

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

MELASTOMATACEAE

By Fabián A. Michelangeli (2 Feb 2018)



Adelobotrys adscendens (photo: P. Acevedo)

An almost exclusive tropical family of shrubs, trees, herbs, and lianas, represented by ca. 3600 species and ca. 100 genera in the Neotropics. Of these, ca. 100 species from 16 different genera are vines, lianas, or epiphytic climbers. Melastomataceae are most diverse in moist forests throughout the tropics, from sea level to above the tree line in the Andes and other tropical mountains. Vines and lianas are well represented from sea level to about 2900 meters. Most genera contain only a few species of climbers, with the exception of *Adelobotrys* where most species are vines or lianas, and *Phainantha*, all climbers or sprawling herbs.

In *Blakea*, most species are epiphytic shrubs or hemiepiphytes and in *Pleiochiton*, all species are epiphytic. In both genera, some species are occasionally woody climbers as their branches can grow considerable lengths.

Diagnosics: In the absence of flowers, Melastomataceae climbers can be recognized by its leaves with acrodromous venation, lacking stipules. The vast majority of the species in the family have opposite leaves, but some climbers either are extremely anisophyllous (with one leaf

in each pair highly reduced), or early caduceous or missing altogether, given the appearance of alternate leaves.

General Characters

1. **STEMS.** Little has been published about the morphology or anatomy of the stems of climbing Melastomataceae. The few woody climbing species that have been studied have **regular anatomical configuration** with a large medulla (fig. 1a), while there is no study on the stem of herbaceous climbers.
2. **EXUDATES.** Exudates are absent in all genera of Melastomataceae.
3. **CLIMBING MECHANISMS.** Lianas and vines are often twiners or scandent. Additionally, the climbing members of *Adelobotrys*, *Boyania*, *Clidemia*, *Phainantha* and *Tococa* may have adventitious roots along the stem (fig. 1b) or restricted to the nodes.
4. **LEAVES.** Leaves in Melastomataceae are simple and usually opposite with acrodromous venation and lack stipules. However, in several climbing members of the family one of the leaves in each pair is conspicuously reduced or absent altogether, especially in *Clidemia* and *Phainantha*.
5. **INFLORESCENCES.** Inflorescences can be terminal, axillary, or in the leafless nodes of older stems. Terminal inflorescences are often paniculate (fig. 1c), while axillary inflorescences are mostly cymose, fasciculate or solitary.
6. **FLOWERS.** Melastomataceae have 4-5(-9)-merous, usually diplostemonous flowers, with a well-developed hypanthium and free petals; ovary inferior to superior depending on the genus; stamens at anthesis, either around the style or displaced towards one side of the flower (fig. 2a). Ovary position (and fruit type), as well as anther morphology are the most important characters in generic delimitations.

