Magnolia Propagation in the United Kingdom and the Czech Republic©

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During Spring and Summer 2000 nine nurseries in Czech Republic and in south England, specialising in magnolia propagation, were visited. Magnolia taxa produced, propagation facilities, and details of propagation techniques were compared. The main differences between nurseries, including their sales strategy, are described. The main method of propagation in both countries is by cuttings. However, some English nurseries propagate magnolias from seeds or have them grafted in New Zealand. The reasons why magnolias are difficult to propagate are outlined by each nurseryman, and the author's own experiences of magnolia propagation are included.

INTRODUCTION

Participation in the Mary Hilliar Travel Scholarship gave me the opportunity to compare the technologies of magnolia propagation and production at nine nurseries in two different countries. This paper gives information about different conditions and practical experiences at each nursery.

Climatic Conditions. The coastal areas of Great Britain are under the influence of maritime climate classified as Zone 9 which means that the average minimum temperature does not fall below 6.6°C. With the exception of some mountain areas, the rest of the British Isles falls under Zone 8 (minimum temperature -12.2°C to -6.7°C). The Czech Republic is on the border of a maritime and continental climate. According to the Heinze and Schreiber (1984) revision of the U.S.D.A. Plant Hardiness Zone Map, the average annual minimum temperature fluctuates between -23.3°C and -17.8°C (Zone 6) while some parts of the country fall into Zone 7 (-17.7°C to -12.3°C).

ENGLISH NURSERIES

Burncoose Nurseries, Cornwall. This nursery produces 3- or 4-year-old plants. Grafted plants are propagated under contract in New Zealand. The nursery's method of making magnolia cuttings is simple, yet it can offer some 86 species and cultivars. Total magnolia production in 1 year is over 1000 plants.

Hillier Nurseries, Hampshire. The propagation section is just one element of a large multi-site nursery. Although there is a fog system installed, mist is preferred for magnolia cuttings. The nursery propagates 12,000 plants per year and offers a range of 12 species and cultivars of magnolia. Hillier's propagators believe the most important elements for successful propagation are time of propagation and use of a good rooting hormone.

P.M.P. Plant Specialities, Junker's Nursery, Somerset. A small family nursery (circa 0.5 ha) with its own magnolia propagation by cuttings plus grafted

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plants imported from New Zealand. It offers 44 magnolia taxa. Annual production is 500 to 1000 plants. According to Mr. Junker, neither rooting hormone nor the availability of a propagation fogging system are important factors in successful propagation. However overwintering is a problem.

Mallet Court Nursery, Somerset. Small (1-ha) nursery with a wide assortment of rare and unusual plants. Seed propagation is preferred for magnolia species. Cultivars are propagated at the nursery by cuttings, with some cultivars being grafted elsewhere under contract. The plant catalogue offers 24 species and cultivars. Total production is 10,000 to 12,000 magnolias per year.

Liss Forest Nursery, Hampshire. A well known nursery producing a wide range of genera in large numbers. Nurseryman Peter Catt prefers to propagate magnolias by cuttings although he also undertakes some grafting. Nearly 6500 magnolias in 24 taxa are produced per year.

CZECH NURSERIES

Horak Nurseries, Bystrice. This famous family nursery has used layering to propagate magnolias for more than 15 years. Cuttings are used for a few species and cultivars now (7 taxa and 5000 plants per year) and there is a tendency to use subcontract propagation because of unsuitable conditions. Growth stagnation during the 2nd year seems to be the main problem. Mr. Kvetoslav Horak says that rooting hormone is not the most important factor for successful propagation. More important are quality of stock plants, time of propagation, propagation facilities, aftercare, and weather.

Schuch Nursery, Zdechovice. Propagates 8000 plants in three cultivars and one species. According Mr. Schuch the most important thing is time of potting.

Litomysl Nurseries. Originally propagated magnolias using layering, but has now switched to cuttings. The catalogue offers seven species and cultivars. Total production is 10,000 magnolias per year.

Silva Tarouca Research Institute for Landscape and Ornamental Gardening. The nursery section includes magnolia propagation as one part of the hardy deciduous plant programme. Mr. Jiri Obdrzalek prefers dry overwintering of rooted cuttings and late spring potting.

RESULTS AND DISCUSSION

Many ornamental nurseries of both countries concentrate on propagation of rare and unusual trees and shrubs. In two nurseries (Liss Forest and Schuch) magnolia propagation and production is very important. The most common commercial propagation method is cuttings. Seed propagation and side grafting or chip-budding is little used. Grafted plants are imported from New Zealand (English nurseries) or from Holland (Czech nurseries).

Permanent stock plants under cover are preferred. In just two nurseries cuttings were taken from 3- to 4-year old plants from previous propagation.

Time of taking cuttings ranges from the beginning of May to the middle of August. In England, June or the second half of July is preferred. July is more common in the Czech Republic. According to my own experiences the optimum period (which is a

Table 1. Summary table of magnolia propagation.

