

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

LOASACEAE

By Mark T. Strong (Aug 2021)

A primarily Neotropical family of herbs, rarely subshrubs or lianas, with 20 genera and ca. 265 species. In the Neotropics, there are 18 genera and ca. 200 species with 5 genera and 27 species recorded as climbing or scandent. Only two genera occur outside the Americas, *Kissenia* R. Br. ex T. Anderson (Africa and western Asia) and *Plakothira* J. Florence (Polynesia).

Diagnostics: In vegetative condition, scandent or twining Loasaceae have stems that are terete, rarely quadrangular in cross section, often have lenticels and/or are tuberculate, and white pith internally; pubescence is of several different types of trichomes including scabrid, glochidiate, scabrid-glochidiate, splinter, and stinging hairs or setae; cystoliths and crystal druses/rhaphids are frequently present in stem parenchyma and in leaf blades; leaves are opposite or some alternate distally on stems, linear, ovate or circular, membranous to coriaceous; pseudostipulate or exstipulate.

GENERAL CHARACTERS

1. STEMS. Terete, rarely quadrangular often with white pith internally.
2. PUBESCENCE. Foliage can have scabrid, glochidiate, scabrid-glochidiate, splinter, and stinging hairs or setae or combinations thereof.
3. LEAVES. Opposite or sometimes alternate, usually evergreen, pseudostipulate or exstipulate.
4. CLIMBING MECHANISMS. Neotropical Loasaceae climbers are either scramblers or twiners.
5. INFLORESCENCES. Terminal and thyrses-like, sometimes reduced to dichasia, monochasia, or monads, rarely racemes or capitate; bracteate, rarely ebracteate.

6. FLOWERS. Flowers bisexual, actinomorphic or weakly zygomorphic, chasmogamous, rarely cleistogamous; perianth (4)5(-8)-merous, heterochlamydeous; calyx tube conical to globose, densely pubescent; calyx lobes usually persistent and accrescent, rarely caducous; corolla green, white, yellow, orange or red, the petals erect, spreading or reflexed, linear, spatulate, ovate or terete, plane or boat-shaped, the margin entire, irregularly serrate or lacinate, sometimes with filiform apical appendages or longitudinal lamelliform flaps; stamens haplostemonous, obdiplostemonous or polystemonous, all fertile or some staminodial; filaments inserted basally or epipetalous; anthers basifixed; nectary a ring- or cup-shaped disc, antepetalous glands, or absent; ovary completely inferior to nearly superior; style filiform, included or exserted; stigma punctiform or with 2-5 lobes; ovary with parietal placentation, the ovules anatropous.
7. FRUITS. A dehiscent capsule with 3-5 apical valves or cypsela; seeds 1-numerous, globose, ovoid, or angular, sometimes winged.

USES

There are currently no Loasaceae cultivated for economic purposes. Plants used in folk medicine by indigenous people in South America include species of *Caiophora*, *Mentzelia* and *Nasa* which are used to treat disorders such as allergies, bronchial diseases, liver disorders, and stomach disorders. Historically, native Americans in western North America used seeds of *Mentzelia* as an important food source and the seeds and other parts of the plants were used medicinally as well.

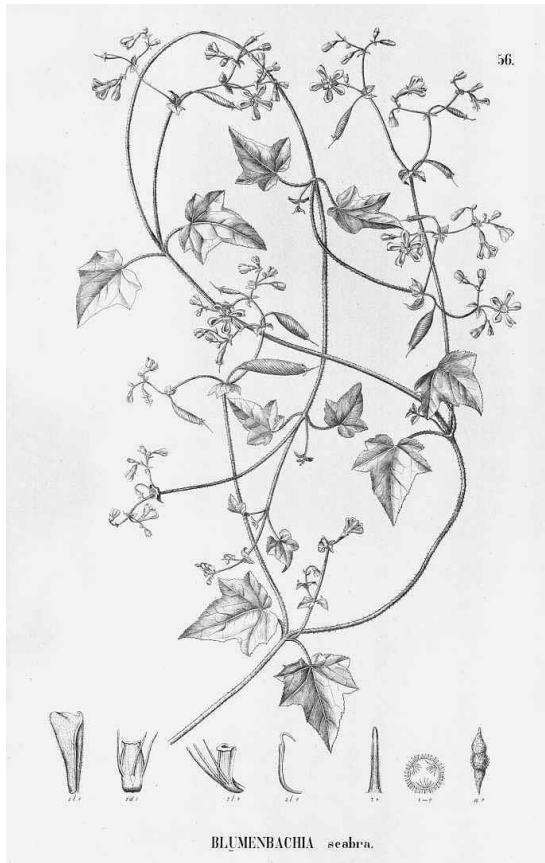
KEY TO THE GENERA

1. Leaves alternate; fruit a cypsela2
1. Leaves opposite; fruit a capsule3
2. Liana; leaf blades simple, lacking stinging hairs***Fuertesia***
2. Scandent annual herb; leaf blades reniform, deeply sinuate-lobate with 3-4 lobes on each side, with both stinging and glochidiate hairs.....***Gronovia***
3. Leaf blades simple, lacking stinging hairs***Klaprothia***

