

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

## RHAMNACEAE

By Pedro Acevedo-Rodríguez (May 2020)



*Gouania* sp., photo by P. Acevedo

A nearly cosmopolitan family of 61 genera and about 900 species of trees, shrubs or lianas. In the Neotropics, the family is represented by 23 genera and 177 species, of which 7 genera and 39 species are reported as lianas or scrambling shrubs. Four of these genera are endemic to the Neotropics, while the remaining three are shared with the Paleotropics.

Climbing Rhamnaceae are found in diverse habitats, but for the most part, they are common in lowland wet forest to drier plant formations such as dry or seasonal forest, savannas, secondary forest and scrubs.

***Diagnostics:*** Mostly lianas with single circinate tendrils somehow associate to the inflorescences or at the end of short lateral branches; leaves are alternate, simple, stipulate

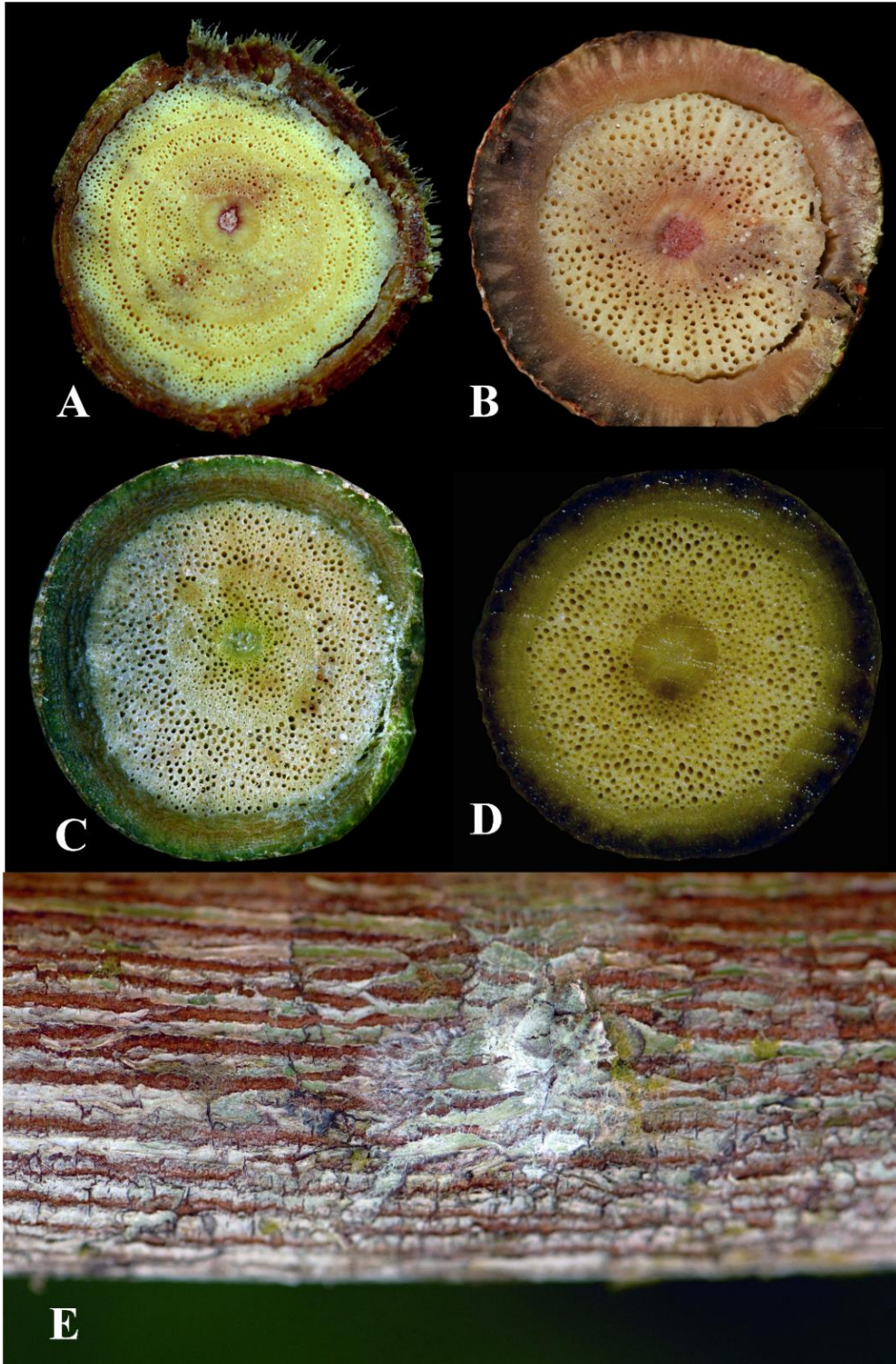
and commonly serrate; cross sections of stems simple, with more or less conspicuous rays, and inconspicuous exudate. Often confused with Sapindaceae but easily told apart by the simple leaves.