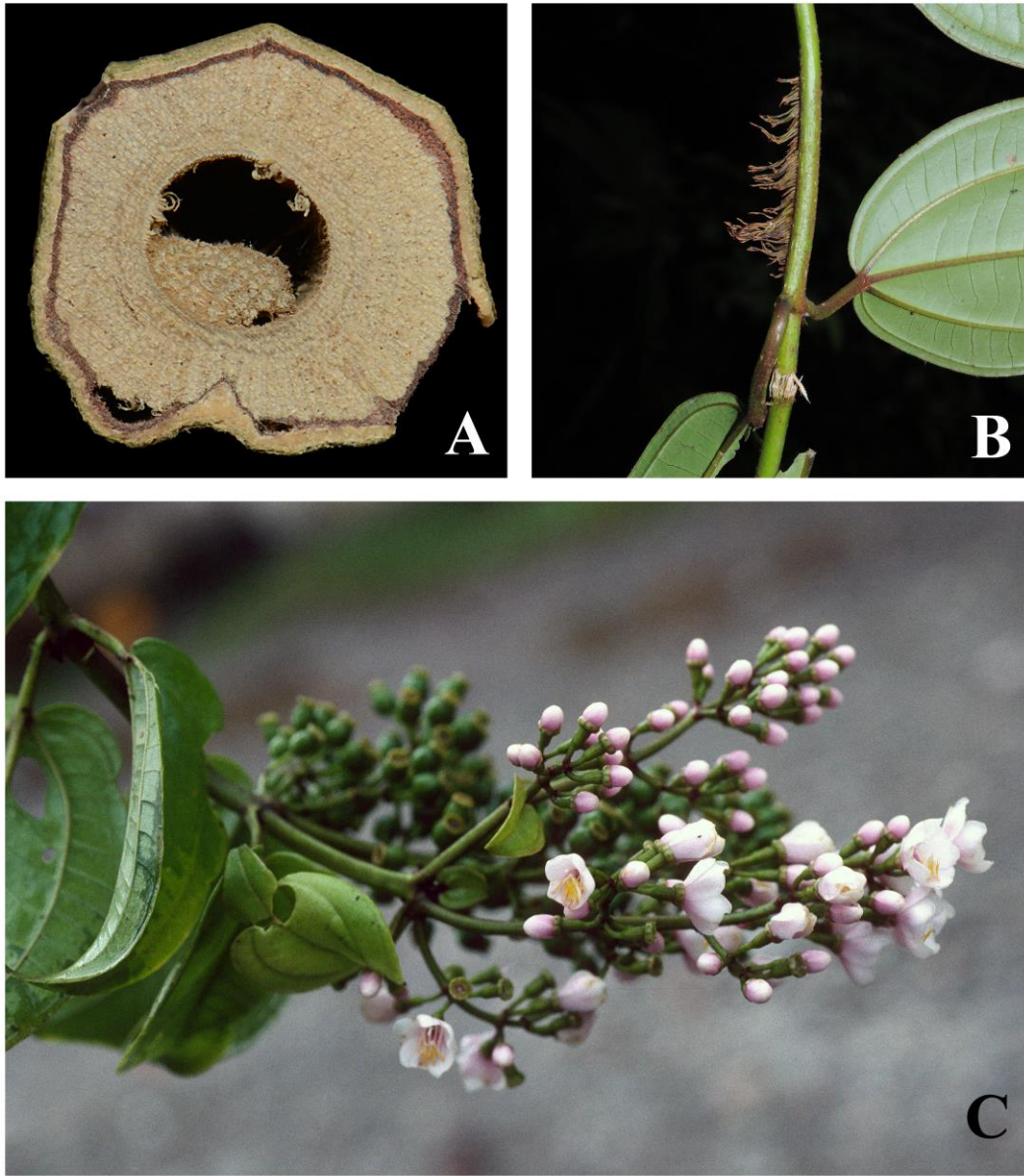


Figure 1. A. Stem cross section of *Adelobotrys* sp. B. Adventitious roots in *Adelobotrys scandens* (Aubl.) DC. C. Panicle in *Adelobotrys adscendens* (Sw.) Triana. Photos: A, C by P. Acevedo; B by F. A. Michelangeli



Figure 2. **A.** Flower in *Graffenrieda patens* Triana. **B.** Fruits in *Adelobotrys adscendens*. Photos: A by C. Zartman; B by P. Acevedo.

7. FRUITS. Fruits in Melastomataceae can be either capsules or fleshy berries with numerous seeds (fig. 2b). Capsules develop from flowers with superior ovaries (in all climbing species) and usually are apically dehiscent, but occasionally the entire wall of the hypanthium breaks up and exposes the ovary (fig. 2b). Berries develop from ovaries that are partly to completely inferior and often indistinguishable from the fleshy hypanthium wall. Seeds usually 0.5 to 2 mm long.

USES

The berries of most species of the tribe Miconieae are edible, although they are not actively cultivated. The succulent stems of *Arthrostemma* are also edible.

