RESPONSE OF MAGNOLIA GRANDIFLORA AND SEVERAL SPECIES OF BERBERIS TO ROOT PROMOTING CHEMICAL TREATMENTS

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Several workers have reported (1,2) favorable rooting responses of stem cuttings of a number of species and varieties of *Berberis* to various chemical treatments In general, the most satisfactory results were obtained with hardwood cuttings. In every case, the percentage of rooted cuttings was low and the period of time required for root initiation was lengthy. Enright (3,4,5) reported successful results in rooting a number of difficult plants with concentrated-solution-dip treatments of indolebutyric acid. This study was undertaken to determine the influence of similar treatments on the rooting response of *Berberis julianae, Berberis sargentiana, Berberis thunbergi, Berberis thunbergi atropurpurea* and *Berberis verruculosa.*

This investigation was carried out for two consecutive 12 month periods to determine the proper time for taking the cuttings, the position on the plant from which the cutting wood should be selected, the timing interval which should be used with the intermittant spray system, and the concentrations of root promoting chemicals that would be most beneficial.

It was found to be true with *Berberis* species, as it is with many other ornamentals, that cuttings rooted best which did not come from the most vigorously growing shrubs. It was also determined that those cuttings taken from the lower branches, often more shaded, rooted better than those taken from the upper branches.

The cuttings were taken from the lateral twigs of the current season's growth and cut to a length of 4 to 6 inches. All the cuttings were taken from the same parent plants for the duration of the study to avoid genetic differences in the woody material used. Although wounding was employed it was found to be of no value in producing rooting response on the barberries. In each test, 50 cuttings were used and their basal portions were dipped to a depth of 2 inches, for a period of 10 seconds, into a solution of indolebutyric acid and distilled water. The solutions were prepared by dissolving the indolebutyric acid crystals in just enough 90% ethyl alcohol to cover them. Then distilled water was added to bring the solutions to the desired volumes. The dip concentrations used were 5000 ppm, 10,000 ppm and 20,000 ppm.

A well drained greenhouse bench with an intermittant mist system was used for the propagation. This system was an in-bench installation with Florida 550B, deflection type nozzles. It was timed to spray the plants for 15 seconds during every 10 minute interval from dawn until one hour after sunset. A coarse grade of bank sand was used as the propagating medium. Soil heating cables were used to maintain the rooting medium temperature at approximately 70 degrees F. during the cold periods of the year. Whenever possible, air temperatures were

maintained at a minimum of 72 degrees F during the day and 62 degrees F. at night.

In all cases, except with the *Berberis julianae,* the 5,000 ppm IBA solutions gave the best results The plants responded in this manner —

Berberis sargentiana	46 days	91%
Berberis thunbergi	17 days	100%
Berberis thunbergi atropurpurea	28 days	90%
Berberis verruculosa	31 days	96%

Cuttings taken in early spring and late fall responded with equally good rooting. Although those taken during the summer did not respond at all. A stronger, or more concentrated solution, 10,000 ppm IBA was necessary to produce roots on *Berberis julianae.* These plants did best when taken during the winter months and rooted in approximately 44 days with an average of 98% success

Magnolia grandiflora was handled in much the same manner. With this plant, however, wounding was an aid to rooting. A thin one inch slice of bark was removed from two sides of the base to expose the cambium before the cuttings were immersed in the IBA solutions The medium and mist timing were identical to that used for the barberry species.

For the College Park, Maryland area it was found that cuttings taken during the late spring or early summer produced the best rooting. It was also found that the root development was directly proportional to the concentration of the chemical solutions used The data for the month of June are a good example of this fact —

Concentration IBA	Cuttings Taken in June (% Rooted)*			
	1st week	2nd week	3rd week	4th week
Control (no treatment)	0	0	0	0
5,000 ppm	6	12	14	10
10,000 ppm	12	22	28	28
20,000 ppm	84	88	86	88

*Cuttings rooted in approximately 63 days

We have found that by reducing the mist interval by one half at weekly intervals, after the cuttings have rooted satisfactorily, they become sufficiently hardened for potting or outdoor planting. Our losses after transplanting have been negligible.

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MODERATOR NELSON· Thank you, Professor Enright Are there questions to be directed to Professor Enright?

MR. WILLIAM FLEMER· Were any of these cuttings *Magnolia grandiflora hybrids,* or were they straight species?

DR. ENRIGHT: Straight species We had very poor results with the hybrids we tried.

MR. JAMES WELLS. Have you tried any of the strong powders in place of the concentrated dip?

DR. ENRIGHT. Not very many.

MODERATOR NELSON. Are there any more questions? If not, we thank you, Dr. Enright for a most interesting presentation.

The next speaker on our program is Mr. Hans Hess who is going to speak to us on the subject, "Copper Beeches by Grafting."

MR. HANS HESS (Wayne, New Jersey) : I feel somewhat out of place talking about grafting, after having heard all these fine speakers talk about the rooting of cuttings. However, up to this point I don't believe there has been much successful work done with the rooting of copper beeches from cuttings, and therefore, we still have to resort to the old and tried method of grafting

Mr. Hans Hess presented his talk, "Copper Beeches by Grafting" (Applause)

COPPER BEECHES BY GRAFTING

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It would not be proper to discuss the field of grafting without giving a little time to the preparation which precedes this mechanical operation. I will therefore start at the very beginning and speak for a few moments about the seeding of *Fagus sylvatica,* the understock for its suntanned brother. Many have had difficulty in obtaining a good stand of seedlings even though they used seed which was apparently fresh. We have found that the seed of *Fagus sylvatica* loses its viability very rapidly and consequently planting immediately after receiving the seed is of the utmost importance. The seed generally arrives from Europe after the ground is frozen solid and therefore seedbed preparation before hand is necessary. Seeding directly on the frozen ground does not effect the germination and it generally reduces the danger of rodent damage. We have, in a few instances had to remove four to six inches of snow before being able to plant the seed and obtained equally good results We have for the past few years treated our beech seed with red lead to avoid any rodent damage. The seed germinates very early, in fact it seems as though germination takes place as the frost leaves the