CUTTING-GRAFTS OF CITRUS WITH PONCIRUS TRIFOLIATA ROOTS

JUDITH COWAN

Duncan & Davies
New Plymouth

Duncan & Davies started growing citrus by cutting-grafts on a trial basis in 1970. This followed a trip by Mr. Trevor Davies who saw this being done in the U.S.A. The reason was that plants can become saleable in a much shorter time than when other methods are used.

Present methods of raising the understock from seed and then field budding produce a saleable plant after 4, 5 or even 6 years, whereas cutting-grafted plants attain a similar size in 18 months to 2 years. We commenced our cutting-grafting in autumn (March) but this can be carried on in to May, this being about the latest because of the semi-deciduous nature of the *Poncirus trifoliata* understock. I see no reason, however, why this method could not be extended to the spring and early summer.

Wherever possible, cuttings were used as understock, these being collected from several stock hedges. This has several advantages over young seedlings which give only a very small diameter in which to make the cleft graft. Cuttings can be up to pencil thickness giving a good area for cutting and also for matching of cambium layers.

Once collected, the understock is cut into suitable lengths. To begin we grafted anything from 6-18" in length, using a side graft at the base for about 40% and cleft grafting the remainder. This was mainly to determine the more satisfactory method — both from the operator's point of view and the end result. The cleft graft method proved easier and, in most cases, gave a better result so we switched to this method for our second year trials. It was discovered upon further research that there is an optimum length at which the understock will influence the scion with its properties of dwarfing, earlier fruiting, etc. This proved to be from 12-18" so, without really knowing why, we had gone to this length anyway.

Normal cutting procedures are followed; viz. collect material in plastic bags, dip in fungicide and insecticide solution and cut to the desired 12-18". If older stock is used 2 or 3 cuttings may be made from one stick. For ease of handling, the thorns are then removed, particularly from the upper and lower regions.

The cleft graft is then made in the top of the cutting and the scion inserted. Scions are collected from the nursery row or from mature trees and may be cool stored for 2 or 3 weeks until required. I prefer short tip growths up to 2" in length and reduce the foliage on large species such as grapefruit. The graft is tied

using a rubber budding strip and treated again as a normal cutting; i.e. the lower stem (rootstock) is wounded and treated with hormone, in this case IBA (0.8% powder). Cutting-grafts are then set under mist in our normal propagating medium — 3 parts sawdust, 2 parts peat, 1 part pumice and placed on bottom heat up to 30°C. This is the normal method, but I have at times put cuttings of understock in and grafted these once rooting has occurred. I prefer to do the whole operation at once thus reducing handling.

It takes about three weeks for the stock to root but it is interesting to note that there appears to be a two-way translocation of materials, coming not only from stock to scion but also in reverse, borne out by the considerably longer time stocks grafted with Seminole tangelo scions take to root compared with those grafted with mandarin cultivars.

Once the stock is well rooted the plants are potted up into standard compost and returned to a heated glasshouse to establish the roots. The rubber ties and remaining leaves, thorns, etc. can be removed at this stage but I prefer to disturb the graft as little as possible and so delay this task for a further 3 or 4 weeks until the plants are well established and shifted out to a shade-house.

Poncirus trifoliata roots almost 100% but, as mentioned previously, this is influenced somewhat by the scion cultivar. Similarily, the grafting "take" appears to be slightly lower with some species, namely tangelos and some grapefruit. Overall, we expect a minimum of 75%, but with most cultivars we have over 90% success.

With results like this the question is raised why we do not produce all our citrus by this method. Basically, it is a matter of space and time; when growing up to 30,000 by this method at least 2 glasshouses would be required. Indications are that heat is essential — a fact brought home when newly-potted plants were shifted outside too early resulting in leaf drop and substantial losses.

I feel there is room for further research in this field which could, perhaps, produce clonal rootstocks of a much better quality thus benefitting both the grower and the customer.