

inches deep, constructed of cedar and sprayed with copper naphthenate. Bottom heat is supplied by electric cables and a temperature close to 73°F is maintained. Some experimenting has been done recently with ½ inch hot water pipes placed six inches apart in the bottom of the bed. Results have been equal to electric cables.

A mist system is used, controlled by a micro switch which is activated by a moisture-balanced screen. This system compensates for dark days and nighttime. The greenhouse is ventilated by a vent fan which is thermostatically controlled to keep the house temperature down on hot days.

For many years we have been interested in the influence that sawdust seems to have on root growth of mature rhododendron plants. As a result we started experimenting with various types and quantities of sawdust in our rooting medium. The use of sawdust proved so successful that we now use a medium consisting of 90 percent sawdust and 10 percent peat moss on all rhododendron cultivars. Douglas fir and cedar sawdust seem to work equally well. Fresh fir sawdust and all cedar sawdust should be thoroughly leached before use. We accomplish this by placing it in the benches and thoroughly soaking it with a hose until the water running out is no longer brown.

The results of using sawdust are good aeration and drainage, resulting in rapid rooting and large root balls. We have avoided any serious removal of nitrogen from the cuttings by the sawdust by starting a feeding program as soon as the cuttings are transplanted.

When the above procedures are followed, we experienced no difficulty in obtaining an acceptable percentage in rooting cuttings of difficult rhododendrons.

ROOTING *ACER RUBRUM* CULTIVARS USING SINGLE NODE CUTTINGS

J.A. ENGLISH

Shady Nook Gardens, Ltd.

9423 Gibson Road

Chilliwack, British Columbia V2P 6H4 Canada

We have been propagating *Acer rubrum* for a number of years; however the work done by E.R. Orton of Rutgers University on single node cuttings (Sept. 1978 issue of *The Plant Propagator*) made large scale propagation practical due to the better utilization of cutting wood.

Our method differs from that in the article, in that we use a potting mix of equal parts sawdust, peat, and pumice, and the cuttings are stuck in three inch square pots. Disturbing the roots, by potting from the cutting flat, increases the losses greatly. Out of 20,000 cuttings stuck last year, the rooting percentage after 20 to 25 days averaged 85 percent. The cuttings were taken during July and August, and wood up to ¼ in rooted well. The rooted cuttings are moved to a cold poly house where they remain until the following spring. Approximately 50% of these break dormancy and put on new growth before winter dormancy. The balance either die or break into new growth by April first or earlier. Our problem is how to make the cuttings break dormancy and put on 10 to 12 inches of new growth by planting time in late April or early May. Nutrition is a problem in rooting plants in containers, and even in 3-inch pots it is difficult to get liquid fertilizer into the pot, due to the large leaves. In an attempt to solve this problem we have added dolomite and superphosphate to our mix, also adding 2½ pounds of Osmocote 18-6-12. It is too early to tell yet whether this system will work.

While it is not possible to learn all of the answers in three years — we are producing a liner that does very well after it is field planted.

Some of the things we have learned are: maple leaves burn badly on hot sunny days unless kept constantly wet with mist: at the same time it is important not to let the medium get too wet, otherwise the cuttings will rot at the base.

While it will increase costs, this year we plan to keep the liners in a heated greenhouse at 50°F and, in addition, we will be using lights in an attempt to make the plants break dormancy earlier. It is hoped that the increase in the number of saleable liners will more than offset the added cost.

The plants here on the podium, are from those that broke dormancy in late April, and the 24 inches of growth indicates the “take-off” ability of *Acer rubrum* single node cuttings.

MODERATOR MORTON: Now for some questions for our panelists. Ray Maleike has one.

RAY MALEIKE: Jim English — what time of year do you take your *Acer rubrum* cuttings?

JIM ENGLISH: July and August.

RAY MALEIKE: Do they root if taken any earlier than that?

JIM ENGLISH: Yes, but generally the cutting wood is so soft it is extremely difficult to keep them from burning in the propagating house.

