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QUESTION BOX

The question box session was convened at 8:00 pm with Mr. Ralph Shugert and Mr. Ben Minamoto serving as moderators.

MODERATOR SHUGERT: Has anyone propagated *Viburnum nudum* from seed? If so, what seed treatments were used?

DON SHADOW: The seed, unless picked a little green, will take 2 years to germinate. If picked green and planted in the fall it will often germinate the following spring.

MODERATOR SHUGERT: What is the most successful method of growing *Taxus cuspidata* (Syn.: *T. cuspidata* 'Capitata') from seed and how important is the seed source?

ED MEZITT: I collect and clean my own seed, plant them out the same fall, and cover the beds with hay. The seed germinates the second year. We have been using lead arsenate for rodent control.

CASE HOOGENDOORN: Put the seed in sand for one year and then sow it. The seed will germinate the next year. If it is dead it will never come up.

RALPH SHUGERT: Mr. Hoogendoorn hit a very salient point in this matter. It is very important to take a cutting test on any seed. For *Taxus*, *Seeds of Woody Plants in the U.S.* states: 90-100 days of warm, 100-120 days of cold; sow it in the spring and maybe the seeds will germinate the next year.

MODERATOR SHUGERT: If you propagate *Stewartia pseudo-camellia* 'Korean Splendor' from seed what do the seedlings look like, the species or the cultivar?

CASE HOOGENDOORN: It will not come true from seed.

MODERATOR SHUGERT: How does the germination rate of fall-seeded Canadian hemlock compare to the germination rate of cold stratified seed planted in the spring? Do 1-0 hemlock seedlings require shade? If so, how much and for how long?

BRUCE BRIGGS: I can only comment on the western hemlock. The forestry industry grows a tremendous amount for reforestation. They shade the 1-0 seedlings because of the large growth they get. We grow ours in plastic houses in tubes with heat and obtain twice the plant in the same length of time.

FRANK GOUIN: We have just started to work with hemlock in our sludge project and we find that fall-sown seed have fewer weed problems. Germination is the same for both methods, however, we lose many seedlings during weeding of spring-sown beds.

RALPH SHUGERT: I might add that my experience has been, that if the seed viability is there, there is no difference in stands between fall and spring sown. Most nurseries in the Midwest do not shade 1-0 seedlings.

MODERATOR BEN MINAMOTO: What species of *Juniperus* are graft compatible with *Platycladus orientalis* (Syn.: *Thuja orientalis*)?

RICHARD CROSS: In the latest IPPS Proceedings (1977), Philip Hall addressed that subject.

MODERATOR BEN MINAMOTO: What is the best rootstock for cultivars of Japanese black pine?

ED MEZITT: Japanese black pine seedlings.

MODERATOR BEN MINAMOTO: Can *Chamaecyparis nootkatensis* 'Pendula' be grafted on *Thuja occidentalis*?

VOICE: In Europe and Canada *Platycladus orientalis* is used.

MODERATOR BEN MINAMOTO: Can *Fagus sylvatica* cultivars be successfully grafted on *F. grandifolia* rootstock? If so, what are the procedures?

CASE HOOGENDOORN: No. You must use *F. sylvatica* seedlings.

LEONARD SAVELLA: You can graft *F. sylvatica* 'Pendula' on *F. grandifolia* with good results. It is the only one we have grafted successfully.

MODERATOR BEN MINAMOTO: Do genetic dwarf crabapples need grafting? If so, what would be the understock?

BILL FLEMER: Probably *Malus sargentii* would be the best to keep them dwarf.

BRUCE BRIGGS: I would recommend that the individual both root cuttings and graft the crabapples to determine what happens.

MODERATOR SHUGERT: Mr. Maronek would you explain how to find the mycorrhizal fungi, how to incorporate the fungi into the soil and how a small nursery would increase it.

