

Redbud Propagation at Hidden Hollow Nursery®

Alex Neubauer

Hidden Hollow Nursery, 214 Tanager Hill Lane, Belvidere, Tennessee 37306

Email: amyandalexn@aol.com

INTRODUCTION

My name is Alex Neubauer. My father and I own and operate Hidden Hollow Nursery in Belvidere, Tennessee. One of the goals of our nursery is to propagate new and/or hard to propagate plant material. In order to reproduce new and superior plant cultivars selected for specific traits that may include flower or leaf color, improved architecture, or disease resistance, the plants must be asexually propagated by any number of methods. Many plants we grow do not root easily from cuttings or other methods, so our approach is budding and grafting. Budding and grafting is a skill (or maybe an art form) that has been practiced since before 2,000 B.C. in China and has persisted through today as an effective method to reproduce desirable plant clones. Grafting is a blanket term for many different techniques of attaching the tissue of one plant to another and then forcing it to grow. Today my talk will focus on the propagation of *Cercis canadensis* or Eastern redbud by budding at our Nursery in Middle Tennessee. *Cercis* is a difficult genus to propagate, and there are many new selections that have been made in the last decade or so with many more under evaluation for the future.

MATERIALS

Rootstock. To successfully transform a redbud seedling into a desirable and uniform cultivar that is ready for sale as a liner is a process that takes us 2 years. We begin the process by purchasing a healthy and hardy 1-year-old rootstock that is approximately 30 to 61 cm (12 to 24 in.) in height and ranges in caliper from 0.3 to 0.6 cm ($\frac{1}{8}$ to $\frac{1}{4}$ in.). We trim the roots to encourage branching and discourage one sided, or “J- roots.” The tops can also be pruned back to a uniform height for ease of planting. Planting takes place from late March through April using our small tree planter attached behind a tractor. We use normal, tidy cultural practices such as band spraying pre-emergent herbicides, administering granulated fertilizer, and regular watering through a drip irrigation system in order to ensure transplant success and to maintain vigor in our seedlings.

Scionwood. Scionwood is the shoot with the buds from your known desirable tree that will be attached to your rootstock and become your future cultivar. It is of utmost importance to begin with the correct scionwood. Some *Cercis* cultivars are easily recognized visually by their physical appearance, yet others are not obvious until later in their life. One example of the importance of proper cultivar identification happened to a customer we could not supply 200 ‘Appalachian Red’. ‘Appalachia’ was the original name Dr. Max Byrkit gave it but it has been transformed. Our customer purchased from a different supplier that did not take the critical step of procuring proper scion wood, so the next spring when they bloomed only two plants out of 200 were the correct ‘Appalachian Red’, proving to be a costly mistake for both parties. The best scions or budsticks are the current year’s growth that is pencil-size with some variation to match the diameter of your rootstock. Budsticks

can be collected from the current crop you are growing, or from stock plants maintained on the nursery.

We normally collect our ripe budsticks early in the morning, remove the leaves with a pair of clippers, wrap them in a wet towel, and place the budsticks in an ice chest until we use them up later in the day.

Tools. The main tools needed for a successful budding procedure include a good sharp grafting knife and a material to tie and hold the buds in place on the rootstock until callusing occurs. There are many knife manufacturers, but we prefer to use Tina brand knives. They are of high German quality — much like my father!

The material we use for tying, or “wrapping” the buds is called Buddy Tape. It is a pliable, parafilm-like material manufactured in Japan that comes in perforated segments on a roll. Each tab is 2.5 × 7 cm (1 × 2.8 in.) and comes on a 40-m roll of 500 tabs.

Conveniences. There are a few other items to make the arduous, but rewarding task of budding just a little more comfortable, but are certainly not required. Our entire budding season usually lasts for around 8 weeks so we indulge ourselves. The big one is the shade buggy with or without a radio. It is a metal frame on four bicycle wheels supporting a white sheet that you wheel along with you to provide shade. I highly recommend it! Other items to keep on hand might be a box of band-aids for the “greenhorn budder” and a bottle of Aleve® for your back. One item beyond our control is possibly proper alignment of the moon and stars, because while all conditions may seem perfect, the budding success can be less than so.

