

GUIDE TO THE GENERA OF LIANAS AND CLIMBING PLANTS IN THE NEOTROPICS

CELASTRACEAE

By Leonardo Biral and Julio A. Lombardi (25 August 2020)



Hippocratea volubilis, photo by P. Acevedo

The family comprises about 1,200 species in 100 genera with global distribution, occurring in temperate zones in both hemispheres, but most diverse in tropical and subtropical areas. Mainly trees and shrubs, but about 30% of species are lianas. Climbers are predominant in the subfamilies Hippocrateoideae and Salacioideae (formerly Hippocrateaceae family), whereas in Celastraceae sensu stricto they are represented in the New World solely by the genus *Celastrus*. In the Neotropics there are just over 100 species of lianas in 13 genera, distributed mainly in forest habitats.

Diagnosics: Leaves simple, opposite or alternate, often elliptic to oblong, and serrate or crenate; flowers are small, bisexual (in all Neotropical climbers), actinomorphic with a conspicuous nectariferous disc and three to five stamens, commonly clustered in axillary inflorescences. Fruits in climbing species include capsules, berries and monocarps. Sterile material may be confused with Malpighiaceae, but it is differentiated by leaves with crenate or serrate margins, the lack of glands on petioles and lamina, and the lack of T-shaped hairs.

General characters

1. STEMS. Woody, up to 50 m in length and 10 cm in diam. Young branches are terete, angled or flattened, old stems are terete, lobed, asymmetrical or flattened. Bark furrowed, fissured (e.g., *Hippocratea volubilis* L.) or exfoliating (*Hylenaea*), with different types and quantity of lenticels. Cross sections with **regular anatomy** where the xylem is dissected by numerous wide rays are found in the Hippocrateoideae, e.g., *Anthodon*, *Cuervea* and *Hippocratea* (fig. 1a, b & d), in species of *Celastrus* in the temperate zone it may have a ring porous pattern (fig. 1c); shallow to deep **phloem wedges** formed by a continuous cambium are found in various species of *Tontelea* (figs. 1e, 2a & b); minute successive interxylary **phloem arcs** are found in *Cheiloclinium* (fig. 1f) and *Semialarium* (fig. 2e); **successive cambia** are found in Salacioideae, e.g., *Peritassa* and *Salacia*, these producing continuous or discontinuous concentric rings or arcs of xylem and phloem (fig. 2c, d & f).
2. EXUDATES. Commonly inconspicuous, but red or yellow exudates have been reported for a few species, e.g., *Prionostemma aspera* (Lam.) Miers.
3. CLIMBING MECHANISMS. Most species have prehensile lateral branches that develop precociously before the leaves are formed (fig. 3b); some species are scramblers with plagiotropic, lateral branches that help them to secure their position on the host plants; twiners (counterclockwise) are found in the genus *Celastrus* (fig. 3a & d) and sometimes in species with other climbing mechanisms such as prehensile branches (e.g., *Peritassa laevigata* (Link) A.C. Sm.) or scramblers. A few species that commonly grow as trees or shrubs sometimes have upper scrambling branches.
4. INDUMENT. Neotropical Celastraceae are mostly glabrous. A few species of climbers are pubescent, with simple, short hairs that usually are restricted to young branches (*Hippocratea volubilis*) or inflorescences and pedicels (*Cheiloclinium puberulum* Lombardi). *Prionostemma aspera* and *Semialarium mexicanum* (Miers) Mennega are entirely pubescent species.
5. LEAVES. Leaves are always simple, opposite or subopposite in all climbing genera (fig. 3b, 4a & c), except for *Celastrus*, which always have them alternate. Stipules are minute, usually triangular and caducous.

6. INFLORESCENCES. Cymose, commonly axillary, sometimes terminal or cauliflorous (fig. 4b), often multi-flowered and dense corymbose (fig. 4a), fasciculate (fig. 4b), or paniculate dichasial thyrses (fig. 4a & c) with opposite, alternate or verticillate branching; flowers rarely solitary; bracts minute, triangular or scale-like. Peduncles cylindrical or angular (e.g., 4-angled in *Elachyptera*).
7. FLOWERS. Flowers are small, actinomorphic, bisexual (in all Neotropical climbing species), perianth (4-)5-merous, segments generally free, sometimes sepals connate at the base; disc nectariferous often conspicuous, extrastaminal or intrastaminal (*Celastrus*); annular, columnar, short-tubular, pulvinate, cupuliform or patelliform; free or adnate to the ovary; stamens 3-5, (1-)2-celled, anthers extrorse or introrse (*Celastrus*), dehiscence transverse, longitudinal, oblique or rarely apical; ovary superior, 3-5-locular, stigma entire or bilobed, 1-many ovules per locule, axillary to erect.
8. FRUITS. Loculicidal, valvicular capsules in *Celastrus* (fig. 6a), divaricate monocarps that open by a median fissure, e.g., *Cuervea*, *Hippocratea* and *Anthodon* (fig. 5a & b) or berries of varied sizes, e.g., *Cheiloclinium*, *Peritassa*, *Salacia* and *Tontelea* (fig. 6b, 7a & b).
9. SEEDS. In Neotropical *Celastrus*, usually one seed per fruit (rarely three) and completely covered by orange to red aril (fig. 6a). Genera with dry fruits have numerous winged seeds, with an elliptic and usually conspicuous basal wing (sometimes reduced, e.g., in *Cuervea* and *Elachyptera*). Fleshy fruits (berries) are few seeded (usually 2-7), surrounded by mucilaginous pulp or sarcotesta (fig. 7a & b).

USES. Economical uses for climbing Celastraceae in the Neotropics are scarce. Stems of *Hippocratea volubilis* have been reported as resistant and used as binding fiber. *Pristimera celastroides* (Kunth) A.C. Sm. is referred to be an insecticide. Pulp of berries of some species of *Peritassa*, *Salacia* and *Tontelea* are edible and fruits sometimes marketed locally. Seeds of *Hylенаea comosa* (Sw.) Miers are edible (Smith 1940, Lombardi 2014).

