Chip Budding Hard-to-Root Magnolias©

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For many years, magnolias have been one of my favorite groups of plants. Their glorious spring flowers, with a variety of shapes, colors, degrees of fragrance and bloom time, make them as a group some of spring's most magnificent flowering plants.

Not all magnolias are easy to propagate by cuttings. In fact, some have proven to be so difficult that the low percentage of success renders them virtually not economical to reproduce. At Pleasant Run Nursery, we propagate our magnolias by the method of chip budding. This has proven to be so successful that we rarely fall below a 90% bud take. Over the years, we have learned a few techniques, which have helped to keep our percentage of take consistently high.

In the spring, we purchase bare-root *Magnolia kobus* seedlings, which we immediately pot up in containers. We prefer to use *M. kobus* over *M. acuminata* because our bud take is significantly better with this species. The size of understock that we prefer is 3/16 inch or 1/4 inch in caliper; this ensures a proper size at the time of chip budding. We pot the understock in a 1.60-gal container (trade #2) in mid-March, using a medium-rate slow-release fertilizer. The understock is allowed to grow all summer, and by September it is ready for budding. The maturity of the budwood is what actually determines the start date of budding. What we look for are well-defined lenticels and the lack of really green wood. In New Jersey, this is usually from mid-September through early October.

Now that the understock and budwood are ready, the chip budding process can begin. The necessary tools include: a good quality grafting knife and medium-coarse sharpening stones, hand pruners, rubbing alcohol, clean rags, and 1/2-inch white polyethylene budding tape. First we prepare the understock by removing all leaves and secondary stems 6–8 inches above the soil level in the container. The understock is then brushed gently with a clean rag to remove any remaining debris. Next the budwood is collected. We usually try to collect enough for 1 to 2 days of budding at a time. It is important to use only current year wood and to try to find wood that has many vegetative buds, not flower buds. Good budstocks will usually have between 5 to 20 buds. Remove the leaves with hand pruners by cutting the petiole 1/4 inch from where it attaches to the budstick. This is also a good time to cut off the green or unripened wood near the tip of the budstick. Tie up the prepared budsticks in bundles and be sure to label each bundle. These can then be wrapped in moist burlap and stored in a cool place or a refrigerator. (If taken care of properly, budwood can be stored under refrigeration for several weeks without harm.)

Preparation of the understock to receive the chip bud can now take place. Find a smooth and straight area on the understock 2 to 3 inches above the soil level. Take the sharpened grafting knife and make a 1/8-inch-deep cut towards the base of the understock at an angle of about 20° to 30°, to form a small tab. Make a second cut about 1 1/2 inches above the tab and 1/8 inches deep. Push the knife blade down while maintaining the depth of 1/8 inch until this cut meets the small tab. At this time the small piece of wood should fall off to expose the woody tissue and cambium.

The next step will be to remove from the budstick a bud chip, which must be the same shape and depth as the cut in the understock. To do this, hold the base of the

budstick towards you and make a 1/8 inch deep cut with an angle of 20° to 30° about 1/4 to 1/2 inch, below the scion bud. Make a second cut 1/8 inches deep approximately 3/4 inches above the scion bud. Draw the knife down behind the bud to form the small veneer. Hold the scion bud chip between your thumb and forefinger. Do not touch the cut surface in order to avoid contamination of the bud union. The bud chip can now be placed on the cut made in the understock. The tab on the understock should hold the bud in place long enough to be tied in. A good bud chip to understock match should show a very narrow margin of exposed cut surface on the understock, around the perimeter of the bud chip. Small supplemental cuts can be made in the understock and bud chip to ensure a good match. Use caution not to touch any cut surfaces.

The bud should be tied in as soon as possible after the carpentry is complete. Remove an 8 to 10 inch long piece of 1/2 inch white polyethylene budding tape from the roll. Stretch one end of the tape over and beyond the basal cut and, maintaining tension, begin tying the bud in. Each wrap around the understock should have an overlap, keeping the tension steady as you cover the chip. Magnolia buds are quite large and fragile, so avoid covering them with the budding tape. Keep the wraps tight enough that all cut surfaces are covered and only the scion bud is exposed. Continue to wrap 1/2 to 1 inch above the chip and tie off with a half-hitch knot.

