GUIDE TO THE GENERA OF LIANAS AND CLIMBING PLANTS

IN THE NEOTROPICS

CONNARACEAE

By Pedro Acevedo-Rodríguez (17 May 2017)

Connarus panamensis (photo: P. Acevedo)

A tropical family of trees, shrubs and lianas generally found below 1000 m elevation with a few species reaching 1500 m. Connaraceae is represented in the Neotropics by *Bernardinia, Cnestidium, Connarus, Pseudoconnarus,* and *Rourea.* The species of *Bernardinia, Cnestidium, and Pseudoconnarus* are all climbers but those in *Connarus* and *Rourea* can be shrubs or trees as well as lianas. About 81 out of a total 105 species of Connaraceae in the Neotropics are either lianas or facultative climbing shrubs found in lowland moist forests, savannas, gallery forests, premontane forests, and sometimes in dry forests.

Diagnostics: Climbing Connaraceae are distinguished vegetatively from climbers in other families by the presence of imparipinnate, trifoliolate or unifoliolate, alternate leaves without stipules and pulvinate leaflets; climbing through the aid of short, tendril-like, lateral branches, or

less often with twining or scandent stems; stems are cylindrical with a simple vascular cylinder, producing watery sap, or very seldom a reddish sap. Often confused with members of the Fabaceae but distinguished by the exstipulate leaves, actinomorphic flowers with apocarpous gynoecia, and the absence of successive cambia in the stems.

General Characters

1. STEMS. Stems are woody and usually 1 to 5 cm in diameter and up to 15 m in length; ***cylindrical*** in cross section, simple, with inconspicuous rays (fig. 1a). Barks are smooth, rough, lenticellate or corky.

2. EXUDATES. Exudates are odorless and ***colorless*** in all genera (figs. 1), except for a few species (e.g., *Connarus coriaceus* Schellenb., *C. incomptus* Planch., and *C. panamensis* Griseb.) which sometimes produce a red exudate in the bark. (fig. 2a)

3. CLIMBING MECHANISM. Most genera have short lateral ***prehensile branches*** with a few species reported as twiners or scandent (fig 1b).

4. LEAVES. Leaves are alternate, exstipulate, ***5-13-pinnate*** (fig. 1c, 2c) or less often ***trifoliolate*** (*Pseudoconnarus* and some species *Connarus* and *Rourea*) (fig. 1d), or rarely ***unifoliolate*** (some *Connarus* and *Rourea*). Petioles and rachis nearly ***cylindrical*** (fig. 1e); petioles and petiolules pulvinate (fig. 1e, 2c). Leaflets opposite or alternate with entire margins; venation pinnate, except in *Pseudoconnarus* where 3 main veins arise from the base of the blade (fig. 1d). *Pseudoconnarus* and some *Rourea* have papillate undersurface.

5. INFLORESCENCES. Inflorescences ascending, hanging or spreading, axillary, pseudoterminal or cauliflorous, paniculate, racemose, spiciform or fasciculate (*Pseudoconnarus*, some *Rourea*) thyrses with flowers in lateral dichasia. Pseudoterminal inflorescences arise from the axil of reduced or ephemerons leaves at the end of branches giving the impression of distal panicles.

6. PEDICELS. Of variable lengths and ***articulate*** (i.e., have an abscission zone above the base).

7. FLOWERS. ***Actinomorphic***, bisexual, pentamerous, heterostylous, usually < 1 cm long. Sepals distinct to completely connate, imbricate or seldom valvate (*Cnestidium*). Petals white (fig. 1f & g), light yellow or light pink, distinct or less often partly connate at base, glabrous or less often pubescent, glandular punctate in most *Connarus* (fig. 1f); stamens 10 in two series; gynoecium of 5 apocarpous carpels or a single carpel in *Connarus*, the style more or less elongated, the stigmas capitate or bilobed; placentation basal, ovules 2 per carpel.

