Grafting Apple Trees

By Jesse A. Randall

Grafting is a procedure where two similar plants are joined together. The selected trees are chosen and grafted together because they both contain specific traits that are desirable. One individual is chosen as the rootstock, a plant with a healthy root system that can be selected based on its disease resistance, ability to grow well in your soil type, and most importantly the rootstock selection can control the overall size of the tree. The other individual is chosen as the scion wood, and it is a portion of a plant that has the desired fruit type, or in the case of non-fruit trees, the appropriate size, shape, disease resistance, appearance, or fall color.

Grafting Unions

Wedge

The wedge union is a very simple graft that is easy for beginners to learn and has high success rate for most fruit and ornamental trees. Before beginning to graft, make sure you have a sharp knife, pruners, rubber bands or plastic wrap, tree wound dressing or hot wax, a small wedge, and tough leather gloves or fish filleting gloves. Most of these products can be found at your local farm and garden supply store.

So you have decided to learn how to graft trees and you are going to start with fruit trees. The first question most have is “where do I go to find the different rootstocks”. There are several large nurseries that specialize in fruit tree production and will often have a site designated to their rootstock varieties, the benefits and drawbacks to each type of rootstock and the availability of each rootstock. We normally encourage folks to place their orders for rootstocks by January as these nurseries get busy lifting, grading, and shipping rootstocks by February and March. Once you have selected and ordered your rootstocks you need to obtain scion wood from the trees that you want to replicate. I normally harvest apple scion wood from neighboring trees of friends and family members before they prune their trees in late February. The scion wood must stay moist and dormant, and this is accomplished by wrapping the scion wood in wet newsprint and placing it in a plastic bag in the refrigerator. Be sure to tag each bundle of scion wood with the cultivar name of the tree and it is best to use write in the rain paper and only us pencil as regular pen ink will bleed when wet and be unreadable! The easiest way to harvest 1 year old scion wood is to cut the water sprouts or branch suckers that grow each year on apple trees. Do not harvest root suckers as they might be from the rootstock and not of the cultivar that you want to replicate.
Step 1: Once the root stock and scionwood have been selected, very carefully cut the scion wood into a wedge shape. It is best to cut this material from the center portion of the watersprout/sucker as this portion gives the best dormant yet developed buds. Aim for 5 good buds on the scionwood above the wedge as this gives you some insurance if some of the buds fail to grow. You only need one bud to actively grow! Commercial grafting knives (like the one pictured to the left) are sharpened on only one side making it easier to cleanly slice each half of the scionwood into a wedge. Hobby grafters can use a sharp utility knife to cut both the wedge and slit in the rootstock. (Photo shows the first half of the scionwood wedge formed. Grafter will now rotate the scion wood 180° and will cut a matching side to form the wedge). The cut wedge needs to stay moist so place it carefully in a cup of water or hold it in your mouth while you complete steps 2 & 3.

Step 2: Using pruning shears, cut the rootstock 4-5 inches from the root collar (about 5 inches the soil line). Then split the shaft of the rootstock lengthwise by initially rocking the knife back and forth to get it started into the wood. The split should divide the rootstock into two even halves. Always wear fish fillet gloves or extremely heavy leather gloves. **Word of Caution** – Most first time grafters will push the knife too hard and it will slice way too far down towards the roots, or it will dive off to one side or the other and when this happens it will most likely cut your pointer finger knuckle or the finger itself on the hand holding the rootstock. **Do Not Force the knife!**
Step 3: Carefully insert the plastic or wood wedge in the rootstock cut that you just made. This wedge separates the two halves making it easier to insert the delicate scion wood wedge without damage to the cambial layer of the scion wood. Normally the rootstock will be larger than the scionwood so pick the straightest edge on both the rootstock and the scionwood and those edges will be the ones that you match up. Place the wedge in the rootstock on the “non-straight” side that will be away from the scionwood.

Step 4: Place the scion wedge next to the rootstock split and make sure the wedge will fit. If not, repeat steps 2 & 3 to lengthen the cut. Carefully insert the scion into the split rootstock. Do not force the scion into the rootstock as this may damage the scion. Make sure to align the bark on at least one side (on the side opposite to the plastic wedge). This is the side that the callous cells and the vascular structures will first form. It is critical that the two cambial layers (rootstock and scionwood) meet along the length of the wedge.

Step 5: Starting from the bottom of the rootstock split, wrap the rubber band around the union. Overlap the rubber band by ¼ each turn to help seal the area. This forces the rootstock and scionwood together and begins the natural wound closure process. It is important to cover all exposed cut sections and it takes some practice to cover the top of the rootstock. With the commercially available grafting rubber bands, which are wider than most standard bands, and some practice you it gets easier to completed cover the top portion. It is important to note that on the non-scionwood side there will be a gap that is not filled with scionwood. This is normal! Lastly, as you wrap the rubber band up the stem make sure the scion wood does not move in the rootstock. If it does, you will have to unwrap the band and start step 4 over again. At least one side must align for the graft to be viable!
Step 6: Seal with tree wound dressing or melted wax. This seals the area which slows the loss of water. It is critical that the scionwood and the graft union do not dry out! This black wound coating also slows the built in breakdown of the rubber bands which normally breakdown slowly when exposed to sunlight. This means that the rubber bands will need to be carefully removed in 1-2 months when the tree begins to grow. Or they could possibly restrict the new trees ability to expand when growing. This could cut off critical water and nutrient transport up and down the stem.

Step 7: Place a tag on each tree rootstock with the scion cultivar name written in pencil. If you are not going to immediately pot the dormant apple tree and grow it in the house you will need to store your newly grafted seedling in a fridge. Put moist shredded paper or sphagnum moss around each root system to maintain moisture levels and place in a plastic bag. The new seedling should be laid flat in the fridge and checked weekly for moisture.

Step 8: Callus cells should form 1-7 days after grafting. The xylem and phloem (water and nutrient transport structures in trees) should reestablish after 2-3 weeks. Plant your grafted seedling after the ground thaws, but before buds break on the trees. Treat the graft union delicately as it will take a growing season or two to strengthen. Be prepared to stake the new growth to take the lateral movement stresses off the graft union. Depending on the rootstock selected for grafting you may need stake for several years. As a general rule, staking is need for more dwarfing rootstocks.

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