RHAMNACEAE

by

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Treelets or shrubs, erect or climbing by hooks or tendrils or the stems twining, rarely herbs or subshrubs. Leaves simple, alternate or opposite. Stipules usually present, small and deciduous or modified into spines and then persistent. Inflorescence mostly consisting of axillary corymbs or cymes, rarely terminal racemes or panicles. Flowers actinomorphic, hermaphrodite or polygamous. Receptacle usually present. Calyx 4—5-lobed, valvate. Petals 4—5 or rarely wanting, small, often cucullate and unguiculate. Stamens epipetalous and often enclosed by the petals; anthers 2-celled, with longitudinal dehiscence. Disk perigynous, fleshy, fitting or loining the receptacle. Ovary sessile, free or immersed in the disk, superior or more or less adherent to the receptacle, (2—) 3 (—4)-locular; styles simple or 2—4-cleft. Ovules solitary in each locule, anatropous, with basal placentation. Fruit drupaceous, a capsule or a samara, 1—4, usually 3-locular. Endosperm copious or scanty. Embryo large, straight.

Over 900 species in c. 55 genera of almost worldwide distribution.

Key to the genera:

1.	Shrubs with tendrils which are modified branch-tips
2.	Shrubs or trees armed with stipular- or stem-spines
3.	Stipular spines small or longer, erect and recurved at the base of the petioles Ziziphus
	Stemspines
4.	Leaves opposite; petals wanting; fruit drupaceous

Krugiodendron Urban, Symb. Ant. 3: 313. 1902

Evergreen, unarmed tree or shrub. Leaves alternate in the basal part of the branches, opposite or nearly so near the top, more or less coriaceous. Stipules small, subulate. In-

florescence consisting of axillary few-flowered, umbel-like cymes. Flowers hermaphrodite, greenish-yellow. Hypanthium short, flattish, persistent under the fruit. Sepals 4—6, keeled inside, narrowly triangular to ovate. Petals wanting. Stamens 4—6; filaments subulate, erect; anthers ovate, opening laterally. Disk fleshy, annular, surrounding the base of the ovary. Ovary short-conical, falsely 2-locular; style short; stigmas 2. Ovules solitary in each locule. Drupe ovoid or globose-ovoid, 1-locular; flesh scanty; putamen thin, bony. Seed-testa adherent to the endocarp. Endosperm wanting. Embryo fleshy with semi-globose cotyledons.

A monotype genus in Southern Florida, southern Mexico, Guatemala, Honduras, Bahamas, Greater Antilles, Lesser Antilles south to St. Vincent, Bonaire, and Curação.

Krugiodendron ferreum (Vahl) Urb.

Urban, Symb. Ant. 3: 314. 1902; Boldingh, Fl. D.W. Ind. Isl. 1: 123. 1909; Urban, Symb. Ant. 4: 375. 1910; Boldingh, Fl. Ned. W. Ind. Eil. 265. 1913; Fl. D.W. Ind. Isl. 2: 61. 1914; Urban, Symb. Ant. 8: 398. 1920; Britton & Millspaugh, Bahama Fl. 256. 1920; Britton & Wilson, Sci. Surv. Porto Rico & Virgin Isl. 5: 533. 1924; Fawcett & Rendle, Fl. Jamaica 5(3): 65, fig. 30. 1926; Questel, Fl. Isl. St. Bartholomew 143. 1941; Leon & Alain, Fl. Cuba 3: 209, fig. 85. 1953; Arnoldo, Zakflora 32. 1954; Zakflora 184. 1964; Adams, Flowering plants of Jamaica 452. 1972; Fournet, Fl. Guadeloupe & Martinique 1132, fig. 553. 1978; — Rhamnus ferreus Vahl in West, St. Croix 276. 1793; Symb. 3: 41, tab. 58. 1794.

