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CHAIRMAN GALLE: We will hold all the questions until after the last speaker. We will now go on to our next speaker who will discuss "Propagation of Other Broadleaves on 'The Edge of the North'", Mr Don Hillenmeyer.

Mr. Hillenmeyer presented his paper. (Applause)

PROPAGATION OF OTHER BROADLEAVES ON THE EDGE OF THE NORTH

DONALD J. HILLENMEYER

Hillenmeyer Nurseries

Lexington, Kentucky

It is certainly an honor and a pleasure to come before this fine organization to present what little I can which might be of interest to fellow members. From attendance at former meetings, I have been

highly impressed at the great amount of technical knowledge presented on these programs. Before going into the actual propagation of the so-called borderline broadleaves, I would like to say something about these plants and their hardiness. There are many plants that have been treated on a "hands off" basis by northern nurserymen (those north of the Ohio River) because of rumors and sad experiences in freeze damage in former years. I find in my experiences that many of these plants have never been tried under the best of conditions, and consequently, your customers have been denied a wider use of plant materials. I am not suggesting that everybody in the North go out and spend a large sum of money on liners of these questionable plants, because there is a limit to how much they will take before freezing.

I am basing my statements on the subject matter to be discussed primarily on experiences in Lexington, Kentucky, and some other Kentucky cities where the weather is comparable to that of Lexington. In the winter of 1950-51, we had a very good test for the plants in Lexington with a cold snap in November that many of you will well remember. We had a temperature of 65°F. on Thursday morning and a low of 5°F. by Friday night. In January and February, we had temperatures several times that were -15°F. or below, the coldest being 20 degrees below zero. With this situation, we had the following plants come through the winter unharmed, when many of the so called hardy plants were damaged: *Magnolia grandiflora*, *Ilex cornuta burfordi*, *Prunus laurocerasus*, *Prunus I. Zabeliana*, *Buxus spp.*, and *Osmanthus americanus*. Many nurserymen have tried purchasing full grown tender plants from the South, and reselling this material. Unfortunately my experience too often has been costly and discouraging. However, these trials have been beneficial, because strains have been selected which permit us a wider use of material in this area.

Now, in reference to the actual propagation of this material, I would like to preface my talk with the statement that I am somewhat new in handling these plants due to the newness in our area, and that I am sure there are better or cheaper ways of propagating these items. However, experience and necessity have shown that some of these methods, even though different than southern ones, have proved beneficial and successful.

MAGNOLIA GRANDIFLORA

In Lexington, we have many magnolias that are twelve inches in diameter which have been through many a severe winter apparently undamaged. I know of a Kentucky nurseryman that had some home grown seedling 4/5' that were planted next to some southern purchased seedlings. The southern types were frozen, the home grown plants showed no damage whatsoever. How much cold will they take? I do not know, but it is proof that there are strains that will take it better than the plain *Magnolia grandiflora*.

Magnolia grandiflora is commonly raised from seed. We gather the cones when they are ripe, spread them out on a floor or bench at room temperature, and the seed will continue to come out of the cone until they can be very easily picked off. The seed should then be cleaned. I have heard, and had only fair success myself, of using uncleaned

seed. The oily coating on the unclean seed is supposed to slow down or prevent germination. They can be cleaned cheaply and easily by soaking in water for several days and then rubbing lightly over a wire mesh. Sow immediately in a mixture of half sand and half peat and place the flats in the greenhouse. Germination, once it starts, is fairly regular and usually by the 15th of February you can count on them being mostly germinated. Pot them or transplant them at your convenience, but generally the sooner the better. This is the way found to be most successful in our area. You can sow them directly in beds if you prefer bed grown magnolias. I do not. If you do this, there are some necessary precautions. Mice love them, so be sure to take precautionary steps to protect the seedlings. The other consideration lies in the fact that they can not be allowed to freeze, and therefore the bed must be protected to prevent this. The seed can be held until spring and sown in beds if preferred. However, it must be stratified to prevent drying out, and they must be stored in a cool place to prevent germination from taking place in the stratification medium.

ILEX CORNUTA BURFORDI

The propagation of this plant is readily accomplished by any methods by which you propagate your other hollies, a subject already ably covered by Mr. Wells. I would like to say a few words about its hardiness. For years nurserymen in Kentucky did not grow the plant because every time they brought up some from the South as finished plants they were damaged. However, there was one brave nurseryman in Lexington who planted some small liners four years previous to this time. In April he called me and showed me these plants. There was no damage whatsoever. They are now being planted with regularity in Kentucky. It appears that when the plant is grown in the locality it can stand the winters much better.

