

Conserving Borneo's genetic diversity for resilient livelihoods in the Mekong

For information about the project "Conserving Borneo's genetic diversity for resilient livelihoods in the Mekong," please visit: <http://www.apforgen.org/initiative/conserving-dalbergia>

Produced by the Institute of Forest and Wildlife Research and Development of the Forestry Administration, 2011

Supported by:
 UKaid, CIAT, APFORGEN, and the Forestry Administration

Guidelines for propagation of *Dalbergia cochinchinensis* and *Dalbergia oliveri* by grafting

A flowering branch of *Dalbergia cochinchinensis*

Prepared by:
 Boreum Chantanya Oudom
 Technical Specialist

2.1 Rootstocks
 Rootstocks are chosen from seedlings grown from seeds. It will usually take at least 1 year for *Dalbergia cochinchinensis* and 1.5 years for *D. oliveri* to reach a suitable rootstock size, which is about 10-12 cm root collar diameter.

2.2 Grafting technique
 On a clean table in a shaded area, select suitable scions and cut them to be 20-25 cm long. The ideal diameter of the scion is 1 cm. At the base of the scion, make a wedge-shaped cut of about 4 cm in length (Photo 2A). Cut the rootstock seedling to be grafted horizontally at 15 cm above the root collar (Photo 2B). Then, split the rootstock in the middle longitudinally, for a distance of about 4 cm, using a sharp knife sterilized with sprayed alcohol. The diameter of scion and the root stock should be the same to make a good match. Gently insert the wedge-shaped scion into the cleft of the rootstock. Make sure that the stock will close tightly on the scion, and the cambiums of the scion and root stock are perfectly matched. Finish the process by wrapping the joint with parafilm (Photo 3) which is available from any large supermarkets in Phnom Penh. Cover the grafted plants with a plastic bag (Photo 4).



Conserving Rosewood genetic diversity for resilient livelihoods in the Mekong

For information about the project
"Conserving Rosewood genetic diversity
for resilient livelihoods in the Mekong,"

please visit:

<https://www.apforgen.org/initiatives/conserving-dalbergia>



Produced by the Institute of Forest and Wildlife Research and Development of the Forestry Administration, 2021



A flowering branch of
Dalbergia cochinchinensis

Guidelines for propagation of *Dalbergia cochinchinensis* and *Dalbergia oliveri* by grafting



Designed by:
Ponleu Domboung Design
<https://pldb.design/>

1 Background

Grafting is a well-suited propagation method for establishing seed sources for native, high value tree species. Grafted trees start to produce seeds early on (within 4 years for *Dalbergia cochinchinensis* instead of 15 years with the normal method of planting seedlings) and are, therefore, suitable for farmer seed suppliers. Grafting is also useful when there is a shortage of seeds, for example due to irregular seed production or few mature individuals in the wild.

This guideline is based on the practice of a farmer-seed supplier in Cambodia who established a grafted seed source of *Dalbergia cochinchinensis* and *D. oliveri* on his farm with financial and technical support from the Darwin Initiative funded project “Conserving Rosewood genetic diversity for resilient livelihoods in the Mekong” (2018-2021). The method can be applied to other high-value timber species for seed production, such as *Heritiera javanica* and *Toona sureni* which are among the priority tree species for planting and conservation in Cambodia.

2 The guideline

2.1 Timing

Grafted plants will require about 3 months in a nursery before they can be planted in the field. So, if grafting is conducted in late April, the grafted stock would be ready for planting in July—the early part of the planting season in mainland Southeast Asia.

2.2 Collection of scion wood for grafting

Look for mature trees which have produced fruits for several years (Photo 1A). Select shoots that grew during the past growing season. Older or younger shoots do not work well. Moderately vigorous to vigorous shoots are best. The shoots should be free of insects and diseases. The cut shoots should be about 25-30 cm in length with a middle diameter of 1 cm.

It is important to collect shoots from many widely spaced trees. This ensures that the seed source will be genetically diverse and that the produced seed is not inbred. Inbreeding reduces seed production, germination and growth of seedlings. Trees that grow close to each other may be related which contributes to inbreeding. Aim to collect shoots from at least 15-20 trees at least 100 m apart whenever possible.

Remove all the leaves from the cut shoots. Tie the bundles of cut shoots from each mother tree together and label them (Photo 1C). It is best to use the cut shoots for grafting the same day as they are collected. If it is not possible, store the scions in a moist medium, such as sawdust, or paper towels, and place in a sealable plastic bag. The bags should be stored in a styrofoam box on top of ice for up to two days.