Small tree or high shrub; branches spreading, the younger twigs puberulent. Leaves alternate but opposite or nearly so towards the top of the branches, short-petiolate; blade ovate, oval or roundish-elliptic, obtuse to emarginate at the apex, rounded or narrowed at the base, 2—7 × 1.5—4.5 cm, margin entire, bright green above, dull beneath, becoming nearly glabrous; petioles 3—6 mm long. Inflorescence few-flowered, much shorter than the leaves. Flowers greenish-yellow. Hypanthium nearly 1 mm long. Disk 5-lobed. Sepals 4—6, narrowly triangular to ovate, 2 × 1 mm. Stamens alternating with the sepals; filaments 1—1.3 mm long; anthers 0.5 mm long. Drupe globose or ovoid, smooth, black when ripe, about 5—8 mm long, 1-seeded.

Distribution as the genus.

Dispersed but not common; in woodlands especially in the limestone areas.

Vernacular names: kaubati (Leeward Group)

iron wood, iron berry (Windward Group).

Bonaire: calcareous plateau of Bolivia (Boldingh 7309, st. Feb.); calcareous hills near Fontein (Boldingh 7334, st. Feb.; Stoffers 564a, fl. Nov.); Seroe Montagne near Dos Pos (Arnoldo 447, fl. Feb.).

CURACAO: San Hieronymus Berg (Arnoldo s.n., fl. Dec.).

ST. EUSTATIUS: from Little Mountains to Venus Bay (Boldingh 963, fl. June); top of The Quill at the side of Glass Bottle, 380—400 m (Stoffers 3572, st. July); between Venus and Little Mountains, 40—100 m (Stoffers 4024, fl. July); near Gilboa Hill, 80 m (Stoffers 4028, fl. July); between Glass Bottle and White Wall, 270 m (Stoffers 4059, st. Aug.); without loc. (v. Groll-Meyer 337, st.).

St. Martin: Mount Paradise (Boldingh 3313, st.); near Mullet Pond (Boldingh 2773, st.); Cole Bay Hill (Stoffers 4503, fl. Aug.; 4505, fl. Aug.; 4507, fl. Aug.; 4509, fl. Aug.).

Gouania Jacquin, Select. Stirp. Am. Hist. 263. 1763

Shrubs, climbing by means of tendrils which are modifications of the ends of the branchlets. Leaves alternate, pinninerved. Stipules caducous. Inflorescence consisting of axillary or supra-axillary racemes. Flowers pedicellate, in the axils of 1—1.5 mm long bracts, small, polygamous. Receptacle obconical. Sepals 5, spreading. Petals 5, cucullate, inserted below the margin of the disk. Stamens 5, inserted on the margin of the disk and alternating with its lobes. Ovary immersed in the disk, adherent to the receptacle, 3-locular; styles 3-parted or -lobed; stigmas very small. Ovules one in each locule. Fruit dry, crowned by the persistent calyx, 3-winged, 3-coccous; cocci indehiscent, separating from the axis. Seeds shining, convex. Embryo obovate. Endosperm scanty.

About 30 species mostly in tropical America.

Gouania lupuloides (L.) Urb.

Urban, Symb. Ant. 4: 378. 1910; Boldingh, Fl. Ned. W. Ind. Eil. 266. 1913; Urban, Symb. Ant. 8: 401. 1920; Britton & Millspaugh, Bahama Fl. 258. 1920; Britton & Wilson, Sci. Surv. Porto Rico & Virgin Isl. 5: 537. 1924; Fawcett & Rendle, Fl. Jamaica 5(3): 72, fig. 34. 1926; Questel, Fl. Isl. St. Bartholomew 144. 1941; Leon & Alain, Fl. Cuba 3: 220. 1953; Gooding et al., Fl. Barbados 272. 1965; Adams, Flowering plants of Jamaica 450. 1972; Fournet, Fl. Guadeloupe & Martinique 1136, fig. 556. 1978; — Banistera lupuloides Linnaeus, Spec. Plant. 427. 1753; — Gouana domingensis Linnaeus, Spec. Plant. ed. 2. 1663. 1763; Grisebach, Fl. Br. W. Ind. Isl. 101. 1859 ['1864']; Duss, Fl. phan. Ant. franç. 93. 1897; Boldingh, Fl. D.W. Ind. Isl. 1: 123. 1909.