Key to the genera of climbing Neotropical Melastomataceae¹

- | | | |
|----|--|--------------------|
| 1. | Fruit fleshy, a multi-seeded berry; ovaries inferior or partly inferior..... | 2 |
| 1. | Fruit a capsule; ovaries usually superior..... | 8 |
| 2. | Inflorescences always axillary; flowers subtended by 2 pairs of persistent, conspicuous bracteoles that often are partly connate (Mexico-Bolivia, Jamaica) | <i>Blakea</i> |
| 2. | Inflorescences terminal or axillary; flowers subtended by a pair of caduceus and/or inconspicuous bracteoles (tribe Miconieae)..... | 3 |
| 3. | Inflorescences axillary or pseudo-lateral (initially terminal but overtopped by the developing axillary bud) | 4 |
| 3. | Inflorescences terminal | 6 |
| 4. | Plants epiphytic (Eastern Brazil) | <i>Pleiochiton</i> |

¹ Intended to work only with climbing species of Melastomataceae.

4. Plants terrestrial 5
5. Petal apex rounded to emarginate (Neotropical) *Clidemia*
5. Petal apex acute Costa Rica to South America) *Ossaea*
6. Petal apex acute (South America)..... *Leandra*
6. Petal apex rounded or emarginate 7
7. Anther's connective with a dorso-basal tooth (Amazon) *Tococa*
7. Anther's connective without a dorso-basal tooth (Neotropics) *Miconia*
8. Calyx hyaline and calyprate, dehiscing at anthesis; anthers with a ring-like appendage around the connective (Guianas, Ecuador) *Phainantha*
8. Calyx regularly lobed, persistent, if calyprate, then not hyaline; anthers lacking a ring-like appendage around the connective 9
9. Anthers with ventral appendages, with or without dorsal appendages 10
9. Anthers without ventral appendages, always with dorsal appendages 12
10. Inflorescences secund; flowers 5-merous (Guyana)..... *Boyania*
10. Inflorescences paniculate or cymose; flowers 4-merous 11
11. Leaves penninerved with the primary veins diverging from the midvein in a subopposite to irregularly alternate fashion at successive points above the blade base (Mexico-Central America) *Heterocentron*
11. Leaves 3-7-nerved with the primary veins all arising at or near the base of the blade (Mexico-Bolivia, Greater Antilles) *Arthrostemma*
12. Capsules and mature hypanthia with 8 or 10 conspicuous longitudinal ribs (N South America) *Macrocentrum*
12. Capsules and mature hypanthia terete 13

13. Anther's thecae oblong, the connective with dorsal caudate appendage at least twice as long as the thecae (Brazil) *Dolichoura*
13. Anther's thecae subulate, the connective with a dorsal appendage less than 1 ½ times as long as the thecae 14
14. Anthers with a dorsal spur but lacking an ascending appendage (Neotropical) *Graffenrieda*
14. Anthers with a dorsal spur and an ascending appendage (at least in the antisepalous stamens)15
15. T-shaped trichomes present in stems, underside of the leaves or hypanthia; anther ascending appendage bifid and acute (Mexico-Bolivia, Jamaica)..... *Adelobotrys*
15. T-shaped trichomes absent; anther ascending appendage not divided, rounded or blunt (South America) *Meriania*

A note on the taxonomy of the tribe Miconieae: Phylogenetic analyses have shown that most genera within the tribe Miconieae are polyphyletic and embedded within the large genus *Miconia*. Recently, several species in *Calycogonium*, *Clidemia*, *Leandra*, *Ossaea* and *Tetrazygia* have been transferred to *Miconia*, and in the near future only one genus may be recognized in the tribe as consensus grows around this taxonomic arrangement. In the key above and the generic descriptions below, I have kept the traditional generic delimitations that date back to 1891, but the numbers of species and characters of each group are in a state of flux. An expanded *Miconia* can be recognized by the same characters of the tribe, i.e., flowers subtended by two pair of bracts, stamens without a prolonged connective (or barely prolonged) and the fruit a berry. This broader *Miconia* includes ca. 1800 species, 35 of which are climbers.

GENERIC DESCRIPTIONS

ADELOBOTRYS DC., Prodr. 3: 127. 1828.



