

Botanical Gardens, spoke of recently in the American Nurseryman of the leaf bud system. That might have real merit. We expect to try it. In the case, the bud would be stuck under the sand and would be more or less protected during the rooting period, and I think that could be real important. We use the leaf stem system, a two inch stem with a four inch.

MODERATOR COGGESHALL: Richard Fillmore?

MR. RICHARD FILLMORE: I would like to ask about varietal differences with respect to ease of rooting. Mr. Cunningham, could you name an easy one and a very difficult one, and one which he would regard as intermediate with respect to ease of rooting?

MR. CUNNINGHAM: This might not be true with a competitor. He might have ones that root easily and they would be difficult for us. For us, Montana rubens, Madam Baron Veillard, Elsa Spath and Romona are easy ones. Of course this usually happens - the difficult ones are those that sell the best. Jackmanii is one we have the most trouble with. (Laughter)

MODERATOR COGGESHALL: I am sorry, that is all the time we have for questions now. Thank you very much.

Our next speaker on the program will speak to us on the propagation of Chaenomeles, and he is certainly no stranger to us. Mr. Wells, of Red Bank, New Jersey.

CHAENOMELES

James S. Wells
Red Bank, New Jersey

The propagation of Chaenomeles does not apparently present any unsurmountable problems and the tests which I am about to describe will simply illustrate some of the finer points which can raise propagation results from a mediocre to an excellent level. The tests were carried out during 1954 while I was with the D. Hill Nursery Company in Dundee, Illinois, and they therefore apply to plants and conditions as they exist in the Midwest. The tests were made on numbered varieties of Chaenomeles raised by Dr. Colby at the University of Illinois, Urbana. These plants had been growing for many years in a stock block on the Hill Nursery and were well established. They normally grew quite vigorously and produced ample supplies of good shoots from which cuttings could be taken.

Equipment

As usual, we were trying to test a number of things at the same time - a mistake, I believe, because one can become so confused in the multiplicity of tests that it is difficult to sort things out - but basically, we were rooting these cuttings in an open-air mist bed.

The bed was set up in a concrete frame with a central mist line. One section was covered with shades and one section was covered with plastic, more or less following the Templeton method. In general, cuttings rooted best in the open with a 50% lath shade covering, but this should not be taken to indicate that the plastic covering could not work. I am quite sure from the results we had that if we had accurately followed the Templeton method the results would have been just as good.

Medium

The medium used was plain, sharp sand and as the mist was applied for 24 seconds every six minutes, excellent drainage had to be provided beneath the bed. Some side protection to prevent drift of the mist was given by the concrete frame and the lath shade, which was desirable to insure complete coverage of the cuttings with the mist.

Timing

Our tests were made on June 23, 1954, and the cuttings were lifted on August 4, a period of exactly six weeks. This was obviously quite sufficient for proper rooting under optimum conditions but no doubt cuttings could have been taken a week or two earlier, which would have been of value in the subsequent reestablishment of the rooted material.

Type of Cuttings

This appeared to be important in terms of size of cuttings. Cuttings were taken from vigorous shoots of current season's growth which had been made following flowering. The shoots were from 6-10" in length, depending upon habit of growth of the variety, but the larger the cutting and the stronger and the more vigorous the stem, the better would the cuttings root. This was noted time after time in the tests on this range of 12 varieties and seems to be important. Some varieties would not naturally produce large cuttings and were more difficult to root.

Hormone Treatments

These were of clear value and should be considered essential. The actual treatment to use depended upon the variety and varied to some degree, but not very widely. A range of tests was applied to almost all of the varieties being grown and although one or two responded to indole butyric acid at 4 mg/g (Hormodin #2) most of them required something a little stronger. Hormodin #3 was good on a number, but time after time, the results showed the clear superiority of 1% (10 mg/g) of the Potassium Salt of IBA. Let me give a typical example.

<u>Variety #5 - High Noon</u>	<u>% Rooted</u>
No Treatment	0%
Hormodin #2	40%
Hormodin #3	50%
1% K Salt IBA	100%

Now I would like to quote my notes at the time these cuttings were lifted. On Hormodin #3 I said, "Treatment not really strong enough. Rooting light, and undeveloped." And then on the 1% K Salt IBA, "large cuttings, excellent rooting, well developed and mature. Size of cutting is obviously important." Some varieties responded to a lesser treatment and variety #2 was one of these. Here, Hormodin #2 gave 100% rooting; Hormodin #3 gave 90%; and 1% K Salt IBA gave 50% rooting. But, this was only one from the many and it seems clear that for most varieties either Hormodin #3 (IBA 8 mg/g) or 1% K Salt IBA should be used. The choice of which to use from these two will also depend somewhat upon the size of cutting available. If the cuttings are sturdy and strong they will respond to the stronger treatment. All cuttings were wounded with a single heavy wound immediately before dipping in the hormone powder.

Hardening up and Subsequent Handling

Cuttings rooted under intermittent mist out-of-doors require care in the return to more normal conditions. A time clock is advantageous in reducing the interval of misting and this, coupled with heavy shading for a week or two, will allow the cuttings to be prepared for moving. It is desirable to move the cuttings, if you can, as early as possible in August, and either pot them or flat them so that they can become re-established before the end of the growing season. Alternatively they could no doubt be allowed to develop a root system in the soil beneath the propagation bed and protected in situ (Templeton method) with equal success. In these tests we lifted the cuttings and potted them and then carried them through the winter in a deep frame. It is interesting to record that there was a distinct difference in the percentage of survival of cuttings dependent upon the quality and vigor of the root system. For instance, with somewhat lightly rooted cuttings, rooted with Hormodin #2, three out of eight died, while the much more strongly rooted cuttings treated with the 1% K Salt IBA only one out of ten died. The following spring this young material was canned and grew successfully into young, salable plants.

