AMARANTHACEAE

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A predominantly tropical family of herbs, subshrubs, shrubs and rarely trees, some herbs and shrubs are scramblers, and a few species are twining lianas. Generally found in moist to humid areas below 1,400 m elevation with a few species reaching 2,700 m. The family is represented in the Neotropics by ~490 species of which 28 are consistently reported as climbers that reach two or more m in length. *Iresine,* contain several species that are scrambling herbs; *Chamissoa* and *Pleuropetalum* a species each that are scrambling shrubs; *Gomphrena, Hebanthe,* and *Pedersenia* have species that are twining lianas and sometimes scrambling shrubs with elongated stems.

Diagnostics: In the absence of fertile material, climbing Amaranthaceae are sometimes confused with Asteraceae or Acanthaceae. However, woody Amaranthaceae, i.e., scrambling shrubs and twining lianas, are easily identified by the cylindrical stems with successive rings of xylem and phloem and by the presence of swollen nodes. The leaves are opposite or alternate depending on the genus, with entire margins, gland-less blades and petioles, and lack stipules. Fruits are circumscissile utricles.

General Characters

1. STEMS. Cylindrical, herbaceous in *Iresine* or woody in *Chamissoa*, *Gomphrena, Hebanthe, Pedersenia,* and *Pleuropetalum*. Herbaceous stems usually are 5 mm or less in diam., and up to 3 m in length; stems of woody species are 1 to 3 cm in diam. and up to 15 m in length. Stems usually present a large medulla, and like in other members of the Caryophyllales, species can vary from having interxylary phloem, with phloem islands of different extents, to successive rings of xylem and phloem (successive cambia) (Figure 35A, B), according to

a new proposal of Neto et al. (2021). Sorting one type of cambial variant from the other in the order requires ontogenetic studies. Vascular variants are known to occur in all genera, both in stems and roots (they make up the succulent structure of sugar beet roots); successive rings of xylem and phloem are known to occur in most genera, however, these are more conspicuous in woody taxa. Barks are light colored, rough and with numerous round, light colored lenticels (Figure 35C). Taxa with opposite leaves usually have swollen nodes (Figure 35D).

2. EXUDATES. Odorless and colorless in all genera
3. CLIMBING MECHANISM. Scrambling herbs (*Iresine*) or shrubs (*Alternanthera*, *Chamissoa*, *Gomphrena*, species of *Pedersenia*, and *Pleuropetalum*), or twining lianas (species of *Gomphrena*, *Hebanthe* and *Pedersenia*).
4. LEAVES. Simple, exstipulate, alternate or opposite (Figure 35D) with entire (seldom crenate) margins. Petioles are short to long (some species have sessile leaves) and lack extrafloral nectaries or glands; blades also lack extrafloral nectaries.
5. INFLORESCENCES. Usually ascending, axillary or terminal, paniculate, racemose, spiciform or glomerulate.
6. FLOWERS. Actinomorphic, bisexual, 3–5-merous, usually < 5 mm long. Tepals light green, cream, or whitish, subequal or the inner ones shorter, distinct or less often partly connate at base, in some genera (*Hebanthe*, *Pedersenia*) with long, straight or wooly trichomes at base; stamens as many as, and opposing the tepals; filaments connate to form a short cup at base, these sometimes alternating with staminal appendages; gynoecium superior, syncarpous, 2- or 3-carpellate, the style elongated or absent, the stigmas bilabiate, capitate or 2–3-branched; placentation basal, ovules solitary or several per carpel.

