CITRUS BUD GRAFTING AT LALOKI

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INTRODUCTION

Citrus trees in Papua New Guinea are well suited to medium altitude areas (about 800-1400 m), e.g. the Mt. Koiari and Goilala districts of the Central Province. (See the article by Michael Bourke and Tevo Tarepe in this issue of HARVEST.) Good trees are also found in the lowland areas where rainfall is fairly regular throughout the year, e.g. Cape Rodney in the Central Province.

Villagers have traditionally grown their citrus trees from seed and also from root suckers. However, some people have noticed that when they sow a seed, the new tree produces different fruit to the parent tree.

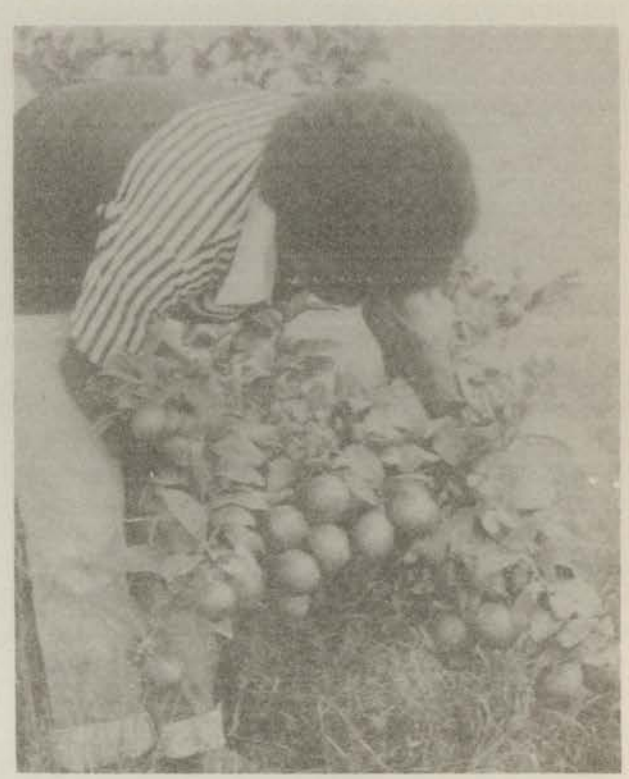
BUDDING AND GRAFTING

'Budding' is the process of joining a single bud onto a rootstock seedling. The young tree develops from that bud. Growing citrus trees in this way in the nursery for transplanting to the field is a project that extends over 12 to 18 months in the lowlands.

'Bud grafting' is the correct term but when single buds are used the operation is generally called budding. Grafting usually applies to larger pieces of scion wood (budwood) or scions containing many buds. In this article I will use the term budding.

MAIN REASONS FOR BUDDING

1. To grow a tree that is identical to the parent tree.
2. A rootstock that is suited to the climatic and soil conditions can be used.
3. Trees can start fruiting much quicker than trees grown from seeds.



A lemon tree at Laloki, 18 months after being budded onto Rough lemon rootstock

TYPES OF BUDDING

There are three types of citrus budding:

1. Microbudding
2. Shield or T budding
3. Chip budding

Microbudding

This is a technique in which much smaller buds are used than with shield or chip budding. The buds are obtained from young growth. It may be round or angular in cross section but wood must be mature and the buds well developed.

Citrus trees grown in the medium altitude areas of Papua New Guinea produce young growth that tends to harden very quickly. This type of budwood is well suited to microbudding.

Shield or T budding

This method involves making a 'T' cut into the bark of the rootstock and inserting a shield-shaped bud under the bark. The rootstock must be in active growth so that the bark will lift easily with a knife.

Chip budding

At Laloki I have found chip budding highly successful and quicker to perform than shield budding. In this article I shall describe only chip budding.

ROOTSTOCK

These are the plants that are propagated from seed and will receive the buds of the variety you wish to grow.

In the Central Province two types of rootstock are in common use because they are able to withstand the dry climate. These are Muli lime (sapora) and Rough lemon.

Seed sowing

Fresh rootstock seed should be sown either into seed trays or containers. When using seed trays spread the seed thinly, about 1-2 cm apart, over the tray. If seed is sown too thickly, damping off disease (*Pythium* spp.) can easily spread through the tray, killing all the seedlings. Cover seeds with soil to a depth of twice their diameter.

Seeds germinate in 2-4 weeks and can be potted into polythene bags when they reach 5-7 cm tall. P.B.5 black polythene bags are ideal. These measure 10 cm wide x 15 cm high.

