

APOCYNACEAE

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A pantropical family of trees, shrubs, lianas, and herbs, generally found below 2,500 m elevation with a few species reaching 4,500 m. Represented in the Neotropics by ~100 genera and 1,600 species of which 82 genera and ~1,400 species are twining vines, lianas or facultative climbing subshrubs; found in diverse habitats, such as rain, moist, gallery, montane, premontane and seasonally dry forests, savannas, scrubs, paramo and puna.

Diagnosics: Twiners with simple, opposite or verticillate leaves. Climbing sterile Apocynaceae are distinguished from climbers in other families by the presence of copious milky latex; colleters in the nodes and/or the adaxial base of leaf blades and/or petioles, sometimes with minute, caducous stipules (in species of *Odontadenia* and *Temnadenia*); stems mostly cylindrical, often lenticellate or suberized, simple or less often with successive cambia and a prominent pericycle defined by a ring of white fibers usually organized into bundles. Trichomes, when present, are glandular and unbranched, most genera of Gonolobinae (subfamily Asclepiadoideae) have a mixture of glandular, capitate and eglandular trichomes.

General Characters

1. **STEMS.** Stems woody or less often herbaceous, 0.2 to 15 cm in diameter and up to 40 m in length; cylindrical (Figure 36A, D, F) or nearly so, nodes sometimes flattened in young branches; nearly always with intraxylary phloem either as a continuous ring or as separate bundles in the periphery of the pith (Metcalf & Chalk 1957); vascular system with regular anatomy (Figure 36A, E), sometimes with deep phloem wedges (Figure 36 B) or successive cambia that produce concentric rings of xylem and phloem (Figure 36D); often with conspicuous pericycle defined by a ring of white fibers (Figure 36E), usually organized into

bundles, a well-defined endodermis, and the presence of druses in the cortex and/or the pith. Barks of mature stems frequently fissured (Figure 37A), corky (Figure 37C, D), and/or lenticellate (Figure 37B).

2. INDUMENTUM. There are two main types of trichomes in the Apocynaceae, i.e., unicellular and multicellular. Unicellular includes: 1) papillae mainly on the adaxial surface of the corolla; 2) eglandular; 3) ribbon-like, rarely found on adaxial surface of corolla lobes; and 4) eglandular, sharp or uncinata. Multicellular trichomes include: 1) eglandular, sharp or uncinata; and 2) glandular capitate, found on most organs. Most eglandular trichomes present conspicuously sculptured cell walls, while glandular capitate trichomes in general present thin non-sculptured cell walls. In subtribe Gonolobinae (subfamily Asclepiadoideae) glandular, capitate trichomes often found in combination with multicellular eglandular trichomes.

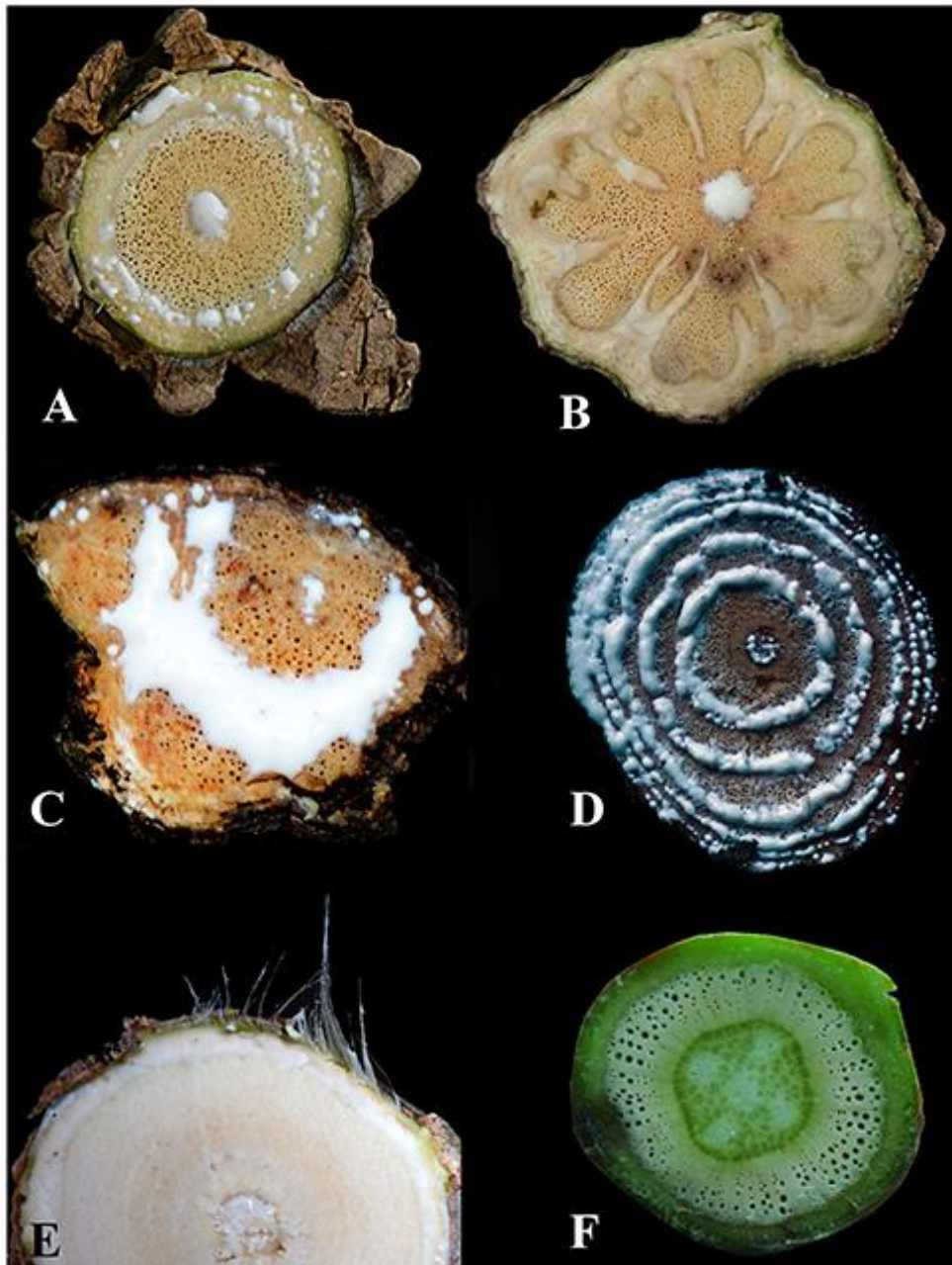


Figure 36. Cross sections of stems in Apocynaceae. **A.** *Marsdenia mexicana*, cylindrical stems with corky bark. **B.** *Condylocarpon isthmicum*, angled stem with phloem wedges. **C.** *Oxypetalum* sp., asymmetrical with acentric medulla. **D.** *Odontadenia* sp. with successive cambia. **E.** *Allamanda cathartica* showing pericyclic fibers. **F.** Apocynaceae, young stem with square pith and conspicuous intraxylary phloem. Photos by P. Acevedo.

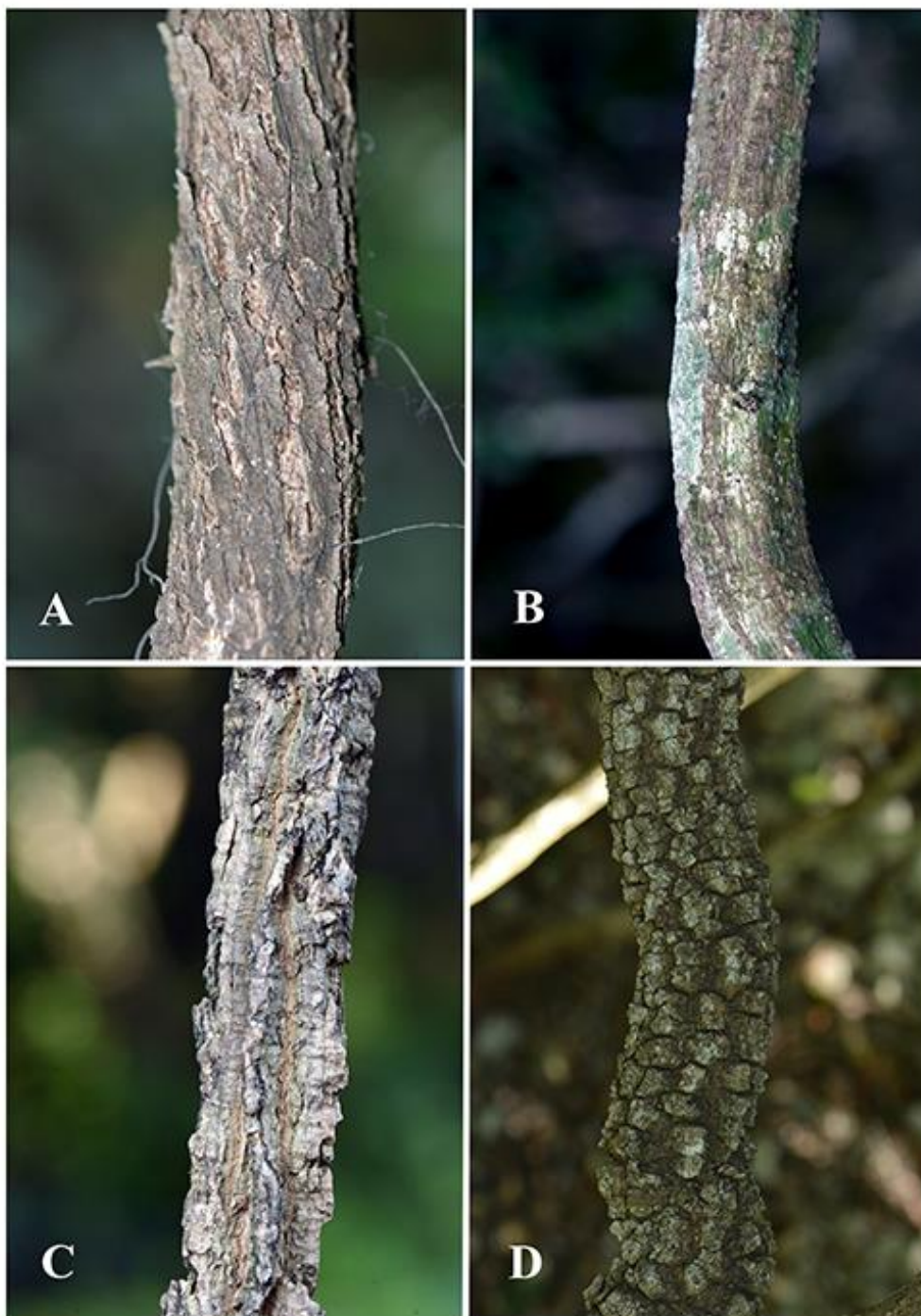


Figure 37. Barks on stems of Apocynaceae. **A.** *Forsteronia* sp., slightly rough and fibrous. **B.** *Condyllocarpon isthmicum*, lenticellate. **C.** *Marsdenia mexicana*, rough and corky. **D.** *Pinochia corymbosa*, rough with small rectangular plates. Photos by P. Acevedo.



Figure 38. Leaves in climbing Apocynaceae. **A.** Twining stems with opposite leaves. **B.** Verticillate leaves in *Condyllocarpon isthmicum*. **C.** Discolored, opposite leaves in *Macropharynx peltata*. **D.** Colleters at the base of leaf blade in *Cynanchum* sp. Photos by P. Acevedo.

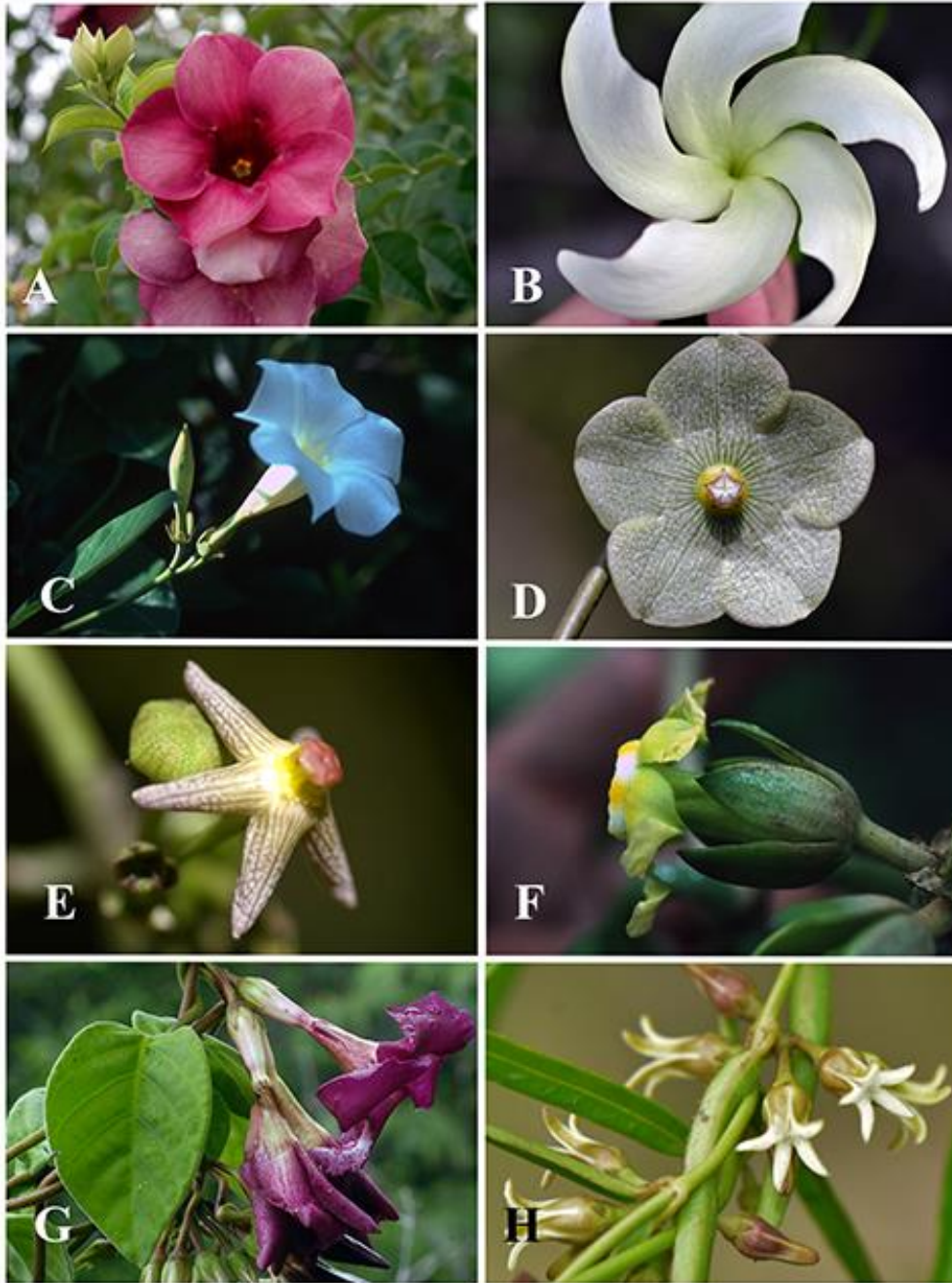


Figure 39. Flower diversity in Apocynaceae. **A.** *Allamanda blanchetii*, infundibuliform, long tubular corolla with imbricate lobes. **B.** *Asketanthera longiflora*, salverform, with strongly contorted lobes. **C.** *Rhabdadenia biflora*, infundibuliform-tubular. **D.** *Mateleia variifolia*, rotate with rounded lobes. **E.** *Mateleia acevedoi*, rotate with narrow, reflexed lobes. **F.** *Prestonia trifida*, salverform with annular thickening at the mouth. **G.** *Mandevilla* sp., infundibuliform with constriction at the middle of tube. **H.** *Metastelma* sp., campanulate. Photos by P. Acevedo.

3. EXUDATES. White or less often watery latex, usually abundant (Figure 37A–D), sometimes malodorous (e.g., *Funastrum*, *Macroscepis*, *Orthosia*, *Prosthecidiscus*, *Scyphostelma*), produced by non-articulated or articulated laticifers. Recent publications suggests all laticifers in Apocynaceae might be actually articulated, but very early losing the transverse walls (Demarco et al. 2006; Demarco & Castro 2008).
4. CLIMBING MECHANISM. Mostly twiners (Figure 38A), but some species are scrambling herbs, subshrubs, or shrubs. *Pacouria guianensis* Aubl. has prehensile inflorescence axes.
5. LEAVES. Simple, opposite (Figure 38A, C) or verticillate (Figure 38B) rarely alternate in upper nodes, exstipulate, but with interpetiolar colleters of stipular origin present in many species, rarely with small, caducous stipules (e.g., some *Odontadenia*, *Temnadenia*, *Thoreauea*). Petioles adaxially grooved or nearly terete often with colleters. Blades with entire or undulate margins (Figure 38A–C), often with several conical or tooth-like colleters at the base (Figure 38D), venation pinnate, mostly brochidodromous, sometimes with domatia.
6. INFLORESCENCES. Axillary, subaxillary or (sub-) terminal, or both axillary and (sub-) terminal, cymose, racemose, often sciadioidal (umbelliform), or corymbiform, single and alternate or two per node; flowers rarely solitary, sessile to long-pedicellate; bracts often small, sometimes foliaceous and conspicuous (e.g., *Asketanthera*, *Macropharynx*).
7. FLOWERS. Mostly actinomorphic, bisexual, pentamerous, minute (few millimeters long, Figure 39H) to large (more than 80 mm long). Calyx mostly 5-lobed (Figure 39), connate at least at base, imbricate or valvate in bud, with several flat or tooth-like adaxial colleters often present. Corolla partly connate at base, rotate (Figure 37D), campanulate (Figure 39H),

infundibuliform (Figure 38A, C), sinistrorse, rarely valvate, corolline and/or gynostegial corona often present (the latter almost universally present and often highly

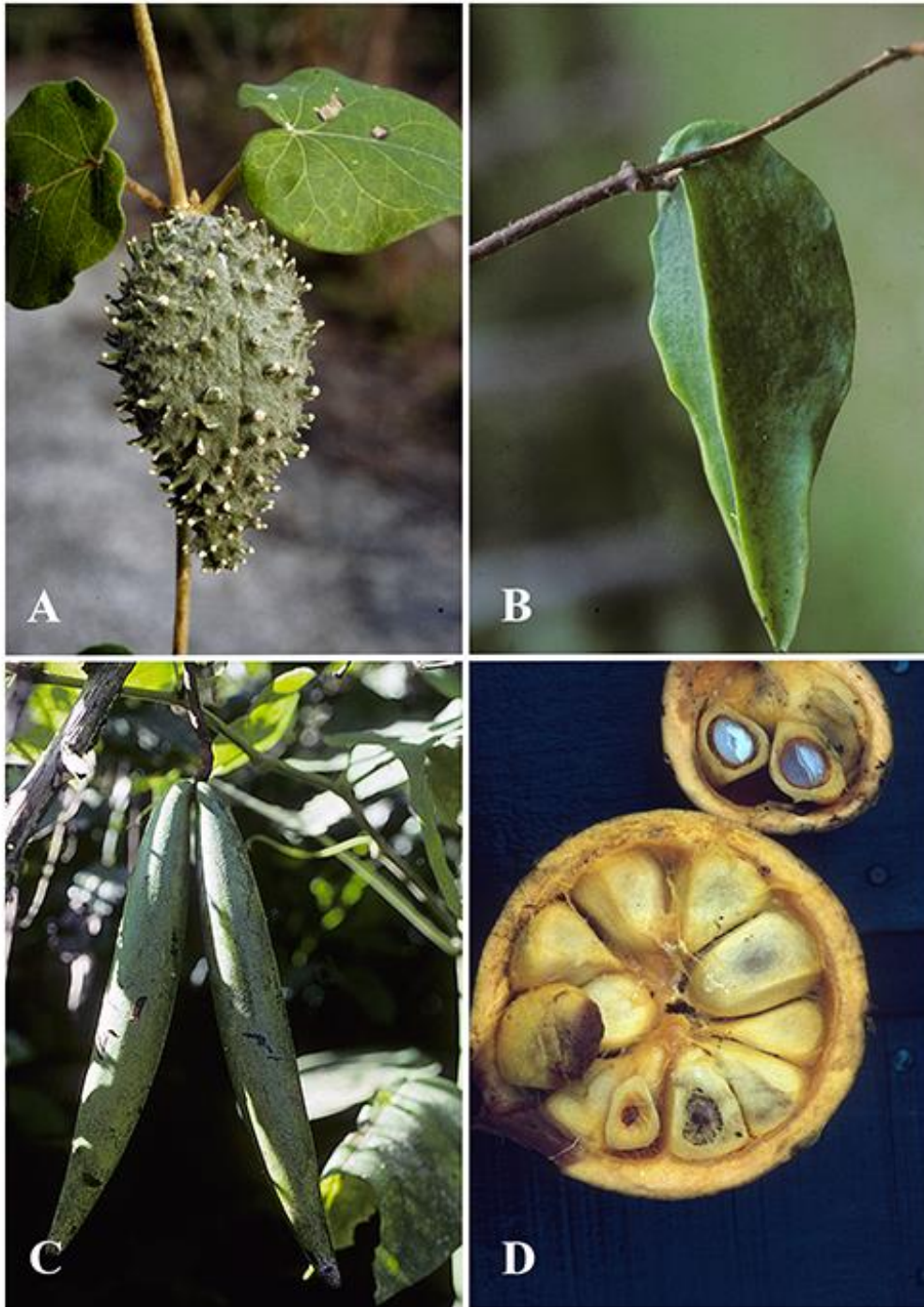


Figure 40. Fruits in Apocynaceae. **A.** *Ibatia maritima*, muricate follicle. **B.** *Gonolobus stephanotrichus*, narrow longitudinally winged follicle. **C.** *Forsteronia amblybasis*, fusiform follicles. **D.** *Pacouria guianensis*, indehiscent berry; seeds surrounded by a pulp. Photos by P. Acevedo.

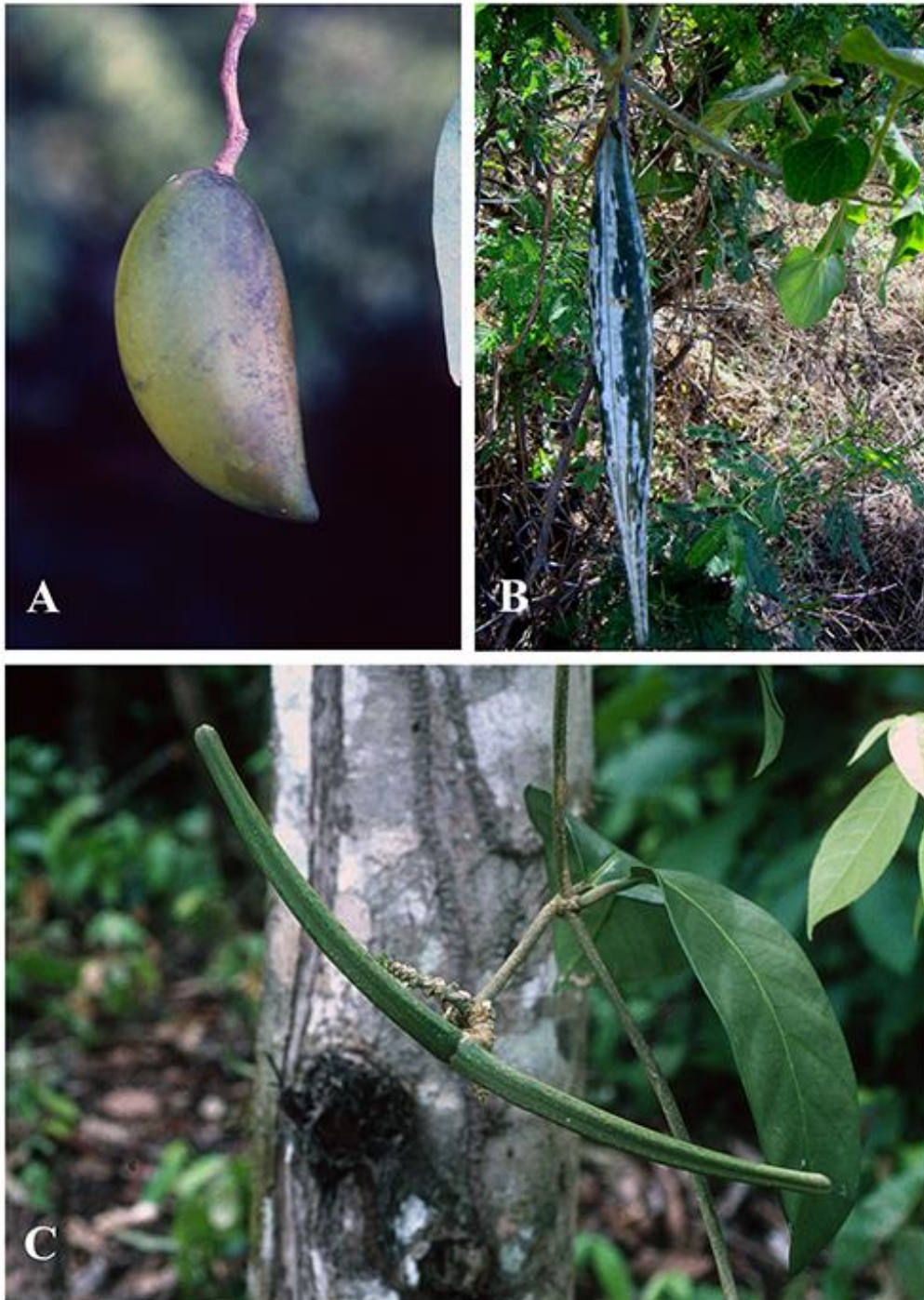


Figure 41. Fruits in Apocynaceae. **A.** *Ruehssia rubrofusca*, ovoid, asymmetrical follicle. **B.** *Polystemma guatemalense*, a single fusiform follicle. **C.** *Mesechites trifidus*, divaricate, oblong follicles. Photos: A & C by P. Acevedo; B by G. Morillo.



Figure 42. Seeds in Apocynaceae. **A.** *Cryptostegia madagascariensis*, with long, white coma. **B.** *Riparoampelos amazonicus*, ecomose seeds. Photos by P. Acevedo.

elaborated in subfamily Asclepiadoideae); stamens 5, alternate with the corolla lobes, filaments adnate to the corolla tube, free, or connate into a staminal tube around the gynoecium, anthers 2-locular, with lignified guide rails in many genera, distinct, or mostly connivent around the style-head forming a gynostegium; pollen in single grains or tetrads, or tightly bound into pollinia [in pairs in the Asclepiadoideae, connected by two flexible arms (caudicles) to a central rigid clip (retinaculum)]; nectaries discoid around the ovary, or alternistaminal troughs on staminal tube, sometimes associated with the corona; gynoecium of 2 apocarpous or hemisyncarpous carpels, superior or rarely subinferior; placentation marginal (often with many ovules), styles distinct but fused at apex into a complex style-head.

8. **FRUITS.** Fruit of climbing Apocynaceae are variously ornamented including smooth (Figure 41A), muricate (Figure 40A), and winged (Figure 40B), mostly of 2(1) distinct mericarps [“follicles], that are dehiscent, rarely indehiscent and segmented, e.g., *Condylocarpon*; capsules e.g., *Allamanda*, or berries e.g., *Pacouria* (Figure 40D).
9. **SEEDS.** Usually subcylindrical, fusiform to narrowly ovate or elliptic and dorso-ventrally flattened, with a micropylar coma (Figure 42A); flat, winged and ecomose in some genera, e.g., *Allamanda*, *Anechites*, *Riparoampelos*, *Skytanthus* (Figure 42B); naked and longitudinally folded (e.g., *Condylocarpon*), or surrounded by a pulp, e.g., *Pacouria* (Figure 40D).

USES

Apocynaceae is an important source of secondary metabolites (indole alkaloids, cardenolides, steroidal alkaloids, iridoid glycosides), with potential use in pharmacy and

medicine; some of these compounds are very toxic and may cause death of cattle or people (e.g., in *Cynanchum montevidense* Spreng.). Arrow poisons are extracted from a few species, and exudates or plant parts from some species are used in popular medicine (e.g., *Macroscepis hirsuta* (Vahl) Schltr. is used against syphilis, *Ruehssia cundurango* (Triana) Liede & H.A. Keller yields the medicinal drug condurango, *Mesechites trifida* (Jacq.) M. Arg. is used as antivenom in cases of snake bites and as analgesic, and *Allamanda cathartica* L. is used as purgative). Fruits (raw or cooked) of some species of *Gonolobus*, *Marsdenia*, and *Pacouria*, are eaten by country people in Mexico, Central America and South America, and latex of some *Araujia* species are drunk replacing milk by country people in Argentina. Young fruits of *Morrenia odorata* (Hook. & Arn.) Lindl. are eaten, and the latex is used to produce cheese; the plant is said to enhance milk flow in cows and women. Flowers of *Echites panduratus* A. DC. are an important source of food in El Salvador and Guatemala. Resistant and flexible stems of species as *Funastrum clausum* (Jacq.) Schltr. and *Mandevilla veraguasensis* (Seem.) Hemsl. are used as rope or fishing poles, and tawny hairs of seeds are sometimes used as filling (e.g., in pillows). Many species of Apocynaceae are widely cultivated as ornamentals because of their beautiful flowers, and some of them are cultivated as source of food for butterflies.

The modern concept of Apocynaceae contains several subfamilies, some of which were treated in the past as families Asclepiadaceae and Periplocaceae. Although this treatment does not separate genera by subfamily, a key to subfamilies is provided for general knowledge.

