69. OLACACEAE

Family description and key to genera por Q. Jiménez M. y S. Knapp

Shrubs, lianas, treelets or trees with or without buttresses, sometimes semi-parasitic. Bark gray or brown, variously roughened; white latex occasionally present. Leaves alternate, estipulate, membranous or fleshy, sometimes with resinous dots or lines, the margins usually entire; venation usually pinnate, occasionally 3-5 nerved from the base; petiole present. Inflorescences axillary or rarely from old stems, simple or branched, short racemose, paniculate, spicate, rarely umbellate, often fasciculate, the flowers very rarely solitary. Flowers bisexual or unisexual, occasionally heterostylos, actinomorphic, 3-7-merous (5-merous in Mesoamerica). Calyx small with dentate lobes or the margin crenulate, the cup-like base occasionally adnate to the thickened flower axis and inconspicuous. Corolla with petals free or variously connate, valvate in bud. Disk sometimes present, occasionally accrescent in fruit. Stamens 5-10, in 1 or 2 series, epipetalous, occasionally also episepalous (if 10); anthers 2-thecate, occasionally with tranverse septae, with longitudinal dehiscence. Ovary superior, hemi-inferior or inferior (*Schoepfia*) when adnate to the flower axis, 1-several-locular; ovules 1-5(-7), pendulous from a central placenta. Fruit a drupe or pseudodrupe when adnate to flower axis (*Schoepfia*); pericarp thin or fleshy; endocarp crustaceous or woody; fruiting calyx minute or greatly expanded. Seed 1; testa thin; endosperm abundant; embryo minute. Pantropical, c. 27 gen., 230 spp. 13 Neotropical genera, mostly Amazonian.


1. Leaves with the tertiary venation scalariform, subparallel; inflorescence an elongate spike, rusty tomentose; sap a white latex in the stems and leaves.  
3. *Minquartia*

1. Leaves with tertiary venation inconspicuous, not subparallel; inflorescence not spicate, variously fasciculate, paniculate or the flowers solitary; sap colorless, not a white latex.
2. Stems with spines; leaves often mucronate, on short shoots, deciduous or semi-deciduous.

5. Ximenia

2. Stems without spines; leaf tip various, not mucronate; leaves borne on long shoots, evergreen.

3. Fruiting calyx adnate to the thick flower axis, not expanded; drupe with a small circle at the apex, which is the top of the ovary.

4. Schoepfia

3. Fruiting calyx much expanded beneath the drupe; drupe not as above.

4. Flowers in a paniculate corymb in the axils of the leaves; corolla lobes linear, persistent; stamens 5, epipetalous; drupe verrucose to tuberculate; fruiting calyx to 13 cm in diameter, chartaceous, reddish green.

1. Chaunochiton

4. Flowers fasciculate in the axils of the leaves; corolla lobes deltate, soon deciduous; stamens 10; drupe smooth or finely striate; fruiting calyx 1-4 cm in diameter, fleshy, usually brightly colored.

2. Heisteria

1. Chaunochiton

*Sagotanthus* Tiegh.

Por S. Knapp y Q. Jiménez M.

Trees, to 40 m in Mesoamerica, to 150 cm dbh; bark red brown mottled with white on main trunk, gray on stems, smelling of almonds. Branchlets without spines, without short shoots, brittle, terete; sap colorless, a milky latex absent. Leaves evergreen, elliptic, pinnately nerved, fleshy, petiolate; tertiary venation not scalariform. Inflorescences axillary, few- to many-flowered corymb-like panicles; bracts tiny. Flowers bissexual, fragrant, with short pedicels; calyx 5-lobed, cup shaped, tiny at anthesis, enlarging in fruit; corolla 5-lobed, the lobes connate at the base or free, linear elongate; stamens 5, shorter than the corolla lobes, the filaments filiform, adnate to the corolla lobes at the base, the anthers 4-lobed, subglobose; disk absent; ovary superior, free, oblong; ovule 1, pendulous; style filiform; stigma 5-lobed, capitate. Fruit a globose or subovoid drupe, verrucose or tuberculate (Mesoamerica) to ribbed and striate, subtended by the much enlarged fruiting calyx; fruiting calyx funnel-shaped or flattened (Mesoamerica); seed 1, without starch, the embryo minute. 3 spp., Neotropicos, mainly Amazonian.

Trees, to 40 m, to 70 cm dbh; trunk cylindrical to the base, without buttresses; bark reddish gray, smooth. Branchlets drying reddish, somewhat brittle. Leaves 6-10 × 3-4 cm, elliptic, fleshy when fresh, brittle and drying reddish, glabrous, the venation pinnate, drying darker, the midrib impressed above, keeled beneath, leaves of juvenile plants more lanceolate and thinner in texture; base acute, somewhat decurrent onto the petiole; margins entire, thickened; apex acute; petiole 0.5-1 cm, somewhat winged from the leaf base. Inflorescences 1-3 per axil, 2-5 cm long, on short shoots occasionally bearing leaves. Flowers reddish green, fragrant, glabrous, in congested groups of 5-9 along the inflorescence axis; pedicels 5-7 mm, filiform, glabrous; calyx cup-shaped, the tube c. 1 mm, the lobes c. 0.5 mm, mere acumens from the rim, minutely papillate along their margins; corolla 8-9 mm, the lobes free nearly to the base, spathulate-cucullate, yellow or greenish yellow, with uniseriate trichomes c. 1.5 mm along the margins of the lobes; stamens red, the filaments 6-7 mm, glabrous, the anthers c. 0.5 mm, appearing like a crown on top of the filament; ovary glabrous, obovoid; style 7-8 mm, glabrous; stigma c. 0.5 mm in diameter. Drupe 1-1.3 cm in diameter, globose, verrucose to tuberculate over the entire surface; fruiting calyx much enlarged, 9-13 cm in diameter, flattened, chartaceous, reddish green. Selvas altas perennifolias. CR (Zamora 1928, INB). 50-600 m. (Mesoamerica, Guayanas, Brazil.)

