

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

POLYGONACEAE

By Pedro Acevedo-Rodríguez (Aug 2020)



Antigonon leptopus Hook. & Arn., photo by P. Acevedo

A nearly cosmopolitan family of 55 genera and about 1,115 species of herbs, shrubs, trees, and lianas. The 36 species of climbing Polygonaceae in the Neotropics are endemic to this region, representing six genera which are also endemic or predominantly represented in the Neotropics. For the most part, they are found in moist to wet lowland forest with few species occurring in dry forest or open savanna-like formations

Diagnosics: Predominantly lianas, scrambling shrubs or erect shrubs with climbing branches; many species with woody flattened stems, commonly with successive production of xylem and phloem rings or bands; leaves simple, entire, with pinnate venation, lacking stipules; flower and fruit are quite variable, in some genera flowers are papilionaceous with two

large, wing-like sepals. General appearance like Icacinaceae but distinguished by the flowers.

General Characters

1. **STEMS.** Woody with substantial secondary growth, developing cylindrical initially, but in many species becoming flat, *bilobed* (fig. 1c &d), or asymmetrical (fig. 1e), known to attain up to 20 m in length and up to 12 cm in diam.; cross sections in *Muehlenbeckia* have *regular* vascular anatomy with inconspicuous rays (fig. 1b); *Antigonon* has *successive cambia* that produce discontinuous concentric rings of xylem and phloem (fig. 1a).
2. **EXUDATES.** No visible exudate in *Coccoloba* and *Muehlenbeckia*, with mucilaginous secretion in *Antigonon* (fig. 4b).
3. **CLIMBING MECHANISMS.** Most genera are *scramblers*, as is *Coccoloba* in early stages (fig. 2b), but in some species older branches become *twiners* (fig. 2a). *Antigonon* has axillary *tendrils* that are bifid at the apex (fig. 3a) or tendrils that correspond to secondary axis of the inflorescence (fig. 3b).
4. **LEAVES.** Alternate, with a conspicuous ochrea, coriaceous to membranaceous in species of *Muehlenbeckia*, commonly short- to medium-petioled, with gland-less blades and entire or undulate margins.
5. **INFLORESCENCE.** Axillary or terminal, erect to pendant racemes or panicles with flowers in ocreolate fascicles.
6. **PEDICELS.** Usually short.
7. **FLOWERS.** Bisexual or unisexual, actinomorphic, not differentiated into calyx and corolla; perianth of 3-6 basally connate tepals; stamens (6-)8(-9) usually in two series, the filaments free or connate at base, the anthers opening along longitudinal slits; ovary superior, 1-locular, of (2-)3(-4) carpels with basal ovule, the styles distinct or basally connate.
8. **FRUIT.** An achene, usually enclosed by acrescent, fleshy or dry tepals, sometimes winged.

USES

There are a few reports on the utility of Polygonaceae lianas. These are restricted to the use of various species of *Antigonon* as ornamental plants, planted around the tropics for their attractive red or pink flowers.

