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Buchanania cochinchinensis (Lour.) M.R.Almeida

Taxonomy and nomenclature

Species name: *Buchanania cochinchinensis* (Lour.) M.R.Almeida

Family name: Anacardiaceae

Synonyms: *Buchanania lanzan* Spreng., *Buchanania latifolia* Roxb.

Vernacular (common name): Almondette, Chirauli, Chironji, char, achar, pial, cuddapah, Hamilton's mombin, Calumpang

Distribution and habitat

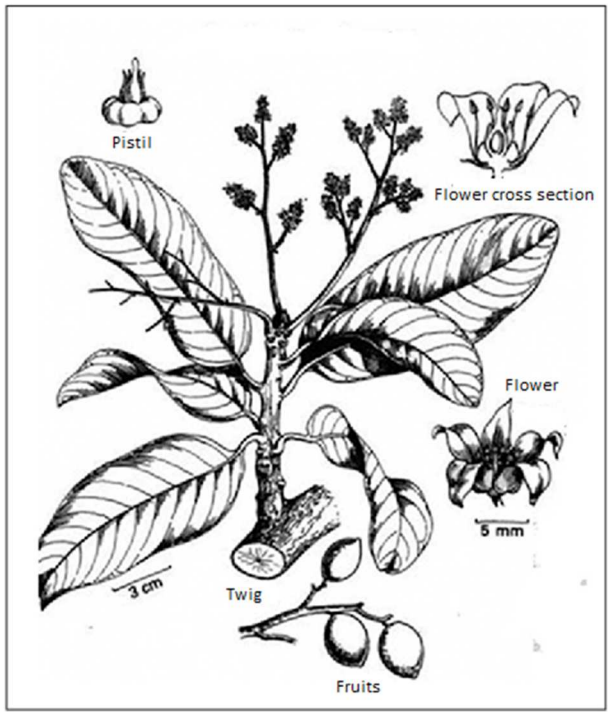
The species is native to India and it is distributed in the tropical deciduous forests of the north, western and central India up to an altitude of 1200m in subtropics and up to 900m in Sub-Himalayas. It is also grown throughout Thailand, Vietnam, Myanmar, Laos, Yunnan (China) and, Nepal. It is a moderate light-demander, somewhat sensitive to drought and very sensitive to frost, but can withstand grazing without damage. It grows well in full sun, but can also tolerate considerable shade. In its natural habitat, the absolute maximum shade temperature ranges between 40-50°C, the absolute minimum between -1°C and 13°C, and the annual precipitation between 750mm and 2150mm. It is generally found on clayey and lateritic soils but can survive on rocky, gravelly, saline, or sodic soils. It does not grow on waterlogged soils. It has a good coppicing capacity but only produces a few root-suckers.

Use

The wood is light grey to grayish brown, light, moderately strong, straight-grained easily seasonable, but not so durable, used as a small beam, in mining, for making doors and windows, boxes, matchboxes, and furniture. The kernels having a pleasant, sub-acidic flavor, are nutritious and eaten raw or roasted, used as in flavoring. Kernels contain 33.5% oil, which can substitute olive and almond oil. Most of the harvest comes from wild trees. The gum from the stem is suitable for dressing, dyeing, and printing textiles. The leaves are used as fodder. It is a good species for afforesting barren hill slopes. The tree serves as a host of the kusumi strain of the lac-insect. Different parts of the plants are used as traditional medicine. The roots are used as astringent, cooling, depurative, and constipating and are useful in the treatment of diarrhea, expectorant, and for curing biliousness and blood diseases. The leaf juice is used as an expectorant, aphrodisiac, purgative, blood purifier, thirst-quencher, and cures digestive disorders. Powdered or crushed leaves are applied to wounds. The seeds are used as expectorant and tonic. The gum is used as analgesic. The oil extracted from kernels is used for treating skin diseases.

Botanical description

It is a small to medium-sized nearly evergreen tree, except for a short leafless period during the hot season (April-May). It has a straight, cylindrical trunk up to 18m in height, 48cm dbh, and a much-branched, rounded crown. Branches are tomentose, when young; bark is dark grey or black, divided into small rectangular flakes resembling crocodile hide, blaze red.



