

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

SOLANACEAE

By Pedro Acevedo-Rodríguez (Aug 2020)



Solanum sp., photo by P. Acevedo

A nearly cosmopolitan family of ca. 99 genera and about 2,300 species of herbs, shrubs, trees, and lianas. In the Neotropics, there are 74 genera and ca. 2,000 species of which 17 genera and 209 species are reported as climbers (lianas and vines). Solanaceae is a ubiquitous family that is found in numerous habitats, but for the most part common in moist to wet lowland forests, few species occur in open savanna-like formations or disturbed habitats.

Diagnostics: Climbing Solanaceae are mostly scramblers or twiners, with unarmed or armed stems, leaves, and inflorescence axes. Leaves are alternate, commonly simple, or less often dissected or compound. Stems are terete, woody or less often herbaceous, with regular vascular anatomy and distinguishable by the presence of *intraxylary phloem*. Fruits in climbing Solanaceae are berries or rarely capsules (e.g., *Schwenckia*).

General Characters

1. **STEMS.** Herbaceous or woody with substantial secondary growth, for the most part cylindrical, some species trigonous or pentagonal when young, becoming terete with age, or less commonly asymmetrical (e.g. *Dysochroma viridiflorum* (Sims) Miers), some species reaching 20 or more m in length and up to 12 cm in diam. Most genera have unarmed stems except for *Solanum* which has numerous species that are armed all over with prickles. Cross sections show **regular** vascular anatomy commonly with narrow vessels and inconspicuous rays (fig. 1b-f); all members have **intraxylary phloem** associated with the medulla in the form of a continuous cylinder or strands (Metcalfe & Chalk, 1957); mature stems in *Dysochroma viridiflorum* are known to be asymmetrical with an acentric medulla (fig. 1a).
2. **EXUDATES.** No visible exudate.
3. **CLIMBING MECHANISMS.** **Twiners** are known in *Lycianthes* (fig. 2a), *Schwenckia* and *Solanum*, **scramblers** are found in most genera, **root-climbers** are known in *Dysochroma*, *Juanulloa*, *Markea*, *Solandra*, *Solanum*, **prehensile petioles** are known in a few species of *Solanum* (e.g., *S. pyriformium* Lam.).
4. **LEAVES.** Alternate, spirally arranged, simple or rarely pinnatifid, coriaceous to membranaceous, commonly short-petioled, with gland-less blades and entire margins; stipules absent, but some species of *Solanum* with pseudo stipules (i.e., conspicuous prophylls).
5. **INFLORESCENCE.** Terminal to lateral sympodial, few- to many-flowered, erect to pendant cymes, or flowers sometimes solitary and axillary.
6. **PEDICELS.** Of variable lengths but usually short.
7. **FLOWERS.** Bisexual or rarely unisexual, actinomorphic or rarely zygomorphic, commonly 5-merous; calyx synsepalous; corolla sympetalous, rotate, tubular, salverform, urceolate, the lobes commonly plicate, quincuncial or convolute, sometimes longer than the tube, white, yellow, red, orange, purple or blueish ; stamens inserted on the corolla tubes, as many as, and alternate to the corolla lobes, the anthers opening by terminal pores or along longitudinal slits; ovary superior, 2-carpellate, placentation axial with few to numerous ovules, the style 1 with bilobed or capitate stigma.
8. **FRUIT.** Quite variable climbers commonly have fleshy to coriaceous berries, less often capsules (e.g., *Schwenckia*), few- to many-seeded.

