

RHODODENDRON PRODUCTION

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The use of tissue culture methods in propagation of rhododendrons has greatly improved their rooting, but has given rise to two significant problems related to the production of quality plants for sale. These are:

- 1) The production of a bushy plant.
- 2) Ensuring plentiful flower buds.

These criteria are of utmost importance from the sales point of view. Rhododendrons which are of a "leggy" form or do not possess many flower buds and are not desirable in the market place. In the retail market, a well-budded or flowering plant sells itself. At Boningale Nurseries Limited, we are not a large scale producer of rhododendrons, nor can we claim to be specialists, but through our experience to date we are upgrading the quality of our production. The main objectives of this paper are: (1) to communicate some of our knowledge; and (2) stimulate interest amongst others to initiate research into production techniques for the benefit of the industry as a whole.

The key to the production of high quality material is not an exact seasonal schedule, but an assessment of the optimum time according to the condition of each individual crop. It is very easy to miss this optimum time when one is fully occupied with significant tasks, such as the potting of shrubs, and lose a few weeks of growth.

In order to illustrate more specifically the significant aspects of production, I will summarise production techniques which are followed by our nurseries. At Boningale, we produce approximately 6,000 large-leave rhododendrons, plus 2,000 dwarf rhododendrons per annum; 2,000 large-leaved rhododendrons are imported from Holland as rooted cuttings, plus 1,000 from North America as plantlets raised by tissue culture, to supplement the quantity and range of cultivars of our own rooted cuttings.

When rooted cuttings have made sufficient growth, which is usually by early April, they are potted into 11 cm rigid pots by hand. This ensures minimum damage to the root system. Rhododendron cuttings generally produce only one or two major roots with many fibrous ancillary roots. Therefore, it is vital to use careful handling. At this stage initial pruning is implemented by pinching out the central terminal bud. This results in production of four or five breaks and creates the "framework" for future growth. Our potting medium is com-

posed of the following ingredients:

Irish moss peat	9 grower bales
Grodan or Rock Wool	3 grower bales
Osmocote 18:11:10 (12/14 months release)	8½ lbs.
Magnesium lime	5 lbs.
Fritted trace elements	1 lb. 12 ozs.
Potassium sulphate	2 lb.

After potting, plants are returned to the glasshouse, where they are set on waist level benches, which are covered with a layer of peat. The glasshouse is shaded; all watering is by hand. We spray the rhododendrons with Benlate to prevent *Phytophthora cinnamomi* and *Botrytis*. We feed the plants with Soluble Sangral on a fortnightly basis to enhance plant vigour and colour.

At the time of transfer to the greenhouse it may be found necessary to carry out further pinching to ensure a good framework. It has been noted that some cultivars, such as *Rhododendron* 'Professor H.J. Zayyer' produce growth beneath the soil level which supplements the plant structure.

During the course of a favourable growing season, two flushes of growth are produced. The first flush is checked as previously mentioned and, at the second flush, the dominant bud is again pinched out to promote further branching. A quality plant requires a minimum of two or three laterals but we aim to achieve five or six.

Before the first of the autumn frosts in early September the liners are placed pot-thick in a frameyard protected from easterly winds by a Rokolene windbreak. All the cultivars grown by our own nursery are hardy but are provided with a protective layer of straw or Rokolene in the coldest winter months to prevent scorching of foliage. Until late March or early April, dependent upon weather, all that is necessary is to undertake periodic checks to monitor the condition of the material and, if straw is used for protection, to check for rodents. In early spring, ideally before any significant growth is made, the rhododendrons are potted up. Large leaved cultivars go into 6-litre pots and dwarf cultivars go into 2-litre containers. It is at this stage that care and time are crucial. Individual handling of the plants is influential in producing a quality crop — no shears are used here!

We work in twos, the first person pruning or 'pinching out', the second preparing the plants for potting. If the plant is either one-sided, single stemmed, or has made "leggy" growth on the second flush, we prune them to the first set of leaves.

Hopefully, the majority of our plants do not possess any of these deficiencies. They have the central terminal growth

pinched out to stimulate production of further laterals lower down. Grading of the material is important and weak or very poorly formed plants are removed in order to obtain maximum use of valuable space.

The second person takes the pot off the pruned and pinched plant and "tickles" the root ball! Teasing the roots assists their expansion and establishment in the new compost medium. Plants are placed in trays, labelled, and transferred for machine potting.

When potted the rhododendrons are placed on raised sanded beds pot-thick. This is to assist their protection in the event of severe weather conditions. Rhododendrons, azaleas, and magnolias are placed so that careful control of watering can be achieved.

