MALPIGHIACEAE\textsuperscript{3}

Introduction

The Malpighiaceae are represented in the flora of the Guayana Highland by about 160 species, of which about 100 are nearly or quite endemic to the area. These species are referable to 22 genera. Such a large number of species, relative to the size of the family (probably about 1250 species in 71 genera, according to my current estimate), in a rather small area makes the flora of Guayana one of the richest and most diverse assemblages of Malpighiaceae in the world. This

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paper is a treatment of the taxonomy of that assemblage and a few related Amazonian species. Subsequent papers will consider some of the phytogeographic and evolutionary questions growing out of this work.

The most recent monograph of the Malpighiaceae is Franz Niedenzu's monumental treatment in Das Pflanzenreich (1928). This work is better than one would gather from its critics, but the keys are sometimes difficult to use, and Niedenzu suffered from seeing a poor representation of many floras. He was never able to do fieldwork or visit herbaria in Paris, London, or the Western Hemisphere, so naturally he made some mistakes and omitted many rare or poorly collected species. José Cuatrecasas (1958) has given us an excellent modern treatment of the Malpighiaceae of Colombia, and the present paper plus my subsequent treatment of the Malpighiaceae for the Flora de Venezuela will extend the modern coverage to include most of South America north of the Amazon. However, new species are still being found regularly in that area, and it will surely be at least another generation, possibly two, before the flora of northern South America is known as well as most temperate and many subtropical floras are today.

I have defined "Guayana," for the purpose of this paper, as the area demarcated with the label "superposed Roraima sediments (approximate limits)" on Bassett Maguire's revised map of Guayana (1979); cf also this volume. In political terms, that includes the uplands of western Guyana; much of Bolivar, Venezuela, and adjacent parts of Roraima Territory, Brazil; all of Amazonas, Venezuela, and adjacent parts of Amazônas, Brazil; the drainage of the upper Rios Negro, Íçana, and Uaupés in Brazil; and the drainage of the Rio Vaupés in Amazonian Colombia. I have tried to include all Malpighiaceae found in this area, as a minimum. In addition, a few extra-Guayana species are included because they are likely to be found in Guayana eventually, or because they are closely related to species of Guayana and need to be distinguished from them. As it happens, the flora of the black waters of the entire Rio Negro is almost entirely covered by this paper, because most species present anywhere on the Rio Negro extend up to the area considered part of Guayana. Similarly, most of the state of Bolivar, Venezuela, will be covered by this paper, even the lowlands along the middle Orinoco. However, the flora of the area of San Félix and Upata is rather different and may well contain species not treated here.

The Malpighiaceae of Guayana include many species of lowland savannas and riversides and many more of the uplands, especially savannas, rocky slopes, and cumbre forests. Except for some of the riverine species, closest relatives of lowland species seem often to be upland species, suggesting that this flora is a rather coherent historical unit that really deserves the recognition accorded it by Maguire and other authors in this series. From the point of view of a specialist in the Malpighiaceae, this flora is especially noteworthy for the abundance of the genera I have recently grouped in the subfamily Byrsonimoideae (Anderson, 1978), genera 1 to 9 in the Taxonomy below. By any measure one could devise, this subfamily is far more abundant in Guayana and northern Amazonia than anywhere else (except for the genera Galphimia and Byrsonima). For reasons I shall discuss elsewhere, I consider the Byrsonimoideae to exhibit most of the ancestral characteristics of the family, and the genus Diacidia, which is endemic to Guayana, has the least specialized inflorescences found in the family. These facts lead me to suggest, with some hesitation, that the Malpighiaceae may have
originated and achieved their early diversity in northern South America, possibly on the Roraima Sandstone Formation of which the tepuis are a remnant. Subsequent migration to the north and south was followed by major new episodes of evolutionary radiation. Thus the mostly Mexican or Antillean genera Malpighia, Galphimia, and Gaudichaudia are absent from Guayana, as is the central Brazilian genus Peixotoa. The large genus Banisteriopsis (90 species) is poorly represented in Guayana (ten species) and very well represented in central Brazil. All of these non-Guayana groups are morphologically relatively advanced, as one would expect of groups resulting from secondary radiation. In a later paper I shall consider in detail the most likely time and place of the origin and diversification of the Malpighiaceae, including the problems inherent in attempting to address that question. For the present it seems safe to say that the Guayana Highland, if not the homeland of the Malpighiaceae, at least has served as a refugium where some rather primitive members of the family have survived.

Taxonomy is at best an inexact science, and taxonomy in the neotropics is still in a primitive stage. This paper is sure to suffer from errors and inadequacies, many of which will become evident as the flora becomes better known. However, in several cases I am already well aware that my treatment leaves much to be desired, and in most of these the source of the problem is not inadequate collection, but more likely extreme variability of the plants, or hybridization (current or former), or misinterpretation on my part. Following is a list of what I consider the species or complexes most in need of further, intensive study. I give it in the hope of encouraging energetic and ambitious students to direct their attention to these problems.

Blepharandra heteropetalalintermedia/cachimbensis
Blepharandra hypoleuca
Byronima concinna
Byrsonima cuprea/punctulata/leucophlebia
Heteropterys macradena
Mascagnia benthamiana
Stigmaphyllum hypoleucum

Taxonomy


Trees, shrubs, subshrubs, or lianas to hardly woody twining vines, always perennial. Vesture always of unicellular hairs, these usually medifixed or submedifixed, sometimes basifixed, rarely stellate. Leaves usually opposite and decussate, sometimes whorled, very rarely subopposite or alternate, often bearing large multicellular glands on the petiole or lamina or both; lamina simple, usually entire, rarely lobed, the margin never really toothed but sometimes pseudodentate or ciliate at the location of marginal glands; stipules usually present on, beside, or within the petiole, distinct or variously connate, sometimes very small or apparently absent. Flowers almost always perfect, subtly to strongly bilaterally symmetrical. Sepals 5, free or partially adnate to the receptacle, eglandular or, most often, the lateral 4 or all 5 bearing (1–)2 large multicellular abaxial glands. Petals 5, free, clawed, alternating with the sepals, imbricate with the posterior innermost and one of the anterior-lateral pair outermost, most often yellow, pink,
or white, sometimes other colors but very rarely blue, the posterior petal often
different from the lateral 4. Stamens mostly 10, fewer by reduction in some
genera, very rarely up to 15, the stamens alike or heteromorphic; anthers raised
on filaments, usually dehiscent by longitudinal slits, rarely with apical or subapical
pores or short slits. Gynoecium superior, usually comprising 3 free to connate
carpels, occasionally 2, very rarely 4, all carpels usually fertile, each fertile carpel
containing 1 pendent anatropous ovule; styles usually 1 per carpel, rarely connate
or reduced in number. Fruit dehiscent or indehiscent, nutlike, drupaceous, or
samaroid; seed without endosperm.

Type. Malpighia Linnaeus.

A few aspects of the morphology of Malpighiaceae require fuller discussion to
enable the reader to successfully use the keys and descriptions that follow.

Vesture. With their peculiar hairs, Malpighiaceae achieve much variation in
vesture, which is of great systematic importance. My use of terms generally
follows that of Niedenzu, and attempts to be precise and consistent. The typical
malpighiaceous hair is T-shaped or Y-shaped, with the basal part called the foot
or stalk and the crosspiece the trabecula or branches. The variations in vesture
depend on length and straightness of the foot and angle, length, and straightness
of the trabecula. Sericeous is used when the trabecula is straight and ± sessile,
producing a silky vesture. I use this term whenever the hairs are tightly appressed,
even when they are sparse, so that the term refers more to the quality of the hairs
than their abundance, which is denoted by qualifying adjectives as appropriate.
Velutinous denotes erect, parallel hairs, usually Y-shaped but sometimes simple
(i.e., basified, usually through suppression of one branch); again, density is indi-
cated by modifiers. Tomentose is used when the hairs, usually the trabeculae,
are twisted and non-parallel. These basic types of vesture often grade into each
other, which is indicated by combinations like tomentose-sericeous.

Inflorescence. The ancestral inflorescence of the Malpighiaceae seems to have
been a thyrs, a raceme of helicoid cymes (cincinnsi). This inflorescence is still
well developed in most byronimoid genera, with the least condensation present
in species of Diacidia, Burdachia, Glandonia, and several other genera. Each
cincinnsi is subtended by a bract. The axis of the cincinnsi is called the pedun-
cle, and it bears two bracteoles at or below its apex, which is a distinct joint.
Beyond the joint the shoot terminates in the flower borne on a pedicel. One of
the bracteoles subtends a secondary peduncle, which in turn bears two bracteoles,
one sterile and one fertile, and a terminal flower. The fertile bracteole is always
on the same side, hence the helicoid nature of the cyme. The history of the
inflorescence in the family is one of successive and parallel episodes of reduction
and condensation. First the cincinnsi were reduced to single flowers. This is now
the commonest situation, where each apparent flower-unit (bract, peduncle with
two bracteoles, and pedicel with flower) is actually a one-flowered cincinnsi.
These are grouped in pseudoracemes, corymb, or umbels, and these may then
be reduced (often to four flowers) and then borne themselves in racemes or
panicles. Another common change is for the peduncle to be lost, so that the
sessile pedicel is subtended just below the joint by the bract and both bracteoles.
These units may then be variously grouped in second- and third-order inflores-
cences. In some evolutionary lines the clustering probably preceded the loss of
the peduncle. See Figure 7 for a diagram of some of the commonest evolutionary
Fig 7. Evolutionary trends in the inflorescences of Malpighiaceae. a) Raceme of cincinni; b) pseudoraceme (raceme of 1-flowered cincinni); c) many-flowered corymb or umbel, peduncles retained; d) 4-flowered umbel, peduncles retained; e) many-flowered corymb or umbel, peduncles lost; f) 4-flowered umbel, peduncles lost.
trends. In my descriptions, if they are not modified, the terms bract, peduncle, bracteole, and pedicel refer only to the structures just described. This usage is consistent with Niedenzu’s. Occasionally, in order to avoid ambiguity, I use the term floriferous bract or floriferous peduncle, which mean the same as bract or peduncle respectively. Other axes of the inflorescence are not normally denoted here by the term peduncle; if they are, such axes are clearly distinguished from the floriferous peduncle. Similarly, reduced leaves in the inflorescence that do not subtend a floriferous peduncle are never simply called bracts; they are distinguished by some modifier, such as “inflorescence bracts.”

Floral symmetry. Flowers of Malpighiaceae are almost always bilaterally symmetrical, a fact ignored by many authors, particularly ones who have never seen the plants alive. The flowers, which are visited by bees, orient with the innermost petal (the “flag”) erect and at the back of the flower from the bee’s point of view. That petal is very often different in size, shape, color, stance, or other aspects from the other four petals. Across the flower is the odd sepal, which is often different from the other four, in many genera eglandular when they are biglandular. These two organs define a plane of symmetry and serve as reference points for the descriptions. The flag petal is posterior, the other four are the posterior-lateral pair and the anterior-lateral pair. The odd sepal is anterior, the others anterior-lateral and posterior-lateral. The stamens are denoted with respect to the sepal or petal to which they are nearest. When the stamens are heteromorphic, as they sometimes are in very elaborate ways, the androecium is symmetrical, so that each stamen has a twin across the flower except for the two on the plane of symmetry, which are usually unique. The carpels are called anterior or posterior; the commonest arrangement is for one carpel to be anterior, ± on the plane of symmetry, and the other two to be posterior, on each side of the plane of symmetry.

Measurements of mascagnioid samaras. Among the genera with schizocarpic, samaroid fruits, several have the largest wings lateral and the dorsal wing variously developed (Mascagnia, Hiraea, et al). In these groups I have followed Niedenzu’s terminology for measurements of the wings, which is that for all three wings “width” denotes the distance from the nut to the farthest margin, while “height” is the maximum measurement at right angles to the width. In some cases these uses of the terms seem absurd, but the variation in the size and shape of these three wings is such that no set of terms, consistently applied, will seem appropriate in all cases.

Notes about the Keys to Genera

The keys below are constructed for the flora of Guayana, as defined above in the Introduction. While they will usually serve for other areas in northern South America, they do not attempt to deal with exceptional species that do not grow in Guayana. For example, almost every samara-bearing genus has one or more species with ± wingless fruits somewhere in its range, and such species will not necessarily key out here, nor will species of Stigmaphyllum with truncate styles, nor species of Hiraea with pedunculate flowers, etc. For explanation of some of the terms used, see the preceding discussion of morphology. For illustrations, see the plates for individual species. At least one species of every genus is illus-
trated, and most of the characters used in the following keys are shown in those plates.

Key to the Genera of Malpighiaceae in Guayana
(for specimens with flowers)

1. Styles slender and subulate, the stigmas minute; shrubs or trees.
2. Leaves bearing large glands on the petiole or abaxial surface of the lamina; some bracteoles often bearing large apical or abaxial glands.
   3. Anthers with 2 dark longitudinal wings on the outer locules; carpels connate only along a narrow central axis, separating in fruit. 2. Lopanthera.
   3. Anthers unwinged; carpels broadly and persistently connate.
   4. Stipules connate intrapetiolarly, persistent; flower bud spherical; connective of the anther enlarged, greatly exceeding the apically rounded locules; filaments glabrous. 8. Burdachia.
   4. Stipules connate intrapetiolarly, caducous, leaving a large interpetiolar scar; flower bud pyramidal; connective of the anther exceeded by extensions of the apically tapered locules; filaments densely hirsute. 9. Glandonia.
3. Leaves and bracteoles eglundular (except for tiny pellucid dots in the lamina and gland-tipped marginal teeth or cilia on bracts and bracteoles in some species).
   5. Inflorescence a tight umbellate fascicle, sessile or subsessile, axillary to leaves or bracts or leaf-scars on older stems; carpels distinct; petals abaxially sericeous, at least on claw. 1. Pterandra.
   5. Inflorescence an elongated terminal thyrs or pseudoraceme; carpels connate, at least in flower; petals glabrous or rarely bearing a few hairs.
   6. Anthers bearing on each side a line or cluster of vesicular outgrowths toward the apex; carpels separating in fruit. 4. Verrucularia.
5. Anthers without vesicular outgrowths; carpels persistently connate, the fruit indehiscent.
   7. Anthers bearing few to many basifixed awns or hairs, the apical ones more or less stiff and directed slightly forward; petals of the open flower flat to somewhat concave; hairs on the leaves (if any) mostly basifixed.
   8. Petals white and/or pink, or 4 white and the posterior pale yellow; anthers with the apical hairs hardly or not at all different from other hairs on the stamen; stamens 10; ovary with all 3 locules fertile (except in some populations of B. fimбриata). 4. 5. Blepharandra.
   8. Petals all yellow; anthers with 2–4 stout apical awn-like hairs, these strongly differentiated from other hairs on the stamen, if any; stamens 6–10; ovary with only 2 locules developed and containing ovules, the third reduced and empty. 6. Diacidia.
   7. Anthers glabrous or bearing medifixed or sub-medifixed hairs, the apex without specially modified or directed hairs; lateral 4 petals concave or cup-shaped in open flower, especially the anterior 2; hairs on the leaves (if any) mostly medifixed or sub-medifixed or branched, rarely basifixed or sub-basifixed. 7. Byrsosnima.
4. A few pink-flowered species of Byrsosnima have anthers that mimic those of Blepharandra, from which they differ in having the stipules connate to form an intrapetiolar pair, the connective of the anthers much exceeding the fertile part of the locules, and the ovary sericeous at the apex.
10. Stipules small, up to 2 mm long, interpetiolar or borne on the base of the petiole, distinct.

11. Stipules borne on the base of the petiole; carpels 2 or 3, completely connate in the ovary, developing into an indehiscent, fleshy fruit; styles free or connate; trees or shrubs. 21. Bunchosia.

11. Stipules interpetiolar, sometimes apparently absent; carpels 3, centrally connate in the ovary, the fruit dry and schizocarpic; styles 3, free; vines or shrubs.

12. Calyx bearing 10 glands; bracteoles wider than the floriferous bract and often longer, often bearing marginal or abaxial glands. 19. Tetrapterys.

12. Calyx bearing 8–9 glands; bracteoles as large as the bract or smaller, eglandular.


13. Petals abaxially sericeous.5

14. Petals, especially the lateral 4, very densely sericeous and dentate to laciniate; bracts and bracteoles triangular, closely investing base of pedicel. 10. Banisteriopsis.

14. Petals sparsely sericeous and long-fimbriate; bracts and bracteoles lingulate, spreading. 11. Diplopterys.

9. Styles with the stigma internal, the apex dorsally rounded, truncate, or extended into a hook or flap.

15. Styles (2 or all 3) with an apical-dorsal extension laterally expanded into a horizontal or pendulous flap; 4 anthers opposite the lateral sepals with the locules much reduced, nearly or quite sterile. 12. Stigmaphyllum.

15. Styles rounded or truncate at the apex or with the apical-dorsal extension hook-like or pedaliform; all anthers fertile.

16. Bracteoles much larger than the bracts, globose-cymbiform, borne just below the flower, enclosing the bud until anthesis; pedicel none or up to 2 mm long in fruit, the peduncle well developed. 17. Mezia.

16. Bracteoles mostly similar to the bracts or smaller than them, larger in some species, not enclosing the bud, at least not throughout its enlargement; pedicel well developed relative to the peduncle.

17. Calyx with 1 large central gland on each of the 4 lateral sepals, the anterior sepal eglandular.

18. Petals (in ours) pink, the lateral 4 abaxially sparsely to densely sericeous; bracteoles large, 4 mm long or longer; flowers borne ultimately in 4-flowered umbels. 16. Jubelina.

18. Petals yellow, glabrous; bracteoles small, up to 2.5 mm long; flowers borne ultimately in elongated pseudoracemes. 20. Lophopterys.

17. Calyx eglandular or with 2 glands on each of the 4 lateral sepals or on all 5 sepals.

19. Anthers with the connective extended up to 1 mm beyond the locules; petals abaxially densely sericeous; anther locules (in ours) densely pilose-sericeous. 22. Dicella.

19. Anthers with the connective hardly or not at all exceeding the locules; petals glabrous or variously hairy; anther locules hairy in a few species, otherwise glabrous.

20. Petals (at least the lateral 4) with a prominent abaxial wing; petals pink and/or white.

21. Flowers borne ultimately in a tight corymb or umbel.

5 While this paper was in press, Banisteriopsis krukoffii Gates was found for the first time in Venezuela. It has the petals of a Banisteriopsis but the spreading bracts and bracteoles of a Diplopterys.
of 4–10 flowers; all petals smooth on the adaxial face.

13. Heteropterysis.

21. Flowers borne ultimately in an elongated pseudoraceme; posterior petal (and the laterals in some) papillose on the adaxial face.


20. Petals abaxially smooth or at most slightly carinate, mostly yellow, in a few species lilac, pink, white, bronze, maroon, or yellow turning red.

22. Pedicels sessile (i.e., floriferous peduncle not developed); flowers borne ultimately in umbels of 4–many flowers.

23. Stipules well-developed, usually elongated, epipetiolar, mostly borne at or above the middle of the petiole; inflorescences axillary.


23. Stipules none or minute and borne at the base of the petiole; inflorescences terminal or axillary and terminal.

13. Heteropterysis.

22. Pedicels pedunculate; flowers borne ultimately in umbels, corymb, or pseudoracemes.

24. Petals concealed by the sepals during enlargement of the bud, until anthesis.


13. Heteropterysis.

25. Carpels with lateral crests, developing into lateral wings in fruit.

15. Mascagnia.

24. Petals (at least the outermost) exposed during enlargement of the bud.


15. Mascagnia.


27. Flowers borne ultimately in elongated to congested pseudoracemes.

28. Bracteoles smaller than bracts; carpels with 1 crest on each side.

15. Mascagnia.

28. Bracteoles mostly larger than bracts; carpels with 2 (or more) crests on each side.

19. Tetrapterys.

27. Flowers borne ultimately in umbels of 4(–6) flowers.

29. Stipules none or borne on the base of the petiole; carpels smooth-sided.

13. Heteropterysis.

29. Stipules interpetiolar, distinct or connate; carpels with lateral crests, developing into lateral wings in fruit.

19. Tetrapterys.

Key to the Genera of Malpighiaceae in Guayana
(for specimens with fruits)

1. Fruit proper unwinged, the sepals sometimes accrescent or winglike in fruit; fruit schizocarpic or indehiscent.

2. Fruit schizocarpic, the mericarps dry, or the carpels distinct even in flower.

3. Leaves and bracteoles glandular (except for tiny pellucid dots in the lamina of some species).
4. Inflorescence a tight umbellate fascicle, sessile or subsessile, axillary to leaves or bracts or leaf-scars on older stems; pedicels sessile.
   1. Pterandra.
4. Inflorescence an unbranched, often corymbose, terminal thyrs or pseudoraceme comprising cincinnus of 1–several flowers; pedicels pedunculate.
   4. Verrucularia.

3. Leaves bearing large glands on the petiole or abaxial surface of the lamina; some bracteoles often bearing large apical or abaxial glands.
5. Styles slender and subulate, the stigmas minute; anthers longitudinally winged.
   2. Lophanthera.
5. Styles stout, truncate or subpeltate at the apex; anthers unwinged.

2. Fruit indehiscent, dry or fleshy.
6. Woody vines; sepals enlarged in fruit to form 5 wings 2–5.5 cm long subtending a nut 13–18 mm in diameter, the anterior sepal/wing eglandular.
   22. Dicella.
6. Shrubs or trees; sepals not or only slightly accrescent in fruit (except in Diacidia spp, with the nut up to 2.5 mm in diameter and all 5 sepals biglandular).
7. Leaves and bracteoles eglandular (except for gland-tipped marginal teeth or cilia on bracts and bracteoles in some species).
8. Fruit up to 2.5 mm in diameter, dry at maturity, the stone covered by a very thin, non-fleshy coat; hairs on the leaves (if any) mostly basifixed.
9. Fruit with up to 3 fertile locules (only 2 in some populations of B. jimbrati); anthers with the apical hairs hardly or not at all different from other hairs on the stamen; sepals not or hardly accrescent in fruit.
   5. Blepharandra.
9. Fruit with only 2 locules; anthers with 2(–4) stout apical awn-like hairs, these strongly differentiated from other hairs on the stamen, if any; sepals accrescent in fruit in some species.
   6. Diacidia.

8. Fruit 4–15 mm or more in diameter, the stone covered by a fleshy exocarp; hairs on the leaves, if any, mostly medifixed or submedifixed or branched, rarely basifixed or sub-basifixed.
   7. Byrsinumia.
7. Leaves bearing large glands on the petiole or abaxial surface of the lamina; some bracteoles often bearing large abaxial glands.
10. Fruit without a soft fleshy exocarp, dry and corky or fibrous at maturity; inflorescence terminal, with each bract subtending a short cincinnus of 1–6 flowers; styles slender and subulate, free, the stigmas minute.
11. Stipules connate intrapetiolarly, persistent; 1 cotyledon folded back, the other embracing it; filaments glabrous.
   8. Burdachia.
11. Stipules connate interpetiolarly, caducous, leaving a large interpetiolar scar; cotyledons straight and not folded, equal or one larger and slightly embracing the other; filaments densely hirsute.
10. Fruit with an edible fleshy yellow or red exocarp at maturity; inflorescence lateral, with each bract subtending 1 flower; styles stout, free or connate, with large subpeltate stigmas.

1. Fruit winged, the wings reduced in some species to winglets or dissected crests; fruit schizocarpic.
12. Mericarps with neither the dorsal nor the lateral wing(s) clearly dominant, the wings short relative to the size of the nut, often dissected and irregular or rudimentary.
13. Flowers borne ultimately in umbels or corymbs of 4(–8).
   11. Diplopterys.
   15. Mascagnia.
13. Flowers borne in an elongated pseudoraceme.
12. Mericarps samaroid, with either dorsal or lateral wings(s) well developed and dominant.

15. Samara with the dorsal wing dominant, the nut bearing on its sides only short winglets or crests or quite smooth.

16. Wing of the samara with the adaxial edge thickened, the veins diverging and branching from it toward the thinner abaxial edge.

17. Styles with the stigma quite apical and without any sort of dorsal extension at the apex.

17. Styles with an internal stigma and a prominent dorsal extension of the apex in the form of a hook or flap.


12. Stigmaphyllum.

16. Wing of the samara with the abaxial edge thickened, the veins diverging and branching from it toward the thinner abaxial edge.

13. Heteropterys.

15. Samara with the lateral wing(s) dominant, the dorsal wing smaller or reduced to a winglet or crest, occasionally absent.

18. Bracteoles much larger than the bracts, globose-cymbiform, borne just below the flower, enclosing the bud until anthesis; pedicel none or up to 2 mm long in fruit, the peduncle well developed, 7-25 mm long in fruit.

17. Mezia.

18. Bracteoles similar to the bracts or smaller than them, not enclosing the bud; pedicel well developed relative to the peduncle.

19. Calyx with 1 large central gland on each of the 4 lateral sepals, the anterior sepal eglandular.

20. Nut of the samara with the fertile locule accompanied on each side by a parallel sterile cavity developed during maturation; lateral wings of the samara directed sideways, semicircular or up to twice as long as wide; bracteoles large, 4 mm long or longer; flowers borne ultimately in 4-flowered umbels.


20. Nut of the samara containing only the fertile locule; lateral wings of the samara directed forwards, 3 or more times as long as wide; bracteoles small, up to 2.5 mm long; flowers borne ultimately in elongated pseudoracemes.

19. Lophostyris.

19. Calyx eglandular or with 2 glands on each of the 4 lateral sepals or on all 5 sepals.

21. Samara with 1 continuous lateral wing or 2, 1 on each side.

22. Pedicels usually pedunculate, the peduncle rarely much reduced or absent; stipules interpetiolar or borne on the base of the petiole, very short; flowers usually borne in ± elongated pseudoracemes, these occasionally congested to form corymb or umbels.

15. Mascagnia.

22. Pedicels sessile; stipules epipetiolar, most often borne well above the base of the petiole, often elongated; flowers borne in umbels of 4 or more.


21. Samara with 4 discrete lateral wings, 2 on each side.

19. Tetrapteryis.


Shrubs or trees, the leaves often crowded at tips of branchlets, eglandular (except for tiny angular translucent dots often present in the lamina); stipules intra- and epipetiolar, basally to completely connate. Inflorescence reduced to fasciculate clusters in the axils of leaves or bracts or above leaf scars; pedicels sessile. Flowers apparently almost actinomorphic, very weakly or not at all cinctate in bud. Sepals all eglandular or all biglandular. Petals ± alike, often persistent in fruit, abaxially sparsely to densely sericeous on claw and center of limb.
Stamens 10 in 2 whorls, the outer whorl opposite the petals and having longer filaments than the inner whorl; filaments distinct, flat, adaxially hirsute at the base; anthers alike, glabrous, 4-locular, the outer locules bearing introrse longitudinal wings; pollen tri- or tetracolporate. Receptacle with tufts of basified hairs inside sepals and petals and filaments. Ovary of 3 distinct uniovulate carpels borne on a flat or pyramidal torus; styles 3, attached ventrally or subapically, inbent in bud, persistent in fruit, subulate with minute apical stigmas. Fruit composed of 3 (or fewer due to abortion), dry, 1-seeded, indehiscent cocci with a papery exocarp and a moderately thick, corneous but not bony endocarp.

Type. Pterandra pyroidea Adr. Jussieu.

Pterandra comprises at present seven described species: Four in northern Amazonia and the Guayana Highland, one in the Planalto of south-central Brazil (P. pyroidea Adr. Juss.), one in southern Amazonia (P. evansii Cuatr.), and one on Isla Gorgona, Colombia (P. ultramontana Cuatr.). Several additional species will be described in the near future.

Key to the Species of Pterandra in Guayana

1. Shrubs or trees 2–10 m tall; fascicles of flowers borne in the axils of current leaves or above leaf scars 1 or 2 nodes below current leaves, probably all on stem of the current season; lamina of the largest leaves up to 9.5 cm long; bracts and bracteoles narrowly triangular; sepals slightly or not at all revolute.

2. Leaves white or yellow below, bearing scattered, dark red or brown, short (up to ca 0.5 mm long), straight, sessile hairs; lateral veins of the lamina flush with the surface below or prominent; anther wings 0.3–0.5 mm wide; carpels and cocci borne on a pyramidal torus.
   1. P. flavescens.

2. Leaves light green below, brown- or white-sericeous, the hairs up to 1.3 mm long, straight to somewhat serpentine, sessile or short-stalked; lateral veins of the lamina prominently raised below; anther wings 0.2 mm wide; carpels and cocci borne on a flat torus.
   2. P. sericea.

1. Trees 15–25 m tall; fascicles of flowers borne on older parts of the stem 1 to many nodes below current leaves, probably stem from previous season or seasons; lamina of the largest leaves (5–)8–14 cm long; bracts and bracteoles broadly triangular; sepals strongly revolute.

3. Pedicel 0.4–0.6 mm in diameter; leaves obtuse or very short-acuminate at the apex, the acumen up to 5 mm long; translucent dots in the lower epidermis of the leaf prominent; calyx glands pink; petals white.
   3. P. arborea.

3. Pedicel 1–1.2 mm in diameter; leaves longer-acuminate at the apex, the acumen 7–12 mm long; translucent dots in the lower epidermis obscure; calyx glands whitish-yellow; petals greenish-yellow.
   4. P. guianensis.


Shrubs or small trees 2–10 m tall; branchlets sericeous. Lamina of the larger leaves (3–)4–9.5 cm long, (1–)2–5 cm wide, elliptical or slightly obovate, cuneate at the base, obtuse or rounded and apiculate at the apex, white or yellow below, with angular glandular dots usually conspicuous in the surface below and sometimes above, sericeous on the midrib above and below and on lateral veins below and sometimes above, otherwise glabrate above and bearing scattered, dark red or brown, short, straight, sessile hairs below, with only the midrib prominently raised below, the 7–9 pairs of lateral veins prominent or obscure, the reticulum prominent above. Flowers borne in fascicles of 1–3 in axils of current leaves or above leaf scars 1 or 2 nodes below current leaves; bracts and bracteoles
similar, 1.5–2.5 mm long, 0.5–1 mm wide, narrowly triangular, sericeous, persistent in fruit; pedicels 12–26 mm long, loosely rufo-sericeous. Sepals 1.5–3 mm long beyond the glands, 1.5–2.5 mm wide, triangular, acute or obtuse at the apex, slightly or not at all revolute, sericeous abaxially, glabrous adaxially, often with translucent dots in the adaxial surface, bearing 10 glands, the glands lateral on sepals, 1.5–2 mm long, flat, elliptical or oblong, compressed or not. Petals pale yellow, loosely sericeous abaxially on claw and center of limb, hirsute adaxially on claw, at least at base; claw 1.5–2.5 mm long, 0.7–0.8 mm wide; limb 3.5–4.5 mm long, (3–)3.5–4.5 mm wide, round or spatulate, ± flat, erose, usually with translucent dots in center. Stamens with filaments 2–3 mm long; anthers 0.8–1 mm long, reflexed, mostly persistent in fruit, the wings dark red, 0.3–0.5 mm wide, slightly shorter than locules, often widest at base, the connective glandular, dark red and slightly extended at apex; pollen tricolporate. Ovary with carpels ca 1.5 mm high, borne on a pyramidal torus, hirsute; styles slightly subapical, 3–4 mm long, glabrous except at base. Cocci 4.5 mm high, spheroid, without a base of spongy tissue, pubescent.

Type. *Maguire & Politi 28104*, savanna along open banks of lower Caño Negro, 1500 m, Cerro Sipapo (Paráque), Amazonas, Venezuela, 25 Dec 1948 (holotype NY! isotypes US! VEN!).


Shrubs or trees 2.5–10 m tall; branchlets sericeous to eventually glabrate. Lamina of the leaves 3–7 cm long, 1.5–3.5 cm wide, elliptic or slightly ovate or obovate, cuneate at the base, obtuse or acute or slightly acuminate and often apiculate at the apex, light green below and containing many angular translucent dots, glabrate above except sericeous on nerves and margin, brown- or white-sericeous below with the hairs sessile or short-stalked, straight or slightly serpentine and up to 1.3 mm long, the midrib and lateral nerves raised below; petiole 4–10 mm long, sericeous; stipules 2.5–3 mm long, sericeous abaxially, dark red-hirsute adaxially, quite connate or free at the apex. Flowers borne in fascicles of 3–6 in axils of current leaves; bracts and bracteoles similar, 1.5–2.5 mm long, up to 0.8 mm wide, narrowly triangular or linear. Pedicel 8–14 mm long, 0.8 mm in diameter, loosely sericeous. Sepals 3–3.5 mm long, 2.5–3 mm wide, triangular, obtuse to acute at the apex, densely sericeous abaxially, glabrous adaxially, all eglandular or all biglandular, the glands up to 2 mm long, flat, circular or elliptical, slightly detached, not compressed. Petals white or pale yellow, abaxially sericeous on claw and midrib, the claw 1–2 mm long, the limb 3–4.5 mm long, 2.5–3.5 mm wide, round or spatulate, flat or revolute, erose, with translucent dots in the center. Stamens with filaments 1.5–3 mm long; anthers 1 mm long, reflexed, deciduous, the wings uniformly ca 0.2 mm wide and red (?), the connective glandular and slightly broadened at the apex. Ovary with carpels borne on a flat torus, hirsute with basifixed hairs; styles basiventridixed, 3–4 mm long. Immature cocci 3 mm high, compressed-ovoid with a swollen base, hirsute.
Fig 8. *Pterandra sericea*. a) Flowering branch; b) stipules and leaf-bases; c) hairs from abaxial surface of lamina; d) flower; e) three stamens opposite one petal and two sepals; f) immature fruit (one carpel aborted). a–d and f drawn from Maguire 32715, e from Wurdack 34405 by Annette Seidenschnur Mahler.

Distribution. Western Guyana and eastern Bolívar, Venezuela. GUYANA. Bolívar: Chimantá Massif, by rapids of Rio Apácara over igneous rock, western side of Apácara-tepuí, elev 415 m, Mar ffr, Steyermark 74677 (F, NY); Cerro Bolívar, elev 700–750 m, Feb ffr, Wurdack 34405 (F, MICH, NY, P, US, VEN).


Trees 15–25 m tall; branchlets sericeous to eventually glabrate. Lamina of the larger leaves (5–)8–14 cm long, (3–)4–7 cm wide, broadly elliptic or obovate, cuneate at the base, obtuse at the apex or very abruptly short-acuminate, the acumen up to 5 mm long, thinly but persistently sericeous below, with many prominent angular translucent dots in the lower epidermis, loosely sericeous above but soon glabrate except on the veins; petiole 8–22(–28) mm long, sericeous; stipules 3–4 mm long, quite connate, abaxially sericeous at the base and distally glabrous, adaxially hirsute. Flowers borne in paired fascicles on old stems axillary to and slightly above leaf scars, each fascicle bearing 1–5 flowers at a time; bracts and bracteoles similar, 1–2 mm long and wide, triangular, abaxially sericeous, adaxially glabrous, deciduous. Pedicel (13–)15–24 mm long, 0.4–0.6 mm in diameter, sericeous. Sepals ca 3.5 mm long, linguiform, revolute, abaxially sericeous, adaxially glabrous, all biglandular, the glands pink, ca 1.5 mm long, flat, elliptical. Petals white, abaxially sericeous, adaxially hirsute at base of claw or glabrous, the claw 1–1.5 mm long, the limb 3.5–4.5 mm long, 2.5–3.5 mm wide, ovate or elliptical, flat, erose or subentire. Stamens with filaments 1.5–3 mm long; anthers 0.7–0.9 mm long, the connective not glandular or enlarged, the wings ca 0.3 mm wide. Ovary 1–1.5 mm high, borne on a pyramidal torus, tomentose; styles subapical, ca 4 mm long, glabrous except at base. Cocci 4–4.5 mm high, spheric with a base of spongy tissue, tomentose.

Type. Ducke, unfoloded forest, cachoeira, Rio Tarumâ, near Manaus, Amazônas, Brazil, 3–8–1929 (holotype RB 23649! isotype US!).

Distribution. Itacoatiara to Manaus and northwest. BRAZIL. Amazônas: margem do ig. do Bindá, Manaus, Coelho s n [INPA 4009] (IAN, INPA); type, q v; Manaus-Itacoatiara Highway, Reserva Florestal Ducke, forest on terra firme, Prance et al 2122 (MICH, NY); Manaus-Itacoatiara, Rodrigues & Loureiro 7058 (INPA), Rodrigues 7244 & 7577 (INPA); Rio Maturacá, catinga forest between Missão Salesiana and Serra Pirapucú, elev 400–800 m, Silva & Brazão 60825 (MG, MICH, NY, US).

Collected in flower from July to September and in fruit from August to January. Cowan 38123 (MG, MICH, NY, US) is this species or a very close relative. It was collected in Serra do Navio, Terr. Amapá, Rio Amapari, heavily forested hills, 70–300 m elev. More collections from Amapá, especially ones that note color of petals, should help to understand the variation in this species.

4. Pterandra guianensis Anderson, sp nov

Arbor usque 20 m alta, ramis sericeis, demum glabratis. Folii lamina 9.5–14 cm longa, 3.5–6 cm lata, elliptica vel parum obovata, basi cuneata, margine paene
vel omnino plana, apice abrupte acuminata acumine 7–12 mm longo, supra atro-viridis et novella sericea mox glabra praeter costam, subtus flavovirens et etiam adulta sericea pilis brevibus, sessilibus, rectis parallelisque, ca 0.5 mm longis, costa et utrinque 7–9 nervis lateralis supra planis, subtus prominentibus, reticululo utrinque prominenti, subtus punctis obscuris translucidis angulatisque instructa; petiolus 9–15 mm longus, sericeus; stipulae 3.5–4 mm longae, triangulares, plane connatae vel sulcatae apiceque liberae, abaxialiter glabrae vel basi sericeae, adaxialiter hirsutae. Fasciculi binati florum 2–4 foliiis delapsis axillares, bracteis bracteolisque similaribus, 1–1.5 mm longis latisque, triangularibus, abaxialiter sericeis, adaxialiter glabris, persistentibus vel demum deciduis. Pedicellus 11–16 mm longus, 1–1.2 mm diametro, sericeus. Sepala ca 3.5 mm longa, linguata, revoluta, abaxialiter sericea, adaxialiter glabra, omnia biglandulifera, glandulis albo-flavids, usque 2 mm longis, planis, ellipticis. Petala viridi-flava, abaxialiter sericea, ungue 1–1.5 mm longo, limbo 3–4 mm longo, 2.5–3 mm lato, ovato vel elliptico. Staminum filamenta 1.5–2.5 mm longa; antherae ca 0.8 mm longae, connectivo apice truncate vel minute apiculato, alis 0.2–0.3 mm latis. Ovarium ca 1.5 mm altum, tomentosum pilis ± medifixis; styli ca 3.5 mm longi, praeter basim hirsutam glabri. Fructus tomentosus, cocciis immaturis ca 3 mm altis latisque, in toro pyramidalii portatis.


Distribution. Known only from the type.

This species is closely related to P. arborea, but it differs in its long-acuminate leaves with obscure translucent dots in the epidermis, its stout pedicels, and its greenish-yellow petals.


Shrubs or trees, the stems often containing white latex, the leaves bearing glands on the petiole or lamina or both; stipules intra- and slightly epipetiolar, 3⁄4 to completely connate. Inflorescence terminal (rarely axillary in L. spruceana), a thrusy composed of few-flowered cincinni or dichasia or a pseudoraceme, the bracts and bracteoles persistent, 1 or both bracteoles usually bearing a large gland. Petals entire or at most minutely denticulate, deciduous, the posterior petal moderately to strongly differentiated from the other 4. Stamens 10, ± in 1 whorl, the filaments distinct or slightly connate basally, glabrous, those opposite the sepals longer than those opposite the petals; anthers alike, glabrous, deciduous, 4-locular, the outer locules bearing dark longitudinal wings, the connate shorter than the locules; pollen tricolporate. Receptacle glabrous or with a row of short, basifixed hairs between filaments and ovary. Ovary of 3 uniovulate carpels, the carpels laterally somewhat to quite free but connate along a narrow to broad central axis; styles 3, apical or subapical, bent in bud, subulate with minute apical stigmas, glabrous, often persistent in fruit. Fruit schizocarpic, breaking apart into 3 (or fewer due to abortion) dry, unwinged, 1-seeded cocci, the mericarps indehiscent or slightly dehiscent along the keel but not enough so to release the spheroid seed.

Type. Lophanthera longifolia (H.B.K.) Grisebach.
Lophanthera is a lowland genus of four species, three of which occur in or near Guayana.

Key to the Species of Lophanthera

1. Stipules up to 3 mm long; inflorescence erect, shorter than the subtending leaves; one bracteole bearing a large sessile gland covering much of its abaxial surface; petals white or pink.  
   1. *L. spruceana.*

1. Stipules 5–12 mm long; inflorescence more or less pendulous, often longer than the subtending leaves; one or both bracteoles usually bearing an apical, often stalked gland; petals yellow.
   2. Glands of the calyx 1–4, borne on 1–3 adjacent posterior sepals; ovary and fruit densely pilose.  
   2. *L. pendula.*

2. Glands of the calyx usually 10 (often connate in pairs), symmetrically distributed on all 5 sepals; ovary and fruit glabrous.
   3. Primary peduncle of the cincinnati (from bract to joint of first flower) 2.5–8.5 mm long; anthers 2–2.5 mm long, with wings ca 0.5 mm wide; cocci 7–9 mm long, the proximal half filled with aerechyma.  
   3. *L. longifolia.*

3. Primary peduncle 9–20 mm long; anthers 0.8–1.0 mm long, with wings 0.1–0.2 mm wide; cocci ca 5 mm long, containing only the seed, no aerechyma.  
   4. *L. lactescens.*


Shrubs or small trees to 6 m tall; stems sericeous to glabrate, the hairs short, straight, sessile, reddish-brown. Lamina of the larger leaves 15–22 cm long, 5–10 cm wide, elliptical or slightly ovate or obovate, obtuse or attenuate at the base, revolute at the margin, abruptly short-acuminate at the apex, glabrate above, very sparsely but persistently sericeous below, usually bearing 2 large impressed glands below at the base and several small glands in a row on each side; petiole 5–12 mm long, eglandular, sericeous to glabrate; stipules 1.5–3 mm long, connate, obtuse or rounded at the apex, abaxially sericeous. Inflorescence terminal or rarely axillary, simple, binate, or ternate, each axis 5–15 cm long, with a pair of sterile, much-reduced leaves 1–15 mm above the base, erect, reddish-brown-sericeous, a thyrse composed of ascending 1–5-flowered cincinnati 1–2.5 cm long; bracts 1–2 mm long, triangular, sericeous, eglandular; primary peduncle (from base to joint of first flower) 4–8 (–11) mm long, bearing at its apex 2 bracteoles similar to the bract, one of these bearing a large round gland over most of the abaxial surface, the other, eglandular bracteole usually fertile (i.e. subtending a lateral branch). Pedicel 4–6 mm long, sericeous. Sepals extending 1–2 mm beyond the glands, obtuse or rounded at the apex, sericeous to glabrate abaxially, ciliate on the margin, glabrous adaxially, all biglandular or very rarely 1 of the anterior-lateral sepals eglandular, the glands circular or obovate, 0.8–1.5 mm long, often so compressed as to appear confluent in open flowers. Petals white or pink, 4–6 mm long, dorsally smooth or slightly carinate at base of limb, glabrous, the posterior petal with a much longer and thicker claw than the others. Stamens with the filaments 1.5–2 mm long, the anthers 1.5–2 mm long, the wings 0.3–0.6 mm wide, widest distally and exceeding the locules. Ovary ca 1 mm high, densely sericeous; styles 2–2.5 mm long, slightly incurved at the apex or straight, apical. Cocci separating from each other along a broad zone of contact and leaving a plane base, 8–10 mm long, 5–6 mm wide, thinly sericeous, irregularly ovoid, containing the seed in a globose distal chamber above a broad, empty or aerechymatous base ca 2–3 mm high.
Type. Spruce 2518/2632, prope Panuré ad Rio Uaupés, Amazônas, Brazil, Oct 1852–Jan 1853 flr/frt (isotypes CP, NY!).

Distribution. BRAZIL. Amazônas, Rio Uaupés: caatinga, Rio Tikie at Irippiy, May flr, Fröes 12548/242 (A); caatinga, Panuré, Pires 1052, Nov flr, (IAN), 1070 (IAN), 1080, Nov flr/frt, (IAN, NY), Pires & Silva 7950, Jun flr/frt, (IAN, UB); solo úmido arenoso, Vila Fauareté, May flr, Ribeiro 995 (MICH); Ipanoré, Nov flr, Schultes & Pires 9090 (GH, US); type, q v.

2. Lophanthera pendula Ducke, Tropical Woods 50: 34. 1937.

Shrubs or small trees, the stems sericeous to glabrate and eventually lenticellate. Lamina of the larger leaves 14–23 cm long, 5.5–10.5 cm wide, elliptic or broadly elliptic, cuneate or slightly decurrent at the base, usually abruptly short-acuminate at the apex with the acumen ca 5 mm long, glabrate except loosely sericeous on the midrib, especially below, and on the margins, bearing small impressed glands below near the base and often distally in a row on each side; petiole 2–2.7 cm long, loosely sericeous to glabrate, eglandular or rarely bearing 1–2 glands near the apex on decurrent laminar tissue; stipules 5–8 mm long, abaxially sericeous, adaxially nearly or quite glabrous, the pair triangular, 2-ribbed, quite connate or free at the apex. Inflorescence 25–65 cm long, with a pair of sterile, much-reduced leaves 3–6 cm above the base, ± pendulous, an open pseudoraceme of 1-flowered cymes, with often 1 cm or more between pairs or groups of flowers, tomentose with basifixed or medifixed hairs; bracts 2–3 mm long, triangular, tomentose, eglandular or with marginal glandular spots; peduncle 2–5 mm long, bearing at the apex 2 minute reduced bracteoles and well below the apex 2 larger bracteoles 1–2 mm long, often with marginal glandular spots, 1 bracteole terminating in a large stalked gland. Pedicel 6–9 mm long, pilose. Sepals 2–3 mm long, triangular, acute at the apex, flat, appressed-pilose on both sides, bearing 1–4 glands on 1–3 adjacent posterior sepals, the glands 1–1.3 mm long, flat, circular. Petals yellow, 4–5 mm long, cucullate, dorsally alulate or carinate, glabrous, the posterior petal with a larger, more spreading limb. Stamens with the filaments 2–3 mm long, the anthers 1.5 mm long, the wings ca 0.3 mm wide, widest distally. Ovary ca 1.5 mm high, densely pilose with mostly basifixed hairs; styles ca 4 mm long, persistently bent. Cocci separating from a short pyramidal axis, ca 6 mm long, 4–5 mm wide, pilose, laterally compressed, with a flattened arching dorsal keel, containing only the seed (no aerenchyma).


3. Lophanthera longifolia (Humboldt, Bonpland & Kunth) Grisebach in Martius, Fl. Bras. 12(1): 25. 1858. Fig 9a–h.


Shrubs or small trees 1–6(–10) m tall, the branchlets loosely sericeous, often containing some white latex. Lamina of the leaves 12–30 cm long, 4–10 cm wide, obovate, gradually narrowed at the base, acute or short-acuminate at the apex, glabrate above or sparsely sericeous on the midrib, thinly sericeous below, at least on the veins, usually bearing few to many small impressed glands below near the midrib or distant from it; petiole (1–)1.4–3 cm long, ± persistently sericeous, usually bearing 2(–4) flat glands above near the middle; stipules (6–)7–10 mm long, narrowly triangular, quite connate or bidentate at the apex, abaxially sericeous to glabrate, adaxially glabrous. Inflorescence 12–35 cm long, with a pair of usually sterile, much-reduced leaves about midway between the base and the first cincinni, usually pendulous, loosely sericeous or tomentose, a thyrs composed of 15–70 horizontal or reflexed, 1–4-flowered cincinni; bracts 2–4 mm long, triangular, abaxially loosely sericeous, eglandular; primary peduncle (from base to joint of first flower) 2.5–8.5 mm long, bearing 0.5–1.5 mm below its apex 2 triangular bracteoles, one of these terminating in a sessile or stalked gland, the other, eglandular bracteole subtending a lateral branch. Pedicel (3–)5–8 mm long, loosely sericeous. Sepals extending 2–2.5 mm beyond the glands, triangular, acute at the apex, flat, thinly sericeous distally to glabrate on both sides, all biglandular, the glands 1–2 mm long, obovate, strongly lateral, neighboring glands of adjacent sepals often ± connate. Petals yellow, 5–8 mm long, dorsally carinate and somewhat cucullate, glabrous. Stamens with the filaments 1.5–3 mm long, the anthers 2–2.5 mm long, the wing 0.5 mm wide, widest distally and exceeding the locules. Ovary 1.5–2 mm high, glabrous; styles 3.5–4.5 mm long, apical or slightly subapical. Coccis separating from a pyramidal axis, 7–9 mm long, 3–4 mm wide, glabrous, sub-cylindrical, the proximal half filled with aerenchyma, the distal half bearing the seed and carinate.

Type. Humboldt & Bonpland, locis umbrosis, ad ripam fluminis Cassiquiare (Missiones del Orinoco), Amazonas, Venezuela (P).

Distribution. Along the Alto Río Orinoco, Cassiquiare, and Río Negro in Amazonas, Venezuela; widespread along rivers in Amazônas, Brazil; and occasional in Rondônia and Pará. Representative collections: VENEZUELA. Amazonas: Orinoco, Isla del Ratón, Breteler 4718 (US, VEN, WAG); La Esmeralda, Fariañas et al 295 (VEN); São José do Cassiquiare, Fröes 21500 (NY, US); Río Orinoco between San Fernando de Atabapo and Tamatama, Level L-25 (F, MICH, NY, VEN); Danta Falls, Cuao River, Maguire & Politi 27321 (NY, VEN); W of Santa Barbara, Maguire et al 32077 (NY, VEN); Río Cassiquiare 4 hours below origin, Maguire et al 36604 (MICH, NY, US, VEN); Caño Cupuehi at mouth of Río Atabapo, Maguire et al 37683 (NY, VEN); San Carlos de Río Negro, Ll. Williams 14563 & 14721 (US, VEN); El Cucuy, Río Negro, Ll. Williams 14716 (US, VEN); Alto Orinoco, Esmeralda, Ll. Williams 15314 (VEN), 15361 (NY, US, VEN), 15414 (US, VEN). BRAZIL. Amazônas: Rio Jamundá [Nhamundá], Aminarú-Assú, Black & Ledoux 50–10865 (IAN); Borba, Río Madeira, Ducke 76 (NY); Faro, Ducke [MG 3719 & 6921] (MG); Manaus, Fröes 20846 (NY); Sucuriú, Río Urbú, Fröes 25430 (IAN); Barcelos, Río Negro, Fröes 28439 (IAN); Río Canumã, Río Madeira, Fröes 33748 (IAN); near Tres Casas, mun. Humaitá, Krukoff 6269 (NY); Itacoatiara-Manaus, Oliveira 2948 (IAN); Río Juruá, mata da várzea, Pena 573 (MICH); Maués, Pires 80 (IAN, NY); Tefé, Pires 1413 (IAN); Río Negro between mouth of Río Caures and Barcelos, Prance et al 15136
Fig 9. *Lophanthera longifolia* and *Pterandra guianensis*. a–h, *L. longifolia*: a) Flowering branch; b) stipules and petioles; c) flower; d) stamens, left to right adaxial, lateral, and abaxial views; e) gynoecium; f) infructescence; g) seed in locule with proximal aerenchyma; h) seed. i–m, *P. guianensis*: i) flowering branch; j) connate stipules; k) flower; l) stamens, left and center adaxial views, right abaxial view. Drawn by Melissa Marshall, a–e from Breteler 4718, f–h from Maguire et al 32077, i–m from Tillett et al 45011.

Collected in flower and fruit in almost all months, most frequently from November to March.

*Lophanthera longifolia* is usually collected along rivers. Its fruit appears to be well adapted to dispersal by water, in that half the volume of each coccus is filled with aerenchyma.


Trees to 15 m tall; stems lacticiferous, very finely sericeous, soon glabrate and coarsely lenticellate. Lamina of the larger leaves (12–)15–24 cm long, (5–)9–12 cm wide, obovate, decurrent at the base, rounded or obtuse or apiculate at the apex, glabrate except for very fine subappressed hairs on the midrib, usually bearing several small impressed glands below in a row on each side; petiole 1.5–2.5 cm long, finely sericeous to glabrate, eglandular or bearing 2 large flat glands above in the middle; stipules 8–12 mm long, abaxially gray-sericeous, adaxially very sparsely sericeous, the pair triangular, 2-ribbed, quite connate or free at the apex. Inflorescence 30–40 cm long or longer, with a pair of sterile, much-reduced leaves 1–3 cm above the base, pendulous, gray-sericeous to reddish-subvelutinous, a thyrs composed of many crowded, horizontal or reflexed, 1–3-flowered dichasia or cincinni 2–4 cm long; bracts 1.5–3 mm long, narrowly triangular, loosely sericeous, eglandular; primary peduncle (from base to joint of first flower) 9–20 mm long, bearing at its apex 2 minute bracteoles (hardly more than swellings in some) and well below the apex 2 large triangular bracteoles, one or both of these usually terminating in a large stalked gland, one or both often fertile (i.e., subtending lateral flowers). Pedicel 4–7 mm long, sparsely velutinous. Sepals extending 1–2 mm beyond the glands, triangular, acute at the apex, flat, appressed-tomentose on both sides especially distally, all biglandular, the glands 2–2.5 mm long, obovate, laterally compressed, somewhat decurrent, neighboring glands of adjacent sepals sometimes partially to completely connate. Petals yellow, 5–7 mm long, dorsally carinate, pilose on the margin. Stamens with the filaments 2–2.5 mm long, the anthers 0.8–1 mm long, the wings 0.1–0.2 mm wide, widest distally. Ovary ca 1.3 mm high, glabrous; styles ca 2.3 mm long, incurved at the apex or straightening, subapical. Coci separating from a very short pyramidal base, ca 5 mm long and 3.5 mm wide, glabrous, obovoid, containing only the seed (no aerenchyma). Chromosome number: n = 6 (voucher: Anderson 11665, MICH).

Type. *Ducke* [RB 17698], silva non inundata, Bella Vista, Rio Tapajós, Pará, Brazil, 31–V–1923 flr/frt (holotype RB!).

Distribution. This very rare species is known in the wild only from the lower Rio Tapajós, where Ducke found it and where collectors from IAN have recently
re-collected it. However, Ducke brought it into cultivation in Rio de Janeiro, where it has proved to be an attractive street tree capable of withstanding pollution, neglect, and the other rigors of urban life. The above description was based on specimens from cultivated trees; the vouchers are Anderson 11665, Gates s.n., and Occhioni 3563, all at MICH.

Two aspects of this plant’s morphology are particularly noteworthy. One is the inflorescence, in which the cymules are often dichasia (i.e., both bracteoles subdend lateral branches). Most byronimoids with several-flowered cymules have cincin-
ni instead of dichasia, but I have long thought that both bracteoles might have been fertile in an ancestor, and the fact that this species has dichasia shows at least that both bracteoles can be fertile. The other point of interest is that the anther wings in this species are narrow and rather similar to the “ verrucae” of Verrucularia, which suggests the homology of the outgrowths on the anthers in the two genera and supports a close relationship of the genera that can be inferred from other characters.

This species is also of interest for its chromosome number (n = 6). This is the lowest number known for the Malpighiaceae. It is almost certainly the base number for the subfamily Byronimimoeidae (Anderson, 1978), and may well be the base number for the family. (The other likely base number is five, since many non-byronimoids have chromosome numbers based on ten pairs. No count of five pairs is known, and it may be that a number of ten, derived by aneuploidy from twelve, is basic to the non-byronimoids.) The chromosomes of Lophantha-
era lactescens are unusually fat for this family.


Shrubs or trees, the stems sometimes containing white latex, the leaves bearing glands on the lamina; stipules large, intra- and epipetiolar, connate. Inflorescence terminal, a raceme of short 1–several-flowered cincinni, the bracts and bracteoles persistent, 1 bracteole often bearing a large gland. Petals pink or white. Stamens 10, the anthers alike, glabrous, unwinged, the connective shorter than the locules. Carpels 2 or 3, connate along a central axis, each fertile and bearing a stout, untapered style with the broad apical stigma often becoming subpetalate or bilobed in anthesis. Fruit schizocarpic, breaking apart into 2–3 (or fewer due to abortion) dry, unwinged, smooth, indehiscent, 1-seeded cocci bearing the persistent styles.

Plants apparently gynodioecious, the pistillate flowers bearing flat, unopened anthers with aborted pollen, the perfect flowers bearing large polleniferous anthers and a small ovary with ovules.


Spachea comprises approximately six species in northern South America, Central America, and the West Indies. It is not known to occur in the sandstone uplands of the Guayana Highland proper, but S. elegans grows in the lowlands north, east, and south of there. It is included here as an aid to identification of plants of the general region.

Most Malpighiaceae have monotonously bisexual flowers, so it was a great surprise to discover that Spachea does not. Some plants are functionally pistillate, while the flowers on plants that produce pollen are morphologically perfect
but perhaps functionally staminate, i.e. they do bear ovule-containing carpels, but I suspect that those carpels do not set seed, since I have found no enlarging fruits on old inflorescences of those plants. These observations are based only on material of *S. elegans* and *S. tricarpa*; it will be interesting to see whether species from Colombia and Central America have similar gynodioecy or functional dioecy.


Trees 4–15 m tall, the stems loosely sericeous to subvelutinuous, soon glabrate. Lamina of the larger leaves 7–12(–14) cm long, 3–6 cm wide, elliptical or slightly obovate, cuneate or rounded at the base, often revolute at the margin, usually short-acuminate at the apex, tomentose to soon glabrate above, sparsely reddish-tomentose or subsericeous below at least on the midrib, usually bearing 2–4 impressed glands below near the base and often several glands distally; petiole 7–10 mm long, tomentose or sericeous, eglandular; stipules 3–6 mm long, abaxially sericeous, adaxially glabrous, quite connate. Inflorescence a terminal pseudodaceme of 1-flowered cincinni, 5–20 cm long, tomentose throughout; cincinni horizontal or reflexed; peduncle 1–4 mm long, twisted and apparently bearing the bract on its upper side; bracts and bracteoles 0.5–1.5 mm long, ovate or rotund, both bracteoles borne well below the joint, some plants with 1 bracteole terminating in a ± stalked gland. Pedicel 4–6 mm long, tomentose to glabrate in fruit. Sepals 2–3 mm long, ca. 1.5 mm wide, broadly rounded at the apex, thinly sericeous on both sides and ciliate around the margin, bearing 8–9 glands 2–3 mm long. Petals pink, glabrous or with a few hairs at base of claw, subequal, the claw 1.5–2.5 mm long, the limb 2.5–3.5 mm long, 1.5–2.5 mm wide, obovate, minutely fimbriate with short unicellular processes, persistent in fruit. Filaments free, bearing a few basal hairs. 1.5–2 mm long in "pistillate" flowers, ca. 3 mm long in "perfect" flowers; anthers ca. 1 mm long and unopened in "pistillate" flowers, 1.1–1.3 mm long and releasing abundant pollen in "perfect" flowers. Receptacle bearing long hairs between stamens and ovary. Carpels 2(–3), glabrous or bearing a few hairs, 1–2 mm high; styles 2(–3), 2–2.5 mm long, glabrous, divergent to eventually recurved, the reniform or bilobed stigmas 0.5–0.8 mm wide. Fruit of 2(–3) glabrous cocci 4.5–6 mm long, 3–4 mm wide, dorsiventrally slightly flattened, spheroid, ellipsoid, or slightly obovoid, bearing a smooth scar 1.5–2.0 mm wide over much of the length of the ventral face; torus almost flat, bearing a short ridge between the cocci.

Type. Rodschied, in litore insulae Arowabisch, Essequibo River, Guyana (GOET).

Distribution. Reported from Trinidad, southeastern Venezuela, Guyana, Surinam, French Guiana, and Terr. Roraima, Brazil. VENEZUELA. Delta Amacuro: Río Amacuro, Sierra Imataca, falls at San Víctor, elev 65–80 m, ♀, Oct frt, Steyermark 87154 (MICH, NY). Bolivar: Pto. Ordaz-San Félix, Aristeguieta 5297, ♀, Apr frt (VEN) & 5838 (MY, NY, VEN); San Félix, elev 30–40 m, ♀, Dec frt/mm frt, Bernardi 7798 (VEN). GUYANA. Upper Rupununi River, near
Fig 10. *Spachea elegans*. a) Flowering branch, ×0.5; b) stipules, ×5; c) bract, peduncle, and bracteoles, ×5; d–f) flower, stamen, and gynoecium of functionally pistillate plant, d ×4, e ×10, f ×7.5; g–i) flower, stamen, and gynoecium of perfect or functionally staminate plant, g ×4, h ×10, i ×7.5; j) intact fruit, ×5; k) coccus, ventral face, ×5; l) torus in old flower, ×3. Drawn by Karin Douthit, a–f from Aristeguieta 5297, g–i from Pires et al 14.413, j–l from Steyerman 87154.
Dadanawa, ♂, De La Cruz 1492 (NY); Puruni River, ♂, Forest Dept. 7724 (NY); Barima River, ♂, Jenman 7127 (NY); Rupununi River basin, near mouth of Charwair Creek, ♂, Smith 2352 (NY). BRAZIL. Terr. Roraima: Caracaraí, ♂, Apr fr, Pires et al 14334 (MICH); R. Ajaraní, ♂, Pires et al 14413 (MICH); R. Anauá, ♂, Pires et al 14501 (MICH).


Shrubs, the leaves eglandular, the stipules intrapetiolar and free or slightly connate. Inflorescence an unbranched, often corymbose, terminal thyrs or pseudoraceme composed of 1—several-flowered cincinni, the bracts and bracteoles eglandular and persistent. Sepals all biglandular, the neighboring glands of adjacent sepals sometimes connate. Petals yellow, the posterior relatively little differentiated except for a thicker claw. Stamens 10, the filaments glabrous, those opposite the sepals longer than those opposite the petals, the anthers alike, glabrous, deciduous, 4-locular, each of the outer locules bearing a line or cluster of vesicular outgrowths toward the apex. Receptacle glabrous. Ovary of 3 connate uniovulate carpels; styles 3, glabrous, subulate with minute apical stigmas, inbent at the apex in bud. Fruit schizocarpic, breaking apart into 3 (or fewer due to abortion), dry, 1-seeded cocci, the cocci dorsally loculicidal (in nature?) but not enough so to release the seed.


Verrucularia is closely related to Galphimia, and they have a similar schizocarpic fruit. The mericarps seem to be dehiscent along the dorsal suture, but in both groups it is difficult to say whether they are actually dehiscent before separating in nature, or split open on herbarium specimens in response to being pressed and dried.

Verrucularia comprises two species, the type and the new one described below.

Verrucularia piresii Anderson, sp nov Figs 11 & 12.

Frutex? ("arbor") 50 cm altus, ramulis sericeis. Lamina foliorum majorum 4—5.5 cm longa, 1.5—2.5 cm lata, elliptica, basi attenuata, margine revoluta, apice acuta, supra glabra, subtus glabra vel pilis perpaucis persistentibus praeципue costa obsita, nervis lateralisibus numerosis tenuibus supra prominulis (in sicco), subtus obscure, epiderimide abaxiali olivacea, minute papillosa et stomatibus (?) translucentibus instructa; petiolum (8—)10—13 mm longus, sericeus vel demum subglabratus; stipulae 1.5—2 mm longae, triangulares, apice obtusae, ± liberae, abaxialiter sericeae, adaxialiter glabres. Inflorescentia usque 6 cm longa, sericea, cincinnis 1—2-floris, bracteis 2.5—4.5 mm longis, lineariibus, denticulatis, glabris vel basi paucipliferos, pedunculo primario 4—8 mm longo sub apice bibracteolato, bracteolis bracteis similibus sed brevioribus. Pedicellus 6—8 mm longus, sericeus vel glabrescens. Sepala glandulas 0.8—1.5 mm longas obovatas decurrentes 2—2.5 mm superantia, ca 1.3 mm lata, apice rotundata, plana, glabra, integra vel irregulariter denticulata. Petala glabra, ungue 2—3 mm longo, limbo 4—5 mm longo, plano vel carinato, denticulato. Stamina filamentis 2.7—4 mm longis, 1 mm connatis, antheris 1—1.2 mm longis, verruculis usque 0.3 mm latis, dissectis, per 2/5 longitudinem loculorum extensis. Ovarium sphaeroidale, 1.5 mm altum, proximaliter minute sericeum distaliter glabrum, stylis 3.5 mm longis. Fructus ignotus.
Fig 11. *Verrucularia piresii* and *Glandonia prancei*. a–d, *Verrucularia piresii*: a) Flowering branch, ×0.5; b) flower, ×2.5; c) stamen, ×10; d) gynoecium, ×7.5. e–i, *Glandonia prancei*: e) Flowering branch, ×0.5; f) stipules, ×1; g) flower, ×2.5; h) stamen, ×5; i) fruit, ×1. Drawn by Karin Douthit, a–d from *Pires 15040*, e–f from *Prance et al 8058*, g–h from *Prance et al 3363*, i from *Prance et al 20557*. 
Type. *Pires 15040*, Serra Aracá, elev 1000 m, Amazonas, Brazil, 10 Feb 1975 (holotype IAN 145476, isotype MICH).

This most interesting species is known only from the type, collected by João Murça Pires, for whom the species is named. Prance (1976) states that the Serra Aracá is about 1°N, 63°W. That is an astonishing disjunction from central Bahia where *Verrucularia glaucophylla* grows. The two species must have been separated for a very long time, but there has been only slight morphological divergence. They can be distinguished on the following bases; further collections of *V. piresii* may reveal more differences.
Key to the Species of *Verrucularia*

1. Leaves acute at the apex, olive-green below, the epidermis minutely but densely and evenly papillose (Fig 12a); petiole (8–)10–13 mm long; petals glabrous; anthers 1–1.2 mm long, bearing 1–3 distinct outgrowths on each side; ovary proximally sericeous, distally glabrous. *V. piresii*.

1. Leaves broadly rounded and often apiculate or emarginate at the apex, whitish below, the epidermis bearing a reticulate pattern of raised white cells forming crypts surrounding sunken stomates* (Fig 12b); petiole 2–6 mm long; petals often bearing at least a few hairs on the claw and midrib; anthers ca 0.7 mm long, bearing undivided apical outgrowths; ovary uniformly spreading-sericeous to pilose. *V. glaucophylla*.

In addition to these differences, *V. glaucophylla* has more persistent hairs on its leaves than *V. piresii*, and its calyx glands are larger and less decurrent.

*Verrucularia glaucophylla* Adr. Jussieu was published in the "Malpighiacearum synopsis," Ann. Sci. Nat. 2e Sér. Bot. 13: 327. 1840. Its type is *Martius 1921* (M) from the Serra da Villa do Rio de Contas, Bahia, Brazil. All subsequent collections have been from the hills in central Bahia; some recent collections are the following: 3 km N of town of Rio de Contas, cut-over woodland by river, elev 980 m, Jan flr/fl, *Harley 15348* (MICH); by Rio Cumbuca, 3 km N of Mucugé, Serra do Sincorá, conglomerate sandstone rock, elev 850 m, Feb flr/fl, *Harley 16027* (K); S of Andaraí near Xique-Xique, Serra do Sincorá, Feb flr/fl, *Harley 18671* (MICH); Rio do Ferro Doido, 19.5 km SE of Morro do Chapêu, Mar flr/fl, *Harley 19193* (MICH); S of Vila do Rio de Contas, Mar flr/fl, *Harley 20076* (MICH); Rio Agrestes, *Hatschbach 39692*, and Rio Ferro Doido, *Hatschbach 39705* (both MICH); Rio Ferro Doido, sand on sandstone, elev 1100 m, Feb flr, *Irwin et al 32437* (MICH).


Trees or shrubs, the hairs often basifixed or sub-basifixed, the leaves eglandular, the lamina with many (12–20 or more) fine, parallel lateral veins on each side interconnected by a fine, elaborate reticulum, the stipules intra- and epipetiolar, free from each other but often basally connate with opposite stipules to form an interpetiolar sheath. Inflorescence a thyrs or pseudoraceme composed of 1–several-flowered cincinni. Bracts and bracteoles eglandular. Sepals all biglandular. Petals white, pink, or red (1 yellow in *B. hypoleuca*), the lateral 4 spreading to reflexed, the posterior erect or spreading. Stamens 10, all fertile, the filaments free, flat, hirsute with straight basifixed hairs, the anthers alike, with 2 linear locules bearing at least apical tufts of basifixed hairs and often hirsute on the sides as well. Receptacle bearing long basifixed hairs inside or all around the stamens. Ovary of 3 quite connate carpels, 1 ± anterior and 2 ± posterior, spheroid or conoid, glabrous; styles 3, incept in bud, subulate with minute apical stigmas, glabrous, deciduous in fruit. Fruit a tiny, spheroid or ovoid, 3-angled, dry, indehiscent, nut-like capsule with a bony and often rugose endocarp, glabrous. Embryo with the cotyledons folded (mature seeds not seen).

Type. *Blepharandra hypoleuca* (Bentham) Grisebach.

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6 Plants from the Chapada da Diamantina near Morro do Chapêu in Bahia may have the crypts poorly developed or absent, so that the epidermis below is more or less smooth and not white; in other respects they agree well with other collections of *V. glaucophylla*. 
Blepharandra comprises six species, divided here into two geographically and ecologically disjunct sections. Section Blepharandra occurs in Guyana and southern Venezuela, while section Callytranchele is found only in Amazonas, Venezuela, and Amazonian Brazil. Where the sections meet, at Cerro Duida, the plants of section Blepharandra grow high on the slopes of the tepui, at elevations of 1400 m or more, while those of section Callytranchele are from lowland savannas at elevations of 400 m or less.

Blepharandra is clearly very closely related to Diacidia, a fact that has been overlooked by previous workers (Niedenzu put them in different tribes). Basifixed hairs, exfoliating glaucescence, and lacerate sepals are all present in both genera and otherwise rare in the Malpighiaceae. Accrescent sepals are the rule in Diacidia and are found also in Blepharandra section Blepharandra; they occur sporadically elsewhere in the family, including some species of Byrsonima. Stiff awn-like hairs at the apex of the anther are found only in Blepharandra and Diacidia, and the tiny, dry, indehiscent fruit of these two genera is peculiar to them.

Key to the Species of Blepharandra

1. Stipules acute or acuminate at the apex, deciduous before the leaves.  
   Section Blepharandra.

2. Sepals, most bracteoles, and some bracts bearing gland-tipped marginal processes 1–2 mm long; leaves light green below, not glaucous; leaves, vegetative internodes, and abaxial surface of the stipules glabrous.
   1. B. fimbriata.

2. Sepals, bracteoles, and bracts entire or denticulate; leaves white- or yellowish-glaucous below; petioles, internodes, and abaxial surface of the stipules densely hairy, leaf blades densely hairy to glabrate below.
   2. B. hypoleuca.

1. Stipules rounded at the apex, persistent on the leaf-base.  
   Section Callytranchele.

3. Lamina cuneate or truncate at the base.

4. Petals all pink, turning white in age; sepals glabrous adaxially or sparsely sericeous near the margin, sericeous abaxially; free lobes of the stipules 2.5–4 mm long; pubescence of the inflorescence light to dark brown; pedicel 5–6(–7) mm long; largest leaves with the lamina 1.5–3 cm wide, the margin thick and non-revolute.
   3. B. angustifolia.

4. Lateral 4 petals white, the posterior pink; sepals densely sericeous on both sides; free lobes of the stipules 4–7 mm long; pubescence of the inflorescence white; pedicel 8–10(–13) mm long; largest leaves with the lamina (2.5–)3–7 cm wide, the margin thin and often revolute.
   4. B. heteropetala.

3. Lamina cordate at the base.

5. Lateral 4 petals white, the posterior pink; sepals entire or bearing 1–several short, obscure processes; hairs at apex of anther 1–1.2 mm long.
   5. B. intermedia.

5. Petals all pink, the posterior darker, all turning white in age; sepals lacerate into many cilia; hairs at apex of anther up to 0.6 mm long.
   6. B. cachimbensis.

Section Blepharandra


Weak shrub, prostrate to erect, up to 2 m high; vegetative stems terete, glabrous except for tufts of ferrugineous hairs at the nodes. Lamina of the larger leaves 3.5–8 cm long, 1.7–3.8 cm wide, elliptical, cuneate, truncate, or subcordate at the base, obtuse or rounded and sometimes apiculate at the apex, glabrous on both sides, dark green above, light green but not glaucous below, coriaceous, the margin red and thickened, flat or usually revolute, the veins and reticulum visible
Fig 13. *Blepharandra fimbriata*. a) Flowering branch; b) flower; c) stamens, lateral view (left) and adaxial view (right); d) gynoecium; e) fruit; f) fruit in cross section, seeds removed, showing two locules fertile and one sterile. Drawn from Maguire 33002 by Melissa Marshall.
or prominulous on both sides; petiole 5–15 mm long, glabrous, often dark red, the bases of opposite petioles briefly connate; stipules foliaceous, 11–30 mm long, 4–7 mm wide, ovate or elliptical, often asymmetrical, acute or acuminate at the apex, free, deciduous well before the leaves, the veins prominent on both sides, abaxially glabrous, adaxially tomentose especially at the margins and bearing a tuft of basifixed ferrugineous hairs at the base. Inflorescence a terminal thyrses 10–14 cm long, the axis dark red or purplish and villous to proximally glabrate; bracts 4–10 mm long, 2–4 mm wide, triangular or lanceolate, flat, entire or bearing few to many gland-tipped marginal processes 1–2 mm long, glabrous or ciliate on the margin, persistent or belatedly deciduous; cincinni 1–4-flowered, the primary peduncle 5–13 mm long, villous; bracteoles like the bracts but smaller. Pedicel 5–14 mm long, sparsely to densely villous. Calyx with glands ca 1.5 mm long and slightly detached at the apex, the sepals lobes often red, triangular, 3–4 mm long, 1.5–2 mm wide, bearing 2–10 gland-tipped marginal processes ca 1 mm long, revolute, glabrous or tomentose on the margins and above the glands, slightly accrescent in fruit (up to 7 mm long and 3 mm wide). Petals white, glabrous, flat or somewhat concave, erose or denticulate, the lateral 4 with the claw 1.5–2 mm long and the limb 5.5–6.5 mm long and wide, subcircular, the posterior petal with the claw 2–2.5 mm long and the limb 6.5–7.5 mm long and wide, subcircular or obovate. Filaments 3–4 mm long, bearing many straight basifixed hairs at the base and few to none distally; anthers 1–1.5 mm long, each locale bearing many straight basifixed hairs in a tuft over the apex and usually in a row down the outer side and often barbate at the base, the connective slightly exceeding the locules at the apex. Pollen slightly prolate, tricolporate, the colpi short, the ora elliptical, oriented at 90° to the colpi and almost as long as them. Ovary 1.3 mm high, with all 3 carpels fertile or the anterior empty and smaller; styles 5–6.5 mm long, often reddish. Fruit 3.5 mm high, 3.5 mm in diameter.

Type. Cardona 944, Cerro Guaíquinima, Alto Paragua, Bolívar, Venezuela, elev 1740 m, Oct 1943 (holotype US! isotype VEN!).

Distribution. Known only from Cerro Guaíquinima in Venezuela and the Ayanganna Plateau in Guyana. GUYANA. Upper Mazaruni River basin, Ayanganna Plateau, scrub on W side of Haieka River, 1–2 mi E of Chinowieng Village, elev 740 m, Tillett et al 45266 (K, MICH, NY, US). VENEZUELA. Bolivar, Cerro Guaiquinima, Alto Paragua: type, q v; elev 1700 m, Cardona 1107 (VEN); open scrub savanna, cumbre, elev 1800 m, Maguire 32729 (MICH, NY, US, VEN); North Valley, elev 1600–1700 m, Maguire 32955 (NY); slopes, ridges and quebradas in valley below SE escarpment, elev 1600–1700 m, Maguire 33002 (NY, VEN); Salto del Río Szcerberanari (Río Carapo), 5°44’4"N, 63°41’8"W, elev 750 m, Steyermark et al 113125 (MICH).

Collected in flower and fruit from August to January.


Blepharandra cretacea (Gleason) Steyermark, Fieldiana (Bot.) 28(2): 280. 1952.

Blepharandra cretacea var composita Steyermark, Fieldiana (Bot.) 28(2): 281. 1952. Type. Steyermark 58191, Cerro Duida, elev 1700–1980 m, Amazonas, Venezuela (holotype F, isotype NY!).
Blepharandra ptariana Steyermark, Fieldiana (Bot.) 28(2): 282. 1952. Type. Steyermark 60310, savanna between Santa Teresita de Kavanayén and base of Ptari-tepui, elev 1220 m, Bolívar, Venezuela (holotype F, isotype NY!).

 Shrubs or small trees 1–8 m tall; vegetative stems loosely sericeous, eventually glabrate. Lamina of the larger leaves 4.5–15.5 cm long, 3–9.5 cm wide, elliptical or ovate, truncate to deeply cordate at the base, slightly revolute at the margin, obtuse or rounded at the apex, coriaceous, green and glabrous above, glaucous and tomentose or sericeous to glabrate below, the glaucescence white and flaky or yellowish and granular, the hairs light brown to dark reddish-brown, usually a mixture of long straight reflexed hairs and short twisted hairs, the vesture varying greatly in abundance and persistence; petiole 2–14(–18) mm long, sericeous or tomentose to glabrate; stipules 5–17(–22) mm long, 3–9 mm wide, ovate or triangular, slightly asymmetrical, acuminate at the apex, free, deciduous before the leaves, often with a prominent midrib, tomentose on both sides and ferrugineous-hirsute adaxially. Inflorescence a terminal, simple or rarely ternate thyrs or pseudoraceme 5–20 cm long, densely and persistently villous or velutinous, the hairs light to dark brown; bracts 5–11 mm long, 2–3 mm wide, narrowly triangular, flat or navicular, entire or denticulate, abaxially villous or sericeous, adaxially glabrous, caducous; cincinni (1–)2–5-flowered, the primary peduncle (0–)2–12 mm long, villous or velutinous; bracteoles 2–7 mm long, 0.5–3 mm wide, linear to ovate, flat or slightly concave, entire or denticulate, abaxially villous to subglabrous and ciliate at the margin, adaxially usually glabrous, caducous or variably persistent. Pedicel 5–10(–16) mm long, villous or velutinous. Calyx with the glands 1–2 mm long, green or pink, circular or elliptical or obovate, often free at the apex, rarely rudimentary, the sepal lobes 2.5–4.5 mm long, 1.5–3 mm wide, triangular, revolute, entire or denticulate, abaxially tomentose or villous, adaxially glabrous or proximally tomentose, slightly accrescent in fruit (up to 5 mm long). Petals glabrous or with a few hairs at base of claw, erose or denticulate, the lateral 4 white, with the claw 1.5–2.5 mm long and the limb 3.5–5(–7) mm long and 4–5.5(–7) mm wide, subcircular, flat or concave, the posterior petal yellow or white, with the claw 2–3 mm long and the limb 4.5–5.5(–7.5) mm long and 4.5–6(–7.5) mm wide, concave or galeiform. Filaments 2–4 mm long, densely hirsute, especially at the base; anthers 1.3–2.5 mm long, each locale bearing many (rarely few) basifixed hairs (0.5–)0.7–1 mm long in a row over the apex and usually down the outer side, the connective slightly to prominently exceeding the locules at the apex. Ovary 1–1.5 mm high and wide, with all 3 carpels fertile; styles 4–7 mm long. Fruit 2.5–3.5 mm high and wide, contracted at the base.

 Type. Rob. Schomburgk II 677/Rich. Schomburgk 1043, Roraima, Bolívar, Venezuela ["Guiana angl."] (holotype K; fragment of isotype NY!).

 Distribution. Eastern Guyana, Bolívar, Venezuela, and Cerro Duida. GUY-ANA. Chinoweng, Wandabu Mountain, Forest Dept. 7842 (NY); Krabu Savanna, on rocks in open, Forest Dept. 7980 (NY); upper Mazaruni River, Imbaimadai Savannas, in shallow sand on sandstone, elev 550 m, Maguire 32191 (K, MICH, NY); Pakaraima Mts, Kamarang River–Wenamu Trail, Samwarakna-Tipu, elev 1100 m, Maguire & Fanshawe 32485 (K, MICH, NY, US), elev 3350 ft, Maguire & Fanshawe 32561 (K, NY); Kamarang River Crossing, Kamarang Head, elev 2700 ft, Maguire 33268 (NY); upper Mazaruni River basin, Merume Mts, open rocky places along trail from Partang Rapids to first falls of Partang River, elev
460–550 m, Maguire et al 43886 (K, MICH, NY) and 43887 (K, MICH, NY); upper Mazaruni River, Membaru Creek, Pinkus 28 (GH, NY) and Pinkus 211 (NY); upper Mazaruni River basin, Kamarang River, top of Eboropu escarpment, elev 910 m, Tillett & Tillett 45675 (K, MICH, NY, US), Utschi River above Falls, elev 830 m, Tillett & Tillett 45845 (K, MICH, NY, US). VENEZUELA. Bolívar: Auyantepúí, Cardona 237 (VEN); Cerro Aprada, Caroni, elev 900 m, Cardona 1987 (NY, VEN); Río Surukun, Caroni, Perai-tepuí, elev 900 m, Cardona 2099 (NY, VEN); Caroni, Cerro Acopán, elev 1800 m, Cardona 2286 (VEN), elev 2100 m, Cardona 2287 (VEN); Auyantepúí, elev 2100 m, Cardona 2662 (NY, VEN); Auyantepúí, elev 1800–2000 m, Foldats 2602 (NY, VEN); Salto Angel, Foldats 7195 (VEN); Kavanayen, Lasser 1807 (NY, VEN); Río Paragua, Cerro Guaiquinima, North Valley, elev 1600–1700 m, Maguire 32981 (MICH, NY, VEN), Maguire 33042 (MICH, NY, US, VEN); Gran Sabana, Ilu-tepuí, Mesa Grande, elev 1600 m, Maguire 33354 (NY, VEN); Sororopan-tepuí, north-facing slope, Maguire & Wurdack 33920 (MICH, NY, VEN); type, q v; Ptari-tepuí, rocky open portion of plateau on southeast-facing slopes, elev 1600 m, Steyermark 59623 (NY, VEN); Chimantá Massif, Apácara-tepuí, elev 2000 m, Steyermark 75697 (NY); Auyan-tepuí, dry granite hills, elev 1800 m, Steyermark 93587 (VEN); Auyan-tepuí, elev 1850 m, Steyermark 93660 (NY, VEN); Cerro Jaua, elev 1922–2100 m, Steyermark 97908 (NY, VEN); Sierra Pakaraima, Cabeceras del Río Paragua (Aguapira), elev 1400 m, Steyermark 107340 (NY); Meseta del Jaua, Cerro Sarisaríñana, elev 1410 m, Steyermark et al 108862 (NY); Meseta del Jaua, Cerro Jaua, elev 1750–1800 m, Steyermark et al 109320 (NY); savanna of Río Uarama below Uarama-tepuí, NE of Luepa, elev 1220 m, Steyermark & Nilsson 632 (NY, VEN); savanna and stream margin along caño E of high part of Torono-tepuí, elev 1975 m, Steyermark & Wurdack 982 (MICH, NY, US, VEN); top of slope between Caño Mojado and Río Torono, at extreme N end of Torono-tepuí, elev 2152 m, Steyermark & Wurdack 1052 (NY, VEN); Río Carun, Alto Paragua, Tamayo 2469 (VEN); Auyan-tepuí, Tate 1174 (NY, VEN). Amazonas, Cerro Duida: elev 2100 m, Fariñas et al 284 (VEN), 352 (VEN), 531 (NY), 547 (VEN); Culebra Creek, elev 1600 m, Maguire & Maguire 29088 (MICH, NY, VEN); Culebra Creek just above Culebra Falls, elev 1400 m, Maguire et al 29742 (MICH, NY, US, VEN); elev 1675 m, Steyermark 58126 (NY).

Collected in flower and fruit in all months.

This exceedingly variable species defies my best efforts to divide it into natural and useful taxa. An extensive series of collections has been studied, and as often happens with polymorphic species, the more collections one studies the harder it becomes to find groups of correlated characters. It is possible to divide the species on the basis of any of several arbitrarily selected characters, but the membership of the subdivisions keeps changing with the character selected. For this reason I have decided to reject the taxonomy of MacBryde (1970, p 46 et seq) and recognize only B. hypoleuca. Study of MacBryde's key (p 46) will illustrate the difficulties. Blepharandra cretacea has the leaves not truly sessile, but with petioles only about 2–3 mm long and obscured by the cordate leaf base. Many collections of otherwise typical B. hypoleuca, from various parts of the range, have the petioles 3–5 mm long. The next character, whether or not the leaf bases are "amplexicaul," is not really a separate character from the first. In plants with cordate leaf bases (a common condition in B. hypoleuca) the base
will be more or less "amplexicaul" depending on how short the petiole is. Leaf size is not a good basis for the separation, because small-leaved plants of *B. hypoleuca* are common. One can, without difficulty, find plants of *B. hypoleuca* with veins just as prominent as in *B. cretacea*. Number of hairs on the filament and anther is highly variable, with *B. cretacea* representing one end of a continuous series; the type of *B. cretacea* has more than 10 hairs per theca, and many collections of *B. hypoleuca* are intermediate between the "many" and "few" condition. Lest it be felt that the combination of these characters will still support *B. cretacea*, in spite of their individual weakness, I would point to the collections of *B. hypoleuca* from Auyan-tepui. These collections are Cardona 237 and 2662, Foldats 2602 and 7195, Steyermak 93587 and 93660, and Tate 1174. In general these collections strongly resemble the collections from Cerro Duida that MacBryde calls *B. cretacea*. Most of the Auyan collections have been identified as *B. cretacea* by Gleason or Steyermark, but according to MacBryde's definition they have to be called *B. hypoleuca*. This is because he has chosen to place greatest emphasis on the length of the petiole and the number of hairs on the anther (the Auyan material has fewer anther hairs than usual for *B. hypoleuca*, but more than the Duida specimens). Thus one chooses a character to emphasize and ends up with *B. cretacea* sensu MacBryde or *B. cretacea* sensu Gleason and Steyermark. Neither seems to me to warrant recognition.

In such a variable species, some discussion of the nature and distribution of the more significant variation is necessary.

1. Leaf base. Every intermediate between truncate to deeply cordate can be found, with much variation even on the same plant. There is little geographical pattern, but the truncate leaf base is perhaps commoner in Guyana and easternmost Venezuela.

2. Leaf and bracteole vesture. With a few exceptions, the leaves on plants from Guyana have few hairs to begin with, and these are soon lost. In most western populations the leaves tend to be and remain more densely hairy. This same general trend holds for bracteoles.

3. Leaf size. Plants with very large and very small leaves have been collected throughout the range of the species, from the Upper Mazaruni River to Cerro Duida. Plants from higher on mountains and in more open vegetation seem often to have smaller, more appressed leaves, but the inconsistency of data on labels makes it hard to assess the significance of this tendency.

4. Inflorescence. Plants with large, many-flowered inflorescences have them "compound," i.e. each cincinnus consists of several flowers. Plants with tighter, fewer-flowered inflorescences have a reduction in the number of flowers per cincinnus, culminating in the pseudoraceme of some plants from Cerro Duida.

5. Stamen hairs. Most collections have many long, stiff, basified hairs on the filament and anther, especially at the apex of the anther. However, plants with relatively few shorter hairs on the anther have been collected on Auyan-tepui, on the Chimantá Massif, and on Cerro Duida.

In addition to these characters, other interesting but apparently trivial variations occur. The sepals are nearly eglandular in *Foldats 2602*, and that plant also has the connective of the anther extended well beyond the locules, which condition occurs sporadically elsewhere to varying degrees. The stipules are more
belatedly deciduous in plants from Cerro Duida than is usual. Steyermark & Wurdack 1052, from Torono-tepui, is notable for the size of its petals and their red claws, and the density and dark color of the tomentum in the inflorescence.

The variation in this species seems best interpreted as a combination of geographical clines, such as are found in many species and can be identified in herbarium material, and probably ecological variation and differentiation. The latter needs to be studied in the field, where careful analysis of the habitats and associated vegetation may yield an understanding of some of the diversity.

Section Callyntranthe (Niedenzu) Anderson, comb et stat nov


Type. Blepharandra angustifolia (Humboldt, Bonpland & Kunth) Anderson.

3. Blepharandra angustifolia (Humboldt, Bonpland & Kunth) Anderson, comb nov

Malpighia praenos Sprengel, Syst. 2: 384. 1825, nom superfl.

Much-branched shrubs or small trees 1–6 m tall; stems terete, originally sericeous (always?), very soon glabrate. Lamina of the larger leaves 4.5–7.5(–8.5) cm long, 1.5–3 cm wide, elliptical or rectangular or narrowly obovate, cuneate to truncate at the base, obtuse to truncate and often slightly emarginate at the apex, coriaceous, flat, the margin white, thickened and not revolute, originally ciliate on the margin and tomentose at base of midrib above but very soon quite glabrate, densely areolate above, glaucous below, the glaucescence exfoliating to expose a prominulous reticulum; petiole 7–11(–18) mm long, often narrowly winged distally, glabrous; stipules persistent on the petiole, connate with adjacent stipules of the opposite leaf to form an interpetiolar sheath 2.5–4 mm long, the free lobes 2.5–4 mm long, rounded at the apex, abaxially glabrous, adaxially densely ferrugineous-hirsute. Inflorescence 5–12 cm long, terminal or axillary, a simple or ternate thyrs, the axis ferrugineous-sericeous to velutinous; bracts 2.5–7.5 mm long, ovate, concave, obtuse or rounded at the apex, abaxially sericeous, adaxially glabrous, deciduous before anthesis; cincinni (2–)3–6(–9)-flowered, the primary peduncle 1–3(–5) mm long, velutinous; bracteoles like the bracts but smaller. Pedicel 5–6(–7) mm long, velutinous, circinate in bud. Calyx with the glands (0.7–)1–1.5 mm long, the sepal lobes 2–3 mm long, 1.5–2.5 mm wide, entire, rounded at the apex, flat (not revolute), abaxially sericeous, adaxially glabrous or sparsely sericeous near the margin. Petals pink, turning white with age, glabrous or bearing a few hairs on the claw, the lateral 4 with the claw 1.5–2.5 mm long and the limb 3–4 mm long and wide, cordate, flat or concave, entire or denticulate, the posterior petal with the claw 2.5–3.5 mm long, the limb 3.5–5 mm long and 4–6 mm wide, subcircular, concave or galeiform, dentate. Filaments 2–3 mm long, bearing many straight basifixed hairs, these especially dense at the base; anthers 1–1.2 mm long, the locules clothed in many straight basifixed
Fig 14. *Blepharandra heteropetala*. a) Flowering branch; b) stipules; c) hairs from inflorescence; d) flower; e) stamen, side view; f) anther, adaxial view; g) gynoecium, with base of posterior petal for orientation; h) fruit. a–g drawn from Wurdack & Adderley 42704, h from Wurdack & Adderley 43672 by Annette Seidenschnur Mahler.
hairs, especially at the apex, the connective dark red or black, slightly exceeding the locules at the apex. Ovary 1.5 mm high, with all 3 carpels uniovulate; styles 4.5–5 mm long. Fruit 2.5–3 mm high, 3 mm in diameter, the seeds 3 (or fewer due to abortion).


Distribution. Savannas between the Alto Río Orinoco and the Alto Río Negro. VENEZUELA. Amazonas: Santa Cruz, margin of Río Atabapo, near mouth of Río Atacavi, Foldats 3658 (NY, VEN); Cerro Yapacana, Río Orinoco, dominant shrub of savanna, gold mine trail, elev 125 m, Maguire et al 30779 (NY, VEN); Yapacana caño laguna, NW base of Cerro Yapacana, elev 125 m, Maguire & Wurdack 34480 (MIC, NY, US, VEN) and Maguire & Maguire 34501 (MIC, NY, US, VEN); Pacimoni savanna, on right bank of Río Pacimoni 50 km above mouth, elev 100–140 m, Maguire et al 37576 (MIC, NY, VEN); Yapacana savannas, NW base of Cerro Yapacana, Maguire et al 41484 (MIC, NY, VEN); above junction of Caño Cotua with Río Orinoco, SW of Cerro Yapacana, elev 100 m, Steyermark & Bunting 103000 (NY, VEN); Caño Manomí/Casiquiare, Vareschi 7786 p.p. (VEN). BRAZIL. Amazônas: Río Curicuriary, alto Río Negro, catinga na margem rochosa da cachoeira do Cajú, Duce s n [RB 25233] (RB); Igarapé Toury, afl. do Río Negro, beira da catinga, ao longo da margem do rio, Fróes 27897 (IAN).

Collected in flower from August to April.

The species treated by Cuatrecasas as Byrsonima angustifolia is actually an undescribed species of Byrsonima, which is described below as Byrsonima bronweniana.