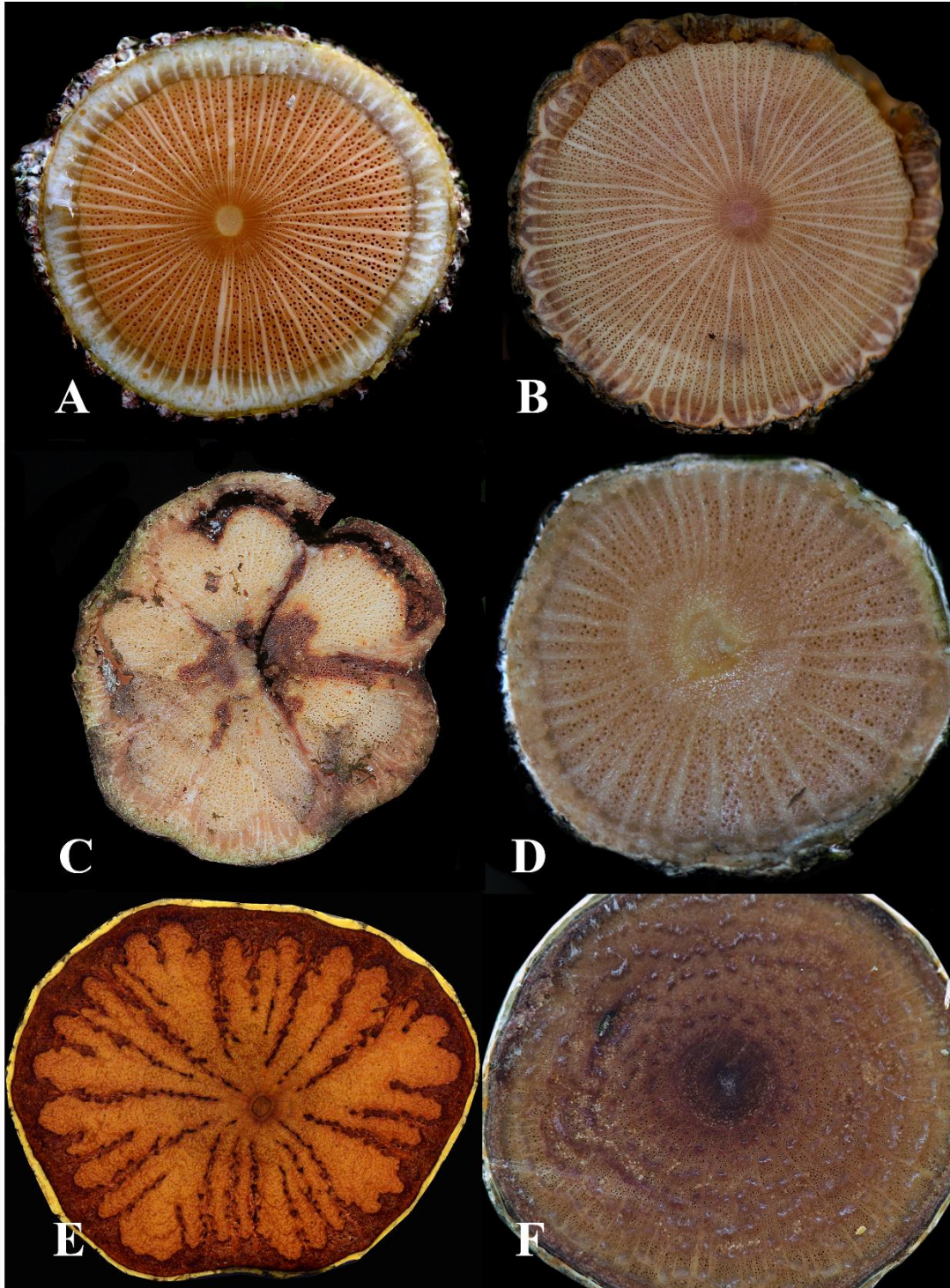


Figure 1. Cross sections of Celastraceae stems. **A.** *Cuervea kappleriana*, vascular tissues dissected by wide rays, vessels are very wide. **B.** *Hippocratea volubilis*, vascular tissues dissected by wide rays, vessels are very wide. **C.** *Celastrus sp.*, vascular tissues dissected by narrow rays, presence of deep phloem wedges. **D.** *Anthodon decussatum*, vascular tissues dissected by wide rays, vessels are very wide. **E.** *Tontelea corymbosa*, asymmetrical stem, xylem with deep phloem wedges. **F.** *Cheiloclinium sp.*, with successive interxylary phloem arcs. Photos by P. Acevedo.

