

## ROOTING OF BROADLEAVED EVERGREENS, ESPECIALLY HYBRID RHODODENRONS AND SPECIES

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The rooting of Broadleaved Evergreens covers so much territory that I find that I will only be able to cover the rooting of hybrid Rhododendrons and even there limit myself to the big leaved types. In many phases of rooting Rhododendrons I follow many of the practices put forth in these meetings and I here acknowledge my debt to those who contributed this information.

Before you can root a Rhododendron cuttings you must get the cutting. Where this cutting comes from and how it was treated before being cut determines not only your success in rooting or rotting it, but also what kind of plant it will make after it is rooted.

There is no real substitute for stock plants in Rhododendron production. If you grow enough plants until they are six or seven years old, you might get by without them. The fact remains that ideal conditions for plants in production do not yield ideal cutting material. Stock plants must be treated differently than those being grown for sale if optimum growth and bud set are to be maintained with the plants under production, and optimum rooting is to be experienced with the cuttings. The amount of nitrogen in the cutting at the time it is taken is the main key as to how it will root. I find plants that are visibly running out of gas are the ones that will yield cuttings with the most root ability. A cutting taken from one of those dark and lustrous beauties will take much longer to root if it ever does root. When the nitrogen is high in the cutting, it just won't root until the nitrogen is burned up. When nitrogen is excessive the bottom of the cutting will rot and very often the leaves will turn black and compost in the bench.

The care and feeding of stock plants becomes a problem since we want low nitrogen in the cutting when taken, but need enough nitrogen in the stock plants in the Spring to break into vigorous growth and produce cuttings of the size and quantities needed. The amount of nitrogen necessary to do this will depend on the conditions under which the stock plants are grown, the soil and the amount of shade. I used to feel that shade on stock plants was essential. Further experience has proven that this is not at all necessary with most hardy cultivars. A plant will need a decreasing amount of nitrogen as shade is increased to produce any given result in the plant. I hesitate to say just how much nitrogen should be applied to stock plants because of the tremendous variability in soils. If you assume that your soil is going to yield very little nitrogen on its own, then 40 pounds of actual nitrogen per acre applied in the ammonium form in March or early April would be ample for the plants growing in the ground. For stock plants growing in some sort

of container it would not be quite enough, because of the tremendous leaching that goes on in the containers. I am coming to think that constant feeding at rapidly decreasing ratios as the season progresses might be suitable for stock plants in containers. The levels of phosphorus, potassium, magnesium, calcium and available iron may be maintained rather high without hurting rooting.

The absolutely worst stock plant is a one-year old Rhododendron. As the plant gets older and proportionately larger it becomes more useable as a true stock plant. When one-year plants are used as a cutting source, the chain cutting syndrome sets in rapidly. The effect of chain cuttings was first noticed and pointed out by Guy Nearing. Chain cutting is repeatedly taking a cutting from a cutting. This produces crops with ever decreasing vigor. Leaf size and the overall size of the plants are reduced with each succeeding crop. The ultimate result is the exhaustion of the cultivar.

As we all know, small, slender, unbudded cuttings root very easily. I suggest that we not be deceived by this easy rooting. The important thing is how rapidly an unrooted cutting turns into a saleable, budded plant. The larger the caliber of the cutting the faster the rooted plants will develop. My suggestion then is to take the largest and fattest cuttings that are available. When there are enough large cuttings this means that no so-called ideal cuttings would be taken. I would further suggest that we pay no attention to flower buds and instead let's welcome them because they yield plants that do more branching at the first growth than those without. This heresy would be moderated only when the cultivar is very difficult. Dr. Dresselhuys would not be the best subject for these jumbo cuttings.

About six years ago I became disturbed about how we were rooting Rhododendrons. It is true that our overall percentage was in the high eighties and nineties, but the amount of sticking back required to get this percentage was excessive. To try to reduce this double work I laid out a series of hormone trials using all of the commonly available materials and a few uncommon materials in various combinations and in varying strengths.

Every batch of cuttings taken over the next three years had cuttings taken from it to try these 14 different materials. Gradually the information began to take shape. There emerged materials that were consistently safe, and were consistently producing heavy rooting, good attachment, and perhaps most important leveled the time required to root a whole batch of cuttings. In other words, markedly reducing the number needing to be stuck back. It was at this time that we were successful at rooting cuttings of the size usually considered to be too big. As you know, the first growth that a Rhododendron makes will root as will the second growth or the third. We know that if a plant makes two growths that each of the growths will root as separate cuttings. We wondered what would happen if the two growths were stuck as one cutting. Much to our astonishment

these rooted as well as the single cuttings. The question arose whether this could be carried a step further. Could you get a first growth, then pinch it then get a branched growth on top of that and then root the whole shooting match as a sort of a branched little Rhododendron. We tried this and this, too, will root. The thing to watch out for here is that the leaves are thinned out enough so that they don't overlap each other to cause rotting.