BRUCE BRIGGS: Did you ever try forcing growth of *Acer rubrum* in early spring for your cuttings; this is what I think Ray was referring to. If you can get growth of cutting wood early then you would have more time in the summer to grow the shoots that you want for the fall. This is what some have done in the East and in England.

BRUCE BRIGGS: My question is for Wilbur Anderson. On the apple tissue culture, after you etiolated the small plantlets, did you then put them into a medium *in vitro*, or did you go directly outside in the soil with them?

WILBUR ANDERSON: The experiment that I just discussed was terminated at that point — after we rooted or rated the rooting. We feel that some work done in Sweden, using darkness without actually etiolating the plant material, is most significant in getting good rooting percentages. I think that is the way to go. I would say that the results that we have are just confirming that etiolation, or say darkness, is doing something to get the endogenous growth regulator balance in favor of rooting. The manipulation, the actual way of handling it, is still up for grabs but I think that is where we are going to learn how to root all the apple cultivars. Good rooting is probably tied up with the darkness treatment.

BRUCE BRIGGS: That is what I was trying to get to, Andy; whether you had tried the work the lady had done in Sweden. Now, one other thing, you people in the room — don't think that etiolation is just for tissue culture. What you have heard here is a general principle that will work on rooting of any plants, tissue culture or on the outside.

RALPH SHUGERT: How about your *Juniperus virginiana* 'Skyrocket' propagating procedures? Is it all cuttings, or some grafts; what are your hormone treatment, etc.?

RODGER DUER: 'Skyrocket' roots from cuttings, they root very easily. For the hormone I believe we are using 3000 ppm IBA.

VOICE: You said after your cuttings are rooted you cut the bottom heat and start sprinkling with fertilizer injected into the water. Do you get growth on the cuttings before they are transplanted?

RODGER DUER: Oh, yes. We usually end up pruning them a couple of times before they are potted.

VOICE: So what size are they when they leave the propagating trays?

ROBERT DUER: We like to keep them nice and short, only about four inches or so; with too much growth on them, browning out of the foliage underneath develops.

VOICE: In your situation, how long do they sit in the propagating trays before they are transplanted?

RODGER DUER: Ideally, you should get to them right away but we have approximately 12 million conifers and it takes time to get around to all of them, to get them potted. Sometimes they sit in the flats as long as 6 to 8 months.

BRUCE MacDONALD: Question for Jim. Have you tried, with your *Acer rubrum* cuttings, removing one of the pair of leaves after they are well-rooted?

JIM ENGLISH: No, I haven't Bruce, but that is one of the things I am going to do this year because somebody else is suggesting that too.

We root *Acer palmatum* cuttings in pots, simply because they do not transplant worth a darn. If you root them in a flat, and move them into a pot, your losses become staggering. I mean it is nothing at all to lose 25 to 30%. Exactly the same as with magnolias. We find that if we root them in a pot, there are no problems, but if we root them in a flat and then pot them up, the losses are heavy. One other thing I should stress is that one of the problems in rooting in pots is that of getting fertilizers into the plants as soon as they are rooted. We haven't been using any fertilizer in the propagating mix at all and it is difficult to overhead liquid-feed because the fertilizer washes off. So what we have done this year is to put 2 lbs of 18-6-12 Osmocote per cubic yard in the rooting mix in order to have a little nutrition immediately for the plants as soon as they have rooted.

VOICE: We use 5 pounds per yard of 14-14-14.

JIM ENGLISH: And you don't get any burning?

VOICE: No.

JIM ENGLISH: As a matter of fact, that is one of the things I have written down and am going to try this year. Thanks.

VOICE: I have a question for Rodger. I am wondering do *Juniperus scopulorum* cuttings catch up in growth with grafts after the first year or so? Do they ever catch up?

RODGER DUER: Yes, usually by the second season they do catch up. In the first season, the grafts make about double the growth of the cuttings.