4. Blepharandra heteropetala Anderson, sp nov  

Frutex vel arbor 2–7 m alta, ramis vegetativis glabris (ab initio?), cicatricibus prominentibus. Foliorum majorum lamina 6–10 cm longa, (2.5–)3–7 cm lata, elliptica vel ovata, basi cuneata vel truncata, margine revoluta, apice emarginata, reticuloutrinque prominulo vel obscuro, subtus nunc glauca glaucidine tenui non exfoliata, nunc eglauca; petiolus (6–)8–12 mm longus, 3–5 mm proximalibus in vagina cum stipulis connatis, distaliter alatus; stipulae epipetiolares, in petiolo persistentes, cum stipulis oppositis in vagina interpetiolari 3–5 mm longa con-natae, lobis liberis 4–7 mm longis, apice rotundatis, abaxialiter glabris, adaxialiter basi hirsutis apice glabris. Inflorescentia 7–20 cm longa, terminalis vel axillaris, simplex vel saepius ternata vel bitemnata, thyrsiformis, albovelutina, bracteis 2.5–5 mm longis, 1.5–2 mm latis, ovatis, concavis, abaxialiter subsericeis vel glabris, adaxialiter glabris, caducis, cincinnis 2–6-floriferis, velutinis, pedunculo primario 1–3 mm longo, bracteolis bracteis similibus sed minoribus et abaxialiter sericeis. Pedicellus 8–11 (in fructu 13) mm longus, velutinus pilis 0.3 mm longis, in albastro circinatus. Sepalorum glandes 1.3–2 mm longae, obovatae, lobi (1.5–)2–3 mm longi, (1–)1.4–2 mm lati, triangulares, apice acuti vel obtusi vel rotundati, plani vel apice paulo revoluti, integri (vel obscure denticulati), utrinque laxe sericei. Petala glabra vel ungue paucipilifero; petala 4 lateralia alba, ungue 1–1.5 mm longo, limbo 3–4 mm longo, 2.5–4 mm lato, ovato, margine denticulato, paulo concavo; petalum posticum roseum, ungue 3–4 mm longo, 1 mm diametro, limbo.
3.5–4.5 mm longo, 5–6 mm lato, galeiform, margin denticulato. Filamenta 1.5–
4 mm longa, utrinque densissime pilosa, pilis longissimis, tenuibus, basifixis;
antherae 1–1.7 mm longae, connectivo atrorubro loculos aequanti vel paulo su-
peranti, loculis pilosis pilis basifixis apice persistentibus rectis 1–1.2 mm longis;
pollen tricolporatum. Ovarium conoideum vel sphaeroideum, 1–1.2 mm altum,
1.3–1.5 mm diametro, triloculare, loculis omnibus uniovulatis; stili 5–6 mm longi,
patulo-ascendentes. Fructus 2 mm altus, 2.5 mm diametro, subsphaeroideus.
Semina 3 vel abortu 2 vel 1, matura ignota.

Type. Wurdack & Adderley 42704, Sabanita Morocoto, right bank of Río Ori-
noco, 8 km below mouth of Río Atabapo, Amazonas, Venezuela, elev 125–150
m, 30 May 1959 (holotype MICH, isotypes NY, US, VEN).

Distribution. Savannas of the Alto Río Orinoco to campinas east and north of
Manaus. VENEZUELA. Amazonas: Sabana de Morocoto, W of Cerro Moro-
coto, Río Orinoco below San Fernando de Atabapo, elev 150 m, Level L-7
(MICH, NY, US, VEN); type, q v: Cerro Cariche, near left bank of Río Orinoco,
half-way between Tama-Tama and San Antonio, elev 350 m, Wurdack & Adderley
43672 (MICH, NY, US, VEN). BRAZIL. Amazônas: Manaus-Caracarái Road,
Km 140, white sandstone, Berg et al P18162 (INPA, MICH) & Km 130, scrub
forest on sandstone, Berg et al P19507 (INPA, MICH); Río Urubú, Maracara,
terrenos sêcos, altos e arenosos, Fröes 25113 (IAN, US); Río Urubú, Fröes
25260 (IAN); Río Aracá, sub-afl. do Río Negro, solo arenoso, Fröes & Addison
29280 (IAN, UB); Manaus-Caracarái, Km 130, Igarapé Lages, disturbed campina,
Nelson & Lima P21058 (INPA, MICH); Río Urubú, lg. Cachoerinha, N. Pereira
[MG 30278 & 30279] (MG); Campina da Lage, com blocos de arenito, Igarapé de
Lage, Pires & Leite 14536 (IAN); Manaus-Caracarái Road, Km 130, Igarapé
Lages, campina amongst sandstone rocks, Prance 21031 (INPA, MICH); Ma-
naus, Km 200 [near Río Urubú], campina arenosa, Rodrigues 7260 (INPA); low
forest near Igarapé Lages, Km 130, Steward et al P20250 (INPA, MICH).

Collected in flower in almost all months, most commonly from May to Septem-
ber.

Recently collectors have found in southern Amazônas a Blepharandra that is
similar to B. heteropetala in stature and leaf-shape, but its leaves are smaller
than usual and the flowers are reported to be white, with no mention made of the
pink flag petal for which the species is named. Perhaps these populations repre-
sent B. heteropetala with some introgression from the southern species, B. ca-
chimbensis, or perhaps they deserve recognition as yet another species in this
complex. The collections are INPA 60468 from the Município de Lábrea and
INPA 60667, 60670, and 60696 from Nova Prainha.

5. Blepharandra intermedia Anderson, sp nov

Frutex usque 2 m altus, ramis vegetativis glabras. Folia appressa; lamina foli-
orum majorum 4–7 cm longa, 2.5–4.2 cm lata, elliptica vel oblonga, basi cordata,
margine plana vel revoluta, apice rotundata et emarginata, coriacea, glabra, ret-
ticulo obscuro vel utrinque prominulo; petioli 5–7 mm longi, glabri; stipulae
5–7 mm longae, 2–3 mm proximalibus in vagina cum petiolo et stipulis oppositis
coalisit, 3–4 mm distalibus liberis rotundatis, abaxialiter glabrae, adaxialiter hir-
sutae in dimidio proximali. Inflorescentia 6–15 cm longa, terminalis, thyrsiformis,
simplex vel ternata, albo- vel brunneo-velutina, cincinnis 2–3-floris, bracteis brac-
teolisque caducis, bracteis 2–4 mm longis, oblongis, margine ciliatis aliter glabris, bracteolis 1.5–3 mm longis, ovatis, abaxialiter sericeis. Pedicellus 7–10 mm longus, velutinus. Flos et fructus velut in B. heteropetala.

Type. Pires & Leite 14840 [IAN 144455], Rodovia Perimetral Norte 20 km a leste de Caracaraí, Terr. Roraima, Brazil, 1 Jul 1974 (holotype IAN, isotype NY).


This plant is quite intermediate between Blepharandra cachimbensis and B. heteropetala, having the stature and small cordate leaves of the former and the pink and white petals, nearly or quite entire sepals, and long anther-hairs of the latter. Its status as a species depends on morphological discontinuities that may or may not be reinforced by further collection. It may have arisen through relatively recent hybridization between B. heteropetala and the mostly southern B. cachimbensis, which was recently collected for the first time north of the Amazon (Coelho 784).


Shrubs 1–2(–3) m tall; vegetative branches glabrous. Lamina of the larger leaves (2–)2.5–6(–6.6) cm long, 1.5–4 cm wide, elliptical, cordate at the base, flat or slightly revolute at the margin, rounded and very often emarginate at the apex, glabrous, coriaceous; petiole 2–4 mm long, glabrous; stipules 4–8 mm long, persistent on the petiole, connate with adjacent stipules of the opposite leaf to form an interpetiolar sheath, the lobes free, rounded at the apex, abaxially glabrous, adaxially hirsute at the base. Inflorescence 5–15 cm long, a terminal simple or ternate thyrse, densely white- or brown-velutinous; bracts 4–8 mm long, 3–5 mm wide, triangular or ovate, concave, denticulate, caducous; cincinni 3–6-flowered; bracteoles like the bracts but smaller. Pedicel 5–12 mm long, velutinous. Calyx with the glands 1–2.5 mm long, obovate, the sepal-lobes 2.5–4 mm long, 1.7–2.5 mm wide, ovate, very broadly rounded at the apex, lacerate at the margin into many long cilia, usually distally revolute, sericeous on both sides. Petals all pink, the posterior darker than the lateral 4, all turning white in age; lateral 4 petals with the claw 1.5–2.3 mm long, the limb 3.5–5 mm long, 4–5.3 mm wide, orbicular, slightly concave, entire or denticulate; posterior petal with the claw 2.5–4 mm long, the limb 5.5–6.5 mm long, 6–7.5 mm wide, flat or concave or slightly corrugated, obtusely denticulate. Filaments 2.5–4.2 mm long, free or very slightly connate, very densely pilose on both sides, the straight, slender, basified hairs especially dense on the proximal half; anthers 1–2 mm long, the locules bearing relatively few, often caducous hairs on their sides and a cluster of 8–16 straight, basified hairs up to 0.6 mm long at the apex of each locule, the connective dark red, slightly exceeding the locules at the apex. Ovary spheroid, 1.4–2 mm in diameter, glabrous, with all 3 locules uniovulate; styles 4–5 mm long, glabrous. Fruit 2.5–3 mm in diameter, 2–2.5 mm high, subspheroid, glabrous, the seeds 3 (or fewer due to abortion).

Type. Anderson 10896, upper, drier part of sandy floodplain between Rio Currú and Missão Velha, Alto Tapajós, Pará, Brazil, elev ca 200 m (holotype IAN, isotypes MICH, NY).

Distribution. Sandy campos in Amazonian Brazil, mostly in the south. BRA-


Trees, shrubs, or subshrubs, with mostly basifixed or sub-basifixed hairs, the leaves eglandular; proximal portion of stipules and petioles fused to form an interpetiolar sheath; distal portion of stipules (the part extending beyond the petioles) free or connate. Inflorescence a simple or compound thyrs (i.e., a raceme or panicule of cincinni) or a pseudoraceme (i.e., a raceme of 1-flowered cincinni); bracts and bracteoles eglandular. Sepals all biglandular, slightly (subgenus Diacidia) or greatly (subgenus Sipapoa) accrescent in fruit. Petals yellow, often with red claws, glabrous or with a few hairs at base of claw; lateral petals spreading or reflexed, posterior petal erect, its claw stouter than in the laterals and its limb a different shape. Stamens 6–10; filaments flattened, free or especially the posterior 3(–5) up to ½ connate, abaxially glabrous, adaxially hirsute at the base; anthers deciduous, alike, 2-locular, each locale bearing at the apex and angled forward 1(–2) stout, basifixed, awn-like hairs [hence the name of the genus, meaning two-barbed], the connective equaling the locules or extended and bent forward between them at the apex; pollen tricolporate. Receptacle hirsute between filaments and ovary. Ovary glabrous, syncarpous, spheroid or conoid, 1–1.5 mm high, composed of 3 carpels but only 2-locular, the anterior carpel reduced to a ridge of tissue; styles 3, glabrous, straight, subulate, 2–4 mm long, unequal, one or both of the 2 posteriors shorter than the anterior, the stigmas minute and slightly internal. Fruit a spheroid or ovoid, dry, indehiscent, nut-like capsule ca 2.5 mm high and wide, glabrous, with a thin exocarp and a bony, smooth or rugose endocarp and containing 2 seeds (or 1 due to abortion), subtended and enclosed by accrescent (in subgenus Sipapoa red, membranous, veiny, wing-like) sepals.

Type. Diacidia galphimioides Grisbach.

I have given careful consideration to Dr. Bassett Maguire’s (1969) bases for maintaining Sipapoa distinct from Diacidia. The ones with which I can agree are given in the key below; for the others (habit, leaf size, anther pubescence, substrate, geographical range), recent collections or observations have eroded their ability to separate the two groups. With its reduced androecium and accrescent sepals, Sipapoa is obviously a natural group, but its close relationship to Diacidia is equally obvious. Since I prefer to emphasize relatedness at the generic level,
I have decided to combine the two groups as subgenera of a single genus. This course is consistent with the rather conservative view of genera that has prevailed in most studies of the Malpighiaceae.

*Diacidia* is closely related to *Blepharandra*. See the treatment of *Blepharandra* for a discussion of that relationship.

**Key to the Species of *Diacidia***

1. Stamens 10; sepals only slightly accrescent in fruit, up to 3.5 mm long and 2.5 mm wide; interpetiolar stipular sheath 2–3(–6) mm long, obscure, lacking median seams; known only from elevations of 100–450 m. Subgenus *Diacidia*.
   2. Robust shrubs or small trees 0.5–2(–4) m tall; larger leaves 4–9 cm long, 1.2–5 cm wide; lateral veins of the lamina raised below; bracteoles mostly 3–7 mm long; pedicel (6)–7–10 mm long.
      1. *D. galphimioides*.
   2. Subshrubs or spindly shrubs to 1 m tall; larger leaves 0.7–3 cm long, 0.3–1.6 cm wide; lateral veins of the lamina flat and usually inconspicuous below; bracteoles 1.5–2.5 mm long; pedicel 4–7 mm long.
      2. *D. parvipila*.
1. Stamens 6–9; sepals greatly accrescent in fruit, forming membranous wings 7–13 mm long and (2.5–)4–12 mm wide; interpetiolar stipular sheath 4–26 mm long, marked by median seams; known only from elevations of 650–2250 m. Subgenus *Sipapoa*.
   3. Stipule-lobes beyond petiole completely connate to form a single intrapetiolar structure.
   4. Stipules beyond petiole 28–90 mm long, broadly obtuse or rounded at the apex.
      5. Leaves densely and persistently hairy above. 3. *D. glaucifolia*, sucker shoots?
      5. Leaves glabrous above, or at most sericeous on the midrib and ciliate on the margin.
   6. Inflorescence a compound thyrsel, with a terminal axis and few to many lateral axes, and with the cincinni several-flowered; inflorescence, bracts, bracteoles, and sepals densely and persistently hairy; trees 2–15 m tall.
      7. Leaves glabrous or soon glabrate below.
      7. Leaves densely and persistently rufous-sericeous below. 4. *D. rufa*.
6. Inflorescence a simple pseudoraceme, glabrate; bracts, bracteoles, and sepals glabrous; shrubs 0.5–3 m tall.
      5. *D. stipularis*.
4. Stipules beyond petiole 7–10 mm long, acute at the apex.
   6. *D. kunhardtii*.
3. Stipule-lobes beyond petiole nearly or quite distinct.
   8. Inflorescence a simple thyrsel with several-flowered cincinni, glabrous; leaves glabrous below. 7. *D. cordata*.
   8. Inflorescence a pseudoraceme, hairy; leaves hairy below.
10. Lamina of the larger leaves 3–6 cm long, 1–2.5 cm wide, glabrous or soon glabrescent above except for the very base; stipule-lobes 1–3 mm long.
   11. Fertile stamens 6; connective of the anthers much enlarged, glo- 
       ular at the apex; sepals ciliate on the margin; leaves glabrous above 
       except sericeous at the very base; leaf hairs sub-basifixed above, 
       basifixed below. 9. *D. ferruginea*.
   11. Fertile stamens 8; connective of the anthers slightly overtopping 
       the locules but hardly or not at all enlarged; sepals glabrous on 
       the margin; leaves initially sericeous above, soon glabrescent; leaf hairs 
       sub-medifixed to sub-basifixed above, sub-basifixed below.
   10. *D. aracaënsis*.
10. Lamina of the larger leaves 6–10 cm long, 3–5.5 cm wide, densely and 
      persistently hairy above; stipule-lobes 5–15 mm long.
12. Abaxial surface of the lamina woolly, the hairs much twisted and
Subgenus Diacidia


Shrubs or small trees 0.5–2(–4) m tall; vegetative internodes sericeous. Lamina of the larger leaves 4–6(–9) cm long, 1.2–2.7(–5) cm wide, elliptical, cuneate or rounded at the base, flat at the margin, acute or obtuse and apiculate at the apex, slightly or not glaucous on both sides, loosely sericeous to subtomentose on both sides, occasionally glabrescent in age, the hairs basifixed or sub-basifixed, the lateral veins obscure above and raised below; petiole 4–8 mm long, with the proximal 2–3 mm part of the petiolar-stipular sheath and the distal 2–5 mm free, sericeous; stipules 5–8(–13) mm long, united proximally with the opposite pair to form an obscure, smooth sheath without seams 2–3(–6) mm long, the distal 2–5 (–7) mm completely connate to produce a single intrapetiolar structure broadly rounded at the apex, abaxially sericeous, adaxially glabrous. Inflorescence 9–18 (–22) cm long, glabrous or sparsely sericeous below the lowest cincinnus, a simple thyrs, the cincinni (1–)2–10-flowered; bracts and bracteoles glabrous, the bracts ca 5 mm long and caducous, the bracteoles (3–)4–7 mm long, deciduous. Pedicel (6–)7–10 mm long, glabrous. Sepals revolute, entire, glabrous. Limb of the lateral petals 3.5–5 mm long and wide; limb of the posterior petal 4–6 mm long, 5–7.5 mm wide. Fertile stamens 10; anthers 0.8–1.3 mm long, each locale bearing 1 (–2) apical awns and abundantly tomentose on the sides and base with long, fine, twisted, persistent or deciduous hairs, the connective bent forward over the apex and down between the locules. Fruit subtended by slightly accrescent sepals, these up to 3.5 mm long, 2.5 mm wide, truncate at the base, entire at the margin, obtuse or rounded at the apex, glabrous.

Type. *Spruce* 2966, ad flumina Casiquiari, Vasiva et Pacimoni, Amazonas, Venezuela (GH! K).


Mitú, Cuatrecasas 6882 (US) & Davis 202 (MICH); Cerro del Varador, Río Inirida, Alv. Fernández 2074 (US). Cerro Mitú, Maguire et al 44091 (COL, NY) & 44100 (NY); Río Negro, opposite Piedra de Cocuí, Schultes & López 9891 (NY, US); San Felipe & vicinity, Schultes et al 18096 (NY, US) & 18123 (US); Mesa de Yambí, Río Karurú, Schultes & Cabrera 19170 (US); Río Vaupés, cerro de Tiplacca, between Mitú and Javareté, Schultes & Cabrera 19314 & 19318 (US); granitic slope at Cerro de Mitú, Zarucchi 1674 (MICH).

Collected in flower and fruit from September to May.

2. Diacidia parvifolia


In addition to the differences given in the key, this species differs from the preceding one in having slightly smaller petals, and the connective of the anther does not extend so far forward between the locules. For a complete description see the protologue.

Type. Cuatrecasas 7703, San José del Guaviare, Vaupés, Colombia (holotype US).

Distribution. Vaupés, Colombia, in savannas, often over quartztitic rocks, at elevations of 100–450 m. In addition to the collections cited in the protologue, I would refer the following collections (annotated as D. galphimioides by Cuatrecasas) to this species: Río Kuduyarí, Cerro Yapobodá, Schultes & Cabrera 14355 (US), Schultes et al 20049 (NY, US). Recent collections, all from Mitú and vicinity: Río Paraná-pichuna, sandstone savanna at major rapids, Zarucchi 1343 (MICH); lower Río Kubiyú, sandstone savanna, Zarucchi 1409 & 1778 (MICH); lower Río Paraná-pichuna, savanna at major rapids, Zarucchi 1990 (MICH).

Collected in flower and fruit in almost every month.

This is very closely related to Diacidia galphimioides. Plants from the Río Negro and Río Orinoco areas have large leaves and bracteoles; these constitute “typical” D. galphimioides. Most plants from southeastern Colombia have small leaves and bracteoles, and are recognized here as D. parvifolia. However, plants from Cerro Mitú in Colombia have the larger leaves and stature of D. galphimioides but bracteoles little larger than those of D. parvifolia. These plants are being called D. galphimioides here, but it seems clear that they represent intermediates between the two “species,” and that population deserves study to try to determine its genetic and ecological position with respect to D. galphimioides sens str and D. parvifolia.

Subgenus Sipapoa (Maguire) Anderson, comb et stat nov


Type. Diacidia kunhardtii (Maguire) Anderson.

In the descriptions below, the term “fruit wings” refers to the accrescent, wing-like sepals; the fruit proper is unwinged.

3. Diacidia glaucifolia (Maguire) Anderson, comb nov


Trees 5–15 m tall; vegetative internodes glabrous. Lamina of the larger leaves 16–27 cm long, 11–18 cm wide, broadly elliptical or obovate, obtuse or truncate
or subcordate at the base, obtuse or rounded at the apex, glaucous below, glabrous above, ciliate to glabrate on the margin, sericeous below on the midrib and lateral veins to soon glabrate, the hairs 1–1.5 mm long, basifixed, straight, fine, the veins prominent below; petiole 3.4–5.3 cm long, with the proximal 1.7–2.8 cm part of the petiolar-stipular sheath and the distal 1.3–2.5 cm free, glabrous; stipules 8.2–10.5 cm long, united proximally with the opposite pair to form a sheath 1.2–2 cm long, the distal 7–9 cm completely connate to produce a single intrapetiolar structure broadly rounded at the apex, abaxially glabrous and glaucous, marginally ciliate to glabrate, adaxially glabrous except hirsute at base inside sheath. Inflorescence 17–35 cm long, laxly rufous-sericeous, a compound thyrse, the terminal axis ternate and subtended by 2–4 unbranched lateral axes, the cincinnati mostly 4–10-flowered; bracts and bracteoles sericeous or tomentose on both sides, more densely so abaxially, the bracts caducous, the bracteoles smaller and longer persistent. Pedicel 4–10 mm long, villous. Sepals revolute, dentate or laciniate, abaxially tomentose or villous, adaxially sparsely tomentose to glabrate. Limb of the petals 5–7 mm long, 4–6 mm wide. Fertile stamens (8–)9, 1 (very rarely both) of the stamens opposite the anterior-lateral petals absent; anthers 1.4–1.8 mm long, each locule bearing 1(–2) apical awns and otherwise glabrous. Fruit wings up to 9 mm long and 4 mm wide, truncate or cordate at the base, dentate or laciniate at the margin, abaxially tomentose or villous.

Type. Maguire et al 42057, Cerro de la Neblina, Río Yatúa, Amazonas, Venezuela (holotype NY! isotypes F! NY! US! VEN!).

Distribution. Known only from the Cerro de la Neblina in Venezuela and the nearby Serra de Pirapucu in Brazil, at elevations of 650–1100 m; see protologue.

Collected in flower and fruit from November through February.

Two intriguing collections from Neblina may represent hairy-leaved sucker shoots of this species. They are Maguire et al 42057B, for which the label states they are sucker shoots, and Coradin 445 (IAN 149920 & 149920a). In the latter case the plant was described as a shrub 1.5 m tall; it may have been juvenile, or these may have been stump sprouts. Both collections are sterile. The leaves are smaller, especially narrower, than in typical specimens, and cuneate at the base. More interesting, the leaves are abundantly and persistently hairy on both sides (mostly on the midrib and veins below, uniformly above) and ciliate on the margin, with straight basifixed hairs 3–7 mm long. The petioles and stipules are also hairy. This is in marked contrast to Maguire et al 42057A, sterile apical shoots with glabrate leaves like those of the flowering stems. Such dimorphism between sucker shoots and apical shoots is otherwise unknown in the Malpighiaceae, and almost incredible to me. I think it possible that there is actually an undescribed species of Diacidia on Neblina, a shrub with hairy leaves, but until it is found fertile these two collections are best left with D. glaucifolia.

4. Diacidia rufa (Maguire) Anderson, comb nov


Trees 2–12 m tall; vegetative internodes glabrous. Lamina of the larger leaves 8.5–17(–22) cm long, 5–10(–14) cm wide, obovate, truncate or usually slightly cordate at the base, obtuse at the apex, glaucous below (the glaucescence often
hidden by hairs), glabrous above or sericeous on the midrib, ciliate on the margin, persistently rufous-sericeous below, the hairs 1–4 mm long, basifixed, straight, fine, longer on the midrib and lateral veins but very dense over the whole surface, the veins prominent below; petiole 2–4(–5) cm long, with the proximal 1.2–3 (–3.5) cm part of the petiolar-stipular sheath and the distal 0.5–1(–1.5) cm free, glabrous; stipules 5.5–10 cm long, united proximally with the opposite pair to form a sheath 1–2 cm long, the distal 4–8 cm completely connate to produce a single intrapetiolar structure broadly rounded at the apex, abaxially sericeous to glabrate and glaucous, ciliate on the margin, adaxially glabrous except hirsute at base inside sheath. Inflorescence, flowers, and fruit ± like those of *D. glaucifolia*, the cincinnati only 2–6-flowered and various parts, especially the pedicels and sepals, tending to be more densely villous.

Type. *Maguire et al* 42036, Cerro de la Neblina, Río Yatúa, Amazonas, Venezuela (holotype NY! isotypes F! US! VEN!).

Distribution. Known only from the Cerro de la Neblina and the nearby Serra de Pirapucú in Brazil, at elevations of 1600–1800 m; see protologue. Collected in flower and fruit from November through January.

*Diacidia rufa* and *D. glaucifolia* are almost identical except for the size and hairiness of their leaves and stipules. Since they bloom at the same time and grow in the same mountains, it would be interesting to know how they maintain their identity. Label data reveal that *D. glaucifolia* has been collected between elevations of 650 m and 1100 m, versus 1600 m to 1800 m for *D. rufa*. While it is difficult for one who has not been there to evaluate these data, they suggest that the two species have different ecological requirements that may effect partial or complete reproductive isolation and may also select against hybrids if they do occur.

5. *Diacidia stipularis* (Maguire & Phelps) Anderson, comb nov


Shrubs 0.5–3 m tall; vegetative internodes glabrous. Lamina of the larger leaves 4.5–13.5 cm long, 2.5–9.5 cm wide, elliptical or ovate or subrotund, obtuse or truncate or subcordate at the base, broadly obtuse or rounded at the apex, glaucous below, glabrous above, densely and ± persistently white- or yellowish-sericeous below, the hairs 2–2.5 mm long, basifixed, straight, fine, the lateral veins obscure or prominulous below; petiole 1.2–2.4 cm long, with the proximal 0.7–1.4 cm part of the petiolar-stipular sheath and the distal 0.4–1.0 cm free, glabrous; stipules 3.5–8 cm long, united proximally with the opposite pair to form a sheath 0.7–2 cm long, the distal 2.8–6.2 cm completely connate to produce a single intrapetiolar structure broadly obtuse or rounded at the apex, glabrous on both sides except hirsute adaxially inside sheath. Inflorescence 9–15 cm long, glaucous and apparently glabrous (actually initially strigose but the hairs caducous), a pseudoraceme; bracts and bracteoles glabrous, caducous, the bracts 8–10 mm long, the bracteoles ca 2 mm long. Pedicel 7–14 mm long, glabrous. Sepals revolute, entire or obtusely denticulate, glabrous. Limb of the petals 4–6 mm long, 4–5 mm wide. Fertile stamens 6(–7), the 4 opposite the lateral petals absent; anthers 1.1–1.6 mm long, each locule bearing 1(–2) apical awns and laterally
strigose to soon glabrate, the few hairs straight, basifixed, caducous. Fruit wings up to 12 mm long and 5 mm wide, cordate at the base, entire or paucidenticate distally, acute at the apex, unequal, glabrous.

Type. Cowan & Wurdack 31200, Cerro Parú, Río Parú, Río Venturí, Amazonas, Venezuela (holotype NY! isotypes F! MO! NY! US! VEN!).

Distribution. Known only from the type locality, at elevations of 1600–2000 m; see protologue.

Collected in flower and fruit in January and February.

6. **Diacidia kunhardtii** (Maguire) Anderson, comb nov


Shrubs or small trees to 4 m tall; vegetative internodes glabrous. Lamina of the larger leaves 4–7 cm long, 2.3–5 cm wide, elliptical to nearly rotund, obtuse or rounded at base and apex, glaucous below, sparsely sericeous to glabrate above, densely and persistently ciliate on the margin, spreading-sericeous below on the midrib and lateral veins, the hairs 2–4 mm long, basifixed, straight, very fine; petiole 17–26 mm long, with the proximal 12–19 mm part of the petiolar-stipular sheath and the distal 5–8 mm free, hirsute; stipules 22–32 mm long, united proximally with the opposite pair to form a sheath 15–22 mm long, the distal 7–10 mm completely connate to produce a single triangular intrapetiolar structure acute at the apex, abaxially sericeous, adaxially hirsute. Inflorescence 9–20 cm long, villous, a pseudoraceme (the cincinnati rarely 2-flowered); bracts and bracteoles abaxially sericeous, marginally ciliate, adaxially glabrous, the bracts caducous, the bracteoles smaller and longer persistent. Pedicel 3–5 mm long, villous. Sepals revolute, glandular-dentate, abaxially tomentose to glabrate, adaxially glabrous. Limb of the petals 2.5–4 mm long, 2–4 mm wide. Fertile stamens 8, the 2 opposite the anterior-lateral petals absent or reduced to minute rudimentary filaments; anthers 1–1.5 mm long, each locule bearing 1(–2) apical awns and otherwise glabrous. Fruit wings up to 13 mm long and 4 mm wide, cordate at the base, dentate at the margin, obtuse at the apex, glabrate.


Distribution. Known only from Cerro Sipapo, at elevations of 1450–1500 m; see protologue.

Collected in flower and fruit in December and January.

7. **Diacidia cordata** (Maguire) Anderson, comb nov


Shrubs 0.5–1.5 m tall, the stems glabrous and often glaucous. Lamina of the larger leaves 3–6.5 cm long, 1.5–4.5 cm wide, elliptical or oblong or slightly ovate or obovate, deeply cordate at the base, obtuse or rounded at the apex, glaucous below, initially ciliate on the margin but soon quite glabrate, the veins and reticulum prominent on both sides, the midrib red; petiole 5–10 mm long, all but up to 1 mm part of the petiolar-stipular sheath, glabrous; stipules 11–16 mm long, united proximally with the opposite pair to form a sheath 4–6 mm long, the distal
7–10 mm free as 2 triangular acute epipetiolar lobes, abaxially glabrous, adaxially hirsute inside the sheath and glabrous distally. Inflorescence 5–17 cm long, glabrous, a simple thyrsoid, the cincinnati 2–6(–8)-flowered; bracts 6–9 mm long, rhombic, glabrous, caducous; bracteoles similar but smaller. Pedicel 8–12 mm long, glabrous. Sepals revolute, entire, glabrous. Limb of the petals 4–6.5 mm long, 3–4.5 mm wide. Fertile stamens 8–9, 1 or both of the 2 opposite the anterior-lateral petals absent or reduced to minute rudimentary filaments; anthers 1–1.3 mm long, each locule bearing 1–2 apical awns and laterally finely hirsute to soon glabrate. Fruit wings up to 7 mm long and 4 mm wide, cordate at the base, entire, acute or obtuse at the apex, often unequal and asymmetrical, glabrous.

Type. Maguire et al 42537D, Cerro de la Nebulosa, Río Yatúa, Amazonas, Venezuela (holotype NY! isotypes F! NY! US! VEN!).

Distribution. Known only from Cerro de la Nebulosa, at elevations of 1500–1800 m; see protologue.

Collected in flower and fruit in December and January.

8. Diacidia hypoleuca (Maguire) Anderson, comb nov


Trees 3–10 m tall; vegetative internodes glabrous, glaucous. Lamina of the larger leaves 5.5–10.5 cm long, 3–6 cm wide, elliptical or obovate, obtuse or truncate or subcordate at the base, obtuse or usually rounded or emarginate and apiculate at the apex, glaucous below, glabrous above, densely and persistently white- or yellowish-sericeous below, the hairs up to 4 mm long, basifixed, straight, very fine, the lateral veins prominent below; petiole 1.6–2.5 cm long, with the proximal 1.3–1.9 cm part of the petiolar-stipular sheath and the distal 0.2–0.6 cm free, sericeous; stipules 2–3 cm long, initially united proximally with the opposite pair to form a sheath 0.7–1.6 cm long (the sheath soon splitting open along the interpetiolar seams), the distal 1–1.8 cm nearly free (up to 3 mm connate) as 2 triangular or ovate, acute or acuminate epipetiolar lobes, abaxially glabrate on the sheath and sericeous distally, ciliate on the margins, adaxially hirsute inside the sheath and glabrous distally. Inflorescence 6–12 cm long, loosely sericeous, a pseudoraceme; bracts and bracteoles deciduous, the bracts 7–9 mm long and abaxially very densely sericeous, the bracteoles ca 3 mm long and sparsely pilose. Pedicel 6–13 mm long, tomentose. Sepals revolute, denticulate or subentire, glabrous on both sides, ciliate to glabrate on the margin. Limb of the petals 3.5–5 mm long (–7 mm in the posterior petal), 3–4.5 mm wide. Fertile stamens 9, 1 of the stamens opposite the anterior-lateral petals absent; anthers 1–1.3 mm long, each locule bearing 1(–2) apical awns and laterally finely hirsute to very soon glabrate (apparently glabrous). Fruit wings up to 10 mm long and 8 mm wide, cordate at the base, denticulate or subentire at the margin, obtuse at the apex, glabrate or ciliate on the margin; pedicel strongly reflexed in fruit.

Type. Maguire et al 30704, Cerro Yapacana, upper Río Orinoco, Amazonas, Venezuela (holotype NY! isotypes F! MO! US! VEN!).

Distribution. Known only from the type locality, at elevations of 1000–1200 m; see protologue. A recent collection from the same place is Steyermark & Bunting 103138 (NY, VEN).

Collected in flower and fruit in January, April, and May.


Shrubs or small trees 1–4 m tall; vegetative internodes persistently sericeous. Lamina of the larger leaves 3–4.5 cm long, 1–2 cm wide, narrowly elliptical, obtuse at the base, thickened at the margin, obtuse and apiculate at the apex, glaucous below, glabrous above except sericeous at very base, densely and persistently rufous- or yellowish-sericeous below, the hairs up to 1.3 mm long, basifixed below, sub-basifixed above, straight, very fine, the lateral veins obscure on both sides or prominulous below; petiole 5–9 mm long, with the proximal 4–6 mm part of the petiolar-stipular sheath and the distal 1–3 mm free, sericeous; stipules 5–9 mm long, united proximally with the opposite pair to form a sheath 4–7 mm long (the sheath often soon splitting open along the interpetiolar seams), the distal 1–2 mm free as 2 triangular, acute, epipetiolar lobes, abaxially sericeous, adaxially hirsute inside the sheath and glabrous distally. Inflorescence 3–12 cm long, tomentose, a pseudoraceme; bracts ca 4 mm long and abaxially densely sericeous; bracteoles ca 2 mm long and sparsely pilose. Pedicel 8–12 mm long, tomentose. Sepals revolute, entire, abaxially sparsely pilose to glabrate, ciliate on the margin, adaxially glabrous. Limb of the lateral petals 3.5–4 mm long, 3.5–4.5 mm wide; limb of the posterior petal 5.5–6 mm long, 6.5–7 mm wide. Fertile stamens 6, the 4 opposite the lateral petals absent; anthers 1–1.5 mm long, each locule bearing 1(–2) apical awns and otherwise glabrous, the connective much enlarged and globular at the apex. Fruit wings up to 13 mm long and 12 mm wide, cordate at the base, entire at the margin, rounded at the apex, glabrate or ciliate on the margin; pedicel strongly reflexed in fruit.

Type. *Cowan & Wurdack 31233*, Cerro Parú, Río Parú, Río Ventuari, Amazonas, Venezuela (holotype NY! isotypes MO! VEN!).

Distribution. Known only from the type locality and vicinity, at elevations of 1700–2000 m; see protologue. Two recent collections from the same area [Cerro Asisa (La Momia), Serranía Parú] are Hoyo & Morillo 64 and 97 (both VEN).

Collected in flower and fruit in January, February, and May.

This species is morphologically the most specialized in the genus. Apart from the very reduced androeium, it is notable for its short stipule-lobes, strongly dimorphic petals, enlarged connectives, and distinctly internal stigmas.

10. *Diacidia aracaënsis* Anderson, sp nov

Arbor 3 m alta, internodiis vegetatis sericeis. Lamina foliorum majorum 3–6 cm longa, 1.2–2.5 cm lata, elliptica vel anguste ovata, basi obtusa, margine parum revoluta, apice acuta vel obtusa apiculataque, subtus glauca, supra novella sericea mox glabrescens, subtus pertinaciter sericea vel demum glabrescens, pilis supra submediofixis vel sub-basifixis (altero brachio 1.1 mm altero 0.5–0.1 mm longo), subtus sub-basifixis (altero brachio 1 mm altero 0.1 mm longo), nervis lateralibus utrinque obscuris vel paulo prominulis; petiolus 7–9 mm longus, 4–6 mm proximalibus in vagina cum stipulis coalitis, 2–4 mm distalibus liberis, sericeus; stipulae 6–8 mm longae, 4–5 mm proximalibus in vagina cum petiolo et stipulis oppositis coalitis, 2–3 mm distalibus liberis triangularibus, abaxialiter sericeae, adaxialiter hirsutae. Inflorescentia 3–11 cm longa, tomentosa, pseudoracemosa
Fig 15. *Diacidia aracaënsis*. a) Flowering branch; b) stipules; c) leaf hairs (upper from adaxial surface, lower from abaxial surface); d) bract, adaxial view; e) bracteole, adaxial view; f) flower; g) stamens, adaxial view; h) stigma; i) enlarged sepals surrounding fruit. Drawn from holotype.
cincinnis unifloris, pedunculo 0.5–1.3 mm longo, bracteis bracteolisque deciduis, abaxialiter sericeis, illis ca 3 mm, his ca 1.5 mm longis. Pedicellus 8–10 mm longus, tomentosus. Sepala revoluta, minute denticulata, abaxialiter in centro sericea, margine et adaxialiter glabra. Petala 4 lateralia ungue 1 mm longo, limbo 4.5–5 mm longo et lato, late ovato, denticulato. Petalum posticum ungue 1.5 mm longo, limbo 5–6 mm lato, 3–3.5 mm lato, elliptico, denticulato. Stamina fertilia 8, 2 petalis anterioribus oppositis anantheris vel absentibus, filamentis ca 2 mm longis, liberis vel usque ½ connatis. Antherae 1.2–1.5 mm longae, in quoque loculo 1–2 aristis apicalibus ornatae, aliter glabrae, connectivo apice tantum parum tumido. Ovarium conicum, 1.3 mm altum. Styli 2–2.5 mm longi, stigma- tubus internis. Fructus alae (maturae?) usque 7 mm longae, 5 mm latae, basi subcordatae, margine integrae vel minute denticulatae, apice rotundatae, abaxialiter sparsim sericeae, aliter glabrae.

Type. Pires 14993, Serra Aracá [ca 1°N, 63°W fide Prance (1976)], Amazonas, Brazil, 2 Oct 1975 (holotype IAN 145429, isotype MICH).

Known only from the type collection; named for the type locality, which has yielded a number of endemic new species.


Shrubs or small trees 3–9 m tall; vegetative internodes loosely sericeous. Lamina of the larger leaves 6–10–13.5 cm long, 2.8–5.5 cm wide, elliptical or slightly obovate, obtuse or rounded at the base, flat or revolute at the margin, obtuse or rounded and apiculate or very shortly acuminate at the apex, slightly or not at all glaucous below, villous or subsericeous or subtomentose above, the hairs straight or slightly bent and erect to subappressed, woolly below, the hairs much twisted and intertwined (or nearly straight on the midrib), the lateral veins obscure above and prominulous below; petiole 19–32 mm long, with the proximal 14–25 mm part of the petiolar-stipular sheath and the distal 4–7 mm free, villous or woolly; stipules 20–35 mm long, united proximally with the opposite pair to form a sheath 15–25 mm long (the sheath soon splitting open along the interpetiolar seams), the distal 5–11 mm free as 2 triangular, acute or acuminate, epipetiolar lobes, abaxially subsericeous, adaxially hirsute inside the sheath and glabrous distally. Inflorescence 4–12 cm long, villous, a pseudoraceme; bracts and bracteoles abaxially sericeous or villous (especially the bracts), eventually deciduous, the bracts 3.5–5 mm long, the bracteoles 2–3 mm long. Pedicel 7–10–12 mm long, villous. Sepals revolute, entire or denticate, abaxially villous, ciliate on the margin, adaxially glabrous. Limb of the lateral petals 4.5–5 mm long, 3–4 mm wide; limb of the posterior petal 6 mm long, 3–4 mm wide. Fertile stamens (7–8), the 2 opposite the anterior-lateral petals absent and the stamen opposite 1 of the posterior-lateral petals sometimes reduced to a staminode; anthers 1.1–1.5 mm long, each locule bearing 1–2 apical awns and otherwise glabrous or sparsely pilose and soon glabrate, the connective bent forward at the apex. Fruit wings
up to 13 mm long and 7 mm wide, cordate at the base, entire or dentate at the margin, acute or obtuse at the apex, abaxially villous; pedicel reflexed in fruit.

Type. "Mountains of British Guiana, [Robert] Schomburgk s.n." (K) [probably actually from Amazonas, Venezuela; cf Maguire, 1969, p. 50].

Distribution. Known from three mountains in Amazonas, Venezuela, at elevations of 1200–1900 m: Cerro Duida, Steyermark 58122 (NY, US), Tate 563 (NY, US); Cerro Huachamacari, Maguire et al 29806 (NY), 29858 (NY), 29869 (F, NY), 30091 (F, MO, NY, VEN), 30111 (NY, VEN), 30221 (NY), 30252 (NY, VEN); Sierra Parima, Brazilian frontier, 3°58'N, 64°40'W, elev 1750 m, Cardona 3080 (VEN), 4°5'N, 64°40'24"W, elev 1500 m, Steyermark 107499 (VEN).

Collected in flower and fruit in January, March, May, and December.

12. Diacidia steyermarkii (Maguire) Anderson, comb nov


Trees 3–8 m tall; vegetative internodes loosely sericeous to villous. Lamina of the larger leaves 6–10 cm long, 3–4.5 cm wide, elliptical or obovate, rounded or slightly cordate at the base, revolute at the margin, obtuse or rounded and apiculate or very shortly acuminate at the apex, glaucous below (the glaucescence hidden by the hairs), villous above, the hairs straight and erect (broken and appressed on older leaves), very densely sericeous below, the hairs straight, appressed, and parallel, the lateral veins impressed above and very prominent below; petiole 23–30 mm long, with the proximal 18–25 mm part of the petiolar-stipular sheath and the distal 3–7 mm free, villous or woolly; stipules 26–39 mm long, united proximally with the opposite pair to form a sheath 15–26 mm long (the sheath soon splitting open along the interpetiolar seams), the distal 9–15 mm free as 2 ovate or triangular, acuminate, epipetiolar lobes, abaxially villous or subsericeous, adaxially hirsute inside the sheath and glabrous distally. Inflorescence 12–15 cm long, villous, a pseudoraceme; bracts and bracteoles abaxially sericeous (especially the bracts), eventually deciduous, the bracts 4–6 mm long, the bracteoles 1.5–2 mm long. Pedicel 6–10 mm long, villous or woolly. Sepals erect or revolute, denticulate, abaxially sericeous or woolly, adaxially glabrous or sparsely pilose near the margin. Limb of the lateral petals 4–5 mm long and wide; limb of the posterior petal 5–6 mm long, 4–5 mm wide. Fertile stamens 8, the 2 opposite the anterior-lateral petals absent; anthers 1–1.5 mm long, each locule bearing 1 apical awn and otherwise glabrous, the connective bent forward at the apex. Fruit wings (immature?) up to 7 mm long and 2.5 mm wide, truncate at the base, entire or dentate at the margin, acute or obtuse at the apex, abaxially loosely sericeous; pedicel spreading in fruit.

Type. Steyermark 98016, Cerro Jaua, Rio Kanarakuni, Rio Caura, Bolivar, Venezuela (holotype NY! isotype VEN).

Distribution. Known only from the Meseta del Jaua, Bolivar, Venezuela, at elevations of 1320–2250 m. Dr. Steyermark made the following additional collections in 1974: Cerro Sarisariñana, 109030 & 109158 (both NY); Cerro Jaua, 109282 & 109576 (both NY).

Collected in flower and fruit in February and March.


Trees, shrubs, or subshrubs, the leaves eglandular; stipules intra- and epipetiolar, free or partially to completely connate, persistent on the petiole (except in *B. stipulacea*). Inflorescence terminal, a raceme of few-flowered cincinni or a pseudoraceme (i.e. a raceme of 1-flowered cincinni), the bracts and bracteoles eglandular, the peduncle usually very short or absent. Flowers circinate in bud in many species. Sepals all biglandular or not rarely all eglandular, connate as far as the tips of the glands, the glands green, yellow, white, or pink. Petals yellow, white, pink, or red ("purple" in *B. fernandezii*), usually glabrous (bearing a few hairs in a few species), the lateral 4 with slender, recurved claws, the anterior pair with deeply cup-shaped limbs, the posterior pair shallower; posterior petal with a stout, erect claw and the limb smaller, flat or crumpled and often reflexed. Stamens 10, all fertile; filaments alike, flat, free or basally connate, glabrous or (usually) with some basal hairs, at least adaxially; anthers ± alike, of different lengths in some species; pollen usually tricolporate. Receptacle hirsute between filaments and ovary. Ovary with the 3 carpels completely connate, 3-locular, every locule containing 1 ovule or the anterior sterile in some species; styles 3, apical, ± alike, glabrous, subulate, often bent at the tips in bud, the stigmas minute and apical or slightly internal. Fruit a drupe, the thin flesh green turning yellow, orange, red, purple, blue, or blue-black at maturity, the stone with a hard wall, trilocular, the seeds as many as the ovules or fewer due to abortion, the embryo coiled.

**Lectotype. Byrsonima coccolobifolia** H.B.K.

**Byrsonima** is the largest genus in the family, comprising at least 150 species, all American. It is the most widespread and ecologically diverse genus of the subfamily Byrsonimoideae, a fact that I relate to its bird-dispersed fruits, which are unique in the subfamily (Anderson, 1978). Functionally similar fruits have evolved independently in the genera *Bunchosia* and *Malpighia*, neither of which is closely related to *Byrsonima*.

Success in identifying a *Byrsonima* to species depends on correct interpretation of the anthers. For this a dissecting microscope is usually essential, preferably one equipped with an ocular micrometer. I have included a plate (Fig 16) with photographs of the principal types of anthers, and one should use that plate as an adjunct to the key. The drawings of individual species will also help in this respect.

**Key to the Species of Byrsonima in Guayana** (for specimens with flowers)

1. Petals yellow, sometimes turning orange or red with age.
2. Gnarled shrubs up to 60 cm tall; leaves mostly in dense clusters without measurable internodes. 8. *B. verbascifolia*.
2. Shrubs or trees 1–30 m tall; internodes usually over 5 mm long.
3. Stipules free or up to ½ connate; pedicel long-pedunculate, the primary peduncle 5–15 mm long; anthers glabrous; petals often bearing a few hairs, especially on the claw and margin of the limb. 1. *B. maguirei*. 

3. Stipules completely connate to form an entire intrapetiolar pair; pedicel sessile or short-pediculate, the peduncle 0–2(–4) mm long; anthers sericeous or tomentose between or on both sides of the locules; petals glabrous.

4. Lamina velutinous below, the hairs with a straight, erect stalk, the branches mostly shorter than the stalk.

5. All or many hairs of the abaxial surface of the lamina stellate, i.e. with more than 2 branches; stipules (8–)10–23 mm long, deciduous.

2. *B. stipulacea*.

5. All hairs of the lamina bifurcate, i.e. Y-shaped with only 2 branches; stipules 5–6 mm long, persistent on the petiole. 4. *B. poeppigiana*.

4. Lamina tomentose, sericeous, or glabrate below, the hairs (if any) sessile, subsessile, or with a stalk shorter than the trabecula or branches.

6. Posterior petal eglandular.

7. Leaves densely to sparsely sericeous or nearly glabrate, the hairs straight, appressed, parallel.

8. Petiole of the larger leaves (7–)10–15 mm long, sericeous to glabrate, often with an admixture of long, spreading, basifixed or sub-basifixed hairs; ovary glabrous or sparsely sericeous at the apex; peduncle (0.5–)1–2(–4) mm long.

5. *B. arthropoda*.

8. Petiole of the larger leaves (15–)20–40 mm long, sericeous to glabrate, all hairs short, medifixed, appressed; ovary densely sericeous; peduncle 0–1(–2) mm long.

9. Lamina densely and persistently ferrugineous-sericeous below, the hairs 0.2–0.5 mm long; trees 15–33 m tall.

6. *B. aerugo*.

9. Lamina sparsely sericeous to nearly glabrate below, the hairs 0.1–0.2 mm long, never dense enough to hide the lamina; trees 8–25 m tall.

7. *B. crispa*.

7. Leaves tomentose to glabrate, the hairs ± twisted, not appressed or parallel.

10. Stipules 6 mm long; stems tomentose with an admixture of long, straight, spreading, sub-basifixed hairs. 3. *B. fanshaweii*.

10. Stipules 2–4 mm long; stems sericeous or appressed-tomentose, without spreading hairs.

11. Lamina abruptly narrowed and usually short-acuminate at the apex, mostly about twice as long as wide and less than 10 times as long as the petiole, usually glabrescent below at maturity, the principal lateral veins and alternating, slightly weaker veins strongly parallel, the reticulum often white and visible above.

9. *B. crassifolia*.

11. Lamina gradually narrowed to an acute or slightly acuminate apex, at least 2.5 times as long as wide and over 10 times as long as the petiole, persistently tomentose below, the lateral veins not strongly parallel, the reticulum not especially white or visible above.

10. *B. laurifolia*.

6. Posterior petal with 2 or more glands at the apex of the claw or occasionally on the base of the limb.

12. Ovary glabrous; lamina ± persistently subsericeous below, the hairs distinctly stalked, with slightly twisted, non-parallel trabeculae over 0.5 mm long; lamina with 8–12 pairs of lateral veins strongly raised below, parallel and anastomosing near the margin, alternating with weaker, shorter, parallel veins; lamina
broadly elliptical, 4–7(–9) cm wide; shrubs or small trees 2–5
(–9) m tall. 11. *B. chrysophylla*.

12. Ovary sericeous; leaves appressed-sericeous to glabrate below,
the hairs sessile or short-stalked, with short, straight, parallel
trabeculae up to 0.5 mm long; lamina with 15–20 or more pairs
of fine lateral veins parallel and anastomosing near the margin,
one very prominent below; lamina narrowly elliptical, 1.7–4
(–5.5) cm wide; trees 3–25 m tall. 12. *B. spicata*.

1. Petals white, pink, red, or "purple," often changing from white to pink or red with age.


14. Leaves sessile or subsessile, the petiole up to 2 mm long. 13. *B. coccolobifolia*.

14. Leaves petiolate, the petiole of larger leaves at least 5 mm long.

15. Bracts at least 3 mm long, mostly deciduous before maturity of the fruit;
locules of the anther rounded or acute at the apex.

16. Larger leaves with the petiole 5–10 mm long, densely and ± persistently
tomentose, the lamina (5–)8.5–15 cm long, (3.5–)4.5–7 cm
wide; anthers 1.8–2.8 mm long; ovary glabrous, with all 3 locules
fertile; styles 2.7–3.7 mm long. 14. *B. schomburgkiana*.

16. Larger leaves with the petiole 25–30 mm long and glabrous, the lamina
16–20 cm long, 7–9.5 cm wide; anthers 3–3.8 mm long; ovary
densely sericeous on the distal half, with only 2 locules fertile; styles
5.5–6.5 mm long. 15. *B. fernandezii*.

15. Bracts up to 1.5 mm long, persistent in fruit and after; locules of the anther
extended at the apex into slender, sterile projections.

17. Lamina with the midrib ± persistently sericeous below, and with the
lateral veins prominent below; sepals adaxially sparsely sericeous;
anthers 3.5–4.6 mm long (including extensions of the locules and
connective); styles 4–5 mm long, bent or hooked at the apex;
Guyana. 16. *B. gymnocalycina*.

17. Lamina with the midrib usually soon glabrate, the lateral veins obscur
or prominulous below; sepals adaxially glabrous; anthers 2–3.2
mm long; styles 3–4 mm long, ± straight; western Amazonia.

17. *B. japurensis*.


18. Locules of the anthers with the outer thecae dorsiventrally flattened, often long-
er than the inner thecae, and very often bearing narrow membranous longitudinal
wings (Fig 16h, i, j).

19. Pedicel of old flowers and fruits straight or ascending.

20. Lamina of the larger leaves 14.5–22.5 cm long, 7–10 cm wide, the
petiole 20–35 mm long; connective of the anthers exceeding the locules
by 0.9–1.3 mm; fruit (dried) 10–12 mm in diameter. 18. *B. rodriguesii*.

20. Lamina of the larger leaves (4–)6–13 cm long, (2–)3–6.5 cm wide, the
petiole (7–)10–20 mm long; connective exceeding the locules by 0.2–
0.8 mm; fruit (dried) 4–8 mm in diameter.

21. Lamina acute or obtuse to rounded and often apiculate or retuse
at the apex; stipules 1.5–5 mm long; bracts usually 2–5 mm long,
rarely only 1 mm; locules of the anthers with narrow membranous
wings up to 0.1 mm wide.

22. Bracts and bracteoles green; inflorescence (3–)6–16 cm
long, the flowers borne 1–several per bract; stipules 1.5–
2.5(–3.5) mm long, adaxially hirsute. 19. *B. concinna*.

22. Bracts and bracteoles red; inflorescence 4–5 cm long, the
flowers borne 1 per bract; stipules 3.5–5 mm long, adaxi-
ally sparsely sericeous. 20. *B. rubrobracteata*.

21. Lamina acuminate, rarely acute, at the apex; stipules ca 1 mm
long; bracts 1–1.5 mm long; locules of the anthers unwinged.

21. *B. garcibarrigae*.

19. Pedicel of old flowers and fruits decurved and often eventually twisted.

23. Sepals abaxially sericeous or appressed-tomentose; bracts 1.2–3.5 mm long; stems sericeous to glabrate.

24. Lamina narrowly elliptical, 2–3 cm wide, persistently glaucous below; sepals revolute in anthesis; filaments 2–2.3 mm long; connective of the anthers exceeding the locules by 0.5–0.8 mm; styles ca 4 mm long.

22. *B. bronweniana*.

24. Lamina elliptical or obovate, 3–4.5 cm wide, not glaucous below; sepals appressed in anthesis; filaments 2.6–2.8 mm long; connective exceeding the locules by 0.2–0.5 mm; styles ca 3 mm long.

23. *B. bracteolaris*.

23. Sepals glabrous or ciliate on the margin (very rarely with a few appressed hairs abaxially in the center in *B. amoena*); bracts 0.5–1.5 mm long; stems glabrous except short-hirsute in axils of stipules.

25. Lamina with a thick, persistent glaucescence below; inflorescence glabrous (? or soon glabrate).

24. *B. luetzelburgii*.

25. Lamina not glaucous below; inflorescence thinly sericeous to glabrate.

26. Petiole of the larger leaves (11–)15–22 mm long, the lamina 5–7 cm wide, broadly elliptical; fruit (dried) 12 mm in diameter.

25. *B. laevis*.

26. Petiole of the larger leaves (3–)5–10 mm long, the lamina 3–5.7 cm wide, obovate or occasionally elliptical; fruit (dried) 4–5.5 mm in diameter.

26. *B. amoena*.

18. Locules of the anthers cylindrical or linear and unwinged.

27. Ovary sericeous.

28. Mature lamina glabrous or glabrate below or very sparsely sericeous, the white hairs hardly visible without a lens; lamina not or hardly glaucous above.

29. Bracts and bracteoles persistent past maturity of the fruit; bracts 1–2 mm long, shorter than or as long as the bracteoles; sepals stretched but not elongated in fruit, up to 3 mm long; petiole 20–35(–45) mm long; flowers often borne 2(–3) per bract; all 3 locules of the ovary fertile.

27. *B. christianaeae*.

29. Bracts and bracteoles deciduous before anthesis; bracts 4–5 mm long, about twice as long as the bracteoles; sepals accrescent in fruit, to 5–6 mm long and notably auriculate; petiole 10–20 (–23) mm long; flowers borne 1 per bract; only 2 locules of the ovary fertile.

28. *B. incarnata*.

28. Mature lamina abundantly and persistently sericeous below, not or only belatedly glabrescent, the usually dark hairs easily visible without a lens; lamina often densely glaucous above.

30. Lamina of the larger leaves 5.5–12 cm long, 2.5–7 cm wide, the stipules 3–5 mm long; inflorescence (3–)5–13 cm long.

29. *B. chalcophylla*.

30. Lamina of the larger leaves 14–17 cm long, 7.5–9 cm wide, the stipules 7–9 mm long; inflorescence (14–)25–26 cm long.

30. *B. macrostachya*.

27. Ovary glabrous.

31. Stipules 10–11 mm long, completely connate, the pair rounded at the apex; limb of the petals abaxially pilose.

31. *B. tillettii*.

31. Stipules 1.7–9 mm long, free or connate, if connate and over 6 mm long then the pair triangular, acute at the apex, sulcate in the middle; petals glabrous.
32. Bracts and bracteoles mostly deciduous by anthesis or soon after, long before maturity of the fruit.
33. Lamina of the larger leaves 8–15 cm long, 4–8 cm wide; stipules 1.7–3.5 mm long; ovary with the anterior carpel sterile.
34. Inflorescence 16–24 cm long; petiole of the larger leaves 16–25 mm long; sepals eglandular or the glands rudimentary, immersed; flowers borne 2–3(–4) per bract; sepals mostly revolute in open flowers.
32. B. wurdackii.
34. Inflorescence 6–10 cm long; petiole of the larger leaves 10–15 mm long; sepals all biglandular, the glands normally developed, prominent; flowers borne 1–2 per bract; sepals appressed in open flowers.
33. B. frondosa.
33. Lamina of the larger leaves 15–25 cm long, 7–13 cm wide; stipules 4–7.5 mm long; ovary with all 3 carpels fertile.
34. B. cowanii.
32. Bracts and bracteoles persistent to or past maturity of the fruit.
35. Stems and petioles glabrous except for hirsute axils of stipules in B. kariniana the stems and petioles sericeous when first formed, but immediately glabrescent; fruit (dried) 5–10 mm in diameter.
36. Petiole 3–5(–7) mm long, slightly shorter than the stipules to slightly longer, never twice as long; anthers with the connective equaling the locules or exceeding them by up to 0.5 mm.
37. Pedicel distally thickened, 2–3 mm in diameter at the apex, straight in bud; anthers with the locules 1.6–2.2 mm long, the connective not or hardly exceeding them, by up to 0.1 mm.
35. B. pachypoda.
37. Pedicel 1 mm in diameter (–1.5 mm in fruit), circinate in bud; anthers with the locules 1–1.3 mm long, the connective exceeding them by 0.3–0.5 mm.
36. B. steyermarkii.
36. Petiole of the larger leaves 12–19 mm long, at least twice as long as the stipules, often longer; anthers with the connective exceeding the locules by 0.7–1 (–1.5) mm.
37. B. kariniana.
35. Stems and petioles persistently hairy or eventually glabrescent; fruit (dried) up to 6 mm in diameter.
38. Lamina with the lateral veins very numerous and fine, not or hardly distinguishable from parallel veinlets and the reticulum; sepals abaxially thinly sericeous or tomentose, especially in the center, or glabrous, often ciliate on the margin.
39. Sepals adaxially glabrous; petiole 10–16(–23) mm long; lamina of the larger leaves 8–12(–15.5) cm long, 3–4.7(–5.2) cm wide, obtuse at the apex, usually densely glaucous below; stipules 2.5–4(–5) mm long; inflorescence 5–17 cm long, the flowers always borne 1 per bract: Alto Orinoco to middle Río Negro.
38. B. coniophylla.
39. Sepals adaxially sparsely tomentose; petiole 6–8(–10) mm long; lamina of the larger leaves 4–
7(–8) cm long, 1.8–2.6(–3) cm wide, short-acute or acute at the apex, not or only thinly glaucous below; stipules 1.8–2.8 mm long; inflorescence 2–8 cm long, the flowers 1 or 2 per bract; Guyana, Surinam, northern Pará, and Roraima Territory. 39. *B. eugeniifolia*.

38. Lamina with the principal lateral veins easily distinguished from finer veins and the reticulum, usually 5–13 pairs, sometimes more in laminas over 10 cm long; sepals abaxially densely and uniformly sericeous or tomentose, sometimes glabrescent in fruit.

40. Anthers with the connective not or hardly exceeding the locules, by up to 0.2 mm; stipules usually completely and smoothly connate, rarely free at the apex; sepals strongly revolute in anthesis; hairs on the filaments kinky; fruit developing half immersed in the enlarged, disc-like receptacle. 40. *B. nitidissima*.

40. Anthers with the connective exceeding the locules by 0.3–1 mm; stipules free; sepals appressed in anthesis; hairs on the filaments straight; fruit quite superior throughout development. *B. punctulata* complex.

41. Lamina persistently velutinous below, the hairs on tissue between the veins erect, ± straight, basifixied, the hairs on the veins denser, twisted, sub-basifixied. 41. *B. cuprea*.

41. Lamina below glabrous or sparsely tomentose to glabrate between the veins, tomentose to glabrate on the principal veins, most densely so on the midrib.

42. Lamina of the larger leaves 8.5–14.5 cm long, 4–8 cm wide, the petiole 10–19 mm long; stipules 3.5–7(–8) mm long, often acuminate; reticulum usually ± concolorous with areolar tissue; inflorescence 9–18 cm long. 42. *B. punctulata*.

42. Lamina of the larger leaves 5–9 (–10.5) cm long, 3–4.5(–5) cm wide, the petiole 5–11 mm long; stipules 1.5–2.5(–3) mm long, acute or obtuse; fine reticulum visible (in dried leaves) below or, usually, on both sides as a white mesh against darker areoles; inflorescence 5–10(–12.5) cm long. 43. *B. leucophlebia*.

**Key to the Species of *Byrsonima* in Guayana?**
(for specimens with fruits)

1. Bracts and bracteoles all or most deciduous before maturity of the fruit.

2. Hairs of the lamina more or less straight and appressed or subappressed, or the lamina glabrous or glabrate.

*Byrsonima tilletii*, which is unknown in fruit, is not included in this key.
3. Lamina glabrous or soon nearly or quite glabrulate.

4. Leaves sessile or subsessile, the petiole up to 2 mm long; lamina usually rounded or cordate at the base. 13. B. coccolobifolia.

4. Leaves petiolate, the petiole at least 5 mm long; lamina tapered, cuneate, or rarely rounded at the base.

5. Lamina with 15–20 or more pairs of fine lateral veins, none very prominent; leaves 1.7–4(–5.5) cm wide. 12. B. spicata.

5. Lamina with 5–12 pairs of principal lateral veins; larger leaves 4–11 cm wide.

6. Petiole persistently tomentose or only belatedly glabrescent; sepals membranous in fruit, the portion beyond the glands elongating to form a lingulate process at least twice as long as wide. 14. B. schomburgkiana.

6. Petiole glabrous or sericeous to glabrate; sepals thick in fruit, the portion beyond the glands often somewhat accrescent but triangular, about as wide as long, often auriculate at the base.

7. Inflorescence 6–10 cm long. 33. B. frondosa.

7. Inflorescence 11–35 cm long.

8. Stipules 1.7–3.5 mm long.

9. Lamina of the larger leaves 16–20 cm long, 7–9.5 cm wide; trees 25 m tall; pedicel vellutinous. 15. B. fernandezii.

9. Lamina of the larger leaves 9.5–15 cm long, 5–8 cm wide; trees 6 m tall; pedicel sericeous or glabrescent. 32. B. wurdackii.

8. Stipules 4–7.5 mm long.

10. Flowers borne 1 per bract; pedicel vellutinous; fruit sericeous to glabrate, ca 12 mm in diameter (dried). 28. B. incarnata.

10. Flowers borne mostly in clusters of 2–4 per bract (greatly condensed cincinni); pedicel sericeous or glabrescent; fruit glabrous, 8–10 mm in diameter (dried). 34. B. cowanii.

3. Lamina more or less persistently sericeous or subsericeous below, at least along the midrib.

11. Stipules about ½ to ⅔ connate, the pair sulcate, bidentate at the apex; pedicel straight in fruit. Go to couplet 30 of preceding key.

11. Stipules completely and smoothly connate, the apex entire; pedicel decurved or twisted in fruit.

12. Leaf hairs mostly 0.5 mm long or longer, often stalked, substraight, subappressed. 11. B. chrysophylla.

12. Leaf hairs mostly 0.4 mm long or shorter, sessile, quite straight and strongly appressed.

13. Lamina with 15–20 or more pairs of fine lateral veins, none very prominent; leaves 1.7–4(–5.5) cm wide; sepals adaxially loosely sericeous. 12. B. spicata.

13. Lamina with 6–10 pairs of principal lateral veins; larger leaves 5.5–10 cm wide; sepals adaxially glabrous or rarely sparsely sericeous. 5. B. arthropoda.

2. Hairs of the lamina twisted or erect.

14. Gnawed shrubs up to 60 cm tall; leaves mostly in dense clusters without measurable internodes. 8. B. verbascifolia.

14. Shrubs or trees 1–30 m tall; internodes usually over 5 mm long.

15. Sepals membranous in fruit, the portion beyond the glands elongating to form a lingulate process at least twice as long as wide. 14. B. schomburgkiana.

15. Sepals thick in fruit, the portion beyond the glands often somewhat accrescent but triangular, about as wide as long, often auriculate at the base.
16. Lamina velutinous below, the hairs with a straight, erect stalk, the branches mostly shorter than the stalk.
17. All or many hairs of the abaxial surface of the lamina stellate, i.e. with more than 2 branches; stipules (8–)10–23 mm long, deciduous.
2. B. stipulacea.
17. All hairs of the lamina bifurcate, i.e. Y-shaped with only 2 branches; stipules 5–6 mm long, persistent on the petiole.
4. B. poeppigiana.
16. Lamina tomentose below, the hairs sessile, subsessile, or with a stalk shorter than the branches. Go to couplet 10 of preceding key.
1. Bracts and/or bracteoles persistent to or past maturity of the fruit.
18. Pedicel prominently pedunculate, the primary peduncle 5–15 cm long. 1. B. maguirei.
18. Pedicel sessile or short-pedunculate, the peduncle up to 3 mm long.
19. Stipules ½ to completely connate.
20. Bracts 3–5 times as long as the bracteoles, strongly reflexed or revolute. Go to couplet 9 of preceding key.
20. Bracts up to twice as long as the bracteoles, sometimes the same length or shorter, appressed or spreading or somewhat reflexed.
21. Sepals membranous in fruit, the portion beyond the glands elongating to form a lingulate process at least twice as long as wide.
14. B. schomburgkiana.
21. Sepals thick in fruit, the portion beyond the glands often somewhat accrescent but triangular, about as wide as long, often auriculate at the base.
22. Pedicel straight or very slightly nodding in fruit.
23. Lamina of the larger leaves 18–30 cm long, 7–15 cm wide, the petiole 20–35(–45) mm long; fruit sericeous to glabrate. 27. B. christianeae.
23. Lamina of the larger leaves 4–10.7 cm long, 1.8–5.5 cm wide, the petiole 6–19 mm long; fruit glabrous.
24. Lamina with the lateral veins very numerous and fine, not or hardly distinguishable from parallel veinlets and the reticulum; fruit (dried) 3–5 mm in diameter.
24. Lamina with 7–10 pairs of principal lateral veins easily distinguished from finer veins and the reticulum; fruit (dried) 10 mm in diameter. 37. B. kariniana.
22. Pedicel strongly decurved and/or twisted in fruit.
25. Fruit (dried) 4–4.5 mm in diameter, developing half immersed in the enlarged, disc-like receptacle; lamina of the larger leaves 3.5–8.5 cm long, 2–4.5 cm wide, rounded or broadly obtuse at the apex, the petiole 2–6 mm long; bracts 1.5–3 mm long.
40. B. nitidissima.
25. Fruit (dried) 10–15 mm in diameter, quite superior throughout development; lamina of the larger leaves 10–20 cm long, 4–7 cm wide, obtuse or acuminate, the petiole (8–)10–20(–30) mm long; bracts 0.5–1.5 mm long.
40. B. nitidissima.
19. Stipules quite free or only basally connate.
26. Vegetative internodes, petioles, and abaxial surface of stipules at least initially hairy, the vesture persistent or deciduous.
27. Internodes, petioles, and abaxial surface of stipules soon glabrescent. Go to couplet 24 of preceding key.
27. Internodes, petioles, and stipules persistently hairy, only belatedly glabrescent. Go to couplet 38 of preceding key.
26. Vegetative internodes, petioles, and abaxial surface of stipules glabrous except for hirsute axils of stipules.
28. Pedicel straight or ascending in fruit.
29. Petiole 3–5(–7) mm long, slightly shorter than the stipules to slightly longer, never twice as long.
30. Pedicel distally thickened, 2–3 mm in diameter at the apex; inflorescence sparsely sericeous or submentose, soon glabrescent. 35. B. pachypoda.
30. Pedicel 1 mm in diameter (–1.5 mm in fruit); inflorescence densely and persistently hairy (loosely sericeous or tomentose). 36. B. steyermarkii.

29. Petiole of the larger leaves (7--)10–35 mm long, at least twice as long as the stipules, usually 3 times as long or longer. Go to couplet 20 of preceding key.
28. Pedicel decurved and often eventually twisted in fruit. Go to couplet 23 of preceding key.

1. Byrsonima maguirei Anderson, sp nov Fig 17.

Frutex vel arbor 2–8 m alta, ramis hornotinis laxe rubro- (vel brunneo-) sericeis vel tomentosis, anotinis glabratris, pilis stipulis oppositis magis appressis et longius persistentibus. Lamina foliorum 5–17 cm longa, 2.2–9.5 cm lata, elliptica vel late elliptica, basi truncata vel breve angustata, margine plana vel paulo revoluta, apice obtusa, supra novaella costa margineque rufotomentosa mox glabrata, lucida, costa et utrinque 8–10 nervis lateralibus et venis tertiariis impressis, subtus rufo- vel atrobrunneotomentosa demum glabrata, pilis sessiliibus, tortis, non parallelis, patulis, usque 1 mm longis (ut videtur in eodem populo plantae laminis ab initio subglabrís permox glabratris adsunt), costa prominenti, nervis lateralibus prominulis, epidermide glauca; petiolus 10–30 mm longus, sericeo-tomentosus demum glabratris; stipulae 4–7 mm longae, late triangulares, liberae vel usque 1/2 connatae, abaxialiter sericeae, adaxialiter glabrae. Inflorescencia thyrsus 8–18 cm longus, rufotomentosus, cincinnis lateralibus 1–3 floriferis, bracteis 4–7 mm longis, 1–1.5 mm latis, subulatis, rectis, abaxialiter tomentosis, adaxialiter glabris, in fructu persistentibus, pedunculo florifero primario 5–15 mm longo, tomentoso, bracteolis bracteis similaribus, tantum 2.5–3.5(–4) mm longis. Pedicellus 8–10 mm longus, tomentosus, erectus vel paulo ciricatus in abalastro juvenissimo rectus in fructu. Sepala glandulas 2.5–3.5 mm superantia, 2 mm lata, triangularia, apice obtusa vel rotundata et revoluta, abaxialiter tomentosa, adaxialiter glabra, omnia biglandulifera, glandulis 2.5–3 mm longis, obovatis, compressis, medio tomentosis. Petala lutea, etate rubescientia?, saepe paucipilifera praecipue ungue marginque, 4 lateralia patentia vel reflexa, ungue 3 mm longo, limbo 3.5–4 mm longo, 5–6 mm lato, cavo, margine eroso vel lacerato; petalum posticum erectum, ungue 3.5 mm longo crассioreque, limbo 4 mm longo, 6 mm lato, corrugato et revoluto, margine eroso. Filamenta 2.5–3 mm longa, abaxialiter glabra, adaxialiter praecipue basi hirsuta, pilis rubris et basifixis; antherae glabrae, 1.6–2 mm longae, subaequales, loculis linearibus, non alatis, apice rotundatis, connectivum aequantibus vel parum superantibus; pollen sphaeroideum, colpis (2–)3 instructum. Ovarium conicum, 1.5 mm altum, glabrum, carpello antico sterili; styli 2.5 mm longi. Fructus glaber, immaturus viridis, siccus usque 2 cm longus, 1.8 cm latus, globosus basi parum elongatus, carne tenui, nuce rugosa, loculis 2 monospermis.

Type. Maguire, Wurdack & Maguire 42303, scrub forest, cumbre 5–18 km W of Cumbre Camp, summit, 1200–2200 m, Cerro de la Neblina, Amazonas, Venezuela, Dec flr (holotype MICH, isotypes NY, US, VEN). Distribution. Known only from the Cerro de la Neblina. Paratypes: VENE-
Fig 17. *Byronima maguirei*. a) Flowering branch; b) stipules; c) hairs from inflorescence; d) flower; e) gynoecium and five stamens; f) stamen, adaxial view; g) fruit. a–f drawn from Maguire et al 42303, g from Maguire et al 42312 by Annette Seidenschnur Mahler.
ZUELA. Amazonas: Cerro de la Neblina, cumbre 5–18 km W of Cumbre Camp. frt, *Maguire et al 42304* (MICH, NY, VEN); NW head of Cañon Grande, frt/frt, *Maguire et al 42312* (NY, VEN); scrub forest between E and N head of Cañon Grande, flr, *Maguire et al 42445* (NY, VEN); all collected in December, 1957.

Of the several new species of *Byrsonima* found in Guayana, this is one of the most interesting and distinctive. It is therefore appropriate that it be named in honor of Bassett Maguire, intrepid explorer of the Guayana Highland and specialist in the systematics of Clusiaceae.

*Byrsonima maguirei* is notable for its large tomentose to glabrate leaves, free to half-connate stipules, long peduncles (most species of the genus have the pedicels sessile or subsessile), long, straight, persistent bracts and bracteoles, hairs on some petals (the petals are quite glabrous in most species), conical ovary with one carpel sterile, and large fruits.


*Byrsonima longibracteata* Martius, Flora 24 Beibl. 61. 1841, nom. superfl. Type = type of *B. stipulacea*.


Trees 8–25 m tall; stems velutinous, the vesture a mixture of shorter hairs and straight, basifixed, spreading hairs up to 3 mm long, persistent or eventually (usually in subsequent seasons) deciduous. Lamina of the larger leaves 12–27 cm long, 6–13 cm wide, elliptical or rhombic, sometimes somewhat ovate or obovate, cuneate at the base, slightly revolute, acute or obtuse at the apex, sometimes acuminate or rounded, velutinous to glabrescent above with a mixture of long, basifixed simple hairs, stalked stellate hairs, and sessile stellate hairs, persistently velutinous below with most hairs stalked-stellate but the midrib and lateral veins with an admixture of long basifixed simple hairs, rugose above, the midrib, lateral veins, and scalariform tertiary veins quite prominent below; petiole 12–27 mm long, velutinous like the stems with the long spreading hairs sometimes deciduous; stipules (8–)12–25 mm long, amplexicaulous, abaxially velutinous like the stems and petioles, occasionally glabrescent, adaxially glabrous, completely connate to form an intrapetiolar pair rounded or obtuse or rarely acute at the apex, lineate with many fine parallel veins, the pairs interpetiolarly short-connate soon tearing apart, each pair deciduous independently of and often well before the leaf. Inflorescence 8–21 cm long, velutinous, the flowers borne singly or in clusters (condensed cincinni) of 2–3 per bract; bracts 6–10 mm long, ca 2 mm wide, linear or narrowly triangular, straight or reflexed but not revolute, mostly deciduous before or during anthesis; peduncle none or up to 1 mm long; bracteoles 2.5–5 mm long, 1.3–2 mm wide, triangular, deciduous. Pedicel 10–13(–19) mm long, velutinous, straight or slightly circinate in bud, straight or slightly decurved in fruit. Sepals all biglandular or all eglandular, 2.5–4 mm long, 2–2.5 mm wide,
lingulate, rounded at the apex, strongly revolute, velutinous on both sides, ac- crescent and somewhat auriculate in fruit, the glands 2–3.5 mm long. Petals yel- low, glabrous, erose or subentire. Filaments 1.5–2.3 mm long, basally connate, abaxially nearly glabrous, adaxially short-hirsute at the base; anthers 2.2–4.2 mm long, heterogeneous in the same flower, the locules linear, 1.5–3.2 mm long, loosely sericeous on both sides, free at the apex, the connective usually exceeding the locules by 0.4–1.1 mm, rounded or obtuse at the apex. Ovary conical, ca 1.5 mm high, densely short-velutinous with an overlay of appressed hairs, all 3 locules fertile; styles 4–5.3 mm long. Fruit globose, up to 18 mm in diameter, orange-yellow, tomentose to glabrate, "acidulous, edible," the nut ca 9 mm in diameter, deeply rugose.

Type. Mart. Hb. Fl. Bras. 567, "in sylvis ad Ilheos," Bahia, Brazil (holotype P, isotypes MO! NY!).

Distribution. Atlantic lowlands from Espírito Santo, Brazil, north through the Guianas to Terr. Delta Amacuro in Venezuela, and inland to Bolívar and adjacent Terr. Roraima. Guayana collections: GUYANA. Near Mazaruni Forest Station, Essequibo County, Archer 2435 (NY); Mazaruni River Jenman 5371 (NY); Mt. Ayanganna, mixed evergreen forest on talus from cliffs, elev 900 m, Tillett et al 45161 (K, MICH, NY, US). VENEZUELA. Bolívar: Selvas pluviales, Urimán, 400 m, Bernardi 915 (NY); Alto Caroní, Bernardi 1516 (VEN); cabeceras del Río Hacha, 700–750 m, Bernardi 2866 (VEN); SE de Santa Elena de Uairén, 900 m, Bernardi 6724 (NY); selva pluvial montaña, Paujil, 120 km S de El Dorado, 1000 m, Bernardi 6799 (NY); Cerro Upuima, Caroní, 1300 m, Cardona 2239 (VEN); entre Km 88 y 126, Ant. Fernández 1108 (NY); cumbre de La Escalera, Río Uri- yuk, 1000 m, Maguire et al 46882 (NY, VEN); Quebrada O-paru-má, between Santa Teresita de Kavanayén and Río Pacairao, 1065–1220 m, Steyermark 60431 (NY); S of El Dorado, Km 42–65, 230 m, Steyermark 86669 (NY, VEN); E of Cerro El Picacho, 45 km N of Tumeremo, 600–650 m, Steyermark 89094 (MICH, NY); Auyan-tepuí, 1000–1480 m, Steyermark 94170 (VEN); vic. Cerro Uei, between Luepa and Cerro Venamo, 1100 m, Steyermark & Nilsson 460 (NY, VEN); base of SW-facing escarpment, Amuri-tepuí, Chimantá Massif, 1365 m, Steyer- mark & Wurdack 1372 (NY, VEN); El Dorado-Sta Elena de Uairén, Km 109, 540 m, Trujillo 3611 (MY); La Escalera, Trujillo 11620 (MY). BRAZIL. Roraima, Serra dos Surucucús: Prance et al 10071 (MICH, NY), 13577 (MICH, NY); Rosa 292 (MICH).

Collected in flower and fruit in most months.

This species is unusual in its stellate hairs and deciduous stipules. Niedenzu segregated it as the genus Alcoceratothrix (elk-horn-hair), but I reject that genus. Byrsonima stipulacea is the extreme in a series of closely related species, some with stellate hairs, some with only bifurcate or otherwise typically malpighiaceous hairs. Therefore, the only basis for recognizing Alcoceratothrix becomes the large deciduous stipules of this species, and that, while an interesting feature, is not sufficient basis to justify separating this species from its close relatives in Byr- sonima.

3. Byrsonima fanshawei Anderson, sp nov

Arbor 6 m alta, trunco 4 cm diametro, ramis tomentosis tarde glabris, pilis primum rufis mox canescentibus, mixtis et medifixis valde tortis appressisque et
sub-basifixis rectis patulisque. Foliorum majorum lamina 10–12.7 cm longa, 5–7 cm lata, elliptica vel obovata, basi cuneata, apice obtusa vel rotundata, supra tomentosa demum glabra praeter costam, rugosa venis impressis, subitus pertinaciter tomentosa vel demum glabra, pilis laminae ipseae medifixis, sessilibus vel subsessilibus, ca 0.5 mm longis, tortis, irregulariter stellatis brachiis 2–5 inaequalibus, pilis costae mixtis et pilis laminae similaribus et pilis sub-basifixis, rectis, patulis, non stellatis, 1.5–2 mm longis; petiolus 11–15 mm longus, pertinaciter tomentosus; stipulae 6 mm longae, abaxialiter tomento-sericeae demum glabratae, adaxialiter glabrea, in petiolo persistentes, omnino connatae, pari late ovato apice obtuso. Inflorescentia pseudoracemosa 6.5–9 cm longa, tomentosa, bracteis 4–5 mm longis, 1–1.5 mm latis, anguste triangularibus, rectis, abaxialiter sericeis, adaxialiter glabris, in fructu deciduis, pedunculo florifero 0–0.5(–1) mm longo, bracteolis bracteis similaribus, tantum 1.5–2 mm longis. Pedicellus (in fructu) ca 10 mm longus, tomentosus, decurvatus. Sepala (in fructu) glandulas 4–6 mm superantia, 3.5–4.5 mm lata, ovata, apice obtusa, parum revoluta, utrinque tomentosa (adaxialiter sparsius), omnia biglandulifera, glandulis 2–2.6 mm longis. Petala et antherae non cognitae. Ovarium tomentosum, 3-loculare, loculis omnibus fertilibus; styli ca 4 mm longi. Drupa (sicca, paulo immatura) 8–9 mm diametro, globosa apice paulo producta, tomentosa praecipue versus apicem, 3-sperma vel abortu 2–1.

Type. Maguire & Fanshawe 23270, bush island on savanna, Kaieteur Plateau, British Guiana [Guyana], May frt (holotype NY, isotype MO).

Byronima fanshawei is known only from the type, which was collected in fruit, so the petals and anthers are unknown; the petals will almost certainly prove to be yellow and the anthers are probably sericeous, at least between the locules. The species seems to be most closely related to B. stipulacea, from which it differs in its shorter persistent stipules, sessile or subsessile leaf-hairs, and smaller fruits. The leaves of the type are also more broadly obtuse than is usual in B. stipulacea. The epithet honors D. B. Fanshawe, one of the collectors of the type.

4. Byronima poeppigiana  

Trees 7–24 m tall; branches velutinous or sub-sericeous to glabrate. Lamina of the leaves 10–19 cm long, 4.5–9 cm wide, obovate (or elliptical), attenuate (or cuneate) at the base, slightly revolute at the margin, rounded or broadly obtuse and short-acuminate at the apex, soon glabrate above except velutinous on the midrib proximally, thinly but persistently velutinous below, the hairs up to 0.5 mm long, erect, bifurcate, the branches mostly shorter than the stalk; midrib and lateral veins prominent below; petiole 6–15(–18) mm long, velutinous like the lamina with a proximal admixture of straight, sub-basifixed hairs 1.5 mm long; stipules 5–6 mm long, connate, the pair rounded at the apex, abaxially velutinous. Inflorescence 10–16 cm long, velutinous; bracts 2–4 mm long, up to 1 mm wide, subulate, spreading to strongly reflexed, mostly caducous; peduncle 1–2 mm long (–3 mm in fruit), 1–2-flowered; bracteoles mostly 0.8–1.5(–2) mm long, up to 1 mm wide, triangular, eventually deciduous. Pedicel 6–8 mm long, velutinous, circinate in bud, decurved in fruit. Sepals all biglandular, 1.5–2 mm long, broadly triangular, obtuse or rounded at the apex, revolute, abaxially sericeous, adaxially glabrous, accrescent and slightly auriculate in fruit. Petals yellow, glabrous. An-
Fig 18. *Blepharandra intermedia* and *Byronima fanshawei*. a–f, *Blepharandra intermedia*: a) Flowering branch, ×0.5; b) stipules and petiole, adaxial side, ×2.5; c) cincinnus, ×2.5; d) flower, ×3.5; e) stamen, ×7.5; f) fruit, ×6. g–i, *Byronima fanshawei*: g) Fruiting branch, ×0.5; h) hairs from abaxial surface of lamina, ×ca 50; i) fruit, ×2.5. Drawn by Karin Douthit, a–b and d–f from *Pires et al* 14493, c from *Pires & Leite* 14840, g–i from *Maguire & Fanshawe* 23270.
thers 2–3 mm long, loosely sericeous, especially between the locules, the connective equalling or slightly exceeding the locules, the locules narrowly linear, separated on the connective, free at the apex. Ovary conical or cylindrical, 1 mm high, glabrous or sparsely sericeous at the apex; styles 3.5 mm long. Immature fruit 10 mm long, 7 mm in diameter, ovoid with an attenuate apex, glabrous or with a few hairs at the apex.

Type. Poeppl 2690, Ega [=Tefé], “ostia flum. Teffé,” Amazônas, Brazil, Oct flr (holotype P? isotypes F! NY!).

Distribution. Upper Rio Negro and upper Rio Amazonas. VENEZUELA. Amazonas: Rio Negro, Santa Rosa de Amenadona, en selva alta, tierra firme, 100 m, Mar flr/frt, Ll. Williams 14706 (F, MICH, VEN); Rio Casiquiare between mouth of Rio Siapa and mouth of Rio Paciba, 100–130 m, Jul flr/frt, Wurdack & Adderley 43632 (MICH, NY, US, VEN). PERU. Loreto: Mishuyacu, near Iquitos, 100 m, Dec flr, Klug 692 (NY); Rio Momón, trocha de Momoncillo, Distr. Iquitos, Mar flr, Revilla 309 (MICH), Nov flr, Revilla 1838 (MICH); Iquitos, Tessmann 5063 (NY).

The collections called var velutina by Niedenzu represent two other species.


Byrsonima schultesiana Cuatrecasas, Webbia 13(2): 603. 1958. Type. Schultes & Cabrera 12562, Soratama, Río Apaporis, 250 m, Amazonas-Vaupés, Colombia, Jun flr (holotype US! isotype NY!).

“Bush” or tree 6–20(–25) m tall, the stems loosely sericeous to glabrate. Lamina of the larger leaves 12–18 cm long, 5–10 cm wide, obovate (or elliptical), cuneate or attenuate at the base, short-acuminate or obtuse at the apex, thinly sericeous, ± glabrate above at maturity, persistently sericeous to eventually glabrate below, the hairs 0.2–0.4 mm long, fusiform, sessile, appressed, the lateral veins prominent below, the reticulum prominulous below or on both sides; petiole (7–)10–15 mm long, sericeous to glabrate, often with an admixture of long, spreading, basifixed or sub-basifixed hairs; stipules 3–6 mm long, connate, the pair rounded or occasionally acute and usually slightly reflexed at the apex, abaxially sericeous, adaxially glabrous. Inflorescence 8–14(–19) cm long, velutinous or appressed-tomentose; bracts 2–4(–6) mm long, up to 0.8 mm wide at base, subulate, spreading to strongly reflexed or revolute, mostly deciduous before or during anthesis; peduncle (0.5–)1–2.5(–4) mm long, 1–2-flowered; bracteoles 0.5–1(–2) mm long, up to 1.5 mm wide, triangular, eventually deciduous. Pedicel 4–9 mm long, velutinous to subsericeous, slightly circinate in bud, decurved or twisted in fruit. Sepals all biglandular, 1–1.5 mm long and wide beyond the glands, broadly triangular, obtuse or rounded and revolute at the apex, abaxially sericeous, adaxially glabrous or rarely sparsely sericeous, accrescent and slightly auriculate in fruit. Petals yellow, glabrous. Anthers 1.9–2.9 mm long, loosely sericeous, especially between the locules, the connective equalling or slightly exceeding the locules, the locules narrowly linear, separated on the connective, often free at the apex. Ovary 1–1.5 mm high, conical or ovoid, glabrous or sparsely sericeous at the apex; styles 2.8–3.3 mm long. Fruit ca 10 mm in diameter (dry), ovoid or spheroidal with a slightly protuberant apex, glabrous or with a few hairs at the apex.
Type. *Poeppig 2214*, Yurimaguas, Maynas, Peru (holotype G).


Collected in flower and fruit from October to June.

This species is closely related to *Byrsonima poepiggiana*, from which it differs reliably only in the form of the leaf hairs. *Byrsonima schultesiana* is a form in which the short, sessile, appressed hairs persist on the leaves; its bracteoles are also unusually sericeous. However, the extensive series of collections that show this feature all represent one population, at Soratama. Other populations, even from Colombia, vary in the persistence of the hairs, and when all the collections cited above are considered it becomes very difficult to maintain *B. schultesiana*. Cuatrecasas described the petals as white or pink, on the basis of the labels with *Garcia-Barriga 14108* (white) and *Schultes & Cabrera 19585* (pink). However, all other collections have been said to have yellow petals, including the type of *B. schultesiana*, and it seems very probable that this species has yellow petals like those of its close relatives.


Trees 15–33 m tall; branches tightly sericeous. Lamina of the larger leaves (12–)14–21–25 cm long, (4.5–)6–9–11 cm wide, elliptical or slightly obovate, cuneate or attenuate at the base, acute or usually acuminate at the apex, glabrate above at maturity or somewhat sericeous, especially near the base and on the midrib, densely and persistently ferrugineous-sericeous below, the hairs 0.2–0.5 mm long, subsericeous, straight and tightly appressed, parallel, usually so dense and persistent as to completely hide the lamina, the midrib and 9–13 pairs of major lateral veins prominent below; petiole (15–)20–40 mm long, sericeous or glabrescent; stipules 2.5–4 mm long, connate, the pair acute or obtuse at the apex, abaxially sericeous, adaxially glabrous. Inflorescence 7–13–19 cm long, sericeo-velutinous; bracts 3.5–5 mm long, 0.8–1.3 mm wide, subulate, strongly reflexed or circinately revolute, deciduous or persistent; peduncle 0.5–1(–2) mm long, 1(–2)-flowered; bracteoles 0.6–1.5 mm long, 1–1.5 mm wide, triangular, deciduous or persistent. Pedicel 8–12 mm long in flower, up to 14 mm long in fruit, pilose-
sericeous, straight and ascending in bud and fruit. Sepals all biglandular, 1.5–2.5 mm long, triangular, obtuse at the apex, revolute, abaxially sericeous, adaxially sparsely to densely sericeous or velutinous, accrescent in fruit up to 6 mm long. Petals yellow, glabrous. Anthers 2–3 mm long, sericeous, especially between the locules, the connective equalling the locules or extended beyond them up to 0.6 mm (both extremes and intermediates occurring in the same flower), the locules narrowly linear, 1.6–2.5 mm long, sometimes free at the apex. Ovary conical, 1.5 mm high, densely sericeous; styles 3–3.3 mm long. Fruit yellow, 11 mm in diameter (dried), globose, sericeous on the distal half to glabrate, excavated at the base where borne on a rounded torus.

Lectotype. Sagot 102, Karouany, French Guiana (P, NY!).

Distribution. Rain forests of French Guiana, Surinam, Guyana, and eastern Venezuela. Collections from Guayana: VENEZUELA. Bolívar: Río Apacará, region de Uirimán, 400–500 m, Bernardi 1502 (NY, VEN); entre Río Ikabarú y Río Blanco, Bernardi 6588 (NY); bosques de Marivaca 17 km al sur de Los Castillo, Bernardi 7862 (NY); NE of Upata, 500 m, Breteler 5094 (VEN); Río Ibabarú, Caroni, 500 m, Cardona 2150 (VEN) & 2151 (VEN); camino a Itteipó, puerto del Río Tírica, Caroni, Cardona 2164 (US, VEN); La Isabel a Río Grande, El Palmar, Dto. Piar, Conejos 74 (VEN); Roraima, Robt. Schomburgk II 811, type of B. ferruginea var macrophylla & syntype of B. aerugo (NY); 15–35 km S of El Dorado, 200–250 m, Steyermark 111252 (MICH). Terr. Delta Amacuro: E de Río Grande, ENE de El Palmar, Blanco 277 (NY). GUYANA. Kaieteur Falls, Potaro River, De La Cruz 4389 (NY); opposite Kubinang village, between Kukui River and Kako River, upper Mazaruni River basin, 460 m, Tillett & Tillett 45432 (K, MICH, NY, US).

Collected in flower and fruit from June to December.

For an excellent discussion of the nomenclature of Byrsonima aerugo, see Sandwith, Kew Bulletin 1935: 311–313. Note also that B. aerugo is very close to B. crispa, and if the two should ever be combined, crispa is much the older epithet.


Byrsonima carmeniana Cuatrecasas, Webbia 13(2): 615. 1958. Type. Cuatrecasas 8896, Cerro de La Sardina, 500 m, Florencia, Caquetá, Colombia, Már flr (holotype US! isotypes COL, F!).

Trees 8–25 m tall; branches tightly sericeous. Lamina of the leaves (8–)11–19 (–22) cm long, (3–)4.5–7(–8) cm wide, elliptical, attenuate at the base, attenuate or usually acuminate at the apex, glabrate above at maturity or obscurely sericeous, especially on the midrib, sparsely sericeous to nearly glabrate below, the hairs 0.1–0.2 mm long, sessile, straight and tightly appressed, parallel, never dense enough to hide the lamina, the midrib, lateral veins, and reticulum prominent below; petiole 20–30 mm long, sericeous to glabrate; stipules 3–4.5 mm long, connate, the pair acute or obtuse at the apex, abaxially sericeous, adaxially sparsely sericeous or glabrous. Inflorescence 6–14 cm long, sericeo-velutinous; bracts (2.5–)3–4.5(–6) mm long, up to 1 mm wide, subulate, strongly reflexed or circinately or helically revolute, deciduous or persistent; peduncle 0–1(–2) mm long, 1(–2)-flowered; bracteoles 0.5–1(–1.5) mm long, 1–1.5 mm wide, triangular, usually persistent to maturity of the fruit. Pedicel 7–11 mm long in flower, up to
13 mm in fruit, loosely sericeous, straight or slightly circinate in bud, mostly straight and ascending in fruit. Sepals all biglandular, 1.5–2 mm long, triangular or lingulate, obtuse at the apex, revolute, abaxially sericeous, adaxially slightly to densely sericeous or velutinous near the apex, accrescent in fruit. Petals yellow, glabrous. Anthers 1.5–2.5 mm long, sericeous, especially between the locules, the connective equalling the locules or extended beyond them up to 0.6 mm (both extremes and intermediates occurring in the same flower), the locules narrowly linear, sometimes free at the apex. Ovary conical or compressed-hemispherical, 1.5 mm high, densely sericeous, especially on the distal half; styles 2.6–3.2 mm long. Fruit yellow, 10–13 mm in diameter (dried), globose, sericeous at the very apex, excavated at the base where borne on a rounded torus, the nut rugose.