Climbing shrub or woody vine; branches loosely pubescent, becoming glabrous in age. Stipules subulate, 4-8 mm long. Leaves petiolate; blade ovate to elliptic, acute to short acuminate at the apex, rounded or subcordate at the base, $3-9\times 2-6$ cm, thin, pinninerved, glabrous or sparingly pubescent, margin serrate with blunt teeth, with or without small glands; petiole 0.5-1.5 cm, pubescent. Inflorescence consisting of slender, pubescent racemes up to 15 cm long; pedicels pubescent, 1-3 mm long. Flowers often clustered along the axis, yellowish-green. Receptacle 1-1.5 mm long, pubescent outside. Sepals broadly ovate, acute at the apex, about 1.5×1.5 mm. Petals obovate, convex, cucullate, yellow, $1-1.5\times 1$ mm. Stamens epipetalous; filaments dilated towards the base, 1 mm long; anthers elliptic, less than 0.5 mm long. Fruit 8-12 mm broad, the wings included, rarely the wings absent. Seeds broad-elliptic to oval, 2.5-3.5 mm long, darkbrown, shining.

Florida, West Indies south to Grenada, Bahamas, and Central America.

In thickets and in woodlands.

Vernacular name: white root (Windward Group).

SABA: lower part of the Bottom Mountain, 300 m (Boldingh 1444, fl. & fr. July).

St. Eustatius: along road from Tumble Down Dick Bay to Signal Hill (Boldingh 168, fr. May); near Mary's Glory, 150 m (Boldingh 1136, fr. June).

ST. MARTIN: road to Marigot (Boldingh 2811, st. Aug.); lower part of the hills between Mt. Chambord and Mount Vernon (Boldingh 2954, st. Aug.).

Colubrina L. C. Richard ex A. T. Brongniart, Ann. Sci. Nat. Paris 10: 368. 1827 nom. cons. 4882

Unarmed trees or shrubs, more or less pubescent, the younger parts often rusty tomentose. Leaves alternate, penninerved. Stipules caducous. Inflorescence consisting of axillary clusters. Flowers hermaphrodite. Receptacle hemispheric, persistent in fruit. Sepals 5, spreading. Petals 5, cucullate. Stamens 5, enclosed by the petals. Disk 5-cornered or 5—10-lobed. Ovary immersed in the disk, adherent to the receptacle at one side, 3-locular; style 3-branched or 3-lobed; stigmas blunt. Ovules one in each locule. Fruit subglobose, dry or the exocarp somewhat fleshy, endocarp 3-coccous; cocci splitting open on the inner side. Seeds smooth or shining, rarely with a small aril. Endosperm scanty.

About 15 species mostly in the tropics and subtropics of America.

Key to the species:

Colubrina arborescens (Mill.) Sarg.

SARGENT, Trees and shrubs 2: 167. 1911; URBAN, Symb. Ant. 8: 400. 1920; Gooding et al., Fl. Barbados 271. 1965; Adams, Flowering plants of Jamaica 451. 1972; — Ceonanthus arborescens Miller, Gard. Dict. ed. 8. 1768; — Colubrina ferruginosa Brongniart, Ann. Sci. Nat. Sér 1. 10: 386, t. 15, f. 3. 1827; Grisebach, Fl. Br. W. Ind. Isl. 100. 1859 ['1864']; Boldingh, Fl. D.W. Ind. Isl. 1: 123. 1909; Urban, Symb. Ant. 3: 377. 1910; Boldingh, Fl. Ned. W. Ind. Eil. 266. 1913; Fawcett & Rendle, Fl. Jamaica 5(3): 68. 1926; Leon & Alain, Fl. Cuba 3: 219. 1953; — Colubrina colubrina (Jacquin) Millspaugh, Field Mus. Bot. 2: 69. 1900; Britton & Millspaugh, Bahama Fl. 258. 1920; Britton & Wilson, Sci. Surv. Porto Rico & Virgin Isl. 5: 536. 1924; — Rhamnus colubrinus Jacquin, Enum. Syst. Plant. Carib. 16. 1768.