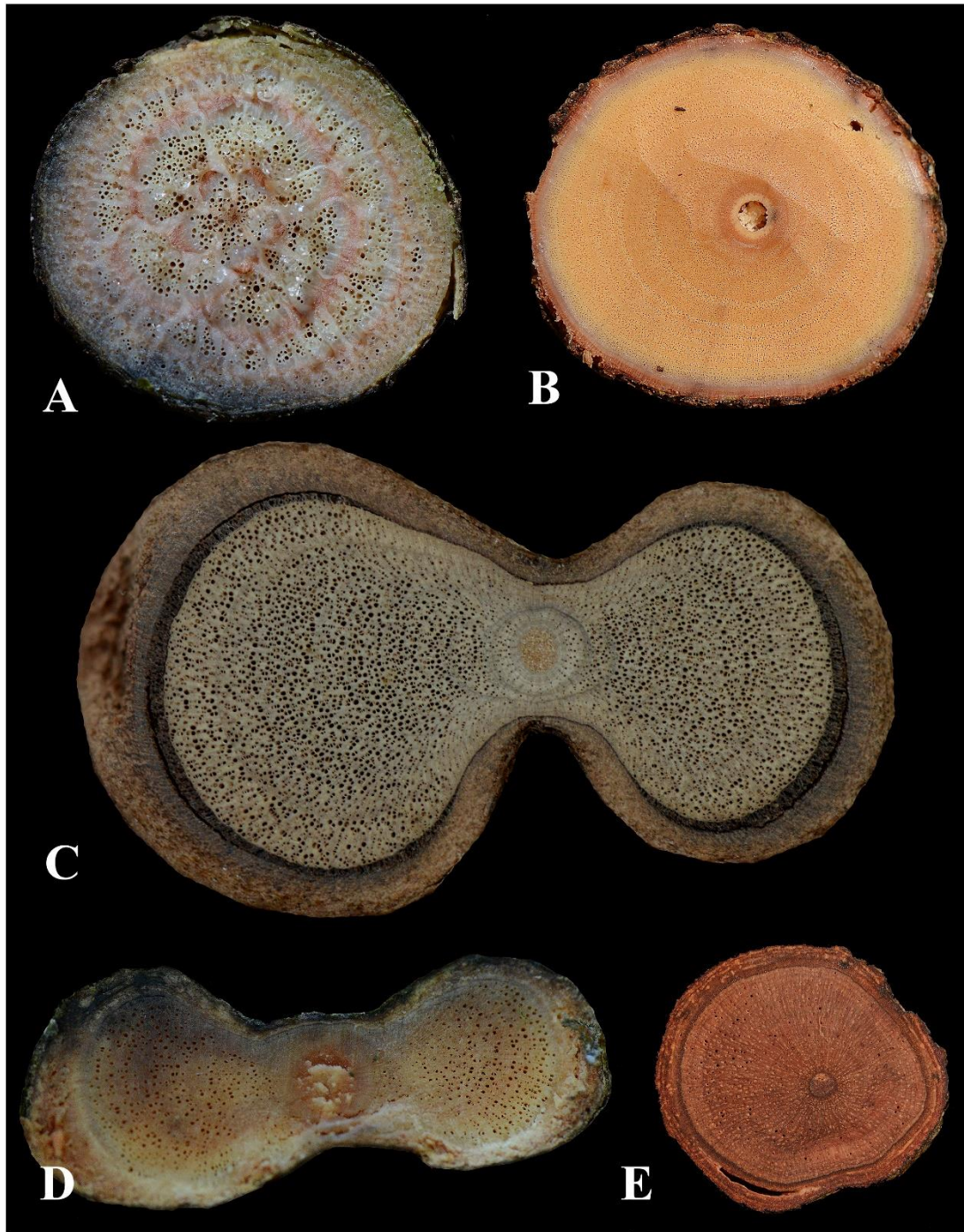


Figure 1. Cross sections of stems in Polygonaceae. **A.** *Antigonon cinerascens*, with successive cambia. **B.** Symmetrical stem in *Podopterus cordifolius* (16970). **C.** Asymmetrical, bilobed stem in *Coccoloba* sp. **D.** Asymmetrical, bilobed stem in *Coccoloba* sp. **E.** Subsymmetrical stems with regular anatomy, with narrow rays (16807). Photos by P. Acevedo.



Figure 2. Climbing mechanisms in *Coccoloba*. **A.** Mature stems twining. **B.** Early stages with erect, scrambling stems. **C.** Mature, bilobed, scrambling stem. Photos by P. Acevedo.



Figure 3. Climbing mechanism in *Antigonon*. **A.** Axillary bifid tendril in *Antigonon leptopus*. **B.** Tendrils part of the inflorescence in *Antigonon cinerascens*. Photos by P. Acevedo.



