

holds fruits after flowering along the fog belt of the California coast. Weather, or perhaps self-sterility, may account for the infrequent production of seed on a *M. denudata* specimen at Urbana, Illinois.

Besides actual freeze injury to the flower parts, weather too cool, or too hot, at flowering time may possibly interfere with pollen germination or fertilization. Unfavorable weather could result in spoilage of pollen, or interfere with its natural distribution by insects, though we do not need or want insects in our parent flowers for controlled crosses. Dr. Charles E. Heiser, Jr. of Indiana University has studied the relationship of insects to natural fertilization in American Magnolias.

REFERENCES

- Boyce, Stephen G and Kaeiser, Margaret 1961 "Why Yellow-Poplar Seeds Have Low Viability." Cents States Forest Exp Sta Tech Paper 186. 16 pp
- Carpenter, I W. and Guard, A T 1950 "Some Effects of Cross-Pollination on Seed Production and Hybrid Vigor of Tuliptree" Jour Forestry 48(12). 852-855
- Dandy, J E 1948. Curt Bot Mag CLXV: sub t 16
- Dandy, J E. 1950 "Survey of the Genus Magnolia together with Michelia and Manglitia" Camellias and Magnolias, Conference Report 64-81
- Freeman, Oliver M 1937. "A New Hybrid Magnolia" Nat Hort Mag 16 161-162
- Janaki-Ammal, E. K 1952. "The Race History of Magnolias" Indian Jour Genetics and Plt Br 12 82-92
- Kosar, William F 1962 "Magnolias Native to North America" Jour Calif Hort Soc. XXIII(1) 2-12
- Rehder, Alfred 1927 (second ed 1940) Manual of Cultivated Trees and Shrubs

MODERATOR MCDANIEL: Our next paper will be given by Jim Wells, James Wells Nursery, Inc., Red Bank, New Jersey.

THE USE OF CAPTAN IN THE ROOTING OF RHODODENDRONS

JAMES S. WELLS
James Wells Nursery, Inc.
Red Bank, New Jersey

I would like to take one of the three minutes allotted to me. if I may, to mention briefly an aspect of our work which I think has not always been recognized, and that is the "quality" of the rooting obtained from any given treatment. I believe that sometimes we are inclined to be mesmerized by percentages, and it is very easy to present a misleading picture from figures which do not reflect the quality of the rooting obtained. We all know how much the successful re-establishment and ultimate survival of a young plant depends upon the quality of the root system produced in the propagation bench. Where material is propagated in fall or winter, the percentage of survival the following spring, no matter how carefully the storage conditions may be controlled, is in direct ratio to the number and the quality of roots on the cutting when they are first moved. I must own that I was quite disturbed to hear at last year's meeting, a num-

ber of critical comments to the procedure of wounding cuttings, and I think Jack Hill and Dr. Chadwick both stated that they had not found this procedure to be helpful. I wonder whether they have assessed the procedure from the point of view of quality as well as the percentage of rooting. If this has not been done, then such comments could be misleading.

The purpose of this preamble is to state that I believe the main value of the Captan treatment is in the improvement of the quality of the root system, although it does seem to have a definite effect upon the percentage of well rooted cuttings under certain circumstances.

I first learned of this treatment by scanning the reports of the Boskoop Trial Grounds which reached me in the spring of 1962, and we mixed up a few powders and tested them in the summer of last year. These initial tests indicated that the treatment was of real value. Let me quote one or two figures.

Rhododendron Luciferum — This is a variety which roots with reasonable ease but does not produce a very vigorous root system and the points of attachment to the cutting are often weak. One hundred cuttings were inserted on the 4th of August, 1962, and treated with 1% IBA. On November 29, they were lifted and compared to a similar quantity which we treated with 1% IBA containing 1/2 Captan. Results were as follows:

1% IBA — No Captan	1% IBA with Captan
55%	100%
41 Cuttings heavily rooted	92 Cuttings heavily rooted
14 Cuttings light rooted	8 Cuttings light rooted
45 Cuttings dead	

Comments on lifting — outstandingly good, well attached heavy balls. This clearly best.

These results could be duplicated on a number of other varieties, but there was one other aspect of the treatment which became apparent from this initial test. The inclusion of Captan in the rooting powder does appear to have a modest inhibiting effect upon the development of new top growth on the cuttings. This is quite important for batches of cuttings taken both early and late. It does not entirely eliminate the top growth, but it greatly reduces it and as a result the cuttings tend to keep in a much better condition.

