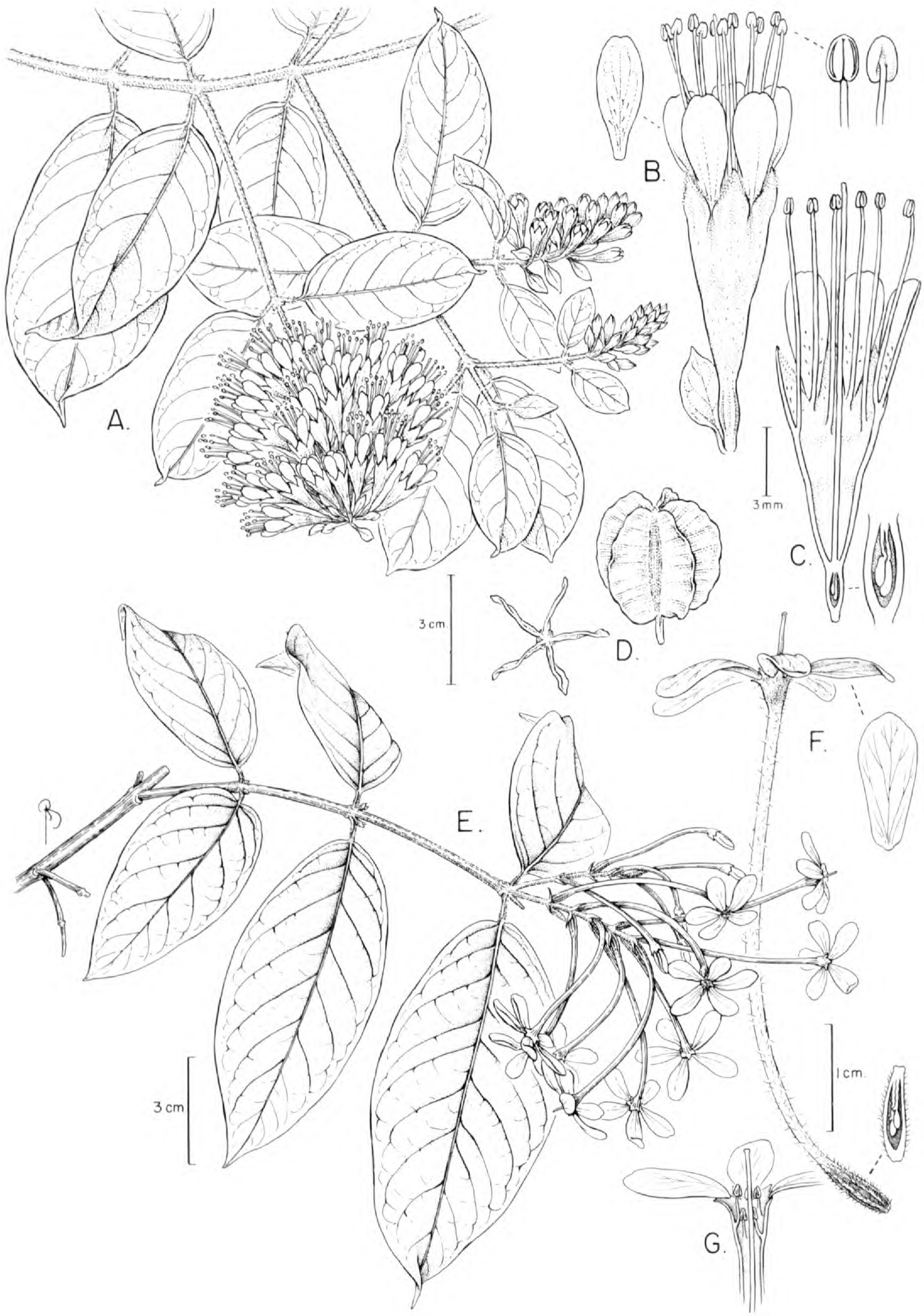

Fig. 61. A-D. *Combretum grandiflorum*. **A.** Flowering branch. **B.** Flower, with details of the petals and stamens. **C.** Flower, longitudinal section, with detail of the ovary. **D.** Fruit, top and side views. **E-G.** *Combretum indicum*. **E.** Flowering branch. **F.** Flower, with detail of the petal and ovary. **G.** Flower, longitudinal section, with detail of the stamens.

1. Rourea surinamensis Miq., Linnaea 26: 221. 1853.

Fig. 62. A-H

SYNONYMS: *Rourea frutescens* sensu Bello, non Aubl.
Rourea glabra sensu Griseb., non Kunth

Juan caliente, Bejuco de garrote

Woody vine, twining, attaining more than 20 m in length. Stems strong, flexible, grayish or brown, up to 2 cm in diameter; lateral branches short, twining like tendrils. Leaves alternate, pinnately compound or less frequently unifoliolate; leaflets 3 or 5, opposite or subopposite, 4-15 × 1.5-6.5 cm, elliptical, oblong, or ovate, coriaceous, glabrous, the apex acuminate, the base rounded (or in young plants cordiform), the margins entire, revolute; upper surface dark, shiny, with the midvein sunken, the secondary veins slightly prominent; lower surface pale green, dull, with the reticulate venation prominent; petioles 3-8 cm long, with the base swollen; petiolules swollen, ca. 5 mm long; stipules minute. Flowers numerous, in clustered, axillary panicles or racemes, 5-10 cm long. Calyx crateriform, 2.5-3 mm long, of 5 oblong sepals, ca. 2 mm long; petals white, spathulate, ca. 4 mm long, early deciduous; stamens 10, in two series, the filaments unequal, the anthers ellipsoid; gynoecium of 5 free carpels, pubescent, the style elongate, the stigma peltate or bilobed. Follicles ellipsoid, 1-1.5 cm long, reddish when mature; seeds black, with a white aril at the base.

Phenology: Flowering from March to September and fruiting from December to April.

Status: Native, rather common.

Distribution: in mature or secondary moist forests, at middle elevations. Also in Hispaniola, the Lesser Antilles, Trinidad, the Guianas, and eastern Venezuela.

Public forests: El Yunque and Río Abajo.

Reference: Forero, E. 1976. A revision of the American species of *Rourea* subgenus *Rourea* (Connaraceae). Mem. New York Bot. Gard. 26: 1-119.

18. *Family* ***CONVOLVULACEAE***

Key to the genera

1a. Flowers arranged in panicles; corolla white, 4-6 mm long ..... 8. *Poranopsis*
1b. Flowers solitary or in simple or compound cymes; corolla of diverse colors, when white they exceed 2.5 cm long, when violet-pink, lavender, or yellow they are ca. 5 mm long. 2

2a. Stigmas globose, subglobose, biglobose, or bilobate. 3
2b. Stigmas elongate (filiform or oblong). 11

3a. Sepals conspicuously unequal, the outer ones broader, concealing the inner ones ..... 1. *Aniseia*
3b. Sepals more or less equal or slightly unequal, the outer ones usually smaller than the inner ones.....4

4a. Fruits indehiscent, irregularly dehiscent or dardily dehiscent by the dissolution of the pericarp. . 5
4b. Fruits capsular, 4-valvate, sometimes with the exocarp operculate. 9

5a. Lower surface of the leaves densely pubescent; axes of the inflorescences densely pubescent or tomentose. 6
5b. Lower surface of the leaves and axes of the inflorescences glabrous or puberulous; fruits indehiscent or irregularly or tardily dehiscent, fibrous or crustaceous. 7

6a. Fruit indehiscent, fleshy, covered by the accrescent sepals; corolla violet-pink ..... 2. *Argyreia*
6b. Fruit with the exocarp separating like an operculum, endocarp opening irregularly, sepals not covering the fruit; corolla white or white with a yellow center ..... 7. *Operculina*

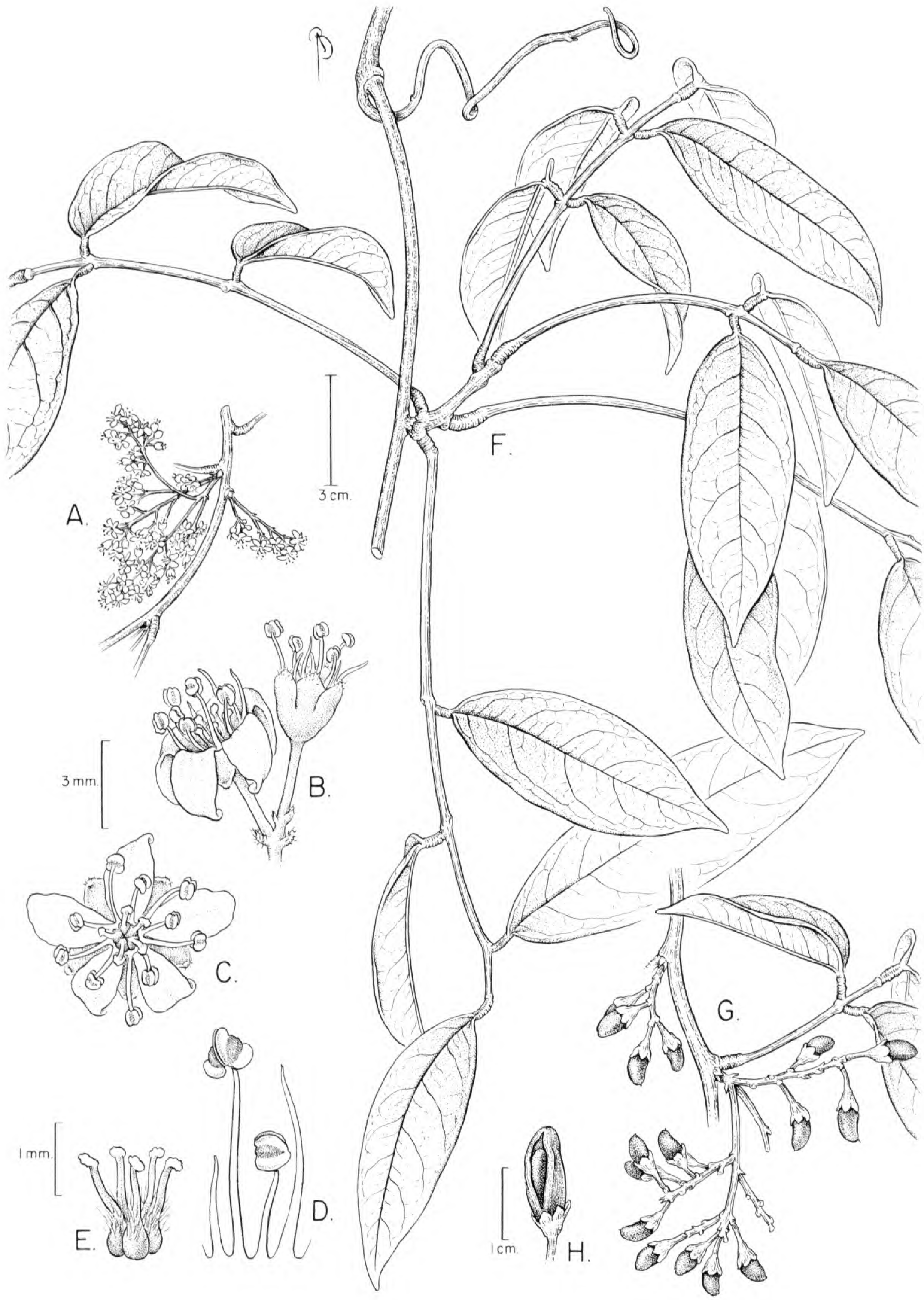

Fig. 62. A-H. *Rourea surinamensis*. **A.** Inflorescence. **B.** Detail of the inflorescence. **C.** Flower, top view. **D.** Stamens. **E.** Gynoecium. **F.** Vegetative branch. **G.** Fertile branch. **H.** Fruit.

7a. Fruit covered by the accrescent, overlapping sepals; corolla violet-pink, 6-8 cm long; fruit fibrous, tardily dehiscent by the dissolution of the pericarp ..... 9. *Stictocardia*
7b. Fruit exposed, the sepals although accrescent, not covering the fruit; corolla white or yellow, 2.5-3 cm long; fruit crustaceous, indehiscent or irregularly dehiscent 8

8a. Fruit ellipsoid, indehiscent, 1-1.2 cm long, with only one seed inside; corolla white with the center violet ..... 10. *Turbina*
8b. Fruit ovoid, irregularly indehiscent, 1.5-2.5 cm long, seeds generally 4; corolla yellow ..... 6. *Merremia* (in part)

9a. Leaves narrowly lanceolate or linear, 0.5-6 mm wide, with the base hastate or auriculate; corolla yellow, 1-2 cm long ..... 11. *Xenostegia*
9b. Leaves of diverse forms, if lanceolate and hastate then with the corolla white, 3-4 cm long. 10

10a. Anthers twisted after opening; sepals accrescent at the base of the fruit; leaves usually palmately compound (except in the case of *M. umbellata*); corolla yellow or white with a purple center ..... 6. *Merremia* (in part)
10b. Anthers straight (not twisted) after opening; sepals generally not accrescent; leaves simple, or if palmately compound then with the corolla violet-pink or red ..... 4. *Ipomoea*

11a. Stigmas filiform; corolla white ..... 3. *Convolvulus*
11b. Stigmas oblong; corolla blue, white, or red ..... 5. *Jacquemontia*

1. ANISEIA

Herbaceous vines, twining, producing watery latex. Leaves alternate; blades simple; stipules absent. Flowers 5-merous, bisexual, actinomorphic, solitary or in axillary dichasia; bracts 2, on the distal portion of the peduncle. Calyx of unequal sepals, the 2 outer ones much broader, concealing the inner ones; corolla white, infundibuliform, the limb 5-dentate or entire, with 5 lines of pubescence outside; stamens 5, shorter than the corolla, the filaments adnate to the corolla; ovary superior, glabrous, bilocular, each locule with two ovules, the style solitary, the stigma bilobed. Fruit a globose capsule that opens along 4 valves, covered by the accrescent sepals; seeds 4 per fruit. A genus of neotropical origin, of 5 species, of which one has been introduced into the Old World tropics.

1. Aniseia martinicensis (Jacq.) Choisy, Mém. Soc. Hist. Nat. Genève 8: 66. 1837.

Fig. 63. A-D

BASIONYM: *Convolvulus martinicensis* Jacq.

Herbaceous vine, twining, climbing, or creeping, 2-4 m in length. Stems glabrous or puberulous when young, with watery latex. Leaves alternate; blades simple, 4-9 × 2.4-3.7 cm, narrowly lanceolate, elliptical, or oblanceolate, membranaceous, the apex obtuse and mucronate, the base obtuse, acute, or attenuate, the margins entire or crenate; upper surface dull, glabrous, granular, with the midvein slightly prominent; lower surface pale green, glabrous, dull, with the venation slightly prominent and puberulous; petioles puberulous, slender, 1-2 cm long. Flowers solitary, axillary; peduncles 3-5 cm long, with a pair of minute bracteoles on the distal portion; pedicel ca. 1 cm long. Calyx green, of 5 unequal sepals, ovate, acuminate, the two outer ones 12-17 mm long, broader than the 3 inner ones; corolla white, campanulate, 2.5-3 cm long; stamens not exserted. Capsules 4-valvate, ovoid, 1.3-1.5 cm long, partially covered by the accrescent sepals; seeds dark brown to almost black, ca. 6.5 cm long, with two sides flat and one convex, sparsely covered with minute, squamose hairs, especially on the angles.

Phenology: Collected in flower in February and April and in fruit from December to February and in July.

Status: Native, uncommon.

Distribution: In marshy areas near Laguna Tortuguero and at the mouth of the Humacao River. Throughout the Neotropics.

Public forest: Tortuguero.

2. ARGYREIA

Twining lianas. Leaves alternate, petiolate; blades simple; stipules absent. Inflorescences of simple dichasial cymes. Flowers 5-merous, bisexual, with actinomorphic symmetry. Calyx of 5 sepals, variable in shape and size, usually pubescent and accrescent in fruit; corolla purple, pink, or white, infundibuliform, campanulate, or tubular, the limb almost entire to deeply 5-lobed; stamens 5, inserted or exserted; ovary superior, glabrous or pubescent, 2-4-locular, the style solitary, inserted or exserted, the stigma biglobose. Fruits indehiscent, ellipsoid to globose, fleshy, red, orange, or yellowish; seeds 4 or fewer per fruit. A genus of 90 species native to continental tropical Asia, Malaysia, and northern Australia; the following species is cultivated in the New World.

1. Argyreia nervosa (Burm. f.) Bojer, Hort. Maurit. 224. 1837.

Fig. 63. E-F

BASIONYM: *Convolvulus nervosus* Burm. f.
SYNONYMS: *Rivea nervosa* (Burm. f.) H. Hallier
Argyreia speciosa (L.f.) Sweet

Twining liana, without latex, attaining more than 5 m in length. Stems cylindrical, densely canescent when young, becoming glabrous when mature. Leaves alternate; blades simple, 12-22 (27) × 8.5-20 cm, cordiform, coriaceous, the apex obtuse to rounded, sometimes mucronate, the base cordiform, the margins entire; upper surface dark, dull, glabrous, with the venation slightly sunken; lower surface densely canescent, with the pinnate venation prominent; petioles 5-15 cm long, densely canescent. Flowers few, in axillary simple or double dichasial cymes; bracts foliaceous, ovate, acuminate, 2-5 cm long, canescent on the lower surface, forming an involucre at the base of the dichasia; peduncles densely canescent, up to 15 cm long. Calyx crateriform, canescent, accrescent, of 5 ovate sepals, obtuse, mucronate, 1.5-2 cm long; corolla lavender, dark violet in the throat, infundibuliform, 6-6.5 cm long, canescent outside, the limb with 5 slightly prominent, rounded lobes; stamens and style not exserted. Indehiscent fruits ovoid, 1-1.5 cm long, puberulous, the pericarp thick, subtended by the subwoody, persistent sepals, slightly shorter than the fruit; seeds light brown, ca. 5 mm long, densely appressed short-pubescent, with two sides flat and one convex, the hilum forming a navel.

Phenology: Flowering from April to August, collected in fruit in November.

Status: Exotic, cultivated in Puerto Rico and the Virgin Islands, uncommon.

Distribution: Native to India, cultivated and naturalized in the Antilles and throughout the tropics.

3. CONVOLVULUS

Erect or prostrate herbs, shrubs, or twining vines. Leaves alternate, petiolate; blades simple, entire or lobed; stipules absent. Flowers bisexual, actinomorphic, solitary or clustered in involucrate heads. Calyx of 5 equal or unequal sepals; corolla campanulate or infundibuliform, the limb slightly 5-lobed; stamens 5, exserted; ovary superior, with a solitary style and 2 filiform stigmas. Fruit a 4-valvate capsule, with each of the valves opening in two; seeds 4 per fruit, with two sides flat and one convex. A genus of about 250 species, mostly native to the Old World.

1. Convolvulus nodiflorus Desr. in Lam., Encycl. 3: 557. 1792.

Fig. 63. G-K

SYNONYMS: *Jacquemontia nodiflora* (Desr.) G. Don
Convolvulus albiflorus Vahl

Slightly woody vine, twining, attaining 5 m in length. Stems cylindrical, tomentose, with white or golden hairs, trifurcate, producing watery latex. Leaves alternate; blades simple, 2-4.5 × 1-3 cm, lanceolate, ovate, elliptical, or rounded, chartaceous, the apex obtuse, acute, acuminate, or retuse, usually mucronate, the base rounded, truncate, or cordiform, the margins entire; upper surface dull, with the midvein slightly prominent, sparsely covered with 2- or 3-fid trichomes; lower surface densely pubescent with white or golden, bi- or trifid hairs, with the pinnate venation prominent; petioles slender, 0.5-1.5 cm long. Flowers few, in axillary cymes; peduncle densely tomentose, up to ca. 1 cm long. Calyx light green, crateriform, sepals ovate, equal, not accrescent, 3-3.5 mm long, rounded at the apex; corolla white, infundibuliform, 1.2-1.5 cm long, the limb with 5 obtuse lobes; stamens white, the filaments 8-10 mm long; ovary white, the stigmas exserted. Capsules ovoid, ca. 5 mm long, the pericarp thin, light brown; seeds brown, ca. 3 mm long, with 2 sides flat and one convex, puberulous.

Phenology: Flowering and fruiting from October to April.

Status: Native, rather common.

Distribution: In thickets along the coastal zone. Also on Caja de Muerto, Culebra, Desecheo, Isla Ramos, Vieques, Guana Island, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Antilles, Central America, and South America.

Public forests: Boquerón, Ceiba, Guajataca, Guánica, and Susúa.

4. IPOMOEA

Twining, creeping vines or rarely shrubs, usually with abundant milky latex. Leaves alternate, petiolate; blades simple, entire, lobed, palmately or pinnately compound; stipules absent. Flowers bisexual, actinomorphic, solitary or in axillary simple or dichasial cymes; peduncles slender or thick, shorter or longer than the petioles. Calyx of 5 equal or unequal sepals, free to the base; corolla campanulate, infundibuliform, or hypocrateriform, the limb entire to deeply 5-lobed; stamens 5, inserted or rarely exserted, the filaments usually unequal, the anthers lanceolate; ovary superior, 2-4-locular, the style solitary with a subglobose or biglobose stigma. Fruits capsular, 4-valvate, ovoid or globose; seeds 4 per fruit, with two sides flat and one convex, glabrous or pubescent. A pantropical genus of about 500 species.

Key to the species of *Ipomoea*

1a. Corollas hypocrateriform 2
1b. Corollas infundibuliform or campanulate 9

2a. Corolla white 3
2b. Corolla cardinal red, red-orange or bright pink 5

3a. Leaves pinnatisect ..... 15. *I. quamoclit*
3b. Leaves entire, simple. 4

4a. Sepals lanceolate, aristate and revolute at the apex; corolla 10-12 cm long, the tube light green inside, the limb with 5 light green lines forming a star; stamens exserted ..... 1. *I. alba*
4b. Sepals ovate, concave, obtuse or rounded at the apex; corolla 5-7 cm long, the tube white, with cardinal red fringes inside at the base; stamens not exserted ..... 23. *I. violacea*

5a. Corolla cardinal red 6
5b. Corolla bright pink or red-orange 7

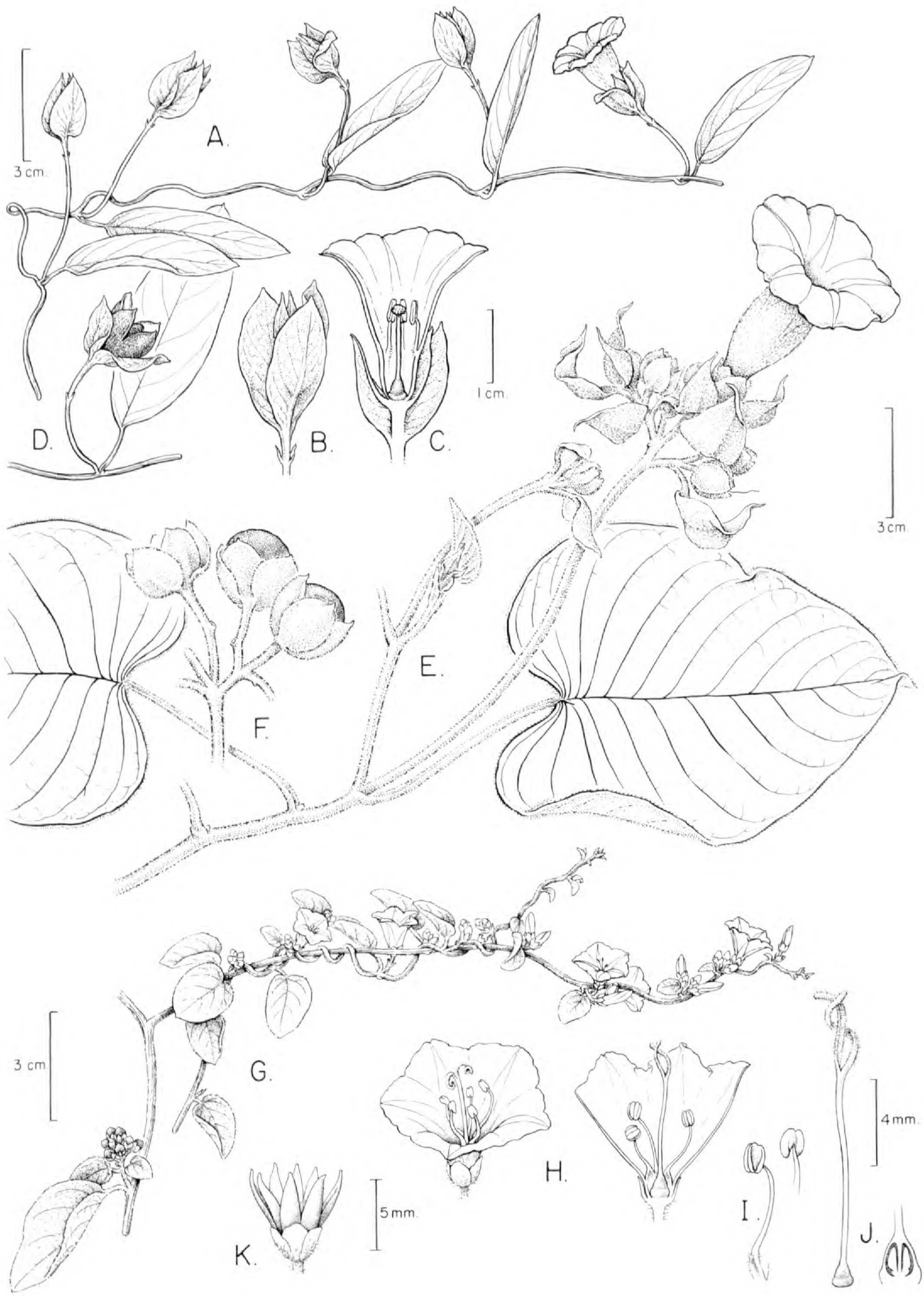

Fig. 63. A-D. *Aniseia martinicensis*. **A.** Flowering branch. **B.** Involucre with bracts. **C.** Flower, longitudinal section. **D.** Branch with fruit. **E-F.** *Argyreia nervosa*. **E.** Flowering branch. **F.** Infructescence. **G-K.** *Convolvulus nodiflorus*. **G.** Fertile branch. **H.** Flower, and flower, longitudinal section. **I.** Stamens. **J.** Gynoecium, and detail of the ovary. **K.** Open fruit.

6a. Leaves entire, reniform, with the apex retuse, 0.3-1.8 cm long ..... 18. *I. steudelii*
6b. Leaves pinnatisect, 2-10 cm long ..... 15. *I. quamoclit*

7a. Corolla bright pink; sepals pink; leaf with the base truncate, obtuse, or sometimes subcordiform.....8
7b. Corolla red-orange; sepals green; leaf cordiform at the base ..... 5. *I. hederifolia*

8a. Corolla with the limb entire or with 5 shallow, ovate, and expanded lobes ..... 10. *I. microdactyla*
8b. Corolla with the limb deeply 5-lobed, the lobes oblong and reflexed ..... 16. *I. repanda*

9a. Leaves palmately compound 10
9b. Leaves simple, entire, or trilobed 11

10a. Corolla bright pink or crimson, thick, ca. 6 cm long; calyx smooth; peduncle thick, straight .... 6. *I. horsfalliae*
10b. Corolla pale violet or purple, membranaceous, 1.5-2.5 cm long; calyx verrucose; peduncle filiform, spirally twisted ..... 24. *I. wrightii*

11a. Plants creeping or sometimes the younger portions of the stem twining, producing roots in the area of the nodes that are in contact with the soil 12
11b. Plants ascending, twining, rarely producing roots at the nodes (*I. setifera*) 14

12a. Plants strictly creeping; common on sandy coasts of the littoral zone 13
12b. Plants with the basal portion creeping, the younger portions ascending, twining; plants cultivated or escaped from cultivation ..... 2. *I. batatas*

13a. Corolla pink or lavender; leaves oblong to rounded, the apex deeply emarginate and mucronate..... 13. *I. pes-caprae*
13b. Corolla white with a yellow center; leaves oblong to lanceolate, the apex emarginate and mucronate ..... 7. *I. imperati*

14a. Leaves reniform or lyrate, < 1.5 cm long, clustered on short axillary branches; petioles usually longer than the leaf blade ..... 4. *I. eggersii*
14b. Leaves not reniform or lyrate, alternate, not clustered on short axillary branches 15

15a. Corolla yellow with the center purple ..... 12. *I. ochracea*
15b. Corolla of other colors 16

16a. Plant with at least some or all of the leaves trilobed 17
16b. Leaves entire, never lobed 21

17a. Corolla 1.4-1.6 cm long ..... 22. *I. triloba*
17b. Corolla 1.8 cm long or longer 18

18a. Calyx glabrous or puberulous; corolla 5-7 cm long, violet to violet-pink ..... 8. *I. indica*
18b. Calyx hirsute; corolla 1.5-4.5 cm long, lilac, pale blue, whitish, pink, or violet-blue 19

19a. Corolla 1.5-3 cm long; inflorescences of double dichasia resembling a head; bracts 1.5-3 cm long, forming an involucre at the base of the inflorescences ..... 9. *I. meyeri*
19b. Corolla 4-4.5 cm long; inflorescences of simple dichasia or sometimes the flower solitary; bracts 4-4.5 mm long, not forming an involucre 20

20a. Sepals with apices long-acuminate, elongate, much longer than the body ..... 11. *I. nil*
20b. Sepals with apices acute or slightly acuminate .....14. *I. purpurea*

21a. Leaves elliptical, oblong, or lanceolate, hastate or auriculate at the base ..... 19. *I. tenuissima*
21b. Leaves ovate, broadly ovate, or oblong, cordiform or truncate at the base 22

22a. Corolla pink or violet-pink; sepals with the margins not hyaline 23
22b. Corolla blue, turning violet when mature; sepals with hyaline margins..... 22. *I. tricolor*

23a. Sepals with three parallel veins, prominent, like a keel .....17. *I. setifera*
23b. Sepals without prominent veins 24

24a. Young stems 4-winged; sepals obtuse or retuse at the apex .....3. *I. calantha*
24b. Young stems cylindrical; sepals apiculate at the apex ..... 20. *I. tiliacea*

1. Ipomoea alba L., Sp. Pl. 161. 1753.

Fig. 64. A-E

SYNONYMS: *Calonyction aculeatum* (L.) House
Calonyction bona-nox (L.) Bojer

Bejuco de puerco, Bejuco de vaca, Claro de luna, Flor de luna

Twining vine, slightly woody, climbing or creeping, 5-20 m in length, with scarce milky or watery latex. Stems cylindrical, slender, fragile, glabrous, green, with the nodes mulberry-colored and with spiniform projections. Leaves alternate; blades simple or sometimes 3-5-lobed, 7-18 × 8-16 cm, broadly ovate, chartaceous or subcoriaceous, glabrous, the apex acute or acuminate, the base cordiform, the margins undulate and slightly revolute, entire or 3-7-lobate; upper surface dark green, dull; lower surface pale green, with prominent venation; petioles 6-24 cm long, fragile, usually mulberry-colored, with the base somewhat broadened. Flowers fragrant, nocturnal, solitary or few in axillary racemes; peduncle cylindrical, 4-15 cm long. Calyx green, the sepals 2.5-3 cm long, lanceolate, long-aristate and revolute at the apex; corolla white, hypocrateriform, 10-12 cm long, the tube narrow, light green inside, the limb 5-lobed, 9-12 cm in diameter, with 5 light green lines outside forming a star; stamens and stigmas white, exserted. Capsules ovoid-conical, 2-3 cm long, with a persistent style; seeds 4, dark brown to black, glabrous, ca. 1 cm long, with two sides flat and one convex.

Phenology: Flowering and fruiting sporadically throughout the year.

Status: Possibly native, rather common.

Distribution: In moist areas, along roads and in pastures at middle and lower elevations. Also on Vieques. Cultivated throughout the tropics but native to continental tropical America.

Public forests: El Yunque, Guánica, Maricao, and Río Abajo.

2. Ipomoea batatas (L.) Lam., Encycl. Méth. 6: 14. 1804.

Fig. 64. F-G

BASIONYM: *Convolvulus batatas* L.

Batata, Camote, Sweet potato

Creeping vine, with the younger portions twining and ascending, 3-4 m in length, with abundant milky latex. Roots tuberous, edible. Stems cylindrical, slender, flexible, glabrous or pubescent, usually producing aerial roots in the area of the nodes. Leaves alternate; blades simple or 3-7-lobed, 6-13 × 6-10 cm, when simple broadly ovate, deltoid, chartaceous, glabrous, the apex acute, obtuse, or acuminate, mucronulate, the base cordiform, lyrate, or truncate, the margins entire; upper surface dark green, dull; lower surface pale green, with prominent venation; petioles 5-12 cm long, glabrous. Flowers few, in axillary dichasial cymes; peduncle cylindrical, 7-12 cm long. Calyx green, not accrescent, the sepals oblong, unequal, 8-12 mm long, aristate at the apex; corolla violet-pink, infundibuliform-campanulate, 3-4.5 cm long, the limb ca. 4 cm in diameter, with 5 rounded lobes; stamens and stigmas not exserted. Capsules depressed-globose,

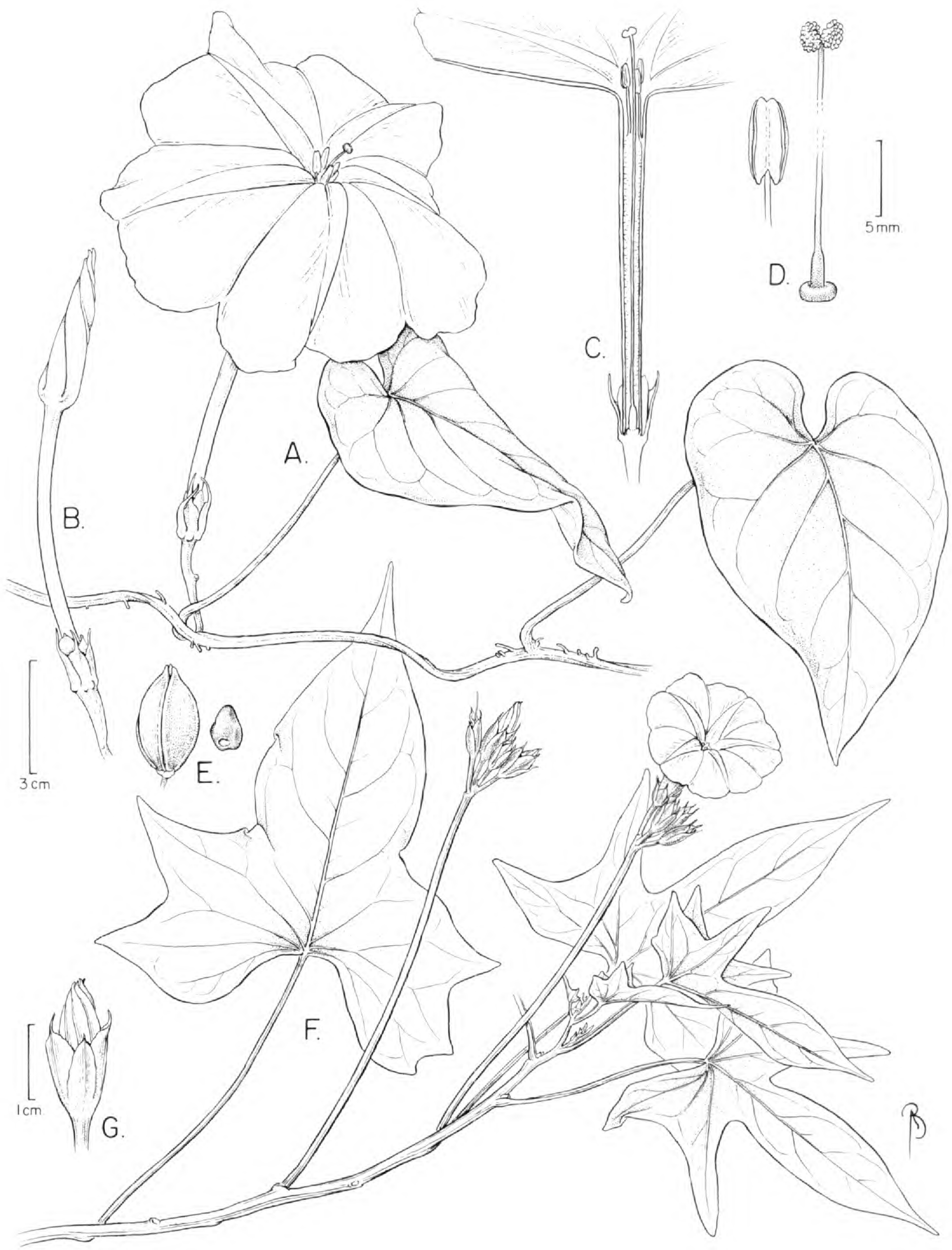

Fig. 64. A-E. *Ipomoea alba*. **A.** Flowering branch. **B.** Floral bud. **C.** Flower, longitudinal section. **D.** Anther and gynoecium. **E.** Fruit. **F-G.** *Ipomoea batatas*. **F.** Flowering branch. **G.** Floral bud.

ca. 5 mm long, pilose; seeds black, dull, puberulous, ca. 3.5 mm long, with two sides flat and one convex.

Phenology: Collected in flower and fruit from November to January.

Status: Exotic, cultivated and naturalized, rather common.

Distribution: Widely cultivated in Puerto Rico and the Virgin Islands. Native to the Neotropics but cultivated throughout the tropics and subtropics.

3. Ipomoea calantha Griseb., Cat. Pl. Cub. 202. 1866.

Fig. 65. A-C

Twining vine, slightly woody, 3-4 m in length. Young stems 4-winged, puberulous, cylindrical and striate when mature. Leaves alternate; blades simple, 5.5-14 × 4.7-10.5 cm, broadly ovate, chartaceous, the apex acute, obtuse, or acuminate, mucronulate, the base cordiform or truncate, the margins entire; upper surface dark green, dull, glabrous, with a prominent midvein; lower surface pale green, with prominent venation and puberulous; petioles 3-13 cm long, puberulous. Flowers solitary or few, in simple dichasial and axillary cymes; peduncle 4-13.5 cm long. Calyx green, not accrescent, the sepals oblong, puberulous, unequal, 8-12 mm long, the 2 outer ones shorter than the 3 inner ones, obtuse at the apex, the inner ones retuse at the apex; corolla violet-pink, infundibuliform, 6.5-7 cm long, the limb ca. 5 cm in diameter, with 5 rounded lobes; stamens and stigmas not exserted. Capsules ovoid-elongate, 1-1.3 cm long, light brown, glabrous; seeds reddish brown, ellipsoid, ca. 8 mm long, with a row of long silky hairs at the margins.

Phenology: Apparently flowering and fruiting sporadically throughout the year.

Status: Native, uncommon.

Distribution: In thickets and disturbed areas in southern Puerto Rico. Also in Cuba, Hispaniola, Colombia, and Venezuela.

Public forest: Guánica (according to Quevedo et al. 1990) and Maricao (according to Cedeño, 1991).

4. Ipomoea eggersii (House) D. F. Austin, Ann. Missouri Bot. Gard. 64: 335. 1979.

Fig. 65. D-E

BASIONYM: *Exogonium eggersii* House
SYNONYM: *Ipomoea arenaria sensu* Urb.

Twining vine, slightly woody, much branched from the base, attaining 5 m in length, with abundant milky latex. Tuberous roots subglobose (resembling a beet). Stems cylindrical, slender, reddish brown, glabrous. Leaves alternate, clustered on short axillary branches; blades 6-15 × 4-13 mm, reniform, lyrate or lobed, chartaceous, glabrous, the apex retuse, mucronate, the base cordiform, truncate, or rounded, the margins sinuate; upper surface dark green, dull, glabrous, with the veins flat; lower surface pale green, with the midvein thick and prominent; petioles 5-30 mm long, glabrous, slender. Flowers solitary at the end of short branches; bracts oblong, minute. Calyx pale green, not accrescent, the sepals ovate to rounded, 5-6 mm long, glabrous, unequal; corolla infundibuliform, 4-5 cm long, the tube pale green outside, white inside, the limb pink or pale violet, 3-4 cm in diameter, with 5 obtuse lobes; stamens and stigmas white, not exserted. Capsules ellipsoid, ca. 1.5 cm long, light brown; seeds 4 per fruit, dark brown, ca. 6 mm long, with a tuft of long silky hairs at the margins.

Phenology: Collected in flower from January to April and in fruit from January to March.

Status: Native, rather common.

Distribution: In thickets and coastal forests on Vieques, St. Croix, St. John, St. Thomas, Tortola, Virgin Gorda, and Water Island; the Lesser Antilles.

Commentary: *Ipomoea eggersii* seems to be closely related to *I. steudelii,* because both species share numerous morphological characters. The leaves and seeds are almost indistinguishable. However, the corollas of both species are drastically different and their distribution does not overlap: *I. eggersii* is distributed from the Virgin Islands to the Lesser Antilles, while *I. steudelii* is found on Culebra, Vieques, Puerto Rico, and probably in Hispaniola.

5. Ipomoea hederifolia L., Syst. Nat. ed. 10, 2: 925. 1759.

Fig. 65. F-H

SYNONYM: *Quamoclit coccinea* sensu Urb.

Twining vine, slightly woody, attaining 5 m in length, with watery latex. Stems cylindrical, slender, glabrous. Leaves alternate; blades 4-13 × 4.5-11 cm, ovate or deeply 3-5-lobed, chartaceous, glabrous, the apex of the lobes acuminate, the base cordiform or sagittate; upper surface dark green, dull, glabrous, punctate, with the veins slightly prominent; lower surface pale green, with the primary and secondary veins prominent; petioles 4.5-9 cm long, glabrous, slender. Flowers in dichasial cymes with one-sided racemose branches. Calyx pale green, not accrescent, the sepals 5-8 mm long, lanceolate, aristate at the apex; corolla hypocrateriform, bright red or red-orange, 4-4.5 cm long, the limb ca. 2.5 cm in diameter, with 5 obtuse lobes, shallow; stamens and stigmas white or pink, exserted. Capsules globose, ca. 8 mm in diameter, the pericarp thin; seeds 4 per fruit, light brown, ca. 5 mm long, pubescent.

Phenology: Collected in flower and fruit from October to January.

Status: Apparently native, moderately common.

Distribution: In thickets, forest margins, and disturbed areas of the coast or the interior of Puerto Rico. Also on Vieques, St. Croix, St. John, and St. Thomas; the Antilles, Central America, and South America, introduced in the Old World tropics.

Public forest: Toro Negro.

6. Ipomoea horsfalliae W. Hook., Bot. Mag. t. 3315. 1854.

Fig. 66. A-B

Twining vine, slightly woody, attaining more than 10 m in length, with watery latex. Stems cylindrical, slender, glabrous. Leaves alternate, palmately compound; leaflets 5, elliptical, 5.5-10 × 1.6-2.7 cm (the central leaflet larger than the lateral ones), chartaceous or membranaceous, glabrous, the apex acuminate or long-acuminate, the base acute or acuminate; upper surface glabrous, with the midvein slightly prominent; lower surface glabrous, punctate, with a prominent midvein; petioles 4.5-6 cm long, glabrous, slender. Flowers in double dichasial cymes. Calyx with a reddish tinge, not accrescent, the sepals unequal, 7-10 mm long, elliptical to ovate, obtuse at the apex, the outer ones shorter than the inner ones; corolla infundibuliform, violet-red or bright pink, 4-6.3 cm long, the limb 3.5-4.5 cm in diameter, with 5 rounded lobes; stamens and stigmas not exserted. Capsules ellipsoid, ca. 8 mm in diameter, the pericarp thin; seeds 4 per fruit, light brown, ca. 5 mm long, glabrous.

Phenology: Collected in flower from October to January.

Status: Possibly exotic and naturalized, uncommon.

Distribution: In moist forests of the Cordillera Central and in the zone of mogotes. This species was originally described based on material cultivated in the gardens at Kew, but of uncertain origin. The species is considered by some as native to Jamaica and introduced in other places due to its showy flowers.

Public forests: Maricao and Toro Negro.

Commentary: This species forms hybrids with *I. repanda* and produces plants with 5-digitate leaves and flowers very similar to those of *I. repanda*. These are cultivated throughout the tropics.

7. Ipomoea imperati (Vahl) Griseb., Cat. Pl. Cub. 203. 1866.

Fig. 66. C-E

BASIONYM: *Convolvulus imperati* Vahl
SYNONYMS: *Ipomoea stolonifera* J. F. Gmel.
Convolvulus littoralis L.
Ipomoea littoralis (L.) Boiss, non Blume

Erect herb or creeping or sometimes ascending vine, slightly woody, attaining 2 m in length, with milky latex. Stems cylindrical, slender, glabrous, producing adventitious roots in the area of the nodes. Leaves alternate, usually clustered on short axillary branches; blades simple, 2-10 × 1-2.5 cm, lanceolate, oblong, or deltoid, sometimes subsagittate, lyrate, or deeply trilobed, fleshy when fresh, chartaceous on drying, glabrous, the apex obtuse, rounded, or sometimes emarginate, mucronate, the base cuneiform, truncate, subcordiform to subsagittate; upper surface dull, glabrous, with the veins flat; lower surface glabrous, with the primary and secondary veins prominent; petioles 1-6.5 cm long, sulcate, pilose at the apex. Flowers solitary or in ascending dichasial cymes; peduncles 1.5-4.5 cm long. Calyx

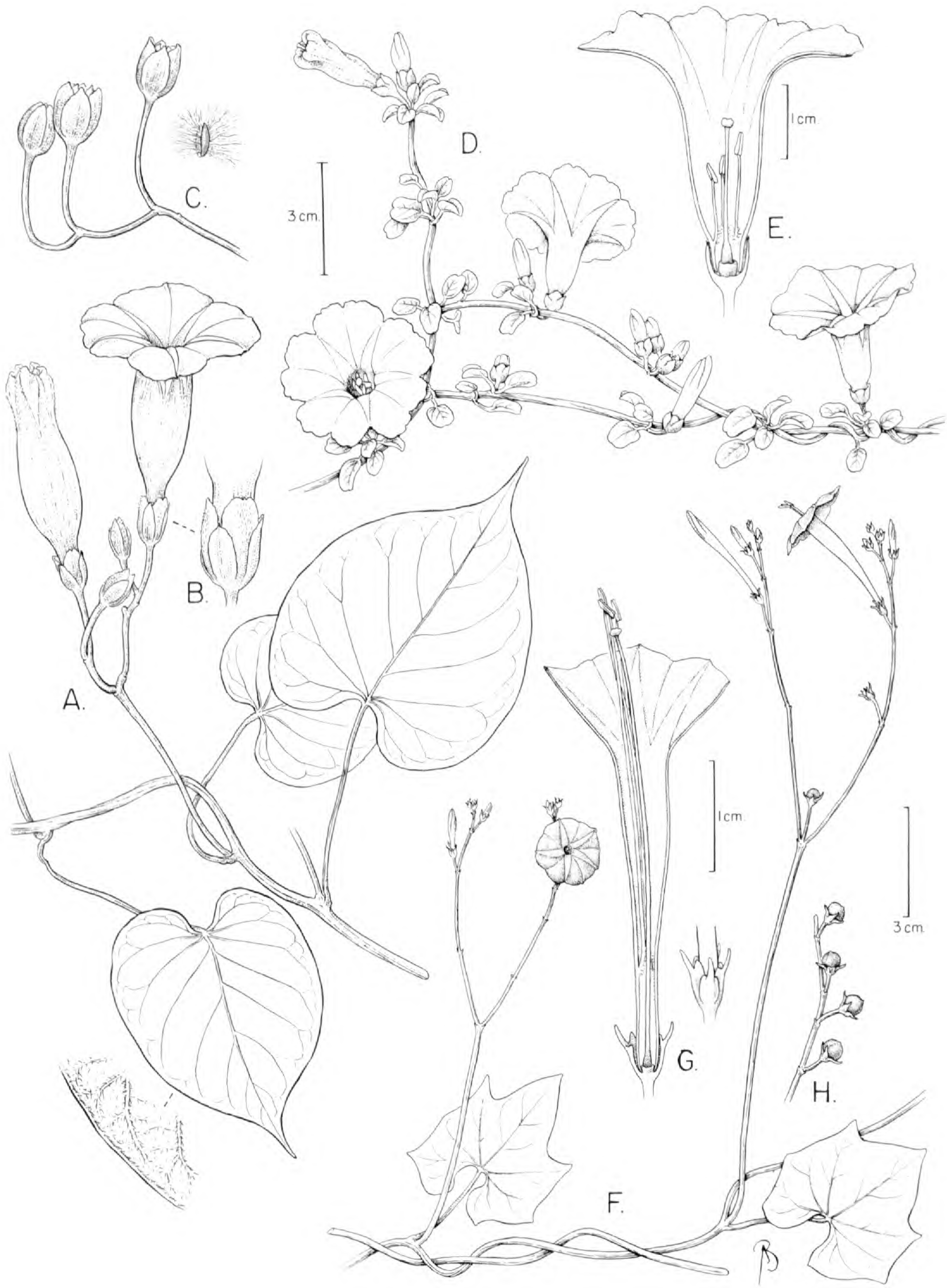

Fig. 65. A-C. *Ipomoea calantha*. **A.** Flowering branch. **B.** Detail of the calyx. **C.** Infructescence and seed. **D-E.** *Ipomoea eggersii*. **D.** Flowering branch. **E.** Flower, longitudinal section. **F-H.** *Ipomoea hederifolia*. **F.** Flowering branch. **G.** Flower, longitudinal section. **H.** Infructescence.

green, not accrescent, the sepals 10-15 mm long, elliptical, aristate at the apex, the margin hyaline, the two outer ones slightly longer than the inner ones, glabrous; corolla white, with a yellow center, infundibuliform, 2.5-5 cm long, the limb 3-6 cm in diameter, with 5 shallow, obtuse lobes; stamens and stigmas not exserted. Capsules globose or conical, 1.2-1.5 cm long; seeds 1-4 per fruit, ca. 5 mm long, lanate-pubescent.

Phenology: Collected in flower from October to March.

Status: Native, uncommon.

Distribution: Along the sandy coasts of the northern littoral zone. Also on Culebra and Vieques. A pantropical species, distributed along the sandy coasts of the littoral zone.

Public forest: Guánica and Piñones

8. Ipomoea indica (Burm.) Merr., Int. Rumph. Herb. Amb. 445. 1917.

Key to the varieties

1a. Plants glabrous; leaves usually trilobed ..... *I. indica* var. *acuminata*
1b. Plants appressed-pubescent; leaves cordiform, not lobed..... *I. indica* var. *indica*

8a. Ipomoea indica (Burm.) Merr. var. **acuminata** (Vahl) Fosberg, Bot. Not. 129: 38. 1976.

Fig. 66. F-I

BASIONYM: *Convolvulus acuminatus* Vahl
SYNONYMS: *Ipomoea cathartica* Poir.
Ipomoea portoricensis (Spreng.) G. Don

Bejuco de gloria

Herbaceous vine, twining, 2-5 m in length, with abundant milky latex. Stems slender, glabrous, cylindrical, smooth, greenish. Leaves alternate; blades 6-11 × 4-8 cm, glabrous, ovate or trilobed, chartaceous, the apex acute or short-acuminate, the base cordiform, the margins entire; upper surface with the venation slightly prominent; lower surface with prominent venation, glabrous or puberulous; petioles 6-12 cm long, cylindrical, glabrous. Flowers solitary or in simple dichasial cymes, axillary. Calyx green, accrescent, glabrous, the sepals subequal, 15-18 mm long, lanceolate, chartaceous, long-acuminate at the apex; corolla violet-pink with the center darker, infundibuliform, 5-7 cm long, the limb ca. 7 cm in diameter, with 5 rounded lobes; stamens not exserted; stigmas white, slightly exserted. Capsule globose, 10-15 cm in diameter, subtended by the accrescent sepals, subwoody; seeds black, elliptic-triangular, ca. 5 mm long, smooth, with a line of hairs at the margins.

Phenology: Flowering from July to April and fruiting from December to July.

Status: Native, rather common.

Distribution: Along the sandy coasts of the littoral zone and in moist areas at middle elevations. Also on Cayo Santiago, Culebra, Desecheo, Vieques, St. Croix, St. John, St. Thomas, and Tortola; throughout the Antilles and tropical America.

Public forests: Cambalache, Ceiba, El Yunque, Guilarte, Piñones, Río Abajo, Tortuguero, and Vega.

8b. Ipomoea indica var. **indica**

Herbaceous vine, twining. Stems appressed-pubescent, cylindrical. Leaves alternate; blades simple, 6-8 × 5-6 cm, ovate, chartaceous, the apex acuminate, the base cordiform, the margins entire; upper surface glabrous; lower surface with the venation slightly prominent, appressed-pubescent; petioles 5-6 cm long, cylindrical. Flowers solitary or in simple dichasial cymes, axillary. Calyx green, accrescent, appressed-pubescent, sepals subequal, ca. 2 cm long, lanceolate, chartaceous, long-acuminate at the apex; corolla violet-pink, infundibuliform, ca. 5 cm long, the limb ca. 3 cm in diameter; stamens not exserted; stigmas white, slightly exserted. Capsule globose, 10-15 mm in diameter, subtended by the accrescent sepals, subwoody; seeds black, elliptic-triangular, ca. 5 mm long, smooth, with a line of hairs along the margins.

Phenology: Collected in flower in December.

Status: Native, very rare.

Distribution: Known from a single collection in Piedras Chiquitas in Coamo, Puerto Rico. This variety predominates on the coasts of the Indo-Pacific region, and apparently is also found from Mexico to Brazil and Argentina.

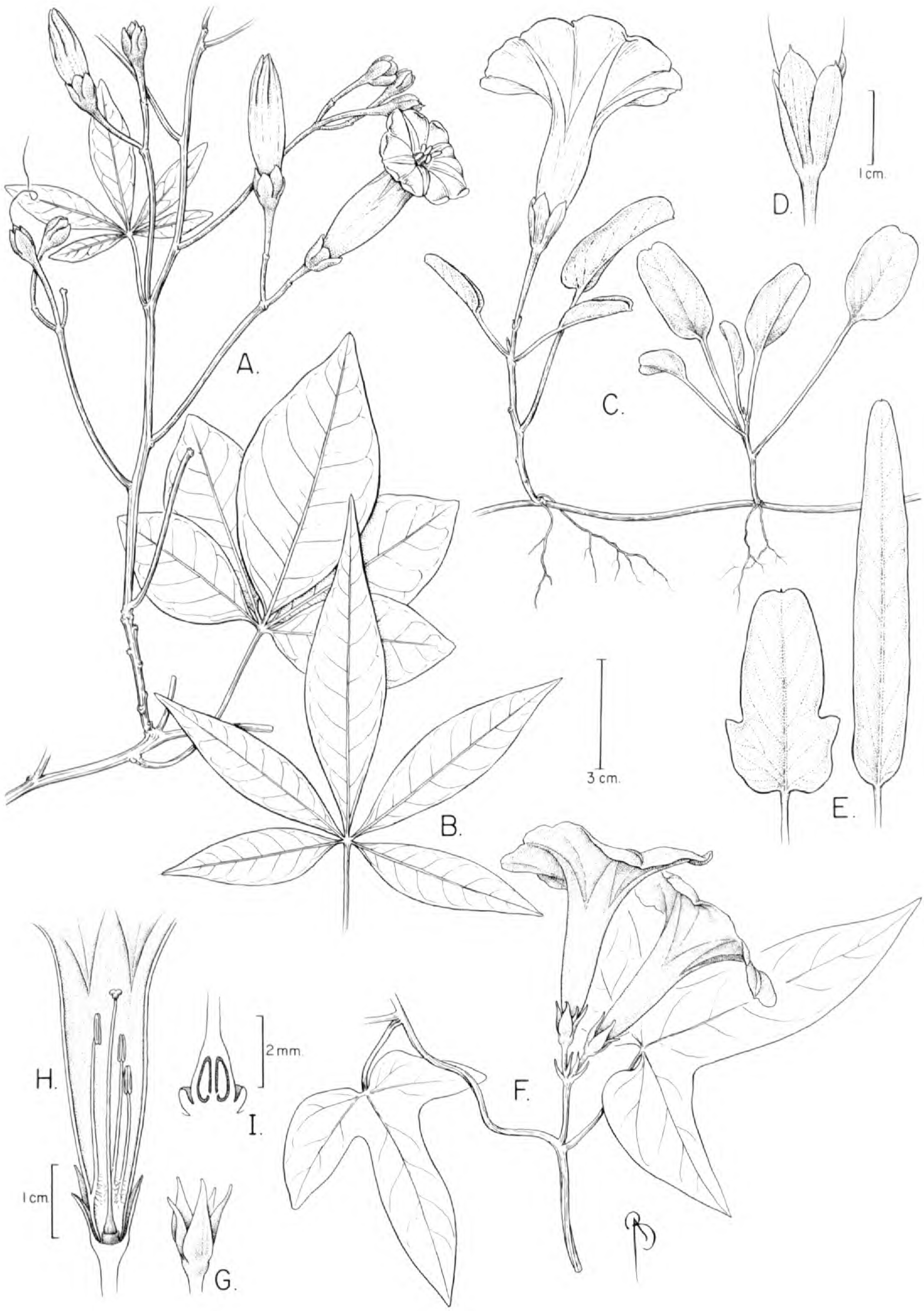

Fig. 66. A-B. *Ipomoea horsfalliae*. **A.** Flowering branch. **B.** Leaf. **C-E.** *Ipomoea imperati*. **C.** Habit. **D.** Flower, showing calyx. **E.** Leaf variation. **F-I.** *Ipomoea indica* var. *acuminata*. **F.** Flowering branch. **G.** Calyx. **H.** Flower, longitudinal section. **I.** Ovary and nectary, longitudinal section.

9. Ipomoea meyeri (Spreng.) G. Don, Gen. Syst. 4: 275. 1838.

Fig. 67. A-E

BASIONYM: *Convolvulus meyeri* Spreng.

Herbaceous vine, twining, 3-5 m in length. Stems slender, glabrous or pubescent, cylindrical, with scarce milky latex. Leaves alternate; blades simple, 4-9.5 × 3-7 cm, ovate, broadly ovate, deltate, lyrate, or trilobed, membranaceous, the apex and the lobes acute or acuminate, the base cordiform or sagittate, the margins entire; upper surface with the venation slightly prominent, strigose; lower surface with prominent venation, glabrous; petioles 2.5-6.5 cm long, slender, hirsute, especially at the apex. Flowers solitary, or 2 or 3 in axillary cymes, involucrate; peduncle 2-17 mm long, strigose to glabrescent; bracts of the involucre oblong, 1.5-2 cm long, sparsely hirsute. Calyx green, accrescent, the sepals unequal, 1.2-1.7 cm long, lanceolate, hirsute, especially near the base, long-acuminate at the apex; corolla pale blue, pale violet, or whitish, with the center white, infundibuliform, 1.5-3 cm long, the limb 2.5-3 cm in diameter, with 5 rounded lobes; stamens and stigmas not exserted. Capsules globose, ca. 8 mm in diameter, with the sepals persistent, erect, and accrescent; seeds 4 per capsule, reddish brown, elliptic-cuneiform, ca. 5 mm long, finely pubescent.

Phenology: Collected in flower from October to January and in fruit from December to January.

Status: Native, locally common.

Distribution: Common in southern and western Puerto Rico. Also in the Antilles, Central America, and northern South America.

Public forests: Guánica.

10. Ipomoea microdactyla Griseb., Cat. Pl. Cub. 204. 1866.

Fig. 67. F-J

SYNONYMS: *Exogonium microdactylum* (Griseb.) House
Ipomoea repanda var. *microdactyla* (Griseb.) Powell

Herbaceous vine, twining, 1.5-2 m in length, without latex. Stems slender, cylindrical, glabrous, with spinescent projections on the more mature portions. Leaves alternate; blades simple, 3-10 cm long, glabrous, ovate, lanceolate, or deeply 3-7-lobed, the apex and the lobes obtuse to acuminate, mucronate, the base cordiform, cuneate or truncate, the margins undulate; upper surface with the venation flat; lower surface punctate or foveolate, with prominent venation; petioles 1.5-4.5 cm long, slender, glabrous. Flowers 2-3, in axillary cymes; peduncles 0.8-4.5 cm long. Calyx pink, the sepals unequal, 4.5-7 mm long, rounded, glabrous, with the margins hyaline; corolla bright pink, hypocrateriform, 3-4.5 cm long, the limb with 5 ovate lobes, obtuse, expanded; stamens and stigmas exserted. Capsules conical, stramineous, 1-1.5 cm long, apiculate; seeds 4 per capsule, reddish brown, 5-6 mm long, with two sides flat and one convex, with a row of silky hairs longer than the seed at the margins and the apex.

Phenology: Flowering and fruiting throughout the year.

Status: Native, uncommon.

Distribution: On the central plateau of Mona Island. Also in the Bahamas, Cuba, and the United States (Florida).

Public forest: Mona.

11. Ipomoea nil (L.) Roth, Catal. Bot. 1: 36. 1797.

Fig. 67. K-O

BASIONYM: *Convolvulus nil* L.

Twining vine, attaining 5 m in length, with scarce watery latex. Stems cylindrical, slender, strigose. Leaves alternate; blades simple, 4.5-13.3 × 5.7-15 cm, chartaceous, strigose, deeply trilobed, the lobes ovate or lanceolate, acuminate at the apex, the base cordiform, sagittate, or deeply cordiform; upper and lower surface with the veins slightly prominent; petioles 2-8 cm long, strigose. Flowers solitary or in simple dichasia, axillary; peduncles as long as the petioles or slightly shorter; bracts subulate, 4-5 mm long, not forming an involucre. Calyx green, not accrescent, of 5 equal sepals, 2-3 cm long, lanceolate, chartaceous, long-acuminate, externally strigose, hirsute outside on the basal portion; corolla pale blue, lavender, or purple with the center white, infundibuliform, 4-4.5 cm long, the limb with shallow, rounded lobes; stamens and stigmas white, not exserted. Capsule subglobose, ca. 5 mm long, the pericarp thin, color yellowish brown, glabrous, with the chartaceous sepals persistent at the base; seeds 4 per fruit, ca. 4 mm long, dark brown, finely pubescent.

Phenology: Flowering from November to April and fruiting from January to April.

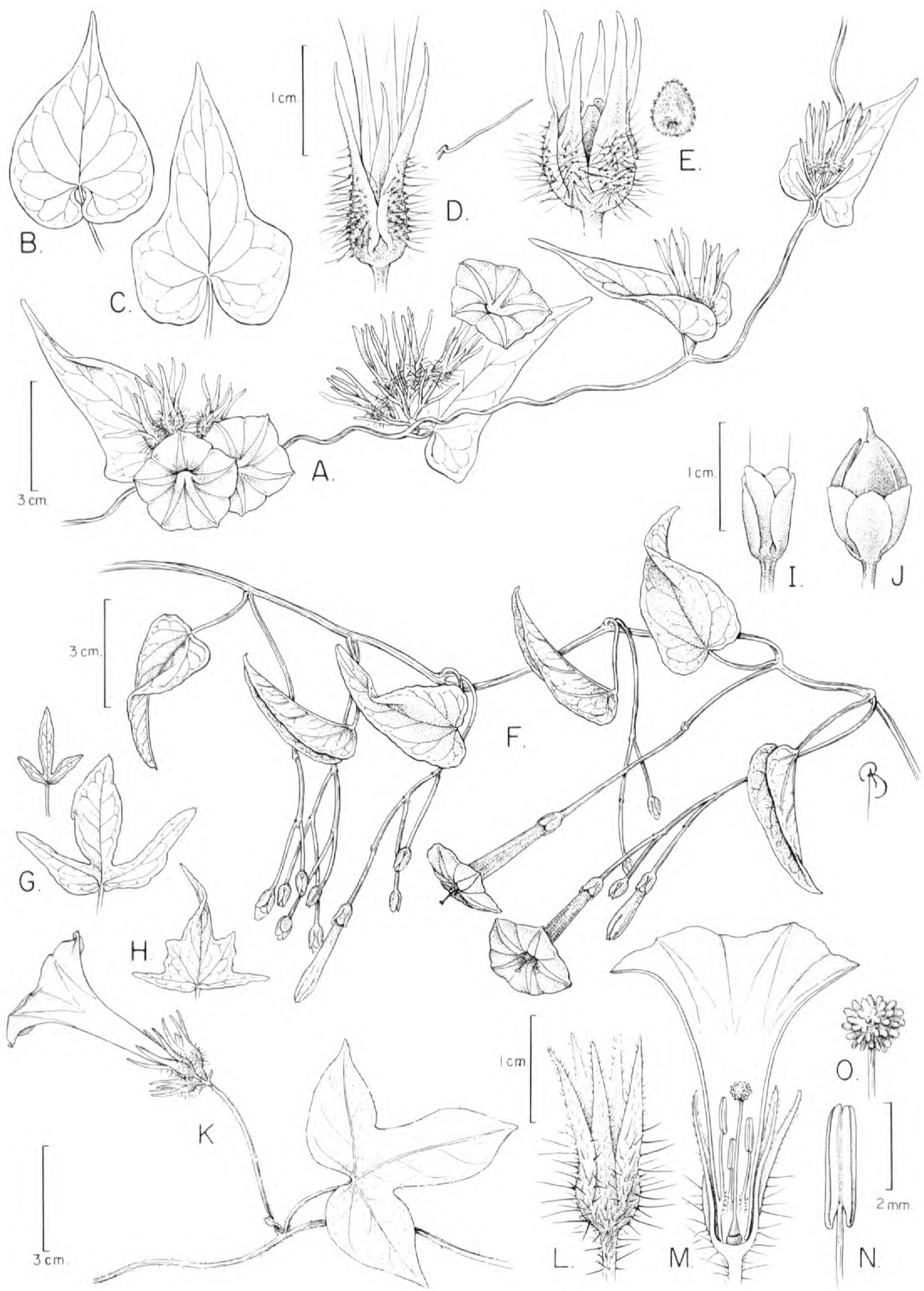

Fig. 67. A-E. *Ipomoea meyeri*. **A.** Flowering branch. **B.** Ovate leaf. **C.** Hastate leaf. **D.** Calyx, with detail of the pubescence. **E.** Fruit and seed. **F-J.** *Ipomoea microdactyla*. **F.** Flowering branch. **G-H.** Leaf variation. **I.** Calyx. **J.** Fruit. **K-O.** *Ipomoea nil*. **K.** Flowering branch. **L.** Calyx. **M.** Flower, longitudinal section. **N.** Stamen. **O.** Stigma.

Status: Exotic, naturalized.

Distribution: Common in southwestern Puerto Rico. Also on Desecheo, Vieques, St. Croix, St. John, St. Thomas, and Tortola; native to Mexico but found distributed throughout the tropics.

Public forest: Boquerón and Guánica.

12. Ipomoea ochracea (Lindl.) G. Don, Gen. Hist. 4: 270. 1838.

Fig. 68. A-C

BASIONYM: *Convolvulus ochraceus* Lindl.

Slightly woody vine, twining, attaining 5 m in length, with scarce watery latex. Stems cylindrical, slender, pubescent. Leaves alternate; blades simple, 3-10 × 2.5-7.5 cm, ovate, chartaceous, glabrous except for some hairs on the veins, the apex acuminate and usually mucronate, the base cordiform, the margins entire or sinuate; upper and lower surface with the veins slightly prominent, the lower surface usually glaucous; petioles 2-6 cm long, pubescent. Flowers solitary or in double dichasia, axillary; peduncles slightly longer than the petioles; bracts ovate, ca. 1.6 mm long. Calyx green, not accrescent, of 5 subequal sepals, 5-7 mm long, chartaceous, ovate or oblong-ovate, glabrous, punctate; corolla pale yellow, with the base of the tube purple inside, infundibuliform, 3-4 cm long, the limb with 5 shallow, rounded lobes; stamens and stigmas white, not exserted. Capsule ovoid, glabrous, with a thin pericarp, 1.3-1.6 cm long, stramineous, with the sepals persistent, not accrescent at the base; seeds 4 per fruit, 4-5 mm long, black, dull, glabrous.

Phenology: Collected in flower and fruit from December to February.

Status: Exotic, naturalized.

Distribution: Common in southwestern Puerto Rico. Also on St. Croix and St. John; probably native to tropical Africa, widely cultivated throughout the tropics.

Public forests: Guánica, Maricao, and Susúa.

13. Ipomoea pes-caprae (L.) R. Br. in Tuckey, Narr. Exped. Zaire 477. 1818.

Fig. 68. G-H

BASIONYM: *Convolvulus pes-caprae* L.

Bejuco de puerco playero, Beach moning glory, Goat foot

Vine, creeping or sometimes ascending, up to 10 m in length, with scarce milky latex. Stems cylindrical, glabrous, woody in the older portions, the young portions herbaceous, producing adventitious roots in the area of the nodes. Leaves alternate; blades simple, 6.5-12 × 4-7.3 cm, oblong, reniform to subrounded, coriaceous, glabrous, the apex emarginate and mucronate, the base rounded, cordiform, or truncate, the margins entire; upper surface with the veins flat, scarcely visible; lower surface with the veins slightly prominent; petioles 3-8 cm long, glabrous, thick, slightly compressed on the upper surface, swollen at the base. Flowers solitary or in simple dichasia, axillary; peduncles shorter than the petioles; bracts subulate, ca. 5 mm long. Calyx yellowish green, not accrescent, the sepals unequal, 1.2-1.4 cm long, coriaceous, ovate, the apex rounded and mucronate; corolla pink or lavender, infundibuliform, 4.5-5 cm long, the limb up to 6 cm in diameter, with 5 rounded lobes; stamens and stigmas not exserted. Capsule ovoid to globose, 1.5-1.8 cm long, light brown, with a thin pericarp and with the sepals persistent and reflexed at the base; seeds 4 per fruit, ca. 8 mm long, dark brown, pubescent, with two sides flat and one convex.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: On the sandy coasts of the littoral zone, probably on all the islands and keys of Puerto Rico and the Virgin Islands. A pantropical species, very common on the sandy coasts of the littoral zone.

Public forests: Guánica, Mona, and Piñones.

14. Ipomoea purpurea (L.) Roth, Bot. Abh. 27. 1787.

Fig. 68. D-F

BASIONYM: *Convolvulus purpureus* L.

Herbaceous vine, twining, 2-3 m in length. Stems cylindrical, slender, pilose or hirsute. Leaves alternate; blades simple, 2-10 × 2-10 cm, cordiform or deeply trilobed, the lobes ovate or lanceolate, chartaceous, strigulose on both surfaces, the apex acuminate, the base cordiform, the margins entire or slightly sinuate, ciliate; upper and lower surface with the veins slightly

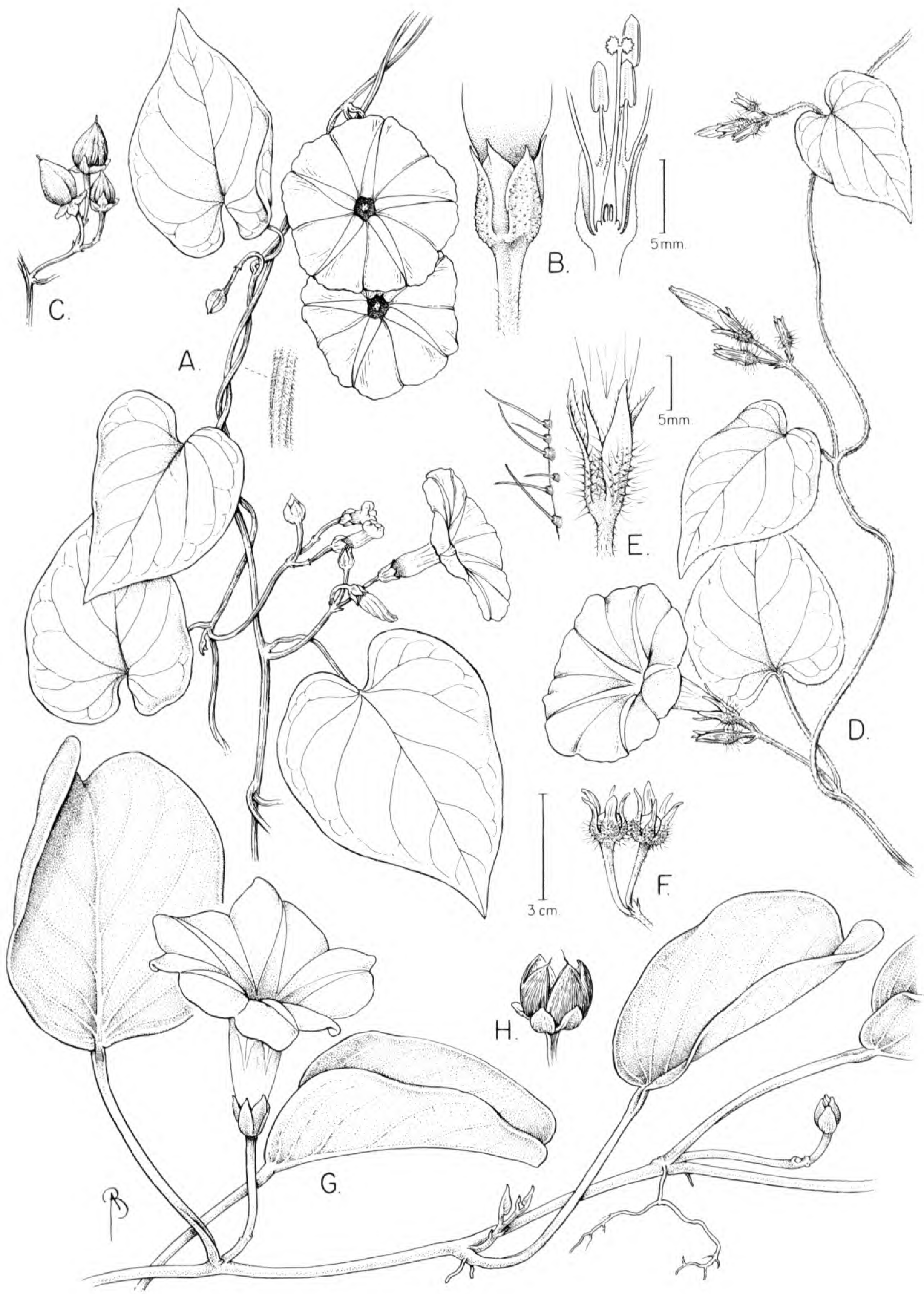

Fig. 68. A-C. *Ipomoea ochracea*. **A.** Flowering branch, with detail of the stem pubescence. **B.** Calyx and flower, longitudinal section. **C.** Infructescence. **D-F.** *Ipomoea purpurea*. **D.** Flowering branch. **E.** Calyx, and detail of pubescence. **F.** Infructescence. **G-H.** *Ipomoea pes-caprae*. **G.** Habit. **H.** Fruit.

prominent; petioles 2.5-6 cm long, slender, strigulose, sulcate. Flowers solitary or in simple dichasia, axillary; peduncles longer than the petioles; bracts subulate, ca. 3 mm long, not forming an involucre. Calyx green, of 5 subequal sepals, 8-16 mm long, chartaceous, oblong-lanceolate, the outer ones slightly broader than the inner ones, acute at the apex, hirsute outside on the basal portion; corolla blue, purple, pink, or with lines (forming a star) of these colors on a white background, infundibuliform, 4-4.5 cm long, the throat white, limb with shallow, rounded lobes; stamens and stigmas pink, not exserted. Capsule depressed-globose, 9-10 mm in diameter, glabrous, the pericarp thin, with the chartaceous sepals persistent at the base; seeds 4 per fruit, pyriform, 3-4 mm long, black, glabrous.

Phenology: Flowering from June to January.

Status: Exotic, uncommon.

Distribution: Along roads and in disturbed places. Also on Vieques, St. Croix, St. Thomas, and Tortola. Probably native to Mexico, but found distributed throughout the tropics.

15. Ipomoea quamoclit L., Sp. Pl. 159. 1753.

Fig. 69. A-B

Herbaceous vine, twining, 2-7 m in length, with watery latex. Stems cylindrical, slender, glabrous. Leaves alternate or clustered on short axillary branches; blades deeply pinnatisect, ovate or elliptical in outline, with 9-19 pairs of linear segments, alternate or opposite, 1-9 cm long, chartaceous, puberulous or glabrous; petioles not evident. Flowers solitary or 2-6 in cymes; peduncles as long as or longer than the leaves; bracts ovate, ca. 1 mm long. Calyx green, not accrescent, of 5 unequal sepals, 4-7 mm long, chartaceous, ovate, the outer ones shorter than the inner ones, glabrous, obtuse at the apex, with a mucro that is borne below the apex; corolla red (sometimes white), hypocrateriform, 2-3 cm long, the limb with deep lobes, deltate, obtuse; stamens and stigmas pink, exserted. Capsule ovoid to conical, with a thin pericarp, lepidote outside, 8-10 mm long; seeds 4 per fruit, cuneiform, 7-8 mm long, dark brown to black, with tufts of irregularly scattered hairs.

Phenology: Flowering from August to February, collected in fruit in February.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: In disturbed areas. Cultivated on St. Croix and St. Thomas. Possibly native to Mexico, but today found distributed throughout the tropics.

Public forests: Cambalache and Tortuguero.

16. Ipomoea repanda Jacq., Enum. Syst. Pl. 13. 1760.

Fig. 69. C-F

SYNONYM: *Exogonium repandum* (Jacq.) Choisy

Bejuco rosado, Bejuco colorado, Mari-de-Lugo

Herbaceous vine, twining, attaining 10 m in length, usually producing abundant milky latex. Roots tuberous, elongate or rounded. Stems slender, glabrous, cylindrical, striate when young, lenticellate on the mature portions. Leaves alternate; blades simple, 5-18 × 1.5-13 cm, glabrous, chartaceous, ovate, lanceolate, or sometimes trilobed, the apex and lobes acute or acuminate, mucronate, the base cordiform, truncate, or rounded, the margins revolute, entire or slightly undulate; upper surface dark green, shiny; lower surface pale green, punctate, with a prominent midvein; petioles 1.5-6 cm long, sulcate, glabrous. Flowers in compound dichasial cymes, pendulous; bracts deciduous. Calyx pink, crateriform, not accrescent, the sepals unequal, 8-10 mm long, ovate, obtuse at the apex; corolla bright pink, hypocrateriform, 4-5.5 cm long, the limb with 5 deep lobes, oblong, obtuse, reflexed; stamens and stigmas pink or white, exserted. Capsules conical to ellipsoid, the pericarp thin, pale brown, 1.2-1.5 cm long, apiculate; seeds 4 per capsule, black, 5-6 mm long, with two sides flat and one convex, with a row of silky hairs longer than the seed at the margins and the apex.

Phenology: Flowering and fruiting throughout the year, especially from June to January.

Status: Native, very common.

Distribution: In moist forests of the Cordillera Central, in the Sierra de Luquillo, and in the zone of mogotes. Also on St. John, St. Thomas, and Tortola; the Lesser Antilles.

Public forests: Carite, El Yunque, Guajataca, Guilarte, Maricao, Río Abajo, and Toro Negro.

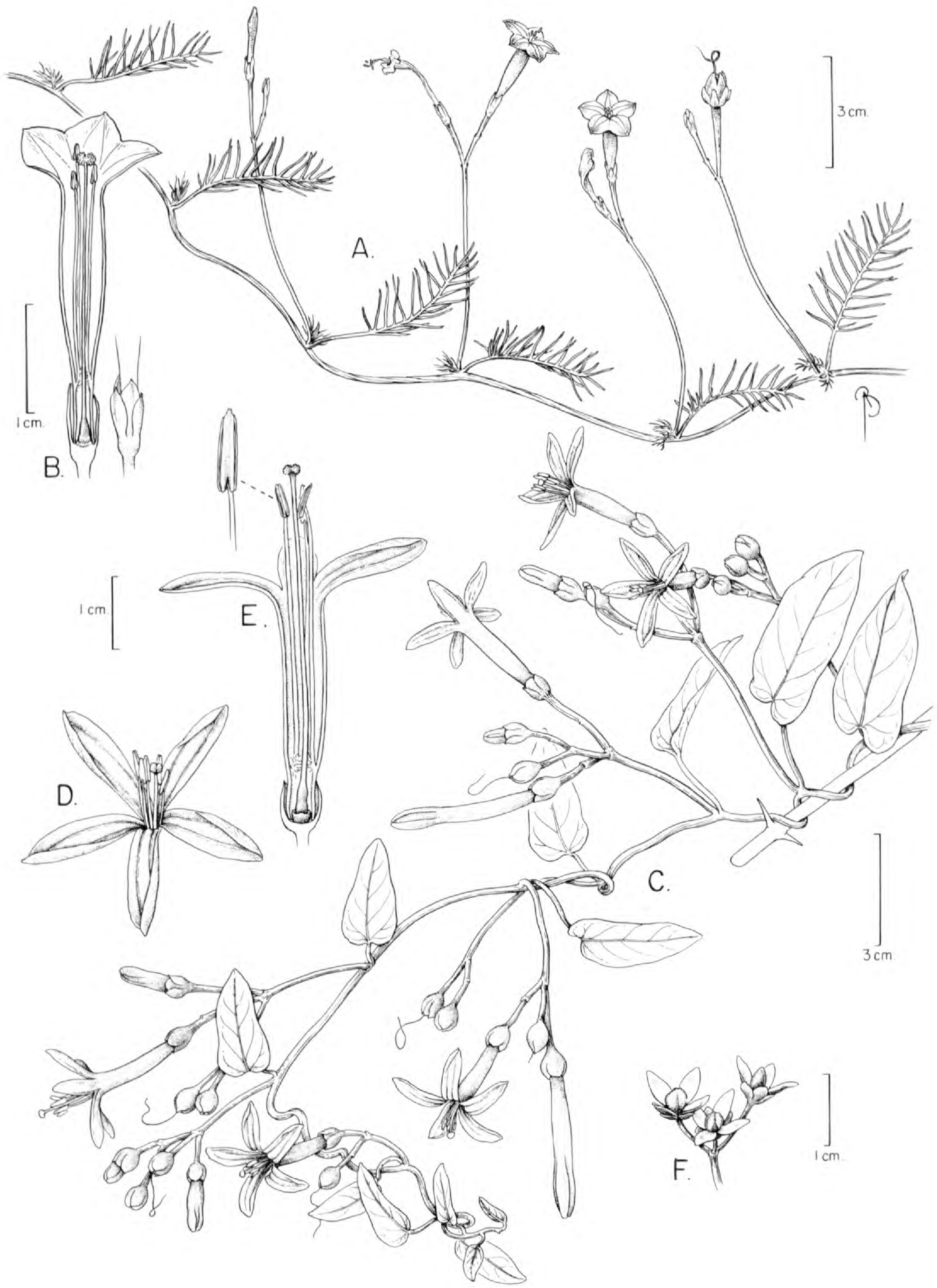

Fig. 69. A-B. *Ipomoea quamoclit*. **A.** Flowering branch. **B.** Flower, longitudinal section, and calyx. **C-F.** *Ipomoea repanda*. **C.** Flowering branch. **D.** Flower, top view. **E.** Flower, longitudinal section, with detail of stamen. **F.** Infructescence.

17. Ipomoea setifera Poir. in Lam., Encycl. 6: 17. 1804.

Fig. 70. A-B

SYNONYM: *Ipomoea rubra* (Vahl) Millsp.

Bejuco de puerco, Gloria de la mañana, Wild morning glory

Herbaceous vine, twining, climbing, or creeping, attaining 12 m or more in length, with abundant milky latex. Stems cylindrical, slender, pilose, sometimes with a pink tinge, usually with numerous aerial roots where they enter in contact with the soil. Leaves alternate; blades simple, 4.5-16 (24) × 2.7-6.4, glabrous, chartaceous, oblong or ovate, the apex obtuse, retuse and mucronate, the base cordiform or hastate, the margins revolute, undulate, usually with a pink or purple tinge; upper surface dark green with the midvein slightly prominent; lower surface pale green, minutely punctate, with prominent venation, conspicuously reddish; petioles 10-21 cm long, slender, glabrous, sulcate, usually reddish. Flowers in compound dichasial cymes, axillary; peduncle thick, shorter than the petioles; bracts ovate, 1.5-2 cm long. Calyx light green, crateriform, the sepals ovate, unequal, 12-17 mm long, with 3 parallel veins and prominent like a keel, the apex acuminate, the outer sepals longer than the inner ones; corolla violet-pink with the center darker, infundibuliform, 4-7 cm long, the limb 4-5 cm in diameter, with 5 rounded lobes; stamens pink, not exserted; stigmas pink, exserted. Capsule ovoid, ca. 1 cm in diameter, the pericarp thin, covered by the persistent sepals at the base; seeds 4 per fruit, with two sides flat and one convex, ca. 6 mm long, dark brown to black, tomentulose.

Phenology: Flowering from November to April and fruiting from January to April.

Status: Native, very common.

Distribution: In moist disturbed areas. Also on St. John; throughout the Antilles, continental tropical America, naturalized in western Africa.

Public forests: Carite, Cambalache, Ceiba, El Yunque, Guilarte, Maricao, Río Abajo, Toro Negro, and Tortuguero.

18. Ipomoea steudelii Millsp., Field Mus. Bot. 2: 86. 1900.

Fig. 70. C-G

SYNONYMS: *Exogonium arenarium* Choisy

Ipomoea arenaria (Choisy) Steud., non Roem. & Schult.

Twining vine, slightly woody, much branched from the base, 2-3 m in length, with scarce milky latex (almost imperceptible). Stems cylindrical, slender, light brown, glabrous, striate. Leaves alternate, clustered on short axillary branches; blades simple, 3-18 × 1.3-14 mm, lyrate, reniform, deltate, or deeply 3-5-lobed, membranaceous, glabrous, the apex retuse, with the midvein projecting like a mucro, the base subcordiform, truncate, or cuneate, the margins slightly sinuate; upper surface dark green, dull, glabrous, with the veins flat; lower surface pale green, with the midvein thick and prominent; petioles 2-15 mm long, glabrous, slender. Flowers solitary, at the end of minute axillary branches, which present the scars of the deciduous leaves. Calyx green, the sepals glabrous, unequal, 7-11 mm long, ovate, obtuse at the apex; corolla crimson, hypocrateriform, 3.5-4 cm long, the limb ca. 2.5 cm in diameter, with 5 more or less deep lobes, narrowly deltate; stamens and stigmas exserted. Fruits ellipsoid to subconical, 1-1.2 cm long, light brown; seeds 4 per fruit, dark brown, ca. 5.5 mm long, with a row of whitish silky hairs longer than the seed, at the apex and on the back.

Phenology: Flowering from November to May and fruiting from January to July.

Status: Native, locally common.

Distribution: In thickets and dry forests of the coast and in the dry limestone zone. Also on Culebra, Culebrita, and Vieques; cited for Hispaniola, perhaps in error.

Public forests: Boquerón, Guánica, Maricao, and Susúa.

19. Ipomoea tenuissima Choisy ex DC., Prodr. 9: 376. 1845.

Fig. 71. A-C

Herbaceous vine, twining, attaining 1 m in length. Stems cylindrical, slender, glabrous or puberulous. Leaves alternate; blades simple, 2-6 × 0.3-1(2) cm, membranaceous, glabrous, lanceolate, the apex obtuse, mucronate, the base hastate or auriculate, the margins entire; upper and lower surface with the veins slightly prominent; lower surface punctate; petioles 1-2.2 cm long, slender, glabrous. Flowers solitary or rarely in pairs, axillary; peduncles as long as or

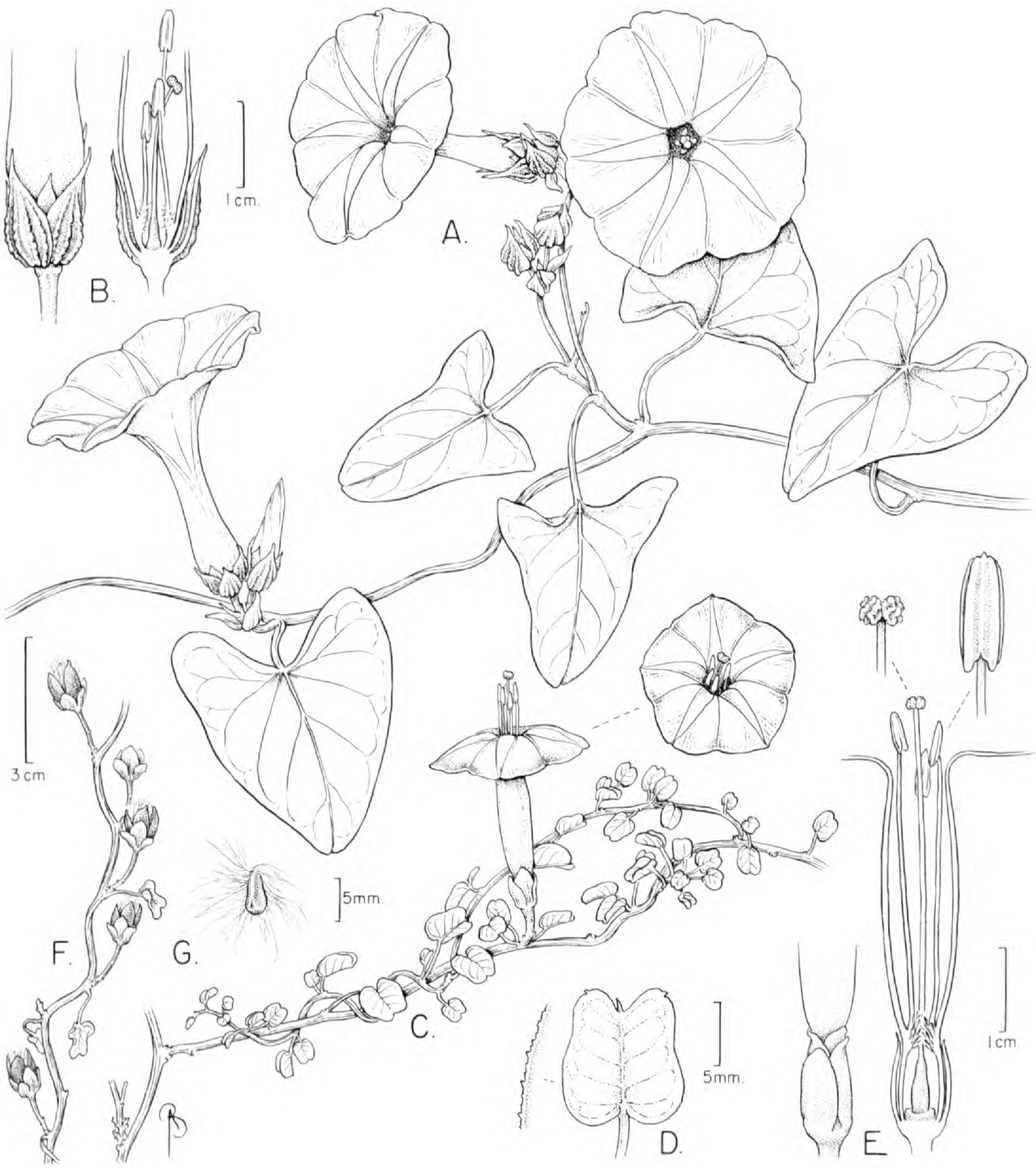

Fig. 70. A-B. *Ipomoea setifera*. **A.** Flowering branch. **B.** Calyx and flower, longitudinal section. **C-G.** *Ipomoea steudelii*. **C.** Flowering branch. **D.** Leaf, with detail of the margin. **E.** Calyx and flower, longitudinal section. **F.** Infructescence. **G.** Seed.

slightly longer than the petioles; bracts subulate, ca. 2.5 mm long. Calyx green, not accrescent, of 5 subequal sepals, 6-7 mm long, chartaceous, elliptical, obtuse and aristate at the apex, ciliate at the basal margins, the midvein slightly prominent; corolla violet-pink, infundibuliform, ca. 3 cm long, the limb with shallow, rounded lobes; stamens and stigmas not exserted. Capsule ovoid-conical, ca. 5 mm long, glabrous, with a thin pericarp and with the chartaceous sepals persistent at the base; seeds 4 per fruit, cuneiform, ca. 3.7 × 2.5 mm, dark brown, finely pubescent at the margins.

Phenology: Collected in flower in May.

Status: Probably exotic.

Distribution: Known from Puerto Rico by a single collection from Joyuda (Cabo Rojo) in 1913. This species is known from Cuba, Hispaniola (whence it was described), and the United States (Florida).

20. Ipomoea tiliacea (Willd.) Choisy in A.DC., Prodr. 9: 375. 1845.

Fig. 71. D-H

BASIONYM: *Convolvulus tiliaceus* Willd.

Bejuco blanco, Bejuco de puerco, Goat foot, Wild potato, Wild vine

Slightly woody vine, twining, 5-10 m in length, with abundant milky latex. Stems glabrous or pubescent, striate, cylindrical. Leaves alternate; blades simple, 5-20 × 4-14 cm, ovate, chartaceous, sometimes 3-5-lobed, the apex acuminate, the base cordiform, the margins undulate, ciliate; upper surface dark green, dull, usually with the venation sunken, glabrous except for the pilose midvein; lower surface pale green, with prominent venation, slightly pubescent; petioles 4-25 cm long, sulcate, puberulous. Flowers in double dichasia, axillary; peduncles shorter than the petioles. Calyx green, not accrescent, sepals unequal, 8-12 mm long, oblanceolate, glabrous, apiculate at the apex; corolla violet-pink to pale pink, with the center darker, infundibuliform, 5-6 cm long, the limb with 5 rounded lobes; stamens and stigmas not exserted. Capsule depressed-globose, 8-10 mm in diameter, the pericarp thin, light brown; seeds 4 per fruit, glabrous, dark brown, dull, angular, 3.5-4 mm long.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: One of the most common species of *Ipomoea* in Puerto Rico. It is found on roadsides and river banks, on fences, in pastures, and in forests at lower and middle-upper elevations. Also on Culebra, Vieques and the Virgin Islands; the Antilles, the United States (Florida), the Bahamas, and from Mexico to Brazil.

Public forests: Carite, Ceiba, El Yunque, Guánica, Guilarte, Maricao, Piñones, Río Abajo, Toro Negro, Tortuguero, and Vega.

21. Ipomoea tricolor Cav., Icon. 3: 5, t. 208.

Fig. 71. I-K

Herbaceous vine, twining or creeping, attaining 5 m in length, without milky latex. Stems glabrous, cylindrical, slender. Leaves alternate; blades simple, 5-12 × 4-14 cm, ovate, chartaceous, the apex acuminate and mucronate, the base deeply cordiform, the margins entire; upper and lower surface glabrous, minutely punctate, with the venation slightly prominent; petioles 2.5-10 cm long, glabrous. Flowers in simple or double dichasia, axillary; peduncle as long as or shorter than the petioles. Calyx green, not accrescent, sepals equal, 6-8 mm long, lanceolate, glabrous, obtuse at the apex, with the margin hyaline; corolla blue, turning violet when mature, infundibuliform, 6-7 cm long, the tube white outside and yellow inside, the limb with 5 rounded lobes; stamens and stigmas white, not exserted. Capsule conical, 1.3-1.6 cm long, light brown; seeds 4 per fruit, glabrous, black, dull, 9-10 mm long.

Phenology: Flowering from November to February.

Status: Exotic, naturalized, uncommon.

Distribution: On roadsides and in disturbed areas. Also on St. Croix, St. John, and St. Thomas. Native to Central America, but distributed throughout the tropics because of its cultivation.

22. Ipomoea triloba L., Sp. Pl. 161. 1753.

Fig. 72. A-C

Bejuquillo de puerco

Herbaceous vine, twining or creeping, 2-3 m in length, with scarce milky latex. Stems green, cylindrical, smooth, slender, puberulous. Leaves alternate; blades simple, 3-6 (9) × 3-5 (6.5) cm, ovate to subcircular, usually 3-5-lobed, chartaceous, the apex mucronate, acute, or emarginate, the base cordiform or sagittate, the margins smooth, slightly revolute; upper surface with minute hairs on the veins; lower surface glabrous, with prominent venation; petioles glabrous, somewhat sulcate, 2-4 cm long, with two glandular depressions where they join the blade. Flowers in simple or compound dichasial cymes, axillary; peduncles longer than the petioles, quadrangular, pubescent, tuberculate. Calyx green, not accrescent, the sepals pilose, subequal, ca. 8 mm long, ovate to oblanceolate, the apex acuminate or acute; corolla violet-pink

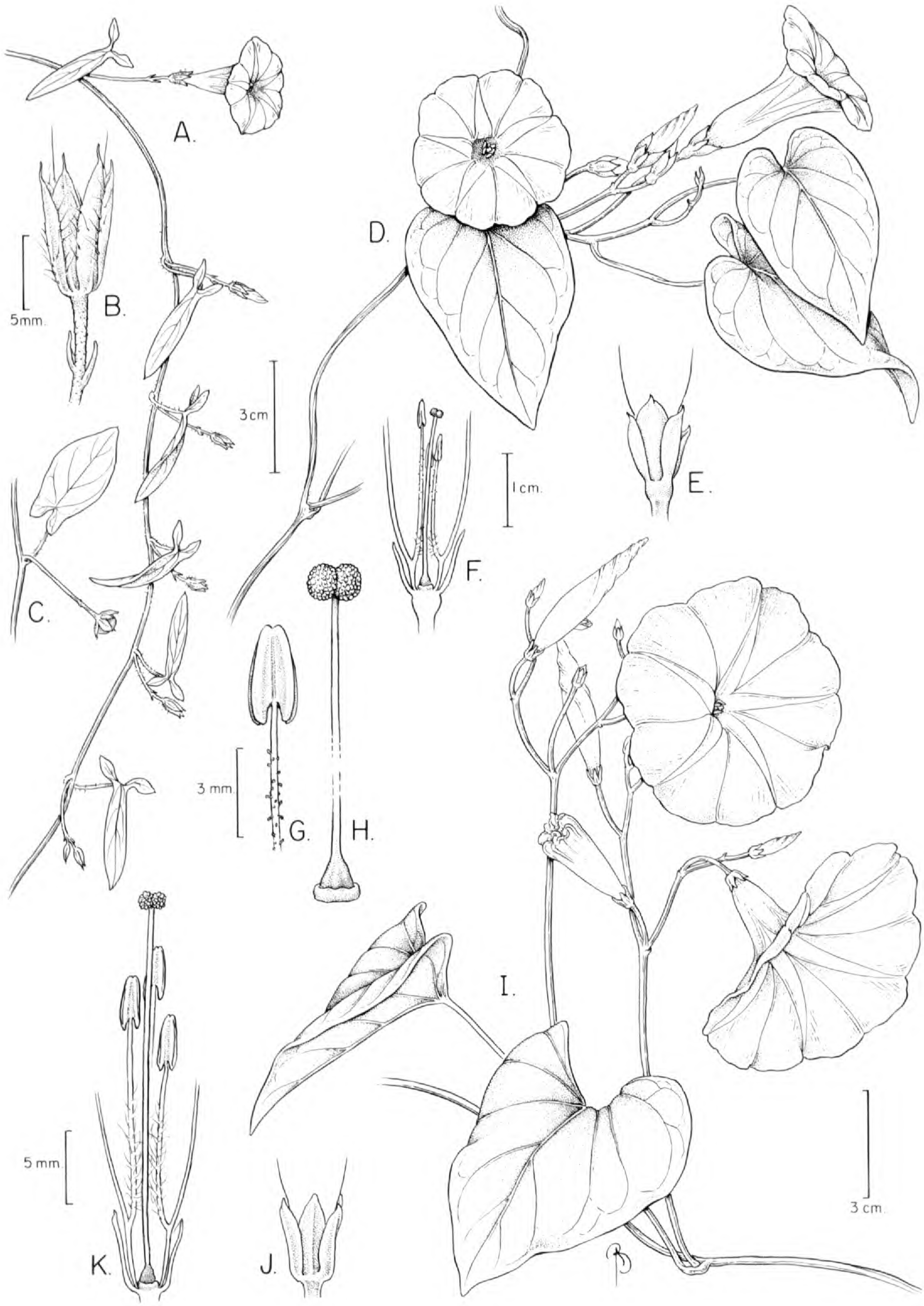

Fig. 71. A-C. *Ipomoea tenuissima*. **A.** Flowering branch. **B.** Calyx. **C.** Fruit. **D-H.** *Ipomoea tiliacea*. **D.** Flowering branch. **E.** Calyx. **F.** Flower, longitudinal section. **G.** Stamen. **H.** Gynoecium. **I-K.** *Ipomoea tricolor*. **I.** Flowering branch. **J.** Calyx. **K.** Flower, longitudinal section.

or lavender, usually reddish at the base in the center, infundibuliform or campanulate, 1.4-1.6 cm long, the limb ca. 1 cm in diameter; stamens sagittate, white, two of them shorter, not exserted; stigmas globose, white, not exserted. Capsule depressed-globose, brown, ca. 8 mm in diameter, pilose, with the style persistent; seeds 4 per fruit, 3-5 mm long, glabrous, dark brown to black.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: In grasslands and pastures and on roadsides. Also on Icacos, Caja de Muerto, Desecheo, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda. Naturalized in tropical regions of the Old World.

Public forests: Boquerón, Guánica, Mona, Piñones, and Río Abajo.

Commentary: In the absence of the corolla, this species can be confused with *I. tiliacea* in individuals with relatively large and unlobed leaves. Nevertheless, *I. triloba* is distinguished by having pilose sepals, while those of *I. tiliacea* are glabrous.

23. Ipomoea violacea L., Sp. Pl. 161. 1753.

Fig. 1. B; 72. I-K

SYNONYMS: *Convolvulus tuba* Schltdl.
Calonyction tuba (Schltdl.) Colla
Ipomoea tuba (Schltdl.) G. Don
Ipomoea macrantha Roem. & Schult.
Convolvulus grandiflorus L.f.
Operculina grandiflora (L.f.) House, pro parte

Bejuco de vaca, Flor de luna, Coast moon vine, Beach morning glory

Slightly woody vine, twining, up to 15 m in length, with abundant milky latex. Stems cylindrical or subtriangular, grayish, with numerous lenticels usually arranged in lines; adult stems up to 3 cm in diameter, cross section with numerous alternating concentric rings of xylem and phloem. Leaves alternate; blades 9-15 × 7-11 cm, glabrous, broadly ovate, sometimes trilobed, fleshy-coriaceous, usually involute, the apex acute or acuminate, mucronate, the base cordiform or deeply cordiform, the margins undulate; upper surface light green, with the venation yellowish; lower surface pale green, shiny, with prominent venation; petioles cylindrical, glabrous, yellowish green, longer than the blade, with a pair of triangular glands at the base of the blade, swollen at the base. Flowers nocturnal, solitary or in simple dichasial cymes, axillary; peduncles cylindrical, up to 7 cm long, with two bracteoles in the upper middle portion. Calyx yellowish green, accrescent, the sepals unequal, 2-2.5 cm long, fleshy, concave, glabrous, the apex obtuse to rounded; corolla white, hypocrateriform, coriaceous, 5-7 cm long, the tube externally yellowish, internally with numerous transparent hairs and cardinal red fringes at the base, the limb 6-7 cm in diameter, with 5 obtuse lobes; stamens and stigmas not exserted. Capsules globose or depressed-globose, yellowish brown, 2.5-3 cm in diameter, with accrescent sepals, persistent at the base; seeds 4, obtusely angular, 1-1.2 cm long, brown, velvety, with a row of hairs along two angles.

Phenology: Flowering throughout the year.

Status: Native, common.

Distribution: On the sandy coasts of the littoral zone. Also on Cayo Ratones, Culebra, Desecheo, Mona, Vieques, St. Croix, St. John, St. Thomas, and Tortola; the Antilles, the Bahamas, the Cayman Islands, the United States (Florida), and from Mexico to the Guianas. Introduced in the tropics of the Old World.

Public forests: Guánica, Mona, and Piñones.

24. Ipomoea wrightii A. Gray, Syn. Fl. N. Amer. 2(1): 213. 1878.

Fig. 72. D-H

SYNONYM: *Ipomoea pulchella sensu* Griseb.

Herbaceous vine, annual, twining, climbing, or creeping, 3-4 m in length. Stems cylindrical, slender, glabrous, sometimes with minute spiniform projections. Leaves alternate, palmately compound; leaflets 5, lanceolate or oblong-lanceolate, 1-4 cm long, glabrous, chartaceous, the apex acute, the base acuminate, the margins entire; upper surface sparsely punctate, with the midvein slightly prominent; lower surface pale green, with prominent venation, punctate or foveolate; petioles 2-6 cm long, slender, glabrous, with minute spiniform projections. Flowers usually solitary, axillary; peduncles 2-4 cm long, filiform, sinuate or spirally twisted; pedicels thick, claviform, 0.6-1.5 cm long, usually verrucose on

the upper portion; bracts deltate, ca. 1 mm long. Calyx light green, not accrescent, the sepals equal, 5-7 mm long, ovate, glabrous, verrucose, the apex obtuse or rounded and mucronate; corolla pale violet or purple, infundibuliform, 1.5-2 cm long, the limb 1.5-1.7 cm in diameter, with 5 obtuse lobes; stamens and stigmas not exserted. Capsule conical, 1-1.5 cm long, glabrous, the pericarp thin; seeds 4 per fruit, elongate, obtusely triangular, tomentulose, ca. 1 cm long.

Phenology: Collected in flower in November and in fruit in February.

Status: Apparently exotic, rare.

Distribution: Known only from three collections in Puerto Rico, one from the Guánica Lagoon (*Sintenis 3619*), another from Sabana Grande (*Sintenis 7019*), and the last from Dorado (*Woodbury, s.n.*). A pantropical species of unknown origin, widely distributed in the New World.

Additional Species: *Ipomoea eriocarpa R.Br.* and *Ipomoea pestigris* L. have been collected in Puerto Rico from cultivated plants; nevertheless, neither of these is common in our gardens, nor are they found naturalized.

Doubtful Species: *Ipomoea krugii* Urb. is known only from the type collection made by Leopoldo Krug (no. 776) in Mayagüez between 1868 and 1876. The type collection of this species, like its illustration (*Krug, Flora Portoricensis icones, Fig. 128*) were deposited in the Botanical Museum of Berlin, but were destroyed during the Second World War. Today, the only surviving material of this species is a photograph of the illustration (distributed by the Field Museum in Chicago). The description of this species agrees in numerous aspects with *Ipomoea triloba* and, since the presumed species has not been collected for more than a century, it is possible that it represents a teratological collection of *I. triloba* with white flowers or some other ornamental species that has not become naturalized in Puerto Rico.

5. JACQUEMONTIA

Twining or creeping vines, herbs, or decumbent shrubs, apparently without milky latex. Leaves alternate, petiolate; blades simple, entire or lobed, usually punctate; stipules absent. Flowers bisexual, actinomorphic, in compound or less frequently simple dichasial cymes, axillary; peduncles usually elongate. Calyx of 5 free sepals, not accrescent, equal or unequal; corolla campanulate, infundibuliform, rotate, or hypocrateriform, the limb entire to deeply 5-lobed; stamens 5, inserted or exserted, the filaments usually unequal, the anthers lanceolate; ovary superior, 2-locular, the style solitary with two elongate stigmas, oblong to ellipsoid, slightly compressed. Fruits capsular, 4-valvate, but each valve opening in two; seeds 4 per fruit, triangular, glabrous or pubescent. A predominantly neotropical genus of about 100 species.

Key to the species of *Jacquemontia*

1a. Corollas tubular, red or crimson ..... 5. *J. solanifolia*
1b. Corollas infundibuliform or rotate, white, blue, pink, or lavender. 2

2a. Cymes compact, forming a head; bracts foliaceous, > 1.5 cm long, forming an involucre at the base of the inflorescence; plant hirsute ..... 6. *J. tamnifolia*
2b. Cymes open, not forming a head; bracts minute, not forming an involucre at the base of the inflorescence; plant tomentose, pubescent, or glabrous. 3

3a. Corollas rotate, blue, the limb pentagonal in outline. 4
3b. Corollas infundibuliform, white, lavender, or pink, the limb deeply lobed. 5

4a. Plant ferruginous-tomentose; corolla violet-blue ..... 2. *J. cumanenis*
4b. Plant sparsely pubescent; corolla brilliant blue ..... 4. *J. pentanthos*

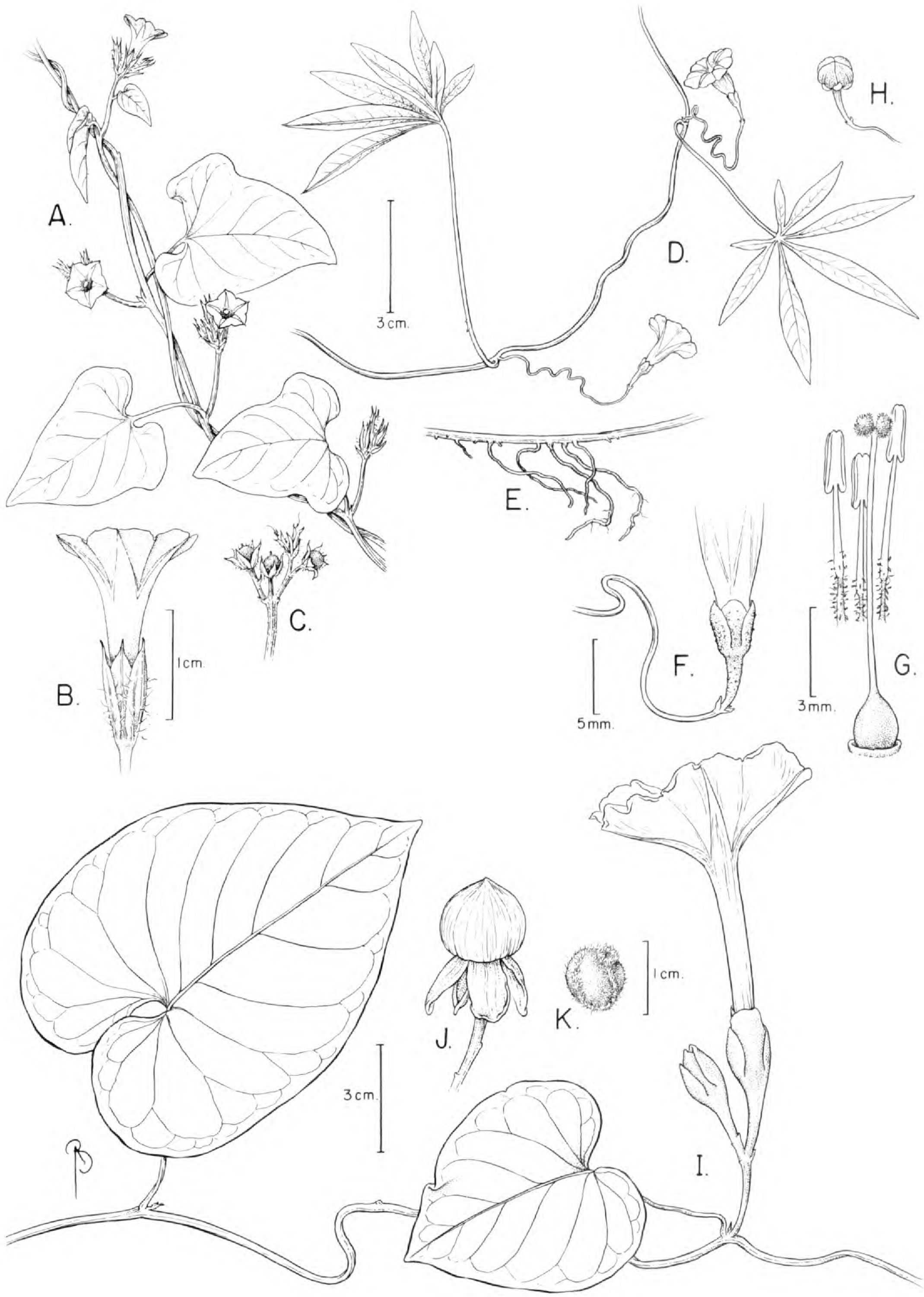

Fig. 72. A-C. *Ipomoea triloba.* **A.** Flowering branch. **B.** Flower. **C.** Infructescence. **D-H.** *Ipomoea wrightii.* **D.** Flowering branch. **E.** Stem with adventitious roots. **F.** Flower with twining pedicel and calyx. **G.** Stamens and gynoecium. **H.** Fruit. **I-K.** *Ipomoea violacea.* **I.** Flowering branch. **J.** Fruit. **K.** Seed.

5a. Inflorescences pedunculate; corolla white, sometimes with a pink or lavender tinge. 6
5b. Inflorescences sessile; corolla lavender or pink ..... 7. *J. verticillata*

6a. Leaves coriaceous or subfleshy, the apex rounded or less frequently acute, emarginate and mucronate, the base acute, obtuse, or cuneate; lateral branches numerous, short, densely leafy, persistent on the main stem even after the loss of the leaves; inflorescences of simple dichasial cymes..... 1. *J. cayensis*
6b. Leaves coriaceous, the apex obtuse and mucronate, the base truncate or rounded, unequal; lateral branches elongate or short, sparsely leafy, deciduous; inflorescences of double dichasial cymes..... 3. *J. havanensis*

1. Jacquemontia cayensis Britton in Britton & Millsp., Fl. Bahamas 349. 1920.

Fig. 73. A-C

Slightly woody vine, twining, much branched from the base, attaining 2 m in length. Stems slender, cylindrical, copper-brown, densely pubescent, with whitish stellate hairs. Leaves alternate or clustered on short axillary branches; blades simple, (1) 2-3 × 0.5-1.5 (2) cm, elliptical, ovate, obovate, or rounded, coriaceous or sub fleshy, the apex rounded or less frequently acute, emarginate and mucronate, the base acute, obtuse, or cuneate, the margins revolute, reddish, with stellate hairs; upper surface yellowish green, glabrous or with some scattered stellate hairs, the midvein sunken; lower surface yellowish green, dull, with a prominent midvein, covered with stellate hairs; petioles 5-12 mm long, reddish, densely covered with stellate hairs. Flowers arranged in simple dichasial cymes; peduncles ca. 4 mm long, stellate-pubescent; pedicels 6-8 mm long, stellate-pubescent. Calyx green, crateriform, the sepals ovate, 2.5-3 mm long, acute at the apex, the margins brown; corolla white, infundibuliform, ca. 1 cm long, deeply lobed, the lobes ovate, ca. 5 mm long; stamens white, exserted; stigmas white, bilobate. Capsule ovoid, ca. 4 mm in diameter, light brown, glabrous; seeds pyriform-triangular, 2-3 mm long, puberulous or glabrous.

Phenology: Collected in flower and fruit in mid-September.

Status: Native, uncommon.

Distribution: Along the south coast of Puerto Rico. Also on Mona and Anegada; the Bahamas, Cuba, and the Turks Islands.

Public forests: Guánica and Mona.

Commentary: *Jacquemontia cayensis* can be confused with *J. havanensis;* both species are quite variable, to the point that it is difficult to identify some specimens as one species or the other. As a general rule, *J. cayensis* has leaves rounded at the apex and flowers clustered in reduced cymes. *Jacquemontia havanensis,* on the other hand, has leaves with acute or obtuse apices and the cymes contain 4 or more flowers.

2. Jacquemontia cumanensis (Kunth) Kuntze, Revis. Gen. Pl. 2: 441. 1891.

Fig. 73. D-F

BASIONYM: *Convolvulus cumanenis* Kunth

Slightly woody vine, twining, much branched from the base, up to 2 m in length, without latex. Stems slender, cylindrical, ferruginous-tomentose. Leaves alternate; blades simple, 1.2-4 × 0.8-2.6 cm, broadly ovate, chartaceous, the apex obtuse or acute, the base cordiform, the margins sinuate; upper and lower surface tomentose; petioles 0.8-2 cm long, tomentose. Flowers in compound dichasia; peduncles 1.5-3 cm long; bracts elliptical, ca. 5 mm long. Calyx green, crateriform, the sepals 8-10 mm long, tomentose, broadly ovate or deltate, acuminate at the apex; corolla violet-blue to almost violet, with white lines forming a star inside, rotate, the limb 2.2-2.5 cm in diameter, pentagonal in outline and with the margins reflexed; stamens and pistil white, exserted. Capsule globose, ca. 5 mm in diameter, brown, glabrous, with the sepals persistent at the base; seeds obtusely triangular, ca. 4 mm long, brown, glabrous.

Phenology: Flowering and fruiting from September to March.

Status: Native, uncommon.

Distribution: In thickets and dry forests of the littoral zone. Also on Vieques, St. Croix, St. John, St. Thomas, and Tortola; the Lesser Antilles and Venezuela.

Public forest: Guánica.

3. Jacquemontia havanensis (Jacq.) Urb., Symb. Antill. 3: 342. 1902.

Fig. 73. G-I

BASIONYM: *Convolvulus havanensis* Jacq.
SYNONYM: *Jacquemontia jamaicensis* (Jacq.) H. Hallier ex Soler.

Aguinaldo de costa

Slightly woody vine, twining, attaining 2 m in length, without milky latex. Stem branched from the base, slender, cylindrical, densely covered with white, stellate hairs. Leaves alternate; blades simple, 1.5-5 × 0.5-1.5 cm, lanceolate, oblong, ovate, or linear, coriaceous, sparsely stellate-pubescent, the apex obtuse and mucronate, the base truncate or rounded, usually unequal, the margins revolute; upper surface with the venation sunken; lower surface with prominent venation; petioles slender, 6-12 mm long, slightly compressed, stellate-pubescent. Flowers in compound dichasial cymes, axillary, shorter than the leaves. Calyx green, crateriform, the sepals unequal, 4-5 mm long, puberulous, ovate to oblanceolate, the apex apiculate; corolla white, sometimes with a pink tinge at the margins, infundibuliform, 1-1.3 cm long, the limb with deep, obtuse lobes; stamens and stigmas white, slightly exserted. Capsules ovoid or ellipsoid, 5-6 mm long, with the sepals persistent at the base; seeds triangular, 2-2.3 mm long, brown, glabrous, with a short marginal wing, membranaceous.

Phenology: Flowering and fruiting almost throughout the year, particularly from November to March.

Status: Native, common.

Distribution: In dry thickets along the southern littoral zone. Also on Mona, Cayo Ratones, Cayo Icacos, Culebra, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; the Antilles, the United States (Florida), the Bahamas, southern Mexico, and Belize.

Public forests: Guánica and Mona.

4. Jacquemontia pentanthos (Jacq.) G. Don, Gen. Hist. 4: 283. 1838.

Fig. 74. A-D

BASIONYM: *Convolvulus pentanthos* Jacq.

Aguinaldo azul, Clashie-melanie

Slightly woody vine, twining, attaining 2 m in length, without latex. Stems cylindrical, slender, sparsely covered with white trifid hairs, glabrous when mature. Leaves alternate; blades simple, 1.8-6 × 1.2-3.7 cm, ovate or lanceolate, chartaceous, sparsely covered with white trifid hairs on both surfaces, the apex obtuse, acute, or mucronate and sometimes retuse, the base cordiform or truncate, the margins entire or sinuate; upper surface dark green; lower surface pale green, with prominent venation; petioles slender, pubescent or glabrous, 1-4 cm long. Flowers in congested dichasial cymes; peduncles longer than the leaves; bracts elliptical, ca. 5 mm long. Calyx green, the sepals broadly ovate or deltoid, 8-10 mm long, pubescent, acuminate at the apex; corolla blue or brilliant blue, with the center white, forming a star of 5 arms, rotate, the limb pentagonal in outline, 2.2-2.5 cm in diameter, the margins reflexed; stamens and stigmas white, exserted. Capsules globose, ca. 5 mm in diameter, brown, with the sepals persistent at the base; seeds obtusely triangular, ca. 4 mm long, brown, glabrous.

Phenology: Flowering and fruiting throughout the year.

Status: Native, rather common.

Distribution: In thickets and dry forests and on sandy coasts of the littoral zone. Also on Cayo Santiago, Culebra, Desecheo, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Neotropics, introduced in Malaysia and Sri Lanka.

Public forests: Cambalache, Ceiba, Guajataca, Guánica, Maricao, Mona, Río Abajo, and Susúa.

5. Jacquemontia solanifolia (L.) H. Hallier, Bot. Jahrb. Syst. 16: 542. 1893.

Fig. 74. E-H

BASIONYM: *Ipomoea solanifolia* L.
SYNONYMS: *Ipomoea filiformis* Jacq.
Exogonium solanifolium (L.) Britton

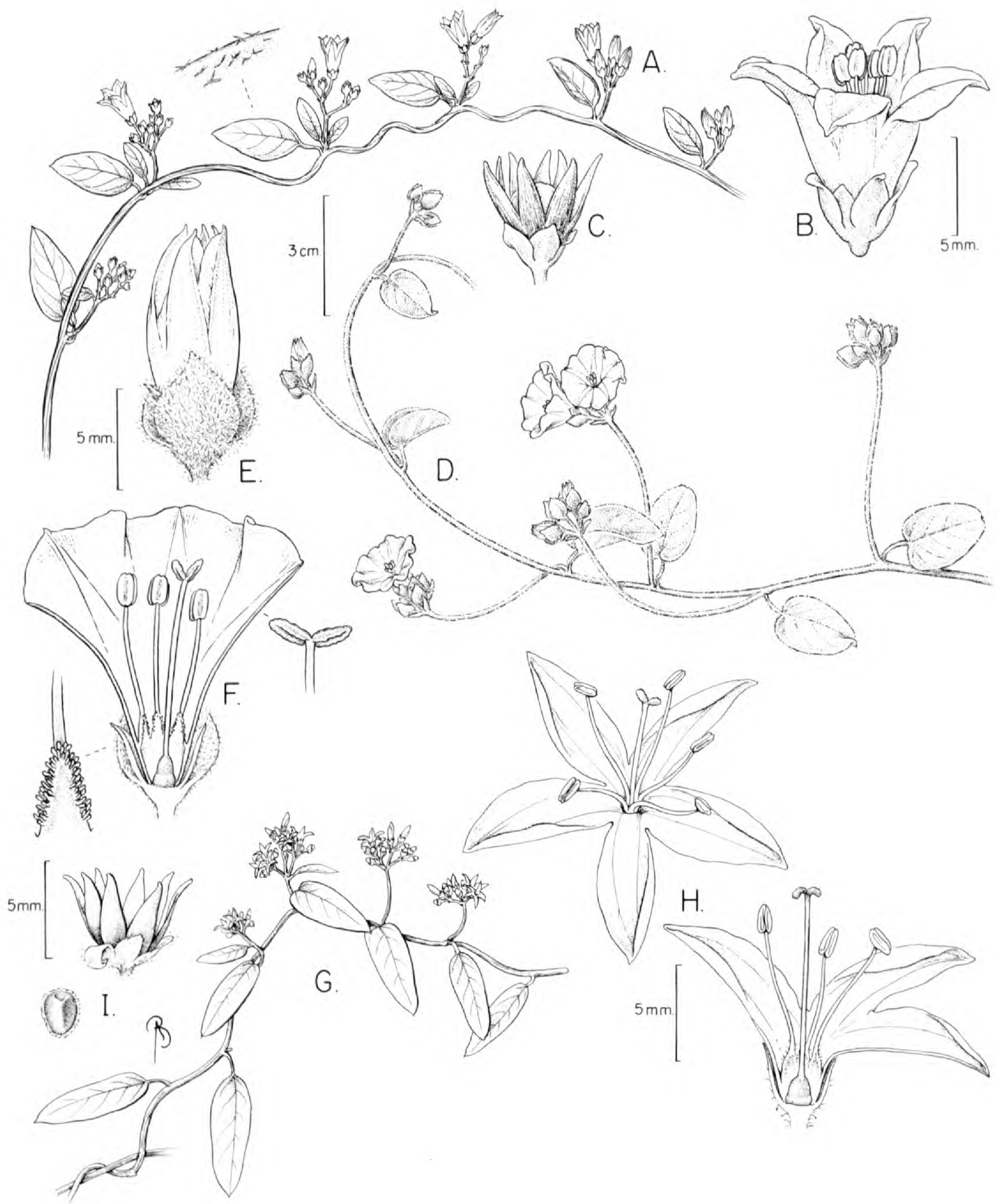

Fig. 73. A-C. *Jacquemontia cayensis*. **A.** Flowering branch. **B.** Flower. **C.** Fruit. **D-F.** *Jacquemontia cumanensis*. **D.** Flowering branch. **E.** Floral bud. **F.** Flower, longitudinal section, with details of the base of the filament and stigma. **G-I.** *Jacquemontia havanensis*. **G.** Flowering branch. **H.** Flower, top view and longitudinal section. **I.** Fruit.

Slightly woody vine, twining, branched from the base, attaining 2 m in length and not producing latex. Stems cylindrical, slender, densely covered with white trifid hairs when young. Leaves alternate; blades simple, 3-6 × 1.5-3.7 cm, lanceolate, chartaceous, sparsely covered with white trifid hairs on both surfaces, the apex obtuse, acute, or mucronate, the base cordiform, rounded, obtuse, or truncate, the margins revolute; upper surface dark green; lower surface pale green, with prominent venation; petioles slender, pubescent, 1.5-4 cm long, canaliculate. Flowers sparse, in elongate cymes; peduncles 2-4 cm long; bracts subulate, ca. 5 mm long. Calyx green, crateriform, the sepals unequal, 4-5 mm long, ovate or rounded, glabrous; corolla hypocrateriform, crimson, 2-2.5 cm long, with 5 deep lobes, expanded, obtuse, mucronate at the apex; stamens and stigmas white, exserted. Capsules ovoid or conical, 7-8 mm in diameter, brown, with the sepals persistent at the base; seeds obtusely triangular, ca. 4 mm long, brown, glabrous, with a short marginal wing at the vertices.

Phenology: Flowering and fruiting from November to February.

Status: Native, uncommon.

Distribution: In dry forests and thickets of the littoral zone. Also on Mona, Vieques, St. Croix, St. John, and St. Thomas; the Lesser Antilles.

Public forests: Guajataca, Guánica, Mona, Piñones, and Río Abajo.

6. Jacquemontia tamnifolia (L.) Griseb., Fl. Brit. W. I. 5: 474. 1862.

Fig. 74. I-K

BASIONYM: *Ipomoea tamnifolia* L.
SYNONYM: *Thyella tamnifolia* (L.) Raf.

Aguinaldo peludo

Slightly woody vine, twining, climbing, or creeping, attaining 5 m in length, with watery latex. Stems cylindrical, slender, hirsute or glabrescent, with malpighiaceous or simple hairs. Leaves alternate; blades simple, 3-10 × 1.5-3.7 cm, ovate, chartaceous, the apex acute or acuminate, the base truncate to cordiform, the margins entire or sinuate; upper surface green, punctate; lower surface pale green, with prominent venation; petioles slender, pubescent or glabrous, 1-4 cm long. Flowers in compact cymes, forming a head; peduncles longer than the petioles; bracts foliaceous, ovate, ca. 2.5 cm long, forming an involucre. Calyx green, the sepals lanceolate, 10-15 mm long, hirsute, acuminate at the apex; corolla white, turning lavender or pale blue, infundibuliform, as long as the sepals; stamens and stigmas white, not exserted. Capsules globose, 4-5 mm long, light brown, glabrous, with the sepals persistent at the base; seeds obtusely triangular, ca. 2 mm long, light brown, glabrous.

Phenology: Flowering and fruiting from November to February.

Status: Native, uncommon.

Distribution: In thickets and dry forests of the littoral zone. Also in the southeastern United States, Cuba, Hispaniola, the Bahamas, the Lesser Antilles, Central America, South America, Africa, and the Mascarenes.

Public forests: Boquerón and Guajataca.

7. Jacquemontia verticillata (L.) Urb., Symb. Antill. 3: 339. 1902.

Fig. 74. L-N

BASIONYM: *Ipomoea verticillata* L.

Slightly woody vine, twining, 1-2 m in length, with watery latex. Stems cylindrical, slender, appressed-pubescent, with white trifid hairs. Leaves alternate; blades simple, 2.2-4.2 × 0.7-1.5 cm, lanceolate, chartaceous, the apex obtuse, acute, or mucronate, the base cordiform, the margins entire or repand, appressed-pubescent on both surfaces; upper surface dark green; lower surface pale green, with the venation inconspicuous; petioles slender, pubescent or glabrous, 0.7-1 cm long. Flowers in compact dichasial cymes, sessile or subsessile; bracts minute. Calyx green, the sepals subequal, 2-3 mm long, ovate-lanceolate, pubescent or glabrous, acuminate at the apex; corolla pink, lavender, or rarely white, infundibuliform, ca. 6 mm long, the limb deeply 5-lobed; stamens not exserted; stigmas exserted. Capsules ellipsoid, ca. 4 mm long, brown, with the sepals persistent at the base; seeds obtusely triangular, ca. 2 mm long, brown, glabrous.

Phenology: Collected in flower and fruit in November and December.

Status: Native, rare.

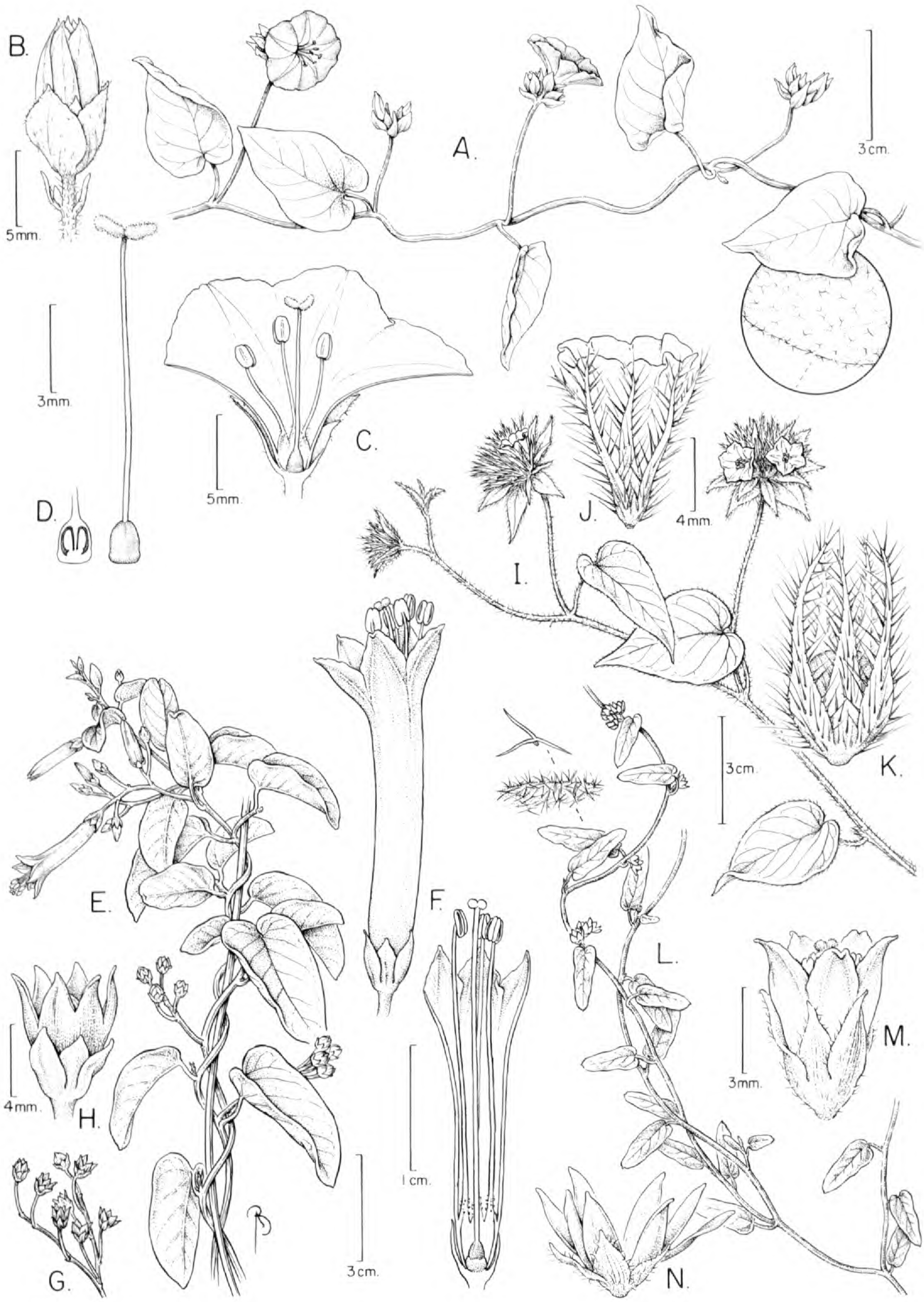

Fig. 74. A-D. *Jacquemontia pentanthos*. **A.** Flowering branch. **B.** Fruit. **C.** Flower, longitudinal section. **D.** Ovary, longitudinal section and gynoecium. **E-H.** *Jacquemontia solanifolia*. **E.** Flowering branch. **F.** Flower. **G.** Infructescence. **H.** Fruit. **I-K.** *Jacquemontia tamnifolia*. **I.** Flowering branch. **J.** Flower. **K.** Fruit with bracts at the base. **L-N.** *Jacquemontia verticillata*. **L.** Fertile branch. **M.** Flower. **N.** Open fruit.

Distribution: Known from the area of mogotes. Also Cuba, Hispaniola, Jamaica, and the Bahamas.

Public forest: Río Abajo.

6. MERREMIA

Twining vines, with milky or watery latex, sometimes with glandular hairs. Leaves alternate, petiolate; blades simple, palmately lobed or compound; stipules absent. Flowers bisexual, actinomorphic, 5-merous, solitary or in compound dichasial cymes, axillary; peduncles usually elongate. Calyx usually accrescent, the sepals equal or unequal; corolla campanulate or infundibuliform, the limb entire or slightly 5-lobed; stamens inserted, the filaments subequal, the anthers lanceolate, twisted after opening; ovary superior, 2-locular, the style solitary, with two subglobose stigmas. Fruits capsular, ovoid to globose, 4-valvate or irregularly dehiscent; seeds 4 per fruit, triangular, glabrous or velvety. A pantropical genus of about 80 species.

Key to the species of *Merremia*

1a. Leaves with simple blades; flowers in umbelliform cymes ..... 6. *M. umbellata*
1b. Leaves palmately compound or palmatilobed; flowers solitary or in few-flowered dichasial cymes.....2

2a. Leaves palmatilobed 3
2b. Leaves palmately compound 4

3a. Plants glabrous; margin of the leaf entire or slightly undulate; corolla brilliant yellow ..... 5. *M. tuberosa*
3b. Plants hispid; margin of the leaf sinuate or sinuate-dentate; corolla white with reddish or pink center ..... 3. *M. dissecta*

4a. Leaflets with the margin entire. 5
4b. Leaflets with the margin serrate ..... 4. *M. quinquefolia*

5a. Sepals hispid, acute at the apex ..... 1. *M. aegyptia*
5b. Sepals glandular-pubescent, acuminate at the apex ..... 2. *M. cissoides*

1. Merremia aegyptia (L.) Urb., Symb. Antill. 4: 505. 1910.

Fig. 75. A-E

BASIONYM: *Ipomoea aegyptia* L.

Slightly woody vine, twining or creeping, attaining 3 m in length, with scarce milky latex. Stems cylindrical, slender, hispid, with simple yellowish hairs. Leaves alternate; blades 5-palmately compound, chartaceous; leaflets 4-14 × 2-6 cm, oblanceolate or elliptical, the apex and base acuminate, the margins entire, ciliate; upper and lower surface hispidulous; petioles slender, sulcate, hispid, 6-8 cm long. Flowers in dichasial cymes; peduncles shorter than the petioles; bracts deciduous. Calyx green, the sepals unequal, 1.5-2 cm long, lanceolate or elliptical, hispid outside on the basal portion, acute at the apex; corolla white, infundibuliform, 2.5-3 cm long, the limb slightly pentagonal, 4-4.5 cm in diameter; stamens and stigmas white, not exserted. Capsules subglobose, ca. 1 cm in diameter, light brown, glabrous, with the sepals persistent, accrescent, and expanded; seeds obtusely triangular, 5-6 mm long, pale brown, glabrous.

Phenology: Flowering and fruiting from November to May.

Status: Native, uncommon.

Distribution: Occasional in disturbed areas at lower and middle elevations. Also on Mona, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the tropics.

Public forests: Boquerón, Cambalache, and Mona.

2. Merremia cissoides (Lam.) H. Hallier, Bot. Jahrb. Syst. 16: 552. 1893.

Fig. 75. F-G

BASIONYM: *Convolvulus cissoides* Lam.
SYNONYM: *Ipomoea cissoides* (Lam.) Griseb.

Herbaceous vine, twining, 3-5 m in length, with scarce watery latex. Stems cylindrical, slender, glandular-pubescent and frequently hispidulous, glabrescent. Leaves alternate; blades 5-palmately compound, 2-7.2 × 1.2-3.3 cm, chartaceous; leaflets elliptical, ovate, or ovate-lanceolate, the apex obtuse, the base acute, the margins entire or slightly dentate; upper surface glabrous; lower surface glandular-pubescent or glabrous; petiolules ca. 1 mm long, glandular-pubescent; petioles slender, hispidulous, glandular-pubescent, 2-3 (6) cm long. Flowers in simple or double dichasial cymes; peduncles longer than the petioles; bracts persistent, subulate. Calyx green, the sepals unequal, 1-1.5 cm long, ovate or ovate-lanceolate, glandular-pubescent externally, acuminate at the apex; corolla white, with the center purple, infundibuliform, 2-3 cm long, the limb 5-lobed, (2.2)3-4 cm in diameter; stamens and stigmas white, not exserted. Capsules globose, 6-8 mm in diameter, light brown, glabrous, with the sepals persistent; seeds ellipsoid, ca. 6 mm long, grayish, lanate.

Phenology: Collected in flower in February.

Status: Native, rare.

Public forest: Guánica (according to Quevedo et al., 1990).

Distribution: Occasional in disturbed areas at lower elevations in eastern Puerto Rico. Also in Cuba, continental tropical America, and tropical Asia.

3. Merremia dissecta (Jacq.) H. Hallier, Bot. Jahrb. Syst. 16: 552. 1893.

Fig. 75. H-K

BASIONYM: *Convolvulus dissectus* Jacq.

Slightly woody vine, twining, much branched, 2-5 m in length, with scarce milky or watery latex. Stems cylindrical, slender, striate, hirsute when young, glabrous when mature. Leaves alternate; blades simple, 4-7 × 1.2-3 cm, 7-9-palmatilobed, divided almost to the base, chartaceous, glabrous, the lobes sinuate to sinuate-dentate, lanceolate or elliptical in outline, acuminate and mucronate toward the apex, the lower lobes sometimes again lobate; petioles slender, pilose or glabrous, 2.5-4 cm long. Flowers solitary or occasionally in cymes; peduncles as long as the petioles; bracts deciduous. Calyx green, the sepals unequal, 2-2.2 cm long, lanceolate to rounded, glabrous, hyaline; corolla white, with the center reddish, infundibuliform, 3-4 cm long, the tube light yellow, the limb pentagonal, 3.5-4 cm in diameter; stamens and stigmas yellow, not exserted. Capsules depressed-globose, 1-1.5 cm wide, opening by 4 hyaline valves, brown, glabrous, with accrescent sepals, ca. 3 cm long, persistent; seeds obtusely and asymmetrically pyramidal, 5-7 mm long, dull black, glabrous.

Phenology: Flowering throughout the year and fruiting from August to December.

Status: Native, common.

Distribution: In disturbed areas at lower elevations. Also on Vieques, St. Croix, St. John, St. Thomas, and Tortola; throughout the tropics.

Public forests: Guajataca, Guánica, and Susúa.

4. Merremia quinquefolia (L.) H. Hallier, Bot. Jahrb. Syst. 16: 552. 1893.

Fig. 76. A-D

SYNONYM: *Ipomoea quinquefolia* L.

Batatilla blanca

Herbaceous vine, creeping or climbing, twining, 2-3 m in length, with scarce watery latex. Stems slender, cylindrical, sparsely hirsute or glabrous, sometimes with a reddish or mulberry-colored tonality. Leaves alternate, (3-)5-palmately compound, chartaceous; leaflets 2-7 × 0.5-1.2 cm, elliptical or lanceolate, glabrous, the apex acuminate, mucronate, the base acute and sessile, the margins serrate; upper surface green, dull, glabrous, with the venation sunken; lower surface pale green, dull, glabrous, with prominent venation; petioles slender, 1-3 cm long, hispid or glabrous. Flowers solitary or in simple dichasia; peduncles as long as the petioles, glandular-pubescent; pedicels slender, 8-15 mm long; bracts minute. Calyx green, the sepals unequal, ca. 1 cm long, glabrous, oblong, the apex obtuse; corolla pale yellow or white, infundibuliform, 2-

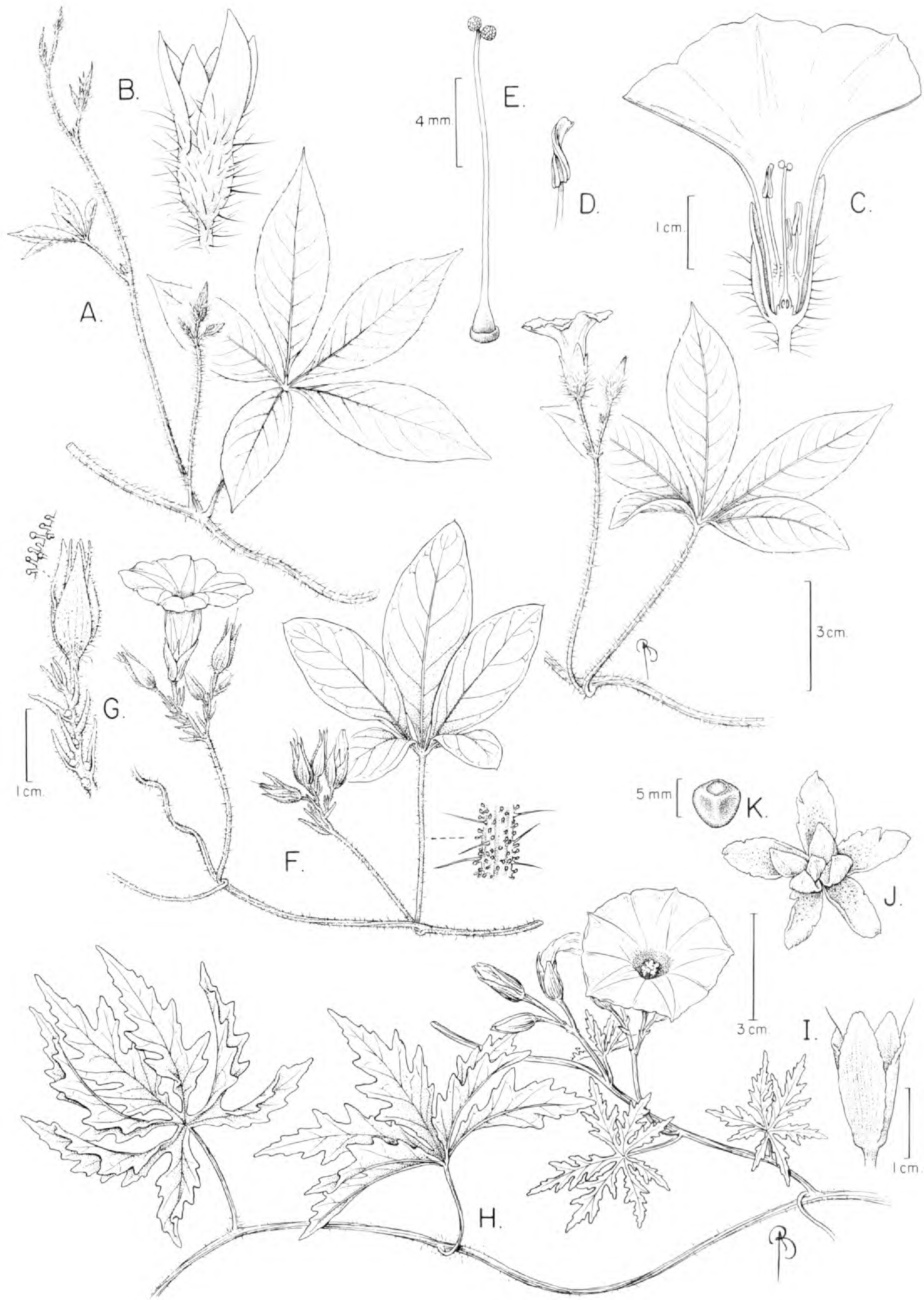

Fig. 75. A-E. *Merremia aegyptia*. **A.** Flowering branch. **B.** Calyx. **C.** Flower, longitudinal section. **D.** Anther. **E.** Gynoecium. **F-G.** *Merremia cissoides*. **F.** Flowering branch. **G.** Calyx, with detail of the pubescence. **H-K.** *Merremia dissecta*. **H.** Flowering branch. **I.** Calyx. **J.** Open fruit. **K.** Seed.

2.2 cm long, the limb with obtuse lobes, slightly reflexed; stamens and stigmas pale yellow, not exserted. Capsules depressed-globose, opening by 4 valves, 0.7-1 cm long, light brown, glabrous; seeds obtusely trigonal, 3-4.5 mm long, black, covered with whitish lanate hairs.

Phenology: Flowering throughout the year, especially from November to May.

Status: Native, very common.

Distribution: In disturbed areas, on roadsides and in pastures, at lower elevations. Also on Culebra, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout tropical America.

Public forests: Cambalache, Ceiba, Guajataca, Guánica, Mona, Río Abajo, Susúa, and Toro Negro.

5. Merremia tuberosa (L.) Rendle in Dyer, Fl. Trop. Afr. 4: 104. 1905.

Fig. 76. E-G

BASIONYM: *Ipomoea tuberosa* L.

Flor de palo

Woody vine, climbing, twining, 10-15 m in length, with abundant milky latex. Stems thick, cylindrical, glabrous. Leaves alternate; blades simple, 7-12 × 6-11 cm, 7-palmatilobed, the lobes elliptical, long-acuminate at the apex, the base cordiform, the margins revolute, slightly sinuate; upper surface dark green, slightly shiny, glabrous, with the venation sunken; lower surface pale green, dull, glabrous or puberulous, with the venation yellowish, prominent; petioles as long as the blade, cylindrical, glabrous or puberulous. Flowers functionally unisexual, solitary or in simple dichasia. Calyx yellowish green, the sepals unequal, 2-3 cm long, fleshy, accrescent and woody once the fruit is formed; corolla yellow, infundibuliform, 4-5 cm long, the limb 4-5 cm in diameter; stamens exserted, the anthers white; stigma bilobed, green, exserted. Capsules ovoid, opening irregularly, 1.5-2.5 cm long, light brown, with the sepals persistent and accrescent at the base; seeds 4 per fruit, black, obtusely trigonal, 1-1.5 cm long, velvety.

Phenology: Flowering from October to December and fruiting from November to March.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: Ornamental plant, sometimes naturalized in disturbed areas. Also on St. Croix and St. John. Native to tropical America but found widely distributed throughout the tropics.

6. Merremia umbellata (L.) H. Hallier, Bot. Jahrb. Syst. 16: 552. 1893.

Fig. 76. H-L

BASIONYM: *Convolvulus umbellatus* L.
SYNONYM: *Ipomoea polyanthes* Willd. ex Roem. & Schult.

Aguinaldo amarillo, Yellow morning glory

Slightly woody vine, climbing or creeping, twining, attaining 5 m in length, with scarce milky latex. Stems slender, cylindrical, glabrous or pubescent, green or copper-colored, with a pair of spiniform projections at the nodes. Leaves alternate; blades simple, 4-17 × 5-12 cm, ovate or lanceolate, chartaceous, glabrous, the apex obtuse, acute, or short-acuminate and mucronate, the base cordiform or sagittate, the margins undulate; upper surface yellowish green, dull, glabrous, with the venation sunken, covered with minute white hairs; lower surface glabrous, with the veins puberulous; petioles cylindrical, usually longer than the blade, pubescent. Flowers in umbelliform cymes, axillary; peduncles shorter than the petioles, angular or cylindrical, puberulous, sometimes with winged projections; pedicels ca. 2 cm long, puberulous. Calyx green, the sepals unequal, 1-1.5 cm long, glabrous, overlapping, ovate or rounded; corolla brilliant yellow, infundibuliform, 2.5-3 cm long, the limb ca. 3 cm in diameter, with obtuse lobes; stamens white, not exserted; stigmas greenish, slightly exserted. Capsule globose, 4-valvate, ca. 1 cm long, brown, covered by the persistent sepals; seeds obtusely trigonal, 5-8 mm long, brown, velvety, with a line of longer hairs on two of the margins.

Phenology: Flowering and fruiting from November to April and sometimes later in the year.

Status: Native, very common.

Distribution: In disturbed areas, on roadsides and in pastures and vacant lots, at lower to middle elevations. Also on Vieques, St. Croix, St. John, St. Thomas, and Tortola; throughout tropical America.

Public forests: Guánica and Susúa.

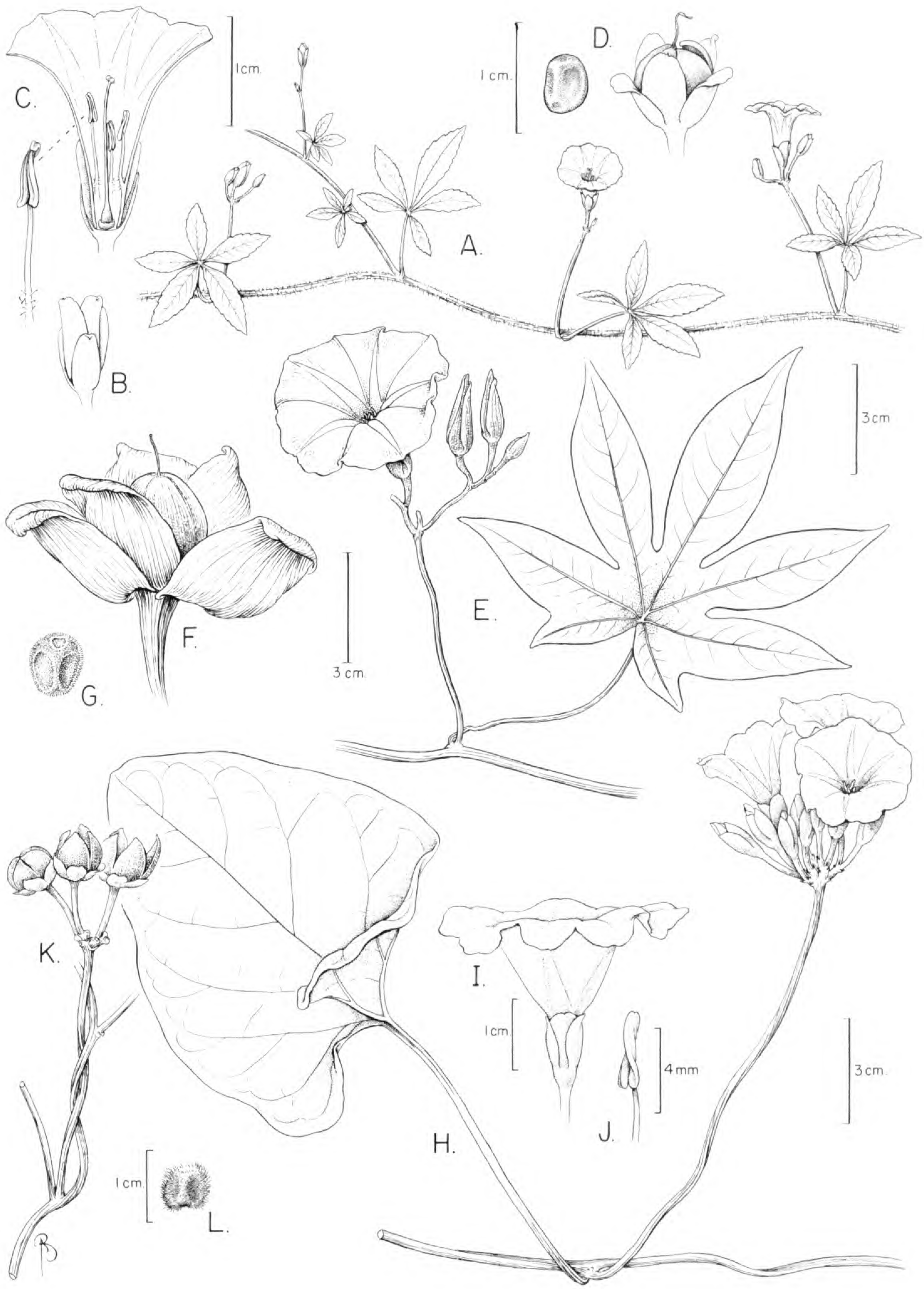

Fig. 76. A-D. *Merremia quinquefolia*. **A.** Flowering branch. **B.** Calyx. **C.** Flower, longitudinal section, with detail of stamen. **D.** Seed and fruit. **E-G.** *Merremia tuberosa*. **E.** Flowering branch. **F.** Fruit with accrescent sepals. **G.** Seed. **H-L.** *Merremia umbellata*. **H.** Flowering branch. **I.** Flower. **J.** Stamen. **K.** Infructescence. **L.** Seed.

7. OPERCULINA

Twining vines, with milky latex. Stems, petioles, peduncles, and pedicels usually winged. Leaves alternate, petiolate; blades simple, entire or lobed; stipules absent. Flowers bisexual, actinomorphic, solitary or in simple dichasial cymes, axillary; peduncles longer than the petioles. Calyx campanulate, of 5 equal or unequal sepals, usually not green, accrescent and woody in fruits, irregularly dentate at the margins; corolla campanulate or broadly infundibuliform, the limb entire or pentagonal; stamens 5, inserted, the anthers twisted after opening; ovary superior, 2-locular, the style solitary, with two subglobose stigmas. Fruits capsular, ovoid to globose, circumscissile, with the exocarp separating like an operculum, the remaining layers of the fruit wall opening irregularly, or 4-valvate; seeds 4 per fruit, glabrous or velvety. A pantropical genus of about 12 species, with the majority of the species native to Central America and northern South America.

1. Operculina turpethum (L.) J. Silva Manso, Enum. Subst. Braz. 16. 1836.

Key to the varieties

1a. Leaves (mature) 5-16 cm long; corollas 3-4.5 cm long..... *O. turpethum* var. *turpethum*
1b. Leaves (mature) 16-24 cm long; corollas 7-8 cm long..... *O. turpethum* var. *ventricosa*

1a. Operculina turpethum var. turpethum

Fig. 77. A-C

BASIONYM: *Convolvulus turpethum* L.
SYNONYMS: *Convolvulus triqueter* Vahl
Operculina triquetra (Vahl) H. Hallier

Slightly woody vine, twining. Stems slender, angular, sulcate or 3-5-winged, pubescent when young, glabrous when mature. Leaves alternate; blades simple, 5-16 × 5-15 cm, broadly ovate, orbicular, ovate-lanceolate, or lanceolate, chartaceous, the apex acuminate, acute, obtuse, or rounded and mucronate, the base cordiform or hastate, the margins entire or slightly undulate; upper surface glabrous or appressed-pubescent, dull, with the venation slightly prominent; lower surface densely appressed-pubescent, with prominent venation; petioles cylindrical, 2.5-5 cm long, appressed-pubescent. Flowers solitary or in simple dichasial cymes; peduncles 2-18 cm long, pubescent, cylindrical; bracts oblong, 2-3 cm long, at the base of the pedicels. Calyx light green, the sepals unequal, 1.5-2.5 cm long, the outer ones appressed-pubescent, ovate or broadly ovate, obtuse and mucronate at the apex; corolla white or with the center yellowish, broadly infundibuliform, glabrous, 3-4.5 cm long, the limb ca. 3 cm in diameter, with obtuse lobes; stamens and stigmas not exserted. Capsule depressed-globose, ca. 1.5 cm long, operculate, with the inner layers opening irregularly, covered by the accrescent and persistent sepals; seeds black, glabrous, subglobose, keeled, with a prominent hilum, ca. 6 mm long.