A. adscendens (photo: F. Michelangeli)

Lianas, root climbers, shrubs or rarely erect shrubs or trees. Stems terete or obscurely quadrangular, occasionally flattened and often with adventitious roots, especially near the ground. T-shaped trichomes present in most species in young stems, petioles, leaf nerves on the abaxial surface and/or the hypanthium.

Leaves isomorphic. Inflorescences terminal or axillary, often paniculate,

more rarely cymose. Flowers 5-merous; petals usually pink or white; stamens 10, isomorphic or dimorphic, the connective not prolonged below the thecae but with dorsal spur and a prolonged ascending appendage, often bifid and acute; ovary superior. Fruit a capsule.

Distinctive features: Lianas often with adventitious roots and t-shaped trichomes. Anther's connective with a dorsal spur and an ascending appendage; fruit capsular.

Distribution: A genus of about 34 species from Mexico to Bolivia and Jamaica, represented by only one species in the Atlantic Rain Forest of Brazil. Most species in the genus are lianas from moist lowland to mid elevation forests, although some are small trees or shrubs.

ARTHROSTEMMA Pav. ex D. Don, Mem. Wern. Nat. Hist. Soc. 4: 283. 1823.



A. ciliatum (photo: F. Michelangeli)

Sprawling or scandent herbs; stems quadrangular and obviously to obscurely winged. Leaves isomorphic. Inflorescence a terminal panicle. Flowers 4-merous; hypanthium green; petals pink to fuchsia; stamens 8, dimorphic; antisealous stamens larger, connective prolonged below the thecae and with a ventral bifid or blunt appendage; ovary superior, 4-locular. Fruit a capsule.

Distinctive features: Quadrangular stems with four merous flowers and dimorphic anthers.

Distribution: A genus of 4 species distributed from Mexico and the Greater Antilles to Bolivia, usually at the edge of open or disturbed areas on moist soils. One species, *A. ciliatum* Pav. ex D. Don, can be a vine, although generally it grows as a scrambling herb or subshrub.

BLAKEA P. Browne, Civ. Nat. Hist. Jamaica 323. 1756.

Trees, shrubs, and twiners (occasionally root climbers), often epiphytic or hemiepiphytic. Leaves isomorphic to markedly dimorphic. Inflorescences axillary, often fasciculate; flowers subtended by a pair of bracteoles, with the two bracts of a given pair variously fused. Flowers 6-merous; anthers 12 or more rarely 6, free from each other or the thecae laterally connate, in that case either forming a ring or a semi-circle around the style, connective not prolonged below the thecae and without appendages or with a dorsal caudate appendage or spur; ovary inferior or partially inferior. Fruit a berry.



B. ciliata (photo: F. Michelangeli)

Distinctive features: Lateral inflorescences, flowers 6-merous, subtended by two pairs of bracts (persistent in fruit), fruit a berry. Many species are very plastic in habit, varying from trees, to lianas or woody, scrambling epiphytes.

Distribution: A widely distributed Neotropical genus of ca. 190 species in low and mid elevation humid forests (but present only in Jamaica in the Greater Antilles and absent in the Brazilian Atlantic Forest). Many species are epiphytes or hemiepiphytes with long branches, but often the same species may be found rooted on the ground or even growing as a tree. At least 30 species have been reported as climbers, but the number is surely higher. It is most diverse in southeastern Central America and the Chocó biogeographic region.

BOYANIA Wurdack, Mem. New York Bot. Gard. 10 (5): 160. 1964.

Trailing or stoloniferous herbs, sometimes climbing, up to 2 m tall, with terete stems and



B. ayangannae (photo: F. Michelangeli)

often with adventitious roots. Leaves isomorphic or nearly so. Inflorescence terminal, long pedunculate, scorpioid or verticillate. Flowers 5-merous; stamens 10, isomorphic, the connective not prolonged below the thecae, but with both a dorsal spur and a ventral ascending appendage; ovary superior. Fruit an apically dehiscent capsule.

Distinctive features: Herbs with long-pedunculate inflorescences, 5-merous flowers, anthers isomorphic and with both dorsal and ventral appendages, fruit capsular.

