

NYCTAGINACEAE

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A tropical to warm temperate family of ~32 genera and 400 species of herbs, shrubs, trees and lianas. In the Neotropics, the family is represented by 28 genera and ~292 species, of which only 8 genera and 25 species are lianas or vines. For the most part, they are found in dry or semi-deciduous lowland forest. The most widespread species, *Pisonia aculeata* L. is pantropical and found throughout the lowlands of the Neotropics.

Diagnostics: Scrambling vines or lianas, stem cross section with dispersed islands of interxylary phloem, successive bands of interxylary phloem or with successive cambia, forming alternating bands of xylem and phloem; leaves simple, opposite or alternate, and entire, lacking stipules; flowers with gamosepalous, corolla-like calyx, corolla absent; fruit commonly an anthocarp.

General Characters

1. STEMS. Smooth, glabrous, to variously pubescent; herbaceous to woody, cylindrical, some genera with substantial secondary growth, some species reaching > 25 m in length and ~20 cm in diam., e.g., *Pisonia aculeata* L.; bark smooth (e.g., *Pisonia*) to corky (e.g., *Commicarpus*, ***Bougainvillea***). Cross sections show different patterns of interxylary phloem strands imbedded within the secondary xylem that is the result of differential production of phloem and conjunctive tissues (Cunha Neto et al. 2021, 2022). There are two interxylary phloem patterns found in Nyctaginaceae lianas, i.e., phloem islands found in *Commicarpus* (Figure 185C), ***Bougainvillea*** (Figure 185B), *Pisonia* (Figure 185A) and *Pisoniella glabrata* (Heimerl) Heimerl, characterized by the presence of dispersed phloem strands within the xylem; and concentric bands **within the secondary xylem** found in ***Bougainvillea*** (Figure 185D), ***Leucaster*** (Figure 185E) and ***Pisoniella***

arborescens (Lag. & Rodr.) Standl. (Figure 185F). Successive cambia are encountered in *Leucaster* but also in the non-climbing genera *Andradea* and *Ramisia*. **Nyctaginaceae xylem is commonly dissected by numerous narrow rays.**

2. EXUDATES. Clear, no visible exudate.
3. CLIMBING MECHANISMS. Most neotropical climbing Nyctaginaceae are scramblers, sometimes (e.g., *Pisonia*) holding on to host plants by short cirri-like branches that have short axillary, recurved thorns. The petioles in *Belemia fucsioides* Pires are reported as prehensile (Flora e Funga do Brasil 2020).
4. LEAVES. Alternate, opposite or verticillate, coriaceous to chartaceous, simple, short- to long-petioled, with gland-less blades and commonly entire margins; stipules absent.
5. INFLORESCENCE. Axillary dichasial or umbellate cymes, sometimes accompanied by brightly colored foliaceous bracteoles or bracts.
6. PEDICELS. Of variable lengths but usually >1 cm long (except in *Pisonia* where flowers are nearly sessile).
7. FLOWERS. Bisexual or rarely unisexual, actinomorphic, minute to large; calyx gamosepalous, of (3–)5(–8) sepals, resembling a corolla, funnel-shaped, campanulate or nearly hypocrateriform with the tube sometimes constricted near the middle; corolla wanting; stamens as many as the sepals, or less often fewer or more numerous, the filaments of equal or unequal lengths, shortly connate at base or less often distinct, the anthers opening by longitudinal slits; ovary superior, sessile or stipitate, often with an