Chaunochiton has only been found in the Golfito and Osa Peninsula region of the Pacific slope in Costa Rica where it is a relatively common tree in undisturbed forest. The leaves give off a strong odor of cyanide when crushed.

2. Heisteria Jacq.

Rhaptostylum Bonpl., Hesioidia Vell., Acrolobus Klotzsch, Hemiheisteria Tiegh., Phanerocalyx S. Moore, Aptandropsis Ducke

Por. Knapp y Q. Jiménez M.
Trees, treelets, scandent or occasionally lianas, to 40 cm dbh; bark brown to brown and mottled. Branchlets without spines, without short shoots, slender, terete or winged and striate; sap colorless, a milky latex absent. Leaves evergreen, lanceolate to ovate, pinnately nerved or occasionally 3-nerved from the base, glabrous, occasionally coriaceous and shining, laticifers and idioblasts in lamina apparent as pellucid dots, petiolate; tertiary venation irregular or scalariform. Inflorescences axillary fascicles, the cushions or glomerules few to many-bracteolate; bracts very small, glabrous. Flowers bisexual, pedicellate (Mesoamerica) or sessile; calyx cup-shaped, 5-dentate or lobed, tiny at anthesis, enlarged in fruit (Mesoamerica) or remaining unchanged; corolla 5-lobed, the petals free or very lightly connate at the base, valvate, deltate to narrowly deltate, glabrous or hairy inside; stamens 10 (occasionally 12), the outer a little longer and episepalous, the inner shorter and epipetalous, the filaments ligulate or filiform, inserted near the base of the lobes, the anthers subglobose; disk adnate to the base of the ovary; ovary superior, flask-shaped, 3-locular below, 1-locular above; stigma 3-lobed, sessile. Fruit a globose to ellipsoid, occasionally barrel-shaped, drupe, smooth or striate, subtended by the enlarged and usually brightly colored fruiting calyx; pericarp thin-fleshy; fruiting calyx fleshy, unlobed to deeply 5-lobed at maturity. Seed 1, the testa thin, the endosperm copious, the embryo very small. Aprox. 33 spp., 3 in Africa, the rest in the Neotropics.

Species of *Heisteria* are distinguished by leaf characters, such as shape and texture, and the shape of the mature drupe. Some species are quite easy to distinguish, while others are extremely variable and appear to grade into one another (*H. macrophylla/H. povedae*). The degree to which this variability is due to environmental factors (i.e. sun versus shade, elevation, possible host differences) or to interspecific hybridisation is not known. In this treatment we have tried to provide a practical definition of the Mesoamerican species as identifiable elements, while at the same time indicating potential difficulties or taxa needing further study.

1. Shrubs or scandent shrubs or canopy lianas.
2. Lianas or scandent shrubs; leaves 3-veined from the base, ovate; fruiting calyx strongly reflexed, green.

7. *H. scandens*

2. Shrubs, usually single stemmed; leaves pinnately nerved; linear to narrowly elliptic to elliptic; fruiting calyx not strongly reflexed, red.
3. Drupe ellipsoid, narrow.
4. Leaves oblong-elliptic to narrowly elliptic, 16-35 × 5-11 cm, with scalariform tertiary venation; petiole drying dark and rugose for its entire length. 3. H. latifolia
4. Leaves elliptic to broadly elliptic, 6-13 × 3-7 cm, the tertiary venation obscure; petiole drying green for its entire length. 1. H. acuminata
3. Drupe globose to depressed globose.
5. Stems winged; leaves 6-20 × 2.5-6.5 cm, elliptic to narrowly elliptic, the venation pale yellow or white and the leaves more or less pellucid; drier upland forests. 6. H. povedae
5. Stems not markedly winged; leaves 11-36 × 1.5-10 cm, lanceolate to narrowly elliptic, the venation not markedly paler; wet lowland forests. 4. H. macrophylla
1. Trees or treelets.
6. Leaves coriaceous and shiny, the venation obscure.
7. Drupe verrucose, not shiny, ellipsoid to globose, white or pale green; Costa Rica and Panama. 2. H. concinna
7. Drupe smooth or slightly ridged, subglobose, black; Chiapas, Guatemala and Belize to Nicaragua. 5. H. media
6. Leaves not markedly coriaceous and shiny, if thick, then not shiny above.
8. Drupe globose to depressed-globose; stems winged; leaf venation whitish. 6. H. povedae
8. Drupe ellipsoid or subglobose, if subglobose very large; stems not winged; leaf venation brownish.
9. Drupe 1.8-2 cm, subglobose to somewhat ellipsoid, apically truncate, orange when ripe. 8. H. skutchii
9. Drupe 0.9-1.2 cm, narrow and ellipsoid, not apically truncate, shiny and black when ripe.
10. Leaves oblong-elliptic to narrowly elliptic, 16-35 × 5-11 cm, with scalariform tertiary venation; petiole drying dark and rugose for its entire length. 3. H. latifolia
10. Leaves elliptic to broadly elliptic, 6-13 × 3-7 cm, the tertiary venation obscure; petiole drying green for its entire length. 1. H. acuminata

*Heisteria cyanocarpa* Poepp., *H. longipes* Standl.

