

plants can stand quite a variation. We've had no difficulty. We have even dipped freshly-made cuttings right in these Clorox solutions, and still there hasn't been any difficulty. One of the main reasons we've done it is because on one or two varieties of roses we have had considerable incidence of crown gall and it occurred to us that this might be a preventive, and so far it has apparently worked very well.

SATURDAY AFTERNOON

October 5, 1963

This session convened at 1:30 P.M. with Wayne Melott, Moderator, presiding.

MODERATOR MELOTT: When I started in the nursery business about 30 years ago, we had one apple rootstock, French Crab; two cherries, Mahaleb and Mazzard. We had one plum root, Myro. We had one peach root, Lovell plus Muir and about everything else they could mix up into the bag, but that's all we had, just a few rootstocks. Now look what we have. You can't even count them. You haven't got enough fingers, toes, arms and legs all together to tell how many Merton-Mallings and East Mallings and Mazzard F-12-1's, Stockton Morellos and Mahalebs, Myros, and Myro 29's, and Marianna and just about everything. Give me the good old days! I am not going to say anything more about rootstocks because we have a real good program coming up. We have, first of all, a second generation nurseryman here in the Pacific Northwest, who is co-owner of the Pacific Coast Nursery Company, in business with his brother, John; they are located here in the Portland area and in Sunnyside in Washington. Martin's going to talk on seedling production. Martin Holmason!

SEEDLING PRODUCTION

MARTIN HOLMASON
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I don't believe that trying to cover the methods of seedling production in 20 minutes would be as hard as trying to tell you how to build an atomic bomb but I will have to try as I don't know how to build a bomb! There are many sides to the ques-

tion of growing seedlings but I will cover the high points as I see them and if there are any questions you wish to ask, we'll have them at the end of my discussion.

We grow seedlings in two places, one growing ground is located in Sunnyside, Washington, and one is located here in Oregon on Sauvie Island.

I'll begin with our plant up in Washington where we grow all our apple and pear seedlings. Of course, some of the seed is imported, some from France, some from Austria or China or Japan while some is local seed. We import *Pyrus calleryana*, *P. ussuriensis* and French crabapple seed. Our domestic apple seed is locally grown and is mostly of the Winesap variety. Our Bartlett pear seed is from local canneries.

Some of the seed is planted in the fall and is planted dry. Seed planted in March and April has to be stratified from 6 to 8 weeks before planting. The seed is put to soak in water for about 10 days and then packed between layers of ice from 6 to 7 weeks until the ground and weather conditions are just right for planting. The seed is then planted with a four-row planter and within 3 to 4 days they have germinated and are ready to come through the ground. Of course, they must be raked and helped through the ground.

The reason for planting all our apple and pear seed in the Washington area is because we have flood irrigation up there and most of these seedlings have to be root-pruned to grow branched trees and the soil around the Oregon area does not grow good branched-rooted apple and pear seedlings.

After these seedlings have grown roots about 4 to 5 inches long, they are root-pruned and the water is turned on immediately after they are cut and then after about 2 weeks they begin to throw new roots which makes them branch.

All the seedlings in Washington are dug in the fall, beginning around November 1. They are all pitted in the ground from 4 to 6 weeks to sweat off the leaves. They are taken in from the pits and graded for shipping into 4 grades: $\frac{3}{8}$ ", $\frac{1}{4}$ ", and $\frac{3}{16}$ " and $\frac{2}{16}$ ".

The seedlings we grow in Oregon are the Mazzard and Mahaleb cherry, Myrobalan and American plum, and the quince rooted cuttings.

Years ago, we used to stratify all this stone fruit seed in sand but now we have found that by planting the seed early enough in the fall (if the ground has enough moisture in it) we don't have to stratify. We plant this seed sometime during the month of October when they will get plenty of rain and, that way, they stratify themselves.

The seed is planted about two inches underground and then the rows are mounded two or three inches over the top. They are left until spring of the year and after they begin to sprout, the mound is raked off and the seed will come through the

ground by themselves unless the soil is too heavy; then they have to be helped a second time.

These seedlings are left in the ground in the fall until practically all the leaves are gone, then dug. They are brought into the warehouse at the time of digging and sorted into the 4 grades as are the apple and pear. The $\frac{3}{8}$ " grade is tied in bundles of 50; the $\frac{1}{4}$ " and #1's in bundles of 100 and the #2's and #3's in bundles of 200.

The bundles are stacked in the warehouse and they are never sprinkled or watered from the time they are removed from the field until they are shipped. These bundles are stacked tightly in piles so they can't dry out, for once a seedling has dried out, it is very hard to revive and make grow; perhaps it would be impossible. If the seedlings are left alone and not watered, they will keep in the stack in our warehouse for 4 to 5 months without any trouble at all. We have kept seedlings this way in good condition until May or June following a December digging for many years now.

Our quince are planted as cuttings and after that, are treated just as any other seedling as to digging and grading and shipping.

When shipping any seedlings, we pack them in boxes in damp packing material and they have been held in cold storage by our customers as late as June and planted and still they have good results.

