conditions and to adapt equipment for large scale commercial operation.

LITERATURE CITED

1. Stoutemyer, V.T. 1942. Humidification and the rooting of greenwood cuttings of difficult plants. *Proc. Amer. Soc. Hort. Sci.* 40:301-304.
2. Stoutemyer, V.T. 1946. Rooting and germinating seeds under fluorescent and cold cathode lighting. *Proc. Amer. Soc. Hort. Sci.* 48:309-325.

BRIAN HOWARD: Would you envision cooling the water to be an advantage before it goes into the chamber?

DAN MILBOCKER: I doubt there would be an advantage to cooling it; in fact, there may be an advantage to heating it, because the cooler the water, the more energy it takes to make a fog droplet.

PROPAGATION OF *ARALIA ELATA* 'VARIEGATA'

JOERG LEISS

Sheridan Nurseries Ltd.
Oakville, Ontario

The white variegated form of the Japanese angelica tree, a plant of the genus Araliacea to which belong *Hedera* and *Acanthopanax*, is a most exotic looking plant that thrives under difficulties that would tax most other plants. City conditions, sun, shade, or drought prove no obstacle.

We obtained our first two plants from a Belgian nursery approximately twelve years ago. The price at that time was $7.50. When we lost one of the two, the cost per plant was well over $20.00. However, during the second season of growth, large double compound leaves more than one inch long, edged on each of the more than 150 leaflets with a creamy white, was worth any price.

PROPAGATION

After a thorough search of the literature, suggestions for root cuttings, grafting on established understocks or seeding were found. Since the plant was not on its own roots, root cuttings were out. Seeding showed that only green plants germinated; that left grafting. This was tried but proved unsuccessful because of a gumlike substance that seemed to prevent healing. Another problem arose because of the fact that scion material was between 3 and 4 cm thick and understocks of such propor-

tions were hard to find. Also one scion had the potential of only one plant.

At this time, Dr. H.B. Howard of the East Malling Experiment Station described patch budding as a method of propagation for understocks that did not slip easily. This seemed to be the method for us to try. Patch budding not only would give us much more propagation material, but also we could use smaller understocks in a dormant condition. Our hunch proved correct. Plants knitted before the latexlike sap prevented healing. Understocks of *Aralia elata* are produced by seed, root cuttings and divisions.

Seed. Seed being the most obvious, it is produced on the terminal shoots in September; flowering occurs in August. The flower is a broad panicle, each flower producing a small, bluish fruit that contains two seeds. The seed is flat, oblong and measures 3 × 1 × 1 mm. Fall seeded, it produces a small plant of 20 cm height and of 10 to 15 mm stem diameter during the first summer. Germination usually does not exceed 5%. Seed is not expensive to collect and clean, and is an economical way to produce understocks.

Root cuttings. This method is probably the most common one used: 10 to 12 cm long by 8 to 10 mm diameter root pieces, or larger, will produce a 15 to 20 cm plant during one growing season. Roots are collected in the fall and made up during the winter. They are spring planted vertically into a warm sandy soil, 3 to 5 cm below ground level and kept moist.

Division. Division of plants and natural root suckers presents another way to produce instant understock.

PRODUCTION

Suitable understocks produced by any of the means described above are selected during the fall and stored in sawdust, frost free. Understocks are 15 to 20 mm thick with a good root system.

Scion wood is collected in February during a frost free period and only well ripened 1 year old wood is cut. Stem diameter is not too important as only the buds are used. The understocks are brought into the work room, roots shortened to about 5 cm and cleaned. The top is reduced to 15 cm.

A patch bud is prepared for the scion material and placed onto the understock. We use a straight 3 mm deep cut from above the bud starting about 1 cm above to 12 cm below the bud, cutting it off with a short, blunt cut. The identical patch is cut out of the understock, and the bud patch is substituted for the bark piece. We use rubber budding strips and wax all cuts with grafting wax. Grafted material is placed in a box with

sawdust in the greenhouse at 15°C and kept moderately moist. The understock will show suckering within 2 to 3 weeks after grafting and the plants are then potted up into a light, well drained soil in 6" pots. Shoot development during the first season seldom exceeds 3 to 6 cm. Success is between 10 and 60% for patch budding. Winter protection is advisable for the first winter.

In the following spring, the grafted plants are planted out into beds and usually 30 cm shoots develop. Wild shoots have to be removed periodically. When transplanting again, the plant is planted below the bud union and this prevents suckering of the understock best. The ultimate would be to have a variegated plant on its own roots. At present only a variegated seedling would accomplish this and production costs would be very cheap as root cuttings could be used. The plant, in our experience, is virtually insect and disease proof and hardy to Zone III.

MANIPULATION OF HERBICIDES AND EFFECT OF HERBICIDES ON ROOTING

BRUCE A. BRIGGS

Briggs Nursery
Olympia, Washington 98501

Abstract. Ten herbicides were applied on *Cotoneaster dammeri* 'Lofast' in 1 gal containers in three different concentrations from low to medium to high ranges. While some of the low rates did tend to promote rooting and some of the excess rates did retard rooting, in general the normal dosages of herbicides which are adequate for weed control, showed little effect on the rooting of cuttings taken from the treated plants. The timing, condition of the wood, wounding and hormone treatment appear to be more critical factors than the normal rate of herbicide applied to the treated plants.

A second research project was set up to determine what properties the active herbicide would have on root formation when applied to the base of the cutting in a liquid solution. Eight different herbicides were applied to the base as a 5 sec dip in strengths of 5, 100 and 1000 ppm. The cuttings were then suspended through black poly and placed to grow under controlled conditions. They were observed and evaluated as to the effect on callus, root formation and hormonal reaction. While callus was slightly increased on some and decreased on others, no significant pattern developed. No attempt was made to correlate callus with rooting. In general, no hormonal reaction was observed that produces increased number or shorter roots.

The results of these two projects on *Cotoneaster dammeri* 'Lofast' seem to support other literature from former IPPS meetings, that a normal application of the herbicides tested to a stock plant, does not greatly affect the rooting ability of cuttings subsequently taken from that plant.

As many of our nurserymen have questioned the advisability of continued and repeated applications of herbicides on stock plants, the subject has come up several times in the past literature of the IPPS. In the early 1960's, Myhre (7) made refer-