

years ago all trees were sold on seedling rootstocks, there has been a gradual changeover in the last ten years to size-controlling rootstocks, with a sudden upswing in the more dwarfing understocks. The switch to high density plantings and to growing trees in hedgerows made this changeover necessary.

The demand for the smaller trees on a large scale is relatively new and the industry is still in a transition period. During our 12 years in Canada, the demand has switched from 'E.M. VII' to 'E.M. II' to 'M.M. 104' and '106', and now to 'M.M. 111'. The changes are not always gradual but sudden and this brings tension to the nurseryman who cannot supply trees on a recommended rootstock overnight. It also brings disappointment to the fruitgrower who cannot get what he wants. Several modern fruitgrowers, especially those with capacity to raise their own trees successfully, buy the latest recommendations directly from the plant propagators.

Summarizing, we can say that the transition is as confusing to the orchardists as it is to the nurseryman and as complex for the plant propagator as it is for the plant breeder who introduces new, promising additions to our already large range of rootstock types. We feel that a very sound policy is to stick to a rootstock which has given good results for the individual fruitgrower. The more material that is released, the more we need close cooperation between orchardists, nurserymen, and plant propagators. In closing, we express the hope that we, as plant propagators, may play our part in this important facet of the fruit industry.

MODERATOR NELSON: Thank you, John. I would like at this time to call on Mr. Herbert Frost, who is going to speak on "Growing Trees on Malling Stocks". Mr. Frost is from Frost Nurseries, Granite Falls, Washington. Mr. Frost:

## **GROWING APPLE TREES ON MALLING ROOTSTOCKS**

HERBERT H. FROST

*Frost Nursery  
Granite Falls, Washington*

Our nursery is located 40 miles northeast of Seattle, Washington, in the western foothills of the Cascade Mountains, where the soil and climate conditions are excellent for growing hardy trees. The soil is upland sandy loam with a pH of 5.5 to 6 and is rich in organic matter. The ground is prepared two years in advance of planting, with two green cover crops deeply plowed under. We add 400 lbs. of 10-20-20 commercial fertilizer per acre.

At this time we are growing apples on 'E.M. IX' and 'E.M. VII' understocks. The reason we have confined our growing to these two is that we sell primarily to retail stores; 'E.M. IX', a dwarf of 8 to 10 feet, and 'E.M. VII', a semi-dwarf—12 to 15

feet—are the most acceptable. We discontinued 'E.M. IV' because of its brittle roots. Our finished trees are never sold as whips, but are headed back at approximately 40 inches and are grown on as well-branched 2- and 3-year-olds.

We propagate our stocks as both mound and continuous layers. Our original stock came from Canada. We plant our tree understock in early spring with a mechanical planter spacing them 16 inches apart in rows 42 inches wide. All our budding is done in August. We do not irrigate; the trees develop an excellent root system and heavy caliper in one year through the deep plowing and constant cultivation. For weed control, we cultivate and hoe. However, we have used pre-emerge herbicides successfully.

We follow a rigid spray program throughout the year. Part of this program includes the use of a dormant spray, Cyprex 65W, for scab and mildew, Rothane 50 for leaf roller; Captan as a fungicide, and occasionally malathion.

For the coming year we are including some of the Malling-Merton types; and if these prove satisfactory, we shall include them in our inventory.

MODERATOR NELSON: You know, 15 years ago—maybe a little longer—any researcher that couldn't answer a question would say it was "physiological". Well now I think the pendulum has turned enough that any time a researcher can't answer a question he sends the problem to a virologist. Dr. Maurice Welch is one of our leading Canadian virologists. It gives me great pleasure to introduce Dr. Welch, Head of the Plant Pathology Section, Canada Department of Agriculture, Summerland, B. C. Dr. Welch:

### **VIRUS-FREE ROOTSTOCKS**

MAURICE WELSH

*Plant Pathology Section, Canada Dept. of Agriculture  
Research Station  
Summerland, British Columbia*

The problems that viruses provide for nurserymen are typical of the complexities that have been gradually overtaking propagators of fruit trees since the early carefree days when Johnny Appleseed was scattering his seeds along trails in the American wilderness. The complications began, of course, as growers recognized the superiority of certain seedlings and the need to grow them as varieties grafted on rootstocks. Even this was relatively simple for a time, when there seemed a need only for germination of randomly-collected seeds, and their topworking to the desired varieties. Now by contrast, the fruit breeder and the nurseryman must concern themselves with vegetatively-propagated as well as seedling rootstocks, which endow the trees with varying degrees of dwarfing, and provide other useful characteristics. Often a