Following these initial tests we commenced changing all our treatments to include the 50% Captan and a batch of cuttings was made on October 1st, 1962, of the variety Nova Zembla. Two hundred fifty cuttings were inserted treated with 2% IBA and Captan and two hundred fifty were treated with straight 2% IBA. Both were lifted on December 20. Results were as follows:

2% IBA
 172 Cuttings heavily rooted
 37 Cuttings medium rooted
 11 Cuttings light rooted
 19 Cuttings very light rooted

11 Cuttings callused
 2% IBA with Captan
 249 Cuttings heavily rooted
 1 Cuttings light rooted

I would like to quote my comments on both of these as they were lifted:

Straight IBA Treatment — clearly inferior to IBA plus Captan. Note difference in figures. These differences appear to represent the value of Captan under seemingly ideal and identical conditions. We appear to have “hit it right” on this whole block as to timing, condition of cuttings, treatments, etc. Root balls on this treatment were not so even, nor so well attached as the IBA plus Captan treatment.

2% IBA Plus Captan — Results outstandingly good, even, heavy rooting with well attached balls. Cuttings have that certain clean look of well being as compared to cuttings adjacent which looked dull. Results could not have been better both in quality and quantity of roots; appearance of cuttings, leaves, etc. Captan has increased the rooted cuttings by 40, or about 15% in a given time.

If we assess the *quality* of rooting by assigning a numerical value to each type of root system, a further vital difference between these two treatments becomes apparent. To do this we gave the following values to rooted cuttings:

Heavily rooted	Root ball fitting into a 3" pot	5 points
Medium rooted	About equal to a golf ball	4 points
Light rooted	About equal to a 25c piece — 10 to 15 roots emerging	3 points
Very light rooted	5 to 10 roots emerging—no root ball	2 points
Callused but no roots		1 point
Dead		0 point

Now if we apply these point values to the treatment with straight 2% IBA, they achieve a total value of 1,090 points, while the 2% IBA with Captan would receive a value of 1,248 points. We see, therefore, that the addition of Captan to the hormone powder has done two things. First it has increased the number of cuttings sufficiently well rooted to be transplanted to the propagation bench by 40, an increase of about 15%. But second, and in my opinion, perhaps, a more important point is that it has improved the overall size and quality of the root systems by 15%. These two results combined are, I suggest, significant.

I must apologize to our scientific members for using such teleological expressions as “clean” and “bright” but these are the only words which can convey the difference which exists between cuttings treated with and without Captan, and in the interests of accurate communication, I think they have to be used. All our treatments are now made up by using double the

required strength of hormones mixed in talc and reducing this powder to the required level by adding an equal quantity by volume of 10% Captan.

MODERATOR MCDANIEL: Thank you very much, Jim. Our next speaker will be Mr. Al Lowenfels, Willow Lake Farm, White Plains, New York.

LILACS, SECOND YEAR FROM CUTTINGS

ALBERT LOWENFELS
White Plains, New York

Because of the presence of so many learned and noted botanists, this talk should have said "*Syringa*." But just being a plain propagator I use the common name. My inspiration for raising lilacs from cuttings came from reading a pamphlet by Kirkpatrick issued at least 20 years ago by Boyce Thompson, Yonkers, N.Y. Aside from that I find very little in the literature on propagating lilacs from cuttings. Bailey, in his classical nursery manual, gave various methods of propagation and said "Green cuttings handled in frames in the spring and summer are used," and he also mentions that mature wood would grow. Well, I'm not able to root summer cuttings or mature wood. Mahlstedt and Haber give one line on lilacs, showing spring and summer as the best time for green lilacs. Hartman and Kester give almost a page to lilacs including green cuttings taken early in spring, but remark, "due to the fact that cuttings must be taken at a definite time in the spring at the peak of the nurseryman's busy season, some commercial propagators practice grafting."

Well — I do not see where propagators are any busier in early May than any other time — and I do not think grafting is as good as own rooted plants. Putting lilac on lilac should be against the law. Putting them on privet means a battle with privet suckers, in a fair number of instances. Some growers, such as Heard of Des Moines, put lilac on Ash — but having rooted lilac cuttings for some years, I think this is the best method. Kirkpatrick told me that the best time to take the cuttings is when the terminal bud is unfolding, when the joint with the main stem is somewhat sticky — and that this joint should be included. My experiments show that this is correct. I have been unable to root lilac cuttings without this joint.

Last year I took my first cuttings on April 28th. I made 960 cuttings of about 25 varieties of hybrids and my list (which I will be glad to show anyone) shows 38 different plantings. This year I stuck the cuttings in perlite which was on top of peat moss. My last cuttings were made on June 12th. I used Hormodin #3 and had Captan on some — I didn't find this made much difference. I got 579 rooted cuttings. I think I would have had more except that on one very hot May day, my mist