## General Characters

1. **STEMS.** Young stems commonly cylindrical but costate in *Alvimiantha*; mature stems woody with substantial secondary growth, cylindrical, some species known to reach up to 20 m in length and up to 10 cm in diam.; bark for the most part smooth or moderately rough (fig. 1e); cross sections with **regular** vascular anatomy with slightly conspicuous rays and wide vessels (fig. 1a-d).
2. **EXUDATES.** Watery or no visible exudates.
3. **CLIMBING MECHANISMS.** Most genera of climbing Rhamnaceae are **tendrilled**, these include *Alvimiantha*, *Gouania*, *Johnstonalia*, and *Reissekia*. Tendrils in *Gouania* are circinate (or rarely spiraled) and are either distal on short branches or associate to the inflorescence; in *Alvimiantha*, *Johnstonalia* and *Reissekia*, they are produced in the nodes of lateral branches, although they sometimes seem axillary (to the leaves of leading stems) as they may develop precociously from axillary shoots. *Berchemia* on the other hand is a woody **twiner**, while *Ampelozizyphus* and *Sageretia* are **scramblers**.
4. **LEAVES.** Alternate or sub-opposite (in climbers), simple, chartaceous to coriaceous commonly with serrate margins, but some species with entire margins; veins are pinnate (fig. 2a & b) or acrodromous with 3 main arcuate veins from or near the base, a few species have mixed acrodromous venation (fig. 2c); secondary veins commonly are abaxially prominent and tertiary veins are commonly reticulate or less often clathrate; petioles short to long, stout, commonly adaxially furrowed, glandless or with a pair of glands near the apex; stipules of various sizes and shapes, persistent or caducous.
5. **INFLORESCENCE.** Axillary or terminal, spicate, racemose or paniculate thyrses, or flowers sometimes clustered and axillary.
6. **PEDICELS.** Often short and often expanding as the flower matures, flowers sometimes sessile.
7. **FLOWERS.** Bisexual, actinomorphic, 4-5-merous; hypanthium present in tribe Gouaniae; sepals distinct, equal; corolla of distinct, small or minute petals enveloping the stamens; stamens as many as the petals and opposite to them, the filaments often adnate to the base of petals, the anthers short, opening along longitudinal slits; ovary syncarpous, inferior,

of 2-3 carpels; ovules 1 per carpel, basal, the style 1 or absent, with 2-3 stigmatic branches.

8. FRUIT. Schizocarps splitting into 3 mericarps, fleshy drupes or dry capsules; seeds 1 per carpel, exarillate and not winged.



**Figure 1.** **A.** Cross section of *Gouania polygama* with ring-porous wood. **B.** Cross section of *Reissekia sp.* with large vessels and conspicuous rays. **C.** Cross section of *Gouania sp.* with ring-porous wood. **D.** Cross section of *Gouania mollis* with diffuse-porous wood. **E.** Moderately rough bark of *Reissekia sp.* Photos by P. Acevedo.





