

Successful Japanese Maple Grafting: From a Grafter's Apprentice

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INTRODUCTION

Japanese maples (*Acer palmatum*) are among the aristocrats in our landscapes. We often consider them as status symbols in our yards. When a plant reaches this level of celebrity, it allows nurseries to get a little added value for their efforts. Japanese maples seldom fall into the category of hollies, junipers, or azaleas. These plants are often specified by the hundreds by landscape designers. Typically Japanese maples are specimen trees or shrubs with only one or two plants specified per landscape job. However, with some additional marketing and landscape demonstrations, mass planting of 'Tamukeyama' or 'Waterfall', a screen row of 'Moonfire' or a small border hedge of 'Shaina' could be a possibility. Like many of our other plant groups, there is probably a Japanese maple with a form, texture, size, color, and site tolerance to fit almost any landscape requirement. There are opportunities for imaginative, artistic nursery producers to create some unique plants by training limbs into artistic forms, or using the vast array of cultivars to select plants to put on standards such as 'Shaina' or 'Koto No Ito'. Opportunities also exist to develop container gardens with Japanese maple cultivars as the center of attention for patio and business entrances. Production of bonsai plants is also a possible niche.

The toughness of Japanese maples belies its price. They are very drought tolerant when established, with few insect and disease problems. Most Japanese maples do not do well in wet sites and many cultivars suffer in the South when planted on southern or southwest exposures. This paper is about propagation of these special plants with an emphasis on grafting.

This information is not my own success story but comes from my observations and view as an apprentice grafter. I have done hundreds of grafts whereas the individual I worked with performs several thousand grafts each year at his nursery and as a contract grafter for other nurseries. Harold Johnston of Johnnies Pleasure Plants, in Tallahassee, Alabama, has a small back yard mailorder nursery with a collection of close to 300 cultivars, including a recently patented cultivar he released under the name of 'Beni Shien' ('Purple Smoke'). It is true that there is an art and science to grafting. I learned the science at school but I needed a professional grafter and repetition to begin to learn the "art" and "feel" of grafting. I am not sure if the "art" is taught as much as it is absorbed through observation and practice.

TOOLS OF THE TRADE

The tools of the trade include a sharp grafting knife, sharpening stone, leather strap, 15-cm (6-inch) budding rubbers or grafting tape, hand pruning shears, a 20-cm (8-inch) concave bonsai cutter, small cooler, 1 qt zip-lock [5.1 cm × 15 cm (2 inch × 6 inch) or 5.1 cm × 20 cm (2 inch × 8 inch)] 2-ml plastic bags, twist ties or clothes pins, plant or pot tags, fine point Sharpie® pen or water-proof marker, comfortable back supporting chair, work bench or grafting table, and a shaded area or comfortable place to work.

A very sharp knife made of good steel that will hold an edge is crucial for obtaining a smooth cut. Ragged cuts from dull knives can cause poor contact and graft failure. Not being a knife expert, I went to A.M. Leonard Tool catalogue (phone:800-543-8955) and bought one of their most expensive Tina 640T grafting/budding knives for around \$50. This reasoning has worked well for me. Some people use razor blades and exchange the blades as they become dull. The plastic bags along with the twist ties are used to form a mini-greenhouse to cover the scion and graft, and can be purchased from National Bag Company, Inc. (phone:800-247-6000) or Consolidated Plastics Company, Inc (phone: 800-352-1000). The bonsai concave cutter has been very helpful in removing the understock after the graft has "taken". It allows you to make a closer, more precise cut. This tool can be purchased from John Vermeulen and Son, Inc., Neshanic Station, New Jersey for \$35 (phone:800-824-2306). One tool that another individual, Robert Eiland, with 30-years grafting experience relies on is a micro visor (MFD Enterprises, Kerryville, Texas, phone:800-210-6662, which costs \$35). This is a big help if you wear reading glasses and have to constantly tilt your head back to see what you are doing. It also helps with the smaller scion wood. The other items are obvious or will become apparent with further description of the process.