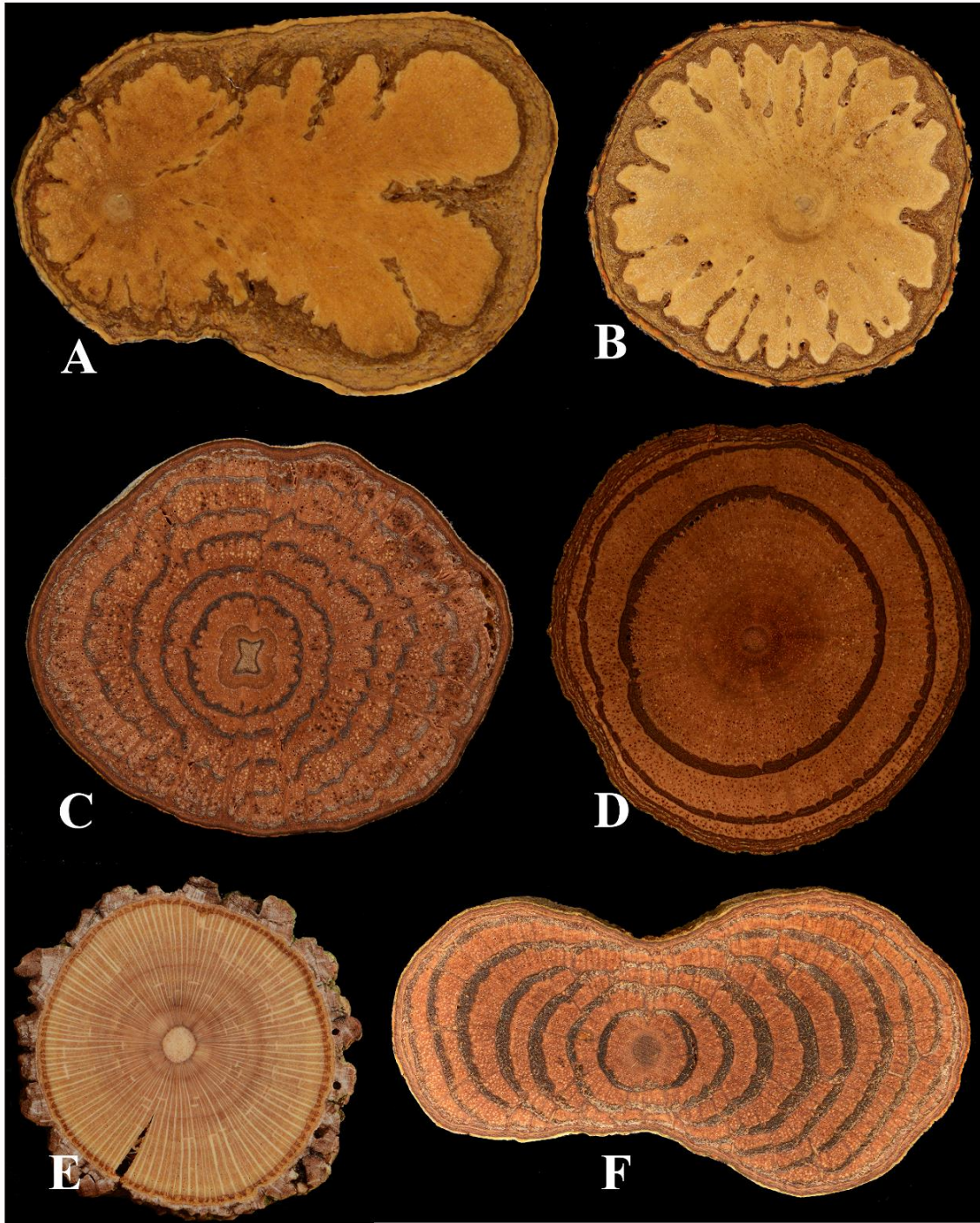


Figure 2. Cross sections of Celastraceae stems. **A.** *Peritassa glabra*, asymmetrical stem (medulla is toward the left), xylem with deep phloem wedges. **B.** *Tontelea fuliginea*, nearly terete stem, xylem with deep to shallow phloem wedges. **C.** *Salacia maburensis*, slightly asymmetrical stem, with successive concentric arcs of xylem and phloem. **D.** *Peritassa laevigata*, terete stem with successive concentric rings of xylem and phloem. **E.** *Semialarium mexicanum*, vascular tissues dissected by wide rays, successive interxylary arcs present. **F.** *Salacia cordata*, flattened stems with successive concentric rings of xylem and phloem. Photos by P. Acevedo.



Figure 3. Climbing mechanisms in Celastraceae. **A.** *Celastrus scandens*, exclusively a twining liana. **B.** *Hippocratea volubilis*, showing full-grown prehensile branches. **C.** *Peritassa laevigata*, initially climbing through prehensile branches, some branches twining and becoming woody. **D.** *Celastrus grenadensis*, lobed and twisted old stem. Photos by: A-C by P. Acevedo; D. by J. Amith.

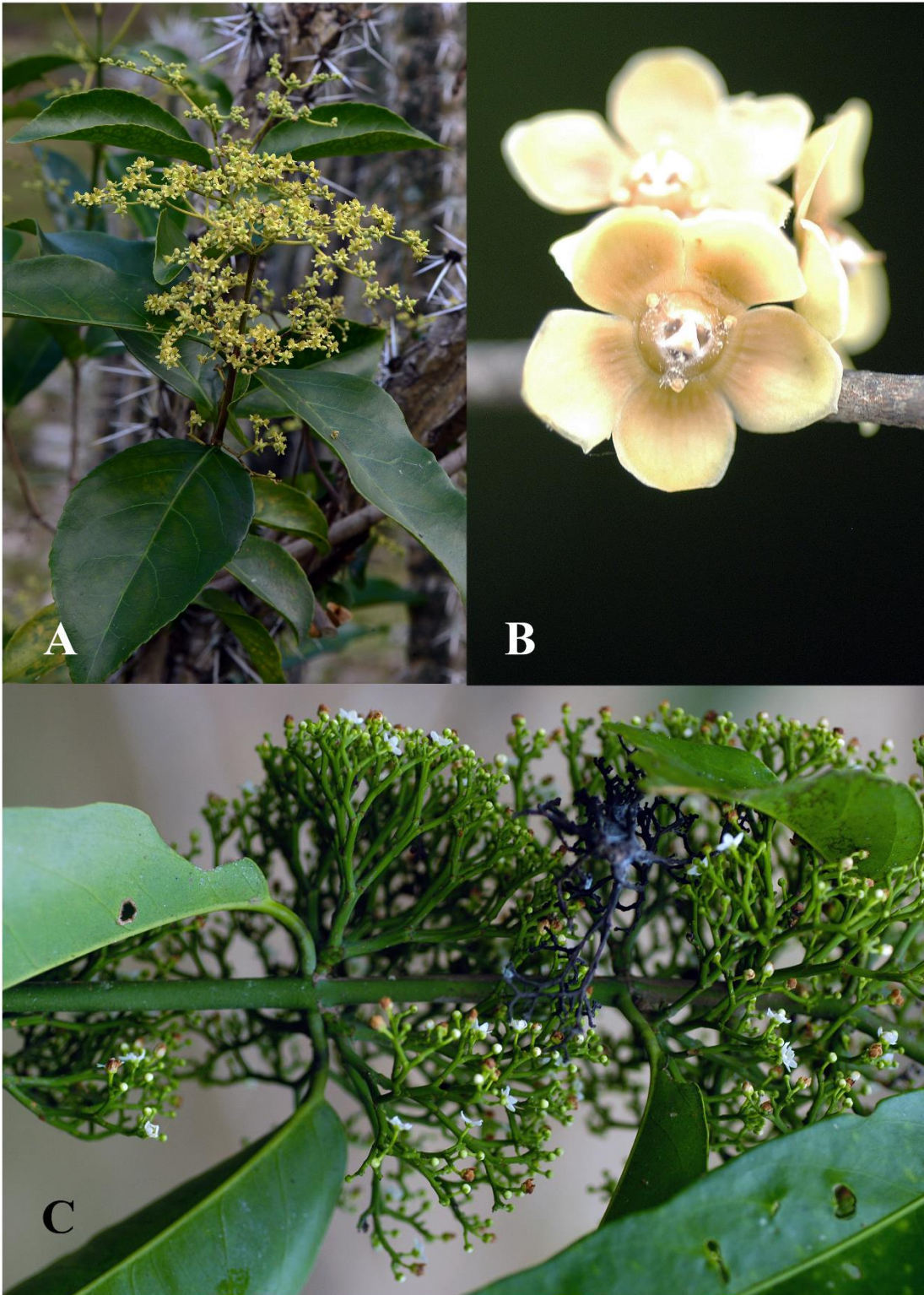


Figure 4. Inflorescences in Celastraceae. **A.** *Hippocratea volubilis*, with axillary corymbose thyrses. **B.** *Salacia impressifolia*, cauliflorous inflorescence. **C.** *Tontelea attenuata*, with axillary pleochasial cymes. Photos by P. Acevedo.