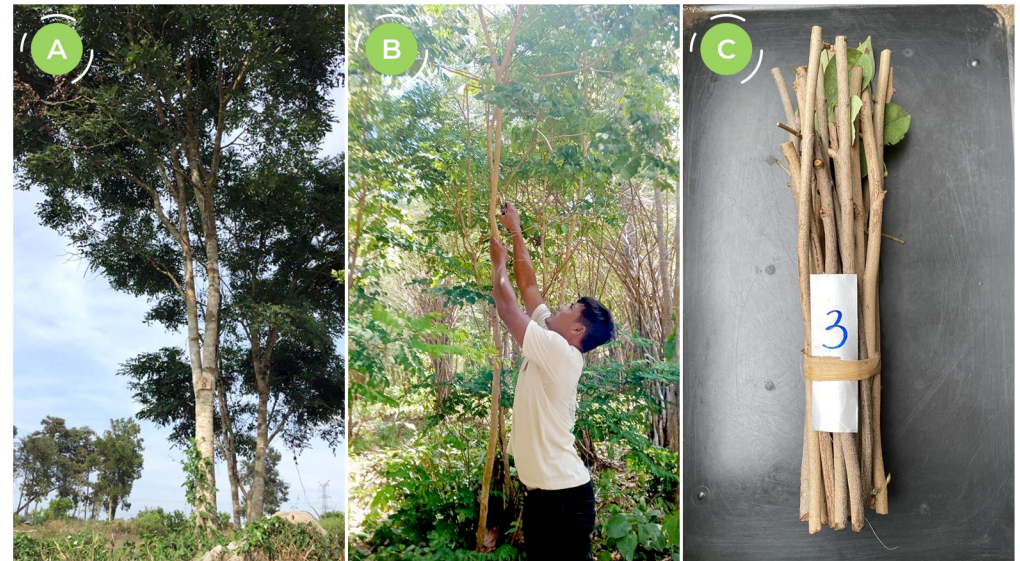


Photo 1: A mature tree (*Dalbergia oliveri*) which has produced seeds is ideal for collection of scions (A). A young tree often has shoots within easy reach, but is not suitable for scion collection because the tree is not reproductively mature (B). A bundle of cut shoots (C).

2.3 Rootstocks

Rootstocks are chosen from seedlings grown from seeds. It will usually take at least 1 year for *Dalbergia cochinchinensis* and 1.5 years for *D. oliveri* to reach a suitable rootstock size, which is about 1.5-2 cm root collar diameter.



Photo 2: Rootstock and scion (A). Preparing the rootstock (B).

2.4 Grafting technique

On a clean table in a shaded area, select suitable scions and cut them to be 20-25 cm long. The ideal diameter of the scion is 1 cm. At the base of the scion, make a wedge-shaped cut of about 4 cm in length (Photo 2A).

Cut the rootstock seedling to be grafted horizontally at 15 cm above the root collar (Photo 2B). Then, split the rootstock in the middle longitudinally, for a distance of about 4 cm, using a sharp knife sterilized with sprayed alcohol. The diameter of scion and the root stock should be the same to make a good match.

Gently insert the wedge-shaped scion into the cleft of the rootstock. Make sure that the stock will close tightly on the scion, and the cambiums of the scion and root stock are perfectly matched. Finish the process by wrapping the joint with parafilm (Photo 3) which is available from any large supermarkets in Phnom Penh. Cover the grafted plants with a plastic bag (Photo 4).



Photo 3: Wrapping the joint with parafilm.



Photo 4: The grafted plants are covered with a plastic bag.

2.5 Post grafting

Maintain the newly grafted plants in a shaded area in the nursery and water them regularly, as needed.



Photo 5: The grafted plants are maintained in a shaded area of the nursery.

2.6 Emergence of buds

After 7-10 days the grafted plants develop new buds indicating the success of grafting (Photo 6). The plastic bag can be removed after 2 weeks. The parafilm binding is removed when the joint is fully sealed, and this takes approximately 3 months for both *D. cochinchinensis* and *D. oliveri*. The success rate for both species is approximately 60% under the farmer's nursery conditions.

Maintain the grafted plants in the nursery for 3 months, gradually reducing the shade to increase the light. The plants should be hardened off by placing them in the full sun and giving minimal watering, about 2 weeks prior to planting to ensure a high survival rate in the field.



Photo 6: Vigorous buds/shoots on grafted *Dalbergia oliveri* plants in the nursery.



Photo 7: *Dalbergia oliveri* plants in the nursery one month after grafting (A). Grafted plants of *Dalbergia cochinchinensis* in their second year after field establishment for seed production as a farmer's seed source (B).