UNDERSTOCK

One of the first steps in grafting Japanese maples is to get a source of understock. Harold either produces his from seed or purchases liners from Heritage Seedlings in Oregon. Seeds are collected in October just as wings begin to turn brown, but before the seed turns brown and dries out. Seeds are placed in hot water and soaked as water cools for about 48 h. They are then placed in Zip Lock plastic bags containing slightly moist sphagnum peat moss, labeled with the date and seed name and put into a cooler at temperatures between 0.6 to 4.4C (33 and 40F). Stratification continues for 100 to 130 days. Seed is broadcast and planted 0.6 to 1.3 cm ($\frac{1}{4}$ to $\frac{1}{2}$ inch) deep in 6.4 cm (2.5 inch) deep trays in February and placed under mist (6 sec every 10 min) in the greenhouse. The medium used is pine bark or peat and perlite (1 : 1, v/v). As seedlings germinate, they are fertilized with 150 to 200 ppm of Peter's 20N-20P-20K soluble fertilizer, once or twice per week. Seedlings are ready for transplanting by mid April and are transplanted to 10-cm (4-inch) or 3.9-liter (1-gal) containers and placed pot to pot under 50% shade. With fertilization and care, many of these seedlings are ready for grafting by August, which continues through February and March.

GRAFTING

Harold has tried many different methods of grafting but has settled on a side or side veneer graft on 1- to 4-year-old seedlings. He has used clonal rooted cuttings as understock but has not noticed a clear advantage over seedling rootstock. In a survey of several nurseries in England, France, and Italy, M. Studd (1997) reported successful field and container grafts using whip and tongue, shield, and side veneer grafts with graft wax. Vertrees (1992) reported successful grafts through chip budding, patch budding, and T-budding. Some Oregon nurseries graft in the field using a stick bud with 2 to 3 nodes. As with many other nursery practices, there are numerous acceptable production methods which achieve successful results. The method used depends on personal preference, the market, how it fits a nursery production system, climate, and other site conditions at the nursery.

Depending on the cultivar, Harold has found that he can begin grafting as early as late July when scion wood matures to a semihardwood condition. Harold continues to graft through March by using understock kept in an unheated greenhouse. Scion wood for February and March grafting is collected and submersed in water. Excess water is shaken off and put in a labeled zip lock bag. Scionwood can last up to 2 months or more in storage. Harold will often go through his stockplants and collect a hundred or more scions, stuff them in his pocket and take them to the grafting bench for grafting. I need all the insurance I can get, so I go by the book and collect the scions, put them in bags with labels and then place them in a cooler to take to the grafting bench. Harold's method does show that you have a large margin for error in collecting scionwood. Harold grafts onto understock in 10.2-cm (4-inch), 3.8-liter (1-gal), and 11.4-liter (3-gal) containers. The rootstock range from 0.6 cm (1/4 inch) diameter to 1.5 to 1.8 m (5 to 6 ft) tall trees. The larger trees are top worked with weeping cultivars or shrub cultivars to be used on a standard. As many as 8 to 10 grafts may be used on a large, branched understock to get a well branched, quick-maturing, weeping plant. Harold also creates vertical specimens by grafting up and down the stem using the same or different color and texture cultivars.

Harold's grafting is similar to textbook side veneer instructions. He locates a long, straight, smooth internode (either high or low on the stem depending on the cultivar and the desired results) and makes a shallow cut (15° or less depending on the thickness of the stem) about 2.5 to 3.8 cm (1 to 1.5 inches) with a sharp knife. He angles in a little at the base of the cut to get greater tension on the scion when it is placed on the understock. The cut should be done with a single stroke. Try to avoid whittling. Harold keeps his resulting flap on the understock. I like to remove about two-thirds of the flap so that I can better view the cambium layer and align my graft. After removing all but one or two leaves from the scion, the same shallow cut is made at the base of the scion wood with an additional cut of 45° made on the lower 0.6- to 1.3-cm (1/4 to 1/2 inch) opposing side. This forms a wedge to fit under the flap at the base of the understock cut. The short cut side of the scion is inserted under the flap on the understock and aligned with the scion at the edge so that the cambium matches. On large understock, the cambium layer is further from the edge. On finer scions like 'Filagree Lace', be careful to move the scion closer to the edge and not pull it out of position when wrapping.

