

Garcinia gummi-gutta

(L.) N. Robson

Clusiaceae

camboge tree

LOCAL NAMES

Danish (gummiguttræ); Dutch (geelhars); English (gamboge,brindal berry); French (mangoustanier du cambodge,gomme-gutte); German (gummiguttbaum); Hindi (upage mara,murugana huli); Japanese (garushinia kanbogia); Trade name (camboge tree)

BOTANIC DESCRIPTION

Garcinia gummi-gutta is an evergreen, small or medium-sized dioecious, understory tree, 5 –20 m tall, about 70 cm dbh, with a rounded crown and horizontal or drooping branches. The bark is dark and smooth.

Leaves opposite, petiolate, dark green, shining, 13-18 by 4-8 cm, elliptic to obovate, glabrous; petiole 1.2-2.2 cm.

Flowers in clusters of 4-20, are usually red, but some trees have yellow ones. Petals normally 4, each about 12 mm wide 11 mm long; anthers attached to a pistillode with a non-functional stigma. Female flowers occur singly or in clusters of up to 4. The stigmatic surface is normally enlarged, and there is no style. Pistillate flowers have rudimentary and non-functional staminodes. Neither male nor female flowers produce nectar.

Fruit a green, ovoid berry, 5 cm in diameter, yellow or red when ripe, with 6-8 grooves.

Seed 6-8, smooth, large, about 5 cm long and 2 cm wide surrounded by a succulent aril.

BIOLOGY

Seed-grown plants start bearing after 10-12 years whereas grafts from the third year onwards and will attain the stage of full bearing at the age of 12-15 years. In India, flowering occurs in January-March and fruits mature in July. There are also reports of off-season bearers, bearing twice annually. The orange yellow mature fruits either drop from the tree or are harvested manually. The rind is separated for processing immediately after harvest.

G. gummi-gatta flowers in the dry season. It appears to be pollinated by wind, bees and small weevils of the genus *Deleromus* (Curculionidae). Monkeys (*Presbytus entellus* and *Macaca radiata*) and species of civets (*Paradoxorus hermaphroditus* and *P. jerdonii*) disperse the fruits. The seeds are consumed by two species of arboreal squirrels (*Ratufa indica* and *Funambulus palmaram*).

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ECOLOGY

It is found in semi-evergreen to evergreen forests. In India, it is commonly found in the evergreen and shola forests of Western Ghats, Karnataka and Kerala. The tree is very much adapted to both hilltops and plain lands, but its performance is best in riverbanks and valleys. It also grows well in dry or occasionally water logged or flooded soils.

BIOPHYSICAL LIMITS

Altitude: 50-1800 m

Mean annual temperature: 15-30°C

Mean annual rainfall: 1500-4000 mm

Soil type: It grows well in dry or occasionally water logged or flooded soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: India, Nepal, Sri Lanka

Exotic: China, Malaysia, Philippines



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

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PRODUCTS

Food: The rinds of the ripe fruits are processed and used as a condiment in fish and prawn preparations to impart flavour and taste and to improve the keeping quality. In India, the dried seeds often yield a protein and fat-rich butter, popularly known as uppage tuppa. Fruit juice or syrup is used as a coolant and helps reduce body fat. Fruit rind is marketed in large quantities, for example in India, export of over 50 tonnes (valued at 17 million rupees) have been recorded.

Timber: Its wood is used in construction and furniture making.

Lipids: Fat obtained from seed is used as vegetable butter.

Medicine: A decoction made from it is given for rheumatism and bowel complaints. In cattle, it is used as a wash for mouth diseases. An extract obtained from the mature fruit rind, Hydroxy Citric Acid, is used against obesity.

Other products: It contains 30% acid essentially (-)-hydroxy-citric acid, Camboginol and cambogin.

SERVICES

Shade or shelter: It's a good shade tree for shade-loving crops such as ginger or in association with other field crops including medicinal plants.

Ornamental: A good ornamental tree especially when mixed with other trees.

Boundary or barrier or support: Ideally suited for boundary planting on the farm field.

Intercropping: The crop can be raised as a perennial intercrop with coconut and arecanut.

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TREE MANAGEMENT

Land preparation involves preparing 1 m² pits 10 m apart. Refill the pits with a mixture of topsoil and compost / fertilizer. Proper care should be given to avoid water stagnation in pits. In India, planting is generally done during July-October months: The crop can be raised as a pure or as a perennial intercrop of coconut, arecanut gardens. Clean the field free of bushes and thick shades. Weed once in three months and mulch the basin with black polythene or dry leaves to avoid drying.

The percentage of male trees in population varies from 50-60 per cent and this also creates much difficulty in the cultivation of the crop. Problems such as lack of high yielder, planting grafts prepared from elite mother trees can solve variability in population and occurrence of male trees

Fertilizer application involves using 10 kg of cattle manure or compost per seedling/graft during the first year. This is increased gradually to 50 kg annually at 15 years.

GERMPLASM MANAGEMENT

Seeds are collected manually from freshly harvested and fully ripened fruits before they fall. Immediately after harvesting, they are washed in running water to separate the fruit rind. The seed storage behaviour is recalcitrant. Viability can be maintained for 1-2 months in moist storage at 20°C.

PESTS AND DISEASES

Hard scales and beetles are the common pests infesting the crop. The hard scales desap the leaves and tender shoots. Both the beetles and grubs defoliate the crop inflicting heavy loss on yield. Seedling blight is very common in the nursery stage. Leaf folders are very common in the nursery.

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FURTHER READNG

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SUGGESTED CITATION

Orwa C, A Mutua, Kindt R, Jamnadass R, S Anthony. 2009 *Agroforestry Database: a tree reference and selection guide version 4.0* (<http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp>)