

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

POLEMONIACEAE

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Cobaea scandens, photo by P. Acevedo

Largely an extra-tropical family of herbs, shrubs or lianas, with 27 genera and about 350 species. Although the two largest genera are distributed across North America and temperate Asia, most genera are endemic to the New World, with highest diversity in North America-Mexico, with few genera extending to South America. *Cobaea* Cavanilles with 17 species is the only genus of climbers in the family and is distributed from Mexico to Bolivia through the mid- to high-elevation habitats of Central and South America.

Diagnostics: Lianas and vines with compound, alternate leaves with distal leaflets modified into bifid tendrils; corollas funnel-shaped or campanulate, greenish, purplish or yellow; stem cross sections simple, with large

vessels and inconspicuous rays. Sometimes confused with Bignoniaceae due to the gamopetalous corolla, but easily distinguished by the alternate leaves and trilobular ovaries.

General Characters

1. **STEMS.** Herbaceous to woody with moderate secondary growth, cylindrical (fig. 1a), up to 25 m in length and 1-2(3) cm in diam.; cross sections simple, with *regular* vascular anatomy, rather indistinctive, with numerous large vessels more or less radially disposed, inconspicuous medulla and inconspicuous rays (fig. 1a); bark smooth, greenish to beige.
2. **EXUDATES.** Watery or no visible exudates.
3. **CLIMBING MECHANISMS.** Distal leaflets modified into bifurcate *tendrils*.
4. **LEAVES.** Alternate, pari-pinnately compound, with 3-5 pairs of leaflets and distal portion (rachis and often more than one leaflet) modified into bifid tendrils (fig. 2a & b); leaflets opposite, sub-opposite or seldom alternate, with pinnate venation and entire to undulate margins, chartaceous or less often coriaceous, petiolulate or less often sessile; petioles short or the leaves sessile; exstipulate (fig. 2a & b).
5. **INFLORESCENCE.** Axillary, dichasial cymes, or flower solitary.
6. **FLOWERS.** Bisexual, actinomorphic, 5-merous; sepals free, large, green; corolla gamopetalous, funnel-shaped or campanulate, 5 lobed, green but sometimes purplish or pink tinged, purple, white or yellow; stamens 5, the filaments adnate to the corolla at the base, sometimes distally curved; disc 5-lobed, each lobe representing a nectary (fig. 3 c); ovary superior, trilocular, often with several axile ovules, the style elongated, with 3 stigmatic branches.
7. **FRUIT.** A septicidal, 3-valvate, ellipsoid, dry capsule, with a stout septal column in the center; seeds numerous, overlapping, winged.

GENERIC DESCRIPTION

COBAEA Cavanilles, Icon. 1: 11. 1791.

Herbaceous to subwoody tendrilled vines, with short, laeral hanging branches, reaching 5-10(25) m in length. Stems mostly angled, glabrous or various indument of simple hairs,

pubescent, unarmed, becoming cylindrical with age, reaching 1-2(3) cm in diam. Leaves alternate, pari-pinnately compound; leaflets 3-5 pairs, opposite, subopposite or less often alternate, chartaceous to coriaceous, pinnately veined, with undulate margins, commonly asymmetrical at base and petiolulate; rachis canaliculate, with distal portion along with distal leaflets modified into bifurcate tendrils that are either prehensile or act as hooks and help anchoring the plant to the host. Inflorescence axillary dichasial cymes, pendulous or erect, or flowers solitary; pedicels 10-28 cm long. Sepals free, large, green; corolla commonly yellow with purplish or pink stripes, less often purple, light yellow or white; stamens shorter than the corolla or exserted. Capsule ellipsoid, commonly maculate, 3-79 cm long, with persistent calyx and disc nectary at the base; seed numerous, small, flat and winged.

Distinctive features: *Cobaea* along with the Fabaceae genera *Lathyrus* and *Vicia*, are the only genera of vines in the Neotropics that have compound once-pinnate leaves with distal leaflets modified into tendrils. *Lathyrus* and *Vicia* are distinguished by the presence of stipules and the typical papilionaceous flower of legumes.

Distribution: A neotropical genus of 18 species distributed from Mexico south to Bolivia through high elevation habitats. The genus has two centers of distribution, one in the mountains of Mexico and another in the Andes from Venezuela to Bolivia. *Cobaea scandens* Cavanilles is widely cultivated in parts of Mexico, Central America, South America, Europe, Asia, Africa, and New Zealand.