Distribution: A genus of two species, one from Guyana and one from Colombia. The species in Guiana is usually a trailing herb, but it can climb up trunks up to 2 m, while the Colombian species is a terrestrial herb.

CLIDEMIA D. Don, Mem. Wern. Nat. Hist. Soc. 4: 284, 306. 1823.



C. garciabarrigae (photo: M. Alvear)

Herbs, shrubs, or root climbers or twiners. Leaves isomorphic to strongly dimorphic (often in the climbing species), or even with one leaf in each pair missing. Inflorescences lateral or terminal but appearing lateral by overtopping of the lateral meristem (pseudo-lateral inflorescences). Flowers 4-6(-8) merous, diplostemonous; petals round or emarginate; stamens isomorphic or only slightly dimorphic, the connective not prolonged below the thecae; ovary inferior or partially inferior. Fruit a berry. (see note on tribe Miconieae above).

Distinctive features: Inflorescences with lateral or pseudo-lateral inflorescences, flowers lacking two pairs of subtending bracts, petals round or emarginated, inferior or partially inferior ovaries, fruit a berry.

Distribution: A widely distributed Neotropical genus of ca. 220 species of which ca. 15 are climbers throughout the Neotropics with ca. 15 additional species occasionally reported as climbers.

DOLICHOURA Brade, Arquivos do Jardim Botânico do Rio de Janeiro 16: 12. 1959.



D. spiritusantensis (photo: F. Michelangeli)

Shrubs, erect or scandent and even twiners. Leaves isophyllous. Flowers 6-merous; anthers isomorphic, the thecae oblong, the connective not prolonged but with a caudate dorsal appendage at least twice as long as the thecae; ovary superior. Fruit a capsule.

Distinctive features: Flowers 6-merous. Petals purple. Anthers purple with a long caudate dorsal connective appendage. Fruit a capsule.

Distribution: A genus of two species endemic to the Atlantic Forests and rocky outcrops of Espiritu Santo in Eastern Brazil, one of them a climbing shrub.

GRAFFENRIEDA DC., Prodr. 3: 105. 1828.



G. patens (photo: C. Zartman)

Trees, shrubs and more rarely twiners. Leaves isomorphic. Inflorescence terminal, often paniculate, more rarely cymose. Flowers 4-6 merous, diplostemonous; calyx calyprate or opening either regularly or irregularly at anthesis; petals often acute, more rarely emarginated, usually white, more rarely yellow; anthers isomorphic or slightly dimorphic, usually white or more rarely

yellow, the connective not prolonged below the thecae, with a dorsal acute spur; ovary superior. Fruit a capsule.

Distinctive features: Flowers with anthers with an acute dorsal spur, fruit a capsule.

Distribution: A Neotropical genus of ca. 70 species, with three species of Amazonia and Southern Central America reported as climbers.

HETEROCENTRON Hook. & Arn., Bot. Beechey Voy. : 290. 1838.

Shrubs and herbs, commonly sprawling or scandent, occasionally scandent. Stems quadrangular or winged, rarely terete. Leaves usually isophyllous, the venation acrodromous and plinerved or with pinnate venation, the secondaries arching towards the apex. Flowers 4-merous, diplostemonous; calyx lobes free and persistent; stamens dimorphic, the antisealous whorl



H. elegans (photo: F. Michelangeli)

larger and with the connective conspicuously prolonged below the thecae and with a ventral, horizontal bifid appendage, the antipetalous whorl smaller, the connective barely prolonged below the thecae and with a reduced ventral appendage; ovary superior, the apex with 4 scales, 4-locular. Fruit a capsule.

Distinctive features: Stems quadrangular or winged. Leaves acrodromous and plinerved or with pinnate venation, the secondaries arching towards the apex. Flowers 4-merous. Stamens dimorphic, the antisealous whorl with the connective conspicuously prolonged below the thecae and with a ventral, horizontal bifid appendage. Fruit a capsule.

Distribution: A genus of 15 species from Central America and southern Mexico, mostly of shrubs and sprawling herbs. About a third of the species are reported as climbing up to 6 m.