Although grafting tapes can be used, Harold prefers budding rubbers. This is because of the tension you can apply and the ease of removal. If you fail to remove the budding rubbers, they often rot with no damage to the graft. Everyone develops their own style of wrapping. Harold begins at the base of the graft and secures the end of the budding rubber by overlapping the end during the first two wraps. He then adjusts the scion and makes the next wrap at the top of the graft. This secures the scion in position. He continues to wrap down the stem with good tension until he reaches the base. However, I continue to wrap from the bottom to the top and adjust the scion as I go. The final tie is completed by wrapping the budding rubber over the tip of your fingernail of your index finger on the last wrap around the stem. As you complete the last wrap, wedge the budding rubber beneath your index finger and release the tension. Pull your index finger back along the stem rolling the wedged budding rubber under the portion on top of your finger. The budding rubber rolls off your fingernail and pinches the tailing end, thus completing the tie. However, this is much easier said than done! The graft is completed by taking a plastic bag, placing

in over the scion, and pulling it down over the graft. This is secured by a twist tie or a clothes pin. It is an extra step but pulling the bag over the scion is easier if you make a 2.5- to 3.8-cm (1- to 1.5-inch) slit at the bag opening. The finished grafts are placed back under the shade structure. Within 7 to 10 days it is possible to tell if the graft has taken. The wood at the graft union dries and turns brown to black if the union fails. The bag should be left on the grafted plants for 3 to 4 weeks. Gradually untie, then remove the bags over the next 2 weeks. If dormant, leave the understock above the graft intact to protect the graft from accidental breakage. As buds begin to swell, cut the understock with the bonsai cutter and shift the plants to a larger container. Harold, with help, can graft between 500 to 600 plants in a day, and about 50% less if he is transporting all his plant materials and gathering his own scion wood.

GRAFTING TABLE

Our usual method of grafting was to grab a rickety chair, put it under a pecan tree, flip over a 5-gal paint or lard can, and bring a worn-out cardboard box of assorted grafting supplies along with a cooler of scionwood. We scattered 1-gal understock around the chairs to be grafted. This "system" was inefficient and hard on my back. I was always looking for where I put my knife or the marking pens. Grafted plants were mixed with the ungrafted plants. The chair was too tall for the bucket which made it hard to hold the understock at the right angle to make the proper cuts. My bad back, being inherently disorganized, and having a desire to make a day of grafting a comfortable and less frustrating experience, led me to the design of a grafting table (Figs. 1, 2, 3, and 4). The grafting table design is pictured below along with a new industrial, adjustable chair or stool (Global Equipment Co., Suanee, Ga., phone: 800-645-1232, Model CG252375, \$252). The cost of the materials for constructing the table was about \$70. A more thorough illustration of the design is available on our web site at www.ag.auburn.edu/landscape.

The table was designed for 1 or 2 people to graft at a time. The four pockets or trays in the center of the table hold your knife, sharpening stone, bags, twist ties, budding rubbers, markers, and tags. The trays can be removed when you are finished grafting and stored until next time. Your leather strap is attached to the table. Cut outs in the center are placed so you can get closer to your work. The shelf underneath the table allows you to take a 3.8-liter (1-gal) container and lean it against the table to give you a good 45° to make your cuts and wrapping easier. It also is a good place for your knife while you are wrapping the graft. Although it was not part of the design idea, the support board under the table was perfect for a footrest. The table is 1.1 m (3.5 ft) high which allows one to stand up and comfortably work in this position. You can put 30 to 40 1-gal, understock plants on one side. As you finish the grafts, you push them to the finished side. If you are grafting by yourself, there is a slide bar that pulls the hard to reach pots to you. After completing the 30 to 40 pots, you shift the completed grafts to a trailer and reload the understock. If you are fortunate enough to have some help, the other individual can keep the plants moved and restocked. It is a simple system that has worked well. If you do not have a good shade tree or air conditioned room, you may need to add a large umbrella to the design.