8. FRUITS. One-seeded follicles, one to several per flower; red or less often orange or bicolorous; short to long stipitate in *Connarus* (fig. 1h) and *Pseudoconnarus*, sessile in *Bernardinia*, and *Cnestidium* and *Rourea* (fig. 1i); coriaceous, falcate and usually slightly flattened in *Connarus* (fig. 1h, 2 b), nearly ellipsoid in remaining genera (fig. 1i).

9. SEEDS. Seeds nearly ellipsoid, black or orangish, shiny, with a basal ***arillode*** that can be orange, yellow or white, and crenate, undulate or lobed at margin (fig. 2d).

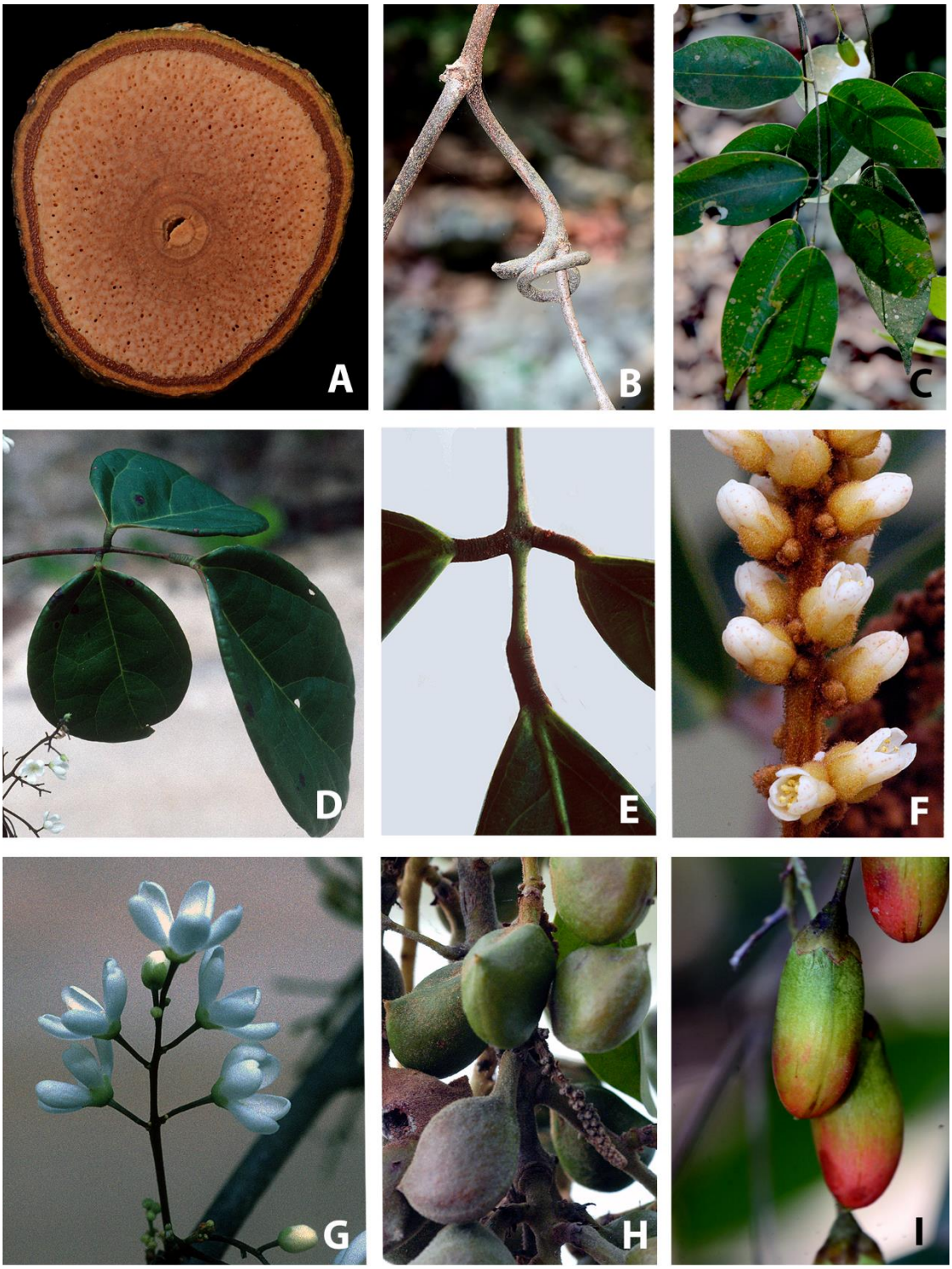

Figure 1. **A-C**. *Rourea glabra* Kunth. **A**. Cross esction of stem. **B**. Prehensile branch. **C**. Leaf. **D**. Leaf in *Pseudoconnarus macrophyllus* (Poepp.) Radlk. **E**. *Connarus* sp., trifoliolate leaf with pulvinuli. **F**. *Connarus panamensis* Griseb., inflorescence. **G**. *Pseudoconnarus macrophyllus,* inflorescence. **H**. *Connarus panamensis,* falcate fruits. *Rourea glabra*, sessile capsules. Photos by P. Acevedo.

