Grafting egg fruit to control bacterial wilt

DPI&F Note

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Bacterial wilt is a major disease problem of eggfruit in some areas and can make eggfruit production uneconomical. One solution to this problem in smaller production areas may be grafting onto a resistant rootstock. Although labour-intensive this procedure can markedly increase the cropping life of the plants.

A rootstock that can be used in eggfruit grafting is devil's fig (*Solanum torvum*), the fruit of which is used in Indonesian and Thai cooking. Although devil's fig is normally resistant to bacterial wilt (*Ralstonia solanacearum)*, it has shown wilt symptoms when planted through plastic mulch, due to the higher soil temperature under the plastic.

A trial conducted by Don Gordon was carried out at Elimbah on the property of J & R Sanna.

Comments on the trial

The best way to propagate the plants is to grow the rootstock in 50 mm or 75 mm tubes and graft when the stock is 3 to 6 mm diameter. Seed can be germinated in normal seedling trays then transplanted to the bigger tubes a few days before grafting.

Cleft grafting is used (Figure 1). Shoot tips from an old crop may be used, but the best tips (scions) are taken from young seedlings grown specifically for the purpose. These scions should be no longer than 70 mm and contain one or two growing points. The length of the two cuts on the scion is no more than 15 mm, providing the rootstock is small. One vertical cut is made in the stock. To achieve equal size between the stock and scion, the rootstock seed is generally planted several weeks before the eggfruit seed. Variations in germination times, even from different batches of seed from the same company, can interrupt grafting plans. There is some indication that while eggfruit germinates best at 30°C, it still has 50% germination at 25°C whereas devil's fig will give much less than 50% germination at 25°C. Bottom heat equipment or frying pans are used in cooler weather.

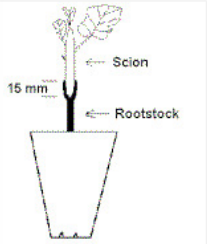

Figure 1. Grafted eggplant seedling

In small plants up to pencil thickness, medium thickness clear plastic is as effective as most grafting tape. Smaller plants are often grafted using florist tape. Florist tape can have a short life when stored so buy it from a wholesaler in a bulk pack to ensure it is fresh. Do not store it in a hot place, such as the dashboard of a car, or it will melt together into an unusable mess. When stretched, florist tape clings to itself but will fall off as the plant expands. The fact that it does not need tying makes it easier to use. In a protected nursery environment, string or special grafting clips, which work well with whip grafting, can be used. Under good nursery conditions more leaves can be left on the scion, which helps quicker recovery of the scion.

Do not let the rootstock get too big before grafting. Once greater than pencil thickness, less of the sap flow of the stock is intercepted by the scion. This results in a slow growing scion. Florist tape is unsuitable for use with bigger plants, so normal plastic tape has to be used. If this tape is removed early because potato tuber moth has got under the tape problems arise. Early removal of the tape can cause the union on the stock to 'pull back' from the scion (see Figure 2). The cause of this is probably the tendency of the scion to 'take' better at the tip or lowest part rather than on the top of the stock in older plants. This weak union can break in a storm, particularly with a heavy crop load.

Figure 2. Folding back of the stock from the scion after removing tape too early. (A problem where older rootstocks are grafted.)

Do not plant too deep in the field because too many suckers will develop. Many eggfruit growers have planted tobacco, eggfruit and capsicums in the past. There is a tendency to plant deep because a better root system can result. With devil's fig, the lateral vegetative buds grow up as suckers, even from 100 mm down. Removal of these can be a major maintenance task when growing the crop.

If the scion dies in the field, remove the whole plant and replace it. Any attempt to graft bigger stocks in the field is 'hit and miss' at best and they become very thorny.

Check young plants regularly for signs of potato tuber moth. If potato tuber moth larvae get under the tape nothing will control them and the grafted piece will wilt and die.

Other considerations

Bacterial wilt could still be a problem if plastic mulch is used. Overhead irrigation and bare soil can reduce bacterial wilt problems, both with grafted plants and normal seedlings. As bacterial wilt is mainly a summer problem there is more to be gained by grafting a spring planting. If some devil's fig plants show wilt in a particular situation, normal seedling eggfruit would have a much higher crop loss.

As with seedling eggfruit, there is a tendency for the plant to lodge or 'crawl' along the ground. This could be overcome by trellising the crop, using a trellis as for tomatoes but with fewer wires.

It is recommended that whip grafting be tried once the grower is able to master the cleft method. The nursery environment would have to be good, with equal size of stock and scion. With grafting clips, rain and overhead watering is excluded until the tissue has healed. In a week or so the clips can be removed.

Grafting is more suitable for smaller growers who want a second crop from the one planting. Growers who aim to pick the first crop only before ploughing in would find grafting of less value.

If tuber moth is normally a problem on seedling eggfruit, it can be worse on the grafted plant.

Most of the points covered in this article would also apply to tomatoes.

Anyone interested in trying grafting would be encouraged to try giant devil's fig (*Solanum hispidum* - beware the thorns) as well as wild tobacco tree (*Solanum mauritianum*). These would have potential as rootstocks if their resistance to wilt is as good as devil's fig. The amount of suckering from these plants is unknown but it would be a bonus if they sucker less. Devil's fig tends to be more adaptable to different soils in the wild than the other two.