Growing Fruit Trees in Small Containers[2]

P. R. FRIDLUND[1]

Many investigators who grow young fruit trees are hampered by insufficient greenhouse space. The IR-2 Virus-free Deciduous Fruit Tree Repository project is no exception, so alternative methods of maintaining trees were attempted. Initially these trials were directed toward tree propagations and inoculated virus-index hosts that required only short-term retentions (3-12 weeks) in their containers.

Our standard procedure has been to pot ¼-inch (.63 cm) caliper nursery liners in 5-inch (12.7 cm) clay pots filled with greenhouse soil mix. Chip buds are used for all propagations and double-bud indexings at rootstock budbreak. In double budding the virus indicator and inoculum buds are grafted simultaneously on the same healthy seedling. The seedling is cut back and virus symptoms occur on the shoot arising from the indicator bud if virus was graft transmitted from the inoculum bud.

Recently I tested, for possible IR-2 and other pomological uses, a commercial polyethylene container called Deepot that was developed for and used in reforestation. A unit of Deepots consists of a collar that is one-foot square (930 sq cm) and holds 20 detachable pots, each pot measuring 2½ inches (6.3 cm) in diameter and 10 inches (25.4 cm) deep (Fig. 1). Thus, through a vertical expansion it is theoretically possible to use four times the number of Deepots per unit greenhouse area compared with 5-inch clay pots. Further savings occur since the volume of soil used per Deepot is only about half that of a 5-inch clay pot. Also the collar permits easy handling of large numbers of pots.

Deepots proved as effective as clay pots when indexing for the following viruses in their index-hosts during periods from 3-12 weeks (Fig. 1): *Prunus* ringspot in *Prunus tomentosa* seedlings, apple chlorotic leaf spot by double-budding inoculum with the apple indicator cultivar, R-12740-7A, on apple seedlings, and the green ring mottle virus by double-budding inoculum with the flowering cherry indicator Kwanzan, on mazzard seedlings. Other combinations are under test.

The excellent growth of the control trees during these tests also proved the practicality of producing normal trees in these containers.

Further testing with the *Prunus* ringspot virus and *P. tomentosa* seedlings was done using sand as the growing medium with a plug of coarse-ground horticultural peat in the bottom of the Deepot. Available nutrients for the seedlings consisted of those stored in their roots plus a small amount of slow-release fertilizer (19-6-12). The tests lasted three weeks and the trees grown in sand were as efficient as the soil-grown controls in clay pots although new sprouts did not grow as rapidly on trees grown in sand. Further, longer-term testing of other combinations in sand medium is underway and, if successful, will not only radically change our procedures but also will encourage us to devise a machine for semi-automatic large-scale potting.

Long-term storage of desirable fruit

[1]Plant Pathologist, Irrigated Agriculture Research and Extension Center, Washington State University, Prosser, Washington 99350.

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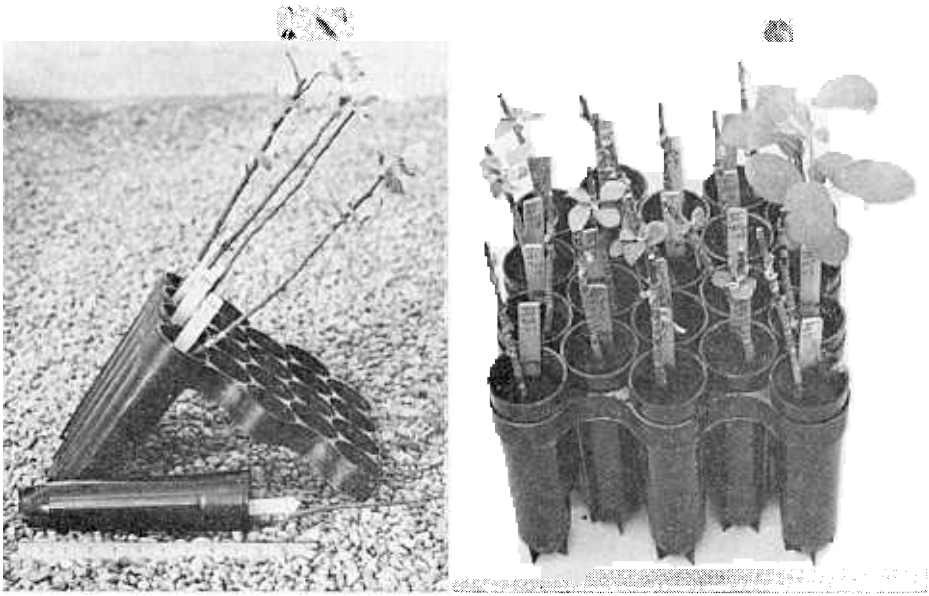

Figure 1. Left, Deepot collar and removable pots. Right, Deepots used during indexing for the apple chlorotic leaf spot virus by double budding inoculum and indicator on apple seedling liners. Two healthy control trees on the right. Photograph taken six weeks after budding.

tree genotypes in germplasm repositories can be extremely expensive if maintained as orchard trees. Thus investigations on pear cultivar preservation were begun using Deepots with soil to determine the number of years a tree can be maintained in these small containers. During the first growing season the only complicating factor was a minor increase in foliage disease among the crowded trees. If it is found that trees will survive for many years using this method, then germplasm maintenance of thousands of genotypes of the same species is unquestionably economically feasible. In the meantime it is suggested that this method is immediately practical for short-term retention in the pots.

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I certify that the statements made by me above are correct and complete. Loren D. Tukey, Business Manager, September 30, 1976.