

# Mango grafting manual

(*Mangifera indica* L.)

A step-by-step guide





This leaflet has been prepared by the Tree Productivity and Diversity theme of the World Agroforestry Centre (ICRAF), Nairobi Kenya with inputs from Erick Ngethe, Valentine Gitonga, Agnes Gachuiiri, Sammy Carsan, Katja Kehlenbeck, and Stepha McMullin.

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# Grafting of a mango tree (*Mangifera indica* L.)

Grafting is a rapid vegetative propagation technique to multiply plants identical to the desired parent tree. Propagation is the process of raising new plants from a variety of sources: seeds, cuttings, bulbs and other plant parts.

Grafted mango trees take a shorter time to start flowering and produce fruits. More trees can be accommodated per unit of land as trees grafted on a dwarfing rootstock grow less vigorously. Given the many mango varieties available, farmers have good opportunities to graft desired varieties with great market and domestic consumption potential.

## Plants grafting principles:

- Involves joining or uniting two separate woody parts of a living plant tissue from different trees or plants to form one plant.
- Parts used in grafting: Scion; refers to the bud or piece of stem that is to be attached to the rootstock. Rootstock refers to the seedling or tree upon which a scion is to be attached. Materials selected as scions should be taken from terminal buds (end of a branch) of a tree or plant, at the 'tight bud stage' or before a new flush with buds which are swollen but have not opened.

There are several grafting methods which differ according to how the scion is attached to the rootstock. These grafting methods are top/wedge, whip/tongue and side/veneer.

Usually mango seedlings are grafted using top/wedge grafting method.



*Mango scions*



*Mango rootstock*



*Top wedge join*

# Step by step guide to grafting

## Step

# 1

## Prepare your propagation tools & materials

Required tools and materials:

- Pruning scissor, scalpel, or grafting knife.
- Grafting tape or soft clear polythene bag cut in strips. The ideal material for covering should be a clear polythene strip that is water proof and flexible.
- Sterilizer such as spirit, but other alternative could be used such as rubbing isopropyl (alcohol - although it evaporates quite readily) or using household bleach prepared by mixing one part with nine parts of water by volume (this bleach can be highly corrosive to certain metals).
- Plastic bag to collect scion or wet newspaper or cooler box (optional).

### **Important:**

*All grafting tools should be thoroughly sterilized before each grafting activity to avoid infecting plants with diseases.*

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## Step

# 2

## Select the rootstock

A good rootstock is very important for future production of high quality mango fruits. The rootstock provides the rooting system and part of the stem of the future mango tree.

Select the rootstock according to these criteria:

- Suitable variety; best are 'Peach' and 'Sabre' varieties, but if not available chose a seedling from a local mango tree that grows well in your area.
- Healthy, strong and free of pests.
- About 6 months old (which should be at least 25 cm tall) with a stem as thick as a pencil.



## Step

# 3

## Cut the scions

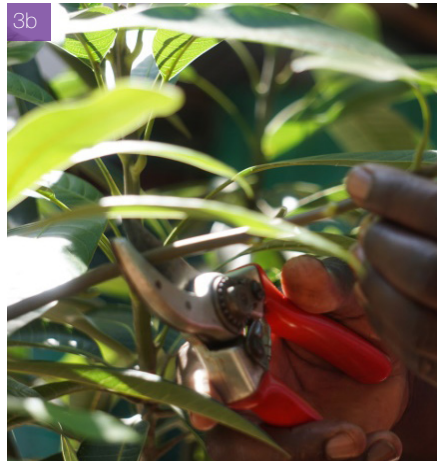
It is very important to get quality scions for grafting, as this will develop into the productive crown of your future mango tree.

To get quality scions follow these steps:

- Identify a highly productive, healthy mother tree of the desired variety and quality.
- Select scions from the end of the branches which are as thick as a pencil and have an active, healthy terminal bud.
- Cut the scion at 10 cm length with a pruning scissor or secateurs or a very sharp knife.
- Remove the leaves from the scion with a clean sharp knife or secateurs.
- Wrap the fresh cut scions in a wet newspaper and put the package in a plastic bag.
- Transport your scions to the place of grafting soonest. Store the package at a cool place during transport and use a cooling box for longer transport if available.

### When to collect scions:

- It is advisable to collect scions during warm and humid weather, just before the production of new leaves (also called flushing).