Shrub or tree, up to 8 m high; twigs rusty-tomentose. Leaves petiolate; blade ovate to elliptic or oblong-elliptic, obtuse, acute or short-acuminate at the apex, rounded or subcordate at the base, $4-15 \times 2.5-7$ cm, dark-brown and glabrous above, paler and rusty-tomentose or glabrate except the nerves beneath, margin entire, pinninerved, often with dark, roundish glands beneath; petioles 0.5-2 cm long, tomentose. Inflorescence consisting of clusters, smaller then the petioles. Receptacle rusty-tomentose on the outside. Sepals ovate, obtuse, 2×1 mm long. Petals spathulate, about 2×1 mm, yellow, cucullate. Stamens epipetalous; filaments filiform, widened near the base, 2 mm long; anthers ovoid, 0.5 mm long, versatile, with longitudinal dehiscence. Ovary immersed in the disk; style cylindric, 3-branched. Disk filling the receptacle. Capsule

obovoid-globose, 6.5—8 mm in diam., 7—9 mm long, black, about twice as long as the cupule. Seed elliptic to suborbicular, 3—3.5 mm in diam., black, shining.

Florida, Mexico to Honduras, Bahamas, Antilles south to Barbados, especially on the drier islands; cultivated in West Africa.

In woodlands and thickets.

SABA: St. Giles Quarter (Boldingh 1866a, fr.); Fort Bay Gut between Promised Land and Thais Hill, 175—200 m (Stoffers 3431a, fl. & fr. May).

St. Eustatius: top of The Quill, 400 m (Boldingh 223, fr. June); slope of The Quill near Bengalen (Stoffers 3779a, fl. & fr. July).

Colubrina elliptica (Sw.) Briz. & Stern

BRIZICKY & STERN, Trop. Woods 109: 95. 1958; ADAMS, Flowering plants of Jamaica 451. 1972; FOURNET, Fl. Guadeloupe & Martinique 1135, fig. 555. 1978; — Rhamnus ellipticus SWARTZ, Prodr. Veg. Ind. Occ. 50. 1778; — Colubrina reclinata (L'Herit.) Brongniart, Mem. Fam. Rhamn. 62. 1826; Ann. Sci. Nat. Ser. 1: 10: 369. 1827; Grisebach, Fl. Br. W. Ind. Isl. 101. 1859 ['1864']; Duss, Fl. phan. Ant. franç. 93. 1897; Urban, Symb. Ant. 4: 378. 1910; Boldingh, Fl. Ned. W. Ind. Eil. 266. 1913; Fl. D.W. Ind. Isl. 2: 61. 1914; Britton & Millspaugh, Bahama Fl. 257. 1920; Urban, Symb. Ant. 8: 400. 1920; Britton & Wilson, Sci. Surv. Porto Rico & Virgin Isl. 5: 536. 1924; Fawcett & Rendle, Fl. Jamaica 5(3): 68, fig. 32. 1926; Questel, Fl. Isl. St. Bartholomew 144. 1941; Leon & Alain, Fl. Cuba 3: 218. 1953.

Shrub or small tree with orange-brown, furrowed bark which exfoliates in thin layers; branches glabrescent, twigs finely pubescent. Leaves petiolate; blades elliptic, ovate or ovate-lanceolate, $2.5-8\times2.5$ cm, obtuse, acute or short-acuminate at the apex, rounded or cuneate at the base, glabrous on the upper surface, more or less puberulous beneath, pinninerved, margin entire with a pair of glands near the base and rarely one higher up; petioles slender, 0.5-1.5 cm long, tomentose. Inflorescence consisting of axillary clusters, as long as or shorter than the petioles. Flowers greenish. Receptacle puberulous on the outside. Sepals ovate to triangular, acute, 1.5×1 mm, puberulous outside. Petals spathulate to obovate, 1.5×1 mm, enclosing the stamens, cucullate. Stamens epipetalous; filaments 1-1.5 mm long, widened near the base; anthers ovoid, 0.5 mm long. Ovary immersed in the disk; style 3-branched. Disk 10-lobed. Fruit globose, 7-9 mm in diam., orange-red or brownish. Seeds oblong-ellipsoid or somewhat ovoid, blackish, shining, 3-5 mm long.

Florida, Mexico to Guatemala, Venezuela, and Antilles south to St. Vincent.

ARUBA: only once collected, without loc. (Beaujon s.n., fr.).

