QUESTION BOX

The question box session was convened at 4:00 p.m. with Ralph Shugert and Bruce Briggs serving as moderators.

MODERATOR SHUGERT: Does anyone have any comments to make about gel seeding? Does anyone have an address for a gel source?

GLEN LUMIS: We are doing a little work with black spruce. If anyone would like to write me I can put them on to some sources that can help them. My address is Department of Horticultural Sciences, University of Guelph, Guelph, Ontario, Canada.

MODERATOR SHUGERT: During the tour of Weston Nurseries we saw the rooting of *Pinus mugo* cuttings. Please explain your procedure and do you take spring cuttings?

KATHLEEN FREELAND: We have not tried spring rooting of cuttings. We take them in the winter with good success. We are going to try candles next spring. The cuttings are 3-4 inches long and from current seasons growth. We are using 1% hormone. We have also experimented with Jim Wells Synnergol from England. We will know better next year how it worked.

MODERATOR SHUGERT: Question for Ed Mezitt. Would you explain your method for forcing *Malus* into leaf and flower for shows?

ED MEZITT: The secret is that they should have a good root system. It will take about 4-5 weeks at a cool temperature of 50-55°F The plants need syringing 4 times per day to prevent drying of the wood.

MODERATOR SHUGERT: How do you help *Acer griseum* trees to produce viable seeds?

GUS MEHLQUIST: I have had no experience with that species but know that the seeds do not germinate because they lack embryos. That often happens with isolated clones of various species and I presume that results because they require cross pollination with different clones.

BILL FLEMER: The plant appears to be highly self-sterile. If you are going to get seed set you are probably going to have to plant a large group of different clones in close proximity to each other for cross pollination.

GARY KOLLER: There was a very good study done in Europe on flowering and sexual expression in maples. The study showed that in *Acer griseum* there is a flowering sequence problem in an individual plant. First you have the male flowers opening and then the female flowers open. In a cluster of different clones you would hopefully have different clones with different flowering sequences pollinating each other.

MODERATOR BRIGGS: Do nutrients help root initation when applied during rooting?

JOHN McGUIRE: No. I personally feel that the nutrient status of the stock plant at the time the cutting is taken is more important.

DICK ZIMMERMAN: In tissue culture we cut the nutrient concentration in half for rooting.

PAUL READ: With many of our tissue culture propagated plants we get our best results when we cut the nutrients out completely and root in sphagnum peat. We move them along as fast as possible with bottom heat and high humidity. I think the physical conditions of the medium are more important for rooting than nutrients with many plants, and aeration probably is one of the big things.

BRUCE BRIGGS: I would like to throw something out for your consideration. In the west they are using Osmocote in their propagating medium and getting better results. Also we made a mistake in tissue culture and doubled our phosphate concentration and we increased our rooting tremendously.

MODERATOR SHUGERT: Has anyone propagated birch from cuttings?

DAN MILBOCKER: We have rooted birch under high humidity conditions when the plants are young. After they start to produce catkins they become more difficult. They can be rooted in June and also in the fall just before leaf drop, especially with river birch.

JOE CESARINE: Birch roots very easily from cuttings. I will send the editor the technique we have developed. (Ed. Note. The information from Joe Cesarine can be found at the end of the Question Box session.)

JOERG LEISS: European birch roots quite readly from cuttings taken in late May and June, and treated with No. 3 Hormodin under mist.

MODERATOR SHUGERT: To anyone producing *Acer tegmentosum*. Should all propagation, liner and field production be carried out in sun or shade. The plant appears to be very limited in growth when in full sun.

TIMOTHY BROTZMAN: We propagate the plant under shade cloth.

MODERATOR SHUGERT: Has anyone propagated oaks from cuttings?

DALE MARONEK: Dr David Morgan at Texas A&M has been working on southern oaks.

MODERATOR SHUGERT: Is anyone rooting *Kalopanax pictus* from cuttings?

BILL FLEMER: We have grown it from root cuttings but have never been successful with stem cuttings. Dig up large sections of roots in the spring as soon as the frost is out of the ground. Cut the roots into 3-4 inch pieces and stick vertically in the medium with the distil portion down in a cool greenhouse.

MODERATOR SHUGERT: Question for Frank Guoin. When should you remove the plants from under your propagation tent in order for them to harden off for winter storage when propagating in the summer time? What fungicide do you use?

FRANK GUOIN: For the summer propagated plants we took the cuttings in early July. The longest we had cuttings under the tent was with viburnum and they came out in late August. These were overwintered without difficulty when covered with microfoam around Thanksgiving time. With the winter propagated cuttings we uncover everything on March 15 and leave it sit until it starts to grow. We use Captan (2 lbs) with Vaporgard as a sticker. Problems can develop if the thermoblanket is left on to long in the fall or spring so we try to get it off as fast as possible.