Phenology: Collected in flower in January.

Status: Exotic, cultivated, uncommon, probably not naturalized.

Distribution: St. Croix, St. John, and St. Thomas. Native to the Old World.

1b. Operculina turpethum var. ventricosa

(Bertero) Staples & D. F. Austin, Brittonia 33: 595. 1981.

BASIONYM: *Convolvulus ventricosus* Bertero
SYNONYM: *Operculina ventricosa* (Bertero) Peter

Woody vine, robust, twining, attaining 10 m or more in length, with milky latex. Stems cylindrical, glabrous, with the pith hollow in dried specimens. Leaves alternate; blades simple, 16-24 × 5-15 cm, broadly ovate, chartaceous, the apex acuminate or obtuse and mucronate, the base cordiform, the margins entire or slightly undulate; upper surface glabrous, dull, with the venation slightly prominent; lower surface glabrous or puberulous, the prominent venation appressed-pubescent; petioles cylindrical, 8-20 cm long, appressed-pubescent. Flowers solitary or in simple dichasial cymes; peduncles 15-20 cm long, thick, appressed-pubescent, cylindrical; bracts ovate, ca. 3.5 cm long, deciduous. Calyx yellowish green,

the sepals subequal, 3.5-4 cm long, externally appressed-pubescent or glabrous, oblong-ovate, obtuse and mucronate at the apex; corolla white, broadly infundibuliform, glabrous, 7-8 cm long, the limb 8-10 cm in diameter, with obtuse lobes; stamens and stigmas not exserted. Capsule globose, ca. 3 cm long, operculate, with the inner layers opening irregularly, covered by the accrescent and persistent sepals; seeds black, dull, glabrous, obtusely trigonal, with a prominent hilum.

Phenology: Flowering from November to March and fruiting in January and March

Status: Exotic, uncommon.

Distribution: Species native to the Old World, introduced to the Antilles as an ornamental, where it can be found naturalized. Also on St. Croix and St. Thomas.

8. PORANOPSIS

A monospecific genus, characterized by the following species.

1. Poranopsis paniculata (Roxb.) Roberty, Candollea 14. 26. 1953.

Fig. 77. D-G

BASIONYM: *Porana paniculata* Roxb.

Velo de novia, Christmas vine

Slightly woody vine, twining, 5-7 m in length, with scarce watery latex. Stems slender, cylindrical, canescent. Leaves alternate; blades simple, 4-9 × 3-6.5 cm, chartaceous, ovate, palmatinerved, the apex acute, acuminate, or cuspidate, the base cordiform, the margins entire or slightly sinuate; upper surface pubescent, with the venation slightly prominent; lower surface densely pubescent, with prominent venation; petioles cylindrical, pubescent, 2-3.2 cm long. Flowers bisexual, actinomorphic, in axillary or terminal panicles, ascending, up to 17 cm long, with the axes tomentose; bracts oblong or lanceolate, minute, tomentose. Calyx green, canescent-tomentose, accrescent, the sepals free to the base, ca. 1.5 mm long, lanceolate; corolla white, infundibuliform, glabrous, 4.5-6 mm long, the limb 5-lobed; stamens 5, not exserted, the filaments very short, of equal size; ovary superior, with an annular disc at the base, unicarpellate, with two basal ovules, the style very short, the stigma globose or bilobate, green, not exserted. Fruit indehiscent, ovoid-globose, 5-6 mm long, with the three outer sepals accrescent; seed usually one, ovoid or subglobose.

Phenology: Collected in flower from November to February.

Status: Exotic, cultivated and naturalized in disturbed areas, uncommon.

Distribution: Species native to India, cultivated throughout the tropics, where it can be found naturalized in disturbed areas. Also on Vieques, St. Croix, and St. Thomas.

9. STICTOCARDIA

Twining vines, glabrous or pubescent, usually with scarce milky latex. Leaves alternate, petiolate; blades simple, entire, punctate on the lower surface; stipules absent. Flowers bisexual, actinomorphic, solitary or in simple dichasial cymes, axillary. Calyx of 5 subequal sepals; corolla infundibuliform; stamens 5, inserted, the anthers lanceolate; ovary superior, 2-locular, the style solitary, with two subglobose stigmas, not exserted. Fruits indehiscent, 4-locular, with fibrous walls, tardily dehiscent by the dissolution of the pericarp, covered by the accrescent sepals; seeds 4 per fruit, obtusely triangular, velvety. A Paleotropical genus of about 12 species.

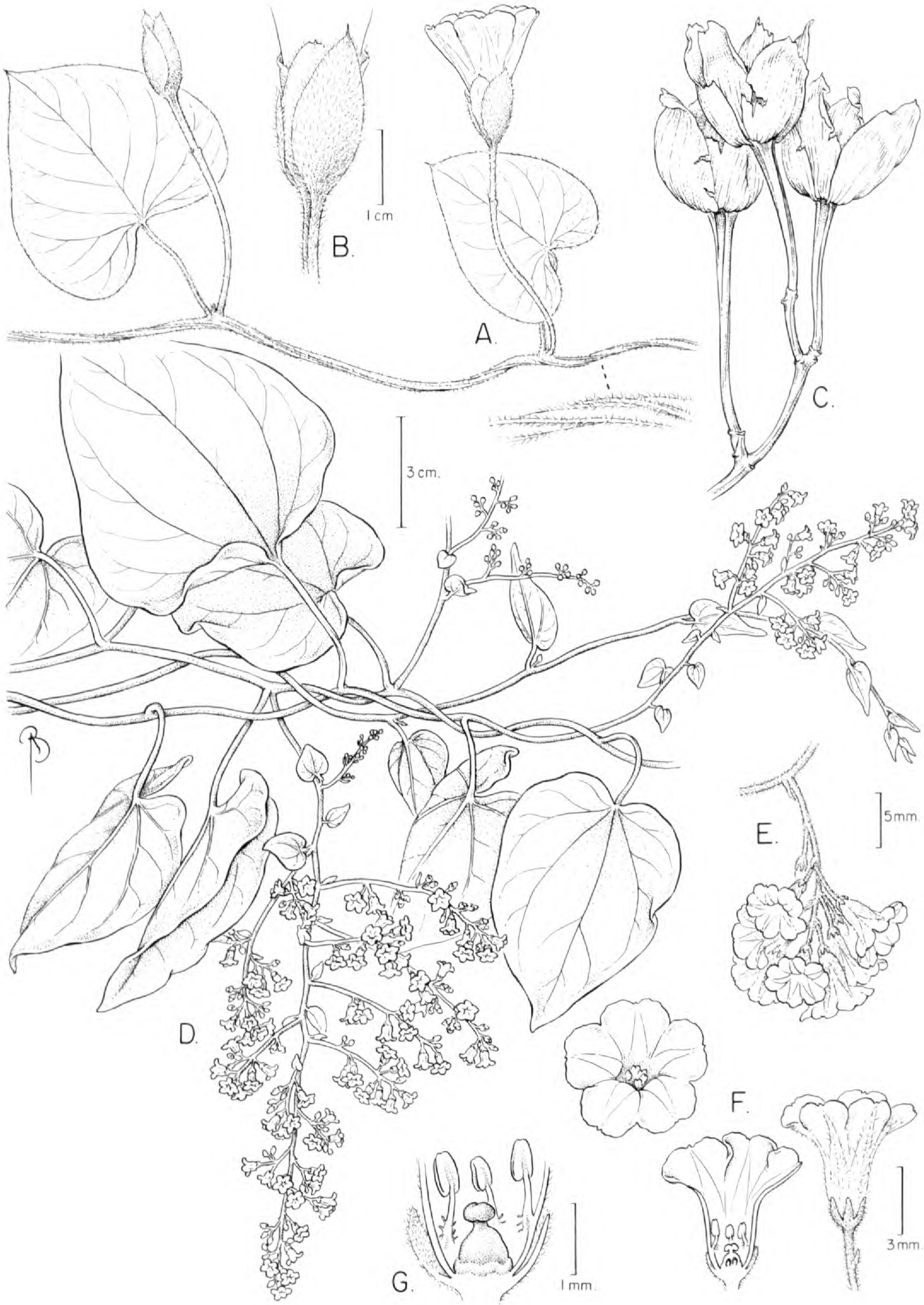

Fig. 77. A-C. *Operculina turpethum* var. *turpethum*. **A.** Flowering branch. **B.** Calyx. **C.** Infructescence. **D-G.** *Poranopsis paniculata*. **D.** Flowering branch. **E.** Inflorescence. **F.** Flower, top view, longitudinal section, and side view. **G.** Flower, longitudinal section, showing stamens and gynoecium.

1. Stictocardia tiliifolia (Desr.) H. Hallier, Bot. Jahrb. Syst. 18: 159. 1893.

Fig. 78. A-D

BASIONYM: *Convolvulus tiliaefolius* Desr.
SYNONYM: *Rivea campanulata* sensu House, non (L.) House

Woody vine, creeping or climbing, twining, attaining 5 m in length, with scarce milky latex. Stems slender, cylindrical, glabrous or pubescent, with numerous short lateral branches. Leaves alternate; blades simple, 5-17 × 5-12 cm, ovate to subrounded, chartaceous, glabrous, the apex acute, obtuse, or short-acuminate and mucronate, the base cordiform or sagittate, the margins undulate; upper surface dull with the venation flat; lower surface dull, punctate, with prominent venation; petioles 10-15 cm long, subcylindrical, slightly sulcate, glabrous. Flowers solitary or in simple cymes, axillary. Calyx green, the sepals glabrous, unequal, 1.7-2 cm long, overlapping, ovate or rounded; corolla pink or lavender, 6-8 cm long, the limb up to 6 cm in diameter, with rounded lobes; stamens and stigmas pink, not exserted. Fruit globose, 2.5-3 cm long, brown, tardily dehiscent by the dissolution of the pericarp, covered by the accrescent sepals; seeds obtusely triangular or rounded, ca. 1 cm long, brown, velvety.

Phenology: Flowering and fruiting from December to February.

Status: Exotic, naturalized in disturbed areas, uncommon.

Distribution: In areas of low elevation, on the north and west coasts. Also on Cayo Santiago, Vieques, St. Croix. St. John, St. Thomas, and Tortola. Native to tropical Asia, but dispersed throughout the tropics because of its cultivation.

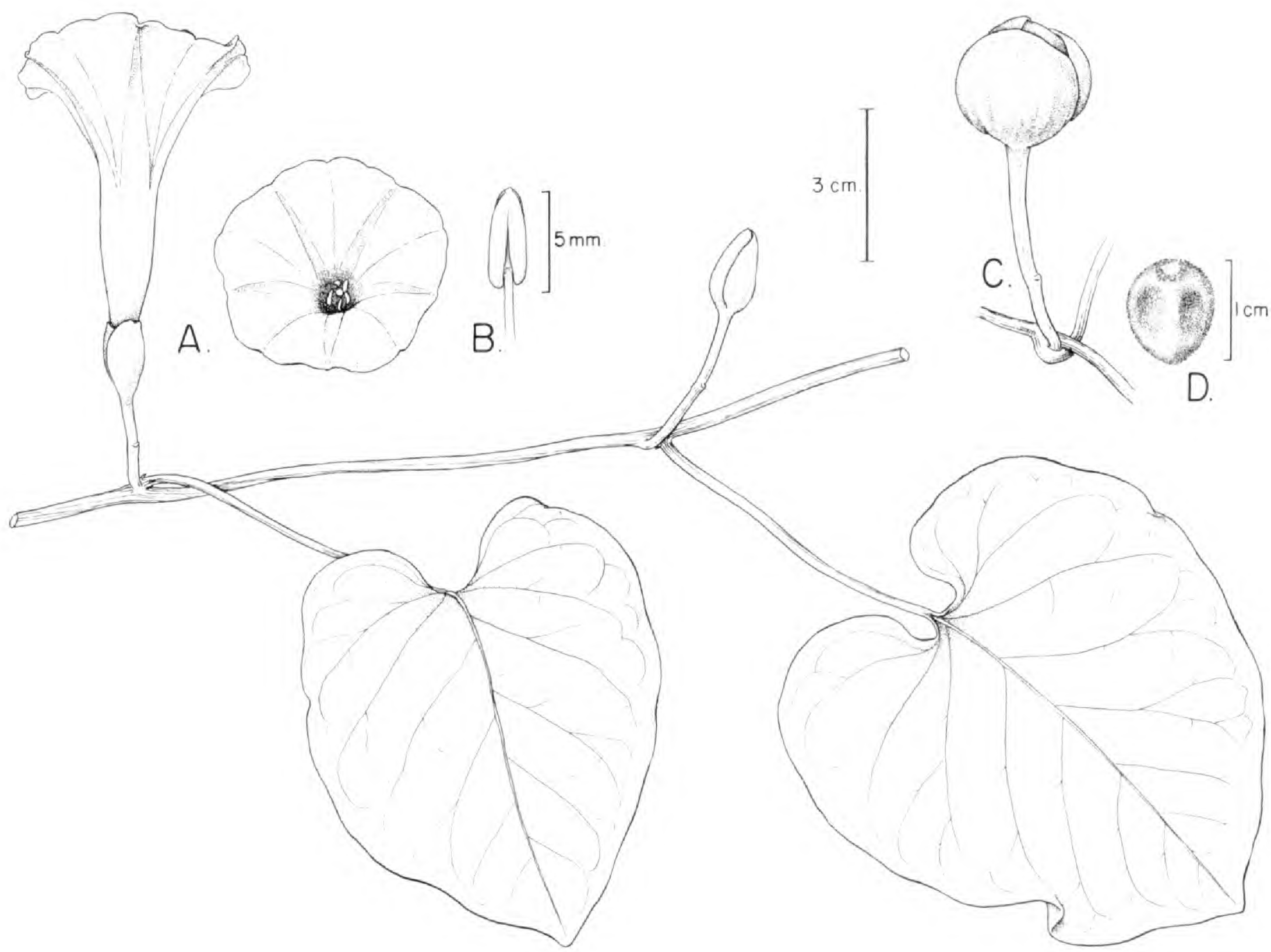

Fig. 78. A-D. *Stictocardia tiliifolia*. **A.** Flowering branch. **B.** Flower, top view, and stamen. **C.** Fruit covered by accrescent sepals. **D.** Seed. From Acevedo-Rodríguez et al. 1996. Flora of St. John, U. S. Virgin Islands. Mem. NYBG Vol. 78.

10. TURBINA

Woody vines, twining, glabrous or pubescent, which produce scarce watery latex. Leaves alternate, petiolate; blades simple, cordiform; stipules absent. Inflorescences of axillary cymes, terminal panicles, or the flowers solitary; sepals unequal, ovate or lanceolate, accrescent in the fruit; corollas infundibuliform or hypocrateriform, white, greenish, pink, or crimson; stamens inserted, the filaments glandular-pubescent at the base; ovary superior, bilocular, the style simple, with two globose stigmas. Fruits indehiscent, dry, woody to crustaceous, ellipsoid or globose, unilocular; seed usually 1, ovoid to ellipsoid, pubescent. A pantropical genus of about 12 species.

1. Turbina corymbosa (L.) Raf., Fl. Tellur. 11: 81. 1838.

Fig. 2. D; 79. A-G

BASIONYM: *Convolvulus corymbosus* L.
SYNONYM: *Rivea corymbosa* (L.) H. Hallier

Aguinaldo blanco, Corona de novia

Woody vine, twining, much branched from the base, attaining 10 m or more in length, with scarce watery latex. Stems glabrous or pubescent, cylindrical when young, compressed, angular, or sulcate when mature, up to 3 cm in diameter, the bark grayish, with numerous dark lenticels; cross section of the stem polystelic, with peripheral vascular cylinders of different diameters. Leaves alternate; blades 3-10 × 2.7-5.5 cm, ovate, chartaceous, the apex acute, short-acuminate, or acuminate, the base cordiform, the margins entire, slightly undulate; upper surface dark green, slightly shiny, glabrous, the venation flat; lower surface pale green, dull, glabrous or puberulous, with a prominent midvein; petioles 1.5-6 cm long, slender, cylindrical, glabrous. Flowers numerous in axillary corymbs. Calyx green, the sepals oblong, 10-12 mm long, coriaceous, acute at the apex; corolla 2.5-3 cm long, white, infundibuliform, the tube yellow internally, except for the dark violet base, the limb with 5 yellowish bands forming a stellate design; stamens white, not exserted, the anthers sagittate; stigmas white, globose, not exserted. Fruits indehiscent, ellipsoid to subovoid, crustaceous, 1-1.5 cm long, the sepals persistent, unequal, accrescent, woody. Seed one, ellipsoid to subglobose, 4-5 mm long, minutely pubescent, light brown.

Phenology: Flowering from the end of October to January and in May, and fruiting in January and February.

Status: Native, locally common.

Distribution: On roadsides or in recent secondary forests. Also throughout the Antilles, from Mexico to Bolivia, and the United States (Florida), introduced in the Old World tropics.

Public forests: Cambalache, Río Abajo, and Susúa.

11. XENOSTEGIA

A genus of two species, native to tropical Asia. The species that is described below characterizes the genus.

1. Xenostegia tridentata (L.) D. F. Austin & Staples, Brittonia 32: 533. 1980.

Fig. 79. H-M

BASIONYM: *Convolvulus tridentatus* L.
SYNONYM: *Ipomoea angustifolia* Jacq.
Merremia angustifolia (Jacq.) H. Hallier
Ipomoea filicaulis Willd.

Slightly woody vine, twining, much branched, climbing or creeping, 1-2 m in length, with scarce milky latex. Stems glabrous or pubescent, angular. Leaves alternate; blades 2-10 × 0.5-0.6 cm, chartaceous, linear, oblong, or lanceolate, the apex acute or acuminate and mucronate, the base hastate or auriculate, the margins 1-3-dentate in the basal portion; upper surface dark green, dull,

Fig. 79. A-G. *Turbina corymbosa.* **A.** Flowering branch. **B.** Flower, longitudinal section, and calyx. **C.** Stamen, showing pubescence. **D.** Gynoecium, whole and longitudinal section. **E.** Fruiting branch. **F.** Fruit. **G.** Stem, cross section. **H-M.** *Xenostegia tridentata.* **H.** Flowering branch. **I.** Leaf. **J.** Flower, whole and longitudinal section. **K.** Stamen. **L.** Gynoecium. **M.** Fruit and seed.

glabrous, the venation flat; lower surface pale green, dull, glabrous or puberulous, with a prominent midvein; petioles 1-1.5 mm long, slender, cylindrical, glabrous. Flowers solitary or in simple cymes, axillary; peduncles slender, 2.5-4 cm long. Calyx green, the sepals unequal, oblong or ovate-oblong, 4-10 mm long, the two outer ones smaller, obtuse-truncate at the apex; corolla white or pale yellow, campanulate, 1-2 cm long, the limb with 5 deep lobes; stamens not exserted; stigmas not exserted. Capsule subglobose, 4-9 mm long, 4-valvate, the sepals persistent; seeds 1-4, obtusely ovoid, 2-3 mm long, glabrous, light brown, dull, squamulose.

Phenology: Flowering and fruiting from September to May.

Status: Exotic, naturalized, uncommon.

Distribution: Native to the Old World tropics (Africa-Pacific), naturalized in some localities of the northern littoral zone (Manatí-Santurce), on sandy substrates. Also in South America and the Old World tropics.

Public forest: Tortuguero.

References: Austin, D. F. 1982. Convolvulaceae. Flora de Venezuela. Vol. 8. Ediciones Fundación, Venezuela. Austin, D. F. and S. Demissew. 1997. Unique fruits and generic status of *Stictocardia* (Convolvulaceae). Kew Bull. 52: 161-169. Austin, D. F. Genera of Convolvulaceae. WWW. Fau.edu/divdept/biology/protologues.htm. Staples, G. W. and D. F. Austin. 1981. Changes in the West Indian *Operculina* (Convolvulaceae). Brittonia 33: 591-596.

19. *Family* ***CUCURBITACEAE***

Key to the genera

1a. Fruits < 7 cm long 2
1b. Fruits > 10 cm long 8

2a. Fruits capsular, dehiscent, with numerous pendulous seeds, covered by a fleshy red aril ..... 11. *Momordica*
2b. Fruits indehiscent, the seeds without an aril 3

3a. Fruits red; corolla white, the limb 3-5 cm in diameter ..... 3. *Coccinia*
3b. Fruits green, yellowish, or orange; corolla of various colors, when white then the limb 1-1.5 cm in diameter 4

4a. Fruits spinulose, spiny, or smooth, 4-5 cm long ..... 4. *Cucumis*
4b. Fruits smooth, 1-4 cm long 5

5a. Infructescences short, with the fruits densely clustered; stems articulate; roots tuberous ..... 6. *Doyerea*
5b. Infructescences elongate, racemose, or the fruits solitary; stems not articulate; roots not tuberous..... 6

6a. Plants herbaceous, usually 1-2 (4) m long; stems slender, < 5 mm in diameter; corolla yellow ..... 10. *Melothria*
6b. Plants robust, usually 5 m or more in length; stems > 5 mm in diameter; corolla orange, cream-colored, white, or greenish yellow 7

7a. Corolla orange; stems cylindrical ..... 12. *Psiguria*
7b. Corolla cream-colored, white, or greenish yellow; stems angular ..... 1. *Cayaponia*

8a. Fruits dry when mature 9
8b. Fruits fleshy, juicy when ripe 11

9a. Fruits with woody walls, not fibrous inside 10
9b. Fruits with thin and fragile walls on drying, the interior formed by a conglomeration of fibers that form a network ..... 9. *Luffa*

10a. Plants hispid-pubescent; petioles with prominent glands; fruits indehiscent, elongate, 20-35 cm long; seeds ovate-oblong, compressed, ca. 1.5 cm long ..... 8. *Lagenaria*
10b. Plants glabrous; petioles without glands; fruits dehiscent by an operculum that occupies 1/3 of the fruit, this with 3 sutures that are united at the apex, subglobose, 8-12 cm in diameter; seeds circular, slightly compressed, 3-6 cm in diameter ..... 7. *Fevillea*

11a. Fruits white or light green, pyriform, spinulose ..... 13. *Sechium*
11b. Fruits dark green, orange, reddish brown, or with light green bands alternating with dark green, not pyriform, smooth 12

12a. Fruits cylindrical (3 to 4 times longer than wide), reddish brown, aromatic ..... 14. *Sicana*
12b. Fruits almost as wide as long, green, orange, or with dark green bands 13

13a. Corolla campanulate, the limb ca. 10 cm in diameter ..... 5. *Cucurbita*
13b. Corolla rotate, the limb ca. 2 cm in diameter ..... 2. *Citrullus*

1. CAYAPONIA

Herbaceous vines, monoecious or dioecious, glabrous or pubescent, with tendrils axillary or lateral to the leaves; latex watery, usually abundant. Leaves alternate, petiolate; blades simple, entire, lobed, palmatilobed or palmatifid; stipules absent. Flowers unisexual, actinomorphic, solitary or in racemes, panicles or fascicles, axillary. Calyx campanulate, with 5 minute lobes; corollas tubular, the lobes reflexed or expanded; staminate flowers with a pistillode and 3 exserted stamens, the filaments adnate to the corolla, the anthers sigmoid, concrescent; pistillate flowers with 3 staminodia; ovary inferior, 3-carpellate, trilobed, the style simple, with 3 stigmatic branches. Fruit a small berry; seeds 2-3, compressed. A predominantly neotropical genus of about 60 species.

Key to the species of *Cayaponia*

1a. Calyx 5-9 mm long; lobes of the corolla 12-15 mm long; margin of the leaves entire or crenate..... ..... 1. *C. americana*
1b. Calyx 3-4 mm long; lobes of the corolla 3-5 mm long; margin of the leaves spinulose .... 2. *C. racemosa*

1. Cayaponia americana (Lam.) Cogn. in A.DC. & C.DC., Monogr. Phan. 3: 785. 1881.

Fig. 80. A-B

BASIONYM: *Bryonia americana* Lam.

Bejuco de torero

Herbaceous vine, slender, climbing or creeping, with axillary tendrils, attaining 10 m in length. Stems angular, glabrous or puberulous, swollen at the nodes; tendrils simple or branched, usually longer than the leaves. Leaves alternate; blades 5-20 × 5-18 (25) cm, chartaceous, ovate, palmatilobed, with 3-5 more or less deep lobes, oblong to linear, the apices acute, acuminate, or rounded, the base cordiform or lyrate, the margins

entire or crenate; upper surface dark green, shiny, hispidulous, with the venation sunken and pubescent; lower surface yellowish green, dull, with the venation reticulate, prominent, and pubescent; petioles sulcate, puberulous, 2-7 cm long. Flowers solitary or in short racemes. Calyx green, campanulate, 5-9 mm long; corolla white or greenish yellow, minutely pubescent, the tube ca. 1 cm long, the lobes 12-15 mm long, oblong, reflexed; stamens exserted, the filaments greenish, pubescent at the base, the anthers yellow. Berry ellipsoid, 1.5-2 cm long, smooth, olive-green, turning orange or red-orange when ripe; seeds ovate, 0.8-1.2 cm long, not arillate.

Phenology: Flowering and fruiting from February to December.

Status: Native, very common throughout Puerto Rico.

Distribution: On roadsides and in dry forests and coastal thickets. Also on Culebra, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; the United States (Florida), Cuba, Hispaniola, and the Lesser Antilles.

Public forests: Carite, Ceiba, El Yunque, Maricao, Río Abajo, and Toro Negro.

2. Cayaponia racemosa (Mill.) Cogn. in A.DC. & C.DC., Mon. Phan. 3: 768. 1881.

Fig. 80. C-G

BASIONYM: *Bryonia racemosa* Mill.

Climbing herbaceous vine, with axillary tendrils, attaining 10-15 m in length. Stems green, cylindrical, striate, glabrous, swollen at the nodes; tendrils trifid, 15 cm long or longer. Leaves alternate; blades entire or 3-7-lobed, 4-20 × 3-17 (25) cm, ovate, chartaceous or subcoriaceous, the lobes oblong, the apex acuminate or acute, the base cordiform or reniform, the margins spinulose; upper surface scabrid; lower surface light green, dull, with the reticulate venation prominent, puberulous; petioles sulcate or slightly winged, glabrous, 4-7 cm long. Flowers unisexual, in axillary racemes. Calyx pale green, crateriform or campanulate, 3-4 mm long, the lobes triangular; corolla greenish white, tubular, the tube ca. 3 mm long, pubescent inside, the lobes 3-5 mm long, reflexed. Berry ovoid, 10-12 mm long, green, turning orange when ripe; seeds 2-3, elliptical, ca. 8 mm long, not arillate.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common throughout Puerto Rico.

Distribution: In pastures and on roadsides at lower elevations. Cited for Tortola by Britton (1925); also in the Greater Antilles, Central America, Barbados, Trinidad, and northern South America.

Public forests: Guilarte, Maricao, Río Abajo, Susúa, and Toro Negro.

2. CITRULLUS

Herbaceous vines, creeping or climbing, monoecious, pubescent, with axillary tendrils with 2-5 branches or simple; latex watery. Leaves alternate, petiolate; blades simple, entire, lobed-pinnatifid; stipules absent. Flowers unisexual, actinomorphic, solitary or rarely in axillary fascicles; calyx campanulate, with 5 narrow lobes; corollas rotate or broadly campanulate, deeply 5-lobed; staminate flowers with a pistillode and 3 exserted stamens, the filaments free, adnate to the base of the corolla, the anthers concrescent or free; pistillate flowers with 3 staminodia; the ovary inferior, ovoid, tricarpellate, the styles 3, the stigmas bilobate. Fruit a fleshy berry, indehiscent, large; seeds numerous, oblong, compressed. An Old World genus of about 4 species, some of which are cultivated for their edible fruits.

1. Citrullus lanatus (Thunb.) Matsum. & Nakai, Cat. Sem. Spor. Hort. Bot. Univ. Imp. Tokyo 30, no. 854. 1916.

Fig. 81. E-J

BASIONYM: *Momordica lanata* Thunb.
SYNONYM: *Cucurbita citrullus* L.

Melón, Sandía

Creeping or climbing herbaceous vine, with axillary tendrils, attaining 1.5-3 m in length. Stems green, sulcate, pilose or lanate, glabrous when mature; tendrils with 2-5 branches, 15 cm long or longer. Leaves alternate; blades 6-16 × 3-11 cm, ovate-triangular in outline, deeply 3-5-

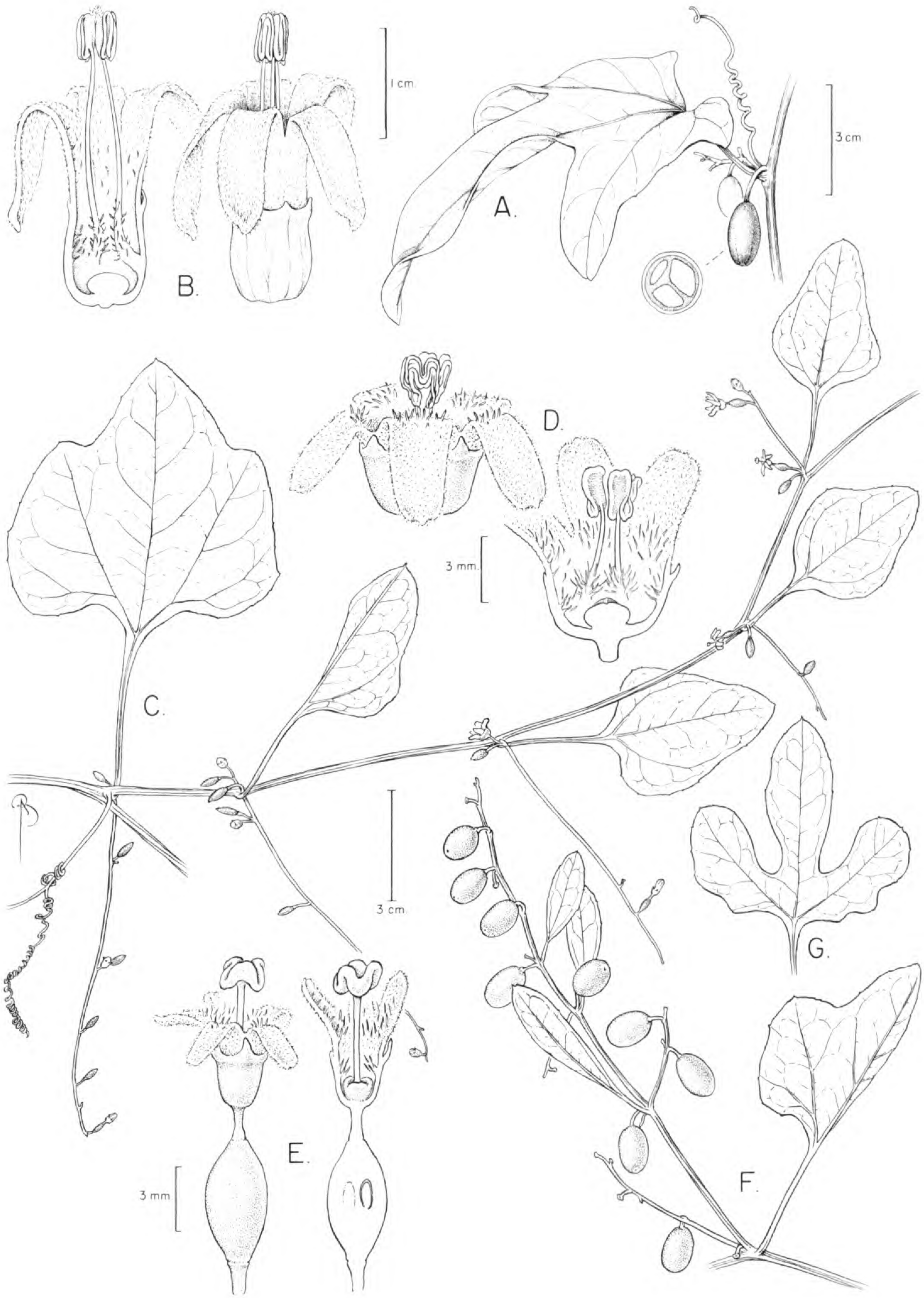

Fig. 80. A-B. *Cayaponia americana*. **A.** Branch with fruits, and cross section of fruit. **B.** Flower, whole and longitudinal section. **C-G.** *Cayaponia racemosa*. **C.** Fertile branch. **D.** Staminate flower, whole and longitudinal section. **E.** Pistillate flower, whole and longitudinal section. **F.** Branch with fruits. **G.** Trilobate leaf.

pinnatifid-lobed, membranaceous, the lobes oblong or ovate, lobate, obtuse or rounded at the apex, the base cordiform or reniform, the margins undulate or irregularly dentate; upper surface lanate-pubescent; lower surface light green, dull, with the reticulate venation prominent, puberulous, scabrous in mature leaves; petioles lanate-pubescent, 1-11 cm long. Staminate and pistillate flowers of similar size, solitary; peduncles 2-4 cm long, pubescent. Hypanthium villous. Calyx green, campanulate, ca. 1 cm long, villous, lobes linear-lanceolate, 3-4 mm long; corolla yellow or greenish yellow, campanulate, 1-1.5 cm long, villous outside, limb ca. 2.3 cm in diameter, the lobes deep. Berry globose or cylindrical, up to 40 cm long, green, mottled or with light green lines, the endocarp thick, pink, white, or yellowish; seeds numerous, elliptical, 5-10 mm long.

Phenology: Collected in flower in November and in March.

Status: Exotic, cultivated or spontaneous, uncommon.

Distribution: Species cultivated for its edible fruits. Spontaneous in sandy areas and on roadsides. Native to tropical Africa, but widely cultivated throughout the tropics.

3. COCCINIA

Herbaceous vines, dioecious, with axillary tendrils, simple or bifid; latex watery. Stems striate, glabrous. Leaves alternate, petiolate; blades simple, entire or lobed; stipules absent. Flowers unisexual, actinomorphic, solitary or in short racemes; calyx campanulate, with 5 minute lobes; corolla campanulate, 5-lobed, with the venation dark; staminate flowers with 3 stamens, the filaments free from one another or distally connate, the anthers connate, triplicate; pistillate flowers with 3 staminodia; ovary inferior, smooth, trilocular, with numerous horizontal ovules, the style with 3 stigmatic branches. Fruit a globose berry, fleshy; seeds numerous, ovate. An African genus of about 30 species.

1. Coccinia grandis (L.) Voigt, Hort. Suburb. Calcutt. 59. 1845.

Fig. 81. A-D

BASIONYM: *Bryonia grandis* L.
SYNONYM: *Coccinia cordifolia* sensu Britton, non (L.) Cogn.

Subwoody vine, climbing by axillary tendrils, which attains 20 m in length. Stems much branched, angular, with white dots, pubescent in the area of the nodes; tendrils simple or bifid, shorter than the leaves. Leaves alternate; blades simple, 4-11 × 4.2-10 cm, entire or deeply 5-lobed, the apex obtuse or acute, the base cordiform, the central lobe lanceolate, the lateral ones asymmetrical, ovate-lanceolate, the margins minutely dentate; upper surface dull, scabrid; lower surface pale green, dull, slightly scabrid, with prominent venation; petioles 1.5-2 cm long, sulcate, glabrous. Flowers usually solitary, axillary, the staminate and pistillate flowers similar. Hypanthium ellipsoid. Calyx turbinate, green, ca. 5 mm long, glabrous; corolla white, with the center pale yellow, campanulate, 5-lobed, the tube 2-2.5 cm long, the limb 3-5 cm in diameter. Berry ellipsoid, smooth, 3-6 cm long, red when ripe; seeds numerous, compressed, ca. 6 mm long.

Phenology: Collected in flower in August.

Status: Exotic, naturalized, locally common.

Distribution: In southwestern Puerto Rico and in Quebradillas. Also on St. Croix, and cited for St. Thomas (Britton and P. Wilson, 1925). Native to Africa, but naturalized throughout the tropics.

4. CUCUMIS

Herbaceous vines, monoecious, with axillary tendrils; latex watery. Leaves alternate, petiolate; blades entire, dentate or palmatilobed; stipules absent. Flowers unisexual, actinomorphic, solitary or in axillary fascicles; calyx campanulate, with 5 minute lobes; corolla yellow, campanulate; staminate flowers with a pistillode and 3 stamens, the filaments adnate to the base of the corolla, the anthers

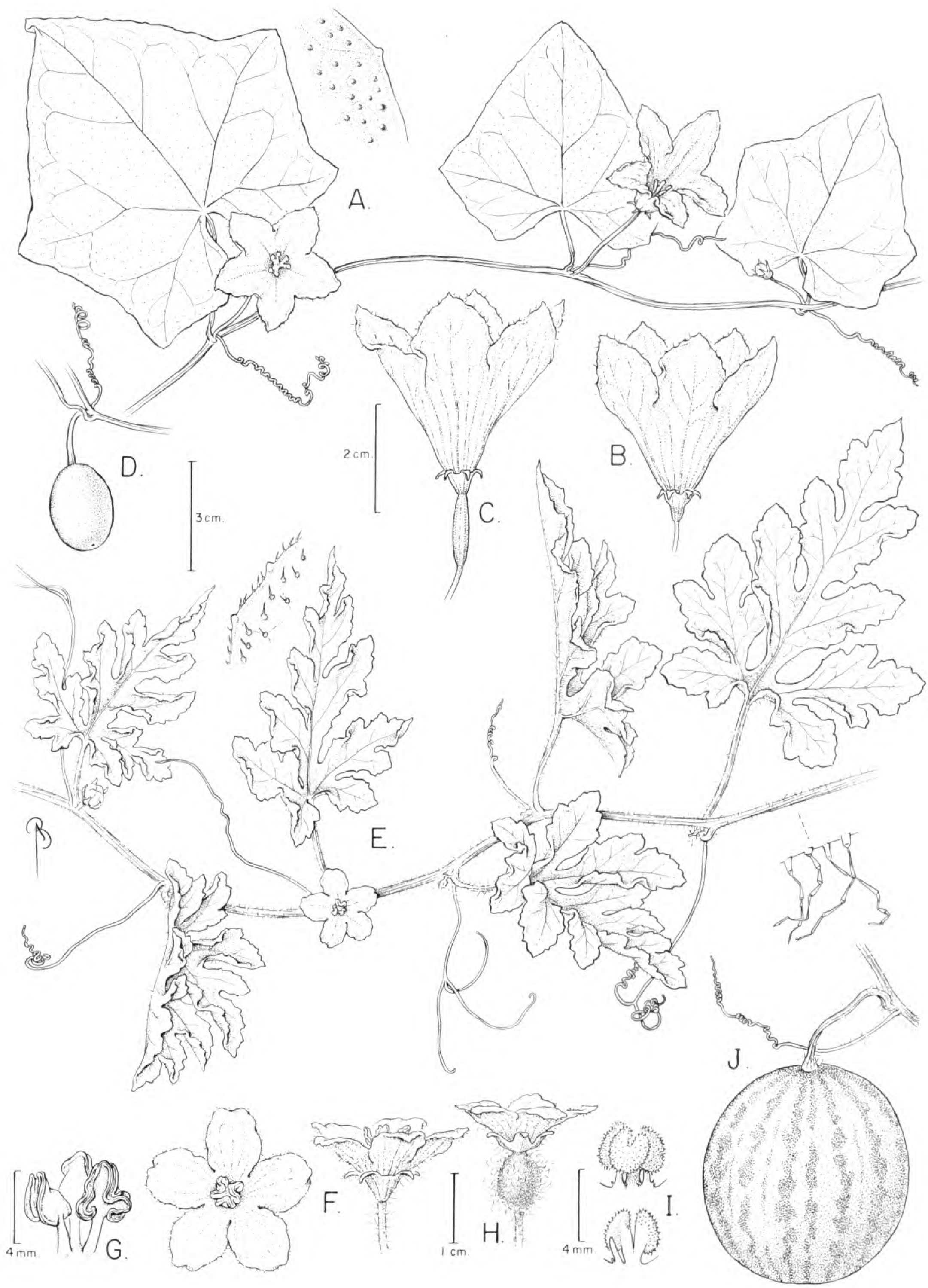

Fig. 81. A-D. *Coccinia grandis*. **A.** Flowering branch. **B.** Staminate flower. **C.** Pistillate flower. **D.** Fruit. **E-J.** *Citrullus lanatus*. **E.** Habit. **F.** Staminate flower, top and side views. **G.** Stamens. **H.** Pistillate flower. **I.** Stigmas. **J.** Fruit.

concrescent or free, distally with the connective prolonged into an appendage; pistillate flowers with 3 staminodia; ovary inferior, trilocular, with numerous horizontal ovules, the style with 3-5 stigmatic branches, bilobed. Fruit an ellipsoid or cylindrical berry, fleshy; seeds numerous, elliptical. An Old World genus of about 30 species, some of which are widely cultivated for their edible fruits.

Key to the species of *Cucumis*

1a. Leaves deeply 3-5-palmatilobed ..... 1. *C. anguria*
1b. Leaves ovate, entire or slightly 3-lobed. 2

2a. Fruits densely spiny (spines ca. 1 cm long) ..... 2. *C. dipsaceus*
2b. Fruits smooth, not spiny ..... 3. *C. melo*

1. Cucumis anguria L., Sp. Pl. 1011. 1753.
Fig. 82. A-D
Pepinillo silvestre, Cocombro, Pepineto, Wild cucumber

Herbaceous vine, creeping or climbing by axillary tendrils, which attains 0.25-2 m in length. Stems branched from the base, slender, angular, hirsute; tendrils simple, shorter than the leaves. Leaves alternate; blades 3-10 × 3.5-10 cm, deeply 3-5-palmatilobed, the lobes oblong or oblanceolate, the apices obtuse or rounded, the base lyrate, the margins ciliate, crenate or denticulate; upper surface dull, scabrid; lower surface pale green, dull, scabrid, with prominent venation and hispidulous; petioles sulcate, hispidulous, 6-12 cm long. Flowers solitary or in axillary fascicles, unisexual. Calyx campanulate, yellowish, 5-6 mm long, villous-spinulose; corolla pale yellow, ca. 1 cm long, the lobes acute. Berry ellipsoid or obovoid, spinulose, 4-5 cm long, greenish yellow, edible; seeds numerous, elliptical, cream-colored, 1-1.3 cm long.

Phenology: Collected in flower and fruit from January to March and in July and November.

Status: Exotic, naturalized, uncommon.

Distribution: Along the coast or in coastal thickets, in southern and southwestern Puerto Rico. Also on Culebra, Mona, Vieques, Anegada, St. Croix, St. Thomas, and Tortola. Native to Africa, but naturalized in the Antilles, Central America, and South America.

Public forest: Guánica and Mona.

2. Cucumis dipsaceus Ehrenb. ex Spach, Hist. Nat. Veg. 6: 211. 1838.
Fig. 82. E-F

Herbaceous vine, creeping or climbing by axillary tendrils, which attains 1.5 m in length. Stems much branched, slender, angular, sulcate, hispid on the angular margins; tendrils simple, longer than the leaves. Leaves alternate; blades 2.5-7.5 × 2-7 cm, ovate or trilobed, the lobes obtuse, the base cordiform, the apex obtuse, the margins dentate or entire; upper surface dull, scabrid; lower surface pale green, dull, scabrid, with prominent venation and hispidulous; petioles sulcate, hispidulous or hispid, 1.5-5 (12) cm long. Flowers solitary, the staminate flowers sometimes in axillary fascicles; calyx campanulate, 3.6-5.2 mm long, hispidulous, the lobes narrowly oblong or linear, 1.6-4 mm long, hispidulous; corolla pale yellow, campanulate, hispidulous outside, the tube 1-1.5 mm long, the lobes obovate, acute, 5.5-8.5 mm long. Berry ellipsoid or globose, densely spiny (spines ca. 1 cm long), 3-6.5 cm long, pale yellow; seeds numerous, elliptical, cream-colored, 4-5 mm long.

Phenology: Collected in flower in April and in fruit from April to June.

Status: Exotic, naturalized, uncommon.

Distribution: In coastal pastures in southern Puerto Rico. Also on Tortola. Native to Africa, but naturalized throughout the tropics.

3. Cucumis melo L., Sp. Pl. 1011. 1753.
Fig. 82. G-I

Creeping herb or herbaceous vine, creeping or climbing by axillary tendrils, attaining 2 m in length. Stems branched from the base and along the main stems, slender, angular, sulcate, hispid; tendrils simple, hispid, as long as the leaves. Leaves alternate; blades 2.2-13 × 2-13 cm, ovate,

broadly ovate, or trilobed, the lobes obtuse, the base cordiform or lyrate, the margins denticulate; upper surface dull, scabrid; lower surface pale green, dull, scabrid, with prominent venation and hispidulous; petioles 1-9 cm long, sulcate, hispid. Staminate flowers in axillary fascicles; pistillate flowers solitary; calyx campanulate, yellowish green, 2.8-4(5.6) mm long, hispidulous, the lobes linear to triangular, 1.2-3.6 mm long; corolla yellow, infundibuliform, 7-1.4 mm long, the lobes obtuse. Berry ellipsoid, smooth, 4.5-5.5 cm long, green with whitish spots, turning yellow-orange when ripe, the pulp extremely bitter; seeds numerous, elliptical, cream-colored, 4-5 mm long.

Phenology: Flowering and fruiting throughout the year.

Status: Exotic, naturalized, uncommon.

Distribution: In disturbed areas at lower elevations, collected in Gurabo and Lajas. An African species that has given rise to several races with edible fruits through artificial selection. Among these are the "cantaloupe" and the "honeydew."

5. CUCURBITA

Herbaceous vines, annual, monoecious, creeping or climbing by axillary tendrils; stems sulcate, producing watery latex; tendrils axillary, with 2-5 branches. Leaves alternate, petiolate; blades subentire, rounded or deeply lobed; stipules absent. Flowers unisexual, actinomorphic, solitary, the staminate flowers also in axillary fascicles; calyx campanulate, rarely cylindrical, with (4-)5(-7) minute lobes; corolla campanulate, deeply lobed; stamens 3, the filaments fleshy, inserted at the base of the floral receptacle, the anthers linear, connate into a cylindrical column; ovary inferior, 3-5-locular, with numerous horizontal ovules, the style simple, short, with 3-5 stigmatic branches, bilobed or bifurcate. Fruit a fleshy, fibrous, or woody berry, large; seeds numerous, elliptical. A New World genus of about 30 species, some of which are widely cultivated for their edible fruits.

1. Cucurbita moschata Duchesne ex Poir., Dict. Sci. Nat. 11: 234. 1818.

Fig. 83. A-B

Herbaceous vine, creeping or climbing by axillary tendrils, 5-10 m in length. Stems branched from the base and along the main stems, flexible, angular, pubescent with soft or slightly rigid hairs, elongate, not pungent; tendrils with 4 branches, pilose, shorter than the petiole. Leaves alternate; blades 15-25 × 15-25 cm, broadly ovate, slightly lobed, the lobes obtuse, the apex obtuse, the base cordiform or hastate, the margins finely serrate; upper surface puberulous, usually with irregular whitish spots; lower surface short-pubescent, with prominent venation; petioles 11-39 cm long, striate, puberulous to densely pubescent, with unicelular hairs intermingled with multicellular trichomes. Flowers solitary; calyx campanulate, yellowish green, 3.5-4 cm long, hirsute, the lobes linear to oblong, 2.5-3 cm long; corolla brilliant yellow, campanulate, 7-9 cm long, the lobes obtuse, revolute; peduncle thick, angular, sulcate. Berry variable, soft or hard, depressed-globose to globose, green, turning yellowish when ripe, 25-30 cm long; mesocarp orange, fleshy, thick; seeds numerous, elliptical, 1.5-2 cm long, cream-colored to light brown.

Phenology: Flowering and fruiting throughout the year.

Status: Exotic, cultivated and naturalized, common.

Distribution: On roadsides, along trails, and in pastures.

Public forests: Maricao, Piñones, and Río Abajo.

Commentary: In Puerto Rico two other species of *Cucurbita* (*C. pepo* L. and *C. maxima* Duchesne ex Lam.) have been reported; nevertheless, these are rarely cultivated and are not found naturalized in Puerto Rico (pers. comm. Dr. Linda Beaver, University of Puerto Rico, Mayagüez Campus).

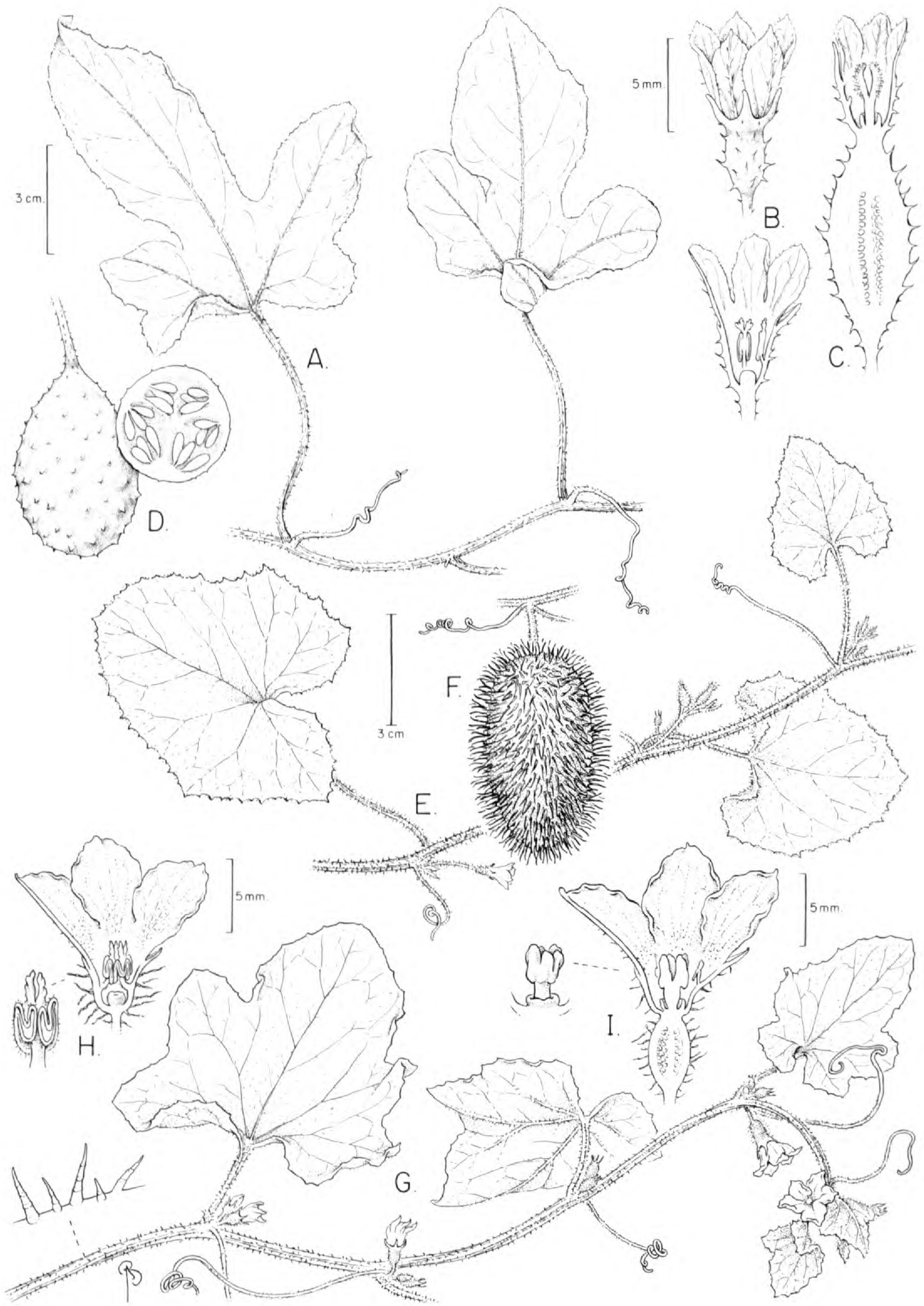

Fig. 82. A-D. *Cucumis anguria*. **A.** Branch with leaves. **B.** Staminate flower, whole and longitudinal section. **C.** Pistillate flower, longitudinal section. **D.** Fruit and cross section of fruit. **E-F.** *Cucumis dipsaceus*. **E.** Flowering branch. **F.** Fruit. **G-I.** *Cucumis melo*. **G.** Flowering branch. **H.** Staminate flower, longitudinal section, with detail of anthers. **I.** Pistillate flower, with detail of the stigma.

6. DOYEREA

A monospecific genus, characterized by the following species.

1. Doyerea emetocathartica Grosourdy, Med. Bot. Criollo 2: 338. 1864.

Fig. 83. C-F

SYNONYMS: *Corallocarpus emetocatharticus* (Grosourdy) Cogn.
Anguria glomerata Eggers

Herbaceous vine, dioecious, climbing by tendrils, attaining 10 m or more in length. Stems green, cylindrical, fleshy, fragile, glabrous, producing abundant watery latex, much branched from the base, which bears tuberous roots; tendrils axillary, simple, shorter than the leaves. Leaves alternate; blades 5-10 × 5.5-10 cm, ovate or broadly ovate, usually 3-lobed, chartaceous, the apex acute, obtuse, or acuminate, usually mucronate, the base cordiform or lyrate, the margins minutely dentate; upper surface scabrid; lower surface pubescent, with the reticulate venation prominent; petioles sulcate, pubescent, ca. 4 cm long. Flowers unisexual, in axillary cymes. Calyx green or pale orange, campanulate, 3.5-4 mm long, puberulous, the lobes oblong, reflexed; corolla white, yellowish green, or pale orange, campanulate, the tube ca. 1 mm long, the lobes 1-1.2 mm long, pilose, oblong, erect or reflexed; stamens 2, the filaments short, concrescent; ovary inferior, elongate, bicarpellate, the style simple, bifurcate near the apex, the stigmas bifid, subglobose and exserted. Berries asymmetrically ellipsoid, 1-1.2 cm long, smooth, pale green, turning orange when ripe; seeds few, ovoid, ca. 4 mm long, not arillate.

Phenology: Collected in flower in January, August, and September and in fruit in August.

Status: Native, rather common.

Distribution: In thickets and coastal forests. Also on Culebra, Vieques, St. Croix, St. John, and St. Thomas; the Antilles and from Mexico to northern South America.

Public forests: Boquerón and Guánica.

7. FEVILLEA

Herbaceous or slightly woody vines, dioecious, with simple axillary tendrils; latex watery. Leaves alternate, petiolate; blades entire, cordiform; stipules absent. Flowers unisexual, actinomorphic, in axillary panicles; calyx campanulate, with 5 minute lobes; corolla rotate, the lobes with an appendage on the adaxial surface; staminate flowers with 5 stamens, the filaments recurved; pistillate flowers with 5 minute staminodia, the ovary inferior, globose, tricarpellate, the styles 3, connate at the base, the stigmas forming a trilobed capitulum. Fruits globose, dehiscent by an operculum, which occupies 1/3 of the fruit, pericarp subwoody; seeds numerous, large, circular, compressed, not arillate. A neotropical genus of about 10 species.

1. Fevillea cordifolia L., Sp. Pl. 1013. 1753.

Fig. 84. A-F

Pepita amarga, Uyama, Secua

Slightly woody vine that climbs by axillary tendrils and attains 10 m or more in length. Stems green, subcylindrical, glabrous, striate when young, with numerous pendulous lateral branches; tendrils simple or bifurcate, up to 16 cm long. Leaves alternate; blades entire, 8-16 × 4-12 cm, ovate or pentagonal, coriaceous, glabrous, the apex acuminate, the base cordiform, the margins revolute, entire or denticulate; upper surface dark green, shiny; lower surface light green, dull, the venation palmate, prominent; petioles usually curved, sulcate, glabrous, 4-6 cm long. Staminate and pistillate flowers similar, in axillary panicles, 20-60 cm long; pedicels ca. 8 mm long. Calyx crateriform, puberulous, the sepals ovate, ca. 2 mm long; corolla yellow-pink, rotate, the limb ca. 1 cm in diameter, with rounded lobes; stamens 5, ca. 1.5 mm long; ovary globose, puberulous.

Fig. 83. A-B. *Cucurbita moschata*. **A.** Flowering branch. **B.** Pistillate flower, detail of the gynoecium. **C-F.** *Doyerea emetocathartica*. **C.** Flowering branch. **D.** Staminate flower, whole and longitudinal section. **E.** Pistillate flower, whole and longitudinal section. **F.** Fruit, with detail of cross section.

Fruit subglobose, green, 8-12 cm in diameter, operculate, with three sutures united in the distal portion, the pericarp subwoody; seeds few, compressed, subcircular, 3-6 cm in diameter, cream-colored.

Phenology: Flowering from February to September and fruiting from June to September. The seeds are dispersed by water currents and are frequently found on river banks and beaches.

Status: Native, locally common.

Distribution: In disturbed areas along rivers, roads, and moist forest margins in central Puerto Rico. Also in Jamaica, Cuba, Hispaniola, Trinidad, and continental tropical America.

Public forests: Maricao and Río Abajo.

8. LAGENARIA

A monospecific genus, characterized by the following species.

1. Lagenaria siceraria (Molina) Standl., Field Mus. Bot. 3: 435. 1930.

Fig. 84. G-K

BASIONYM: *Cucurbita siceraria* Molina
SYNONYM: *Lagenaria vulgaris* Ser.

Güiro, Güicharo, Marimbo

Herbaceous vine, monoecious, which climbs by tendrils, 5-10 m in length. Stems herbaceous, puberulous or densely pubescent, striate; tendrils axillary, bifid. Leaves alternate; blades simple, 6-15 × 7-22 cm, ovate or pentagonal, angular or lobed, chartaceous, the apex apiculate, the base cordiform, the margins sinuate-dentate; both surfaces puberulous; petioles elongate, with a pair of lateral glands, corniculate where they are joined to the blade; stipules absent. Flowers white, nocturnal, unisexual, actinomorphic, usually solitary, axillary; staminate flowers larger than the pistillate flowers; peduncles longer than the accompanying petiole in the staminate flowers or as long as the petiole in the pistillate flowers. Calyx infundibuliform to campanulate, with 5 triangular to linear lobes, 3-4 mm long; corolla yellow, of free petals, expanded, 2-4 cm long, obovate to oblong-ovate, with the apex apiculate and emarginate; stamens 3, the filaments free, inserted on the base of the floral receptacle, the anthers concrescent; hypanthium < 1 cm long; ovary inferior, tricarpellate, ovoid to cylindrical, tomentose, with numerous horizontal ovules, the style short, the stigmas trilobate. Fruit a berry, very variable in form, 20-35 cm long, the pericarp woody, smooth, glabrous; seeds numerous, ovate-oblong, ca. 1.5 cm long, not arillate.

Phenology: Collected in flower and fruit in September.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: In disturbed areas along roads and moist forest margins in central Puerto Rico. Native to the Old and New World tropics, where it is rather frequently cultivated.

9. LUFFA

Herbaceous vines, monoecious, with axillary tendrils; latex watery. Leaves alternate, petiolate; blades simple, 5-7-lobed; stipules absent. Flowers unisexual, actinomorphic; calyx campanulate, with 5 elongate lobes; corolla rotate, the lobes deep; staminate flowers in axillary racemes; stamens 3-5, not exserted, the filaments free; pistillate flowers solitary, with 3 staminodia; ovary inferior, elongate, tricarpellate, the styles 3, connate at the base, the stigmas forming a trilobed capitulum. Fruits elongate, dehiscent by apical pores, the mesocarp with a fibrous reticulum; seeds numerous, compressed, winged or not, not arillate. An Old World genus of about 10 species, some of which are cultivated throughout the tropics for their useful fruits.

Key to the species of *Luffa*

1a. Stamens 3; fruits with 10 longitudinal ribs; seeds rugose ..... 1. *L. acutangula*
1b. Stamens 5; fruits trigonal, slightly sulcate longitudinally; seeds smooth ..... 2. *L. aegyptiaca*

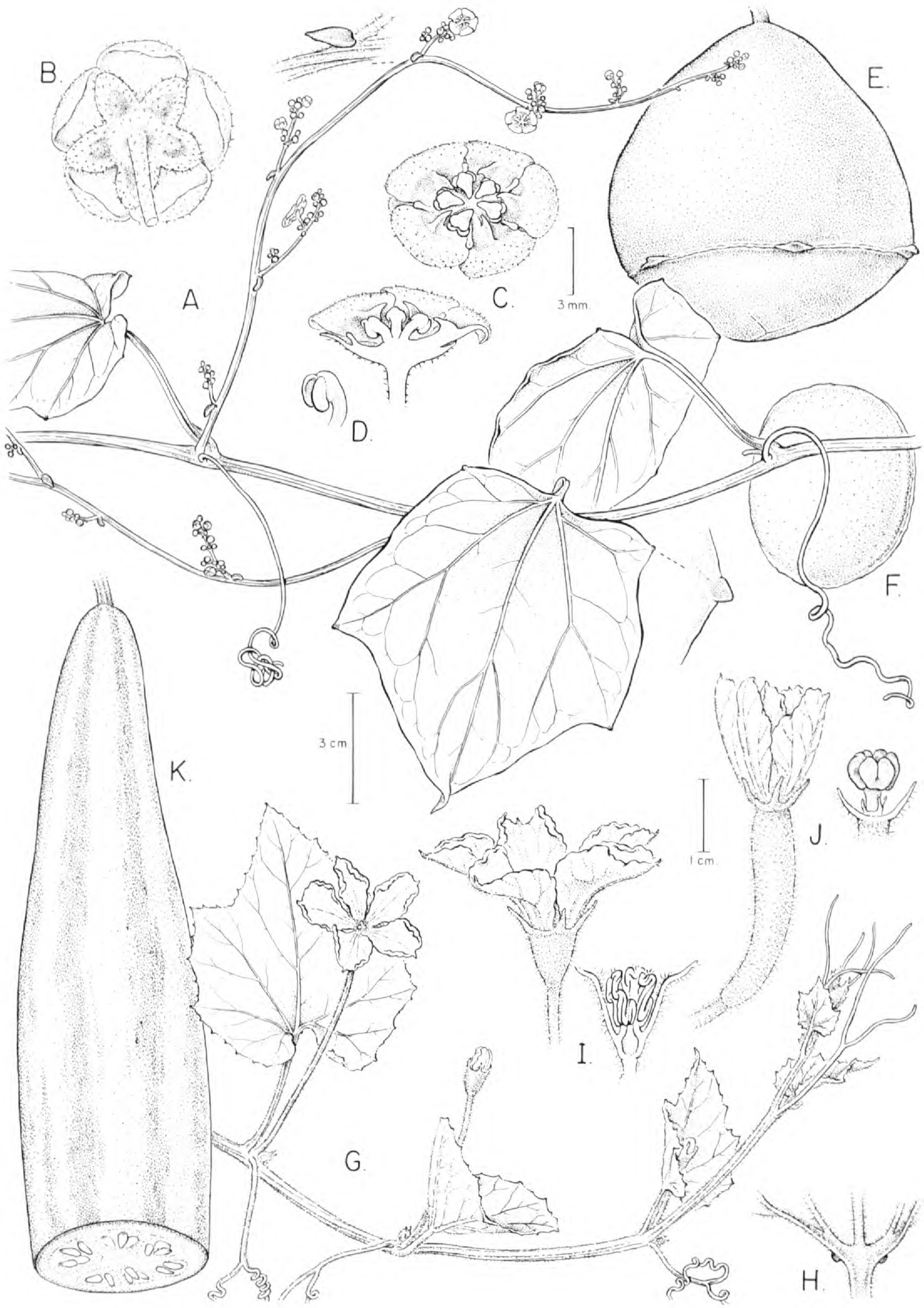

Fig. 84. A-F. *Fevillea cordifolia*. **A.** Flowering branch. **B.** Staminate flower, bottom view. **C.** Staminate flower, longitudinal section and top view. **D.** Anther. **E.** Fruit. **F.** Seed. **G-K.** *Lagenaria siceraria*. **G.** Flowering branch. **H.** Detail of the glands at the base of the leaf blade. **I.** Staminate flower. **J.** Pistillate flower and detail of stigma. **K.** Fruit.

1. Luffa acutangula (L.) Roxb., Hort. Beng. 70. 1814.

Fig. 85. D-E

BASIONYM: *Cucumis acutangula* L.

Esponja, Estropajo

Herbaceous vine, monoecious, creeping or climbing by axillary tendrils, attaining 5-10 m in length. Stems green, angular, scabrous; tendrils trifid. Leaves alternate; blades 15-20 cm long, 5-7-palmatilobed, chartaceous, the lobes more or less deep, the apex acute or acuminate, the base cordiform or hastate, the margins sinuate-dentate or denticulate; upper surface scabrous; lower surface pale green, scabrous; petioles 8-10 cm long. Flowers unisexual, actinomorphic. Calyx urceolate, with keeled lobes, 10-12 mm long, triangular; corolla pale yellow, the lobes deep, obtuse. Staminate flowers in racemes; stamens 3, the filaments free, 3-4 m long, villous. Pistillate flowers solitary, with a hypanthium < 1 cm long; staminodia 3, minute, glandular; ovary inferior, tricarpellate, claviform, 10-angled, with numerous horizontal ovules, the style short, the stigmas globose. Fruit claviform, with 10 longitudinal ribs, 15-30 cm long, the pericarp crustose, dehiscent by apical pores; seeds numerous, ovate, 11-12 mm long, blackish, rugose.

Phenology: Collected in fruit in July.

Status: Exotic, cultivated and naturalized (according to Britton, 1925), uncommon.

Distribution: Probably native to the paleotropics, in disturbed areas along roads and moist forest margins in central Puerto Rico. Cultivated throughout the tropics and subtropics.

2. Luffa aegyptiaca Miller, Gard. Dict. ed. 8. 1768.

Fig. 85. A-C

SYNONYM: *Luffa cilindrica* M. Roem.

Esponja, Estropajo, Sponge cucumber, Strainer vine

Herbaceous vine, monoecious, climbing by axillary tendrils, attaining 10 m in length. Stems green, slender, subcylindrical or angular, ribbed, glabrous or puberulous; tendrils trifid. Leaves alternate; blades 11-25 (35) × 7-25 (32) cm, 3-7-palmatilobed, chartaceous, the lobes lanceolate or ovate, the apices acute or acuminate, the base cordiform, the margins entire or serrate; upper surface scabrid; lower surface pale green, scabrid; petioles as long as or longer than the blade. Flowers unisexual, actinomorphic. Calyx green, campanulate, the lobes 12-15 mm long, lanceolate; corolla pale yellow, 2.5-4.5 cm long, the lobes ovate, obtuse. Staminate flowers in racemes 12-15 cm long; stamens 5, not exserted, the filaments free, 3-4 m long, villous. Pistillate flowers solitary, with a hypanthium ca. 3 cm long; ovary inferior, tricarpellate, ellipsoid, with numerous horizontal ovules, the style short, the stigmas globose. Fruit trigonal, slightly sulcate, 20-45 cm long, the pericarp crustose, dehiscent by apical pores, the mesocarp forming a network of fibers; seeds numerous, elliptical, 10-13 mm long, black, smooth.

Phenology: Flowering from November to January and fruiting in January and from July to August.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: Native to the paleotropics, cultivated, escaped, or naturalized, in disturbed areas along roads and moist forest margins in central Puerto Rico. Also on St. Croix, St. John, and St. Thomas. Cultivated throughout the tropics and subtropics.

10. MELOTHRIA

Herbaceous vines, monoecious, with axillary tendrils; latex watery. Leaves alternate, petiolate; blades simple, entire or lobed; stipules absent. Flowers unisexual, actinomorphic; calyx crateriform, with 5 minute lobes; corolla campanulate, short-tubular, the lobes more or less deep, expanded; staminate flowers in axillary racemes; stamens 3, the filaments free, the anthers free or concrescent; pistillate flowers solitary, with 3 staminodia; ovary inferior, ovoid or fusiform, tricarpellate, the style short, simple, the stigmas 3, linear. Fruit a smooth berry, small, ovoid or ellipsoid; seeds numerous, minute, without an aril. A neotropical genus of about 10 species.

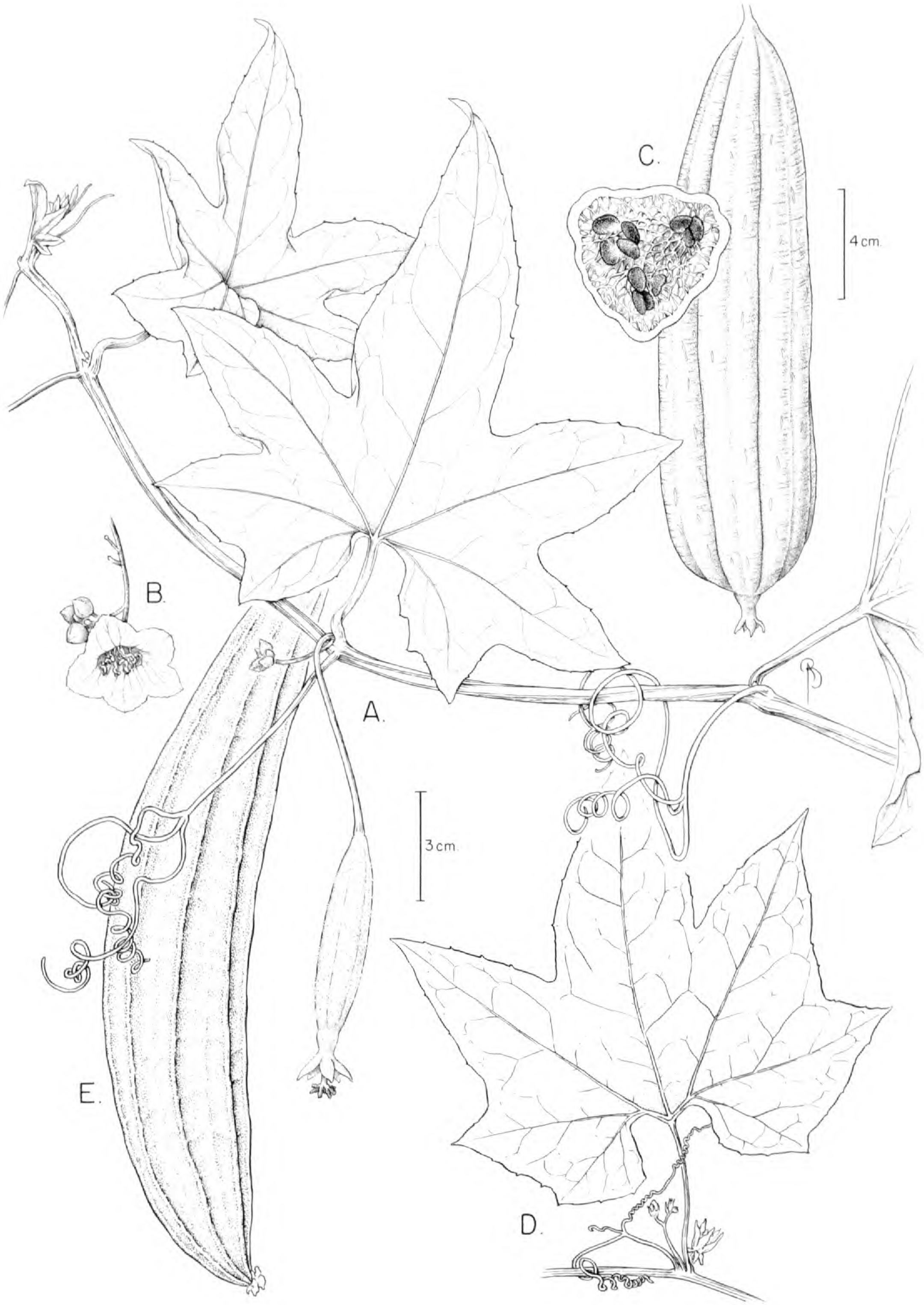

Fig. 85. A-C. *Luffa aegyptiaca*. **A.** Fertile branch. **B.** Staminate flower. **C.** Fruit, with detail of cross section. **D-E.** *Luffa acutangula*. **D.** Flowering branch. **E.** Fruit.

1. Melothria pendula L., Sp. Pl. 35. 1753.
Fig. 86. A-F

SYNONYMS: *Bryonia guadalupensis* Spreng.
Melothria guadalupensis (Spreng.) Cogn.

Pepinillo cimarrón

Herbaceous vine, much branched, which climbs by tendrils, attaining 1-2 (4) m in length. Stems slender, 2-3 mm in diameter, green, slightly striate, puberulous and with some minute hairs; tendrils axillary, simple, filiform, 6-9 cm long. Leaves alternate; blades ovate or 3-5-lobed, membranaceous, the apex acute or acuminate, mucronate, the base lyrate or cordiform, the margins crenate, repand, or denticulate; upper surface green, shiny, scabrid, with the venation flat; lower surface light green, dull, scabrid, with the venation slightly prominent; petioles shorter than the blade, sulcate. Staminate and pistillate flowers in the same raceme; peduncles 2-3 cm long. Calyx yellowish green, campanulate, ca. 5 mm long; corolla pale yellow, campanulate, ca. 5 mm long, with 5 deep lobes; stamens subsessile, adnate to the corolla tube, the anthers free, the pistil with an annular disc at the base. Berry ovoid, smooth, 1.5-1.8 cm long, olive green when ripe; seeds numerous, elliptical or ovate, ca. 5 mm long, not arillate.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: In disturbed areas such as pastures, at upper to lower elevations. Also on Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Antilles, the Bahamas, the southern United States, and continental tropical America.

Public forests: El Yunque, Maricao, Río Abajo, Toro Negro, and Vega.

11. MOMORDICA

Herbaceous vines, monoecious, with axillary tendrils, without latex. Leaves alternate, petiolate; blades simple, entire or palmatilobed; stipules absent. Flowers unisexual, actinomorphic; calyx campanulate or infundibuliform, with 5 minute lobes; corolla campanulate or rotate. Staminate flowers in axillary racemes or solitary; stamens 3, the filaments free, the anthers free or concrescent; pistillodes absent or glandular. Pistillate flowers solitary, on long peduncles with foliaceous bracts; staminodia absent; ovary inferior, ellipsoid, tricarpellate, with numerous horizontal ovules, the style terminal, simple, the stigmas 3, linear, bilobate. Fruit a fleshy capsule, which opens by 3 valves; seeds numerous, compressed, arillate. A predominantly African genus of about 40 species.

1. Momordica charantia L., Sp. Pl. 1009. 1753.
Fig. 86. G-K

Cundeamor, Jumbee pumpkin, Maiden apple, Old maid

Herbaceous vine, creeping or climbing by axillary tendrils, attaining 8 m in length. Stems green, slender, subcylindrical, striate, villous; tendrils simple, 9-11 cm long. Leaves alternate; blades 3-11 × 3-10 cm, 5-7-lobed, membranaceous to chartaceous, the apex obtuse or acute, the base cordiform, the margins deeply undulate or dentate; upper surface dark green, dull, puberulous; lower surface yellowish green, dull, with prominent venation, puberulous; petioles slender, sulcate or slightly winged, villous, 3-6 cm long. Flowers solitary, axillary; peduncle elongate, with a foliose bract below the middle. Calyx yellowish green, campanulate, 10-12 mm long, the lobes lanceolate; corolla pale yellow, rotate, ca. 3.5 cm in diameter. Capsule ellipsoid-angular to fusiform, muricate, 3-5 cm long, changing from green to yellow-orange when mature, dehiscent at the apex by 3 valves; seeds pendulous, compressed, covered by a red and fleshy aril.

Phenology: Flowering and fruiting throughout the year.

Status: Exotic, naturalized, very common.

Distribution: On fences and roadsides and in coffee plantations and pastures at middle and lower elevations. Also on Culebra, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; native to China and Asia but found naturalized throughout the tropics and subtropics of the New World.

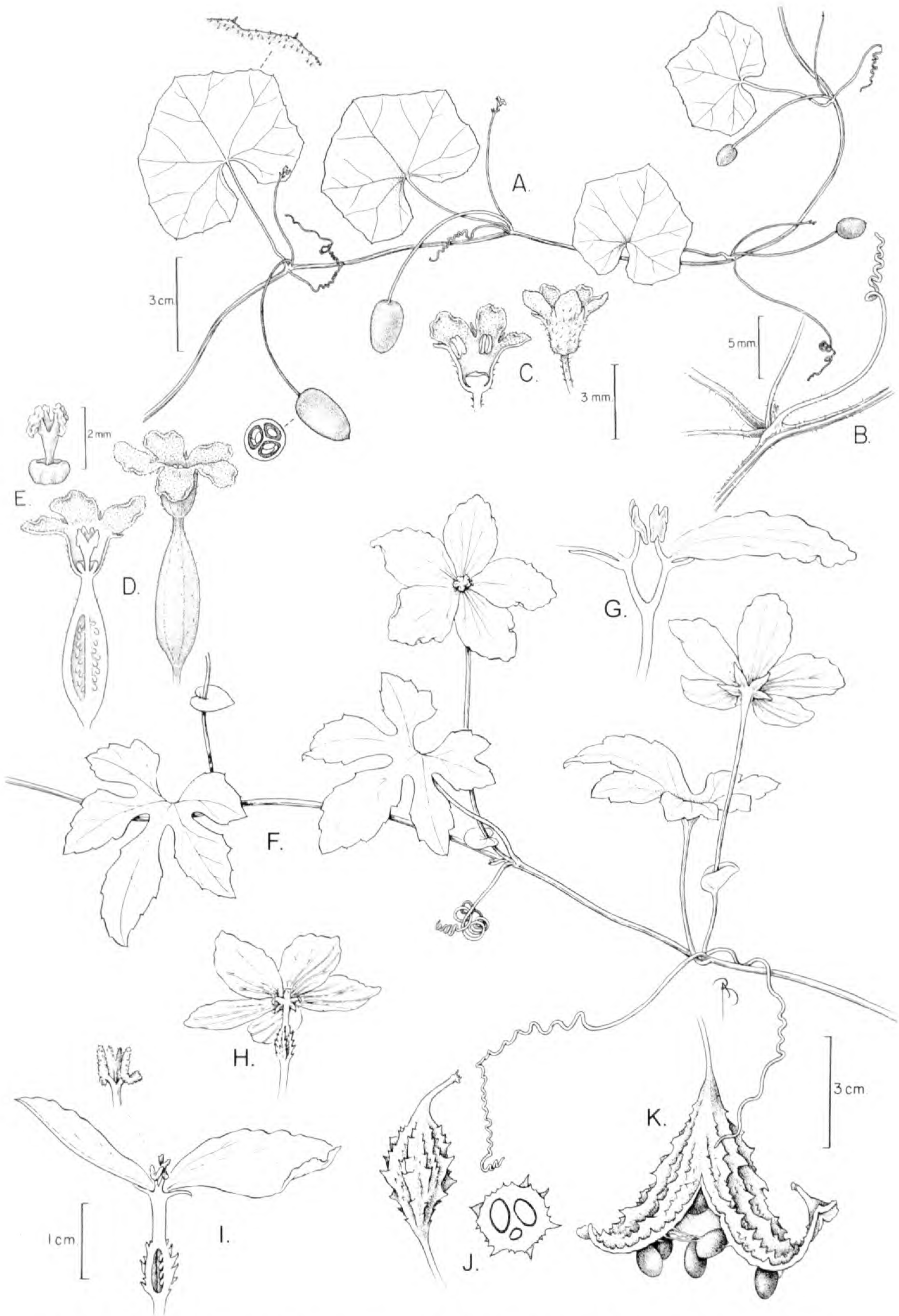

Fig. 86. A-E. *Melothria pendula*. **A**. Fertile branch. **B**. Detail of tendril. **C**. Staminate flower, whole and longitudinal section. **D**. Pistillate flower, whole and longitudinal section. **E**. Gynoecium. **F-K**. *Momordica charantia*. **F.** Flowering branch. **G**. Staminate flower, longitudinal section. **H**. Pistillate flower, side view. **I**. Pistillate flower, longitudinal section. **J**. Fruit, with detail of cross section. **K**. Open fruit. From Mori, S. A. et al. 2003. Vascular plants of central French Guiana. Mem. NYBG Vol. 76(2).

Public forests: Cambalache, El Yunque, Maricao, Mona, Río Abajo, Susúa, and Vega.

Commentary: *Momordica charantia* has at least three forms that are cultivated for their edible fruits. These are known as "bitter melon" and "bitter gourd" and may attain up to 60 cm long. In Puerto Rico the wild form, not a cultivated one, is found, although there exists one collection (*Sintenis 919*), made in 1885, with fruits ca. 15 cm long, apparently from a cultivated plant.

12. PSIGURIA

Herbaceous vines, monoecious or dioecious, climbing by simple axillary or lateral tendrils, without latex. Leaves alternate, petiolate; blades simple, entire, palmatilobed or 3-5-foliolate; stipules absent. Flowers unisexual, actinomorphic; calyx campanulate or infundibuliform, with 5 minute lobes; corolla campanulate or rotate. Staminate flowers in axillary cymes with elongate peduncles; stamens 2, sessile, inserted on the tube of the receptacle, the anthers free, linear, the connective prolonged into an appendage; pistillodes absent. Pistillate flowers solitary or in groups of 2-4; staminodia 2, minute; ovary inferior, oblong, bicarpellate, with numerous horizontal ovules, the style terminal, simple, the stigmas 2, bifurcate. Fruit a cylindrical or ovoid berry, quadrangular or sulcate; seeds numerous, compressed, oblong. A neotropical genus of about 12 species, distributed from Mexico to Paraguay, including the Antilles.

Key to the species of *Psiguria*

1a. Leaves 3-lobed. 2
1b. Leaves 3-5-foliolate. 3

2a. Calyx of the staminate flowers urceolate, with deltate lobes; corolla papillose outside; anthers broadly lanceolate ..... 2. *P. pedata*
2b. Calyx of the staminate flowers cylindrical, with lanceolate-acuminate lobes; corolla puberulous outside; anthers subulate ..... 1. *P. ottoniana*

3a. Pistillate flowers solitary or in pairs; calyx cylindrical-urceolate, ca. 12 mm long; petals 6-7 mm long ..... 2. *P. pedata*
3b. Pistillate flowers in groups of 2-4, axillary; calyx fusiform, 3-3.2 cm long; petals ca. 2.8 cm long ..... 3. *P. trifoliata*

1. Psiguria ottoniana (Schltdl.) C. Jeffrey, Kew Bull. 33: 352. 1978.

Fig. 87. A-B

BASIONYM: *Anguria ottoniana* Schltdl.

Herbaceous vine, attaining 3 m in length and climbing by axillary tendrils. Stems slender, glabrous; tendrils simple, filiform, ca. 15 cm long. Leaves alternate; blades 9-17 × 8-17 cm, deeply 3-5-lobed, glabrous, the lobes acute or acuminate, mucronate, the base deeply cordiform, the margins entire, bidentate toward the apex of the lobe; petioles ca. 3.5 cm long, slender, glabrous. Staminate flowers 3-8, in axillary racemes; peduncle longer than the accompanying leaf; calyx green, cylindrical, slightly dilated at the base, the lobes lanceolate-acuminate; corolla orange, the lobes oblong, acute at the apex, puberulous outside; anthers subulate. Pistillate flowers and fruits unknown.

Phenology: Unknown.

Status: Native, known from Puerto Rico from a single collection (*Plée 42*) at the beginning of the 19th century. This collection was identified by Cogniaux, in his time a specialist in the Cucurbitaceae, and is found deposited in the Museum of Natural History in Paris.

Distribution: Its distribution in Puerto Rico is unknown, since the collection of Plée did not include the specific locality. It is also found in Cuba and the Bahamas (according to Jeffrey and Trujillo, 1992).

2. Psiguria pedata (L.) R. A. Howard, J. Arn. Arb. 54: 441. 1973.

Fig. 87. C-G

BASIONYM: *Cucumis pedatus* L.
SYNONYMS: *Psiguria trilobata* (L.) R. A. Howard
Cucumis trilobatus L.
Anguria trilobata Jacq.
Anguria plumeriana Schltdl.

Monoecious vine, herbaceous, 3-4 m in length and climbing by tendrils. Stems green, slender, striate, glabrous, somewhat fleshy; mature stems fleshy, with the bark very thick, corky, and fissured, with winged longitudinal projections; tendrils lateral, simple, filiform, 10-15 cm long. Leaves alternate; blades 7-13.5 × 5-13.5 cm, broadly ovate, deltoid, 3-lobed, 3-5-foliolate, membranaceous or chartaceous, the venation 5-palmate, the apex acute or acuminate, the lobes obtuse, the base cordiform or hastate, the margins undulate, denticulate, ciliate; upper surface dark green, dull, puberulous, pustulose; lower surface puberulous, sometimes pustulose, light green, dull, with prominent venation; petioles slender, glabrous, 2.5-5 cm long. Staminate flowers in axillary racemes; peduncle as long as or longer than the accompanying leaf; calyx yellowish green, urceolate, 5-7 mm long, the lobes deltate; corolla orange, tubular, ca. 11 mm long, papillose outside, the lobes oblong, ca. 2 cm long; anthers sessile, compressed, lanceolate, 5-8 mm long; pistillode absent. Pistillate flowers solitary or in pairs, axillary, peduncles shorter than the accompanying leaf; calyx and hypanthium fusiform or tubular, 3-3.2 cm long, the lobes subrounded, apiculate, ca. 2 mm long; corolla orange, ca. 2.8 cm long, the lobes free almost to the base, obovate. Berry ellipsoid, smooth, ca. 4 cm long; seeds numerous, elliptical, ca. 7 mm long.

Phenology: Collected in flower in January, May, July, and October and in fruit in July and November.

Status: Native, locally common.

Distribution: In moist forests along the Cordillera Central and in the zone of mogotes. Cited for St. Croix by Cogniaux (1916); also in Hispaniola, Cuba, and the Bahamas.

Public forest: Río Abajo and Vega.

3. Psiguria trifoliata (L.) Alain, Phytologia 47: 192. 1980.

Fig. 89. H

BASIONYM: *Anguria trifoliata* L.
SYNONYM: *Anguria plumeriana* var. *trifoliata* Cogn.
Anguria cookiana Britton

Herbaceous vine, which climbs by tendrils. Stems thick, striate, glabrous, somewhat fleshy; tendrils lateral, simple, filiform, as long as the accompanying leaf. Leaves alternate, 3-foliolate, glabrous; leaflets chartaceous, acute, mucronate, the margins entire or crenate-serrate, the central leaflet 7-10 × 3-5 cm, elliptical, the lateral leaflets 5-9 × 2-4 cm, asymmetrically ovate-lanceolate; petioles slender, glabrous, 1-4 cm long. Staminate flowers 10-20 in axillary racemes; peduncle as long as or longer than the accompanying leaf; calyx obovoid to subcylindrical, glabrous, 8-12 mm long, the lobes triangular, ca. 1 mm long; petals oblong, 1-2 cm long. Pistillate flowers in groups of 2-4, axillary, peduncles short. Berry ovoid-elongate, ca. 4 cm long, smooth, variegated; seeds numerous, elliptical, ca. 7 mm long, without an aril.

Phenology: Collected in fruit in November.

Status: Native, rare.

Distribution: Known from few old collections from Coamo, Vega Baja, and Cayey. Also in Hispaniola.

13. SECHIUM

Herbaceous vines, monoecious, climbing by axillary tendrils, 3-5-fid; without latex; stem tuberous at the base. Leaves alternate, petiolate; blades simple, palmatilobed; stipules absent. Flowers unisexual, actinomorphic; calyx campanulate, with 5 minute lobes; corolla campanulate or rotate, the lobes deep. Staminate flowers in axillary racemes or panicles with elongate peduncles; stamens 5, the filaments united to one another to form a central column, the anthers sigmoid; pistillodes absent. Pistillate flowers solitary or in pairs, smaller than the staminate flowers, axillary to the staminate inflorescence; ovary inferior, obovoid, unicarpellate, with a pendulous ovule, solitary, the style terminal, simple,

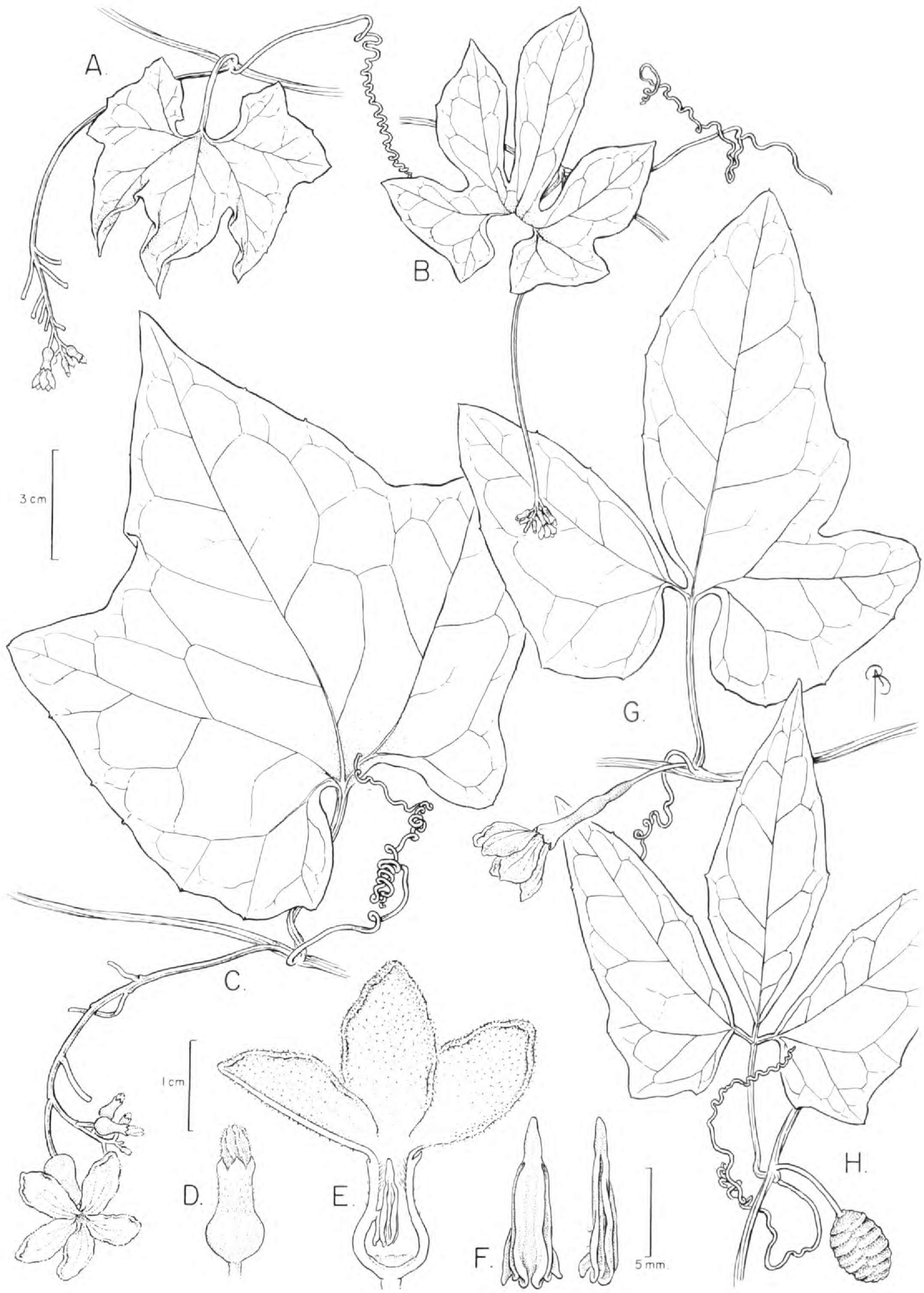

Fig. 87. A-B. *Psiguria ottoniana.* **A.** Branch with lobed leaf. **B.** Branch with deeply lobed leaf. **C-G.** *Psiguria pedata.* **C.** Branch with staminate inflorescence. **D.** Bud. **E.** Staminate flower, longitudinal section. **F.** Stamens, front and side views. **G.** Branch with pistillate flower. **H.** *Psiguria trifoliata*, branch with fruit.

short, the stigma subglobose. Fruit indehiscent, fleshy, pyriform, sulcate, spinulose; seed one, large, compressed, germinating inside the fruit. A genus native to Central America, of about 5 species.

1. Sechium edule (Jacq.) Sw., Fl. Ind. Occ. 1150. 1800.

Fig. 88. A-E

BASIONYM: *Sicyos edulis* Jacq.

Chayote, Cho-cho

Herbaceous vine climbing by axillary tendrils, 10 or more m in length. Stems much branched, greenish, striate, pubescent when young, glabrous when mature, sometimes pubescent at the nodes; tendrils axillary or lateral to the leaves, thick, with 4 or 5 branches that intertwine in a spiral. Leaves alternate; blades 6-22 × 6-22 cm, ovate or rounded, 3-5-lobed-angled, chartaceous, the venation 5-9-palmate, the lobes acute at the apex, the base cordiform, the margins entire or denticulate; upper surface dark green, scabrous, with the venation slightly prominent; lower surface yellowish green, with prominent venation, pubescent; petioles thick, 4-15 cm long. Staminate flowers in axillary racemes; calyx green, campanulate, with 5 minute lanceolate lobes; corolla yellowish green, the lobes oblong, 6-8 mm long; stamens yellow. Pistillate flowers solitary on a long pedicel axillary to the staminate inflorescence; calyx green, campanulate, with oblong lobes, ca. 4 mm long; corolla yellowish green, with five deep lobes, oblong, 10-12 mm long; ovary inferior, obovoid-fusiform, pubescent. Fruit fleshy, pyriform, sulcate, 8-16 cm long, green or white, usually spinulose. Seed one, lenticular, germinating inside the fruit.

Phenology: Flowering and fruiting throughout the year.

Status: Exotic, cultivated and naturalized, very common.

Distribution: In disturbed areas. Native to Central America, widely cultivated throughout the tropics for its edible fruits.

Public forests: Maricao and Río Abajo.

14. SICANA

Herbaceous vines, monoecious, climbing by axillary tendrils, 3-5-fid. Leaves alternate, petiolate; blades simple, 5-9-lobed; stipules absent. Flowers unisexual, actinomorphic; calyx campanulate, with 5 reflexed lobes; corolla campanulate, with 5 deep oblong-ovate lobes. Staminate flowers solitary; stamens 3, the filaments short, inserted on the receptacle, the anthers sigmoid, concrescent in a capitulum; pistillodes absent. Pistillate flowers solitary, similar to the staminate flowers; staminodia 3, minute; ovary inferior, subovoid, tricarpellate, with numerous horizontal ovules, the style terminal, simple, short, the stigmas 3, slightly bilobate, papillose. Fruit a cylindrical berry, smooth; seeds numerous, oblong, compressed, not arillate. A genus of 4 species, one of which is cultivated throughout Latin America; of the remaining species, one is endemic to Jamaica, another to Trinidad and Tobago, and another to the Dominican Republic.

1. Sicana odorifera (Vell.) Naudin, Ann. Sci. Nat. Bot. Sér. 4: 18. 181. 1862.

Fig. 88. F-G

BASIONYM: *Cucurbita odorifera* Vell.

Pepino angolo, Casabana, Curuba, Pepino

Herbaceous vine, climbing by tendrils, attaining 8 m or more in length. Stems green, thick, sulcate, puberulent or glabrescent; tendrils axillary, 5-fid, 9-11 cm long. Leaves alternate; blades 10-20 × 10-20 cm, 3-5 (7)-lobed, chartaceous, the lobes deep, acute, the base cordiform, the margins undulate or denticulate; upper surface dark green, slightly shiny, glabrous; lower surface pale green, with prominent venation, glabrous; petioles 7-13 cm long, slender, canaliculate or slightly winged, villous. Flowers unisexual, ascending, solitary, axillary; peduncle shorter than the accompanying leaf. Calyx green, campanulate, 6-8 mm long, tomentose, the lobes

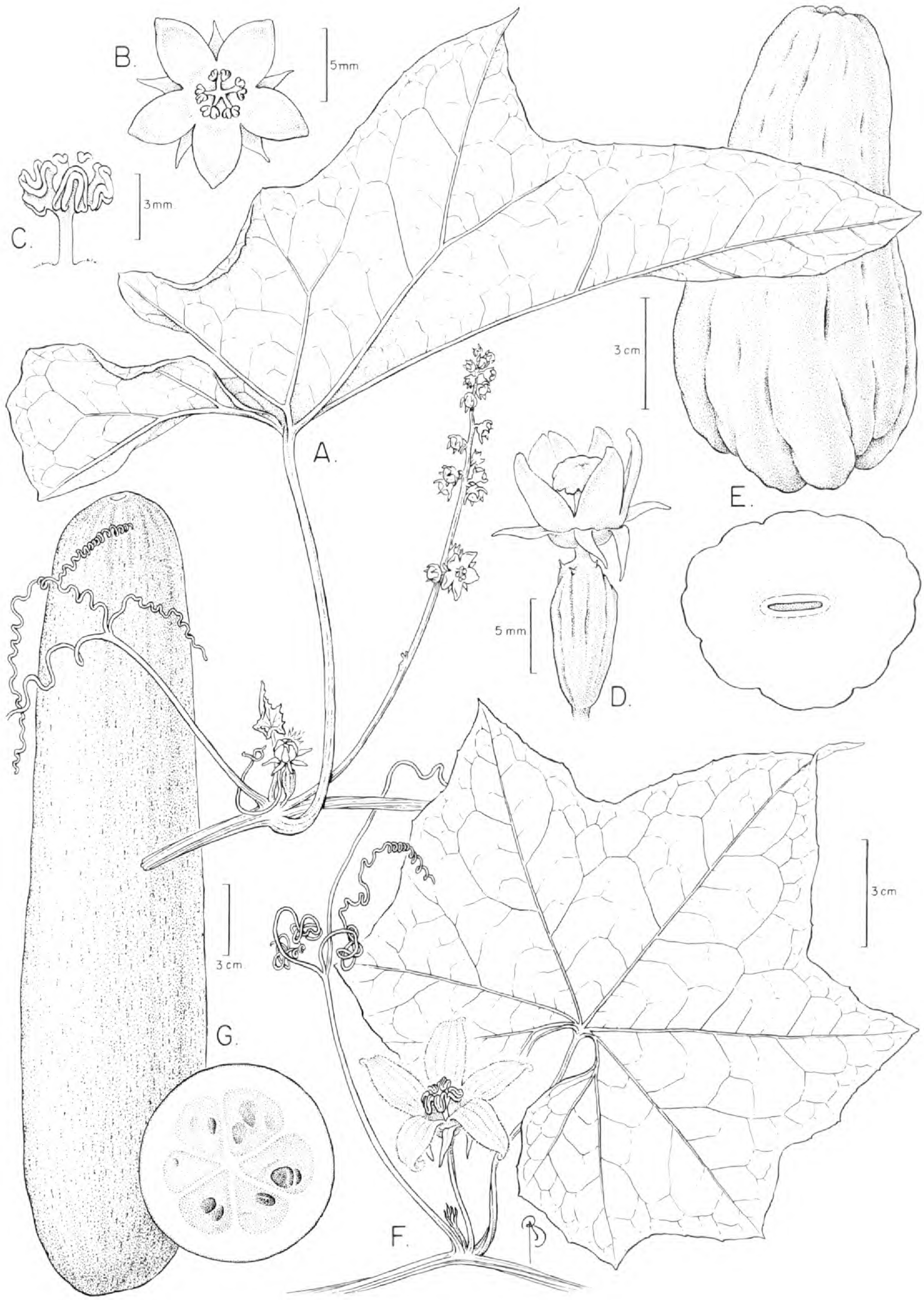

Fig. 88. A-E. *Sechium edule*. **A.** Flowering branch. **B.** Staminate flower, top view. **C.** Stamens. **D.** Pistillate flower. **E.** Fruit, with detail of cross section. **F-G.** *Sicana odorifera*. **F.** Flowering branch (staminate). **G.** Fruit, with detail of cross section.

reflexed, 10-12 mm long, lanceolate; corolla yellow, campanulate, 2.5-4 cm long, tomentose; stamens 3; staminodia 3; ovary ovoid, 5-6 mm long, puberulent. Berry pendulous, cylindrical or ellipsoid, 30-50 cm long and ca. 10 cm in diameter, yellowish brown or mulberry-colored; seeds, numerous, asymmetrically ovate, compressed, with the margin darker, 13.5-15 mm long.

Phenology: Collected in flower and fruit during August.

Status: Exotic, cultivated, common.

Distribution: Species native to South America, cultivated in Puerto Rico and the Greater Antilles for its edible fruits, which are found for sale in the public markets.

References: Cogniaux, A. 1916. Cucurbitaceae-Fevilleae et Melothrieae. Pp. 1-246. *In:* A. Engler (ed.). Das Pflanzenreich. IV. 275. Jeffrey, C. and B. Trujillo. 1992. Cucurbitaceae. Flora de Venezuela. Vol. 5(1): 11-201. Kirkbride, J. H. 1993. Biosystematic monograph of the genus *Cucumis* (Cucurbitaceae). Parkway Publishers. Boone, North Carolina. Purseglove, J.W. 1982. Tropical crops. Dicotyledons. Longman Group Ltd.; Whitaker, T.W. and G.W. Bohn. 1950. The taxonomy, genetics, production and uses of the cultivated species of *Cucurbita*. Econ. Bot. 4: 52-81.

20. *Family* ***CUSCUTACEAE***

1. CUSCUTA

Herbs with more or less long twining stems, without chlorophyll, parasites by means of haustoria. Leaves alternate, rudimentary, reduced to minute scales; stipules absent. Flowers minute, bisexual, actinomorphic, in axillary heads or spikes; calyx crateriform, of 4-5 free or connate sepals; corolla white or pink, tubular, with 4-5 lobes; stamens 4-5, the filaments adnate to the corolla tube, with a basal appendage on the ventral surface, the anthers longitudinally dehiscent; ovary superior, bicarpellate, each carpel with 2 ovules, the styles 2, free. Fruit a capsule, circumscissile or with irregular dehiscence, or an indehiscent berry; seeds (1)2-4 per fruit, minute.

1. Cuscuta americana L., Sp. Pl. 124. 1753.
Fig. 89. A-H
Fideillo, Tente en el aire

Herbaceous parasitic vine, attaining 5 m in length, with numerous lateral twining branches that adhere by means of haustoria. Stems yellow-orange, cylindrical, smooth, glabrous, 1.5-2.5 mm in diameter. Leaves vestigial, 1-2 mm long, yellowish, in the form of scales. Flowers bisexual, sessile, in short axillary cymes. Calyx crateriform, whitish, membranaceous, 2.3-2.5 mm long, with 5 minute lobes; corolla whitish, crateriform to tubular, ca. 2.3 mm long, with 5 minute and rounded lobes; stamens 5, adnate to the upper portion of the corolla tube, the filaments with a scalloped scale at the base; ovary depressed-globose. Capsule thin-walled, 1.5-2 mm long, opening longitudinally in the area between the two styles. Seed one or rarely two per fruit, subglobose or lenticular, ca. 1.5 mm long, smooth, light brown.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common

Distribution: In coastal thickets. Also on Desecheo, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Neotropics.

Public forests: Ceiba, Guánica, and Mona.

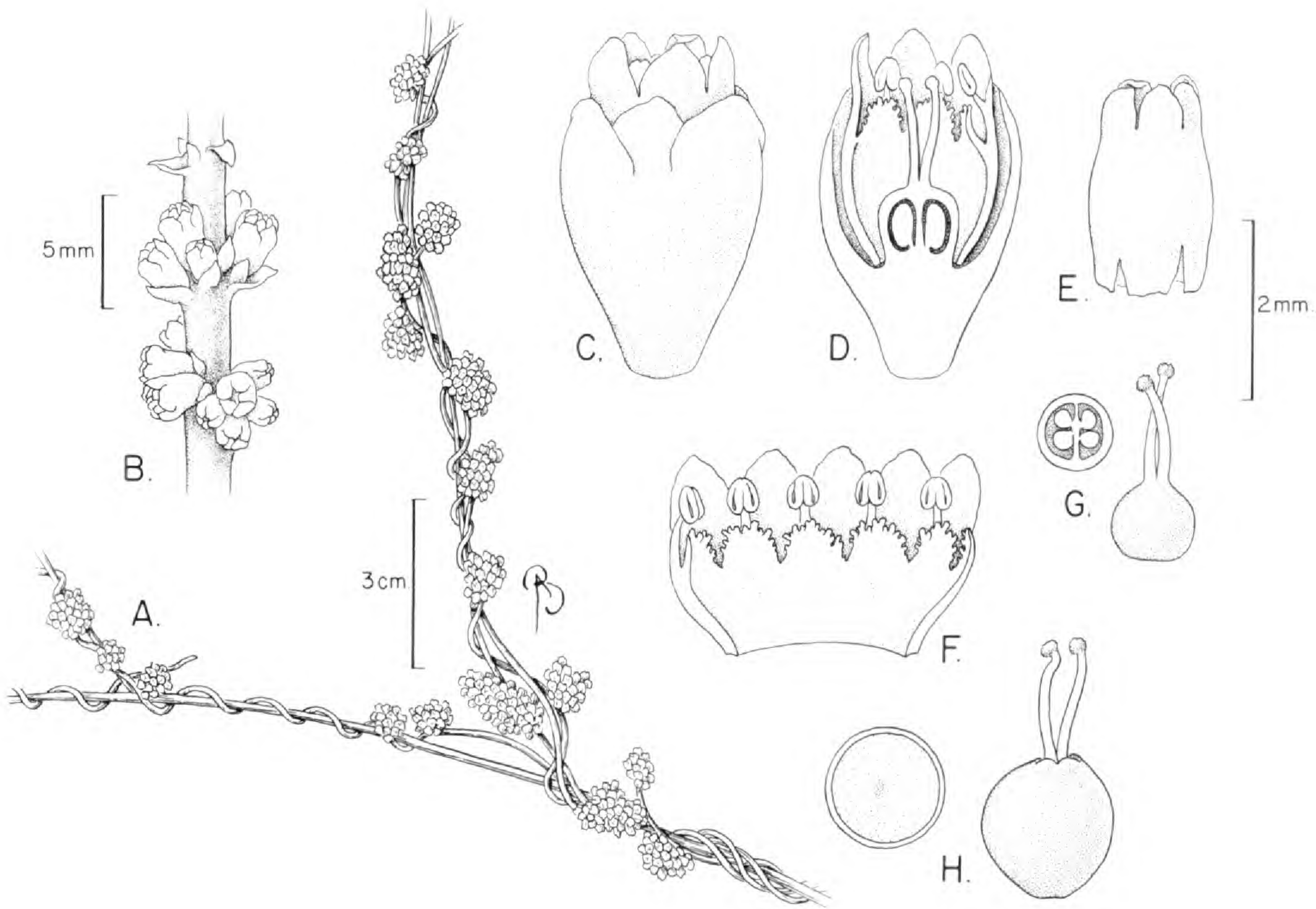

Fig. 89. A-H. *Cuscuta americana*. **A.** Flowering branch. **B.** Detail of inflorescence. **C.** Flower. **D.** Flower, longitudinal section. **E.** Corolla. **F.** Corolla open, showing stamens. **G.** Gynoecium, and cross section of the ovary. **H.** Fruit, with detail of cross section. From Acevedo-Rodríguez et al. 1996. Flora of St. John, U. S. Virgin Islands. Mem. NYBG Vol. 78.

21. *Family* ***DILLENIACEAE***

Key to the genera

1a. Leaves acuminate at the apex; ovary unicarpellate; inflorescence fasciculate; fruits subglobose, pubescent .....1. *Doliocarpus*
1b. Leaves obtuse or apiculate at the apex; ovary bicarpellate; inflorescence paniculate; fruits bilobate, glabrous .....2. *Pinzona*

1. DOLIOCARPUS

Twining vines; stems thick, sometimes attaining 30 cm in diameter; cross section with concentric rings of xylem alternating with concentric rings of parenchyma. Leaves alternate, simple, entire or serrate, petiolate; stipules absent or of short duration. Inflorescences of fascicles or glomerules. Flowers bisexual, actinomorphic. Calyx of 3-6 free sepals, subequal, generally the inner ones larger, imbricate, persistent; petals 2-6, free, early deciduous, white; stamens numerous, the filaments unequal, the anthers

dehiscent by longitudinal sutures; ovary superior, unicarpellate, with two basal ovules, the style terminal, filiform, the stigma punctiform to peltate. Fruit a berry or capsule with irregular dehiscence; seeds usually 2, reniform, black, covered by a white arillode, membranaceous or fleshy. A neotropical genus of about 40 species.

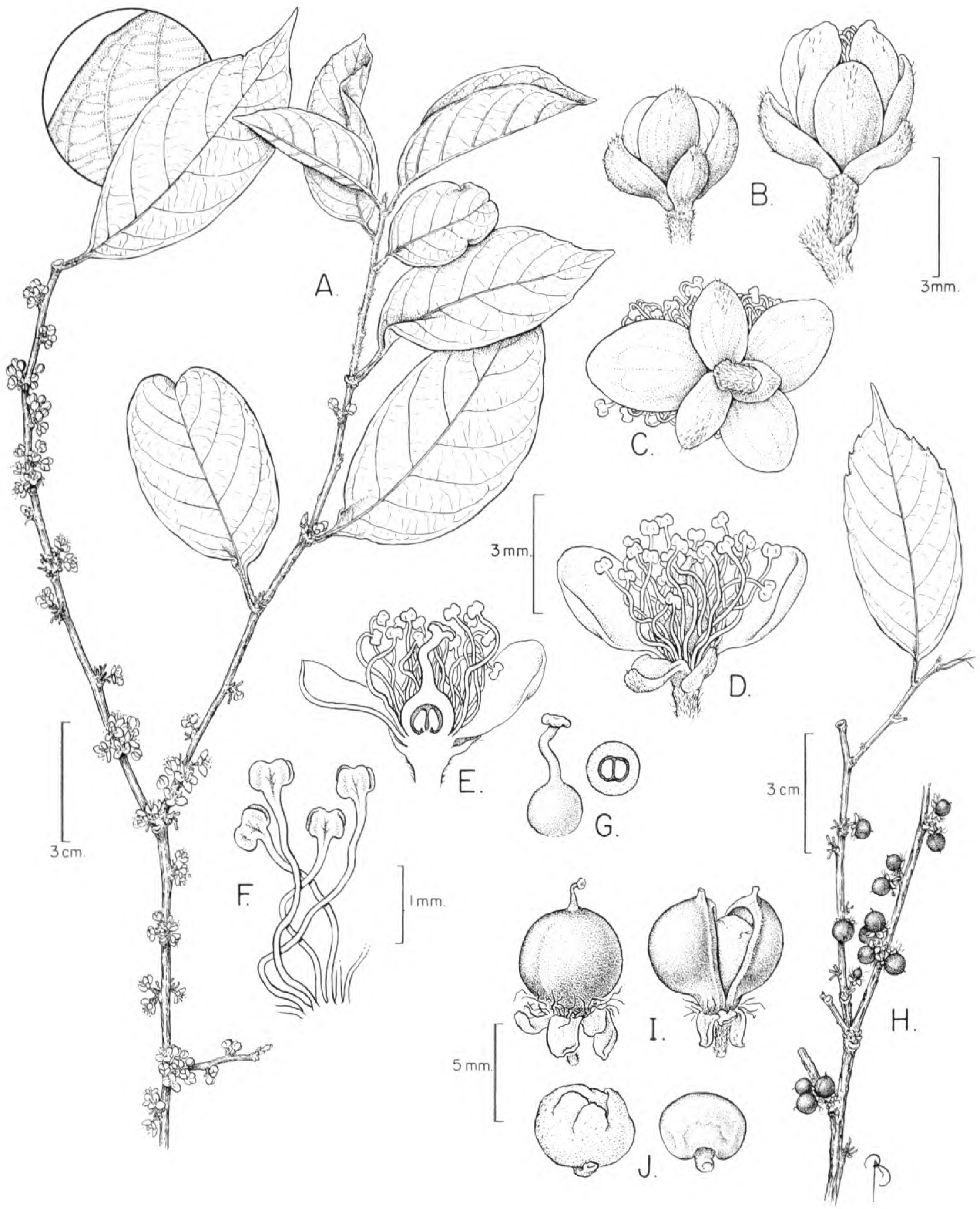

Fig. 90. A-J. *Doliocarpus brevipedicellatus*. **A.** Flowering branch. **B.** Floral buds. **C.** Flower, basal view. **D.** Flower, side view. **E.** Flower, longitudinal section. **F.** Stamens. **G.** Gynoecium, whole and cross section, showing two ovules. **H.** Fruiting branch. **I.** Fruit, closed and open. **J.** Seed, with arillode and naked. From Mori, S. A. et al. 2003. Vascular plants of central French Guiana. Mem. NYBG Vol. 76(2).

1. Doliocarpus brevipedicellatus Garcke, Linnaea 22: 47. 1849.

Fig. 90. A-J

Twining liana attainig 5 m or more in length. Branches angular, appressed-pubescent. Leaves 5-16 × 2.5-8 cm, lanceolate or less frequently elliptic-lanceolate, coriaceous or subcoriaceous, the upper surface pilose on the primary vein, the lower surface strigose on the secondary veins, the apex acuminate, the base cuneate or rounded, the margins deeply dentate-mucronate; petioles 0.5-1.2 cm long, strigose. Inflorescences fasciculate, racemose, with 3-5 flowers; peduncles and pedicels appressed-pubescent. Calyx of 4-5 unequal sepals, pilose outside, the outer ones 1.5-2 mm long, lanceolate, the inner ones 3-3.5 mm long, ovate-elliptical; petals 2-3 mm long, white; stamens 25-40; pistil glabrous. Capsules 4-7 mm in diameter, irregularly dehiscent. Seed one.

Phenology: Collected in flower in March.

Status: Native, uncommon in Puerto Rico.

Distribution: Known from the zone of mogotes. Its distribution in the Neotropics is rather widespread, being found in Hispaniola, Nicaragua, Panama, Colombia, Venezuela, the Guianas, Brazil, and Bolivia.

Commentary: This species was treated by Liogier (1994) in his "Descriptive Flora of Puerto Rico and adjacent islands, Vol. 3" as a synonym of *Doliocarpus major* Gmel. This error was initiated by Hunter in 1965, but corrected by Kubitzki in 1971. *Doliocarpus major* is a South American species that is distinguished from *D. brevipedicellatus,* among other things, by having longer inflorescences and papillae on the lower surface of the leaves.

Excluded species: *Doliocarpus olivaceus* Sprague & R.O. Williams ex Standl. was reported for Puerto Rico by Liogier (1994) based on the erroneous identification of a specimen of *Pinzona coriacea*. This species is known from Venezuela, the Guianas, Brazil, and Bolivia, but not from the Antilles.

2. PINZONA

A monotypic genus characterized by the following species.

1. Pinzona coriacea Mart. & Zucc. in Zucc., Abh. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. 1: 371. 1832.

Fig. 1C; 91. A-K

SYNONYM: *Doliocarpus calinoides* (Eichl.) Gilg.

Bejuco de agua

Twining liana attainig 30 m in length; stems cylindrical, up to 10 cm in diameter, producing abundant potable water when cut; bark reddish brown, peeling in a scaly manner; cross section with concentric rings of xylem alternating with rings of parenchyma. Branches puberulent, angular, scabrous, glabrescent, and cylindrical when mature. Leaves alternate, 8.5-22 × 3-12.5 cm, broadly elliptical, ovate to obovate, coriaceous, the apex rounded, sometimes short-apiculate, the base rounded to subcordiform, the margins revolute, sinuate, or dentate-mucronate; upper surface scabrid, sometimes with the veins appressed-pubescent; lower surface with prominent venation, papillose; petioles thick, 1-3.5 cm long, winged, with the base decurrent to half the diameter of the branch. Inflorescences of axillary panicles, 3-7 cm long, pilose; bracts oblong to ovate, 1-2 mm long. Calyx of 3-4 subequal sepals, ca. 2 mm long; petals 3, obovate, longer than the sepals; stamens 25-30, the filaments sinuate; ovary superior, bicarpellate, biglobose, glabrous. Fruit capsular, bilobate, bilocular, crustose, tardily dehiscent. Seeds 2 per fruit, with an orange arillode.

Phenology: Collected in flower in May and June and in fruit in November.

Status: Native, locally common.

Distribution: In moist, mature forests of montane areas, in the Cordillera Central and the Sierra de Luquillo. From Belize to Bolivia, including the Antilles.

Public Forests: Carite and El Yunque.

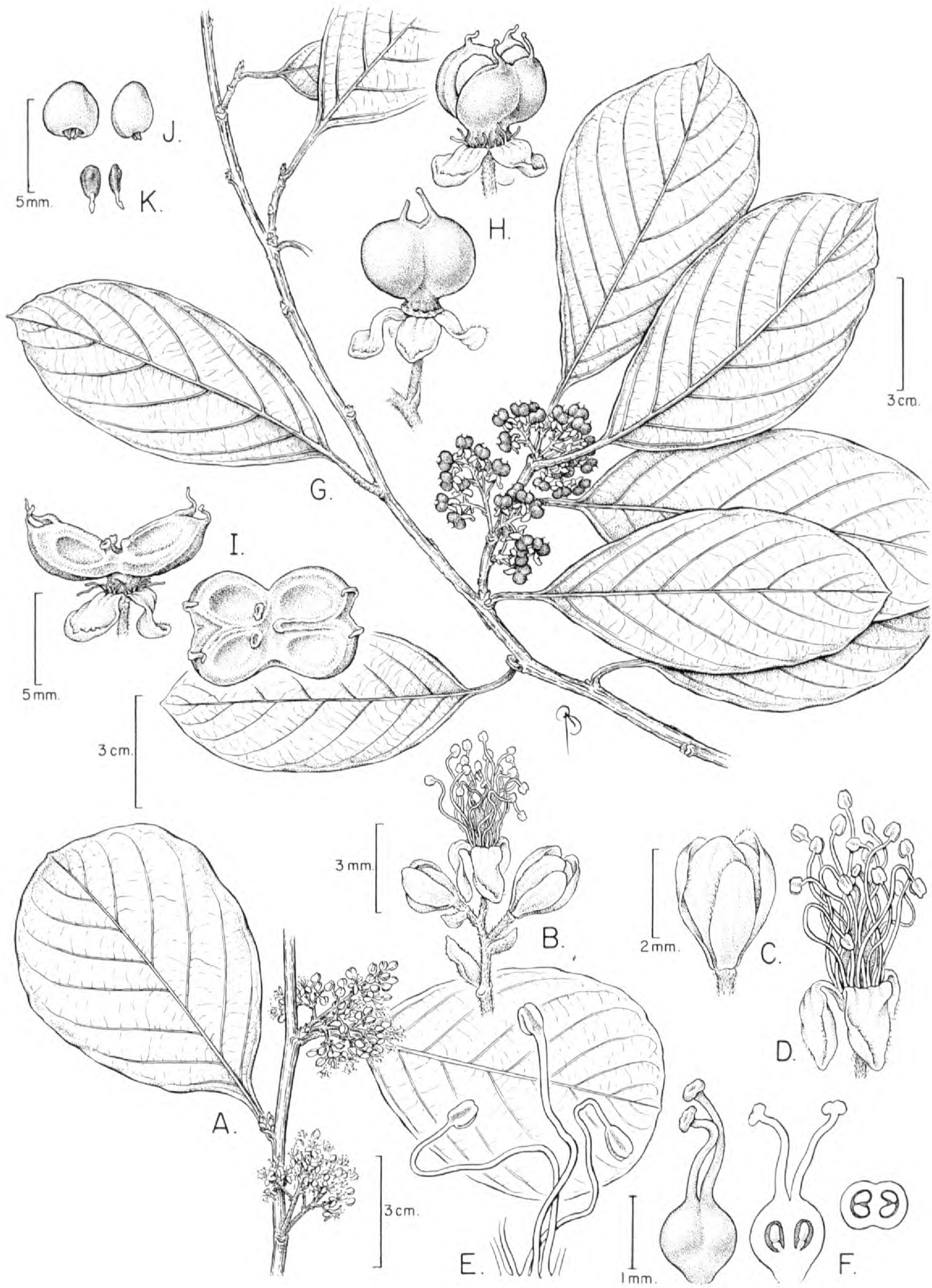

Fig. 91. A-K. *Pinzona coriacea*. **A.** Flowering branch. **B.** Detail of inflorescence. **C.** Bud. **D.** Flower. **E.** Stamens. **F.** Gynoecium, whole, longitudinal section, and cross section. **G.** Fruiting branch. **H.** Fruit, closed and open. **I.** Open fruit, without seeds, side and top views. **J.** Seed, front and side views. **K.** Embryo, front and side views. From Mori, S. A. et al. 2003. Vascular plants of central French Guiana. Mem. NYBG Vol. 76(2).

References: Aymard, G.A., 1998. Dilleniaceae. *In*: Steyermark et al. (eds.), Flora of the Venezuelan Guayana. Vol. 4; Aymard, G.A. 1997. Dilleniaceae Nova Neotropicae, V. El género *Doliocarpus* en Colombia. Anal. Jardín Bot. Madrid 55: 17-30; Hunter, G.E. 1965. Flora of Panama Part VI. Family 118. Dilleniaceae. Ann. Missouri Bot. Gard. 52: 580-598; Kubitzki, K. 1971. *Doliocarpus, Davilla* und verwandte Gattungen (Dilleniaceae). Mitt. Bot. München 9: 1-105.

22. *Family* ***ERICACEAE***

Key to the genera

1a. Corolla tubular or tubular-campanulate, 1.4-1.8 cm long, white, pink, or red; leaves rounded or rounded-ovate, 1-2.7 cm long, the lateral veins inconspicuous; flowers solitary (in our species).....1. *Gonocalyx*
1b. Corolla campanulate, 6-8 mm long, yellowish green; leaves 4-11 cm long, usually ovate, with the secondary and tertiary veins visible; flowers in terminal racemes ..... 2. *Vaccinium*

1. GONOCALYX

Epiphytic or terrestrial shrubs, erect or clambering. Leaves alternate, entire, coriaceous, short-petiolate. Inflorescences of terminal racemes or the flowers solitary or in pairs. Flowers bisexual, actinomorphic. Calyx tubular or tubular-campanulate, ribbed or smooth, with 4-5 lobes at the apex; corolla campanulate to tubular, red, pink, or white, with 4-5 lobes; stamens 8-10, the filaments shorter than the anthers, adnate to the base of the corolla, the anthers with two thecae, whose distal portion is elongate and tubular, with a terminal pore or with longitudinal sutures; disc 10-lobate; ovary inferior, 4-5-locular, the style terminal, single, the stigma truncate. Fruit a berry, usually with 4-5 longitudinal ribs; seeds numerous, minute. A genus of 8 species, distributed in Hispaniola, Puerto Rico, the Lesser Antilles, Costa Rica, and Colombia.

Key to the species of *Gonocalyx*

1a. Calyx green; corolla tubular-cylindrical, white or pink, with the lobes erect; stigma white, slightly exserted; leaves rounded or ovate-elliptical, the margins markedly revolute (the blade convex), the apex rounded .....2. *G. portoricensis*
1b. Calyx red; corolla tubular-campanulate or campanulate, red, with the lobes expanded; stigma red, exserted; leaves ovate, ovate-elliptical, or rarely rounded, the margins slightly revolute (the blade almost flat), the apex acute or obtuse .....1. *G. concolor*

1. Gonocalyx concolor Nevling, J. Arn. Arb. 51: 222. 1970.

Fig. 92. A-D

Epiphytic or terrestrial shrub, usually clambering, attainig 5 m in length. Stems much branched, slender, cylindrical, dark brown, the twigs minutely dense-pubescent. Leaves alternate, ovate, ovate-elliptical, or less frequently rounded, flat, rigid-coriaceous, 1.5-2.7 × 1-2 cm, the apex obtuse or acute, sometimes rounded, mucronate, the base obtuse or rounded, the margins slightly revolute or flat, entire or crenulate; upper surface glabrous, with the midvein sunken; lower surface

pale green, shiny, with scattered papilliform hairs, the midvein prominent, the lateral venation inconspicuous; petioles 2-2.5 mm long. Flowers solitary, axillary, pendulous; peduncle 7-11 mm long. Calyx campanulate, red, with 5 longitudinal ribs, 3-3.5 mm long; corolla tubular-campanulate, red, ca.18 mm long, with 5 broadly deltate, expanded lobes; stamens 8, the filaments ca. 2 mm long, pubescent, the anthers with the distal, tubular portion of the theca 4-5 times longer than the theca, projecting slightly outside the corolla; ovary inferior, the style thick, the stigma red, exserted. Fruits subglobose-5-angled, wine-red, truncate, 6.5-9 mm long (Kolterman et al. unpublished data).

Phenology: Collected in flower during April and July.

Status: Endemic to Puerto Rico, quite rare.

Distribution: Known only from the Carite forest.

Public Forest: Carite.

2. Gonocalyx portoricensis (Urb.) A.C. Smith, Contr. U. S. Natl. Herb. 38: 354. 1932.

Fig. 92. E-I

BASIONYM: *Thibaudia portoricensis Urb.*
SYNONYM: *Ceratostema portoricensis (Urb.) Hoerold*

Clambering shrub attainig 3 m in length. Stems much branched, slender, cylindrical, dark brown, the twigs reddish, densely pubescent. Leaves alternate, reddish when young, circular or broadly ovate, convex, rigid, 0.8-2 × 0.6-1.2 cm, the apex obtuse or rounded, mucronate, the base obtuse or rounded, the margins markedly revolute, entire or denticulate; upper surface green, shiny, glabrous, with the midvein sunken; lower surface pale green, shiny, glabrous or with scattered papilliform hairs, with the midvein prominent and the lateral venation inconspicuous; petioles 1.5-3 mm long. Flowers solitary, axillary, pendulous; peduncle 6-12 mm long. Calyx campanulate, with 5 longitudinal ribs, 3-3.5 mm long; corolla tubular, pale pink or white, ca. 16 mm long, with 5 erect, deltate lobes; stamens 10, the filaments ca. 1 mm long, pubescent on the upper margin, the anthers with the distal, tubular portion of the theca 4-5 times longer than the theca, not exserted; ovary inferior, the style thick, the stigma white, slightly exserted. Fruits depressed-globose, white or red, 4-7 mm in diameter.

Phenology: Flowering and fruiting from the end of January to August.

Status: Endemic to Puerto Rico, rather common.

Distribution: On mountaintops, usually in dwarf forest, along the Cordillera Central and the Sierra de Luquillo.

Public Forests: Carite, El Yunque, Guilarte, and Toro Negro.

2. VACCINIUM

Shrubs, erect or less frequently clambering, or rarely trees. Leaves alternate, pinnately veined, entire or serrate, coriaceous, petiolate. Inflorescences of axillary racemes, less frequently the flowers solitary or in pairs; pedicels usually bibracteate. Flowers bisexual, actinomorphic. Calyx tubular to globose, with 4-5 lobes at the apex; corolla cylindrical, urceolate, or campanulate, white, green, red, or yellowish, with 4-5 more or less deep lobes; stamens 8-10, as long as the corolla; ovary inferior or partially inferior, 4-5-locular, the style terminal, single, the stigma simple or capitate. Fruit a berry, with the sepals persistent on the apical portion; seeds 5-numerous, minute. A genus of about 300 species, mostly of the Northern Hemisphere and in the montane forests of the tropics.

1. Vaccinium racemosum (Vahl) Wilbur & Luteyn, Brittonia 29: 275. 1977.

Fig. 92. J-M

BASIONYM: *Hornemannia racemosa* Vahl
SYNONYMS: *Symphysia racemosa* (Vahl) Stearn
Thibaudia krugii Urb. & Hoerold

Woody shrub, scandent or clambering, attainig 3-5 m in length. Stems much branched, copper-colored, more or less cylindrical, striate, attaining up to 3 cm in diameter, the nodes swollen. Leaves alternate, reddish when young, glabrous, coriaceous, slightly brittle, ovate or elliptical, 4-

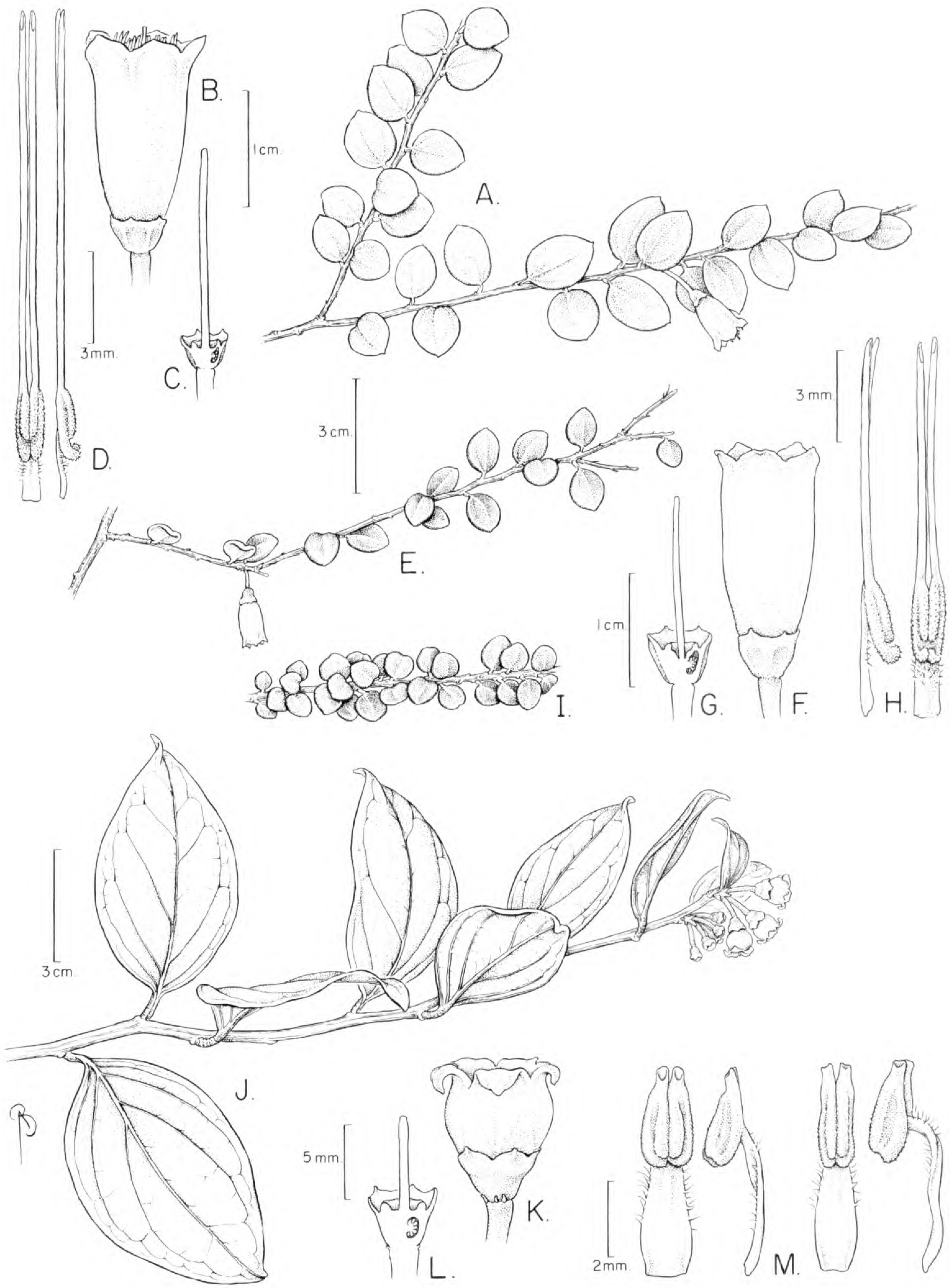

Fig. 92. A-D. *Gonocalyx concolor*. **A.** Flowering branch. **B.** Flower. **C.** Calyx, longitudinal section. **D.** Stamens, front and side views. **E-I.** *Gonocalyx portoricensis*. **E.** Flowering branch. **F.** Flower. **G.** Calyx, longitudinal section. **H.** Stamens, side and front views. **I.** Vegetative branch. **J-M.** *Vaccinium racemosum*. **J.** Flowering branch. **K.** Flower. **L.** Calyx, longitudinal section. **M.** Stamens.

14 × 2-8 cm, in general convex, the venation pinnate, usually from near the base, the apex acuminate, the base rounded or obtuse, the margins entire or undulate, revolute; upper surface dark green, shiny, with the venation generally sunken, translucent and yellowish; lower surface yellowish green, with the palmate venation prominent; petioles 5-7 mm long, thick, rugose. Inflorescences of terminal corymbiform racemes; pedicels thick, 10-12 mm long. Calyx campanulate, ca. 5 mm long, green, smooth, with five minute lobes; corolla campanulate, early deciduous, yellowish green, ca. 8 mm long, the lobes ovate, ca. 5 mm long, reflexed; stamens 10, the filaments white, flattened, adnate to the base of the corolla, the anthers golden yellow, the distal tube as long as the theca; ovary inferior, the style simple, the stigma subcapitate. Fruit fleshy, globose, 5-8 mm in diameter, cardinal red, with the calyx persistent on the apical portion. Seeds numerous, ca. 1 mm long, foveate, obtuse-trigonal.

Phenology: Flowering and fruiting from June to March.

Status: Native, rather common.

Distribution: From high and moist regions along the Cordillera Central and the Sierra de Luquillo. Also throughout the Antilles.

Public Forests: Carite, El Yunque, Guilarte, and Toro Negro.

References: Luteyn, J.L. 1976. Notes on neotropical Vaccinieae (Ericaceae). 1. *Gonocalyx*-A genus new to Central America. Brittonia 28: 37-41. Luteyn, J.L. and R.L. Wilbur. 1977. New genera and species of Ericaceae (Vaccinieae) from Costa Rica and Panama. Brittonia 29: 255-276. Luteyn, J.L. 1996. Ericaceae. *In*: Harling, G. and L. Andersson (eds.) Flora of Ecuador. Vol. 54.

23. *Family* ***EUPHORBIACEAE***

Key to the genera

1a. Inflorescences of cymes with two trilobate foliaceous bracts at the base, forming a pseudanthium; staminate flowers with numerous stamens; leaves deeply trilobate (in our species) ..... 1. *Dalechampia*

1b. Inflorescences of racemes, lacking foliaceous bracts; staminate flowers with 2-3 stamens; leaves simple (in our species) ..... 2. *Tragia*

1. DALECHAMPIA

Twining vines or less frequently shrubs, monoecious, usually covered with stinging hairs, producing scarce watery latex when wounded. Leaves simple, alternate, 3-5-lobate, petiolate, with a pair of stipels at the base of the blade; stipules present. Flowers unisexual, actinomorphic, apetalous, clustered in bisexual cymes, with long peduncles and two foliaceous bracts, forming a pseudanthium. Staminate flowers in distal cymules; bracteoles with numerous resinous glands; calyx 4-6-valvate; stamens numerous, grouped on a short stipe to form a head, the anthers short, opening along longitudinal sutures; pistillode absent. Pistillate flowers in basal cymules; calyx with 8-12 lobes with glandular margins; ovary superior, trilobate, tricarpellate, each carpel with a solitary ovule, the style simple, with a capitate or peltate stigma. Fruit a trilobate capsule, with one seed per locule. A genus of about 100 species, mostly of the Neotropics.

1. Dalechampia scandens L., Sp. Pl. 1054. 1753.

Fig. 93. A-E

Herbaceous vine, twining, attainig 5 m in length. Stems cylindrical, slender, pilose. Leaves alternate, membranaceous, deeply trilobate, 5-7 × 6-12 cm, the apex acute or acuminate, the base cordiform, the margins denticulate; upper surface puberulent, with slightly prominent venation; lower surface pilose, with prominent venation; petioles 6-8 cm long, pilose; stipules ovate or lanceolate, 0.5-1 cm long. Pseudanthium on peduncles 4 cm long; bracts 3(-5)-lobate, up to 2.5 cm long, foliaceous, with the margins serrate, with stinging glandular hairs. Staminate flowers in distal cymules. Calyx of 4 sepals, ca. 1.5 mm long; stamens numerous, forming a head. Pistillate flowers in basal cymules. Calyx of 10-12 sepals; ovary trilobate. Capsule trilobate, puberulent, ca. 5 mm long. Seeds globose, ca. 3 mm in diameter, with black spots.

Phenology: Flowering and fruiting throughout the year.

Status: Native, rather common.

Distribution: In coastal or dry forests and thickets. Also on Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Antilles (except for Jamaica) and from Mexico to South America.

Public Forests: Boquerón, Guánica, and Susúa.

2. TRAGIA

Twining vines or less frequently erect herbs, monoecious, covered with stinging hairs, producing scarce watery latex when wounded. Leaves alternate, entire or 3-lobate, petiolate, the margins serrate or entire; stipules minute, deciduous. Flowers unisexual, actinomorphic, apetalous, in bisexual racemes, axillary or terminal. Staminate flowers short-pedicellate, numerous. Calyx 3-4-valvate; stamens (2-)3-5, the filaments connate at the base; pistillode minute. Pistillate flowers long-pedicellate. Calyx of 3 or 6 sepals; ovary tricarpellate, each carpel with a solitary ovule, the style simple, with 3 stigmatic branches. Fruit a trilobate capsule with explosive dehiscence, with one seed per locule. A genus of about 150 species, of tropical, subtropical, and subtemperate distribution.

1. Tragia volubilis L., Sp. Pl. 980. 1753.

Fig. 93. F-J

Pringamosa, Bran nettle

Climbing or creeping vine, twining, attainig 1-3 m in length. Stems slender, with appressed and glandular stinging hairs. Leaves alternate, usually clustered on short lateral branches, membranaceous, oblong, ovate, or lanceolate, 2-8 × 0.9-4 cm, the apex acuminate, the base subtruncate or cordiform, the margins serrate; upper surface pale green, with stinging glandular hairs, the midvein slightly prominent; lower surface pale green, with prominent venation, puberulent; petioles slender, 0.3-6 cm long; stipules subulate, ca. 4 mm long. Flowers greenish, in axillary racemes. Staminate flowers numerous, along the length of the inflorescence. Calyx 0.8-1 mm long; stamens 2-3. Pistillate flowers on long pedicels at the base of the raceme. Calyx ca. 1 mm long, pilose; ovary hispid. Capsule with three rounded lobes, ca. 7 mm in diameter, covered with stinging hairs. Seeds globose, ca. 2 mm in diameter, brown, smooth.

Phenology: Flowering and fruiting almost throughout the year.

Status: Native, rather common.

Distribution: In pastures and secondary forests, at lower elevations, in the limestone zone and in dry areas. Also on Culebra, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout tropical America.

Public Forests: Cambalache, Ceiba, Guajataca, Guánica, Maricao, Río Abajo, and Susúa.

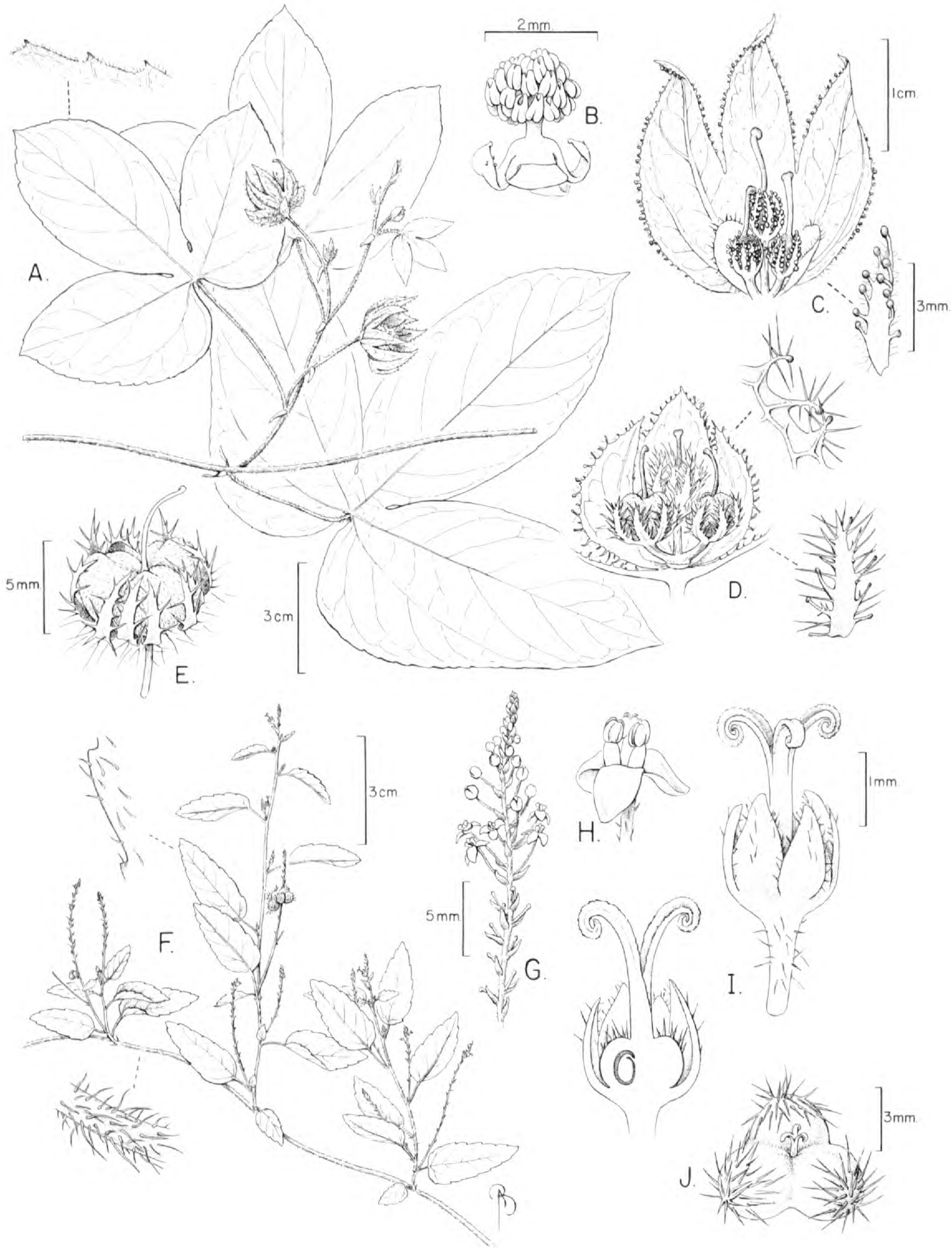

Fig. 93. A-E. *Dalechampia scandens*. **A.** Flowering branch. **B.** Staminate flower. **C.** Pistillate cyme, with a bract removed to show the flowers, and detail of a sepal. **D.** Infructescence, with detail of the stinging hairs on the bract and sepals. **E.** Fruit. **F-J.** *Tragia volubilis*. **F.** Fertile branch. **G.** Inflorescence. **H.** Staminate flower. **I.** Pistillate flower, whole and longitudinal section. **J.** Fruit.

24. *Family* ***FABACEAE***

Key to the subfamilies

1a. Flowers zygomorphic; corolla of free petals; inflorescences usually racemose.....2
1b. Flowers actinomorphic; corolla of connate petals; inflorescences usually of densely flowered heads or spikes.....*Mimosoideae*

2a. Corolla of 5 equal or almost equal petals ..... *Caesalpinioideae*
2b. Corolla with the central petal (standard) elongate, 2 lateral ones connate into a keel and 2 lateral ones smaller ..... *Faboideae*

24a. *Subfamily* **CAESALPINIOIDEAE**

Key to the genera

1a.Leaves bipinnate; rachis lacking stipitate glands; fruits slightly flattened....1.*Caesalpinia*
1b. Leaves pinnate; rachis with a stipitate gland; fruits cylindrical .....2. *Senna*

1. CAESALPINIA

Trees or erect or clambering shrubs. Stems usually spiny. Leaves bipinnate; pinnae opposite, the leaflets opposite or alternate; petioles and rachis lacking stipitate glands; stipules minute to foliaceous. Flowers unisexual or bisexual, in axillary or terminal racemes; pedicels articulate in the distal portion. Calyx campanulate, 5-lobate; corolla of various colors, the petals 5, free; stamens 10, the filaments flattened, free, of equal length, the anthers dehiscent along longitudinal sutures; ovary unilocular, superior, sessile or short-stipitate, with numerous ovules. Fruit a legume of various forms, dehiscent or indehiscent; seeds solitary or numerous, of various forms. A tropical genus of about 100 species.

Key to the species of *Caesalpinia*

1a. Stipules foliaceous, up to 1.5 cm long, persistent; seeds gray ..... 1. *C. bonduc*
1b. Stipules minute, < 5 mm long, deciduous; seeds yellow-orange, brown, or black.....2

2a. Legumes not spiny.....3
2b. Legumes spiny.....5

3a. Stems spiny; leaflets oblong; legume 2-3 cm broad; seeds oblong ..... 4. *C. decapetala*
3b. Stems not spiny; leaflets elliptical or broadly elliptical; legume ca. 4 cm broad; seeds almost globose 4

4a. Rachis of the leaf with minute spines; leaves with 3-5 pairs of pinnae; seeds dark brown or almost black.....6. *C. portoricensis*
4b. Rachis of the leaf not spiny; leaves with 7 pairs of pinnae; seeds yellow-orange ..... 3. *C. culebrae*

5a. Leaflets 4-8 cm long, acute or short-acuminate at the apex; petals ca. 15 mm long ..... 5. *C. major*
5b. Leaflets 1-3 cm long, obtuse, rounded, or emarginate at the apex; petals 7-8 mm long ..... 2. *C. ciliata*

1. Caesalpinia bonduc (L.) Roxb., Fl. Ind. ed. 2, 2: 362. 1832.

Fig. 94. A-C

BASIONYM: *Guilandina bonduc* L.
SYNONYM: *Caesalpinia crista sensu* Urb. *and sensu* Britton & Wilson

Mato de playa

Scandent shrub, much branched along the main stem, attainig 2-6 m in length. Stems cylindrical, up to 2.5 cm in diameter, densely spiny. Leaves bipinnate, paripinnate, 30-75 × 10-34 cm; pinnae 4-8 pairs, opposite; leaflets 3-7 pairs per pinna, opposite, 2.5-5(6.8) × 1.2-3 cm, ovate, lanceolate, oblong, or elliptical, chartaceous, glabrous or puberulent, the apex obtuse, mucronate, the base truncate, rounded to almost cordiform, the margins entire, revolute, ciliate; upper surface dull; lower surface with the midvein prominent; petiolules short, cylindrical; petioles and rachis spiny; stipules foliaceous, up to 1.5 cm long, persistent, divided into 3-5 segments. Flowers functionally unisexual, in axillary or terminal racemes; rachis tomentose and densely spiny; bracts lanceolate, 8-14 mm long, persistent. Calyx campanulate, 4-6 mm long, tomentose, the sepals reflexed, oblong. Petals yellow, 5.5-8 mm long, spathulate; stamens 10, of which 4 are fertile in the staminate flowers, all sterile in the pistillate flowers; ovary sessile, rudimentary in the staminate flower, the stigma terminal. Legumes oblong, 4-7.5 × 2-4 cm, semi-inflated, densely spiny, tardily dehiscent along both sutures. Seeds usually 2, ovoid or almost globose, 1.5-2 cm long, gray.

Phenology: Flowering and fruiting from October to March.

Status: Native, rather common.

Distribution: Along the sandy coasts of the littoral zone. Also on Culebra, Mona, Vieques, Anegada, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; along the tropical littoral coasts.

Public Forests: Guánica, Mona, and Piñones.

2. Caesalpinia ciliata (Bergius ex Wikstr.) Urb., Symb. Antill. 2: 275. 1900.

Fig. 94. D-F

BASIONYM: *Guilandina ciliata* Bergius ex Wikstr.
SYNONYM: *Caesalpinia bonduc sensu* Urb.
Guilandina melanosperma Eggers
Caesalpinia divergens Urb.

Mato de playa

Scandent shrub, with many lateral branches along the main stem, attainig 6 m in length. Stems cylindrical, up to 2.5 cm in diameter, densely spiny. Leaves bipinnate, paripinnate, 20-35 × 10-28 cm; pinnae 3-10 pairs, opposite; leaflets 4-8 pairs per pinna, opposite, 1.5-3 × 1-1.7 cm, elliptical, ovate, or rounded, chartaceous, glabrous or puberulent, the apex rounded, mucronate, the base obtuse or cuneate, slightly unequal, the margins entire, revolute, ciliate; upper surface dull; lower surface with the midvein prominent; petiolules short, cylindrical, tomentose; petioles and rachis spiny; stipules lanceolate, acuminate, 0.5-1 mm long. Flowers functionally unisexual, in axillary or terminal racemes; rachis tomentose and densely spiny; bracts lanceolate, 3.5-6 mm long, deciduous. Calyx campanulate, 4-5 mm long, tomentose, the sepals reflexed, oblong. Petals yellow, 4.5-6.5 mm long, spathulate; stamens 10, four of which are fertile in the staminate flowers, all sterile in the pistillate flowers; ovary sessile, rudimentary in the staminate flower, the stigma terminal. Legumes oblong to almost rounded, 5-7.5 × 3-5.5 cm, semi-inflated, sparsely spiny, tardily dehiscent along both sutures. Seeds 1-2, ovoid or rounded, 1.5-2 cm long, yellow to orange-brown or less frequently black.

Phenology: Flowering from March to August and fruiting in June.

Status: Native, rather common.

Distribution: Along the sandy coasts of the littoral zone. Also on Caja de Muerto, Cayo Ratones, Culebra, Icacos, Mona, Vieques, Anegada, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; the Bahamas, Hispaniola, and throughout the Lesser Antilles.

Public Forests: Guánica, Mona, and Piñones.

3. Caesalpinia culebrae (Britton & Wilson) Alain, Bull. Torrey Bot. Club 90: 187. 1963.

Fig. 94. G

BASIONYM: *Guilandina culebrae* Britton & Wilson

Scandent shrub, with many lateral branches along the main stem, attainig 2 m in length. Stems cylindrical, unarmed, finely pubescent. Leaves bipinnate, paripinnate, ca. 22 × 14 cm; pinnae 7-8 pairs, opposite; leaflets 5-7 pairs per pinna, opposite, 1-1.5 × 0.9-1.4 cm, elliptical or elliptic-obovate, chartaceous, the apex rounded, emarginate, the base unequal, one side rounded, the other obtuse, the margins entire, revolute, ciliate; upper surface glabrous, slightly punctate; lower surface puberulent, with the midvein prominent; petiolules short, tomentulose; petioles and rachis unarmed, tomentulose; stipules minute, deciduous. Flowers in axillary racemes, 6-10 cm long; rachis tomentulose; bracts lanceolate, with the apex caudate, ca. 4 mm long, deciduous. Calyx campanulate, ca. 8 mm long, tomentose, the sepals reflexed, oblong. Petals yellow, 7-8 mm long, spathulate. Legumes elliptic-circular, ca. 7 × 4 cm, flattened, unarmed, apiculate at the apex. Seeds globose, ca. 1.7 cm in diameter, yellow-orange.

Phenology: Collected in flower and fruit in March.

Status: Endemic, known from Culebra from very few collections.

Distribution: Sandy dunes on Culebra and Cayo Diablo.

4. Caesalpinia decapetala (Roth) Alst. in Trimen, Handb. Fl. Ceylon 6, Suppl. 89. 1931.

Fig. 95. A-C

BASIONYM: *Reichardia decapetala* Roth
SYNONYMS: *Caesalpinia sepiaria* Roxb.
Biancaea sepiaria (Roxb.) Todaro

Zarza de cercas, Zarza

Vine or woody shrub, scandent, attainig 2-3 m in length. Stems puberulent, striate, cylindrical, with numerous lenticels and recurved spines, attaining up to 2 cm in diameter. Leaves bipinnate, paripinnate, 30-45 cm long; pinnae 4-10 pairs, opposite; leaflets 7-12 pairs, opposite, chartaceous, oblong, 8-25 × 8-10 mm, the apex rounded or retuse, the base obtuse to rounded, the margins entire; upper surface dark green, dull; lower surface pale green, dull, punctate, with the midvein prominent, scattered-pubescent, especially along the midvein; petiolules minute; rachis usually with a reddish tinge, spiny, pubescent; petioles spiny, ca. 7 cm long, with the base broadened; stipules triangular, ca. 1 mm long, caducous. Flowers in subaxillary or terminal racemes, up to 35 cm long; rachis unarmed or with some minute spines at the base, pubescent, with stipitate glands; pedicels 2-2.5 cm long; bracts minute. Calyx green, the sepals oblong, ca. 1 cm long, except for one that is almost twice the size of the other four. Petals yellow, almost rounded, 1-1.5 cm long; stamens exserted, filaments unequal, pubescent on the lower half; ovary pubescent. Legume woody, oblong, ca. 7 × 2 cm, dehiscent along the upper suture. Seeds oblong, ca. 1 cm long, dark brown.

Phenology: Flowering and fruiting from September to June.

Status: Exotic, naturalized, common.

Distribution: On roadsides, along rivers, or in pastures, at lower and middle elevations. Native to India, but naturalized throughout the Neotropics and western Africa.

Public Forests: Maricao, Río Abajo, and Toro Negro.

