

attempted. In leafy juvenile cuttings, 42% rooting was obtained with 12 mM ascorbic acid. For mature shoot cuttings, 250 ppm IBA+ 125 ppm IAA+ 125 ppm NAA and 800 ppm thiamine were used for production of clonal planting stock of teak. In micropropagation, for shoot multiplication, MS medium supplemented with 10µM BA and 1µM NAA and for *in vitro* rooting, 15µM NAA were standardized.

### ROTATION

Depending on area and type of forest, the average rotation age for teak is fixed between 50 to 80 years. Inaccessible areas in M.P. and Tamil Nadu are worked under selection system having rotation between 100 to 150 years earlier.

### ECONOMICS

Teak is prized for its timber. The economics of teak plantations depend more on its grade, quality and timber volume. Value of teak plantations are found to be a function of site quality, age and tree density. The average rate of teak timber in India is Rs. 20, 000-25,000/- per cubic meter.

### PROTECTION

**Pests and Insects:** In nurseries, *Holotrichia* spp. (White grub) and in plantations and natural forests of teak, *Hyblaea puera* (teak defoliator) and *Eutectona machaeralis* (teak leaf skeletonizer) are major insect pests. Important nursery diseases are leaf blight caused by *Rhizoctonia solani* and bacterial wilt caused by *Pseudomonas solanacearum*. Stem rots and root rots are other major diseases of trees in plantations and natural stands.

**Mortality:** Large scale mortality and decline of teak forests has been reported. Site deterioration, moisture stress and depleted vigour due to repeated coppicing, gregarious flowering in bamboo (which is one of the main associates of

teak) followed by its drying and burning which created loss of ground cover, soil desiccation and injury to the roots and standing trees of teak are factors responsible for mortality of teak. The extent of mortality in teak varies from 20-60 %. Measures of protection from such mortality are as follows:

- Proper management of teak forests
- Careful protection of bamboo areas from fire
- Maintenance of shrubby and herbaceous undergrowth
- Introduction of fresh stock of teak in the forest
- Little dependence on repeated coppicing
- Removal of diseased and dead trees.
- Selection of resistant clones of teak

### USES

Teak is the most important timber in India suitable for a large number of end uses. It is used for following purposes:

- Construction
- Railway sleepers, coaches
- Door/window shutters and frames
- Furniture and cabinet making
- Electric and telephone poles
- Medicinal: The bark is effective as a tonic, astringent in bronchitis and leucorrhoea. Both flowers and seeds are diuretic. Flowers are useful in biliousness, bronchitis and urinary discharge.

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# TEAK

*Tectona grandis* L.f.



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**2008**

## INTRODUCTION

*Tectona grandis* (Teak, sagaun) is a large deciduous tree up to 30 m high, belonging to Family-Verbenaceae. It is naturally distributed in south and south-east Asia. In India, it occurs naturally in the states of Rajasthan, parts of Uttar Pradesh, Maharashtra, Madhya Pradesh, Chattisgarh, Orissa, Andhra Pradesh, Karnataka and Kerala. It prefers moist warm climate, from sea level to 1200m altitude. It grows on deep, well drained, light, porous soil, loam and sandy loam being most preferred. It is one of the most valuable tree species of the world because of durability of the timber, decorative grains and easy working qualities.

## SILVICULTURAL CHARACTERS

Light	:	Strong light demander
Drought	:	Drought sensitive
Frost	:	Frost sensitive
Fire	:	Extremely fire hardy
Wind	:	Wind firm

Coppicing and pollarding power: Coppices and pollards vigorously.

## REGENERATION

The species can be regenerated naturally as well as artificially.

**Natural Regeneration :** It is achieved through seeds, but natural regeneration is not satisfactory if left to itself.

**Artificial Regeneration :** It can be raised by any of the following methods:

- Direct Sowing
- Entire transplanting
- Root-shoot/stump planting
- Vegetative propagation

**Seed Collection:** It starts yielding fruits from 10-12 years of planting and every year abundant

quantities of seeds are produced. On an average a 40 year old tree produces about 2-3 kg of fruits. The fruiting season is between November and March/April. Fruit collection in Madhya Pradesh is done in March-April. Spreading sheets on the ground and shaking of fruiting branches is one of the best methods for seed collection.

**Drying and Storage of Seeds :** Careful sun drying is essential before storing to ensure the viability. Teak seeds stored for one year germinate better than the currently collected seeds. In order to maintain full germination capacity, fruits should be stored in air-tight (sealed) containers (tins, cans, glass jars or double sealed and heavy plastic bags at 4° C). Teak fruits kept in jute bags under shade maintain their germination capacity for 6 months. Presowing treatments, such as alternate soaking and drying for at least 45 days, cowdung slurry treatment etc. are necessary for good seed germination.

## NURSERY TECHNIQUES

**Site preparation for sowing:** Seedlings in nursery can be raised by sowing seeds in beds by three methods either broadcast sowing, line sowings in regular lines 5 to 10 cm apart or dibbling in drills 10 cm apart. Time of sowing seeds is between February and June depending on local conditions. In Madhya Pradesh, end of May, and in Maharashtra, October is considered suitable for sowing.

**Seedlings raised in beds :** In moist localities, raised beds and in very dry localities, sunken beds are prepared. Rectangular beds 10m x 1m dimension with a height of 15 to 30 cm are prepared. Soil is properly worked by breaking clods. About 3 kg treated seeds are required per bed. Sown seeds are covered with thin layer of soil to protect them from wind, desiccation, insects

and rodents. Beds are irrigated at an interval of 3-4 days till seed germinates, thereafter, every 7-10 days.

**Preparation of stumps:** In 10-12 months (June of following year), the seedlings have attained the required size and removed from beds with the help of transplanting shovel after irrigating the bed. Stumps are prepared by cutting aerial portion to about 1-2 cm above collar region and trimming root portion at a length of 20-25 cm from collar. On an average each nursery bed produces 400 to 600 utilizable stumps.

**Containerized seedling production system:** Teak seedlings are also raised in polythene bags especially in social forestry nurseries for supply to farmers. Seedlings are also grown in various types of root trainers, which avoid root coiling and deformation. The root trainer grown seedlings exhibit better survival and growth.

## PLANTATION TECHNIQUES

**Direct sowing :** Practiced on a very limited scale in parts of Madhya Pradesh and north Maharashtra. Two to three seeds are sown at each stake. The casualties are heavy and the plantation is not well stocked.

**Entire transplants :** This method has almost ceased except in replacing casualties.

**Root-shoot/stump planting :** It is considered to be the best method for raising teak plantations as stumps show high rate of survival and minimum moisture loss is ensured while transporting the stumps.

## Vegetative Propagation

The research work on vegetative propagation of teak carried out at TFRI, Jabalpur, can be utilized for production of large number of plants. Both macropropagation (cuttings) and micropropagation techniques have been