KEY TO THE SUBFAMILIES OF CLIMBING APOCYNACEAE IN THE NEOTROPICS

1. Anthers free from style-head; corolla lobes in bud overlapping to the left, rarely overlapping to the right; fruit a pair of follicle-like mericarps, a berry, a capsule, or a pair (or one) of segmented

- indehiscent mericarps; seeds compressed with wings, plano-convex, or ~circular, often with an aril, or subcylindrical, mostly without an apical coma **1. Rauvolfioids**
1. Anthers connate, and adnate to the style-head; corolla lobes in bud overlapping to the right or valvate, rarely overlapping to the left; fruit a pair (or one) of follicle-like mericarps; seeds compressed and somewhat ovate to orbicular, or subcylindrical, mostly with an apical coma (tuft or trichomes)..... 2
2. Anthers 4-locular; pollen almost always shed as monads; style-head secretions for pollen transport a foamy adhesive or gummy; nectaries, when present, an entire or discontinuous ring around the base of the ovary; coma, when present, usually light brown or yellowish brown; leaf blades often without colleters **2. Apocynoids**
2. Anthers 2- or 4-locular; pollen shed as tetrads or united forming pollinia; style-head secretions for pollen transport forming a translator [with sticky end (viscidium), or with a rigid clip (retinaculum) and two flexible arms (caudicles)]; coma, when present, mostly silvery white; leaf blades with or without colleters 3
3. Anthers 2-locular; pollen in pollinia; leaf blades mostly with colleters at adaxial base (native species in the Neotropics) **3. Asclepiadoideae**
3. Anthers 4-locular; pollen shed in tetrads onto a spoon-shaped receptacle; leaf blades without colleters (exotic and cultivated species in the Neotropics) **4. Periplocoideae**

Key to the genera of climbing Apocynaceae in Mexico and Central America

1. Leaf blades without colleters at base or along adaxial midvein2
1. Leaf blades and/or proximal adaxial petiole with colleters20
2. Leaf axils without colleters or stipular appendages3

2. Leaf axils with colleters or stipular appendages4
3. Calyx lobes without colleters; corolla white to dark pink; seeds rostrate; stipules absent; plants of riparian forests, swamps or mangroves***Rhabdadenia***
3. Calyx with 5 to many colleters at adaxial base; corolla yellow or cream, frequently with reddish lines; seeds truncate; stipules sometimes present; plants of evergreen lowland forests, riparian forests and forest edges ***Odontadenia***
4. Leaves peltate; trichomes with thin unsculptured walls***Macropharynx***
4. Leaves petiolate at base; trichomes, if present, mostly with sculptured walls5
5. Trichomes of stems, leaves and fruits rigid, with disciform multicellular bases, sometimes uncinata; anthers rostrate, free from style-head; fruits indehiscent, 1-seeded ***Anechites***
5. Trichomes not uncinata, without disciform multicellular bases; anthers not rostrate, adnate or close to style-head, fruits dehiscent or indehiscent, usually with several seeds6
6. Fruit of indehiscent segmented mericarps, or capsule (s) with winged seeds, or longitudinally folded ecomose seeds; anthers free from style-head.....7
6. Fruits follicles, with comose seeds; anthers strongly or loosely connivent around style-head 8
7. Stems woody, usually thick; flowers 50–80 mm long, with an annular nectary disc; fruits spiny capsules, seeds concentrically winged ***Allamanda***
7. Stems slender, not woody; flowers 2.5–5 mm long, without nectary disc; fruit of two (rarely one) indehiscent, flattened or trigonous, 1–16 segmented mericarps, containing fusiform, longitudinally folded, wingless seeds ***Condylocarpon***

8. Stems ferrugineo-tomentose, glabrescent with age; calyx lobes foliaceous, 42–53 mm long; corolla tube 88–150 mm long; plants exotic, cultivated, flowering throughout the year
..... ***Beaumontia***
8. Stems pubescent to glabrous, if pubescent, then indumentum usually not ferruginous; calyx lobes 1–30 mm long, usually not foliaceous (except in *Macropharynx*); corolla tube 4–60 mm long9
9. Corolla with a corolline corona of 5 free entire or bifid segments; spathaceous pollen translators placed in 5 cavities at the style-head (pollen shed in tetrads onto a spoon-shaped receptacle); fruit of two narrowly ovoid to fusiform, 3-keeled follicles; plants exotic and invasive***Cryptostegia***
9. Corolla usually without a corona (corolline corona present in *Prestonia* and *Thoreauea*); pollen not agglutinated by a translator structure; fruit of one or two cylindrical to narrowly fusiform smooth to ribbed follicle(s)10
10. Mature stems conspicuously pubescent11
10. Mature stems glabrous or glabrescent, young stems puberulent in some species14
11. Calyx lobes without colleters; corolla salverform, purple or greenish purple, tube with an annular thickened throat..... ***Laubertia***
11. Calyx lobes with one colleter per sinus; corolla salverform or infundibuliform, white, cream, yellow, green or a combination of these with red, yellow or brown, tube with or without an annular thickened throat.....12
12. Corolla generally with 5 internal epistaminal appendages or vertical callous ridges, and an annular thickening of a contrasting color at throat***Prestonia***
12. Corolla without internal appendages or ridges, and without a thickened throat.....13

13. Stems densely puberulent or glabrous; bracts and calyx lobes ovate, 1–3(–5) mm long;
corolla tube 29–38 mm long, lobes adaxially ciliate or arachnoid-villous *Echites*
13. Stems tomentulose, hispid or hirsute; bracts and calyx lobes oblong or linear, foliaceous, 9–
21 mm long; corolla tube 24–28 mm long, lobes adaxially glabrous *Macropharynx*
14. Axillary (intrapetiolar) stipules or laminar foliaceous colleters present.....15
14. Axillary (intrapetiolar) digitate small or conspicuous colleters present16
15. Corolla urceolate, with an inner 5–10 lobed corona; stamens included; follicles continuous,
12–16 cm long; seeds with a yellowish white coma.....*Thoreauea*
15. Corolla rotate, without a corona; stamens wholly exerted; follicles moniliform, up to 40 cm
long; seeds with a white coma *Thenardia*
16. Leaf blades usually with domatia; corolla rotate or subcampanulate*Pinochia*
16. Leaf blades without domatia; corolla salverform or infundibuliform17
17. Corolla salverform18
17. Corolla infundibuliform19
18. Corolla with 5 internal epistaminal appendages or vertical callous ridges, and an annular
thickening of a contrasting color at throat; seeds mostly truncate.....*Prestonia*
18. Corolla without appendages or ridges, and without a thick annulus at throat; seeds rostrate
..... *Echites*
19. Corolla yellow or greenish yellow, lobes adaxially glabrous; anthers with spirally coiled
apical appendages; nectaries as long as or longer than ovaries *Pentalinon*
19. Corolla white, cream or greenish white, lobes adaxially arachnoid-villous or ciliate; anthers
with an incurved narrowly attenuate apex; nectaries somewhat shorter than ovaries
..... *Prestonia*

20. Inflorescences axillary, terminal or subterminal; stamens with free filaments, anthers distinct of mostly connivent around style-head; pollen almost always shed as monads; fruit usually develops into two (rarely one by abortion), cylindrical, subcylindrical or narrowly navicular follicles; seeds usually linear or narrowly oblong, more or less subcylindrical, coma mostly light brown or yellowish brown21
20. Inflorescences usually subaxillary, but axillary or seemingly axillary in some species (*Jobinia, Orthosia, Tassadia, Cynanchum*); stamens completely connate, anthers adnate to the style-head, filaments laterally fused and enclosing ovary to form a staminal tube; pollen gathered into pollinia; fruit of two or frequently one (by abortion in some genera) fusiform, ovate or more or less obclavate (rarely subcylindrical) follicles; seeds dorso-ventrally compressed, usually narrowly ovate or elliptic in outline, sometimes oblong, often with wing-like margins and a silvery white coma25
21. Inflorescences thyriform, terminal or subterminal, usually many flowered; corolla rotate to subcampanulate, small, tube less than 10 mm long; style-head fusiform, 5-costate; stamens usually exerted; abaxial leaf blades usually with domatia *Forsteronia*
21. Inflorescences racemose or umbelliform cymes, or branched, axillary, terminal or subterminal, few to many flowered; corolla infundibuliform, salverform or tubular-salverform, small to large, tube more than 10 mm long; style-head pentagonal, umbrella-shaped, usually with 5 lateral projections or ridges or fusiform; stamens included; abaxial leaf blades with or without domatia.....22
22. Inflorescences terminal or subterminal cymes with 3–4 umbels, few flowered (9–12 flowers); corolla infundibuliform or campanulate; abaxial leaf blades usually with domatia *Tintinnabularia*

22. Inflorescences axillary or subterminal, rarely terminal, racemose or cymose, with few to many flowers; corolla infundibuliform, salverform, or tubular-salverform; abaxial leaf blades usually without domatia.....23
23. Tertiary leaf venation more or less perpendicular to the midvein (percurrent-opposite); style-head fusiform; adaxial corolla tube with conspicuous infrastaminal pubescent line
..... *Allomarkgrafia*
23. Tertiary leaf venation percurrent-subopposite or irregular; style-head pentagonal, umbrella-shaped, usually with 5 lateral projections or ridges; adaxial corolla tube usually glabrous, if pubescent, then trichomes only on or close to the stamen filaments24
24. Inflorescences usually racemose, simple, rarely paniculate; leaf colleters along or at base of adaxial midvein.....*Mandevilla*
24. Inflorescences cymose and branched; leaf colleters at base of adaxial midvein and/or on the petiole just below the blade..... *Mesechites*
25. Mature branches and leaves usually inconspicuously shortly pubescent, glabrescent to glabrous, sometimes leaf blades densely pubescent26
25. Mature branches and leaves moderately to densely puberulous to hirsute.....38
26. Adaxial petiole bases with several conspicuous digitate colleters; gynostegial corona of free staminal lobes adnate along the filament tube; pollinia erect from the caudicles..... *Ruehssia*
26. Adaxial petiole bases without colleters; gynostegial corona not adnate along the filament tube; pollinia pendent or horizontal from the caudicles..... 27
27. Stems and leaves usually with mixed pubescence, of glandular capitate and eglandular short trichomes, sometimes internodes glabrous or glabrescent with age; pollinia usually horizontal from the caudicles (often wider than long and laterally attached to the caudicles), sometimes

- subpendent, with at least one concave face and /or with a hyaline sterile margin; fruit usually of one (rarely two) follicle with muricate or winged surface (rarely smooth)..... 28
27. Stems and leaves usually with inconspicuous to moderate short eglandular pubescence at least in apical internodes, but often glabrescent or glabrous with age; pollinia pendent from the caudicles (often longer than wide, subapically or laterally attached to the caudicles), uniformly fertile, with uniformly convex faces; fruit of one or two, frequently subcylindrical, slender smooth follicles, sometimes ovate or narrowly fusiform, rarely suborbicular or 3-costate 32
28. Gynostegial corona and corolline corona (annular or cup-like, entire or discontinuous) present 29
28. Only gynostegial corona present..... 30
29. Lower internodes of mature stems conspicuously lenticellate; anthers with radial laminar dorsal appendages, follicles often obtuse or acute at apex*Gonolobus*
29. Lower internodes of mature stems usually thinly and smoothly suberized, not lenticellate; anthers without dorsal appendages, follicles attenuate toward apex*Chloropetalum*
30. Plants with a thick erect, conspicuously corky caudex; pubescence of stems, leaves, and inflorescences of appressed ferruginous, more or less vermiform eglandular trichomes, these trichomes with thin, unsculptured walls, glandular-capitate trichomes few or absent; leaf blades suborbicular, early caducous; follicles narrowly fusiform, with short obtuse, suberized projections.....*Suberogerens*
30. Plants without a caudex; pubescence of stems, leaves and inflorescences of spreading or retrorse eglandular trichomes and sparse glandular-capitate trichomes, eglandular trichomes with sculptured walls; leaf blades ovate, elliptic or oblong-lanceolate, usually persistent;

- follicles fusiform or fusiform-attenuate, winged, ridged or smooth, and sometimes with conic or uncinata, not suberized projections 31
31. Corona composed of 5 somewhat incurved thickly laminar staminal segments adnate to the stipe at the base, and interstaminal segments deeply concave, usually puberulous abaxially; anthers somewhat bent toward flower axis, pollinia subpendent; follicles with five asymmetric wings and/ or several conic or conic-uncinate projections***Atrostemma***
31. Corona with 5 ridged apically ligulate staminal segments adnate to the stipe, interstaminal segments plane or slightly concave, glabrous, basal margin skirt-like, minutely crenulate, dentate or entire; anthers and pollinia horizontal or almost so; follicles 5-winged, 5-ridged or almost smooth ***Matelea***
32. Plants slightly branched and usually not forming tangles; stems and leaves mostly glabrous, short trichomes sometimes present in 1 or 2 lines along apical internodes and adaxial midvein of leaf blade 33
32. Plants much branched and frequently forming tangles; stems usually short pubescent, pubescence in 1 or 2 lines, or ubiquitous, leaf blades glabrescent to densely pubescent 35
33. Inflorescences axillary, usually paired, lax, thyrsoidal or simple, 2- to 4-branched; corolla lobes glabrous; fruit of two usually 3-costate slender follicles, subtriangular in cross section, frequently remaining fused at the tips and containing 2–10 seeds each ***Jobinia***
33. Inflorescences subaxillary, single or paired, racemose or helicoid cymes; corolla lobes marginally ciliate or glabrous; fruit of usually one, fusiform or ovate, smooth, not costate follicle, containing 30–400 seeds34
34. Leaf blades ovate to broadly obovate or suborbicular, shallowly to deeply cordate at base, secondary veins arching, not parallel; axillary foliated short shoots (prophylls) usually

present; inflorescences racemose or condensed partial inflorescences borne in elongated dichasia; corolla lobes pubescent or papillose, not ciliated; follicle broadly ovate or fusiform, rounded or tapering toward apex, not attenuate *Cynanchum*

34. Leaf blades usually oblong or lanceolate, basally obtuse, rounded to narrowly subcordate, with conspicuously dense and parallel secondary veins; prophylls absent; inflorescences simple or with dichasial branching at the base; corolla lobes marginally ciliated; follicle fusiform-ovate and long attenuate towards apex *Blepharodon s. l.*

35. Inflorescences sessile or subsessile congested small cymes, alternate along an axillary, thin, short and simple or ramified, leafless (or with very reduced leaves), zigzagging axis; pubescence, if present, frequently ferruginous; fruit of two spreading erect follicles, forming an acute angle when mature, each follicle with a small basal protuberance, rarely narrowly subcylindrical or suborbicular, with acute apex; plants often growing along wet riparian forests, sometimes in wet cloud forests *Tassadia*

35. Inflorescences sessile or pedunculate, congested to somewhat lax cymes, subaxillary or axillary, not disposed along leafless branches (but leaves early caducous in *Orthosia*); pubescence, if present usually white or translucent, not ferruginous; fruit a pair of follicles, or a single narrowly cylindrical, fusiform follicle; plants of dry or wet shrubby open vegetation, semi deciduous to humid cloud forests and paramo 36

36. Stems not clearly differentiated in long and short shoots; corolla lobes adaxially with smooth and/or verrucose trichomes, often barbate; plants of dry scrubby vegetation or dry deciduous forests and thickets..... *Metastelma*

36. Stems often differentiated in long and short shoots; corolla lobes glabrous, papillose or pubescent; plants of semi deciduous to cloud forests or paramo 37

37. Stems often green, long and short shoots not conspicuously distinct, without clearly distichous leaves, usually leafless at flowering time; leaf blades rounded to cuneate at base; inflorescences seemingly axillary or subaxillary, sometimes paired; fruit a pair of follicles, at obtuse angles when mature, follicles narrowly cylindrical and long-attenuate at apex, without distinct beak *Orthosia*
37. Stems soon turning brown when dry, with long and short shoots usually conspicuously distinct, short shoots with conspicuously distichous leaves, if indistinct, then stems not green; leaf blades cordate, subcordate, truncate or obtuse at base; inflorescences always subaxillary, single in a node; fruit of one or a pair of follicles, follicles fusiform or spindle-shaped and often beaked *Scyphostelma*
38. Pollinia wholly fertile, with rounded faces, pendent or erect from the caudicles; stems and usually leaves with eglandular short and moderate-sized white or translucent trichomes (ferruginous in *Tassadia*); follicles usually smooth.....39
38. Pollinia with a sterile zone, usually with at least one concave face, horizontal from the caudicles, in some genera pollinia pendent; stems and leaves usually with mixed pubescence, of glandular, capitate and eglandular short and long trichomes; in some genera trichomes mainly eglandular, but then these ferruginous or yellowish, and follicles conspicuously muricate or winged43
39. Leaf axils with several digitate colleters; pollinia erect from the caudicles; follicles with thick hard pericarp *Ruehssia*
39. Leaf axils without colleters: pollinia pendent from the caudicles; follicles with a thin pericarp40

40. Inflorescences alternate along an axillary, thin, short and simple or ramified, leafless (or with very reduced leaves), zigzagging axis; or sessile or subsessile congested small cymes; fruit a single or a pair of follicles, if paired, then always at obtuse angles; staminal corona shorter to longer than gynostegium..... *Tassadia*
40. Inflorescences usually pedunculate (sometimes subsessile), bostrychoid or sciadioidal; fruit a single follicle (sometimes two), this usually pendent, ovate, fusiform and then often beaked41
41. Stems with long and short shoots usually conspicuously distinct, short shoots with conspicuously distichous leaves; follicle(s) fusiform, often beaked, containing less than 30 seeds *Scyphostelma*
41. Stems not conspicuously differentiated in long and short shoots, the leaves usually decussate; follicle(s) narrowly ovoid and long-attenuate, containing 31–370 seeds42
42. Mature stems with conspicuously fissured-suberized basal internodes; latex often with a disagreeable garlic scent; corolla rotate or rotate-campanulate, lobes oblong, ovate (– lanceolate), usually revolute and ciliate; gynostegial corona a ring shorter than gynostegium, and 5 free semi-vesicular-dolabriform staminal lobes connate to this ring*Funastrum*
42. Mature stems with thinly suberized, almost smooth basal internodes; latex without a particularly disagreeable scent; corolla campanulate or urceolate, fused for ~half of length, lobes frequently oblong-lanceolate and strongly twisted, sometimes ovate or obovate; gynostegial corona of five free staminal lobes, often adnate to both corolla and gynostegium, attached at the base of the stipe..... *Oxypetalum*

43. Glandular trichomes with white crystalline inclusions (sometimes black when dried) present on stems, leaves and inflorescence; corona of 5 diversely digitately appendaged lobes; follicles long fusiform-cylindrical, smooth, glabrous and mottled *Polystemma*
43. Glandular trichomes translucent, yellowish brown or reddish, without white crystalline inclusions, remaining translucent or turning brown to black when dried; corona not digitate (except digitate appendages in *Dictyanthus*); follicles ovate or fusiform, muricate or winged, or almost smooth and with few sparse conical projections, usually puberulent to hirsute, sometimes glabrous but not mottled 44
44. Eglandular long trichomes (5–6 celled) on conical or column-like multicellular bases present on stems, leaves, inflorescences and follicles; style-head long-rostrate, appendage narrowly clavate, apically obtuse *Prosthecidiscus*
44. Eglandular long trichomes usually surrounded by a narrow ring of small, modified epidermal cells present on stems, leaves, inflorescences and sometimes on follicles; style-head not rostrate or shortly rostrate and apically rugose or bifid 45
45. A thick, erect, conspicuously corky caudex present; pubescence of stems, leaves, and inflorescences of appressed ferruginous, vermiform, eglandular trichomes, with thin unsculptured walls, glandular-capitate trichomes few or absent; follicles narrowly fusiform, with short obtuse, suberized projections *Suberogerens*
45. Caudex small or absent; pubescence on stems, leaves and inflorescences of spreading or retrorse translucent to yellowish eglandular trichomes with sculptured walls, glandular trichomes usually densely distributed, sometimes scarce or absent; follicles fusiform or ovate-fusiform, with short or long projections, or winged 46

46. Gynostegial corona digitately 5-lobed, with axes partly adnate to the corolla tube; pubescence of stems, leaves and inflorescences of eglandular long and short uncinatate or spreading trichomes, and glandular short spreading translucent trichomes; corolla tube internally convolute opposite to corona lobes, corolla lobes often sharply revolute *Dictyanthus*
46. Gynostegial corona diverse, lobes entire, dentate or fimbriate, not digitate, adnate to the corolla tube lengthwise or at the base; stems, leaves and inflorescences with eglandular and glandular straight trichomes, sometimes with few glandular trichomes; corolla tube not convolute, the lobes plane to somewhat revolute 47
47. Herbs or subshrubs with erect or twining stems, usually less than 5 m long when mature; plants mostly from dry savannahs, deserts, dry scrubs or seasonally dry forests 48
47. Subshrubs or shrubs with twining stems, 5 to 40 m long when mature; plants from seasonally dry or wet tropical forests or savannas 49
48. Lower internodes of mature stems with thick fissured cork; leaf axils with several small colleters; anthers without dorsal appendages; pollinia pendent from the caudicles; follicles muricate *Ibatia*
48. Lower internodes of mature stems often conspicuously lenticellate; leaf axils without colleters; anthers with radial laminar dorsal appendages; pollinia usually horizontal from the caudicles; follicles 3- to 5-winged, rarely smooth *Gonolobus*
49. Corolla urceolate or tubular; follicles usually 7-winged; petioles with several (~3–5) digitate axillary colleters *Macroscepis*

49. Corolla rotate to campanulate; follicles muricate, 3- to 5-winged, or almost smooth; petioles usually without axillary colleters, except for small axillary colleters in petioles of *Fischeria*, but then corolla rotate and follicles smooth or with few small protuberances 50
50. Corolla lobes ascending, crisp at apex, with a papillose median line on the adaxial surface; follicles almost smooth or with some small conic projections, neither muricate nor winged 51
50. Corolla lobes usually spreading or reflexed, adaxially neither papillose nor crisp; follicles muricate or winged52
51. Corona annular, frequently slightly 5-lobed at base or marginal apex, sometimes striate or slightly rugose; anthers inflated dorsally, frequently pear-shaped***Fischeria***
51. Corona deeply 5-lobed, strongly rugose-verrucose, usually with 5 radial projections opposite to anthers; anthers not vesicular..... ***Rhytidostemma***
52. Adaxial leaf blade base with fascicles of 30–50 colleters; corolla without a corolline corona; pollinia pendent from the caudicles; follicles with long strongly curved projections 2.5–3.5 cm long..... ***Buceholstia***
52. Adaxial leaf blade base with 4–8 colleters; corolla with a corolline corona; pollinia horizontal or pendent from the caudicles; follicles 3- to 5-winged, or with projections up to 2.5 cm long .
53
53. Pubescence on vegetative structures and inflorescences of eglandular and glandular trichomes; follicles 3- to 5-winged, rarely smooth 54
53. Pubescence on vegetative structures and inflorescences mainly of eglandular trichomes; follicles muricate..... 55

54. Corolla lobes conspicuously reflexed; anthers without radial laminar appendages; pollinia pendent from the caudicles; follicles 5-winged, not strongly curved at base
 *Pseudolachnostoma*
54. Corolla lobes usually spreading, anthers with radial laminar dorsal appendages; pollinia generally horizontal from the caudicles; follicles 3- to 5-winged, rarely smooth, strongly asymmetric and curved at base *Gonolobus*
55. Stem and leaf pubescence made of eglandular trichomes 1.5–5.3 mm long; corolla rotate, 36–48 mm diam., lobes ovate-orbicular or broadly deltoid; gynostegium sessile; corolline corona a shallow fleshy cup, roughly pentagonal; pollinia horizontal from the caudicles; plants from lowland wet or rain forests *Rotundanthus*
55. Stem and leaf pubescence made of short (0.25–0.75 mm) and long (1–2.5 mm) eglandular trichomes; corolla campanulate ~28 mm diam., lobes ovate or oblong; gynostegium stipitate; corolline corona cupuliform-urceolate, shortly urceolate or tubular; pollinia pendent from the caudicles; plants from upper mountain cloud forests *Vulcanoa*

Key to the genera of climbing Apocynaceae in the West Indies

1. Anthers 4-locular; pollen as single pollen grains or pollen tetrads.....2
1. Anthers 2-locular; pollen of a theca gathered in pollinia, these joint in pollinaria by a corpusculum and caudicles 19
2. Leaf blades without colleters at base or along adaxial midvein 3
2. Leaf blades and/or proximal adaxial petiole with colleters 17
3. Anthers free from style-head; fruits indehiscent or a capsule, with winged or longitudinally folded ecomose seeds..... 4

3. Anthers connate, and strongly adnate to style-head; fruit a single follicle, or a pair of follicles, mostly with comose seeds..... 6
4. Trichomes in stems, leaves and fruits rigid, with disciform, multicellular bases, sometimes uncinata; anthers rostrate; fruit indehiscent, 1-seeded; seeds narrowly oblong and flattened, with two opposite wings *Anechites*
4. Trichomes in stems, leaves, and fruits not rigid or uncinata, with few-celled bases; anthers not rostrate; fruit a capsule with winged seeds or a pair (rarely one) of indehiscent segmented mericarps with 1–16 longitudinally folded wingless seeds 5
5. Stems woody, usually thick; flowers 50–80 mm long, with an annular nectary disc, and frequently with a corona; fruits spiny capsules, seeds concentrically winged *Allamanda*
5. Stems slender, not woody; flowers 2.5–5 mm long, without nectary disc or corona; fruit of two (rarely one) flattened or triangular, 1–16 segmented mericarps with fusiform, longitudinally folded, verrucose, comose seeds *Condylocarpon*
6. Corolla with a corolline corona of 5 free segments or epistaminal ridges, sometimes with an annular thickening at throat 7
6. Corolla with neither a corona nor an annular thickening at throat 8
7. Corolla usually salverform, with an annular thickening at throat, and usually with 5 single appendages; pollen shed in simple grains, not gathered in a pollen translator; fruit of two subcylindrical continuous or diverging, smooth or articulated follicles..... *Prestonia*
7. Corolla infundibuliform, without an annular thickening at throat; spathaceous spoon-shaped pollen translators (pollen shed in tetrads) present; fruit of two narrowly ovoid to fusiform 3-keeled follicles *Cryptostegia*
8. Young stems, and often leaves, glabrous 9

8. Young stems, and often leaves, pubescent..... 13
9. Corolla rotate or subcampanulate; stamens exerted for at least 1/3 of length.....***Pinochia***
9. Corolla salverform or infundibuliform; stamens included..... 10
10. Leaf axils without colleters; inflorescences 1- or 2-flowered; calyx lobes without colleters;
corolla white to dark pink; plants of riparian forests, swamps or mangroves***Rhabdadenia***
10. Leaf axils usually with several small colleters; inflorescences usually many-flowered; calyx
lobes with one or more colleters; corolla white, cream, yellow, orange, or red-purple; plants
of diverse types of vegetation 11
11. Calyx with 5 colleters opposite to the lobes; corolla salverform, lobes frequently oblong;
seeds rostrate..... ***Echites***
11. Calyx with 3–6 colleters, alternate to the lobes (axillary) or many at adaxial base; corolla
infundibuliform, lobes obliquely obovate; seeds truncate or rostrate..... 12
12. Anthers acuminate or subulate at apex sometimes slightly twisted; fruit of one follicle, or two
divergent follicles; seeds truncate..... ***Odontadenia***
12. Anthers with spirally coiled apical appendages 13–17 mm long; fruit of two follicles, usually
connate at apex; seeds rostrate..... ***Pentalinon***
13. Corolla rotate or subcampanulate; anthers exerted at least 1/3 of length; seeds truncate
.....***Forsteronia***
13. Corolla salverform or infundibuliform; anthers mostly included; seeds rostrate 14
14. Corolla salverform 15
14. Corolla infundibuliform 16
15. Bracts foliaceous, 12–20 mm long; calyx lobes 10–20 mm long, foliaceous; seeds 16–19 mm
long***Asketanthera***

15. Bracts scarious, 1–3 mm long; calyx lobes 1–7 mm long, scarious or slightly foliaceous;
 seeds 5–13 mm long *Echites*
16. Anthers 5–7 mm long, with spirally coiled apical appendages, 7–17 mm long; style-head
 capitate-fusiform; fruit of two follicles, usually connate at apex *Pentalinon*
16. Anthers 3–5 mm long, without apical appendages; style-head fusiform; fruit of two,
 divaricate follicles *Angadenia*
17. Inflorescences thyrsiform, terminal or subterminal, usually many-flowered; corolla rotate to
 subcampanulate with very small tube less than 10 mm long; style-head fusiform, 5 costate;
 stamens usually exerted, rarely included; abaxial leaf blades usually with domatia
 *Forsteronia*
17. Inflorescences racemose or umbelliform cymes, or branched, axillary, terminal or
 subterminal, few- to many-flowered; corolla funnelform, salverform or tubular-salverform,
 small to large, tube more than 10 mm long; style-head pentagonal, umbrella-shaped, usually
 with 5 lateral projections or ridges, or fusiform; stamens included; abaxial leaf blades with
 or without domatia 18
18. Inflorescences usually racemose, simple, rarely paniculate; leaf colleters along or at base of
 adaxial midvein *Mandevilla*
18. Inflorescences cymose and branched; leaf colleters present at base of adaxial midvein and/or
 on the petiole just below the blade *Mesechites*
19. Mature stems and leaves with inconspicuous sparse short pubescence of multicellular
 eglandular trichomes to glabrescent, in some genera mixed with few glandular capitate
 trichomes, sometimes leaf blades moderately pubescent 20

19. Mature branches and leaves moderate to densely puberulous to hirsute, trichomes eglandular or glandular, or a mixture of both kinds 28
20. Leaf axils with several colleters; pollinia erect from the caudicles *Ruehssia*
20. Leaf axils without colleters; pollinia pendent or horizontal from the caudicles.....21
21. Anthers usually horizontal, with the longest dimension perpendicular to the flower axis; pollinia with a sterile translucent zone, almost horizontal from the caudicles; follicles 3- to 5-winged, wings sometimes discontinuous or reduced22
21. Anthers more or less vertically disposed, with the longest dimension almost parallel to the flower axis; pollinia without a sterile zone, pendent from the caudicles; follicles wingless 25
22. Corolline corona absent; laminar dorsal anther appendages absent23
22. Corolline corona present, annular, but sometimes interrupted or discontinuous, or represented by pubescent mounts of tissue subopposite to the anthers; laminar dorsal anther appendages present or absent24
23. Corolla campanulate, lobes basally incurved with an ocelle-like concavity, and with a large white ocelle at apex; pubescence of eglandular trichomes, ubiquitous or in two lines on young stems, sparse on leaf blades, or on midvein and adaxial petiole surface*Jacaima*
23. Corolla rotate or subcampanulate, lobes spreading to ascendant, without ocelles; pubescence of eglandular and few glandular trichomes, usually in one or two lines on young stems, and at base and apex of leaf blades, or on adaxial petiole surface *Matelea*
24. Basal internodes of mature stems conspicuously lenticellate; laminar dorsal anther appendages present; follicles mostly obtuse or acute at apex.....*Gonolobus*

24. Basal internodes of mature stems thinly suberized, not lenticellate; laminar dorsal anther appendages absent; follicles broadly attenuate at apex*Chloropetalum*
25. Leaf blades ovate to broadly obovate or suborbicular, shallowly to deeply cordate at base; inflorescences usually long pedunculate; caudicles more or less horizontal, long, without appendages; mericarps a single large (15–27 cm long) broadly ovate or fusiform follicle, with thick walls, mostly rounded or tapering toward apex, containing 30–400 seeds *Cynanchum*
25. Leaf blades narrowly ovate, narrow lanceolate to oblong, usually cuneate, obtuse or rounded, rarely subcordate at base; inflorescences usually sessile or short pedunculate (peduncle of moderate length in some *Metastelma* species); caudicles short and pendent; follicles single or in pairs, less than 10 cm long, with thin walls, usually containing less than 20 seeds.....26
26. Inflorescences (sessile or subsessile congested small cymes) alternate along an axillary (or terminal), simple or ramified, leafless (or with very reduced leaves) zigzagging axis; fruit of paired, erect follicles, forming an acute angle, each with a small basal protuberance, rarely narrowly subcylindrical or suborbicular; staminal corona lobes usually equaling gynostegium*Tassadia*
26. Inflorescences subaxillary or axillary, small umbelliform cymes, not on a leafless axis, but leaves early caducous in *Orthosia*; fruit a single or a pair of follicles, when paired, parallel or disposed at an obtuse angle, without a small basal protuberance; staminal corona usually shorter than gynostegium.....27
27. Inflorescences often axillary or almost so; corona of 5 staminal laminar segments attached at base of gynostegium, fused at base over at least half of length; fruit a pair of follicles, always in obtuse angles; leaf blades often early caducous *Orthosia*

27. Inflorescences subaxillary; corona of 5 free staminal filiform or laminar segments, attached just below the anthers or along the stipe, or shifted to the base of the corolla, equaling or exceeding the gynostegium; follicles, when paired, in an almost parallel disposition; leaf blades usually not caducous..... ***Metastelma***
28. Pubescence of stems, leaves and inflorescences of eglandular trichomes only.....29
28. Pubescence of stems, leaves and inflorescences mixed, of eglandular and glandular trichomes34
29. Leaf axils with several digitate colleters; pollinia erect from the caudicles; follicles usually with thick hard pericarps..... ***Ruehssia***
29. Leaf axils without colleters; pollinia pendent or horizontal from the caudicles; follicles with thin walls.....30
30. Pollinia subhorizontal from the caudicles; leaf blades oblong-lanceolate, basally sagittate; staminal corona segments prominently convex and cucullate (hooded), not ligulate ...***Poicilla***
30. Pollinia pendent from the caudicles; leaf blades ovate, oblong-ovate to narrowly elliptic or linear, basally cuneate, rounded, obtuse, truncate to cordate; staminal corona segments not cucullate, ligulate or without a ligule..... 31
31. Corolla rotate or rotate-campanulate; gynostegial corona of 5 free vesicular-dolabriform staminal segments connate to a basal ring.....***Funastrum***
31. Corolla campanulate or urceolate; gynostegial corona of 5 laminar segments or part of a highly complex system of fused staminal-interstaminal coronas that are folded into a corolline corona, sometimes apparently absent 32
32. Herbaceous twiners, mature stems to 2.5 m long; leaf blades less than 5 cm long, rounded or obtuse, at the most slightly cordate at base..... 33

32. Suffruticose twiners, mature stems 3–5 m long; leaf blades 5–10 cm long, broadly ovate or lanceolate, distinctly cordate at base; corolla campanulate, with very long twisted lobes; style-head long rostrate*Oxypetalum*
33. Leaf blades tapering and without colleters at base; corolline corona absent; follicles fusiform, with some isolated protuberances, and with sparse trichomes *Anemotrochus*
33. Leaf blades basally rounded or slightly cordate, with 2–4 colleters at base; corolline corona part of a complicated system of ridges and bulges mostly in fused part of corolla, or apparently absent or reduced; follicles, as far as known, smooth and glabrous *Tylo dontia*
34. Mature leaf blades 2 × 1 cm to ~6 × 3 cm, basally rounded, obtuse or truncate, with glabrous or nearly glabrous surface, pubescent on veins 35
34. Mature leaf blades usually larger than 6 × 4 cm to 22 × 15 cm or larger, basally cordate or subcordate (truncate to cuneate in a few *Gonolobus* species, in which dorsal laminar anther appendages and corolline coronas occur), mostly with pubescent surface and veins 36
35. Corolla lobes ovate, adaxially pubescent; staminal corona lobes obovate to suborbicular, rounded to emarginate at apex, with a small internal ligule, as long as the gynostegium; style-head flat, anther wings thick, slightly incurved; follicles subcylindrical-fusiform, not winged.....*Poicillo psis*
35. Corolla lobes linear-lanceolate, glabrous; staminal corona lobes swollen at base, subtriangular in front view, ridged, rising vertically and then connecting to the stipe below the anthers, shorter than gynostegium; style-head conical or convex with as lightly raised protuberance; anther wings thin, with divergent apices; follicles fusiform, with 5 undulating wings (in few species known)..... *Ptycanthera*

36. Stems with light brown pubescence of eglandular spreading trichomes, 1.5–6 mm long, and glandular capitate trichomes, 0.15–0.4 mm long, these turning black when dried and very dense in some species; corolla lobes conspicuously crisp marginally at apex; anthers inflated dorsally, vesicular, frequently pear-shaped; follicles smooth or with some small protuberances, neither muricate nor winged..... ***Fischeria***
36. Stems usually with whitish or yellowish pubescence, eglandular trichomes spreading or retrorse, 0.4–2 (–2.5) mm, glandular capitate trichomes 0.1–0.4 mm long, translucent to light brown when dry; corolla lobes planar, sometimes somewhat concave or marginally undulate, but not crisp; anthers neither inflated nor vesicular; follicles 3- to 5-winged or muricate.... 37
37. Mature stems conspicuously lenticellate; laminar dorsal anther appendages present; pollinia horizontal from the caudicles; follicles 3-to 5-winged, wings sometimes discontinuous or reduced in size ***Gonolobus***
37. Mature stems conspicuously suberized and grooved; laminar dorsal anther appendages absent; pollinia pendent from the caudicles; follicles winged or muricate..... 38
38. Corolla urceolate or tubular; gynostegium generally included style-head concave or convex; staminal corona segments usually fleshy, basally fused to the interstaminal corona, adnate to the corolla tube at least ½ of its length, free in the upper ½–⅓ or at apex; follicles (5-) 7-winged, two of the wings incomplete ***Macroscopis***
38. Corolla rotate to subcampanulate; gynostegium exerted, style-head concave to rostrate; corona of fused, mostly laminar staminal and interstaminal parts, adnate to the stipe and to inner base of corolla tube, interstaminal corona segments frequently cup-like; follicles tuberculate, usually with some suberized zones ***Ibatia***