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### What to avoid when harvesting scions:

- Harvesting from diseased branches
- Low lying or crowded branches
- Bigger or smaller sized scions that don't match the rootstock
- Scions not at 'tight bud stage'
- Woody or matured stems
- Avoid collecting scions between flowering and harvesting season

### **Important:**

- *Scions should be stored in a zip-lock plastic bag in a cool dark place and not more than 7 days. The sooner you perform your grafting with the cut scions, the better and the higher the success rate. It is recommended that you collect material (step 1 and 2) and perform grafting activity on the same day whenever possible.*
- *To ensure successful grafting, it is recommended that a farmer selects healthy and vigorous rootstocks and scions which come from desired mango varieties.*

## Step

# 4

## Preparing rootstock for top or wedge grafting

- Ensure that you pair scions to rootstock of the same thickness.
- Cut the mango rootstock seedling horizontally at a height of about 6 – 8 cm above soil level by using a pruning scissor or sharp knife.



- Split the cut upper end of the rootstock through to a depth of about 3 cm using a very sharp knife.





## Step

# 5

## Preparing the scion for top or wedge grafting

- Cut the scion to a final length of about 10 cm with a pruning scissor or a sharp knife.
- Use the scalpel or razor blade to sharpen the cut lower end of the scion to a V-shape by removing the wood on both sides of the scion.
- Try to make the V-shape as deep as possible as this will increase the survival rate of your grafted scion. About 2 – 3 cm long is suitable.



## Step 6

### Join rootstock and scion

- Slide the sharpened end of the scion into the slot you have cut on the rootstock.
- Insert the scion as deep as possible into the cut of the rootstock and align the two parts.

#### **Important:**

*Make sure the cambium parts (these are the white greenish layers just under the bark) of the scion and the rootstock are in close contact and quite firm. It is important that both the scion and rootstock have exactly the same thickness at the contact location. If this is not the case, it is advisable that you remove the scion and repeat the sharpening at a thinner end or cut the rootstock at a thicker part of its stem. Then repeat the joining and check if the two are matching better.*



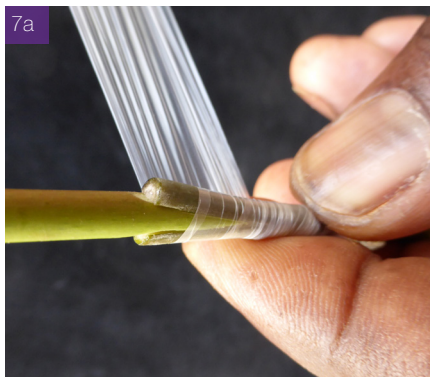
## Step

# 7

### Enclose (bandage) the union

Fix both the scion and rootstock in place by covering the point of union until it is healed. To do this;

- Hold the union carefully with one hand.
- With your other hand, wrap the grafting tape or the polythene strip tightly around the union and knot or inter-loop the two ends of the tape/strip.
- Make sure that the wrapping is tight enough and that the scion does not move out of the union while wrapping.



## Step

# 8

### Cover the scion

This is done in order to increase the temperature and humidity around the graft hence improving the chances of a successful graft union.

- Wrap another grafting tape or polythene strip around the scion, but a bit more loosely than the one bandaging the union.
- Knot or inter-loop the two ends of the tape/strip.
- Don't cover the upper part of the scion which is the terminal bud so that it can grow and produce new leaves.

#### What to avoid:

- Using unclean grafting materials can lead to wound contamination/ infection.
- Direct exposure of union to sunlight may lead to high water loss. Grafted mango should be stored under a shade.



## Step

# 9

## Let the wounds heal and remove the bandage

- Label the grafted seedling with the name of the scion variety.
- Keep the grafted seedling in the shade and water it well.
- After about 14-21 days the scion should have developed new leaves and the wound should have healed.
- Remove the grafting tape or polythene strip when the wound is fully healed. Be careful not to injure the stem when removing the tape/strip.



Step

10

## Post grafting care: hardening, transplanting and removal of terminal bud

- Harden your grafted seedling to avoid shock by placing them in a shade house or a shaded area for 6-8 weeks before transplanting.
- Transplant the grafted seedling into a well prepared planting hole (*refer to planting manual*).

About 6 months after transplanting, you can remove the terminal bud of the stem to initiate branching at the desired height of your mango tree.

### ***Important:***

*Overwatering of recently grafted plants is a common fault encountered as there is minimal loss of water through leaves. Please do not overwater the grafted plant.*







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