Type. Poeppig 3003, "Insula Colares, ostia fluvii Amazonici," Pará, Brazil (holotype P).

Distribution. In forests on terra firme, scattered throughout Amazonia, north to the Orinoco, south to Bahia. COLOMBIA. Caquetá: Type of B. carmeniana, q v. Meta: Acacias, 450 m, Aug flr, Jaramillo et al 440 (US); Sierra de La Macarena, 800 m, Jan frt, Philipson et al 2211 (US) & Sep flr, Plowman et al 424 (MICH). VENEZUELA. Amazonas: Orinoco River, southern part of Isla del Raton, elev 90 m, Nov frt, Breteler 4797 (MICH, VEN, WAG). VENEZUELA-BRAZIL BOUNDARY. Amazonas: Sierra Parima, headwaters of Rio Padauirí, Feb flr, Cardona 1449 (F, US, VEN). The other collections seen are from Manaus and east, Santarém and vicinity, Belém and vicinity, the Serra do Cachimbo, and southernmost Bahia.

This species is very similar to Byrsonima aerugo. They differ in their stature (B. aerugo is usually taller) and in the vesture of the leaves, which are very densely and persistently sericeous below in B. aerugo. The two taxa have not been collected in the same area.


Gnarled shrubs up to 60 cm tall, the leaves borne in dense sessile clusters on the thick coryck stem, the internodes essentially none. Lamina of the larger leaves 14–25(–33) cm long, 5–13(–15) cm wide, obovate or spatulate, attenuate at the base, often grading into a winged petiole, usually obtuse or rounded and apiculate at the apex, occasionally retuse, densely and usually persistently villous above and woolly below, rarely eventually subglabrate above or on both sides, the reticulum usually prominulous above and quite prominent below (but hidden by the vesture); petiole 10–35(–80) mm long, often winged and grading into the lamina, woolly or villous; stipules 6–12 mm long, connate, the pair triangular, abaxially villous, the hairs darker brown than on the petiole, adaxially glabrous. Inflorescence (15–)18–35(–42) cm long, villous or woolly, pseudoracemose or thyrsiform with the lowest cincinnati pedunculate and several-flowered; bracts 5–11 mm long, 1–2 mm wide, narrowly triangular or subulate, abaxially woolly, adaxially glabrous, mostly deciduous during or soon after anthesis; bracteoles like the bracts but shorter, about half as long. Pedicel 5–10 mm long, tomentose-
villous, circinate in bud, decurved (always?) in fruit. Sepals all biglandular, 1.5–3 mm long beyond the glands, 1–2 mm wide, obtuse or rounded and revolute at the apex, abaxially densely tomentose, adaxially glabrous, accrescent in fruit; glands 1–2 mm long. Petals yellow, glabrous. Anthers 1.8–3.3 mm long, loosely tomentose to glabrate, the connective not or hardly exceeding the apex of the locules. Ovary densely appressed-villous, 1.5–2 mm high, all 3 locules fertile; styles 3–3.5 mm long. Fruit ca 15 mm in diameter, yellow (?), globose, thinly villous.

Type. Linnaean Herbarium, genus 588 sheet 10 in Savage’s catalogue. See discussion below.

Distribution. Open savannas of South America from Colombia and Venezuela south to Paraná; also reported by Niedenzu from Cuba. Collections from Guayana: VENEZUELA. Bolívar: Río Hacha, región de Canaima, 300 m, Agostini 357 (VEN); sabanas de Urimán, Río Caroni, 350–400 m, Cardona 1161 (VEN); Caicara-Tauca, Dto. Sucre, Ant. Fernández 1714 (NY); Kavanayén, Lasser 1902 (VEN); Canaima, 400 m, Rukis & Foldats 502 (VEN); Kavanayén NW to Río Karuai, 1220 m, Steyermark 59385 (NY); Los Hicoteos, Tamayo 2188 (US, VEN); Sta Elena, Cerro Akurimá, Tamayo 2827 (US, VEN); La Paragua, 70 m, Williams 12544 (VEN) & 12776 (US, VEN); Maripa, 100 m, Williams 11968 (US, VEN). Amazonas: Sabanas Budare, Alto Ventuari, 300 m, Cardona 151 (VEN); open scrub savanna on white sand, 3 km SW of Base Camp, Cerro Sipapo, 200 m, Maguire & Politi 28969 (MICH, NY, VEN). BRAZIL. Terr. Roraima: Bóa Vista, Fróes 22913 (IAN), Rodrigues & Aubreville 668 (IAN, INPA); Surumú, entre o rio e a serra de Mairari, M. Silva 43 (NY); Frechal, Tate 26 (NY); Limão, Tate 84 (NY); S. Marcos, Ule 7807 (MG).

Collected in flower in all months except July and August.

The specimen in the Linnaean Herbarium is labelled in Linnaeus’ hand and is presumably the type. However, if it is the type it is certainly not an Aublet collection from French Guiana, as stated by Cuatrecasas (1958, p 605), since Aublet first went to French Guiana in 1762 (Stafleu 1971, p 282). There is nothing on the sheet to indicate the source of the specimen, neither the collector nor the country of origin. Linnaeus said in the protologue only “Habitat in America calidioire.”

This species is quite variable through its range; the description above is based only on the collections cited.

Two additional Venezuelan collections deserve special comment. They are Maguire et al 32045, Santa Bárbara, Amazonas (NY, VEN), and Killip 37232, El Negro, between Ciudad Bolívar and El Cristo, Bolivar (VEN). Both are atypical in their elongated internodes, short leaves with ± unwinged petioles, and small bracts. They may represent some unrecognized taxon close to Byrsonima verbascifolia sensu stricto, but it also seems quite possible that they resulted from hybridization between B. verbascifolia and the ubiquitous B. crassifolia.


Shrubs or small trees (0.8–)1–5(–10) m tall; stems appressed-tomentose, the wood soon fissured by elongated lenticels. Lamina of the larger leaves 6.5–11 (–15.5) cm long, 3–6.5(–8) cm wide, elliptical or broadly elliptical or somewhat obovate or suborbicular, cuneate or attenuate at the base, usually abruptly short-acuminate at the apex, occasionally obtuse or rounded, densely tomentose to glabrate on both sides, belatedly glabrescent on the midrib, the vesture often deciduous in a characteristic patchy manner below, the hairs eventually changing from brown to gray; parallel lateral veins and the reticulum prominulous, usually white above or on both sides; petiole 8–13(–19) mm long, tomentose or eventually glabrescent; stipules 2–3(–4) mm long, connate, the pair obtuse or rounded at the apex, abaxially tomentose-sericeous, adaxially glabrous. Inflorescence 7–13(–17) cm long, appressed-tomentose or tomentose; bracts 1.5–3(–5) mm long, ca 1 mm wide, broadly to narrowly triangular, appressed or spreading but not revolute, usually deciduous before maturity of the fruit, often much earlier; peduncle 0–2(–3) mm long, 1–2(–3)-flowered; bracteoles like the bracts but 0.7–1.5(–2) mm long, deciduous. Pedicel 6–12(–14) mm long, tomentose or subsericeous, circinate in flower, decurved in fruit. Sepals all biglandular, 1.5–2 mm long beyond the glands, obtuse or rounded at the apex, eventually revolute, abaxially tomentose, adaxially glabrous or rarely sparsely tomentose, not or only slightly accrescent in fruit; glands 2–2.5 mm long. Petals yellow, glabrous, all eglandular. Anthers 1.8–3 mm long, the connective equaling the locules or extended beyond them up to 0.2(–0.4) mm, the locules 1.8–3 mm long, pilose with few to many spreading hairs on both sides, linear, attached at the apex. Ovary 1.3–2 mm high, glabrous or sparsely to densely tomentose-sericeous, all 3 locules usually fertile; styles 3–3.5(–4) mm long. Fruit yellow, glabrous or sparsely tomentose to glabrare, 8–10 mm in diameter (dried), globose or depressed-globose.

Type. Linnaean Herbarium, genus 588 sheet 8 in Savage’s Catalogue. See discussion below.

Distribution. Savannas from Mexico to southern South America, often the dominant species; also common in the West Indies. Collections from Guayana: GUYANA. Upper Mazaruni River, De La Cruz 2212 (NY); Kaieteur Plateau, Maguire & Fanshawe 23260 (NY); Kamarang River, Pinkus 18 (NY); Ayanganna Plateau, upper Mazaruni River, Tillett et al 44869 (NY) & 45247 (K, MICH, NY). VENEZUELA. Bolivar: Catarata Camá, 1090–1120 m, Badillo & Holmquist 6304 (MY); Cerro Perro, Cardona 754 (NY, VEN); Urimán, Cardona 1160 (NY, VEN) & 1633 (US, VEN); Río Jakmerú, Cardona 1854 (NY, US, VEN); región de El Palmar, Upata y Guasipati, 300 m, Cardona 2123 (VEN); Alto Caroni, Cardona 2551 & 2831 (VEN); Río Perro de Agua, Dto. Sucre, Ant. Fernández 1598 (MY); Kavanayén, 1300 m, Ferrari 1042 (MY); Río Paragua, between La Paragua and Salto de Auraima, 260 m, Killip 37279 (VEN); Sta Elena, Lasser 1281 (NY); Kavanayén, Lasser 1753 (NY, VEN); SE Kavanayén, 1300 m, Maguire 33709 (MICH, NY, VEN), Maguire et al 33996 (MICH, NY, US, VEN); Cerro Toribia, 450–500 m, Maguire et al 35945 (NY, VEN); Arabupu, Pinkus 67 (NY); Canaima, 400 m, Steyermark 106361 (NY); below Uarama-tepuí, 1220 m, Steyermark & Nilsson 662 (NY, VEN); El Chaparro, Medio Caura, 140 m, Williams 11535 (US, VEN); Guayapo, Bajo Caura, 100 m, Williams 11730 (US, VEN) & 11971 (VEN); La Ceiba, Medio Paragua, 70 m, Williams 12633 (US, VEN); La Frontera, E of Cerro Bolívar, 550 m, Wurdack 34465 (NY, VEN); 1–3 km E of Río Orinoco,
between mouth of Río Horeda and Cerro Gavilan, Wurdack & Monachino 39903 (MICH, NY, US, VEN). Amazonas: W base of Cerro Parú, 200 m, Cowan & Wurdack 31481 (MICH, NY, VEN); Puerto Ayacucho, Holt & Gehriger 411 (NY, US); Cerro Moriche, Rio Ventuari, Maguire et al 30837 (NY) & 30872 (NY, VEN); Santa Barbara, Maguire et al 32050 (NY, VEN); Palomal, 100–120 m, Maguire et al 36086 (MICH, NY, US, VEN); Serrania Parú, Phelps & Hitchcock 452 (NY); Esmeralda, Steyermark 57751 (NY), Tate 203 (NY); Puerto Ayacucho, Williams 13467 VEN), 15942 (NY, US, VEN); Esmeralda, Williams 15328 (US, VEN). BRAZIL. Terr. Roraima: Bôa Vista, Black 51–12532 (IAN); Serra Tepuquem, 800–900 m, Maguire & Maguire 40052 (MG, NY), Pance et al 4292 (NY); Bôa Vista, Rodrigues & Aubreville 660 (IAN, MG); Rio Branco, S. Marcos, Ule 7803 (MG).

Collected in flower and fruit in all months.

This species is exceedingly variable, and careful revision of the complex may result in the recognition of several natural taxa. The traditionally cited non-Guayan synonmys are omitted here, because I am not at this time confident of their correct disposition. In the area of Guayana the species is homogeneous and easily recognized. The description given above is based only on the collections cited.

Cuatrecasas (1958, p 610) has pointed out that if the type of Malpighia crassifolia came from Jamaica, the name is probably currently misapplied, since Byrsonima crassifolia in our sense seems not to occur in Jamaica. Fortunately, there is no reason to suppose the type did come from Jamaica. Cuatrecasas mentions specimens of Browne in the Linnaean Herbarium, but no specimen of Browne could be the type of a Linnaean name published in 1753, since Linnaeus acquired Browne's material only in 1758 (Stearn, 1957, p 108). The only reference to Jamaica in the protologue is "Tiliae affinis" etc. of Sloane, and that is cited with a question mark. Linnaeus gave as place of origin only "America calidioire." According to Savage (1945) there are two specimens under Malpighia crassifolia in the Linnaean Herbarium. The first (genus 588 sheet 8) is labelled "Malpighia/3 crassifolia" in Linnaeus' hand; 3 is the number assigned to this species in the Species Plantarum. This is probably the type, if the type is extant. Judging from the photograph on microfilm I would guess that it agrees well with our current concept of the species. We shall probably never know where it came from, but given the wide distribution of the species it is not surprising that a specimen reached Linnaeus before 1753. The other specimen (sheet 9) is labelled "Malpighia crassifolia varietas Br.' in Linnaeus' hand. It resembles Byrsonima coriacea of Jamaica. Linnaeus presumably acquired it in 1758 and filed it here because of its general resemblance to Byrsonima crassifolia.


Shrub 1 m tall; branches sericeous, the hairs dark brown turning gray. Lamina of the leaves 11.5–14 cm long, 4–6 cm wide, narrowly elliptical or ovate, attenuate at the base, gradually narrowed distally to an acute or slightly acuminate apex, tomentose above to glabrate except on the midrib, persistently tomentose below (or eventually glabrescent?), the short hairs turning from ferrugineous to gray;
principal lateral veins few (ca 5–7 on each side), not strongly parallel, the reticulum not especially white or visible above; petiole 8–9 mm long, tomentose; stipules 3–3.5 mm long, connate, abaxially sericeous. Inflorescence (immature) 11 cm long, tomentose; bracts 2.5–3.5 mm long, ca 1 mm wide, triangular, not revolute, densely tomentose; peduncle none; bracteoles similar to the bracts but 1–2 mm long. Pedicel tomentose, circinate in bud. Sepals all biglandular, abaxially densely tomentose, adaxially tomentose near the margin. Petals yellow, glabrous. Anthers sericeous, especially between the locules, the connective equalling or slightly exceeding the locules, the locules linear, attached at the apex. Ovary densely tomentose.


Distribution. Known only from the type and the following collection. VENEZUELA. Bolivar: Gallery forest and grassland, 2–10 km from El Dorado-Santa Elena Road on road to Kavanayén, 1200–1250 m, Mar flr, Gentry et al 10504 (MICH).

This interesting collection does not fit satisfactorily with any of the common yellow-flowered species of Guayana. With its tomentose leaves, short bracts, and circinate buds it is most like B. crassifolia, but it differs from that species in the shape of the leaves, the persistence of the foliar venation, the venation of the lamina, and the shortness of the petiole. The ovary is also densely hairy, which is known but rare in B. crassifolia. The specimen I have seen is only in bud, hence the incompleteness of the description. I may be misapplying the name Byrsonima laurifolia by using it for this plant. My identification is based only on Kunth’s description, the microfiche photograph of his type, and the photograph of the duplicate in Berlin. That is scant basis for an identification in this very difficult group of species.


Shrubs or small trees 2–5(–9) m tall; stems sericeous to glabrate. Lamina of the leaves broadly elliptical, cuneate or obtuse at the base, acuminate at the apex, 7–17 cm long, 4–7(–9) cm wide, revolute, soon glabrate above except on midrib, densely sericeous to submentose below, the hairs brown, short-stalked, not parallel, over 0.5 mm long, usually persistent (except in vicinity of Manaus); principal lateral veins 8–12 pairs anastomosing at margin, alternating with weaker veins; petiole 5–15 mm long, sericeous; stipules 2–3 mm long, connate, abaxially sericeous. Inflorescence (4–)7–15 cm long, sericeous; bracts 1–3 mm long, narrowly triangular, spreading to revolute, deciduous; peduncle 0–1 mm long, 1(–2)-flowered; bracteoles like the bracts, but 1–1.5 mm long. Pedicel 5–11 mm long, loosely sericeous, circinate in bud, usually decurved in fruit. Sepals all biglandular or all eglandular, broadly triangular, obtuse or rounded at the apex, appressed or revolute, 1.5–2 mm long, loosely sericeous on both sides. Petals yellow, glabrous, the posterior petal bearing 2 glands at apex of claw. Anthers 2–3 mm long, sericeous, especially between the locules, the connective equalling or slightly exceeding the apex of the locules, the locules narrowly linear and often free at the
apex. Ovary glabrous. Fruit yellow, globose, ca 10 mm in diameter (dried), glabrous.

Type. *Humboldt & Bonpland*, San Carlos del Río Negro, Amazonas, Venezuela (P).

Distribution. Drainages of the upper Río Orinoco, the Río Vaupés, and the Río Negro; reported from Peru. Selected collections from Guayana and nearby: VENEZUELA. Amazonas: Foot of Duida, along Orinoco, *Fariñas et al 325* (VEN); region of San Fernando de Atabapo, *Foldats 3621* (NY, VEN); Culebra Savanna, Río Cunucunuma, 200 m, *Maguire et al 29423* (MICH, NY, VEN); Santa Barbara, *Maguire et al 30814* (MICH, NY, US, VEN); Yavita-Pimichín trail near Pimichín, Río Guainía, *Maguire & Wurdack 36327* (MICH, NY, VEN); San Carlos de Río Negro, 120 m, *Rutkis 232* (VEN) & *Schultes & López 9379* (NY, US); vic. San Fernando de Atabapo, road to Titi, 100 m, *Steyermark 58418 & 58419* (both NY); San Carlos de Río Negro, 125 m, *Steyermark & Bunting 102719* (NY, VEN); Sierra Parima, near Simarawochi, Río Matacuni, 795–830 m, *Steyermark 106978* (NY); Yavita, 128 m, *Ll. Williams 13901* (NY, US, VEN); San Carlos de Río Negro, 100 m, *Ll. Williams 14548* (US, VEN); Esmeralda, 143 m, *Ll. Williams 15319* (US, VEN); between San Fernando de Atabapo and Río Orinoco, 125–150 m, *Wurdack & Adderley 42669* (MICH, NY, VEN). BRAZIL. Amazonas: Río Içana, Tunúi, *Black 48–2598* (IAN); Castanheiro, Río Negro, *Duque [RB 35600]* (RB); Ilha Carambana, above Tapurucuara, *Egler 576* (NY); Vaupés, Rodovia Perimetral Norte, *Nascimento et al 27* (IAN); Vaupés, Río Negro, *Oliveira 2165* (IAN); Camanáus, Río Negro, *Pires 362* (IAN); Pari-Cachoeira, alto Río Negro, *Pires & Silva 8042* (UB); Tapuruquara, *Prance et al 15619* (NY); Iauareté, Río Vaupés, *Ribeiro 944* (MICH); São Gabriel, *Schultes & López 8769* (NY, US); Serra Wabeessee, below Bela Vista, Río Vaupés, between Ipanoré and confluence with Río Negro, *Schultes & Pires 9137* (US); São Marcelino, Igarapé Uabá, Río Negro between Cocui and mouth of Río Içana, *Schultes & López 9538* (US); Camanáus, Río Negro, *Tate 122* (NY). COLOMBIA. Vaupés: Headwaters of Río Papurí, Río Paca, *Allen 3054* (COL); San Felipe, *Romero Castañeda 1217* (COL); Yavaraté, *Romero Castañeda 3650* (COL).

This species is frequently encountered in or at the edge of savannas, and also along rivers; *Steyermark 106978* is interesting as the first collection I have seen from uplands, but it too was growing in a savanna. *Byrsonima chrysophylla* seems to occur all the way down the Río Negro to Manaus, where it is common. However, specimens from Manaus are somewhat different from those of the upper Río Negro and Río Orinoco, especially in the tendency of the leaves to become glabrate.


*Malpighia spicata* Cavanilles, Diss. 8: 409, tab. 237. 1789.


*Byrsonima coriacea var spicata* (Cavanilles) Niedenzu in Engler, Das Pflanzenreich IV. 141: 700. 1928.

Trees 3–25 m tall; stems tightly sericeous, glabrate in age. Lamina of the leaves
narrowly elliptical or obovate, acute or attenuate at the base, acute or acuminate at the apex, 6.5–11(–13) cm long, 1.7–4(–5.5) cm wide, sericeous above at first, at maturity ± glabrate except often sericeous on the midrib, tightly sericeous to belatedly glabrate below, the hairs nearly or quite sessile, straight, to 0.5 mm long; lateral veins 15–20 or more pairs, fine; petiole 5–10 mm long, sericeous; stipules 1–3 mm long, connate, abaxially sericeous. Inflorescence 4–10 cm long, sericeous; bracts 1–2.5 mm long, narrowly triangular, spreading to revolute, deciduous; pedunule 0–1 mm long, 1(–2)-flowered; bracteoles like the bracts, but 0.5–1 mm long. Pedicel 7–8 mm long, sericeous, circinate in very young buds, mostly decurved in fruit. Sepals biglandular, broadly triangular, exceeding the glands up to 1.5 mm, loosely sericeous on both sides; glands yellow. Petals yellow, glabrous, the posterior petal bearing 2 or more glands at apex of claw or on base of limb, the limb corrugated. Anthers 2–2.5 mm long, sericeous, especially between the locules, the connective equalling or slightly exceeding the apex of the locules, the locules narrowly linear and often free and slightly flared at apex. Ovary sericeous. Fruit yellow-orange, globose, 10–12 mm in diameter (dried), sericeous to glabrate.

Type. Santo Domingo (P?).

Distribution. West Indies and northern South America. Collections from Guayaquil and nearby: VENEZUELA. Amazonas: Río Coro-Coro, Yutajé, 250 m, Steyermark et al 113966 (MIC). Bolivar: Pto Orda-San Félix, Aristeguieta 5340 (VEN); 40 km SE of Tumeremo, near Río Botanamo, 100 m, Little 17586 (VEN); Mount Roraima District, vic. Arabupu [Arabopó], 1260 m, Pinkus 72 (NY, US) & 95 (NY); vic. Tumeremo, 305 m, Steyermark 60935 (NY); Altiplanición de Nuria, 540 m, Steyermark 86483 (NY, VEN) & 400 m, Steyermark 88289 (NY); 4 km up Río Asa from Raudal Cotua, 290 m, Steyermark 86801 (NY, VEN); 2 km SE of Los Patos, N of Río Hacha, 15 km N of Río Supamo, 365 m, Steyermark 86985 (NY, VEN); region of El Palmar, Trujillo 2300 (MY); eastern outlier of Cerro Marimarota, (Cerro La Puerta), 100–250 m, Wurdack & Monachino 41389 (MIC, NY, US, VEN). GUYANA. Upper Mazaruni River, De La Cruz 2035 (GH, NY) and Kamakusa, De La Cruz 4173 (MO, NY); Kanuku Mts, Smith 3350 (NY). BRAZIL. Terr. Roraima: Serra da Lua, Dormida, Prance et al 9289 (MIC, NY); S. Marcos, Ule 7804 (MG). SURINAM. Tafelberg, 570 m, Maguire 24724 (NY).

Collected in flower and fruit most often from August to January.

Byrononia propinqua is a variant of this species with the leaves larger and more persistently sericeous than is typical. Steyermark's recent collection from Amazonas is very similar to the type of B. propinqua. A more interesting form is the plant collected by Pinkus at Arabopó near Mount Roraima. It has much denser and more persistent foliar hairs than usual, giving it a very different aspect similar to that of B. chrysophylla. The elevation is also unusual. However, in most characters these collections agree with B. spicata. The two sheets of De La Cruz 4173, from the Upper Mazaruni River in Guyana, are rather different from each other. The sheet at MO is ± typical B. spicata, except that the leaves are large à la propinqua. However, the sheet at NY is intermediate between B. spicata and B. aerugo. This intermediacy is shown in size and shape of leaves, prominence of veins, length and curvature of bracts, and curvature of the pedicel.
Since both species are known from the Upper Mazaruni, this collection may well be of hybrid origin.


Shrubs or small trees 1–5 m tall, the young stems glabrous or very sparsely sericeous and soon glabrate, the epidermis and later the bark exfoliating. Lamina of the larger leaves 7–14 cm long, 5–9 cm wide, ovate, rhomboidal, or obovate, rounded or slightly cordate at the base, acute, obtuse, rounded, or emarginate at the apex, at first bearing a few hairs but very soon quite glabrate, the lateral veins prominulous on both sides, the margin and veins below often white; petiole 0–2 mm long, thick, glabrate; stipules 1–2 mm long, connate, the pair wider than long, broadly rounded, abaxially loosely sericeous to glabrate, adaxially glabrous. Inflorescence 9–17 cm long, loosely sericeous or tomentose to glabrate; bracts 2–3.5(–5) mm long, 1–2 mm wide, ovate to lingulate, mostly deciduous before maturation of the fruit; peduncle none, the flowers borne 1 per bract; bracteoles like the bracts but smaller. Pedicel 4–8 mm long, (–12 mm in fruit), loosely sericeous or tomentose, circinate in bud, twisted and/or decurved in fruit. Sepals all biglandular, 2–2.5 mm long beyond the glands, 1.5–2 mm wide, ovate or lingulate, obtuse or rounded at the apex, abaxially glabrous or proximally sericeous, adaxially densely sericeous except near margin, reflexed in anthesis, accrescent in fruit; glands 2–2.8 mm long. Petals pink and white, glabrous, the limb much wider than long, several petals exposed in bud. Anthers 2.4–4 mm long, sericeous on both sides of the locules, especially distally, the locules 2–3 mm long, linear, rounded and often detached at the apex, the connective extended (0–)0.2–1.3 mm beyond the locules, the extension tapered distally and usually recurved. Ovary 1–1.5 mm high, cylindrical, glabrous, all 3 locules fertile; styles 3.7–5.5 mm long, bent at the apex. Fruit green (yellow at maturity?) 7–8 mm in diameter (dried), globose or ovoid, glabrous, the nut rugose.

Type. **Humboldt & Bonpland**, Villa de Cura, Aragua, Venezuela (P).

Distribution. Savannas of the West Indies and South America from Venezuela south to Paraguay. Guayana collections: VENEZUELA. Bolivar: Rio Hacha, Canaima, Feb flr, Agostini 359 (VEN); Ciudad Piar, 450 m, Apr flr, Aristeguieta 2205 (VEN); Fundacion Road, 420–510 m, May flr, Maguire & Wurdack 35771 (VEN), May flr, Maguire & Wurdack 35772 (VEN); Rio Carrao, SW of Saltas Canaima, May flr, Rutkis & Foldats 507 (VEN); San Felix, May flr, Steyermark 86265 (VEN); San Felix-Puerto Ordaz, elev 20 m, Jun flr, Steyermark 94288 (VEN); sabana de Guayapo, Bajo Caura, 100 m, Apr flr, Williams 11779 (US, VEN); La Ceiba, Medio Paragua, 70 m, Mar flr, Williams 12647 (US, VEN); Caicara, Alto Orinoco, 100 m, Jun flr, Williams 13280 (VEN). BRAZIL. Terr. Roraima: Bôa Vista, Sep flr, Black 51–13789 (IAN); Lake Maiu, 40 km NW of Bôa Vista, Jan flr, Prance et al 9138 (MICH, NY); Bôa Vista, Nov flr, Rodrigues & Aubreville 659 (INPA, MG); S. Marcos, Rio Branco, Jan flr, Ule 7806 (MG).

Trees 4–18 m tall, rarely shrubs only 1–2 m tall; stems densely tomentose or sericeous to glabrate. Lamina of the larger leaves (5–)8.5–15 cm long, (3.5–)4.5–7 cm wide, obovate, cuneate to rounded at the base, obtuse or abruptly acuminate to rounded and usually apiculate at the apex, often glaucous below, tomentose but soon glabrate on both sides except often persistently tomentose on the midrib, especially proximally, the margin usually white, the lateral veins prominulous below or on both sides; petiole 5–10 mm long, densely and persistently tomentose or belatedly glabrescent; stipules 2–4 mm long, smoothly connate, abaxially sericeous, adaxially glabrous. Inflorescence 8–20 cm long, densely tomentose; bracts 3–5(–9) mm long, 0.8–1 mm wide, narrowly lingulate, spreading, abaxially tomentose, mostly deciduous but occasionally persistent in fruit; peduncle 0–0.5 mm long, 1-flowered; bracteoles like the bracts but shorter. Pedicel 5–10 mm long (–13 mm in fruit), tomentose, hardly circinate in bud, straight or decurved in fruit. Sepals all biglandular, 2–2.5 mm long beyond the glands, 1.7–2 mm wide, lingulate, strongly revolute in anthesis, abaxially densely tomentose, adaxially proximally tomentose, distally thinly tomentose to glabrous, accrescent (mostly elongated) in fruit; glands 2–2.5 mm long. Petals pink or pink and white, glabrous, the outermost covering all others in bud. Anthers 1.8–2.8 mm long, loosely sericeous or tomentose on the locules, especially distally, the locules 1.3–1.9 mm long, rounded or acute and detached at the apex, the connective extended (0.3–)0.5–1.1 mm beyond the locules, the extension globular, obtuse or rounded, straight or slightly recurved. Ovary 1.2–1.5 mm high, ovoid, glabrous, all 3 locules fertile; styles 2.7–3.7 mm long, straight or slightly curved distally. Fruit yellow, 6–9 mm in diameter (dried), glabrous, the nut rugose; accrescent sepals 5–10 mm long, 2–3.5 mm wide, lingulate, membranous, veiny.


Collected in flower and fruit mostly from August to February, rarely in March and April.


Tree 25 m tall, the stems sericeous to glabrate. Lamina of the larger leaves 16–20 cm long, 7–9.5 cm wide, elliptical or somewhat obovate, cuneate or slightly attenuate at the base, rounded and apiculate at the apex with the apexum ca 5 mm long, glabrous on both sides, coriaceous, the principal lateral veins about 7–9 on each side, prominulous, not connected by numerous or parallel tertiary veins; petiole 25–30 mm long, glabrous; stipules 2.5 mm long, connate, rounded. Inflorescence 11–18 cm long, short-velutinous; bracts 4–5 mm long, 2–2.5 mm wide, narrowly triangular, most apparently deciduous before or during anthesis; peduncle 1–2(–3) mm long, 1–2(–3)-flowered; bracteoles 1.5–2 mm long, 1–1.5 mm wide, ovate, caducous. Pedicel 9–13 mm long, velutinous, circinate in bud. Sepals all biglandular, ca 1.5–2 mm long beyond the glands, 2 mm wide, rounded at the apex, revolute, densely tomentose-sericeous on both sides, the glands 2.5–3.5 mm long. Petals "moradas" (purple? dark red?), glabrous, the outermost conical-galeiform. Filaments 2.5 mm long, free, densely hirsute; anthers 3–3.8 mm long, very densely appressed-hirsute for their whole length with the straight, ± basifixed hairs ca 1.5 mm long, the locules 2–2.3 long, linear, rounded at the apex, the connective extended beyond the locules 0.9–1.7 mm, the extension slender, tapering to an acute apex, straight or recurved. Ovary 2 mm high, cylindrical, densely sericeous on the distal half, only 2 of the locules fertile; styles 5.5–6.5 mm long, bent at the apex. Fruit unknown.

Type. Alvaro Fernández 2028, San Joaquin, riberas del Río Inírida, Vaupés, Colombia, 230 m, Jan flr (holotype COL, isotype US!).

Distribution. Known only from the type.

This very distinctive and interesting plant has incredibly hairy anthers that mimic and even surpass those of a Blepharandra. Cuatrecasas described a section to accommodate it (Section Kerozeugma), but it resembles in many respects species in Niedenzu's Section Acrotheca (e.g. B. gymnocalyxina) and could perhaps be placed there, even though it lacks an apical extension of the locules, which Niedenzu used to define the section. It is certainly more similar to species in Niedenzu's Subsection Uroceras than any of the species of the other Subsection, Brachyceras.


Shrubs or small trees to 6 m tall, the stems loosely sericeous to glabrate. Lamina of the larger leaves 11–16(–20) cm long, 4–6.5(–7.5) cm wide, elliptical, cuneate at the base, slightly revolute, obtuse or abruptly short-acuminate at the apex, sericeous to glabrate above, the hairs on the midrib longer persistent, sericeous to belately glabrate below, with longer, looser, darker hairs on the veins and short, white appressed hairs on the lamina between, the lateral veins prom-
inent below; petiole 10–20(–30) mm long, sericeous to glabrate; stipules 3–4(–5) mm long, connate, the pair obtuse or rounded at the apex, abaxially sericeous, adaxially glabrous. Inflorescence 8–15 cm long, sericeous; bracts and bracteoles 0.8–1.5 mm long, ovate or triangular, persistent in fruit; peduncle 0–1(–2) mm long, 1-flowered. Pedicel 5–9 mm long, loosely sericeous, circinate in bud, twisted and decurved in fruit. Sepals 1.5–2.5 mm long, 2–2.5 mm wide, obtuse, revolute at the apex, abaxially sericeous, adaxially sparsely sericeous, accrescent in fruit, all biglandular with the glands 2.5–4 mm long or all apparently eglandular, actually bearing rudimentary subdermal nonfunctional glands. Petals "pink" or "white," glabrous, the anterior 2 rounded-galeiform, the posterior 3 with the limb ± flat or corrugated. Anthers 3.5–4.6 mm long, densely appressed-hirsute for their whole length, the locules with the fertile part 2.6–3.5 mm long, drawn out at the apex in slender, sterile extensions 0.7–1.3 mm long, the connective extended beyond the fertile part of the locules (0.2–)0.5–1.5 mm, the extension slender and tapering distally, usually recurved. Ovary 1.5–2 mm high, cylindrical or conical, densely sericeous, especially distally, only 2 of the locules fertile; styles 4–5 mm long, bent at the apex. Fruit red, 12–15 mm in diameter (dried), 10–12 mm high, ovoid, ± beaked at the apex, glabrate or sericeous at the apex, borne on a broad, flat, accrescent calyx and receptacle, the nut prominently ribbed and rugose.

Type. Parker, Demerara, Guyana, frt (K).

Distribution. GUYANA. Marshall Falls, Mazaruni River, Apr frt, Forest Dept. 5484 (NY, RB); Essequibo, below Arisar, river bank, Sep frl, Forest Dept. 6146 (NY, US); bank of Potaro River, Tumatumari, Jul frt, Gleason 357, Jul frl, Gleason 392, Jul bud, Gleason 393 (all NY); Bootooba, Demerara River bank, Mar frt, Persaud 61 (F), Oct frl, Persaud 167 (F, NY); Essequibo River, rocky bank and islets at first Falls, Sep frl, Sandwith 206 (NY, RB).


Fig 16g.


Shrubs or trees 3–21 m tall; stems sericeous, soon glabrate. Lamina of the larger leaves 10–17 cm long, 4–7 cm wide, elliptical or slightly ovate, cuneate at the base, obtuse or usually acuminate at the apex, sparsely sericeous below to (usually) quite glabrate, the lateral veins obscure or prominulous; petiole (8–)12–20(–25) mm long, sparsely sericeous to glabrate; stipules 1.5–3(–4.5) mm long, connate, the pair acute to rounded, abaxially sericeous to glabrate, adaxially glabrous. Inflorescence 6–18 cm long, sericeous or subtomentose to glabrate; bracts and bracteoles 0.5–1(–1.5) mm long, triangular or rounded, the bract often shorter than the bracteoles, all persistent to maturity of the fruit and after; pe-
duncle 0–0.5 mm long, 1-flowered. Pedicel 6.5–10 mm long, sericeous or tomentose, circinate in bud, twisted and/or decurved in fruit. Sepals all biglandular, 1.5–2 mm long beyond the glands, 1.5–2.2 mm wide, triangular, reflexed at the apex in anthesis, abaxially sericeous, adaxially glabrous; glands ca 2 mm long. Petals pink or white, glabrous, the lateral 4 all concave, the anterior 2 deeply cup-shaped. Anthers 2–3.2 mm long, sparsely to densely sericeous, the locules with the fertile part 1.3–2.5 mm long, drawn out at the apex in slender, sterile extensions 0.3–1.1 mm long, the connective extended beyond the fertile part of the locules 0.3–1.2 mm, the extension tapering distally, straight or recurved. Ovary ca 1 mm high, ovoid, sericeous or glabrous, only 2 of the locules fertile; styles 3–4 mm long, ± straight. Fruit red, 10–12 mm in diameter (dried), 10–13 mm high, ovoid to globose, ± beaked at the apex, especially when immature, glabrous or glabrate.

Type. *Martius*, Japará, Amazônas, Brazil, Dec flr (M).

Distribution. Along rivers in western Amazonia, from Manaus west to Loreto, from Acre north to the middle Orinoco. Collections from Guayana: VENEZUELA. Bolivar: La Paragua, 70 m, Williams 12579 (MICH, US, VEN); Río Paraguana, 50–100 km from mouth, 110 m, Wurdack & Monachino 41063-A (MICH, NY, US, VEN). Amazonas: Río Orinoco 10 km above Río Atabapo, Level L-119 (MICH, NY, US, VEN); Río Sapi, Río Casiquiare, 130 m, Maguire & Wurdack 34838 (MICH, NY, US, VEN); Mavaca, Lizot (MICH); Capihuara, Casiquaire, 120 m, Williams 15615 (US, VEN). COLOMBIA. Meta: La Serrania, Río Ariari, Laguna de Aquasucia, 300 m, Jaramillo et al 1028 (COL). Vaupés: Río Vaupés, Mitú-Mirití, Cuatrecasas 6912 (US); Río Inirida, Río Papunúa, 200 m, Alvaro Fernández 2215 (US); Río Piraparaná, Garcia-Barriga 14321 (US); Río Micaya, Gutiérrez & Schultes 648 (NY); Lagos de Pasos, Gutiérrez & Schultes 848 (GH, MICH); Caño Arara, Gutiérrez & Schultes 886 (NY); Mitú and vicinity, Schultes et al 24260 & 24363 (ECON); lower Río Kubiýú, Zarucchi 1271 (MICH); Río Vaupés near Mitú, Zarucchi 2111 & 2221 (MICH). Amazonas-Vaupés: Sorotama, Schultes & Cabrera 13534 (US) & 13767 (NY, US); Raudal Yacopi, Schultes & Cabrera 15507 (GH, US); Jinogójé, Schultes & Cabrera 16594 (US), 17604 (US), 19817 (NY, US), 19867 (COL, GH). BRAZIL. Amazônas: Castanha, Padauary, Río Negro, Fróes 22584 (IAN, UB); Río Demeni, Pai Raimundo, Fróes & Addison 29009 (IAN); Itaubal, Río Aracá, Fróes & Addison 29263 (IAN); Macará, Río Negro, Pires 261 (IAN); Río Negro between Río Curucuriari & Barcellos, Schultes & López 8882 (US); between Manaus and Barcellos, Spruce 1911 (GH); mouth of Río Negro, Spruce 1628, syntype of *B. fluminensis* (NY). Terr. Roraima: Canto Galo, Río Mucajá between Pratinha and Río Apiauí, Prance et al 3984 (MICH, NY).

Collected in flower mostly from August to November, in fruit from November to June.

I am unable to find adequate bases for maintaining the various segregates from this species. The "best" of them is *Byrsonima inundata*, and there is a certain similarity to the populations of the Río Negro that gives them some claim to status. However, most of the characters of that group occur elsewhere in the range of *B. japurensis*, e.g. relatively short extensions of the anther locules and a sericeous ovary. The only reliable basis for recognizing *B. inundata* is that the leaf is obtuse instead of short- to long-acuminate. However, if one arranges col-
lections geographically from the Río Negro upstream to the Río Vaupés in Colombia, one sees a gradual shift in shape of the lamina, with no clear morphological discontinuity. Assigning the intermediate collections to one species or the other seems to be entirely arbitrary, and I cannot find a defensible way to do it, so I have defined the species broadly.

18. **Byrsonima rodriguesii** Anderson, sp nov

Fig 19.

Arbor 12–18 m alta, ramis vegetativis glabris praeter axilllas hirsutas stipularum. Lamina foliorum majorum 14.5–22.5 cm longa, 7–10 cm lata, elliptica, basi cuneata vel attenuata, apice abrupte breviamminata, glabra, nervis lateralis et reticulo utrinque prominulis; petiolus 20–35 mm longus, glaber; stipulae 4–5 mm longae, liberae, late ovatae, abaxialiter glabrae, adaxialiter dense appresso-hirsutae. Inflorescentia 9–11 cm longa, appresso-tomentosa, floribus plerumque 2 fasciculatis (vero in cincinno sessili 2-floro portatis), bracteis 2.5–3.5 mm longis, 1.5–2.5 mm latis, triangularibus, glabris vel sparsim sericeis, reflexis vel revolutis, post maturitate fructus persistentibus, pedunculo nullo vel in fructu usque 1 mm longo, bracteolis bracteis similaribus sed minoribus praecipue brevioribus. Pedicellus 7–9 mm longus (–12 mm in fructu), appresso-tomentosus, circinatus in alabastro, rectus vel ascendens et crassior in fructu. Sepala omnia biglandulifera, glandulas 1.5 mm superantia, 2.5 mm lata, rotundata, utrinque glabra vel basi sparsim sericea, margine breviter ciliata, appressa, in fructu accrescentia, glandulis 3–4 mm longis. Petala “alba et rubra” (primum alba demum rubra?), glabra, 4 lateralia limbo 5–7 mm longo latoque, profunde concavo, extimo altera in alabastro omnino tegenti, ungue ca 2.5 mm longo; petalam posticum limbo 3–3.5 mm longo, 3.5–4 mm lato, corrugato, ungue 2.5–3 mm longo. Filamenta 2.5 mm longa, usque ¼ connata, abaxialiter glabra, adaxialiter basi hirsuta; antherae 2–2.5 mm longae, glabrae, loculis 1–1.4 mm longis, dorsiventraliter complanatibus, connectivo loculos 0.9–1.3 mm superantibus, recto vel reflexo. Ovarium glabrum, carpelliis omnibus fertilibus; stylis 3.5–4 mm longis, versus sepalum anticum curvati. Fructus (siccus) 10–12 mm diametro, globosus, viridis, glaber, nuce rugosa.


Paratypes. BRAZIL. Amazônas: Estrada Manaus–Itacoiara, Km 150, May flr, Loureiro et al [INPA 35770] (INPA, NY); Estrada Manaus–Itacoiara, Km 68, mata da t. firme, solo argiloso, Apr flr, Rodrigues 8799 (INPA, MICH, NY).

This species is named in honor of Dr. William Rodrigues, student of Myristicaceae and collector of the type. The flattened anthers, ascending pedicel in fruit, and persistent bracts and bracteoles indicate that its closest relatives are **Byrsonima concinna** and **B. densa**. Of these two it is most like **B. concinna** in its glabrous vegetative parts, large bracts and bracteoles, and outer petal completely covering the others in bud. It is distinguished from both **B. concinna** and **B. densa** by its large leaves and stipules, large fruit, and long extension of the anther’s connective.

This is not a species of Guayana. It is included here because of its apparent relationship to **Byrsonima concinna**, an endemic of upland Guayana.
Fig 19. *Byronima rodrguesii*. a) Fruiting branch, ×0.5; b) stipules, adaxial side, most hairs removed, ×2.5; c) fruit (dried), ×2; d) bud, ×2.5; e) flower, ×2.5; f) stamens, ×7.5; g) gynoecium (glabrous ovary shown surrounded by hairs on the receptacle), ×5. Drawn by Karin Douthit, a–c from *Rodrigues 8799*, d–g from *Rodrigues et al 2843*. 

Fig 16h.

Shrubs or small trees 1.2–8(–15) m tall; vegetative stems glabrous except hirsute in axils of stipules. Lamina of the larger leaves (4–)6–11(–13) cm long, (2–)3–6.5 cm wide, elliptical or obovate, attenuate or cuneate at the base, acute or obtuse to rounded and often apiculate at the apex, glabrous, coriaceous, the lateral veins and reticulum usually moderately prominent below or on both sides; petiole (7–)10–20 mm long, glabrous; stipules 1.5–2.5(–3.5) mm long, free, ovate, obtuse or rounded at the apex, abaxially glabrous, adaxially hirsute. Inflorescence (3–)6–16 cm long, usually simple, rarely basally ternate, sericeous or tomentose; bracts (1–)2–5 mm long, 1.2–3.5 mm wide, ovate or triangular, green, straight or revolute, glabrous or sparsely tomentose, persistent in fruit and after; peduncle none, the flowers 1–several in axil of each bract; bracteoles like the bracts or smaller. Pedicel (4–)5–11 mm long (–13 mm in fruit), sericeous or tomentose, cincinate in bud, straight or ascending in old flowers and fruit. Sepals all biglandular, 1–2(–3) mm long beyond the glands, 1.5–2 mm wide, rounded at the apex, ciliate on the margin, glabrous on both sides or thinly to (rarely) densely sericeous or tomentose, revolute in anthesis, accrescent (especially elongated) in fruit; glands 1.6–2.7 mm long, pink or white. Petals white, turning pink in age, the posterior sometimes yellow, glabrous, the outermost covering all others in bud. Filaments 2–3 mm long, straight or slightly incurved at the apex, abaxially ± glabrous, adaxially short-hirsute basally; anthers 1.2–2.1 mm long, glabrous, the locules 0.9–1.6 mm long, dorsiventrally flattened and bearing narrow membranous longitudinal wings up to 0.1 mm wide, the connective exceeding the locules by (0.2–)0.4–0.8 mm, the extension globose, glandular, inserted slightly between the locules. Ovary 0.9–1.4 mm high, glabrous, all 3 locules fertile; styles 2.5–3.5 (–4.5) mm long. Fruit 4–8 mm in diameter (dried), ovoid, globose, or depressed-globose, green (mature?), glabrous, the nut rugose.


Distribution. Mostly in eastern Guayana, with outliers on Cerros Yutaje, Sipapo, and Neblina. GUYANA. Krabu Savanna, Weramu Trail, Forest Dept. 7979 (NY); Imbaimadai Savannas, Upper Mazaruni River, 550 m, Maguire 32187 (K, MICH, NY); Waipa Trail from N Kopinang Savanna, southern Pakaraima Mts, 825 m, Maguire et al 46099A (K, MICH, NY, US). VENEZUELA. Bolívar: Cerro de las Guacamayas, 800–1000 m, Bernardi 1645 & 1655 (VEN); región de Urímán, 350 m, Bernardi 1686 (NY, VEN); Río Torono, Cardona 845 (NY, US, VEN); Cerro Upuima, Caroni, 1300 m, Cardona 2237 (US, VEN); Auyan-tepui, 1600–1700 m, Cardona 2622 (NY, VEN) & 2626 (GH, NY, VEN); Salto Angel, Foldats 7067 (VEN); Uaipan-tepui, 1200 m, Koyama & Agostini 7358 (NY, VEN); Uarupata to Iju-tepui, 1000 m, Maguire 33215 (MIC, NY, VEN); Río Chicanán 2 km S of Río Chibau, 100 m, Maguire et al 53532 (MIC, NY, VEN); Triana Savanna, Cerro Pitón, Cordillera Epicara, Maguire et al 53605 (MO, NY, VEN); Quebrada Pitón, Cerro Pitón, 400 m, Maguire et al 53708 (MIC, NY, VEN); Uaipán-tepui, 1700 m, Phelps & Hitchcock 361 (NY, VEN); mesa between Ptari-tepui and Sororopán-tepui, 1615 m, Steyerman 60278 (NY, VEN),
1120 m, Steyermark 60716 (NY, VEN) & 60742 (VEN); Sierra Auraima, Raudal de El Perro, Río Paragua, 400 m, Steyermark 90825 (NY) & 90829 (US); Río Churún, Auyan-tepui, 1660–1690 m, Steyermark 93258 (MICH, NY, VEN), 93762 (VEN), 93795 (NY, VEN); Auyan-tepui, 1500 m, Steyermark 94118 (NY, VEN); savanna of Uarama-tepui above Río Uarama above Km 150, NE of Luepa, 1220 m, Steyermark & Nilsson 700 (VEN); Río Caroní near rapids just below Urimán, 394 m, Steyermark & Wurdack 61 (MICH, NY, US, VEN); Río Tírica below upper falls, Chimantá Massif, 1940 m, Steyermark & Wurdack 545 (NY, VEN); below upper falls of Caño Mojado, 1895–1910 m, Steyermark & Wurdack 948 & 1091 (F, NY, VEN); cumbre de Cerro Guaiquinima, 750 m, Steyermark et al 113307 (MICH), 1560 m, 113528 (MICH); Auyan-tepui, 1100 m, Tate 1177 (NY), 1850 m, Tate 1180 (NY, VEN), 1100 m, Tate 1183 (NY, VEN). Amazonas: Cerro Yutaje, savanna, 1250 m, Maguire & Maguire 35187 (MICH, NY, VEN), 2100 m, Maguire & Maguire 35312 (MICH, NY, US, VEN); Cerro Sipapo, 1800–2000 m, Maguire & Politi 28361 (NY, VEN); Cerro de la Nebliña, Cañón Grande SSW of Cumbre Camp, 1200–2200 m, Maguire et al 42506 (MICH, NY, US, VEN), BRAZIL. Terr. Roraima: Serra dos Surucucús, 1800 m, Prance et al 9921 (MICH, NY); Uferwald beim Dorfe, Roraima, 1200 m, Ule 8623 (MG).

Collected in flower and/or fruit in all months except June and July.

This upland species shows the same sort of distribution and variability as Blepharandra hypoleuca. This variation is most noteworthy in the size of the bracts and bracteoles and fruits. The small bracts and bracteoles found in some populations are unfortunate, since the usually long bracts and bracteoles are the easiest way to distinguish this species from its relatives of the Amazonian lowlands. However, the variation in bracts and bracteoles is continuous and I can find no way to split the species on that basis. In most characters this species is a reasonably coherent morphological entity, and there is no other species with alate anthers in eastern Guayana (except for the segregate B. rubrobracteata), so from a practical point of view it should be easy to apply this name in spite of the variation included in the description.

The plants from Cerros Yutaje and Sipapo are interesting for their very short, stout pedicels. If one were going to recognize infraspecific taxa in this species, those isolated populations could surely comprise such a segregate.

20. Byrsonima rubrobracteata Anderson, sp nov

Frutex usque 5 m altus, ramis vegetativis glabris praeter axillas hirsutas stipularum. Lamina foliorum majorum 5.5–10 cm longa, 3–6 cm lata, elliptica vel obovata, basi attenuata, margine revoluta, apice rotundata vel paulo apiculata vel retusa, glabra, coriacea, nervis reticuloque subtus obscurs, supra obscurs vel prominulis; petiolus 10–15 mm longus, glaber; stipulae 3.5–5 mm longae, liberae, late ovatae, abaxialiter glabrae, adaxialiter sparsim sericeae. Inflorescentia 4–5 cm longa, appresso-tomentosa, floribus singulis et pro parte maxima in dimidio distali confess, bracteis 2.5–3.5 mm longis latisque, late ovatis, rubris, appressis vel paulo revolutis, glabris praeter marginem ciliatam, post maturitate fructus persistentibus, pedunculo nullo, bracteolis bracteis similaribus vel paulo minorebus. Pedicellus 9–13 mm longus, appresso-tomentosus, in alabastro circinatus, in fructu rectus. Sepala omnia biglandulifera, glandulas ca 2 mm superantia, 2.5–
3 mm lata, apice rotundata, carnosa, appressa apice revoluta, abaxialiter proximaliter sparsim sericea, margine ciliata, adaxialiter glabra, in fructu rosea et moderate accrescentia, glandulis alboroseis 2–2.5 mm longis. Petala alba demum rosea vel rubra, glabra. Filamenta 2.6–2.9 mm longa, abaxialiter glabra, adaxialiter basi brevihirsuta; antherae 1.4–1.7 mm longae, loculis 1–1.4 mm longis, dorsiventraliter complanatis et anguste alatis, connectivo rhomboideo, loculos 0.3–0.4 mm superanti. Ovarium glabrum, carpellis omnibus fertilibus; styli ca 3 mm longi. Fructus immaturus viridis, 6–7 mm diametro (siccus), globosus vel ovoideus, glaber, calyce rubro accrescenti subtentus, nuce rugosa.


This species is similar to *Byrsonima concinna*, from which it differs in its red bracts and bracteoles, its short, dense inflorescence with only one flower per bract, the long stipules only sparsely sericeous adaxially, and the coriaceous, revolute lamina, which is ± rounded at the apex and has the reticulum obscure below.


Trees 6–20 m tall; vegetative stems glabrous except hirsute in axils of stipules. Lamina of the larger leaves 9–12.5 cm long, 3.5–5 cm wide, elliptical, attenuate or cuneate at the base, acuminate or rarely acute at the apex, glabrous, the lateral veins prominent on both sides; petiole 15–20 mm long, glabrous; stipules ca 1 mm long, free, broadly rounded, abaxially glabrous, adaxially hirsute. Inflorescence 6–16 cm long, tomentose, the flowers borne 1(–2) per bract; bracts 1–1.5 mm long and wide, triangular, often revolute, glabrous or bearing a few hairs, persistent, probably past maturity of the fruit; peduncle none; bracteoles like the bracts or smaller. Pedicel 4.5–6 mm long, subsericeous to subvelutinous, circinate in bud, straight in old flowers and young fruits. Sepals all biglandular, 1.7–2 mm long and wide, obtuse or rounded, glabrous except at base and ciliate on margin, reflexed in anthesis, accrescent in fruit; glands 1.9–2.2 mm long, pink. Petals white (pink in age?), glabrous, the outermost concealing all others during enlargement of the bud. Anthers 1.2–1.5 mm long, glabrous, the locules 0.8–1 mm long, dorsiventrally flattened, the connective exceeding the locules by 0.4–0.6 mm, the extension globose, inserted slightly between the locules. Ovary glabrous, all 3 locules fertile; styles ca 3 mm long. Mature fruit unknown.

Type. *Garcia-Barriga 14107*, Soratama, entre los ríos Kananarí y Pacoa, Río Apaporis, Amazonas, Colombia. 250 m, Dec flr (holotype US! isotype NY!).


This species is very similar to *Byrsonima densa* (Poiret) DC. (=*B. amazonica* Grisebach), and I shall not be surprised if the two are eventually united on the strength of collections that combine the characters that presently distinguish them. Those characters are summarized in this couplet:
1. Pedicel 4.5–6 mm long; petiole of larger leaves 15–20 mm long; outermost petal concealing all others during enlargement of the bud; vegetative parts glabrous (except stipules adaxially).

B. garciabarrigae.

1. Pedicel 6–11 mm long; petiole usually less than 10 mm long; 3–4 petals visible in enlarging bud; vegetative parts often initially sericeous, soon glabrate.

B. densa.

Most collections of Byrsonima densa have been from northeastern Amazonia (Pará, Amapá, French Guiana, Surinam). However, Fróes 22804 (IAN), from the Rio Negro, seems to be referable to that species, so the apparent geographic disjunction of the two may be an artifact of inadequate collecting.

22. Byrsonima bronzweniana Anderson, sp nov

Fig 20.

Frutex vel arbor 2–3(–8) m alta, ramis vegetativis sericeis mox glabratis. Lamina foliorum majorum 5–9.5 cm longa, 2–3 cm lata, anguste elliptica, basi cuneata, apice rotundata vel obtusa, interdum retusa, primum sparsim sericea mox vel demum glabrata, coriacea et margine revoluta stramineaeque, subtus pertinaciter glauca, nervis lateralibus numerosis, parallenis, tenuibus, obscuris vel proninis, reticulo aequaliter prominulo; petiolum 6–13 mm longus, sparsim sericeus vel glabrous; stipulae 1–2 mm longae, liberae, obtusae vel rotundatae, abaxialiter sericeae vel glabratae, adaxialiter appresso-hirsutae. Inflorescentia 7–13 cm longa, sericea, interrumpita, floribus singulis, bracteis 1.2–3.2 mm longis, 1–2(–3) mm latis, ovatis vel triangulares, sericeis, post maturitate fructus persistebatibus, pedunculo nullo, bracteolis bracteas similares sed minoribus. Pedicellus 6–8 mm longus (–11 mm in fructu), sericeus vel glabrescens, in alabastro circinatus, in fructu et floribus vetustioribus decurvatus et demum tortus. Sepala omnia biglandulifera, glandulas 1.5–1.8 mm superantia, 1.5–2 mm lata, rotundata, abaxialiter sericea, adaxialiter glabra, per anthesin revoluta, in fructu accrescentia praecipue elongata, glandulis 1.5–2 mm longis. Petala alba demum rosea, glabra, persistens in fructu immaturo. Filamenta sepalis opposita 2–2.3 mm longa, petals opposita 2.5–3 mm longa, basi usque 0.7 mm connata, abaxialiter glabra, adaxialiter in dimidio proximali hirsuta; antherae 1.7–2.1 mm longae, glabrae, loculis 1–1.3 mm longis, dorsiventraliter complanatis, anguste alatis ala membranacea 0.08–0.15 mm lata, connectivo loculos 0.5–0.8 mm superantes, globosi, glanduloso, inter loculos inserto. Ovarium glabrum, carpellis omnibus fertilibus; styli ca 4 mm longi. Fructus ruber, 5.5–7 mm diametro (siccus), globosus, interdum petalis persistentibus subentus, nucis rugosa.

Type. Maguire, Wurdack & Maguire 34612A, waterside, along Yapacana Caño from Laguna to mouth, Alto Río Negro, Amazonas, Venezuela, 125 m, 20 Mar 1953 flr (holotype MICH, isotypes NY, US, VEN).

Distribution. Along rivers, Alto Río Orinoco to Alto Río Negro. VENEZUELA. Amazonas: Orilla inundada del Río Temi, alrededores de Yavita, 125–140 m, Jul flr/frt, Bunting et al 4051 (U); a lo largo del Río Temi, Yavita, 125 m, Apr flr, Steyermark & Bunting 102941 (NY, VEN); selva inundada, Río Atabapo, cerca Isla el Zapo, 90 m, Aug flr, Vareschi & Jaffé 8006 (VEN); riberes bajas y anegadas del Caño San Miguel, Río Guainía, 127 m, Mar flr, Ll. Williams 14876 (F, MO, US, VEN). BRAZIL. Igarapé Toury, afl. do Rio Negro, margem do rio, Mar flr, Fróes 27901 (IAN, UB); Igarapé Jurupari, afl. do R. Uapés, Apr flr, Fróes 28217 (IAN, UB).

Dr. Cuatrecasas called this species Byrsonima angustifolia H.B.K. in his Prima
Flora Colombiana, but that name is properly applied to a superficially similar species of *Blepharandra*, q.v. There seems to be no name for this *Byrsonima*, so I am naming it for my friend and student, Dr. Bronwen Gates, whose revision of *Banisteriopsis* has brought order to a very muddled corner of the Malpighiaceae. *Byrsonima bronweniana* is in the group of species allied to *B. luetzelburgii* and *B. densa*. In that group it is notable for its glaucous, narrow, obtuse or rounded leaves with many fine veins, interrupted inflorescence, large bracts and bracteoles, decurved pedicels, and petals often persistent in fruit.

Shrubs or small trees 2–4 m tall; stems initially sericeous, soon or eventually glabrate. Lamina of the larger leaves 5.5–9 cm long, 3–4.5 cm wide, elliptical or obovate, cuneate at the base, obtuse or rounded and sometimes apiculate or retuse at the apex, initially sparsely sericeous but soon quite glabrate, the margin yellow, 0.2–0.4 mm wide, revolute, the lateral veins and reticulum usually prominent below or on both sides; petiole 8–12(–15) mm long, loosely sericeous to glabrate; stipules 2–3 mm long, free, ovate, obtuse, abaxially sericeous to glabrate, adaxially glabrous except hirsute at the base. Inflorescence 5–10 cm long, sericeous or tomentose, the flowers borne 1 per bract; bracts 1.5–3.5 mm long (the lowest pair up to 6 mm long), 1.5–2.5 mm wide, triangular, loosely sericeous to nearly glabrous, spreading or reflexed, persistent past maturity of the fruit; peduncle none; bracteoles like the bracts but usually smaller. Pedicel 5–6 mm long, loosely sericeous or tomentose, circinate in bud, decurved in fruit and old flowers. Sepals all biglandular, 1.5 mm long beyond the glands, ca 2 mm wide, rounded at the apex, abaxially densely sericeous or appressed-tomentose, adaxially glabrous, appressed in anthesis, accrescent in fruit; glands 1.6–2 mm long, pink. Petals white, turning pink in age, glabrous, the outermost ± completely covering all others in bud. Filaments 2.6–2.8 mm long, abaxially glabrous, adaxially hirsute basally; anthers 1.4–1.7 mm long, glabrous, the locules 1.1–1.3 mm long, dorsiventrally flattened and bearing prominent membranous longitudinal wings 0.1–0.2 mm wide, the connective exceeding the locules by 0.2–0.5 mm, the extension globose, glandular, inserted slightly between the locules. Ovary ca 1 mm high, glabrous, all 3 locules fertile; styles ca 3 mm long, curved toward the anterior sepal. Fruit 5 mm in diameter, 6 mm high (dried), ovoid, glabrous, subtended by the accrescent, reddish calyx, the nut rugose.


Distribution. Cerros Duida and Sipapo. VENEZUELA. Amazonas: Cerro Sipapo, edge of savanna, Base Camp, 125 m, Jan flr, *Maguire & Politi* 28287 (NY); Cerro Duida: Orinoco River, 30 km below La Urbana, 80 m, Mar flr, *Maguire & Maguire Jr* 29069 (NY); open scrub, Caño Negro basin, 2000–2300 m, Nov imm flr/frt, *Maguire et al* 29679 (MICH, NY, VEN); summit, along valley forest between Central Camp and Brocchinia Hills, 1675 m, Aug flr, *Steyermark* 58112 (NY, VEN); summit, 1320–1440 m, Jan flr, *Tate* 566, 595, & 740 (all NY).

As Sandwith has noted (1935, p 313), this species is similar to *Byrsonima concinna*. However, its leaves and internodes are initially sericeous while they are always glabrous in *B. concinna*, and the pedicels of fruits and old flowers are decurved, as in *B. laevis* and its close relatives and unlike *B. concinna*, *B. densa*, and their close relatives. Its leaves also have a wider yellow margin than is usual in *B. concinna*, its anthers have wider longitudinal wings, and its sepals are always densely sericeous or tomentose, a condition that does occur in *B. concinna* but only rarely.

I have not seen the type, a single specimen at Kew. Therefore, I cannot be sure I am applying this name correctly. However, if it does agree with the Duida plants in having vegetative vesture and decurved pedicels in fruit, it was probably collected by Robert Schomburgk on Duida when he visited the Orinoco in 1839. He must have collected the type of *Diacidia vestita* (q.v) in that vicinity, and
that collection was another of his unnumbered unicantes. Note that Tate collected *Diacidia vestita* (his number 563) and *Byrsonima bracteolaris* (566) together on Duida. It seems quite possible that he was unknowingly following Robert Schomburgk's exact route and re-collecting the same populations.

If it should eventually seem necessary to unite these two species, I would strongly favor using the name *Byrsonima concinna*, of which the type is central to the variation of the assemblage, not *B. bracteolaris* with its very peripheral morphology and distribution. There is also the practical consideration of isotypes—*B. concinna* has several, *B. bracteolaris* has none.


Trees 6–8 m tall; stems glabrous except short-hirsute in axils of stipules. Lamina of larger leaves 8–14 cm long, 4–7 cm wide, broadly elliptical, cuneate to truncate at the base, revolute at the margin, broadly obtuse or rounded and sometimes apiculate at the apex, very coriaceous, glabrous, glaucous or not above, the epidermis below concealed by a thick persistent glaucescence, the numerous parallel lateral veins and reticulum ± prominent above, obscure below; petiole 10–22 mm long, glabrous; stipules 1.5–3 mm long, broadly obtuse or rounded, free, abaxially glabrous, adaxially hirsute (?). Inflorescence 8–12 cm long, glabrous (? or soon glabrate), the flowers borne 1 per bract; bracts and bracteoles 1–1.5 mm long, 1.2–1.7 mm wide, obtuse or rounded, glabrous or bearing a few marginal hairs, persistent past maturity of the fruit, the bracteoles usually slightly larger than the bracts; peduncle none. Pedicel ca 8 mm long (in fruit), thinly sericeous to glabrate, circinate in bud, decurved and eventually twisted in fruit and old flowers. Sepals all biglandular, glabrous, reflexed, accrescent, and red in fruit. Petals "dilute rosea." Anthers "glaberrimae obovoidae ± 2 mm longae, connectivo sursum incrassato loculos basi productos sursum divergentes vix vel usque ½ mm superante" (Niedenzu). Ovary glabrous. Fruit 4.5–5.5 mm in diameter, 5–6 mm high, globose or ovoid, red, glabrous, the nut rugose.

Syntypes. *Luetzelburg* 22581, 22623, 22636: Casiquiare, Amazonas, Venezuela; *Luetzelburg* 22838: Esmeralda, Orinoco, Amazonas, Venezuela; *Luetzelburg* 22835, 23746: Jatica, Uaupés, Amazônas, Brazil; all collected in flower.


I have seen none of the syntypes, and shall delay choice of a lectotype until I do. Neither of the collections I have seen has flowers, so I may be wrong in my assumption that the anther locules are dorsiventrally flattened and probably alate. This species is quite similar to *Byrsonima laevis*, from the same area, but it seems to be well marked by its large coriaceous leaves with thick glaucescence below and its small fruit. It is interesting and puzzling to note that whereas Luetzelburg collected the species six times in a single voyage, modern collectors have since found it only twice.

Trees 6–10 m tall; stems glabrous except short-hirsute in axils of stipules. Lamina of the larger leaves 8.5–10.5(–13) cm long, 5–7 cm wide, broadly elliptical, cuneate or obtuse and then somewhat attenuate at the base, often revolute at the margin, obtuse or rounded and abruptly apiculate or retuse at the apex, coriaceous, glabrous, not glaucous below, not or slightly glaucous above, the lateral veins numerous, parallel, and prominent on 1 or both sides; petiole (11–)15–22 mm long, glabrous; stipules 1–2 mm long, free, broadly rounded, abaxially glabrous, adaxially short-hirsute at base. Inflorescence 9–14 cm long, thinly sericeous with tightly appressed hairs to glabrate, the flowers borne 1 per bract; bracts and bracteoles 0.5–1 mm long, 0.7–1.4 mm wide, mostly wider than long, obtuse or broadly rounded, glabrous or bearing a few hairs, persistent past maturity of the fruit; peduncle none. Pedicel 4.5–6 mm long (–9 mm in fruit), slender, even in fruit only 0.5 mm in diameter, thinly sericeous to glabrate, circinate in bud, decurved and eventually twisted in fruit and old flowers. Sepals all biglandular, 1.2–1.5 mm long beyond the glands, 1.7–1.9 mm wide, obtuse or rounded, glabrous except ciliate on the margin, revolute in anthesis, accrescent in fruit; glands 1.2–2 mm long, pink. Petals white, glabrous, the outermost ± completely covering all others in bud. Filaments 1.8–2 mm long opposite the sepals, 2–2.5 mm long opposite the petals, abaxially glabrous, adaxially hirsute basally, connate at the base; anthers 1.6–1.8 mm long, glabrous, the locules 1.4 mm long opposite the petals, 1.6–1.7 mm long opposite the sepals, dorsiventrally flattened and bearing prominent, discolored, membranous wings 0.15–0.2 mm wide, the connective exceeding the locules by 0.1–0.3 mm, the extension rounded, glandular, and abaxially protuberant opposite the sepals. Ovary glabrous, all 3 locules fertile; styles ca 3 mm long. Fruit 12 mm in diameter (dried), globose, glabrous.


Distribution. Known only from the type and the following two collections. VENEZUELA. Amazonas: A lo largo del camino entre Yavita y Pimichín, a 1 km de Yavita, suelo de arena blanca con selva, 125 m, Apr frt, Steyerm. & Bunting 102894 (NY, VEN). BRAZIL. Amazônas: Rio Uneiuxi, 300 km above mouth, caatinga forest on terra firme, Oct flr, Prance *et al* 15589 (MICH, NY).

Another collection that is *Byrsonima laevis* or very close to it is *Silva & Brazão 60913*, wet caatinga forest, Serra Pirapucú, 1250 m, Jan flr, Amazônas, Brazil (MG, MICH, NY, US). It generally resembles the collections cited, but differs in having less parallel lateral veins and anthers with shorter locules and narrower wings. When the species is better known its range of variation will probably expand to accommodate this plant.


Shrubs or small trees 1.5–6 m tall; stems glabrous except short-hirsute in axils of stipules. Lamina of the larger leaves 6–10.5 cm long, 3–5.7 cm wide, obovate
or occasionally elliptical, usually cuneate or obtuse at the base, usually rounded and often retuse or apiculate at the apex, rarely obtuse, glabrous, the margin yellowish and often slightly revolute, the lateral veins prominulous above; petiole (3–)5–10(–12) mm long, glabrous; stipules 1–2 mm long, free, rounded or obtuse, abaxially glabrous, adaxially short-hirsute at base. Inflorescence 6–15(–19) cm long, sericeous to glabrate, the flowers borne 1 per bract; bracts and bracteoles 0.5–1(–1.5) mm long, 0.9–1.6 mm wide, rounded or obtuse, glabrous except usually ciliate on the margin, persistent past maturity of the fruit; peduncle none. Pedicel 4–10 mm long, very slender, sericeous to glabrate, circinate in bud, decurved and eventually twisted in fruit and old flowers. Sepals all biglandular, 1.5 mm long beyond the glands, ca 1.5 mm wide, obtuse or rounded, glabrous except usually ciliate on the margin (very rarely sparsely sericeous abaxially in the center), reflexed in anthesis, accrescent in fruit; glands 1.4–2.6 mm long. Petals white, turning red in age, glabrous. Filaments 1.5–2 mm long, abaxially glabrous, adaxially hirsute at base; anthers 1–2 mm long, glabrous, the locules 0.8–1.9 mm long, dorsiventrally flattened and bearing membranous longitudinal wings ca 0.1 mm wide, the connective equalling the locules or exceeding them by 0.1–0.2 mm. Ovary glabrous, all 3 locules fertile; styles 2.5–3 mm long. Fruits 4–5.5 mm in diameter (dried), globose, glabrous, the nut rugose.

Type. Cuatrecasas 6966, Yuruparí, ± 350 km arriba de Mitú, Vaupés, Colombia, 220 m, Sep flr/frt (holotype US! isotype F!).

Distribution. In savannas on white sands in the drainage of the Ríos Negro and Vaupés. BRAZIL. Amazônas: Campina of Cacau Pirêra, Estr. para Manacapuru, A. B. Anderson 209 (NY); Manaus, Campina de Ponta Negra, Ducke 1746 (A, MG); Tauacuera, baixo Rio Negro, Ducke [MG 12195] (NY); Rio Cuieiras just below mouth of Rio Brancinho, Prance et al 14828 & 17718 (MICH, NY); Km 2 Estr. Terra Preta, branch of Manaus-Manacapuru 5 km from Cacau Pirêra, Prance et al 23486 (MICH); Manaus, Ponta Negra, Rodrigues & Coelho [INPA 8411] (MG). COLOMBIA. Vaupés: Río Vaupés, Cerro Circasia, Garcia-Barriga 15043 (US); Río Cubiyú, Humbert & Schultes 27365 (US); Cerro Yapobodá, Río Kuduyari, 450 m, Schultes & Cabrera 14217 (NY, US); Río Piraparaná, Schultes & Cabrera 17539 (US) & 17548 (NY, US); Cerro Kañendá, Río Kubiýú, 250 m, Schultes & Cabrera 18381 (NY, US); Mesa de Yambi, Río Karurú, 300 m, Schultes & Cabrera 19138 (US); Raudal de Yuruparí, Río Vaupés, Schultes & Cabrera 19743 (NY, US); Mitú & vicinity, Schultes et al 24282 (ECON), Zarucchi 1963, 2058, 2209 (all MICH). Amazonas: Araracuara Savannas, Río Caquetá, Maguire et al 44154 (COL, MICH, NY, US). VENEZUELA. Amazonas: Cuenca del Río Manapiare, entre el Cerro Morrocoy y la Serranía Colmena, 5°20’N, 66°10’W, elev 200–350 m, Huber 1204 (MICH).

Collected in flower (and rarely in fruit) from September to December, and once each in April and June.

27. Byrsonima christianae Anderson, sp nov Fig 16k, 1 & 21.

Arbor 12–25 m alta, ramis sericeis mox vel demum glabratis. Lamina foliorum majorum 18–30 cm longa, 7–15 cm lata, obovata, basi attenuata, margine plana vel paulo revoluta, apice rotundata vel late obtusa et brevissime acuminata vel acuminata, utrinque glabra (vero sparsim sericea permax glabrata), nervis late-
Fig 21. *Byrsonima christianae*. a) Flowering branch, ×0.35; b) stipules, ×5; c) flower, ×3; d) cutaway view of flower, showing gynoecium and 3 stamens, ×5.5; e) stamens, ×14; f) immature fruit, ×1.7. Drawn by Annette Seidenschnur Mahler, a–e from the type, f from *Forest Dept. 1004*. 
ralibus distantibus subtus prominentibus, supra prominulis; petiolus 20–35(–45) mm longus, sparsim sericeus mox glabratus; stipulae 3–5 mm longae, abaxialiter sericeae demum glabrateae, adaxialiter distalter sericeae proximaliter glabrae, omnino connatae vel raro apice liberae, pari late triangulari, apice acuto vel obtuso, paribus interpetiolariter usque 1 mm connatis. Inflorescentia (10–)13–25 cm longa, sericea vel tomentosa demum glabratra, floribus singulis vel saepius 2 (–3) fasciculatis (vero in cincinno sessili 2(–3)-floro portatis), bracteis 1–2 mm longis, 1.5–2 mm latis, rotundatis vel triangularibus, post maturitate fructus persistentibus, pedunculo nullo vel raro usque 0.5 mm longo, bracteolis 1–2.5 mm longis, 1.3–2.5 mm latis, persistentibus, plerumque longioribus quam bractea. Pedicellus 6–9(–12) mm longus, sericeus vel tomentosus, rectus vel paulo circinatus in alabastro, rectus et crassior in fructu. Sepala glandulas 1.5–2.5 mm superantia, 2.5–3.5 mm lata, apice rotundata, in fructu non vel paulo accrescentia, appressa, abaxialiter sericca, adaxialiter glabra vel sparsim sericea, omnia biglandulifera, glandulis 2.5–4.5 mm longis, obovatis, compressis. Petala primum alba demum rubra, glabra vel abaxialiter in limbo paucipilifera, erosa. Filamenta 1–2.5 mm longa, libera, abaxialiter basi brevissime hirsuta, adaxialiter basi hirsuta; antherae glabrae, 2.1–4.2 mm longae, loculis non alatis, 0.5–1.8 mm longis, connectivo luteo, glanduloso, loculos 1.2–2.9 mm superantia, conoideo, recto vel paulo reflexo. Ovarium sericeum, sulcatum, carpellis omnibus fertilibus; stili 1.5–2.5 mm longi. Fructus sparsim sericeus vel glabratus, globosus, 17–20 mm diametro (siccus), "aurantiaco-luteus, carnosus, edulis."

Type. Tillett & Tillett 45583, mixed evergreen forest, E arm of Karowtipu, Kako River, upper Mazaruni River basin, British Guiana [Guyana], elev ca 950 m, 1 Oct 1960 flr (holotype MICH, isotypes K, NY, US).

Distribution. Guyana and Amapá; to be expected also from forests at moderate elevations in Surinam and French Guiana. Paratypes: GUYANA. Mahdia R. Potaro R. 107 miles Bartica-Potaro Road, mixed forest on white sand, Jan frt, Forest Dept. 1004 (NY); Dicymbe forest, Potaro River Gorge, May frt, Maguire & Fanshawe 23535 (F, MO, NY, US); frequent, mixed-evergreen forest on and below talus from cliffs along NE sides, Mt. Ayanganna, upper Mazaruni River basin, 750–900 m, Aug flr, Tillett et al 45881 (K, MICH, NY, US). BRAZIL. Amapá: Missão do Serviço Florestal no T. Amapá, Sep frt, Bastos 13 (IAN); heavily forested hills, Pôrto Terezinha, Rio Amapari, Serra do Navio, 70–300 m, Nov flr, Cowan 38274 (MG, MICH, NY, US).

This species is named in honor of my wife, Christiane Eva Seidenschur Anderson, astute student of Malpighiaceae and Compositae. It is similar to Byronima incarnata, but easily distinguished by the characters given in the key. The Cowan collection from Amapá has more, darker hairs on the inflorescence and longer bracts, bracteoles, pedicels, and anthers than the specimens from Guyana.


Tree 12–20 m tall, the stems densely sericeous to glabrate. Lamina of the larger leaves 12–25.5 cm long, 6.5–11 cm wide, obovate, cuneate or attenuate at the base, slightly revolute at the margin, usually abruptly short-acuminate at the apex, thinly sericeous to glabrate, the lateral veins prominent on both sides and interconnected by ± parallel tertiary veins; petiole 10–20(–23) mm long, sericeous.
to eventually glabrate; stipules 4–7 mm long, nearly to quite connate, the pair triangular, acute, usually sulcate and sometimes bidentate at apex, abaxially densely sericeous to glabrate, adaxially glabrous. Inflorescence 12–18 cm long, loosely sericeous, the flowers borne 1 per bract, the bracts 4–5 mm long, 1.5–2 mm wide, deciduous before anthesis; peduncle none; bracteoles 2 mm long, 1.5–2 mm wide, deciduous before anthesis. Pedicel ca 5 mm long in flower, up to 10 mm long in fruit, velutinous, straight in bud, straight or decurved in fruit. Sepals 2 mm long beyond the glands, 2–2.5 mm wide, rounded at the apex, appressed, densely tomentose-sericeous on both sides, accrescent in fruit, eventually 5–6 mm long and wide and notably auriculate, the 10 glands 2–2.5 mm long, pink or red, obovate, compressed. Petals white or pale pink, glabrous. Filaments 2 mm long, abaxially bearing a few hairs, adaxially hirsute at the base; anthers glabrous, 1.9–2.4 mm long, the locules 1–1.3 mm long, linear, non-alate, acute at the apex, the connective fleshy, much enlarged, exceeding the locules by 0.9–1.4 mm, the extension often reflexed and tapered distally to a blunt point. Ovary densely sericeous, ovoid, the anterior locule sterile; styles 1.5 mm long. Fruit ca 12 mm in diameter (dried), globose with a short apical extension, “green” (blue and glaucous when dried), sericeous to glabrate with some hairs usually persistent at the apex, the flesh thick, the nut rugose.

Type. Forest Dept. 2737, Moraballi Creek, Essequibo River, British Guiana [Guyana], Oct flr (K?).

Distribution. Known only from the type and the following collections. GUYANA. Forest along Potaro River, ca 1 mile above Kaieteur Falls, 420 m, Feb frt, Cowan & Soderstrom 1757 (NY, US); Wallaba forest, 50 miles, Bartica–Potaro Road, Nov flr/imm frt, Forest Dept. 1436 (NY); Wallaba forest on white sand, 65 miles, Bartica–Potaro Road, Nov imm frt, Forest Dept. 2793 (NY, US); sandy Wallaba forest near 14th milepost, Bartica–Potaro Road, Aug bud, Sandwith 1145 (NY).

This seems to be primarily a lowland species. It is included in this treatment because of the one collection from the Kaieteur Plateau, and in order to facilitate its comparison with the similar Byrsonima christianeeae.


Shrubs or trees 2.5–12(–24) m tall; stems sericeous. Lamina of the larger leaves 5.5–12 cm long, 2.5–7 cm wide, elliptical or obovate, cuneate or obtuse at the base, revolute at the margin, acute to obtuse to abruptly acuminate or rounded and apiculate at the apex, sericeous to glabrate and often densely glaucous above, densely sericeous below with dark brown hairs, the vesture persistent or thinning or belately abraded and sometimes canescent in age, the midrib prominent on both sides, the lateral veins 5–7(–8) on each side, prominent below, prominulous above; petiole 7–25 mm long, sericeous or eventually glabrate; stipules 3–5 mm long, triangular, ½–¾ connate, the pair sulcate in the middle, abaxially sericeous, adaxially glabrous. Inflorescence (3–)5–13 cm long, loosely sericeous, the flowers borne 1 per bract; bracts (3–)4–6.5 mm long, 1–1.5 mm wide, narrowly triangular, straight, mostly deciduous before or during anthesis; peduncle usually none, up to 0.5 mm long in fruit; bracteoles like the bracts but shorter. Pedicel 4–7 mm
Fig 22. *Byronima macrostachya*, *B. chalcophylla*, and *B. tilletii*. a–b, *B. macrostachya*: a) Branch with inflorescence, ×0.5; b) stipules (leaf removed), ×1.5. c–f, *B. chalcophylla var carraoana*: c) Flower, ×2.5; d) stamens, ×5; e) gynoecium, ×5; f) fruit, ×2.5. g–j, *B. tilletii*: g) Branch with
long (−10 mm in fruit), sericeous, straight in bud and fruit. Sepals all biglandular, 2–2.5 mm long and wide, triangular, acute or obtuse, sericeous or tomentose on both sides, more densely so abaxially, appressed in anthesis, accrescent in fruit, the glands 2.5–3 mm long, pink. Petals white with pink centers, glabrous. Filaments ca 2 mm long, abaxially glabrous, adaxially hirsute at base; anthers 1.5–2.9 mm long, glabrous, the locules 0.8–1.4 mm long, cylindrical, non-alaete, acute and divergent at the apex, the connective exceeding the locules by 0.6–1.7 mm, the extension rounded and reflexed. Ovary 1.2–1.7 mm high, densely sericeous, with only 2 locules fertile; styles 1.2–1.5(−2) mm long, straight. Fruit “yellow-green,” 8–10 mm in diameter (dried), ovoid, sericeous to glabrate.

Type. Ule 8624, in unteren Walde, Roraima, Amazonas [Terr. Roraima, Brazil, or more likely Bolivar, Venezuela], Jan flr (holotype B, destroyed; fragments of holotype NY!).

Key to the Varieties of Byrsonima chalcophylla

1. Lamina with the hairs below so dense and persistent as to completely conceal the epidermis, even on older leaves; fruit densely and persistently sericeous. 29a. var chalcophylla.
1. Lamina sericeous below, but the hairs not so dense as to completely conceal the epidermis, especially on older leaves; fruit glabrescent, nearly or quite glabrate at maturity. 29b. var carraoana.

29a. Byrsonima chalcophylla var chalcophylla

Distribution. Known only from the following two collections. VENEZUELA. Bolivar: Ilu-tepui, Gran Sabana, 1900 m, Mar flr/flr, Maguire 33483 (MICH, NY, VEN); lower forests, Roraima, Jan flr, type, Ule 8624 (NY).

29b. Byrsonima chalcophylla var carraoana (Steyermark) Anderson, comb et stat nov

Figs 16m & 22c–f.

Byrsonima carraoana Steyermark, Fieldiana Bot. 28(2): 287. 1952. Type. Steyermark 60883, Carrao-tepui, Bolivar, Venezuela, 2470–2500 m, Dec flr/flr (holotype F! isotypes NY! VEN!).

Byrsonima bolivarana Steyermark, Fieldiana Bot. 28(2): 287. 1952. Type. Steyermark 60272, mesa between Ptarí-tepui and Sororopán-tepui, Bolivar, Venezuela, 1615 m, Nov flr/flr (holotype F! isotypes NY! US!).

Distribution. Forests of eastern Bolívar and western Guyana. VENEZUELA. Bolivar: Km 133 S of El Dorado, 1300 m, forest near savanna, Gentry et al 10563 (MICH); forested slopes, NW part of Abácapa-tepui, Chimantá Massif, 1300 m, Steyermark 75175 (NY); elfin forest, Apácaratepui, 2000 m, Steyermark 75741 (NY); moist mossy recumbent forest, Auyan-tepui, 1660 m, Steyermark 93807 (NY, VEN); dwarf forest between Luepa and Cerro Venamo, 1200 m, Steyermark & Nilsson 301 (VEN); rocky slopes of zanjón bordering Upper Falls of Rio Tirica, Central Section, Chimantá Massif, 1950 m, Steyermark & Wurdack 504 (MICH, in florescence, ×0.5; h) cincinns, ×2; i) flower bud, ×5; j) immature stamens from bud, upper opposite a petal, lower opposite a sepal, ×10. Drawn by Karin Douthit, a–b from Cowan & Wurdack 31363, c–e from Steyermark & Wurdack 504, f from Steyermark 93807, g–j from Tillett et al 45092.
NY, VEN); bosque muscoso enano montañoso, Cerro Venamo, 1400–1450 m, Steyermark et al 92501 (F, NY, VEN); selva enana en la altiplanicie del suelo arenoso blanco, drenaje de Río Cuyuní, Km 130–131 al sur de El Dorado, 1290–1300 m, Steyermark et al 104521 (NY, VEN). GUYANA. Upper Mazaruni River basin, Mt. Ayanganna, low scrub, scrub, and low forest (8–10 m) on shoulder of E flank, above Thompson Camp, 1418–1525 m, Tillett et al 45072 (K, MICH, NY, US).

Collected in flower and fruit most frequently from November to June.

30. *Byrsonima macrostachya* Anderson, sp nov

Arbor 20 m alta, tronco 35 cm diametro, ramis sericeis, foliis confertis. Lamina foliorum majorum 14–17 cm longa, 7.5–9 cm lata, elliptica vel obovata, basi obtusa, margine revoluta, apice abrupte acuminata vel rotundata et apiculata apiculo 3–6 mm longo, supra primum sericea demum glabra et saepe glauca, subuts densissime et pertinaciter sericea, pilis primum rufis demum atrobrunneis vel canescentibus epidermidem omnino tegentiibus, nervis lateralibus utrinque 8–11 subuts prominentibus supra prominulis; petiolus 20–28 mm longus, sericeus; stipulae 7–9 mm longae, triangularibus, ca ½ connatae pari in medio sulcato, abaxialiter sericeae, adaxialiter glabrae praeter basam brevihirsuta. Inflorescentia (14–)25–26 cm longa, laxe sericea, floribus singulis, bracteis 2.5–4 mm longis, 0.8–1.5 mm latis, triangularibus vel anguste ellipticis, tomentosis, rectis, deciduis ante vel per anthesin, pedunculo nullo, bracteolis bracteis similariibus plerumque minoribus. Pedicellus abalastri 5–6 mm longus, tomentosus, non circinatus. Sepala omnia biglandulifera, in abalastro glandulas 2–2.5 mm superfantia, 2.5–3 mm lata, utrinque dense tomentoso-sericea, apice obtusa vel rotundata, glandulis ro-seis, ca 2.5 mm longis. Petala rosea, glabra. Antherae glabrae, loculis cylindricis, non alatis, apice acutis, in abalastro 1–1.4 mm longis, connectivo globoso 0.8–1.3 mm superatis. Ovarium dense sericeum, tantum 2 loculis fertilibus; styli in abalastro 1.3 mm longi, recti. Fructus ignotus.


This species is known only from the type, which is in bud. It is obviously closely related to *Byrsonima chalcophylla* of eastern Guayana, being distinguished by its larger leaves and stipules and much longer inflorescence, for which it is named.

31. *Byrsonima tillettii* Anderson, sp nov

Frutex usque 2.5 m altus, ramis rubro-sericeis demum glabratis. Lamina foliorum majorum 9–11 cm longa, 4.5–6 cm lata, elliptica vel obovata, basi cuneata, margine parum revoluta, apice obtusa vel rotundata, coriacea, supra primum appresso-tomentosa demum glabra, subtuts pertinaciter patulo-sericea, pilis rubris demum canescentibus, sessilibus, rectis vel leviter tortis, ± parallelis, usque 1 mm longis, abundantibus sed epidermidem non omnino tegentiibus, costa et 8–10 nervis lateralibus supra prominulis subuts prominentibus, venis tertiariis inter se subparallelis; petiolus 7–10 mm longus, sericeus demum glabratus; stipulae
10–11 mm longae, abaxialiter sericeae demum glabratae, adaxialiter glabrae, omnino connatae, pari linguiformi apice rotundato. Inflorescentia ca 10 cm longa (immatura), rufo-tomentosa, cincinnis lateralis 1–2(–3?)-floris, bracteis 5–7 mm longis, 2 mm latis (basalibus usque 10 mm × 4 mm), anguste triangularibus, patulis, abaxialiter appresso-tomentosis, adaxialiter glabris vel apice tomentosis, pedunculo florifero primario 2–3 mm longo, tomentoso, bracteolis bracteis similariibus, tantum 4–4.5 mm longis. Pedicellus tomentosus, in alabastro circinatus. Flores tantum in alabastro cogniti. Sepala glandulas 2.5–3 mm superantia, 2.5 mm lata, ovata, apice obtusa, appressa, abaxialiter dense tomentosa, adaxialiter sparsim tomentosa, omnia biglandulifera, glandulis albis, glabris. Petala alba? (vel fors an rosea), limbo abaxialiter rubro-pilos, margine integro vel denticulato, ungue (in alabasto) adaxialiter piloso. Filamenta abaxialiter glabra, adaxialiter praeicpe basi hirsuta, pilis rubris, basifixis, usque 2.5 mm longis; antherae glabrae, subaequales, loculis linearibus, non alatis, apice mucronulatis, longe superatis connectivo crasso glandulooso, connectivo antherarum petalis oppositum obtuso, sepalis oppositarum majore globosoquae. Ovarium glabrum, carpello antico sternili. Fructus ignotus.


This species is known only from the type, which is only in bud, but nevertheless seems to be quite distinct from all described species. It is distinguished by its short petioles, large, rounded stipules, persistently sericeous leaves, long bracts and bracteoles, pedunculate flowers, pilose petals, glabrous anthers with much enlarged connective and apically mucronate locules, and glabrous ovary with the anterior lobe sterile. The collectors of the type did not describe the color of the petals, but did say that the calyx glands were white; that, plus the fact that the other species of *Byrsonima* with similar anthers all have white or pink petals, makes me confident that *B. tilletti* will also prove to have white or pink petals. The epithet honors Stephen L. Tillet, one of the collectors of the type and student of Venezuelan botany.

32. *Byrsonima wurdackii* Anderson, sp nov

Arbor m alta, ramis sericeis mox glabratis. Lamina foliorum majorum 9.5–15 cm longa, 5–8 cm lata, obovata vel elliptica, basi cuneata, margine ± plana, apice obtusa vel rotundata et breviter acuminata vel apiculata, sparsim sericea mox glabra, supra vel utrinque glauca, nervis lateralis utrinque 5–9, subtus prominulis, supra prominentibus (et saepe venis tertiariiis scalariformibus); petiolum 16–25 mm longus, sericeus vel glabratus; stipulae 1.7–3.5 mm longae, abaxialiter sericeae vel glabrae, adaxialiter glabrae praeter basim hirsutam, connatae vel apice liberae, pari late triangulari, sulcato, apice acuto. Inflorescentia 16–24 cm longa, sparsim sericea, floribus rarior singulis plerunque 2–3(–4) fasciculatis (vero in cincinno sessili vel subsessili 2–3(–4)–floro), bracteis caducis non visis, pedunculo nullo, bracteolis 0.8–1.5 mm longis, 0.4–0.8 mm latis, lingulatis, caducis, tantum 2 visis. Pedicellus 5–7 mm longus (usque 10 mm in fructu), sericeus vel glabrescentis, rectus in alabastro, decurvatus in fructu, gracilis, etiam in fructu
Fig 23. *Byronima wurdackii*: a) Flowering branch, ×0.6; b) stipules, ×3.6; c) hairs, upper from abaxial surface of lamina, lower from pedicel, ×170; d) flower, ×5; e) androecium and gynoecium, claw of posterior petal shown for orientation, lower 4 stamens removed from flower above, ×7.2; f) immature fruit within accrescent calyx, ×4. Drawn from the type by Annette Seidenschnur Mahler.
tantum ca 0.6 mm diametro basi, usque 1.3 mm apice (siccus). Sepala 1.5–2.3
mm longa, 2–2.3 mm lata, apice obtusa et plerumque revoluta per anthesin, in
fructu acressentia et auriculata, utrinque sparsim sericea, eglandulosa vel glandu-
dulis rudimentarvis, immersis, usque 1.5 mm longis. Petala alba demum subrosea,
glabra, erosa. Filamenta 1.5–2 mm longa, libera, abaxialiter glabra, adaxialiter
basi hirsuta; antherae glabrae, 1.6–2.7 mm longae, loculis 0.6–1.2 mm longis, non
alatis, apice liberis et divergentibus, connectivo glanduloso, loculos 0.8–1.6 mm
superanti, erecto, apice rotundato. Ovarium glabrum, ca 1 mm altum, ovoideum,
carpe11 antico stéréi; st1yi 2.2–2.5 mm longi, in alabastro versus sepulum anticum
flexi. Fructus glaber, globosus, ca 6–7 mm diametro (siccus), nux paulo rugosa.

Type. Maguire & Wurdack 36406, sabanita 1 km E of Maroa, Río Guainía,
Amazonas, Venezuela, 130 m, 25 Nov 1953 flr (holotype MICH, isotypes NY,
US, VEN).

Paratypes. VENEZUELA. Amazonas: San Carlos, Río Negro, Dec ftt,
Schultes & López 9370 (F, GH, US). BRAZIL. Amazônas: Igarapé Jurupary,
afl. do baixo Uaupés, catenga, Sep flr, Ducke [RB 35611] (MICH, RB).

