

Still another method for propagating perennials is by tissue culture. I would like to briefly discuss why we use tissue culture in our operation.

Tissue culture helps in building up stock of new cultivars. We are presently working on *Hemerocallis* and *Hosta* 'Frances Williams'. If we had to propagate the conventional way, which is strictly by division, it would take many years to be able to offer newer cultivars to the trade. Usually not many plants are available in a new cultivar. *Hosta* must grow for 2 years before dividing the parent stock into planters, and then it yields only 3 to 5 divisions. With tissue culture it is possible to have thousands of plants within a year's time.

With tissue culture we are able to eliminate diseases and help in the prevention of diseases. Crown gall problems occur in both *Artemisia* 'Silver King' and *Gypsophila paniculata* 'Bristol Fairy'. Tissue cultured 'Bristol Fairy' does not have crown gall nor does crown gall move into the plant if planted in a field environment (at least not for the first year).

Tissue culture also helps rejuvenate certain plants. Regression takes place in asters over a 4 to 5 year period in which the stolons (next year's plants) slowly decrease in number from 15 to 20, to 1 to 4. First generation tissue culture plants develop as many as 25 to 50 stolons.

DON SHADOW: I notice that you are offering the white form of *Dicentra spectabilis*. How are you propagating this?

JOHN WALTERS: By top cuttings.

RALPH SHUGERT: Are you using any herbicide treatment after the methyl bromide application?

JOHN WALTERS: We are using no weed control chemicals other than the pretreatment with methyl bromide, + 2% chloropicrin. We have stayed away from herbicides because of the wide diversity of herbaceous plants we grow. We are waiting for more university research in this area.

QUESTION BOX

The Question Box session was convened at 3:00 p.m. with Ralph Shugert and Bruce Briggs serving as Moderators.

MODERATOR SHUGERT: Question for Bob Eastman. Please talk about storing bareroot plants ungraded over winter as opposed to graded prior to storage.

BOB EASTMAN: My philosophy has been to grade them shortly after digging because you do not have to rehandle

them. It cuts down labor costs and provides a better quality plant.

MODERATOR SHUGERT: Question for Elton Smith. Please offer comments on the possible promotion of *Phytophthora* on capillary mats.

ELTON SMITH: Initially there was concern that capillary mat watering would promote root diseases. Experience has not proven this to be true. We have not done any work on that aspect.

DAVE DUGAN: Elton, were you using chlorinated water in your capillary mat study?

ELTON SMITH: Our experiences are with chlorinated city water. However, this is not the case for other countries where this research has been done. We have not done work with actual contaminated water. I am not saying that you can not have *Phytophthora*. It is more of a problem where we have too much water.

MODERATOR SHUGERT: Question for Elton Smith. Is there a need to incorporate superphosphate into a potting medium if a complete analysis slow-release fertilizer is used?

ELTON SMITH: Phosphorus is important to plant growth. A good all around fertilizer (3:1:2) would be enough.

MODERATOR SHUGERT: Question for Elton Smith. Have there been more studies done on the coloring of the mats, especially the purplish-brown mats, that have inhibited algae growth?

ELTON SMITH: I am not sure that I can answer the question as it pertains to color. Yes, there are purplish mats that do just that. On the other hand, the florist industry has been predominately using white mats in Ohio. Indeed, algae is a problem; however, there are chemicals that can suppress it. What we have done, and I did not mention it earlier, was just hose it off between the plants.

MODERATOR SHUGERT: Is orientation (N-S, E-W) a critical factor in the location of a gutter-connected propagation facility in a northern climate for year-round propagation of a wide variety of plant types?

MARK RICHEY: We do have a small problem with shade from the gutters on our N-S house. However, it would be much worse with an E-W orientation.

MODERATOR BRIGGS: Has anyone had any experience rooting *Ilex opaca* 'Maryland Dwarf'? Have you had problems with leaf drop about 3 weeks after sticking? What do I do to prevent this from happening?

ELWIN ORTON: Letting the cuttings get dry shortly after putting them into the bench is the problem.

MODERATOR BRIGGS: What would cause most of the foliage of *Thuja occidentalis* 'Lutea' to turn brown and fall off during cutting propagation under mist?

BRUCE BRIGGS: Too wet.

