

9.2. forma *villosus*

*Fl. & Fr.* : June - Sept.

*Distrib.* India : Assam.

Bangladesh, Myanmar and Indo-Malaya.

2. *Arytera* Blume

Trees or shrubs. Leaves paripinnate, spirally arranged. Leaflets 4-6 (-8), ovate to oblong-lanceolate, apex, obtuse or subobtusely acuminate, base acute, margin entire, sparingly coriaceous. Flowers uni or bi-sexual, yellow, in branched racemes. Sepals 5-6. Petals 5 with long ciliate auricles at base which are sometimes connate into a scale. Disc annular, crenate, glabrous. Stamens 8; filaments pilose; in male flowers exerted, short in female ones; anthers pubescent, glabrescent. Ovary 2-loculed. Fruits capsular, 2-lobed, coriaceous. Seeds with saccate aril.

China, Indo-Malaya, China, Australia and Pacific; 25 species, 1 in India.

*Arytera littoralis* Blume, Rumphia 3: 170. 1849; Parkinson, For. Fl. Andaman Isls. 137. 1923. *Euphoria xerocarpa* Blume, Bijdr. 234. 1825. *p.p.* *Arytera xerocarpa* (Blume) Adelb. in Blumea 6: 324. 1948. *Cupania adenophylla* Planchon ex Hook.f., Fl. Brit. India 1: 677. 1875.

Trees or shrubs, up to 10 m tall; branchlets lenticellate with prominent leaf-scars, together with rachis pale brown; hairy to glabrous. Leaves (2-) 4-6 foliolate; leaflets subopposite, ovate, elliptic, elliptic oblong or oblong-lanceolate, 4-1.5 x 1.75-6.5 cm, acuminate at apex, cuneate to slightly attenuate at base, coriaceous, glabrous; lateral nerves 8-10 pairs. Inflorescences axillary or pseudoterminal, pubescent. Flowers yellow, up to 2.5 cm in diam. Calyx deeply lobed, segments subvalvate. Petals hairy above. Capsules with compressed lobes. Seeds ellipsoid-orbiculate, black.

*Fl. & Fr.* : Feb. - Nov.

*Distrib.* India : In the littoral forests. Andaman & Nicobar Islands.

Myanmar and Malesia.

3. *Cardiospermum* L.

Climbing herbs; stem and branches wiry, grooved, tendrillar. Leaves alternate, exstipulate, biternate; leaflets coarsely dentate. Flowers polygamodioecious, ca 0.5-0.8 mm across, atoping coiled tendrils, in axillary racemes or corymbs. Sepals 4 in two pairs; outer small; inner large. Petals 4 in two pairs; upper pair with a suprabasal scale; lower with an inflexed appendage. Disc with 2 glands. Stamens 8; filaments free or connate below, of unequal lengths. Ovary sessile or subsessile, 3-loculed. Fruit an inflated, membranous, trigonous, 3-celled, loculicidally 3-valved capsule. Seeds globose usually with hilum at base.

Tropical America and Africa; ca 12 species, 2 in India.

*Literature.* MATTHEW, K.M. (1983). Flora of Tamil Nadu Carnatic 1: 291-292.

## KEY TO THE SPECIES

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| 1a. Capsules pyriform, winged at the angles; seeds with large heart-shaped hilum       | 2. <i>C. halicacabum</i> |
| b. Capsules subglobose, ovate when young, not winged; seeds with small orbicular hilum | 1. <i>C. canescens</i>   |

1. *Cardiospermum canescens* Wallich, Pl. As. Rar. 1: 14.t. 14. 1829; Hiern in Fl. Brit. India 1: 670. 1875.

Softly hairy, scandent annuals; stems sulcate. Leaves biternate; petioles up to 5 cm long; petiolules 0.1-1 mm long, hairy; leaflets 3-5, margins irregularly toothed, both sides hairy, more so on lower surface. Flowers white; in long, peduncled, umbellate cymes arising from the base of a pair of coiled tendrils. Outer sepals rounded, hairy on outer faces. Petals rounded at apex. Style short. Capsules subglobose, 3-angled, sparsely hairy. Seeds globose, smooth, black, with white aril.

*Fl. & Fr.* : Throughout the greater part of the year.

*Distrib.* India: Western Ghats and Deccan Plateau. Andhra Pradesh, Gujarat, Maharashtra, Tamil Nadu, Karnataka and Kerala.

Sri Lanka, Myanmar and Abyssinia.