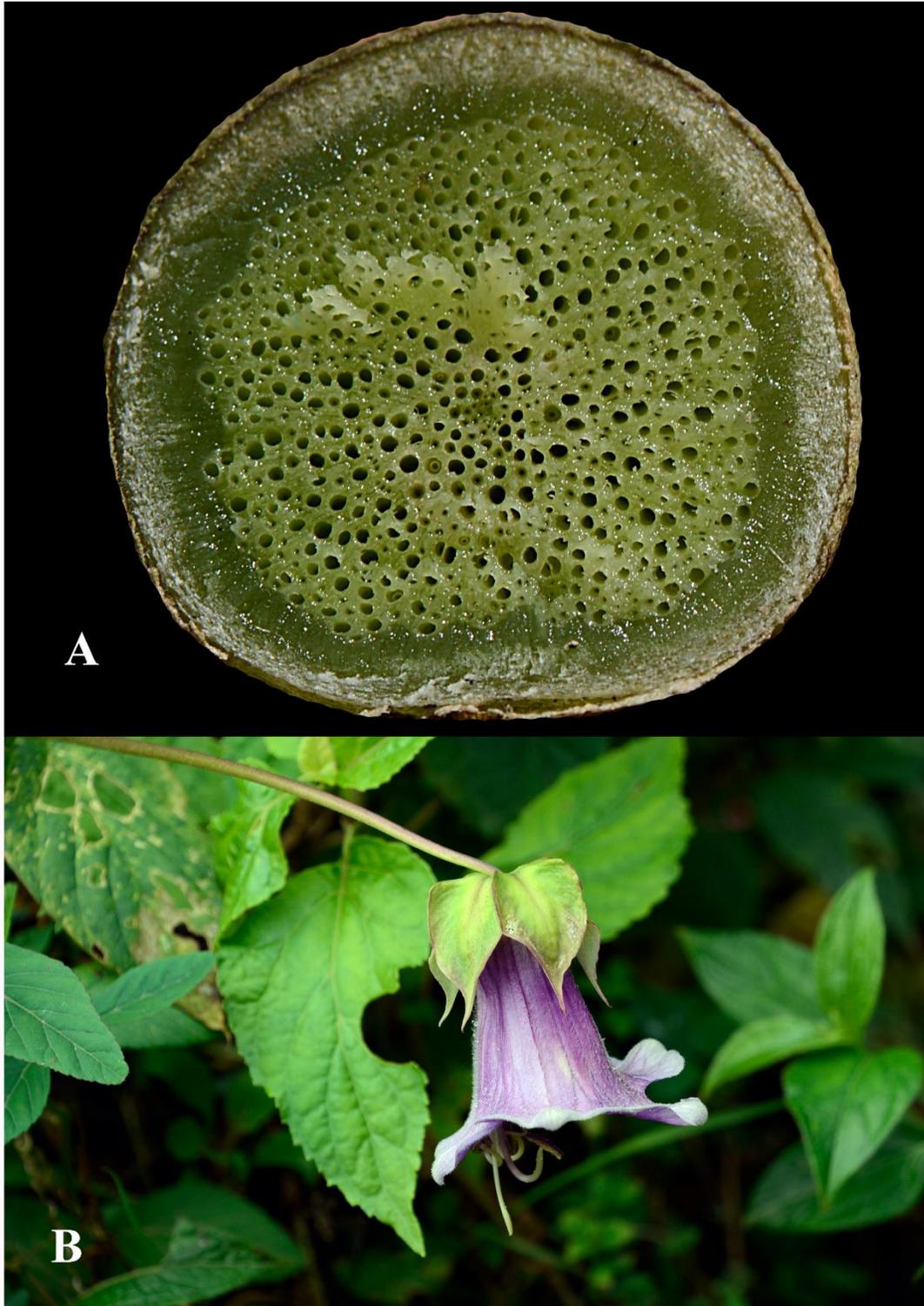


Figure 1. A Stem cross section of *Cobaea scandens*. B. Long pedicelled flower of *Cobaea biaurita*. Photos by P. Acevedo.



Figure 2. Leaves in *Cobaea*. **A.** 10-pinnate leaf with alternate, sessile leaflets of *Cobaea* sp. **B.** 6-pinnate leaf with opposite, long-petiolulate leaflets of *Cobaea scandens*. Photos by P. Acevedo.



Figure 3. A. Pendulous flower of *Cobaea scandens*. B. Dehiscent capsule of *Cobaea scandens*. C. Flower with removed corolla showing large calyx, 5-lobed disc, and trigonous ovary of *Cobaea biaurita*. Photos by P. Acevedo.

RELEVANT LITERATURE

- Austin, D. F. 1971. Polemoniaceae. In: R. F. Woodson, Jr., and R. W. Schery (eds), Flora of Panama. Ann. Missouri Bot. Gard. 58: 355.
- Carlquist, S., V.M. Eckhart, and D.C. Michener. 1984. Wood anatomy of the Polemoniaceae. Aliso 10: 547-572.
- Prather, L.A. 1999. Systematics of *Cobaea* (Polemoniaceae). Systematic Botany Monographs, Vol. 57: 1-81.

PICTURE VOUCHERS

Figure 1.

- A. *Cobaea scandens* (Acevedo 16403).
B. *Cobaea biaurita* Standl. (no voucher).

Figure 2.

- A. *Cobaea* sp. (no voucher).
B. *Cobaea scandens* (Acevedo 16403).

Figure 3.

- A-B. *Cobaea scandens* (Acevedo 16403).
C. *Cobaea biaurita* Standl. (no voucher).