Shrubs, treelets or trees to 9 m; bark smooth and brown with raised bumps. Branchlets terete, very slightly angular when very young, usually dark. Leaves 6-13 × 3-7 cm, elliptic to broadly elliptic, chartaceous, sometimes shining above; venation pinnate, brownish, the tertiary venation obscure; base acute to cuneate; margins slightly revolute; apex abruptly acute; petioles 0.5-1.1 cm, green and rugose along the entire length. Inflorescence of 4-5 elongate glomerules, appearing globose, with 10-20 flowers; bracts glabrous; pedicels 3-5 mm. Flowers white or cream; buds markedly ovoid and pointed at the tips; calyx flat, the lobes less than 0.5 mm, mere projections from the flattened disk; petals c. 2 mm, glabrous within; filaments 1-1.5 mm, petaloid. Drupe 1-1.2 × 0.5-0.7 cm, ellipsoid or narrowly ellipsoid, shiny, not strongly ridged, black; fruiting calyx 1.5-2.5 cm in diameter, not lobed, the margins sinuate, spreading or slightly reflexed, bright blood-red in fresh material, purplish red in dry material; peduncles 1-2 cm, relatively thin and slender. *Selvas altas perennifolias*. CR (*Hammel et al.* 17984, MO); P (*Croat 15335*, NY). 0-1000 m. (Mesoamerica, Colombia, Venezuela, Ecuador, Peru, Bolivia, Brasil.)

Considerable confusion has existed over the correct application of the name *Heisteria acuminata*. Burger (1983) used the epithet for the set of specimens here treated as *H. povedae*, but he had not examined the type from P. This specimen is similar to the species called *H. cyanocarpa* by Burger. Sleumer (1984) examined the type, and named the set of specimens identified as *H. cyanocarpa* sensu Burger as *H. acuminata*. Material called *H. acuminata* by Burger (1983) belongs to a different taxon, with its own confusion over names (see below, *H. povedae*). The type of *H. acuminata* however, is from 1800 m elevation near Popayán in southern Colombia, and is only really matched by a few sheets collected near the type locality (Jørgensen pers. comm.). In South America, several different and very distinct entities were included in *H. acuminata* sensu Sleumer (Jørgensen, 1999, pers. comm.). The unravelling of this complex situation awaits study of *Heisteria* across its entire range. We thus maintain *H. acuminata* sensu Sleumer for these Mesoamerican plants, while
realizing that should detailed study indicate they are not conspecific with the type material, *H. longipes* will probably be the correct name for Mesoamerican material. For full synonymy of *H. acuminata* sensu Sleumer, see Sleumer (1984), only synonyms applied to Mesoamerican plants or based on Mesoamerican types are given here.


   Tree to 20 m, to 45 cm diameter at breast height; bark smooth, brown; branches hanging. Branchlets somewhat winged when young, later terete. Leaves 8-16(-25) × 4-6.5(-13) cm, elliptic to narrowly elliptic to occasionally somewhat ovate, coriaceous, shiny and with the midrib sunken above, matte below; venation pinnate, somewhat yellowish below; base acute; margins thickened and revolute; apex acute to acuminate, often abruptly so; petiole 1-1.5(-2.5) cm, the distal 1/2 rugose and darker. Inflorescence a flattened sessile pad bearing 10-30 flowers; bracts glabrous; pedicels 5-8 mm. Flowers greenish-white; buds probably ellipsoid ?; calyx cupuliform, the tube 0.5-1 mm, the lobes 0.5-1 mm, generally longer than the tube, sharply deltate; petals 1.5-2 mm, pubescent within; filaments 1-1.5 mm, filiform. Drupe 0.9-1 × 1-1.3 cm, globose to ellipsoid, white or pale green, the surface matte, verrucose; fruiting calyx 1.9-2.6 cm in diameter, 5-lobed nearly to the middle, spreading or slightly reflexed at maturity, red; peduncles 0.8-1.2 cm. **Selvas altas perennifolias**. CR (*Herrera 4611*, MO); P (*Foster 1968, F*). 0-700 m. (Mesoamerica, Ecuador.)


   *Heisteria megalophylla* Sleumer, *H. olivae* Steyerm.

   Shrubs to small trees, 1-6 m; bark smooth and greenish brown. Branchlets terete, greenish brown. Leaves 16-35 × 5.5-11 cm, elliptic to narrowly elliptic, matte on both surfaces; venation pinnate, drying brownish, the tertiary venation scalariform; base abruptly acute to cuneate, appearing somewhat auriculate; margins plane; apex acute-acuminate to long acuminate; petioles 0.5-2 cm, dark and rugose along the entire length. Inflorescence a compact group of 5-6 glomerules, often borne along
older stems almost to ground level; bracts glabrous; pedicels 2-3 mm. Flowers
greenish or reddish; buds ellipsoid?; calyx cupuliform, the lobes c. 0.5 mm, more or
less equal to the tube; petals c. 1.5 mm, glabrous within; filaments 1-1.5 mm, distally
filiform, basally ligulate. Drupe 0.9-1 × 0.6-0.7 cm, ellipsoid, shiny and strongly
ridged, black; fruiting calyx 1.7-2.5 cm in diameter, unlobed to very slightly 5-lobed,
spreading or cupping the base of the fruit, bright red; peduncles 0.7-1.5 cm. Bosques
premontanos, selvas altas perennifolias. P (McPherson 8580, MO). 100-1000 m.
(Panama, Colombia, Venezuela, Ecuador.)

