

further studies to understand the process of heartwood formation with different hosts. *Santalum album* planted with multiple hosts in the field has shown to be successful in plantations in Kununurra, Western Australia (Radomiljac *et. al.*, 1998) and similar information can be obtained from continuing this field experiment. Further work in this direction will help in establishing a farm forestry system or multi-species plantation of sandal along with other valuable timber species.

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Relationship between Girth and percentage of oil in trees of sandal (*Santalum album* L.) provenances

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Abstract

In three provenance areas of sandal viz. Bangalore, Thangli (Karnataka) and Maryoor (Kerala), studies have been made in respect of GBH and oil. It was observed that percentage of oil remains nearly constant at 4 % after 80 cm girth and that rise in oil percentage beyond 80 cm girth was found to be just marginal.

Introduction

The Sandal tree is mainly exploited for its heartwood which yields the renowned East Indian Sandalwood oil - rated very high for its sweet, fragrant, persistent, spicy, warm, woody note, tenacious aroma and fixative property. Sandal heartwood is currently priced at R.12 lakhs per ton and its oil Rs. 22,000 per kg.

Karnataka and Tamil Nadu occupy nearly 90 % of the total area of Sandal (*Santalum album* L) of 9000 sq. km in India. The rest is distributed in other

States like Andhra Pradesh, Kerala, Madhya Pradesh, Orissa, Maharashtra, Rajasthan, Uttar Pradesh, Bihar and Manipur.

At present, India produces 1000 tons of heartwood and 40 tons of oil per annum. For many years till now, amongst the export of various essential oils - sandalwood oil alone contributes for nearly 25 % of the earned revenue.

A study on the girth and oil content in sandal trees growing in different areas

and the influence of girth increment on oil yield has been reported earlier (Venkatesan, 1980). The present study reports on the relationship between girth and percentage of oil in three provenances viz. Bangalore, Thangli and Marayoor.

Materials and Methods

Nine sandal-bearing areas were identified as potential provenances in India on the basis of population density, phenotypic character, latitude, longitude and eco-climate. Jain *et.al.* (1998) found that the age/girth of sandal trees influences the content of oil in the heartwood. Heartwood from young trees (around 10 years of age, height < 10 m, girth < 50 cms) contain 0.2 to 2 % of oil and that from the mature trees (30 to 50 years of age, height 20 m, girth 100 cms) contain 2.8 to 6.2 % of oil.

In the present study, an attempt was made to find out any relationships between girth and oil content within sandal provenance areas. Oil content in the standing tree was deter-

mined using UV-spectroscopic method (Shankarnarayana *et.al*, 1997) from core samples taken at breast height, using an increment borer (BH). In each provenance, 20 sandal trees of girth class ranging from 40 to 100 cm were chosen at random for core samples. Girth class range, the average percentage of oil in respect of 4 to 6 trees have been evaluated for the three provenance areas viz, Bangalore, Thangli (Karnataka) and Marayoor (Kerala) and the results are presented in graphs 1,2 and 3 respectively (Figure 1).

Results and Discussion

From Figure 1, it is evident that in three provenance areas (out of nine in India) of sandal viz Bangalore, Thangli (Karnataka) and Marayoor (Kerala) that the percentage of oil was nearly the same at 4 % from GBH 80 cms and onwards. Rises in oil percentage beyond 80 cm girth were found to be just marginal.

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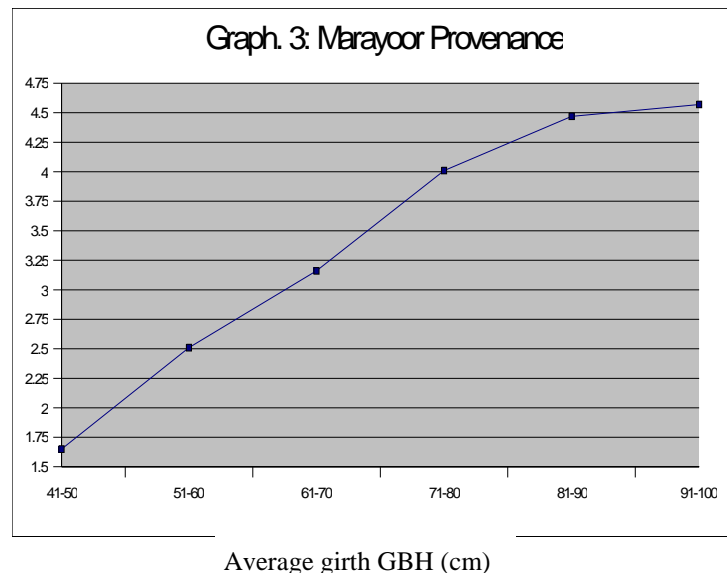
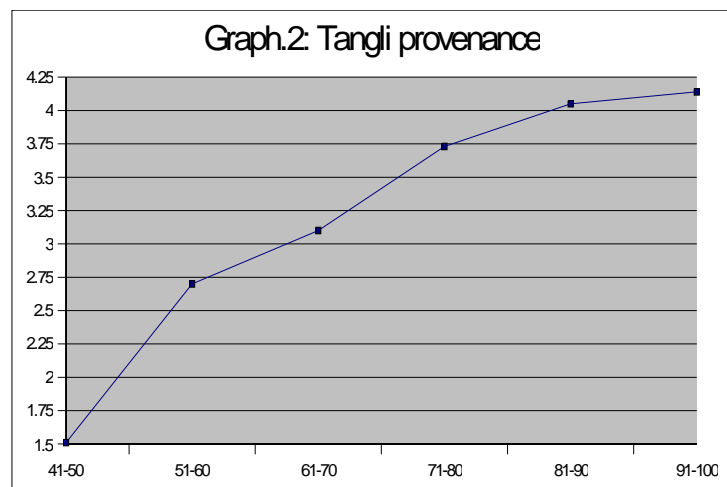
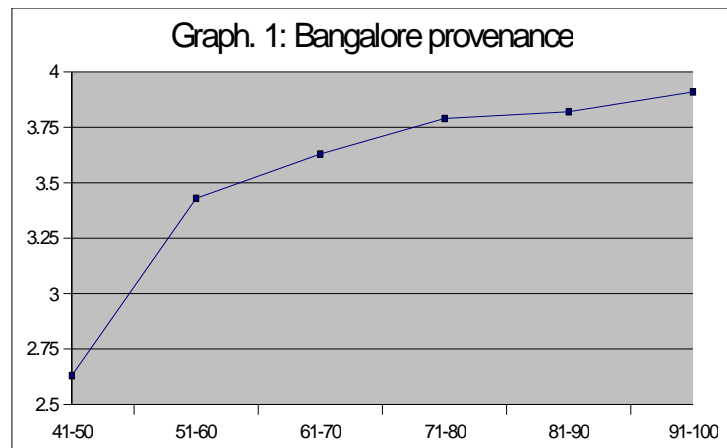


Figure1. Average girth and percentage yield of oil in different provenances.