Thread Grafting Made Simple (And Successful!)

By Randy Bennett

How many times have you styled a bonsai only to wish that you had a branch in this location or that, rather than settle for what was available on the tree. Well, for many deciduous and evergreen varieties, the possibility is there by using a relatively simple technique known as "thread grafting".

Just the mention of grafting sends many a bonsai enthusiast into a state of panic. They may have read articles before on grafting and pictures like the ones below come to mind. The thought of having to take a cutting, cut it at the precise angle needed, cutting into the trunk or branch of the parent tree and lining up the tissue from the cutting to the host when the tissue they need to line up between two is only one cell thick… well to many, it seems like a roll of the dice and the dice are from a crooked game!

Cutting to grafted onto the bonsai

Cutting into the branch of an established bonsai

Lining up the cambium of the cutting with the cambium of the host

Sealing the graft union to prevent the cutting from drying out

Yes, well this is <u>NOT</u> what I'm talking about! The truth of the matter is, there are many methods of grafting: side-veneer grafts, splice grafts, whip and tongue grafts, saddle grafts, bridge grafts, inarch grafts and approach grafts. And many of these can be applied to grafting roots as well as branches. But what I am talking about is thread grafting.

Any explanation into the process of thread grafting needs to begin with three words… **DO NOT PANIC**! It's going to be okay. I promise. This method of grafting is relatively simple and straightforward. It can be utilized to add branches as well as roots wherever you need them and can be used with most deciduous trees and evergreen species. More importantly, it is almost fool-proof – meaning any fool can do it. Basically, it consists of drilling a hole through the trunk or branch of a tree, "threading" a shoot through the hole and allowing the shoot to graft itself to the trunk or branch as the shoot grows. Now obviously, there is a little more to it than that, but that is the basic idea.

So here are the specifics

Step 1 : Let it grow! Let it grow! Let it grow! It is important to have a healthy tree on which you have allowed at least one shoot to grow quite long. If you have multiple branches that you wish to thread graft onto your tree, then you will need multiple long shoots. An alternative is

to use a shoot from a separate tree of the same species or even the trunk of a “whip” of the same species.

The important point to remember, if you choose to use a separate source for the thread grafted branch, is to make sure that the leaf size and shape are the same. For example, Japanese green maples and trident maples can have multiple leaf patterns – even among the exact same species. So make sure that your source material is an exact match for the host tree.

Step 2: Choose the right time. In South Louisiana, the best time to perform this technique is in late January – before buds begin to swell.

Step 3: Get all your materials together ahead of time. You will need: a drill, a sharp, small-bladed knife, utility knife or Exacto knife, a set of drill bits, cut paste or putty, blue painter’s tape, a felt-tip pen, a small piece of wood from which you can cut a tiny wedge the size of a matchstick and bonsai wire appropriate for the size of the shoot you are going to thread graft.





Step 4: Pick the shoot to use as the thread graft. If you are using a shoot(s) from the same tree, you will achieve the best results if you select a shoot(s) near the apex of the tree. These shoots will typically be the most vigorous and will, therefore, be the quickest to graft onto the trunk or branch. Most trees are top-dominant, so using a lower branch may take a little longer to successfully graft.

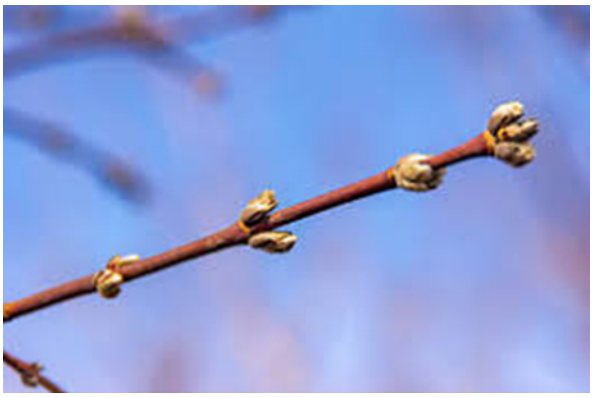
Step 5: Wrap the painter's tape tightly around the trunk. This is an old trick of woodworkers to keep wood from splintering when sawing or drilling holes. Wrap blue painter's tape tightly around the trunk of the tree where the grafting will take place, being sure to cover where the thread grafted shoot will enter and exit the trunk. Although this step is not absolutely essential, it helps to prevent the bark from tearing as the drill bit exits the trunk. If you use the tape trick, you only need to go around the trunk one time, leaving enough tape after the wrap to stick to itself. This step is not one to use on trees with rough or thick bark, but it is especially useful on thin-barked trees like Japanese maples, crepe mytrles, etc.

Step 6: Think about the angle of the new branch. Do you need the grafted branch to exit parallel to the ground, at an upward angle or at a downward angle? If at an angle – how much of an angle? Once you have decided, use the felt-tip marker to mark the tape or the trunk where the shoot will enter and mark the other side of the trunk where you need the shoot to exit.

