WINTER HARDINESS OF NEWLY POTTED AND CONTAINER MATERIAL, PREPARATION FOR AND PROTECTION IN STORAGE

HARRISON L. FLINT, *Moderator*
RALPH SHUGERT, *Recorder*

Concern for winter hardiness of plant material is shared by all of us in the temperate zone, even though we may be concerned with different degrees of hardiness and different plants. Hardiness is certainly enough of a problem in a field production — but it's even more serious in overwintering young pot-grown plants.

With this introduction, discussion commenced:

Several overwintering problems with specific plants were brought up. It was pointed out that failure to overwinter *Cornus elegantissima,* so-called, has been observed, apparently because of too much cold in some cases and too little cold for breaking dormancy in others. Hardening of young plants is accomplished by some growers by withholding water. The need for a considerable exposure to temperatures around 40°F. or below for breaking internal dormancy was reviewed.

A variety of methods have been used by members of the group for storing young propagated stock:

Pit storage has been used successfully at the University of Rhode Island. Rooted cuttings are placed in tight polyethylene bags. These are imbedded in perlite in a pit in the ground. Results in one year compared favorably with those from refrigerated storage.

Several persons described plastic structures used for overwintering young plants. These ranged from relatively small quonset-type or A-frame structures to full-size greenhouses. Some used heaters during cold weather — others did not — depending upon the location and the nature of the plants being protected.

The point was made that propagators can't afford to give plants *minimum* protection — only maximum protection is truly economical when plant losses are considered.

Further discussion centered on the need for ventilation in plastic structures and ways of accomplishing it. Methods in use among members varied from simply lifting a flap of plastic on a frame to thermostatically-controlled exhaust fan ventilation. There was good agreement on the need for ventilation in spring but some disagreement as to whether ventilation is necessary during warm periods in winter, probably due to differences in experience in different locations. Some growers use shade over plastic structures — some do not — some use shade only in spring.

Nurserymen in several areas including northern Ohio, are storing stock in opaque buildings such as polyethylene-lined barns, with good results.

Burlap shades over plants are giving good results in Oregon. Burlap shades are also being used experimentally at the

University of Minnesota. Also at that institution, sticky coatings are being applied to Rhododendron leaves and then flocking material is stuck to them to insulate them from rapid temperature changes.

Rooted cuttings are being carried overwinter in refrigerated storage in Rhode Island with good results. Growers in other areas are keeping shrub lining-out stock and scions for spring budding and grafting in refrigerated storage. Storage temperatures commonly run in the mid 30's. The point was made that rooted cuttings potted and stored in sash houses get a head start in the spring over cuttings stored bare-root in refrigerators.

Discussion then centered upon special treatments used with problem species such as *Cornus florida rubra, Viburnum carlesi,* and deciduous azaleas, to help overwinter survival. Several growers stressed the importance of propagating early in the summer to allow time for new top growth in the same season. Some use lights to increase the daylength and force new growth, as recommended by Sid Waxman. Others suggested that leaving the root system undisturbed in the rooting medium over winter will accomplish the same thing, at least for some plants such as deciduous azaleas.

The last question raised probably could have sustained the discussion for another hour or two. The moderator was grateful that it came near the end of the allotted time. The question is a familiar one — "Are plants obtained from warmer areas likely to be less able to winter-harden than similar plants grown in colder areas?" Conrad Weiser was asked for a professional opinion and replied, in essence, that the ability to winter-harden is a genetic charactristic, not one determined by environment.

MODERATOR JOHNSON: I am sure there are comments on this report.

HANS HESS: I would like to make this comment. Seedlings of various plants grown by nurserymen including sweet gum, *Albizzia,* and many others, which are grown from seed gathered from northern sources without a question will be hardier particularly in the younger stages than those from seed from southern sources. I believe Bill Flemer will bear this out.

HARRISON FLINT: Are you assuming, Hans, that such sources would be very genetically?

HANS HESS: It has nothing to do with genetics, it's a matter of sources — from areas of colder temperatures seeds of sweet gum, red bud and bayberry are far hardier especially in the first and second year.

DR. HESS: Hans is right about the hardiness being better from northern seed, but I do believe this is due to genetic variability. The plant will look like a sweet gum plant but there are subtle genetic variations which affect hardiness. As a re-

sult of natural selection, they are more hardy and the southern grown plants have evolved with less hardiness.

JOERG LEISS: I would say that if you took a red maple from Northern Canada and propagated it in Texas and brought it back to Canada it would be just as hardy as it was before. It is more or less the source of the seed which determines the hardiness. If it is genetically hardy, it stays hardy no matter where you propagate it.

MODERATOR JOHNSON: The report of the fourth round table discussion will be given by William Flemer.

ROOTING CHEMICALS, LIQUID VS. POWDER, USE, ETC. AND ROOTING MEDIA, NATURAL, ARTIFICIAL, ADDITIVES, ETC.

WILLIAM FLEMER, III, *Moderator*
JAMES D. KELLEY, *Recorder*

Various methods of hormone application used were tabulated as follows:

Soak Treatment — 11 participants
Quick Dip — 9 participants
Talc Treatment — 24 participants

Soak Treatment — Reports of 18 hour soak, cuttings were bundled with rubber bands during soaking in idolebutyric acid solutions. Such solutions were usuable for two days before discarding was necessary.

Hormones in general were not found to be useful for improving rooting of hard wood cuttings. There were two exceptions reported in which deciduous hard wood cuttings of *Berberis thunbergi* Crimson Pygmy in which hormone soak in IBA greatly increased rooting percentages. A Dutch paper was also cited which indicated that *Laburnum vossi* hard wood cuttings rooted better with hormone treatments.

David Leach observed that: "Theoretically the activity of any hormone should double with every 10°C temperature increase but this does not appear to be strictly so." Comments from the floor bore out this contention of increased activity was true, and instances were cited in which increased heat caused stem burning of cuttings from excess hormone activity. Martin Van Hof reported using weaker hormones for summer than for winter Juniper cuttings.

Jim Wells reported no decrease in the activity of stored hormones but others had experienced a decline in effectiveness during the shelf life of the materials. All agreed light was harmful to hormones.

Leach reported on rooting Exbury, Knaphill, and Ilam hybrid deciduous azaleas and generalized that yellow hybrids required a weaker hormone concentration than orange or red clones. He also reported a wide difference in the use of clonal stock. Cecile for example roots very easily and some of the Ilam varieties are very difficult.