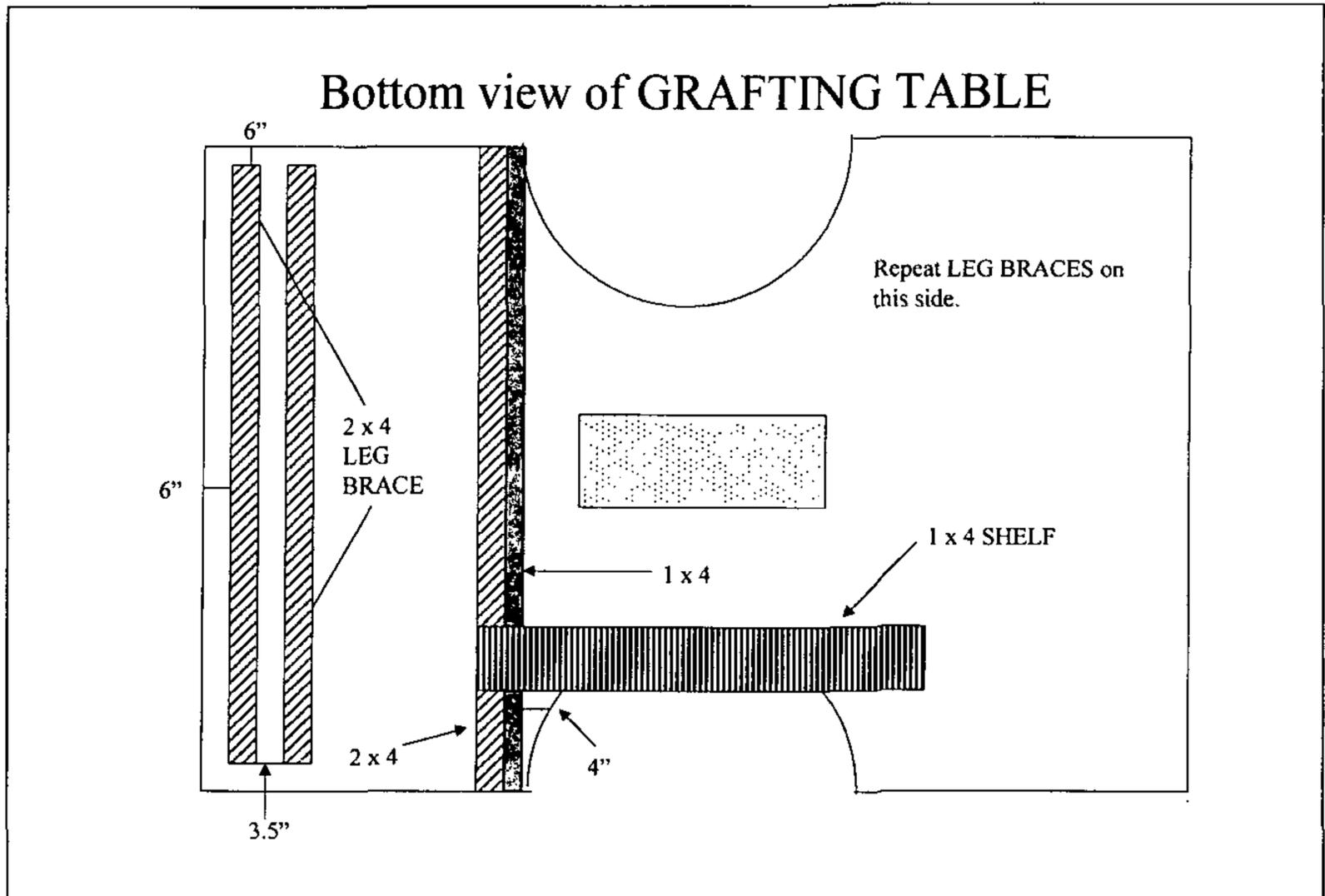


Figure 1. Bottom view of grafting table.