Condalia Cavanilles, Anal. Hist. crinc. nat. Madrid 1: 39. 1799 nom. cons. 4862

Shrubs or trees; branches armed with stem-spines. Leaves alternate, entire, usually pinninerved. Stipules present, not modified into prickles. Inflorescence consisting of axillary, few- to many-flowered fascicles or flowers solitary. Sepals 5 (4—7). Petals wanting. Stamens as many as the sepals. Disk present. Ovary free, incompletely 2-locular; style

simple or 2—3-lobed. Drupe at the base mostly surrounded by the persistent receptacle, terminated by the persisting part of the style; putamen incompletely 2-locular.

About 12 species from southern United States to Chile and Argentina.

Condalia henriquezii Bold.

BOLDINGH, Fl. Ned. W. Ind. Eil. 265. 1913; Fl. D.W. Ind. Isl. 2: 61, plate 7. 1914; ARNOLDO, Zakflora 22, 50. 1954; Zakflora 183. 1964.

Strongly branched shrub or small tree; branches glabrous, provided with stemspines up to 10 cm long. Leaves alternate or clustered on short-shoots; blades obovate or spathulate, retuse and mucronate at the apex, cuneate at the base, $0.5-2\times0.4-1.2$ cm, coriaceous, pinninerved, the veins inconspicuous, margin entire; petiole short. Stipules triangular, densely tomentose. Inflorescence consisting of 2- to many-flowered fascicles. Flowers greenish; pedicels filiform. Receptacle flat. Sepals 5, broadly ovate to triangular, acute at the apex, $1.5-2\times1.5$ mm. Stamens 5, alternating with the sepals; filaments more or less subulate, 1 mm long; anthers ovoid to roundish, cordate at the base, 0.5×0.5 mm, versatile. Disk flat, 5-cornered, filling the receptacle. Ovary partly immersed in the disk, globose; style short, conic; stigma 2-lobed. Drupe globose, 0.5-0.6 cm in diam., yellowish-green to red-greenish.

Curação, Bonaire, and northern Venezuela.

In dry regions; on Curação and Bonaire preferential on limestone.

Vernacular names: bèshi, bèshi di kabritu, palu di bèshi (Leeward Group).

BONAIRE: calcareous hills near Rincón (Boldingh 7063, st. Feb.; 7060, flb. Feb.); Coeroe-boeroe (Stoffers 893, fl. & fr. Dec.).

CURAÇAO: saltpans near St. Willebrordus (Stoffers 353, fl. Oct.); seashore near St. Jan (Boldingh 5693, st. Dec.); calcareous hills near Malpais (Boldingh 4894, st. Oct.); calcareous soil near Knip (Boldingh 5380, fl. Dec.); hills to the east of Westpunt (Boldingh 5441, st. Nov.); calcareous hills near Siberië (Boldingh 5267, st. Nov.; 4976, fl. Nov. (Type!); limestone plateau near Willemstad (Britton & Shafer 3056, st. March).

Ziziphus P. Miller, Gard. Dict. abr. ed. 4. 1754

Shrubs or small trees; branches unarmed or provided with short, erect or recurved, stipular prickles. Leaves alternate, deciduous or persistent, 3—5-nerved from the base, the margin entire or serrate. Inflorescence consisting of fascicles or cymes. Receptacle flattish or broadly obconical. Petals 5 or rarely wanting. Stamens 5. Disk 5—10-lobed. Ovary immersed in the disk. Ovary completely or partly 2 (—1)-locular; styles 2 (—4), free or more or less united. Fruit a drupe, frequently surrounded by the persistent receptacle at the base; putamen 1(—4)-locular. Endosperm scanty or wanting.

Perhaps about 100 species in tropical and subtropical regions, especially in Asia and America.

Key to the species:

Ziziphus mauritiana Lam.

LAMARCK, Encycl. 3: 319. 1789; GOODING et al., Fl. Barbados 272. 1965; ADAMS, Flowering plants of Jamaica 452. 1972; FOURNET, Fl. Guadeloupe & Martinique 1135, fig. 554. 1978; — Ziziphus jujuba (L.) LAMARCK non MILLER 1768; DUSS, Fl. phan. Ant. franç. 94. 1897; BOLDINGH, Fl. D.W. Ind. Isl. 1: 123. 1909; Fl. Ned. W. Ind. Eil. 265. 1913; URBAN, Symb. Ant. 8: 398. 1920; BRITTON & WILSON, Sci. Surv. Porto Rico & Virgin Isl. 5: 535. 1924; QUESTEL, Fl. Isl. St. Bartholomew 144. 1941; LEON & ALAIN, Fl. Cuba 3: 211. 1953; ARNOLDO, Gekw. en nutt. pl. Ned. Ant. 140. 1954; Gekw. en nutt. pl. Ned. Ant. 223. 1971; — Rhamnus jujuba Linnaeus, Spec. Plant. 194. 1753.