METHODS

The Slicing and Dicing. As everyone in this room knows, the learning curve in a nursery is huge. The way you started is not necessarily the way you do it now, and what works for some may not work for other propagators. We have successfully propagated *Cercis* by other techniques, but we have found chip budding to be the most practical method for our production. We bud from mid-August to late September when the rootstock is in a good state of growth and “juicy” in budder’s lingo. The scionwood is also still growing, but the buds are well formed and the bark has hardened so it is not easily skinned.

To begin the budding procedure in the field you must bend at the waist and back up to the rootstock, or straddle the row with the bud stick in the left hand and knife in the right hand for a right handed person. We always prefer to move to our left along the row with our wrapper close by on our right side. I first cut the chip out of the rootstock 2.5 to 3.8 cm (1 to 1 ½ in.) above the soil line. The knife is drawn horizontally across the rootstock at a steep angle to make the first cut, which I call the heel. The second cut is made approximately 1.3 cm (½ in.) above the first, drawing the knife through the plant just below the bark and skimming just above the pith to reveal the vascular cambium. The order can be reversed for personal preference. This chip of bark is removed and discarded leaving a long inverted U shape.

Next, with the bottom of the bud stick towards my body, a matching chip is cut that contains a bud to replace the one removed from the rootstock. With this procedure I usually make the long, smooth cut first, beginning above the bud and ending just below the remaining petiole or leaf stem. I slide the knife out from below the chip and make the second steeper and shorter heel cut to release the chip from the

scion. I then grab the chip between my thumb and index finger and gently push it onto the cut rootstock. My father grabs the chip between his thumb and his knife, again personal preference. In a perfect world the greenish cambial ring on your chip will exactly line up with the cambial ring on the rootstock. “Getting it right” will most likely occur sometime after 100,000 repetitions or more. Perfecting your technique in the beginning supersedes speed. You must take time and fight for every bud to live. A good stand is the ultimate goal. Speed comes with practice.

As the “budder,” once I am comfortable that I have made a good match, I let the individual working as the “wrapper” terminate the procedure. The wrapper takes a single tab of Buddy Tape behind the rootstock and stretches one corner around to the front and just below the bud with the left hand and holds this against the rootstock. With his right hand, he stretches the tab around the right side of the rootstock and over the first corner of the other side of the tab to initially secure it. The wrapper then continues to wrap the tab around and over the union until the entire site is covered, usually in four to five wraps stretching the tab as he goes. To finish is as simple as tearing the tab, while pulling against the rootstock or using the entire tab. A proficient budder can skillfully accomplish 100–150 buds per hour depending on cultivar. Straight, plump budsticks are much faster than skinny, zig-zag sticks.

AFTERCARE DURING THE CURRENT YEAR

Once budding is completed care for the rest of the year is minimal. It is important to maintain vigor and health, and keep the budded liners weed free for the next few months until the onset of winter and dormancy. It is possible after a few weeks to check the success of your budding. The Buddy Tape biodegrades and splits open. At this time you can see if the buds have attached successfully, or if they have been pushed out. A nicely attached bud shows sign of callus around the edges and is slightly sunken in the center. It should have normal healthy color and not look dry or brown. At this point you can check your take and decide if it would be beneficial to re-bud the unsuccessful plants. At our nursery we typically see a 75%–90% bud success rate. This of course does not mean we will ultimately harvest these plants, since as there are many other factors to contend with. These include early and late freezes (during the Easter 2007 freeze, we lost 80% of our crops), wind breakage, worker damage, animal and insect damage, and harvest damage. Again, you must fight for the survival and successful harvest of each budded plant.