Key to the genera of climbing Apocynaceae in South America

1. Stamens with free filaments, anthers 4-locular, mostly connivent around style-head; pollen shed in monads in most genera, but pollen shed in tetrads onto a spoon-shaped receptacle in *Cryptostegia*; mericarp usually develop into two (rarely one by abortion), cylindrical, subcylindrical or narrowly navicular follicles, navicular-fusiform and 3-winged in *Cryptostegia*; seeds usually linear or narrowly oblong, more or less subcylindrical, mostly with a light brown or yellowish brown coma, coma rarely absent 2
1. Stamens completely connate, anthers 2-locular, adnate to the style-head, filaments laterally fused and enclosing ovary to form a staminal tube; pollen gathered into pollinia; mericarps two or frequently one (by abortion in some genera) fusiform, ovate or more or less obclavate (rarely subcylindrical); seeds dorso-ventrally compressed, usually narrowly ovate or elliptic in outline, sometimes oblong, often with wing-like margins and a silvery white coma, coma rarely absent 27
2. Leaf blades usually with 2 or more colleters on the adaxial leaf blade and/or proximal adaxial petiole surface3
2. Leaf blades and proximal petiole surface without colleters.....6
3. Inflorescences thyriform, terminal or subterminal, usually many-flowered; corolla rotate to subcampanulate, very small, the tube less than 10 mm long; style-head fusiform, 5 costate; stamens usually exerted, rarely included; abaxial leaf blades usually with domatia *Forsteronia*
3. Inflorescences racemiform or umbelliform cymes, axillary, terminal or subterminal, few to many flowered; corolla funnelform, salverform or tubular-salverform, small to large, tube more than 10 mm long; style-head pentagonal, umbrella-shaped, usually with 5 lateral

- projections or ridges or fusiform; stamens included; abaxial leaf blades with or without
domatia.....4
4. Tertiary leaf venation more or less perpendicular to the midvein (more or less opposite-
percurrent); style-head fusiform; adaxial corolla tube with conspicuous infrastaminal
pubescent lines..... *Allomarkgrafia*
4. Tertiary leaf venation percurrent-subopposite or irregular; style-head pentagonal, umbrella-
shaped, usually with 5 lateral projections or ridges; adaxial corolla tube usually glabrous, if
pubescent, then only on or close to the stamen filaments.....5
5. Inflorescences usually racemose, simple, rarely paniculate; leaf colleters along or at base of
adaxial midvein..... *Mandevilla*
5. Inflorescences cymose and branched; leaf colleters at base of adaxial midvein and/or on the
petiole just below the blade *Mesechites*
6. Leaves peltate; seeds rostrate7
6. Leaves not peltate; seeds truncate or rostrate8
7. Young stems, leaves, inflorescences and follicles densely lanuginose, often glabrescent with
age; calyx lobes foliaceous, with indefinitely distributed colleters; corolla infundibuliform,
usually light green.....*Macropharynx*
7. Young stems, leaves, inflorescences and follicles glabrous; calyx lobes small, scarious, with
groups of colleters alternate to the lobes; corolla salverform, purple (Brazil) *Stipecoma*
8. Trichomes of stems, leaves and fruits rigid, with disciform multicellular bases, sometimes
uncinate, anthers rostrate, free from style-head; fruits indehiscent, 1-seeded; seeds narrowly
oblong and flattened, winged..... *Anechites*

8. Trichomes of stems, leaves and fruits, if present, then not uncinata, without disciform multicellular bases; anthers generally not rostrate, usually adnate to style-head; fruits dehiscent follicles 9
9. Mostly erect shrubs, rarely slender vines 1–5 m long; stems, petioles, peduncles and/or pedicels usually glandular-setose, calyx lobes usually glandular-setose, without colleters; corolla tube conspicuously 5-veined (veins seem ridged in dry flowers), usually glandular-setose along the veins; follicles 2, partly connate at the base..... *Galactophora*
9. Usually vines, when mature 2 m or longer; stems, leaves, inflorescences and flowers glabrous or pubescent but without glandular-setose trichomes; corolla tube not conspicuously 5-veined; fruits a large berry, or one or two follicles and then free at the base 10
10. Inflorescences terminal, with prehensile peduncles, many-flowered, cymose, with recurving peduncles; fruit a many-seeded globose edible berry, with thick leathery pericarp.. *Pacouria*
10. Inflorescences axillary, subaxillary or terminal, without prehensile peduncles, few or many-flowered; fruits follicles, capsules or schizocarps, with thin or thick walls 11
11. Corolla with a corona of 5 free entire or bifid segments; spathaceous pollen translators present in 5 cavities at the style-head (pollen shed in tetrads onto a spoon-shaped pollen translator); fruit of two follicles, narrowly ovoid to fusiform 3-winged; plants exotic and invasive in the Neotropics*Cryptostegia*
11. Corolla usually without a corona, but a corona of 5 appendages or ridges present in *Prestonia*, and epistaminal corona present in some species of *Allamanda*; pollen not agglutinated by a translator structure; fruit of one or two follicles, cylindrical to narrowly fusiform, smooth to ribbed 12

12. Corolla lobes overlapping to the left; anthers free from style-head; seeds winged or longitudinally folded, ecomose..... 13
12. Corolla lobes overlapping to the right; anthers strongly or loosely attached to style-head; seeds usually comose 14
13. Stems slender, not woody; flowers 2.5–5 mm long, without nectary disc; fruits schizocarps, flattened or trigonous, 1–16 segmented; seeds 1–16, fusiform, longitudinally folded, verrucose..... **Condylocarpon**
13. Stems thick, usually woody; flowers more than 10 mm long, with or without a nectary disc; fruits slender long follicles, or spiny capsules with smooth winged seeds **Allamanda**
14. Leaf blades glabrous, with conspicuously revolute margins; inflorescences dichasial, many-flowered, with all flowers grouped at distal end; follicles with several very narrow longitudinal ribs; plants endemic to the state of Bahia, NE Brazil..... **Bahiella**
14. Leaf blades glabrous or pubescent, without revolute margins; inflorescences dichasial, or racemiform cymes, sometimes reduced or 2- or 3-branched; follicles often not ribbed; plants of diverse distribution patterns in the Neotropics..... 15
15. Stems glabrous or glabrescent, young stems puberulent in some species 16
15. Stems conspicuously pubescent, sometimes glabrescent when old..... 20
16. Corolla generally with a corona of 5 internal epistaminal appendages or vertical callous ridges, and an annular thickening of a contrasting color at throat..... **Prestonia**
16. Corolla with neither a corona nor an annular thickening at throat 17
17. Calyx lobes closely imbricate at anthesis, frequently strongly unequal, each lobe with 2 or more colleters at base; style-head fusiform or subcapitate, without a basal annulus **Odontadenia**

- 17. Calyx lobes slightly imbricate, equal or subequal, with one colleter at adaxial base, or some lobes without colleters and some lobes with 2 alternate colleters; style-head with or without an annulus at base 18
- 18. Calyx lobes with 5 alternate colleters, the outer lobes without colleters, the inner lobes with 2 alternate colleters each, the medial lobe with 1 colleter; style-head without a basal annulus....

Secondatia

- 18. Calyx lobes with 5 opposite colleters; style-head with a basal annulus 19
- 19. Inflorescences axillary, determinate; leaf blades glabrous; plants from USA (Florida) and the Antilles to St. Andres Island (Colombia)..... ***Echites***
- 19. Inflorescences subaxillary or subterminal, indeterminate; leaf blades frequently minutely puberulent, sometimes glabrous abaxially; plants from E and S Brazil ***Temnadenia***
- 20. Leaf axils and calyx without colleters; plants of riparian forests, swamps or mangroves ***Rhabdadenia***
- 20. Leaf axils usually with several colleters; calyx with or without colleters; plants of diverse types of vegetation, but usually not in swamps or mangroves 21
- 21. Leaf axils usually without colleters (small colleters present in some species); calyx lobes closely imbricate at anthesis, frequently strongly unequal, each lobe with 2 or more colleters at base; style-head fusiform or subcapitate, without a basal annulus ***Odontadenia***
- 21. Leaf axils with 2 or more colleters; calyx lobes slightly imbricate, equal or subequal, with one colleter each at adaxial base, or without colleters; style-head with or without an annulus at base; 22
- 22. Corolla with an annular thickening at throat, usually of a contrasting color 23
- 22. Corolla without an annular thickening at throat 25

23. Calyx lobes petaloid, large, foliaceous	<i>Rhodocalyx</i>
23. Calyx lobes not petaloid, small, green	24
24. Calyx with one colleter opposite to each lobe, and corolla with a corona of 5 epistaminal appendages or vertical callous ridges	<i>Prestonia</i>
24. Calyx without colleters, and corolla without a corona	<i>Laubertia</i>
25. Stamens widely exerted from the corolla tube	<i>Hylaea</i>
25. Stamens included in the corolla tube	26
26. Inflorescences axillary, sometimes two at a node, usually simple, condensed subumbelliform cymes; flowers subtended by several conspicuous linear bracts and bracteoles on petioles or just below calyx; corolla tube often somewhat sulcate and twisted	<i>Macropharynx</i>
26. Inflorescences subaxillary or subterminal, one per node, usually dichotomously or trichotomously branched; flowers subtended by 1–2 bracts; corolla tube not sulcate	<i>Temnadenia</i>
27. Stems and leaves glabrous, sometimes leaves with a few short trichomes on adaxial surface, or along midvein and margins	28
27. Stems (at least nodes) and leaves pubescent.....	39
28. Leaf axils with several digitate colleters; pollinia erect from the caudicles; follicles with thick hard pericarp	<i>Ruehssia</i>
28. Leaf axils without colleters; pollinia pendent or horizontal from the caudicles; follicles with thin or moderately thick pericarp.....	29
29. Inflorescences axillary, paired; pollinia pendent from the caudicles.....	30
29. Inflorescences subaxillary, one per node; pollinia pendent or horizontal from the caudicles	31

30. Corolla 1.5–3 mm long; corona simple; mericarps often longitudinally 3-costate..... *Jobinia*
30. Corolla 4–5 mm long; corona usually double; mericarps smooth or longitudinally striate
(Brazil)..... *Peplonia*
31. Pollinia horizontal from the caudicles, with a hyaline zone or margin and one face somewhat concave; follicles usually 5-costate or 5-winged, rarely smooth (follicles unknown for *Malinvaudia*)..... 32
31. Pollinia pendent from the caudicles, wholly fertile and with round faces; follicles usually smooth or striate, rarely sparsely muricate 33
32. Inflorescences pedunculate, peduncle 5–7.5 cm long; corolla campanulate, with 5 interlobular pubescent pads; corona of five, distinct, 3-dentate, staminal segments; interstaminal segments not differentiated (E Brazil) *Malinvaudia*
32. Inflorescences sessile or shortly pedunculate, peduncles usually less than 1 cm long; corolla rotate or rotate-campanulate, without pubescent pads; corona of a basal skirt-like margin and 5 ridged, apically ligulate, staminal segments adnate to the stipe, interstaminal segments plane or slightly concave *Matelea*
33. Leaves linear to filiform, corolla urceolate or bottle-shaped, hiding the gynostegium, corona absent or vestigial *Morilloa*
33. Leaves of various shapes, corolla of various shapes, corona present 34
34. Corolla rotate, yellowish green to dark purple, adaxially evenly puberulous to villous
..... *Petalostelma*
34. Corolla of various shapes, if rotate, then not dark colored and adaxially not evenly puberulous to villous..... 35

35. Corona of 5 simple laminar lobes, sometimes grooved or folded, often partly connate in the lower half, forming an annulus or a tube in some species 36
35. Corona of 5 semivesicular, dolabriform, or cymbiform lobes, with a basal annulus or stipe in some species 37
36. Leaf blades ovate to broadly obovate or suborbicular, shallowly to deeply cordate at base; axillary foliate short shoots (prophylls) usually present in subgenus *Mellichampia*; corolla rotate to rotate-campanulate, deeply 5-lobed, lobes not twisted, sometimes reflexed; style-head usually convex, conic, or capitate, not rostrate; caudicles without appendages; follicles of one medium-sized to large, broadly ovate or fusiform, follicle, mostly rounded or tapering toward apex..... *Cynanchum*
36. Leaf blades oblong or lanceolate, cuneate to rounded at base, or ovate-lanceolate, shortly subcordate or cordate at base; corolla campanulate or urceolate, fused for ~half of length, the lobes frequently strongly twisted; style-head generally with a conspicuous bifid projection; caudicles with a conspicuous appendage; follicles narrowly fusiform, lanceolate to oblong-lanceolate, long acuminate-attenuate toward apex*Oxypetalum*
37. Leaf blades with ciliate margins and conspicuously dense and subparallel secondary veins (adaxial surface pilose but stems glabrous in *B. colombianum*); staminal corona lobes free, attached along anther backs, cucullate, bicorniculate, vesicular or bucket-shaped*Blepharodon s. l.*
37. Leaf blades with glabrous margins and more or less sparse arched-ascendant secondary veins; staminal corona lobes differentiated from anther backs and/or filament tube, dolabriform, saccate or semivesicular 38

38. Mature stems with conspicuously fissured-suberized basal internodes; leaf blades linear to oblong or narrowly sagittate; corolla usually less than 15 mm diam.; pollinia oblongoid, ellipsoid to clavate, apically attached to the straight, horizontal caudicles basally inserted at the retinaculum; plants widespread in the Neotropics, present in dry scrubs or seasonally dry deciduous forests, from 100 to 2000 m *Funastrum*
38. Mature stems slightly suberized at base; leaf blades elliptic, oblong or obovate, rounded, cuneate or subcordate at base; corolla 16–60 mm diam.; pollinia narrowly clavate, apically attached to the straight, declinate or geniculate caudicles, submedially inserted at the retinaculum; plants restricted to montane Andean wet forests and scrubs, between 1800 and 3900 m *Pentacyphus*
39. Stems (at least young shoots or terminal internodes) and leaves, and often inflorescences with a scarce to dense indument of few to many glandular capitate trichomes or a mixture of glandular and eglandular trichomes, rarely stems, internodes and leaves glabrous or glabrescent; pollinia with a hyaline sterile zone or margin, and usually with at least one concave face..... 40
39. Stems, leaves and inflorescences with a scarce to dense indument of eglandular trichomes, sometimes glabrous or glabrescent; pollinia wholly fertile, usually with round or flat faces 59
40. Mature branches and leaves usually inconspicuously shortly pubescent to glabrescent 41
40. Mature branches and leaves moderately to densely pubescent 46
41. Base of mature leaf blades acute or obtuse to shallowly and broadly subcordate 42
41. Base of mature leaf blades cordate 44

42. Abaxial leaf blade generally with ubiquitous or sparse short (0.2–0.35 mm long) spreading eglandular trichomes; style-head concave; anthers somewhat bent toward flower axis; pollinia subpendent from the caudicles *Atrostemma*
42. Abaxial leaf blade usually glabrous or with few eglandular and sometimes glandular trichomes on midvein, or on surface at apex; style-head plane or convex, rarely rostrate; anthers and pollinia horizontal or almost so 43
43. Inflorescences long-pedunculate, peduncles 5–7.5 cm long; corolla campanulate, throat with 5 pubescent interlobular pads; corona gynostegial, staminal corona segments 3-dentate, adnate to the base of stipe (SE Brazil)..... *Malinvaudia*
43. Inflorescences shortly pedunculate, sometimes sessile, peduncles usually less than 1 cm long; corolla usually rotate or rotate-campanulate, limb or throat glabrous or pubescent, but then without pubescent pads; corona gynostegial, staminal corona segments of apically ligulate often ascending ridges adnate to the stipe for most of their length (Central and South America) *Matelea*
44. Stem pubescence in two lines of retrorse eglandular trichomes and spreading glandular trichomes; corolla lobes oblong, tightly contorted in bud; staminal corona segments of 5 fleshy distinct bilobed elements, interstaminal segments not differentiated; follicles pentagonal and 5-costate (S Brazil)..... *Lhotzkyella*
44. Stem pubescence generally ubiquitous, of spreading or retrorse eglandular trichomes and spreading glandular trichomes; corolla lobes ovate or oblong, moderate or loosely contorted in bud; staminal and interstaminal corona of laterally connate laminar segments, forming an annular or cup-shaped structure; follicles muricate 45

45. Basal stem internodes thinly suberized, not sulcate; leaf axils without colleters; calyx with 4–5 colleters per axil; corolla lobes dull dark purplish, bearing several long flat and long white trichomes at adaxial apex; pollinia horizontal from the caudicles; follicles muricate, with blunt-tipped not suberized tubercles; seeds ecomose (riparian wet or rain forest, Amazonia) ..

Riparoampelos

45. Basal internodes with thick sulcate corky layer; leaf axils with several small colleters; calyx usually with 1–2 colleters per axil; corolla lobes white, green, brown or purple, adaxially glabrous or pubescent, if pubescent, then trichomes short ubiquitous or along one side; pollinia pendent from the caudicles; follicles muricate, tubercles acute or with a thick irregular corky apex; seeds comose (dry scrubs, seasonally dry forest and savannas, Neotropics)..... ***Ibatia***

46. Herbs or subshrubs with erect, prostrate, decumbent or short twining stems, usually less than 5 m long when mature; plants mostly from dry savannas (Cerrados), deserts, dry scrubs or seasonally dry forests..... 47

46. Subshrubs or shrubs with twining stems 5 to 30 m long when mature; plants from seasonally dry, wet or rain tropical forests, or from temperate austral savannas or forests 49

47. Gynostegial corona fleshy, purple to blackish purple, cyathiform, 5-lobed, radially sinuate-lobulate, with five broad cavities in interstaminal position ***Cristobalia***

47. Corona not fleshy, not dark purple, of different construction..... 48

48. Stems with dense grayish tomentose pubescence, eglandular trichomes up to 0.45 mm long; corolla lobes erect and apically recurved, glabrous; corona of 5 free, bifid segments, with each branch conspicuously fimbriate; style-head truncate or slightly concave, with 5 blunt scales at top ***Rojasia***

48. Stems with dense yellowish or white-translucent pubescence, eglandular trichomes 0.25–1 (–3) mm long; corolla lobes usually spreading or slightly recurved, glabrous or pubescent; corona of 5 partly or completely connate staminal and interstaminal segments, entire or lobed, glabrous or puberulous: style-head concave, convex to rostrate, without scales
..... ***Ibatia***
49. Corolla campanulate, urceolate, tubular or salverform; pollinia pendent from the caudicles
..... 50
49. Corolla rotate, pollinia horizontal or pendent from the caudicles 52
50. Corolla urceolate or tubular, lobes usually not reticulate; corolline corona present; gynostegial corona lobes apically truncate or crenulate; follicles (5-) 7-winged, or with 7–9 lines of short conic projections (Neotropics)..... ***Macroscepis***
50. Corolla campanulate or salverform, lobes usually conspicuously reticulate; corolline corona absent; gynostegial corona lobes apically bifid-digitate; follicles with 5 wings and several blunt projections 51
51. Nodes usually with 1–2 subaxillary colleters; corolla campanulate; pedicels 2–6.2 times longer than peduncle + rachis (tropical wet or rain forests of E South America, below 800 m, one species on a sandstone mountain of the Venezuelan Guayana above 1500 m)
..... ***Phaeostemma***
51. Nodes without subaxillary colleters; corona generally broadly salverform, narrowly campanulate in one species; pedicels 0.5 to 1.5 longer than peduncle + rachis (mainly of mountain wet forests above 1000 m in W and N South America, from Peru to N Venezuela)
..... ***Lachnostoma***

52. Corolla and calyx lobes strongly reflexed; corona shortly tubular or salverform, as long as or a bit shorter than gynostegium; pollinia pendent from the caudicles; follicles 5-winged, long-attenuate at apex (wet and rain lowland and submontane forests, Central and South America) ***Pseudolachnostoma***
52. Calyx lobes usually ascending, not reflexed, corolla lobes ascending, spreading or slightly recurved; corona annular, shallowly cup shaped, flabellate or consisting of five distinct staminal segments, adnate to the stipe or to the corolla tube, shorter than gynostegium; pollinia horizontal from the caudicles; follicles smooth, with small conical or irregular projections, or winged; if winged, then annular corona present (follicles not known for *Orinoquia*) 53
53. Eglandular trichomes on stems, leaves and inflorescences usually translucent or light yellow, sparse to dense, 0.3–2.5 (–3.5) mm long; gynostegial and corolline corona present; follicles 3- to 5-winged, rarely smooth..... 54
53. Eglandular trichomes on stems, leaves and inflorescences usually light brown, yellowish brown or golden yellow, 1.9–7 mm long; gynostegial corona present; corolline corona absent; follicles smooth or with short inconspicuous projections (unknown for *Orinoquia*) 55
54. Lower internodes of mature stems conspicuously lenticellate; anthers with radial laminar dorsal appendages; follicles usually obtuse or acute at apex.....***Gonolobus***
54. Lower internodes of mature stems usually thinly suberized, not lenticellate; anthers without dorsal appendages; follicles usually broadly attenuate at apex ***Chloropetalum***
55. Inflorescences 7- to 30-flowered, long-pedunculate; corolla lobes apically usually crisp, papillate along a medial line adaxially; gynostegium stipitate; anthers convex, sometimes

- inflated and vesicular dorsally; corona gynostegial, annular or 5-lobed, smooth, striate or conspicuously rugose, mainly adnate to the stipe..... 56
55. Inflorescences 2- to 6-flowered, subsessile or long-pedunculate; corolla lobes usually obtuse or emarginate at apex, neither crisp nor papillate; gynostegium sessile or subsessile; anthers slightly convex or emarginate, not vesicular; gynostegial corona shallowly cup-shaped, flabellate or made of five almost distinct staminal segments, neither striate, rugose, nor verrucose, adnate to base of corolla tube and to the gynostegium 57
56. Anthers inflated, thick and vesicular dorsally, hiding most of style-head; staminal corona annular, sometimes slightly 5-lobed, smooth or somewhat striate, without radial projections ***Fischeria***
56. Anthers convex, not inflated, with a thin translucent apical membrane, not hiding style-head; staminal corona of five almost distinct, conspicuously rugose or verrucose lobes, frequently with five laterally flat or conical projections that arise radially from the stipe ***Rhytidostemma***
57. Inflorescences subsessile; calyx lobes oblong-elliptic, usually with 1–2 axillary colleters; gynostegial corona purple to black, with a deeply 5-lobed disc; pollinia oblongoid or narrowly calceolate; follicles somewhat tuberculate, with small conic protuberances (tropical rainforest and lower montane wet or rain forests, from Colombia to Bolivia) ***Pruskortizia***
57. Inflorescences long-pedunculate; calyx lobes ovate, usually without colleters; gynostegial corona shallowly cup-shaped or of five staminal almost distinct lobes, yellowish as far as known; pollinia obovoid or obovoid-reniform; follicles smooth, or slightly striate when dry (unknown for *Orinoquia*)..... 58

58. Stems, leaves and inflorescences with sparse to moderate pubescence of dark brown long (1.9–3 mm) eglandular trichomes, and dense pubescence of dark brown to black glandular trichomes (0.3–0.4 mm long); corolla 17–18 mm diam., with deltoid lobes; pollinia 0.6–0.7 mm long (non-flooded wet forest, French Guiana) ***Graciemoriana***
58. Stems, leaves and inflorescences with moderate pubescence of golden yellow, eglandular, very long (5–7 mm long) trichomes, and sparse pubescence of translucent glandular trichomes (0.1–0.15 mm long); corolla 50–55 mm diam., with narrowly ovate lobes; pollinia 0.9–1 mm long (wet or rain forest, headwaters of the Orinoco River, Venezuelan Guayana) .. ***Orinoquia***
59. Leaf axils with several digitate colleters; pollinia erect from the caudicles; follicles with thick hard pericarp ***Ruehssia***
59. Leaf axils without colleters; pollinia pendent from the caudicles; follicles usually with thinly fleshy or moderately firm pericarp, hard and thick in species of *Cynanchum* subgenus ***Mellichampia*** 60
60. Leaf blades basally cuneate, rounded, obtuse, rarely some leaves subcordate 61
60. Leaf blades basally cordate, subcordate or sagittate, and in some species hastate or truncate 66
61. Stems often with distinct long and short shoots, and in some cases adventitious buds forming shoots 62
61. Stems not clearly differentiated in long and short shoots 64
62. Inflorescences sessile or subsessile congested small cymes, alternate along an axillary (or terminal), simple or ramified, leafless (or with very reduced leaves), zigzagging axis;

- mericarps paired, erect, forming an acute angle; staminal corona lobes equaling gynostegium..... *Tassadia*
62. Inflorescences subaxillary or axillary small umbelliform cymes; fruit a single or a pair of follicles, if paired, then always at obtuse angles; staminal corona shorter to longer than gynostegium..... 63
63. Corona formed by two series of laminar segments, the outer segments usually longer than the inner ones, usually fused only at base, inner segments sometime reduced or absent; inflorescences subaxillary; mericarps single or in pairs, narrowly fusiform or narrowly ovoid, with a distinct beak, leaf blades often with revolute margins, not early caducous..... *Ditassa*
63. Corona of a single series of laminar segments, fused over at least half of length; follicles in pairs, more or less cylindrical without distinct beak, always in obtuse angles; leaf blades not revolute, often early caducous *Orthosia*
64. Corona a ring shorter than gynostegium, and 5 free semi vesicular-dolabriform staminal lobes connate to this ring; mericarps one, ovoid or ellipsoid with a distinct beak, containing 30–175 seeds..... *Funastrum*
64. Corona of 5 or 10 staminal laminar segments, without a well-differentiated ring; mericarps one or two, ovoid, fusiform or more or less cylindrical, usually containing less than 20 seeds 65
65. Gynostegium sessile or stipitate; corona of free staminal lobes attached just below the anthers or along the stipe, or shifted to the base of the corolla, equaling or exceeding the gynostegium, triangular, oblong or subulate; leaf blades with spreading non-revolute margin *Metastelma*

65. Gynostegium usually sessile; corona of 2 series of laminar segments, the outer lobes longer or as long as the inner ones, usually fused only at base, inner segments borne from the base of the anthers, sometimes reduced or absent; follicles single or in pairs, narrowly fusiform or narrowly ovoid and long-acuminate, with a distinct beak; leaf blades often with revolute margins..... *Ditassa*
66. Stems often with distinct long and short shoots, and adventitious buds forming shoots; leaves frequently distichous, rarely decussate; fruit normally of two, narrowly cylindrical to narrowly fusiform and long-acuminate follicles *Scyphostelma*
66. Stems usually not clearly differentiated in short and long shoots; leaves usually decussate; fruit a single, ventricose, ovoid, or fusiform, truncate to acuminate follicle..... 67
67. Staminal corona segments dolabriform, saccate or semi vesicular, sometimes with a basal annulus 68
67. Staminal corona laminar, tubular or absent, in some species a basal annulus present 70
68. Pollinia narrowly clavate, apically attached to the caudicles, caudicles submedially inserted at the retinaculum; plants restricted to montane Andean wet forests and scrubs, between 1800 and 3900 m..... *Pentacyphus*
68. Pollinia ovoid, subreniform, ellipsoid, oblong or obovoid, apically attached to the caudicles, caudicles basally inserted at the corpusculum; plants from dry scrubs or forests in the Neotropics, or in Andean wet forests, from 100 to 4500 69
69. Corolla rotate or rotate-campanulate; gynostegial corona of 5 free semi-vesicular-dolabriform staminal lobes connate to a basal ring; style-head convex to conical, not rostrate; follicles ovoid or ellipsoid with a distinct beak..... *Funastrum*

69. Corolla globose, urceolate or campanulate, rarely rotate, shallowly lobed; gynostegial corona present or absent, if present, then lobes free, ovoid to subglobose, rounded or with an acute tip at apex; style-head conical and bilobed or rostrate, with 1 or 2 appendages in some species; follicles of diverse shape and size, but often fusiform or ovoid-fusiform, slightly bulbous at base and long-attenuate, with a slightly dilated, sometimes truncate tip
.....*Philibertia*
70. Inflorescences sessile or subsessile congested small cymes, alternate along an axillary (or terminal), simple or ramified, leafless (or with very reduced leaves), zigzagging axis 71
70. Inflorescences subaxillary or axillary small umbelliform cymes; fruit a single or a pair of follicles, if paired, then always at obtuse angles; staminal corona shorter to longer than gynostegium..... 72
71. Corolla abaxially usually glabrous; gynostegium sessile; fruit paired follicles, forming an acute angle when mature, each with a small basal protuberance, rarely narrowly subcylindrical or suborbicular, with acute apex *Tassadia*
71. Corolla abaxially hirsute; gynostegium stipitate; fruit unknown..... *Hypolobus*
72. Stems sparsely puberulous, pubescence often in lines; leaf blades sparsely puberulous to glabrescent, not tomentose; axillary foliated short shoots (prophylls) often present; corolla rotate to rotate-campanulate, deeply lobed, lobes not twisted; style-head usually convex, conical, or capitate, not rostrate; caudicles simple, without appendages *Cynanchum*
72. Stems tomentose or hirsute, sometimes puberulous but not in lines; leaf blades often abaxially tomentose, hirsute in *Monsanima*; axillary foliated shoots absent; corolla globose, urceolate or campanulate, sometimes rotate, lobes often twisted in *Oxypetalum*; style-head

- conical and bilobed, slightly mammillate, bifid or long-appendiculate; caudicles with or without appendages 73
73. Stems and leaves hirsute; gynostegial corona lobes highly united into an apically inwards folded tube, obscuring the gynostegium; anther wings shorter than dorsum, basally strongly centrifugal; plants of N and east-central Brazil ***Monsanima***
73. Stems and leaves usually tomentose or puberulous; gynostegial corona lobes present or absent, if present, then free from the base or variously connate, obscuring gynostegium in some species; anther wings longer than dorsum, parallel to dorsum or somewhat centrifugal; plants mainly from east-central Brazil and Paraguay to Bolivia and Argentina 74
74. Corolline corona (apparently of gynostegial origin) forming a ring around base of gynostegium, or absent; gynostegial corona minute, between anthers wings at top of stipe, or absent ***Philibertia***
74. Corolline corona (apparently of gynostegial origin) of 5 lobes, these free, partly fused or almost completely connate forming a tube, or arising at or near base of corolla tube; gynostegial corona absent..... 75
75. Corona lobes free; caudicles of pollinaria frequently with lateral teeth; stems and leaves usually glabrescent to villous, sometimes tomentose***Oxypetalum***
75. Corona lobes fused at least at base, sometimes mostly connate forming a tube; caudicles of pollinaria without teeth; stems and leaves (at least abaxially) usually white tomentose.....76
76. Style-head appendages usually thick, fleshy; corpusculum with flattened appendage apically, if absent then anthers with plumose tips; corolla campanulate, the tube narrowly enclosing the gynostegium ***Araujia***

76. Style-head appendages slender, never thick and fleshy; corpusculum without a terminal appendage; corolla rotate or the tube broadly campanulate *Morrenia*

ALLAMANDA Linnaeus, Mant. Pl. 214. 1771. (*Rauvolfioids*)

Erect or scrambling shrubs; latex white. Stems woody, terete and sometimes lenticellate



Allamanda cathartica, photo by P. Acevedo.

when mature; cross section with regular anatomy (Figure 36E). Leaves 3- to 5-verticillate, sometimes opposite or alternate in the upper nodes; blades narrowly obovate, narrowly elliptic to lanceolate, acuminate at apex, cuneate at base, without colleters; petioles with many colleters at base.

Inflorescences axillary or terminal, few to several-flowered cymes; bracts small. Calyx lobes foliaceous, usually strongly unequal, with or without colleters; corolla yellow, sometimes purple to lilac, infundibuliform, lobes sinistrorsely contorted in bud, obovate, slightly shorter than the tube; with or without corolline corona; stamens included, anthers narrowly oblong and basally sagittate, not adnate to style-head; gynoecium syncarpous, 1-locular; style-head spool-shaped, with an apical hair wreath at apex and reflexed membrane at base; nectary annular. Fruit capsular, spiny. Seeds several per fruit, flat, concentrically winged, ecomose.

Distinctive features: Leaves 3- or 5-verticillate, flowers 5–8 cm long, with sinistrorsely contorted lobes and an annular nectary disc, gynoecium syncarpous, 1-locular, capsules spiny, seeds flat, concentrically winged.

Distribution: A neotropical genus of ~15 species, seven of which are scrambling lianas; native to Brazil, Venezuela, Colombia and the Guianas; wet or periodically flooded lowland forests; below 1,500 m. A few species widely cultivated and naturalized throughout the tropics because of their beautiful flowers.

ALLOMARKGRAFIA Woodson, Ann. Missouri Bot. Gard. 19: 45. 1932. (*Apocynoids*)

Twining lianas; latex watery or watery-white. Stems somewhat flattened when young,



Allomarkgrafia plumeriiflora, photo by C. Galdames.

terete when old, glabrous, with inconspicuous interpetiolar colleters. Leaves opposite; blades elliptic or narrowly elliptic, acuminate at apex, rounded, obtuse to cuneate at base with 4–12 or more colleters, secondary veins impressed, tertiary veins more or less perpendicular to the midrib or inconspicuous. Inflorescences axillary or

terminal, cymose, helicoid-racemose, bi- or trichotomously branched, with few to more than 10 flowers; bracts ovate, small. Calyx lobes ovate, with an irregular line of colleters at base; corolla white, cream, green or rose-green, infundibuliform, rarely salverform, lobes dextrorsely contorted in bud, obovate, slightly longer than the tube; corona absent but with 5 infrastaminal crests from the base of the tube to the base of the staminal filaments; stamens included, anthers sagittate, with truncate or obtuse bases, adnate to the style-head; nectaries 5, free or connate,

shorter than ovary; style-head with 5 radial projections in the lower half. Fruit of two, long, narrowly cylindrical or subcylindrical follicles, membranaceous, glabrous. Seeds many, comose.

Distinctive features: Similar to *Mandevilla* and *Mesechites*, differing from *Mandevilla* by its compound (branched) inflorescences and from *Mesechites* by its infundibuliform to narrowly campanulate corollas (vs. salverform in *Mesechites*).

Distribution: A neotropical genus of 10 species distributed from Nicaragua to Peru; in wet forests; 0–1,500 m.

ANECHITES Grisebach, Fl. Brit. W. I. 410. 1861 [“1864”]. (*Rauvolfioids*)

Twining herbaceous vines, 5–6 m long; pubescence sparse, of eglandular, rigid



Anechites nerium, photo by P. Acevedo.

multicellular trichomes with disc-shaped multicellular bases, often uncinatate at apex; latex white. Stems terete or subterete, scabrous to villous with yellowish trichomes; cross section with regular anatomy; bark with corky lines when mature. Leaves opposite; blades narrowly ovate to narrowly elliptic, acute

or shortly acuminate at apex, rounded or subcordate at base without colleters, sparsely scabrous; petioles with very small adaxial colleters. Inflorescences axillary, laxly racemose, 5- to 10-flowered, long-pedunculate. Calyx lobes ovate, with a row of colleters at base; corolla white, subsalverform, tube slender, lobes sinistrorsely contorted in bud, obovate, longer than the tube; corona absent; stamens deeply included, free from style-head, anthers narrowly ovate, caudate at

apex, not adnate to the style-head; nectary annular, $\frac{1}{3}$ the length of the ovary; gynoecium apocarpous, with (2)4–6 ovules per carpel, style-head lenticular with 2 large, papillose lobes at apex. Fruits of two slender, indehiscent, 1-seeded follicles, covered with short, recurved trichomes. Seeds narrowly oblong, compressed, ecomose.