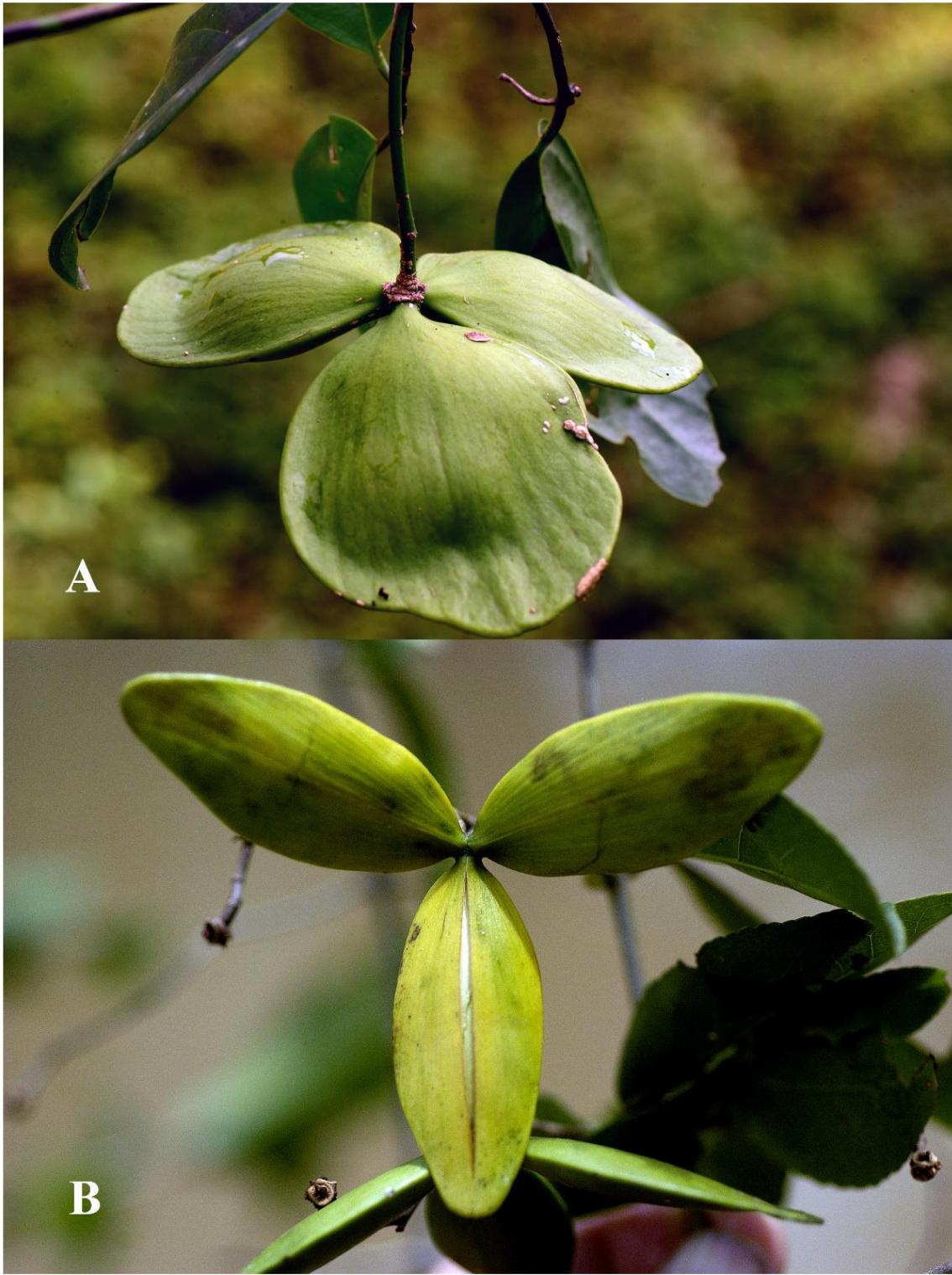


Figure 5. Fruits in Celastraceae. **A.** *Cuervea kappleriana*, hanging fruit with swollen monocarps. **B.** *Hippocratea volubilis*, fruit with three, flat monocarps, one of which is partly dehiscent. Photos by P. Acevedo.



Figure 6. Fruits in Celastraceae. **A.** *Celastrus orbiculatus* with dehiscent capsule, seeds covered by red aril. **B.** *Salacia impressifolia*, leathery berry. Photos by P. Acevedo.



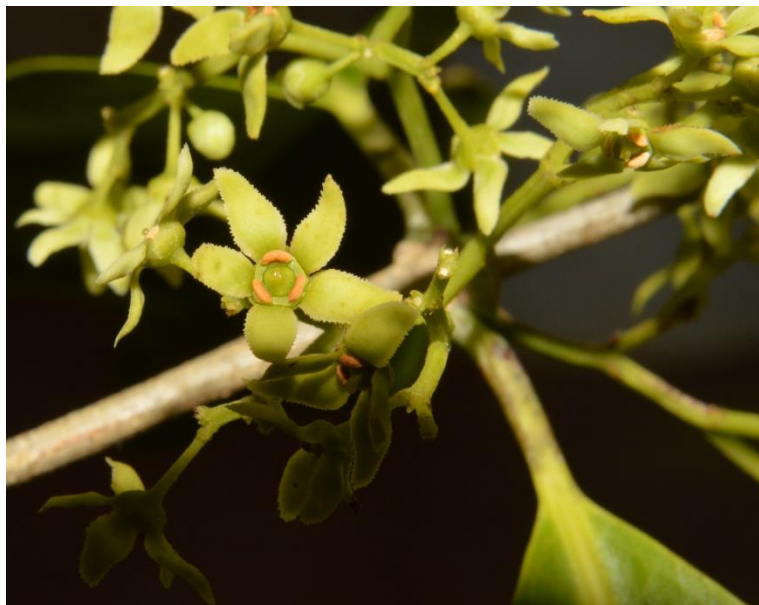
Figure 7. Fruits in Celastraceae. **A.** *Peritassa laevigata*, leathery berry, seeds covered by a fleshy pulp. **B.** *Tontelea ovalifolia*, large, woody fruit, seeds covered with a starchy pulp. Photos by P. Acevedo.

KEY TO THE GENERA

1. Leaves alternate; disc intrastaminal; seeds arillate *Celastrus*
1. Leaves mostly opposite; disc extrastaminal; seeds not arillate..... 2
2. Fruit a capsule or dehiscent monocarp, dry; seeds basally winged (wing sometimes reduced)
not surrounded by a pulp 3
2. Fruit a fleshy berry; seeds wingless, surrounded by mucilaginous pulp 10
3. Plants scabrous..... *Prionostemma*
3. Plants glabrous or pilose but not scabrous 4
4. Young twigs pilose; petals adaxially barbellate..... *Hippocratea*
4. Young twigs glabrous or rarely pilose; petals not barbellate..... 5
5. Petals serrate; filaments short (anthers subsessile) *Anthodon*
5. Petals entire or erose; filaments conspicuous 6
6. Disc pulviniform *Semialarium*
6. Disc not pulviniform 7
7. Large flowers (8-17 mm); petals with erose margins *Cuervea*
7. Flowers small (up to 5 mm), petals with entire margins..... 8
8. Inflorescence a dichotomously branched dichasial cyme *Pristimera*
8. Inflorescence a many-branched pleiochasial cyme 9
9. Inflorescence branches conspicuously quadrangular, winged *Elachyptera*
9. Inflorescence branches flat or cylindrical, not winged *Hylenaea*
10. Disc short-tubular or columnar, adnate to the ovary; stigma 3-lobed..... 11
10. Disc variously shaped, if tubular, free from the ovary; stigma 3-lobed or entire 12
11. Disc columnar; stamens in lateral cavities of the disc; style inconspicuous..... *Cheiloclinium*
11. Disc short-tubular; stamens not in lateral cavities on the disc; style conspicuous *Tontelea*
12. Disc short-tubular; anthers 2-celled, with longitudinal or oblique dehiscence..... *Peritassa*
12. Disc various, but not short-tubular; anthers (1)2-celled, with oblique or apical dehiscence
..... *Salacia*

GENERIC DESCRIPTIONS

ANTHODON Ruiz & Pavón, Fl. Peruv. 1: 45. 1798.



