

Propagation of Rhododendrons at Millais Nurseries

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INTRODUCTION

Millais Nurseries is a specialist rhododendron and azalea nursery producing around 650 different varieties ranging from tiny dwarfs to large forest trees. It was started as a retail nursery in 1970 by Ted Millais, the author's father. Current production is approximately 40,000 plants per year. The market ranges from retail customers wanting one or two rare plants for their collection either from our plant centre or by mail order throughout the world, to large garden centres. The nursery also undertakes contract growing for the wholesale market.

Rhododendrons are not the easiest plants to propagate, but Millais Nurseries offers such a wide range that most have to be propagated in-house. In order to improve efficiency and output, a new propagation house was installed in 1993 with 70 m² of roller benching, thermabed hot-water heating, and mist and wean facilities. The house contains five beds and each is individually controlled by electronic thermostat and electric leaf. The house itself is a Solspan Alloy 20 with automatic vents and a fixed thermal/shade screen. The complete development cost £13,000 and is proving highly efficient and maintenance free. Oil heating costs are averaging £200 per year.

Propagation techniques for rhododendrons include cuttings, seed, tissue culture, grafts, and layering. However, layering is no longer practiced on this nursery due to economics and the poor quality of the plants produced.

CUTTINGS

The standard rooting substrate used at Millais Nurseries is a mixture of bulrush medium peat and bark (2:1, v/v). When sticking cuttings in trays Cambark 100 with 0.5 kg m⁻³ Osmocote 12-14 month formulation is used. For direct sticking into cells the fine grade Cambark plus 0.5 kg m⁻³ Osmocote Mini is used.

All cuttings or rooted cuttings are treated with nematodes in September as a precaution against vine weevil, prior to incorporation of Suscon Green from the liner stage onwards. Routine fungicides include Benlate, Octave, Rovral, and Bravo on a 2- to 3-week cycle. Pesticides (Ambush and Nemolt) are used to control aphid and sciarid fly if these become a problem.

Basal temperature is maintained at 18C. During the summer, humidity is maintained by a simple Macpenny mist unit operating under white polythene which is vented at the edges on hot days. In September, the mist is progressively limited by 24-h timer at night, and then by day, to prevent the compost getting too wet. By the end of September a clear polythene tent is used to replace white polythene and the mist restricted to 2 or 3 bursts per day. Through the autumn and winter the mist is operated manually just occasionally and the tunnels vented 2 or 3 times per week to help drain off excess moisture.

Our cuttings propagation season starts in June with deciduous azaleas. Many writers have suggested forcing stock plants under lights or polythene to enable

sufficient growth before autumn for the cutting to survive winter. However, by taking the cutting in June as soon as 75 mm to 100 mm of new growth is made, we have not had any problems as long as the cutting is kept in active growth with Osmocote.

If the cutting is soft, the tip is removed to prevent wilting, and if it is firm a scrape wound is made to the base. Rooting hormone is usually Seradix 2 (0.3% IBA) or Rhizopon AA (0.5% IBA). However, Seradix 1 (0.1% IBA) has proved better for white cultivars, and Seradix 3 (0.8% IBA) better on deep red cultivars. The occidentale hybrids are some of the first to root after about 5 weeks, followed by the Exbury types. The small flowered Ghent hybrids, and white cultivars, prove more difficult.

In early July many of the more difficult species rhododendrons will root with some persuasion, but this does vary considerably from year to year. Typical hormones would be Seradix 1 or 2 or Rhizopon AA. Three or four leaves in a fan shape are selected to stay on one side of the cutting and the remaining leaves taken off. The leaves are reduced to 40 mm long if necessary to avoid touching each other, and reduce transpiration. The base of the cutting is wounded on the same side as the remaining leaves and the cuttings are arranged neatly within the tray so that all the leaves point South towards the light. This procedure helps to ensure that all the roots develop in the same direction away from the light, and aids separation of cuttings at the time of potting on.

Most dwarf rhododendrons and evergreen azaleas are easy to root in July. These are best taken as 40-mm to 50-mm cuttings preferably, with the terminal bud present as this helps branching at the liner stage. Sometimes the growth is very soft and the cuttings tend to wilt but this can be prevented by refrigerating the cuttings in moist polythene bags for 48 h. Most cuttings respond to Seradix 2 without any wounding. Cells of about 30 mm × 30 mm are used for rooting as this prevents transplanting shock and potting is quicker.