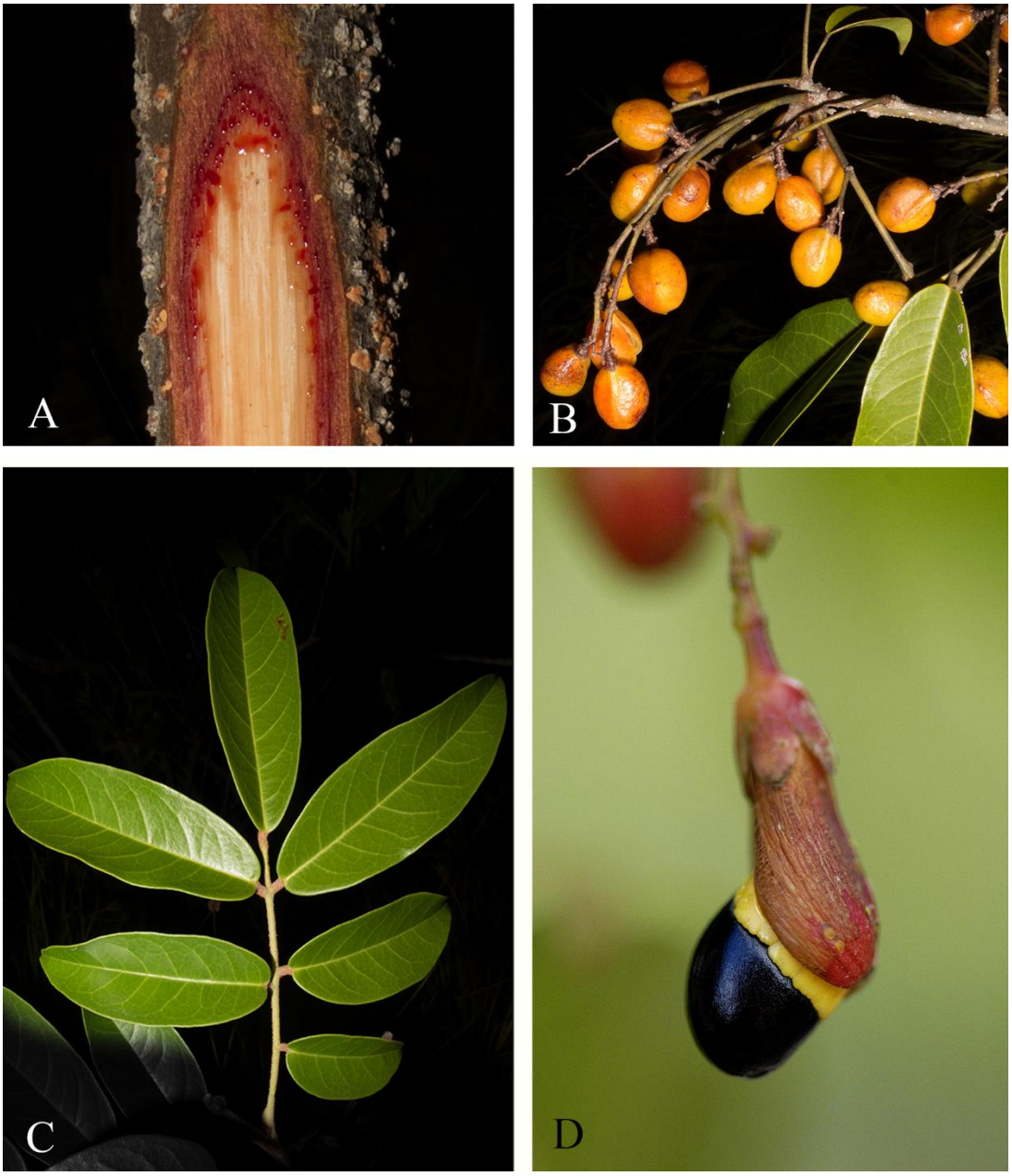

Figure 2. **A-C**. *Connarus incomptus* Panch. **A**. Stem with reddish exudate. **B**. Fruiting branch. **C**. Imparipinnate leaf. **D**. *Rourea sp.*, dihisced fruit with crenate arillode. Photos A-C by Ricardo Perdiz; D by P. Acevedo.

USES

Three species of Connarus have been reported as being used for fish poisoning in the Neotropics (Acevedo-Rodríguez 1990). According to Forero (1983) several species of *Connarus*, *Rourea* and *Cnestidium* has been used in folkloric medicine for the treatment of various ailments. Pérez et al., (2015) report that seeds of *Connarus panamensis* are used as fish bate, and those of *Rourea glabra* Kunth to poison rats and other small mammals.

Key to the genera of Connaraceae

1. Leaves trifoliolate; leaflets with three main veins from base and papillate undersurface (South America) ..... ***Pseudoconnarus***

1. Leaves imparipinnate, trifoliolate or unifoliolate; leaflets with pinnate venation, not papillate underneath (except for some *Rourea*) 2

2. Follicles falcate, stipitate, usually slightly flattened; petals usually glandular punctate; flowers with a single carpel (Neotropics) ..... ***Connarus***

