

SAPINDACEAE

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Monoecious or dioecious trees, shrubs or vines climbing by axillary tendrils. Leaves usually alternate, compound to decompose, often even-pinnate or rarely simple. Stipules sometimes present and then persistent or deciduous. Inflorescence consisting of terminal and/or axillary thyrses, or simple or compound racemes or rarely flowers solitary. Flowers small, actinomorphic or zygomorphic, hypogynous, usually unisexual by abortion or rarely bisexual. Sepals 4—5, free or connate, usually unequal, deciduous or persistent. Petals 4—5, free, clawed, often with petaloid appendages on the interior surface above the claw, or rarely wanting. Disk nectariferous, extra-staminal or intrastaminal. Stamens 6—10 (—12), often 7—8; filaments free or connate near the base, inserted within or on the disk; anthers versatile, introrse, with longitudinal dehiscence; in female flowers staminodial or wanting. Pistil 3—(2—6)-carpellary, rudimentary in male flowers; ovary superior, 2—4 (—6)-locular; style short or elongate, sometimes cleft at the apex; stigma 1 or 3. Ovules 1—2 in each locule, on an axile placenta. Fruit a drupe, berry, capsule or schizocarp splitting into drupe-like, nut-like or samaroid mericarps, often 1-locular. seeds usually solitary in a locule, often with an aril. Endosperm scanty or wanting. Embryo usually curved.

Pantropic family of about 150 genera and 1800 species, especially in the Neotropics; a few species extending into warm-temperate regions.

Key to the genera:

1. Shrubs or herbs climbing by inflorescence-tendrils..... 2
 Erect shrubs or trees..... 4
2. Petiole and rhachis winged..... 3
 Petiole and rhachis not winged..... *Cardiospermum*
3. Leaves 5-foliolate..... *Paullinia*
 Leaves bi-ternate..... *Serjania*
4. Leaves simple (unifoliolate), covered with resiniferous glands, surface often appearing varnished; petals wanting; fruit winged..... *Dodonaea*
 Leaves compound; petals present; fruit not winged..... 5

5. Leaves 3 (—1)-foliolate..... 6
Leaves abruptly pinnate..... 8
6. Leaflets large, up to 20 cm long, pointed at the apex, margin toothed *Allophylus*
Leaflets smaller, up to 10 cm long, not or short-pointed; margin entire or slightly
undulate..... 7
7. Leaflets lanceolate to ovate or oblong to elliptic, up to 10 cm long; petiole
1.25—1.75 cm long..... *Exothea*
Leaflets obovate to oblanceolate, up to 5 cm long, sessile..... *Hypelate*
8. Flowers in slender, simple or paniculate racemes, terminating the lateral bran-
ches; leaves usually 4-foliolate, the terminal pair larger; rhachis flattened or wing-
ed; berry ellipsoid or obovoid..... *Melicoccus*
Flowers in slender axillary, subterminal corymb-like thyrses; leaves 2— to 4
(—6)-foliolate or sometimes 3—1-foliolate..... *Exothea*

Serjania P. Miller, Gard. Dict. Abr. ed. 4. 1754

Usually climbing shrubs with axillary bi-branched tendrils. Leaves bi-ternate. Stipules small. Inflorescence consisting of axillary pseudo-racemes, sometimes pushed aside by an other vegetative branch, bearing 5—20-flowered, elongate or contracted cincinni of which the 2 lower ones are often changed into tendrils or the inflorescence congested at the end of the branchlets and forming large panicles. Flowers polygamous, pseudo-hermaphrodite or male, zygomorphic, often fragrant. Sepals 5, persistent, the 2 lower ones sometimes more or less connate, the outer 2 smaller, the inner ones petaloid. Petals 4 by abortion of the lower one, usually longer than the sepals, with a scale at the base. Scales petaloid, shorter than the petals, unequalsided, cucullate. Disk unequalsided, enlarged between the stamens and the upper petals, forming conspicuous glands above the insertion of the petals. Stamens 8, very unequal; filaments hairy; anthers elliptic. Pistil 3-carpellary; ovary pear-shaped, triquetrous, 3-locular; style filiform; stigmas 3. Ovules one in each locule. Fruit 3-coccos; cocci broadly winged, united in the persistent axis, indehiscent. Seeds provided with a small aril.

Over 200 species in tropical and subtropical America.

Serjania curassavica (L.) Radlk.

RADLKOFER, Serj. Monogr. 311. 1875; suppl. 156, t. 4, fig. 23. 1886; in ENGLER, Pflanzenreich IV, 165: 200. 1931; BOLDINGH, Fl. Ned. W. Ind. Eil. 261. 1913; Fl. D.W. Ind. Isl. 2: 59. 1914; ARNOLDO, Zakflora 52, fig. 35. 1954; Zakflora 192, fig. 35. 1964.

Climbing shrub, subglabrous; stems round or slightly striate, younger stems puberulous to tomentose. Leaves alternate, bi-ternate, broadly ovate to rhombic in outline, 6—13 × 5—10 cm; rhachis and rhachilla alate; petiole 4 cm long, canaliculate above, margi-
nate to alate; leaflets serrate to sublobate-dentate, leaflets 1.5—7 × 1—4 cm, subcori-
aceous; terminal leaflets ovate to subrhombic, acuminate or obtuse at the apex, attenuate
at the base, their petiolule 1.5 cm long; lateral leaflets ovate, subacute at the apex, con-

tracted into the winged petiole or sessile. Stipules linear-lanceolate, 3 mm long, pilose. Inflorescence consisting of tomentose thyrses, 3—12 cm long, the cincinni 4—6-flowered; pedicels 3 mm long; tendrils at the base of the inflorescence often present. Bracts and bracteoles oblong-lanceolate, 2—3 mm long. Flowers hermaphrodite, zygomorphic. Sepals connate at the base into a 2 mm long tube; lobes ovate, 3—4 × 2.5 mm, tomentose without. Petals 4, pandurate, punctate, c. 2 × 4 mm; scales alate and fimbriate. Disk with 5 mushroom-like lobes, two of which are larger than the others. Stamens 8; filaments 3 mm long, acute, about as long as the ovary; anthers 1 mm long, dorsifixed, with lateral dehiscence. Pistil 3-carpellary; ovary superior, 6-costate, star-shaped in cross-section, hairy; style 1.5 mm long, grooved, sometimes punctate; stigmas 3, free, curved, densely papillose. Fruit a cordate, 3-winged schizocarp capsule, c. 2 × 2 cm; wings up to 1 cm wide, adnate to the stipitate elongated ovary-base. Seeds one per locule, pyriform.