Specimens of Heisteria latifolia can be very difficult to distinguish from H.
macrophylla when not with mature fruit.

Kjøbenhavn 1856: 40 (1856). Holotype: Nicaragua, Oersted 4171 (C!). Illutr.:

Heisteria costaricensis Donn. Sm.

Shrubs to small treelets, 1-3 m, often single stemmed; bark brown, more or
less smooth. Branchlets terete, slightly angular when young. Leaves 11-36 × 1.5-10
cm, lanceolate to narrowly elliptic to elliptic, matte on both surfaces; venation
pinnate, brownish; base acute to cuneate; margins slightly revolute, not thickened;
apex acuminate; petioles 0.5-1.5 cm. Inflorescence a few-flowered, somewhat
elongate glomerule; bracts c. 0.5 mm, glabrous; pedicels 1-2 mm. Flowers white or
greenish white to pink or reddish; buds ellipsoid; calyx c. 1 mm, cupuliform to
crateriform, the lobes c. 0.5 mm, more or less equal to the tube; petals 1-2.5 mm;
filaments 1-1.5 mm, somewhat ligulate at the base. Drupe 6-9 × 6-9 mm, globose to
occasionally somewhat depressed globose, shiny and prominently ridged, black or
purlplish-black; fruiting calyx 1.5-2(-3) cm in diameter, 5-lobed to c. 1/2 way,
spreading or slightly cupping the base of the fruit, red; peduncles 0.5-1 cm. Selvas
altas perennifolias. H (Nelson & Cruz 9492, MO); N (Moreno 23237, MO); CR
(Garwood et al. 1145, BM); P (de Nevers & Pérez 3696, MO). 0-900 m. (Endémica.)

Heisteria costaricensis has been distinguished from H. macrophylla by its
very narrow leaves, but there is enormous variation in leaf width even within a single
individual, and individual specimens are difficult to place. The presence of an
indistinct intramarginal vein was cited by Sleumer (1983) as characteristic of H.
costaricensis, but this character is not consistently found in specimens with narrow leaves and is in fact not even visible in the majority of specimens annotated as *H. costaricensis* by both Sleumer and Burger (but see below). Burger (1983) suggested that *H. costaricensis*, *H. macrophylla* and what he called *H. acuminata* (=*H. povedae*) were possibly members of a single polymorphic species or that they hybridized in the field. Further field work on a populational basis will be necessary to ascertain if this is indeed the case.


Some specimens of *Heisteria macrophylla* have unusual, strongly reflexed calyces in fruit (Panama: Knapp 5081 (MO), D’Arcy 16384 (MO); Costa Rica: Burger et al. 10571 (F), Chacón 937 (MO), Dodge & Goerger 9880 (F, MO), Herrera 6775 (F, MO), Jiménez M. 2244 (F, MO, NY, US), Morales 150 (MO), Morales y Jiménez 835 (F, MO), Zuñiga 82 (F, MO)). These specimens exhibit the full range of leaf shape variation found in *H. macrophylla*, and if not in mature fruit are indistinguishable from other specimens identified as *H. macrophylla*. These specimens all possess a faint intramarginal vein, which may be the basis for its citation as a distinguishing character for *H. costaricensis*. They may represent a distinct species.


*Heisteria chippiana* Standl., *H. macrophylla* auct. non Oersted

Trees to 30 m, 40 cm diameter at breast height; wood dark brown and hard; bark brown and flaking. Branchlets terete, occasionally slightly angular when very young, pale greenish brown. Leaves 8-15 × 3.5-8 cm, elliptic to occasionally somewhat obovate, thick and coriaceous, drying olive green, shiny above; venation pinnate, drying yellowish beneath; base acute to truncate; margins revolute, thickened; apex acute to abruptly acute acuminate; petiole 1-2 cm, darker and rugose in the distal half. Inflorescence a globose glomerule with 10-30 flowers; bracts c. 0.5
mm, glabrous; pedicels 5-7 mm. Flowers yellowish, fragrant; buds globose to ellipsoid; calyx cup-shaped, c. 2 mm, the lobes longer than the tube; petals 2-2.5 mm, pubescent within; filaments 1-1.5 mm, ligulate. Drupe 1.5 × 1.3-1.5 cm, subglobose, black, smooth or very slightly ridged, shiny; fruiting calyx 4-5 cm in diameter, 5-lobed half way to base, spreading, red; peduncles 0.5-1.2 cm. **Selvas medianas perennifolias, selvas altas perennifolias.** Ch (Matuda 3690, MEXU); B (Gentle 2897, US); G (Contreras 4618, NY); H (Standley 55292, F); N (Moreno 25486, MEXU). 0-600 m. (Endémica.)

Specimens identified as *Heisteria media* from Costa Rica by Sleumer (1984) are in fact *Schoepfia macrophylla*.