5. Caesalpinia major (Medic.) Dandy & Exell, J. Bot. Brit. & For. 76: 180. 1938.

Fig. 95. D-F

BASIONYM: *Bonduc majus* Medic.
SYNONYMS: *Guilandina bonduc sensu* Britton & Wilson, & Urb.
Caesalpinia globerulum Bakh. f. & van Royen

Liana or scandent shrub, which attains 15 m in length. Stems cylindrical, up to 2.5 cm in

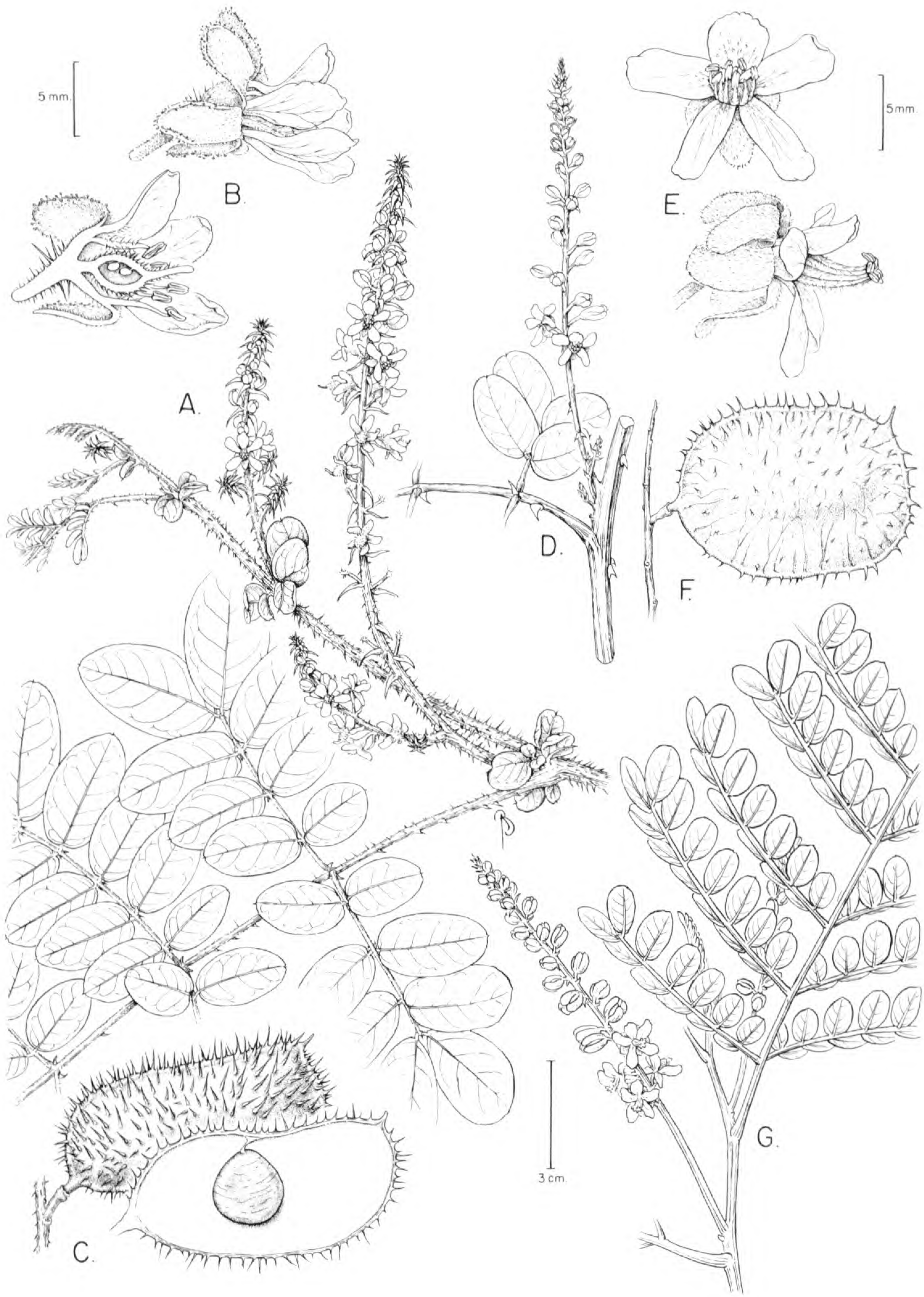

Fig. 94. A-C. *Caesalpinia bonduc.* **A.** Fertile branch. **B.** Flower, whole and longitudinal section. **C.** Legume with seed. **D-F.** *Caesalpinia ciliata.* **D.** Fertile branch. **E.** Flower, top and side views. **F.** Legume. **G.** *Caesalpinia culebrae*, fertile branch.

diameter, densely spiny. Leaves bipinnate, paripinnate, up to 60 cm long; pinnae 3-10 pairs, opposite; leaflets 4-8 pairs per pinna, opposite, 3.5-7.7 × 2.5-3.7 cm, elliptical, ovate, or oblong, chartaceous, glabrous or puberulent, the apex obtuse or acute, mucronate, the base unequal, rounded, or one side obtuse, the margins entire, revolute, ciliate; upper surface glabrous, slightly shiny; lower surface with the midvein prominent, glabrous or puberulent; petiolules short, puberulent; petioles and rachis spiny, puberulent; stipules minute, deciduous. Flowers in axillary racemes, up to 30 cm long; rachis tomentulose, unarmed; bracts lanceolate, long-acuminate, ca. 1 cm long, deciduous. Calyx campanulate, 6-7 mm long, tomentose, the sepals reflexed, oblong. Petals yellow, 6-7 mm long, spathulate; stamens 10, the filaments unequal, shorter than the petals; ovary pubescent, the style and stigma glabrous. Legumes broadly oblong, 6-12 × 3-6 cm, sparsely spiny. Seeds ovoid or rounded, 1.5-2.5 cm long, yellow-orange.

Phenology: Unknown.

Status: Native, uncommon.

Distribution: In the zone of mogotes. Also in Cuba, Jamaica, the Bahamas, and Hispaniola.

Public Forest: Río Abajo.

6. Caesalpinia portoricensis (Britton & Wilson) Alain, Bull. Torrey Bot. Club 90: 187. 1973.

Fig. 95. G-I

BASIONYM: *Guilandina portoricensis* Britton & Wilson

Scandent shrub attainig 6 m in length. Stems cylindrical, striate, puberulent, unarmed. Leaves bipinnate, paripinnate, ca. 15 cm long; pinnae 3-5 pairs, opposite; leaflets 3-5 pairs per pinna, opposite, 1-2 cm long, ovate or broadly elliptical, chartaceous, glabrous, the apex rounded or emarginate, the base unequal, rounded on one side, obtuse on the other, the margins entire; petioles and rachis puberulent, with some spines; stipules deciduous. Legumes broadly oblong, 5-6 × cm, semi-woody, unarmed, dehiscent along one suture. Seeds ovoid or rounded, 1.5-2 cm long, dark brown to almost black, shiny, not striate.

Phenology: Collected in fruit during March.

Status: Endemic, very rare.

Distribution: Known from a single collection from Salinas de Guánica.

Public Forest: Guánica.

2. SENNA

Trees, erect, scandent, or clambering shrubs, or less frequently herbs. Stems unarmed. Leaves pinnate; leaflets opposite; petioles and rachis sulcate, usually with a stipitate gland; stipules persistent. Flowers bisexual, in axillary or terminal racemes or panicles or solitary; bracts minute to foliaceous; pedicels elongate or short. Calyx of 5 more or less elongate sepals; corolla yellow, of 5 free petals, unequal, unguiculate; stamens 10, three of which are usually smaller and sterile, the filaments flattened, free, the anthers basifixed, dehiscent by terminal pores; ovary unilocular, superior, short-stipitate, with numerous ovules. Fruit a legume of various forms, dehiscent or indehiscent; seeds numerous, of various forms. A genus of about 260 species, predominantly neotropical.

Key to the species of *Senna*

1a. Leaves with 2-5(6) pairs of sub-fleshy leaflets .....1. *S. bicapsularis*
1b. Leaves with 2 pairs of chartaceous leaflets .....2. *S. nitida*

1. Senna bicapsularis (L.) Roxb., Fl. Ind. ed. 2, 2: 342. 1832.

Fig. 96. A-F

BASIONYM: *Cassia bicapsularis* L.
SYNONYM: *Adipera bicapsularis* (L.) Britton & Rose

Hoja de sen, Sen del país, Stiver bush

Clambering shrub, with many lateral branches, attainig 3 m in length. Stems slender, cylindrical, smooth, grayish or brown, with some

Fig. 95. A-C. *Caesalpinia decapetala.* **A.** Fertile branch. **B.** Flower, side view. **C.** Legume. **D-F.** *Caesalpinia major.* **D.** Fertile branch. **E.** Flower, side view. **F.** Legume. **G-I.** *Caesalpinia portoricensis.* **G.** Leaf. **H.** Recurved spines at the base of the leaflets. **I.** Legume and seed.

lenticels. Leaves alternate, bipinnate, 3-8 cm long; leaflets 2-5 pairs, 1.5-4 × 1-2.5 cm, obovate to oblanceolate, sub-fleshy, glabrous, the apex truncate, emarginate and usually mucronate, the base asymmetrical, cuneate or subcordiform, the margins entire or slightly undulate; upper surface dark green, dull, sometimes glaucous; lower surface pale green, dull, with the midvein slightly prominent, glaucous; petiolules ca. 2 mm long; rachis sulcate, slender, with a stipitate, ellipsoid gland between the basal pair of leaflets; petioles short, glabrous or puberulent, with the base swollen; stipules minute, lanceolate, early deciduous. Inflorescences of axillary racemes, few-flowered; pedicels 1-3.5 cm long, articulate; bracts lanceolate, deciduous. Calyx forming a turbinate hypanthium, 1.5-3.4 mm long, the sepals 5, oblong-elliptical, yellow, 5-8 mm long, concave, glabrous. Petals yellow, concave, 1-1.5 cm long, cuneate at the base, the central, basal petal obovate, the lateral ones oblong, shorter than the central, basal petal; stamens 10, dimorphic, 3 of which are longer and fertile, the remaining ones sterile; ovary glabrous, the style curved. Fruit an oblong, cylindrical legume, 8-19 × 1-2 cm, septate, indehiscent. Seeds numerous, 4-6 mm long, ellipsoid, brown, shiny.

Phenology: Flowering and fruiting from November to May.

Status: Native, rather common.

Distribution: In disturbed areas, usually on roadsides and in pastures, at lower elevations. Also on Culebra, Vieques, Anegada, St. Croix, St. Thomas, Tortola, and Virgin Gorda; the Antilles, tropical continental America, and Bermuda. Has been introduced into the Old World tropics.

Public Forest: El Yunque.

2. Senna nitida (L.C. Rich.) Irwin & Barneby, Mem. New York Bot. Gard. 35: 159. 1982.

Fig. 96. G-J

BASIONYM: *Cassia nitida* L.C. Rich.
SYNONYMS: *Chamaefistula antillana* Britton & Rose
Cassia antillana (Britton & Rose) Alain

Hediondilla

Clambering or scandent shrub, which attains 2-5(10) m in length. Stems up to 2.5 cm in diameter, grayish, almost cylindrical; branches green, striate, glabrous or puberulent. Leaves alternate, pinnate; leaflets 4, opposite, ovate or elliptical, 6-12 × 2-4.5 cm, the distal pair larger, the apex acuminate, the base unequal or rounded, the margins slightly undulate, revolute; upper surface shiny, glabrous or puberulent, with the midvein sunken; lower surface glabrous, yellowish green, dull, punctate; petiolules swollen; rachis with a linear stipitate gland between the leaflets; petioles longer than the rachis, sulcate, swollen at the base. Inflorescences of axillary racemes, produced toward the end of the branches. Sepals oblong or ovate, ca. 5 mm long. Petals yellow, rounded, 1-2 cm long. Legume 10-18 × 1-1.5 cm, almost cylindrical, compressed along the suture, fleshy, producing a yellow exudate, oily and rancid. Seeds ca. 10 mm long, flattened, elliptical.

Phenology: Flowering from October to December.

Status: Native, relatively common.

Distribution: On roadsides and in forests and pastures, in moist areas, at middle and lower elevations. Also on St. Thomas and Tortola; St. Kitts and probably Haiti.

Public Forests: Carite, El Yunque, Guajataca, and Maricao.

Reference: Irwin, H. and R. Barneby. 1982. The American Cassiinae. A synoptical revision of Leguminosae tribe Cassieae subtribe Cassiinae in the New World. Mem. New York Bot. Gard. Vol. 35: 1-918.

24b. *Subfamily* ***FABOIDEAE***

Key to the genera

1a. Leaves unifoliolate or pinnately compound. 2
1b. Leaves trifoliolate.....8

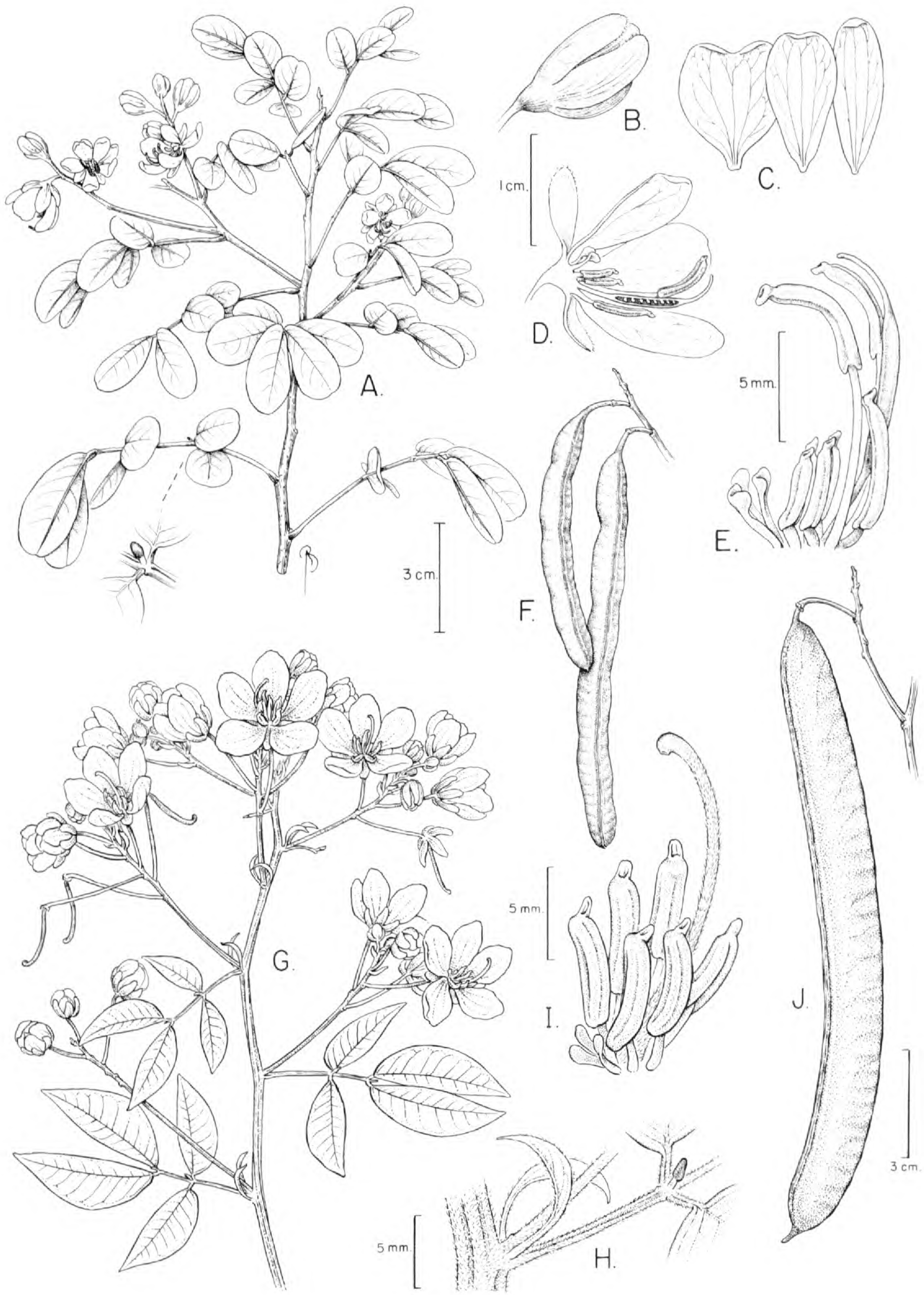

Fig. 96. A-F. *Senna bicapsularis.* **A.** Fertile branch, with detail of foliar gland. **B.** Bud. **C.** Petals. **D.** Flower, longitudinal section. **E.** Fertile and sterile stamens. **F.** Legume. **G-J.** *Senna nitida.* **G.** Fertile branch. **H.** Leaf, with detail of the stipules and foliar gland. **I.** Fertile stamens, staminodia, and pistil. **J.** Legume.

2a. Leaves unifoliolate 3
2a. Leaves paripinnate or imparipinnate 4

3a. Leaflets cordiform, with a pair of stipels at the base; flower 3-5 cm long; calyx and corolla bright red; legume oblong, 6-8 cm long ..... 15. *Neorudolphia*
3b. Leaflets ovate to oblong, without stipels at the base; flower < 1 cm long; calyx green; corolla pink; legume almost circular, 2-2.3 cm long ..... 7. *Dalbergia ecastaphyllum*

4a. Leaves paripinnate; seeds subglobose, brilliant red with a black spot at the base ..... 1. *Abrus*
4b. Leaves imparipinnate; seeds brown, black, or cream-colored 5

5a. Leaflets opposite, with stipels at the base; legume oblong 6
5b. Leaflets alternate, without stipels at the base; corolla pink; legume circular or almost circular in outline 7

6a. Leaves with 5-7 leaflets; calyx with the dorsal lobes connate at the base; corolla blue-violet, the standard broadly ovate or circular, the wings as long as or longer than the keel; anthers yellow ..... 6. *Clitoria* (in part)
6b. Leaves with 11-21 leaflets; calyx with the dorsal lobes free to the base; corolla red-orange, the standard oblong, elongate, the wings shorter than the keel; anthers white ..... 2. *Barbieria*

7a. Stipules spiny, persistent; fruit semicircular, woody ..... 12. *Machaerium*
7b. Stipules minute, deciduous, not spiny; fruit flattened, circular, chartaceous ..... 7. *Dalbergia monetaria*

8a. Legume obtusely 4-angular; seeds sticky ..... 6. *Clitoria falcata*
8b. Legume flattened or almost cylindrical, not quadrangular; seeds not sticky 9

9a. Leaves lacking stipels at the base of the leaflets ..... 4. *Canavalia*
9b. Leaves with stipels at the base of the leaflets 10

10a. Standard oblong, elongate; legumes with rigid, elongate, stinging hairs ..... 14. *Mucuna*
10b. Standard circular to reniform in outline; legumes lacking stinging hairs 11

11a. Standard 3-4 cm wide, more than twice as long as the keel and the wings ..... 5. *Centrosema*
11b. Standard < 2.5 cm wide, less than twice as long as the keel and the wings 12

12a. Legume cylindrical or almost cylindrical, sometimes compressed in the portion between the seeds 13
12b. Legume not cylindrical, flattened or compressed laterally 15

13a. Corolla maroon or purple ..... 13. *Macroptilium*
13b. Corolla pink, lavender, or yellow 14

14a. Stipules auriculate; nodes of the rachis of the inflorescence swollen, with extrafloral nectaries; corolla yellow ..... 21. *Vigna luteola*
14b. Stipules truncate at the base; nodes of the rachis of the inflorescence not swollen, lacking extrafloral nectaries; corolla lavender or pink ..... 17. *Phaseolus*

15a. Legumes conspicuously septate between the seeds 16
15b. Legumes not septate between the seeds 19

16a. Legume with the apex straight ..... 18. *Pueraria*
16b. Legume with the apex recurved..... 17

17a. Legumes ca. 3 mm wide; terminal leaflet elliptical or lanceolate ..... 20. *Teramnus*
17b. Legumes > 4mm wide; terminal leaflet rhombic or ovate..... 18

18a. Margin of the leaflets entire or sinuate ..... 3. *Calopogonium*
18b. Margin of the leaflets serrate-mucronate ..... 16. *Pachyrhizus*

19a. Legumes ca. 5 cm wide, with 2 or 3 circular seeds, 3-4 cm in diameter ..... 9. *Dioclea*
19b. Legumes <2.5 cm wide, with numerous seeds, < 1 cm long..... 20

20a. Legumes falcate..... 21
20b. Legumes oblong..... 23

21a. Lower surface with resinous dots ..... 19. *Rhynchosia*
21b. Lower surface lacking resinous dots..... 22

22a. Terminal leaflet broadly ovate or broadly rhombic-ovate; corolla white or lavender, ca. 1.5 cm long; legume up to 2 cm wide ..... 11. *Lablab*
22. Terminal leaflet lanceolate-triangular; corolla blue or purple, ca. 5 mm long; legume up to 1.3 cm wide .....17. *Phaseolus lunatus*

23a. Legume articulate, with the margin constricted in the portion between the seeds, with a pubescence of uncinate hairs with which it adheres to the fur or clothing .....8. *Desmodium*
23b. Legume not articulate, the margin straight and pubescence of simple hairs or glabrous 24

24a. Style glabrous ..... 10. *Galactia*
24b. Style barbate. 25

25a. Keel of the corolla twisted by 360 degrees or more; corolla pink or lavender ..... 17. *Phaseolus* (in part)
25b. Keel of the corolla recurved or twisted by less than 180 degrees; corolla yellow, pink, or lavender ..... 21. *Vigna*

1. ABRUS

Slightly woody vines, twining. Leaves alternate, paripinnate; leaflets opposite; stipels minute, appressed to the rachis; stipules minute or foliaceous. Inflorescences of axillary, lateral, or terminal pseudoracemes; bracts and bracteoles minute, caducous; pedicels short. Calyx campanulate, with 5 minute lobes at the apex; corolla pink, white, or reddish; standard ovate or obovate, retuse at the apex; wings recurved, shorter than or as long as the keel; stamens 9, the filaments united into a long tube; ovary superior, almost sessile, with numerous ovules, the style smooth, the stigma capitate. Fruit a flattened, dehiscent legume; seeds numerous, ellipsoid or almost globose, red with a black spot at the base or completely brown. A genus of 17 species, native to the paleotropics.

1. Abrus precatorius L., Syst. Nat. ed. 12, 472. 1767.

Fig. 97. A-D

Peronías, Ojos de cangrejo, Jumbee seeds, Scrubber, Wild Licorice

Slightly woody vine, twining, much branched from the base, attainig 3 m in length. Stems green, cylindrical, puberulent, turning dark gray, rugose, glabrous and slightly flattened when mature. Leaves alternate, pinnate, 3-5 cm long; leaflets

8-15 pairs, 0.8-1.5 × 0.3-0.7 cm, oblong or oblanceolate, membranaceous, the apex rounded and mucronate, the base rounded, the margins entire; upper surface glabrous, dull, with inconspicuous venation; lower surface puberulent, dull, with the midvein prominent; petiolules minute, slender; rachis without glands, puberulent, with a minute stipel at the base of each leaflet; petioles minute, slender, with the base slightly swollen; stipules filiform, 2-3 mm long, persistent. Inflorescences of small axillary or terminal pseudoracemes, with 5-7 flowers clustered on the swellings of the rachis; bracts minute, deciduous. Calyx campanulate, green, 3-5 mm long, puberulent; corolla pink, the standard ovate, with the center dark pink, up to 1 cm long, concave, the apex acute, the wings and keels as long as the standard, unguiculate. Legumes oblong, 2-4.5 × 1-1.5 cm, slightly inflated, with the apex elongate and recurved and the margins slightly undulate, opening along the two sutures. Seeds ellipsoid, brilliant red, with a black spot at the base, 6-8 mm long.

Phenology: Flowering from October to June and fruiting from November to September.

Status: Exotic, naturalized, rather common.

Distribution: In disturbed areas, such as secondary forests or along trails. Also on Culebra, Vieques, and the Virgin Islands. Native to the paleotropics, but found naturalized throughout the Neotropics.

Public Forests: Cambalache, Ceiba, Guánica, Piñones, and Susúa.

2. BARBIERIA

A monospecific genus, characterized by the following species.

1. Barbieria pinnata (Pers.) Baill., Hist. Pl. 2: 263. 1870.

Fig. 97. E-I

BASIONYM: *Galactia pinnata* Pers.
SYNONYMS: *Clitoria pinnata* (Pers.) R.H. Sm. & G.P. Lewis
Clitoria polyphylla Poir.
Barbieria polyphylla (Poir.) DC.

Enredadera

Woody vine or clambering shrub, twining, attainig 4-10 m in length. Stems slender, much branched, striate, hirsute, glabrescent, copper-colored, with some whitish lenticels. Leaves alternate, imparipinnate; leaflets 11-21, chartaceous, oblong, 2-5.5 × 1.2-2.2 cm, the apex rounded and mucronate, the base rounded or obtuse, the margins entire, ciliate; upper surface pale green, dull, with inconspicuous venation; lower surface green, silky or whitish, pubescent, with the midvein prominent, yellowish, covered with minute hairs; petiolules 1-2 mm long, ferruginous-pubescent; petioles 1-4 cm long, pilose; rachis pilose, with a pair of stipels at the base of each pair of leaflets; stipels linear, 3-5 mm long; stipules lanceolate, 5-9 mm long, pubescent, persistent. Inflorescences of axillary racemes of few distal flowers, 4-16 cm long; bracts lanceolate, pubescent, forming an involucre at the base of the calyx. Calyx tubular, reddish, striate, 2.5-3.5 cm long, with five subulate sepals, acuminate, 0.8-1 cm long, the ventral sepals slightly longer than the lateral ones; corolla red or red-orange, the standard oblong-oblanceolate, unguiculate, 5-6 cm long, the wings oblong, 9-13 mm long, the keel elliptic-oblong, 17-23 mm long; stamens 10, staminal column white, the anthers white; ovary superior, linear, 8-11 mm long, white-pubescent. Legume subsessile, oblong, flattened, laterally compressed between the seeds, 5-7 × 0.5-0.6 cm, pubescent, with the margins sinuate and the calyx persistent at the base. Seeds 4-9 per fruit, dark brown or black, oblong, 4-6 mm long.

Phenology: Collected in flower from November to January and in fruit from January to May.

Status: Native, not very common.

Distribution: In forests in the zone of mogotes, in secondary forests, and on roadsides in moist places at middle elevations. Also in Cuba, Hispaniola, Central America, and South America.

Public Forests: El Yunque, Maricao, and Río Abajo.

Fig. 97. A-D. *Abrus precatorius*. **A.** Flowering branch. **B.** Flower. **C.** Petals: wing, keel, standard. **D.** Open and closed fruit. **E-I.** *Barbiera pinnata*. **E.** Flowering branch, with detail of the leaflet apex. **F.** Calyx. **G.** Petals: standard, keel, and wing. **H.** Gynoecium. **I.** Fruits.

3. CALOPOGONIUM

Slightly woody vines, twining. Leaves alternate, trifoliolate; stipels and stipules minute. Inflorescences of axillary pseudoracemes or fascicles; the flowers clustered on the nodal swellings of the rachis; bracts and bracteoles minute; pedicels short. Calyx campanulate-tubular, with the two upper lobes united to form a lip, the 3 lower lobes lanceolate; corolla blue or violet, the standard obovate, auriculate at the base, the wings narrow, the keel shorter than the wings; stamens 9-10, one of them free, the rest with the filaments united into a long tube; ovary superior, sessile, hirsute, with numerous ovules, the style curved, glabrous, the stigma capitate. Fruit a flattened legume, linear, dehiscent, septate between the seeds; seeds circular. A genus of 6-8 species, native to tropical continental America, naturalized in the paleotropics.

Key to the species of *Calopogonium*

1a. Terminal leaflet rhombic or rounded-rhombic; stems villous, glabrescent when mature; bracteoles ca. 2 mm long, deciduous; legumes 7-10 mm wide .....1. *C. coeruleum*
1b. Terminal leaflet ovate or rhombic-ovate; stems hirsute; bracteoles 4-6 mm long, persistent; legumes 3-5 mm wide ..... 2. *C. mucunoides*

1. Calopogonium coeruleum (Benth.) Sauv., Anal. Acad. Ci. Habana 5: 337. 1869.

Fig. 98. A-F

BASIONYM: *Stenolobium coeruleum* Benth.

Slightly woody vine, twining, with many lateral branches, attainig 10 m in length. Stems slender, cylindrical, villous-pubescent on the younger portions. Leaves alternate, trifoliolate; leaflets chartaceous, 5-10.5 × 3-8 cm, the apex obtuse or less frequently rounded, the base of the distal leaflet cuneate, that of the lateral ones asymmetrical and obtuse-truncate, the margins undulate, revolute; upper surface dark green, dull, pubescent, especially on the sunken venation; lower surface pale green, pubescent, with the venation yellowish, prominent. Inflorescences of axillary pseudoracemes, 12-45 cm long, with 4-5 flowers grouped on small mounds along the rachis; rachis thick, cylindrical, pubescent; pedicels ca. 5 mm long, pubescent. Calyx campanulate, 5-7 mm long, appressed-pubescent, the sepals lanceolate, 2.5-4 mm long; corolla blue, the standard ca. 1 cm long, oblanceolate. Legume tomentose, 3-8 × 0.7-1.0 cm, flattened, with the margins compressed between the seeds and the calyx persistent at the base. Seeds almost square, reddish brown, shiny, 4-5 mm wide.

Phenology: Flowering from November to February and fruiting from February to April.

Status: Exotic, naturalized, common.

Distribution: In moist pastures and disturbed areas, at lower and middle elevations. Also in Cuba, Hispaniola, St. Vincent, Trinidad and Tobago, and tropical continental America.

2. Calopogonium mucunoides Desv., Ann. Sci. Nat. (Paris) Sér. 1, 9: 423. 1826.

Fig. 98. G-I

SYNONYM: *Calopogonium orthocarpum* Urb.

Jicama

Slightly woody vine, twining or creeping, much branched, attainig 3-5 m in length. Stems slender, cylindrical, hirsute. Leaves alternate, trifoliolate; leaflets chartaceous, 2-10 × 1.5-6.5 cm, the apex obtuse to almost rounded, the base of the terminal leaflet cuneate to rounded, and that of the lateral leaflets markedly asymmetrical (obtuse-subtruncate), the margins entire; both surfaces dull, appressed-pubescent; lower surface with prominent venation. Inflorescences of axillary pseudoracemes, up to 10 cm long; rachis hirsute; bracts subulate, persistent, ca. 7 mm long. Calyx campanulate, 7-8 mm long, hirsute, the sepals subulate, caudate at the apex; corolla blue or purple, the standard 6-7 mm long, emarginate. Legume oblong-linear, flattened, hirsute, 2-4 × 0.3-0.5 cm. Seeds almost quadrangular, ca. 3 mm wide, reddish brown, shiny.

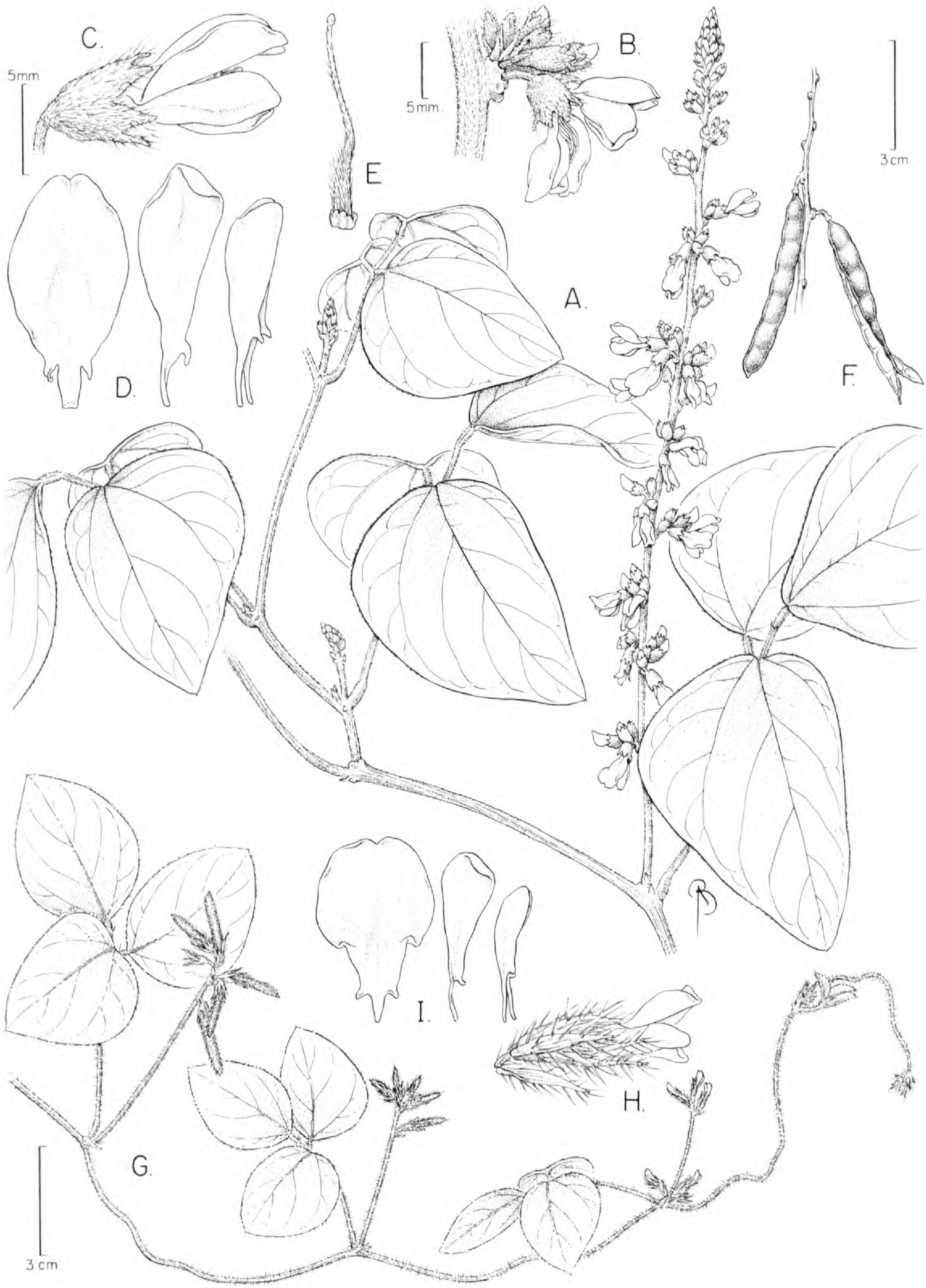

Fig. 98. A-F. *Calopogonium caeruleum.* **A.** Flowering branch. **B.** Portion of inflorescence. **C.** Flower. **D.** Petals: standard, wing, and keel. **E.** Gynoecium. **F.** Fruits. **G-I.** *Calopogonium mucunoides.* **G.** Fertile branch. **H.** Flower. **I.** Petals: standard, wing, and keel.

Phenology: Collected in flower and fruit from December to March.

Status: Exotic, naturalized, relatively common.

Distribution: In disturbed areas such as pastures and roadsides, in moist zones at lower and middle elevations. Also in Cuba, Hispaniola, Jamaica, tropical America, and naturalized in Africa and Asia.

Public Forest: Río Abajo.

4. CANAVALIA

Woody or herbaceous vines, twining or creeping. Leaves alternate, trifoliolate; stipels absent; stipules minute, deciduous. Inflorescences of axillary or terminal pseudoracemes; the flowers clustered on the nodal swellings of the rachis; bracts minute, in pairs; pedicels short. Calyx campanulate, the lobes 5, unequal, 2 larger; corolla pink, violet, or purple, the standard obovate, unguiculate, auriculate and thickened at the base, the wings and the keel of similar size; stamens 10, the filaments united into a long tube; ovary superior, sessile or stipitate, pubescent, with numerous ovules, the style filiform, the stigma capitate. Fruit an elongate legume, flattened or slightly inflated, dehiscent or indehiscent, not septate between the seeds, with a longitudinal keel along both sutures or along the ventral suture; seeds 3 or more, usually oblong. A genus of 50 species, the great majority native to the New World.

Key to the species of *Canavalia*

1a. Seeds brown or white; legumes with a keel on each side of both sutures (each valve with three longitudinal ribs); flowers in groups of 2-3 on the nodal swellings along the rachis 2

1b. Seeds red; legumes with a rib on each side of the ventral suture; flowers in groups of 3-5 on the nodal swellings along the rachis ..... 2. *C. nitida*

2a. Plants climbing, cultivated or in areas of secondary vegetation; legumes up to 30 cm long; seeds white ..... 1. *C. ensiformis*

2b. Plants creeping or climbing, common on the sandy coasts of the littoral zone; legumes 7-15 cm long; seeds brown ..... 3. *C. rosea*

1. Canavalia ensiformis (L.) DC., Prodr. 2: 404. 1825.

Fig. 99. A-E

BASIONYM: *Dolichos ensiformis* L.

Slightly woody vine, twining, attainig 1-2 m in length. Stems cylindrical, puberulent, glabrescent, with the pith hollow. Leaves alternate, trifoliolate; leaflets chartaceous, broadly ovate or broadly elliptical, 6-20 × 5-12 cm, the apex obtuse or rounded, short-apiculate, the base obtuse, asymmetrical on the lateral leaflets, the margins entire; both surfaces strigulose, punctate; petiole and rachis cylindrical, glabrescent; petiolules swollen, ca. 8 mm long. Inflorescences of axillary pseudoracemes, 25-36 cm long, with 2-3 flowers grouped on the nodal swellings along the rachis; pedicels 1-2 mm long, glabrescent. Calyx green, campanulate, 12-14 mm long, bilabiate; corolla pale violet, ca. 2 cm, the standard and the wings white at the base, violet on the distal portion. Legume linear, up to 30 × 3.5 cm, woody, slightly curved toward the apex, each valve with three longitudinal ribs. Seeds 15-20, ellipsoid, up to 3 cm long, white or cream-colored.

Phenology: Unknown.

Status: Exotic, known only in cultivation, not very common.

Distribution: Native to the Neotropics, but known only in cultivation. This species was described based on material collected by Sloane in Jamaica.

2. Canavalia nitida (Cav.) Piper, Contr. U. S. Natl. Herb. 20: 562. 1925.

Fig. 99. F-G

BASIONYM: *Clementea nitida* Cav.
SYNONYM: *Canavalia rusiosperma* Urb.

Mato colorado, Haba de burro de jardín

Woody vine, twining, with numerous pendulous branches, attainig 15-18 m in length. Stems cylindrical, glabrous or puberulent, thick, the bark light brown, almost smooth. Leaves alternate, trifoliolate; leaflets coriaceous, elliptical, oval, or oblong, involute, 6.5-12 × 3-5.5 cm, the apex obtuse, acute, or rounded, the base rounded, asymmetrical on the lateral leaflets, the margins slightly revolute, thickened, both surfaces glabrous, with the venation slightly prominent; petiolules cylindrical, pubescent, 4-5 mm long; petioles 4-5 cm long, with the base swollen; stipels absent; stipules minute, deciduous. Inflorescences of axillary pseudoracemes, 13-23 cm long, the flowers in groups of three or four on each nodal swelling along the rachis; pedicels 5-6 mm long, puberulent. Calyx greenish, shiny, 15-18 mm long, pubescent; corolla violet-pink, the standard orbicular, ca. 2.5 cm long, with the center pale yellow, the keel and the wings

ca. 1.5 cm long. Legume woody, brown, up to 20 × 5 cm, the valves with two slight ribs on the sides of the suture. Seeds ca. 2 cm long, almost circular or ellipsoid, crimson with the hilum black.

Phenology: Flowering and fruiting from August to February.

Status: Native, uncommon.

Distribution: In forests in moist areas, at middle and lower elevations in central, northern, and western Puerto Rico. Also on St. John and St. Thomas; Hispaniola.

3. Canavalia rosea (Sw.) DC., Prodr. 2: 404. 1825.

Fig. 99. H-L

BASIONYM: *Dolichos roseus* Sw.
SYNONYMS: *Dolichos maritimus* Aubl.
Canavalia maritima (Aubl.) Urb.
Canavalia maritima Thouars
Dolichos obtusifolius Lam.
Canavalia obtusifolia (Lam.) DC.

Haba de playa, Habichuela playera, Mato de playa, Bay bean, Canavalia

Woody vine, creeping or twining, much branched from the base, attainig 2-6 m in length. Stems smooth, glabrescent, green, mulberry-colored at the nodes, with adventitious roots. Leaves alternate, trifoliolate; leaflets 4-10.4 × 3-10 cm, chartaceous, oblong, ovate, or orbicular, involute, the apex obtuse, rounded, retuse and mucronate, the base cuneate or rounded, the margins entire; upper surface glabrous except for the puberulent veins; lower surface puberulent, yellowish green, dull, with prominent venation; rachis sulcate, villous, 3-4.5 cm long; petiolules swollen, villous, ca. 1 cm long; petioles sulcate, villous, swollen at the base, 4-6 cm long; stipels absent; stipules triangular, persistent. Inflorescences of axillary pseudoracemes, 25-30 cm long, the flowers in pairs on each nodal swelling along the rachis; bracts minute, deciduous. Calyx 8-11 mm long, yellowish green, with five lobes, three small and two large, puberulent; corolla violet-pink, the standard broadly elliptical, 2-2.5 cm long, reflexed, white in the center, the wings and the keel shorter than the standard. Legume 10-17 × 2.3-2.5 cm, oblong, not flattened, subwoody, with three keels on each valve. Seeds numerous, 1.5-1.8 cm long, ellipsoid, brown, with the hilum white.

Phenology: Flowering and fruiting almost throughout the year.

Status: Native, very common.

Distribution: Along the sandy coasts of the littoral zone. On all the islands and keys of Puerto Rico and the Virgin Islands; throughout the tropical and subtropical coasts of the planet.

Public Forests: Guánica, Mona, and Piñones.

5. CENTROSEMA

Herbaceous vines, twining. Leaves alternate, trifoliolate; stipels present; stipules minute, persistent. Flowers axillary, solitary or grouped on a bracteate peduncle; bracts appressed to the calyx; pedicels more or less elongate. Calyx campanulate, the lobes 5, unequal or almost equal; corolla pink, lavender,

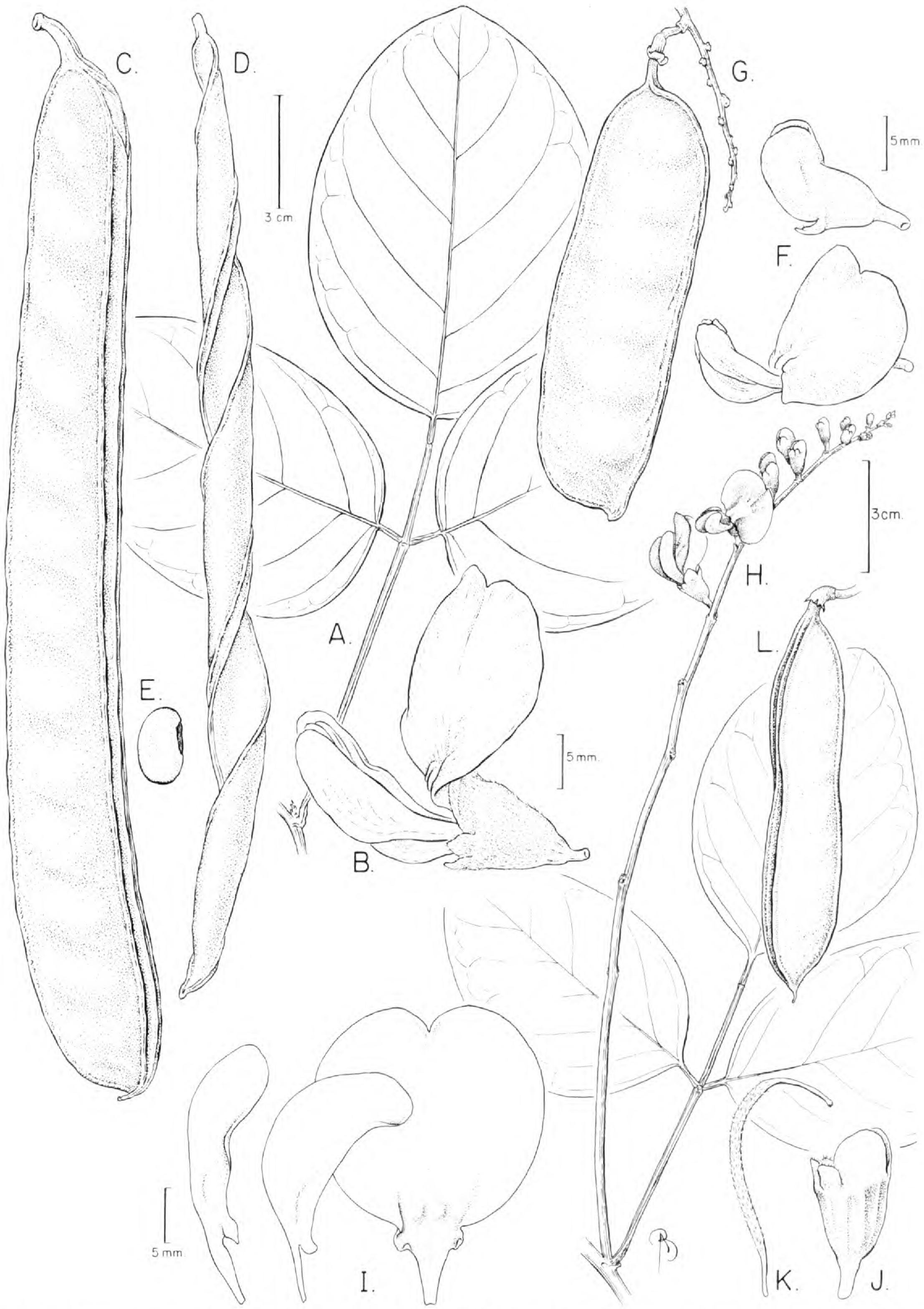

Fig. 99. A-E. *Canavalia ensiformis.* **A.** Leaf. **B.** Flower. **C.** Fruit. **D.** Valve of the fruit. **E.** Seed. **F-G.** *Canavalia nitida.* **F.** Calyx and flower. **G.** Fruit. **H-L.** *Canavalia rosea.* **H.** Flowering branch. **I.** Petals: keel, wing, and standard. **J.** Calyx. **K.** Gynoecium. **L.** Fruit.

or white, the standard ovate or rounded, unguiculate, the wings and the keel of similar size, shorter than the standard; stamens 10, diadelphous or monadelphous; ovary superior, almost sessile, with numerous ovules, the style curved, pubescent, the stigma capitate or truncate. Fruit a linear legume, flattened, with the margins ribbed, dehiscent by valves that twist on drying, not septate between the seeds; seeds numerous, small, oblong. A genus of about 45 species, of pantropical distribution.

Key to the species of *Centrosema*

1a. Corolla pink-burgundy; standard 4.5-6 cm wide; legume 7-10 mm wide ....1. *C. plumieri*
1b. Corolla pale violet; standard 2-4.5 cm wide; legume 4-6 mm wide..... 2

2a. Lobes of the calyx very unequal, the lateral ones deltate, as long as the tube of the calyx, the central ones subulate, much longer than the tube; legume ca. 6 mm wide..... 2. *C. pubescens*
2b. Lobes of the calyx subequal, subulate, longer than the tube of the calyx; legume ca. 4 mm wide ..... 3. *C. virginianum*

1. Centrosema plumieri (Turp. ex Pers.) Benth., Comm. Leg. Gen. 54. 1837.

Fig. 100. A-F

BASIONYM: *Clitoria plumieri* Turp. ex Pers.
SYNONYM: *Bradburva plumieri* (Turp. ex Pers.) Kuntze

Flor de conchitas

Non-woody vine, twining, attainig 5 m in length. Stems cylindrical, green, smooth, glabrous or puberulent. Leaves alternate, trifoliolate; leaflets 4-11 × 3-8 cm, the apex acute, obtuse, or short-acuminate; margins undulate; upper surface slightly shiny, with the venation sunken, puberulent; lower surface dull, puberulent, with prominent venation; terminal leaflet deltate, ovate, or elliptical, with the base cuneate or cuneate-rounded; lateral leaflets oblong or elliptical, with the base asymmetrical, rounded-truncate; petiolules swollen, 3-4 mm long; petioles 6-10 cm long, slender, glabrous, with the base swollen; stipels linear, up to 10 mm long; stipules oblong-lanceolate, 10-12 mm long, with the venation conspicuously parallel. Flowers solitary or in pairs at the end of long axillary peduncles; bracteoles ovate, convex, 10-14 mm long. Calyx campanulate, 5-8 mm long, glabrous, with three lobes, ca. 2.5 mm long; corolla pink to cardinal red, abaxially appressed-pubescent, the standard 4.5-6 cm wide, rounded, cardinal red in the center and pink or whitish toward the edges, the wings ca. 3 × 1.5 cm, with the apex cardinal red, the keel white, ca. 3.5 cm long. Legume flattened, linear, 10-15 × 0.6-1 cm, the apex long-acuminate, the margins thickened.

Phenology: Flowering from October to January and fruiting from January to February.

Status: Apparently native, relatively common.

Distribution: In disturbed areas, such as roadsides and pastures, at lower elevations in moist areas. Throughout the Neotropics, introduced in Africa and tropical Asia.

Public Forests: Guajataca and Río Abajo.

2. Centrosema pubescens Benth., Ann. Wiener Mus. Naturgesh. 2: 119. 1837.

Fig. 100. G-I

SYNONYM: *Bradburya pubescens* (Benth.) Kuntze

Flor de pito, Flor de conchitas

Slightly woody vine, twining, attainig 8 m in length. Stems slender, appressed-pubescent. Leaves alternate, trifoliolate; leaflets ovate, oblong, or elliptical, 3-8 × 1.6-4.5 cm, the apex acute or obtuse, the base rounded or obtuse, the margins entire; both surfaces glabrous to pubescent; upper surface with the venation sunken; lower surface with prominent venation; petiolules thickened, pubescent; petioles sulcate, almost quadrangular, 2-5 cm long, puberulent; stipels subulate, 2-2.5 mm long; stipules ovate, 2-4 mm long.

Flores solitary or in pairs at the end of bracteate, axillary peduncles, 5-10 cm long; bracts oblong, slightly longer than the calyx. Calyx asymmetrically campanulate, the tubular portion 5-7 mm long, with five very unequal lobes, the lateral ones deltate, ca. 1 mm long, the central

ones subulate or linear, ca. 6 mm long; corolla pale violet, lavender, or less frequently yellowish or whitish with purple lines, the standard 2-4.5 cm wide, abaxially velvety, the wings and the keel shorter than the standard. Legume linear, 10-20 × 0.6 cm, the apex acuminate, with the margins ribbed, dehiscent by valves that twist on drying. Seeds 8-15 per fruit, oblong-quadrangular, dark brown, dull, 5-6 mm long.

Phenology: Flowering predominantly during the months from November to December, but may be found in flower from September to March.

Status: Native, very common.

Distribution: In disturbed areas, such as abandoned fields, pastures, or roadsides, at middle and lower elevations. Native to tropical America, introduced in Asia and Africa.

Public Forests: Maricao, Río Abajo, and Susúa.

3. Centrosema virginianum (L.) Benth., Comm. Legum. Gen. 56. 1837.

Fig. 100. J-M

BASIONYM: *Clitoria virginiana* L.
SYNONYM: *Bradburya virginiana* (L.) Kuntze

Conchita de Virginia, Flor de conchitas, Blue wiss, Butterfly pea

Slightly woody vine, twining, attainig 6-7 m in length. Stems slender, strong, cylindrical, finely pubescent. Leaves alternate, trifoliolate; leaflets 2.5-7 × 0.5-2 cm (the terminal one longer than the lateral ones), lanceolate, oblong, ovate, or linear, chartaceous, the apex acute or obtuse, mucronate, the base cuneate to rounded, the margins entire or crenate, ciliate, both surfaces glabrous or puberulent; lower surface with prominent venation; rachis 0.7-1.5 cm long; petioles 2.3-2.8 cm long, slender, sulcate, thickened; stipels narrowly subulate, 4-5 mm long; stipules subulate, 3-5 mm long, persistent, markedly veined. Flowers 1-4, at the end of a bracteate axillary peduncle; bracts ovate or ovate-lanceolate, persistent, notably veined. Calyx green, asymmetrically campanulate, with five subulate, subequal lobes, the tubular portion ca. 2 mm long, the lateral lobes ca. 5 mm long, the central lobes 7-8 mm long; corolla lilac or almost white, the standard broadly ovate, 3-4 cm wide, white in the center with purple lines, the wings and keel unguiculate, much shorter than the standard. Legume linear, 10-13 × 0.3-0.4 cm, the apex acuminate, the margins ribbed, dehiscent by valves that twist on drying. Seeds numerous, 3-4 mm long, oblong, brown or light brown with dark brown spots.

Phenology: Flowering and fruiting almost throughout the year.

Status: Native, very common.

Distribution: In disturbed areas such as roadsides, fences, and pastures, in thickets and dry forests, usually along the coasts, in the zone of mogotes, and in areas of the Cordillera Central. Also on Culebra, Culebrita, Icacos, Mona, Vieques, and the Virgin Islands; throughout the Antilles and from southern North America to Argentina. Introduced in Africa.

Public Forests: Cambalache, Ceiba, El Yunque, Guánica, Maricao, Mona, Piñones, Río Abajo, Susúa, Toro Negro, and Tortuguero.

6. CLITORIA

Twining herbaceous or woody vines, trees, or shrubs. Leaves alternate, trifoliolate or imparipinnate; leaflets 3-9, opposite; stipels present; stipules minute, persistent. Flowers solitary or grouped in axillary racemes; bracteoles appressed to the calyx, persistent. Calyx campanulate, with 5 equal or almost equal lobes; corolla blue-violet, white, yellow, or red, the standard rounded, rugose, longer than the wings and the keel, the wings longer than the keel; stamens 10, diadelphous or monadelphous; ovary superior, stipitate, the style curved, pubescent, the stigma truncate. Fruit a linear or oblong legume, flattened, dehiscent along both sutures, not septate between the seeds; seeds few, rounded to oblong. A genus of about 60 species, the great majority of tropical to subtropical distribution.

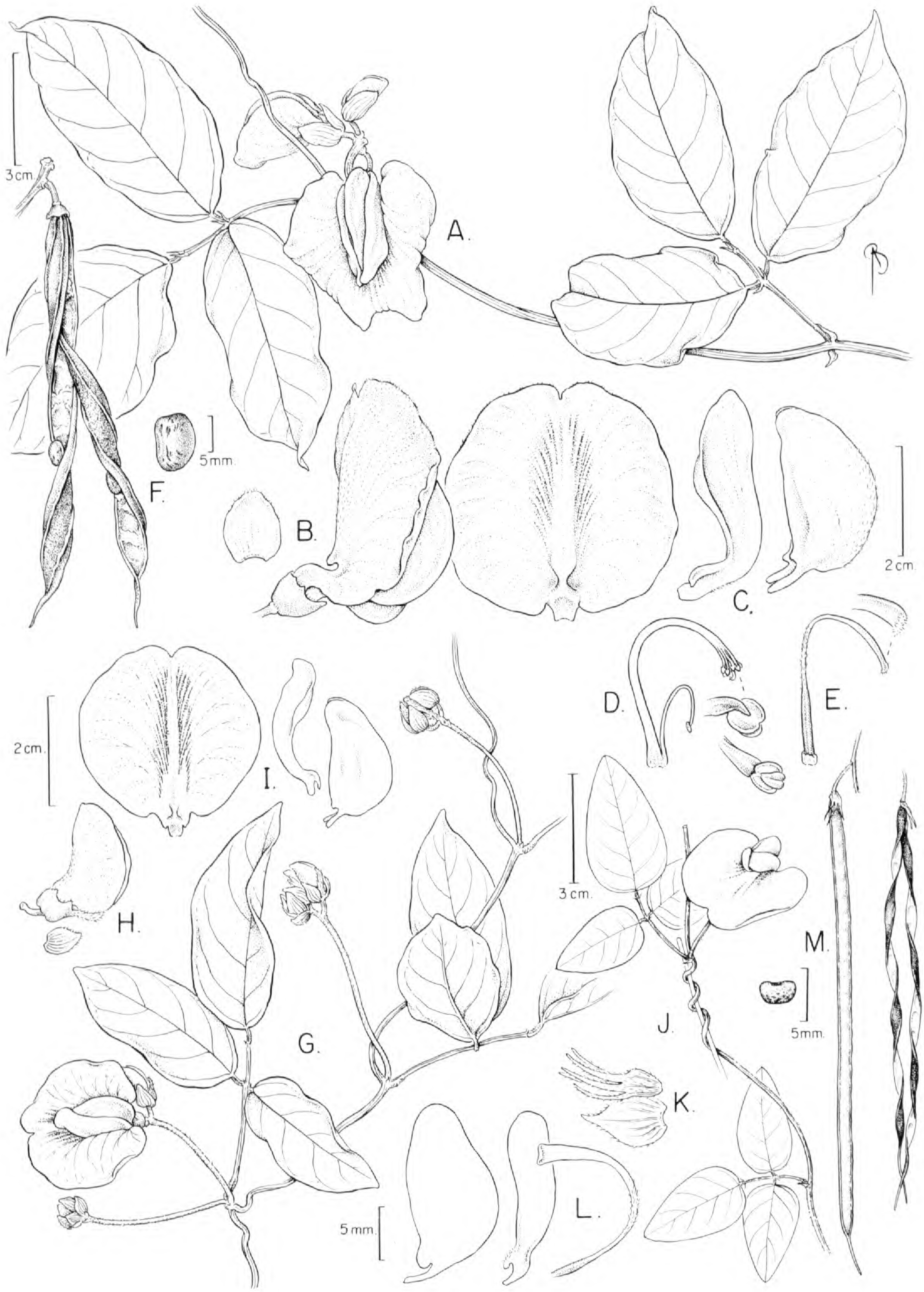

Fig. 100. A-F. *Centrosema plumieri*. **A.** Flowering branch. **B.** Bracteole and flower. **C.** Petals: standard, wing, and keel. **D.** Stamens and detail of anthers. **E.** Gynoecium and detail of the stigma. **F.** Open fruit and seed. **G-I.** *Centrosema pubescens*. **G.** Flowering branch. **H.** Flower and bracteole. **I.** Petals: standard, wing, and keel. **J-M.** *Centrosema virginianum*. **J.** Flowering branch. **K.** Calyx and bracteole. **L.** Wing, keel, and gynoecium. **M.** Seed, closed and open fruit.

Key to the species of *Clitoria*

1a. Leaves 3-foliolate; corolla light yellow, white, or white with lilac lines; legumes obtusely quadrangular; seeds sticky ..... 1. *C. falcata*
1b. Leaves 5-7-foliolate; corolla blue-violet; legumes flattened; seeds not sticky .....2. *C. ternatea*

1. Clitoria falcata Lam., Encycl. Méth. Bot. 2: 51. 1786.

Fig. 101. A-C

SYNONYMS: *Clitoria rubiginosa* Juss.
Martiusia rubiginosa (Juss.) Britton

Ahoga gallina, Conchitas, Flor de pito

Slightly woody vine, twining, attainig 5 m in length. Stems slender, flexible, tomentose, glabrescent when mature. Leaves alternate, trifoliolate; leaflets coriaceous, 2.2-9 × 1.2-4.5 cm, elliptical, ovate, or lanceolate, the apex acute or obtuse, mucronate, sometimes retuse, the base obtuse or rounded, the margins smooth, revolute; upper surface dark green, dull, with the venation pale green, glabrous; lower surface sericeous, with prominent venation; stipels lanceolate, ca. 7 mm long, pubescent; petiolules minute, ferruginous-tomentose, thickened; rachis 0.5-1.5 cm long, ferruginous-tomentose; petioles ferruginous-tomentose, 4-6 cm long, with the base thickened; stipules elliptical or ovate, ca. 7 mm long, with notable parallel veins. Inflorescences of axillary cymes with 2-4 flowers at the end of a peduncle, tomentose, 2-11 cm long; bracts hirsutulous, ca. 8 mm long, oblong, green, with notable parallel veins; pedicels ca. 4 mm long, tomentose. Calyx campanulate, yellowish green, the tube 12-16 mm long, the lobes deltate, 7-12 mm long; corolla pale yellow or white with pale violet lines, the standard rounded, ca. 5 cm long, plicate, retuse, with violet or cardinal red lines on the central portion inside, the wings and keels ca. 2 cm long, longer than wide. Legume 4-6 cm long, pubescent, oblong, obtusely quadrangular, with a rib along each of the valves, the apex acuminate. The seeds 4-6 per fruit, almost spherical, ca. 3 mm in diameter, covered with a sticky, gelatinous matrix.

Phenology: Flowering and fruiting from September to January.

Status: Native, relatively common.

Distribution: In disturbed areas such as pastures, fences, and along trails, at middle and lower elevations. Native to tropical America; introduced in western Africa.

Public Forests: El Yunque and Río Abajo.

Commentary: Fantz (1990) recognizes two varieties belonging to this species, of which only the typical variety is found in Puerto Rico. Within this variety he recognizes two forms based on characters of the fruit, which are found in Puerto Rico. *Clitoria falcata* var. *falcata* f. *falcata* possesses legumes with ribs that extend along the length of the valves, while in *C. falcata* var. *falcata* f. *heteromorpha* (Griseb.) Fantz the ribs are absent or extend along at most 2/3 of the length of the valve.

2. Clitoria ternatea L., Sp. Pl. 753. 1753.

Fig. 101. D-H

Bejuco de conchitas, Papitos, Deleite, Conchitas, Blue vine, Butterfly pea

Woody vine, twining, attainig 1-3 m in length. Stems slender, cylindrical, with lines of minute trichomes. Leaves alternate, 5-7-foliolate; leaflets opposite, 1.5-4.5 × 1-3.5 cm, elliptical or less frequently ovate or oblong, chartaceous, the apex rounded, obtuse, sometimes retuse or mucronate, the base obtuse, the margins entire; upper surface dark green, dull, puberulent, with the midvein sunken; lower surface pale green, dull, puberulent, with prominent venation; rachis 2-7 cm long; petiolules minute, pubescent; petioles 2-4 cm long, pubescent, with the base thickened; stipels filiform, ca. 1.5 mm long; stipules lanceolate, pubescent, ca. 4 mm long. Flowers solitary, on short peduncles; pedicel ca. 1 cm long, pubescent, with a pair of bracteoles in the middle. Calyx campanulate, 1.5-2.2 cm long, green, puberulent, the lobes lanceolate-ovate, 8-10 mm long, with the midvein conspicuous; corolla blue-violet, the standard broadly ovate, 3.5-5 cm long, retuse, with the base pale yellow and the center pale yellow inside. Legume 9-11 × ca. 1 cm, oblong, ribbed

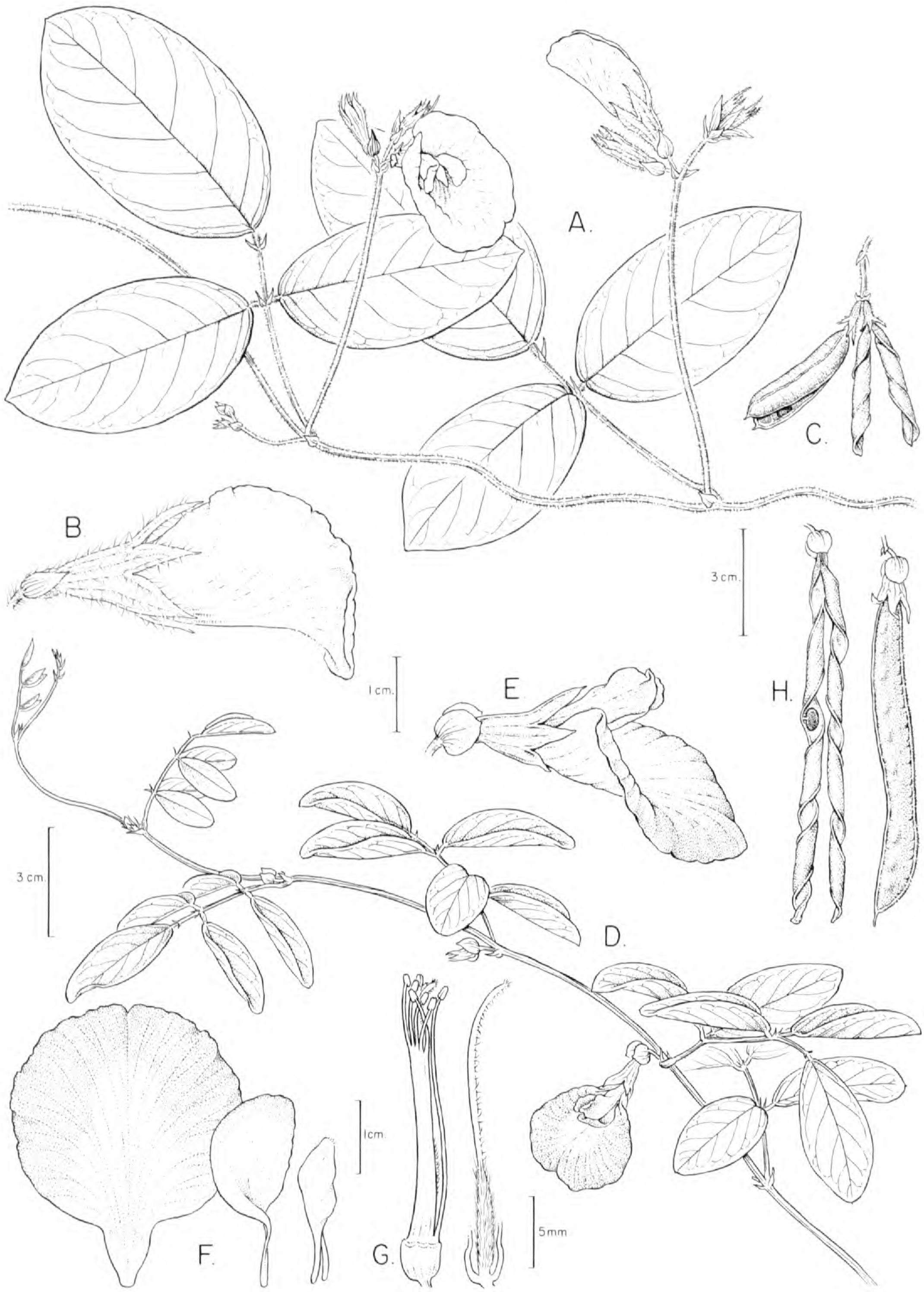

Fig. 101. A-C. *Clitoria falcata.* **A.** Flowering branch. **B.** Flower. **C.** Fruits. **D-H.** *Clitoria ternatea.* **D.** Flowering branch. **E.** Flower. **F.** Petals: standard, wing, and keel. **G.** Stamens and gynoecium. **H.** Open and closed fruit.

along both margins, the apex acuminate. Seeds numerous, 5-6 mm long, oblong, flattened, dark brown.

Phenology: Flowering and fruiting throughout the year.

Status: Exotic, cultivated and naturalized, relatively common.

Distribution: In disturbed areas, such as pastures or roadsides. Native to Africa but found widely distributed throughout the tropics and subtropics of the New World. Also on Vieques, St. Croix, St. John, St. Thomas, and Tortola.

Public Forests: Guánica and Río Abajo.

Commentary: According to Fantz (1990), the following two varieties are found in Puerto Rico: *Clitoria ternatea* var. *ternatea* with simple flowers (only one standard per flower) and *C. ternatea* var. *pleniflora* Fantz with double flowers (4-5 standards per flower).

7. DALBERGIA

Trees, clambering shrubs, or lianas. Leaves alternate, imparipinnate or unifoliolate; leaflets alternate; stipels absent; stipules minute, deciduous. Inflorescences of axillary or terminal racemes or panicles; bracts and bracteoles minute, deciduous or persistent. Calyx campanulate, with 5 elongate lobes, equal or unequal; corolla white, yellow, or pink, the standard rounded or ovate, retuse, narrow at the base, the wings usually longer than the keel; stamens 9-10, diadelphous or monadelphous; ovary superior, stipitate, pubescent, the style usually curved, the stigma minute. Fruit a linear to rounded legume, indehiscent, usually with the margins membranaceous; seeds small, lenticular. A tropical genus of about 100 species.

Key to the species of *Dalbergia*

1a. Leaves unifoliolate; calyx ferruginous-tomentose; plants usually of the littoral zone ..... 1. *D. ecastaphyllum*

1b. Leaves 3-5-foliolate; calyx puberulent; plants usually along rivers in the interior of the island ..... 2. *D. monetaria*

1. Dalbergia ecastaphyllum (L.) Taub in Engl. & Prantl, Nat. Pflanzenfam. 3(3): 335. 1894.

Fig. 102. A-E

BASIONYM: *Hedysarum ecastaphyllum* L.
SYNONYMS: *Ecastaphyllum ecastaphyllum* (L.) Britton
Ecastaphyllum brownei Pers.

Clambering or scandent shrub, much branched from the base, attainig 1-5 m in length. Stems cylindrical, white-pubescent. Leaves alternate, unifoliolate (exceptionally with 3-foliolate leaves on the same plant); leaflets 6-12 × 4.5-8 cm, ovate or oblong, coriaceous, the apex obtuse to acuminate, the base rounded to almost cordiform, the margins entire; upper surface dark green, dull, glabrous, with the venation sunken; lower surface light green, puberulent, with prominent venation; petioles 5-10 mm long, pubescent; stipels absent; stipules ovate to lanceolate, 4-10 mm long, white-sericeous, deciduous. Inflorescences of axillary panicles 1-4 cm long, densely ferruginous-tomentose; bracts minute, deciduous. Calyx campanulate, 2.5-3.5 mm long, green, ferruginous-tomentose; corolla pink or white, the standard rounded, ca. 7 mm long, retuse, unguiculate, the wings longer than the standard. Legume 2-2.3 × 1.5-2 cm, oblong to almost circular, flattened, indehiscent, brown when ripe. Seed solitary, up to 1.7 cm long.

Phenology: Flowering and fruiting throughout the year.

Status: Native, common.

Distribution: In thickets and dry forests of the littoral zone. Also on Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout tropical America and Africa.

Public Forests: Guánica, Mona, Piñones, and Tortuguero.

2. Dalbergia monetaria L.f., Suppl. Pl. Syst. Veg. 317. 1781.

Fig. 102. F-I

SYNONYM: *Securidaca volubilis* L. *pro parte*

Membrillo, Palo de brasilete

Liana with pendulous branches, which supports itself on other plants by means of short branches that entangle like tendrils, attaining 10 m or more in length. Stems flexible, cylindrical, up to 10 cm in diameter; bark light brown; branches cylindrical, pubescent on the younger portions. Leaves alternate, 3- to 5-foliolate; leaflets alternate, 5-12 × 3-7 cm, ovate or elliptical, involute, the apex acuminate, the base obtuse or rounded, the margins entire or slightly undulate, revolute; upper surface dark green, shiny, glabrous; lower surface pale green, dull, puberulent, with prominent venation; petiolules thickened, puberulent; rachis puberulent, up to 11 cm long; petioles 1.2-5 cm long, puberulent; stipules minute, ovate, caducous. Inflorescences of short, clustered, axillary racemes. Calyx campanulate, green, 2-3 mm long, puberulent; corolla white, the standard rounded, 5-10 mm long, retuse, unguiculate at the base; the wings and the keel as long as the standard. Legume circular, flattened, 3-4 cm long. Seed one.

Phenology: Flowering from February to October and fruiting from June to March.

Status: Native, rather common.

Distribution: Along the banks of rivers and streams, in the interior of the island, at middle and lower elevations. Also throughout the Antilles and in tropical South America.

Public Forests: El Yunque, Guajataca, Maricao, Río Abajo, and Susúa.

8. DESMODIUM

Erect, prostrate, or clambering herbs, perennial. Leaves alternate, usually trifoliolate; stipels minute; stipules minute, deciduous or persistent. Inflorescences of axillary or terminal pseudoracemes or panicles; bracts and bracteoles minute, deciduous or persistent. Calyx campanulate, with 5 short, almost equal lobes; corolla yellow, pink, or bluish, the standard oblong to rounded, retuse, narrow at the base, the wings and the keel of the same length; stamens 10, diadelphous or monadelphous; ovary superior, stipitate or sessile, pubescent, with few ovules, the style inflexed, the stigma minute. Fruit a linear legume, flattened or spiral, with the ventral margin or both margins deeply sinuate between the seeds, indehiscent, but separating in segments containing a single seed which adheres to the clothing or the fur of animals; seeds small, oblong. A genus of about 300 species of almost cosmopolitan distribution.

Key to the species of *Desmodium*

1a. Stems cylindrical; legume crenate only along the ventral margin 2
1b. Stems trigonal; legume crenate along both margins ..... 3. *D. intortum*

2a. Legume with 2-3 segments; leaflets with the apex acute or acuminate or less frequently obtuse, distal leaflet cuneate at the base .....1. *D. axillare*
2b. Legume with 5-8 segments; leaflets with the apex obtuse or acute, distal leaflet obtuse or rounded at the base .....2. *D. incanum*

1. Desmodium axillare (Sw.) DC., Prodr. 2: 333. 1825.

Fig. 103. A-C

BASIONYM: *Hedysarum axillare* Sw.
SYNONYMS: *Meibomia axillaris* (Sw.) Kuntze
Meibomia umbrosa Britton
Meibomia sintenisii (Urb.) Britton

Decumbent or scandent herb, scarcely branched from the woody base, attainig 2 m in length. Stems more or less cylindrical, producing aerial roots in the area of the nodes, pubescence mixed, of uncinate trichomes and minute, erect trichomes, glabrescent with age. Leaves alternate, trifoliolate; leaflets 3-9 × 2-6.5 cm, chartaceous, the apex obtuse, acute, or acuminate, usually

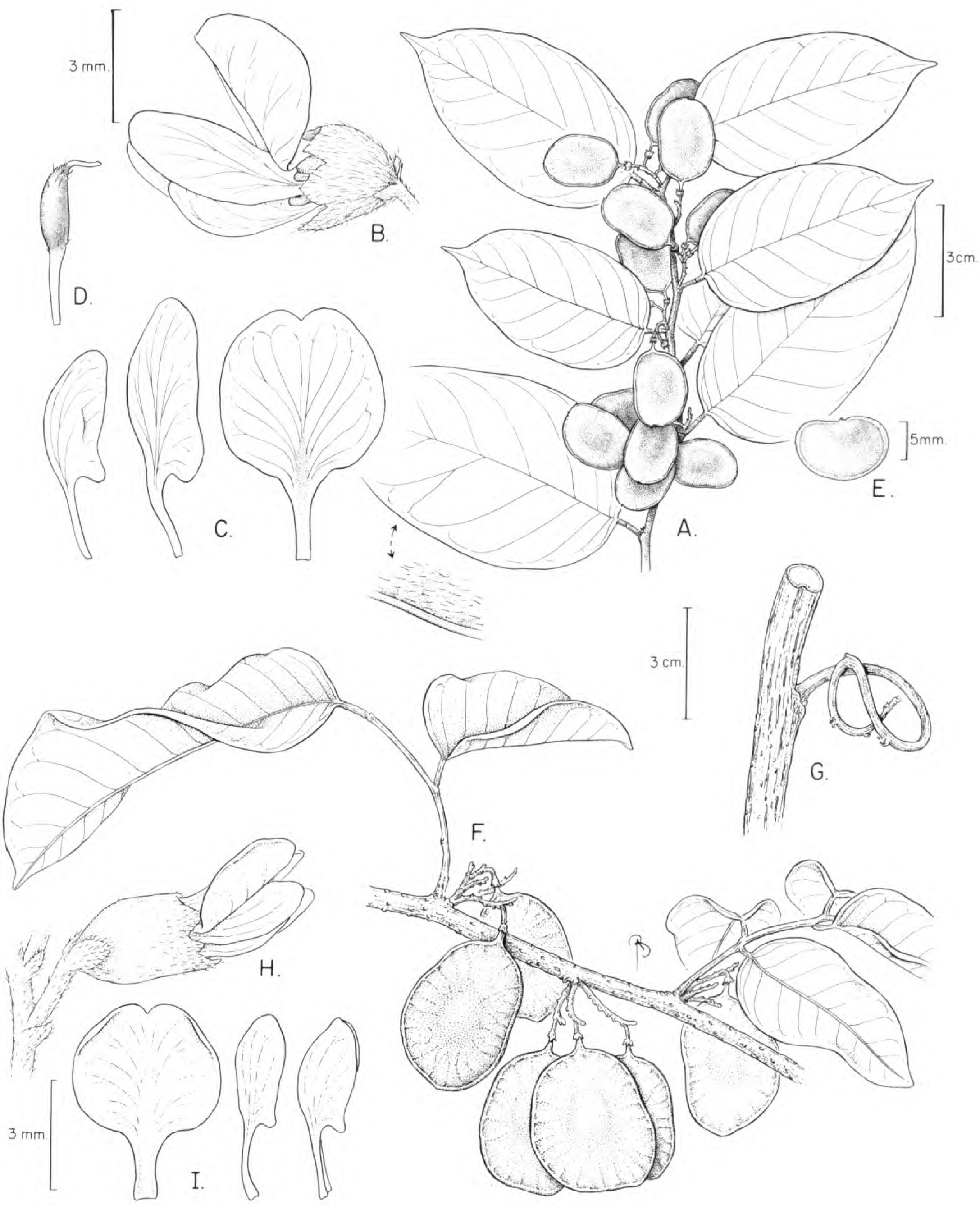

Fig. 102. A-E. *Dalbergia ecastaphyllum*. **A.** Fertile branch. **B.** Flower. **C.** Petals: keel, wing, and standard. **D.** Gynoecium. **E.** Seed. **F-I.** *Dalbergia monetaria*. **F.** Fertile branch. **G.** Prehensile lateral branch. **H.** Flower. **I.** Petals: standard, wing, and keel.

mucronate, the margins entire, strigose; upper surface dark green, glabrous, puberulent on the venation; lower surface grayish green, strigose, with prominent venation; distal leaflet rhombic, with the base cuneate; lateral leaflets asymmetrical, one side elliptical, the other ovate,

the base obtuse or rounded; petiolules 2-5 mm long, pilose; petioles 4.5-10.5 cm long, uncinate-pubescent, striate; rachis 1-6 mm long, pilose, canaliculate; stipules ovate to lanceolate, 5-10 mm long, deciduous; stipels filiform, ca. 2 mm long. Inflorescences of axillary racemes, erect, 30-45 cm long, the axis pubescent, dark brown, with flowers paired along its length; pedicels 12-17 mm long. Calyx purple, campanulate, ca. 2 mm long, pilose; corolla pink or pale violet, ca. 4 mm long. Legume uncinate-pubescent, 0.7-1(2) cm long, crenate on the ventral suture, with (1)2(3) fertile segments. Seeds ca. 3.5 mm long, oblong-elliptical, light brown.

Phenology: Collected in flower and fruit from January to August.

Status: Native, rather common.

Distribution: On the ground in dry to moist forests and in areas of disturbed vegetation along the Cordillera Central. Also on St. Croix; distributed throughout the Antilles, Central and South America.

Public Forests: El Yunque, Guilarte, Maricao, Río Abajo, and Toro Negro.

Key to the varieties in Puerto Rico

1a. Leaflets acute or acuminate at the apex..... 2
1b. Leaflets obtuse... *D. axillare* var. *axillare*

2a. Plants densely pubescent .... *D. axillare* var. *acutifolium*
2b. Plants puberulent..... ..... *D. axillare* var. *stoloniferum*

2. Desmodium incanum DC., Prodr. 2: 332. 1825.

Fig. 103. D-G

SYNONYM: *Hedysarum canum J.F. Gmel.*
Desmodium canum (J.F. Gmel.) Schinz & Thell.
Hedysarum supinum Sw.
Meibomia supina (Sw.) Britton

Decumbent or scandent herb, much branched from the woody base, attainig 1-1.5 m in length. Stems more or less cylindrical, appressed-pubescent or pilose, glabrescent with age. Leaves alternate, trifoliolate; leaflets 3-9 × 0.8-3.8 cm, elliptical, oblong, ovate, lanceolate, or exceptionally rounded, chartaceous, involute, the apex obtuse or acute, mucronate, the base obtuse or rounded, the margins entire; upper surface dark green, puberulent; lower surface grayish green, strigulose, with prominent venation; petiolules 1.5-3 mm long, pilose; petioles 0.7-3 cm long, pilose, canaliculate; rachis 3-10 mm long, pilose, canaliculate; stipules ovate to lanceolate, 6-10 mm long, persistent; stipels minute, subulate. Inflorescences of terminal pseudoracemes, 10-18 cm long, pubescent; bracts minute, persistent. Calyx green, campanulate, 2.5-3 mm long, strigulose; corolla pink or pink-violet, the standard ovate, 5-6 mm long, retuse, unguiculate at the base, the wings and the keel as long as the standard. Legume uncinate-pubescent, 2-4 cm long, crenate on the ventral suture, with 5-8 fertile segments. Seeds 2.5-3.5 mm long, oblong-elliptical, light brown.

Phenology: Flowering and fruiting throughout the year.

Status: Apparently native, very common.

Distribution: In the understory of dry to moist forests and in areas of disturbed vegetation. Also on Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; distributed throughout the tropics as a weed.

Public Forests: El Yunque, Guajataca, Guánica, Maricao, Mona, Río Abajo, and Susúa.

3. Desmodium intortum (Mill.) Urb., Symb. Antill. 8: 292. 1920.

Fig. 103. H-M

BASIONYM: *Hedysarum intortum* Mill.

Decumbent or ascendent herb, branched from the base, attainig 3 m in length. Stems trigonal, densely covered with uncinate hairs. Leaves alternate, trifoliolate; leaflets 4-7 × 2-5 cm, ovate, broadly ovate, or elliptical, chartaceous, the apex obtuse or acute, the base rounded, the margins entire; upper surface dark green, strigulose; lower surface pale green, more or less strigose, with prominent venation; petiolules 2.5-3 mm long, densely pilose; petioles 2-3.5 cm long, pilose, striate; rachis ca. 5 mm long, pilose; stipules ovate, acuminate, ca. 7 mm long, deciduous; stipels minute, subulate. Inflorescences of terminal or axillary pseudoracemes, uncinate-pubescent. Calyx green, campanulate, puberulent, the tubular portion ca. 3 mm long, the inner sepal ca. 3.5 mm long, lanceolate, the rest ca. 1.5 mm long, deltate; corolla pink-violet, the standard ca.

9 mm long, retuse at the apex, unguiculate at the base, the wings and the keel as long as the standard. Legume uncinate-pubescent, ca. 2.5 cm long, crenate on both margins, with 6-11 fertile segments.

Phenology: Collected in flower and fruit during January and February.

Status: Native, relatively common.

Distribution: On the edges of forests along the Cordillera Central. Also in Hispaniola and Jamaica; southwestern United States, Mexico, and Central America to Peru.

Public Forest: Toro Negro.

9. DIOCLEA

Woody vines, twining, occasionally erect subshrubs. Leaves alternate, trifoliolate; stipels minute; stipules conspicuous, persistent, or absent. Inflorescences of axillary pseudoracemes, fasciculate, the flowers grouped on the swellings along the rachis; bracts and bracteoles minute, deciduous. Calyx campanulate, with 4 lobes, the upper lobe entire or emarginate; corolla purple or rarely white, the standard reflexed, emarginate, auriculate and usually with 2 callosities at the base, the wings free, sometimes spurred, the keel distally fused, rostrate; stamens 10, pseudomonadelphous; ovary superior, villous, stipitate or sessile, with 1 or more ovules, the style flattened or cylindrical, the stigma capitate, terminal or subterminal. Fruit a linear, oblong, obovate, or almost circular legume, compressed or turgid, coriaceous or woody, dehiscent or indehiscent; seeds large, compressed to globose, with a linear, elongate hilum. A genus of about 55 species, distributed throughout the tropics, with the greater number of species in South America.

1. Dioclea reflexa Hook. f., Niger Fl. 306. 1849. **Fig. 104. A-H**

Bejuco de mato, Maya prieta

Woody vine, twining, attainig 10 m in length. Stems pilose, cylindrical, glabrescent when mature, attaining 1 cm in diameter. Leaves alternate, trifoliolate; leaflets 7-16 × 5-10.5 cm (the terminal leaflet larger than the lateral ones), elliptical or less frequently oblong, chartaceous, the apex rounded, usually terminating in a short apiculus, the base rounded, unequal on the lateral leaflets, the margins entire or undulate, slightly revolute; upper surface green, dull, punctate, strigulose, especially on the midvein, the lateral veins sunken; lower surface pale green, dull, strigulose, with prominent pilose venation; petiolules thickened, 5-6 mm long, pilose; stipels 8-10 mm long, linear; petioles 7-9 cm long, sulcate, pilose, with the base thickened; stipules subulate, ca. 1 cm long, sericeous. Inflorescences of axillary or terminal pseudoracemes; rachis ca. 40 cm long, thick, woody, sericeous; flowers in groups of three on each of the nodal swellings along the rachis; bracts subulate, ca. 1.5 cm long, reflexed, sericeous. Calyx ca. 1.5 cm long, ferruginous-strigulose, with five lobes, one of which is lanceolate and longer, the rest ovate; corolla cardinal red or violet, the standard ca. 1.2 cm long, with the center whitish inside, the wings and the keel unguiculate, as long as the standard. Legume 10-15 × 5-6 cm, oblong, laterally compressed between the seeds, densely pubescent, glabrescent on drying, the margins thickened. Seeds 1-3, circular, 2-3.5 cm long, brown with a black hilum along 2/3 - 3/4 of the circumference.

Phenology: Collected in flower from October to December and in fruit from January to March.

Status: Native, uncommon.

Distribution: In forests and pastures at lower or middle elevations. Also in Cuba, Hispaniola, Jamaica, Central America, South America, and tropical western Africa.

Public Forest: El Yunque.

Commentary: In this work I follow Maxwell (1999), who considers *D. reflexa* as a species distinct from the Asian species, *D. hexandra* (Ralph) Mabberley.

The seeds of *D. reflexa* superficially resemble those of *Mucuna urens,* since they are of similar size and both possess a hilum that covers a large portion of its circumference. Nevertheless, the seeds of *D. reflexa* are distinguished from those of the latter species by their light brown color with brown spots (vs. uniformly reddish brown) and by the presence of a dark brown hilum (vs. a black hilum).

Fig. 103. A-C. *Desmodium axillare* var. *acutifolium*. **A.** Flowering branch. **B.** Flower. **C.** Fruit. **D-G.** *Desmodium incanum*. **D.** Fertile branch. **E.** Detail of stipule. **F.** Flower. **G.** Fruit. **H-M.** *Desmodium intortum*. **H.** Fertile branch and detail of pubescence. **I-J.** Inflorescence. **K.** Flower. **L.** Petals: standard, wing, and keel. **M.** Stamens and gynoecium.

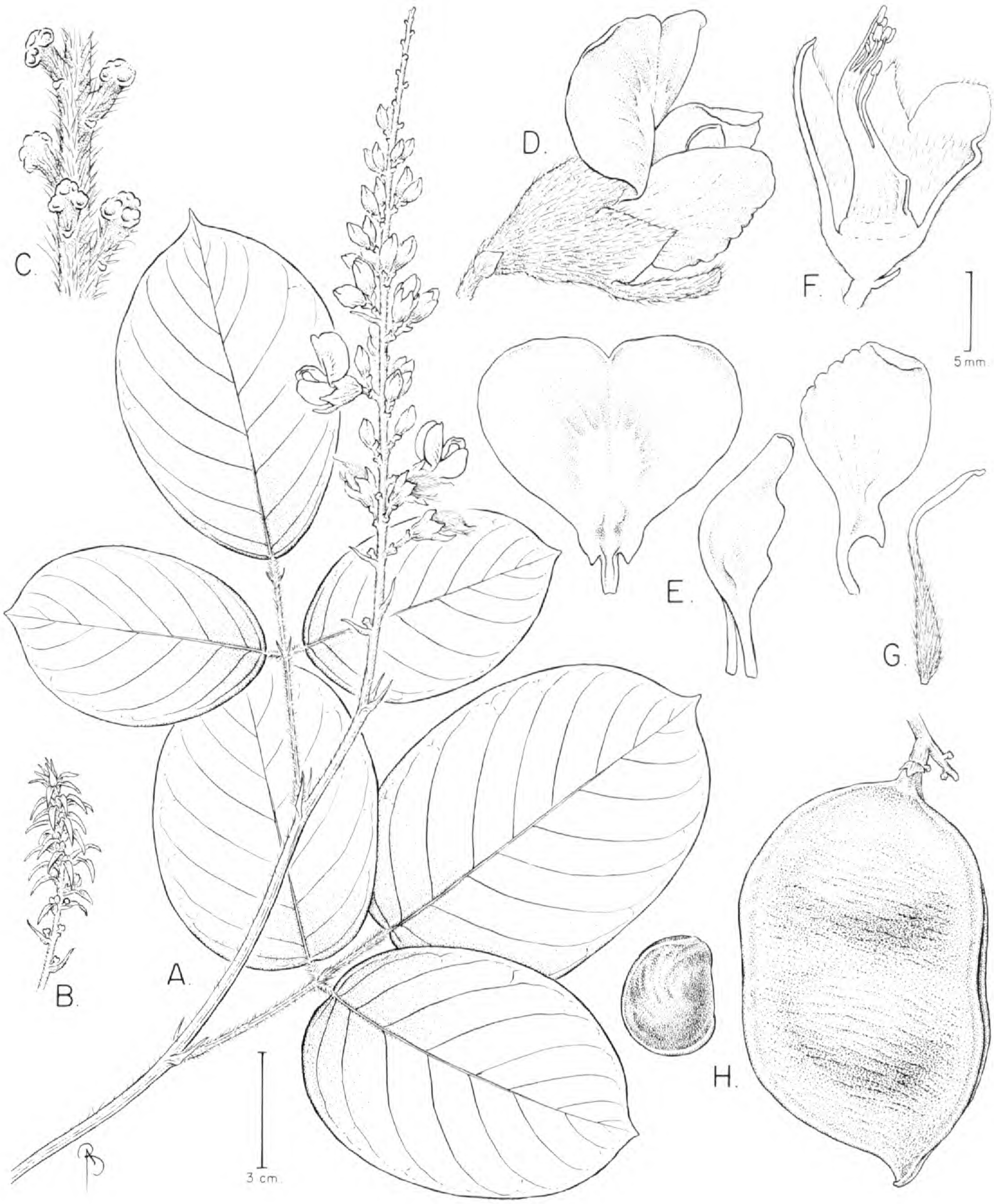

Fig. 104. A-H. *Dioclea reflexa*. **A.** Flowering branch. **B.** Juvenile inflorescence. **C.** Nodes of the inflorescence. **D.** Flower. **E.** Petals: standard, keel, and wing. **F.** Calyx, longitudinal section showing stamens. **G.** Gynoecium. **H.** Seed and fruit.

10. GALACTIA

Herbaceous or slightly woody vines, twining. Leaves alternate, trifoliolate or unifoliolate; stipels minute or absent; stipules minute, deciduous. Inflorescences of axillary or terminal pseudoracemes, the flowers grouped on the swellings along the rachis; bracts and bracteoles minute, deciduous or persistent. Calyx campanulate, with 4 lobes, elongate; corolla pink, lavender, white, or less frequently red, the standard elliptical or rounded, reflexed, narrow at the base, the wings appressed to the keel; stamens 10, monadelphous or diadelphous, unequal; ovary superior, sessile, pubescent, with numerous ovules, the style curved, glabrous, the stigma capitate. Fruit a flattened, linear legume, slightly curved, with a beak at the apex, dehiscent by twisting valves; seeds small, few, ovoid, brown. A genus of about 50 species, the majority of the New World tropics.

Key to the species of *Galactia*

1a. Corolla brilliant red; standard 14-18 mm long; species endemic to the Virgin Islands ..... 2. *G. eggersii*
1b. Corollas pink or lavender; standard 5-15 mm long; species of wide distribution 2

2a. Leaflets linear or linear-oblong; inflorescences usually of a single flower; calyx strigose ..... 3. *G. longifolia*
2b. Leaflets ovate, elliptical, oblong, or lanceolate; inflorescences of 4 or more flowers; calyx pilose or pubescent (sometimes strigulose) 3

3a. Legumes 5-5.5 mm wide; standard 12-15 mm long ..... 1. *G. dubia*
3b. Legumes 6-9 mm wide; standard 8-10 mm long ..... 4. *G. striata*

1. Galactia dubia DC., Prodr. 2: 238. 1825.

Fig. 105. A-E

SYNONYMS: *Galactia dubia* DC. *var. ehrenbergii* Urb.
Galactia dubia DC. *var. guanisensis* Urb.

Iron weed

Non-woody vine, twining, attainig 2 m in length. Stems slender, green, appressed-pubescent. Leaves alternate, trifoliolate; leaflets 1-4 × 0.8-2 cm, subcoriaceous, elliptical, oblong, or obovate, involute, the apex emarginate, rounded, mucronate, the base rounded, the margins entire; upper surface dark green, shiny or dull, puberulent or pubescent; lower surface pale green, dull, strigose or sericeous-pubescent, with the midvein prominent; petioles slender, pubescent, 1-2 cm long; stipules lanceolate, 2-3 mm long; stipels absent. Inflorescences of axillary pseudoracemes, few-flowered; rachis 1-4 cm long; flowers 2-3, clustered on the swellings of the rachis; bracts minute, persistent. Calyx almost campanulate, green, pilose, 5-10 mm long, the sepals 4, ovate, acuminate, 4-7 mm long, two of which are longer; corolla pale pink or lavender, the standard oblong-elliptical, 12-15 mm long, reflexed, greenish at the base on the inner surface, the wings and the keel 10-12 mm long. Legume 3-6 × 0.5-0.6 cm, oblong-linear, flattened, slightly curved, pubescent. Seeds ca. 4 mm long, oblong, dark brown.

Phenology: Flowering from January to October and fruiting from January to May.

Status: Native, relatively common.

Distribution: In areas of disturbed vegetation, at lower elevations, mostly near the coast. Also on Culebra, Culebrita, Desecheo, Icacos, Mona, Vieques, St. Croix, Little St. James, St. John, St. Thomas, and Tortola; the Lesser Antilles.

Public Forests: Cambalache, Guánica, Mona, Río Abajo, and Susúa.

2. Galactia eggersii Urb., Symb. Antill. 2: 311. 1900.

Fig. 105. F-H

Non-woody vine, twining, attainig 2 m in length. Stems slender, green, appressed-pubescent, glabrous when mature. Leaves alternate, trifoliolate; leaflets 1-3 × 0.7-2.1 cm, subcoriaceous, elliptical to rounded, involute, the apex emarginate, rounded, mucronate, the base rounded, the margins entire; upper surface dark green, slightly shiny, puberulent; lower surface pale green, dull, pubescent, with the midvein prominent; petioles 0.5-2 cm long; stipules lanceolate, 2-3 mm long; stipels subulate. Inflorescences of axillary pseudoracemes, of one or a few flowers; rachis 1-2.5 cm long, pubescent; flowers 1-3, clustered on the swellings of the rachis; bracts minute, persistent. Calyx almost campanulate, green, pilose, 8-12 mm long, the sepals unequal; corolla brilliant red, the standard elliptical, 14-18 mm long, reflexed, the wings and the keel as long as the standard; style white. Legume 5-6 × 0.5-0.6 cm, oblong-linear, flattened, slightly curved, pubescent, with the margins slightly sinuate. Seeds ca. 5 mm long, reniform, dark brown, shiny.

Phenology: Collected in flower and fruit from December to February.

Status: Endemic, uncommon.

Distribution: In coastal thickets or in areas of disturbed vegetation, along the littoral zone. Endemic to Guana Island, St. John, St. Thomas, and Tortola.

3. Galactia longifolia (Jacq.) Benth., Ann. Wien. Mus. 2: 127. 1838.

Fig. 105. I-L

BASIONYM: *Galega longifolia* Jacq.

Decumbent herb, branched from the base, the branches twining in the distal portion, attaining 2 m in length. Stems slender, cylindrical, sericeous, glabrescent with age. Leaves alternate, trifoliolate; leaflets 2-6.5 × 0.4-1(1.3) cm, subcoriaceous, linear, oblong or narrowly elliptical, the apex obtuse or acute, mucronate, the base rounded, the margins entire; upper surface dark green, dull, strigulose; lower surface pale green, dull, strigose to almost sericeous, with the midvein prominent, the lateral leaflets smaller than the terminal one; petioles slender, pubescent, 1-10 mm long; rachis pubescent, longer than the petiole; stipules subulate, 1.5-3 mm long; stipels subulate, ca. 1 mm long, deciduous. Inflorescences of reduced, axillary pseudoracemes, usually with a single flower; rachis 1.7-5 cm long, strigulose or glabrescent. Calyx almost campanulate, green, strigose or strigulose, 3.5-5.5 mm long, the sepals 4, elongate, lanceolate, acuminate; corolla pink to pale violet, the standard obovate, 5-7 mm long, reflexed, the wings and the keel as long as the standard. Legume 2.5-3.7 × ca. 0.4 cm, oblong-linear, flattened, slightly curved, appressed-pubescent. Seeds ca. 2.8 mm long, elliptical, light brown.

Phenology: Collected in flower and fruit from March to September.

Status: Apparently native, but known from very few collections.

Distribution: Known only from the Guayama area. Also in Hispaniola, the Lesser Antilles, the United States (Texas), and the Gran Chaco of Argentina and Paraguay.

4. Galactia striata (Jacq.) Urb., Symb. Antill. 2: 320. 1900.

Fig. 105. M-O

BASIONYM: *Glycine striata* Jacq.

SYNONYMS: *Galactia striata* (Jacq.) Urb. *var. tomentosa* (Bertol.) Urb.

Galactia berteriana DC.

Galactia striata (Jacq.) Urb. *var. berteriana* (DC.) Urb.

Slightly woody vine, twining, attainig 2-5 m in length. Stems slender, pubescent. Leaves alternate, trifoliolate; leaflets 3-6 × 2-3 cm, elliptical or ovate, chartaceous, the apex rounded or less frequently obtuse, mucronate, the base rounded, the margins entire; upper surface dark green, dull, pubescent; lower surface pale green, dull, pilose or velutinous, with prominent venation; petiolules thickened, ca. 4.5 cm long, pubescent; stipels minute; rachis ca. 1 cm long; stipules filiform, ca. 3 mm long, pubescent. Inflorescences of axillary pseudoracemes; rachis 4-14 cm long; flowers 2-3, grouped on the swellings along the rachis; bracts minute, persistent. Calyx green, ca. 1 cm long, pubescent, the sepals 4, one of them larger; corolla pink or lavender, the standard 8-10 mm long, elliptical, purple with white lines, yellow at the base on the inner surface, the wings and the keel as long as the standard. Legume 4-8 × 0.6-0.9 cm, oblong, flattened, pubescent, the apex with a recurved

Fig. 105. A-E. *Galactia dubia.* **A.** Fertile branch. **B.** Flower. **C.** Calyx. **D.** Standard, wing, and keel. **E.** Fruits. **F-H.** *Galactia eggersii.* **F.** Fertile branch. **G.** Flower. **H.** Fruit. **I-L.** *Galactia longifolia.* **I.** Fertile branch. **J.** Flower, side view. **K.** Standard, wing, and keel. **L.** Legume. **M-O.** *Galactia striata.* **M.** Fertile branch. **N.** Flower, side and front views. **O.** Standard, wing, and keel.

point. Seeds 4-5 mm long, flattened, reniform to oblong, dark brown, dull.

Phenology: Flowering and fruiting from August to March.

Status: Native, rather common.

Distribution: In areas of secondary vegetation, at lower and middle elevations. Also on Culebra, Desecheo, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Neotropics.

Public Forests: Cambalache, Guánica, Guajataca, Mona, Río Abajo, and Tortuguero.

11. LABLAB

A monospecific genus, characterized by the following species.

1. Lablab purpureus (L.) Sweet, Hort. Brit. ed. 1, 481. 1826.

Fig. 106. A-F

BASIONYM: *Dolichos purpureus* L.
SYNONYM: *Dolichos lablab* L.

Chicharos, Frijol caballero, Habas de caballo, Bona wiss, Sweet pea

Slightly woody vine, twining, attainig 3-7 m in length. Stems slightly angular, pilose. Leaves alternate, trifoliolate; leaflets 5-16 × 4.5-12 cm, broadly ovate or rhombic, chartaceous, the apex acute or acuminate, the base cuneate or truncate on the central leaflet, unequal on the lateral ones, the margins entire, ciliate; upper surface dull, pubescent, with prominent venation; lower surface with the venation reticulate, prominent, pubescent; petiolules thickened, pubescent; petioles 6-20 cm long, canaliculate, laterally flattened, thickened at the base; stipules lanceolate, ca. 5 mm long, persistent; stipels subulate. Inflorescences of axillary pseudoracemes, erect, up to 25 cm long, the flowers 2-3, grouped on the swellings along the rachis; pedicels 4-5 mm long. Calyx campanulate, green, pubescent, 6-7 mm long, the sepals 4 or 5, unequal, lanceolate; corolla white or pale violet, the standard rounded, 1.4-2 cm long, the wings oblanceolate, the keel as long as the wings; stamens 10, diadelphous; ovary flattened, the style curved, the stigma terminal. Legume 5-10 × 2-3 cm, almost oblong, broader in the portion near the apex, the upper margin with numerous callosities, the apex acuminate, tardily dehiscent. Seeds 3-5, up to 1 cm long, ovate or elliptical, flattened, light brown, with a white funiculus.

Phenology: Flowering and fruiting throughout the year.

Status: Exotic, naturalized, rather common.

Distribution: In disturbed areas, such as along roadsides, on fences, and in pastures. Probably native to Africa, found distributed throughout the tropics. Also on Vieques, St. Croix, St. John, and St. Thomas.

Public Forests: El Yunque Maricao, Río Abajo, and Toro Negro.

12. MACHAERIUM

Trees, shrubs, or scandent lianas, usually with short, prehensile branches, spiny and with red latex. Leaves alternate, imparipinnate; leaflets alternate; stipels absent; stipules spinescent, persistent. Inflorescences of axillary or terminal racemes or panicles; bracts minute; bracteoles broadly ovate, paired at the base of the calyx. Calyx asymmetrically campanulate, 5-lobate or subtruncate; corolla violet-pink, white, or yellow, the standard rounded or reniform, narrowed at the base, the wings and the keel subequal; stamens 10, diadelphous or monadelphous; ovary short-stipitate, with 1-2 ovules, the style curved, the stigma punctiform or capitate. Fruit an indehiscent legume, usually samaroid, with a terminal wing, or flattened, straight, curved, or in the form of a half-moon, circular in outline, without a wing, or the wing reduced; seeds solitary, reniform, ovate, or orbicular. A genus of about 130 species, the majority of the New World tropics.

1. Machaerium lunatum (L.f.) Ducke, Arch. Jard. Bot. Rio de Janeiro 4: 310. 1925.

Fig. 106. G-L

BASIONYM: *Pterocarpus lunatus* L.f.
SYNONYM: *Drepanocarpus lunatus* (L. f.) G.F.W. Meyer

Escambrón, Palo de hoz

Scandent shrub attainig 15 m in length. Stems cylindrical, attaining up to 12 cm in diameter, with numerous persistent, recurved stipular spines. Leaves imparipinnate; leaflets 5-7, alternate or rarely opposite, 2-7 × 0.5-3 cm, oblong or oblanceolate, chartaceous, glabrous, the apex retuse, the base obtuse or rounded, the margins entire; petiolules 2-3 mm long; stipules recurved, spiniform, up to 1 cm long. Inflorescences of axillary or terminal racemes, with few to many flowers, 5-15 cm long; bracts minute, persistent. Calyx 3.5-5 mm long, glabrous; corolla pink to violet-pink, the standard up to 8 mm long, retuse, the wings falcate, the keel incurved. Legume 2-3.7 cm wide, in the form of a half-moon, circular in outline, indehiscent. Seed 1, reniform.

Phenology: Collected in flower from February to August and in fruit from March to December.

Status: Native, common.

Distribution: In the coastal swamps that border on the mangroves. Also on Vieques, St. Croix, St. John, and St. Thomas; Hispaniola, the Lesser Antilles, tropical continental America and tropical Africa.

Public Forest: In all probability, found in Piñones.

13. MACROPTILIUM

Erect, creeping, or clambering herbs or herbaceous vines. Leaves trifoliolate; stipules and stipels minute. Inflorescences of axillary pseudoracemes, the flowers grouped in pairs on the swellings along the rachis; bracts minute. Calyx almost campanulate or tubular, of 5 equal or unequal sepals; corolla usually cardinal red, the standard rounded, reflexed, narrowed at the base, the wings narrowed at the base, much longer than the other petals, the keel narrowed at the base, twisted in the distal portion, fused to the staminal tube; stamens 10, diadelphous; ovary superior, subsessile, flattened, pubescent, with many ovules, the style thickened at the base, twisted, the stigma punctiform. Legume linear, cylindrical, dehiscent by valves that twist on drying; seeds numerous, small, oblong-cylindrical. A genus of 20 species, native to the New World.

Key to the species of *Macroptilium*

1a. Twining vine; terminal leaflet usually trilobate; lower surface densely white-pubescent; corolla purple ..... 1. *M. atropurpureum*
1b. Erect or clambering herb; terminal leaflet not lobed; lower surface puberulent; corolla maroon, pink, or white ..... 2. *M. lathyroides*

1. Macroptilium atropurpureum (DC.) Urb., Symb. Antill. 9: 457. 1928.

Fig. 107. A-D

BASIONYM: *Phaseolus atropurpureus* DC.

Herbaceous vine, twining, attainig 3-5 m in length. Stems cylindrical, strigose. Leaves alternate, trifoliolate; leaflets 2-8 × 1.7-3.5 cm, coriaceous, upper surface dull, pubescent; lower surface densely white-pubescent, with prominent venation, the apex acute or obtuse; terminal leaflet ovate-rhombic, sometimes bilobate, the base cuneate; the lateral leaflets asymmetrical, unilobate, the base cuneate-obtuse; petiolules slender, white-pubescent; petioles 1-7 cm long, white-pubescent; stipules subulate to triangular, white-pubescent, 2.5-3 mm long; stipels subulate, white-pubescent, ca. 2 mm long. Inflorescences of axillary pseudoracemes, erect, 13-26 cm long, the flowers grouped in pairs on the swellings on the distal portion of the rachis; pedicels ca. 2 mm long. Calyx tubular-campanulate, green, with a reddish tonality, strigose-sericeous, 5-7 mm long, the sepals subequal or unequal, or all of them

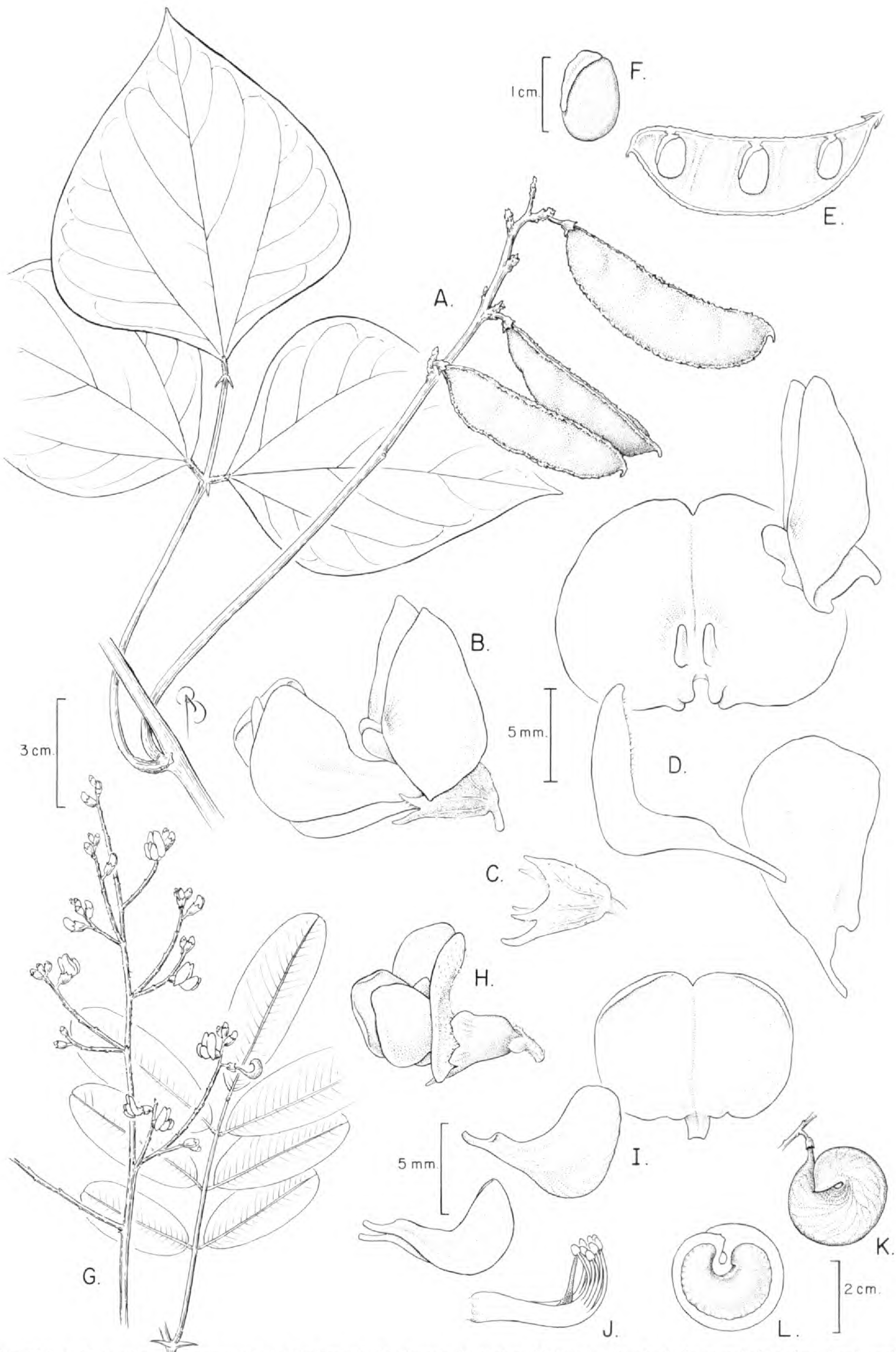

Fig. 106. A-F. *Lablab purpureus*. **A.** Fertile branch. **B.** Flower. **C.** Calyx. **D.** Petals: standard, front and side view, keel, and wing. **E.** Open fruit. **F.** Seed. **G-L.** *Machaerium lunatum*. **G.** Inflorescence and leaf. **H.** Flower. **I.** Petals: keel, wing, and standard. **J.** Stamens. **K.** Fruit. **L.** Fruit, longitudinal section. From Acevedo-Rodríguez et al. 1996. Flora of St. John, U. S. Virgin Islands. Mem. NYBG Vol. 78.

shorter than the tubular portion of the calyx; corolla purple, the standard rounded, ca. 2 cm long, the wings, shorter than the standard, unguiculate, the keel recurved in a spiral; stamens 10, diadelphous; ovary flattened, sericeous, the style slightly curved, the stigma terminal, punctiform. Legume 5-8 × 0.2-0.4 cm, linear, flattened, sericeous. Seeds numerous, ca. 3.6 mm long, dark brown, dull.

Phenology: Collected in flower and fruit from January to July.

Status: Exotic, uncommon, a relatively recent introduction, since it was not reported for Puerto Rico by Britton and Wilson in 1924.

Distribution: In disturbed, ruderal areas. Also on St. Thomas. Native to tropical continental America, but distributed throughout the tropics.

Public Forest: Piñones.

2. Macroptilium lathyroides (L.) Urb., Symb. Antill. 9: 457. 1928.

Fig. 107. E-J

BASIONYM: *Phaseolus lathyroides* L.
SYNONYM: *Phaseolus semierectus* L.

Habichuela parada, Wild bush bean

Erect or clambering herb, scarcely twining, with numerous basal or lateral branches, attainig 1.5-2(3) m in length. Stems almost cylindrical, up to 5 mm in diameter, pubescent, glabrescent. Leaves alternate, trifoliolate; leaflets elliptical, ovate, or lanceolate, 3-5 × 2-3 cm, chartaceous, the apex mucronate, acute or obtuse, the base obtuse or cuneate, the margins entire; upper surface glabrous, dark green, dull; lower surface pale green, dull, puberulent, with prominent venation; petiolules thickened, pubescent, 2-3 mm long; petioles sulcate, pubescent, sometimes reddish, with the base thickened; stipules lanceolate, 5-10 mm long, with notable parallel venation; stipels subulate, minute. Inflorescences of axillary pseudoracemes, 15-30 cm long, the flowers paired on the swellings on the distal portion of the rachis. Calyx campanulate, 5-7 mm long, strigose or puberulent, the sepals lanceolate, two of which are slightly smaller than the rest; corolla maroon, pink, and sometimes white, the standard 1-1.5 cm long, the wings longer than the standard, concave, the keel shorter than the standard, recurved in the form of a spiral. Legume linear, somewhat flattened and recurved, 6-12 cm × ca. 3 mm, dehiscent by valves that open in a spiral. Seeds numerous, 2-3 mm long, oblong-reniform, dark brown.

Phenology: Flowering and fruiting throughout the year.

Status: Apparently native, very common.

Distribution: In areas of disturbed vegetation throughout the island. Also on Vieques, St. Croix, St. John, St. Thomas, and Tortola; throughout the Antilles, United States (Florida), Central and South America, and the tropics of the Old World.

Public Forests: Guánica, El Yunque, Maricao, and Río Abajo.

14. MUCUNA

Lianas or twining vines. Leaves alternate, trifoliolate; stipels absent or present; stipules deciduous. Inflorescences of pendulous axillary pseudoracemes, usually with a long peduncle; bracts foliaceous, deciduous. Calyx campanulate, bilabiate, with 4 lobes, one of which is smaller; corolla violet, violet-pink, bluish, or yellow, the standard oblong, elongate, narrowed at the base, auriculate, the wings and the keel subequal, longer than the standard; stamens 10, diadelphous; ovary superior, sessile, villous, with few ovules, the style filiform, the stigma punctiform. Fruit an oblong legume, coriaceous, usually covered with stinging hairs, dehiscent; seeds oblong, circular, rounded, with an oblong, elongate hilum. A genus of about 120 species distributed throughout the tropics.

Key to the species of *Mucuna*

1a. Seeds oblong (in the form of a bean), with a short hilum; legume 4-9 cm long, ca. 1.5 cm wide, cylindrical, densely hispid ..... 1. *M. pruriens*
1b. Seeds circular, flattened, with a linear, black hilum, extending over 2/3 to 3/4 of the circumference; legume 8-20 cm long, 2-5 cm wide, more or less flattened, falcate, sparsely hispid..... 2

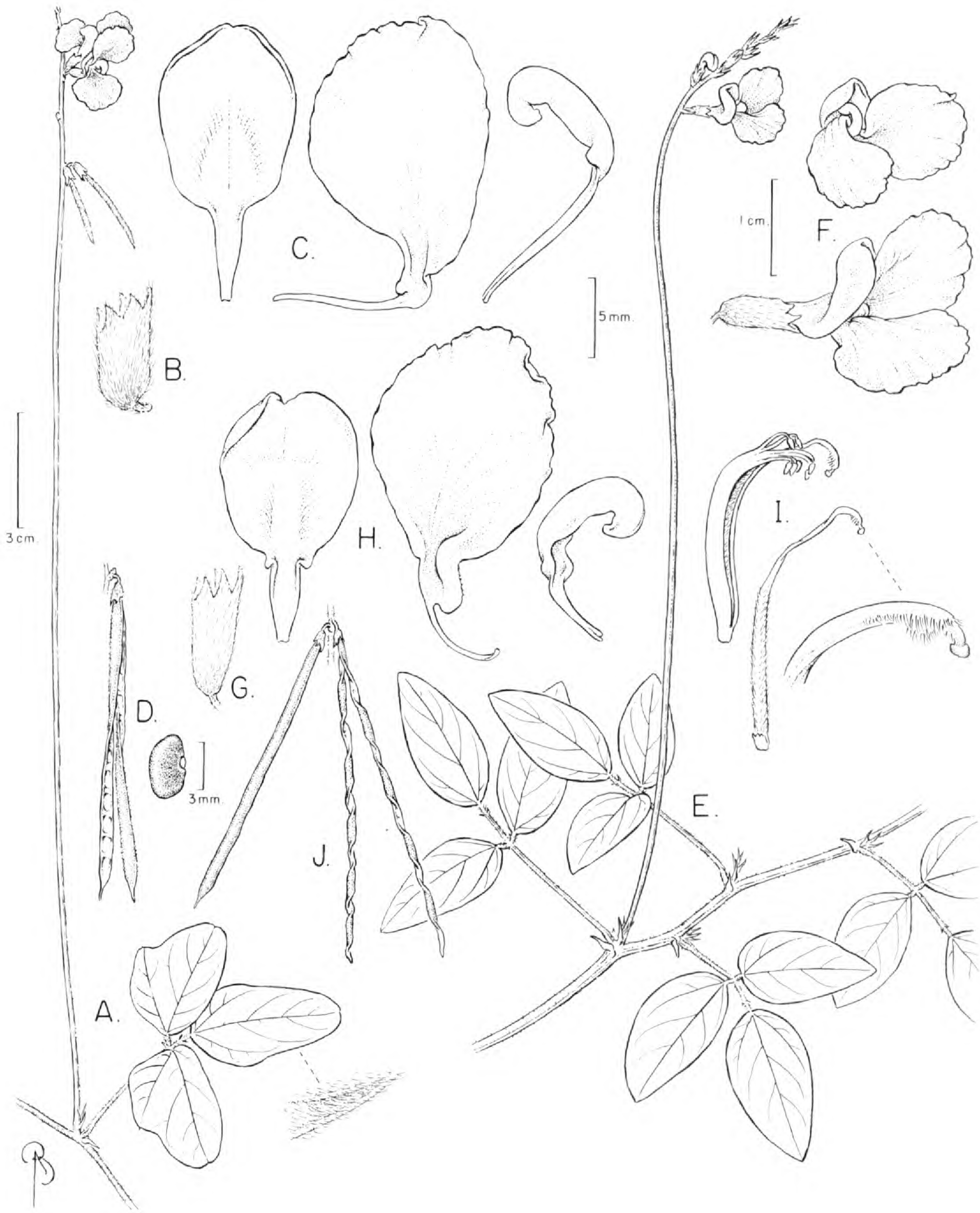

Fig. 107. A-D. *Macroptilium atropurpureum.* **A.** Fertile branch, with detail of pubescence on the lower surface of the leaf. **B.** Calyx. **C.** Petals: standard, wing, and keel. **D.** Fruit and seed. **E-J.** *Macroptilium lathyroides.* **E.** Fertile branch. **F.** Flower, top and side views. **G.** Calyx. **H.** Petals: standard, wing, and keel. **I.** Staminal column, gynoecium, with detail of the style and stigma. **J.** Fruit, closed and open.

2a. Lower surface of leaflets sericeous-pubescent; corolla yellow.....2. *M. sloanei*
2b. Lower surface of leaflets glabrous; corolla bluish or violet-pink .....3. *M. urens*

1. Mucuna pruriens (L.) DC., Prodr. 2: 405. 1825.

Fig. 108. A-E

BASIONYM: *Dolichos pruriens* L.
SYNONYM: *Stizolobium pruriens* (L.) Medic.

Pica-pica, Cow-itch

Slightly woody vine, twining, attainig 5-7 m in length. Stems pubescent, cylindrical, striate, glabrescent. Leaves alternate, trifoliolate; leaflets chartaceous, the apex acute or obtuse, mucronate, the upper surface dark green, dull, puberulent, the lower surface pale green, strigulose, with prominent venation, the margins slightly sinuate; terminal leaflet rhombic-ovate, (5.5)7.5-15 × 4-6 cm, the base obtuse, rounded to almost cuneate; lateral leaflets markedly asymmetrical, one side oblong, the other ovate, 5)7.5-13(18) x (2.8)4.5-7.2(10.3) cm, the base obtuse on one side, truncate on the other; petiolules pubescent, 4-6 mm long; rachis 1.2-2 cm long, strigose; petioles 4.5-16.5 cm long, strigose, with the base swollen; stipules minute, caducous; stipels linear, 4-5 mm long. Inflorescences of axillary pseudoracemes, 10-30 cm long, with 1-3 flowers per node. Calyx grayish green, campanulate-asymmetrical, 1-1.5 cm long, sericeous-pubescent, mixed with some stiff hairs, the sepals unequal, triangular, deep; standard ovate, 1.5-2 cm long, violet, the wings purple, oblong, ca. 4 cm long, the keel pale violet; staminal column almost white, exserted, the anthers violet. Legume more or less cylindrical, with the curved extremities forming an 's', 4-10 × 1-1.4 cm, densely covered with stiff, extremely stinging hairs, dehiscent by valves that open in a spiral. Seeds ellipsoid, brown with black spots, ca. 1 cm long, with a cream-colored hilum, ca. 5 mm long.

Phenology: Collected in flower from August to April and in fruit from October to January.

Status: Probably native, rather common.

Distribution: In disturbed areas such as pastures, forest edges, and roadsides, at lower and middle elevations. Also on St. Croix; of widespread distribution throughout the tropics.

Public Forests: Guajataca, Río Abajo, and Susúa.

2. Mucuna sloanei Fawc. & Rendl., J. Bot. 55: 36. 1917.

Fig. 108. F-H

SYNONYMS: *Dolichos urens* Jacq., *non* L.
Mucuna urens sensu Urb., *non* (L.) DC.

Matos, Matos del monte, Ojo de buey

Twining liana attainig 10-15 m in length. Stems cylindrical, strigulose. Leaves alternate, trifoliolate; leaflets 8-12.5 × 5.7-7.5 cm, chartaceous, the obtuse apex usually terminating in a short acumen, the margins entire; upper surface strigulose, dark green, dull; lower surface pale green, dull, sericeous-pubescent (silvery), with prominent venation; terminal leaflet oblong-elliptical or ovate, the base obtuse, rounded to almost truncate; lateral leaflets very asymmetrical, one side lanceolate, the other elliptical, the base obtuse, truncate, or almost cordiform; petiolules thickened, strigose, ca. 5 mm long; petioles sulcate, glabrescent, up to 11 cm long; stipules deciduous; stipels subulate, ca. 4 mm long. Inflorescences of axillary pseudoracemes, short, with few flowers at the end. Calyx yellowish green, broadly campanulate, 1.5-2 cm long, sericeous; corolla yellow, the standard 2.5-4 cm long, the wings and the keel, elongate, falcate, longer than the standard; style appressed-pubescent. Legume oblong, flattened, 8-18 × 4-5 cm, densely covered with stiff stinging hairs. Seeds 2-4, circular, 2-3 cm long, brown with the black hilum along ¾ of the circumference.

Phenology: Unknown.

Status: Native, uncommon.

Distribution: Known from few collections from the western or central-western area (Aguada, Mayagüez, Sabana Grande, Lares). Also in Jamaica, Cuba, Hispaniola, some of the Lesser Antilles, Central and South America.

Public Forests: Maricao and Susúa.

3. Mucuna urens (L.) DC., Prodr. 2: 405. 1825.

Fig. 108. I-M

BASIONYM: *Dolichos urens* L.
SYNONYM: *Mucuna altissima* (Jacq.) DC.

Tortera, Mato, Pica-pica, Ox-eye-bean

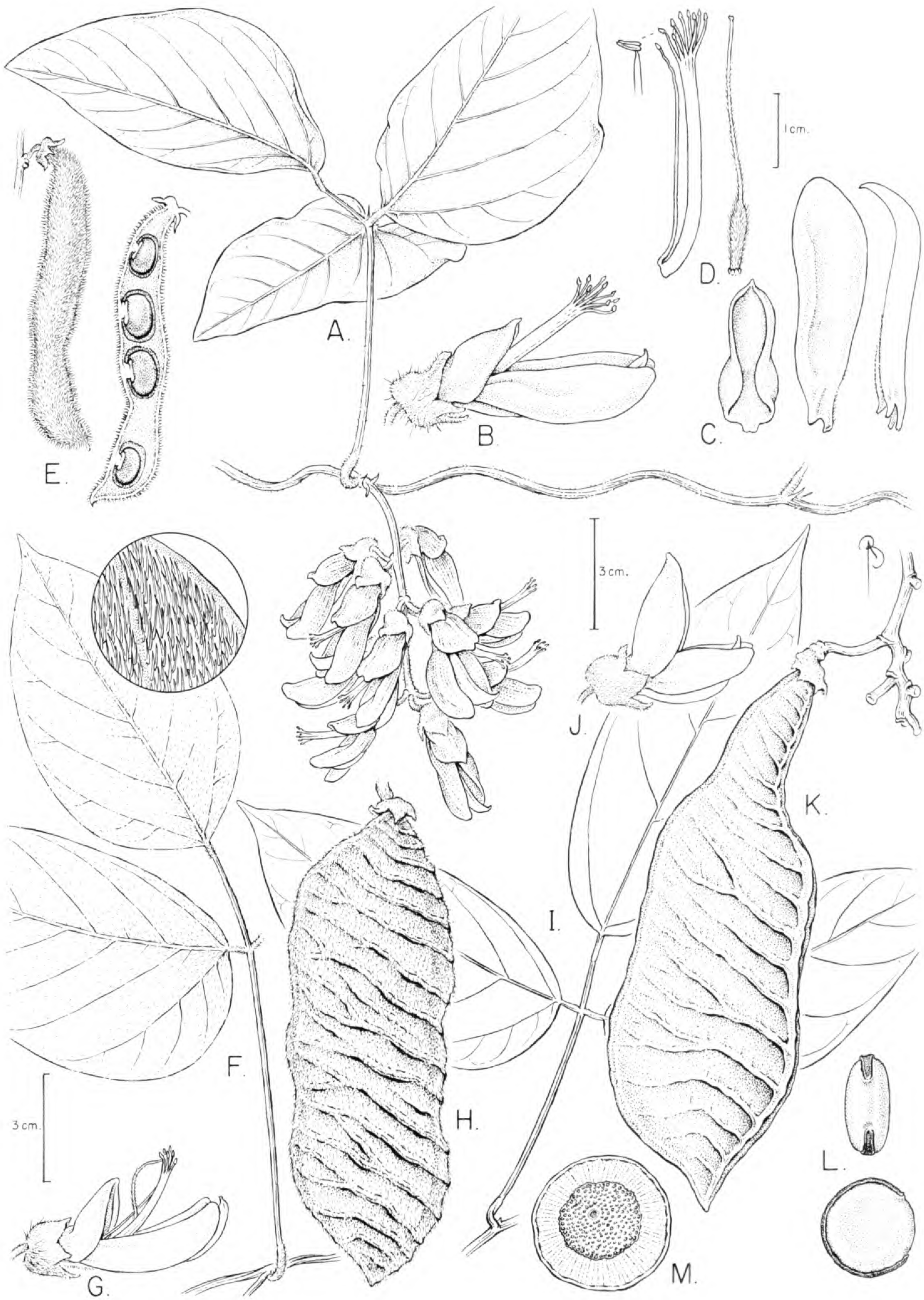

Fig. 108. A-E. *Mucuna pruriens*. **A.** Flowering branch. **B.** Flower. **C.** Petals: standard, wing, and keel. **D.** Stamens and gynoecium. **E.** Fruits with seeds. **F-H.** *Mucuna sloanei*. **F.** Leaf, with detail of the lower surface. **G.** Flower. **H.** Fruit. **I-M.** *Mucuna urens*. **I.** Leaf. **J.** Flower. **K.** Fruit. **L.** Seeds. **M.** Cross section of mature stem.

Woody vine, twining, attainig 30 m in length. Stems cylindrical, glabrous, smooth, that turn blackish on drying, attaining up to 10 cm in diameter at the base and producing a watery sap with a pink color. Leaves alternate, trifoliolate, usually pendulous: leaflets coriaceous, glabrous, 7-14 × 4.5-7 cm, the margins entire, upper surface dark green, shiny, glabrous; lower surface light green (purple on juvenile leaflets), shiny, glabrous, with prominent puberulent venation; terminal leaflet elliptical or oblong, the apex acuminate, the base rounded; the lateral leaflets asymmetrical, elliptic-lanceolate, the apex acuminate, the base unequal, truncate-obtuse; petiolules slightly thickened, 5-6 mm long, glabrous or puberulent; stipels absent; petioles 4-9 cm long, striate, thickened at the base; stipules deciduous. Inflorescences of pendulous pseudoracemes; peduncles 1-1.5 m in length. Calyx 1.3-1.7 cm long, ferruginous-pubescent, with one of the sepals longer than the rest; pedicel ca. 2 cm long, ferruginous-pubescent; corolla blue-violet or cardinal red, the standard 3-4 cm long, the wings violet-pink, the keel yellowish, shorter than the wings. Legume woody, more or less oblong, flattened, 12-23 × 5-6 cm, the apex with a long point, the valves with prominent venation, like transverse ribs, which join at the ventral margin to form a sinuate projection, covered with rigid, rust-colored hairs, which separate with great facility and produce a sharp pain on contact. Seeds ca. 3.5 cm wide, circular, hard, brown with a black hilum along more than ¾ of the circumference.

Phenology: Collected in flower from October to April and in fruit in February.

Status: Native, locally common.

Distribution: On river banks, in moist forests at middle and lower elevations, in the zone of mogotes. Reported for St. Thomas by Krebs (1847), probably in error. Also in Jamaica, Cuba, Hispaniola, the Lesser Antilles, Trinidad, Central America, and northern South America.

Public Forests: El Yunque, Guilarte, Maricao, and Río Abajo.

15. NEORUDOLPHIA

A monospecific genus, endemic to Puerto Rico, characterized by the following species. Very similar to the genus *Rhodopis* of the Dominican Republic; nevertheless, both differ markedly in the morphology of their flowers.

1. Neorudolphia volubilis (Willd.) Britton in Britton & Wilson, Bot. Porto Rico 5: 426. 1924.

Fig. 109. A-H

BASIONYM: *Rudolphia volubilis* Willd.

Bejuco prieto, Bejuco colorado, Bejuco de alambac, Bejuco de alambre

Woody vine, twining, attainig 5-10 m in length. Stems strong, flexible, cylindrical, slightly flattened and with numerous lenticels when mature. Leaves alternate, unifoliolate; leaflets coriaceous, (5)6-13 × 4-9 cm, ovate or broadly ovate, the apex long- or short-acuminate, the base cordiform or less frequently truncate, the margins entire or sinuate, revolute; upper surface dark green, slightly shiny, with slightly prominent venation and puberulent; lower surface yellowish green, with the reticulate venation prominent; petiolule thickened, pubescent, 4-5 mm long, with a pair of stipels at the base; petioles 2.5-5 cm long, sulcate, puberulent, with the base broadened. Inflorescences of cauliflorous or axillary pseudoracemes, pendulous, 12-24 cm long, the flowers in groups of 2-3 per node of the inflorescence; pedicels 10-12 mm long, pink; bracts minute, lanceolate. Calyx 2.5-3 cm long, pink, fleshy, almost campanulate, the sepals 5, two of which are broad and rounded, the remaining three lanceolate; corolla brilliant red, the standard ca. 5 cm long, oblong, folded in half longitudinally, enclosing the stamens, the remaining 4 petals (the wings and two petals homologous to the keel, which are not fused) ca. 1.5 cm long, linear and recurved; stamens 10, diadelphous, ca. 4 cm long, slightly exposed; ovary short-stipitate, with numerous ovules, the style slender, elongate, sericeous, the stigma punctiform. Fruit an oblong legume, flattened, 6-12 × 1-1.5 cm, pubescent, dehiscent by valves that

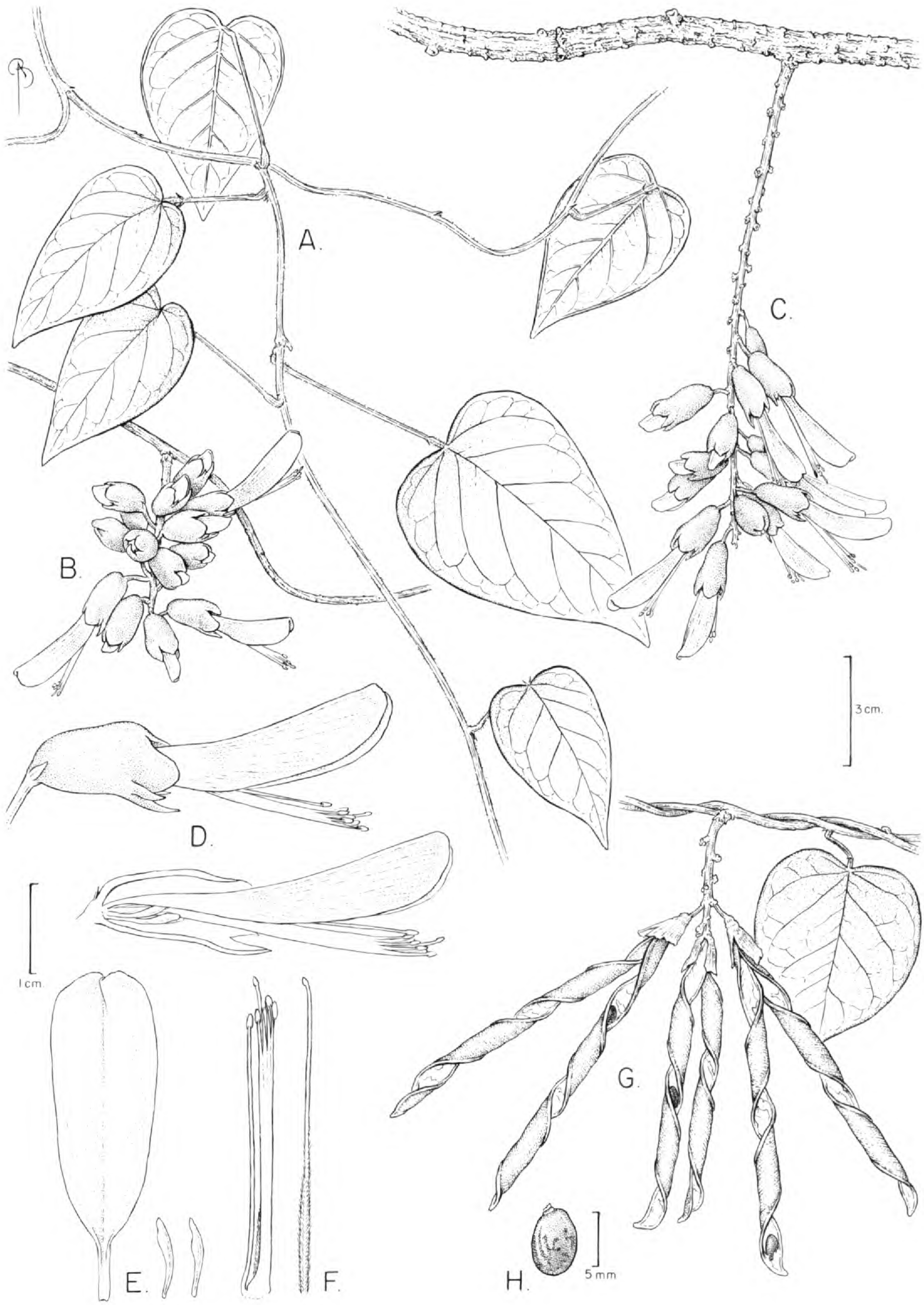

Fig. 109. A-H. *Neorudolphia volubilis.* **A.** Sterile branch. **B.** Inflorescence on young branch. **C.** Cauliflorous inflorescence. **D.** Flower, and flower, longitudinal section. **E.** Petals: standard, wing, and keel. **F.** Stamens and gynoecium. **G.** Open fruits. **H.** Seed.

open in a spiral. Seeds oblong or ovoid, 6-8 mm long, light brown.

Phenology: Flowering from June to December and fruiting from November to April.

Status: Endemic, very common.

Distribution: In the moist or wet forests of the Cordillera Central, the Sierra de Luquillo, and in the area of mogotes, at middle and upper elevations.

Public Forests: Carite, Guajataca, Guilarte, El Yunque, Maricao, Río Abajo, Susúa, and Toro Negro.

16. PACHYRHIZUS

Herbaceous or slightly woody vines, twining, with tuberous roots. Leaves alternate, trifoliolate; stipels filiform; stipules lanceolate, persistent. Inflorescences of axillary or terminal pseudoracemes, long-pedunculate; bracts minute. Calyx campanulate, bilabiate, with 5 lobes; corolla blue or violet, the standard broadly obovate, auriculate, oblong, the wings oblong-falcate, with a curved appendage at the base of the inner margin, adhering to the keel along the basal portion of the inner margin, the keel as long as the wings, recurved; stamens 10, diadelphous; ovary superior, subsessile, with many ovules, the style curved, the stigma globose. Fruit an oblong legume, coriaceous, flattened, dehiscent, the valves septate internally between the seeds; seeds flattened, with a hilum of reduced size. A genus of 6 species, distributed throughout the Neotropics.

1. Pachyrhizus erosus (L.) Urb., Symb. Antill. 4: 311. 1905.

Fig. 110. A-E

BASIONYM: *Dolichos erosus* L.
SYNONYM: *Cacara erosa* (L.) Kuntze

Jícama

Herbaceous vine, twining, attainig 3-10 m in length. Tuberous roots thick. Stems cylindrical, slightly ribbed, pilose. Leaves alternate, trifoliolate; leaflets chartaceous, the apex short-acuminate, the margins deeply dentate, the teeth mucronate; upper surface dark green, dull, sparsely appressed-pubescent, with slightly prominent venation; lower surface pale green, sparsely appressed-pubescent, with the reticulate venation prominent; terminal leaflet 8-16 × 9-19 cm, rhombic, the base cuneate or sub-reniform; lateral leaflets asymmetrical, broadly ovate-elliptical, the base cuneate-subtruncate; petiolules thickened, pubescent, with a pair of stipels at the base; rachis 3-4 cm long, pilose; petioles 8-13 cm long, sulcate, pilose, with the base broadened. Inflorescences of axillary pseudoracemes, erect, 30-45 cm long, the flowers in groups of 1-5 per node of the inflorescence; pedicels 6-8 mm long; bracteoles minute, oblong. Calyx 9-11 mm long, green, campanulate, the sepals 4, one larger that the others; corolla blue or blue-violet, the standard semicircular, ca. 1.5 cm long, emarginate, the wings and the keel as long as the standard; stamens 10, diadelphous. Fruit an oblong legume, flattened, 7-15 × 1.1-2 cm, pubescent. Seeds quadrangular, flattened, ca. 7 mm long, dark brown.

Phenology: Collected in flower during September and in fruit in January, February, and August.

Status: Exotic, cultivated and naturalized, locally common.

Distribution: In areas of degraded vegetation, along trails and in secondary forests. Native of southern Mexico, widely cultivated throughout the tropics for its edible tuberous roots.

Public Forest: Guajataca.

17. PHASEOLUS

Erect herbs or twining vines, with a pubescence of uncinate hairs. Leaves alternate, trifoliolate, with the rachis more or less elongate; stipules striate, truncate at the base, persistent; stipels minute. Inflorescences of axillary racemes, with the nodes not swollen and lacking extrafloral nectaries; bracts

minute, persistent. Calyx campanulate, bilabiate, with 5 minute lobes at the apex; corolla white, pink, red, purple, or yellow, the standard symmetrical, rounded, unguiculate, reflexed, the keel spirally twisted, narrow; stamens 10, diadelphous; ovary almost sessile, linear, with one or more ovules, the style spirally twisted, (1.5-2 turns), barbate, the stigma terminal. Fruit a linear or oblong legume, straight, dehiscent; seeds oblong. A genus of 200 species, of cosmopolitan distribution.

Key to the species of *Phaseolus*

1a. Legume falcate, curved, up to 2 cm wide; leaflets truncate at the base ..... 1. *P. lunatus*
1b. Legume oblong, straight or slightly curved, up to 1 cm wide; leaflets rounded or cuneate at the base..... 2. *P. vulgaris*

1. Phaseolus lunatus L., Sp. Pl. 724. 1753.
Fig. 110. F-I

Herbaceous vine, twining, attainig 5-6 m in length. Stems obtuse-pentagonal or cylindrical, puberulent. Leaves alternate, trifoliolate; leaflets chartaceous, the apex acute or short-acuminate, the margins sinuate; upper surface dark green, dull, glabrous, with slightly prominent venation; lower surface pale green or glaucous, glabrous, with the primary and secondary venation prominent; terminal leaflet 5.5-11 × 3.5-7.5 cm, rhombic or deltate, the base cuneate or truncate; lateral leaflets asymmetrically deltate, the base truncate; petiolules thickened, 3-5 mm long, pubescent; rachis 1.5-2.5 cm long; petioles 6.5-9 cm long, sulcate, puberulent, the base slightly broadened. Inflorescences of axillary pseudoracemes, erect, 3-30 cm long, the flowers in groups of 2 per node of the inflorescence; pedicels 6-9 mm long, pilose; bracteoles minute, oblong. Calyx 2-2.5 mm long, green, campanulate, pilose, the sepals deltate, subequal; corolla white or lilac, pink or bluish, the standard semicircular, 7-10 mm long, abaxially pilose, the wings obovate, unguiculate, as long as the standard, the keel spirally twisted, ca. 1 cm long; stamens 10, diadelphous, the vexillar stamen broadened at the base; ovary with hispidulous pubescence, intermingled with uncinate hairs. Fruit an oblong-falcate legume or in the form of a half-moon, flattened, 5-7 × 1-2 cm, puberulent with uncinate hairs or glabrescent, dehiscent by valves that open in a spiral. Seeds reniform, flattened, ca. 7 mm long, reddish brown, with dark spots.

Phenology: Collected in flower and fruit from December to June.

Status: Exotic, cultivated and naturalized, locally common.

Distribution: In areas of degraded vegetation, along trails, on fences, and in thickets. Also in the Antilles. Probably native to tropical continental America, where it is widely cultivated. Introduced in the tropics of the Old World.

2. Phaseolus vulgaris L., Sp. Pl. 723. 1753.
Fig. 110. J-M
Habichuelas, Frijoles

Herbaceous vine, climbing or creeping, attainig 3 m in length, or sometimes an erect herb. Stems obtuse-pentagonal or cylindrical, puberulent. Leaves alternate, trifoliolate; leaflets chartaceous, the apex acuminate, the margins entire; upper surface dark green, dull, appressed-puberulent, with slightly prominent venation; lower surface pale green, appressed-puberulent, with prominent venation; terminal leaflet 6-10 × 5-7.5 cm, deltate or rhombic, the base cuneate or truncate; lateral leaflets asymmetrically deltate, the base truncate-obtuse; petiolules thickened, 4-6 mm long, pilose; rachis 1.8-2.8 cm long, marginate or slightly winged; petioles 8-15 cm long, adaxially flattened, marginate, puberulent; stipules triangular, ca. 4 mm long; stipels oblong, ca. 3 mm long. Inflorescences of axillary pseudoracemes, the rachis up to 8 cm long, uncinate-pubescent, the flowers usually 4, in groups of 2 per node, this with an ovate bract, persistent at the base; pedicels 7-8 mm long, pilose; bracteoles elliptic-ovate, rounded at the apex, up to 7.5 mm long. Calyx 3.5-4 mm long, green, obliquely campanulate, puberulent, the sepals unequal; corolla white to lilac, pink, or

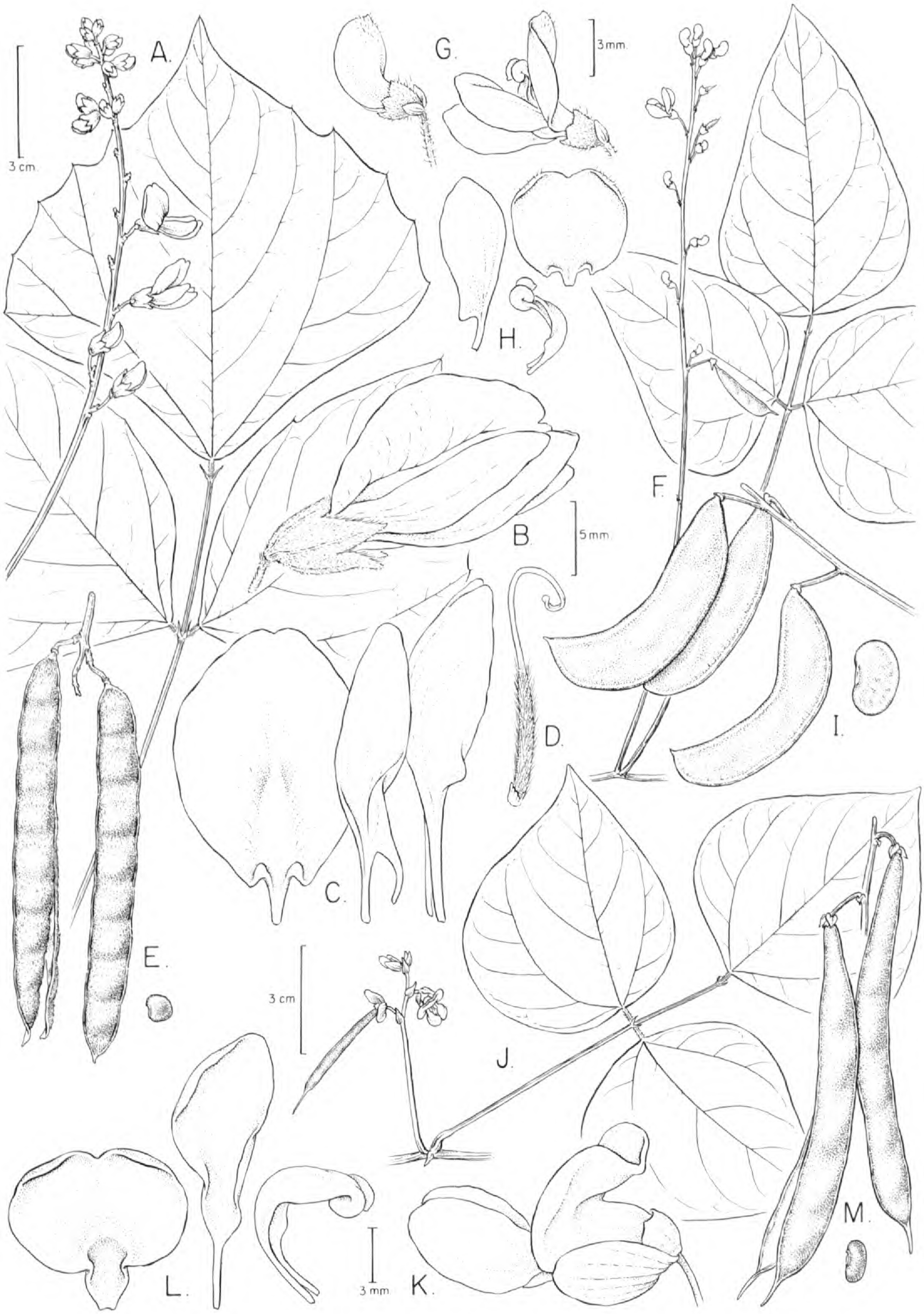

Fig. 110. A-E. *Pachyrhizus erosus*. **A.** Leaf and inflorescence. **B.** Flower. **C.** Petals: standard, wing, and keel. **D.** Gynoecium. **E.** Fruits and seed. **F-I.** *Phaseolus lunatus*. **F.** Flowering branch. **G.** Bud and flower. **H.** Petals: wing, keel, and standard. **I.** Fruits and seed. **J-M.** *Phaseolus vulgaris*. **J.** Fertile branch. **K.** Flower. **L.** Petals: standard, wing, and keel. **M.** Fruit and seed.

purple, the standard semicircular, ca. 10 mm long, glabrous, the wings obovate, unguiculate, longer than the standard, the keel spirally twisted, ca. 1 cm long; stamens 10, diadelphous, the vexillar stamen broadened at the base; ovary strigulose. Fruit an oblong legume, slightly flattened, straight or slightly curved, 9-12 × 1-1.2 cm, glabrous, long-apiculate at the apex, dehiscent by valves that separate longitudinally. Seeds oblong-reniform, 1-1.2 mm long, of various colors, reddish brown, grayish with dark spots, pink.

Phenology: Collected in flower and fruit from May to July and in November.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: In areas of degraded vegetation, along trails, on fences, and in thickets. Also throughout the Antilles. Native to Mesoamerica, with numerous forms cultivated for millennia in tropical continental America. Widely cultivated throughout the world.

Excluded Species:

Phaseolus polystachyos (L.) Britton was reported for Puerto Rico by Liogier (1982, as *P. polystachios*), based on an erroneous identification of *Phaseolus lunatus* (*Liogier, et al. 31642*).

18. PUERARIA

Herbaceous or woody vines, twining. Leaves alternate, trifoliolate; stipules ovate to linear, persistent; stipels minute. Inflorescences of axillary or terminal pseudoracemes; bracts minute. Calyx campanulate, with 5 unequal lobes; corolla blue or violet, the standard obovate, retuse at the apex, unguiculate and auriculate at the base, the wings unguiculate, with a curved appendage at the base of the inner margin, the keel slightly longer than the wings; stamens 10, monadelphous or diadelphous; ovary superior, sessile, with several ovules, the style glabrous, curved, the stigma capitate. Fruit a linear legume, flattened, dehiscent by valves that twist on opening; seeds oblong, numerous. A genus of 6 species native to southern Asia, with one species introduced in the New World as a forage plant.

1. Pueraria phaseoloides (Roxb.) Benth., J. Linn. Soc., Bot. 9: 125. 1865.

Fig. 111. A-D

BASIONYM: *Dolichos phaseoloides* Roxb.

Kudzu tropical, Corsú

Herbaceous vine, twining, much branched, attainig 15 m in length. Stems cylindrical, pilose. Leaves alternate, trifoliolate; leaflets 3-12(14) × 2.9-8.7(13) cm, chartaceous, ovate or rhombic, the lateral ones asymmetrical, the apex acute, the base cuneate on the central leaflet, rounded-obtuse on the lateral ones, the margins entire; upper surface dark green, dull, pubescent, especially on the veins; lower surface pale green, strigose, with prominent venation; petiolules swollen, 4-5 mm long, pubescent; petioles sulcate, pubescent, up to 12 cm long, with the base swollen; stipules narrowly lanceolate, 3-5 mm long; stipels subulate, minute, persistent. Pseudoracemes axillary, up to 25 cm long, with 2-3 flowers per node; bracts minute, persistent; peduncles pubescent. Calyx campanulate, ca. 5 mm long. Legume linear, flattened, 6-9 cm long, slightly curved, dehiscent by valves that open in a spiral, the valves septate between the seeds. Seeds numerous, ca. 3 mm long, oblong, dark brown to almost black.

Phenology: Flowering and fruiting from November to March.

Status: Exotic, naturalized, very aggressive and very common.

Distribution: In moist disturbed areas, at middle and lower elevations. Also on St. John. Native to tropical Asia, introduced in Africa and the Americas as a forage plant.

Public Forests: Carite, El Yunque, Maricao, Río Abajo, and Tortuguero.

Commentary: Apparently originally introduced on lands of the Agricultural Experiment Station in Mayagüez in Puerto Rico in 1940 from material from Malaya; today this species has a wide distribution throughout Puerto Rico.

19. RHYNCHOSIA

Herbaceous or woody vines, twining. Leaves alternate, trifoliolate, the lower surface with numerous yellow resinous dots; stipules deciduous; stipels minute. Inflorescences of axillary racemes, with the flowers sparse or clustered; bracts minute, persistent or deciduous. Calyx campanulate, with 4-5 elongate lobes; corolla yellow, the standard obovate or rounded, slightly retuse at the apex, unguiculate and auriculate at the base, the wings unguiculate, with a curved appendage at the base of the inner margin, the keel scarcely longer than the wings; stamens 10, monadelphous or diadelphous; ovary superior, short-stipitate, with few or numerous ovules, the style glabrous, curved, the stigma capitate. Fruit an oblong legume, flattened, apiculate at the apex, usually dehiscent by valves that twist on opening; seeds few or numerous, flattened, rounded or elliptical. A genus of about 200 species, of pantropical distribution.

Key to the species of *Rhynchosia*

1a. Robust lianas that attain 8-10 m in length; mature stems flattened, forming a ribbon up to 2.5 cm wide; seeds red and black ..... 2. *R. phaseoloides*
1b. Slightly woody vines, usually less than 5 m in length; mature stems cylindrical, less than 5 mm in diameter; seeds brown 2

2a. Lower surface of the leaflets with the tertiary venation not prominent; calyx 2.5-3 mm long, the sepals short-subulate, as long as or twice as long as the tubular portion of the calyx .....1. *R. minima*
2b. Lower surface of the leaflets with the reticulate tertiary venation prominent; calyx 6-10 mm long, the sepals linear-lanceolate, three times as long as the tubular portion of the calyx .....3. *R. reticulata*

1. Rhynchosia minima (L.) DC., Prodr. 2: 385. 1825.

Fig. 111. E-H

BASIONYM: *Dolichos minimus* L.
SYNONYMS: *Rhynchosia minima var. lutea* Eggers
Rhynchosia minima var. pauciflora Kuntze
Dolicholus minimus (L.) Medic.

Frijolillo, Habilla

Non-woody vine, twining, attainig 1-4 m in length. Stems slender, densely pubescent, striate, cylindrical, with numerous resinous dots in the furrows. Leaves alternate, trifoliolate, chartaceous; margins entire, slightly revolute; upper surface dull, glabrous or white-pubescent, especially on the veins, with numerous orange resinous dots; lower surface pale green, glabrous, puberulent or pubescent, with minute orange resinous dots and the primary and secondary venation prominent; terminal leaflet rhombic, 0.9-2.8(7.5) × 0.6-2.8(6.3) cm, the apex acute or obtuse, the base cuneate; lateral leaflets asymmetrical, elliptical-ovate, slightly smaller than the terminal leaflet, the base obtuse; petiolules densely pubescent, 1-1.5 mm long; petiole striate, densely pubescent, 1.5-2 cm long; stipules subulate, 2-2.5 mm long, densely pubescent; stipels subulate, ca. 3 mm long. Inflorescence a raceme, as long as or longer than the leaves. Calyx green, the lobes lanceolate, 2-3 mm long; corolla yellow with purple or brown venation, the standard 5 mm long, orbicular-ovate; wings oblong, unguiculate, 4-5.5 mm long, with resinous dots. Legume falcate to oblong-ovate, flattened, minutely villous, 9-20 × 3-5 mm, with a beak at the apex. Seeds 2-3, ovate-reniform, dark brown to almost black, 3-4 mm long.

Phenology: Flowering and fruiting throughout the year.

Status: Probably exotic, naturalized, very common.

Distribution: Abundant on fences and in weedy places at middle and lower elevations. Also on Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; generalized in the tropics and subtropics of the world. Although this

species is very abundant in the New World, it is believed to be native to the Old World, because in the latter region it exhibits a great diversity of differentiation at the varietal level.

Public Forests: Cambalache, Guánica, Guajataca, Mona, and Río Abajo.

2. Rhynchosia phaseoloides (Sw.) DC., Prodr. 2: 385. 1825.

Fig. 112. A-H

BASIONYM: *Glycine phaseoloides* Sw.
SYNONYM: *Dolicholus pyramidalis sensu* Britton & Wilson, *non* Lam.

Bejuco de paloma

Woody vine, twining, attainig 3-10 m in length. Stems cylindrical, sericeous, mature stems flattened like a ribbon, attaining 2.5 cm wide, glabrous. Leaves alternate, trifoliolate, chartaceous; margins entire or slightly sinuate; upper surface dark green, dull, strigulose or glabrous; lower surface pale green, lanate-pubescent, with minute orange resinous dots, the venation prominent; terminal leaflet rhombic or deltate, 3.5-11.5 × 2.4-9.2 cm, the apex acuminate, the base cuneate to almost rounded; lateral leaflets asymmetrical, lanceolate-ovate, slightly smaller than the terminal leaflet, the base obtuse-rounded to cordiform; petiolules densely pubescent, 2-4 mm long; petiole densely pubescent, 4-7 cm long; stipules deciduous. Inflorescence a raceme, as long as or shorter than the leaves. Calyx green, puberulent, 3.5-4 mm long, asymmetrical, one of the lobes lanceolate, ca. 3 mm long, the rest ovate, ca. 1.5 mm long; corolla yellow, the standard 7-8 mm long, obovate, emarginate, punctate, yellow with a reddish tinge; wings oblong, unguiculate, 7-7.5 mm long, with resinous dots; ovary minutely sericeous. Legume oblong, flattened, with the margin sinuate between the seeds, with glandular dots, minutely sericeous, 1.2-2.4 × 0.8-1.2 cm, the apex short-apiculate. Seeds usually two per fruit, ellipsoid, ca. 5 mm long, shiny, the longitudinal half nearer to the hilum red, the other half black.

Phenology: Flowering throughout the year.

Status: Native, not very common.

Distribution: In secondary forests in the zone of mogotes. Also on St. Thomas; throughout the Antilles, southern Panama, and South America.

Public Forests: Maricao and Río Abajo.

Commentary: The seeds of *Abrus precatorius* are apt to be confused with those of *Rhynchosia phaseoloides*, since both have a similar coloration. Nevertheless, in *R. phaseoloides* the hilum is on the red portion of the seed, while in *A. precatorius* the hilum is on the black portion.

3. Rhynchosia reticulata (Sw.) DC., Prodr. 2: 385. 1825.

Fig. 111. I-K

BASIONYM: *Glycine reticulata* Sw.
SYNONYM: *Dolicholus reticulatus* (Sw.) Millsp.

