

# VATERIA INDICA

Family: Dipterocarpaceae

Local name: Vella-payin

## 1. Introduction

*Vateria indica* L. (syn. *Vateria malabarica* Bl.), is locally known as Vella-payin, Vella-kunthirikam, Paini-maram, Perum-paini or Payini.

The tree belongs to the flowering plant family Dipterocarpaceae.

The species is fairly common in the moist deciduous, semievergreen and evergreen forests of Kerala. It is also disturbed in other parts of the Western Ghats of peninsular India.

The plant is moisture-dependent and shade tolerant. It grows well in damp and rich soils with free drainage. It is sensitive to fire, and is poor in coppicing.

The tree grows to an average height of 30 m with cylindrical, smooth, white-grey bark. The simple, alternate leaves are ovate, oblong or elliptic and rounded at base.

Flowers are white and fragrant with 40-50 stamens, borne on terminal or axillary, drooping inflorescence of corymbose panicles.

Fruit is capsular and is one seeded.

Clear logs, up to 15 m length and about 1.4 m girth are common for the tree.

Sapwood is creamy white to greyish-white and the heartwood is grey to light yellowish or pinkish, turning brown on exposure. The wood is moderately hard and heavy (575 kg/m<sup>3</sup>). The grain is fairly straight to narrowly interlocked and the texture is medium to coarse.

The wood is easy to work and finishes to very smooth surfaces. It also peels well. However, as it is not durable and the heartwood is very refractory to treatments, the wood is used only for temporary construction and other general purposes, and also as Class 1 plywood. Marine plywood, tea chests, blockboards, packing cases and temporary boxes are made of *Vateria* wood. It is also reported to have good pulping qualities for paper making.

The bark and leaf juice of the tree are medicinal. A gum-resin called Piney resin, White dammar or Dhupa is also available from the bark of the tree, used in varnish industry and for making incense. A semi-solid fat is contained in the dried kernels of seeds, known as Piney tallow, Malabar tallow or Dhupa fat, used in the manufacture of soaps and candles.

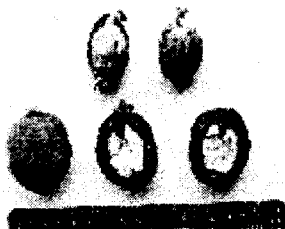


## 2. Plantation technology

### 2.1. Seed collection and processing

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

- *V. indica* trees flower during January to April and fruits ripen during May to August.
- When the fruits on the mother trees attain pale brown colour, it is the right time to collect them for extraction of seeds.
- As the seeds start germination when they are attached to mother trees (vivipary), they have to be collected, as early as possible, once the fruits are ripened.
- Gather the fruits by lopping the terminal branchlets and collect them on plastic sheets, spread on the forest floor below the mother trees, to avoid mixing of fruits with litter, debris, stones, etc.
- Fruits, free from weevil attack, are to be taken to the nursery site for processing.



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

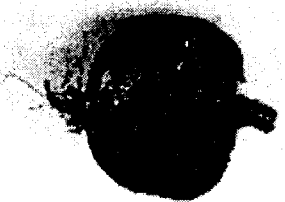
- Fruits are three valved and they can be manually opened to detach the seeds for sowing.
- There is no need to process the seeds except for dressing with fungicide Carbendazim @ 6 g per kilogram.

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

- Seeds of *V. indica* can be stored in gunny bags for about a month without losing much germinability.

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

- The weevil, *Sitophilus vateriae*, infests the seeds either moderately or heavily, and therefore, damaged ones are to be discarded at the time of collection or before sowing.
- The seeds harbour rich microflora comprising of eight field fungi, three storage moulds and one bacterium.
- Seed dressing with Carbendazim (@ 6g/kg seeds) is necessary to avoid seed-rot and other infections in emerging seedlings.



### 2.1.5. Seed germinability

- Fresh seeds without any pre-treatment give about 95 per cent germination when sown in standard nursery beds.