Shrubs or small trees, 1-5 m; bark pale. Branchlets strongly angular, 4-winged, often flattened when very young, the wings persisting in older stems, pale olive green, often white striped. Leaves 6-20 × 2.5-6.5 cm, elliptic to narrowly elliptic, shape very variable even within a single collection, usually drying a very pale olive green, strongly pellucid dotted or striped below, matte on both surfaces; venation pinnate, drying bright pale yellow or white, all orders clearly visible; base acute to cuneate; margins revolute, paler; apex acuminate, occasionally acute; petioles 0.5-1.1 cm, rugose and pale green along the entire length. Inflorescence a few-flowered glomerule of 5-7 flowers; bracts glabrous, pale green; pedicels 1-2 mm. Flowers white; buds ellipsoid; calyx cupuliform, the lobes c. 0.25-0.5 mm, either mere teeth from the calyx rim or more or less equalling the tube; petals c. 2 mm, glabrous within; filaments 1-1.5 mm, liguliform to petaloid. Drupe 7-9 mm in diameter, depressed globose to globose, strongly ridged and shiny, black, when ripe with a faint bloom; fruiting calyx 1.9-2.5 cm, unlobed, the margins sinuate, spreading or slightly cupping the base of the fruit, fleshy, red; peduncles 5-9 mm, very thick. **Bosques premontanos, selvas altas perennifolias, bosques de Quercus.** Ch (Matuda 8756, MEXU); G (Steyermark 52087, F); ES (Standley 20185, F); N (Moreno 20309, MO); CR (Skutch 4581, F); P (Knapp 1578, MO). (200-)800-1500(-2000) m. (Endémica.)
These plants were called *Heisteria acuminata* by Burger (1983). He recognized them as different to *H. macrophylla* s.s., differentiating them by habitat: with plants of *H. macrophylla* s.s. growing in wet lowland forests and those of *H. povedae* growing in drier more upland formations. Sleumer (1984) lumped these two taxa, stating however “Specimens with leaves smaller than usual occur in Panama exclusively on its Pacific side”. The past decades of collecting in particularly Costa Rica, have produced abundant specimens showing these two entities as distinct. *Heisteria povedae* is generally (as recognized Burger) a plant of higher elevation, somewhat drier forests, and usually (but not always) has smaller leaves than *H. macrophylla* s.s. which dry a pale olive green. The stems of *H. povedae* are strongly angled and winged at the tips, with the wings persisting onto quite large branchlets, and are markedly white punctulate or striate. Stems of *H. macrophylla* s.s. can be slightly winged when very small, but the angles rarely persist beyond the first two leaves.


*Heisteria fatoensis* Standl.

Shrubs to 2-3 m to large canopy lianas to 6 cm in diameter; bark smooth, brownish. Branchlets terete, brown. Leaves 5.5-11(-16) × 3-6(-9) cm, elliptic to ovate, shiny above; venation markedly 3-nerved from the base, drying yellowish beneath; base truncate; margins slightly revolute; apex acuminate, usually abruptly so; petiole 0.8-1.2 cm, somewhat thickened and rugose in the distal half. Inflorescence a small axillary cushion of fascicles each with 5-10 flowers; bracts c. 0.5 mm, glabrous; pedicels 2-4 mm. Flowers white or cream; buds ellipsoid?; calyx cupuliform, shallowly lobed, the lobes c. 0.5 mm, shorter than the tube, minutely papillate on the tips; petals 1-1.5 mm, pubescent within, the margins papillose; filaments 1-1.5 mm, ligulate. Drupe 1-1.5 × 1-1.5 cm, subglobose to ellipsoid, smooth, orange when mature, shiny; fruiting calyx c. 2 cm in diameter, orbicular, strongly reflexed, green, the margin entire and somewhat sinuate; peduncles 1.2-1.5 (-2) cm, slender. *Selvas altas perennifolias*. N (Moreno 26732, MO); CR (Herrera 4476, F); P (Knapp &

Treelet to 15 m; bark reddish. Branchlets terete, reddish. Leaves 9.5-15 × 3-5.5 cm, elliptic to narrowly elliptic, thick and coriaceous, matte above and below, the midrib sunken; venation pinnate, obscure; base acute; margins revolute, thickened; apex acute to acuminate; petiole 0.9-1.1 cm, thickened, verrucose and darker in the distal half. Inflorescence a few-flowered axillary glomerule; bracts c. 0.5 mm; petioles c. 2 mm. Flowers white; buds markedly obovoid; calyx shallowly 5-lobed, c.0.5 mm, the lobes more or less equal to the tube; petals c. 1 mm; filaments not known. Drupe 1.8-2 × 1-1.5 cm, subglobose to ellipsoid, apically truncate, smooth, with some very indistinct ridges, greenish-orange; fruiting calyx 3-4.5 cm in diameter, shallowly 5-lobed, spreading or somewhat enclosing the drupe, orange; peduncles c. 1.5 cm, stout. *Selvas altas perennifolias, bosques premontanos?*. CR (*Herrera 3937, INB*). 600-900 m. (Endémica.)

3. **Minquartia** Aubl.


Por S. Knapp y Q. Jiménez M.