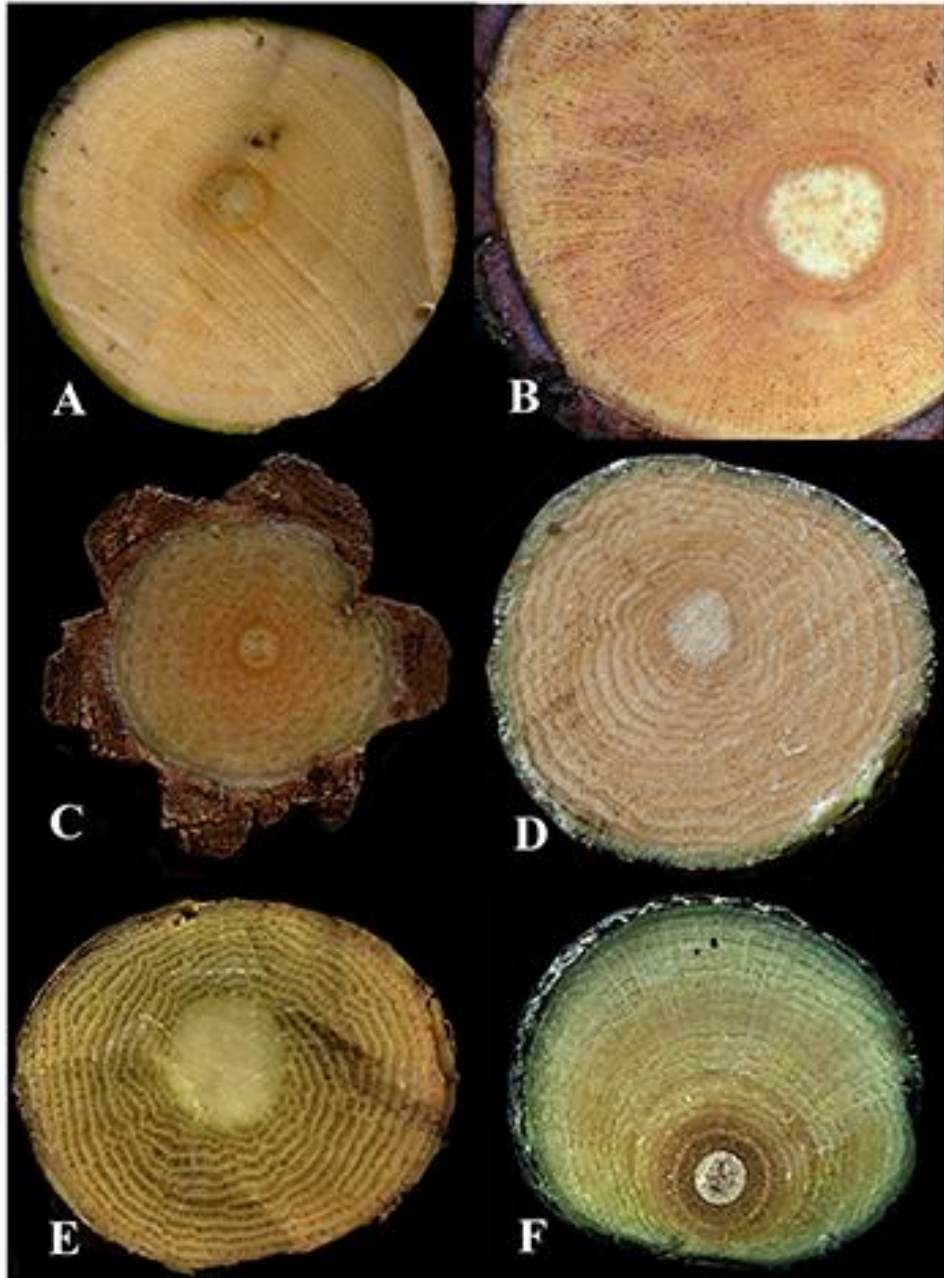


Figure 185. Cross sections of Nyctaginaceae stems. **A.** *Pisonia aculeata*, stem showing islands of interxylary phloem. **B.** *Bougainvillea* sp., stem with interxylary phloem bands and **numerous narrow rays**. **C.** *Commicarpus scandens*, with islands of interxylary phloem. **D.** *Bougainvillea* sp., with successive **interxylary phloem**. **E.** *Leucaster caniflorus*, stem with successive bands **of interxylary phloem**. **F.** *Pisoniella arborescens*, stem with successive bands **of interxylary phloem**. Photos: A–D by P. Acevedo; E by I.C. Neto; F by M.R. Pace.



Figure 186. Scrambling woody habit. **A.** *Pisonia aculeata*, an armed (thorns and cirri) scrambling liana. **B.** *Leucaster caniflorus* an unarmed scrambling liana. Photos: A by P. Acevedo; B by I.C. Neto.

annular disc at the base, 1-carpellate, with a single basal ovule, the style terminal, elongate.