*Note.* Matthew (Flora of Tamil Nadu Carnatic 1: 291-292. 1983) is of the opinion that the material present in many Indian herbaria and described in Indian Floras under this species is referable to *C. halicacabum* L. var. *luridum* (Blume) Adelb. However, the material examined by the author agrees well with the protologue of *Cardiospermum canescens* Wallich.

**2. *Cardiospermum halicacabum* L.,** Sp. Pl. 366. 1753; Hiern in Fl. Brit. India 1: 670. 1875. *C. microcarpum* Kunth, Nov. Gen. et Sp. Pl. 5: 104. 1821.

Beng.: *Sibjhul*, *Nayaphutki*; Guj.: *Kagadolio*, *Korolio*; Kan.: *Kakarlata*; Mani.: *Putka*, *Sibjul*; Mar.: *Tejovati*, *Kapal-phodi*.

Annual or perennial, tendrillar, climbing herbs; stem and branches slender, furrowed, pubescent or glabrous. Leaves deltoid or ovate, 3-8 cm, biternate; leaflets deeply incised, acute at apex, narrowed at base. Flowers very small, white in umbellate cymes; cyme resting on 2 opposite circinate tenderils. Outer sepals rounded-obovate, inner rounded, larger than the outer, very thin. Petals rounded. Capsules on short stalks, subglobose or broadly pyriform, 1.2-3 cm across, trigonous, truncate at top, angles winged. Seeds globose, black.

*Fl. & Fr.* : Throughout the greater part of the year.

*Distrib.* India : Throughout the country in tropical and subtropical regions, mostly amidst hedges.

*Note.* Roots, leaves and seeds are reported to be used in indigenous system of medicine in Maharashtra.

#### 4. *Cupania* Plum.

Small to medium trees or large shrubs. Leaves alternate, pinnate, exstipulate; leaflets opposite or subopposite, entire, subcoriaceous. Inflorescence

axillary and subterminal panicles or raceme, bracteolate. Flowers polygamo-dioecious. Sepals 5-4, concave, imbricated in 2 rows. Petals 5-4, alternating with calyx segments, often with 1-2 basal scales. Disc regular or unequally thick, annular, glabrous, exserted. Stamens 7-10 or fewer, free, inserted in the disc. Ovary ovoid-obovoid or obcordate, 2-4-celled; ovules solitary. Fruits obcordate-pyriform, glabrous, 1-2 seeded. Seeds arillate at base.

Pantropical, Australia; ca 55 species, 1 in India.

***Cupania jackiana*** Hiern in Fl. Brit. India 1: 678. 1875. *Arytera montana* Blume, Rumphia 3: 171. 1847. *Lepidopetalum montanum* (Blume) Radlk., Sap. Holl.-Ind. 14. 1879; Lakshmin. in Hajra *et al.*, Fl. Andaman-Nicobar Isls. 1: 319. 1999. *Lepidopetalum jackianum* Radlk., Sap. Holl.-Ind. 45. 1879.

Small trees; young parts pubescent. Upper leaves 15-30 cm long; leaflets 6-8, opposite-subopposite, elliptic, 5-15 x 3.5-6 cm, obtusely acuminate, cuneate-obtuse at base. Panicles towards the apex of the branches, short petioled; lateral veins 8-10 pairs. Sepals lanceolate, united at the base. Corolla ovate-cordate. Stamens 8; filaments slender, glabrous; anthers oblong. Ovary 2-loculed. Capsules oblong-obovoid, 2-celled, 1-seeded, sometimes 2-seeded, mucronate-cuspidate, shortly stipitate at base. Seeds ellipsoid, black.

*Fl. & Fr.* : April - March.

*Distrib.* India : Andaman & Car Nicobar Islands.

*Note.* The fruits are said to be favourite to pigeons in Andaman & Nicobar Islands.

#### 5. *Dimocarpus* Lour.

Trees or shrubs. Leaves paripinnate; petiole slightly swollen at base, exstipulate; leaflets opposite or alternate; membranous or thin coriaceous, glabrous or somewhat hairy, entire, repand or serrate to dentate, blunt at apex to acuminate, often mucronate, base more or less oblique. Inflorescence terminal, thyrsoid. Flowers unisexual, yellowish to white. Sepals 5-6-lobed. Petals 5, rarely 6. Disc 5-lobed, densely hairy. Stamens 6-10, slightly exserted

or not; filaments very slender, thread like. Ovary sessile, broadly cordate, tuberculate. Fruits globular to broadly ellipsoid.