Figure 4. **A.** Leaf in *Cocoloba* sp. showing the ochrea. **B.** Stem in *Antigonon cinerascens* with mucilaginous exudate. Photos by P. Acevedo.

KEY TO THE GENERA

- 1. Plants climbing by axillary tendrils, or tendrils part of inflorescence*Antigonon*
- 1. Plants twiners or scramblers2
- 2. Outer 3 perianth segments with a dorsal wing that tappers from the apex down onto the pedicel, acresent, later enclosing the achene that seemingly is in a central position in relation to these wings.....*Podopterus*
- 2. Perianth segments not forming a dorsal wing.....3
- 3. Perianth 3-merous; fruits covered by acresent elongated sepals that are connate at the base, and project upward as wings*Magoniella*
- 3. Perianth 5-merous; fruit partially to totally enclosed by a fleshy perianth.....4
- 4. Plant woody; stems asymmetrical, often flattened and bilobed in cross sections; branches lenticellate; flowers functionally unisexual..... *Coccoloba*
- 4. Plants woody with cylindrical stems, if herbaceous the stems green, flattened like a ribbon; branches not lenticellate; flowers unisexual or bisexual*Muehlenbeckia*

GENERIC DESCRIPTIONS

ANTIGONON Endlicher, Gen. 310. 1837.



A. cinerascens Martens & Galeotti, photo by P. Acevedo.

Herbaceous or woody vines, that climb by means of tendrils that are either axillary or modified secondary inflorescence axes; stems cylindrical up to 15 m long and ca. 2.5 cm in diam., sometimes producing a mucilaginous exudate (fig. 4b); cross section with successive cambia that produce discontinuous concentric rings of xylem and phloem (fig. 1a). Leaves

alternate, simple, entire; petioles elongate; stipules connate around the stem to form a tubular ochrea. Flowers bisexual, actinomorphic, produced in ocreolate fascicles along axillary or terminal racemes or panicles; perianth of 5 free petaloid tepals; stamens 8, the filaments connate at the base, the anthers dehiscent longitudinally; ovary superior, unilocular, with a single ovule, the styles 3, free, the stigmas peltate. Fruit an achene with a single seed, covered by the acresent tepals.

Distinctive features: Short tubular ochreas; tendrils bifurcate, axillary or part of the inflorescence; flowers reddish bright pink or white; stem cross sections with successive cambia, producing a mucilaginous exudate.

Distribution: A genus of 4 species, native to Mexico and Central America, some species cultivated and naturalized throughout the Neotropics and Paleotropics. *Antigonon leptopus* Hook. & Arn. has become invasive in the West Indies, and parts of South America, often surviving fires and colonizing extensive areas.

COCCOLOBA P. Browne, Civ. Nat. Hist. Jamaica 209. 1756, (nom. et orth. cons.).



C. arborescens (Vell.) R.A. Howard, photo by P. Acevedo

Trees, shrubs or scrambling lianas, often with twining branches when older. Stems subcylindrical, asymmetrical, and often flattened, attaining 15 m in length and ca. 10 cm in width; stem cross sections with xylem often reddish, dissected by narrow rays, in many species flattened-bilobed (fig. 1a & c; fig. 2c).

Leaves alternate, simple, entire, obtuse or rounded at base (in lianas); petioles short to long; ochreas tubular, persistent or caducous. Flowers functionally unisexual, actinomorphic, produced

in ocreolate fascicles (staminate flowers) and solitary (pistillate flowers) along axillary or terminal racemes or panicles; perianth of 5 free unequal petaloid tepals; stamens 8, the filaments connate at the base, the anthers dehiscent longitudinally; ovary superior, unilocular, with a single ovule, the styles 3, free, the stigmas peltate. Fruit an achene with a single seed, covered by the accrescent, often fleshy tepals.

Distinctive features: Vegetatively similar to *Muehlenbeckia* but distinguished by the characters mentioned in the key.

