Ougeinia dalbergioides

Benth.

Fabaceae - Papilionoideae

sandan

LOCAL NAMES
Bengali (pandan,bandhan); Hindi (tinsia,tinis,Sandan,sanaan,kallu vengai,chikkuda,bandhan); Tamil (mokke,kallu); Trade name (sandan)

BOTANIC DESCRIPTION
Ougeinia dalbergioides is a medium-sized, semi-deciduous tree, commonly attaining 40-50 cm DBH and 7-14 meters in height. The stem is often crooked, but in some areas the tree is straight. The bark, varying from pale pinkish-brown to dark bluish grey, is somewhat rough and exfoliates in irregular thin soft scales.

Leaves pinnately trifoliate, smooth above and lightly pubescent below. Obovate leaflets generally 6-12 cm long, 2-15 cm wide, sizes varying greatly. Leaf margins entire.

Flowers light-pink to white. The previous years branches generally do not bear flowers. Branches bearing flowers are leafless, while others retain leaves.

Pods with a distinct scam, 5-10 cm long, 1 cm wide, remaining closed until seeds germinate. Mature pods yield 2-5 viable seeds.

Seeds smooth brown, 10-12 mm long, 5 mm wide. Seed production not heavy each year.

Variants of this species differ morphologically from the normal plants by producing narrower leaves with 4- 6 leaflets instead of 3. They also grow 30% slower than the normal plants. Detailed investigations on the physiology of variant plants are in progress.

BIOLOGY
Flowers emerge in clusters from February to May, pods mature and ripen in May to June and fall chiefly in June.

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ECOLOGY
O. dalbergioides is native to sub-tropical regions of India and a component of mixed deciduous and sal (Shorea robusta) forests. It is associated with pines at the higher limits of its elevation range.

BIOPHYSICAL LIMITS
Altitude: 300-1 500 m
Mean annual temperature: 20-47 deg C
Mean annual rainfall: 950-1 900 mm
Soil type: This species is not found in wet regions. Sandan grows well on dry exposed sites and eroded hills. It also occurs on alluvial soil, red clay, black cotton, and rocky soil. Its best growth and greatest size is attained in lowland alluvial soils.

DOCUMENTED SPECIES DISTRIBUTION

Native: India, Nepal
Exotic:

The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to your planting site.

PRODUCTS
Fodder: The leaves are highly valued as cattle feed. Farmers lop side branches, but often spare the main limbs to assure good growth and future supplies of fodder. In some areas, natural stands of this species are such important fodder resources that timber harvesting is forbidden. Leaves contain 12- 15% crude protein.

Fuel: Sandan wood is a good fuel with a calorific value of 4 900-5 200 Kcal/kg.

Fibre: Bark fibers are suitable for making rope.

Timber: O. dalbergioides yields a valuable timber. The sapwood is grey and narrow, the heartwood is light golden brown, hard, strong, heavy and elastic-specific gravity is 0.84 and average weight is 865 kg/m^3. The wood air seasons slowly without much degradation. The wood can be kiln-seasoned without difficulty, requires slow and careful drying and does not require preservative treatment. It is difficult to work, turns well and takes polish readily.
Though originally considered difficult to peel, it is now frequently utilized for plywood. Sandan timber is used in the manufacture of agricultural implements, construction timbers, furniture and textile mill implements. It is also a specialty timber for marine plywood.

Poison: The bark is used as a fish poison.

Medicine: The bark is used against fevers and a sap exudate is used to make a medicine against dysentery.

Other products: The tree is a host plant for lac producing insects. The resulting shellac is of high quality.

SERVICES
Erosion control: Sandan coppices well and produces abundant root-suckers. This characteristic is particularly useful for controlling erosion along steep banks and eroded hillsides.

Nitrogen fixing: As with many other leguminous plants, O. dalbergioides forms nitrogen fixing symbiosis with Rhizobium bacteria. Reliable estimates of its nitrogen fixing capacity are not available.

Ornamental: Flowering trees are conspicuous and afford a beautiful sight, making sandan a versatile ornamental tree.

Intercropping: Sucessful planting in Taungya plantations with the lesser millet (Eleusine coracana) when about 60 cm wide strips are kept clear of the crop have been reported.

TREE MANAGEMENT
Young trees and seedlings need a moderate amount of shade. However, once established O. dalbergioides requires full sunlight for its best development. Although young trees are drought and frost sensitive, mature trees are hardy. A tree spacing of 3 x 6 m is recommended for timber production.

Mean annual growth increment averages between 3-20 mm in DBH. Trials indicate that keeping seedlings free of heavy weed competition improves growth and survival and such trees attain heights of 4-5 m and DBH of 10.5 cm in about 6 years. Conversely, heavy weed competition can kill seedlings.

Sandan coppices well and produces abundant root-suckers. Fast-growing coppice and root-suckers attain 7-10 m in height and 12-17 cm in DBH after 20 years. Coppice and root-suckers can be managed for timber production. In its native range, forests are commonly managed simultaneously for sandan and teak production. The exploitable diameter for O. dalbergioides timber is generally 30 cm.

Timber exploitation has degraded the natural stands of this species. To reverse this condition, improved natural forest management and the establishment of large scale tree plantations are necessary.

GERMPLASM MANAGEMENT
The seeds do not retain their viability for long and should be used within 12 months of maturity. Once collected seed should be properly dried and stored in sealed containers. Seeds weigh 28000-33000/kg.

PESTS AND DISEASES
Sandan is very susceptible to heart rot (Fomes caryopnhylla), buff brown pocket rot (Polystictus nilgheriensis) and white spongy rot (Asterostromella rhodospora). The tree is also susceptible to a number of defoliators and borers. The latter also attack dead wood.

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SUGGESTED CITATION

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