Frijolillo, Habilla

Non-woody vine, twining, attainig 2-5 m in length. Stems slender, angular, striate, sometimes almost triangular, ferruginous-tomentose when young. Leaves alternate, trifoliolate, chartaceous; margins entire or slightly sinuate, revolute; upper surface dark green, dull, puberulent, with the venation sunken; lower surface pale green, lanate-pubescent, with minute orange resinous dots, the venation prominent; terminal leaflet rhombic, 2-12 × 1-7 cm, the apex obtuse or rounded, the base cuneate or obtuse; lateral leaflets asymmetrical, elliptical-ovate, smaller than the terminal leaflet, the base obtuse-cuneate; petiolules tomentose, 1-3 mm long; rachis 4-8 mm long, tomentose; petiole tomentose, 2-5 cm long; stipules lanceolate, up to 10 mm long, sericeous; stipels minute, only on the distal leaflet. Inflorescence a raceme, up to 10(25) cm long, with few flowers. Calyx green, pilose, 6-10 mm long, the lobes lanceolate; corolla yellow, the standard 6-10 mm long, obovate to orbicular, emarginate, glabrous or puberulent; wings obovate, unguiculate, longer than the standard; ovary minutely sericeous. Legume oblong-ovate, falcate, flattened, with one margin straight and the other curved, minutely sericeous, 1.5-3 × 0.8-1.1 cm, the apex short-apiculate. Seeds usually two per fruit, circular, flattened, ca. 5 mm in diameter, light brown with dark brown spots.

Phenology: Flowering and fruiting throughout the year.

Status: Native, rather common.

Distribution: In disturbed areas such as pastures, weedy places, roadsides, and fences, at lower and middle elevations. Also on Culebra, Desecheo, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; also

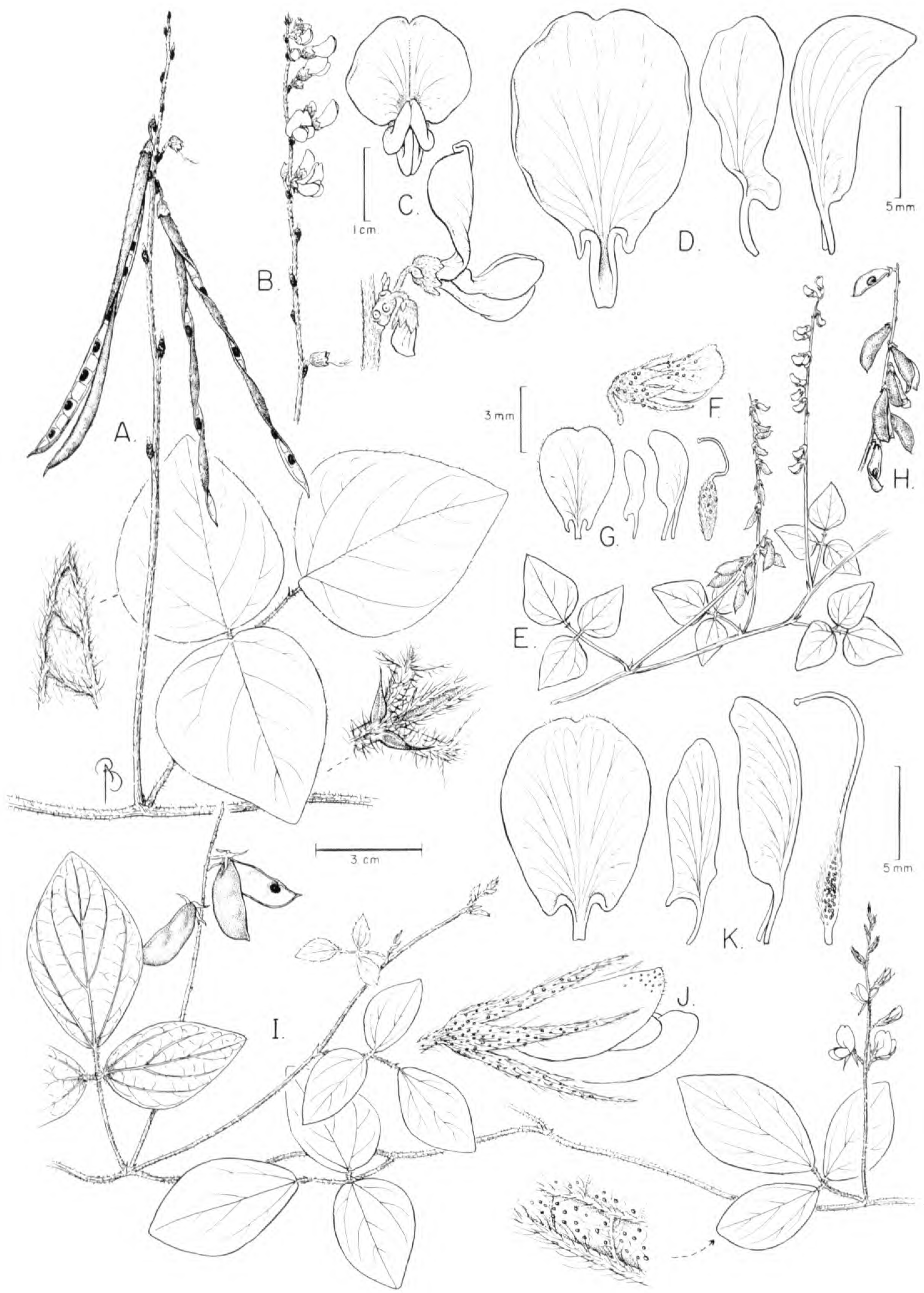

Fig. 111. A-D. *Pueraria phaseoloides.* **A.** Fertile branch, with detail of pubescence on the lower surface of the leaf. **B.** Inflorescence. **C.** Flower, front and side views. **D.** Petals: standard, wing, and keel. **E-H.** *Rhynchosia minima.* **E.** Fertile branch. **F.** Flower. **G.** Petals: standard, wing, and keel, and gynoecium. **H.** Infructescence. **I-K.** *Rhynchosia reticulata.* **I.** Fertile branch, with detail of pubescence on the lower surface of the leaf. **J.** Flower. **K.** Petals: standard, wing, and keel, and gynoecium.

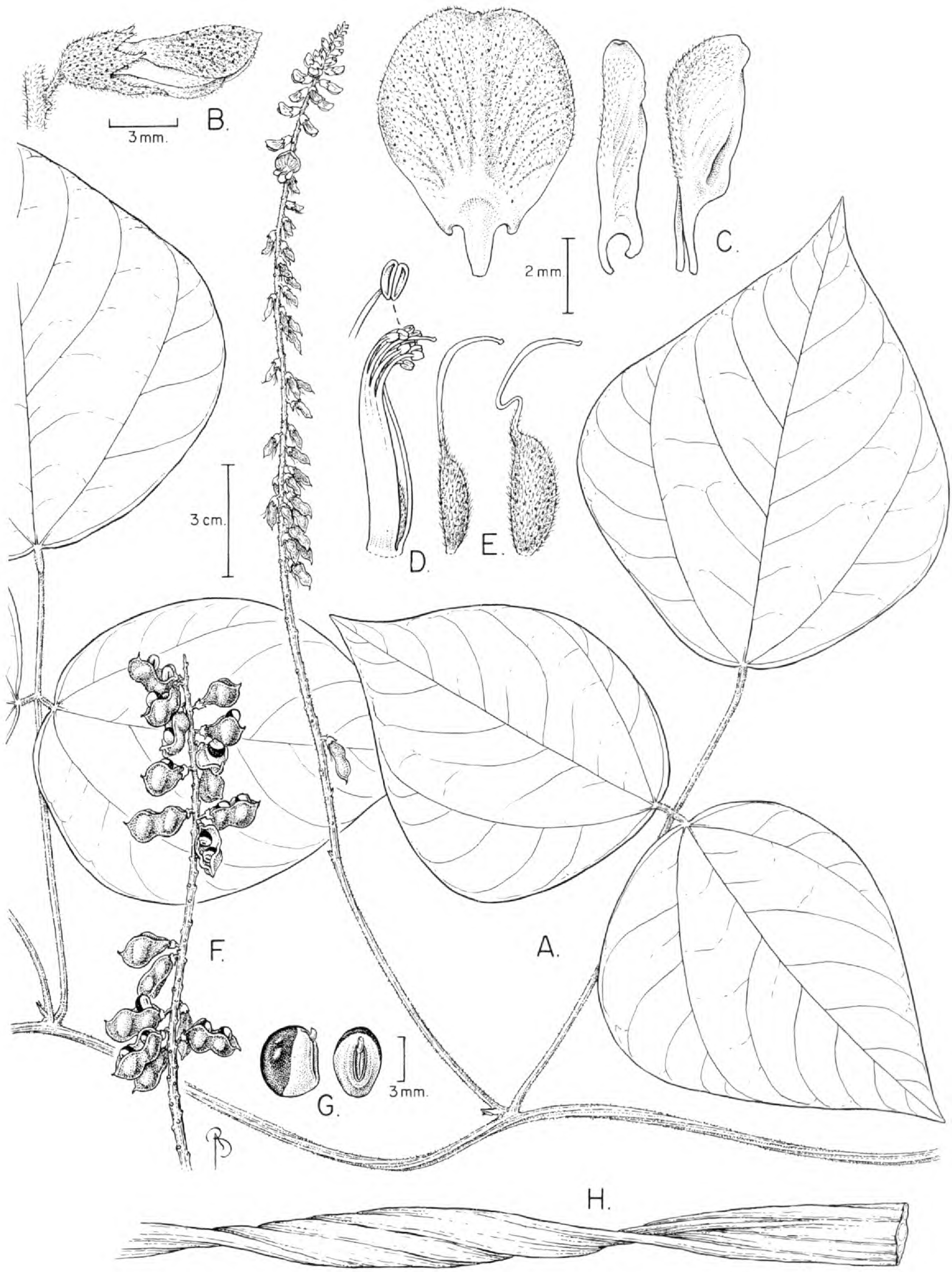

Fig. 112. A-H. *Rhynchosia phaseoloides*. **A.** Flowering branch. **B.** Flower. **C.** Standard, wing, and keel. **D.** Stamens, with detail of anther. **E.** Gynoecium. **F.** Infructescence. **G.** Seeds side and front views. **H.** Mature stem. From Mori, S. A. et al. 2003. Vascular plants of central French Guiana. Mem. NYBG Vol. 76(2).

throughout the Antilles, tropical continental America.

Public Forests: Cambalache, Carite, Ceiba, Guajataca, Guánica, Maricao, Mona, Río Abajo, and Susúa.

Excluded Species:

Rhynchosia caribaea (Jacq.) DC. has been cited for Puerto Rico by Liogier (1982, 1988), but is excluded from the present work. This species is native to Africa and very similar to *R. minima,* with which it has been confused in the New World. According to Grear (1978), *R. caribaea* has been collected in Puerto Rico, and can be distinguished from *R. minima* by its viscid-hirsute fruits and by its larger flowers. The record of *R. caribaea* for Puerto Rico is based on two collections made in the nineteenth century, one of which was from a cultivated plant. This species has not been collected again in Puerto Rico, which suggests that it was unable to establish itself or to become naturalized. *Rhynchosia caribaea* is also unknown in our gardens; for this reason, it is excluded from our flora.

20. TERAMNUS

Herbaceous vines, twining, climbing, or creeping. Leaves alternate, trifoliolate; stipules subulate, persistent; stipels minute. Inflorescences of axillary pseudoracemes; bracts small. Calyx campanulate, with 4-5 lobes of similar size; corolla white, yellow, or lavender, the standard obovate, the wings unguiculate, the keel shorter than the wings; stamens 10, monadelphous, the anthers unequal; ovary superior, sessile, with numerous ovules, the style short, pubescent, the stigma capitate. Fruit a linear legume, flattened, curved at the apex, dehiscent by valves that twist on opening; seeds numerous, flattened, oblong. A genus of 8 species, of pantropical distribution.

Key to the species of *Teramnus*

1a. Stems pilose; leaflets elliptical, ovate to almost rounded, strigose on the lower surface; legume pilose or glabrous, 2-5 cm long .....1. *T. labialis*
1b. Stems tomentose or sericeous; leaflets oblong or lanceolate, sericeous on the lower surface; legume ferruginous-tomentose, 4-7 cm long .....2. *T. uncinatus*

1. Teramnus labialis (L.f.) Spreng., Syst. Veg. 3: 235. 1826.

Fig. 113. A-E

BASIONYM: *Glycine labialis* L.f.

Frijolillo

Twining vines, 3-5 m in length. Stems slender, pilose, almost hirsute when young. Leaves trifoliolate; leaflets 1.5-6.2 × 0.6-3.5 cm, chartaceous, the apex mucronate, obtuse or rounded, the base obtuse or rounded, the margins ciliate; upper surface appressed-pubescent; lower surface strigose; terminal leaflets elliptical; lateral leaflets asymmetrical, elliptic-oblong or elliptic-ovate; petiolules 2-3 mm long, pilose; stipules lanceolate, up to 3 mm long; stipels ca. 1.5 mm long, linear. Inflorescences of axillary pseudoracemes that attain 11 cm long, the flowers in pairs on the nodes of the rachis. Calyx campanulate, 3-5 mm long, strigose; corolla white, pink, or pale violet, the standard obovate, ca. 5 mm long, the wings and the keel shorter than the standard. Legume 2-5 × 0.3-0.4 cm, linear, slightly flattened, strigulose, glabrescent, with a curved beak at the apex, dehiscent by valves that twist back in a spiral. Seeds 8-10, oblong, 2.5-3 mm long, reddish brown.

Phenology: Flowering and fruiting throughout the year.

Status: Native, rather common.

Distribution: In disturbed areas such as pastures, forest edges, and roadsides, at lower and middle elevations. Also on Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin

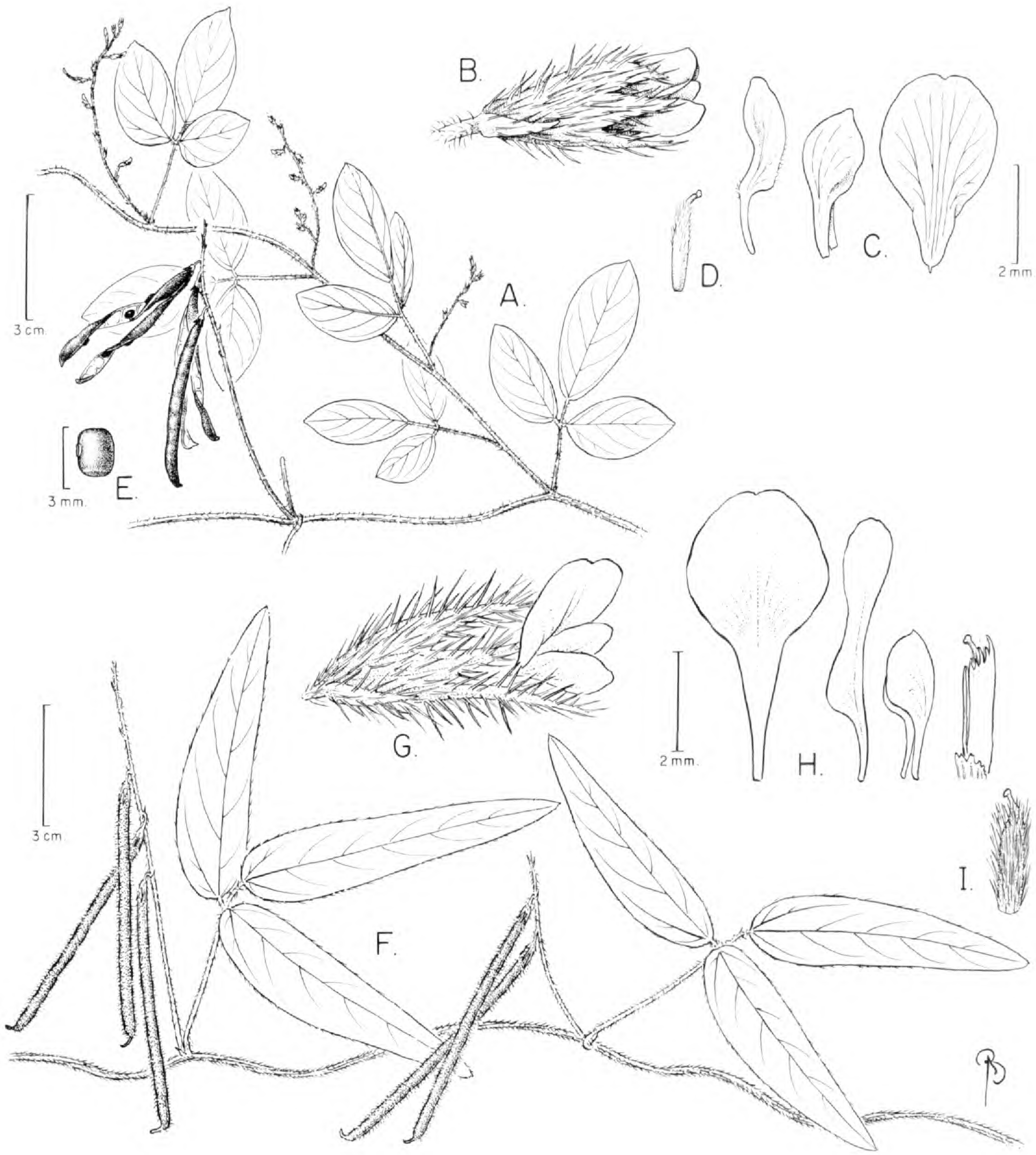

Fig. 113. **A-E.** *Teramnus labialis.* **A.** Fertile branch. **B.** Flower. **C.** Petals: wing, keel, and standard. **D.** Gynoecium. **E.** Seed. **F-I.** *Teramnus uncinatus.* **F.** Fertile branch. **G.** Flower. **H.** Standard, wing, keel, and staminal column. **I.** Gynoecium.

Gorda; throughout the Antilles and Central America.

Public Forest: Guánica, Mona, and Río Abajo.

2. Teramnus uncinatus (L.) Sw., Nov. Gen. Sp. Pl. 105. 1788.

Fig. 113. F-I

BASIONYM: *Dolichos uncinatus* L.

Cresta de gallo blanca, Frijolillo peludo

Slightly woody vine, twining, attainig 3-5 m in length. Stems cylindrical, ferruginous-tomentose or sericeous. Leaves alternate, trifoliolate; leaflets chartaceous, oblong, lanceolate, or less frequently elliptical, 5-12 × (0.6)0.9-3.2(6) cm, the apex acute, obtuse, or

rounded, mucronate, the base obtuse or rounded, frequently unequal on the lateral leaflets, the margins entire; upper surface strigulose; lower surface sericeous-pubescent, with prominent venation, ciliate; petiolules tomentose, 2-4 mm long; rachis ferruginous-tomentose, sulcate, 0.2-2 cm long; petioles ferruginous-tomentose, sulcate, 3-11.5 cm long; stipules lanceolate, pubescent, 3-4 mm long; stipels linear, 1-2 mm long. Inflorescences of axillary pseudoracemes, 10-15 cm long, with 2 or 3 flowers grouped at the nodes; peduncle tomentose or sericeous. Calyx campanulate, ca. 6 mm long, tomentose, the lobes linear; corolla pink or lavender, the standard ca. 4 mm long, oblong or rounded, the wings longer than the keel, the keel whitish. Legume flattened, linear, 4-7 × 0.3-0.4 cm, ferruginous-tomentose, with a curved beak at the apex, dehiscent by valves that twist back in a spiral. Seeds oblong, 4-5 mm long, reddish brown.

Phenology: Collected in flower from October to January and in fruit from October to March.

Status: Native, relatively common.

Distribution: In disturbed areas such as roadsides, pastures, secondary forests, and thickets, at middle and lower elevations. Also in the Greater Antilles, tropical continental America and introduced in tropical Africa.

Public Forests: Carite, Guajataca, Maricao, Río Abajo, and Toro Negro.

21. VIGNA

Herbaceous vines, twining, climbing, or creeping. Leaves alternate, trifoliolate; stipules of various forms, persistent; stipels subulate. Inflorescences of axillary or terminal pseudoracemes; bracts small. Calyx campanulate, bilabiate, with 5 lobes, two of which are almost completely united; corolla yellow, pink, or pale blue, the standard rounded, the wings unguiculate, with a narrow projection or spur at the base, the keel recurved, as long as the wings; stamens 10, diadelphous, the anthers of the same size; ovary sessile, with numerous ovules, the style curved, pubescent on the distal portion, the stigma lateral. Fruit an oblong or linear legume, flattened to cylindrical, dehiscent by valves that twist on opening; seeds flattened, quadrangular or almost reniform. A genus of about 100 species, the majority of tropical Africa and Asia.

Key to the species of *Vigna*

1a. Corolla uniformly brilliant yellow 2
1b. Corolla pink or violet-pink, changing to white or pale yellow with purplish lines 5

2a. Standard ca. 1.5 cm long; legumes 4-7 cm long 3
2b. Standard 6-10 mm long; legumes 1-4 cm long 4

3a. Leaflets chartaceous, ovate, acute at the apex; stipules sagittate at the base; legumes 4-7 cm long ..... 5. *V. luteola*
3b. Leaflets fleshy, obovate, obtuse, or rounded at the apex; stipules truncate at the base; legumes 5-6 cm long ..... 6. *V. marina*

4a. Standard ca. 6 mm long; legume 8-15 mm long, with 1-3 seeds ..... *V. hosei*
4b. Standard ca. 1 cm long; legume 3-4 cm long, with 5-7 seeds ..... 4. *V. longifolia*

5a. Standard < 1 cm long; legumes ascendant ..... 7. *V. peduncularis*
5b. Standard 1.5-3 cm long; legumes sparse or pendulous 6

6a. Style spirally twisted 7
6b. Style erect or sigmoid 8

7a. Stipules truncate at the base; peduncle of the inflorescence as long as or shorter than the accompanying leaf; legume oblong, 8-9 mm wide, curved in the middle.....1. *V. adenantha*
7b. Stipules asymmetrical, the base auriculate on only one side; legume linear, curved in the distal portion, 3-4 mm wide.....2. *V. antillana*

8a. Plant more or less glabrous; legume 10-40 cm long .....8. *V. unguiculata*
8b. Plant ferruginous-pilose; legume 7-11 cm long .....9. *V. vexillata*

1. Vigna adenantha (G. Meyer) Marechal, Mascherpe & Stanier, Taxon 27: 202. 1978.

Fig.114. E-H

BASIONYM: *Phaseolus adenanthus* G. Meyer

Habichuela cimarrona

Slightly woody vine, twining, climbing, attainig 3-5 m in length. Stems slender, almost cylindrical, glabrous or pilose. Leaves alternate, trifoliolate; leaflets chartaceous, with three principal veins from the base, the apex acute, obtuse, or acuminate, the upper surface glabrous, sometimes sparsely appressed-pubescent, the lower surface pale green, appressed-pubescent, especially on the prominent veins, the margins deeply sinuate; terminal leaflet lanceolate or ovate, 3-9.5(15.5) × 1.5-5.3(9.6) cm, the base cuneate or obtuse; lateral leaflets markedly asymmetrical, with one side elliptical and the other ovate or lanceolate, the base cuneate-obtuse; petiolules pubescent, 2-5 mm long; rachis 1-2 cm long, striate, pilose; petioles canaliculate, striate, pilose or glabrous, 3-9.5 cm long; stipules triangular, 3-4 mm long, glabrous, conspicuously veined, truncate at the base; stipels oblong, ca. 2 mm long. Inflorescence of axillary pseudoracemes, 4-12 cm long, with 2 flowers per node; peduncle appressed-pubescent or glabrous; pedicels 1.6-2 mm long, glabrous; bracts in pairs, lanceolate, deciduous. Calyx green, glabrous, campanulate, 5-7.5 mm long, with 3 lanceolate lobes, longer than the two central ones, which are rounded and fused; corolla pale violet; standard reniform, retuse at the apex, 2.2-3 cm long and up to 2.5 cm wide, pale violet, whitish toward the margins, with the vexillar callus yellow; wings 2.2-2.5 cm long, obovate, twisted, enclosing the keel, pale violet, dark violet toward the apex, or sometimes pale yellow; keel up to 3 cm wide, pale violet to whitish, spirally twisted at the apex (½-1½ turns). Legume oblong, curved, flattened, the area of the seeds slightly prominent, 7-11 cm long, 8-9 mm wide, puberulent, scabrous along the margins, the apex acute, recurved. Seeds 11-16, almost circular, flattened, ca. 6 mm wide, dark brown.

Phenology: Collected in flower and fruit from December to April.

Status: Probably native, rather common.

Distribution: Moist disturbed areas at lower and middle elevations. Native to tropical America, cultivated in Africa and Asia.

Public Forests: El Yunque, Guajataca, and Río Abajo.

2. Vigna antillana (Urb.) Fawcett & Rendle, Fl. Jam. 4(2): 69. 1920.

Fig. 114. A-D

BASIONYM: *Phaseolus antillanus* Urb.

Herbaceous vine, twining, climbing, attainig 3-5 m in length. Stems cylindrical, glabrous, reddish on the young portions. Leaves alternate, trifoliolate; leaflets chartaceous, 3-9 × 2-7 cm, the apex acuminate, the margins entire, slightly revolute; upper surface glabrous or puberulent, with slightly prominent venation; lower surface glabrous or puberulent, with prominent venation; terminal leaflet broadly ovate or deltate, the base cuneate or truncate, with three main veins; lateral leaflets markedly asymmetrical, with one side oblong and the other broadly ovate, the base truncate; petiolules puberulent, 4-5 mm long; rachis 2-2.5 cm long, marginate, puberulent or glabrous; petioles marginate, puberulent or glabrous, 3-10 cm long; stipules lanceolate, 6-8 mm long, asymmetrical at the base, one side auriculate; stipels subulate, minute, persistent. Inflorescence of axillary pseudoracemes, up to 30 cm long, with 2 flowers per node; peduncle glabrous or puberulent; pedicels 2-3 mm long, glabrous; bracts minute, persistent. Calyx green, puberulent, campanulate, 4-5 mm long, the lobes more or less of the same length, 3 of them triangular, the 2 central ones rounded and fused;

corolla pale violet to violet-pink; standard obovate, rounded at the apex, 1.5-1.8 cm long, pale violet; wings longer than the standard, oblong, unguiculate, pale violet; keel as long as the standard, twisted in the form of an 's', pale violet. Legume linear, curved toward the apex, flattened, the area of the seeds slightly prominent, 6-14 cm long, 3-4 mm wide, puberulent, the apex terminating in a beak, dehiscent by valves that twist back on opening. Seeds 15-20, oblong, slightly flattened, 2-3 mm long, brown or blackish.

Phenology: Collected in flower and fruit from December to February.

Status: Native, rather common.

Distribution: In more or less dry and disturbed areas, at lower elevations. Also on Caja de Muerto, Vieques, St. Croix, St. John, and Tortola; throughout the Antilles.

Public Forest: Guánica.

Commentary: This species was treated erroneously as *Phaseolus peduncularis* in Flora of St. John, U.S. Virgin Islands (*Acevedo-Rdgz. et al., 1996*).

3. Vigna hosei (Craib) Backer ex Heyne in Nutt., Pl. Nederl. Ind. ed. 2(2): 840. 1927.

Fig. 114. I-L

BASIONYM: *Dolichos hosei* Craib

Herbaceous vine, creeping or climbing, attainig 2-3 m in length, often forming a dense cover on the ground. Stems cylindrical, ca. 1 mm in diameter, greenish, ferruginous-pilose, much branched and producing roots in the area of the nodes. Leaves alternate, trifoliolate; leaflets chartaceous, with three main veins from the base, 2-4(5) × 1.5-2 cm, the apex obtuse or acute, both surfaces strigulose, the margins slightly undulate; terminal leaflet elliptical, obovate, or lanceolate, the base obtuse or rounded; lateral leaflets asymmetrical, with one side wider than the other, the base obtuse-rounded; petiolules pilose, ca. 1 mm long; rachis 4-10 mm long, striate, pilose; petioles 2-5 cm long, striate, pilose; stipules lanceolate, ca. 3 mm long, hastate at the base; stipels oblong or subulate, minute, persistent. Inflorescence of axillary pseudoracemes, 2-3(7) cm long, with 1-4 flowers in the distal portion (1-2 flowers per node); pedicels ca. 2 mm long. Calyx campanulate, ca. 1.5 mm long, the lobes ca. 0.7 mm long, triangular-subulate, ciliate; corolla pale yellow; standard broadly orbicular, 7-9 × 8-11 mm, the wings obovate, ca. 8 mm long, the keel ca. 7 mm long; ovary with two ovules, the stigma lobate. Legume oblong, almost cylindrical, 8-15 mm long, ca. 4 mm wide, pubescent, slightly compressed between the seeds. Seeds 1-2, oblong, ca. 5 mm long, dark reddish brown.

Phenology: Flowering throughout the year.

Status: Exotic, naturalized, locally common.

Distribution: In moist disturbed areas. Native to Borneo and Java, introduced in the Antilles.

Public Forests: Carite, El Yunque, and Río Abajo.

4. Vigna longifolia (Benth.) Verdc., Kew Bull. 24: 541. 1970.

Fig. 115. A-C

BASIONYM: *Phaseolus longifolius* Benth.
SYNONYMS: *Phaseolus lanceolatus* Bello
Phaseolus ovatus Benth.

Habichuela cimarrona

Herbaceous vine, creeping or climbing, attainig 2-3 m in length. Stems very slender, 0.5-1.5 mm in diameter, greenish, ferruginous-pilose or glabrous when mature, sometimes with roots in the area of the nodes. Leaves alternate, trifoliolate; leaflets chartaceous, with three main veins from the base, 2-6.2 × 0.4-2.2(3) cm, lanceolate or linear, the apex acute, the base rounded, the margins slightly undulate; both surfaces more or less strigulose; lateral leaflets slightly asymmetrical at the base; petiolules broadened, pilose, 1-2 mm long; rachis 2-6 mm long, canaliculate, pilose; petioles 2-5 cm long, canaliculate, pilose; stipules peltate in the center, glabrous, persistent, both ends oblong, up to 4 mm long, of the same length or one longer than the other; stipels oblong, ca. 0.5 mm long, persistent. Inflorescence of axillary pseudoracemes, 4-12(22) cm long, the flowers 2 per node, which are found in the distal portion of the inflorescence; pedicels ca. 2 mm long; bracteoles in pairs, at the base of the calyx, oblong, sparsely pilose, 3-5 mm long, deciduous. Calyx asymmetrically campanulate, 1.5-3 mm long, the lobes short, obtuse, similar; corolla pale yellow; standard obovate, ca. 8 mm long, the wings and the keel more or less of the same length as the

Fig. 114. A-D. *Vigna antillana.* **A.** Fertile branch. **B.** Flower, front view. **C.** Flower, side view. **D.** Gynoecium, keel, standard, and wing. **E-H.** *Vigna adenantha.* **E.** Fertile branch. **F.** Bud, and flower, side view. **G.** Gynoecium, keel, wing, and standard. **H.** Fruit. **I-L.** *Vigna hosei.* **I.** Fertile branch, with detail of the stipules. **J.** Flower, side view. **K.** Gynoecium, keel, wing, and standard. **L.** Fruit.

standard. Legume oblong, compressed, 2.5-4 cm long, 6-7 mm wide, appressed-pubescent. Seeds 5-7, asymmetrically ellipsoid, ca. 5 mm long, reddish brown, shiny, the hilum whitish, ca. 2.5 mm long.

Phenology: Collected in flower and fruit in March and in fruit in May.

Status: Apparently exotic, naturalized, locally common. Although the existence of this species in Puerto Rico has been since the end of the nineteenth century, it seems to have been introduced, because this constitutes the only record for the species in the Antilles.

Distribution: Known only on the margins of the Tortuguero Lagoon, on a substrate of white sands. Native to tropical continental America, from Panama to Argentina and Uruguay.

Public Forest: Tortuguero.

5. Vigna luteola (Jacq.) Benth. in Mart., Fl. Bras. 15(1): 194. 1859.

Fig. 115. D-H

BASIONYM: *Dolichos luteolus* Jacq.
SYNONYMS: *Dolichos repens* L.
Vigna repens (L.) Kuntze, *non* Baker

Frijol silvestre, Goat wiss

Herbaceous vine, creeping or climbing, twining, attainig 10 m in length. Stems branched from the base, slender, cylindrical, ferruginous-pilose. Leaves alternate, trifoliolate; leaflets chartaceous, ovate or lanceolate, 2.5-7.5 × 1-5 cm; upper surface glabrous, with slightly prominent venation; lower surface sparsely appressed-pubescent, especially on the prominent veins, the apex acute, obtuse, or less frequently acuminate, the base cuneate to rounded, slightly asymmetrical on the lateral leaflets, the margins entire, ciliate; petiolules 2-3 mm long, pubescent; rachis 9-13 mm long, marginate or narrowly winged; petioles 2-9 cm long, marginate or narrowly winged; stipels oblong, 2-2.5 mm long; stipules lanceolate, ca. 3 mm long, auriculate at the base. Pseudoracemes axillary, up to 30 cm long, the flowers 1-2 per node, which are found in the distal portion of the inflorescence; pedicels 4-5 mm long, erect, with the calyx in a horizontal position or reflexed. Calyx green, campanulate, 4-5 mm long, the sepals unequal, the longer (3 mm) ones subulate, the shorter (1.5-2 mm) ones deltate, ciliate. Corolla brilliant yellow; standard rounded, 1.5-2 cm long; the wings and the keel as long as the standard. Legume pointing downward, linear, almost cylindrical, slightly curved, with the margins slightly sinuate between the seeds, 4-7 cm long, ca. 5 mm wide, glabrous or pubescent, blackish on drying. Seeds oblong or rectangular, ca. 5 mm long, reddish brown.

Phenology: Flowering almost throughout the year.

Status: Native, very common.

Distribution: On the sandy coasts of the littoral zone, also in disturbed areas such as roadsides and pastures. Also on Culebra, Mona, Vieques, St. Croix, St. John, St. Thomas, and Tortola; throughout tropical and subtropical America, especially along the coasts of the littoral zone, also in Africa and Asia.

Public Forests: Cambalache, Carite, Ceiba, Guánica, El Yunque, Mona, Piñones, Río Abajo, Toro Negro, and Tortuguero.

6. Vigna marina (Burm.) Merr., Interpret. Rhumph. Amboin. 285. 1917.

Fig. 115. I-J

SYNONYM: *Vigna retusa* (E. Meyer) Walp.

Herbaceous vine, creeping, twining, attainig 2 m or more in length. Stems slender, cylindrical, striate, pubescent, glabrous when mature. Leaves alternate, trifoliolate; leaflets slightly fleshy, obovate, elliptical, or almost rounded, 2.5-7 × 1.5-4 cm; upper surface appressed-pubescent or glabrous; lower surface appressed-pubescent or glabrous, the venation prominent, the apex obtuse or rounded, the base cuneate or rounded, slightly asymmetrical on the lateral leaflets, the margins entire; petiolules 1-2 mm long, glabrous or sericeous; rachis ca. 11 mm long, sulcate, glabrescent; petioles ca. 3 cm long, sulcate, glabrescent; stipels oblong, ca. 1 mm long; stipules lanceolate, 2-3 mm long, truncate at the base. Pseudoracemes axillary, 6-8(20) cm long, the flowers few per node, which are found in the distal 1/2 or 1/3 of the inflorescence; pedicels ca. 4 mm long. Calyx green, campanulate, ca. 4 mm long, the sepals unequal, ciliate. Corolla yellow; standard obovate, ca.1.5 cm long, emarginate at the apex; the wings and the keel as long as the standard. Legume almost cylindrical, with the margins slightly sinuate between the seeds, 5-6 cm long, ca. 5 mm wide, glabrous, blackish on

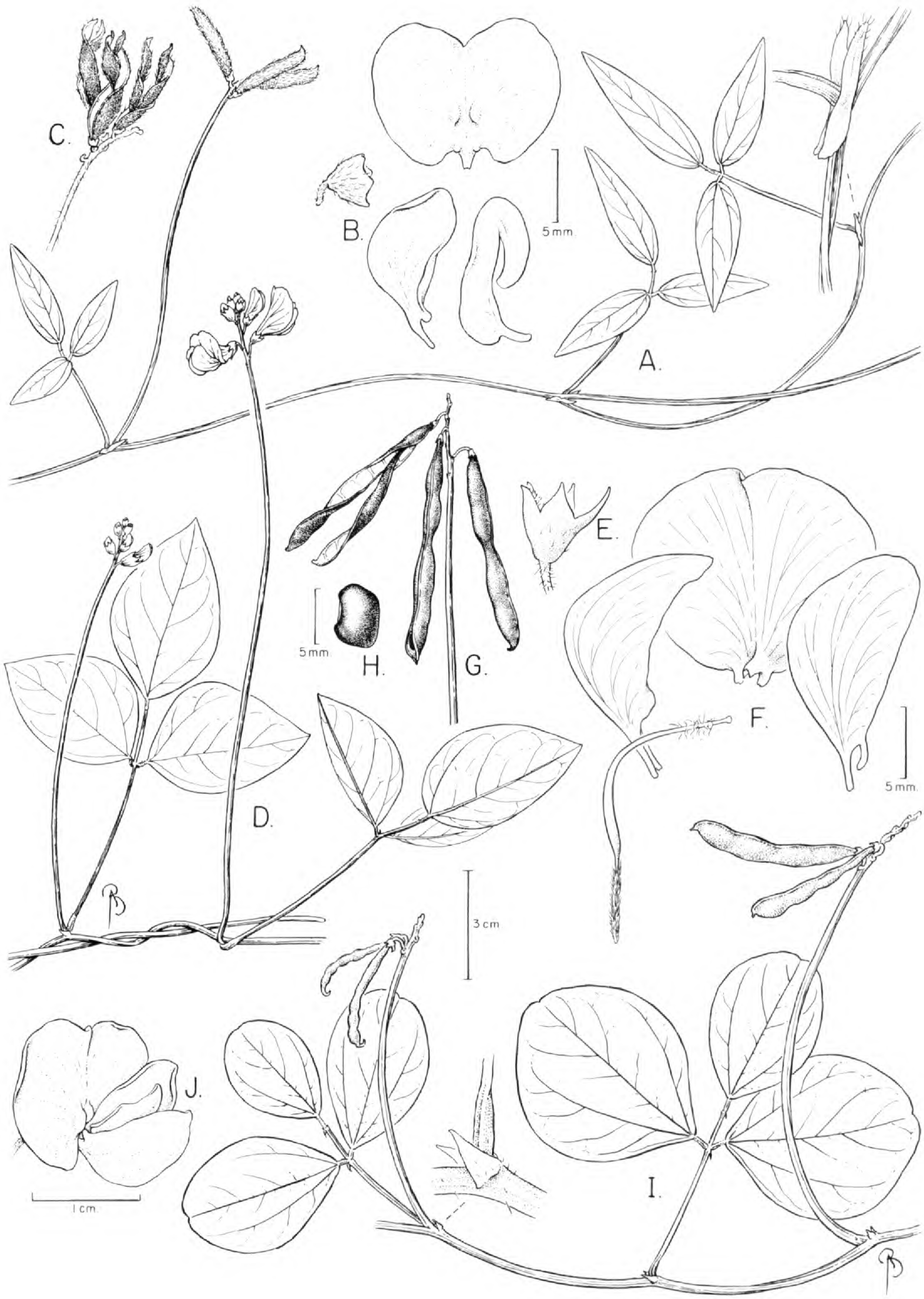

Fig. 115. A-C. *Vigna longifolia.* **A.** Fertile branch, with detail of the stipules. **B.** Calyx, standard, wing, and keel. **C.** Dehiscent fruits. **D-H.** *Vigna luteola.* **D.** Fertile branch. **E.** Calyx. **F.** Gynoecium, keel, standard, and wing. **G.** Infructescence. **H.** Seed. **I-J.** *Vigna marina.* **I.** Fertile branch, with detail of the stipules. **J.** Flower.

drying. Seeds rectangular, ca. 4.5 mm long, black, shiny.

Phenology: Collected in fruit in March.

Status: Native, very rare.

Distribution: Known from a single collection from Boca de Cangrejos, apparently along the sandy coast. Predominant along the tropical coasts of the Old World. In the New World, it is known from a few collections from Panama and Brazil.

Commentary: The application of the name *V. marina* is rather confused, and needs an explanatory note. This epithet was originally published by Burman based on the work of Rumphius (Index Alt. Herb. Amboin. 5: 391, tab. 141 fig. 2, 1750). As a result, the name *Vigna marina* is typified by the illustration presented in that work. Nevertheless, the examination of this illustration reveals that in reality it represents the species that today bears the name *V. luteola*. Due to the code of nomenclature's principle of priority, the name *V. luteola* should be replaced with *V. marina*. Nevertheless, the name *Vigna luteola* could be maintained if the name *V. marina* was conserved with a different type, so as to preserve the traditional use of both names. In this treatment I use the traditional nomenclature in anticipation of a proposal to conserve the name *V. marina* with a different type. As a result, *V. retusa* becomes a synonym of *V. marina*.

7. Vigna peduncularis (Kunth) Fawcett & Rendle, Fl. Jam. 4(2): 68. 1920.

Fig. 116. A-D

BASIONYM: *Phaseolus peduncularis* Kunth

Herbaceous vine, creeping or climbing twining, attainig 2 m in length. Stems branched from the base, slender, almost cylindrical, puberulent, usually producing roots in the area of the nodes. Leaves alternate, trifoliolate; leaflets chartaceous, ovate-deltate or lanceolate, 3-8 × 1.5-5 cm, both surfaces glabrous, the venation slightly prominent on the lower surface, the apex acute, acuminate, or less frequently obtuse, the base cuneate, the margins entire, slightly ciliate; terminal leaflet larger than the lateral ones; lateral leaflets asymmetrical at the base, one side obtuse, the other cuneate or truncate; petiolules ca. 3 mm long, puberulent; rachis 5-10 mm long, striate; petioles 2-7 cm long, striate, slender, glabrous; stipels obovate, ca. 1 mm long; stipules oblong or lanceolate, 2-2.5 mm long. Pseudoracemes axillary, up to 26 cm long, the flowers 2 per node, in the distal portion of the inflorescence; peduncles thick, glabrous or puberulent; pedicels ca. 1 mm long, erect, with the calyx in an ascending position. Calyx green, campanulate, puberulent, 2.2-2.5 mm long, the sepals more or less equal, broadly deltate, except for the abaxial one, which is narrower and slightly longer; corolla pale pink, standard obovate, unguiculate, ca. 8 mm long, the wings and the keel as long as the standard, the wings oblong, sinuate, unguiculate, the keel spirally twisted. Legumes ascendent, linear, flattened, straight, with the margins slightly undulate, 4-5.5 cm long, ca. 3 mm wide, puberulent, punctate. Seeds oblong, ca. 3.5 mm long, light brown with blackish spots, the hilum white, ca. 2 mm long.

Phenology: Collected in flower and fruit in November and January.

Status: Native, uncommon.

Distribution: In disturbed places like roadsides and pastures. Also in the Antilles, Central America, and South America.

Public Forest: Río Abajo.

8. Vigna unguiculata (L.) Walp., Repert. Bot. Syst. 1: 779. 1842.

Fig. 116. E-F

BASIONYM: *Dolichos unguiculatus* L.

Frijol, Cowpea

Herbaceous vine, climbing and twining, attainig 3-5 m in length. Stems up to 5 mm in diameter, cylindrical, glabrous, wine-colored when young. Leaves alternate, trifoliolate; leaflets chartaceous, 5-14.6 × 3-10.5 cm, both surfaces glabrous, with slightly prominent venation, the apex obtuse or acute, mucronate, the margins sinuate to lobate; terminal leaflet rhombic-ovate or rhombic-lanceolate, the base cuneate, with the point rounded or sometimes subcordiform; lateral leaflets markedly asymmetrical, one side oblong, the other ovate or lanceolate, the base cuneate or truncate; petiolules 4-5 mm long, puberulent, winged; rachis 0.5-3.5 cm long, canaliculate, marginate or winged; petioles 1-10 cm long, canaliculate, marginate or winged, glabrous, thick, broadened at the base; stipels oblong or obovate, ca. 2 mm long; stipules peltate,

constricted in the zone of insertion, the distal portion lanceolate, 6-10 mm long, the basal portion 2-3 mm long. Pseudoracemes axillary, up to 40 cm long, the flowers 2 per node, in the distal portion of the inflorescence; peduncles thick, glabrous; pedicels ca. 2 mm long, erect, with the calyx in an ascending position. Calyx green, campanulate, glabrous, ca. 8 mm long, the sepals slightly unequal, subulate, as long as the tubular portion. Corolla pale violet, white, greenish, or yellowish; standard rounded, 1.5-3 cm long, unguiculate, with the base auriculate; the wings and the keel shorter than the standard, the keel not spirally twisted. Legumes ascendent or horizontal, linear, slightly compressed, straight, 15-20 × ca. 1 cm, glabrous, the valves with partitions between the seeds. Seeds 10-15 per fruit, oblong, 9-10 mm long, reddish brown or white with a black spot, the hilum white, ca. 2 mm long.

Phenology: Flowering and fruiting almost throughout the year.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: In disturbed places like roadsides and pastures. Cultivated throughout the tropics for food; apparently native to the tropics of the Old World.

Public Forest: Río Abajo.

9. Vigna vexillata (L.) A. Rich. in Sagra, Hist. Fis. Polit. Nat. Cuba 11: 191. 1845.

Fig. 116. G-K

BASIONYM: *Phaseolus vexillatus* L.

Frijol cimarrón

Herbaceous vine, creeping or climbing, twining, attainig 4-5 m in length. Stems slender, green, ferruginous-pilose. Leaves alternate, trifoliolate; leaflets chartaceous, 3.5-11.5 × 1.5-5.2 cm, lanceolate, the upper surface strigulose, the venation slightly prominent; lower surface strigulose or strigose, with prominent venation, the apex acute or acuminate, the base obtuse or rounded on the terminal leaflet, unequal (obtuse-truncate) on the lateral ones, the margins revolute, ciliate; petiolules 2-4 mm long, pilose, marginate; rachis canaliculate, pilose, 3-20 mm long; petioles canaliculate, pilose, swollen at the base, 1.6-10 cm long; stipels subulate, 2-3 mm long; stipules lanceolate, 6-9 mm long, sagittate at the base. Pseudoracemes axillary, 10-31 cm long, the flowers 2 per node, in the distal portion of the inflorescence; peduncle thick, sparsely pilose, glabrescent; pedicels 2.5-3 mm long, erect; bracteoles subulate, ca. 5 mm long, pubescent. Calyx green, campanulate, puberulent, 12-15 mm long, the sepals slightly unequal, subulate, as long as the tubular portion of the calyx. Corolla pale violet or pink; standard ca. 2 cm long, the wings 1 cm wide, with the base mulberry-colored. Fruit a linear legume, cylindrical, 7-11 cm long, with the apex acute, slightly recurved, ferruginous-pilose-pubescent. Seeds oblong, black or gray.

Phenology: Flowering and fruiting throughout the year.

Status: Apparently native, relatively common.

Distribution: In disturbed places like roadsides and pastures. Also in the Antilles, Central America, South America, Africa, and tropical Asia.

Public Forest: Río Abajo.

Excluded Species:

Vigna juruana (Harms) Verdc. was cited for Puerto Rico by Liogier (1998) based on the erroneous identification of a specimen of *Vigna luteola (Alain 27987)*.

References: Burkart, A. 1971. El género *Galactia* (Legum.-Phaseoleae) en Sudamérica, con especial referencia a la Argentina y países vecinos. Darwiniana 16: 662-802. Fantz, P.R. 1990. *Clitoria* (Leguminosae) Antillarum. Moscosoa 6: 152-166. Fantz, P.R. 1996. Resegregation of *Barbieria* from *Clitoria* (Leguminosae: Phaseoleae: Clitoriinae). Sida 17: 55-68. Grear, J.W. 1978. A revision of *Rhynchosia* (Leguminosae-Faboideae). Mem. New York Bot. Gard. 31: 1-168. Maxwell, R. H. 1999. *Dioclea*. pp. 310-315. *In*: J. A. Steyermark et al. (eds.) Flora of the Venezuelan Guayana. Vol. 5.

Fig. 116. A-D. *Vigna peduncularis.* **A.** Fertile branch. **B.** Flower, side and front views. **C.** Standard, wing, gynoecium, and keel. **D.** Fruits. **E-F.** *Vigna unguiculata.* **E.** Fertile branch, with detail of the inflorescence. **F.** Fruits. **G-K.** *Vigna vexillata.* **G.** Fertile branch. **H.** Flower. **I.** Standard, wing, and keel. **J.** Gynoecium. **K.** Infructescence.

24c. Subfamily *MIMOSOIDEAE*

Key to the genera

1a. Inflorescences racemes of spikes, 4-5 cm long..... 2. *Entada*
1b. Inflorescences racemes of heads or solitary heads 2

2a.Corolla white, cream-colored, or yellowish ..... 1. *Acacia*
2b. Corolla pink ..... 3. *Mimosa*

1. ACACIA

Trees, shrubs, or lianas; stems unarmed or spiny. Leaves alternate, bipinnate; pinnae opposite; leaflets small, numerous, opposite; petioles and rachis usually with nectariferous glands; stipules usually spiny, persistent; stipels absent. Flowers bisexual, produced in heads or spikes grouped in axillary or terminal racemes or panicles; bracts small. Calyx campanulate, of 5 united or free sepals; corolla yellow or white, tubular, with 4-5 lobes; stamens numerous, exserted, the filaments free or united at the base; ovary superior, sessile or stipitate, with several ovules, the style filiform, curved, pubescent on the distal portion. Fruit an oblong or linear legume, straight or curved, flattened to almost cylindrical, dehiscent or indehiscent; seeds of diverse forms, usually flattened. A genus of about 500 species, the majority of tropical America, tropical Africa, and Australia.

Key to the species of *Acacia*

1a. Plant spiny; stems obtusely quadrangular; legume 1.5-2 cm wide ..... 1. *A. retusa*
1b. Plant not spiny; stems more or less cylindrical; legume 2.5-3 cm wide ..... 2. *A. vogeliana*

1. Acacia retusa (Jacq.) R. A. Howard, J. Arnold Arbor. 54: 459. 1973.

Fig. 117. A-F

BASIONYM: *Mimosa retusa* Jacq.
SYNONYMS: *Mimosa paniculata* West ex Vahl, *non* Willd.
Acacia westiana DC.
Senegalia westiana (DC.) Britton & Rose
Acacia riparia sensu Britton & Wilson, *non* Kunth

Zarza brava, Katch and keep

Liana that supports itself by means of recurved spines and attains 15 m in length. Stems cylindrical, quadrangular and sulcate when mature, attaining 10 cm in diameter, sometimes splitting into 4 longitudinal sections; branches angular, with numerous recurved spines. Leaves bipinnate, 6-13 cm long; pinnae 4-8 pairs; leaflets 16-32 pairs per pinna, 3-5 mm long, oblong, chartaceous, the apex obtuse, the base cordate-obtuse, unequal, the margins entire; primary rachis flattened, usually aculeate, pubescent, with two stipitate annular glands, one in a distal position and another in a basal position; secondary rachis cylindrical, unarmed; petioles ca. 2 cm long, with the base slightly swollen; stipules minute, early deciduous. Inflorescences of terminal panicles of globose heads, 1-1.5 cm in diameter. Calyx campanulate, 0.6-1 mm long, glabrous; corolla white, campanulate, 2-2.5 mm long; stamens white, exserted. Legume flattened, 6-15 × 1.5-2 cm, glabrous or tomentose, chartaceous, the margin thickened, unarmed, dehiscent along both sutures.

Phenology: Flowering from July to December and fruiting from October to March.

Status: Native, rather common.

Distribution: In dry disturbed areas, at middle and lower elevations. Also on Culebra, Vieques, St. Thomas, St. John, Tortola, and Virgin Gorda; also in Hispaniola, the Lesser Antilles, and northern South America.

Public Forests: Cambalache, Ceiba, Guánica, Río Abajo, and Susúa.

2. Acacia vogeliana Steud., Nomencl. Bot. ed. 2, 1: 9. 1840.

Fig. 117. G-J

SYNONYMS: *Lysiloma vogeliana* (Steud.) Stehlé
Acacia ambigua Vogel, *non* Hoffmans.
Lysiloma ambigua (Vogel) Urb.

Liana, not spiny, that climbs by means of twining lateral branches and attains 10 m in length. Stems cylindrical, striate, puberulent. Leaves bipinnate, 6-13 cm long, puberulent; pinnae in 5 pairs, pulvinate, with a pair of linear glands above the pulvinus; rachis sulcate, puberulent, with an annular gland between the two pairs of basal and distal pinnae; leaflets 15-16 pairs per pinna, 5-10 mm long, oblong-lanceolate, chartaceous, the apex obtuse, mucronulate, the base obtuse-rounded, unequal, the margins entire; both surfaces glabrous or minutely puberulent; stipules minute, early deciduous. Inflorescences of terminal panicles of heads, ca. 1 cm in diameter. Calyx campanulate, 0.6-1 mm long, strigose; corolla white or cream-colored, campanulate, strigose, 2-2.5 mm long; stamens white, exserted. Legumes 6-16 × 2.5-3 cm, oblong, flattened, chartaceous, glabrous, stipitate, with the seeds prominent, the margins thickened and slightly undulate. Seeds 4-6 mm long, elliptical, light brown.

Phenology: Collected in flower in August and in fruit in January.

Status: Native, very rare.

Distribution: Known from a single collection in Puerto Rico (at the entrance to La Parguera) and another on St. John (entrance toward Bordeaux); also in Hispaniola and probably on Martinique.

Commentary: The collections (*Acevedo 1, 3, 3242 and 5047*) by which this species is known from Puerto Rico and the Virgin Islands differ from the type collection (from Hispaniola) in having a climbing habit. The collections known from Hispaniola are all of trees or shrubs.

2. ENTADA

Lianas; stems unarmed or spiny. Leaves alternate, bipinnate, sometimes with a terminal tendril; pinnae opposite; leaflets numerous, opposite; petioles with or without nectariferous glands; stipules small, setaceous; stipels minute. Flowers bisexual, produced on spikes arranged in paniculate inflorescences; bracts minute. Calyx campanulate or crateriform, of 5 small sepals; corolla of free petals; stamens 10, exserted, the filaments free at the base, the anthers with a deciduous apical gland; ovary superior, subsessile, with numerous ovules, the style filiform. Fruit an oblong legume, straight or recurved, flattened, articulate between the seeds, the margins thickened, separating from the valves when ripe; seeds flattened, circular or reniform. A genus of about 15 species, of pantropical distribution.

1. Entada polystachya (L.) DC. var. **polyphylla** (Benth.) Barneby, Brittonia 48: 175. 1996.

Fig. 118. A-D

SYNONYM: *Entada polyphylla* Benth.

Liana, not spiny, that climbs by means of foliar tendrils (homologous to the two distal pinnae) and attains 10 m in length. Stems more or less cylindrical, striate. Leaves bipinnate, 15-25 cm long; pinnae in 4-6 pairs; rachis slightly flattened along the upper surface, puberulent; secondary rachis carinate, puberulent, with a pair of stipels below the basal pinnae; leaflets 10-20 pairs per pinna, 10-16 mm long, oblong, coriaceous, the apex obtuse, rounded, or emarginate, the base asymmetrical, one side cuneate, the other truncate, the margins entire, revolute; upper surface dark green, glabrous or puberulent; lower surface pale green, strigulose, with the midvein prominent; petiole 3-3.5 cm long, with a long pulvinulus at the base; stipules minute, early deciduous. Inflorescences terminal, forming a raceme of cylindrical spikes, 4-5 cm long. Calyx crateriform, ca. 0.5 mm long, puberulent; petals oblong, green or reddish brown, 1.2-1.5 mm long; stamens white, slightly longer than the petals. Legumes

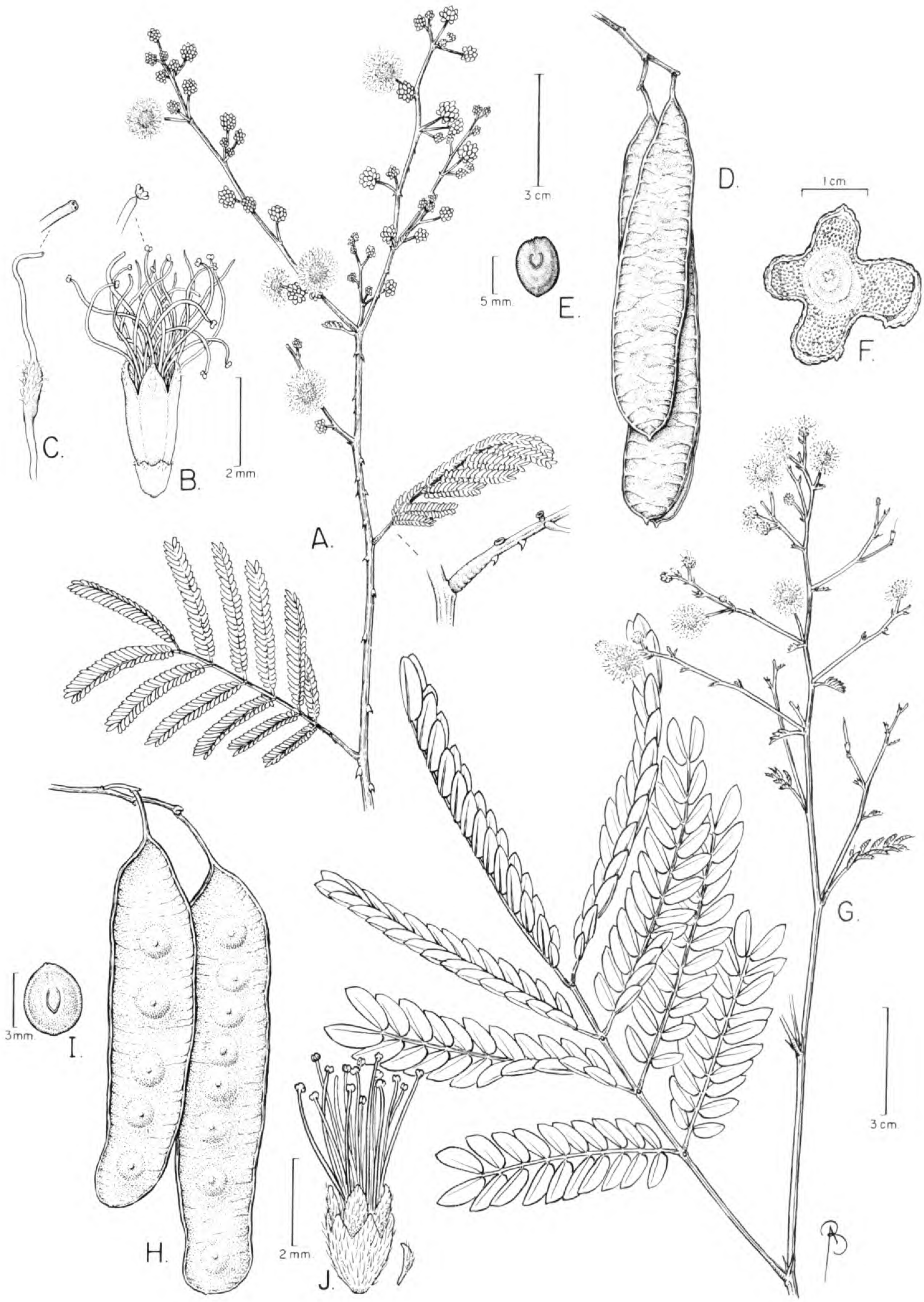

Fig. 117. A-F. *Acacia retusa.* **A.** Fertile branch. **B.** Flower. **C.** Gynoecium. **D.** Fruits. **E.** Seed. **F.** Stem, cross section. **G-J.** *Acacia vogeliana.* **G.** Fertile branch. **H.** Fruit. **I.** Seed. **J.** Flower.

25-35 × 6.5-7.5 cm, oblong, flattened, coriaceous, glabrous, stipitate, with the margins thickened and conspicuously undulate, separating into segments that contain a single seed. Seeds 4-6 mm long, elliptical, light brown.

Phenology: Collected in flower in May.

Status: Apparently native, extremely rare or extirpated.

Distribution: Known from a single collection (*Sintenis 1240)*, from the base of Monte de Mula in Fajardo. Also on Dominica and in northern South America.

3. MIMOSA

Erect or scandent herbs or shrubs; stems spiny. Leaves alternate, bipinnate; pinnae opposite; leaflets small, numerous, opposite; petioles and rachis without nectariferous glands; stipules minute, deciduous or persistent; stipels minute or absent. Flowers bisexual or staminate, produced in heads, solitary or grouped in axillary or terminal racemes; bracts small, usually shorter than the corolla. Calyx minute, hypocrateriform, crowned by 5 minute sepals; corolla yellow or pink, infundibuliform, with 3-6 lobes (petals); stamens as numerous as or double the number of petals, exserted, the filaments free; ovary superior, stipitate, with several ovules, the style filiform, the stigma punctiform. Fruit an oblong legume, chartaceous, flattened, indehiscent or dehiscent by the walls that separate from the thickened margin, usually spiny; seeds flattened, lenticular or ovate. A genus of about 450 species, of pantropical distribution, the majority of the Neotropics.

Key to the species of *Mimosa*

1a. Fruits obtusely quadrangular, with numerous longitudinal ribs ..... 4. *M. quadrivalvis*
1b. Fruits flattened, without longitudinal ribs 2

2a. Leaves with a single pair of pinnae; leaflets 3-4 pairs, elliptic-oblong-lanceolate, acute at the apex..... 1. *M. casta*
2b. Leaves with 2-7 pairs of pinnae; leaflets 3-20 pairs, obliquely obovate or oblong, rounded or obtuse at the apex..... 3

3a. Leaflets 15-20 pairs, 3-4 mm long, oblong; heads ca. 6 mm in diameter.....3. *M. diplotricha*
3b. Leaflets 3-8 pairs, 1-1.5 cm long, obliquely obovate; heads 1.3-1.7 cm in diameter.....2. *M. ceratonia*

1. Mimosa casta L., Sp. Pl. 518. 1753.

Fig. 118. E-H

Zarza

Woody vine, climbing, scarcely branched, that supports itself on other plants by means of spines which are borne along the length of its stems and petioles, and attainig 1-2 m in length. Stems angular, glabrous, with numerous recurved spines. Leaves alternate, bipinnate, with a single pair of pinnae; leaflets 3-4 pairs, elliptical to oblong-lanceolate, 1-3 × 0.5-1.5 cm, the apex acute, the base asymmetrical, one side attenuate, the other rounded, the margins ciliate; upper surface glabrous; lower surface sparsely sericeous, with prominent venation; petioles up to 10 cm long, with numerous recurved spines, pulvinate at the base; stipules subulate, ca. 5 mm long. Inflorescences of globose heads, axillary; peduncle 5-15 mm long. Calyx ca. 0.2 mm long, glabrous; corolla white, infundibuliform 1-2 mm long, glabrous, with 4 lobes; stamens 4, the filaments free, ca. 1 cm long. Legume flattened, oblong, 3-4 × ca. 1.2 cm, glabrous, with 4-5 articulations, the margin with recurved spines.

Phenology: Collected in flower and fruit in January and February.

Status: Exotic, adventive, apparently a recent introduction, locally common.

Distribution: On roadsides and in pastures at lower and middle elevations. Also in the Lesser Antilles and from Panama to Brazil.

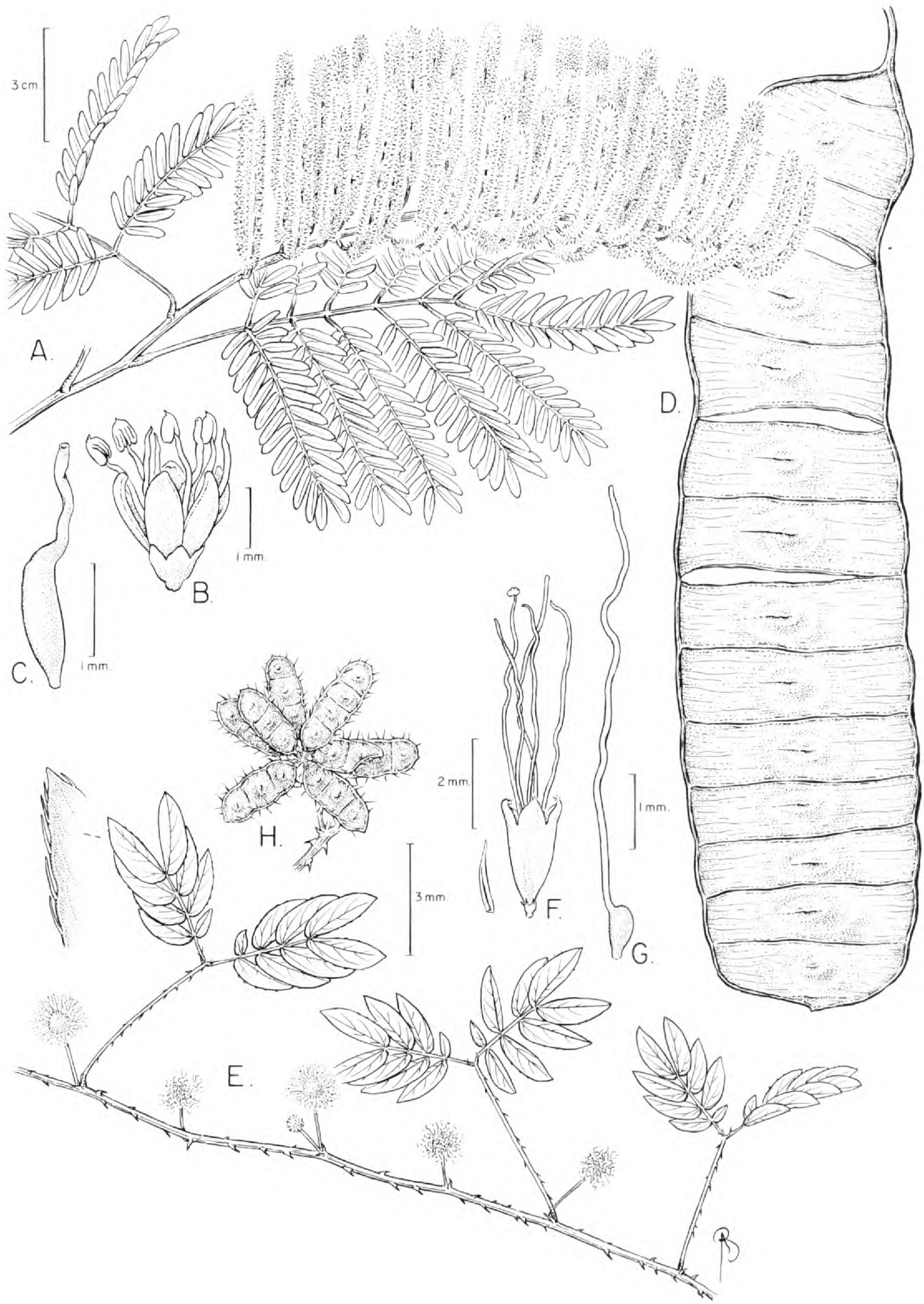

Fig. 118. A-D. *Entada polystachya* var. *polyphylla*. **A.** Fertile branch. **B.** Flower. **C.** Gynoecium. **D.** Fruit. **E-H.** *Mimosa casta*. **E.** Fertile branch, with detail of the margin of a leaflet. **F.** Flower. **G.** Gynoecium. **H.** Infructescence.

2. Mimosa ceratonia L, Sp. Pl. 523. 1753.

Fig. 119. A-D

SYNONYM: *Lomoplis ceratonia* (L.) Raf.

Zarza, Lamedora, Black amaret, Amarat steckel, Amarat

Woody vine, climbing, much branched, that supports itself on other plants by means of spines that are borne along the length of its stem and leaf axes, attaining 2-6 m in length. Stems green or with a reddish tinge, obtusely quadrangular, glabrous, striate, with numerous recurved spines, becoming almost cylindrical and grayish when mature. Leaves alternate, 7-15 cm long, bipinnate; pinnae 4 or 5, pairs opposite; rachis sulcate, with numerous recurved spines; leaflets opposite, 3-8 pairs per pinna, 1-1.5 cm long, obliquely obovate to almost rounded, chartaceous, the apex rounded, the base rounded-obtuse, asymmetrical, the margins slightly revolute, sometimes ciliate; upper surface dark green, dull, glabrous; lower surface pale green, dull, with prominent venation; stipules 8-10 mm long, lanceolate. Heads 1.3-1.7 cm in diameter, in terminal racemes; peduncles 1-2 cm long, with numerous recurved spines. Calyx 0.7-1 mm long, glabrous; corolla pink, infundibuliform, ca. 2 mm long, with three petals or lobes; filaments white, 4-6 mm long. Legumes flattened, straight or slightly curved, 4-6 × 1.5-1.7 cm, coriaceous, dehiscent by the walls that separate from the thickened margin, covered with recurved spines. Seeds 7-8 mm long, oblong-elliptical, flattened, dark brown.

Phenology: Flowering from June to January and fruiting from December to March.

Status: Native, very common.

Distribution: On roadsides and in pastures at lower and middle elevations. Also on Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; Hispaniola and the Lesser Antilles as far as St. Vincent, reported for Venezuela.

Public Forests: Cambalache, Carite, El Yunque, Guajataca, Maricao, Río Abajo, Susúa, and Toro Negro.

3. Mimosa diplotricha C. Wright ex Sauv., Anal. Acad. Ci. Habana 5: 405. 1868.

Fig. 119. E-H

Scandent shrub, much branched from the base, that supports itself on other plants by means of spines that are borne along the length of its stem and leaf axes, attainig 1.5-2 m in length. Stems pentagonal, pilose, with numerous recurved spines along the angles. Leaves alternate, 5-13 cm long, bipinnate; pinnae 6 or 7, pairs opposite; leaflets opposite, 18-15 pairs per

pinna, 2.5-4.2 mm long, oblong, chartaceous, the apex obtuse, the base asymmetrically obtuse-truncate; both surfaces strigulose; lower surface pale green, dull, with the midvein sunken; rachis very slender, pilose, with some recurved spines; stipules subulate, ca. 4.5 mm long; stipels linear, ca. 1.5 mm long. Heads 7-10 mm in diameter, axillary; peduncles with numerous recurved spines, 6-15 mm long. Calyx ca. 0.2 mm long, glabrous; corolla pink, infundibuliform, ca. 1.2 mm long, with 4(5) lobes; filaments pink, 3-5 mm long. Legumes usually 10 or more per head, oblong or linear, flattened, straight or slightly curved, 10-24 × 3-4.3 mm, chartaceous, covered with spines, especially along the margin. Seeds 3-8, 2.3-3 mm long, flattened, ovate or rhombic, dark brown.

Phenology: Collected in flower in December.

Status: Exotic, adventive, of recent introduction, uncommon.

Distribution: On roadsides and in pastures at lower and middle elevations. Also in Cuba, Hispaniola; Mexico, Central and South America.

Public Forest: El Yunque.

4. Mimosa quadrivalvis L. var. **urbaniana** Barneby, Mem. New York Bot. Gard. 65: 297. 1991.

Fig. 119. I

SYNONYMS: *Schrankia portoricensis* Urb.
Morongia portoricensis (Urb.) Britton
Leptoglottis portoricensis (Urb.) Britton & Rose
Schrankia leptocarpa sensu Bello, *non* DC.
Schrankia distachya sensu A. Stahl, *non* DC.

Zarzaparilla

Erect or clambering shrub, scarcely branched, that supports itself on other plants by means of spines that are borne along the length of its stem and petioles, attaining 1-2 m in length. Stems slender, angular or ribbed, pilose, glabrescent, with numerous recurved spines along the angles. Leaves alternate, bipinnate, with 4-5 pairs of pinnae; leaflets 8-10 pairs, oblong, 2.5-4 mm long, the apex obtuse, the base very asymmetrical, truncate-obtuse, the margins ciliate; both surfaces

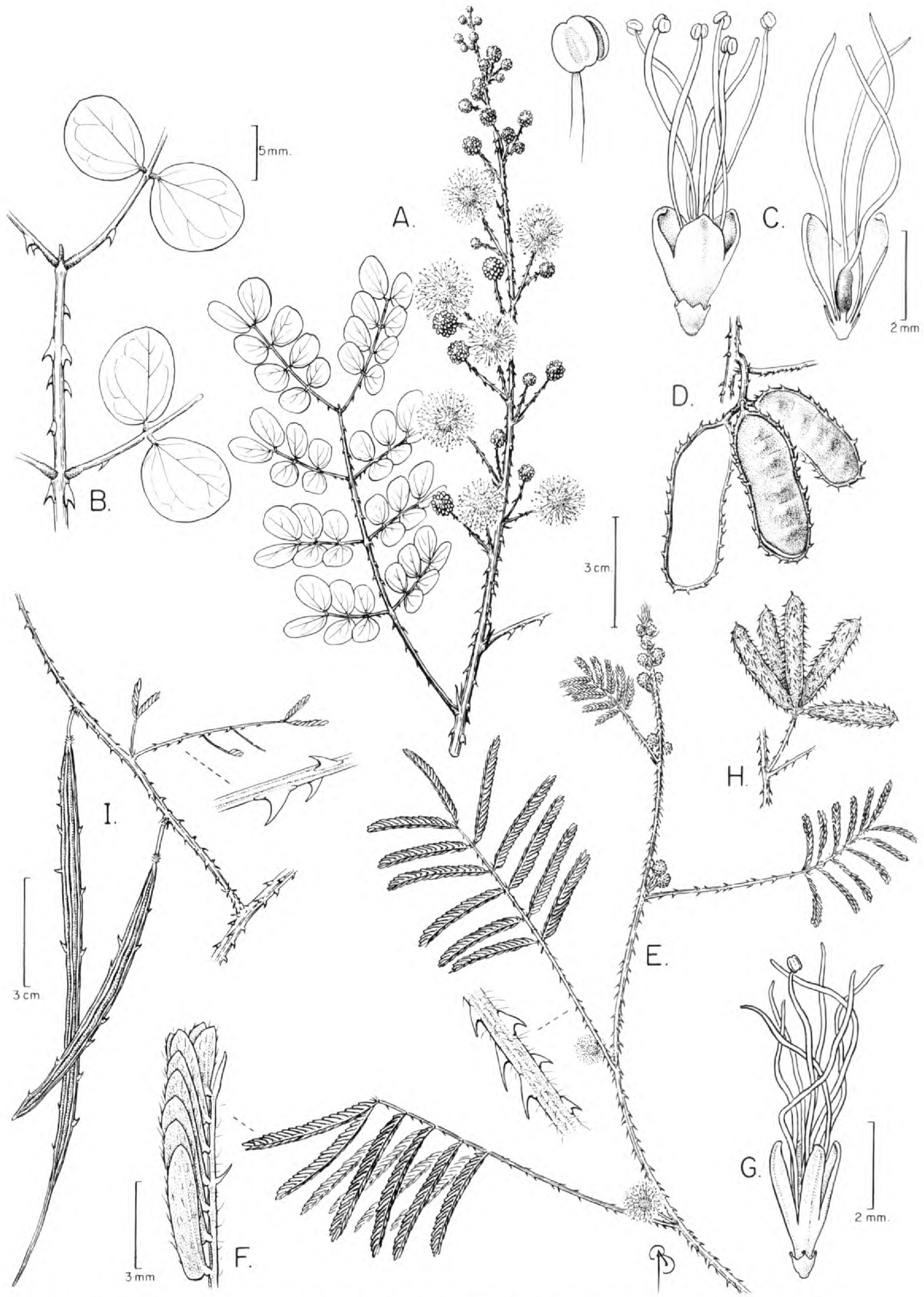

Fig. 119. A-D. *Mimosa ceratonia*. **A.** Fertile branch. **B.** Detail of leaf. **C.** Whole flower, with detail of anther, and flower, longitudinal section, showing gynoecium. **D.** Fruits. **E-H.** *Mimosa diplotricha*. **E.** Fertile branch, with detail of the leaf rachis. **F.** Pinna. **G.** Flower. **H.** Fruits. **I.** *Mimosa quadrivalvis* var. *urbaniana*, fertile branch, with detail of leaf rachis.

glabrous or puberulent with numerous minute circular scales; rachis very slender, spiny; stipules subulate, 3-4 mm long; stipels spiniform, ca. 1 mm long. Heads globose, axillary, solitary; peduncle 4-13(20) mm long. Calyx 0.3-0.5 mm long; corolla campanulate, pink, 2-3 mm long, with 5-6 lobes; stamens exserted, pink, ca. 6 mm long. Legumes 1-7 per head, erect, linear or oblong, quadrangular, 2-14 cm long, 2.5-6.5 mm wide, pilose, with 4-5 longitudinal ribs, which have recurved spines.

Phenology: Collected in fruit during December.

Status: Variety endemic to Puerto Rico, uncommon.

Distribution: Known from Piedras Chiquitas, Coamo.

25. Family ***LAURACEAE***

1. CASSYTHA

Twining vines, herbaceous, parasitic. Leaves reduced to minute scales. Flowers bisexual, sessile, in axillary spikes . Tepals 6, in two unequal series; fertile stamens 9, in three whorls; ovary superior, globose, minute. Fruit a fleshy berry. A cosmopolitan genus of 20 species.

1. Cassytha filiformis L., Sp. Pl. 35. 1753.

Fig. 120. A-F

SYNONYM: *Cassytha americana* Nees

Fideillo, Bejuco dorado, Cabellos de ángel, Fideos, Tente en el aire, Yellow dodder, Yellow love

Herbaceous vine, twining, parasitic, that adheres to the host plant by means of small haustoria, attainig 1-5 m in length. Stems yellowish green or yellow, flexible, ca. 2 mm in diameter, cylindrical, profusely branched. Leaves 1-2 mm long, lanceolate, sessile, almost imperceptible or absent. Inflorescences of short spikes with few flowers. Tepals white, ovate, ca. 2 mm wide. Fruit globose, light green or white, 5-7 mm in diameter.

Phenology: Flowering and fruiting throughout the year.

Status: Native, rather common.

Distribution: In disturbed areas at low elevation, predominantly near the littoral zone. Also on Cayo Diablo, Isla Piñeiros, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; a cosmopolitan species.

Public Forests: Guánica, Mona, Piñones, and Tortuguero.

26. Family ***MALPIGHIACEAE***

Key to the genera

1a. Mericarp with a single dorsal wing well developed (lateral wings not developed).....2
1b. Mericarp with 4 wings (two pairs of lateral wings, the dorsal wing not developed) 3.*Tetrapterys*

2a. Stamens 10, subequal, fertile; styles obtuse at the apex .....1. *Heteropterys*
2b. Stamens 10, unequal, 4-6 fertile, with the anthers thicker; styles with the apex broadened .....2. *Stigmaphyllon*

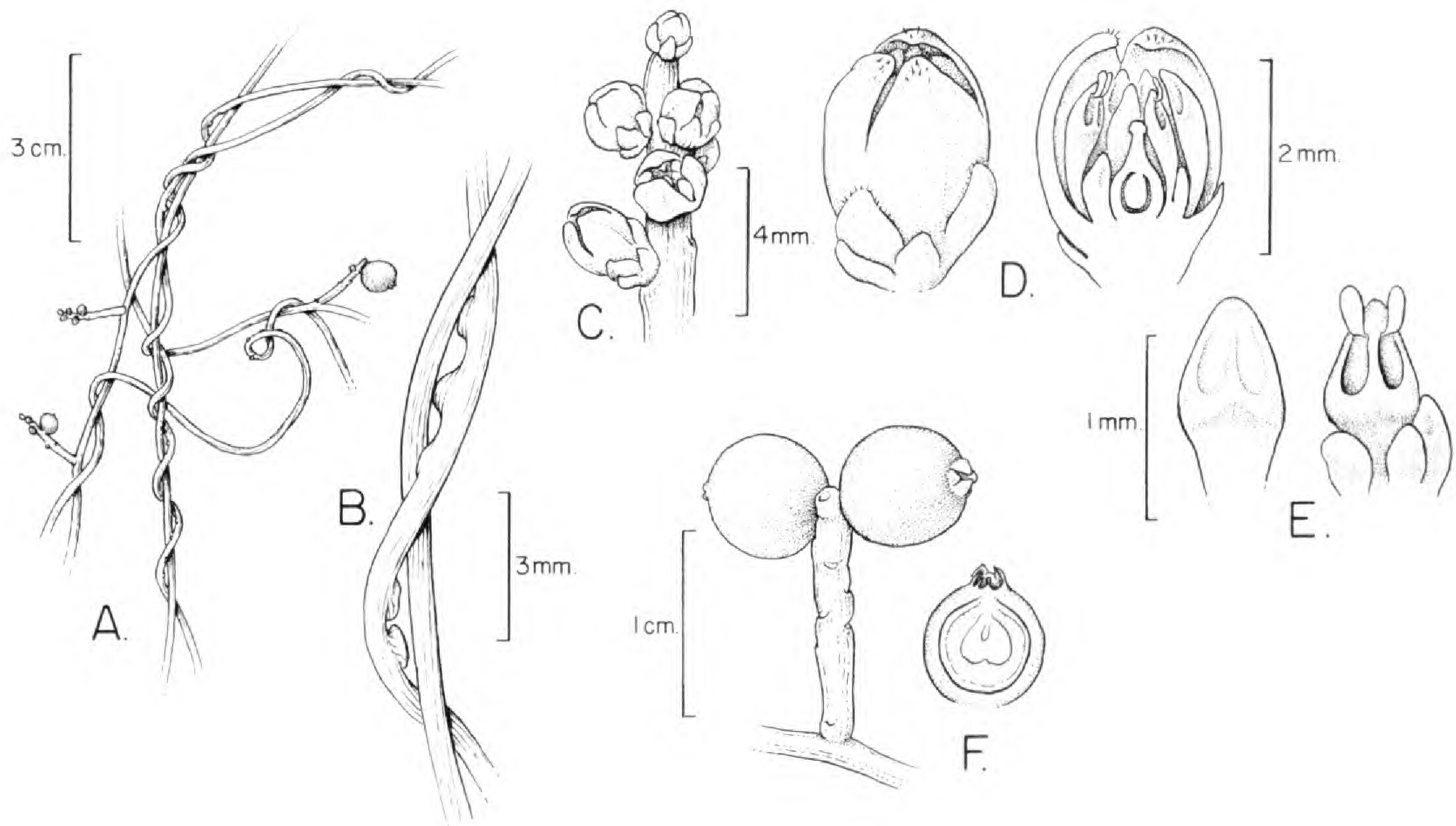

Fig. 120. A-F. *Cassytha filiformis*. **A.** Fertile branch. **B.** Detail of haustoria. **C.** Inflorescence. **D.** Flower, whole and longitudinal section. **E.** Stamens, closed and dehiscent. **F.** Fruits. From Acevedo-Rodríguez et al. 1996. Flora of St. John, U. S. Virgin Islands. Mem. NYBG Vol. 78.

1. HETEROPTERYS

Twining vines, shrubs, or small trees, usually with malpighiaceous hairs. Leaves simple, entire, opposite, usually with glandular depressions on the blade; petioles usually with a pair of stipitate glands; stipules minute or absent. Flowers bisexual, in axillary or terminal umbels, corymbs, or pseudoracemes. Calyx of 5 basally connate sepals, 4 of which have a pair of glands on the outer surface, or less frequently eglandular. Petals yellow, pink, or white; stamens 10, unequal, fertile, the filaments connate at the base, the anthers ellipsoid to oblong; ovary superior, of 3 connate carpels, the styles 3, free, erect, thick. Fruit a schizocarp of 3 samaras with a dorsal wing. A genus of approximately 125 species, the great majority distributed throughout the Neotropics.

Key to the species of *Heteropterys*

1a. Petals pink; leaves 1.5-2 cm long ..... 2. *H. purpurea*
1b. Petals yellow; leaves 7-15 cm long..... 2

2a. Stems not lenticellate; leaves with the lower surface densely appressed-ferruginous-pubescent; petioles with two glands in the middle ..... 3. *H. wydleriana*
2b. Stems densely lenticellate; leaves with the lower surface glabrous; petioles without glands ..... 1. *H. laurifolia*

1. Heteropterys laurifolia (L.) A. Juss., Ann. Sci. Nat. Bot. Sér. 2. 13: 176. 1840.

Fig. 121. A-F

BASIONYM: *Banisteria laurifolia* L.

Bejuco de buey, Paralejo velludo, Dragon wiss

Vine or sometimes scandent shrub, woody, twining, attainig 5-10 m in length. Stems flexible, cylindrical, lenticellate, attaining 3.5 cm in diameter. Leaves opposite, 5-15(23.5) × 2-9(13.5) cm, coriaceous, glabrous, oblong or elliptical, the apex acuminate or rounded, the base acute, the margins undulate or entire; upper surface shiny, with the midvein prominent, yellowish green; lower surface yellowish green, with the midvein prominent; petioles 1-1.2 cm long, without glands. Inflorescences of panicles, terminal or axillary, the axes densely ferruginous-pubescent; pedicels ca. 7 mm, ferruginous-pubescent, articulated above the base; bracts ca. 2 mm long, at the base of the pedicel; bracteoles in pairs, minute, inserted on the articulation of the pedicel. Calyx green, ferruginous-pubescent, of 5 oblong sepals, ca. 4 mm long, 4 of them with a pair of glands at the base of the outer surface, which are 1.2-2 mm long. Petals 5, yellow, unguiculate, 4-7 mm long. Mericarps 3, ferruginous-tomentose in the seminiferous portion, glabrous toward the wing, 2-4 cm long, with a dorsal wing, curved, ascendent or divaricate.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common throughout Puerto Rico.

Distribution: In secondary forests or pastures or along roads or rivers. Also throughout the Antilles, from Central America to Bolivia. Reported for St. Croix by Niedenzu (according to Britton and Wilson, 1924).

Public Forests: Ceiba, El Yunque, Guajataca, Guánica, Maricao, Río Abajo, Susúa, and Toro Negro.

2. Heteropterys purpurea (L.) Kunth in Humb., Bonpl. & Kunth, Nov. Gen. Sp. (quarto ed.) 5: 164. 1821 [1822].

Fig. 121. G-K

BASIONYM: *Banisteria purpurea* L.

Bejuco de paralejo, Bejuco de toro, Red wiss

Woody vine, twining, attainig 3-8 m in length. Stems slender, cylindrical, copper-colored, puberulent, lenticellate, with numerous lateral branches. Leaves opposite, chartaceous, 1.5-2 × 1-1.5 cm, oblong, elliptical, or ovate, the apex obtuse or rounded, sometimes mucronate, the base obtuse or rounded, the margins revolute; upper surface shiny, glabrous or puberulent; lower surface yellowish green, dull, puberulent; petioles 3-10 mm long, puberulent, with a pair of glands in the middle; stipules absent. Inflorescence of axillary racemes; bracts minute, without glands; pedicels 5-6 mm long, slender, ferruginous-pubescent; articulated near the base. Calyx of 5 sepals, elliptical or ovate, ca. 3 mm long, appressed-pubescent, 4 of which have a pair of glands at the base of the outer surface. Petals 5, pink, broadly ovate, unguiculate, 4.5-5 mm long, the apex rounded. Mericarps 1.5-3 cm long, with an ascendent dorsal wing.

Phenology: Flowering throughout the year and fruiting from December to March.

Status: Native, very common.

Distribution: In dry forests and disturbed areas at lower elevations, usually along the coast. Also on Culebra, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; the United States (Florida), the Antilles, Trinidad, and Venezuela.

Public Forests: Cambalache, Ceiba, Guánica, Guajataca, and Susúa.

3. Heteropterys wydleriana A. Juss., Ann. Sci. Nat. Bot. Sér. 2. 13: 275. 1840.

Fig. 121. L-S

SYNONYMS: *Banisteria wydleriana* (A. Juss.) C.B. Robinson
Heteropterys bellonis Urb.

Ahorca caballo

Woody vine, twining, attainig 10-15 m in length. Stems cylindrical, ferruginous-pubescent when young, attaining 5 cm in diameter, the bark grayish. Leaves opposite, coriaceous, 6.5-15 × 3.6-7 cm, oblong or elliptical, the apex acute or obtuse and sometimes mucronate, the base obtuse or rounded; upper surface dark green, slightly shiny, puberulent, the midvein ferruginous-pubescent; lower surface densely ferruginous-sericeous-tomentose, the venation prominent; petioles ca. 1 cm long, with a pair of glands at the middle, ferruginous-pubescent. Inflorescences of axillary

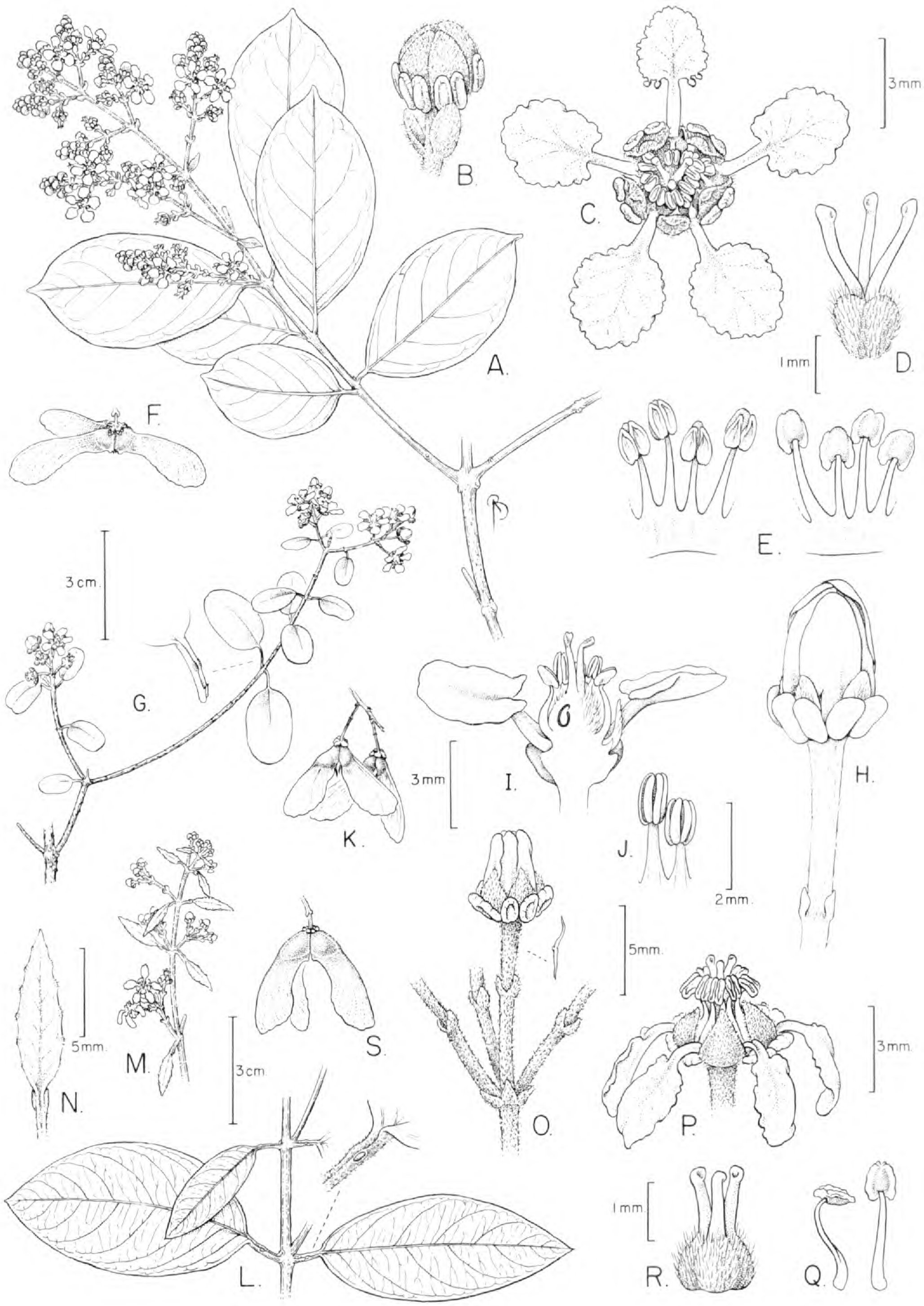

Fig. 121. A-F. *Heteropterys laurifolia*. **A.** Fertile branch. **B.** Bud. **C.** Flower. **D.** Gynoecium. **E.** Stamens, front and back view. **F.** Fruit. **G-K.** *Heteropterys purpurea*. **G.** Fertile branch. **H.** Bud. **I.** Flower, longitudinal section. **J.** Stamens. **K.** Fruit. **L-S.** *Heteropterys wydleriana*. **L.** Branch, with detail of the petiolar glands. **M.** Inflorescence. **N.** Juvenile leaf, showing glands. **O.** Detail of the inflorescence. **P.** Flower. **Q.** Stamens. **R.** Gynoecium. **S.** Fruit.

dichasial cymes; bracts minute, triangular; pedicels 9-11 mm long, ferruginous-strigose, articulated in the middle. Calyx ferruginous-strigose, the sepals 5, triangular, 3-4 mm long, four of them with a pair of glands at the base of the outer surface. Petals 5, yellow, oblong, unguiculate, ca. 4 mm long. Mericarps (1-)3, ferruginous-tomentose, 4-5 cm long, with a distal dorsal wing, ascendent.

Phenology: Flowering from September to January and fruiting in January and February.

Status: Endemic to Puerto Rico, locally common.

Distribution: In secondary and mature forests in the zone of mogotes and serpentine.

Public Forests: Maricao, Río Abajo, and Susúa.

2. STIGMAPHYLLON

Twining vines, usually with simple or malpighiaceous trichomes. Leaves simple, entire, opposite, usually with a pair of glands at the base or on the petiole; stipules minute, eglandular. Flowers bisexual, in axillary or terminal umbels, corymbs, or pseudoracemes; bracts eglandular; bracteoles glandular or eglandular. Calyx of 5 basally connate sepals, 4 of which have a pair of glands on the outer surface. Petals yellow, sometimes with a reddish tinge, unguiculate, the posterior petal usually with the unguiculate base larger and the limb smaller than the other petals; stamens 10, unequal, the filaments connate at the base, the anthers glabrous or pubescent; ovary superior, of 3 connate carpels, the styles 3, free, with the stigmatic portion on the inner (adaxial) portion. Fruit a schizocarp of 3 samaras with a dorsal wing, distal, on a pyramidal receptacle. A genus of approximately 100 species, distributed from Mexico to Argentina, including the Antilles.

Key to the species of *Stigmaphyllon*

1a. Mericarp with a dorsal wing, divaricate (projecting horizontally); leaves coriaceous..... .2
1b. Mericarp with a distal wing, ascendent or rudimentary; leaves chartaceous..... 3

2a. Young stems strigulose; leaves glabrescent on both surfaces, the tertiary veins inconspicuous; samaras glabrescent .....2. *S. emarginatum*
2b. Young stems tomentose; leaves densely appressed-pubescent on the lower surface, the tertiary veins conspicuously reticulate; samaras tomentose ..... 3. *S. floribundum*

3a. Leaves acute, obtuse, or sometimes apiculate at the apex; wing of the mericarp rudimentary, reduced to an apical crest of the seminiferous locule, 4-9 mm long..... 1 *S. bannisterioides*
3b. Leaves acuminate at the apex; wing of the mericarp distal, ascendent, well developed, 2.6-3.7 cm long ..... 4. *S. puberum*

1. Stigmaphyllon bannisterioides (L.) C. Anderson, Taxon 41: 328. 1992.

Fig. 122. A-C

BASIONYM: *Malpighia bannisterioides* L.
SYNONYMS: *Banisteria ovata* Cav.
Stigmaphyllon ovatum (Cav.) Niedenzu
Brachypterys ovata (Cav.) Small

Woody vine, twining, attainig 3-6 m in length. Stems cylindrical, sericeous when young. Leaves opposite, ovate, elliptical, or lanceolate, 4-12 × 1.5-5.5 cm, chartaceous, the apex acute, obtuse, or sometimes apiculate, the base attenuate, obtuse, or truncate, with a pair of annular glands in the area adjacent to the petiole, the margins entire; upper surface glabrous or glabrescent; lower surface sparsely sericeous; petiole slightly sulcate, sericeous, 0.4-1.8 cm long; stipules minute, triangular. Inflorescences of umbels with (3)4(6) flowers, axillary, solitary or in dichasial cymes, with a pair of broadly ovate leaves of reduced size at the base; peduncles 0.2-2.5 mm long; pedicels 15-30 mm long, cylindrical; bracteoles 0.8-1.6 mm long, ovate, elliptical, or triangular. Calyx of 5 ovate sepals, sericeous, ca. 3 mm long, four of

them with a pair of elongate glands outside at the base. Petals yellow, rounded or obovate, unequal, 9-12 mm long, unguiculate; stamens unequal; styles equal or almost equal. Mericarps with the wing reduced to an apical crest, 4-9 mm long, the seminiferous portion with 4-6 ribs.

Phenology: Flowering from December to July and fruiting from February to July.

Status: Native, quite rare.

Distribution: Known only from the Naguabo area on the edge of a mangrove between the mouth of the Santiago River and the Antón Ruiz River. Also on Vieques; the Greater Antilles, Martinique, St. Lucia, and Barbados, from the Caribbean coast of Mexico to the north coast of Brazil, east of the mouth of the Amazon, and from the Pacific coast of Colombia to northern Peru.

2. Stigmaphyllon emarginatum (Cav.) A. Juss., Ann. Sci. Nat. Bot., II, 13: 290. 1840.

Fig. 122. D-G

BASIONYM: *Banisteria emarginata* Cav.
SYNONYMS: *Stigmaphyllon periplocifolium* (Desf.) A. Juss.
Stigmaphyllon lingulatum (Poir.) Small

Bejuco de San Juan

Woody vine, twining, attainig 5-10 m in length. Stem up to 8 cm in diameter; much branched from the base; bark very rough, reddish brown. Branches copper-colored, glabrous, more or less cylindrical, lenticellate, the young portions strigulose. Leaves opposite, coriaceous, lanceolate, ovate, oblong, linear, or less frequently rounded, 2.5-10(13) × 1-5.5(10.5) cm, sparsely appressed-pubescent when young, glabrescent, the apex acute or obtuse, emarginate-mucronate, the base truncate or cordiform, the margins entire or undulate; upper surface shiny, with the reticulate venation prominent; lower surface pale green, dull, with the midvein prominent; petioles yellowish, flattened on the upper surface, 0.2-2 cm long, with two discoid glands in the area adjacent to the blade; stipules triangular, minute. Inflorescences of axillary umbels, corymbs, or pseudoracemes, with 15-35 flowers; peduncles pubescent, 0.2-2.5 cm long; pedicels 3-23 mm long, articulated above the base; bracts minute, eglandular. Calyx of 5 ovate-triangular sepals, 4(5) of which have a pair of glands outside at the base. Petals 5, yellow, rounded, unguiculate, 11-15 mm long; stamens unequal, glabrous or puberulent; anterior style shorter; stigmas green. Mericarps 1.6-2.2 cm long, with an asymmetrical dorsal wing, curved on the upper margin and crenate on the lower margin.

Phenology: Flowering throughout the year and fruiting from January to August.

Status: Native, very common.

Distribution: In disturbed areas and dry forests near the littoral zone. Also on Caja de Muerto, Culebra, Desecheo, Icacos, Mona, Vieques, Anegada, St. Croix, St. John, St. Thomas, Tortola, Virgin Gorda; Jamaica, Hispaniola, and the Lesser Antilles southward to Martinique.

Public Forests: Ceiba, Guánica, Maricao, Mona, Piñones, and Susúa.

3. Stigmaphyllon floribundum (DC.) C. Anderson, Syst. Bot. 11: 128. 1986.

Fig. 122. H-M

BASIONYM: *Banisteria floribunda* DC.
SYNONYMS: *Stigmaphyllon tomentosum* (Desf.) Niedenzu
Tetrapterys paniculata sensu A. Stahl
Heteropterys nitida var. obtusifolia Kuntze

Bejuco de toro, Bejuco de menta, Bull wiss, Red wiss

Woody vine, twining, attainig 15 m in length. Stems much branched from the base, cylindrical, attaining 2-3 cm in diameter; bark rough, reddish brown. Branches lenticellate, cylindrical, tomentose. Leaves opposite, yellowish or reddish when young, elliptical, oblong, linear, lanceolate, or rounded, 4-18 × 2.5-15.5 cm, coriaceous, the apex obtuse or truncate, emarginate-mucronate, the base obtuse, truncate to cordiform, the margins entire, revolute, ciliate; upper surface dark green, glabrous or sparsely pubescent; lower surface pale green, dull, densely appressed-pubescent or sericeous, the venation prominent; petioles cylindrical, ferruginous-pubescent, 1-2.5 cm long, with a pair of prominent discoid glands in the area adjacent to the blade; stipules triangular, minute. Inflorescences of terminal panicles, up to 22 cm long, composed of umbels or pseudoracemes, with 20-30(50) flowers; peduncles strigose; pedicels strigose, 1-3 cm long. Calyx of 5 rounded sepals, 2-2.7 mm long, strigose, four of them with a pair of glands outside at the base. Petals yellow, rounded, 11-15 mm long, unguiculate; stamens unequal; anterior style

shorter, the stigmas green. Mericarps 1.8-3.2 cm long, strigose, especially the seminiferous portion, with a rudimentary apical wing and a well developed dorsal wing, divaricate, more or less oblong, with the upper margin curved.

Phenology: Flowering throughout the year and fruiting sporadically.

Status: Endemic to Puerto Rico and the Virgin Islands, rather common.

Distribution: In coastal forests and disturbed areas of the littoral zone. Also on Mona, St John, and Virgin Gorda.

Public Forests: Cambalache, El Yunque, Guánica, Guajataca, Guilarte, Maricao, Mona, Río Abajo, Susúa, and Tortuguero.

4. Stigmaphyllon puberum (Rich.) A. Juss., Ann. Sci. Nat. Bot., II, 13: 289. 1840.

Fig. 123. A-G

BASIONYM: *Banisteria pubera* Rich.

Woody vine, twining, attainig 10-15 m in length. Stems cylindrical, sericeous when young. Leaves opposite, lanceolate, elliptical, ovate, or less frequently rounded, (6.8)8.2-13 × 3-6 cm, the apex acuminate, the base obtuse, slightly decurrent on the petiole, with a pair of prominent discoid glands, 1-1.8 mm in diameter, in the area near the petiole, the margins revolute, with scattered minute sessile glands; upper surface glabrous or sericeous on the midvein; lower surface sericeous or sparsely sericeous, the venation prominent; petiole canaliculate, sericeous, 1.5-4 cm long; stipules triangular, minute, deciduous. Inflorescences of axillary umbels, with 8-15 flowers, grouped in dichasial cymes or thyrses; peduncles 1.5-4.8 mm long; pedicels cylindrical, 2.5-7.5 mm long; bracts triangular, 1.5-2.2 mm long, with a pair of glands at the base. Calyx of 5 ovate sepals, sericeous, four of them with a pair of prominent oblong glands outside at the base. Petals yellow, sometimes with a reddish tonality, rounded, 7.5-13 mm long, unguiculate, the posterior petal 5-7 mm long; stamens unequal; anterior style longer, the stigmas with leafy appendages. Mericarps 2.6-3.7 cm long, glabrous, with an ascendent wing, in a distal position.

Phenology: Known from Puerto Rico only in sterile condition.

Status: Native, rare.

Distribution: Known from few localities in eastern Puerto Rico, from Fajardo to Naguabo. Also in Jamaica, the Dominican Republic, the Lesser Antilles, Central America, and northern South America.

Excluded Species:

Stigmaphyllon cordifolium Niedenzu (= *S. diversifolium* (Kunth) A. Juss.) was reported for St. Thomas by Niedenzu (1928), in error. His report is based on two collections, i.e., *Read 88* and *Eggers 390*, which have been identified as *S. emargiatum* in the recent monograph of C. Anderson (1997).

Cultivated Species:

Stigmaphyllon retusum Griseb. has been cultivated at the Agricultural Experiment Station in Mayagüez, from seeds from Vera Cruz, Mexico. The available collection of this species dates from 1952 and includes flowers and fruits. Since this species can reproduce itself sexually in Puerto Rico, it is possible that it may manage to establish itself on the island some day.

3. TETRAPTERYS

Twining vines, or less frequently shrubs. Leaves simple, entire, opposite; petioles sometimes with glands; stipules minute, simple, interpetiolar. Flowers bisexual, in umbels or corymbs, grouped in axillary or terminal cymes or panicles; bracteoles usually on the distal portion of the peduncle. Calyx of 5 basally connate sepals, ovate or oblong, usually 4 of which are biglandular or less frequently all biglandular or eglandular. Petals yellow, unguiculate, glabrous, rounded, ovate, or elliptical, with the margins entire, denticulate, or crenate; stamens 10, slightly unequal, the filaments connate at the base, the anthers glabrous or pubescent; ovary superior, of 3 connate carpels, the styles 3, free, erect, usually one of them more slender, the stigmatic surface on the inner (adaxial) portion. Fruit a schizocarp with 2-3 samaroid mericarps with a narrow dorsal wing and 2 pairs of lateral wings forming an 'x'. A genus of 90 species, distributed from Mexico to Argentina, including the Antilles.

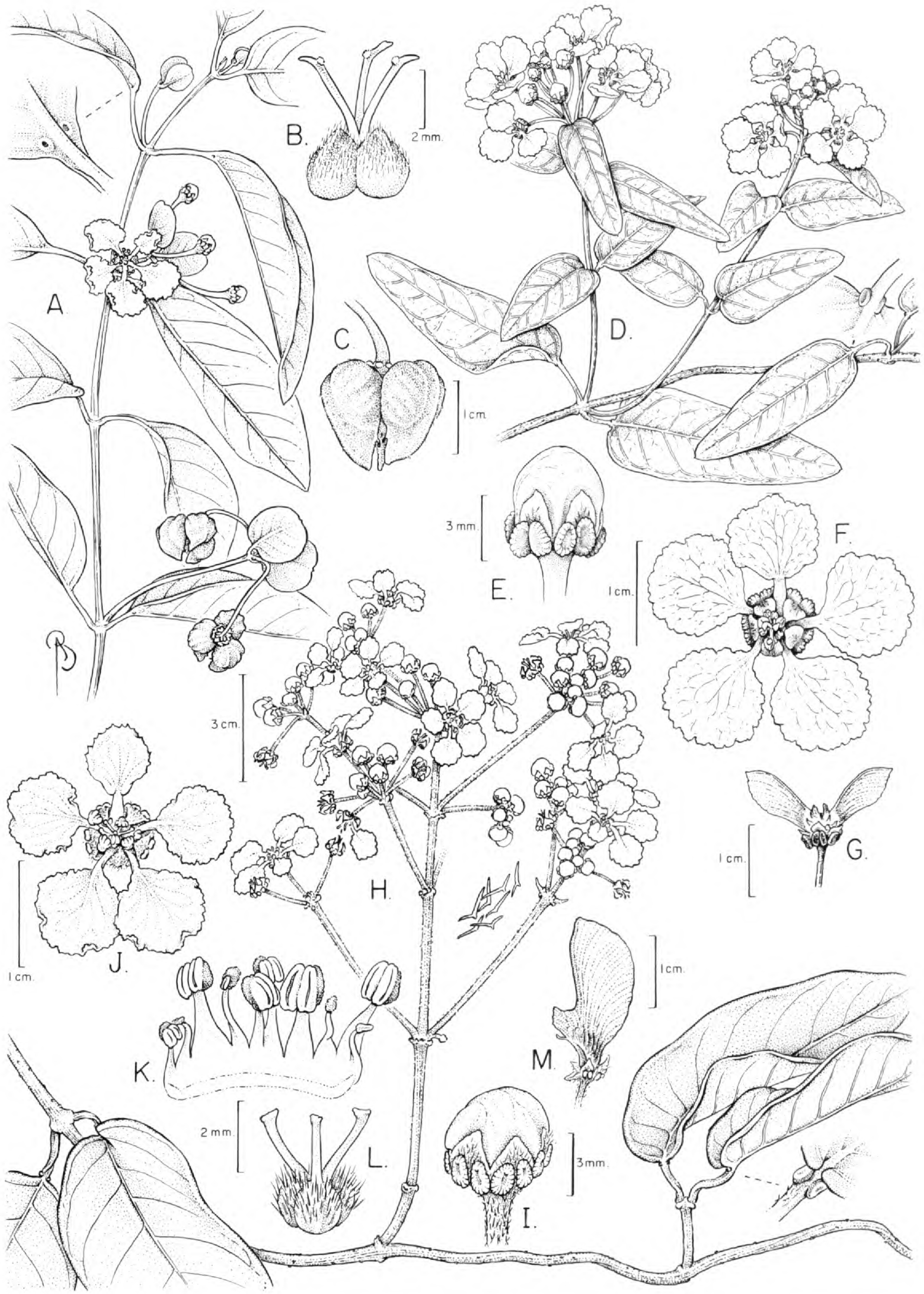

Fig. 122. A-C. *Stigmaphyllon bannisterioides*. **A.** Fertile branch, with detail of laminar glands. **B.** Gynoecium. **C.** Fruit. **D-G.** *Stigmaphyllon emarginatum*. **D.** Fertile branch, with detail of petiolar glands. **E.** Bud. **F.** Flower. **G.** Fruit. **H-M.** *Stigmaphyllon floribundum*. **H.** Fertile branch, with detail of petiolar glands. **I.** Bud. **J.** Flower. **K.** Stamens. **L.** Gynoecium. **M.** Fruit.

1. Tetrapterys inaequalis Cav., Diss. 433. 1790. **Fig. 123. H-N**

SYNONYMS: *Tetrapterys paniculata* Bello
Tetrapterys citrifolia sensu Alain, *non* (Sw.) Pers.

Bejuco de paralejo, Bejuco de sopla

Woody vine, twining, attainig 5-10 m in length. Stems cream-colored, cylindrical, sericeous-tomentose when young, glabrous when mature. Leaves opposite, chartaceous, elliptical oblong or ovate, 4-15 × 3-6(8.9) cm, the apex obtuse, acute, or acuminate, the base obtuse, rounded, or subcordiform, sometimes unequal, the margins undulate or entire; upper surface dark green, slightly shiny, glabrescent; lower surface dull, glabrous or puberulent, with prominent venation and usually sericeous-tomentose; petioles 0.6-1.5 cm long, sericeous-tomentose or glabrous, slightly sulcate; stipules oblong to lanceolate, 5-6 mm long, sericeous-tomentose, early deciduous, leaving an annular scar. Inflorescences formed by short branches with numerous umbels of 4 flowers; peduncles sericeous-tomentose; pedicels sericeous-tomentose, 6-9 mm long, articulated in the middle; bracts minute. Calyx of 5 green sepals, ovate, 2-3 mm long, 4 of which have a pair of glands outside at the base. Petals yellow, 5-7 mm long, the base unguiculate, orange, the limb ovate. Mericarps 2.5-3 cm long, with two pairs of wings, the distal ones ca. 20 × 5 mm, the basal ones ca. 10 × 2.5 mm.

Phenology: Collected in flower from September to November and in fruit from November to March.

Status: Native, uncommon.

Distribution: In disturbed areas like along roads and rivers and in secondary forests, at lower and middle elevations, found along the northern limestone zone. Also on Vieques; reported for St. Thomas and St. Croix (Britton and Wilson, 1924) but not confirmed; the Lesser Antilles.

Public Forest: Cambalache and Maricao.

Note: Sterile specimens of this species have been identified by Woodbury and treated by Liogier (1982, 1997) as *Sabicea cinerea* Aubl. and in the Spanish edition of this book as *Sabicea* sp. a. This error was apparently started by Werham (1914) who cited *S. cinerea* as occurring in Puerto Rico in his *Monograph of the genus Sabicea*. This mistake is corrected in the present edition.

Excluded Genus:

The report of *Banisteriopsis lucida* (A. Rich.) Small for Puerto Rico is based on a bibliographic error. Originally this species was reported as doubtful for Puerto Rico by Otto Kuntze (1891), as *Stigmaphyllon nigrescens* (A. Juss.) Kuntze, based on the transfer of *Banisteria nigrescens* A. Juss. Some years later, Niedenzu (1899) placed *Stigmaphyllon nigrescens* as a synonym of *Banisteria lucida* A. Rich., and cited Kuntze as evidence of the presence of this species in Puerto Rico. In that publication, Niedenzu disassociated the name *S. nigrescens* from its basionym, presenting it as a new species of Kuntze. Britton and Wilson (1924), adopted the opinion of Niedenzu and cited the presence of *Banisteriopsis lucida* in Puerto Rico based on a supposed specimen of Kuntze. This error acquired a new dimension when Bates, in 1982, cited *S. nigrescens* as a synonym of *Banisteriopsis lucida* and adjudicated a specimen of Otto Kuntze (s.n.) collected in Puerto Rico from a cultivated plant and deposited in the herbarium of the New York Botanical Garden. The examination of the publication of Kuntze clearly reveals that the author did not collect this species and that his report for Puerto Rico was characterized as doubtful. I therefore conclude that the report of this species for Puerto Rico is based on the perpetuation of an error and, for this reason, it is excluded from the flora of Puerto Rico in the present work.

References: Anderson, C. 1997. Monograph of *Stigmaphyllon* (Malpighiaceae). Syst. Bot. Mon. 51: 1-313. Bates, B. 1982. *Banisteriopsis*, *Diplopterys* (Malpighiaceae). Fl. Neotropica 30: 1-237. Kuntze, O. 1891. Revisio Generum Plantarum. Paris. Niedenzu, F. 1899. De genere Stigmatophyllo. Brunsberg. Niedenzu, F. 1928. Malpighiaceae. *In*: A. Engler (ed.). Das Pflanzenreich. IV. 141. Leipzig.

Fig. 123. A-G. *Stigmaphyllon puberum*. **A.** Fertile branch, with detail of laminar glands. **B.** Bud. **C.** Flower. **D.** Stamens. **E.** Gynoecium, with detail of the stigma. **F.** Fruits. **G.** Mericarp. **H-N.** *Tetrapterys inaequalis*. **H.** Fertile branch. **I.** Bud. **J.** Flower. **K.** Stamens. **L.** Gynoecium. **M.** Infructescence. **N.** Fruit.

27. *Family* **MARCGRAVIACEAE**

1. MARCGRAVIA

Clambering shrubs, usually epiphytic, with dimorphic branches and leaves; juvenile branches climbing by means of aerial roots, the internodes short, with leaves of reduced size; adult branches usually pendulous, with leaves 3-4 times as long as the juvenile ones. Leaves simple, entire, alternate, usually with dark glandular dots on the blade or the margin; petioles usually short; stipules absent. Flowers bisexual, in terminal umbelliform racemes; the peripheral flowers fertile, the central ones sterile, usually replaced by elongate nectaries with a cavity or pocket in which abundant nectar accumulates; bracteoles appressed to the calyx, similar in form to the sepals. Calyx of 4 decussate sepals; corolla in the form of a calyptra, deciduous; stamens 10 or more numerous, the filaments free; ovary superior, with 4-12 carpels, with numerous ovules. Fruit a berry, globose or ovoid, with numerous seeds surrounded by a reddish aril. A genus of 45 species, distributed throughout the Neotropics.

Key to the species of *Marcgravia*

1a. Adult leaves with glandular dots only along the margin; inflorescences with 6-25 flowers; pedicels 4-7 cm long, usually densely lenticellate; flower straight; calyx 8-9 mm wide; nectaries light brown, 4-5 mm wide ..... 1. *M. rectiflora*

1b. Adult leaves with glandular dots distributed along the lower surface; inflorescences with ca. 50 flowers; pedicels ca. 3 cm long, not lenticellate or with sparse lenticels; flower geniculate; calyx 3-6 mm wide; nectaries reddish, 1-1.3 cm wide ..... 2. *M. sintenisii*

1. Marcgravia rectiflora Triana & Planchon, Ann. Sci. Nat. Sér. 4, 17: 364. 1862.

Fig. 2F; 124. A-G

SYNONYMS: *Marcgravia umbellata* Griseb.
Marcgravia brittoniana Alain

Bejuco de rana, Pegapalma, Bejuco de paloma, Bejuco de lira, Bejuco de sapo

Liana with two different morphological phases. Juvenile plants and branches climbing, ca. 1 m in length, sparsely branched, climbing by means of adventitious roots; stems flattened; leaves 1.5-2.5 cm long, ovate to oblong, retuse at the apex, very closely spaced. Adult plant attaining 10 m or more in length and with scandent or pendulous branches. Stems cylindrical, lenticellate, woody, flattened when adult, bilobate in cross section, attaining 2.5 cm wide. Leaves oblong or elliptical, 7-12.5 × 2.8-4 cm, coriaceous, glabrous, the apex acuminate, the base acute, obtuse, or less frequently rounded; the margins entire, with minute black dots; upper surface dark green, slightly shiny; lower surface yellowish green, with the midvein prominent, the secondary veins inconspicuous; petioles 2-3 mm long. Inflorescence an umbelliform raceme with 6-25 flowers and 1-3 nectaries in a central position, 3-3.5 × 0.4-0.5 cm; pedicels straight, 3.5-6 cm long, lenticellate; bracts 2, rounded, smaller than the sepals. Calyx green, 5-7 mm long, of 4 rounded sepals; corolla green, forming a calyptra, ca. 1 cm wide, early deciduous; stamens numerous, the filaments white; ovary green. Fruit globose, fleshy, light brown, lenticellate-rugose, 1.5-2 cm in diameter. Seeds numerous, minute, surrounded by a red pulp.

Phenology: Flowering from March to December and fruiting from February to May.

Status: Native, very common.

Distribution: In forests at lower and moderately high elevations. Also on Tortola; Cuba and Hispaniola.

Public Forests: Carite, El Yunque, Guajataca, Guilarte, Maricao, Río Abajo, and Toro Negro.

2. Marcgravia sintenisii Urb., Jahrb. Bot. Gart. Berlin 4: 245. 1886.

Fig. 124. H-K
Pegapalma

Plant with the juvenile phase morphologically different from the adult phase. Juvenile plant ca. 1 m in length, sparsely branched, climbing by means of adventitious roots; stems flattened; leaves 1.5-2 cm long, cordiform to almost rounded, with the margin crenate, very closely spaced. Adult plant developing into a woody vine, with scandent and pendulous branches, attainig 5-10 m in length. Stems cylindrical, 2-5 cm in diameter. Leaves alternate, changing from reddish to green when mature, 4.5-9 × 1.3-4 cm, coriaceous, elliptical, lanceolate, or oblong, the base obtuse to rounded, the apex acute or obtuse, the margins revolute; upper surface dark green, dull; lower surface light green, dull, with numerous scattered black dots, the midvein prominent; petioles 4-5 mm long. Inflorescence an umbelliform raceme with about 50 flowers and 7-9 reddish nectaries in a central position, 1.8-2 × 1-1.2 cm; pedicels geniculate, 1.5-3.5 cm long, with few lenticels; bracts minute, opposite, not near the flower. Calyx reddish, of 4 rounded sepals, ca. 2 mm long; corolla calyptrate, 3-5 mm long, reddish or green with an orange tinge, deciduous; stamens 10-11; ovary light orange, the stigma green. Fruit globose, reddish, ca. 1 cm in diameter, fleshy. Seeds numerous, ca. 1 mm long, pink or green.

Phenology: Flowering and fruiting from April to December.

Status: Endemic to Puerto Rico, common.

Distribution: In moist and wet forests at upper elevations.

Public Forests: Carite, El Yunque, Guilarte, Maricao, and Toro Negro.

Reference: Dressler, S. 1997. Lectotypification of *Marcgravia rectiflora* (Marcgraviaceae). Taxon 46: 109-110.

28. *Family* MENISPERMACEAE

Key to the genera

1a. Slightly woody vine; leaves broadly ovate to rounded, with the lower surface pubescent and the base peltate; anthers sessile; fruits globose, red-orange, pilose .....1. *Cissampelos*
1b. Liana; leaves ovate to broadly ovate, with the lower surface glabrous and the base not peltate; anthers on long filaments; fruits obovoid, purple .....2. *Hyperbaena*

1. CISSAMPELOS

Herbaceous vines, twining, dioecious, usually with simple trichomes. Leaves alternate, rounded to ovate, peltate or cordiform at the base, palmately veined; petioles elongate; stipules absent. Flowers minute, unisexual, pedicellate, in axillary inflorescences. Staminate flowers actinomorphic, in corymbs; sepals 4, free; corolla hypocrateriform; stamens 4, connate into a short tube, with sessile anthers. Pistillate flowers zygomorphic, in elongate cymes with foliaceous bracts; calyx and corolla of a single sepal and a single petal toward the same side of the flower; ovary superior, sessile, unilocular, with a single basal ovule, the stigma lobate. Fruit a globose drupe, fleshy, with the endocarp woody and verrucose; seed horseshoe-shaped. A genus of 19 species, of pantropical distribution.

Fig. 124. A-G. *Marcgravia rectiflora.* **A.** Fertile branch. **B.** Inflorescence, and detail of flower. **C.** Nectary, whole and longitudinal section. **D.** Corolla. **E.** Flower, without corolla. **F.** Infructescence. **G.** Branch of the juvenile stage. **H-K.** *Marcgravia sintenisii.* **H.** Sterile branch, with detail of the lower surface of the leaf. **I.** Fertile branch. **J.** Nectary, whole and longitudinal section. **K.** Flower, without corolla, side and top views.

1. Cissampelos pareira L., Sp. Pl. 1031. 1753.

Fig. 125. A-J

Bejuco de mona, Pareira, Oreja de ratón, Velvet leaf

Dioecious vine, slightly woody, twining, attainig 3-6 m in length. Stems slender, cylindrical, glabrous or pilose. Leaves alternate, chartaceous, broadly ovate to almost circular, 4-12 × 4-10 cm, the apex rounded, obtuse, emarginate, usually mucronate, the base cordiform, subtruncate, usually peltate; upper surface glabrous, yellowish green or grayish, dull; lower surface pale green, almost whitish, sparsely or densely pubescent, with the venation palmate, prominent, the margin revolute, crenate; petioles cylindrical, pubescent, 2-7 cm long, with the base swollen. Inflorescences of axillary cymes or cauliflorous; bracts of the pistillate inflorescences foliaceous, ovate, pilose. Flowers 1-1.5 mm long, greenish. Calyx pilose. Drupe globose, red-orange, 4-5 mm in diameter, fleshy, partially covered by a bract. Seed horseshoe-shaped.

Phenology: Flowering throughout the year.

Status: Native, very common.

Distribution: In moist and disturbed areas throughout Puerto Rico. Also on Culebra, Vieques, St. Croix, St. John, St. Thomas, and Tortola; of pantropical distribution.

Public Forests: Cambalache, Carite, Ceiba, El Yunque, Guajataca, Guilarte, Maricao, Río Abajo, Susúa, Toro Negro, and Tortuguero.

2. HYPERBAENA

Twining vines, scandent shrubs, or trees, glabrous or with a pubescence of simple hairs. Leaves alternate, coriaceous, rounded to ovate, peltate or cordiform at the base, pinnately veined; petioles elongate; stipules absent. Flowers minute, green or white, unisexual, pedicellate, in axillary spikes or panicles; sepals 6, unequal. Petals free, 6 or less frequently fewer or these completely absent. Staminate flowers with 6 stamens, longer than the petals; pistillate flowers with 6 staminodia; ovary superior, with 2-5 free carpels, ovoid to globose, the stigma sessile. Fruit a drupaceous monocarp with a single seed inside; endocarp woody; seed horseshoe-shaped. A genus of 21 species, distributed throughout the Antilles and from Mexico to Argentina.

Key to the species of *Hyperbaena*

1a. Leaves ovate or broadly ovate; monocarps 1.0-1.5 cm long ..... 1. *H. domingensis*
1b. Leaves elliptical; monocarps 2.3-2.7 cm long ..... 2 *H. laurifolia*

1. Hyperbaena domingensis (DC.) Benth., J. Proc. Linn. Soc., Bot. 5, Suppl. 2: 50. 1861.

Fig. 1F; 126. A-H

BASIONYM: *Cocculus domingensis* DC.

Twining liana attainig 15 m in length, or less frequently a scandent shrub with numerous lateral branches. Stems cylindrical, glabrous or puberulous; cross section with concentric rings of xylem. Leaves alternate, coriaceous, ovate or broadly ovate, 4-20 × 2.5-12 cm, with the venation pinnate, the apex acute or acuminate, the base cordiform or truncate, the margins entire; upper surface glabrous or puberulent on the primary and secondary veins; lower surface glabrous, the venation prominent, the tertiary venation reticulate; petioles 1-6 cm long, swollen at the apex. Inflorescences racemose, of minute white or greenish flowers; staminate inflorescences clustered; pistillate inflorescences solitary. Staminate flowers: calyx 0.6-0.8 mm long; petals ca. 1 mm long; stamens 6, ca. 1 mm long. Pistillate flowers slightly larger; ovary of 3 ellipsoid carpels. Monocarps obovoid, purple, glabrous, 1.0-1.5 cm long.

Phenology: Collected in flower during June, July, and November and in fruit during October and December.

Status: Native, uncommon.

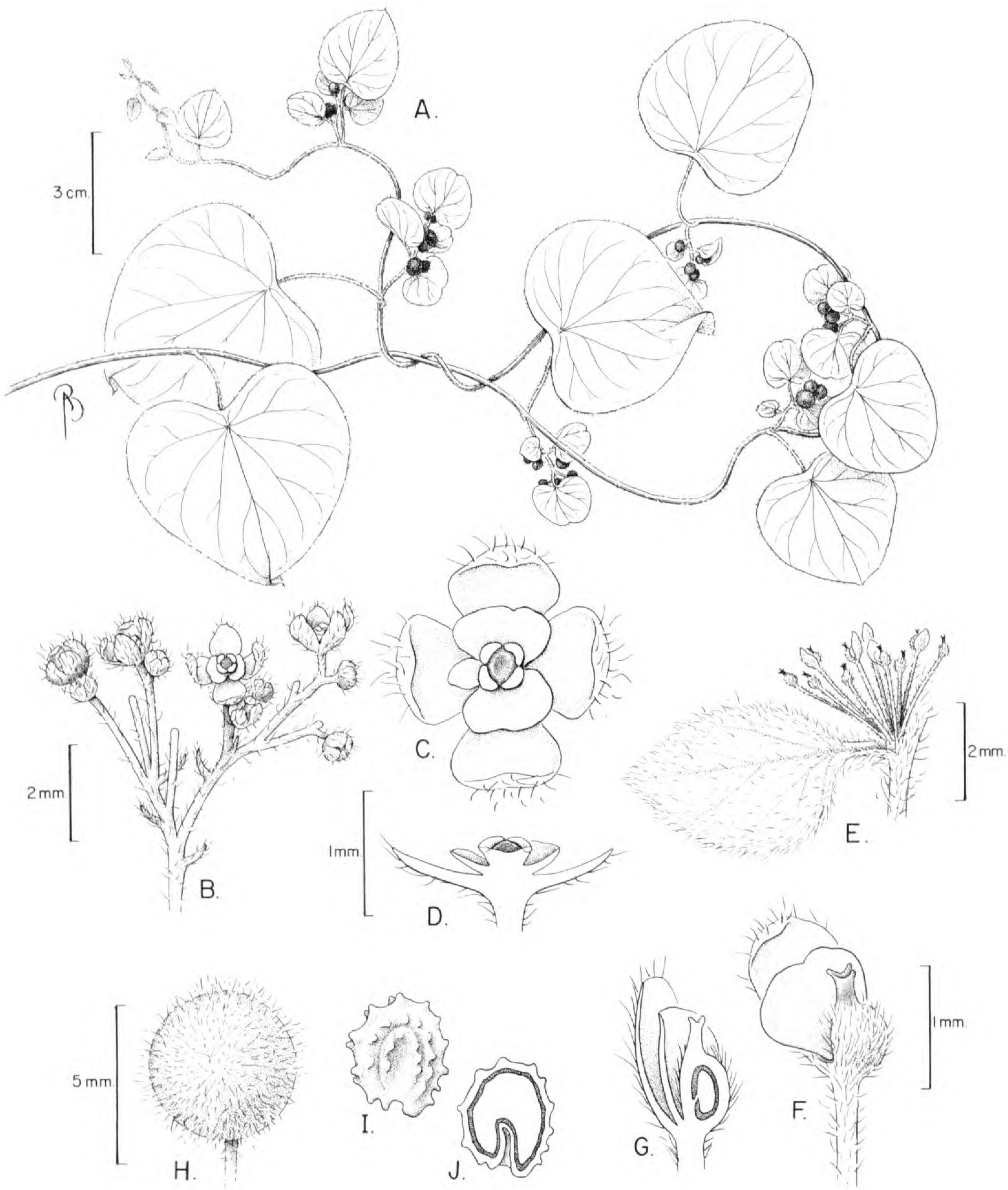

Fig. 125. A-J. *Cissampelos pareira*. **A.** Fertile branch. **B.** Staminate inflorescence. **C.** Staminate flower. **D.** Staminate flower, longitudinal section. **E.** Pistillate inflorescence. **F.** Pistillate flower. **G.** Pistillate flower, longitudinal section. **H.** Fruit. **I.** Seed. **J.** Seed, longitudinal section. From Acevedo-Rodríguez et al. 1996. Flora of St. John, U. S. Virgin Islands. Mem. NYBG Vol. 78.

Distribution: In moist forests. Also on St. John and St. Thomas; in the Greater and Lesser Antilles and from northern South America to Bolivia.
Public Forests: El Yunque, Guajataca, Guilarte, and Río Abajo.

2. Hyperbaena laurifolia (Poir.) Urb., Symb. Antill. 1: 304. 1899.

Fig. 126. I-O

BASIONYM: *Cissampelos laurifolia* Poir.
SYNONYMS: *Hyperbaena glauciramis* Urb. & Ekman
Hyperbaena pellucida Urb. & Ekman

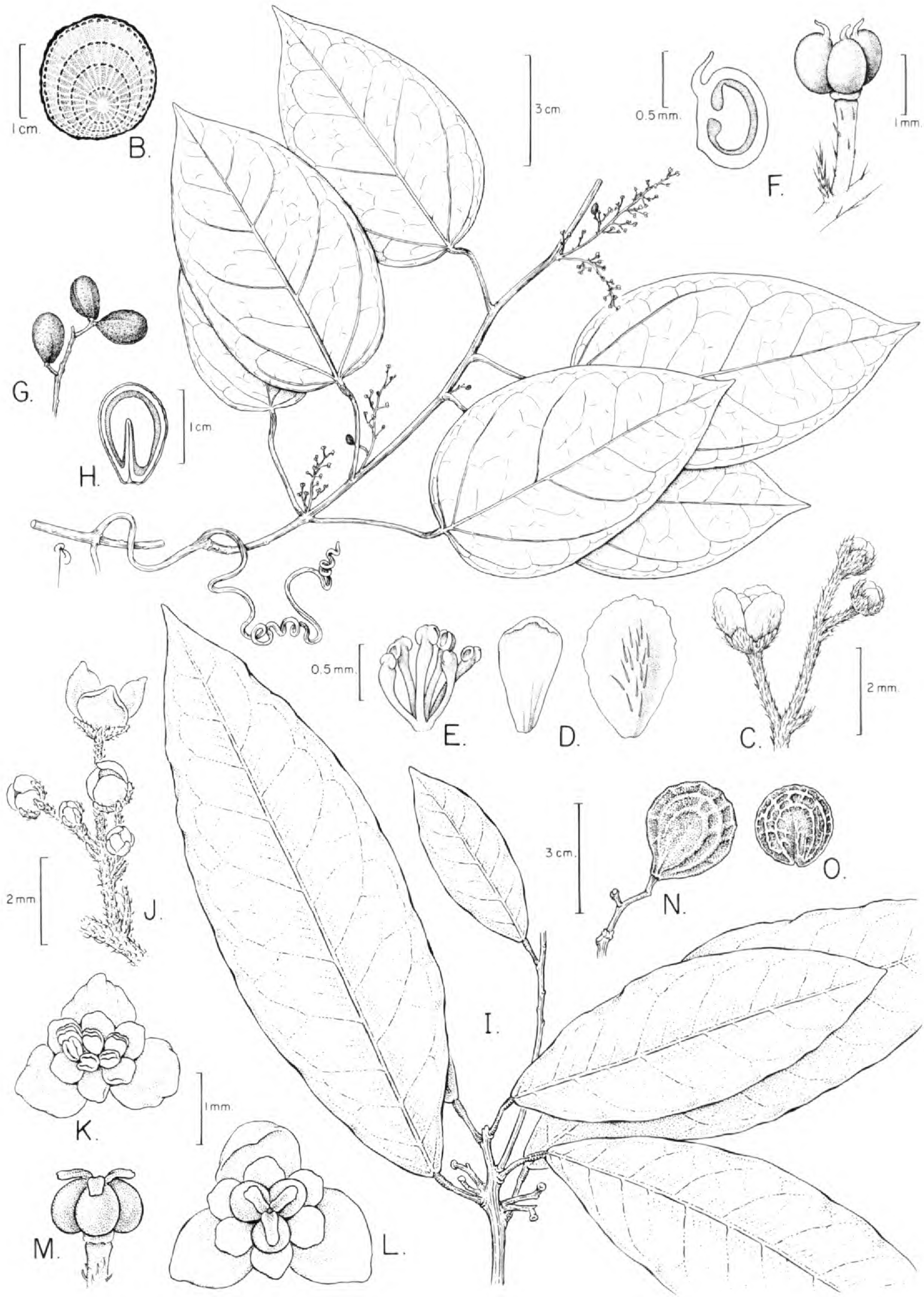

Fig. 126. A-H. *Hyperbaena domingensis*. **A.** Fertile branch. **B.** Cross section of the mature stem. **C.** Portion of inflorescence. **D.** Petals. **E.** Stamens. **F.** Carpels, longitudinal section, and gynoecium. **G.** Fruits. **H.** Monocarp, longitudinal section. **I-O.** *Hyperbaena laurifolia*. **I.** Branch. **J.** Portion of inflorescence. **K.** Staminate flower, top view. **L.** Pistillate flower, top view. **M.** Gynoecium. **N.** Monocarp. **O.** Stone containing seed.

Hyperbaena apiculata Urb. & Ekman

Erect, decumbent, or scandent shrub attainig 5-6 m in length. Stems cylindrical, glabrous, striate. Leaves alternate, coriaceous, elliptical or less frequently elliptic-lanceolate, glabrous, 8-16 × 2.3-5 cm, with the venation pinnate, the apex acute, the base obtuse, the margins entire; upper surface with the venation pale; lower surface glabrous, the primary vein prominent, the secondary and tertiary venation slightly prominent, reticulate; petioles 0.7-1.7 cm long, pulvinate at the apex and the base. Inflorescences racemose, of minute greenish flowers; the axes ferruginous-strigulose; staminate inflorescences clustered, much longer than the petioles; pistillate inflorescences solitary or clustered, as long as or shorter than the petioles. Staminate flowers: calyx ca. 0.5 mm long; petals ca. 1 mm long; stamens 6, almost sessile. Monocarps circular, slightly compressed, glabrous, 2.3-2.7 cm long.

Phenology: Collected in flower from February to August and in fruit in March.

Status: Native, uncommon.

Distribution: In moist forests in the zone of mogotes. Also on St. Thomas and Hispaniola.

Public Forest: Río Abajo.

Reference: Mathias, M. E. and W. L. Theobald. 1981. A revision of the genus *Hyperbaena* (Menispermaceae). Brittonia 33: 81-104.

29. *Family* ***MORACEAE***

1. FICUS

Trees or shrubs, erect, scandent, or strangling, that produce abundant milky latex when wounded. Leaves alternate, simple or lobate, coriaceous; petioles short or elongate; stipules deciduous, elongate, forming a conical hood that protects the apical meristem. Flowers unisexual, minute, produced in the interior of an axillary inflorescence, globose or ellipsoid, formed by an enlarged receptacle (syconium); calyx reduced, membranaceous; corolla absent. Staminate flowers with 2 stamens; pistillate flower with a unilocular ovary with one apical ovule. Fruit a syconium formed by an enlarged receptacle, globose or ellipsoid, containing numerous achenes in the interior. A genus of about 800 species, of pantropical distribution.

Key to the species of *Ficus*

1a. Plants with long pendulous or scandent branches, without adventitious roots; plants with a single phase; syconium globose, depressed-globose, or obovoid, 6-12 mm long..... 1. *F. citrifolia*
1b. Plants ascending by adventitious roots; plants with a dimorphic juvenile phase; syconium pyriform, 4-6 cm long ..... 2. *F. pumila*

1. Ficus citrifolia Miller, Gard. Dict. ed. 8. 1768.
Fig. 127. A-C
Jagüey blanco, White fig

Terrestrial or strangling (epiphytic) tree attainig 10 m in height, or less frequently a liana attainig 10 m in length, producing abundant milky latex. When it grows as a liana its branches are pendulous or scandent, the stems cylindrical, attaining 10 cm in diameter. Leaves alternate, 4-20 × 2-12 cm, elliptical, ovate, elliptic-lanceolate, or less frequently oblanceolate, chartaceous or subcoriaceous, glabrous, the apex obtuse or acuminate, the base obtuse, cordiform, or truncate,

the margins entire; upper surface with slightly prominent venation; lower surface with the reticulate venation prominent; petioles 1-7 cm long, glabrous, canaliculate; stipules conical, glabrous, with a reddish tinge. Syconium globose, depressed-globose, or obovoid, 6-12 mm long, greenish yellow, with reddish spots, turning red when ripe; peduncles 4-8 mm long.

Phenology: Collected in fertile condition during August.

Status: Native, rather common.

Distribution: Although this is a tree of widespread distribution, the lianescent form has only been documented for the zone of mogotes in Puerto Rico. The arboreal form is also found on Caja de Muerto, Culebra, Desecheo, Mona, Vieques, Anegada, Jost van Dyke, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; the United States (Florida), the Greater and Lesser Antilles.

Public Forests: Mona and Río Abajo.

Commentary: The lianescent form of this species grows on the tops and sides of mogotes and produces long stems that hang down and reach the base of the mogotes. Once the stems have reached the base of the mogotes, they become creeping or scandent. It is possible that this growth form results from the etiolation of the stems due to the low light intensity, and that it does not constitute a fixed characteristic for this species. Nevertheless, this phenomenon has been observed rather frequently, which justifies the inclusion of this species in the present work.

2. Ficus pumila L., Sp. Pl. 1060. 1753.

Fig. 127. D-L

Hiedra

Plant with the juvenile phase morphologically different from the adult phase. Juvenile plant attaining several meters in length, much branched, climbing by means of adventitious roots; stems flattened; leaves 1.5-2.5 cm long, ovate to oblong, retuse at the apex, very closely spaced. Adult plant developing into a much branched liana, with adventitious roots, attainig 10 m in length and produces abundant white latex when wounded. Stems flattened, striate, tomentose, glabrescent when mature, with short pendulous branches. Leaves alternate, simple, 4-7 × 2.2-4 cm, oblong, oblanceolate, ovate, or elliptical, the apex obtuse, the base subcordiform, the margins entire; upper surface dark green, slightly shiny, with the venation notably lighter; lower surface light green, dull, with prominent reticulate venation; petioles 1.3-1.6 cm long, flattened on the upper surface, pubescent, light brown; stipules oblong-lanceolate to subulate, persistent, 1-1.2 cm long, brown, sericeous. Syconium green, pyriform, up to 6 cm long, soft. Apparently not forming seeds in Puerto Rico.

Phenology: Collected in 'flower' during February.

Status: Exotic, ornamental, common.

Distribution: A plant widely cultivated in Puerto Rico.

Public Forests: El Yunque and Maricao.

30. *Family* ***NYCTAGINACEAE***

Key to the genera

1a. Herbaceous plants that attain 2-3 m in length; anthocarps (fruits) with a ring of stipitate glands on the distal portion ..... 1. *Boerhavia*

1b. Woody plants that attain 10 m or more in length; anthocarps lacking glands or with 5 or 10 longitudinal lines of stipitate glands..... 2

2a. Leaves alternate; branches cylindrical; flowers produced in threes, each of which is subtended by a foliaceous bract of various colors (white, pink, red, or orange); flowers bisexual, 2-2.5 cm long, hypocrateriform, the tube angular, compressed in the central portion, the lobes revolute; stamens not exposed .....2. *Bougainvillea*

Fig. 127. A-C. *Ficus citrifolia*. **A.** Fertile branch. **B.** Detail of syconus, showing operculum, and longitudinal section of the syconus. **C.** Achene and gynoecium. **D-L.** *Ficus pumila*. **D.** Branch of juvenile stage. **E.** Fertile branch. **F.** Syconus, longitudinal section. **G-I.** Staminate flowers. **J.** Stamens. **K.** Pistillate flower. **L.** Perianth and gynoecium.

2b. Leaves opposite; branches quadrangular; flowers produced in axillary cymes, the bracts minute, green; flowers unisexual, 2.5-3 mm long, campanulate; stamens much longer than the perianth .....3. *Pisonia*

1. BOERHAVIA

Erect or prostrate herbs, quite branched from a taproot. Leaves opposite or subopposite, with prominent linear raphides. Flowers minute, in axillary or terminal panicles or in pedunculate heads; bracts and bracteoles hyaline; calyx constricted above the ovary, the upper portion with 5 lobes; stamens 1-6, the filaments free; ovary superior, the stigma capitate or peltate. Anthocarps dry, cuneiform or fusiform, usually with 5 ribs.

1. Boerhavia scandens L., Sp. Pl. 3. 1753.
Fig. 128. A-F

SYNONYM: *Commicarpus scandens* (L.) Standl.

Clambering herb with pseudodichotomous branching, attainig 1-2 m in length. Branches cylindrical, brittle, glabrous. Leaves opposite, in pairs of the same size, 2-5 × 0.8-4 cm, deltoid, ovate, or broadly ovate, chartaceous, the apex obtuse or acute, the base cordiform or truncate, the margins undulate and ciliate; upper surface glabrous; lower surface puberulent; petioles canaliculate, 0.5-2.7 cm long. Inflorescences umbelliform, axillary; peduncles glabrous, 5-12 cm long; bracts and bracteoles minute, lanceolate, deciduous; pedicels unequal, 2-8 mm long. Calyx: basal part claviform, 1-1.5 mm long, glabrous, green; upper part or limb infundibuliform, white or yellowish green, green or with a pink tinge inside, 2-2.5 mm long; stamens 2, white; pistil white. Anthocarps long-pedicellate, green, claviform, dry, 12-13 mm long, with a ring of sticky stipitate glands on the distal portion.

Phenology: Collected in flower in January and September and in fruit in January.

Status: Native, locally common.

Distribution: In pastures on roadsides, near the coast. Also on Anegada, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; from the southern United States to Guatemala, the Antilles, Venezuela, and from Colombia to Peru.

Public Forest: Guánica.

2. BOUGAINVILLEA

Scandent or less frequently erect shrubs or small trees, usually with axillary spines. Leaves alternate or subopposite, simple; petioles slender; stipules absent. Flowers bisexual, in axillary dichasial cymes, with 3 flowers, each of which is subtended by 1 brilliantly colored foliaceous bract. Perianth tubular, consisting only of the calyx, with small imbricate lobes; stamens 5-8(10), included; ovary superior, stipitate, fusiform, the stigma unilateral. Fruit a fusiform anthocarp with 5 longitudinal ribs, not glandular. A genus of about 18 species, native to South America, cultivated throughout the tropics and subtropics.

Key to the species of *Bouganvillea*

1a. Stems and leaves pubescent with curved and short trichomes or glabrous; floral tube with ascendent and curved trichomes .....1. *B. glabra*

1b. Stems and lower surface of the leaves with numerous straight and elongate trichomes (pilose); floral tube with numerous straight and erect trichomes .....2. *B. spectabilis*

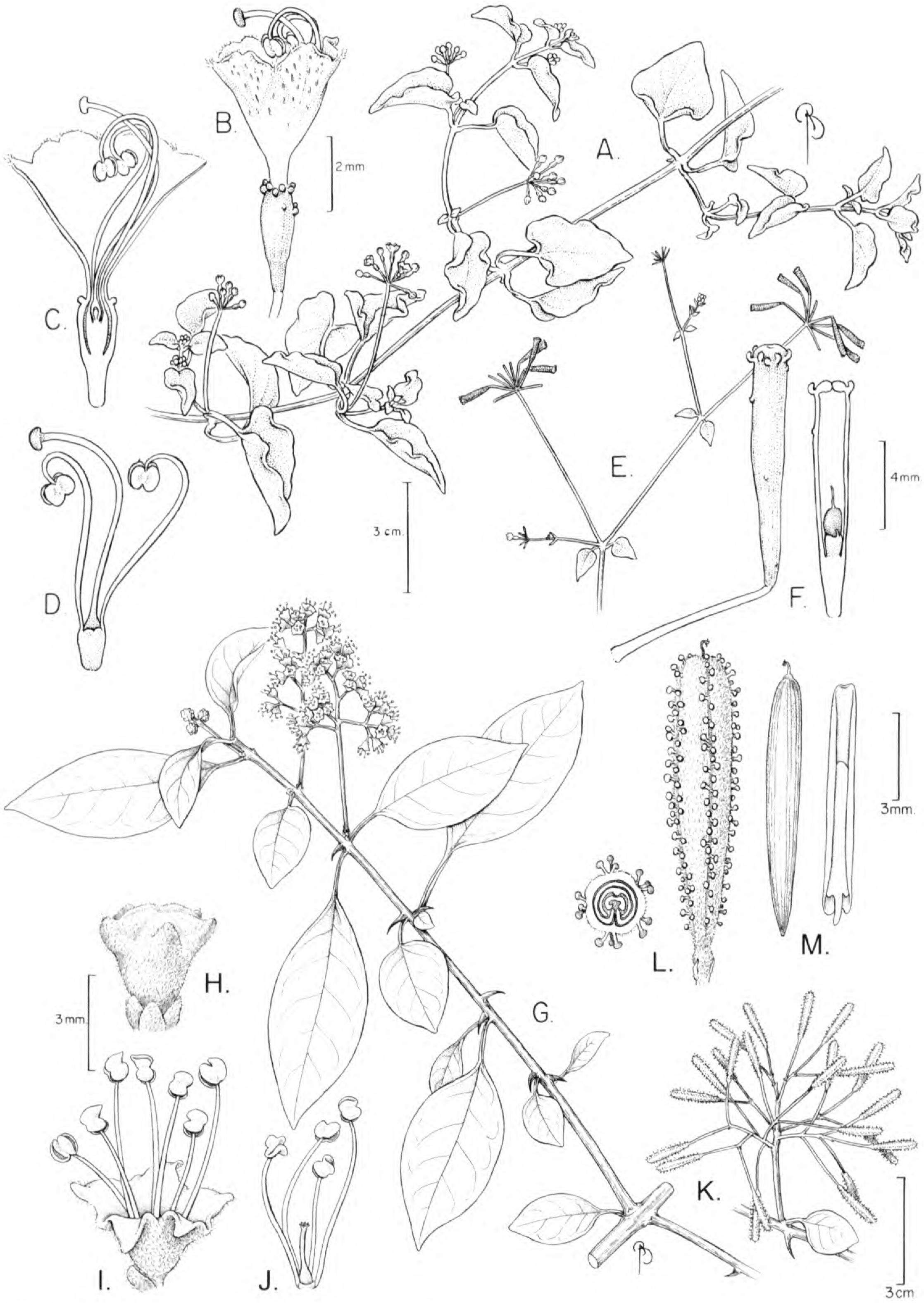

Fig. 128. A-F. *Boerhavia scandens*. **A.** Fertile branch. **B.** Flower. **C.** Flower, longitudinal section, showing gynoecium. **D.** Gynoecium and stamens. **E.** Branch with fruits. **F.** Anthocarps. **G-M.** *Pisonia aculeata*. **G.** Fertile branch. **H.** Bud. **I.** Flower. **J.** Stamens and gynoecium. **K.** Infructescence. **L.** Anthocarp, whole and cross section. **M.** Naked fruit and embryo.

1. Bougainvillea glabra Choisy in DC., Prodr. 13(2): 437. 1849.

Fig. 129. A-F

Trinitaria

Woody vine or shrub, clambering, attainig 15 m in length. Stem cylindrical, attaining 5-6 cm in diameter; cross section of the stem with discrete vascular bundles within the connective tissue. Branches pubescent, puberulent, or glabrous, with straight, axillary spines. Leaves alternate or subopposite, 3-6 × 1.5-3 cm, chartaceous, elliptical, puberulent, the apex acuminate, the base attenuate, slightly asymmetrical, the margins slightly sinuate; lower surface with the midvein prominent; petioles slender, 4-12 mm long. Dichasial cymes compound, on axillary branches or at the end of axillary spines, the axes glabrous or puberulent; bracts ovate, glabrous, cordiform at the base, 2.5-4 cm long, of showy colors, red, deep pink, orange, white, or purple. Perianth tubular-hypocrateriform, 2.5-3 mm long, pubescent, with 8-10 obtuse lobes, cream-colored. Anthocarp fusiform, glabrous, ca. 1.5 cm long.

Phenology: Flowering throughout the year.

Status: Exotic, very common in our gardens.

Distribution: Much cultivated throughout Puerto Rico. This is the most common species of its genus in Puerto Rico and the Virgin Islands. It grows well in dry areas and requires little watering, for which reasons it is cultivated along avenues and highways. Also throughout the Antilles. Native to South America, but widely cultivated around the globe.

2. Bougainvillea spectabilis Willd., Sp. Pl. ed. 2, 348. 1799.

Fig. 129. G-H

Trinitaria

Woody shrub, erect or clambering, attainig 5 m in length. Branches pilose, with straight, axillary, pilose spines. Leaves alternate, 2.6-2.5 × 2.7-5 cm, chartaceous, ovate, the apex acute, obtuse, or acuminate, the base obtuse, rounded, or attenuate, slightly asymmetrical, the margins sinuate; lower surface tomentulose, with prominent pilose venation; petioles slender, 1-2.3 cm long, pilose. Dichasial cymes compound, on axillary branches or at the end of axillary spines, the axes pilose; bracts ovate, pubescent, pilose along the midvein, cordiform at the base, 3.6.5.5 cm long, red or deep pink. Perianth tubular-hypocrateriform, 2.2-3 mm long, pilose.

Phenology: Flowering throughout the year.

Status: Exotic, uncommon.

Distribution: Little cultivated in Puerto Rico. Also throughout the Antilles. Native to South America, but widely cultivated on a worldwide level.

3. PISONIA

Trees, shrubs, or lianas, dioecious or monoecious. Leaves opposite or subopposite, sometimes with axillary spines. Flowers unisexual, small, white or pale yellow, in axillary or terminal panicles, corymbs, or cymes; bracts and bracteoles minute, persistent. Staminate flowers campanulate to obconical; stamens 6-8, exserted, the filaments unequal, connate at the base. Pistillate flowers tubular, 5-lobate; ovary superior, sessile, the style exserted, the stigma branched. Fruit a dry anthocarp, oblanceolate or ellipsoid, with 5 ribs that bear sticky, stipitate glands. A genus of 10-15 species, of tropical distribution.

1. Pisonia aculeata L., Sp. Pl. 1026. 1753.

Fig. 1A; 128. G-M

SYNONYM: *Pisonia helleri* Standl.

Escambrón, Prickly-mampoo

Liana or woody, clambering shrub, attainig 20 m in length. Stems more or less cylindrical, glabrous or minutely pubescent, grayish or cream-colored, lenticellate, attaining 7 cm in diameter; cross section of the stem with discrete vascular bundles within the connective tissue. Branches short or elongate; short branches opposite, divaricate, persistent, with recurved spines, produced on the trunk; elongate branches at the end of the stem, glabrescent, quadrangular, with recurved axillary spines. Leaves opposite on the elongate branches or whorled on the short lateral

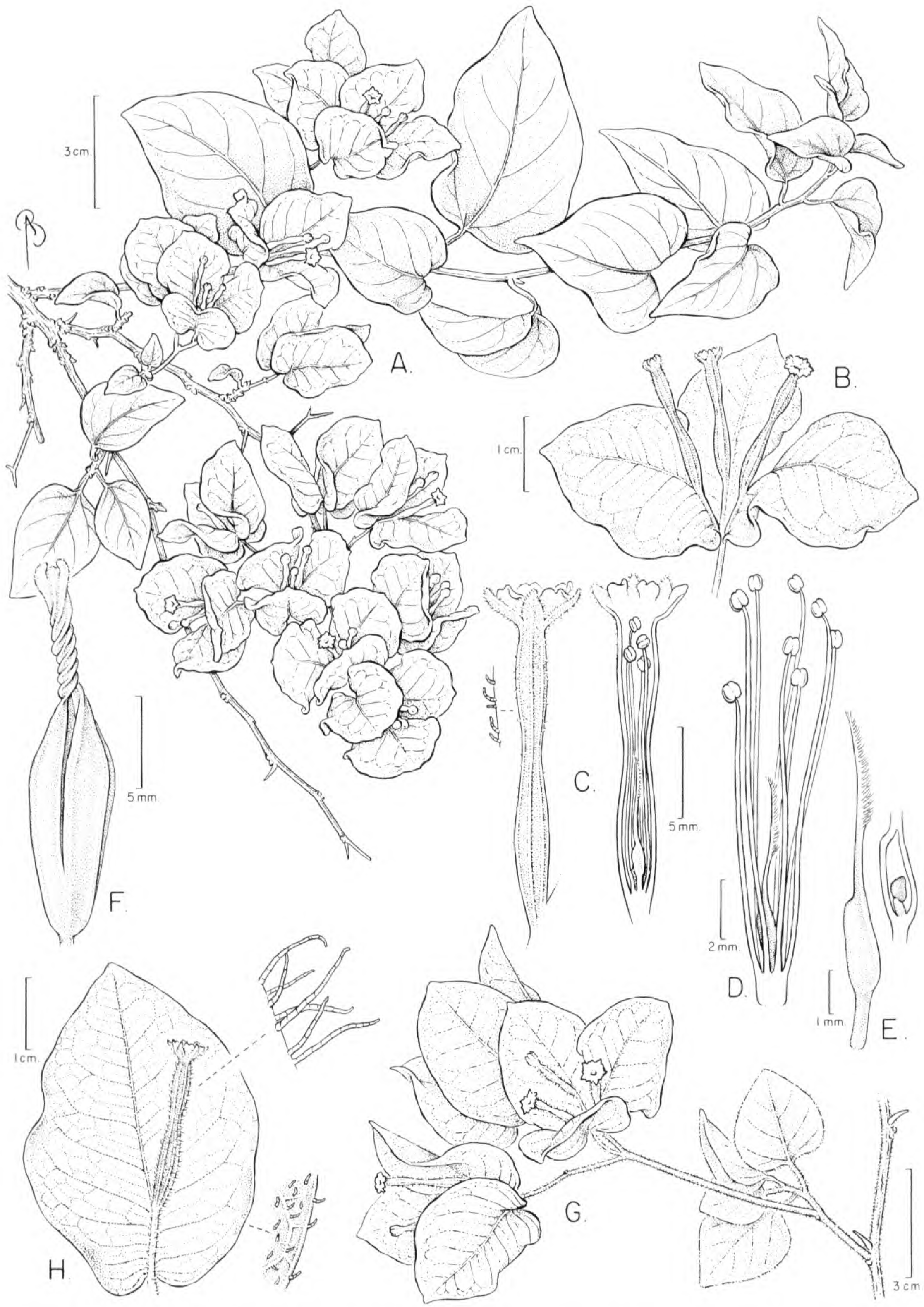

Fig. 129. A-F. *Bougainvillea glabra*. **A.** Flowering branch. **B.** Inflorescence. **C.** Whole flower and flower, longitudinal section, showing gynoecium and stamens. **D.** Stamens and gynoecium. **E.** Gynoecium, with detail of ovule. **F.** Anthocarp. **G-H.** *Bougainvillea spectabilis*. **G.** Flowering branch. **H.** Flower with bract and detail of pubescence.

branches, 6-14 × 3-6 cm, chartaceous, elliptical, ovate, oblong, or suborbicular, the apex acute, obtuse, rounded, or short-acuminate, the base obtuse, unequal or rounded, the margins crenulate; upper surface glabrous, dark green, shiny, with the midvein slightly prominent; lower surface pale green, shiny, glabrous or sometimes pubescent, with the midvein prominent; petioles slender, 1-3 cm long. Inflorescences of small axillary cymes, with minute sessile flowers. Staminate flowers campanulate, 2.5-3 mm long, yellowish, pubescent outside; stamen exserted, the filaments twice as long as the perianth. Pistillate flowers ca. 2.5 mm long, almost tubular, tomentose; stigma exserted, branched. Anthocarp ellipsoid or claviform, obtusely 5-angular, 10-12 mm long, tomentose, with one or two lines of stipitate glands in each of the angles.