**Figure 2.** A. Tendrils in Rhamnaceae. *Gouania sp.*, tendril part of the inflorescence. B. *Gouania sp.* tendril distal on short lateral branches. C. *Reissekia sp.* tendrils precociously born on young axillary shoots. Photos by P. Acevedo.



**Figure 3.** Spicate thyrses in *Gouania*. **A.** *Gouania polygama*, with yellowish green flowers. **B.** *Gouania* sp. flowers with green hypanthium and white perianth. Photos by P. Acevedo.





**Figure 4.** Winged schizocarps in Rhamnaceae. **A.** *Reissekia sp.* mericarps membranaceous, slightly inflated. **B.** *Gouania lupuloides*. mericarps sub-woody. Photos by P. Acevedo.

## USES

The bark of *Gouania polygama* and *Gouania lupuloides* are used in the Dominican Republic to make a fermented, refreshing drink called mabí. In Jamaica, dismembered branches are used as a substitute for tooth brushes. The bark and roots of *Ampelozizyphus amazonicus* Ducke, commonly known as *saracura-mirá*, are used as a stimulant and in the treatment of various ailments in northern Brazil. The fruits of *Sageretia elegans* (Kunth) Brongn., commonly known as *cambuití-cipó* are eaten in parts of southeastern Brazil.

## KEY TO THE GENERA

1. Twining lianas.....**Berchemia**
1. Tendrilled or scrambling lianas .....2
2. Tendrilled lianas .....3
2. Scrambling lianas.....6
3. Mericarps coriaceous to sub-woody, not inflated; inflorescence not umbellate .....4
3. Mericarps membranaceous, inflated; inflorescence umbellate .....5
4. Nectary disc with 5 prominent lobes alternating with the stamens; mericarp wider than long, often depressed apically and basally; inflorescence of racemose or spicate thyrses .. **Gouania**
4. Nectary disc unlobed; mericarps taller than wide, not depressed; inflorescence an axillary cluster of 2 sessile flowers.....**Johnstonalia**
5. Leaf margins entire; venation trinerved from base; fruits taller than wide.....**Alvimiantha**
5. Leaf margins serrate; venation pinnate or mixed trinerved; fruits wider than tall.....**Reissekia**
6. Leaves alternate, with entire margins, strongly 3-nerved from base; ovary inferior; fruit capsular.....**Ampelozizyphus**
6. Leaves opposite to alternate, with serrate margins, pinnately veined but with 3-5-strong secondary veins from base; ovary superior; fruit fleshy drupes.....**Sageretia**



## GENERIC DESCRIPTIONS

**ALVIMIANTHA** Grey-Wilson, *Bradea* 2: 287. 1978.



*A. tricamerata*, photo from isotype at NYBG

Tendrilled lianas. Young stems 5-costate; stems few m long. Tendrils simple, circinate, produced at the nodes (middle) of plagiotropic branches. Leaves alternate, coriaceous, simple, with serrate margins, the blade with 3 main arcuate veins from base, abaxially tomentose with prominent veins; petioles short, without glands; stipules ca. 5-7 mm long, lanceolate, caducous. Inflorescences axillary pedunculate umbellate cymes. Flowers bisexual, actinomorphic, with conical hypanthium crowned by 5 ovate sepals; petals 5, much smaller than the sepals, concave, enveloping the stamens; stamens 5, as long as the petals, the filaments adnate to the margin of the disc; disc crateriform slightly lobed in the area between the filaments; ovary inferior, trilocular, the locules uniovulate, the stigmas 3, short. Fruit an ellipsoid, hollow,

crutaceous, 3-valvate, acropetally dehiscent capsule, the valves remaining distally attached to the central carophores, the inner layer of the mesocarp splitting away into a winged indehiscent structure that contains one seed in the center.

**Distinctive features:** Tendrilled lianas, with alternate, 3-veined leaves with serrate margins; tendrils simple, produced at the nodes of short lateral plagiotropic branches; capsule crustose, inflated. Similar to other Rhamnaceae but differs by the characters highlighted in the key.