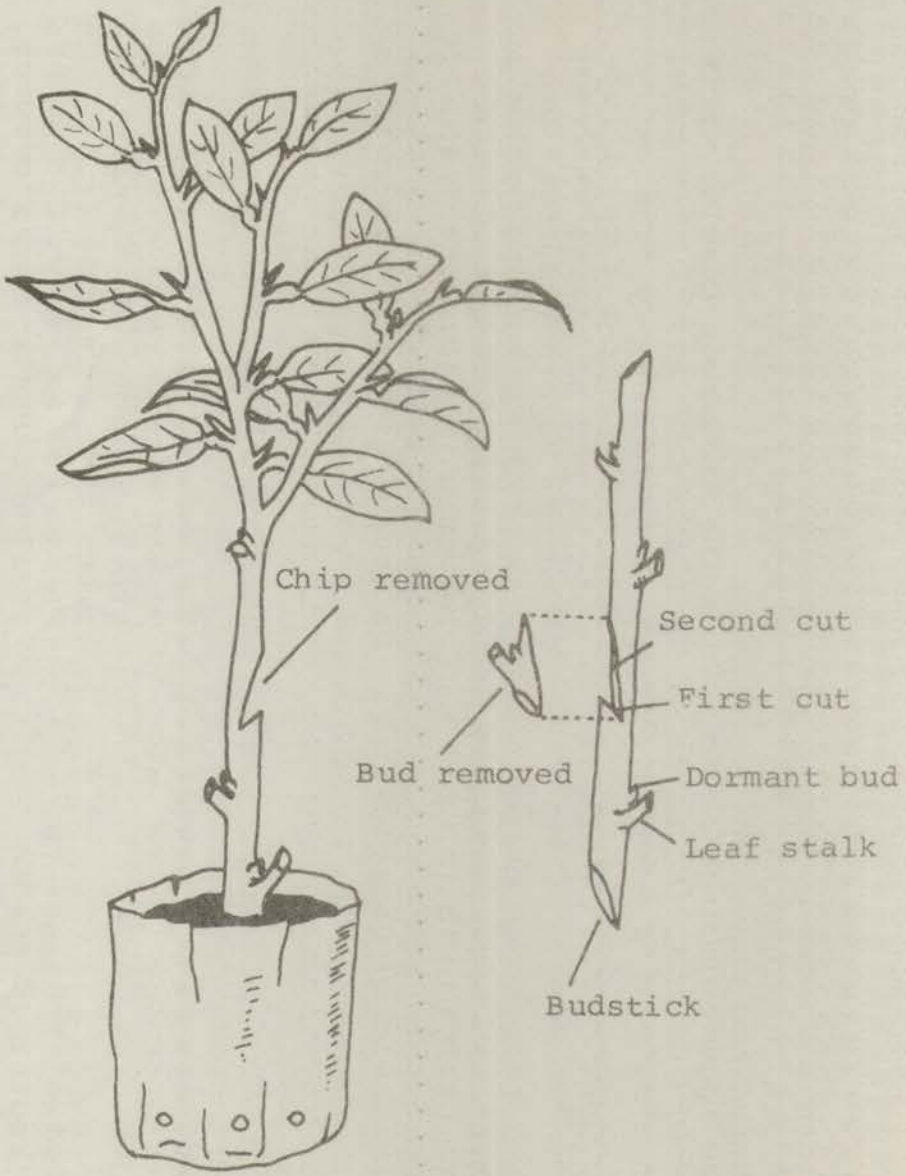
Rootstock preparation

Rootstocks are ready to bud when they are about the same diameter as a pencil. The plants will take roughly six months from seed sowing to reach this stage.

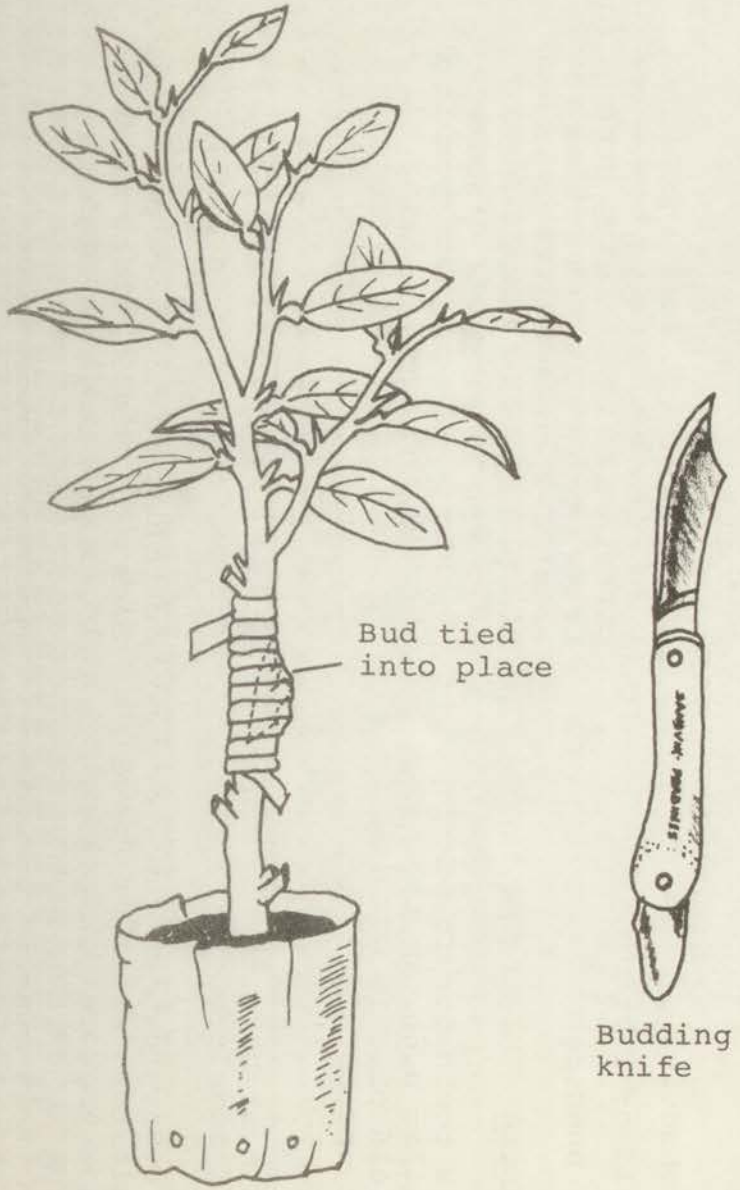
As the seedlings develop, trim off any side shoots that grow. Rootstocks must be growing vigorously at the time of budding so pot up plants at least 2 months before budding. One week prior to budding, using a sharp knife, remove all the leaves on the rootstock stem 20 cm above soil level. This allows for easy access when budding.