Phenology: Flowering from December to June and fruiting from February to August.

Status: Native, rather common.

Distribution: In disturbed areas, secondary or mature forests, moist to dry, at lower to middle elevations. Also on Vieques, St. Croix, St. John, and St. Thomas; throughout the Neotropics.

Public Forests: Guajataca and Río Abajo.

Reference: Gillis, W. T. 1976. Bougainvilleas of cultivation (Nyctaginaceae). Baileya 20: 34-41.

31. *Family* ***OLEACEAE***

1. JASMINUM

Erect or scandent shrubs or twining vines. Leaves opposite or less frequently alternate, simple or pinnately compound; petioles present; stipules absent. Flowers bisexual, usually showy and fragrant, solitary, clustered in axillary or terminal cymes or panicles; calyx campanulate or infundibuliform, with 4-9 lobes; corolla hypocrateriform, with 4-9 imbricate lobes, the tube cylindrical; stamens 2, included in the tube; ovary superior, the style slender and elongate, the stigma bilobate or less frequently simple. Fruit a small berry. A genus of 450 species, native to Asia, Malasia, Africa, and Australia.

Key to the species of *Jasminum*

1a. Leaves compound.....2
1b. Leaves simple.....3

2a. Leaves trifoliolate; sepals acuminate..... 1. *J. fluminense*
2b. Leaves pinnately 5-7-foliolate; sepals filiform ..... 2. *J. grandiflorum*

3a. Leaves subtruncate or cordiform at the base; lower surface pubescent..... 3. *J. multiflorum*
3b. Leaves rounded or cuneate at the base; lower surface glabrous, barbate in the axils of the secondary veins ..... 4. *J. sambac*

1. Jasminum fluminense Vell., Fl. Flumin. 10. 1825 [1829].

Fig. 130. A-D

SYNONYM: *Jasminum azoricum sensu* Urb., Britton, *non* L.

Jazmín oloroso, Jazmín de canario, Jazmín de trapo

Woody vine, twining, attainig 4-6 m in length. Stems cylindrical, pubescent, attaining 1 cm in diameter, glabrescent when mature. Lateral branches numerous. Leaves opposite, trifoliolate, 5-10 cm long; leaflets 2-5 × 2-3.5 cm (terminal leaflet larger than the lateral ones), broadly ovate,

involute, the apex acute or acuminate, the base subtruncate, the margins entire; upper surface puberulent; lower surface with the midvein prominent, barbate in the axils of the secondary veins; petioles and petiolules pubescent, the petioles 0.5-2 cm long. Inflorescences of axillary cymes with numerous fragrant flowers; peduncles 3-4 cm long; pedicels 3-4 mm long, densely pubescent. Calyx green, ca. 3 mm long, campanulate, with 4-9 small acuminate lobes; corolla white, hypocrateriform, 1.5-2.5 cm long, with 4-9 lobes; stamens 2; ovary 4-lobate, the stigma bilobate. Fruit a purple or almost black berry, shiny, globose, 5-8 mm in diameter.

Phenology: Flowering from December to September and fruiting from January to August.

Status: Exotic, naturalized, rather common.

Distribution: Along roads, in pastures, or in disturbed areas. Species native to Africa but described from material collected in Brazil. Naturalized on Vieques, St. Croix, St. John, and St. Thomas. Cultivated as an ornamental and naturalized throughout the tropics.

Public Forests: Cambalache, Ceiba, and Guánica.

2. Jasminum grandiflorum L., Sp. Pl. ed. 2, 9. 1762.

Fig. 130. E-J

Jazmín, Jazmín de España

Slightly woody vine, twining, attainig 3-5 m in length. Stems octagonal to almost cylindrical, slender, glabrous, puberulent in the area of the nodes. Lateral branches numerous. Leaves opposite, imparipinnate, 5-7 cm long; leaflets 7 or 9, opposite, 1-3 × 0.7-1.2 cm, the apex acute or obtuse, mucronulate, the margins entire; terminal leaflet larger than the lateral ones, elliptical, with the base obtuse; the lateral leaflets ovate, the base asymmetrical, obtuse, subrounded on the basal ones, the distal ones decurrent on the rachis; upper surface glabrous; lower surface with the midvein prominent, glabrous to puberulent; rachis narrowly winged; petioles glabrous, 12-14 cm long; petiolules puberulent. Inflorescences of axillary dichasial cymes with 3 fragrant flowers; peduncles 2-5 cm long; pedicels 8-20 mm long, glabrous, with a pair of minute bracteoles on the middle. Calyx green, ca. 1.5 mm long, campanulate, with 5 linear lobes, 2-4 mm long; corolla white, hypocrateriform, 2.2-2.5 cm long, the tube white or pink outside, the lobes 5, elliptical, 1.5-2 cm long; stamens 2, included; stigma bilobate, slightly exposed. Fruits not seen.

Phenology: Collected in flower during December and January.

Status: Exotic, cultivated, uncommon.

Distribution: Although not very common, it is cultivated in our gardens. Species native to Arabia, but widely cultivated throughout the tropics.

3. Jasminum multiflorum (Burm.f.) Andrews, Bot. Repos. 8: part 102, t. 496. 1807.

Fig. 131. A-F

BASIONYM: *Nyctanthes multiflora* Burm. f.
SYNONYM: *Jasminum pubescens* (Retz.) Willd.

Jazmín, Jazmín de papel

Clambering shrub, 2-5 m in length. Stems slender, tomentose. Leaves opposite, simple, 3-7 × 2-3.5 cm, ovate, the apex acute, the base subtruncate or cordiform, the margins entire; upper surface glabrous; lower surface tomentose, especially on the veins; petioles tomentose, 6-12 mm long. Inflorescences of axillary cymes, sessile, with numerous fragrant sessile flowers; bracts and bracteoles densely pubescent. Calyx green, ca. 1 cm long, infundibuliform, tomentose, with numerous linear lobes; corolla white, hypocrateriform, ca. 2 cm long, with 4-9 oblong lobes; stamens 2; ovary 4-lobate, the stigma bilobate. Fruits not observed on any of the collections from Puerto Rico or the Virgin Islands.

Phenology: Collected in flower from October to April.

Status: Exotic, cultivated and naturalized, rather common.

Distribution: Native to Asia, introduced as an ornamental, which is found naturalized in Puerto Rico, Vieques, St. John, and throughout the tropics.

Public Forests: Maricao, Río Abajo, and Toro Negro.

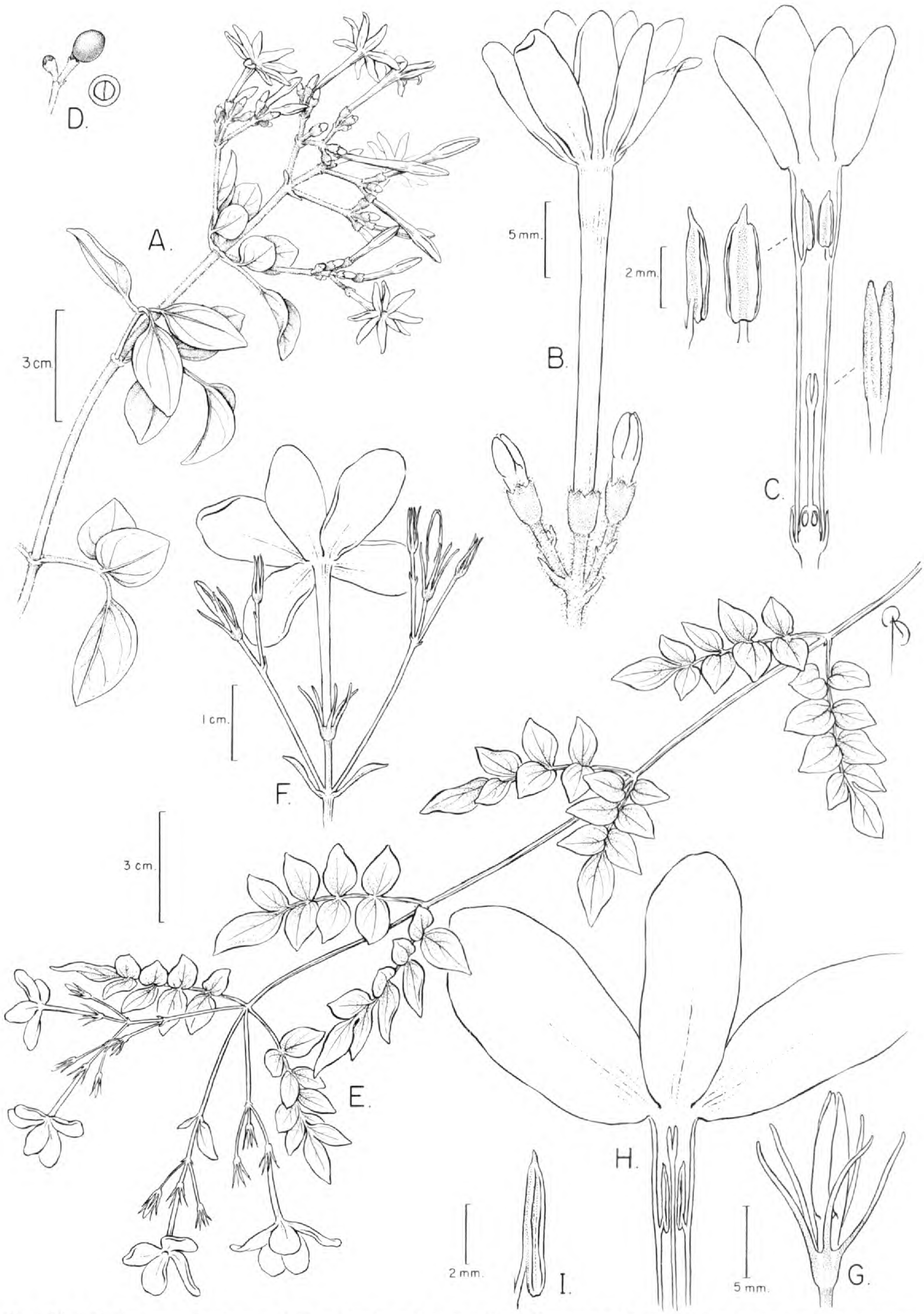

Fig. 130. A-D. *Jasminum fluminense*. **A.** Flowering branch. **B.** Detail of inflorescence. **C.** Flower, longitudinal section, showing gynoecium and stamens, with details of anthers and stigmas. **D.** Fruit, whole and cross section. **E-I.** *Jasminum grandiflorum*. **E.** Flowering branch. **F.** Detail of inflorescence. **G.** Bud. **H.** Corolla, longitudinal section, showing stamens and stigmas. **I.** Anther.

Fig. 131. A-F. *Jasminum multiflorum*. **A.** Flowering branch. **B.** Detail of inflorescence. **C.** Flower, top and side views. **D.** Flower, longitudinal section, showing gynoecium and stamens. **E.** Stamens, front and side views. **F.** Gynoecium. **G-I.** *Jasminum sambac*. **G.** Flowering branch, with detail of lower surface of the leaf, barbate in the axils of the veins. **H.** Detail of inflorescence. **I.** Corolla, top view and longitudinal section, showing stamens.

4. Jasminum sambac (L.) Soland. in Ait., Hort. Kew. ed. 1, 1: 8. 1789.

Fig. 131. G-I

BASIONYM: *Nyctanthes sambac* L.

Diamela

Erect or clambering shrub, 1-2 m in length. Stems slender, puberulent, glabrous when mature. Leaves opposite, simple, 3.5-10.5 × 3-5.8 cm, elliptical, the apex obtuse, mucronate, the base obtuse to rounded, the margins entire; upper surface glabrous, except for the midvein, which is puberulent; lower surface glabrous, with the midvein prominent, barbate on the secondary veins; petioles pubescent, 5-7 mm long. Inflorescences of axillary cymes, long-pedunculate, with few fragrant flowers; peduncle and pedicels pubescent. Calyx green, ca. 1 cm long, infundibuliform, tomentose, with 7-10 linear lobes; corolla white, hypocrateriform, the tube 1-1.4 cm long, the lobes 5, elliptical, 1-1.3 cm long. Fruits not observed.

Phenology: Collected in flower during September.

Status: Exotic, cultivated and naturalized (according to Liogier, 1995), uncommon.

Distribution: Species native to India, introduced as an ornamental. Also on Vieques; cultivated throughout the tropics.

32. *Family* ***PASSIFLORACEAE***

1. PASSIFLORA

Herbaceous or woody vines that climb by means of axillary tendrils. Leaves alternate, simple, entire or palmately lobed; petioles usually with extrafloral nectaries; stipules usually small and deciduous. Flowers usually large and showy, bisexual or less frequently unisexual, actinomorphic, produced in axillary cymes or solitary, sometimes covered at the base by an involucre of foliaceous bracts; hypanthium short or tubular; calyx of (3-)5(-8) sepals, free or connate at the base. Petals as numerous as the sepals, alternating with them, rarely absent; corona of 1 or several whorls of free or connate appendages; stamens (4)5, the filaments free or on a stipe (androgynophore), the anthers dehiscent by longitudinal valves; ovary superior, usually on a gynophore, or rarely sessile, unilocular, with (2)3(-5) carpels, the placentation parietal, with numerous ovules, the styles 3, free or connate at the base, the stigmas capitate or oblanceolate. Fruit a berry or less frequently a capsule. A genus of 400 species, 350 of these native to tropical America, the rest to the paleotropics.

Key to the species of *Passiflora*

1a. Leaves trifoliolate ..... 1. *P. berteroana*
1b. Leaves simple..... 2

2a. Leaves entire, not lobed..... 3
2.b Leaves variably lobate..... 7

3a. Stipules foliaceous, ovate or elliptical; petioles with 3 pairs of glands.....9. *P. quadrangularis*
3b. Stipules filiform; petioles with one pair of glands..... 4

4a. Flowers subtended by a minute subulate bract or without bracts..... 5
4b. Flowers subtended by an involucre of foliaceous bracts..... 6

5a. Plants tomentose; flowers in groups of 2-6, axillary; petals linear, ca. 3.5 mm long; fruits depressed-globose ..... 7. *P. multiflora*
5b. Plants puberulent or glabrous; flowers solitary or in pairs, axillary; petals absent; fruits ovoid or ellipsoid..... 13. *P. suberosa*

6a. Bracts of the involucre connate in the lower ½; leaves with three main veins that are borne almost from the base ..... 6. *P. maliformis*
6b. Bracts of the involucre free to the base; leaves pinnately veined ..... 5. *P. laurifolia*

7a. Leaves with the lateral lobes divergent, as long as or longer than the central lobe (apex of the leaf), the leaf then bilobate or with the apex truncate or retuse. 8
7b. Leaves with the central lobe longer than the lateral lobes..... 12

8a. Leaves with the lateral lobes projecting well beyond the apex. 9
8b. Leaves with the lateral lobes as long as the central lobe (the apex), or slightly longer. 10

9a. Lateral lobes ca. 3 times longer than the central lobe (apex of the leaf), forming an angle of divergence of 45-93°; corolla green ..... 2. *P. bilobata*
9b. Lateral lobes 1.5-2 times longer than the central lobe, forming an angle of divergence of 108-160°; corolla brilliant red ..... 8. *P. murucuja*

10a. Leaf cordiform at the base; flowers < 2.5 cm in diameter, the sepals green, the petals white..... 11
10b. Leaf rounded or cuneate at the base; flowers ca. 5 cm in diameter, the sepals and petals pink-violet ..... 14. *P. tulae*

11a. Flowers solitary; sepals 2-2.5 cm long; fruit dehiscent, pyriform, reddish when ripe, ca. 2 cm in diameter ..... 10. *P. rubra*
11b. Flowers grouped in axillary cymes; sepals ca. 1.5 cm long; fruit indehiscent, depressed-globose, purple when ripe, 5-8 mm in diameter ..... 12. *P. sexflora*

12a. Leaves with margins serrate..... 13
12b. Leaves with margins entire or undulate ..... 13. *P. suberosa*

13a. Leaves lobate-digitate, with 7 deep lobes; petioles with two pairs of stipitate, conical glands ..... 11. *P. serrato-digitata*
13b. Leaves trilobate; petioles with a pair of prominent sessile glands or lacking glands 14

14a. Plant pilose, foul-smelling; stipules laciniate, with numerous marginal glands; petioles lacking glands; bracts of the involucre deeply laciniate, with marginal glands; fruits ovoid, 2-2.5 cm long, orange when ripe ..... 4. *P. foetida*
14b. Plant glabrous, not foul-smelling; stipules filiform, without glands; bracts of the involucre ovate, not laciniate; fruits ovoid, 5-7 cm long, yellow when ripe..... 3. *P. edulis*

1. Passiflora berteroana DC., Prodr. 3: 325. 1828.

Fig. 132. A-D

Herbaceous vine, attainig 1.5-4 m in length and climbs by means of axillary tendrils. Stems slender, angular, striate, glabrous. Leaves alternate or grouped on short axillary branches, trifoliolate, the leaflets usually deeply trilobate, 1.2-3.0 × 2.0-4.0 cm, the lobes spathulate, the apices truncate and mucronate, the base cuneate, the margin undulate, revolute; upper surface glabrous; lower surface glabrous, with prominent

venation; petioles 2-3(6) mm long, canaliculate, without glands; stipules subulate, 2.5-4 mm long; tendrils simple, filamentous. Flowers axillary, solitary or in pairs; the bracts subulate, alternate, not forming an involucre; peduncle 8-11 mm long, articulated near the apex. Sepals subulate, green or whitish, 6-7 mm long; petals pale green or whitish, subulate, ca. 3 mm long; corona of two series of filiform filaments, the outer ones longer, yellowish, the inner ones much shorter than the outer ones, green; gynophore ca. 3 mm long, tubular; stamens 5; ovary ellipsoid, the styles recurved, the stigmas capitate. Fruit a fleshy berry, globose (fide Liogier, 1994), ca. 7 mm in diameter.

Phenology: Collected in flower in September and December.

Status: Native, extremely rare.

Distribution: Known from two collections from Guánica, in dry forests and thickets of the south coast. Also in Hispaniola.

Public Forest: Guánica.

2. Passiflora bilobata Juss., Ann. Mus. Hist. Nat. Paris 6: 107. 1805.

Fig. 132. E-I

Herbaceous vine, attainig 0.5-2 m in length and climbs by means of axillary tendrils. Stems slender, angular, striate, glabrous or puberulent. Leaves alternate, in the form of a horseshoe or a 'v', with three main veins, coriaceous, with two divergent lobes, forming an angle of 45-93° between the, the lobes oblanceolate, oblong, or linear, 2.2-6.5 × 0.4-1.4 cm, with rounded or acuminate apices, the base cuneate or rounded, the margin undulate, revolute; upper surface puberulent; lower surface glabrous, with prominent venation; petioles 3-5 mm long, canaliculate, without glands; stipules filiform, ca. 4 mm long; tendrils simple, filamentous. Flowers axillary, in pairs; the bracts subulate, not forming an involucre; peduncle ca. 10 mm long, articulated near the apex. Sepals oblong, green, 4-6 mm long; petals pale green, oblong, as long as the sepals; corona of two series of filiform filaments, pale green, as long as the sepals; gynophore ca. 2 mm long, tubular; stamens 5; ovary claviform, the styles recurved, the stigmas capitate. Fruit a fleshy berry, ovoid or globose, 1-1.4 cm long, almost black, dull. Seeds numerous, elliptical, ca. 2.3 mm long, with transverse striae.

Phenology: Collected in flower in October and January and in fruit in January.

Status: Native, uncommon.

Distribution: In dry forests and thickets of the south coast. Also in Hispaniola.

Public Forest: Guánica, Maricao, and Susúa.

3. Passiflora edulis Sims, Bot. Mag. 45: t. 1989. 1818.

Fig. 133. A-G

Parcha, Water lemon, Passion fruit.

Woody vine, glabrous, attainig 5-10 m in length and climbs by means of axillary tendrils. Stems cylindrical, attaining 2 cm in diameter. Leaves alternate, glabrous, coriaceous, 7-12 × 9-15 cm, deeply trilobate, the lobes oblong or elliptical, the apex acute, the base cordiform, the margins serrate; upper surface dark green, slightly shiny, with the venation yellowish; lower surface pale green, with prominent venation; petioles 3-6 cm long, with a pair of prominent sessile glands in the area where they join the blade; stipules filiform, ca. 5 mm long; tendrils simple. Flowers solitary, pendulous, axillary, subtended by an involucre of 3 ovate bracts, ca. 2 cm long; peduncle 4-6 cm long. Sepals oblong, green, whitish on the inner surface, 3-3.5 cm long; petals oblong, white on the inner surface, 2.5-3 cm long; corona with two series of appendages, with violet bands; gynophore green, ovoid, lobate, 5-7 mm long; stamens 5; ovary ellipsoid, green, the styles slightly reflexed, the stigmas capitate. Fruit ovoid, 5-7 cm long, yellow when ripe, the pericarp coriaceous, thick. Seeds numerous, black, elliptical, foveate, ca. 5 mm long, covered with a juicy orange matrix.

Phenology: Flowering from April to October and fruiting from June to December.

Status: Exotic, cultivated and naturalized, very common.

Distribution: In disturbed areas of secondary vegetation. Native to South America, but cultivated throughout the tropics for its edible fruits.

Public Forests: El Yunque, Maricao, Río Abajo, Susúa, and Toro Negro.

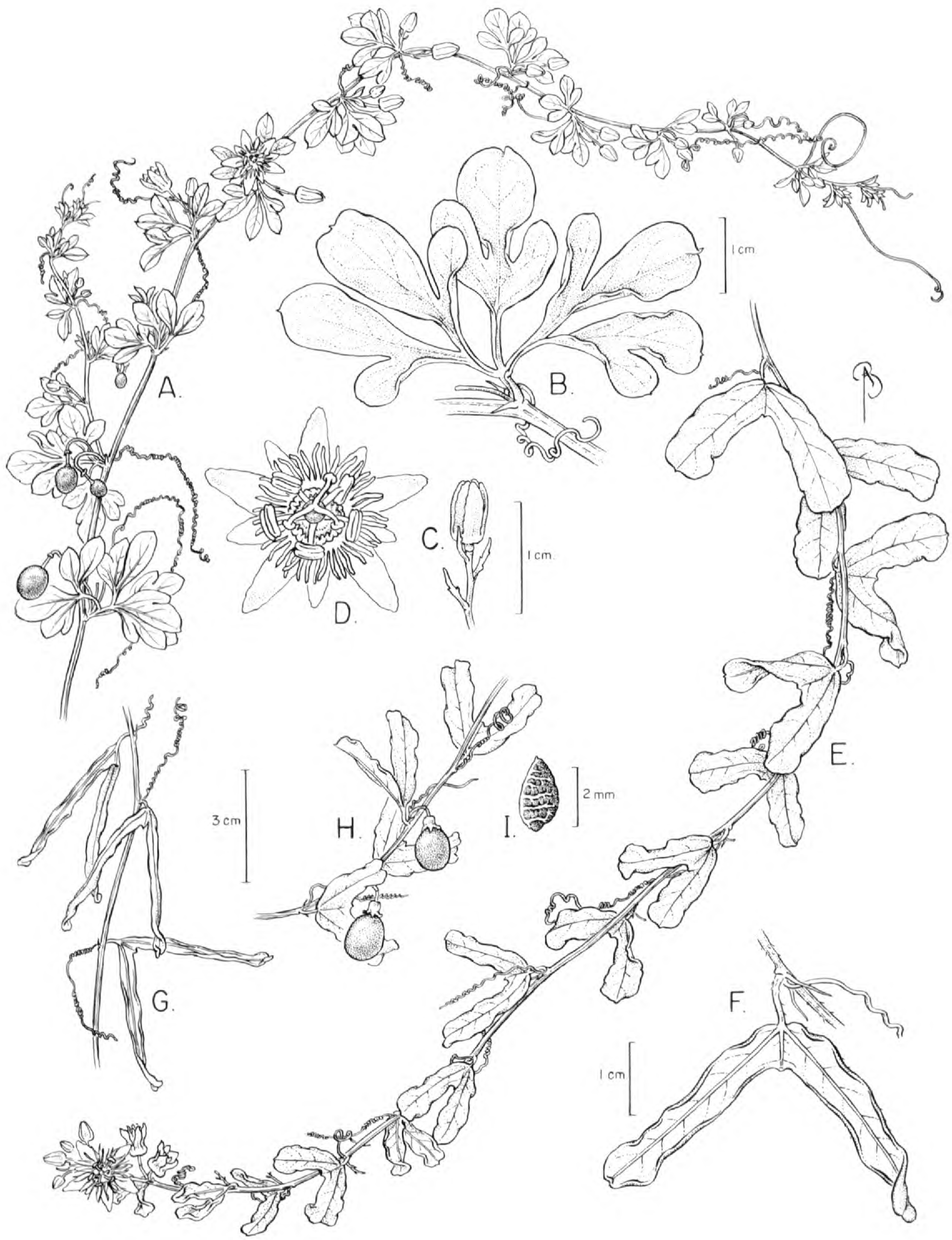

Fig. 132. A-D. *Passiflora berteroana*. **A.** Fertile branch. **B.** Leaf. **C.** Bud. **D.** Flower. **E-I.** *Passiflora bilobata*. **E.** Flowering branch. **F.** Leaf. **G.** Vegetative branch, with tendrils. **H.** Branch with fruits. **I.** Seed.

4. Passiflora foetida L., Sp. Pl. 959. 1753.
Fig. 133. J-K
Tagua-tagua, Love–in-the-mist, Papbush

Slightly woody vine, glandular-pubescent, attainig 5 m in length and climbs by means of axillary tendrils. Viscid glandular hairs with a strong disagreeable odor. Stems cylindrical, slightly striate, glandular-pubescent. Leaves alternate, chartaceous, usually trilobate, with the central lobe longer than the lateral ones, or less frequently simple, 5-12 × 5-10 cm, both surfaces pubescent, the lobes elliptical to ovate, with the apex acute or acuminate, the base cordiform or subcordiform, the margins crenate-serrate; petioles slender, pubescent, 2-5.5 cm long, pilose, eglandular; stipules ovate in outline, pinnatifid; tendrils pubescent, simple, 15 cm or more in length. Flowers axillary, solitary or clustered in pairs or threes, subtended by an involucre of three pinnatifid bracts, 2-3 cm long, glandular-viscid; pedicels 4-4.5 cm long, pubescent. Sepals 5, oblong, green, whitish on the inner surface, 2-2.5 cm long, mucronate at the apex; petals white, oblong, 2-2.5 cm long; corona multiseriate, the segments filiform, 15-17 mm long, the innermost series with a violet band at the base; gynophore cylindrical, green, with reddish spots, ca. 7 mm long; stamens 5; ovary ellipsoid, green, sparsely pilose, the styles pilose, the stigmas capitate. Fruit a coriaceous or papery berry, ovoid, 1.5-2.5 cm long, orange when ripe, covered by the persistent bracts. Seeds numerous, oblong, truncate at both ends, foveate, ca. 5 mm long, covered by a yellow aril.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: In dry or moist disturbed areas at lower elevations. Also on Culebra, Mona, Vieques, St. Croix, St. John, St. Thomas, and Tortola; common throughout the Neotropics.

Public Forests: El Yunque, Maricao, Mona, and Susúa

A very variable species, with 38 varieties recognized (Killip, 1938). In Puerto Rico 3 varieties are found, and in the Virgin Islands 2 are found. The following key describes the differences between them.

Key to the varieties

1a. Plants essentially glabrous; fruits red (Puerto Rico; the United States (Florida), the Bahamas, Cuba, and Hispaniola)..... .....*P. foetida* var. *riparia* (Griseb.) Killip

1b. Plants hirsute; fruits orange.....2

2a. Ovary pubescent; fruit pubescent or puberulent, less than 2.5 cm in diameter; bracts of the involucre slightly laciniate (Puerto Rico, St. Croix; Jamaica, the Lesser Antilles, and South America)..... ..... *P. foetida* var. *foetida*

2b. Ovary glabrous; fruit glabrous, 2-3 cm in diameter; bracts of the involucre quite laciniate (Puerto Rico, Culebra, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola; the Antilles, South America, and the tropics of the Old World) ....*P. foetida* var. *hispida* (DC.) Gleason

5. Passiflora laurifolia L., Sp. Pl. 956. 1753.
Fig. 133. H-I
Parcha, Bell apple

Woody vine, glabrous, attainig 2-5(-10) m in length and climbs by means of axillary tendrils. Young parts with a reddish tinge. Stems cylindrical, flexible. Leaves alternate, glabrous, coriaceous, 6.6-12 × 3.7-6.6 cm, oblong or elliptic-lanceolate, not lobate, the apex rounded or obtuse, sometimes mucronate or short-apiculate, the base almost cordiform, truncate to almost rounded, the margins entire; lower surface pale green, with the midvein prominent; petioles 0.7-2.5 cm long, reddish, with a pair of globose glands in the area where they join the blade; stipules filiform, 8-10 mm long, glandular at the apex; tendrils simple. Flowers solitary, pendulous, axillary, subtended by a persistent involucre of 3 ovate bracts, 2.5-4 cm long, with the margins serrate-glandular; peduncle 2-3.2 cm long. Sepals oblong-elliptical, 3-4 cm long, violet-pink on the inner surface, green externally, with a dorsal keel that projects beyond the apex; petals oblong, white, with numerous violet dots on the inner surface, 3.5-4 cm long; corona multiseriate, the segments filiform, with violet bands, shorter than the petals; gynophore cylindrical, yellow, ca. 1

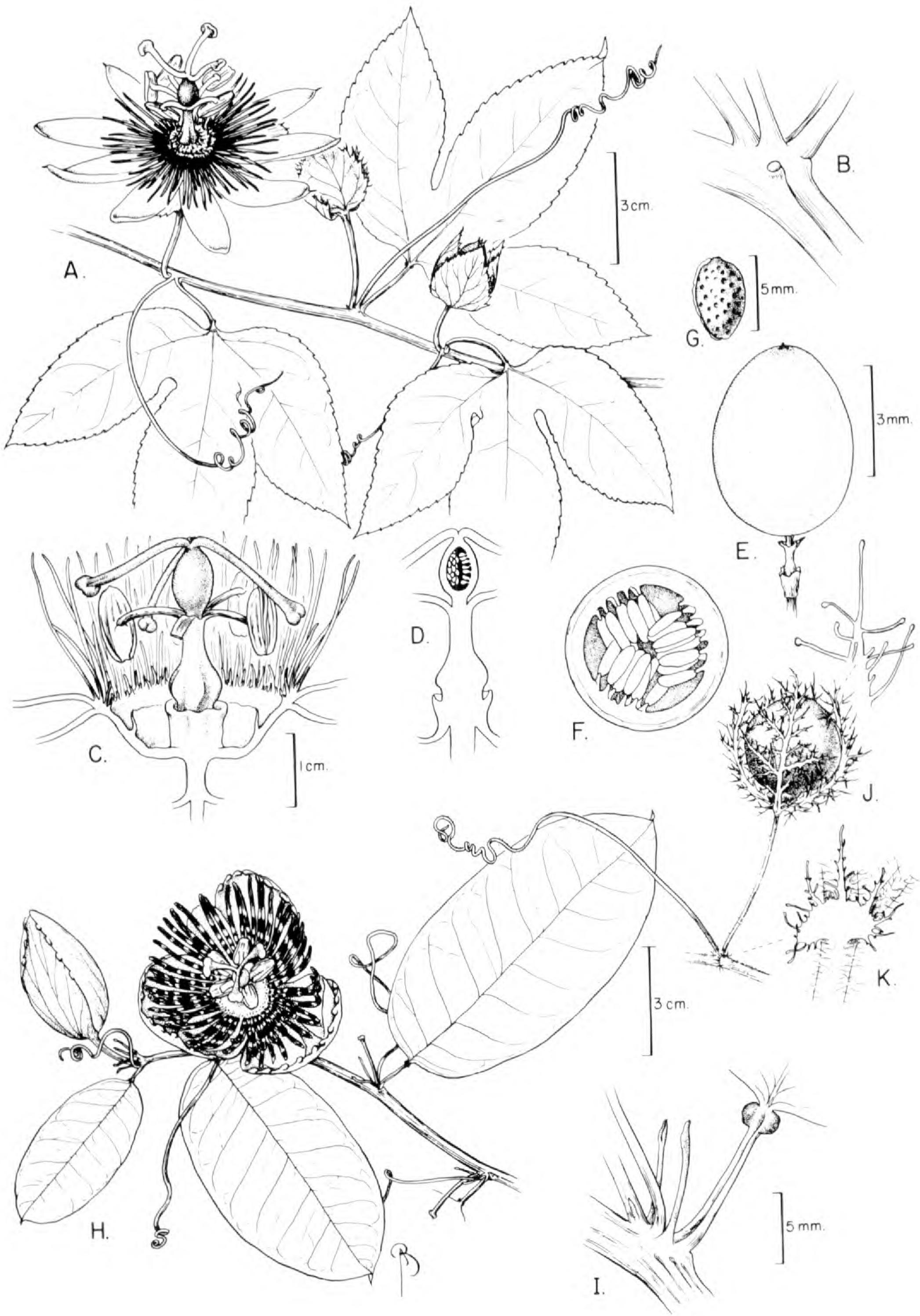

Fig. 133. A-G. *Passiflora edulis*. **A.** Flowering branch. **B.** Node. **C.** Flower, longitudinal section. **D.** Gynoecium and androgynophore, longitudinal section. **E.** Fruit. **F.** Fruit, cross section. **G.** Seed. **H-I.** *Passiflora laurifolia*. **H.** Flowering branch. **I.** Node and petiole with gland. **J-K.** *Passiflora foetida*. **J.** Fruit, and detail of involucral bract. **K.** Stipules. From Acevedo-Rodríguez et al. 1996. Flora of St. John, U. S. Virgin Islands. Mem. NYBG Vol. 78.

cm long; stamens 5; ovary ellipsoid, yellow, the styles curved, the stigmas capitate-bilobate. Fruit a coriaceous berry, ellipsoid, 4-6 cm long, green, with numerous yellow dots, with the involucre persistent at the base. Seeds numerous, elliptic-triangular, foveate, cream-colored, covered by a juicy yellow matrix.

Phenology: Collected in flower from June to August and in fruit in July and August.

Status: Apparently exotic, uncommon.

Distribution: Known in Puerto Rico only from the collection *Sintenis 1890*, which came from a plant cultivated in Fajardo. In the Virgin Islands (St. Croix, St. John, St. Thomas and Tortola) it is found in disturbed areas, thickets, and secondary forests at low elevation. Also throughout the Antilles and South America, extensively cultivated for its flowers and fruits.

6. Passiflora maliformis L., Sp. Pl. 956. 1753.
Fig. 134. A-B
Parcha cimarrona

Woody vine, glabrous or finely pilose, attainig 2-5(15) m in length and climbs by means of axillary tendrils. Stems subangular, cylindrical when mature, up to 2.5 cm in diameter. Leaves alternate, glabrous, chartaceous, 6-12 × 4-10 cm, ovate or ovate-lanceolate, not lobate, the apex acute, acuminate, or less frequently rounded, the base truncate to almost cordiform, the margins entire or undulate; venation pinnate, but the two basal secondary veins extending beyond the middle of the blade, prominent on both surfaces, especially on the lower surface; petioles 1.5-5 cm long, with a pair of subsessile glands above the middle; stipules linear, 9-15 mm long, not glandular; tendrils simple. Flowers solitary, axillary, subtended by a persistent involucre of 3 ovate bracts, green, 4-6 cm long, connate at the base; peduncles 3-7 cm long. Calyx campanulate, the tube ca. 1 cm long, the sepals oblong or oblong-lanceolate, 3-4 cm long, green, with a dorsal keel that projects beyond the apex; petals linear-lanceolate, green, with numerous violet dots on the inner surface, ca. 3 cm long; corona multiseriate, the 2 outer series of filiform segments, with violet bands, the inner series tuberculate; stamens 5; ovary oblong or subglobose, glabrous, the stigmas capitate. Fruit a crustaceous berry, globose, 3.5-4 cm in diameter, green, with the involucre not persistent. Seeds numerous, oblong-obcordate, 5-6 mm long, reticulate.

Phenology: Collected in flower in February and March and in fruit in June.

Status: Native, uncommon.

Distribution: Known in Puerto Rico from several collections of *Sintenis*, one of which comes from a primary forest in Utuado. Also on St. Thomas; the Antilles, Venezuela, Colombia, and Ecuador.

7. Passiflora multiflora L., Sp. Pl. 956. 1753.
Fig. 3F; 134. C-F

Slightly woody vine, tomentose, attainig 2-15 m in length and climbs by means of axillary tendrils. Stems cylindrical, with numerous lateral branches; mature stems sulcate; cross section with 4-lobate xylem. Leaves alternate, tomentose, chartaceous, 5-12 × 2-4 cm, oblong or lanceolate, not lobate, the apex rounded or obtuse, mucronate, the base obtuse or rounded, the margins entire, revolute; upper surface dull, pubescent; lower surface pale green, dull, pilose, with prominent venation; petioles 4-10 mm long, tomentose, with a pair of glands in the area where they join the blade; stipules filiform, 3-5 mm long; tendrils simple. Flowers in groups of 2-6, axillary, subtended by a minute subulate bract; peduncle 5-15 mm long, tomentose. Sepals elliptical, green, ca. 3.5 × 1.5 mm; petals linear, white, 3.5 × 0.8 mm; corona of numerous filiform segments, yellowish, ca. 2.5 mm long; gynophore cylindrical, broadened at the base, 0.7-0.8 mm long; stamens 5, yellowish; ovary ellipsoid, green, the stigmas capitate-bilobate, yellow. Fruit a fleshy berry, depressed-globose, 6-8 mm in diameter, glabrous, turning from green to purple when ripe. Seeds numerous, lenticular, rugose, ca. 2 mm long, light brown.

Phenology: Collected in flower from December to March and in fruit from January to April.

Status: Native, uncommon

Distribution: In dry forests or in the zone of mogotes. Also on St. John, St. Thomas, Tortola; the United States (Florida), the Bahamas, Cuba, and Hispaniola.

Public Forest: Río Abajo.

8. Passiflora murucuja L., Sp. Pl. 957. 1753.

Fig. 134. G-J

Slightly woody vine, glabrous, attainig 2-5 m in length and climbs by means of axillary tendrils. Stems angular, striate. Leaves alternate, bilobate (in the form of a boomerang), with the lateral lobes 1.5-2 times longer than the apex, these up to 4 cm long, rounded and retuse at the apex, forming an angle of divergence of 108-160° between them (sometimes the central apex projecting like a small lobe), chartaceous, with 3 main veins from the base, the base cuneate, obtuse. or rounded, the margins entire; upper surface dull, glabrous; lower surface pale green, dull, glabrous, with prominent venation and a line of circular glands along the acroscopic side of the lobes; petioles 1-1.5 cm long, glabrous, without glands; stipules linear-filiform, 2-4 mm long; tendrils simple. Flowers solitary or in pairs, axillary; peduncle 1-2.5 cm long, glabrous, articulated below the middle; bracts minute, below the articulation of the peduncle. Calyx tubular, brilliant red, 3-4 cm long, the sepals oblong, connate at the base; petals long-deltate, brilliant red, 1-2 cm long; corona tubular, brilliant red, 1-1.5 cm long, crenate or entire at the apex; stamens 5; ovary ovoid, glabrous. Fruit a fleshy berry, globose, 1-1.5 cm in diameter, black-purple when ripe. Seeds numerous, ovate, transversely sulcate, ca. 2.5 mm long.

Phenology: Flowering and fruiting throughout the year.

Status: Native, extremely rare in Puerto Rico.

Distribution: Known from the mogotes in the zone of Quebradillas. Also in Hispaniola.

Public Forests: Guajataca and Río Abajo.

9. Passiflora quadrangularis L., Syst. Nat. ed. 10, 1248. 1759.

Fig. 135. A

Granadilla

Slightly woody or herbaceous vine, glabrous, attainig 3-5 m in length and climbs by means of axillary tendrils. Stems trigonal or quadrangular, the angles winged, becoming cylindrical when mature. Leaves alternate, glabrous, chartaceous or membranaceous, 10-20 × 8-15 cm, broadly elliptical or broadly ovate, not lobate, rounded toward the abruptly acuminate apex, the base rounded, subtruncate, or cordiform, the margins entire; lower surface with the pinnate venation prominent; petioles 2-5 cm long, thick, canaliculate, with three pairs of sessile glands; stipules ovate or ovate-lanceolate, 2-3.5 cm long; tendrils simple. Flowers solitary, pendulous, axillary, subtended by a persistent involucre of 3 ovate bracts, 3-5 cm long; peduncle 1.5-3 cm long, trigonal. Sepals ovate or oblong-ovate, 3-4 cm long, white, violet, or pink on the inner surface, green externally; petals oblong-ovate to oblong-lanceolate, white with a pink tinge, 3-4.5 cm long; corona multiseriate, the segments filiform, as long as the sepals, with red-violet and white bands at the base, blue in the middle, and with numerous pink-blue spots above the middle; gynophore thick; stamens 5; ovary ovoid. Fruit a fleshy berry, oblong-ovoid, 20-30 × 12-15 mm, green, with three longitudinal furrows. Seeds numerous, cordiform or almost circular, 7-10 mm long, reticulate.

Phenology: Collected in flower from March to September.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: In disturbed areas. Also on St. Croix; of uncertain origin, cultivated throughout the Neotropics for its edible fruits.

10. Passiflora rubra L., Sp. Pl. 956. 1753.

Fig. 135. B-D.

Parcha colorada, Flor de pasión, Bat wings

Herbaceous vine, that climbs by means of axillary tendrils and attains 2-5 m in length. Stems angular, almost triangular, pilose, striate, attaining 5 mm wide, with many lateral branches. Leaves alternate, simple, bilobate or less frequently with a third lobe in a central position, 4-12 × 4-12 cm, chartaceous, pubescent, with three main veins that are borne from the base, the lobes acute, divergent, mucronate, the base cordiform, the margins entire; lower surface with the veins prominent, with a reddish tonality; petioles 2-4 cm long, pubescent, with a reddish tonality, without glands; stipules subulate, pubescent, ca. 5 mm long; tendrils simple, pubescent, up to 20 cm long. Flowers axillary,

Fig. 134. A-B. *Passiflora maliformis*. **A.** Flowering branch, with details of petiolar glands and stipules. **B.** Fruit. **C-F.** *Passiflora multiflora*. **C.** Fruiting branch. **D.** Flower. **E.** Flower, longitudinal section, with details of stamen and petal with corona appendages. **F.** Fruits. **G-J.** *Passiflora murucuja*. **G.** Flowering branch and flower, top view. **H.** Detail of foliar glands. **I.** Flower, longitudinal section. **J.** Androgynophore, stamens, and gynoecium, with detail of anther.

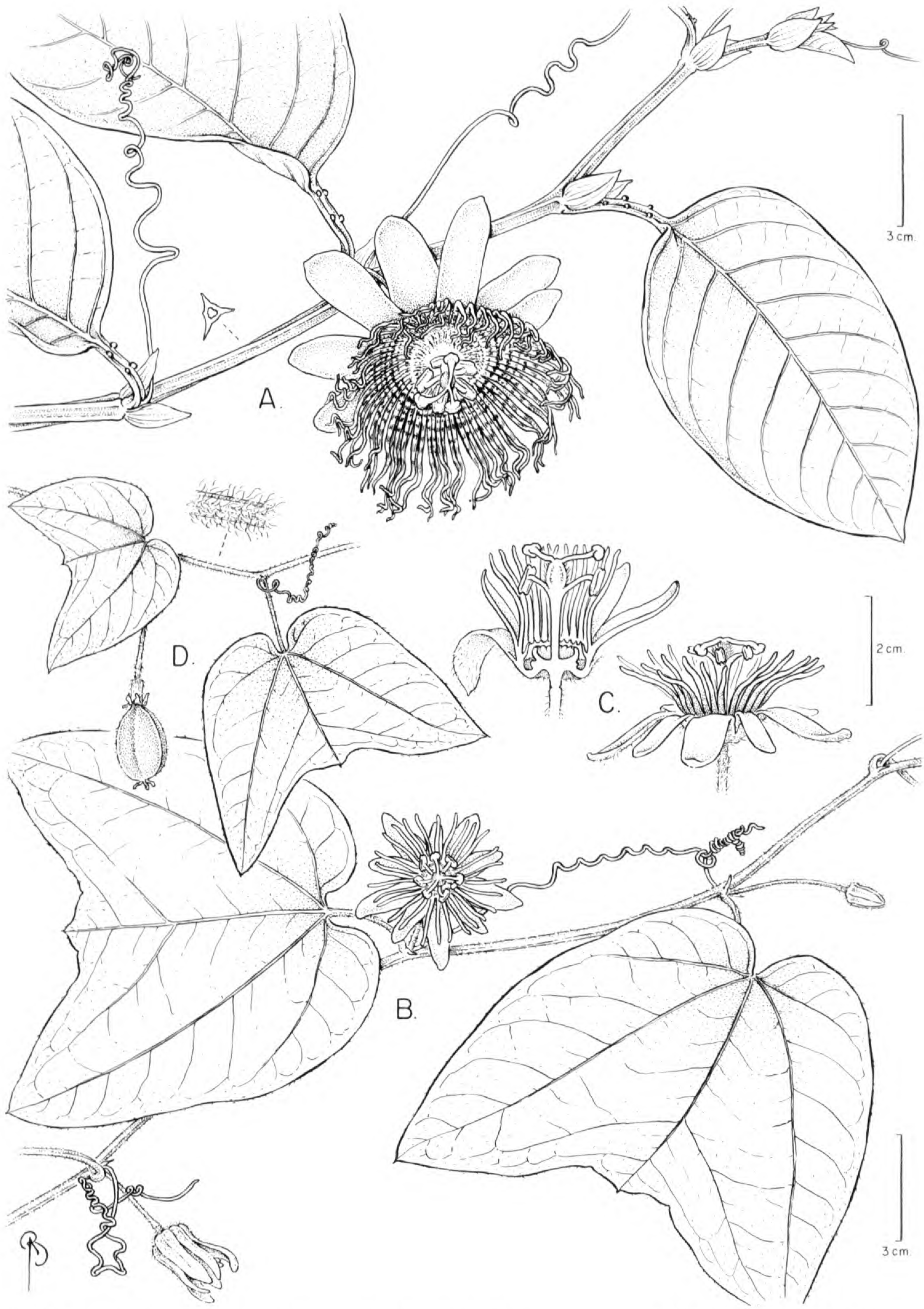

Fig. 135. A. *Passiflora quadrangularis*, flowering branch, with detail of stem cross section. **B-D.** *Passiflora rubra*. **B.** Flowering branch. **C.** Flower, whole and longitudinal section. **D.** Fruiting branch.

solitary or in pairs; pedicels pubescent, 3-5 cm long. Sepals oblong, 1.3-2.5 cm long, pilose and green on the outer surface, white on the inner surface; petals linear, whitish, 0.9-1.5 cm long; corona biseriate, the outer segments filiform, 1-1.3 cm long, pink to purple, the inner ones minute; gynophore cylindrical, 0.6-1 cm long; stamens 5, greenish; ovary ellipsoid-globose, green, hirsute, the styles reflexed, the stigmas capitate. Fruit a fleshy capsule, tardily dehiscent, up to 2 cm in diameter, ellipsoid or ovoid, red or red-pink, pilose, with 8 longitudinal ribs. Seeds numerous, elliptical, 3-4 mm long, transversely sulcate, covered by a white aril.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: In disturbed areas, at lower to middle elevations. Also on Vieques, St. Croix, St. John, St. Thomas, Tortola, and throughout tropical America.

Public Forests: Carite, El Yunque, Maricao, Río Abajo, and Susúa.

11. Passiflora serrato-digitata L., Sp. Pl. 960. 1753.

Fig. 136. A-B

Tagua-tagua

Slightly woody vine that climbs by means of tendrils and attains 10-15 m in length. Stems cylindrical, brittle, attaining 1 cm in diameter; cross section with the pith hollow. Leaves alternate, 5-7-palmately lobed, 9-15 × 14-20 cm, the lobes oblong, acuminate at the apex, the base subcordiform, the margins finely serrate; upper surface shiny, glabrous; lower surface glabrous, with prominent venation; petioles 6.5-15 cm long, glabrous, with a pair of conical stipitate glands at the base of the blade and another in the middle; tendrils simple, axillary, longer than the leaves. Flowers solitary, axillary, subtended by an involucre of 3 foliaceous bracts, ca. 4 cm long, ovate, fleshy, with the veins notably pink. Sepals lanceolate, ca. 3 × 2.5 cm, greenish yellow with pink dots. Petals 5, white, oblong, ca. 3 × 1 cm; corona biseriate, the segments filiform, violet; anthers ca. 13 mm long; stigmas subglobose. Fruit a globose berry, crustaceous, 5-6.5 in diameter, yellow when ripe. Seeds numerous, more or less elliptical, ca. 6 mm long, foveate.

Phenology: Flowering from June to September and fruiting from August to February.

Status: Native, rare.

Distribution: Known in Puerto Rico from the Sierra de Luquillo, in moist gallery forests. Also in Hispaniola, the Lesser Antilles, and South America.

Public Forest: El Yunque.

12. Passiflora sexflora Juss., Ann. Mus. Hist. Nat. Paris 6: 110, t. 37, f. 1. 1805.

Fig. 136. C-G.

Parchita

Herbaceous vine that climbs by means of tendrils and attains 6 m in length. Stems slender, pubescent, almost cylindrical or angular, attaining 4 mm in diameter. Leaves alternate, simple, bilobate or less frequently with a third (short) lobe in a central position, 6-8(10) × 3.5-14 cm, chartaceous, with three main veins that are borne from the base, the lobes acute, divergent, the apex of the blade forming a central lobe, more or less deep, rounded, mucronate, the base subcordiform, the margins entire; upper surface pubescent, especially on the veins; lower surface with the veins prominent, pubescent; petioles 2-3 cm long, pubescent, with a violet tonality, without glands; stipules subulate, 3-5 mm long; tendrils axillary, simple, pubescent, ca. 6 cm long. Flowers minute, in axillary cymes; peduncles pubescent, 5-7 mm long; pedicels ca. 7 mm long, pubescent. Sepals yellowish green, 8-15 mm long, lanceolate, abaxially pubescent; petals 5, whitish, 8-9 × 2 mm, linear; corona biseriate, the filaments white with mulberry-colored bands, 5-8 mm long; stamens 5; stigmas subglobose. Fruit a depressed-globose berry, dark violet, pubescent, 5-8 mm in diameter. Seeds numerous, ca. 2 mm long, depressed-ovoid, rugulose.

Phenology: Flowering and fruiting from September to May.

Status: Native, relatively common.

Distribution: In forests and weedy places at middle and upper elevations in moist zones. Also on Tortola; Cuba, Hispaniola, Jamaica, the Lesser Antilles, the United States (Florida), and Mexico.

Public Forests: Carite, El Yunque, Guajataca, Guilarte, Maricao, Río Abajo, and Toro Negro.

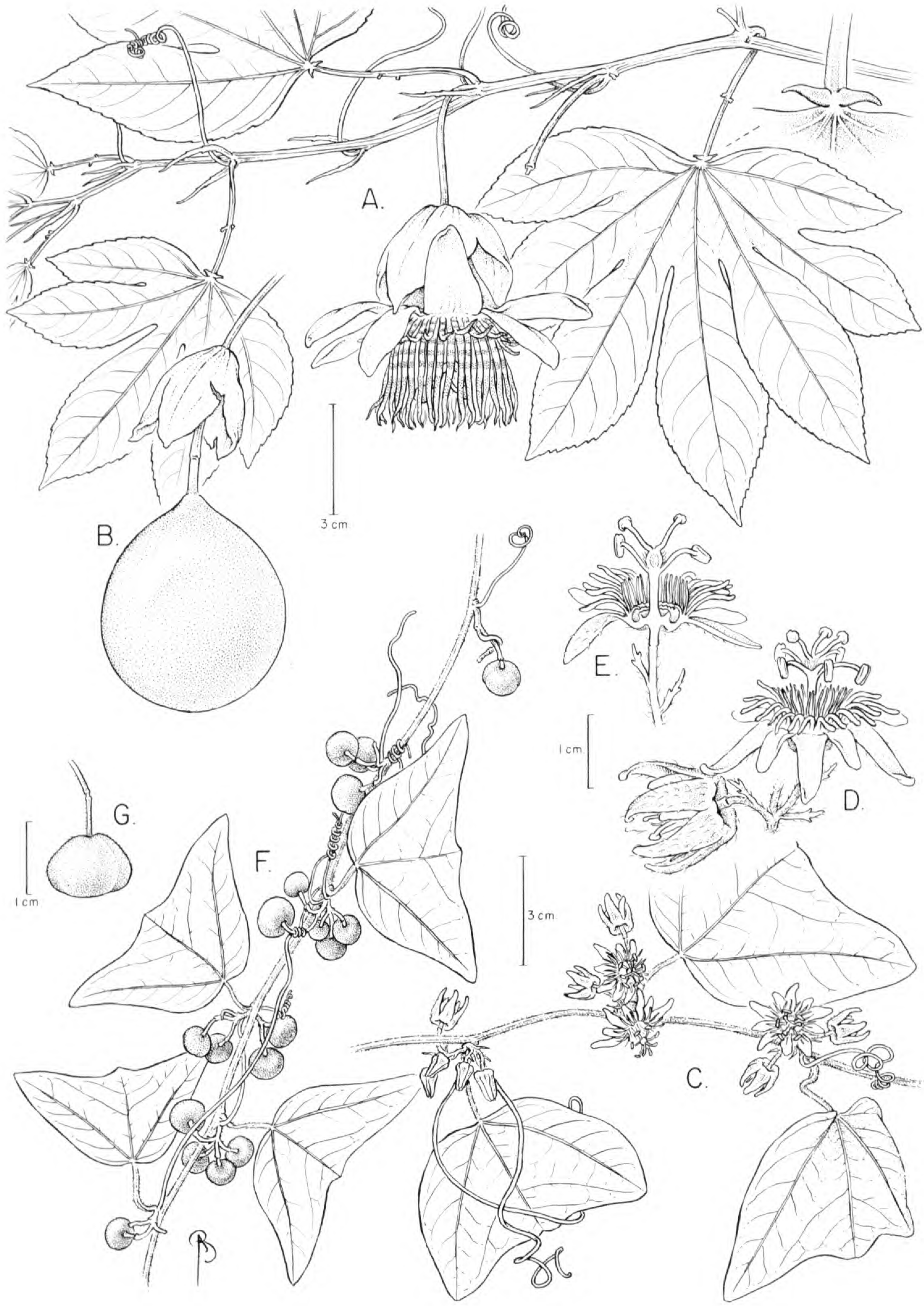

Fig. 136. A-B. *Passiflora serrato-digitata.* **A.** Flowering branch. **B.** Fruit. **C-G.** *Passiflora sexflora.* **C.** Flowering branch. **D.** Portion of inflorescence. **E.** Flower, longitudinal section. **F.** Fruiting branch. **G.** Fruit.

13. Passiflora suberosa L., Sp. Pl. 958. 1753.

Fig. 137. A-E

SYNONYM: *Passiflora pallida* L.

Parcha yedra, Indigo berry, Ink berry

Non-woody vine that climbs by means of tendrils and attains 1-3 m in length. Stems slender, cylindrical, pubescent or glabrous, usually with a reddish tinge; mature stems with 4 longitudinal wings, of cork or corky material. Leaves alternate, chartaceous, glabrous, 4-15 × 4-10 cm, extremely variable in form, trilobate, lanceolate, ovate, linear, or elliptical, with 3 or 5 main veins that are borne from the base, the lobes more or less deep, oblong, ovate to almost linear, the central lobe longer than the lateral ones, the apex obtuse or acute, the base cordiform, rounded, or obtuse, sometimes peltate, the margins slightly revolute, ciliate; upper surface shiny, glabrous or puberulent; lower surface glabrous or pubescent, with slightly prominent venation; petioles 15-20 mm long, glabrous or pubescent, sulcate, reddish, with a pair of minute glands above the middle; tendrils axillary, simple, glabrous; stipules filiform, ca. 5 mm. Flowers erect, solitary or in pairs, axillary; pedicels articulate, 15-20 mm long; bracts absent. Sepals 5, lanceolate, 8-13 mm long, green outside, whitish or light green on the inner surface; petals absent; corona biseriate, the segments mulberry-colored, shorter than the sepals; gynophore cylindrical, ca. 5 mm long; stamens 5, green, ascendent; ovary ellipsoid, green, the styles reflexed, the stigmas capitate. Fruit an ovoid or ellipsoid berry, 10-12 mm long, dark violet when ripe. Seeds numerous, ellipsoid, ca. 3 mm long, covered by a green pulp.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: In disturbed areas, on roadsides, in thickets, and in coastal forests. Also on Caja de Muerto, Cayo Santiago, Culebra, Desecheo, Icacos, Mona, Vieques, Anegada, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Antilles, tropical America, and introduced in the tropics of the Old World.

Public Forests: Cambalache, Guajataca, Guánica, Maricao, Mona, Piñones, Río Abajo, and Susúa.

14. Passiflora tulae Urb., Symb. Antill. 1: 374. 1899.

Fig. 137. F-H

Tagua-tagua serrana, Flor de pasión

Slightly woody vine that climbs by means of tendrils and attains 4-5 m in length. Stems slender, angular, green or mulberry-colored, striate, glabrous or puberulent on the younger portions. Leaves alternate, coriaceous, semicircular or semielliptical, sometimes in the form of a boomerang, 3-8 × 2.5-9 cm, with three main veins that are borne from the base, the apex more or less truncate, with two or three rounded lobes, the base rounded, the margins sinuate; upper surface dark green, shiny, glabrous, with the veins sunken; lower surface pale green, dull, puberulent, with prominent venation, with a row of circular glands on each side of the midvein; petioles 1.5-3 cm long, cylindrical, smooth, not glandular; tendrils axillary, simple, longer than the leaves. Flowers solitary or in pairs on an axillary peduncle, 3-5 cm long; sepals 5, oblong, 3-4 × 0.7 cm, pink-violet; petals ca. 3 cm long, oblong, of the same color as the sepals; corona tubular, orange, ca. 1.5 cm long; gynophore ca. 3 cm long. Fruit a globose or ellipsoid berry, green, 1-2 cm long, with the sepals persistent at the base.

Phenology: Flowering from December to April and fruiting from February to June.

Status: Endemic to Puerto Rico, not very common.

Distribution: Along the Cordillera Central and in some localities in the zone of mogotes.

Public Forests: Carite, Guilarte, Maricao, and Río Abajo.

Excluded Species:

Passiflora anadenia Urb. is excluded from the flora of Puerto Rico, since the report of this species is based on the erroneous identification of a collection of *Passiflora bilobata* from Guánica.

Reference: Killip, E. P., 1938. The American species of Passifloraceae. Publ. Field Mus. Nat. Hist. Bot. Ser. 19: 1-613.

Fig. 137. A-E. *Passiflora suberosa*. **A.** Mature stem, with detail of cross section. **B.** Flowering branch. **C.** Branch with bud, and details of stipules, petiolar glands, and pubescence. **D.** Fruiting branch. **E.** Flower, side and top views. **F-H.** *Passiflora tulae*. **F.** Flowering branch. **G.** Detail of laminar glands. **H.** Flower.

33. *Family* ***PHYTOLACCACEAE***

Key to the genera

1a. Fruits woody or subwoody 2
1b. Fruits fleshy ..... 3. *Trichostigma*

2a. Fruits indehiscent, with the sepals much longer than the fruit ..... 1. *Agdestis*
2b. Fruits capsular, with the sepals shorter than the fruit ..... 2. *Stegnosperma*

1. AGDESTIS

A monotypic genus, characterized by the following species.

1. Agdestis clematidea Moçiño & Sessé ex DC., Syst. Nat. 1: 543. 1818.

Fig. 138. A-C

Twining vine, herbaceous, attainig 15 m in length. Stems angular, reddish, striate, puberulent. Leaves with a strong, disagreeable odor, alternate, chartaceous, ovate or broadly ovate, 3-9 × 3-7.5 cm, the apex obtuse or short-acuminate, mucronate, the base deeply cordiform or hastate, the margins crenulate; upper surface dark green, dull, with minute dots; lower surface light green, dull, puberulent, with prominent venation; petioles 1.5-9 cm long, with a reddish tinge, sulcate; stipules absent. Flowers bisexual, white, in axillary panicles, 6-17 cm long; peduncles glabrous or puberulent; pedicels 1-2 mm long, with a minute green bracteole, lanceolate, at the base. Sepals 4, white, 3-5 mm long, oblong or oblanceolate, with the parallel venation conspicuous; petals absent; stamens 13-20; ovary partially inferior, the style conical, with 4 recurved stigmatic branches; ovule solitary. Fruits coriaceous, indehiscent, turbinate, ca. 3 mm long, with the sepals persistent at the base. Seeds elliptical.

Phenology: Flowering from May to December.

Status: Exotic, cultivated and naturalized (according to Liogier, 1985), uncommon.

Distribution: Occasional in our gardens. Native to Mexico, cultivated sporadically in the Antilles and South America.

2. STEGNOSPERMA

Erect or scandent shrubs; glabrous. Leaves alternate, simple; stipules minute, deciduous. Flowers bisexual, in terminal racemes; bracts and bracteoles minute, persistent. Calyx of 5 sepals; corolla of 5 deciduous petals; stamens 10; ovary superior, with 3-5 uniovulate carpels, the styles free, as numerous as the carpels. Fruit a globose capsule, dehiscent from the apex toward the base; seeds 1-5, globose. A genus of 3 species, of the Antilles and Central America.

1. Stegnosperma cubense A. Rich. in Sagra, Hist. Nat. Cub. 10: 309. 1845.

Fig. 138. D-H

Erect, clambering, or creeping shrub, with numerous lateral branches, attainig 1.5-5 m in length. Stems cylindrical, glabrous, dark gray, with minute lenticels. Leaves alternate, coriaceous

or chartaceous, elliptical, 1.2-6 × 0.9-2.7 cm, the apex obtuse or less frequently acute or rounded, the base obtuse, the margins crenulate; upper surface dark green, dull, with inconspicuous venation; lower surface light green, dull, with the midvein prominent; petioles 4-10 mm long; stipules absent. Flowers fragrant, in racemes at the end of short axillary branches, up to 7 cm long; peduncle glabrous; pedicels 2-3 mm long. Sepals 5, white, ca. 2.5 mm long, elliptical, more or less concave; petals 5, white, elliptical, 2.5-3 mm long; stamens 10, the filaments connate at the base; ovary superior, with 3-5 carpels, stigmas 3-5, sessile, elongate. Fruit a reddish capsule, ovoid, 4-5.5 mm long, opening by 3-4 woody valves. Seeds ellipsoid, black, shiny, ca. 4 mm long, covered by a white to pink aril.

Phenology: Collected in flower from June to September and from November to January and in fruit from January to March and from August to September.

Status: Probably exotic, cultivated, probably naturalized.

Distribution: Known from a single collection made by Britton and Horne (*9628*) in 1931 in Barrio Asomante near Aibonito. Also in Cuba, Hispaniola, Jamaica, and from Mexico to Nicaragua.

3. TRICHOSTIGMA

Clambering shrubs or lianas with scandent branches; cross section of the stem with discrete vascular bundles, surrounded by parenchymatous tissue. Leaves alternate or subopposite; petioles long; stipules absent. Flowers bisexual, actinomorphic, in axillary racemes; bracts deciduous; bracteoles persistent; calyx of 4 free tepals; petals absent; stamens 8-16, in two whorls, the anthers dehiscent longitudinally; ovary superior, unilocular, with a single ovule, the stigma sessile, with numerous branches. Fruit a fleshy drupe with a single seed and the persistent sepals at the base. A genus of 3 species, distributed throughout the Neotropics

1. Trichostigma octandrum (L.) H. Walter, Pflanzenr. 4(83): 109. 1909.

Fig. 138. I-M

BASIONYM: *Rivina octandra* L.

Bejuco de paloma, Bejuco de nasa, Bejuco de palma, Basket wiss, Black wiss, Hoopvine

Clambering shrub or liana, with pendulous branches, attainig 5-10(-30) m in length. Stems cylindrical, 5-15 cm in diameter. Branches glabrous, with numerous lenticels. Leaves alternate, chartaceous, elliptical or oblong, 4-9(13) × 1.7-4(6) cm, the apex acute or acuminate, the base acute or obtuse, sometimes unequal, the margins crenulate; upper surface dark green, dull, glabrous, with the venation reticulate, inconspicuous; lower surface light green, dull, with the midvein prominent, sometimes the secondary veins, the tertiary veins inconspicuous; petioles 0.5-1.5(3) cm long, with a yellowish or pink tinge, sulcate, swollen at the base; stipules absent. Inflorescences of axillary racemes, up to 15 cm long; peduncle glabrous or puberulent; pedicels 4-7 mm long, with a minute green bracteole, filiform, below or above the middle. Sepals 4, white, 3-5 mm long, oblong or elliptical, concave; petals absent; stamens 8-16; stigmas sessile, capitate, with numerous filiform branches. Fruit fleshy, globose or ellipsoid, purple, 5-7 mm long.

Phenology: Flowering and fruiting from April to October.

Status: Native, very common.

Distribution: In mature or secondary forests from the littoral zone to the Cordillera Central. Also on Culebra, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Antilles and tropical continental America.

Public Forests: Cambalache, Ceiba, El Yunque, Guánica, Mona, Guilarte, Río Abajo, Susúa, and Tortuguero.

Commentary: In Guilarte and Río Abajo there are several populations of *Trichostigma* that differ from *Trichostigma octandrum* in having scabrous leaves with the tertiary and quaternary venation very conspicuous. The recognition of these populations at the specific or subspecific level is not possible because there are no other significant morphological differences.

Fig. 138. A-C. *Agdestis clematidea*. **A.** Flowering branch. **B.** Flower, top view and longitudinal section. **C.** Stigmas and stamen. **D-H.** *Stegnosperma cubense*. **D.** Flowering branch. **E.** Flower, side view, and petal. **F.** Gynoecium, side view and longitudinal section. **G.** Infructescence. **H.** Seed and fruit. **I-M.** *Trichostigma octandrum*. **I.** Fertile branch. **J.** Flower, side view. **K.** Stamens. **L.** Gynoecium, side view and longitudinal section. **M.** Immature fruit.

34. *Family* ***PIPERACEAE***

1. PEPEROMIA

Terrestrial or epiphytic herbs, erect, prostrate, pendulous, or climbing; stems succulent, glabrous or pubescent. Leaves alternate, opposite or whorled, with palmate or pinnate venation; petioles elongate or short or less frequently absent. Flowers numerous, in terminal spikes or opposite the leaves; stamens 2; ovary superior, sessile or stipitate, the stigma one, terminal or lateral. Fruit a minute drupe, ellipsoid or globose, sessile or stipitate. A genus of 1000 species, distributed throughout the tropics and subtropics.

1. Peperomia rotundifolia (L.) Kunth in Humb. Bonpl. & Kunth, Nov. Gen. Sp. (quarto ed.) 1: 65. 1815.

Fig. 139. A-D

BASIONYM: *Piper rotundifolium* L.

Yerba de ratón, Yerba linda, Yerba de medio real, Bejuco de alcanfor

Epiphytic herb, ascending by means of small aerial roots, attainig 1-3 m in length. Stems cylindrical, brittle, pubescent, ca. 1 mm in diameter, with numerous lateral branchlets. Leaves alternate, fleshy when fresh, aromatic, membranaceous on drying, 5-11 mm long, elliptical, obovate, or almost circular, the apex

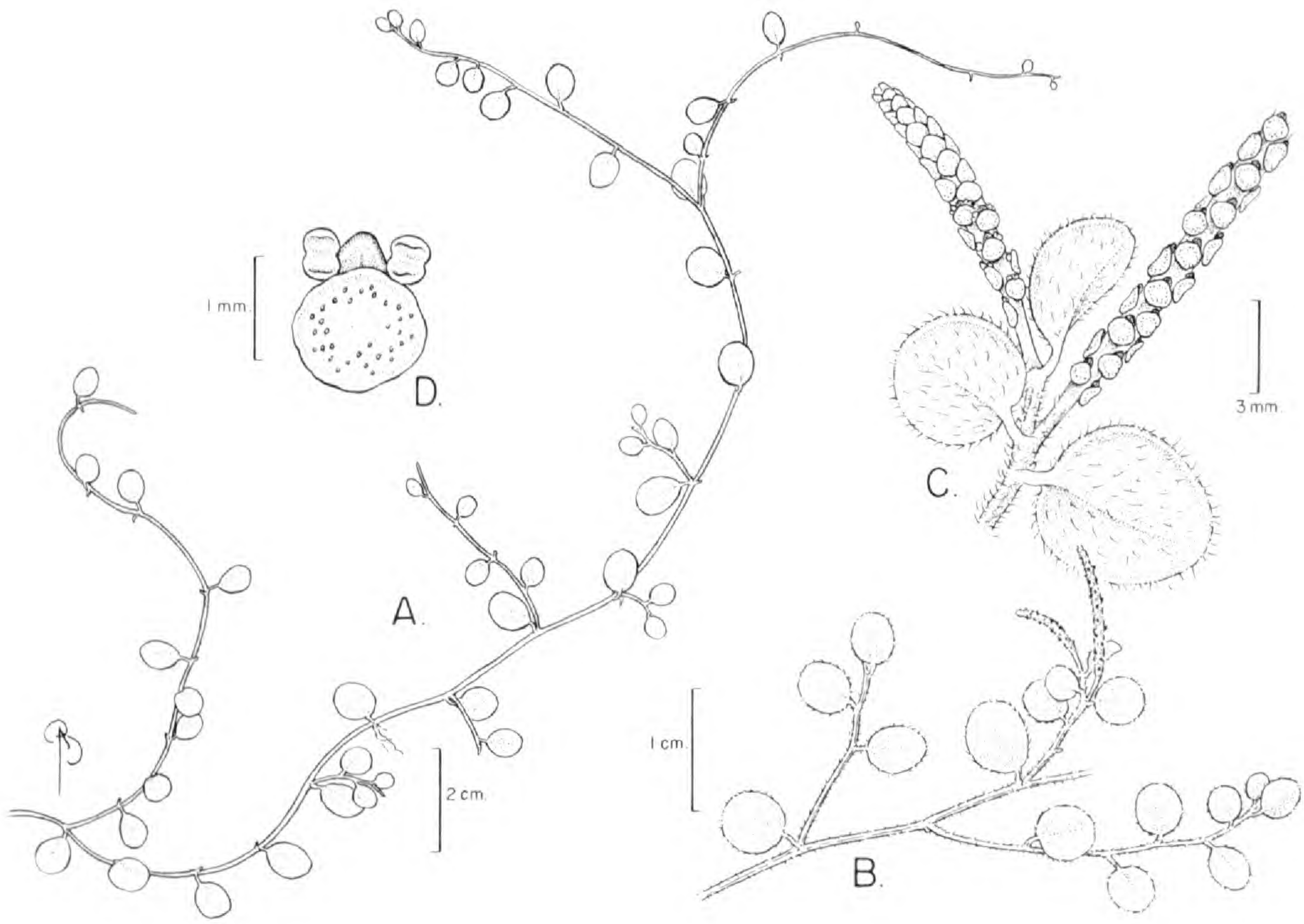

Fig. 139. A-D. *Peperomia rotundifolia.* **A.** Habit. **B.** Fertile branch. **C.** Detail of fertile branch. **D.** Flower.

rounded, the base obtuse or almost rounded, the margins entire, markedly revolute, ciliate; upper surface dark green, glabrous, puberulent, or minutely strigulose, with dark dots; lower surface concave, pale green, glabrous or puberulent, with dark dots; petioles thin, 1-5 mm long, with minute dark dots. Inflorescences of terminal spikes, 1-2.5 cm long, produced on the lateral branchlets.

Phenology: Flowering throughout the year.

Status: Native, locally common.

Distribution: On trees and rocks in moist forests of the Cordillera Central. Also in Cuba, Jamaica, the Lesser Antilles, Trinidad, and tropical continental America.

Public Forests: Carite, El Yunque, Guajataca, Guilarte, Maricao, Río Abajo, and Toro Negro.

35. *Family* ***PLUMBAGINACEAE***

1. PLUMBAGO

Shrubs or herbs, erect, creeping, or climbing. Leaves simple, alternate, petiolate or sessile, with pinnate venation; stipules absent. Flowers bisexual, actinomorphic, short-pedicellate, bibracteate, in terminal racemes or panicles; calyx with 5 longitudinal ribs covered with stipitate glands, the lobes triangular; corolla hypocrateriform, the tube longer than the calyx, the lobes obovate, rounded, or truncate; stamens 5, the filaments free, included or slightly exserted, the anthers dehiscent by longitudinal valves; ovary superior, unilocular, with one basal ovule per carpel; style united, with 5 stigmatic branches. Fruit a valvate capsule, membranaceous, with a single seed. A tropical genus of 12-20 species.

1. Plumbago scandens L., Sp. Pl. ed. 2, 215. 1762.

Fig. 140. A-F

Slightly woody shrub, scandent, with numerous basal or lateral branches, attaining 2-3 m in length. Stems cylindrical, striate, glabrous. Leaves alternate, chartaceous, 3-13 × 1-6 cm, ovate, oblong-lanceolate, spathulate, or oblanceolate, the apex acute, acuminate, or obtuse, the base obtuse, rounded, cuneate, or attenuate, sometimes unequal, the margins entire; upper surface glabrous; lower surface with lepidote dots; petioles 5-10 mm long. Inflorescences of terminal panicles, up to 30 cm long; peduncles glabrous, striate, sparsely covered with sessile glands; bracteoles elliptical, ca. 2 mm long; pedicels ca. 1 cm long. Calyx green, 7-11 mm long, the ribs with sticky stipitate glands; corolla white, hypocrateriform, the tube 1.2-2 cm long, the lobes 0.5-1 cm long, obovate, mucronate; stamens exserted, the anthers pale violet. Fruit an oblong capsule, covered by the persistent calyx and sticky.

Phenology: Collected in flower from January to August.

Status: Exotic, cultivated and naturalized, common in our gardens.

Distribution: Cultivated, rather common, also naturalized in disturbed areas, roadsides, and in pastures. Also on Desecheo, Mona, St. Croix, St. John, St. Thomas, and Tortola; throughout tropical America.

Public Forest: Mona.

Fig. 140. A-F. *Plumbago scandens*. **A.** Flowering branch. **B.** Node with premature branches. **C.** Portion of inflorescence showing a flower. **D.** Stamens, front and back views. **E.** Gynoecium, with details of the stigmas and ovary. **F.** Fruit, whole and longitudinal section. From Luteyn, J. L. 1990. Plumbaginaceae. In: G. Harling & L. Anderson (eds.), Fl. Ecuador 151: 39-46.

35. *Family* ***POLYGALACEAE***

1. SECURIDACA

Lianas or less frequently clambering shrubs or small trees. Leaves alternate, simple; petioles short; stipules absent; nodes usually glandular. Flowers bisexual, zygomorphic, in axillary or terminal racemes; bracts minute; calyx of 5 free sepals, deciduous, the two inner ones larger, petaloid; petals 3, deciduous, united at the base, the central petal in the form of a keel; stamens 8, the filaments united into a staminal tube, the anthers dehiscent by a subapical aperture; ovary superior, unilocular, with a single ovule, the stigma bilobate. Fruit a samara with a distal wing, the seminiferous locule basal, with a single seed. A genus of 50 species, distributed throughout the tropics and subtropics.

Key to the species of *Securidaca*

1a. Leaves narrowly ovate, ovate, or oblong, 3.5-12 cm long, the apex obtuse or short-acuminate..... 1. *S. diversifolia*
1b. Leaves ovate, elliptical, or obovate, 1-2 cm long, the apex rounded or emarginate..... 2. *S. virgata*

1. Securidaca diversifolia (L.) Blake, Contr. U. S. Natl. Herb. 23: 594. 1923.

Fig.141. A-D

BASIONYM: *Polygala diversifolia* L.
SYNONYMS: *Elsota diversifolia* (L.) Blake
Securidaca erecta Jacq.

Liana, with short twining lateral branches, attainig 5-10 m in length. Stems cylindrical, strigulose. Leaves alternate, coriaceous, 3.5-9(12) × 1.7-3.5 cm, narrowly ovate, ovate, or oblong, the apex obtuse or short-acuminate, the base obtuse, the margins entire, revolute; upper surface puberulent, with the midvein flat; lower surface with prominent venation, minutely strigulose; petioles 2-4 mm long. Inflorescences of racemes, terminal on short (4-12 cm long) lateral branches, these with rounded leaves, < 1 cm long, at the base; pedicels 4-5 mm long, strigulose; calyx of 5 sepals, unequal, the 3 outer ones ca. 3 mm long, violet, rounded, strigulose, the inner ones petaloid, 8-10 mm long, violet, rounded; keel violet, ca. 8 mm long, the upper petals spathulate, violet, slightly shorter than the keel; ovary glabrous, the style curved, glabrous, the stigma truncate. Samara 3.5-4.2 cm long, hirsute, the wing with reticulate venation, 3-3.5 × 10-13 cm.

Phenology: Collected in flower in March, April, and July.

Status: Native or naturalized on St. Croix; cultivated in Puerto Rico and St. Thomas.

Distribution: Uncommon in our gardens, cultivated at the Agricultural Experiment Station in Mayagüez. Its natural distribution is from Mexico to Peru and the Lesser Antilles.

2. Securidaca virgata Sw., Prodr. 104. 1788.

Fig. 1E; 141. E-M

SYNONYM: *Elsota virgata* (Sw.) Kuntze

Bejuco de sopla, Jaboncillo

Woody vine, twining, with pendulous branches, attainig 5-10 m in length. Stems cylindrical, puberulent, slightly flattened when mature; cross section with bands of vascular tissue alternating with bands of parenchyma. Leaves alternate, 1-2 cm long, obovate or oblong, minutely strigulose, the apex rounded, retuse, the base cuneate or obtuse, the margins entire, revolute, the venation inconspicuous on both

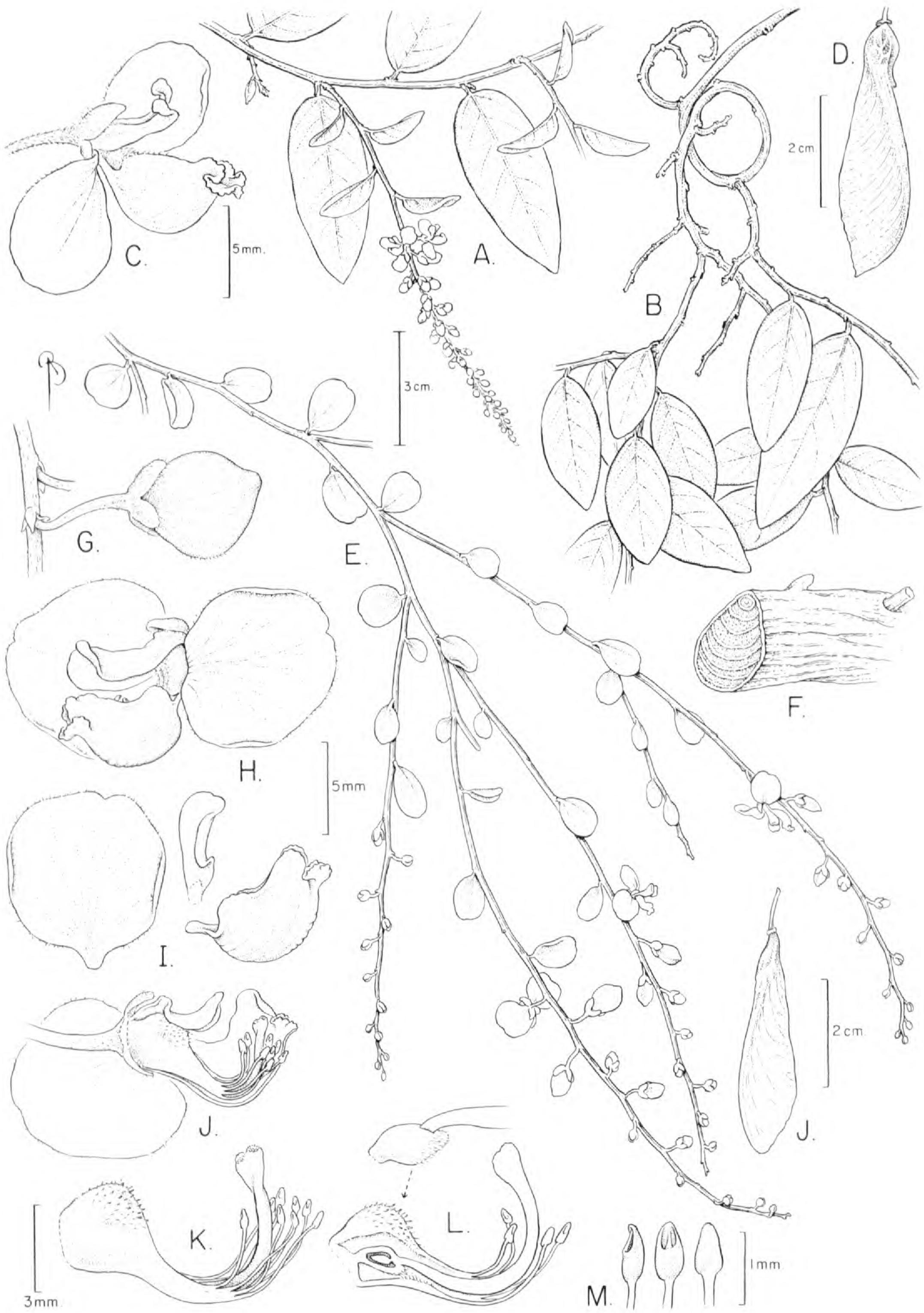

Fig. 141. A-D. *Securidaca diversifolia.* **A.** Flowering branch. **B.** Sterile branch. **C.** Flower, side view. **D.** Samara. **E-M.** *Securidaca virgata.* **E.** Flowering branch. **F.** Cross section of mature stem. **G.** Floral bud. **H.** Flower, top view. **I.** Petaloid sepal, keel, and lateral petal. **J.** Flower, side view. **K.** Stamens and gynoecium. **L.** Stamens and gynoecium, longitudinal section. **M.** Anthers.

surfaces; petioles ca. 1 mm long, strigulose. Inflorescences of terminal racemes; pedicels ca. 6 mm long, minutely sericeous; calyx of 5 sepals, unequal, the 3 outer ones 2-4 mm long, pink, rounded, strigulose, the inner ones petaloid, 8-12 mm long, pink, rounded; keel white, ca. 8 mm long, the upper petals yellow, fleshy, slightly shorter than the keel. Samara 3-4 cm long, minutely sericeous, especially the seminiferous locule, the wing with reticulate venation, 2-3 × 1 cm.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: In disturbed areas, on roadsides, in pastures, and in secondary forests at lower and middle elevations. Also on Vieques, Cuba and Hispaniola.

Public Forests: Cambalache, Ceiba, El Yunque, Guajataca, Maricao, Río Abajo, and Susúa.

36. *Family* ***POLYGONACEAE***

1. ANTIGONON

Herbaceous or woody vines, that climb by means of the axes of the inflorescences, modified into tendrils. Leaves alternate, simple, entire; petioles elongate; stipules connate around the stem to form a tubular structure known as an ocrea. Flowers bisexual, actinomorphic, produced in ocreate fascicles along axillary or terminal racemes or panicles; perianth of 5 free petaloid tepals; stamens 8, the filaments connate at the base, the anthers dehiscent longitudinally; ovary superior, unilocular, with a single ovule, the styles 3, free, the stigmas peltate. Fruit an achene with a single seed, covered by the accrescent tepals. A neotropical genus of 8 species.

Key to the species of *Antigonon*

1a. Lower surface of leaves tomentose; outer tepals circular, 2.6-3.2 mm long, sagittate at the base, with the lobes overlapping; petioles < 1 cm long .....1. *A. guatemalensis*
1b. Lower surface of leaves puberulent or glabrous; outer tepals ovate, 5-7 mm long, subcordiform at the base, the lobes not overlapping; petioles > 1 cm long .....2. *A. leptopus*

1. Antigonon guatemalense Meissn. in DC., Prodr. 14: 184. 1856.

Fig. 142. A-F

SYNONYMS: *Antigonon macrocarpum* Britton & Small
Antigonon grandiflorum (Bertol) B.L. Rob.

Bellísima

Slightly woody vine that climbs by means of tendrils and attains 5-10 m in length. Stems puberulent, pentagonal. Leaves alternate, ovate, broadly ovate, or ovate-triangular, chartaceous, 5-9.5 × 3.2-7.7 cm, the apex obtuse or acute, mucronate, the base cordiform, the margins crenulate; upper surface pubescent, dull, with the venation flat; lower surface tomentose, with prominent venation; petioles 8-10 mm long, tomentose, almost cylindrical. Flowers bisexual, in groups of 4-5 flowers, in axillary racemes or terminal panicles, the racemes 15-22 cm long, the axes densely pubescent with septate trichomes, the distal portion of the axis twisting like a tendril; pedicels 1.5-2 cm, articulated near the middle, the basal portion persistent, sometimes twisted like a tendril. Perianth pink, in two unequal series, the outer ones circular, 2.6-3.2 cm long, the base sagittate, with overlapping sinuses, the inner ones ca. 1.5 cm long, ovate; staminal column ca. 2 mm long. Achene ellipsoid, ca. 1.2 cm long.

Phenology: Collected in flower during November.

Status: Exotic, cultivated and spontaneous (according to Liogier, 1985).

Distribution: Cultivated in Puerto Rico and the Virgin Islands (St. Croix and St. Thomas), although not very common. Native to Guatemala, but cultivated in Central and South America as well.

2. Antigonon leptopus Hook. & Arn., Bot. Beechey Voy. 308, t. 69. 1838.

Fig. 142. G-M

Bellísima, Coralina, Coral, Coralillo, Coral vine, Mexican creeper, Coralita, Honeysuckle

Slightly woody vine that climbs by means of tendrils and attains 5-13 m in length. Stems puberulent, pentagonal, with many lateral branches. Leaves alternate, ovate, triangular-ovate, or almost lanceolate, chartaceous, 5-14.5 × 2-7 cm, the apex acute or acuminate, the base cordiform or truncate, the margins crenulate, sometimes ciliate; upper surface light green, slightly shiny, puberulent, with the venation sunken; lower surface pale green, dull, puberulent or glabrous, with prominent venation; petioles 1-5 cm long, reddish, puberulent, cylindrical or subwinged. Flowers bisexual, in axillary racemes or terminal panicles, 10-20 cm long, puberulent, terminating in a pair of spiral tendrils; pedicels 3-4(-10) mm long. Perianth 4-7 mm long, of 5 ovate or elliptical tepals, intense pink or white; staminal column 2-3 mm long, of the same color as the tepals. Achene ovoid, 5-8 mm long.

Phenology: Flowering throughout the year, although more predominantly from June to December.

Status: Exotic, naturalized, locally very common.

Distribution: Originally cultivated, but escaped and naturalized, very prolific. In disturbed coastal areas, thickets, and dry forests. Also on Vieques, Anegada, St. Croix, St. John, St. Thomas, and Tortola. Native to Mexico but widely cultivated throughout the Antilles, South America, and the tropics in general.

Public Forests: El Yunque and Río Abajo.

37. *Family* ***RANUNCULACEAE***

1. CLEMATIS

Woody vines that climb by means of twining leaves. Leaves opposite, trifoliolate, pinnate or biternate; petioles elongate; stipules absent. Flowers unisexual or bisexual, actinomorphic, produced in cymes or umbels, arranged in racemes; calyx of 4-5 free petaloid sepals; petals absent; stamens numerous, the filaments free, the anthers dehiscent longitudinally; ovary superior, of numerous free carpels, with a single ovule, the style terminal, slender, plumose. Fruit an achene with a persistent style, elongate and plumose, dispersed by the wind. A genus of about 250 species, the great majority of which are of the temperate zone.

Key to the species of *Clematis*

1a. Mature leaves trifoliolate.....2
1b. Mature leaves 5- or 9-foliolate.....3. *C. flammulastrum*

2a. Plants essentially glabrous .....1. *C. dioica*
2b. Plants pubescent .....2. *C. polygama*

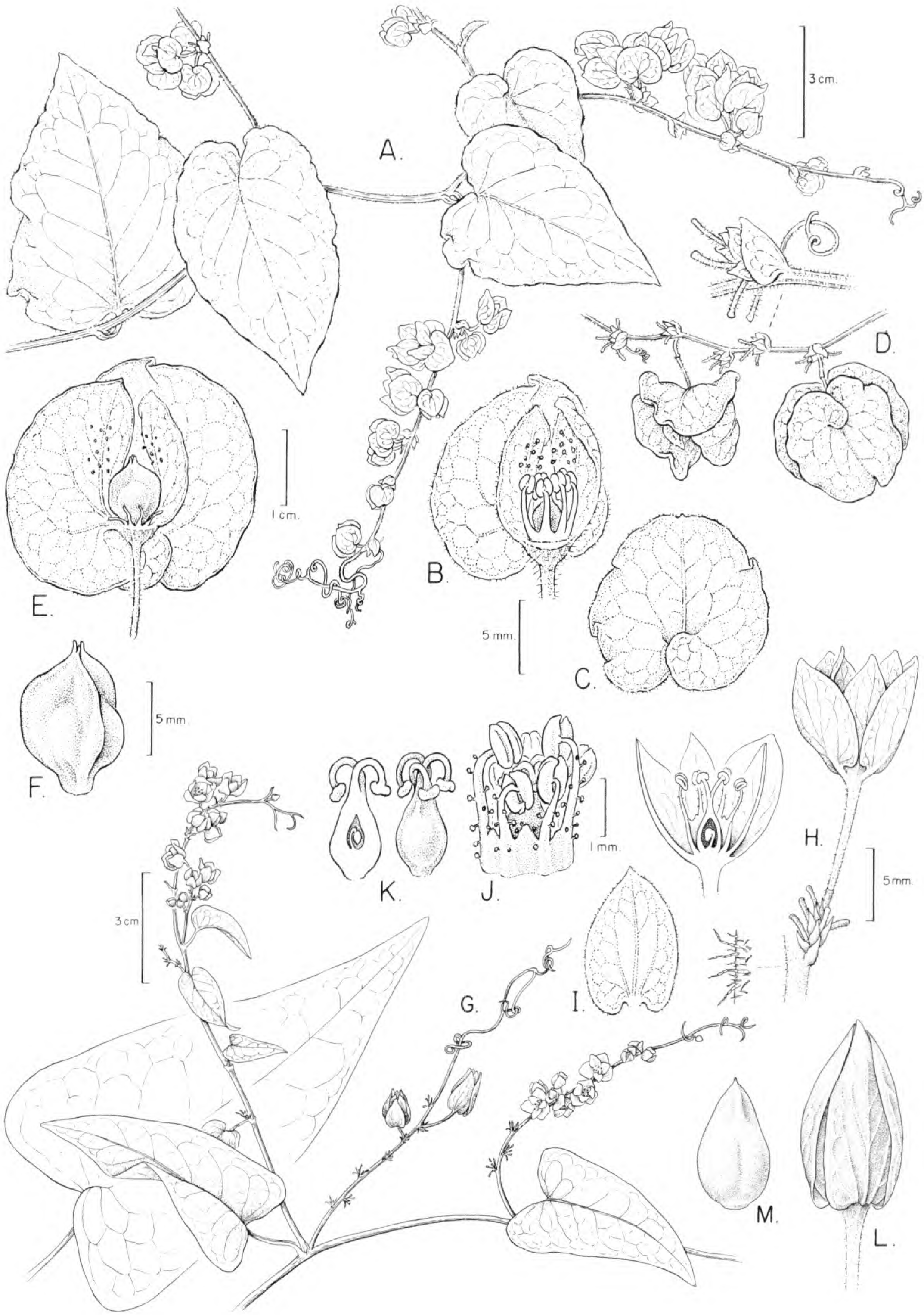

Fig. 142. A-F. *Antigonon guatemalense*. **A.** Fertile branch. **B.** Flower, showing outer and inner tepals, androecium, and gynoecium. **C.** Outer tepal. **D.** Detail of inflorescence. **E.** Flower, showing gynoecium. **F.** Immature fruit. **G-M.** *Antigonon leptopus*. **G.** Fertile branch. **H.** Flower, longitudinal section and side view. **I.** Outer tepal. **J.** Androecium. **K.** Gynoecium, longitudinal section and side view. **L.** Fruit with persistent tepals. **M.** Fruit, tepals removed.

1. Clematis dioica L., Syst. Nat. ed. 10, 1084. 1759.

Fig. 143. J
Cabellos de ángel

Slightly woody vine, dioecious, that climbs by means of twining leaves and attains 3-10 m in length. Stems slender, sulcate, glabrous, almost cylindrical, with many lateral branches. Leaves opposite, trifoliolate; leaflets coriaceous, ovate or cordiform, 5-9 × 2-7 cm, the apex acute or short-acuminate, the base subcordiform or rounded, the margins entire, sometimes with 1-2 teeth; upper surface shiny, glabrous; lower surface pale green, dull, glabrous or puberulent toward the base, with slightly prominent venation; petiolules more or less glabrous, the terminal one 1.5-3 cm long, the lateral ones 0.7-2.5 cm long; petioles 3-7 cm long, glabrous. Inflorescences axillary or terminal on short lateral branches; flowers unisexual, in dichasial cymes; pedicels 1.2-4 cm long, with a pair of minute bracteoles below the middle. Sepals white or cream-colored, oblanceolate or obovate, 4-10 mm long, more or less glabrous except for the lanate-pubescent margins; stamens 30-50, unequal; carpels 15-25, ca. 6 mm long. Fruit an ellipsoid achene, slightly compressed, 3-4 mm long, pilose, the margin not thickened, the style plumose, persistent, 2-6 cm long, dispersed by the wind.

Phenology: Flowering and fruiting from October to February.

Status: Native, rare.

Distribution: Known from a single collection made by *Sintenis (5843)* in 1887 in the area of Barrio Callejones in Lares. Recently collected in a mogotes in Aguadilla. Known from southern Mexico, Belize, and the Greater Antilles.

2. Clematis flammulastrum Griseb., Pl. Wright. 153. 1860.

Fig. 4.E, 143. E-I
Cabellos de ángel

Slightly woody vine, dioecious, that climbs by means of twining leaves and attains 3-4 m in length. Stems slender, almost cylindrical, brittle, puberulent, especially at the nodes; mature stems fissured, with corky bark, attaining ca. 1 cm in diameter. Leaves opposite, 5-9-foliolate; leaflets coriaceous, ovate, lanceolate, oblong, or sometimes deltate in outline, 2.5-6 × 0.8-3.6 cm, the apex acute or acuminate, the base rounded or subcordiform, the margins revolute, lobate-serrate, especially on the basal leaflets; upper surface slightly shiny, glabrous or puberulent, with the venation sunken; lower surface pale green, dull, glabrous or puberulent, with prominent venation; petiolules puberulent, 5-15 mm long; petioles 2-7 cm long, puberulent. Inflorescences axillary or terminal on short lateral branches; flowers unisexual, in paniculiform dichasial cymes; pedicels 2.5-3.2 cm long, strigulose, with a pair of minute bracteoles almost at the base. Sepals oblanceolate or obovate, 8-10 mm long, sericeous on the surface; stamens 35-60, unequal; carpels 20-30(50), ca. 6 mm long. Fruit an elliptical achene, flattened, 3-4 mm long, pilose, with the margin thickened on one border, the style plumose, persistent, 1.5-3 cm long, dispersed by the wind.

Phenology: Collected in flower in November and in fruit in January.

Status: Native, not very common.

Distribution: Although not very common, this species is found throughout Puerto Rico, except for the wet areas. Also in the Greater Antilles.

Public Forests: Guajataca, Guilarte, and Maricao.

3. Clematis polygama Jacq., Enum. Syst. Pl. 24. 1760.

Fig. 143. A-D
Cabellos de ángel

Slightly woody vine, dioecious, that climbs by means of twining leaves and attains 10 m in length. Stems slender, cylindrical, sulcate, pilose or strigose, with many lateral branches. Leaves opposite, trifoliolate; leaflets chartaceous, ovate or lanceolate, 5-11 × 2-8 cm, the apex acute or acuminate, the base rounded or subcordiform, the margins entire, not lobate, sometimes with 1-3(5) teeth; upper surface dull, glabrous or sparsely strigulose; lower surface pale green, dull, glabrous or sparsely strigulose, with prominent venation; petiolules strigulose, the terminal one 0.7-3.5 cm long, the lateral ones 0.4-2 cm long; petioles 3-13 cm long, strigulose. Flowers unisexual, in axillary simple dichasial cymes, sometimes

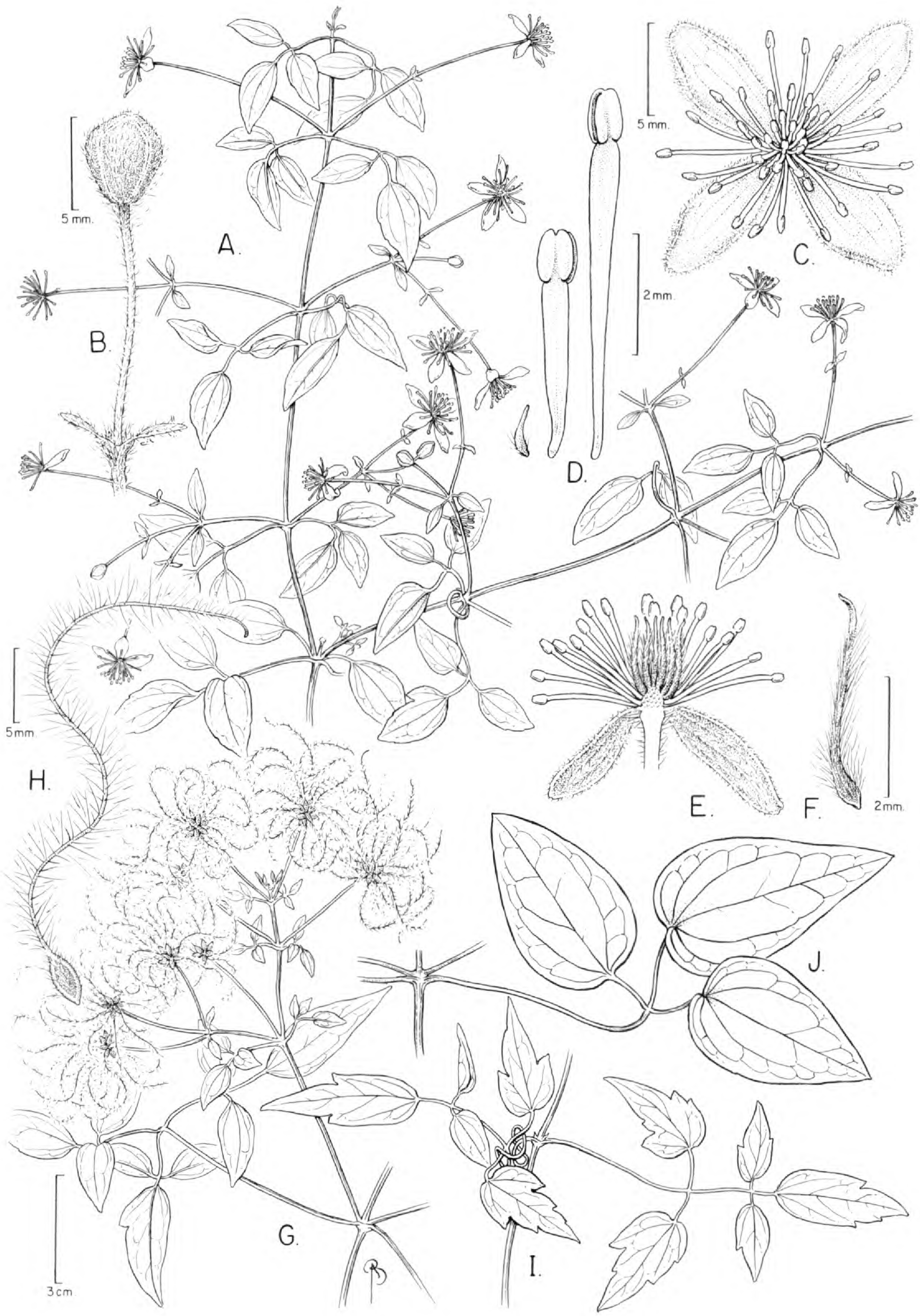

Fig. 143. A-D. *Clematis polygama.* **A.** Flowering branch. **B.** Bud. **C.** Flower, top view. **D.** Stamens. **E-I.** *Clematis flammulastrum.* **E.** Flower, longitudinal section. **F.** Carpel. **G.** Fertile branch. **H.** Achene. **I.** Node with pair of leaves. **J.** *Clematis dioica*, node, showing a leaf.

solitary; peduncles strigose; pedicels 1.2-3 cm long, strigose, with a pair of minute bracteoles near the base. Sepals white, cream-colored, or pale green, oblong or elliptical, 8-10 mm long, sericeous-pubescent on the outer surface; stamens 16-66, unequal; carpels 20-60, ca. 6 mm long. Fruit an elliptical achene, compressed, ca. 4 mm long, pilose, the margin thickened, the style plumose, persistent, 4-6 cm long, dispersed by the wind.

Phenology: Collected in flower in October and November and in fruit in December and January.

Status: Native, relatively common.

Distribution: In disturbed areas, secondary vegetation, and thickets. Also from central Mexico to Panama and the Greater Antilles.

Public Forests: Guajataca, Guilarte, Maricao, and Río Abajo.

Commentary: The three species present in Puerto Rico had been treated as a single species under the name of *Clematis dioica*. The revision of Moreno (1993) reveals the presence of three species in Puerto Rico, with *C. dioica* limited to the Greater Antilles. The species that is found in the Lesser Antilles corresponds, according to her, to *C. guadeloupae* Pers.

Reference: Moreno, N.P. 1993. Taxonomic revision of *Clematis* L. subgenus *Clematis* (Ranunculaceae) for Latin America and the Caribbean. Doctoral thesis, Rice University.

38. *Family* ***RHAMNACEAE***

1. GOUANIA

Woody vines that climb by means of axillary tendrils, basal to the inflorescences. Leaves alternate, chartaceous or coriaceous, usually serrate; stipules small, persistent. Flowers bisexual or less frequently unisexual, actinomorphic, in axillary or terminal spikes, racemes, or panicles; calyx conical to campanulate, with 5 lobes; petals 5, greenish yellow or whitish, unguiculate, concave; stamens 5, as long as the petals, usually hooded by the petal, the filaments adnate to the margin of the disc; disc crateriform; ovary subinferior, trilocular, the locules uniovulate, the stigmas 3, reflexed. Fruit a schizocarp, trilocular, three-winged, septicidal, that separates into 3 indehiscent mericarps; seeds obovate. A pantropical genus of about 50 species.

Key to the species of *Gouania*

1a. Leaves 4.5-7.5 cm long, glabrous or puberulent ..... 1. *G. lupuloides*
1b. Leaves 5-15 cm long, pubescent ..... 2. *G. polygama*

1. Gouania lupuloides (L.) Urb., Symb. Antill. 4: 378. 1910.

Fig. 144. A-H

BASIONYM: *Banisteria lupuloides* L.
SYNONYM: *Rhamnus domingensis* Jacq.
Gouania domingensis (Jacq.) L.

Bejuco indio, Bejuco de sopla, Sopla, Chow stick, Soap stick, Soap vine, White root

Woody vine that climbs by means of tendrils and attains 7-12 m in length. Stems with many lateral branches; bark grayish, fissured. Branches cylindrical, green, glabrous or puberulent; tendrils simple, semicircular in form, basal to the inflorescences or terminal on short lateral branches. Leaves alternate, 4.5-7.5(10.5) × 2-4(6.5) cm, chartaceous, ovate or elliptical, glabrous or puberulent, the apex acute or short-

acuminate, the base rounded or subcordiform, the margins serrate; upper surface dark green, shiny, with the venation sunken; lower surface pale green, slightly shiny, with prominent venation; petioles 0.5-1.5 cm; stipules 2-3 mm long. Inflorescences of racemes, terminal or on short axillary branches, 5-10 cm long, pubescent. Calyx pubescent outside, the sepals ca. 1 mm long, triangular, glabrous on the inner surface; petals yellowish, ca. 1 mm long, forming a hood that covers the stamen; stamens slightly shorter than the petals; disc ca. 1 mm high. Fruit a three-winged schizocarp, 5-7 mm long, dehiscent into 3 trigonal mericarps. Seeds 3-4 mm long.

Phenology: Flowering from August to March and fruiting from November to March.

Status: Native, very common.

Distribution: In disturbed areas, secondary forests, and dry forests at lower and middle elevations. Also on Vieques, St. Croix, St. John, St. Thomas, and Tortola; throughout the Antilles, the United States (southern Florida) and from southern Mexico to northern South America.

Public Forests: Cambalache, Ceiba, Guajataca, Guánica, Maricao, Río Abajo, and Susúa.

2. Gouania polygama (Jacq.) Urb., Symb. Antill. 4: 378. 1910.

Fig. 144. I-N

BASIONYM: *Rhamnus polygamus* Jacq.
SYNONYM: *Gouania tomentosa* Jacq.

Mascapelo

Woody vine that climbs by means of tendrils and attains 8-15 m in length. Stems grayish, attaining 3 cm in diameter. Branches green, ferruginous-tomentose, slightly striate; tendrils simple, semicircular, basal to the inflorescences or distal on short lateral branches. Leaves alternate, 5-15 × 3.2-7.5 cm, broadly elliptical, oblong, or ovate, chartaceous, the apex obtuse, acute, or short-acuminate, the base subcordiform or rounded, the margins serrate; upper surface dark green, slightly shiny, pubescent; lower surface pale green, dull, pilose, with prominent venation; petioles 1-1.5 cm long, pubescent. Inflorescences of axillary or terminal racemes, 10-22 cm long. Calyx 1.5-2 mm long, cupuliform, whitish, tomentose, the sepals ovate, 0.7-1 mm long; petals whitish, ca. 1 mm long, spathulate, enclosing the stamens; stamens as long as the petals; disc almost pentagonal, fleshy; styles 3. Fruit a three-winged schizocarp, 8-12 mm long, dehiscent into 3 indehiscent mericarps, trigonal, with a wing on each side of the seminiferous center. Seeds ovate, light brown, shiny, ca. 3 mm long.

Phenology: Collected in flower from October to November and in fruit from December to January.

Status: Native, locally common.

Distribution: In disturbed areas, more or less moist, at middle elevations, in western and central Puerto Rico. Also in Cuba, Hispaniola, Tobago, Trinidad, and tropical continental America.

Public Forests: Guánica, Guajataca, Guilarte, Río Abajo, and Susúa.

39. *Family* ***ROSACEAE***

1. RUBUS

Erect, clambering, or decumbent shrubs, with numerous recurved spines. Leaves alternate, compound, trifoliolate or 5-9-pinnate; stipules small, conspicuous, usually adnate to the petiole, persistent. Flowers bisexual, actinomorphic, in axillary or terminal racemes or panicles; calyx with 5 lobes, usually glandular; petals 5, free, white; stamens numerous, the filaments free; gynoecium of numerous coherent carpels, superior, uniovulate. Fruit a syncarp of numerous, minute, coherent drupes. A genus of about 250 species, the majority of the temperate zone of the Northern Hemisphere.

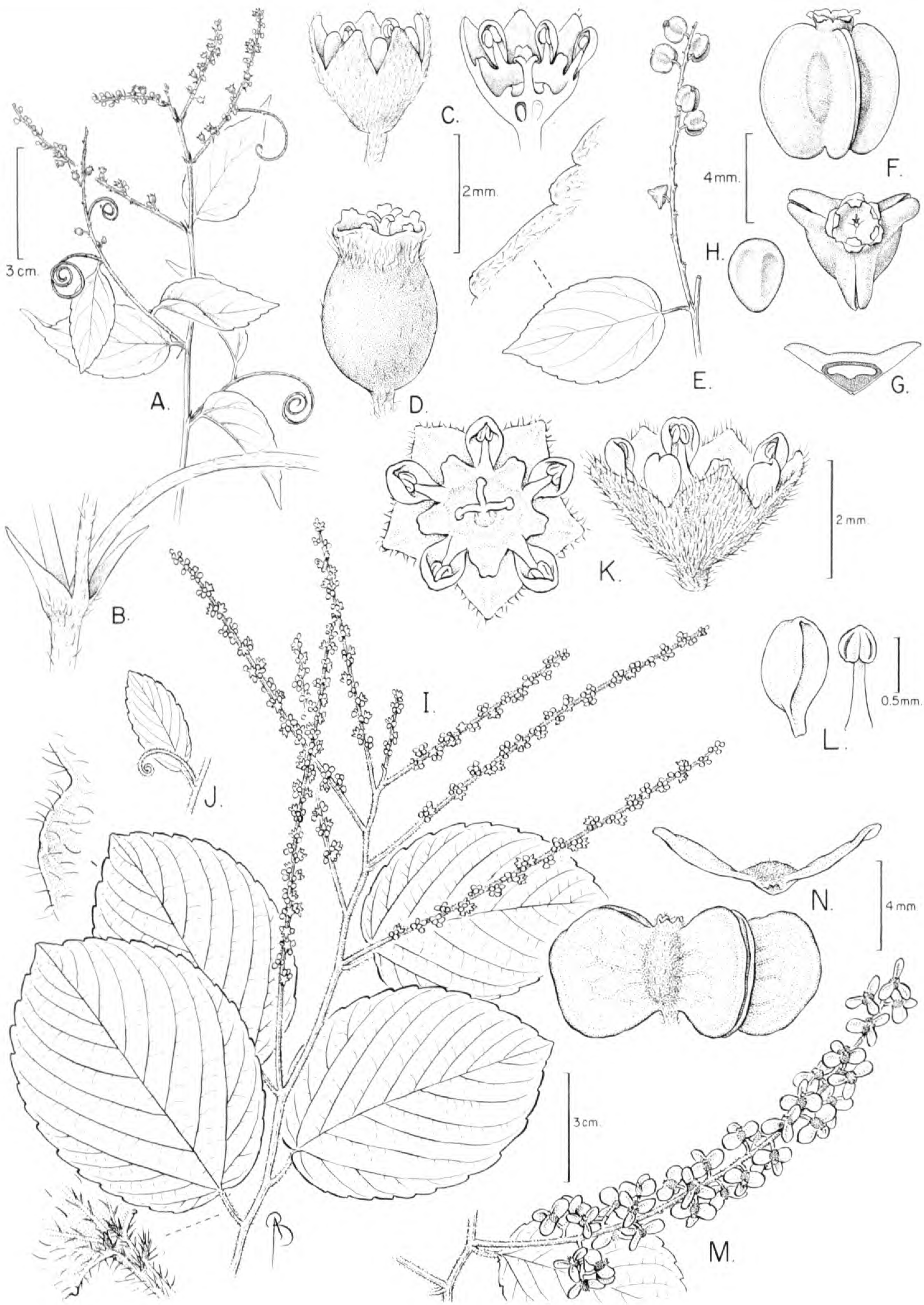

Fig. 144. A-H. *Gouania lupuloides*. **A.** Fertile branch. **B.** Node with stipules. **C.** Flower, side view and longitudinal section. **D.** Fertilized flower. **E.** Fruiting branch. **F.** Fruit, side and top views. **G.** Mericarp. **H.** Seed. **I-N.** *Gouania polygama*. **I.** Fertile branch, with details of pubescence. **J.** Leaf with tendril. **K.** Flower, top and side views. **L.** Petal and stamen. **M.** Fruiting branch. **N.** Fruit, side view, and mericarp.

1. Rubus florulentus Focke, Abh. Nat. Ver. Bremen 11: 411. 1800.

Fig. 145. A-J

Fresa de la montaña

Clambering shrub or woody vine, climbing, that supports itself by means of recurved spines and attains 5-10 m in length. Stems cylindrical or angular, more or less glabrous, with a reddish tinge, with numerous recurved spines. Leaves alternate, trifoliolate; leaflets 4-11 × 3.3-8 cm, elliptical, ovate, broadly elliptical, or oblong, the terminal leaflet larger than the lateral ones, the apex obtuse, acute, or short-acuminate, the base rounded, truncate, or subcordiform, the margins serrate-mucronate; upper surface dark green, shiny, with the venation sunken, the midvein ferruginous-pubescent; lower surface pale green, dull, with prominent venation, the midvein yellowish, with recurved spines, puberulent, especially alongside the midvein and at the base of the secondary veins; petioles 2.5-6 cm long, swollen at the base, spiny; rachis spiny, 1-3 cm long; stipules linear, 3-4 mm long, adnate to the petiole. Inflorescences of terminal racemes or panicles; axes spiny, tomentose, up to 15 cm long; pedicels 4-7 mm long, tomentose, spiny. Sepals ovate, sericeous outside, free almost to the base, ca. 5 mm long, mucronate at the apex; petals white, obovate, 12-15 mm long; stamens numerous, 3-4.5 mm long; styles glabrous, stigma lateral on distal portion. Fruits aggregate, broadly ovoid, 1.5-2 cm long, formed of numerous fleshy achenes, dark violet in color.

Phenology: Flowering from February to August.

Status: Endemic to Puerto Rico, not very common.

Distribution: Known only from the Cordillera Central, in Adjuntas, Jayuya, Maricao, and Orocovis.

Public Forests: Guilarte, Maricao, and Toro Negro.

40. *Family* ***RUBIACEAE***

Key to the genera

1a. Twining vines or lianas 2
1b. Herbs or scandent shrubs, not twining..... 3

2a. Fruits white, circular, laterally flattened; mature stems sulcate, with numerous vascular cylinders ..... *1. Chioccoca*
2b. Fruits red or wine-colored, ellipsoid or globose; mature stems terete with a single vascular cylinder ..... *6. Sabicea*

3a. Scandent shrubs or herbs, not bering aerial roots; corolla < 1 cm long 4
3.b. Shrubs climbing by means of aerial roots; corolla > 2 cm long 6

4a. Leaves with a strong, fetid odor ..... *4. Lasianthus*
4b. Leaves without fetid smell 5

5a. Herbs; stems hispidulose, retrorsely pubescent along corners; fruits capsular, light brown..... *2. Diodia*
5b. Shrubs; stems glabrous, fruits of fleshy drupes, red ..... *5. Psychotria*

6a. Flowers solitary; tube of the corolla 6-10 cm long; fruit capsular, green, 5-12 cm long ..... *3. Hillia*
6b. Flowers in heads; tube of the corolla 1.5-2.5 cm long; fruit a berry, white, ca. 1.5 cm long ..... *7. Schradera*

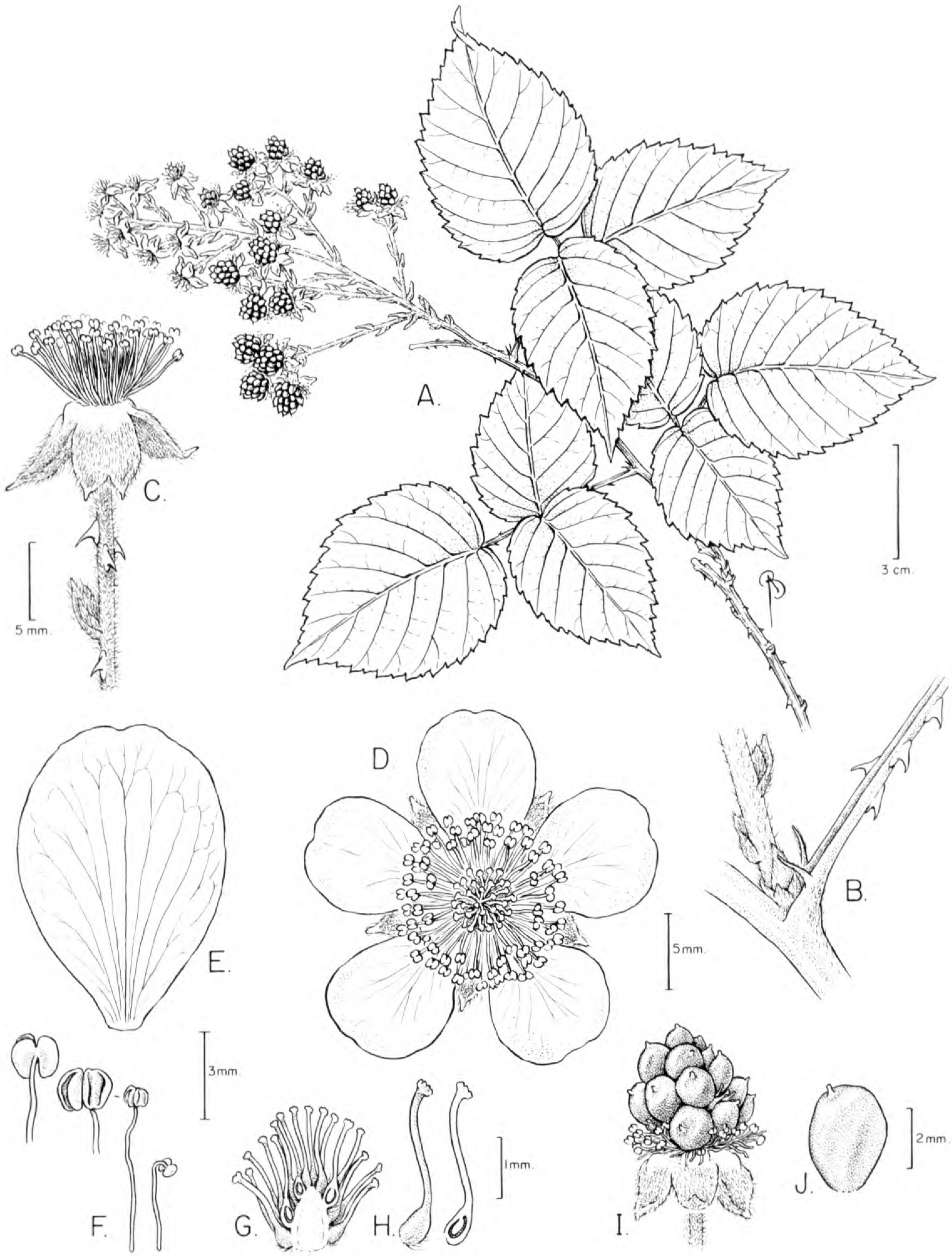

Fig. 145. A-J. *Rubus florulentus*. **A.** Fertile branch. **B.** Node with immature inflorescence. **C.** Flower, side view. **D.** Flower, top view. **E.** Petal. **F.** Stamens. **G.** Gynoecium, longitudinal section. **H.** Carpel, side view and longitudinal section. **I.** Syncarp. **J.** Fruitlet.

1. CHIOCOCCA

Twining vines or shrubs. Leaves opposite, coriaceous, entire; stipules interpetiolar, deciduous. Flowers bisexual or pistillate, 5-merous, actinomorphic, produced in axillary racemes. Calyx 5-lobate; corolla infundibuliform or campanulate, with reflexed or expanded lobes; stamens 5; ovary inferior, of two carpels, each carpel with a pendulous ovule, the style filiform. Fruit a flattened berry with two pyrenes. A neotropical genus of approximately 20 species.

1. Chiococca alba (L.) Hitchc., Rep. Missouri Bot. Gard. 4: 94. 1893.

Fig. 146. A-H

BASIONYM: *Lonicera alba* L.
SYNONYMS: *Chiococca racemosa* L.
Chiococca parvifolia Griseb.
Chiococca alba (L.) Hitchc. *var. parvifolia* (Griseb.) Urb.
Chiococca alba (L.) Hitchc. *ssp. parvifolia* (Griseb.) Steyerm.

Bejuco de berac, Snow berry

Woody vine or shrub, twining, attainig 3-10 m in length. Stems sulcate, with numerous opposite lateral branches; cross section of the mature stem with several cortical vascular bundles. Leaves opposite, coriaceous, elliptical, lanceolate, ovate, or oblong, 3-8 × 1-3.5 cm, the apex obtuse, acute, or acuminate, the base obtuse or acute, the margins entire, revolute; upper surface dark green, dull; lower surface light green, dull, with the midvein prominent; petioles 4-7 mm long, glabrous or puberulent; stipules ca. 2 mm long, acicular. Flowers bisexual or pistillate, in axillary racemes, 2-5 cm long; pedicels 3.5-5 mm long. Hypanthium green, glabrous, laterally flattened, ca. 2 mm long, crowned by a crateriform calyx, 1-1.2 mm long, the sepals triangular, ca. 0.5 mm long; corolla infundibuliform, pentagonal, intense yellow, usually with reddish lines on the angles (purple in the floral buds), the tube 4.5-6 mm long, the lobes reflexed, 1.5-3 mm long; stamens slightly exserted, the filaments unequal, pilose, connate at the base into a short tube; style bilobate, exserted in the pistillate flowers. Fruit a circular drupe, laterally flattened, 5-7 mm long, fleshy, white when ripe.

Phenology: Flowering throughout the year and fruiting from June to March.

Status: Native, very common.

Distribution: In forests and on roadsides, in dry and moist areas at lower and middle elevations. Also on Mona, Vieques, St. Croix, St. John, St. Thomas, and Virgin Gorda; throughout the Antilles, the United States (Florida), and tropical continental America.

Public Forests: Cambalache, Carite, Ceiba, Guajataca, Guánica, Maricao, Mona, Río Abajo, Susúa, and Tortuguero

Commentary: There is too much variation in the characters that have been utilized to distinguish *Chiococca alba* from *C. parvifolia*, so that it is not possible to distinguish two species with certainty. For this reason, I consider *C. alba* in a broader sense, including *C. parvifolia*. On the other hand, in Puerto Rico there is another species of *Chiococca* that I consider to be in accordance with the original description of *C. micrantha* Johnst. This species is not included in this work, since it is of shrubby habit. It can be distinguished from *C. alba* by the following key.

1a. Woody vine, twining; stems with cortical bundles; inflorescences 2-5 cm long, of 5-30 flowers; corolla intense yellow, 4.5-6 mm long ..... *C. alba*

1b. Erect shrub with arcuate stems; stems without cortical bundles; inflorescences less than 1 cm long, with 2-3 flowers; corolla pale yellow, ca. 2 mm long ..... *C. micrantha*

2. DIODIA

Erect, decumbent, or scandent herbs. Stems quadrangular. Leaves opposite, entire, sessile or almost sessile; stipules interpetiolar, connate, and united to the petiole. Flowers bisexual, sessile, 4-(6)-merous, actinomorphic, solitary, in axillary spikes or heads. Calyx 2-4(-6)-lobate; corolla infundibuliform or hypocrateriform, with 4(-6) lobes; stamens 4(-6); ovary inferior, of two carpels, each carpel with a

single ovule, the style filiform, the stigma bilobate or capitate. Fruit indehiscent or schizocarpous, dry. A genus of approximately 50 species, the majority of tropical America, some species of Africa.

1. Diodia sarmentosa Sw., Prodr. 30. 1788.

Fig. 146. I-L

Scandent or decumbent herb, attainig 3-5 m in length. Stems quadrangular, hispidulous or puberulent, retrorsely pubescent on the angles. Leaves opposite, membranaceous, elliptical or oblong-lanceolate, 2.5-7.3 × 0.9-2.8 cm, the apex acute or acuminate, the base attenuate, the margins entire, revolute; upper surface dull, scabrous, with the venation sunken; lower surface scabrous, puberulent, with prominent venation; petioles < 1 mm long; stipules connate at the base, with numerous acicular projections up to 5 mm long. Flowers bisexual, in axillary fascicles, sessile. Hypanthium green, glabrous, obovoid, ca. 2.5 mm long, crowned by 4 long-triangular lobes, ca. 1.5 mm long, pubescent; corolla tubular, ca. 2.5 mm long, white, the lobes 5, ca. 0.5 mm long; stamens included. Fruit schizocarpous, opening in two indehiscent longitudinal halves, each containing one seed inside. Seeds dark brown, oblong, slightly flattened on one side, ca. 3 mm long.

Phenology: Flowering from July to April and fruiting from September to April.

Status: Native, locally common.

Distribution: In thickets and pastures and on forest edges and roadsides, in moist areas at lower and middle elevations. Reported for St. Thomas (Britton, 1925). Also in the Antilles, Mexico, Central America, northern South America, and introduced in the tropics of the Old World.

Public Forests: Carite, El Yunque, Maricao, Río Abajo, Susúa, and Tortuguero.

3. HILLIA

Epiphytic shrubs, scandent, with long pendulous branches. Leaves opposite, thick-coriaceous, entire, petiolate; stipules intrapetiolar, membranaceous, deciduous. Flowers bisexual, actinomorphic, solitary, subsessile, terminal. Calyx with 2-9 foliaceous or truncate lobes; corolla hypocrateriform, the tube elongate, narrow, with 3-7 expanded lobes; stamens 4-7; ovary inferior, of two carpels, each carpel with numerous ovules, the style filiform. Fruit an elongate capsule, narrow, oblong or cylindrical, septicidal; seeds numerous, with an appendage of hairs on the apical portion. A neotropical genus of 24 species.

1. Hillia parasitica Jacq., Enum. Pl. Carib. 18. 1760.

Fig. 146. M-P

SYNONYM: *Hillia longiflora* Sw.

Hilia, Flor de sierra, Tibey trepador

Clambering or epiphytic shrub, climbing by means of adventitious roots, attainig 2-3 m in length. Stems cylindrical, brown, with pendulous lateral branches. Leaves opposite, coriaceous, glabrous, 3.5-12 × 1.7-6.5 cm, elliptical or oblanceolate, the apex abruptly acuminate, revolute, the base acute, the margins entire, revolute; upper surface dark green, shiny, with the midvein yellowish; lower surface pale green, with the midvein slightly prominent; petioles cylindrical, 10-20 mm long; stipules oblong, 1-5.5 cm long, membranaceous, deciduous. Flowers solitary, terminal on lateral branches, subtended by a pair of oblong bracts, 15-18 mm long. Calyx tubular, 3-5 mm long, green; corolla white, the tube narrow, 6-10 cm long, the limb with 4-7 slender lobes, 2-4 cm long, spreading, reflexed at the apex. Capsule cylindrical, 5-12 cm long, laterally compressed. Seeds numerous, elliptical, ca. 1 mm long, with a tuft of silky fibers, ca. 2 cm long, in the apical portion.

Phenology: Flowering and fruiting almost throughout the year.

Status: Native, locally common.

Distribution: In moist upper regions along the Cordillera Central and in the Sierra de Luquillo. Also throughout the Antilles and in tropical South America.

Public Forests: Carite, El Yunque, Guilarte, Maricao, and Toro Negro.

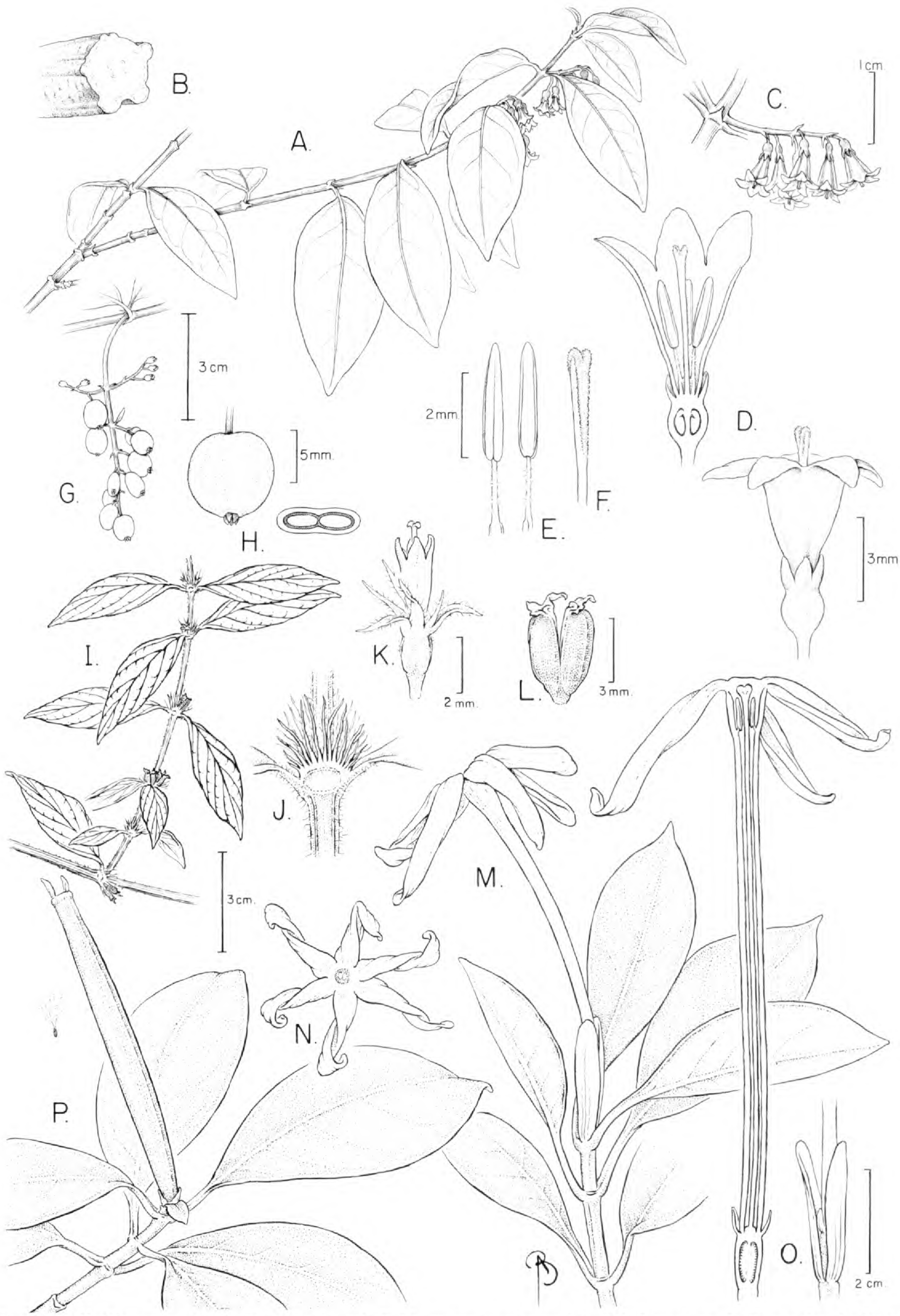

Fig. 146. A-H. *Chiococca alba*. **A.** Flowering branch. **B.** Mature stem, cross section. **C.** Inflorescence. **D.** Flower, longitudinal section and side view. **E.** Stamens. **F.** Stigma. **G.** Infructescence. **H.** Fruit, side view and cross section. **I-L.** *Diodia sarmentosa*. **I.** Branch. **J.** Node, showing stipules. **K.** Flower. **L.** Fruit. **M-P.** *Hillia parasitica*. **M.** Flowering branch. **N.** Flower, top view. **O.** Flower, longitudinal section, and detail of bracts. **P.** Branch with fruit.

4. LASIANTHUS

Erect or clambering shrubs or small trees, usually with a fetid odor. Leaves opposite, decussate, simple, entire; stipules interpetiolar, triangular, persistent or deciduous. Flowers bisexual, 4-6-merous, actinomorphic, produced in axillary fascicles. Hypanthium urceolate, ovoid or subglobose, lobes 3-6; corolla tubular, hypocrateriform or infundibuliform, with 4-6 expanded or erect lobes; stamens 4-6, inserted on the throat, included; ovary inferior, of 4-12 carpels with one ovule, the style filiform, with 4-10 stigmatic branches. Fruit a fleshy drupe, with 4-12 trigonal pyrenes, each containing a single seed. A genus of approximately 150 species, of southeastern Asia, Malasia, tropical Australia, and Africa, with two species in the Antilles and one in tropical continental America.

1. Lasianthus lanceolatus (Griseb.) M. Gómez, Noc. Bot. Sist. Habana 86. 1893.

Fig. 147. J-P

BASIONYM: *Hoffmannia lanceolata* Griseb.
SYNONYMS: *Sabicea moralesii* Griseb.
Lasianthus moralesii (Griseb.) C. Wr.

Mata de peo

Slightly woody shrub or herbaceous, clambering or decumbent, attainig 2 m in length. Stems green, glabrous or sparsely lanate, cylindrical or slightly flattened or sulcate, attaining 5 mm in diameter. Leaves opposite, (4.5)6.5-13.3 × 2.3-5.7 cm, brittle and very foul-smelling when fresh, chartaceous on drying, oblanceolate, obovate, oblong, or elliptical, the apex acuminate or short-acuminate, the base acute or obtuse, the margins crenulate, revolute; upper surface glabrous, dull or shiny, foveate-reticulate, with the venation sunken; lower surface pale green, lanate-pubescent only on the primary and secondary veins, the venation reticulate, prominent; petioles sparsely lanate, 1.2-1.7(2.5) cm long; stipules oblong, ca. 3 mm long, early deciduous. Axillary buds lanate-pubescent. Flowers sessile, in axillary clusters. Calyx green, 4-4.5 mm long, the lobes 3-5, ovate, ca. 2.5 mm long, strigulose; corolla infundibuliform, white, the tube ca. 3 mm long, the lobes 4-5, revolute, hirsute on the inner surface; ovary partially inferior, glabrous. Fruits urceolate, fleshy, with 5 pyrenes, 5-7 mm long, white or yellowish, with the sepals fleshy and persistent at the apex.

Phenology: Flowering almost throughout the year and fruiting from December to July.

Status: Native, locally common.

Distribution: In the interior of moist and wet forests of the Cordillera Central and the Sierra de Luquillo. Also in the Greater Antilles.

Public Forests: Carite, El Yunque, Guilarte, and Toro Negro.

5. PSYCHOTRIA

Erect or less frequently clambering shrubs, herbs, or small trees. Leaves opposite or less frequently 3 or 4 per node, petiolate; stipules interpetiolar or intrapetiolar, persistent or deciduous. Flowers bisexual, 4-6-merous, actinomorphic, sessile or pedicellate, in axillary or terminal panicles, corymbs, cymes, racemes or heads, with greenish axes. Calyx crateriform, dentate or truncate at the apex; corolla gamopetalous, hypocrateriform, infundibuliform, or campanulate, of various colors, but usually white; stamens 4-6, exserted or included; ovary inferior, with 2(-5) carpels, each carpel with one ovule. Fruit a fleshy drupe with 2(5) pyrenes, each containing a single seed. A pantropical genus of 1,000-1,500 species.

1. Psychotria microdon (DC.) Urb., Symb. Antill. 9: 539. 1928.

Fig. 147. A-I

BASIONYM: *Rondeletia microdon* DC.
SYNONYM: *Psychotria pinnularis* Sessé & Moçiño

Woody shrub, clambering, attainig 2-2.5 m in length. Stems grayish, glabrous, slightly flattened or quadrangular; lateral branches decussate, short or elongate. Leaves opposite, 5-10 × 2-4.3 cm, chartaceous, obovate or oblanceolate, the apex

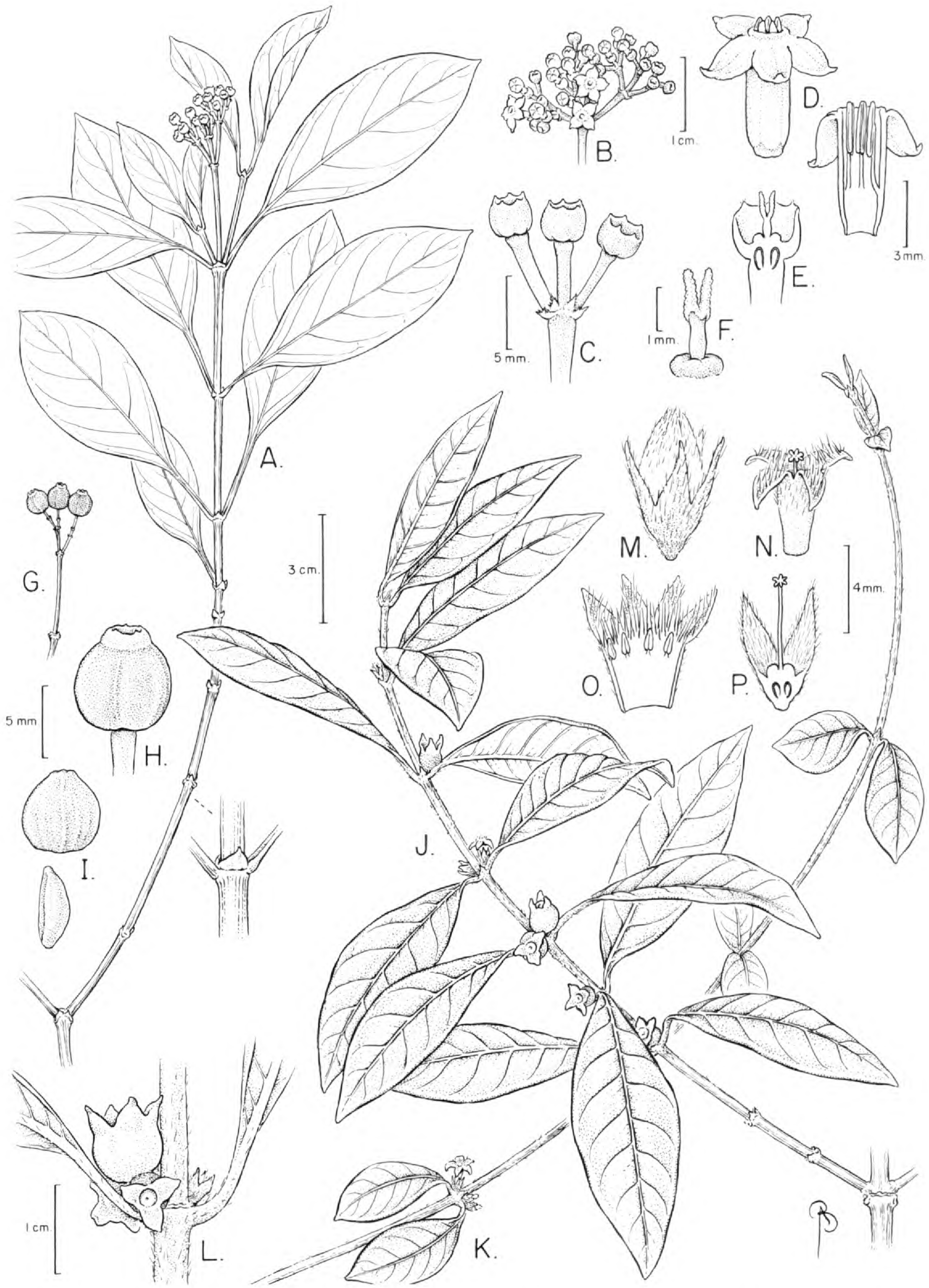

Fig. 147. A-I. *Psychotria microdon*. **A.** Fertile branch. **B.** Inflorescence. **C.** Detail of inflorescence. **D.** Corolla, side view and longitudinal section. **E.** Calyx and hypanthium. **F.** Gynoecium. **G.** Portion of infructescence. **H.** Fruit. **I.** Pyrene and seed. **J-P.** *Lasianthus lanceolatus*. **J.** Fertile branch. **K.** Flowering branch. **L.** Detail of infructescence. **M.** Bud. **N.** Corolla. **O.** Corolla, longitudinal section. **P.** Calyx and gynoecium, longitudinal section.

acute or obtuse, the base acute, obtuse, or attenuate toward the petiole, the margins entire, revolute; upper surface glabrous, with the venation flat; lower surface pale green, glabrous or puberulent on the veins, the venation prominent; petioles glabrous, 0.5-2 mm long; stipules ovate, ca. 1.5 mm long, early deciduous. Flowers almost sessile, in terminal corymbs at the ends of short lateral branches. Calyx green, 1.5-2 mm long, crateriform, glabrous, the lobes thin; corolla campanulate, white, the tube ca. 5 mm long, the lobes 3-3.5 mm long, spreading; stamens 5, included. Fruits compressed-obovoid, 5-6 mm long, red when ripe. Pyrenes 2, sulcate.

Phenology: Flowering from April to December and fruiting from July to March.

Status: Native, not very common.

Distribution: In disturbed areas, dry forests and thickets. Also on Isla Piñeiro, Vieques, Guana, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; Cuba, Hispaniola, the Lesser Antilles, northern South America and along the Pacific coast of South America to Peru.

Public Forests: Ceiba, Guánica, and Guajataca.

6. SABICEA

Vines or twining lianas or less frequently small trees. Leaves opposite or whorled, entire; stipules interpetiolar, simple, persistent. Flowers bisexual, 4-6-merous, actinomorphic, produced in axillary cymes or fascicles. Calyx 3-6-lobate; corolla infundibuliform or hypocrateriform, the tube short or elongate, with 4-5 lobes; stamens 4-6, inserted on the throat of the corolla, exserted or included; ovary inferior, with (2)3-5 carpels, each carpel with numerous axile ovules. Fruit a berry with 2-5 locules; seeds numerous, minute, ovoid or angular, foveate. A genus of approximately 135 species, distributed in tropical America, Africa, and Madagascar.

1. Sabicea villosa Roem. & Schult., Veg. 5: 265. 1819.

Fig. 148. A-D

SYNONYM: *Sabicea hirsuta* Kunth

Herbaceous or slightly woody vine, twining, attainig 5 m in length. Stem green, hirsute, cylindrical, glabrescent, attaining 5 mm in diameter. Leaves opposite, membranaceous, 6-12 × 3.2-5.5 cm, ovate, oblong or elliptical, the apex acuminate, the base obtuse or less frequently attenuate, unequal, the margins entire, ciliate; upper surface sparsely hirsute, with the venation sunken; lower surface sparsely hirsute, particularly on the prominent veins; petioles hirsute, 7-14 mm long; stipules broadly ovate, 6-7 mm long, strigulose on the outer surface, persistent. Flowers sessile, in axillary clusters; bracts ovate, 3-5 mm long. Calyx green, strigose, 2-2.5 mm long, the lobes 5, expanded, glabrous; corolla tubular, white, strigose, 6-7 mm long. Berry globose or ellipsoid, fleshy, strigose, 7-10 mm long, purple, with the sepals persistent at the apex. Seeds numerous, ca. 0.5 mm long, cuneiform.

Phenology: Flowering and fruiting during most of the year.

Status: Native, not very common.

Distribution: In pastures and forests in moist and wet areas at middle elevations. Also tropical continental America.

Public Forests: Carite, El Yunque, Maricao, Río Abajo, and Toro Negro.

Excluded Species

Sabicea cinerea and *Sabicea* sp. a. (of the Spanish edition of this books) are excluded as their records were based on misidentification of *Tetrapteryx inaequalis* of the Malpighiaceae.

7. SCHRADERA

Trees or shrubs, epiphytic or climbing by means of adventitious roots. Leaves opposite, coriaceous, entire, petiolate; stipules interpetiolar, large, connate at the base, deciduous. Flowers bisexual, 5-10-merous, actinomorphic, produced in involucrate and pedunculate heads, these solitary or in umbels.

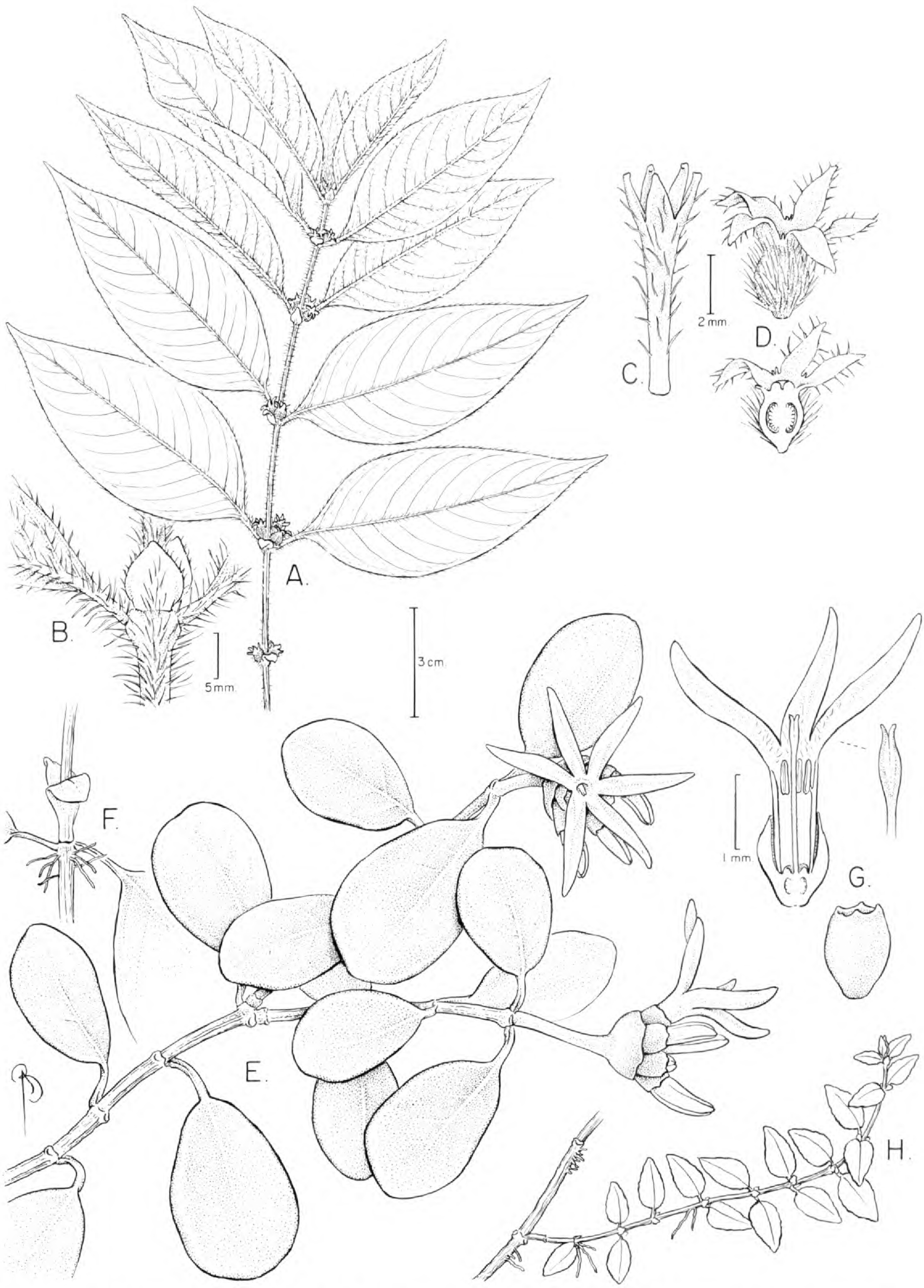

Fig. 148. A-D. *Sabicea villosa*. **A.** Fertile branch. **B.** Node, showing stipules. **C.** Corolla. **D.** Calyx and hypanthium, side view and longitudinal section. **E-H.** *Schradera exotica*. **E.** Flowering branch. **F.** Node, with detail of stipules. **G.** Flower, longitudinal section, calyx, and stigmas. **H.** Juvenile branch.

Calyx tubular or crateriform, truncate or with minute lobes; corolla white, infundibuliform, hypocrateriform, or tubular-campanulate, fleshy, villous on the throat, with 5-10 valvate lobes; stamens 5-10, inserted on the throat of the corolla, included or exserted; ovary inferior, with 2-4 carpels, each carpel with numerous ovules, the style with 2-4 stigmatic branches. Fruit a berry with 2-4 locules; seeds numerous, minute, circular. A neotropical genus of 16-40 species.

1. Schradera exotica (Gmelin) Standl., Field Mus. Pub. Bot. 4: 286. 1929.

Fig. 148. E-H

BASIONYM: *Urceolaria exotica* Gmelin
SYNONYM: *Schradera capitata* Vahl
Schradera vahlii Steyerm.

Plant with a juvenile phase morphologically different from the adult phase. Juvenile plant ca. 1 m in length, sparsely branched, which grows attached to the host plant by means of adventitious roots; leaves membranaceous, crenate. Adult plant developing into a woody vine, with scandent and pendulous branches, attainig 12 m in length. Stems cylindrical, up to 2.5 cm in diameter. Leaves opposite, coriaceous, glabrous, elliptical or oblong, 5-9.5 × 2.8-5.5 cm, the apex and the base obtuse, the margins entire, revolute; upper surface dark green, shiny, with the midvein yellowish green; lower surface pale green, with the midvein prominent; petioles yellowish green, thick, ca. 1.5 cm long; stipules interpetiolar, caducous, obovate, 1.5-2 cm long, reflexed at the apex. Inflorescences in terminal heads; involucre crateriform, thick, green, ca. 2.5 cm in diameter; flowers sessile; peduncles thick, 3-4 cm long. Calyx 10-15 mm long, crateriform, green, fleshy, truncate at the apex; corolla white, fleshy, tubular, with 9 or 10 oblong lobes, the tube pilose inside; stamens 6; style white, stigmas 2, green, exserted. Fruit a white berry, oblong, fleshy, ca. 1.5 cm long. Seeds numerous, minute.

Phenology: Collected in flower from March to July and in November.

Status: Native, locally common.

Distribution: In moist and wet forests of the Cordillera Central and the Sierra de Luquillo. Also in Cuba, Hispaniola, and the Lesser Antilles.

Public Forests: Carite, El Yunque, Guilarte, Maricao, and Toro Negro.

References: Steyermark, J. A. 1974. Rubiaceae. Flora de Venezuela. Vol IX (1-3): 1-2070. Edición Especial del Instituto Botánico. Caracas, Venezuela. Taylor, C. M. 1994. Revision of *Hillia* (Rubiaceae). Ann. Missouri Bot. Gard. 81: 571-609.

41. *Family* ***SAPINDACEAE***

Key to the genera

1a. Herbaceous vines, 2-3 m in length, without latex; stems simple (cross section with a single central vascular cylinder); fruits capsular, membranaceous, inflated; seeds black, with a white reniform or cordiform hilum ..... 1. *Cardiospermum*

1b. Woody vines, 5-10 m in length, with milky latex; stems simple or compound (cross section with a central vascular cylinder and three or more peripheral vascular cylinders); fruits capsular or schizocarpous, neither membranaceous nor inflated; seeds black or brown, with an aril at the base or with a light brown circular hilum.....2

2a. Fruit red, capsular, dehiscent, exposing 1-3 black seeds with a white, fleshy aril at the base..... 2. *Paullinia*

2b. Fruit light brown, schizocarpous (indehiscent), which separates into three samaroid units with a basal wing; seeds not exposed, brown, with a circular scar, lacking an aril..... 3. *Serjania*

1. CARDIOSPERMUM

Herbaceous vines or erect herbs, lacking latex. Stems simple (cross section with a single vascular cylinder), angular. Leaves alternate, trifoliolate or biternate; leaflets chartaceous; rachis and petioles not winged; stipules minute and caducous. Tendrils spirally twisted, in pairs on the axis of the inflorescence (this sometimes not developed), vestigial in the non-climbing species. Inflorescence of axillary thyrses, with flowers grouped in lateral scorpioid cymes; pedicels articulated at the base; calyx of 4 or 5 sepals; petals 4, with a petaliferous appendage on the inner surface; floral disc unilateral, with 2 or 4 glands; stamens 8, the filaments unequal; ovary superior, 3-carpellate, the style simple, with 3 stigmatic branches. Fruit an inflated capsule, membranaceous, septicidal; seeds one per locule, globose or ellipsoid, with a white reniform or cordiform scar at the base. A genus of neotropical origin, of approximately 15 species, 3 of which have a pantropical distribution.

Key to the species of *Cardiospermum*

1a. Petals 5 mm or more in length; glands of the floral disc 2, oblong, 1.2-2 mm long; capsules ellipsoid, up to 6 cm long.....2. *C. grandiflorum*
1b. Petals less than 5 mm long; glands of the floral disc 4(2), ovoid or rounded, ca. 0.4 mm long; capsules subglobose or turbinate-trigonal, up to 3 cm long.....2

2a. Plants slightly robust; leaflets sinuate-dentate; inflorescences of 4 or more cincinni; capsules ellipsoid or globose-trigonal; seed with a reniform hilum .....1. *C. corindum*
2b. Plants herbaceous; leaflets deeply lobate or laciniate; inflorescences of 3 cincinni; capsules trigonal, depressed at the apex; seed with a cordiform hilum .....3. *C. halicacabum*

1. Cardiospermum corindum L., Sp. Pl. ed. 2, 526. 1762.

Fig. 149. M-N

Slightly woody vine, much branched from the base, that climbs by means of tendrils and attains 1.5-3 m in length. Stems with 5 longitudinal ribs, pubescent; cross section with a single vascular cylinder. Leaves alternate, biternate; leaflets 12-16 × 9-12 cm, chartaceous, the margins sinuate-dentate; both surfaces more or less pubescent, especially on the prominent venation; terminal leaflet rhombic, acute or acuminate at the apex and attenuate at the base; lateral leaflets oblong-ovate, acute at the apex, rounded at the base; rachis and petioles not winged; petioles 2-3 cm long; stipules minute, early deciduous; tendrils in pairs, spirally twisted, at the end of short axillary axes (aborted inflorescences), from which an inflorescence usually develops. Flowers functionally unisexual, zygomorphic, in axillary racemiform thyrses; cincinni more than 4, usually in more than one whorl. Calyx light green, of 4 sepals, the two outer ones ca. 1 mm long, the inner ones ca. 2.5-4 mm long; petals white, obovate, 3.5-4.5 mm long; petaliferous appendages slightly shorter than the petals, fleshy and yellow at the apex, forming a hood that encloses the apex of the glands of the disc; disc unilateral, with 4 rounded or ovoid glands, ca. 0.4 mm high; stamens 8, the filaments unequal, pubescent; ovary trilocular, with one style and 3 stigmas. Capsule ellipsoid to globose-trigonal, 2-3 cm long, inflated, stramineous when ripe. Seed one per locule, spherical, black, ca. 4 mm in diameter, with a white, reniform hilum.

Phenology: Collected in flower and fruit in February and May.

Status: Apparently native, rather common.

Distribution: In disturbed areas and dry forests at low elevation. Also on Desecheo, Mona, Vieques, Guana Island, St. Croix, St. John, and St. Thomas; throughout the tropics and subtropics. Cultivated for its curious capsules.

Public Forests: Guajataca, Guánica, and Mona.