**Distribution:** A Brazilian genus with a single species (*A. tricamerata* Grey-Wilson) endemic to the Serra do Curral Feio in Bahia, found in caatinga forest.

**AMPELOZIZYPHUS** Ducke, Arq. Inst. Biol. Veg. 2: 157. 1935.



*A. amazonicus*, photo by R. Foster

Trees, erect or scrambling shrubs or lianas that reach up to 18 m in length; stems striate, angled, unarmed, becoming cylindrical with age, reaching 7 cm in diameter; bark peeling off in plates, inner bark with salicylate smell; cross section simple. Leaves alternate, simple, entire, coriaceous, with 3 main arcuate veins from base; petioles short, nearly cylindrical, not pulvinate. Inflorescence an axillary cymose fascicle or axillary or terminal elongated thyrses with flowers in corymbose clusters. Flowers bisexual, actinomorphic; hypanthium conical; sepals 5; petals 5, greenish yellow, concave, enveloping the stamens; stamens 5, as long as the petals, the filaments adnate to the margin of the disc; disc crateriform slightly lobed in the area between the

filaments; ovary inferior, trilocular, the locules uniovulate, the stigmas 3, short. Fruit a trilocular capsule.

**Distinctive features:** Distinguished by the 3-nerved coriaceous, alternate, elliptical leaves and bark with salicylate smell. Vegetatively like some Menispermaceae but lacking pulvinate petioles and vascular tissue with a single cambium; sometimes confused with *Sparattanthelium* (Hernandiaceae) but the leaves lacking the typical ranalian smell present in *Sparattanthelium*.

**Distribution:** A neotropical genus of 3 species, of which only *A. amazonicus* Ducke commonly growing as a liana or scrambling shrub; distributed in northern South America and the north-western portion of the Amazon Basin, in seasonally flooded forests.

**BERCHEMIA** Necker ex A. P. de Candolle, Prodr. 2: 22. 1825, (*nom. cons.*).



*B. scandens* (Hill) K. Koch, photo by Larry Allain

Erect shrubs or twining lianas; stems cylindrical; reaching 7-10 m in length and about 5 cm in diam.; bark grayish, smooth. Leaves alternate or opposite, (alternate in our species), ovate or oblong, with pinnate venation and crenate margins; short petiolate. Inflorescences axillary or terminal racemose or paniculate thyrses, or flowers rarely solitary. Flowers bisexual, actinomorphic, small, greenish white, calyx cupular, 5-dentate; petals 5, sessile, cucullate, enveloping the stamens; stamens 5;

disk covering the ovary but fused to the disk; ovary superior, 2 carpellate, the style distal, the stigma capitate or bifid. Fruit an ellipsoid, fleshy drupe, the stone 2-celled; seeds linear-oblong.

**Distinctive features:** A twining liana with coriaceous, alternate, simple, penninerved leaves, and drupaceous fruits.

**Distribution:** A genus of 37 species with most species distributed in tropical and southern Africa and East Asia, with a single species in the Neotropics, i.e., *Berchemia scandens* (Hill) K. Koch, a twining liana, distributed in central to southeastern United States, the Yucatan Peninsula and Chiapas in Mexico, and Guatemala.



**GOUANIA** Jacquin, Sel. Stirp. Amer. Hist. 263. 1763.



*G. polygama* (Jacq.) Urb., photo by P. Acevedo

Tendrilled lianas; young stems cylindrical to angulate, smooth or striate; older stems cylindrical, reaching 3-20 m in length and up to 10 cm in diam; bark smooth to moderately rough, beige to dark brown. Tendrils simple, circinate (sometimes spiraled when old), either distal on short branches or produced at the base of the inflorescence. Leaves alternate, chartaceous or coriaceous, penninerved, commonly serrate; petioles short, glands; stipules minute to small, persistent. Inflorescences axillary, spicate or racemose thyrses or distal frondo-bracteate paniculate thyrses. Flowers bisexual or sometimes unisexual, actinomorphic, with conical to campanulate hypanthium; sepals 5, light green or white; petals 5, greenish yellow or whitish, concave, enveloping the stamens; stamens 5, as long as the petals, the filaments adnate to the