LEANDRA Raddi, Mem. Mat. Fis. Soc. Ital. Sci. Modena, Pt. Mem. Fis. 18: 385. 1820.



L. candelabrum (photo: F. Michelangeli)

Erect or creeping herbs or shrubs, and sometimes twiners. Leaves isomorphic to strongly dimorphic. Inflorescence terminal. Flowers 4-6(-8) merous, diplostemonous; petals acute; stamens isomorphic or only slightly dimorphic, the connective not prolonged below the thecae; ovary inferior or partially inferior. Fruit a berry. (see note on tribe Miconieae above).

Distinctive features: Terminal inflorescences, flowers with acute petals, fruit a berry.

Distribution: A widely distributed Neotropical genus with ca. 230 species of which at least 6 are reported as climbers or creeping shrubs and herbs in Amazonia, Guiana Shield, Choco and Eastern Brazil.

MACROCENTRUM Hook.f., in Benth. & Hook. f., Gen. Pl. 1: 732, 756. 1867.

Terrestrial or epiphytic herbs, or subshrubs, occasionally scandent or sprawling. Leaves isomorphic to strongly dimorphic. Inflorescence solitary and axillary or terminal few-flowered secund cymes. Flower 4-5-merous with the hypanthium 8-10-costate; calyx lobes oblate to

lanceolate or aristate, persistent; stamens isomorphic or nearly so, connective slightly prolonged



M. fasciculatum (photo: P. Acevedo)

below the thecae, and with a dorsal acute, descending tooth; ovary superior usually 3-locular. Fruit a ridged capsule.

Distinctive features: Inflorescence solitary and axillary or terminal few-flowered second cymes. Flower 4-5-merous with the hypanthium 8- or 10-costate. Inflorescence solitary and axillary or terminal few-flowered second cymes. Hypanthium 8- or 10-costate. Fruit a ridged capsule.

Distribution: South American genus of ca. 25 species from moist and cloud forests, mostly in the

Guiana Shield, with one species in the foothill of the Peruvian Andes and the Coastal Cordillera of Venezuela. Two species reported as occasionally climbing at low and mid elevations in the Guiana Shield.

MERIANIA Sw., Fl. Ind. Occid. 2: 823. 1798.

Trees, shrubs or more rarely twiners or scandent. T-shaped trichomes absent. Leaves isomorphic or only slightly dimorphic. Flowers 4-6(-8)-merous, diplostemonous; calyx calyptrate and opening irregularly, to lobate and regular; petals round to emarginate, 2-12 cm long, usually pink or fuchsia, but also white or orange; stamens isomorphic or only slightly dimorphic, the connective not prolonged below the thecae but with a dorsal spur and commonly a blunt dorsal ascending appendage (at least in the antisepalous stamens); ovary superior. Fruit a capsule.

Distinctive features: T-shaped trichomes absent. Flowers with petals 2-12 cm long, anther connective not prolonged but with a dorsal spur and commonly a blunt dorsal ascending appendage (at least in the antisepalous stamens). Fruit a capsule.

Distribution: A Neotropical genus of ca. 120 species, mostly from mid and high elevation cloud forests, but occasionally also in lowland forests. At least two species in the western slope of the Andes are lianas and several others seem to be facultative climbers in the slopes of the Andes.

MICONIA Ruiz & Pav., Fl. Peruv. Prodr. 60. 1794.



M. loreyoides (photo: M. Alvear)

Herbs, shrubs, or rarely twiners. Leaves isomorphic to strongly dimorphic. Inflorescence terminal. Flowers 4-6(-8) merous, diplostemonous; petals round to emarginated; stamens isomorphic or only slightly dimorphic, the connective not prolonged below the thecae; ovary inferior or partially inferior. Fruit a berry. (see note on tribe Miconieae above).

Distinctive features: Terminal inflorescences, flowers with round to emarginate petals, fruit a berry.

Distribution: A widely distributed neotropical genus present in most humid to seasonal environments, with ca. 1100 species, ca. 12 of which are lianas, vines or creeping shrubs, an equal number of species occasionally reported as climbers throughout the Neotropics.