Shrub or tree up to 15 m high with slender drooping branches; young branches and flowers densely tomentose; branches armed with short prickles, rarely unarmed. Leaves petiolate; blades ovate, elliptic-ovate or suborbicular, rounded at the apex, acute or rounded at the base, 3—7 × 2.5—5 cm, shining dark-green and glabrous above, white or tawny-woolly-tomentose beneath, margin serrulate; petioles stout, 0.5—1.5 cm long, tomentose. Inflorescence consisting of short-pedunculate, axillary cymes which are shorter than the petioles. Flowers slender-pedicellate. Sepals triangular, acute, 1.9—2.2. mm long, tomentose outside, keeled on the inner side. Petals subspathulate or obovate, concave, cucullate, about 1.7 mm long, enclosing the stamens. Disk 10-sulcate, glabrous. Stamens epipetalous; filaments slightly dilated to the base; anthers ovoid, cordate at the base, versatile, about 0.5 mm long. Ovary 2-locular; styles 2, united to the middle. Fruit subglobose or ellipsoid, 2- or 1-locular, glabrous, 1.5—1.7 cm long.

Native of the Old World tropics; cultivated and naturalized in the tropics; in the West Indies especially in the drier parts.

ARUBA: Oranjestad (Stoffers 1924, st. Jan.).

St. Martin: from Philipsburg to Guana Bay (Bolding 2393a, fl. & fr.); near Philipsburg (Boldingh 2337a, fr. Aug.); Kanaal Rolandus (Stoffers 2251, st. March); Vineyard Hill near Pointe Blanche (Stoffers 4512, fl. Aug.).

Ziziphus spina-christi (L.) Willd.

WILLDENOW, Spec. Plant. 1: 1105. 1797; BOLDINGH, Fl. Ned. W. Ind. Eil. 265. 1913; Fl. D.W. Ind. Isl. 2: 60. 1914; Arnoldo, Zakflora 21, 50. 1954; Gekw. en nutt. pl. Ned. Antillen 141, fig. 208. 1954; Zakflora 184. 1964; Gekw. en nutt. pl. Ned. Ant. 223, fig. 147. 1971; — Rhamnus spinachristi Linnaeus, Spec. Plant. 195. 1753.

Small tree or high shrub; branches white, long-flexuous or short intricate, glabrous, armed with erect and curved prickles. Leaves petiolate; blade ovate, ovate-lanceolate or elliptic, obtuse or acute and often mucronate at the apex, rounded at the base, 2—5.5 \times 1—3.5 cm, glabrous or slightly pubescent beneath when young, especially on the

veins, margin crenate-serrate; petioles 1—2.5 cm long. Inflorescence consisting of few-to many-flowered sessile or pedunculate cymes. Flowers greenish-yellow. Sepals 5(—7), ovate, acute at the apex, 1.9—2.3 mm long, more or less tomentose outside, keeled inside. Petals obovate, concave, somewhat cucullate, 2 mm long, enclosing the stamens. Stamens epipetalous; filaments thick, 2 mm long; anthers oblong-ovoid, cordate at the base, versatile, 0.5 mm long. Disk large, often with a fringe of hairs around the base of the styles, 10-sulcate. Ovary 2-locular; styles 2, united to above the middle and then spreading, not curved. Drupe fleshy, 2-locular, subglobose, yellow to pale brown, 1—2 cm in diam. Fruit edible.

Originally from western Asia and northern Africa; in 1885 introduced from Palestine into Curaçao by C. Gorsira and there cultivated and naturalized.

Vernacular name: apeldam (Leeward Group).

ARUBA: cultivated.

CURAÇÃO: near Soto (Arnoldo 1125, fl. & fr. Nov.); without loc. (Boldingh 5385, fr.).