Propagation from Root Cuttings

I recently had a visit from John Verkade of Wayne, New Jersey, and as we were discussing the qualities of these Chaenomeles, he casually mentioned a method of propagation used by him in Holland which sounds extremely efficient and simple. I have not tried it, but I intend to do so. He said that an established plant should be carefully lifted in early spring and the large roots removed. The plant can then be set back to re-establish itself. The roots are cut up into 3/4-1" pieces, simply cutting them with a pair of shears. It is unnecessary to differentiate between the top and the bottom of the root. These pieces are then sowed in rows in a bed, not broadcast, because he suggests that by keeping them in rows they have more room to develop and produce better plants. The pieces of roots are covered with about 1" of a 50-50 mixture of sand and peat and he says all you have to do then is watch them come up like seed. He pointed out the importance of not letting the roots become dry while they are

being removed and handled. It is vital that there be no delay during this process and certainly the roots must never be left lying around. In talking about this with John, he said that the quality of the plants produced in this manner was excellent. The plants had a full year to grow, which in a well prepared bed they did with vigor, and the stock could be lifted for sale as lining-out material or for planting or canning, as desired, at the end of the first year. This sounds such an easy and efficient method that I think we should all try it next spring.

I cannot close this discussion without very briefly commenting on the excellent quality of the varieties raised by the University of Illinois. I have watched these now for some years and I believe that they are all of exceptional quality, but if one could be selected, then I would have "High Noon (#5)". This is a strong and vigorous plant with excellent large, semi-double flowers produced in massed profusion. The color is shown as porcelain rose on the color chart but these words are quite inadequate to describe the brilliancy of the color. The sound quality of this group of plants, coupled with their extreme hardiness, recommends them without reserve as first-class horticultural material.

MODERATOR COGGESHALL: Are there any questions?

MR. WELLS: I shouldn't bring in this subject, I am sure. Truthfully, I haven't grown *Chaenomeles* commercially, produced any large quantity for the very simple reason they don't produce a good income. Why these plants, and one or two others, should always sell for such a low price, I don't know. We have to go through essentially the same procedures to produce them as many others which will command a much higher figure. There doesn't seem to be any rhyme or reason why one plant should be priced so low and this is one of them.

MR. ROLAND DeWILDE: Have you tried heel cuttings at all? I find heel cuttings yield close to 100 percent if you put Hormodin #3 on. In fact, in some cases, #2 is strong enough. What I try to get is the spurs that come on these things, that grow anywhere from three to six inches long, and cut right off on the side of the branch. I guess I am old-fashioned but I always carry on the experiments of Boyce Thompson, where they found the natural auxins are close to the base of the heel cutting. Maybe that is one reason I make out alright with a lower concentration of Hormodin.

MR. WELLS: I think that is probably true, Roland. Like you, I was brought up that a cutting without a heel was no cutting at all, but I recall making tests on Juniper pfitzer in which it was clearly shown heel cuttings were less satisfactory. Now I don't want to get off on another plant, but I don't think that we can slavishly accept on all plants these rules of thumb which we did accept twenty years ago without question. Now I think it might well be on this plant, that you are right.

MR. DeWILDE: It works out about the same with holly. Sometimes you get more roots on cuttings which most have an older piece of wood

on them than the softer flush of growth.

MR. WELLS: We noticed a very great difference in the rooting ability between varieties. This is shown in Figure 2. No. 13 callused with great big gobs of callus, but rooted very indifferently at any concentration of Hormone, whereas, the other varieties rooted very easily indeed.

In talking with Harvey Templeton about this, he said he has a couple of varieties which he can't root at all. It would be interesting to work on some of these. There is a wide varietal difference.

MR. DeWILDE: I worked on them in France. This was back in 1926 in a propagating department of a nursery under the so-called glass bells. The same thing turned out. This would be before hormones or anything of the kind. They usually make very short heel tipped cuttings and so you would get a solid stand and some maybe only 20%, and some practically didn't root, but they raised about 35 or 40 varieties, as I remember, and there was a definite difference between each variety as far as rooting is concerned.

MODERATOR COGGESHALL: I am sorry, gentlemen, we must call a halt to these questions.

The next speaker will speak on a plant which is not too commonly grown or propagated, at least to my knowledge - Helleborus. Mr. Case Hoogendoorn, Hoogendoorn Nurseries, Newport, Rhode Island.

PROPAGATION OF HELLEBORUS

Case Hoogendoorn
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Before I go into this subject I would like you to understand that I am no authority on Helleborus and I am going to tell you only my experiences with the limited variety we grow.

For the benefit of those members and guests who don't know Helleborus (also called Christmas Rose), I would like to tell you a little about this particular plant regarding its likes and dislikes so that you will understand more readily how we try to apply its proper environments to the propagation of this particular plant in order to grow it successfully.

To begin with, I would like you to understand that Helleborus is a perennial and because it is called Christmas Rose, it is not a rosebush as some people think.

We all know that Helleborus is a rather temperamental plant, but it is not too bad once you understand the plant. Helleborus is perfectly hardy as it originated from the Alps in Europe. It will never get winterkilled as it does not mind low temperatures at all but it might get summer-killed, as it resents heat and drought. Furthermore