AFTERCARE AND PROCESSING DURING THE SECOND YEAR

As fall turns to winter, we get busy with the harvest of finished trees for spring sales. The healed buds lie dormant during the winter. In mid- to late February we come back to our rootstock with the grafted bud attached and we remove the top of the rootstock with pruners just above the top of the attached bud. This cut slopes from the top of the bud straight back at approximately a 30° angle. This step is very important so that the cut will callus and close up almost totally by the end of the growing season. This makes the plant straighter, stronger, and more resistant to disease, and of overall higher quality.

When the buds break dormancy, all the energy of the established rootstock is forced into the one remaining bud that was grafted. At this point we apply fertilizer, and shortly thereafter we place a fiberglass stake to maintain a straight stem and prevent wind breakage. Removing the top also forces many shoots, or suckers to arise from the rootstock below the bud union. These must be removed by pruning close to the rootstock. This process is carried out up to three times per season. By the third pass in mid-August, not many are found and the new clone is growing strong. May through August is spent tying the central leader to the stake and removing lower branches approximately every 2 weeks depending on growth rate. I estimate that we go over each tree nearly 20 times in two growing seasons from trimming the roots on the rootstock, planting, budding, wrapping, staking, cutting back the top, removing suckers and pruning, taping a minimum of five passes, harvesting, grading, bundling, storing, and final shipping — aside from the normal pest spray regimen.

CONCLUSIONS

The summer budded *Cercis* cultivars ultimately yield plants of 1.2 to 2.1 m (4 to 7 ft) with a stem caliper of 1.9 to 3.2 cm ($3/4$ to 1 $1/4$ in.) by the end of the following growing season, which are sold as liners. Other methods yield mixed results. Rooting stem cuttings is reportedly difficult and varies between cultivars. One study reported a maximum success of 83% on only one cultivar, although this appeared to be a deviation from the norm and well above the success reported in other investigations. *Cercis chinensis* does appear to root easier, but 2-year bed-grown plants are smaller in size than budded liners. While I have no personal experience, *Cercis* are being produced from tissue culture. They also tend to be smaller (Hotte, Hines, pers. commun.) and not readily available to the trade with limited cultivars being produced. It would take a minimum of 1 to 2 years to equal the size of a budded liner. Our personal experience and the lack of plants available to the market by other means of propagation leads us to believe that chip budding in the nursery on established rootstocks is a very successful and viable method for producing cultivars of *C. canadensis* and var. *texensis* liners in Middle Tennessee. Important *Cercis* cultivars in the trade, new cultivars, and desirable characters needed in future cultivar development are listed below.

Important *Cercis* Cultivars.

- *canadensis* 'Appalachia Red'
- *canadensis* Lavender Twist™ pp#10328
- *canadensis* 'Floating Clouds'
- *canadensis* 'Forest Pansy'
- *canadensis* 'Hearts of Gold' pp#17740
- *canadensis* 'Pauline Lily'
- *canadensis* 'Royal White'
- *canadensis* 'Silver Cloud'
- *canadensis* 'Tennessee Pink'
- *canadensis* var. *texensis* 'Traveller' pp#8640
- *reniformis* 'Oklahoma'

Important New *Cercis* Cultivars.

- *canadensis* 'Ace of Hearts' pp#17161: smaller symmetrical stature
- *canadensis* 'Alley Cat': superior variegation
- *canadensis* 'Kay's Early Hope': one of the showiest and earliest to bloom redbuds
- *canadensis* 'Litwo' Little Woody pp#15854: smaller bluish textured leaves
- *canadensis* 'Ruby Falls' ppaf: purple leaved and weeping
- *canadensis* 'Merlot' ppaf: *C. canadensis* var. *texensis*: × *C. canadensis* hybrid with thick, glossy purple leaves

Desirable Traits Needed in Future Cultivar Development.

- Weeping and variegated
- Red leaves with variegation
- Double flowered with better color and architecture