

Grafting techniques of *Allanblackia* spp

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Sustainable Development Goals	No poverty, decent work and economic growth and life on the land

Summary

This practice describes grafting techniques of the *Allanblackia* spp. For example, the whip and the whip and tongue grafting methods.

Description

To achieve a successful graft, it is important to have healthy, actively growing rootstocks, as well as scions with active (swollen) buds that have not yet opened. Normally, scions and rootstocks should be of the same diameter, in order to align cambium layers.

This is required for the formation of the graft union, to allow the effective movement of the nutrients and water needed for plant growth between roots and shoots.

Figure 1. Healthy rootstocks in the nursery ready for grafting



1. Scion selection, collection and storage

Scions should be collected from actively growing trees that show no signs of disease or pest attack. Scions are best taken from terminal shoots with actively growing buds (swollen buds about to open).

The use of vertically growing (orthotropic) shoots is best, but otherwise shoots growing at up to 45 degrees from the vertical can be used. The diameter of the scion should match with that of the rootstock and should be between 5 and 15 cm long.

After selecting and removing the scion from the tree, all leaves should be removed immediately to reduce moisture loss through transpiration. Scions should be wrapped in moist cotton wool, moist paper towels or moist newspapers and placed inside a plastic bag (Figure 2).

This should then be kept in a cool box with ice, to keep the scions at a temperature of 5 to 10° C. If ice is unavailable to collect scions, temperature can be minimised by keeping the cool box in a shady place.

For long term storage (more than 2 days), scions can be kept in a refrigerator, but it is advisable to use scions as soon as possible after collection.



Figure 2. Preserving scions by wrapping them with damp cotton wool



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2. Various grafting methods

Four popular grafting methods are top cleft, side cleft, whip, and whip and tongue. The most successful methods for *Allanblackia* have been top cleft for *A. parviflora* and side tongue for *A. floribunda*.

Regardless of the grafting method, scions are generally treated beforehand with fungicide to prevent fungal infections. Grafting equipment should also be sterilised by dipping in 95 percent ethanol before and during grafting.

Figure 3. Scion prepared and inserted into the rootstock



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2.1 The top cleft grafting method

Cut the rootstock straight across where the diameter of the stem is the same as that of the scion. Then make a smooth, straight cut vertically down the centre of the rootstock,

deep enough to accommodate the wedge of the scion. The scion is prepared by making two sloping cuts to form a 'V' shape wedge. This is then inserted into the cut in the rootstock, making sure the cambium layers match up.

Figure 4. Scion prepared and inserted into the rootstock



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The point of union is tightly held together with grafting tape and sufficiently covered to make sure water cannot enter the point of union. A clear plastic bag can be used to cover the scion and union in order to prevent excessive moisture loss during wound healing. After three to four weeks, when new growth appears, the plastic bag and grafting tape are removed.

Figure 5. Scion prepared and inserted into the rootstock



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Figure 6. Tying the union with grafting tape and plastic bag to avoid excessive water loss



Figure 7. Tying the union with grafting tape and plastic bag to avoid excessive water loss



Figure 8. Tying the union with grafting tape and plastic bag to avoid excessive water loss



2.2 The side cleft grafting method

A shallow, slanted cut 3 to 4 cm long is made along the side of a healthy rootstock.

The base of the scion is also trimmed to match with the incision made on the rootstock. The scion is then inserted into the rootstock incision, and scion and rootstock are bound tightly together with grafting tape.

After 3 to 4 weeks when a firm union has formed, the terminal portion of the rootstock (about 3 to 4 cm above the point of union) is cut away. Grafting tape is then removed.

Figure 9. Preparation of scion



Figure 10. Making the incision on the rootstock





Figure 11. Insertion of scion on the rootstock



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Figure 12. Scion inserted in place and binding with a grafting tape



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2.3 The whip grafting method

The whip graft is difficult for the beginner but is relatively a quick method once mastered, and is the best approach for grafting onto field (rather than nursery) plants. It is achieved by making a matching sloping cut about 3 cm long at the base of the scion and on the rootstock with a sharp knife. If the stock and scion are not the same size, match the cambium layers on one side. Secure the scion to the rootstock with a rubber band and then with grafting tape. A clear plastic bag is used to cover

the scion and union to prevent excessive moisture loss prior to healing. The graft is successful when the scion produces new growth, the plastic bag and grafting tape are then removed.