SELECTING BUDWOOD

The budwood is taken from trees of the citrus fruit you wish to grow. Select healthy mature trees that bear good fruit. Mature budwood is wood that has reached the stage of flowering. This budwood will produce fruit when the trees are still young.



Budding is carried out by first cutting a chip of wood out of the rootstock stem. A similar sized chip containing a dormant bud is removed from the budstick.....



.....and is placed in the space left after removing the chip from the rootstock. The bud is tied in place using tape. The whole operation is carried out using a sharp budding knife (right).

Choose young shoot growth about 15-30 cm below the growing tips. This area should be round wood (not angular) and of approximately the same diameter as the stem of the rootstock. Buds must be dormant and not in active growth.

Remove budwood from the tree using secateurs (strong cutters used in gardening) and immediately cut off all leaves leaving a short section of the petiole (leaf stalk) intact. If it is not possible to do the budding the same day, budwood may be wrapped in a dry plastic bag and stored in a refrigerator. Do not store the budwood in a freezer.

BUDDING

Buds must be inserted into the rootstock 15 cm above soil level. This will prevent the buds coming into contact with the soil when the trees are planted into the field. If the bud union touches the soil, citrus collar rot disease may kill the trees.

Insert the budding knife downwards at a 45° angle into the rootstock stem approximately 5 mm deep. Then make another downward cut starting 2 cm above the first cut. Make the cut at a shallow angle, gradually becoming deeper, to finish at the stopping point of the previous cut. A chip of wood will now drop out.

You should always keep the knife at a steep downwards angle to the stem when cutting. The blade will cut much more easily when held in this way, and it reduces the risk of slicing your fingers. In addition, always keep the budding knife razor sharp by using a sharpening stone.

Exactly the same method of cutting is used to cut the budwood. However, each chip of wood removed must include a dormant bud. Buds are always positioned in the axil (between leaf stalk and stem) of the leaves. Start the first 45° bottom cut immediately below the bud, and the second cut about 1.5 cm above the bud. Support the budstick with your left hand forefinger positioned directly below the bud you are removing.

Place the bud you have removed into the rootstock in the space left after cutting out the chip. Tie the bud in firmly with budding tape. Start taping below the bud and finish with a half hitch tied above the bud. All cut surfaces must be sealed completely with the tape. This prevents the buds from drying out and also stops water from getting in and rotting the buds.

If the width of the bud does not match the width of the cut on the rootstock be sure to match up one side of the bud bark with one side of the rootstock bark.

AFTER CARE

Two to three weeks after budding remove the tape by cutting it from top to bottom on the rootstock behind the bud. If the bud is still green it will develop and start growing. At this stage, using secateurs, cut off the rootstock stem, with all its leaves, above the bud. This cut should be made at about 60° to the stem to allow for water run off. If moisture lies on this cut surface, rots may develop in the stem.

If the bud has turned brown, this shows that it has died. You should try budding again on

another section of the stem.

As the bud grows, check the rootstock stem from time to time. Cut off any other buds that have begun to grow. If the plants start to become rootbound, pot them up into larger polythene bags.

PLANTING OUT

Plants will be ready to plant into the field approximately 4-6 months after budding. Remember to remove the polythene bags from the roots.

In the Central Province, try to plan your budding operation so that your trees can be planted out at the beginning of the wet season.

FURTHER READING

Bourke, R.M. and Tarepe, T. (1982). Locations for commercial citrus production in Papua New Guinea. *Harvest* 8(4):

Wishart, R.L. Microbudding. Originally published in the *South Australian Journal of Agriculture*. Photocopies of this article may be obtained from Horticulture Section, D.P.I., Konedobu.

(Illustration on page 158 by Isako Isekia, U.P.N.G.)