Aruba, Bonaire, Curaçao, and Colombia.
Mostly in woodlands.

ARUBA: Jamanota (Boldingh 6298, fl. & fr. Dec.; Stoffers 1656, fr. Jan.); slope of Miralamar (Boldingh 6460, fl. Jan.); limestone rocks near Fontein (Arnoldo 244, flb. Dec.).

BONAIRE: Hobau (Stoffers 1041, fl. Dec.); slope of Macutacao (Boldingh 7124, fl. & fr. Jan.); Labra (Stoffers 588, fl. Nov.); near Fontein (Suringar s.n., fl. & fr. Feb. [L]); Seroe Largo (Arnoldo 356, fl. Jan.).

CURAÇAO: Seroe Christoffel, 100 m (de Wilde 133a, fl. Jan.); id., 300 m (Burgers 35, fl. Dec.; Suringar s.n., fr. Feb. [L]); id., at the foot (Arnoldo 1824, fl. Jan.); from Klein Santa Marta to Dokterstuin (Boldingh 5635, flb. Dec.); hills to the east of Westpunt (Boldingh 4933, st. Nov.; 4939, flb. Nov.); Knip hills (Stoffers 1109, fl. & fr. Dec.); museum garden, Mundo Nobo (Arnoldo 2018, flb. Ap.); Caracas Baai (Britton & Shafer 3137, flb. & fr. March).

Paullinia Linnaeus, *Spec. Plant.* 365. 1753

Woody vines, climbing by axillary and peduncular tendrils. Leaves alternate, bipinnate or decompound. Stipules deciduous. Inflorescence consisting of axillary thyrses bearing contracted cincinni of which the 2 lower ones are often modified into tendrils, congested at the end of the branchlets, forming large panicles. Flowers polygamous, pseudo-hermaphrodite or male, zygomorphic. Sepals 5, persistent, the lower 2 sometimes more or less connate, the outer 2 smaller, the inner one petaloid. Petals 4, usually longer than the sepals, each with a crested, hooded scale at the base, the scales of the upper petals with a tongue-shaped appendage below the top, and a fleshy, mostly bilobed dorsal crest, those of the lower petals very unequal-sided, without appendages and with a smaller subulate or winglike crest. Disk unequal-sided, with conspicuous glands above the insertion of the petals. Stamens 8. Ovary pear-shaped, triquetrous, 3-locular; style filiform; stigmas 3. Ovules solitary in each locule. Fruit 3-coccos; cocci broadly winged, indehiscent. Seeds with a small aril.

Over 200 species in tropical and subtropical America.

Paullinia pinnata L.

LINNAEUS, Spec. Plant. 366. 1753; DUSS, Fl. phan. Ant. franç. 119. 1897; URBAN, Symb. Ant. 4: 369. 1910; BOLDINGH, Fl. Ned. W. Ind. Eil. 261. 1913; Fl. D.W. Ind. Isl. 2: 60. 1914; URBAN, Symb. Ant. 8: 389. 1920; BRITTON & WILSON, Sci. Surv. Porto Rico & Virgin Isl. 5: 524. 1924; WILLIAMS, Fl. Trinidad & Tobago 1: 183. 1930; RADLKOFER, in ENGLER, Pflanzenreich IV, 165: 247. 1931; LEON & ALAIN, Fl. Cuba 3: 189, fig. 73. 1953; ARNOLDO, Zakflora 52. 1954; Zakflora 192. 1964; FOURNET, Fl. Guadeloupe & Martinique 1102. 1978; — *Paullinia curassavica* Jacquin, Obs. Bot. 3: 12, t. 61. 1768.

Climbing shrub. Leaves alternate, odd-pinnate, 5 (—3)-foliolate, sometimes in a pair on short twigs, obovate in outline, 6—12 × 9—11 cm; leaflets elliptic-ovate to lanceolate, 2.5—7.5 × 1.5—4 cm, acute to acuminate at the apex, cuneate at the base, margin slightly crenate, coriaceous, glabrous; petioles geniculate and blackish at the insertion of the blade; petioles and rachis winged. Inflorescence consisting of an ament-like raceme, up to 4 cm long, scanty haired; peduncle grooved. Bracts stiff, triangulate or ovate, 2 mm long-pubescent, pedicels up to 4 times very shortly branched, 3 of which seeming abortive, with minute bracteoles at the base; fertile branche 2.5 mm long, sometimes with a very minute bracteole in the midst and a circumscising groove demarcating the base of the calyx tube. Flowers 3—5 mm, hermaphrodite, zygomorphic. Sepals 5, c. 3 mm long. Petals oblong or obovate, attenuate at the base, c. 4.5 mm long. Disk an encircling wall around the ovary. Stamens 8; filaments filiform, compressed and provided with hairs; anthers glabrous. Pistil with the ovary hidden in the disk, very small, 3-locular, gradually passing into the style. Fruit a brown or red thick-walled capsule, 3 cm long. Seeds black, with a bilobed arillus.

West Indies; continental America and tropical Africa.

In deciduous seasonal forests.

CURAÇAO: hills near Knip Plantation (Arnoldo 100, flb. March; 1413, st. July); hills near Rooi Behoenda (Boldingh 5513, fr. Nov.).

