

ing much better than the rest of the same cuttings, which he did not sprinkle. I believe these cuttings had been dipped in his usual hormone when they were planted. About two weeks ago we sprinkled the holly bed I mentioned with the Jiffy Grow solution and are now hoping it will work as it did for Bruce with his Daphne. We had dipped them previously when planted about a month before. I'll let you know later if this turns out as we hope.

Finally, lest we grow conceited, each one of us should remember what Paul wrote — "I planted, Apollo watered, but God gave the growth."

Thank you.

MODERATOR CURTIS: I do not believe our next gentleman on the program has need for a lengthy introduction. He is head propagator for Oki Nursery, Sacramento, California; he was one of those that did so much work to help make our program last year such a great success at Sacramento. Mr. Ed Kubo:

PROPAGATION OF XYLOSMA CONGESTUM

ED KUBO

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Defoliation of *Xylosma congestum* during the rooting and liner stage is of great concern to most propagators. Defoliated *Xylosma* cuttings or liners, regardless of rooting, will not grow.

We, at Oki Nursery, have tried to determine how to prevent defoliation. Hormone applications of different concentrations have been used — for example, 650 ppm to 10,000 ppm of indolebutyric acid. We have tried interval misting and no misting, and collecting cuttings from new and old wood at different times of the year. Different ingredients for liner soil mix, rooting medium and variable temperatures and humidity have also been tried.

For the present time, with our experience, we have come to the following conclusions:

Time of Taking Cuttings: We have found that the time of year cuttings are taken has a great effect on the amount of foliage drop. In our area we have found the best time to take cuttings is from August through the middle of October.

Type of Wood: The first and second cuttings, below the tip, are the best cuttings to take. The older the wood, the greater the problem of defoliation.

Rooting Medium and Rooting Hormone: For the rooting medium we use 25% sphagnum peat moss and 75% perlite. We have found 5,000 ppm of IBA in 50% alcohol to be best for rooting of *Xylosma congestum*.

Misting and Hardening Off: Interval misting is required in rooting of *Xylosma* with bottom heat of 70° F. After the

cuttings are rooted, frequency of misting should be cut off gradually. The hardening-off stage is very critical. We have found that by utilizing greenhouses that are equipped with evaporator coolers, using the pad and fan system, losses are considerably reduced during the hardening-off process. By using the pad and fan system, our greenhouses are always at a relative humidity between 60 and 80% with temperatures between 70° and 80° F.

Handling of Liners: The handling of liners is as critical as handling of cuttings. It is important that the greenhouse in which the liners are handled not be extremely cold nor hot. The ideal temperature is between 70° and 75° F. Our liner greenhouses are also equipped with the pad and fan system of cooling.

Firbark or redwood sawdust used as component parts of a liner mix will also cause defoliation. We know that both firbark and redwood sawdust have chemicals that are toxic to plants. Also, there are certain varieties that are more sensitive to the chemicals. Fifty percent sand and fifty percent sphagnum peat moss, which has been steam sterilized, has been found to be best for *Xylosma* liners.

Condition of Stock Plants for Propagation: We suspect that the fertility requirements of stock plants have great influence on success or failure of *Xylosma* propagation. We feel that by experimenting with zonal fertility, interesting facts can be obtained. For example, *Xylosma* stock plants that are low in fertility, propagate better than those that are high. On the other hand, *Camellia* cuttings propagate better if fertility is high. But what is the optimum range? This can only be determined scientifically by block testing and data accumulation of performance through zonal fertility. When such data is accumulated, we are confident that plants such as *Xylosma congestum* can be grown for a specific purpose.

MODERATOR CURTIS Our next speaker, Mr. Ed Wood, is a graduate of Oregon State University in Ornamental Horticulture. He has a nursery operation in Portland where he grows ground covers. Mr. Wood:

MR. ED WOOD: Bill asked me to talk about difficult to propagate plants. I should not be up here. If I find they're difficult, I wax enthusiastic, think they should be in the trade, find somebody like Bill who thinks they're beautiful and let him propagate them; I throw them out because I can't make any money on them. Primarily, in growing ground covers, obviously most of our plants are not hard to root, so what we want to do is to find a way to make the easy rooting ones, easier. I am glad to hear that more and more florists are coming into this organization. For twelve years we were mixing up concentrate dips and spraying carnations, and we were plating out for bacterial wilt to avoid contamination. It worked beautifully. Here I changed to a nurseryman, and promptly forgot all about what I was doing as a florist, so I

think the more we get an interchange between these fields, the more we are all going to learn.