Step 7: Test your shoot. You have to make sure that whichever shoot you use, it is both long enough to thread through the trunk and flexible enough to handle the bend and angle of exit. Most importantly, you need to make sure that there will be sufficient length on the exit side to ensure that the shoot, once it leafs out, will have sufficient light and room to grow. The shoot that you use to thread-graft will become a primary branch if it is going through the trunk. Using the felt-tip marker, mark behind the bud that will eventually form the first secondary branch of the shoot as it exits the trunk. On the shoot to be grafted, make sure that the bud closest to the trunk is in a lateral position and not a vertical one.

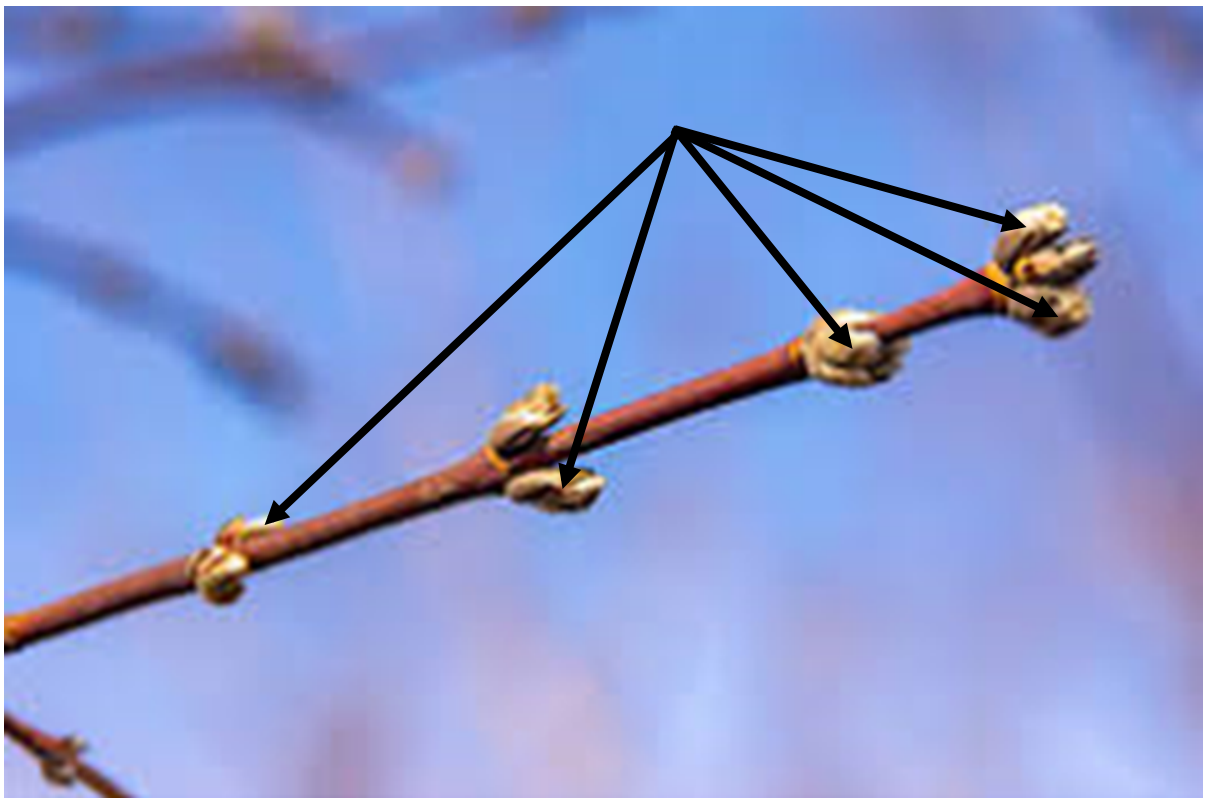
Some species, like elms, are not a problem. They have an alternating bud pattern along their shoots, so it is easy to thread through the hole you drill. Other species, like trident and Japanese maples, have opposing buds, which makes threading the shoot more difficult.

Dormant buds on an American elm



Dormant buds on a green Japanese maple

IMPORTANT: The thing to do when using a species with opposing buds is to rub off one of every pair of buds that will form the grafted branch. <u>Moreover, you must make sure that the first bud exiting the hole in the trunk is in a horizontal position and not a vertical one.</u> You must perform this task with consideration and forethought. The photo below illustrates which buds to remove when you have a species with opposing buds. Holding the branch in position alongside the trunk as you test your shoot in Step 7, you can rub off all the buds that will be growing downward, as you can see in the photo below. As far as the lateral buds are concerned, be sure and alternate bud removal to first one side and then the other as you move out along the length of the branch.