Cardiospermum Linnaeus, Spec. Plant. 366. 1753

Monoecious or dioecious, herbaceous to suffrutescent vines, climbing by axillary tendrils. Leaves bi-ternate and sometimes also 3-foliolate with 3-lobed leaflets, or subbi-pinnate; petiolate. Stipules minute. Inflorescence consisting of axillary, corymb-like, reduced thyrses, bearing 2 opposite tendrils below the top of the peduncle. Flowers small, irregular, mostly unisexual but sometimes also hermaphrodite. Sepals 4 (—5), the two exterior nearly half as long as the interior ones. Petals 4, unguiculate, appendaged. Disk unilateral, with a gland opposite each of the two upper petals. Male flower: stamens 8; filaments of unequal length, slightly connate at the base; pistillode present. Female flowers: staminodes present; pistil 3-carpellary; ovary 3-locular; styles 3; stigmas acute, papillate. Ovules solitary in each locule on an axile placenta. Fruit a 3-locular membranaceous to subchartaceous capsule, 3-angled or slightly 3-lobed. Seeds globular with a large hilum and a white aril. Endosperm very scanty.

About 12 species, mainly in tropical America.

Key to the species:

1. Capsule subglobose, 2—3 cm long; leaves up to 15 cm long; seed 2.5—4 mm in diam., with a kidney-shaped or barely notched aril. *C. corindum*
Capsule broader than long, about 1 cm long and 2 cm broad; leaves up to 8 cm long; seed c. 3 mm in diam., with a bilobed aril. *C. halicacabum*

Cardiospermum corindum L.

LINNAEUS, Spec. Plant. ed. 2. 526. 1762; URBAN, Symb. Ant. 4: 370. 1910; BOLDINGH, Fl. Ned. W. Ind. Eil. 262. 1913; Fl. D.W. Ind. Isl. 2: 60. 1914; URBAN, Symb. Ant. 8: 390. 1920; BRITTON & WILSON, Sci. Surv. Porto Rico & Virgin Isl. 5: 525. 1924; FAWCETT & RENDLE, Fl. Jamaica 5(3): 48. 1926; RADLKOFER, in ENGLER, Pflanzenreich IV, 165: 397. 1932; QUESTEL, Fl. Isl. St. Bartholomew 190, fig. 74. 1953; ARNOLDO, Zakflora 52. 1954; Zakflora 191. 1964; ADAMS, Flowering plants of Jamaica 439. 1972; FOURNET, Fl. Guadeloupe & Martinique 1100. 1978.

Perennial subshrub; branches simple or branched, climbing or trailing, up to 3.5 m long, pubescent or glabrate; 5-angular near the base and canaliculate towards the top. Leaves biternate, membranaceous, the leafsegments various, ovate, oval or lanceolate, acute, acuminate or obtuse and mucronulate at the apex, cordate or contracted into the petiole at the base, 0.5—7 cm long, margin dentate, crenate or somewhat lobed. Inflorescence consisting of many-branched and -flowered cincinni arranged into a thyse, mostly larger than the leaves; peduncle sometimes vine-like and the part above the lateral coiled abruptly passing into the thyse. Flowers white to yellowish, 4—6 mm long and c. 8 mm wide. Sepals 4, the outer 2 roundish-ovate, the inner 2 sepals oblong and twice as long as the outer. Petals obovate; scales unequal-sided at the lower petals, on the upper ones scales with hairy deflexed appendages and a crest. Glands of the disk globose, short. Stamens pilose at the base. Capsule subglobose to obovoid, 2.5—3 cm in diam., subchartaceous to membranaceous. Seeds black, 2.5—4 mm in diam.; hilum semicircular, white.

West Indies; continental tropical America from the southern United States southward; Old world tropics.

In dry vegetations.

BOINAIRE: Dos Pos (Arnoldo 421, fl. & fr. Feb.); near Rincón (Boldingh 7067, fl. & fr. Jan.); calcareous plateau near Playa Grandi (Boldingh 5485, defl. Feb.).

CURAÇAO: Ronde Klip (Boldingh 5408, fl. & fr. Nov.); Caracas Baai, in coastal thicket (Britton & Shafer 3138, fl. & fr. March); St. Marie (Went 1328, fl. & fr. Dec.); Seroe Christoffel (Stoffers 1192, fl. & fr. Dec.); without loc. (Aschenberg s.n., fl. & fr.).

Cardiospermum halicacabum L.

LINNAEUS, Spec. Plant. 366. 1753; GRISEBACH, Fl. Br. W. Ind. Isl. 122. 1859 [1864]; DUSS, Fl. phan. Ant. franç. 117. 1897; BOLDINGH, Fl. D.W. Ind. Isl. 1: 121. 1909; JOHNSTON, Proc. Bost. Soc. Nat. Hist. 34(7): 233. 1909; URBAN, Symb. Ant. 4: 310. 1910; BOLDINGH, Fl. Ned. W. Ind. Eil. 262. 1913; BRITTON & MILLSAUGH, Bahama Fl. 252. 1920; BRITTON & WILSON, Sci. Surv. Porto Rico & Virgin Isl. 5: 524. 1924; FAWCETT & RENDLE, Fl. Jamaica 5(3): 48. 1926; WILLIAMS, Fl.

Trinidad & Tobago 1: 182. 1930; LEON & ALAIN, Fl. Cuba 3: 190. 1953; ADAMS, Flowering plants of Jamaica 438. 1972; FOURNET, Fl. Guadeloupe & Martinique 1200. 1978.