margin of the disc; disc crateriform, lobulate between the filaments; ovary inferior or subinferior, 3-carpellate, with a single ovule per carpel, the style terminal with 3 stigmatic, reflexed branches. Fruit wider than long, trilocular, three-winged, septicidal schizocarp, that separates into 3 indehiscent, winged mericarps, with the seed in the center and winged along the lateral margins.

**Distinctive features:** The presence of a simple circinate tendril, distal on short branches or at the base of spicate or racemose thyrses is a character that helps distinguish *Gouania* from other climbing Rhamnaceae.

**Distribution:** A pantropical genus of about 73 species, 39 of which are distributed in the Neotropics, with most species below 1000 m elevation, commonly in dry and seasonal forests, but some species in wet or moist forests.

**JOHNSTONALIA** Tortosa, Novon 16: 433. 2006.



*J. axilliflora*, from holotype at TEX

Tendrilled lianas; young stems angulate, 8-ribbed, appressed-pubescent. Tendrils simple, circinate, produced at the nodes of flowering branches. Leaves alternate, chartaceous, 3-nerved from base, with entire margins; petioles short, glandles; stipules linear, 4-5 mm long, caducous. Inflorescences axillary, sessile, 2-flowered glomerules in distal axils. Flowers light green, bisexual with cupular hypanthium; sepals 5, triangular; petals 5, concave, enveloping the stamens; stamens 5, as long as the petals, the filaments adnate to the margin of the disc; disc crateriform, unlobed; ovary inferior, 3-carpellate, the style terminal with 3 clavate stigmata. Fruit trigonous ellipsoid, longer than wide, trilocular, unwinged, septicidal schizocarp, that separates into 3 indehiscent, unwinged mericarps..

**Distinctive features:** The presence of simple, alternate, 3-nerved leaves with simple, circinate tendrils indicates its position in Rhamnaceae, the axillary, 2-flowered glomerules and unwinged elongated mericarps distinguished it from other genera of climbing Rhamnaceae.

**Distribution:** An endemic Peruvian genus with a single species, i.e., *J. axilliflora* (M. Johnst.) Tortosa, known only from the Condebamba valley in the Department of Cajamarca, Peru, in dry inter Andean valley with xerophytic vegetation, at 2100-2600 m elevation.

**REISSEKIA** Endlicher, Gen. 1103. 1840.



*R. smilacina*., photo from Biodiversidade Teresopolis website

Tendrilled lianas. Young stems striate; older stems cylindrical, reaching 12 m in length, ca. 3 cm in diam.; cross section with slightly conspicuous rays and wide vessels; bark light brown and moderately rough forming rectangular plates (fig; 1e). Tendrils simple, circinate, produced at the nodes (middle) of axillary flowering branches.

Leaves alternate, coriaceous, simple, with serrate margins, the blade pinnate, obscurely 3-veined from base (the lateral veins not reaching the apex); petioles short to 1/3 the length of the blade, glandless; stipules early caducous. Inflorescences axillary, pedunculate, umbellate cymes, produced on short lateral branches. Flowers bisexual, actinomorphic, with subglobose hypanthium crowned by 5 ovate sepals; petals 5, much smaller than the sepals, concave enveloping the stamens; stamens 5, as long as the petals, the filaments adnate to the margin of the disc; disc crateriform, unlobed; ovary inferior, trilocular, the locules uniovulate, the style crowned by 3 stigmatic branches. Fruit trigonous, apically and basally depressed schizocarp, wider than long, papiraceous, inflated, splitting into 3 indehiscent, winged mericarps that separate from the central carpophores acropetally and remain dangling from the carophores; fruit peduncle slightly reflexed or arched.