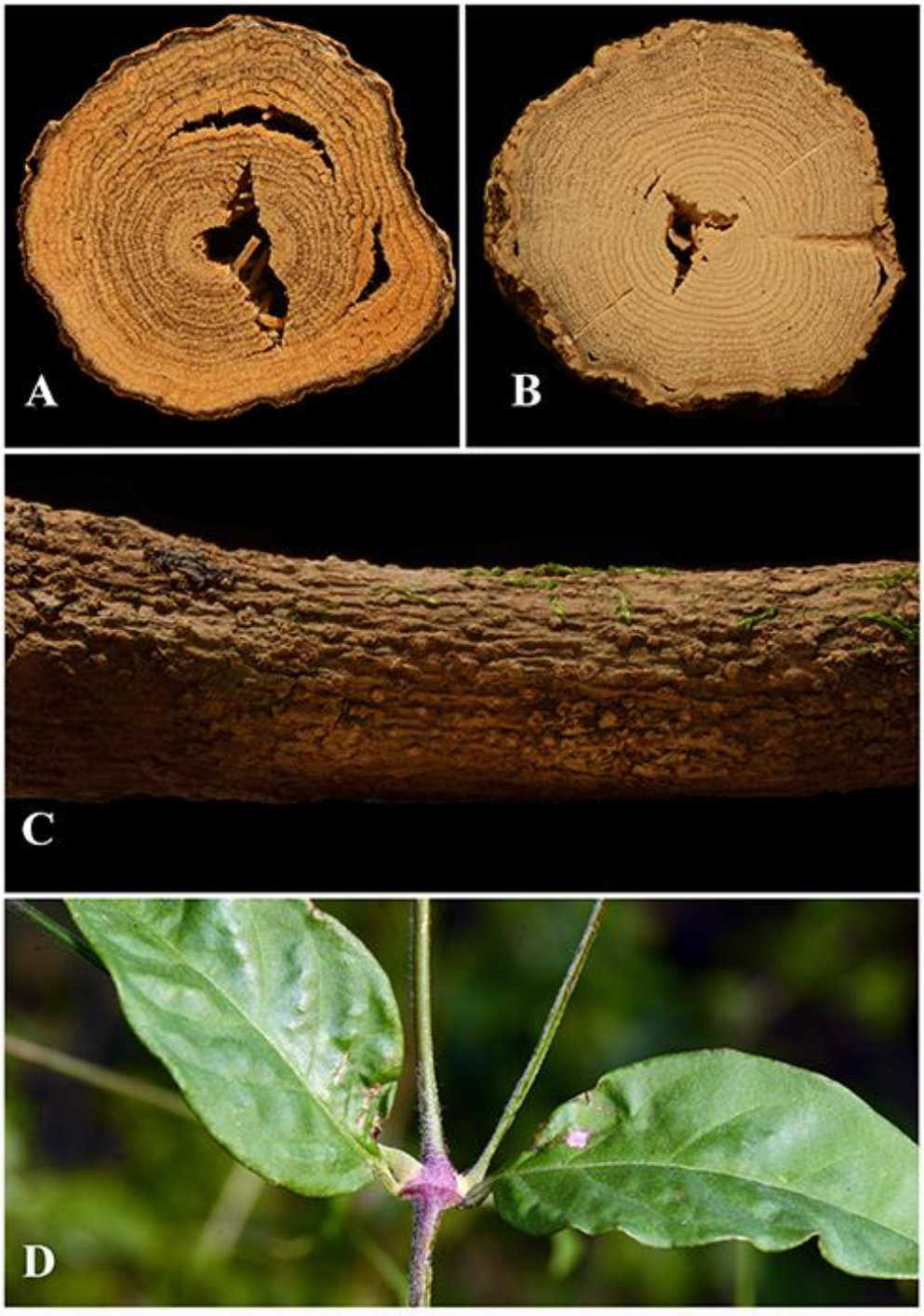


Figure 35. Woody stems in Amaranthaceae. **A.** Cross section of *Chamissoa altissima* stem with successive rings of xylem and phloem. **B.** Cross section of *Pedersenia volubilis* stem with successive rings of xylem and phloem. **C.** Lenticellate bark of *Hebanthe eriantha*. **D**. *Hebanthe eriantha* with swollen nodes. Photos by P. Acevedo.

