



SEED LEAFLET

No. 61 January 2002



Tectona grandis L.f.

Taxonomy and nomenclature

Family: Verbenaceae

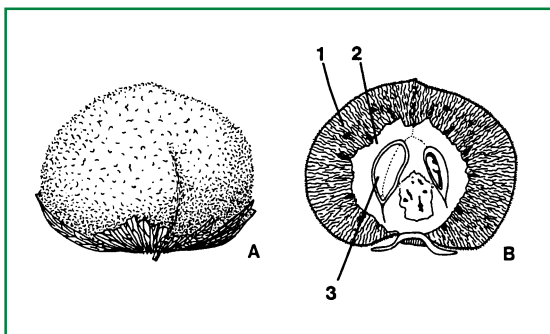
Synonyms: None

Vernacular/common names: jati (Indonesia); sagun (India); lyiu (Myanmar); mai sak (Thailand); teak (Eng.); teck (Fr.); teca (Sp.)

Distribution and habitat

The area of natural distribution covers the Indian sub-continent, Myanmar, Thailand and the western part of Laos. Northern limit is latitude 25°N in Myanmar and southern limit 9°N in India. Teak's longitudinal limits are 70°-100°E. Within this area, the occurrence is discontinuous, the natural teak forests being separated by mountain ranges, plains, farmland and other types of forests.

In Indonesia, teak is not a native species, but it has been grown on Java for centuries.



A, Fruit with remains of calyx; B, longitudinal section of fruit - 1, mesocarp; 2, endocarp; 3, seed. Line drawing: Birthe Vejlgård.

Uses

Teak is widely used as a plantation species on sites with a seasonal tropical climate. It is often grown in agroforestry systems and is one of the most versatile timber species, used for heavy and light construction work, house building, carpentry, wood carvings etc.

Botanical description

A large deciduous tree which, under favourable conditions, may reach a height of 30-40 m. In dry habitats growth becomes more stunted and branching more widespread and bushy. On good sites, clear boles of 15-20 m or more can usually be obtained, as lower branches are shaded out. Fluting and buttresses are often found at the base of older trees.

The bark is thick, grey or light greyish-brown. The leaves are large, 25-50 cm long and 15-35 cm wide, opposite, elliptic or obovate, the underside grey and densely covered with red glandulous hairs.

The flowers are small (6-8 mm in diameter), whitish and bisexual. They appear in large panicles containing up to a few thousand flower buds, which open only a few at a time during the flowering period of 2-4 weeks.

Fruit and seed description

Fruit: the fruit is a hard, irregularly rounded drupe. It varies in size from 5-20 mm, the most common size being between 11 and 17 mm. Its structure consists of a thin papery outer layer (the persistent calyx), a thick corky middle layer (mesocarp) and a stony inner part (endocarp) which contains the 4 seed chambers. Number of fruits per kg varies around 1100-3500 with an average of approx. 2000 fruits/kg. This corresponds to approx. 500 fruits per litre.

Seed: the seeds are oval and about 6 x 4 mm. Only rarely have all 4 seed chambers fully developed seeds, the normal number being 1-2. Usually only one seed per fruit manages to develop into a seedling.

Flowering and fruiting habit

Teak normally starts to flower 6-8 years after planting. Flowering takes place in the rainy season, starting about one month after the first rains. Teak usually flowers every year, but with large variation in intensity between years. Pollination is by insects. Sometimes flower and fruit setting is greatly disturbed by defoliating insects which also eat the flower buds. The fruit attains its full size in approximately 50 days, but it is not mature until 120-150 days after fertilization. A sign of maturity is that fruits can be shaken from the tree, or fall to the ground naturally.

Harvest

Teak fruits are usually collected from the ground. In seed source areas, the ground is usually cleaned and sometimes burnt to prepare seed collection. To ease collection, a cover can be spread out on the ground. The fruits fall over a period of 3-4 months in the dry season. Seed collection should be done at least twice in a season, so that early fallen fruits do not remain on the forest floor for long. The amount of fruits which can be collected depends on age of stand, location and type of stand and it is difficult to give exact figures about seed

production. Generally, seed production is in the order of 20-30 kg/ha/year in plantations and seed production areas with low management, whereas in seed orchards with more intensive management seed production may be as high as 200-300 kg/ha/year.

Processing and handling

After collection, the fruits are cleaned for branches, leaves and rotten and damaged fruits and then dried in the sun for 2-3 days. After drying, the calyx is removed in a cement mixer, seed thresher or by squeezing and beating the seed in a bag. Finally the impurities are removed by winnowing.

Seed storage

Teak seed stores well and may keep its germination capacity for several years provided the seed has low moisture content before storage and is protected against fluctuations in temperature and humidity during storage.

If seeds are to be used in the same planting season, no special storage is needed. Seed can be piled in a convenient place near the nursery, preferably in a shed or in a storeroom, but not necessarily dried. Seed can be stored this way for maximum 3-4 months. Seed can be stored for up to two years at around 12 % moisture content and stored in airtight containers (glass jars or sealed plastic bags) and kept in a dry, shaded and relatively cool place. If stored at low moisture content and in a cold store (0-4°C), the germination capacity of the seed can be maintained for 5-10 years.

Dormancy and pretreatment

Germination of teak is often poor and sporadic but the exact nature of dormancy is not known. The most common method of pretreatment is to soak the fruits during the night and dry them in the sun during the day, repeating this for 1-2 weeks.

A better method is dry heat. The seeds are heated for 1-5 weeks at 50°C or 48 h at 80°C. This method is difficult to implement for large seed lots as it requires a large oven, but it can improve germination considerably.

Sowing and germination

Sowing is done directly in the field or in the nursery. If sown directly, normally 3-4 seeds are sown per hole to secure that at least one seedling will develop. This method is very demanding in terms of quantity of seed.

Sowing in the nursery is done in a seedbed with soil or sand. The seed is covered with a thin layer of sand or soil not to be washed away by rain or be eaten by rodents and other animals. It is important that the seed is not sown too deep, as this will reduce germination rate drastically. Teak plants are very sensitive to shade, and when there is large variation in germination time, the later germinating seedlings can be shaded to death if they emerge under a large seedling. Germination generally starts 10-12 days

after sowing, but spreads over a very long time, especially if no pretreatment has been made.



Natural teak forest close to Ban Cham Pui, Lampang district, Northern Thailand. Photo: Erik Kjær, DFSC

Selected readings

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Soerianegara, I. and R.H.M.J. Lemmens (eds), 1994. *Timber Trees: Major Commercial Timbers.* Plant Resources of South-East Asia No. 5 (1). PROSEA. Bogor, Indonesia.

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