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## Grafting sandalwood in Vanuatu

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### Abstract

Historically sandalwood plantings in Vanuatu have been established mainly by seed propagation and transplanted wildings. This method continues to be very important for village communities to grow sandalwood collected from their natural sources. With increasing interest across the country in planting sandalwood the Department of Forests (DoF) is actively encouraging improved clonal seed orchards to keep up with demand.

Clonal propagation of mature trees by cuttings has been difficult to achieve by conventional methods, but grafting has proven a viable alternative method. The superior individuals identified within the current ACIAR sandalwood project are now being grafted using the methods developed in conjunction with SPRIG.

### Introduction

Grafting has been used widely in many horticultural crops for clonal propagation of difficult to root species and also to combine the desirable features of the tree crown (scion) and rootstocks.

Grafting of sandalwood is now being used in Vanuatu to develop sexually mature clones. Grafted clones can potentially set seed after 8 months and produce viable seed. These plants are valuable for the establishment of seed orchards as they can begin to produce large volumes of seed very quickly.

Establishment of seed orchards is promoted by the Vanuatu DoF because of the following benefits:

- higher seed production and seed viability resulting from improved pollination between closely spaced trees.



Figure 1: Villager training in Vanuatu.

- Ease of monitoring seed maturation and seed collection from sites established close to the village.
- Improved oil quality of seedlings established from orchards with parents of high oil quality,
- *Ex-situ* conservation of genetic material.

### Training

The Department of Forests is now implementing villager training in grafting which includes a recent sandalwood propagation workshop in Vila, jointly conducted by DoF, JCU, SPRIG and DPI.

One component of the training aimed to assist village communities to establish their own grafted seed orchards, and encouraged propagation from the trees identified as having high quality oil.

Acknowledged by village participants the propagation and nursery training has also been important for the propagation of other timber and nut species.

### Methods

Grafting success depends on a lot of factors including compatibility between rootstock and scion, rootstock management, selection and matching of both cambiums; and post-management of grafts. The condition of the rootstock

and scion is critical and the best success has been achieved with actively growing plants. While there are many methods for grafting woody perennial trees good success in sandalwood has been achieved using the wedge graft (Fig 1).

Grafting success varies considerably between people, based on their level of experience in grafting. Success is maximised when the diameter of the scion and the rootstock are equal and both the cambium tissues are aligned. Once grafted the plant is grown under shade and the scion covered with clear plastic film. Experience has shown that inexperienced grafters may achieve up to 60 % success, while experienced grafters can achieve 80 to 90 % success rates. Scions collected from sexually mature plants can flower from eight months after grafting while immature scion material will delay flowering.



Figure 1: Wedge graft technique used to successfully graft sandalwood.

### Conclusion

The Department of Forests sees the significance of grafting as important for enhancing its sandalwood domestication strategies. Grafted seed orchards are the most rapid way of increasing the availability of improved seed throughout Vanuatu.

The current high value of sandalwood has generated interest in planting sandalwood in non-traditional sandalwood growing areas. Consequently the demand for sandalwood seed is expected to increase. Therefore training village communities to establish their own grafted seed orchards is seen to be the most efficient way of achieving their goals of establishing commercial plantings of high quality sandalwood.