OSSAEA DC., Prodr. 3: 168. 1828.

Herbs, shrubs, twiners or scandent. Leaves isomorphic to strongly dimorphic. Inflorescence axillary. Flowers 4-5(-6)-merous, diplostemonous; petals acute; stamens isomorphic or only slightly dimorphic, the connective not prolonged below the thecae; ovary inferior or partially inferior. Fruit a berry. (see note on tribe Miconieae above).



O. araneifera (photo: F. Michelangeli)

Distinctive features: Axillary inflorescences, flowers with acute petals, fruit a berry.

Distribution: A widely distributed genus throughout moist forests of the Neotropics with ca. 100 species, mostly herbs and shrubs, but some can be small trees and at least three species are facultative climbers in Costa Rica, Panama and South America.

PHAINANTHA Gleason, Bull. Torrey Bot. Club 75: 539. 1948.

Terrestrial herbs, scandent shrubs, root climbers, or epiphytes, usually with adventitious roots at the nodes. Leaves isomorphic, opposite or in whorls of 3, but often appearing alternate by abortion of one leaf per node. Inflorescences axillary or terminal, cymose-paniculate or umbelliform. Flowers 4-merous; calyx hyaline and calyptriform, dehiscing at anthesis; stamens 8, isomorphic or slightly dimorphic, connective not prolonged or only shortly so, with a cordiform or pandurate basal appendage; ovary superior, 4-locular. Fruit a capsule.



P. laxiflora (photo: F. Michelangeli)

Distinctive features: Flowers 4-merous. Calyx hyaline and calyptriform. Stamens 8, connective with a cordiform or pandurate basal appendage. Fruit capsular.

Distribution: A South American genus of five species of vines and creeping herbs, restricted to the Guiana highlands and surrounding forests, with one disjunct species found in the Cordillera del Condor in southern Ecuador.

PLEIOCHITON Naudin ex A. Gray, U. S. Explor. Exped. Bot. 1: 583. 1854.



F. blepharodes (photo: F. Michelangeli)

Epiphytic shrubs or herbs with long, hanging branches, or twiners rooted on the soil. Leaves usually isomorphic, more rarely dimorphic. Inflorescence terminal or lateral cymes. Flowers (4-)5(-6) merous, diplostemonous; petals acute to round; stamens slightly dimorphic, the connective not or barely prolonged below the thecae; ovary partially inferior, 3-locular. Fruit a berry. (see note on tribe Miconieae above).

Distinctive features: Epiphytic shrubs. Fruit a berry.

Distribution: A genus of 12 species endemic to the Atlantic rain forests of Eastern Brazil. All species are epiphytic shrubs that can sprawl considerable distances from the roots, and at least one species also rooting on the ground.

TOCOCA Aubl., Hist. Pl. Guiane 1: 437. 1775.

Herbs, shrubs, or rarely twining vines. Leaves isomorphic to strongly dimorphic (most species bearing an ant domatium at the apex of the petiole or the base of the blade, but this

characters is absent in the climbing species). Inflorescences terminal, paniculate. Flowers 5-(6)-merous, usually diplostemonous; petals emarginated; stamens isomorphic, the connective not prolonged below the thecae but with a blunt short dorso-basal tooth; ovary inferior or partially inferior. Fruit a berry. (see note on tribe Miconieae above).

Distinctive features: Inflorescence terminal. Flowers 5-merous. Stamens isomorphic, the connective with a blunt short dorso-basal tooth. Fruit a berry.

Distribution: A Neotropical genus with 52 species from the Amazon and the Guiana shield and only one species reaching Central America. *Tococa caryophyllaea* (DC.) S.S. Renner from Central Amazonia is the only species that consistently grows as a liana.