DALE MARONEK: The ectomycorrhizal fungi produce aerial fruiting structures, such as "puffballs". If you find these structures in a forest situation they may be mycorrhizal fungi. With endomycorrhizal fungi types it is a little different. You will have difficulty finding and collecting them. We use a series of techniques including staining to see if the spores are present in the plant tissues in combination with sieving and centrifugation to isolate the spores. We have tried broadcasting on the soil surface and mixing it into the upper 4 to 6 inches and that has worked well. In our container mixes, we treat it like any other component in the mix. With our ectomycorrhizal fungi, we are mixing in vegetative inoculum that we grow in our lab.

MODERATOR SHUGERT: Where does one obtain inoculum for mycorrhizal infection? Is it available commercially or does one collect it from the wilds? How does one prepare inoculum?

DALE MARONEK: When we do it ourselves, we collect fruiting bodies and grow the material as you would callus on agar in tissue culture. After establishing a colony of the fungal material, we then transfer some to a peat-perlite medium containing the necessary growth factors for inoculum production. The fungus actually grows into the vermiculite and we simply use this material as you would fertilizer. Mycorrhizal material is available from Abbott Laboratories, Chicago, Illinois.

MODERATOR SHUGERT: Do broadleaf plants, such as rhododendrons, have mycorrhizal fungi on their roots? Does high pH or calcium have any effect?

DALE MARONEK: There is a select group of mycorrhizal fungi that work with the Ericaceae. I have not worked with this group but Dr. Linderman at Oregon State University has and could better answer that question. Depending on the fungal isolate, pH does affect the fungal isolates ability to function. There is a great deal of variation.

CARMINE RAGONESE: If you incorporate generous amounts of organic material, especially with rhododendrons, the fungi are present.

MODERATOR BEN MINAMOTO: I've rooted softwood cuttings of *Ulmus villosa* under mist. The new growth was horizontal and no amount of staking would induce apical dominance. Late the following winter, the growth was cut back to just above the soil line and the new spring growth showed apical dominance. Unfortunately, I have lost one year's growth. How can I get apical dominance to assert itself?

VOICE: There is a report that gibberellic acid will correct that problem.

MODERATOR BEN MINAMOTO: In the interest of energy conservation, what is the coolest house temperatures that one can successfully root *Thuja*, *Picea* and *Juniperus* species if you use bottom heat?

LARRY CARVILLE: We have found with all three of them that you can maintain a top temperature as low as 30°F and get good root formation with bottom heat.

DICK CROSS: We have had success rooting those species. In our area it is quite cold in December and January when we are doing it and, to conserve heat, we start them out at a top temperature of 50 to 55°F. When spring comes we gradually increase the night temperature to 60°F and finish them off at 65°F. The bench temperature runs a little higher than the air temperature because the heat pipes are under the benches.

RALPH SHUGERT: When I propagated in Nebraska in a structure similar to a pit house, the top heat was set to come on at 34°F. The bottom heat in the ground beds was electric cable and carried at 70°F. Under those conditions, I felt that the top heat was not important. You would have a well rooted cutting by June that could be potted and carried till the following spring and lined out.

DAVE BAKKER: I want to caution you a little bit. First, it is a known fact that when the rooting medium temperature gets below 55°F, hormone activity decreases greatly. One should, therefore, be between 60-70°F with the bottom heat. Secondly, if the temperature differences between the top and bottom is too great you force water by vapor pressure into the cuttings because of the high humidity. This may cause a lot of basal decay on your cuttings. You can be too cheap with the use of bottom heat.

CARMINE RAGONESE: Regarding the manipulation of bottom heat, with rhododendrons a bottom heat of 70°F in combination with a dull overcast day will cause defoliation of the cuttings. You must lower the bottom heat. If there is full sun leave the temperature at 70°F.

MODERATOR BEN MINAMOTO: Poly tents do not keep

the tops cool when rooting cuttings. Therefore, is the old saying "warm bottoms and cool heads" out of date?

CASE HOOGENDOORN: The reason for following that procedure was to stop the cutting from initiating top growth. If you keep the house cool you will root the cuttings and not force growth.