**Distinctive features:** Tendrilled lianas with simple, circinate tendrils, produced at the nodes of short lateral branches; the cymes umbellate and the mericarps membranaceous and slightly inflated.

**Distribution:** A Brazilian genus with one or two species, distributed in eastern Brazil, in moist to seasonally dry forests.



**SAGERETIA** Brongniart, Mém. Fam. Rhamnées 52. 1826.



*S. elegans*, photo by M.O. Montiel.

Trees or erect shrubs, sometimes with scrambling branches and reaching 3-5 m in length; stems nearly cylindrical, striate, pubescent or glabrous, sometimes armed with spines. Leaves opposite or sub-opposite or less often alternate, subcoriaceous, lustrous, lanceolate to ovate-elliptic, rounded or subcordate at the base, pinnately veined but often with 3-5-strong secondary

veins from base, the margins serrate; lower surface with prominent venation; petioles slender, short, 4-9 mm long. Inflorescences of axillary paniculate thyrses. Flowers sessile, ca. 1.5 cm long, greenish white, bisexual, actinomorphic; sepals 5, nearly free to the base; petals 5, unguiculate, cucullate; stamens 5, as long as the petals; disk cupular, 5-lobate; ovary superior, ovoid, immersed in the disk but free from it, 3-carpellate, the style short, crowned by 3 obtuse or capitate stigmata. Fruit a globose fleshy drupe, 6-8 mm. in diam. containing 3 coriaceous indehiscent nutlets; seeds oblong.

**Distinctive features:** Scrambling shrub, armed with simple spines along the branches; leaves opposite to alternate, simple with serrate margins; may be confused with *Celtis iguanaea* but this species has recurved or branched spines usually in pairs at the base of the leaves.

**Distribution:** A pantropical genus of about 36 species, with only 3 species in the Neotropics, of which only *S. elegans* (Kunth) Brongn. is a scrambling liana, widely distributed from Mexico to southern Brazil.

## RELEVANT LITERATURE

- Acevedo-Rodríguez, P. 2005. Vines and climbing plants of Puerto Rico and the Virgin Islands. *Contrib. United States National Herbarium* 51: 1-483.
- Gray-Wilson, C. 1978. *Alvimiantha*, a new genus of Rhamnaceae from Bahia, Brazil. *Bradea* 2: 287-290.
- Medan D. 1989. Diaspore diversity in the anemochorous Gouanieae (Rhamnaceae). *Plant Systematics and Evolution*. 168: 149-158.
- Pool, A. 2014. Taxonomic Revision of *Gouania* (Rhamnaceae) for North America. *Annals of the Missouri Botanical Garden*, 99(3): 490-552.
- Standley, P.C. and J.A. Steyermark. 1949. Rhamnaceae in: *Flora of Guatemala*. *Fieldiana Botany* 24(VI).
- Tortosa, R.D. 2005. *Johnstonia*, a New Genus of Gouanieae (Rhamnaceae) from Peru. *Novon* 15: 642-645.
- Tortosa, R.D. 2006. The New Name *Johnstonalia* Substitutes for *Johnstonia* (Rhamnaceae). *Novon* 16: 433.

## PICTURE VOUCHERS

Figure 1.

- A. *Gouania polygama* (Jacq.) Urb. (Acevedo 16368).
- B. *Reissekia* sp. (Acevedo 16923).
- C. *Gouania* sp. (no voucher).
- D. *Gouania mollis* Reissek (Pace 207).
- E. *Reissekia* sp. (Acevedo 16923).

Figure 2.

- A. *Gouania* sp. (no voucher).
- B. *Gouania* sp. (no voucher).
- C. *Reissekia* sp. (Acevedo 16923).

Figure 3.

- A. *Gouania polygama* (Jacq.) Urb. (Acevedo 16368).

B. *Gouania sp.* (Acevedo 17216).

Figure 4.

A. *Reissekia sp.* (Acevedo 16923).

B. *Gouania lupuloides* (L.) Urb. (Acevedo 3812).