South and S.E. Asia, Sri Lanka, Eastern Malesia; 5 species, 1 in India.

**Dimocarpus longan** Lour., Fl. Cochinch. 293. 1790. *Nephelium longan* Cambess., Mem. Mus Hist. Nat. Pairs 18: 30. 1829; Hiern in Fl. Brit. India 1: 688. 1875.

Kan.: *Kanakindeli*; Kh.: *Samphal-bol*; Mal.: *Psakotta*; Mar.: *Umb*, *Vumb*; Tam.: *Puvatti*, *Katta Puvan*, *Shempuvan*, *Sakattai*.

Trees, up to 25 m tall, sometimes buttressed; bark smooth, younger parts with stellate pubescence; twigs terete, faintly grooved. Leaves upto 45 cm long; leaflets 4-10, opposite or alternate, oblong or ovate-lanceolate, 3.5-14 x 1.5-3.5 cm; thin, membranous to coriaceous; apex acute to acuminate, more or less oblique at base, rachis rusty puberulous, becoming glabrous on ageing, thinly tufted, tomentose on mid rib and nerves, with or without naked gland or tuft of hairs on nerve axils beneath. Panicles terminal or axillary, pubescent. Flowers in clusters; pedicels short, pubescent. Calyx lobes confluent at base, partially hairy on inner side. Petals linear-spathulate, densely hairy or if not hairy, sessile glands present inside towards apex. Ovary 2-3-lobed. Fruits smooth to warty, sometimes granular, glabrescent.

*Fl. & Fr.* : Feb. - Aug.

*Distrib.* India : Indo-Gangetic plain. N.E. India, Deccan peninsula, commonly in evergreen forests, up to 1800 m. Punjab, Uttar Pradesh, Assam, Arunachal Pradesh, Meghalaya, Maharashtra, Karnataka, Tamil Nadu and Kerala.

Bangladesh, Myanmar, Sri Lanka, China, Taiwan, Thailand, Vietnam, Philippines and Papua New Guinea.

*Note.* Forms with narrow linear leaves are also often met with. The young leaves are conspicuously red. The bases of upper leaflets are distinctly oblique. Often cultivated. The aril is edible.

## 6. *Dittelasma* Hook.f.

Trees; bark grey leathery, young parts softly tomentose. Leaves alternate, pinnate, exstipulate; leaflets subopposite or alternate. Inflorescence axillary or terminal panicle. Flowers polygamo-monoecious; bracteate. Sepals 5, tomentose on outer face. Petals 4, each with a scale, tomentose outwards. Disc semicircular, glabrous. Stamens 8, inserted at the base of ovary and disc, equal; filaments hairy. Ovary 3-lobed, 3-loculed, ovoid-globose, glabrous; ovules 1 in each locule. Fruits fleshy, indehiscent, of 3 cocci. Seeds globose, exarillate; testa thick.

Indo-Malaya; a monotypic genus in North-Eastern region of India.

***Dittelasma rarak*** (DC.) Hook.f., in Benth. & Hook.f., Gen. Pl. 1: 396. 1862; Hiern in Fl. Brit. India 1: 672. 1875. *Sapindus rarak* DC., Prodr. 1: 608. 1824.

Trees, up to 20 m tall, terete, with glabrous, smooth bark. Leaves pari- or imparipinnate, up to 50 cm long; leaflets 14-26, falcately lanceolate or oblong, 3.5-18 x 0.8-6 cm, oblique at base, subcoriaceous, pubescent when young, becoming glabrescent or glabrous afterwards, short petioled. Panicles erect, ovoid-pyramidal, fulvus, velvety. Flowers white or pale. Calyx appressed, pubescent; sepals of unequal length, oblong. Petals oblong. Anthers slightly exerted. Fruits subglobose, ca 6 mm across; pericarp saponaceous.

*Fl. & Fr.* : June - Nov.

*Distrib.* India : In primary and secondary forests, between 200-1000 m. West Bengal, Assam and Meghalaya. Rare.

Bhutan, Myanmar, Vietnam, China, Sumatra, Malaya, Java and Sri Lanka (introduced).