A. decussatum, photo by A.K. Koch

Glabrous lianas, with prehensile lateral branches; stems cylindrical, reaching 12-15 m in length, exudate inconspicuous; cross section with regular anatomy, vascular tissue dissected by numerous, conspicuous rays. Leaves opposite or subopposite, margin crenate to crenulate; stipules triangular, caducous. Inflorescence a compound dichasium, axillary, multi-flowered. Flowers 5-merous,

perianth segments free, petals yellowish, margin serrate; disc extrastaminal, annular, free from the ovary; stamens 3, filaments very short, broadened at base, anthers oblong to reniform, with transversal dehiscence; ovary 3-locular, style short and apical, stigma 3-lobed or punctate, ovules 4-10 per locule, axillary. Fruit a loculicidal capsule, shaped like an inverted funnel, sometimes flattened, 3-lobed, lobes emarginate or rounded, opening by a longitudinal fissure in the middle of each lobe. Seeds winged, elliptic, with a conspicuous membranaceous wing, thickened at the margin.

Distinctive features: Leaves crenate at the margins; petals regularly serrate; large flattened fruits with three emarginate or rounded lobes; seeds with a conspicuous basal wing. Fruits similar to *Semialarium* but distinguished from it by the crenate leaves (vs. entire).

Distribution: A monotypic genus (*Anthodon decussatum* Ruiz & Pav.) distributed from Costa Rica to Brazil and Paraguay, along gallery forests, rain forests and seasonally dry forests.

CHEILOCLINIUM Miers, Trans. Linn. Soc. London 28(2): 420. 1872.



C. cognatum (Miers) A.C. Sm., photo by P. Acevedo

Lianas, shrubs or trees, glabrous or rarely pubescent on inflorescences; climbing species with decussate, prehensile branches, often reaching 15+ m in length; stems terete, in some species reaching at least 3.5 cm in diam., exudate inconspicuous; cross sections with numerous conspicuous rays traversing the vascular tissues, some species with successive interxylary phloem arcs.

Leaves opposite or subopposite, margin entire or crenulate; stipules caducous. Inflorescences a compound dichasial cyme or a thyse, axillary or terminal, multi-flowered, with opposite branching. Flowers 5-merous, perianth segments free, petals reddish, orangish, yellow or green, margin entire; disc extrastaminal, columnar, adnate to the ovary, but discontinuous by lateral cavities of stamen insertions; stamens 3(-5), emerging from the disc, filaments flattened, anthers orbicular with transversal dehiscence; ovary 3(-5)-locular, style absent, stigma sessile, 3(-5)-lobed, lobes entire or bifid, 2-7 ovules per locule, axile or apical. Fruit a berry, ellipsoid or spheroid, sometimes with 3-5 longitudinal whitish bands. Seeds 2-7, surrounded by mucilaginous pulp.

Distinctive features: Disc adnate to the ovary, discontinuous, stamens emerging from the disc through lateral cavities, style absent, stigma lobed; fruit an ellipsoid or globose berry.

Distribution: Restricted to the New World with 12 species, ranging from Mexico to southern Brazil; common in rain forest at low elevations but reaching 1100 m elevation.

CELASTRUS Linnaeus, Sp. Pl. 196. 1753.



C. liebmannii Standl., photo by J.A. Lombardi

Twining lianas, glabrous (in Neotropical species); stems cylindrical or deeply lobed in *C. liebmannii* Standl., reaching > 20 in length and about 10 cm in diam., with scanty watery exudate; cross sections with regular anatomy showing numerous conspicuous rays traversing the vascular tissues, some species with deep phloem wedges. Leaves alternate, margin entire, crenate, serrulate or obscurely crenulate-serrulate; stipules minute (1 mm long), caducous. Inflorescences

axillary or terminal, a racemiform or paniculate, dichasial thyrses. Flowers 5-merous, perianth segments free, petals white or greenish, margins entire or erose; disc intrastaminal, annular, flat, fleshy, free from the ovary; stamens 5, inserted on the edge or beneath the disc, filaments filiform, anthers ovoid or orbicular, apiculate or not, dehiscence longitudinal; ovary 3-locular, stigma entire or 3-lobed, with 1 ovule per locule. Fruit a 3-valved, loculicidal capsule, pericarp coriaceous. Seeds 1(-3), completely covered by an orange to red aril.

Distinctive features: Alternate leaves; intrastaminal disc; isostemonous androecium; fruit capsular that opens by three valves; seeds completely covered by an orange to red aril.

Branches conspicuously lenticellate. The Neotropical species differ from all others in the genus (including temperate species from North America, e.g., *Celastrus scandens* L.) by bisexual flowers, one ovule per locule, and fruits usually with only one seed (vs. unisexual flowers, two ovules per locule, and fruits 3-6-seeded).

Distribution: About 30 species, chiefly in Asia. Five species in the Neotropics, from Mexico to Brazil, in diverse forest habitats.

CUERVEA Triana ex Miers, Trans. Linn. Soc. London 28(2): 370. 1872.



C. kappleriana (Miq.) A.C. Sm., photo by P. Acevedo

Lianas or climbing shrubs, glabrous, with opposite, prehensile branches; stems cylindrical, 10- 15 m in length and ca. 3.5 cm diam., with no visible exudate; cross section cylindrical, with regular anatomy, vascular tissues dissected by numerous wide rays. Leaves opposite or subopposite, margin entire or rarely crenulate; stipules

caducous. Inflorescences axillary or a terminal thyrse with flowers in dichasia or sub dichasia, usually lax, multi or pauci-flowered, branches opposite or alternate. Flowers 5-merous, perianth segments free, petals concave, white to yellowish, unequal, thin, margin entire or erose; disc extrastaminal, annular or short-tubular, free from the ovary; stamens 3, filaments thin, broadened at base, anthers oblong to ellipsoid, dehiscence transversal; ovary 3-locular, style short, stigma punctate or 3-lobed, 2-6 axile ovules per locule. Fruit of three, divaricate, swollen monocarps that dehisce through a longitudinal fissure. Seeds asymmetrically ellipsoid, with a remnant basal wing (sometimes not developed), 3-6 per monocarp.

Distinctive features: Inflorescence usually few-flowered; large flowers for Celastraceae (up to 17 mm); disc annular or short-tubular; monocarps swollen with 3-6 large seeds.

Distribution: A genus of five species from the Neotropics and West tropical Africa, 3 of which are found in the Neotropics, distributed from Mexico to Brazil, including Cuba (2 spp.), Jamaica (1 sp.) and Lesser Antilles, in moist primary and secondary forests, 100-400 m elevation.

ELACHYPTERA A.C. Smith, *Brittonia* 3(3): 383-384. 1940.



E. micrantha (Cambess.) A.C. Sm., photo by J.A. Lombardi

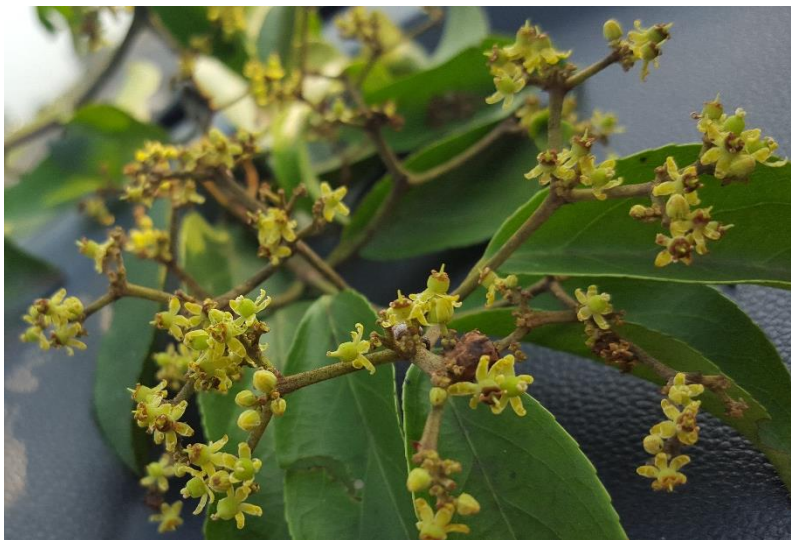
Lianas or shrubs, glabrous or rarely puberulent; lianas climbing through the aid of lateral prehensile branches; stems reaching 15 m in length, exudate inconspicuous; cross sections with numerous conspicuous rays traversing the vascular tissues. Leaves opposite or subopposite, margins entire, crenulate or dentate; stipules caducous. Inflorescence a pleiochasium or compound dichasium, axillary or terminal, multi-flowered, with opposite or verticillate, 4-angled branches. Flowers 5-merous,

minute, perianth segments free, petals yellowish, margin entire, papillose or erose; disc extrastaminal, annular, free from the ovary, sulcate; stamens 3, filaments flattened, broadened at base, anthers oblong, with transversal dehiscence; ovary 3-locular, sulcate, style short, stigma 3-lobed, the lobes alternate to stamens; 2-4 axile ovules per locule. Fruit of three, divaricate, flat monocarps, each of which open by a central longitudinal fissure. Seeds elliptic, with basal, short or reduced wing.

Distinctive features: Inflorescences congested, multi-flowered with many minute flowers, with 4-angled axes; stigma 3-lobed with lobes alternating with stamens; fruits of three monocarps; seeds with a short wing.

Distribution: Eight species distributed in Africa and tropical America, four of which are found from Mexico to northern Argentina, including one species in Jamaica.

HIPPOCRATEA Linnaeus, Sp. Pl. 1191. 1753.



H. volubilis L., photo by L. Biral

numerous, conspicuous rays. Leaves opposite or subopposite, margin crenate; stipules triangular, caducous. Inflorescences axillary or terminal, a compound dichasial cyme, multi-flowered, with opposite or alternate and cylindrical axes. Flowers 5-merous, perianth segments free, petals green to yellowish, adaxially barbellate along a transversal band, margins minutely ciliate; disc extrastaminal, conspicuously pulvinate, adnate and covering the ovary in its entirety; stamens 3, filaments flattened, broadened at base, the anthers oblong to orbicular, with transversal dehiscence; ovary 3-locular, sulcate, with evident style and punctiform stigma; 4-8 axile ovules per locule. Fruit of three, divaricate, flat, oblong-elliptic monocarps, each of which open by a central longitudinal fissure. Seeds winged, elliptic to transversal-elliptic, wing elliptic, basal, membranaceous but thickened at the margin.

Lianas, usually pilose in young twigs and inflorescences, climbing through the aid of opposite prehensile branches, some individuals recorded as twiners; stems cylindrical reaching 15-20 m in length and 10 cm in diam., exudate inconspicuous; cross section with regular anatomy where the vascular tissues are dissected by

Distinctive features: Pilose young twigs and inflorescences; inflorescences long-pedunculate, with dichotomous branching; petals adaxially barbellate; disc completely covering the ovary, sometimes puberulent.

Distribution: One species in the Americas. *Hippocratea volubilis* is the most common and widely distributed climbing species in the family, occurring from the U.S.A. (Florida) to northern Argentina, including the Antilles.

HYLENAEA Miers, Trans. Linn. Soc. London 28(2): 366-367. 1872.



H. unguiculata Mennega, from Clark 4723 (US).

Lianas or rarely shrubs, with glabrous or puberulent flowers, climbing through the aid of opposite prehensile branches; stems cylindrical reaching 2-19 m in length and 2.5-20 cm in diam.; cross sections with numerous conspicuous rays traversing the vascular tissues. Leaves opposite or subopposite, margin entire or rarely crenulate; stipules caducous.

Inflorescences axillary or terminal, pleochasial, multi-flowered, with opposite, alternate or verticillate, flattened or cylindrical axes. Flowers 5-merous, minute, perianth segments free, petals yellow or greenish, margin erose; disc extrastaminal, annular, free from the ovary; stamens 3, anthers ellipsoid, with transversal to oblique dehiscence; ovary 3-locular, style short, stigma punctiform; 4(-6) axile ovules per locule. Fruit of three, divaricate monocarps, each of which open along a central longitudinal fissure, pericarp coriaceous. Seeds winged, wing basal, shorter than the seminiferous nucleus.

Distinctive features: Inflorescences usually with thin axes (capillaceous); fruits woody, with coriaceous pericarp; seeds winged, wings inconspicuous, never longer than seminiferous nucleus.

Distribution: Endemic to the Neotropics with three species, from Costa Rica to Bolivia, with one species also occurring in Haiti.

PERITASSA Miers, Trans. Linn. Soc. London 28(2): 402. 1872.