Distribution: A Neotropical genus with 200 to 400 species (depending on the author) most of which are trees or shrubs, and only 20 species are lianas. The lianas are for the most part distributed in South America, with one or two species extending north into Panama and Costa Rica or some of the Lesser Antilles Islands; in moist to wet lowland forests.

MAGONIELLA Adr. Sánchez, Syst. Bot. 36: 708. 2011.



M. obidensis (Huber) Adr. Sánchez, photo by Luiz Otavio Adão Teixeira.

Dioecious, scrambling liana; stems cylindrical, fistulose, often housing ants, reaching up to 12 m in length. Leaves chartaceous or membranaceous, with more or less undulate margins; ochrea tubular, persistent or caducous.

Inflorescences axillary or terminal, simple, racemose, longer than the subtending leaf, with 1-2-flowered monochasia.

Staminate flowers 3-merous; sepals free; petals free similar to the sepals; stamens in two



Fruit in *M. obidensis*, photo by Luiz Otavio Adão Teixeira.

whorls, 6 in the outer whorl, inserted on the disc and 3 in the inner whorl, the anthers longitudinally dehiscent; disc small, pubescent; gynoecium rudimentary. Pistillate flowers 3-merous, sepals connate at base into a short tube; petals much shorter than the sepals; staminodes present; disc small; gynoecium tricarpellate, unilocular, with a single basal ovule and 3 styles. Achenes trilobed, enclosed by an acrescent calyx with the 3 sepals projecting upward as wings, articulate at the junction with pedicel.

Distinctive features: Scrambling lianas, with ochreate leaves; fruits enclosed by an apically 3 winged calyx.

Distribution: A South American genus of 2 species, found in Venezuela, Brazil (Acre, Minas Gerais, Pará, Rio de Janeiro, Rondonia), and Bolivia (Beni); along forest margins, secondary growths, non-flooded forests, and in the moist Atlantic forest; 100-900 m elevation.

MUEHLENBECKIA Meisner, Pl. Vasc. Gen. 1: 316; 2: 227. 1841, (nom. cons.).



M. thamnifolia (Kunth) Meisn., photo by J. Burke

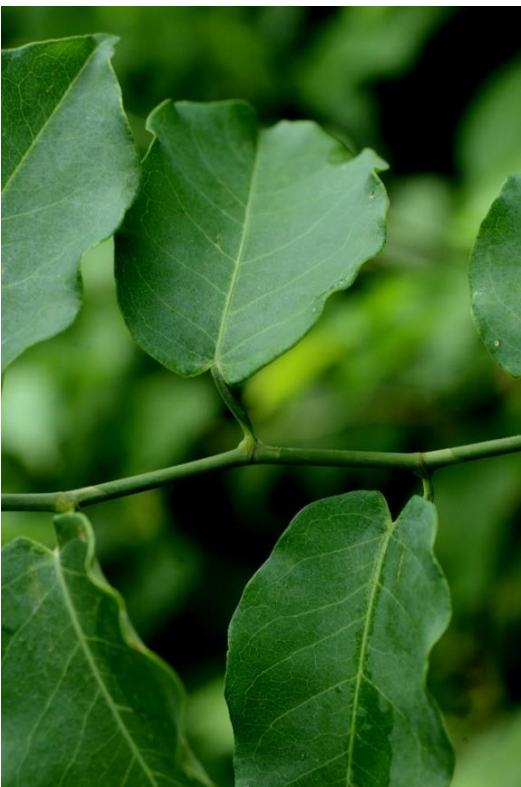
Scrambling or twining lianas up to 10 m long; branches flexuose in some species. Stems cylindrical, not lenticellate. Leaves alternate, coriaceous, simple, with wavy margins; petioles short; ochrea tubular, membranaceous, caducous, as long as the petiole. Inflorescences axillary or terminal, spicate, shorter than the subtending leaf. Flowers bisexual or unisexual, (plant polygamous monoecious), actinomorphic, pedicellate, produced in ocreolate fascicles; tepals 5, petaloid, connate at base, outer ones slightly larger than the inner ones, white or greenish white. Staminate flowers with 8 stamens, the filaments distinct, adnate to base of perianth tube; ovary rudimentary. Pistillate flowers with acrescent perianth; stamens sterile; ovary superior, styles 3, connate

