

# **GARCINIA GUMMI-GUTTA**

**Family: Guttiferae**

**Local name: Kodam-puli**

## **1. Introduction**

*Garcinia gummi-gutta* (syn. *Garcinia cambogia* Gaertn.) is locally known as Kodam-puli, Meen-puli, Malabar puli, Pinenga, Pinaru or Garakka-puli.

The tree belongs to the flowering plant family Guttiferae.

The species is quite common in homesteads and moist deciduous forest areas of Kerala and it is naturally occurring in peninsular India, Sri Lanka and Thailand.

It is a light demanding tree when fully grown and is suited to the climate and soil of moist deciduous, semievergreen and evergreen forests.

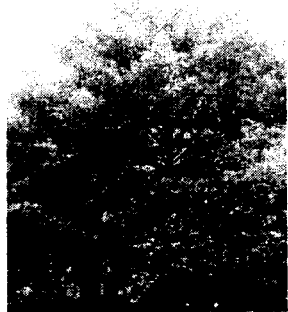
The trees attain an average height of about 25m with dense rounded or pyramidal, evergreen crown.

The bark contains an yellow gum and the branches are usually horizontal or drooping with thick, glossy, dark green leaves. Male and female trees are separate and male trees bear flowers in axillary umbellate clusters, whereas female flowers are in groups of 1-4.

The fruit is a berry, light yellow in colour. Each fruit contains 6-8 ovoid, pale brown seeds which are covered with white, sweet or sourish, slimy aril.

The logs are straight, attaining 10-15 m length and 0.5 m girth. The tree is grown in Kerala, mainly for its fruits, even though its timber is suitable for making match boxes and splints. The grey, close-textured wood is moderately heavy (weigh 640-800 kg/m<sup>3</sup>), but is not durable. However, heartwood of old trees is hard and strong.

The raw and processed rind of the fruits are extensively used as a condiment, coagulant and for polishing gold and silver. The bark yield the gum called Gummi-gutt or Comboge used as pigment, medicine and varnish. The seed is a source of edible fat.

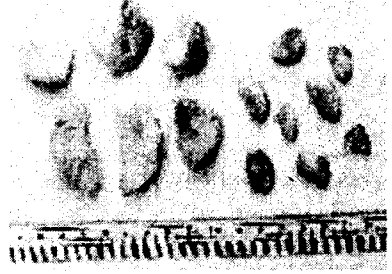


## 2. Plantation technology

### 2.1. Seed collection and processing

#### 2.1.1. When and how to collect seeds

- Trees of *G. gummi-gutta* flower from January onwards and bear ripened fruits during the rainy season of June-July.
- Even though the fruits fall on ripening, in order to procure sufficient quantity of fruits, plastic sheets can be spread out below the mother trees and the branches of trees shaken or beaten to collect the fruits.
- Transport the fruits to gunny bags in the nursery site.



#### 2.1.2. How to process the fruits/seeds

- Remove the fleshy rind and the pulpy part of the fruits by hand using knife.
- Wash the seeds in water repeatedly to remove the white, succulent aril.
- Remove the flat and thin seeds, which float on the surface of water.
- Dry the brown, ovoid and thick seeds in shade for 5-6 days before sowing and for storing.
- Removal of seed coat before sowing improve germination.

#### 2.1.3. How long the seeds can be stored

- The depulped, cleaned and sun-dried seeds can be stored in suitable containers up to 6 months without losing much germinability.

#### 2.1.4. Seed germinability

- Fresh, dried seeds with seed coat will give about 45 per cent germination in the nursery beds.
- If the seed coat is removed and sown, upto 82.5 per cent germination can be obtained.

#### 2.1.5. How to control seed pests and diseases

- Seeds of *G. gummi-gutta* are not usually infested by pests.
- Only few fungi with very low per cent incidence like species of *Cladosporium*, *Trichoderma*, *Geniculosporium* and *Scolecobasidium* are noted on the seeds of *G. gummi-gutta*, which do not require any control measures.

### 2.1.6. Quantity of seeds required for one hectare plantation

- On an average mature fruits are of the size 5.8 cm x 6.5 cm and about 6-10 of them weigh one kilogram.
- The seeds are of an average size of 3.3 cm x 1.5 cm and 590-600 of them weigh one kilogram.
- For raising one hectare plantation at 2 m x 2 m spacing, about 700-800 fruits weighing 70-80 kg, containing about 5556 seeds with a weight of about 10 kg are required, as germination rate is about 45 per cent for the fresh seed samples, without removing the seed coat.

## 2.2. Nursery establishment

### 2.2.1. How to raise seedlings

#### 2.2.1.1. Standard nursery beds

- Dried seeds after removal of seed coat can be sown for germination.
- Use raised standard nursery beds of size 12 m x 1.2 m for raising seedlings. The seeds can be dibbled at a distance of 10 cm, in drilled lines. About 1.6 kg of dried seeds will be sufficient to sow in one standard nursery bed.
- The seeds start to germinate within 149 days and the germination will be completed within 335 days.
- Almost 82 per cent of the seeds sown in nursery beds germinate within 10-60 days.
- Spray Carbofuran (60 g/m<sup>2</sup>) in nursery beds, once in two months, to check infection of seedlings by ticks and mites.
- Spraying of Copper oxychloride (3 gm in 1 litre of water/m<sup>2</sup> of bed) is recommended to prevent fungal attack of tender leaves.