Distinctive features: Pubescence of eglandular rigid trichomes with disc-shaped multicellular bases, often uncinata at apex, corolla lobes sinistrorsely contorted in bud, stamens free from style-head, carpels with (2)4–6 ovules each, style-head with 2 large apical apices, follicles 1-seeded, pubescent to conspicuously plumose with yellowish trichomes.

Distribution: A rare neotropical genus of a single species, *A. nerium* (Aubl.) Urb., distributed in the Greater Antilles and in Costa Rica, Panama, Colombia, Venezuela, and Ecuador; humid or riparian forests; below 1,000 m.

ANEMOTROCHUS Mangelsdorff, Meve & Liede, Willdenowia 46(3): 452. 2016.

(*Asclepiadoideae*)

Prostrate herbs or twining vines, densely covered with multicellular, eglandular, white,



Anemotrochus yamaniguyensis, photo by S. Liede-Schumann.

retorse trichomes; latex white.

Stems with beige corky bark when

mature. Leaves opposite; blades

small without colleters,

membranous, margins entire, often

revolute; petioles very short.

Inflorescences extra-axillary,

subsessile, mostly on short shoots,

with up to 6 flowers. Flowers small, shortly pedicellate; calyx lobes lanceolate, much shorter than the corolla; corolla white, cream, yellowish green, or whitish with greenish reticulation especially along medial line, broadly urceolate to subcampanulate, lobes as long as the tube, ovate to linear, often twisted, adaxially pubescent along one side; corolline corona a protuberance at the base of staminal corona or absent; staminal corona laminar, half as long to as long as the gynostegium; interstaminal corona a more or less visible sinus between staminal corona segments; pollinia pendulous, slightly furrowed. Fruits of 1 or 2 fusiform follicles with pericarp protuberances, with ~15 seeds. Seeds ovate to obovate, winged, comose.

Distinctive features: Flowers small; corolla urceolate, with twisted lobes that are adaxially pubescent along one side.

Distribution: A West Indian genus of three or four species from NW West Indies; only *A. eggersii* (Schltr.) Mangelsdorff et al., from Bahamas, Cuba, Jamaica and Hispaniola, reported as a vine reaching 2 m in length; in lowland, coastal vegetation.

ANGADENIA Miers, Apocyn. S. Amer. 173. 1878. (*Apocynoids*)

Herbaceous or suffrutescent, twining vines, 3–9 m long; sparsely pilose or glabrescent;



Angadenia berteroi, photo by P. Acevedo.

latex white. Stems cylindrical; cross section with regular anatomy. Leaves opposite; blades broadly elliptic to oblong-linear, somewhat leathery, obtuse and mucronulate to

acuminate at apex, obtuse to subcordate at base, without colleters; petioles with conspicuous interpetiolar colleters. Inflorescences axillary or subterminal, scorpioid cymes, simple or dichotomously branched at base, 5- to 30-flowered, long-pedunculate; bracts ovate or lanceolate, small. Calyx lobes ovate-lanceolate, with 1–2 alternate colleters; corolla bright yellow, tubular-campanulate, 2–3 cm long, the expanded upper part much longer than the narrowly cylindrical tube and ~as long as the lobes, lobes dextrorsely contorted; corona absent; stamens included, anthers oblong-elliptic, narrowly sagittate, obtuse or acute at apex, adnate to the style-head; nectaries 5, connate or almost free; style-head fusiform. Fruit of two terete follicles, continuous to slightly moniliform, acuminate. Seeds numerous, shortly rostrate, with light, buff-yellow coma.

Distinctive features: Differs from other genera with rostrate seeds by the combination of long peduncles (longer than leaves), inconspicuous bracts, infundibuliform corolla, often slightly moniliform follicles, and shortly rostrate seeds.

Distribution: A New World genus of two species distributed in SE United States (Florida), Bahamas, Cuba, Hispaniola and Jamaica; pine forests, coastal thickets and forest margins, on limestone substrate; 0–900 m.

ARAUJIA Brotero, Trans. Linn. Soc. London 12: 62. 1818. (*Asclepiadoideae*)

Twining vines, 5–6 m long; latex white. Stems terete or nearly so, densely hirsute,



Araujia sericifera, photo by Paul Shirley Succulents.

glabrescent. Leaves opposite; blades discolorous, abaxially albo-pubescent or albo-tomentose, with 2–4 colleters at base. Inflorescences subaxillary, 1- to 5-flowered, racemose or umbellate; bracts small. Flowers fragrant; calyx lobes deltoid, ovate to broadly lanceolate, often twisted, $\frac{1}{2}$ as long as

the corolla; corolla campanulate to widely salverform, with 5 ovate lobes $\frac{1}{2}$ as long as the tube; gynostegial corona of free or basally fused staminal lobes, adnate to the corolla and gynostegium, shorter than the gynostegium; gynostegium sessile, style-head massive, rostrate or capitate and bifid; pollinia pendent, apically attached to straight, declinate or ribbon-shaped caudicles, corpusculum often larger than pollinia, with hyaline margin. Fruit of a single follicle,

ellipsoid to obliquely obpyriform, occasionally vaguely tuberculate or costate, with thick woody pericarp. Seeds many, wingless, denticulate, comose.

Distinctive features: *Araujia* is similar to *Morrenia*, but differs by the massive style-head, the campanulate to widely salverform corolla and a corona of free, short, erect, fleshy lobes.

Distribution: A genus of ~eight species from south-central Brazil, Bolivia, Paraguay, Argentina, and Uruguay, with five species occurring within the limits of the Neotropics; dry to moist lowland forests, often in disturbed areas; below 1,800 m.

ASKETANTHERA Woodson, Ann. Missouri Bot. Gard. 19: 46. 1932. (*Apocynoids*)

Twining vines, 3–5 m long; pubescence of eglandular, usually ferruginous trichomes;



Asketanthera longiflora, photo by P. Acevedo.

latex white or clear. Stems thick or slender, terete, densely hispidulous to glabrous; cross section with regular anatomy. Leaves opposite; blades ovate-elliptic, acuminate at apex, obtuse to round at base, without colleters; petioles with several pectinate, adaxial, stipular colleters. Inflorescences axillary, simple, scorpioid, 2- to 20-flowered; peduncle shorter or longer than subtending leaves; bracts large. Calyx lobes broadly elliptic or broadly lanceolate with a single antisepalous (sometimes lacinate) colleter at the base; corolla salverform, greenish white to yellow, tube slender, lobes strongly dextrorsely contorted, obliquely obovate or elliptic-

lanceolate, mostly longer than the tube; corona absent; stamens included, anthers narrowly

lanceolate or oblong, acuminate at apex, with short obtuse tails at base, adnate to the style-head; nectaries 5, free, shorter than ovary; style-head cylindrical with an expanded basal annulus. Fruit of two straight, terete, acuminate, pubescent to glabrate follicles. Seeds many, rostrate, with cream colored coma.

Distinctive features: Differs from *Angadenia*, *Echites* and *Pentalinon* by the large foliaceous bracts and sepals and corolla tube with the external indument distributed in five longitudinal lines (vs. scarious bracts, small sepals and corolla tube externally glabrous or with indument irregularly distributed).

Distribution: A West Indian genus of four species, three endemic to Hispaniola and one found in Hispaniola and Cuba; wet forests and gallery forests on cliffs or limestone formations; below 1,000 m.

ATROSTEMMA Morillo, Pittieria 39: 198. 2015. (*Asclepiadoideae*)

Twining vines, 3–10 m long; latex white. Stems with glandular and eglandular trichomes,



Atrostemma xerophilum, photo by G. Morillo.

glabrescent, usually thinly corky when mature.

Leaves opposite; blades broadly ovate to oblong-elliptic, cuneate to broadly cordate at base with 2–5 colleters, abaxially densely puberulous, with glandular trichomes.

Inflorescences subaxillary, 3–7-flowered, pedunculate or sessile; bracts small. Calyx

lobes linear to suborbicular; corolla rotate,

green or yellowish green and dark-reticulate, lobes oblong-lanceolate to obovate-elliptic;

gynostegial corona cyathiform or annular-cyathiform, staminal segments incurved, thickly laminar or fleshy, adnate to stipe at base, interstaminal segments concave, usually puberulous abaxially; gynostegium subsessile, style-head concave; anthers somewhat erect, obtriangular, pollinia subpendent, corpusculum sagittate. Fruit of one follicle, asymmetrically oblong or boat-shaped, obtusely muricate, glabrous. Seeds many, narrowly ovate, comose.

Distinctive features: Vegetatively similar to *Matelea* but differing by the abaxial leaf surface usually densely glandular-puberulous, with erect short trichomes, gynostegial corona cyathiform or annular-cyathiform, with incurved thick laminar or fleshy staminal segments, adnate to stipe, and with concave interstaminal segments, somewhat erect, obtriangular; anthers with subpendent pollinia, concave style-head, and a single, asymmetrically oblong or boat-shaped, muricate, glabrous follicle.

Distribution: A neotropical genus of 10 species, distributed in Guatemala, Nicaragua, Costa Rica, Colombia, Venezuela, Guyana and NE Brazil; forests and thickets, dry or humid; 100–1,700 m.

BAHIELLA J.F. Morales, Sida 22 (1): 342. 2006. (*Apocynoids*)

Twining lianas; latex white. Stems terete when mature, glabrous. Leaves opposite; blades coriaceous, elliptic or obovate-elliptic, rounded, obtuse, retuse or apiculate at apex, obtuse or attenuate at base, without colleters, margins conspicuously revolute, secondary and tertiary veins inconspicuous; petioles with small axillary colleters. Inflorescences axillary, cymose, many-flowered, pedunculate; bracts small and inconspicuous. Calyx lobes narrowly ovate, with a single (sometimes deeply lacerate) antisepalous colleter at base; corolla salverform or infundibuliform, tube rose or purple, lobes dextrorsely contorted, green or rose-lilac, narrowly

obovate; corona wanting; stamens included, anthers acuminate at apex, sagittate with acute divergent tails at base, adnate to the style-head; nectary annular, irregularly 5-lobed, ½ the length to as long as ovary; style-head spool-shaped, with a membranaceous annulus at base. Fruit of 2 divaricate, woody, straight, terete, longitudinally ribbed, glabrous follicles. Seeds many, rostrate, glabrous, with cinnamon-brown coma.

Distinctive features: Differing from all South American Apocynoids by the glabrous leaves, lacking colleters, with conspicuously revolute margins and inconspicuous tertiary veins, by a complex branched inflorescence architecture with the flowers borne in dense apical clusters, the spool-shaped style-head with a basal annulus, and follicles with several, narrow longitudinal ribs.

Distribution: Two species, endemic to Bahia, Brazil; wet, coastal forests; 0–100 m.

BEAUMONTIA N. Wallich, Tent. Fl. Nepal. 14. 1824. (*Apocynoids*)

Twining lianas; pubescence of eglandular ferruginous trichomes; latex white. Stems



Beaumontia grandiflora, photo by G. Morillo.

terete, pubescent or glabrous.

Leaves opposite; blades

elliptic or obovate, shortly

acuminate at apex, obtuse at

base, without colleters;

petioles with colleters at

adaxial base. Inflorescences

axillary or terminal, cymose,

with up to 10 flowers; bracts

foliaceous, large. Calyx lobes obovate or elliptic, with several colleters at base; corolla white to

cream, infundibuliform, tube cylindrical, lobes dextrorsely contorted, broadly ovate, shorter than the tube; corona wanting; stamens included, anthers on long, slender filaments, adnate to the style-head; nectary annular, shorter than ovary; ovary syncarpous; style-head fusiform. Fruit large, woody, oblong-ellipsoid of two connate follicles. Seeds many, truncate, comose.

Distinctive features: A robust liana with ferruginous, eglandular pubescence, few-flowered inflorescence, foliaceous calyx lobes with several colleters at the base, very large white or cream campanulate corollas, with stamens exposed and with conspicuously long, slender filaments, and follicles fused into a very large, stout, woody fruit up to 35×7 cm.

Distribution: A genus of 10 species, native to tropical Asia; *B. grandiflora* Wall. is commonly cultivated in Mexico, Central America and the West Indies.

BLEPHARODON Decaisne in A. de Candolle, Prodr. 8: 603. 1844. (*Asclepiadoideae*)

Herbaceous or suffrutescent twining vines to 10 m long, rarely subshrubs or herbs; latex



Blepharodon mucronatum, photo by P. Acevedo.

white. Stems striate but not suberized, with 2–5 conspicuous stipule-like colleters along interpetiolar line; cross section with regular anatomy. Leaf blades discolorous, ovate to oblong or lanceolate, with numerous straight, subparallel secondary veins, with 2–4 colleters at the base. Inflorescences subaxillary, 2- to 14-flowered, racemose, umbellate or paniculate, pedunculate or sessile; bracts small. Calyx lobes ovate, deltoid or

white. Stems striate but not suberized, with 2–5 conspicuous stipule-like colleters along interpetiolar line; cross section with regular anatomy. Leaf blades discolorous, ovate to oblong or lanceolate, with numerous straight, subparallel secondary

lanceolate; corolla rotate or campanulate, rarely urceolate, greenish white or cream-yellow, lobes mostly ovate or triangular, flat or revolute along margins, ciliate; gynostegial corona of free staminal lobes attached along the back of anthers, equaling or longer than the gynostegium, erect, cucullate, bicorniculate, bucket-shaped, or semi-vesicular; gynostegium sessile or stipitate, style-head flat or umbonate; pollinia pendent, rarely erect, laterally attached to the straight, horizontal to ascending caudicles with pronounced hyaline margins. Fruit usually one obclavate, subcylindrical or fusiform follicle, smooth, glabrous, rarely muricate. Seeds many, narrowly ovate, with wingless denticulate margins, comose.

Distinctive features: Leaves with dense, subparallel secondary veins; corolla lobes often with ciliate margins; gynostegial corona of free staminal lobes attached along the back of the anthers, erect, cucullate, bicorniculate, bucket-shaped, or semi-vesicular.

Distribution: In its present circumscription, *Blepharodon* is polyphyletic (Liede-Schumann et al. 2005) with 26 species from Central and South America, 25 of which are twining vines.

Blepharodon sensu str. consists of two species, *B. ampliflorus* E. Fourn. and *B. lineare* (Decne.) Decne., distributed in E and S Brazil, Paraguay and N Argentina; wet or seasonally dry forest, dry sandy or rocky savannahs and disturbed areas; 0–2,000 m.

BRUCEHOLSTIA Morillo, Pittieria 39: 207. 2015. (*Asclepiadoideae*)

Twining lianas 10 to 40 m long, with white latex; dense brownish or yellowish brown



Bruceholstia magnifolia, photo by B. Holst.

mixed pubescence. Stems softly suberized at base when old. Leaves opposite; blades broadly ovate or elliptic, pubescent, deeply cordate at base, with 30–50 colleters; petioles with fascicles of 30–50 colleters at the base. Inflorescences subaxillary, racemose, 4- to 6-flowered; long-pedunculate; bracts long, lanceolate. Calyx lobes thick, broadly elliptic; corolla fleshy, rotate-campanulate, pale orange or yellowish green, reticulate, lobes ovate, glabrous;

corona gynostegial, fleshy, dark brown to purple, annular-cyathiform, staminal lobes reniform, ligulate, adnate to the base of the anthers; gynostegium sessile, scarcely surpassing the corona, style-head pentagonal, flat or concave; anthers vertical, with apical locules, pollinia pendent.

Fruit of one large fusiform follicle, covered with long, curved processes and dark brown pubescence. Seeds many, narrowly ovate, comose.

Distinctive features: Recognized by the large cordiform leaves, the presence of 30–50 colleters at the base of each petiole and adaxial leaf blades; dense brownish or yellowish brown mixed pubescence; corollas fleshy, orange or yellowish green; long pendent pollinia, and large fusiform brown-pubescent follicles covered with long curved processes.

Distribution: A genus of a single species, *Bruceholstia magnifolia* (Pittier) Morillo, distributed from southern Mexico to Panama; tropical wet or rain forests; 70–1,700 m.

CHLOROPETALUM Morillo, Pittieria 39: 213. 2015. (*Asclepiadoideae*)

Tressensia H.A. Keller (2017).

Suffrutescent twining vines or trailing plants, with thin rhizomes; mixed pubescence of



Chloropetalum sp., photo by G. Morillo.

short glandular and long eglandular trichomes; latex white. Stems normally with two, rarely 3–6 small colleters along interpetiolar line, usually thinly suberized at base, not lenticellate. Leaves opposite; blades ovate to ovate-oblong, cordate, with 2–6 colleters at base. Inflorescences subaxillary, 2–14-flowered, shortly pedunculate. Calyx lobes ovate to oblong-ovate; corolla rotate or

shallow campanulate, green or yellowish green, reticulate, lobes ovate or ovate-oblong; corolline corona as interrupted thickened areas with clusters of short trichomes on the corolla tube; gynostegial corona disciform or deeply 5-lobed, adnate to base of corolla and gynostegium; gynostegium sessile or shortly stipitate, style-head flat or slightly concave; anthers without dorsal radial appendages, pollinia subtriangular or pyriform, horizontal or slightly pendent. Fruit of one or two, 5-costate or 5-winged, long-acuminate follicles. Seeds narrowly obovoid, distally dentate, reticulate-verrucose, comose.

Distinctive features: Morphologically similar to *Gonolobus* but distinguished by mature stems that are thinly suberized at base; anthers without dorsal radial appendages, and the long-acuminate follicles. The segregation of *Chloropetalum* from *Gonolobus* is supported by the results of two phylogenies based on molecular data (Klings et al. 2008, Mangelsdorff et al. 2016, Liede-Schumann, unpublished data).

Distribution: A neotropical genus of four species; distributed from Honduras to SE Brazil, including some of the Lesser Antilles; seasonally dry, moist riparian forests, and thickets; 0–1,500 m.

CONDYLOCARPON Desfontaines, *Mém. Mus. Hist. Nat.* 8: 119. 1822. (*Rauvolfioids*)

Twining lianas reaching 15 m in length; latex white. Stems puberulous to tomentose,



Condyllocarpon isthmicum, photo by P. Acevedo.

glabrescent, cylindrical or nearly so, lenticellate; cross sections in some species with deep phloem wedges (Figure 36B). Leaves opposite-decussate or verticillate; blades elliptic to broadly lanceolate, inter-secondary veins often polygonal-reticulate, without colleters; petioles usually with colleters on adaxial surface. Inflorescences terminal and /or axillary, many-flowered thyrses, congested in terminal branches; bracteoles ovate to lanceolate, small. Calyx lobes ovate, triangular or orbicular, lacking colleters; corolla cream, yellow or greenish white, sometimes with reddish brown streaks, infundibuliform or salverform, tube present, very short; lobes sinistrorsely contorted, oblique, narrowly dolabriform, or narrowly obovate with ribbon-like appendages on the left margin; corona absent; stamens free from style-head, anthers ovate or lanceolate, without basal appendages; gynoecium of two apocarpous carpels; style-head orbicular or turbinate, shortly 2-lobed; nectary absent.

Fruits of 2, pendulous, indehiscent, articulate follicles with thick leathery endocarp, with 1–16, 1-seeded segments. Seeds fusiform, longitudinally folded, ecomose.

Distinctive features: Recognized by the reticulate tertiary venation with polygonal areoles; small calyx lobes without colleters, small corolla, with sinistrorsely contorted lobes, stamens ovate or lanceolate, free from a barely differentiated style-head; follicles indehiscent, articulate, with each articulation containing a single ecomose seed with thick, ruminant endosperm.

Distribution: Seven species, distributed from Nicaragua to SE Brazil and Bolivia; wet forests, riparian forests and mangrove swamps, below 1,000 m.

CRISTOBALIA Morillo, S.A. Cáceres & H.A. Keller, *Pittieria* 40: 132. 2016.

(*Asclepiadoideae*)

Twining vines, 1–5 m long; latex white. Stems flexuous, terete, hirsute, not corky at base.



Cristobalia bella, photo by H. Keller.

Leaves opposite; blades membranous to subcoriaceous, obovate-elliptic or ovate-elliptic to deltoid-ovate, to 15 cm long, obtuse and apiculate or acuminate at apex, narrowly cordate at base with 3–10 colleters, densely pubescent; petioles with axillary colleters. Inflorescences subaxillary, subsessile, 3–15-flowered; bracts linear. Calyx campanulate, with 1–3 colleters in the sinus between the lobes; corolla rotate to campanulate, 14–21 mm diam., lobes ovate, glabrous, adaxially green or dark pink to purple, reticulate; gynostegial corona fleshy, purple to

blackish purple, cyathiform, 5-lobed, radially sinuate-lobulate, with five broad cavities in interstaminal position; gynostegium exserted, shortly stipitate; anthers with prominent, curved, laminar wings; carpels muricate; pollinia reniform or asymmetric and shortly calceolate. Fruit of 1 or 2, fusiform-ellipsoid, muricate follicles, with many conic to unciform projections, hirsute. Seeds numerous (> 300 in *C. bella* Morillo et al.), ovate-oblong, minutely and coarsely toothed or almost entire, comose.

Distinctive features: Vegetatively similar to *Macroscepis* but differing by stems not corky at the base, subsessile or short-pedunculate inflorescence, calyx lobes not foliaceous, corolla broadly campanulate or rotate-campanulate, adaxially green or dark pink to dark-purple, with reticulate lobes, corona forming five broad cavities alternate to the anthers, gynostegium exserted, and fruits muricate, with many conic to unciform projections.

Distribution: A genus of four species, found in southern South America, only *C. hirsutissima* Morillo, S.A. Cáceres & H.A. Keller found within the limits of the Neotropics in Bolivia (Tarija); forests; 200–2,670 m.

CRYPTOSTEGIA R. Brown, Bot. Reg., t. 435. 1820. (*Periplocoideae*)

Twining lianas, 2–3(–10) m long; latex white, abundant. Stems smooth copper-colored,



Cryptostegia grandiflora, photo by P. Acevedo.

lenticellate and
ridged when mature,
glabrous or
pubescent; cross
section with regular
anatomy. Leaves
opposite; blades
elliptic or ovate to
oblong-elliptic,
without colleters,
glabrous.

Inflorescences terminal, cymose, 1–4(–9)-flowered; bracts foliaceous. Calyx lobes ovate or elliptic; corolla large, infundibuliform, purple, pale rose or white, lobes ovate-lanceolate; corolline corona inserted on corolla tube, reaching the sinus of corolla lobes, lobes free, filiform, entire or bifid; gynostegium concealed in corolla tube; nectar pockets at base of corolla tube; nectaries five transversal ridges, fused to staminal feet, basally connate to each other; stamens with free filaments, anthers broadly lanceolate, connective appendages lanceolate; pollen granular, aggregated in rectangular or T-shaped tetrads, loose on spoon-shaped, sticky translator. Fruit of two divergent narrowly ovoid to fusiform follicles, naviculate, 3-keeled, with thick walls (Figure 42A). Seeds many, tuberculate or ridged, with a white coma.

Distinctive features: Recognized by the corolline corona of filiform appendages, the spoon-shaped pollen translator, and the ovoid to widely fusiform, 3-keeled follicles. Young stems are coppery and leaf midvein is light colored.

Distribution: Two species native to Madagascar; cultivated and naturalized throughout the tropics, becoming a noxious weed in disturbed areas and dry forests, scattered and naturalized throughout the Neotropics; 0–500 (–1,500) m. Plants are very toxic due to the presence of cardiac glycosides.

CYNANCHUM Linnaeus, Sp. Pl. 212. 1753. (*Asclepiadoideae*)

Ampelamus Raf. (1819); *Enslenia* Nutt. (1818); *Mellichampia* A. Gray ex S. Watson (1887); *Metalepis* Griseb. (1866); *Roulinia* Decne. (1844); *Rouliniella* Vail (1902); *Sarcostemma* R. Br. (1810); *Stelmagonum* Baill. (1890); *Telminostelma* E. Fourn. (1885).

Herbaceous or suffrutescent, twining vines 0.5–20 m long; latex white, abundant. Stems with short trichomes in 1 or 2 lines, glabrescent or glabrous, tomentulose at the nodes, sometimes suberized at the base; often with short shoots (prophylls) resembling stipules; cross section with regular anatomy. Leaves opposite; blades with 3–14 colleters at base. Inflorescences subaxillary or seemingly axillary, (3–)5 to 20 (–50)-flowered, simple, helicoidal or umbellate, mostly pedunculate; bracts small and inconspicuous. Calyx lobes suborbicular, narrowly ovate to



Cynanchum montevidense, photo by P. Acevedo.

oblong; corolla rotate or campanulate, rarely cyathiform, often white, cream, green, yellow, rarely dark brown, sometimes with reddish, maroon or purple streaks, glabrous, papillose or with verrucose trichomes over the whole surface, lobes ovate, oblong, triangular, rarely recurved;

gynostegial corona with at least basally fused lobes, forming a ring of connate staminal and interstaminal parts, annular, cyathiform, urceolate or campanulate, shorter than to exceeding the gynostegium, staminal lobes laminar, ovate, deltoid, rhombic to oblong, entire or bi- or trilobed, sometimes apically reflexed; gynostegium sessile or stipitate; anthers broadly sagittate or deltoid, pollinia ovoid, oblong, clavate or pyriform, corpusculum ovate to oblong. Fruit usually of a single follicle, narrowly or broadly and asymmetrically ovoid, ellipsoid or oblong-fusiform, rounded or obtuse at both ends, often with thick and smooth pericarp. Seeds many per follicle, ovate or elliptic, entire or slightly denticulate, comose.

Distinctive features: The most distinctive feature of many *Cynanchum* species is the possession of stipule-like prophylls. Species without prophylls can be distinguished from superficially similar species of Oxypetalinae and Gonolobinae by the pubescence of eglandular trichomes, a corona usually consisting of both staminal and interstaminal parts and smooth pericarps.

Distribution: Cosmopolitan genus with ~100 species, with centers of distribution in Africa and Asia. In the Americas, 20–40 species, distributed from S United States (Texas), Mexico to SE



Figure 43. *Cynanchum subpaniculatum*. **A.** Flowering branch. **B.** Detail of leaf base with colleters. **C.** Flower bud. **D.** Flower, top and lateral views. **E.** Pollinia with translators and gland. **F.** Dehiscent fruit. **G.** Seed with coma. Drawing courtesy of Bobbi Angell.

Bolivia and NE Argentina, and Jamaica; seasonally dry forests and tickets, humid lowland forest margins, or riparian forests, often in periodically flooded habitats; below 1,200 m.

Note. Not clear how many species occur in the Neotropics as the taxonomy of the genus is currently inadequate.

DICTYANTHUS Decaisne in A. de Candolle, Prodr. 8: 604. 1844. (*Asclepiadoideae*)

Erect or trailing herbs, subshrubs, or twining vines 0.2–2 m long, often with a basal



Dictyanthus yucatanensis, photo by J. Conrad.

caudex; pubescence of glandular short and eglandular short and/or long trichomes; latex white. Stems with interpetiolar line of trichomes and colleters, usually woody and fissured-suberized at base. Leaves opposite; blades ovate, cordate or lobed at base, with 2–11 colleters. Inflorescences subaxillary with 1–few-flowered helicoidal cymes, sessile or pedunculate; bracts ovate, oblong to linear. Calyx lobes elliptic, narrowly ovate or lanceolate; corolla campanulate, tubular or urceolate, the tube slightly

longer than the lobes, usually internally convolute, opposite to corona lobes, the lobes often sharply revolute; gynostegial corona digitately 5-lobed, adnate to the corolla tube and partly to the gynostegium; gynostegium stipitate, style-head pentagonal, concave to apiculate at apex; pollinia subhorizontal, obliquely flattened-obovate, concave and hyaline along upper margin, corpusculum sagittate. Fruit of a single mottled, fusiform, muricate follicle with few to many

thick or thin spreading or curved projections. Seeds many, flattened-obovate, with entire or dentate margins, comose.

Distinctive features: Herbaceous twining vines, with spreading glandular and uncinat e glandular trichomes, stems usually woody and fissured-suberized at base, leaves small ovate-cordate, corolla campanulate to urceolate, often with internally convolute tube, follicles small, fusiform, muricate, thin walled.

Distribution: About 16 species from northern Mexico to Nicaragua; mainly seasonally dry forests and savannas; 0–1,500 (–2,250) m.

DITASSA R. Brown, *Asclepiadeae* 38. 1810. (*Asclepiadoideae*)

Herbaceous or suffrutescent twining vines, 1–5 m long, rarely (sub-) shrubs; latex white.



Ditassa oxyphylla, photo by A. Popovkin.

Stems pubescent, tomentose or glabrous, indument translucent, occasionally yellow or brown; bark commonly corky at base. Leaves strongly ascending; blades linear, elliptic to obovate, or obdeltoid, cuneate, rounded to subcordate at base, usually with 2, rarely up to 5 colleters, often strongly revolute and

pubescent. Inflorescences subaxillary, alternating at nodes, 1–17-flowered, umbellate, occasionally basally dichasial, pedunculate or sessile. Calyx lobes ovate, oblong or lanceolate; corolla rotate, campanulate, cyathiform or urceolate, mostly white or cream, adaxially

with verrucose or barbate trichomes on lobes and sinuses, the lobes oblong, lanceolate, ovate or triangular; gynostegial corona of 5 free or rarely basally fused, staminal lobes, sometimes absent, usually differentiated from base of anthers into an outer and an inner lobule; gynostegium usually sessile, style-head umbonate to capitate, rarely rostrate; anthers erect; corpusculum narrowly ovoid, obovoid or oblong, smaller than the pollinia. Fruit of one, rarely two follicles, narrowly fusiform, obclavate or narrowly oblong, rarely ovate-lanceolate (occasionally with basal swelling), with a distinct beak. Seeds few per follicle, oblong to ovate, usually wingless, comose.

Distinctive features: Similar to *Metastelma* but distinguished by the ascending leaves often with revolute margins, the biseriate corona, and the often basally swollen, strongly beaked follicles.

Distribution: A South American genus with ~140 species, distributed from Colombia to northern Argentina and Uruguay, ~105 species reported as twining vines; open plant formations; 100–3,000 m.

ECHITES P. Browne, Civ. Nat. Hist. Jamaica 182. 1756. (*Apocynoids*)

Allotoonia J.F. Morales & J.K. Williams (2004); *Fernaldia* Woodson (1932).



Echites umbellatus, photo by P. Acevedo.

Herbaceous or suffrutescent, twining vines, 2–7 m long; pubescence of eglandular trichomes; latex clear or white. Stems slender, cylindrical with interpetiolar colleters not clearly differentiated; cross section with regular anatomy. Leaves opposite; blades elliptic

to narrowly elliptic to narrowly ovate, obtuse, acute, acuminate to caudate at the apex, rounded, obtuse or cuneate at base, without colleters; petioles with several adaxial colleters at base.

Inflorescences axillary, racemose, helicoidal to dichasial, few- to many-flowered; pedunculate or subsessile; bracts small, inconspicuous. Calyx lobes inconspicuous, ovate with one antisepalous (sometimes laciniate) colleter at the base; corolla salverform to infundibuliform, white, cream-white, greenish white, greenish yellow, yellow, orange, or pinkish white; lobes dextrorsely contorted in bud, usually longer or as long as the tube, sometimes acuminate and filiform; corona absent; stamens included, anthers with basal auricles acute to acuminate or obtuse or broadly rounded, narrowly triangular at apex, adnate to the style-head; nectaries 5, free or connate into a 5-lobed ring, usually shorter or as long as the ovary; style-head spool-shaped, with a basal annulus. Fruit of two, free, cylindrical or slightly moniliform, membranaceous to woody follicles. Seeds many, short- to long-rostrate, cream to tan coma.

Distinctive features: Recognized by the combination of glabrous or puberulent stems and leaves, small and inconspicuous bracts, calyx lobes with a solitary antisepalous colleter and salverform to infundibuliform corollas lacking an annular corona at the throat or free corona lobes above the stamens.

Distribution: A neotropical genus of 14 species, distributed from southern United States (Florida) to the Greater Antilles and from Mexico to Panama; scrubs, dry forests and montane forests; 50–2,000 m.

FISCHERIA de Candolle, Cat. Horti Pl. Monsp. 112. 1813. (*Asclepiadoideae*)

Twining vines or lianas, 3–20 m long; pubescence of short glandular translucent and long



Fischeria stellata, photo by P. Acevedo.

eglandular yellowish trichomes; latex white.

Stems pubescent to hispid, lenticellate with age; cross section with regular anatomy.

Leaves decussate; blades ovate, elliptic to narrowly lanceolate, narrowly and shortly cordate at base, with 2–10 colleters; petioles

with axillary colleters. Inflorescences 1 (2) per

node, subaxillary cymes, 12–30-flowered, long-pedunculate; bracts linear, small. Calyx lobes ovate, oblong, or lanceolate-attenuate; corolla rotate-campanulate, lobes incurved, white and green, or cream with reticulate green venation, lanceolate, ovate or triangular, papillose along midvein adaxially; gynostegial corona fleshy, annular, adnate to corolla and gynostegium, 5-lobed at base or apex, often abaxially warty, sometimes fimbriate at apex; anthers without transversally dehiscent membrane, connective appendage dorsally inflated or thickly laminar, often pear-shaped, hiding style-head margin; pollinia reniform, horizontal, corpusculum broadly sagittate. Fruit of one large follicle, obliquely ellipsoid or ovoid, nearly smooth, glabrous or puberulent. Seeds many, ovate, winged, coarsely dentate, comose.