Annual, climbing herb, glabrous or the younger parts slightly covered with minute hairs; stems simple or branched, 5—6-ribbed. Leaves bi-ternate, membranaceous; lateral segments of the lateral leaflets ovate, of the terminal leaflets oblong; terminal segments lanceolate, rhomboid at the base, often acuminate; all segments deeply lobed and mucronulate, margin sharply serrate. Inflorescence of the 3 pedunculate cincinni 6—9 cm long, the terminal 3 branches at about 0.5 cm distance from the tendrils. Flowers white, nearly 4 mm long and c. 7 mm wide. Sepals 4, the 2 outer roundish-ovate, the inner oblong and twice as long as the outer. Petals obovate, unguiculate; scales unequal-sided on the lower petals, on the upper ones the scales with a hairy, deflexed appendage and a conspicuous crest. Glands of the disk short, roundish. Stamens pubescent. Seeds with bilobed aril.

Continental tropical America from the southern United States southwards, West Indies, and Old World tropics.

var. microcarpa (Kunth) Blume

BLUME, Rumphia 3: 185. 1847; DUSS, Fl. phan. Ant. franç. 118. 1897; URBAN, Symb. Ant. 4: 370. 1910; BRITTON & WILSON, Bahama Fl. 252. 1920; URBAN, Symb. Ant. 8: 390. 1920; WILLIAMS, Fl. Trinidad & Tobago 1: 182. 1930; RADLKOFER, in ENGLER, Pflanzenreich IV, 165: 391. 1931; LEON & ALAIN, Fl. Cuba 3: 190. 1953; ARNOLDO, Zakflora 191. 1964; — *Cardiospermum microcarpum* KUNTH, in HUMBOLDT, BONPLAND & KUNTH, Nov. Gen. & Spec. 5: 104. 1821; GRISEBACH, Fl. Br. W. Ind. Isl. 122. 1859 ['1864']; BRITTON & WILSON, Sci. Surv. Porto Rico & Virgin Isl. 5: 525. 1924; FAWCETT & RENDLE, Fl. Jamaica 5(3): 48. 1926; ADAMS, Flowering plants of Jamaica 438. 1972; FOURNET, Fl. Guadeloupe & Martinique 1101. 1978.

Capsule broader than long, truncate or depressed at the apex, about 1 cm long and 2 cm broad. Seeds c. 3 mm in diam., with a 2-lobed aril.

West Indies, continental trop. America from Florida and Mexico southwards; Old World tropics.

Rather common, especially in dry vegetations.

CURAÇAO: Julianadorp (Stoffers 1309, fl. & fr. Jan.); Groot Piscadera (Burgers 99, fl. & fr. Jan.); Malpais (Nagelkerken 402, fl. & fr. June).

SABA: St. Giles (Boldingh 1868, fl. & fr. July); Windwardside (Boldingh 2307, fl. & fr. July).

ST. EUSTATIUS: along roads in Oranjestad (Stoffers 3882, fl. & fr. July; Boldingh 1106, fl. June); Bengalen (Boldingh 618, st. June); without loc. (van Groll-Meyer 154, fl. & fr.).

ST. MARTIN: along road from Marigot to Philipsburg (Boldingh 3112, fl. Sept.); from Cul de Sac to Marigot Hill, 0—200 m (Boldingh 2632, fl. Aug.); Point Blanche (George sub Boldingh 2496, fl. & fr. Aug.); Simson Bay (Arnoldo 3406, fl. & fr. Jan.); Mount Paradise (Boldingh 3316, fr. Sept.); from Philipsburg to Guana Bay (Boldingh 2421, fl. Aug.).

Monoecious or dioecious, evergreen shrubs or rarely treelets, mostly resinous-viscous. Leaves alternate or rarely opposite, simple, sub-chartaceous, margins subentire or repand, lateral veins parallel, numerous, surface usually appearing varnished, viscous, more or less covered with resiniferous glands. Stipules wanting. Inflorescence consisting of terminal and axillary thyrses or panicles. Bracts small. Flowers hermaphrodite or unisexual by abortion. Sepals 4—5, connate at the base, mostly deciduous. Petals wanting. Stamens 6—10 in hermaphrodite and male flowers, sterile or wanting in female flowers; filaments short; anthers linear-oblong, apiculate and longer than the filaments. Disk intrastaminal, nectariferous, minute in male flowers, stipe-like in hermaphrodite and female flowers. Pistil 2—4-carpellary; ovary 2—4-locular, covered with resiniferous glands; style filiform and 2—4-fid at the apex; stigmas small; pistil in male flowers rudimentary or wanting. Ovules 2 in each locule, superposed and sessile on the outgrowth of the placenta. Fruit a capsule, chartaceous, 2—4-locular, distinctly winged. Seeds lenticular or obovoid with callus-like outgrowth around the hilum. Endosperm wanting.

A genus of about 60 species, primarily Australian, one species pantropical, one in Madagascar, and 3 in Hawaii.

Key to the species:

1. Flowers hermaphrodite; scar of the sepals under the fruit mostly strongly lobed around the conspicuous stamen scars; fruit mostly 2-merous, strawcoloured or brownish. *D. viscosa*
Flowers unisexual; scar of sepals under the fruit usually annular, sometimes slightly lobed; fruits partly 3-merous, sometimes 4-merous, especially the wings tinged reddish when mature. *D. elaeagnoides*

Dodonaea viscosa (L.) Jacq.

JACQUIN, Enum. pl. Carib. 19. 1760; GRISEBACH, Fl. Br. W. Ind. Isl. 127. 1859 ['1864']; DUSS, Fl. phan. Ant. franç. 123. 1897; BOLDINGH, Fl. D.W. Ind. Isl. 1: 122. 1909; URBAN, Symb. Ant. 4: 373. 1910; BOLDINGH, Fl. Ned. W. Ind. Eil. 263. 1913; URBAN, Symb. Ant. 8: 395. 1920; FAWCETT & RENDLE, Fl. Jamaica 5(3): 58, fig. 26. 1926; WILLIAMS, Fl. Trinidad & Tobago 1: 191. 1930; RADLKOFER, in ENGLER, Pflanzenreich IV, 165: 1363. 1933; LEON & ALAIN, Fl. Cuba 3: 192, fig. 75. 1973; GOODING *et al.*, Fl. Barbados 267. 1965; ADAMS, Flowering plants of Jamaica 439. 1972; FOURNET, Fl. Guadeloupe & Martinique 1102, fig. 534. 1978; LEENHOUTS, Blumea 28: 285. 1983; — *Ptelea viscosa* LINNAEUS, Spec. Plant. 118. 1753.