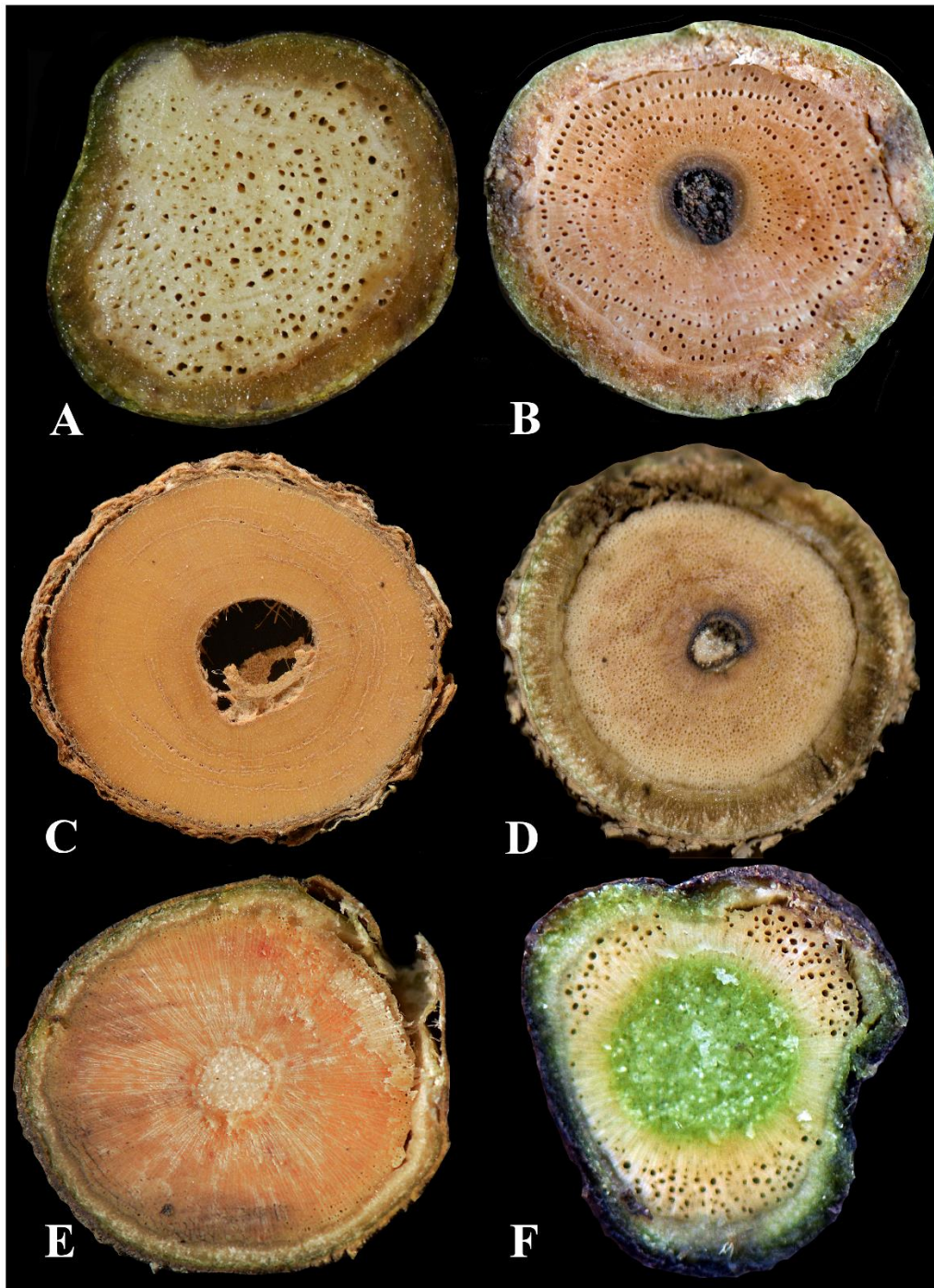


Figure 1. Cross sections of stems in Solanaceae. **A.** *Dyssochroma viridiflorum*, with asymmetrical, unidirectional growth, medulla is in upper left corner. **B.** *Lycianthes sp.* with slightly asymmetrical stem with regular anatomy and large vessels. **C.** *Solandra boliviana*, with regular anatomy and inconspicuous vessels. **D.** *Solanum sp.*, with regular anatomy and large vessels. **E.** *Solanum glaucescens*, with regular anatomy, inconspicuous vessels and numerous narrow rays. **F.** *Solanum sp.*, with young, trigonous stem with regular anatomy and large vessels. Photos by P. Acevedo.

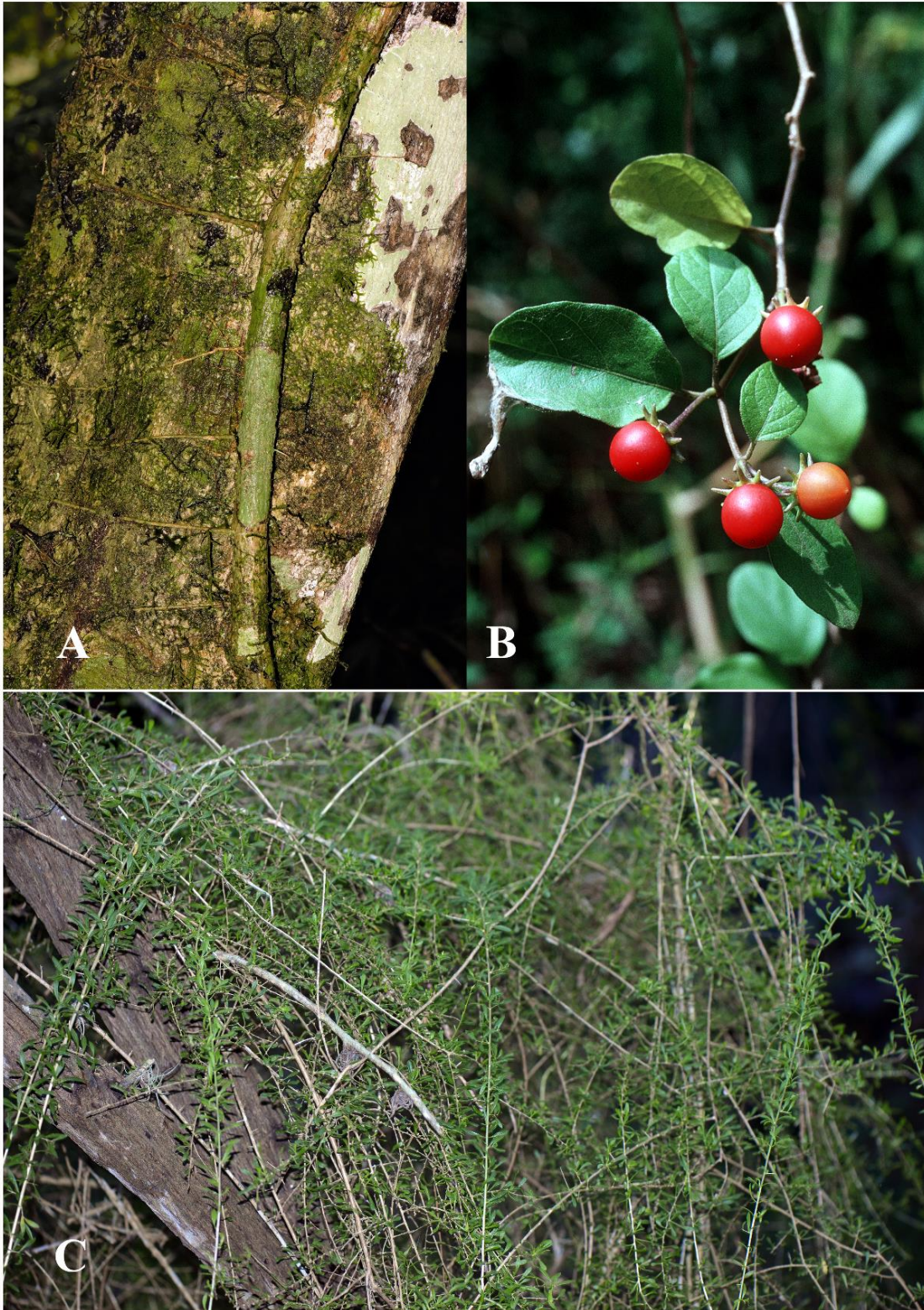


Figure 2. Climbing mechanisms in Solanaceae. **A.** *Dysochroma viridiflorum*, a root-climber liana. **B.** *Lycianthes virgata*, a twining vine. **C.** *Lycium americanum*, a scrambling shrub. Photos by P. Acevedo.