2. Cardiospermum grandiflorum Sw., Prod. 64. 1788.

Fig. 149. H-K

Slightly woody vine, with numerous lateral branches, that climbs by means of tendrils and attains 5-8 m in length. Stems almost cylindrical, striate, glabrous; cross section with a single vascular cylinder. Leaves alternate, biternate; leaflets chartaceous, glabrous except for some hairs on the veins, the margins deeply serrate; terminal leaflet rhombic, 4.5-8 × 2-4 cm, the apex acute or acuminate, the base cuneate or attenuate; lateral leaflets oblong-lanceolate, 2.7-7 × 1.3-3 cm, the apex acute or acuminate, the base obtuse or attenuate; rachis and petiole not winged, canaliculate; petioles 1-5 cm long; stipules minute, early deciduous; tendrils in pairs, spirally twisted, at the end of short axillary axes (aborted inflorescences), from which an inflorescence usually develops. Flowers functionally unisexual, zygomorphic, in axillary racemiform thyrses; cincinni more than 4, usually in more than one whorl. Calyx light green, of 4 sepals, the two outer ones ca. 1.7-3 mm long, the inner ones ca. 5-8 mm long; petals white, obovate, 6-9 mm long; petaliferous appendages slightly shorter than the petals, fleshy and yellow at the apex, forming a hood that encloses the apex of the glands of the disc; disc unilateral, with 2 elongate glands, corniform, whitish, 1.2-2 mm long; stamens 8, the filaments unequal, glabrous or pubescent; ovary ovoid or ellipsoid, villous, with one style and 3 stigmas. Capsule membranaceous, inflated, ellipsoid or ovoid, 3-5.5 cm long, stramineous when ripe. Seed one per locule, spherical, black, 4-5.5 mm in diameter, with a white, obtuse-triangular hilum.

Phenology: Collected in flower in December and in fruit in February.

Status: Exotic, cultivated and locally naturalized in Puerto Rico, not very common.

Distribution: Naturalized at the Experimental Station in Mayagüez. Reported for St. Croix and St. Thomas. Native to the Neotropics, apparently introduced in the tropics of the Old World. Cultivated for its curious capsules.

3. Cardiospermum halicacabum L., Sp. Pl. 366. 1753.

Fig. 149. A-G

Herbaceous vine, much branched from the base, that climbs by means of tendrils and attains 1.5-2 m in length. Stems with 5 longitudinal ribs, glabrous or puberulent; cross section with a single vascular cylinder. Leaves alternate, biternate; leaflets chartaceous, puberulent or sparsely pubescent, the apex obtuse, acute, or acuminate, the base attenuate, the margins lobate or laciniate; terminal leaflet lanceolate or triangular-lanceolate, rhombic or narrowly lanceolate in outline, 2-3.5(5) cm long; lateral leaflets ovate, lanceolate, or oblong in outline, 1-2.5 cm long; rachis and petiole not winged; petioles 2-3 cm long; stipules lanceolate, ca. 5 mm long; tendrils in pairs, spirally twisted, at the end of short axillary axes (aborted inflorescences), from which an inflorescence usually develops. Flowers functionally unisexual, zygomorphic, in axillary racemiform thyrses, shorter than the accompanying leaf; cincinni usually in whorls of 3. Calyx light green, of 4 unequal sepals, the outer ones ca. 1.2 mm long, the inner ones 3-3.5 mm long. Petals white, obovate, 2.5-3.5 mm long; petaliferous appendages slightly shorter than the petals, fleshy and yellow at the apex, forming a hood that encloses the apex of the glands of the disc; disc unilateral, with 4 rounded or ovoid glands, ca. 0.4 mm long; stamens 8, the filaments unequal, pubescent; ovary trilocular, with one style and 3 stigmas. Capsule membranaceous, subglobose or turbinate-trigonal, inflated, stramineous when ripe. Seed one per locule, spherical, black, 3-5 mm in diameter, with a white cordiform hilum.

Key to the varieties

1. Capsules subglobose, as long as wide, 2.5-3.5 cm long, with the apex retuse..... .....*C. halicacabum* var. *halicacabum*
1. Capsules turbinate-trigonal, wider than long, 0.8-1.5 cm long, with the apex truncate..... ..... *C. halicacabum* var. *microcarpum*

3a. Cardiospermum halicacabum var. **halicacabum** L.

Distinguished by its larger, subglobose fruits (see the key).

Phenology: Collected in flower and fruit in December and March.

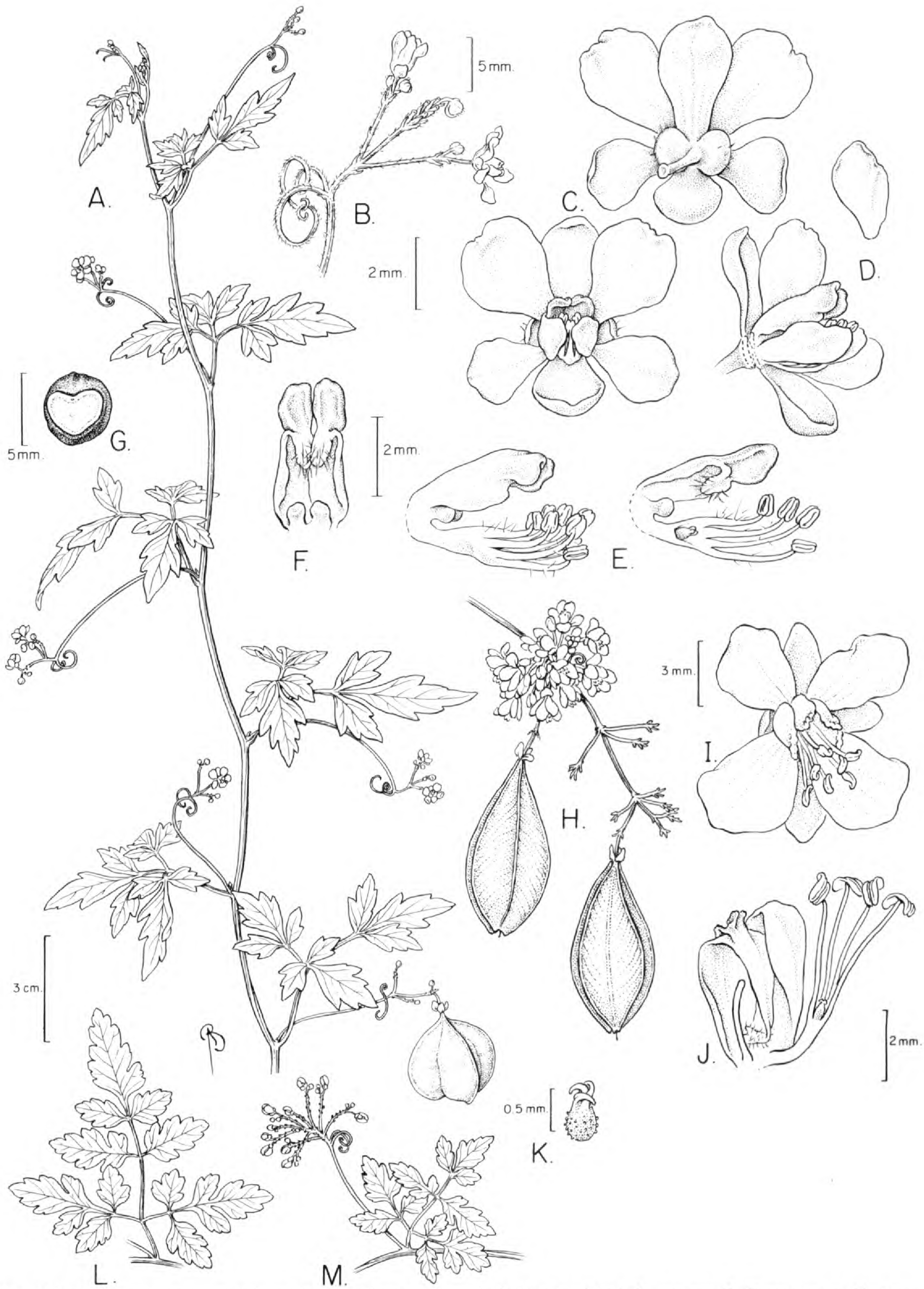

Fig. 149. A-G. *Cardiospermum halicacabum*. **A.** Flowering branch. **B.** Details of the inflorescence. **C.** Flower, top and bottom views. **D.** Flower, side view, and petal. **E.** Petaliferous appendage, glands of the disc, and stamens, and longitudinal section. **F.** Petaliferous appendages and glands of the disc, front view. **G.** Seed, showing cordiform hilum. **H-K.** *Cardiospermum grandiflorum*. **H.** Portion of inflorescence, with flowers and fruits. **I.** Flower, top view. **J.** Stamens, with corniform gland and petaliferous appendages. **K.** Pistillode. **L-M.** *Cardiospermum corindum*. **L.** Leaf. **M.** Flowering branch.

Status: Apparently native, not very common.

Distribution: In disturbed or open areas, like roadsides and thickets. In all probability native to the Neotropics, but distributed in the tropics of the Old World. Cultivated as an ornamental for its curious capsules.

Public Forest: Guánica.

2b. Cardiospermum halicacabum var. **microcarpum** (Kunth) Blume, Rumphia 3: 183. 1847.

Distinguished from the typical variety by the presence of turbinate-trigonal fruits, truncate at the apex and of smaller size (see the key).

Phenology: Collected in flower from November to July and in fruit from January to June.

Status: Apparently native, rather common.

Distribution: In disturbed, well illuminated areas, like roadsides and pastures. Also on St. Croix, St. John, and St. Thomas; throughout the tropics and subtropics.

Public Forests: Mona and Tortuguero.

BASIONYM: *Cardiospermum microcarpum* Kunth

2. PAULLINIA

Vines, woody or less frequently herbaceous, usually with abundant milky latex. Stems simple or compound (cross section with a single vascular cylinder or with a central cylinder and 3-5 peripheral cylinders). Leaves alternate, trifoliolate, 5-foliolate, biternate, or with numerous leaflets; leaflets chartaceous or coriaceous; rachis and petioles winged or not winged; stipules minute and caducous or large and persistent. Tendrils spirally twisted, in pairs at the base of the axis of the inflorescence (this sometimes not developed). Inflorescence of axillary thyrses, with flowers grouped in lateral scorpioid cymes; pedicels articulated at the base; calyx of 4 or 5 sepals. Petals 4, with a petaliferous appendage on its inner surface; floral disc unilateral, with 4 glands; stamens 8, with unequal filaments; ovary superior, tricarpellate, with one ovule per carpel, the style simple, with 3 stigmatic branches. Fruit a woody capsule, winged or without wings, septicidal; seeds one per locule, globose or ellipsoid, black, with a fleshy, white arillode on the lower portion. A neotropical genus of approximately 200 species, one of which is also found in Africa.

Key to the species of *Paullinia*

1a. Stems cylindrical, tomentose or tomentulose; cross section of the mature stems simple; leaves biternate (three trifoliolate pinnae, for a total of 9 leaflets); petioles not winged; fruits three-winged, 1-1.5 cm long.....2

1b. Stems pentagonal, glabrous; cross section of the mature stems composed of 2-3 peripheral vascular cylinders; leaves 5-foliolate, pinnate; petioles winged; fruits pyriform, not winged, 1.5-2.5 cm long .....2. *P. pinnata*

2a. Flowers sessile or almost sessile; calyx puberulent; lower surface with numerous glandular papillae, not lineate; fruits oblong in outline.....1. *P. fuscescens*

2b. Flowers pedicellate; calyx tomentose; lower surface not papillose, with dark lines; fruit elliptical or obovate in outline .....3. *P. plumierii*

1. Paullinia fuscescens Kunth in Humb. Bonpl. & Kunth, Nov. Gen. Sp. (quarto ed.) 5: 120. 1821.

Fig. 150. A-D

Woody vine that climbs by means of tendrils and attains 3-7 m in length. Stems cylindrical, tomentose or tomentulose, up to 5 mm in diameter, with slight watery latex when cut; cross section simple (with a single vascular cylinder). Leaves alternate, biternate; leaflets chartaceous, the margins serrate, revolute; upper surface sparsely pubescent on the midvein, green, shiny; lower surface green, dull, the venation prominent and

puberulent, with a tuft of hairs in the axils of the secondary veins, with glandular papillae; terminal leaflets 4-6 × 1.5-2.5 cm, lanceolate, the apex acuminate, the acumen obtuse, the base long-attenuate; lateral leaflets 1-2 × 0.7-1 cm, almost elliptical, the apex obtuse, the base acute or obtuse; rachis narrowly winged, 1-1.6 cm long; petioles not winged, 7-12 mm long; stipules triangular, ca. 1 mm long; tendrils in pairs, spirally twisted, at the end of short axillary axes, from which an inflorescence usually develops. Inflorescences of axillary racemiform thyrses, with few sessile flowers, zygomorphic, in lateral cincinni; axes tomentose. Calyx whitish green, of 5 sepals, 2-2.5 mm long; petals white, cuneate at the base, ca. 2 mm long; petaliferous appendages slightly shorter than the petals, fleshy and yellow at the apex, forming a hood that encloses the glands of the disc; stamens 8, the filaments unequal; ovary trilocular. Capsule three-winged, red, 1-1.5 cm long. Seeds one per locule, black, obovoid, slightly laterally compressed, ca. 6 mm long, with a white and emarginate aril on the lower half.

Phenology: Collected in flower and fruit during February and March.

Status: Exotic, naturalized, locally common on St. Croix.

Distribution: In disturbed areas at lower elevations; cultivated and locally naturalized at the Experimental Station in Mayagüez. Native to Cuba, Mexico, Central America, Trinidad, Tobago, and northern South America.

2. Paullinia pinnata L., Sp. Pl. 366. 1753.

Fig. 150. I-O

Bejuco de costilla, Bejuco de paloma, Basket wiss

Woody vine that climbs by means of tendrils and attains 6-10 m in length. Stems obtuse, 3-5-angular, glabrous or pubescent on the young portions, glabrescent when mature, up to 6 cm in diameter and producing scarce milky latex when cut; bark smooth, light brown; cross section with a central vascular cylinder and 2 or 3 peripheral vascular cylinders, smaller than the central one. Leaves alternate, pinnately 5-foliolate; leaflets coriaceous, 5-16 × 2.2-6 cm (the distal leaflet larger), elliptical, ovate, or lanceolate, the apex acute, the base attenuate or acute on the terminal leaflet and obtuse or rounded and sometimes asymmetrical on the lateral ones, the margins deeply serrate; upper surface glabrous or puberulent along the midvein, green, shiny, with slightly prominent venation; lower surface glabrous or puberulent along the midvein, green, dull, the venation prominent, with a tuft of hairs in the axils of the secondary veins; rachis and petioles broadly winged; stipules subulate, ca. 5 mm long; tendrils in pairs, spirally twisted, at the end of short axillary axes, from which an inflorescence usually develops. Flowers zygomorphic, in axillary racemiform thyrses; axis of the inflorescence tomentose. Calyx light green, puberulent, of 5 sepals, the two outer ones ca. 2 mm long, the inner ones 4-5 mm long; petals white, obovate, 4-5 mm long; petaliferous appendages slightly shorter than the petals, fleshy and yellow at the apex, forming a hood that encloses the glands of the disc; disc unilateral, with 4 rounded to ovoid glands. Capsule pyriform, not winged, red, 1.5-3 cm long. Seeds 12-15 mm long, ellipsoid, with a white aril, covering the base and more than half of the two sides.

Phenology: Flowering from April to November and fruiting from October to July.

Status: Native, rather common.

Distribution: In forests and pastures at middle and lower elevations, in moist or dry places. Also on Vieques and Tortola; throughout the Neotropics and tropical Africa.

Public Forests: Carite, El Yunque, Guilarte, Maricao, Río Abajo, Susúa, and Toro Negro.

3. Paullinia plumieri Triana & Planchon, Ann. Sci. Nat. Bot. Sér. 4: 18. 360. 1862.

Fig. 150. E-H

Woody vine that climbs by means of tendrils and attains 3-7 m in length. Stems cylindrical, tomentose or tomentulose, up to 0.5 cm in diameter; cross section simple (with a single vascular cylinder). Leaves alternate, biternate; leaflets chartaceous, the margins serrate, revolute; upper surface glabrous, puberulent on the midvein; lower surface with prominent venation and puberulent, with a tuft of hairs in the axils of the secondary veins, the tertiary venation dark,

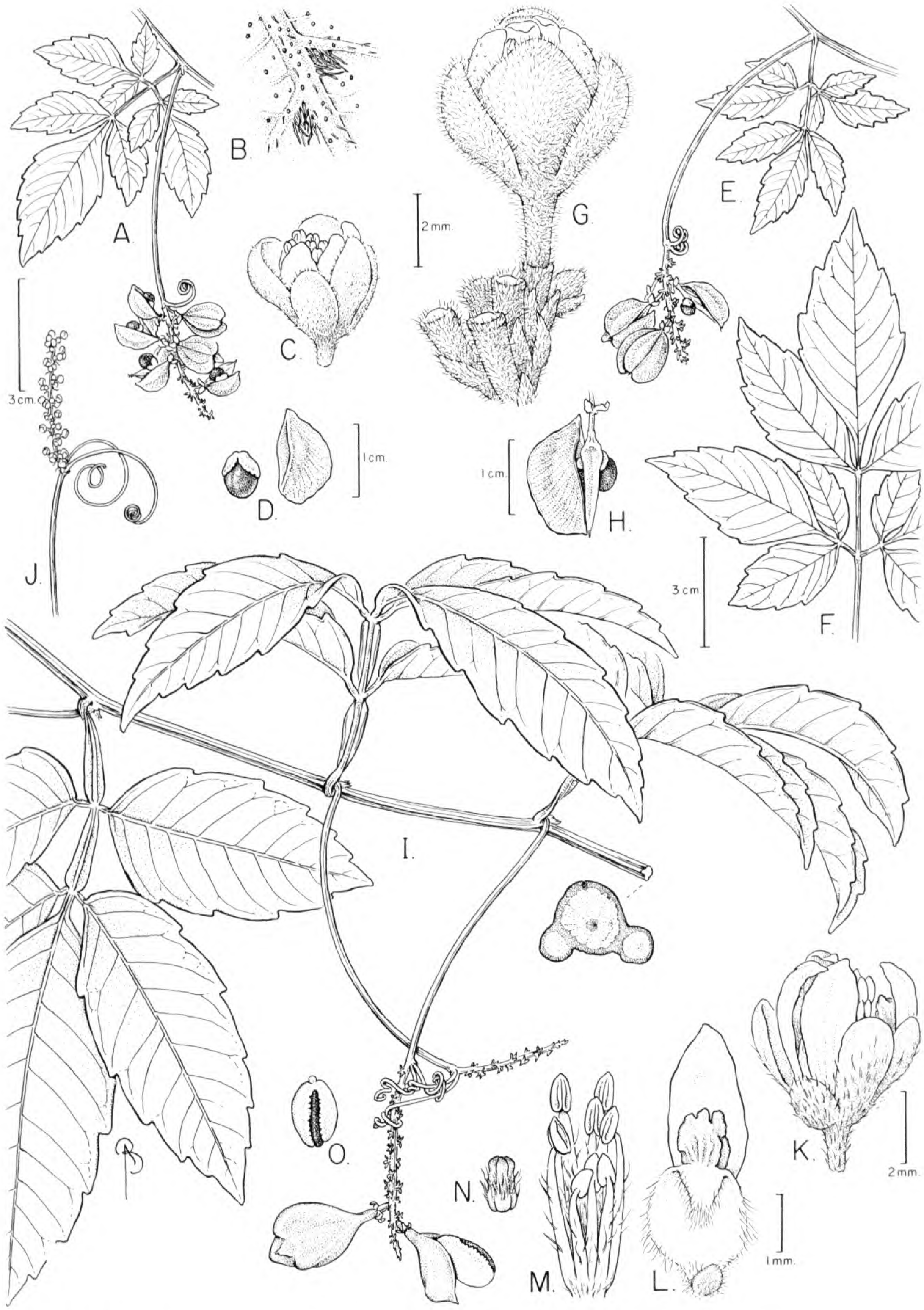

Fig. 150. A-D. *Paullinia fuscescens*. **A.** Fruiting branch. **B.** Lower surface of the leaflet, showing axillary tuft of hairs and glandular papillae. **C.** Flower, side view. **D.** Seed and valve of fruit. **E-H.** *Paullinia plumieri*. **E.** Fruiting branch. **F.** Leaf. **G.** Portion of inflorescence, showing floral bud. **H.** Open fruit, showing seeds and valve. **I-O.** *Paullinia pinnata*. **I.** Fruiting branch, with detail of the stem cross section. **J.** Inflorescence with tendrils. **K.** Flower, side view. **L.** Petal, with appendage. **M.** Stamens. **N.** Pistillode. **O.** Seed.

in the form of lines, sometimes with glandular papillae; terminal leaflets 4-9 × 2-3 cm, lanceolate or ovate, the apex obtuse or acuminate, the acumen obtuse, the base long-attenuate; lateral leaflets 2.5-5 × 1.2-2.2 cm, oblong, the apex obtuse or acute, the base obtuse or rounded; rachis narrowly winged, 1-3.2 cm long; petioles not winged, 1-5.5 cm long; stipules triangular, 1-2 mm long; tendrils in pairs, spirally twisted, at the end of short axillary axes, from which an inflorescence usually develops. Inflorescences of axillary thyrses, with numerous pedicellate flowers, zygomorphic, in lateral cincinni; axes tomentose. Calyx densely tomentose, of 4 sepals, 2.5-3.5 mm long; petals white, obovate, ca. 3.5 mm long; petaliferous appendages slightly shorter than the petals, fleshy and yellow at the apex; ovary tomentose. Capsule three-winged, elliptical or obovate in outline, red, pubescent, 1.7-2 cm long. Seeds one per locule, black, elliptic-trigonal, ca. 6 mm long, with a white and emarginate aril at the base.

Phenology: Collected in flower and fruit from February to April.

Status: Apparently native, although uncommon.

Distribution: Known from one side of Sage Mountain on Tortola. Also on some of the Lesser Antilles.

3. SERJANIA

Lianas or herbaceous vines, climbing by means of tendrils, usually with milky latex. Stems simple or compound (cross section with a single vascular cylinder or with several vascular cylinders). Leaves alternate, trifoliolate, pinnately 5-foliolate, biternate, or triternate; leaflets chartaceous or coriaceous; rachis and petioles winged or not winged; stipules minute and caducous. Tendrils spirally twisted, in pairs at the base of the axis of the inflorescence (this sometimes not developed). Inflorescence of axillary thyrses, with flowers grouped in lateral scorpioid cymes; pedicels articulated at the base; calyx of 4 or 5 sepals. Petals 4, with a petaliferous appendage on its inner surface; disc floral unilateral, with 2 or 4 glands; stamens 8, with unequal filaments; ovary superior, of 3 carpels, the style simple, branched in 3 elongate stigmas. Fruit a schizocarp that separates into three samaroid mericarps, the seminiferous portion distal and the wing proximal. Seed globose or ellipsoid, with a triangular or rounded scar at the base. A neotropical genus of 230 species, the majority of savannas, thickets, and open areas.

Key to the species of *Serjania*

1a. Leaves 5-foliolate pinnate or less often biternate; stems with a single vascular cylinder ..... 1. *S. diversifolia*
1b. Leaves biternate triternate or bipinnate; stems with 5 or more vascular cylinders..... 2

2a. Leaves biternate (9 leaflets); glands of the floral disc pubescent at the base; ovary tomentose; seminiferous locules of the fruit tomentose ..... 2. *S. lucida*
2b. Leaves triternate or bipinnate (more than 9 leaflets); glands of the floral disc glabrous or puberulent; ovary glabrous or puberulent; seminiferous locules of the fruit glabrous or puberulent ..... *S. polyphylla*

1. Serjania diversifolia (Jacq.) Radlk., Monogr. Serjania 136. 1875.

BASIONYM: *Paullinia diversifolia* Jacq.

Woody vine that climbs by means of tendrils and attains 6-10 m in length. Young stems obtusely pentagonal, glabrous or puberulent, reddish tinged, not producing milky latex; mature stems cylindrical, rough, fragile, light brown; cross section with a single vascular cylinder. Leaves alternate, 5- foliolate pinnate or less often

biternate; leaflets coriaceous, the margins remotely serrate; upper surface glabrous, shiny, with light green venation; lower surface light green, dull, lineate, with the reticulate venation slightly prominent; distal leaflets rhombate, 4-9 × 2-4.5 cm, the apex obtuse, retuse and sometimes slightly mucronate, the base long-attenuate; lateral leaflets oblong or elliptic, smaller than the distal ones, the apex obtuse, apiculate, the base acute or abruptly attenuate; rachis marginate; petioles 2-5-4 cm long, naked, glabrous; stipules minute, caducous; tendrils in pairs, spirally twisted, at the end of short axillary axes, from which an inflorescence usually develops. Inflorescence of axillary thyrses; flowers zygomorphic; calyx cream to whitish green; corolla cream. Fruit reddish tinged, stramineous when dry, splitting into 3 samaroid mericarps, 1.5-2 cm long.

Phenology: Collected in fruit during March.

Status: Quite rare.

Distribution: Known in Puerto Rico from a steril collection of Sintenis (*6999*) from the vivinity of Utuado. Recently rediscoved in Guajataca (*Acevedo-Rdgz. 13462*) and Bayamón (*Chinea s.n.* and *Acevedo-Rdgz. & Chinea 13751*) in late secondary forests on limestone substrate. Also in Hispaniola, Cuba and the Bahamas.

Public Forests: Guajataca.

2. Serjania lucida Schum., Skr. Naturhist.-Selsk. 3(2): 128. 1794.

Fig. 151. A-F

SYNONYM: *Paullinia curassavica* sensu West, non L.

Bejuco de corrales, Bejuco de costilla, Basket-wood, Black whithe, Cabrite rotting, White wist, Basket wiss, Black wiss

Woody vine that climbs by means of tendrils and attains 6-10 m in length. Stems obtusely pentagonal or hexagonal, sulcate, glabrous or puberulent, producing abundant milky latex when wounded; mature stems cylindrical, smooth, deeply sulcate, light brown; cross section with a central vascular cylinder and 5-6(8) peripheral vascular cylinders. Leaves alternate, biternate (9 leaflets); leaflets coriaceous, the margins serrate on the distal portion; upper surface glabrous, shiny, with slightly prominent venation; lower surface light green, dull, with the reticulate venation slightly prominent, barbate in the axil of the secondary veins, lineate; distal leaflets ovate or lanceolate, 3.5-9 × 1.7-3.8 cm, the apex acute or acuminate, the base rounded, abruptly attenuate; lateral leaflets lanceolate, 1.7-5 × 0.8-2.5 cm, the apex acute or obtuse, the base rounded or abruptly attenuate; rachis marginate; petioles 1-4.5(8.5) long, not winged, glabrous; stipules minute, caducous; tendrils in pairs, spirally twisted, at the end of short axillary axes, from which an inflorescence usually develops. Inflorescences of axillary thyrses or forming a panicle when they are terminal on the branches; flowers zygomorphic, pedicellate, grouped in lateral cincinni. Calyx light green or whitish green, white-tomentose, of 5 sepals, 3-5 mm long. Petals white, obovate, 4-5 mm long; petaliferous appendages slightly shorter than the petals, fleshy, yellow, and bifurcate at the apex; disc unilateral, with 2-4 rounded or ovoid glands, pubescent at the base; stamens 8, the filaments pilose; ovary trilocular, tomentose. Mericarps samaroid, 1.5-2.5 cm long, with a wing on the lower portion, the seminiferous portion almost globose, reticulate, tomentose, with a single brown, ellipsoid seed inside.

Phenology: Flowering and fruiting from November to April.

Status: Endemic to eastern Puerto Rico and the Virgin Islands, rather common.

Distribution: On forest edges and roadsides, in dry forests and coastal thickets. In eastern (Ceiba) and northeastern (Vacía Talega to Fajardo) Puerto Rico, to the Virgin Islands (Culebra, Palominos, Vieques, Anegada, St. Croix, St. John, St. Thomas, Tortola, Virgin Gorda).

Public Forests: Ceiba and Piñones.

3. Serjania polyphylla (L.) Radlk., Monogr. Serjania 179. 1875.

Fig. 151. G-J

BASIONYM: *Paullinia polyphylla L.*

SYNONYMS: *Paullinia triternata Jacq.*

Serjania triternata (Jacq.) Willd.

Bejuco de corrales, Bejuco de costilla

Woody vine that climbs by means of tendrils and attains 5-10(20) m in length. Stems cylindrical, sulcate, puberulent, glabrescent, producing abundant milky latex when wounded; mature stems cylindrical, smooth, deeply sulcate,

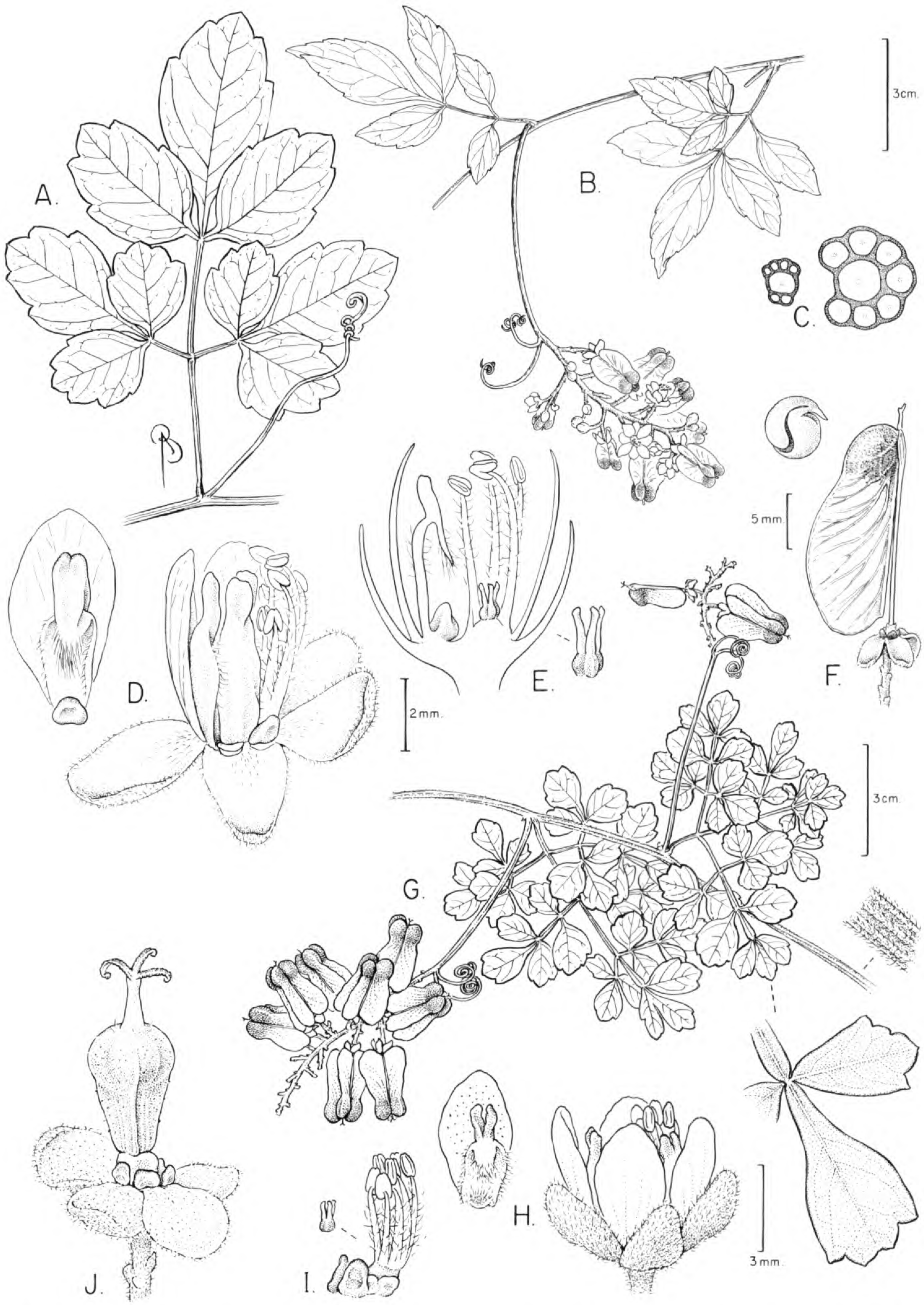

Fig. 151. A-F. *Serjania lucida*. **A.** Leaf. **B.** Fertile branch. **C.** Stem cross section. **D.** Petal with appendage, and side view of the flower. **E.** Flower, longitudinal section, and detail of pistillode. **F.** Samaroid mericarp and embryo. **G-J.** *Serjania polyphylla*. **G.** Fruiting branch, with detail of distal leaflet. **H.** Petal with appendage, and side view of the flower. **I.** Glands of the disc, stamens, and detail of the pistillode. **J.** Flower with fertilized ovary.

light brown, attaining 5 cm in diameter; cross section with a central vascular cylinder and (5)8-10 peripheral vascular cylinders. Leaves alternate, triternate (27 leaflets) or exceptionally bipinnate (more than 27 leaflets); leaflets coriaceous, the margins deeply serrate or lobate on the distal portion; upper surface glabrous, shiny, with slightly prominent venation; lower surface light green, dull, with the reticulate venation slightly prominent, barbate in the axil of the veins nearest to the base, lineate; distal leaflets ovate or rhombic, 1.7-5 × 0.7-3 cm, the apex acute, obtuse, truncate, or acuminate, the base abruptly attenuate; lateral leaflets elliptical, ovate, or oblong, 1-3 × 0.8-2.7 cm, the apex obtuse or truncate, the base rounded, abruptly attenuate; primary and secondary rachis winged or narrowly winged; petioles 1-3 long, not winged, glabrous or puberulent; stipules minute, caducous; tendrils in pairs, spirally twisted, at the end of short axillary axes, from which an inflorescence usually develops. Inflorescences of axillary thyrses or forming a panicle when they are terminal on the branches; flowers zygomorphic, pedicellate, grouped in lateral cincinni. Calyx pale green, white-tomentose, of 5 sepals, 3-5 mm long. Petals white, obovate, 4-5 mm long; petaliferous appendages slightly shorter than the petals, fleshy, yellow, and bifurcate at the apex; disc unilateral, with 4 rounded or ovoid glands, glabrous or puberulent at the base; stamens 8, the filaments pilose; ovary trilocular, glabrous or puberulent. Mericarps samaroid, 1.5-2.5 cm long, with a wing on the lower portion, the seminiferous portion almost globose, reticulate, glabrous or puberulent, with a brown, ellipsoid seed inside.

Phenology: Flowering from September to April and fruiting from October to April.

Status: Native, very common.

Distribution: On forest edges and roadsides, in dry forests, coastal thickets, and forests in the zone of mogotes. Found from Cayey to Hispaniola, with collections in Utuado and the south and west coasts of Puerto Rico. Also on Caja de Muerto.

Public Forests: Cambalache, Guajataca, Guánica, Maricao, Río Abajo, and Susúa.

References: Acevedo-Rodríguez, P. 1993. Systematics of *Serjania* (Sapindaceae). Part I: A revision of *Serjania* section *Platycoccus*. Mem. New York Botanical Garden 67: 1-93. Radlkofer, L.T. 1875. Monographie der Sapindaceen-Gattung *Serjania*. Verlag der K.B. Academie. München.

43. *Family* ***SCHLEGELIACEAE***

1. SCHLEGELIA

Lianas or shrubs, climbing by adventitious roots. Stems cylindrical, interpetiolar zone not glandular; pseudostipules inconspicuous, conical, obtuse; cross section of the mature stem with normal peripheral phloem. Leaves opposite, simple, coriaceous, without tendrils. Flowers in axillary racemes or terminal bracteate panicles. Calyx simple, crateriform, truncate or irregularly lobed; corolla white, pink, purple, or reddish, zygomorphic, tubular-campanulate or tubular, more or less glabrous outside, the lobes lepidote inside; stamens 4, didynamous, inserted or exserted, 2 of them modified into staminodia; ovary superior, globose, bilocular, with a simple central placenta in each locule, the ovules multiseriate per locule. Fruit usually a globose berry with a thin pericarp and with a persistent calyx on the basal portion; seeds numerous, small, without wings, surrounded by a pulp. A genus of 14 species naturally distributed from Guatemala to Brazil, including the Antilles.

1. Schlegelia brachyantha Griseb., Cat. Pl. Cub. 191. 1866.

Fig. 152. A-E

SYNONYMS: *Schlegelia brachyantha* var. *portoricensis* Urb.
Schlegelia portoricensis (Urb.) Britton
Schlegelia axillaris sensu A. Stahl, non Griseb.

Higüerito de sierra, Tulipa

Woody vine, 10-15 m in length, climbing by adventitious roots that are produced in the area of the nodes. Stems cylindrical, lenticellate, up to 5 cm in diameter. Leaves opposite; blades simple, 6-12 × 3-7 cm, elliptical, oblong, or obovate, coriaceous, fragile, glabrous, the apex obtuse or rounded, sometimes retuse, the base acute, obtuse, or rounded, the margins smooth, revolute; upper surface dark, shiny, with the midvein sunken; lower surface yellowish green, with a prominent midvein; petioles recurved, thick, grayish, 8-12 mm long. Flowers in small axillary racemes; pedicels pubescent, 4-8 mm long. Calyx green, campanulate, truncate, ca. 5 mm long; corolla white or pink with mulberry-colored lines inside, tubular, 15-18 mm long, the limb with 5 rounded lobes, unequal; stamens 4, exserted, 2 fertile, 2 staminodia. Berry globose, purple when ripe, 6-10 mm in diameter; seeds angular, surrounded by the pulp of the fruit.

Phenology: Flowering throughout the year, particularly from March to August, and fruiting in June.

Status: Native, very common.

Distribution: In moist forests at middle and upper elevations. Also in Cuba and Hispaniola; cited for Panama and Venezuela.

Public forests: Carite, El Yunque, Guilarte, Maricao, Río Abajo, and Toro Negro.

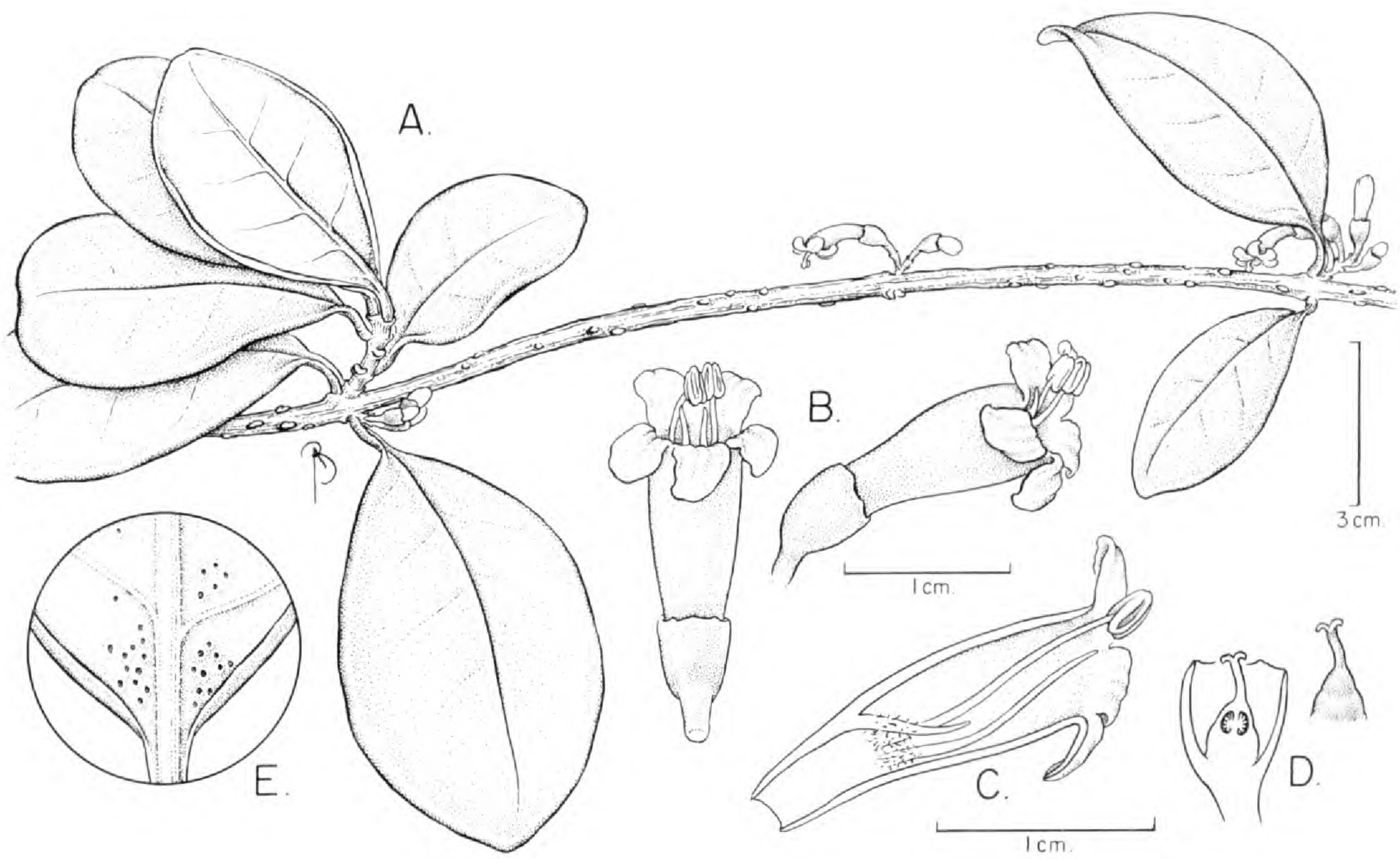

Fig. 152. A-E. *Schlegelia brachyantha*. **A.** Fertile branch. **B.** Flower, front and side views. **C.** Corolla, longitudinal section, showing stamens and staminodium. **D.** Calyx and gynoecium, longitudinal section. **E.** Detail of the lower surface of the leaf, showing foveae.

44. *Family* ***SCROPHULARIACEAE***

1. LOPHOSPERMUM

Herbaceous vines, climbing by means of twining petioles, without latex. Basal leaves opposite, the distal ones alternate, simple, deltate or cordiform, the margins dentate or crenate; stipules absent. Flowers bisexual, solitary, axillary; peduncle elongate, erect or pendulous; calyx urceolate or inflated and campanulate, of 4 or 5 sepals; corolla gamopetalous, bilabiate or subtubular, the lobes 5, subequal or dimorphic; floral disc absent; stamens 4, didynamous, included, the filaments with glandular

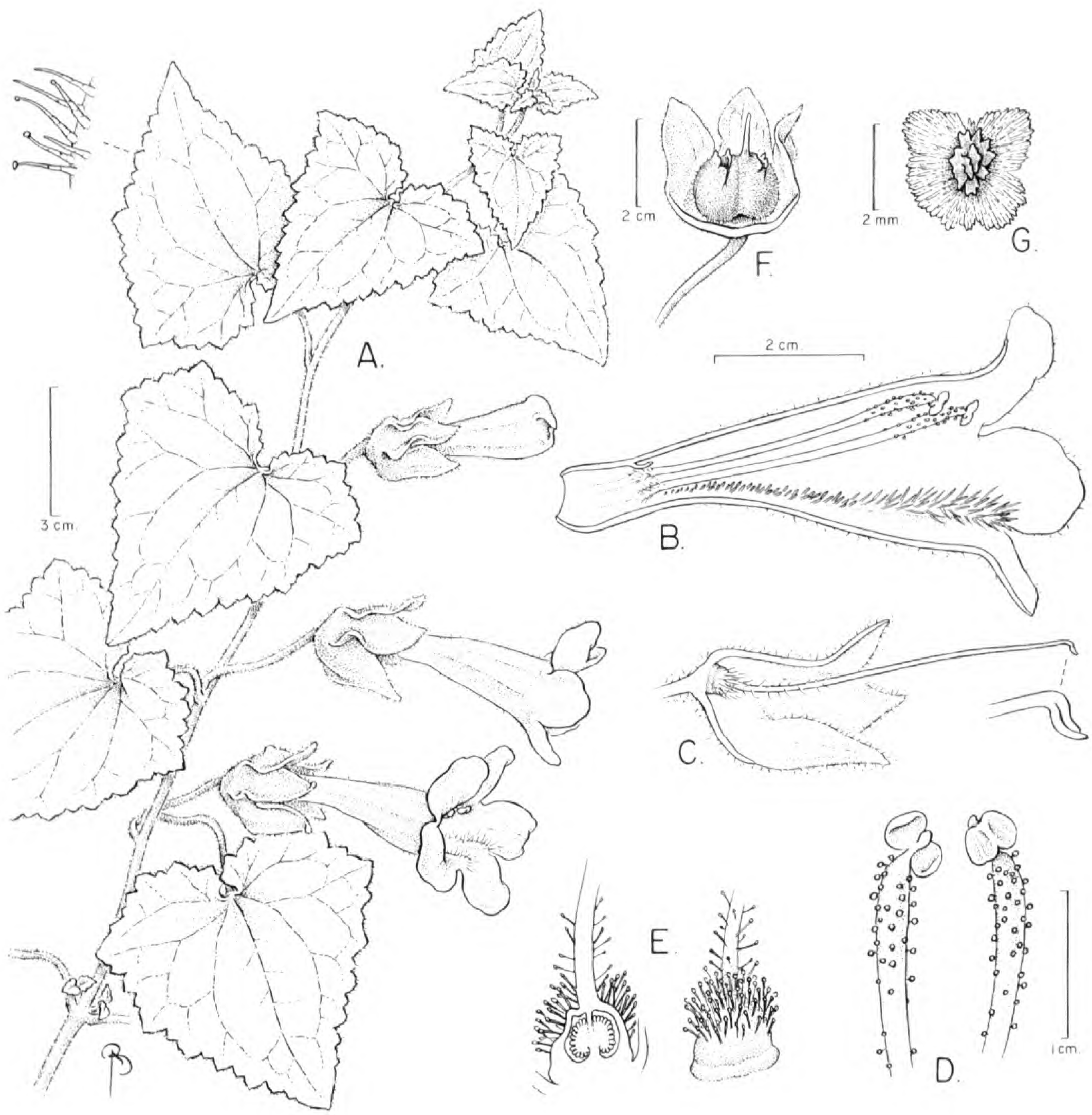

Fig. 153. A-G. *Lophospermum erubescens.* **A.** Fertile branch, with detail of the pubescence. **B.** Corolla, longitudinal section, showing stamens. **C.** Calyx, longitudinal section, showing gynoecium. **D.** Stamens. **E.** Ovary, whole and longitudinal section. **F.** Fruit with accrescent calyx. **G.** Seed.

trichomes; ovary superior, of 2 carpels, the style simple, the stigma conical, bilobate or with two short branches. Fruit a bivalvate capsule, ovate, globose, symmetrical or asymmetrical, with irregular dehiscence. Seeds numerous, circular. A genus of 10 species native from Mexico to Guatemala, the majority of montane cloud forests.

1. Lophospermum erubescens D. Don in Sweet, Brit. Flow. Gard. Ser. 2 1: , t. 68, sub t. 75. 1831 [1830].

Fig. 153. A-G

Mijo del sol

Herbaceous vine, branched from the base, that climbs by means of twining petioles and attains several meters in length. Stems cylindrical, with a pubescence of glandular trichomes. Leaves alternate, simple, deltate, chartaceous, 3.5-7.3(15) × 2.5-6.7, the apex acute, the base cordiform, the margins dentate-mucronate; upper surface and lower surface densely glandular-pubescent, the venation slightly prominent or not prominent; petioles 3-6.5 cm long, twining, densely glandular-pubescent; stipules absent. Flowers solitary, axillary; peduncles as long as or longer than the petioles, densely glandular-pubescent. Calyx green, usually purple tingeD, glandular-pubescent, the sepals lanceolate, free, 2.5-3 cm long. Corolla infundibuliform, intense pink, abaxially glandular-pubescent, 6-7.5 cm long, with 5 rounded lobes, 1-1.4 cm long; stamens 4, didynamous; ovary bilocular, glandular-pubescent. Capsule membranaceous, ovoid, 1.5-1.9 cm long. Seeds discoid, ca. 2 mm wide, sculptured in the center, surrounded by a translucent wing.

Phenology: Flowering from January to July and fruiting from June to August.

Status: Exotic, cultivated and naturalized (according to Liogier, 1995), uncommon.

Distribution: Native to Mexico, but found cultivated and naturalized throughout the tropics.

Reference: Elisens, W.J. 1985. Monograph of the Maurandyinae (Scrophulariaceae-Antirrhineae). Syst. Bot. Monographs 5: 1-97.

45. *Family* ***SOLANACEAE***

Key to the genera

1a. Corolla rotate, 1-2 cm in diameter, violet; anthers dehiscent by a terminal pore.....2
1b. Corolla cyathiform, greenish white or yellow, 15-23 cm long; anthers dehiscent by longitudinal sutures ..... 2. *Solandra*

2a. Leaves deeply lobate; calyx of 5 sepals, without appendages ..... 3. *Solanum*
2b. Leaves entire; calyx with 10 linear appendages ..... 1. *Lycianthes*

1. LYCIANTHES

Herbs, shrubs, or herbaceous or woody vines, without spines, glabrous or pubescent with simple or stellate hairs. Leaves alternate, simple, entire; stipules absent. Flowers actinomorphic, 5-merous, bisexual, solitary or fasciculate, axillary. Calyx campanulate or crateriform, truncate, usually with 5-10 linear appendages on or near the margin; corolla rotate, with the limb pentagonal or lobate; stamens

5, the filaments shorter than the anthers, the anthers concrescent, dehiscent by terminal pores; ovary superior, of two connate carpels, with a single style, the placentation axile, with numerous ovules. Fruit a berry, usually globose, with the calyx accrescent at the base; seeds numerous, discoid. A pantropical genus of about 200 species.

1. Lycianthes virgata (Lam.) Bitter, Abh. Nat. Ver. Bermen 24: 307. 1919.

Fig. 154. A-F

SYNONYM: *Solanum virgatum* Lam.

Berenjena de paloma

Woody vine, twining, branched from the base, attainig 10 m in length. Stems cylindrical, stellate-pubescent when young, glabrous when mature, attaining 2.5 cm in diameter. Leaves alternate, 6.5-14 × 3.5-5.5 cm, oblong, ovate, or elliptical, chartaceous, involute, the apex acute, acuminate, or less frequently obtuse, the base obtuse or rounded, sometimes asymmetrical, the margins undulate; upper surface shiny, with some scattered stellate hairs, with the venation lighter; lower surface light green, dull, densely stellate-pubescent, with prominent venation; petioles stellate-pubescent, 1-2 cm long. Flowers 4-5 in axillary fascicles; pedicels stellate-pubescent, 1-1.6 cm long. Calyx green, turbinate, stellate-pubescent, 3-5 mm long, with 10 ribs that project beyond the margin like linear appendages; corolla pale violet or lilac, rotate, pentagonal, ca. 2 cm in diameter, with five thick greenish ribs on the outer surface, which alternate with the pale violet membranaceous tissue; anthers oblong, connivent, ca. 4 mm long, yellow, that open by a terminal pore. Berry globose, fleshy, orange, ca. 8 mm in diameter, with the calyx persistent at the base. Seeds numerous, circular, flattened, light brown, ca. 2 mm in diameter.

Phenology: Collected in flower from July to August and in fruit in November.

Status: Native, uncommon.

Distribution: In forests and weedy places at middle elevations, in the Cordillera Central and in the area of mogotes. Also in Cuba and Hispaniola.

Public Forests: Guilarte, Río Abajo, and Toro Negro.

2. SOLANDRA

Scandent shrubs or lianas, without spines, glabrous or pubescent with simple or branched hairs. Leaves alternate, simple, entire; stipules absent. Flowers actinomorphic, 5-merous, bisexual, solitary, terminal. Calyx tubular or campanulate, angular and sometimes inflated, 2-5-lobate; corolla infundibuliform or campanulate, with the limb 5-lobate; stamens 5, the filaments inserted on the tube, the anthers dehiscent by longitudinal sutures; ovary superior, of 4 connate carpels, partially inferior, the placentation axile, with numerous ovules, the style filiform, the stigma capitate. Fruit a coriaceous berry, enclosed by the accrescent calyx; seeds numerous, reniform. A neotropical genus of 8 species.

1. Solandra grandiflora Sw., Königl. Vet. Acad. Handl. 8: 300, t. 11. 1787.

Fig. 157. G-H

Woody vine, attainig 8-10 m in length. Stems cylindrical, glabrous, with numerous short lateral branches; bark gray, rugose in dried specimens, slightly lenticellate. Leaves alternate or congested at the end of short lateral branches, 6.5-14 × 3.2-7.3 cm, obovate, spathulate, or broadly elliptical, glabrous, coriaceous, the apex almost rounded, projecting in a short acumen, the base attenuate, the margins revolute, entire; upper surface shiny, with the venation flat; lower surface light green, with prominent venation; petioles glabrous, slender, 2-5.5 cm long. Flowers solitary, at the end of short lateral branches, pedicels glabrous, thick, not distinguishable from the calyx. Calyx green, tubular-campanulate, glabrous, 4-10 cm long, inflated-angular; corolla cyathiform, 14-23 cm long, greenish white or yellow, with several marron lines inside, the tubular portion shorter

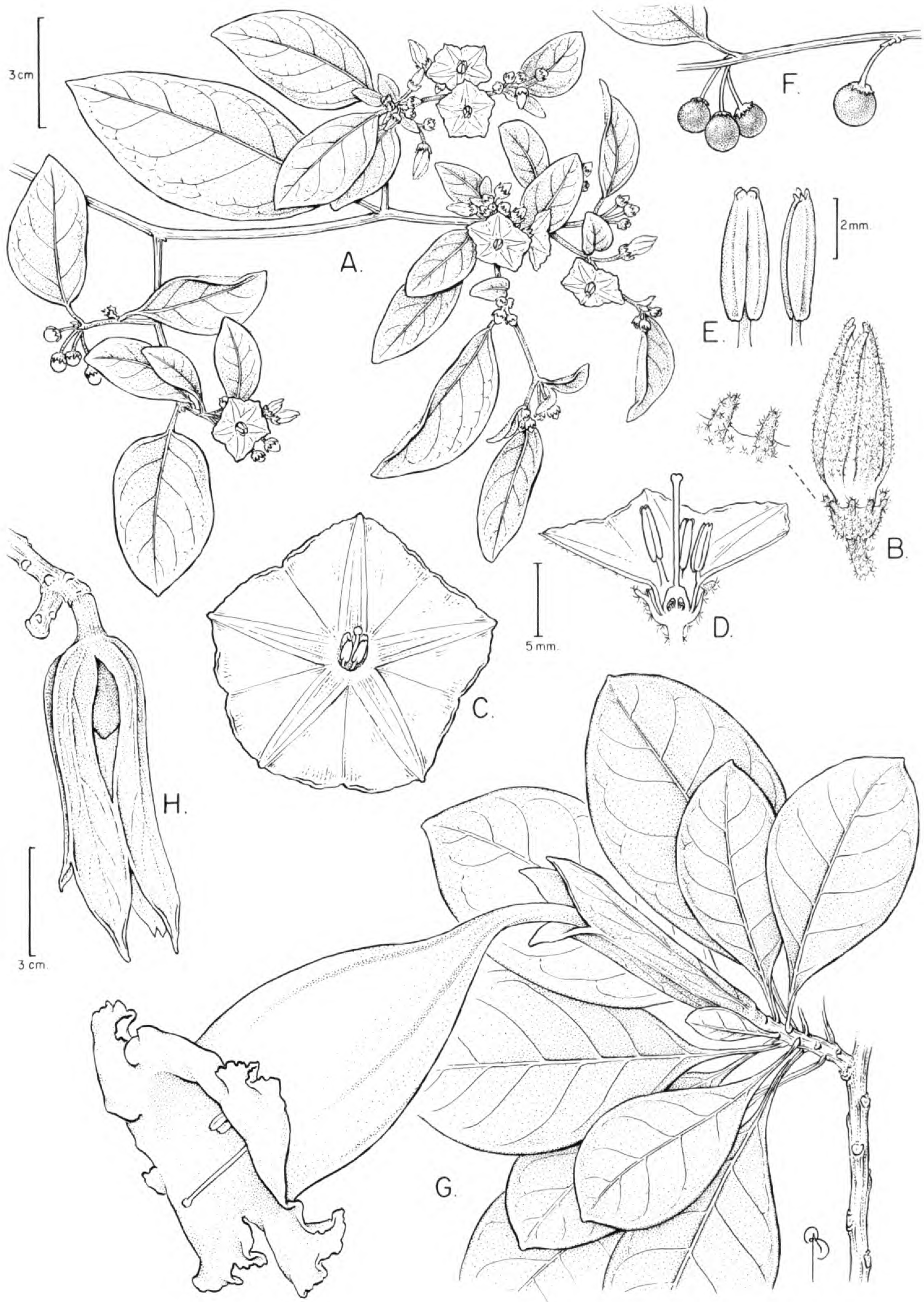

Fig. 154. A-F. *Lycianthes virgata.* **A.** Flowering branch. **B.** Bud, with detail of the calyx. **C.** Flower, top view. **D.** Flower, longitudinal section. **E.** Anthers, front and side views. **F.** Branch with fruit. **G-H.** *Solandra grandiflora.* **G.** Flowering branch. **H.** Fruit with persistent calyx.

than or as long as the dilated portion, the limb with 5 sinuate lobes, more or less revolute; stamens as long as the corolla. Berry coriaceous-woody, depressed-ovoid, ca. 3 cm long, with the calyx split and persistent at the base.

Phenology: Collected in flower from October to December.

Status: Apparently exotic, cultivated and naturalized, uncommon.

Distribution: Cultivated or sometimes at the margin of forests along the Cordillera Central. Cultivated on St. Thomas. Apparently native to Jamaica, today found throughout the Antilles, Panama, Venezuela, and Brazil.

Public Forests: Guilarte and Maricao.

Cultivated Species:

Solandra longiflora Sw. has been collected on St. Croix from cultivated plants, and apparently does not grow there spontaneously. This species is distinguished from *S. grandiflora* by the longer corolla (23-32 cm long), with the tubular portion longer than the dilated portion.

3. SOLANUM

Herbs, shrubs, trees, or herbaceous or woody vines, usually with spines or prickles, glabrous or pubescent with simple or stellate hairs. Leaves alternate, simple or compound, entire or lobate; stipules absent. Flowers actinomorphic, 5-merous, bisexual or rarely unisexual, produced in racemes or solitary. Calyx deeply lobate; corolla usually rotate, with the limb pentagonal; stamens 5, the filaments shorter than the anthers, the anthers concrescent, dehiscent by terminal pores; ovary superior, of two connate carpels, the placentation axile, with numerous ovules, the style filiform, the stigmas bifid. Fruit a berry with numerous seeds inside. A cosmopolitan genus, of approximately 1,400 species.

Key to the species of *Solanum*

1a. Plants markedly spiny; corolla white .....1. *S. lancifolium*
1b. Plants not spiny or inconspicuously spiny; corolla lavender or pale violet.....2

2a. Corolla deeply lobate, the limb 2-2.5 cm wide; anthers 3-5 mm long.....2. *S. seaforthianum*
2b. Corolla rotate (the lobes short), the limb 3.5-6 cm wide; anthers 9-10.5 mm long.....
.....3. *S. wendlandii*

1. Solanum lanceifolium Jacq., Collectanea 2: 286. 1788 [1789].

Fig. 155. A-D

Woody vine, scandent, that supports itself on the host plants by means of recurved spines and attains 2-6 m in length. Stems cylindrical, stellate-pubescent, with few or numerous recurved spines, yellowish. Leaves alternate, 10-18 × 3.7-7 cm, lanceolate, ovate, or elliptical, chartaceous, the apex acute, obtuse, or acuminate, the base obtuse or rounded, asymmetrical, the margins entire; upper surface dull, with some scattered stellate hairs, with the venation flat or slightly prominent; lower surface light green, dull, sparsely stellate-pubescent, with prominent venation, the midvein with yellowish recurved spines; petioles stellate-pubescent, 1-5 cm long, usually with recurved spines. Flowers in lateral racemes, 2-4 cm long, stellate-pubescent; pedicels stellate-pubescent, 1.5-1.7 cm long. Calyx green, campanulate, stellate-pubescent, 4.5-5 mm long, of 5 subulate sepals; corolla white, deeply lobate, stellate-pubescent on the outer surface, the tube ca. 1.5 mm long, the lobes 8-11 mm long, oblong, oblong-lanceolate, or ovate, expanded or slightly reflexed; anthers subulate, connivent, 6.2-6.5 mm long, yellow; style projecting beyond the anthers, the stigma capitate. Berry globose, fleshy, brilliant red or orange when ripe, 0.9-1.3 cm in diameter, glabrous. Seeds numerous, circular, flattened, yellowish, 3.2-3.5 mm in diameter.

Phenology: Collected in flower and fruit from January to August.

Status: Native, uncommon.

Distribution: In forests and thickets. Vieques (according to Liogier, 1995), St. John, St. Thomas (according to Krebs, 1847), and Tortola; also in Hispaniola, the Lesser Antilles, Mexico, Central America, Colombia, Venezuela, and Ecuador.

2. Solanum seaforthianum Andr., Bot. Repos. 8, t. 504. 1807.

Fig. 155. E-I

Jazmín de Italia, Falsa belladona

Slightly woody vine, scandent, attainig 3-6 m in length. Stems more or less cylindrical, puberulent, glabrescent, unarmed. Leaves alternate, trifoliolate, 5-7(9)-pinnately compound, 5-7(9)-pinnatilobed, or less frequently simple, 4.5-9(14) × 2.6-10 cm, membranaceous; leaflets or segments elliptical or oblong-elliptical, the apex acute or acuminate, the base obtuse to almost cordiform, asymmetrical, the margins entire; upper surface dull, appressed-puberulent; lower surface light green, dull, appressed-puberulent, especially on the prominent venation; petioles appressed-puberulent, 2-6.5 cm long, slender. Flowers in terminal panicles but appearing lateral (sympodial by apposition), 6-23 cm long, puberulent; pedicels glabrous or puberulent, 8-12 mm long. Calyx green, 1-1.5 mm long, short-conical but attenuate toward the pedicel, glabrous or puberulent, almost truncate or with 5 very short lobes, obtuse; corolla lavender (rarely white), deeply lobate, the lobes 5-12 mm long, oblong or almost elliptical, expanded; anthers oblong, 3-4 mm long, not connivent, the filaments slightly unequal; style projecting beyond the anthers, the stigma capitate. Berry globose, fleshy, crimson, 9-16 mm in diameter. Seeds numerous, circular, flattened, ca. 3 mm in diameter.

Phenology: Flowering almost throughout the year, collected in fruit in January, February, and June.

Status: Exotic, cultivated as an ornamental and naturalized, although not very common.

Distribution: In disturbed areas, like roadsides and pastures. Also on Vieques, St. Croix, and St. Thomas. Native to South America, but cultivated throughout the tropics.

Public Forests: Carite and Río Abajo.

3. Solanum wendlandii Hook. f., Bot. Mag. t. 6914. 1887.

Fig. 155. J-L

Campana de pascua, Flor de la mañana, Papa aérea, Giant potato climber

Slightly woody vine, scandent, attainig several meters in length. Stems cylindrical, glabrous, unarmed or less frequently with some minute recurved spines. Leaves alternate, deeply (3)5-7-pinnatilobate or sometimes simple, 4.5-7.5-17 × 4.6-12 cm, membranaceous, glabrous, with numerous minute dots, elliptical when simple, 4.5-14 × 4.6-7.5, the apex short-acuminate, the base obtuse to almost rounded; segments or lobes elliptical or oblong-elliptical, usually asymmetrical, the apex acute or acuminate, the margins entire; lower surface dull, the primary vein prominent, sometimes with recurved spines; petioles glabrous, 3-6.5 cm long, usually narrowly winged, sometimes with recurved spines. Flowers unisexual, in terminal pseudodichotomous panicles, 8-20 cm long, glabrous; pedicels glabrous, 1-1.7 cm long. Staminate flowers: calyx green, cyathiform, glabrous, 5-7 mm long, with 5 ovate-deltate or ovate lobes, 1-3 mm long, apiculate at the apex; corolla lavender, rotate, pentagonal, 3.5-6 cm wide, the lobes apiculate, ciliate; anthers oblong, 9-10.5 mm long, not connivent, dehiscent by terminal pores and by longitudinal sutures, the filaments thick, unequal. Pistillate flowers and fruits not observed.

Phenology: Collected in flower from April to October.

Status: Exotic, cultivated as an ornamental and escaped from cultivation (according to Liogier, 1995), although not very common. The plants of this species that are found in cultivation seem to be all male, and apparently reproduce asexually.

Distribution: In moist areas of the cordilleras. Native to Costa Rica, but widely cultivated in the tropics for the beauty of its flowers.

Excluded Species:

Solanum pyrifolium Lam. was reported for Puerto Rico by Liogier (1995) based on one of his collections (*Liogier 34137*), from the area of the Cabezas de San Juan in Fajardo. This species is here excluded from the flora of Puerto Rico because his report is based on an erroneous

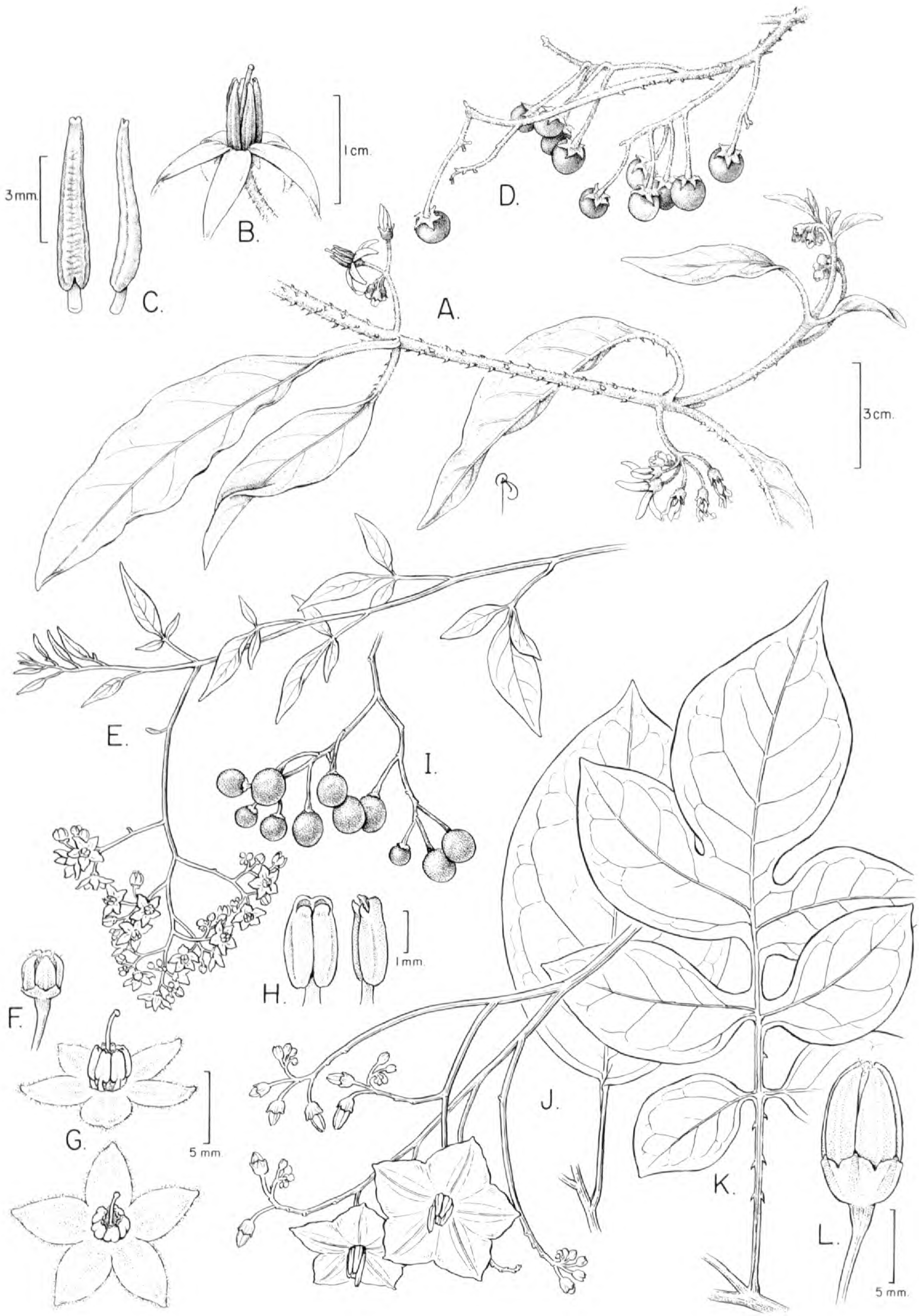

Fig. 155. A-D. *Solanum lancifolium.* **A.** Flowering branch. **B.** Flower. **C.** Anthers, front and side views. **D.** Infructescence. **E-I.** *Solanum seaforthianum.* **E.** Flowering branch. **F.** Bud. **G.** Flower, side and top views. **H.** Anthers, front and side views. **I.** Infructescence. **J-L.** *Solanum wendlandii.* **J.** Inflorescence and simple leaf. **K.** Lobate leaf. **L.** Bud.

identification of *Solanum seaforthianum*. *Solanum pyrifolium* is a species endemic to Hispaniola that is distinguished from *S. seaforthianum* by its 4-5 mm long calyx, with rounded lobes ca. 1 mm long (vs. calyx 1-1.5 mm long, truncate, with obtuse lobes 0.1-0.2 mm long) and by simple and entire leaves (vs. leaves trifoliolate, 5-7(9)-pinnately compound, 5-7(9)-pinnatilobed, or less frequently simple and entire). The specimen *Liogier 34137* has almost all the leaves simple and entire, but a scrupulous examination reveals that it also has trifoliolate leaves.

Reference: Bernadello, L.M. and A. T. Hunziker. 1987. A synoptical revision of *Solandra* (Solanaceae). Nord. J. Bot. 7: 639-652.

46. *Family* ***TROPAEOLACEAE***

1. TROPAEOLUM

Scandent or creeping herbs, annual or perennial, usually with tuberous roots. Leaves alternate, simple or palmately compound, entire or lobate, long-petiolate, peltate at the base; stipules minute. Flowers bisexual, 5-merous, solitary, axillary or less frequently in axillary umbels. Calyx deeply lobate, with a long basal spur; petals free; stamens 8, in two whorls, the filaments unequal, the anthers dehiscent by longitudinal sutures; ovary superior, of three connate carpels, the placentation axile-apical, with a single ovule per carpel, the style filiform, with three short stigmatic branches. Fruit schizocarpous, separating into three fleshy mericarps with a single seed inside. A genus of the New World, with approximately 86 species.

1. Tropaeolum majus L., Sp. Pl. 345. 1753.
Fig. 156. A-I

Herbaceous vine, scandent or creeping, attainig 2-3 m in length. Stems cylindrical, glabrous, fleshy. Leaves alternate, ascendent, simple, more or less circular, peltate, 5-8 cm in diameter, membranaceous, glabrous; upper surface dark green, dull, with the venation light; lower surface pale green; petioles glabrous, 5.5-15(25) cm long. Flowers solitary, axillary, ascendent; pedicels glabrous, as long as or longer than the petioles. Calyx yellow or pale orange, the sepals unequal, ovate, oblong, 2-2.3 cm long, the spur straight or slightly curved, up to 3 cm long; petals orange or red, obovate, long-unguiculate, 3-4 cm long, three of them long-ciliate on the margin adjacent to the claw; anthers lanceolate, the filaments slender, unequal; ovary trilobate, glabrous. Fruit tricoccal, ca. 10 mm long.

Phenology: Collected in flower in February.

Status: Exotic, cultivated as an ornamental and naturalized, although not very common.

Distribution: In moist areas of the Cordilleras Central. Native to the Andean cordillera, but widely cultivated for the beauty of its flowers.

Public Forest: Guilarte.

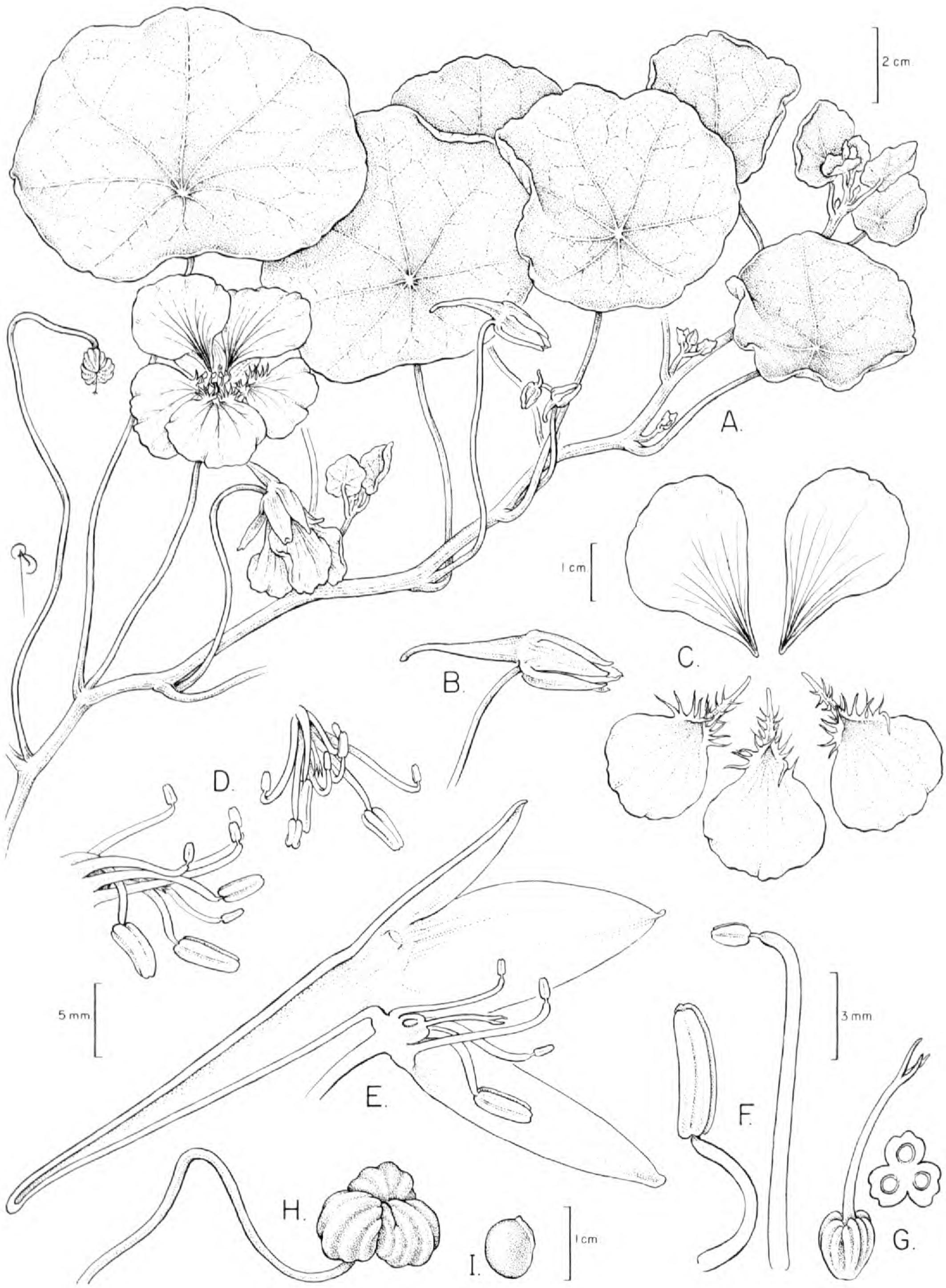

Fig. 156. A-I. *Tropaeolum majus.* **A.** Fertile branch. **B.** Calyx, side view. **C.** Petals. **D.** Stamens. **E.** Longitudinal section of the flower, showing spur, sepals, stamens, and gynoecium. **F.** Fertile and sterile stamens. **G.** Gynoecium, and cross section of the ovary. **H.** Fruit. **I.** Seed.

47. *Family* ***ULMACEAE***

1. CELTIS

Shrubs, trees, or lianas, with spines or unarmed. Leaves alternate, simple, usually serrate and less frequently crenate or entire, petiolate; stipules minute and deciduous. Flowers 5-merous, unisexual or sometimes bisexual; the staminate flowers in axillary cymes; the pistillate flowers solitary or few in axillary cymes; calyx of free sepals. Petals absent; stamens 5; ovary superior, with a single locule; ovule solitary and pendulous; styles 2. Fruit a fleshy drupe. A genus of approximately 80 species, the majority of the Northern Hemisphere and South Africa.

1. Celtis iguanaea (Jacq.) Sarg., Silva 7: 64. 1895. **Fig. 157. A-G**

BASIONYM: *Rhamnus iguanaeus* Jacq.
SYNONYMS: *Momisia iguanaea* (Jacq.) Rose & Standl.
Celtis aculeata Sw.

Azufaifo, Cock spur

Scandent shrub or liana that climbs by means of short lateral branches with recurved spines, attainig 3-10(20) m in length. Stems glabrous or puberulent at the extremities, cylindrical, attaining 8 cm in diameter; bark grayish or light brown, with numerous lenticels. Leaves alternate,

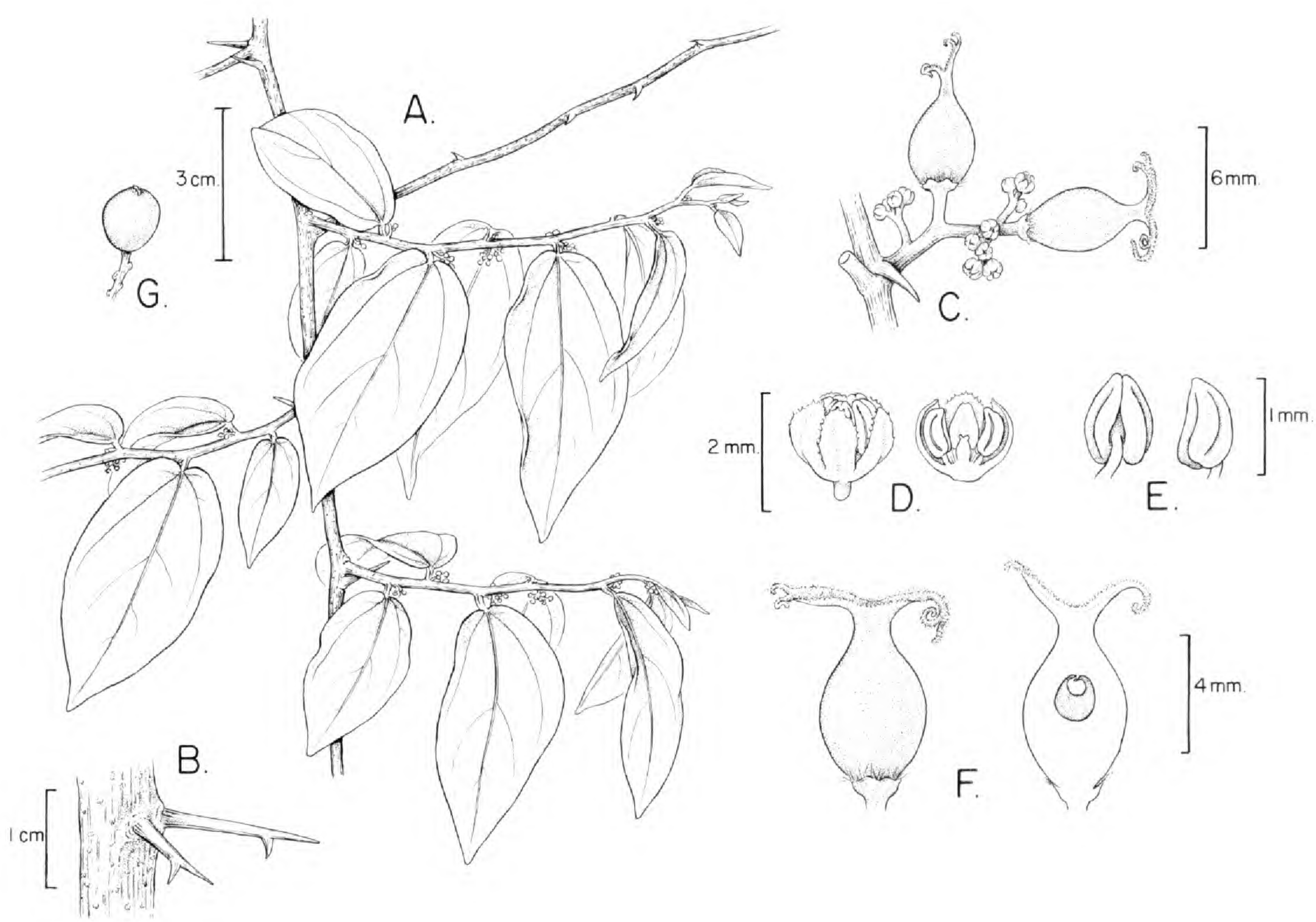

Fig. 157. A-G. *Celtis iguanaea.* **A.** Fertile branch. **B.** Stipular spines. **C.** Inflorescence with immature fruits. **D.** Staminate flower, whole and longitudinal section. **E.** Stamens, back and side views. **F.** Immature fruit, whole and longitudinal section. **G.** Mature fruit. From Acevedo-Rodríguez et al. 1996. Flora of St. John, U. S. Virgin Islands. Mem. NYBG Vol. 78.

4-15 × 2.5-8.7 cm, chartaceous, ovate, oblong, or sometimes obovate, the apex short-acuminate or sometimes obtuse, the base rounded, cordiform, or truncate, the margins entire, crenate, or sparsely serrate; upper surface yellowish green, dull, glabrous or puberulent, punctate, with three main veins, sunken; lower surface yellowish green, dull, glabrous, the venation prominent, with small tufts of hairs in the axils of the secondary veins; petioles 2-15 mm long. Flowers unisexual or bisexual, the staminate flowers in branched axillary cymes, the pistillate or bisexual flowers in simple axillary cymes. Calyx of discrete sepals, oblong, concave, ciliate, 1-2 mm long; stamens 5, ascendent; ovary ovoid, with two pubescent styles. Drupe fleshy, ovoid or almost globose, 6-10(14) mm long, orange, with persistent styles.

Phenology: Flowering from February to May and fruiting from May to September.

Status: Native, uncommon.

Distribution: In dry areas along the coast, and in the area of mogotes. Also on Culebra, Desecheo, Icacos, Vieques, St. Croix, St. John, and St. Thomas; throughout the Neotropics.

Public Forest: In all probability, found in Guánica.

48. *Family* ***VALERIANACEAE***

1. VALERIANA

Herbs or less frequently herbaceous vines, twining or scandent, glabrous or pubescent, usually with a fetid odor. Leaves opposite, simple, entire, dentate, trifoliolate, pinnate, or pinnatisect; stipules absent. Flowers actinomorphic or slightly zygomorphic, bisexual or rarely unisexual, produced in terminal or axillary dichasial cymes; bracts and bracteoles present. Calyx tubular, with 5-20 lobes, dentate, setose or plumose; corolla infundibuliform, campanulate, or hypocrateriform, the tube short, the lobes 5, expanded; stamens 3(4), adnate to the throat, included or exserted, the anthers sessile; ovary inferior, 3-carpellate, the carpels with a single ovule, the stigma 2-3-lobate. Fruit a dry indehiscent achene with a single fertile carpel, crowned by the plumose sepals. An almost cosmopolitan genus, of approximately 250 species.

1. Valeriana scandens L., Sp. Pl. ed. 2, 47. 1762.
Fig. 158 A-E
Valeriana

Herbaceous vine, twining, attainig 2-3 m in length. Stems cylindrical, glabrous or puberulent at the nodes. Leaves opposite, trifoliolate; leaflets 1.3-6 × 0.8-2.2 cm (terminal leaflet larger than the lateral ones), membranaceous, glabrous, lanceolate or ovate-lanceolate, the apex acuminate, the base obtuse, rounded, or truncate, the margins entire or crenate, the venation slightly prominent on both surfaces; petioles slender, 1.2-3 cm long. Flowers in dichasial or pseudodichotomous cymes with lateral monochasia. Hypanthium ovoid, ca. 1 mm long, crowned by 10-12 filiform sepals; corolla narrowly campanulate, 1.3-1.8 mm long, the lobes 0.2-0.4 mm long; stamens included; style ca. 1 mm long, with three short stigmatic branches. Achene flattened, ribbed, ovate, ca. 2.5 mm long, crowned by a tuft of plumose sepals, ca. 4 mm long

Phenology: Collected in flower from November to May and in fruit in March.

Status: Native, uncommon.

Distribution: In moist areas of the Cordillera Central and in the area of mogotes. Also in tropical continental America, Cuba, Hispaniola, and the United States (Florida).

Public Forests: Guilarte and Río Abajo.

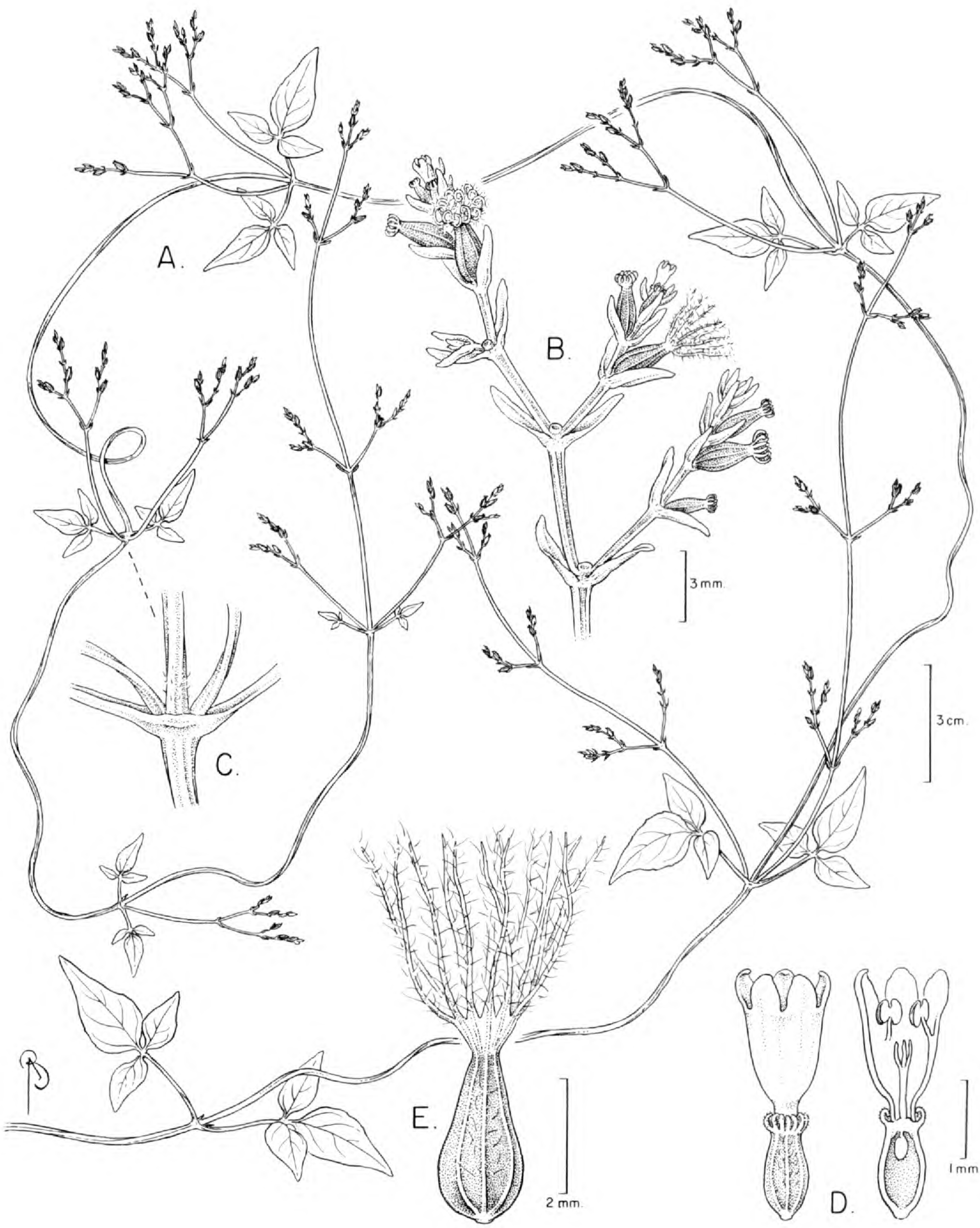

Fig. 158. A-E. *Valeriana scandens.* **A.** Fertile branch. **B.** Detail of branch with flowers and fruits. **C.** Node. **D.** Flower, whole and longitudinal section. **E.** Fruit.

49. *Family* ***VERBENACEAE***

Key to the genera

1a. Flowers sessile, subtended by an involucre of 3(4) elongate bracts, expanded, pink or lilac at the base, much longer than the calyx.....2. *Congea*
1b. Flowers with minute bracts, not covering the calyx.....2

2.a Calyx gamosepalous, acetabuliform, orange, the sepals not apparent .....3. *Holmskioldia*
2b. Calyx of free sepals or sepals connate only at the base, of various colors, but not orange.....3

3a. Inflorescences corymbiform; calyx green, white, or pink, the sepals imbricate.....1. *Clerodendrum*
3b. Inflorescences racemose; calyx violet, the sepals expanded .....4. *Petrea*

1. CLERODENDRUM

Trees, erect shrubs, or less frequently lianas or scandent shrubs, sometimes with axillary spines. Leaves simple, opposite or whorled, petiolate, with entire or dentate margins. Flowers showy, bisexual, zygomorphic, in axillary cymes or terminal panicles. Calyx campanulate or tubular, truncate, 5-lobate; corolla 5-merous, hypocrateriform; stamens 4, the filaments didynamous, adnate to the base of the corolla, exserted; ovary superior, 4-locular, each locule with a solitary ovule; style slender, crowned by a globose stigma. Fruit drupaceous, 4-lobate, with 4 pyrenes. A genus of approximately 400 species, the majority native to the tropics of the Old World.

Key to the species of *Clerodendrum*

1a. Branches with conical spines, opposite or whorled, in the area of the nodes.....1. *C. aculeatum*
1b. Branches unarmed.....2

2a. Calyx reddish, 1-1.5 cm long ..... *C.* × *speciosum*
2b. Calyx white, 1.5-2.5 cm long ..... *C. thomsonae*

1. Clerodendrum aculeatum (L.) Schltdtl., Linnaea 6: 750. 1831.
Fig. 159. A-E

BASIONYM: *Volkameria aculeata* L.

Erect or scandent shrub attainig 3 m in length. Stems cylindrical, usually striate, puberulent, with 2 or 3 spines, opposite or whorled, in the area of the nodes; stipules absent. Leaves opposite or three per node, 1.5-7 × 0.5-2.6 cm, oblong or elliptic-ovate, chartaceous, glabrous or puberulent, the apex acute or obtuse, the base cuneate or rounded, the margins entire; upper surface dull, dark green; lower surface pale green, dull, with numerous dots; petioles 2.5-10 mm long, puberulent. Inflorescences of axillary cymes. Calyx campanulate, puberulent, 2.5-4 mm long, the sepals expanded; corolla white, hypocrateriform, 1.4-2.7 cm long, the tube sometimes with a purple tinge; filaments pink, twice as long as the corolla; style purple, as long as the filaments. Drupe ovoid or depressed-ovoid, 5-7 mm long, opening in two halves when ripe.

Phenology: Collected in flower from January to March and from August to October and in fruit from January to August.

Status: Native, locally common.

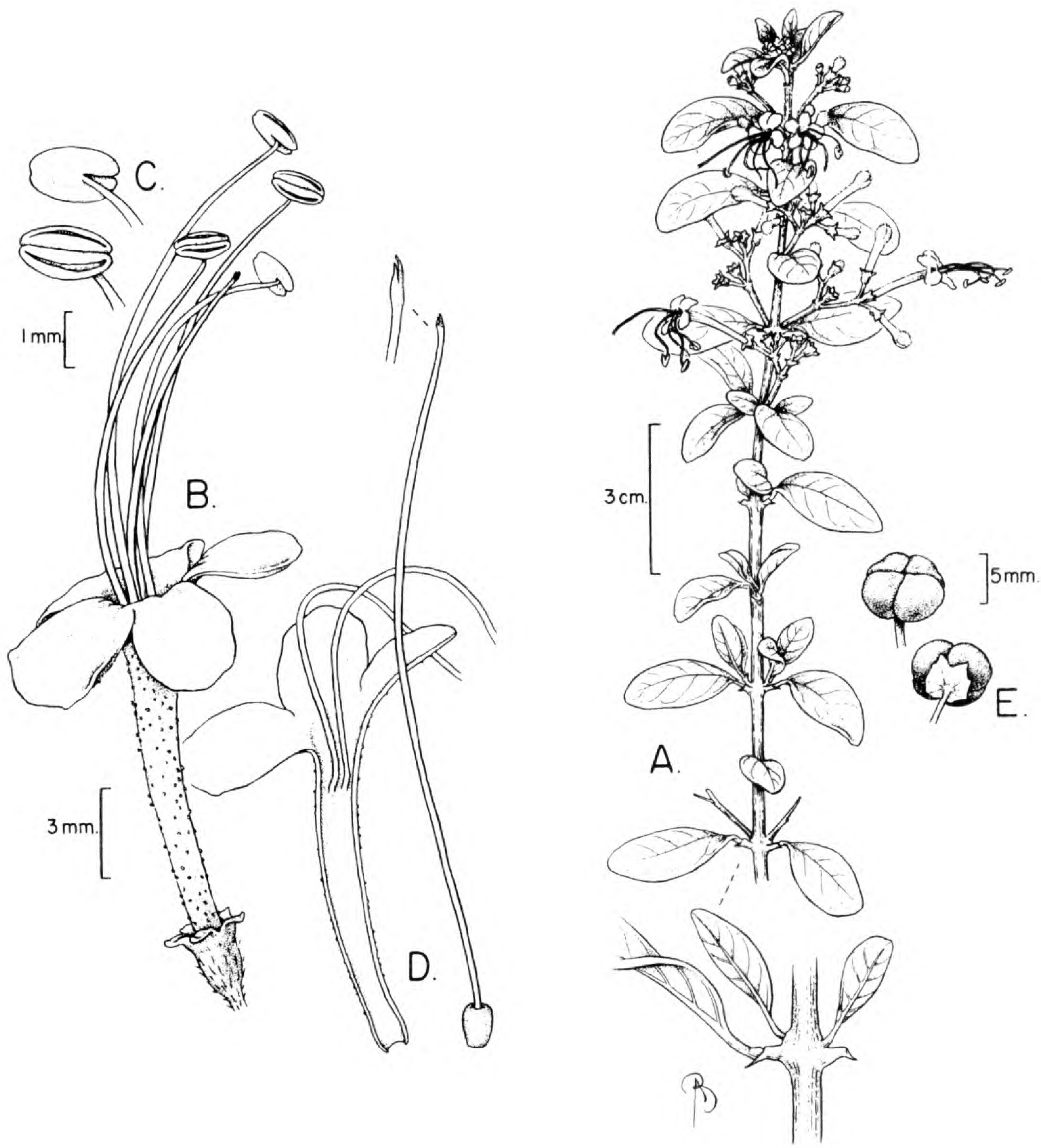

Fig. 159. A-E. *Clerodendrum aculeatum.* **A.** Fertile branch, and detail of node, showing axillary spines. **B.** Flower. **C.** Anthers, front and back views. **D.** Corolla, longitudinal section, gynoecium, and detail of the stigma. **F.** Fruits. From Acevedo-Rodríguez et al. 1996. Flora of St. John, U. S. Virgin Islands. Mem. NYBG Vol. 78.

Distribution: In dry forests and thickets, along the littoral zone. Also on Mona, Anegada, Jost van Dyke, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Antilles, Venezuela, and the Guianas.

Public Forests: Guánica and Mona.

2. Clerodendrum × speciosum Dombrain, Flor. Mag. 8, pl. 432. 1869.

Fig. 160. E-G

SYNONYMS: *Clerodendrum thomsonae f. speciosum* (Dombrain) Voss

Clerodendrum umbellatum var. speciosum (Dombrain) Moldenke

Slightly woody vine, twining, attainig 3 m in length. Stems obtusely quadrangular, striate,

minutely puberulent; stipules absent. Leaves opposite, 7.5-15.5 × 5.7-8 cm, elliptical or ovate, chartaceous, the apex acuminate, the base rounded or cordiform, the margins entire or remotely sinuate; upper surface glabrous; lower surface glabrous, pale green, with numerous dots, the veins prominent and minutely puberulent; petioles 1-2 cm long, sulcate, puberulent. Inflorescences of axillary dichasial cymes; bracts minute, subulate. Calyx more or less urceolate, 1.0-1.5 cm long, intense pink to purple, puberulent, the sepals lanceolate, connate at the base, acuminate at the apex; corolla red or red-orange, hypocrateriform, 2.5-3 cm long, the tube quite narrow, the lobes rounded; filaments pink, twice as long as the corolla; style pink, as long as the filaments. Fruit unknown.

Phenology: Collected in flower from September to February.

Status: Exotic, cultivated, persistent and naturalized in some localities in Puerto Rico.

Distribution: Common in gardens in Puerto Rico and the Virgin Islands. Cultivated throughout the tropics.

Public Forests: Río Abajo and Tortuguero.

Commentary: Discrepancies exist regarding the nature of this taxon. Originally (1869), it was described as a hybrid under the name of *C. x speciosum*. Later, Voss (1894) considered this taxon as a form of *C. thomsonae* and Moldenke (1937) as a variety of *C. umbellatum* Poir. Moldenke, in 1983, changed his opinion, recognizing it as a form of *C. thomsonae*, but pointed out that the studies necessary to discard its hybrid nature do not yet exist. Due to the fact that the nature of this taxon has not been established with certainty, it seems to me appropriate to utilize the name of *C. x speciosum*, this being the most widely used name.

3. Clerodendrum thomsonae Balf. , Edinburgh New Philos. J. 15(2): 233, t. 2. 1862.

Fig. 160. A-D

Slightly woody vine, twining, attainig 3-7 m in length. Stems obtusely quadrangular, puberulent; stipules absent. Leaves opposite, 5.2-14 × 2.7-7 cm, elliptical or lanceolate, chartaceous, the apex acuminate, the base obtuse or rounded, the margins entire or remotely sinuate; upper surface puberulent, dark green, dull; lower surface puberulent, pale green, with numerous dots, the veins prominent; petioles 1-2.8 cm long, sulcate, puberulent. Inflorescences of axillary dichasial cymes; bracts minute, subulate. Calyx more or less urceolate, 1.5-2.5 cm long, white, puberulent, the sepals lanceolate or elliptic-lanceolate, connate at the base, acuminate at the apex; corolla red or crimson, hypocrateriform, ca. 2 cm long, the tube quite narrow, the lobes rounded; filaments pink, twice as long as the corolla; style pink, as long as the filaments. Fruit unknown.

Phenology: Collected in flower in December.

Status: Exotic, cultivated.

Distribution: Common in gardens in Puerto Rico and the Virgin Islands. Cultivated throughout the tropics.

2. CONGEA

Lianas or clambering shrubs, without spines, pubescence of simple or stellate hairs. Leaves simple, opposite, petiolate, with entire margins; stipules absent. Flowers bisexual, zygomorphic, in head-like cymes, arranged in terminal panicles. Calyx ovoid-campanulate, 5-dentate; corolla 5-merous, tubular, bilabiate, the upper lip bilobate, the basal lip trilobate, shorter than the upper lip; stamens 4, exserted, the filaments didynamous, adnate to the corolla below the throat; ovary superior, imperfectly bilobate, each locule biovulate; style slender, as long as the filaments, stigma bifid. Fruit dry, obovoid, with a single seed. A genus of 10 species, native to southeastern Asia.

1. Congea tomentosa Roxb., Pl. Coromandel. 3: 90. 1820.

Fig. 161. A-C

Lluvia de orquídeas, Terciopelo

Twining liana, with numerous lateral branches, short, divaricate, usually pendulous, attainig 10-15 m in length. Stems cylindrical, sericeous-tomentose; stipules absent. Leaves

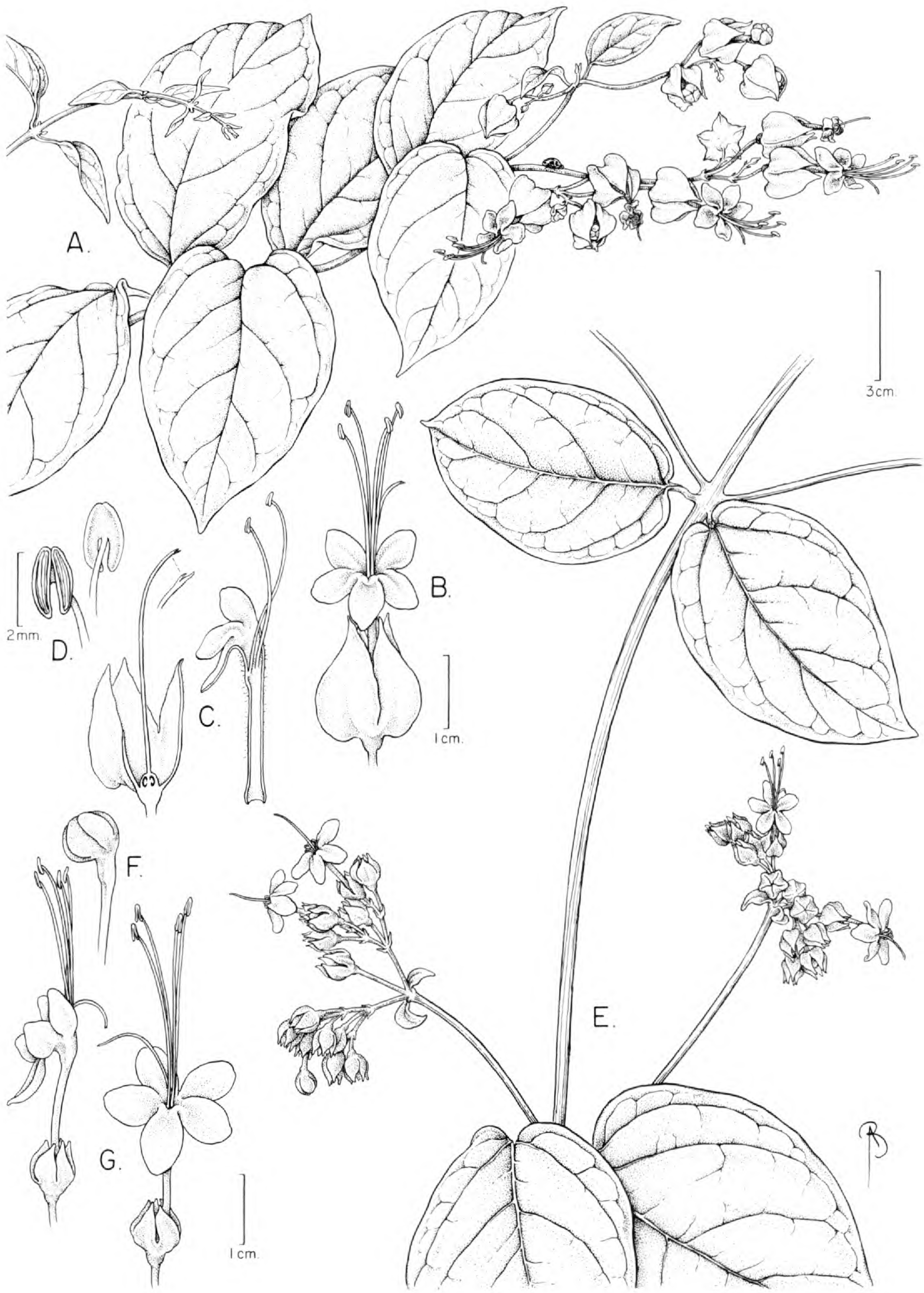

Fig. 160. A-D. *Clerodendrum thomsonae.* **A.** Fertile branch. **B.** Flower. **C.** Calyx, with gynoecium and corolla, longitudinal section. **D.** Stamens. **E-G.** *Clerodendrum × speciosum.* **E.** Fertile branch. **F.** Bud. **G.** Flower, side view and upper side view.

opposite, 5-13(18.5) × 3-7.5(9.5) cm, elliptic-ovate or ovate, coriaceous, the apex short-acuminate, acute, or obtuse, the base rounded or subcordiform, sometimes asymmetrical, the margins entire or remotely sinuate; upper surface puberulent, dark green, dull; lower surface white-tomentose, with the venation quite prominent; petioles 5-13 mm long, lanate-tomentose. Inflorescences at the end of the short lateral branches, forming an inflorescence with a marked transition from leaves to bracts; bracts at the base of the branches of the inflorescence ca. 1 cm long, elliptical; axes lanate-tomentose, glabrescent; bracts of the involucre 3(4), expanded or reflexed, connate at the base, 2.3-4 × 0.8-1.4 cm, elliptical or oblong, pink or lilac toward the apex, green at the base, white-tomentose, with prominent venation. Flowers sessile, in groups of (5)7(9). Calyx infundibuliform, 5-7 mm long, light green, white-lanate-tomentose; corolla tubular, bilabiate, slightly longer than the calyx, white, glabrous, the upper lobes oblong, ca. 3 mm long, the basal lobes shorter and rounded; filaments long-exserted, reddish brown or purple; ovary obovoid, glabrous, the style as long as the filaments. Fruit unknown.

Phenology: Collected in flower from January to March.

Status: Exotic, cultivated and naturalized, although not very common.

Distribution: Common in gardens in Puerto Rico and the Virgin Islands, and naturalized in disturbed vegetation in the Cordillera Central. Native to Indomalasia. Cultivated throughout the tropics.

3. HOLMSKIOLDIA

Erect or clambering shrubs, glabrous or pubescent, without spines or with axillary spines. Leaves simple, opposite, petiolate, with entire or dentate margins; stipules absent. Flowers bisexual, zygomorphic, in axillary cymes or racemes or congested and terminal. Calyx gamosepalous, rotate or acetabuliform, truncate or sinuate-dentate, usually of brilliant colors; corolla tubular, more or less bilabiate, the tube curved, the limb with 5 lobes; stamens 4, exserted, the filaments didynamous, connate to the corolla in the middle portion of the tube; ovary superior, 4-locular, each locule with a solitary ovule, the style elongate, exserted, the stigma bifid. Fruit drupaceous, 4-lobate, subtended by the accrescent calyx, with 4 pyrenes inside. A genus of 19 species, native to southern Asia, southeastern Africa, and Madagascar.

1. Holmskioldia sanguinea Retz., Obs. 6: 31. 1791.

Fig. 161. D-E

Paraguita chino, Platillo, Parasol

Scandent or erect shrub, with numerous basal branches, attainig 2 m in length. Stems obtusely quadrangular or cylindrical, puberulent, grayish; stipules absent. Leaves opposite, 3-12 × 1.5-8.5 cm, ovate or ovate-lanceolate, chartaceous, the apex acuminate or acute, the base cuneate or truncate, the margins serrate; upper surface puberulent, dark green, dull; lower surface puberulent, pale green, with numerous dots, the venation prominent; petioles 8-30 mm long, puberulent. Inflorescences of racemes or less frequently panicles, axillary or terminal, up to 5 cm long; bracts minute; pedicels 2.5-8 mm long, slender, glandular-pubescent. Calyx acetabuliform, orange, 1.6-2.2 cm in diameter, with minute dots; corolla hypocrateriform, crimson, 1.5-2.5 cm long; stamens slightly exserted, the filaments pink; ovary glabrous, the style as long as the filaments. Fruit globose, brown, verrucose.

Phenology: Collected in flower from November to April.

Status: Exotic, cultivated, rather common, apparently naturalized in areas of the Cordillera Central.

Distribution: Common in gardens in Puerto Rico. Native of southern Asia. Cultivated throughout the tropics.

Fig. 161. A-C. *Congea tomentosa.* **A.** Inflorescence and leaves. **B.** Portion of inflorescence, with bracts. **C.** Flower. **D-E.** *Holmskioldia sanguinea.* **D.** Flowering branch. **E.** Corolla. **F-H.** *Petrea volubilis.* **F.** Flowering branch. **G.** Flower, longitudinal section and top view. **H.** Stamen and gynoecium.

4. PETREA

Tress, shrubs, or twining vines, without spines, glabrous or pubescent. Leaves simple, opposite, subopposite, or whorled, usually scabrous, petiolate, with entire or slightly crenate margins; stipules absent. Flowers bisexual, in axillary or terminal racemes. Calyx with a short cylindrical or campanulate tube and 5 deep lobes, elongate; corolla, hypocrateriform, blue, violet, or less frequently white, the tube urceolate, cylindrical, or infundibuliform, the lobes 5, expanded; stamens 4, the filaments didynamous, connate on the middle portion of the corolla; ovary superior, with a single fertile carpel, bilocular, each locule with a solitary ovule; style terminal, the stigma capitate. Fruit drupaceous, with 2 pyrenes, completely covered by the calyx. A genus of 11 species, native to the Neotropics.

1. Petrea volubilis L., Sp. Pl. 626. 1753.
Fig. 161. F-H

Twining liana or shrub, scandent or less frequently erect, with numerous basal branches, attainig 2-4 m in length. Stems obtusely quadrangular, pubescent or glabrous; stipules absent. Leaves opposite, sometimes whorled, 3-25 × 1.5-11 cm, elliptical, chartaceous, the apex obtuse, rounded-acute, or short-acuminate, the base obtuse or rounded, sometimes slightly asymmetrical, the margins entire, crenate, or sometimes serrate; upper surface glabrous or puberulent, scaberulous, with prominent venation; lower surface puberulent or glabrous, pale green, scaberulous, with numerous resinous dots, the venation prominent; petioles 4-16 mm long, puberulent. Inflorescences of axillary racemes, 10-60 cm long; bracts minute; pedicels 7-18 mm long, slender, puberulent. Calyx infundibuliform, blue-violet or white, the sepals 1.6-2 cm long, connate at the base to form a tube, 3-7 mm long, glabrous or pubescent; corolla infundibuliform, blue-violet or white, 0.6-1.5 cm long, the limb 5-lobate, one of the lobes larger; stamens included; ovary glabrous, the style short. Fruit unknown.

Phenology: Flowering sporadically throughout the year.

Status: Exotic, cultivated.

Distribution: Common in gardens in Puerto Rico and the Virgin Islands. Native to tropical continental America. Cultivated throughout the tropics.

References: Abid, M. A., 1966. A revision of *Congea* (Verbenaceae). The Garden's Bulletin Singapore. 21: 259-314. Moldenke, H. N. and A. L. Moldenke. 1983. Verbenaceae. *In*: Dassanayake and Fosberg, (eds.). Flora of Ceylon. Vol. 4: 196-487. Rueda, R. M. 1994. Systematics and evolution of the genus *Petrea* (Verbenaceae). Ann. Missouri Bot. Gard. 81: 610-652.

50. *Family* ***VITACEAE***

Key to the genera

1a. Stems generally herbaceous and fleshy; inflorescences ascendent or expanded toward the sides, as broad as long or broader than long; flowers 4-merous; petals persistent after anthesis .....1. *Cissus*

1b. Stems woody when mature; inflorescences pendulous, much longer than broad; flowers 5-merous; petals concrescent at the apex, forming a deciduous aggregate during anthesis .....2. *Vitis*

1. CISSUS

Vines, usually fleshy, that climb by means of tendrils opposite the leaves. The stems fleshy or slightly woody, without anatomical anomalies, producing scarce watery latex when cut. Leaves simple or trifoliolate, alternate, with serrate or entire margins; petioles more or less long; stipules small and deciduous. Flowers 4-merous, actinomorphic, usually bisexual, produced in compound cymes, opposite the leaves; calyx campanulate, with 4 minute lobes; petals 4, reflexed during anthesis; stamens alternating with the petals; disc cupuliform, entire or lobate; ovary superior, bilocular, with a robust and elongate style. Fruit a fleshy berry, globose, ovoid, or depressed-globose. A pantropical genus of 350 species.

Key to the species of *Cissus*

1a. Leaves simple.....2
1b. Leaves trifoliolate.....3

2a. Leaves ovate, coriaceous ..... 5. *C. verticillata*
2b. Leaves elliptical, fleshy ..... 3. *C. rotundifolia*

3a. Stems angular, 4-6-winged; terminal leaflet 4.3-15 cm long, usually elliptical, lanceolate, or ovate ..... 1. *C. erosa*
3b. Stems cylindrical, sometimes sulcate; terminal leaflet 1.6-4 cm long, rhombic or obovate..... 4

4a. Terminal leaflets obovate, obtuse, or rounded at the apex, the margins crenate or scattered-dentate; flowers red..... 2. *C. obovata*
4b. Terminal leaflets rhombic, acute at the apex, the margins sinuate-dentate on the upper half; flowers yellowish green ..... 4. *C. trifoliata*

1. Cissus erosa L.C. Rich., Act. Soc. Hist. Nat. 1: 106. 1792.

Fig. 162. A-J
Caro de tres hojas

Non-woody vine, that climbs by means of tendrils and attains 5-6 m in length. Stems angular, quadrangular, or 4-6-winged, branched, glabrous or puberulent, the nodes swollen. Leaves alternate, trifoliolate; leaflets elliptical, lanceolate, or ovate, 4.3-10.5 × 3-5.5 cm (the terminal leaflet larger), glabrous or puberulent on the prominent veins, the apex acute or obtuse, the base acute, obtuse, or attenuate on the central leaflet and unequal on the lateral leaflets, the margins serrate; petiolules very short or absent; petioles canaliculate or slightly winged, 2-3(5) cm long; stipules deltoid, auriculate at the base, 2-4 mm long. Tendrils opposite the leaves, simple, filiform, 10-12 cm long, sometimes terminating in adventitious discs. Inflorescences of umbelliform cymes, opposite the leaves; peduncle longer than the accompanying leaf; pedicels 2-2.5 mm long, reddish. Calyx ca. 1 mm high, red or pink, truncate; petals red, glabrous, papillose; stamens green; disc reddish. Fruits globose, 5-7 mm in diameter, black when ripe. Seed one, 5-7 mm long.

Phenology: Flowering throughout the year.

Status: Native, common.

Distribution: In disturbed areas on roadsides, on fences, and in pastures at lower and middle elevations. Also on Anegada; Hispaniola and tropical continental America.

Public Forests: El Yunque, Guilarte, Maricao, Río Abajo, and Tortuguero.

2. Cissus obovata Vahl, Symb. Bot. 3: 19. 1794.

Fig. 163. A-D

SYNONYMS: *Cissus caustica* Tussac
Cissus tuberculata Jacq.

Slightly woody vine that climbs by means of tendrils and attains 3-15 m in length. Stems much

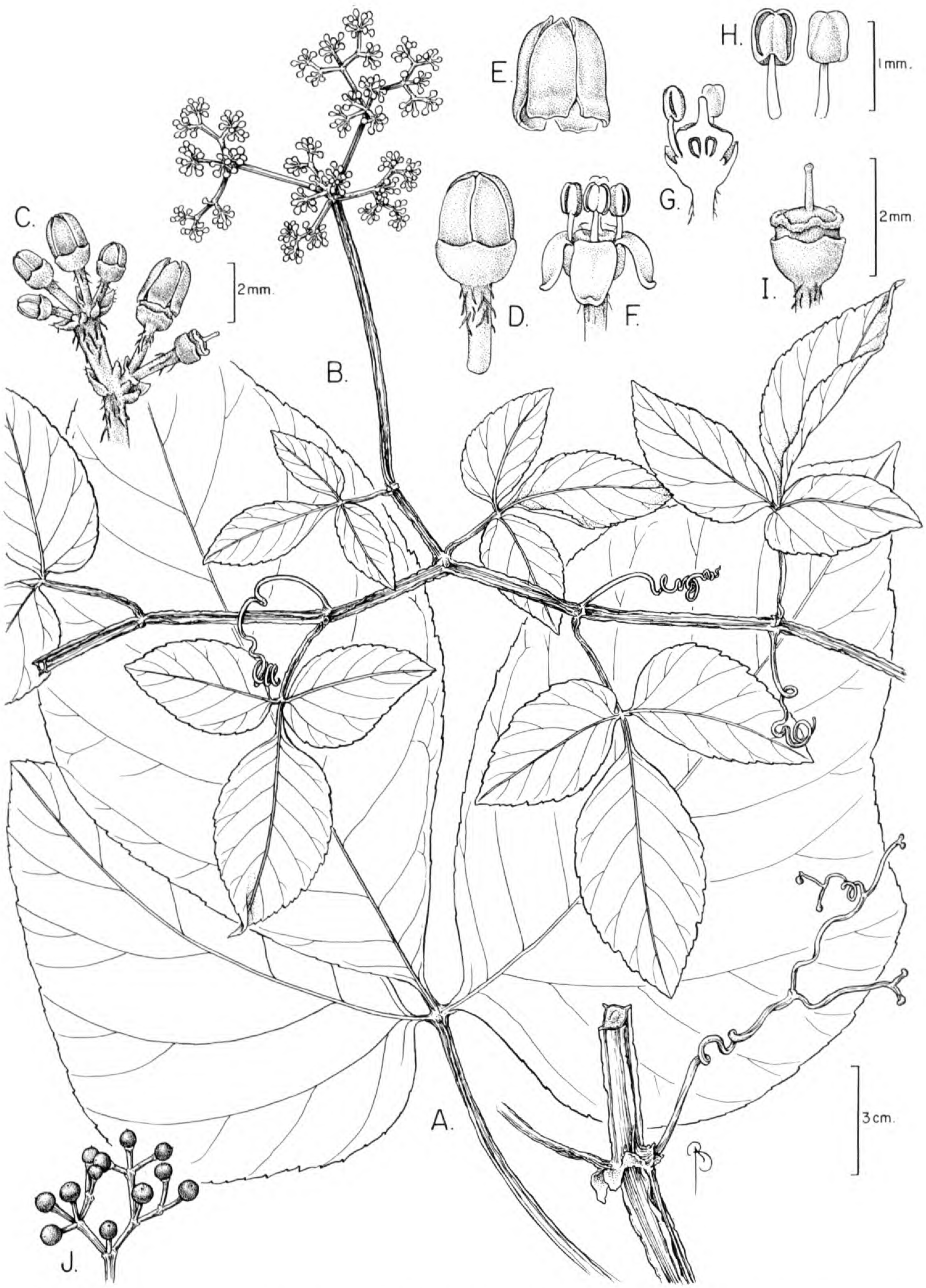

Fig. 162. A-J. *Cissus erosa*. **A.** Leaf and mature stem. **B.** Flowering branch. **C.** Detail of inflorescence. **D.** Bud. **E.** Petals. **F.** Flower. **G.** Flower, longitudinal section. **H.** Stamens. **I.** Flower with fertilized ovary. **J.** Infructescence. From Mori, S. A. et al. 2003. Vascular plants of central French Guiana. Mem. NYBG Vol. 76(2).

branched, subcylindrical, angular, fleshy, 3-8 mm in diameter, glabrous or puberulent, reddish and then grayish, flexuous, with the nodes swollen. Leaves alternate, trifoliolate, chartaceous, glabrous or pubescent; leaflets obovate, almost rounded, or elliptical, 0.7-6 × 0.5-3.5 cm (the terminal leaflet larger), the apex rounded, obtuse, mucronate and sometimes retuse, the base cuneate to rounded, unequal on the lateral leaflets, the margins crenate or scattered-dentate on the distal portion; petioles 0.8-5 cm long; stipules deltoid, early deciduous; tendrils opposite the leaves, minute, bifurcate, with an adventitious disc at the end. Inflorescences of cymes, opposite the leaves, with the peduncles glabrous or puberulent, reddish; pedicels reddish. Calyx reddish, ca. 1 mm long. Petals 4, reddish, 1-2 mm long, triangular, deciduous. Fruits globose to globose-obovoid, 4-5 mm in diameter, black or purple when ripe. Seed one, ca. 5 mm long.

Phenology: Collected in flower in June and November and in fruit in July.

Status: Native, locally common.

Distribution: At lower and middle elevations in coastal areas and in the zone of mogotes. Also on Mona, St. Croix, St. John, and St. Thomas; Hispaniola and the Lesser Antilles.

Public Forests: El Yunque, Guajataca, Guánica, Mona, and Río Abajo.

3. Cissus rotundifolia (Forssk.)Vahl, Symb. Bot. 3: 19. 1794.

Fig. 163. E-F

BASIONYM: *Saelanthus rotundifolius* Forssk.

Non-woody vine, that climbs by means of tendrils and attains more than 5 m in length. Stems fleshy, with abundant watery latex, more or less cylindrical, striate, with malpighiaceous hairs on the new growth, glabrescent. Leaves alternate, fleshy, oval, glabrous, 4-6.5 × 4-6 cm, involute, the apex truncate to almost rounded, the base cordiform, the margins serrate; petioles 0.8-1.2 cm long, sulcate; stipules ca. 2 mm long, oblong-lanceolate, early deciduous; tendrils opposite the leaves, thick, simple, slightly longer than the leaves, twisting in the form of a spiral. Inflorescences cymose, opposite the leaves, with the flowers grouped in umbels; pedicels 4-10 mm long, green. Calyx green, rotate or discoid, 1.5-1.8 mm wide; petals 4, pale green or whitish green, oblong-triangular, 2-2.5 mm long, deciduous; disc short-cupular, ca. 0.3 mm high; ovary sinuate-lobate at the base. Fruits globose, fleshy, ca. 0.8-1 cm in diameter, greenish.

Phenology: Collected in flower in September and in fruit in April and September.

Status: Exotic, cultivated and escaped from cultivation, uncommon.

Distribution: Cultivated in the Virgin Islands; escaped on St. Croix. Native to Yemen and Africa, but cultivated as an ornamental throughout the tropics.

4. Cissus trifoliata (L.) L., Syst. Nat. ed. 10, 897. 1759.

Fig. 164. E-F

BASIONYM: *Sicyos trifoliata* L.
SYNONYM: *Cissus acida* L.

Bejuco de caro, Sorrel vine

Non-woody vine that climbs by means of tendrils and attains 2-15 m in length. Stems much branched, cylindrical, fleshy, 3-8 mm in diameter, glabrous or puberulent, reddish brown or grayish when mature, the nodes swollen. Leaves alternate, trifoliolate, fleshy, glabrous; leaflets ovate, obovate, or oblong, 2-3 × 1-2.6 cm, the apex rounded, acute, or truncate, the base cuneate or attenuate, the margins deeply dentate-mucronate on the upper half; upper surface and lower surface dull; petioles fleshy, sulcate, 1-3 cm long; stipules 3.5-5 mm long, lanceolate; tendrils opposite the leaves, simple, filiform, 6-8 cm long, twisted in the form of a spiral. Inflorescences in cymes, opposite the leaves. Calyx yellowish green, 1.5-2 mm long. Petals 4, yellowish or whitish, reflexed, 2-2.5 mm long, lanceolate-triangular, deciduous. Fruits depressed-globose, 7-8 mm in diameter, shiny, metallic blue or black when ripe.

Phenology: Flowering from March to July and fruiting from July to August.

Status: Native, very common.

Distribution: At lower and middle elevations in coastal areas. Also on Caja de Muerto, Cayo Ratones, Mona, St. Croix, St. John, St. Thomas, and Tortola; the Bahamas, Cuba, Jamaica, Hispaniola, Colombia, Venezuela, and Ecuador.

Public Forests: Guánica, Mona, and Tortuguero.

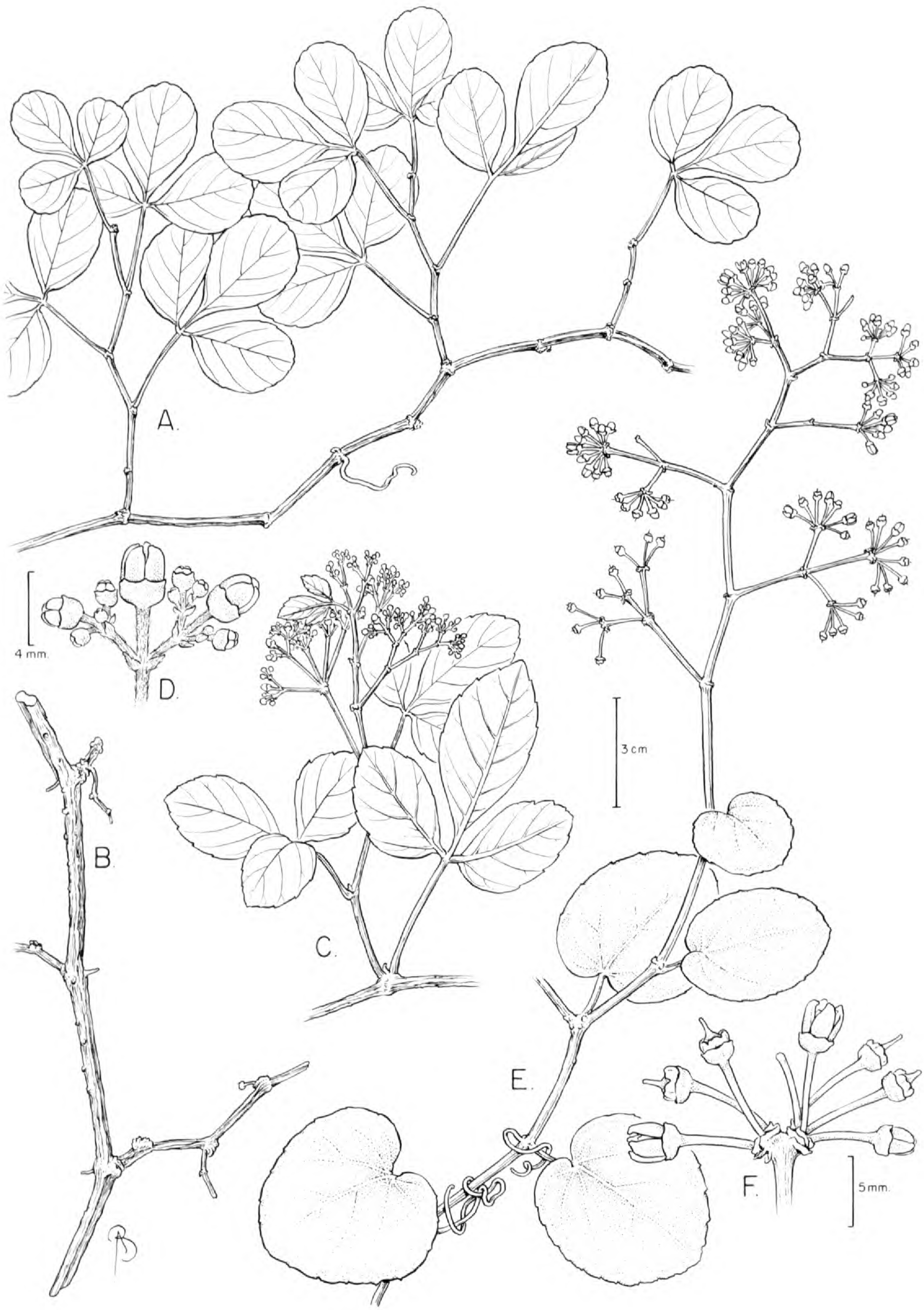

Fig. 163. A-D. *Cissus obovata.* **A.** Sterile branch. **B.** Leafless stem. **C.** Flowering branch. **D.** Detail of inflorescence. **E-F.** *Cissus rotundifolia.* **E.** Flowering branch. **F.** Details of inflorescence.

5. Cissus verticillata (L.) Nicolson & Jarvis, Taxon 33: 727. 1984.

Fig. 164. A-D

BASIONYM: *Viscum verticillatum* L.
SYNONYM: *Cissus sicyoides* L.

Bejuco de caro, Lambrali, Pinna koop, Puddin vine

Non-woody vine, that climbs by means of tendrils and attains more than 10 m in length. Stems fleshy, with abundant watery latex, cylindrical when young, flattened when mature, attaining 5 cm in diameter, the nodes swollen. Leaves alternate, coriaceous, ovate, 5-12 × 3.8-6.5 cm, the apex acute or rounded, the base cordiform, the margins revolute, denticulate; upper surface green, shiny; lower surface green, dull, with prominent venation; petioles 2-5 cm long, sulcate; stipules 2.5-3.5 mm long, auriculate; tendrils opposite the leaves, simple or bifurcate, up to 25 cm long, twisting in the form of a spiral. Inflorescences of compound cymes that are borne opposite the leaves; pedicels ca. 3 mm long, yellowish green or reddish. Calyx yellowish green or reddish, 0.7-1 mm long; petals 4, yellowish or pink, oblong-lanceolate, 2-2.5 mm long, deciduous; disc annular, yellow, 0.5-0.8 mm high. Fruits globose, fleshy, 0.7-1 cm in diameter, shiny, dark violet or black, with one or two seeds inside.

Phenology: Flowering and fruiting throughout the year.

Status: Native, very common.

Distribution: In disturbed areas such as pastures and roadsides, at middle and lower elevations. Also on Culebra, Desecheo, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; from southern North America to northern South America, including the Antilles.

Public Forests: Cambalache, Carite, Ceiba, El Yunque, Guánica, Maricao, Mona, Río Abajo, Susúa, and Toro Negro.

Doubtful Species:

Cissus intermedia A. Rich. was reported for Puerto Rico by Urban (1903-1911), based on the collections *Stahl 602* and *Sintenis 4797*. The collection of Stahl has been re-identified by Lombardi (2000) as *C. obovata*. On the other hand, the collection of Sintenis (deposited in the herbarium of Berlin) seems to have been destroyed during the Second World War. Since the existence of any other specimen that might be referred to *C. intemedia* is unknown, I consider that this species is not found in Puerto Rico. Its distribution is limited to the Bahamas, Cuba, and Hispaniola.

Commentary: Several species of *Cissus* (*C. erosa*, *C. trifoliata*, and *C. verticillata*) are affected by the parasitic fungus *Mycosyrinx cissi* (Poiret) G. Beck, which causes the inflorescences to grow in a monstrous form, producing numerous sterile branches. These deformed inflorescences look like a parasitic plant of the family Loranthaceae or Viscaceae. For this reason, the name *C. verticillata* has replaced the well known name *C. sicyoides*. It turns out that this species was first described by Linnaeus based on one of these deformed inflorescences, under the name of *Viscum verticillatum*. This basionym has priority over *C. sicyoides*, since it is older, and therefore it has replaced *C. sicyoides*.

2. VITIS

Lianas or woody vines, that climb by means of tendrils that are opposite the leaves. The stems woody, without anatomical anomalies, producing abundant water when cut. Leaves simple, usually palmately lobed, alternate, with serrate margins; petioles more or less elongate; stipules deciduous. Flowers 5-merous, actinomorphic, bisexual or unisexual, produced in panicles, opposite the leaves; calyx cupuliform, with 5 minute lobes; corolla of 5 petals, concrescent at the apex, that separate as a unit in anthesis; stamens alternate with the petals; disc cupuliform, 5-lobate; ovary superior, bilocular, the style short, conical. Fruit a fleshy berry, ellipsoid or globose. A genus of approximately 60 species, the majority of the Northern Hemisphere. The grape belongs to this genus.

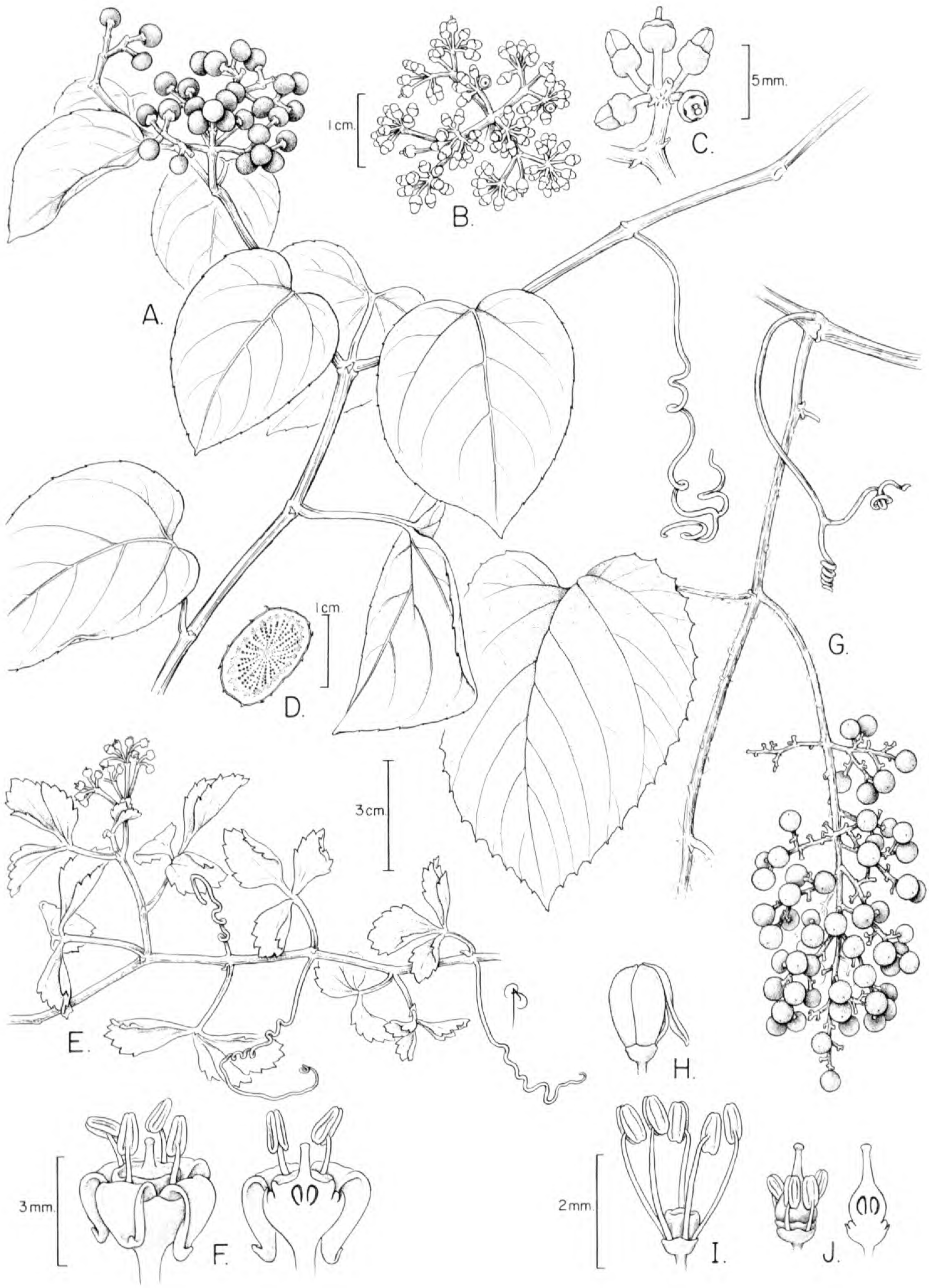

Fig. 164. A-D. *Cissus verticillata*. **A.** Fertile branch. **B.** Inflorescence. **C.** Detail of inflorescence. **D.** Cross section of mature stem. **E-F.** *Cissus trifoliata*. **E.** Fertile branch. **F.** Flower, whole and longitudinal section. **G-J.** *Vitis tiliifolia*. **G.** Fertile branch. **H.** Flower. **I.** Staminate flower, without petals. **J.** Pistillate flower, without petals, and longitudinal section. From Acevedo-Rodríguez et al. 1996. Flora of St. John, U. S. Virgin Islands. Mem. NYBG Vol. 78.

1. Vitis tiliifolia Roem. & Schult., Syst. Veg. 5: 320. 1819.

Fig. 164. G-J

SYNONYM: *Vitis caribaea* DC.

Bejuco de agua

Liana that climbs by means of tendrils and attains 10-35 m in length. Stems cylindrical, woody, producing abundant potable water when cut and attaining 8 cm in diameter; bark dark brown, rough. Leaves simple, broadly ovate or trilobate, 6.5-14 × 6.5-12.5 cm, chartaceous, the apex acute to short-acuminate, the base cordiform to almost truncate, the margins serrate; upper surface puberulent; lower surface tomentose; petioles 2.5-8 cm long; stipules caducous. Inflorescences of pendulous axillary panicles, 9-17 cm long. Calyx green, discoid, the sepals ca. 2 mm long. Petals 1.5-2.2 mm long, greenish yellow, oblong-obovate, persistent; disc ca. 0.2 mm high. Berries globose, 5-10 mm in diameter, juicy, violet when ripe. Seeds 1-2, circular, ca. 4 mm long.

Phenology: Collected in flower during March and April and in fruit in September.

Status: Native, rather common.

Distribution: In moist forested areas, at middle elevations. Also on St. Croix, St. John, and St. Thomas; throughout the Antilles and from Mexico to northern South America.

Public Forests: El Yunque, Guajataca, and Río Abajo.

Doubtful Genus:

Ampelopsis arborea (L.) Koehne was treated by Liogier (1994) as present in Puerto Rico, based on Howard (1989), who included Puerto Rico in the distribution of the species. This report has not been confirmed, and it seems that, if it is found in our gardens, it is not very common; therefore, it is not included in the present work.

Reference: Lombardi, J.A., 2000. Vitaceae. Gêneros *Ampelocissus*, *Ampelopsis* e *Cissus*. Flora Neotropica Mon. 80: 1-250.

MONOCOTYLEDONS

Key to the families

1a. Plants climbing by means of adventitious aerial roots.....2
1b. Plants twining, clambering, or climbing by means of tendrils.....3

2a. Flowers minute, < 3 mm long, produced in spadices, subtended by a spathe (foliaceous bract) ..... *Araceae*
2b. Flowers showy, > 5 cm wide, solitary or in racemes..... *Orchidaceae*

3a. Plants like a fern, with verticillate phylloclades (needle-like) ..... *Asparagaceae*
3b. Plants not like a fern, with true leaves whose blade is not needle-like.....4

4a. Leaves petiolate (not forming a leaf sheath or this not enclosing the stem); blades ovate, rounded to cordiform at the base, with 5-7 parallel-arcuate main veins that are borne from the base (or nearly so).....5
4b. Leaves not petiolate, with a leaf sheath that encloses the stem; blades oblong, lanceolate, or rarely ovate, not cordiform at the base, with a single main vein.....6

5a. Plants twining, lacking tendrils; fruits capsular or samaroid ..... *Dioscoreaceae*
5b. Plants climbing by means of a pair of tendrils that are borne from the base of the petiole; fruits fleshy, almost globose..... *Smilacaceae*

6a. Stems triangular; leaf blades usually with cutting margins; leaf sheath closed; flowers subtended by a single scale ..... *Cyperaceae*
6b. Stems cylindrical; leaf blades with margins not cutting; leaf sheath open; flowers subtended by a pair of scales ..... *Poaceae*

1. *Family* ***ARACEAE***

Key to the genera

1a. Flowers bisexual.....2
1b. Flowers unisexual.....4

2a. Spathes chartaceous and reflexed, the spadix completely exposed; stems up to 5 mm in diameter; leaves entire, green, not perforated .....1. *Anthurium*
2b. Spathes fleshy and erect, enclosing the spadix; stems up to 2 cm in diameter; leaves pinnately compound, or entire and variegated, or entire and perforated, not variegated.....3

3a. Leaves entire and variegated (green and yellow) or green and pinnately compound, not perforated; ovary unilocular; seeds reniform .....2. *Epipremnum*
3b. Leaves with entire margins, the blade with large perforations; ovary bilocular; seeds ovoid or cylindrical .....3. *Monstera*

4a. Leaves entire, cordiform or elliptical, or pinnately compound .....4. *Philodendron*
4b. Leaves digitate .....5. *Syngonium*

1. ANTHURIUM

Terrestrial or epiphytic herbs, erect or rarely climbing by means of adventitious roots; stems fleshy, elongate or very reduced. Leaves alternate, simple or digitate; petioles elongate, covered by a cataphyll in the juvenile stages. Spathe usually chartaceous, reflexed, usually perennial, green, white, pink, or red; spadix sessile or short-stipitate, cylindrical or conical, with numerous flowers from the apex to the base. Flowers bisexual, sessile; tepals 4; stamens 4; ovary bilocular, with 1 or 2 pendulous ovules per locule, the style short or absent, the stigma discoid or lobate. Fruit a bilocular berry, fleshy, red, white, or violet. Seeds oblong. A neotropical genus of about 700 species.

1. Anthurium scandens (Aubl.) Engler in Mart., Fl. Bras. 3(2): 78. 1878.

Fig. 165. A-F

BASIONYM: *Dracontium scandens* Aubl.

Herbaceous epiphytic vine, that climbs by means of adventitious roots and attains 1-2 m in length. Stems cylindrical, the internodes covered by a fibrous leaf sheath. Leaves simple, alternate, lanceolate-elliptical or elliptical, 7-13 × 2.5-5 cm, chartaceous, the apex acuminate, the base obtuse or attenuate, the margins entire; upper surface glabrous, foveolate; lower surface glabrous, with numerous dark dots; petioles 0.7-4.5 cm long; leaf sheath stramineous, fibrous, persistent, ca. 3 cm long. Inflorescences axillary, erect; spadix in

flower 1.5-2 cm long; spathe reflexed, membranaceous, green, with the venation mulberry-colored, 1-1.2 cm long. Tepals 4, green or brown, ca. 1 mm long, cuneiform, involute; anthers stramineous; ovary green. Berries depressed-globose, ca. 5 mm in diameter, juicy, white when ripe. Seeds ellipsoid, ca. 1 mm long.

Phenology: Flowering and fruiting probably throughout the year.

Status: Native, rather common.

Distribution: Epiphytic herb in moist or rain forests. Of widespread distribution in the Neotropics.

Public Forests: Carite, El Yunque, Guilarte, Maricao, and Río Abajo.

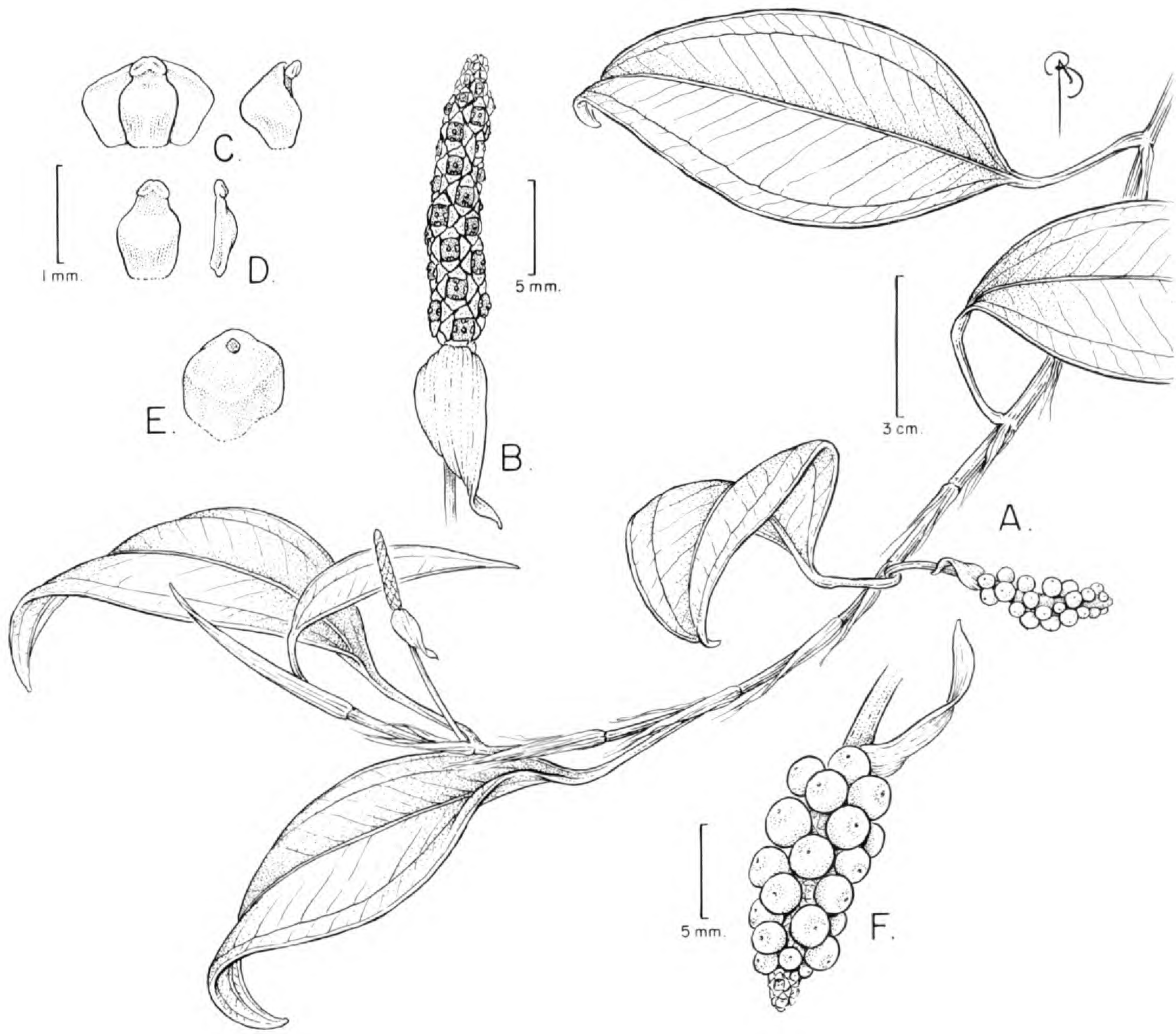

Fig. 165. A-F. *Anthurium scandens*. **A.** Fertile branch. **B.** Inflorescence. **C.** Flower, and stamen with accompanying tepal. **D.** Gynoecium, side view, and stamen. **E.** Fertilized ovary. **F.** Infructescence.

2. EPIPREMNUM

Robust vines, climbing by means of adventitious roots. Leaves alternate; blades simple, entire or pinnately compound; petioles pulvinate at the apex, the sheath forming a winged margin that usually decomposes into fibers. Spathe thick-coriaceous, straight, enclosing the spadix, deciduous; spadix cylindrical, thick, erect. Flowers bisexual, lacking a perianth; stamens 4; pistil prismatic, truncate at the apex, the ovary unilocular, with 2-8 basal ovules, the stigma linear. Berries fleshy, yellowish. Seeds reniform. A genus of 8 species, native to the area between southeastern Asia and the western Pacific, cultivated throughout the tropics.

Key to the taxa of *Epipremnum*

1a. Leaves green, not variegated, pinnately compound or the juvenile leaves entire; stems and petioles green; usually producing flowers and fruits .....1. *E. pinnatum*
1b. Leaves variegated (green-yellow), entire or less frequently pinnately compound; stems and petioles yellow-orange; rarely in fertile condition .....2. *E. pinnatum 'Aureum'*

1. Epipremnum pinnatum (L.) Engler, Pflanzenr. IV (23B) 37: 60. 1908.

Fig. 166. A-C

BASIONYM: *Pothos pinnata* L.
SYNONYM: *Philodendron nechodomi* Britt.

Non-woody vine, glabrous, that climbs by means of aerial roots and attains 6-8 m in length. Stems flexible, cylindrical, green, with a papyraceous epidermis, up to 3 cm in diameter, producing scarce watery latex when cut. Leaves alternate, chartaceous, dimorphic, the juvenile leaves entire, the adult leaves pendulous, pinnately compound, up to 50 x 30 cm, the apex terminating in a leaflet or acuminate segment, the base asymmetrical, subcordiform; upper surface dull, glabrous, the venation flat; lower surface dull, with prominent venation, with a line of domatia on both sides of the midvein, this sometimes with small spiniform outgrowths; petioles up to 35 cm long, marginate along their length. Inflorescence axillary, solitary, erect; spathe almost cylindrical, up to 18 cm long, opening along one side, fleshy, yellowish, acuminate at the apex, deciduous; spadix sessile, more or less cylindrical, 12-15 cm long.

Phenology: Collected in flower and fruit in January and February.

Status: Exotic, cultivated although uncommon.

Distribution: Cultivated in Puerto Rico, naturalized on St. Thomas. Native to southeastern Asia and Oceania.

2. Epipremnum pinnatum 'Aureum' Nicolson, Allertonia 1: 347. 1978.

Fig. 166. D-E

SYNONYMS: *Epipremnum aureum* (Lindl. & André) Bunting
Pothos aurea André

Bejuco de agua

This cultivated form is usually much more robust than the wild species, attaining more than 10 m in length. It is also distinguished from the wild species by having yellow-orange stems and petioles and by the variegated (white or yellow) and predominantly entire leaves. The size of the leaves in the cultivated plants tends to be much smaller (7-10 cm long), while plants that have escaped from cultivation or have become naturalized have leaves with blades that attain 35 cm long. This cultivated race seems to be sterile, since its fruits are not known.

Phenology: Usually sterile, collected only once in flower in Puerto Rico.

Status: Exotic, cultivated and naturalized, rather common.

Fig. 166. A-C. *Epipremnum pinnatum*. **A.** Sterile branch. **B.** Leaf. **C.** Inflorescence. **D-E.** *Epipremnum pinnatum* 'Aureum'. **D.** Sterile branch. **E.** Leaf.

Distribution: Along roads and on abandoned farms. Known only in cultivation or naturalized, throughout the tropics.

Public Forests: El Yunque, Río Abajo, and Toro Negro.

3. MONSTERA

Robust or slender vines, climbing by means of adventitious roots; stems smooth or verrucose, elongate. Leaves alternate; blades simple, entire or laciniate, usually perforated; petioles usually elongate and winged. Spathe very thick, convolute, enclosing the spadix, deciduous; spadix cylindrical, thick, erect. Flowers bisexual, lacking a perianth; stamens 4; pistil prismatic, truncate at the apex, the ovary bilocular, with two basal ovules in each locule, the stigma punctate or linear. Berries fleshy, green, white, yellow, or orange. Seed usually one, ovoid or cylindrical. A genus of 22 species, native to tropical continental America and the Lesser Antilles.

1. Monstera adansonii Schott, Wiener Zeitschr. Kunst 1830: 1028. 1830.

Fig. 167. A-C

Non-woody vine, glabrous, that climbs by means of aerial roots and attains 5-10 m in length. Stems flexible, cylindrical, green, 0.5-2.5 cm in diameter, producing scarce watery latex when cut. Leaves alternate, dimorphic, chartaceous, entire, asymmetrically elliptic-lanceolate, the basal leaves not perforated, the distal leaves with numerous perforations, 26-47 x 13-22.5 cm, the apex short- or long-acuminate, the base asymmetrical, cuneate-obtuse; upper surface dull, with a flat, broad midvein; lower surface pale green, with the midvein prominent and the secondary venation darker; petioles winged almost to the apex, shorter than the blade. Inflorescence axillary, solitary, erect; spathe almost cylindrical, up to 20 cm long, opening along one side, green outside, cream-colored on the inner surface.

Phenology: Collected in flower in February.

Status: Exotic, cultivated and naturalized, uncommon.

Distribution: Cultivated in gardens and naturalized in areas of disturbed vegetation. Native to tropical continental America.

Public Forests: El Yunque.

4. PHILODENDRON

Robust or slender vines, climbing by means of adventitious roots, or less frequently erect herbs; stems elongate, producing abundant watery and caustic sap when wounded. Leaves alternate; blades simple, lobate, divided or pinnately compound; petioles usually elongate. Spathe convolute, enclosing the spadix, usually thickened and not adhering to the spadix; spadix cylindrical, erect, usually almost sessile, with pistillate flowers on the basal portion. Flowers unisexual, lacking perianth; stamens 2-6; ovary usually bilocular, the locules with one or more ovules, the stigma sessile, entire or lobate. Fruits fleshy, with one or more seeds inside. Seeds ovoid or ellipsoid. About 275 species, native to the Neotropics, of which the majority are climbing.

Key to the species of *Philodendron*

1a. Petioles winged or marginate almost to the apical portion .....4. *P. lingulatum*
1.b Petioles not winged or with the wing only on the lower half.....2

2a. Blades of the leaves 25-60 cm long; petioles 40-100 cm long; cataphylls persistent.....3
2b. Blades of the leaves 13.5-35 cm long; petioles 10-35 cm long; cataphylls deciduous. 4

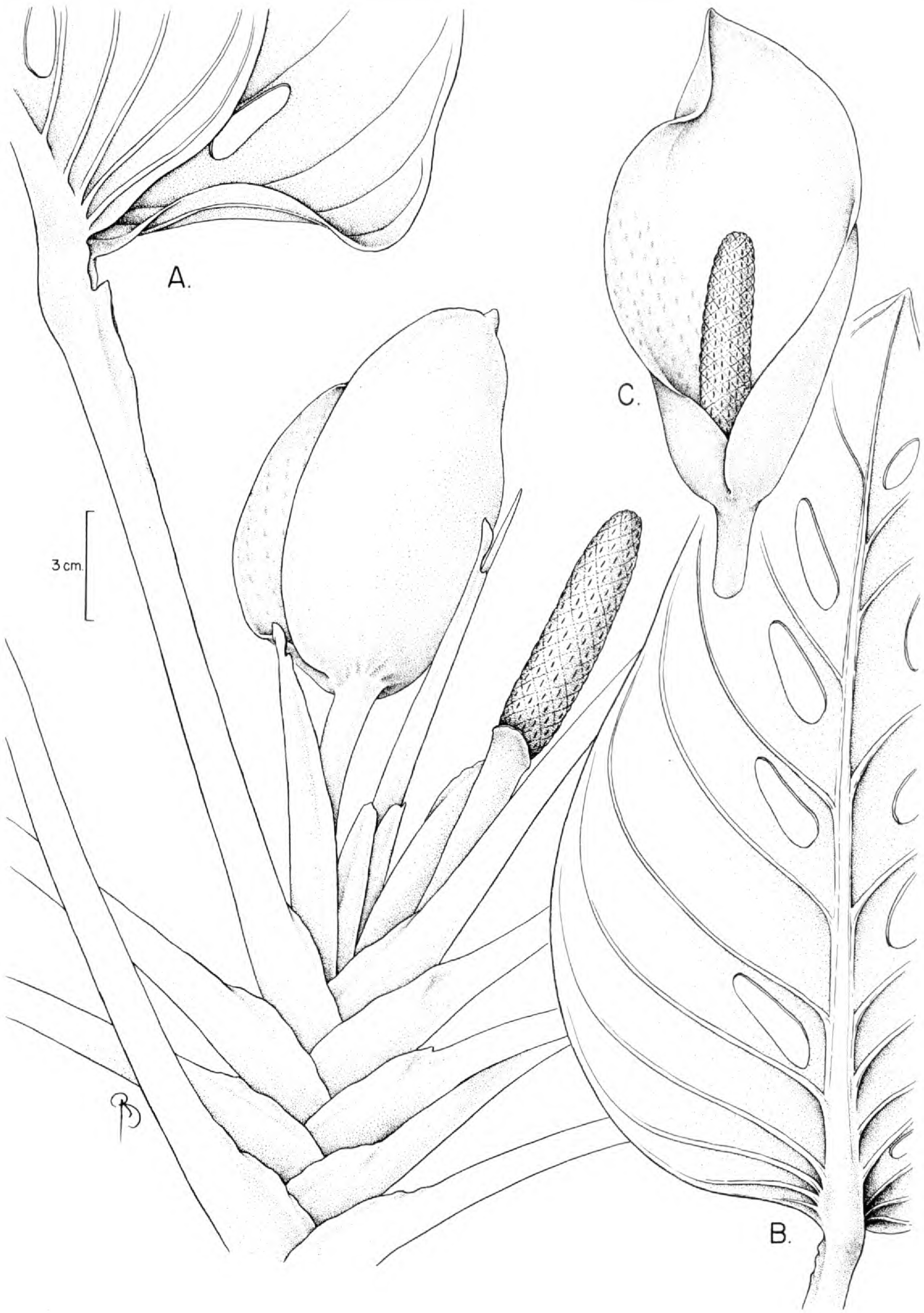

Fig. 167. A-C. *Monstera adansonii*. **A.** Fertile branch. **B.** Leaf. **C.** Spathe and spadix. From Mori, S. et al. 1997. Vascular plants of central French Guiana. Mem. NYBG Vol. 76(1).