7. FRUITS. Small (hardly longer than the flower), of one to several-seeded circumscissile utricles.
8. SEEDS. Lenticular, reniform or subrounded, exarillate, black and shiny or arillate in *Chamissoa.*

Key to the genera of climbing Amaranthaceae

1. Leaves alternate; inflorescences racemose; tepals glabrous 2

1. Leaves opposite; tepals densely covered with tufts of long hairs on the outer surface 3

2. Anthers tetrasporiangate; utricle turning yellow at maturity; seeds numerous, black, shiny (Costa Rica to Peru) ..... ***Pleuropetalum***

2. Anthers bisporangiate; utricle turning white or rosy upon maturity; seed solitary, with white, fleshy arillode (Neotropics) ..... ***Chamissoa***

3. Flowers in globose or ovoid glomerules that are short- to long-pedicellate, these solitary or part of a paniculate synflorescence 4

3. Flowers solitary or in few-flowered clusters, dispersed or sometimes congested along the axis of the panicle 5

4. Filaments connate into a long tube; stigma of 2 elongated branches; Brazil..... ***Gomphrena***

4. Filament connate only at base, alternating with interstaminal appendages; stigma capitate (Mexico, Ecuador)..... ***Alternanthera***

5. Panicles with 3–5 verticillate secondary branches of similar lengths; tepals unequal with long trichomes only on inner three tepals (Continental tropical America) ..... ***Hebanthe***

5. Panicle with opposite branches or if verticillate, the lateral two, longer; tepals equal or subequal, all with long trichomes.....6

6. Perianth trichomes on abaxial surface of tepals; stigma capitate to bilobed (Neotropics) ..... ***Pedersenia***

6. Perianth trichomes at the base of tepals; stigma of two, elongate, filiform branches (Neotropics) ..... ***Iresine***

ALTERNANTHERA Forsskål, Fl. Aegypt. Arab. 28. 1775.

Prostrate herbs with a long taproot, less often subshrubs, scrambling herbs or lianas.

Alternanthera pubiflora, photo by D. Culbert.

Stems herbaceous, thin, striate, 2–6 m long. Leaves opposite and entire, petiolate. Inflorescence of axillary, globose to subcylindrical heads on long peduncles. Bracts and bracteoles boat-shaped, much smaller than the tepals. Flowers bisexual. Tepals 5, free, glabrous or with short trichomes, subequal, or the outer ones longer; stamens five, alternating with triangular interstaminal appendages, filaments free or united into a short tube at base; ovary nearly globose or obovoid, with a single ovule per carpel, style of variable lengths, stigma capitate. Fruit a thin-walled, flattened utricle, with persistent tepals, usually dispersed as a unit; seeds solitary, lenticular, smooth.

Distinctive features: Opposite leaves and inflorescences of simple heads.

Distribution: A predominantly neotropical genus with ~150 species, with only two species reported as climbers. *Alternanthera pubiflora* (Benth.) Kuntze from Mexico and *A. grandis* Eliasson from Ecuador.

CHAMISSOA Kunth in Humboldt, Bonpland & Kunth, Nov. Gen. Sp. 2: ed. qu., 196. 1818.

Herbs, erect subshrubs or scrambling shrubs. Stem cylindrical, up to 3 cm in diam. and 15 m in length; cross section with successive rings of xylem and phloem (Figure 15A). Leaves alternate, petiolate, with crenate margins. Flowers bisexual or functionally unisexual, clustered in cymules, which are arranged in axillary racemes or distal panicles. Tepals 5, ovate or lanceolate, free; stamens 5, the filaments united at the base to form a short staminal tube, anthers bisporangiate; interstaminal appendages absent; ovary superior, unilocular, uniovulate, the style short, with 2 or 3 stigmas. Fruit a membranaceous, circumscissile utricle; seed solitary, covered by a fleshy white arillode.