Trees with milky latex in stems and leaves; bark of trunk usually deeply grooved or perforated. Branches without spines, without short shoots, pubescent with a dense tomentum of rusty branched trichomes, these deciduous on older branches. Leaves evergreen, elliptic, pinnately nerved, glabrous, with laticifers and secretory cells, these drying black; petiole often darker than the lamina; tertiary venation very fine and scalariform. Inflorescences axillary, pedunculate spikes, usually simple, many-flowered with dense fascicles of 2-5-flowers along the axis; bracts small, broadly deltate, rusty tomentose. Flowers bisexual, each fascicle subtended by a small ovate, early deciduous bract; sepals 5, connate; petals 5, lobed c. halfway to the base, deltate; stamens 10, epipetalous, alternately slightly unequal, the filaments filiform, the anthers 4-loculate, ovoid; ovary flask-shaped, rusty tomentose; style straight;
stigma 3-5-lobed, paler than the style. Fruit a drupe with a thin fleshy exocarp, this dissolving and falling away; seed 1, the endocarp tuberculate, the embryo minute in copious endosperm. 1 spp., Neotropicos.


Trees to 30-40 m, to 50 cm dbh; trunk with conspicuous buttresses; bark brownish gray, perforated, with white latex when cut. Branches angular, glabrous. Leaves 9-25 × 4-10 cm, drying pale green, with punctate dots of laticifers visible, glabrous, the tertiary venation fine and conspicuous; base truncate; margins entire; apex abruptly acuminate; petiole 1.5-3 cm, drying black, sometimes minutely rusty tomentose. Inflorescences 1 per axil (occasionally 2), 6-15 cm long at anthesis, densely rusty tomentose. Flowers rusty tomentose; calyx c. 1 mm, cup-shaped, the tube and lobes more or less equal in length, densely rusty tomentose; corolla tube c. 1 mm, broadly cup-shaped, the lobes 1-1.5 mm, deltate, rusty tomentose without, densely pubescent with long white uniseriate trichomes over the entire lobe surface; filaments 0.5-1 mm long, longer on stamens alternate with the corolla lobes; anthers c. 0.5 mm; style c. 0.5 mm; stigma shortly 3-5-lobed. Drupe to 3 × 2 cm, tuberulate; pedicel 3-4 mm, thickened. *Selvas altas perennifolias*. N (*Laguna 118*, MO); CR (*Herrera 2255*, MO); P (*Proctor Cooper 497*, F). 0-300 m (-1000 m in South America). (Mesoamerica, Colombia, Venezuela, Guayanas, Ecuador, Peru, Brazil, Bolivia.)

*Minquartia* is an important timber tree because its wood is hard, heavy and extremely durable. In Costa Rica it is locally common on the Osa Peninsula and also on the Atlantic slope. The fine, scalariform tertiary venation is unmistakeable, and this combined with the presence of latex makes even sterile individuals easy to identify.
Shrubs, treelets or large trees to 20 m, reportedly root parasites. Branches without spines, without short shoots, glabrous or minutely puberulent; sap colorless, a milky latex absent. Leaves evergreen, lanceolate to obovate, 3 to pinnately-nerved, usually petiolate; tertiary venation not scalariform, usually indistinct. Inflorescences axillary, 2-3-flowered, often more than one per axil; bracts at the base of the inflorescence imbricate, minute. Flowers bisexual, often heterostyious, tubular, fragrant, usually yellowish or red; bract and two bracteoles at pedicel apex fused to form a three-lobed epicalyx; calyx adnate to the flower axis, inconspicuous; corolla with 3-4 petals, tubular, the lobes valvate and revolute, delinate to narrowly delinate, with a tuft of hairs in the centre where the anther inserted; stamens opposite the corolla lobes, epipetalous, the filaments adnate with the corolla for their entire length, the anthers free, 2-celled; disk epigynous, fleshy; ovary superior in the upper half, covered by the disk, the lower half of the ovary epigynous; style straight, glabrous, in short-styled flowers not exceeding the corolla tube, in long-styled flowers the stigma borne at the level of the corolla lobes; stigma capitate (Mesoamerica); ovule 1, pendulous. Fruit a drupe, subtended by the persistent epicalyx, crowned by the remains of the disk and calyx, the epicarp originating from the flower axis; seed 1, the embryo small. 23 spp., 19 in the Americas.

1. Flowers all sessile or practically so; flowers in pairs on the peduncle; top of ovary and disk gray-puberulous; bark white, corky.  

2. S. schreberi

1. Flowers all, or at least some, pedicellate; flowers usually more than 2 per inflorescence; top of ovary and disk glabrous; bark pale gray, not markedly white and corky.

2. Leaves strongly 3- or 5- veined from the base, drying olive or pale green; peduncles usually 1 per axil; drupe 12-18 mm; lowland forests, 0-100 m, Caribbean slope.

1. S. macrophylla
2. Leaves with the venation obscure, often drying black; peduncles more than 2 per axil; drupe 6-8 mm; cloud forests, 1000-3200 m, Caribbean and Pacific slopes.

3. *S. vacciniiflora*


Trees, 10-20 m, 10-35 cm dbh; bark gray-green, not white and corky; branchlets glabrous, brittle, flattened and somewhat winged. Leaves 7-15 × 4-7 cm, elliptic to obovate, glabrous, drying greenish-olive, with 3 to 5 main nerves from the base; base obtuse to more or less truncate, winged onto the short petiole; margins entire, somewhat revolute; apex acute to acuminate, occasionally caudate; petiole 2-6 mm, winged from the leaf base. Inflorescences 1 (-2) per axil; peduncle 0.2-2.5 cm, glabrous, with 2-5 short to long pedicellate flowers; pedicels c. 2 mm. Epicalyx glabrous, the margin very shallowly lobed, not ciliate. Flowers not known; ovary glabrous, not gray puberulent on the top. Drupe 12-18 mm, the surface striate, red or pink; top of ovary in fruit slightly verrucose. *Selvas altas perennifolias*. G (*Steyermark 39240*, F); N (*Proctor et al. 26972*, F); CR (*Poveda 976*, F). 0-100 m. (Endémica.)