One thing we stress very thoroughly and try to tell our customers is that when they receive the seedlings, they must never be left to dry out. A lot of times the customer will take the seedlings from the packing, throw them on a loose pile, get busy with other things and the seedlings dry out, often to the point of dying. We know this to be the case because it has happened to us too. After the seedlings are trimmed they are either healed in outside in the ground or repacked in boxes until planting time.

In regard to the stone fruit seed especially, we have been trying for a good number of years to grow virus-free seedlings for our customers. It has taken a long time to get the right trees and get our orchards planted. The orchards and the seedlings have been checked and rechecked usually twice a year and we believe that within two years, all our stone fruit seedlings will be virus-free.

Of course, we have a lot of seedlings now that are checked to the satisfaction of the Departments of Agriculture to be virus-indexed and free as is possible of disease but it will still be two years before they will issue a certificate saying they are 100% free. All our seed in both Oregon and Washington is grown in fumigated ground but our problem has been that the customers receive these clean seedlings, then plant them in infected ground and wonder why they have diseased trees.

The inspectors and the colleges and experiment stations

have done a good deal of very fine work in this field and the work has finally paid off in clean, virus and disease-free seedlings.

I've tried to cover at least the high spots of this seedling propagation problem but there is a lot of ground to cover in a few minutes. It has taken us forty years to work some of these problems out so perhaps if there is some additional information you would like, we can take a few minutes for questions.

MODERATOR MELOTT: Are there any questions for Martin?

MR. C. J. ALLEY: Do you find certain lots of Mazzard cherry seeds from particular trees that are obstinate and will not split when you stratify them?

MR. MARTIN HOLMASON: That I couldn't exactly tell you. We have planted and kept seeds separate from seventy different trees, and planted each tree separately and haven't had any trouble with them. They all germinated about the same, providing they're good seed. Now we have had a lot of seed that would not crack, especially with old seed; it does not swell up enough and it will not crack the pit.

MR. C. J. ALLEY: Is there any treatment you can give this seed, the fresh seed, to make it crack?

MR. MARTIN HOLMASON: We used to stratify the seed in sand to make it crack years ago, but that is a lot of extra work, so we don't do it anymore. We just take the seed and plant it in dry in October. We get enough wet and cold weather to stratify the seed by spring, but if you were in a dry climate you could not do it.

MR. DALE KESTER: Did I understand you to say that you use a damping-off preventive spray on cherry seedlings?

MR. MARTIN HOLMASON: Yes, it is a Captan formulation.

MR. JACK DOTY: What time of the year do you root prune?

MR. MARTIN HOLMASON: About in July, after planting in March or April.

MR. DAVID A. LAWYER: I would like to ask if you hand-plant or machine-plant the seeds when you plant them. How do you keep from breaking off the root radicle when they start to sprout?

MR. MARTIN HOLMASON: We always plant the seeds in the fall. We plant them dry so there are no root radicles to break off. When we used to store them in sand for stratification, then we had to plant them by hand. Now we machine-plant; we do not plant by hand anymore and we never let any of the seeds sprout before we plant them.

MR. FROST: Do you have any problems with rodents — mice or field mice?

MR. MARTIN HOLMASON: We used to have a lot, but since we started fumigating they're pretty well out of the ground.

DR. C. J. ALLEY: Do you have some superior selections of Mahaleb seed trees?

MR. MARTIN HOLMASON: They are all superior that will be coming on now. We have planted about 500 pounds of superior selections. They're fully 100% supposed to be virus-free and they've been all started from layers, not grafted or budded, and they're all superior seeds.

DR. C. J. ALLEY: What I am getting at is in regard to some of the selection work that has been done by the Agricultural Experiment Stations where they have been selecting clones of Mahaleb cherry, say for either large leaf or upright growth. Do you have some better selections of these?

MR. MARTIN HOLMASON: We get all our seed trees from the Prosser Experiment Station in Washington; they are still working on large-leaf and small-leaf Mahalebs. They have come out with a Turkish clone now that is a large-leaf and a very good grower; we think that within the next four or five years that it is going to be the seedling used for Mahaleb altogether.

DR. C. J. ALLEY: Yes, but has work continued, say with these particular liners now, as to the type of top tree they would give; in other words, would there be better production of fruit or would it be a more vigorous type of growth?

MR. MARTIN HOLMASON: Well, we have budded-in — up there in Washington — on both varieties of Mahaleb this last summer, so we can tell you more about that in a year or two from now.

DR. C. J. ALLEY: Do these selections of Turkish-type seed source trees produce better than the ordinary type of Mahalebs?

MR. MARTIN HOLMASON: They produce as well but they are much slower ripening so we don't know how it's going to work out. It takes about three or four weeks longer than the ordinary Mahaleb cherry.

MODERATOR MELOTT: The next speaker is Kent Brooks from Carlton Nursery Company who has been a long time friend and business associate, together with his brother, Lyle, and myself in the Carlton Nursery Company. He has charge of propagation and production and is going to talk on double-budding of pear trees. Mr. Kent Brooks!

DOUBLE-BUDDING OF PEAR TREES

KENT BROOKS

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Most of you know, of course, there are varieties of pears that are not compatible with quince rootstocks, especially the Bartlett variety. While we have received reports of a Swiss and French selection of Bartlett as being compatible, there has