Distinctive features: Large lianas, densely glandular and eglandular pubescent throughout, with long-pedunculate, many-flowered inflorescences; white, or white and green-reticulate corollas with incurved apically crisped lobes; annular corona, and conspicuously expanded, often pear-shaped connective appendages that cover the style-head margins.

Distribution: Eight species from southern Mexico to SE Brazil, Cuba and Jamaica; wet, seasonal, or montane forests and thickets, often along forest or stream margins; 0–2,000 m.

FORSTERONIA G. Meyer, Fl. Esseq. 133. 1818. (*Apocynoids*)

Twining or scrambling lianas or rarely erect shrubs (Figure 44); pubescence of short



Forsteronia laurifolia, photo by P. Acevedo.

eglandular trichomes; latex white, abundant; lianas reaching 3–15 m in length, often with short, opposite, plagiotropic branches. Stems terete or angled, glabrous or rarely pubescent, conspicuously lenticellate, often suberized when mature, nodes with deltoid or subulate, mostly caducous stipule-like

colleters; cross section with regular anatomy. Leaves opposite, rarely 3-verticillate; blades ovate, elliptic to oblanceolate, acute to acuminate at apex, acute to subcordate or cuneate at base, usually with 2 or a group of colleters, secondary veins usually with tufted domatia in the axils. Inflorescences terminal and axillary, many-flowered thyrses, pedunculate or sessile; bracts small and inconspicuous. Calyx lobes ovate, triangular or lanceolate, with colleters few and alternisepalous or several in a row; corolla 5–10 mm diam., white, greenish white or yellow, rotate, subcampanulate, subcylindrical or obconic, tube short, often with a ring of trichomes at the throat, lobes dextrorsely contorted in bud, ovate, lanceolate or oblong, glabrous to densely pilose adaxially; corona absent; stamens included to completely exserted; anthers oblong to lanceolate, acute at apex, mostly cordate to truncate at base, adnate to the style-head; nectaries 5, free or connate at base; style-head narrowly fusiform, subcylindrical or conic-subcylindrical,

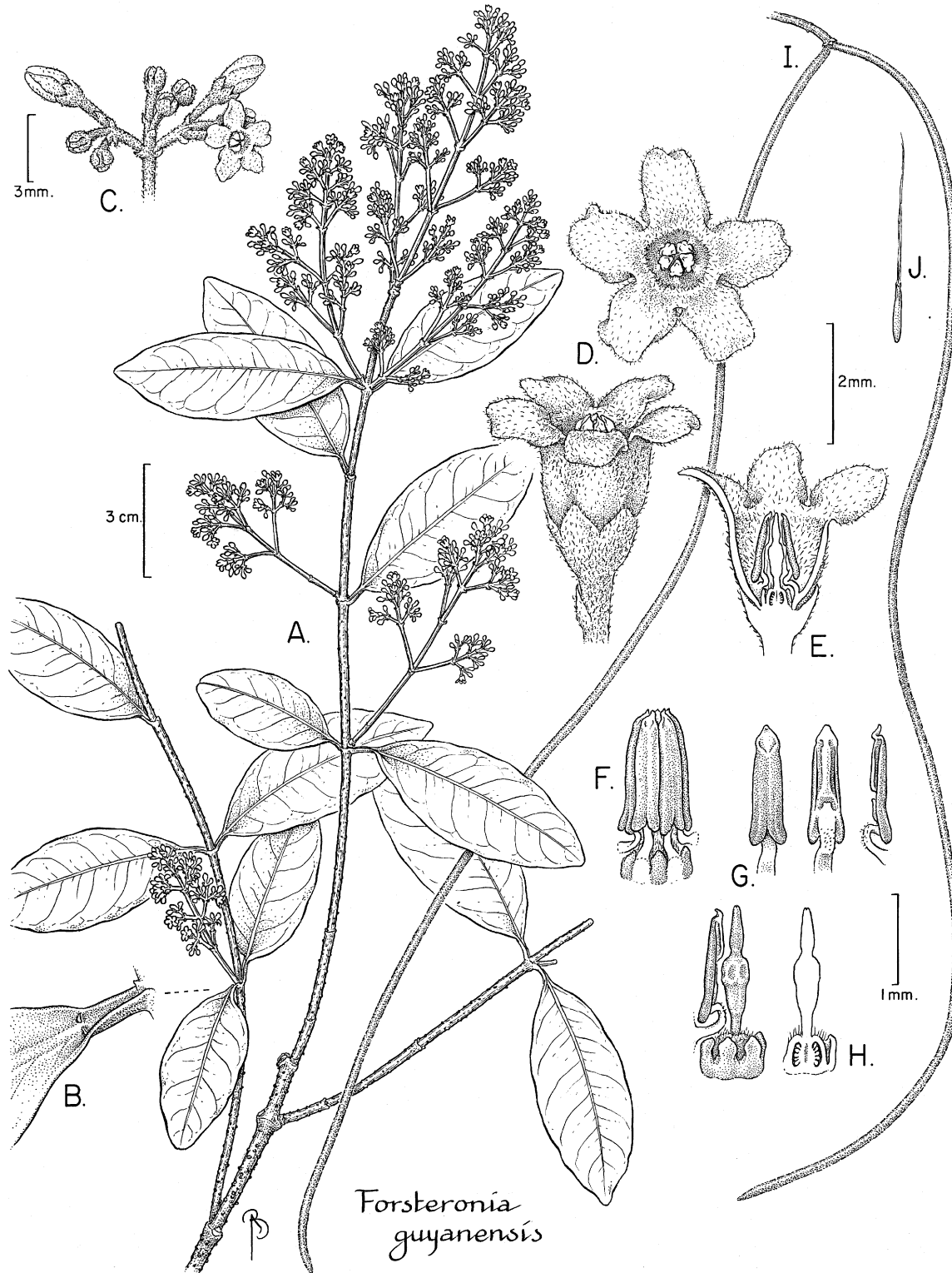


Figure 44. *Forsteronia guyanensis*. A. Flowering branch. B. Detail of leaf base with colleters. C. Distal portion of inflorescence. D. Flower, top and lateral views. E. Flower, longitudinal section. F. Androecium. G. Anthers, dorsal, frontal, & lateral views. H. Gynoecium, surrounded by a lobed nectary disc at base. Drawing courtesy of Bobbi Angell.

without annulus. Fruit of two, pendent, divaricate or parallel, narrowly cylindrical to moniliform follicles, usually lenticellate. Seeds truncate, usually 5- to 8-ribbed, with a ventral groove, and a yellowish brown coma.

Distinctive features: Recognized by the conspicuously lenticellate stems, leaf domatia, minute corolla with a ring of trichomes at the throat, exserted stamens, narrowly cylindrical lenticellate follicles with longitudinally 5- to 8-ribbed, papillate seeds. Resembling *Pinochia*, but distinguished by the leaf colleters, style-head ribbed in the lower part without a basal annulus, anthers truncate or cordate at the base, and seeds 5–8-ribbed.

Distribution: A New-World genus with 41 of the 45 species occurring in the Neotropics; southern Mexico to Brazil and north-central Argentina; lowland wet or riparian forests, lower montane forests, and sometimes in rocky or sandstone savannas; mostly below 1,000 (–1,500) m.

FUNASTRUM E. Fournier, Ann. Sci. Nat. Bot., sér. 6, 14: 388.1882. (*Asclepiadoideae*)

Pattalias S. Watson (1889); *Seutera* Rchb. (1828).

Herbaceous or frutescent, twining or creeping vines or rarely subshrubs, commonly rhizomatous; latex white, often with strong garlic smell. Stems often suberized at base. Leaves



Funastrum clausum, photo by B. Hammel.

occasionally
 caducous; blades
 ovate, linear,
 elliptic, truncate,
 cordate-lobate or
 hastate at base with
 2–4 colleters.
 Inflorescences
 subaxillary,
 umbellate, 6- to
 20(–60)-flowered,

sessile to long-pedunculate; bracts linear, small. Calyx lobes ovate, elliptic or lanceolate; corolla rotate or subcampanulate, white, cream, green or yellow, often flushed with purple, lobes usually revolute and ciliate; gynostegial corona white, formed by a short ring and 5 free, erect, vesicular dolabriform staminal lobes connate to this ring; gynostegium sessile or shortly stipitate, style-head conical to shortly rostrate; pollinia pendent, oblong to clavate. Fruit of one (–2) follicle(s), narrowly fusiform or obclavate, smooth or slightly costate-tuberculate. Seeds few to many per follicle, ovate, winged, comose.

Distinctive features: Similar in stem and leaf morphology to *Araujia*, *Oxypetalum*, *Morrenia*, and *Philibertia*, but distinguished by a corona of five free vesicular, dolabriform staminal lobes surrounded by a low corona ring. Species of *Philibertia* may have a similar corona structure, but their corolla is campanulate or salverform (not rotate or subcampanulate) and the stems and leaves often are whitish or yellowish tomentose.

Distribution: A New-World genus of ~21 species, 13 of which are twining vines distributed in the Neotropics from Mexico to SE Brazil, including the West Indies; open, arid or semi-arid areas, gallery forests and sometimes flooded areas; 0–1,600 (–2,000) m.

GALACTOPHORA Woodson, Ann. Missouri Bot. Gard. 19: 49. 1932. (*Apocynoids*)

Erect shrubs, or rarely slender twining vines, 1–5 m long; latex usually clear. Stems



Galactophora crassifolia, photo by J.E. Householder.

terete, often pubescent, puberulent or glandular-setose, with colleters along interpetiolar line. Leaves opposite, decussate; blades coriaceous, ovate to elliptic, broadly cuneate, rounded to obtuse at apex, obtuse or cordate at base without colleters, often punctate-pustulate; petiole

with many axillary digitate colleters. Inflorescences terminal or subterminal, corymbose or subumbellate, 8- to 16-flowered, pedunculate or sessile, usually glandular-setose; bracts small and inconspicuous. Calyx lobes foliaceous, without colleters, frequently glandular-setose on margins; corolla large, rose-orange, rose-pink, or white, rarely purple, infundibuliform, the tube elongated, conspicuously 5-veined and ridged, usually glandular-setose along the veins, the lobes dextrorsely contorted, broadly ovate to deltoid; corona absent; stamens deeply included, anthers narrowly oblong-sagittate, adnate to the style-head; nectaries 5, connate, much shorter than ovary; gynoecium of two carpels partly connate at base, style-head pentagonal-fusiform, with 5 radial projections at base. Fruit of two, terete follicles, connate at the base. Seeds many, oblong or fusiform, truncate, with a cream-white to yellow-brown coma.

Distinctive features: Distinguished by the glandular-setose pubescence, the foliaceous calyx lobes without colleters, the long corolla tube with 5 conspicuous ridged veins, and the basally partly joined follicles.

Distribution: A South American genus of six or seven species, with only two species (*G. crassifolia* (Müll. Arg.) Woods. and *G. schomburgkiana* Woods.) reported as twining vines. These are found in Colombia, Venezuela, Guyana, and Brazil; sandstone savannas, scrub and forest margins; 50–2,000 m.

GONOLOBUS Michaux, Fl. Bor.-Amer. 1: 119. 1803. (*Asclepiadoideae*)

Exolobus E. Fourn. (1885); *Fimbristemma* Turcz. (1852); *Trichostelma* Baill. (1880).

Herbaceous or suffrutescent twining vines, 3–10 m long; pubescence of long, yellow or



Gonolobus incerianus, photo by P. Acevedo.

translucent trichomes, frequently mixed with glandular, short trichomes; latex white. Stems lenticellate in lower internodes. Leaf blades broadly ovate, oblong-elliptic or cordate, with 2–8 colleters at base. Inflorescences subaxillary, racemiform cymes, 1- to 15-flowered, subsessile to pedunculate; bracts

often linear, small. Calyx lobes broadly ovate to linear; corolla rotate, green or yellowish green, sometimes white or purple, often reticulate, frequently pubescent, lobes linear, lanceolate or ovate-elliptic, tightly twisted in bud; corolline corona inserted in corolla tube, usually annular, sometimes interrupted, ciliate or fimbriate; gynostegial corona fleshy, annular or cup-shaped, of

mostly connate staminal and interstaminal parts, adnate to base of gynostegium and corolla; gynostegium sessile or stipitate; anthers subtriangular, horizontal, dorsally with laminar appendages; pollinia horizontal, oblong-obovoid to reniform, corpusculum sagittate. Fruit of 1 (– 2) ovoid or ellipsoid, 3- to 5-winged follicles, rarely smooth or muricate, strongly asymmetrical at base, often obtuse or acute, rarely attenuate toward apex, with numerous ovate seeds.

Distinctive features: Similar to *Chloropetalum*, which differs by anthers without appendages, apically attenuate follicles, and mature thinly suberized stems, not lenticellate.

Distribution: A New World genus with 120–140 species, ~80 of which are distributed in the Neotropics from Mexico to SE Brazil and the West Indies; seasonal dry or wet forests and thickets; 0–2,850 m.

GRACIEMORIANA Morillo, Pittieria 39: 223. 2015. (*Asclepiadoideae*)

Twining vines, ~10 m long; pubescence dense, of brownish glandular and eglandular spreading trichomes (Figure 45). Leaf blades broadly elliptic or obovate-elliptic, narrowly



Graciemoriana gracieae, photo by S. Sant.

cordate at base, apparently without colleters, tertiary venation conspicuous. Inflorescences subaxillary, helicoid cymes, 3- to 4-flowered, pedunculate. Calyx lobes narrowly ovate-elliptic, without colleters; corolla rotate-campanulate, green, conspicuously reticulate, lobes spreading, broadly

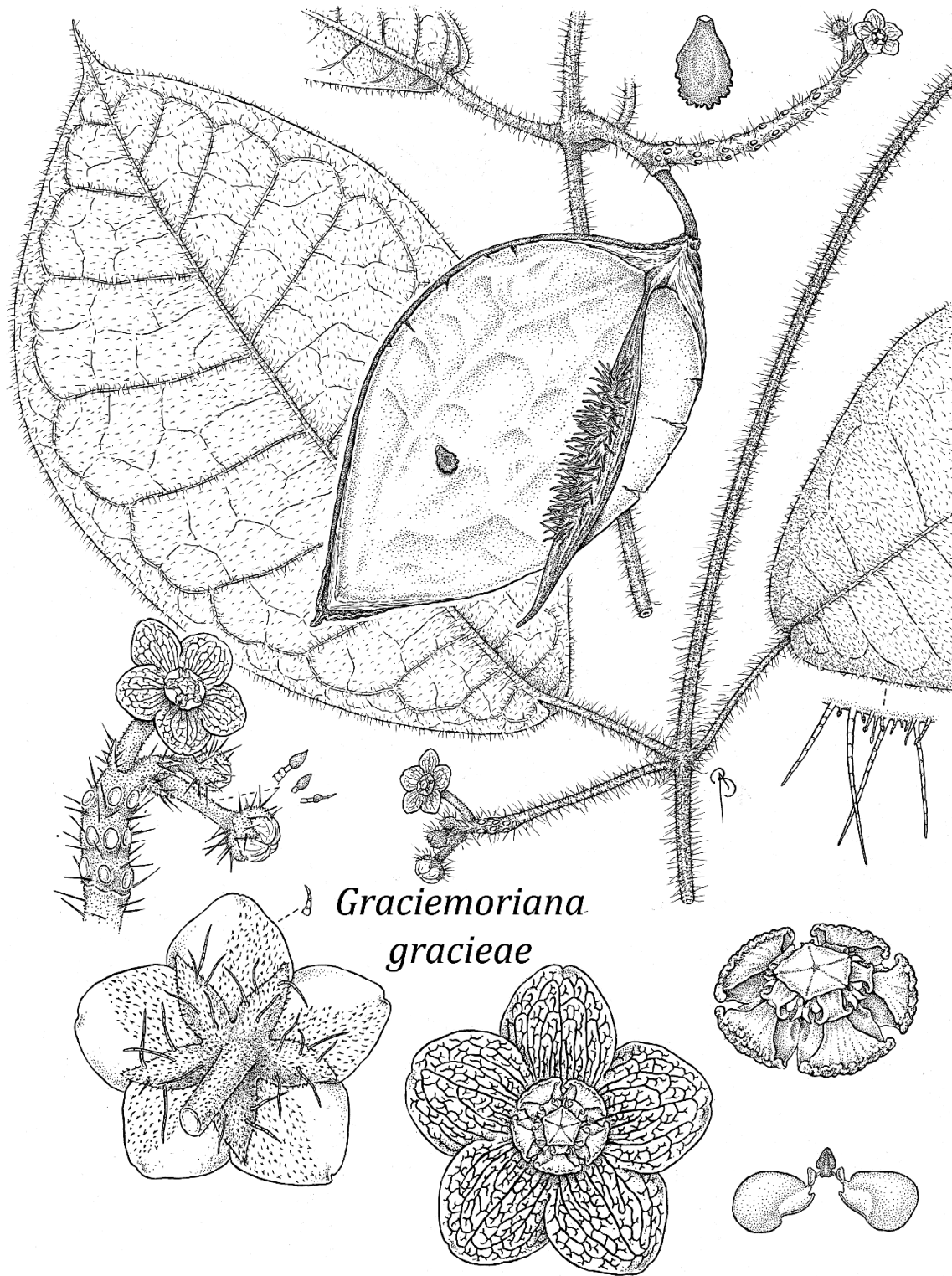


Figure 45. *Graciemoriana gracieae*. Drawing courtesy of Bobbi Angell.

deltoid, obtuse, emarginate, abaxially pubescent; corona gynostegial, yellow, fleshy, segments five, irregularly trapezoidal, marginally rugose-carunculate; gynostegium shortly stipitate, style-head pentagonal, slightly convex; anthers subtriangular, horizontal; pollinia subhorizontal, asymmetrically obovoid-reniform, corpusculum broadly sagittate. Fruit of one ovoid-fusiform follicle, brown-puberulent. Seeds many, ovate, comose.

Distinctive features: Similar to *Fischeria* and *Rhytidostemma* because of its mixed dense brownish pubescence, leaf shape and size, pollinia, and fruit morphology, but differing by the few-flowered inflorescences, calyx without colleters, medium-sized, rotate-campanulate corollas, with spreading, broadly deltoid obtuse lobes, corona of five irregularly trapezoidal segments and a shortly stipitate gynostegium with slightly convex style-head.

Distribution: One species, *Graciemoriana graciae* (Morillo) Morillo, endemic to French Guiana; non-flooded moist forests; 200–400 m.

HYLAEA J.F. Morales, Novon 9: 83. 1999. (*Apocynoids*)

Twining lianas or small trees; latex usually clear. Stems terete, puberulent to glabrous. Leaves coriaceous; blade elliptic to broadly elliptic, acuminate at apex, obtuse at base without colleters. Inflorescences axillary, many-flowered, subcorymbose to umbelliform, long-pedunculate; bracts foliaceous or scarious. Sepals with a single antisepalous colleter at the base; corolla salverform to subinfundibuliform, white and pink to purple-tinged, glabrous, lobes longer or as long as the tube; free corolline corona lobes small, inserted above each anther; annular corona absent; stamens inserted near orifice of corolla tube, almost completely exerted, the filaments short, puberulent, the anthers acute to acuminate at base; nectaries 5, distinct, as high as or surpassing the ovary; ovary apocarpous, glabrous, style-head fusiform. Fruit unknown.

Distinctive features: Similar to *Prestonia* but differing by the almost completely exerted stamens and the absence of an annular corona in the orifice of the corolla tube.

Distribution: A poorly known genus of two species restricted to the Brazilian-Venezuelan Amazonia; *H. leptoloba* (Monach.) J.F. Morales is the only climbing species and is endemic to the state of Amazonas, Brazil; often on white sandy soils and/or along black water rivers; below 400 m.

HYPOLOBUS E. Fournier in Martius, Fl. Bras. 6(4): 311. 1885. (*Asclepiadoideae*)

Suffrutescent twining vines; hirsute or tomentose. Leaves opposite; blades ovate, apically mucronate, hirsute-tomentose. Inflorescences one or two per node, 15- to 30-flowered, thyrses, flowers in clusters of 2–6, along a zigzagging rachis; pedunculate. Flowers small; calyx lobes ovate-lanceolate, hirsute; corolla rotate to subcampanulate, with short tube and ovate lobes, abaxially hirsute; gynostegial corona elevated, of five separate, triangular lobes, gynostegium subtended by a short column; pollinia horizontal, much larger than the oblong corpusculum; style-head umbonate. Fruits and seeds unknown.

Distinctive features: Like *Tassadia* because of similar inflorescences, but unique within neotropical Asclepiadoideae by the abaxially hirsute corolla lobes, along with a corona and gynostegium subtended by a column.

Distribution: A single species, *H. infractus* E. Fourn., endemic to Bahia (Brazil), but possibly extinct.

IBATIA Decaisne in A. de Candolle, Prodr. 8: 599. 1844. (*Asclepiadoideae*)

Amphidetes E. Fourn. (1885); *Callaeolepium* H. Karst. (1866); *Omphalophthalma* H. Karst. (1866); *Pseudibatia* Malme (1900); *Pycnobregma* Baill. (1890).

Twining vines or sometimes erect subshrubs or shrubs, 2–5 m long; mixed pubescence of translucent or yellowish trichomes; with unpleasant smell, latex white. Stems cylindrical, with



Ibatia maritima, photo by P. Acevedo.

conspicuously fissured-suberized bark (suberized strands to 15 mm high) when old. Leaves opposite; blades ovate to suborbicular, usually (sub-) cordate at base with 2–11 colleters; petioles with adaxial colleters. Inflorescences subaxillary, racemose, sometimes paniculate or condensed subglobose cymes, 5- to 20-

flowered, short-pedunculate; bracts small. Calyx lobes ovate or lanceolate; corolla rotate to campanulate, white or green to purple, lobes ovate to oblong; gynostegial corona of partly or completely connate staminal and interstaminal segments, annular, cup-shaped or 5-lobed; gynostegium stipitate, style-head concave to rostrate; anthers radially protruding, with dorso-apical dehiscence; pollinia pendent, usually obovate or subdeltoid, hyaline in the proximal end, corpusculum (sub-) sagittate. Fruit one or two ovoid or narrowly fusiform, muricate follicles, 5–10 cm long, projections usually with corky apex (Figure 40A). Seeds numerous per follicle, comose.

Distinctive features: Similar in general morphology to *Rojasia* but recognized by the densely yellowish or translucent pubescence throughout, the numerous axillary colleters, anthers radially

protruding with dorso-apical dehiscence, pendent pollinia with proximal hyaline margin, and follicle projections and surface often partly suberized.

Distribution: A New-World genus of ~33 species, 25 of which are twining vines; that occurs in the Neotropics; Honduras, Nicaragua, Panama to southern Brazil, and the West Indies (except Jamaica); in dry and seasonally dry forests and scrubs; 0–3,000 m.

JACAIMA Rendle, J. Bot. 74: 340. 1936. (Asclepiadoideae)

Twining slender vines, up to 8 m long; pubescence of eglandular trichomes; latex white. Stems slender, puberulous, with hairs in two lines. Leaves opposite; blades ovate to oblong or oblong-elliptic, cuneate, rounded to subtruncate at base with 2–5 colleters. Inflorescences subaxillary, racemiform cymes, 4- to 9-flowered, short-pedunculate. Calyx urceolate, lobes oblong or ovate, small; corolla narrowly campanulate, white or greenish yellow, 4–5 mm diam., glabrous, tube short, lobes oblong, as long as or longer than the tube, spreading, abaxially concave at the center and revolute at the acute apex; staminal corona a costate ridge adnate to the stipe for most of its length, apically ligulate; gynostegium stipitate, style-head umbonate; pollinia horizontal, oblong-obovate, corpusculum narrowly sagittate. Fruit of one glaucous, narrowly ovoid, acuminate follicle, 5-ridged, glabrous. Seeds unknown.

Distinctive features: Like *Matelea* (a genus not confirmed for the Antilles in its strict sense) but recognized by the pubescence of eglandular trichomes, the leaves with adaxial midvein and petiole sparsely pubescent, and by the narrowly campanulate corolla tube that encloses the gynostegium and has concave lobes that are revolute at apex.

Distribution: Genus endemic to Jamaica with a single species *J. costata* (Urb.) Rendle; exceedingly rare in thickets on limestone substrate, 0–270 m.

JOBINIA E. Fournier in Martius, Fl. Bras. 6(4): 327, t. 97. 1885. (Asclepiadoideae)

Cyathostelma E. Fourn. (1885); *Cynanchum* L. sect. *Formosum* Liede (1997); *Dicarpophora* Speg. (1926); *Kerbera* E. Fourn. (1885).

Suffrutescent twining vines 3–5 m long or rarely erect herbs; latex white. Stems terete, glabrous. Leaves opposite; blades ovate to oblong, often cordate, with 2–3 colleters at the base.



Jobinia formosa, photo by J. Roque.

Inflorescences axillary, mostly paired, longer than subtending leaves, 5- to 30(–68)-flowered, often dichasial toward the base, but subumbellate toward the apex, often long-pedunculate. Corolla rotate, broadly campanulate or cyathiform, white or yellowish green, rarely purple, lobes oblong, lanceolate, triangular or ovate, occasionally caudate; gynostegial corona tubular or cyathiform, with oblanceolate or oblong staminal lobes, occasionally with short interstaminal lobules or teeth; gynostegium sessile or stipitate, style-head

umbonate to rostrate; pollinia pendent from the caudicles, ellipsoid-obovoid, oblong or clavate, corpusculum narrowly ovoid- elliptic, ellipsoid or oblong. Fruit a pair of fusiform, subparallel or spreading, often 3-costate or 3-striate, glabrous follicles. Seeds few, ovate, winged, comose.

Distinctive features: Similar to *Orthosia*, *Scyphostelma*, and *Monsanima* but glabrous, with axillary, basally dichasial inflorescences, a fused gynostegial corona and a pair of 3-striate or 3-costate, narrowly fusiform follicles.

Distribution: A New-World genus with ~25 species, 18 of which are twining vines that occur in the Neotropics; southern Mexico, Guatemala, Honduras, Nicaragua, Venezuela, Ecuador, Peru, Bolivia to eastern Brazil and northern Argentina; wet lowland, montane forests, and thickets; 200–3,700 m.

LACHNOSTOMA Kunth in Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 3: ed. qu., 199.

1819. (*Asclepiadoideae*)

Twining vines 5–10 m long; pubescence mainly of eglandular yellowish trichomes, but



Lachnostoma sp., photo by G. Morillo.

glandular on leaf veins; latex white. Stems often rhizomatous, densely pubescent, thinly and inconspicuously suberized when old.

Leaves opposite; blades ovate to oblong-ovate, cordate or subcordate at base with 2–5 colleters. Inflorescences subaxillary,

helicoidal cymes, 5- to 15-flowered,

moderate to long-pedunculate. Calyx lobes ovate, oblong-ovate to lanceolate, small; corolla broadly infundibuliform, rarely narrowly campanulate, lobes green, yellowish green or purple, frequently reticulate, narrowly ovate to deltoid, spreading, adaxially glabrous; gynostegial corona adnate to the stipe and corolla tube at least $\frac{1}{2}$ of its length, apically bilobed-digitate; gynostegium stipitate, style-head plain to slightly concave at apex; pollinia pendent, oblong-pyriform, with a hyaline translucent margin, corpusculum broadly sagittate. Fruit of one, narrowly ovoid or fusiform follicle, with 5 obtuse ridges and some blunt intercostal projections. Seeds many, ovate, comose.

Distinctive features: Similar to *Phaeostemma*, but lacking leaf subaxillary colleters and presenting peduncles (incl. rachis) that are as long as or longer than the pedicels, and an infundibuliform corolla.

Distribution: About 16 species from northern Venezuela to Peru; submontane and wet montane forests; (700–) 1,000–3,300 m.

LAUBERTIA A. de Candolle, Prodr. 8: 486. 1844. (*Apocynoids*)

Twining vines, 3–4 m long; trichomes eglandular, yellowish brown or ferruginous; latex



Laubertia boissieri, photo by P. Acevedo.

clear or white. Stems terete, the nodes appressed-puberulent, with 4–5 conspicuous colleters along interpetiolar line, internodes glabrous or glabrate, conspicuously lenticellate when mature. Leaves opposite, rarely ternate; blades ovate to ovate-elliptic or lanceolate, acuminate at apex, obtuse to truncate at

base without colleters; petioles with adaxial colleters. Inflorescences axillary or terminal, few- to many-flowered, scorpioid, 2- or 3-branched, pedunculate; bracts narrowly lanceolate to oblong. Calyx lobes linear, ovate-lanceolate or ovate-triangular, appressed-puberulent or hirtellous, without colleters; corolla salverform, purple, pinkish purple or white, the tube straight or twisted around the anthers, longer than the lobes, with an annular corona at the throat, lobes dextrorsely contorted in bud, obovate or broadly dolabriform, apically rounded; free corona lobes above the stamens absent; stamens slightly included or somewhat exerted, the anthers oblong, acuminate

at apex, sagittate with acute tails at base, adnate to the style-head; nectaries 5, free or connate at base, as long as or shorter than ovary; style-head spool-shaped, expanded at the base and near the top. Fruit of two terete, slightly moniliform follicles, appressed-hirtellous to glabrous. Seeds many, truncate, with a cream to tan coma.

Distinctive features: Somewhat similar to *Prestonia* because of the salverform corolla with a thickened annular throat but differing mainly by the calyx lobes without colleters and corolla tube without internal appendages or ridges.

Distribution: A neotropical genus of four species known from Mexico, Belize, Venezuela, Colombia, Ecuador, Peru, Bolivia, and Brazil; mostly in wet submontane and montane forests, but also in Amazonian lowland forests; (450–) 1,000–2,500 m.

LHOTZKYELLA Rauschert, Taxon 31: 557. 1982. (*Asclepiadoideae*)

Pulvinaria E. Fourn. (1851) nom. illeg.

Twining vines; mixed pubescence of glandular and eglandular trichomes; latex not known. Stems thinly suberized at base when mature, pubescence in two lines, eglandular trichomes retrorse. Leaves opposite; blades narrowly ovate or oblong-ovate, distinctly cordate, 3–4 colleters at base. Inflorescences subaxillary, 4- to 6-flowered, short-pedunculate. Calyx lobes ovate; corolla campanulate or suburceolate, dark purple; lobes tightly contorted in bud, oblong, glabrous except puberulous at adaxial base; staminal corona segments of 5 fleshy bidentate distinct elements, free from the stipe and shorter than gynostegium; gynostegium stipitate, style-head disc-shaped, slightly convex, anthers ventricose, with dorso-lateral dehiscence; pollinia pendent, narrowly obovoid, somewhat hyaline at proximal end, corpusculum sagittate. Fruit a single, narrowly ovoid, acute, pentagonal, 5-costate follicle. Seeds unknown.

Distinctive features: Distinguished from members of subtribe Gonolobinae by the combination of purple corolla with oblong lobes, tightly contorted in bud, stipitate gynostegium, ventricose, erect anthers, staminal corona of 5, fleshy distinct bilobed segments and pentagonal, 5-costate follicles. Corolla and leaf shape of *Lhotzkyella* are similar to those in species of *Oxypetalum*, but *Oxypetalum* has eglandular trichomes, style-head often rostrate, toothed caudicles, and smooth or rarely muricate follicles.

Distribution: A single species, *L. lhotzkyana* (E. Fourn.) Rauschert endemic to Mato Grosso, Brazil; scrubs (*cerrado*); below 500 m.

MACROPHARYNX Rusby, Mem. New York Bot. Gard. 7: 327. 1927. (*Apocynoids*)

Peltastes Woods. (1932).



Macropharynx steyermarkii, photo by G. Morillo.