The leaves are dull green, thick and leathery, crowded at the ends of the branches, simple, alternate, estipulate, petiole stout and hairy, lamina 10-25 cm x 4-12 cm, broadly oblong, obtuse or rounded at the base, margin entire, reticulately veined, lateral nerves 10-20 pairs, pinnate. Flowers are bisexual, small, greenish-white, in axillary and terminal panicles, sessile, calyx lobes 5, persistent; petals 5, oblong; stamens 10; filaments free, carpels 5-6, free, superior, tomentose, 4 reduced to a thread-like processes, one fertile, perfect, conical, villous. A single panicle bears about 3000 – 5000 flowers.

Fruit and seed description

Fruit are purplish-black as they mature, small ovoid or globose, laterally compressed drupe, 8-12 mm in diameter; enclosing creamish- brown, biconvex, oily hard, and edible stone.4300 to 5300 seeds weigh one kg, equivalent to 1000 seeds weight of 190-230 grams.

Flowering and fruiting habit

It flowers during January-March. The time from flower initiation to flowering is 16-20 days. Fruits mature from the third week of April to the third week of May. Only about 3 percent of flowers develop into fruits. The low fruit set presumably due to pollination failure and self-incompatibility. Seedling trees of higher age produce more fruit than the tree of lower age group. It takes about 15-18 years to come into bearing in seed originated plants and 4-5 years in grafted plants.

Seed collection

The fruits are harvested from the tree. The best time of collection is when the colour of the fruits turns dark green or purple and the seed turns black. The moisture content of fruits and seeds at this stage is about 60-65% and 16-19% respectively. Manual harvesting can be done by lopping the fruit-bearing shoots with a sickle attached to a long pole or plucking the fruits. Fruit yield per tree in a season is 4-15 kg depending on the age of the tree and ecological conditions.

Processing and handling

After collection, immature fruits are discarded and ripe fruits are soaked overnight in water and rubbed between palms or with a jute sack or by depulper. The seeds are cleaned on wire mesh in running water. These are then allowed to dry under the sun and cleaned by a seed blower or by winnowing.

Dormancy and pretreatment

Just after collection 60-80% of seeds germinate. Drying of mature seeds may cause secondary dormancy, which is naturally removed at the onset of rain in the month of July-August. To hasten germination in the nursery, dormancy can be removed by acid treatment, mechanical scarification, or combined treatment of sulfuric acid for 5 minutes and gibberellic acid at the dose of 250 ppm.

Storage and viability

Seeds of *B. cochinchinensis* can tolerate desiccation to 4- 5% moisture content; hence the seeds are of the orthodox type. Seeds can remain viable for up to one year at ambient conditions, if stored at 4-6% moisture content. Viability can be prolonged to more than 2 years if stored at 15 to -20°C with the same moisture content. Seeds stored at 7-8% moisture content have maximum viability of 8-10 months at any temperature.

Sowing and germination

Freshly collected seeds are sown at the depth of 0.5-1 cm in the well-drained nursery beds in the month of May-June. Germination completes in 30 days. The seedlings are delicate and risk considerable mortality in transplanting. It is, therefore better to sow the seeds directly in big-sized polythene bags and allow them to grow in a nursery for a period of two years. Direct sowing at the commencement of rain can also give a better result.

Pest and diseases

It is a delicate species, even partial debarking and minor injuries result in rotting of the exposed portion and subsequently attack by stem borers *Bactocera rufomaculata*. The larvae of *Euproctis scintillans* and *Bombotelia nugatrix* defoliate the species and those of *Ceroplastes ceriferus* feed on the sap of leaves and shoots. The wood and bark are attacked by various borers. The larvae of *Lycaenesthes lycaenina* bore the floral buds. Hoppers (sucking pest) can be controlled by spraying with dimethoate (0.03%) or phosphamidon (0.05%) at the time of panicle emergence and fruit set. Mealybug, *Pseudococcus crotonis* sucks sap from different plant parts and causes leaf-fall and premature fruit fall. They can be controlled by spraying 0.03% dimethoate or phosphamidon (0.05%).

Selected readings:

Luna, R.K. (1996). Plantation trees. International Book Distributors. Dehra Dun, India.

Sudhakara, K. Online manual for the forest tree seeds of Kerala. College of Forestry, Kerala Agricultural University, Thrissur.

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