2. Follicles ellipsoid or nearly so, sessile; petals not glandular punctate; flowers with 5 apocarpous carpels 3

3. Sepals valvate; leaves 7-13 pinnate (Mexico to N South America, Cuba)..... ***Cnestidium***

3. Sepals imbricate; leaves variously compound (unifoliolate, trifoliolate, 5-33-pinnate).....4

4. Sepals free nearly to the base, almost as long as the petals (Brazil)..... ***Bernardinia***

4. Sepals connate into a cupular or bell-shaped calyx, shorter than the petals (Neotropics) ..... ***Rourea***

GENERIC DESCRIPTIONS

BERNARDINIA Planchon, Linnaea 23: 412. 1850.

Small trees, erect or climbing shrubs; stems cylindrical, lenticellate. Leaves 7-13-foliolate pinnate. Inflorescences axillary, paniculate. Flowers actinomorphic, bisexual, pentamerous, not glandular punctate; sepals imbricate, free nearly to the base, almost as long as the petals; petals glabrous; stamens 10, free, glabrous; gynoecium of 5 apocarpous, bi-ovulate carpels. Follicles red, sessile, slightly fleshy, nearly ellipsoid, 1-2(-4) per flower.

Distinctive features: Sepals long, striate, free nearly to the base.

Distribution: A single species restricted to southeastern Brazil.

CNESTIDIUM Planchon, Linnaea 23: 439. 1850.