BRUCE BRIGGS: In summer propagation, we are reversing the temperatures. We close the house up and cause high air and cooler soil temperatures.

FRANK GOUIN: We should go back and look at Dr. Milbocker's paper in last years' IPPS Proceedings (1977). He has also reversed the temperatures with accelerated rooting.

MODERATOR BEN MINAMOTO: What kind of woody plants are being worked on in tissue culture?

LEN STOLTZ: I am currently working with *Ficus elastica* 'Decora' and 'M-26' apple understock. There is other work being done on elm and poplar.

MARK ZILIS: I have worked on *Prunus*, *Hamamelis*, and *Viburnum* species.

VOICE: Flow Laboratories is providing an abstracting service in the tissue culture area.

BRUCE BRIGGS: Rhododendrons are on the way. There is, however, a problem with rooting the plants in tissue culture. You can take the plants out of tissue culture and root them. We have just finished spending a year researching how to grow the little plants after you get them out of culture.

MODERATOR SHUGERT: Has anyone had success in rooting *Chionanthus virginicus* and *C. retusus* cuttings?

DON SHADOW: I have successfully rooted *C. retusus* from softwood cuttings stuck just as they began to harden. The cuttings are also wounded and treated with Hormodin #2. There appears to be a juvenility factor in the rooting ability. The first cuttings I obtained from old trees rooted very poorly. Cuttings from the rooted cuttings in subsequent years rooted without any problem. We grow *C. virginicus* from seed.

MODERATOR SHUGERT: How much Benlate or Captan should we be using in rooting powders?

CARMINE RAGONESE: You should use 1/16 of the total bulk as the desired fungicide.

BRIAN HUMPHREY: At Hillier's we were unable to duplicate the good results reported for Captan addition to rooting powders. In general we feel, in the case of Captan, if one is applying artificial bottom heat, Captan is of no advantage, or is detrimental. Captan, it is thought, is of advantage only when

you are trying to root plants cold without bottom heat. Commercial Benlate is 10% active ingredient. When mixing it with auxin you take double strength auxin and combine it with an equal part of Benlate and you end up with the recommended 5% Benlate.

DAVE BARKER: Captan in our rooting powders caused stunting of certain plants. We have found that you should stick your cuttings with the normal auxin treatment and then drench them in with the wettable Captan powder. Use a real heavy drench so you don't have to water the greenhouse for a week. Although Captan in the rooting powders appears to be inhibitory with most plants, *Prunus triloba* 'Multiplex' benefits from Captan incorporation into the rooting powder.

CARMINE RAGONESE: Don't worry about incorporating a fungicide into your rooting powder. I dip my rhododendron cuttings in one tablespoon of Terraclor/2 gal of water with good results.

VOICE: I am using Fermate in a 10:1 ratio and obtain excellent results with herbaceous and softwood cuttings in the summer.

RALPH SHUGERT: Research work on the use of fungicides as rooting aids is currently being conducted at Ohio State. I think they are going to recommend the auxin treatment, stick it and apply the fungicide over the top. They are not going to recommend blending with auxin.

FRANK GOUIN: Poinsettia growers are currently applying Benlate to the stock plants 10 days before taking cuttings. This allows the Benlate to get into the cuttings and start to work.

MODERATOR BEN MINAMOTO: Mr. Mezitt, would you give the address for the 3 inch wide by 5 inch deep pots you mentioned.

ED MEZITT: I will be glad to send the address to anyone who wants it.

DICK CROSS: There is a manufacturer of clay pots in Jackson, MS, Cerma Inc., who still makes similar clay pots.

VOICE: Syracuse Clay Pottery Inc. in Syracuse, N.Y. makes clay rose pots.

MODERATOR BEN MINAMOTO: Does anyone know the reason for sparse and crooked growth of pine and spruce in cans? The plants are in 1, 2 and 5 gallon cans.

ED MEZITT: Unless you have a good container program and know your mixes nothing is going to grow as well in containers as in the field. Grow the pines in the field and plunge them into pots in August and reestablish root growth.