Glabrous shrub or rarely treelet, 1.5—3 m tall; branchlets nearly always hardly glandular, remaining reddish-brown, fissuring lengthwise reticulately. Leaves obovate, rounded and apiculate, sometimes rounded or acute at the apex, narrowed at the base into the petiole, 5—12.5 x 1.5—4.5 cm, 2.5—2.75 times as long as wide, widest slightly above or sometimes in the middle, thin-pergamentaceous, drying greenish, not varnished, glands nearly always inconspicuous. Inflorescence consisting of panicles, about half as long as the leaves. Flowers hermaphrodite. Sepals 4(—5), caducous, scar under the fruit varying from deeply lobed to nearly annular. Anthers 1—1.5 mm. Pistil mostly

2-merous but often some to several 3-merous ones on the same specimen; style not to slightly cleft at the apex. Body of the fruits 9—13 mm high, wings halfway 4—6 mm wide, membranous, straw-coloured; body not conspicuously glandular, glabrous.

South-eastern Asia, Australia and Pacific islands, tropical Africa, Madagascar, Florida, Greater Antilles and some islands of the Lesser Antilles, Suriname and Brazil.

Coastal, mostly on sandy beaches.

ST. MARTIN: seashore near Simson Bay village (Boldingh 3031, fl. Aug.); Cole Bay Hill (George s.n., sub Boldingh 2504, defl. Aug.).

***Dodonaea elaeagnoides* Rudolph**

RUDOLPH ex LEDEBOUR & ALDERSTAM, Diss. Bot. Pl. Doming. 18. 1805; LEENHOUTS, Blumea 28: 284. 1983; — *Dodonaea viscosa* (L.) JACQUIN f. *elaeagnoides* RADLKOFER, in ENGLER, Pflanzenreich IV, 98: 1371. 1933.

Dioecious or rarely monoecious shrub up to 3 m high; branches soon, sometimes nearly from the beginning, terete, rather gnarly, greyish, often fairly densely or scurfy glandular. Leaves obovate, 2.5—10 x 1—4 cm, ratio 1.75—4.5, widest at most 0.25 of the length below the apex; apex rounded or sometimes nearly truncate, sometimes either apiculate or emarginate, chartaceous to stiff pergamentaceous, drying brownish to sometimes greenish, usually not very glandular and accordingly not varnished. Inflorescence glabrous but variable glandular. Flowers unisexual. Sepals 4. Stamens 6 or 7; anthers 1.5—1.8 mm long; in female flowers completely suppressed. Pistil 2-merous, sometimes partly 3-merous; style 4.5—5 mm long, knobbed or slightly lobed at apex. Fruit with body 4—7 mm high, the wings 2—4 mm wide, at the apex adnate to the style base for 1.5—2.5 mm, thin-pergamentaceous (slightly more stiff than in *D. viscosa*), mostly not conspicuously glandular, glabrous, possibly brownish to reddish.

West Indies, Florida and Florida Keys.

Coastal and inland, up to 350 m alt.

ST. EUSTATIUS: road to White Wall, 50 m (Arnoldo 3182, fl. & fr. Dec.; Stoffers 3503, fl. July); slope of The Quill above White Wall, 350 m (Boldingh 1, fl. & fr. May); slope of The Quill on the side of White Wall, 200 m (Boldingh 1199, fr. June); White Wall (Boldingh 804, fr. June); gut near Fort de Windt (Boldingh 828, fr. June; 835a, st. June).

Note: Recently Leenhouts, in Blumea 28: 271. 1983, accepted *Dodonaea elaeagnoides* Rudolph: 'Especially the unisexual flowers and the clearly different fruits — smaller and with the wing apically adnate to the style base — are for me strong arguments to consider this a good species, allied with *viscosa* but sufficiently different'.

In order to facilitate the comparison between *D. viscosa* and *D. elaeagnoides* Leenhouts diagnoses, exclusively based upon American material, are given above. Also the key to the species is taken from Leenhouts as far as it concerns the two species given here.

Allophylus Linnaeus, Spec. Plant. 348. 1753

Shrubs or trees. Leaves alternate, palmately compound, mostly 3-foliolate, petiolate; leaflets entire or serrate, often pellucid-dotted or -lined, the lateral ones often unequal-sided. Inflorescence consisting of axillary racemiform or laxly paniculate cincinni. Flowers obliquely zygomorphic, polygamo-dioecious, small. Sepals 4, concave, broadly imbricate, the inner 2 suborbicular, the outer 2 elliptic, smaller. Petals 4, spatulate or cochleariform, with a small bifid appendage above the claw. Disk small, unilateral. Stamens mostly 8. Pistil 2—3-carpellary; ovary 2—3-locular, excentric, compressed; style 2—3-fid to 3-lobed. Ovules solitary in each cell. Fruit drupe-like, consisting of almost free, subglobose or obovoid, indehiscent cocci. Seeds obovoid, erect; aril short, fleshy or wanting.

Tropical and subtropical regions.

Note: Leenhouts, in *Blumea* 15: 301-358. 1967, brings all 271 species and varieties listed by Radlkofe (1931) together in one single species: *Allophylus cobbe* (L.) Raeuschel.

Allophylus racemosus Sw.