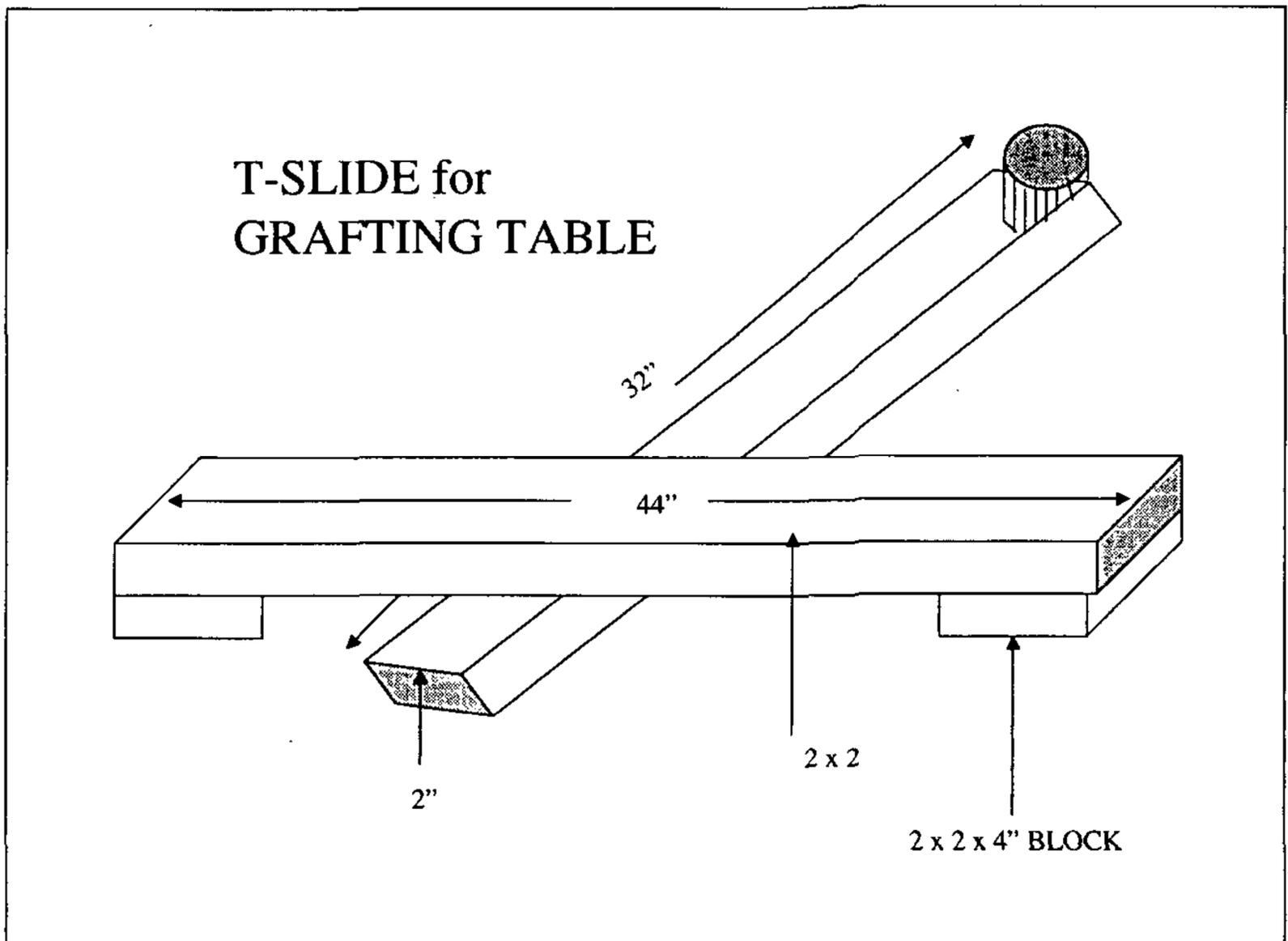


Figure 2. T-Slide for grafting table.