Byrsonima wurdackii is named for John J. Wurdack, student of Melastomata-
ceae and Polygalaceae and veteran collector of the plants of Guayana. It is notable
for the veins more prominent above than below, the long inflorescence, the very
early caducous bracts and bracteoles, the flowers occurring in clusters (very
reduced cincinnati), the calyx glands rudimentary or apparently absent, the large
connective of the anthers, and the small pendent fruit within the enlarged calyx.

There is a specimen of this species at IAN with a label that says “R. E. Schultes
9374.” It is supposed to be from Amazonas, Brazil. Dr. Schultes tells me that
this is an error, and that this is probably a duplicate of his 9370 from San Carlos,
Venezuela.


Small trees; stems sericeous to glabrate. Lamina of the larger leaves 8–12 cm
long, 4–5 cm wide, obovate, attenuate or cuneate at the base, abruptly acuminate
at the apex, initially sericeous (?) but glabrate at maturity, with 9–12 pairs of
lateral veins prominulous on both sides, the tertiary veins scalariform; petiole
10–15 mm long, very sparsely sericeous to glabrate; stipules 2–3 mm long, com-
pletely connate, the pair triangular, acute or obtuse, abaxially sericeous, adaxial-
ly hirsute at base. Inflorescence 6–10 cm long, sericeous, the flowers borne 1–2 per
bract; bracts and bracteoles 1.7–2.3 mm long, ca 0.8 mm wide, lingulate, caducous
before anthesis; peduncle none. Pedicel 3–3.5 mm long, loosely sericeous, some-
what circinate in bud. Sepals all biglandular, 1.5 mm long beyond the glands, 1.7
mm wide, triangular, obtuse, densely sericeous on both sides or glabrescent near
the margin, appressed in anthesis; glands ca 2 mm long. Petals “avermelhadas”
(white turning red? pink turning red?), glabrous. Filaments 1.5 mm long, abaxially
glabrous, adaxially hirsute at base; anthers 2–2.5 mm long, glabrous, the locules
0.8–1.2 mm long, cylindrical, non-alate, slightly divergent at the apex, the massive
connective exceeding the locules by 1–1.5 mm, rounded, straight or reflexed.
Ovary ca 1 mm high, glabrous, sulcate, with the anterior carpel sterile; styles 1.5
mm long, straight. Fruit unknown.

Type. Martius, Coari, Amazônas, Brazil, Nov flr (M, P).
Fig 24. *Byrsonima cowanii*. a) Flowering branch, ×0.45; b) flower, ×2.5; c) stamens, ×8; d) gynoecium, ×6.5; e) infructescence, ×0.5. Drawn by Melissa Marshall, a–d from the type, e from Maguire & Politi 28728.

Distribution. Known only from the type and the following recent collection. BRAZIL. Amazônas: Caatinga alta, Taraquá, Rio Uaupés, Nov flr, Pires 1107 (IAN, NY).
34. **Byrsonima cowanii** Anderson, sp nov

Frutex vel arbor 2–12 m alta, ramis sericeis mox glabratis, internodiis saepe brevissimis. Lamina foliorum majorum 15–25 cm longa, 7–13 cm lata, obovata, basi cuneata, margine paulo revoluta, apice breviamuminata, sparsim sericea mox glabratana, nervis lateralis utrinque 8–11, utrinque ± aequaliter prominentibus, multis venis tertiarioribus scalariformibus prominulis interconnessis; petioli 11–21 mm longis, sericeus mox glabratus; stipulae 4–7.5 mm longae, utrinque sericeae vel glabrae, late triangulares, amplexicaules, $\frac{1}{2}–\frac{4}{5}$ connatae, acutae, pari sulcato. Inflorescentia 17–35 cm longa, sericea vel demum glabrescens, floribus in cincinnis condensatissimis (1–)2–4-floris, bracteis (4–)5–6 mm longis, 1–1.6 mm latís, anguste triangularibus, sparsim sericeis, rectis vel apice paulo reflexis, per anthesis deciduis, pedunculo nullo, bracteolis 1–3.5 mm longis, 0.5–3 mm latiis, triangularibus, per anthesin deciduis. Pedicellus 6–8 mm longus, usque 12 mm in fructu, sericeus vel glabrescens, rectus in alabastro, rectus vel ascendens in fructu, ca 1.5 mm diametro in fructu. Sepala glandulas ca 1.5 mm superantia, 1.7–2.2 mm lata, triangularia, apice obtusa vel rotundata, appressa, in fructu elongata (fere linguiforme) et basi parum auriculata, utrinque sericea vel sparsim sericea, omnia biglanduliferaa, glandulas 2.5–3.5 mm longis, obovatis, compressis, apice revolutis. Petala "rosea" (primum alba demum rosea?), glabra, subintegra. Filamenta ca 2 mm longa, basi connata, abaxialiter glabra, adaxialiter in dimidio proximali hirsuta, pilis rubris et basifixis; antherae glabrae, 1.8–2.3 mm longae, loculis non alatis, (0.6–)0.8–1 mm longis, apice acutis sed non liberris, connectivo luteo, glanduloso, loculos 0.8–1.5 mm superantii, ± reflexo, apice rotundato vel obtuso. Ovarium glabrum, 1–1.5 mm altum, conicum, sulcatum, carpellis omnibus fertilibus; styli ca 1.5 mm longi, recti. Fructus glaber, globosus, 8–10 mm diametro (siccus), atrocyaneus (siccus), nux rugosa.

Type. **Wurdack & Adderley 43745**, laja, Caño Cupavén, Río Orinoco, opposite mouth of Río Atabapo, Amazonas, Venezuela, 125–150 m, 4 Aug 1959 flr/frt (holotype MICH, isotypes NY, US, VEN).

Paratypes. **VENEZUELA. Amazonas:** Formación arbustiva sobre la laja Cabezón al margen del río Cabezón, cerca de su desembocadura en el río Atabapo, 2–3 km S de El Meréy, Sep flr, **Foldats 3882** (NY, VEN); banks of Cuao River, above Cuao Creek, 125 m, Nov flr, **Maguire & Politi 27399** (MICH, NY, US, VEN); mixed montane forest, trail from Base Camp, Cerro Sipapo (Paráque), 125 m, Jan flr/frt, **Maguire & Politi 28601** (MICH, NY, US, VEN); mixed montane woodland, vic. Intermediate Camp, Cerro Sipapo, 600 m, Feb flr, **Maguire & Politi 28728** (MICH, NY, VEN).

This species is named in honor of Richard S. Cowan, student of Leguminosae and collector of many fine specimens in Guayana. It is especially notable for the very condensed cincinni with large, deciduous bracts and bracteoles and the straight or ascending pedicels.

35. **Byrsonima pachypoda** Anderson, sp nov

Figs 16n & 25.

Frutex 2–4 m altus vel arbor 8 m alta, internodiis brevibus glabris praeter axilllas hirsutas stipularum. Folia apice ramorum conferta; laminafoliorum majorum 6–14.5 cm longa, 3–8.3 cm lata, obovata, basi gradatim angustata, interdum rotundata, margine revoluta, apice late obtusa vel rotundata et interdum brevissime apiculata, coriacea, glaberrima, interdum leviter glauca, nervis lateralis ob-
scuris vel prominulis; petiolus 3–5(–7) mm longus, crassissimus, glaberrimus; stipulae 3–6 mm longae, triangulares vel ovatae, apice acutae vel obtusae, intra-petiolaritler inter se distinctae, interpetiolaritler breviter connatae, abaxialiter glabrae, adaxialiter dense ferrugineo-hirsutae. Inflorescentia 5–10 cm longa, sparsim sericea vel subtomentosa mox glabrescens, floribus singulis, bracteis 2.5–3 mm longis, 2–3 mm latis, ovatis apice acutis, sparsim sericeis vel glabris, post maturitate fructus persistentibus, pedunculo nullo, bracteolis bracteis similariibus, saepe paulo breviribus et plerumque angustioribus. Pedicellus ruber, 8–22 mm longus, distaliter dilatatus apice 2–3 mm diametro (siccus), tomentosus vel subsericus demum glabrescens, rectus in alabastro et fructu. Sepala rubra, glandulas 2 mm superantia, 2–3 mm lata, late ovata, in fructu paulo accrescentia et crassiora, apice obtusa vel rotundata, appressa, abaxialiter glabra praeter basim paucipilifera, adaxialiter glabra, omnia biglandulifera, glandulis 1.5–3 mm longis, obovatis, rubris demum denigricantibus. Petala alba actate rosea, glabra, 4 lateralia patentia vel reflexa ungue 2.5–3.5 mm longo, limbo 3.5–4 mm longo, 5–6 mm lato, cordato, margine sinuato subintegro; petalum posticum erectum, ungue 2.5–3 mm longo crassioreque, limbo 3–3.5 mm longo, 5 mm lato, corrugato. Filamenta 2.3–2.6 mm longa, abaxialiter glabra vel sparsim tomentosa, adaxialiter basi hirsuta; antherae glabrae, 1.6–2.2 mm longae, subaequales, loculis linearibus, non alatis, apice non liberis, connectivo tumido non vel brevissime (usque 0.1 mm) superatis. Ovarium conicum, 1.5 mm altum, glabrum, carpello antico sterali (semper?); styli 2.5 mm longi, omnes vel posteriores versus sepalum anticum flexi. Fructus glaber, globosus vel ovoideus, ca 8 mm diametro, primum ruber demum ater, carne tenui, nuce rugosa.


*Brysonima pachypoda* is named for its straight, red, enlarged pedicels. It is one of the few species in the genus to have white/pink petals and the connective not or hardly exceeding the locules of the anther. It is also notable for its glabrous, brittle, subsessile leaves crowded at the tips of the branches, and for the free stipules abaxially glabrous and adaxially densely hirsute.

36. *Brysonima steyermarkii* Anderson, sp nov

Arbor 6–7 m alta, ramis vegetativis glabras praeter axillas brevihirsutae stipularum. Lamina foliorum majorum 6.5–12.2 cm longa, 4.5–7 cm lata, obovata, basi rotundata vel paulo cordata, margine revoluta, apice late obtusa vel rotundata et plerumque apiculata, coriacea, utrinque glabra, nervis lateraliibus utrinque 6–9, obscuris vel prominulis; petiolus 3–5 mm longus, glaber; stipulae 3–5 mm longae, liberae, ovatae, abaxialiter glabrae, adaxialiter basi hirsute. Inflorescentia 2.5–10.5 cm longa, laxe sericea vel tomentosa, floribus singulis, bracteis bracteolisque

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Fig 26.
Fig 25. *Byrsonima pachypoda*. a) Flowering branch, × ca 0.8; b) leaf-bases and stipules, × 3.6; c) flower, × 3.6; d) androecium and gynoecium, with claw of posterior petal shown on left for orientation, the 5 separate stamens (right) removed from same flower, × 6; e) fruit, × 3. Drawn from Maguire 33396 by Annette Seidenschun Mahler.
Fig 26. Byrsonima rubrobracteata and B. steyermarkii. a–b, B. rubrobracteata: a) Flowering branch, ×0.5; b) stamens, ×7.5. c–h, B. steyermarkii: c) Fruiting branch, ×0.5; d) stipules, ×2.5; e) fruit, ×3; f) flower, ×3.5; g) stamens, left opposite petal, middle opposite sepal, ×7.5; h) gynoecium, ×7.5. Drawn by Karin Douthit, a–b from Tillett et al 45128, c–e from Cowan & Wurdack 31344, f–h from Steyermar 97979.
1.5–2.5 mm longis latisque, ovatis vel rotundatis, glabris vel margine ciliatis, post maturitatem fructus persistentibus, pedunculo nullo. Pedicellus 8–12 mm longus, 1 mm diametro (usque 1.5 mm in fructu), laxe sericeus vel tomentosus, in alabastro circinatus, in fructu rectus. Sepala omnia biglandulifera, glandulas 2 mm superantia, 2 mm lata, rotundata, abaxialiter basi brevihirsuta distaliter glabra, margine ciliata, adaxialiter glabra, per anthesin appressa, in fructu accrescentia et rubescensia, glandulis 2.5 mm longis. Petala alba, glabra, 4 lateralia ungue 2 mm longo, limbo 3–5 mm longo latoque; petalum posticum ungue 2.5 mm longo, limbo 3 mm lango latoque. Filamenta 2.2–2.5 mm longa, recta vel paulo curvata, abaxialiter glabra, adaxialiter hirsuta in dimidio proximali; antherae 1.4–1.6 mm longae, glabres, loculis 1–1.3 mm longis, cylindricis, non alatis, apice acutis, connectivo 0.3–0.5 mm superatis. Ovarium 1.2 mm altum, glabrum, sulcatum, loculis omnibus fertileibus; styli inaequales (semper?), anticus et 1 posticus 1.5 mm longi, alter posticus 2.1 mm longus. Fructus 5–7.5 mm diametro (siccus), viridis (immaturus?), glaber, globosus, sepalis accrescensibus revolutis rubescensibus subcentus, nuce rugosa.


Distribution. Known only from the type and the following paratype. VENEZUELA. Amazonas: Cerro Parú, cumbre, Rio Ventuari, 2000 m, Feb frt, Cowan & Wurdack 31344 (MICH, NY, VEN).

This species, named in honor of Julian A. Steyermark, is notable for the short petiole, rather large, coriaceous, revolute lamina with a rounded or cordate base, large stipules, and non-alate anther locules. Because of the persistent bracts and bracteoles and erect pedicel in fruit it is similar and probably rather closely related to Byrsonima concinna.

37. Byrsonima kariniana Anderson, sp nov

Frutex usque 4 m altus, internodiis vegetativis glabris (vero sericeis permox glabratis), nodis in axillis stipularum hirsutis pilis atrorubris basifixisque demum glabratis. Lamina foliorum majorum 6.5–10.7 cm longa, 3–5.5 cm lata, elliptica, basi cuneata, margine revoluta, apice rotundata, obtusa, vel brevissime acuminata, coriacea, utrinque glabra (vero sericea permox glabrat), supra vel utrinque glauca, nervis lateralibus utrinque costae 7–10, subtus prominulis supra obscurs vel rarius prominulis; petiolus 12–19 mm longus, sericeus permox glabratus; stipulae 3.4–5 mm longae, late triangulares, \(\frac{1}{2}–\frac{5}{5}\) connatae, pari medio sulcato, abaxialiter sericeae mox glabratae, adaxialiter glabre. Inflorescentia 6–13 cm longa, tomentosa demum glabrescens, floribus singulis, bracteis 2.5–7 mm longis, 2–4 mm latis, e basi ad apicum inflorescentiae deminuentibus, ovatis vel lanceolatis, patentibus, rectis vel rarius apice paulo revolutis, sericeis demum glabratis, post maturitatem fructus persistentibus, pedunculo nullo, bracteolis bracteis similariibus, tantum 2–3 mm longis latisque, late ovatis. Pedicellus 2.5–6 mm longus, 1.2–2 mm diametro, tomentosus pilis atrobrunneis, demum glabratus, rectus in alabastro, rectus (vel paulo decurvatus?) in fructu. Sepala glandulas 2.2–2.5 mm superantia, 2.5 mm lata, late triangularia, in fructu accrescentia et auriculata, apice obtusa vel rotundata, appressa, abaxialiter dense sericea demum glabrat, adaxialiter glabra vel sparsim tomentosa, omnia biglandulifera, glandulis 1.8–2.3
mm longis (−3 mm in fructu), anguste obovatis, compressis, apice paulo revolutis, basi interdum decurrentibus. Petala "rosea" (primum alba demum rosea?), glabra, erosa. Filamenta ca 3 mm longa, fere libera, abaxialiter glabra, adaxialiter in dimidia proximali hirsuta, pilis rubris et basifixis; antherae glabrae, 1.9–2.5 (−3) mm longae, subaequales, loculis lineariis, non alatis, 1.2–1.5 mm longis, apice acutis et breviter liberis, connectivo carnoso sulcato 0.7–1(−1.5) mm su-
peratis. Ovarium glabrum, carpello antico sterili; styli 2.5 mm longi (–3.2 mm in fructu) in alabastro versus sepalum anticum flexi. Fructus glaber, globosus, ca 10 mm diametro, atrocyaneus (?), glaucus, carne crassa, nuce ca 7 mm diametro, laevi vel paulo rugosa.

Type. Maguire & Politi 28021, summit, North Peak (IV), Cerro Sipapo (Páraque), 2000 m, Amazonas, Venezuela, 30 Dec 1948 flr/frt (holotype NY, isotypes MICH, VEN).

Distribution. Known only from the type locality. Paratypes: VENEZUELA. Amazonas, Cerro Sipapo, Dec–Jan: Forest near summit, Peak I, 5600 ft, frt, Maguire & Politi 27626 (NY); SE slope, savanna, Peak I, 5000–6000 ft, flr/imm frt, Maguire & Politi 27647 (NY); dissected terraces and low slopes, Peak IV, flr, Maguire & Politi 28139 (NY, VEN); Caño Profundo, vic. Caño Negro, 4800 ft, imm frt, Maguire & Politi 28273 (NY, VEN).

This species is rather similar to the eastern species Byrsonima chalcophylla, but it is easily distinguished by its glabrous leaves, persistent bracts and bracteoles, and glabrous ovary and fruit. It is also notable for its short, stout, straight pedicel. The epithet honors Mrs. Karin Douthit, the incredibly talented and patient artist who has illustrated this and many other species of neotropical vascular plants.


Small trees 2–8 m tall, sometimes shrubby, rarely less than 1 m tall; stems sericeous or tomentose to eventually glabrescent, the hairs turning from brown to gray. Lamina of the larger leaves 8–12 (–15.5) cm long, 3–4.7 (–5.2) cm wide, narrowly ovate or elliptical, cuneate or truncate at the base, mostly obtuse or slightly acuminate at the apex, rarely acute, usually glaucous below and sometimes glaucous above, thinly sericeous on both sides at first, glabrate at maturity or with some hairs persistent on the midrib, the numerous fine parallel lateral veins and reticulum prominulous above or on both sides; petiole 10–16 (–23) mm long, sericeous or tomentose to glabrate; stipules 2.5–4 (–5) mm long, ovate or triangular, free to nearly connate, abaxially sericeous, adaxially densely hirsute. Inflorescence 5–17 cm long, sericeous or tomentose, the flowers borne 1 per bract; bracts 2.5–4 mm long, 1–2 mm wide, narrowly triangular or lingulate, sparsely tomentose, especially on the margin, persistent past maturity of the fruit; peduncle none; bracteoles like the bracts but smaller. Pedicel 7–14 mm long, sericeous or tomentose, slightly circinate in bud, straight or slightly nodding in fruit. Sepals all biglandular, 1.5–3 mm long beyond the glands, 1.5–2.5 mm wide, ovate or distally lingulate, glabrous or ciliate on the margin and rarely bearing scattered hairs abaxially, reflexed in anthesis, accrescent and often turning red in fruit; glands 1.2–2.2 mm long, red, sometimes decurrent. Petals white, turning red in age, glabrous. Filaments 2–3 mm long, abaxially glabrous, adaxially hirsute at base; anthers 1.8–3.1 mm long, glabrous, the locules 1.8–3.1 mm long, linear, non-alate, often slightly detached at the apex, the connective shorter than the locules, equaling them, or exceeding them by up to 0.3 mm. Ovary glabrous, 0.8–1.2 mm high, sulcate, with all 3 locules fertile; styles 3.3–5 mm long. Fruit red or black, 4–5 mm in diameter (dried), depressed-globose, glabrous, the nut rugose.
Fig 28. Byrsonima coniophylla. a) Flowering and fruiting branches, ×0.5; b) stipules, ×3; c) flower, ×3; d) stamens, ×7.5; e) gynoecium, ×10; f) fruit, ×5. Drawn by Karin Douthit from Maguire et al. 36648.
Type. "Brasilia borealis" (holotype P, Field Mus. Neg. 35556).

Distribution. Sandy savannas from the Alto Orinoco south to the middle Río Negro. VENEZUELA. Amazonas: Río Casiquiare, Laguna Baciba, Fariñas et al 665 & 666 (NY, VEN); 2 km N de El Meréy, margen del Río Atabapo, Foldats 3873 (NY); Caño Guazuriapana, Río Atabapo near San Fernando, 150 m, Level L-99 (MICH, NY, VEN); NW base of Cerro Yapacana, 150 m, Maguire & Wurdack 34540 (MICH, NY, VEN); Sabana El Venado, on left bank of Caño Pimichin above Puerto Pimichin, Río Guainia, 140 m, Maguire & Wurdack 35645 & 36362 (NY); 50–60 km above mouth of Río Pacimoni, Maguire et al 36648 (MICH, NY, US, VEN), 36678 (MICH, NY, VEN), 41671 (MICH, NY, VEN); Sabana El Venado, above Pimichin, Maguire et al 41822 (NY); Río Atabapo, San Fernando, Medina 545 (VEN); Río Casiquiare, arriba de Solano, 100 m, Steyermark & Bunting 102443 (NY, VEN); Caño Monomí, Casiquiare, Vareschi 7786 p p & 7786a (both VEN); Río Atabapo, cerca Isla el Zapó, Vareschi & Jaffe 8007 & 8008 (VEN). COLOMBIA. Vaupés: Puerto Inirida, Río Inirida, García-Barriga 20846 (GH); Puerto Huesito, sabanas del Alto de la Cruz, García-Barriga 20889 (GH); 1 km W of Cacagual (Piedra Cacaguati), Maguire et al 36284 (NY); Cacagual Savanna, Río Atabapo between San Fernando and Caño Temi, Maguire et al 41433 (MICH, NY, US, VEN). BRAZIL. Amazónas: R. Curicuriari, Duque [RB 35608] (RB); Río Negro, Euniy, lago do Dondona, Fróes 22350 (IAN, UB); Río Uneixi, 35 km above mouth, Campina do Dodono, Prance et al 15440 (INPA, MICH, NY); Río Uneixi, 200–300 km above mouth, Prance et al 15536 (INPA, MICH, NY); Río Uneixi, 5 km above mouth, Prance et al 16171 (MICH, NY); Ilha Xibará, above Barcellos, Schultes & López 8893 (GH, IAN). Terr. Roraima: R. Xeriuini, Pires et al 13940 (IAN), 13986 (MICH), 14020 (MICH).

Collected in flower and fruit in most months.

Plants from near the Río Atabapo sometimes have atypically small leaves. This condition occurs in small plants, 0.7 m tall or shorter, which suggests that the small leaves are a phenotypic phenomenon of no taxonomic significance. The extreme of this is seen in García-Barriga 20889, which has very small, narrow leaves but floral characters of this species.


Shrubs or small trees 1–7.5 m tall; stems tightly sericeous to eventually glabrate. Lamina of the larger leaves 4–7(–8) cm long, 1.8–2.6(–3) cm wide, elliptical or slightly ovate, attenuate or cuneate at the base, usually short-acuminate at the apex, sometimes acute, not or only thinly glaucous below or above, initially sparsely sericeous, glabrate at maturity or sparsely sericeous below on the midrib, the many fine parallel lateral veins not or hardly distinguishable from the reticulum, obscure or prominulous on one or both sides; petiole 6–8(–10) mm long, sericeous to glabrate; stipules 1.8–2.8 mm long, acute or obtuse, free to nearly connate, the pair sulcate in the middle, abaxially sericeous, adaxially hirsute. Inflorescence 2–8 cm long, loosely sericeous, the flowers borne 1–2 per bract; bracts 1.5–2.7(–3.5) mm long, 1–2 mm wide, triangular, often red, persistent past maturity of the fruit; peduncle 0(–1) mm long; bracteoles like the bracts but smaller. Pedicel 6–8 mm long, loosely sericeous or tomentose, straight or slightly circinate in bud, straight or slightly nodding in fruit. Sepals all biglandular, 2–2.7
mm long beyond the glands, 1.8–2.7 mm wide, usually red or turning red in fruit, rounded at the apex, revolute in anthesis, abaxially usually thinly sericeous or tomentose, especially in the center, ciliate on the margin, adaxially sparsely tomentose, accrescent in fruit; glands 1.5–2.8 mm long, often pink, sometimes decurrent. Petals white, turning pink and then red in age, glabrous. Filaments 2.3–2.7 mm long, connate up to 1 mm, abaxially glabrous, adaxially sparsely hirsute at base; anthers 1.9–2.7 mm long, glabrous, the locules 1.7–2.7 mm long, linear, non-alate, sometimes detached at the apex, the connective equaling the locules or exceeding them by up to 0.3 mm. Ovary ca 1 mm high, glabrous, sulcate, with all 3 locules fertile; styles 3.5–4.4 mm long. Fruit 3–4 mm in diameter (dried), purplish red, glabrous, ovoid to depressed-globose, subtended by the accrescent, red or purplish calyx, the nut rugose.

Type. Forest Dept. 2387, Captain Creek, Mahaicony River, Demerara Co., British Guiana [Guyana] (holotype K).

Distribution. Sandy savannas from Guyana south and west to Roraima Territory. GUYANA. Kaieteur Plateau vic. Kaieteur Falls, 420 m, Cowan & Soderstrom 1871 & 1947 (NY); Rupununi Savanna, Goodland 908 (US); vic. St. Cuthbert’s Mission, 50 km S to SSE of Georgetown, Mori et al 8030 & Mori & Bolten 8289 (both MICH); Kaieteur Savanna, Sandwith 1297 (NY). SURINAM. Distr. Saramacca, Kappul savanna, ped. austr. mont. Tafelberg, Kramer & Heekening 2902 (NY). BRAZIL. Pará: Rio Parú de Oeste, 2°20’N, 55°45’W, Cavalcante 2510 & 2558 (MG, NY); R. Marapí, afl. do R. Parú, Ribeiro 411 (MICH); Porteira, Rio Trombetas, Ribeiro 459 (MICH); campos de Marapí, Rosa 58 (MICH). Terr. Roraima: Bôa Vista-Caracará, Black 51–13448 (IAN); Rio Cantá, Black 51–13929 (IAN); Anana savanna, Boyan 188 (INPA); 20 km E of Caracarái, Pires & Leite 14844 (IAN); R. Univini, Pires et al 14187 (MICH), l4191 (IAN), 14226 (MICH); R. Anauá, Pires et al 14486 (MICH).

Collected in flower and fruit in most months.

This species is similar and closely related to *Byrsonima coniophylla*. Their ranges seem to overlap only in southwestern Roraima Territory. There, in the region of Rio Xeriuni-Rio Univini, both species were collected by Pires et al, as well as one plant (*Pires et al 14228*) that combines the characters of the two and is probably a hybrid. These two species are a good example of a recurrent situation, in which related but distinguishable taxa from eastern and western Amazonia meet in southern Roraima and Amazônas north of Manaus. Sometimes there is minimal integradation, as in this case. In other cases, there seems to have been extensive hybridization and back-crossing, as in the *B. punctulata* complex. The pattern suggests to me that these species diverged from a common ancestor at a time when they were effectively isolated, and subsequently they have come back into contact. Since *B. coniophylla* and *B. eugeniifolia* are species of sandy savannas, perhaps they diverged in a wetter period when higher rivers and denser forests in Brazil isolated the savannas of the upper Orinoco from the savannas of Guyana.


Shrubs or trees 2–5(–10) m tall, the stems loosely sericeous or subvelutinous to glabrate. Lamina of the larger leaves 3.5–8.5 cm long, 2–4.5 cm wide, elliptical
or obovate or occasionally somewhat ovate, rounded or sometimes cuneate at the base, flat or slightly revolute at the margin, rounded or broadly obtuse at the apex, sericeous or tomentose above to usually glabrate at maturity, often with some hairs persistent on the midrib, dark and shining above when dried, sericeous to velutinous below, the sessile hairs with the arms appressed to erect, sometimes glabrescent but never completely glabrate in age, the lateral veins 5–8 on each side, prominent and often yellowish below, the reticulum often prominulous above; petiole 2–6 mm long, sericeous to velutinous, sometimes glabrescent; stipules 2–5 mm long, usually completely and smoothly connate, very rarely sulcate in the middle and free at the apex, the pair triangular, acute (rarely obtuse or rounded) at the apex, abaxially sericeous to glabrate, adaxially glabrous. Inflorescence 4–14 cm long, tomentose, a simple pseudoraceme or the flowers often 2 per bract but both sessile; bracts 1.5–3 mm long, 1.5–2 mm wide, triangular, sericeous to glabrate, persistent to maturity of the fruit and after; peduncle none; bracteoles like the bracts but slightly smaller, especially narrower. Pedicel 3–6 mm long, slender (ca 0.5 mm in diameter), sericeous to velutinous, straight in bud, decurved in fruit. Sepals abaxially sericeous, adaxially sparsely sericeous, strongly revolute, accrescent and turning red in fruit, all biglandular, the glands 1.5–3 mm long, obovate, compressed in flower, separated in fruit due to stretching of the receptacle and calyx. Petals white or pinkish, at least the claws, glabrous, subtentire, the margin undulate or slightly erose. Filaments 1.5–2.5 mm long, ± equal, quite distinct, adaxially bearded, especially on the proximal half, with long, kinky, twisted, ferruginous hairs; anthers glabrous, the locules cylindrical, 1.4–1.8 mm long, equalled or slightly exceeded at the apex by the connective, by up to 0.2 mm. Ovary 0.7–1 mm high above the receptacle, conical, glabrous, all 3 locules fertile; styles 2.5–3.3 mm long. Fruit glabrous, 4–4.5 mm in diameter, 3.5 mm high, broadly ovoid, green (immature) and displayed in the accrescent red calyx, developing half immersed in the enlarged, disc-like receptacle, popping out at maturity, the proximal half then enclosed in a white, fleshy, oily mesocarp, the distal half with very little flesh; nut 3-angled, rugose, 3-loculed, containing 3 seeds or fewer due to abortion.

Type. Humboldt & Bonpland, Isla Panumana inter Atures et Carichana, Missiones del Orinoco, Amazonas, Venezuela (P).

Distribution. Scrub forests on or beside crystalline "lajas" near the Alto Orinoco between Parguaza and Sanariapo. VENEZUELA. Bolívar: Parguaza, Velez 2446 (US). Amazonas: 10 km S of Puerto Ayacucho, Foldats 3583 (NY, VEN); 30–34 km S of Pto Ayacucho, 150 m, Gentry & Berry 14536 (MIC), 30 km N of Pto Ayacucho, Gentry & Berry 14719 (MIC); Pto Ayacucho, 100 m, Holt & Blake 776 (NY, US); Pto Ayacucho, Maguire et al 36069 (MIC, NY, US, VEN) & 36185 (MIC, NY, US, VEN); Sanariapo, 100 m, Maguire et al 36201 (MIC, NY, US, VEN); near Maypures, Spruce 3638 (NY); Sanariapo, Steyermark 58462 (NY); 35 km S of Pto Ayacucho, Steyermark & Huber 113863 (MIC); Pto Ayacucho, Wessels Boer 1901 (MIC), Williams 13036 (US, VEN), 13153 (US, VEN), & 15878 (MIC, MO, US, VEN). COLOMBIA. Vichada: Río Orinoco, Puerto Carreño, Cuatrecasas 4058 (US).

Collected in flower and fruit from April to June and September to November.

Bysonima nitidissima is notable for the tangled hairs of the filaments; these hairs are ± straight in most species of the genus. The fruit is unique, developing
immersed in a disc-like receptacle. It is not rare for the ovary of other species to be slightly immersed, but as the fruit enlarges it usually becomes quite superior.


Small trees 5–7(–10) m tall; stems densely velutinous or appressed-velutinous. Lamina of the larger leaves 8–16 cm long, 4–8 cm wide, ovate or occasionally elliptical or obovate, obtuse or rounded at the base, revolute at the margin, acute or obtuse or rarely rounded at the apex, usually glaucous below, glabrate above at maturity except tomentose at base on costa and margin, persistently and usually densely velutinous below, the hairs on tissue between the veins erect, ± straight, basifixed, the hairs on the veins denser, twisted, sub-basifixed, with 8–17 pairs of principal lateral veins arching and anastomosing within the margin, very prominent below, usually sunken above; petiole 11–20 mm long, densely tomentose or velutinous, often glabrescent in age; stipules 5–9 mm long, free, ovate and long-acuminate, densely hairy on both sides, abaxially glabrescent in age. Inflorescence 8–17 cm long, densely tomentose, rarely glabrescent in age, the flowers borne singly or in condensed cincinni of 2–3; bracts 1.5–2.5(–3.5) mm long, 1.5–2(–3) mm wide, triangular, tomentose, persistent past maturity of the fruit; peduncle 0.2 mm long; bracteoles like the bracts or smaller. Pedicel 3–7 mm long, densely tomentose, circinate in bud, decurved in fruit. Sepals all bispinose, 2 mm long beyond the glands, 2 mm wide, triangular, obtuse, abaxially densely tomentose, adaxially tomentose distally, appressed in anthesis; glands 2–2.5 mm long. Petals white, turning pink or red in age, glabrous, the lateral 4 with the claw 2 mm long, the limb 3.5–4.5 mm long, 4–5 mm wide; posterior petal with the claw 2.5 mm long, the limb 3–3.5 mm long, 4–4.5 mm wide. Filaments 2–3 mm long, abaxially glabrous, adaxially hirsute at base with short, straight hairs; anthers 1.5–2.3 mm long, glabrous, the locules 1–1.6 mm long, linear, tapered but not detached at the apex, the connective clavate, exceeding the locules by 0.5–0.9 mm. Ovary ca 1 mm high, glabrous, conical, sulcate, with all 3 locules fertile; styles 2–2.3 mm long. Fruit 5–6 mm in diameter (dried), red, ovoid or globose, glabrous, the nut rugose.

Type. Spruce 2073 (cited erroneously as 2973 in protologue), Rio Negro between Barcellos and São Gabriel, Amazônas, Brazil, Dec frt (holotype GOET? isotypes F! GH! MG!).

Distribution. Alto Orinoco to Alto Rio Negro. VENEZUELA. Amazonas: Rio Sipapo by Lorenzo Garces, Dec frt, Maguire & Politi 27851 (NY, VEN); sabanita, base of Cerro Moriche, Rio Venturi, Jan frt, Maguire et al 30833 (NY, VEN); river edge, laja 50 km above mouth of Rio Pacimoni, 100–140 m, Nov frt, Maguire et al 36656 (MICH, NY, US, VEN); riverine forest near Laja Catipan, Rios Pacimoni-Yatua, Feb frt, Maguire et al 37550 (NY); flumina Casiquiari, Vasiva, et Pacimoni, Spruce 3332 (GH, MG, NY); Rio Casiquiare, arriba de Solano, 100 m, Apr flr, Steyermark & Bunting 102445 (NY, VEN). BRAZIL. Amazônas: Rio Curicuriri, above Cachoeira do Cajú, Oct flr, Ducke [RB 25231] (INPA); Icana, Poço Aiary, Nov frt, Fróes 21385 (IAN, NY, US).

This species is hardly different (except in vesture) from the large-leaved populations of Byrsonima punctulata found in the area of San Fernando de Atabapo. Their close relationship seems assured, and since B. punctulata grades into or hybridizes with B. leucophlebia in the area of Manaus the three form a complex
of almost continuous variation that is divided into species only with some arbitrariness.


Small trees 2.5–9 m tall; stems densely tomentose or velutinous, eventually glabrescent. Lamina of the larger leaves 8.5–14.5 cm long, 4–8 cm wide, ovate or elliptical, obtuse or rounded at the base, revolute at the margin, obtuse or acute at the apex, sometimes rounded or slightly acuminate, glaucous or not below or above, glabrate above at maturity except often tomentose at base of costa and on margin, sparsely tomentose to glabrate below between the veins, densely tomentose on the principal veins, most densely so on the midrib, to glabrate, often black-punctate below (fungal fruiting bodies?), with 8–12 pairs of principal lateral veins arching and anastomosing within the margin, prominent below, flush or sunken above, the reticulum usually ± concolorous with the areolar tissue; petiole 10–19 mm long, densely tomentose, often glabrescent in age; stipules 3.5–7(–8) mm long, free, triangular or ovate and often acuminate, densely hairy on both sides, abaxially glabrescent in age. Inflorescence 9–18 cm long, densely tomentose, the flowers borne singly or in condensed cincinni of 2–3; bracts 1.5–3 mm long and wide, triangular or ovate, tomentose, persistent past maturity of the fruit; peduncle 0–2 mm long; bracteoles like the bracts or smaller. Pedicel 2.5–5(–6) mm long, densely tomentose, circinate in bud, usually decurved in fruit. Sepals all biglandular, 2–2.5 mm long beyond the glands, 2–2.5 mm wide, triangular, obtuse, abaxially densely tomentose, adaxially tomentose distally, apressed in anthesis, reddening and somewhat accrescent in fruit; glands 2–3.5 mm long, red, sometimes decurrent. Petals white, turning pink and then red in age, glabrous. Filaments 2–3 mm long, abaxially glabrous, adaxially sparsely hirsute at base with short, straight hairs; anthers 1.4–2.5 mm long, glabrous, the locules 0.9–1.5 mm long, linear, tapered but not detached at the apex, the connective clavate, exceeding the locules by (0.3–)0.4–1 mm. Ovary 1–1.3 mm high, glabrous, conical or ovoid, sulcate, with all 3 locules fertile; styles 2–2.5 mm long. Fruit (dried) 4–6 mm in diameter, red or eventually blue, glabrous, ovoid or globose, subtended by the red calyx, the nut rugose.

Type. "Brasilia borealis" (P).

Distribution. Upper Orinoco and Vaupés to Manaus. VENEZUELA. Amazonas: Caño Cupueni, opposite mouth of Río Atabapo, 120–130 m, Maguire et al 36217 (MICH, NY, US, VEN) & 37698 (MICH, NY, US, VEN); San Fernando de Atabapo, 124 m, Williams 13829 (F) & 13839a (F, VEN). COLOMBIA. Vaupés: along Río Vaupés about 1 km below Urania, Zarucchi 2235 (MICH). BRAZIL. Amazônas: Río Cuieiras, 50 km upstream, Campbell et al P21837 (MICH); Río Preto, Frões 22736 (IAN, UB) & 22882 (IAN); Río Urubú, Frões 25322 (IAN); Bôa Vista, Río Aracá, Frões & Addison 29064 (IAN); Río Tarumá, Gentry & Ramos 12895 (MICH); R. Negro, Pena 446 (MICH); Río Cuieiras and R. Brancinho, Prance et al 14882 (MICH, NY), 17868 (MICH), 18022 (MICH). Terr. Roraima: R. Xeriuini, Pires et al 13967 (MICH); R. Catrimani, Igarapê Camogi, Pires et al 14058 (MICH); Río [Agua Bôa do] Univini, Pires et al 14173 (IAN).
Morphologically and geographically this species fills in the gap between *Byronima cuprea* and *B. leucophebia*. It seems to have no characteristics peculiar to it, except for the black dots, probably fungal in origin, often present on the lamina below. In the area of Manaus *B. punctulata* and *B. leucophebia* seem to hybridize, with the following collections intermediate; I am calling these *B. punctulata* sens lat: Tarumã-miry, campina, Dec flr, Ducke [MG 12420] (MG); Rio Tarumã, igapô, Aug flr, Fröes 25043 (IAN); Rio Urubú, prox. cach. Lindoia, Dec flr, Rodrigues 299 (IAN, MG); Rio Cuieiras, igarapé Cachoeira, Nov flr, Rodrigues & Coelho 4875 (MG).

Collected in flower and fruit from September to April.


Shrubs or small trees 2–5(–8) m tall; stems densely sericeous or tomentose, eventually glabrescent. Lamina of the larger leaves 5–9(–10.5) cm long, 3–4.5 (–5) cm wide, ovate or elliptical, obtuse or rounded at the base, usually not or hardly revolute at the margin, obtuse or rounded at the apex, rarely acute or slightly acuminate, glaucous or not below or above, sparsely tomentose or glabrate on both sides at maturity except usually persistently tomentose on the midrib, with 7–12 pairs of principal lateral veins promonilous below and flush above, the fine reticulum visible (in dried leaves) below or, usually, on both sides as a white mesh against darker areoles; petiole 5–11 mm long, densely tomentose, often glabrescent in age; stipules 1.5–2.5(–3) mm long, free, triangular, acute or obtuse, densely hairy on both sides, abaxially glabrescent in age. Inflorescence 5–10(–12.5) cm long, densely tomentose, the flowers borne singly or in condensed cincinni of 2–3; bracts 1–2 mm long, 1.5–2.5 mm wide, triangular or ovate or rounded, tomentose, persistent past maturity of the fruit; peduncle 0–2 mm long; bracteoles like the bracts or smaller. Pedicel 2.5–7.5 mm long, densely tomentose, cincinnate in bud, usually decurved in fruit. Sepals all biglandular, 1.5–2 mm long beyond the glands, 1.5–2 mm wide, triangular, obtuse or rounded at the apex, abaxially densely tomentose, adaxially tomentose distally, appressed in anthesis, somewhat accrescent in fruit; glands 2–3 mm long, red, sometimes decurrent. Petals white, turning pink or red in age, glabrous. Filaments 2–2.5 mm long, abaxially glabrous, adaxially sparsely hirsute at base with short, straight hairs; anthers 1.4–2.2 mm long, glabrous, the locules 1.1–1.6 mm long, linear, tapered but not detached at the apex, the connective clavate, exceeding the locules by 0.3–0.7 mm. Ovary ca 1 mm high, glabrous, ovoid, with all 3 locules fertile; styles 2–2.3 mm long. Fruit (dried) 4–5 mm in diameter, red or eventually black, glabrous, ovoid, the nut rugose.

Type. Spruce 764 in 1850, Santarém, Pará, Brazil, Aug flr (holotype GOET?, isotypes F! MG! NY!).

Distribution. Central and eastern Amazonia, north into Bolívar. VENEZUELA. Bolívar: Canaima, 300 m, Agostini 260 (MY, NY, VEN); near Laguna of Canaima, Hertel et al. 15212 (VEN); Angel Falls, Kunhardt 18 (NY); Rio Carrao, Canaima, Trujillo 6082 (MY); Canaima, 400 m, Steyermark 106378 (NY); Canaima, Tejera & Braun 11 (VEN). BRAZIL. Pará: Belterra, Lago Jururucuí, Black 47–1769 (IAN); Rio Jamundá, Ducke [MG 3737 & 11793] (both MG); Faro, praia do lago, Ducke [MG 6903 & 8473] (both MG); Santarém, Ducke [MG 10840] (MG); campos do Mariapiaxy, Ducke [MG 11970] (MG); Lago Preto de Juruti,
Oliveira 43 (IAN); Rio Arapiuns, Pires & Silva 4357 (IAN); Rio Capim, N. T. Silva 459 (IAN, UB). Maranhão: Rio Gurupi, Fróes 34541 (IAN). Amazônas: Rio Urubú, São Francisco, Fróes 25504 (IAN, UB); Rio Madeira, Rio Canumã, Fróes 33742 (IAN); Maués, Pires 89 (IAN); Km 55, Humaitá-Lábrea, between Rio Ipixuna and Itaparana, campina, Prance et al. 3311 (MICH, NY); Km 201, Manaus-Itacoatiara, banks of Rio Urubú, Prance et al. 3690 (MICH, NY); Maués, beach, N. T. Silva 4494 (MICH). Terr. Rondônia: 2–4 km E of Abunã, savanna island, Prance et al. 8595 (MICH, NY).

Collected in flower and fruit in all months, most commonly from June to November.

See discussion under Byrsonima punctulata.


Shrubs or trees with coriaceous leaves bearing abaxial glands; stipules intrand epipetiolar, completely connate, coriaceous, persistent on the petiole. Inflorescence terminal, single or 2–3 together, each usually divided near the base into 3(–5) axes, each axis 4–20 cm long, a raceme of short cincinni, the bracts and bracteoles persistent, the lowest bracteole and alternate subsequent bracteoles bearing a large eccentric abaxial gland. Flower buds circinate, spheroid, the outermost petal completely covering the others. Sepals appressed in anthesis, all biglandular, the glands obovate, compressed. Petals glabrous, pink or white, strongly dimorphic, the lateral 4 with an eglandular limb borne on a slender, strongly recurved claw, the posterior with the limb at least basally glandular and borne on a thick, erect claw. Receptacle glabrous on both sides of the stamens. Filaments opposite the sepals slightly longer than those opposite the petals, glabrous, connate at the base; all 10 anthers fertile, subsimilar, glabrous, the locules linear, quite distinct, rounded at the apex, often exceeded at the apex by the thick, fleshy connective. Ovary of 3 completely connate carpels, 1 ± anterior and 2 ± posterior, 3-locular but 1 of the posterior locules empty and smaller; styles 3, apical, inbent in bud, ± straightening in anthesis, slender and subulate, that of the sterile carpel slightly shorter than the other 2, the stigma slightly internal and decurrent. Fruit an indehiscent fibrous or aerenchymatous nut, dry at maturity and without a stone, usually containing only 1 locule completely filled by 1 seed (through abortion of the other ovule and collapse of its locule and the sterile locule); seed spheroid, the cotyledons thick, 1 folded back lengthwise, the other embracing it.

Type. Burdachia prismatocarpa Adr. Jussieu.

Burdachia comprises four species of Amazonia and Guyana, all of which are treated below. They are usually found by rivers or in low, periodically inundated places ("igapós"), and it seems probable that the indehiscent fruits, which are dry and buoyant at maturity, are adapted to dispersal by water.

Key to the Species of Burdachia

1. Fruit conoid to spheroid, round in cross section, the walls smooth; leaves and vegetative stems glabrous; stipules abaxially glabrous; peduncle glabrous or with a few hairs in a line; ovary depressed-globose.

1. B. sphaerocarpa.
1. Fruit pyramidal, bearing 8–9 longitudinal ribs, these extended at the base into knobs or spurs; leaves minutely sericeous or tomentose below to glabrate, some hairs usually persisting on the midrib; vegetative stems sericeous to glabrate; stipules abaxially sericeous to glabrate; peduncle sparsely to densely sericeous; ovary conoid.

2. Largest leaves mostly wider than 6 cm, up to 14 cm; stipules 6–10 mm long; fruits 14–20 mm long.  
\[2. \textit{B. prismaticarapa}.\]

2. Largest leaves mostly less than 6 cm wide; stipules 3–5 mm long; fruits up to 12 mm long.

3. Hairs on lamina sessile, straight, strongly appressed, ± persistent; pedicel proper (i.e. beyond the joint) glabrous; ovary and fruit glabrous.  
\[3. \textit{B. williamsii}.\]

3. Hairs on lamina short-stalked, ± serpentine, loose, deciduous, the mature lamina often glabrate except for midrib; pedicel loosely sericeous to glabrate; ovary densely tomentose; fruit tomentose to glabrate.  
\[4. \textit{B. duckei}.\]


Small trees 3–8 m tall, the younger vegetative stems strongly flattened and glabrous, becoming terete in age. Lamina of the larger leaves (8–)10–23 cm long, 5–10(–11.5) cm wide, ovate, elliptical, or obovate, cuneate, rounded, or slightly cordate at the base, thickened and revolute at the margin, acute or short-acuminate to rounded and often apiculate at the apex, glabrous, usually bearing 2 large glands below at base by midrib and many scattered tiny impressed glands distally, the lateral veins and often a coarse reticulum prominent below, prominent or obscure above; petiole 9–25 mm long, thick, glabrous, eglandular (except for the pair of glands at juncture of lamina and petiole); stipule-pair 5–9(–11) mm long, ovate, auriculate at the base, acuminate at the apex, coriaceous, abaxially glabrous, adaxially densely orange-hirsute. Inflorescence tomentose-sericeous to glabrate, erect or pendent in fruit, single or double, simple or divided at the base into 3(–5) axes, each cincinnus of 1–2(–6) flowers, the bract and bracteoles 1–2.5 mm long, broadly ovate or triangular, concave, abaxially glabrous, adaxially hirsute at the base; peduncle of the cincinnus glabrous or with a few hairs in a line. Pedicel 5–11(–13) mm long, glabrous, thickened in fruit. Sepals 1.5–2 mm long beyond the glands, 1.7–2.5 mm wide, broadly obtuse or rounded, membranous at the margin, glabrous, the glands 2–3 mm long. Lateral petals with the claw 4–6 mm long, the limb 6.5–9.5 mm long, 7–11 mm wide, deeply concave (outermost) to nearly flat, orbicular, deeply cordate at the base, entire or slightly erose; posterior petal with the claw 4 mm long, the limb 4–5 mm long, 3 mm wide, flat or distally reflexed, ovate or oblong, bearing 2–4 large stalked pendent glands on each side at the base and several sessile glands distally, these continuous over the apex or not. Filaments 1.5–2.2 mm long; anthers 2–4 mm long, variable in the same flower but generally longer opposite the sepals, the connexive equaling the locules at the apex or extended up to 1 mm in an obtuse or rounded, erect or reflexed projection. Ovary depressed-globose, 1–1.5 mm high, glabrous; styles 4–6 mm long, glabrous. Fruit 15–28 mm long, 11–17 (–19) mm in diameter, spheroid to conoid, rounded at the base, smooth-sided and round in cross section, usually ± rostrate at the apex, “green” drying brown, glabrous, with a thick fibrous husk, 1-seeded.

Type. \textit{Martius}, Barra do Rio Negro [Manaus], Amazonas, Brazil (P, M).

Collected in flower and fruit in diverse months, especially from March to June and September to December.
This species has populations in two disjunct areas, in both of which occur similar variations in size and shape of leaves and fruits. However, plants of the two areas do seem to differ consistently in the color of their petals, insofar as it has been noted by collectors, and that may represent a significant adaptation to different pollinators. I am recognizing two varieties on the basis of that difference, with the special purpose of emphasizing the peculiar distribution of the species. More complete collection may eventually erode the bases for recognizing these varieties.

The collections cited by Cuatrecasas (1958, p 636) as Burdachia sphaerocarpa are treated here as *B. prismatocarpa* var *loretoensis*.

**Key to the Varieties of Burdachia sphaerocarpa**

1. Petals pink; westernmost Pará and Amazônas, Brazil.  
1a. var *sphaerocarpa*.  
1b. var *glandifera*.

**1a. Burdachia sphaerocarpa** Adr. Jussieu var *sphaerocarpa*


**Distribution.** VENEZUELA. Amazonas: 0–0.5 km NE of San Carlos de Río Negro, secondary forest and open areas, elev 120 m, Liesner 3685 (MICH). BRAZIL. Amazônas: terra firme, capoeira, Igarapé de S. Raimundo, Manaus, Almeida [INPA 3103] (INPA); primary forest, terra firme, 5 km upstream from junction of Rios Cuieiras and Branquinho, Campbell *et al* P21924 (MICH); Barcelos, Rio Domani, Duarte 7159 (INPA); Parintins, Ducke 142 (A); Ducke 142a (NY); igapó, Borba, Rio Madeira, Ducke 461 [RB 34636] (A, MO, NY, RB, US); margem, Igarapé da Cachoeira Grande, Ducke 780 (INPA, MO, NY, RB, US) & 793 (MO, NY, US); terra firme, margem do Rio Ícana, Frões 21413 (IAN, NY, US); W bank of Rio Negro, N of Manaus, Gentry & Ramos 12891 (MICH); praia alagável do rio, Maués, Pires 37 (NY); forest on terra firme, Rio Cuieiras just below mouth of Río Brancinho, Prance *et al* 14996 (MICH, NY); high muddy river bank, Rio Negro between mouth of Río Caurés and Barcelos, Prance *et al* 15138 (MICH, NY); Rio Cuieiras above mouth of Rio Brancinho, flooded river bank, Prance *et al* 17728 (MICH); margem do Rio Purus, Cachoeira de Lindóia, Rodrigues 308 (INPA); carrasco arenoso, Manaus, Rodrigues 984 (INPA, US); Ponta Negra, Manaus, Rodrigues & Coelho 2087 (INPA); Porto de Manaus, baixo Rio Negro, região de Cacau-Pirera, Rodrigues & Jaccoud 8886 (INPA); Manaus, Schwacke III 266 (RB); Pará: praia do Lago de Faro, Ducke [RB 14189] (RB).

The collection from Rio Ícana, Frões 21413, has unusually wide leaves and 2–6 flowers in each cincinnus instead of the 1–2 found in most plants of *Burdachia sphaerocarpa*. Perhaps it deserves recognition as a variety, but that would best await further collection, especially of material with flowers.

**1b. Burdachia sphaerocarpa** var *glandifera* (Gleason) Anderson, comb et stat nov


**Type.** *De La Cruz 3515*, Amakura River, Northwest District, 8°10ʹN, 60°W, British Guiana [Guyana] (holotype NY! isotypes F! MO!).
Distribution. GUYANA. Overhanging Francois Creek, Mahaicony River, Davis 177 (NY); upper Mazaruni River, ca 60°10'W, De La Cruz 2043 (F, MO, NY, US) & 2176 (F, MO, NY, US); Kamakusa, upper Mazaruni River, ca 59°50'W, De La Cruz 2869 (F, MO, NY); type, q v; overhanging water, just below mouth of Tipuru inlet, Essequibo River, Forest Dept. 6110 (NY, US); Lama (?) Creek, Jenman 3779 (NY); Jenman 6413 (E, NY); riverside, sandy soil, Bootooba, Demerara River, Persaud 31 (F); Persaud 53 (F); riverside, Mallali, Persaud 177 (F, NY).


Key to the Varieties of Burdachia prismatocarpa

1. Ovary densely tomentose or sericeous; fruit tomentose or sericeous to glabrate; connectives of most anthers much exceeding the locules, the projection reflexed; fruit with very pronounced longitudinal ribs or winglets and basal projections. 2a. var prismatocarpa.

1. Ovary and fruit glabrous or at most sparsely sericeous; connectives of most anthers about as long as the locules; fruit with low, rounded ridges and short basal projections.

2b. var loretoensis.

2a. Burdachia prismatocarpa Adr. Jussieu var prismatocarpa  Fig 29a–d.

*Burdachia prismatocarpa* var argutivinosa Cuatrecasas, Webbia 13: 636.1958. Type Cuatrecasas 7248, Mitú, Río Vaupés, Colombia (holotype US! isotypes COL, F! NY!).

Shrubs or trees 2–15 m tall, the vegetative stems sericeous to glabrate. Lamina of the larger leaves 11–21 cm long, 6–12(–14) cm wide, ovate or elliptical, mostly rounded or cordate at the base, flat or slightly revolute at the margin, mostly obtuse or rounded at the apex, often emarginate and then sometimes apiculate, glabrate above, sparsely but ± persistently sericeous below, the hairs short, fine, sessile, bearing 2 large glands below at the base on the midrib and few to many tiny impressed glands distally scattered or concentrated along the midrib, the lateral veins strongly parallel and prominent below, the reticulum prominulous on both sides; petiole 10–25 mm long, thick, sericeous to glabrescent, eglandular; stipule-pair 6–10 mm long, ovate or triangular, acuminate to broadly rounded at the apex, concave to flat or slightly revolute and often thin at the margin, abaxially sericeous to glabrate, adaxially densely orange-hirsute in the proximal half, hirsute or glabrous distally. Inflorescence tomentose-sericeous, each cincinnus of 1–2 (–3) flowers, the bract and bracteoles 1–3 mm long, ovate, membranous at the margin, glabrous or sparsely sericeous, the bracteoles usually borne near the base of the peduncle; peduncle of the cincinnus often sericeous, especially distally. Pedicel 6–10(–12) mm long, glabrous, lengthened and thickened in fruit. Sepals 1.5–2 mm long beyond the glands, 1.5–2 mm wide, broadly obtuse, membranous at the margin, glabrous, the glands pink, 2.5–3 mm long. Petals pink or white, the lateral 4 with the claw 3–4 mm long, the limb 5–7.5 mm long, 5–8 mm wide, orbicular, deeply to shallowly concave, cordate, erose; posterior petal with the claw 2.5–3.5 mm long, the limb 3–4 mm long, 3–4 mm wide, flat or distally reflexed, ovate, bearing large, usually stalked glands at the base and smaller,
Fig 29. Burdachia prismatocarpa and Glandonia williamsii. a–d, Burdachia prismatocarpa var prismatocarpa: a) Flowering branch, ×0.3; b) flower, ×3.6; c) stamens, ×5; d) fruit, ×0.6. e–k, Glandonia williamsii: e) Leafy branch, ×0.3; f) stipules, ×1.2; g) inflorescence, ×0.6; h) cincinnus with bud, ×3; i) flower, ×2; j) stamens, ×5; k) fruit, ×0.6. Drawn by Melissa Marshall, a–c from Maguire et al 31025, d from Wardack & Monachino 39778, e–f from Williams 14154, g–j from Maguire et al 36493, k from Maguire et al 37554.
sessile glands distally, the glands usually continuous over the apex. Filaments 1.3–2 mm long; anthers 2–3 mm long, variable in the same flower, the connective projecting beyond the locules up to 1 mm, the projection obtuse or rounded, usually reflexed. Ovary conoid, ribbed, ca 1.5 mm high, densely sericeous or tomentose; styles 3–4.5 mm long, sericeous at the base. Fruit 14–20 mm long, 10–18 mm in diameter, pyramidal, bearing 8–9 longitudinal aerenchymatous ribs or winglets (3 per carpel), these usually extended as spurs and often interconnected at the base, rostrate at the apex, green drying brown, tomentose to glabrate, the wall composed of much aerenchyma reinforced by fibers, containing 1 seed (rarely 2).

Type. *Martius*, Tefé, Brazil (M?).


Collected in flower mostly from August to March (especially October to December) and in fruit from November to June (especially February to May).

Fruits that seem to be adapted for dispersal by water have evolved in many Malpighiaceae that grow in the Amazon region, but none is more impressive in
that respect than the fruit of Burdachia prismatocarpa. Its wall produces a number of ribs or winglets that are composed mostly of aerenchyma, so that the mature fruit is dry, light, and very buoyant. It is worth noting that these ribs are developed in positions that correspond to the lateral and dorsal wings in mascagnoid genera. If the structures are homologous, Burdachia might constitute an intriguing link between the byrsosnímid genera and the wing-fruited genera.

2b. Burdachia prismatocarpa var loretoensis Anderson, var nov

Differt a Burdachia prismatocarpa var prismatocarpa limbo petali postici in dimidio proximali utrinque ca 9 glandulis parvis instructo, distaliter eglanduloso, connectivis antherarum loculos apice aequantibus vel paulo superantibus, ovario fructuque glabro vel sparsim sericeo, et fructu crisitis longitudinalibus humilibus rotundatisque et umbonibus basalibus brevioribus.

Type. Woytkowski 5146, banks of Rio Nanay, elev 100 m, Dept. Loreto, Peru, 8 Dec 1958 flr/imm flr (holotype US, isotypes F, MO).


This is the plant that Cuatrecasas called Burdachia sphaerocarpa in his Prima Flora Colombiana.


This plant has the small leaves, stipules, and fruits of B. duckei, the ovary glabrous, the inflorescence usually pendent (?), and otherwise resembles B. prismatocarpa var prismatocarpa. It occurs between San Fernando de Atabapo and Cucui, an area from which B. prismatocarpa is not known although it occurs north and south of there. Near San Fernando two collections have been made which suggest that B. williamsii and B. prismatocarpa may hybridize (Gentry 10967 and Level L-100). Burdachia williamsii is a rather weak segregate and might be better treated as a variety of B. prismatocarpa.

Type. Ll. Williams 14321, Maroa, Río Guainía, Amazonas, Venezuela, 13 Feb 1942 (holotype F! isotypes A! US!).

Distribution. VENEZUELA. Amazonas: E-W caño north of Cerro Yapacana, from gold mine trail to Río Orinoco, elev 130 m, Maguire et al 30775 (MICH, NY, US, VEN) & 30792 (NY); Caño Arapacua, Río Pacimoni, elev 120 m, Maguire & Wurdack 34888 (MICH, NY, US, VEN); Casiquari, Vasiva, and Pacimoni Rivers, Spruce [3425] (GH); Río Temi, Yavita, Steyermark & Bunting 102966 (NY, VEN); Maroa, Guainía, Alto Río Negro, Ll. Williams 14320 (VEN), type q v, 14447 (F, MO, US, VEN), 14806 (US, VEN).

Collected in flower from January to April, in fruit in March and April.
4. **Burdachia duckei** Steyermark, Fieldiana Bot. 28: 283. 1952.

*Burdachia prismaticarpa* β *spruceana* Grisebach in Martius, Fl. Bras. 12(1): 23. 1858. Type. 
*Spruce* 1659, prope Barra [Manaus], Rio Negro, Amazônas, Brazil, Jul 1851 (holotype GOET? isotypes GH! NY!).

Lamina of larger leaves 6–13 cm long, 3–6 cm wide, revolute at the margin, loosely sericeous or tomentose to glabrescent with short-stalked, ± serpentine hairs, bearing 2 small glands below at base and no to relatively few tiny distal glands, mostly near the midrib; stipules 3–5 mm long, strongly concave. Inflorescence often pendent. Pedicel loosely sericeous to glabrate. Petals pink. Ovary densely tomentose. Fruit 9–11 mm long, 8–9 mm in diameter, the ribs only moderately developed (not extended into corky winglets), tomentose to glabrate. Otherwise similar to *B. prismaticarpa* var *prismaticarpa* and *B. williamsii*.

This species has the smallest leaves and fruits of any *Burdachia*. It is closely related to *B. prismaticarpa*, the two apparently occurring together near Manaus without hybridizing. Perhaps where populations are sympatric their flowering is allochronic; also, *B. duckei* seems to grow more often in igapós than along permanent streams.

Grisebach’s epithet *spruceana* was presumably assigned the rank of forma by Niedenzu, Arb. Bot. Inst. Ak. Braunsberg 5: 60. 1914. I have not seen that publication.

Type. *Ducke* 522, Igarapé da Cachoeira Grande, Manaus, Amazônas, Brazil, 14 Jul 1937 (holotype F! isotypes MO! NY!).

Distribution. By streams and in igapós above and below Manaus, between Barcelos and Rio Urubú. BRAZIL. Amazônas: Barcelos, Duarte 7161 (INPA); type, q v; Rio Cuieiras, 50 km upstream, Kubitzki et al P21729 (MICH); Manaus, igarapé do Tarumã, Mello 4029; Rio Urubú, Prance et al 3680 (MICH, NY) & 4735 (MICH, NY): Rio Cuieiras just below mouth of Rio Brancinho, Prance et al 14893 (MICH, NY); Rio Brancinho, Rio Cuieiras, Prance et al 17867 (MICH); Manaus, Rio Tarumãzinho, Prance & Lleras 23741 (MICH): Rio Cuieiras, Rodrigues 6727 (INPA); Manaus, Cachoeira Baixa do Tarumã, Rodrigues s n [INPA 1177] (INPA); Manaus, Cachoeira Alta do Tarumã, Rodrigues & Lima 2254 (INPA); Rio Negro, Ilha Gavião near mouth of Rio Branco, Schultes 24531 (INPA); near Manaus, Spruce [1659] (GH, NY); Manaus, Cachoeira Grande, Ule 8880 (MG). Terr. Roraima: R. Xeriuini, Pires et al 13921 (MICH).

Collected in flower most often from May to September, but in fruit in March, April, September, and December, which suggests some flowering in January and February.


Shrubs or trees; leaves often bearing abaxial glands; stipules interpetiolar, linear, the adjacent stipules from opposite leaves connate in pairs, the 2 pairs at each node conduplicate and equitant over the apical bud, caducous, the members of a pair often splitting apart before falling off. Inflorescence terminal, usually simple, a raceme of short cincinni, the bracts and bracteoles persistent, the lowest bracteole and alternate subsequent bracteoles bearing a large eccentric abaxial gland. Flower buds circinate, conical or pyramidal, the outermost petal completely covering the others. Sepals all biglandular, the glands obovate, com-
pressed. Petals strongly trimorphic, the outermost with the limb conical-galeiform, its claw recurved after anthesis, the other 3 laterals flat or crumpled or folded, recurved, the posterior with the flat or reflexed limb borne on a stout, erect claw. Receptacle glabrous on both sides of stamens. Filaments very short, connate at base, densely hirsute on both sides; all 10 anthers fertile, similar, subulate, the locules linear, quite distinct, tapering at the apex into 2 sterile awn-like extensions ca 0.5 mm long, exceeding the slender connective. Ovary with 3 completely connate carpels, 1 anterior and 2 posterior, all 3 locules fertile; styles 3, apical, inbent at the apex in bud, never fully straightened, subulate, the stigma minute and terminal. Fruit an indehiscent fibrous nut, cylindrical or truncate-conoid, dry at maturity and without a stone, containing only 1 locule completely filled by 1 large seed (through abortion of the other 2 ovules and collapse of their locules); seed spheroid or cylindroid, the cotyledons large, fleshy, straight and not folded, equal or one larger and slightly embracing the other.

Type. *Glandonia macrocarpa* Grisebach.

*Glandonia* comprises three geographically disjunct species, one from the upper Ríos Negro and Orinoco, one from the vicinity of Manaus, and one from the upper Ríos Purús and Madeira. The species are similar, particularly the latter two, but seem to be meaningful biological entities.

The fruit of *Glandonia*, like that of *Burdachia*, has a fibrous, inedible husk which imparts buoyancy to the mature fruit. This is presumably an adaptation for dispersal by water. All three species are usually found growing near rivers or in periodically inundated savannas or igapós.

**Key to the Species of Glandonia**

1. Lamina minutely papilllose below (Fig 12c), coriaceous; stems, stipules, petioles, and midrib below appressed-tomentose, persistently so or eventually glabrate. 1. *G. williamsii*.

1. Lamina nearly or quite smooth below (Fig 12d), papyraceous; stems, stipules, and leaves glabrous (? or very soon glabrescent).

2. Inflorescence (13–)17–28 cm long, open, with 1–2.5 cm between pairs of cincinni; lamina 15–26 cm long, 6–10 cm wide, strongly obovate; floriferous peduncle 0–1(–2) mm long, nearly or quite included by the subtending bracteole; posterior petal with large glands on proximal ½–½ of limb; pedicel 10–12 mm long. 2. *G. macrocarpa*.

2. Inflorescence 5–11 cm long, with the cincinni crowded, up to 1 cm apart; lamina 9–18 cm long, 3.5–6.5(–8) cm wide, elliptical or slightly obovate; floriferous peduncle 2–3 mm long, raising the joint beyond the subtending bracteole; posterior petal with few small glands at base of limb; pedicel 6–8 mm long. 3. *G. prancei*.


Fig 12c & 29e–k.

Shrubs or small trees 2–8 m tall, the young vegetative stems flattened and tomentose or sericeous, becoming terete and glabrate in age. Lamina of the larger leaves 10–22 cm long, 3.3–10.3 cm wide, elliptical or slightly ovate or obovate, cuneate or rounded at the base, revolute at the margin, obtuse to acuminate at the apex, coriaceous, minutely papilllose below, appressed-tomentose to glabrate, bearing (0–)2(–6) large glands below at the base by the midrib and several small glands distally, the lateral veins and reticulum moderately prominent below; petiole 11–24 mm long, tomentose to glabrate, eglandular; stipules 9–21 mm long, abaxially tomentose to glabrate. Inflorescence 5–18 cm long, appressed-tomen-
tose or sericeous, the cincinni mostly less than 1 cm apart, containing 3–5 flowers; bracts and bracteoles ovate, abaxially sericeous, the bracts 3–5 mm long, the bracteoles 2–3 mm long; floriferous peduncle (1-)2–4 mm long. Pedicel 8–10 mm long, densely tomentose or sericeous. Sepals 1.5–2 mm long beyond the glands, 2–2.5 mm wide, rounded, abaxially sericeous, adaxially glabrous, the glands 2–3 mm long. Petals "white" or "yellow" (perhaps the outermost yellow and the others white), glabrous or bearing a tuft of hairs abaxially at base of claw, the outermost with the "helmet" 5–6 mm long, 4–4.5 mm in diameter, erose, the claw 3–4 mm long, the other 3 laterals with the limb 4–6 mm long, 4–5.5 mm wide, obtusely sagittate, flat to conduplicate, eglandular and denticulate or erose, the claw 3.5–4.5 mm long, the posterior petal with the limb 4–5.5 mm long, 3–4 mm wide, rounded-sagittate, bearing on each side ca 10 glands on the proximal half and distally eglandular, erect or reflexed, the claw 3.5 mm long. Filaments 1.3 mm long, densely hirsute; anthers 3.5–5 mm long, bearing a tuft of straight hairs on the connective just above the insertion of the filament. Ovary 1.3 mm high, pyramidal, glabrous; styles 4.5–5.5 mm long, subequal, glabrous, the terminal 0.5 mm bent over. Fruit 14–22 mm long, 12–14 mm in diameter, cylindrical becoming conoid at maturity, bearing 7–9 low, rounded, longitudinal ribs.

Type. *Ll. Williams 14154*, Yavita, 128 m, Alto Orinoco, en sabanetas periodicamente anegadas, Amazonas, Venezuela, 2 Feb 1942 (holotype F! isotypes F! VEN!).

Distribution. Upper Río Orinoco and upper Río Negro. VENEZUELA. Amazonas: São José Casiquiare, *Fróes 21509* (NY); NW base of Cerro Yapacana, Yapacana caño laguna, elev 125 m, *Maguire & Wurdack 34487* (NY) & *34610* (MICH, NY, VEN); Piedra Catipán, Río Yatua, elev 100–140 m, *Maguire et al 36493* (MICH, NY, US, VEN); riverine forest near Laja Catipán, elev 100–140 m, *Maguire et al 37554* (MICH, NY, US, VEN); type, q v; cerca del Río Temí, sabanetas periodicamente anegadas, elev 128 m, *Williams 14168* (F, VEN); Río Guainiá, Bajo Caño San Miguel, elev 127 m, *Williams 14884* (F, US, VEN).


Collected in flower from October to May, in fruit from February to June.


Fig 12d.

Trees to 12 m tall; young vegetative stems glabrous (? or very soon glabrescent), flattened, becoming terete in age. Lamina of the larger leaves 15–26 cm long, 6–10 cm wide, strongly obovate, cuneate or rarely abruptly rounded at the base, flat or slightly revolute at the margin, acuminate at the apex, papyraceous, smooth (not papillose) below, glabrous, eglandular or bearing several small glands below at the base and distally, the lateral veins and reticulum prominent below;
petiole 10–25 mm long, glabrous, eglandular; stipules not seen (over 1 cm long, according to Niedenzu). Inflorescence (13–)17–28 cm long, appressed-tomentose, open, the pairs of cincinni 1–2.5 cm apart, containing 2–5 flowers; bracts and bracteoles ovate or elliptical, concave, abaxially sericeous, the bracts 3.5–6 mm long, the bracteoles 1.5–4 mm long; floriferous peduncle 0–1(–2) mm long, nearly or quite included by the subtending bracteole. Pedicel 10–12 mm long, appressed-tomentose. Sepals 1.5–2 mm long beyond the glands, 2–2.5 mm wide, rounded, abaxially sericeous, adaxially glabrous, the glands 2–3 mm long. Petals white, glabrous, the outermost with the “helmet” 5–5.5 mm long and 5.5 mm in diameter, erose, the claw 5 mm long, the other 3 laterals with the limb 5.5–6.5 mm long, 6 mm wide, orbicular, cordate, ± flat, eglandular and entire or denticulate, the claw ca 4 mm long, the posterior petal with the limb 5 mm long and wide, orbicular, bearing on each side ca 5–7 large glands on the proximal ¼–½, distally eglandular and ± entire, reflexed beyond the glands, the claw 3.5 mm long. Filaments 1.3 mm long, densely hirsute; anthers 4.5–5.5 mm long, bearing a tuft of straight hairs on the connective just above the insertion of the filament. Ovary 1.3 mm high, pyramidal, glabrous; styles ca 5.5 mm long, subequal, glabrous, the terminal 0.5–1 mm indent. Fruit 20–28 mm long, 15–18 mm in diameter, cylindrical becoming truncate-conoid, bearing many (ca 15–20) unequal, rounded, longitudinal ribs, the larger ribs forming rounded spurs at base.


Distribution. Known only from the vicinity of Manaus. BRAZIL. Amazônas, Manaus: Igarapê de Santa Maria, Chagas & Coelho [INPA 3504] (IAN, US); Cachoeira Alta do Tarumã, Coelho [INPA 2934] (NY, US); Coelho [INPA 3118] (US); Coelho & Mello [INPA 3230] (US); Estrada do Aleixo, silva paludosa non inundabilis ad rivulum, Ducke 63 (MO, NY, US) & 239 (NY); Igarapê do Crespo, ad ripas paludosas, Ducke 1182 (MO, NY, US); Ducke [RB 23646] (US).

Collected in flower in November and February, in fruit in February.

3. Glandonia prancei Anderson, sp nov

A Glandonia macrocarpa differt lamina 9–18 cm longa, 3.5–6.5(–8) cm lata, elliptica vel parum obovata, stipulis 18–24 mm longis, inflorescentia 5–11 cm longa, cincinnis congestis usque 1 cm a se distantibus, bracteis 2–4 mm longis, bracteolis 1–3 mm longis, pedunculo floriferō 2–3 mm longo, pedicello 6–8 mm longo, antheris 3–3.5 mm longis, et petalo postico basi limbi perpaucis glandulis instructo.


Distribution. Southwestern Amazonia. BRAZIL. Amazônas: type, q v; flooded bank of Lago Preto, 3 km N of Lábrea, basin of Rio Purús, Oct flr, Prance et al 8058 (INPA, MICH, NY); margin of Igapó Açu at crossing with Manaus-Pôrto Velho Road, Mar flr, Prance et al 20557 (INPA, MICH).

This species is named in honor of Ghilean Tolmie Prance, in recognition of his stellar contributions to botanical exploration, research, and education in Amazonian Brazil.


Vines, shrubs, or rarely small trees, the leaves usually opposite or ternate, occasionally subopposite or alternate, bearing glands on the lamina or petiole or both, the stipules small, free, interpetiolar. Flowers borne in 4-flowered umbels, corymbs of up to 10 flowers, or pseudoracemes, these single or grouped in a paniculate or cymose inflorescence; floriferous peduncle usually absent, but well-developed in a few species, the floriferous bract and bracteoles all present, eglandular. Petals yellow, pink, or white, usually the lateral 4 spreading or reflexed and the posterior erect. Stamens 10, all fertile, the anthers alike in some species but more commonly strongly dissimilar, the connective greatly exceeding the locules in some anthers of some species. Ovary of 3 free carpels adnate to a common torus, 1 anterior and 2 posterior, all fertile; styles 3 (very rarely only the anterior developing), the stigmas terminal. Fruit schizocarpic, breaking apart into 3 samaras (or fewer due to abortion) separating from a short pyramidal torus, each samara having its largest wing dorsal, thickened on the adaxial (upper) edge, the veins terminating in the thinner abaxial edge; much shorter winglets or crests present on the sides of the nut in some species; dorsal wing rudimentary in a few species; nut usually with a functional carpophore.

Type. Banisteriopsis cornifolia (H.B.K.) Robinson in Small.

This wholly American genus comprises approximately 90 species. Dr. Bronwen Gates has just completed a revision of the genus, which will be published in the near future. She has very kindly given me access to her manuscript, and the treatment published here for Banisteriopsis in Guayana has been extracted from Dr. Gates’ monograph and adapted to my format. I acknowledge her generous help with warm thanks. Since that modern revision will soon be available, I have cited only the best known synonyms here.

Key to the Species of Banisteriopsis in Guayana
(for specimens with flowers)

1. Petals pink, sometimes fading to pale yellow in age, some with the proximal half of the posterior petal yellow.
2. Pedicel raised on a peduncle 0.5–3(--7) mm long; bracts and bracteoles persistent; anther locules quite glabrous; lamina (in Guayana populations) very densely metallic-sericeous below.
   1. B. maricata.
   2. Pedicel sessile; bracts and bracteoles deciduous before or during anthesis; anther locules sparsely pilose to glabrate; lamina sparsely sericeous to glabrate below. 2. B. caapi.

1. Petals all yellow from the beginning.
3. Petals, especially the lateral, very densely sericeous abaxially; styles, at least the anterior, densely bearded on the proximal half, with long spreading hairs.*
4. Flowers borne only in umbels of 4; pedicels densely brown-sericeous to glabrate; lamina usually sparsely sericeous below; calyx glands 1–1.8 mm long. 3. B. lucida.
4. Flowers borne in umbels of 4 subtended by 1 or 2 additional pairs; pedicels sparse-

* While this paper was in press, Banisteriopsis krukoffii Gates was collected at Solano, 20 km NE of San Carlos de Rio Negro, Amazonas, Venezuela, May flr, Liesner 7375 (MICH). It will key out with B. lucida and B. pubipetala, but differs from both in having divergent, spatulate bracts and bracteoles. Banisteriopsis krukoffii was previously known only from Amazonian Brazil.
ly golden-sericeous to glabrate; lamina glabrous below; calyx glands 1.5–3 mm long.

3. Petals glabrous; styles glabrous or bearing at most a few hairs at base.

5. Lateral petals subentire to denticulate, especially at base of limb.

6. Lamina densely tomentose or tomentose-sericeous below.

6. Lamina very sparsely appressed-sericeous below (apparently glabrate, the hairs discernible only with a lens).

5. Lateral petals fimbriate or lacerate or at least distinctly dentate all around the margin of the limb.

7. Lamina very densely and tightly sericeous below, the vesture producing a metallic sheen.

7. Lamina glabrous or sparsely sericeous to glabrate below.

8. Inflorescence glabrous; leaves with the lamina deeply cordate at the base, the lobes often equalling the petiole.

8. Inflorescence hairy; leaves with the lamina truncate, rounded, or shallowly cordate at the base.

9. Inflorescence golden-sericeous; connective of the anthers opposite the 3 anterior sepals only slightly exceeding the locules, by up to 0.5 mm; reduced leaves in the inflorescence entire, the margin eglandular or bearing tiny glands.

9. Inflorescence minutely brown- or white-tomentose; connective of the anthers opposite the 3 anterior sepals greatly exceeding the locules, by 0.6–1 mm; reduced leaves in the inflorescence usually bearing well-developed glands or ciliate processes on the margin.

10. B. martiniana.

Key to the Species of Banisteriopsis in Guayana
(for specimens with fruits)

1. Locule of the nut of the samara hairy within; bracts and bracteoles deciduous before or during anthesis.

2. B. caapi.

1. Locule of the nut glabrous within; bracts and bracteoles persistent.

2. Nut of the samara bearing winglets, crests, ridges, or aculeate outgrowths on the sides.

3. Nut of the samara bearing several ridges or rounded or aculeate outgrowths on each side.

4. Lamina (in Guayana populations) very densely metallic-sericeous below; samara with at most a slight, rounded projection at adaxial base of dorsal wing.

1. B. muricata.

4. Lamina sparsely sericeous below; samara with a ± triangular appendage up to 10 mm high and 5 mm wide at adaxial base of dorsal wing.

3. B. lucida.

3. Nut of the samara bearing 1–3 undissected lateral wings on each side parallel to the areole.

5. Nut of the samara bearing 2 or 3 wings on each side.

5. Nut of the samara bearing only 1 wing on each side.

6. Lamina densely tomentose or tomentose-sericeous below.

5. B. cinerascens.

6. Lamina very sparsely appressed-sericeous below (apparently glabrate, the hairs discernible only with a lens).

6. B. wurdackii.9

2. Nut of the samara unappendaged on the sides, the veins sometimes prominent.

Go to couplet 7 of preceding key.

9 Banisteriopsis krukoffii Gates will also key out here; see footnote to couplet 3 of preceding key. Banisteriopsis krukoffii has the flowers borne ultimately in umbels of 4 and the bracts and bracteoles divergent and spatulate; B. wurdackii has the flowers ultimately in short pseudoracemes of 10–20 flowers and the bracts and bracteoles appressed and triangular.

*Banisteria muricata* Cavanilles, Tom. III, Nona Dissertatio Botanica 423. 1790.


*Banisteria argentea* (Humboldt, Bonpland & Kunth) Sprengel, Syst. Veg. 388. 1825.


Woody vine, sometimes shrubby, the stems sericeous to glabrate. Lamina of the leaves (3.5—)5.3—12.7(—16.5) cm long, (2.3—)4.8—7.5(—9) cm wide, ovate, elliptical, or rotund, cuneate to cordate at the base, acuminate to apiculate at the apex, eglandular or bearing 2—4(—5) pairs of stipitate glands below, sparsely sericeous to glabrate above, sparsely to densely (always densely in Guayana populations) silver- or golden-sericeous below, the tertiary veins scalariform; petiole 5—16 mm long, usually sericeous, eglandular or with 1—2 pairs of cupulate glands near the apex; stipules triangular, 0.5—1 mm long. Inflorescence composed of 4-flowered umbels grouped in dense axillary and terminal cymes, usually sericeous; bracts and bracteoles 0.5—1.2 mm long, broadly triangular, persistent; peduncle 0.5—3(—7) mm long. Pedicel 3—12 mm long, usually sericeous. Sepals abaxially sericeous, adaxially sericeous near the margin, all eglandular or the lateral 4 biglandular, the glands 1.3—2 mm long. Petals pink, becoming paler in age, the posterior yellow in the proximal half, glabrous, the lateral 4 with the claw 0.8—1.4 mm long, the limb 4—8.5 mm long, 3.5—8 mm wide, orbicular, laciniate, eglandular; posterior petal with the claw 1.4—3 mm long, constricted at the apex, the limb 4—7 mm long, 3.5—6 mm wide, obovate, fimbriate with the basal fimbriae enlarged and gland-tipped. Filaments 1—3.6 mm long, the posterior 3 inflexed between the posterior styles; anthers with locules 0.6—1.2 mm long, glabrous, the connectives of those opposite the 3 anterior sepals glandular and enlarged, exceeding the locules by 0.8—1.7 mm opposite the antero-lateral sepals. Styles slender and diverging, the anterior 2.2—2.8 mm long, the posterior 2 lyrate, 2.6—3.6 mm long, the stigmas capitulate. Samara sericeous, especially on the nut, with the dorsal wing (12—)20—34(—45) mm long, (9—)11—16(—20) mm wide, with at most a slight rounded projection at the adaxial base; nut with the sides rugose, tuberculate, muricate, or alulate (bearing several rounded or aculeate outgrowths in Guayana populations), the locule glabrous within.

Type. **Joseph de Jussieu**, Peru, frt (P).

Distribution. From Chiapas, Mexico, south to Argentina. Collections from Guayana and nearby: VENEZUELA. Bolivar: Entre Los Castillos y San Félix, Bernardi 7955 (VEN); N slope of Cerro Bolivar, elev 300—400 m, Maguire et al 35965 (MICH, NY, VEN); Santa Rosa, Tovar 2 (VEN); Ciudad Piar-Pto. Ordaz, Trujillo 5965 (MY). BRAZIL. Roraima: Río Mucajai, núcleo Fernando Costa, Black 51—13716 (IAN); beira do Rio Branco, 5 km N Boa Vista, Black 51—13781


*Banisteria caapi* Spruce ex Grisebach in Martius, Fl. Bras. 12: 43. 1858.

Woody vine, the stems sericeous to glabrate. Lamina of the leaves (4.8–)8.2–15.9(–20.5) cm long, (2.5–)3.5–7.7(–11.5) cm wide, ovate, obtuse to truncate at the base, short- to long-acuminate at the apex, glabrate above, sparsely sericeous to glabrate below, bearing 2–5 pairs of sessile glands below near or at the margin and another pair near the midrib at the base: petiole 9–25 mm long, sparsely sericeous to glabrate, eglandular or biglandular near the apex; stipules 0.5–1 mm long, triangular. Inflorescence an axillary cyme of 4-flowered umbels, sparsely tomentose to velutinous, the bracts and bracteoles 1–1.8 mm long, deciduous before or during anthesis, rarely immediately afterwards. Pedicel 7–11 mm long, sessile, appressed- or tomentose-sericeous. Sepals abaxially sericeous, adaxially minutely tomentose, all eglandular or the lateral 4 biglandular, the glands 0.5–2.2 mm long. Petals pale pink, becoming pale yellow in age, glabrous, fimbriate, the lateral 4 with the claw 1–1.5 mm long, the limb 5–8.5 mm long, 4–6 mm wide, the posterior petal with claw 2.5–3 mm long, constricted at the apex, the limb 5–7 mm long, 2.5–4.5 mm wide, broadly obovate, the basal fimbriae gland-tipped. Filaments 2–4 mm long, the posterior 3 inflexed between the posterior styles; anthers with the locules sparsely pilose to glabrate, 0.3–1.2 mm long, the connectives 0.2–1.6 mm long, the anterior 5 longest and glandular, those of the anthers opposite the antero-lateral sepals exceeding the locules by 0.5–1 mm. Anterior style 2.8–3.2 mm long, straight, the posterior styles 3–4 mm long, diverging and lyrate at the base, the stigmas capitate. Samara appressed-pubescent to glabrate, with the dorsal wing 18–42 mm long, 8–22 mm wide, bearing a rounded tooth at the adaxial base; nut bearing prominent ribs on the side perpendicular to the areole, rarely with a short aculeate outgrowth, the locule hairy within.


This is one of the most famous of hallucinogenic plants. Among its many vernacular names, the most used are caapi, yagé, and ayahuasca. See Gates’ mono-
graph for a discussion of the variation and taxonomy of this species, and Cuatrecasas (1958) for some information on the chemistry of the psychoactive drug.


Woody vine, the stems sericeous to glabrate. Leaves falcate, the lamina (3.6–) 6–13.3–(16.4) cm long, (2.2–)3.2–6–(7.5) cm wide, elliptical, cuneate at the base, short- to long-acuminate at the apex, sparsely sericeous to soon glabrate above, sparsely sericeous (sometimes glabrescent) below, bearing minute glands on the margin, these more numerous toward the apex; petiole 4–10 mm long, sparsely sericeous to glabrate, eglandular; stipules 0.5–1 mm long, triangular, joined by an interpetiolar line. Inflorescence axillary, of 2–4 4-flowered umbels in each axil, densely brown-sericeous; bracts and bracteoles up to 1 mm long, cymbiform, appressed, persistent. Pedicel 13–20 mm long, sessile, brown-sericeous to glabrate. Sepals abaxially golden-sericeous, rounded at the apex, the lateral 4 biglandular, the glands 1–1.8 mm long. Petals yellow, abaxially densely sericeous, the lateral 4 with the claw 1–1.5 mm long, the limb dentate to lacerate, plane, broadly elliptical, that of the anterior pair 7–10 mm long and 6–8.5 mm wide, that of the posterior pair 5–7.5 mm long and 4–6.5 mm wide; posterior petal with the claw 3–3.5 mm long, constricted at the apex, the limb 4–5 mm long, 3–4 mm wide, obovate, lacerate, eglandular. Filaments glabrous, 1.4–4.4 mm long, longest opposite the styles; anthers with the locules 0.9–1.4 mm long, pubescent, the connectives not exceeding the locules, those opposite the sepals obovate, swollen distally, those opposite the petals obovate. Anterior style 2.4–4.8 mm long, stout, bent inwards at apex, densely bearded with long spreading hairs on the proximal ½, the posterior 2 styles 2–3.4 mm long, slender, diverging from the base, directed toward the posterior petal, the stigmas truncate, not capitate. Samara sparsely sericeous, with the dorsal wing 36–63 mm long, 14–25 mm wide, usually much narrowed proximally; nut globose, 5–10 mm in diameter, the sides prominently ridged or rarely cristate, the ridges radiating from the areole, bearing apically at the base of the dorsal wing a ± triangular appendage up to 10 mm high and 5 mm wide, the locule glabrous within.


Distribution. Wet tropical forests of eastern South America, extending westward through the Orinoco and Amazon drainages and around the Caribbean lowlands. Guayana collections: GUYANA. Potaro River 4 miles above Kaietuer Falls, elev 420 m, *Cowan & Soderstrom* 2093 (F, NY); Kaietuer Falls, *De La Cruz* 4433 (F, GH, MO, NY, US); Potaro River above Kaiatuk, *Maguire & Fanshawe* 23354 (F, GH, MO, NY, US); Ireng River, between Waipa and Sand Hill Rapids, southern Pakaraima Mts, *Maguire et al* 46235 (K, MICH, NY, US). VENEZUELA. Bolivar: Río Cuyuni, *Brewer* 134 (VEN); Río Caroni, cerca de la boca del Jeabarú, elev 400 m, *Cardona* 1178 (US, VEN); Río Carú, Alto Paragua, elev 500 m, *Cardona* 2518 (VEN); Río Chicanán above Puerto Lema, elev 300 m, *Steyermark* 89510 (VEN). Amazonas: above Capibara, Brazo Casiquiare, *Holt & Blake* 689 (US); Río Manaviche, Alto Orinoco, *Lizot* 77 (VEN); Esmeralda-Occamo-Mavaca, *Medina* 384 (VEN); Río Padamo 1 hour above mouth, Alto Orinoco, elev 150 m, *Maguire & Maguire* 34721 (Mich, NY, US,
VEN); Río Orinoco near mouth of Río Maraca, elev 150 m, Maguire & Maguire 34748 (MICH, NY, US, VEN); flumina Casiquiare, Vasiva et Pacimoni, Spruce 3276 (BR, GH, MG, NY); Capihuara, Alto Casiquiare, elev 120 m, Ll. Williams 15719 (US, VEN); Río Orinoco just above Tama-Tama, elev 125–150 m, Wurdack & Adderley 43130 (MICH, NY, US, VEN) & 43650 (MICH, NY, US, VEN). BRAZIL. Amazónas: Río Castanho, trib. of Río Padauirí, upper Río Negro basin, elev 100–140 m, Cardona 1422 (US, VEN) & 1428 (US). Roraima: Uaiacá airstrip, 3°33’N, 63°11’W, Río Uraricoeira, Prance et al 10740 (MICH, NY).

Collected in flower and fruit in diverse months.


Woody vine, the stems sparsely sericeous to soon glabrate. Lamina of the leaves (2.5–)5.1–13(–15.5) cm long, (1.1–)2.1–6(–8.3) cm wide, elliptical or ovate, cuneate to cordate at the base, short- to long-acuminate at the apex, glabrous, bearing minute glands on or just within the margin below, these more numerous toward the apex; petiole 2–8(–12) mm long, sparsely sericeous to glabrate, eglandular; stipules 0.5–1.2 mm long, triangular, situated on a more or less conspicuous interpetiolar ridge. Inflorescence compound, composed ultimately of very condensed racemes of 2–3(–5) pairs of flowers, most often a terminal umbel of 4 subtended by 1–2 additional pairs, sparsely sericeous to glabrate, the bracts and bracteoles 0.8–1.6(–2) mm long, triangular, appressed, persistent. Pedicel 10–22(–26) mm long, sessile, sparsely golden-sericeous to glabrate. Sepals abaxially golden-sericeous, the lateral 4 biglandular, the glands 1.5–3 mm long. Petals yellow, abaxially densely sericeous, the lateral 4 with the claw 1–2 mm long, the limb 7–12 mm long, 6–11 mm wide, laciniate, the anterior pair larger; posterior petal with the claw 3–5 mm long, thick, constricted at the apex, the limb 3.5–8.5 mm long and wide, orbicular, fimbriate, the basal fimbriae sometimes gland-tipped. Filaments glabrous, 1.8–5 mm long, longest opposite the anterior sepal and postero-lateral sepals and petals, shortest opposite the posterior petal, the posterior 3 usually inflexed between the posterior styles; anthers with the locules 0.8–2 mm long, sparsely to densely pilose, the connectives not exceeding the locules, those opposite the sepals ovate to narrowly ovate and apically papillate, those opposite the petals narrowly oblong and apically smooth. Styles 3–5 mm long, the anterior usually longer and thicker than the posterior 2, bearded on the proximal $\frac{1}{3}$ (to $\frac{1}{2}$ of the anterior), the stigmas capitulate. Samara with the dorsal wing 20–40(–65) mm long, 9–16(–23) mm wide, glabrate; nut glabrate, bearing on each side 2–3 wings 1–3(–5) mm wide and parallel to the areole and apically at the base of the dorsal wing a triangular appendage 1.5–4(–7) mm high and 2.5–4(–9) mm wide, the locule glabrous within.


Distribution. Widespread throughout Brazil, extending north to Colombia, west to Peru and Bolivia, and south to Paraguay; known in Venezuela only from one collection from Tachira; unknown in Guyana. Collections from near Guayana: COLOMBIA. Meta: Monte de Machadero, Ocoa, 4 km SE Villavicencio, Jan f., Hermann 11115 (COL, US); sabanas de San Juan de Arama, Río Guejar, Jan f.,
Idrobo & Schultes 1329 (US); Sierra de La Macarena, Río Guapaya, Dec frt, Philipson et al 1719 (F, NY, US). Vaupés: Mitú and vicinity, along Río Yí and Río Kubiyú, Zarucchi et al 1817 (MICH). BRAZIL. Roraima: Río Mucajai, capoeira, Sep frt, Black 51–13610 (IAN).


