Propagation of Magnolias: Rooting Techniques, Post-Rooting Care, and Overwintering of Rooted Cuttings

Alexander Howkins
Specimen Trees Wholesale Nurseries Ltd. 18598 Advent Road, Pitt Meadows, British Columbia, Canada

Magnolia species and cultivars of *Magnolia acuminata*, *M. denudata*, *M. kobus*, *M. liliiflora*, *M. ×loebneri*, and *M. ×soulangiana* comprise an important sector of both retail and landscape contract sales for Specimen Trees Wholesale Nurseries Ltd.

Specimen Trees Wholesale Nurseries Ltd. is located in Pitt Meadows, a part of the greater Vancouver area in southwestern British Columbia. The nursery is comprised of 480 acres, 16 acres in container, 6 acres under poly greenhouse, and a 9000-unit pot-in-pot system.

We produce four species and 13 cultivars of magnolias (see List A). Approximately 2000 units of each magnolia taxa are produced in rooted plugs, #2 pot, or #15 pot. Field-grown stock is grown from 1.25 m to 3.5 m in size.

The greatest hurdle we have overcome over the past 8 years, is the successful propagation of magnolias from cuttings, making them a viable crop for our business. Magnolia cuttings are readily rooted, however, the overwintering of the cutting has proven most difficult.

CUTTING STOCK PARAMETERS

Without exception, juvenile plants produce the best cutting material. We have found that cutting off 2- to 3-year-old plants has produced the best percentages in rooting.

The time of the year for taking cuttings is best done in the month of July to early August when the plants are still in active growth. The cutting material from the tree will vary in length from 2 to 3 ft. This material is in active growth, in other words, it has not set either flower or terminal buds. We cut in the morning and bring the material into the propagation house where they sit under micro spinners. This moisture keeps the cuttings in a turgid state until they are processed.

The cuttings are taken from the upright growing branches, not from the lower or lateral branches. Care is taken not to take cuttings from trees under any kind of heat stress or disease. The most common diseases in our area are *Pseudomonas syringae* (classic black interveinal blotching of the leaf) and *Microsphaera* sp. (powdery mildew is a white fungal bloom on the surface of the leaf). Both of these diseases can affect rooting percentages and over-wintering success.

PROCESSING OF CUTTINGS

Our propagation crew always produces at least a three-node cutting, which varies in length from 3 to 6 inches. A four- to five-node cutting is used for the smaller leafed cultivars, such as *M. stellata*. Each cutting will have the basal leaf stripped. The cut below the basal bud node is a straight cut. The cutting is dipped into ethanol-based IBA (5000 ppm). We use the brand Stimroot. Because of the pubescent nature of the magnolia stems, we do not use powdered rooting hormone as it cakes too heavily causing the end to rot. The dipping process only encompasses the bottom 1/4 inch of the cutting. We have tried higher hormone

treatments, but find this causes burning of the cutting. We have also tried wounding, but we find this to cause necrosis of the basal end of the cutting. Special quality control is continually administered by our crew when handling the cuttings. They are always looking for diseased material.

ROOTING SUBSTRATE AND VESSEL

We have tried over the years a number of mixes and vessels for rooting magnolias, and have found the following to be the best.

The mix is comprised of coarse peat, coarse perlite, shaved styrofoam beads(from 1 to 3 mm in size)(1 : 4 : 5, by volume). The shaved styrofoam is the most important ingredient in the mix, as it offers excellent air porosity, water movement, and light density.

The pH of the water in Pitt Meadows is 4.6 and the pH of the rooting substrate is about 5.6. The water in the Pitt Meadows is exceptionally pure and has a salt reading of 5 ppm. Because magnolia cuttings root easily and are also very susceptible to root trauma, we use 219 round and 529 square Jiffy products. Prior to this, we tried rooting magnolia cuttings in deep flats and plug trays, but both products had downfalls somewhere along the production line.

Both the 219 plug and the 529 polypak are peat moss cups, which we pack with the rooting substrate. The beauty of these peat plugs are that they are deep, so they hold the cutting securely, they are a semisterile product, and they offer no root disturbance at the time of transplanting.