MODERATOR BEN MINAMOTO: Mr. Van Hof, is any mist used when propagating your *Taxus* with little or no heat? What is the temperature of the frames in winter?

EVERETT VAN HOF: No mist is used. The cuttings are just watered in. I am not sure what the temperature is, however, it does freeze in the frames.

MODERATOR BEN MINAMOTO: Can anyone tell me the correct method for propagating 'P.J.M.' rhododendron?

KATHY FREELAND: We have found that you can take cuttings from August to December. The cuttings should be 6 inches long, with all flower buds removed, wounded and given a hormone treatment. Our medium is a peat-perlite mix and bottom heat (75°F) is used. The minimum air temperature is 55°F and mist is used on bright sunny days.

MODERATOR BEN MINAMOTO: I would like to know the spacing for cuttings in the accelerated growth method of Knox Henry.

VOICE: It depends on the size of the leaves. For example, *Forsythia* is spaced 3 inches and *Ribes* is spaced 1 inch.

MODERATOR BEN MINAMOTO: Does anyone know of an electronic tree grader for use in a commercial nursery?

BRIAN HUMPHREY: Hillier's Nursery has developed what we call the Hillier Electronic Tree Grader which both counts and sizes trees.

MODERATOR BEN MINAMOTO: What does anyone know about chlorinating pond water for watering plants?

VOICE: *Ornamentals NorthWest* just presented a complete article on that subject.

BRIAN HUMPHREY: You must have reasonably clean water to chlorinate. If it is cloudy with clay deposits the whole idea of chlorination is questionable. The clay absorbs the chlorine and any change in clay content could cause you to be over or under your chlorine content. A filter is necessary for cloudy water.

MODERATOR BEN MINAMOTO: Has anyone used a chemical to remove snow from plastic houses and is it toxic to plants?

FRANK GOUIN: You might try urea. It will melt snow down to 23°F. Calcium chloride is safer than sodium chloride because it does not dissociate as rapidly and will cause less plant damage. I do not know what any of them will do to plastic.

MODERATOR BEN MINAMOTO: Can anyone comment on hot sauce as a repellent?

FRANK GOUIN: We have had some good and bad results. Some growers swear by it, however, we found in one test plot that if the deer are hungry enough they will eat the plants with hot sauce. Some deer also like the sauce better than others. With rabbits we have had a higher degree of success with the oil extract, 4 oz/100 gallons of water, in 7 different test areas. However, it does not work with woodchucks.

VOICE: At our nursery I use Thiram, at the rate of 1 lb Thiram in 4 gallons of water and 1 gallon of latex paint. The deer hate the smell of Thiram. The mixture is my own recipe.

MODERATOR SHUGERT: Where does one obtain Clormone?

DAN STUDEBAKER: We get it from the Clormone Co., Upper Montclar, N.J.

VOICE: I purchase it from Good-Prod., Co., Livingston, N.J.

MODERATOR SHUGERT: Can NAA be used as effectively as IBA for a rooting hormone?

DAVE BAKKER: We have run a large number of tests with IBA and NAA and found for all *Taxus* cuttings that NAA (0.2%) is superior.

MODERATOR SHUGERT: Is IBA necessary for root production in certain plants?

VOICE: At Purdue University root regeneration research with black walnut has shown that IBA is better than NAA. So, IBA may be better with certain species.

BRUCE BRIGGS: On filberts, NAA will not work at all but IBA is very effective.

MODERATOR SHUGERT: That completes all the questions in the Question Box. I thank every one of you for your cooperation and kind attention.

Tuesday Evening, November 29, 1978

The twenty-eighth annual banquet was held in the Concert Hall of the Royal York Hotel, Toronto, Canada.

On behalf of the Society, awards were presented to Mr. Barry A. Eisenberg for the best graduate student award paper and to Dr. Thomas A. Fretz who was the advisor for the work presented in the paper by Mr. Eisenberg.

Two papers received awards for the best undergraduate paper. The awards were presented to Mr. John Frett and Dr.