8. FRUIT. An achene or nut enclosed by a hardened, persistent calyx (an anthocarp), sometimes with sticky glands.

Key to the genera of climbing Nyctaginaceae

1. Plant herbaceous, the base becoming woody with age, reaching 2–2.5 (4) m in length;
 inflorescence umbellate *Commicarpus*
1. Plant woody throughout, reaching 3 + m in length; inflorescence not umbellate2
2. Plants bearing axillary thorns3
2. Plants unarmed.....4
3. Plant with short, axillary, cirri-like branches; axillary thorns opposite or subopposite, short (~1 cm long) and recurved; bracteoles inconspicuous*Pisonia*
3. Plant without cirri-like branches; axillary thorns alternate, straight, 2–5 cm long; bracteoles large, foliaceous, often bright colored *Bougainvillea*
4. Flowers pink or magenta.....5
4. Flowers greenish, yellowish or white6
5. Petioles prehensile; flowers magenta, > 2 cm long, glabrous, the tube constricted near the middle,*Belemia*
5. Petioles not prehensile; flowers pink, ~1 cm long, with stipitate glands on lower half, the tube not constricted,*Pisoniella*
6. Inflorescence frondo-bracteate with cymes subtended by white, leaf-like bracts *Colignonia*
6. Inflorescence distinctly differentiated from leafy branches, with inconspicuous bracts7

7. Pubescence of stellate hairs; flowers wide infundibuliform-plicate; stamens 2, included
 *Leucaster*
7. Pubescence of simple hairs; flowers campanulate or nearly so; stamens 4–8, exserted.....8
8. Scrambling shrubs to 5 m long; leaves fleshy-coriaceous; flowers bisexual; fruits not forming
 an anthocarp..... *Cryptocarpus*
8. Scrambling lianas > 10 m long; leaves chartaceous; flowers unisexual; fruit an anthocarp with
 5 rows of sticky, stipitate glands..... *Pisonia*

BELEMIA Pires, Bol. Mus. Paraense Emilio Goeldi, N.S. Bot. 52: 1. 1981.

Scrambling vines; clinging to the phorophyte through the aid of prehensile petioles; stems



unarmed, several m long; roots tuberous. Stems terete, herbaceous to slightly woody, fistulose. Leaves alternate, lanceolate, chartaceous, pinnately veined, with entire margins; petioles about half as long as the blades. Flowers bisexual, solitary or in 2–25-flowered racemose cymes, axillary or subterminal, long pedicellate, without involucre; perianth deep pink, tubular, constricted below the middle, upper portion infundibuliform, with 5 plicate lobes; stamens 10–12, unequal, as long as the perianth, connate at the very base; ovary sessile, asymmetrical at base, style nearly as

Belemia fucsioides, photo by Cyl Farney (RB).

long as the perianth, stigma peltate. Fruits an ellipsoid or ovoid anthocarp.

Distinctive features: Herbaceous vines with prehensile petioles; leaves simple, alternate; flowers tubular, deep pink, large (> 2 cm long), constricted below the middle, lacking an involucre.

Distribution: A Brazilian endemic genus of two species distributed in central (Tocantins) and southeastern (Minas Gerais and Espírito Santo) regions; thickets (*cerrado*), and semideciduous forests.

BOUGAINVILLEA Commerson ex A. L. Jussieu, Gen. 91. 1789.

Scrambling lianas or less frequently erect shrubs or small trees, usually with straight



Bougainvillea campanulata, photo by P. Acevedo.

axillary thorns. Stems terete; bark rough, usually in rectangular plates; cross sections with concentric rings of interxylary phloem (Figure 185D) or with phloem bands (Figure 185B).

Leaves alternate or subopposite, simple; petioles slender; stipules absent. Flowers bisexual, in axillary 3-flowered dichasial cymes, each of which is subtended by a brightly

colored foliaceous bracteole. Perianth salverform, consisting only of the calyx, with small imbricate lobes; stamens 5–8(10), included; ovary superior, stipitate, fusiform, the stigma unilateral. Fruit a fusiform anthocarp with 5 longitudinal ribs, not glandular.

Distinctive features: Scrambling lianas with axillary, simple, straight thorns, inflorescence a 3-flowered cyme, each flower subtended by a foliaceous, often brightly colored bracteole; stem cross section with concentric rings of interxylary phloem.

Distribution: A genus of ~16 species, native to South America (Ecuador, Peru, Bolivia, southern Brazil and northern Argentina), six species are reported as scrambling lianas; dry forest, savannas and scrubs; 0–1,350 m. Some species widely cultivated throughout the tropics and subtropics as garden plants.

COLIGNONIA Endlicher, Gen. 311. 1837.

Erect herbs, subshrubs or scrambling vines 1–15 m long; some species with tuberous



Colignonia scandens, photo by Eric Hunt.

roots. Stem cylindrical, slender, unarmed. Leaves opposite, ovate or deltoid, with pinnate venation, cuneate or truncate at base, acute at apex, with entire margins; petioles nearly as long as the blade.

Inflorescence axillary cymes with umbellate,

long pedunculate partial inflorescences, subtended by foliaceous, white bracts. Flowers bisexual; long pedicelled; perianth campanulate or nearly free spreading tepals, 3- or 5- merous; stamens 5

of equal length, spreading; ovary superior, style clavate, stigma penicillate. Fruit an anthocarp 3- or 5-angled or 5-winged.

Distinctive features: Scrambling vines, partial inflorescences umbellate with white, foliaceous bracts not forming an involucre.

Distribution: A South American genus of six species with diverse habit varying from erect herbs or subshrubs to vines several m long, distributed in the Andean region of Colombia, Ecuador, Peru, Bolivia and Argentina; montane rainforests and cloud forests, often in disturbed areas; 3,000–3,800 m.

COMMICARPUS Standley, Contr. U.S. Natl. Herb. 12: 373. 1909.



Erect or trailing
subshrubs or scrambling
suffrutescent vines reaching 1–4
m long; stems terete, unarmed,
up to 1 cm in diam.; bark corky
and beige in old stems; cross
section with islands of
interxylary phloem (Figure

185C). Leaves opposite, deltoid, ovate, or broadly ovate, the apex obtuse or acute, cordiform or truncate at base, with undulate and ciliate margins; petioles canaliculate. Inflorescence umbelliform, axillary, long pedunculate; bracts minute, caducous; pedicels as long as or longer than the flowers. Flowers bisexual; perianth white or yellowish green, constricted and with knobby glands below the middle, lower part claviform, upper part infundibuliform, 2–2.5 mm

long; stamens 2, with curled filaments, exerted; ovary superior, white, style as long as the stamens, stigma capitate. Fruit a claviform anthocarp, 10-striate, with a ring of sticky knobby glands on distal portion, long-pedicellate.

Distinctive features: Scrambling herbaceous vines with forked, brittle branches and opposite leaves, flowers white or yellowish green, anthocarp claviform with sticky knobby glands at the apex, and stem cross section with islands of interxylary phloem.

Distribution: A pantropical genus of 25 species, five of which are endemic to the Neotropics, only *C. scandens* (L.) Standl. grows as a vine; distributed from southern United States to

Commicarpus scandens, photo by P. Acevedo.

Guatemala, the West Indies and

NW South America (Venezuela, Colombia, Ecuador and Peru); dry forests and scrubs; 0–800 m.

CRYPTOCARPUS Kunth in Humboldt, Bonpland & Kunth, Nova Gen. Sp. 2: ed. qu., 187.

1817.



Spreading to scrambling,

unarmed shrubs, 1–5 m long.

Stems terete, slightly flexuose.

Leaves alternate, succulent-

coriaceous, involute, ovate,

cordate at base, with lighter

margins; petioles much shorter

than the blade. Inflorescence

axillary, congested, paniculate cymes; involucre absent. Flowers bisexual; perianth campanulate, ~3 mm long, yellowish green, whitish adaxially, with (4) 5 deltoid lobes; stamens 4–5, unequal,

long-exserted; ovary superior, green with short style and penicillate stigma. Fruits covered by the persistent pubescent perianth.

Distinctive features: Spreading-arched or scrambling shrubs with succulent leaves, inflorescence of congested paniculate cymes with yellowish-green and white flowers.

Distribution: A neotropical genus of a single species, *C. pyriformis* Kunth distributed in Ecuador including the Galapagos, Peru and Bolivia; mostly coastal vegetation, mangrove thickets and saltwater marshes, recorded from the Yungas in Bolivia; 0–200 (2,000) m.

Cryptocarpus pyriformis, photo by Paloma.

LEUCASTER Choisy in A. de

Candolle, Prodr. 13(2): 457. 1849.

Scrambling, unarmed lianas reaching > 20 m long, with long dangling branches or less often small trees; indumentum of stellate scurvy scales on young parts. Stems terete, reaching 12–15 cm in diam.; cross section with concentric, slightly discontinuous bands of interxylary phloem (Figure 185E). Leaves alternate, simple, with entire margins, short-petioled.

Inflorescence axillary or frondo-bracteate thyrses on short axillary branches, with flowers grouped in dichasia; bracts and bracteoles, green, conspicuous, not forming an involucre; pedicels long, ferruginous stellate pubescent. Flowers bisexual; perianth yellowish green, wide-



Leucaster caniflorus, photo I. C. Neto.

infundibuliform-
plicate, 5-lobed;
stamens 2, free,
included, filaments
short, anthers
introrse; ovary
superior, sessile,
style absent, stigma
forming a crest. Fruit
covered by the
persistent perianth but

not forming an anthocarp.