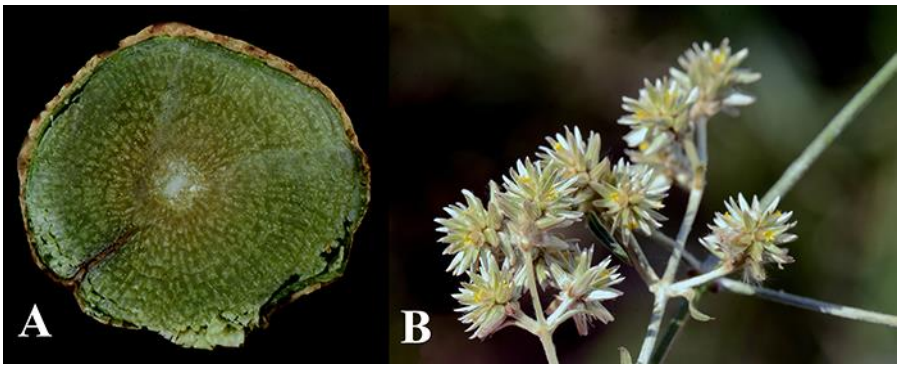
Chamissoa altissima, photo by P. Acevedo.

Distinctive features: Alternate leaves with crenate margins; cross sections of stems with successive rings of xylem and phloem.

Distribution: A neotropical genus of two species, one of which (*C. altissima* (Jacq.) Kunth) is a robust scrambling liana that is widely distributed from Mexico to northern Argentina, including the Antilles.

GOMPHRENA Linnaeus, Sp. Pl. 224. 1753.

Prostrate or erect herbs, rarely scrambling or twining vines. Stems nearly cylindrical, up to 1 cm in diam. and 12 m in length; cross section with successive, concentric, more or less continuous bands of xylem and phloem.



Gomphrena vaga. **A**. Stem cross section with successive cambia. **B.** Inflorescence. Photos by P. Acevedo.

Leaves opposite, short-petiolate or sessile, usually clasping at base. Flowers bisexual, nearly sessile, produced in terminal or axillary, globose or cylindrical heads; bracts and bracteoles membranous or nearly coriaceous, whitish; tepals 5, free or united at base, usually pubescent; stamens 5, the filaments fused into a long tube, each filament with 2 apical lobes; interstaminal appendages absent; ovary nearly globose, with one ovule, the style of variable length, the stigmas 2, erect or divergent. Utricle irregularly dehiscent, with a single lenticular seed.

Distinctive features: Opposite leave; cross sections of stems with successive, continuous bands of interxylary phloem; flowers grouped in heads; filament fused into a long tube.

Distribution: About 100 species, mostly native to tropical America**.** Only two species from Brazil are reported as climbers, *G. scandens* (R.E. Fr.) J.C. Siqueira a scrambling shrub, and *G. vaga* Mart. a twining liana.

HEBANTHE Martius, Nov. Gen. Sp. Pl. 2(1): 42, t. 140–145. 1826.

Scrambling shrubs or twining lianas. Stems nearly cylindrical, in some species up to 10 cm in diam. and 15 m in length; cross section with successive, concentric continuous bands of xylem and phloem. Leaves opposite, petiolate, with entire margins. Flowers bisexual, solitary or in glomerules along the axes of axillary or terminal panicles that have spicate secondary branches mostly disposed in verticels of 3 or 5; bracts and bracteoles persistent. Tepals 5, free, concave, unequal, the inner three with a long tuft of wooly hairs on the abaxial surface (only on half side of the middle tepal); stamens 5, the filaments united at the base to form a short staminal tube; interstaminal appendages well developed or absent; ovary unilocular, uniovulate, ovoid, the stigma capitate-bilobed, sessile or subsessile. Fruit an indehiscent utricle, covered by the perianth.

Hebanthe eriantha. **A**. cross section of stem with successive cambia. **B**. Inflorescence. Photos by P. Acevedo.

Distinctive features: Opposite leaves; cross sections of stems with successive, continuous bands of interxylary phloem; inflorescence's secondary units mostly 3- or 5-verticillate; inner tepals with long wooly hairs.