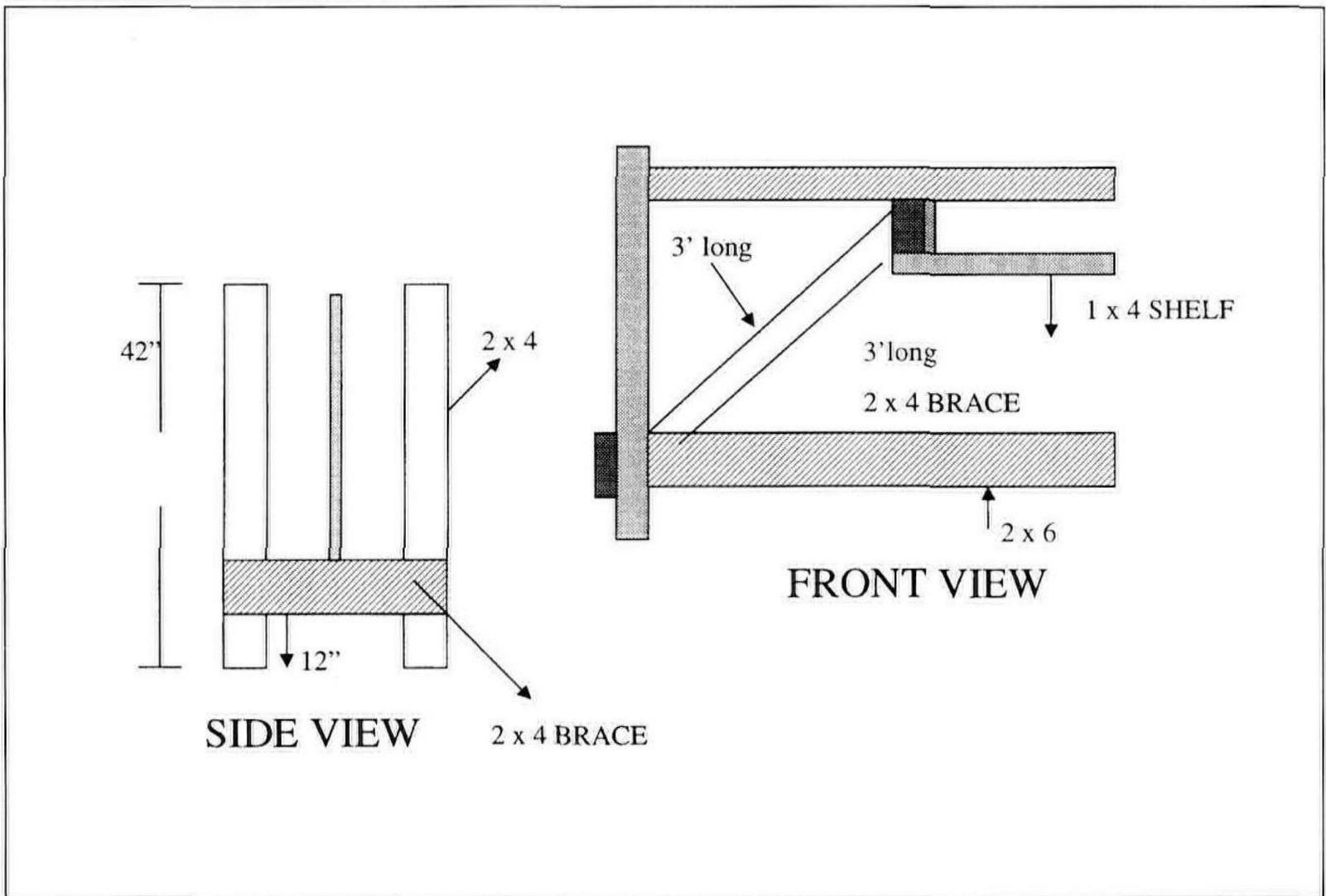


Figure 3. Side and front views of grafting table.