This is *Schoepfia* sp. A of Burger (1983) and *Heisteria media* from Costa Rica cited in Sleumer (1984). Sleumer (1984) put *S. macrophylla* into synonymy with *S. schreberi*, but the type is a good match for material clearly distinct from that species recently collected in Nicaragua and Costa Rica. Other large leaved sheets from Petén and Chiapas (see below) have the characteristic white bark and sessile flowers of *S. schreberi*, but vegetative material can be difficult to determine. *Schoepfia macrophylla* inhabits a clearly distinct forest type along the Caribbean coastal fringe at sea level. Two collections from 750 m elevation on Cerro Jefe, Panama (*McPherson 10364*, MEXU; *McPherson & Morello 8133*, MEXU) appear to match material of *S. macrophylla*, but only bear a single immature fruit each, so placing them is difficult.


Shrub, treelet or small tree, to 9 m; bark bright white, corky. Branchlets glabrous, rounded, brittle. Leaves 3.5-8(-11) × 1.5-4(-6) cm, very variable in size and shape, lanceolate, elliptic to obovate, to occasionally almost orbicular, glabrous, fleshy, drying olive green and tuberculate on both surfaces, with 3-5 main nerves from the base; base acute, decurrent on the petiole; margins entire; apex acute, blunt at the extreme tip; petiole 1-5 mm, somewhat winged from the leaf base. Inflorescences 1-5(-7) per axil, short pedunculate; peduncle 5-7 mm, glabrous, bearing a pair of sessile flowers. Epicalyx shallowly 3-lobed, the margins ciliate, occasionally only minutely so. Flowers heterostylos, glabrous without, yellowish, orange or red; corolla tube 2-2.5 mm, cylindric to campanulate; corolla lobes 1-1.5 mm, deltate, the apex acute; anthers c. 0.5 mm; ovary gray puberulous on the top; style in long-styled flowers 2-2.5 mm long, glabrous; stigma c. 1 mm in diameter, capitate, globose. Drupe 5-8 mm, glabrous, red; top of ovary in fruit minutely gray puberulous, appearing as a white patch at the tip of the drupe. *Bosques de galeria, pasture edges, damp forest, zapotales, ramonales*. T (Rovirosa 279, NY); Ch (Breedlove 49077, NY); Y (Gaumer 2384, F); QR (Cabrera & Cortez 384, MEXU); B (Gentle 8060, MEXU); G (Contreras 2902, MO); H (Hazlett 1151, MO); ES (Standley 20889, US); N (Moreno 5082, MO); CR (Hammel 19327, MO); P (Nee 8152, US). 0-900(-1100) m. (Florida, Mexico, Mesoamerica, Colombia, Venezuela, Antillas.)

*Schoepfia schreberi* is extremely variable in leaf form depending upon the humidity and water content of the soil where it grows. Some specimens from Petén, Guatemala and Chiapas have very large leaves and are very like *S. macrophylla*. The gray patch of trichomes at the tip of the fruit, the pinnately veined leaves, and the white corky bark however, usually make them easily identifiable as *S. schreberi*. 

Subscandent shrubs, 1-5 m, or small trees to 8 m; bark pale gray and somewhat corky. Branchlets brittle, glabrous or minutely pubescent with tiny, unicellular trichomes (very new growth often also minutely pubescent). Leaves 3-10(-12) × 1-3(-4.5) cm, lanceolate to elliptic, occasionally ovate, fleshy, glabrous, often drying black, the venation obscure; base acute; margins entire to minutely erose; apex acuminate, the tip somewhat blunt; petiole c. 2 mm, winged from the decurrent leaf base. Inflorescences usually 1-5 per axil, pedunculate, the peduncle 5-15 mm, glabrous, bearing 2-5 short to long pedicellate flowers; pedicels 0.5-3 mm. Epicalyx glabrous, the margin very shallowly 2-3-lobed, ciliate. Flowers apparently bisexual, not usually heterostylos, glabrous, red or pinkish red; corolla tube (4-)5-6 mm, urceolate to tubular urceolate; corolla lobes 2-2.5 mm, narrowly triangular, the apex acuminate; anthers c. 0.5 mm; style 2-2.5 mm, glabrous; stigma c. 1 mm in diameter, flattened; ovary glabrous, not gray puberulent on the top. Drupe 8-10 mm long, ellipsoid to ovoid, red or pink, becoming black; top of ovary in fruit slightly verrucose. *Cloud forests, bosques premontanos, bosques con* Quercus y Pinus. Ch (Hernández & Ton 574, MO); G (Steyermark 50804, F); ES (Sandoval & Sandoval 1453, MO); CR (Herrera 1580, INB); P (McPherson 15981, US). (1000-)1200-2500(-3200) m. (Endémica.)

*Schoepfia vacciniiflora* occurs at higher elevations than *S. macrophylla*, which has similar pedicellate flowers.

5. **Ximenia** L.

* Amyris P. Browne, Heymassoli AUBL., Rottboelia Scop., Pimecaria Raf.*

Por S. Knapp y Q. Jiménez M.