Robust twining lianas, 4–10 m long; pubescence of ferruginous or translucent, spreading, long and short eglandular trichomes; latex clear or clear-white. Stems terete, densely pubescent, glabrescent with age, interpetiolar line conspicuous, with colleters; cross section with regular anatomy, often with long pericyclic fibers. Leaves opposite; blades widely elliptic to suborbicular, acuminate at apex, cordate or peltate at base without colleters; petioles with many colleters on adaxial fibers. Leaves opposite; blades widely elliptic to suborbicular, acuminate at apex, cordate or peltate at base without colleters; petioles with many colleters on

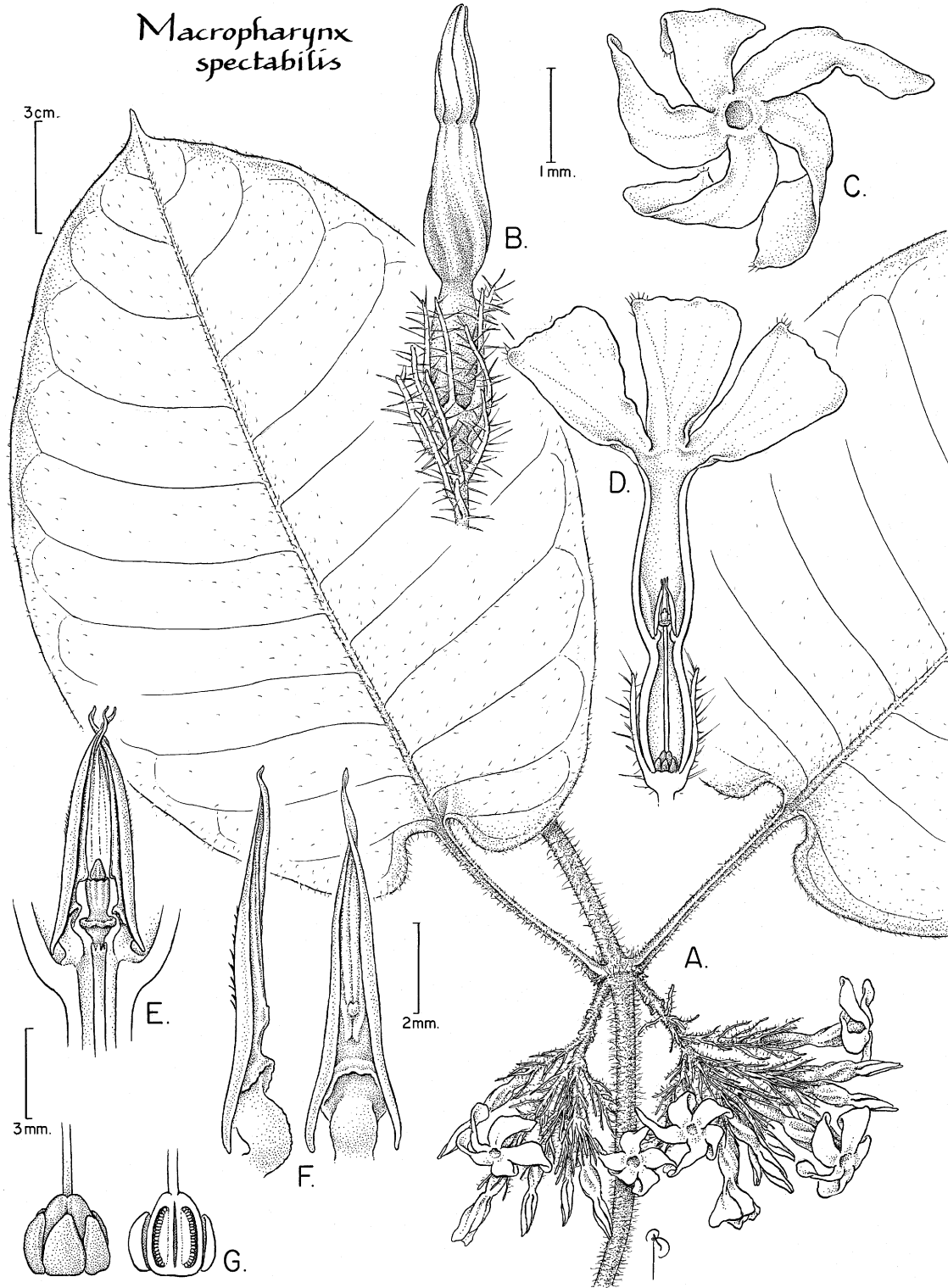


Figure 46. *Macropharynx spectabilis*. **A.** Flowering branch. **B.** Flower bud with contorted aestivation, sepals aristate, hispid. **C.** Flower top view. **D.** Flower longitudinal section. **E.** Gynostegium, longitudinal section. **F.** Anthers lateral & dorsal views. **G.** Ovary with nectaries at base, same, longitudinal section. Drawing courtesy of Bobbi Angell.

adaxial fibers. Leaves opposite; blades widely elliptic to suborbicular, acuminate at apex, cordate or peltate at base without colleters; petioles with many colleters on adaxial colleter at base. Corolla white, light yellow, yellow-green or light green, infundibuliform or subsalverform, tube 17–50 mm long, often expanded around stamens and twisted below stamen insertion; the outside sulcate at stamen position on distal portion, lobes dextrorsely contorted in bud, obliquely obovate, revolute; stamens included, the anthers acuminate at apex, sagittate with acute tails at base, adnate to the style-head; nectaries 5, free or connate at base, often as long as or longer than ovary; style-head spool-shaped, apically shortly bilobed, with a basal annulus. Fruit of two pendent, cylindrical, straight or falcate thick follicles, 26–40 cm long, usually pubescent when young. Seeds many, rostrate, with a light yellow coma.

Distinctive features: Distinguished by the combination of dense pubescence, many foliaceous bracts and bracteoles along the twisted pedicels, and corolla white, yellow-green, light yellow or greenish white, without a corona, and with upper corolla tube often somewhat sulcate at base; largest corolla in neotropical Apocynoids with a tube of up to 50 mm width.

Distribution: A New World genus of 15 species, 14 of which are found in the Neotropics, Honduras, from Costa Rica to Bolivia and SE Brazil; rainforests; 100–1,000 m.

MACROSCEPIS Kunth in Humboldt, Bonpland & Kunth, *Nov. Gen. Sp.* 3: ed. qu., 201. 1819.

(*Asclepiadoideae*)

Schubertia Mart. (1824).

Suffrutescens twining vines, 5–20 m long; pubescence of glandular translucent and



Macroscepis pleistantha, photo by P. Acevedo.

yellowish or translucent eglandular trichomes; latex white, with unpleasant smell. Stems frequently suberized at base. Leaf blades obovate-oblong to suborbicular, rarely oblong, narrowly cordate, with 2–9 colleters at base; petioles with 2–4 subaxillary colleters.

Inflorescences subaxillary, often

umbelliform cymes, 2- to 20-flowered, short to moderate pedunculate; bracts linear. Calyx lobes foliaceous, ovate, ovate-lanceolate, narrowly elliptic, usually with a colleter per axil; corolla fleshy, urceolate, tubular or narrowly infundibuliform, 14–41 mm diam., white, green to orange, brown, or reddish brown, lobes obovate, narrowly obovate or oblong, obtuse or rounded-emarginate; corolline corona present; gynostegial corona fleshy, partly adnate to the gynostegium and corolla, staminal lobes apically truncate or crenulate, included or exserted; 5 conspicuous nectar chambers present between stipe and corolla tube; gynostegium stipitate, style-head convex or concave, anthers with dorso-apical dehiscence; pollinia pendent, mostly oblong, triangular-oblong, oblong-elliptic, triangular-reniform, often with a thin external margin, corpusculum sagittate. Fruit of 1–2 follicles ovoid, ellipsoid or fusiform, acuminate, 8–15 cm long, (5-) 7-winged, rarely with 7–9 lines of short conic projections, glabrous to hirsute. Seeds numerous, ovate, with dentate wing, comose.

Distinctive features: Recognized by the subaxillary leaf colleters, the urceolate to narrowly infundibuliform corolla, fleshy gynostegial corona lobes adnate to stipe at base, and 5 conspicuous anther chambers at base of gynostegium extending along the corolla tube for most of its length, pendent pollinia often with hyaline margin, and (5-) 7-winged follicles or with 7–9 lines of conic projections.

Distribution: A New-World genus with ~25 species, 17 of which are found in the Neotropics, distributed from northern Mexico to NE Argentina; dry or wet forests and thickets; 0–1,600 m.

MALINVAUDIA E. Fournier in Martius, Fl. Bras. 6(4): 312, t. 92. 1885. (*Asclepiadoideae*)

Twining vines; inconspicuously puberulent or glabrous; latex white. Stems with



Malinvaudia capillacea, photo by J.L. da Costa Lima.

inconspicuous interpetiolar line. Leaf blades narrowly ovate to oblong-lanceolate, long-acuminate, subcordate at base with 2–4 colleters. Inflorescences subaxillary, lax, helicoid cymes, 6- to 9-flowered, longer than subtending leaves; peduncle 5–7.5 cm long, pedicels thread-like, 1–3 cm long.

Calyx lobes ovate-oblong, acuminate, with

1 colleter per sinus; corolla campanulate, ~20–22 mm diam., throat with 5 interlobular pubescent pads, lobes oblong, acuminate, conspicuously veined, with puberulent proximal adaxial surface; gynostegial corona shorter than gynostegium, of 5 distinct fleshy staminal segments, these 3-dentate, central tooth shorter; gynostegium sessile, style-head broadly pentagonal, flat or slightly concave at top; anthers obtriangular, dorsally without appendages; pollinia horizontal,

triangular-obovoid, inner face concave, corpusculum sagittate. Fruit a single spindle-shaped follicle, 5-costate. Seeds ovate with a denticulate apex.

Distinctive features: Among subtribe Gonolobinae, recognized by the apically long-acuminate, cordate leaves, long-pedunculate and -pedicellate, lax 6- to 9-flowered inflorescence, campanulate corollas with oblong-acuminate lobes and 5 interlobular pubescent pads, and corona of 5 distinct 3-dentate staminal segments.

Distribution: A genus of a single species, *Malinvaudia capillacea* E. Fourn.; E Brazil and NE Argentina; below 600 m.

MANDEVILLA Lindley, Edwards' Bot. Reg. 26: t. 7. 1840. (*Apocynoids*)

Dipladenia A. DC. (1844); *Exothostemon* G. Don (1837); *Macrosiphonia* Müll. Arg. (1860); *Quiotania* Zarucchi (1991). *Telosiphonia* (Woods.) Henrick. (1996).

Herbs, erect or scrambling shrubs or twining lianas 3–8 m long; glabrous or with eglandular short or long trichomes; latex white, abundant. Stems terete, angulate, ridged or compressed, sometimes winged, often lenticellate when mature, the nodes sometimes with interpetiolar line of colleters. Leaves opposite or whorled; blades linear, ovate, elliptic or obovate-oblong, obtuse, rounded or shortly cordate at base, usually with several colleters at the base or adaxially along midvein, petioles with or without adaxial colleters. Inflorescences axillary or (sub-) terminal, simple, rarely branched, racemose or



Mandevilla hirsuta, photo by P. Acevedo.

cymose, few- to many-flowered; bracts small to foliaceous. Calyx lobes ovate, deltoid, oblong-ovate or oblong-lanceolate, small and inconspicuous to large and foliose, with one to several colleters at base; corolla infundibuliform, salverform or tubular-salverform (Figure 39G), sometimes with a broad throat, the lobes dextrorsely contorted in bud, often white, yellow, yellow-orange, pink, red or purple, obliquely ovate to narrowly obovate; corona absent; stamens usually included, the anthers narrowly oblong to oblong-elliptic, acute at apex, truncate or obscurely caudate at base, fused to the style-head and each other; nectaries 5(2), free or partly connate at base; style-head pentagonal, thick, with 5 longitudinal ridges or radial projections. Fruit of two follicles, moniliform or cylindrical. Seeds few or many, mostly truncate, with a yellowish brown coma.

Distinctive features: Similar to *Mesechites* and *Allomarkgrafia* by the presence of a style-head with 5 longitudinal ribs or arms, lacking an annulus and having leaf blades with small, adaxial colleters; but differing from them by the simple, racemose inflorescence and the arms of style-head often forming long ridges for most of its length (vs. cymose, branched inflorescences, and arms of style-head restricted to the lower part). In addition, many species of *Mandevilla* have adaxial colleters scattered along the leaf midvein, whereas in *Allomarkgrafia* and *Mesechites* leaf colleters are always clustered at the base of the blade or along the adaxial petiole surface.

Distribution: A neotropical genus of ~170 species, 122 of which are reported as climbers; distributed from northern Mexico to northern Argentina, with one or two species native to Cuba and Jamaica; savannas and humid or seasonally dry forests; 50–3,000 m.

MATELEA Aublet, Hist. Pl. Guiane 277, t. 109. 1775. (*Asclepiadoideae*)

Peckoltia E. Fourn. (1885).

Twining herbaceous or suffrutescent vines 2–5(10) m long, or erect herbs or shrubs;



Matelea ruiz-pavonii, photo by S. Liede-Schumann.

pubescence of short glandular and eglandular trichomes; latex white.

Stems inconspicuously pubescent, often in one or two rows, glabrous and suberized at base when mature.

Leaf blades ovate to oblong-lanceolate, acute to acuminate, obtuse to subcordate at base, glabrous or

scarcely pubescent, with 2–7 colleters

at base. Inflorescences of subaxillary helicoid cymes, 3- to 12-flowered, short-pedunculate;

bracts small and inconspicuous. Calyx lobes ovate, lanceolate, or oblong-ovate, small and

inconspicuous, with 1–2 colleters per axil; corolla rotate or short campanulate, 5–17 mm diam.,

green, rarely purple, reticulate, lobes deltoid to ovate-oblong, often spreading; corona

gynostegial, marginally annular, staminal segments apically ligulate, ascending ridges, attached to gynostegium at least at base, interstaminal segments usually concave, and with a basal skirt-

like margin; gynostegium stipitate or sessile, style-head flat or convex, rarely rostrate; anthers

narrowly triangular in frontal view; pollinia usually horizontal, obovoid or obpyriform,

corpusculum sagittate. Fruit of 1 or 2 narrowly fusiform to ovoid, 5-winged, smooth or prickled

follicles; seeds many, obovate or ovate, usually with a coma.

Distinctive features: *Matelea* in a strict sense is defined by the combination of a corona of 5 staminal ridged, apically ligulate segments adnate to the stipe, plane or concave interstaminal segments, and basal skirt-like margin, pollinia horizontal, somewhat concave and partly hyaline

in one face, narrowly fusiform or ovate, thin-walled, winged, ridged or almost smooth follicles, and inconspicuously pubescent (glandular and eglandular trichomes) stems and leaves.

Distribution: A neotropical genus of ~75 species distributed in Central and South America; mostly in wet and riparian transitional forests; 0–2,200 m. Species from the West Indies previously placed in *Matelea* are currently recognized in *Ibatia*, *Poicilla*, *Jacaima*, *Poicillopsis* and *Ptycanthera*, while others await proper generic placement.

Note: *Matelea* as defined by Woodson (1941) is proven polyphyletic in recent studies (e.g., Krings et al. 2008, Krings & Morillo 2015, Morillo 2013, 2015) where several monophyletic clades previously placed in *Matelea* have been recovered. These results support the resurrection of *Jacaima*, *Poicillopsis*, *Poicilla* and *Ptycanthera* (Krings et al. 2008), and *Ibatia* and *Lachnostoma* (Morillo 2012), and the recognition of new genera such as *Atrostemma*, *Bruceholstia*, *Graciemoriana*, *Orinoquia*, *Pseudolachnostoma*, *Riparoampelos* and *Vulcanoa* (Morillo 2012, 2015). *Matelea viridivenia* Alain has been transferred to the new genus *Anemotrochus* (Mangelsdorff et al., 2016) but further untangling of *Matelea* is necessary. For example, several species of *Matelea* are still waiting for new generic placements as they are shown to form distinct monophyletic clades. Proper classification of the elements currently assigned to *Matelea* awaits comprehensive studies encompassing a larger number of species.

MESECHITES Müller Arg. in Martius, Fl. Bras. 6(1): 150. 1860. (*Apocynoids*)

Twining lianas; pubescence when present, of eglandular short trichomes; latex white. Stems terete, conspicuously lenticellate when mature, nodes sometimes with a conspicuous interpetiolar line of colleters. Leaves opposite; blades ovate to elliptic or narrowly elliptic, obtuse, acute, apiculate to caudate at the apex, obtuse, rounded or subcordate at base with 2–4



Mesechites trifidus, photo by P. Acevedo.

colleters, tertiary venation reticulate. Inflorescences usually axillary, pedunculate, 2- or 3-branched, branches consisting of a few to several-flowered helicoid cymes; bracts small and inconspicuous. Calyx lobes ovate, deltoid or narrowly ovate, minute, with 1 antisepalous colleter or 3

irregularly distributed colleters at base, these often lacinate; corolla salverform, tube straight, lobes dextrorsely contorted, white, cream, green, yellow, pinkish or reddish tinged, lobes dextrorsely contorted, obliquely obovate-oblong, noticeably shorter than the tube; corona absent; stamens deeply included, the anthers narrowly oblong to oblong-elliptic, acute at apex, auriculate with short obtuse tails at base, adnate to the style-head; nectaries 5, connate into a 5-lobed or undulate annulus, shorter than ovary; style-head fusiform to pentagonal in the upper part, with 5 longitudinal projections at the base. Fruit of two follicles, continuous and subterete or strongly moniliform. Seeds many, truncate, with a yellowish brown coma.

Distinctive features: *Mesechites* shares with *Forsteronia*, *Mandevilla*, *Allomarkgrafia*, and *Tintinnabularia* the presence of a style-head with 5 ribs or longitudinal projections (at least at the base), and adaxial leaf blades with colleters. *Mesechites* has compound inflorescences while those of *Mandevilla* are predominantly simple. The absence of domatia separates *Mesechites* from *Forsteronia* and *Tintinnabularia*. *Mesechites* has salverform corollas and weakly to

strongly moniliform follicles (~half the spp.) while *Allomarkgrafia* has (narrowly) infundibuliform to (narrowly) campanulate corollas and continuous follicles.

Distribution: A neotropical genus of ~8 species, half of which are found in South America, and the other half are endemic to Cuba and or Hispaniola. *Mesechites trifidus* (Jacq.) Müll. Arg. is widely distributed from Mexico to northern Argentina; scrubs (*cerrado*), seasonally dry, humid or riparian forests; 50–1,600 m.

METASTELMA R. Brown, *Asclepiadeae* 41. 1810. (*Asclepiadoideae*)

Herbaceous or suffrutescent twining vines to 4 m long; pubescence when present, of



Metastelma parviflorum, photo by P. Acevedo.

eglandular short trichomes; latex white. Stems slender, usually pubescent, often thickly suberized in old basal internodes. Leaf blades linear to ovate, acute, obtuse, to subcordate at base with 0–4 colleters. Inflorescences subaxillary, simple, helicoidal or umbellate, 2- to 14 (–20)-flowered,

subsessile to moderate-pedunculate; bracts small and inconspicuous. Calyx lobes ovate or deltoid, with 0–3 colleters per sinus; corolla rotate or campanulate, 1.5–4.5 mm long, white, cream or light green, abaxially usually glabrous, adaxially with smooth and/or verrucose trichomes on the lobes, often barbate; lobes valvate or imbricate in bud, oblong or ovate; gynostegial corona of free staminal lobes, attached just below the anthers or along the stipe, or

shifted to the base of the corolla (e.g., *M. parviflorum* (Sw.) R. Br.), equaling or exceeding the gynostegium, triangular, oblong or subulate; gynostegium sessile or stipitate, style-head flat, conical or rarely elongated-conical; anthers ventricose; pollinia pendent, ovoid, oblong or clavate, (sub-) apically attached to the caudicles, corpusculum ovate. Fruit of (1–) 2 narrowly obclavate or narrowly cylindrical, attenuate follicles, 2–7 cm long, smooth. Seeds few per follicle, narrowly ovate or oblong, comose.

Distinctive features: Distinguished from *Ditassa* in South America by the combination of subsessile or stipitate gynostegium, corona of simple, free staminal lobes, attached just below the anthers or along the stipe (or shifted to the base of the corolla), equaling or exceeding the gynostegium, triangular, oblong or subulate, leaf blades with flat (not revolute) margins, and usually ventricose anthers with wings often shorter than the body.

Distribution: A New World genus with ~70 species in the West Indies, Central and South America; dry or seasonally dry forests, scrubs, forest margins, disturbed areas, riverine vegetation; 0–3,000 m.

MONSANIMA Liede & Meve, Ann. Missouri Bot. Gard. 99: 66. 2013. (*Asclepiadoideae*)

Slender twining vines: pubescence of eglandular trichomes; latex white. Leaf blades discolorous, linear to narrowly lanceolate or elliptic or oblong-elliptic, base truncate to subcordate with 3 or 4 colleters, hirsute on both surfaces. Inflorescences subaxillary, corymbiform or umbelliform, 2- to 5-flowered, shorter than subtending leaves; peduncle 7 mm long, hirsute. Flower densely hirsute; calyx lobes narrowly triangular, surpassing the corolla tube, with 1 colleter in each axil; corolla rotate or campanulate, 5–10 mm long, brown or white with purplish veins, glabrous, tube 2–3 mm long, lobes ovate, acuminate; gynostegial corona of



Monsanima morrenioides, photo by A. Rapini.

highly fused staminal lobes, slightly sigmoid, fluted, almost entirely connate, free only at the apex, strongly incurved over the gynostegium and completely obscuring it; gynostegium sessile, style-head slightly mammillate; anthers subtriangular, with short, strongly centrifugal anther wings that extend in a protuberant appendix over the dorsum, apex with or without appendages; pollinia pendent, suboblong, with short, broad, horizontal caudicles, corpusculum oblong. Fruit a solitary follicle, spindle-shaped, ~8 cm long; seeds not known.

Distinctive features: Similar to *Jobinia*, *Orthosia* and

Scyphostelma, differing by the hirsute stems and leaves, gynostegial corona lobes united into a tube, apically folded inwards and obscuring the gynostegium, and wings shorter than dorsum, basally strongly centrifugal.

Distribution: Two species in Bahía, Brazil, endemic to high altitude scrubs (*cerrado* and *campo rupestre*); ~1,500 m.

MORILLOA Fontella, Goes & S.A. Cáceres, Bonplandia (Corrientes) 23: 28. 2014.

(*Asclepiadoideae*)

Twining, slender vines, to 2.5 m long, basally weakly woody, glabrous or glabrescent; latex sparse, white. Leaves opposite, subsessile or shortly petiolate, blades linear or filiform with 1–2 colleters at the junction with petiole. Inflorescences of umbelliform or racemiform, extra-axillary cymes, at alternate nodes, 3–9-flowered; long-pedunculate. Calyx lobes triangular-



Morilloa carassensis, photo by W. Milliken.

lanceolate, with colleters in each axil; corolla white or (greenish) yellow, urceolate or bottle-shaped, adaxially barbate or whitish puberulent; corona absent or vestigial; gynostegium sessile or shortly stipitate; pollinia pendent, ovate, elliptic or oblong, caudicles horizontal or obliquely descending; corpusculum ovate,

elliptic or obovate; style-head mammillate. Follicles narrowly linear-lanceolate, seeds verrucose, with narrow wing.

Distinctive features: The combination of slender twining habit, linear to filiform leaves, long-pedunculate and long-pedicellate inflorescences, a corolla hiding the gynostegium, and corona absent or vestigial, distinguishes *Morilloa* from similar genera such as *Hemipogon* or *Nephradenia*.

Distribution: A genus of four species endemic to central Brazil; campos rupestres, cerrados, forest margins, on stony or sandy soils 1,000–1,600 m.

MORRENIA Lindley, Edwards' Bot. Reg. 24 (Misc.): 71. 1838. (*Asclepiadoideae*)

Suffrutescent twining vines, to 5 m long, much branched; pubescence when present grayish white tomentum; latex thick, white. Stems glabrous or tomentose, basal internodes conspicuously lenticellate-sulcate, fissured-suberized with age. Leaves opposite; blades triangular or hastate, rarely ovate-oblong, cuneate, truncate, or cordate at base with 2 small



Morrenia variegata, photo by J. Wood.

colleters, margins often undulate, abaxially densely pubescent to tomentose.

Inflorescences subaxillary, 4- to 10-flowered, simple, umbellate to helicoid, subsessile to shortly pedunculate; bracts inconspicuous. Flowers sweetly fragrant, nectariferous; calyx lobes linear or lanceolate, 3.5–10 mm long, with 1–3 colleters per axil; corolla rotate or

campanulate, fused to half of length, 10–15 mm long, white, brown or greenish yellow, abaxially with trichomes, adaxially glabrous or papillose, lobes oblong-lanceolate or lanceolate, spreading or revolute, puberulous; gynostegial corona a ring of connate staminal and interstaminal segments, exceeding and obscuring the gynostegium, fused for more than half of length, staminal parts ovate, often apically bifid, glabrous or adaxially with trichomes; gynostegium sessile or subsessile, style-head umbonate or rostrate, deeply bifid; anther wings extending beyond the anther body, forming a distinct outward curve; pollinia ovoid or oblong, apically or laterally attached to the ribbon-like caudicles, corpusculum ovate or oblong. Fruit of one, ellipsoid, obliquely ovoid or obclavate follicle, 8–14 cm long, smooth, sulcate or verrucose, with thick woody pericarp. Seeds many per follicle (~120; 400–450), oblong or narrowly pyriform, denticulate, comose.

Distinctive features: The suggestion of Rapini et al. (2011) to include *Morrenia* in *Araujia* is not followed here. *Morrenia* is recognized by the slender style-head appendages that are never

thick and fleshy, corpusculum without a terminal appendage, and corolla rotate or broadly campanulate.

Distribution: Eight species, southern South America, S Brazil, Peru, Bolivia, Paraguay, Argentina and Uruguay, with three species in the Neotropics; dry scrubs (*chaco*), or dry to moist forests, often in disturbed vegetation; 80–850 m. *Morrenia odorata* (Hook. & Arn.) Lindl. is considered a noxious weed by the *Citrus* growers in United States (Florida) and Australia.

ODONTADENIA Bentham, J. Bot. (Hooker) 3: 242. 1841. (*Apocynoids*)

Anisolobus A. DC. (1844).

Twining, suffruticose or woody lianas 3–20+ m, rarely erect shrubs; glabrous or with



Odontadenia macrantha, photo by P. Acevedo.

simple eglandular trichomes; latex white, abundant. Stems woody, reaching > 11 cm in diam., terete or subterete, or somewhat flattened when young, often glabrous, sometimes pubescent when young, smooth or lenticellate, interpetiolar line with small caducous stipules in ½ of the species; cross section in

some species with successive cambia. Leaves opposite-decussate, verticillate in one species; blades ovate, elliptic to oblong, or obovate, obtuse and apiculate to acuminate at apex, obtuse, rounded or acute or rarely subcordate at base, without colleters, often glabrous, tertiary veins subparallel; petioles sometimes with adaxial colleters. Inflorescences axillary and/or terminal,

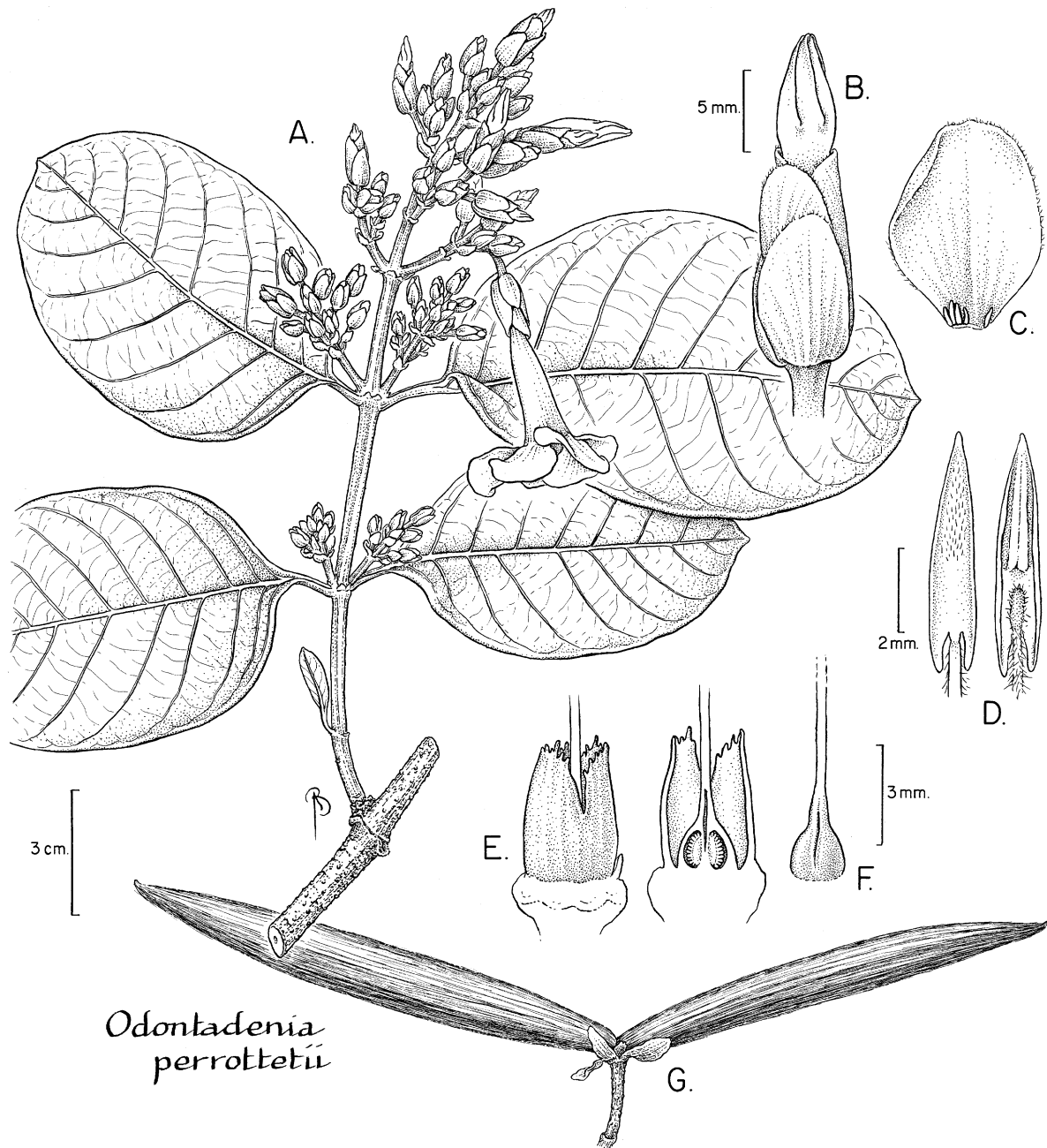


Figure 47. *Odontadenia perrottetii*. **A.** Flowering branch. **B.** Flower bud. **C.** Bract, frontal view with colleters at base. **D.** Anthers dorsal & ventral views. **E.** Flower base showing ovary surrounded by a nectary disc, longitudinal section of same. **F.** Ovary and portion of style. Drawing courtesy of Bobbi Angell.

frequently 2 per node, a dichasial cyme or a thyrses, 5- to 30-flowered; bracts 1–8 (–15) mm long.

Calyx cupulate at base, lobes narrowly ovate to suborbicular, unequal and closely imbricate or

subequal, with 1–6 colleter at base; corolla mostly yellow, infundibuliform, sometimes salverform, tube 9–30 mm long, without a corona, lobes dextrorsely contorted in bud, obliquely obovate; stamens deeply included, the anthers acute at apex, sagittate with acute short tails at base, adnate to the style-head; nectaries 5, thin and often irregularly dentate, usually connate into a disc, shorter or longer than ovary; style-head broadly fusiform or subcapitate, without an annulus. Fruit of two pendent, parallel or divergent, often linear-cylindrical, often stout follicles, 6–47 cm long. Seeds many, truncate, with a yellowish brown coma.

Distinctive features: Recognizable by the combination of leaf blades with a dense reticulum of subparallel tertiary veins, small, caducous stipules (in ½ of the species), a dichasial or thyriform, axillary and/or terminal inflorescence, calyx cupulate at base, often with unequal closely imbricate lobes, yellow, orange or white, medium-sized to large corollas, and often a broadly fusiform or subcapitate style-head.

Distribution: A neotropical genus of 21 species; distributed from southern Mexico to Brazil and Bolivia, including Cuba and Hispaniola; lowland riparian and submontane forests, along forest margins and sometimes in secondary growths; 50–1,100 m.

ORINOQUIA Morillo, *Pittieria* 39: 229. 2015. (*Asclepiadoideae*)

Twining vines; pubescence of golden-yellow, long, eglandular trichomes, and short translucent glandular trichomes. Leaves opposite; blades broadly obovate-elliptic, apically abruptly acuminate, basally cordate. Inflorescences 3–5-flowered, umbelliform cymes; peduncles very long. Corolla 45–55 mm diam., rotate; lobes 18–19 mm long, narrowly ovate; gynostegial corona shallowly cup-shaped, staminal lobes 10, radially disposed, bifid, marginally expanded

and opposite the anthers; interstaminal lobes narrowly ligulate, reflexed; pollinia horizontal, obovoid. Follicles unknown.

Distinctive features: Distinguished from all known genera in the Gonolobinae by the correlation of densely yellowish pubescence of long, erect, eglandular, multiseptate, spreading trichomes, and few minute conic trichomes on stems, leaves and inflorescence, membranaceous broadly obovate-elliptic, basally cordate leaves, long-pedunculate, few-flowered, umbelliform cymes, with narrowly ovate acuminate or attenuate bracts, rotate large corollas with a ring of translucent trichomes surrounding the corona, broad strongly compressed disciform sessile gynostegium, large broadly obovate pollinia, rhombic-ovate concave-convex corpusculum, and corona of 10 radially disposed marginally expanded lobes, in addition to 5 oblong sulcate segments alternating with them.

Distribution: A genus of a single species, *O. yanomamica* (Morillo) Morillo, endemic to Venezuela; rainforests, headwaters of the Orinoco River; 150–400 m.

ORTHOSIA Decaisne in A. de Candolle, Prodr. 8: 526. 1844. (*Asclepiadoideae*)

Suffrutescent or herbaceous twining vines, 0.5–8 m long, often rhizomatous; latex white,



with a strong fetid smell; branching with distinct long and short, orthotropic or plagiotropic, green shoots. Leaves frequently distichous, rarely decussate; blades linear, oblong or ovate, rounded, obtuse, truncate or attenuate at base, mostly with 2 colleters. Inflorescences

Orthosia sp., photo by G. Morillo.

sub- or extra-axillary, shorter than subtending leaves, umbellate, 1- to 20-flowered, pedunculate or (sub-) sessile. Calyx lobes with 0–2 colleters per axil; corolla rotate, campanulate, cyathiform or urceolate, 1–2.5 mm long, white, cream, green, yellow, maroon or purple, usually papillose, lobes oblong, lanceolate or triangular; gynostegial corona of staminal lobes, rarely free and very small, usually fused up to $\frac{3}{4}$ of length, cyathiform, urceolate, campanulate or rotate; staminal parts frequently trifid with median tooth prominent; gynostegium (sub-) sessile, rarely stipitate, style-head flat or umbonate; pollinia ovoid, clavate or pyriform, subapically attached to the caudicles. Fruit a pair of nearly cylindrical to narrowly obclavate follicles, 4–7 cm long, disposed at obtuse angles. Seeds 4–13 per follicle, oblong, wingless, comose.

Distinctive features: Similar in general morphology to *Tassadia* and *Scyphostelma*. In *Tassadia*, inflorescences are sessile or subsessile congested small cymes, often alternate along an axillary, leafless, zigzagging axis, often leafless at flowering time; fruits paired follicles often disposed at an acute angle, and frequently thickened at base; in *Scyphostelma*, follicles are often narrowly fusiform and when paired, disposed at an acute angle.

Distribution: A neotropical genus of ~36 species, distributed from Mexico to northern Argentina and SE Brazil (excluding the Amazon region) and from SE United States (Florida) to the Greater Antilles; wet to dry forests, often in thickets, clearings and roadsides, 0–2,000 m.