PRUNUS LAUROCERASUS CAROLINIANA

Cherry laurel is a plant that will suffer damage in a severe winter, although I have hopes that this will be remedied in time. I had the pleasure of cutting six foot plants back in the spring of 1951, but still the plant is grown, planted in protected places, and called for by the customers. Growth is rapid each year and the customers are using the foliage for winter decorations in the house. Many do not complain if it freezes, because of the enjoyment they have received from decorative uses. I found one plant last year, whose trunk is 18" in diameter, that the owner says was undamaged in the 20 degree below temperature of 1951. Maybe these plants will prove hardier than the normal seedling Cherry laurel. I have only seen the plant one winter and this was a mild one.

Cherry laurel is primarily propagated by seed, and I am sure that there are others that can give a better description of seedling production than I can. However, I do not know that if it is fall sown in the seed bed, the winters in Kentucky are cold enough to prepare the seed for spring germination. The plants can also be propagated with relative ease by cuttings. The reason I bring this in is the hope that hardier varieties may soon be found, and also, because I understand that in the

Nashville, Tennessee area, there have been some strains selected for better leaf quality and generally better plant quality. My experience is that softwood cuttings taken in June, placed under intermittent mist, were rooted somewhere between 85 and 90% by late August. Maybe with a little closer attention to details I can increase the percentage, since I merely stuck them to see if they could be rooted. I presume that any method that you use to produce softwood cuttings would succeed in this case.

PRUNUS LAUROCERASUS ZABELIANA AND SCHIPKAENSIS

I am placing these two plants together because the results in propagating them have been almost identical. The former plant came through the winter of 1951 in excellent shape, although the latter was damaged. The latter is being grown because it has not damaged since then, and it sells well in our area. I have had constant rooting of 90 to 98% when placed under intermittent mist the first of July, and removed the last of August. Also, one year they were rooted very satisfactorily in the greenhouse when placed in the bench in December. Either method seems to be satisfactory.

BUXUS SEMPERVIRENS

Boxwood is a plant that is sold with words of caution to the buyers of nursery stock in Kentucky. Many of the people in this area had ancestors from Virginia and they think that boxwood has to be planted just as grandmother did back in Virginia. Consequently, there have been many planted over the years and many have proven hardy. Of course, there are many strains of boxwood that are hardy, so what I have to say might prove interesting to you. It is not a difficult plant to root. I take my cuttings in the first part of July, place them under mist in sand and get excellent results. When I take the cuttings, I merely strip the leaves and stick them in the sand. They root so easily and so well that I find no need for hormone treatment or any other special preparation.

OSMANTHUS AMERICANA

This plant may not be known too well, and among those who do know it, there are varied opinions as to its acceptability. It has done well in Kentucky in growth and in sales, when grown properly. It survived the winter of 1951 in fine style. It can be raised from seed or reproduced by grafting. The seed is gathered in November and cleaned in the usual manner. You can sow immediately outside in beds or stratify and place outside for six weeks of cold weather. They can then be brought in the greenhouse and given an earlier start, if this is preferred. As soon as they can be handled, they should be potted.

Grafting is often practiced in Kentucky on this plant because of the seedling variation and because of the longer time required to produce a salable plant. Unfortunately, the larger, glossier, leaved plants appear to be more sensitive to cold weather than the narrow-leaved types. A side graft is used for this procedure in the same way you would propagate a juniper. One nurseryman I know says that they can be grafted any time of the year that you prefer, but because of time available and

storage space afterwards, I prefer to do it in August. Ibohium privet is used as an understock. Pot the privet in the winter when you are not too busy, and place them outside in a cold frame until ready for use the following August. Graft them and then place in a shaded greenhouse, treating them in the same manner that you would junipers. When you remove the last of the top of the privet, you can move them outside in a cold frame for the winter

Propagation by cuttings has given varied results. It seems that the more undesirable plants are the ones that are more easily rooted than the good ones. I have had 10 to 90% rooting of these plants under many conditions and methods, but there has been no consistency in the results from one year to the next. Therefore, I feel that it is a waste of time to tell you how not to propagate this plant by cuttings. I would now like to mention a couple of plants that are not going to go through many winters in Lexington, but you would have to classify them as borderline.