MODERATOR BRIGGS: How can *Amelanchier canadensis* be rooted by cuttings.

CATHY FREELAND: Softwood cuttings with 1% IBA.

MICHAEL SCOTT: I have rooted *A. canadensis* and *A. × grandiflora* in the Chicago area from softwood cuttings around the first of June and treated with 2,000 ppm IBA.

MODERATOR BRIGGS: I am troubled with leaf drop on softwood cuttings of *Prunus cistena*. This year leaves dropped after 2 weeks under mist and in 30 days the cuttings died. What did I do wrong?

JOERG LEISS: There is a leaf fungus on *P. cistena* and it is a good idea to spray the stock plants for it. We found that it is one of the causes.

DAVE BAKKER: Spray Benlate on the cuttings after the mist goes off in the evening and allow them to absorb it over night.

JOE FLUCEK: That plant can be propagated easily from hardwood cuttings in the fall of the year. We stick them in the ground and mulch them in.

CLAYTON FULLER: We solved the problem by simply leaving them under the mist for only 4 to 5 days and then moving them from the mist to a side bench in the propagating house where they still get humidity.

MODERATOR BRIGGS: How do you propagate Douglas fir from cuttings?

ROBERT TICHNOR: Young plants root better than older ones and it is also very clone specific. Plageotropic growth can be a problem and it takes a number of years to straighten them out.

BRUCE BRIGGS: October and November are poor months for taking cuttings and spring is the best.

MODERATOR BRIGGS: In growing *Viburnum carlesii* and *V. × carlcephalum*, is it true that the cutting method of propagation has the following disadvantages as compared to those grown by grafting on *V. lantana*: (1) Less winter hardiness the first winter and possibly subsequent years; (2). Considerably slower growth?

WILLIAM FLEMER: We grow them from seed which is the best method. They grow many times faster with no suckering from the understock. You do have to select the seed parents for big flowers and leaves. *Viburnum carlesii* roots and grows slowly from cuttings. *Viburnum* × *burkwoodii* and *V.* × *juddii* both root and grow readily from cuttings.

DON SHADOW: *Viburnum* × *juddii* is a much better plant with us than *V. carlesii*. Do not remove the rooted cuttings but allow them to grow through the next growing season.

MODERATOR SHUGERT: Our container-grown Exbury azaleas retain their leaves well into November. This is past the time we place them in cold storage. It is a problem?

JIM CROSS: It is not a problem in plastic huts. The leaves will naturally fall with no problem.

MODERATOR SHUGERT: Question for William Valavanis. Please comment on grafting *Pinus parviflora* on *P. thunbergii*.

WILLIAM VALAVANIS: No problem. Take the understock in December and graft in January.

MODERATOR SHUGERT: Question for Bill Flemer; Have you rooted *Celtis occidentalis* from softwood cuttings?

BILL FLEMER: We have had no success in rooting cuttings. We bud the clones and grow the species from seed.

MODERATOR SHUGERT: Question for Dennis Stimart: Could you expand on encouraging growth on *Acer griseum* to aid overwintering the first season? I am having a problem after rooting stem cuttings.

DENNIS STIMART: I have a student who is working on over-wintering *Acer palmatum* rooted cuttings and we are finding that if the plants are not fertilized after rooting they over-winter beautifully. The same thing is happening with *Cornus florida*. I have a hunch that if you do not fertilize a lot of these woody species they will over-winter well.

DICK WOLFF: I think we can substantiate what you said, particularly in the case of nitrogen late in the season. We will use phosphate, however.

MICHAEL SCOTT: I have rooted *A. griseum* the past 2 years and we do not fertilize past mid-August with the rooted cuttings. We store them at minimum heat (34°F).

MODERATOR SHUGERT: I am having trouble obtaining economic stands of *Syringa*, French hybrids, from softwood cuttings. What am I doing wrong?

JOERG LEISS: Everyone has problems. We take our cuttings in June, just after the flowers fade, apply number 3

hormone powder, and place them under mist in a greenhouse.

CARL ORNDORFF: The simplest way to get 100% stand is to use root cuttings and direct stick in December in a cool house just above freezing until spring. By June you should have 18 to 24 in. plants. If you put them in the field you will have heavy plants by the fall.