- 3. Leaf blades subpalmately lobed, pinnatifid or bipinnatisect, with stinging hairs4
- 4. Leaf blades subpalmately lobed, rarely bipinnatisect; capsule cylindrical to globose, septicial or septifragal, opening with apical valves, always twisted anticlockwise; seeds winged or with fibrous testa *Blumenbachia*
- 4. Leaf blades pinnatifid or bipinnatisect; capsule with coherent apex, opening with 3-5 longitudinal slits, straight or twisted clockwise and anticlockwise alternating in the inflorescence; seeds not winged, the testa deeply pitted with fenestrate, anticlinal walls
..... *Caiophora*

GENERIC DESCRIPTIONS

BLUMENBACHIA Schrader, Gött. Gel. Anz. 1825: 1705. 1825, *nom. cons.*



B. scabra, from Martius Flora Brasiliensis, 1874.

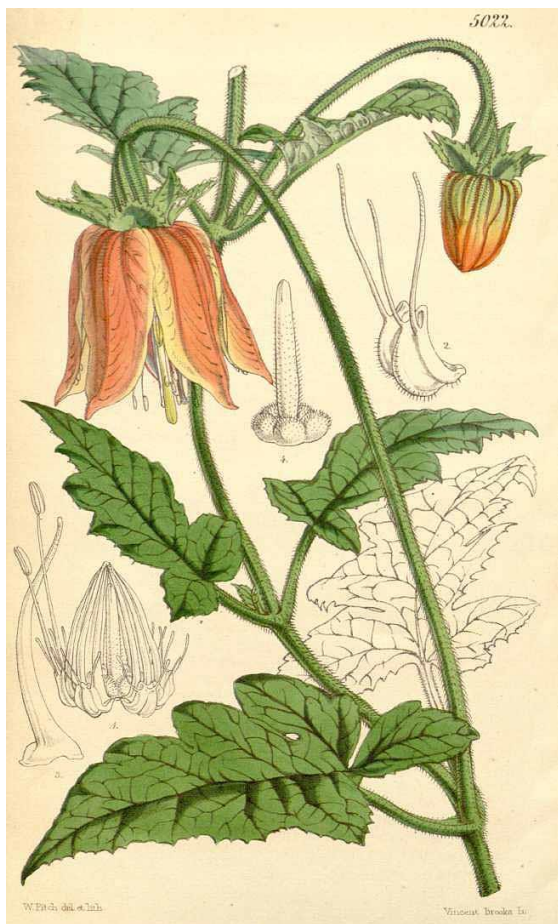
Annual or perennial herbs or twining vines, with stinging hairs. Leaves opposite; blades ovate, subpalmately lobed, or sometimes bipinnatisect, the margins denticulate. Inflorescence terminal, thyrselike, dichasial, or in section *Blumenbachia*, axillary and flowers borne singly. Flowers 2-prophyllate; petals 5, free, white, deeply boat-shaped; nectar scale equaling the free staminodia in size, rectangular, with 3 long, dorsal, filiform appendages, white, red and yellow; placenta simple, ovules numerous. Fruit a cylindrical to globose septicial or septifragal capsule with 10 prominent veins, twisted anticlockwise only; seeds angular, winged, or with fibrous testa.

Unique features: The cylindrical to globose, septicial or septifragal capsules opening with apical valves that are only twisted anticlockwise distinguish

this genus from other Loasaceae.

Distribution: Mostly an extratropical genus of 12 species occurring in Brazil, Uruguay, Paraguay, Argentina, and Chile, only the Brazilian *Blumenbachia eichleri* Urb., *B. exalata* Weigend, and *B. sylvestris* Poepp. represented as climbers occurring in dense rainforest, secondary forest, riverine forest, forest edges, disturbed forest, shrub thickets, and roadsides, from 400-2500 m.

CAIOPHORA C. Presl, Reliq. Haenk. 2: 41. 1831.