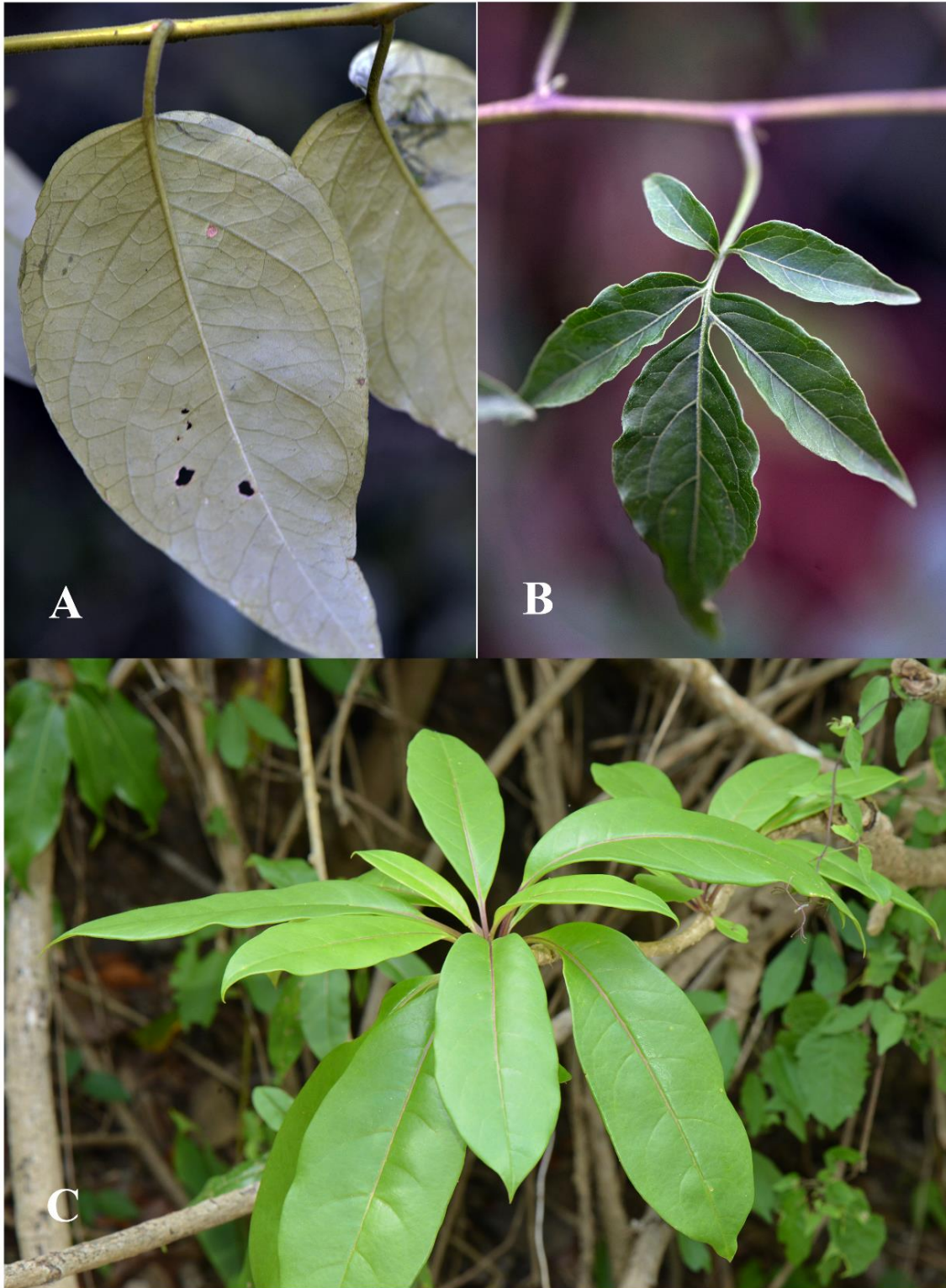


Figure 3. Leaves in Solanaceae. **A.** *Solanum sp.*, leaves simple, widely spaced with sericeous pubescence underneath. **B.** *Solanum seaforthianum*, with pinnatisect leaves. **C.** *Solandra sp.*, leaves simple, congested at the end of branches. Photos by P. Acevedo.

USES

Although Solanaceae is a family with a substantial number of useful species, ranging from production of main crops (e.g., peppers, tomatoes, potatoes, tobacco), source of alkaloids, medicines, and ornamental plants, liana and vines species are of little economic importance except as ornamental, garden plants. *Hawkesiophyton ochraceum* (Cuatrec.) A. Orejuela & C.I. Orozco and *Markea coccinea* Rich. have been used as medicinal plants by local people in the NW Amazon, while species of *Solandra* have psychoactive effects (Orejuela et al, 2017).

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GENERIC DESCRIPTIONS

CAPSICUM Linnaeus, Sp. Pl. 188. 1753.



C. coccineum (Rusby) Hunz., photo by Claudio Dal Zovo

Unarmed, herbs or subshrubs, one species (*C. coccineum* (Rusby) Hunz. reported as a scrambling vine reaching 5-6 m long. Branches 5-angled, flexuose due to lateral sympodial inflorescences. Leaves simple, alternate, entire, penninerved, short petioled. Inflorescence of sympodial corymbiform cymes. Flowers actinomorphic, bisexual, 5-merous; calyx bell-shaped, toothed; corolla yellowish brownish in the

lower center, rotate, with spreading lobes; stamens 5, the filaments of equal length, adnate to the base of corolla, the anthers opening by longitudinal slits; ovary 2-carpellate, the placentation basal-axile with numerous ovules. Fruit a fleshy to leathery berry; seeds numerous, lenticular, flattened.

Distinctive features: Scrambling suffrutescent vine with flexuose branches; flowers dull yellow with brown; berries subglobose, bright red, spicy hot, ca. 8 mm diam.

Distribution: A Neotropical genus of about 40 species, naturally occurring from northern Mexico to northern Argentina including the West Indies; many species cultivated throughout the world for their edible, often pungent pepper fruits. Only one species consistently reported as a climbing shrub or vine, occurring in Peru and Bolivia evergreen forests and thickets; 300-400 m.