ABELIA GRANDIFLORA

Abelia is propagated generally by cuttings. Softwood cuttings placed under mist are rooted very easily when placed in the mist in June and can be removed in five or six weeks. When grown by this method, they are better off if grown in a bed for a year before moving to the field. They are also readily rooted from hardwood cuttings, or at least so I have heard. My experience has been disappointing in this regard, as a 10 to 15% rooting was all that I was ever able to obtain, and many times I had a big zero in the rooted column. Maybe it was the condition of the wood or the way in which it was being stored that was giving the trouble. I do not know why I did not succeed when all the other hardwoods I was making were rooting fine. If in doubt, or unsuccessful in rooting hardwoods, then you should be able to root them easily from softwoods.

NANDINA DOMESTICA

This plant is very readily propagated by seed. Gather the seed when ripe and clean them. Sow the cleaned seeds outside in beds and you should have no trouble getting the seed to germinate in the spring. I have seen seedlings that came up in a bed of peat moss where they had fallen off the mother plant during the winter. Therefore, you do not have to clean the seed, although we have found out from experience that they germinated much faster in the spring when they are cleaned.

There are many other borderline broadleaves that I could talk about, but time is limited and there are many more nurserymen that should have the opportunity to present some of this material to you. I have just covered the highlights of propagating these plants as I do them. There are many of the discussions that could be more detailed, but I do not think this is the time to do so. Generally, the cuttings are treated as any good propagator would, and the grafting procedures are the same as any good grafter would use. There is no need of going into seed bed construction, since methods are more or less standardized. The cuttings were generally as large as I could take them under existing conditions. The hormones used were generally Hormodin #2 and in

some cases, the other strengths, as the season and condition of the wood demanded.

I will be glad to enlarge on any part of these procedures during the question period to follow. I hope you do ask questions if there is any doubt, as I can readily picture what I am doing as I say these things, where you may not get the same impression. Thank you for the privilege of appearing before you and for the kind attention you have given.

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CHAIRMAN GALLE: That concludes our formal presentations and we now are open for questions from the floor.

MR. LOWENFELS: I would like to ask Mr. Wells where he gets the hormones he has mentioned in his talk. Are they available commercially?

MR. WELLS: You really put me right slap on the spot here, Al, because I am forced to say that you can get them from me.

MR. STEAVENSON: Mr. Wells, while you are up here, I would like to ask a question. In your cold frame propagation of hollies, is there any benefit from hormone treatments where you stick in the fall and rooting will not occur until the following spring?

MR. WELLS: No, I doubt it. However, in the cold frame method that I described we used heat supplied from an electric cable. The temperature was between 65 and 70 degrees and therefore you would expect benefit from hormone treatments.

MR. MARTIN VAN HOF: I would like to ask Jim Wells if he considers a mixture of peat and vermiculite to be beneficial for the rooting of cuttings?

MR. WELLS: I don't particularly like vermiculite, although I might be prejudiced. I think it produces a long watery root, and for that reason I don't like it. I do like perlite. The texture of medium which is made up from peat and perlite is quite different from that of a vermiculite-peat mixture. It drains much more readily and it feels gritty. I like that, and therefore I am bearing down on its use quite a lot. I think it has considerable possibilities, and I would go further and say it might be an advantage to add some of chopped styrofoam to make it even lighter and more porous. I believe many of the problems associated with poor rooting are to be found in poor aeration of the rooting medium. The old-fashioned method of hammering down the rooting medium and hammering in the cuttings was, I believe, induced by a necessity to have the base of the cutting closely in contact with the rooting medium so it could perhaps get a little water and thereby keep in a turgid condition. With the advent of mist, that necessity no longer exists.

PRESIDENT VANDERBROOK: Jim, I know that you have been doing quite a bit with mist propagation. The question I would like to ask is whether you have tried any of the polyethylene structures and what results have you had in the past?

MR. WELLS. Yes, I have tried polyethylene, but not as a structure. I tried it as a covering for the bench, as Harvey Gray showed us yesterday, and I think that idea was first promulgated by Mr. Lem in Oregon. My results have not been as good as other people have reported. I believe that we are all after the same thing, which is the control of water and the economy of water in a cutting, while it is re-establishing itself and reorganizing its tissues at the base in order to get a new root system. The polyethylene tent which reduces water loss and maintains a high relative humidity in the atmosphere is one effort, the use of misting is another and the use of Mr. Hancock's syringing is another. We should look at all these ideas and methods with that one idea in mind, the economy of the water reserve in the unrooted cutting.

I prefer an open greenhouse or frame with a mist system added, because I have found that there is less trouble with fungus diseases under that system. I think the use of mist by everyone has shown a great reduction in the incidence of fungus trouble, and the one time that I tried covering my bench right up with polyethylene, fungus came in or got in and became rampant and swept through there like wildfire.