Cnestidium rufescens Planch. (photo: A. Hernández)

Lianas ≥10 m long, with prehensile branches; stems cylindrical, tomentose when young. Leaves 5-9-foliolate pinnate. Inflorescences axillary, paniculate. Flowers actinomorphic, bisexual, pentamerous, not glandular punctate; sepals valvate or narrowly imbricate; petals white, glabrous; stamens 10, free

or shortly connate at base; gynoecium of 5 apocarpous, bi-ovulate carpels. Follicles reddish brown, ellipsoid, slightly falcate, sessile, 1-2(-4) per flower; seed arillate.

Distinctive features: Valvate or narrowly imbricate sepals; follicles rusty tomentose, usually one or two per flower.

Distribution: Two species, Mexico to northern South America and Cuba.

CONNARUS Linnaeus, Sp. Pl. 675. 1753.

Connarus panamensis Griseb. (photo: P. Acevedo)

Small trees, erect or climbing shrubs with prehensile branches; stems cylindrical, usually lenticellate, rough, sometimes corky. Leaves 3-17 foliolate pinnate or less often unifoliolate. Inflorescences axillary, paniculate. Flowers actinomorphic, bisexual, pentamerous, usually glandular punctate; sepals imbricate, connate at base; petals white or yellow; stamens 10, connate at base to various degrees, glabrous or pubescent; gynoecium of a single, bi-ovulate carpels. Follicles dry, yellow, orange or red, short to long stipitate, slightly flattened, and falcate; seed black, with a yellow or orange arillode at base.

Distinctive features: Flowers with a single carpel; perianth usually ***glandular punctate***. Follicles one per flower, coriaceous, falcate, and stipitate.

Distribution: A pantropical genus with 80-100 species, represented in the Neotropics by 54 species, 35 of which are lianas or climbing shrubs. In Mexico, Central America, South America, Cuba, and Lesser Antilles.

PSEUDOCONNARUS Radlkofer, Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. Münch. 16: 356. 1886.

Pseudoconnarus macrophyllus (Poepp.) Radlk. (photo: P. Acevedo)

Lianas; stems cylindrical, lenticellate. Leaves trifoliolate; leaflets with 3 main veins arising from the base. Inflorescences axillary, or cauliflorous, paniculate. Flowers actinomorphic, pentamerous, not glandular punctate; sepals imbricate; petals white; stamens 10, free, glabrous; gynoecium of 5 bi-ovulate carpels. Follicles reddish, one to several per flower, sessile, slightly fleshy, nearly ellipsoid; seed with basal arillode.

Distinctive features: Leaves trifoliolate, leaflets with ***three main veins*** from base; flowers unisexual.

Distribution: A South American genus with 5 species distributed in Colombia, Venezuela, Guyana, Suriname, Peru, and Brazil (Acre, Amazonas, Pará).

ROUREA Aublet, Hist. pl. Guiane 1: 467. 1775.

Rourea glabra Kunth (photo: P. Acevedo)

Vines, shrubs, or trees, with short, lateral prehensile branches. Leaves 5-33 foliolate pinnate, trifoliolate or unifoliolate. Flowers 5-merous, not glandular, in terminal, subterminal, or axillary panicles; calyx cup-shaped of imbricate sepals that are connate at base; corolla of 5 white or pale yellow, free petals or partly connate at base; stamens connate at the base to form a short tube; ovary of 5 free carpels, stigma capitate. Follicles 1 or rarely 2 per flower, sessile, nearly ellipsoid (sometimes slightly curved), fleshy, with persistent (sometimes accrescent) calyx at the base; seed black, with a yellow or white arillode at the base.

Distinctive features: Follicles ellipsoid, fleshy, sessile, usually bicolorous, sometimes the persistent calyx accrescent.

Distribution: A pantropical genus of about 85 species, 42 distributed throughout tropical America, 36 of which are lianas or climbing shrubs.

RELEVANT LITERATURE

Forero, E. 1983. Connaraceae. Flora Neotropica Monograph 36, 208 pages.

Pérez, R., S. Schnitzer, S. Agilar, N. Daguerre, and A. Fernández. Lianas y enredaderas de la Isla de Barro Colorado, Panamá. Smithsonian, Tropical Research Institute, Panama.