Swartz, Nov. Gen. & Spec. Plant. 62. 1788; GOODING *et al.* Fl. Barbados 265. 1965; FOURNET, Fl. Guadeloupe & Martinique 1105, fig. 535. 1978; — *Allophylus occidentalis* (SWARTZ) RADLKOFER, Sitzungsber. phys. math. Cl. Bayer. Akad. Wiss. Muench. 20: 230. 1890 nom. illeg.; BOLDINGH, Fl. D.W. Ind. Isl. 1: 121. 1909; URBAN, Symb. Ant. 4: 371. 1910; BOLDINGH, Fl. Ned. W. Ind. Eil. 262. 1913; URBAN, Symb. Ant. 8: 392. 1920; BRITTON & WILSON, Sci. Surv. Porto Rico & Virgin Isl. 5: 526. 1924; RADLKOFER in ENGLER, Nat. Pflanzenreich IV, 165: 481. 1931; — *Schmidelia occidentalis* SWARTZ, Fl. Ind. Occ. 2: 665. 1800; GRISEBACH, Fl. Br. W. Ind. Isl. 126. 1859 ['1864']; DUSS, Fl. phan. Ant. franç. 122. 1897.

Deciduous tree up to 10 m tall or shrub; trunk to 15 cm or more in diam., few-branched; bark gray and smooth, becoming slightly fissured into thin plates and peeling off; twigs hairy, greyish-green, turning light-brown, younger parts often floccose, older parts glabrous. Leaves alternate, trifoliolate; leaflets oblanceolate to elliptic, acuminate to cuspidate at the apex, attenuate to cuneate at the base and the lateral leaflets inequilateral, 3.5—19.5 x 1—9 cm, membranaceous to coriaceous, margin serrate to double serrate, upper surface shining green with scattered hairs and denser haired veins, lower surface greyish by the dense tomentum; petiolules short, up to 3 mm long; petiole tomentose, 4—10 (—14) cm long, canaliculate above. Inflorescence consisting of axillary racemes, usually up to 7 cm long. Flowers 2—3 in the axil of a bract; bracts and bracteoles small, softly haired; peduncle and pedicels softly haired. Flowers hermaphrodite but often functionally unisexual, slightly zygomorphic. Sepals 4, puberulous outside, the outer 2 boat-shaped, 2 mm long, the inner ones much broader, 2 mm long and 3 mm wide. Petals 4, obovate to spatulate, smaller than the sepals, with a hairy ridge at the midst of the inner surface. Male flower: stamens 8; filaments acute and more than twice as long as the petals, inserted on the disk; anthers versatile, with lateral dehiscence; rudiment of pistil very small or wanting. Female flower: disk unilateral and split up into 2 parts of which the lower part lobed; ovary superior, yellowish by short and long hairs,

2-locular; the locules nearly completely separated, one of which forming the fruit; style one, thick; stigmatic part curled at the top and covered with papillae. Fruit dry, roundish to obovoid, 2-valvate but not opening, brown, orange or red, about 5 mm in diam. Seed 1, roundish, with stiff bristly hairs.

From Cuba to St. Vincent and Barbados; also in continental tropical America from Guatemala to Colombia, Venezuela, and Guyana.
Mostly in forests and woodlands.

SABA: gut between Mastic Gut and Hellsgate, 300-400 m (Boldingh 2057, st. July); road to Mary's Point (Arnoldo 851, flb. Aug.); Crispine (Stoffers 3461, fl. June); Castle Hill, seaside (Stoffers 4175, fl. Aug.; 4190, st. Aug.); Booby Hill, 400 m (Stoffers 4318, fr. Aug.; Boldingh 1598, st. July).

ST. EUSTATIUS: Miss Raders Ravine (Suringar s.n., flb. May); top of The Quill, 350-450 m (Stoffers 3686, st. July; Boldingh 213, fl. June); inner slope of The Quill, 350 m (Boldingh 455, fl. June; 1215, fr. June); slope of The Quill near Bengalen (Stoffers 3778, st. July); slope of The Quill near Glass Bottle (Stoffers 3839, st. July).

ST. MARTIN: Mount Paradise (Le Gallo 872, st. July).

Melicoccus P. Browne, Civ. Nat. Hist. Jamaica 210. 1756

Large, evergreen trees. Leaves alternate, 2-6-foliolate, on the lower branches sometimes simple, petiolate. Stipules wanting. Inflorescence consisting of terminal and axillary, simple or paniculate racemes. Bracts minute and subulate, caducous. Flowers small, unisexual by abortion, polygamo-dioecious, white or greenish-white, actinomorphic, hypogynous. Sepals 4 (-5), nearly free, subequal, petaloid. Petals 4 (-5), nearly twice as long as the sepals, short-unguiculate, without appendages. Disk extra-staminal. Stamens 8. Pistil 2-3-carpellary; ovary 1-locular to imperfectly 2-3-locular; style short; stigma large, 2(-3)-lobed. Ovules 2-3, ascending from the base. Fruit a drupe; pericarp leathery, usually 1-locular and 1-seeded. Seeds ellipsoid; outer seedcoat fleshy, inner leathery to crustaceous. Endosperm wanting.

Two species in tropical America.

Melicoccus bijugatus Jacq.

JACQUIN, Enum. Syst. Plant. Carib. 19. 1760; ADAMS, Flowering plants of Jamaica 440. 1972; FOURNET, Fl. Guadeloupe & Martinique 1110, fig. 539. 1978; — *Melicocca bijuga* LINNAEUS, Spec. Plant. ed. 2. 495. 1762; GRISEBACH, Fl. Br. W. Ins. Isl. 127. 1859 ['1864']; DUSS, Fl. phan. Ant. franç. 123. 1897; BOLDINGH, Fl. D. W. Ind. Isl. 1: 122. 1909; JOHNSTON, Proc. Bost. Soc. Nat. Hist. 34(7): 233. 1909; URBAN, Symb. Ant. 4: 372. 1910; BOLDINGH, Fl. Ned. W. Ind. Eil. 263. 1913; Fl. D. W. Ind. Isl. 2: 60. 1914; URBAN, Symb. Ant. 8: 394. 1920; BRITTON & MILLSAUGH, Bahama Fl. 253. 1920; BRITTON & WILSON, Sci. Surv. Porto Rico & Virgin Isl. 5: 529. 1924; FAWCETT & RENDLE, Fl. Jamaica 5(3): 53. 1926; WILLIAMS, Fl. Trinidad & Tobago 1: 190. 1930; QUESTEL, Fl. Isl. St. Bartholomew 143. 1953; LEON & ALAIN, Fl. Cuba 3: 204. 1953; ARNOLDO, Gekw. en nutt. plant. Ned. Ant. 253. 1954; Gekw. en nutt. plant. Ned. Ant. 232. 1971; GODOING *et al.*, Fl. Barbados 268. 1965.