OXYPETALUM R. Brown, *Asclepiadeae* 30. 1810. (*Asclepiadoideae*)

Suffrutescent twining vines or erect herbs, 0.25–5 m long; latex white. Leaf blades linear,



Oxypetalum banksii, photo by G.H. Shimizu.

ovate, elliptic, oblong-ovate, or triangular-deltoid, cordate, sometimes broadly rounded or truncate at base with 2–6 colleters, often pubescent. Inflorescences subaxillary, 10- to 21-flowered, simple, helicoid or umbellate, pedunculate or sessile; bracts linear to lanceolate. Calyx lobes triangular-ovate, lanceolate or linear, with (0–) 1–3 colleters

in each axil; corolla rotate-campanulate, campanulate or urceolate, often fused for about half of length, 5–15 mm long, white, cream, green, yellow, brown, rose, reddish or bluish, with verrucose or barbate trichomes on the lobes, lobes often twisted; gynostegial corona of free staminal lobes, often adnate to both corolla and gynostegium, attached at the base of the stipe, shorter than the gynostegium; gynostegium sessile or shortly stipitate, exerted from corolla tube, style-head mostly rostrate, with 2–7 appendages, rarely coroniform; pollinia pendent, ovoid, oblong or clavate, caudicles flattened, corpusculum frequently as long as or longer than pollinia. Fruit commonly of two follicles, fusiform to obclavate, beaked, 6–12 cm long, smooth, rarely muricate (*O. wightianum* Hook. & Arn.). Seeds many (140–193) per follicle, ovate or pyriform, wingless or with distally lacerate wing, comose.

Distinctive features: Close to *Araujia*, *Morrenia*, and *Philibertia*, but differing by the combination of corona lobes free, arising at or near base of corolla tube, caudicles of pollinaria frequently with lateral teeth, and corpusculum mostly as long as or longer than pollinia. In

Araujia and *Morrenia*, corona lobes are united into a tube, though sometimes united only shortly at base.

Distribution: A South American genus of ~145 species, 68 of which are reported as climbing plants, with one species extending north to Mexico and the Greater Antilles; forest margins, scrubs (*cerrados*), and open, disturbed areas, rarely in montane grasslands; 0–2,600 m.

PACOURIA Aublet, Hist. Pl. Guiane 268. 1775. (*Rauvolfioids*)

Woody lianas, reaching 10–15 m in length; latex abundant, white. Stems terete, with a



Pacouria guianensis, photo by P. Acevedo.

conspicuous interpetiolar line, reaching 15 cm diam. Leaves opposite; blades elliptic, obtuse to acuminate, obtuse to rounded at base, without colleters; petioles often twisted, with many axillary colleters. Inflorescences terminal or axillary cymes, with flowers clustered at end of recurved peduncles, often apically prehensile

(tendrill-like), bracteoles small. Calyx lobes ovate, imbricate, without colleters; corolla cream or greenish white, salverform, tube 10–13 mm long, lobes sinistrorsely contorted, linear-oblong, as long as corolla tube, reflexed in anthesis; stamens included, free from style-head, anthers lanceolate, shortly caudate at apex, sagittate at base; ovary 1-locular, style-head spindle-shaped, with spreading stigmatic lobes; nectary inconspicuous. Fruit a large (8–10 cm diam.) globose,

indehiscent berry, with leathery pericarp. Seeds 10–12, large, ellipsoid, embedded in edible pulp, ecomose (Figure 40D).

Distinctive features: Large lianas, leaves without colleters, petioles twisted, peduncles prehensile, and large, globose, indehiscent, edible fruits.

Distribution: A genus of three species, from Colombia, Venezuela and the Guianas to Brazil and Bolivia, in lowland wet or rain forest; < 200 m.

PENTACYPHUS Schlechter, Bot. Jahrb. Syst. 37: 605. 1906. (*Asclepiadoideae*)

Tetraphysa Schltr. (1906).

Suffrutescent twining vines, up to 5 m long; latex white. Stems thickened at nodes, often



Pentacyphus andinus, photo by S. Liede-Schumann.

thinly suberized when old. Leaf blades usually discolored, coriaceous, elliptic, oblong or obovate, cuneate, rounded, obtuse, subcordate or subtruncate at base with (0–) 4–8 colleters.

Inflorescences subaxillary, simple, umbellate or branched corymbs,

1- to 8(–16)-flowered, peduncles

2–3 cm long; bracts linear to lanceolate. Flowers often nodding; calyx lobes ovate, narrowly lanceolate to obovate-elliptic, with 1–2 colleters per axil; corolla campanulate or rotate-campanulate, 18–22 mm long, cream-green to yellow with reddish to dark maroon maculation, adnate to the gynostegium, adaxially forming five hairy pouches; gynostegial corona of free

staminal lobes partly attached to the anthers, equaling or longer than the gynostegium; gynostegium stipitate, style-head conical and shortly bifid; pollinia pendent, narrowly oblong or clavate. Fruit of a pendulous fusiform follicle, terete, apically strongly beaked, longitudinally grooved, ~8 cm long. Seeds ovate, winged, smooth, comose.

Distinctive features: The genus, as circumscribed by Meve & Liede (2015), is morphologically diverse. It is recognized by the combination of few-flowered inflorescences with medium to large campanulate or rotate-campanulate corollas, adaxially with trichomes uniformly distributed and forming 5 pouches, dolabriform or laminar corona segments attached along back of the anthers and filament tube and strongly beaked and longitudinally grooved follicles.

Distribution: A neotropical genus of ~three species, distributed in Colombia, Ecuador, Peru, and Venezuela; montane rainforests, or subparamo vegetation, 1,800–4,100 m.

PENTALINON Voigt, Hort. Suburb. Calcut. 523. 1845. (*Apocynoids*)

Twining lianas, 3–5 m long, occasionally suberect shrubs; latex white. Stems pubescent,



Pentalinon luteum, photo by P. Acevedo.

glabrescent and lenticellate with age, with small colleters along interpetiolar line; bark thin, copper-colored; cross sections with regular anatomy. Leaves opposite; blades oblong, elliptic, obovate or subrotund, rounded to shortly acuminate at apex,

rounded, obtuse or subcordate at base without colleters; petioles with several colleters at base.

Inflorescences axillary or terminal cymes, with 5–many flowers; bracts ovate or ovate-lanceolate. Calyx lobes ovate to linear-lanceolate, with alternate pairs or many colleters at base; corolla yellow or greenish yellow, tubular-campanulate, tube 20–50 mm long, sometimes marked with red inside, lobes dextrorsely contorted in bud, obliquely obovate; corona absent; stamens included, anthers oblong, with spirally coiled apical appendages, adnate to the style-head; style-head spool-shaped with a basal annulus; nectaries free or connate, as long as or longer than the ovary. Fruit of two cylindrical, straight follicles, 8–20 cm long, often connate at the apex. Seeds many, rostrate, with a light yellowish brown or white coma.

Distinctive features: Differs from all other Antillean and Central American climbing Apocynoids by the combination of included anthers with spirally coiled apical appendages, yellow infundibuliform corolla without a corona, nectaries as long as or longer than ovary, a pair of follicles usually connate at apex and rostrate seeds.

Distribution: A neotropical genus of two species, distributed from SE United States (Florida), the West Indies and SW and S Mexico to Nicaragua; in dry forests, scrubs, fields, dunes and mangrove margins; 0–1,000 m.

PEPLONIA Decaisne in A. de Candolle, Prodr. 8: 545. 1844. (*Asclepiadoideae*)

Gonioanthela Malme (1927); *Macroditassa* Malme (1927).

Suffrutescent, glabrous, twining vines, up to 5 m long; latex white. Stems 1–2 mm diam.,



Peplonia bradeana, photo by A. Popovkin.

with somewhat thickened and 3–5

stipule-like colleters. Leaf blades

obovate, elliptic, ovate or narrowly

lanceolate, rounded, obtuse or cuneate at

base with 2–4 colleters. Inflorescences

axillary, shorter than subtending leaves,

3- to 10-flowered, of one or two basal

dichasia; subsessile. Calyx lobes ovate or

elliptic, with 1–3 colleters per axil; corolla rotate to campanulate, cream or yellowish green, 2.5–

11 mm diam., basally fused, lobes ovate, triangular-ovate to lanceolate; gynostegial corona

yellowish white, consisting of free or basally fused staminal lobes equaling or longer than the

gynostegium and erect adaxial appendages in staminal position; gynostegium (sub-) sessile,

style-head capitate or conical; pollinia pendent, oblong, corpusculum ovate or ellipsoid. Fruit of

one obclavate to fusiform follicle, 5–12 cm long. Seeds ovate, with dentate wing, comose.

Distinctive features: *Peplonia* is characterized by a pair of axillary dichasial inflorescences, gynostegial corona of free or partly fused segments, as long as or longer than the gynostegium, and a laminar internal shorter appendage. Sterile plants of *Jobinia* resemble *Peplonia*, but differ by the dichotomously or trichotomously branched inflorescence, simple corona (without an inner lobe), and follicles frequently paired and often sulcate or 3-costate.

Distribution: A South American genus of ~12 species, distributed in Venezuela and the Guianas to central Brazil; coastal scrubs (*restinga*), riverine vegetation, and submontane humid forests; 0–1,500 m.

PETALOSTELMA E. Fournier in Martius, Fl. Bras. 6(4): 328. 1885. (Asclepiadoideae)

Suffrutescent twining vines, to ~2.5 m high; shoots basally with suberous bark, (sub-)



Petalostelma dardanoi, photo by A. Rapini.

glabrous; leaves opposite or verticillate (*P. roberti* (S. Moore) Liede & Meve), linear or slender-ovate. Inflorescences 4–8-flowered, umbellate, subsessile or pedunculate; peduncles and pedicels very thin. Calyx lobes ovate; corolla, rotate, green or maroon, abaxially glabrous, adaxially papillose or with long soft trichomes over the whole surface or on the lateral parts of the lobes; lobes ovate, spreading; corolline corona, if present, glabrous or with trichomes, shorter than both corolla and gynostegium, five-partite with free antisepalous lobes or annular. Gynostegial corona, if present, of

free staminal lobes, brownish, glabrous or apically with trichomes, maximally equaling the gynostegium, erect or horizontally spreading, lobes lingulate to cross shaped, basally with a straight spur, occasionally with shorter, dentiform, inflexed proximal lobules. Gynostegium sessile, rarely stipitate; style-head flat; pollinia horizontal to pendulous, very small, ovoid; caudicles convexly recurved, cylindrical; corpusculum obovate. Fruits of one pendent, long, slender, fusiform, smooth follicle; seeds oblong, comose.

Distinctive features: *Petalostelma* is a molecularly strongly supported genus (Liede-Schumann et al. 2014). Morphologically, the genus is set apart from other genera with pendent pollinia by

its slender leaves, thin peduncles and pedicels, the rotate, dull-colored corolla which is adaxially often papillose or covered with long white trichomes, the complex, fleshy gynostegial corona, the obovate corpusculum and the long, pendulous follicles.

Distribution: A South American genus of 10 species; Brazil, Bolivia, Paraguay and Argentina, dry bushlands and forests, non-flooded limestone formations, 50–2,900 m.

PHAEOSTEMMA E. Fournier in Martius, Fl. Bras. 6(4): 311. 1885. (*Asclepiadoideae*)

Suffrutescent twining vines up to 12 m long, with white latex; pubescence of eglandular



Phaeostemma riedelii, photo by G. Morillo.

long and short trichomes, and glandular short trichomes. Stems hirsute, not suberized, often rhizomatous at base. Leaf blades broadly ovate, elliptic or broadly oblong-obovate, acuminate, shortly cordate at base with 2–9 colleters, densely pubescent.

Inflorescences subaxillary, 2- to 12-flowered helicoid cymes, short-pedunculate; bracts linear. Calyx lobes narrowly ovate to oblong-elliptic, with 1–2 colleters per axil; corolla broadly campanulate, green or

yellowish green, 23–38 mm diam., lobes narrowly

ovate to deltoid, reticulate; corona gynostegial, staminal segments partly adnate to corolla tube and stipitate, apically bifid-digitate; gynostegium stipitate, style-head slightly concave; anthers radially protruding from style-head; pollinia pendent, narrowly pyriform, corpusculum sagittate.

Fruit a broadly fusiform follicle, 12–19 cm long, with 5 wings and several blunt projections; seeds many (400–500) per follicle, ovate, with dentate chalazal end, comose.

Distinctive features: Similar to *Lachnostoma*, which differs by the absence of leaf subaxillary colleter, infundibuliform corolla, and peduncle + rachis as long as or longer than pedicels.

Distribution: A neotropical genus of six or seven species with disjunct distribution in northern South America (Venezuelan Guyana and Suriname) and SE Brazil to NE Argentina; wet, rain and montane forest; 100–700(–1,500) m.

PHILIBERTIA Kunth in Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 3: ed. qu., 195. 1819.

(*Asclepiadoideae*)

Amblystigma Benth. (1876); *Aphanostelma* Malme (1933), nom. illeg., non Schltr. (1914);

Brachylogies Hook. & Arn. (1839) nom. illeg., non C. A. Mey. (1829) Chenopodiaceae;

Fontellaea Morillo (1994); *Melinia* Decne. (1844); *Mitostigma* Decne. (1904); *Pentagonium*

Schauer (1843); *Podandra* Baill. (1890); *Steleostemma* Schltr. (1906); *Zosima* Philippi (1870), nom. illeg., non Hoffm. (1814) Apiaceae.

Suffrutescent twining vines, up to 10 m long, sometimes prostrate or erect herbs; latex white, with a garlic scent, rarely colorless. Stems with lower internodes frequently yellowish or grayish suberous. Leaves usually long-petiolate; blades often discoloured, ovate or triangular, cordate or lobate at base with 3–5 colleters. Inflorescences subaxillary, simple, helicoid or



Philibertia campanulata, photo by S. Liede-Schumann.

umbellate, 1- to 18-flowered, often long-pedunculate; bracts linear or oblong. Flowers usually nodding; calyx lobes triangular-oblong, linear-lanceolate or filiform, with 3–5 axillary colleters; corolla campanulate, globose, or salverform, fused for at least half of total length, 4–35 mm diam., white, cream-green, cream-yellow, or dull orange-red, uniformly colored or streaked or with reddish or purple center, with trichomes; lobes occasionally twisted; corolline corona, if present, a short, glabrous ring; gynostegial corona, if present, of free staminal lobes, attached along the back of the anthers, and along the filament tube or just

below the anthers, occasionally differentiated into a proximal and a distal lobule of equal length; gynostegium sessile or stipitate; style-head umbonate or rostrate and bifid or mammillate, rarely flat; pollinia pendulous, (sub-) apically attached to the caudicles, corpusculum linear, oblong to broadly ovoid. Fruit usually of one follicle, obovoid, obclavate or fusiform, rarely subcylindrical, ellipsoid or ovoid, (2.5–) 5–15 cm long, often with bulbous base and a blunt or roundly blunt apex, smooth, rugose, or ridged, rarely with projections, often with dense indument, and thick pericarp; seeds ovate or pyriform, often with a denticulate wing, comose.

Distinctive features: Difficult to distinguish from the related genera *Araujia*, *Funastrum*, *Morrenia* and *Oxypetalum*. *Philibertia* can only be recognized through a combination of

characters. With a wide variability in floral shape and corona composition and shape, the genus is most easily recognized by its soft, often finely pubescent to tomentose leaves that are usually triangular and deeply cordate to lobate at the base. Some species of *Philibertia* have a corolline corona forming a ring around the base of the gynostegium, combined with five semi-vesicular dolabriform staminal corona lobes, a character otherwise only present in *Funastrum*, from which it differs by the highly fused corolla and the triangular leaf shape (linear to ovate in *Funastrum*). From *Oxypetalum*, *Philibertia* is most easily distinguished by the absence of an elaborate style-head and the lack of lateral teeth at the caudicles. From *Araujia* and *Morrenia*, it differs by straight (vs. crispate) leaf margins, and fusiform fruits (ovoid and inflated in *Araujia* and *Morrenia*), as well as in the different corona composition.

Distribution: A genus of ~45 species in southern South America, 27 species of vines found in the southern limits of the Neotropics; moist cloud forest, montane prairies, inter-Andean dry valleys, and dry rocky slopes (*punas*); 400–4,100 m.

PINOCHIA M.E. Endress & B.F. Hansen, *Edinburgh J. Bot.* 64: 270. 2007. (*Apocynoids*)

Twining lianas, 3–15 m long; latex white to cream. Stems terete, smooth or sparsely lenticellate, suberous with age, with small caducous interpetiolar colleters; cross section with regular anatomy. Leaf blades ovate, elliptic, oblanceolate or obovate, acute to acuminate or caudate at apex, acute to cuneate at base, without colleters, hair domatia sometimes in the axils of secondary veins; petioles with several adaxial colleters at base. Inflorescences terminal, subcorymbose, 20- to 60-flowered; bracts ovate or lanceolate. Calyx lobes free, with 1–4



Pinochia corymbosa, photo by P. Acevedo.

colleters; corolla white to greenish white, yellow or red, infundibuliform, tube 1.5–2 mm long, lobes dextrorsely contorted in bud, spreading or reflexed, oblong or lanceolate; corona absent; stamens exserted, anthers oblong-sagittate, acuminate and hyaline at apex, with acuminate tails at base, adnate to the

style-head; nectaries 5, about as long as the ovary; style-head ovate, not 5-ribbed, with an annulus at base. Fruit of two narrow, cylindrical, divaricate follicles, 8.5–20 cm long. Seeds many, pubescent, with a simple central groove and yellowish coma.

Distinctive features: Similar to *Forsteronia* in general vegetative and inflorescence morphology but differing by the lack of colleters at the base of leaf blades, anthers with acuminate basal appendages, ovate non-ribbed style-head with a basal annulus and seeds with a ventral groove without longitudinal ribs.

Distribution: A neotropical genus of four species, distributed from Mexico to Costa Rica, and the Greater Antilles (Cuba, Hispaniola, Puerto Rico); wet lowland, premontane or lower wet montane forests; 100–1,600 m.

POICILLA Grisebach, Cat. Pl. Cub. 176. 1866. (*Asclepiadoideae*)

Slender, woody, twining vines; latex white. Stems densely pubescent, with eglandular trichomes and/or retrorse or spreading trichomes. Leaf blades oblong-lanceolate, obtuse to acute, sagittate at base with 2–3 colleters, densely pubescent on both surfaces. Inflorescences

subaxillary racemiform cymes, few-flowered, subsessile. Calyx lobes lanceolate or oblong-lanceolate, 1.4–2.6 mm long, 1 colleter per sinus; corolla subcampanulate, greenish purple to marron, tube ~0.6 mm long, lobes 1.9–3.5 mm long, reticulate, ovate to deltoid, obtuse to rounded, pubescent on the abaxial face; staminal corona segments adnate to the stipe for most of its length, prominent-convex and cucullate (hooded), not ligulate; gynostegium stipitate; pollinia obovoid, 0.35 mm long. Follicles fusiform, 4.5–7 cm long, 4- to 5-angled or ridged, glabrous or almost so; seeds ovate, with dentate margins.

Distinctive features: Among Antillean Gonolobinae, *Poicilla* is recognized by the small oblong-lanceolate basally sagittate leaves, and the prominent-convex and cucullate staminal corona segments, eligulate.

Distribution: A genus of a single species, *Poicilla tamnifolia* Griseb. endemic to W Cuba; thickets, seasonally semi-deciduous, dry forests and woodland; 0–250 m.

POICILLOPSIS Schlechter ex Rendle, J. Bot. 74: 343. 1936. (*Asclepiadoideae*)

Slender twining vines; pubescence of glandular and eglandular trichomes; latex white. Stems mixed retrorse pubescent in two lines. Leaf blades ovate or ovate-oblong, obtuse and apiculate, rounded to truncate at base with 2 colleters. Inflorescences subaxillary, few-flowered racemiform cymes, peduncle 0.7–2 mm long. Calyx lobes ovate to lanceolate, 1–1.6 mm long, with 1 colleter per sinus; corolla subcampanulate, white to green, 6.5–7 mm diam., lobes 1.8–3.3 mm long, ovate, obtuse to acute, densely pubescent on adaxial surface except along left margin, glabrous on abaxial surface, not ocellate; corona gynostegial, of fused staminal and interstaminal segments, staminal segments connate to the interstaminal segments only at base, lobes ~1.2 mm tall, obovate to suborbicular, rounded to emarginated at apex, as long as the gynostegium, with

an inner small ligule, interstaminal segments concave; gynostegium short-stipitate, style-head flat, ~2 mm diam.; pollinia lanceolate-oblong to falcate, 0.45–0.48 mm long. Fruit a subcylindrical-fusiform follicle, 3.5–4.3 mm long, smooth, pubescent or glabrous; seeds oblong to obovate, comose.

Distinctive features: Among Antillean Asclepiadoideae subtribe Gonolobinae, similar to *Ptycanthera* in leaf morphology, size (2–6 cm long) and pubescence, but differs by the ovate, adaxially densely pubescent corolla lobes (vs. linear-lanceolate and glabrous), corona lobes not swollen at base, obovate to suborbicular, as long as the gynostegium (vs. swollen, subtriangular, shorter than gynostegium), style-head flat (vs. conical or convex), and cylindrical-fusiform, smooth follicles (vs. fusiform, 5-winged).

Distribution: A genus of a single species, *Poicillopsis ovatifolia* (Griseb.) Rendle, endemic to eastern Cuba (Sierra Maestra) and western Hispaniola; 600–1,000 m.

POLYSTEMMA Decaisne in A. de Candolle, Prodr. 8: 602. 1844. (*Asclepiadoideae*)

Labidostelma Schltr. (1906); *Microdactylon* Brandegees (1908); *Rothrockia* A. Gray (1885); *Urostephanus* Rob. & Greenm. (1895).

Suffrutescent, twining vines 3–5 m long, sometimes erect subshrubs; mixed pubescence of glandular, short and eglandular long trichomes; latex white. Stems developed from a thickened taproot, densely pubescent, with fissured corky bark in lower internodes. Leaf blades narrowly ovate to deltoid, acuminate or acute at apex, cordate at base with 3–10 colleters. Inflorescences subaxillary, racemiform cymes, 1- to 6-flowered; bracts linear or lanceolate. Calyx lobes ovate, elliptic or lanceolate, with 1–5 colleters; corolla broadly campanulate to narrowly tubular-campanulate, 5–25 mm diam., green or brown-purple, lobes ovate to triangular-



Polystemma guatemalense, photo by P. Acevedo.

ovate, obtuse, reticulate; corona gynostegial, of 5 connate staminal segments, each with more or less filiform or digitate appendages usually in 2 series; gynostegium sessile or stipitate, style-head convex, flat or slightly concave; pollinia subhorizontal or pendent, reniform or obovoid, with one

concave face, corpusculum sagittate to rhombic. Fruit of one fusiform-cylindrical follicle, 9–15 cm long, smooth, green and white or purplish brown, white-mottled. Seeds many (50–100), narrowly ovate, comose.

Distinctive features: Distinguished from other Mesoamerican Gonolobinae by the combination of glandular trichomes with white, crystalline inclusions on stems, leaves and inflorescence; corona gynostegial, of 5 connate staminal segments, each with more or less filiform or digitate appendages usually in two series; and long fusiform-cylindrical, smooth, glabrous and mottled follicles.

Distribution: About five species from N Mexico to Costa Rica but only three species within the limits of the Neotropics; dry deciduous forests and thorn scrubs; 200–1,300 m.

PRESTONIA R. Brown, *Asclepiadaceae* 58. 1810 (nom. cons.). (*Apocynoids*)

Suffrutescent or herbaceous twining vines, 3–15 m long; latex white or clear. Stems commonly terete, with colleters in a conspicuous interpetiolar line, often conspicuously



Prestonia bahiensis, photo by P. Acevedo.

lenticellate, thinly suberized and sulcate-striate with age. Leaves opposite; blades ovate-elliptic, elliptic, lanceolate to broadly obovate-elliptic, base rounded, narrowly obtuse or acute, rarely subcordate without colleters; petioles with many conspicuous

colleters adaxially. Inflorescences axillary, rarely subterminal, cymose, racemiform or umbelliform, simple or 2- or 3-branched; bracts scarious to foliaceous. Calyx lobes foliaceous, each with a single antisepalous colleter; corolla salverform, greenish yellow, cream often tinged with pink, brown, or rarely red, tube normally with an annular thickening at the throat; corona of five suprastaminal appendages behind the anthers, these sometimes reduced to ribs, lobes dextrorsely contorted in bud, obovate or ovate, shorter than corolla tube; anthers triangular-oblong, acuminate at apex, sagittate with long tails at base, adnate to the style-head; nectaries 5, free or connate to form a 5-lobed annulus, slightly shorter to longer than ovary; style-head broadly subcylindrical to subcapitate, roundly 2-lobed at apex, with an annulus at base. Fruit of 2 follicles, terete or moniliform, sometimes fusiform, 10–65 cm long, free or united lengthwise. Seeds many, truncate or shortly rostrate, with a light brown coma.

Distinctive features: *Prestonia* is recognized by the salverform corolla with annular thickening at the throat and 5 suprastaminal appendages or vertical callous ridges. *Laubertia*, also having a thickened corolla throat, differs from *Prestonia* by the eglandular calyx lobes and corolla without suprastaminal appendages or vertical callous ridges.

Distribution: A neotropical genus of 60–65 species; distributed from Mexico to N Argentina, with one species native to Lesser Antilles; wet tropical lowland, riparian, submontane or montane forests, sometimes in seasonally dry forests and thickets; 100–2,500 m.

PROSTHECIDISCUS Donnell Smith, Bot. Gaz. 25: 149. 1898. (*Asclepiadoideae*)

Twining lianas, 8–10 m long; latex white with a strong Solanaceous scent; plant turning black when drying. Stems corky at base, densely pubescent, with short glandular and eglandular spreading trichomes, and long bristly trichomes. Leaf blades elliptic, broadly ovate to suborbicular, abruptly acuminate, cordate at base with 8–18 colleters, adaxially sparsely setulose to glabrescent, abaxially moderate to densely puberulent. Inflorescences subaxillary, racemiform cymes, 3- to 12-flowered; bracts filiform, 3–4 mm long. Calyx lobes lanceolate, reflexed, with 2–4 colleters per axil; corolla rotate, green and red or purple, lobes spreading to reflexed, 12–19 mm long, oblong-spatulate, rounded at apex, abaxially glandular-puberulous; corolline corona present; gynostegial corona 5-lobed and ligulate, adnate to stipe; gynostegium stipitate, style-head long-rostrate; pollinia subpendent, obpyriform, corpusculum oblong-sagittate. Fruit of one (rarely two) fusiform-attenuate follicle, greyish green, 9–15 cm long, strongly and densely muricate, projections 4–13 mm long, glandular pubescent. Seeds many, comose.

Distinctive features: Recognized among Mesoamerican Gonolobinae by all parts turning black when drying, mixed indument of long, eglandular trichomes, and glandular short capitate trichomes; style-head long-rostrate, with a narrowly clavate, apically obtuse appendage; and follicles fusiform-attenuate, strongly and densely muricate.

Distribution: A single species, *Prosthecidiscus guatemalensis* Donn. Sm., distributed from S Mexico to Costa Rica; seasonally dry, deciduous forests, mainly on limestone substrate; 30–1,800 m.

PRUSKORTIZIA Morillo, Pittieria 39: 215. 2015. (*Asclepiadoideae*)

Twining or scrambling lianas > 6 m long; latex white. Stems cylindrical, with mixed



Pruskortizia macrocarpa, photo by J. Pruski.

pubescence of brown or yellowish, long, eglandular and short glandular trichomes. Leaf blades more than 15 cm long, obovate to oblong-elliptic, acuminate at apex, obtuse or rounded at base, colleters 0–2, hidden under the dense indument. Inflorescences subsessile, 3–6- flowered. Calyx

lobes ovate or lanceolate, much shorter than the corolla; corolla 33–65 mm diam., rotate, lobes spreading to reflexed; gynostegial corona dark purple; staminal corona segments hemi-discoid, with a short central ridge at base of the anthers; gynostegium sessile; pollinia horizontal, oblong or narrowly calceolate; anthers with triangular or deltoid apical membrane; style-head flat. Fruits of a single asymmetrically ovoid follicle, thick-walled, pubescent, tuberculate with small conic protuberances.

Distinctive features: Similar to *Fischeria*, *Gonolobus* and *Phaeostemma*, but distinguished by the densely mixed pubescence, obovate, obovate-elliptic or oblong-elliptic leaves > 15 cm long, 3–6-flowered, subsessile cymes, rotate, green or yellowish green reticulate corollas 33–65 mm diameter, and the thick-walled, somewhat tuberculate, pubescent follicles.

Distribution: Two species distributed from Colombia to Bolivia; rain or montane forests; 100–2,550 m.

PSEUDOLACHNOSTOMA Morillo, Pittieria 36: 44. 2012. (*Asclepiadoideae*)

Suffrutescent twining vines; pubescence dense, of yellowish eglandular and glandular trichomes. Stems 2–4 mm thick, hirsute. Leaf blades ovate-elliptic to ovate-oblong, acuminate, broadly obtuse or rounded at base with 2–5 colleters, pubescent on both surfaces. Inflorescences subaxillary, racemiform cymes, 2- to 12-flowered; subsessile or short-pedunculate, rachis sometimes long, with conspicuous scars; bracts ovate; pedicels 8–20 mm long. Calyx lobes reflexed, narrowly ovate or oblong, with 1 colleter per axil; corolla rotate or rotate-campanulate, 6–20 mm diam., yellowish, green or maroon, occasionally veined with green, minutely hispid, lobes oblong or oblong-obovate, obtuse-emarginate, strongly reflexed; gynostegial corona tubular to cyathiform, adnate to corolla and stipe with five laminar lobules, forming deep nectar chambers, subfleshy; gynostegium stipitate, anthers fused to upper side of style-head, sometimes with minute trichomes; pollinia pendent, pyriform, larger than sagittate corpusculum. Fruit a narrowly fusiform follicle, 10–12 cm long, conspicuously 5-costate, attenuate; seeds unknown.

Distinctive features: Distinguished from other members of subtribe Gonolobinae by the short-pedunculate inflorescences, corolla and calyx lobes strongly reflexed, corona shortly tubular or

salverform, as long as or a bit shorter than the gynostegium, pollinia pendent from the caudicles, and follicles fusiform, 5-winged, long-attenuate at apex.

Distribution: A genus of ~eight species found in Nicaragua, Costa Rica, Panama, Venezuela, Ecuador, Peru and Brazil (Acre); rain and premontane forests; 200–1,350 m.

PTYCANTHERA Decaisne in A. de Candolle, Prodr. 8: 606. 1844. (*Asclepiadoideae*)

Slender twining, suffrutescent vines to 10 m long; stem pubescent along two lines, glabrescent with age, trichomes short eglandular. Leaf blades oblong to ovate, apex obtuse to rounded and apiculate, obtuse to truncate and with 2 colleters at base. Inflorescences subaxillary racemiform cymes, 2- or 3-flowered, subsessile or pedunculate. Calyx lobes ovate or lanceolate, with 1.3–2.7 mm long, with 1 colleter per axil; corolla rotate or subrotate, green, tube 0.8–1 mm long, lobes 4.7–7.5 mm long, linear-lanceolate, obtuse, glabrous; corona gynostegial, staminal segments swollen at base, subtriangular in front view, rising vertically and then connecting to the stipe below the anthers; gynostegium stipitate, style-head conical or slightly rostrate; anther wings with divergent apices; pollinia horizontal, obovate or oblong-obovate, corpusculum narrowly sagittate. Fruit a subcylindrical-fusiform follicle, with 5 undulating wings; seeds unknown.

Distinctive features: Similar to *Poicillopsis* in leaf morphology, size (2–6 cm long) and pubescence, but differs by the linear-lanceolate, glabrous corolla lobes (vs. ovate and adaxially pubescent), corona lobes linear-lanceolate (vs. obovate to suborbicular, rounded to emarginate at apex, with a small internal ligule, as long as the gynostegium), conical or slightly rostrate style-head (vs. flat), and 5-winged follicles (vs. smooth).

Distribution: Four to seven species restricted to Cuba, Hispaniola, Bahamas and Belize; thickets on dry limestone hillsides; 150–200 m.

Note: Molecular analyses by Krings et al. (2008) suggest that the following species belong in this genus: *Matelea acuminata* (Griseb.) Woods., *M. correllii* Spellman, *M. nipensis* (Urb.) Woods., *M. oblongata* (Griseb.) Woods., *M. phainops* Krings and *M. pusilliflora* L.O. Williams.

RHABDADENIA Müller Arg. in Martius, Fl. Bras. 6(1): 173. 1860. (*Apocynoids*)

Suffrutescent twining vines, up to 10 m long; pubescence of eglandular short trichomes;



Rhabdadenia madida, photo by P. Acevedo.

latex white. Stems terete, often glabrous, suberized and slightly lenticellate when old, interpetiolar line thin or prominent, without colleters. Leaves opposite; blade shape extremely variable, linear, oblong, oblanceolate, or obovate-elliptic, obtuse and mucronate, acute

or acuminate at apex, rounded to subcordate or truncate at base without colleters, glabrous or minutely puberulent. Inflorescences terminal or axillary, reduced dichasial cymes with 1– (2–3) –4 flowers; long-pedunculate; bracts 1–3 mm long. Calyx lobes foliaceous, without colleters; corolla white, pink or light purple, infundibuliform, 33–75 mm long, infrastaminal tube short and straight, the throat conical or tubular, without a corona, lobes dextrorsely contorted in bud, unequally obovate; stamens included, anthers oblong-ovate, apically pubescent, truncate to obtusely rounded at base, adnate to the style-head; nectaries 5, free or connate at base, shorter

than ovary; style-head cylindrical, pubescent at apex, with a large membranous conical-truncate basal annulus. Fruit of 2, narrowly cylindrical, continuous follicles, 6–12 cm long. Seeds many, rostrate, coma white to cream.

Distinctive features: Differs from the rest of the neotropical genera of Apocynoids mainly by the large membranous conical-truncate basal annulus around the apically pubescent style-head.

Distribution: A neotropical genus of four to five species, distributed from SE United States (Florida) to the West Indies, and from Mexico to northeastern Argentina; often in flooded forests or flooded savannas, seasonal swamps and mangroves, 0–300 m.