CESTRUM Linnaeus, Sp. Pl. 191. 1753.

Unarmed, erect shrubs, exceptionally leaning or scrambling. Stems cylindrical. Leaves



C. scandens, photo by Don Windsor (STRI)

simple, entire, short petiolate. Inflorescence terminal on short axillary branches, racemiform or corymbiform thyrses. Flowers actinomorphic, bisexual, (4-)5-merous, fragrant; calyx bell-shaped, shallowly lobed or toothed; corolla salverform or funnel-shaped, with spreading lobes, commonly cream or light yellow; stamens 5, included, the

filaments of equal length, adnate to the corolla tube, the anthers opening by longitudinal slits; ovary of 2 connate carpels, the placentation axile with few ovules, the style filiform, the stigma nearly capitate. Fruit a fleshy to leathery berry; seeds few, flattened, angular, lenticular.

Distinctive features: Scrambling shrubs with long tubular, salverform, cream or light yellow, fragrant corollas.

Distribution: A New World genus of about 228 species, with about 200 species in the Neotropics, naturally distributed from Mexico to southern South America and United States (Florida) to the West Indies. Some widely cultivated through the tropics for their fragrant flowers. Only 4 species consistently reported as climbing shrubs (*C. inclusum* Urb., *C. langeanum* D'Arcy, *C. reflexum* Sendtner, and *C. scandens* Vahl); moist evergreen forests; 300-1250 m.

DYSSOCHROMA Miers, Ann. Mag. Nat. Hist. ser. 2, 4: 250. 1849.



D. viridiflora from C. Loddiges, Bot. Cab. Vol 7. 1822.

Unarmed, epiphytic shrubs or root-climbing lianas 3–4 m long, with spreading branches and often tuberous roots. Stems cylindrical or nearly so; cross section asymmetrical in *D. viridiflorum* (Sims) Miers with acentric medulla in mature stems. Leaves alternate, congested toward the end of branches, coriaceous, simple, with entire or wavy margins, sessile to long petioled. Inflorescence axillary, condensed, 1–3-flowered cymes; peduncle very short; pedicels elongated. Flowers bisexual, pendent, actinomorphic with valvate aestivation, larger than subtending leaves; calyx of 5 free, fleshy, lanceolate, valvate, equal, erect sepals; corolla gamopetalous, dull green or green-purple, fleshy, funnel-shaped to campanulate with 5, equal, short to long, reflexed lobes with valvate or

imbricate aestivation; stamens 5, equal, exserted, filaments adnate at the corolla constriction, enlarge at base, anthers basified, lineate, dehiscent by longitudinal sutures; nectary disc fleshy, at the base of a superior, 2-locular ovary, style elongate, included or exserted, stigma bilobed. Fruit a conical berry, lower half covered by the accrescent calyx.

Distinctive features: Root-climbing lianas with large, pendent, green flowers, turning black upon drying.

Distribution: A Brazilian endemic genus of three species recorded as sometimes growing as root-climbing lianas, distributed in southeastern Brazil; moist Atlantic forest, ca. 1000 m.

HAWKESIOPHYTON Hunziker, Kurtziana 10: 39. 1977.



H. ulei (Dammer) Hunz., photo by Sébastien Sant

Unarmed, epiphytic shrubs or root-climbing lianas a few m long, with hanging branches. Stems slightly angled, glabrous. Leaves simple, alternate or subopposite, congested at the end of branches, chartaceous to coriaceous, glabrous with entire margins and short to long, stout petioles. Inflorescence axillary racemiform, few-flowered, cymes, hanging, commonly shorter than the

subtending leaves; pedicels stout, longer than the calyx; bracts minute, persistent. Flowers, actinomorphic, 5-merous, hanging; calyx fleshy-coriaceous, 5-angled, green, lobes valvate, nearly free; corolla campanulate, tubular at base, fleshy-coriaceous, yellow-green, sometimes purplish at base, lobes 5, obtuse, spreading; stamens 5, included or partly exserted, filaments shorter than the anthers, inserted on upper portion of the tube, anthers ellipsoid, basifixed, dehiscing by longitudinal slits; nectary disc annular; ovary superior, ovoid, 2-locular with many ovules, style exserted, stigma capitate. Fruit a fleshy berry with a non accrescent calyx. Seeds, many, flattened.

Distinctive features: Root-climbing lianas, inflorescences shorter than subtending leaves, flowers greenish, berries white.

Distribution: A neotropical genus of 3 species, all of which are reported as climbers or lianas, found in Panama, Colombia, Venezuela, Ecuador, Peru, Bolivia, French Guiana, and Brazil (northern and west-central); moist evergreen and rain forests; 100-500 m.

JUANULLOA Ruiz & Pavón, Prodr. 27. 1794.



J. mexicana Miers, photo by P. Acevedo

Unarmed, epiphytic shrubs or root-climbing lianas 5-30 m long, with hanging branches. Stems cylindrical, glabrous or pubescent, reaching 8 cm in diam. at base in *J. parasitica* Ruiz & Pav. Leaves simple, alternate, coriaceous, and glabrous to tomentose, with entire margins and short petioles.

Inflorescence dichasial or

monochasial cymes terminal in short lateral branches, 3-8-flowered, shorter than the subtending leaves; peduncles short, pedicels stout, short to long; bracteoles minute. Flowers bisexual, erect, spreading or less often pendent, actinomorphic, with quincuncial aestivation; calyx gamosepalous, urceolate or tubular, 5-keeled, fleshy coriaceous, orange, or less often yellow, greenish or purplish, lobes 5, equal, deltoid to lanceolate, usually as long as the tube, sometimes free nearly to the base; corolla tubular or gibbous, longer than the calyx, fleshy-coriaceous, orange or less often yellow or red, lobes 5, short, deltoid or obtuse, spreading; stamens 5, equal, included, inserted low in the tube, anthers dorsifixed, elongate, dehiscing by longitudinal slits; nectary disc annular; ovary superior, ovoid, 2-locular with many ovules, the style included or slightly exserted, almost as long as stigma, small. Fruit an ovoid leathery berry, many-seeded.