at base, the stigmas fimbriate. Fruit an achene, completely or partly covered by the fleshy, black or dark brown perianth, unwinged, trigonous to globose.

Distinctive features: Scrambling or twining lianas with ochreate leaves; achenes covered by 5 fleshy, valvate tepals.

Distribution: A genus of 25 species with disjunct distribution, with most species native to Australasia. The genus is represented in the Neotropics by 8 native species and one exotic species widely cultivated as ornamental (i.e., *M. platyclados* (F. Muell.) Meisn.); along forest margins, secondary growths.

PODOPTERUS Bonpland in Humboldt & Bonpland, Pl. Aequin. 2: 89. 1812 ['1809'].



P. cordifolius Rose & Standl., photo by P. Acevedo

Small trees or scrambling lianas up to 10 m long; branches flexuose. Stems cylindrical, fistulose, up to 3 cm in diam.; cross section with regular anatomy, xylem with inconspicuous rays. Leaves alternate, chartaceous, simple, with wavy margins and cordiform base; petioles short; ochrea tubular, persistent, shorter than the petiole.

Inflorescences axillary or terminal on short lateral branches, racemose, usually longer than the subtending leaf. Flowers bisexual, actinomorphic, long-pedicellate, in 1-2-



P. cordifolius, photo by B. Sullender

flowered monochasia; tepals 5, petaloid bright to pale pink, the exterior 3 dorsally winged, the wing formed along the whole extension of tepals, attenuate at base into the pedicel, the 2 inner tepals not winged; stamens 8, the filaments distinct, unequal, ovary superior, styles 3, connate at base, the stigmas capitate. Fruit an achene, completely covered by the 3 outer membranaceous, acrescent, winged tepals.

Distinctive features: Scrambling lianas with fistulose stems and ochreate, leaves cordiform at base; pedicel elongated.

Distribution: A Central American genus of 3 species of which *P. cordifolius* Rose & Standl. is the only one that grows as a liana; distributed in southwestern Mexico in deciduous and secondary forests, at low elevations.

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.
- Brandbyge, J. 1992. The genus *Muehlenbeckia* (Polygonaceae) in South and Central America. *Bot. Jahrb. Syst.* 114: 349-416.
- Pendry, C.A. 2004. Monograph of *Ruprechtia* (Polygonaceae). *Syst. Bot. Monogr.* 67: 1-113.
- Sánchez, A. and K.A. Kron. 2011. Phylogenetic relationships of *Triplaris* and *Ruprechtia*: Redelimitation of the recognized genera and two new genera for tribe Triplaridae (Polygonaceae). *Syst. Bot.* 36: 702-710.

PICTURE VOUCHERS

Figure 1.

- A. *Antigonon cinerascens* Martens & Galeotti (Acevedo 16371).
B. *Podopterus cordifolius* Rose & Standl. (Acevedo 16370)
C. *Coccoloba* sp. (no voucher)

- D. *Coccoloba parimensis* Benth. (no voucher)
- E. *Coccoloba* sp. (Acevedo 16087)

Figure 2.

- A, B, C. *Coccoloba* sp. (no voucher).

Figure 3.

- A. *Antigonon leptopus* Hook. & Arn. (no voucher).
- B. *Antigonon cinerascens* Martens & Galeotti (Acevedo 16371).

Figure 4.

- A. *Coccoloba* sp. (no voucher).
- B. *Antigonon cinerascens* Martens & Galeotti (Acevedo 16371).