They say the average small grower sometimes is not set up to mix rooting promoting "hormones" in large quantities but there is now a new liquid concentrate preparation on the market. It is being used quite strongly in the Northwest; it is called "Jiffy Grow". I have had some questions on how it is formulated. There is no secret about it. In this solution there is 175 parts per million of boron, added as boric acid. It contains 5000 ppm of indolebutyric acid and 5000 ppm of naphthaleneacetic acid; it also contains phenylmercuric acetate as a germicide and, of course, alcohol as a solvent. Now, on the directions it says use it straight; it is implied that you should try it out with your own crop which is a wise thing to do no matter what the label says. Mrs. Whalley mentioned some of the hard-to-root rhododendrons. A friend of mine in Oregon tried it last year on rhododendrons — dipped them straight and burnt the bottoms right off, but then they just rooted like the dickens right above the dead part. This year he cut down the concentration, using two tablespoons per gallon. I dilute mine a different way. I usually use it about 1 to 10 in water. But with these rhododendrons he has had real success. He stuck them to root in individual pots about the middle of August; I looked at them about the middle of October and they had beautiful roots out in all directions on some of the real toughies; so I think it is worth a try. Someone mentioned spraying the rooting hormone on the plants. I think with heavily cutinized plants you may have a little more difficulty than on some of the others with absorption into the plant. I figure, though, this may speed application up a little. On *Euonymus* we found, with soft cuttings — if we spray it — right at the rooting medium line we get a great big ball of roots where this liquid ran down the cutting. We have gone back to dipping because it is quite rapid. We just take large quantities of cuttings and give them a swish. Now, whether it is one second, or five seconds, or ten seconds, it doesn't matter too much, because you do not dry the cuttings off after they are dipped. You set them down and the chemical soaks in anyway, so I do not think it is critical. I do believe that the concentration is critical, even on the same plant, depending upon the hardness of the wood. In many plants, we have burnt the bottoms right off of them, but it didn't matter, they rooted right above the dead part. It was a very definite deliniation line where the concentrate dip solution came. These are just a very few things to mention; I think this material is available now to the average small grower. I would certainly recommend trying it. It has helped us a lot. Thank you.

MODERATOR CURTIS: The next member of the program is well known to all you folks here. Bruce Briggs has a wholesale nursery in Washington. Bruce is always experimenting. Bruce's nursery is a real interesting place to go. It is one of

the places that, if you come North, you should go to visit because Bruce is always trying something new. I would like to now present Bruce Briggs:

PROGRESS REPORT ON THE ROOTING OF JAPANESE MAPLES

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We will attempt, with the aid of some colored slides, to cover the highlights of our experience during the last eight years or so on the rooting of the many forms of *palmatum* maples.

Soil Mixes: Our first work was with the same mix used for Rhododendron cuttings, 50% each of sand and peat. The rooting was good, but we had trouble hardening them off for winter. We then tried many other soil mixes, such as sawdust, charcoal, pumice and perlite, looking for one which would give good drainage when the cuttings are set outside for the winter.

Perlite offered many advantages such as drainage, sterility, lightness, and obtainability. However, with perlite alone, the maples failed to root. This was also true with *Rhus cotinus* 'Royal Purple' cuttings tried the same year. This year we did root *Rhus cotinus*, R.P., cuttings in perlite alone, but under heavy mist.

At the present time, we prefer a mixture of some 40 to 50% peat and Sponge Rok, #3 medium. This mix gives lots of air and drainage with enough peat to bring rapid rooting. We root the maples in this mix in deep plastic pots, where they are left through the first winter.

Treatment of Cuttings. Cuttings are taken from actively growing tips and are prepared by removing all except the top few leaves. A heavy wound aids rooting and in some cases, a double wound on the heavier wood is used. The cuttings of normal length are then put into a bath of Morton's Soil Drench or a 5% solution of household Clorox. (Clorox as it comes from the store is diluted 20 to 1). Either drench seems to give excellent disease control.

After draining, the cuttings are given a quick dip in a solution of 5000 ppm each of indolebutyric acid and naphthaleneacetic acid. We have found here on the West Coast, as did Mr. James Wells (1) on the East Coast, that the maples react well to a high strength of hormone. A close examination of the roots shows that at times, the high strength of hormone burns some 1/2 inch of the bottom of the cutting. However, they still root much better and faster, even with the burn.

Overwintering of Rooted Cuttings. A large percentage of *palmatum* maples are successfully rooted during the summer, but are lost during the first winter. Various methods of overwintering have been tried, including: removal of all soil