Distinctive features: Root-climbing lianas, flowers showy, fleshy-coriaceous, calyx urceolate, 5-keeled, commonly orange, corolla tubular, longer than the calyx, orange yellow.

Distribution: A neotropical genus of about 9 species, 5 of which are reported as climbers or lianas, most diverse in western and central South America (Colombia, Ecuador, Peru, Brazilian Amazon) with one species extending through Central America to southern Mexico; moist, evergreen forest, rain forests or less often seasonal forests; 200-1500 (-3800) m.

LYCIANTHES (Dunal) Hassler, *Annuaire Conserv. Jard. Bot. Genève* 20: 180. 1917 (nom. cons.).



L. virgata (Lam.) Bitter, photo by P. Acevedo

Unarmed, erect herbs, shrubs, twining or scrambling, lianas, 3-10 m long, rarely small trees. Stems cylindrical, to 2.5 cm in diam.; cross section with regular anatomy. Leaves alternate, chartaceous, simple, penninerved, with entire margins; petioles short. Inflorescence short axillary fascicles or flowers solitary; bracts and bracteoles minute.

Flowers 5-merous, ascending or spreading, actinomorphic, bisexual; calyx synsepalous, campanulate or crateriform, truncate, with 5 or 10 linear appendages on or near the margin; corolla white, lilac, or blueish purple, rotate, pentagonal, each lobe with a thickened medial tissue forming a stellate design; stamens 5, the filaments free, shorter than the anthers, anthers concrescent, opening by terminal pores; ovary superior, 2-locular, with numerous ovules, the style filiform, commonly projecting beyond the anthers, the stigma bilobed. Fruit a globose, or ovoid berry, ca. 2 cm in diam., bright red, red-orange, less often green or white, many-seeded.

Distinctive features: Twining or scrambling lianas with stellate pubescence, calyx with 5 or 10 linear appendages, corolla rotate with a star-shape design, white lilac or blueish purple, berries commonly bright red or orange-red.

Distribution: A tropical genus of about 150 species naturally distributed in the Americas and the Indo-Malaysian region, with 111 species in the Neotropics, 37 of which have been reported as climbers; distributed from Mexico to southeastern Brazil, including the West Indies, most diverse from Guatemala to Colombia; in moist to wet forest; 0-1500 (2800) m.

LYCIUM Linnaeus, Sp. Pl. 191. 1753.



L. americanum, photo by P. Acevedo

Armed, erect or arched shrubs, rarely scrambling, reaching 4 m long (e.g., *L. americanum* Jacq.); pubescence of simple hairs or glabrous. Stems slender, angled, striate, and with short axillary branches often ending on a sharp spiny tip. Leaves alternate or fasciculate, simple, fleshy, oblanceolate, < 2.5 cm long, with entire

margins; petioles short. Flowers axillary, solitary or fascicled at nodes, 5-merous, actinomorphic; calyx campanulate; corolla white with purple marking in the throat, funnel-shaped or campanulate, the tube short (in our species) or elongated, lobes spreading, obtuse and revolute at margins; stamens 5, exserted, the filaments unequal, adnate to the corolla-tube, the anthers opening through longitudinal slits; ovary superior, 2-locular, style filiform, as long as the stamens, stigma capitate. Fruit a few- to many-seeded, globose berry, red to blackish at maturity.

Distinctive features: Scrambling, profusely branched shrub with spiny brachyblasts, with alternate or fasciculate small, fleshy oblanceolate leaves, corollas white to light blue.

Distribution: A pantropical genus of 103 species extending into subtemperate zones, introduced in temperate areas, with 37 species in the Neotropics of which only *L. americanum* is known to grow as a scrambling shrub, distributed in the West Indies (except Jamaica), Venezuela, Colombia, Ecuador, Peru, Bolivia, Paraguay and north-eastern Argentina; coastal, marshy environments and sandy places; 0-3000 m.

MARKEA Richard, Actes Soc. Hist. Nat. Paris 1: 107. 1792.



M. coccinea Rich., photo by P. Acevedo

Unarmed, epiphytic shrubs or root-climbing lianas 5-10 m long, with hanging branches or rarely herbs. Stems cylindrical, often with hollow medulla. Leaves simple, alternate or clustered at the end of branches, chartaceous, and glabrous to tomentose, with entire margins and short to long petioles. Inflorescence lateral, pendent, corymbiform monochasial or racemiform cymes, one to few flowers opened at one time, peduncle short or less often long; pedicels stout, short to long. Flowers bisexual, actinomorphic, 5-merous, with imbricate or cochleate aestivation; calyx urceolate, tubular or campanulate, green with distinctive colored venation, 1-3.5 cm long, the lobes long triangular, free or connate half of their length, membranous to fleshy; corolla orange or light yellow, tubular-campanulate or salverform, 1-10 cm long, the

lobes mostly spreading; stamens 5, equal, inserted near the corolla base, included or slightly exserted, the anthers basified, oblong, opening through longitudinal slits; nectary disc prominent or not; ovary superior, 2-locular with numerous ovules. Fruit a conical to ovoid berry, with numerous flat seeds.

Distinctive features: Root-climbing lianas with pendent inflorescences, calyx large with foliaceous sepals; corolla tubular or campanulate, mostly with spreading lobes.

Distribution: A north-central South American genus with about 21 species of which 10 have been consistently reported as climbers; humid or rain forests; 100-2000 m.

MERINTHOPODIUM J. D. Smith, Bot. Gaz. 23: 11. 1897.



M. neuranthum (Hemsl.) Donn. Sm., photo by Robin Moran

Flowers bisexual, actinomorphic, 5-merous, with valvate aestivation, hanging; calyx light green, of 5 nearly free, chartaceous sepals; corolla sympetalous, with valvate aestivation, campanulate, green, pink tinged within, pinnately veined from base toward each one of the 5 lobes, lobes short reflexed; stamens 5, alternating with the lobes, filaments free, inserted on lower portion of corolla and as long as the tube, the anthers dorsifixed, exerted beyond the tube, or as long as the tube, ellipsoid, dehiscent by longitudinal slits; disc absent; ovary superior, sessile, bilocular, with numerous ovules, the style filiform, exerted, with bilobed stigma. Fruit an ovoid, fleshy berry, with numerous seeds, subtended by the persistent, spreading sepals.

