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Scope of Chandan (*Santalum album*) Cultivation in Himachal Pradesh

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Introduction

Santalum album is one of the most important commercial tree species of India. It is also called as "Royal Tree" because of its unique and high value oil which is extracted from heart wood. The oil is also known as "Liquid Gold". Heart wood formation starts at the age of seven years. It is a semi root parasite and can parasitize on more than 300 species. The best host in nursery is *Cajanus cajan* and *Acacia catechu* in plantations. Chandan is found distributed on 9040 sq. km. area in India. More than 90 per cent of area under its distribution lies in Karnataka and Tamil Nadu. In Himachal Pradesh, it is growing at Bilaspur and Jawalamukhi covering an area of 10 ha and 20-30 ha, respectively. Some trees are growing in Sirmaur and Hamirpur districts, also. It can grow on all types of soils except swampy ones. Better growth can, however, be obtained in well drained loamy soils. It can grow well between 400-1000m altitude, 600-1600mm rainfall per annum and 25 – 35°C temperature.

Sandal wood is drought and frost resistant species. Its silvicultural characters and climatic requirements make this species suitable for cultivation in lower Himachal. People in the past have made attempts to introduce Chandan in Himachal Pradesh. An Army Officer has been reported to plant few Chandan trees at Jawalamukhi for the first time during World War II. Later on, Chandan got naturalised but its spread remained confined to this area only. Sub-tropical sub-montane hill zone covering an area of 9130 sq. km. suits well to the soil and climatic requirements of the species.

A tree having girth of 80cm at breast height can yield up to 80 kg of heart wood. Presently, the average market rate of heart wood of Chandan is Rs. 6000 per kg. The trees can be felled for commercial exploitation at the age of 30 years. As per research conducted at University of Horticulture and Forestry, Nauni,Solan, the oil content around 3.0 per cent can be obtained in heartwood of trees growing in Himachal Pradesh which is comparable to that of trees

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growing in South India. About 1100 trees are planted per ha at a distance of 3m x 3m finally about 800 trees reach harvestable size after mortality and thinning. On an average, if a tree of this age yields bare minimum 2 kg of heart wood, total 1600 kg heart wood can be obtained from one ha area which can earn a gross revenue of Rs. 96,00,000.

Sandal Tree

Owing to its economic and cultural importance, it is imperative to establish large scale Chandan plantations on land rendered unused and barren due to monkey menace and other weather vagaries particularly frost in lower Himachal. *Lantana*, Khair and Shisham are good hosts of Sandal wood and hence, areas invaded by *Lantana* should be brought under Chandan cultivation. This will not only utilize *Lantana* invaded lands economically but will also help suppression/eradication of this obnoxious weed. The areas which are under assured irrigation should be exploited for cultivation of vegetables and other high value low volume crops but the lands without irrigation facilities and are facing degradation can be economically put under Chandan plantations along with suitable host species. The Scientists of Dr. Y. S. Parmar University of Horticulture and Forestry, Solan standardize nursery and plantation technology of Sandal wood in Himachal Pradesh, which is given as below:

Nursery Raising Technology

Sandal fruits are collected during April-May and September-October. They are depulped by soaking and rubbing of the pulp in water. Seeds are dried under shade and stored

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in polythene or gunny bags.About 6000 seeds constitute one kilogram and 80% of them retain viability upto 9 months. Freshly collected seeds of Sandal exhibit 4-6 weeks of dormancy. To hasten germination,the seeds are treated over night with 0.05% gibberellic acid. An average of about 80% seeds germinate under laboratory and 60% under field conditions.

Seed beds of size 10x1m are formed with sand:soil:FYM in the ratio of 2:1:1.Nematicides in the form of Eucalux or Thimet at 500 g per bed mixed with the soil.2.5 kg seed is then spread uniformely over the bed covered with 2cm of sand,watered and mulched with sraw. The straw is removed when leaves appear. To prevent fungal infections the beds are sprayed with 0.25% Dithane once in 15 days.0.02% Ekalux solution once in a month avoids nematode attack.The beds are watered once or twice a day depending on climatic conditions. Seedlings are transplanted at 4-6 leaf stage to polybags (size30x14cm) containing sand,soil and farm yard manure with ratio of 2:1:1along with one or two seeds of red gram(*Cajanus cajan*).The seedlings of Cajanus cajan serve as primary host.After transplanting seedlings are kept in shade for a week,weeded and watered regularly with care to avoid excess moisture.Host plants are pruned periodically to check their growth so that they do not hamper the growth of sandal seedlings. Two g of Ekalux is also provided per polybag to avoid nematode attack.The polybags should not be kept in one place for more than two months to avoid roots penetrationin soil.

Sandal wood Nursery

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Plantation Technology

Healthy sandal seedlings having a height of 30 cms are planted in pits of 50cm3 size with an espacement of 3x3m at the onset of monsoons.Miscellaneous secondary host species of forestry are planted either in the same pit or separate pits.Some of the species which have proved as good host for sandal are *Casuarina equisetifolia,Acacia nilotica,Acacia catechu,Pongamia pinnata,Cassia siamea,Albizia lebbeck, Dalbergia sissoo etc.*

Sandal Plantation