Proper watering is particularly important. Excess standing water in badly drained situations creates ideal conditions for waterborne diseases, primarily *Phytophthora cinnamomi*, for which there exists no guaranteed method of elimination. The best course of action is to attempt to prohibit its occurrence. Watering at night is preferable. Water either drains away or is removed by evaporation during the course of the next day. In the U.S.A., where *Phytophthora* is more prevalent, a Benlate drench is applied at each potting stage. Overwatering also causes production of long "leggy" shoots, when our aim is to produce short strong growth, therefore watering should be kept to a minimal level.

We have noted that plants located on the perimeter of a block in our container unit tend to be shorter and produce a greater number of flower buds. I attribute this to the fact that even under the most efficient irrigation system these receive less water and evaporation is more rapid. Plants which are subjects to a degree of stress generally react by producing more flower buds.

We have the advantage of an automatic timing device situated adjacent to the rhododendron bed, which makes for ease of checking and adjustment. If we consider it necessary the clock is altered daily and we follow the principle that when in doubt, do not water! In warm weather such as in the late spring and early summer, the irrigation is timed for an average of 15 to 20 minutes each evening. Generally one major flush of growth is produced during the course of the growing season, but occasionally a secondary flush occurs.

We make periodic checks for any evidence of pests, disease, and weeds and spray in accordance with the following programme:

Herbicide: February to October, at nine week intervals. Simazine is used at 2.67 lbs per three beds (20,000 plants per bed, 1800 m² per bed).

Pest and Disease Control: March or April to October at monthly intervals. Quantities applied per bed (1800 m²):

Captan, 10-oz; Poliverdol, 1 pint; Dinocap, 4 fl oz; Spredite, 4 fl oz; Pirimore, 15 fl oz.

Approximately 30% of our 6-litre large-leaved rhododendron cultivars attain a saleable standard in 12 months. With dwarf rhododendrons a much higher percentage is obtained. Plants requiring a second season of growth have the dominant bud pinched out early the following spring. Re-spacing of plants may be necessary to prevent "leggy" growth being formed.

Slow-release fertilizer is applied in the form of one 6 gm Agriform tablet per plant. Liquid fertilizers can be utilised as a further method of promoting flower bud production. At Wells Nurseries, rhododendron specialists in the U.S.A., liquid fertilizer treatment (20:20:20) is applied until July. The fertilizer constituents are then changed to 15:45:5 (high phosphate content) to promote bud production. Existing research supports this use of phosphates to increase budding, and has indicated that utilisation of growth retardants gives similar results.

In addition to good growing techniques, the selection of rhododendron cultivars, which bud well in their first and second years of growth, is important. Rhododendrons noted for this characteristic include *Rhododendron* 'Fastuosum Flore Pleno', *Rhododendron* 'Cunningham's White' and *Rhododendron* 'Gomer Waterer'. Yakushimanum types of rhododendron possess both the marketable qualities of compact habit and abundance of flower buds. In some parts of the U.S.A. it is considered advantageous for bud production to grow rhododendrons in the field for one year and then pot up the material.

To conclude, I consider that production and marketing of quality rhododendrons is dependent on four main factors:

1. *Market demand:* Contact with, and response to, customer demand, for specific types and cultivars.

2. *Production methods:* Particular care and attention be given to the correct timing of pruning, grading of plants, pinching of terminal buds in the second year, and careful monitoring of watering and feeding, as well as adequate pest and disease prevention. With further reference to feeding of plants, I am of the opinion that growers need to communicate their requirements more clearly to fertilizer manufacturers to obtain

fertilizers which correspond more specifically to rhododendron needs.

3. Further research into the use of chemical agents which induce bud production.

4. New cultivars which possess desirable characteristics of form and of plentiful flowers should be selected.

STORAGE OF UNROOTED CONIFEROUS CUTTINGS

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INTRODUCTION

Seasonal peaks of work-load are the main reason why German nursery managers have shifted the period for propagating conifers by cuttings into the winter months, November, and December (4). But as a result, more heating and more intensive phytosanitary treatments are necessary. Rising energy costs led to the idea of collecting the cuttings in November, preparing them for insertion and then storing them up until March. The main spring selling season in German nurseries starts in March. For this reason collecting and preparing the cuttings has to be done earlier, if possible in early winter.

Suitable storage conditions must be used to avoid a significant reduction of the rooting capacity. That is why:

- water losses of the cuttings have to be kept to a minimum (13).
- the spread of pathogenic fungi has to be avoided (10), and
- respiration has to be kept low, especially if a definite amount of food reserves is necessary for quick and sufficient rooting (13,19).

All this is possible with storage at low temperature and high humidity and perhaps controlled atmosphere (CA) is advantageous (2,5).

Cuttings of conifers cultivated in Germany have the advantage of being resistant to low temperatures if collected at the proper time of the year, but these cuttings have the disadvantage of not being storage organs which can accumulate food reserves in larger amounts. Thus, the storage temperature for coniferous cuttings might be below freezing, and this seems to