MODERATOR BRIGGS. What is the best way to cutting-propagate *Magnolia heptapeta* (syn.: *M. denudata*) and *M. salicifolia*?

PETER VERMEULEN: We have rooted *M heptapeta* (Syn.: *M. denudata*) in our area about the last week of June or the beginning of July just as the first flush of growth is ending. Terminal cuttings are used with all leaves removed except the top 2-3 leaves. The leaves are generally cut because they are so large. The auxin used varies. We have used Hormodin No. 3 or a mixture of 4% IBA and 4× CutStart at equal parts and 1/16 by volume of a fungicide such as Captan. The medium can be either sand or sand and peat. Bottom heat is 65-70°F.

MODERATOR BRIGGS: Has anyone rooted *Magnolia kobus*?

JOERG LEISS: Take them about the first week of July, give them a heavy wound, 2% hormone powder and stick them in the greenhouse. Rooting will occur in about 4 weeks.

MODERATOR BRIGGS: Has anyone been able to root *Cedrus deodara* 'Kashmir' and *C. atlantica* 'Glauca'?

JACK ALEXANDER: We have been experimenting with the rooting of *C. deodara* 'Shalamar' and our best results have been obtained with a quick dip of 10,000 ppm IBA. Cuttings were taken in December-January and placed in a sand-perlite medium at 70°F under a poly tent.

PAUL BROYLES: We take 6 inch cuttings of *C. atlantica* 'Glauca' about the 15th of December and use perlite as the rooting medium. Hormone is supplied as a 3-4% quick dip.

BRUCE BRIGGS: We had, out west, about 10 years ago a grower who used outside cold frames with heating cables and got *C. deodara* to root like weeds. Cold tops and hot bottoms worked very well.

MODERATOR BRIGGS: Is anyone growing *Daphne* in containers? If so, what is a successful soil mix.

BRUCE BRIGGS: I have talked to Jim Cross and he keeps them on the dry side and uses a medium that drains well. Some members of the group will take wetter feet and these should be tried.

RALPH SHUGERT: I would just like to comment on the rooting of *Daphne* cuttings that I saw on our tour of Weston Nurseries. The cuttings were stuck on November 11 and they had roots forming already. The key, to me, in his rooting of the *Daphne*, was that the mist nozzle was blocked off above the cuttings.

MODERATOR BRIGGS· has anyone worked with an acetone dip prior to IBA treatment?

DAVE BAKKER: We tried it with some hard-to-root junipers but it did not work.

VOICE: We have tried it on may cultivars of dwarf spruce and the only ones that rooted were the untreated cuttings.

MODERATOR BRIGGS: Has anyone rooted Douglas fir successfully?

JOERG LEISS: We have successfully rooted *A. koreana* but we got prostrate forms.

FRANK GUOIN: We did some Douglas fir two summers ago and found wide clonal differences from 100 to 0% rooting.

BRUCE BRIGGS: In the west they have selected out some clones that will root. There is a dead spot in our area in October-November. Our best time is after the cold weather about the first of March.

MODERATOR SHUGERT: What is the best production techniques for the successful propagation of *Juniperus procumbens* 'Nana' (Syn.: *J. chinensis* var. *procumbens* 'Nana')?

JOHN SPARMANN: It is not a problem with us. We have made summer and winter cuttings, stuck them in a sand, peat and perlite mix with Homodin No. 3 and obtain 100% rooting.

PETER VERMEULEN: I will second what John said. One concern though is overwatering because they will rot easily. We have also stuck cuttings in late August and September with heating cables. I have observed frost on the top of the cuttings with no detrimental effects. They seem to like cold tops and a warm rooting zone.

JOERG LEISS: We had a problem until we went to very small cuttings treated with Hormodin No. 3.

MODERATOR SHUGERT: What is the best procedure for propagating *Juniperus chinensis* 'Keteleeri'?

CARL ORNDORFF: We have no problem. Cuttings are taken in late November or December and placed in a greenhouse with bottom heat and very coarse perlite as the medium. No hormone is used.

JOERG LEISS: We gave up rooting that plant because it is not the same plant on its own roots as when grafted.

MODERATOR SHUGERT: Has anyone propagated *Corylus colurna* by cuttings, and if so, by what technique? What experiences can be shared about this plant?

WAYNE LOVELACE: It is a wonderful plant. We have only been able to propagate it from seed. We established a seed source block 20 years ago but have not obtained any seed yet.

JOERG LEISS: It is extremely drought tolerant and is used as a street tree in Europe. We are propagating it as seedlings.

MODERATOR SHUGERT: When junipers, taxus, etc. are grown under accelerated growth, how do you harden them off for winter? Do they harden off completely or do you have trouble?

GLEN LUMIS: You have to be particularly careful with *Taxus* because if they do not set buds they will not grow the next year. You have to get the lights off early.

MODERATOR SHUGERT: What would cause yellowing of *Chamaecyparis* seedlings grown under 53% shade, in a sand-peat medium, and well fertilized?