Figure 13. Successful graft ready for topping and removal of tape



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Figure 14. Rootstock cut above the point of union after the wound has healed with the scion



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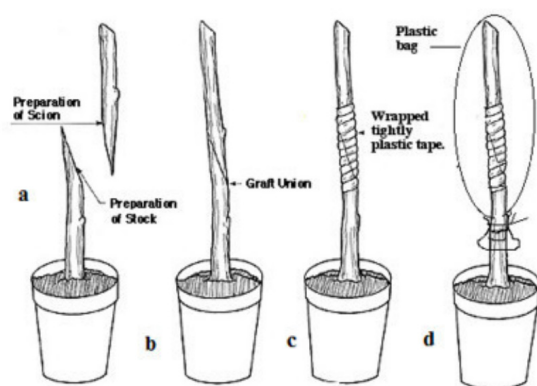
2.4 The whip and tongue grafting method

The whip and tongue method uses interlocking cuts that hold the scion and rootstock together. It is the best technique for small diameter (0.8 to 1.5 cm) rootstocks. Whip and tongue grafting involves making a long, sloping smooth cut



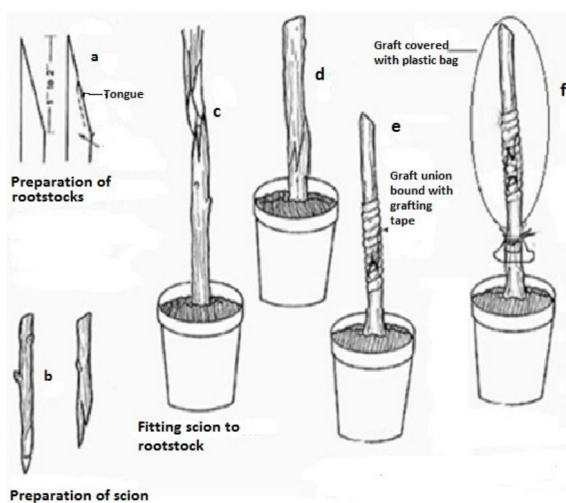
about 2.5 to 6 cm long on the rootstock, followed by a matching cut on the scion. A 'tongue' is then made on both the scion and rootstock by slicing downward into the wood as shown in the figure. The scion is then fitted into the rootstock and the two held together in the normal way with grafting tape, then covered with a clear plastic bag.

Figure 15. The whip grafting method: (a) Scion and rootstock ready for union. (b) Scion and rootstock in place and ready for binding together. (c) Rootstock and scion bound with a grafting tape. (d) Scion and union covered with a clear plastic bag



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Figure 16. The whip and tongue grafting method: (a/b) Scion and rootstock ready for insertion. (c) Fitting scion to rootstock. (d) Scion and rootstock in place and ready for binding. (e) Rootstock and scion bound together with grafting tape. (f) Scion and union covered with a clear plastic bag



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3. Care after grafting, hardening off and field planting

After grafting, the following practices should be adopted:

- Prevent grafts from drying out by placing under shade and by watering regularly; apply water directly to the soil.
- Normally, any shoots other than the scion that grow on the rootstock should be removed.
- Plastic bags should be removed from scions when they start to shoot, generally between 20 and 40 days after grafting. The grafting tape may remain in place for longer, until a vigorous growth is observed. Grafted seedlings must be hardened before they are transplanted on-farm. This involves a gradual reduction in shade and watering in the nursery.
- Field planting should be done at the beginning of the rainy season to allow the plants to establish well before the onset of the dry period.

4. Reasons for grafting failure and precautions

In addition to the use of unhealthy rootstocks, scions at the wrong stage of physiological maturity and not matching the cambium of rootstocks and scions (points mentioned above), the failure of grafting may also be due to factors such as:

- entry of water into the point of union, thereby promoting mould growth;
- mechanical damage of the cambium region during grafting operation;
- incompatibility of the scion and rootstock.

4.1 Precautions that can be taken to prevent failure include

- Graft as soon as possible after scions are taken from the mother tree.
- Use sharp instruments to avoid causing



unnecessary damage to plant tissues.

- Disinfect grafting tools with 95 percent ethanol.
- Cut surfaces must be smooth.
- Secure the union tightly to ensure good contact and wound healing.
- Provide shade to new grafts to avoid excessive water loss.
- Always handle grafts by holding the rootstock, not the scion.

Figure 17. *Allanblackia* spp plants after grafting



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Figure 18. *Allanblackia* spp plants in a green house



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5. Further reading

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3. Agro-ecological zones

- Tropics, warm

4. Objectives fulfilled by the project

- Resource use efficiency; and
- pro-poor technology.