Glabrous tree, up to 15 m tall; trunk up to more than 1 m in diam., branches spreading;

bark greyish-white. Leaves 2—4-foliolate; rhachis 3 cm long, flattened to alate, canaliculate above; leaflets in 2 opposite pairs, ovate-elliptic to elliptic, the terminal ones 6—10 × 3—5 cm, the lower 8—11 × 3.5—5.5 cm, acute to obtuse at the apex, cuneate and oblique at the base, those of the older branches often larger and up to 19 × 7.5 cm, margin entire to slightly serrate. Inflorescence consisting of a glabrous, many-flowered, broadly pyramidal panicle or simple racemes up to 15 cm long. Flowers fragrant, hermaphrodite or unisexual on up to 8 mm long pedicels. Calyx 4 (—5)-lobed; lobes 2 mm long and wide, fimbriate. Petals 4 (—5), obovate, obtuse, greenish-white, 4—5 mm long and 3 mm wide, ciliate. Disk more or less 4—5-lobed, the lobes opposite the petals; stamens 8 (—10), in 2 whorls; filaments glabrous, filiform, 3—4 mm long, in hermaphrodite flowers filaments short, 1 mm; anthers 1 mm long, extrorse. Ovary superior, 2 (—3)-locular; style short; stigma 2 (—3)-lobed. Ovules one in each locule. Fruit a yellowish-green, subglobose drupe, 2—3 cm in diam. Seeds globose.

A native of tropical America; introduced into tropical Asia and Africa.

Rather frequent on the islands of the Windward Group; planted on the islands of the Leeward Group.

Vernacular names: Kenepa (Leeward Group)
Ginep tree (Windward Group).

BONAIRE: Fontein Plantation (Arnoldo 491, male fl., Ap.).

CURAÇAO: Fort Nassau (Suringar s.n., st. Jan. [L]); Priester Berg (Suringar s.n., st. Jan. [L]); without loc. (Aschenberg s.n., male and hermaphr. flowers).

SABA: The Bottom (Boldingh 1872, st. July).

ST. EUSTATIUS: Oranjestad (Suringar s.n., fl. May [L]); Seinpost (Suringar s.n., fl. Ap. [L]); lower part of the hills near Concordia (Boldingh 978, male fl. June); Bengalen (Boldingh 633, st. June); between Schotsen Hoek and Little Mountains (Stoffers 3550, st. Aug.); without loc. (van Groll-Meyer 254. st.).

Hypelate P. Browne, Civ. Nat. Hist. Jamaica 208. 1756

Monoecious, evergreen trees or shrubs. Leaves alternate, 3-foliolate; petiolate. Stipules wanting. Inflorescence consisting of axillary and subterminal, few-flowered, long-pedunculate thyrses as long as or longer than the leaves. Bracts and bracteoles small, caducous. Flowers unisexual by abortion, actinomorphic, the staminate and carpellate flowers in separate inflorescences. Sepals (4—)5, unequal, the 2 exterior smaller than the interior, imbricate, deciduous. Petals (4—)5, unappendaged, flabellate-veined, imbricate. Disk fleshy, annular, shallowly 5-lobed, 7 (—8)-sulcate, glabrous. Stamens (7—)8, inserted on the lobes of the disk, exerted in male flowers, short and with sterile anthers in female flowers. Pistil 3-carpellary, rudimentary in male flowers; ovary 3-locular; style short, curved near the apex; stigma obtuse, 3-lobed. Ovules 2 in each locule, on an axile placenta, superposed. Fruit a slightly sulcate drupe, crowned by the remnant of the style; stone thick crustaceous, 1-locular by abortion, 1-seeded. Seed ellipsoid or obovoid, not arillate. Endosperm wanting.

A monotypic genus in the West Indies and hammocks of southwestern Florida.

Hypelate trifoliata Sw.

SWARTZ, Prodr. Veg. Ind. Occ. 61. 1788; GRISEBACH, Fl. Br. W. Ind. Isl. 127. 1859 [1864]; BOLDINGH, Fl. D. W. Ind. Isl. 1: 122. 1909; URBAN, Symb. Ant. 4: 374. 1910; BOLDINGH, Fl. Ned. W. Ind. Eil. 263. 1913; URBAN, Symb. Ant. 8: 396. 1920; BRITTON & MILLSAUGH, Bahama Fl. 254. 1920; FAWCETT & RENDLE, Fl. Jamaica 5(3): 59, fig. 27. 1926; RADLKOEFER, in ENGLER, Pflanzenreich IV, 165: 1408. 1933; LEON & ALAIN, Fl. Cuba 3: 197, fig. 78. 1953; ADAMS, Flowering plants of Jamaica 440. 1972; FOURNET, Fl. Guadeloupe & Martinique 1106, fig. 536. 1978.

