FORCING GROWTH ON SUMMER-ROOTED RHODODENDRON CUTTINGS[1]

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The success of summer propagation of rhododendron has been demonstrated by McGuire (4) and is being used by a number of nurserymen (6,7,8) both to avoid the high fuel requirement of winter propagation and to distribute the use of facilities over the year. In our studies, we assume that the cuttings are rooted by the fall. They can be stored at a minimum temperature near freezing and planted out in the spring, or growth can be forced during this time provided fuel and energy costs are not too great.

RHODODENDRON 'NOVA ZEMBLA'

Spring growth. The forcing of 1 or 2 spring flushes on either summer or fall cuttings is fairly common (2,3), more common than is reported in the literature. The usual method of spring forcing is to raise the temperature to between 16° and 20°C (61° and 68°F), beginning in February or early March, and to maintain this high temperature through the spring. This is successful but is costly in the use of fuel. Some growers include photoperiodic lighting, at least until the end of March, but I observe that the use of light is diminishing. The objective of our studies is to find methods of conserving fuel by growing the rooted cuttings at a low temperature.

Most of our studies have been with *R.* 'Nova Zembla' cuttings that were taken in July, lifted and fertilized in October and held in a cool house. They were stored at just above freezing from December 1 until February 1, when the minimum temperature was raised to 5°C (41°F). At this temperature, growth begins between May 1 and 15 in our area. We (11) discovered, however, that if the rooted cuttings were exposed to 17°C (63°F) for only 2 weeks around March 1, without supplemental lighting, and returned to 5°C, growth began before April 1 and continued through the spring. This low temperature method saved about 50% of the heat reqirement as compared with keeping the temperature at 17°C until May 15. The growth development was delayed about 3 weeks by the low temperature, but for practical purposes, the plants were equal to high temperature plants by the end of the growing season. Both had matured a third flush of growth (1).

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Fall growth. In theory, there should be an advantage in producing a fall flush of growth which could be built on in the spring. We have not been satisfied with our efforts so far and do not have recommendations. However, I will share some of our experiences. The cuttings should be rooted fairly early, preferably by September 15, in order to take advantage of early fall warm weather. Bottom heat during rooting should benefit, whether out-of-doors or inside. After lifting and fertilizing, growth started readily if the night temperature was kept at about 17°C (63°F) for 2 weeks. Supplemental lighting did not hasten the start of growth on either *R.* 'Roseum Elegans' (10) or *R.* 'Nova Zembla'.

We have not obtained a large number of breaks in the fall. Longer periods of high temperature and lighting produced more fall growth but had a carry-over effect after cold storage of delaying spring growth by as much as a month (10). Scott (9) reported that night-break lighting in the fall delayed spring growth of *Cornus alba*, *Weigela florida*, and *Viburnum opulus*.

Nurserymen may consider producing one or two shoots, without pinching, in the fall by using 2 weeks of warm nights before lowering the night temperature to 5°C (41°F). The shoots can be cut back in the spring to produce multiple basal shoots.

RHODODENDRON 'PJM'

Spring growth. If 'PJM' rooted cuttings have been held at between −4° and +4°C (25° and 39°F) for as long as 2 months, and the temperature is raised to 5°C (41°F) on February 1, growth usually starts the first week of March. The plants continue to grow vigorously at the low minimum temperature. Problems with spring growth of 'PJM' probably come from taking fall cuttings which were exposed before taking, or after rooting, to enough cold to put them into dormancy, but not enough to satisfy their cold requirement to grow. Even in this condition they can be forced into growth with 16°C (60°F) and 3-hour light break in the middle of the night (5). However, such plants may not grow normally if they are returned to a low temperature.

Fall growth. 'PJM' summer cuttings root rapidly and if potted or spaced and given fertilizer in early September, some growth will be made at minimum 5°C (41°F). More growth is stimulated by providing the light break (Table 1). However, with the shearing required to force multiple breaks and the vigor with which these plants grow in the spring, I doubt that much is accomplished by forcing extra fall growth. Furthermore, 'PJM,' like 'Nova Zembla' and 'Roseum Elegans,' was

delayed in making spring growth after being stimulated with supplemental light in the fall (Table 1). For fall growth to be useful, we need to find a way to produce a large number of breaks without causing a delay in spring growth.

Table 1. Effects of induction treatments, started September 21, 1981, on fall growth of *Rhododendron* 'PJM' rooted cuttings, and carry-over effects of fall treatments on initiation of spring growth at minimum 5°C (41°F).

Treatment	Fall growth (cm)	Ave. date of start of spring growth
No induction	4.7 a[2]	March 2 a
2 wks. at 17°C	4.6 a	March 2 a
2 wks. L.B.[1] at 17°C	8.3 b	March 7 b
2 wks. L.B. at 17°C plus 4 wks. L.B. at 5°C	11.0 c	March 12 c

[1] L.B. = 1 klx (100 foot candles) incandescent light between 11 p.m. and 2 a.m.

[2] Means with the same letter are not significantly different at the 5% level.

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RAYMOND HESER: What was the fertilizer used..

JOHN HAVIS: The fertilizer used was 20-20-20 soluble at

the rate of 200 ppm N immediately after potting. Two weeks after that we used a second application.

GUSTAV MELQUIST: Was the 63°F temperature scientifically determined or could some other temperature work just as well? For most warm crops the greenhouses are kept at 60°F at night so this would actually require increasing the temperature over the normal.

JOHN HAVIS: We determined the temperature by looking in the literature, not scientifically.

PROPAGATION OF HERBACEOUS PERENNIALS

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Our primary objective at Walters Gardens Inc. is to produce the perennials we need to meet the projected demand. This is not our only concern. With today's market conditions, we must look very closely at the cost of producing perennials with an attempt to keep this cost reasonable. We must be able to produce perennials profitably. Please keep this in mind as we examine the following methods of propagating perennials.

First of all, one must have a plan of action. One must write down what is to be done and how it is to be done. One must also set goals of production levels. Never rely on verbal communication. Never just guess at what you need. Never propagate more just because you happen to have a lot of propagation stock and it would be a shame for it to go to waste. Always analyze your market. Try to propagate what you think you can sell.

Setting down a plan of action gives you something to refer back to at any point in time. It also gives you the opportunity to assess your performance, giving facts in which to allow for corrections for future years.

The first method of propagating perennials that I will discuss is by seed. A large number of perennials can be produced from seed. As a general rule, if a perennial can be produced from seed, this is the most economical way to go. However, an exception to this might be in choosing a hybrid improvement of a seedling strain which would require propagation by another method.