Nursery	Time of cuttings	Type of cuttings	Rooting hormone	Rooted cuttings (%)
Burncoose	1 June	Semi-ripe 2-3 buds	Roota Hormone or Synegal 5000 ppm	80-100
Hillier	Beginning of May*	Soft, heel 2-3 buds	Own liquid	(60) 90-95
Junker's	Mid/late June	Soft, 2 buds	Powder (0.8 - 1.0 % IBA)	(60)-90
Mallet Court	Mid July-August	Semi-ripe, 2-3 buds	Powder (0.9 % IBA)	60-90
Liss Forest	Mid Jul-mid Aug	Semi-ripe heel 2-3 buds	Murphy	(50) 90-100
Horak	End May- first week June	Soft, heel or apical, 2-3 buds	Rhizopon AA (3-4% IBA)	70-80
Schuch	July	Semi-ripe, 2-3 buds	Powder (2% IBA)	(60) 70-90 (100)
Litomysl	End May* to mid/end July	Green, one-bud, or 2-3 buds	Kostim Rhizogen A (gel, mix IBA and NAA)	75-80
Pruhonice Research Inst	May/June* to July	Semi-ripe, 2-3 buds	Powder 1% or 2% IBA	70-80

* Stock plants under cover (polythene tunnels or greenhouses).

period lasting between 10 and 14 days) is during the beginning of June until the middle of July, dependent upon weather. The time of taking cuttings will vary from year to year as it relates more to the stage of growth and ripening of new shoots than to the calendar. Stem semihardwood cuttings with 2 or 3 buds are generally used, however three nurseries prefer heel and softwood cuttings. Slight side wounding is necessary for semihardwood cuttings, but is not necessary for soft cuttings. Leaf-bud cuttings are suitable for *Magnolia* ×*soulangiana* cultivars, which can be rooted from internodal parts. Cuttings with bases cut under the node are more common for *M. stellata* cultivars. Every nurseryman reduces the leaf laminas by a half and takes off the soft apical parts.

Rooting hormone is used in powder form with a concentration of 0.8% to 2% indolebutyric acid (IBA) in five nurseries. When cuttings are taken at optimum time, the importance of rooting hormone seems to be reduced.

Peat and perlite (in ratios 1 : 2 or 1 : 1, v/v) mixture is often used as the rooting medium. In some nurseries perlite is substituted by bark or sand with the addition of vermiculite or lime, which is often more beneficial for the first overwintering. Plug trays (5 or 6 cm), pots (7 cm), seed trays (25 × 40 cm, 15 to 35 cuttings per tray), or trays (60 × 40 × 10 cm, 65 to 90 cuttings per tray) are used for sticking cuttings. Cuttings remain in the trays for 9 to 11 months.

Each nursery prefers the mist system now, except one where propagation under polythene is used. In Czech nurseries polythene tents were used successfully until 5 years ago. The best method seems to be the mist system under polythene, with a regular on/off regime. For the first 2 weeks maximum air humidity is crucial, particularly during hot summer sunshine, which is more often the case in the Czech Republic. The cuttings stay under the mist system for 6 to 8 weeks. In ideal conditions the first roots can appear after 3 weeks.

Aftercare is always a very important factor for successful propagation. Magnolia cuttings need a lot of water, good fungicide control, and regular removal of dead plant parts.

Overwintering is under cold polytunnels or in greenhouses. A cover (white fleece) is very often used. The Pruhonice Research Institute has extensive experience with protected cold frames. Liss Forest Nursery overwinters with minimal watering while at Schuch Nursery plants are covered with dry peat. Two Czech nurseries use heating to keep plants frost free at 2 to 6°C).

Potting and follow-on aftercare of young plants after overwintering is the last factor that needs to be highlighted. Each nurseryman pots-out magnolias during the next spring or later in the growth cycle. Time of potting, quality of substrate, water availability, and sunshine during the first summer have the main influence on the growth of new shoots.

Percentage of rooted cuttings range between 50 to 100. The eventual plant yield is 85% to 95% of plants propagated. A 60% yield of rooted cuttings is considered economically viable.

The range of magnolias grown is less in the Czech Republic (4 to 9 taxa) than on English nurseries (12 to 86 taxa, although 12 to 20 of them account for the bulk of production). The different climatic factors and slow export of new hybrids and cultivars to the Czech Republic are the main causes of this situation.

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APPENDIX

Magnolias Typical in Both Countries

- *Magnolia* 'Susan', 'Jane', and 'Galaxy'
- *Magnolia* ×*loebneri* and cultivars 'Merrill' and 'Leonard Messel'
- *Magnolia* ×*soulangiana* and cultivars 'Alexandrina', 'Lennei', 'Rustica Rubra'
- *Magnolia stellata* and cultivar 'Royal Star'

Magnolias Typical Just in England*

- *Magnolia* 'Athene', 'Atlas', or 'Apollo'
- *Magnolia* 'Butterflies'
- *Magnolia* 'Elizabeth'
- *Magnolia grandiflora* and cultivars
- *Magnolia campbellii* and cultivars
- *Magnolia* ×*proctoriana*
- *Magnolia salicifolia*
- *Magnolia sieboldii*
- *Magnolia sprengeri* and cultivars
- *Magnolia virginiana*

* Propagated by grafting, excepting *M. grandiflora* and *M. sieboldii*.