PRESIDENT VANDERBROOK: Have you ever submerged your entire cutting in Orthocide, at the rate of two pounds to 100 gallons of water to prevent the fungus development?

MR. WELLS: Yes, I have tried it, but not for cuttings stuck under polyethylene. I did try this procedure under normal misting conditions, although it didn't seem to do any good or harm. I didn't get any less or any more fungus, since the mist itself seems to be as good control as anything for fungus diseases.

MR. ROLLER (Verhalen Nursery Co., Scottsville, Texas): I would like to ask Fred Galle if he doesn't know a half dozen varieties of camellias that will take 5 to 10 degrees below zero. I understand there are some that will take these temperatures.

CHAIRMAN GALLE: You are talking about the varieties that will flower under these conditions, since I think all of them are hardy at these temperatures. Reporting on Zimmerman's paper, which was in the 1955, Camellia Year Book, he listed the varieties Lady Clare, Debutante, and things that even in the mid-south are not considered satisfactory. Apparently what these plants were doing was remaining dormant and flowering in the spring rather than coming in mid-season as we normally think. I think there are a good number of varieties, including those of *C. sasanqua*. They are qualifying and I think are even more satisfactory in some cases than the *C. japonica* varieties.

MR. JOHN VERMEULEN: Talking about borderline plants and temperatures of 20 degrees below zero, I would like to ask Hillenmeyer how many nights of 20 degrees below did he have?

MR. HILLENMEYER: Just one night of 20 degrees below zero. We had 5 or 6 nights running that were 10 below zero, in the winter of 1951. I think five times during that winter in January and February, the temperatures were 15 degrees below zero.

MR. VERMEULEN: On the question of borderline plants, many times they can be brought up from the South and can be used in certain

sections. We could theoretically use most of the plants you have mentioned in New Jersey, since we very seldom get 20 degree below temperatures. However, all the plants you mentioned are generally killed by the wind in February, not by the extremely low temperatures.

MR. HILLENMEYER: You are correct in noting that low temperatures are not the only factors contributing to the hardiness of these plants.

MR. CARL GRANT WILSON: I would like to ask the Chairman about the open field propagation of junipers in the Huntsville area. I have had some of the cutting material propagated in this area and I find they are stuck 8 to 12 inches deep. Can you explain why?

CHAIRMAN GALLE: I think the original deep sticking was necessitated by the lack of irrigation. I think now that they are using irrigation they are sticking their cuttings shallower. I know that there has been quite an objection to that long shank.

MR. RICHARD VAN HEININGEN (Van Heiningen Nurseries, Deep River, Conn.): I would like to direct this question to Mr. Wells. We do a considerable amount of propagation using frames equipped with heating cables. We have had some trouble with lungus in years past. This winter we were rather successful, with no difficulties. However, we felt that our operation was a little bit expensive because we were rather fearful of using a cover over the glass on these frames at night. We were concerned about the immense amount of condensation which collected on the inside of the glass when we used reed mats. It was just dripping in the morning and the cuttings were soaked. We felt that might be just the right condition for fungus to begin. Would you think that would be anything to worry about?

MR. WELLS: No, I don't. I say not worry about it, but any prudent operator keeps his eyes open and looks for trouble which will occur from time to time. We are using three frames, each with ten standard sash and they are heated by electric cables. The cost of heating the frames each month is \$25. The frames are covered with mats.

MR. VAN HEININGEN: How long are these frames?

MR. WELLS: These frames of ten sash are 30 feet 9 inches long, with the dividers. Each strip of ten sash would hold about 10,000 holly cuttings. We cover them each night with reed mats and roll the reed mats up in the morning. If it is a mild day we will give them a little air. In addition to that, we have a line of Florida jets running down the center of the frame, operating at a pressure of about 80 pounds. If I think the day is going to be bright and clear and it is likely to get a little warm, I will put on the mist system and let it run throughout the day, which means that there is a lot of water in that frame.

MR. JACK SIEBENTHALER: I have no question but a few comments, one directed to Mr. Wells, and the other directed to Fred Galle.

