

WINTER PROTECTION FOR LATE PROPAGATED PLANT MATERIAL

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The use of mist for the production of nursery stock both outside and in the greenhouse during the summer period has made the propagation of many plants much easier than in past years.

Generally speaking material propagated in this way is much tougher than the same plant produced in a heavily shaded greenhouse or under double glass with heavy shading. However, in many cases the plants are not sufficiently mature or tough enough to withstand the severe changes of winter weather. This is especially true in Wayne, New Jersey which according to the chart is part of Zone #6 but really belongs to Zone #5.

We propagate a wide variety of material during the summer in open mist beds and some *Rhododendron* hybrids in the greenhouse. The first year that we tried the open mist on a commercial scale the question came up, what do we do with these plants for the winter? Many varieties had been tested experimentally for a few years but there were several untested groups. From past experience we knew that the only safe thing for this material was frame protection.

Two heated frames were built and all material known to need protection plus the doubtful groups were put in these heated frames. Temperature controls were set at 34 degrees. Sash are lined with plastic which saves a lot of oil and the frames are ventilated daily when the outside temperature rises to just above freezing. The plants are kept perfectly dormant this way and begin to grow naturally in the spring. Some shading on the glass is beneficial in March as the light intensity increases.

This method is the surest and safest to have live plants in the spring. It is not the cheapest by any means since it does require moving your cuttings and heating frames, although the amount of oil used to keep the frames frost free is small, the initial building cost of course is the large item of expense.

In these frames we store *Azaleas*, *Pines*, *Magnolias*, *Maples*, *Ilex*, *Gingko*, *Rhododendrons* and *Cherry* varieties. All evergreens and many deciduous items such as *Pyracantha*, *Berberis*, *Crimson Pygmy*, *Cotoneasters*, *Forsythia* and other flowering shrubs can be left in the mist bed using a light salt hay covering for winter protection.

Areas which are somewhat milder than North Jersey can overwinter *Azaleas*, *Ilex* and *Maples* in a deep cinder block frame with equally good success as a heated frame.

Some nurseries in South Jersey and Delaware have successfully carried over the more tender material by putting plastic over the cuttings for the winter. This involves a certain amount of risk, and in a severe winter losses can be heavy.

The best policy for the individual grower is to experiment and decide what is best for his area.

In conclusion, the safest way to overwinter late propagated cut-

tings is a heated storage frame or greenhouse. If you are in a reasonably mild area a deep cinder block or concrete frame will suffice. For those who like to gamble and want something inexpensive, metal bows of flat iron or pipe covered with plastic will serve the purpose. You, the individual propagator must decide what is best for your business.

MODERATOR GALLE: Hans, you might like to come back up. I would like to call all the other speakers back up. We do have some time and I would like to have discussion.

One thing that wasn't mentioned and for some of us in the southern regions it is important — what do you do about protecting the plant propagator himself in this winter weather? This is a fact we overlook.

Again, if you have any questions, when you stand up please give your name and then the question for the panel.

MR. JIM WELLS: I would like to ask Mr. Rose to enlarge a little on the lightweight medium he has used. Has he tried any other formulations? Is this the result of a normal test and how does the growth in this medium compare with more conventional mediums?

MR. ROSE: Yes, we have worked with this some eight years now, I believe. We have tried such mixtures as peat and perlite, soil and perlite, and a small group with soil and peat. In each case we found where perlite is used we have problems that are not common in any business but the mail order trade. That is once a package of ours gets into the hands of kindly Uncle Sam, he can do more with that package before it gets to the customer than you would believe possible. If you use perlite, by the time the customer gets the package, it has been shaken so much that practically all the perlite is in the bottom. Therefore, we have to use something that binds and stays in place. Sphagnum moss gives us a better result in that respect.

As far as we could see, mixtures of peat and perlite, peat and sphagnum, and all various combinations did not give us any better growth than straight sphagnum.

Now we find this, if we start off with young potted cuttings, that these cuttings grow very slowly in the ground sphagnum. Therefore, we start off with transplants rather than extremely young material. That action, as some of you may be able to inform me, is possible because there is so much aeration in the sphagnum.

As far as fertilizing is concerned, we found by adding ordinary fertilizer to sphagnum moss we got no better growth than with Borden 38. Your urea might be good for long-range nitrogen effects. We use Borden's 38 because we think it is milder than urea might be and if we would put it in a small amount of peat and incorporate the peat into the sphagnum, it retained the fertilizing value very well. Have I answered your question, Jim?

MR. WELLS: Yes. Could I just extend this and ask you what soluble feeding program you use, how frequently you maintain it after you have got the plant established in the moss?

MR. ROSE: We do not have a program of weekly or timed period of feeding, but we analyze the media about every week or ten days and when the fertilizer is low, then we fertilize. We have been using instant Vigero, which gives us very fine results, and we have it in our store anyway for retail sales. We found as we analyzed the medium going on throughout the late summer and fall that the times that we needed to fertilize were less and less.

MR. CASE HOOGENDOORN: You say you take a lot of this material early in the fall and put it in storage. What temperature do you run on your controlled storage?

MR. ROSE: Just about freezing, Case. It is hard to get the big storage cellars down to anywhere near freezing, as you would know, when the weather is warm outside. We try to get it down in the forties and then down to the thirties. That is the best we can do.

MR. HOOGENDOORN: I would also like to ask Hans a question about overwintering in frames. What is your temperature in the frames during the daytime?

MR. HANS HESS: The temperature goes up. We open the sash up.

MR. HOOGENDOORN: In freezing weather?

MR. HANS HESS: Yes. Once the sun comes up we open the sash on the lee side of the wind, so we don't get a blast of cold air, but the frames are adjacent to the greenhouses so they are protected from too much wind.