RHODOCALYX Müll. Arg. in Martius, Fl. Bras. 6(1): 172. 1860. (Apocynoids)

Small erect subshrubs and suffrutescent twining vines; pubescence of eglandular short trichomes or glabrate; latex translucent or white. Stems with interpetiolar colleters. Leaves opposite; blades ovate to orbicular, acute to acuminate or obtuse at apex, cuneate to broadly rounded at the base; without colleters. Inflorescences axillary or terminal few- to several-flowered racemes. Calyx lobes large, foliaceous, each with a solitary antisepalous colleter; corolla salverform, reddish brown, orifice yellow, constricted by annular corona, suprastaminal corona lobes absent, lobes dextrorsely contorted in bud, spreading, obliquely obovate, about the same length as, or shorter than, the tube; stamens included; anthers triangular, acuminate at the apex, sagittate at the base with slender, acute basal appendages, adnate to the style-head; nectary of 5 separate lobes or these fused into a 5-lobed ring; ovary apocarpous; style-head spool-shaped with short membranous basal collar. Fruit apocarpous, follicles terete, parallel to slightly falcate, pubescent to glabrous. Seeds numerous, with a tawny sessile coma.

Distinctive features: *Rhodocalyx* superficially resembles *Prestonia* in general habit and salverform corolla with annular corona, however, it lacks the corolline corona lobes behind the stamens, but possesses large, foliaceous calyx lobes.

Distribution: A South American genus of two species one of which is a twining vine, found from northeastern Brazil to southeastern Bolivia and northeastern Paraguay in savannas, *cerrados* and *campo rupestre* vegetation; 600–1,000 m.

RHYTIDOSTEMMA Morillo, Pittieria 37: 127. 2013. (*Asclepiadoideae*)

Suffrutescent twining vines, 3–10 m long; puberulous or hispid, with glandular



Rhytidostemma viride, photo by C. Lane.

translucent and yellowish or light brown eglandular trichomes; latex white. Stems usually thin, not conspicuously lenticellate. Leaf blades ovate, narrowly elliptic to obovate-elliptic, narrowly and shortly cordate at base with 2–11 colleters, pubescent.

Inflorescences subaxillary cymes, 4- to 18-flowered; peduncles 2.5–7 cm long; bracts linear. Calyx lobes reflexed, ovate, oblong, or lanceolate-attenuate with

1(–3) colleter per axil; corolla rotate-campanulate,

6.5–22 mm diam., lobes incurved, green or brownish purple, often with reticulate green venation, with a papillose band along adaxial midvein, narrowly ovate to oblong, one or both apical margins strongly crispate; gynostegial corona fleshy, of 5 rugose or verrucose segments connate at base and adnate to stipe, frequently with 5 laminar or conical radial lobes in staminal position; anther connectives dorsally convex, neither inflated nor hiding style-head margin; pollinia

reniform, horizontal, corpusculum sagittate. Fruit one fusiform follicle, 15–20 cm long, with slightly irregular and densely glandular-pubescent surface; seeds many, comose.

Distinctive features: Similar to *Fischeria*, but distinguished by the convex, non-inflated anthers, with a thin translucent apical membrane, not covering the style-head; and staminal corona of five almost distinct, conspicuously rugose or verrucous lobes, frequently with five laterally flat or conic projections that arise radially from the stipe

Distribution: About eight species from Panama to the Guianas, Peru and Brazil; lowland wet, rain or lower montane forests; 100–1,500 m.

RIPAROAMPELOS Morillo, Pittieria 39: 241. 2015. (Asclepiadoideae)

Suffrutescent twining vines > 10 m long; latex white, abundant. Stems shortly pubescent.



Riparoampelos amazonicus, photo by P. Acevedo.

Leaf blades 8–13 cm long, coriaceous, lanceolate to obovate-elliptic, basally shortly and narrowly cordate, with several colleters at the junction with petiole, venation abaxially prominent, with short erect trichomes. Inflorescences subsessile, 2–3-flowered. Calyx lobes deltoid, shortly acuminate; corolla 20–24 mm diam.,

rotate with spreading, lanceolate, revolute lobes that are yellowish with purplish margins and apex, apically with long, flat and white trichomes; gynostegial corona fleshy, dark purple to black, staminal segments incurved, interstaminal segments broadly concave; gynostegium subsessile; pollinia horizontal, asymmetrically pear-shaped. Follicles narrowly ovoid or fusiform,

muricate, with irregular blunt-tipped projections, orange tinged when mature. Seeds ~25, rose-colored, ovate, pustulate, marginally strongly dentate, without coma (Figure 42B).

Distinctive features: Characterized by coriaceous lanceolate leaves, with a shortly and narrowly cordate base, radiate flowers with a tuft of white trichomes on the tips of the corolla lobes and ecomose, pustulate, marginally strongly dentate, rose-colored seeds.

Distribution: A single species, *R. amazonicus* (Morillo) Morillo, distributed in the Amazon basin (Colombia, Venezuela, Brazil and Peru) and the Guianas; seasonally flooded forests, mainly in riparian vegetation; 100–300 m.

ROJASIA Malme, Ark. Bot. 4(14): 10. 1905. (*Asclepiadoideae*)

Suffrutescent twining vines, 3–4 m long; pubescence mixed, densely greyish tomentose.



Rojasia gracilis, photo by A. Di Giacomo.

Stems pubescent, suberized at base. Leaf blades ovate to triangular-deltoid, acute or obtuse and mucronate at apex, cordate at base with 4–5 colleters, densely pubescent.

Inflorescences subaxillary, helicoid cymes, 4- to 6-flowered, peduncle 8–11 mm long, pedicels ~15 mm long; bracts linear-lanceolate, 3–4 mm long. Calyx lobes

lanceolate, acute, ~5 mm long, with 1 colleter per axil; corolla rotate-campanulate, (greenish) white, 19–22 mm diam., lobes erect or ascending, oblong-spatulate, glabrous; gynostegial corona of free staminal lobes attached below the filament tube, exceeding gynostegium, laminar, bifid, erect, each branch fimbriate; gynostegium stipitate, style-head flat or concave, with 5 blunt

scales at top; pollinia narrowly ovoid, pendent, with a proximal hyaline portion, laterally attached to the articulated caudicles, corpusculum narrowly sagittate. Fruit of a single obclavate follicle, finely pubescent, muricate, projections sparse, long and slender; seeds many, narrowly ovate, comose.

Distinctive features: Vegetatively similar to *Ibatia*, but differing by the combination of stems and leaves with dense grayish tomentose glandular pubescence, corolla lobes oblong-spatulate, erect and apically recurved, corona of 5 free, erect, bifid segments, with each branch conspicuously fimbriate, style-head truncate or slightly concave, with 5 blunt scales at top, pollinia with a proximal hyaline zone, laterally attached to the caudicles, and follicles with long, slender and acute projections, not suberized.

Distribution: A single species, *Rojasia gracilis* (Morong) Malme; predominantly distributed in southern South America but extending its distribution to Bolivia; dry open scrubs (*chaco*) and scrub-forest (*chaco forest*); 50–450 m.

ROTUNDANTHUS Morillo, Pittieria 39: 245. 2015. (Asclepiadoideae)

Twining liana to 9 m long; latex milky. Stems densely villous. Leaf blades 8–17 cm long, oblong-lanceolate or narrowly elliptic, cordate at base, colleters few, hidden under the dense indument; adaxially densely setose-pilose, abaxially densely pilose. Inflorescences axillary, subsessile, 2–5-flowered. Corolla 36–48 mm diam., rotate-campanulate, bright yellow; lobes spreading, ovate, orbicular or broadly deltoid; gynostegial corona a shallow fleshy cup, roughly pentagonal with rounded angles, marginally crenulate with five short ligules below and opposite to the anthers; staminal lobes shortly ligulate; gynostegium sessile with a peltate, broad style-

head; anthers horizontal, with acicular wings; pollinia horizontal, auriculate; style-head peltate. Fruits of a single fusiform follicle, densely muricate, pubescent.

Distinctive features: Much branched lianas, with all vegetative parts villous with yellowish eglandular trichomes; corolla more than five times the diameter of the gynostegium, rotate with wide rounded lobes; gynostegium sessile, with a peltate, very broad style-head, and densely tuberculate follicles.

Distribution: A single species, *R. fulvidus* (Ballard) Morillo, distributed from S Mexico to Costa Rica; wet or rain forests; below 600 m.

RUEHSSIA H. Karsten, Verh. Vereins Beförd. Gartenbaues König. Preuss. Staaten 19: 304.

1849. (*Asclepiadoideae*)

Twining lianas or vines, up to 20 m long, or erect or prostrate shrubs or subshrubs,



Ruehssia linearis, photo by P. Acevedo.

sometimes semi-succulent, with thickened roots; latex usually white. Stems often lenticellate, mostly conspicuously suberized and fissured at base. Leaves opposite or verticillate; blades suborbicular, ovate, elliptic, oblong, or linear, truncate, rounded or cordate at base with

0–20 colleters; petioles with many adaxial colleters at base. Inflorescences subaxillary, 1–2 per node, umbelliform, racemose or paniculate dichasial or monochasial cymes, 3- to 30-flowered,

rarely reduced to 1 flower, shortly pedunculate or sessile. Calyx lobes suborbicular, ovate, elliptic or oblong, small, with (0)5–20 colleters at base; corolla fleshy, rotate, campanulate, urceolate, tubular or salverform, 5–35 mm diam., lobes, white, yellow, green, brown, red, pink, purple or black; corolline corona, if present, of five ridges or several scales on the corolla throat; gynostegial corona of free, fleshy, ovate, triangular, lingulate, oblong or dolabriform staminal segments attached to the back of the anthers or along the filament tube; gynostegium mostly sessile, style-head flat, conical, semi-globose or rostrate; stamens erect, with thin parallel wings; pollinia erect, oblong, clavate, or pear-shaped, corpusculum rhomboid, ovoid to linear. Fruit of 1(–2) ovate, obclavate, ellipsoid, fusiform or subcylindrical, smooth follicle(s), 8–30 cm long, often with thick pericarp; seeds many, ovate, winged, comose.

Distinctive features: Recognized by the erect, pollinia without germination crest, the gynostegial corona of fleshy scales attached to basal backs of anthers, and petioles with many adaxial colleters.

Distribution: *Ruehssia* sensu Espírito Santo et al. (2019) is a neotropical genus that includes all the American species with erect pollinia previously classified as *Marsdenia*; ~126 species distributed from northern Mexico to northern Argentina, including the Greater and Lesser Antilles. ~114 of these species are vines or lianas; thickets, savannas, dry forests or, less often, in seasonally flooded forests (*igapó*); 0–2,500 m.

SCYPHOSTELMA Baillon, Hist. Pl. 10: 252. 1890. (*Asclepiadoideae*)

Cynanchum L. sect. *Microphyllum* Liede (1997); *Liedea* W. D. Stevens (2005).

Herbaceous or suffrutescent twining vines, much branched; pubescence of eglandular, colorless, yellow or brown short trichomes; latex white, often with unpleasant scent. Stems



Scyphostelma pichinchense, photo by S. Liede-Schumann.

slender, usually
densely pilose,
velvety or villous,
frequently in 1 or 2
lines; often with
distinct long and
short shoots, often
ridged and
suberized in lower

internodes. Leaves persistent, frequently distichous, rarely decussate; blades ovate, elliptic, oblong, linear, lanceolate or circular, obtuse, rounded, subcordate or truncate at base with 2 colleters. Inflorescences subaxillary, rarely axillary, occasionally paired, shorter than adjacent leaves, 2- to 8(-20)-flowered, often fasciculate, simple, umbellate, (sub-) sessile, or rarely pedunculate. Calyx lobes ovate, elliptic, deltoid or linear, with (0-) 1-2 colleters per axil; corolla campanulate or cyathiform, 2-6 mm diam., white, cream, green, yellow or reddish, glabrous, papillose or with trichomes over the whole surface; lobes ovate to oblong; gynostegial corona a ring of connate staminal and interstaminal parts, glabrous, tubular or cyathiform or just a seam, equaling to exceeding the gynostegium, fused to three quarters of its length; staminal parts rectangular, ovate, triangular or oblong, erect; gynostegium sessile or stipitate, style-head flat or umbonate; pollinia pendent, ovoid or oblong, apically attached to the caudicles, corpusculum suboblong or narrowly ovoid. Fruit commonly of two spreading follicles, narrowly oblong to obclavate, and attenuate, 2.5-8 (-10) cm long. Seeds few per follicle, oblong, wingless, comose.

Distinctive features: Similar to *Orthosia* which differs by stems often green, long and short shoots not conspicuously distinct, with decussate, not clearly distichous leaves, usually not leafless at flowering time; leaf blades rounded to cuneate at base, inflorescences seem axillary or subaxillary, sometimes paired, and follicles always in pairs at obtuse angles, narrowly cylindrical and long attenuate at apex, without distinct beak.

Distribution: A neotropical genus with ~28 species, found in Costa Rica, Colombia, Venezuela, Ecuador, and Peru; mountain forests and scrubs; 1600–4200 m.

SECONDATIA A. de Candolle, Prodr. 8: 445. 1844. (*Apocynoids*)

Twining lianas or rarely scrambling shrubs; latex white. Stems angulate when young,



Secondatia densiflora, photo by A. Rapini.

glabrate, lenticellate when mature, nodes with small interpetiolar colleter. Leaves opposite; blades ovate, ovate-elliptic to broadly elliptic, acute or round at base, glabrous without colleter, tertiary venation subopposite-percurrent; petiole with several colleter at adaxial base. Inflorescences

axillary or terminal, dichasial cymes or a compound dichasium, with several to many clustered flowers; bracts 1–3 mm long. Calyx lobes ovate or narrowly ovate, with two outer and three inner lobes, one lobe with 2 colletes, 3 lobes with one colleter, and 1 lobe without colleter; corolla white or yellowish green, salverform, tube 4–10 mm long, internally pubescent, without a corona, lobes dextrorsely contorted in bud, narrowly obovate; stamens included, anthers oblong-

sagittate, acuminate and often pubescent at apex, adnate to the style-head; style-head spool-shaped; nectary disc annular, lobed, shorter than ovary. Fruit of 2, thick, fusiform, glabrous follicles. Seeds many, truncate, comose.

Distinctive features: Distinguished by the combination of glabrous eglandular leaves, with subopposite-percurrent tertiary venation, terminal, subterminal or axillary inflorescences with several to many flowers, calyx with two outer and three inner lobes with alternisepalous colleters, salverform, small, white or yellowish green corollas without a corona, and anthers oblong-sagittate, often apically pubescent.

Distribution: A South American genus of four species, distributed from Colombia and Venezuela to southern Brazil, Bolivia and Paraguay; scrub forests (*caatinga*), dry savannas, seasonally dry forests, wet lowland forests and riparian forests; 0–1,350 m.

SKYTANTHUS Meyen, Reise 1: 376. 1834. (Rauvolfioideae)

Erect shrubs, scrambling or twining lianas; latex white. Stems terete, glabrous. Leaves



opposite or subalternate; blades elliptic to oblong-obovate, obtuse to acute or acuminate at apex, cuneate at base without colleters, secondary veins many, subparallel, tertiary veins inconspicuous.

Skytanthus hancorniifolius, photo by A. Rapini.

Inflorescence terminal or subterminal, di- or trichotomously branched cymes; bracts small, lanceolate. Calyx lobes ovate, without colleters; corolla salverform, yellow or purple, tube 6–8 mm long, subcylindrical, expanded in the upper half, with callous appendages (corolline corona) above the stamens, lobes sinistrorsely contorted in bud, inequilateral and narrowly elliptic, much longer than the tube; stamens free from style head, anthers included, subsessile, broadly ovoid, apically with long twisted exerted appendages; nectaries absent; gynoecium of 2 free carpels, style longer than carpels, head annular, shortly bilobed at apex. Fruit of two dehiscent arched, narrowly subcylindrical follicles, sometimes only one by abortion. Seeds many, suboblong, with a membranaceous thin wing at each end, ecomose.

Distinctive features: Leaf blades with subparallel secondary veins and inconspicuous tertiary veins, calyx lobes without colleters, corolla lobes elliptic, longer than the tube, sinistrorsely contorted in bud, tube with inner callous appendages; nectary absent; follicles with thickened suberized 2-winged placenta and seeds winged at both ends.

Distribution: A South American genus of two or three species, native to Eastern Brazil and Chile. *Skytanthus hancorniifolius* (A. DC.) Miers is the only climbing species that grows as a twining liana, however, sometimes grows as an erect large shrub.

STIPECOMA Müller Arg. in Martius, Fl. Bras. 6(1): 175. 1860. (*Apocynoids*)

Twining vines; latex white. Stems reddish purple, slender (1–2 mm diam.), glabrous, with



Stipecoma peltigera, photo by G. Lewis.

scarcely thickened nodes, ribbed and thinly suberized and somewhat fissured when mature. Leaves opposite; blades peltate, eglandular, coriaceous or subcoriaceous, broadly ovate to suborbicular, abruptly and shortly acuminate at apex, abaxially glaucous and white-punctulate, venation conspicuously lighter; petioles with a cluster of filiform colleters at adaxial base. Inflorescences axillary racemose cymes, 10- to 15-flowered, pedunculate. Calyx lobes ovate, subequal, calycine colleters few and alternisepalous; corolla salverform, pink to light-purple, tube 14–16 mm long,

with thickened throat, lobes dextrorsely contorted in bud, obliquely truncate-ovate; stamens included, anthers sagittate, acuminate, with long-acute tails at base, adnate to the style-head; style-head spool-shaped, apically papillate, with membranous annulus at base; nectaries 5, free, rarely connate, subentire, shorter than ovary. Fruit of 2 divaricate, glabrous follicles, 10–12 cm long. Seeds many, long-rostrate, with a cream to cinnamon brown coma.

Distinctive features: Differs from all neotropical Apocynoids by the combination of peltate, adaxially lustrous, glabrous and eglandular leaves, petioles with a cluster of filiform trichome-like colleters on adaxial surface, narrowly salverform pink or light-purple, medium-sized corollas, nectaries shorter than ovary, spool-shaped style-head with annulus at base, and long rostrate seeds.

Distribution: A single species, *S. peltigera* (Stadelm.) Müll. Arg., known from eastern Bolivia to SE Brazil; savannas and scrubs (*cerrado*), on sandy or rocky soils; 700–1,600 m.

SUBEROGERENS Morillo, Pittieria 39: 249. 2015. (Asclepiadoideae)

Suffrutescent twining vines up to 2.5 m long, with a woody and corky caudex up to 20



Suberogerens cyclophylla, photo by U. Meve.

cm diam.; trichomes eglandular, ferruginous or translucent, vermiform, with thin sculptured walls, glandular-capitate trichomes few or absent; stems appressed-puberulent when young, eventually glabrous. Leaves broadly ovate to roundly reniform, acuminate, basally cordate, adaxially sparsely puberulent or glabrous,

abaxially appressed-puberulent. Inflorescences subaxillary, cymose, 2- to 3-flowered, (sub-) sessile. Flowers shortly pedicellate; calyx lobes linear-lanceolate, long-attenuate, longer than corolla tube; corolla rotate, tube adaxially with a white pilose annulus surrounding gynostegium, lobes spreading, green to dark purple, broadly ovate or ovate-deltoid, abaxially appressed-puberulent to glabrous; gynostegial corona purple, of five hemi-disciform ligulate segments in staminal position attached to the corolla tube; gynostegium sessile, style-head flat; anthers with white apical membranes; pollinia horizontal, corpusculum narrowly sagittate. Fruit a narrowly fusiform follicle, minutely muricate; seeds unknown.

Distinctive features: Characterized by thick conspicuously corky caudex, pubescence of stems, leaves, and inflorescences of appressed ferruginous vermiform glandular trichomes, with thin unsculptured walls (glandular-capitate trichomes few or absent), broadly ovate to roundly reniform leaf blades, and narrowly fusiform follicles, with short obtuse, suberized projections.

Distribution: One species, *S. cyclophylla* (Standl.) Morillo; Mexico; thorn scrubs and dry deciduous forests; 200–1,350 m.

TASSADIA Decaisne in A. de Candolle, Prodr .8: 579. 1844. (*Asclepiadoideae*)

Glaziostelma E. Fourn. (1885); *Lorostelma* E. Fourn. (1885); *Madarosperma* Benth. (1876); *Sattadia* E. Fourn. (1885); *Stenomeria* Turcz. (1852).

Suffrutescent, twining vines, > 10 m long, often much-branched; pubescence of



Tassadia obovata, photo by B. Hammel.

eglandular short trichomes; latex white. Stems often with distinct long and short shoots, glabrous to whitish or ferruginous tomentose, sometimes suberized and fissured at base.

Leaves distichous or decussate; blades ovate to oblong, obtuse and mucronate to narrowly

acuminate at apex, obtuse to rounded or cordate at base with 2–4 colleter. Inflorescences terminal, axillary or extra-axillary, (4-) 8- to 50-flowered, thyrsoidal, congested, partial inflorescences helicoid or umbellate, subsessile or pedunculate; rachis angular; pedicels almost obsolete; bracts ovate or deltoid. Calyx lobes ovate or deltoid, with (0–) 1–2 colletes per axil; corolla 3–6 mm diam., rotate, campanulate, cyathiform or urceolate, fused to half of length, cream-green, glabrous or adaxially pubescent; lobes mostly valvate-imbricate, ovate to linear-oblong; gynostegial corona a ring of connate staminal and interstaminal parts, cyathiform, equaling to exceeding the gynostegium, fused up to half of length; staminal lobes ovate, triangular, oblong, trifid or apiculate, erect; gynostegium sessile, style-head occasionally papillose, flat to long-rostrate; pollinia ellipsoid or oblong, occasionally with apical sterile hyaline regions, (sub-) apically attached to the caudicles, corpusculum ovate to oblong. Fruit of two follicles, often disposed at an acute angle, narrowly oblong, obclavate, often with basal thickening, rarely inflated, ellipsoid-suborbicular, 2–6 cm long. Seeds few per follicle, oblong, coma mostly present.

Distinctive features: Similar in habit to *Orthosia*, but distinguished by the combination of persistent leaves, inflorescences of elongate thyrses with congested, sessile partial inflorescences, rachis often conspicuously zigzagged, flowers (sub-) sessile, staminal corona lobes equaling gynostegium, and paired follicles often disposed at an acute angle, frequently with expanded bases or wholly inflated.

Distribution: About 30 species in South America, one species extending to southern Mexico and one species endemic to Cuba; lowland and montane wet forests, riparian forests, floodplains, sometimes in seasonally dry forests; 100–1,900 m.

TEMNADENIA Miers, Apocyn. South Amer. 207. 1878. (*Apocynoids*)

Twining vines, 3–7 m long; latex clear. Stems sparsely puberulent with eglandular



Temnadenia odorifera, photo by G. Siqueira.

reddish trichomes, glabrescent or glabrous, with 2 small interpetiolar colleters. Leaves opposite; blades usually discoloured, membranaceous to fleshy, ovate-elliptic, lanceolate or oblong, apex obtuse-apiculate to abruptly acuminate, obtuse to rounded at base, without colleters, papillose-puberulent to densely puberulent to tomentulose or glabrate. Inflorescences subaxillary, secund cymes, 4- to 30-flowered; pedunculate; bracts lanceolate. Calyx lobes ovate-lanceolate, with a solitary antisepalous colleter at base adaxially; corolla salverform or infundibuliform,

pink to purple, purple-green, or yellow, tube 20–45 mm long, base inflated, without corolline corona, lobes dextrorsely contorted in bud, shorter than the tube, obliquely obovate; anthers included, acuminate at apex, with attenuate basal tails, dorsally pubescent, adnate to the style-head; nectaries 5, free or connate at base, half as long or longer than ovary; style-head fusiform, bilobed at apex, with a basal collar. Fruit syncarpous, of 2 fused follicles, subterete. Seeds rostrate, with cream to cinnamon-brown coma.

Distinctive features: Differing from all South American genera of Apocynoids by its usually indeterminate and di- or trichotomously branched inflorescence, with small, inconspicuous bracts, and connate follicles. Some species of *Prestonia* have connate follicles and branched inflorescences, but they have two corolline coronas, an annular corona around the orifice of the corolla and five suprastaminal lobes.

Distribution: A South American genus of three species distributed in Bolivia and Brazil; wet forests or wet scrubland; 10–1,500 m.

THENARDIA Kunth in Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 3: ed. qu., 209. 1819.

(*Apocynoids*)

Twining suffrutescent lianas; latex clear or clear-white. Stems terete, glabrous. Leaves



Thenardia floribunda from H.B.K., Nov. Gen. Sp. Pl. 3: 209. 1819.

opposite; blades narrowly elliptic, acuminate at apex, acute or obtuse at base without colleters, secondary veins inconspicuous; petioles with a solitary intra-petiolar colleter and 2–4 colleters at base. Inflorescences axillary, subumbellate cymes, di- or trichotomously branched, 6- to 30-flowered; peduncle 2.5–8 cm long, puberulent to glabrous; bracts lanceolate or narrowly elliptic. Calyx lobes narrowly triangular or narrowly elliptic, with 1 antisepalous colleter at adaxial base; corolla creamy white, white and pink or maroon, rotate, tube 1–5 mm long, without a corona, lobes dextrorsely

contorted in bud, obliquely ovate or obovate-orbicular; stamens exserted, anthers acuminate at apex, sagittate or forked with attenuate blunt tails at base, dorsally pubescent, adnate to the style-head, filaments long, coiled or straight, pubescent; nectaries 5, free or more or less connate at

base, as long as or shorter than ovary; style-head spool-shaped. Fruit syncarpous, pendent, 14–40 cm long, comprised of 2 postgenitally fused moniliform follicles. Seeds 6–20 per fruit, with a white coma.

Distinctive features: The genus is distinguished from other American climbing Apocynoids by the combination of watery sap (shared with some *Echites*, *Laubertia*, *Macropharynx* and *Prestonia* species), subumbellate inflorescences, calyx lobes with a single antisepalous colleter at the base within (shared with *Asketanthera*, *Bahiella*, *Echites*, *Hylaea*, *Macropharynx*, *Prestonia*, *Thoreauea*, *Temnadenia* and some species of *Mandevilla*), stamens with wholly exerted anthers (shared with *Forsteronia*, *Hylaea* and *Pinochia*), usually with coiled filaments, and fused follicles (shared with *Temnadenia*, *Thoreauea*, and various species of *Forsteronia*, *Mandevilla* and *Prestonia*).

Distribution: A genus of three species, endemic to rainforests of southern Mexico; 1,000–2,000 m.

THOREAUEA J.K. Williams, *Lundellia* 5: 47. 2002. (*Apocynoids*)

Twining woody or suffruticose lianas; latex white. Stems terete, glabrous, interpetiolar line curved. Leaves (sub-) opposite; blades elliptic or oblong, acuminate at apex, obtuse at base without colleters; petioles with 2–4 lanceolate colleters at base forming a nodal interpetiolar ring and a solitary bract. Inflorescences axillary, subumbellate, trichotomously branched cymes, 20- to 25-flowered; pedunculate; bracts oblong. Calyx lobes deltoid, erect, with 1 antisepalous colleter; corolla white or green with yellow throat, urceolate to campanulate, tube 2.5–6 mm long, corona at throat fleshy 5- to 10-lobed, 1.3–1.6 mm long or weakly developed, irregularly wavy less than 0.5 mm long, lobes dextrorsely contorted in bud, ovate or broadly ovate, shorter

or as long as the tube. Stamens 5, slightly included, shorter than the corona, anthers sagittate, acuminate at apex, with widely divergent tails at base, adnate to the style-head; style-head spool-shaped, with a basal annulus; nectaries 5, almost free at base, somewhat shorter than ovary. Fruit of 2 subcylindrical, glabrous, fused follicles, 12–16 cm long. Seeds many, narrowly truncate, coma yellowish white.

Distinctive features: Distinguished among neotropical climbing Apocynaceae by the combination of petioles with a stipule-like solitary bract; axillary, subumbellate, trichotomously branched cymes; small urceolate to campanulate corollas with a short wavy or 5- or 10-lobed corona at the throat; anthers long-acuminate with strongly divergent tails at base; and fruit of two connate, glabrous, non-moniliform follicles.

Distribution: A genus of three species, endemic to Mexico; montane rainforests; 1,800–2,650 m.

TINTINNABULARIA Woodson, Ann. Missouri Bot. Gard. 23(2): 387. 1936. (*Apocynoids*)

Twining lianas up to 10 m long; pubescence of eglandular trichomes; latex white. Stems



Tintinnabularia mortonii, from Johnson 200 (US).

glabrous or minutely puberulent, with inconspicuous interpetiolar colleter, lenticellate when mature. Leaves opposite; blades narrowly ovate, ovate-elliptic or oblong-elliptic, acuminate at apex, obtuse at base with 2–4 colleters, usually with domatia in axils of secondary veins; petioles with axillary colleters. Inflorescences terminal or subterminal, rarely axillary, trichotomously branched subumbelliform cymes, sometimes reduced to one umbel, 8- to 10-flowered. Calyx lobes subequal, ovate or lanceolate-ovate,

foliaceous, with 1 or 2 colleters at base; corolla yellow to orange-yellow, infundibuliform or narrowly campanulate, tube 12–44 mm long, without a corona, lobes dextrorsely contorted in bud, ovate, much shorter than the tube; stamens mostly with very long filaments, anthers with short to very long, intertwined and exerted filiform apical appendages, adnate to the style-head; nectaries 5, free or connate at base, usually as long as ovary; style-head with 5 radial projections or ridges at the base. Fruit of two membranaceous, moniliform follicles, 35–39 cm long. Seeds many, truncate, comose.

Distinctive features: Similar to *Allomarkgrafia*, *Mandevilla* and *Mesechites* by the presence of several colleters at adaxial leaf blade, corolla usually divided into narrow lower tube and expanded upper tube, without a corona, stamens included, and style-head with 5 radial projections or ridges. Of these four genera, *Tintinnabularia* is distinguished by the combination

of domatia in the axils of the leaf veins abaxially, di- or trichotomously branched dichasial cymes and moniliform fruits. Its most unique feature, however, are the anthers with filiform hairy apical appendages, and in 2 of the 3 spp., elongated (1–3 cm) anther filaments.

Distribution: A genus of three species from SW Mexico, Guatemala and Honduras; submontane or lower montane, wet forests; 1,100–1,700 m.

TYLODONTIA Grisebach, Cat. Pl. Cub. 175. 1866. (*Asclepiadoideae*)

Sparsely branched herbaceous, twining vines, up to 2.5 m long; pubescence of eglandular



Tyloedontia stipitata, photo U. Meve.

recurved trichomes; latex white. Stems, petioles, and inflorescence axis more or less densely pubescent. Leaf blades ovate to lanceolate with 2 colleters. Inflorescences helicoid, mostly with geminiflorous partial inflorescences, sciadioidal-thyrsoidal, or with an elongated rachis, 9- to 70-flowered. Flowers nectariferous; calyx lobes ovate or triangular-ovate; corolla urceolate, fleshy, 1.8–6 mm long, white, usually adaxially densely pubescent, lobes ovate to lanceolate, strongly asymmetric with the left side basally overlapping the neighboring lobe; corolline corona of epipetalous lobules; gynostegial corona in two series, outer series of interstaminal lobules often

larger, inner series of inconspicuous staminal lobules, fleshy, short; gynostegium often stipitate,

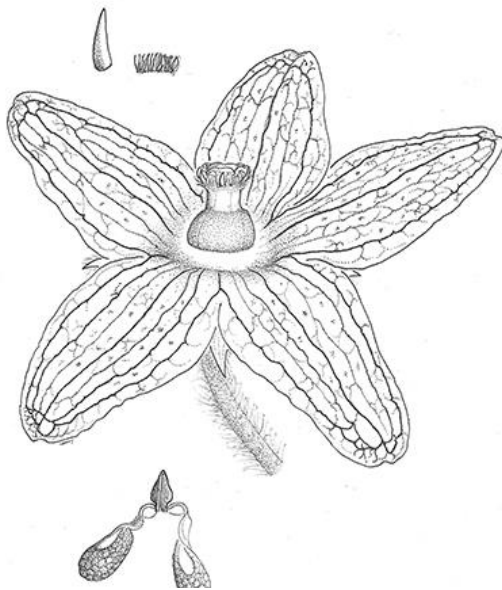
style-head green, with central depression; anther wings divided into a basal (mostly longer, vertically oriented) and an upper (nearly horizontal) part; pollinia pendent, obliquely ovate-reniform, with a flattened zone on the upper medial side; corpusculum ovate-elliptic. Fruit of a single fusiform or narrowly oblong follicle, 6–7.2 cm long, apex drawn in a long beak, glabrous, bent into a 90° angle at base. Seeds pyriform, winged, comose.

Distinctive features: Distinguished from other Antillean Gonolobinae by the combination of densely eglandular, pubescent, slender stems, 1–2 m long, small (1.5–4.5 cm long) ovate to lanceolate leaves, urceolate corolla with noticeably short lobes, and a highly complex system of fused staminal-interstaminal coronas that are folded into a corolline corona.

Distribution: A Cuban genus of four species; submontane wet or rain forests, in dense understory on steep, shaded banks; 200–1,000 m.

VULCANOA Morillo, *Pittieria* 39: 253. 2015. (Asclepiadoideae)

Twining lianas; densely ferruginous-pilose. Leaf blades narrowly ovate to ovate-elliptic,



Vulcanoia steyermarkii, drawing by G. Morillo.

acuminate to cuspidate at apex, cordate at base with 4–6 colleters, ferruginous hispid. Inflorescences racemiform or paniculate, shortly pedunculate, few-flowered cymes. Calyx lobes lanceolate, sometimes with a colleter at base; corolla campanulate, ~2.8 cm diam., white, reticulate with green, lobes spreading, narrowly ovate, adaxially hispidulous; corolline corona tubular-cupuliform, apically fimbriate; gynostegial corona adnate to stipe, with 5

horn-like staminal lobes; gynostegium stipitate; anthers suberect, with short membranes; pollinia pendent, narrowly pyriform; style-head convex. Fruit of a single fusiform follicle, densely muricate, with long, curved projections.

Distinctive features: Distinguished from other Gonolobinae genera by the stipitate gynostegium with the stipe surrounded by a tubular, cupuliform, puberulent corona, with a fimbriate annulus and five hornlike lobes opposite to the anthers.

Distribution: A single species, *V. steyermarkii* (Woods.) Morillo, distributed in southern Mexico and Guatemala; upper montane, cloud forests, on volcanic slopes; 1,700–3,300 (–3,900) m.