The three-node cuttings are placed into the plugs to a depth of $1^1/_2$ inches with care to place the leaves, if possible, in one direction. The plugs eliminate the problem of overcrowding in the flats. This is very important because of the large leaf size of some magnolia cuttings. In the case of *M.* ×*soulangiana* and *M. accumata* cultivars, plugs are often skipped to give more space for their larger leaves. Once cuttings are stuck, they are watered in by way of a watering can, applying a 1% Captan solution.

Once the plug trays are stuck they are placed on the misting benches; receiving a bottom heat temperature of 75F (25C). The misting cycle is 5 sec on with 5-min delay. The cycle starts at 9:30 AM and goes off at 5:00 PM. The reason for the long mist cycle and period is because, magnolia leaves will leaf scorch; the leaf must be uniformly wetted. During the next 4 weeks the first signs of callusing are observed. In and around week 6 sporadic rooting takes place.

WINTER HUSBANDRY

During the early part of October visual inspection of the magnolia cuttings would show approximately 56% rooted and, in the case of some *M. stellata* cultivars, as high 80%. We have found that the plants that are still at the callusing stage will root during the winter months. Therefore, the only procedure we implement at this time is the removal of leaves. We only remove the leaves when the cutting has cast them. There are two reasons for this: the first reason is, it stops any movement of the cutting in the Jiffy pot; the second reason is, so there is no wounding of the leaf attachment area. During this period, we cut the mist cycle back to half its original cycle; the bottom heat stays the same.

By the first of November, all the leaves are removed. The above-ground section of the cutting is dormant, but below ground we still find that rooting is taking place. At this time, the mist cycle comes on every third day for 20 min around 11:00 AM.

This prevents the plug from drying out. The bed temperature is dropped to 55F (13C). The cuttings are held in this state during all the winter months. The air temperature varies from just above freezing to a high of 50F (10C).

As the days get longer in February, the bottom heat of the beds are turned back up to 70F (21C). The mist cycle is on once a day for 20 min around 11:00 AM; this stimulates root growth. About 90% of the cuttings will now be rooted. With roots now active, we top dress the plugs with Nutricote 17-7-9. I also feel that liquid feed would be beneficial at this time, but our system does not allow for it.

BUD BREAK

Around the first week in March, the buds start to swell. We now remove the plugs from the mist benches and put them into our hardening-off area. Here, the air temperature is approximately 50F (10C). The reason for removing them from the heated benches is because, if the leaves break dormancy on the benches they flush very tender and are very susceptible to fungal attacks.

The rooted cuttings sit in the hardening-off area, depending on the year, from late March to early April. If you are in the business of selling plugs, grading and positive identification of strong rooted cuttings is very easy, as they have extensive root systems; to the point of pushing themselves right out of the plastic plug trays. Because magnolia cuttings are so susceptible to root disturbance, you can now present to your potting crew an easily handled liner.

In this day and age, where plastic waste is becoming more and more of a problem, this alternative of a peat plug eliminates the need for 2¼-inch–plastic pots.

In closing, we have had great success using this same technique on *Carpinus betulus* 'Fastigiata', *Cornus kousa*, *C. mas*, *Davidia involucrata*, and *Parrotia persica*.

LIST A

Magnolia 'Butterflies' (*M. acuminata* × *M. denudata* 'Sawada's Cream')
M. denudata (syn. *M. heptapeta*)
M. kobus
M. stellata 'Royal Star'
M. ×*loebneri* 'Ballerina'
M. ×*loebneri* 'Leonard Messel'
M. ×*loebneri* 'Merrill'
M. 'Ricki' (Kosar hybrid)
M. 'Randy' (Kosar hybrid)
M. 'Susan' (Kosar hybrid)
M. sieboldii
M. ×*soulangiana* 'Alexandrina'
M. ×*soulangiana* 'Rustica Rubra'
M. 'Legend'
M. liliiflora 'Nigra'