Glabrous, evergreen, small tree or shrub, up to 8 m tall; trunk up to 10 cm in diam.; bark grey and smooth; twigs slender, grey. Leaves alternate, 3-foliolate; leaflets sessile, obovate to oblanceolate, blunt, notched or sometimes emarginate at the apex, narrowed to the base, 1.5—4.3 × 0.6—1.8 cm, margin entire, slightly involute, rigid and coriaceous, upper leaf-surface green, lower surface yellow-green. Stipules wanting. Inflorescence consisting of an up to 10 cm long, broad, erect panicle near the top of the twigs; pedicels 5 mm long. Bracts and bractlets deciduous. Flowers actinomorphic, 5 mm in diam., hermaphrodite or unisexual by abortion. Sepals (4—)5, reddish, the outer 2 boatshaped, ovate, puberulous at the base and the margin slightly fimbriate. Petals 5, white, somewhat larger than the sepals and somewhat rectangular in outline. Disk regular, fleshy, 8-sulcate, glabrous. Stamens 8, inserted on the disk, 2.5 mm long; filaments filiform, dorsifixed at the base of the emarginate base of the oblong, laterally dehiscing anthers; in female flowers staminodia short and sterile. Pistil 1, 3-carpellary; ovary 3-locular, sessile in the disk, triangular; style short, curved; stigma dot. Fruit an ellipsoid drupe with thin flesh, c. 7 mm when dry, crowned by the persistent style. Seed 1.

Southern Florida, Bahamas, Greater Antilles, St. Martin, and Anguilla.

Rare; known from the dry limestone vegetation in St. Martin.

ST. MARTIN: near Simson Bay Lagoon (Boldingh 2738a, st. Aug.); Lowlands (Le Gallo 859, 898, fl.).

Exothea Macfadyan, Fl. Jamaica 1: 232. 1837

Evergreen (polygamo-)dioecious trees. Leaves alternate, even-pinnate, 2—6- or rarely 3- or 1-foliolate; leaflets subsessile or short-petiolate; petiolate. Inflorescence consisting of axillary and/or subterminal corymb-like thyrses. Bracts and bracteoles minute, deciduous. Flowers small, actinomorphic, unisexual by abortion but also hermaphrodite. Sepals 5, connate at the base, reflexed after blooming, persistent, imbricate. Petals 5, whitish, short-unguiculate, unappendaged, imbricate, about as long as the sepals. Disk fleshy, nectariferous, patelliform, lobulate, puberulous, orange to red. Stamens (7—)8(—10), inserted on the disk in small depressions near its margin. Pistil 2-carpellary, rudimentary in male flowers; ovary sessile, 2-locular, pubescent; style short; stigma large, obtuse, subbilobed or indistinctly 3—4-lobed. Ovules 2 in each locule, suspended from the summit of the axile placenta. Fruit a berry, crowned with the remnants of the style and surrounded at the base by reflexed sepals. Seeds globular, aril wanting. Endosperm wanting.

Three species in the West Indies, tropical continental America from Mexico and southern Florida south to Costa Rica.

***Exothea paniculata* (Juss.) Radlk.**

RADLKOFER, in DURAND, Ind. Gen. Phan. 81. 1888; URBAN, Symb. Ant. 4: 374. 1910; BOLDINGH, Fl. Ned. W. Ind. Eil. 264. 1913; URBAN, Symb. Ant. 8: 396. 1920; BRITTON & MILLSAUGH, Bahama Fl. 254. 1920; BRITTON & WILSON, Sci. Surv. Porto Rico & Virgin Isl. 5: 530. 1924; FAWCETT & RENDLE, Fl. Jamaica 5(3): 61, fig. 28. 1926; RADLKOFER, in ENGLER, Pflanzenreich IV, 165: 1412. 1933; LEON & ALAIN, Fl. Cuba 3: 204, fig. 83. 1953; ADAMS, Flowering plants of Jamaica 440. 1972; FOURNET, Fl. Guadeloupe & Martinique 1108, fig. 538, 538bis. 1978; — *Meliocca paniculata* JUSSIEU, Mém. Mus. Paris 3: 187, t. 5. 1817.

Evergreen, small to medium-sized tree, to 10 m tall; trunk up to 10 cm in diam.; bark brown or reddish-brown, smoothish with large thin flakes or scales; twigs slender, covered with minute yellowish hairs when young, becoming grey with lenticels. Leaves alternate, evenly pinnate with 1 or 2, rarely 3 pairs of leaflets or leaves 3-foliolate; rhachis grooved; leaflets opposite, lanceolate to ovate or oblong to elliptic, acute to obtuse at the apex, oblique to cuneate at the base, yellow-green, margin entire to slightly undulate; glabrous or pubescent on the midvein only; terminal leaflets 5—10 × 1—3.5 cm, the lateral leaflets 3—8.5 × 1—2 cm; petioles 1—3 cm long, canaliculate above. Inflorescence consisting of clusters (panicles) at the ends and sides of the branches, up to 15 cm long, with slender, yellowish hairy branches. Bracts acute, hairy, 2 mm long; pedicels up to 1 cm long with about 4 acute hairy bractlets, only 1 or 2 giving rise to a flower. Flowers partly male, female and hermaphrodite on the same or on different trees, fragrant, c. 6 mm across. Sepals 5, hairy, 4 mm long, rounded to acute, 2—3 × 4 mm, tomentulose, persisting with the fruit. Petals 5, about as long as the sepals, whitish or cream-coloured, glabrous. Stamens 8, inserted on the disk and each emerging from a hole in the disk; filaments filiform, as long as or somewhat longer than the petals in male and hermaphrodite flowers, short and sterile in female flowers; anthers with lateral dehiscence. Disk with 8 lobes slightly hairy. Pistil 2-carpellary; ovary sunk in the disk, 2-locular, one of which is mostly abortive, hairy; style very short, persisting with the fruit; stigma dot. Fruit a berry-like drupe with the calyx at the base and a pointed style at the apex, pulp thin, orange, juicy. Seeds 1 or rarely 2, round, brown, large, c. 0.8 cm in diam.

Mexico, Guatemala, southern Florida, Bahamas, Greater Antilles, and islands of the Lesser Antilles.

Rare, in limestone forests.