C. canarinoides, from Curtis Magazine Vol 83. tab. 5022. 1857.

Perennial herbs, rarely annual, erect or twining, with stinging hairs. Leaves opposite; blades mostly ovate, pinnatifid or bipinnatisect, sometimes ternate. Inflorescence terminal, thyrselike or dichasia, rarely flowers borne singly from basal rosette. Flowers 2-prophyllate, mostly pendent, 5- to 8-merous; petals deeply boat-shaped, green, white, yellow or red; nectar scale often with 3, white, red, yellow, or green, elongate, flag-shaped dorsal appendages with a double arch on back or sometimes wanting; stamens in antesealous fascicles; free staminodia sometimes with basal appendages; placenta Y-shaped, ovules numerous; stigma 3-lobed. Fruit a subglobose to narrowly cylindrical capsule with 10 prominent veins, straight or twisted clockwise and anticlockwise alternating in the inflorescence, usually opening with 3-5 longitudinal slits; seeds angular, the testa deeply pitted with fenestrate anticlinal walls.

Unique features: The capsule with coherent apex, opening with 3-5 longitudinal slits and testa of the seeds with fenestrated anticlinal walls distinguish this genus from other Loasaceae.

Distribution: A genus of ca. 50 species occurring in South America (Brazil, Bolivia, Ecuador, Peru, Uruguay, Argentina, and Chile), with 21 species represented as climbers occurring in Ecuador, Peru, and Bolivia, in cloud forest, montane forest, montane scrub, secondary forest, shrub forest, subtropical forest, riverine forest, rocky crags, slopes, ravines, pasture, and road banks from 1100-4700 m.

FUERTESIA Urban, Ber. Deutsch. Bot. Ges. 28: 520. 1911.

Liana reaching 6 m in length, with splinter hairs and glochidiate hairs bearing 2 hooks at the tip. Leaves alternate; blades simple, ovate, subtruncate, rounded or cordate at base, acuminate to abruptly acuminate at apex, subulate- or bristle-tipped, coriaceous, with entire margin, the secondary veins arching and distally paralleling the margin. Inflorescence terminal, thyrselike, the branches dichasial; calyx lobes free, ovate, yellowish green, longer than petals; petals thinly herbaceous, pale yellow, lacinate, included in the calyx; stamens haplostemonous, staminodia absent; ovary unilocular and uniovulate, bearing a bowl-shaped nectary disk at apex; stigma 3- to 5-lobed. Fruit a cypsela, pentagonous in cross section, winged on ribs, the calyx persistent, enlarging and spreading-ascending; testa white or beige.

Unique features: The liana habit and cypsela fruits with persistent, spreading, enlarged calyx lobes, distinguishes this from other climbing species of Loasaceae.

Distribution: A monotypic genus represented only by the climber, *Fuertesia domingensis* Urb. from Hispaniola (West Indies) occurring on rocky and stony limestone substrate, broad leaf forest, secondary forest, road banks, and around caves from 30-510 m.

GRONOVIA Linnaeus, Sp. Pl. 1: 202. 1753.

Annual herbs, scandent, with stinging hairs and glochidiate hairs which bear 2 hooks at the tip. Leaves alternate; blades reniform, deeply sinuate-lobate with 3-4 lobes on each side, lobes ovate-lanceolate, long acuminate, membranaceous, the margins entire. Inflorescence terminal, thyrselike, the branches monochasial; calyx lobes free or united nearly to apex, narrowly ovate, yellow



G. scandens, photo by Dick Culbert

or yellowish green, longer than petals; petals entire, thinly membranaceous, pale yellow; stamens haplostemonous, staminodia absent; ovary unilocular and uniovulate, bearing a bowl-shaped nectary disk at apex; stigma unlobed, bearing a tuft of 2-celled glandular trichomes at apex of style. Fruit a cypsela, pentagonous in cross section, winged on ribs, the calyx persistent,