3a. Stems 8-10 cm in diameter; spathe short-stipitate, ca. 45 cm long, thick, green on the outer surface, white on the inner surface .....2. *P. giganteum*
3b. Stems 2-2.5 cm in diameter; spathe ca. 18 cm long, long-stipitate, moderately thick, whitish on the outer surface, maroon on the inner surface .....5. *P. ornatum*

4a. Leaves oblong or lanceolate .....1. *P. consanguineum*
4b. Leaves cordiform .....3. *P. hederaceum*

1. Philodendron consanguineum Schott, Syn. Aroid. 88. 1856.

Fig. 168. A-B

SYNONYMS: *Philodendron krebsii* Schott
Philodendron angustatum Schott
Philodendron marginatum Urb.

Bejuco de calabazón, Rasca garganta

Non-woody vine, glabrous, that climbs by means of aerial roots and attains 10-30 m in length. Stems flexible, cylindrical, with an annular scar in the area of the node, attaining up to 2 cm in diameter and producing scarce watery and caustic latex when wounded; bark smooth, dark brown or grayish, membranaceous, exfoliating easily. Leaves alternate, oblong or less frequently lanceolate, coriaceous, 13.5-35 × 7.5-17.5 cm, the apex acute or acuminate, the base cordiform; upper surface shiny, with a broad midvein; lower surface yellowish green, shiny, with the midvein prominent and the secondary venation darker; petioles cylindrical, as long as the blade, with a winged margin on the lower half. Inflorescence axillary, solitary; spathe almost cylindrical, 9-13 cm long, erect, greenish, the spadix sessile.

Phenology: Collected in flower in February and March and in fruit in June.

Status: Native, rather common.

Distribution: In moist forests at lower to middle elevations. Also on St. Thomas; Cuba and Hispaniola.

Public Forests: El Yunque, Guilarte, Maricao, Río Abajo, and Susúa.

2. Philodendron giganteum Schott, Syn. Aroid. 89. 1856.

Fig. 169. A-D

Terrestrial or epiphytic herb, erect or sometimes creeping, attainig 8 m in length. Stems cylindrical, 8-10 cm in diameter, producing watery latex when wounded. Cataphylls up to 60 cm long, decomposing into persistent fibers. Leaves 25-60 × 17-50 cm, lanceolate or triangular-lanceolate, coriaceous, the apex obtuse to acute, the base cordiform, the lobes not overlapping; lower surface slightly pale; petioles erect, almost cylindrical, attaining up to 1 m in length. Inflorescence axillary, solitary; peduncles robust, 6-9 cm long; spathe 14-21 cm long, convolute, constricted in the central part, greenish outside, with the base pink-burgundy, white on the inner surface; spadix sessile, robust, as long as the spathe, the staminal portion whitish and the pistillate portion greenish yellow. Berries yellow or orange.

Phenology: Collected in flower from February to April.

Status: Native, not very common.

Distribution: Occasional in moist forests at the base of mogotes in the northern limestone zone. Also on St. John, St. Thomas, and Tortola; Hispaniola, the Lesser Antilles, Trinidad, and Venezuela.

Public Forests: El Yunque and Río Abajo.

3. Philodendron hederaceum (Jacq.) Schott, Wiener Zeitschr. Kunst 1829: 780. 1829.

Fig. 168. C-D

BASIONYM: *Arum hederaceum* Jacq.
SYNONYMS: *Philodendron scandens* Koch & Sello
Philodendron micans Klotzsch ex Koch
Philodendron oxycardium sensu Britton *non* Schott
Philodendron isertianum Schott

Paisaje

Non-woody vine, glabrous, that climbs by means of aerial roots and attains 10 m in length. Stems cylindrical and smooth, producing watery and caustic latex when wounded; juvenile stems flexuous, with short internodes (ca. 10 cm); adult

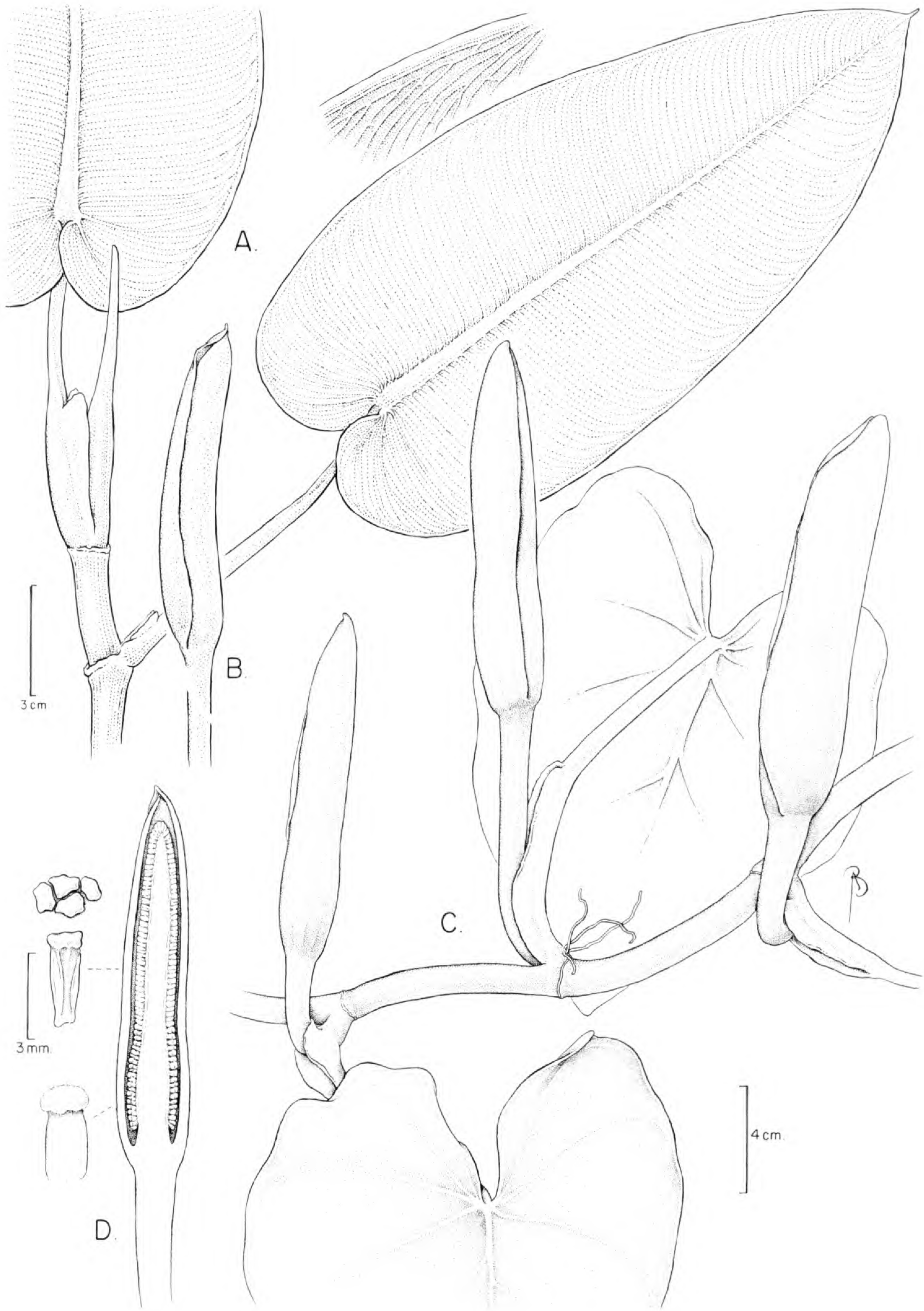

Fig. 168. A-B. *Philodendron consanguineum*. **A.** Branch. **B.** Inflorescence. **C-D.** *Philodendron hederaceum*. **C.** Fertile branch. **D.** Inflorescence, longitudinal section, with detail of the gynoecium and stamens.

Fig. 169. A-D. *Philodendron giganteum*. **A.** Non-climbing habit. **B.** Climbing habit. **C.** Leaf. **D.** Inflorescence, whole and longitudinal section.

stems up to 2 cm in diameter, the internodes elongate and with nodes that present an annular scar; the lateral branches pendulous. Cataphylls up to 12 cm long, caducous. Leaves broadly ovate, coriaceous, 14-30 × 10-20 cm, the apex acuminate to cuspidate, the base cordiform, the margins entire or slightly undulate, pale; upper surface dull, sometimes glaucous, with the midvein prominent and broadened; lower surface yellowish green, dull, with the midvein and some of the lateral veins prominent; petioles arcuate or ascendant, 10-15 cm long, almost cylindrical. Inflorescence axillary, solitary, ascendant; peduncles robust, 5-9 cm long; spathe persistent, ca. 15 cm long, thick, convolute, almost cylindrical, yellowish outside and reddish inside when mature; spadix almost sessile, cylindrical, robust, whitish, as long as the spathe.

Phenology: Collected in flower from May to August.

Status: Native, locally common.

Distribution: Abundant in moist forests at lower to middle elevations. Also on St. John, St. Thomas, and Tortola. Of widespread distribution in the Neotropics.

Public Forests: Carite, El Yunque, Guilarte, Maricao, Río Abajo, and Toro Negro.

4. Philodendron lingulatum (L.) C. Koch, Index Sem. Hort. Berol. App. 4[13]. 1853.

Fig. 170. A

BASIONYM: *Arum lingulatum* L.

Bejuco de calabaza, Calabazón cimarrón

Non-woody vine, glabrous, that climbs by means of aerial roots and attains 15 m or more in length. Stems flexible, cylindrical, dark green, sulcate along one side, 0.5-2.5 cm in diameter, producing scarce watery latex when wounded; epidermis exfoliating easily. Leaves simple, elliptical or ovate, subcoriaceous, 13-42 × 7-28 cm, the apex acute or abruptly acuminate, the base cordiform, subcordiform, cuneate, or truncate; upper surface semi-shiny, with a broad midvein; lower surface semi-shiny, with the midvein prominent and the secondary venation lighter; petiole winged (except for the distal portion), 12-48 cm long, shorter or longer than the blade. Inflorescence axillary, solitary or sometimes paired; spathe cylindric-urceolate at the base, 10-23.5 × 2.9-5.3 cm, erect, light green or whitish on the inner surface, dark green outside; spadix stipitate, 8.7-21.2 cm long, the fertile staminate portion 0.9-1.7 in length, white to cream-colored, the sterile portion 0.6-1.3 cm long, the pistillate portion 2.1-4.7 cm long. Fruit and seeds unknown.

Phenology: Collected in flower from May to July.

Status: Native, not very common.

Distribution: In wet and rain forests, in the Cordillera Central, the Sierra de Luquillo, and the zone of mogotes. Also on Tortola; Hispaniola and the Lesser Antilles.

Public Forests: El Yunque, Guilarte, and Rio Abajo.

5. Philodendron ornatum Schott, Oesterr. Bot. Wochenbl. 3: 378. 1853.

Fig. 170. B-C

Slightly woody vine, glabrous, that climbs by means of aerial roots and attains 2-10 m in length. Stems cylindrical and smooth, with watery and caustic sap; stems 2-2.5 cm in diameter, the internodes elongate, the nodes with an annular scar. Cataphylls ca. 24 cm long, persistent. Leaves cordiform, chartaceous, glabrous, 32-60 × 24-46 cm, the apex acuminate, the base deeply cordate, the margins undulate, slightly revolute; upper surface dull, dark green, the midvein and the secondary veins sunken; lower surface pale, with the midvein and the lateral veins prominent and reddish; petioles ascendant, 14-42 cm long, flattened along the upper surface, pulvinate in the apical portion, the pulvinule with small tubercles or protuberances. Inflorescence axillary, in groups of three, ascendant; peduncles robust, 11-13 cm long; spathe persistent, 16-18 cm long, thick, convolute, almost infundibuliform in outline (slightly constricted below the middle), aristate at the apex, whitish with a pink tinge outside, and cardinal red inside when mature; spadix cylindric-ellipsoid, robust, cream-colored, almost as long as the spathe.

Phenology: Collected in flower in August.

Status: Apparently introduced, naturalized in the area of Guajataca.

Distribution: Rare, at the base of mogotes with abundant organic soil. Native to South America, Venezuela, Trinidad, Tobago, Surinam, and Brazil.

Public Forest: Guajataca.

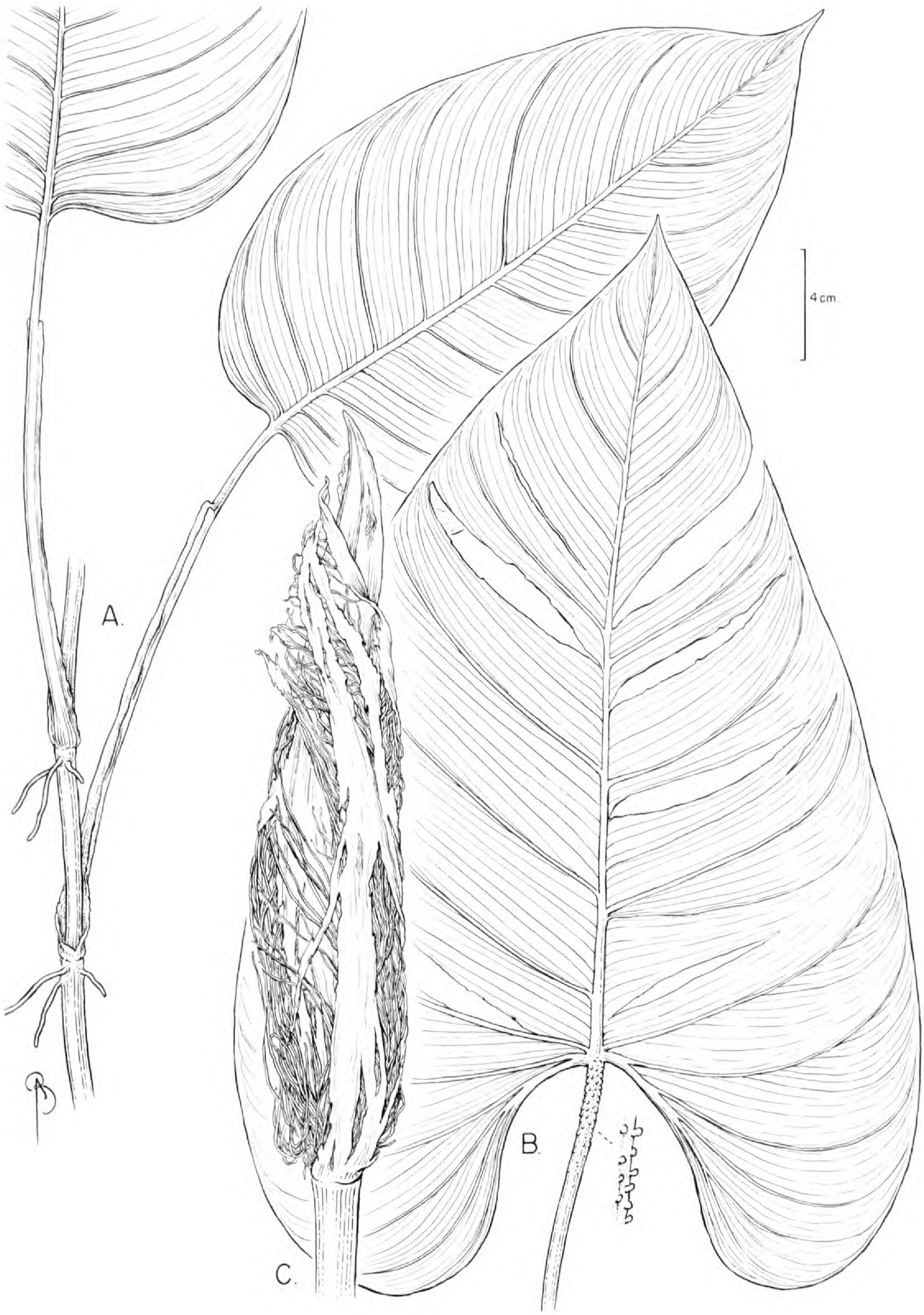

Fig. 170. A. *Philodendron lingulatum*, branch. **B-C.** *Philodendron ornatum*. **B.** Leaf, with detail of tubercles. **C.** Cataphylls.

5. SYNGONIUM

Epiphytic or hemiepiphytic herbs, usually climbing by means of aerial roots. Stems producing abundant milky latex. Leaves simple or divided into 3-11 leaflets; petioles forming a leaf sheath at the base. Inflorescences axillary, solitary or in groups of up to 11; peduncles of the inflorescence erect, pendulous when fruiting; spathe fleshy, convolute, notably narrow in the middle, the tube ellipsoid, the blade whitish to greenish, opening when mature; spadix shorter than the spathe, erect, with the pistillate flowers in a basal position. Flowers unisexual, the perianth absent; stamens 3-4, united into a synandrium; ovary with (1)2(3) locules, which contain 1 or less frequently 2 ovules; stigma discoid or bilabiate. Fruit a berry, containing a single seed, united to form an ovoid syncarp. A neotropical genus of 33 species, the majority climbing.

1. Syngonium podophyllum Schott, Bot. Zeitung (Berlin) 9: 85. 1851.

Fig. 171. A-C

Vine attainig 10 m in length, climbing by means of adventitious roots that it produces in the area of the nodes. Stems cylindrical, glaucous, 1-2 cm in diameter, producing milky latex when wounded. Juvenile plants with hastate leaves; adult plants with dimorphic leaves, the basal leaves hastate, the distal leaves digitate, with 3-11 leaflets, coriaceous, united or free at the base, the basal leaflets smaller and auriculate at the base, the middle leaflets 16-38 × 6-17 cm, obovate, elliptical, or lanceolate, with the apex acuminate; petioles 15-60 cm long, almost cylindrical. Inflorescences in groups of 4-11, ascendant; peduncles 8-9 cm long, slender; spathe ca. 10 cm long, convolute at the base to form a tube, the limb cream-colored on the inner surface, green outside, concave, ephemeral; spadix whitish, sessile, cylindrical, with a constriction between the area of pistillate flowers and the staminate flowers. Syncarp ovoid, red, reddish orange, or yellow, 3-5.5 cm long.

Phenology: Collected in flower in February, July and August.

Status: Exotic, naturalized, rather common.

Distribution: Species escaped from cultivation and naturalized, of rapid proliferation, found throughout Puerto Rico in moist disturbed areas. Also on St. John and St. Thomas. Native to Mexico, but widely cultivated throughout the Antilles and tropical continental America.

Public Forests: Carite, El Yunque, Maricao, Río Abajo, and Toro Negro.

References: Acevedo-Rodríguez, P. & D.H. Nicolson (in prep.) Araceae. *In*: Acevedo-Rodríguez, P. & M.T. Strong (eds.) Monocots of Puerto Rico and the Virgin Islands. Contrib. U.S. National Herbarium. Arias Granda, I. 1998. El género *Philodendron* Schott (Araceae) en Cuba. Feddes Repert. 109: 33-39. Croat, T. B. 1997. A revision of *Philodendron* subgenus *Philodendron* (Araceae) from Mexico and Central America. Ann. Missouri Bot. Gard. 84: 311-704. Madison, M. 1977. A revision of *Monstera* (Araceae). Contrib. Gray Herbarium 207: 3-100. Nicolson, D. H. 1987. Araceae. *In*: Dassanayake, M. D. and F. R. Fosberg (eds.) Flora of Ceylon. Vol. VI. Amerind Publishing Company, New Delhi.

Fig. 171. A-C. *Syngonium podophyllum*. **A.** Fertile branch. **B.** Leaf. **C.** Inflorescence. From Mori, S. et al. 1997. Vascular plants of central French Guiana. Mem. NYBG Vol. 76(1).

2. *Family* ***ASPARAGACEAE***

1. PROTASPARAGUS

Shrubs or subshrubs, erect or scandent and twining, with tuberous roots. True leaves absent or reduced to small scales. The photosynthetic function is carried out by modified branchlets (phylloclades), needle-like or leaf-like, these whorled or in fascicles. Flowers bisexual, minute, in racemes or scattered among the phylloclades; perianth with 6 free segments; stamens 6; ovary superior, 3-locular, with 4-10 ovules per locule, the stigmas three. Fruit a berry. Seeds globose, smooth, black. A genus of about 100 species, distributed in southern and northern Africa and in Asia.

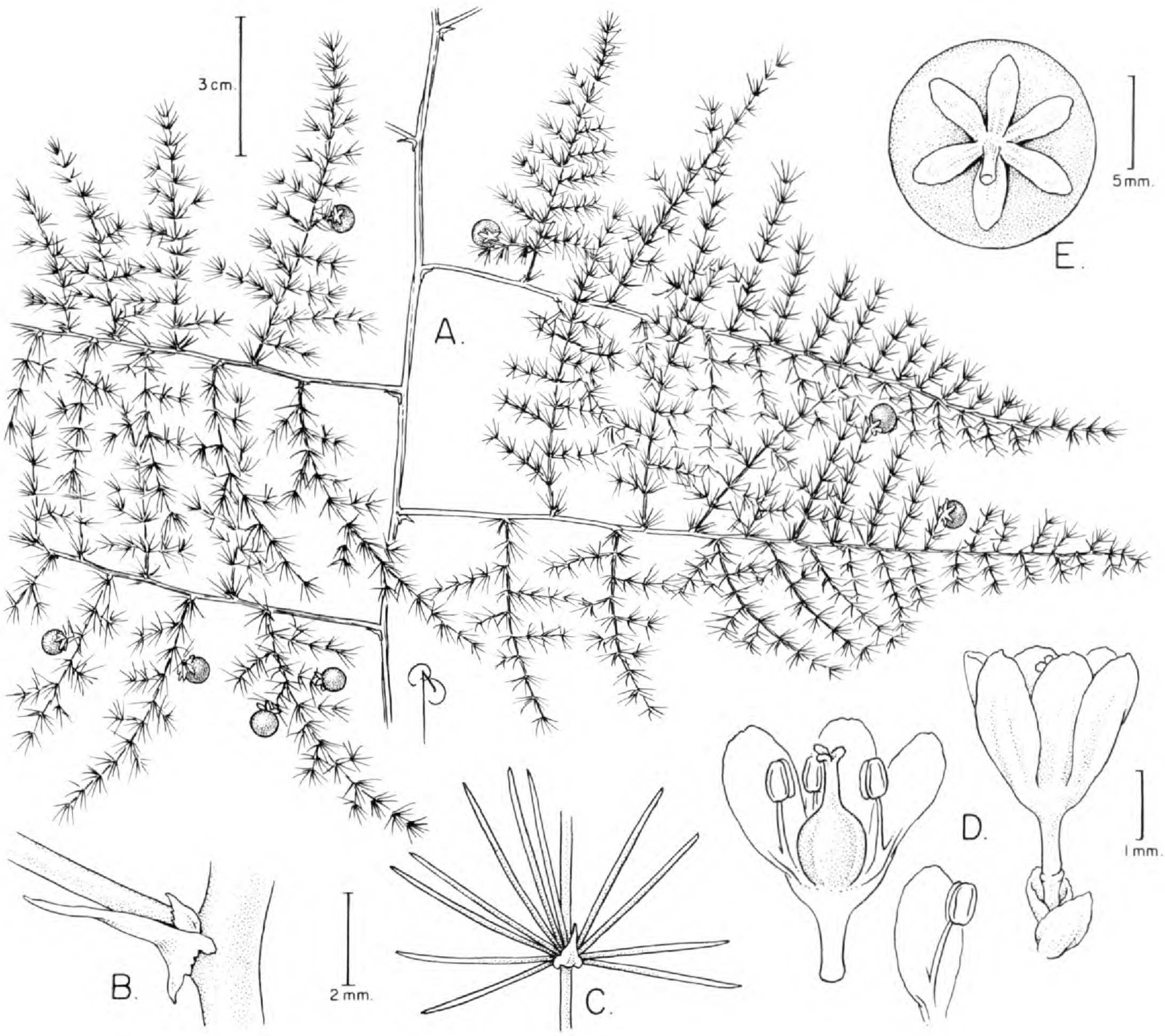

Fig. 172. A-E. *Protasparagus setaceus*. **A.** Fruiting branch. **B.** Base of lateral branch. **C.** Phylloclades. **D.** Flower, side view, with perianth removed, tepal with adnate stamen, and side view. **E.** Fruit, basal view, showing sepals.

1. Protasparagus setaceus (Kunth) Oberm., S. Afr. J. Bot. 2: 244. 1983.

Fig. 172. A-E

BASIONYM: *Asparagopsis setacea* Kunth
SYNONYMS: *Asparagus setaceus* (Kunth) Jessop
Asparagus plumosus Baker

Semiwoody vine, twining, attainig 2-3 m in length. Stems cylindrical, green, spiny at the base. Phylloclades in dense whorls, needle-like, 3.5-6.5 mm long. Flowers solitary, pendulous; pedicels green, 2-2.4 mm long, articulated near the base; perianth pale green, the segments oblong, obtuse, ca. 2.5 mm long. Berries globose, ca. 5 mm in diameter, olive-green or black.

Phenology: Collected in flower and fruit in February.

Status: Exotic, cultivated.

Distribution: Ornamental plant, very common in our gardens. Also on St. Thomas. Native to South Africa, but widely cultivated throughout the tropics.

References: Obermeyer, A. A. 1983. *Protasparagus*. nom. nov., new combinations. S. Afri. J. Bot. 2: 243-244. Obermeyer, A. A. 1985. The genus *Protasparagus* in South Africa. Bothalia 15: 548-549.

3. *Family* ***CYPERACEAE***

1. SCLERIA

Herbs, erect or infrequently ascendant. Rhizomes absent or less frequently elongate, short, or tuberous. Culms triangular. Leaves well developed along the culm (stem), the basal ones not developed; leaf blades linear, flat or somewhat involute, herbaceous, usually with the margins and the principal vein scabrous; leaf sheath trigonous, closed. Inflorescence a panicle or spike, terminal or terminal and axillary; involucral bracts similar to the leaves or absent; spikelets sessile or pedicellate, the staminate ones lanceolate or oblong, with numerous flowers, the scales spirally arranged; pistillate spikelets ovate or elliptical, the scales distichous; flowers unisexual; stamens 1-3; gynoecium with 3 stigmas, ovary usually with a hypogynium at the base. Fruit a subglobose achene, white or variegated with purple. A genus of tropical and subtropical zones, of about 200-225 species.

Key to the species of *Scleria*

1a. Contraligule entire; hypogynium conspicuously trilobate.....2
1b. Contraligule scarious at the apex; hypogynium obscurely trilobate, discoid .....3. *S. secans*

2a. Panicles not congested; margin of the leaves with thick retroflexed hairs (0.2-0.5 mm long), very cutting; scales of the spikelets dark brown or purple-brown; achenes ovoid-globose or globose, 2.6-3 mm long .....1. *S. canescens*
2b. Panicles congested; margin of the leaves with minute retroflexed hairs (almost not cutting); scales of the spikelets greenish brown; achenes globose, 2.3-2.6 mm long. .....2. *S. scindens*

1. Scleria canescens Böck., Cyp. Nov. 1: 37. 1888.

Fig. 173. A-B

Cortadera, Cortadora

Perennial herb, robust, climbing, forming large impenetrable colonies, and attaining 3.5 m in length. Culms ascendant, acutely triquetrous, 3-10 mm wide, retrorsely and antrorsely scabrous on the corners, strigose on the distal portion. Leaves numerous, alternate, sparse, broadly linear,

25-60 × 0.4-1.0 cm, pleated or almost flat, with three main parallel veins, subrigid, retrorsely scabrous on the veins and the margins, the apex acuminate or obtuse; leaf sheath as long as the internode, scabrous on the angles. Panicles solitary, distal or axillary, pyramidal, the distal ones 6-14 cm long, with a short leafy bract at the base; axes minutely pubescent or glabrous; bracteoles filiform. Staminate and pistillate spikelets 4-6 mm long; sterile scales 4-5, ovate-circular, brown or reddish brown, finely ciliate on the margins, the apex apiculate. Achenes ovoid-globose or ovoid, 2.6-3.3 mm long, white, shiny or with a purple tinge; hypogynium trilobate, 1-1.8 mm long, whitish, the lobes semicircular, with the margins reflexed and appressed to the achene.

Phenology: Flowering and fruiting throughout the year.

Status: Apparently endemic to Puerto Rico. Locally very common.

Distribution: In moist or rain forests of the cordilleras. Reported for Cuba, but no specimens seen or found.

Public Forests: Carite, El Yunque, Guilarte, Maricao, and Toro Negro.

2. Scleria scindens Nees ex Kunth, Enum. Pl. 2: 343. 1837.

Fig. 173. C-E

Razor grass

Perennial herb, forming large colonies, erect or climbing, attainig 3.5 m in length. Culms acutely triquetrous, 3-8 mm wide retrorsely and antrorsely scabrid on the corners, strigulose on the distal portion. Leaves alternate, linear, 30-90 × 0.5-1.5 cm, almost flat or pleated, with five parallel main veins, subrigid, retrorsely scabrid on the veins and the margins; leaf sheath scabrid on the angles. Panicles solitary, terminal, pyramidal, dense, 3-8 cm wide, sometimes with one or two small panicles at the base; bracts usually 3 on the terminal panicles. Staminate and pistillate spikelets intermingled, of the same size; sterile scales 2-3, 3-4 mm long, light brown, ciliate on the margins, apiculate at the apex. Achenes globose, 2.3-2.6 mm long, apiculate, white, shiny, sometimes with a purple tinge; hypogynium trilobate, 1-1.7 mm long, the lobes semicircular, slightly revolute, divergent (not appressed to the achene).

Phenology: Collected in flower and fruit from February to August.

Status: Native, locally common.

Distribution: In moist or semi-moist disturbed areas in the Virgin Islands (St. John, Tortola, and Virgin Gorda). Also in Cuba, Hispaniola, and the Lesser Antilles.

3. Scleria secans (L.) Urb., Symb. Antill. 2(2): 169. 1900.

Fig. 173. F-G

BASIONYM: *Schoenus secans* L.

Perennial herb, rhizomatous, climbing, attainig 5-10 m in length. Culms branched in the distal portion, acutely triquetrous, retrorsely spinulose on the corners, distally hirsute. Leaves alternate, linear, 10-40 × 0.2-0.7 cm, nearly flat or pleated, attenuate at the apex, the upper surface hirsute at the base, the lower surface sparsely hirsute to glabrous, retrorsely scabrous along the midvein and the margins; leaf sheath scaberulous on the angles. Inflorescences of few spikelets, composed of a terminal panicle and 1-3 axillary panicles that are borne from the ultimate leaf; terminal panicle 2.5-6 cm long; the lateral ones shorter. Staminate spikelets shorter than the pistillate ones; sterile scales 4, ovate or ovate-lanceolate, 2.5-6 mm long, light or dark brown, reddish or blackish on the margins. Achenes ovoid or oblong-ovoid, rounded at the apex, appressed-pubescent, 2.8-4 mm long, white, sometimes with greenish spots; hypogynium discoid, obscurely trilobate, 0.3-1 mm long, the lobes entire, reflexed.

Phenology: Collected in flower and fruit from October to May.

Status: Native, uncommon.

Distribution: In thickets, along trails, and at the margin of moist forests along the Cordillera Central and the Sierra de Luquillo. Also in the Antilles, Mexico, Central America, and South America.

Public Forests: Carite and El Yunque.

Reference: Strong, M. T. and P. Acevedo-Rodríguez. (in prep.) Cyperaceae. *In*: Acevedo-Rodríguez, P. & M.T. Strong (eds.) Monocots of Puerto Rico and the Virgin Islands. Contrib. U.S. National Herbarium.

Fig. 173. A-B. *Scleria canescens.* **A.** Fertile branch, with details of the node and leaf margin. **B.** Fruit, with scales, and fruit, showing hypogynium. **C-E.** *Scleria scindens.* **C.** Branch, showing detail of the node. **D.** Inflorescence. **E.** Fruit, showing hypogynium. **F-G.** *Scleria secans.* **F.** Fertile branch, with detail of the node. **G.** Fruit, with hypogynium.

4. *Family* ***DIOSCOREACEAE***

Key to the genera

1a. Fruit a trivalvate capsule, with three flattened locules .....1. *Dioscorea*
1b. Fruit a unilocular samara, flattened, with a distal wing.....2. *Rajania*

1. DIOSCOREA

Dioecious vines, herbaceous or slightly woody. Stems cylindrical, angular or winged, sometimes provided with spines. Leaves alternate or opposite, simple or palmately lobed, 3-7(-14)-veined (veins arcuate, parallel), with long petioles and axillary bulbils. Flowers unisexual, actinomorphic, produced in axillary spikes, racemes, or panicles. Perianth minute; staminate flowers with 6 stamens or sometimes with 3 stamens and 3 staminodia; pistillate flowers with 6 staminodia, the ovary inferior. Fruit capsular, chartaceous or coriaceous, 3-winged; seeds numerous, flattened and winged. A tropical and subtropical genus of about 600 species.

Key to the species of *Dioscorea*

1a. Stems predominantly quadrangular or 4-winged (cylindrical at the base in *D. alata*).....2
1b. Stems cylindrical or triangular, not winged.....3

2a. Leaves opposite, entire .....1 *D. alata*
2b. Leaves alternate, 3-6-lobate .....7. *D. trifida*

3a. Leaves pilose on the lower surface along the venation .....5. *D. pilosiuscula*
3b. Leaves glabrous.....4

4a. Stems cylindrical.....5
4b. Stems acutely triangular, spiny .....2. *D. altissima*

5a. Stems unarmed; leaves alternate.....6
5b. Stems usually aculeate; leaves usually opposite .....4. *D. cayenensis*

6a. Staminate flowers in lateral cincinni along the axis of the inflorescences; fertile stamens 3; bulbils angular, smooth; base of the petiole with the margin slightly winged, this not extended on the stem like a pseudostipule .....6. *D. polygonoides*
6b. Staminate flowers solitary along the axis of the racemes; fertile stamens 6; bulbils rounded, verrucose; base of the petiole winged, projecting toward the stem on each side like a semicircular pseudostipules .....3. *D. bulbifera*

1. Dioscorea alata L., Sp. Pl. 1033. 1753.

Fig. 174. A-E

SYNONYM: *Rajania flexuosa Bello*

Ñame, Ñame blanco, Water yam, White yam

Non-woody vine, twining (toward the right), glabrous, attainig 10-15 m in length. Stems quadrangular, with 4 longitudinal projections, winged, undulate, green or reddish; mature stems (at the base) cylindrical and spiny. Leaves mostly opposite, sometimes alternate on branches of rapid

growth, coriaceous, broadly ovate, 5-7-veined, 10-30 × 5-18 cm, the apex acute or acuminate, sometimes reflexed, the base cordiform; upper surface dark green, shiny, with the venation sunken; lower surface pale green, dull, with prominent venation; petioles 4-12 cm long, 4-winged, forming an auriculate sheath at the base, with a pair of pseudostipules that enclose the stem; bulbils elongate, pendulous, attaining 15 cm long, produced when the leaves begin to wither. Inflorescences axillary, unisexual, pendulous; the staminate ones paniculate, 5-15 cm long, with numerous lateral and flexuous spikes that contain numerous male flowers; the pistillate ones racemose, with few flowers. Staminate flowers with the perianth 1-1.5 mm long; pistillate flowers with the perianth 2-2.8 mm long. Capsule 3-locular, 2-3 cm wide, each locule flattened like a wing, with two seeds inside.

Phenology: Collected in flower in October and November and in fruit in January.

Status: Exotic, naturalized, rather common.

Distribution: Very common in disturbed areas and moist secondary forests, at lower and middle elevations. Also on St. John. Native to southeastern Asia, extensively cultivated throughout the tropics for its edible bulbils.

Public Forests: Carite, El Yunque, Guajataca, Maricao, Río Abajo, Susúa, and Toro Negro.

2. Dioscorea altissima Lam., Encycl. Méth. Bot. 3: 233. 1789.

Fig. 174. F-G

SYNONYM: *Dioscorea chondrocarpa* Lam.

Ñame dunguey, Dunguey

Slightly woody vine, twining, glabrous, attainig 10 m or more in length. Stems smooth, angular or triangular, attaining up to 1.5 cm in diameter, with recurved spines, ca. 1 cm long. Leaves alternate or less frequently subopposite, ovate or almost orbicular, 7-9-veined, 8-15 × 7-16 cm, the apex short-acuminate to caudate, the base cordiform, the margins slightly undulate; upper surface slightly shiny, with the venation flat or slightly prominent; lower surface dull, with translucent lines and dots, the primary venation prominent; petioles slender, as long as the blade, sometimes minutely aculeate, with a swelling at both extremities, forming a pair of spiny pseudostipules at the base. Inflorescences in simple spikes, the pistillate ones longer than the staminate ones. Perianth of oblong segments. Capsules up to 3 cm long and 1.5 cm wide.

Phenology: Not observed.

Status: Apparently native, uncommon.

Distribution: Occasional in moist forests at lower to middle elevations. Also in Hispaniola, the Lesser Antilles, and Brazil.

Public Forests: Carite and El Yunque.

3. Dioscorea bulbifera L., Sp. Pl. 1033. 1753.

Fig. 175. A-E

Gunda

Non-woody vine, twining, attainig 8 m or more in length. Stems glabrous, more or less cylindrical. Leaves alternate, ovate, 9-11-veined, membranaceous, 9-12.5(17) × 6.5-11(15.5) cm, the apex acuminate or caudate, the base cordiform; upper surface shiny, the venation slightly prominent; lower surface dull, the venation prominent; petiole 12-15 cm long, the base winged, enclosing the stem on each side like a semicircular pseudostipule; bulbils rounded, 5-6 cm wide, verrucose. Inflorescences axillary, simple, fasciculate; the staminate ones usually in pairs, 9-15 cm long, with the flowers grouped in lateral stipitate cymes; the pistillate ones ca. 12 cm long, with the flowers solitary. Flowers minute, sessile, white to pink; staminate flowers with the perianth ca. 1.2 mm long; fertile stamens 6, adnate on the corolla; pistillate flowers with the perianth ca. 1.4 mm long and the hypanthium ca. 2 mm long. Capsules 3-winged, ca. 2.5 cm long.

Phenology: Flowering and fruiting from August to October.

Status: Exotic, locally common.

Distribution: In moist secondary forests, at middle elevations, in the zone of mogotes and in the Sierra de Luquillo. Native to the tropics of the Old World. Introduced in the tropics and subtropics of the New World.

Public Forests: El Yunque and Río Abajo.

4. Dioscorea cayenensis Lam., Encycl. Méth. Bot. 3: 233. 1789.

Fig. 175. F-K

Ñame de Guinea

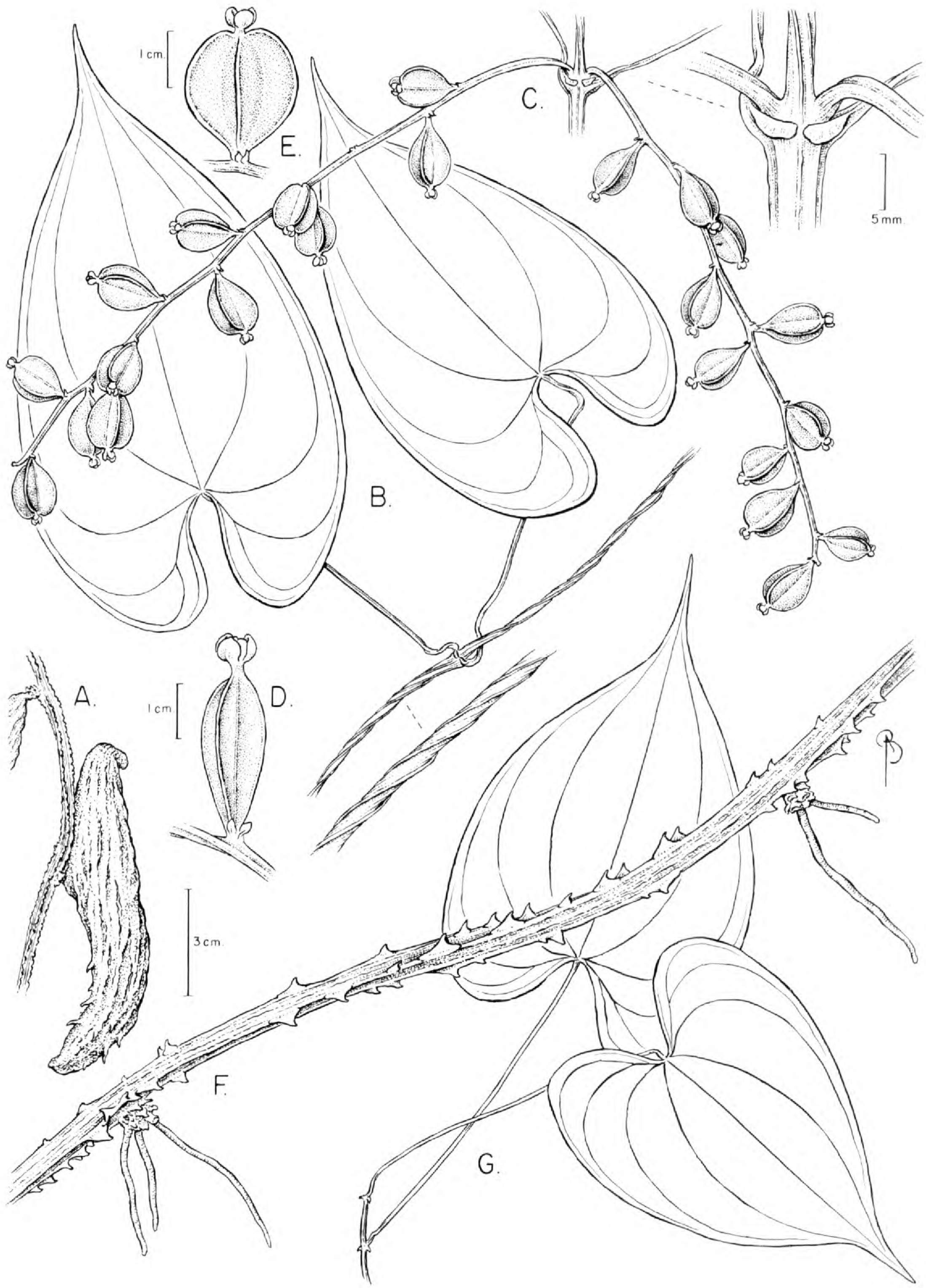

Fig. 174. A-E. *Dioscorea alata.* **A.** Axillary bulbil. **B.** Sterile branch, with detail of the stem. **C.** Infructescences, with detail of pseudostipules. **D.** Immature fruit. **E.** Mature fruit. **F-G.** *Disocorea altissima.* **F.** Mature stem, with adventitious roots. **G.** Leaves.

Slightly woody vine, twining (toward the right), glabrous, attainig 10 m in length. Stems flexible, cylindrical, usually with recurved spines. Leaves opposite, simple, more or less ascendant, coriaceous, ovate, 7-veined, 6-14 × 5-10 cm, the apex abruptly acuminate, the base cordiform to almost truncate, the margins entire, revolute; upper surface shiny, with the venation slightly sunken; lower surface dull, with translucent lines, the primary venation prominent; petioles 4.5-12 cm long, pulvinate at both ends. Inflorescences axillary, fragrant, unisexual, in pendulous spikes, the staminate ones fasciculate, the pistillate ones solitary. Staminate flowers with the perianth 2-2.5 mm long, the stamens 6, all fertile; pistillate flowers with the perianth 1-1.5 mm long. Capsule elliptic-oblong in outline, 1.7 cm long. Seeds with a basal wing.

Phenology: Collected in flower in July and in fruit in December.

Status: Exotic, cultivated and escaped from cultivation, uncommon.

Distribution: In areas of disturbed or secondary vegetation. Although this species was described based on material from French Guiana, it is native to western Africa, where it has been cultivated for centuries (Burkill, 1985). Today it is cultivated throughout the tropics, where it has become naturalized.

Public Forests: Río Abajo.

5. Dioscorea pilosiuscula Bertero *ex* Spreng., Syst. Veg. ed. 16, 2: 152. 1825.

Fig. 175. L-P

Ñame de gunda, Gunda, Dunguey, Air yam, Wild yam

Non-woody vine, twining, attainig 4-8 m in length. Stems slender, strong, almost cylindrical or slightly angular, glabrous or puberulent. Leaves alternate, 5-7-veined, oblong-ovate or ovate, 5.5-12 × 2.5-6.5 cm, chartaceous, the apex long-acuminate, the base cordiform, the margins undulate; upper surface slightly shiny, glabrous, the venation sunken; lower surface pale green, dull, with prominent venation, pilose; petioles slender, glabrous or puberulent, 1.5-4 cm long, sulcate and with both extremities swollen, provided with a pair of small ovoid tubercles in the axil. Inflorescences axillary, pendulous. Staminate flowers unknown in the populations of the Antilles; pistillate flowers with the perianth 1.5-2 mm long. Capsule oblong, 1-2.5 cm long. Seeds ca. 8 mm long, with a basal wing.

Phenology: Flowering and fruiting from December to July.

Status: Native, uncommon.

Distribution: Uncommon in disturbed areas of secondary vegetation, in moist zones at lower and middle elevations. Also on St. John, St. Thomas, and Tortola; throughout the Antilles and South America.

Public Forests: El Yunque, Guajataca, and Río Abajo.

6. Dioscorea polygonoides Humboldt & Bonpland ex Willd., Sp. Pl. 4: 795. 1806.

Fig. 176. A-I

Gunda

Non-woody vine, twining, attainig 8 m or more in length. Stems glabrous, more or less cylindrical. Leaves alternate, ovate, 7-11-veined, chartaceous or membranaceous, (4)8-21 × (2.7)5-17 cm, the apex acuminate, the base cordiform; upper surface shiny, the venation slightly prominent; lower surface dull, the venation prominent; petiole 5-8 cm long, the base marginate, not extended like a pseudostipule; bulbils angular, up to 5 cm wide, smooth. Inflorescences axillary, pendulous; the staminate ones solitary or in pairs, simple or sometimes branched, up to 50 cm long, with the flowers grouped in sessile lateral cymes; the pistillate ones simple, up to 30 cm long, with the flowers solitary. Flowers minute, sessile, white or pale green; staminate flowers with the perianth ca. 1 mm long; fertile stamens 3; pistillate flowers with the perianth ca. 1 mm long and the hypanthium ca. 2 mm long. Capsules 3-winged, 2.5-3.2 cm long, in a position almost perpendicular to the rachis of the spike. Seeds 2 per locule, almost circular, ca. 5 mm in diameter.

Phenology: Flowering and fruiting throughout the year.

Status: Native, rather common.

Distribution: In forests of secondary succession, at middle elevations. Also throughout the Antilles and tropical America.

Public Forests: El Yunque, Maricao, and Río Abajo.

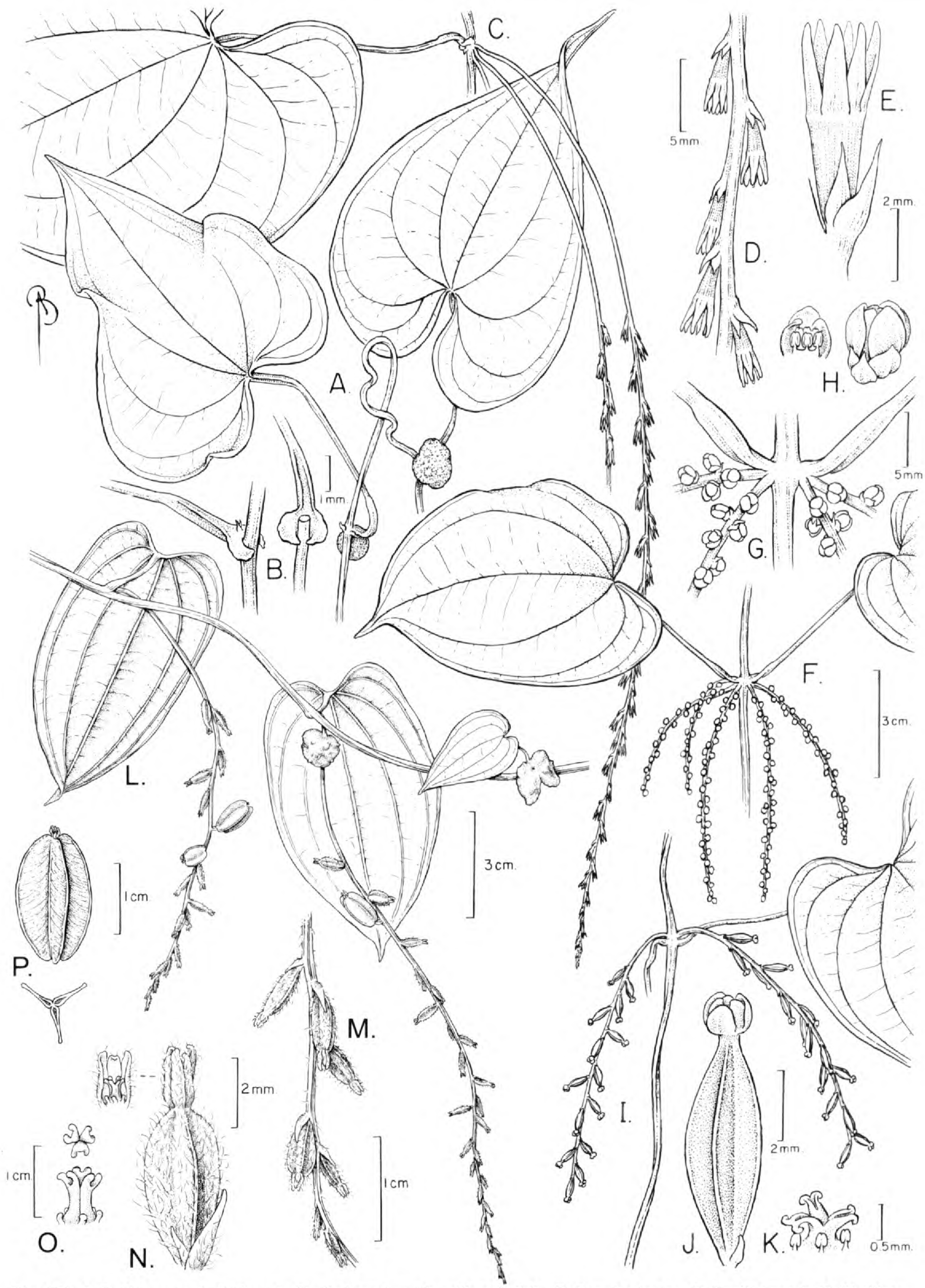

Fig. 175. A-E. *Dioscorea bulbifera.* **A.** Sterile branch, with axillary bulbils. **B.** Pseudostipules. **C.** Fertile branch. **D.** Pistillate inflorescence. **E.** Pistillate flower. **F-K.** *Disocorea cayenensis.* **F.** Fertile branch. **G.** Inflorescences. **H.** Staminate flower. **I.** Infructescences. **J.** Immature fruit. **K.** Stigmas and staminodia. **L-P.** *Dioscorea pilosiuscula.* **L.** Fertile branch, with axillary bulbils. **M.** Detail of infructescence. **N.** Immature fruit, with detail of the flower, showing stigmas and staminodia. **O.** Stigmas, side and top views. **P.** Fruit, side view and cross section.

Fig. 176. A-I. *Dioscorea polygonoides.* **A.** Branch with staminate inflorescences. **B.** Cincinnus with staminate flowers, side view. **C.** Cincinnus with staminate flowers, front view. **D.** Staminate flower, top view. **E.** Stamens, staminate flower, side view. **F.** Branch with pistillate inflorescence. **G.** Pistillate flower. **H.** Stigmas. **I.** Infructescence. **J-L.** *Disocorea trifida.* **J.** Leaf. **K.** Fertile branch. **L.** Staminate flower, and detail of the stamens and pistillode.

7. Dioscorea trifida L. f., Suppl. Pl. 427.1781.
Fig. 176. J-L

Non-woody vine, twining, attainig several meters in length. Stems glabrous or puberulent, obtusely quadrangular, with winged projections along the borders. Leaves alternate, palmate (5-lobate), 9-11-veined, 15-21 × 15-25 cm, membranaceous, the lobes ovate-lanceolate, acuminate at the apex, the base cordiform; upper surface glabrous, the veins slightly prominent; lower surface puberulent along the prominent veins; petioles 5-19 cm long, with 4 longitudinal wings, swollen at the base. Inflorescences axillary; the staminate ones paniculate; the pistillate ones in racemes. Staminate flowers in lateral cymes, sessile, perianth cream-colored, 1.5-6 mm long, the stamens 6; pistillate flowers solitary, hypanthium pubescent, the tepals ca. 2.5 mm long. Capsules oblong-elliptical in outline, 2.5-3.4 cm long by 1.5 cm wide.

Phenology: Unknown.

Status: Exotic, apparently naturalized, uncommon.

Distribution: According to Britton and Wilson (1924) this species grows spontaneously in Puerto Rico in areas where it was formerly cultivated; I know collections only from the Agricultural Experiment Station. Also throughout the Antilles and South America.

Cultivated Species:

Dioscorea esculenta (Lam.) Burkill, *D. floribunda* Mart. & Gal., *D. friedrichsthalii* R. Knuth, and *D. rotundata* Poir. are cultivated in Puerto Rico, but no evidence exists that they have become naturalized or have escaped from cultivation.

2. RAJANIA

Dioecious vines, herbaceous, twining; bulbils elongate. Stems cylindrical. Leaves alternate, entire, petiolate. Inflorescences axillary, of racemes or racemiform thyrses, pendulous or ascendant. Flowers 6-merous; the staminate ones commonly produced in lateral cymes along a racemiform thyrse; fertile stamens 6; the pistillate ones produced in racemes; styles bifid. Fruit an indehiscent samara, with a distal wing. An Antillean genus, of about 25 species.

1. Rajania cordata L., Sp. Pl. 1032. 1753.
Fig. 177. A-L

SYNONYM: *Rajania sintenisii Uline*

Guáyaro, Bejuco de guaragüao, Ñame gulembo, White yam

Non-woody vine, climbing, twining, glabrous, attainig 3-10 m in length. Stems slender, cylindrical, strong, glabrous. Leaves alternate, glabrous, 4-11.5(20) × 2-6.5(12) cm, 5-9-veined, coriaceous or less frequently chartaceous, ovate, lanceolate, or less frequently hastate, the apex acute or acuminate, the base cordiform to almost truncate; upper surface slightly shiny, with the venation flat or slightly prominent; lower surface with prominent venation; petioles 2-7 cm long, cylindrical, pulvinate at the base. Inflorescences axillary, racemose, pendulous or ascendant. Staminate inflorescences solitary or fasciculate, 4-25 cm long, the flowers grouped in lateral cymes, the cymes stipitate, 1-3 per node; flowers with the perianth white or cream-colored, 0.9-1.1 mm long, the stamens 6. Pistillate inflorescences 4-30 cm long, with solitary flowers distributed along the peduncle; flowers with the perianth 1-1.3 mm long, the hypanthium ca. 1.5 mm long. Fruits samaroid, (1.1)1.6-3.2 cm long, flattened, usually reddish or burgundy, with a wing in a lateral distal position.

Phenology: Flowering from July to March and fruiting from September to June.

Status: Native, rather common.

Distribution: In moist forests at middle to upper elevations, along the Cordillera Central and in the northern limestone zone. Also on Vieques, St. Croix, and St. Thomas; throughout the Antilles.

Public Forests: Carite, El Yunque, Guajataca, Guilarte, Maricao, Río Abajo, Susúa, and Toro Negro.

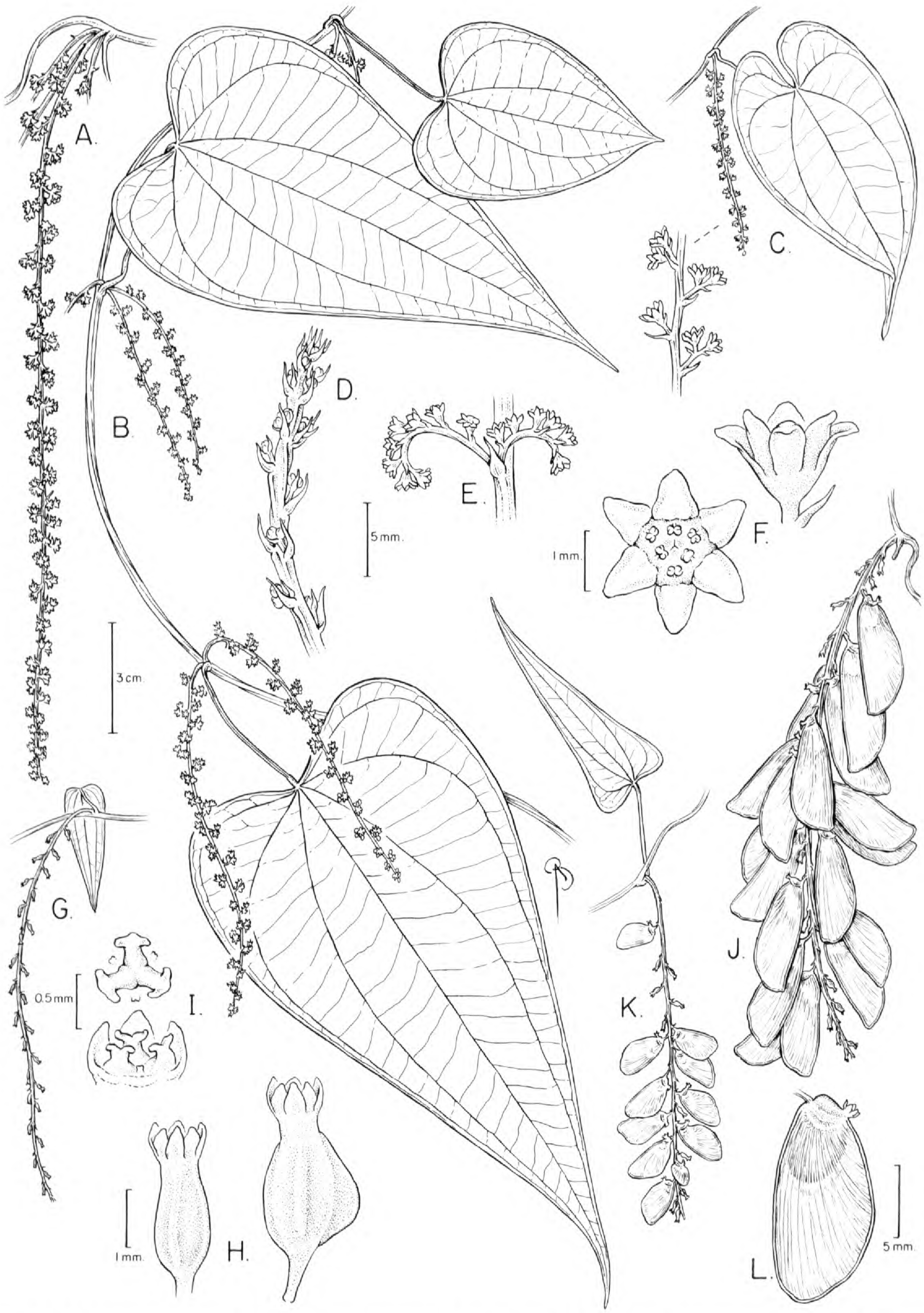

Fig. 177. A-L. *Rajania cordata.* **A.** Staminate inflorescence. **B.** Fertile branch. **C.** Branch with racemose inflorescence. **D.** Distal portion of inflorescence. **E.** Detail of cincinnus. **F.** Staminate flower, top and side views. **G.** Branch with pistillate inflorescence. **H.** Pistillate flower, not fertilized and fertilized. **I.** Staminodia, top and side views. **J-K.** Infructescence. **L.** Samaroid fruit.

References: Burkill, H.M., 1985. The useful plants of west tropical Africa. Vol. 1. Royal Botanic Gardens, Kew. Acevedo-Rodríguez, P. (in prep.) Dioscoreaceae. *In*: Acevedo-Rodríguez & M.T. Strong (eds.) Monocots of Puerto Rico and the Virgin Islands. Contrib. U.S. National Herbarium.

5. *Family* ***ORCHIDACEAE***

1. VANILLA

Herbaceous vines, climbing by means of aerial roots that are produced in the area of the nodes. Stems succulent, thick, glabrous, with abundant watery latex, usually caustic. Leaves alternate, articulate, succulent, coriaceous, lacking a leaf sheath. Inflorescences of short, axillary racemes, with numerous showy flowers. Flowers bisexual; calyx of free and expanded sepals; corolla of free and keeled petals; lip adnate to the semicylindrical and elongate column; ovary pedicellate, articulate; stigma with confluent lobes. Fruit elongate, indehiscent or partially dehiscent, with numerous minute seeds. A pantropical genus, of about 100 species.

Key to the species of *Vanilla* (from Ackerman, 1995)

1a. Leaves shorter than the internodes, early deciduous or persistent.....2
1b. Leaves longer than the internodes, persistent.....5

2a. Leaves persistent, as long as or longer than half the length of the internode, the blade flat; lip green, with cardinal red margins and veins, the margins irregular, the pubescence of yellowish hairs .....6. *V. poitaei*
2b. Leaves early deciduous (although some persistent), shorter than half the length of the internode; lip of a different color, the margins more or less entire or trilobat.....3

3a. Lip mostly red-purple; some leaves persistent, these with the apex curved in the form of a hook.....3. *V. dilloniana*
3b. Lip completely white, white with reddish lateral spots, or reddish with a yellowish midrib; all the leaves deciduous.....4

4a. Lip trilobate (the lateral lobes as long as the central lobe), red with white margins, the midrib yellowish; leaves chartaceous, with the margins not revolute .....1. *V. barbellata*
4b. Lip more or less simple, completely white or with lateral submarginal and sub-basal spots; leaves thick-coriaceous, with the margins revolute ..... 2. *V. claviculata*

5a. Sepals and petals with the margins undulate and the apex reflexed; lip glabrous, with three keels, white with a yellow throat; stems less than 5 mm in diameter; leaves broadly elliptical or ovate, fleshy-coriaceous .....4. *V. mexicana*
5b. Sepals and petals with the margins and the apex straight; lip with a tuft of barbate hairs, yellow-green or yellow-orange; stems 5-15 mm in diameter; leaves oblong or less frequently elliptical or ovate; fleshy-rigid.....6

6a. Floral bracts 12-25 mm long; lip entire .....7. *V. pompona*
6b. Floral bracts 5-10 mm long; lip trilobate ..... 5. *V. planifolia*

1. Vanilla barbellata Reichenb. f., Flora 48: 274. 1865.

Fig. 178. A-E

Non-woody vine, glabrous, scarcely branched, that climbs by means of aerial roots and attains 5-7 m in length. Stems cylindrical, 3-9 mm in diameter, producing abundant watery and caustic latex when wounded; internodes 8-13 cm long; nodes swollen, with an annular scar, producing 1 or 2 grayish roots; the lateral branches pendulous. Leaves early deciduous, sessile, linear-lanceolate, chartaceous, 4-5 × 0.8 cm, the apex acute, the margins entire, not revolute; upper surface dull; lower surface dull. Inflorescence a pendulous axillary raceme with few or many flowers; bracts fleshy, broadly ovate, 4-12 mm long. Sepals green, open, free, oblong to oblanceolate, 3-4 × 0.9-1.2 cm. Petals similar to the sepals but slightly falcate, dorsally keeled and somewhat broader (1-1.3 cm); lip trilobate, greenish on the outer surface, red on the inner surface in the center, but turning white toward the margins, the center with a tuft of barbate and rigid hairs, the basal portion adnate to the column; column straight, almost cylindrical, 2.3-3.3 cm long. Fruits pendulous, fusiform or cylindrical, slightly recurved, changing from green to yellow-orange when ripe, 7-9 cm long, 9-13 mm in diameter.

Phenology: Flowering from April to June (Ackerman, 1995), collected in fruit in January.

Status: Native, locally common.

Distribution: Uncommon in the southern and southwestern zone, in dry forests and coastal thickets at lower to middle elevations. Also on St. Thomas, St. John, and Virgin Gorda; Florida, Cuba, and the Bahamas.

Public Forests: Guánica, Maricao, and Susúa.

2. Vanilla claviculata (Wr.) Sw., Nova Acta Regiae Soc. Sci. Upsal. 6: 66. 1799.

Fig. 178. F-H

BASIONYM: *Epidendrum claviculatum* Wr.

Non-woody vine, glabrous, scarcely branched, that climbs by means of aerial roots and attains 5 m or more in length. Stems cylindrical, 3-8 mm in diameter, producing abundant watery and caustic latex when wounded; internodes 7-13 cm long; nodes swollen, with an annular scar, producing 1 or 2 grayish roots; the lateral branches pendulous. Leaves early deciduous, triangular to lanceolate, fleshy, 2.5-3.5 × 0.5-0.8 cm, the apex reflexed, the margins revolute; upper surface dull; lower surface dull. Inflorescence an erect axillary raceme with few or many flowers; bracts fleshy, broadly ovate, 5-11 mm long. Sepals olive-green, expanded, free, 3.5-4.5 × 1-1.3 cm, the dorsal sepal concave, the lateral ones similar, but falcate. Petals olive-green, elliptic-spatulate, keeled, shorter and broader than the sepals; lip more or less entire, completely white or with some reddish spots at the base, the midvein with numerous bifurcate hairs, the basal portion adnate to the lower third of the column; column straight, almost cylindrical, pubescent on the portion near the stigma, 2.5-3 cm long. Fruits black when ripe, pendulous, fusiform to cylindrical, slightly recurved or straight, 7-11 × 0.9-1.2 cm.

Phenology: Flowering from April to June and producing fruits infrequently (Ackerman, 1995).

Status: Native, locally common.

Distribution: In the dry limestone zone and on serpentine soils. Also in the rest of the Greater Antilles.

Public Forests: Guajataca, Guánica, and Maricao.

3. Vanilla dilloniana Correll, Amer. Orchid Soc. Bull. 15: 331. 1946.

Fig. 179. A-C

Non-woody vine, glabrous, scarcely branched, that climbs by means of aerial roots and attains 5-7 m in length. Stems cylindrical, 4-8 mm in diameter, producing abundant watery and caustic latex when wounded; internodes up to 20 cm long; nodes slightly swollen, producing 1 or 2 grayish roots; the lateral branches pendulous. Leaves persistent, lanceolate-triangular, fleshy, sessile, 3-3.5 × 1-1.4 cm, the apex reflexed, the margins involute; upper surface dull; lower surface dull.

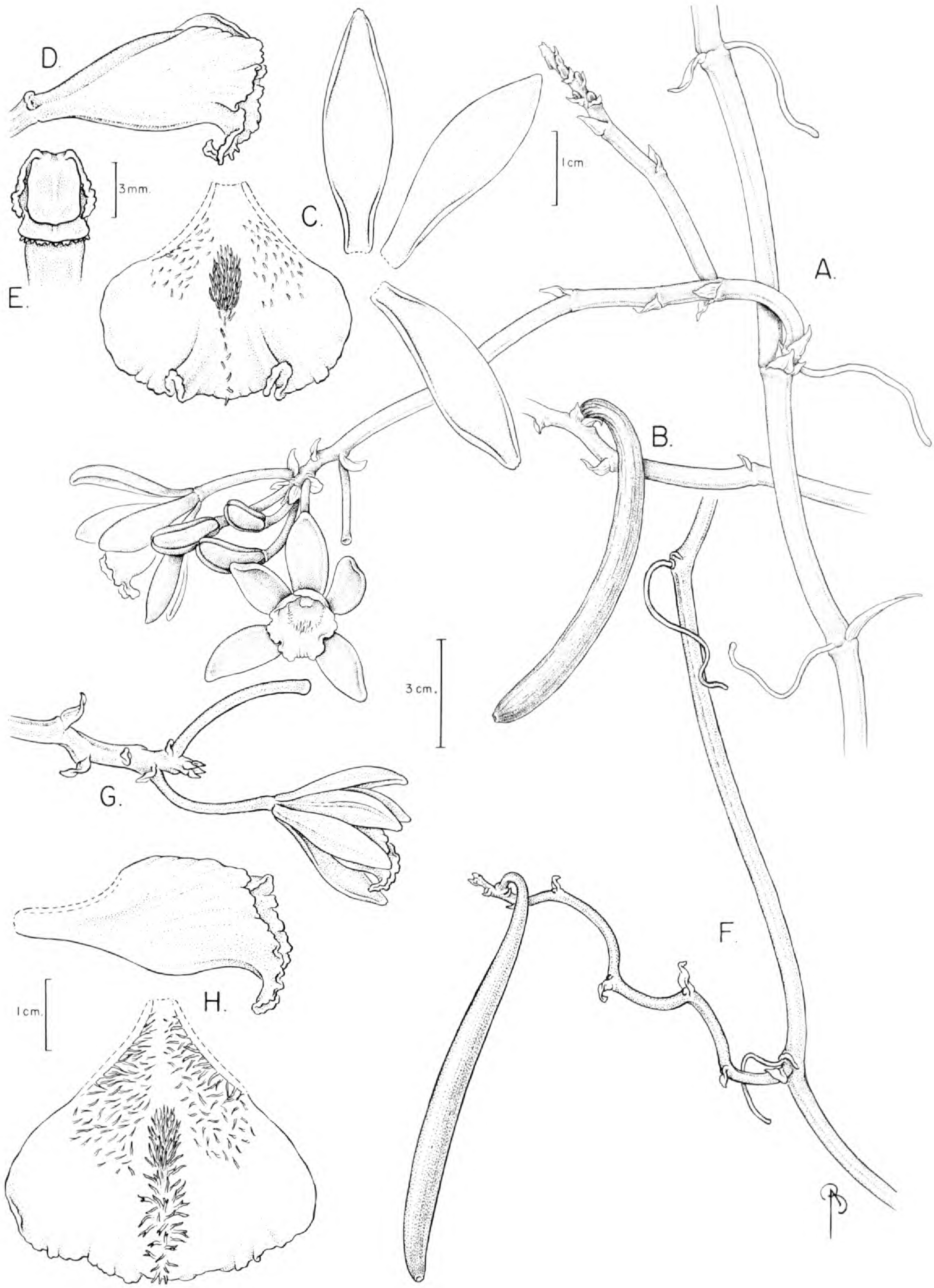

Fig. 178. A-E. *Vanilla barbellata.* **A.** Flowering branch. **B.** Fruiting branch. **C.** Lip, petal, sepal, and petal. **D.** Lip, side view. **E.** Column. **F-H.** *Vanilla claviculata.* **F.** Fruiting branch. **G.** Portion of inflorescence. **H.** Lip, side and front views.

Inflorescence a pendulous axillary raceme, few-flowered; bracts fleshy, broadly ovate, 5-7 mm long. Sepals light green, free, expanded, 4.8-5.5 × 0.8-1.2 cm, the dorsal sepal concave, narrowly oblong-elliptical, the lateral ones similar but falcate, 4.5-5 × 0.9-13 cm. Petals light green, oblong-oblanceolate, keeled, 4.1-5 × 1.1-1.4 cm; lip crenulate, obscurely trilobate, purple-brown, pale toward the margins and the throat, the basal portion adnate to the lower half of the column; column arcuate, slender, 3.2 cm long. Fruits pendulous, fusiform-clavate, ca. 16 cm long and 12 mm in diameter, changing from green to yellow-orange when ripe, partially dehiscent at the apex; seeds minute, numerous, black, in a white gelatinous matrix.

Phenology: Flowering from March to May and fruiting from September to January.

Status: Native, locally common.

Distribution: In moist forests on serpentine soils, in the region of Sabana Grande, San Germán, and Yauco. Also in Florida, Cuba, and Hispaniola.

Public Forests: Maricao and Susúa.

4. Vanilla mexicana Miller, Gard. Dict. ed. 8, no. 1. 1768.

Fig. 179. A-C

SYNONYMS: *Vanilla vanilla* (L.) Britton, *nom. inadmis.*
Vanilla inodora Schiede

Non-woody vine, glabrous, scarcely branched, that climbs by means of aerial roots and attains 5 m or more in length. Stems cylindrical, 2-3(5) mm in diameter, producing watery and caustic latex when wounded; internodes 7.5-20 cm long; nodes swollen, with an annular scar, producing a single adventitious root per node; the lateral branches pendulous. Leaves persistent, elliptical or broadly ovate, fleshy-coriaceous, 13-25 × 6.5-12.5 cm, the apex acuminate, the margins entire, flat; both surfaces dull, glabrous, with prominent venation; petioles thick, 0.5-1 cm long. Inflorescence an axillary raceme, few-flowered; bracts fleshy, broadly ovate, 2.5 cm long. Sepals green, thick, rigid, free, expanded, up to 6.5 × 2 cm, oblong-lanceolate to lanceolate-elliptical. Petals similar, but dorsally keeled and smaller; lip trilobate, white with a yellow crest, the basal portion adnate along 5 mm of the column; column white, slender, 2-2.5 cm long. Fruits pendulous, cylindrical, up to 27 cm long.

Phenology: Flowering from March to May, producing fruits in Puerto Rico only by artificial pollination.

Status: Exotic, cultivated and escaped, rare.

Distribution: Escaped from cultivation by vegetative reproduction. In moist forests at middle elevations. Also on St. Croix; Mexico, Guatemala, Nicaragua, the United States (Florida), the Antilles, and northern South America.

Public Forests: El Yunque and Maricao.

5. Vanilla planifolia Jackson in Andrews, Bot. Repos. 8: t. 538. 1808.

Fig. 179. F-G

Non-woody vine, glabrous, scarcely branched, that climbs by means of aerial roots and attains 7-10 m in length. Stems cylindrical, 5-10 mm in diameter, producing watery and caustic latex when wounded; internodes up to 12 cm long; nodes slightly swollen, producing a single adventitious root per node; the lateral branches pendulous. Leaves persistent, oblong, elliptical, or ovate, fleshy, rigid, 14-25 × 4.5-8 cm, the apex acute or acuminate, the margins entire, slightly revolute; upper surface dull; lower surface dull; petioles 1-1.5 cm long, thick. Inflorescence a pendulous axillary raceme, few-flowered; peduncle flexuous; bracts fleshy, broadly ovate, 5-10 mm long. Sepals yellowish green, thick, free, expanded, 3.5-5.5 × 1.3 cm, elliptic-oblanceolate. Petals similar, but dorsally keeled and smaller; lip greenish yellow, reflexed at the apex, with a retuse apical lobe, the basal portion unguiculate, adnate to the column; column arcuate, 3-3.5 cm long. Fruits black when ripe, pendulous, cylindrical, fragrant, up to 25 cm long.

Phenology: Flowering from February to April, but rarely producing fruits, because its natural pollinators are not found in Puerto Rico.

Status: Exotic, naturalized by asexual reproduction.

Distribution: Formerly cultivated in Puerto Rico for the commercial production of vanilla. Today, some of these plantations persist, with some populations naturalized in moist forested areas at middle elevations. Species native to

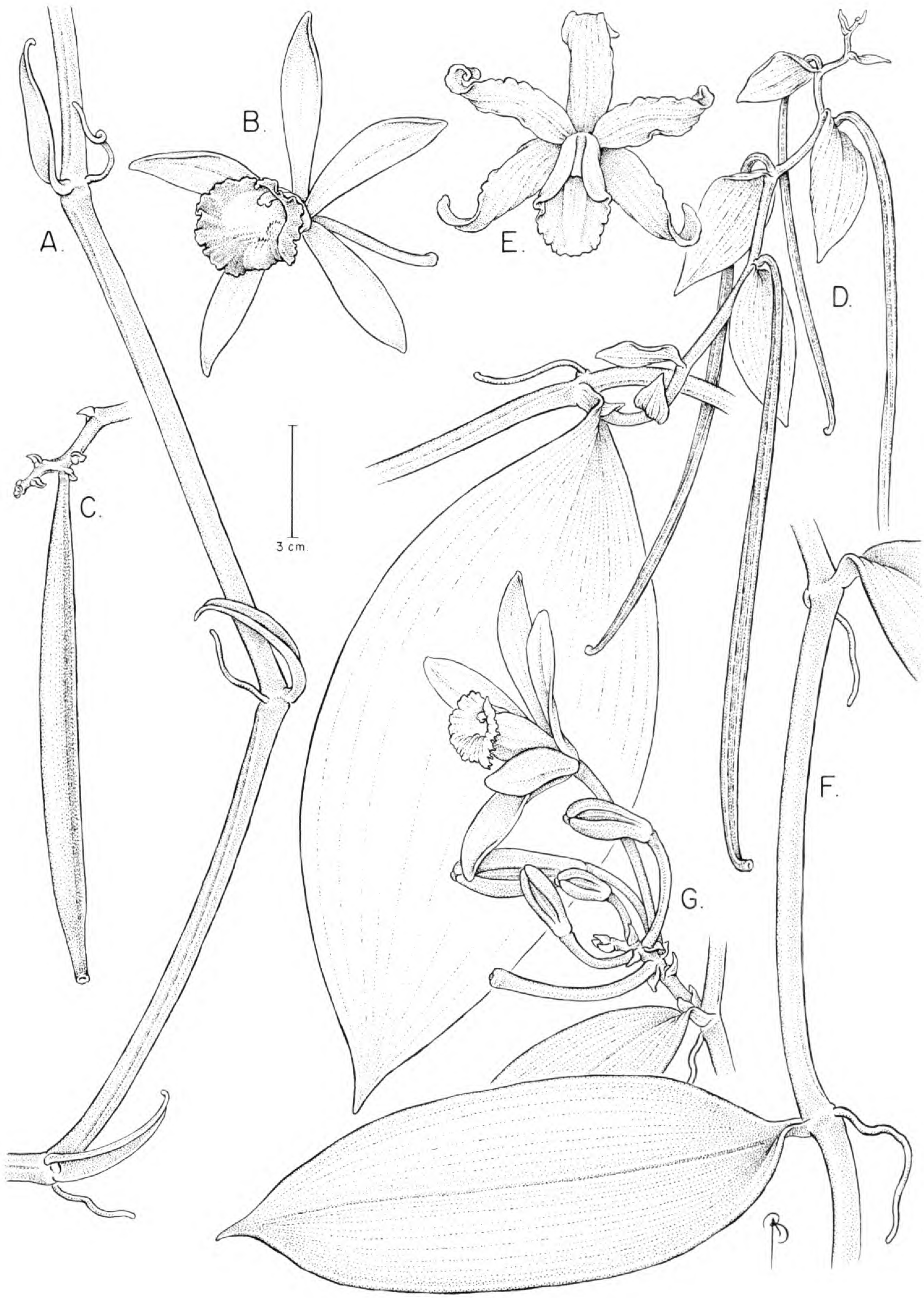

Fig. 179. A-C. *Vanilla dilloniana.* **A.** Sterile branch. **B.** Flower. **C.** Fruit. **D-E.** *Vanilla mexicana.* **D.** Fertile branch. **E.** Flower. **F-G.** *Vanilla planifolia.* **F.** Sterile branch. **G.** Inflorescence.

Mexico, but widely cultivated in the tropics. Also on St. Croix, St. John, and St. Thomas.

Public Forests: El Yunque and Maricao.

6. Vanilla poitaei Reichenb. f., Linnaea 41: 66. 1877.

Fig. 180. A-F

SYNONYMS: *Vanilla eggersii* Rolfe
Vanilla correllii Sauleda & Adams

Non-woody vine, glabrous, scarcely branched, that climbs by means of aerial roots and attains 5-8 m in length. Stems cylindrical, 4-9 mm in diameter, producing watery and caustic latex when wounded; internodes 8-20 cm long; nodes slightly swollen, producing 1-3 adventitious roots per node; the lateral branches pendulous. Leaves persistent, lanceolate to oblong-lanceolate, fleshy, rigid, flat, sessile, (3)7-12 × 1.4-3 cm, the apex markedly reflexed like a hook; upper surface dull; lower surface dull; petioles 3-4 mm long. Inflorescence a pendulous axillary raceme, with many flowers; bracts broadly ovate, 4-7 mm long. Sepals green, free, more or less expanded, the dorsal sepal oblanceolate, 5-5.5 × 1.1-1.3 cm, the lateral sepals similar but oblique. Petals similar, but dorsally keeled, obliquely oblanceolate, and smaller; lip greenish outside, white with cardinal red margins, and the throat yellow, the basal portion short-unguiculate, adnate along ¾ of the column; column arcuate, ca. 3 cm long. Fruits pendulous, fusiform-cylindrical, ca. 15 cm long.

Phenology: Flowering from April to July, but rarely producing fruits.

Status: Native, uncommon.

Distribution: In moist or rain forests, at lower to middle elevations. Also on Vieques, St. Thomas, the Bahamas, Cuba, and Hispaniola.

Public Forests: El Yunque, Guajataca, Río Abajo, and Maricao.

7. Vanilla pompona Schiede, Linnaea 4: 573. 1829.

Fig. 180. G-H

Non-woody vine, glabrous, scarcely branched, that climbs by means of aerial roots and attains 5 m in length. Stems cylindrical, 12-15 mm in diameter, producing watery and caustic latex when wounded; internodes up to 20 cm long; nodes swollen, with an annular scar, producing 1 adventitious root per node; the lateral branches pendulous. Leaves persistent, oblong-ovate or oblong-elliptical, fleshy, rigid, flat, almost sessile, 20-30 × 6-10 cm, the apex acute or obtuse, the base obtuse; both surfaces dull, with the parallel venation prominent; petioles ca. 1.5 cm long. Inflorescence an axillary raceme, with many flowers; bracts fleshy, broadly ovate, 1.2-2.5 cm long. Sepals greenish yellow or yellowish cream-colored, free, expanded, oblanceolate, obtuse, or rounded, ca. 9 × 1-2 cm. Petals similar, but dorsally keeled; lip yellow-orange, entire, unguiculate, adnate along the column; column slender, semicylindrical, ca. 7 cm long, barbate in the area near the stigma. Fruits pendulous, fusiform, ca. 18 × 2.5 cm.

Phenology: Flowering from March to May, but not producing fruits in Puerto Rico because its natural pollinators are not found on the island.

Status: Exotic, persistent, uncommon.

Distribution: Formerly cultivated for the production of vanilla, and still found on abandoned farms. Species native to Mexico and Guatemala, but widely cultivated in the neotropics.

Public Forests: Maricao.

Reference: Ackerman, J. D. 1992. The orchids of Puerto Rico and the Virgin Islands. Editorial de la Universidad de Puerto Rico. Ackerman, J. D. 1995. An orchid flora of Puerto Rico and the Virgin Islands. Mem. New York Bot. Gard. Vol. 73: 1-203.

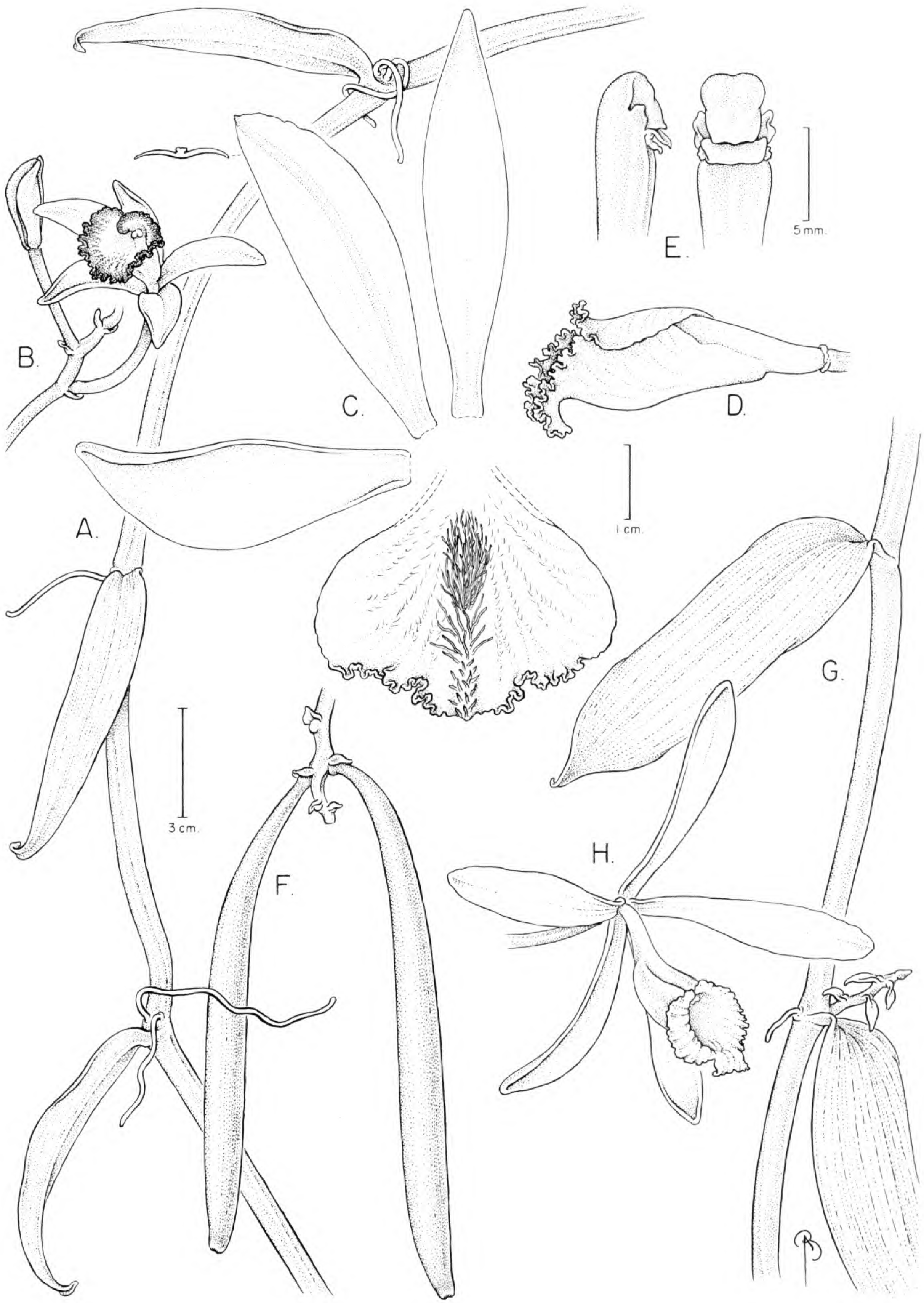

Fig. 180. A-F. *Vanilla poitaei.* **A.** Sterile branch. **B.** Inflorescence. **C.** Sepals, free petal, and lip. **D.** Lip, side view. **E.** Column, side and front views. **F.** Infructescence. **G-H.** *Vanilla pompona.* **G.** Branch. **H.** Flower.

6. *Family* ***POACEAE***

Key to the genera

1a. Leaves of the culm different from the leaves of the branches; branches short, whorled in the area of the nodes.....2
1b. Leaves of the culm similar to those of the branches; apex of the leaf sheath lacking setaceous appendages; branches short or elongate, alternate.....3

2a. Leaves 7-13 per branch; apex of the leaf sheath with setose appendages .....1. *Arthrostylidium*
2b. Leaves 15-40 per branch; apex of the leaf sheath lacking setose appendages .....2. *Chusquea*

3a. Leaf blades 0.2-3.4(4.6) cm wide; glumes not aristate.....3. *Lasiacis*
3b. Leaf blades 3-11 cm wide; glumes aristate, the arista 5-22 mm long .....4. *Olyra*

1. ARTHROSTYLIDIUM

Herbs, caespitose, perennial, with pachymorphic and sympodial rhizomes. Culms cylindrical, lignified, hollow, elongate, scandent, with one main branch per node, the branches with three to many branches that are borne from a mound. Leaves of the culm different from those of the branches; foliaceous leaves with internal and external ligules; leaf sheath with a prominent or inconspicuous setaceous appendage. Inflorescences of spicate racemes, lacking bracts, the rachis straight or flexuous. Spikelets subsessile, with 2 or more flowers, bisexual; fertile flowers 1 or more numerous, deciduous along with the rachilla when mature; glumes 1 or 2, as long as half the length of the spikelet. About 30 species, distributed from Mexico to Bolivia and in the Antilles.

Key to the species of *Arthrostylidium*

1a. Leaves of the branches 0.7-2 mm wide .....1. *A. farctum*
1b. Leaves of the branches 3-30 mm wide.....2

2a. Foliaceous leaves 6-11 × 1-3 cm; culms markedly scabrous; rachis of the inflorescence straight .....2. *A. multispicatum*
2b. Foliaceous leaves 2.5-6 × 0.3-0.7 cm; culms smooth; rachis of the mature inflorescence flexuous .....3. *A. sarmentosum*

1. Arthrostylidium farctum (Aubl.) Soderstr. & Lourteig, Phytologia 64: 163. 1987.

Fig. 181. A-C

BASIONYM: *Arundo farcta* Aubl.
SYNONYM: *Arthrostylidium capillifolium* Griseb.

Climbing bamboo

Climbing, small bamboo, attainig 3-5(15) m in length. Culms smooth, shiny, 1-5 mm in diameter, cylindrical, flexible, with internodes 5-20 cm long, the nodes with numerous branchlets, 7-15 cm long, grouped in dense whorls. Leaves of the branches linear, 6-15 × 0.7-2 mm,

chartaceous, with the venation parallel; leaf sheath with the margins ciliate; setaceous appendages in two series, 1-5 mm long. Inflorescences 2-10 cm long, spicate, with 3-7 spikelets. Spikelets 8-11 mm long, linear, appressed to the rachis.

Phenology: Rarely seen in flower. The plant allegedly dies after flowering.

Status: Native, uncommon.

Distribution: Uncommon on forested slopes, forest margins, and in dry thickets on limestone and serpentine. Also on Vieques, St. John, and St. Thomas; in the Bahamas, Cuba, and Hispaniola. This species was erroneously accredited to French Guiana in the original description.

Public Forests: Maricao, Río Abajo, and Susúa.

2. Arthrostylidium multispicatum Pilg., in Urb., Symb. Antill. 2: 341. 1901.

Fig. 181. D-G

BASIONYM: *Arundinaria multispicata* (Pilger) Hack.

Climbing, small bamboo, attainig 5-10 m in length. Young culms scabrous, smooth when mature, cylindrical, flexible, attaining 3-5 mm in diameter, the internodes 2.5-10 cm long, the nodes with numerous branchlets, 20-40 cm long, grouped in dense whorls. Leaves of the branches lanceolate, 6-12 × 1-1.7 cm, chartaceous, with the venation parallel; leaf sheath puberulent; setaceous appendages 1-2 mm long, deciduous; internal and external ligules ca. 2 mm long. Inflorescences 4-12 cm long, spicate, with 4-10 subsessile spikelets. Spikelets 2-3 cm long, linear, appressed to the rachis, with 3-5 fertile flowers; rachis straight. Fruit unknown.

Phenology: Collected in flower in February.

Status: Native, rare.

Distribution: Uncommon on forested slopes along the Cordillera Central. Also in Cuba, Hispaniola, and Trinidad.

Public Forests: Carite, Guilarte, Maricao, and Toro Negro.

3. Arthrostylidium sarmentosum Pilg., in Urb., Symb. Antill. 4: 108. 1903.

Fig. 181. H-J

Bambú trepador, Bambuilla

Climbing, small bamboo, with numerous pendulous lateral branches, attainig 2-8 m in length. Stems glabrous, smooth, shiny, cylindrical, 0.7-2.5(4) mm in diameter, the internodes 10-18 cm long, the nodes with 15-30 branches, 10-15 cm long, grouped in dense whorls. Leaves of the branches lanceolate, 1-5 × 0.2-0.5 cm, chartaceous, glabrous, with the venation parallel. Inflorescences terminal on the short lateral branches, racemose, 2-3.5 cm long, flexuous, with 3-5 spikelets. Spikelets pubescent, 15-18 mm long, linear, appressed to the rachis, with 4-5 flowers.

Phenology: Rarely seen in flower, collected in flower in December.

Status: Native, rather common.

Distribution: In moist forests at middle to upper elevations; along the Cordillera Central and the Sierra de Luquillo. Also throughout the Antilles and in Venezuela.

Public Forests: Carite, El Yunque, Guilarte, Maricao, and Toro Negro

2. CHUSQUEA

Small or medium-sized bamboos. Culms elongate, erect, arcuate or scandent, cylindrical, lignified, solid or occasionally hollow, with numerous branches per node. Leaves of the culm different from those of the branches; foliaceous leaves with internal and external ligules; leaf sheath lacking setose appendages. Inflorescences terminal, of panicles or less frequently racemes. Spikelets lanceolate or ovate, short-aristate or not aristate, with numerous flowers; glumes 2, short; 2 basal flowers sterile; distal flowers bisexual; palea bicarinate; stamens 3; stigmas 2. About 150 species, distributed from Mexico to Chile and Argentina, including the Antilles.

Fig. 181. A-C. *Arthrostylidium farctum.* **A.** Fertile branch. **B.** Inflorescence. **C.** Spikelet. **D-G.** *Arthrostylidium multispicatum.* **D.** Sterile branch. **E.** Fertile branch. **F.** Detail of inflorescence. **G.** Spikelet. **H-J.** *Arthrostylidium sarmentosum.* **H.** Sterile branch, with detail of the sheath appendage. **I.** Inflorescence. **J.** Spikelet.

1. Chusquea abietifolia Griseb., Fl. Brit. W. I. 529. 1864.

Fig. 182. A-D5

Small bamboo, creeping or climbing, attainig 5-10 m in length, forming dense thickets. Culms cylindrical, 2.5-3.5 cm in diameter, strong, scabrous when young, becoming smooth when mature, the internodes 6-14 cm long, the nodes with numerous minute whorled branches, 4-10 cm long, these with 15-40 leaves. Leaves alternate, overlapping, narrowly lanceolate, 15-30 × 2-3 mm, the apex acute, the margins ciliate, scabrous; the outer ligule ca. 0.2 mm long, the inner ligule ca. 0.5 mm long; pseudostipules ca. 1 mm long. Inflorescences of few-flowered panicles, ca. 5 cm long. Spikelets 5.5-7 mm long, short-pedicellate; glumes oblong, short-aristate, the lower ones 1-1.5 mm long, the upper ones 3-5 mm long; sterile flowers oblong-lanceolate, 6-7 mm long; fertile flowers lanceolate-ovate, 5.5-6.5 mm long, pubescent and ciliate at the apex; palea ca. 5 mm long.

Phenology: Not observed.

Status: Native, very rare.

Distribution: Uncommon in moist forests at 600-1205 m in elevation; along the Cordillera Central. Also in the rest of the Greater Antilles.

Public Forests: Maricao and Toro Negro.

3. LASIACIS

Perennial herbs. Culms cylindrical, lignified, elongate, scandent, decumbent, or erect, branched. Leaves monomorphic, those of the culm similar to those of the branches; leaf sheath smooth, lacking setaceous appendages; ligules membranaceous; blades linear to ovate. Inflorescences in the form of a panicle, the primary branches divaricate, the rachis with a spikelet on the distal portion. Spikelets adaxial, cylindrical or globose, covered at the base by a glume, with 2 or more bisexual flowers. A neotropical genus of 16 species.

Key to the species of *Lasiacis*

1a. Ligules of the upper leaves 0.2-0.6 mm long ..... 1. *L. divaricata*
1b. Ligules of the upper leaves > 1.6 mm long.....2

2a. Primary branches reflexed or spreading; leaf sheath glabrous or pubescent ..... 2. *L. ligulata*
2b. Primary branches appressed or spreading; leaf sheath papillose, hispid, or pubescent..... ..... 3. *L. sorghoidea*

1. Lasiacis divaricata (L.) Hitchc., Contr. U.S. Natl. Herb. 15: 16. 1910.

Fig. 182. E-G

BASIONYM: *Panicum divaricatum L.*
SYNONYMS: *Panicum bambusoides Desv. ex Ham.*
Lasiacis harrisii Nash

Perennial herb; culms 0.5-5 m in length, erect or scandent; brittle, cylindrical, up to 6 mm in diameter. Leaves distichous; leaf sheath glabrous; ligule 0.2-0.6 mm long; blades lanceolate to linear, flattened, (3-)5-12(-16) cm long by (3-)6-14(20) mm wide, glabrous except for some hairs on the midvein. Inflorescences ovate; primary axis 2-12(20) cm long; secondary axes 2-8(12) cm long. Spikelets solitary, obovoid, (3.5)3.7-4.3 × 2.1-2.6 mm; lower glumes 1.4-2 mm long, 7-11-veined; upper glumes 3.5-4.5 mm long, 9-11-veined.

Phenology: Collected in fertile condition from September to February.

Status: Native, rather common.

Distribution: In areas of secondary vegetation, along roads and in open and disturbed areas. Also on Caja de Muerto, Desecheo, Mona, Vieques, St. Croix, St. John, St. Thomas, Tortola, and Virgin Gorda; throughout the Antilles, the United States (Florida), and from Mexico to South America.

Public Forests: Cambalache, Carite, Ceiba, Guajataca, Guánica, Maricao, Mona, Río Abajo, and Susúa.

2. Lasiacis ligulata Hitchc. & Chase, Contr. U.S. Natl. Herb. 18(7): 337. 1917.

Fig. 182 H-K

SYNONYM: *Panicum divaricatum* L. var. *puberulum* Griseb.

Perennial herb; culms 1-5 m in length, erect or scandent. Leaves distichous; leaf sheath glabrous or pubescent; ligule (1.6)2-3(3.7) mm long; blades broad to narrowly lanceolate, flattened, (5-)7-14(-17) cm × (6-)10-22(34) mm, scabrous, glabrous or pubescent on the upper surface. Inflorescences ovate; primary axis 2-17(21) cm long; secondary axes 1-8 cm long, reflexed or spreading. Spikelets solitary, obovoid, (3-)3.2-3.8 × 1.7-2.4 mm; lower glumes 0.7-2 mm long, 7-11-veined; upper glumes 2.7-3.5 mm long, 9-11-veined.

Phenology: Collected in fertile condition from November to March and in June.

Status: Native, uncommon.

Distribution: Uncommon in areas of secondary vegetation. Also on St. Croix, St. John, St. Thomas, and Tortola; throughout the Antilles and from Central America to Bolivia.

Public Forests: Carite, El Yunque, Maricao, Río Abajo, and Susúa.

3. Lasiacis sorghoidea (Desv.) Hitchc., Contr. U.S. Natl. Herb. 18(7): 338. 1917.

Fig. 183. A-D

BASIONYM: *Panicum sorghoideum* Desv.

SYNONYMS: *Panicum divaricatum* L. *var. lanatum* Schltdl. & Cham.

Panicum fuscum Sieber ex Griseb.

Lasiacis swartziana (Hitchc.) Hitchc.

Perennial herb; culms 1-10 m in length, erect, decumbent, or scandent. Leaves distichous; leaf sheath pubescent, papillose or hispid; ligule (0.3)0.5-1.5(-2.6) mm long; blades lanceolate, ovate or linear, flattened, (6-)9-19(-23) cm × (6)12-34(46) mm, smooth, pubescent on the upper surface. Inflorescences ovate; primary axis (5-)9-25(-35) cm long; secondary axes 4-9 cm long, appressed or spreading. Spikelets solitary, obovoid or ellipsoid, (3-)3.4-4.1 × 2.5-3.2 mm; lower glumes (1.2-)1.5-2.1 mm long, 7-11-veined; upper glumes 3-4.3 mm long, 9-13-veined.

Phenology: Collected in fertile condition from November to April.

Status: Native, locally common.

Distribution: Uncommon in areas of secondary or disturbed vegetation. Also on Vieques, St. Croix, St. John, St. Thomas, and Virgin Gorda; throughout the Antilles and from Mexico to Argentina.

Public Forests: Carite, El Yunque, Maricao, and Susúa.

4. OLYRA

Monoecious herbs, perennial, caespitose; culms erect or creeping or climbing. Leaves with well developed auricles; ligules membranaceous; blade broad. Inflorescences paniculate, solitary or numerous at the upper nodes of the stem. Spikelets with a single flower; pistillate spikelets usually with a claviform pedicel, separating as a unit or the flowers separating from the glumes, the glumes acuminate or aristate, membranaceous, pluriveined, longer than the flower; flowers lanceolate or ovate, whitish, persistent; spikelets staminate, smaller than the pistillate ones, linear or lanceolate, hyaline, deciduous, the glumes usually absent; stamens 3.

1. Olyra latifolia L., Syst. Nat. ed. 10, 1261. 1759.

Fig. 183. E-H

Perennial herb; culms erect or climbing, 1-6 m in length, 3-12 mm in diameter, brittle, hollow inside, with numerous branches from the middle and upper nodes; nodes somewhat collapsed, pilose or glabrous. Leaf sheath pilose or glabrous; auricles up to 5 mm long; ligules 0.7-5 mm long; blades lanceolate to ovate, 10-32 × 3-11 cm, the base obtuse or subcordate, the apex acuminate. Panicles pyramidal, 7-20 × 4-14 cm, on peduncles ca. 15 cm long.

Fig. 182. A-D. *Chusquea abietifolia.* **A.** Sterile branch. **B.** Fertile branch. **C.** Inflorescence. **D.** Spikelet. **E-G.** *Laciacis divaricata.* **E.** Fertile branch. **F.** Spikelet. **G.** Apex of the leaf sheath. **H-K.** *Laciacis ligulata.* **H.** Fertile branch. **I.** Apex of the leaf sheath. **J.** Portion of the inflorescence. **K.** Outer glume, inner glume, palea, and lemma.

Fig. 183. A-D. *Laciacis sorghoidea.* **A.** Fertile branch. **B.** Detail of the apex of the sheath. **C.** Inflorescence. **D.** Spikelet and flower. **E-H.** *Olyra latifolia.* **E.** Fertile branch. **F.** Rhizome with culms. **G.** Part of inflorescence with pistillate spielet and pedicels of staminate spikelet! **H.** Lateral and frontal views of pistillate floret. **E-H** from Mori, S. et al. 1997. Vascular plants of central French Guiana. Mem. NYBG Vol. 76(1).

Phenology: Collected in fertile condition in October and January.

Status: Native, locally common.

Distribution: In forests, pastures, and along rivers, in moist areas, at middle and lower elevations.

Public Forests: Guajataca, Maricao, Río Abajo, and Susúa.

7. *Family* ***SMILACACEAE***

1. SMILAX

Herbaceous or slightly woody vines, dioecious, with farinaceous rhizomes. Stems cylindrical, strong and flexible, sometimes with spines. Leaves alternate, simple, with the main veins arcuate, parallel; petioles with a pair of filamentous tendrils at their union with the leaf sheath. Flowers unisexual, 3-merous, actinomorphic, produced in axillary umbels. Staminate flowers with 6 stamens, the anthers basifixed. Pistillate flowers usually with staminodia; ovary 3-carpellate, with 1 or 2 ovules per carpel. Fruit fleshy, with 1-6 seeds. A genus of tropical or temperate vines, of about 350 species.

Key to the species of *Smilax*

1a. Leaves coriaceous to rigid-coriaceous, with the margins usually spiny and the apex obtuse or acute; stems spiny ..... 1. *S. coriacea*

1b. Leaves chartaceous, with the margins entire and the apex acuminate; stems not spiny ..... 2. *S. domingensis*

1. Smilax coriacea Spreng., Syst. Veg. 2: 103. 1825.

Fig. 184. A-F

SYNONYMS: *Smilax ilicifolia sensu* Boldingh *non* Desv.
Smilax havanensis var. portoricensis A. DC.
Smilax guianensis var. *subarmata* O.E. Schulz
Smilax coriacea var. *ilicifolia* O.E. Schulz
Smilax subarmata O.E. Schulz

Dunguey, Dunguey blanco, Green briar

Slightly woody vine that climbs by means of tendrils and attains 5 m or more in length. Stems slender, strong, flexible, puberulent or glabrous, covered with small recurved spines. Leaves coriaceous or rigid-coriaceous, 5.5-12(18) × 2.6-9(12.5) cm, ovate, elliptical, oblong, lanceolate, or linear, 3-7-veined, the apex obtuse, acute, or less frequently rounded or slightly retuse, mucronate, the base rounded, obtuse, or cordiform, the margins revolute and usually spiny; upper surface dark green, shiny, glabrous, with the midvein prominent, the margins revolute and usually spiny; petioles 0.5-2 cm long, articulated at the apex, forming a sheath at the base, from which two simple tendrils are borne. Inflorescences axillary, umbelliform, these solitary or on short flexuous branches, lacking leaves. Flowers greenish or yellowish. Staminate flowers with pedicels ca. 5 mm long, tepals oblong, reflexed, 2-3 mm long. Pistillate flowers with pedicels ca. 3 mm long; tepals ovate, erect, 1.5-1.8 mm long. Fruits globose or depressed-globose, 5-7 mm in diameter, black when ripe.

Phenology: Flowering from January to March and from June to August and fruiting from September to January.

Status: Native, very common.

Distribution: Of widespread distribution, in coastal thickets, dry forests, and moist forests of the Cordillera Central. Also on Vieques, Guana Is., St. Croix, St. John, St. Thomas, Tortola, Virgin Gorda; Hispaniola and the Lesser Antilles.

Public Forests: Carite, El Yunque, Guánica, Guajataca, Maricao, Río Abajo, Susúa, Toro Negro, and Tortuguero.

Commentary: In the first edition of this work, *Smilax coriacea* was considered a synonym of *S. havanensis* Jacq. This error is rectified in this edition, since the two species are different and can be distinguished by their pattern of the venation. The secondary veins on the leaves of *S. coriacea* form an angle with the principal vein that varies from 45° to 90°, while in *S. havanensis* the secondary veins form an angle with the principal vein that varies from 25° to 35°. *Smilax havanensis* is found in Cuba and in Hispaniola, but it is not found in Puerto Rico, nor in the Virgin Islands.

2. Smilax domingensis Willd, Sp. Pl. 4: 783. 1806.

Fig. 184. G-K

Bejuco de membrillo, Raiz de zarzaparilla, Zarzaparilla

Slightly woody vine that climbs by means of tendrils and attains 5-10 m in length. Stems slender, strong, glabrous, smooth, scarcely branched. Leaves alternate, simple, chartaceous, 5-12(15) × 2-6.5 cm, ovate, oblong, elliptical, or broadly elliptical, usually involute, 5-veined, the apex acuminate, the base obtuse, rounded, or less frequently subcordate; the margins entire; upper surface shiny, glabrous; lower surface dull, glabrous, papillose, with prominent venation; petioles 1-1.5 cm long, articulated at the apex, forming a sheath at the base, from which two simple tendrils are borne, 8-12 cm long. Inflorescence axillary, umbelliform, solitary. Flowers greenish, fragrant. Staminate flowers with pedicels 5-9 mm long; tepals elliptical, 3-3.5 mm long. Fruit globose, fleshy, ca. 1 cm in diameter, dark violet or almost black, with a single seed inside.

Phenology: Flowering from May to August and fruiting from December to February.

Status: Native, rather common.

Distribution: In moist forests at middle to upper elevations, along the Cordillera Central and in the zone of mogotes. Also in the Greater Antilles, Mexico, Guatemala, and Belize.

Public Forests: Cambalache, El Yunque, Guajataca, Maricao, Río Abajo, Susúa, and Tortuguero.

Reference: Acevedo-Rodríguez, P. (in prep.) Smilacaceae. *In*: Acevedo-Rodríguez, P. & M. T. Strong (eds.) Monocots of Puerto Rico and the Virgin Islands. Contrib. U.S. Natl. Herb.

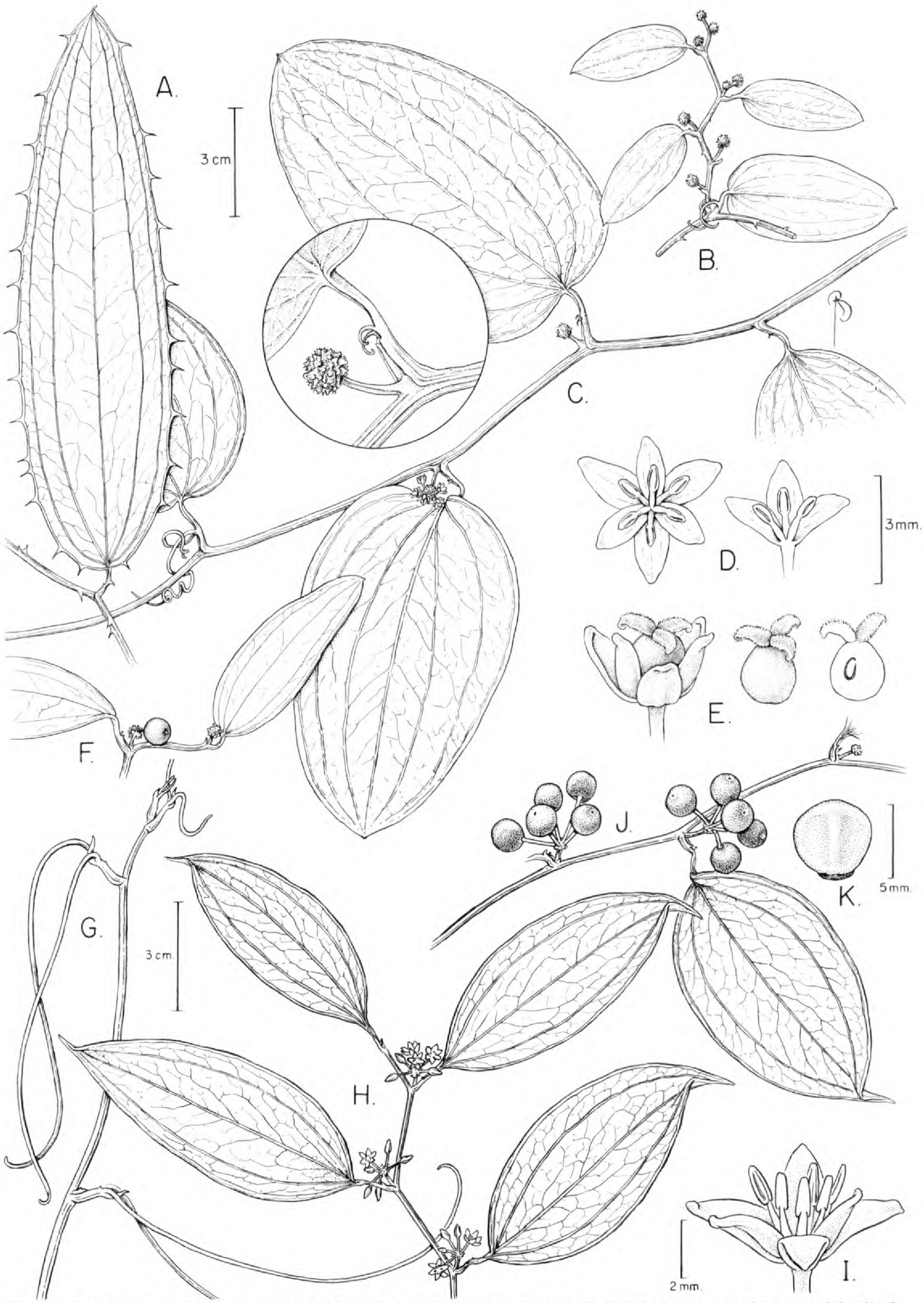

Fig. 184. A-F. *Smilax coriacea*. **A.** Leaf with spiny margin. **B.** Fertile branch. **C.** Branch with non-spiny leaves, and detail of inflorescence. **D.** Staminate flower, top view and longitudinal section. **E.** Pistillate flower, gynoecium, and longitudinal section of the gynoecium, showing ovule. **F.** Branch with fruit. **G-K.** *Smilax domingensis*. **G.** Vegetative branch with tendrils. **H.** Fertile branch. **I.** Staminate flower. **J.** Fruiting branch. **K.** Seed.

COLLECTIONS EXAMINED

BLECHNACEAE

Blechnum fragile: Acevedo-Rdgz., P. 3064; 7815; 7828; 10864; 11446.

DAVALLIACEAE

Oleandra articulata: Acevedo-Rdgz., P. 6967; 7739; 9324; Britton, N.L. 2060; 2204; 6863; 7570; Cowles, H.T. 406; Dale 51; Eggers, B. 1209; Heller, A.A. 1072; 4613; Hioram, B. 351; Johnston, J.R. 765; Otero, J. 52; Sargent, F.H. 604; Shafer, J.A. 3459; Sintenis, P. 1002; 1780; Webster, G.L. 8698.

DENNSTAEDTIACEAE

Hypolepis nigrescens: Acevedo-Rdgz., P. 9433; 11457; Proctor, G.R. 40131; 40629; Sargent, F.H. 3154. Hypolepis repens: Acevedo-Rdgz., P. 7740; Proctor, G.R. 39399; 39644; 40628; 41285.

Hypolepis tenerrima: Proctor, G.R. 40130; Sargent, F.H. 605; Sintenis, P. 4105; 6454. Hypolepis urbanii: Proctor, G.R. 40130.

Odontosoria aculeata: Acevedo-Rdgz., P. 2095; 7146; 9321; 9434. Britton, N.L. 505; 1074; 1612; 6079; Cowles, H.T. 255; Dale 5; Fisher, M.J. 71; Goll, G.P. 402; 403; 433; Heller, A.A. 126; Hioram, B. 108; Proctor, G.R. 39398; Shafer, J.A. 3146; Sintenis, P. 169; 2172; Underwood, L.M. 25; Vélez, I. 1050.

Odontosoria scandens: Acevedo-Rdgz., P. 7825; 9431. Britton, N.L. 1457; 2454; 2613; Proctor, G.R. 39422; 40812; Sargent, F.H. 403; 3139; Schubert 408; Sintenis, P. 4600; Webster, G.L. 8767.

GLEICHENIACEAE

Dicranopteris flexuosa: Acevedo-Rdgz., P. 9427; 9448; Britton, N.L. 8126; Heller, A.A. 4353; Hioram, B. 329; Proctor, G.R. 39416; 41104; 41158; Stevenson, J.A. 227; 3259; Underwood, L.M. 1286.

Dicranopteris pectinata: Acevedo-Rdgz., P. 7120; 9333; 9372; Britton, N.L. 584; Cowgill 630; Cowles, H.T. 398; Goll, G.P. 438; 938; Proctor, G.R. 39503; 41133; Sintenis, P. 1768; Underwood, L.M. 266.

Gleichenia bifida: Acevedo-Rdgz., P. 9322; 9373; 9447; 10218; 10524; Britton, N.L. 503; 5389; 6561; 7573; Cowles, H.T. 399; Eggers, B. 1202; Gaibee; Goll, G.P. 413; 435; 929; Hioram, B. 283; Proctor, G.R. 39418; Shafer, J.A. 3422; Sintenis, P. 429; 1769; 3988; Stimson 1282; Underwood, L.M. 288; 330; Webster, G.L. 8627.

Gleichenia brevipubis: Proctor, G.R. 39420; 41419.

Gleichenia rubiginosa: Acevedo-Rdgz., P. 9423; Gleason 33; Proctor, G.R. 39419; 40136; 42052.

LOMARIOPSIDACEAE

Lomagramma guianensis: Proctor, G.R. 41108; Sintenis, P. 426; 526.

Lomariopsis amydrophlebia: Proctor, G.R. 40712; Sintenis, P. 1795.

Lomariopsis kunzeana: Britton, E.G. 5215; Underwood, L.M. & Griggs 843.

Lomariopsis sorbifolia: Acevedo-Rdgz., P. 10816; Sintenis, P. 1762.

POLYODIACEAE

Microgramma heterophylla: Acevedo-Rdgz., P. 1907; 2037; 10891.

Microgramma lycopodioides: Acevedo-Rdgz., P. 263; 9412; 11653; Britton, N.L. 4129; 7289; Fosberg, F.R. 51334; Goll, G.P. 404; 617; Heller, A.A. 1369; 4476; 6235; Proctor, G.R. 39396; 40837; Sargent, F.H. 102; Shafer, J.A. 3152; 3615; Sintenis, P. 1784; 2834; Stimson 1237; Underwood, L.M. 70; 292.

Microgramma piloselloides: Acevedo-Rdgz., P. 200; 3039; 9319; 10810.

Polypodium loriceum: Acevedo-Rdgz., P. 7826; 10523; 10871.

SCHIZAEACEAE

Lygodium japonicum: Acevedo-Rdgz., P. 10849.

SELAGINELLACEAE

Selaginella willdenovii: Acevedo-Rdgz., P. 9328.

ACANTHACEAE

Asystasia gangetica: Acevedo-Rdgz., P. 3083; 7001; 7082.

Oplonia spinosa: Acevedo-Rdgz., P. 760; 3975; 4116; 4147; 5418; 7026; 9302; 10595; 11330; Britton, N.L. 2545; Heller, A.A. 4688; Johnston, J.R. 803; Prance, G.T. 29373; Sargent, F.H. 399; 693; Sintenis, P. 5202; Stevenson, J.A. 2405; Wasshausen, D.C. 1303; Webster, G.L. 8974; Woodbury, R.O. 56.

Thunbergia alata: Acevedo-Rdgz., P. 3050; 7002; 7135; Boom, B. 9895; Eggers, B. 760; Fisher, M.J. 21; 22; 23; Goll, G.P. 71; 152; Heller, A.A. 624; 6312; 6392; Liogier, A.H. 30010; Prey, N. 82; Sargent, F.H. 189; Sintenis, P. 158; Stevenson, J.A. 98; 306; 3328; Underwood, L.M. 757.

Thunbergia fragrans: Acevedo-Rdgz., P. 171; 529; 1928; 4665; 5329; 7003; 9353; Boom, B. 9891; 9945; Goll, G.P. 774; Sintenis, P. 2673; Stevenson, J.A. 2154.

Thunbergia grandiflora: Acevedo-Rdgz., P. 7049; 9350; 9418.

AMARANTHACEAE

Celosia nitida: Acevedo-Rdgz., P. 1807; 4358; 6988; 11080; 11293; Britton, N.L. 132; 1956; 5033; Heller, A.A. 6424; Johnston, J.R. 1246; Sargent, F.H. 3211; Shafer, J.A. 2756; Sintenis, P. 615; 3024; 3444; Velez, I. 3086a

Chamissoa altissima: Acevedo-Rdgz., P. 3738; 7050; 7730; 7849; 9410; 11872; Axelrod, F. 10982; Heller, A.A. 545; 4521; 6197; Johnston, J.R. 1130; Sargent, F.H. 82; 461; 704; Sintenis, P. 264; 2139; 5892; 6357; Stevenson, J.A. 1130.

Iresine angustifolia: Acevedo-Rdgz., P. 779; 2469;2568; 2726; 3122; 3890; 6979; 10658; Raunkiaer, C. s.n.

Iresine diffusa: Acevedo-Rdgz., P. 118; 7852; 9487; 9494; Britton, N.L. 1444; Goll, G.P. 600; 622; Heller, A.A. 349;

Morton, C.V. 5740; Sargent, F.H. 221; Sintenis, P. 303; 2422; 5844; Stevenson, J.A. 2410; Underwood, L.M. 342; 457.

Pfaffia aurata: Acevedo-Rdgz., P. 24; 7744.

APOCYNACEAE

Allamanda cathartica: Acevedo-Rdgz., P. 9338; Britton, N.L. 1555; Fisher, M.J. 4; Goll, G.P. 389; 965; Sargent, F.H. 748; 3010; Shafer, J.A. 3013; Sintenis, P. 832; 2499; Stevenson, J.A. 1271.

Anechites nerium: Stahl, A. 870.

Echites agglutinata: Acevedo-Rdgz., P. 902; 2045; 2665; 3142; 3819; 3974; 4422; 5068; 5249; 7797; 10900; 10978; 11322; 11403; 11558; 11726; Britton, N.L. 615; 1296; 2277; Goll, G.P. 806; Proctor, G.R. 43988; Sintenis, P. 1943; 2457; Stevenson, J.A. 2944; 3503; Underwood, L.M. 666 Webster, G.L. 8601; 8896.

Forsteronia portoricensis: Acevedo-Rdgz., P. 313; 319; 2957; 5223; 7131; 10827.

Pentalinon luteum: Acevedo-Rdgz., P. 368; 685; 686; 1835; 2833; 4292; 11298; Johnston, J.R. 821; Sargent, F.H. 723; Shafer, J.A. 2737; Sintenis, P. 1891; Stevenson, J.A. 6583.

Rhabdadenia biflora: Eggers, B. 1155; Sargent, F.H. b23; Sintenis, P. 935; Stevenson, J.A. 433.

ARISTOLOCHIACEAE

Aristolochia elegans: Acevedo-Rdgz., P.4136.

Aristolochia oblongata subsp. **calceiformis**: Acevedo-Rdgz., P. 157; 2207; 11436; 11642; Britton, N.L. 6781; Johnston, J.R. 923; Sintenis, P. 3056.

Aristolochia odoratissima: Acevedo-Rdgz., P. 4098.

Aristolochia trilobata: Acevedo-Rdgz., P. 2215; 2217; 2431; 4214; 5080; 6993; Britton, N.L. 5517; Shafer, J.A. 3808; Sintenis, P. 812.

ASCLEPIADACEAE

Cryptosgetia madagascariensis: Acevedo-Rdgz., P. Acevedo-Rdgz., P. 734; 1992; 4681; 6969; 6987. 6989; 10800; 10829; 11238; 11463.

Gonolobus stephanotrichus: Acevedo-Rdgz., P. 7785; 10596; 10814; 11445; Sintenis, P. 4666.

Hoya australis: Acevedo-Rdgz., P. 7044.

Marsdenia elliptica: Acevedo-Rdgz., P. 7658; 10169; 11658; 11739; Axelrod, F. 9399; Wydler, 308.

Marsdenia woodburyana: Acevedo-Rdgz., P. 10174.

Matelea maritima: Acevedo-Rdgz., P. 652; 903; 1034; 2737; 4076; 4674; Britton, N.L. 1641; 1932; Goll, G.P. 750; Proctor, G.R. 46582; Shafer, J.A. 2657; Sintenis, P. 2174; 3208.

Matelea sintenisii: Acevedo-Rdgz., P. 7792; 7819; Britton, N.L. 1076; 2040; 2600; Liogier, A.H. 28598.

Matelea variifolia: Acevedo-Rdgz., P. 351; 11453; 11644.

Metastelma anegadense: Acevedo-Rdgz., P. 10964; 11054. DArcy, W.G. 4809.

Metastelma decipiens: Acevedo-Rdgz., P. 602; 900; 1815; 1836; 1941; 2324; 2620; 3106; 3908; 3961; 4144; 4201; 4258; 4659; 6973; 7083; 9297; 9486; 10944; 11024; 11076; 11223; 11296; 11855; Axelrod, F. 10519; Britton, N.L. 129; 647; 883; 6817; Heller, A.A. 4603; Liogier, A.H. 10219; 30185; Ostenfeld, C.H. 23; Sintenis, P. 1692; Rose, J.N. 3191.

Metastelma leptocladon: Acevedo-Rdgz., P. 3754; 7714; 10216; Axelrod, F. 9956; Sargent, F.H. 622.

Metastelma lineare: Acevedo-Rdgz., P. 382; 3746; 7204; 9361; 11414; Axelrod, F. 5386; Britton, E.G. 744; Britton, N.L. 2548; 2700; Sargent, F.H. 392; Stevenson, J.A. 2040; Underwood, L.M. 50; Webster, G.L. 8854.

Metastelma monense: Acevedo-Rdgz., P. 4273.

Metastelma parviflorum: Acevedo-Rdgz., P. 399; 1074; 3074; 5386; 6174; 7919; 10177; Britton, N.L. 55; 311; 1430; 1581; 1927; 2701; 5885; Fosberg, F.R. 58870a; Ricksecker, A.E. 170; Ricksecker, Mrs. J.J. 146; Sargent, F.H. 124; 3189; Sintenis, P. 861; 3813; Stevenson, J.A. 518.

ASTERACEAE

Berylsimpsonia vanillosma: Heller, A.A. 6263; Sargent, F.H. 375; Sintenis, P. 2920; Acevedo-Rdgz., P. 7068.

Bidens reptans: Acevedo-Rdgz., P. 160; 3734; 7807; Britton, N.L. 1559; 7452; Goll, G.P. 572; Heller, A.A. 874; 6081; Sargent, F.H. 481; Sintenis, P. 2919; Stevenson, J.A. 2404.

Bidens urbanii: Acevedo-Rdgz., P. 3735; 3745; 11730; Britton & Coewll, 1559; Kennedy, H. 4787.

Chromolaena borinquense: Acevedo-Rdgz., P. 206; 7779; 9367; Britton, N.L. 8486; Proctor, G.R. 43021; 44475; Sargent, F.H. 3292.

Koanophyllon polyodon: Acevedo-Rdgz., P. 3744; 7063; 10526; 10735.

Lepidaploa borinquensis: Acevedo-Rdgz., P. 3053; 7065; 7154; 7924; 9421; 10204; Heller, A.A. 4391.

Mikania congesta: Acevedo-Rdgz., P. 2256; 7786; 11386; Axelrod, F. 3118; 7294; Britton, N.L. 2371; Liogier, A.H. 10709; 32923; Shafer, J.A. 1972; Sintenis, P. 154; 2093; 3873; Stevenson, J.A. 1704.

Mikania cordifolia: Abbott 1532; Acevedo-Rdgz., P. 3739; 4109; 4215; 7124; 7809; 9343; Boom, B. 7071; Britton, N.L. 368; 1669; 2349; 8578; Heller, A.A. 211; 4664; 6334; 6379; Liogier, A.H. 10646; Shafer, J.A. 2644; Sintenis, P. 204; 3052; 6194; Stevenson, J.A. 1154.

Mikania fragilis: Acevedo-Rdgz., P. 3057; 3759; 6965; 7102; Boom, B. 6928; 7109; 7941; Sintenis, P. 4127; Wagner 1749; Woodbury, R.O. s.n.

Mikania micrantha: Acevedo-Rdgz., P. 13; 7052; 7136; 9406; 10529; 10626; 10751; 11885; V,lez, I. 3196.

Mikania odoratissima: Acevedo-Rdgz., P. 7056; 7201; 7790; 9370; 9371; 10671; 11450; 11754; Britton, N.L. 3899; 9786; Proctor, G.R. 44339; Sargent, F.H. 8115.

Mikania pachyphylla: Acevedo-Rdgz., P. 7111; 9435; Axelrod, F. 4288; Breckon, G. 4241; Liogier, A.H. 10814; Proctor, G.R. 43542; Sargent, F.H. 318.

Mikania porosa: King, R.M. 10613; Acevedo-Rdgz., P. 7066; 7212; 9356; Axelrod, F. 3980; Britton, N.L. 1678; 3892; Proctor, G.R. 47575; Stahl, A. 381; Stevenson, J.A. 1656.

Mikania stevensiana: Acevedo-Rdgz., P. 7059; 7169.

Piptocarpha tetrantha: Acevedo-Rdgz., P. 2974; 7095; 9449; Boom, B. 6899; 7104; 10077; Breckon, G. 4428; Britton, N.L. 2030; 5285; Liogier, A.H. 10024; Shafer, J.A. 3437; Sintenis, P. 1637; 5339.

Piptocoma acevedoi: Acevedo-Rdgz., P. 5217; 7148; Cedeño, J.A. 196; 379.

Pseudogynoxys chemopodioides: Liogier, A.H. 36008; Acevedo-Rdgz., P. 7238; 9420; 11352.

Salmea scandens: Acevedo-Rdgz., P. 7798; 10862; 10879; Britton, N.L. 321; 1610; 1970; Eggers, B. 1159; Heller, A.A. 405; 4690; Liogier, A.H. 10711; Sintenis, P. 2346; 6206; 6628; Stevenson, J.A. 495; Woodbury, s.n.

Sphagneticola trilobata: Acevedo-Rdgz., P. 923; 2894.

BASELLACEAE

Anredera vesicaria: Acevedo-Rdgz., P. 1870; 2512 4228; Axelrod, F. 9947.

BIGNONIACEAE

Amphilophium paniculatum: Acevedo-Rdgz., P. 10457; 10620; Sintenis, P. 2092; Stevenson, J.A. 2493.

Arrabidaea chica: Acevedo-Rdgz., P. 2105; Sintenis, P. 1096; Stahl, A. 79.

Cydista aequinictialis: Heller, A.A. 4447; Acevedo-Rdgz., P. 2810; Axelrod, F. 9761; 9814; 10726; Britton, N.L. 8614; Heller, A.A. 1027; Sintenis, P. 945; 5764; Stevenson, J.A. 1752; Underwood, L.M. 261; Woodbury, R.O. 7696.

Distictis lactiflora: Acevedo-Rdgz., P. 982; 2203; 4660; 5403; 7010; 10557; 11822; Britton, N.L. 1268; 1771; 5849; Goll, G.P. 500; 694; Heller, A.A. 341; Shafer, J.A. 2789; Sintenis, P. 577; 2116; 2173; 3091; 3187; 3304; 6819; Underwood, L.M. 459.

Macfadyena unguis-cati: Acevedo-Rdgz., P. 2110; 2803; 3958; 9352; 11272; Axelrod, F. 4740; Britton, N.L. 66; Heller, A.A. 1233; Howard, R.A. 15754; Sargent, F.H. 74; Shafer, J.A. 2001; 2349; Sintenis, P. 550; 862; 1242; 1285; 1415; 3270; 5000; Underwood, L.M. 371; 782; Stevenson, J.A. 1757.

Mansoa hymenaea: Acevedo-Rdgz., P. 7215; 10180; 10183.

Phryganocydia corymbosa: Acevedo-Rdgz., P. 11500; Fosberg, F.R. 58885.

Podranea ricasoliana: Acevedo-Rdgz., P. 7920.

Saritaea magnifica: Acevedo-Rdgz., P. 6992.

BORAGINACEAE

Cordia bellonis: Acevedo-Rdgz., P. 7164; 10709.

Cordia polycephala: Acevedo-Rdgz., P. 96; 822; 2059; 3054; 3834; 5174; 10465; 10481; 11219; 11477.

Tournefortia bicolor: Acevedo-Rdgz., P. 4121; Britton, E.G. 2866; Britton, N.L. 339; 6269; Sargent, F.H. B20; Sintenis, P. 1420; 6211.

Tournefortia hirsutisima: Acevedo-Rdgz., P. 2458; 2865; 4162; 5076; 5154; 5340; 7240; 10224; 11202; 11205; Axelrod, F. 5053; Cowell, J.F. 586; Goll, G.P. 808; Heller, A.A. 515; Johnston, J.R. 875; Sargent, F.H. 32; Shafer, J.A. 2693; Sintenis, P. 667; 1733; 6826; Stevenson, J.A. 1568; 1792; Underwood, L.M. 289.

Tournefortia maculata: Acevedo-Rdgz., P. 218; 5222; 5237; 10628; 11665; Axelrod, F. 4634; Britton, N.L. 2485; 2869; 4541; 5276; 5590; Eggers, B. 1298; Heller, A.A. 609; Liogier, A.H. 33133; Sargent, F.H. 184; Shafer, J.A. 2228; Sintenis, P. 1575; Webster, G.L. 8927.

Tournefortia microphylla: Acevedo-Rdgz., P. 777; 1881; 2326; 3793; 4404; 5361; 6977; 6981; 7771; 7866; 7893; 10988; 11222; 11257; 11424; 11487; Axelrod, F. 4706; 5055; 6328; Britton, N.L. 1578; 1580; 1658; 1803; 4626; 4796; 5376; Liogier, A.H. 9163; Mill., G. 1668; Sargent, F.H. 166; 633; Shafer, J.A. 2695; 2868; Sintenis, P. 3404; 4832; Stevenson, J.A. 5486; V,lez, I. 3839.

Tournefortia scabra: Acevedo-Rdgz., P. 7219; Britton, N.L. 1285; Heller, A.A. 6274; Liogier, A.H. 31136; Sargent, F.H. B71; Shafer, J.A. 1982; Sintenis, P. 3378; Underwood, L.M. 702; Woodbury, R.O. s.n.

Tournefortia volubilis: Acevedo-Rdgz., P. 986; 1083; 10901; Britton, N.L. 271; Liogier, A.H. 31147; Sintenis, P. 640; 1316; 4957; 5221.

BUDDLEJACEAE

Buddleja madagascariensis: Acevedo-Rdgz., P. 11454.

CACTACEAE

Hylocereus trigonus: Acevedo-Rdgz., P. 2874; 5091; 7042; 11250; Britton, N.L. 1583; 1860; 1931; 2305; Hioram, B. 12; Shafer, J.A. 2834.

Hylocereus undatus: Acevedo-Rdgz., P. 11494.

Pereskia aculeata: Acevedo-Rdgz., P. 4267; Gregory 209; Shafer, J.A. 2563.

Selenicereus grandiflorus: Acevedo-Rdgz., P. 1874; 2835.

CAPPARIDACEAE

Capparis flexuosa: Acevedo-Rdgz., P. 1026; 1826; 1947; 2312; 2351; 2521; 4664; 4687; 4688; 5202; 7079; Axelrod, F. 6338; Gregory 188; Heller, A.A. 6163; Johnston, J.R. 798; Little, E.L. 21636; Mill. 1667; Sargent, F.H. 46; Shafer, J.A. 2658; 2767; Sintenis, P. 869; 3334; 3379; 3613; 3841; 3954; 4999; 5487; Stevenson, J.A. 2502; 5490; Underwood, L.M. 586; 592; 645.

CAPRIFOLIACEAE

Lonicera japonica: Acevedo-Rdgz., P. 2986; 9439; Sintenis, P. 4467; Stevenson, J.A. 5106.

CELASTRACEAE

Hippocratea volubilis: Acevedo-Rdgz., P. 248; 569; 2999; 6175; 6186; 7130; Axelrod, F. 4630; Britton, N.L. 1440; 1599; 1917; 4345; 5812; Eggers, B. 1160; Heller, A.A. 266; 4424; Liogier, A.H. 10265; 30929; Pfeifer 2934; Shafer, J.A. 2876; 2899; 2910; 3247; Sintenis, P. 795; 1854; 5164; 6392; Stevenson, J.A. 396; 2692; Underwood, L.M. 643.

Pristimera caribaea: Acevedo-Rdgz., P. 7229; 7236; 7722; 7803; 10617; Sargent, F.H. 16.

CLUSIACEAE

Clusia gundlachii: Acevedo-Rdgz., P. 2188; 3007; 7929; 9318; 10634; 10865; 11443; Britton, N.L. 4214; 6374; Eggers, B. 1231; Howard, R.A. 16830; Liogier, A.H. 10011; 10096; Little, E.L. 16328; Maguire, B. 60022; Sargent, F.H. 657; Shafer, J.A. 2259; 3174; 3284; 3550; Sintenis, P. 350; 351; 1529; Underwood, L.M. 404.

COMBRETACEAE

Combretum grandiflorum: Acevedo-Rdgz., P. 10841.

Combretum indicum: Acevedo-Rdgz., P. 7140; 11217; 11493; Heller, A.A. 974; Sintenis, P. 996; 5134; Stevenson, J.A. 54.

CONNARACEAE

Rourea surinamensis: Acevedo-Rdgz., P. 2135; 9340; 11684; Britton, N.L. 1692; 2705; Cede¤o, J.A. 121; Eggers, B. 1246; Heller, A.A. 956; 997; Liogier, A.H. 9696; Pfeifer 3047; Sargent, F.H. 229; Shafer, J.A. 3172; 3411; Sintenis, P. 668; 1040; 1496; 5728; 5984; Stevenson, J.A. 564; 1755.

CONVOLVULACEAE

Aniseia martinicensis: Axelrod, F. 9936; Liogier, A.H. 31343; 37389; 37405.

Argyreia nervosa: Sargent, F.H. 754.

Convolvulus nodiflorus: Acevedo-Rdgz., P. 2274; 2378; 2761; 3165; 3960; 4000; 5362; 6188; 7008; 7870; 10171; Britton, N.L. 28; 1577; 1802; Goll, G.P. 514; 570; Heller, A.A. 877; 6060; Sargent, F.H. 148; 207; Shafer, J.A. 2384; 2984; Sintenis, P. 2115; 2899; 3098.

Ipomoea alba: Acevedo-Rdgz., P. 7918; 10531; 10791; Cowell, J.F. 788; Goll, G.P. 154; Heller, A.A. 375; Sargent, F.H. 336; Sintenis, P. 446; Stevenson, J.A. 1160.

Ipomoea batatas: Goll, G.P. 590; 1062; Prey, N. 42; Stevenson, J.A. 2230; Acevedo-Rdgz., P. 3243; Stevenson, J.A. 2468.

Ipomoea calantha: Sintenis, P. 3128.

Ipomoea eggersii: Acevedo-Rdgz., P. 762; 1078; 2275; 2711; 3095; 4043; Britton, N.L. 59; 508; Eggers, B. 31; Fosberg, F.R. 60856; Ogdon, N. s.n.; Ricksecker, A.E. 367: Rose, J.N. 3192; Smith, A.C. 10589. Ipomoea eriocarpa: Stevenson, J.A. 2278

. **Ipomoea hederifolia**: Acevedo-Rdgz., P. 2347; 3031; 3082; 3101; Eggers, B. 172; Fosberg, F.R. 59368; Ricksecker, A.E. 144; Stevenson, J.A. 5112; Rose, J.N. 3214.

Ipomoea horsfalliae: Acevedo-Rdgz., P. 7837; 11451; 11675; 11752.

Ipomoea imperati: Acevedo-Rdgz., P. 7039; 9294; Britton, N.L. 199; 1544; 1716; Goll, G.P. 959; Heller, A.A. 42; Sargent, F.H. 726; Shafer, J.A. 2399; Sintenis, P. 976; Stevenson, J.A. 356.

Ipomoea indica var. **acuminata**: Acevedo-Rdgz., P. 526; 2264; 4051; 4127; 4666; 6971; 7217; 7804; 9309; 9354; 10789; 11455; Sintenis, P.442.

Ipomoea indica var. **indica**: Axelrod, F. 3467.

Ipomoea meyeri: Goll, G.P. 745; Heller, A.A. 6225; Sintenis, P. 5533.

Ipomoea nil: Acevedo-Rdgz., P. 2315; 3100; 3161; 5372; 7243; Heller, A.A. 6310; Shafer, J.A.d 1973; Sintenis, P. 2912; 3216.

Ipomoea ochracea: Acevedo-Rdgz., P. 2607; 3096; 4099; 5336; 6231; 7718; 10527.

Ipomoea pes-caprae: Acevedo-Rdgz., P. 2052; 4380; 11057; Fosberg, F.R. 52279; Goll, G.P. 3; 957; Sargent, F.H. 107; Shafer, J.A. 2400; Sintenis, P. 86; Stevenson, J.A. 1688; Underwood, L.M. 924.

Ipomoea purpurea: Heller, A.A. 1410.

Ipomoea quamoclit: Britton, N.L. 7888; Goll, G.P. 41; Underwood, L.M. 145.

Ipomoea repanda: Acevedo-Rdgz., P. 163; 620; 2400; 2559; 2563; 2839; 3123; 3128; 7117; Britton, N.L. 1516; 7122; Eggers, B. 1321; Hartley 13328; Howard, R.A. 16812; Liogier, A.H. 10438; Sargent, F.H. 113; Shafer, J.A. 3604; Sintenis, P. 289; 5330; Stevenson, J.A. 1156; Vélez, I. 1480.

Ipomoea reptans: Sargent, F.H.

Ipomoea rubra: Sintenis, P. 962; Wetmore 163.

Ipomoea setifera: Acevedo-Rdgz., P. 3094; 3764; 5433; Britton, N.L. 1392; 1506; 9428; Fisher, M.J. 7; Goll, G.P. 251; 843; Heller, A.A. 376; 6364; Sargent, F.H. 108; Sintenis, P. 963; Stevenson, J.A. 291; 698.

Ipomoea steudelii: Acevedo-Rdgz., P. 4761; 7766; 7867; 10799; Britton, N.L. 30; 1828; 4813; Heller, A.A. 6170; Liogier, A.H. 10481; Sargent, F.H. 561; Shafer, J.A. 2752; Sintenis, P. 3226; 3637; 5540; Underwood, L.M. 544; Acevedo-Rdgz., P. 7143.

Ipomoea tiliacea: Acevedo-Rdgz., P. 524; 2468; 2650; 3763; 6207; 9306; 9332; 11230; Britton, N.L. 127; 1505; 1608; 5529; Heller, A.A. 971; 6341; Johnston, J.R. 873; Prey, N. 91; Shafer, J.A. 2449; Stevenson, J.A. 67; 292; Underwood, L.M. 127.

Ipomoea tricolor: Acevedo-Rdgz., P. 3119.

Ipomoea triloba: Acevedo-Rdgz., P. 2056; 2314; 3079; 3099; 4200; 5399; 7218; Axelrod, F. 10827; Britton, N.L. 1663; 4975; 6060; Goll, G.P. 797; 800; Heller, A.A. 494; 6222; Prey, N. 51; H. Shafer, J.A. 2851; 3042; Sintenis, P. 827; 3215; 3454; Stevenson, J.A. 2482.

Ipomoea violacea: Acevedo-Rdgz., P. 2451; 4007; 4304; 6972; 9458; Britton, N.L. 5043; Fosberg, F.R. 52281; Liogier, A.H. 10799; Sargent, F.H. 3226; Sintenis, P. 1873.

Ipomoea wrightii: Sintenis, P. 3619. Jacquemontia cayensis: Acevedo-Rdgz., P. 7874; 10975; 11560; 11564; Liogier, A.H. 10794.

Jacquemontia cumanensis: Acevedo-Rdgz., P. 3964; 3971; 3973; 4237; 7882; 11423; Axelrod, F. 9562; Britton, N.L. 1894; 1934; Liogier, A.H. 10605; 35705; Sargent, F.H. 141; Shafer, J.A. 2918; Woodbury, R.O. 236.

Jacquemontia havanensis: Acevedo-Rdgz., P. 2348; 4077; 4177; 4392; 5294; 7007; 7142; 7220; 7763; 7770; 7896; 10797; 10965; 11011; 11026; 11077; Axelrod, F. 9448; Britton, N.L. 217; 4696; 4988; Heller, A.A. 6425; Johnston, J.R. 737; Liogier, A.H. 10638; 1565; Sargent, F.H. 167; Shafer, J.A. 2815; Sintenis, P. 3453; Stevenson, J.A. 1244.

Jacquemontia pentanthos: Acevedo-Rdgz., P. 687; 862; 1037; 2014; 2306; 4024; 4037; 4100; 4102; 4410; 5365; 6974; 7053; 10476; 11069; 11211; 11397; 11509. Britton, E.G. 692; Britton, N.L. 13; 1570; 1965; 2820; 4072; 4823; 5024; 8073; Goll, G.P. 594; 1018; Heller, A.A. 315; 4456; Johnston, J.R. 816; Sargent, F.H. 456; Shafer, J.A. 2612; 2725; Sintenis, P. 31; 3160; Stevenson, J.A. 2455.

Jacquemontia solanifolia: Acevedo-Rdgz., P. 2663; 3989; 5414; 6999; 9303; 9366; 10804; Axelrod, F. 9437; 9456; Britton, N.L. 1943; 9524; Shafer, J.A. 2687; Sintenis, P. 5681.

Jacquemontia tamnifolia: Acevedo-Rdgz., P. 7024; Axelrod, F. 10844; Britton, N.L. 4011; Goll, G.P. 176; Heller, A.A. 4400; 6437; Howard, R.A. 17306; Sintenis, P. 692; Stevenson, J.A. 271; 529.

Merremia aegyptia: Acevedo-Rdgz., P. 527; 3080; 5360; 7216; Axelrod, F. 10485.

Merremia cissoides: Acevedo-Rdgz., P. 9348; Liogier, A.H. 31319.

Merremia dissecta: Acevedo-Rdgz., P. 691; 1987; 5413; 7006; 7012; 11373; 11461; Cowles, H.T. 205; Webster, G.L. 8984.

Merremia quinquefolia: Acevedo-Rdgz., P. 690; 2296; 3081; 3895; 5342; 7019; Garcia, J. Goll, G.P. 520; Liogier, A.H. 10808.

Merremia tuberosa: Acevedo-Rdgz., P. 5352; Liogier, A.H. 31166.

Merremia umbellata: Acevedo-Rdgz., P. 2467; 2472; 4019; 4103; 5402; 6991; Britton, N.L. 10050; Goll, G.P. 499; Sargent, F.H. 90; Shafer, J.A. 2884; Sintenis, P. 829; Stevenson, J.A. 1148.

Poranopsis paniculata: Acevedo-Rdgz., P. 9293; Goll, G.P. 525; Liogier, A.H. 30239; Stevenson, J.A. 6924.

Stictocardia tiliifolia: Acevedo-Rdgz., P. 2898; 3120; 4008; Axelrod, F. 10071; Shafer, J.A. 2583; Sintenis, P. 86; Stevenson, J.A. 3501; 5886.

Turbina corymbosa: Acevedo-Rdgz., P. 5239; 7241; 9391; 10774; Britton, N.L. 6013; Sargent, F.H. 109; Sintenis, P. 5800.

Xenostegia tridentata: Acevedo-Rdgz., P. 9478; Britton, N.L. 1498; 5782; Heller, A.A. 1276; 6440; Sintenis, P. 6738; Stevenson, J.A. 1315; 1701; Strong, M.T. 417; Underwood, L.M. 982.

CUCURBITACEAE

Cayaponia americana: Acevedo-Rdgz., P. 702; 1850; 2065; 2625; 2735; 3856; 7853; 10792; 10860; 10896; 11320; Axelrod, F. 5064; Britton, N.L. 128; 923; 1240; 4146; 7800; Heller, A.A. 4663; Liogier, A.H. 10468; 28920; Sargent, F.H. 615; Shafer, J.A. 2640; Sintenis, P. 1441; 2398; 5015; 5236; Stevenson, J.A. 5209; Wilson, P. 265.

Cayaponia racemosa: Acevedo-Rdgz., P. 9355; 10805; 11444; Axelrod, F. 4441; 6087; Britton, N.L. 1784; Stevenson, J.A. 772.

Citrullus lanatus: Acevedo-Rdgz., P. 9347.

Coccinia grandiflora: Acevedo-Rdgz., P. 11460.

Cucumis anguria: Acevedo-Rdgz., P. 4023; 5234; Axelrod, F. 5939; 9695; Britton, N.L. 1265; Eggers, B. 627; Goll, G.P. 646; Liogier, A.H. 29440; Shafer, J.A. 2663; Sintenis, P. 601; Stevenson, J.A. 3258; Underwood, L.M. 575.

Cucumis dipsaceus: Acevedo-Rdgz., P. 8519; 11073; Axelrod, F. 10474. **Cucumis melo**: Acevedo-Rdgz., P. 10460; Axelrod, F. 8452; Stevenson, J.A. 5310; Taylor, C.M. 8560.

Doyerea emetocathartica: Acevedo-Rdgz., P. 1944; 4044; 4226; 11276; Axelrod, F. 8750; Britton, N.L. 226.

Fevillea cordifolia: Acevedo-Rdgz., P. 2218; 4724; 9419; Axelrod, F. 4276; Britton, N.L. 329; Sintenis, P. 986; 6604.

Lagenaria siceraria: Acevedo-Rdgz., P. 11421; Britton, N.L. 10101; Goll, G.P. 454; 974; Sintenis, P. 1922.

Luffa aegyptiaca: Acevedo-Rdgz., P. 4066; 7231; Goll, G.P. 829; Heller, A.A. 370; Sintenis, P. 716; 3174; Stevenson, J.A. 342.

Melothria pendula: Acevedo-Rdgz., P. 2413; 5430; Britton, N.L. 1668; 2062; Goll, G.P. 180; 327; 328; 351; 608; 873; 874; Kuntze, C.E.O. 376; Sintenis, P. 897; Stevenson, J.A. 1797; Underwood, L.M. 35; 207; 349.

Momordica charantia: Acevedo-Rdgz., P. 2678; 2734; 4671; Britton, N.L. 16; Goll, G.P. 60; 310; Heller, A.A. 153; 4458; Sargent, F.H. 123; Shafer, J.A. 2520; Sintenis, P. 726; 919; Stevenson, J.A. 97.

Psiguria pedata: Acevedo-Rdgz., P. 203; 7781; 10593; 10702; 11659; Goll, G.P. 627; 762; Sintenis, P. 2131; Sintenis, P. 2371. Sechium edule: Acevedo-Rdgz., P. 10528; Axelrod, F. 4738. **Sicana odorifera**: Acevedo-Rdgz., P. 12137; Sintenis, P. 5208; Stevenson, J.A. 6664.

CUSCUTACEAE

Cuscuta americana: Acevedo-Rdgz., P. 775; 1840; 2453; 2466; 2569; 2751; 3774; 4048; 4190; 7071; 11045; 11068.

DILLENIACEAE

Pinzona coriacea: Acevedo-Rdgz., P. 10821; 10863; Sintenis, P. 1442; 2629; 6173.

ERICACEAE

Gonocalyx concolor: Axelrod, F. 6643.

Gonocalyx portoricensis: Axelrod, F. 6735; Luteyn, J. 5116; Sargent, F.H. 283; Shafer, J.A. 3641; Webster, G.L. 8697.

Vaccinium racemosum: Acevedo-Rdgz., P. 3758; 7096; 7928; 10875; McKee, H.S. 10640; Sargent, F.H. 533; Shafer, J.A. 3343; 3649.

EUPHORBIACEAE

Dalechampia scandens: Acevedo-Rdgz., P. 600; 660; 1048; 1882; 2325; Axelrod, F. 6231; Sintenis, P. 626; 3579; Stevenson, J.A. 2158.

Tragia volubilis: Acevedo-Rdgz., P. 703; Britton, N.L. 36; 337; Goll, G.P. 539; 631; 1024; Heller, A.A. 340; Millspaugh 696; Sargent, F.H. A75; Sintenis, P. 722; Stevenson, J.A. 991; 1974; Underwood, L.M. 393; 728.

FABACEAE

Abrus praecatorius: Acevedo-Rdgz., P. 10486; 710; 2370; Britton, N.L. 150; Goll, G.P. 241; 521; 951; Heller, A.A. 603; Sargent, F.H. 634; Shafer, J.A. 2340; Sintenis, P. 8; Stevenson, J.A. 508; Underwood, L.M. 405; 967; Wetmore 234.

Acacia retusa: Acevedo-Rdgz., P. 2624; 3791; 4055; 5050; 5185; 11216; Britton, N.L. 15; 9776; Heller, A.A. 476; 6191; Shafer, J.A. 2344; Sintenis, P. 45; 1951; 2994; 5216; 5622; Stevenson, J.A. 2237; Underwood, L.M. 568; 665.

Acacia vogeliana: Acevedo-Rdgz., P. 1; 3; 3242; 3794; 5047.

Barbieria pinnata: Acevedo-Rdgz., P. 7074; Goll, G.P. 937; Sintenis, P. 151; 5710; 5942; Stevenson, J.A. 248.

Caesalpinia bonduc: Acevedo-Rdgz., P. 807; 2570; 3932; 4021; 11475; Britton, N.L. 209; 287; 1900; 4699; 8326; 9007;Fosberg, F.R. 52287; Underwood, L.M. 701; Prey, N. s.n.; Ricksecker, A.E. 331; Sargent, F.H. 569; Shafer, J.A. 1587; 2730; Stevenson, J.A. 355; 2946.

Caesalpinia ciliata: Acevedo-Rdgz., P. 4134; 4227; 4290; 11522; Britton, N.L. et al. 116; 1678; Britton, N.L. 5047; Fosberg, F.R. 54063; Rose, J.N. et al. 3224; Shafer, J.A. 2819

Caesalpinia decapetala: Acevedo-Rdgz., P. 7069; Axelrod, F. 6012; 6013; Liogier, A.H. 31396; Sargent, F.H. 560; 3284; Sintenis, P. 203.

Calopogonium caeruleum: Acevedo-Rdgz., P. 9461; Axelrod, F. 4255; Britton, N.L. 2822; Liogier, A.H. 10540; Stevenson, J.A. 6847.

Calopogonium mucunoides: Acevedo-Rdgz., P. 7805; Britton, N.L. 400; 1007; Heller, A.A. 440; 4575; Stevenson, J.A. 308; Telford 6.

Canavalia ensiformis: Tracy 308.

Canavalia nitida: Britton, N.L. 4151; Prey, N. s.n.; Shafer, J.A. 2823; Sintenis, P. 452.

Canavalia rosea: Acevedo-Rdgz., P. 776; 2018; 2911; 4320; 5301; 6975.

Centrosema plumieri: Acevedo-Rdgz., P. 10168; 10786.

Centrosema pubescens: Acevedo-Rdgz., P. 256; 1054; 6985; 9452; Axelrod, F. 10817; Britton, N.L. 2823; 6735; 7317; Heller, A.A. 210; 6084; Sargent, F.H. 122; Sintenis, P. 3080; 5588; Wetmore 175.

Centrosema virginianum: Acevedo-Rdgz., P. 715; 823; 1929; 2318; 3896; 4409; 5426; 6959; 7851; 7881; 9414; 11227; 11383; Britton, N.L. 7; 262; 8125; Fisher, M.J. 8; Goll, G.P. 8; 144; 377; 526; Heller, A.A. 926; 6415; McKee 10603; Sargent, F.H. 355; Shafer, J.A. 2345; Sintenis, P. 2306; 3573; Stevenson, J.A. 17; 30; 729; 2198.

Clitoria falcata: Acevedo-Rdgz., P. 10564; Axelrod, F. 5631; Britton, N.L. 1468; 1621; Eggers, B. 1351; Goll, G.P. 299; 373; Liogier, A.H. 10248; 10689; Sintenis, P. 74; 5737; Stevenson, J.A. 463.

Clitoria ternata: Acevedo-Rdgz., P. 2623; 5236; 5392; 11489;Axelrod, F. 6378; Britton, N.L. 4875; Goll, G.P. 47; 502; Heller, A.A. 6224; Hioram, B. s.n.; Sargent, F.H. 272; Shafer, J.A. 2358; Sintenis, P. 825; 1639; Stevenson, J.A. 1835; 2244.

Dalbergia ecastaphyllum: Acevedo-Rdgz., P. 805; 2039; 2041; 9310; 6996; Axelrod, F. 5012; 9511; 10902; Britton, N.L. 1712; 6824; Cowles, H.T. 219; Heller, A.A. 331; 4506;

Sargent, F.H. 3006; Shafer, J.A. 2605; Sintenis, P. 131; 4862; Stevenson, J.A. 1705; 2132; Underwood, L.M. 657; 699; 700; Woodbury, R.O. s.n.

Dalbergia monetaria: Acevedo-Rdgz., P. 4715; 7174; 7700; 9329; 11384; Britton, N.L. 1528; 2130; 2422; 8094; Gregory 175; Heller, A.A. 208; 979; Little, E.L. 16423; Sargent, F.H. 635; 667; Shafer, J.A. 3377; 3381; 3468; Sintenis, P. 328; 1421; 3898; 4498; 5265; 6293; Stevenson, J.A. 1282.

Desmodium axillare: Acevedo-Rdgz., P. 194; 233; 7737; 7793; 10586; 11439.

Desmodium incanum: Acevedo-Rdgz., P. 864; 2291; 2518; 2785; 4159; 9417; 10492; 10587; 10925.