Some of the dwarf species rhododendrons are particularly prone to rotting-off before rooting. For some of the fine foliage taxa, such as *Rhododendron anthopogon*, better results are obtained by taking a short piece of the previous year's wood with a clump of 4 or 5 young shoots which are just resting on the surface of the compost. Rooting can happen either from the new or old wood.

Cuttings of *R. yakushimanum* hybrids and other hardy hybrids are taken in August, varying the hormone according to the hardness of the cutting. Records of hormones used have been kept for many years for many varieties but the greatest variable is the condition of the cutting and not the cultivar. For the softer cuttings Seradix 1 or 2 and Rhizopon AA are used, with Synergol (liquid quick dip) in strengths ranging from 1 : 9 to 1 : 3 (1000 ppm to 2500 ppm active ingredient IBA and NAA) for the woodier material.

Softer cuttings have been most successful when use has been made of trimmings from liners or young crops during the growing season. The aim is to finish cuttings by the end of August but rooting is quite possible in October and November.

SEED

The opening up of China with permits for western plant collectors since 1990, and exchanges with institutes such as Kunming Botanic Gardens, has resulted in good quality seed being collected for the first time since Frank Kingdon-Ward in the 1930s. Ted Millais has collected regularly in Yunnan, Sichuan and Tibet at altitudes

of up to 16,000 ft in the last few years with other enthusiasts. The nursery now has several species in cultivation for the first time ever and these are being distributed to other collections.

Identification in the field is the first important hurdle, and this is often followed up with confirmation at the Royal Botanic Gardens, Edinburgh. Natural hybrids are particularly confusing, taxonomically.

Seed is collected from September onwards. After a mild winter it may still be possible to collect in the following spring. Paper envelopes are best for storage but often self-destruct with damp seed on a wet mountain. Zip-lock polybags are good for dry seed, but damp seed will rot in them. Once home, the seed pods are placed in small containers and left to open on a radiator shelf. After a week or two they open and seeds fall out if shaken. They are then sieved with a kitchen sieve and the chaff blown gently away. The prepared seed is stored dry in new paper envelopes and placed with an antidessicant in an airtight container in a domestic fridge or freezer until sowing at the beginning of January. Seed can be kept for several years like this.

Seed is sown into half-size seed trays filled with bulrush medium peat passed through a 10-mm sieve. This makes a fibrous peat with a fine surface. Seed is sown on the surface and pressed in lightly. Each tray is covered with a clear propagator lid and misted daily by hand using boiled water (cooled) to reduce disease and liverwort growth.

Germination takes about 3 to 4 weeks and supplementary H.P.SONT lighting is then given, using cheap rate electricity between midnight and 7 AM until the end of March. This has proved particularly beneficial, giving good colour and short internodes.

From late April seedlings are pricked out into 35-mm cells with 0.5 kg m⁻³ Osmocote Mini granules. These are placed under mist until June and then moved to a double skinned polytunnel with a 50% shade net over. Watering and prevention of high temperatures is critical throughout the summer. In August the larger plugs can be moved on into 9-cm pots with either 1.5 kg or 2.5 kg Osmocote depending on variety. Most taxa will be in 1.5-litre pots for their 2nd year and be marketable in their 3rd year in 3-litre pots.

TISSUE CULTURE

Millais was the first U.K. nursery to bring in plantlets from Briggs Nurseries in America. Plants are also obtained from U.K. laboratories. Tissue culture is an excellent way of importing and bulking up new cultivars of guaranteeing production targets of hard-to-root cultivars, particularly where contracts are involved. Most cultivars perform well and are bushier from the base. Some people have argued that tissue-culture grown plants are weaker and take longer to flower but, in the author's experience, problems are not encountered providing the laboratories have done their jobs properly. However there are some cultivars, such as *R.* 'Crest' in which the whole character of the plant is changed, becoming much bushier with paler, smaller flowers than the original. Incorrect naming has also been a problem.

From experience it is best to receive plugs in early October and pot them up, giving a few weeks of basal heat to encourage new root development before winter.

GRAFTS

Wherever possible plants are produced on their own roots. However there are 25 types grafted on contract. These are mainly specific clones of species or late flowering hardy hybrids which we are unable to root.

A reverse saddle graft is performed in January and held together with mini clothes pegs. *Rhododendron ponticum* liners in 9-cm pots have been used as understocks but consumer resistance means that *R.* 'Cunningham's White' is now used. The success rate is around 80% overall and the 1-year grafts are supplied to the nursery in 1.5-litre pots in the following March.

CONCLUSION

Millais Nurseries makes use of all four methods of propagation and experience over many years has shown which method is best for each variety propagated.