GROWING RHODODENDRONS FROM TISSUE CULTURE

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An accelerated growth program for growing tissue-cultured rhododendrons in heated greenhouses during the winter is one way to produce large quantities of small well-branched plants. This method of growing reduces the time needed to produce saleable plants. In 1985 Knuttel Nursery, Inc. implemented such an accelerated growth program that was based on work done by Jim Cross (1).

During the first year of this program, small rooted plantlets were potted in 3 in. cell packs and placed in trays. The trays were placed on pallets on the ground and lights were strung over them. Presently, all rooted cuttings are potted in 14×16×3½ in. trays and placed on 3 ft high benches. These trays retain water more evenly than the cell packs and the plants perform better in them.

The soil mix consists of two yd^3 softwood bark, 1 yd^3 each of sand, peat, and hardwood bark, to which is added dolomite lime, triple superphosphate, and Osmocote 18-6-12 (8 to 9 month formulation).

The plantlets are available in two sizes: a rooted cutting resembling a seedling and a 2 to 3 in. well-established liner. The cost of growing the rooted cutting to the size of the liner is less than the difference in price between the two sizes. There are also fewer growth problems if the plants are established in the new soil mix at the smaller stage.

The plants are put in a greenhouse heated to between 68 and 70°F by an oil-burning furnace which blows hot air through poly-vent tubing underneath the benches. The soil temperature is approximately 60 to 62°F. After the plants are actively growing, the air temperature is lowered to between 62 and 65°F.

Tall spindly rooted cuttings are potted deeper than usual. Up to one inch of shoot length can be planted below the soil level. Once the tissue-culture plants have been potted, standard management practices are followed. Irrigation needs are carefully monitored and a preventive spray program is followed. Most management time is spent pruning to produce full, multi-branched plants.

The plants become established in a month. They are fertilized with Peters 20-0-20 every ten days until mid-March, and then Peters 20-20-20 is used. Soluble salt levels are carefully monitored.

During the winter months the natural daylength is extended by lighting with clear incandescent 75 watt bulbs. These lights hang 2 ft above the plants and are 4 ft apart. At night the lights come on for 5 min every half hour (2). Jim Cross found that the benefits of artifi-

cial lighting were minimal (1). We are running experiments this year to assess the actual benefits of lighting.

In the winter of 1985, kerosene heaters were used to enrich the atmosphere with carbon dioxide. Last year this practice was discontinued with no significant difference in growth.

In May the large liners are potted into 1½ or 2 gal pots, and placed in the normal container production cycle. The plants are pruned once more in June. Many are saleable at the end of the season at a 10 to 15 in. size. Even though their growth cycle has been altered, these plants are winter hardy in northern Connecticut. The plants that have not been sold are potted into 3-gal containers the following spring. They are pruned in June and at the end of that growing season they are saleable 18-in. or larger two-year-old plants. A non-accelerated plant requires at least one more growing season to attain that size.

Before the start of the accelerated growth program, it cost 62% of the sale price to produce rhododendrons. Tissue culture plants grown through this program cost 46% of the sale price. Costs may further decrease as these growing techniques are refined.

There are some problems, however, associated with growing tissue-cultured plants. Certain rhododendron cultivars show variability. For example, 'Molly Fordham' grown from tissue-cultured plants exhibited 35% brooming while those grown from stem cuttings under the same conditions had no brooming. The 'Molly Fordham' that showed the brooming did not thrive. Other cultivars, such as rhododendron 'Aglo', displayed variation but appeared to grow out of it.

Tissue culture labs grow their plants under different conditions. Therefore, the same cultivars may vary in growth and performance depending on the source.

There are some cultivars that are difficult if not impossible for us to grow. Rhododendrons 'Bali', 'Nepal', and 'Golden Gala' exhibited extensive leaf-tip burn even though no fertilizer was applied. Adjacent to these plants were cultivars that thrived. Therefore, most cultivars are test grown in small quantities before they are put into large scale production.

A serious problem with some tissue culture sources is that the labs have inadvertently sold cultivars that were not true to name. Since tissue culture transplants do not resemble the mature plants, production time and money will be spent before the mistake is discovered. A nursery also may not have a ready market for the incorrect cultivars. In addition, if no one at the nursery is familiar with the mature plant a cultivar will be marketed under the wrong name. The frequency of these mistakes indicates that some tissue culture labs are not addressing this issue with enough concern. The grower is often left with the financial burden of this error.

Even with these problems, growing tissue-cultured rhodo-

dendrons in the accelerated growth program is worthwhile. It enables one to grow better quality plants more quickly and profitably.

LITERATURE CITED

1. Cross, J. 1978. Growth momentum. *Nursery Production—Field and Container.* 114:35–39.
2. Waxman, S. 1961. The application of supplemental flashing light to increase the growth of deciduous evergreen seedlings. *Proc. Inter. Plant Prop. Soc.* 11:107–111.

EFFECTS OF SPENT MUSHROOM COMPOST ON THE PRODUCTION OF GREENHOUSE-GROWN CROPS

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Abstract. Selected cultivars of *Chrysanthemum morifolium* and *Lilium longiflorum* were grown under greenhouse conditions in different ratios of spent compost, and in two commercial growing preparations, with either a 14-14-14 slow release fertilizer, or with a 20-20-20 water soluble nutrient solution. In all cultivars of both plant species, the most commercially desirable plants were produced in spent compost and Speedel in a 1:1 ratio. Plants with the highest bud count were also produced in this mix. The shortest plants were produced in spent compost alone, which exerted a growth retarding effect in all media and nutrient combinations. Nutrient treatments alone had no significant effects on flowering, root development, or bud count.

INTRODUCTION

The use of top soil as a growing medium component for greenhouse and container grown plants has declined. Contamination from herbicides, microorganisms, nematodes, and weed seeds, together with increasingly high cost factors have contributed significantly to this decline. At the same time, the use of commercially prepared growing mixes has risen sharply. These soilless materials have all the characteristics normally associated with a good growing mix. They are contaminant-free, light weight, have high air and water-holding capacity, and drain well. They are also comparatively inexpensive, particularly in consideration of labor and other cost factors associated with the preparation of soil-containing mixes.

The low weight factor associated with perlite, vermiculite, and sphagnum peat-containing commercial mixes is especially significant in minimizing cost when being shipped to distant markets.