Desmodium intortum: Acevedo-Rdgz., P. 3761; 9430; 11447.

Dioclea reflexa: Axelrod, F. 10825; Britton, N.L. 1677; 7815; Sintenis, P. 5040; 5311.

Entada polyphylla: Sintenis, P. 1240.

Galactia dubia: Acevedo-Rdgz., P. 808; 824; 1035; 1047; 2331; 3114; 4429; 5351; 7862; 7864; 10798; 10990; 11220; Axelrod, F. 6964; Britton, N.L. 146a; 207; Liogier, A.H. 10626.

Galactia eggersii: Acevedo-Rdgz., P. 2483; 4138.

Galactia longifolia: Axelrod, F. 9753; Liogier, A, 37048.

Galactia striata: Acevedo-Rdgz., P. 716; 1032; 1851; 3816; 5188; 7225; 7871; 9415; 10474; 10802; 10894; 11471; Britton, N.L. 29; 235; 1794; Goll, G.P. 497; 706; 725; 900; 953; Heller, A.A. 6114; Liogier, A.H. 29965; McKee 10622; Shafer, J.A. 2573; 2859; Sintenis, P. 1994; 2050; 2927; Stevenson, J.A. 2168.

Lablab purpureus: Acevedo-Rdgz., P. 2123; 2899; 2908; 3030; 4714; 5350; 7085; 10625; 11258; 11261; 11464; Axelrod, F. 9506; 10855; Goll, G.P. 796; 995; Heller, A.A. 36; Shafer, J.A. 2480; Sintenis, P. 5810; Stevenson, J.A. 6125.

Machaerium lunatum: Acevedo-Rdgz., P. 2829; Axelrod, F. 9509.

Macroptilium atropurpureum: Acevedo-Rdgz., P. 9312; 11226; Axelrod, F. 10476.

Macroptilium lathyroides: Acevedo-Rdgz., P. 367; 860; 1854; 2117; 2757; 3879; 5187; 5393; 10715; 11362; 11498; Britton, N.L. 8786; Goll, G.P. 10; 149; Heller, A.A. 30; Liogier, A.H. 9966; Sargent, F.H. 91; Shafer, J.A. 2379; 2672; Sintenis, P. 376; Stevenson, J.A. 59; Underwood, L.M. 134; 164.

Mimosa casta: Acevedo-Rdgz., P. 10; 11; 6203; 10830.

Mimosa ceratonia: Acevedo-Rdgz., P. 5152; 10512; Britton, N.L. 897; 1645; Goll, G.P. 406; Heller, A.A. 220; 6388; Shafer, J.A. 2717; Sintenis, P. 5050; Stevenson, J.A. 251; Underwood, L.M. 663.

Mimosa diplotricha: Acevedo-Rdgz., P. 7045.

Mimosa quadrivalvis: Sintenis 3162; 3199; Stahl. A., s.n.

Mucuna pruriens: Acevedo-Rdgz., P. 7123; 10627; 10795; Axelrod, F. 11009; Goll, G.P. 698; 719; 721; Heller, A.A. 4403; Liogier, A.H. 31882; Sargent, F.H. 609; 643; Sintenis, P. 148; 3107; Stevenson, J.A. 2115; 2170; 2174.

Mucuna sloanei: Acevedo-Rdgz., P. 11385; Caminero, G. 306; Eggers, B. 1317; García, R. 3248; Prey, N. s.n.; Sintenis, P. 5748; 5941.

Mucuna urens: Acevedo-Rdgz., P. 269; 7799; 9405; 10200; Axelrod, F. 9325; Sintenis, P. 4785; 5041.

Neorudolphia volubilis: Acevedo-Rdgz., P. 2984; Britton, N.L. 1059; 2010; Eggers, B. 1291; Shafer, J.A. 3227; Sintenis, P. 369; 1657; Stevenson, J.A. 240; Underwood, L.M. 91.

Pachyrhizus erosus: Acevedo-Rdgz., P. 5225; 7228; Goll, G.P. 155; Sintenis, P. 5581; Stevenson, J.A. 2272.

Phaseolus lunatus: Acevedo-Rdgz., P. 3741; Britton, N.L. 2068; Goll, G.P. 587; 673; 705; Liogier, A.H. 10810; Sintenis, P. 3110; 5778; Stevenson, J.A. 1979.

Pueraria phaseoloides: Acevedo-Rdgz., P. 2411; 3740; 5432; 6966; Axelrod, F. 5819; 9472; Hermann, F.A. s.n.; Liogier, A.H. 10539; 10574.

Rhynchosia minima: Acevedo-Rdgz., P. 1957; 2337; 3921; 5374; 5398; 7222; 7776; 11274; Britton, N.L. 1857; Goll, G.P. 574; 733; Heller, A.A. 32; 4571; 6288; Johnston, J.R. 1157; Sargent, F.H. 587; Shafer, J.A. 2484; Sintenis, P. 117; 3140; 3888; 5493; Stevenson, J.A. 1157; 1351; Underwood, L.M. 212; 712.

Rhynchosia phaseoloides: Acevedo-Rdgz., P. 173; 220; 9365; 10202; Britton, N.L. 2138; Sintenis, P. 2837; 4491; 5858; 5923; 6623.

Rhynchosia reticulata: Acevedo-Rdgz., P. 282; 880; 883; 2118; 2304; 2879; 3227; 3889; 4426; 5199; 7202; 10193; 10480; 11323; Britton, N.L. 229; 1605; Cowell, J.F. 754; Fosberg, F.R. 57539; Goll, G.P. 234; 246; 569; 585; 637; 691; 722; Heller, A.A. 28; 4418; Johnston, J.R. 1316; McKee 10646; Millspaugh 252; Sargent, F.H. 494; Shafer, J.A. 2363; Sintenis, P. 375; 3724; Stevenson, J.A. 1316; Telford 4; Underwood, L.M. 454; 619.

Senna bicapsularis: Acevedo-Rdgz., P. 705; 841; 2369; 2591; 3917; 4032; Axelrod, F. 9507.

Senna nitida: Acevedo-Rdgz., P. 2224; 7189; 10530; 11207.

Teramnus labialis: Acevedo-Rdgz., P. 621; 648; 1956; 2367; 5397; 6986; 11203; Britton, N.L. 1601; 1760; 6504; Liogier, A.H. 30403; McKee 10629; Sargent, F.H. 503; Shafer, J.A. 2446.

Teramnus uncinatus: Acevedo-Rdgz., P. 3749; 7055; 7806; Cowell, J.F. 5490; Goll, G.P. 636; Heller, A.A. 6255; Liogier, A.H. 10421; Sargent, F.H. 3218; Sintenis, P. 110; 2046; 2961; 5914; Stevenson, J.A. 5041; Telford 5.

Vigna adenantha: Acevedo-Rdgz., P.9346; 9388; 10167; 10772; 10807; Axelrod, F. 6052; Britton, N.L. 1406; 1607; 2367; Heller, A.A. 1221; Sintenis, P. 5627; Stevenson, J. A. 288.

Vigna antillana: Acevedo-Rdgz., P. 3134; 3796; 3868.

Vigna hosei: Acevedo-Rdgz., P. 7932; 9456; 10521; 10525; 10677.

Vigna longifolia: Britton, N.L. 6751.

Vigna luteola: Acevedo-Rdgz., P. 2994; 4005; 5179; 7089; 7915; 9389; 10773; 11240; Britton, N.L. 208; 1594; 5511; Goll, G.P. 16; 954; Heller, A.A. 240; 4682; Shafer, J.A. 2729; Sintenis, P. 170; 3947; 6715; Stevenson, J.A. 5474; Underwood, L.M. 5; Webster, G.L. 8621.

Vigna peduncularis: Acevedo-Rdgz., P. 310; 10567; 10723; 10778; 11640. Vigna unguiculata: Acevedo-Rdgz., P. 9411; 10859; Britton, N.L. 1464; Goll, G.P. 1061; Sintenis, P. 2910; Stevenson, J.A. 2176.

Vigna vexillata: Acevedo-Rdgz., P. 10166; 10794; 11375; Axelrod, F. 10478; Goll, G.P. 338; Sargent, F.H. 563; Sintenis, P. 1095; Stevenson, J.A. 5803.

LAURACEAE

Cassytha filiformis: Acevedo-Rdgz., P. 4372; 5299; 6169; 9301; Britton, N.L. 1896; Fosberg, F.R. 52288; Heller, A.A. 330; Little, E.L. 21671; Shafer, J.A. 2892; 2920; Sintenis, P. 625; 3325; 5675; Stevenson, J.A. 1723; Underwood, L.M. 931.

MALPIGHACEAE

Heteropterys laurifolia: Acevedo-Rdgz., P. 3072; 5231; 5232; 7080; 7157; 7230; 10197; 10840; Axelrod, F. 10757; 10904; Britton, N.L. 426; 1510; Hartley 13368; Heller, A.A. 1320; 4406; Proctor, G.R. 44917; Sargent, F.H. 421; Sintenis, P. 101; 1559; 1693; 3286; 3809; 5068; Stevenson, J.A. 2187; Underwood, L.M. 481; 618.

Heteropterys purpurea: Acevedo-Rdgz., P. 664; 872; 1033; 2658; 5391; 7009; 7897; 10194; 11472; Britton, N.L. 54; 1272; 1479; 1509; Goll, G.P. 542; Heller, A.A. 478; Sargent, F.H. 5; Shafer, J.A. 2551; Stevenson, J.A. 988; 1385; Underwood, L.M. 477.

Heteropterys wydleriana: Acevedo-Rdgz., P. 2211; 4723; 4793; 7193; 7708; 7794; Breckon, G. 4219; Britton, N.L. 4201; Sintenis, P. 192.

Stigmaphyllon bannisterioides: Acevedo-Rdgz., P. 9345.

Stigmaphyllon emarginatum: Acevedo-Rdgz., P. 591; 790; 992; 2017; 2897; 3965; 4042; 4355; 5206; 5366; 5439; 7081; 9307; 10536; 11218; 11228; 11430; 11473.

Stigmaphyllon floribumdum: Acevedo-Rdgz., P. 10796; 308; 1062; 2854; 2855; 3742; 6994; 7013; 7195; 7239; 7765; 10196; 10205.

Stigmaphyllon puberum: Acevedo-Rdgz., P. 7072.

Tetrapterys inaequalis Acevedo-Rdgz., P. 10182; 11676.

MARCGRAVIACEAE

Marcgravia rectiflora: Acevedo-Rdgz., P. 91; 581; 2198; 3736; 7145; 7151; 9404; 9457; Britton, N.L. 470; 2216; Heller, A.A. 359; Sintenis, P. 269; 1592; 4461; 5057; Stevenson, J.A. 5249; Underwood, L.M. 57; 823; 835.

Marcgravia sintenisii: Acevedo-Rdgz., P. 2958; 7114; Britton, N.L. 2169; Howard, R.A. 16813; Liogier, A.H. 10028; Nieves 1573; Shafer, J.A. 3310; 3645; Sintenis, P. 2222; 4320; Webster, G.L. 8710.

MENISPERMACEAE

Cissampelos pareira: Acevedo-Rdgz., P. 826; 1868; 2219; 2439; 3126; 5343; 7090; 11312; Axelrod, F. 6003; Britton, N.L. 126; 667; Heller, A.A. 332; 1283; Otero, J. 564; Sargent, F.H. 223; Shafer, J.A. 2482; 3255; Sintenis, P. 326; 5186; 5354; Stevenson, J.A. 259; 435; 1971; Underwood, L.M. 305; 321; 350; 357; Wilson, P. 282.

Hyperbaena domingensis: Acevedo-Rdgz., P. 3173; 5084; 7030; 11698; Liogier, A.H. 10117; 10324; Shafer, J.A. 3238; Sintenis, P. 4220.

Hyperbaena laurifolia: Acevedo-Rdgz., P. 6998.

MORACEAE

Ficus citrifolia: Acevedo-Rdgz., P. 10635.

Ficus pumila: Acevedo-Rdgz., P. 9336; 9459.

NYCTAGINACEAE

Boerhavia scandens: Acevedo-Rdgz., P. 2520; 3105; 4764; 7892; 10801; 11291; 11499; 11532.

Bougainvillea glabra: Acevedo-Rdgz., P. 11237.

Bougainvillea spectabilis: Sintenis, P. 698; Stevenson, J.A. 322.

Pisonia aculeata: Acevedo-Rdgz., P. 548; 4209; 4737; 7221; 10651; 11480; Liogier, A.H. 35979; Shafer, J.A. 2572; Sintenis, P. 672; Underwood, L.M. 561.

OLEACEAE

Jasminum azoricum: Britton, N.L. 5818.

Jasminum fluminense: Acevedo-Rdgz., P. 2892; 3839; 6978; 7084; 7872; 11245; 11479.

Jasminum grandiflorum: Acevedo-Rdgz., P. 10532; Prey, N. 47.

Jasminum multiflorum: Acevedo-Rdgz., P. 1892; 3854; 4672; 10710; Britton, N.L. 1503; Croat, T.B. 60924; Goll, G.P. 189; 360; 759; Heller, A.A. 383; Sargent, F.H. 327; Shafer, J.A. 3012; Sintenis, P. 171; 5422.

Jasminum sambac: Stevenson, J.A. 255.

PASSIFLORACAE

Passiflora bilobata: Acevedo-Rdgz., P. 7681; 7755; 7762; 11422.

Passiflora edulis: Acevedo-Rdgz., P. 834; 5164; Liogier, A.H. 10258; Stevenson, J.A. 6420.

Passiflora foetida: Acevedo-Rdgz., P. 772; 1948; 5186; 5333; 11229; Axelrod, F. 5050; Boom, B. 8008; Britton, N.L. 2244; Goll, G.P. 393; Heller, A.A. 978; 1029; 6119; Johnston, J.R. 225; Liogier, A.H. 9805; Sargent, F.H. 193; 573; Sintenis, P. 810; Underwood, L.M. 113; 346.

Passiflora laurifolia: Acevedo-Rdgz., P. 927; 929; 1924; 2856; 5104; 5169; 5355; 11478; Sintenis, P. 1890.

Passiflora maliformis: Sintenis, P. 1166; 6560.

Passiflora multiflora: Acevedo-Rdgz., P. 2484; 3857; 4002; 11650; 11704; Britton, N.L. 1426; 6787; 7118; Sintenis, P. 687; 6654; Stevenson, J.A. 1248.

Passiflora murucuja: Acevedo-Rdgz., P. 7032; 10817; Stevens, F.L. 1818.

Passiflora quadrangularis: Acevedo-Rdgz., P. 10558; Sargent, F.H. 595; Shafer, J.A. 3483; Sintenis, P. 1022; Stevenson, J.A. 6715; Underwood, L.M. 778.

Passiflora rubra: Acevedo-Rdgz., P. 103; 285; 905; 2438; 4052; 9375; Axelrod, F. 5246; 5812; Britton, N.L. 824; Goll, G.P. 250; 303; 374; Heller, A.A. Shafer, J.A. 2987; Sintenis, P. 341; 2804; 6017; Stevenson, J.A. 153; Underwood, L.M. 362.

Passiflora serrato-digitata: Axelrod, F. 5749; Eggers, B. 1372; Sintenis, P. 5426; Stevenson, J.A. 5210.

Passiflora sexflora: Acevedo-Rdgz., P. 2679; 3752; 7847; 9320; 9446; 10761; 10869; Axelrod, F. 5338; 6137; Britton, N.L. 450; 1398; 2019; 2607; 2756; Cowles, H.T. 141; Goll, G.P. 440; Heller, A.A. 4475; Howard, R.A. 16942; Sargent, F.H. 322; 599; Wetmore 209.

Passiflora suberosa: Acevedo-Rdgz., P. 614; 630; 639; 898; 2063; 2330; 2434; 3006; 3133; 4075; 4302; 5196; 6958; 10498; 11374; 11474; 11510; Britton, N.L. 38; 5030; Fosberg, F.R. 57550; Goll, G.P. 185; 311; 331; 409; 634; Heller, A.A. 6068; Prey, N. 80; Sargent, F.H. 3208; Shafer, J.A. 2506; 2788; Sintenis, P. 644; 811; 1687; 3488; 5114; Stevenson, J.A. 1856; Underwood, L.M. 472; 601.

Passiflora tulae: Acevedo-Rdgz., P. 3751; 10537; 11456; Britton, N.L. 937; 2588; 5539; Liogier, A.H. 28444; Sintenis, P. 4176; 5278.

PHYTOLACCACEAE

.**Stegnosperma cubense**: Britton, N.L. 9628.

Trichostigma octandrum: Acevedo-Rdgz., P. 628; 4347; 4731; 5354; 5447; 11350; Britton, N.L. 113; 1705; 2241; Cowell, J.F. 758; Heller, A.A. 1165; Sargent, F.H. 205; Shafer, J.A. 2835; Sintenis, P. 921; 1016; 3931; Stevenson, J.A. 1885; 2500

PIPERACEAE

Peperomia rotundifloia: Eggers, B. 1153; Sargent, F.H. 411; 3294; Sintenis, P. 469; 1669.

PLUMBAGINACEAE

Plumbago scandens: Acevedo-Rdgz., P. 627; 1893; 2462; 5341.

POLYGALACEAE

Securidaca diversifolia: Ricksecker, A.E. 338.

Securidaca virgata: Acevedo-Rdgz., P. 3747; 6954; 7127; 9453; Britton, N.L. 983; 4478; 5809; Cowell, J.F. 582; Eggers, B. Goll, G.P. 410; 586; 1055; Heller, A.A. 4385; Holdridge, L. 215; Sargent, F.H. 250; Shafer, J.A. 2380; Sintenis, P. 46; 1065; 5291; 6658; Stevenson, J.A. 102; Underwood, L.M. 77; Webster, G.L. 8844.

POLYGONACEAE

Antigonon leptopus: Acevedo-Rdgz., P. 1811; 5267; 11265; 11468; Goll, G.P. 75; 648; Sargent, F.H. s.n.; Shafer, J.A. 2706; Sintenis, P. 953; Stevenson, J.A. 530.

RANUNCULACEAE

Clematis dioica: Sintenis, P. 5843.

Clematis flammulastrum: Acevedo-Rdgz., P. 7224; 10221; Britton, N.L. 1762; Heller, A.A. 6156; Sintenis, P. 43; Stevenson, J.A. 1074; 1158.

Clematis polygama: Acevedo-Rdgz., P. 7234; Axelrod, F. 8473; Sintenis, P. 2255; 2949; 6207.

RHAMNACEAE

Gouania lupuloides: Acevedo-Rdgz., P. 2295; 3812; 7011; 7087; Goll, G.P. 230; 386; 582; Heller, A.A. 6104; Liogier, A.H. 10346; Shafer, J.A. 2356; 2860; Sintenis, P. 200; 1261; 1960; 2924; 5508; 5550; Stevenson, J.A. 385; 697.

Gouania polygama: Acevedo-Rdgz., P. 7139; 7811; Sargent, F.H. s.n.; 351; Sintenis, P. 36; 3566; 5577.

ROSACEAE

Rubus florulentus: Britton, N.L. 4550; Sargent, F.H. 639; 3039; Sintenis, P. 4100; 4669.

RUBIACEAE

Chiococca alba: Acevedo-Rdgz., P. 162; 708; 1914; 2199; 2432; 2592; 3129; 3821; 5077; 5173; 7020; 7033; 7075; 7194; 7209; 9491; 10500; 11338; Axelrod, F. 4754; Britton, N.L. 1063; Fosberg, F.R. 44165; 51352; Holdridge, L. 232; Liogier, A.H. 9895; Sargent, F.H. 702; Shafer, J.A. 2945; 3792; Sintenis, P. 1; 278; 774; 1948; 2393; 2483; 3421; 6199; 6550; Stevenson, J.A. 269; 1798; Underwood, L.M. 157; 907; Webster, G.L. 8869.

Diodia sarmentosa: Acevedo-Rdgz., P. 7126; 7926; 11393; Britton, N.L. 1393; 1517; 2350; Heller, A.A. 272; 4387; Howard, R.A. 17023; Liogier, A.H. 29765; Proctor, G.R. 44551; Sargent, F.H. 260; Sintenis, P. 5052; Stevenson, J.A. 1855; Underwood, L.M. 971.

Hillia parasitica: Acevedo-Rdgz., P. 4657; 7112; 7931; Britton, N.L. 924; 2020; 2203; 2591; 5525; 6541; Fosberg, F.R. 51339; Pfeifer 2485; Shafer, J.A. 3443; Sintenis, P. 525; Wagner 1752.

Lasianthus lanceolatus: Acevedo-Rdgz., P. 6964; 7827; 7834.

Psychotria microdon: Acevedo-Rdgz., P. 586; 2395; 2690; 2876; 6171; 10472; 10932; Britton, N.L. 1507; 6152; Heller, A.A. 6102; Liogier, A.H. 9679; 10218; 10302; 31514; Little, E.L. 21672; Shafer, J.A. 2335; 2529; Sintenis, P. 5229.

Sabicea villosa: Sintenis, P. 263; Wilson, P. 232.

Schradera exotica: Acevedo-Rdgz., P. 223; 9436; Boom, B. 9794; Britton, N.L. 2276; Liogier, A.H. 10050; Shafer, J.A. 3242; Sintenis, P. 1238; 1429.

SAPINDACEAE

Cardiospermum corindum: Acevedo-Rdgz., P. 1087; 1844; 2345; 2373; 4154; 4345; 11085; Britton, N.L. 1586; Liogier, A.H. 35326; Shafer, J.A. 3017.

Cardiospermum grandiflorum: Acevedo-Rdgz., P. 10843.

Cardiospermum halicacabum: Acevedo-Rdgz., P. 523; 961; 966; 967; 968; 969; 1088; 2429; 2474; 2501; 5235; 9463; 11490; Britton, N.L. 1882; Goll, G.P. 1004; Liogier, A.H. 10637; Prey, N. 24; Sargent, F.H. 530; Sintenis, P. 1725; Stevenson, J.A. 5261.

Paullinia fuscescens: Acevedo-Rdgz., P. 5356; 10845; 11459.

Paullinia pinnata: Acevedo-Rdgz., P. 304; 1090; 3073; 6230; 6957; 6961; 7125; 9451; 11442; Boom, B. 7997; Britton, N.L. 1525; Eggers, B. 716; Goll, G.P. 369; Heller, A.A. 1223; Sargent, F.H. 431; Shafer, J.A. 2905; 3404; Sintenis, P. 188; 1532; Underwood, L.M. 354; 469; 993.

Paullinia plumierii: Shafer 1158.

Serjania lucida: Acevedo-Rdgz., P. 629; 709; 1828; 2281; 2313; 3146; 3765; 4658; 5210; 5334; 5358; 7086; 9305; 11081; 11582; Heller, A.A. 56; 4661.

Serjania polyphylla: Acevedo-Rdgz., P. 719; 2200; 7015; 9392; 10195; 11204; 11212; Boom, B. 10022; Britton, N.L. 772; 1307; 4311; 4651; 4964; Goll, G.P. 692; Heller, A.A. 6063; Sintenis, P. 274; 3406; 5646; 5772.

SCHLEGELIACEAE

Schlegelia brachyantha: Acevedo-Rdgz., P. 2964; Britton, N.L. 5534; 6383; Eggers, B. 1318; Liogier, A.H. 10762; 28533; Sargent, F.H. 312; Shafer, J.A. 3446; Sintenis, P. 3075; Stevenson, J.A. 5233.

Tecomaria capensis: Acevedo-Rdgz., P. 11353; Morrow, C.F. 61; Shafer, J.A. 1474.

SOLANACEAE

Lycianthes virgata: Acevedo-Rdgz., P. 11437; 11643; Britton, N.L. 9440; Sargent, F.H. s.n.; Sintenis, P. 2091; 2620; 4235.

Solandra grandiflora: Liogier, A.H. 35677; Sintenis, P. 364.

Solanum lanceifolium: Acevedo-Rdgz., P. 906; 1857; 2417; 2848; 4112; 5108.

Solanum seaforthianum: Acevedo-Rdgz., P. 11476; Barker, E.E. 7859; Britton, N.L. 9867; Liogier, A.H. 29782; 34137; 36499; Santiago-Blay, J.A. s.n.; Stevenson, J.A. 1829; Woodbury, R.O. s.n.

TROPAEOLACEAE

Tropaeolum major: Acevedo-Rdgz., P. 10201.

ULMACEAE

Celtis iguanaea: Acevedo-Rdgz., P. 635; 2021; 2361; 2691; 3237; 3815; 5150; 6980; 7237.

VALERIANACEAE

Valeriana scandens: Acevedo-Rdgz., P. 9399; 10203; Britton, N.L. 495; 5401; Sintenis, P. 302; 4932.

VERBENACEAE

Clerodendrum aculeatum: Acevedo-Rdgz., P. 681; 1934; 1994; 2818; 3766; 4026; 5140; 5409; 6976; 11059; 11273; 11524.

Clerodendrum x speciosum: Acevedo-Rdgz., P. 9413.

Congea tomentosa: Acevedo-Rdgz., P. 7121; 9460.
Holmskioldia sanguinea: Acevedo-Rdgz., P. 10533; 10842; Fisher, M.J. 19.
Petrea volubilis: Acevedo-Rdgz., P. 4239; 11266.

VITACEAE
Cissus erosa: Acevedo-Rdgz., P. 4720; 7171; 9471; 10809; 11503; Britton, N.L. 4083; 6732; 9909; Sargent, F.H. 612; Sintenis, P. 190; 4716; 5346; Stevenson, J.A. 6351; 6723; Underwood, L.M. 85; 513.
Cissus obovata: Acevedo-Rdgz., P. 10861; 11708; Britton, N.L. 1687; Stevenson, J.A. 2621; Underwood, L.M. 550.
Cissus rotundifolia: Acevedo-Rdgz., P. 11003; 11495.
Cissus trifoliata: Acevedo-Rdgz., P. 1017; 1799; 2693; 4375; 5127; 5363; 5446; 11251; 11497; Axelrod, F. 6346; Breckon, G. 4067; Sintenis, P. 4901; Acevedo-Rdgz., P. 2015.
Cissus verticillata: Acevedo-Rdgz., P. 169; 819; 833; 2088; 2420; 2820; 3993; 4683; 5114; 5172; 7088; 10591; 10929; 11681. Vitis tiliifolia: Acevedo-Rdgz., P. 198; 2128; Axelrod, F. 5996.

ARACEAE
Anthurium scandens: Acevedo-Rdgz., P. 7113; 7132; 9339; 9395; 10661; 11880; Britton, N.L. 1031; 4138; Eggers, B. 1210; Heller, A.A. 6357; Proctor, G.R. 46929; Shafer, J.A. 3562; Sintenis, P. 1505; Stevenson, J.A. 5044; Underwood, L.M. 415.
Epipremnum pinnatum: Acevedo-Rdgz., P. 7141; 10838; 11260; Howard, R.A. 16921.
Epipremnum pinnatum "aureum": Acevedo-Rdgz., P. 9334; Birdsey, s.n.
Monstera adansonii: Acevedo-Rdgz., P. 9313.
Philodendron consanguineum: Breckon, G. 4264; Britton, N.L. 1656; 2586; 4313; Goll, G.P. 1032; Sargent, F.H. 342; Sintenis, P. 4347; Stevenson, J.A. 3494; Underwood, L.M. 753.
Philodendron giganteum: Acevedo-Rdgz., P. 4165; 10806; Britton, N.L. 1685; 4312; Sintenis, P. 757.
Philodendron hederaceum: Acevedo-Rdgz., P. 2610; 2880; 11360; Britton, N.L. 1691; 4489; 4544.
Philodendron ligulatum: Acevedo-Rdgz., P. 11875; Britton, N.L. 2139; Sargent, F.H. 559; Sintenis, P. 1746.
Philodendron ornatum: Proctor, G.R. 47073; 50206; Woodbury, R.O. s.n
Syngonium podophyllum: Acevedo-Rdgz., P. 4061; 6968; 7122; 9326; 9331; 9351.

ASPARAGACEAE
Protasparagus setaceus: Acevedo-Rdgz., P. 7067; 9349.

CYPERACEAE
Scleria canescens: Acevedo-Rdgz., P. 11449; González Más 1410. Scleria scindens: Acevedo-Rdgz., P. 2606; 2884; 5102; 7150. Scleria secans Britton, N. L. & Cowell 1402.

DIOSCORACEAE
Dioscorea alata: Acevedo-Rdgz., P. 7047; 7076; Goll, G.P. 137; 1066; Sargent, F.H. B48; Sintenis, P. 448; 4509; Stevenson, J.A. 2100; Underwood, L.M. 358.
Dioscorea bulbifera: Acevedo-Rdgz., P. 9369; 11701.
Dioscorea esculenta: Axelrod, F. 10051.
Dioscorea pilosiuscula: Acevedo-Rdgz., P. 399; 2419; 2645; Sintenis 1384b.
Dioscorea polygonoides: Acevedo-Rdgz., P. 140; 2977; 7078; 9317; 10812.
Dioscorea trifida: Sargent, F.H. 500.
Rajania cordata: Acevedo-Rdgz., P. 127; 5171; 5226; 6962; 7035; 7104; 7147; 7664; 7922; 7925; 7927; 9403; 9437; 10220; 10570; 10820; 10877; 10878; 11208; 11381; 11406; Axelrod, F. 11069; Britton, N.L. 947; 1732; Goll, G.P. 238; 1033; Liogier, A.H. 9701; 9866; Sargent, F.H. 385; 3159; Shafer, J.A. 2631; 3253; 3606; 3655; Sintenis, P. 1384a; Stevenson, J.A. 158; 3113; Underwood, L.M. 739; Webster, G.L. 8738.

ORCHIDACEAE
Vanilla barbellata: Acevedo-Rdgz., P. 4142; 10953; 11389.
Vanilla claviculata: 7205.
Vanilla dilloniana: Acevedo-Rdgz., P. 7058; 7182.
Vanilla mexicana: Axelrod, F. 5639; Eggers, B. 1322.
Vanilla planifolia: Acevedo-Rdgz., P. 4058; 7077; 9323.
Vanilla poitaei: Acevedo-Rdgz., P. 9387.

POACEAE
Arthrostylidium farctum: Acevedo-Rdgz., P. 2490; 2652; 10742; 11639; Chase, A. 6248; Cowles, H.T. 1166; Shafer, J.A. 2625; Sintenis, P. 3891.
Arthrostylidium multispicatum: Acevedo-Rdgz., P. 9422; 11441; Britton, N.L. 953; 4222; 6542; 7300; Chase, A. 6201; 6470; 6751; Sintenis, P. 209; 4106.
Arthrostylidium sarmentosum: Acevedo-Rdgz., P. 6963; 9327; Britton, N.L. 493; 2042; 2180; 4209; 5236; 5600; 6096; 7283; Chase, A. 6190; 6223; 6468; 6730; 6731; 6738; 6749; Clark, L.G. 229; Jones, G.N. 11014; Liogier, A.H. 9724; Nees, W.E. 116; Proctor, G.R. 42301; Shafer, J.A. 3490; Sintenis, P. 354; 4046; Soderstrom, T.R. 1804; 1816; 2001; 2053.
Chusquea abietifolia: Edelman, D.K. 58; 59; 60; Hess, W.E. 116; Sargent, F.H. 3062; Stevens, F.L. 4755.
Lasiacis divaricata: Acevedo-Rdgz., P. 213; 825; 1886; 2288; 2415; 2638; 2681; 3169; 3795; 5218; 5247; 6984; 7155; 10488; 10574; 10931; 11429; Barrett 9; Britton, N.L. 2623; Chase, A. 6224; 6225; 6335; 6365; 6379; 6420; 6521; 6532; 6543; 6560; 6578; 6587; 6610; 6683; 6726; 6742; 6782; 6814; Edelman, D.K. 2; Hess, W.E. 454; Otero, J. 255; Sintenis, P. 2470; Underwood, L.M. 144.
Lasciacis ligulata: Acevedo-Rdgz., P. 2688; 10822; Boom, B. 6911; Britton, N.L. 678; 4490; Chase, A. 6454; 6734; 6747; Liogier, A.H. 10418; Sintenis, P. 215; 5918; Wilson, P. 350.
Lasiacis sorghoidea: Acevedo-Rdgz., P. 3844; 3853; Britton, N.L. 6450; Chase, A. 6218; 6419; 6457; 6728; 6760; 6809; Heller, A.A. 4375; Hess, W.E. 75; Holm 74; Shafer, J.A. 2570; Sintenis, P. 2861; 3062.
Olyra latifolia: Acevedo-Rdgz., P. 5123; 5153; 5246; 7156; Axelrod, F. 5080; Chase, A. 6175; 6200; 6334; 6416; 6570; 6645; 6732; Heller, A.A. 4583; McKee 10601; Sintenis, P. 138; 2396; 4764; Soderstrom, T.R. 1802; Stimson 1229; Wetmore 172.

SMILACACEAE
Smilax coriacea: Acevedo-Rdgz., P. 3818; 7211; 9339; 11395; 11418; 11848; Axelrod, F. 11103; 11160.
Smilax domingensis: Acevedo-Rdgz., P. 183; 315; 330; 2184; 7129; 9330; 9488; 11835; Axelrod, F. 9492; Sargent, F.H. 362; Sintenis, P. 1417; Stevenson, J.A. 3458; Proctor, G.R. 45653; 46291; 48067; 50442.

ILLUSTRATION VOUCHERS

Fig. 1.
Pisonia aculeata: (A) *Acevedo-Rdgz. s.n.*
Ipomoea violacea: (B) *Acevedo-Rdgz. 4007.*
Pinzona coriacea: (C) *Acevedo-Rdgz. 10863.*
Chamissoa altissima: (D) *Acevedo-Rdgz. 4599.*
Securidaca virgata: (E) *Acevedo*-Rdgz. 9454.
Hyperbaena domingensis: (F) *Acevedo*-Rdgz. 3173.

Fig. 2.
Paullinia pinnata (A) *Acevedo-Rdgz. s.n.*
Serjania polyphylla (B) *Acevedo*-Rdgz. s.n.
Chiococca alba: (C) *Acevedo-Rdgz. 3129.*
Turbina corymbosa: (D) *Acevedo-Rdgz. 9391.*
Rhynchosia phaseoloides: (E) *Acevedo-Rdgz. 9365.*
Marcgravia rectiflora: (F) *Acevedo-Rdgz. s.n.*

Fig. 3.
Distictis lactiflora: (A) Acevedo-Rdgz. s.n.
Cydista aequinoctiale: (B) *Acevedo-Rdgz. 2810.*
Amphilophium paniculatum: (C) *Acevedo-Rdgz. 10620.*
Macfadyena unguis-cati: (D) *Acevedo-Rdgz. 3958.*
Pristimera caribaea: (E) *Acevedo-Rdgz. 7236.*
Passiflora multiflora: (F) *Acevedo-Rdgz. 11704.*

Fig. 4.
Citrullus lanatus: (A) Whiteford 4047.
Gouania lupuloides: (B) *Woodbury 17003.*
Cissus trifoliata: (C) *Acevedo-Rdgz. 5127.*
Serjania lucida: (D) *Acevedo-Rdgz. 709.*
Arrabidaea chica: (E) *Proctor 2731.*
Smilax coriacea: (F) *Britton 1376* .
Metastelma monense: (G) *Acevedo-Rdgz. et al. 4273.*
Clematis flammulastrum: (H) *Britton 1762.*

Fig. 5.
Blechnum fragile: (A-C) *Wilson 142.*
Oleandra articulata: (D-E) *Britton & Bruner 7570.*

Fig. 6.
Hypolepis nigrescens: (A) *Proctor 40629.*
Hypolepis repens: (B) *Proctor 39399.*
Hypolepis tenerrima: (C) *Proctor 40130.*
Hypolepis urbanii: (D) *Ekman H. 12842.*

Fig. 7.
Odontosoria aculeata: (A, B) *Acevedo-Rdgz. et al. 2095.* (C) *Dewolf 1889.*
Odontosoria scandens: (D, E) *Webster et al. 8767.* (F) *Sánchez & Liogier 204.*

Fig. 8.
Dicranopteris flexuosa: (A) Field sketch. (B-D) *Britton & Britton 8126.* (E) *Proctor 39416.*
Dicranopteris pectinata: (F, G) *Cowles 348.*

Fig. 9.
Gleichenia bifida: (A, B) *Stimson 1282.* (C) *Acevedo-Rdgz. 9373.*
Gleichenia brevipubis: (D) *Proctor 39420.*
Gleichenia rubiginosa: (E) *Proctor 40136.*

Fig. 10.
Lomagramma guianensis (A) *Proctor 41108.* (B) *Ekman 15083.*
Lomariopsis ampdrophlebia: (C) *Woodbury s.n.*
Lomariopsis kunzeana: (D) *Sargent 3107.*
Lomariopsis sorbifolia: (E) *Bro. Hioram 331.*

Fig. 11.
Microgramma heterophylla: (A) *Grimes 3222.* (B) *Acevedo-Rdgz. et al. 2037.*
Microgramma lycopodioides: (C, D) *Liogier & Martorell 31012.*
Microgramma piloselloides: (E) *Underwood & Griggs 352.* (F) Wilson 245.
Polypodium loriceum: (G) *Acevedo-Rdgz. 10871.*

Fig. 12.
Lygodium japonicum: (A-C) *Tang Siu Ging 6968.*
Selaginella willdenovii: (D-G) *Proctor 40184.*

Fig. 13.
Asystasia gangetica: (A-E) *Acevedo-Rdgz. 3083.*
Oplonia spinosa: (F, G, I-K) *Heller 4688.* (H) Photograph: *Acevedo-Rdgz. 4147.*

Fig. 14.
Thunbergia fragrans: (A-F) field sketch, *Acevedo-Rdgz. 1928.*
Thunbergia alata: (G-L) Sketch form a cultivated plant.

Fig. 15.
Thunbergia grandiflora: (A-F) Sketch form a cultivated plant *Acevedo-Rdgz. 9418.*

Fig. 16.
Celosia nitida: (A-E) *Woodbury 172.*
Chamissoa altissima: (F) Field sketch, *Acevedo-Rdgz. 9410.* (G-J) *Sintenis 213a.* (K) *Acevedo-Rdgz. & Siaca 3738.*

Fig. 17.
Iresine angustifolia: (A-F) *Acevedo-Rdgz. 779.*
Iresine argentata: (G-I) *Britton et al. 6371.*
Iresine diffusa: (J-L) *Thompson 1124.*

Fig. 18.
Allamanda cathartica: (A-D) Sketch form a cultivated plant at NYBG conservatory. ***Anechites nerium***: (E-H) *Nash 601.*

Fig. 19.
Forsteronia portoricensis: (A-F) *Acevedo-Rdgz. et al. 7131.*

Pentalinon luteum: (G-I) *Acevedo-Rdgz. 685.* (J) *Acevedo-Rdgz. 1835.*

Fig. 20.
Echites agglutinata: (A-F) *Zanoni 35972.*
Rhabdadenia biflora (G, I-K) *Acevedo-Rdgz. et al 6347.* (H) Photograph from Costa Rica.

Fig. 21.
Aristolochia anguicida: (A, D) *Ricksecker 85.* (B) *Duss 4725.* (C) Photograph de F. González (COL).
Aristolochia oblongata subsp. ***calceiformis***: (E, H) *Fuertes 1879.* (F, J) *Axelrod & Luckow 3417.* (I) *Ekman H. 7899.*

Fig. 22.
Aristolochia elegans: (A-F) *Acevedo-Rdgz. 4136*
Aristolochia trilobata: (G) Photograph from Guyana. (H) *Marcano 8217.*

Fig. 23.
Aristolochia grandiflora: (A) *Morley & Whiteford 561.* (B, C) Photograph of *Gentry 32509* growing at NYBG conservatory).

Fig. 24.
Aristolochia odoratissima: (A) *Nee 41844*; Photograph of F. *González 3574.* (B) *Britton & Shafer 338*
Aristolochia ringens: (C) Photograph of F. González; *Heller 861.* (D) *Allard 18080.* (E, F) *González s.n.*

Fig. 25.
Cryptostegia madagascarensis: (A-D) Field sketch.
Cryptostegia grandiflora: (E, G) *Ekman 8500.* (H) *Acevedo-Rdgz. 8511.*

Fig. 26.
Gonolobus stephanotrichus: (A-D, F) Field sketch, *Acevedo-Rdgz. 10580.* (B-C) Baker 3052. (G) Sintenis 4666.
Hoya australis: (H-K) *Acevedo-Rdgz. 7044.*

Fig. 27.
Marsdenia elliptica: (A) *Axelrod 9399.* (B-D) *Howard 6392.*
Marsdenia floribunda: (F-H) Cultivated, not vouchered. (E) *Acuña & Roig 19968.*

Fig. 28.
Marsdenia woodburyana: (A-D) *L. Ramírez & A. Rosado 27.* (E-F) *Proctor 39358.*

Fig. 29.
Matelea maritima: (A-D) *Acevedo-Rdgz. 2737.*
Matelea sintenisii: (E-H) *Proctor 40302.*
Matelea variifolia: (I-L) *Woodbury s.n.*

Fig. 30.
Metastelma anegadense: (A-D) *Britton & Fishlock 962.*
Metastelma decipiens: (E-H) *Acevedo-Rdgz. 1815.*
Metastelma leptocladon: (I) Field sketch, not vouchered. (J-N) *Acevedo-Rdgz. et al. 7714.* (O) *Acevedo-Rdgz. 3754.*

Fig. 31.
Metastelma lineare: (A-E) Field sketch, *Acevedo-Rdgz. 9361.* (F) *Acevedo-Rdgz. & Siaca 3746.*
Metastelma monense: (G-K) *Acevedo-Rdgz. et al. 4273.*
Metastelma parviflorum: (L-P) *Axelrod & Ackerman 268.*

Fig. 32.
Oxypetalum cordifolium: (A-E) *Cuatrecasas 14430.* (F) *Jack 6943.*
Funastrum clausum: (G-J) *Proctor 31087.*

Fig. 33.
Berylsimpsonia vanillosma: (A-C) *King & Proctor 10601.*
Bidens reptans: (D-G) *Acevedo-Rdgz. 7807.*
Bidens urbanii: (H-I) *Acevedo-Rdgz. & Siaca 3745.* (J) *Acevedo-Rdgz. & Siaca 3735.*

Fig. 34.
Chromolaena borinquensis: (A) *Acevedo-Rdgz. 9367.* (B-D) *Acevedo-Rdgz. & Axelrod 7779.*
Koanophyllon polyodon: (E-F) *Axelrod et al. 3594.*
Lepidaploa borinquensis: (G-K) *Acevedo-Rdgz. 7924.*

Fig. 35.
Mikania congesta: (A-D) *Axelrod 3118.*
Mikania cordifolia: (E-H) *Duss 2814.*

Fig. 36.
Mikania fragilis: (A, B) Field sketch, not vouchered. (C, D) *Acevedo-Rdgz. 3759.*
Mikania micrantha: (E-H) Field sketch, *Acevedo-Rdgz. 9406.*

Fig. 37.
Mikania odoratissima: (A-C) *Sargent 8115.*
Mikania pachyphylla: (D, F, G) *Proctor 43542.* (E) *Axelrod 4288.*

Fig. 38.
Mikania porosa: (A-C) Field sketch, *Acevedo-Rdgz. 9356.*
Mikania stevensiana: (D-F) *Acevedo-Rdgz. 7169.*

Fig. 39.
Piptocarpha tetrantha: (A-C) *Acevedo-Rdgz. 2974.*
Pseudogynoxys chenopodioides: (D-G) Field sketch, not vouchered.

Fig. 40.
Piptocoma acevedoi: (A-H) Acevedo-Rdgz & Chinea 5217.

Fig. 41.
Salmea scandens: (A-C) *Liogier 10711.*
Sphagneticola trilobata: (D-H) *Acevedo-Rdgz. 2794.* (I) *Zanoni 10417*

Fig. 42.
Anredera vesicaria: (A-G) *Zanoni 37125.*
Anredera cordifolia: (H-J) *Brown & Britton 78.*
Basella alba: (K-N) *Schultes & Black 8138.*

Fig. 43.
Amphilophium paniculatum: (A-C) *Ernst et al. 2104.*
Arrabidaea chica: (D-F) *Proctor 27391.* (G) *Saunders 604.*

Fig. 44.
Cydista aequinoctialis: (A-C) *Acevedo-Rdgz. 2810.* (D) *Questel 575.*
Distictis lactiflora: (E, F) *Acevedo-Rdgz. 4660.* (G) *Sintenis 3091.* (H) *Sintenis 3304.*

Fig. 45.
Macfadyena unguis-cati: (A, B) *Holdridge 1074*. (C) *Acevedo-Rdgz. 2803*.
Mansoa hymenaea: (D-G) Field sketch, not vouchered.
Mansoa alliacea: (H) *Ducke 7713*.

Fig. 46.
Phryganocydia corymbosa: (A-C) *Fosberg 58885*.
Podranea ricasoliana: (D-F) *Acevedo-Rdgz. 7920*. (G) *Britton & Britton 9900*.

Fig. 47.
Pyrostegia venusta: (A-D) *Mori et al. 12294*. (E) *Regnell* s.n.
Saritaea magnifica: (F-H) *Acevedo-Rdgz. et al. 6992*.

Fig. 48.
Tecomaria capensis: (A-C) *Morrow 61*.
Tynanthus polyanthus: (D, E) *Abbott 330*. (F-I) *Kirkbride & Vera 52787*.

Fig. 49.
Cordia bellonis: (A-F) *Axelrod & Rivera 8469*
Cordia polycephala: (G-L) *Axelrod & Axelrod 3064*

Fig. 50.
Tournefortia bicolor: (A) *Sintenis 6211*. (B-E) *Sargent B-70*
Tournefortia hirsutissima: (F-I) *Acevedo-Rdgz. 2865*. (J) Photograph, *Acevedo-Rdgz. s.n.*

Fig. 51.
Tournefortia maculata: (A) *Sargent 184*. Field sketch, not vouchered. (B-E) *Sargent 184*. (F) *Britton et al. 2485*.

Fig. 52.
Tournefortia microphylla: (A-C) *Acevedo-Rdgz. 777*. (D) Photograph, *Acevedo-Rdgz. 2326*.
Tournefortia scabra: (E-G) *Acevedo-Rdgz. 7219*.
Tournefortia volubilis: (H-K) *Ernst 1636*.

Fig. 53.
Buddleja madagascariensis: (A-E) *Liogier 33103*.

Fig. 54.
Hylocereus trigonus: (A-C) *Acevedo-Rdgz. 2874*.
Hylocereus undatus: (D) Photograph, *Acevedo-Rdgz. s.n.* (E) Photograph of Juan T. Roig, Cuba 1912.

Fig. 55.
Pereskia aculeata: (A-C, E) *Acevedo-Rdgz. 4267*. (Photograph). (D) Redrawn form Memoirs of the NYBG.
Selenicereus grandiflorus: (F) *Rose 06.210*, Photograph. (G) *Acevedo-Rdgz. 2835*.

Fig. 56.
Capparis flexuosa: (A, B) *Acevedo-Rdgz. 4688*. (C) *Prance et al. 29290*. (D) *Woodbury 341* (left), *Luteyn 5145*. (E) Photograph, *Acevedo-Rdgz. 2521*.

Fig. 57.
Lonicera japonica: (A-E) Sketch of plant cultivated at NYBG conservatory

Fig. 58.
Hippocratea volubilis: (A-H) From S. Mori et al. 2002. Guide to the vascular plants of central French Guiana. Mem. New York Bot. Gard. 76.

Fig. 59.
Pristimera caribaea: (A, B, D-F) *Acevedo-Rdgz. 10601*. (C) Sargent 16

Fig. 60.
Clusia gundlachii: (A) Field sketch, not vouchered. (B-D) *Howard 16830*. (E-G) Photographs, *Acevedo-Rdgz. 9318*.

Fig. 61.
Combretum grandiflorum: (A-C) *deWolf 2036*. (D) *Liogier 31966*. ***Combretum indicum***: (E, F) Field sketch, not vouchered. (G) *Ricksecker 337*.

Fig. 62.
Rourea surinamensis: (A-E) *Proctor 41586*. (F-H) Field sketch, not vouchered.

Fig. 63.
Aniseia martinisensis: (A) *Axelrod 5913*. (B, C) *Proctor 37514*. (D) *Liogier 33579*.
Argyreia nervosa: (E) *Arnoldo-Broeder 3117*. (F) *Leonard 7447*.
Convolvulus nodiflorus: (G-K) *Acevedo-Rdgz. 3960*.

Fig. 64.
Ipomoea alba: (A-D) Field sketch, *Acevedo-Rdgz. 10775*. (E) Field sketch, not vouchered.
Ipomoea batatas: (F-G) *Ricksecker 228*.

Fig. 65.
Ipomoea calantha: (A, B) *Ekman 1471*. (C) *Ekman 7093*.
Ipomoea eggersii: (D-E) *Acevedo-Rdgz. 4043*.
Ipomoea hederifolia: (F, G) *Acevedo-Rdgz. 3031*. (H) *Acevedo-Rdgz. 3082*.

Fig. 66.
Ipomoea horsfalliae: (A) *Sintenis 450*. (B) *Acevedo-Rdgz. & Breckon 7837*.
Ipomoea imperati: (C, D) *Acevedo-Rdgz. & Cedeño 9294*. (E) *Sintenis 976*
Ipomoea indica var. ***acuminata***: (F) *Acevedo-Rdgz. 4051*. (G-I) *Acevedo-Rdgz. 4127*.

Fig. 67.
Ipomoea meyeri: (A, D) *Heller 6225*. *(B) Ekman 2436*. (C) *Sintenis 5543*. (E) *Ekman 10916*.
Ipomoea microdactyla: (F-G) *Curtiss 211*. (H-J) *Correll 49280*.
Ipomoea nil: (K) *Acevedo-Rdgz. 2315*. (L-N) *Acevedo-Rdgz. 3080* (pickled). (O) *Eggers s.n.*

Fig. 68.
Ipomoea ochracea: (A, B) *Acevedo-Rdgz. 10513* and field sketch. (C) *Acevedo-Rdgz. 7718*.
Ipomoea purpurea: (D-E) *Heller 1410* and from cultivated plant. (F) Cultivated plant.
Ipomoea pes-caprae: (G) Field sketch, not vouchered. (H) *Goll 957*.

Fig. 69.
Ipomoea quamoclit: (A, B) *Ricksecker 26.*
Ipomoea repanda: (C-F) Field sketch, not vouchered.

Fig. 70.
Ipomoea setifera: (A, B) Field sketch, not collected.
Ipomoea steudelii: (C-E) *Acevedo-Rdgz. 10783.* (F, G) *Acevedo-Rdgz. 7143.*

Fig. 71.
Ipomoea tenuissima: (A-C) *Curtiss 495.*
Ipomoea tiliacea: (D-H) Field sketch, not vouchered.
Ipomoea tricolor: (I) Cultivated plant. (J, K) *Goll 797.*

Fig. 72.
Ipomoea triloba: (A, B) *Acevedo-Rdgz. 3099.* (C) *Acevedo-Rdgz. 3079.*
Ipomoea wrightii: (D, F-H) *Jack 6711.* (E) *Sintenis 3619.*
Ipomoea violacea: (I) *Acevedo-Rdgz. 4007.* (J, K) *Fosberg 55339.*

Fig. 73.
Jacquemontia cayensis: (A, B) *Correll & Popenoe 51309.* (C) *Millspaugh 9257.*
Jacquemontia cumanensis: (D) *Axelrod & Escobar 2906.* (E, F) *Atha & Zanoni 723.*
Jacquemontia havanensis: (G, H) *Acevedo-Rdgz. 4077.* (I) *Proctor 42607.*

Fig. 74.
Jacquemontia pentanthos: (A, B) *Acevedo-Rdgz. 4037.* (C, D) *Acevedo-Rdgz. 687.*
Jacquemontia solanifolia: (E, F) Field sketch, *Acevedo-Rdgz. 10788.* (G, H) *Sintenis 5681.*
Jacquemontia tamnifolia: (I-K) *Heller 6437.*
Jacquemontia verticillata: (L) *Leonard s.n.* (M, N) *Britton et al. 12927.*

Fig. 75.
Merremia aegyptia: (A-E) *Acevedo-Rdgz. 3080.*
Merremia cissoides: (F-G) *Acevedo-Rdgz. 9348.*
Merremia dissecta: (H-K) *Acevedo-Rdgz. & Reilly 1987.*

Fig. 76.
Merremia quinquefolia: (A, D) *Acevedo-Rdgz. 3081.* (B, C) *Acevedo-Rdgz. 2296.*
Merremia tuberosa: (E) *Liogier 31166.* (F) *Zanoni 33435.* (G) *Feucht 629.*
Merremia umbellata: (H-J) *Acevedo-Rdgz. 4019.* (K, L) *Acevedo-Rdgz. 2472.*

Fig. 77.
Operculina turpethum: (A, B) *Eggers 152.* (C) *Bristol 2331*
Poranopsis paniculata: (D-G) Field sketch, not vouchered.

Fig. 78.
Stictocardia tiliifolia (A-C) *Acevedo-Rdgz 4008* and *3120.* (D) *Proctor 43440.*

Fig. 79.
Turbina corymbosa: (A-D) Field sketch, *Acevedo-Rdgz. 10756.* (E, G) *Acevedo-Rdgz. 9391.*
Xenostegia tridentata: (H-J, M) *Axelrod 5237.* (J, K) *Taylor 7658.*

Fig. 80.
Cayaponia americana: (A, B) Photograph, *Acevedo-Rdgz. 3856.*
Cayaponia racemosa: (C) *Allard 14478.* (D, E) *Axelrod & Thomas 6087.* (F) *Molina 24700.* (G) *Stevenson 772.*

Fig. 81.
Coccinia grandis: (A, B) *Boom et al. 8040.* (C) *Fosberg 58912.* (D) *Hahn 4810.*
Citrullus lanatus: (E-I) *Acevedo-Rdgz. 9347.* (J) Field sketch, not vouchered.

Fig. 82.
Cucumis anguria: (A-D) Field sketch, *Acevedo-Rdgz. 4023.*
Cucumis dipsaceus: (E) *Ndegwa 297.* (F) *Burger 1345.*
Cucumis melo: (G-I) Cultivated plant, not vouchered.

Fig. 83.
Cucurbita moschata: (A, B) Field sketch, not vouchered.
Doyerea emetocathartica: (C-E) *Acevedo-Rdgz. 4044.* (F) *Acevedo-Rdgz. 1944.*

Fig. 84.
Fevillea cordifolia: (A-D) Field sketch, *Acevedo-Rdgz. 9419.* (E) *Cid & Nelson 2608.* (F) *Cuatrecasas 10915.*
Lagenaria siceraria: (G) Cultivated plant, not vouchered. (H-J) Photographs and Pedersen 8768. (K) Photos, *Acevedo-Rdgz. 11603.*

Fig. 85.
Luffa aegyptiaca: (A-C) *Acevedo-Rdgz. 4066.* (B) B. *León 502.*
Luffa acutangula: (D) *Shafer 480.* (E) Unvouchered photograph.

Fig. 86.
Melothria pendula (A-E) ***and Momordica charantia***: (F-K) From S. Mori, et al. 2002. Guide to the vascular plants of central French Guiana. Mem. New York Bot. Gard. 76(2).

Fig. 87
Psiguria ottoniana: (A) *Rogel 390.* (B) *Pleé 42.*
Psiguria pedata: (C-F) Field sketch and unvouchered alcohol collection. (G) *Axelrod 8405.*
Psiguria trifoliata (H) *Goll 627.*

Fig. 88.
Sechium edule: (A-E) Field sketch, not vouchered.
Sicana odorifera: (F) *Calderon 2062* and *Webster 12752.* (G) Photograph, *Acevedo-Rdgz. s.n.*

Fig. 89.
Cuscuta americana: (A-H) *Acevedo-Rdgz. 2569.*

Fig. 90.
Doliocarpus brevipedicellatus: (A-J) From S. Mori et al. 2002. Guide to the vascular plants of central French Guiana. Mem. New York Bot. Gard. 76(2).

Fig. 91.
Pinzona coriacea: (A-K) From S. Mori et al. 2002. Guide to the vascular plants of central French Guiana. Mem. New York Bot. Gard. 76(2).

Fig. 92.
Gonocalyx concolor: (A-D) *Axelrod 6643.*
Gonocalyx portoricensis: (E, F) *Webster & Mill. 8697.* (G, H) *Luteyn s.n.* alcohol collection. (I) Field sketch, not vouchered.
Vaccinium racemosum: (J-M) Field sketch, not vouchered.

Fig. 93.
Dalechampia scandens: (A-D) *Acevedo-Rdgz. 1882.* (B) *Thompson 1089.* (C) *Bro. León 630.* (E) *Acevedo-Rdgz. 660.*
Tragia volubilis: (F-J) *Acevedo-Rdgz. 703.*

Fig. 94.
Caesalpinia bonduc (A) *Acevedo-Rdgz. 2570* and field sketch. (B, C) *Acevedo-Rdgz. 4021.*
Caesalpinia ciliata (D-F) *Acevedo-Rdgz. 8227.*
Caesalpinia culebrae (G) *Britton 79.*

Fig. 95.
Caesalpinia decapetala: (A) Sargent 560. (B) *Axelrod & Sastre 6013.* (C) *Sargent 3284.*
Caesalpinia major (D-E) *Sauleda 3698.* (F) *Brace 6779.*
Caesalpinia portoricensis (G-I) *Britton et al. 4916.*

Fig. 96.
Senna bicapsularis: (A-C) Field sketch. (D-F) *Acevedo-Rdgz. 3917.*
Senna nitida: (G-I) *Nee 44141.* (J) *Liogier et al. 28351.*

Fig. 97.
Abrus precatorius: (A) *Acevedo-Rdgz. 710.* (B, C) *Yuncker 17303.* (D) *Acevedo-Rdgz., s.n.* , alcohol collection.
Barbiera pinnata: (E-H) *Almeda 7472.* (I) *Sintenis s.n.*

Fig. 98.
Calopogonium caeruleum: (A-E) Field sketch, not vouchered. (F) *Axelrod 4177.*
Calopogonium mucunoides: (G-I) *Heller 440.*

Fig. 99.
Canavalia ensiformis: (A) *Yuncker 18150.* (B) *Thompson 598* (C) *F.C.I. 01931.* (D, E) *Duss 1077.*
Canavalia nitida: (F, G) *Correll & Correll 50614.*
Canavalia rosea: (H-K) *Acevedo-Rdgz. 776.* (L) *Zanoni 17093.*

Fig. 100.
Centrosema plumieri: (A-E) Field sketch, *Acevedo-Rdgz. 10770.* (F) *Zanoni et al. 18954.*
Centrosema pubescens: (G-I) Field sketch, not vouchered.
Centrosema virginianum: (J) Mori 17093. (K-N) *Acevedo-Rdgz. 1424.*

Fig. 101.
Clitoria falcata: (A) *Axelrod 5244.* (B) Photograph, *Acevedo-Rdgz. s.n.* (C) *Britton et al. 6662.*
Clitoria ternatea: (D) Unvouchered cultivated plant and *Taylor 9334.* (H) *Britton 920* (left) *Acevedo-Rdgz. 2623* (right).

Fig. 102.
Dalbergia ecastaphyllum: (A, E) *Acevedo-Rdgz. 2034.* (B-D) *Acevedo-Rdgz. 2041.*
Dalbergia monetaria: (F-I) Filed sketch.

Fig. 103.
Desmodium axillare var. ***acutifolium***: (A, B) *Woodbury et al. s.n.* (C) *Taylor 10160.*
Desmodium incanum: (D-G) *Acevedo-Rdgz. 4159.*
Desmodium intortum: (H, J-M) *Acevedo-Rdgz. 3761.* (I) *Axelrod 3770.*

Fig. 104.
Dioclea reflexa: (A) *Proctor 51109.* (B) *Sintenis 5311.* (C-G) *Axelrod & Royowitz 10825.* (H) *Britton & Shafer 1677* and *Proctor 51109* (fruit).

Fig. 105.
Galactia dubia: (A-D) *Acevedo-Rdgz. 1429.* (E) *Liogier 10806.*
Galactia eggersii: (F) *Eggers s.n.* (G-H) *Acevedo-Rdgz. 4138.*
Galactia longifolia: (I-K) *Box 907.* (L) *Liogier 37048.*
Galactia striata: (M-O) *Acevedo-Rdgz 10782*, Field sketch and alcohol collection.

Fig. 106.
Lablab purpureus: (A-F) *Acevedo-Rdgz. 2123.*
Machaerium lunatum: (G, K, L) *Heller 823.* (H-J) *Acevedo-Rdgz. 2829.*

Fig. 107.
Macroptilium atropurpureum: (A, D) *Whiteford 7162.* (B, C). *Haught 6291.*
Macroptilium lathyroides: (E-I) Cultivated, unvouchered. (J) *Acevedo-Rdgz. 2117.*

Fig. 108.
Mucuna pruriens: (A-E) Field sketch and alcohol collection, *Acevedo-Rdgz. 10779.*
Mucuna sloanei: *(F, G) Eggers 1317. (H) Sintenis* 5941.
Mucuna urens: (I, K-M) *Acevedo-Rdgz. 9405.* (J) *Zanoni 44140.*

Fig. 109.
Neorudolphia volubilis: (A) Field sketch, not vouchered. (B) *Acevedo-Rdgz. 2984.* (C) *Boom 7069.* (D-F) *Axelrod 4865.* (G-H) *Grimes 3255.*

Fig. 110.
Pachyrhizus erosus: (A-D) *Stehlé 4507.* (E) *Acevedo-Rdgz. 5225.*
Phaseolus lunatus: (F-H) *Acevedo-Rdgz. 3741.* (I) *Sintenis 5778.*
Phaseolus vulgaris: (J-L) *Ekman 1793.* (M) *Goll 747.*

Fig. 111.
Pueraria phaseoloides: (A) *Liogier 28042.* (B-D) *Lavestre 1826.*
Rhynchosia minima: (E-G) *Shafer 2484.* (H) *Sintenis 1176.*
Rhynchosia reticulata: (I-K) *Mori 17094.*

Fig. 112.
Rhynchosia phaseoloides: (A-H) From S. Mori et al. 2002. Guide to the vascular plants of central French Guiana. Mem. New York Bot. Gard. 76(2).

Fig. 113.
Teramnus labialis: (A-D) *Acevedo-Rdgz. 1956.* (E) *Acevedo-Rdgz. 716.*

Teramnus uncinatus (F) *Acevedo-Rdgz. 7055.* (G-I) *Sintenis 2961.*

Fig. 114.
Vigna antillana: (A) *Acevedo-Rdgz 3796.* (B-C) *Acevedo-Rdgz 3868.* (D) *Hess 5115.*
Vigna adenantha: (E-G) *Acevedo-Rdgz 10772.* (H) *Acevedo-Rdgz 10167.*
Vigna hosei: (I-K) *Acevedo-Rdgz. 10677.* (L) *Acevedo-Rdgz. 9456.*

Fig. 115.
Vigna longifolia: (A) *Britton et al. 6751.* (B, C) *Stevenson 2097.*
Vigna luteola: (D, F) *Stimson 3158.* (G, H) *Fosberg 48305.*
Vigna marina: (I-J) *Stevenson 1686.*

Fig. 116.
Vigna peduncularis: (A-C) Acevedo-Rdgz 10762 (D) Acevedo-Rdgz 10778.
Vigna unguiculata: (E, F) *Acevedo-Rdgz. 9411; 10859.*
Vigna vexillata: (G-J) *Axelrod 10478*, field sketch and alcohol collection. (K) *Sintenis 1095.*

Fig. 117.
Acacia retusa: (A-C) *Acevedo-Rdgz. 5050.* (D-F) *Acevedo-Rdgz. 4055.*
Acacia vogeliana: (G, J) *Acevedo-Rdgz. 5047.* (H, I) *Acevedo-Rdgz. 3794.*

Fig. 118.
Entada polystachya* var. *polyphylla: (A-C) *Guedes 299* and . *s.n.*, photo. (D) *Henkel 3580.*
Mimosa casta: (E-G) *Woodbury s.n.* (H) *Acevedo-Rdgz. 10830.*

Fig. 119.
Mimosa ceratonia: (A-C) *Mori 17024.* (D) *Zanoni 29326.*
Mimosa diplotricha: (E-G) *Acevedo-Rdgz. 7045.* (H) *Anderson 8803* (Brazil).
Mimosa quadrivalvis *var.* ***urbaniana***: (I) *Liogier 36196.*

Fig. 120.
Cassytha filiformis: (A) *Acevedo-Rdgz. 4372.* (B-F) *Acevedo-Rdgz 3952.*

Fig. 121.
Heteropterys laurifolia: (A-E) *Acevedo-Rdgz. 5231.* (F) *Acevedo-Rdgz. 5232.*
Heteropterys purpurea: (G-K) *Acevedo-Rdgz. 664* and *Acevedo-Rdgz. 2658.*
Heteropterys wydleriana: (L-R) *Acevedo-Rdgz. & Chinea 2211.* (S) *Acevedo-Rdgz. et al. 4793*

Fig. 122.
Stigmaphyllon bannisterioides: (A-C) *Acevedo-Rdgz. 9345* and photo. (B) *Hahn 3826* (Guyana).
Stigmaphyllon emarginatum: (D-G) *Acevedo-Rdgz. 4042* and field sketch.
Stigmaphyllon floribunda: (H-J, L, M) *Acevedo-Rdgz. 10780* and field sketch. (K) *Acevedo-Rdgz. 10205.*

Fig. 123.
Stigmaphyllon puberum: (A-G) *Ernst 129a.*

Tetrapterys inaequalis: (H, I) *Urban 2494.* (J-L) *Duss 1469.* (M) *Urban 3086.* (N) *Heller 3086.*

Fig. 124.
Marcgravia rectiflora: (A, C-E) *Acevedo-Rdgz. 9404* and field sketch. (B, F, G) Field sketch, not vouchered.
Marcgravia sintenisii: (H-K) Field sketch, not vouchered.

Fig. 125.
Cissampelos pareira: (A) *Mori 17021.* (B-D) *Acevedo-Rdgz. 826.* (E-J) *Acevedo-Rdgz. 2439.*

Fig. 126.
Hyperbaena domingensis (A, B, F) *Daly 3301.* (C, E) *Diaz 333.* (G) *Howard 19774.* (H) *Duss 3682.*
Hyperbaena laurifolia (I-O) *Holdridge 24.* (J, K) *Séller 1355.* (L, M) *Stevenson 2186.* (N) *Llano s.n.* (O) *Britton 1918.*

Fig. 127.
Ficus citrifolia: (A-C) *Acevedo-Rdgz. 1967*
Ficus pumila: (D-L) *Acevedo-Rdgz.9459.*

Fig. 128
Boerhavia scandens: (A-D, F) *Acevedo-Rdgz. 10801*, Field sketch and pickled collection. (E) *Heller 6090.*
Pisonia aculeata: (G-J) *Acevedo-Rdgz. 4209.* (K-M) *Rose 3598.*

Fig. 129.
Bougainvillea glabra: (A-E) Field sketch and pickled collection. (F) *Urban 698.*
Bougainvillea spectabilis: (G-H) *Hermann 2788.*

Fig. 130.
Jasminum fluminense: (A, D) *Acevedo-Rdgz. 2892* and photo. (B, C) Howard 20334.
Jasminum grandiflorum: (E) *Acevedo-Rdgz. 10532.* (F) *Howard 19172.* (G-I) *Thompson 993.*

Fig. 131.
Jasminum multiflorum: (A-F) Field sketch and pickled collection.
Jasminum sambac (G, H) *Liogier 36277.* (I) *Leonard 4947.*

Fig. 132.
Passiflora berteroana: (A, C, D) *Liogier 13915.* (B) *Liogier 33732.*
Passiflora bilobata: (E, F) *Liogier 11131.* (G) *Liogier 10495.* (H, I) *Acevedo-Rdgz. 7762.*

Fig. 133
Passiflora edulis; (A-G) *Acevedo-Rdgz. 834.*
Passiflora laurifolia: (H, I) *Mori 17054.*
Passiflora foetida: (J, K) *Acevedo-Rdgz. 1948.*

Fig 134.
Passiflora maliformis: (A) *Ekman 9796.* (B) *Leonard 4979.*
Passiflora multiflora: (C) Field sketch. (D, E) *Acevedo-Rdgz. 4002* and photo. (F) *Acevedo-Rdgz. 3857* and photo.
Passiflora murucuja: (G-J) Cultivated, unvouchered.

Fig. 135.
Passiflora quadrangularis: (A) *Stevenson 6715.*

Passiflora rubra: (B) Field sketch. (C) , photo). (D) *Axelrod 5246.*

Fig. 136.
Passiflora serrato-digitata: (A) *Eggers 1372.* (B) *Axelrod 5749.*
Passiflora sexflora: (C-E) *Acevedo-Rdgz. 10745*; *Acevedo-Rdgz. 10761* and photo. (F, G) Field sketch.

Fig. 137.
Passiflora suberosa: (A, B, E) *Acevedo-Rdgz. 10498.* (C) *Urban 871.* (D) *Acevedo-Rdgz. 4302.*
Passiflora tulae: (F-H) *Acevedo-Rdgz. 3751.*

Fig. 138.
Agdestis clematidea: (A-C) *Palmer 50.*
Stegnosperma cubensis: (D-F) *Lavestre 2240.* (G, H) *Liogier 17818.*
Trichostigma octandrum: (I, M) *Zanoni 25547.* (J-L) *Britton & Wheeler 113.*

Fig. 139
Peperomia rotundifolia: (A) *Mejia 15609.* (B-D) *Lavestre 1553.*

Fig. 140.
Plumbago scandens. (A-D) *Hudson 754.* (D-E) *Rodríguez 89.* (F) *Zanoni 27488.*

Fig. 141.
Securidaca diversifolia: (A) *Eggers 1219.* (B) *Rose 3638.* (C-D) *Liogier 31916.*
Securidaca virgata: (E-M) Field sketch and *Acevedo-Rdgz. 9453.*

Fig. 142.
Antigonon guatemalense: (A-C) *Ricksecker 16.* (D-F) *Archer 433.*
Antigonon leptopus: (G-H, L, M) *Acevedo-Rdgz. 1811.* (I-K) *Zanoni 24475.*

Fig. 143.
Clematis polygama: (A) *Axelrod 8473.* (B-D) *Liogier 31073.*
Clematis flammulastrum: (E, F) *Axelrod 1547.* (H, I) *Axelrod 3167.*
Clematis dioica: (J) *Britton 1762.*

Fig. 144.
Gouania lupuloides: (A-D) *Acevedo-Rdgz. 2295.* (E-H) *Woodbury s.n.*
Gouania polygama: (I, K-L) *Atha 752.* (J) *Sintenis 36.* (M-N) *Acevedo-Rdgz. 7139.*

Fig. 145.
Rubus florulentus: (A, I, J) *Gentry & Zardini 50448.* (B-H) *Sintenis 4100.*

Fig 146.
Chiococca alba: (A, C-F) *Acevedo-Rdgz. 5077.* (B) *Acevedo-Rdgz. 1914.* (G-H) *Acevedo-Rdgz. 3821.*
Diodia sarmentosa: (I, J, L) *Liogier 29765.* (K) *Woodbury s.n.*
Hillia parasitica: (M) *Acevedo-Rdgz. 2990.* (N-P) Field sketch.

Fig. 147.
Psychotria microdon: (A-F) *Liogier 15663.* (G-I) *Little 26127.*
Lasianthus lanceolatus: (J-L) *Acevedo-Rdgz. 6964.* (K) Field sketch. (M-P) *Acevedo-Rdgz. 7834.*

Fig. 148.
Sabicea villosa: (A-D) *Woodbury s.n.*
Schradera exotica: (E, H) Field sketch. (F) *Stevens 2356.* (G) *Jiménez 5096.*

Fig. 149.
Cardiospermum halicacabum: (A-G) Field sketch, not collected.
Cardiospermum grandiflorum: (H, I) *Acevedo-Rdgz. 10841* (photo) and *Acevedo-Rdgz. 10843.* (J-L) *Liogier 35326.*
Cardiospermum corindum: (L) *Acevedo-Rdgz. 4154.* (M) *Acevedo-Rdgz. 2373.*

Fig. 150.
Paullinia fuscescens: (A, B, D) *Fosberg 55298.* (C) *Britton 103.*
Paullinia plumieri: (E, F, H) *Stehlé 1591.* (G) *Stehlé 5719.*
Paullinia alata: (I, O) Filed sketch and *Acevedo-Rdgz. 9451.* (J) *Woodbury s.n.* (K-N) *Underwood & Griggs 469.*

Fig. 151.
Serjania lucida: (A) *Acevedo-Rdgz. 8305.* (B, F) *Acevedo-Rdgz. 709.* (C-E) *Acevedo-Rdgz. 629.*
Serjania polyphylla: (G, J) *Boom 10036.* (H, I) *Boom 10022.*

Fig. 152.
Schlegelia brachyantha: (A-D) Field sketch, not collected. (E) *Acevedo-Rdgz. 2964*

Fig. 153.
Lophospermum erubescens: (A-G). Cultivated, unvouchered.

Fig. 154.
Lycianthes virgata: (A-E) *Acevedo-Rdgz. 11437.* (F) *Urban 2620.*
Solandra grandiflora: (G) *Axelrod 5250* and photo. (H) *Degener 18751.*

Fig. 155.
Solanum lancifolium: (A-D) *Acevedo-Rdgz. 5108* and field sketch.
Solanum seaforthianum: (E-H) *Acevedo-Rdgz. 11476.* (I) *Britton & Britton 9867.*
Solanum wendlandii: (J, L) *Liogier 28469.* (K) *Zanoni 30535.*

Fig. 156.
Tropaeolum majus: (A-I) Cultivated, unvouchered.

Fig. 157.
Celtis iguanaea: (A, B) *Acevedo-Rdgz. 2691* and photo. (C-F) *Acevedo-Rdgz. 2611*, pickled. (G) *Acevedo-Rdgz. 2021*, pickled.

Fig. 158.
Valeriana scandens: (A, D) *Acevedo-Rdgz. 9399.* (B, C, E) *Zanoni & Maas 34088*

Fig. 159.
Clerodendrum aculeatum: (A, E) *Acevedo-Rdgz. 5140* and field sketch. (B, C, D) *Acevedo-Rdgz. 2818*, pickled.

Fig. 160.
Clerodendrum thomsonae:. (A-D) *Acevedo-Rdgz. 9413.*
Clerodendrum x speciossimum: (E-G) Cultivated, not collected, field sketch.

Fig. 161
Congea tomentosa: (A-C) *Liogier 32719* and *Acevedo-Rdgz. s.n., photo.*
Holmskioldia sanguinea: (D, E) *Acevedo-Rdgz. 10533* and *Acevedo-Rdgz.* s.n. , photo.
Petrea volubilis: (F-H) Field sketch and pickled, not vouchered.

Fig. 162.
Cissus erosa: (A-J) From S. Mori et al. 2002. Guide to the vascular plants of central French Guiana. Mem. New York Bot. Gard. 76(2).

Fig. 163.
Cissus obovata: (A) *Britton & Britton 9903.* (B) *Eggers 556.* (C, D) *Ekman 6050.*
Cissus rotundifolia: (E, F) *Spellenberg 7370.*

Fig. 164. FSJ
Cissus verticillata: (A) *Acevedo-Rdgz. 5114,* field sketch. (B-D) *Acevedo-Rdgz. 4683*, photograph and pickled.
Cissus trifoliata: (E) *Acevedo-Rdgz. 5127*, field sketch. (F) *Acevedo-Rdgz. 2693*, pickled.
Vitis tiliifolia: (G) Photograph from Escambray, Cuba and *Augusto 1574.* (H, I) *Taylor 8086.* (J) *Augusto 1574.*

Fig. 165.
Anthurium scandens: (A-F) *Acevedo-Rdgz. 9395.*

Fig. 166.
Epipremnum pinnatum: (A, B) Field sketch, not collected. (C) *Acevedo-Rdgz. 10838.*
Epipremnum pinnatum cv. ***aureum***: (D) Field sketch, not collected. (E) *Acevedo-Rdgz. 7141.*

Fig. 167.
Monstera adansonii. (A-C) From S. Mori et al. 1997. Guide to the vascular plants of central French Guiana. Mem. New York Bot. Gard. 76(1).

Fig. 168.
Philodendron consanguineum: (A) *Engler 4347.* (B) *Liogier 11161.*
Philodendron hederaceum: (C, D) *Acevedo-Rdgz. 2880.*

Fig. 169.
Philodendron giganteum: (A-D) *Acevedo-Rdgz. 10806.*

Fig. 170.
Philodendron lingulatum: (A) *Axelrod 9192.*
Philodendron ornatum: (B) *Gentry et al. 77672.* (C) *Proctor 47073.*

Fig. 171.
Syngonium podophyllum: (A,B) *Mori 15131.* (C) *Acevedo-Rdgz. 4061.*

Fig. 172.
Protoasparagus setaceus: (A-E) *Acevedo-Rdgz. 9349.*

Fig. 173.
Scleria canescens: (A, B) *Heller 1090.*
Scleria scindens: (C) *Acevedo-Rdgz. 5102.* (D, E) *Ernst 1577.*
Scleria secans: (F, G) *Mejia 11127.*

Fig. 174.
Dioscorea alta: (A, B) *Acevedo-Rdgz. 7047.* (C) *Hansen et al. 9308.* (D) *Nee 44151.* (E) *Acevedo's photos.*
Dioscorea altissima: (F) *Gentry & Zardini 50388.* (G) *Allard 13992.*

Fig. 175.
Dioscorea bulbifera: (A, B) *Acevedo-Rdgz. 9369* and field sketch. (C-E) *Ekman 4732.*
Dioscorea cayenensis: (F, G) *Acevedo-Rdgz. 11896*, photo. (H) Howard 18920. (I-K) *Webster & Gooding 3634.*
Dioscorea pilosiuscula: (L-P) *Acevedo-Rdgz. 3991.*

Fig. 176.
Dioscorea polygonoides: (A) *Acevedo-Rdgz. 10812.* (B) *Boom 6812.* (C-E) *Liogier 35001.* (F-H) *Boom 9595.* (I) *Shafer 3521.*
Dioscorea trifida: (J) *Sargent 500.* (K, L) *Allard 14144.*
Fig. 177.
Rajania cordata: (A) *Stevens 2782.* (B) *Acevedo-Rdgz. 7147.* (C) *Grimes 3245.* (D, F) *Stevenson 1187* and pickled. s.n. (E) *Howard 16165.* (G-I) *Axelrod 218.* (J) *Howard 16905.* (K, L) *Wagner 1911.*

Fig. 178.
Vanilla barbellata: (A) *Liogier 15640.* (B) *Liogier 15047.* (C-E) *Ackerman 2129.*
Vanilla claviculata: (F) *Nee 44080.* (G, H) *Ackerman 2013.*

Fig. 179.
Vanilla dilloniana: (A) field sketch. (B) *Luer's* photo. (C) *Stimson 1276.*
Vanilla mexicana: (D) *Harris 8555.* (E) Luer's photo.
Vanilla planifolia: (F, G) field sketch.

Fig. 180.
Vanilla poitaei: (A) *Acevedo-Rdgz. 9387.* (B) *Pennington 1836.* (C-E) *Ackerman 2016.* (F) *Acevedo-Rdgz. 7187.*
Vanilla pompona: (G) *Duss 3487.* (H) Photo.

Fig. 181.
Arthrostylidium farctum: (A-C) *Ekman 9286.*
Arthrostylidium multispicatum: (D) *Chase 6201.* (E-G) *Clark & Reiners 1508.*
Arthrostylidium sarmentosum: (H) *Acevedo-Rdgz. 6963.* (I, J) *Soderstrom 2053.*

Fig. 182.
Chusquea abietifolia: (A) *Liogier 30906.* (B-D) *Ekman 8009.*
Lasiacis divaricata: (E-G) *Goll 227.*
Lasiacis ligulata: (H-K) *Acevedo-Rdgz. 2681.*

Fig. 183.
Lasiacis sorghoidea: (A, B) *Holm 74.* (C, D) *Cedeño 637.*
Olyra latifolia: (E-H) *Mori 18848.*

Fig. 184.
Smilax coriacea: (A) *Martorell s.n.* (B, E) *Fuertes 444.* (C) *Britton 1376.* (D) *Liogier 35155.* (F) *Acevedo-Rdgz. 3818.*
Smilax domingensis: (G) Field sketch. (H, I) *Proctor 48067.* (J, K) *Liogier 34627.*

GLOSSARY

abaxial (abaxial)- in laminar organs such as leaves, sepals, and petals, refers to the lower surface
accrescent (acrescente)- having additional growth after its formation
achene (aquenio)- a one-seeded, dry, indehiscent fruit with the pericarp fused to the seed coat
actinomorphic (actinomorfa)- having at least two planes of symmetry
acuminate (acuminado)- terminating in an elongated point
acute (agudo)- forming an angle less than 90°
adaxial (adaxial)- in laminar organs such as leaves, sepals, and petals, refers to the upper surface
adnate (adnato)- refers to the fusion (or close adherence) of different stuctures, e.g., a stamen and a petal
adventitious (adventicio)- refers to any organ that develops from adult tissue
aggregate fruit (fruto agregado)- a fruit that is made up of small fruitlets, the products of the apocarpous gynoecium of a single flower
androgynophore (androginóforo)- a column that bears the stamens and the gynoecium
anthocarp (antocarpo)- a structure consisting of a fruit together with the floral envelope or perianth
apocarpous (apocárpico)- having the individual carpels separate
appressed (adpreso)- pressed against something
areole (areola)- a small cavity surrounded by the anastamosed (fused) veins
arillode (arilodio)- a fleshy structure that resembles an aril, but whose origin is undetermined
aristate (aristado)- terminating in a long, slender, rigid point
articulate (articulado)- presenting a joint or articulation
attenuate (atenuado)- narrowed
auriculate (auriculado)- ear-shaped
barbate (barbado)- having a beard-like tuft of hairs
berry (baya)- a fleshy, indehiscent, simple or syncarpous fruit
bicarinate (bicarinado)- having two keels or ridges
bifurcate (bifurcado)- divided into two parts of the same size
biglobose (bigloboso)- having a structure composed of two united but distinct spheres
bilabiate (bilabiado)- refers to a calyx or corolla that is divided into two lips
bipinnate (bipinnado)- refers to a twice-pinnate blade
biternate (biternado)- refers to a twice-ternate leaf blade, i.e., a ternate leaf in which each primary leaflet is divided into three secondary leaflets, for a total of nine secondary leaflets
blade (lámina)- the laminar portion of the leaf, joined to the petiole
bract (bráctea)- any foliaceous organ near the flowers, differing from the leaves by its size, coloration, form, or texture
bracteole (bractéola)- diminutive of bract, referring to those bracts that are found on the secondary axes of inflorescences
bulbil (bulbillo)- a small bulb borne in leaf axils, whose function is the accumulation of food reserves
calyptra (caliptra)- a cap-like structure
calyptrate (caliptrado)- cap-like
cambium (cámbium)- a tissue composed of meristematic cells located between the wood and the liber (phloem)
campanulate (campanulado)- bell-shaped
canescent (canescente)- covered with short, white hairs
capitate (capitado)- in the form of a head or arranged in capitula (heads)
capitulum (capítulo)- an inflorescence, usually globose or convex, composed of sessile flowers
caudate (caudado)- terminating in a long, tail-like point
caudex (caudex)- the trunk of a palm or tree-fern
chartaceous (cartáceo)- having a papery texture
ciliate (ciliado)- bearing cilia
cilium (cilio)- a fine hair along the margin of any laminar organ
cincinnus (cincino)- a scorpioid cyme whose flowers are arranged in different planes
circumcissile (circuncísil)- having circular dehiscence
claviform (claviforme)- club-shaped, i.e., widening gradually toward the apex
collateral (colateral)- borne on the side
concolorous (concoloro)- of the same color
concrescent (concrescente)- more or less united
connate (connato)- refers to similar organs that are united, e.g., petals united to form a tubular corolla
connective (conectivo)- the sterile portion of an anther, located between the two thecae (anther sacs)
cordiform (cordiforme)- heart-shaped; in laminar organs, with the base auriculate and wider than the rest of the lamina
coriaceous (coriáceo)- having a leathery texture
corona (corona)- a group of petaloid appendages that form a whorl within the corolla

cortical (cortical)- relative to the cortex or bark
corymb (corimbo)- an inflorescence whose flowers are borne on different portions of the axis but are at the same height because their pedicels are of different lengths
corymbiform (corimbiforme)- in the form of a corymb
crateriform (crateriforme)- bowl-shaped
crenate (crenado, festoneado)- having short, rounded protruberances along the margin, scalloped
crenulate (crenulado)- diminutive of crenate
crustaceous (crustáceo)- having a rigid and brittle texture, like an egg-shell
culm (culmo)- the stem of the grasses and sedges
cuneate, **cuneiform** (cuneado, cuneiforme)- wedge-shaped
cupuliform (cupuliforme)- in the form of a little cup
cyme (cima)- an inflorescence whose axis terminates in a flower and bears secondary axes
cymose (cimoso)- in the form of a cyme
deciduous (caducifolio)- refers to a plant that loses its leaves
decumbent (decumbente)- lying or trailing on the ground, but with the tips ascending
decurrent (decurrente)- extending below the point of insertion
dehiscent (dehiscente)- opening
deltoid (deltoide)- triangular
dendroid (dendroide)- branching like a small tree
dentate (dentado)- with teeth along the margin
denticulate (denticulado)- diminutive of dentate, i.e., with small teeth along the margin
dichasial (dicasial)- bearing dichasia
dichasium (dicasio)- a cymose inflorescence whose axis terminates in a flower that is accompanied by two lateral flowers from the base
didynamous (didínamo)- with four stamens, of which two are longer and two are shorter
digitiform (digitiforme)- in the form of digits or fingers, i.e., deeply divided into diverging lobes
dimorphic (dimorfo)- presenting two forms
discoid (discoide)- disc-shaped
discolorous (discoloro)- of two or more colors
distichous (dístico)- arranged in two rows
divaricate (divaricado)- applies to branches or secondary axes that form a very wide angle in relation to the principal axis
domatium (domacio)- a small depression, usually in the axils of the secondary veins
drupaceous (drupáceo)- referring to or like a drupe
drupe (drupa)- a fleshy fruit with a stone, i.e., having a woody endocarp with the seed(s) inside
ellipsoid (elipsoide)- in the form of an ellipse, but in three dimensions
elliptical (elíptico)- in the form of an ellipse, i.e., widest in the central portion and narrowing toward both rounded ends
endemic (endémico)- having a distribution limited to a particular place or region
endocarp (endocarpo)- the inner tissue of the fruit wall
epiphyte (epífito)- a plant that lives on another plant without parasitizing it
exocarp (exocarpo)- the outer tissue of the fruit wall
exserted (exserto)- exposed, projecting outward
falcate (falcado)- sickle-shaped
fascicle (fascículo)- a tight bundle; a tightly contracted cyme
ferruginous (ferrugíneo)- rust-colored
flabellate (flabelado)- fan-shaped
flexuous (flexuoso)- twisted, more or less in the shape of a 'z'
foveate (foveado)- with the surface bearing small pits
frond (fronda)- a fern leaf
fusiform (fusiform)- spindle-shaped
gamopetalous (gamopétalo)- referring to a corolla composed of fused petals
glabrescent (glabrescente)- losing hairs or pubescence at maturity
glabrous (glabro)- lacking hairs or pubescence
glaucous (glauco)- light green in color with a slightly bluish shade
glume (gluma)- in grasses, a sterile bract at the base of the spikelet
gynoecium (gineceo)- a collective term for the female parts of a flower
gynophore (ginóforo)- a column that bears the gynoecium
gynostegium (ginostegio)- a protective organ around the gynoecium that is distinct from the perianth
harpidium (harpidio)- a hooked, claw-like tendril
hastate (hastado)- referring to a laminar organ, pointed and with divergent lobes
haustorium (haustorio)- an organ that functions as a sucker, through which vital juices are obtained
hemiepiphyte (hemiepífito)- a plant that begins its life cycle as an epiphyte but later establishes contact with the soil, from which it obtains nutrients like a normal plant
heterostylous (heterostilado)- having two or three kinds of individuals whose styles differ in length
hilum (hilum)- a scar on the surface of the seed
hirsute (hirsuto)- covered with rigid hairs and rough to the touch
hispid (híspido)- covered with very rigid hairs and very rough to the touch
hispidulous (hispiduloso)- with short, rigid hairs
homologous (homólogo)- concordant, referring to organs that have the same origin
hyaline (hialino)- transparent
hypanthium (hipanto)- the sunken axis of a flower with an inferior ovary
hypocrateriform (hipocrateriforme)- trumpet-shaped
imbricate (imbricado)- referring to foliaceous organs that are closely spaced and overlap at their margins

incised (inciso)- divided more or less deeply into segments
incurved (incurvado)- curved inward, with the concavity on the inner or upper side
indehiscent (indehiscente)- not opening
indeterminate (indeterminado)- growing indefinitely
indusium (indusio)- an organ that covers and protects fern sporangia
inflexed (inflexo)- curved inward
infundibuliform (infundibuliforme)- funnel-shaped
interstaminal (interestaminal)- between or within the stamens
involucre (involucro)- a group of bracts that surrounds and more or less encloses the flowers
laciniate (laciniado)- divided into deep, narrow, sharp-pointed segments
lanceolate (lanceolado)- lance-shaped, referring to a laminar structure whose widest portion is below the middle, narrowing toward both ends
lenticel (lenticelo)- a pore in the bark of a woody stem
lenticellate (lenticelado)- having more or less conspicuous lenticels
lenticular (lenticular)- lens- or lentil-shaped
lepidote (lepidoto)- scaly or with trichomes in the form of scales
lignescent (lignescente)- becoming woody at maturity
limb (limbo)- in a gamopetalous corolla, the free portion of the corolla that forms a border at the end of the tube
megaphyllous (megafilo)- with large leaves
membranaceous (membranáceo)- like a membrane
mericarp (mericarpo)- each of the units, composed of an entire carpel, into which a schizocarpic fruit separates
mesocarp (mesocarpo)- the middle tissue of the fruit wall
mogote (mogote) a limestone formation that results from the erosion and dissolution of the rock; in the strict sense, refers to small limestone bluffs surrounded by alluvion washed in from more or less remote areas; in the broad sense, includes other limestone bluff formations without alluvion at the base; in English, mogotes are sometimes called "haystack hills"
monadelphous (monadelfo)- referring to stamens whose filaments are all fused
monocarp (monocarpo)- a fruit formed from a single carpel
monomorphic (monomorfo)- with all individuals presenting a single form
mucronate (mucronato)- with an apex that terminates in a short, abrupt point
multiseriate (multiseriado)- with several series of whorls
oblanceolate (oblanceolado)- inversely lanceolate, with the widest portion above the middle
oblong (oblongo)- much longer than wide and with parallel sides
obtuse (obtuso)- forming an angle greater than 90°
ocrea (ócrea)- a structure composed of a pair of connate stipules that forms a sheath surrounding the stem
operculum (opérculo)- the upper portion that separates by circumscissile or transverse dehiscence
orbicular (orbicular)- globose
ovate (ovado)- egg-shaped, referring to a laminar organ
overlapping (solapado)- referring to the characters used to distinguish species, these are tenuous when they overlap and usually show intermediate states, complicating the distinction of the limits between the forms
ovoid (ovoide)- egg-shaped, in three dimensions
palea (palea)- in grasses, the inner and upper of the two bracts that subtend a flower
palmately compound (palmaticompuesto)- referring to a compound leaf whose three or more leaflets arise from the apex of the petiole
palmately lobed (palmatilobado)- referring to a leaf whose lobes are palmately arranged
panicle (panícula)- a compound inflorescence of indeterminate growth and pyramidal shape
paniculiform (paniculiforme)- in the form of a panicle
papilla (papila)- a very short trichome or protruberance of the epidermal cell membrane
papillose (papiloso)- having papillae
pappus (pappus)- in composites, the limb of the calyx transformed into simple or plumose hairs or rigid bristles
paraphysis (paráfisis)- a trichome that accompanies the sorus
parietal (parietal)- produced from or borne on the wall (of the carpel)
patelliform (pateliforme)- shaped like a knee-cap or disc
peduncle (pedúnculo)- the axis that subtends a solitary flower or an inflorescence
peltate (peltado)- referring to a leaf with the petiole inserted in the center of a rounded blade
pendulous (colgante)- hanging down
perianth (perianto)- the floral envelope, i.e., sepals, petals, and/or tepals
pericarp (pericarpio)- the fruit wall, composed of exocarp, mesocarp, and endocarp
petaliferous appendage (apéndice petalífero)- a laminar structure adherent to the inner surface of the petal, making it appear double
petiolule (peciólulo)- the petiole that subtends a leaflet of a compound leaf
phenology (fenología)- the study of flowering and fruiting periods
phloem (floema)- the portion of the conductive tissue responsible for food transport, usually found external to the xylem
pinna (pinna)- synonym of a leaflet in compound leaves

pinnate (pinnado)- referring to a leaf whose leaflets are arranged along an elongate rachis
pinnately lobed (pinnatilobado)- referring to a leaf whose lobes are pinnately arranged
pinnatisect (pinnatisecto)- referring to a leaf that is pinnately divided
pinnule (pínnulas)- a leaflet of a bipinnate or tripinnate leaf
pistillate (pistilado)- referring to female flowers
pistillode (pistilodio)- the rudimentary pistil of a male flower
plumose (plumoso)- like a bird's feather
pollinium (polinio)- a mass of pollen grains, characteristic of the families Asclepiadaceae and Orchidaceae
prismatic (prismático)- prism-shaped
proleptic (proléptico)- referring to a phenomenon observed in the shoot system in which lateral bud growth is supressed by the dominance of the apical meristem, so that the lateral buds develop only after the main shoot has attained a certain degree of development or maturity
prophyll (profilo)- a bud-scale on a lateral branch
pseudanthium (pseudanto)- an inflorescence that resembles a single flower due to the manner in which its flowers are arranged, typical of the family Euphorbiaceae
pseudoracime (pseudoracimo)- an simple, racemose inflorescence whose flowers are borne on protuberances along the rachis, typical of the subfamily Faboideae of the family Fabaceae or Leguminosae
pseudostipule (pseudoestípula)- a structure that occupies the position of a stipule but of different origin, representing a prophyll or a basal leaflet that surrounds the stem
puberulent (puberulento)- having short, scattered hairs
pubescent (pubescente, velloso)- hairy
pulviniform (pulviniforme)- shaped like a pulvinus
pulvinus (pulvino)- a swollen structure in the form of a small pillow
pyrene (pirenio)- the bony portion of a drupe that contains one or several seeds
raceme (racimo)- a simple, elongated inflorescence with stalked flowers
racemose (racemoso)- in the form of a raceme
rachis (raquis)- in a compound leaf, an axis bearing the petiolules or leaflets; in an inflorescence, the primary or secondary axis that bears the flowers
ray (radio)- a row of radially arranged parenchymatous cells found in xylem tissue
reflexed (reflexo)- bent downward
reniform (reniforme)- kidney-shaped
reticulate (reticulado)- forming a network or reticulum
retroflexed (retroflexo)- curved downward
retuse (retuso)- with a small cut or crack
revolute (revoluto)- with the margins curved toward the lower surface
rhizome (rizoma)- an underground stem
rhombus (rombo)- a quadrilateral whose sides are parallel and of the same length, and whose opposite angles are equal
rotate (rotáceo)- wheel-shaped, referring to a gamopetalous corolla with a very short tube and an evident limb
rugose (rugoso)- wrinkled
rugulose (ruguloso)- diminutive of rugose
samara (sámara)- a dry, winged, usually membranaceous fruit that is wind-dispersed
sarmentose (sarmentoso)- with long, slender, flexible woody branches that can support themselves on nearby objects
scabrid (escábrido)- diminutive of scabrous
scabrous (escabroso)- having a rough texture
scandent (escandente)- climbing
schizocarp (esquizocarpo)- an indehiscent fruit whose carpels separate at maturity
secondary growth (crecimiento secundario)- growth in diameter of stems or other axial structures
segment (segmento)- a portion of a pinnatisect or pinnately lobed leaf that reaches the midvein
septicidal (septicida)- opening along the septum
septum (septo)- the wall that divides the carpels in a syncarpous gynoecium
sericeous (seríceo)- covered with short, appressed hairs
serrate (aserrado)- saw-like, with small, sharp, closely spaced teeth
seta (seta)- a long, stiff hair
setose (setoso)- having a pubescence of long, stiff hairs
setulose (setuloso)- diminutive of setose
sheath (vaina)- a broadened leaf base that partially or completely surrounds the stem upon which it is inserted
sigmoid (sigmoide)- in the form of an 's'
sorus (soro)- a group of sporangia located on a fern frond
spadix (espádice)- a simple inflorescence with a fleshy central axis, surrounded by a spathe
spathe (espata)- an elongate bract that surrounds the inflorescence
spathulate (espatulado)- spatula- or spoon-shaped
spicate (espigado)- in the form of a spike
spike (espiga)- a simple inflorescence with sessile flowers
spikelet (espícula)- the basic inflorescence of the grasses, composed of a very short axis that bears two sterile bracts (called glumes) at the base, followed by the flowers
sporangium (esporangio)- a structure that contains the spores of a plant
spurred (espolonado)- bearing a spur or a more or less deep sac
squamose (escuamoso)- covered with scales

squamulose (escuamuloso)- diminutive of squamose, covered with small scales

staminate (estaminado)- relating to the stamens or the male flower

staminode (estaminodio)- a sterile stamen, more or less modified

standard (estandarte)- the upper and usually the largest petal in the corolla of members of the subfamily Faboideae of the family Fabaceae or Leguminosae

stellate (estrellado)- bearing radially branched, star-like hairs

stipe (estípite)- the petiole of a fern frond

stipel (estipela)- a small appendage at the base of some leaflets

stipule (estípula)- a small appendage at the base of some leaves

striate (estriado)- having lines, ridges, or grooves on the surface

strigose (estrigoso)- bearing straight, rigid, appressed hairs

strigulose (estriguloso)- diminutive of strigose

strobilus (estróbilo)- a structure with a central axis bearing a group of bracts, which in turn bear or subtend seeds or spores

subinvolucral (subinvolucral)- in a position below the involucre, referring to bracts that do not form part of the involucre

subulate (subulado)- narrowing toward the apex and terminating in a fine point

sulcate (sulcado)- furrowed

supernumerary (supernumerario)- numerous

suture (sutura)- the concrescent margin of the carpels

syconium, syconus (sicono)- a fruit composed of a hollow, rounded or pear-shaped receptacle with an apical aperture; within the receptacle are found the flowers and later the fruitlets

sympodial (simpódico)- referring to a growth pattern in which the principal axis shows determinate growth and, as a result, is displaced by an axillary or lateral axis

syncarpous (sincarpo, sincárpico)- referring to ovaries whose carpels are fused

tendril (zarcillo)- a touch-sensitive organ by means of which a vine holds on to its source of support

tepal (tépalo)- members of a floral whorl that cannot be distinguished as either sepals or petals due to their similarity or position

ternate (ternado)- refers to a leaf blade that is divided into three leaflets

thyrse (tirso)- an inflorescence whose principal axis shows indeterminate growth but whose lateral units are cymose, i.e., with determinate growth

thyrsoid (tirsoide)- in the form of a thyrse

tomentose (tomentoso)- densely covered with short, simple or branched, interwoven hairs

tracheid (traquea)- an imperforate xylem element whose principal function is the conduction of water, but which also functions in structural support

translator (translator)- in some members of the family Asclepiadaceae, an organ that serves to transfer the pollen from one flower to another by means of insects; it is composed of the gland or clip (corpusculum) and the translator arms (retinacula or connectives) that hold the pollinia

trichome (tricoma)- a hair

trifid (trífido)- divided into three more or less equal parts

tripinnate (tripinnada)- thrice pinnate

triternate (triternado)- thrice ternate, resulting in 27 leaflets, cf. ternate and biternate

truncate (truncado)- with the end transversally flat, as though it had been cut off

tuberculate (tuberculado)- with tubercles, i.e., more or less rounded protruberances

turbinate (turbinado)- in the form of an inverted cone

unicarpellate (unicarpelado)- with only one carpel

uncinate (uncinado)- claw-shaped

undulate (ondulado)- wavy, referring to the margin of a laminar organ

unguiculate (unguiculado)- referring to petals with the basal portion very narrow, like a claw

urceolate (urceolado)- urn-shaped

utricle (utrículo)- a dry, indehiscent, syncarpous, one-seeded fruit, enclosed by a bladder composed of the concrescent prophylls

vascular cylinder (cilindro vascular)- the portion of the stem composed of xylem, cambium, and phloem

ventral suture (sutura ventral)- a suture opposite the midvein

xylem vessel (vaso xilemático)- a perforated xylem element specialized for water conduction

vine (bejuco)- a plant that climbs by means of active mechanisms or specialized structures

voluble (voluble)- twining, by means of stems that are capable of spiral movement or circumnutation, which can be toward the right or the left, depending on the species

wing (ala)- an elongate, membranaceous structure

zygomorphic (zigomorfa)- having bilateral symmetry, i.e., with only one plane of symmetry

INDEX TO SCIENTIFIC NAMES

Abrus 242
precatorius L. 242
Acacia 13, 293
ambigua Vogel 294
retusa (Aubl.) R.A. Howard 15, 293
riparia sensu Britton & P. Wilson 293
vogeliana Steud. 294
westiana DC. 293
ACANTHACEAE 46
Achyranthes
altissima Jacq. 53
argentata (Mart.) Moq. 56
nodosa Bert. ex Mart. 56
Acrostichum
sorbifolium L. 36
Adenocalymna
obovatum Urb. 123
portoricense A. Stahl 118
Adiantum
aculeatum L. 27
Adipera
bicapsularis (L.) Britton & Rose 237
Agdestis 341
clematidea Moçiño. & Sessé 341
Allamanda 58
blanchetii DC. 59
cathartica L. 58
AMARANTHACEAE 9, 51
Ampelopsis
arborea (L.) Koehne 403
Amphilophium 11, 117
paniculatum (L.) Kunth 117
Amphistelma
ephedroides Griseb. 87
Anechites 59
asperuginis Griseb. 59
nerium (Aubl.) Urb. 59
Anguria
cookiana Britton 218
glomerata Eggers 209
ottoniana Schltdl. 217
plumeriana Schltdl. 218
plumeriana var. trifoliata Cogn. 218
trifoliata L. 218
trilobata Jacq. 218
Aniseia 159
martinisensis (Jacq.) Choisy 159
Anredera 113
baselloides (Kunth) Baill. 113
cordifolia (Tenore) Steenis 113
leptostachys (Moq.) Steenis 114
vesicaria (Lam.) C.F. Gaertn. 114
Anthacanthus
spinosus (Jacq.) Nees 47
Anthurium 404
scandens (Aubl.) Engl. 404
Antigonon 349
grandiflorum (Bertol) B.L. Rob. 349
guatemalense Meisn. 349
leptopus Hook. & Arn. 350
macrocarpum Britton & Small 349
APOCYNACEAE 58
Apocynum
nerium Aubl. 59
ARACEAE 404
Argyreia 160
nervosa (Burm. f.) Bojer 160
speciosa (L. f.) Sweet 160
Aristolochia 65
anguicida 66
bilabiata sensu Pfeifer 70
calceiformis Urb. 70
elegans Mast. 66
galeata sensu authors 71
gandiflora Sw. 66
grandiflora sensu Vahl 71
littoralis sensu Pfeifer 66
oblongata subsp. **calceiformis** (Urb.) R. Rankin & Acev.-Rdgz. 70
odoratissima L. 70
pandurata Jacq. 70
ringens Vahl 71
trilobata L. 71
ARISTOLOCHIACEAE 65
Arrabidaea 11, 118
chica (H. & B.) Velot 118
Arthrostylidium 436
capillifolium Griseb. 436
farctum (Aubl.) Sodestr. & Lourteig 436
multispicatum Pilger 437
sarmentosum Pilger 437
Arum
hederaceum Jacq. 410
lingulatum L. 413
Arundinaria
multispicata (Pilger) Hack. 437
Arundo
farcta Aubl. 436
ASCLEPIADACEAE 73
Asclepias
clausa Jacq. 76
maritima Jacq. 82
ASPARAGACEAE 417
Asparagopsis
setacea Kunth 418
Asparagus
plumosus Baker 418
setaceus (Kunth) Jessop 418
Aspidium
articulatum Sw. 22
ASTERACEAE 13, 91
Asystasia 46

gangetica (L.) T. Anders. 13, 47
Banisteria
emarginata Cav. 305
floribunda DC. 305
laurifolia L. 302
lucida A. Rich. 308
lupuloides L. 354
nigrescens A. Juss. 308
ovata Cav. 304
pubera Rich. 306
purpurea L. 302
wydleriana (A. Juss.) C.B. Robinson 302
Banisteriopsis
lucida (A. Rich.) Small 308
Barbieria 243
pinnata (Pers.) Baill. 243
polyphylla (Poir.) DC. 243
Basella 114
alba L. 114
rubra L. 114
vesicaria Lam. 114
BASELLACEAE 113
Batocydia
unguis (L.) DC. 122
Berylsimpsonia 13, 93
vanillosma (Wr. & Sauv.) B. Turner 93
Biancaea
sepiaria (Roxb.) Todaro 235
Bidens 94
alba (L.) DC. 96
dissecta (O.E. Schultz) Sherff. 96
portoricensis Bello 94
reptans (L.) G. Don 94
reptans var. urbanii (Greenman) O.E. Schulz 94
scandens L. 109
urbanii O.E. Shulz 15, 94
Bignonia
aequinoctialis L. 118
alliacea Lam. 123
capensis Thunb. 130
caryophyllea Bello 130
chica Humb. & Bonpl. 118
hymenaea DC. 123
lactiflora Vahl 120
magnifica W. Bull 128
paniculata L. 117
unguis-cati L 122
venusta Ker-Gawl. 126
BIGNONIACEAE 11, 116
BLECHNACEAE 22
Blechnum 22
fragile (Liebm.) Morton & Lellinger 22
Boerhavia 319
scandens L. 319
Bonduc
majus Medic. 235
BORAGINACEAE 132
Bougainvillea 9, 319
glabra Choisy 321
spectabilis Willd. 321
Boussingaultia
cordifolia Tenore 113
leptostachys Moq. 114
Brachypterys
ovata (Cav.) Small 304
Bradburya
plumieri (Turp. ex Pers.) Kuntze 250
pubescens (Benth.) Kuntze 250
virginiana (L.) Kuntze 251
Bryonia
americana Lam. 201
grandis L. 204
guadalupensis Spreng. 215
racemosa Mill. 202
Buddleja 141
madagascariensis Lam. 141
BUDDLEJACEAE 141
Cacalia
cordifolia L. f. 100
Cacara
erosa (L.) Kuntze 274
CACTACEAE 141
Cactus
grandiflorus L. 144
Caesalpinia 233
bonduc (L.) Roxb. 234
bonduc sensu Urb. 234
ciliata (Wikstr.) Urb. 234
crista sensu Urb. 234
culebrae (Britton. & P. Wilson) Alain 235
decapetala (Roxb.) Alst. 235
divergens Urb. 234
globerulum Bakh. f. & van Royen 235
major (Medik.) Dandy & Exell 235
portoricensis (Britton & P. Wilson) Alain 237
sepiaria Roxb. 235
CAESALPINOIDEAE 233
Calonyction
aculeatum (L.) House 164
bona-nox (L.) Boj. 164
tuba (Schltdl.) Colla 181
Calopogonium 245
caeruleum (Benth.) Sauv. 245
mucunoides Desv. 245
orthocarpum Urb. 245
Canavalia 247
ensiformis (L.) DC. 247
maritima (Aubl.) Urb. 248
maritima Thouars 248
nitida (Cav.) Piper 248
obtusifolia (Lam.) DC. 248
rosea (Sw.) DC. 248
rusiosperma Urb. 248
CAPPARACEAE 146
Capparis 146
flexuosa L. 147
saligna Vahl 147
CAPRIFOLIACEAE 147
Cardiospermum 367
corindum L. 367
grandiflorum Sw. 368
halicacabum L. 368
var. **halicacabum** L. 368
var. **microcarpum** (Kunth) Bl. 370
microcarpum Kunth 370
Cassia
antillana (Britton & Rose) Alain 239
bicapsularis L. 237

nitida Rich. ... 239
Casssytha ... 300
americana Nees ... 300
filiformis L ... 300
Cayaponia ... 201
americana (Lam.)Cogn. ... 15, 201
racemosa (Mill.) Cong. ... 202
CELASTRACEAE ... 11, 13, 149
Celosia ... 51
nitida ... 53
Celtis ... 13, 387
aculeata Sw. ... 387
iguanea (Jacq.) Sarg. ... 387
Centrosema ... 248
plumieri (Turp.) Benth. ... 250
pubescens Benth. ... 15, 250
virginianum (L.) Benth. ... 251
Ceratostema
portoricensis (Urb.) Hoerold ... 228
Cereus
trigonus Haw. ... 142
undatus Haw. ... 142
Chamaefistula
antillana Britton & Rose ... 239
Chamissoa ... 9, 53
altissima (Jacq.) Kunth ... 53
Chiococca ... 11, 359
micrantha Johnst. ... 359
alba (L.) A.S. Hichc. ... 359
alba (L.) Hitchc. ssp. parvifolia (Griseb.) Steyerm. ... 359
alba (L.) Hitchc. var. parvifolia (Griseb.) Urb. ... 359
parvifolia Griseb. ... 359
racemosa L. ... 359
Chromolaena ... 96
borinquensis (Britton) H. Robins. ... 15, 96
Chusquea ... 437
abietifolia Griseb. ... 439
Cissampelos ... 311
laurifolia Poir. ... 314
pareira L. ... 15, 313
Cissus ... 397
acida L. ... 399
caustica Tussac ... 397
erosa Rich. ... 397, 401
intermedia A. Rich. ... 401
obovata Vahl. ... 397, 401
rotundifolia Vahl ... 399
sicyoides L. ... 401
trifoliata (L.) L. ... 399, 401
tuberculata Jacq. ... 397
verticillata (L.) Nicols. & Jarvis ... 15, 401
Citrullus ... 202
lanatus (Thumb.) Mats. & Nakai ... 202
Clematis ... 13, 350
guadeloupae Pers. ... 354
dioca L. ... 352
flammulastrum Griseb. ... 352
polygama Jacq. ... 352
Clementea
nitida Cav. ... 248
Clerodendrum ... 390
aculeatum (L.) Schlecht. ... 390
thompsonae Balj. ... 392
thompsonae Balf. f. speciosum (Dombrain)Voss ... 391
umbellatum Poir. var. speciosum (Dombrain) ... 391
x **speciosum** van Gert. ... 391
Clitoria ... 251
falcata Lam ... 253
falcata var. falcata f. falcata ... 253
falcata var. falcata f. heteromorpha (Griseb.) Fantz ... 253
pinnata (Pers.) R.H. Sm. & G.P. Lewis ... 243
plumieri Turp. ex Pers. ... 250
polyphylla Poir. ... 243
rubiginosa Juss. ... 253
ternata L. ... 253
ternatea var. pleniflora Fantz ... 255
ternatea var. ternatea ... 255
virginiana L. ... 251
Clusia ... 151
gundlachii A. Stahl ... 15, 152
CLUSIACEAE ... 151
Coccinia ... 204
cordifolia sensu Britton ... 204
grandis (L.) Voigt ... 204
Cocculus
domingensis DC. ... 313
COMBRETACEAE ... 153
Combretum ... 153
grandiflorum G. Don ... 154
indicum (L.) Jongkind ... 155
Commicarpus
scandens (L.) Standl. ... 319
Congea ... 392
tomentosa Roxb ... 392
CONNARACEAE ... 155
CONVOLVULACEAE ... 9, 11, 157
Convolvulus ... 160
acuminatus Vahl ... 169
albiflorus Vahl ... 161
batatas L. ... 164
cissoides Lam. ... 190
corymbosus L. ... 198
cumanenis Kunth ... 184
dissectus Jacq. ... 190
grandiflorus Jacq. ... 181
havanensis Jacq. ... 185
imperati Vahl ... 167
littoralis L. ... 167
martinicensis Jacq. ... 159
meyeri Spreng. ... 171
nervosus Burm. f. ... 160
nil L. ... 171
nodiflorus Desr ... 161
ochraceus Lindl. ... 173
pentanthos Jacq. ... 185
pes-caprae L. ... 173
purpureus L. ... 173
tiliaceus Willd. ... 179
tiliaefolius Desr. ... 197
tridentatus L. ... 198
triqueter Vahl ... 194
tuba Schltdl. ... 181
turpethum L. ... 194
umbellatus L. ... 192
ventricosus Bertero ... 194
Corallocarpus
emetocatharticus (Grosourdy) Cogn. ... 209
Cordia ... 132

bellonis Urb. ... 15, 132
polycephalla (Lam.) I.M. Johnst. ... 133
wagnerorum Howard ... 133
Coreopsis
reptans L. ... 94
Cryptostegia ... 73
grandiflora R. Br ... 13, 74
madagascarensis Bojer ex Dcne. ... 74
Cucumis ... 204
acutangula L. ... 213
anguria L. ... 206
dispsaceus Ehrenb. ex Spach ... 206
melo L. ... 206
pedatus L. ... 218
trilobatus L. ... 218
Cucurbita ... 207
citrullus L. ... 202
maxima Duchesne ex Lam. ... 207
moschata (Duch.) Poir ... 207
odorifera Vell. ... 220
pepo L. ... 207
siceraria Molina ... 211
CUCURBITACEAE ... 11, 200
Cuscuta ... 222
americana L. ... 222
CUSCUTACEAE ... 222
Cydista ... 11, 118
aequinoctialis (L.)Miers ... 118
Cynanchum
anegadense (Britton) Alain ... 86
cheesmanii Woods. ... 86
decaisneanum (Schltr.) Alain ... 86
decipiens (Schltr.) Alain ... 86
ephedroides (Griseb.) Alain ... 87
grisebachienum (Schltr.) Alain ... 86
leptocladon (Decne.) Jiménez ... 87
lineare (Bello) Alain ... 87
monense (Britton) Alain ... 89
parviflorum (R.Br.) Alain ... 89
parviflorum Sw. ... 89
CYPERACEAE ... 418
Dalbergia ... 255
ecastaphyllum (L.) Taub ... 255
monetaria L. ... 256
Dalechampia ... 230
scandens L. ... 231
Davallia
aculeata (L.) J.E. Smith ... 27
dumosa Sw. ... 27
DAVILLIACEAE ... 22
DENNSTEADTIACEAE ... 24
Desmodium ... 256
axillare (Sw.) DC. ... 256
canum (J.F. Gmel.) Schinz & Thell. ... 258
incanum DC. ... 258
intortum (Mill.) Urb. ... 258
DICOTYLEDONS ... 41
Dicranopteris ... 29
flexuosa (Schrad.) Underw. ... 29
pectinata (Willd.) Underw. ... 29
rubiginosa (Mett.) Maxon ... 33
DILLENIACEAE ... 9, 223
Dioclea ... 11, 259
hexandra (Ralph) Mabberley ... 259
reflexa Hook. f. ... 259
Diodia ... 359
sarmentosa Sw. ... 360
Dioscorea ... 421
alata L. ... 421
altissima Lam. ... 422
bulbifera L. ... 422
cayensis Lam. ... 422
chondrocarpa Griseb. ... 422
esculenta (Lam.) Burkill ... 427
floribunda Mart. & Gal. ... 427
friedrichsthalii R. Knuth ... 427
pilosiuscula Bertero ex Spreng. **polygonoides** H. & B. ... 424
polygonoides Humboldt & Bonpland ex Willd. ... 424
rotundata Poir. ... 427
trifida L. ... 427
DIOSCOREACEAE ... 421
Distictis ... 11, 120
lactiflora (Vahl) DC. ... 120
Dolicholus
minimus (L.) Medik. ... 278
pyramidalis sensu Britton & P. Wilson ... 279
reticulatus (Sw.) Millsp. ... 279
Dolichos
ensiformis L. ... 247
erosus L. ... 274
hosei Craib ... 286
lablab L. ... 265
luteolus Jacq. ... 288
maritimus Aubl. ... 248
minimus L. ... 278
obtusifolius Lam. ... 248
phaseoloides Roxb. ... 277
pruriens L. ... 270
purpureus L. ... 265
repens L. ... 288
roseus Sw. ... 248
uncinatus L. ... 283
unguiculatus L. ... 290
urens Jacq. ... 270
urens L. ... 270
Doliocarpus ... 9, 223
brevipedicellatus Garcke ... 225
calineoides (Eichl.) Gilg. ... 225
major Gmel. ... 225
olivaceus Sprague & R.O. William ex Standl. ... 225
Doxantha
unguis-cati (L.) Miers. ... 122
Doyerea ... 209
emetocathartica Grosourd. ... 209
Dracontium
scandens Aubl. ... 404
Drepanocarpus
lunatus (l. f.) G.F.W. Meyer ... 266
Ecastaphyllum
brownei Pers. ... 255
ecastaphyllum (L.) Britton ... 255
Echites ... 59
agglutinata Jacq. ... 61
biflora Jacq. ... 65
lappulacea Lam. ... 59
Elsota

diversifolia (L.) Blake 347
virgata (Sw.) Kuntze 347
Entada 294
polystachya (L.) DC var. **polyphylla** (Benth.) Barneby 294
polyphyla Benth. 294
Epidendrum
claviculatum Wr. 430
Epipremnum 406
aureum (Lindl. & André) Bunting 406
pinnatum (L.) Engler 406
pinnatum cultivar **Aureum** 406
ERICACEAE 227
Eupatorium
borinquense (Britton) B.L. Rob. 96
cordifolium sensu Bello 97
polyodon Urb. 97
EUPHORBIACEAE 230
Exogonium
arenarium Choisy 177
eggersii House 166
microdactylum (Griseb.) House 171
repandum (Jacq.) Choisy 175
solanifolium (L.) Britton 185
FABACEAE 9, 11, 13, 233
FABOIDEAE 239
Fevillea 209
cordifolia L. 209
Ficus 316
citrifolia Miller 316
pumila L. 317
Flemingia
grandiflora Roxb. ex Rottler 51
Forsteronia 61
corymbosa sensu Britton & P. Wilson 61
portoricensis Woods. 15, 61
Funastrum 74
clausum (Jacq.) Schltr. 76
Galactia 262
berteriana DC. 263
dubia DC. 262
dubia DC. var. ehrenbii Urb. 262
dubia DC. var. guanicensis Urb. 262
eggersii Urb. 15, 262
longifolia (Jacq.) Benth. 263
pinnata Pers. 243
striata (Jacq.) Urb. 263
striata (Jacq.) Urb. var. berteriana (DC.) Urb. 263
striata (Jacq.) Urb. var. tomentosa (Bertol.) Urb. 263
Galega
longifolia Jacq. 263
Gleichenia 31
bifida (Willd.) Spreng. 31
brevipubis Christ. 31
flexuosa (Schrad.) Mett. 29
rubiginosa Mett. 33
GLEICHENIACEAE 28
Glycine
labialis L. f. 282
phaseoloides Sw. 279
reticulata Sw. 279
striata Jacq. 263
Gonocalyx 227
concolor Nevling 15, 227
portoricensis (Urb.) A. C. Smith. 228
Gonolobus 76
sintenisii Schltr. 83
stephanotricus Griseb. 76
variifolius Schltr. 83
Gothofreda
cordifolia Vent. 91
Gouania 11, 354
domingensis (Jacq.) L. 354
lupuloides (L.) Urb. 354
polygama (Jacq.) Urb. 355
tomentosa Jacq. 355
Guilandina
bonduc L. 234
bonduc sensu Britton & P. Wilson 235
ciliata Bergius ex Wikstr. 234
culebrae Britton & P. Wilson 235
melanosperma Eggers 234
portoricensis Britton & P. Wilson 237
Hedysarum
axillare Sw. 256
canum J.F. Gmel 258
ecastaphyllum L. 255
intortum Mill. 258
supinum Sw. 258
Heteropterys 301
bellonis Urb. 302
laurifolia (L.) A. Juss. 302
nitida var. obtusifolia Kuntze 305
purpurea (L.) Kunth. 302
wydleriana A. Juss. 15, 302
Hillia 360
longiflora Sw. 360
parasitica Jacq. 360
Hippocratea 11, 149
caribaea Urb. 151
domingensis Urb. & Ekm. 151
ovata Lam. 149
volubilis L. 149
Hoffmannia
lanceolata Griseb. 362
Holmskioldia 394
sanguinea Retz. 394
Hornemannia
racemosa Vahl 228
Hoya 77
australis R. Br. ex Traill 77
carnosa (L.) R.Br 77
Humata
scandens Desv. 27
Hylocereus 142
trigonus (Haw.) Safford 142
undatus (Haw.)Britton 142
Hyperbaena 9, 313
apiculata Urb. & Elman 316
dominguensis (DC.) Benth. 313
glauciramis Urb. & Ekman 314
laurifolia (Poir.) Urb. 314
pellucida Urb. & Ekman 314
Hypolepis 24
aculeata (Spreng.) J. Smith 25
nigrescens Hook. 25
repens (L.) C. Presl 25

tenerrima Maxon ... 25
urbanii Brause ... 25
Ibatia
maritima (Jacq.) Decne. ... 82
Ipomoea ... 9, 161
aegyptia L. ... 189
alba L. ... 164
angustifolia Jacq. ... 198
arenaria (Choisy) Steud. ... 177
arenaria sensu Urb. ... 164
batatas (L.) Lam. ... 164
calantha Griseb ... 166
cathartica Poir. ... 169
cissoides (Lam.) Griseb. ... 190
eggersii Austin ... 166
eriocarpa R.Br. ... 182
filicaulis Willd. ... 198
filiformis Jacq. ... 185
hederifolia L. ... 166
horsfalliae W. Hooker ... 167
imperati (Vahl) Griseb. ... 167
indica (Burm.) Merril ... 169
var. **acuminata** (Vahl) Fosberg ... 169
var. **indica** ... 169
krugii Urb. ... 182
littoralis (L.) Boiss ... 167
macrantha Roem & Schult. ... 181
meyeri (Spreng.) G. Don ... 171
microdactyla Griseb. ... 171
nil (L.) Roth. ... 171
ochracea (Lindl.) G. Don ... 173
pes-caprae R.Br. ... 173
pestigris L. ... 182
polyanthes Roem. & Schult ... 192
portoricensis G. Don ... 169
pulchella sensu Griseb. ... 181
purpurea (L.) Roth. ... 173
quamoclit L. ... 175
quinquefolia L. ... 190
repanda Jacq. ... 175
repanda var. microdactyla (Griseb.) Powell ... 171
rubra (Vahl) Millsp. ... 177
setifera Poir. ... 15, 177
solanifolia L. ... 185
steudelli Millsp. ... 177
stolonifera J. Gmelin ... 167
tamnifolia L. ... 187
tenuissima Choisy ... 177
tiliacea (Willd.) Choisy ... 15, 179
tricolor Cav. ... 179
triloba L. ... 179, 182
tuba (Schltdl.) Don ... 181
tuberosa L. ... 192
verticillata L. ... 187
violacea L. ... 181
wrightii A. Gray ... 181
Iresine ... 55
angustifolia Euphras. ... 55
argentata (Mart.) D. Dietr ... 56
argentata var. latifolia Suess. ... 56
celosia L. ... 55
celosioides L. ... 55
celosioides Sw. ... 55
diffusa H. & B. ex Willd. ... 55
elatior Rich. ex Willd. ... 55
paniculata (L.) Kuntze ... 55
Jacquemontia ... 182
cayensis Britton ... 184
cumanensis (Kunth) Kuntze ... 184
havanensis (Jacq.) Urb. ... 185
jamaicensis (Jacq.) H. Hallier ex Solereder ... 185
nodiflora (Desr.) G. Don ... 161
pentanthos (Jacq.) G. Don ... 185
solanifolia (L.) H. Hallier ... 185
tamnifolia (L.) Griseb. ... 187
verticillata (L.) Urb. ... 187
Jasminum ... 323
azoricum sensu Urb. ... 323
fluminense Vell. ... 13, 323
grandiflorum L. ... 324
multiflorum (Brm.) Andr. ... 324
pubescens (Retz.) Willd. ... 324
sambac (L.) Soland. ... 327
Justicia
gangetica L. ... 47
spinosa Jacq. ... 47
Koanophyllon ... 97
polyodon (Urb.) R. King & H. Rob. ... 97
Lablab ... 265
purpureus (L.) Sweet ... 13, 265
Lagenaria ... 211
siceraria (Molina)Standl. ... 211
vulgaris Ser. ... 211
Lasianthus ... 362
lanceolatus (Griseb.) M. Gómez ... 362
moralesii (Griseb.) C. Wr. ... 362
Lasiacis ... 439
divaricata (L.) Hitchc. ... 439
harrisii Nash ... 439
ligulata Hitchc. & Chase ... 440
sorghoidea (Desv.) Hitchc. & Chase ... 440
swartziana (Hitchc.) Hitchc. ... 440
LAURACEAE ... 300
Lepidaploa ... 13, 97
borinquensis Urb. ... 15, 97
Leptoglottis
portoricensis (Urb.) Britton & Rose ... 298
Lomagramma ... 33
guianensis (Aubl.) Ching ... 33
Lomaria
fragilis Liebm ... 22
LOMARIOPSIDACEAE ... 33
Lomariopsis ... 35
amydrophlebia (Sloss. ex Maxon) Holttrum ... 35
kunzeana (Underw.) Holttrum ... 35
sorbifolia (L.) Fee ... 36
Lomoplis
ceratonia (L.) Raf. ... 298
Lonchitis
repens L. ... 25
Lonicera ... 147
japonica Thumb. ... 147
alba L. ... 359
Lophospermum ... 378
erubescens D. Don ... 379
Luffa ... 211
acutangula (L.) Roxb. ... 213

aegyptiaca Mill. ... 213
cilindrica M.Roem. ... 213
Lycianthes ... 379
virgata (Lam.) Bitter ... 380
Lycopodium
willdenovii Desv. ex Poir. ... 41
Lygodium ... 39
japonicum (Thunb.) Sw. ... 39
Lysiloma
ambigua (Vogel) Urb. ... 294
vogeliana (Steud.) Stehlé ... 294
Macfadyena ... 11, 122
unguis-cati (L.) A. Gentry ... 15, 122
Machaerium ... 9, 265
lunatum (L. f.) Ducke ... 266
Macrodiscus
lactiflorus (Vahl) Bureau ... 120
Macroptilium ... 266
atropurpureum (DC.) Urb. ... 266
lathyroides (L.) Urb. ... 268
Malpighia
bannisterioides L. ... 304
MALPIGHIACEAE ... 300
Mansoa ... 123
alliacea (Beauv.) A. Gentry ... 123
hymenaea (DC.) A. Gentry ... 122
Marcgravia ... 11, 13, 310
brittoniana Alain ... 310
rectiflora Tria. & Planch. ... 310
sintenisii Urb. ... 15, 311
umbellata Griseb. ... 310
MARCGRAVIACEAE ... 11, 13, 310
Marsdenia ... 77
elliptica Decne. ... 15, 79
floribunda (Brongn.) Schltr. ... 79
woodburyana Acev.-Rodr. ... 15, 81
Martiusia
rubiginosa (Juss.) Britton ... 253
Matelea ... 81
borinquensis Alain ... 83
maritima (Jacq.) Woods. ... 82
sintenisii (Schlecht.) Woods. ... 15, 83
variifolia (Schlecht.) Woods. ... 79, 83
Meibomia
axillaris (Sw.) Kuntze ... 256
sintenisii (Urb.) Britton ... 256
supina (Sw.) Britton ... 258
umbrosa Britton ... 256
Melothria ... 213
guadalupensis (Spreng.) Cogn. ... 215
pendula L. ... 15, 215
MENISPERMACEAE ... 9, 311
Merremia ... 189
aegyptia (L.) Urb. ... 189
angustifolia (Jacq.) H. Hallier ... 198
cissoides (Lam.) H. Hallier ... 190
dissecta (Jacq.) H. Hallier ... 15, 190
quinquefolia (L.) H. Hallier ... 15, 190
tuberosa (L.) Rendle ... 192
umbellata (L.) H. Hallier ... 15, 192
Mertensia
bifida Willd. ... 31
flexuosa Schrad. ... 29
pectinata Willd. ... 29
Metastelma ... 85
albiflorum Schltr. ... 86
anegadense Britton ... 86
decaisneanum Schltr. ... 86
decipiens Schltr. ... 86
ephedroides (Griseb.) Schltr. ... 87
fallax Schltr. ... 86
grisebachianum Schltr. ... 86
leptocladon (Dcne.) Schltr. ... 87
lineare Bello ... 87
monense Britton ... 15, 89
parviflorum R.Br. ... 89
Microgramma ... 36
heterophylla (L.) Wherry ... 37
lycopodioides (L.) Copeland ... 37
piloselloides (L.) Copeland ... 37
Mikania ... 99
congesta DC. ... 15, 100
convolvulacea DC. ... 100
cordifolia (L.) Willd. ... 15, 100
fragilis Urb. ... 15, 100
fragilis Urb. var. leptodon Urb. ... 100
gonoclada DC. ... 100
micrantha Kunth ... 103
micrantha var. congesta (DC.) L.B. Rob. ... 100
odoratissima Urb. ... 15, 103
pachyphylla Urb. ... 15, 103
porosa Urb. ... 15, 105
rotunda sensu A. Stahl ... 100
scandens sensu A. Stahl ... 100
stevensiana Britton ... 15, 105
swartziana sensu A. Stahl ... 105
Mimosa ... 13, 296
casta L. ... 296
ceratonia L. ... 298
diplotricha C. Wr. ... 298
paniculata West ex Vahl ... 293
quadrivalvis L. var. **urbaniana** Barneby ... 298
retusa Jacq. ... 293
MIMOSOIDEAE ... 293
Momisia
iguanaea (Jacq.) Rose & Standl. ... 387
Momordica ... 215
charantia L. ... 13, 215
lanata Thunb. ... 202
MONOCOTYLEDONS ... 403
Monstera ... 408
adansonii Schott ... 408
MORACEAE ... 316
Morisonia
flexuosa L. ... 147
Morongia
portoricensis (Urb.) Britton ... 298
Mucuna ... 268
altissima (Jacq.) DC. ... 270
pruriens (L.) DC. ... 270
sloanei Fawc. & Rendl. ... 270
urens (L.) Medik. ... 270
urens sensu Urb. ... 270
Mycosyrinx
cissi (Poiret) G. Beck ... 401
Neorudolphia ... 13, 272
volubilis (Willd.) Britton ... 15, 272
NYCTAGINACEAE ... 9, 317

Nyctanthes
multiflora Burm. f. ... 324
sambac L. ... 327
Odontosoria ... 27
aculeata (L.) J. Smith ... 27
scandens (Desvaux) C. Christ. ... 27
uncinella (Kuntze) Fée ... 27
OLEACEAE ... 323
Oleandra ... 22
articulata (Sw.) C. Presl. ... 22
nodosa (Willd.) C. Presl ... 22
Olyra ... 440
latifolia L. ... 440
Operculina ... 194
grandiflora (Jacq.) House ... 181
triquetra (Vahl) H. Hallier ... 194
turpethum (L.) J. Silva. Manso ... 194
turpethum var **ventricosa** (Bertero) Staples & D. F. Austin ... 194
ventricosa (Bertero) Peter ... 194
Ophioglossum
japonicum Thunb. ... 39
Oplonia ... 47
spinosa (Jacq.) Raf. ... 47
ORCHIDACEAE ... 429
Osmia
borinquenis Britton ... 96
Oxypetalum ... 89
cordifolium (Vent.) Schlecnt. ... 91
Pachyrhizus ... 274
erosus (L.) Urb. ... 274
Panicum
bambusoides Desv. ex Ham. ... 439
divaricatum L. ... 439
divaricatum L. var. lanatum Schltdl. & Cham. ... 440
divaricatum L. var. puberulum Griseb. ... 440
fuscum Sieber ex Griseb. ... 440
sorghoideum Desv. ... 440
Passiflora ... 11, 327
anadenia Urb. ... 339
berteroana Balbis ex DC. ... 328
bilobata Juss. ... 329
edulis Sims. ... 329
foetida L. ... 15, 331
var. **foetida** ... 331
var. **hispida** (DC.) Gleason ... 331
var. **riparia** (Griseb.) Killip ... 331
laurifolia L. ... 331
maliformis L. ... 333
multiflora L. ... 333
murucuja L. ... 334
pallida L. ... 339
quadrangularis L. ... 334
rubra L. ... 15, 334
serrato-digitata L. ... 337
sexflora Juss. ... 337
suberosa L. ... 15, 339
tulae Urb. ... 15, 339
PASSIFLORACEAE ... 11, 327
Paullinia ... 9, 11, 370
curassavica sensu West ... 374
diversifolia Jacq. ... 373
fuscescens Kunth ... 370
pinnata L. ... 15, 371
plumierii Triana & Planchon ... 371
polyphylla L. ... 374
triternata Jacq. ... 374
Pentalinon ... 62
luteum (L.) Hansen & Wunderlin ... 62
Peperomia ... 344
rotundifolia (L.) Kunth ... 344
Pereskia ... 144
aculeata Mill. ... 144
Petrea ... 396
volubilis L. ... 396
Pfaffia ... 9, 56
aurata (Mart.) Borsh ... 56
grandiflora sensu Liogier ... 56
Phaseolus ... 274
adenanthus G. Meyer ... 285
antillanus Urb. ... 285
atropurpureus DC. ... 266
lanceolatus Bello ... 286
lathyroides L. ... 268
longifolius Benth. ... 286
lunatus L. ... 275
ovatus Benth. ... 286
peduncularis Kunth ... 290
polystachyos (L.) Britton ... 277
semierectus L. ... 268
vexillatus L. ... 291
vulgaris L. ... 275
Philodendron ... 408
angustatum Schott ... 410
consanguineum Schott ... 410
giganteum Schott ... 410
hederaceum ... 410
isertianum Schott ... 410
krebsii Schott ... 410
lingulatum (L.) C. Koch ... 413
marginatum Urb. ... 410
micans Klotzsch ex Koch ... 410
nechodomi Britton ... 406
ornatum Schott ... 413
oxycardium sensu Britton ... 410
scandens Koch & Sello ... 410
Phryganocydia ... 124
corymbosa (Vent.) K. Schum. ... 124
PHYTOLACCACEAE ... 341
Pinzona ... 9, 225
coriacea Mart. & Zucc. ... 225
Piper
rotundifolium L. ... 344
PIPERACEAE ... 344
Piptocarpha ... 105
tetrantha Urb. ... 15, 107
Piptocoma ... 107
acevedoi Pruski ... 107
Pisonia ... 321
aculeata L. ... 321
helleri Standl. ... 321
PLUMBAGINACEAE ... 345
Plumbago ... 345
scandens L. ... 345
POACEAE ... 436
Podranea ... 126
ricasoliana (Tanf.) Sprague ... 126
Polygala

diversifolia L. ... 347
POLYGALACEAE ... 9, 347
POLYGONACEAE ... 349
POLYPODIACEAE ... 36
Polypodium ... 39
exiguum Heward ... 37
guianense Aubl. ... 33
heterophyllum L. ... 37
loriceum L. ... 39
lycopodioides L. ... 37
piloselloides L. ... 37
serpens Sw. ... 37
Porana
paniculata Roxb. ... 195
Poranopsis ... 195
paniculata (Roxb.) Roberty ... 195
Pothos
aurea André ... 406
pinnata L. ... 406
Prestonia
agglutinata (Jacq.) Woods. ... 61
Pristimera ... 11, 151
caribaea (Urb.) A.C. Smith ... 151
Protasparagus ... 417
setaceus (Kunth) Oberm. ... 418
Proustia
krugiana Urb. ... 93
stenophylla Urb. & Ekman ... 93
vanillosma C. Wright ... 93
Pseudogynoxys ... 109
chenopodioides (Kunth) Cabrera ... 109
Psiguria ... 11, 217
ottoniana (Schlchet.) C. Jeffrey ... 217
pedata (L.) R.A. Howard ... 218
trifoliata (L.) Alain ... 218
trilobata (L.) Howard ... 218
Psychotria ... 362
pinularis Sessé & Moçiño ... 362
microdon (DC.) Urb. ... 362
PTERIDOPHYTES ... 21
Pterocarpus
lunatus L. f. ... 266
Pueraria ... 277
phaseloides (Roxb.) Benth. ... 13, 277
Pyrostegia ... 126
ignea (Vell.) K. B. Presl ... 126
venusta (Ker-Gawl.) Miers ... 126
Quamoclit
coccinea sensu Urb. ... 166
Quisqualis
indica L. ... 155
Rajania ... 427
cordata L. ... 427
flexuosa Bello ... 421
sintenisii Uline ... 427
RANUNCULACEAE ... 13, 350
Reichardia
decapetala Roth ... 235
Rhabdadenia ... 62
biflora (Jacq.) Muell. Arg. ... 65
paludosa (Vahl) Miers ... 65
RHAMNACEAE ... 11, 354
Rhamnus
domingensis Jacq. ... 354
iguanaeus Jacq. ... 387
polygama Jacq. ... 355
Rhynchosia ... 11, 278
caribaea (Jacq.) DC. ... 282
minima (L.) DC. ... 278
minima var. lutea Eggers ... 278
minima var. pauciflora Kuntze ... 278
phaseloides (Sw.) DC. ... 279
reticulata (Sw.) DC. ... 279
Rivea
campanulata sensu House ... 197
corymbosa (L.) H. Hallier ... 198
nervosa (Burm. f.) H. Hallier ... 160
Rivina
octandra L. ... 342
Rondeletia
microdon DC. ... 362
ROSACEAE ... 355
Rourea ... 155
frutescens sensu Bello ... 157
glabra sensu Griseb. ... 157
surinamensis Miq. ... 157
RUBIACEAE ... 11, 357
Rubus ... 355
florulentus Focke ... 15, 357
Rudolphia
volubilis Willd ... 272
Sabicea ... 364
cinerea Aubl. ... 308, 364
hirsuta Kunth ... 364
moralesii Griseb. ... 362
villosa Roem. & Schult. ... 364
Saelanthus
rotundifolius Forssk. ... 399
Salmea ... 109
scandens (L.) Urb. ... 109
SAPINDACEAE ... 9, 11, 366
Sarcostema
clausum (Jacq.) R. & S. ... 76
Saritaea ... 128
magnifica (Sprague) Dugand ... 128
SCHIZAEACEAE ... 39
Schizopsis
polyanthus Bur. ... 130
Schlegelia ... 13, 376
axillaris sensu A. Stahl ... 377
brachyantha Griseb. ... 377
brachyantha var. portoricensis Urb. ... 377
portoricensis (Urb.) Britton ... 377
SCHLEGELIACEAE ... 13, 376
Schoenus
secans L. ... 419
Schradera ... 364
capitata Vahl ... 366
exotica (Gmelin) Standl. ... 366
vahlii Steyerm ... 366
Schrankia
distachya sensu A. Stahl ... 298
leptocarpa sensu Bello ... 298
portoricensis Urb. ... 298
Scleria ... 418
canescens Boeck. ... 418
scindens Nees ex Kunth ... 419
secans (L.) Urb. ... 419

SCROPHULARIACEAE 378
Sechium 218
edule (Jacq.) Sw. 220
Securidaca 9, 347
diversifolia (L.) Blake 347
erecta Jacq. 347
virgata Sw. 347
volubilis L. 256
Selaginella 41
willdenovii (Desv. ex Poir.) Baker 41
SELAGINELLACEAE 41
Selenicereus 144
grandiflorus (L.)Britton & Rose 144
Senecio
chenopodioides Kunth 109
confusus Britten 109
Senegalia
westiana (DC.) Britton & Rose 293
Senna 13, 237
bicapsularis (L.) Roxb. 237
nitida Rich. 239
Serjania 9, 11, 373
diversifolia (Jacq.) Radlk. 373
lucida Schum. 374
polyphylla (L.) Radlk. 374
triternata (Jacq.) Willd. 374
Sicana 220
odorifera (Vell.) Naud. 220
Sicyos
edulis Jacq. 220
trifoliata L. 399
Silphium
trilobatum L. 111
SMILACACEAE 13, 443
Smilax 443
coriacea Spreng. 443
coriacea var. ilicifolia O.E. Schulz 443
dominguensis Willd. 444
guianensis var. subarmata O.E. Schulz 443
havanensis Jacq. 444
havanensis var. portoricensis A. DC. 443
ilicifolia sensu Boldingh 443
subarmata O.E. Schulz 443
SOLANACEAE 379
Solandra 380
grandiflora Sw. 380
longiflora Sw. 382
Solanum 382
lanceifolium Jacq. 382
pyrifolium Lam. 383, 385
seaforthianum Andr. 383, 395
virgatum Lam. 380
wendlandii Hook. f. 383
Spathodea
corymbosa Vent. 124
Sphagneticola 111
trilobata (L.) Pruski 111
Stegnosperma 341
cubense A. Rich. 341
Stenochlaena
amydrophlebia Slosson ex Maxon 35
kunzeana Underw. 35
Stenolobium
caeruleum Benth. 245
Stephanotis
floribunda Brongn. 79
Sticherus
brevipubis (Christ.) A.R. Smith 31
Stictocardia 195
tiliifolia (Desr.) H. Hallier 197
Stigmaphyllon 304
bannisterioides (L.) C. Anderson 304
cordifolium Niedenzu 306
diversifolium (Kunth) A. Juss. 306
emarginatum (Cav.)A. Juss. 305, 306
floribundum (DC.) C. Anderson 15, 305
lingulatum (Poir.) Small 305
nigrescens (A Juss.) Kuntze 308
ovatum (Cav.) Niedenzu 304
periplocifolium (Desf.) A. Juss. 305
puberum (Rich.) A. Juss. 306
retusum Griseb. 306
tomentosum (Desf.) Niedenzu 305
Stizolobium
pruriens (L.) Medik. 270
Symphysia
racemosa (Vahl) Stearn 228
Syngonium 415
podophyllum Schott 415
Tecoma
capensis (Thunb.) Lindl. 130
ricasoliana Tanfani 126
Tecomaria 128
capensis (Thunb.) Lindl. 130
Teramnus 282
labialis (L.) Spreng. 282
uncinatus (L.) Sw. 283
Tetrapterys 306
citrifolia sensu Alain 308
inaequalis Cav. 308, 364
paniculata Bello 308
paniculata sensu A. Stahl 305
Thibaudia
krugii Urb. & Hoerold 228
portoricensis Urb. 228
Thunbergia 48
alata Bojer ex Sims 13, 49
fragrans Roxb. 13, 49
grandiflora (Roxb. & Rottl.) Roxb. 51
volubilis Pers. 49
Thyella
tamnifolia (L.) Raf. 187
Tournefortia 133
bicolor Sw. 135
ferruginea Lam. 138
hirsutissima L. 135
laevigata Lam. 135
laurifolia Vent. 135
maculata Jacq. 135
microphylla Bert. ex Spreng. 138
peruviana Poir. 135
scabra Lam. 138
volubilis L. 138
volubilis L. var. microphylla (Bert. ex Spreng.) A.DC. 138
Tragia 231
volubilis L. 231
Trichostigma 342

octandrum (L.) Walt. 342
Trommsdorffia
argentata Mart. 56
aurata Mart. 56
TROPAEOLACEAE 385
Tropaeolum 385
majus L. 385
Turbina 11, 198
corymbosa (L.) Raf. 198
Tynnanthus 130
polyanthus (Bur.) Sandw. 130
caryophylleus (Bello) Alain 130
ULMACEAE 13, 387
Urceolaria
exotica Gmelin 366
Urechites
lutea (L.) Britton 62
Vaccinium 228
racemosum (Vahl) Wilber & Luteyn 228
Valeriana 388
scandens L. 388
VALERIANACEAE 388
Vanilla 429
barbellata Rchb. 430
claviculata (Wr.) Sw. 430
correllii Sauleda & Adams 434
dilloniana Corell 430
eggersii Rolfe 434
inodora Schiede 432
mexicana Mill. 432
planifolia G. Jackson 432
poitaei Rchb. 434
pompona Schiede 434
vanilla (L.) Britton 432
Varronia
bellonis (Urb.) Britton 132
corymbosa (L.) Desv. 133
polycephala Lam. 133
VERBENACEAE 390
Vernonia
borinquensis Urb. 97
borinquensis Urb. var. hirsuta Gleason 97
borinquensis Urb. var. resinosa Gleason 97
borinquensis Urb. var. stahlii Urb. 97
Vigna 284
adenantha (Meyer) Mercht. et al. 285
antillana (Urb.) Fawcett & Rendle 285
hosei (Craib.) Back. 13, 286
juruana (Harms) Verdc. 291
longifolia (Benth.) Verdc. 286
luteola (Jacq.) Benth. 15, 288
marina (Burm.) Merr. 288
peduncularis Kunth 290
repens (L.) Kuntze 288
retusa (E. Meyer)Walp 288
ungiculata (L.) Walp. 290
vexillata (L.) A. Rich. 291
Vinca
lutea L. 62
Vincetoxicum
leptocladon Decne. 87
sintenisii (Schltr.) Britton 83
stephanotrichum (Griseb.) Britton 76
variifolium (Schltr.) Britton 83
Viscum
verticillatum L. 401
VITACEAE 11, 396
Vitis 401
caribaea DC. 403
tiliifolia H. & B. ex Roem. & Schult. 403
Volkameria
aculeata L. 390
Wedelia
trilobata (L.) Hitchc. 111
Xenostegia 198
tridentata (L.) D.F. Austin & Staples 198

INDEX TO VERNACULAR NAMES

Acelga trepadora 114
Aguinaldo amarillo 192
Aguinaldo azul 185
Aguinaldo blanco 198
Aguinaldo de costa 185
Aguinaldo peludo 187
Ahoga gallina 253
Ahorca caballo 302
Air yam 424
Allamanda 58
Amarat 298
Amarat steckel 298
Azufaifo 387
Babeiro 61
Babeiro amarillo 62
Bambú trepador 437
Bambuilla 437
Barbados gooseberry 144
Basket wiss 342, 371, 374
Basket-wood 374
Basora 133
Bat wings 334
Batata 164
Batatilla blanca 190
Bay bean 248
Beach milk vine 82
Beach morning glory 181
Bejuco blanco 118, 179
Bejuco colorado 175, 272
Bejuco de agua 225, 403, 406
Bejuco de ajo 123
Bejuco de alambac 272
Bejuco de alambre 272
Bejuco de alcanfor 344
Bejuco de berac 359
Bejuco de buey 302
Bejuco de calabaza 413
Bejuco de calabazón 410
Bejuco de caro 399, 401
Bejuco de clavo 130
Bejuco de conchitas 253
Bejuco de corrales 374
Bejuco de costilla 371, 374
Bejuco de cupey 152
Bejuco de garrote 157
Bejuco de gloria 169
Bejuco de guaragüao 427
Bejuco de lira 310
Bejuco de masa 135
Bejuco de mato 259
Bejuco de membrillo 444
Bejuco de menta 305
Bejuco de miel 109
Bejuco de mona 313
Bejuco de muela 109
Bejuco de nasa 342
Bejuco de palma 342
Bejuco de paloma 279, 310, 342, 371
Bejuco de paralejo 302, 308
Bejuco de puerco 164, 177, 179
Bejuco de puerco playero 173
Bejuco de rana 310
Bejuco de San Juan 61, 305
Bejuco de Santiago 71
Bejuco de sapo 310
Bejuco de sopla 308, 347, 354
Bejuco de torero 201
Bejuco de toro 302, 305
Bejuco de vaca 164, 181
Bejuco dorado 300
Bejuco indio 354
Bejuco prieto 149, 272
Bejuco rosado 175
Bejuquillo de puerco 179
Bell Apple 331
Bellísima 349, 350
Berenjena de paloma 380
Black amaret 298
Black eye susan 49
Black sage 133
Black whithe 374
Black wiss 251, 342, 374
Black witty 147
Blue vine 253
Blue wiss 251
Bona wiss 265
Bottle wiss 147
Bran nettle 231
Bull wiss 305
Burro 147
Butterfly pea 251, 253
Cabellos de ángel 300, 352
Cabrite rotting 374
Cachimbo 71
Calabazón cimarrón 413
Camote 164
Campana de pascua 383
Canaria 58
Canario morado falso 74
Canavalia 248
Cantiva 58
Caro de tres hojas 397
Casabana 220
Cat-claw 122
Chayote 220
Chícharos 265
Chickenet 142
Chiggernit 135
Chiggernit grape 135
Cho-cho 220
Chow stick 354
Christmas vine 195
Claro de luna 164
Clashie-melanie 185
Climbing bamboo 436
Clock vine 49
Coast moon vine 181
Cock spur 387
Cocombro 206
Conchita de Virginia 251
Conchitas 253
Consuelda 114
Coral 350
Coral vine 350
Coralillo 350
Coralina 350
Coralita 350
Corona de novia 198
Corsú 277
Cortadera 418
Cortadora 418
Cow-itch 270
Cowpea 290
Cresta de gallo blanca 283
Cundeamor 215
Cupeillo de altura 152
Cupey de altura 152
Curuba 220
Deleite 253
Diamela 327
Dragon wiss 302
Dunguey 422, 424, 443
Dunguey blanco 443
Enredadera 243
Escambrón 266, 321
Espinaca de Nueva Zelandia 114
Esponja 213
Estefanotis 79
Estropajo 213
Falsa belladona 383
Fideillo 222, 300
Fideos 300
Flor de conchitas 250, 251
Flor de luna 164, 181
Flor de nieve 49
Flor de palo 192
Flor de pasión 334, 339
Flor de pito 250, 253
Flor de sierra 360
Flor de la mañana 383
Florador 79
Fresa de la montaña 357

Frijol ... 290
Frijol caballero ... 265
Frijol cimarrón ... 291
Frijol silvestre ... 288
Frijoles ... 275
Frijolillo ... 278, 279, 282
Frijolillo peludo ... 283
Gallito ... 71
Giant potato climber ... 383
Giniper ... 135
Gloria de la mañana ... 177
Goat foot ... 173, 179
Goat wiss ... 147, 288
Granadilla ... 334
Green briar ... 443
Guaco ... 100, 105
Guaco de cabra ... 105
Guaco falso ... 100, 103
Guaco redondo ... 100
Guanabanilla cimarróna ... 82
Guard wiss ... 118
Guáyaro ... 427
Güicharo ... 211
Güiro ... 211
Gunda ... 422, 424
Haba de burro de jardín ... 248
Haba de playa ... 248
Habas de caballo ... 265
Habichuela cimarrona ... 285, 286
Habichuela parada ... 268
Habichuela playera ... 248
Habichuelas ... 275
Habilla ... 278, 279
Hediondilla ... 239
Hiedra ... 317
Higüerito de sierra ... 377
Hilia ... 360
Hoja de sen ... 237
Honeysuckle ... 147, 350
Hoopvine ... 342
Hortensia de bejuco ... 144
Indigo berry ... 339
Ink berry ... 339
Iron weed ... 262
Jaboncillo ... 347
Jagüey blanco ... 316
Jazmín ... 324
Jazmín de canario ... 323
Jazmín de España ... 324
Jazmín de Italia ... 383
Jazmín de papel ... 324
Jazmín de trapo ... 323
Jazmín oloroso ... 323
Jícama ... 245, 274
Juan caliente ... 157
Jumbee pumpkin ... 215
Jumbee seeds ... 242
Katch and keep ... 293
Kudzu tropical ... 277
Lambrali ... 401
Lamedora ... 298
Leche de perra ... 61
Lemon vine ... 144
Liana de la sierra ... 118
Liana fragante ... 120
Liana uñada ... 122
Limber caper ... 147
Lluvia de orquideas ... 392
Love-in-the-mist ... 331
Madagascar jasmin ... 79
Madeira vine ... 113, 114
Madreselva ... 147
Maiden apple ... 215
Mari-de-Lugo ... 175
Marimbo ... 211
Mascapelo ... 355
Mata de ajo ... 123
Mata de cera ... 77
Mata de peo ... 362
Mato ... 270
Mato colorado ... 248
Mato de playa ... 234, 248
Matos ... 270
Matos del monte ... 270
Maya prieta ... 259
Melón ... 202
Membrillo ... 256
Mexican creeper ... 350
Mijo del sol ... 379
Ñame ... 421
Ñame blanco ... 421
Ñame de Guinea ... 422
Ñame de gunda ... 424
Ñame dunguey ... 422
Ñame gulembo ... 427
Nigua ... 135
Ojo de buey ... 270
Ojos de cangrejo ... 242
Old maid ... 215
Oreja de ratón ... 313
Ox-eye-bean ... 270
Paisaje ... 410
Palawang ... 147
Palinguam ... 147
Palo de brasilete ... 256
Palo de burro ... 147
Palo de hoz ... 266
Palo de perico ... 133
Panitos ... 71
Papa aerea ... 383
Papbush ... 331
Papitos ... 253
Paraguita chino ... 394
Paralejo velludo ... 302
Parasol ... 394
Parcha ... 329, 331
Parcha Cimarrona ... 333
Parcha Colorada ... 334
Parcha yedra ... 339
Parchita ... 337
Pareira ... 313
Passion fruit ... 329
Pega palo ... 120
Pegapalma ... 310, 311
Pelicanos ... 71
Pepineto ... 206
Pepinillo cimarrón ... 215
Pepinillo silvestre ... 206
Pepino ... 220
Pepino angolo ... 220
Pepita amarga ... 209
Peronías ... 242
Pica-pica ... 270
Pinna koop ... 401
Pitahaya ... 142
Platillo ... 394
Ponpón ... 82
Prickly-mampoo ... 321
Pringamosa ... 231
Puddin vine ... 401
Purple alamanda ... 74
Raíz de zarzaparilla ... 444
Rasca garganta ... 410
Razor grass ... 419
Red wiss ... 302, 305
Rubber vine ... 74
Sandia ... 202
Sanjuanera ... 61
Saragüero ... 133
Scrubber ... 242
Secua ... 209
Sen del país ... 237
Snow berry ... 359
Soap stick ... 354
Soap vine ... 354
Sopla ... 354
Sorrel vine ... 399
Sponge cucumber ... 213
Stiver bush ... 237
Strainer vine ... 213
Strawberry pear ... 142
Suelda con suelda ... 114
Susana ... 49
Susana blanca ... 49
Sweet pea ... 265
Sweet potato ... 164
Tagua-tagua ... 331, 337
Tagua-tagua serrana ... 339
Tente en el aire ... 222, 300
Terciopelo ... 392
Tibey trepador ... 360
Tobacco pipe ... 71
Tortera ... 270
Trinitaria ... 321
Tulipa ... 377
Tunbergia ... 51
Uña de gato ... 122
Uyama ... 209
Valeriana ... 388
Velo de novia ... 195
Velvet leaf ... 313
Viuda ... 49, 120
Water lemon ... 329
Water Yam ... 421
Wax plant ... 77, 79
Wedelia ... 111
White fig ... 316
White root ... 354
White wist ... 374
White yam ... 421, 427
Wild allamanda ... 62
Wild bush bean ... 268

Wild cucumber 206
Wild Licorice 242
Wild marygold 111
Wild morning glory 177
Wild potato 179
Wild vine 179
Wild yam 424
Yellow dodder 300
Yellow love 300
Yellow morning glory 192
Yerba de medio real 344
Yerba de ratón 344
Yerba linda 344
Zarza 235, 296, 298
Zarza brava 293
Zarza de cercas 235
Zarzaparilla 298, 444