MODERATOR BRIGGS: What is Chloromodrin?

BRUCE BRIGGS: If you look in past IPPS Proceedings you will find that information.

CHARLES ANDERSON: Dr. Hindamin writes in the *J. Amer. Rhododendron Soc.* that he has been using triacantanol at 1/10 mg per liter and has been increasing his rooting. In Chloromodrin you have triacantanol and some auxins.

RALPH SHUGERT: Mr. Anderson, on the label of that product it says a natural food extract. How do you account for that?

CHARLES ANDERSON: Triacantanol is extracted from alfalfa.

MODERATOR BRIGGS: Question for Brent McCown. Could you elaborate on methods you are using to maintain cultures that are episodic in their growth habit?

DEBORAH McCOWN: Brent feels that if you do not have juvenile tissue you are not going to be able to overcome the episodic growth problems. With something like oak you can possibly cut it back and stimulate juvenile growth.

RICHARD ZIMMERMAN: In France they are grafting desirable woody plants onto seedlings and repeating this process until reversion is obtained.

MODERATOR BRIGGS: Has anyone micropropagated lilac?

GLEN LUMIS: Virginia Hilderbrant has completed a masters degree and can provide information on lilacs. Her address is Horticultural Research Institute of Ontario, Vineland Station, Ontario, Canada.

MODERATOR SHUGERT: Could Bruce Briggs describe his pallet system of propagation?

BRUCE BRIGGS: We use a box that is 4 × 6 ft with 6 in. sides. The box is elevated during cutting placement which makes it easy to work. The box is placed on the floor which is heated.

MODERATOR SHUGERT: What is the understock for viburnum standards?

ED MEZITT: We have never grafted viburnum standards

but *V. lantana* would be a good choice.

VOICE: *Viburnum lentago* is a good understock.

ED LOSELY: We find that *V. lantana* is good for *V. carlesii* and related types.

JOERG LEISS: *Viburnum lantana* suckers no matter what you do.

MODERATOR SHUGERT: Is there a difference in winter hardiness among *Pyrus calleryana* cultivars?

MICHAEL YANNY: We have a nice specimen of 'Select' at the Wisconsin Arboretum. The flowers are not hardy but the tree is substantially. At Johnson's Nursery we have ordered in whips of 'Bradford' and 'Greenspire' for the last 2 years and they have all had bark splitting problems.

NEW AND USEFUL PLANTS

JACK ALEXANDER, MODERATOR

MODERATOR ALEXANDER: Our first speaker today on this topic is Kurt Tramposch.

KURT TRAMPOSCH: *Lamium* spp. are members of the mint family and are useful as shade-loving groundcovers because of their variegated foliage, rapid growth, and undemanding cultural requirements. An excellent review of *Lamium* spp. can be found in the 1981 summer edition of the American Rock Garden Society Bulletin. Because of their aggressive nature most *Lamium* spp. should be used with discretion.

A commonly cultivated taxon is *L. maculatum* which produces an invasive, dense low carpet in a short time and has purplish flowers throughout the summer.

An English introduction, named *L. maculatum* 'Beacon Silver', is more restrained and produces a mass of silver leaves in the shade.

The most widely cultivated species, *L. galeobdolon*, (now reclassified as *Lamiastrum galeobdolon*) is commonly known as yellow archangel. I have found this ground cover to be an attractive trouble-free species that is useful to brighten shady areas of the garden. It tolerates poor soil and shade as deep as that under mature hemlocks, but does not do well under full afternoon sun. Its welcome foliage appears very early in April and clusters of bright yellow flowers are produced by the end of the month in Boston. *Lamiastrum galeobdolon* must be kept away from other plantings as it can be surprisingly prolific.

Five years ago I was given a new cultivar of *L. galeobdolon* by my father. This, as yet unnamed cultivar, enjoys the advantages of the species without its invasiveness. Its leaves have a mottled variegation varying slightly from that of the species. The plant stays compact, with flowers and leaves about 1/3 that of the species. It layers out as it spreads, very similar to *Vinca*, and is readily propagated. I have found it to be trouble-free and hardy to -25°F in zone 5b west of Boston. It deserves wide distribution and I would be happy to provide plants to anyone who would care to propagate it.