First, I would like in a friendly way to score Jim Wells for his expression of the common fallacy in the nursery industry today that it is the job primarily of the retailer to educate the public. To me, that is in direct contrast, in fact, diametrically opposite to the established basic principles of selling in the United States. The only example that you

have to look to is the automobile industry or if you want to look further you can look at the television or refrigerator people, where the manufacturer, whom we could compare to the wholesaler in this particular industry of ours, does the primary and basic advertising. He comes out with new models or new plants. He promotes those models if he thinks they are good enough and establishes a desire in the minds of the public to come to the retailer and demand that particular product or model. Now that is a basic method of merchandising in this country. I don't think we are so different, Jim. We are not a different breed of horses from the automobile manufacturers. We may be lighter and slower but we can overcome that in a short period of time. I think before we make any further commitments about our ignorance we ought to look at the basic problem of merchandising. This is not a merchandising session so we won't carry it any further. Let's not blame the retailer any more than we blame the wholesaler who sits behind his desk, and produces the same old plant material. Let him come up with new material and a well planned promotion scheme, as for example, the All-America Rose. This is probably one of the best examples. Let him come out with his promotion and create a desire in the minds of the public. Then the retailer and smaller growers will follow along and everybody will enjoy a healthy business climate.

The other comment I would like to make is simply to stir up interest for a future program. In line with what we have heard this morning, I think we can find a great deal of interest in this group on a discussion of so-called reversed hardiness. I think there can be a further development of a study along the line of trading some of the more desirable Northern plants to the South. I am genuinely serious in hoping sometime in the near future of hearing a discussion on what Northern plants not grown in the South might have possibilities in the warmer climate.

MR. QUINN (Ashland, Ohio): Mr. Hillenmeyer, in regard to after-hardiness of plants that you bring in from the deep South, have you had any records in regard to the different seasons or months of the year that you received the plants?

MR. HILLENMEYER. No, I haven't any results for the different seasons. We have lost them when we brought them in the fall, and we have lost them in the spring. If we receive them not too late in the fall, at a time when perhaps they are still a little tender, we might get a cold snap and that, I think, does the damage. In the spring, if we get them too late, they usually have begun to green up and a late cold snap does the damage. After they have been planted out a year, we notice no difference in their hardiness from the ones grown in our locality. If they get through the first summer all right, they generally do quite well.

MR. QUINN. The reason I brought this question up, was that I have observed a nursery in North Central Ohio, that has been regularly bringing salable plants up from the deep South. I wondered why they would bring three to four or four to five foot plants and put out into their field in the Spring. I expected all the plants to be dead, but believe it or not, all those plants came through the first winter without

any damage whatsoever. I finally found the secret of their moving these particular plants. They brought them in January, at a time of the year when the plants should be completely dormant. They brought them into cellars or cold barns and kept the plant completely dormant until clear up into April. They were then brought out into their sales beds or put directly in the nursery.

MR. LESLIE HANCOCK: Mr. Wells, I would like to know what temperature the Johnson variety of *Ilex opaca* went through in 1934.

MR. WELLS. I do not know. Mr. Gable lives in Stewartstown, Pennsylvania, which is in the southern part of the state near the Maryland line. It is relatively high up, about 900 feet up in a very exposed place.

MR. VERMEULEN: I believe that this plant has withstood temperatures below zero, without injury.

MR. ART VUYK: I would like to add a little to what John Vermeulen was saying about the temperatures in Pennsylvania. Fifteen to twenty below zero is quite common in Indiana, Pennsylvania. If these temperatures occur in January I am not worried about them, but I am worried about a temperature of ten above in March. Under these conditions we get damage to several of these more tender plants.

Now I have a question to ask Mr. Wells. I would like to go a little further than even two years' wood at the base of holly cuttings. I am convinced that you can even use five or six year old wood just as easy as the two year. However, I am a commercial grower and I would like to know where I can obtain 15,000 cuttings at a reasonable price?

MR. WELLS: Well, this does bring up a point which I think every propagator faces and that is the need of having a good stock block. I wonder how many of you that have stock blocks give them as much care as your salable plants. They should have better care.

CHAIRMAN GALLE: That is all the time we have for questions. I want to thank the members of the panel and thank you for your interest. (Applause)

PRESIDENT VANDERBROOK: We are traveling along pretty much on time, and as scheduled, our next subject will be on the mulch bed method of producing seedlings. It is now my pleasure to introduce Mr. William C. Sherman, who will discuss this subject for us.

MR. WILLIAM CARL SHERMAN (Forrest Keeling Nursery, Elsberry, Missouri): Thank you, Mr. President. I am very happy to be here this morning and present this topic to you. I am two and a half years young in this business, and I am sure that I do not have all the answers for you.

Mr. William Sherman read his paper, entitled "The Mulch Bed Method of Seedling Production" (Applause)