P. laevigata (Link) A.C. Sm., photo by P. Acevedo

Lianas or less common shrubs or trees, glabrous or pilose in inflorescences; lianas climbing through the aid of opposite, prehensile branches, sometimes main stem twining; stems cylindrical, reaching > 15 m in length and ca. 6 cm in diam., exudate clear, in some species quickly oxidizing dark brown; cross section regular with slightly

conspicuous rays and the xylem cylinder undulate at the periphery, some species (e.g., *P. laevigata* (Link) A.C. Sm.) with successive, concentric rings of xylem and phloem in older stages. Leaves opposite, subopposite or alternate (rare in climbing species), margin entire, crenate or dentate; stipules triangular, caducous. Inflorescences axillary, terminal or cauliflorous, fasciculate or a thyrse with compound dichasia, multi-flowered, with opposite or alternate, 4-angled or cylindrical axes. Flowers 5-merous, minute, perianth segments free, petals yellow to greenish, margins entire, erose or fimbriate; disc extrastaminal, short-tubular, free from the ovary; stamens 3, anthers oblong to triangular, with vertical to oblique dehiscence; ovary 3-locular, style conspicuous, stigma punctiform or rarely 3-lobed; ovules axile or apical,

(1)2(-7) per locule. Fruit a leathery berry, spheroid or pyriform. Seeds 2-6, surrounded by mucilaginous pulp.

Distinctive features: Disc short-tubular and free from the ovary; anthers with longitudinal to oblique dehiscence; berries subglobose, maturing yellow or orange, with large seeds covered by a fleshy pulp.

Distribution: A neotropical genus of 19 species, from Costa Rica to southern Brazil, including Trinidad and Tobago; in diverse habitat such as non-flooded, flooded, humid forests, dry forests, and savanna-like vegetation. Eighteen species are commonly reported as lianas, but sometimes they exhibit arboreal or shrubby habit.

PRIONOSTEMMA Miers, Trans. Linn. Soc. London 28(2): 354-355. 1872.



P. aspera (Lam.) Miers, photo by J.A. Lombardi

Lianas or shrubs, scabrous; climbing through the aid of opposite prehensile branches. Leaves opposite or subopposite, margins entire; stipules triangular, caducous. Inflorescence an axillary or terminal, bifurcate thyse (polychasium), multi-flowered, with opposite or alternate, flattened or angled axes. Flowers 5-merous, minute, perianth segments free, petals green, margins fimbriate;

disc extrastaminal, patelliform, flattened, puberulent, free from the ovary; stamens 3, anthers oblong, with transversal dehiscence; ovary 3-locular, style conspicuous, stigma punctiform; ovules axile to apical, 8 per locule. Fruit of three, divaricate, flat monocarps, with thin, rough

pericarp, opening along a central longitudinal fissure. Seeds winged, elliptic, wing thickened along the margin.

Distinctive features: Plant scabrous; disc flattened; fruits with scabrous surface.

Distribution: Monotypic genus occurring from Mexico to Brazil and Bolivia, including Trinidad and Tobago.

PRISTIMERA Miers, Trans. Linn. Soc. London 28(2): 360. 1872.



P. celastroides (Kunth) A.C. Sm., photo by P. Acevedo

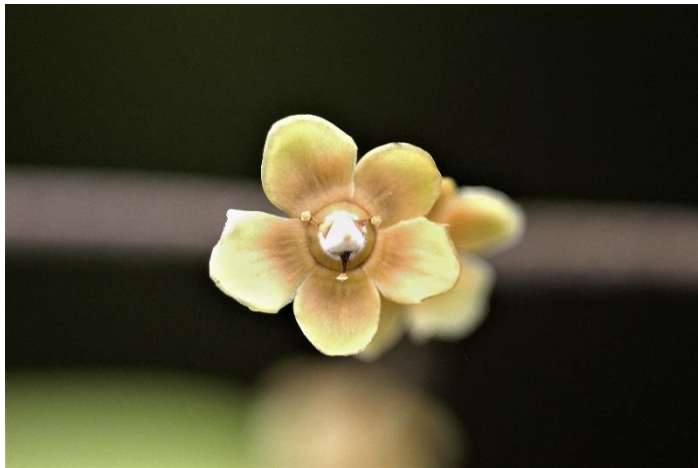
Lianas, shrubs or trees, glabrous; lianas climbing through the aid of opposite prehensile branches; stems cylindrical reaching 10-15 m in length and 2.5-7.5 cm diam., exudate inconspicuous; cross sections with regular anatomy, vascular tissues dissected by numerous, conspicuous rays. Leaves opposite or subopposite, margin crenulate to

entire; stipules triangular, caducous. Inflorescences axillary or terminal, bifurcate, dichasial cymes, pauci- or multi-flowered, with branches opposite, the axes cylindrical or 4-angled. Flowers 5-merous, perianth segments free, petals yellow, green or white, margins entire or ciliate; disc extrastaminal, annular or short-tubular, free from the ovary; stamens 3, anthers oblong, spherical or reniform, with transversal dehiscence; ovary 3-locular, style short, stigma punctiform or 3-lobed; ovules axile, 4-6 per locule. Fruit of three, divaricate, flat, green monocarps, each of which opens along a central longitudinal fissure. Seeds winged, elliptic.

Distinctive features: Inflorescence a bifurcate dichasial cyme with opposite branching; disc annular or short-tubular, not connate to the ovary; fruits of 3, flat monocarps.

Distribution: A primarily African genus with 36 species, 19 of which are found in the Neotropics, from Mexico to Argentina, including the West Indies (except Jamaica); in diverse humid and dry forests. Some species sometimes exhibit arboreal or shrubby as well as lianoid habit.

SALACIA Linnaeus, Mant. Pl. 159. 1771, (nom. cons.).



S. impressifolia (Miers) A.C. Sm., photo by P. Acevedo

Lianas, shrubs or trees, glabrous or rarely puberulent; lianas climbing by means of lateral, short, decussate, prehensile branches; stems nearly cylindrical to flattened, with inconspicuous exudate; cross sections with successive cambia producing concentric, continuous rings of xylem and phloem or discontinuous arcs of phloem. Leaves opposite, subopposite

or alternate (rare in climbing species), margin entire or crenate; stipules triangular, caducous. Inflorescence axillary, cauliflorous or in short brachyblasts, fasciculate, paniculate or corymbose thyrses, pauci- or multi-flowered, axes opposite or alternate, cylindrical or 4-angled. Flowers 5-merous, perianth segments free or connate, petals yellow, green or reddish, margin entire, fimbriate, denticulate or erose; disc extrastaminal, annular, pulviniform, patelliform, cylindrical, cupuliform, adnate to the ovary to different degrees; stamens (2-)3, anthers oblong, rhombic or reniform, dehiscence oblique or apical; ovary (2-)3-locular, style evident, stigma punctiform; ovules axile, 2-8 per locule. Fruit a berry, spheroid, ellipsoid or ovoid, usually green or orange when mature. Seeds many, surrounded by mucilaginous pulp.