Vine or spreading shrub, the stems densely sericeous, eventually glabrate. Lamina of the leaves 3.3–13.9(–17) cm long, 1.6–8 cm wide, narrowly to broadly elliptical, cuneate to truncate at the base, plane to slightly revolute at the margin, acute to short-acuminate at the apex, glabrous above, densely tomentose or tomentose-sericeous below, rarely glabrescent, bearing minute glands on the margin, the pair of glands at juncture of lamina and petiole usually enlarged; petiole 4–10(–14) mm long, densely tomentose-sericeous; stipules up to 1.5 mm long, triangular, joined by a prominent interpetiolar ridge. Inflorescence axillary, paniculate, sparsely to densely tomentose-sericeous, the branches bearing 8–20 flowers; bracts and bracteoles 0.6–1 mm long, triangular, appressed, persistent. Pedicel 6–11 mm long, sessile or borne on a peduncle up to 3 mm long, sparsely tomentose-sericeous. Sepals abaxially sparsely sericeous, adaxially glabrous, rounded at the apex, the lateral 4 biglandular, the glands 1.2–1.8 mm long. Petals yellow, glabrous, the lateral 4 with the claw 0.5–0.8 mm long, the limb 5–5.5 mm long, 3–4.5 mm wide, elliptical, concave, subentire or denticulate, especially proximally; posterior petal with the claw 1.5–2 mm long, the limb 4.5–6 mm long, 3–4 mm wide, broadly obovate, short-fimbriate, the basal fimbriae gland-tipped. Filaments 1.8–2.4 mm long; anthers with the locules 0.9–1.4 mm long, glabrous, the connectives not exceeding the locules. Styles equal, 2–2.4 mm long, diverging from the base, more or less inbent at the apex, the stigmas truncate. Samara with the dorsal wing 20–28 mm long, 8–11 mm wide, sparsely sericeous, often with a low rounded projection at the adaxial base; nut densely sericeous, bearing on each side a single wing parallel to the areole, 5–6 mm long and 0.5–2 mm wide, the locule glabrous within.


Distribution. Roraima, Brazil, and Bolivia. Guayana collections: BRAZIL. Roraima: Bóa Vista–BV road (BR 174), Km 76, by Uaricoeira River, elev 136 m, Oct frt, Coradin & Cordeiro 547 (MICH); Serra do Murupu, Aug frt, Luetzelburg 20660 (R); type, q.v.

Bentham cited the two Schomburgk numbers as he did when he was citing two numbers for the same collection. Robert Schomburgk’s label has the printed locality “Roraima,” which would imply their camp at the southwestern base of Roraima in what is now Bolivar, Venezuela, while Richard Schomburgk’s labels have the written localities “Suruma fl.” or “Cotinga fl.” Nevertheless, Bentham clearly believed they were actually the same gathering, and I would guess that he was correct, especially since the specimens are very similar and in the same stage of flowering. The species has been found again in Roraima Territory but not in Bolivar, so the locality on Richard Schomburgk’s labels is more likely to
be the correct one. The gathering, assuming there was only one, was probably made below the junction of the Cotingo and Surumu Rivers, which would explain the use of the former name on one label (the one at GOET) and Surumu on the other (the one at B and NY). All sheets of these two numbers should be considered isotypes, except, of course, for the holotype at Kew.


Banisteria cinerascens (Bentham) Grisebach var. glabrescens Niedenzu in Engler, Pflanzenreich IV, 141: 406. 1928. Type. Ule 9477, Seringal S. Francisco, Río Acre, Amazônas [probably Acre], Brazil.

Woody vine, the stems sericeous, soon glabrate. Leaves usually falcate, the lamina (7–)10–21.6 cm long, (3–)4.5–10.6 cm wide, lanceolate to broadly elliptical, acute to obtuse or rarely cordate at the base, somewhat revolute at the margin, short- to long-acuminate at the apex, glabrous above, sparsely sericeous below, the hairs 0.2–0.4 mm long, sessile, straight, bearing minute glands on the margin; petiole 7–12 mm long, sparsely sericeous, biglandular at the apex; stipules up to 1.5 mm long, triangular, joined by a prominent interpetiolar line. Inflorescence axillary, paniculate, sericeous, the branches bearing 10–20 flowers; bracts and bracteoles 0.6–1 mm long, triangular, appressed, persistent. Pedicel 6–12 mm long, sericeous, subsessile, the peduncle 0.5–2 mm long. Sepals abaxially sparsely sericeous, adaxially glabrous, rounded at the apex, the lateral 4 biglandular, the glands 1.4–2 mm long, free and reflexed apically. Petals yellow, glabrous, the lateral 4 with the claw 0.5–0.8 mm long, the limb 4.5–5.5 mm long, 3–4 mm wide, elliptical, entire or proximally denticulate; posterior petal with the claw 1.5–2 mm long, the limb 4.5–5.5 mm long, 3–4.5 mm wide, obovate, short-fimbriate, the basal fimbriae often enlarged and glandular. Filaments 0.8–2.6 mm long, that opposite the posterior petal shortest; anthers with the locules 0.8–1.4 mm long, glabrous, the connectives not exceeding the locules. Styles equal, 2–2.6 mm long, diverging from the base, more or less inbent at the apex, the stigmas truncate. Samara with the dorsal wing 24–38 mm long, 10–15 mm wide, sparsely sericeous, with a low rounded projection at the adaxial base up to 2.5 mm high and 5–8 mm wide; nut densely sericeous, bearing on each side a single wing parallel to the areole, 4–10 mm long and 2–4 mm wide, rarely absent, the locule glabrous within.

Type. Wurdack & Monachino 41145, Río Villacoa about 25 km from river mouth, Bolívar, Venezuela, elev 80–110 m, Jan f1r/f1t (holotype MIC, isotypes NY, VEN).

Distribution. Bolívar and western Amazonia north to Costa Rica. Guayana collections: VENEZUELA. Bolívar: Cerro Negro Peron, on E-W crystalline range on right bank of Río Purguaza just below El Carmen, elev 120–350 m, Dec f1r, Wurdack & Monachino 40976 (MIC, NY, VEN); type, q v.


Woody vine, the stems sericeous to glabrate. Leaves with the lamina 6–12.8 cm long, 2.9–6.5 cm wide, narrowly elliptical to elliptical or ovate, rounded or cordate at the base, obtuse to acute at the apex, glabrous above, densely and persistently sericeous below, the vesture more or less shining and golden; petiole 6–10(–20) mm long, golden-sericeous, with a pair of prominent glands at the apex;
Fig 30. Banisteriopsis wurdackii. a) Flowering shoot, ×0.5 (enlargement of upper lamina ×1, lower ×5); b) flower bud, ×3.5; c) flower, ×3.5; d) posterior (flag) petal, ×3.5; e) part of androecium, stamen to left opposite anterior sepal, stamen to right opposite posterior petal, ×10; f) anther, adaxial view, ×10; g) gynoecium, left with anterior style in middle, right with anterior style to left, ×10; h) fruit with 2 samaras developed, ×0.75. Drawn by Karin Douthit, a from Wurdack & Monachino 40976, b–g from Pena 474, h from Wurdack & Monachino 41145.
Fig 31. *Banisteriopsis lyrata*. a) Leafy shoot and inflorescence on older, leafless stem, ×0.5; b) flower and posterior (flag) petal, ×5; c) androecium and gynoecium, lateral-posterior view, ×7.5; d) stamen opposite anterior-lateral sepal, ×7.5; e) gynoecium, anterior style in center, ×5. Drawn by Karin Douthit from Prance & Ramos 6960.
stipules triangular, minute. Inflorescence axillary, paniculate, the branches bearing 3–4 pairs of flowers, sparsely to densely tomentose-sericeous, the bracts and bracteoles 1–1.5(–2) mm long, broadly triangular, appressed, persistent. Pedicel 6–10 mm long, sessile, densely to sparsely sericeous. Sepals abaxially sericeous throughout or glabrous distally, adaxially glabrous, rounded at the apex, the lateral 4 biglandular, the glands 0.8–2 mm long. Petals yellow, glabrous, long-fimbriate, the lateral 4 with the claw 1–2 mm long, the limb 6–10 mm long, 4.5–7 mm wide, broadly elliptical, plane, the antero-lateral pair somewhat larger; posterior petal with the claw 3 mm long, constricted at the apex, the limb 5–8 mm long, 3.5–5 mm wide, ovate, with 2–3 prominent gland-tipped teeth proximally. Filaments opposite the 3 anterior sepals and the postero-lateral petals 3.4–4.4 mm long, longest opposite the postero-lateral petals, the other filaments 1.8–2.6 mm long, the posterior 3 inflexed between the posterior styles; anthers with the locules 0.6–1 mm long, glabrous, the connectives of the stamens opposite the 3 anterior sepals broadly obovate, much enlarged and glandular, 0.9–1.3 mm long, 0.7–1.1 mm wide, exceeding the locules by 0.2–0.7 mm. Styles glabrous, the anterior 2.4–3.4 mm long, straight and erect, the posterior 2 lyrate, 3–4.2 mm long, much longer than the anterior, slender, the stigmas capitulate. Fruit unknown.

Type. Prance et al 6960, vicinity of Santa Barbara, 15 km E of Km 117 on Pôrto Velho to Cuiabá highway, Rondônia, Brazil, Aug flr (holotype INPA, isotypes MICH, NY).

Distribution. Southern Venezuela and Amazonian Brazil. VENEZUELA. Bolívar: Campamento Forestal “Potreritos,” Reserva Forestal La Paragua, Feb flr, Blanco 676 (MY); Río Asa, Reserva Forestal La Paragua, Feb imm flr, Blanco 715 (NY); La Prisión, Medio Caura, elev 100 m, Mar flr, Ll. Williams 11627 (F, MICH, US, VEN). BRAZIL. Pará: Río Jari, estrada que liga Monte Dourado a Caracurú, terra firme, Nov flr, Oliveira 3501 (IAN, MICH, NY); estrada entre Planalto A e Tinguelin, Km 21, Dec flr, N. T. Silva 2859 (IAN). Rondônia: Río Guaporé, Fazenda Santa Rosa, Jun flr, Black & Cordeiro 52–14867 (IAN); type, q v.


Shrub or vine, the stems glabrous. Lamina of the larger leaves 5.2–15.5 cm long, 3.5–11.8 cm wide, ovate, deeply cordate at the base, acute to short-acuminate at the apex, with the margin often revolute and distally ciliate or glandular-dentate, glabrous, bearing 1 pair of sessile glands below at base by midrib, the reticulum prominent on both sides; petiole 2–6 mm long, glabrous, eglandular; stipules minute. Inflorescence glabrous, axillary or terminal, decompound, the flowers borne in umbels of 4 flowers or corymbs of 6–8 flowers, the reduced or bract-like leaves of the inflorescence with marginal cilia up to 6 mm long; bracts and bracteoles 0.6–0.8 mm long, glabrous, persistent. Pedicel 12–18 mm long, glabrous, sessile. Sepals glabrous on both sides, rounded at the apex, the lateral 4 biglandular, the glands 1.5–2 mm long. Petals yellow, glabrous, lacerate, the lateral 4 with the claw 3.5–4 mm long, the limb 8–11 mm long and wide, orbicular, the antero-lateral pair larger and more concave; posterior petal with the claw 3.5
Fig 32. *Banisteriopsis pulcherrima*. a) Flowering branch, ×0.5; b) flower, ×1.5; c) androecium and gynoecium, side view, the enlarged anther to the left opposite the glandular anterior sepal, 1 large anther removed, ×5; d) part of androecium, the leftmost anther opposite the anterior sepal, the rightmost opposite the posterior petal, ×5.5; e) gynoecium, the shorter style anterior, ×6; f) fruit, the middle samara anterior, ×1. Drawn by Karin Douthit, a from Maguire & Fanshawe 23125, b–f from Maguire et al 43889.
mm long, widest at the apex, the limb 8.5–9.5 mm long and wide, reflexed, broadly obovate, often with red veins, the basal teeth gland-tipped. Filaments 2.6–4 mm long, the posterior 3 inflexed between the posterior styles; anthers with the locules 0.7–1 mm long, glabrous, the connectives opposite the 3 anterior sepals globose, much enlarged and glandular, 1.2–1.6 mm long, 1.4–1.8 mm wide. Styles glabrous, the anterior straight and erect, 2.8–3 mm long, the posterior 2 diverging at the base and directed posteriorly, 3.8–4 mm long, the stigmas capitate. Samara sericeous to glabrate, especially on the nut, the dorsal wing 24–35 mm long, 10–13 mm wide, without a projection at the adaxial base; nut with the sides unappressed, the veins prominent, the locule glabrous within.


Distribution. Endemic to western Guyana and SE Bolívar. GUYANA. Kaieteur Falls, elev 420 m, Cowan & Soderstrom 1815 & 2030 (NY, US); Chinoweng, Wadabu Mt, Forest Dept. 7849 (NY); Mt. Roraima, elev 2200 m, E. Jenman 243 (US); savanna, Kaieteur Plateau, Maguire & Fanshawe 23125 (BR, F, GH, MO, NY, P, US); Partang Rapids to first falls of Partang River, Merume Mts, Upper Mazaruni River basin, Maguire et al 43889 (K, MICH, NY, US); Ayanganna Plateau, Upper Mazaruni basin, elev 747 m, Tillett et al 44905 (K, MICH, NY, US); savanna E end of Karowtipu, Kako River, Upper Mazaruni basin, elev 950 m, Tillett & Tillett 45597 (NY); Kaieteur savanna, elev 330 m, Tutin 694 (US). VENEZUELA. Bolívar: El Dorado–La Gran Sabana, elev 1200 m, Bunting 2964 (MY) & 3042 (F, MY); entre Kms 88 y 126, Ant. Fernández 1120 (MY); Angel Falls, Kunhardt 2 & 21 (NY): Cerro Piton, Cordillera Epicara, elev 400 m, Maguire et al 53561 (NY, VEN) & 53669 (MICH, NY, VEN); Mount Roraima, forested SW-facing quebrada, elev 2040–2130 m, Steyermark 58689 (F, NY); Km 155 S of El Dorado on road to Santa Elena, elev 1200 m, Steyermark 11290 (MICH); between Luepa and Cerro Venamo, elev 1200 m, Steyermark & Nilsson 83 (NY, VEN); between Cerro Uei and El Dorado, elev 800–1000 m, Steyermark & Nilsson 835 (VEN); Km 125, S de El Dorado, Steyermark et al 92964 (F, NY, VEN); El Dorado–Sta. Elena, Km 107, elev 560 m, Trujillo 3541 (MY).

Collected in flower December to September, in fruit in December, February, and May to October.


Woody vine, the stems golden-sericeous, sometimes glabrescent. Leaves opposite, subopposite, ternate, or subternate; lamina 4.5–12.2 cm long, 2.3–10 cm wide, ovate to orbicular, coriaceous, rounded or shallowly cordate at the base, revolute at the margin, obtuse to apiculate at the apex, bearing minute glands on or near the margin and a single pair of sessile glands beside the midrib at the base below, glabrous above, sparsely sericeous to glabrate below, with the tertiary veins scalariform; petiole 5–14 mm long, golden-sericeous to glabrate, eglandular; stipules minute. Inflorescence axillary, appressedgolden-sericeous, decom- pound, the branches pseudoracemes of (2–)3–7 pairs of flowers, rarely 4-flowered umbels; reduced leaves of the inflorescence entire, the margin eglandular or bearing tiny glands; bracts and bracteoles up to 1 mm long, triangular, persistent. Pedicel 8–12 mm long, sessile, sericeous. Sepals sparsely sericeous abaxially,
Fig 33. *Banisteriopsis maguirei*. a) Flowering branch, ×0.5; b) detail of the inflorescence, ×5; c) flower, ×5; d) androecium, with posterior petal for orientation, ×7.5; e) gynoecium, the anterior carpel in center, ×7.5; f) samara, ×1.5. Drawn by Karin Douthit, a–e from Steyermark 105918, f from Maguire 32850.

Glabrous adaxially, rounded at the apex, the lateral 4 biglandular, the glands 1.4–2 mm long. Petals yellow, the claw and center of limb sometimes red or orange, glabrous, long-fimbriate, the lateral 4 with the claw 1.5–2.5 mm long, the limb 4–7 mm long and wide, orbicular, the antero-lateral pair larger; posterior petal with the claw 2.5–2.8 mm long, widest at the apex, the limb 3.5–5 mm long, 3–4 mm
wide, broadly ovate to orbicular, the basal fimbriae gland-tipped. Filaments 1.8–3.6 mm long; anthers with the locules 0.6–1 mm long, glabrous, the connectives of those opposite the 3 anterior sepals glandular and somewhat enlarged at the apex, exceeding the locules by 0.2–0.5 mm. Styles glabrous, the anterior 3–3.2 mm long, straight and erect, somewhat thicker than the other 2, the posterior styles 3.2–3.6 mm long, straight and subparallel or diverging, the stigmas capitate. Samara sericeous to glabrate, the dorsal wing 18–25 mm long, 8–10 mm wide, without a projection at the adaxial base; nut with the sides unappended, the veins prominent, the locule glabrous within.

Type. Maguire & Politi 28323, Caño Profundo, Cerro Sipapo, Amazonas, Venezuela, elev 1500 m, Jan flr (holotype MICH, isotypes NY, US, VEN).

Distribution. Mountains of Amazonas and western Bolívar. VENEZUELA. Amazonas: region del Duida y Marahuaca, Barnes 50 (VEN); type, q v; Cerro Huachamacari, Rio Cunucunuma, cumbre, elev 1700 m, Maguire et al 29807 (NY), summit camp, elev 1800 m, Maguire et al 30010 (NY, VEN) & 30096 (MICH, NY, VEN), W of Caño de Dios to ridge, Maguire et al 30244 (NY); summit Cerro Guanan, elev 1800 m, Maguire et al 31699 (NY, VEN); NW Ridge, Cerro Yutaje, elev 1400 m, Maguire & Maguire 35163 (NY, VEN) & 35285 (NY); savanna, Cerro Coro-Coro, Serrania Yutaje, Maguire & Maguire 35495 (NY, VEN); Sierra Parima, 2°27'24"N, 63°56'W, elev 1300 m, Steyermark 105918 (NY). Bolívar: Cerro Guaiquinima, elev 1800 m, Maguire 32850 (NY, VEN); Cerro Jaua, elev 1810–1880 m, Steyermark et al 109672 (MICH).

Collected in flower and fruit from December to May.


Banisteriopsis leptocarpa (Bentham) R. O. Williams, Flora Trinidad & Tobago 1: 131. 1929.

Woody vine, rarely shrubby. Leaves with the lamina 4.5–17 cm long, 2–8.5 cm wide, ovate to elliptical, obtuse to shallowly cordate at the base, obtuse to acute to long-acuminate at the apex, bearing on the margin minute or larger cupulate glands, more numerous distally, and below at base beside the midrib a pair of sessile or cupuliform glands; petiole 3–20 mm long, minutely tomentose to glabrate, eglandular; stipules minute, triangular. Inflorescence minutely brown- or white-tomentose, rarely glabrate, axillary, composed of 4-flowered umbels borne in condensed dichasium of usually 3 umbels, containing greatly reduced leaves with a pair of large basal glands and ± well developed glands or ciliate extensions on the margin, the bracts and bracteoles 0.6–1.2 mm long, rounded at the apex, appressed, persistent. Pedicel 6–14 mm long, sessile, glabrous or sparsely pubescent. Sepals abaxially sparsely sericeous, adaxially glabrous, rounded, eglandular or the lateral 4 biglandular, the glands 1–1.5 mm long, the sepals enlarged and spreading in fruit. Petals yellow, glabrous, dentate to lacerate, the lateral 4 with the claw 1.5–3 mm long, the limb 4.5–6.5 mm long and wide, orbicular, eglandular; posterior petal with the claw 2.5–3 mm long, thick and fleshy, constricted at the apex, the limb 4.5–6.5 mm long, 2.5–3.5 mm wide, obovate, reflexed, the narrow proximal part with 2–3 pairs of gland-tipped teeth. Filaments
1.4–3.8 mm long, those opposite the 3 styles longest, the posterior 3 inflexed between the posterior styles; anthers with the locules 0.5–1 mm long, glabrous, the connectives opposite the 3 anterior sepals globose, much enlarged and glandular, 1.2–1.6 mm long, 1–1.3 mm wide, exceeding the locules by 0.6–1 mm. Styles glabrous, the anterior straight and erect or directed anteriorly, 2–2.2 mm long, thicker than the posterior 2, the posterior styles diverging basally, 2.6–3 mm long, slender, the stigmas capitate. Samara sericeous to glabrate, the dorsal wing 16–32 mm long, 5–12 mm wide, without a projection at the adaxial base; nut with the sides unappended, smooth or with the reticulate veins prominent, the locule glabrous within.

Type. Martin s n [92], Cayenne (P).

Key to the Varieties of Banisteriopsis martiniana

1. Hairs of the inflorescence ferrugineous; lamina of the leaves plane, 4.5–12.5 cm long, bearing cupulate marginal glands; reduced leaves of the inflorescence sparsely sericeous. 10a. var martiniana.

1. Hairs of the inflorescence white or gray; lamina of the leaves falcate, 7–17 cm long, bearing minute marginal glands; reduced leaves of the inflorescence glabrous. 10b. var subenervia.

10a. Banisteriopsis martiniana var martiniana

Branches minutely puberulent to glabrate, the hairs brown. Lamina of the leaves 4.5–12.5 cm long, 2–6.9 cm wide, truncate to subcordate at the base, obtuse to short-acuminate at the apex, plane, subcoriaceous to coriaceous, sparsely sericeous to soon glabrate on both sides, the marginal glands cupulate; petiole 3–15 mm long. Inflorescence minutely tomentose, rarely glabrate, the hairs ferrugineous, the reduced leaves sparsely sericeous, the branches subtending the umbels 4–8(–15) mm long.

Distribution. Northeastern South America, common in eastern Guayana at elevations of 100–2000 m. Guayana collections: GUYANA. Kamakusa, Upper Mazaruni, De La Cruz 4075 (F, GH, MO, NY, US), 4160 (F, GH, MO, US), 4251 (F, GH, MO, NY, US); Kaieteur Falls, De La Cruz 4494 (NY, US); Samwarankna-Tipu, Pakarama Mts, elev 1100 m, Maguire & Fanshawe 32499 (K, MICH, NY); Kaieteur Savannah, elev 300–360 m, Sandwith 1441 (NY); Kukui River, Upper Mazaruni, elev 470 m, Tillett & Tillett 45387 (K, MICH, NY, US); Karowtipu, Kako River, Upper Mazaruni, elev 470 m, Tillett & Tillett 45467 (K, MICH, NY); E end of Karowtipu, elev 950 m, Tillett & Tillett 45593 (K, MICH, NY, US). VENEZUELA. Bolívar: Piedra de la Virgen, El Dorado-Sta. Elena, elev 400–600 m, Badillo & Holmquist 6042 (F, MY); Kussarivará-Río Carón, Urimán, elev 500 m, Bernardi 1627 (VEN); raudales Karabak, Río Uaiapurí, Carón, Cardona 1903 (US, VEN); Cerro Uaiápín, Carón, elev 1750 m, Cardona 2009 (VEN), elev 1640 m, Cardona 2044 (VEN); Kavanayén, elev 1300 m, Ferrari 1021 (MY); SW slope, Ptari-tepui, elev 1500–2000 m, Maguire & Wurdack 33888 (NY); 2 km S of Río Chibau on Alto Río Cuyuni, elev 100 m, Maguire et al 53524 (MICH, NY, VEN); Cerro Pitón, Cordillera Epicara, elev 400 m, Maguire et al 53661 (NY, VEN) & 53704 (MICH, NY, VEN); Roraima, Rich. Schomburgk 999 (NY)/Robt. Schomburgk II 651 (F, G); Gran Sabana, Río Kukenán, base of Mt. Roraima, elev 1185–1280 m, Steyermak 58559 (F, US, VEN); between Kun and

Collected in flower and fruit in almost all months.


Branches glabrous. Lamina of the leaves 7–17 cm long, 4.1–8.5 cm wide, obtuse to cordate at the base, short- to long-acuminate at the apex, falcate, coriaceous to fleshy, glabrous on both sides, the marginal glands minute; petiole 7–20 mm long. Inflorescence minutely puberulent, the hairs white or gray, the reduced leaves glabrous, the branches subtending the umbels 1–8 mm long.

Type. *Schultes & Cabrera 16387*, Caño Guacayá, Río Miritiparaná, 0°30′S, 70°40′W, elev 210 m (holotype US, isotypes GH, NY, U).


Collected in flower and fruit in diverse months.


Woody vines, often riverine. Leaves opposite, sericeous to glabrate with short, straight, appressed hairs, the stipules small, free, interpetiolar. Inflorescence axillary, shorter than the subtending leaves, of 1–several simple 4-flowered umbels or 1–several racemes of up to 7 4-flowered umbels; floriferous peduncle absent; bracts and bracteoles similar, lingulate, eglandular, spreading, persistent, borne in a cluster of 12 at base of umbel. Calyx with the lateral 4 sepals biglandular, the anterior eglandular or rarely 1-glandular. Petals yellow, fimbriate, abaxially sparsely sericeous. Stamens 10, all fertile, the filaments glabrous, those opposite the sepals longer than those opposite the petals, those of the 3 posterior stamens inflexed between the posterior styles, the anthers unequal. Ovary of 3 free carpels adnate to a common torus, 1 anterior and 2 posterior, all fertile, densely hairy; styles 3, free, with capitulate terminal stigmas. Fruit schizocarpic, breaking apart
into 3 mericarps (or fewer due to abortion) separating from a short pyramidal torus; nut of the mericarp with a hard woody pericarp, bearing a dorsal crest and 2–several lateral winglets or crests parallel to the areole and interconnected by ridges, sericeous.


*Diplopterys* was established by Jussieu for the single species *D. paralias*, which is now considered a synonym for *D. pauciflora*. Niedenzu amplified the genus to include *Jubelina*, *Mezia*, and *Diplopterys spruceana* Niedenzu, as well as *D. pauciflora*. His amplified *Diplopterys* is a very artificial group that must be dismembered. *Jubelina* and *Mezia* are recognized here as distinct mascagnioid genera. *Diplopterys spruceana* is here transferred to *Mascagnia*, as *M. heterocarpa*, because of its similarity to *M. leucanthele* and *M. guianensis*. That reduces *Diplopterys* to its type again, to which one can add the species treated here and two new ones soon to be described by Dr. Bronwen Gates. These constitute a group of closely related species clearly derived from *Banisteriopsis*, indeed, scarcely distinguishable from it in flower. The samara has lost the elongated dorsal wing of *Banisteriopsis*, the nut is enlarged, and the lateral winglets are enlarged and interconnected, so that the two genera are quite easily distinguished in fruit. Dr. Gates has decided to maintain *Diplopterys* as a natural and convenient segregate from *Banisteriopsis*, a decision which I support. She will include a brief revision of *Diplopterys* in her forthcoming monograph of *Banisteriopsis*, which see for more discussion of the relationship of the two groups. The treatment of *Diplopterys* in this paper is adapted from her manuscript.


Woody vine, the stems golden-sericeous to eventually glabrate. Lamina of the leaves (8.5–)10–21(–26) cm long, (3–)4.1–9 cm wide, elliptical, falcate, truncate at the base, long-acuminate at the apex with the acumen up to 3 cm long, coriaceous, glabrate above, sparsely sericeous below, the revolute margin bearing many minute impressed glands; petiole (4–)8–15(–22) mm long, sericeous to glabrate, bearing 2 large convex glands at the apex; stipules minute, triangular, often joined by an interpetiolar line. Inflorescence axillary, composed of 4-flowered umbels borne singly or in short racemes or condensed panicles, sericeous, the bracts and bracteoles (1.5–)2–3 mm long, lingulate, spreading. Pedicel 5–12 mm long, sessile, sparsely sericeous to glabrate. Sepals reflexed apically, the lateral 4 biglandular with the glands 1–1.8 mm long, the anterior eglandular or rarely bearing 1 gland. Petals yellow, sparsely sericeous abaxially in the middle of the limb, long-fimbriate, eglandular, the antero-lateral pair with the claw 1–1.5 mm long, the limb 7–8 mm long and wide, concave, the postero-lateral pair with the claw 0.5–1 mm long, the limb 5–7 mm long, 4–5.5 mm wide, broadly elliptical, flat, the posterior petal erect, the claw 2.5–3.5 mm long, constricted at the apex, the limb 4.4–5.5 mm long, 3–4.5 mm wide, obovate. Filaments 1.6–2.8 mm long, glabrous, up to ½ connate; anthers 0.8–1 mm long, the locules sparsely hairy to glabrate, those opposite the sepals with the connective broadly obovate and papillose, those opposite the petals with the connective oblong and smooth to papillose. Styles 1.4–1.6 mm long, the anterior slightly shorter than the posterior
Fig 34. *Diplópterys cabrerana*. a) Habit, × 0.5; b) leaf base with glands, ×1.5; c) umbel of 4 buds, ×2; d) petals, upper a postero-lateral, lower a posterior (flag), ×4; e) part of androcium, stamen to left opposite anterior sepal, stamen to right opposite posterior petal, ×10; f) gyneceum, anterior style in center, ×10; g) mericarp with short wings, abaxial view (left), adaxial view (middle), cross section (right), ×1; h) mericarp with long wings, abaxial view (left), adaxial view (right), cross-section (below), ×1. Drawn by Karin Douthit, a–f from Schultes & Cabrera 17297, g from Krukoff 8971, h from Williams 14965.
2, straight and parallel or the posterior 2 diverging, bearing stiff straight hairs at the base, the stigmas capitate. Mericarp without a carpophore, sericeous, circular, the nut up to 15 mm long and wide, bearing a dorsal crest or winglet 1–5 mm wide and essentially 4 ridges or winglets on each side 0.5–10 mm wide, irregular, dissected and interconnected with transverse ridges.

Type. Schultes & Cabrera 17297. Caño Teemeeña, Río Piraparaná, Vaupés, Colombia, Sep flr (holotype US).


This plant is widely used by Indians, alone or with Banisteriopsis caapi, to make hallucinogenic drinks. It has commonly been misidentified as Banisteriopsis rusbyana, especially in the ethnobotanical literature. See the discussion by Dr. Bronwen Gates in her forthcoming monograph.


Woody or herbaceous vines, rarely shrubs. Leaves opposite or rarely alternate or subopposite, the lamina entire or lobed, the petiole usually long and bearing two large glands at its apex, the stipules interpetiolar, free, inconspicuous. Inflorescence a dichasium of congested pseudoracemes, these usually corymbose or umbellate, rarely reduced to a few flowers; bracts and bracteoles small; floriferous peduncle and pedicel present, or the peduncle absent. Lateral 4 sepals biglandular, the anterior eglandular. Petals yellow or yellow and red, the posterior (flag) erect and smaller than the spreading lateral 4. Filaments unequal in length and thickness, thickest opposite the carpels (i.e. opposite the anterior sepal and the 2 posterior-lateral petals); anthers 10, very unequal, the 4 opposite the lateral sepals with much-reduced locules and the 1 opposite the posterior petal often small. Ovary of 3 carpels partially connate, 1 anterior and 2 posterior, all fertile or, according to Niedenzu, the anterior sterile in some species; styles 3, with the apex internally stigmatic and dorsally truncate, hooked, or (most often) bearing
a foliaceous appendage, the latter symmetrical on the anterior style and unilateral on the posterior styles. Fruit schizocarpic, breaking apart into 3 samaras (or fewer due to abortion) separating from a pyramidal torus, each samara having its largest wing dorsal, thickened on the adaxial (upper) edge, the veins terminating in the thinner abaxial edge; much shorter winglets or crests present on the sides of the nut in some species; dorsal wing rudimentary in a few species.

**Type.** *Stigmaphyllon auriculatum* (Cavanilles) Adr. Jussieu.

*Stigmaphyllon* comprises approximately 80 species of the American tropics and subtropics; one species (*S. ovatum*) has been found at least once in West Africa.

**Key to the Species of *Stigmaphyllon* in Guayana**

1. Lamina of the leaf cordate at the base, usually obtuse or rounded (occasionally acute or slightly acuminate) at the apex, with several prominent marginal glands and the venation basally palmate; pedicel about as long as the peduncle; petals erose or dentate; stamens opposite the posterior-lateral petals about as long as that opposite the anterior sepal; nut of samara with a lateral crest at right angles to axis of wing; wing of samara narrowed beyond nut, then flared, widest distally.

2. Anterior style with the dorsal appendage foliaceous, i.e. extended on each side into broad, rounded foliololes, similar to the appendages of the posterior styles but symmetrical.

1. *S. hypoleucum*.

2. Anterior style with the dorsal appendage hook-shaped, unwinged, quite different from the foliaceous appendages of the posterior styles.

2. *S. brachiatum*.

1. Lamina of the leaf cuneate to rounded at the base, acuminate at the apex, with the margin eglandular (or rarely with a few tiny, obscure glands) and the venation pinnate, even at the base; pedicel usually at least twice as long as the peduncle; petals fimbriate, especially the posterior 3; stamens opposite the posterior-lateral petals distinctly shorter than that opposite the anterior sepal; nut of samara without a lateral crest, often longitudinally rugose (parallel to axis of wing); wing of samara widest at the base.

3. *S. puberum*.

1. **Stigmaphyllon hypoleucum** Miquel, Linnaea 18: 51. 1844.  
   
   *Banisteria fulgens* sensu Lamarck, Encycl. Bot. 1: 368. 1783, non Linnaeus.
   *Banisteria splendens* de Candolle, Prodr. 1: 588. 1824, nom superfl.

Vines, the stems thinly sericeous to eventually glabrate. Lamina of the larger leaves (6–)8–16 cm long, (6.5–)7.5–15 cm wide, broadly ovate to circular, moderately to deeply cordate at the base, usually obtuse to rounded or retuse and mucronate at the apex (less often acute or slightly acuminate), with several small marginal glands and often indented at the glands, sericeous to soon glabrescent above, very densely to thinly but persistently sericeous below, the hairs 0.2–0.4 (–0.5) mm long, usually sessile and very tightly appressed, occasionally short-stalked and looser, the lateral veins basally palmate; petiole 25–95 mm long, sericeous, with 2 large apical glands; stipules ca 0.7 mm long and 1.5 mm wide, triangular, persistent or deciduous. Floriferous bracts 0.5–1 mm long, eglandular; peduncle and pedicel about equal, each 4–7 mm long (–10 mm in fruit); bracteoles 1–1.5 mm long, eglandular or each bearing 2 tiny basal glands. Sepals obtuse or
Fig 35. *Stigmaphyllum hypoleucum*. a) Fruiting branch, ×0.5; b) flower, ×2.5; c) flower with petals removed, side view, anterior sepal to right, ×5; d) part of androecium, stamen to right opposite anterior sepal, stamen to left opposite posterior petal, ×5; e) styles, posterior view, anterior style in center, ×5; f) fruit of 2 samaras, ×0.75. Drawn by Karin Douthit from *Wurdack 34434*. 
rounded at the apex, abaxially sericeous, adaxially glabrous. Petals yellow or red and yellow (the outermost often ± red and the posterior often with basal red blotches), dentate or erose, glabrous or thinly sericeous; anterior-lateral petals with the claw 1.5–2.5 mm long, the limb 7–13 mm long, 7–11 wide, truncate at the base; posterior-lateral petals with the claw 0.5–1.5 mm long, the limb 6–10 mm long and wide, cuneate at the base; posterior petal with the claw 3–3.5 mm long, the limb 5–9 mm long, 4–7 mm wide, constricted at the base. Filaments glabrous, flanged and connate in the proximal \( \frac{1}{3}–\frac{1}{2} \), 3–3.5 mm long opposite anterior sepal, anterior-lateral sepals, and posterior-lateral petals, 2–2.6 mm long opposite anterior-lateral petals, posterior-lateral sepals, and posterior petal; anthers glabrous, the anterior 7.1–1.7 mm long, the 2 opposite the anterior-lateral sepals with large, glandular connectives and the locules much-reduced; posterior 3 anthers 0.6–0.9 mm long, all with small locules. Ovary with all 3 locules fertile; styles 2.5–4 mm long, often proximally hirsute, all with large, rounded horizontal or pendent folioles covering the opposite anthers; anterior style straight, with the dorsal appendage 1.5 mm long, 1.7–2.5 mm wide; posterior styles somewhat twisted, the dorsal appendage 2 mm long, 1.2–1.5 mm wide. Samara 34–45 mm long, sericeous to glabrate, the wing 12–17 mm wide, narrowest beyond nut and then flared, widest distally, bearing a basal adaxial projection 2–4 mm high; nut bearing an often dissected lateral crest to 2 mm wide.

Type. *Focke 683*, juxta flumina Boven-Cottica, Surinam (U?).

Collected in flower and fruit at various times, but in Guayana most frequently from January to July.

Cuatrecasas (1958) has shown that the name Stigmaphyllon fulgens cannot be applied to this species because its basionym is a later homonym (actually a mis-application) of a Linnaean name. However, Cuatrecasas should not have used de Candolle’s name Banisteria splendens, because it is a superfluous name and therefore illegitimate. In his protologue de Candolle cited as a synonym the legitimate name Banisteria heterophylla Willdenow, which he set aside because it was inappropriate. Willdenow’s name cannot be used in Stigmaphyllon because there is already a Stigmaphyllon heterophyllum, so I am adopting the next oldest name, S. hypoleucum Miquel. There are at least two older names, one of which may eventually displace this one (S. richardianum Jussieu and S. macropodium Jussieu, both published in the Synopsis in 1840), but it is not obvious from the descriptions or photographs of the types that these species are conspecific with S. hypoleucum, so for the present the latter name seems to be the best choice.

The description above is based only on the collections cited; the flowers are smaller in some extra-Guayana populations.

This species is very variable, particularly in size, shape, and hairiness of the leaves. However, the variations in different characters are not well correlated. In different parts of the range, almost every degree of sericeousness is associated with leaves varying from very large and orbicular to small, ovate, and acute. There is also considerable variation in size and coloration of the petals. The older name Stigmaphyllon martianum Adr. Jussieu (1840) seems to apply to plants from Manaus and that part of Amazonia with the leaves ovate, truncate or slightly cordate at the base, acute to acuminate at the apex, not indented at the margin, and very thinly sericeous below, and with very large, mostly yellow petals. A few Guayana collections approach it, but I have treated them here as S. hypoleucum sens lat. The whole complex, including S. hypoleucum, S. martianum, and S. brachiatum, needs thorough revision.

The appendage of the anterior style is quite atypical in Maguire et al 44142 and Williams 11239. In both the lateral folioles are reduced and the axis is extended, producing an appendage intermediate between that of Stigmaphyllon hypoleucum and S. brachiatum. See further discussion under S. brachiatum.


This species seems hardly different from Stigmaphyllon hypoleucum except for the stylar character given in the key; the appendages of the posterior styles also tend to be smaller in S. brachiatum. See the description of S. hypoleucum.

Type. Triana, Villavicencio, Colombia.

Distribution. Northern South America. Guayana collections: VENEZUELA. Bolívar: Carretera El Pao-San Félix, elev 250 m, Aristeguieta 2285 (NY, VEN); Santa María de Erebató, 5°5’N, 64°40’W, elev 350 m, Steyermark et al 109847 (NY). Amazonas: San Juan de Manapiare, elev 375–425 m, Agostini 1504 (MICH); Mavaca, Aristeguieta & Lizot 7371 (NY, VEN); Isla del Ratón, elev 90 m, Breteler 4721 (VEN, WAG); El Maco. Río Ventuari, Foldats 108A (VEN); Boca del Vichada, elev 100 m, Holt & Gehriger 221 (NY, US); Base Camp, Cerro
Camani, elev 200 m, Maguire 31802 (NY, VEN); San Juan de Manapiare, elev 100 m, Morillo 3174 (VEN); Casiquiari, Vasiva, and Pacimoni Rivers, 1853–4, Spruce 3277 (MG, NY). COLOMBIA. Vaupés: Mitú to Monfort, E. W. Davis 107 (MICH); Miraflores, elev 300 m, Gutierrez V. & Schultes 819 (COL); Río Guaviare, desembocadura del Ariari con el Río Guayabero, Pinto E. & Sastre 938 (COL).

Collected in flower and fruit most often from January to May.

The shape of the stylar appendages is traditionally important in the taxonomy of Stigmaphyllon, and on that basis Niedenzu placed S. brachiatum and S. hypoleucum in different subgenera. However, except for the presence or absence of lobes on the appendage of the anterior style the two species are indistinguishable. It seems probable that S. brachiatum is derived from S. hypoleucum by loss of the folioles on the anterior style. This idea is supported by Williams 11239, which is from the Medio Caura where S. hypoleucum is common and S. brachiatum unknown. Its anterior style is intermediate between the two forms, and in the circumstances the intermediate form seems likelier to have originated directly through modification of local S. hypoleucum than through hybridization. Indeed, Stigmaphyllon brachiatum may not be a monophyletic taxon. In Bolívar it mimics eastern forms of S. hypoleucum, while the populations of western Amazonas and Colombia are more like the Orinoco populations of S. hypoleucum, which suggests its origin on at least two occasions, perhaps more. This raises an obvious question about its taxonomic status, which I shall not attempt to resolve here.

A most interesting collection is Maguire et al 44142 from the Río Caquetá in Colombia. The anterior style has an extended axis and small, triangular folioles, the result being unlike the usual condition in either species. In other respects the plants are most like Colombian collections of S. brachiatum. Stigmaphyllon hypoleucum sensu stricto is not yet known from Colombia, but Maguire’s intermediate leads me to predict that it will be found there, probably on the lower Ríos Vaupés, Apaporis, or Caquetá.


Vines, the stems densely sericeous to eventually glabrate. Lamina of the larger leaves 10–15 cm long, 4–7 cm wide (~10.5 cm in Central America), narrowly to broadly ovate or subelliptical, cuneate to rounded at the base, entire and nearly or quite eglandular at the margin, acuminate at the apex, sericeous to glabrate above, the hairs often persistent on the midrib, persistently sericeous below, the venation pinnate, even at the base, the reticulum prominulous above; petiole 15–45 mm long, densely sericeous, biglandular at the apex; stipules minute to 1 mm long, subulate or triangular, borne near base of petiole, persistent. Inflorescence densely sericeous, each umbel with 4–8(–15) flowers; bracts 1–2 mm long, eglandular; peduncle 1–4 mm long; bracteoles 1–1.5 mm long, eglandular. Pedicel 4–8 mm long, usually at least twice as long as peduncle. Sepals ovate, rounded at the apex, abaxially sericeous, adaxially glabrous. Petals yellow and red, fimbriate (the posterior 3 more deeply so than the anterior 2), glabrous; anterior-lateral
petals with the claw 2–2.6 mm long, the limb 7.5–10 mm long and wide, truncate at the base; posterior-lateral petals with the claw 0.5–1(–2) mm long, the limb 5.5–7.5 mm long and wide, cuneate at the base; posterior petal with the claw 3–3.5 mm long, the limb 5–6 mm long, 4–5 mm wide, constricted at the base. Filaments glabrous, up to ½ connate, 3.5–4.5 mm long opposite the anterior sepal, 1.8–2.8 mm long opposite anterior-lateral petals, posterior-lateral sepals, and posterior petal, (2.5–)3–3.5 mm long opposite anterior-lateral sepals and posterior-lateral petals; anthers glabrous, the anterior 7 1–1.3 mm long, the 2 opposite the anterior-lateral sepals with large, globose, glandular connectives and the locules much-reduced; posterior 3 anthers 0.5–0.9 mm long, all with small locules. Ovary with all 3 locules fertile; anterior style 4–4.5 mm long, the dorsal appendage an arcing axis 1.1–1.3 mm long, bearing pendent foliolo, the total width ca 2.6 mm; posterior styles 2.5–3.5 mm long, the dorsal appendage 0.8–1.3 mm long, 0.6–0.8 mm wide, horizontal or somewhat pendent. Samara 22–40 mm long, sericeous to glabrate, 10–15 mm wide, widest at the base with the wing partly surrounding the nut; nut without a lateral crest but often longitudinally rugose (parallel to axis of wing).

Type. *Leblond* 44, French Guiana (G).

Distribution. Lowlands of northern South America to Belize and the West Indies. Collections from Guayana and nearby: GUYANA. Kamakusa, upper Mazaruni River, Jul flr/frt, *De La Cruz 4087* (NY); Mazaruni Station, Jul frt, *Forest Dept. 2971* (NY) & Jan frt, *Forest Dept. 4935* (NY); Oko Creek, Cuyuni River, elev 90 m, *Tuin 342* (US). VENEZUELA. Delta Amacuro: Between La Margarita and Puerto Miranda, Río Acury, elev 80–100 m, Nov flr, *Steyermark 87775* (MICH).


Woody vines, shrubs, or small trees, the leaves opposite or very rarely alternate or whorled, usually bearing glands on the lamina or petiole or both, the stipules very small, free, triangular, borne on or beside base of petiole, often apparently absent. Flowers borne in umbels, corymb, or pseudoracemes, these single or grouped in racemes or panicles, axillary or terminal or both; floriferous peduncle usually developed, absent in some species, subtended by a bract and bearing 2 bracteoles at or below the apex, the bract and/or the bracteoles glandulariferous in some species. Petals mostly yellow or pink, occasionally white, bronze, maroon, or lilac, glabrous in all but a few species. Stamens 10, all fertile, the anthers more or less alike and glabrous in all but a few species, the connective never exceeding the locules. Ovary of 3 carpels partially connate, 1 anterior and 2 posterior, all fertile; styles 3, the apex with a large internal stigma and dorsally rounded, truncate, acute, or hooked. Fruit schizocarpic, breaking apart into 3 samaras (or fewer due to abortion) separating from a short pyramidal torus, each samara having its largest wing dorsal, thickened on the abaxial (lower) edge and (in most species) bent upward, the veins terminating in the thinner adaxial edge; much shorter winglets or crests present on the sides of the nut in some species; dorsal wing rudimentary in a few species.

Type. *Heteropterys purpurea* (L.) H.B.K.
This is a difficult genus of perhaps 120 species, with one in Africa (H. leona), the rest occurring from Mexico to Argentina.

Key to the Species of *Heteropterys* in Guayana

1. Sepals erect or incurved; petals exposed early and through most of the enlargement of the bud.
2. Pedicels sessile.
3. Woody vine; petiole usually 10–20 mm long; lamina 10–15 cm long, 5–11 cm wide, the hairs (especially below) clearly stalked.
4. Leaves tomentose, with serpentine or twisted hairs, golden-brown below; posterior petal with the claw 2.5–3 mm long and the limb 5 mm in diameter; filaments 2.5–3 mm long.  
   1. *H. neblinensis*.
5. Leaves velutinous, with erect bifurcate hairs, greenish below; posterior petal with the claw 1.5 mm long and the limb ca 3 mm in diameter; filaments 1.3–2 mm long.  
   2. *H. olivacea*.
3. Shrub or slender tree to 2.5 m tall; petiole 5–10 mm long; lamina 3–8 cm long, 2–4 cm wide, the hairs nearly or quite sessile.  
   3. *H. steyermarkii*.
2. Pedicels pedunculate.
5. Mature lamina glabrous or glabrate below or only sparsely sericeous, the vesture not apparent without a lens.
6. Petals yellow, abaxially smooth or with the midvein prominent; anthers loosely sericeous; petiole 15–22 mm long, eglandular or biglandular at or above the middle; lamina 9–20 cm long, 5–12 cm wide; samara 63–80 mm long.
   4. *H. lasseri*.
6. Petals pink or white and pink, abaxially prominently winged; anthers glabrous; petiole 4–12 mm long, usually biglandular near the base; lamina 6–12.5 cm long, 3.3–6.5 cm wide; samara 28–37 mm long.
   5. *H. cristata*.
5. Mature lamina persistently and prominently sericeous or tomentose below.
7. Leaves tomentose below; petals pink or pink and white, 4 or all of them abaxially prominently winged; nut of the samara usually bearing short lateral crests or winglets; lamina of larger leaves 4.5–12.5 cm long, 3–6.5 cm wide.
8. Lamina eventually glabrate below, soon glabrate and shining above; pedicel 5–9 mm long; bracteoles appressed; stigma laterally compressed, higher than wide.
   5. *H. cristata*.
8. Lamina quite persistently tomentose below, ± persistently tomentose above and not shining; pedicel 2–3 mm long; bracteoles spreading; stigma laterally expanded, at least twice as wide as high.
   6. *H. beecheyana var alata*.
7. Leaves tightly sericeous below; petals yellow, abaxially carinate; nut of the samara with the sides quite smooth; lamina of larger leaves 11–20 cm long, 6.5–10.5 cm wide.
   7. *H. macrostachya*.
1. Sepals revolute at the apex; petals concealed by sepals during enlargement of the bud.
9. Inflorescence composed of umbels or coryms of 4–6(–8) flowers or of short crowded pseudoracemes with 1–3 pairs of flowers and then a terminal umbel, the axis (excluding the floriferous peduncles and pedicels) up to 1.5 cm long (sometimes to 2.5 cm in *H. nervosa*).
10. Lamina glabrous below.
11. Branches of the inflorescence usually with 1–3 pairs of flowers below the terminal umbel; very fine reticulum about as prominent above as below.
   8. *H. nervosa*.
11. Branches of the inflorescence usually without flowers developed below the terminal umbel; reticulum more prominent on one side than on the other.
12. Largest leaves with the petiole up to 5 mm long and the lamina up to 7.7 cm long and 3.2 cm wide, the lateral veins only prominent below.
12. Largest leaves with the petiole 7–15 mm long and the lamina 11–21 cm long and 4.5–9 cm wide, the lateral veins prominent below.

10. Lamina sparsely to densely sericeous or tomentose-sericeous below (older leaves sometimes eventually glabrescent).

13. Bracts (and often bracteoles) reflexed or revolute; lamina sparsely sericeous below, the vesture visible only with a lens.

14. Axillary and terminal panicles 10–30 cm long; pedicels about as long as peduncles, neither twice nor half as long.

14. Axillary panicles (including pedicels but excluding fruits) 1.5–3 cm long; pedicel over twice as long as peduncle.

11. H. oligantha.

13. Bracts and bracteoles ascending; lamina moderately to densely sericeous or tomentose-sericeous below, the vesture visible without a lens.

15. Sepals with the hairs uniformly dark brown; petals sparsely pilose, especially on the margins, to glabrate; lamina of the larger leaves 2–4 cm wide, the reticulum not visible above.

12. H. cuatrecasasii.

15. Sepals with the hairs proximally rust-brown, distally white; petals abaxially persistently sericeous; lamina of the larger leaves 5–7 cm wide, the reticulum visible above.


9. Inflorescence composed of elongated pseudoraecemes not terminating in umbels, these mostly over 2.5 cm long, often much longer.

16. Lamina of the largest leaves 17–30 cm long and (7–)8–13 cm wide; wing of the samara 22–37 mm wide.

17. Bracts 5–8 mm long, 3–6 mm wide; bracteoles 4–5 mm long, 3–4 mm wide; samara 3.5–5 cm long, the nut 1.7 cm or more across, the abaxial edge of the wing recurved; lateral petals with the limb mostly 4.5–6.5 mm long, 4.2–5.5 mm wide.


17. Bracts and bracteoles 2–3 mm long, 1.5–2 mm wide; samara 5–6 cm long, the nut less than 1 cm across, the abaxial edge of the wing bent upward; lateral petals with the limb 3–4.6 mm long, 2.8–4.2 mm wide.

15. H. riparia.

16. Lamina of the largest leaves up to 17 (rarely 18) cm long and 7 (very rarely 8) cm wide; wing of the samara 5–14 mm wide.

18. Lamina obtuse or rounded at the apex; leaves opposite, alternate, or whorled, often variable on the same stem, strictly decussate usually only in short, small-leaved forms (juveniles? stump sprouts?); shrublets, shrubs, or small trees.

H. oblongifolia complex.

19. Lamina moderately to strongly revolute, with the fine reticulum much more prominent above than below; vegetative internodes nearly or quite glabrous; lower epidermis papillose (due to protruding starch grains in guard cells), often glaucous.

16. H. oblongifolia.

19. Lamina nearly or quite flat, with the reticulum about as prominent below as above or more prominent below; vegetative internodes minutely sericeous to glabrate; lower epidermis smooth or obscurely papillose, not glaucous.

17. H. atabapensis.

18. Lamina acute or acuminate at the apex, or if obtuse the plant a woody vine; leaves strictly decussate; shrubs, small trees, or woody vines.

20. One or both bracteoles usually bearing 1–2 prominent abaxial glands; petiole sometimes bearing 1–2 glands on the distal half; wing of the samara usually flabelliform, the abaxial edge often recurved.

18. H. orinocensis.

20. Bracteoles usually eglandular, rarely with minute marginal glands; petiole eglandular; wing of the samara elongated, obovate or falcate, the abaxial edge usually curved or bent abruptly upward.

21. Samara reflexing during elongation and developing with the wing pointed downward; lamina "glaucous" below due to the prominent whitish guard cells; campos near Caracaraí, Roraima Territory, Brazil.

1. **Heteropterys neblinensis** Anderson, sp nov

Liana lignosa, ramis teretibus sericeis. Folia opposita vel raro verticillata; lamina 10–15 cm longa, 6–11 cm lata, subcircularis vel late ovata vel elliptica, basi plerumque rotundata, margine revoluta, apice rotundata apiculataque vel abrupte brevi-acuminata, supra primo tomentosa pede pilorum brevi trabecula serpentina demum glabrescens praeter nervos principals, subitus dense et pertinaciter sulphureo-tomentosa pede pilorum ca 0.2 mm longo trabecula 0.6–1.2 mm longa subdirecta, serpentina, vel valde tortuosa, eglandulosa vel sub margine aliquid glandulis parvis munita, nervis lateralis et tertiaris supra impressis subitus prominentibus; petiolum 14–20 mm longus, 2–3 mm diametro, pertinaciter sericeus vel demum glabrescens, basi biglandulifer glandulis 1.5–3 mm diametro; stipulae non visae. Infloroscentia racemosa (vel raro panicula) 7–11 umbellarum, axillaris et terminalis, 10–22 cm longus, tomentoso-sericeus; umbella 5–15(–20?)–flora, in pedunculo 1–5 cm longo portata, 2 bracteis parvis glanduliferis subtenta, bracteis bracteolisque floriferis 1–1.5 mm longis, eglandulosus, persistentibus, pedunculo florifero nullo. Pedicellus 7–15 mm longus, 1–1.5 mm diametro, appresso-tomentosus. Sepala 4 lateralia 8 glandulas 1.5–2.5 mm longas ellipticas vel obovatas non compressas 2–2.5 mm superantia, 2.5–2.7 mm lata, anticum eglandulosum vel biglandulosum, omnia ovata vel triangularea, apice obtusa, appressa, abaxialiter sericea, versus marginem glabra, adaxialiter glabra. Petala aenea vel lutea et aenea, glabra, concava, abaxialiter laevia, 4 lateralia recurvata, ungue 2–2.5 mm longo, limbo 5 mm longo latoque, margine denticulato eglandulosus; posticum atrius, erectum, ungue 2.5–3 mm longo, limbo 5 mm longo, 4.5–5.5 mm lato, margine toto circuitu glandulosum-dentato. Filamenta 2.5–3 mm longa, glabra, basi connata, recta vel paulo sinuata, 2 petalis postico-lateralis opposita multo crassiora quam ceteris; antherae 1.3–2 mm longae, 2 petalis postico-lateralis oppositae longissimae, glabras, connectivo proximaliter atrorubro distaliter luteo. Ovarium 1.5 mm altum, sericeum; styli 2.5 mm longi, anticus paulo brevior, glabri vel basi sericei, recti vel paulo divergentes, apice "pedaliformi" i e plano et dorsalis brevissime uncinato unco rotundato. Samara 32–35 mm longa, tomentoso-sericea; ala dorsalis ca 25 mm longa, 11–12 mm lata, margine abaxiali recto vel paulo sursum curvato; nux 8 mm longa, 5–6 mm alta, lateribus ecristata paulo rugulosa.


Distribution. Known only from the type locality and nearby. Paratypes: **Maguire et al 42111**, Nov flr (NY); **Maguire et al 42464**, Dec flr (MICH, NY, VEN); **Maguire et al 42537B**, Dec flr (NY).

**Heteropterys neblinensis** is referable to Niedenzu’s section **Macroprosopis** series **Holopetalum**. It is distinguished from the known species of that series by its terete stem, its leaves rounded at the base and sulphur-yellow below, its many-flowered umbels, and the petals “bronze” or “pale yellow tinged with bronze.”
Fig 36. *Heteropterys neblinensis*. a) Flowering branch, ×0.5; b) hairs, left to right from adaxial side of lamina, abaxial side, and axis of inflorescence, ×75; c) flower, ×3; d) stamens, left one opposite posterior petal, ×9; e) stigma, ×28; f) samara, ×1.1. Drawn by Annette Seidenschnur Mahler, a–e from Maguire et al 42111, f from Maguire et al 37207.
The species most similar to *H. neblinensis* is *H. olivacea*; the characters that distinguish them are summarized in the key. This species is named for the Cerro de la Neblina, which has one of the most interesting endemic floras in South America.

2. *Heteropterys olivacea* (Cuatrecasas) Anderson, comb nov

*Stigmaphyllon olivaceum* Cuatrecasas, Ciencia 23(4): 141. 1964.

Vine, the younger stems velutinous, the older stems glabrescent and woody. Lamina 12.5–13.5 cm long, 6.7–7.5 cm wide, elliptical, obtuse or rounded at the base, slightly revolute at the margin, acute with a short process at the apex, persistently velutinous on both sides, the hairs below denser but finer than above and mostly colorless except on the veins, erect, long-stalked, V-shaped to almost T-shaped, the epidermis showing through as green except on the veins, the lateral and tertiary veins impressed above and prominent below; petiole 13–15 mm long, velutinous, with 2 large basal glands; stipules not seen. Inflorescence an axillary or terminal panicle of umbels, the umbel with 5–8 flowers, subtended by 2 small glandular bracts, the floriferous bracts and bracteoles 0.5–1 mm long, eglandular, persistent, the floriferous peduncle absent. Pedicel 7 mm long, 1 mm in diameter, velutinous. Sepals ca 1 mm long beyond the glands, 1.3 mm wide, appressed, sometimes very slightly revolute at the margin, abaxially velutinous except glabrous and membranous near the ciliate margin, adaxially glabrous, the lateral 4 bearing 8 glands, the anterior eglandular. Petals yellow, glabrous, the lateral 4 with the claw ca 1.5 mm long and the limb 4–5 mm in diameter, entire or denticate; posterior petal with the claw 1.5 mm long and the limb ca 3 mm in diameter, with an entire, slightly glandular-thickened margin. Filaments 1.3–2 mm long, glabrous, connate at the base, straight, the 2 opposite the posterior-lateral petals much thicker than the others; anthers 1.4–1.7 mm long, longest on the thicker filaments, glabrous, the connective proximally dark red, distally yellow. Ovary 0.8 mm high, velutinous; styles ca 2 mm long, straight, pediform at the apex with the dorsal projection very short and rounded. Fruit unknown.

Type. *Schultes & Cabrera* 14591, Río Apaporis, Raudal de Jirijirimo (below mouth of Río Kananari), Amazonas-Vaupés, Colombia, 0°5′N, 70°40′W, elev 270 m, 25 Nov 1951 flr (holotype US!).

Presumably Dr. Cuatrecasas described this species in *Stigmaphyllon* because of its umbellate inflorescence. However, the ten subequal anthers and the three subequal unappendaged stigmas make that placement very doubtful. Moreover, this plant is very similar in most characters to the undoubted *Heteropterys* described above as *H. neblinensis*. I am therefore fairly sure that *Heteropterys* is its correct genus, although it is still known only from the type, which lacks fruits.

3. *Heteropterys steyermarkii* Anderson, sp nov

Frutex vel arbor parva 1.5–2.5 m alta, ramis paucis, tenuibus, sericeis. Folia opposita vel raro verticillata; lamina foliorum majorum 3–8 cm longa, 2–4 cm lata, elliptica, late elliptica, vel paulo obovata, coriacea, basi cuneata vel rotundata, margine crassiuscula, interdum paulo revoluta, apice obtusa vel rotundata et saepe apiculata, utrinque sericea vel appresso-tomentosa pilis fere sessilibus
Fig 37. Heteropterys steyermarkii. a) Flowering branch, ×0.7; b) hairs, lowest from abaxial side of lamina, others from axis of inflorescence, ×130; c) flower, ×2.7; d) stamens, the middle one opposite the posterior petal, ×9; e) gynoecium, the middle style opposite the anterior sepal, ×9; f) samara and torus, ×1.3. Drawn from the type by Annette Seidenschnur Mahler.
et persistentibus vel supra demum deciduis, vel in eodem populo fere glabra permox glabrata, subtus epidermide albo- vel luteo-papillosa, nervis utrinque prominulis vel supra obscuris; petiolus 5–10 mm longus, sericeus, basi biglandularis, glandulis 0.5–1 mm diametro; stipulae non visae. Inflorescentia umbella terminalis 3–11-flora, 2 foliis vel bracteis glandulariferis subtenta, bracteis bracteolisque floriferis usque 1 mm longis, eglandulosus, persistentibus, pedunculo florifero nullo. Pedicellus 8–15 mm longus (–22 mm in fructu), sericeus. Sepala glandulas 0.8–1.5 mm longas ellipticas vel circulares non compressas 1–1.8 mm superantia, 1.9–2.4 mm lata, 4 lateralia biglandulosa, anticum eglandulosum vel 1–2 glandulis parvis munitum, omnia ovata, apice obtusa, appressa, abaxialiter sericea, adaxialiter glabra. Petala glabra, concava, abaxialiter laevia, 4 lateralia brunneo-marronina, patentia, ungue 1.8 mm longo, limbo 5 mm longo, 6 mm lato, margine denticulato eglanduloso; posticum album, erectum, ungue 2.5 mm longo, limbo 4 mm longo, 5 mm lato, margine basi vel toto circuitu glandulooso-dentato. Filamenta 1.5–2 mm longa, glabra, basi ½ connata, recta; antherae 1.4–1.6 mm longae, connectivo toto aequaliter luteo. Ovarium 1 mm altum, sericeum: styli 2 mm longi, anticus paulo brevior, glabri, recti, apice pedaliformi dorsaliter uncinato unco 0.4 mm longo, angusto, obtuso. Samara 18–30 mm longa, tomentososericea; ala dorsalis 13–24 mm longa, 8–14 mm lata, margine abaxiali plerumque leviter sursum curvato; nux 5–7 mm longa, 4–5 mm alta, lateribus ericristata rugulosa; torus pyramidalis 2–3 mm altus.


Distribution. Known only from Cerros Autana and Sipapo. Paratypes: VENEZUELA. Amazonas, Cerro Sipapo (Paráque): Pockets in rocky savanna near Camp Savanna, elev 1500 m, Dec frt, Maguire & Politi 27524 (MICH, NY, VEN); marsh, elev 1500 m, Dec frt, Maguire & Politi 27694 (NY); South Basin Savanna, elev 1860 m, Jan frt, Maguire & Politi 28673 (NY, VEN).

This most interesting species is named in honor of Julian Steyermark, whose tireless efforts have so greatly advanced botany in Venezuela. Like the preceding two species it is referable to Niedenzu’s section Macroprosopis series Holopetalum, but these three species are probably more closely related to each other than any of them is to any of the species known to Niedenzu. Among many distinguishing features, *H. steyermarkii* is especially notable for the erect habit, small leaves, several-flowered terminal umbels, petals brown-maroon (the laterals) and white (the posterior), and long dorsal hook at the apex of the styles.

4. *Heteropterys lasseri* Anderson, sp nov

Liana lignosa, ramis sericeis lenticellis parvis criberrimis mox evolutis. Foliolum lamina 9–20 cm longa, 5–12 cm lata, late elliptica, basi cuneata vel subrotundata, margine crassiuscula plana vel revoluta, apice rotundata et abrupte brevi-acuminate, adulta utrinque glabra vel supra costa et subtus ubique sparsim sericea pilis minimis sessilibus appressisque, nervis supra obscuris subtus ± prominentibus, eglandulosa vel subtus basi 2–6-glandulifera; petiolus 15–22 mm longus, sericeus vel demum glabrus, eglandulosus vel 2(–4)-glandulifer glandulis
Fig 38. *Heteropterys lasseri*. a) Leaf and inflorescence, ×0.5; b) flower in umbel, ×3.5; c) posterior (flag) petal, ×5; d) anther, adaxial side, ×7.5; e) anther, abaxial side, ×7.5; f) gynoecium, anterior carpel to right, ×7.5; g) apex of posterior styles, ×25; h) apex of anterior style, ×25; i) samara, ×0.5.

Drawn by Karin Douthit, a–h from Steyermark et al 92913, i from Forest Dept. 4528.
prope vel super medium; stipulae non visae. Inflorescentia axillaris et terminalis, sericea, panicula floribus in umbellis 4–6-floris vel umbella 4-flora et 2 floribus proximalibus, bracteis flori feris 1.5–2.5 mm longis ovatis involutis, eglandulosis vel 1(−2)-glanduliferis, pedunculo 3–5 mm longo, bracteolis bracteis similibus saepe minoribus, sub apice pedunculi portatis. Pedicellus 4–5 mm longus sericeus. Sepala omnia eglandulosa vel 4 lateralia biglandulosa et anticum 0, 1, vel 2 glandulis munitum, glandulas 1.8–2.8 mm longas ellipticas 1–1.5 mm superantia, 1.8–2 mm lata, ovata, apice obtusa vel rotundata, appressa, abaxialiter sericea, adaxialiter glabra. Petala lutea, carnosa, abaxialiter laevia vel basi paulo carinata et glabra vel (praecipue in ungue) sparsim sericea, 4 lateralia patentia, ungue 1.5–2 mm longo, limbo 3.5–4.5 mm longo, 3–4 mm lato, obovato, concavo, basi sagittato vel truncato, margine subintegro et paulo revoluto; posticum ungue 2–2.5 mm longo, limbo 3 mm longo, 2.2–3 mm lato, reflexo, ± plano, basi sagittato et utrinque 3–5 glandulis munito, distaliter eroso vel subintegro. Filamenta 1.5–2 mm longa, glabra, basi connata, recta; antherae 1.5–2.1 mm longae, ± reflexae, loculis dense et laxe sericeiis vel tomentosis, connectivo atrorubro apice luteo. Ovarium 1.5 mm altum, sericeum, sine crisisis vel alulis lateralisibus; styli glabri, 2 postici 1.5–2 mm longi, ± recti, apice desuper planato dorsaliter rotundato-truncate; anticus 2–2.4 mm longus, divergens, apice a lateribus compresso dor saliter truncate. Samara 63–80 mm longa, sericea; ala dorsalis 53–70 mm longa, 17–20 mm lata, proximaliter angustata sed nucem angustae semiamplectens, margine abaxiali recto vel paulo sursum curvato; nux globosa, 9–11 mm diametro, lateribus rugosa et ecrisata vel 1 cristula 1.5 mm longa lataque munita.

Type. Steyermark, Dunsterville & Dunsterville 92913, bosque húmedo montañoso, vecindades del salto, Río Venamo, Bolívar, Venezuela, elev 900 m, 9 Jan 1964 flr (holotype VEN, isotype NY).

Paratypes. VENEZUELA. Bolívar: Dto. Roscio, carretera El Dorado–Santa Elena de Uairén, mas arriba de la Laja, elev 800–1200 m, Jun flr, Badillo & Holmquist 6086 (MY); Kavanayen, quebrada de Pakairao, May flr, Lasser 1928 (F, NY, VEN). GUYANA. Black Ck., Groete Ck. Essequibo R., Apr flr, Forest Dept. 4528 (NY).

Heteropterys lasserii is named in honor of Dr. Tobias Lasser, eminent student of the Venezuelan flora and Director of the Instituto Botánico in Caracas.


Woody vines, the stems sericeous or tomentose to glabrate, with many small lenticels. Lamina of the larger leaves 6–12.5 cm long, 3.3–6.5 cm wide, smaller in the inflorescence, ovate, obverse or rounded at the base, acute or acuminate at the apex, initially sericeous or tomentose, soon glabrate and shining above, soon to eventually glabrate below, often bearing a row of small impressed glands parallel to the margin but set in from it, the fine reticulum usually prominulous on both sides, occasionally obscure above; petiole (4–)6–12 mm long, sericeous or tomentose to glabrate, usually biglandular near the base; stipules none (?) or minute, 0.1–0.2 mm long, triangular, borne on base of petiole. Inflorescence ax-
illary and terminal, paniculate, with the flowers ultimately borne in umbels or tight corymbs of 4–10 flowers, sericeous or tomentose, with small leaves or bracts bearing several large glands, the floriferous bracts 1–2 mm long, eglandular, persistent, the peduncle 3–7 mm long and bearing below its apex 2 appressed bracteoles 0.6–1 mm long. Pedicel 5–9 mm long. Sepals 1–1.7 mm long beyond the glands, 1–2 mm wide, triangular, appressed, abaxially uniformly tomentose or sericeous, adaxially glabrous or sericeous toward the margins, the lateral 4 bearing 8 elliptical, compressed glands 1.7–2.5 mm long and hairy on the inner edges, the anterior sepal eglandular. Petals pink or pink and white, glabrous, not papilllose on the adaxial face, the lateral 4 with the winged claw 1–1.5 mm long, the limb 3.3–4 mm long, 1.6–2 mm wide, entire, with a prominent abaxial wing 1–1.5 mm wide and usually extending beyond the limb; posterior petal with the claw 2 mm long and the limb (3–)3.5–4.5 mm long, 2–2.5 mm wide, entire, distally crumpled, with an abaxial wing 0.4–1.4 mm wide. Filaments 1.5–2 mm long, glabrous, almost free to ½ connate, straight; anthers 0.8–1.2 mm long, glabrous, subequal. Ovary 1.5 mm high, tomentose; styles 1.2–2 mm long, glabrous, straight and erect or somewhat reflexed, the anterior usually shorter and slenderer than the posterior 2, dorsally truncate, acute, or apiculate at the apex, laterally compressed. Samara 28–37 mm long, appressed-tomentose to glabrate; dorsal wing 26–32 mm long, 13–14 mm wide, the abaxial margin bent upward; nut 6 mm long, 4–5 mm high, bearing on both sides a lateral crest or wing 1–5 mm wide, subtenture or dissected into several winglets; torus ca 2 mm high.


This species is defined rather broadly here, perhaps too broadly. The collections cited are variable in the vesture of the inflorescence and young leaves, a character which often marks species in the Malpighiaceae. However, in this case the variation seems to be nearly continuous. The collections from Guyana and *Fröes & Addison* 29255 have rather short, sessile or sub sessile, appressed hairs, becoming slightly serpentine and short stalked in the type of *H. cristata*. The only collection from the Orinoco, *Breteler* 4732, has distinctly stalked and serpentine hairs. This trend culminates in the two collections from Roraima Territory and, judging from Bentham's description, in the type of *H. carinata*. In these plants the young leaves are loosely tomentose, with stalked strongly twisted hairs that are gradually decidual.

The extra-Guyana species *Heteropterys floridana* Cuatrecasas is very closely related to *H. cristata* and may not eventually stand as distinct. It is known only from the type, *Klug* 2153, collected in flower on the Río Putumayo in Loreto, Peru, and *Mori et al* 9155, collected in fruit on the Río Solimões at Río Jandiatuba in Amazônas, Brazil. Both collections are distinguished by their very short, ses-
sile, appressed, somewhat persistent leaf hairs and their eglandular petioles. In addition, the type has only small wings on the petals, about 1 mm wide and hardly longer than the petal limb.

The type of *H. carinata* was collected by the Schomburgks in November, 1842, near Roraima. According to Richard Schomburgk’s Travels, vol. 2, pp 180–222 in the translation, they spent the entire month of November on the southwest side of Roraima in what is now Venezuela.

Flowering specimens in *Clonodia* will key out to *Heteropterys cristata* if they are taken for *Heteropterys* instead of *Clonodia*. They can be readily distinguished from *H. cristata* by the papillose inner face of at least the posterior petal and by the ultimate unit of the inflorescence being an elongated pseudoraceme instead of a tight corymb or umbel of 4–10 flowers.


Differt a *Heteropterys beechevana* var *beechevana* petalis lateralis alatis alis 0.7–1 mm latis, petalo postico carinato vel anguste alato, foliis non supra rugosis, et glandulis foliorum majorum plerumque non stipitatis.

Shrub to 8 m tall or woody vine, the stems tomentose or subvelutinous to eventually glabrate, with many small lenticels. Lamina of the larger leaves 4.5–7.5 cm long, 3–5.2 cm wide, ovate, mostly rounded or cordate at the base, rounded or retuse and often mucronate at the apex, densely and persistently tomentose on both sides, eglandular below or bearing a pair of flat glands at the base, the veins flush above, prominent below; petiole (4–)6–8–(10) mm long, tomentose, eglandular or bearing 2 flat glands, usually between middle and apex; stipules not seen. Inflorescence paniculate, the flowers ultimately borne in umbels, corymb, or very short crowded pseudoracemes of 4–14 flowers, tomentose, with small leaves often bearing 2 large slightly stalked basal glands, the floriferous bracts and bracteoles 1–1.5 mm long, eglandular, spreading, the peduncle 3–5 mm long. Pedicel 2–3 mm long, tomentose. Sepals 1–1.8 mm long beyond the glands, 1.2–1.5 mm wide, ovate or triangular, appressed, abaxially carinate and sparsely sericeous to distally glabrous, adaxially glabrous, the lateral 4 bearing 8 elliptical or obovate glands 1–1.3 mm long, the anterior sepal eglandular or rarely 1(2)-glandular. Petals pink or pink and white, glabrous, the lateral 4 spreading or reflexed, with the claw 1.2–1.5 mm long, the limb 2.8–3.5 mm long, 2.2–2.5 mm wide, entire or denticulate, with an abaxial wing 0.7–1 mm wide; posterior petal erect, with the thick claw 2.2–2.5 mm long, the limb 2.5–2.8 mm long, 2.2–2.7 mm wide, often crumpled, dentate, abaxially carinate or with a narrow wing to 0.3 mm wide. Filaments 1.5–2 mm long, shortest opposite the posterior and antero-lateral petals, glabrous, up to ½ connate, straight or somewhat incurved; anthers 0.9–1.3(1.5) mm long, glabrous, subequal, the connective dark red. Ovary ca 1 mm high, sericeous; styles 1.9–2.4 mm long, glabrous except at base, divergent, dorsally acute at the apex, the stigma laterally expanded, ca 0.5 mm wide and 0.2 mm high. Samara 18–30 mm long, red, sericeous, borne erect; dorsal wing 15–26 mm long, 7–12 mm wide; nut 3–4 mm long, 2.5–3.5 mm high, spheroid, the sides rarely smooth, usually bearing 1–several crests or winglets 0.5–2 mm wide; torus ca 1 mm high.
Type of var alata: Wurdack & Monachino 39811, Cerro San Borja, Río Orinoco, Bolívar, Venezuela, elev 100–300 m, 12 Dec 1955 flr (holotype MICH, isotypes NY, US, VEN).

Lectotype of H. beecheyana: Linden 909, Mexico (P).

Distribution. Venezuela and Colombia east of the Andes, especially common in the Llanos Orientales of Colombia (see collections cited by Cuatrecasas). Guayana collections: VENEZUELA. Bolívar: Type, q v; Cerro San Borja, Dec frrt, Wurdack & Monachino 39816 (MICH, NY, US, VEN). Amazonas: 12.5 km S of Puerto Ayacucho, Nov flr, Davidse 2832 (MICH); Caño Negro, ca 67°W, Río Ventuari, Cerro Parú, elev 200 m, Jan flr/frtt, Maguire et al 31618 (NY); Puerto Ayacucho, elev 100–200 m, Nov flr/frtt, Maguire et al 36071 (MICH, NY, US, VEN); road from Sanariapo to Puerto Ayacucho, elev 100–120 m, Nov flr, Maguire et al 36146 (MICH, NY, VEN).

Heteropterys beecheyana is a variable species ranging from Mexico to Bolivia. The petals are usually smooth or at most carinate, except in the populations east of the Andes in Colombia and Venezuela, where they are winged. Except for this one prominent feature, there is little to distinguish our plants, so it seems best to treat them as a geographical variety.


Heteropterys apiculata Miquel, Stirp. Surin. 81. 1851. Type. Kappler, Marowijne River, Surinam (U?).

Woody vine, rarely a spreading shrub, the young stems sericeous, lenticellate. Lamina of the larger leaves 11–20 cm long, 6.5–10.5 cm wide, elliptical or slightly ovate or obovate, cuneate to rounded at the base, obtuse, short-acuminate, rounded, or retuse and mucronate at the apex, coriaceous, very soon glabrate and shining above or sericeous on the midrib, very densely and persistently metallic-sericeous below, the hairs producing a golden or silvery sheen, with an irregular row of small impressed glands below set in from the margin, the lateral veins and reticulum prominulous on both sides; petiole 8–13 mm long, sericeous, 2–4-glandular at or above the middle; stipules minute, ca 0.2–0.3 mm long, borne on (or beside?) the base of the petiole, often apparently absent. Inflorescence a raceme or panicle of 4–6-flowered umbels, sericeous, the floriferous bracts 1–1.5 mm long, eglandular, the peduncle 3–6 mm long, the bracteoles like the bracts and quite apical. Pedicel 2–5 mm long, sericeous. Sepals 0.5–2 mm long beyond the glands, 1.5 mm wide, triangular, appressed, abaxially uniformly sericeous, adaxially glabrous, the lateral 4 bearing 8 elliptical glands 2–3.5 mm long and sericeous on the inner edges, the anterior eglandular but appearing glanduliferous due to lateral displacement of adjacent glands. Petals yellow, glabrous, abaxially carinate, the lateral 4 spreading, with the claw 1.2–1.5 mm long, the limb 3–5 mm long, 2–3.5 mm wide, truncate or sagittate at the base, entire or denticulate; posterior petal erect, with the thick claw 1.5–2.5 mm long, the limb 3–4.5 mm long, 2.5–3.5 mm wide, glandular-dentate on the proximal ½–¾. Filaments 1.5–3 mm long, glabrous or abaxially sparsely sericeous, ½–¾ connate, straight; anthers 1.2–1.6 mm long, glabrous, subequal, reflexed, the connective dark red. Ovary 1.5 mm high, sericeous; styles 1.2–2.3 mm long, glabrous, straight or
slightly divergent, dorsally truncate at the apex. Samara 30–65 mm long, sericeous, borne nearly erect; dorsal wing 25–57 mm long, 12–27 mm wide, the abaxial edge straight or somewhat recurved; nut subspheroidal, 5–10 mm in diameter, smooth-sided; torus ca 3 mm high.

Type. L. C. Richard, French Guiana (G, P).

Distribution. Riverine forests from Costa Rica and Trinidad to Bolivia and central Brazil. Collections from Guayana and adjacent localities: VENEZUELA. Bolívar: Río Paragua, Raudal de Guaiquinima, elev 475 m, Steyermark 90809 (NY); Salto Para, Río Caura, elev 200 m, Steyermark et al 113011 (MICH) & Ll. Williams 11483 (US, VEN); Piedra Marimare, E bank of Río Orinoco opposite head of Isla El Gallo, Wurdack & Monachino 40860 (MICH, NY, US, VEN); Río Suapure between mouth and Los Aceites (35 km upstream), elev 80–90 m, Wurdack & Monachino 41328 (MICH, NY, VEN). COLOMBIA. Amazonas-Vaupés: Río Apaporis entre el Río Pacoa y el Río Kananari, Soratama, elev 250 m, Schultes & Cabrera 13533 (NY, US). BRAZIL. Amazónas: Rio Negro, at Isla Macará, near mouth of Río Padauri, Cardona 1313 (US, VEN); between Cachoeira do Caranguejo and falls of the Río Cauaburi, Silva & Brazão 61000 (MG, MICH, NY, US).

Collected in flower and fruit at diverse times, most commonly from November to February.

This species is quite variable, especially in size and shape of the leaves and samaras, and my description does not attempt to accommodate extra-Guayana variation. It is based only on the collections cited above.


Floriferous peduncle usually developed, the bracteoles apical; many species with some individuals or populations with 4 sepals biglandular and others with all sepals eglandular; sepals completely concealing the petals during enlargement of the bud, revolute at the apex in anthesis; petals yellow, abaxially smooth, the lateral 4 spreading, the posterior erect; filaments glabrous, slightly connate; connective of the anther often proximally dark red and distally yellow-glandular; nut of the samara quite smooth-sided, without lateral crests or winglets.

Type. Heteropterys laurifolia (L.) Adr. Jussieu.

This is a very natural, easily recognized group, comprising at least 25 species and quite possibly half again as many. The species are similar and the differences between them subtle, so that the group is taxonomically much more difficult than the rest of Heteropterys. Niedenzu’s key often does not work, and he seems to have misapplied a number of names for which he did not see the types. Since I cannot revise the group here, I have employed a broad species concept except where segregates are obvious. Unfortunately, my nomenclature differs appreciably from that of Niedenzu and Cuatrecasas. This treatment is offered as a provisional one for Guayana, in anticipation of further changes when the subgenus is revised.


Type. Moss 15, Pará [Belém], Pará, Brazil (US).


Woody vine; vegetative stems (but not the inflorescence) moderately to very prominently lenticellate. Lamina of the larger leaves 7–13(–17) cm long, (2–)4–6.5(–8) cm wide, elliptical, ovate, or somewhat obovate, cuneate or rounded at the base, acuminate at the apex, glabrous and shining, sometimes with a sub-marginal row of small impressed glands below, the lateral veins and fine reticulum usually prominent or prominulous on both sides; petiole (6–)8–13 mm long, sparsely sericeous or glabrate, eglandular; stipules minute, interpetiolar at base of petioles. Inflorescence axillary and terminal, racemose or paniculate, the flowers borne ultimately in a short, crowded pseudoraceme up to 2.5 cm long, with (0–)1–3 pairs of flowers and then a terminal umbel of 4–6 flowers, sericeous to submentose, the floriferous bracts and bracteoles 1.5–3 mm long, ovate or elliptical, concave, often spreading, sericeous on both sides, eglandular or with minute marginal glands, the peduncle 2–6 mm long. Pedicel 2–6 mm long. Sepals eglandular or 4 biglandular. Petals glabrous, with the claw 2–2.5 mm long and the limb ca 3 mm long, 2.6 mm wide, entire or denticulate. Filaments 1.5–2.5(–3) mm long, longest opposite the sepals; anthers 0.7–1 mm long, with the connective mostly dark red, yellow at the apex. Styles 1.8–3 mm long, glabrous, straight or divergent, dorsally with a very short hook at the apex ca 0.1 mm long or rarely a prominent hook 0.3 mm long. Samara 22–40 mm long; dorsal wing 17–32 mm long, 9–13(–16) mm wide, the abaxial edge straight or curved upward; nut 4–8 mm long, 2.5–3.5 mm high, cylindroidal.

Type. *St. Hilaire*, western Minas Gerais, Brazil (P).


Collected in flower and fruit mostly from July to November.

This is the species that was called *Heteropterys anoptera* by Niedenzu and *H. mossii* by Cuatrecasas. Although I have not seen the type of *H. nervosa*, its
photograph (Field Museum neg. 35591) compares very well with recent collections from south-central Brazil. Niedenzu never saw the St. Hilaire type. The species is rather distinctive, due to its short, crowded, corymbose racemes. The material from north of the Amazon differs from southern specimens in that the vegetative stems usually have much more numerous and prominent lenticels. However, in other respects the plants from north and south are similar. The description given above is based only on the collections cited.

I do not know whether or not *Heteropterys anoptera* Adr. Jussieu is a synonym for *H. nervosa*. The type of *H. anoptera* is a St. Hilaire collection in fruit from Olho d’Agua in Minas Gerais (here designated lectotype). Niedenzu never saw it, nor have I, not even a photograph, and since Jussieu applied the name to plants that I would call *H. nervosa* (eg Martius from Serra Frio) and to ones that I would exclude (eg Claussen from Minas Gerais) it is clearly best to await study of the type before deciding the status of this name.

The photograph of the type of *Heteropterys suberosa* (Field Museum negative 12799) shows a plant indistinguishable from the northern forms of *H. nervosa* (=*H. mossii*). If the northern, more lenticellate forms were segregated, the correct name would be *H. suberosa*, not *H. mossii*.

9. *Heteropterys murcapiresii* Anderson, sp nov

Frutex scandens (?). Foliorum lamina 3.5–7.7 cm longa, 1.9–3.2 cm lata, elliptica vel anguste ovata, basi cuneata vel rotundata, apice acuta, obtusa, vel rotundata, coriacea, glabra (adulta), subtus prope marginem aliquot glandulis parvis impressis munita, nervis lateralibus et reticulo supra obscuro vel prominulo subtus prominulo vel ± prominenti; petioli 2–5 mm longus, glaber, eglandulosus; stipulae non visae. Inflorescentia racemus vel panicula umbellarum, umbella 4-flora, sericea, bracteis bracteolisque floriferis 1–1.5 mm longis, pedunculo 4–5 mm longo. Pedicellus 4–6 mm longus. Sepala glandulas 2.3 mm superantia, 1.2–1.6 mm lata, apice revoluta, abaxialiter tomentella, adaxialiter glabra, 4 lateralia 7–8 glandulis 1.1–1.4 mm longis munita, anticum eglandulosum. Petala glabra, margin e rosa, ungue 2.3–2.7 mm longo, limbo 3.2–3.7 mm longo, 3–3.2 mm lato. Filamenta 2.3–3.5 mm longa, glabra, basi connata, ± recta vel demum torta; antherae ca 0.8 mm longae, glabrae, connectivo in ¼–⅓ proximali atrorubro distaliter luteo. Ovarium 1 mm altum, tomentellum; styli 2.8–3.3 mm longi, glabri, ± recti, apice a lateribus compresso dorsaliter brevi-uncinato unco 0.1–0.2 mm longo. Fructus ignotus.


*Heteropterys murcapiresii* is notable for its small, glabrous, coriaceous leaves and the small bracts and bracteoles. It bears a superficial resemblance to some forms of *H. oblongifolia* from the Alto Orinoco area, but is readily distinguished by its inflorescence terminating in 4-flowered umbels. The species is named for Joao Murca Pires, one of the foremost botanists of Amazonian Brazil.
Fig 39. *Heteropterys murcapiresii* and *H. oligantha*. a–e, *H. murcapiresii*: a) Flowering branch, ×0.5; b) umbel, ×1.5; c) flower bud about to open, ×5; d) anther, abaxial view, ×15; e) apex of style, ×30. f–i, *H. oligantha*: f) Branch, ×0.5; g) umbel, ×2.5; h) apex of style, ×30; i) samara, ×0.5. Drawn by Karin Douthit, a–e from *Pires* 14456, f–h from *Forest Dept.* 3769, i from *Forest Dept.* 3865.

Woody liana; stems sericeous, lenticellate. Lamina of the larger leaves 11–21 cm long, 4.5–9 cm wide, elliptical or slightly obovate, cuneate to rounded at the base, acuminate to rounded at the apex, glabrous and shining above, sparsely sericeous below with short, appressed hairs, to glabrate, with a submarginal row of small impressed glands, the coarser veins more prominent below than above, the finest reticulum sometimes visible above; petiole 7–15 mm long, sericeous to glabrate, eglandular; stipules not seen. Inflorescence a branched panicle 10–30 cm long, with flowers borne ultimately in umbels of 4–6(–8), subtomentose, lenticellate on the main axis, the bracts 1–2 mm long, reflexed; peduncle 2.5–4 mm long; bracteoles 1–2 mm long, revolute or reflexed, eglandular or with 1–2 tiny basal marginal glands. Pedicel 2–5 mm long. Sepals eglandular or 4 biglandular. Petals glabrous, with the claw 1.7–2.5 mm long, the limb 2.5–3.2 mm long and wide, entire or slightly erose. Filaments 1.5–2.7 mm long; anthers 0.9–1.3 mm long, the connective dark red, yellow at the apex. Styles 2–2.5 mm long, glabrous, straight or slightly bowed, dorsally truncate at the apex or with a short, blunt hook up to 0.1 mm long. Samara 45–50 mm long, borne nearly horizontally; dorsal wing 38–42 mm long, 12–17 mm wide, the abaxial edge straight or recurving slightly before bending upward; nut 7–8 mm long, 3–5 mm high, with a narrow extension of the wing along the upper edge.

Type. *Schultes* 5646, upper Apaporis basin, confluence of Ajaju and Macaya (Puerto Hevea), Vaupés, Colombia, Jul flr (holotype US! isotypes GH! US!).


11. **Heteropterys oligantha** Anderson, sp nov

Liana lignosa, ramis sericeis mox glabratris. Foliorum majorum lamina 8–11.6 cm longa, 3–4.1 cm lata, elliptica, basi cuneata, apice acuminata, supra glabrata vel in costa sparsim sericea, subitus glaucescens et sparsim sed pertinaciter sericea et aliquot glandulis impressis inter marginem et costam munita, nervis majoribus subitus prominentibus, reticulo supra prominulo; petiolus 4–8 mm longus, sericeus vel demum glabratris, eglandulosus; stipulae non visae. Inflorescentia panicula axillaris 1.5–3 cm longa, floribus in umbella 4-flora interdum 2 floribus proximalibus adjectis, sericea, bracteis bracteolisque 1–1.3 mm longis, revolutis, deciduis vel persistentibus, pedunculo 1.5–3 mm longo (–4 mm in fructu). Pedicellus 6–8 mm longus (–10 mm in fructu), sericeus, apice tumidus. Sepala apice revoluta, in paratypo eglandulosa, in holotypo 4 lateralia 8 glandulis 1.6–1.9 mm longis munita, abaxialiter sericea adaxialiter glabra. Petala ignota. Filamenta 1.6–2.4 mm longa, glabra, basi connata; antherae 0.8–1 mm longae, glabrae. Styli ca 2.7 mm longi, glabrae, ± recti, apice dorsoliter uncinato unco 0.1–0.2 mm longo. Samara 45–55 mm longa, sericea praeципue in nuce, falciformis, nuce ± horizon-
tali, ala ± erecta; ala dorsalis 40–50 mm longa, 13–17 mm lata, margine abaxialia valde sursum curvato; nux 10–12 mm longa, 5–6 mm alta, a lateribus compressa.

Type. Forest Department of British Guiana 3769, 1½" diam rope from crown of Licania in Kakaralli-Clump Wallaba forest, Mahdia R. Potaro R. 107 miles Bartica-Potaro Road, Guyana, 16 Jan 1943 young frt (holotype NY).

Distribution. Known only from the type and the following paratype. GUYANA. Kakaralli-Clump Wallaba forest, Eagle Mt., Jan frt, Forest Dept. 3865 (NY).

This species is named for the short, few-flowered axillary inflorescence, with the flowers ultimately borne in umbels of four, sometimes subtended by an additional pair. It is also notable for the long, falcate samaras, the small, revolute bracts and bracteoles, and the glaucescence of the undersurface of the leaves.

12. Heteropterys cuatrecasasi Anderson, sp nov

Frutex scandens, ramis sericeis pilis atrobrunneis demum canescentibus. Foliorum majorum lamina 4–9 cm longa, 2–4 cm lata, ovata vel elliptica, basi cuneata vel rotundata, apice acuminata, coriacea, supra laxe sericea saepe mox glabrescens, subtus pertinaciter tomentoso-sericea vel demum glabrescens, eglandulosa vel subtus margine aliquot glandulis minimis impressis munita, nervis lateralibus supra invisibilius subtus prominulis; petiolum 5–9 mm longus, sericeus, eglandulosus; stipulae non visae. Inflorescentia panicula axillaris et terminalis brevis et conferta, tomentoso-sericea pilis atrobrunneis vel demum canescentibus, floribus in umbellis vel corymbis 4–6(–8)–floribus, bracteis 2–3 mm longis, eglandulosis, pedunculo 2–5 mm longo, bracteolis 1.5–2.5 mm longis, ellipticis, appressis, eglandulosis. Pedicellus 3–5 mm longus, tomentoso-sericeus. Sepala 4 lateralia 8 glandulas 1–1.5 mm longas circulares vel ellipticas virides 2.4–2.9 mm superantia, 1.7–2 mm lata, triangularia, apice revoluta, abaxialiter omnino tomentosa pilis atrobrunneis, adaxialiter glabra, anticum eglandulosum vel raro 1 glandula parva munitum. Petala lutea, margine et abaxialiter pauciplifera vel demum glabrata, ugue 2–2.4 mm longo, limbo 2.3–2.8 mm longo latoque, margine eroso vel denticulato. Filamenta 2.4–3 mm longa, usque ½ connata, glabra, recta vel paulo curvata; antherae 0.8–1.1 mm longae, glabrae, connectivo omnino nigro. Ovarium 1.5 mm altum, sericeum: styli 1.8–2 mm longi, basi sericei, recti, erecti vel divergentes, apice truncati. Samara 21–33 mm longa, ± pertinaciter tomentoso-sericea; ala dorsalis 15–26 mm longa, 9–16 mm lata, margine abaxiali recto vel leviter sursum curvato; nux 5–8 mm longa, 4–6 mm alta; torus ca 2 mm altus.

Type. Cowan & Wurdack 31339, frequent in higher sabanitas, cumbre, Cerro Parú, along west rim S from camp caño, Amazonas, Venezuela, elev 2000 m, 7 Feb 1951 frt (holotype MIC, isotypes NY, US, VEN).

Distribution. Known only from the Serranía Parú and nearby Cerro Huachamacari. Paratypes: VENEZUELA. Amazonas: Laguna Asisa, cerro Asisa (La Momia), Serranía Parú, 4°14'N, 65°56'W, elev 1310 m, May bud, Hoyos & Morillo 38 (VEN); dense woodland along right fork of Caño de Dois, Cerro Huachamacari, elev 1800 m, Dec frt, Maguire et al. 30196 (NY, VEN); northernmost sabanita before high point, cumbre, Cerro Parú, elev 2000 m, Feb frt, Cowan & Wurdack 31228 (NY, VEN).

Heteropterys cuatrecasasi is named in honor of Dr. José Cuatrecasas, whose excellent treatment of the Malpighiaceae of Colombia has been extremely helpful in the preparation of this paper. It is notable for the small, acuminate leaves,
Fig 40. *Heteropterys cuatrecasasii*. a) Flowering branch, ×0.7; b) flower, posterior petal to left, ×4.7; c) androecium and gynoecium, central stamen opposite posterior petal, central style opposite anterior sepal, ×10; d) samara, ×1.3. Drawn by Annette Seidenschnur Mahler, a–c from Maguire et al 30196, d from Cowan & Wurdack 31339.
which are persistently tomentose-sericeous below and have the veins not visible above, the short crowded inflorescence, the elliptical appressed bracteoles, the roundish green calyx glands, the small petals with sparse, deciduous hairs on the margin and abaxial surface, the truncate styles, and the small samaras.