Distribution: A genus of six species of climbers; continental tropical America from Mexico to Bolivia.

IRESINE P. Browne, Civ. Nat. Hist. Jamaica 358. 1756.

Erect or clambering herbs or shrubs, less frequently small trees or scrambling shrubs.


Iresine diffusa, photo from J. Amith.

Leaves opposite or subopposite, petiolate; blades simple. Flowers unisexual or bisexual, pedicellate, clustered in cymes along axillary or terminal panicles; bracts and bracteoles persistent. Tepals 5, with a tuft of hairs at the base on the outer surface; stamens 5, the filaments united at the base to form a short staminal tube; interstaminal appendages absent; ovary superior, uniovulate, rounded, the stigmas divided into 2 elongate, filiform branches, sessile or subsessile. Fruit a membranaceous, subglobose, circumscissile utricle. Seed solitary, globose or lenticular, shiny, naked.

Distinctive features: Opposite leaves; perianth's indument long, wooly arising from the base of all tepals.

Distribution: A neotropical genus with ~40 species, seven of which are consistently reported as climbers.

PEDERSENIA Holub, Preslia 70(2): 181. 1998.

Trommsdorffia Martius (1826), not Bernhardi (1800).

Scrambling shrubs, twining lianas and a few arborescent species. Stems nearly cylindrical, 1–2 cm in diam. and up to 15 m in length; cross section with successive, concentric rings of xylem and phloem.

Pedersenia macrophylla. **A**. Cross section of stem with successive cambia. **B**. Inflorescence. Photos by P. Acevedo.

Leaves opposite, petiolate; blades simple. Flowers bisexual, arranged in glomerules, along the axes of axillary or terminal panicles; bracts and bracteoles persistent. Tepals 5, free, concave, subequal, all with a tuft of stiff hairs at the base on the abaxial surface; stamens 5, the filaments united at the base to form a short staminal tube; interstaminal appendages absent; ovary superior, unilocular, uniovulate, ovoid, the stigma capitate-bilobed, sessile or subsessile. Fruit an indehiscent utricle, with persistent perianth.

Distinctive features: Opposite leaves; cross sections of stems with successive rings of xylem and phloem; inflorescence's main axis elongated, secondary units mostly opposite; all tepals with long, stiff, or wooly hairs.

Distribution: A neotropical genus with ~ten species, eight of which are reported as climbers; Costa Rica to Bolivia and Paraguay, Hispaniola, Puerto Rico, and the Lesser Antilles.

PLEUROPETALUM J.D. Hooker, London J. Bot. 5: 108. 1846.

Erect or scrambling shrubs or herbs; stems up to 3 m long; cross section not known to us. Leaves alternate, petiolate, with crenate margins. Flowers bisexual, in racemes or panicles. Tepals 5, ovate or suborbicular, subequal, free, rigid, dorsally striate, glabrous; stamens 6–8, the

filaments united at the base to form a short staminal tube; interstaminal appendages absent; ovary superior, unilocular, multiovulate, the style short, with 6 stigmas. Fruit a fleshy, circumscissile utricle, with numerous, black, naked, tiny seeds.

Pleuropetalum pleiogynum. Fruiting branch. B. Fruit close-up. Photos by B. Hammel.

Distinctive features: Alternate leaves with crenate margins; six stamens; and fruits with numerous black tiny seeds.

Distribution: A neotropical genus of three species, one of which (*P. pleiogynum* (Kuntze) Standl.) is a scrambling shrub that reaches 3 m in length; Mexico to northern Colombia.

EXCLUDED TAXA

Celosia nitida Vahl. Although a clambering herb, this species is excluded from the current treatment because it does not reach the minimum length of 2 m to be included in this field guide.

Pfaffia spp. Previous circumscription of *Pfaffia* included lianas and scrambling shrubs; however, these are now recognized in *Hebanthe* or *Pedersenia*.