Unarmed, terrestrial or epiphytic shrubs, or root-climbing lianas. Stems cylindrical. Leaves simple, alternate, subopposite or congested at the end of branches; petioles stout. Inflorescence racemose, axillary, hanging, lower portion of axis with numerous scars from fallen flowers, distal portion with 3 to 8 flowers; peduncle 15-50 cm long; pedicels longer than the calyx.

Distinctive features: Root-climbing lianas; inflorescences with long (30-60 cm), hanging filiform, peduncle; flowers on distal portion of inflorescence.

Distribution: A neotropical genus of 3 species, all of which are reported as sometimes growing as climbers or lianas, distributed from Guatemala, Honduras and Belize, south to Colombia and Venezuela; moist evergreen and rain forests; 100-900 m.

POORTMANNIA Drake, Bull. Soc. Philom. Paris ser. 8, 4: 128. 1892.



P. speciosa Drake, photo by Robin Foster

Epiphytic shrubs, root-climbing lianas or small trees. Stems cylindrical; bark verrucose. Leaves coriaceous, 10-30 cm long, elliptic, oblong or oblanceolate, entire, abaxially prominently veined; petioles short, stout. Inflorescence axillary, few-flowered cymes; pedicels shorter than the peduncles. Flowers pendant, large, 5-merous, with valvate aestivation; calyx green, purplish tinged, campanulate, 5-keeled, lobes coriaceous, deltoid or lanceolate, free $\frac{1}{2}$ way to near the base; corolla green or greenish, campanulate, 5-15 cm long, fleshy, lobes obtuse-deltoid, strongly reflexed; stamens slightly exserted, filaments ciliate, enlarged at base, inserted near the base of corolla, connivent around the straight style, anthers oblong, dorsifixed near the base;

nectary fleshy; ovary 5-carpellate, 10-locular, stigma clavate, 5-lobed. Fruit a large berry surrounded by the accrescent calyx. Seeds numerous, reniform, elongated.

Distinctive features: Root-climbing lianas, distinguished from other climbing Solanaceae by the ventrifixed anthers and the 4- or 5-carpellate gynoecium, very close to *Trianaea* and apparently only distinguished (besides molecular characters) by different type of pollen (Orejuela et al. 2017).

Distribution: A neotropical genus of a single species, *P. speciosa*, which is reported as sometimes growing as a root-climbing liana, distributed in north-western South America (Colombia, Ecuador & northern Peru); moist evergreen and montane forests; 1300-1900 m.

Note: Although most contemporary authors have treated *Poortmannia* as a synonym of *Trianaea*, a recent phylogenetic study by Orejuela et al., (2017) recognizes it as a distinct genus based on DNA sequences and therefore it is recognized in the current treatment.

SALPICHROA Miers, London J. Bot. 4: 321. 1845.



S. didierana Jaub., photo from SolanaceaeSource.org

Unarmed, shrubs or scrambling vines 2-5 m long. Stems angular or winged in some species, reaching 2 cm in diam. Leaves simple, opposite or alternate, ovate or ovate-cordate; petioles short. Flowers solitary, rarely in pairs, axillary, hanging, bisexual, actinomorphic, 5-merous, with valvate aestivation; calyx of 5, nearly free, linear or lanceolate sepals; corolla sympetalous, long tubular or narrowly funnel shaped, greenish, yellow or brownish yellow, lobes short spreading; stamens 5, filaments free, included or exserted, inserted on upper half of corolla, anthers narrow, dorsifixed, ellipsoid, dehiscent by longitudinal slits; disc prominent, not fused to the ovary; ovary superior, bilocular, with numerous ovules, the style filiform, included or exserted, stigma subcapitate. Fruit fleshy, scarlet, red, purple

or blackish, ellipsoid berries. Seeds numerous, flattened, rugulose.

Distinctive features: Scrambling vines, 2-5 m long, flowers solitary, axillary, hanging, corolla greenish yellow or yellowish, tubular to narrow funnel-shaped, berries ellipsoid, purplish red or black.

Distribution: A neotropical genus of 16 species distributed from Venezuela to north-western Argentina and Chile, four species reported as leaning or scrambling vines, these occurring in Venezuela, Colombia, Ecuador and Peru; moist areas; 450-3950 m.

SCHULTESIANTHUS Hunziker, Kurtziana 10: 35. 1977.



S. odorifer (Cuatrec.) Hunz., photo by Andrés Orejuela Ramírez

Epiphytic shrubs or small trees, sometimes growing as root-climbing lianas, with long, hanging branches. Leaves subopposite, alternate and congested at the end of branches, thick coriaceous, entire, abaxially with prominent venation and gland-like

hairs. Inflorescence terminal, few-flowered, congested cymes; peduncles short. Flowers erect or spreading with imbricate or cochlear aestivation; calyx tubular-campanulate, coriaceous, lobes free $\frac{1}{2}$ way, subcircular or deltoid, strongly overlapping, accrescent and woody in fruit; corolla wide funnel-shaped with tubular base, 4-15 cm long, pale green, cream or light yellow, lobes rounded, fimbriate; stamens included or slightly exerted (not beyond the lobes), straight or declinate, filaments inserted on upper part of tube, densely pubescent on lower $\frac{1}{2}$, anthers basifixed; ovary superior, 2-locular, style declinate, stigma capitate, bilobed. Fruit green or purplish green, ovoid berry with thick pericarp. Seeds numerous, flattened.

Distinctive features: Root-climbing lianas, inflorescences short, congested, corolla greenish to light yellow with fimbriate lobes, berries covered by accrescent woody calyx.

Distribution: A neotropical genus of 8 species distributed from southern Mexico to northwestern South America, six species reported as climbers or lianas, these found in Mexico, Guatemala, Colombia, Venezuela, Ecuador and Peru; moist evergreen and rain forests; 500-2500 m.

SCHWENCKIA Linnaeus, Gen. Pl. ed. 6, 577 ['567']. 1764.