Distinctive features: Long scrambling lianas, with long dangling branches; stem cross section with concentric rings of interxylary phloem; indument of stellate, scurvy scales; flowers yellowish green nearly rotate, 5-lobed.

Distribution: A Brazilian endemic genus with a single species *L. caniflorus* Choisy, found in the states of Minas Gerais, Espírito Santo and Rio de Janeiro; semi deciduous forests, rainforests and coastal forests (*restinga*); 0–500 m.



Figure 187. *Pisonia aculeata*. **A.** Staminate inflorescence. **B.** Trunk with cirrus-like branches. **C.** Foliose branches, with opposite, decussate lateral branches at a 90° angle with main branch. Photos by P. Acevedo.

PISONIA Linnaeus, Sp. Pl. 1026. 1753.

Grajalesia Miranda (1951).

Dioecious or monoecious trees, shrubs or scrambling lianas to 20 m + long. Stems terete, reaching 15 cm + diam.; bark grayish, smooth, lenticellate; cross section with islands of interxylary phloem (Figure 185A). Some species of lianas with short or elongate branches; short branches opposite and divaricate with recurved thorns (Figure 187C), *P. proctori* Lundell, from Belize, is an unarmed liana with laxly pendent branches. Leaves opposite or subopposite on the elongate branches, whorled on the short lateral branches, chartaceous, penninerved, elliptic to suborbicular, with entire or crenulate margins; petioles short. Inflorescences axillary or terminal, paniculate or corymbose cymes; bracts and bracteoles minute, persistent, not forming an involucre. Flowers unisexual, small, light-colored, sessile or shortly pedicellate; staminate perianth bell-shaped to obconical, stamens 6–8, long exserted, the filaments unequal, connate at base; pistillate perianth tubular, 5-toothed, ovary ovoid, sessile, the style exserted, the stigma many-branched. Anthocarp long-pedunculate, dry, club-shaped to ellipsoid, 5-ribbed, with 1 or 2 rows of stipitate, viscid glands along each angle, or 5-winged without glands in *P. fasciculata* Standl.

Distinctive features: Scrambling lianas, often armed with axillary recurved thorns and lateral, short, spiny, cirrus-like shoots; leaves alternate, simple, exstipulate; anthocarps with rows of sticky stipitate glands.

Distribution: A pantropical genus of ~30 species, 23 of which are distributed throughout the Neotropics. Three to five species reported in the Neotropics as lianas, including the pantropical and widely distributed *P. aculeata* L., these are distributed from Mexico to SE Brazil, including the West Indies; seasonally dry and moist forests; 0–650 m.

PISONIELLA (Heimerl) Standley, Contrib. U.S. Natl. Herb. 13: 385. 1911.

Erect shrubs or scrambling lianas > 10 m long, with divaricate, forked, unarmed branches.



Pisoniella arborescens photo by M. R. Pace.

Stems terete, reaching 3 cm or more in diam.; cross section in *P. glabrata* (Heimerl) Standl. with phloem islands (Cunha Neto et al. in prep.) and in *P. arborescens* (Lag. & Rodr.) Standl. with concentric bands of interxylary phloem

(Figure 185F). Leaves opposite, ovate, chartaceous with pinnate venation and entire margins, long petioled. Inflorescences axillary or terminal, congested head-like glomerules; bracts minute, not forming an involucre; long-pedunculate. Flowers bisexual, short pedicellate; perianth tubular-campanulate, lower half green with rows of stipitate glands, upper half pink, 5-lobed; stamens 6–11, long exerted, slightly unequal, connate at base; ovary stipitate, style exerted, stigma capitate, finely papillose. Fruit a clavate anthocarp, obscurely 5 ribbed, with a row of stipitate, viscid glands along each angle.

Distinctive features: Unarmed scrambling vines with divaricate, forked branching; flowers in long-pedunculate head-like glomerules; perianth pink with rows of stipitate glands on lower half; anthocarps green, with 5 rows of viscid stipitate glands.

Distribution: A neotropical genus of two species with disjunct distribution, with *P. arborescens* in central Mexico and *P. glabrata* in Bolivia and NW Argentina; deciduous forests; 1,200–1,700 m.