13. Heteropterys dichromocalyx Anderson, sp nov

Liana lignosa, ramis sericeis. Foliorum majorum lamina 11–12 cm longa, 5–7 cm lata, elliptica, basi cuneata vel rotundata, apice acuminata, supra mox glabra nitidaque, subtus ± pertinaciter sericea pilis 0.15–0.3 mm longis, sessilibus, rectis, appressis, aliquot glandulis parvis, impressis, marginalibus vel submarginalibus in dimidio distali munita, reticulo utrinque prominulo; petiolus 8–10 mm longus, sericeus, eglandulosus; stipulae minutae, interpetiolarae, prope basim petioli portatae. Inflorescentia panicula brevis axillaris et terminalis, sericea, floribus in umbellis 3–6-floris, bracteis 1.5–2.5 mm longis, eglandulosis, pedunculo 2–4 mm longo, bracteolis 1.5–2 mm longis, ascendentibus, eglandulosis. Pedicellus 4.5–6 mm longus, sericeus. Sepala 4 lateralia 8 glandulas 1.2–1.5 mm longas, circulares vel ellipticas, virides 2.5–3 mm superantia, ca 2 mm lata, triangularia, apice revoluta, abaxialiter sericea pilis proximalibus ferrugineis distalibus albis, adaxialiter sparsim pilosa, anticum eglandulosum. Petala lutea, abaxialiter pertinaciter sericea, margin e erosus vel subintegro, 4 lateralia ungue 2.5–2.7 mm longo, limbo 2.7–3 mm longo, 2.2–2.7 mm lato; petalum posticum ungue 2.2 mm longo, limbo 2.7 mm longo, 2.3 mm lato. Filamenta 2.6–3.4 mm longa, usque ½ connata, glabra, recta vel pauro curvata; antherae 0.7–0.9 mm longae, glabrae, reflexae, connectivo atrorubro apice luteo. Ovarium ca 1.2 mm altum, sericeum, carpellis lateribus laevibus; styli 2.7–3 mm longi, in dimidio proximali sericei, recti vel leviter curvati, erecti vel divergentes, apice truncati vel dorsali rotundati. Fructus ignotus.

Type. Silva & Brazão 60610, high forest from Igarapé Anta up slopes to Pico da Neblina, elev 1350–2000 m, Amazônas, Brazil, 14 Dec 1965 flr (holotype MG, isotypes MICH, NY, US).

Known only from the type. This species is named for the hairs of the sepals, which are proximally brown and distally white. It is similar in many respects to H. cuatrecasasii, and it is that similarity, in addition to the revolute sepals and carpels without lateral crests, that makes me confident that this is a Heteropterys even without seeing fruits. In addition to these features, H. dichromocalyx is notable for the leaves shiny above and thinly sericeous below with tiny marginal or submarginal glands, the inflorescence terminating in umbels, and the small sericeous petals.


*Byrsinuma reticulata* (Poiret) de Candolle, Prodr. 1: 581. 1824.

*Banisteria multiflora* de Candolle, Prodr. 1: 589. 1824.

Fig 41. *Heteropterys dichromocalyx* and *H. catoptera*. a–f, *H. dichromocalyx*: a) Flowering branch, ×0.5, the circles ×1.5; b) portion of inflorescence, ×1; c) flower, ×5; d) petal, abaxial side, ×10; e) gynoeicum, ×7.5; f) style apex, ×25. g–k, *H. catoptera*: g) Leaf and axillary panicle, ×0.5; h) flower, ×2.8; i) bracteole, ×7.5; j) style apex, ×25; k) immature fruit, ×2.5. Drawn from the types by Karin Douthit.
Woody liana; stems sericeous, soon glabrate. Lamina of the largest leaves 23–29 cm long, 9.5–12.5 cm wide, often smaller near the inflorescence, ovate or elliptical to obovate, rounded at the base, abruptly acuminate at the apex with the acumen 1–2 cm long, glabrous above, thinly but ± persistently sericeous below with short, appressed hairs, to eventually glabrate, with a submarginal row of small impressed glands, the coarse veins prominent below, the finest reticulum prominent above; petiole 7–14 mm long, thinly sericeous to glabrate, eglundular; stipules not seen. Inflorescence a terminal and axillary panicle, with flowers borne ultimately in pseudoracemes 6–20 cm long, sericeous to glabrate, the bracts 5–8 mm long, 3–6 mm wide, loosely sericeous on both sides, usually with small marginal glands, often deciduous, the peduncle (2–)4–6 mm long, the bracteoles 4–5 mm long, 3–4 mm wide. Pedicel 5–8 mm long. Calyx bearing 8 elliptical glands 2.5–3.5 mm long on the 4 lateral sepals, the anterior eglundular. Petals glabrous, the lateral 4 reflexed, with the claw 3–4 mm long, the limb (4–)4.5–6.5 mm long, 4.2–5.5 mm wide, dentate; posterior petal erect, the claw slightly longer, the limb smaller. Filaments 3–4.8 mm long; anthers ca 1 mm long, glabrous or with a small tuft of hairs at the apex of each locule, the connective globose, dark red with a narrow yellow band over the apex. Styles 3.8–4.5 mm long, glabrous or sericeous on the proximal half, straight or eventually bent, the apex triangular and extended dorsally into a hook 0.3–0.6 mm long. Samara 35–50 mm long, borne ± horizontally, finely sericeous; dorsal wing 20–25 mm long, 27–37 mm wide, flabellate to semicircular, the abaxial edge somewhat to strongly recurved; nut flattened, trapezoidal, 17–25 mm in diameter.

Type. Cayenne (G).

Distribution. Riverine forests in lowland northeastern South America; also reported to occur in Colombia and Jamaica. VENEZUELA. Amacuro: Rio Cuyubini, elev 90 m, Nov flr, Steyermark 87498 (Mich). GUYANA. Essequibo River, Jan flr, Atkinson 84 (Mich); Kaieteur Falls, Potaro River, Oct–Nov flr, De La Cruz 4491 (MO, NY); Kamuni Creek, Groete Creek, Essequibo River, flr, Fanshawe 531 (NY). BRAZIL. Pará: Belém-Mosqueiro, Mar flr, N. T. Silva 59708 (Mich).


Woody vine; stems sericeous, soon glabrate and developing many prominent lenticels. Lamina of the larger leaves 17–30 cm long, 7–12 cm wide, ovate or elliptical, broadly cuneate to rounded at the base, acuminate at the apex, quite glabrous (mature) or bearing a few tiny appressed hairs below on the midrib, with a submarginal row of rather few small impressed glands, the reticulum visible but not or only slightly raised above; petiole 9–13 mm long, glabrous or with a few appressed hairs, eglundular; stipules not seen. Inflorescence a panicle, with the flowers borne in pseudoracemes (2–)3–13 cm long, tomentose-sericeous, the bracts and bracteoles 2–3 mm long, 1.5–2 mm wide, the peduncle 1–2.5 mm long. Pedicel 2.5–3.5 mm long. Calyx eglundular or bearing 8 glands 1.6–1.8 mm long on the 4 lateral sepals. Petals glabrous, erose, the lateral 4 with the claw 2.5–3.5 mm long, the limb 3–4.6 mm long, 2.8–4.2 mm wide; posterior petal with the claw 2.5–3.5 mm long, the limb 2.7–3.6 mm long, 2.8–3 mm wide, the veins
sometimes dark red. Filaments 2–2.9 mm long; anthers 0.8–1.4 mm long, glabrous, the connective dark red. Styles 2.5–3.1 mm long, basally sericeous, straight or bent, the apex dorsally with a very short to moderately long hook 0.05–0.2 mm long. Samara 50–60 mm long, borne ± erect; dorsal wing 22–27 mm wide, flabellate, the abaxial edge bent upward; nut 15 mm long, 7–9 mm high.

Type. Schultes & Cabrera 16591 p p, Jinogójé, Río Apaporis, Amazonas-Vaupés, Colombia, Jun flr (holotype US!).

Illustration. Schultes 1975, p 125.


The Heteropterys oblongifolia complex

Heteropterys oblongifolia sensu lato is restricted to the low savannas of the Alto Orinoco and south to the Río Pacimoni. There are two morphological entities, which I am treating here as two species, H. oblongifolia and H. atabapensis. Superimposed on that pattern of variation is another which confuses the picture. In both of the species recognized here one encounters parallel ranges in size of plant and width of leaves, from very short plants with narrow leaves to large plants with broad leaves. I am interpreting this variation as phenotypic plasticity and giving it no taxonomic importance, for two reasons: 1) the variation is continuous, and 2) all sizes can be collected in the same place (eg Wurdack & Adderley 42776 & 42778). There remains the question of whether recognition of two species is justifiable. The two are sufficiently different that most plants are easily assigned to one or the other, and so far they have not been collected in the same place (see Fig 42). However, they are certainly closely related, and more intensive collection of the savannas of southern Amazonas may reveal intermediate forms that will make the recognition of two taxa impossible.


Fig 43h.

Shrublets, shrubs, or small trees 20 cm to 4 m tall, the vegetative internodes nearly or quite glabrous. Leaves opposite, alternate, or borne in whorls of 3 or 4, ascending; lamina of the larger leaves 6–12(–13.6) cm long, 1–5(–5.6) cm wide, narrowly to broadly elliptical or somewhat ovate or obovate, cuneate or rounded at the base, moderately to strongly revolute at the margin, obtuse, rounded, or retuse at the apex (or acute in the narrowest forms), sparsely sericeous and soon glabrare, mostly with a submarginal row of impressed glands below, papillose below (due to protruding starch grains in guard cells) and often glaucous, the fine reticulum much more prominent above than below; petiole 0–5 mm long, glabrate, eglandular; stipules not seen. Inflorescence a panicle with the flowers borne in
Fig 42. Distribution of *Heteropterys oblifolia* (squares) and *H. atabapensis* (circles).
pseudoracemes, sericeous with dark brown hairs, the bracts (0.5–)1–2.5 mm long, usually eglandular, the peduncle 1.5–5(–6) mm long, the bracteoles 0.5–1.5 mm long, eglandular. Pedicel 5–10 mm long. Calyx bearing 8 glands 1.3–2.5 mm long on the 4 lateral sepals, the anterior sepal eglandular or occasionally bearing 1–2 small glands. Petals glabrous, the claw 2–3.5 mm long, the limb 3–5 mm long, 3–5.7 mm wide, erose. Filaments 1.5–2.5(–3.4) mm long; anthers 0.6–0.8 mm long, glabrous, the connective dark red in the center, yellow distally and laterally. Styles 2–2.5 mm long, glabrous or basally sericeous, straight, the apex dorsally rounded or truncate or with a very short, blunt hook up to 0.1 mm long. Samara 20–27 mm long, borne ascending to erect; dorsal wing 10–11 mm wide, the abaxial edge straight or curving upward; nut 5–6 mm long, 4 mm high.

Type. **Tate 297**, Grand Savanna, Esmeralda, Amazonas, Venezuela (holotype NY!).


Collected in flower and fruit mostly from November to April.

17. **Heteropterys atabapensis** Anderson, sp nov

Frutex 10 cm–4 m altus, ramis vegetativis minute sericeis vel demum glabris. Folia opposita, alterna, vel verticillata; lamina foliorum majorum 3.5–10(–12) cm longa, (0.5–)1–6.5 cm lata, ovata vel elliptica vel raro linearis, basi cuneata, rotundata, vel cordata, ± plana, apice obtusa vel rotundata, primo sericea permox glabrata, plerumque subtus aliquot glandulis impressis submarginalibus munita, epidermide abaxiali non vel tantum obscure papillosa et non glaucescenti, reticulo grosso utrinque aequaliter prominenti vel valdius subtus; petiolum 0–2 mm longum, sericeus vel glabressus, eglandulosus; stipulae non visae. Inflorescentia panicula floribus in pseudoracemis, sericea pilis atrobrunneis, bracteis (0.5–)1–2.5 mm longis, eglandulosis, pedunculo (0–)1–6 mm longo, bracteolis 0.5–1.5 mm longis, plerumque eglandulosis. Pedicellus 5–14 mm longus. Flores ut in *H. oblongifolia*, praeter glandulas calicinales saepè minora et petala limbo saepè paulo majore. Samara 10–23 mm longa, portata ascendens vel erecta; ala dorsalis 5–10 mm lata, margine abaxiali recto vel sursum curvato; nux 3–7 mm longa, 3–5 mm alta.

Type. *Wurdack & Adderley 42778*, Río Atabapo 20 km above San Fernando de Atabapo, savanna on right bank of Caño Cumaré, Amazonas, Venezuela, elev 125–140 m, Jun flr (holotype NY).
Fig 43. *Heteropterys atabapensis* and *H. oblongifolia*. a–g, *H. atabapensis*: a) Flowering branch, ×0.5; b & c) leaves from other collections, ×0.5; d) flower, ×2.5; e) anther, abaxial view, ×12.5; f) gynoecium and side view of style, ×7.5; g) fruit, ×1. h, *H. oblongifolia*, fruiting branch, ×0.5. Drawn by Karin Douthit, a from Wurdack & Adderley 42778, b from Maguire et al 36282, c & g from Maguire & Wurdack 35575, d–f from Wurdack & Adderley 43765, h from Maguire et al 37585.
Distribution (Fig 42). Savannas from the upper Río Guainía north along the Ríos Atabapo and Orinoco to the Río Sipapo, at elevations of 125 to 200 m. VENEZUELA. Amazonas: Santa Cruz, Río Atabapo cerca de la desembocadura del Río Atacaví, Sep flr, Foldats 3797 (NY, VEN); Base Camp, Cerro Sipapo, Dec flr, Maguire & Politi 27986 (MICH, NY, VEN), Feb frt, 28822 (NY); Río Guainía, Sabana El Venado, Apr flr/frt, Maguire & Wurdack 35569 (NY), 35575 (NY); 1 km E of Maroa, “vining,” Apr frt, Steyermark & Bunting 102805 (NY, VEN); Río Orinoco 8 km below mouth of Río Atabapo, May flr/frt, Wurdack & Adderley 42685 (NY, VEN); Caño Cumaré, Río Atabapo 20 km above San Fernando de Atabapo, Jun flr, Wurdack & Adderley 42776 (NY) & type q v and Aug flr, 43765 (NY, VEN); Sabana Manacaí, Río Atabapo 15 km above Guarinumo, Jun flr, Wurdack & Adderley 42971 (NY, VEN). COLOMBIA. Vaupés: 1 km W of Cacagual (Piedra Cacaguati), Río Atabapo, Nov flr, Maguire et al 36282 (COL, MICH, NY), Sep flr, 41441 (NY).


Woody vine; vegetative internodes thinly sericeous to glabrate, dark purplish, lenticellate. Lamina of the largest leaves (9)−11−18 cm long, 3.5−7 cm wide, 2−3.5 times as long as wide, ovate or rarely elliptical, rounded at the base, obtuse, acute, or acuminate at the apex, nearly or quite glabrous above, thinly sericeous to glabrate below, eglandular or with a few impressed submarginal glands below, the fine reticulum often whitish and usually prominulous on both sides; petiole sericeous or often glabrate, eglandular or often biglandular near the apex; stipules not seen. Inflorescence a panicle, the flowers borne in pseudoracemes 3−12 cm long, sericeous to glabrate, the bracts 2−3 mm long, usually eglandular, the peduncle 1−5(−8) mm long, the bracteoles 1.5−2.5 mm long, usually bearing 2 abaxial glands. Pedicel 4−9 mm long. Calyx bearing 8 elliptical glands 1.8−2.5 mm long on the 4 lateral sepals, the anterior sepal eglandular or rarely bearing 2 small glands. Petals glabrous, erose, the lateral 4 with the claw 2.5−3.5 mm long, the limb 4−6.5 mm long and wide; posterior petal similar, the claw slightly longer, the limb slightly smaller. Filaments 2−3.6 mm long, strongly unequal in same flower; anthers 0.8−1 mm long, glabrous, the connective dark red. Styles 2.5−3.5 mm long, the apex truncate or extended dorsally into a hook up to 0.2 mm long. Samara (16)−19−23 mm long, borne horizontally; dorsal wing (8)−11−13 mm wide, usually ± flabellate, the abaxial edge usually slightly to strongly recurved, rarely straight; nut 6−9 mm long, 5−6 mm high.

Type. Humboldt & Bonpland, Río Orinoco near San Borja, Amazonas, Venezuela (P).

Distribution. Common along rivers throughout Amazonia and north to the middle Orinoco, at elevations of 80−125 m. Guayana collections studied: VENEZUELA. Bolivar: Río Pargueni, Wurdack & Monachino 39785 (NY, VEN); Río
Orinoco between mouth of Río Pargueni and mouth of Río Horeda, Wurdack & Monachino 39881 (MICH, NY, VEN); island in Río Orinoco between Puerto Paez and Orupe, Wurdack & Monachino 39968 (NY). Amazonas: Sipapo R. near confluence with Orinoco, Breteler 4828 (VEN, WAG); mouth of Río Parú, Cowan & Wurdack 31561 (MICH, NY, VEN); San Antonio, Río Orinoco, Curran 188 (MICH, NY); Río Negro near Cerro Cucuy, Maguire & Wurdack 34939 (MICH, NY, VEN); arriba de la boca del Río Cuao, Morillo & Ishikawa 3538 & 3541 (both VEN); Río Negro, cerca de la frontera colombo-venezolano-brasiler, Morillo et al 4120 (MICH); Río Sanariapo, Ll. Williams 15948 & 15948a (both US); between San Fernando de Atapapo and Río Orinoco, Wurdack & Adderley 42677 (NY); Río Orinoco between Minicio and mouth of Río Atabapo, Wurdack & Adderley 43719 (MICH, NY, US, VEN). BRAZIL. Amazônas: mouth of Río Xie, upper Río Negro basin, Schultes & Lopez 9208 (GH, IAN, US). COLOMBIA. Vaupés: Río Guaviare al otro lado de San Fernando, Venezuela, Araque Molina & Barkley 18V212 (US).

Collected in flower and fruit in diverse months.

_Heteropterys acutifolia_ is placed in synonymy under this species on the basis of the cited photograph of the type, which shows leaves and fruits of the shape characteristic for the species. The description in the protologue fits the plant in the picture, not only as to leaf shape, but also as to details such as the absence of petals and the shape of the young fruits, so that I am fairly sure it really is the type. The label distributed by Field Museum with the photograph ascribes the collection to Claussen, but I doubt that that is correct. The printed label that usually accompanied Claussen’s collections is absent (at least from the photograph), and Jussieu does not mention Claussen in the protologue. Moreover, Jussieu states that the type came “e parte boreali Brasiliâe,” presumably the Amazon, while Claussen collected only in Minas Gerais and around Rio de Janeiro. If I am wrong and this does prove to be a Claussen collection from Minas Gerais, then I am probably also wrong to equate it with _H. orinocensis_, which is not known from Minas Gerais and very probably does not grow there.

19. _Heteropterys catoptera_ Anderson, sp nov

Liana lignosa, internodiis vegetativis parce sericeis demum glabrata. Foliorum majorum lamina 10–13.5 cm longa, 3.8–4.7 cm lata, elliptica vel anguste ovata, basi cuneata vel subrotundata, apice acuminata, subtus glaucescens, sericea supra mox glabra, subtus pilis minimis appressisque ± persistentibus, eglandulosa vel prope marginem aliquot glandulis abortivis munita, reticulo utrinque aequaliter vel supra validius prominenti; petiólus 6–7 mm longus, sericeus demum glabratus, eglandulosus; stipulæ 0.15 mm longae, triangulares, interpetiolares. Inflorescência panicula, ramis complanatibus et sericeis, floribus confertis in pseudoracemis (2–)3–7 cm longis, bracteis 2.5–5 mm longis, infinis petiolatis et biglanduliferis alter et eglandulosus, pedunculo 2–3 mm longo, bracteolis 2–2.5 mm longis, eglandulosis, membranaceae et translucentibus reticulo visibilib, ovatis apice rotundatis. Pedicellus 3–4 mm longus. Sepala eglandulosa, 3.3 mm longa, 1.2 mm lata, apice revoluta, abaxialiter sericea, adaxialiter glabra. Petala luta, glabra, 4 lateralia ungue 2.5–3 mm longo, limbo 4.5–5 mm longo, 4–5.5 mm lato, margine erosa vel dentato; petalum posticum ungue 3 mm longo, limbo 4 mm longo latoque. Filamenta 2–3 mm longa, 2 petalis postico-lateralibus opposita crassiora; antherae
0.8–1.2 mm longae, glabrae, connectivo atrorubro. Ovarium ca 1 mm altum, sericeum; styli 2.5–3 mm longi, arcuati, glabri, apice dorsaliter uncinato unco ca 0.2 mm longo. Samara immaturissima usque 16 mm longa, 3 mm lata, reflexa ala dorsali valde descendent et proximaliter ultra nucem producta.


This peculiar species is known only from the type. Its name refers to the downward-pointing wings of the young fruit, its main distinguishing feature. I would expect the wings to maintain that orientation at maturity, but only collection of more mature material will tell us that for certain. The species is also notable for the glaucescence of the underside of its leaves (due to whitish guard cells), the slender crowded pseudoracemes, and the membranous, translucent bracts and bracteoles with the reticulum visible.

20. Heteropterys macradena (de Candolle) Anderson, comb nov

Banisteria macradena de Candolle, Prodr. 1: 590. 1824.

Woody vines, shrubs, or small trees; stems usually prominently lenticellate. Lamina of the largest leaves (7–)8–13(–17) cm long, (3–)4–6.5(–8) cm wide, ovate or elliptical, cuneate or rounded at the base, occasionally obtuse or rounded but mostly acuminate at the apex, sericeous on both sides, soon glabrate above, the hairs ± deciduous or sometimes persistent below, a submarginal row of glands usually present below, the reticulum usually prominent on both sides; petiole 4–10 mm long, sericeous to glabrate, eglandular; stipules minute, interpetiolar. Inflorescence axillary and terminal, usually paniculate, sericeous, the flowers borne in elongated pseudoracemes, the bracts 2–3(–4) mm long, eglandular or with minute marginal glands, the peduncle 1–3(–4) mm long, the bracteoles 1.5–3 mm long, usually eglandular, rarely with minute marginal glands. Pedicel 5–6 mm long. Calyx eglandular or the lateral 4 sepals biglandular. Petals glabrous, erose or dentate, the claw 3–4 mm long, the limb 3.7–5(–6) mm long, 3.7–5 mm wide. Filaments 2.2–4.5 mm long, strongly unequal in same flower; anthers 0.8–1.2 mm long, glabrous, the connective globose, dark red. Styles 3–5 mm long, glabrous, straight or the posterior 2 somewhat lyrate, the apex truncate or, usually, extended dorsally into a hook up to 0.2 mm long. Samara 25–35(–40) mm long, borne ascending; dorsal wing (8–)10–14 mm wide, obovate or falcate, the abaxial edge usually bent upward ± abruptly beyond the nut or gradually curved upward; nut 5–9 mm long, 3–5 mm high, round in cross-section.

Type. Cayenne (G).

Distribution. Northern South America. Collections from in and near Guayana: VENEZUELA. Bolívar: Isla del Río Hacha, 6°15′N, 62°47′W, Agostini 228 (NY, VEN), 334 (US), 335 (US, VEN); Ciudad Piar, Cerro Bolívar, elev 500 m, Aristeguieta 2198 (MY, VEN); La Laja, El Dorado-Sta. Elena de Uairen, Badillo & Holmquist 6068 (MY); San Félix, elev 30–40 m, Bernardi 7780 (VEN); Río
Caroni, boca de Tirika, elev 400 m, Cardona 1166 (US, VEN); Alto Paragua, 500 m, Cardona 2453 (VEN); El Arenal, Dto. Cedeño, Ferrari 1268 (MY); Salto El Llovizno, Río Caroni, Pannier 829a (VEN); Río Nichare, 6°15′N, 65°5′W, elev 200–250 m, Steyermark & Gibson 95688 (NY, VEN); Río Tirica to mouth of Río Torono, elev 500 m, Steyermark & Wurdack 1299 (MICH, NY, US, VEN); Río Kukenán, Tamayo 2869 (US, VEN); Río Caroni, Paso Caruachi, Trujillo 5781 (F, MY); La Ceiba, Medio Paragua, elev 70 m, Ll. Williams 12639 (US, VEN); La Paragua, Ll. Williams 12711 (US, VEN); San Mateo, Bajo Paragua, elev 75 m, Ll. Williams 12833 (MICH, US, VEN) & 12839 (US, VEN); Cerro Bolivar, elev 750 m, Wurdack 34391 (MICH, NY, US, VEN); Raudal Budare, Río Sapatui, elev 110 m, Wurdack & Monachino 41245 (NY) & 41246 (MICH, NY, US, VEN). Amazonas: Pto. Ayacucho, Curran 58 (MICH, NY); Savanna at Sta. Barbara, Maguire et al 32043 (MICH, NY, US, VEN); Sierra Parima, 2°27′24″N, 63°56′W, elev 1300 m, Steyermark 106148 (NY); Sierra Parima, 3°49′N, 64°36′W, elev 795–830 m, Steyermark 107027-A & 107209 (both NY); Pto. Ayacucho, elev 95 m, Ll. Williams 13147 (US, VEN); Tamatama, elev 121 m, Ll. Williams 15101 (US, VEN); Esmeralda, elev 143 m, Ll. Williams 15313 (A, US, VEN). COLOMBIA. Vaupés: Calamar, Río Unilla, elev 240 m, Cuatrecasas 7324 (COL); Miraflores, elev 270 m, Schultes 5371 (GH, NY, US). Amazonas-Vaupés: Río Apaporis, Schultes & Cabrera 15944 (NY, US). BRAZIL. Terr. Roraima: Serrinha, Rio Mucajáí, elev 500 m, Prance et al 4234 (MICH); Serra do Mel, Surumu, Ule 8183 (MG).

Collected in flower and fruit mostly from January to May.

As construed here, this is an exceedingly variable species, especially with respect to habit and size and shape of leaves. It is to be hoped that a future revision will result in its division into two or more natural, morphologically homogeneous taxa.

Many of the plants placed here would have been called H. suberosa by Niedenzu and H. acutifolia by Cuatrecasas. I have placed both of those names in synonymy (under H. nervosa and H. orinocensis respectively), but even if I had not the epithet macradena is older than either of them. Niedenzu considered macradena a synonym for the older name laurifolia, but judging from the photograph of the type (Field Mus. neg. 33404) I can see little basis for that decision. In fact, almost no collections from South America seem to be conspecific with the many collections of H. laurifolia from Central America, Mexico, and the West Indies. Although a variable species, H. laurifolia regularly has the reticulum, including the ultimate veinlets, white or yellowish below and thereby in strong contrast to the green laminar tissue.


Woody vines or shrubs. Leaves decussate; stipules none (?) or minute (ca 0.3 mm long), triangular, borne on the stem at the base of the petiole. Inflorescence a pseudoraceme. single or compound to form a panicle, terminal or terminal and lateral; bracts and bracteoles persistent. Calyx bearing 8–10 glands. Petals pink and/or white, abaxially winged, the lateral 4 recurved, the posterior ± erect. All
10 stamens fertile, glabrous, the filaments basally to \( \frac{1}{2} \) connate, straight or the posterior 3 (especially the 1 opposite the posterior petal) sigmoid. Ovary of 3 fertile carpels, connate at the base, free distally, 1 anterior and 2 posterior; styles 3, strongly unequal, the anterior thinner and usually shorter than the other 2, bent toward the posterior petal, the 2 posterior styles turned toward the anterior sepal; stigmas internal, the apex of the styles dorsally truncate to prominently hooked. Fruit a dry schizocarp comprising 3 (or less by abortion) indehiscent mericarps with the wings reduced to winglets or rounded outgrowths, separating from a short pyramidal torus.


*Clonodia* is a genus of two or three species, the two treated below plus possibly *C. ovata* Niedenzu, which I have not seen. Niedenzu’s other species, *C. sessilis*, is a synonym for *Mascagnia benthamiana* (Grisebach) Anderson; the two species had the same Spruce collection as type.

This is one of several groups of Malpighiaceae that have become distinctive by losing the fruit-wing of their samara-bearing ancestors. In general, I am opposed to granting generic status to such species, especially when other characters leave no room for doubt as to the affinities of the derived species. However, I am recognizing *Clonodia* because there is some doubt (at least in my mind) about its origin. The fruit, especially that of *C. complicata*, does seem to be mascagnioid, and the racemose inflorescence and winged petals suggest *Mascagnia* species. However, similar inflorescences and identical winged pink and white petals occur in *Heteropterys* species, which also tend to have many small, punctiform lenticels like those of *Clonodia*. Moreover, the carpels in *Heteropterys* are often only connate at the base, leaving a short torus as in *Clonodia*, while those of *Mascagnia* are usually (always?) connate their whole length and separate from a long, slender torus. The fruit of *Diplopterys* is certainly a far cry from that of *Banisteriopsis*, but its derivation from a species of *Banisteriopsis* seems certain and in flower *Diplopterys* is practically indistinguishable from *Banisteriopsis* (see discussion above under *Diplopterys*). By the same token, perhaps the fruit of *Clonodia* came from a *Heteropterys* that started with lateral crests and lost the large dorsal wing. Other types of data will have to be sought to shed some light on the relationships of *Clonodia*.

**Key to the Species of Clonodia in Guayana**

1. Mericarp with the nut 7 mm in diameter, bearing thick, often much-dissected winglets or crests with rounded edges and the veins obscure or invisible; most hairs of the inflorescence composed of a bulbous stalk, distally bifurcate; lamina of the larger leaves (9–)11–16.5 cm long, 5–9 cm wide, persistently sericeous below or eventually glabrate; petals all densely papillose or verrucose adaxially, the posterior more strongly so; abaxial wing of the lateral petals shorter than the limb; filament opposite the posterior petal almost as long as the two adjacent filaments. 1. *C. racemosa*.

1. Mericarp with the nut 4–5 mm in diameter, bearing thin winglets with clearly visible veins; hairs of the inflorescence composed of a slender stalk and a much longer crosspiece at right angles to it; lamina of the larger leaves (5.5–)7.5–11.5(–13) cm long, (3–)4–6(–7) cm wide, soon nearly or quite glabrate; posterior petal usually adaxially papillose, the laterals smooth or basally papillose; abaxial wing of the lateral petals about as long as the limb or longer; filament opposite the posterior petal much shorter than the 2 adjacent filaments, hardly longer than the short filaments opposite the anterior-lateral petals. 2. *C. complicata*. 


Woody vines; vegetative stems appressed-tomentose to glabrate, terete, with many tiny punctiform lenticels. Lamina of the larger leaves (9–)11–16.5 cm long, 5–9 cm wide, ovate or elliptical, rounded at the base, acute or abruptly acuminate at the apex, loosely sericeous to glabrate above, thinly sericeous below, persistently so or eventually glabrate, usually granulate above, with the reticulum prominent on both sides, bearing many (rarely few) glands below ± in 1 row on each side; petiole 5–10 mm long, sericeous to glabrate, bearing 2 glands at or somewhat above the base and occasionally 2–4 additional glands distally. Inflorescence a simple pseudoraceme terminating terminal and lateral shoots, 5–13 cm long, comprising (20–)30–60 flowers, tomentose, with some hairs T-shaped but most composed of a bulbous stalk, distally bifurcate; bracts 1–2 mm long, subulate, eglan- dular; peduncle 1.5–4.5(–6) mm long; bracteoles 0.5–1 mm long, ovate, borne between the middle and the apex of the peduncle, eglanular or rarely 1 with a small gland. Pedicel 5–12(–15) mm long, loosely sericeous or subvelutinous. Sepals beyond the glands 1.5 mm long, 1.5–2 mm wide, triangular, appressed after anthesis, abaxially sericeous, adaxially glabrous, bearing apparently 8 glands (actually 10, those of the anterior sepal ± connate with the adjacent glands) 2.5–3 mm long. Petals pink or pink and white, glabrous or bearing a few hairs abaxially, the lateral 4 with the claw 1.5–2.5 mm long, the limb 4.5–5.5(–6.5) mm long, 3–4 mm wide, oblone or rhomboidal, dentate or subentire, adaxially papilllose, bearing a small abaxial wing 1–1.5 mm wide and 2–3 mm high, never reaching as high as the limb; posterior petal with the claw 3–3.5 mm long, thick, the limb 4.5–5 mm long, 3–4 mm wide, obovate, laciniate, adaxially densely papilllose or verrucose, abaxially with a small wing or only carinate. Filaments opposite the anterior-lateral petals 1.5 mm long, the other 8 2.5–3 mm long, those opposite the posterior-lateral petals thicker than the other 8; anthers 0.8–1.8 mm long, the posterior 3 smallest. Ovary 1.5–2 mm high, sericeous; styles glabrous or basally sericeous, the anterior 1.5–2 mm long, the posterior 2.25 mm long, the apex with a short (0.2 mm) to very pronounced (0.5 mm) dorsal hook. Mericarp densely sericeous, the nut subglobose, 7 mm in diameter, bearing thick winglets or crests with the veins obscure, including a central dorsal winglet 2–4 mm wide, entire or dissected, and many irregular crests on each side, projecting 2–3 mm, dissected or partly connate, some parallel or highly irregular in orientation; ventral areole subcircular, 3 mm in diameter.

Type. _Martius_, Lac. Coari, Rio Solimões, Amazonas, Brazil (M, P).

Distribution. Amazonian Colombia and Brazil. COLOMBIA. Vaupés: Rio Kuduyari, _Allen 3179_ (COL); near Mitú, _Davis 214_ (MIC); type of _Atopocarpus papillosus_, q v; Rio Kuduyari, _Schultes & Cabrera 17896_ (NY). BRAZIL. Amazonas: Rio Negro, at Isla Macará, near mouth of Rio Padauri, _Cardona 1277_ (NY, US, VEN) & _1285_ (NY, US); Tapera, Padaury, Rio Negro, _Fröes 22701_
(IAN); near Livramento, Mun. Humaitá, Krukoff 6700 (NY) & 6702 (MICH, NY, US); Ponta Negra, sandy river bank, Rio Negro, vic. Manaus, Prance et al. 9091 (MICH, NY); Rio Negro between Ilha Uabetuba and Ilha da Silva, flooded river margin, Prance et al 15223 (MICH, NY); Manaus, Schwacke III 505 (GOET); type of C. verrucosa, q v; prope Barra, May 1851, Spruce 1545 (NY); inter Santarém et Barra, Oct 1850, Spruce (E); Manaus, Ule 5992 (NY). Pará: Rio Maicurú, várzea, Pires 6597a (IAN).

Collected in flower and fruit mostly from October to February, once in May.

An older name that might apply to this plant is Hiraea nitida H.B.K.; see the discussion under Mascagnia in this paper.

Pires 6597a is typical in most respects, but its peduncles are long and its mericarp is intermediate between that of Clonodia racemosa and C. complicata. The winglets are thick and densely sericeous as in C. racemosa, but they are much less dissected and have a more regular, parallel orientation than is found in other plants of C. racemosa. This collection, from Pará, is also disjunct from the rest of the species. Further collection may allow a reassessment of its taxonomic disposition.

2. Clonodia complicata (Humboldt, Bonpland & Kunth) Anderson, comb nov

Fig 44f–l.


Shrubs or woody vines, usually growing along streams or in low, seasonally inundated places; stems loosely sericeous to glabrate, terete, with many tiny punctiform lenticels. Lamina of the larger leaves (5.5–)7.5–11.5(–13) cm long, (3–)4–6(–7) cm wide, ovate, rounded or cuneate at the base, acute at the apex, loosely sericeous at first but nearly or quite glabrate at maturity, usually granulate above, with the reticulum prominent on both sides, usually bearing below on each side a row of (2–)4–8 glands between midrib and margin; petiole (3–)5–8 mm long, loosely sericeous to glabrate, eglanular or bearing 2(–4) glands, often near the middle. Inflorescence a pseudoraceme, terminal and sometimes also axillary, simple or rarely ternate, 3–13 cm long, comprising 20–50 flowers, tomento-sericeous with all the hairs composed of a short, slender stalk and a much longer crospiece at right angles; bracts 1.5–3 mm long, subulate, eglanular; peduncle 2–3.5 mm long; bracteoles 1–1.5 mm long, narrowly triangular, borne near the middle of the peduncle, eglanular. Pedicel 5–10 mm long, sericeous. Sepals beyond the glands ca 1.5 mm long and wide, triangular, appressed after anthesis, abaxially sericeous, adaxially glabrous, bearing 8(–10) glands (2–)2.5–2.8 mm long, free at the apex. Petals pink and/or white, glabrous, the lateral 4 with the claw 1.5–2(–2.5) mm long, the limb 4–5 mm long and wide, erose, adaxially smooth or basally papillose, bearing a prominent abaxial wing 1–1.5 mm wide and 3 mm high, reaching as high as the limb or higher; posterior petal with claw
Fig 44. *Heteropterys beecheviana* var alata and *Clonodia complicata*. a–e, *Heteropterys beecheviana* var alata: a) Flowering branch, ×0.5; b) cluster of flowers, ×2.5; c) flower, ×3.5; d) gynoecium, ×10; e) samara, ×1.5. f–l, *Clonodia complicata*: f) Flowering branch, ×0.5; g) hair from inflorescence, ×88; h) flower bud, ×5; i) flower, ×3.5; j) flag (posterior) petal, showing papillose adaxial surface, ×5; k & l) fruits (only 1 mericarp developed in each), ×4. Drawn by Karin Douthit, a–d from Wurdack & Monachino 39811, e from Wurdack & Monachino 39816, f–k from Breteler 4829, l from Cardona 822.
2.5–3.5 mm long, thick, abaxially carinate, widening distally into the limb 3.5–5 mm long, 4 mm wide, dentate, adaxially nearly smooth to densely papillose with large flat papillae, abaxially with a short narrow wing. Filaments strongly unequal, those opposite the sepals 2.5–3 mm long, slender, the 3 opposite the anterior-lateral petals and the posterior petal 1.4–2 mm long, usually slender, the 2 opposite the posterior lateral petals 2–2.7 mm long, very stout; anthers 1–1.5 mm long, subsimilar, those opposite the petals slightly longer and having larger connectives than those opposite the sepals. Ovary 1.5 mm high, sericeous; styles glabrous, the anterior 1.5–2 mm long, the posterior 2 2–3 mm long, the apex dorsally truncate or with a very short hook. Mericarp sparsely sericeous or tomentose, with the nut subglobose, 4–5 mm in diameter, bearing thin winglets with clearly visible veins, including a central dorsal winglet 0.5–2 mm wide, dentate to entire, extended forward at the apex 2 mm and sometimes downward at the base up to 5 mm, and 3–5 winglets on each side 1–3 mm long and wide, mostly at right angles to the central winglet, sometimes connate at the apex with it; ventral areole subcircular, 2.5 mm in diameter.


Distribution. Río Orinoco and tributaries in Venezuela and Colombia. VENEZUELA. Terr. Delta Amacuro: Manoa, Rusby & Squires 166 (NY). Bolívar: zona inundada, bajío de Ciudad Bolívar, desembocadura del Río Maruanta, Arísteguieta 4862 (US, VEN); Raudal del Perro, Alto Paragua, Cardona 793 (NY, US, VEN); Río Torono, Alto Paragua, Cardona 822 (NY, VEN); marsh, 31 km W of Caicara along Hwy 19 to Ciudad Bolívar, elev 60 m, Davidse 4361 (MO); Ciudad Bolívar, elev 35 m, Holt & Blake 841 & 852 (US); Río Paragua, between Río Torono and Salto de Aurora, elev 275 m, Killip 37555 (VEN); Temblador, Medio Caura, elev 100 m, Williams 11614 (F, MO, VEN); edges of Río Pargueni 1–10 km above mouth, elev 90 m, Wurdack & Monachino 39773 (NY). Amazónas: ribera, Raudales de Santa Bárbara de Orinoco, Argumosa 129; Sipapo River, near confluence with Orinoco River, elev 90 m, Breteler 4829 (US, VEN, WAG); margins of Río Orinoco just above mouth of Río Atabapo, elev 125–150 m, Wurdack & Adderley 42729 (MICH, NY, US, VEN). COLOMBIA. Vichada: Puerto Carreño, Cuatrecasas 4000 (F, US). Boyacá: low area, flooded during part of rainy season, Orocué, elev 140 m, Haught 2837 (F). Meta: near Orocué, Lehmann 8766 (NY). Vaupés: Amanawén, Romero 1236 (US).

Collected in flower in almost all months.

One of the collections cited above, *Wurdack & Adderley* 42729, has a most peculiar gyroecium. The styles lack the usual apical hook, and instead of a discrete stigma the receptive area (if indeed there is one) seems to be decurrent on the inner face of the style. Moreover, the carpels frequently contain a second, smaller ovule. The carpels of Malpighiaceae consistently contain only one ovule, and other plants of this species conform to that rule. I cannot guess the origin of the peculiarities in this particular population, but in the absence of any evidence that they have persisted I am inclined to dismiss them as a transient abnormality of no systematic significance.


Vines, mostly woody, with decussate leaves usually bearing glands on the lamina or petiole or both, the stipules small, free, triangular, inter- or epipetiolar.
Flowers mostly borne in pseudoracemes, these single or grouped in panicles, axillary or terminal or both, the pseudoracemes sometimes reduced and congested to form corymb, a few species bearing flowers in pairs or 4-flowered umbels; floriferous peduncles usually well developed, subtended by a bract and bearing 2 bracteoles at or slightly to well below the joint, 1 or both bracteoles glanduliferous in some species. Lateral 4 sepals usually biglandular, the anterior usually eglandular, biglandular in a few species. Petals yellow, pink, or lilac (or white?), the posterior usually at least somewhat differentiated from the lateral 4. Stamens 10, all fertile, the anthers more or less alike. Ovary of 3 often crested carpels connate along a central axis, 1 anterior and 2 posterior, all fertile; styles 3, the apex with a large internal stigma and dorsally rounded, truncate, acute, or short-hooked. Fruit schizocarpic, breaking apart into 3 (or less by abortion) samaras, each samara having its largest wings lateral, 2 discrete wings or a single wing through confluence of the laterals at the base or at base and apex; dorsal wing smaller, sometimes reduced to a crest or lost; intermediate winglets present or absent; wings reduced to horny rudiments in a few species.

Type. *Mascagnia americana* Bertero.

This is a diverse and perhaps unnatural genus of about 55 species, found from Mexico to Argentina.

In addition to the species treated below, there is another possible *Mascagnia* in Guayana about whose identity I am uncertain. That is *M. nitida* (H.B.K.) Niedenzu, based on *Hiraea nitida* H.B.K., its type collected near Santa Bárbara del Alto Orinoco. Judging from the photograph of the type, I am certain this is none of the species described here under *Mascagnia*. It may really be a species of *Mascagnia*, one that has not been found again on the Orinoco. Another possibility is that this is another collection of the plant which Kunth described as *Hiraea complicata*, in which case *Mascagnia nitida* will become a synonym for *Clonodina complicata* (H.B.K.) Anderson; see *Clonodina* in this paper. A third possibility is that this is a collection of *Clonodina racemosa* (Adr. Juss.) Niedenzu; if so, *nitida* will replace *racemosa* as the correct epithet for that species. However, *Clonodina racemosa* is not known from even the Río Negro in Venezuela, much less the Río Orinoco, and the branching of the inflorescence in the type is atypical for *C. racemosa*, so this last possibility is probably remote. The correct disposition of this name must await study of the type and perhaps re-collection of this species from the Alto Orinoco.

**Key to the Species of *Mascagnia* in Guayana**
(for specimens with flowers)

1. Petals completely concealed by the sepals during enlargement of the bud, emerging only at anthesis.
2. Petals abaxially densely and persistently tomentose or loosely sericeous.
   3. Margin of the bracteoles and sepals with a row of stalked clavate or capititate glands; petals yellow.
      1. *M. glandulifera*.
   3. Margin of the bracteoles and sepals eglandular; petals lilac or pink.
      2. *M. macrodisca*.
2. Petals glabrous.
4. Calyx glands 10 (all 5 sepals biglandular); bracteoles 2–4.5 mm long, elliptical or obovate, broadly obtuse or rounded at the apex; petals yellow, turning red in age.
5. Leaf hairs stalked, the branches straight or serpentine and often ascending, persistent or deciduous.
6. Mature leaves very densely and persistently tomentose below.
3. *M. guianensis.*
4. *M. leucanthelie.*
5. Leaf hairs sessile, straight, appressed, persistent below.
5. *M. heterocarpa.*
4. Calyx glands 8 (lateral 4 sepals biglandular, anterior sepal eglandular); bracteoles up to 2 mm long, ovate or triangular, acute or slightly obtuse at the apex; petals yellow, not changing color in age.
7. Anthers 1–1.5 mm long, bearing a few hairs abaxially at the base and sericeous between the locules; calyx glands 1.7–2.5 mm long; petals with the limb 3.5–5 mm long, 2.5–3.5 mm wide; ultimate pseudoracemes (1–)2–6 cm long; floriferous bracts 1–2 mm long, often bearing 1 or 2 large glands or eglandular.
8. Lamina of the larger leaves 4.5–7.5(–9.5) cm wide, golden- or silvery-sericeous below, the reticulum ± prominent below.
8. Lamina of the larger leaves 9–12 cm wide, dark brown-sericeous below, the reticulum below ± obscured by outer layer of hairs.
7. *M. castanea.*
7. Anthers 0.5–0.7 mm long, glabrous; calyx glands 0.5–1.5 mm long; petals with the limb 2.3–2.5 mm long, 1.5–1.7 mm wide; ultimate pseudoracemes 0.3–2.5 cm long; floriferous bracts 0.5–0.9 mm long, eglandular.
8. *M. poepiggiana.*
1. Petals (at least the outermost) exposed during enlargement of the bud.
9. Petals abaxially densely and persistently sericeous.
9. *M. microcarpa.*
10. Pedicels sericeous or subvelutinous; sepals abaxially sericeous; leaves usually persistently sericeous or velutinous below, occasionally glabrescent; wing of the samara sparsely sericeous.
11. Petiole biglandular near the middle; floriferous peduncle 0(–1) mm long; sepals revolute in anthesis; lateral petals with the limb 2.3–2.5 mm long, 1.5–1.7 mm wide; anthers 0.5–0.7 mm long.
8. *M. poepiggiana.*
11. Petiole eglandular; floriferous peduncle 2–5.5 mm long; sepals appressed in anthesis; lateral petals with the limb 4.5–5 mm long, 2.5–4 mm wide; anthers 1.2–1.7 mm long.
12. Leaf hairs below dark brown or reddish, usually with sinuos and/or ascending branches; inflorescence an axillary panicle of 3–5(–7) corymbs with the flowers congested and ascending; dorsal wing of samara 2–5 mm wide.
10. *M. septum.*
12. Leaf hairs below white or stramineous, straight, appressed; inflorescence a simple axillary pseudoraceme with the flowers evenly spaced and ± horizontal; dorsal wing of samara none or a crest up to 1.5 mm wide.
11. *M. schunkei.*
10. Pedicels and sepals glabrous; leaves glabrous or soon glabrate; wing of the samara glabrescent, nearly or quite glabrate at maturity.
13. Lamina of larger leaves 8–15 cm long, 4–7.5 cm wide, cordate at the base, crenate at the margin; petiole 3–5 mm long; petals yellow.
12. *M. eggersiana.*
13. Lamina of larger leaves 14–25 cm long, 6–11 cm wide, obtuse or rounded at the base, smooth at the margin with a discolored band 0.5–1 mm wide; petiole 11–18 mm long; petals white.
13. *M. dissimilis.*

**Key to the Species of *Mascagnia* in Guayana**
(for specimens with fruits)

1. Fruit wings reduced to rudimentary crests.
5. *M. heterocarpa.*
1. Fruit wings developed (although short and thick in *M. microcarpa*).
2. Lateral wing of the samara continuous at the base, continuous at the apex or incised part way or completely to the nut.
3. Calyx glands 8 (lateral 4 sepals biglandular, anterior sepal eglandular).
   4. Petiole bearing 2–10 small glands in 2 rows; samara 4–10 cm wide, with the
dorsal wing 5–10 mm wide. Go to couplet 3 of preceding key.
   4. Petiole eglandular; samara 2–3.6 (–4.2) cm wide, with the dorsal crest or wing
0–5 mm wide. Go to couplet 10 of preceding key.
3. Calyx glands 10 (all 5 sepals biglandular). Go to couplet 6 of preceding key.
2. Lateral wings of the samara discrete, i.e., divided to the nut at base and apex.
5. Mature lamina so densely sericeous below as to be completely concealed by the
hairs. Go to couplet 7 of preceding key.
5. Mature lamina glabrate or sericeous below, but the hairs not dense enough to
completely conceal the laminar tissue.
6. Pedicel several times as long as the peduncle; lamina glabrate or very sparsely
sericeous below, bearing a row of glands on the revolute margin; fruit wings
thick, coriaceous or aerenchymatous; inflorescences shorter than the sub-
tending leaves. 9. *M. microcarpa*.
6. Pedicel about as long as the peduncle; lamina persistently sericeous below,
bearing 2–several glands below parallel to but set in from the margin; fruit
wings papery and brittle; inflorescence often apical, much branched, and ex-
ceeding the subtending leaves. 2. *M. macrodisca*.


Woody vine; stems sericeous to glabrate. Lamina of the larger leaves 11–14.5
cm long, 4.5–8 cm wide, elliptical, rounded at the base, abruptly acuminate at
the apex, sericeous to glabrate on both sides or the hairs persistent below and
often on the midrib above, eglandular or with 1–3 sessile marginal glands on each
side near the base; petiole 8–13 mm long, sericeous, bearing (2–)4–10 small glands
in 2 rows; stipules minute, triangular, borne on the petiole slightly above its base.
Flowers borne in axillary and terminal pseudoracemes or panicles, the ultimate
pseudoracemes 3–8 cm long and containing 10–20 flowers; bracts caducous, 3–5
mm long, ovate, abaxially tomentose, adaxially glabrous or tomentose at the
margin, bearing many small stalked clavate or capitate marginal glands; peduncle
2–5 mm long, bearing 2 bracteoles at its apex, the bracteoles like the bracts but
persistent or eventually deciduous. Pedicel 3–5 mm long. Sepals completely con-
cealing the petals until anthesis, ca 5 mm long (–7 mm in fruit) and 2 mm wide,
narrowly elliptical, bearing many small stalked clavate or capitate glands on the
margin and distally on the adaxial surface, tomentose on both sides, the lateral
4 each bearing 2 large abaxial glands 1.5 mm long (–2.5 mm in fruit), the anterior
without abaxial glands. Petals yellow, abaxially densely tomentose, 5–9 mm long,
the posterior petal with dark veins and a longer claw and much smaller limb than
the lateral petals. Filaments 2–4.5 mm long, very unequal, the longest opposite
the anterior sepal, glabrous, ± straight, connate at the base; anthers ca 1 mm
long, glabrous. Styles 3.5–4 mm long, the anterior slightly shorter than the pos-
terior 2, glabrous, straight, very short-hooked dorsally at the apex. Samara 4.5–
6 cm wide, hispid with the hairs often at glandular dots, the lateral wings mem-
branous, 2–3 cm wide, continuous at the base, divided to the nut at the apex,
undulate and coarsely toothed at the margin; central dorsal wing 6–10 mm wide,
± semicircular, entire or erose; intermediate winglets none or very small; ventral
areole ovate, 3.5 mm long, 2.5 mm wide.
Type. Schultes & Cabrera 13208, Soratama, entre el Río Pacoa y el Río Kanana, Río Apaporis, elev 250 m, Amazonas-Vaupés, Colombia, 31 Jul 1951 (holotype US! isotype NY!).

Illustration. Schultes 1975, p 129.

Distribution. VENEZUELA. Amazonas: 12–15 km NE of San Carlos, elev 100 m, Morillo et al 4206 (MY). BRAZIL. Amazónas: mixed woodland, Camp 5 (Palmito Camp), elev 750 m, Rio Cauaburi, Rio Negro, Maguire et al 60426 (NY), COLOMBIA. Amazonas-Vaupés: Soratama, Río Apaporis, type q v, also Schultes & Cabrera 13594 (US). PERU. Loreto: Maynas, Iquitos, Santo Thomas, Revilla 1748 (MICH).

Collected in flower and fruit in July and August, and in fruit in April and November.


Woody vines; stems persistently sericeous. Lamina of the larger leaves 9–14 (–18) cm long, 4–8 (–12) cm wide, elliptical or slightly ovate or obovate, cuneate or rounded at the base, short-acuminate at the apex, sericeous to soon glabrate above, persistently sericeous below with short, straight, sessile hairs, bearing below in the proximal half 1–several small glands on each side in a row parallel to but set in from the margin; petiole 10–22 mm long, persistently sericeous, usually bearing 2–8 small glands in 2 rows; stipules minute, triangular, borne at the base of the petiole. Flowers borne in axillary and terminal pseudoracemes or panicles, the ultimate pseudoracemes 2–9 cm long and containing 6–20 (–30) flowers; bracts 1.5–3 mm long, ovate or triangular, eglandular, abaxially sericeous, adaxially glabrous; peduncle 3–5 mm long; bracteoles like the bracts but smaller, borne between the middle and the apex of the peduncle. Pedicel 3–4 mm long (–6 mm in fruit). Sepals completely concealing the petals until anthesis, ca 4.5 mm long, ½ connate, abaxially sericeous, adaxially glabrous, revolute after anthesis, the lateral 4 biglandular with the glands 2.5–3.5 mm long and distally free and revolute, the anterior sepal eglandular. Petals violet (or pink?), abaxially densely sericeous or tomentose, adaxially sparsely tomentose, 4.5–5.5 mm long, dentate or glandular-fimbriate, subequal. Filaments 2–3 mm long, subequal, glabrous, straight, ca ½ connate; anthers 1–1.3 mm long, glabrous. Styles 2.5–3.5 mm long, glabrous, straight, erect or divergent, dorsally rounded, truncate, or apiculate at the apex. Samara 4–8 cm wide, sericeous, the lateral wings membranous, 2–4 cm wide, continuous at the base or rarely divided nearly or quite to the nut, divided to the nut at the apex, sinuate, entire; central dorsal wing 5–10 mm wide, semicircular or trapezoidal, entire; intermediate winglets none; ventral areole ovate, 4–5 mm long, 3–4 mm wide.

Type. Triana 5568-6, Villavicencio, Colombia, elev 460 m, Feb 1856 (COL! G, MO).

Manapiare Km 172, 6°N, 66°W, elev 450 m, Delascio Chitty 2220 (MICH); 47 km N of Tumeremo, forest at base of Altiplanicie de Nuria, Steyermark 89315 (NY); La Prisión, Medio Caura, elev 120 m, Ll. Williams 11647 (F, US, VEN). Amazonas: Mavaca, Alto Orinoco, Aristeguieta & Lizot 7388 (NY, VEN). COLOMBIA. Vaupés: Rio Guaviare, San José del Guaviare, elev 240 m, Cuatrecasas 7477 (F, US); Alto Vaupés, Miraflures, elev 300 m, Gutierrez V. & Schultes 700 (GH).

Collected in flower November to January, in fruit December to April.

The only collections from the Alto Orinoco (Aristeguieta & Lizot 7388 and Delascio Chitty 2220) have fruits that are atypical in that the lateral wings are partially to completely divided at the base; moreover, the petals of the former were reported to be pink. In other respects they are similar to other collections of M. macrodisca. Perhaps they represent a taxon that deserves recognition, but that must await the availability of more, better documented collections.

3. Mascagnia guianensis Anderson, sp nov


Liana lignosa, ramis vegetativis sericeis demum glabratibus. Foliorum majorum lamina 6–10(–13) cm longa, 3–5(–6) cm lata, elliptica, basi cuneata vel rotundata, margine valde revoluta, apice plerumque rotundata et apiculata vel rarius acuminata, supra tomentosa vel demum glabra, subtus pertinaciter dense tomentosa, pilis stipitatis trabeculo recto vel flexuoso 1–2 mm longo, subtus saepè glandulis aliqut parvis in serie sub margine instructa; petiolus 8–15(–20) mm longus, appresso-tomentosus, prope medium biglandulifer; stipulae minutae, in dimidio proximales petioli portatae. Inflorescentia dichasium terminale, composi- tum, folii reductus rotundis instructum, axibus aureo-tomentosis, floribus in umbellis (3–)4-floris, bracteis 3–4(–6) mm longis, spathulatis, utrinque tomentosis, eglandulosis, pedunculo 3–6(–9) mm longo, tomentoso, bracteolis apice vel subjacentibus, 2–4 mm longis, spathulatis vel ellipticis, utrinque tomentosis vel supra subglabros, eglandulosis vel 1-glanduliferis. Pedicellus 5–10 mm longus, tomentosus. Sepala in alabastro petala omnino includedentia, 4–5 mm longa, anguste triangularia, post anthesin revoluta, basi connata, abaxialiter tomentosa, adaxialiter apice puberula cetera glabra, omnia 5 biglandulifera, glandulis 2–2,5 mm longis. Petala lutea demum rubescens, glabra, 4–6 mm longa, 2,5–3 mm lata, obovata, 4 lateralia ungue ca 1 mm longo et margine integra vel eosa, posticum ungue ca 2 mm longo et margine dentatum. Filamenta 2,5–3 mm longa, illa sepalis opposita quam illa petalis opposita parum longiora, abaxialiter sericea, adaxialiter glabra, ½ connata; antherae 1–1,3 mm longae, glabree. Ovarium 1,5 mm altum, tomentosum, stylis 2–2,3 mm longis, aequalibus, glabris, crassis, rectis et erectis, apice dorsalis paulo rotundatis, stigmatibus fere terminalibus. Samara 2,3–3,5 cm alta, 2,5–4 cm lata, suborbicularis, alis lateralis membranaceis, 1,3–2 cm latis, basi continuis, apice discretis, margine sinuatis; ala dorsalis centralis 4–7 mm lata, semicircularis, integra vel lobata; alulae dorsales intermediae nullae; areola ventralis ovata, 3 mm longa, 2–2,5 mm lata.
Fig 45. *Mascagnia guianensis* and *M. heterocarpa*. a–f, *M. guianensis*: a) Flowering and fruiting branch, ×0.8; b) abaxial surface of lamina, ×23 (above) and enlarged hair, ×38 (below); c) flower bud, ×7.7; d) flower, ×3.8; e) gynoeicum, ×11.5; f) samara, ×1.2. g) *M. heterocarpa*, mericarp, ×2.3. Drawn by Karin Douthit, a, b, & f from Gleason 825, c–e from Forest Dept. 3644, g from Ducke 1169.
Type. _Gleason_ 825, dense upland forest, Rockstone, British Guiana [Guyana], 15 Jul–1 Aug 1921 (holotype NY).

Distribution: GUYANA. Berbice-Rupununi Cattle Trail, _Abraham_ 234 (NY); upper Mazaruni River, about 60°10'W, _De La Cruz_ 2231 (MO, NY, US); Malali, Demerara River, lat. ca 5°35'N, _De La Cruz_ 2653 (NY); Barima River, 8°20'N, 59°50'W, _De La Cruz_ 3401 (NY); Mazaruni Station, _Forest Dept._ 3644 (NY); dry sandhills E of Rockstone, _Gleason_ 753 (NY); type, q v; Rockstone, _Hitchcock_ 17289 (NY); Demerara, _Jenman_ 4087 (US); white sand 1.5 miles from Atkinson Field, _Robertson & Austin_ 278 (MO); Moraballi Creek, near Bartica, Essequibo River, _Sandwith_ 484 (NY), 529 (NY, US); Demerara, _Warren s n_ (F). SURINAM. Forest of Zandery, _Samuels_ 254 (NY). FRENCH GUIANA. Rivière du Maroni, _Mélino_ 116 & 258 (NY); Godebert, _Wachenheim_ 399 (NY).

Collected in flower and fruit at diverse times, especially from May to November.

This rather common species is widely known as _Mascagnia leucanthela_ Grisebach, but it must have a new name because the type of that name, _Spruce_ 2070, came from the upper Rio Negro and is referable to a related but distinct species.


Woody vines; branches loosely sericeous to glabrate. Lamina of the larger leaves 8–14 cm long, 5–8 cm wide, broadly elliptical, cuneate at the base, abruptly short-acuminate at the apex, tomentose to soon glabrate on both sides or thinly hispid below with stalked T-shaped or Y-shaped hairs, eglandular (?); petiole 10 mm long, tomentose to glabrate, eglandular; stipules minute, borne on the stem at base of petiole. Inflorescence an open, compound, terminal dichasium, the axes persistently white-tomentose, containing much-reduced, persistently white-tomentose, orbicular leaves bearing a row of abaxial glands inside the margin, the flowers borne in pairs; bracts 3–5 mm long, elliptical or obovate, tomentose on both sides, eglandular; peduncle 7–10 mm long, tomentose; bracteoles borne at the apex of the peduncle, like the bracts but usually slightly smaller and more rounded at the apex. Pedicel 6–10 mm long, tomentose. Sepals completely concealing the petals until anthesis, ca 4 mm long, triangular, revolute after anthesis, abaxially densely tomentose, adaxially puberulent, all 5 biglandular, the glands 3–3.5 mm long. Petals yellow, turning red in age, glabrous, 5.5–6.5 mm long, 2.5–3 mm wide, bluntly dentate, the posterior with the claw thicker and 2 mm long vs. 1 mm in the laterals. Filaments 3–3.5 mm long, those opposite the sepals slightly longer than those opposite the petals, glabrous, ± straight, ca ½ connate; anthers 1–1.3 mm long, glabrous, soon reflexed. Styles ca 2 mm long, the anterior slightly shorter, sericeous proximally, stout, straight, and erect, dorsally truncate or rounded at the apex, the stigmas appearing almost terminal. Samara ca 4 cm wide and 3–4 cm high, suborbicular, the lateral wings membranous, ca 2 cm wide, continuous at the base, divided to the nut at the apex, undulate and coarsely toothed at the margin; central dorsal wing ca 7 mm wide, trapezoidal, toothed and often lobed; intermediate winglets none or 1–several seta-like structures as high as the width of the dorsal wing or shorter; ventral areole broadly ovate, 4.5 mm high, 4 mm wide.
Type. Spruce 2070, Rio Negro between Barcellos and São Gabriel, Amazonas, Brazil, Dec (GOET?, M). Spruce 2070 is also the type of M. spruceana Nied.

Distribution. Known only from the type and the following collection, both from the upper Rio Negro. BRAZIL. Amazonas: road margins Camanaus-Uaupés road, near Camanaus, sandy soil, terra firme, Prance et al 15927 (MICH, NY).

Collected in flower and fruit in November and December.

The name of this rare species has been applied to a closely related plant of the Guianas, described here as M. guianensis. Since the only collection cited by Grisebach in the protologue is Spruce 2070 from the Rio Negro, that has to be the type.

5. **Mascagnia heterocarpa** Anderson, nom nov


Woody vines; branches sericeous to eventually glabrate. Lamina of the larger leaves 9–16 cm long, 6–9(–12) cm wide, elliptical, cuneate or rounded at the base, revolute at the margin, abruptly acuminate or rounded and apiculate at the apex, sericeous above to soon glabrate or the midrib sericeous, moderately to thinly but persistently sericeous below, the hairs short, sessile, straight, parallel, and fine, bearing few to many small glands below in 1–3 rows parallel to but set in from the margin; petiole 9–18(–22) mm long, persistently golden-sericeous, bearing (0–)2–4(–8) small impressed glands; stipules not seen. Inflorescence a decumbent panicle terminating in umbels or corymbs of 4(–8) flowers, the axes golden-sericeous; bracts 3–5 mm long, elliptical or obovate, abaxially densely and adaxially thinly sericeous, eglandular; peduncle (3–)5–9 mm long; bracteoles like the bracts but (2–)2.5–4 mm long, borne between the middle and the apex of the peduncle. Pedicel 6–11 mm long. Sepals completely concealing the petals until anthesis, ca 4 mm long and 2 mm wide, triangular, revolute after anthesis, abaxially sericeous, adaxially glabrous, all 5 biglandular, the glands 2–2.5 mm long. Petals yellow, turning red in age, glabrous, 4–5.5 mm long, ca 2 mm wide, erose or subentire, reflexed, the posterior with the claw ca 2 mm long vs. 1 mm in the laterals. Filaments 2.5–3 mm long, abaxially somewhat sericeous, ± straight, ca ½ connate; anthers 1–1.5 mm long, glabrous, soon reflexed. Styles 2–2.5 mm long, subequal, sericeous at the base, stout, straight and erect to soon recurved-divergent, dorsally truncate or rounded at the apex, the stigmas appearing almost terminal. Mericarp 12–18 mm long, 12–17 mm wide, sericeous, lacking membranous wings, the large nut bearing instead many coriaceous or corycky crests or winglets 2–4 mm high or wide, comprising a central dorsal crest extending over the apex, ca 4–6 often reticulate crests on each side ± at right angles to the dorsal crest, and sometimes partial fusion of these crests to produce a dissected rudiment of the lateral wing, continuous at the base, discrete at the apex; ventral areole ovate, 7 mm long, 6 mm wide.

Type. *Spruce 1093*, in vicinibus Barra [Manaus], Amazonas, Brazil, Dec–Mar 1850–51 (isotypes E! GH! M, NY!).

Distribution. Known only from Manaus and vicinity. BRAZIL. Amazonas, Manaus: Igarapé do Pensador, terra firme, arenosa, capoeira, *Coelho s n* [INPA
3000] (INPA, US); BR 17, Km 9, terra firme, úmido, arenoso, capoeira grossa, *Coelho s n* [INPA 3078] (IAN, INPA, US); igarapé do Parque 10, terra firme, solo arenoso, úmido, *Coelho s n* [INPA 6740] (INPA); Estrada do Aleixo, ad ripas paludosas rivuli, *Ducke 1169* (GH, NY, US); igarapé dos Francêses, terra firme, úmido, arenosa, capoeira fechada, *Mello & Coelho s n* [INPA 3175] (INPA); type, q v.

Collected in flower from October to December, in fruit from December to February.

I have not seen the original publications of either *Malpighiodes spruceana* Niedenzu or *Mascagnia spruceana* Niedenzu; but if Niedenzu’s later treatment in *Pflanzenreich* reflects the protologues, it is clear that the two epithets had different types referable to different species, and that Niedenzu was well aware of that fact and intended to publish two names. *Malpighiodes spruceana* is a legitimate name, but it cannot be transferred to *Mascagnia* because there already exists the name *Mascagnia spruceana* Niedenzu which, although superfluous and therefore illegitimate, still serves as an earlier homonym. Therefore, I am proposing a new name for this species when it is treated as a species of *Mascagnia*; in other genera its epithet would revert to *spruceana*. The epithet proposed, *heterocarpa*, refers to the fact that the fruit of this species is so different from that of most species of *Mascagnia*, including its closest relatives.

Considered by itself, this species would hardly seem referable to *Mascagnia*. However, it is so similar in so many characters to *Mascagnia leucanthela* and *M. guianensis* that the close relationship of these three species seems certain. As has happened in almost every wing-fruited genus of Malpighiaceae, the fruit of this species has simply lost its membranous wings. While this has the unsettling effect of depriving the plant of its most useful generic character, that does not seem to me sufficient basis for erecting a separate genus or for putting it into an artificial cluster of unrelated species with similar fruits, as did Niedenzu. When, as in the case of *Clonodia*, there exists a serious question as to the origin of a peculiar plant, then erecting a genus for it may be justifiable, but in this case the plant has close extant relatives that cannot be excluded from *Mascagnia*, and it seems best to me to place it with them.

This is not a species of Guayana, but it is included here because the treatment of its two close relatives, both species of lowland Guayana, offered a good opportunity to clarify the identity and relationships of this interesting plant.

6. *Mascagnia benthamiana* (Grisebach) Anderson, comb nov


Woody vines, often on stream banks or in seasonally inundated places; stems sericeous to soon glabrate. Lamina of the larger leaves 9–18(–21) cm long, 4.5–7.5(–9.5) cm wide, narrowly to broadly ovate, rounded (rarely slightly cordate) at the base, revolute at the margin, acuminate at the apex, sericeous to soon glabrate above, persistently golden- or silvery-sericeous below, the hairs so dense
and appressed as to completely conceal the lamina and usually giving the leaf a metallic sheen, bearing many to few (occasionally no) small marginal glands, otherwise eglandular, the reticulum ± prominent on both sides; petiole (2-)4–11 mm long, sericeous to glabrate, bearing 2 large glands at or slightly above the base; stipules ca 0.3 mm long, borne on the petiole beside or slightly above the glands. Inflorescence a sericeous, compound, axillary or terminal panicle containing bracts 3 mm long bearing 2 large glands, the flowers ultimately borne in pseudoracemes (1–)2–6 cm long of 4–16 flowers; floriferous bracts 1–2 mm long, ovate, bearing 2 large abaxial glands or eglandular; peduncle none or up to 4 mm long; bracteoles 0.7–1.5(–2) mm long, triangular, borne at the apex of the peduncle. Pedicel 3–6 mm long, sericeous. Sepals completely concealing the petals until anthesis, 3–4 mm long, ca 1.5 mm wide, revolute after anthesis, membranous at the margins, obtuse or rounded at the apex, abaxially thinly sericeous, adaxially glabrous, the lateral 4 biglandular with the glands 2–2.5 mm long and often revolute at the apex, the anterior sepal eglandular. Petals yellow, glabrous, the limb 3.5–5 mm long, 2.5–3.5 mm wide, erose, the claw 1–2 mm long, thicker in the posterior petal. Filaments 1.5–2 mm long, glabrous, straight, up to ½ connate; anthers 1–1.5 mm long, bearing a few straight hairs abaxially at the base and sericeous between the locules. Ovary 1–1.5 mm high, sericeous; styles 1.2–2.3 mm long, subequal, glabrous except hirsute at the base, stout, recurved-divergent, dorsally rounded or truncate at the apex, the stigmas internal but sometimes appearing nearly terminal. Samara usually with 2 discrete trapezoidal lateral wings 11–20 mm wide, sinuate at the margin or lobed or incised to the nut, occasionally only 5–10 mm wide and irregularly much dissected; central dorsal wing or crest 2–7 mm wide, subentire or sinuate, often extended forward at the apex between the lateral wings; intermediate winglets usually none, rarely several small crests or processes; ventral areole ovate, 2–3 mm in diameter.


Collected in flower and fruit in various months in different areas.

This is a widespread and exceedingly variable species. The description given above does not attempt to include all the variation in the species; it is taken from the representatives seen from Amazonian Peru and Colombia and northern Brazil. The species usually has a mascagnioid samara, but occasionally the lateral wings are much dissected, and it was one of these collections that Grisebach and Niedenzu treated as a *Tetrapteryx*. Other characters show the Spruce type to be conspecific with Amazonian populations of *Mascagnia sericans* Niedenzu. The same Spruce collection is also the type of *Clonodia sessilis* Niedenzu.

7. *Mascagnia castanea* (Cuatrecasas) Anderson, comb nov


Type. *Schultes & López* 10014, upper Rio Negro basin, Rio Dimiti, at base
Serra Dimiti, Amazônas, Brazil, 12–19 May 1948 flr (holotype US! isotypes IAN! US!).

This plant is known only from the type; for a full description see the protologue. Its fruit is not known, but its flowers and many vegetative characters are so like those of *Mascagnia benthamiana* that I transfer the name to *Mascagnia* with some confidence. Indeed, they are so similar that perhaps it would be better to treat *M. castanea* as a variety of *M. benthamiana*. Resolution of its status had better await revision of this whole variable complex, by which perhaps more material of *M. castanea*, including fruits, will be available.

8. **Mascagnia poepiggiana** (Adr. Jussieu) Anderson, comb nov

*Mascagnia subsericea* Cuatrecasas, Webbia 13(2): 370. 1958. Type: *Garcia-Barriga 14089*, Soratama, Amazonas, Colombia, elev 250 m, Dec frt (holotype US! isotype NY!).

Woody vines, the stems sericeous to eventually glabrate. Lamina of the larger leaves 8.5–15(–19) cm long, 5–9 cm wide, ovate or elliptical or slightly obovate, cuneate to rounded at the base, acuminate to rounded and apiculate at the apex, sericeous to soon glabrate above, persistently golden- or silvery-sericeous below, the hairs so dense and appressed as to completely conceal the lamina and give the leaf a metallic sheen, bearing several small, flat or cylindrical marginal glands, otherwise eglandular, the fine tertiary veins obscure or prominulous above and strongly parallel; petiole 7–9(–11) mm long, sericeous to glabrate, bearing 2 glands at or slightly above the middle; stipules ca 0.3 mm long, triangular, borne on the petiole at or slightly above the base. Inflorescence a sericeous, compound, axillary or terminal panicle containing bracts up to 3 mm long and eglandular or bearing 2 small glands, the flowers ultimately borne in pseudoracemes 0.3–2.5 cm long of 2–13 flowers; floriferous bracts and bracteoles 0.5–0.9 mm long, ca 0.5 mm wide, triangular, eglandular; peduncle 0(–1) mm long. Pedicel 3.5–4 mm long (–5 mm in fruit), sericeous to glabrescent. Sepals incompletely covering petals before anthesis, ca 1.5 mm long and 1.2 mm wide, revolute in anthesis, membranous at the margin, rounded at the apex, abaxially thinly sericeous in the center, adaxially glabrous, the lateral 4 biglandular with the glands 0.5–1.5 mm long and subpetalate, the anterior sepal eglandular. Petals yellow (the posterior with red veins?), glabrous, the limb 2.3–2.5 mm long, 1.5–1.7 mm wide, subentire or erose, the claw 1 mm long in the lateral 4, 1.5–2 mm long in the posterior. Filaments ca 1.5 mm long, glabrous, straight, basally connate; anthers 0.5–0.7 mm long, glabrous, the connective dark red. Styles 1.3 mm long in flower, subequal, glabrous, slightly bowed, dorsally rounded or truncate at the apex. Samara sericeous, with 2 discrete, basically trapezoidal lateral wings 10–15 mm wide, grossly and irregularly toothed or lobed; central dorsal crest or wing 1–3 mm wide, entire or dentate; intermediate processes none or 1–several, ca 1 mm high.


Distribution. Western Amazonia. COLOMBIA. Amazonas: type of *M. subsericea*, q v. BRAZIL. Amazônas: Rio Japurá, Dec–Jan frt, syntype (lectopara-
type) of *M. poeppigiana*, Martius s.n (M); lectotype of *M. poeppigiana*, q.v. PERU. Madre de Dios: Iberia, Jun frt, *Schultes 6228* (NY, US) and Jun frt, *Schultes 6229* (US).

The type and paratype of *Mascagnia mater-dei* differ in several respects from the other collections cited. The glands on the petiole are slightly recessed. The glands on the margin of the lamina are cylindrical instead of flat, and more numerous. Also, the hairs on the lamina are longer and looser, producing a less metallic effect. However, in most respects the species is reasonably homogeneous. It is in the same complex as *M. benthiamiana* and *M. castanea*.

9. *Mascagnia microcarpa* (Sandwith) Anderson, comb nov


Woody vines, the stems sericeous, soon glabrate. Lamina of the larger leaves 9–13(–16) cm long, 4–7(–8) cm wide, ovate or elliptical, cuneate or rounded at the base, revolute at the margin, acuminate at the apex, very sparsely sericeous to nearly or quite glabrate on both sides, bearing many tiny impressed glands on the adaxial surface of the revolute margin; petiole 8–13 mm long, sericeous to glabrate, eglandular or bearing 2(–4) small glands on the distal half; stipules 0.3–0.5 mm long, triangular, interpetiolar. Inflorescences axillary congested panicles shorter than (usually less than half the length of) the subtending leaf, sericeous throughout to glabrate, the flowers mostly borne in corymbose clusters of 4–8 or more; bracts 1.5–3 mm long, ovate or triangular, appressed, eglandular; peduncle 1–3 mm long; bracteoles 1–1.5 mm long, ovate or triangular, appressed, eglandular, borne at the apex of the peduncle. Pedicel 5–20 mm long, sericeous to glabrate. Sepals leaving the outer petal exposed during enlargement of the bud, ca 3 mm long and 2 mm wide, appressed after anthesis, broadly rounded at the apex, abaxially densely sericeous except the margin, adaxially glabrous, the lateral 4 biglandular with the glands 2.5–3 mm long, free at the apex, the anterior sepal eglandular. Petals yellow, very densely golden-sericeous abaxially on claw and limb except margin, the lateral 4 reflexed, with the claw ca 2.5 mm long and the limb 5–7 mm long, 4–6 mm wide, concave, denticulate or erose, the posterior ± erect, with the claw 2–3 mm long and the limb 3–5 mm long, 2–3 mm wide, flat or crumpled, glandular-fimbriate ± all around the margin. Filaments 2.5–3 mm long, abaxially proximally sericeous, adaxially sparsely sericeous, straight, \(\frac{1}{2}–\frac{1}{2}\) connate; anthers 1.3–1.8 mm long, those opposite the sepals longer (with more pendent locules) than those opposite the petals, glabrous or sparsely sericeous abaxially on the connective. Ovary 1–1.5 mm high, sericeous; styles 2.5–3 mm long, equal, glabrous except at base, straight and divergent, dorsally rounded or truncate or very short-apiculate at the apex, with broad internal stigmas. Samara with the nut 5–8 mm in diameter and the wings small and thickened, coriaceous or aerenchymatous, the 2 lateral wings discrete, 5–9 mm wide, coarsely and irregularly toothed, the central dorsal wing 1–3 mm wide or reduced to a rounded ridge, entire; intermediate winglets none; ventral areole elliptical, 5–7 mm long, 2.5–4 mm wide.

Type. *Sandwith 289*, Moraballi Creek, near Bartica, Essequibo River, British Guiana [Guyana], 18 Sep 1929 (holotype K, isotype NY!).

Distribution. Guayana collections: GUYANA. Mazaruni River: long. 60°10'W,
De La Cruz 2269 (NY), 2361 (F, GH, MO, NY), & 2399 (F, GH, MO, NY); Kamakusa, long. ca 59°50'W, De La Cruz 2892 (F, GH, MO, NY); Jenman 5370 (NY).

Collected in flower from August to February, in fruit from November to June. This is a lowland species that is included here only because the Mazaruni collections cited above place it within the flora of Guayana as defined in this paper. This species is quite unlike other species of Mascagnia in Guayana. It is very closely related to M. sinemariensis (Aublet) Grisebach, from which it differs only in the samara, which has an enlarged nut and reduced, corky wings in M. microcarpa.


Woody vines. Lamina of the larger leaves 8–16 cm long, 6–8.5 cm wide, elliptical or ovate, rounded or cordate at the base, acuminate at the apex, tomentose to glabrate above except on the midrib, velutinous to subsericeous below with the hairs reddish, sessile, with erect to subappressed and often sinuous arms, occasionally glabrescent, bearing 2–4 impressed yellow glands near the base and 2–4 similar glands distally; petiole 8–16 mm long, reddish-velutinous to glabrate, eglandular; stipules ca 0.5 mm long, triangular, interpetiolar. Inflorescence axillary, 2–7(–9) cm long, shorter than the subtending leaf, a panicle of 3–5(–7) short, congested, corymbose pseudoracemes of 5–20 flowers; bracts 1–1.5 mm long, eglandular; peduncle 2–5 mm long; bracteoles 0.5–1 mm long, eglandular, borne at the middle of the peduncle or below or above but always well below the apex. Pedicel 7–15 mm long, sparsely but persistently sericeous or subvelutinous. Sepals appressed after anthesis, exceeding the glands by ca 1 mm, obtuse or acute, abaxially sericeous, adaxially glabrous, the lateral 4 biglandular with the glands 2.5–3 mm long, decurrent, free and slightly reflexed at the apex, the anterior sepal eglandular. Petals yellow, glabrous, exposed during enlargement of the bud, the laterals with limb 5 mm long and 4 mm wide, the claw ca 1.7 mm long, the posterior with a smaller limb and thicker claw. Filaments 1.5–2 mm long, glabrous, ± straight, connate only at the very base; anthers 1.2–1.5 mm long, glabrous. Ovary densely tomentose-sericeous; styles 2–2.5 mm long, green (at least at the apex), the anterior distinctly shorter and slenderer than the posterior 2, divergent, dorsally truncate or acute at the apex. Samara 1.8–3 cm high, 1.6–3 cm wide, broadly ovate to orbicular, sparsely and loosely sericeous, the lateral wing membranous, continuous at base and apex, often shallowly notched at the apex, entire or sinuate at the margin; nut eccentric i.e inserted above the center of the wing; central dorsal winglet 2–5 mm wide; intermediate winglets none; ventral areole ovate, 1.5–3 mm long, 1–2.5 mm wide.

Type. St. Hilaire, Rio de Janeiro, Brazil (P).

Amazonas: Orinoco River, Isla del Ratón, elev 90 m, Breteler 4702 (VEN, WAG).
Bolívar: La Marabutana, entre Ikabaru y los Caribes, elev 400 m, Bernardi 6548 (NY); La Gran Sabana, 2 km W of Kamarata, elev 450 m, Koyama & Agostini 7257 (NY, VEN); headwaters and upper part of Quebrada Caballape, W of Hato de Nuria, E of Miamo, elev 230–350 m, Steyermark 88663 (NY); between San Ignacio de Yuruani and San Francisco de Yuruani, S of El Dorado on road to Santa Elena, elev 1200 m, Steyermark 111399 (VEN); Río Parguaza, 3–5 km below El Carmen, ca 50 km above river mouth, elev 110 m, Wurdack & Monachino 40941 (NY). GUYANA. Upper Rupununi River, near Dadanawa, De La Cruz 1797 (NY); vicinity of Bartica, Essequibo River, De La Cruz 1878 (NY).

Collected in flower and fruit in all months.

As Cuatrecasas pointed out in his Prima Flora Colombiana, Niedenzu’s concept of this species was very broad. Careful study of the complex throughout its range may eventually allow its subdivision, but that is beyond the scope of this paper. The plants called *Mascagnia sepium* in northern South America are relatively homogeneous morphologically, and the description given above is based on them alone, not on the whole range of variation of the species. These plants have each axillary inflorescence compound and both bracteoles eglandular, unlike plants from central and southern Brazil. They are also notable for their reddish pubescence.

11. *Mascagnia schunkei* Anderson, sp nov

Liana lignosa, ramis sericeis demum glabratris. Foliorum majorum lamina 5.5–17 cm longa, 2.3–6.5 cm lata, elliptica vel parum ovata obovataev, basi cuneata vel rotundata, apice acuminata, supra sericea mox glabrata vel costa pertinaciter sericea, subtus pertinaciter sericea, utrinque pilis sessilibus, rectis appressisque, niveis, stramineis, vel aureis, subtus basi biglandulosa vel eglandulosa; petiolus 5–15 mm longus, sericeus, eglandulosus: stipulae 1–2 mm longae, subulatae, interpetioloare. Inflorescentia pseudoracemos axillaris, simplex, (2)–3–10 cm longus, omnino sericeus, floribus 10–50, horizontalibus vel parum reflexis, non in corymo congestis, bracteis 1–2.5 mm longis, subulatis, eglandulosis, pedunculo 3–5.5 mm longo, bracteolis 0.5–1.5 mm longis, eglandulosis vel l (rarius ambabus) glandulam parvam gerenti, apice vel parum sub apice pedunculi portatis. Pedicellus 5–9 mm longus, sericeus. Sepala 4 lateralia 8 glandulas 2.5–3 mm longas 0.5–1.5 mm superantia, anticum eglandulosum, omnia triangularia, integra, apice acuta vel obtusa, abaxialiter in centro sericea, adaxialiter glabra, per anthesin appressa. Petala lutea (vel rosea?), glabra, exposita in alabastro accrescenti, 4 lateralia limbo 4.5–5 mm longo, 2.5–3.5 mm lato, obovato vel elliptico, minute denticulato, basi truncato vel parum hastato, ungue 1.3 mm longo; posticum limbo parum minore. Filamenta 1.5–2 mm longa, glabra, recta, brevissime connata; antherae 1.5–1.7 mm longae, glabrae. Ovarium ca 1 mm altum, dense hirsutum, stylis 1.5–2 mm longis, antico quam 2 posticiis minore, rectis et erectis vel divergentibus, apice dorsaliter rotundatis, truncatis, vel breviter apiculatis. Samara 2.5–3.6 cm alta lataque, ovata vel orbicularis, sparsim appresso-sericea; ala lateralis membranacea, basi continua, apice paulo emarginata vel usque nucem incisa, margine integra vel sinuata; nux supra medium alae sita; crista dorsalis
Fig 46. *Mascagnia schunkei*. a) Flower bud, ×5; b) calyx from above, eglandular sepal forward, ×5; c) stamens, ×5; d) gynoecium, ×10; e) fruiting branch, ×0.5; f) samara, adaxial view, ×0.75; g) samara, abaxial view, ×0.75; h) torus after release of samaras, ×5. Drawn by Karin Douthit, a–d from *Schunke 7877*, e–h from *Schunke 6195*. 
nulla vel usque 1.5 mm lata; crista ventralis brevis, interdum in sinu apicali producta; areola ventralis ovata, 3.5 mm longa, 2 mm lata.

Type. Schunke Vigo 6195, east of Tingo María, Huánuco, Peru, elev 700 m, 24 Oct 1962 frt (holotype F, isotype LA).


Mascagnia schunkei is named for José Schunke Vigo, the collector of the type, whose many collections from Amazonian Peru have greatly advanced our knowledge of that flora. It is in a group of similar species including M. cynanchifolia Grisebach, M. strigulosa (Rubey) Niedenzu, and M. hirsuta Niedenzu. Of these, Mascagnia cynanchifolia is the most distinctive, because it has the flowers congested and ascending, the petals bearing a few hairs abaxially, and the filaments and anthers sericeous. It seems to be endemic to Manaus; I have seen from there an isotype (NY) and a Ducke collection (MICH, RB). The other species all have the flowers evenly spaced and mostly horizontal, and the petals, filaments, and anthers are glabrous. Mascagnia schunkei has the hairs of both sides of the lamina straight and appressed, and the upper side is usually soon glabrate. In M. strigulosa, of which I have seen the holotype (NY) and a recent collection (Prance 3463, MICH, NY), the hairs are acutely bifurcate above and acutely bifurcate to substraight below, and persistent on both sides. I have not seen the type of M. hirsuta, but Niedenzu described the leaves as hirsute on both sides, rather than sericeous, which suggests a vesture most like that of M. strigulosa.

Color of the petals is known for only a few collections in this whole complex. Some are described as pink, and some as yellow. This difference, if real, should eventually aid in the taxonomy of Mascagnia, but at present I have too few observations to use the character. Schunke 7877 is supposed to have had greenish-yellow petals, and in Gentry et al 21306 they are described as pink.

12. Mascagnia eggersiana (Niedenzu) Anderson, comb et stat nov


Woody vines, the stems puberulent, soon quite glabrate. Lamina of the larger leaves 8–15 cm long, 4–7.5 cm wide, ovate or elliptical or slightly obovate, cordate at the base, crispate at the margin, acuminate at the apex, sparsely sericeous to soon glabrate on both sides, bearing 2–6 small glands below at the base and often a pair in the distal ½; petiole 3–5 mm long, sparsely sericeous to glabrate, eglandular; stipules 0.5–1 mm long, triangular, turning dark red or black, interpetiolar. Inflorescence a sparsely velutinous axillary or terminal panicle containing reduced leaves, the flowers borne in corymbose or elongated pseudoracemes 1.5–6 cm
long, of 5–25 flowers; bracts 0.5–1.5 mm long, eglandular; peduncle 1.5–4.5 mm long, peltate at the apex in age, glabrescent; bracteoles ca 0.5 mm long, eglandular, borne mostly at or below the middle of the peduncle. Pedicel 5–9 mm long, glabrous. Sepals appressed after anthesis, exceeding the glands by 1.5 mm, 1.5 mm wide, ovate, obtuse at the apex, glabrous on both sides, the lateral 4 biglandular with the glands 2.5–3 mm long, free and slightly reflexed at the apex, the anterior sepal eglandular. Petals yellow, glabrous, exposed during enlargement of the bud, the laterals with the limb 3 mm long, 3 mm wide, ovate, erose or coarsely dentate, the claw 2 mm long, the posterior with a thicker claw and more deeply incised limb. Filaments 1.5–2 mm long, longest opposite the sepals, glabrous, straight, connate only at the very base; anthers ca 0.8 mm long, glabrous, the connective slightly glandular-swollen. Ovary 1.5 mm high, sparsely sericeous; styles 1.7–2 mm long, subequal, divergent, dorsally truncate or with a very short hook at the apex. Samara 2–3 cm high, 2–2.5 cm wide, ovate, soon quite glabrate, the lateral wing membranous, continuous at base and apex, emarginate at the apex or incised up to halfway to the nut, sinuate at the margin; nut eccentric; central dorsal winglet 3–5 mm wide; intermediate winglets none; ventral areole narrowly ovate, 5.5 mm long, 2 mm wide.

Type. Egggers 13518, Venezuela, 1891 (C, Field Mus. neg. 21344).

Distribution. VENEZUELA. Bolivar: edges of savanna and morichal near Pilón, 5 km NE of mouth of Río Parguazu, elev 100 m, Jan flr/frt, Wurdack & Monachino 41130 (NY, VEN). Aragua: selva hacia Rancho Grande, elev 1000 m, Jul flr, Trujillo 5083 (NY).

Niedenzu described two distinct species as varieties of Mascagnia tenuifolia, var amazonica and var eggersiana. I here designate Spruce 4958 from Tarapoto, Peru (MG! NY!) as lectotype of Mascagnia tenuifolia Niedenzu, which will result in the use of that name for Niedenzu’s var amazonica. The other variety is here raised to the status of species. The two species can be distinguished by the following characters:

1. Petals yellow; larger leaves cordate at the base, crispatate at the margin; apex of styles dorsally truncate or very short-hooked; ovary sparsely sericeous, samara quite glabrate; apex of peduncle peltate in age.

   M. eggersiana.

1. Petals pink; larger leaves rounded at the base, slightly revolute but not crispatate at the margin; apex of the 2 posterior styles dorsally long-hooked, the anterior with a short hook; ovary densely sericeous, samara sparsely but persistently sericeous; apex of peduncle truncate.

   M. tenuifolia.


Woody vines, the stems glabrous or glabrate, older stems up to 1 cm in diameter. Lamina of the larger leaves 14–25 cm long, 6.5–11 cm wide, ovate or oblong, obtuse or rounded at the base, smooth and slightly revolute at the margin with a discolored band 0.5–1 mm wide, abruptly acuminate at the apex with the acumen 10–15 mm long, initially sericeous but very soon glabrate, eglandular or bearing up to 4 impressed glands at the base below and up to 6 distally, the reticulum raised or obscure on both sides; petiole 11–18 mm long, glabrous, eglandular; stipules ca 1 mm long, triangular, interpetiolar. Inflorescence axillary, minutely velutinous, an open panicle of 5–8 elongated to subcorymbose pseudodacemes 2–10 cm long, composed of (4–)7–40 flowers each; bracts 0.7–1 mm
long, eglandular; peduncle (2–)3–5(–8) mm long; bracteoles ca 0.5 mm long, eglandular or abaxially somewhat callose, borne between the middle and the apex of the peduncle or at the apex. Pedicel 11–14(–23) mm long, glabrous. Sepals exceeding the glands by 0.7–1.5 mm, obtuse or rounded at the apex, entire or denticulate, glabrous on both sides, the lateral 4 biglandular with the glands 2–3 mm long, the anterior sepal eglandular. Petals white, glabrous, the outermost exposed in the enlarging bud, with the limb ca 5 mm long, 3–3.5 mm wide, obovate, minutely denticulate, membranous, abaxially carinate, the winged claw ca 1 mm long. Filaments 1.5–3 mm long, glabrous, flanged and connate at the base, distally slender except opposite the posterior-lateral petals, those 2 filaments thick and broad; anthers 1.5–1.7 mm long, glabrous. Ovary sparsely sericeous; styles ca 2.5 mm long, the anterior slightly longer than the posterior 2, glabrous, laterally flattened, dorsally truncate or with a very short hook at the apex. Samara (2–)2.5–3.6 cm high, (2–)2.5–3.2(–4.3) cm wide, ovate or orbicular, glabrate at maturity or with a few hairs on the nut, the lateral wing membranous, continuous at base and apex, emarginate at the apex, entire or slightly sinuate; nut eccentric; central dorsal winglet 2–6 mm wide; intermediate winglets none; ventral areole ovate, about 3 mm long and 2 mm wide.

Type. Lawrance 546, El Umbo, Boyacá, Colombia, 21 Oct 1932 frt (holotype NY! isotype A!).


This species is similar to Mascagnia nervosa Niedenzu, from which Cuatrecasas (1958) distinguishes it by the lack of a prominent reticulum on the upper side of the leaves in M. dissimilis. That characteristic is not very consistent, and the separation is better achieved on the basis of the larger ovate or oblong leaves of M. dissimilis with a distinctive discolored band at the margin. M. nervosa seems to be a species of NW Venezuela and adjacent Colombia and Panamá.

A possible synonym for M. dissimilis is Mascagnia filipes Macbride, described in 1950 in the Flora of Peru with Klug 815 from Mishuyacu near Iquitos as type; I have not seen that collection.