## 7. *Dodonaea* L.

Shrubs, rarely attaining tree habit; branches slender, often viscous, angular; bark ash black-reddish brown. Leaves alternate, subsessile, simple or abruptly pinnate, exstipulate. Inflorescence lateral and terminal, racemes or panicles. Flowers polygamous. Sepals 2-5, imbricate or valvate. Petals absent. Disc very

small in female flowers; obsolete in male ones. Stamens 5-10, usually 8, inserted on outer face of disc; filaments short; anthers linear-oblong. Ovary 3-6-loculed, sessile; ovules 2 in each cell. Capsules membranous or coriaceous, septically 2-6-valved, valves winged, cells 1-2-seeded. Seeds lenticular or subglobose, compressed.

Tropical and subtropical regions, chiefly Australian; ca 55 species, 2 in India.

*Literature.* LEENHOUTS, P.W. (1983). Notes on the Extra Australian species of *Dodonaea* (Sapindaceae). *Blumea* 28(2): 271-289.

#### KEY TO THE SPECIES

- 1a. Flowers mostly unisexual, often dioecious; scar of sepals on fruit usually annular, occasionally slightly lobed; fruits glandular, reddish tinged, especially the wings
- b. Flowers bisexual; scar of sepals under fruit mostly strongly lobed; fruits straw-colored or brownish

1. *D. angustifolia*

2. *D. viscosa*

1. *Dodonaea angustifolia* L.f., Suppl. Pl. 218. 1782. *D. viscosa* Jacq. var. *angustifolia* Benth., Fl. Austrl. 1: 476. 1863.

Tam.: *Viraali*, *Vilaari*.

Shrubs or small sized trees, up to 6 m tall; bark blackish; young branchlets glandular. Leaves elliptic-lanceolate, 1-9 x 0.2-1.8 cm, apex acute to acuminate, when fresh somewhat coriaceous, surfaces glandular. Inflorescence axillary and terminal racemes or panicles. Flowers green, up to 4 cm long. Sepals 4-5, connate at base, persistent. Stamens up to 10; anthers oblong, slightly hairy at the tip. Disc annular. Pistil 2-4-merous; style cleft at apex, rarely not so. Capsules 2-3-winged, glandular, glabrous. Seeds subglobose, up to 4 mm across, black.

*Fl. & Fr.* : Throughout the year.

*Distrib.* India : In open grounds, especially the forest clearings and establishes quickly in such locations; Central India and Western Ghats. Madhya Pradesh and Tamil Nadu.

Pakistan, Afghanistan, Iraq, Iran, Arabia, China, Japan, Sri Lanka, Vietnam, Malesia, Australia, New Zealand, Tropical Africa, Madagascar, Mascarene Island, South Africa, N. & S. America and West Indies.

2. *Dodonaea viscosa* Jacq., Enum. Syst. Pl. 19. 1760; Hiern in Fl. Brit. India 1: 697. 1875. **Fig. 78.**

Hindi: *Sannata*; Kan.: *Bhandaru*; Mal.: *Vrali*; Tam.: *Viraali*; Tel.: *Bhandaru*.

Shrubs to small sized trees, up to 4 m tall; branches terete, often angled; young parts scurfy puberulous. Leaves oblanceolate-obovate or broadly elliptic, 1-8 x 0.2-1.5 cm, subacute or shortly apiculate or sometimes notched, abruptly tapering towards the basal end, viscid, with shining yellowish resinous exudation. Inflorescence paniced cymes, up to 7 cm long, lateral nerves up to 35, looping. Flowers greenish yellow. Sepals oblong. Anthers oblong-linear. Capsules membranous, compressed, up to 1.5 cm long, notched at apex and base, 2-3-winged, 1-2-seeded. Seeds black.

*Fl. & Fr.* : Jan. - Sept.

*Distrib.* Throughout India.

Myanmar, Vietnam, Malesia, Australia, Pacific, Pakistan, Tropical Africa, Madagascar, N. and S. America and West Indies.

*Note.* A very complex and variable species. On the basis of differences in leaf shape and shape and size of the fruits, Radlkofer (1933, *l.c.*) has mentioned three varieties, eight forms and seven subforms under the species. The local name *Viraali*, according to Mathews (Flora of the Tamil Nadu Carnatic 1: 294. 1983) is applicable to *D. angustifolia* L.f. This species is commonly used as a hedge. Wood is very hard and heavy, therefore, useful in making tool-handles and walking sticks.

8. *Filicium* Thwaites ex Benth. & Hook.f.

Trees; branches angular, covered with waxy scales. Leaves alternate, imparipinnate, subcoriaceous; leaflets subopposite, entire, rachis broadly winged. Flowers small, polygamous. Sepals 5, imbricate, caducous. Petals 5. Disc