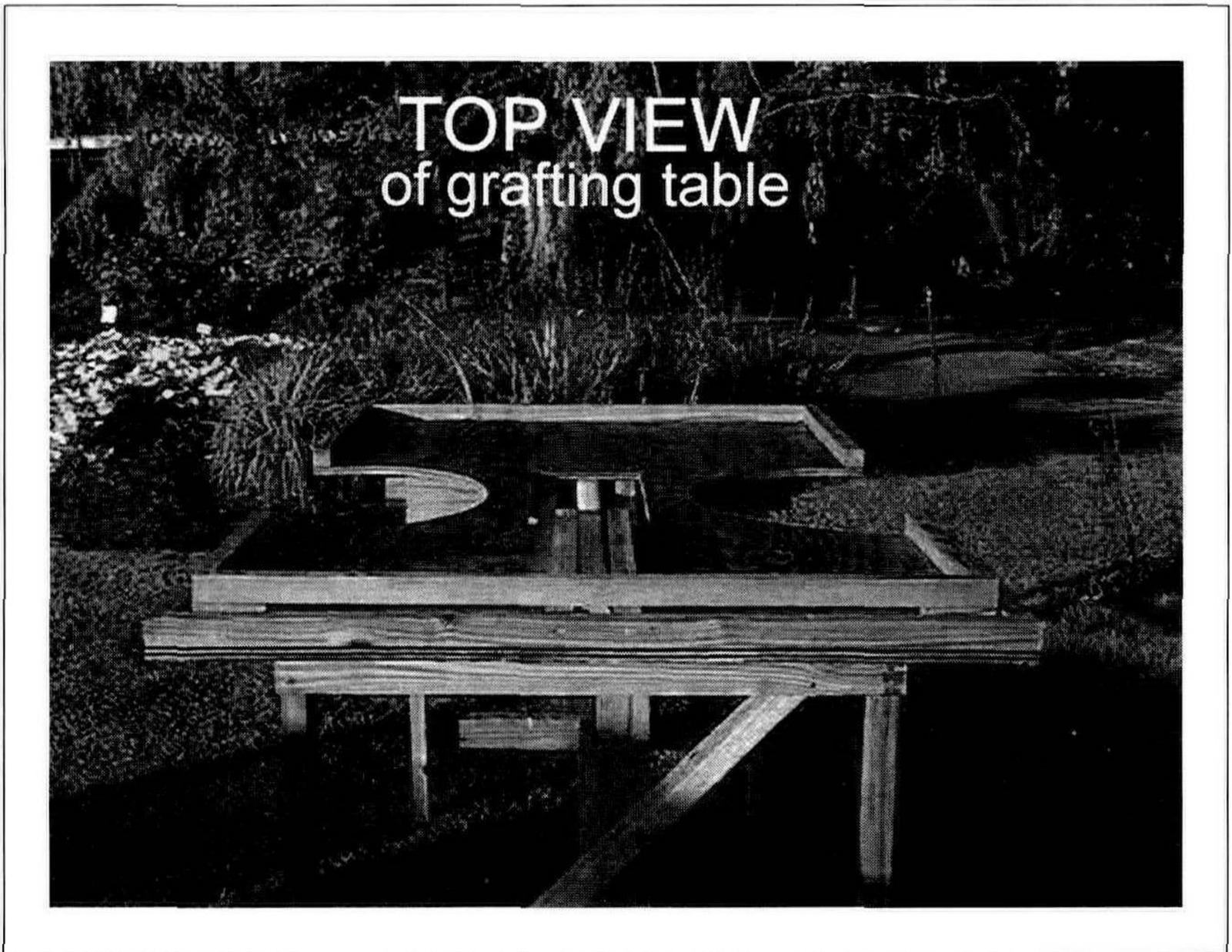


Figure 4. Photo of top view of grafting table.

CONCLUSION

Japanese maples are a special group of plants. With imagination, study, good marketing, and grafting practice, a nice niche can be carved out for a family nursery business.

LITERATURE CITED

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