Woody vines or lianas. Leaves opposite, the petiole eglandular, the lamina bearing impressed glands or rarely eglandular, the lateral veins interconnected by ± parallel tertiary veins, the stipules small or minute, triangular, borne at the base of the petiole. Inflorescence axillary and terminal, decompound, thrysiform, containing much-reduced bract-like leaves below the floriferous bracts, the flowers ultimately borne in umbels of 4 or corymbs of 6; bracts and bracteoles large, pubescent on both sides, persistent; peduncle shorter than or at most equal to
the pedicel; old flowers (not setting seed) deciduous at the peduncle-pedicel joint. Sepals nearly free, narrowly ovate or oblong or obovate, the anterior sepal eglandular, the 4 lateral sepals each bearing 1 large gland formed by the ± complete fusion of 2 (except in *J. uleana*, with 6–8 distinct glands on the 4 lateral sepals). Petals pink or yellow, the lateral 4 spreading, the posterior erect. Receptacle glabrous. Stamens 10, the filaments and anthers glabrous, the connectives not extended beyond the locules. Ovary of 3 carpels, adaxially adnate to a common axis, 1 anterior and 2 posterior, all fertile; styles 3, subterminal, the apex with a large internal stigma and dorsally truncate or short-hooked. Fruit sericeous to glabrate, schizocarpic, comprising 3 (or less by abortion) 1-seeded samaras on a pyramidal torus, each samara bearing at least 2 large lateral wings usually continuous at the base and a smaller central dorsal wing, and often additional wings, winglets, or crests between them, the fertile locule accompanied on each side by a parallel sterile cavity developed during maturation of the fruit.


This is a mascagnioid genus of six known species: one in Central America and northern Colombia, one in Amazonian Peru, two in northwestern Amazonia (treated below), and two in northeastern Amazonia. It is most closely related to *Mezia*, which see for notes on their similarities and differences.

**Key to the Species of *Jubelina* in Guayana**

1. Stem hairs with a short cylindrical stalk and longer branches at right angles to it, producing a ± appressed vesture; lamina with 2–4(–6) glands at the base below and 2–6 distally in a single row; calyx glands revolute at the apex; posterior-lateral petals dentate but eglandular, only the posterior petal glandular-fimbriate; anterior style straight, posterior styles arcuate-ascending; samara without wings or winglets between the central dorsal wing and the lateral wings.
   1. *J. bracteosa*.

1. Stem hairs with a long fusiform stalk and very short erect branches, producing a velutinous vesture; lamina with (8–)10–30 scattered glands below, often not in a single row; calyx glands attached for their whole length; posterior-lateral petals as well as the posterior petal glandular-fimbriate; all 3 styles straight; samara with 2 intermediate dorsal wings parallel to and higher than the central dorsal wing and many transverse winglets between them and the lateral wings.
   2. *J. magnifica*.


Woody vine with the stems subsericeous or appressed-tomentose, the hairs with a very short stalk and the limb at right angles to it and straight to somewhat serpentine. Lamina of the larger leaves 13–18 cm long, 7–12 cm wide, broadly elliptic, cuneate or rounded at the base, flat or slightly revolute at the margin, rounded or more often abruptly short-acuminate at the apex with the acumen 2–13(–20) mm long, bearing 2–4(–6) impressed glands below at the base and 2–6 in a single row distally, persistently velutinous to tomentose on both sides, more densely so below, the hairs with the arms longer than the stalk and suberect to parallel to the lamina and becoming serpentine, the nerves and reticulum prominent above, prominent below; petiole 14–23 mm long, subsericeous. Inflorescence lax to crowded, tomentose or subsericeous, containing much-reduced glanduliferous leaves, the flowers borne in umbels of 4, the bracts and bracteoles
pink (?), 4–6.5 mm long, 1.5–2(–2.5) mm wide, narrowly oblong or spatulate, appressed-tomentose or subsericeous on both sides, the peduncle 0–1.5 mm long. Pedicel 5–7 mm long, subvelutinous, thickened in fruit. Sepals 4.5–5.5 mm long, 1–1.4 mm wide, narrowly oblong, reflexed, distally inflated with aerenchyma, tomentose on both sides, the anterior eglandular, the lateral 4 all bearing 1 large gland 1.5–2 mm long and wide, broadly ovate, acute and revolute at the apex, often emarginate at the base. Petals pink; lateral 4 petals sparsely to densely sericeous abaxially, the claw 2.5–3.5 mm long and 0.3–0.5 mm in diameter, the limb 4.5–6.5 mm long and 6–7.5 mm wide, rotund, the anterior-laterals deeply concave and entire to erose, the posterior-laterals shallowly concave and dentate; posterior petal glabrous, the claw 3.5 mm long, 0.7–1 mm in diameter, the limb 3.5–5 mm long, 2.5–4.5 mm wide, ± flat and rectangular, glandular-fimbriate all around the margin. Filaments 2–3.3 mm long, the longest opposite the anterior sepal, ca ½ connate; anthers 1–1.4 mm long, those opposite the sepals with slightly swollen glandular connectives. Ovary ca 1 mm high, hispid; styles glabrous, the anterior 2.5 mm long, straight, the posterior 2 2.8 mm long, arcuate-ascending, the apex with a short rounded dorsal hook. Immature samara elliptical, ca 35 × 25 mm, the nut ca 12 mm in diameter, the ventral areole linear, 10 mm long, 2 mm wide; lateral wings continuous at the base, free at the apex, ca 13 mm wide, 26 mm high (i.e. from base to apex), flat, entire or slightly repand; central dorsal wing 6 mm wide, 17–20 mm high, semicircular, extended forward at the apex between the lateral wings; intermediate wings and winglets none, represented only by a crest on each side of the central dorsal wing, ca 1 mm wide and continuous at the apex with the lateral wing.

Lectotype. Spruce 2853, Rio Uaupés, Amazônas, Brazil (isotypes G, NY!).

Distribution. Rio Uaupés/Vaupés and upper Rio Negro. VENEZUELA. Amazonas: Carretera San Carlos-Solano, 2–6 km SO de Solano, elev 100 m, Apr flr, Morillo et al 3980 (MICH); San Simón de Cocuy, 1–2 km NO de la Piedra de Cocuy, elev 100 m, Apr flr, Morillo et al 4141 (VEN). BRAZIL. Amazônas: Pari Cachoeira, Rio Tiquié [69°45'W, 0°15'W], Dec flr, Coelho & Francisco 274 (INPA); Rio Papury, Vaupés, Rio Negro, Oct flr, Fróes 21173 (IAN, NY); Panuré, Rio Uaupés, Spruce 2853 (NY). COLOMBIA. Vaupés: Mitú, selva, elev 200 m, Oct flr, Cuatrecasas 7255 (US); Piracuara, Nov flr/frt, Romero Castañeda 3753 (COL).

The collection by Romero Castañeda is the first for this species with fruit, albeit immature. It indicates that Jubelina bracteosa is closely related to J. wilburi Anderson; in fact, the drawing of the samara published with that species (Brittonia 28: 411. 1976 [1977]) could almost serve for J. bracteosa, except for the longer lateral wings in J. wilburi.

2. Jubelina magnifica Anderson, sp nov

Liana lignosa, ramis velutinis demum glabratis, pilis usque 1 mm longis, erectis, fusiformibus, distaliter brevibifurcatis, brachiis ± erectis saepe inaequalibus. Foliiorum majorum lamina 18–28 cm longa, 10–18 cm lata, late ovata vel elliptica, basi rotundata, margine paulo revoluta, apice abrupte acuminata acumine saepe usque 2(–2.5) cm longo, utrinque velutina subtus densissime, pilis bifurcatis, subtus (8–)10–30 glandulis impressis dispersis instructa, nervis lateralisibus et venis

Fig 47.
Fig 47. *Jubelina magnifica*. a) Flowering branch, ×0.5; b) detail, abaxial surface of leaf, ×10; c) hair from abaxial surface of leaf, ×25; d) stem hairs, ×25; e) flower, ×2.5; f) gynoecium, ×10; g) samara, abaxial view, ×0.5; h) samara, cross-section, ×0.5. Drawn by Karin Douthit, a–f from Maguire et al 36748, g and h from Wurdack & Adderley 43579.
tertiariis parallelis subitus prominentibus; petiolus (9–)13–20(–25) mm longus, velutinus; stipulae ca 1.5 mm longae. Inflorescentia velutina, foliolis glanduliferis instructa, floribus in umbellis 4-floris, bracteis floriferis 6–8 mm longis, 3–4 mm latis, obovatis vel ellipticis, utrinque appresso-tomentosis vel subsericeis, eglan- dulosis, pedunculo 0–2.5 mm longo, bracteolis bracteis similibus. Pedicellus 8–15 mm longus, velutinus vel tomentosus, in fructu crassior. Sepala 6.5–7 mm longa, 1.8–2.5 mm lata, anguste oblonga, reflexa, distaliter clavata aerenchymate inflata, utrinque tomentosa, anticum eglanululosum, 4 lateralia omnia 1 glandulam magnam 2–2.8 mm longam, 1.5–2.5 mm latam, late ovatum vel circularem, apice non revolutam gerentia. Petala rosea, 4 lateralia abaxialiter sericea, inter sepala patentia, 2 antico-lateralia ungue 2.5–3.5 mm longo, 0.5–0.8 mm diametro, limbo 6–7 mm longo, 7–9 mm lato, profunde concavo, margine eroso et eglanululosum vel basi pauciglandulifero, 2 postico-lateralia ungue 1.7–3 mm longo, 0.7 mm diametro, limbo 6–6.5 mm longo, 5–5.5 mm lato, plano vel parum concavo, margine toto circuitu glanduloso-fimbriato; petalum posticum glabrum, erectum, ungue 3–3.5 mm longo, 1–1.4 mm diametro, limbo 5–7.5 mm longo, 3–4 mm lato, elliptico vel obovato, plano, margine toto circuitu glanduloso-fimbriato. Filamenta glabra, basi connata, 2.4–3 mm longa, illa sepalis opposita quam illa petalis opposita longiora; antherae glabrae, 1–1.7 mm longae, in eodem flore heterogeneae. Ovarium 2 mm altum, dense hispidum, stylis 2–3 mm longis, glabris, rectis, subaequalibus, apice dorsaliter truncatis vel breviiuncinatis. Samara immatura subcircularis, 5 × 4.5 cm, nuce ca 2 cm diametro, loculum fertilem 7–8 mm diametro et 2 cavernulas laterales ca 4 mm diametro continente, areola ventrali lineari, 12–15 mm alta et 2–3 mm lata, basi in rostrum 2 mm longum producta, alis lateribus basi discretis vel confluentibus sed profunde emarginatis, apice discretis, utraque semicirculari 10–15 mm lata, corrugata et margine repanda, ala dorsali centrali redacta, ca 5 mm lata et 25 mm alta (e apice ad basin), semicirculari, apice nucis inter alas laterales parum producta, alis dorsalis intermedii utrinque 1 ad alam centrallem paralleli ca 8–12 mm lata et ca 30 mm alta, apice basique cum ala laterali confluenti, valde plicata vel corrugata, margine grosse dentata, alulis inter alam lateralem et alam dorsalem intermedium ca 10, 3–7 mm latis, irregularibus, saepe lobatis, plerunque transversis.

Type. Maguire, Wurdack & Bunting 36748, igarapé forest of uppermost Río Yaciba, Ríos Pacimoni-Yatua, Casiquiare, Amazonas, Venezuela, elev 100–140 m, 12 Dec 1953 flr/flrt (holotype NY [no. 1 of 2 sheets], isotypes MICH, NY [no. 2 of 2 sheets], US, VEN).

Distribution. Known only from the type locality and nearby localities. VEN-EZUELA. Amazonas: type loc. q v, Maguire et al 36694, Dec flr/imm flrt (MICH, NY, US, VEN), 36694-A, Dec flr (NY), 36743, Dec flr (MICH, NY, US, VEN), type q v; uppermost Río Yatua, elev 100–140 m, Jun flr, Maguire et al 42601 (NY); Río Síapa between Raudal Gallineta and Salto Gallineta, elev 130–150 m, Jun flr/flrt, Wurdack & Adderley 43579 (MICH, NY, US, VEN).

Collected in flower and fruit in December and June.

This species is named for its large velutinous leaves, dense inflorescences, and large complicated fruits; it must be a truly magnificent vine. Its closest relatives are Jubelina riparia and J. rosea; they can be separated by the following key:

1. Lamina of the larger leaves 18–28 cm long, 10–18 cm wide, acuminate at the apex with the acumen up to 2(–2.5) cm long, bearing (8–)10–30 scattered glands below; all 4 lateral petals
densely sericeous abaxially; central dorsal wing of the samara only ½ or less the width of the 2 parallel intermediate dorsal wings, hidden between them. *J. magnifica.*

1. Lamina of the larger leaves 12–19 cm long, 9–13 cm wide, rounded or short-acute at the apex with the acumen up to 1 cm long, bearing 0–4(–6) glands below at the base and (0)1–2(–6) glands distally in a single row; posterior-lateral petals much less sericeous than the anterior-lateral ones or glabrate; central dorsal wing of the fruit equal to or wider than the 2 parallel intermediate dorsal wings.

2. Samara (according to descriptions and figures) with the lateral wings only 0.7–1 cm wide beyond the nut, ± corrugated, coarsely toothed at the margin; intermediate dorsal wings connected to the lateral wings by many crowded irregular crests; lamina with 2–4(–6) glands below clustered at or near the base, plus 1–2 on each side distally. *J. riparia.*

2. Samara with the lateral wings 3–3.5 cm wide beyond the nut, ± flat, sinuate at the margin; intermediate dorsal wings connected to the lateral wings by a few small parallel crests; lamina without glands below at the base, but usually bearing 1–3(–4) on each side in a row distally. *J. rosea.*

*Jubelina riparia* Adr. Jussieu has as its type *Leprieur* in 1832 from the Oiapoque River in French Guiana (P, F!). The following recent collections have extended its range into Brazil: Terr. Amapá: right bank of Rio Amapari 2–3 miles above Serra do Navio, Nov flr, Cowan 38591 (MICH, NY); along the Rio Araguari, vic. Camp 12, 1°11′N, 52°8′W, Sep flr, Pires et al 51345 (NY). Pará: várzea do Aurá, Anandindéua, Sep flr, Pires 4744 (US).

*Jubelina rosea* (Miquel) Niedenzu is based on *Hiraea rosea* Miquel, its type being *Kappler 1807* from the Marowijne River in Surinam (U?). Until recently it was known only from the type, another collection from Surinam cited by Kostermans (1936), and *Méliinon* in 1864 from French Guiana (F, NY). However, two new collections were made in Surinam in 1976, one of which is in fruit and dramatically confirms that this species, so like *J. riparia* in other respects, has quite distinctive fruits. These collections are *Mori & Bolten 8399* from Brownsberg Nature Park, edge of forest, Mazaroni Plateau, 90 km S of Paramaribo, Sep flr (MICH), and *Mori & Bolten 8551* from Lely Mountains, 175 km SSE of Paramaribo, elev 500–700 m, Oct flr (MICH). Both of these are from upland localities, presumably quite different from the riverine localities of all known collections of *J. riparia.* This suggests a possible ecological difference between the two species in addition to the morphological differences given in the above key.


Woody vines or lianas. Leaves opposite, the petiole eglandular, the lamina bearing impressed glands or eglandular, the stipules minute, interpetiolar, caducous. Inflorescence tightly reddish- or dark brown-sericeous throughout, axillary and terminal, decompound, containing much-reduced bract-like leaves below the floriferous bracts, the flowers ultimately borne in umbels of 4; bracts smaller than the bracteoles, abaxially sericeous, adaxially glabrous or sparsely sericeous near the margin, eglandular, deciduous before maturation of the fruit; peduncle well developed; bracteoles borne just below the flower, large, globose-
cymbiform, the inner enclosing the bud until anthesis, the outer enclosing both bud and inner bracteole, abaxially sericeous, adaxially glabrous or sparsely sericeous, often splitting at the apex at anthesis, persistent or deciduous; pedicel very short, to 2 mm long in fruit; old flowers (not setting seed) deciduous at base of peduncle, not at joint between peduncle and pedicel. Sepals free, narrowly oblong or spatulate, rounded at the apex, abaxially tomentose, adaxially glabrous or bearing a few hairs, the anterior sepal eglandular, the 4 lateral sepals each bearing 2 large compressed glands, these distinct or partially to completely connate. Petals yolk-yellow, plane or slightly concave, the lateral 4 reflexed, the posterior erect or reflexed in the limb. Receptacle glabrous. Stamens 10, the filaments basally to ½ or more connate, the 2 opposite the postero-lateral petals longer and thicker than all others; anthers dimorphic, the 5 opposite the sepals differing in size and shape of the connective, and sometimes in pubescence, from the 5 opposite the petals. Ovary of 3 carpels, adaxially adnate to a common axis, 1 anterior and 2 posterior, all fertile, sericeous; styles 3, subterminal, the apex with a large internal stigma and dorsally truncate or short-hooked or pedaliform, the anterior style shorter and often slenderer than the 2 posterior styles. Fruit schizocarpic, comprising 3 (or less by abortion) 1-seeded samaras borne on a pyramidal torus, each samara bearing 2 large lateral wings free or more often continuous at the base, a smaller dorsal wing, and often additional crests or winglets between them or outside the lateral wings.

Type. *Mezia araujei* Schwacke ex Niedenzu.

This is a mascagnioid genus, distinguished by its four-flowered umbels, the reddish or dark brown sericeousness of the inflorescence, the very large bracteoles that completely enclose the flower until anthesis, the very short (practically absent) pedicel, the long narrow sepals four of which bear large compressed or rarely connate glands, and the dimorphic anthers. It is also most unusual in this family for abscission of old flowers to be at the base of the peduncle instead of between peduncle and pedicel. The genus most like *Mezia* is *Jubelina*, which resembles *Mezia* in having umbels, large bracteoles, long narrow sepals, compressed or connate calyx glands, and large mascagnioid fruits. However, *Jubelina* has a well developed pedicel, the bracteoles do not enclose the bud, abscission of its flowers is at the peduncle-pedicel joint, and its samara has sterile cavities on each side of the fertile locule, which are not present in *Mezia*.

*Mezia* comprises several species in addition to the ones treated here, these occurring mostly in Brazil, as far south as Rio de Janeiro.

**Key to the Species of Mezia in Guayana**

1. Anthers all glabrous; peduncle in fruit 11–25 mm long.
2. Leaves moderately sericeous to glabrate below, often early glabrescent; lamina of larger leaves 13–20 cm long, 6–9.5 cm wide. 1. *M. includens*.
   2. Leaves very densely and persistently sericeous below, the short appressed hairs completely concealing the lamina and producing a reddish- or ferrugineous-metallic sheen; lamina of larger leaves 16–28 cm long, 10–17 cm wide. 2. *M. rufa*.

1. Anthers opposite the sepals densely tomentose, those opposite the petals glabrous or with a few apical hairs; peduncle in fruit 7–9 mm long. 3. *M. curranii*. 


Liana with the young stems often quadrangular, the older stems punctate and often fissured as well. Lamina of the larger leaves 13–20 cm long, 6–9.5 cm wide, elliptic, sometimes slightly ovate or obovate, rounded to cuneate or slightly attenuate at the base, usually abruptly short-acuminate at the apex with the acumen 5–15 mm long, glabrous above, moderately sericeous to glabrate below, bearing 2 large glands below at the base and a row of tiny impressed glands parallel to but set in from the margin, the lateral veins and reticulum prominent above, prominent below; petiole 1.4–2.1(–2.5) cm long, sericeous to glabrate; stipules caducous, leaving interpetiolar scars ca 0.5 mm wide. Bracts 3(–5) mm long, concave; peduncle 7–16(–20) mm long in flower, 11–25 mm long and thickened in fruit; bracteoles 8–12 mm long, reddish-brown, eglandular; pedicel up to 2 mm long, thickened in fruit. Sepals 6.5–9.5 mm long beyond glands, 2–2.5 mm wide, reflexed and often revolute, the glands 2.5–3.5 mm long, 1–1.5 mm wide, obovate, compressed but distinct. Lateral petals with the claw 1.5–3 mm long, 0.3–0.5 mm wide, the limb 10–16 mm long, 9–14 mm wide, orbicular or broadly obovate, abaxially brown-sericeous in center, crumpled toward the margin, erose; posterior petal with the claw 3.5–4.5 mm long, 0.8–1.1 mm wide, constricted at the apex, the limb 5–7.5 mm long, 4–5.5 mm wide, rectangular, glabrous, glandular-fimbriate all around the margin. Filaments glabrous, 2–4 mm long, ca ½ connate; anthers all glabrous, those opposite the petals 1–2.4 mm long with the dark connective equalling (very rarely slightly exceeding) the locules, the anther opposite the posterior petal much smaller than the other 4, those opposite the sepals with the locules 1–1.5 mm long, exceeded at the apex by the ellipsoid connective by 0.4–1(–1.5) mm, the connective uniformly dark except for a yellow line or ridge over the apex, apparently a remnant of sterile locular tissue. Styles straight, terete or slightly flattened, proximally sericeous, acute or truncate at the apex, the anterior style 3–3.5 mm long, the posterior styles 4–5 mm long. Samara subcircular, 7–10 × 5–9 cm, the nut with an ovate areole 7–11 mm high, 3–5 mm wide, the lateral wing 3–4.5 cm wide, continuous at the base, incised to the nut at the apex, membranous, entire or repand at the margin, the central dorsal wing 7–10 mm wide, semicircular, with a shorter parallel winglet between the dorsal and lateral wings and sometimes with transverse crests or winglets.


Distribution. Wet forests in northern South America, principally Venezuela, with a few collections from adjacent areas, one from Panama, and a few from French Guiana. Guayana collections seen: COLOMBIA. Amazonas-Vaupés: Río Apaporis (at mouth of Río Piraparaná) and vicinity, 0°15′S, 70°30′W, elev ca 210 m, *Schultes & Cabrera* 15691 (A, NY, US). BRAZIL. Amazonas: Río Castanho, trib. of Río Padauiri, upper Río Negro basin, elev 100–140 m, *Cardona* 1587 (US, VEN). VENEZUELA. Amazonas: Sierra Parima, 2°27′24″N, 63°56′W, 45 km
NW of headwaters of Río Orinoco, elev 1300 m, Steyermark 106064 (NY). Bolivia: riparian climber, caño Avacapa, region Urimá, elev 400–500 m, Bernardi 1469 (NY); region Ríos Icabarú & Hacha, Bernardi s n, 12/1/1956 (NY); Upata-San Felix, Blanco 132 (US); El Dorado-La Gran Sabana, Km 114–124, Bunting 3082 (F, MY); S of El Dorado, Km 42–65, elev 230 m, Steyermark 86702 (NY, VEN); headwaters of Río Chichanán, Sierra Lema, 6°5’N, 62°W, elev 300–320 m, Steyermark 89477 (F, NY, VEN) & 89645 (NY, US, VEN); El Dorado-Sta. Elena de Uairen, Trujillo 3761 (MY). GUYANA. Mt. Ayanganna, upper Mazaruni River basin, elev 800–900 m, Tillett et al 45136 (K, MICH, NY, US); Kako River, upper Mazaruni River basin, elev ca 500 m, Tillett & Tillett 45538 (K, MICH, NY, US); Mazaruni Station, Forest Dept. 4286 (NY).

Collected in flower and fruit from January to September.

The description given above is based only on the collections cited. These are rather variable in the size, shape, and vesture of the leaf, and in the winglets of the samara, but still seem to represent a reasonably coherent phenetic species.

2. **Mezia rufa** Anderson, sp nov

Liana internodiis vegetativis sericeis demum glabriis, quadrangularibus, venturiobus fissuratis et 4-alulatis. Foliorum majorum lamina 16–28 cm longa, 10–17 cm lata, late elliptica vel parum ovata obovatave, basi rotundata vel breviter attenuata, apice abrupte acuminata acumine 1–2 cm longo, supra sericea mox vel demum glabra, subtus densissime et pertinaciter metallo-sericea pilis rufis vel ferrugineis, sessilibus, rectis, usque 0.4 mm longis, subtus basi 2 glandulis magnis et utrinque sub margine praecipue versus apicem serie 5–10 glandularum parvum impressum instructa, reticulo et nervis lateralibus supra prominulis, subtus mediocriter prominentibus; petiolum 2–2.5 cm longus, sericeus vel demum glabrus, eglandulosus; stipulae non visae. Inflorescentia rufa-sericea, bracteis 4–6 mm longis, concavis, pedunculo (in flore) 11–15 mm longo, bracteolis 10–12 mm longis, rufis, eglandulosus, pedicello usque 1 mm longo. Sepala glandulas 6–7.5 mm superantia, 2–3 mm lata, reflexa et valde revoluta, glandulis 3–4 mm longis, 1.5 mm latiss, elliptica vel obovatis, compressis sed distinctis. Petala lateralia ungue 2–3.5(–4) mm longo et 0.5–1(–1.5) mm lato, limbo (10–)12–15(–18) mm longo et 12–15(–18) mm lato, suborbiculari, abaxialiter in centro sericeo, corrugato versus marginem, margine eroso; petalum posticum ungue 4.5–5 mm longo et 1.5 mm lato, apice constricto, limbo 7–8 mm longo, 7–9 mm lato, suborbiculari, glabro, margine toto circuittu glanduloso-fimbriato vel distaliter eglanduloso. Filamenta glabra, 2.5–3.5 mm longa, ca ½ connata; antherae glabreae, illae petalis oppositae 1–1.8 mm longae, connectivo loculos non vel brevisse superantia, illae sepalis oppositae connectivo tumido loculos 1.3–1.5 mm longos 0.5–1 mm superantia. Styli recti, ± teretes vel parum complanati, sericei in dimidio proximali, apice dorsaliter truncati, anticus 3–3.8 mm longus, postici 3.5–4.5 mm longi. Samara immatura sicut in *M. includens*, i e ala lateralii basi continua apice usque nucem incisa, ala dorsali centrali et utrinque alula intermedia parallelibus, et aliquot alulis transversis; samara matura ignota.

Type. *Silva & Brazil* 60837, forest between Missão Salesiana and Serra Pirapucú, Rio Maturaca, elev 50–400 m, Amazônas, Brazil, 15 Jan 1966 flr (holotype MG, isotypes MICH, NY, US).
Fig 48. *Mezia rufa* and *M. curranii*. a–g, *M. rufa*: a) Leaf, ×0.5; b) portion of inflorescence, ×0.5; c) bud enclosed by bracteoles, ×2.5; d) flower, ×1.5; e) anther from stamen opposite petal, ×10; f) anther from stamen opposite sepal, ×10; g) gynoecium, ×5. h–i, *M. curranii*: h) Leaf, ×0.5; i) samara, abaxial side (left) and adaxial side (right), ×0.5. Drawn by Karin Douthit, a–g from *Silva & Brazão* 60837, h–i from Curran 253.

The epithet of this handsome species refers to its leaves, which have a rufous or ferrugineous metallic sheen below due to the appressed, persistent hairs.

3. Mezia curranii Anderson, sp nov

Liana internodiis vegetativis sericeis mox glabratis, teretibus vel obscure angulatis, vetustioribus fissuratis non punctatis. Foliorum majorum lamina 12.5–23 cm longa, 4.5–8.3 cm lata, ca triplo longioris quam lata, elliptica vel anguste ovata, basi breviter attenuata, apice acuminata acumine 1.5–2 cm longo, supra glabra, subtus sparsissime sericea vel glabrata, subtus basi 2 glandulis magnis et utrinque sub margine serie 5–10 glandularum parvarum impressarum instructa, nervis lateraliis et reticulo utrinque praecipue subtus prominentibus; petiolus 1.2–1.7 cm longus, glabratus, eglandulosus; stipulae non visae. Inflorescentia atrobrunneo-sericea, demum glabrescentia, bracteis et bracteolis delapsis non visis, pedunculo (in fructu) 7–9 mm longo, laxe sericeo, pedicello (in fructu) usque 1.5 mm longo, flavido-tomentoso vel glabrato. Sepala glandulas 6–6.5 mm superantia, 1.5–1.8 mm lata, glandulis 2–2.5 mm longis et 1.1 mm latis, obovatis, decurrentibus, compressis sed distinctis. Petala delapsa non visa. Filamenta gabra, 2–2.7 mm longa, ½–¾ connata; antherae petalis oppositae glabrae vel apice paucipiliferae, 1–1.6 mm longae, connectivo triangulare loculos lineares non superant; antherae sepalis oppositae dense tomentosa, connectivo ellipsideo loculos lineares 1–1.3 mm longos 0.5 mm superant. Styli (in fructu) 2.3–3.5 mm longi, recti, ± teretes, sericei in dimidio proximali, apice dorsaliter truncati. Samara subcircularis 5.5–6.5 × 4–6 cm, nucis areola ventrali ovata, 4–6.5 mm alta, 2–2.6 mm lata; ala laterali 2–3 cm lata, basi continua, apice usque necem incisa, membranacea, margine repanda; ala dorsali centrali ca 7 mm lata, 1.9–2.4 cm alta (e apice ad basin), semicirculari; alis dorsali intermedii utrinque 1 ad alam centralem paralleli 5–7 mm lata; alulis inter alam lateralem et alam dorsalem intermediam ca 5–10, 5–7 mm latis, undulatis, plerumque transversis.

Type. H. M. Curran 253, Culebra, Amazonas, Venezuela, "4/9/50" (holotype MICH, isotype NY).

This species is generally similar to Mezia includens in such important respects as having the filaments glabrous and half connate, the connective cylindrical, and the styles straight and truncate. However, in having the anthers opposite the sepals densely tomentose it is more like M. araujei of the coastal mountains near Rio de Janeiro, and it differs further from M. includens in having relatively narrow, long-acuminate leaves and in details of the fruit. It is known only from the type, which is in fruit, so description of its petals will have to await its re-collection. The specific epithet honors the collector of the type, H. M. Curran.

10 While this paper was in press I received from Dr. Otto Huber a collection (Huber 449) that seems to be referable to Mezia rufa and is the first collection from Venezuela. The leaves are quite small for this species (9 cm long and 4 cm wide, with the petiole 1 cm long), but otherwise the plants resemble the more southern populations; perhaps older stems bore larger leaves. VENEZUELA. Amazonas: Cuenca del Rio Manapiare, entre el Cerro Morrocoy y la Serranía Colmena, 5°20'N, 66°10'W, selva de galeria, elev 200–350 m, Jan flr/imm frt (MICH).

Woody vines (or rarely small trees?) with decussate leaves usually bearing glands on the lamina or petiole or both, the tertiary nerves often strongly parallel, the stipules usually borne on the petiole (except H. primaeva), often at or above the middle, often long and subulate. Inflorescence axillary, basically 1–several compact panicles of several 4-flowered umbels, often reduced to a single umbel, the umbel many-flowered in some species; pedicel usually sessile (i.e., floriferous peduncle absent), subtended by a bract and 2 bracteoles, the bracts and bracteoles persistent and eglandular (except 1 bracteole glandular in H. primaeva & H. adenophora). Sepals not completely concealing the petals in bud, the lateral 4 biglandular or eglandular, the anterior eglandular. Petals usually (always?) yellow, usually glabrous, the posterior usually differentiated from the lateral 4. Stamens 10, all fertile, the anthers glabrous and vore or less alike. Ovary of 3 nearly free carpels, 1 anterior and 2 posterior, all fertile; styles 3, each inserted low on the ventral face of a carpel, the apex with an internal stigma and dorsally rounded to prominently hooked. Fruit schizocarpic, breaking apart into 3 samaras (or fewer due to abortion), each samara having its largest wings lateral, usually 2 discrete wings (continuous at the base in H. primaeva); dorsal wing smaller, sometimes reduced to a crest or lost; intermediate winglets or slender projections rarely present; mericarps borne on a very low pyramidal torus. Embryo with 1 large and 1 very small cotyledon.

Type. H iraea reclinata Jacquin.

This natural and difficult genus comprises at least 45 species, occurring throughout the Neotropics but most diverse in northern South America.

Key to the Species of H iraea in Guayana

1. Individual umbels of 15–36 flowers. 1. H. longipilifera.

1. Individual umbels of 4(–6) flowers.

2. Mature lamina densely velutinous below, the hairs erect, stalked, bifurcate.

3. Lamina 23–26 cm long (excluding the caudate apex 8 mm long), 16–20 cm wide; petiole 21–28 mm long, 4–5 mm in diameter; pedicel (in fruit) 11–15 mm long, 0.8–1.5 mm in diameter (~2.5 mm at apex); 1 of each pair of bracteoles (4 per umbel) bearing a large abaxial gland.

2. H. primaeva.

3. Lamina of the larger leaves 6.5–12.5 cm long, 4.5–8 cm wide; petiole 6–11 mm long, 1–2.5 mm in diameter; pedicel (in flower) 15–21 mm long, 0.5–0.7 mm in diameter (~1 mm at apex); bracteoles eglandular.

3. H. bifurcata.

2. Mature lamina sericeous to glabrate below, the hairs (if any) nearly or quite sessile and ± appressed to the lamina.

4. Lamina very densely and persistently sericeous below, the hairs completely concealing the lamina and producing a golden or silvery-metallic sheen; posterior petal glandular-fimbriate.

4. H. faginea.

4. Lamina thinly sericeous or subtomentose below to glabrate; posterior petal denticulate to fimbriate, eglandular (so far as known).

5. Umbel with a globose or depressed-globose, often dark glandular cushion, 0.7–2 mm in diameter, in the center between the bracteoles.

5. H. fimбриata.

6. Lamina distinctly cordate at the base; limb of the lateral petals 6.5–8 mm long, 7.5–9 mm wide.


6. Lamina cuneate or rounded at the base; limb of the lateral petals 4–7 mm long, 4.5–7 mm wide.

7. Lateral veins quite prominent below, hardly or not at all raised above; limb of the lateral petals 5–7 mm long and wide; nut of the samara 3–4 mm in diameter.
7. Lateral veins not or only slightly raised, about as prominent above as below; limb of the lateral petals 4–5 mm long, 4.5–5 mm wide; nut of the samara ca 2 mm in diameter.

5. Umbel without a prominent central cushion, at most with a tiny obscure central body up to 0.3 mm in diameter.

8. Ovary and samara (both nut and wings) densely velutinous, most of the hairs erect, ± straight, basifixid or sub-basifixid; nut of the samara depressed-globose, 8–10 mm in diameter, bearing 15–20 parallel ribs, some of the ribs usually continuing as winglets on the underside of the lateral wings; lamina of the larger leaves 19–25 cm long, 6.5–9.5 cm wide.

7. H. silvae.

8. Ovary and samara sericeous or tomentose, many or all of the hairs (especially on the wings) medifixed and ± appressed; nut of the samara (where known) globose or cylindrical, 2–5 mm in diameter, smooth-sided; lamina of the larger leaves 6–28 cm long, 3–12 cm wide.


8. H. celiana.

9. Pedicel 7–15 mm long.

10. Lateral veins quite prominent below, hardly or not at all raised above; immature samara greenish or yellowish, the lateral wings 35–50 mm high and 18–30 mm wide.

11. Petiole 12–20 mm long; mature lamina glabrate below except for the sericeous midrib; pedicel brownish-tomentose.


11. Petiole 6–10 mm long; mature lamina bearing many fine white hairs below, 0.2–0.5 mm long, in addition to those of the often sericeous midrib; pedicel whitish-sericeous.

10. H. affinis.

10. Lateral veins not or only slightly raised, about as prominent above as below; immature samara reddish, the lateral wings up to 18 mm high and 10 mm wide.

11. H. tepuiensis.

1. Hiraea longipilifera Anderson, sp nov

Fig 49.

Liana lignosa, ramis sericeis. Foliorum lamina 13–18 cm longa, 7.5–12 cm lata, late elliptica vel obovata, coriacea, basi cordata vel subcordata, margine revoluta et elliptis glandulis parvis instructa, apice obtusa saepe apiculata, supra primo subsericea pilis 1.1–1.4 mm longis brevistipitatis demum glabrata praeter costam, subtus dense et pertinaciter velutina pilis majoribus T-formibus pede usque 0.5 mm longo trabecula usque 1.1 mm longa, pilis minoribus Y-formibus, nervis lateralis et venis tertiaris inter se valde parallellis supra impressis vel obscuris subtus prominentibus; petiolus 10–15 mm longus, 3–4 mm diametro, laxe sericeus, apice biglandulifer; stipulae 1.5–4 mm longae, subulate, 2–5 mm supra basim petioli portatae. Inflorescentia axillaris, umbella 15–36-flora, pedunculo sericeo 3–6 cm longo, bracteis floriferis 2–3 mm longis, triangularibus, abaxialiter sericeis, adaxialiter glabris, eglandulosis, bracteolis similaribus sed minoribus. Pedicellus 24–26 mm longus, apice 2 mm diametro, brunneo-sericeus. Sepala 3–3.5 mm longa, 2–2.5 mm lata, triangularia, apice revoluta, abaxialiter dense sericea, adaxialiter glabra, omnia eglandulosa vel 4 lateralia 8 glandulis ellipticis 2.2–2.8 mm longis instructa. Petala lutea, 4 lateralia ungue 2–2.5 mm longo, limbo 6–8 mm longo, 6.5–9 mm lato, suborbiculares, concavo, margine subintegro vel dentato eglanduloso; posticum ungue 3.5 mm longo, limbo 5.5–6 mm longo, 6–6.5 mm lato, orbiculari, plano vel parum concavo, margine toto circuito glandulosos-fimbriato glandulis 0.3–1 mm longis, digitiformibus. Filamenta glabra (vel adax-
Fig 49. *Hiraea longipilifera*. a) Flowering branch; b) stipules on petioles; c) hair from adaxial surface of leaf; d) hair from abaxial surface of leaf; e) flower; f) 4 stamens, the shortest that opposite the posterior petal; g) gynoecium, the anterior style to the left. Drawn from Tillett & Tillett 45281 by Annette Seidenschnur Mahler.
ialiter basi paucipilifera), basi breviter connata, illa sepalis opposita 3.5–4.2 mm longa, recta vel sigmoidea, illa petalis opposita 2.5–3 mm longa, recta; antherae 1–2 mm longae, illae petalis lateralibus oppositae longissimae, connectivo brunneo vel atrorubro, apice luteo-glandulosu. Ovarium 1.5 mm altum, dense atrorubneo-hirsutum; styli ca 3.5–5 mm longi, glabri, arcuato-ascendentes vel demum torti, anticus parum brevior, apice dorsali brevi-uncinati unco acuto vel obtuso. Fructus ignotus.

Type. Tillett & Tillett 45281, Mora forest bordering Kukui River at Adaro River mouth, upper Mazaruni River Basin, Guyana, elev ca 500 m, 5 Sep 1960 flr (holotype MICH, isotypes K, NY, US).

This species is known only from the type. It belongs in section Polyactinia Niedenzu, and is distinguished from other species in that section by the long, stalked hairs on the leaves, the long, stout pedicels with dark brown hairs, the revolute sepals, the finger-shaped marginal glands of the posterior petal, and the distinctly hooked apex of the styles.

2. Hiraea primaeva Anderson, sp nov

Liana lignosa, ramis velutinis pilis usque 0.6 mm longis, erectis, fusiformibus, plerumque brevifurcatis. Foliorum lamina (praeter apicem) 23–32 cm longa, 16–25 cm lata, late elliptica, basi rotundata vel subcordata, margine revoluta multis glandulis parvis instructa, aliter eglandulosa, apice abruptissime caudata apice 8 mm longo, utrinque pertinae velurina pilis erectis bifurcatisque, nervis lateralis et venis tertiaris inter se valde parallelis supra impressis subtus prominentibus, etiam venulis inter se ± parallelis utrinque prominulis; petiolus 21–30 mm longus, 4–5 mm diametro, velutinus, prope vel supra medium biglandulifer; stipulae ca 1.5 mm longae, triangulares, basi petioli portatae (?) vel interpetiolas. Inflorescentia axillaris, usque 8 cm longa, cyma (?) 3–7 umbellarum 4-florarum, velutina, bracteis 3–4 mm longis instructa; umbella pedunculo 9–13 mm longo, bracteis floriferis 1.5–2 mm longis, triangularibus, abaxialiter subvelutinis, adaxialiter glabris, eglandulosis, bracteolis 1–1.5 mm longis, in quoque flore 1 bracteola uniglandulifera, glandulo versus centrum umbellae excentrico. Pedicellus (fructu) 11–15 mm longus, 0.8–1.5 mm diametro, apice tumidus usque 2.5 mm diametro, subvelutinus. Sepala 4 lateralia 8 glandulas 2–2.5 mm diametro 3.5 mm superantia, usque 4 mm lata (fructu), anticum eglandulosum, omnia triangularia vel ovata, apice velutina, abaxialiter velutina, adaxialiter glabra. Petala 4 limbo denticulato et eglandulosu, 1 (probabiliter posticum) limbo longe glanduloso-fimbriato. Filamenta 3–5 mm longa, glabra, recta, basi breviter connata; antherae 1–1.5 mm longae. Ovarium velutinum, stylus (fructu) 4.5–5.5 mm longis, rectis, basi sericeis, apice dorsali uncinatis. Samarae ala lateralis circularis vel transverse late elliptica, 5–6.5 cm lata, 4–5 cm alta, apice usque nucem incisa, basi continua, margine integra sinuata, membranacea, puberula; ala dorsalis 5–6 mm lata, 5–8 mm alta, dentata; nux 5 mm diametro, subglobosa, brevivelutina, areola ventrali circulari 1.5–2 mm diametro.


This most interesting species is known only from the type collection. It resembles other species of Hiraea in its inflorescence, styles, and the venation and
Fig 50. *Hiraea primaeva* and *H. fimbriata*. a–g, *H. primaeva*: a) Leaf and old infructescence, ×0.5; b) stipules, ×1; c) detail of adaxial surface of lamina, minus hairs, ×0.5; d) detail of abaxial surface of lamina, minus hairs, ×0.5; e) hair from abaxial surface of lamina, ×50; f) bracts and bracteoles of umbel, with glands on 4 bracteoles, ×7.5; g) samara, abaxial view, ×0.5. h–k, *H. fimbriata*: h) Flowering branch, ×0.5; i) stipules, ×3; j) flower, ×2.5; k) glandular cushion in center of umbel, ×5. Drawn by Karin Douthit from the types.
marginal glands of the leaves. It does not resemble the rest of the genus in having its stipules basal (interpetiolar?) and the lateral wing of the samara continuous below, as in *Mascagnia* sect *Mascagnia*, rather than incised to the nut. It is admittedly anomalous in *Hiraea*, but would be just as anomalous in *Mascagnia*. I have named the species *Hiraea primaeva* to suggest that it may represent one of the intermediate steps by which some *Mascagnia*-like ancestor gave rise to *Hiraea*.^[11] The type is in fruit, and retains only fragments of flower parts, so the above description is deficient in many respects and will have to be supplemented when a collection is made with flowers. The petals, while too shriveled to measure with any accuracy, had claws at least 3–4 mm long and limbs over 4 mm long, so the flowers should prove to be quite showy; the petals are probably yellow.

3. **Hiraea bifurcata** Anderson, sp nov  

Frutex scandens, ramis junioribus velutinis pilis brevis (usque 0.3 mm) bifurcatis, vetustioribus mox glabris. Folia opposita; foliorum majorum lamina 6.5–12.5 cm longa, 4.5–8 cm lata, obovata, basi rotundata, margine distaliter aliquot glandulis parvis instructa, apice rotundata vel emarginata et saepe apiculata, supra primo velutina interdum pilis effractis glabrescentis, subtus pertinaciter velutina pilis bifurcatis (*Y-formibus*), usque 0.4 mm longis; petiolus 6–11 mm longus, 1–2.5 mm diametro, pertinaciter aureo-velutinus, inter medium et apicem biglandulifer; stipulae 1.7–2.5 mm longae, subulatae, prope vel subter medium petioli portatae. Inflorescentia axillaris, usque 3.5 cm longa, cyma umbellarum 4-florum, simplex (1 umbella pedunculo usque 13 mm longo) vel prope basim ternata (3 umbellis) vel biternata (7 umbellis), tomentosa, umbella sine pulvino centrali, bracteis bracteolisque floriferis 1–1.5 mm longis, triangularibus, abaxialiter sericeis, adaxialiter glabris, eglanulosis. Pedicellus 15–21 mm longus, 0.5–0.7 mm diametro (~1 mm apice), appresso-tomentosus. Sepala 2–2.5 mm longa, 1.5–1.8 mm lata, ovata, apice obtusa, appressa post anthesin, abaxialiter laxe sericea, adaxialiter glabra, anticum eglanulosum, 4 lateralia 8 glandulis ellipticis 1.5–1.8 (~2) mm longis instructa. Petala lutea, parum concava, 4 lateralia ungue 2.5–3 mm longo, limbo 5.5–6 mm longo, 6–6.5 mm lato, ovato vel orbiculari, margine eroso vel dentato, eglanulosum; posticum ungue 3–3.5 mm longo, limbo 5 mm longo laque, margine toto circuitu glanduloso-fimbriato glandulis parvibus capitellatis. Filamenta glabra, basi breviter connata, recta vel sigmoidea, illa sepalis opposita 3.5–4.5 mm longa, illa petalis opposita 2.5–3 mm longa; antheraeae 0.6–0.8 mm longae, ± aequales, loculis lateribus in connectivo globoso pro parte maxima luteo-glanduloso. Ovarium 1.5 mm altum, hirsutum; styli ca 4–5 mm longi, glabri vel supra basim paucipiliferi, arcuati (2 posteriores valdii), apice dorsaliter uncinati. Fructus ignotus.

Type. *Maguire, Wurdack & Bunting* 36155, open granitic exposure, along trail from Sanariapo Road to Salto Carestia, Great Rapids of the Orinoco, Amazonas.

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^[11] Another member of the same series is *Hiraea adenophora* Sandwith, of Guyana. It has the stipules at the base of the petiole, the inflorescence an open axillary panicle of 4-flowered umbels, the pedicels raised on short peduncles, and one of each pair of bracteoles glandular.
Fig 51. *Hiraea bifurcata*. a) Flowering branch; b) leaf-bases and stipules; c) hair from abaxial surface of lamina; d) flower; e) androecium and gynoecium, side view, with eglandular anterior sepal to left and stump of posterior petal to right. Drawn from the type by Annette Seidenschnur Mahler.
Venezuela, elev 100–120 m, 11 Nov 1953 (holotype NY, isotypes MICH, NY, VEN).

This species is known only from the type collection. The epithet refers to the Y-shaped hairs of the leaves. It is related to 

_H. velatina_ Niedenzu (which Cuatrecasas included in _H. ternifolia_ (H.B.K.) Adr. Jussieu), but the combination of characters found in this plant has not been found in the descriptions of those two species or in the specimens seen that have been referred to them.


_Malpighia faginea_ Swartz, Prodr. 74. 1788.


Woody vine; stems sericeous to soon glabrate. Lamina of the larger leaves (7–)8.5–15(–18.5) cm long, 3–6(–7.5) cm wide, obovate or elliptical, rounded or subcordate at the base, acuminate at the apex, usually bearing several small glands distally on the margin and 2 large glands at the base by or on the midrib, glabrate above at maturity or thinly sericeous, especially on the midrib, densely and persistently sericeous below, the straight, appressed hairs giving the lamina a golden or silvery-metallic sheen; petiole 5–9(–11) mm long, abaxially sericeous, adaxially velutinous; stipules 2.5–5 mm long, subulate and distally flattened, borne between the middle and the apex of the petiole. Inflorescence axillary, a short ternate cyme of 3 4-flowered umbels, occasionally reduced to a single umbel; floriferous bracts and bracteoles 1–1.5 mm long, abaxially sericeous; umbel without a large central cushion, at most an inconspicuous nubbin. Pedicel (7–)8–11(–15) mm long, sericeous. Sepals 1.5–2.5 mm long and wide, ovate, abaxially finely sericeous, adaxially glabrous, all eglandular or the lateral 4 bearing 8 elliptical, slightly detached glands 1.5–2 mm long. Petals yellow, apparently thick-textured, the lateral 4 with the claw 2–2.5 mm long and the limb 4.5–6 mm long, 5–7 mm wide, orbicular, flat or somewhat concave, dentate or laciniate, eglandular; posterior petal with the claw 3–4 mm long and the limb 3.5–4.5 mm long and wide, glandular-fimbriate all around the margin. Filaments 3–3.5 mm long opposite the sepals, 2–2.5 mm long opposite the petals, straight or sigmoid, glabrous, connate at the base; posterior 3 anthers 0.6–1 mm long, anterior 7 1–1.5 mm long, the largest often with the connective swollen and glandular. Ovary 1 mm high, finely sericeous; styles 3.5–4 mm long, glabrous, the posterior 2 strongly arcuate, the anterior nearly straight, all with a short, pointed, dorsal hook at the apex. Fruit with the lateral wings free at base and apex, 5–15 mm wide and high, trapezoidal or rectangular, entire or lobed or completely divided into 2 as in _Tetrapertys_, often irregularly reduced, chartaceous or usually coriaceous, sericeous; central dorsal wing 1.5–5 mm wide, semi-circular to triangular; nut 4–6 mm in diameter, sericeous, with prominent longitudinal ribs; ventral areole 2 mm in diameter, circular.

Type. **Masson**, Grenada (BM!).

Distribution. Northern South America, Lesser Antilles, Panamá, and Nicara-
gua. Guayana collections: GUYANA. Puruni River, Mazaruni River, Forest Dept. 7716 (MICH); Kartabo, junction of Mazaruni and Cuyuni Rivers, Hitchcock 17196 (GH, US); Kauri Creek, Cuyuni River, Tutin 111 (US). BRAZIL. Terr. Roraima: vic. Uaiáé airstrip, Rio Uraricoeira 3°33'S, 63°11'W, Prance et al 10690 & 10718 (MICH, NY). VENEZUELA. Bolivar: Caño Maurepá, Alto Paragua, Cardona 805 (US, VEN); Río Carapa, elev 300 m, Río Paragua, Cardona 914 (VEN) & 924 (US, VEN); Río Karún, Alto Río Paragua, elev 300 m, Cardona 1189 (US, VEN); Río Paragua, between Guaiquinima and Río Torono, elev 280 m, Killip 37528 (US, VEN); Hato La Vergareña, 6°45'S, 63°30'W, island in Río Aro 14 km below mouth of Caño Azul, elev 390 m, Wurdack 249 (MICH, NY, VEN). Amazonas: Río Orinoco between San Fernando de Atabapo and Tama-Tama, elev 150 m, Level L-20 (MICH, NY, US, VEN); Alto Río Orinoco, Río Padamo, Maguire & Wurdack 34711 (MICH, NY, US, VEN); ad fluminum Casiquiari, Vasiva et Pacimoni, Spruce 3210 (MG, NY); arriba de Tamatama, Alto Orinoco, elev 121 m, Williams 15266 (A, MICH, US, VEN); Capihuara, Casiquiare, elev 120 m, Williams 15605 (F, US, VEN).

Collected in flower in diverse months, most often from February to July.

I have been unable to discover any satisfactory basis for distinguishing Hiraea chrysophylla from H. faginea. Niedenzu's principal difference was whether the leaves are golden or silver below, but both conditions can be found on different leaves of the same plant and intermediates abound. I can only conclude that they are the same species and adopt the older name.

5. Hiraea fimbriata Anderson, sp nov Fig 50h–k.

Liana lignosa, ramis junioribus dense et arcte sericeis, vetustioribus glabratis. Foliorum majorum lamina 8–22 cm longa, 4–10.5 cm lata, obovata vel elliptica, basi cordata, margine eglandulosa, apice acuminata, acuta, vel obtusa, primo subtomentosa pilis rectis vel sinuatis 0.5–1 mm longis, adulta glabrata vel saepe costa utrinque basi sericea, costa subitus basi biglandulifera vel eglandulosa; petiolus 4–10 mm longus, pertinaciter aureo-sericeus, eglandulosus; stipulae 1–2.5 mm longae, subulatae, revolutae, inter medium et apicem petioli portatae. Inflorescentia axillaris, 1–4 umbellae 4-florae in quaque axilla, usque 2.5 cm longa, sericea, pedunculo bibracteolato 3–6 mm longo, umbella in centro pulvino glanduloso hemisphaerico instructa, bracteis bracteolisque floriferis 1–1.5 mm longis, triangularibus, abaxialiter sericeis, adaxialiter glabris, eglandulosis. Pedicellus 7–14 mm longus, 0.6–1 mm diametro, arcte sericeus. Sepala 2–3 mm longa, 2.5 mm lata, triangularia, appressa post anthesin, abaxialiter sericea, adaxialiter glabra, anticum eglandulosum, 4 lateralia 6–8 glandulis ellipticus 1.5–2 mm longis instructa (1–2 glandulis sepalorum antico-lateralium saepe absentibus). Petala lutea, omnia fimbriata et eglandulosa, 4 lateralia ungue 3–3.5 mm longo, limbo 6.5–8 mm longo, 7.5–9 mm lato, orbiculari, concavo vel plano; posticum ungue 4–4.5 mm longo, limbo 5–6 mm longo et lato, quadrangulari, saepe corrugato. Filamenta glabra, basi brevissime connata, 3–4 mm longa, recta vel (praecipue posterioria) arcuata, illa sepalis opposita quam illa petalis opposita longiora; antherae ca 1 mm longae, subaequales, connectivo globoso vel obovooide, atrorubro, sub apice luto-glanduloso. Ovarium 1.5 mm altum, dense atrobrunneo-hirsutum; styli 4–5
mm longi, glabri vel proximaliter sericei, valde arcuati (praecipue 2 posteriores), apice dorsalter longi-uncinati, unco antico ca 0.9 mm longo, posterioribus ca 0.5 mm longis. Fructus immaturissimus 2 alis lateralibus instructus.

Type. Wurdack & Monachino 39770, edges of Río Pargueni 1–10 km above mouth, Bolívar, Venezuela, elev 90 m, 10 Dec 1955 (holotype MICH, isotypes NY, US, VEN).

Distribution. Tributaries of middle and upper Río Orinoco. VENEZUELA. Bolívar: Selva rebalsera de Guayapo, Bajo Caura, elev 100 m, May flr/imm frt, Williams 12038 (F, VEN); type, q v. Amazonas: Isla Ratón, Bossio s.n. (MICH); Sipapo River near confluence with Orinoco River, inundated in rainy season, elev 90 m, Nov flr, Breteler 4830 (US, VEN, WAG). COLOMBIA. Vichada: Río Meta, Caño de la Ceiba, riverbank, Oct flr, Cuatrecasas 4089 (US).

*Hiraea fimbriata* is probably most closely related to *H. reclinata*, from which it can be distinguished by its shorter stipules borne near the apex of the short petiole, the eglandular margin of its lamina, its shorter, stouter, very tightly sericeous pedicels, the bulbous cushion in the middle of the umbel, and the large, fimbriate, eglandular petals with long claws. The epithet refers to the fimbriate petals.


Woody vines, the stems sericeous to glabrate. Lamina of the larger leaves 6–16(–21) cm long, 3–6(–8) cm wide, elliptical or obovate, cuneate or rounded at the base, flat or slightly revolute and eglandular at the margin, acute, obtuse, or abruptly short-acuminate and often apiculate at the apex, glabrate above, thinly but persistently sericeous below, the hairs 0.2–0.4 mm long, white, straight, fine, sessile, the midrib and 7–10(–12) pairs of lateral veins obscure above, prominent below; petiole 6–10(–12) mm long, sericeous, bearing 2 large glands at the apex; stipules 0.5–1 mm long, borne between the middle and the apex of the petiole. Inflorescence axillary, up to 2.5 cm long, sericeous, single or up to 3 per axil, each bearing 1 4-flowered umbel, the peduncle of the umbel 5–10 mm long; bracts and bracteoles 0.5–1 mm long, abaxially sericeous; umbel with a dark, hemispherical or globose cushion in the center between the bracteoles. Pedicel 8–13 mm long, sericeous. Sepals 0.5–1.5 mm long beyond the glands, 1.5 mm wide, ovate, slightly revolute at the apex, abaxially sericeous, adaxially glabrous, the lateral 4 bearing 8 elliptical glands 1.7–2.5 mm long. Petals yellow, apparently thick-textured, sub-entire to distinctly fimbriate, all eglandular, the lateral 4 with the claw 1.5–2 mm long and the limb 5–7 mm long and wide, orbicular, flat, the posterior petal with a longer claw and smaller, often crumpled limb. Filaments 3.5–4.5 mm long opposite the sepals, 1.8–2.5 mm long opposite the petals, glabrous, straight or sigmoid, connate at the base; anthers 0.8–1.1 mm long, the locules borne laterally on a globose or hemispherical connective, dark red with a yellow glandular apex. Ovary 1 mm high, densely hirsute; styles ca 3–4 mm long, glabrous, the posterior 2 strongly arcuate, the anterior bowed, laterally flattened, the apex dorsally rounded or with a short bulbous or flattened and rounded projection. Samara with the lateral wings trapezoidal, 7–10 mm wide, (6–)11–15 mm high, entire or sinuate or coarsely and irregularly toothed, usually membranous, loosely sericeous with some spreading hairs; dorsal wing 1–2 mm
wide, 4 mm high, subentire; nut 3–4 mm in diameter, cylindroidal, softly white-hirsute, with the ventral areole 1–1.5 mm in diameter, orbicular or ovate.

Type. Schultes & Cabrera 17022, Río Apaporis, Jinogójé (near mouth of Río Piraparaná), Amazonas-Vaupés, Colombia, Aug flr/frt (holotype US!, isotypes NY! US!).


Distribution. Ríos Orinoco, Uaupés/Vaupés, and Apaporis. VENEZUELA. Amazonas: trail between San Fernando de Atabapo and Río Orinoco, elev 125–150 m, May flr, Wurdack & Adderley 42670 (NY, VEN). BRAZIL. Amazônas: Taracuá, margem do R. Uaupés, Jun flr, Pires & Silva 7931 (IAN); Río Uaupés, acima de Sta. Rosa, May frt, M. F. Silva et al 1550 (INPA). COLOMBIA. Amazonas-Vaupés: cuenca del Río Apaporis, Río Piraparaná, elev 250 m, Aug flr, Garcia-Barriga 14215 (NY, US); Río Apaporis, Raudal Yayacopi (La Playa) and vicinity, quarzite base, elev 240 m, Aug frt, Schultes & Cabrera 16969 (US); type, q v. Vaupés: Inundated stream across from Mitú, May frt, Zarucchi 1633 (MICH).

The leaves of Zarucchi 1633 are 14–16 cm long and 5–7 cm wide, with the petiole 10–12 mm long, while most specimens have them 6–11 cm long and 3–5.5 cm wide, with petioles 6–10 mm long. Its fruits are also atypical (immature?), having coriaceous, coarsely toothed lateral wings only 6–8 mm high instead of the usual 11–15 mm. It may represent a taxon worth recognition, but on the other hand further collection may well expand the range of variation in H. apaporiensis to include this extreme, so I prefer not to name it at this time.

7. Hiraea silvae Anderson, sp nov

Liana lignosa, rami sericeis permox glabris. Foliorum majorum lamina 19–25 cm longa, 6.5–9.5 cm lata, obovata vel elliptica, basi cuneata, apice acuminata vel cuspidata, eglandulosa, adulta utrinque glabra, venis lateralibus 8–10 utroque latere, inter se distantibus, arcuato-ascendentibus, prope marginem anastomosantibus, subitus prominentibus; petiolus 10–15 mm longus, sericeus, inter medium et apicem biglandulifer; stipulae 2.5–3 mm longae, subulatae, super medium petioli portatae. Inflorescentia axillaris, 1–3 umbellae 4-florae superpositae, pedunculo umbellifero ca 1 cm longo, sericeo, prope basim bibracteato, umbella sine pulvinlo centrali, bracteis bracteolisque floriferis 1–1.5 mm longis, triangularibus, abaxialiter sericeis, adaxialiter glabris, eglandulosis. Pedicellus (in fructu) 14–17 mm longus, sericeus. Sepala (in fructu) 3 mm longa, 2.5 mm lata, triangularia, apice revoluta, abaxialiter sericea, adaxialiter glabra, anticum eglandulosum, 4 lateralia 8 glandulis 2.5 mm longis, anguste ellipticas instructa. Petala ignota. Filamenta glabra, basi connata, demum torta; antherae (in floribus delapsis) 0.7–1 mm longae. Ovarium 1.5 mm altum, dense hirsutum; styli glabri, arcuati, apice dorsaliter uncinati. Samara (et nux et alae) dense velutina, pilis (præcipe in nuce) erectis, rectis, basifixis vel sub-basifixis; alae laterales inter se liberae, 15–20 mm latae, usque 25 mm altae, margine sinuatae; crista dorsalis centralis 1–2 mm lata, semicircularis; nux 8–10 mm diametro, depresso-globosa, 15–20-costata costis saepè in latere inferiore alae laterales continuis, dorsaliter inter cristam centralem et alas laterales aliquot cristis dissectis parvis irregularibus instructa.
Fig 52. *Hiraea celiana* and *H. silvae*. a–e, *H. celiana*: a) Flowering branch, ×0.5; b) flower, ×2.5; c) stamen, abaxial view, ×10; d) stamen, adaxial view, ×10; e) style, ×10. f–i, *H. silvae*: f) Fruiting branch, ×0.5; g) stipules and petiolar glands, ×4; h) samara, adaxial view, ×1; i) samara, abaxial view, ×1; j) hairs from fruit, ×35. Drawn by Karin Douthit from the types.
Type. *Silva* & Brazão 60964, margin of Rio Cauaburí, in high forest on terra firma, between Maturacá and Rio Yá, Amazônas, Brazil, 3 Feb 1966 (holotype MG, isotypes MICH, NY, US).

This species is known only from the type, which is in fruit. It is quite distinctive because of its densely velutinous samara, with the straight, erect, basifixixed or sub-basifixixed hairs abundant on the wings as well as the nut. The samara is also interesting for its large, depressed-globose, ribbed nut, the ribs often continuing as winglets on the underside of the lateral wings. The distant, strongly arched veins suggest that this species is related to *H. schultesii*, from which it can be distinguished by its larger leaves and very different fruits.

The axillary inflorescence in *Hiraea silvae* seems to arise from one to three distinct axillary buds, judging from the vertical arrangement of the units in each axil. Each unit is a single umbel borne on an unbranched peduncle, obviously reduced from a cyme of umbels, with the bracts of the lateral branches retained but sterile.

*Hiraea silvae* is named in honor of Nilo T. Silva, Brazilian collector of Amazonian plants.

8. *Hiraea celiana* Anderson, sp nov

Liana lignosa, ramis junioribus sericeis, demum glabratis. Foliorum majorum lamina 14–28 cm longa, 6–12 cm lata, coriacea, oblanceolata, basi acuta, margine eglandulosa, apice abrupte rotundata vel breviamuminata, altera supra glabra subtus glabrate vel sparsissime sericea costa pertinaciter sericea; petiolum 13–18 mm longus, pertinaciter sericeus, apice biglandulosus; stipulae 1–1.5 mm longae, subulatae, inter medium et apicem petioli portatae. Inflorescentia axillaris, 1–4 umbellae (4–5) florae superpositae in quaque axilla, rufomentumosa, pedunculo umbellifero 2–4 bracteolato 5–15 mm longo, umbella sine pulvino centrali, bracteis bracteolifloris floriferis 1–1.5 mm longis, triangularibus, abaxialiter sericeis, adaxialiter glabris, eglandulosis. Pedicellus 16–22 mm longus, rufomentumosus pilis sinuosis et saeppe patentibus. Sepala 3 mm longa, 2–2.4 mm lata, ovata, abaxialiter laxe sericea, adaxialiter glabra, anticum eglandulosum, 4 lateralia 8 glandulis ellipticas 1.5–2 mm longis non compressis instructa. Petala lutea, omnia eglandulosa et (praecipue posticum) fimbriata, 4 lateralia ungue 2.5–3.5 mm longo, interdum abaxialiter sericeo, limbo 5–6.5 mm longo, 6–7 mm lato, orbiculari, ± concavo; posticum ungue 3.5–4 mm longo, limbo 5–5.5 mm longo et lato, circulari, corrugato. Filamenta glabra, basi connata, illa sepalis opposita 3–3.7 mm longa, arcuata, illa petalis opposita 2.1–2.6 mm longa, recta; antherae 0.8–1.3 mm longae, subaequales, connectivo globoso, rubro demum nigrescenti, sub apice luteo-glandulosum. Ovarium 1 mm altum, dense tomentosum; styli 3.6 mm longi, pilis T-formibus 0.5–0.8 mm longis per totam longitudinem instructi, anticus rectus, posteriores valde arcuati, omnes apice dorsaliiter rotundati vel triangulariter truncati. Fructus ignotus.

Type. *Maguire & Politi* 28523, mixed montane forest slopes above lower escarpment above Cañon Grande, Cerro Sipapo (Paráque), Amazonas, Venezuela, elev 1500 m, 21 Jan 1949 flr (holotype MICH, isotypes NY, US, VEN).

Distribution. Known only from the type collection and the following two paratypes from the same general locality: scrub savanna vicinity of Base Camp, elev
150 m, 25 Dec flr, Maguire & Politi 27965 (MICH, NY, US, VEN); mixed rain forest at 100 m elev, vicinity of Base Camp, Jan flr, Maguire & Politi 28295 (NY).

_Hiraea celiana_ is named in honor of Celia K. Maguire, who, although not a professional botanist, has made a substantial contribution to the study of the plants of Guayana through her assistance to her husband, Bassett Maguire, both in the field and at The New York Botanical Garden. This species is distinguished from others in the genus by its large, coriaceous, oblanceolate leaves with the margin eglandular, the loose, reddish-brown tomentum of the inflorescence and pedicels, which are unusually long, the fimbriate, eglandular petals, and the sparsely sericeous styles, which are laterally flattened at the apex and triangular-truncate or bear a very short, blunt hook.

A Brazilian collection that is probably closely related to _H. celiana_ is _Pires 580_ (IAN), from the Serra de São Gabriel on the Rio Negro in Amazonas. _Pires 580_ has slightly smaller leaves with shorter petioles, and shorter pedicels with the hairs stramineous instead of reddish-brown. The petals are similar, but they persist as the fruits enlarge in _Pires 580_, whereas they are deciduous before enlargement of the fruits in _H. celiana_. _Pires 580_ has a well-developed dorsal wing on the samara, 3–4 mm wide, which is sometimes a useful character in the taxonomy of _Hiraea_, but since the fruits of _H. celiana_ are unknown they cannot be compared in this respect. _Pires 580_ may well be an undescribed species, but I would prefer to defer giving it formal recognition until more material of it is found, and until _H. celiana_ is found in fruit.


“Small tree,” the younger stems tightly sericeous. Lamina of the larger leaves 10–14.5 cm long, 5.5–8.5 cm wide, obovate or elliptical, cuneate or rounded at the base, abruptly short-acuminate at the apex, coriaceous, eglandular, glabrate except for the midrib sericeous below, the 5–7 pairs of distant lateral veins prominent below and obscure above; petiole 12–20 mm long, tightly sericeous, biglandular at the apex; stipules 1–1.5 mm long, borne above the middle of the petiole. Inflorescence an unbranched axillary umbel (1–2 per axil) of 4 flowers borne on a peduncle 5 mm long and bibracteate at or below the middle, the umbel without a prominent cushion between the bracteoles, the bracts and bracteoles of the umbel 1 mm long, triangular, abaxially sericeous. Pedicel (in fruit) 10–12 mm long, brownish-tomentose. Calyx bearing 8 glands on the 4 lateral sepals. Petals and stamens unknown. Samara appressed-tomentose with brown hairs, the nut ca 4 mm in diameter, globose or cylindroidal, smooth-sided, the lateral wings 35–50 mm high, 20–28 mm wide, “translucent white-green” (immature), membranous with prominent veins, the central dorsal wing none or a crest ca 0.5 mm wide, the ventral areole ca 1.5 mm in diameter. See the protologue for a more complete description.

Type. Schultes & Cabrera 15996, Rio Apaporis, Raudal Yayacopi (La Playa) and vicinity, Amazonas-Vaupés, Colombia, quartzite base, elev ca 240 m, Mar frt (holotype US!, isotypes GH! NY!).

Distribution. Known only from the type.

Woody vine, the stems sericeous to glabrate. Lamina of the larger leaves 13–19 cm long, 6–10 cm wide, elliptical, rounded or slightly cordate at the base, short-acuminate at the apex, glabrate above, sparsely sericeous below with straight white appressed hairs 0.2–0.5 mm long, eglandular, the lateral veins prominent below and obscure above; petiole 6–10 mm long, sericeous to glabrate, biglandular at the apex; stipules 1–2 mm long, borne above the middle of the petiole. Inflorescence an unbranched axillary umbel (up to 5 per axil) of 4 flowers borne on a bibracteate peduncle 3–6 mm long, in the axils of current leaves or more commonly at older leafless nodes, the umbel without a prominent cushion between the bracteoles, the bracts and bracteoles of the umbel 0.5–1 mm long, triangular, abaxially sericeous. Pedicel 13–15 mm long, whitish-sericeous. Sepals ovate, abaxially sericeous, eglandular or the 4 lateral sepals bearing 8 apically detached yellow glands. Petals light yellow, membranous, eglandular, the claw 2.2–3 mm long, the limb 4–5 mm long and wide, cuneate at the base, dentate or laciniate at the margin, the anterior-laterals concave, the other 3 ± flat. Filaments 3–3.5 mm long opposite the sepals, 1.7–2.3 mm long opposite the petals, basally connate, ± straight; anthers 0.7–1.2 mm long, with a globose, glandular connective. Ovary 0.6 mm high, sericeous; styles 3.5–4.5 mm long, sericeous, arcuate, with a rounded dorsal hook at the apex 0.4–0.6 mm long. Samara with the lateral wings 25–30 mm wide, 40–45 mm high, elliptical, membranous, sinuate at the margin, sparsely sericeous; dorsal wing none; nut 5 mm in diameter, sericeous.

Type. Kappler 1709, Karouany River, Surinam (U).


I have not seen the type of Hiraea affinis, nor any specimens from Surinam or French Guiana, and cannot be certain that the specimens cited are correctly identified. However, they agree with Niedenzu’s description and with that of Kostermans in most characters, including the size and glabrescence of the leaves, the eglandular leaf-marginal, the inflorescence borne on old stems, the light-yellow, membranous, eglandular petals, the small anthers with globose, glandular connectives, the hooked styles, and the samara without a dorsal wing (Niedenzu does not mention the latter, but illustrates it). The only important characters in which there is disagreement is that in both of the cited collections the styles are sparsely sericeous, which is not mentioned by Niedenzu or Kostermans, and in Tillett & Tillett 45732 the limb of the petals is smaller than the 5–6 mm of Niedenzu and not hastate at the base. The description given above is based only on the two collections cited.


Woody vine (or small tree? cf discussion); stems sericeous to eventually glabrescent. Lamina of the larger leaves 6–15 cm long, 3–6(–7) cm wide, ovate or
elliptical or occasionally obovate, cuneate or rounded at the base, acuminate at the apex, loosely sericeous or submentosely glabrescent on both sides except persistently sericeous on the midrib especially below at base, eglandular, the veins about as prominulous above as below; petiole 6–15 mm long, sericeous, biglandular on distal half; stipules 0.5–1 mm long, borne at or above the middle of the petiole. Inflorescence an unbranched axillary umbel (1–5 per axil) of 4 flowers borne on a bibracteate peduncle 5–15 mm long, the umbel without a prominent cushion between the bracteoles or rarely with a glandular knob up to 0.7 mm in diameter, the bracts and bracteoles of the umbel 0.7–1.5 mm long, triangular, abaxially sericeous. Pedicel 8–15 mm long, reddish- or brown-sericeous. Sepals triangular, abaxially sericeous, eglandular or the 4 lateral sepals bearing 8 circular or elliptical glands 1.5–2 mm long. Petals eglandular, laciniate, the laterals yellow, with the claw 1.5–2.5 mm long, the limb 4–5 mm long, 4.5–5 mm wide, ± concave; posterior petal "salmon," with the claw 2.5–3 mm long, the limb 3 mm long, 3.5–4 mm wide, flat or crumpled. Filaments 2.5–3.5 mm long opposite the sepals, 1.5–2.5 mm long opposite the petals, basally connate, straight or slightly sinuous; anthers 0.7–1 mm long, with an apically glandular connective. Ovary ca 1 mm high, hirsute; styles 2.8–3.5 mm long, glabrous or with scattered hairs, the anterior shorter and nearly straight, the posterior 2 arcuate, with a short rounded dorsal hook at the apex. Samara with the lateral wings 6–10 mm wide, 13–18 mm high, reddish (immature), subcircular or elliptical or trapezoidal, sinuate at the margin, loosely sericeous; dorsal wing 0.5–1.5 mm wide, 2–2.5 mm high, triangular; nut ca 2 mm in diameter, loosely sericeous, the ventral areole ca 0.5 mm in diameter.

Type. *Pinnus* 90, SW slopes of Mt. Roraima, vicinity of Arabupu, Mt. Roraima District, Bolívar, Venezuela, elev 1380 m, 28 Dec 1939 (holotype F!, isotypes GH! NY!).

Distribution. Mountains of southern Venezuela, usually above 900 m. VEN-EZUELA. Bolívar: margen de la selva, Kavanayén, elev 1300 m, *Lasser 1769* (F, NY, VEN); type, q v; Ptari-tepuí, SE-facing slopes, elev 1585–1600 m, *Steyermark 60039* (VEN); lower portion of Quebrada O-paru-má, tributary of Río Pacairao, below Santa Teresita de Kavanayén, elev 915–1065 m, *Steyermark 60568* (NY); Ptari-tepuí, dense forest at base of cerro along Río Karuai, elev 1220 m, *Steyermark 60636* (NY); along Río Karuai, at base of Sororopán-tepuí, W of La Laja, elev 1220 m, *Steyermark 60790* (F, NY, VEN); along Río Tirica (Río Aparurén) just above Techiné-merú. Chimantá Massif, elev 470 m, *Steyermark & Wurdack 124* (MICH, NY, VEN), 134a (F); Cerro Venamo, bosque alto húmedo montañoso, elev 1220–1275, *Steyermark et al 92717* (NY, VEN); selva húmeda, drenaje del Río Cuyuni, largo del Río Anawaray-parú, vec. Km 134 al sur de El Dorado, elev 1300–1350 m, *Steyermark et al 104473* (NY, VEN); lower slope forest of Tirepon-tepuí, elev 1100 m, *Wurdack 34029* (MICH, NY, US, VEN), elev 1200–1250 m, *Wurdack 34051* (MICH, NY, US, VEN). Amazonas: talus forest, Cerro Parú, elev 1800 m, *Cowan & Wurdack 31408* (MICH, NY, US, VEN).

Collected in flower mostly from November to January.

This is one of the few truly upland species of *Hiraea* in Guayana, most of the collections having come from above 1000 m. In most cases the plant is described as a liana, but four collections are said to have come from trees (small tree:
Cowan & Wurdack 31408, Lasser 1769; tree 8 m: Wurdack 34029; tree 12 m: Steyermark 60790). It seems unlikely that all of these experienced collectors were mistaken, but it would also be very surprising if a high-climbing species of Hiraea could also occur as a tree. Resolution of this problem must await further observations in the field.

19. **Tetrapteryx** Cavanilles, Diss. 9: 433. 1790.

Vines or occasionally shrubs, the leaves usually decussate, often bearing glands on the laminas or petiole or both; stipules small, usually interpetiolar, sometimes apparently absent. Flowers borne in umbels, corymbs, or pseudoracemes, these often grouped in a paniculate inflorescence; pedicel pedunculate, the peduncle subtended by a bract and bearing 2 apical or subapical bracteoles. Lateral 4 sepals usually biglandular, the anterior eglandular or biglandular. Petals yellow or pink, glabrous or abaxially sericeous (all yellow in Guayana). Stamens 10, all fertile, the anthers usually glabrous and more or less alike, the connective not exceeding the locules. Ovary of 3 centrally connate carpels, 1 anterior and 2 posterior, all fertile; styles 3, the apex with an internal to apical stigma and dorsally smooth to truncate or short-hooked. Fruit schizocarpic, breaking apart into 3 samaras (or fewer due to abortion) separating from a pyramidal torus, each samara having its largest wings lateral, usually 4 discrete wings; dorsal wing smaller, sometimes reduced to a crest or lost; intermediate winglets or projections sometimes present.

Type. **Tetrapteryx citrifolia** (Swartz) Persoon.

This is a difficult genus of about 90 species, all found in the New World. Not only does it need revision at the level of species; its limits as a genus are also somewhat vague, since some of its species are very like **Mascagnia**.

**Key to the Species of Tetrapteryx in Guayana**

1. Inflorescence an axillary pseudoraceme, usually unbranched, rarely basally ternate, the flowers sometimes reduced to 1 pair or crowded distally to form a few-flowered corymb or umbel; bracteoles larger than the floriferous bract (wider and at least as long), often bearing marginal or abaxial glands; calyx glands usually 10 (i.e. all 5 sepals biglandular).

   **Section Macrophyllaris** Niedenzu.

2. Limb of the lateral petals denticulate or entire, usually less than 6 mm long (rarely to 7 mm) and 5 mm wide; filaments densely to sparsely sericeous or rarely glabrous; glands on the laminas marginal or none; nut of the samara usually bearing aculate outgrowths between dorsal and lateral wings.

   3. Leaves persistently tomentose below, the hairs ± serpentine and loose; lamina of the largest leaves up to 3.6 cm long.

      1. **T. aristeguietiae**.

      3. Leaves thinly sericeous to glabrate below, the hairs (if any) straight and appressed; lamina of the larger leaves 3.5–15 cm long.

   4. Woody vine or robust shrub over 1 m tall, usually growing by rivers; lamina (2.5–)3.5–7 cm wide; calyx glands (2.5–)3–4 mm long; lateral wings of samara (7–)8–14 mm long, 4, subequal; anthers (1.3–)1.5–1.8 mm long; bracteoles 2–5 mm long.

      2. **T. styloptera**.

   4. Wiry-stemmed shrub 0.2–0.6 (–1) m tall, in savannas; lamina 0.7–2.8 cm wide; calyx glands 1.2–2 mm long; lateral wings of the samara 1.5–3(–5) mm long, variable in number, irregular and often unequal; anthers 0.9–1.1 (–1.5) mm long; bracteoles up to 2 mm long.

      3. **T. gracilis**.

2. Limb of the lateral petals fimbriate, mostly 6–10 mm long and 5.5–9 mm wide; filaments glabrous; glands usually present on the lamina, borne between the midrib and the
margin; nut of the samara devoid of outgrowths between dorsal and lateral wings (all wings reduced to thick, irregular outgrowths in *T. oleifolia*).

5. Stems, inflorescence, and leaves very soon nearly or quite glabrate, except for golden-sericeous axillary buds; margin of the lamina notably thickened; veins usually obscure or invisible; virgate shrubs 0.2–2(–3) m tall. 4. *T. pusilla*.

5. Stems and usually the inflorescence densely and persistently sericeous; leaves sericeous to glabrate; margin of the lamina sometimes revolute but usually not or only slightly thickened; veins visible on one or both sides of the lamina; shrubs or vines.

6. Leaves thinly sericeous to glabrate below, the glands and epidermis easily seen.

7. Petiole 0–2 mm long. 5. *T. huachamacariensis*.

7. Petiole over 3 mm long. 6. *T. fimbrirpetala*.

6. Leaves persistently very densely sericeous below, the hairs nearly or completely concealing the epidermis and partly hiding the glands, if any.

8. Lamina of the larger leaves over 2.5 cm wide, with a row of small impressed glands below between midrib and margin; lateral wings of the samara normal, ie all 4 well-developed, subequal, thin. 7. *T. rhodoptera*.

8. Lamina up to 2.2 cm wide, eglandular or with minute marginal glands; lateral wings of the samara reduced to rounded crests or thick or acuminate, irregular outgrowths. 8. *T. oleifolia*.

1. Inflorescence simple or compound, terminating in umbels of 4(–6) flowers; bracteoles smaller than the floriferous bract or the same size, eglandular or abaxially callose; calyx glands 8 (the anterior sepal eglandular) or all rudimentary or absent.

9. Stipules distinct; styles slender, with small, discrete, nearly terminal stigmas; non-floriferous bracts of the inflorescence inconspicuous, 5 mm long or less, lanceolate; bracteoles longer than wide; calyx glands (if present) usually becoming stalked in older flowers and fruit. 9. *T. mucronata*.

9. Stipules connate in interpetiolar pairs, often caducous but then leaving a prominent interpetiolar scar; styles stout, with the stigmas apparently internal and deciduous; inflorescence containing conspicuous, often orbicular, foliaceous bracts 4–20 mm long, much smaller and thinner than vegetative leaves but much larger than floriferous bracts, these deciduous and usually absent from fruiting specimens; bracteoles about as wide as long or wider; calyx glands sessile. Section *Lophogyntix* Niedenzu.

10. Stems, petioles, and abaxial surface of lamina persistently velutinous, the hairs erect; samara with the dorsal wing absent, represented at most by a slight rib. 10. *T. chloroptera*.

10. Stems, petioles, and lamina thinly sericeous to glabrate, the hairs (if any) appressed; samara (where known) with a well-developed dorsal wing.

11. Lateral petals with the limb 11–12 mm long and 10–12 mm wide; lamina of the leaf with two large elliptical basal glands 2–3 mm long; umbel subsessile, raised above the subtending foliaceous bracts on a peduncle 0.5–1.5 mm long; calyx glands 3.5–6 mm long, some or all asymmetrical, ear-shaped. 11. *T. megalantha*.

11. Lateral petals with the limb up to 5.5 mm long and 4.5 mm wide; lamina eglandular at very base, all glands on the lamina circular, up to 0.4 mm in diameter; umbel raised on a peduncle 3–6 mm long; calyx glands 2–4 mm long, elliptical or obovate.

12. Samara with winglets or acutale outgrowths between dorsal and lateral wings, the upper lateral wings 12–18 mm long, the lower 4–9 mm long; stipule-pair 1–1.5 mm wide, the scar stretched to 2.5 mm at older nodes; lamina of the leaf 9–14 cm long, 4–6.5 cm wide; petiole 7–12 mm long. 12. *T. discolor*.

12. Samara devoid of outgrowths between dorsal and lateral wings, the upper lateral wings 22–35 mm long, the lower 11–15(–20) mm long;
stipule-pair 2.5–4 mm wide, the scar stretched to 5.5 mm at older nodes; lamina of leaf (11–)13–20 cm long, (5–)6–10.5 cm wide; petiole (12–)14–20(–27) mm long.

13. *T. crispa*.

1. *Tetrapterys aristeguietae* Anderson, sp nov

Frutex 1–2.5 m altus, ramis sericeis demum glabratis. Lamina foliorum majorum 2.5–3.6 cm longa, 1.3–2.2 cm lata, elliptica vel ovata, basi cuneata, apice plerumque obtusa vel rotundata, supra tomentosa mox glabrata, subtus pertinaciter tomentosa (vel subsericea) pilis ± patentibus et saepe serpentinis, eglandulosa vel marginie aliquot glandulis minutis munita; petiolus 2.5–4 mm longus, tomentosus vel subsericeus vel glabrus, eglandulosus; stipulae nullae vel minuteae, 0.1–0.2 mm altae, triangulares, interpetiolaris. Inflorescentia pseudoracemus simplex vel ternatus axillaris 1–6 cm longus, florisbus decussatis 2–26, bracteis 1.5–2.5 mm longis, ca 0.7 mm latis, abaxialiter sericeis, eglandulosis, pedunculo 2–6.5 mm longo, sericeo, bracteolis 2.5–4.5 mm longis, 1.2–2 mm latis, ellipticis, glabratis, membranaceae, venosis, eglandulosis, apice vel sub apice pedunculi portatis. Pedicellus (2.5–)4.5–6 mm longus, sericeus vel glabrus. Sepala abaxialiter sericea, adaxialiter glabra, appressa per anthesin, omnia biglandulifera, glandulis 1–2 mm longis. Petala lutea, abaxialiter sparsissime sericea, denticulata, 4 lateralia patentia, ungue 0.8–1.4 mm longo, limbo 3–4 mm longo, 2 mm lato, obovato; petalum posticum ± erectum, ungue 1 mm longo, crasso, limbo 3 mm longo, 2 mm lato. Filamenta 1.2–1.4 mm longa, basi connata, sericea; antennae 0.8 mm longae, glabrae, connectivo rubro demum nigrescenti. Ovarium ca 0.7 mm altum, sericeum; styli 1.5 mm longi, ± aequales, glabri, apice interne vel subterminaliter stigmatiferro dorsalis alternatus rotundato vel truncato. Samarae alae laterales 4, glabratae, 5–8 mm longae, 2–5 mm latae, obovatae vel obturatae, inaequales et irregularuses, 2 superiores saepe longiores, subincertae vel irregulariter lobatae; ala dorsalis 1–2 mm lata, subincerta vel grosse dentata; nux tomentosa, inter alas laterales et alam dorsalem aliquot aculeis 1–4.5 mm longis munita.


Paratype. VENEZUELA. Bolívar: savanna and rock outcrops 1–3 km E of Río Orinoco between mouth of Río Horeda and Cerro Gavilan (Cerro Carichona), elev 100 m, Dec flr, Wurdack & Monachino 3993 (NY).

This species is named in honor of Dr. Leandro Aristeguieta, collector of the type and student of Venezuelan Compositae. *Tetrapterys aristeguietae* is probably most closely related to *T. vacciniifolia*, which was based by Adrien de Jussieu on a Plée collection from Maracaibo. Judging from Jussieu’s description and a photograph of his type, I can advance the following distinctions between the two species:

1. Larger leaves 1.3–2.2 cm wide, up to twice as long as wide; lamina persistently tomentose or subsericeous below; samara with the upper lateral wings longer than or equal to the lower, and bearing several long narrow projections, often longer than the dorsal crest, between it and the lateral wings. *T. aristeguietae*.

1. Larger leaves ca 1 cm wide, about 3 times as long as wide; lamina bearing scattered minute hairs below; samara with the upper lateral wings 3 times shorter than the lower, and bearing no intermediate appendages. *T. vacciniifolia*.


*Tetrapteryx squarrosa* (Grisebach) Grisebach in Martius, Fl. Bras. 12(1): 87. 1858.


Woody vines, rarely shrubs 1 m or taller, the stems sericeous to glabrate. Lamina of the larger leaves (5–)7.5–15 cm long, (2.5–)3.5–7 cm wide, ovate or rarely elliptical, obtuse or rounded at the base, acuminate or rarely acute at the apex, glabrate above, thinly sericeous to glabrate below, the hairs fine, white, strongly appressed, usually with several small impressed marginal glands, otherwise eglandular; petiole (3–)4–9(–11) mm long, sericeous to glabrate, eglandular or bearing 2–4 small glands; stipules none or minute, up to 0.2 mm long, interpetiolar, borne near base of petiole. Inflorescence an axillary pseudoraceme, usually shorter than vegetative leaves, sericeous to glabrate, the flowers decussate; bracts 1.5–3 mm long, 1–2 mm wide, straight or recurved, eglandular or with tiny basal glands; peduncle 1.5–6 mm long; bracteoles 2–5 mm long, (1–)1.5–3.5 mm wide, often recurved or revolute, apical or borne below apex of peduncle, very often bearing 1–2 abaxial glands. Pedicel (2.5–)3.5–6(–10) mm long. Sepals all biglandular, the glands (2.5–)3–4 mm long, narrow, compressed. Petals yellow, glabrous or abaxially sparsely sericeous, entire or, usually, denticulate, obovate, the lateral 4 with the claw 1–1.7 mm long, the limb 4–5.5(–7) mm long, 2.8–5 mm wide; posterior petal similar, the claw thicker and sometimes slightly longer, the limb narrower. Filaments (1.5–)2–2.3 mm long, broad, basally connate, usually sericeous; anthers (1.3–)1.5–1.8 mm long, glabrous or, usually, with a basal tuft of hairs, reflexed. Styles (1.8–)2.2–2.8 mm long, straight or diverging, glabrous except at base, the apex internally stigmatic and dorsally rounded, truncate, or very slightly hooked. Samara sericeous to glabrate on the nut and glabrate on the wings, the 4 lateral wings (7–)8–14 mm long, 2.5–5 mm wide, subequal, the upper 2 often slightly shorter and narrower; dorsal wing 2–4 mm wide, entire to coarsely dissected; nut with several slender outgrowths between dorsal and lateral wings, often exceeding the dorsal wing.

Type. Mathews 1464, Tarapoto, Peru (holotype P, isotype K).

Distribution. Common along rivers in northern South America. Collections from Guayana: GUYANA. Potaro River, vic. of Kaieteur Falls, elev 420 m, Cowan & Soderstrom 1794 & 2222 (NY), Maguire & Fanshawe 23248 & 23302 (GH, NY); Karaurieng River, upper Mazaruni, elev 1250 m, Maguire & Fanshawe 32300 (K, MIC, NY, US). VENEZUELA. Bolívar: Río Hacha, 6°15’N, 62°47’W, Agostini 367 (VEN); Río Apácará, elev 400 m, Bernardi 1573 (VEN); Río Ikabarú, elev 450 m, Bernardi 6568 & 6666 (NY); Río Caróní, boca de Tirika, elev 400 m, Cardona 1153 (US, VEN); Río Uaipará, Cardona 1904 (US, VEN); Alto Paragua, Cardona 2462 (VEN); Río Cucurital, Auyan-tepui, elev 800 m, Cardona 2605 (NY, VEN); Salto Cama, Gran Sabana, elev 1000 m, Davidse 4902 (MIC); Río Apácará, elev 415 m, Steyermark 74673 (F, NY); Río Caróní just below Uirimánd, elev 394 m, Steyermark & Wurdack 5 (NY, VEN); Río Caura, arriba del Salto Para, elev 250–300 m, Steyermark et al 112962 & 113066 (MIC); Río Carrao, Canaima, Trujillo 6071 (MY); Salto de Para, Medio Caura, elev 170

Collected in flower and fruit in all months.

This is an exceedingly variable species. Among the atypical collections included here, special mention should be made of *Wurdack & Adderley* 43196 and 43254. The former has unusually wide leaves, long open pseudoracemes, and very large bracteoles. The latter has long, narrow, reflexed leaves and small bracteoles.

3. *Tetrapterys gracilis* Anderson, sp nov (Fig. 53).

Frutex 0.2–0.6(−1) m altus, ramis gracilibus primum sericeis plerumque mox glabris. Lamina foliorum majorum 3.5–6.5(−10) cm longa, 0.7–2.8 cm lata, ovata vel anguste ovata, basi cuneata vel obtusa, apice attenuata, acuminata, vel acuta, saepe reflexa, mox glabrata, margine aliquid glandulis impressis munita, reticulo subtus vel utrinque prominulo; petiolus 3–6(−9) mm longus, sparsim sericeus vel glabrous, eglandulosus vel 2–4 glandulis parvis munitus; stipulae nullae vel minutae, ca 0.1 mm altae, interpetiolaria proprie basim petioli. Inflorescentia pseudo-racemus axillaris 1–3(−4.5) cm longus, floribus decussatis 4–12(−22), bracteis 0.7–1.2 mm longis, ca 0.5 mm latis, eglandulosus, pedunculo 1–4 mm longo, bracteolis 0.8–2 mm longis, 0.6–1.2 mm latis, apice vel sub apice pedunculi portatis, una vel ambabus saepe uniglanduliferis. Pedicellus 3.5–5.5(−7) mm longus, glabrous praeter apicem. Sepala omnia biglandulifera, glandulas 1.2–2 mm longas 0.7–1.2 mm superantia, 1.2–1.5 mm lata, obtusa, appressa, abaxialiter sericea vel sub-glabrata, adaxialiter glabra. Petala lutea, glabra vel abaxialiter sparsissime sericea, integra vel minute denticulata, 4 lateralia patentia, ungue 0.7–1 mm longo, limbo 3.5–5 mm longo, 2.5–4 mm lato, obovato; petalam posticum erectum, ungue 1–1.4 mm longo, crasso, limbo 3.5–5.5 mm longo, 2.5–4 mm lato, obovato. Filamenta
Fig 53. *Tetrapertys gracilis*. a) Habit, ×0.5; b) flower, ×3.5; c) stamens, ×10; d) gynoecium, ×10; e & f) samaras, ×7.5. Drawn by Karin Douthit, a from Maguire et al 41442, b–e from Maguire et al 41514.
1.1–1.8 mm longa, basi connata, sericea vel subglabra; antherae 0.9–1.1(–1.5) mm longae, glabrae vel basi paucipiliferae, connectivo atrorubro. Ovarium ca 1 mm altum, ± sericeum; styli 1.4–1.9 mm longi, aequales vel antiquus paulo brevior, recti, glabri, apice interna stigmatiferum dorsilater rotundata, truncato, vel brevisime uncinato. Samara sericea vel glabra; alae laterales 1.5–3(–5) mm longae (e nuce ad marginem), in 4 diviseae vel, saepius, irregulariter lobatae, in eadem planta valde variabiles; ala dorsalis 0.5–1(–1.5) mm lata, integra vel sinuata; nux inter alas laterales et alam dorsalem saeppe rugosa vel aliquot aculeis munita.


Distribution. Savannas of Amazonas, Venezuela, and Vaupés, Colombia. VENEZUELA. Amazonas: NW base of Cerro Yapacana, elev 130 m, Jan flr, Maguire et al 30568 & 30809 (both NY); Sabanita El Venado on left bank of Caño Pimichín above Pimichín, Río Guainía, elev 140 m, Nov flr/frt, Maguire & Wurdack 36350 (NY); Pacimoni savanna on right bank of Río Pacimoni 50 km above mouth, elev 100–140 m, Feb flr/frt, Maguire et al 37571 (NY); type, q v; cerro Yapacana, sabana grande, May flr, Steyermark & Bunting 103256 (NY, VEN). COLOMBIA. Vaupés: Caçagual savanna, Río Atabaquito between San Fernando de Atabapo and Caño Temi, Sep flr, Maguire et al 41442 (COL, NY); Mitú and vicinity, lower Río Paraná-pichuna, savanna at major rapids, Sep flr, Zarucchi 1962 & 1984 (both MICH).