Step 8: Wire your shoot. Anchor the appropriate size bonsai wire where the shoot you are going to use emanates from the tree. Wire the shoot just short of the point where it will enter the hole going through the trunk. The purpose of the wire is to hold the curving shoot in position as you begin carefully threading it through the trunk. You will not be able to hold onto the branch the entire time, so you need it to stay in position once you bend it. without proper sized wire, it can pull back out of the hole, which can damage the buds.

Step 9: Choose your bit. You need to select a drill bit that is slightly larger than the shoot you will use for the thread graft. Don't forget to include the dormant buds. They will add to the diameter you need. But you don't want to make the hole too big. You want it to be a slight challenge to get the shoot through the hole without damaging the buds. You can always make the hole a little larger if you need too by using a bit the next size up.

Step 10: Drill the hole. Once you have marked the entrance and exit point on the trunk and selected the size drill bit needed, it is time to drill the hole. You will increase your success by using a new, sharp drill bit. My advice here is to use a smaller bit to make the initial hole, then swap out the smaller bit for the size you need. It creates less damage.

IMPORTANT: You must begin drilling on the side where the shoot will exit the trunk. This will help to insure minimal tearing where the graft union will occur. If you are able to use the painter's tape, the results will be even better, since the tape will help prevent tearing of the bark and the cambium tissue. Once you have drilled the hole, remove the painter's tape.

Step 11: Cut your wooden wedge. Using your knife, cut a small wooden wedge that will fit inside the hole. Your wedge need only be about one to two inches long. It is important to make sure that you cut a wedge that has a long gradual taper and not a short, abrupt one. Some people do not use a wedge and simply seal the wound. However, in my experience, using a wedge helps to increase the chances of success, especially on certain species, and increases the speed at which the graft union occurs.

Step 12: Clean the exit wound. If there are any ragged edges or any tearing around the exit would from the drill bit, you will need to take a sharp knife and cut them clean and smooth.

IMPORTANT: DO NOT MAKE THE EXIT HOLE ANY BIGGER.

Step 13: Thread your branch through the hole. Carefully and gently begin threading the shoot through the hole. Watch the buds as you maneuver the shoot through the trunk. You do not want to damage them or accidentally knock them off. In addition, keep the shoot at the appropriate angle while threading it through and make sure that the first bud of the branch that will be grafted is in a horizontal position and not vertical.

NOTE: Some people suggest scraping the bark of the shoot where it exits the trunk in order to expose the cambium tissue. I have never found this necessary. In fact, it is sometimes detrimental as you are more apt to damage or rub off dormant buds pulling it back out of the hole in order to scrape the shoot. In addition, you may accidentally remove the one-cell-thick cambium layer.

Step 14: Insert your wedge. Once you have the branch snugged into the hole, take the wedge and insert it into the hole **UNDERNEATH** the shoot as it exits the hole in the trunk. Push it in tightly. You want a firm, snug point of contact between the top of the shoot and the top of the hole.

Step 15: Seal the entrance and exit wounds. Whichever type of cut paste you prefer to use, seal both the entrance wound and the exit wound. The purpose is to keep air out. You want the wounds to heal quickly and avoid any dieback of tissue.

Step 16: Finish wiring the branch. Once the process is complete, make a full circle (not too tight) around the trunk to serve as an anchor, and gently wire the rest of the shoot out to the tip. This will help hold it in position. Make sure your coils are on the loose side. Hopefully, you have enough length in your shoot that you can wire the tip of the shoot up. This will help ensure that the auxins (growth hormones) that are concentrated in the tip of the shoot, will remain strong and provide vigorous growth when the shoot leafs out.

This is a Japanese Red Maple on which I thread-grafted a couple of branches. Alright, maybe I did go a little overboard.

Step 17: When to know that the graft has taken. As buds pop and the shoot begins to grow you will need to keep an eye on the wire you applied to make sure it does not cut into the bark. How quickly the graft takes will depend on the species and more importantly, how fast the shoot grows.

The photo below illustrates a thread graft performed on a branch. The shoot was threaded through the left side of the branch and exited the hole on the right side of the branch. If you look closely, you will notice that the shoot on the right side of the branch is now much larger than it is on the left. You will also note that a “collar” has formed around the wound. That “collar” is callous tissue that formed during the healing process. Those two factors are the visual clues that the graft has successfully been completed. If you have part of a wedge sticking out at the bottom of the graft, simply cut it off with concave cutters and add some more cut paste.

At this point it is now safe to cut the shoot off where it entered the trunk on the left side of the branch and seal the cut. The shoot that was used to create the thread graft, can now be returned to its' original position or removed if no longer needed.

The newly created thread graft is still fragile. Allow it to grow unchecked for the rest of the growing season and wait until fall or winter to wire the branch. If it has not grown much after removing the shoot from the entry side of the trunk, let it grow freely for another year before pruning or wiring it.