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

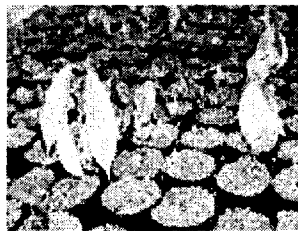
- Mature fruits are oblong in shape with an average size of 5.8 cm x 4.5 cm. About 23-24 fresh fruits weigh one kilogram.
- On an average, the seeds are 4.6 cm x 3.3 cm in size, ovoid in shape and reddish white in colour. About 42-44 seeds weigh one kilogram.
- For raising one hectare plantation at 2m x 2m spacing, about 2632 fruits, weighing about 110 kg are to be collected and processed to get about 2632 seeds which weigh 61 kg, at a germination rate of about 95 per cent.

## 2.2. Nursery establishment

### 2.2.1. How to raise seedlings

#### 2.2.1.1. Standard nursery beds

- Fresh seeds without any weevil attack and fungus infection can be germinated.
- Use raised standard nursery beds of size 12m x 1.2m for production of seedlings.
- Establish nursery during June-July.
- Dibble fresh seeds 20 cm apart, in drilled lines, and cover with a thin layer of soil. About 11.5 kg of seeds can be sown in a standard nursery bed.
- The sown seeds start germinating within 20 days, which will be completed by about 30 days. Almost 95 per cent of the sown seeds germinate.
- Shade and watering every six hours, during the day time are essential to maintain the seedlings in nursery bed.
- Details on optimum shade and watering requirements in the nursery are not available.
- By about three months, the seedlings attain an average height of 9 cm, ready for poly-potting.
- Use polythene bags of 23 cm x 17 cm size, filled with a mixture of soil and sand in 3:1 ratio, for potting the seedlings.
- The poly-potted seedlings, require shade and watering at 2-3 hours interval for about 5 days and subsequently twice a day.



### 2.2.1.2. Dibbling in poly-pots

- To raise seedlings directly in poly-pots, the potting mixture filled poly-pots of 23 cm x 17 cm can be used.
- As the germination percentage is about 80 in poly-pots and due to the large size of seeds, only one seed need to be dibbled in each pot.
- The poly-pots may be watered thrice a day till the seeds germinate and thereafter twice a day. Shade is essential for the seedlings raised in poly-pots till they are field-planted.

### 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 ends 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 30-40 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 16 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

- Seedlings in the nursery may be slightly infested by the bagworm, *Pteroma plagiophleps* and leaf-webber *Rhodoneura* species, which may not require any control measures



- The weevil *Indomias hispidulus* feeding on tender foliage and termites affecting the roots of nursery seedlings may also occur.
- Severe incidence of leaf-blight caused by *Alternaria alternata* may be seen in both seed-bed and container seedlings.
- Application of Carbendazim (@ 0.2% a.i.) as foliar spray can control the disease.
- Leaf-spot disease caused by *Cylindrocladium quinqueseptatum*, *Colletotrichum gloeosporioides*, *Bipolaris maydis* and *Phoma* species can be controlled using the same fungicide, applied at weekly intervals.



## 2.3. Plantation establishment

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

- Select a shaded moist deciduous or semievergreen forest area to out-plant the seedlings of *V. indica*.
- Weed the area to remove the undergrowth and ground flora.
- Align the plot at a spacing of 2m x 2m, or more.
- Take pits of 30 cm x 30 cm x 30 cm size for planting the seedlings.
- Planting at 3.5 m x 3.3 m is also reported.
- Data on suitability of different pit sizes and spacings are 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 cover may be hanged on the stakes which are fixed at each pit-point, while aligning the plot.
- The seedling can be planted in such a way that the level of ground is tallying with the level of soil around the seedling.
- Provide little terracing around the field-planted seedlings to avoid stagnation of water.
- Direct sowing of seeds after soil work in the site is also reported to be successful.



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

- No major pest problem was observed in the field-planted seedlings of *V. indica*. Mild incidence of leaf-spot due to the infection of *Pestalotiopsis* species and *Colletotrichum gloeosporioides* may occur, which may not require any control measure.

### 2.3.4. Plantation maintenance and growth of seedlings

- Almost 90 per cent of the out-planted seedlings survive during the first month of planting. There can be a decline in the survival percentage to 60, mainly due to drought.
- During the first summer season after field-planting, mulching and shade are essential to improve the survival and growth of transplanted seedlings.
- The seedlings grow to an average height of 83 cm within ten months after field-planting.
- Data on nutrient deficiencies and their symptoms are not available.
- The felling age of the tree is reported to be 30 years.

## 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

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