This species is named for its slender, wiry stems, producing the habit of a small shrub. It is obviously derived from Tetrapteryx styloptera, but seems to be adequately distinguished from that species by its habitat, habit, small flowers, and small irregular samaras. One collection, Maguire et al 37571, shows some intermediacy in leaf-size to T. styloptera. It would be interesting to study these two species in areas where their habitats abut to look for more intermediates.


Virgate shrubs 0.2–2(–3) m tall, the stems at first thinly sericeous but very soon nearly or quite glabrate except for golden-sericeous axillary buds. Lamina of the larger leaves 3–6(–7) cm long, 1.3–3.5 cm wide, obovate or occasionally elliptical, cuneate at the base, thickened and often revolute at the margin, obtuse or rounded and often apiculate at the apex, glabrous or very soon glabrate, the veins usually invisible or the lateral veins prominulous above or below, with 2–8 impressed glands below in the proximal ½(–½) between midrib and margin and often 1–4 near the apex; petiole 2–3(–5) mm long, glabrate, eglandular; stipules not seen. Inflorescence an axillary pseudoraceme 4–9 cm long, of 4–6(–8) decussate flowers, often corymbose, thinly sericeous to glabrate; bracts 1–2 mm long, ca 0.7 mm wide, triangular, eglandular (lowest pair sometimes larger, rounded, biglandular); peduncle 6–14 mm long; bracteoles 1–2 mm long, 1–1.7 mm wide, elliptical or orbicular, subapical, bearing 2(–4) small abaxial glands. Pedicel 7.5–15 mm long, glabrate except for tumid apex. Sepals revolute in anthesis, abaxially sparsely sericeous to glabrate, ciliate on the margin, adaxially glabrous, all biglandular, the glands 1.1–2.5 mm long. Petals yellow or yellow with a central red blotch, glabrous, fimbriate, circular or obovate, the lateral 4 with the claw 2–3 mm long,
Fig 54. *Tetrapteryx* section *Macrophyllaris*. a–c, *T. huachamacariensis*: a) Fruiting branch, ×0.5; b) leaf, abaxial side, ×0.75; c) samara, ×2.5. d–f, *T. pusilla*: d) Flower, ×2.2; e) stamen, abaxial view, ×10; f) gynoecium, ×10. g–i, *T. oleifolia*: f) Flowering branch, ×0.5; h) leaf, abaxial side, ×2; i) immature fruit, ×4. Drawn by Karin Douthit, a–c from Maguire et al 30054, d–f from Tillett et al 45201, g–h from Steyermark & Nilsson 8, i from Steyermark et al 105495.
the limb 7.5–10 mm long, 7.5–9 mm wide; posterior petal with the claw 3–4 mm long, the limb 6–7 mm long, 5.5–6.5 mm wide. Filaments 1.8–2.3 mm long, slender (thicker opposite the petals), basally connate, straight, glabrous; anthers 0.6–1.2 mm long, glabrous. Ovary 1–1.3 mm high, glabrous, with winglets already evident; styles 2–2.5 mm long, subequal, straight, glabrous, the apex with the stigma internal to apparently terminal, dorsally truncate to rounded. Samara red to brown, glabrous, the 4 lateral wings 5–7 mm long, (2–)4–6 mm wide, subequal, flabellate or obovate; dorsal wing 1.5–2 mm wide, entire or coarsely dentate; nut devoid of outgrowths between dorsal and lateral wings.

Type. Steyermark 59361, between Mission of Santa Teresita de Kavanayén NW to Río Karuai, elev 1220 m, Oct ff (holotype F! isotype NY!).

Distribution. Moist sandy savannas, Gran Sabana of SE Venezuela and western Guyana. GUYANA. Imbaimadai, Upper Mazaruni River, elev 550 m, Maguire 32201 (K, MICH, NY, US), Maguire et al 40677 (NY); Partang Savanna, near mouth of Partang River, upper Mazaruni basin, elev 460 m, Maguire et al 43806 (NY); Ayanganna Plateau, upper Mazaruni basin, elev 600–740 m, Tillett et al 44870 (NY), 45201A (K, MICH, NY, US). VENEZUELA. Bolívar: Ilu-tepúi, slopes below uppermost west-facing escarpment, elev 2400–2600 m, Maguire 33369 (MICH, NY, VEN); Ilu-tepúi, Uarupata to Enemasic, elev 900 m, Maguire 33558 (NY, VEN); Kavanayén, Maguire 33668 (NY); Km 175 S of El Dorado on road to Santa Elena, elev 1200 m, Steyermark 111298 (MICH); Km 145 S of El Dorado, elev 1350–1400 m, Steyermark et al 104233 (NY); vicinity of Sta Elena de Uairén, Trujillo 11522 (MY); Kavanayén, elev 1300 m, Wurdack 33785 (NY, VEN).

Collected in flower and fruit in almost all months.

5. Tetrapteryx huachamacariensis Anderson, sp nov  Fig 54a–c.

Frutex usque 2 m altus, ramis pertinaciter aureo-sericeis. Lamina foliorum majorum 2.8–6.3 cm longa, 1.8–2.9 cm lata, elliptica, basi cuneata vel rotundata, margine valde revoluta et parum incressata, apice obtusa vel rotundata, glabrata vel costa ± pertinaciter sericea, subtus utrinque serie 5–8 glandularum impressarum inter marginem et costam munita, nervis lateribus plerumque visibilibus (in sicco) sed non prominentibus; petiolus 0–2 mm longus, sericeus, eglandulosus; stipulae minutae, ca 0.1 mm longae, interpetiolares prope basim petioli. Inflorescentia pseudoracemus axillaris 3–6 cm longus, pertinaciter aureo-sericeus, floribus decussatis 4–8, bracteis 1–1.5 mm longis (vel 2 inferioribus folioliformibus), pedunculo (2–)6–10 mm longo, bracteolis 2–4 mm longis, 1.5–3 mm latis, ellipticis vel obovatis, apice vel saepius sub apice pedunculi portatis, eglandulosus. Pedicellus 9–11 mm longus, sericeus vel glabrescens, apice tumidus. Sepala omnia biglandulifera. Petala ignota. Filamenta 1.5–2 mm longa, glabra; antherae ca 1 mm longae, glabrae. Ovarium glabrum; styli 2–2.5 mm longi, recti, glabri, apice interne stigmatifero dorsafliter rotundato vel truncato. Samara immatura rubra, glabra; alae laterales 7–10 mm longae, 3–7 mm latae, 2 superiores latiores; ala dorsalis 2.5–3.5 mm lata, ca 6–7 mm alta, sinuata vel subintegra; nux inter alas laterales et alam dorsalem nuda.

Type. Maguire, Cowan & Wurdack 30054, ridge summit, East Ridge No. 1,
Cerro Huachamacari, Río Cununuma, Amazonas, Venezuela, elev 1820 m, Dec fr (holotype NY, isotypes MICH, VEN).

Paratype. Maguire et al 30164, scrub savanna, SE Escarpment, Cerro Huachamacari, Amazonas, Venezuela, elev 1900 m, Dec fr (NY).

This species is intermediate between Tetrapterys pusilla and T. fimbripetala. It has the small, subsessile, glabrate leaves of the former, and its shrubby habit, but the hairy stems and in florescence of the latter.


Woody vine, occasionally a shrub 1–2 m tall, the stems golden-sericeous, eventually glabrescent. Lamina of the larger leaves (4.5–)6–11(–15) cm long, (2–)3–5(–6) cm wide, elliptical or obovate, cuneate at the base, often slightly revolute but hardly or not thickened at the margin, gradually to abruptly acuminate at the apex, soon glabrate above, thinly sericeous to glabrate below, the lateral veins usually visible on both sides, with a row of 6–20 impressed glands below on each side from base to apex between margin and midrib; petiole 6–11 mm long, sericeous to glabrate; stipules minute, ca 0.1 mm long, interpetiolar at base of petiole. Inflorescence an axillary pseudoraceme 2–6 cm long, of 4–16 mostly decussate flowers, sericeous to glabrate; bracts 1–3 mm long, linear or narrowly triangular, eglandular; peduncle 4–9 mm long; bracteoles 1.5–4 mm long, 1–3 mm wide, elliptical, usually bearing 2–6 abaxial glands, borne at or below apex of peduncle. Pedicel 7–11 mm long, sericeous to glabrate. Sepals revolute in anthesis, abaxially sparsely sericeous, ciliate on the margin, adaxially glabrous, all biglandular, the glands 1.5–3 mm long. Petals yellow, glabrous, fimbriate, circular or obovate, the lateral 4 with the claw 2–2.5 mm long, the limb (4.5–)6–8.5 mm long, (4.5–) 5.5–8 mm wide, the posterior similar but with the claw 3–4 mm long and thicker. Filaments 2–2.8 mm long, nearly free, straight or slightly arched, glabrous; anthers 0.9–1.3 mm long, glabrous. Ovary sparsely sericeous, with winglets already evident; styles 3–4 mm long, usually somewhat arched, glabrous, the apex with the stigma internal to terminal, dorsally truncate to rounded. Samara red to brown, glabrous or the nut sparsely sericeous, the 4 lateral wings 12–20 mm long, 5–11 mm wide, obovate; dorsal wing 2–3 mm wide, ± entire; nut devoid of outgrowths between dorsal and lateral wings.

Type. French Guiana (K, BR?).

Distribution. Guianas, southern Venezuela, and adjacent Brazil. BRAZIL. Terr. Roraima, Serra dos Sururucú: savanna plateau, elev 1800 m, Prance et al 9903 (MICH, NY): Rosa 271 (MICH). VENEZUELA. Bolívar: orillas del Río Purpur, valle de Urimán, Alto Caroni, elev 600 m, Cardona 2591 (VEN); woodland, Uarupata, Ilu-tepui, elev 1800 m, Maguire 33605 (MICH, NY, VEN); thickets along stream, Cerro Pitón, Cordillera Epicara, Alto Cuyuni, elev 400 m, Maguire et al 53659 (NY); wet forest, Sierra de Lema, 6°5′N, 62°W, elev 700 m, Steyermark 89429 (NY, VEN); Canaima, elev 400 m, Steyermark 106432 (NY); wooded ridge of Fila de La Danta, between Luepa and Cerro Venamo, elev 1200 m, Steyermark & Nilsson 199 (NY, VEN); cloud-forest between Lower Cumbre Camp and south-facing escarpment of Agparaman-tepui, elev 1879–1955 m, Steyermark & Wurdack 1137 (NY); Meseta del Jaua, Cerro Sarisariñana, elev 1320
m, Steyermark et al 109037 (NY); Meseta del Jaua, Cerro Jaua, elev 1800–1880 m, Steyermark et al 109549 & 109649 (both NY); bosque húmedo, Cerro Venamo, elev 950–1150 m, Steyermark et al 92401 (VEN); Km 142, selva húmeda, drenaje del Río Cuyuní, S de El Dorado, elev 1300–1380 m, Steyermark et al 104288 (NY, VEN); slopes and talus forest, Sarvén-tepuí, elev 1750–2000 m, Wurdack 34091 (MICH, NY, US, VEN). Amazonas: montane forest, Cerro Sipapo, elev 600 m, Maguire & Politi 28783 (MO, VEN); montane forest, Cerro Yutaje, elev 1000 m, Maguire & Maguire 35054 (MICH, NY, US, VEN), 1400 m, 35099 (MICH, NY, US, VEN), 1500 m, 35346 (MICH, NY, US, VEN); Cerro de la Neblina, Río Yatua, escarpment slopes, Maguire et al 42038 (NY).

Collected in flower and fruit in diverse months, most often from January to April.

This species is rather variable in size and hairiness of leaves. Some of this variation may eventually merit taxonomic recognition, especially Maguire et al 42038 from Cerro de la Neblina, which has the lamina papillose below, and Cardona 2591, which has unusually large leaves and was reported by the collector to be a tree 10 m tall. The Steyermark et al collections from the Meseta del Jaua have small leaves similar to those of T. pusilla.

7. Tetrapterys rhodoptera Oliver, Timehri 5: 190. 1886.


Type. Phelps & Hitchcock 426, Uaipán-tepuí, Bolívar, Venezuela, elev 1400 m (holotype NY! isotype VEN!).

This species is essentially identical to Tetrapterys fimbriipetala, q.v., except for the fact that the lamina is very densely and persistently sericeous below, the hairs nearly or completely concealing the epidermis and partly hiding the glands. The leaves are also on the average somewhat larger, although falling within the range of measurements for T. fimbriipetala. Tetrapterys rhodoptera is easily recognized and has a natural range, but whether it is best classified as a species or at some infraspecific rank is perhaps a matter for the attention of the next monographer of Tetrapterys.

Type. E. F. im Thurn 255, Roraima, British Guiana [Guyana], 15 Dec 1884 ftt (holotype K, isotype US!).

Distribution. Southeastern Venezuela and adjacent Guyana, east of the Río Caroní and south of Auyan-tepuí. GUYANA. Type, q.v. VENEZUELA. Bolívar: El Dorado-Santa Elena de Uairén, Km 135–167, Badillo & Holmquist 6208 (MY); playas arenosas, Río Ikaburu NE del pueblo, elev 450 m, Bernardi 6680 (NY); cerca de los raudales Mureyma, Caroni, elev 740 m, Cardona 1803 (US, VEN); Gran Sabana, road to Kavanayén, elev 1200–1250 m, Gentry et al 10505 (MICH); above Salto Hacha, on plateau S of peak of Uaipán-tepuí, elev 1200 m, Koyama & Agostini 7402 (MY); Kavanayén, Lasser 1747 (F, NY, US, VEN), 1785 (F, NY, US, VEN), 1800 (NY, US, VEN), 1939 (NY, VEN); stream gallery woodland, San Raphael to Río Apongua, elev 1200 m, Maguire 33611 (MICH, NY, VEN); Uaipán-tepuí, Phelps & Hitchcock 418 (NY) & 426 (NY, VEN); Mount Roraima, vic. of Arabupu, elev 1260 m, Pinkus 74 & 283 (both NY); Gran Sabana, between Mission of Santa Teresita de Kavanayén NW to Rio Karuai, elev 1220 m, Steyermark 59381 (F, NY, VEN); Salto de Iwaracarú-merú, W end of Soro-
ropán-tepuí, elev 1615 m, Steyermark 60205 (F, NY); 8 km NW of Kavanayén, elev 1220 m, Steyermark 60451 (US, VEN); Auyan-tepuí, faldas meridionales, elev 1500–1530 m, Steyermark 94122 (VEN); valley of Río Apooguao, Km 146, NE of Luepa, elev 1200 m, Steyermark & Nilsson 720 (NY, VEN); Río Tirica, Torono-tepuí, Chimantá Massif, elev 515 m, Steyermark & Wurdack 1376 (NY).

Collected in flower and fruit from October to June.

Fruiting specimens of *Mascagnia benthamiana* may key out to this species if the samaras are deeply enough dissected to mimic those of a *Tetrapertys*. *Mascagnia benthamiana* can be readily distinguished on these bases, plus others (see description): Petiole bearing 2 large glands at or slightly above the base; stipules epipetiolar; peduncle 0–4 mm long; pedicel 3–6 mm long; anterior sepal eglan-
dular.


“Swauling shrub,” the stems densely and persistently golden-sericeous. Lam-
ina of the larger leaves 5.5–10 cm long, 1.2–2.1 cm wide, narrowly elliptical or
slightly obovate, gradually narrowed to obtuse at the base and apex, slightly
revolute at the margin, very densely golden-sericeous on both sides, eventually
glabrate above, persistently sericeous below with the hairs turning gray, the lat-
eral veins usually visible above, with 1(–2) pairs of impressed glands below near
the base; petiole 4–13 mm long, sericeous, eglanular; stipules minute, interpet-
iolar. Inflorescence an axillary pseudoraceme 2–4 cm long, with 2–6 decussate
flowers, sometimes corymbose, sericeous; bracts 0.5–1 mm long, triangular,
eglanular; peduncle 7–11 mm long; bracteoles 1.5–2 mm long, 1–2 mm wide, ellip-
tical, usually bearing several tiny abaxial glands, apical or subapical. Pedicel
up to 11 mm long, sericeous. Sepals 1.5 mm long beyond the glands, 2–2.5 mm
wide, broadly triangular or ovate, abaxially densely sericeous, adaxially glabrous,
all biglanular, the glands 1.3–2 mm long. Petals yellow or yellow with a red
blotch, glabrous, fimbriate, the lateral 4 with the claw 2 mm long, the limb sub-
circular, 7.5 mm long, 5.5–7 mm wide, the posterior with the claw 2.3 mm long,
the limb elliptical, 5.5 mm long, 4 mm wide. Filaments 1.5–2.5 mm long, nearly
free, straight, glabrous; anthers ca 1 mm long, glabrous, the connective dark red.
Styles 3 mm long, nearly straight, glabrous, the apex with the stigma internal and
dorsally truncate. Immature fruit red, sparsely sericeous, the mericarps ca 6 mm
high, each bearing a dorsal crest up to 2 mm wide and several short, rounded or
aculate lateral outgrowths, the remnants of undeveloped lateral wings.

Guiana” [Bolivar, Venezuela] (holotype K, isotype NY! [998]).

Distribution. VENEZUELA. Bolivar: Along rocks of stream, Cerro La Danta,
NW of Cerro Venamo, elev 1040–1060 m, Apr frt, Steyermark & Nilsson 8 (VEN);
open outcrops along rocky stream, Km 201.9 (‘189–190’), carretera El Dorado–
Santa Elena de Uairén, elev 1200–1400 m, Feb frt, Steyermark et al 105495 (NY).

The peculiar fruit of this rare species is known only from *Steyermark et al.*
105495. More collections in fruit will have to be found before we can have any confidence that this condition is typical for the species.

9. Tetrapterys mucronata Cavanilles, Diss. 9: 434, tab. 262. 1790.


Woody vine, rarely described as a shrub or small tree, the stems glabrous or thinly sericeous to glabrate. Lamina of the larger leaves 6–15 cm long, 3–8 cm wide, ovate or elliptical, cuneate or rounded at the base, slightly thickened and revolute at the margin, acuminate to obtuse at the apex, glabrous above, glabrous or very thinly sericeous to glabrate below, the reticulum prominulous on both sides, with 2 impressed glands below at the base and usually a row of few to many smaller glands distally between margin and midrib; petiole 5–14 mm long, glabrous or sparsely sericeous to glabrate, eglandular; stipules minute, interpetiolar, distinct. Inflorescence an axillary panicle 2–5 cm long, rarely simple, the branches terminating in umbels of 4–6 flowers, thinly sericeous to glabrate, the non-floriferous bracts inconspicuous, 5 mm long or less, the floriferous bracts 0.6–1.5 mm long, eglandular, narrowly triangular, the peduncle 1–6 mm long, the bracteoles like the bracts but 0.5–1 mm long, apical or subapical. Pedicel 5–10 mm long. Sepals appressed in anthesis, abaxially glabrous or thinly sericeous, adaxially glabrous, rounded, all eglandular or the lateral 4 biglandular, the glands circular, ca 2 mm in diameter, becoming prominently stalked and often auriculate in age. Petals yellow, often with reddish flecks, glabrous, entire or denticulate, the lateral 4 with the claw 1.5–3 mm long, the limb 4–6.5 mm long, 3.5–5 mm wide; posterior petal with a very thick claw 2.6–3 mm long, the limb 3.5–4.5 mm long, 3–4.5 mm wide. Filaments 1.5–3 mm long, longest opposite the anterior 3 sepals, shortest opposite the posterior petal, connate at the base, straight, glabrous; anthers 1–2.3 mm long, glabrous, the connective reddish. Ovary sparsely hirsute, with winglets already evident; styles 2.5–3.5 mm long, subequal or the anterior longer, straight, glabrous, slender and tapered distally, the apex with the small, discrete stigma internal or nearly terminal, dorsally rounded. Samara red to brown, glabrous or the nut sparsely sericeous, the upper lateral wings 10–20 mm long and 4–8 mm wide, the lower 5–11 mm long and 2.5–5 mm wide; dorsal wing 2–4 mm wide, coarsely dentate; nut usually bearing several aculeate outgrowths between dorsal and lateral wings.

Type. French Guiana. Herb. Stoupy (P).

Distribution. Brazil and Bolivia north to Panama and the lesser Antilles. Guayana collections: VENEZUELA. Bolivar: Tumeremo to Anaco, 61 km from Guayana frontier, elev 140–200 m, Gentry et al 10666 (MICH); along rocky cascades of Río Upata, W of Upata, elev 500 m, Steyermark 57556 (NY); between Las Nieves and Cerro Pichacho, elev 100–300 m, Steyermark 89274 (MICH); Salto Para, Río Caura, elev 230–280 m, Steyermark et al 113042 (MICH); Temblador, Medio Caura, elev 100 m, Ll. Williams 11605 (A, MICH, US, VEN); flood plain, E bank of Río Orinoco opposite head of Isla El Gallo, elev 100–200 m, Wurdack & Monachino 39986 (MICH, NY, VEN); Río Parguaza, between El Carmen and Raudal Maraca, elev 110–115 m, Wurdack & Monachino 41061-A
(MICH, NY, US, VEN); edges of savanna near Pilon, NE of mouth of Río Parguaza, elev 100 m, Wurdack & Monachino 41119 (MICH, NY, US, VEN); 1–4 km above Salto de Humito, Río Villacoa, elev 80–110 m, Wurdack & Monachino 41155 (MICH, NY, US, VEN); Río Suapure, 55–70 km from mouth, elev 110 m, Wurdack & Monachino 41275 (MICH, NY, US, VEN). Amazonas: Caño Asisa, Río Ventuari, Cowan & Wurdack 31532 (MICH, NY, US, VEN); San Fernando de Atabapo, Curran 95 (NY); Alto Río Atacavi, Foldats 3762 (VEN); Río Orinoco between mouth of Río Atabapo and mouth of Río Ventuari, elev 150 m, Level L-130 (MICH, NY, VEN); Río Cuao, elev 125 m, Maguire & Politi 28392 (MICH, NY, VEN), 28415 (MICH, NY, VEN), 28435 (MICH, NY, US, VEN); Camani, elev 200 m, Maguire 31791 (NY, VEN); Río Manapiare, Cerro Yutaje, Maguire & Maguire 35048 (MICH, NY, US, VEN); Río Yatua between mouth of Río Yaciba and Piedra Arauicaua, elev 100–140 m, Maguire et al 37406 (MICH, NY, US, VEN); Río Casiquiare just above Piedra Guanare, elev 100–130 m, Wurdack & Adderley 43176 (MICH, NY, US, VEN). BRAZIL. Amazônas: S. Gabriel da Cachoeira, Cordeiro 260 (IAN, MICH) & 370 (MICH); Río Cauaburi, vic. base of Cachoeira Caranguejo, Maguire et al 60100 (MG, NY); S. Gabriel da Cachoeira, Pires & Marinho 15682 & 15755 (MICH); S. Gabriel, Ribeiro [IAN 15319] (IAN); Río Dimití, Schultes & López 9928 (NY, US); São Gabriel da Cachoeira, Spruce 2394 (MG); Río Cauaburi between Cachoeira Manajos & C. Tomaz, N. T. Silva & Brazão 60980 (MG, MICH, NY, US). COLOMBIA. Vaupés: Río Macu, Allen 3022 (US); bocas del Carurú, elev 230 m, Cuatrecasas 7046 (US); Río Atabapo between San Fernando de Atabapo and Cocagual, elev 130 m, Maguire et al 36252 (COL, MICH, NY); Río Kananari, Schultes 12107 (GH, US), Schultes & Cabrera 13146 (US); Río Kubiyú, Mitú & vicinity, Zarucchi 2205 (MICH). Amazonas-Vaupés, Río Apaporis, all Schultes & Cabrera: Soratama, 12554 (GH, US); mouth of Río Pacoa, 12559 (GH, NY, US); Jinogójé, at mouth of Río Piraparana and vicinity, 16771 (GH, NY, US); Raudal Yayacopi (La Playa) and vicinity, 16960 (GH, NY, US).

Collected in flower and fruit in almost all months, but most commonly from January to March.

Cuatrecasas segregated Tetrapterys silvatica from T. mucronata principally on the basis of its sericeous pedicels and sepals and a tendency for the leaves to be obtuse rather than acuminate. In addition to his type, six of the above collections would fit his definition of T. silvatica: Cowan & Wurdack 31532, Level L-130, Maguire & Politi 28415, Maguire 31791, Maguire & Maguire 35048, and Zarucchi 2205. However, other collections from the same area (upper Orinoco, upper Río Negro, and Río Uaupés/Vaupés) are intermediate between the typically glabrous condition and the sericeous condition. These are Allen 3022, Cordeiro 260, Maguire et al 37406, Ribeiro s.n., and Schultes & López 9928. The lack of morphological discontinuity between these forms and their geographical sympathy make recognition of T. silvatica difficult and cast doubt on its biological significance, so I have reduced it to synonymy.

Several other collections are worth comment in lieu of formal taxonomic recognition. Two of these are Maguire et al 36252 and Wurdack & Adderley 43176; in both, the fruit wings are only 1–2 mm wide and less than 1 cm long. Also noteworthy are Gentry et al 10666 and Steyermark 57556, 89274, and 113042. In
these the hairs of the vegetative stems are borne on short pegs, which persist after the hairs fall and make the stem tuberculate.


Woody vine, the stems persistently velutinous. Lamina of the larger leaves 13–17.5 cm long, 6.5–12.5 cm wide, ovate, rounded or subcordate at the base, abruptly short-acuminate at the apex, tomentose to glabrate above, persistently velutinous below, with a row of small, impressed glands below parallel to but set in from the margin; petiole 13–15 mm long, eglandular, persistently velutinous; stipules connate in interpetiolar pairs, caducous, leaving a prominent scar extending completely across the node from petiole to petiole. Inflorescence a terminal and axillary panicle, the branches terminating in umbels of 4 flowers, velutinous, the non-floriferous bracts 7–20 mm long, thin, deciduous, the floriferous bracts ca 1.5 mm long, 1 mm wide, eglandular, the peduncle 3–4 mm long, the bracteoles like the bracts but shorter, apical. Pedicel 5–6 mm long, loosely sericeous. Anterior sepal eglandular, lateral 4 biglandular, the glands somewhat deciduous. Petals yellow, entire or slightly scalloped at the margin, the lateral 4 with the claw 1.5 mm long, the limb 4.5–5 mm long, 4–4.5 mm wide; posterior petal similar but the claw 2.2 mm long. Filaments ca 1.7 mm long, glabrous, straight, ca 1/2 connate; anthers ca 1.2 mm long, glabrous. Styles ca 1.7 mm long, subequal, glabrous, stout (the anterior slimmer), with the stigmas apparently internal and deciduous. Samara with the upper lateral wings 24–28 mm long and 7–9 mm wide, the lower 9 mm long and 4–5 mm wide; dorsal wing reduced to a minimal rib; nut smooth or bearing a few short rounded projections between dorsal rib and lateral wings. For more detail, see the protologue.

Type. Cuatrecasas 7462, San José del Guaviare, margen del Río Guaviare, Vaupés, Colombia, elev 240 m, Nov flr (holotype US! isotypes COL, F, NY!).

Paratype. Cuatrecasas 7501, Río Guayabero, Vaupés, Colombia, elev 240 m, Nov frt (US!).

This interesting and distinctive species is known only from the two collections cited.

11. Tetrapterys megalantha Anderson, sp nov

Liana lignosa, ramis vegetativis sparsim sericeis demum glabratis. Lamina foliiorum majorum 11–13 cm longa, 5–7 cm lata, elliptica, basi cuneata vel obtusa et subauriculata, apice abrupte brevi-acuminata, utrinque sparsim sericea mox glabrate, reticulo subtus prominulo, subtus basi 2 glandulis ellipticis 2–3 mm longis et in dimidio distali aliquot glandulis parvis in serie sub margine munita; petiolus 11–16 mm longus, sericeus vel glabatus, eglandulosus; stipulae in paribus interpetiolaribus connatae, pari triangulares, usque 7 mm longo, 6 mm lato, caduco. Inflorescentia cymosa vel paniculata, sericea, floribus in umbellis 4-floris, umbella subsessili (in pedunculo 0.5–1.5 mm longo portata), bracteis non-floriferis 10–20 mm longis, tenuis, bracteis floriferis ca 1.5 mm longis latisque, eglandulosis, pedunculo ca 5 mm longo, bracteolis 1–1.5 mm longis latisque, apicalibus, abaxialiter callosi. Pedicellus 8–10 mm longus, apice tumidus, sericeus mox glabatus. Sepala 2–3 mm lata, rotundata, utrinque glabra praeter marginem minute ciliatam,
Fig 55. *Tetrapteryx megalantha* and *T. aristeguietorum*. a–c, *T. megalantha*: a) Flowering branch and large leaf, ×0.5; b) flower, ×1.3; c) gynoecium (right, ×6) and style-tip (left, ×10). d–g, *T. aristeguietorum*: d) Flowering branch, ×0.5; e) underside of lamina, ×4; f) flower, ×4; g) samara, ×3.5. Drawn from the types by Karin Douthit.
per anthesin appressa, 4 lateralia biglandulifera, glandulis 3.5–6 mm longis, auriformibus. Petala lutea (practer unguem rubrum), glabra, erosa, 4 lateralia ungue 4–5 mm longo, limbo 11–12 mm longo, 10–12 mm lato, orbiculari; petalum posticum ungue 3.5–4 mm longo, crasso, limbo 7–8 mm longo, 6–7 mm lato, obovato. Filamenta 3 mm longa, glabra, recta, ca ½ connata; antherae 1.4–1.8 mm longae, glabrae, subaequales. Ovarium 2 mm altum, dense sericeum; styli ca 2.5 mm longi, subaequales, antico graciliore et paulo breviore, glabri, recti, stigmatibus ut videtur internis et decurrentibus. Fructus ignotus.

Type. Tillett & Tillett 45871, mixed-evergreen forest with indefinite fluvial forest along river, W bank, below Utschi mouth, Kamarang River, upper Mazaruni River basin, elev 550 m, Oct flr (holotype MICH, isotypes K, NY, US).

This species is known only from the type. It is notable for its large stipules, large glands at base of lamina, sessile or subsessile umbels, tumid pedicels, asymmetrical non-decurrent calyx glands, and very large lateral petals. Its closest relative is a species of southwestern Amazonia that has smaller flowers and un-inflated pedicels; representatives of that species are Klug 2636, San Martín, Peru (NY); Klug 3154, Loreto, Peru (NY, US); Schunke V. 7437, San Martín, Peru (MICH); El. Williams 6422, San Martín, Peru (NY); France 5215 & 7015, Rondônia, Brazil (MICH); and Bang 1531, Mapiri, Bolivia (MICH, NY). Probably also referable to that species is Ule 6348, Loreto, Peru, type (?) of T. discolor var andina Niedenzu, not seen. Most of these collections have been called Tetrapteryx peruviana Morton ex Macbride by Macbride or Cuatrecasas, but they do not compare well with Klug 3662 (US!), the type, from San Martín, Peru. It lacks large basal glands on the lamina and has symmetrical decurrent calyx glands and samaras without outgrowths between the lateral and dorsal wings. As far as I can determine, the collections cited (except Klug 3662) represent a natural species without a name. It will be described later as part of a revision of Tetrapteryx.


Woody vine, the stems sericeous to glabrate. Lamina of the larger leaves 9–14 cm long, 4–6.5 cm wide, elliptical, rounded or cuneate at the base, acuminate at the apex, thinly sericeous to very soon glabrate, usually bearing below several to many impressed circular glands 0.2–0.4 mm in diameter in a row about midway between midrib and margin, with no glands at very base of lamina; petiole 7–12 mm long, sericeous to glabrate, eglandular; stipules connate in interpetiolar pairs, the pair triangular, 2–2.5 mm long, 1–1.5 mm wide, persistent or, usually, deciduous, the scar stretched to 2.5 mm wide at older nodes. Inflorescence sericeous to glabrate, cymose-paniculate, the branches terminating in umbels of 4 flowers, the umbel raised on a peduncle 3–6 mm long, the non-floriferous bracts 4–12 mm long, often deciduous in fruit, the floriferous bracts 0.8–1.5 mm long and 0.7–1 mm wide, the peduncle 2.5–6 mm long, the bracteoles 0.5–1.3 mm long and wide, eglandular or abaxially callose, apical. Pedicel 2–4 mm long, loosely sericeous to glabrate. Sepals ca 1.5 mm wide, rounded, glabrous or ciliolate on the margin, appressed in anthesis, the lateral 4 biglandular, the glands 2–4 mm long, elliptical...
or obovate. Petals yellow, glabrous, entire, obovate and slightly sagittate at the base, the lateral 4 reflexed, the claw 1.2–1.6 mm long, the limb 3.7–4.5 mm long, 2.7–3.5 mm wide; posterior petal erect, the claw 2 mm long, thick, the limb 3–4 mm long, 2.8–3.2 mm wide. Filaments ca 2 mm long, glabrous, straight, ca ½ connate; anthers 1.1–1.4 mm long, sparsely sericeous especially at base of locules, alike. Ovary 1.5 mm high, sericeous; styles ca 2 mm long, the anterior slenderer, glabrous, straight or eventually recurved, the stigmas apparently internal and decurrent. Samara appressed-tomentose, the upper lateral wings 12–18 mm long and 4–8 mm wide, the lower lateral wings 4–9 mm long and 3–4 mm wide; central dorsal wing 2–3 mm wide, entire; nut bearing several narrow winglets or aculeate outgrowths on each side between dorsal and lateral wings.

Type. Essequibo, British Guiana [Guyana], Meyer 101 (GOET?).

Distribution. Along rivers from Bolivia and Amazonian Brazil to Guatemala and the West Indies, according to Niedenzu. Collections from Guayana and nearby: GUYANA. Essequibo, Rob. Schomburgk I 197 (US); Kamarang River, Upper Mazaruni River Basin, elev 480 m, Tillett & Tillett 45689 (K, MICH, NY, US). VENEZUELA. Bolívar: Marivaca, 17 km S de Los Castillo, Bernardi 7888 (VEN); Rio Merevari, elev 620 m, Cardona 355 (US); Rio Karum, Paragua, Cardona 1186 (VEN); Río Uronán, afl. del Ikabarú, Caroni, elev 435 m, Cardona 1697 (NY, US, VEN); Guayapo, Bajo Caura, elev 100 m, Ll. Williams 11862 (US, VEN); Río Aro 6–14 km below mouth of Caño Azul, Hato La Vergareña, 6°45′N, 63°30′W, elev 390 m, Wurdack 227 (MICH, NY, US, VEN); Cerro Bolívar, RR right-of-way sections 42–52, elev 500 m, Wurdack 34380 (MICH, NY, US, VEN); Rio Suapure, between Raudal Amajero and Raudal Budare (55–70 km from river mouth), elev 110 m, Wurdack & Monachino 41280 (MICH, NY, US, VEN). BRAZIL. Terr. Roraima: Igarapé Agua Boa, Rio Mucajaí between Pratinha and Rio Apiáu, Prance et al 4047 (MICH); Rio Auaris, near Auaris, elev 760 m, 4°3′N, 64°22′W, Prance et al 9767 (MICH, NY).

Collected in flower and fruit from October to April.


Wooly vine, the stems sericeous to soon glabrate. Lamina of the larger leaves (11–)13–20 cm long, (5–)6–10.5 cm wide, elliptical or slightly ovate or obovate, cuneate to rounded, rarely subcordate, at the base, short-acuminate at the apex, sericeous to glabrate, with some hairs often persisting below especially on the midrib, bearing a row of tiny (ca 0.2 mm in diameter) circular impressed glands below set in from the margin, and with the tertiary veins strongly parallel; petiole (12–)14–20(–27) mm long, sericeous to glabrate, eglandular; stipules connate in interpetiolar pairs, the pair triangular, caducous, leaving a scar 2.5–4 mm wide, stretched to 5.5 mm wide at older nodes. Inflorescence sericeous to glabrate, paniculate, the branches terminating in umbels of 4 flowers, the umbel raised on a peduncle 3–6 mm long, the thin non-floriferous bracts 8–12 mm long, short-petiolate, suborbicular, subcordate, the floriferous bracts 1–1.5 mm long, the peduncle 3–7.5 mm long, the bracteoles 1 mm long and wide, eglandular or abaxially callose, nearly or quite apical. Pedicel 5–10 mm long, sericeous to glabrate. Sepals 1.5–2 mm wide, rounded, glabrous except for the ciliolate margin, appressed in anthesis, the lateral 4 biglandular, the glands 2.5–4 mm long, elliptical
or obovate, often decurrent. Petals yellow, glabrous, entire or sinuate, the lateral 4 with the claw 1.5 mm long, the limb 4.5–5.5 mm long, 4–4.5 mm wide; posterior petal similar, the claw up to 2 mm long and thicker. Filaments 1.5–2 mm long, glabrous, straight, ca ½ connate; anthers 1.2–1.5 mm long, glabrous. Ovary 1.5 mm high, sericeous; styles ca 2 mm long, the anterior slenderer, glabrous, straight, the stigmas apparently internal and decurrent. Samara sericeous to glabrate, the upper lateral wings 22–35 mm long and 9–13 mm wide, the lower lateral wings 11–15(–20) mm long and 6–10 mm wide; dorsal wing up to 3–6 mm wide, entire or lobed; nut smooth between dorsal and lateral wings.

Type. Richard, Kourou River, French Guiana (P).


It seems likely that several species have been confused under this name. However, I cannot revise the group here, as it is mostly extra-Guayanan. The description given above is based only on the collections cited.

The photograph of the type distributed by Field Museum (negative 35597) shows two specimens posed together. The specimen on the left fits the original description perfectly and is very probably the type. The right-hand third of the photo, including the samaras, is a specimen of Tetrapterys mucronata. There is no reason to believe that Jussieu confused these species or based T. crispa on both of these collections. The error was probably the fault of whoever posed the two specimens for the photograph, presumably Francis Macbrie.


Woody vine (or small trees?). Leaves opposite, densely and persistently sericeous below, the stipules minute or absent. Inflorescence paniculate, rarely simple, the flowers ultimately borne in pseudoracemes. Sepals abaxially sericeous, adaxially glabrous, the anterior sepal eglandular, the 4 lateral sepals each bearing a single, very large, circular or elliptical, radially lineate gland. Petals yellow, glabrous. Receptacle glabrous. Stamens 10, the anthers alike. Ovary of 3 free carpels, 1 anterior and 2 posterior, all fertile, borne on a short pyramidal torus; styles 3, stout, with large internal stigmas. Fruit schizocarpic, comprising 3 (or less by abortion) 1-seeded samaras, each samara bearing a relatively short, flabellate or trapezoidal dorsal wing and 2 much longer, narrow, forward-pointing lateral wings 3 or more times as long as wide (except L. splendens, which has a very short dorsal crest and the lateral wings reduced to ridges or lost).

Type. Lophopterys splendens Adr. Jussieu.
At present this genus comprises only three described species, all from the wet lowlands from Delta Amacuro of Venezuela to French Guiana. In the near future I shall publish elsewhere a synopsis of the genus, with several new species from inland Amazonia. The only species that even approaches the Guyana Highland as defined here is the one treated below, and it is included only for the sake of floristic completeness.

**Lophopterys euryptera** Sandwith, Kew Bull. 1951: 34. 1951.


Woody liana to 35 m long; younger branches densely sericeous. Lamina of the larger leaves 16–35 cm long, 10–23 cm wide, obovate, truncate or short-attenuate and often unequal at the base, plane at the margin, very broadly truncate and often apiculate at the apex, eglandular, loosely sericeous to glabrate above, persistently silvery-sericeous below with very tightly appressed hairs, the lateral veins parallel and prominent below, interconnected by prominulous parallel veinlets; petiole 2–6 cm long, sericeous, eglandular; stipules apparently absent. Inflorescence tightly to loosely sericeous, 10–30 cm long, terminal or axillary, a simple or ternate panicle, the flowers borne in mostly decussate pseudoracemes 5–15 cm long of 10–50 flowers each; bracts and bracteoles persistent, even after fall of the fruits and pedicels, triangular, abaxially sericeous to glabrate, adaxially glabrous, the bracts 2–3 mm long, the bracteoles 1.5–2.5 mm long; peduncle none or up to 1 mm long in fruit, obscure. Pedicel 3–8 mm long, 2–2.5 mm in diameter at the apex, sericeous. Sepals triangular, 3–3.5 mm long, 2.5–3 mm wide, acute or obtuse at the apex, strongly appressed after anthesis, the glands 2–3 mm in diameter, one of the sepals adjacent to the anterior sepal also eglandular in some flowers. Petals strongly dimorphic, the 4 lateral petals reflexed between the sepals, ca 10 mm long, 7–9 mm wide, the concave limb decurrent and weakly differentiated from the claw, erose and eglandular at the margin; posterior petal with an erect claw 3 mm long, constricted at the apex, the rectangular limb ca 3.5 mm long and wide, flat and reflexed, fimbriate, the proximal fimbriae broadly glandular, the distal fimbriae finer and decreasingly glandular to eglandular. Stamens with the filaments ca 2.5 mm long, connate for the proximal 0.5–1 mm, glabrous; anthers ca 1.6 mm long, glabrous, reflexed, the locules parallel, linear, membranous along the inner edges, the connective unenlarged. Ovary 1.5 mm high, sericeous, each carpel bearing 3 longitudinal ridges; styles basally sericeous, glabrous beyond the ovary, unequal, the anterior 1 ca 2 mm long beyond the ovary, straight or very slightly reflexed at the apex, the 2 posterior styles 2.5–3 mm long beyond the ovary, strongly reflexed distally, all with the stigmas much wider than high (ca 0.6–0.8 mm wide, 0.2–0.3 mm high) and dorsally truncate or apiculate. Samara with the nut spheroid, ca 9–11 mm in diameter, sericeous, the hairs white and quite persistent; lateral wings 4.5–6.2 cm long, 1–1.7 cm wide, linear, sericeous to glabrate; dorsal wing trapezoidal-flabellate, encircling much of the nut and widest toward base of nut, 1.2–1.9 cm high, 1.9–2.5 cm long, sericeous.

Type. Richard Schomburgk 1536, Barama River, Guyana (K).

Distribution. Southeastern Venezuela and northwestern Guyana. VENEZUE-
Fig 56. *Lophopterys eurytera*. a) Leaf and inflorescence, ×0.5; b) flower, ×2.5; c) stamens, ×10; d) gynoecium, the middle style anterior, ×7.5; e) samara, ×0.5. Drawn by Karin Douthit, a–d from Breteler 3752, e from Maguire et al 46977.

GUYANA. Barima River, Mar flr, *Jenman 6994* (NY).

In his discussion following the original description of this species, Sandwith gives a brief summary (p. 36) of the characters that distinguish it from *Lophopterys surinamensis* (Kostermans) Sandwith. Through the kindness of the authorities at Utrecht I have been able to borrow *Stahel 223*, the type and only known collection of *L. surinamensis*. After comparison of it with the cited specimens of *L. euryptera* I agree with Sandwith that they are distinct species. The lateral wing of the fruit is not consistently wider in *L. euryptera*, but in compensation several other characters support the separation. The most useful distinctions are summarized in the following couplet:

1. Bracts and bracteoles persistent, even after fall of the fruits and pedicels; lamina of the larger leaves 16–35 cm long, 10–23 cm wide, silvery-sericeous below with very tightly appressed hairs; petiole 2–6 cm long; inflorescence tightly to loosely sericeous; nut of the samara sericeous, the hairs white and quite persistent. *L. euryptera.*

1. Bracts and bracteoles deciduous with the fruits and pedicels or before; lamina of the leaves 15–20 cm long, 8–10 cm wide, golden-sericeous below with somewhat looser hairs; petiole ca 1.5 cm long; inflorescence velutinous or pressed-velutinous; nut of the samara velutinosus, the hairs brown and readily abraded. *L. surinamensis.*


Trees or shrubs; leaves decussate, usually bearing impressed glands below in the lamina, the stipules small, free from each other, borne on the base of the petiole. Inflorescence an axillary pseudoraceme, simple or rarely ternate, without vegetative leaves, or in a few species terminating a short lateral branch with a pair of vegetative leaves; bracts and bracteoles persistent, the bracts eglandular, 1 or both bracteoles usually bearing 1–2 abaxial glands. Calyx bearing 8–10 long, decurrent glands. Petals yellow or whitish, glabrous, the lateral 4 recurved, the posterior erect. Stamens 10, glabrous, all fertile, the anthers ± alike; pollen polyporate. Receptacle glabrous on both sides of the stamens. Ovary of 2–3 quite connate carpels, the locules 2–3, each fertile; styles free or partially to completely connate, stout, the large terminal stigmas subpetalate or apparently capitate. Fruit an edible drupe with 2–3 1-seeded pyrenes (or 1 due to abortion) in a common fleshy exocarp, yellow, orange, or red at maturity, the pyrenes elongated, round or elliptical in cross section, free from each other at maturity, with a smooth, brittle, cartilaginous wall.

Type. *Bunchosia odorata* (Jacquin) Humboldt, Bonpland & Kunth.

*Bunchosia* is a genus of about 55 species, ranging from Mexico and the West Indies to Paraguay and southern Brazil. The edible fruits of various species are called “ciruela,” “ciruela de fraile,” and “ciruela de montaña” in Venezuela and Colombia and “marmelo” in Brazil.
Key to the Species of *Bunchosia* in Guayana

1. Inflorescence terminating a short lateral branch bearing a pair of sterile vegetative leaves; leaves persistently velutinous or tomentose below, the hairs with a basally stellate stalk; ovary nearly or quite glabrous, 2–3-carpellate.

   1. B. mollis.

1. Inflorescence axillary, with small bracts only, every bract subtending 1 uniflorous peduncle (or sometimes 2 in *B. glandulifera*); leaves glabrate or sparsely to densely sericeous, the hairs sessile or subsessile, the stalk (if developed) without basal projections; ovary sericeous, 2-carpellate.

2. Styles free.

   3. Leaves persistently very densely silvery- or golden-sericeous below, the lamina completely concealed by the hairs; styles 1.5 mm long; connective brown to red.

   2. B. argentea.

   3. Leaves sparsely sericeous to apparently glabrate; styles 2–2.5 mm long; connective dark red, purplish, or black.

   3. B. armeniaca.

2. Styles connate, the stigmas free or connate.

4. Leaves thinly but persistently sericeous below, undulate and crispate at the margin; pseudoracemes bearing 10–20 flowers, often 2 in the axil of 1 bract; peduncle 2.5–5 mm long; style sericeous; dried fruit 20–28 mm long, 15–20 mm in diameter, the wall smooth.

4. B. glandulifera.

4. Leaves nearly or quite glabrate, plane or slightly revolute at the margin, entire or slightly indented near glands; pseudoracemes usually bearing 20–40 flowers, 1 per bract; peduncle 1–2 mm long; style glabrous; dried fruit up to 15 mm long, 15 mm in diameter, the wall granulate.

5. B. decussiflora.


Shrubs or small trees 1.5–4 m tall (occasionally described as a woody climber); stems velutinous to glabrate. Lamina of the larger leaves 6–17 cm long, 3–12 cm wide, elliptical, ovate, or rhomboid, cuneate to rounded at the base, obtuse or short-acuminate at the apex, usually bearing 2 glands near the base and several distally in a submarginal row, velutinous to glabrate above, persistently velutinous or tomentose below, the hairs T-shaped or Y-shaped, with a basally stellate stalk, much less dense on larger, more expanded leaves than on smaller leaves; petiole 3–4(–6) mm long, velutinous, eglandular; stipules 0.5–1.5 mm long, borne on the base of the petiole. Inflorescence terminating a lateral shoot with a pair of vegetative leaves, 4–11 cm long beyond the leaves, velutinous, the 10–30 flowers decussate or distally in no regular order; bracts 1.5–3(–5) mm long; peduncle 0.5–3 mm long (–6 mm in fruit); bracteoles apical or subapical, 1–1.5 mm long, 1 bearing an abaxial gland. Pedicel (2.5–)4–10 mm long, velutinous or eventually glabrate. Sepals 1.5 mm long beyond the glands, 2 mm wide, rounded, sparsely to densely hispid abaxially, the glands 8–9, 2.5–3.5 mm long, free at the apex. Petals yellow, the laterals with the claw 3–4 mm long, the limb 6–9 mm long, 6–10 mm wide, concave to flat, eglandular-dentate or the posterior pair with a few small glands proximally, the posterior petal with a thick claw 3–4.5 mm long, constricted at the apex, the limb 5.5–7 mm long, 5–8 mm wide, flat or crumpled, bearing marginal glands on the proximal half. Filaments 2–3.5 mm long, up to ½ connate; anthers 1–1.5 mm long, the connective light brown, swol-
len at the apex with the swelling retrose, the locules long-pendulous at the base. Ovary 1.5 mm high, ovoid or globose, 2–3-carpellate, glabrous or bearing a very few hairs; styles 2 or 3, (2–)2.5–3 mm long, free or up to ½ connate, glabrous, the stigmas reniform-peltate. Fruit orange to red, 6–11 mm in diameter (dried), globose, glabrous, the wall granulate.

Type. Robert Schomburgk I 742, Pirarara, British Guiana [Guyana] (holotype K, isotypes GH! NY!).

Distribution. Eastern Venezuela and adjacent Guyana and Brazil. Collections from near Guayana: VENEZUELA. Bolivar: Pto. Ordaz-San Félix, Aristeguieta 5324 & 5329 (VEN); Upata-San Félix, Blanco 115 & 223 (VEN); Ciudad Bolivar, elev 35 m, Holt & Gehriger 86 (US); 40 km S of Tumeremo, 29 km N of El Dorado, elev 220 m, Steyermark 86575 (NY, VEN); forest near Río Caroní, Parque Caroni, near Puerto Ordaz, elev 20 m, Steyermark 94252 (VEN); Upata, Trujillo 2424 (MY); El Palmar, elev 100 m, Williams 12876 (F, VEN); Caicara, elev 90 m, Williams 13248 (US, VEN); Upata, elev 100 m, Williams 13471 (F, VEN). GUYANA. Types of B. mollis and B. schomburgkiana, q v; savanna between Takutu River and Kanuku Mountains, Smith 3212 (NY). BRAZIL. Terr. Roraima: 3 km de Bôa Vista, Black 51–12705 (IAN); beira do Río Branco, perto de Bôa Vista, Black & Magalhães 51–12989 (IAN); Bôa Vista, Ducké [IAN 43426] (IAN); Porto Alegre, Río Amajary, Fröes 23070 (IAN); próximo à boca do Igarapé Igapirapá, afl. do R. Surumú, Pires et al 14631 (IAN, RB); 20 km N of Bôa Vista, Prance et al 9546 (MICH, NY).

Collected in flower and fruit mostly from February to August.


Trees 4–15 m tall; stems persistently sericeous, the older woody stems glabrate. Lamina of the larger leaves (10–)13–18 cm long, (5–)7–9.5 cm wide, elliptical, cuneate or truncate at the base, abruptly acuminate at the apex, bearing 2 large glands near the base and sometimes several small submarginal glands near the apex, glabrate above, densely and persistently silvery- or golden-sericeous below, completely covered by the short, straight, sessile hairs; petiole (7–)9–13 mm long, sericeous, eglandular; stipules ca 0.5 mm long, borne on the base of the petiole. Inflorescence 7–11 cm long, without vegetative leaves, sericeous, the 15–35(–50) flowers proximally decussate, distally mostly in no regular order; bracts 1–2.5 mm long, triangular; peduncle 1–3 mm long (–5 mm in fruit); bracteoles apical, 1 mm long, 1 or both bearing an abaxial gland or subtended by a gland on the peduncle. Pedicel 3–7 mm long, loosely sericeous. Sepals 1–1.5 mm long beyond the glands, 1–1.5 mm wide, rounded, ciliate on the margin and otherwise glabrous, the glands 8–9, 2–3.5 mm long. Petals yellow, eglandular or the posterior and some laterals glandular-dentate proximally. Filaments 2–2.5 mm long, ca ½ connate; anthers 1–1.5 mm long, the connective brown to red, glandular, broad and flat, the locules somewhat pendulous at base. Ovary 1.5 mm high, ovoid, bicarpellate, very densely sericeous; styles 2, free, 1.5 mm long, glabrous except at very base, the stigmas capitate. Fruit 15–25 mm long, 15–20 mm in diameter, ovoid, orange to red-orange, ± persistently sericeous.

Type. Jacquin, Caracas, Venezuela.
Distribution. Venezuela and Colombia. The only Guayana collection seen is the following: VENEZUELA. Bolivar: selva siempre verde al lado Rio Nichare (afluente de Río Caura), 6°15′N, 65°5′W, elev 200–250 m, 25 Apr flr, Steyermark & Gibson 95727 (NY, VEN).

It is surprising to find this northern species in Bolivar, but I have no reason to doubt the identification, except that the petals of the Guayana collection were glandular-dentate, versus eglandular in the northern collections. The description given above is based on the collection cited, plus others from northern Venezuela. Steyermark and Gibson described their plant as “vining,” but it is more likely to have been a tree.


Malpighia armeniaca Cavanilles, Diss. 8: 410, tab. 238. 1789.

Trees 5–12 m tall; stems persistently sericeous, the older woody stems glabrate. Lamina of the larger leaves 11–21 cm long, 6–10 cm wide, elliptical or ovate, cuneate or truncate at the base, thin and slightly revolute at the margin, acuminate at the apex, bearing (1–)2 large glands near the base and often several smaller glands distally near the margin, sparsely sericeous to nearly glabrate (some hairs usually persistent, especially below), the hairs short, straight, sessile, the reticulum prominent on both sides; petiole 10–13 mm long, persistently sericeous, eglandular; stipules 0.5–2 mm long, borne on the base of the petiole. Inflorescence 6–16 cm long, without vegetative leaves, sericeous or eventually glabrescent, the 20–50 flowers proximally decussate but distally inserted in no regular order; bracts 1–2 mm long, triangular; peduncle 2–4 mm long; bracteoles apical, ca 1 mm long, 1 bearing an abaxial gland or subtended by a gland on the peduncle. Pedicel 3–8 mm long, sericeous to glabrate. Sepals 1–2.5 mm long beyond the glands, 1.5–2 mm wide, rounded, ciliate on the margin and otherwise glabrous, the glands 8–10, 3–4 mm long, free or some partly connate in pairs, pilose to glabrate. Petals yellow, the claw 2–3(–3.5) mm long, the limb 4–6 mm long, 3–6 mm wide, the outermost deeply concave and eglandular, the posterior flat and glandular-dentate all around the limb or eglandular at the very apex, the other 3 intermediate, flat or slightly concave, eglandular to glandular-dentate all around. Filaments 2.5–3 mm long, up to ½ connate; anthers 1–1.4 mm long, the connective dark red to almost black, glandular, semiglobose, the locules somewhat pendulous at base. Ovary 1.5 mm high, ovoid, bicarpellate, very densely sericeous; styles 2, free, 2–2.5 mm long, glabrous or proximally sericeous, the stigmas peltate. Immature fruit 1 cm long and 1 cm in diameter, densely and persistently golden-sericeous; mature drupe “subsericea ovoidea 2½ cm longa 2 cm diametro” (Niedenzu, 1928).

Type. Dombey, Chanca, Peru (MA?).


The identification of this material as Bunchosia armeniaca is based on its
agreement in most respects with the descriptions of Niedenzu (1928) and Cuatrecasas (1958). The description is based entirely on the collections cited, except where noted.


Malpighia glandulifera Jacquin, Collect. 4: 207. 1790 [1791] & 5: tab. 5, fig. 3. 1796 [1797].

Shrubs or small trees 2–8 m tall; stems loosely sericeous to glabrate. Lamina of the larger leaves 11–18 cm long, 7–10(–12) cm wide, elliptical or ovate, rounded and often slightly attenuate at the base, undulate and crenate at the margin, acuminate and often cuspidate at the apex, bearing 0–2 glands near the base by the midrib and several distally in 1–3 rows, sparsely sericeous to glabrate above, persistently sericeous below, the hairs short, straight, sessile or subsessile, abundant but not so dense as to completely conceal the lamina; petiole 6–8 mm long, sericeous to glabrate, eglandular; stipules 1–1.5 mm long, borne on the base of the petiole. Inflorescence 5–11 cm long, without vegetative leaves, loosely sericeous to glabrate, the flowers 10–20, often paired (1 above the other) in the axil of the same bract; bracts decussate ± the whole length of the inflorescence, 2–3 mm long; peduncle 2.5–5 mm long; bracteoles apical, 1–1.5 mm long, 1 bearing an often cylindrical abaxial gland. Pedicel 2–4.5 mm long (<6 mm in fruit), sericeous to glabrate. Sepals 1.5–2 mm long and wide beyond the glands, rounded, ciliate on the margin and abaxially thinly sericeous, the glands 10, 4–6.5 mm long, free and recurved at the apex, some partly connate in pairs with glands from adjacent sepals. Petals yellow, the lateral 4 with the claw 2–2.5 mm long, the limb 5–7(–8) mm long and wide, larger and more concave in the anterior pair, eglandular-dentate, the posterior petal with the claw 2.5–3 mm long, the limb 4–5 mm long and wide, flat, glandular-dentate, at least proximally. Filaments 2.5–3.5 mm long, up to ½ connate; anthers 1–1.8 mm long, the connective yellow or light brown, the locules pendulous at base. Ovary 2–2.5 mm high, ovoid, bicarpellate, sericeous; style (formed by 2 connate) 3–3.5 mm long, sericeous, the stigmas nearly free, reniform-peltate. Fruit orange to red, 20–28 mm long, 15–20 mm in diameter, globose or ellipsoid, very sparsely sericeous to glabrate, the wall smooth.

Type. Jacquin, "In sylvis ad Caracas," Venezuela.

Distribution. West Indies and northern South America; widely cultivated in Brazil and elsewhere for the edible fruits. Guayana collections: VENEZUELA. Amazonas: border of forest, Pimichin, ele 100 m, Steyermark & Bunting 102850 (NY, VEN). BRAZIL. Amazônas: upper Rio Negro, Weiss & Schmidt I (NY). COLOMBIA. Vaupés: Raudal Macucú, Rio Vaupés, Romero Castañeda 3483 (COL); entre Yútica y Ñandú, Rio Vaupés, Romero Castañeda 3567 (COL); Mitú and vicinity, cultivated, Zarucchi 1655 & 2172 (MICH), Zarucchi et al 1124 (MICH).

Collected in flower and fruit in diverse months, most often in flower from September to December.

This species has been widely distributed through cultivation, probably formerly by the indigenous peoples as well as more recently by Europeans. I do not know
where it originated, but some of the collections from Amazonian Colombia cited by Cuatrecasas (1958) make no mention of its being a cultivated plant, so perhaps it is native there.

5. **Bunchosia decussiflora** Anderson, sp nov

Fig 57.

Arbor 5–20 m alta vel frutex, ramis vegetatvis sericeis et complanatis mox glabratis et teretibus. Lamina foliorum majorum 14–17.5 cm longa, 4.5–7.5 cm lata, elliptica vel paulo ovata obovatave, saepe parum falcata, basi cuneata, margine plana vel paulo revoluta, integra vel prope glandulas parum indentata, apice acuminata, matura glabra, subitus prope basin 2 glandulis grandibus et distaliter sub margine aliquot glandulis minoribus instructa; petiolum 8–15 mm longus, sericeus vel glabrus, eglandulosus; stipulae epipetiolares, triangulares, 0.5–1.5 mm longae. Inflorescentia 8–15 cm longa, sine foliis vegetatvis, sericea demum glabra, 20–40 floribus decussatis, bracteis 1–2 mm longis, triangularibus, basi callosis, pedunculo 1–2 mm longo, apice bibracteolato, bracteolis 1–1.5 mm longis, ovatis, 1 (interdum ambabus) glandula abaxialis excentrica instructa. Pedicelli 4–7 mm longus, sericeus vel glabrus. Sepala glandulas 1–2.5 mm superantia, 1.3–2 mm lata, triangulare vel rotundata, margine ciliata aliter utrinque glabra, glandulis 8, 2.5–3 mm longis, obovatis, compressis sed distinctis, glabris. Petala flava, extimum ungue 1.5 mm longo, limbo 5 mm longo, 6 mm lato, profunde concavo, dentato et eglanduloso, cetera 3 lateralia ungue 1.5–2 mm longo, limbo 3.5–4.5 mm longo, 2.5–3.5 mm lato, plano vel parum concavo, erosa vel margine aliquot glandulis instructo, posticum ungue 2 mm longo, limbo 4 mm longo, 2.5 mm lato, plano, margine toto circuitu glanduloso-dentato vel apice eglanduloso. Filamenta 1.5–2.5 mm longa, usque ½ connata; antherae 0.8–1.3 mm longae, connectivo semigloboso, brunneo vel rubello, loculis basi pendentibus. Ovarium 1.5 mm altum, globosum, bicarpellatum, sericeum; stylus (ex 2 stylis connatis) 1.5 mm longus, glaber, stigmate bilobo. Fructus aurantiacus vel rubellus, siccus 9–15 mm longus, 9–15 mm diametror, granulatus.


The Brazilian collections cited were described as trees 5–20 m tall, while Croizat described his Venezuelan collections as a coarse, clambering shrub (356) or a vine (809), probably actually a weak shrub.

*Bunchosia decussiflora* is similar to the Peruvian plants that Niedenzu called *Bunchosia hookeriana* (he apparently did not see the type, a Mathews collection in Herb. Hooker, nor have I). I have studied the specimens cited by Niedenzu
Fig 57. *Bunchosia decussiflora.* a) Flowering branch; b) flower; c) stamens; d) gynoecium; e) fruit. Drawn by Melissa Marshall, a–d from *Silva & Brazão 60612*, e from *Silva & Brazão 60764*.

(Spruce 4542, GH, and *Ule 6532*, MG, both from Tarapoto), as well as others from Amazonian Peru that are probably the same species (*Klug 2759* and 3770, both GH, and *Tina et al 2438*, US). *Bunchosia decussiflora* differs from the Peruvian material in having the flowers strictly decussate; in *B. hookeriana* the initially decussate arrangement soon breaks down to an irregular grouping of flowers. In addition, *B. decussiflora* has longer inflorescences with more flowers than does *B. hookeriana*, and its connectives are lighter in color.

Woody vines. Leaves with small interpetiolar stipules. Inflorescence a compound panicle, the flowers ultimately borne in short pseudoracemes with decussate bracts, each bract subtending a 1-flowered peduncle with apical bracteoles. Sepals abaxially sericeous, adaxially glabrous, pressed in against the androecium after anthesis, the anterior sepal eglandular, the 4 lateral sepals biglandular. Petals yellow, abaxially densely sericeous, adaxially glabrous or tomentose. Stamens 10, the anthers ± alike; pollen polyporate. Ovary densely veluminous or sericeous, formed from 3 connate carpels, the 2 posterior locules full-sized and fertile, the anterior carpel rudimentary and empty; 2(–3) styles free, straight and stout, glabrous, obliquely truncate or short-hooked at the apex and with large internal stigmas. Fruit composed of a dry, hard, indehiscent, nut-like structure with a thick, fibrous wall, containing 1–2 seeds, most often only 1, subtended by 5 dry wings formed by enlargement of the sepals; seeds large, containing a small embryo and abundant perisperm.


*Dicella* is a genus of six species, four of which occur in Amazônia. One of those is included in this treatment because it occurs on the middle Rio Negro, the lower slopes of the Serra da Neblina, and Rio Apaporis.


Liana climbing to 30 m, the younger stems and inflorescence golden- or brownish-sericeous. Leaves with the petiole 1.3–2.4 cm long, sericeous, eglandular or bearing 2 small glands above middle on adaxial edges; lamina 10–16 cm long, 5–9 cm wide, elliptic, acute or rounded at the base, abruptly narrowed to an acuminate apex, with the reticulum prominent below and usually prominent above, eglandular or bearing several minute marginal glands, persistently sericeous below, glabrate above. Bracts (4–)5–7 mm long, 3–5 mm wide, elliptic, acute or obtuse at the apex, usually revolute, eglandular, abaxially sericeous, adaxially glabrous except pilose at the apex; peduncle 5–7 mm long, sericeous; bracteoles 3–5 mm long, 2–4 mm wide, obovate or orbicular and broadly rounded at the apex, otherwise like the bracts; bracts and bracteoles deciduous in fruit. Pedicel 5–7 mm long in flower, up to 20 mm long in fruit, sericeous. Sepals 2 mm wide, obtuse or rounded at the apex, exceeding the glands by 2 mm, the glands 2.5–4 mm long. Petals with the abaxial hairs finer and whiter on the limb than on the claw, adaxially glabrous; 4 lateral petals with the claw 1.5–2 mm long, the limb 7–9 mm long, 5–6.5 mm wide, obovate or orbicular, truncate or subauriculate at the base, erose or denticulate at the margin, the anterior pair larger than the posterior pair; posterior petal with a stout claw 3.5–4.5 mm long, the limb 4–6 mm long, 3–5 mm wide, broadly elliptic, cuneate at the base, with marginal glands on the proximal half of the limb. Stamens with the filaments 2–2.5 mm long, connate for 1.5 mm or more, abaxially sericeous, adaxially glabrous; anthers 1.5–2.5 mm long, strongly reflexed after anthesis, the 2 opposite the anterior petals
Fig 58. *Dicella julianii*. a) Flowering branch, ×0.5 (circles ×2.5); b) decussate flower buds, ×2; c) flower, ×2.5; d) androecium, ×5; e) stamens, ×7.5; f) gynoecium, viewed from behind (left) and in front (right), ×7.5; g) fruit, ×0.5. Drawn by Karin Douthit, a–f from Klug 347, g from Fröes 23797.
smaller than the others; locules 1–1.7 mm long, pendulous up to 0.5 mm below insertion of the filament, tapered distally, densely pilose-sericeous; connective dark red, cylindrical or slightly swollen distally, elongated and exceeding the locules by up to 1 mm. Ovary 2 mm high, sericeous, only the 2 posterior locules developed and fertile; styles 2, 2 mm long, the stigmas twisted toward the posterior petal; anterior style often present as a short, slender rudiment between the other 2 and opposite the anterior sepal. Fruit with the nut spherical, 1.3–1.8 cm in diameter, sericeous to glabrate; wings formed by enlargement of the sepals 2–5.5 cm long, 0.7–2 cm wide, narrowly elliptic or obovate, unequal, the posterior-lateral pair longest, the anterior-lateral pair intermediate, and the anterior (eglandular) one smallest.

Type. Klug 347, Mishuyacu, near Iquitos, Loreto, Peru, Oct–Nov flr (holotype US! isotype NY!).


For citation of other specimens seen, as well as notes to use in distinguishing this species from its closest relatives, D. conwayi and D. macroptera, see the Acta Amazônica paper where the combination was published.

Acknowledgments

I salute Bassett Maguire for his vision and persistence in the exploration of Guayana and the subsequent publication of this series of papers on one of the world’s most remarkable floras. My own travels in South America have been made possible, in large part, by grants GB-37314 and GF-42557 from the National Science Foundation to The New York Botanical Garden. Preparation of many of the plates was made possible by a Faculty Research Grant from the Rackham School of Graduate Studies of the University of Michigan. Julian Steyermark has helped in several problems concerning rare species, and I have made much good use of José Cuatrecasas’ Prima Flora Colombiana, although all descriptions given here are entirely mine, based on original observations and measurements except where noted otherwise. Bronwen Gates kindly allowed me to use her unpublished monograph of Banisteriopsis and Diplopterys as the basis for my treatments of those genera in Guayana. The principal artists were Karin Douthit and Annette Seidenschnur Mahler, whose skill has greatly improved this paper. Several plates were drawn by Melissa Marshall.

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(Utrecht); UB (Brasília); WAG (Wageningen). To the curators of all these herbaria I express my gratitude for their cooperation and patience.

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60468 Blepharandra aff heteropetala
60667 Blepharandra aff heteropetala
60670 Blepharandra aff heteropetala
60696 Blepharandra aff heteropetala
Irwin, H. S. et al
32437 Verrucaria glaucophylla
Jaramillo M., R. et al
440 Byrsonima crispa
1028 Byrsonima jaburensis
Jenman, E.
243 Banisteriopsis pulcherrima
Jenman, G. S.
3779 Burdachia sphaerocarpa var glandifera
4087 Mascagnia guianensis
5370 Mascagnia microcarpa
5371 Byrsonima stipulacea
6413 Burdachia sphaerocarpa var glandifera
6994 Lophopterys euryptera
7127 Spachea elegans
Kappler, A.
1709 Hiraea affinis
1807 Jubelina rosea
Killip, E. P.
37232 Byrsonima aff verbascifolia
37279 Byrsonima crassifolia
37528 Hiraea faginea
37535 Clonodia complicata
Klug, G.
347 Dicella julianii
429 Burdachia prismatocarpa var loretoensis
692 Byrsonima poepigiana
1971 Diplopterys cabrerana
2759 Bunchiosa hookeriana
3770 Bunchiosa hookeriana
Koyama, T. & Agostini, G.
7257 Mascagnia sepium
7358 Byrsonima concinna
7402 Tetrapterys rhodoptera
Kramer, K. U. & Hekking, W. H. A.
2902 Byrsonima eugenifolia
Kruhoff, B. A.
1546 Lophanthera longifolia
6269 Lophanthera longifolia
6700 Clonodia racemosa
6702 Clonodia racemosa
8971 Diplopterys cabrerana
Kubitzki, K. et al
P21729 Burdachia ducckei
Kuhlmann, J. G.
732 Banisteriopsis muricata
Kunhardt, Jr., H. R.
2 Banisteriopsis pulcherrima
18 Byrsonima leucophlebia
21 Banisteriopsis pulcherrima

Lesser, T.
1281 Byrsonima crassifolia
1747 Tetrapteryx rhodoptera
1753 Byrsonima crassifolia
1769 Hiraea tepuiensis
1785 Tetrapteryx rhodoptera
1800 Tetrapteryx rhodoptera
1807 Blepharandra hypoleuca
1902 Byrsonima verbascifolia
1928 Heteroptyerys lasseri
1939 Tetrapteryx rhodoptera

Lawrance, A. E.
546 Mascagnia dissimilis

Lehmann, F. C.
8766 Clonodia complicata

Level, J. S.
L-7 Blepharandra heteropetala
L-20 Hiraea faginea
L-25 Lophanthera longifolia
L-58 Diacidia galphimioides
L-99 Byrsonima coniophylla
L-119 Byrsonima japurensis
L-130 Tetrapteryx mucronata

Liesner, R.
3685 Burdachia sphaeroarpa var sphaeroarpa
7375 Banisteriopsis krukoffii

Little, E. L.
17586 Byrsonima spicata

Lizot, J.
77 Banisteriopsis lucida

Luetzelburg, P. von
20660 Banisteriopsis cinerascens
22128 Banisteriopsis martiniaria var subenervia
22330 Diacidia galphimioides
22873 Diacidia galphimioides

Maguire, B.
24724 Byrsonima spicata
31791 Tetrapteryx mucronata
31802 Stigmaphyllum brachiatum
32187 Byrsonima concinna
32191 Blepharandra hypoleuca
32201 Tetrapteryx pusilla
32715 Pterandra sericea
32729 Blepharandra fimbrifera
32850 Banisteriopsis maguirei
32955 Blepharandra fimbrifera
32981 Blepharandra hypoleuca
33002 Blepharandra fimbrifera
33042 Blepharandra hypoleuca
33215 Byrsonima concinna
33268 Blepharandra hypoleuca

Maguire, B.
33321 Byrsonima pachyypoda
33354 Blepharandra hypoleuca
33377 Byrsonima pachyypoda
33396 Byrsonima pachyypoda
33483 Byrsonima chalcoptylla var chalcoptylla
33558 Tetrapteryx pusilla
33569 Tetrapteryx pusilla
33605 Tetrapteryx fimbrifetala
33611 Tetrapteryx rhodoptera
33668 Tetrapteryx pusilla
33709 Byrsonima crassifolia

Maguire, B. & Fanshawe, D. B.
22973 Stigmaphyllum hypoleuca
23125 Banisteriopsis pulcherrima
23248 Tetrapteryx styloptera
23260 Byrsonima crassifolia
23270 Byrsonima fanshaweii
23302 Tetrapteryx styloptera
23354 Banisteriopsis lucida
23535 Byrsonima christianae
32300 Tetrapteryx styloptera
32485 Blepharandra hypoleuca
32499 Banisteriopsis martiniaria var martiniaria
32561 Blepharandra hypoleuca

Maguire, B. & Maguire, B., Jr.
29069 Byrsonima bracteolaris

Maguire, B. & Maguire, C. K.
29088 Blepharandra hypoleuca
34501 Blepharandra angustifolia
34610 Tetrapteryx styloptera
34721 Banisteriopsis lucida
34748 Banisteriopsis lucida
34853 Tetrapteryx styloptera
35048 Tetrapteryx mucronata
35054 Tetrapteryx fimbrifetala
35099 Tetrapteryx fimbrifetala
35163 Banisteriopsis maguirei
35187 Byrsonima concinna
35285 Banisteriopsis maguirei
35312 Byrsonima concinna
35346 Tetrapteryx fimbrifetala
35495 Banisteriopsis maguirei
35522 Burdachia prismatocarpa var prismatocarpa
35536 Burdachia prismatocarpa var prismatocarpa
40052 Byrsonima crassifolia
40363 Byrsonima schomburgkiana

Maguire, B. & Polit, L.
27321 Lophanthera longifolia
27399 Byrsonima cowanii
27524 Heteroptyerys steyermarkii
27626 Byrsonima kariniana
27647 Byrsonima kariniana
Maguire, B. & Politi, L.
27672 Dicadia kunhardti
27677 Dicadia kunhardti
27692 Pterandra flavescens
27692A Pterandra flavescens
27694 Heteropterys steyermarkii
27851 Byronima cuprea
27946 Pterandra flavescens
27965 Hiraea celiana
27986 Heteropterys atabapensis
28021 Byronima kariniana
28104 Pterandra flavescens
28105 Dicadia kunhardti
28139 Byronima kariniana
28273 Byronima kariniana
28287 Byronima bracteolaris
28295 Hiraea celiana
28323 Banisteriopsis maguirei
28361 Byronima concinna
28392 Tetrapteryx mucronata
28415 Tetrapteryx mucronata
28435 Tetrapteryx mucronata
28523 Hiraea celiana
28601 Byronima cowanii
28673 Heteropterys steyermarkii
28728 Byronima cowanii
28783 Tetrapteryx fimbrifetala
28822 Heteropterys atabapensis
28969 Byronima verbascifolia

Maguire, B. & Wurdack, J. J.
33888 Banisteriopsis martiniana var martiniana
33920 Blepharandra hypoleuca
34480 Blepharandra angustifolia
34487 Glandonia williamsii
34540 Byronima coniophylla
34610 Glandonia williamsii
34698 Heteropterys oblongifolia
34711 Hiraea faginea
34838 Byronima japurensis
34888 Burdachia williamsii
34921 Dicadia galphimioide
34939 Heteropterys orinocensis
34943 Dicadia galphimioide
34953 Dicadia galphimioide
35569 Heteropterys atabapensis
35575 Heteropterys atabapensis
35588 Heteropterys nervosa
35645 Byronima coniophylla
35701 Heteropterys oblongifolia
35771 Byronima coccolobifolia
35772 Byronima coccolobifolia
36327 Byronima chrysophylla
36350 Tetrapteryx gracilis
36362 Byronima coniophylla
36406 Byronima wurdackii

Maguire, B. et al
29423 Byrsonima chrysophylla
29679 Byrsonima bracteolaris
29742 Blepharandra hypoleuca
29806 Dicadia vestita
29807 Banisteriopsis maguirei
29858 Dicadia vestita
29869 Dicadia vestita
30010 Banisteriopsis maguirei
30054 Tetrapteryx huachamacariensis
30091 Dicadia vestita
30096 Banisteriopsis maguirei
30111 Dicadia vestita
30164 Tetrapteryx huachamacariensis
30196 Heteropterys cuatrecasasii
30221 Dicadia vestita
30244 Banisteriopsis maguirei
30252 Dicadia vestita
30395 Heteropterys siderosa
30522 Heteropterys oblongifolia
30535 Heteropterys oblongifolia
30551 Heteropterys oblongifolia
30568 Tetrapteryx gracilis
30593 Byrsonima luetzelburgii
30635 Dicadia hypoleuca
30672 Dicadia hypoleuca
30704 Dicadia hypoleuca
30708 Dicadia hypoleuca
30710 Dicadia hypoleuca
30775 Burdachia williamsii
30779 Blepharandra angustifolia
30792 Burdachia williamsii
30803 Heteropterys oblongifolia
30809 Tetrapteryx gracilis
30814 Byrsonima chrysophylla
30833 Byronima cuprea
30837 Byrsonima crassifolia
30872 Byrsonima crassifolia
31025 Burdachia prismatocarpa var prismatocarpa
31168 Heteropterys beecheyan var alata
31699 Banisteriopsis maguirei
32043 Heteropterys macradena
32045 Byrsonima aff verbascifolia
32050 Byrsonima crassifolia
32077 Lophanthera longifolia
33996 Byrsonima crassifolia
34550 Heteropterys oblongifolia
34612A Byrsonima bronweniana
35945 Byrsonima crassifolia
35965 Banisteriopsis muricata
36069 Byrsonima nitidissima
36071 Heteropterys beecheyan var alata
36086 Byrsonima crassifolia
36146 Heteropterys beecheyan var alata
36155 Hiraea bifurcata
Maguire, B. et al
36185 Byrsonima nitidissima
36201 Byrsonima nitidissima
36217 Byrsonima punctulata
36252 Tetrapteryx mucronata
36282 Heteropterys atabapensis
36284 Byrsonima coniophylla
36493 Glandonia williamii
36579 Heteropterys oblongifolia
36604 Lophanthera longifolia
36648 Byrsonima coniophylla
36656 Byrsonima cuprea
36665 Heteropterys oblongifolia
36678 Byrsonima coniophylla
36678A Heteropterys oblongifolia
36694 Jubelina magnifica
36694-A Jubelina magnifica
36748 Jubelina magnifica
36821 Diacidia glaucifolia
36917 Diacidia rufa
36968 Diacidia glaucifolia
36991 Diacidia rufa
37034 Diacidia rufa
37152 Diacidia rufa
37207 Heteropterys neblinensis
37320 Diacidia cordata
37348 Diacidia rufa
37362 Diacidia glaucifolia
37378 Diacidia rufa
37387 Heteropterys siderosa
37406 Tetrapteryx mucronata
37550 Byrsonima cuprea
37554 Glandonia williamii
37557 Heteropterys oblongifolia
37571 Tetrapteryx gracilis
37576 Blepharandra angustifolia
37585 Heteropterys oblongifolia
37616 Heteropterys oblongifolia
37683 Lophanthera longifolia
37698 Byrsonima punctulata
40677 Tetrapteryx pusilla
41433 Byrsonima coniophylla
41441 Heteropterys atabapensis
41442 Tetrapteryx gracilis
41484 Blepharandra angustifolia
41514 Tetrapteryx gracilis
41638 Banisteriopsis martiniana var subenervia
41671 Byrsonima coniophylla
41822 Byrsonima coniophylla
42036 Diacidia rufa
42038 Tetrapteryx fimbripetala
42057 Diacidia glaucifolia
42057A Diacidia glaucifolia
42057B Diacidia glaucifolia
42111 Heteropterys neblinensis

Maguire, B. et al
42216 Diacidia glaucifolia
42303 Byrsonima maguirei
42304 Byrsonima maguirei
42312 Byrsonima maguirei
42445 Byrsonima maguirei
42461 Diacidia rufa
42464 Heteropterys neblinensis
42506 Byrsonima concinna
42537B Heteropterys neblinensis
42537D Diacidia cordata
42601 Jubelina magnifica
43806 Tetrapteryx pusilla
43886 Blepharandra hypoleuca
43887 Blepharandra hypoleuca
43889 Banisteriopsis pulcherrima
44091 Diacidia galphimioides
44100 Diacidia galphimioides
44142 Stigmaphyllum hypoleucum
44154 Byrsonima amoena
46099A Byrsonima concinna
46235 Banisteriopsis lucida
46882 Byrsonima stipulacea
46977 Lophopterys euryptera
53524 Banisteriopsis martiniana var martiniana
53532 Byrsonima concinna
53561 Banisteriopsis pulcherrima
53605 Byrsonima concinna
53659 Tetrapteryx fimbripetala
53661 Banisteriopsis martiniana var martiniana
53669 Banisteriopsis pulcherrima
53704 Banisteriopsis martiniana var martiniana
53708 Byrsonima concinna
56081 Mascagnia schunkei
60100 Tetrapteryx mucronata
60426 Mascagnia glandulifera

Martius, K. F. P. von
1921 Verrucularia glaucophylla

Mathias, M. E. & Taylor, D.
3883 Diplopterys cabrerana
5260 Diplopterys cabrerana

Medina, E.
384 Banisteriopsis lucida
545 Byrsonima coniophylla

Meijeraan, J. W.
9 Bunchosia armeniaca
13 Bunchosia armeniaca

Mélignon, —
116 Mascagnia guianensis
258 Mascagnia guianensis

Meyer, G. F. W.
332 Diplopterys pauciflora
MG, Museu Goeldi, Belém
3719 Lophanthera longifolia
3737 Byrsonima leucophlebia
6903 Byrsonima leucophlebia
6921 Lophanthera longifolia
7893 Lophanthera longifolia
7963 Lophanthera longifolia
8473 Byrsonima leucophlebia
10840 Byrsonima leucophlebia
11793 Byrsonima leucophlebia
11970 Byrsonima leucophlebia
12195 Byrsonima amoenus
12420 Byrsonima punctulata
30278 Blepharandra heteropetalata
30279 Blepharandra heteropetalata
Mori, S. & Bolten, A.
8289 Byrsonima eugenii
8399 Jubiella rosea
8551 Jubiella rosea
Mori, S. et al
8030 Byrsonima eugenii
9053 Burdachia prismaticarpa var loretoensis
9231 Burdachia prismaticarpa var loretoensis
Morillo, G.
3174 Stigmaphyllum brachiatum
Morillo, G. & Ishikawa, M.
3465 Tetrapetrys styloptera
3470 Diacidia galphimioides
3513 Diacidia galphimioides
3538 Heteropterys orinocensis
3541 Heteropterys orinocensis
Morillo, G. et al
2932 Stigmaphyllum hypoleucum
3980 Jubiella bracteosa
4120 Heteropterys orinocensis
4141 Jubiella bracteosa
4206 Mascagnia glandulifera
Naranjo, C.
9 Diplopterys cabrerana
Nascimento, O. C. et al
27 Byrsonima chrysophylla
121 Diacidia galphimioides
135 Hiraea primaeva
Nelson, B. W. & Lima, J. F.
P21058 Blepharandra heteropetalata
Occhioni, P.
3563 Lophanthera lactescens
Oliveira, E.
43 Byrsonima leucophlebia
1203 Lophanthera longifolia
2165 Byrsonima chrysophylla
2948 Lophanthera longifolia
3501 Banisteriopsis lyrata
Pannier, F.
829a Heteropterys macradena
Pena, B. S.
328 Blepharandra cachimbensis
446 Byrsonima punctulata
573 Lophanthera longifolia
Pennington, T. D. et al
P22759 Byrsonima gacibarrigae
Pereira, E.
1777 Blepharandra cachimbensis
Pérez Arbeláez, E. & Cuatrecasas, J.
6756 Heteropterys nervosa
Persaud, A. C.
31 Burdachia sphaerocarpa var glandifera
53 Burdachia sphaerocarpa var glandifera
61 Byrsonima gymnocalyxina
167 Byrsonima gymnocalyxina
177 Burdachia sphaerocarpa var glandifera
Phelps, K. D. & Hitchcock, C. B.
361 Byrsonima concinna
418 Tetrapetrys rydoptera
426 Tetrapetrys rydoptera
452 Byrsonima grossifolia
471 Diacidia stipularis
516 Diacidia ferruginea
Philipson, W. R. et al
1719 Banisteriopsis pubipetala
2211 Byrsonima crispa
Pinkus, A. S.
18 Byrsonima grossifolia
28 Blepharandra hypoleucum
67 Byrsonima grossifolia
72 Byrsonima spicata
74 Tetrapetrys rydoptera
90 Hiraea tepuensis
95 Byrsonima spicata
211 Blepharandra hypoleucum
283 Tetrapetrys rydoptera
Pinto E., P. & Sastre, C.
938 Stigmaphyllum brachiatum
Pires, J. M.
37 Burdachia sphaerocarpa var sphaerocarpa
80 Lophanthera longifolia
89 Byrsonima leucophlebia
237 Tetrapetrys styloptera
250 Lophanthera pendula
261 Byrsonima japurense
362 Byrsonima chrysophylla
580 Hiraea aff celiana
969 Burdachia prismaticarpa var prismatocarpa
1052 Lophanthera spruceana
1070 Lophanthera spruceana
1080 Lophanthera spruceana
1107 Byrsonima frondosa
1413 Lophanthera longifolia
4744 Jubiella riparia
4747 Diplopterys cabrerana
Pires, J. M.  
1659a Clonodia racemosa  
14993 Diacidia aracaeensis  
15040 Verrucularia piresii  

Pires, J. M. & Leite, P.  
14536 Blepharandra heteropetala  
14840 Blepharandra intermedia  
14844 Byrsonima eugeniiifolia  

Pires, J. M. & Marinho, L. R.  
15682 Tetrapteryx munronata  
15755 Tetrapteryx munronata  

Pires, J. M. & Silva, N. T.  
4357 Byrsonima leucophlebia  
7931 Hiraee apaporinensis  
7950 Lophanthera spruceana  
7970 Glandonia williamsii  
8042 Byrsonima chrysophylla  

Pires, J. M. et al  
6112 Blepharandra cachimbensis  
13921 Burdachia duckiei  
13940 Byrsonima coniophylla  
13967 Byrsonima punctulata  
13986 Byrsonima coniophylla  
14020 Byrsonima coniophylla  
14058 Byrsonima punctulata  
14173 Byrsonima punctulata  
14187 Byrsonima eugeniiifolia  
14191 Byrsonima eugeniiifolia  
14226 Byrsonima eugeniiifolia  
14334 Spachea elegans  
14340 Heteropterys catoptera  
14377 Byrsonima schomburgkiana  
14413 Spachea elegans  
14446 Heteropterys murgapiresii  
14453 Blepharandra intermedia  
14456 Heteropterys murgapiresii  
14483 Blepharandra intermedia  
14485 Byrsonima schomburgkiana  
14486 Byrsonima eugeniiifolia  
14493 Blepharandra intermedia  
14501 Spachea elegans  
14631 Bunchosia mollis  
51345 Jubelina riparia  

Plowman, T.  
2034 Diplopterys cabrerana  
2159 Diplopterys cabrerana  
2177 Diplopterys cabrerana  
6040 Diplopterys cabrerana  

Plowman, T. et al  
4246 Byrsonima crispa  
6998 Heteropterys riparia  

Poepig, E. F.  
2214 Byrsonima arthropoda  
2690 Byrsonima poepiggiana  
2799 Mascagnia poepiggiana  
2911 Burdachia prismaticarpa var prismaticarpa  

Prance, G. T.  
21031 Blepharandra heteropetala  
Prance, G. T. & Lleras, E.  
23741 Burdachia duckiei  
Prance, G. T. et al  
2122 Pterandra arborea  
2790 Byrsonima arthropoda  
3311 Byrsonima leucophlebia  
3363 Glandonia prancei  
3680 Burdachia duckiei  
3690 Byrsonima leucophlebia  
3964 Stigmaphyllon hypoleucum  
3984 Byrsonima japurensis  
4047 Tetrapteryx discolor  
4226 Byrsonima schomburgkiana  
4234 Heteropterys macradena  
4292 Byrsonima crassifolia  
4437 Stigmaphyllon hypoleucum  
4735 Burdachia duckiei  
6960 Banisteriopsis lyrata  
8058 Glandonia prancei  
8595 Byrsonima leucophlebia  
9091 Clonodia racemosa  
9138 Byrsonima coccolobifolia  
9289 Byrsonima spicata  
9546 Bunchosia mollis  
9767 Tetrapteryx discolor  
9903 Tetrapteryx fimbripetala  
9921 Byrsonima concinna  
10071 Byrsonima stipulacea  
10145 Bunchosia decussiflora  
10522 Bunchosia decussiflora  
10690 Hiraee faginea  
10718 Hiraee faginea  
10740 Banisteriopsis lucida  
10909 Stigmaphyllon hypoleucum  
10932 Bunchosia armeniaca  
11548 Burdachia prismaticarpa var prismaticarpa  
13577 Byrsonima stipulacea  
14710 Mascagnia schunkei  
14828 Byrsonima moena  
14882 Byrsonima punctulata  
14893 Burdachia duckiei  
14996 Burdachia sphaeroarpa var sphaerocarpa  
15136 Lophanthera longifolia  
15138 Burdachia sphaeroarpa var sphaerocarpa  
15223 Clonodia racemosa  
15440 Byrsonima coniophylla  
15516 Glandonia williamsii  
15536 Byrsonima coniophylla  
15589 Byrsonima laevis  
15619 Byrsonima chrysoyphlla  
15737 Dicella julianii  
15927 Mascagnia leucanthele
Prance, G. T. et al
16171 Byrsonima coniophylla
17718 Byrsonima amoena
17728 Burdachia sphaerocarpa var sphaerocarpa
17867 Burdachia duckei
17868 Byrsonima punctulata
18022 Byrsonima punctulata
20557 Glandonia prancei
23486 Byrsonima amoena
25236 Blepharandra cachimbensis

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14189 Burdachia sphaerocarpa var sphaerocarpa
17698 Lophanthera lactescens
23646 Glandonia macrorcarpa
23649 Pterandra arborea
24164 Lophanthera pendula
25231 Byrsonima cuprea
25232 Blepharandra angustifolia
29041 Lophanthera pendula
35600 Byrsonima chrysophylla
35608 Byrsonima coniophylla
35610 Mezia rufa
35611 Byrsonima wurdackii
90557 Blepharandra cachimbensis

Revilla, J.
188 Byrsonima arthropoda
294 Byrsonima arthropoda
309 Byrsonima poepiggiana
1748 Mascagnia glandulifera
1838 Byrsonima poepiggiana
2351 Mascagnia dissimilis

Ribeiro, B. G. S.
371 Blepharandra cachimbensis
411 Byrsonima eugeniiifolia
459 Byrsonima eugeniiifolia
944 Byrsonima chrysophylla
995 Lophanthera spruceana
1096 Blepharandra cachimbensis

Robertson, K. R. & Austin, D. F.
278 Mascagnia guianensis

Rodrigues, W.
259 Lophanthera longifolia
299 Byrsonima punctulata
308 Burdachia sphaerocarpa var sphaerocarpa
813 Tetrapteryx styloptera
984 Burdachia sphaerocarpa var sphaerocarpa
6727 Burdachia duckei
7244 Pterandra arborea
7260 Blepharandra heteropetala
7577 Pterandra arborea
8799 Byrsonima Rodrigueisii

Rodrigues, W. & Aubreville, A.
659 Byrsonima coccolobifolia

Rodrigues, W. & Aubreville, A.
660 Byrsonima crassifolia
668 Byrsonima verbascifolia

Rodrigues, W. & Coelho, D.
1397 Byrsonima arthropoda
2087 Burdachia sphaerocarpa var sphaerocarpa
4875 Byrsonima punctulata

Rodrigues, W. & Jaccoud, S. R.
8886 Burdachia sphaerocarpa var sphaerocarpa

Rodrigues, W. & Lima, J.
2254 Burdachia duckei

Rodrigues, W. & Loureiro, A.
7058 Pterandra arborea

Rodrigues, W. & Mello, F.
4350 Byrsonima schomburgkiana

Rodrigues, W. et al
2843 Byrsonima Rodriguesii

Romero Castañeda, R.
1217 Byrsonima chrysophylla
1236 Clonodia complicata
3483 Bunchosia glandulifera
3567 Bunchosia glandulifera
3650 Byrsonima chrysophylla
3753 Jubelina bracteosa

Rosa, N. A.
58 Byrsonima eugeniiifolia
271 Tetrapteryx fimbripetala
292 Byrsonima stipulacea

Rusby, H. H. & Squires, R. W.
166 Clonodia complicata

Rutkis, E.
209 Banisteriopsis caapi
232 Byrsonima chrysophylla

Rutkis, E. & Foldats, E.
502 Byrsonima verbascifolia
507 Byrsonima coccolobifolia

Sagot, P.
102 Byrsonima aerugo

Samuels, J. A.
254 Mascagnia guianensis

Sandwith, N. Y.
206 Byrsonima gymnocalycina
289 Mascagnia microcarpa
484 Mascagnia guianensis
529 Mascagnia guianensis
1145 Byrsonima incarnata
1297 Byrsonima eugeniiifolia
1430 Banisteriopsis pulcherrima
1441 Banisteriopsis martiniiana var martiniana

Schomburgk, Richard
328 Heteropteryx cristata
544 Bunchosia mollis
773 Banisteriopsis cinerascens
777 Byrsonima schomburgkiana
Schomburgk, Richard  
912 Byrsonima concinna  
999 Banisteriopsis martiniara var martiniara  
1043 Blepharandra hypoleuca  
1379 Byrsonima stipulacea  
1536 Lophopterys euryptera  
1603 Byrsonima stipulacea  

Schomburgk, Robert  
I 197 Tetrapteryx discolor  
I 279 Heteropterys cristata  
I 525 Byrsonima gymnocalyxina  
I 742 Bunchosia mollis  
I 786 Byrsonima schomburgkiana  
I 844 Banisteriopsis muricata  
I 909 Byrsonima japeurensis  
II 488 Banisteriopsis cinerascens  
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