- Data on optimum water and shade requirements in the nursery not available.
- Seedlings in nursery bed can be poly-potted by about 3 months when they attain an average height of 11.5 cm with 2-4 leaves.
- Polythene containers of 23 cm x 17 cm size, filled with potting mixture (3 soil : 1 sand) can be used for potting.
- The poly-potted seedlings require shade and two times watering a day.

#### 2.2.1.2. Dibbling in poly-pots

- To raise seedlings directly in poly-pots, the potting mixture and pot-size mentioned earlier can be used.
- As the germination percentage is about 82, one seed can be dibbled in each poly-pot.
- If seeds with seed coat are used two seeds may be dibbled and if both germinate, one seedling can be pricked into another filled pot within the first 2 or 3 months after germination.
- Watering, two times a day, and shade are essential for the seedlings raised in poly-pots.

#### 2.2.1.3. Rooting of cuttings

- Collect tender, apical stem cuttings with 2-3 nodes from seedlings or saplings and dip in water immediately after collection.
- Remove half portion of the leaf blade at lower nodes without damaging the apical bud and immerse the cuttings in Carbendazim solution (1 g/1 litre) for 15 minutes, to prevent any fungal attack.
- To prepare the rooting hormone Indole Butyric Acid (IBA) at 4000 ppm concentration, 400 mg of the chemical has to be thoroughly mixed with 100 g of purified talc taken in a mixer.
- Dip the lower end of the Carbendazim treated cuttings in the mixture and then plant in root-trainers of 10 cm x 5 cm size, filled with vermiculite.
- Keep the hormone treated cuttings in the mist chamber for rooting, where the temperature is maintained at 35-40°C and humidity is around 70-80 per cent.
- Rooting will take place within 20-30 days, and then the root-trainers have to be taken out of the mist chamber and kept in a glass house.
- As new leaves emerge, the rooted cuttings can be poly-potted. By this method 54 per cent of the cuttings can be converted into potted seedlings, which need hardening for few days before field-planting.



### 2.2.2. Control of nursery pests and diseases

- Very low damage of nursery seedlings by a dipteran leaf miner may be seen in the nursery, which leads to crinkling and subsequent withering of leaves. It can be controlled by the application of Fenvalerate 20 EC (0.08%).
- Mild attack of sap sucking aphids may occur in seedlings which need no control measures.
- Any incidence of collar-rot disease caused by *Rhizoctania solani* can be controlled by application of the fungicide Carboxin (0.1% a.i.).



## 2.3. Plantation establishment

### 2.3.1. How to prepare the field for planting

- Select a suitable moist deciduous area to out-plant the seedlings of *G. gummi-gutta*, where there is certain amount of shade.
- Weed the area to remove undergrowth and ground flora.
- Align the area at a spacing of 2 m x 2 m or more.
- Take pits of 30 cm x 30 cm x 30 cm size for planting the seedlings.
- Data on different spacing and pit sizes not available.

### 2.3.2. How to out-plant seedlings

- Plant the poly-potted seedlings maintained in the shaded nursery by the onset of South-West monsoon, in June.
- Remove the polythene covers without damaging the root system of the seedlings and the covers may be hanged on the stakes which are fixed at each pit-point, while aligning the plot.
- Seedlings can be planted in such a way that the level of ground is tallying with the level of soil around the seedling.
- Provide terracing around the field-planted seedlings to avoid stagnation of water.

### 2.3.3. Control of pests and diseases in plantation

- No potential pest or disease problem is usually encountered in the field-planted seedlings of *G. gummi-gutta*.
- Minor incidence of leaf-spot caused by *Colletotrichum gloeosporoides*, may not require any control measure.

### 2.3.4. *Plantation maintenance and growth of seedlings*

- During the first two months after out-planting, almost 65 per cent of the seedlings survive and this may be reduced to about 50 per cent by the end of 7 months, if grazing by wild animals is not checked.
- Shade is required to ensure high survival rate of field-planted seedlings.
- Within ten months, the out-planted seedlings will record an average height of 21.4 cm.
- Data on nutrient deficiencies and their symptoms not available.
- Fixing bamboo baskets around the seedlings will be an effective method to prevent grazing by wild animals.
- Watering will help to improve the survival and growth of field-planted seedlings during the summer season.

### 3. *Calender of operations*

	JA	FB	MA	AP	MY	JU	JL	AU	SE	OC	NV	DC
Seed collection						■	■					
Nursery establishment						■	■					
Planting (next year)						■	■					
Weeding/mulching											■	■

### 4. *Further reading*

FRI, 1975. *Troup's Silviculture of Indian Trees*. vol. 1. Controller of publications, Delhi. pp. 218-219.

Nair, K.K.N., C. Mohanan and George Mathew 2002. *Plantation technology of nine indigenous tree species of Kerala. KFRI Research Report 231*. KFRI, Peechi.