VOICE: When you layer, do you wound the layer or do anything to it?

LES CLAY: Well, for the varieties that we have used, no wounding was required.

VOICE: What type of growth do you get from your cuttings of *Cornus florida* Rubra and things like that after you root them?

LES CLAY: We find that taking them from cuttings, we get a good saleable plant in three years. It's about comparable to a two-year-old budded plant that's had two years of growth. But the overall picture is that you still have to grow the understock for one year so it makes the total plant age three years also. Now another interesting thing that we found with a lot of these *C. florida* varieties is to let them go completely dormant prior to potting; by the following spring, when they start to grow, many will have flower buds and will come into flower before they start vegetative growth. It looks rather odd to go into the house and see a bench full of small plants three or four inches tall, all covered with flowers.

AL ROBERTS: Do you get strong orthotropic growth; that is, upright growth, from these rooted cuttings like you would get from a strong bud?

LES CLAY: I think the growth is maybe a little slower than from budding but we do develop a fairly straight stem.

DICK JOYCE: Our next speaker, Ivan Arneson, grows fruit trees, shrubs, deciduous azaleas, and various understocks. If you want to see a nursery where things are not just grown, but they are manicured, then his nursery is the place to go. Ivan Arneson:

PROPAGATION OF CERTAIN FRUIT TREE UNDERSTOCKS

IVAN ARNESON
Arneson Nursery
Canby, Oregon

My first experience in growing trees in the nursery involved the use of seedlings as practiced by most nurserymen at that time. Back in the 1940's Dr. Al Roberts brought in some of the East Malling apple understocks from England and naturally I became interested in them. I started with the East Malling and later on used the Malling Merton apple stocks, the quince 'A', and the Mazzard 'F-12-1' cherry. Since, we have added St. Julien plum, filbert and Provence quince, as well as cherries, and pear stocks.

The suggested way to propagate these was by layering in stool beds. A lot of experimenting was done in the years following to

determine the best way to propagate these. I will try to elaborate on some of the procedures.

To get a bed fast we planted the stools about 1½ feet apart then staked them down at about a 45° angle with wire. As the side limbs grew they were covered with dirt or sand. Later sawdust was found to be a better medium than dirt. A mistake that was sometimes made was to graft these new stocks on a nurse root thus permitting the spread of virus. Sometimes I found trees that looked different than the stock it was supposed to be so I would rogue these out. I am glad I did as other growers found a mixture in some kinds later on.

It is a good practice to level the soil some to aid cutting and keep the stools even. If there are insects or diseases in the ground it is best to fumigate. I have used Terramycin or Morsodren as a drench just before or after planting cherry stocks. In the winter we now plant the trees 2'' to 4'' apart using small trees about 2/16'' to 3/16'' in diameter. Rows can be planted from 40'' to 5'. We are using 4' rows for most of our plantings. Sawdust can now be used to cover the new plants to induce rooting and hold the moisture near the plant. Little needs to be done until cutting time in winter except water, cultivate, and spray.

INSECT AND DISEASE PROBLEMS

Insects

1. Woolly apple aphid (*Eriosoma lanigerum*). Parathion was recommended and worked quite well, but aphids are stubborn and would stay in the ground. A Parathion emulsion works better. We have also tried Cygon.
2. Eriophyid mite in apples. Lime sulphur is good for new plantings, but for young growth we use Kelthane with good results.
3. Apple leaf skeletonizer (*Anthophila pariana*). This is seldom a problem; any good spray for chewing insects should work.
4. Nematodes. This has never been a problem with us. We think it is partly due to using clean sawdust as a mulch.
5. Strawberry root weevils (*Brachyrhinus* Spp.). These are easily kept under control but to eradicate is something else. Ten pounds (a.i.) of Aldrin, or DDT and Aldrin, or Lindane (or BHC) as the weevils emerge in May are the best treatment we have found. A second application may be necessary if a later brood emerges. We used a liquid Lindane once and got burning of the plants.

Diseases.

1. Leaf spot of quince (*Coccomyces hiemalis*). Cyprex gives good results. See that it is put on in time.

2. Powdery mildew (*Podosphaera leucotricha*). In apple, Karathane should do the job. The last two years we have used Parnon.
3. Viruses. Use virus-clean stock if you can get it.
4. Crown gall (*Agrobacterium tumefaciens*). A very stubborn bacterial disease that is almost impossible to eradicate, especially in the cherry stool beds. For cherries use clean ground and clean plants. We have used Terramycin and Morsodren as a drench either before or just after planting. Our new plantings show no galls. In the older plantings we rogued any plant that showed galls, treating the area around with Terramycin or Morsodren. Lately we are trying such things as Terramycin, Bacticin, Morsodren, Clorox, and Elgetol. Almost no galls have appeared where Bacticin or Elgetol have been used.
5. Root rots. With as much water as is used to induce rooting, decays could develop below the sawdust. A copper compound is effective. Collar rot has not shown up in our area.