Distinctive features: Inflorescences fasciculate or corymbose thyrses; disc variously shaped, adnate to the ovary; stigma entire; anthers with oblique or apical dehiscence.

Distribution: Pantropical genus of more than 200 species, with 35 species in the New World, 28 of which are consistently reported as lianas, from Mexico to southern Brazil, including one species in Cuba.

SEMIALARIUM N. Hallé, Bull. Mus. Natl. Hist. Nat., B, Adansonia, sér. 4, 5: 22. 1983.



S. paniculatum (Schult.) N. Hallé, photo by D. Zapata

Lianas, shrubs or trees, glabrous or puberulent, with short, lateral plagiotropic branches; lianas climbing by means of, lateral, short, prehensile branches; stems cylindrical, reaching 10 m in length and ca. 10 cm in diam., exudate inconspicuous; bark rough; cross section cylindrical, vascular tissues dissected by conspicuous rays, and with

minute successive interxylary phloem arcs. Leaves opposite, margin crenulate; stipules triangular. Inflorescence axillary or terminal, a compound dichasial thyrses, multi-flowered, with opposite or alternate, cylindrical or 4-angled axes. Flowers 5-merous, perianth segments free, petals green or yellowish, margin entire; disc extrastaminal, pulviniform, free from the ovary; stamens 3, filaments flattened, broadened at base, anthers oblong, with transversal dehiscence; ovary 3-locular, style conspicuous, stigma punctiform; ovules axile, 6-8 per locule. Fruit a deeply trilobed, flat, capsule, in the shaped of a funnel, each lobe obtuse or emarginate at apex, opening by a longitudinal fissure in the middle of each lobe. Seeds winged, elliptic, wings membranaceous, elliptic, thickened at the margin, longer than seminiferous nucleus.

Distinctive features: Stems cylindrical with rough bark; cross section with conspicuous rays, and with minute successive interxylary phloem arcs; inflorescence a compound dichasium; disc pulviniform, free from the ovary; fruit funnel shaped.

Distribution: Neotropical genus of two species, from Mexico to Paraguay and southeastern Brazil; in rocky outcrops, coastal vegetation, borders and interior of forests, riparian forests, savannas, xerophytic vegetation, disturbed areas, and along roadsides, 0-1750 m.

TONTELEA Miers, Trans. Linn. Soc. London 28(2): 382. 1872.



T. fuligena Lombardi, photo by P. Acevedo

Lianas, shrubs or trees, glabrous or pilose on inflorescences and flowers; lianas twining or with opposite, decussate prehensile branches; stems nearly cylindrical, asymmetrical, sometimes flattened, reaching 5-25 m in length, and 6-10 cm in diam., exudate

inconspicuous; cross sections

subcylindrical to flattened, sometimes asymmetrical, with inconspicuous rays dissecting the vascular tissues, many species with deep phloem wedges, others with successive cambia producing successive rings of xylem and phloem (e.g. *T. attenuata* Miers). Leaves opposite in climbing species, margins entire to obscurely crenulate; stipules triangular, caducous.

Inflorescence axillary or cauliflorous, of multi-flowered, polychasial thyrses, with alternate, subcylindrical to flattened or sulcate axes. Flowers 5-merous, perianth segments free, petals green, white or yellow, margins erose or entire; disc extrastaminal, tubular, connate to the ovary lobes; stamens 3, filaments flattened, broadened at base, anthers reniform, with transversal

dehiscence; ovary 3-locular, style short, stigma 3-lobed, the lobes simple or bifid; ovules axile or apical, (1-)2(-8) per locule. Fruit a berry, spheroid, ellipsoid or cylindrical, usually green or orange when mature, epicarp coriaceous or woody. Seeds few to many, surrounded by a mucilaginous pulp.

Distinctive features: Inflorescences polychasial thyrses; disc tubular, anthers with transversal dehiscence, stigma 3-lobed.

Distribution: A neotropical genus of 17 species, 15 of which are commonly reported as lianas or facultative lianas, distributed from Belize and Guatemala to Paraguay and southeastern Brazil; in riparian forests, open forests and savannas, 0-2500 m elevation.

RELEVANT LITERATURE

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Simmons, M. P. 2004. Celastraceae. In: K. Kubitzki (ed.). The Families and Genera of Vascular Plants. VI. pages 29-64. Springer-Verlag, Berlin.

Smith, A. C. 1940. The American species of Hippocrateaceae. *Brittonia* 3: 341-555.

PICTURE VOUCHERS

Figure 1.

- A. *Cuervea kappleriana* (Miq.) A.C. Sm. (Acevedo 16422).
- B. *Hippocratea volubilis* L. (Acevedo 16959)
- C. *Celastrus* sp. (Amith 82061)
- D. *Anthodon decussatum* (no voucher)
- E. *Tontelea corymbosa* (Huber) A.C. Sm. (Acevedo 6133)
- F. *Cheiloclinium* sp. (Acevedo 16929)

Figure 2.

- A. *Tontelea glabra* A.C. Sm. (Acevedo 6112)
- B. *Tontelea fuliginea* Lombardi (Acevedo 7357)
- C. *Salacia maburensis* Mennega (Acevedo 6109)
- D. *Peritassa laevigata* (Link) A.C. Sm. (Acevedo 3475)
- E. *Semialarium mexicanum* (Miers) Mennega (Acevedo 16159)
- F. *Salacia cordata* (Miers) Mennega (Acevedo 10439)

Figure 3.

- A. *Celastrus scandens* L. (no voucher 6112)
- B. *Hippocratea volubilis* L. (no voucher)
- C. *Peritassa laevigata* (Link) A.C. Sm. (Acevedo 16920)
- D. *Celastrus grenadensis* Urb. (no voucher)

Figure 4.

- A. *Hippocratea volubilis* L. (no voucher)
- B. *Salacia impressifolia* (Miers) A.C. Sm. (Acevedo 14610)
- C. *Tontelea attenuata* Miers. (Acevedo 14396)

Figure 5.

- A. *Cuervea kappleriana* (Miq.) A.C. Sm. (Acevedo 16422)
- B. *Hippocratea volubilis* L. (Acevedo 14997)

Figure 6.

A. *Celastrus orbiculatus* Thunb. (no voucher)

B. *Salacia impressifolia* (Miers.) A.C. Sm. (Acevedo 14610)

Figure 7.

A. *Peritassa laevigata* (Loes) A.C. Sm. (Acevedo 16920)

B. *Tontelea ovalifolia* (Miers.) A.C. Sm. (no voucher)