If the temperature remains warm, the budding tape can be cut off in 4–6 weeks. Callus tissue should be visible around the entire cut in the understock and the leaf petiole should easily fall off. If the callus tissue is not well formed, rewrap the bud chip and inspect in another 7–10 days. Removing the ties too early will cause the bud chips to peel away from the understock. Leaving the ties on too long can cause the bud chip to rot or the callus tissue to grow over and cover the bud chip.

Overwintering the chip-budded understock requires some preparation and attention. By late November, all of our understock is set pot-to-pot in an overwintering house, which provides some minimal heat. We cover the house with 55% 3-mil, white overwintering poly, and only provide enough heat to keep the pots from freezing solid. We have found that magnolia roots can be damaged in an unheated house during a very cold winter. By the end of February the understock is ready to be cut back. Using a sharp pair of hand pruners, cut off the understock about 1/16 inch above the top of the chip bud. The cut can be flat, although we cut at about a 30° angle with the short side being on the back of the understock. This allows the bud to callus easily over the understock cut.

As the weather warms, the buds will begin to swell and eventually elongate. When the buds are about 1 to 1 1/2 inches long we install Grow-Straights® (at this time we also rub off any understock buds, which may have begun to grow). J. Frank Schmidt and Son in Boring, Oregon, developed Grow-Straights. They are simply a piece of right-angled metal, pointed at one end so they can be more easily pushed into the soil. They are available in several lengths, and the 12-inch length works best for us. The Grow-Straights are pushed into the soil in front of the elongated bud, keeping the new growth inside the right angle. We find using Grow-Straights offers several advantages: they protect the bud from being blown off by the wind, they eliminate "dog-leg" (right angle) stems, and they reduce the need for staking certain cultivars. Our magnolias are ready for sale by mid May or the beginning of June the year after the understock is planted. Most cultivars are 2 to 3 1/2 ft tall at

this time. Some of the faster-growing cultivars may need staking, but we find most stems are strong enough to support themselves without flopping.

Chip budding magnolias offer several advantages over other methods of propagation. As was stated earlier, many magnolia cultivars are difficult to root. Also, only one bud is needed to produce a finished plant, unlike propagation using cuttings or grafting. Finally, chip buds are much more vigorous than grafts during the 1st year of growth. This vigor will provide a more robust liner for growing on or a significantly larger plant for the home gardener.

Correlation of Growing Degree Days and the Timing of Cuttings©

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INTRODUCTION

The proper timing for taking cuttings is essential for good propagation results. It is well known that some plants have very narrow time frames in which cuttings can be taken with any degree of success. Some obvious examples are *Euonymous alatus* and *Syringa vulgaris*; if the cutting wood is allowed to mature beyond a certain point, the percentage of rooted cuttings declines greatly. Alternatively, if cuttings of some plants are taken too early in the season, carbohydrates and essential cellular components are not in sufficient quantity to allow for good rooting. Therefore it is critical that the time frame for taking cuttings be watched closely. Violate the time frame, and deleterious results can be quickly found. For instance, *Scabiosa* and asters make two types of growth: one is strictly vegetative and the other gives rise to flowering. Cuttings taken of flowering shoots will often root, flower, and then die; they will not set the needed basal rosettes or buds that will bring the plant through as a perennial. One type of cutting essentially makes it an annual; the other type keeps the perennial characteristics intact.

This quest for the proper timing of cuttings for propagation depends heavily on a variety of tools for success. Calendars immediately come to mind but fall short of delivering consistent results. Weather conditions such as rain, drought, late frosts, early frosts, and a host of events that cannot be readily controlled have considerable influence. Calendars are useful as a starting place, but with many plants things have to be more quantitative. This technique has its drawbacks, though, in that plant development can vary from one year to the next as well as change based upon specific localities (Wunderground.com, 2005). Basing pesticide and chemical applications on a particular week of a calendar is not adequate. Orton and Green (1999) hit upon a good idea with their tome on correlating plant pests with the bloom time and other phenological expressions of plant growth. Their system worked by associating specific pests with specific activities of plants in a large area where it is known that a certain plant such as *Amelanchier canadensis* will bloom or leaf out at the same time period that a specific pest such as Gypsy moth begins to hatch. This technique goes back in time because *A. canadensis* is known as "shadbush" because it blooms at the same time that the shad (a fish) starts their annual migration up