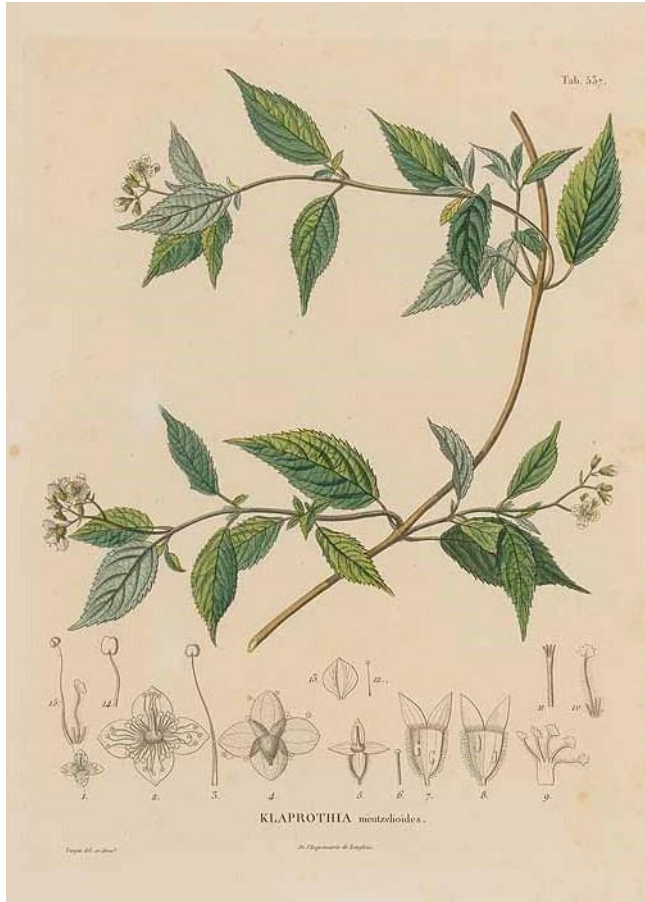
enlarging and strongly ascending; testa white or beige.

Unique features: The combination of an herbaceous annual scandent habit, leaf blades reniform, deeply sinuate-lobate with 3-4 lobes on each side, bearing both stinging and 2-hooked glochidiate hairs, distinguish this genus from other Loasaceae.

Distribution: A genus of two species occurring in Mexico, Venezuela, Colombia, Ecuador, and Peru, with only *Gronovia scandens* L. represented as a climber occurring in a diversity of habitats including tropical dry forest, subtropical forest, deciduous forest, mountain slopes, hillsides, canyons, thickets, road banks, secondary vegetation, and ruderal areas from 0-2000 m.

KLAPROTHIA Kunth in Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 6: 121. t. 537. 1823.

Annual or perennial herbs, erect or ascending, or twining, stinging hairs absent. Leaves opposite; blades simple, bullate at maturity, ovate, acute to subrounded at base, acuminate at apex, the margin serrate. Inflorescence terminal, dichasia or complex and thyrselike. Flowers 2-prophyllate, 4-merous, erect; petals lobed with 2 longitudinal lamellae, white; staminodial groups with 2- 6 staminodia each, all free or in *K. mentzelioides*, 3-4 outer ones only slightly connate



K. mentzelioides, from H.B.K., Nov. Gen Sp. Vol 6: tab. 537. 1823.

basally, very densely papillose-hairy, apex often irregularly lobed and lobed, yellow; placenta simple, ovules numerous. Fruit an ovoid, burr-like, straight to slightly twisted, tardily dehiscent, 4-valved, septical capsule (*K. mentzelioides*), or clavate and twisted and opening with longitudinal slits, lacking prominent veins; seeds narrowly ovoid; testa reticulate with equatorial striae.

Unique features: The 4-merous flowers and petals lobed with 2 longitudinal lamellae distinguish this genus from other Loasaceae.

Distribution: A genus of two species occurring from southern Mexico to Brazil and Bolivia, only *Klapprothia mentzelioides*

Kunth represented as a climber occurring in a diversity of habitats including cloud forest, wet montane forest, primary forest, forest trails, ravines, secondary forest, river banks, stream sides, roadsides, hillsides, and road banks from 600-3500 m.

RELEVANT LITERATURE

Acuña, R., S. Fließwasser, M. Ackermann, T. Henning, F. Luebert, and M. Weigend. 2017. Phylogenetic relationships and generic re-arrangements in “South Andean Loasas” (Loasaceae). *Taxon* 66(2): 365-378.

Moody, M.L. and L. Hufford. 2000, Floral ontogeny and morphology of *Cevallia*, *Fuertesia*, and *Gronovia* (Loasaceae subfamily Gronovioideae). *Int. J. Plant Sci.* 161(6): 869-883.

Poston, M.S. and J.W. Nowicke. 1990. A reevaluation of *Klaprothia* and *Sclerothrix* (Loasaceae: Klaprothieae). *Systematic Botany* 15: 671-678.

POWO. 2019. Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew.
Published on the Internet; <http://www.plantsoftheworldonline.org/> Retrieved 19 May 2021.

Weigend, M. 2004. Loasaceae. Pp. 239-254 in K. Kubitzki (volume ed.), *Flowering Plants - Dicotyledons, Celastrales, Oxalidales, Rosales, Cornales, Ericales*. In K. Kubitzki (general editor), *The Families and Genera of Vascular Plants*, Vol. 6. Springer-Verlag, Berlin.