CARE OF ESTABLISHED STOOL BEDS

In the spring of the year, after danger of frost, the sawdust (about 1'' to 2'' deep) should be removed from the crowns of the stools. Parathion for aphids could be used now. As the stools begin to grow one should follow with sawdust covering the new shoots to 3'' to 4'' of the top. Keep this up until the plants are covered from 6'' to 9'' from the crown. At the same time see that enough water is used to keep the sawdust wet, especially near the plant. Keeping the sun off and using reasonable amount of water seems to induce rooting the most. Too much water can cause poor rooting. In the Willamette Valley we feel we have good climatic conditions for rooting. Cool, damp, fall weather will add a lot of roots to the stools.

After removing the stools we cover the plants an inch or two to avoid freezing; this will be left until the sprouts begin to grow in the spring. Timing is critical. If opened too soon they freeze. If too late the stools will be damaged.

MACHINERY USED IN GROWING UNDERSTOCKS IN STOOL BEDS

Machines to apply sawdust have been constructed all the way from worked-over manure spreaders to well-planned hoppers with spreaders and levelers.

Removing the sawdust and cutting the finished product is time consuming and expensive. At first, hand clippers or loppers were used; now circular saws mounted on wheels or tractors have been used with satisfaction by some propagators. A single mower type of sickle or a double sickle is used by some with equal satisfaction. A chain saw with a thin bar is a fast cutter, but leaves the tree a little

ragged. Most of these require that the ground be level and the stools even in elevation. I am sure other machines are used and the field is wide open for those with a mechanical mind to develop more.

CUTTINGS

We have used only what we consider easy-rooting hardwood cuttings such as 'Myro 29C', 'Marianna 2624' and '4001', quince, and 'St Julien A.' These are taken in December or January and put in the ground as soon as we can after cutting. As a rule, no hormones have been used. We used Benlate on 'St. Julien A' with good results.

In closing let me say that one of the most frustrating problems is to have a stool bed well established and then find that the demand has changed to another stock. This is a good challenge to the young at heart to stay in the propagating business.

TED VAN VEEN: This section of the meeting will be moderated by Bruce Briggs. Bruce, as you know, is our International President and we always enjoy having him at the meetings. Bruce, will you take over now?

BRUCE BRIGGS: Thank you, Ted. It's always an honor to participate in the meetings. I appreciate being asked to moderate this session. I would like to recognize the many students that we have here today. Some of you professors who are here, if you get a chance, don't hesitate to go over and talk to them because these students may be our future nurserymen. So make them welcome.

So let's get started on our "Chemical Aids to Propagation." First of all, we have with us Dr. Charlie Pfieffer. Charlie is from a background of nursery work. He went on later to become a professor at Washington State University. Later he left this field and is now with the Soil and Plant Laboratory. We are certainly indebted to have Charlie working in our profession. We need his help badly and we appreciate every bit of it. He's going to talk on water quality. Charlie:[1]

BRUCE BRIGGS: Thank you, Charlie. I'm sure you remember on the tour yesterday afternoon at Wood's Nursery we looked at all those small tubes in the greenhouse containing Douglas fir seedlings. Ed Wood is fortunate to have a lady who lives there and she must

---

[1] Dr. Pfeiffer discussed the relations of water quality to propagation and plant production.

work there 24 hours a day. She takes care of the place when Ed is gone which must be a lot of the time. But anyway, she is real fortunate to be able to work there with Ed. She is going to talk on the use of penetrants and what they are doing with them. Louise Zachry:[2]

BRUCE BRIGGS: Thank you very much, Louise. Our next speaker here is from Hazel Dell Gardens, Canby, Oregon. We have Myrtle Fish, who will talk on supplemental hormone applications. Myrtle:

SUPPLEMENTAL HORMONE APPLICATIONS

MYRTLE FISH
Hazel Dell Garden Nursery
Canby, Oregon

I have been asked to tell of my experiences in propagation and what I have learned through the years. I have had very good teachers in starting out. Ray and Irene Burden were very patient as I was learning. It has been a lot of fun and hard work. I have found, though, that there is more to propagation than just powdering the cuttings and sticking them. Along with bottom heat in the bench and watering, it all makes for good rooting; at least that is what I keep telling myself. We do have our losses, which makes us try harder the next year. Most cuttings root quite readily, but we do have some stubborn ones, at least they have been for me. We do a lot of experimenting with Jiffy Grow and the combination of Jiffy Grow and Hormodin powder.

Camellias usually root quite readily, although there are a few that are quite hard to root, as we root between 80 and 90 different varieties; there are always a few that are either slow to root or will not root at all. After putting them in with No. 3 Hormodin powder, we let them set for six weeks, then spray with a light application of Jiffy Grow 1:5; too heavy an application will retard the root growth.

---

[2]Louise Zachry discussed the use of penetrants in stimulating hormone activity.