PETER VERMEULEN: Often 2nd year foliage under very heavy shade will show yellowing. A medium that is too wet could also be causing root rot as we have found.

MODERATOR SHUGERT: Does anyone have a mechanical planter for planting dormant perennials grown in peat pots? Also, does anyone have a mechanical way of breaking up peat pots before planting them in the field?

MICHAEL DODGE: No. We have sent samples to Holland Transplanters this fall and they are going to design us a holder for the peat pots. We hope they will incorporate a means of breaking up the pot.

JEORG LEISS: The use of Aqual Grow will aid in the more rapid breakdown of the peat pots.

MODERATOR SHUGERT: Does anyone know of a machine that will clean the tops off perennials after they are dug without damaging the crowns.

MICHAEL DODGE: We use a mower to cut the tops off

MODERATOR SHUGERT: How effective is soaking or submerging the entire leafy cuttings in an IBA/fungicide dip prior to sticking?

MICHAEL DODGE: I know of a nursery in Ohio that does it and we are trying it this year but have no results yet.

RALPH SHUGERT: I know it is common practice for many nurseries to fungicide-dip their cuttings

BILL FLEMER: I am disturbed about the idea of dipping cuttings in solutions of IBA or fungicides prior to sticking I think we are laying ourselves open to enormous trouble. As you know the EPA almost succeeded in banning IAA and IBA from use. They are suspect as being carcinogenic or cancer forming. The sloppy practice of dipping in hormone and fungicide solutions and then having employees handling the cuttings is extremely dangerous. It is dangerous because you lay yourself open for lawsuits from employees who get cancer or lung disease or some other disease. They might start to look at their employer as a good place to start suing for damages. You need only talk to Jim Wells who nearly died from working with fungicide-treated cuttings to find out what can happen. No one should dip cuttings in hormone or fungicide and then work with them. Cuttings dipped in hormone powder is the best way to go. With fungicides, stick the cuttings first then drench with proper precautions.

MODERATOR BRIGGS: Is there a commercial product for the inoculation of mycorrhizae for container-grown plants, such as pine?

DALE MARONEK: No. However, Abbott Laboratories, Chicago, IL, will supply some on a limited basis for a price which will get your started. You can then produce your own

MODERATOR BRIGGS: Question for Tom Pinney. Shouldn't the newly transplanted plants be watered in heavily after planting to increase root development? Why not install Rain Bird sprinklers behind the planter and save all that labor?

TOM PINNEY: I was afraid someone would ask that question. Watering is one of those things that I consider more an art than a science. Overwatering will probably kill more plants than underwatering. The roots must have air for proper development. We bring our soil to the proper water level for the individual species before we plant. That is a cardinal rule with us You can get a little sloppy after root regeneration, but before can lead to growth retardation.

MODERATOR BRIGGS: Question for Tom Pinney. What pH do you use in your growing mix for Black Hill spruce, *Abies concolor*, and for Colorado blue spruce?

TOM PINNEY: I would have to guess but I think we grow them all at about the same pH 4.5-5.0. I know you can grow the Colorado blue spruce higher.

MODERATOR BRIGGS: How do you get mugho pine to make more than 2 flushes in a growing season?

BRUCE BRIGGS: In the west there was some research that showed very high fertility could keep them growing. They were using slow release fertilizer at 15-18 lbs/yard.

MODERATOR SHUGERT: Would *Malus baccata* or *M. sylvestris* be the better understock for grafting crabapples?

BILL FLEMER: *Malus baccata,* because it is slower growing and does not sucker as much. *M. baccata,* however, has a less fibrous root system and is more difficult to transplant.

BOB SIMPSON: Seed source with *M. baccata* is very important. An isolated seed source is one thing but cross pollinated *M. baccata* will give extremely variable understock.

MODERATOR SHUGERT: Has anyone had any experience with using *Pyrus calleryana* as an understock for edible pears?

BILL FLEMER: We have tried it and noted that it dwarfed the scion and also reduced fruit production.

PROPAGATION OF BETULA

JOSEPH CESARINI AND BEN MINAMOTO

Phyto Ecology
P.O. Box 303
Ridgely, Maryland 21660

We used to propagate clones of *Betula pendula* by grafting them during the winter months on seedlings of the same species. We produced our own understock by collecting our own seed. We planted them in a greenhouse at 65°F in flats with a mixture of perlite and peatmoss. The seeding was done during September or October.

The seeds usually germinate very rapidly and with a little help from liquid fertilizer they grow very well all winter long. About May, when the danger of frost is over, we pick them off into 2¼" rose clay pots into our regular potting soil consisting of sand and peat moss with Osmocote, and place them outside in a growing area. By fall, they are the thickness of a pencil. Only a few weeks before grafting we bring them in the greenhouse. The greenhouse temperature is maintained at 65°F and we used a