Trees or shrubs; root parasites. Trunks occasionally multiple, the bark grey or brown. Branches with axillary spines, these often short shoots and bearing leaves; sap colorless, a milky latex absent. Leaves deciduous in dry season, elliptic to oblancoolate to sometimes suborbicular, membranous to fleshy, petiolate or not, all levels of venation usually indistinct. Inflorescences axillary, of 1-several flowers,
bracteate; bracts tiny, deltate, occasionally absent, glabrous. Flowers unisexual or bisexual, white or yellow, usually fragrant; sepals 4(5); petals 4(5), lanceolate; stamens 8(10), adnate to the base of the corolla lobes; ovary superior, elongate, unilocular; style 1, glabrous; stigma minute. Fruit an ellipsoid drupe, the pericarp fleshy and pulpy; seed 1, hard. 8 spp., tropics and subtropics.


1. Flowers in distinctly pedunculate cymes; leaves very variable, but with a distinct petiole.
   1. *X. americana*

1. Flowers in cymes without a distinct peduncle; leaves oblanceolate, without a petiole.
   2. *X. parviflora*


Shrub or many stemmed tree, to 10 m, the stems often spreading. Trunk with grayish brown bark; branches with axillary spines to 7 cm, these lateral and bearing a few leaves. Leaves c. 1-7 × 1-4 cm, extremely variable in size, shape and texture, elliptic to obovate or occasionally suborbiculate, membranous or fleshy, usually drying dark reddish brown and becoming very brittle, the venation inconspicuous; base acute to truncate; margins entire, somewhat revolute in older leaves; apex acute or rounded, occasionally mucronate; petiole usually present, 0.5-1(-1.3) cm, sulcate, densely pubescent in the sulcus. Inflorescence 1-3 cm, axillary or on short lateral shoots, in a group of 2-10 subumbellate cymes; peduncle 0.3-1.5 cm; bract solitary at the base or absent. Flowers bisexual, yellow, fragrant; pedicels 0.5-0.8 cm; sepals 1-1.5 mm, deltoid with a ciliate margin; petals 5-6 mm, lanceolate, densely bearded
from the base to c. 2 mm from the apex; filaments 2-3.5 mm, bent in an “S” shape just beneath the anther; anthers 3-4 mm; ovary 2-4 mm, lanceoloid; style 1.5-4.5 mm. Drupe 1.5-2.5(-4.5) \( \times \) 1.5-3 cm; pericarp pulpy, green to yellowish or pale orange; seed 1, 1.5-2.5 \( \times \) 1-1.2 cm, white. 

Dry forests, bosques caducifolios, savannahs, thorn scrub, acahuales, along beaches. T (Matuda 3075, NY); Ch (Breedlove 24697, MEXU); Y (Enríquez 549, MEXU); C (Shepherd 73, F); QR (Villaneuva 726, MEXU); B (Schipp 512, BM); G (Jones et al. 3140, MEXU); H (Molina R. 30465, MO); ES (Sandoval y Sandoval 1116, F); N (Standley 9281, F); CR (Hammel y Garita 18831, MO); P (Liesner 410, NY). 0-1700 m. (SE Estados Unidos, Mexico, Mesoamerica, Colombia, Venezuela, Guayanas, Ecuador, Peru, Bolivia, Brasil, Paraguay, Argentina, Antillas; introduced to tropical Africa and SE Asia.)

Material from Mesoamerica belongs to var. americana, the widespread and typical variety. Var. argentensis DeFilipps is found only in the southern part of the species range (Paraguay, Argentina and Brazil).

2. Ximenia parviflora Benth., Pl. Hartw. 7 (1839). Isotype: Mexico, Guanajuato, Hartweg 28 (BM!). Ilustr.: not found.

Shrub or small tree, to 4.5 m. Trunk with grayish to dark brown bark; branches striate, with axillary spines to 2 cm long. Leaves 2.5-4 \( \times \) 1-1.5 cm, oblanceolate, often clustered on short lateral shoots, membranous or fleshy, usually drying dark reddish brown, the venation indistinct; base attenuate; margins entire, somewhat revolute in older leaves; apex rounded; petiole usually absent, if present only c. 0.3 cm. Inflorescence 0.5-0.9 cm, axillary or on short lateral shoots, (1-)2-10-flowered; peduncle 0.1-0.4 cm long; bracts c. 1 mm, deltate. Flowers functionally unisexual, yellow or cream; pedicels 2.5-3 mm; sepals c. 0.5 mm, deltate with a ciliate margin; petals 11-12 mm, lanceolate, densely bearded in the central part; filaments c. 2 mm; anthers c. 2.5 mm; functional ovary 1.5-2.5 mm, conical with an elongate apex; style c. 2 mm. Drupe 1.5-1.9 \( \times \) c. 1 cm; pericarp pulpy, green to yellowish; seed 1, c. 1.2 \( \times \) 1 cm, ellipsoid, white. Matorrales esclerofilas, selvas medianas subperennifolias. Ch (Alexander & Sharp 1239, NY); C (Vázquez 29, MEXU). 80-1500 m. (Mexico, Mesoamerica.)

Mesoamerican plants correspond to var. parviflora, the other variety of Ximenia parviflora (var. glauca DeFilipps) occurs in the desert regions of Baja
California. Although the characters that separate this species from the more widespread and variable *X. americana* are difficult to quantify, individual specimens are quite clear.

**Bibliography**