S. grandiflora, from Acevedo 8169 (US)

Erect herbs, shrubs or twining vines 4-5 m long. Leaves alternate, simple, entire, and sessile to petiolate. Inflorescences axillary or terminal, few-flowered racemes or panicles. Flowers hanging, bisexual; calyx 5-lobed, these partly fused to nearly free, linear or lanceolate; corolla light yellow, light green, sometimes pink tinged, gamopetalous, tubular to narrowly urceolate, actinomorphic or zygomorphic, with valvate-conduplicate aestivation, the lobes 5, tri-lobulate or trifid; androecium of 2 fertile stamens and 3 staminodes, or of 4 fertile stamens, included; nectary invaginate; ovary bilocular, sessile, style filiform, stigma clavate. Fruit a thin-walled capsule,

commonly globose. Seeds minute, numerous.

Distinctive features: Twining herbaceous vines 4-5 m long, corolla light yellow or yellow with pinkish hue, tubular with 5 lobes that are tri-lobulate or trifid, fruit a small, thin-walled capsule.

Distribution: A neotropical genus of about 21 species, distributed from southern Mexico to northeastern Argentina and Cuba, only 3 species (*S. alvaroana* Benitez, *S. grandiflora* Benth, & *S. volubilis* Benth.) reported as twining vines; lowland evergreen moist forest on terra firme or seasonally flooded; 100-600 m.

SOLANDRA Swartz, Kongl. Vetensk. Acad. Nya Handl. 8: 300. 1787 (nom. cons.).



S. grandiflora, photo by P. Acevedo

Unarmed, scrambling shrubs or root-climbing lianas, reaching 8-12 m in length; glabrous or pubescent with simple or branched hairs. Stems cylindrical, with numerous short lateral branches; bark gray, smooth, slightly lenticellate; cross section with regular anatomy with inconspicuous vessels. Leaves alternate or congested at the end of branches, simple, entire, chartaceous

to coriaceous, with entire margins and pinnate venation, blade often discoloured; petioles glabrous, slender, 2-5.5 cm long. Flowers 5-merous, bisexual, solitary at the end of short lateral branches, pedicels glabrous, stout. Calyx cylindrical-tubular, angular and sometimes inflated, irregularly cleft into 3-5 short, equal lobes; corolla infundibuliform or campanulate, 14-23 cm long, greenish white or yellow, with several marron lines inside, with 5 fimbriate or lacinate lobes, more or less revolute, the tubular portion shorter than or as long as the dilated portion; stamens 5, declinate, as long as the corolla, the filaments inserted on the tube, the anthers basifixed, dehiscent by longitudinal slits; ovary partially inferior, 2-carpellate, 4-locular, with numerous ovules, the style filiform, the stigma capitate. Fruit a coriaceous berry, depressed-ovoid, enclosed by the accrescent calyx, split and persistent at the base. Seeds numerous, reniform.

Distinctive features: Root-climbing lianas, leaves congested at end of branches, calyx long tubular 3-5 lobed, persistent in fruit and splitting open as fruit ripens, corolla large > 14 cm long light yellow with marron lines and fimbriate lobes.

Distribution: A neotropical genus of 8 species, 5 of which are reported as root-climbing lianas, naturally distributed from Mexico to southeastern Brazil, Jamaica, Cuba, and Hispaniola; Some species widely cultivated as garden plants in tropical areas; in lowland moist and seasonally flooded forests; 200-2000 m.

SOLANUM Linnaeus, Sp. Pl. 184. 1753.



S. rupicola Sendtn., photo by Alex Popovkin

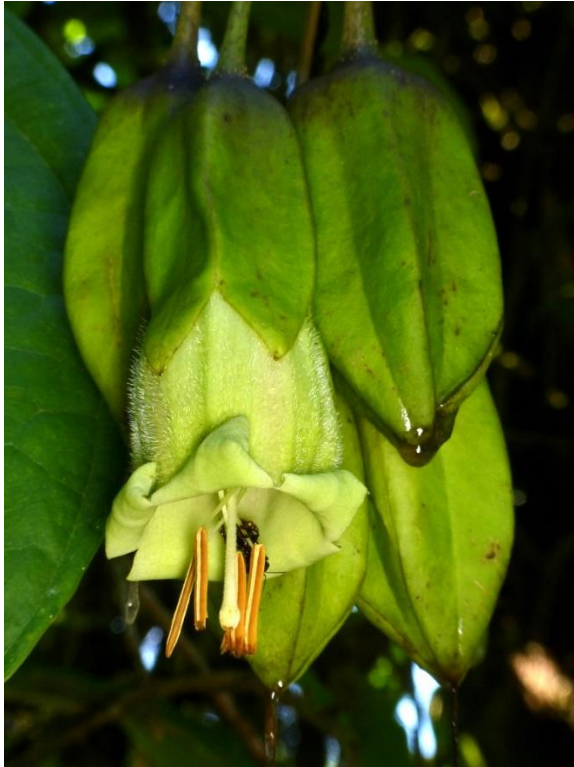
Herbs, shrubs, small trees or herbaceous to woody twining, scrambling, root-climbing vines, sometimes with prehensile petioles, often armed with prickles, glabrous or pubescent, the hairs simple or stellate. Leaves simple or compound, entire or lobed. Flowers actinomorphic, 5-merous, bisexual or rarely unisexual, produced in axillary or terminal racemes, or seldom solitary; calyx deeply lobed; corolla usually saucer-shaped, the limb apically 5-angled with shallow sinuses or with 5 deeply parted lobes;

stamens 5, the filaments shorter than the anthers, the anthers yellow, connivent, opening by a terminal pore; ovary of 2 connate carpels, the placentation axile with numerous ovules, the style filiform, deciduous, the stigma bifid. Fruit a fleshy, leathery or woody berry; seeds numerous, flattened.

Distinctive features: Commonly armed, twining or scrambling lianas, stems angular to terete with regular anatomy, leaves alternate, simple or pinnatisect, calyx deeply lobed, corolla rotate, usually deeply lobed, anthers connivent, opening by a terminal pore.