MR. HOOGENDOORN: Still you are going way above 34 where you have a thermostat set.

MR. HANS HESS: That is right.

MR. HOOGENDOORN: What is the result? When we have tried over wintering, in the spring the plants start to die from the top down. In other words, they haven't had sufficient cold to break dormancy.

MR. HANS HESS: Well, that has not been our experience so far. Everything we have carried there, that includes some grafting material like dogwood and beeches, which you speak of, and Japanese maples from cuttings, have come through very well. Maybe we ventilate a little more than you do, I don't know.

MR. HOOGENDOORN: Do you overwinter any climbing hydrangeas in the frame?

MR. HANS HESS: Yes.

MR. HOOGENDOORN: We cut them in the fall and put them in the frame. We lost some of those, and the ones we didn't lose, showed hardly any new growth. Why?

MR. HANS HESS: We make some hydrangea cuttings also. We make them directly in a pot, and don't pot them after they are rooted. We transfer them into the frame for the winter, and so far at least they have come into growth in the spring. We have had some losses the same as you have, but those that have come through have grown nicely.

MR. HOOGENDOORN: You have had some growth, so have we, but it didn't amount to anything. We have tried something dif-

lerent and it has worked out beautifully, that is why I was asking you about cold storage. Our storage runs anywhere from 34 to 38° F., a small controlled storage. Anyhow, we have a dark and constant temperature vault which seems to be sufficient to break dormancy. We put the cuttings up in poly bags, put them in the cold storage for about three months. In March we take them out and pot them. Then we bring them outside in the frame, and we have shoots anywhere from 8 to 15 inches. Then we have them growing.

MR. ROLAND DEWILDE: Maybe I could make a suggestion. We have always been poor as far as capital investment is concerned. One thing we did, and some of you have seen it, was to build greenhouses which are comparatively low. I suppose the optimum height runs around five feet from the soil level to the ridge. We have no heat whatsoever in those. I have taken rhododendron grafts and taken them right out of the grafting bench, which we run at 70 degrees, cut the stocks off at the proper time, planted them in a soil mixture right in the greenhouse and kept the greenhouse frost free. The way we do that, is to have the glass on, put reed mats over the glass and throw salt hay over the mats, so no light and no frost can get in. Along about the first of March, whenever the temperature seems to settle down to something reasonable, we start taking some of that off. We don't worry about giving them light until it is pretty safe to take all the cover off except the glass. We find we get very nice growth on a number of things that way, because we have done it with dogwood cuttings, with azaleas, and with evergreens. We take them right out of the heat and put them in there and very seldom have any trouble. The only one problem was apple cuttings, and I kind of think it is a special problem. They keep all right until spring and about the time they start blooming and growing, they kind of wilt away. I don't think that had anything to do with the storage.

That is a comparatively cheap way of storing with little work involved. We water the plants when we put them in and we don't touch them until they are sold.

MR. HOOGENDOORN: Yes, but that is in South Jersey. You can't do that in New England.

MR. DEWILDE: If you put the salt hay on, you can do it. It is like insulating with expensive building material.

MR. PETER VERMEULEN: Some years ago, I don't quite remember how long ago, John spoke on the styrafoam. Has anyone had any experience with overwintering with styrafoam?

MR. JACK HILL: Maybe I can answer that question. We have had an experimental lot of perhaps 200 or 300 plants that we have wintered now two years in belted styrafoam material. Actually, it is made right near Dundee. We have not observed any difference in overwintering in those beautifully insulated containers from the 10 gallon can. The plants grow just as well — no better, no worse.

MR. PETER VERMEULEN: I have one more question. We haven't touched yet on hardening where chemicals are concerned. Does anyone have any experience on that?

MR. JIM WELLS: I can make a comment but I don't know whether it is pertinent. We have a couple of plants in the back of the room, rhododendrons which were treated with CCC. This is a growth regulator. It is a dwarfing compound. It is intended to induce budding. I think it does on a strong growing variety of rhododendron like *roseum superbum* which naturally make a third set of growth late in the summer for us. A treatment of CCC in May reduced the size of the plant to some extent, induced budding and prevented this late growth. This is only one treatment and we don't know what the plant is going to do throughout the winter, whether the buds are any good. There are a lot of things to be determined, but it did prevent late growth on this variety.

MR. HILL: (In reference to Ralph Shugert's paper on root pruning). The argument of root pruning versus transplanting or perhaps not even transplanting is perennial in our camp, and we are clearly divided into two groups, those who are for and those who are against and they are both very strong in their convictions. I think you have upright junipers, the *virginiana*, which are truly difficult to transplant especially in early fall just when that plant is at the very peak in appearance and marketability. We have to a large extent solved that problem by using the *Glauca hetz* as understock rather than the classic *virginiana* or *Chinensis*. We get a root system which is superior to any root system we get with *virginiana*, and they have a higher per cent of livability.

MODERATOR GALLE: I believe this completes our time. I would like to thank all the members of the panel for their participation.

We now have a follow-up on something of what we had in discussion this morning — Systems and Mechanization in a Container Nursery — and Mr. George Oki, of Oki Nursery, Inc., Sacramento, California will present it.

SYSTEMS AND MECHANIZATION IN A CONTAINER NURSERY

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The most urgent need of the California nursery industry, within its present market, is for lowered cost of production. This is the opening sentence of Dr. Kenneth F. Baker's Manual 23 or "The U.C. System for Producing Healthy Container Grown Plants." This Manual 23 was edited in September, 1957.

With annual increases in general operational costs, labor, materials, and all taxations on local, state and national levels, this urgent need is becoming more significant for business survival.

Systems and mechanization is an integral part of the U.C. System along with the general practices as outlined in Manual 23. Some of the important factors in integrating systems and mechanization are: