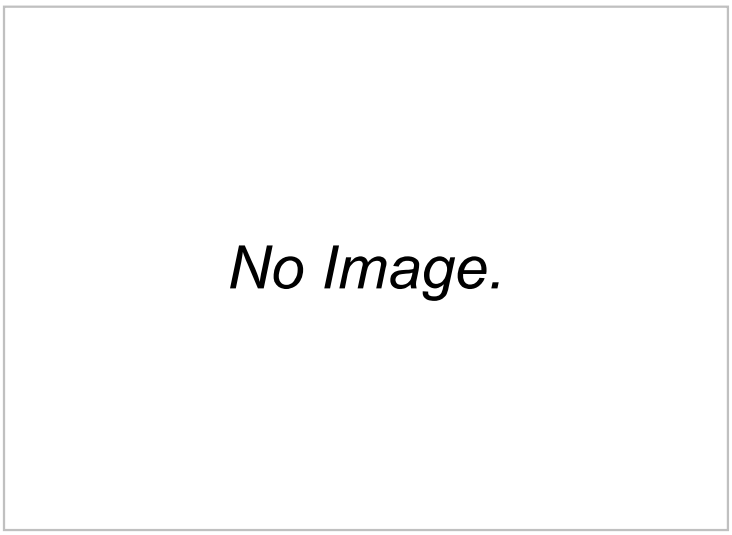
Shorea javanica

Koord. & Valeton **Dipterocarpaceae**

+ Synonyms

Common Name: Dammar

General Information



Dammar is a medium-sized to fairly large tree with a hemispherical or dome-shaped crown; it can grow up to 40 metres tall[303]. The bole is straight and cylindrical, with prominent buttresses up to 1.5 metres high[303]. It can be branchless for up to 20 metres (occasionally to 30 metres), and with a diameter of up to 150 cm[303].
The tree is a major source of the resin dammar - this has many traditional uses and has found a wide range of industrial applications[303]. The tree is often grown in plantations, frequently as a part of an integrated system, and the resin is traded internationally.

Known Hazards

None known

Botanical References

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Range

Southeast Asia - Indonesia.

Habitat

Primary and secondary forest on dry or periodically inundated places on flat land or on slopes at elevations up to 300 metres, occasionally to 500 metres[303].

Properties

Edibility Rating	
Other Uses Rating	
Habit	Tree
Height	30.00 m
Pollinators	Thrips, Insects
Self-fertile	No
Cultivation Status	Cultivated, Wild

Cultivation Details

Damar is a plant of the lowland, humid tropics, where it is found at elevations from sea level to about 500 metres[303]. It grows in areas where the mean annual temperature is about 25°c, and the mean annual rainfall is 1,600 - 3,500mm, with a dry season of less than 6 months[303]. It succeeds in areas with no dry season, but generally grows better with a dry season[303].
Seedling trees grow best with some shade, but by the time they are 4 metres tall they require a sunny position[310].
The tree grows best on deep loamy soils, though it can succeed on various soils from quite deep loamy alkaline soils

to sticky acid clays[303]. Prefers a pH in the range 5 - 7.5, tolerating 4.5 - 8.5[418].
Growth is moderately fast; trees may reach a height of 40 - 50 metres in 50 years[303].
Flowering and fruiting intervals are irregular, possibly every 3 - 5 years; flowering is gregarious and correlated with a previous drought period[303].
The harvest of resins begins when the tree is 15 - 50 years old and continues for 30 years. At 50 years of age the tree is already physiologically old because of reduced photosynthetic and metabolic capacity due to regular tapping, hence the silvicultural rotation lasts approximately 50 years[303].
With an approximate density of 100 trees/hectare, the average production of resin is an estimated 48 tonnes/ hectare per year[303].
There is a decrease in resin production when the tree is flowering and fruiting, with the tree only gradually reaching its maximum production again 1 year later[303].
Seedlings need shade until they reach a height of about 1.5 metres. Then the shade trees can be gradually removed to provide sunlight[303]. The young trees, when exposed to full sunlight, show a tendency to form multiple leaders[303].
Mycorrhizae on the roots of the tree, especially the ectomycorrhizae, appear to increase the tolerance of trees to drought, high soil temperatures, soil toxicity (organic and inorganic) and extremely low soil pH caused by high levels of sulphur or aluminium[303].

Edible Uses

A resin obtained from the tree is used as a food additive[418].

Medicinal

None known

Agroforestry Uses:

The roots are well fortified by typical mycorrhizal association, which enables them to absorb and accumulate nitrogen, phosphorus, potassium and calcium more rapidly and for longer periods than non-mycorrhizal roots[303].
This species is a good example for the tree component in an agroforestry system for resin production. Other useful trees, such as clove, are simultaneously planted with the dammar trees so that although the latter largely dominate, the resulting stand is multilayered, comprising different useful plants such as fruits, vegetables and medicinal plants[303].
Along the southern coast of Sumatra, agroforests, called kebun dammar, or dammar forest gardens, are established at the end of the cycle of shifting cultivation, or when there is a sufficiently large opening in the forest canopy. The cycle normally begins with a crop of upland rice followed by coffee or pepper, and in three to seven years dammar seedlings are added to the upland field. As the dammar grows, it contributes to a microclimate suitable for coffee production; then, fifteen years after planting, dammar overtakes coffee, pepper, and other fruiting trees[325].
The dammar trees begin producing after twenty years, yielding resin for about 30 years before dying sometime between 50 and 60 years of age. Compared to other agroforestry systems, the dammar gardens support a high degree of biological diversity[325].

Other Uses

The bark yields an unusually clear, pale yellow dammar (resin). The resin is harvested from cuts made on the trunk[303]. The resin was formerly used by local people for torches, for caulking boats and handicrafts, and more recently local traders export it to industrial countries, where it is used principally in paints, varnishes and linoleum industries[303]. It is also used in cosmetics, as a food additive and for medication.
Harvesting of the resin commences when the bole is around 25cm in diameter (approx 20 years old). Triangular cuts (becoming circular with age) are arranged in vertical rows around the trunk. The cuts are several centimetres wide at first, but become enlarged at every tapping and eventually become holes of 15 - 20cm in depth and width. The average number of holes for a tree about 30 metres tall and 60 - 80cm in diameter is 9 - 11 in each of 4 - 5 vertical rows. For the higher holes, the tapper climbs the tree supported by a rattan belt and using the lower holes as footholds.
The exuded resin is allowed to dry on the tree before it is collected. The frequency with which the tree is visited to refreshen the cut varies from once a week to once a month, depending on how far the tree is from the village. Tapping can continue for 30 years[891].

The heartwood is yellowish-white and when freshly cut is indistinct from the sapwood, but it gradually becomes yellowish-brown or light brown, and on exposure is slightly more distinct from the sapwood[303]. The grain is usually interlocked, and the texture moderately coarse but even[303]. The planed surface is lustrous, often with subtle ribbon figures[303]. The wood is not very durable and should therefore be kept away from contact with the ground unless it is

treated[303]. Because of its high silica content, the wood is not popular as a sawn timber, but it has been used for a wide variety of purposes, such as door and window frames, posts, beams, joists, rafters, planking, light flooring, ceiling, furniture, interior and shop fitting, vehicle bodies, sports goods, vats, wine casks, food containers, stair stringers, and ship and boat building[303]. The creamy white and uniform colour, the even texture and the good gluing properties make S. Javanica a highly preferred timber for plywood production, which is its most important use[303, 325].
The wood is satisfactorily used for pulp in the manufacture of paper[303].
The lower part of the trunk is scarified from tapping for resin and hence can be used only for firewood[303].

Propagation

Seed - there is no dormancy and so pre-treatment is not necessary[325]. Mature seeds, sown immediately after collection, germinate well (about 96%), but storage often causes rapid deterioration[303]. However, seeds collected 4 and 2 weeks before maturity show only 66% and 79% germination immediately after collection, but their loss of viability during storage is much less[303]. Seeds that are collected from the ground must always be sown immediately[325].
Sow the seed in containers and plant out when 20 - 25cm tall. The seed can also be sown at high densities in nursery seedbeds. The seedlings are not thinned and the high density means that individual plants grow slowly - no more than 20 - 30cm tall after 4 - 5 years. When planted out, the seedlings grow away normally. In this way, seedlings can be available for planting out even in years when seed production is poor.

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