Distribution: A cosmopolitan genus of about 1,230 species, with about 925 species in the Neotropics, 115 of which are reported as vines or lianas; found throughout the Neotropics in almost all kinds of environments; 0-4000 m.

TRIANAEA Planchon & Linden in Linden, Cat. Pl. Exot. 717. 1853.



T. nobilis Planch. & Linden, photo by Adreas Kay

Epiphytic shrubs or root-climbing lianas, exceptionally small trees. Stems cylindrical, flexuose, dark purple when young; bark verrucose when old. Leaves coriaceous, 10-30 cm long, linear to broadly elliptic, entire, abaxially prominently veined; petioles stout. Inflorescence terminal or axillary, pendant, umbelliform cymes or flower sometimes solitary; peduncles and pedicels long. Flowers pendant, large, 5-merous, with quincuncial or cochlear aestivation; calyx campanulate, somewhat inflated, strongly 5-angled, lobes coriaceous, deltoid, about ½ way free; corolla green or greenish with purplish red markings on the throat, campanulate, 5-15 cm long, fleshy, tube short, lobes deltoid, strongly reflexed; stamens exerted, filaments inserted on

lower ¼ of tube, strongly geniculate at base, connivent around the straight style, anthers ventrifixed; nectary prominent; ovary 4- or 5-carpellate, 8-10-locular, stigma capitate to clavate. Fruit a large berry surrounded by the accrescent calyx. Seeds numerous, reniform, elongated.

Distinctive features: Root-climbing lianas, distinguished from other climbing Solanaceae by the ventrifixed anthers and the 4- or 5-carpellate gynoecium.

Distribution: A neotropical genus of about 4 species, all of which are reported as sometimes growing as root-climbing lianas, distributed in north-western South America (Colombia, Ecuador & northern Peru); moist evergreen and montane forests; 1300-2800 m.

WITHERINGIA L'Héritier, Sertum Angl. 33. 1789.



W. coccoloboides (Dammer) Hunz., photo by Franz Xavier

Unarmed, erect herbs or shrubs, rarely small trees or scrambling vines; stem fistulose, glabrous or with simple or branched trichomes. Leaves simple, geminate, unequal in size, entire or sinuate, membranaceous, petioles short or long. Inflorescences axillary, many-flowered fascicles, peduncles commonly short. Flowers 4–5(6)-merous, with valvate aestivation;

calyx cyathiform, commonly truncate; corolla tubular campanulate or rotate, lobes longer than the short tube, usually with an internal ring of hairs near stamen insertion; stamens equal or nearly so, inserted in upper half of corolla tube; anthers dorsifixed or dorsi-basifixed, dehiscent by longitudinal slits, yellow or purple, commonly with an apiculate connective; nectary annular; ovary 2-locular, with numerous ovules, stigma discoid or subglobose. Fruit a fleshy red or yellow berry, sometimes partly covered by the accrescent calyx. Seeds flattened, reniform or nearly so, numerous.

Distinctive features: Leaning or scrambling vines, leaves paired, unequal, inflorescence axillary fascicles, berries bright red or yellow.

Distribution: A neotropical genus of about 10 species distributed from southern Mexico to Bolivia, two species are reported as scrambling herbaceous vines, both distributed in the Pacific and Andean regions of Colombia; moist evergreen and montane forests; 0-3000 m.

Petunia mantiqueirensis T. Ando & Hashim., has been reported as a scandent vine, a rare occurrence in a genus that otherwise contain herbs.

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.
- Ando, T. and G. Hashimoto. 1994. A New Brazilian Species of *Petunia* (Solanaceae) from the Serra da Mantiqueira. *Brittonia* 46: 340-343.
- Barboza, G.E., A.T. Hunziker, G. Bernardello, A.A. Cocucci, A.E. Mscone, C. Carrizo García, V. Fuentes, M.O. Dillon, V. Bittrich, M.T. Cosa, R. Subils, A. Romanutti, S. Arroyo and A. Anton. 2016. Solanaceae, pp. 295-358. In: K. Kubitzki (ed.). *The Family and Genera of Vascular Plants*. Vol 14. Springer, Germany.
- Cuatrecasas, J. 1958. The Colombian species of *Juanulloa*. *Brittonia* 3: 146-150.
- Hunziker, A.T. 1977. Estudios sobre Solanaceae VIII. Novedades varias sobre tribus, géneros, secciones y especies Sud Americanas. *Kurtziana* 10: 7-50.
- Knapp, S., V. Persson and S. Blackmore. 1997. A phylogenetic conspectus of the tribe Juanulloae (Solanaceae). *Ann. Missouri Bot. Gard.* 84: 67-89.
- Orejuela, A., C.I. Orozco and G. Barboza. 2014. Three new species of *Markea* (Solanaceae, Juanulloae) from Colombia. *Phytotaxa* 167: 151-165.
- Orejuela, A., G.A. Wahlert, C.I. Orozco, G. Barboza and L. Bohs. 2017. Phylogeny of the tribes Juanulloae and Solandreae (Solanaceae). *Taxon* 66: 379-392.
- Stehmann J. and L. Giacomini. 2012. *Markea atlantica* (Solanaceae): a new species of tribe Juanulloae disjunct from its core distribution. *Systematic Botany* 37:1035-1042.

PICTURE VOUCHERS

Figure 1.

- A. *Dyssochroma viridiflorum* (Sims) Miers. (Acevedo 16974).
- B. *Lycianthes* sp. (Romero 4545)
- C. *Solandra boliviana* Rusby (Acevedo 14257)
- D. *Solanum* sp. (no voucher)
- E. *Solanum glaucescens* Zucc. (Acevedo 16361)
- F. *Solanum* sp. (Acevedo 17129)

Figure 2.

- A. *Dyssochroma viridiflorum* (Sims) Miers. (Acevedo 16974).
- B. *Lycianthes virgata* (Lam.) Bitter (Acevedo 1399).
- C. *Lycium americanum* Jacq. (no voucher).

Figure 3.

- A. *Solanum* sp. (no voucher)
- B. *Solanum seforthianum* Andrews (Acevedo 16946).
- C. *Solandra* sp. (no voucher).