The three hormone materials that were the most useful are:	
1% I.B.A.	Examples of cultivators used on:
12½% Phygon	Roseum Elegans
50 P.P.M. Boric Acid	Catawbiense Grandiflorum
2% I.B.A.	America, Catawbiense Album
12½% Phygon	
50 P.P.M. Boric Acid	
2% I.B.A.	E. S. Rand and Dr. Dresselhuys
12½% Phygon	
50 P.P.M. Boric Acid	
.1% N.A.	
.25% 245 T.P.	

I.B.A. plus Phygon as reported earlier by Jim Wells produced a noticeable difference in quality of rooting. Boric Acid plus I.B.A. has much the same effect. I.B.A. plus Phygon and Boric Acid has an affect much greater than either combination alone. This is what Jim Wells likes to call the synergistic effect. One good everyday example of the synergistic effect is Irish Coffee.

The combination of ingredients not only effects the quality of rooting, that is the size and attachment of the roots, it has several other marked effects. Speed of rooting is leveled. In other words, more cuttings are ready to transplant at the time they are first lifted. It acts as a safener. It tends to overcome mistakes that could otherwise become troublesome such as degree of maturity or too much nitrogen. It also allows one to use much larger cuttings as I have already stated.

After cuttings are taken and treated, they are stuck in much the same manner as described by earlier speakers. I use the sand-peat medium 50 - 50. Each medium will find its supporters and I am sure that many others may be used in place of this. Depth of the medium in the bench is important. Eight inches is comfortable. A cutting only needs 3 or 4 inches of medium depth if the medium would stay in good shape. However, with the use of mist this soon becomes overly wet even with excellence drainage. It is here that the extra depth becomes useful. It acts as a cushion or a sponge. The bottom becomes rather soggy but out of harms reach so to speak.

The amount of mist used does not seem especially critical. The only thing to watch with the mist is that we don't use too much and get the medium too soggy.

As I see it, the time to take Rhododendron cuttings is Sep-

tember. Earlier cuttings have consistently been a flop with me and later cuttings hang around too long to fit into the follow-up program of late winter growing on.

Problems to look out for while the cuttings are in the bench are several. Leaf spotting is controlled very effectively by sprays of Parzate using two pounds per hundred gallons. Composting is from too much nitrogen in the cutting or from sticking the cuttings so close that the leaves overlap each other so that the washing effect of the mist is prevented. When you get bunched root development where the roots do not grow out this is from the medium being so wet that air is excluded. When the medium is changed these roots will grow quite normally. Blackening and rotting of basal ends are from wetness or rather soggy-ness of the medium or from excessive nitrogen in the cutting. I might mention at this time that if Phygon is used in the hormone mixture it will stain the bottom of the cutting and the wounded sides a dark and dismal black. This is only a stain and the material has not killed the cuttings although it looks like it. It differs in appearance from a dead cutting black in that the unwounded portion of the cutting remains a normal green. I bring this up to forestall any heart attacks among the members trying Phygon. Another side effect of Phygon is that very often rooting will occur without callousing. When callousing does happen it seems to erupt from the cutting. In other words, callous does not form on the outside, but seems to emerge from within. Following the above procedure and maintaining bottom heat at 72 to 75 degrees, one should be able to root 85% to 90% of larger than average cuttings in 10 to 12 weeks.

CASE HOOGENDOORN: Do you find any difference, Dick, in cutting your leaves when you make the cuttings or by leaving on the full-grown leaf?

DICK VANDERBILT: If you can possibly leave the leaves, I think you'll get better rooting.

CASE HOOGENDOORN: Full leaf?

DICK VANDERBILT: Yes. But I think you're going to have to cut most of them to get a decent cutting because otherwise they will be too big.

CASE HOOGENDOORN: I know. I don't have enough greenhouse room. What do you do?

DICK VANDERBILT: Cut them.

CARL WILSON: Did you say that you used IBA and Boric acid? What did you find was the optimum of IBA and what was the optimum boric acid?

DICK VANDERBILT: The boric was consistent at 50 ppm; the IBA varied from 1 - 2% depending upon which cutting you wanted to root.

MODERATOR PINNEY: Our next speaker is Charley Hess from Purdue University.