

with most town water supplies, it is often necessary to use filtration systems to take out algae and other organisms. This can be achieved through a series of special microfilters or sand filters. Also, separately or in conjunction with, chlorination injection can be used to assist in control.

Contamination through dust being sucked in through fan ventilation systems, and then settling on plants, is also a very important aspect too often neglected when problems arise. Ventilation duct systems can hold quite a residue of contaminated dust that can be dispersed over a greater period of time.

Contamination from condensation taking place, and water dripping from the roof and purlins, can often be a factor in disease spread as well. Control for these is much more difficult, extra ventilation being one of the few means of overcoming condensation.

It is always amazing how quickly disease can spread from such contamination points. Wiping out big areas if daily checks, which should be a normal part of good management, are not made, and immediate remedial steps undertaken.

## **OPEN GROUND VS. CONTAINER-GROWN CITRUS**

GARY R. EYLES

*A.T. Eyles & Sons Citrus Nursery  
Kenthurst, New South Wales*

“You’ll never change an old field grower to growing in containers.”

I have heard that comment made on any number of occasions. It is difficult to change from something you know well and which, in our case, has been a successful practice for over 60 years. This paper is a brief description of how we have begun the change to container growing of citrus.

For many years citrus in the Sydney area has been grown in the field to a stage of one full season’s growth after budding. They are then pruned back significantly and dug bare-root. They are sold to orchardists or retailers, in the latter case they need to be placed in a “heeling in” bed, or grown-on in containers for another season and then sold as an “advanced” or three-year-old tree.

A T Eyles and Son were and still are involved in growing the tree to the two-year-old stage in the field. It is now felt, however, that a tree could be grown in a container in two years that would compete favourably with the three-year-old tree containerised after being transplanted from the field.

The system being developed for container-growing differs little from previous practice in the field.

For cultivating field citrus, rootstocks were grown in a seed-bed, dug in early spring and planted out in rows. These would then be grown on and autumn-budded. The following spring they are cut down, trained and grown on the following season. The next spring they are dug out and sold bare-rooted — that is, two years after planting out from the seed-bed.

For container growing, rootstocks from the seed-bed are still used. Experiments have been made this year with some rootstocks grown in seven-inch “root-trainers” inside a poly-house. The advantage here is the minimal disturbance to the root system in transplanting.

Rootstocks planted in the “root-trainers” have shown good growth but seed germination was very poor; this aspect will need improvement before poly-house propagation can provide a reliable alternative to the seed-bed.

The bare-rooted rootstocks from the seed-bed transplanted to containers up to date have had their tap roots cut and have been pruned back. They are planted in 15 litre bags in spring. The nursery work schedule is such that it is more efficient to have filled and positioned the bags some time previously. Originally the bags were filled by hand, lately a front end loader has been used.

Budded in autumn, the rootstocks are cut down in spring, grown and trained into trees and sold starting the end of the following summer. All trees are staked and topped at about 15 inches from the soil level. Four or five branches are kept to form the head of the tree, as was the case with field-grown trees.

Container-grown trees begin to grow after the winter dormancy more quickly than field trees. This may account for the overall accelerated growth rate of container trees compared to field trees. Container trees have been topped this past year in mid-spring, at least a month earlier than their counterparts in the field. By late summer there is a good head on container trees which is left untouched, whereas the growth on field trees is cut back to ensure their survival.

Containerisation seems to promote a greater production of fibrous roots than field growth, and this good root system need not be disturbed when the tree is transplanted.

Fertilization of the tree varies with the two methods of growing. In the field a complete fertilizer along with organic fertilizer are used. Slow-release fertilizer was never used. Containerisation requires great care in the use of any feed that released immediately.

Slow-release fertilizer with its even supply of nutrients is ideal, and has the added benefit of one application lasting several months. An organic feed is employed, primarily to act as a mulch on the surface of the container.

Watering is done by overhead sprinklers which, while watering the plants sufficiently, does have some disadvantages. The space between the rows of containers and the foliage they develop before sale means that the majority of the water is wasted. Sprinklers in the field water the whole bed area evenly so in that situation sprinklers are appropriate. A drip system is to be given a trial and the results compared with the overhead sprinkler operation. While water consumption should be much less it remains to be seen if the drip system can provide sufficient moisture to carry nutrients through the soil in the container.

Weed control in the containers has proven to be much less of a problem than open-field cultivation. The great care required in the application of chemical weedicides, the necessity for several applications, combined with hand weeding which was the practice in the field, has been replaced by the application of a knock-down weedicide to the containers prior to planting to eradicate any weeds growing in the soil mix, followed by hand weeding if necessary.

Containerisation has many advantages over field growing of citrus during the growth stages, and for plant management. A major factor in favour of field-grown trees remains however. As transport costs continue to escalate it is important to take account of the ease and cheapness of transporting bare-rooted trees. Packed in rice straw and moistened, 100 per carton, free of the bulk and weight of container and soil, field-grown trees last for at least two weeks unattended, and have been successfully transplanted after four weeks when shipments have been held up by industrial action.

It seems that transport considerations aside, the advantages of the container-grown tree do outweigh those of the bare rooted product,

- 1) little disturbance of the root system on transplanting,
- 2) no need for pruning,
- 3) no need to search out arable land for cultivation,
- 4) easier maintenance with fertilization and weeding

The results obtained from container-based propagation so far justify the prediction that a two-year-old container citrus tree can compete adequately with those grown in open ground to be "grown on" in a container for a third year.