RELEVANT LITERATURE

- Almeda, F. 2000. A synopsis of the genus *Blakea* (Melastomataceae) in Mexico and Central America. *Novon* 10: 299-319.
- Almeda, F. 2009. Melastomataceae. Pages 164-338 in G. Davidse, M. Sousa S., S. Knapp, F. Chiang (eds.). *Flora Mesoamericana*. Vol. 4 (1). Universidad Nacional Autónoma de México, México City.
- Berry P.E., A. Groger, B.K. Holst, T. Morley, F.A. Michelangeli, N.G. Luckana, F. Almeda, S.S. Renner, A. Freire-Fierro, O.R. Robinson, K. Yatskievych. 2001 Melastomataceae. Pages 263-528 in P.E. Berry, B.K. Holst, K. Yatskievych (eds.). *Flora of the Venezuelan Guayana*. Vol. 6. Missouri Botanical Garden Press, Saint Louis.
- Goldenberg R, M. Reginato. 2013. A new reptant species of *Leandra* (Melastomataceae, Miconieae) from the Atlantic forest, southeastern Brazil. *Phytotaxa* 94: 23-29.
- Goldenberg R, R.D.M. Tavares. 2007. A new species of *Dolichoura* (Melastomataceae) and broadened circumscription of the genus. *Brittonia* 59: 226-232.
- Mendoza-Cifuentes H., F. Almeda, M. Alvear. 2014. Novelty in *Meriania* (Melastomataceae: Merianieae) from Andean Rainforests of Colombia. *Phytotaxa* 178: 23-32.
- Penneys D.S., W.S. Judd. 2011. Phylogenetics and morphology in the Blakeeae (Melastomataceae). *International Journal of Plant Sciences* 172: 78-106.

- Penneys, D.S., W.S. Judd. 2013. Combined molecular and morphological phylogenetic analyses of the Blakeeae (Melastomataceae). *International Journal of Plant Sciences* 174: 802-817.
- Reginato M., J.F. Andrade Baumgratz, R. Goldenberg. 2013. A taxonomic revision of *Pleiochiton* (Melastomataceae, Miconieae). *Brittonia* 65: 16-41.
- Renner S.S. 1986. The Neotropical epiphytic Melastomataceae. Phytogeographic patterns, fruit types and floral biology. *Selbyana* 9: 1987.
- Renner S.S. 1997. *Tococa caryophyllea* (DC.) Renner (Melastomataceae): A climbing *Tococa*. *BioLlania Ed. Esp.* 6: 497-500.
- Schulman L., J. Hyvonen. 2003. A cladistic analysis of *Adelobotrys* (Melastomataceae) based on morphology, with notes on generic limits within the tribe Merianieae. *Systematic Botany* 28: 738-756.
- Schulman L., K. Ruokolainen. 2015. *Adelobotrys tessmannii* (Merianieae, Melastomataceae) and allies: A refined circumscription and description of two new Amazonian species with notes on their ecology. *Phytotaxa* 234: 101-120.
- Ter Welle B.J.H., J. Koek-Noorman. 1981. Wood anatomy of the Neotropical Melastomataceae. *Blumea* 27: 335-394.
- Ulloa Ulloa C., D.A. Neill. 2006. *Phainantha shuariorum* (Melastomataceae), a new species of the Cordillera del Condor region, Ecuador, is of a Guayanan genus. *Novon* 16: 281-285.
- Vliet G.J.C.Mv., J. Koek-Noorman, B.J.Ht. Welle. 1981. Wood anatomy, classification and phylogeny of the Melastomataceae. *Blumea* 27: 463-473.
- Whiffin T.P. 1972. A systematic study of the genus *Heterocentron* (Melastomataceae). Ph. D. Thesis. University of Texas, Austin.
- Wurdack J.J. 1973. Melastomataceae. Pages 1-819 in T. Lasser (ed.). *Flora de Venezuela*. Vol. VIII. Instituto Botánico, Caracas.
- Wurdack J.J. 1980. Melastomataceae. Page 406 in G. Harling, B. Sparre (eds.). *Flora of Ecuador* Vol. 13. University of Goteborg, Swedish Natural Science Research Council, Stockholm.
- Wurdack J.J., S.S. Renner, T. Morley. 1993. Melastomataceae. *Flora of the Guianas*. Koeltz Scientific Books, Koenigstein, Germany.