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Patch Budding for Top Working Olives

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Occasionally it may be desirable to change olive varieties. This can be accomplished by topworking existing trees to the more desirable variety. Traditionally this has been done using the bark graft method where scion sticks are inserted into the cambial area between the bark and the wood (see University of California Olive Production Manual - UC DANR Publication 3353).

Patch budding can be more desirable than bark grafting for topworking olive trees. It requires less scion material than grafting. It is faster and, therefore, less expensive. There is a longer period of time for the budding operation to be performed. There is less follow up required.

Patch budding is normally used on smaller trees or limbs (1/2 to 3 inches in diameter), but with some modification the technique can be used on trees or limbs 6 inches or larger.

Timing

As with bark grafting, patch budding must be done when the barks "slips" (easily separates from the wood). However, because the buds do not need to be forced when they are placed they can be left dormant until the time is right for pushing. Depending on factors such as seasonal climatic variation and limb size and limb position, the bark will usually start to slip around the middle of March to the first of April and continue until the end of August or September. The bark of smaller diameter wood will usually slip both earlier and later than large scaffold limbs. The bark of vigorous small diameter shoots may continue to slip into October and November. However, the slower growth rate at this time of year results in slower callus formation and reduced bud take.

Scion wood selection

Vigorous one to two year old shoots about the diameter of a pencil or larger are selected (Figure 1). When larger limbs are being worked, larger scion wood is more desirable. The leaves are removed without damaging the bud underneath. The bud wood should be used as soon after collection as possible to avoid drying out. If necessary, it can be placed in a bucket of water in the shade while being used or in plastic bags in an ice chest if longer storage is necessary.

Figure 1. *Scion wood, example on left has had the leaves removed.*

Small trees or limbs

To speed the operation, a double-bladed budding knife (with blades ¾" to 1" apart) may be used to ring the bark of the scion above and below the two buds at the node. A vertical cut is made between the two buds and the resulting patch is slipped sideways to remove it from the scion (Figure 2). This prevents the buds from remaining attached to the scion. If budwood is scarce or the shoot being budded is too small to accommodate the patch, while leaving a small strip of the original bark, the patch can be cut in half to separate the buds and create two smaller patches.

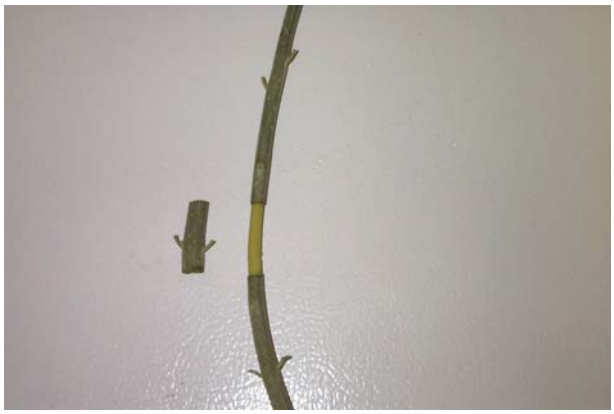

Figure 2. *Scion wood with patch removed.*

Using the same knife, a patch of the bark the same size as the budwood patch is removed from the tree to be topworked and replaced with the budwood patch (Figure 3). The entire procedure can also be accomplished with a single bladed knife.

Figure 3. *Placing the patch bud.*

The patch should fit closely, but does not need to be perfect. The patch is tied tightly to the tree (Figure 4). A wax based budding tape is ideal for this purpose because it will hold the buds securely long enough for them to knit with the tree but will stretch and break when the tree grows and will not have to be removed at a later date. With a wax-based budding tape, the buds can be completely covered. Budding rubbers or plastic budding tape can also be used. With the plastic tape, it is recommended that the scion buds not be covered and the tape be removed at a later date to avoid constricting the shoot.

Figure 4. *Patch tied with plastic budding tape.*

Check the buds two to three weeks after placement. If they appear to be well healed (Figure 5), they can be forced to grow by cutting the limb directly above the new bud. If the budding was done late in the season (late July or August), it may be desirable to allow the bud to remain dormant until the next spring.

Topworking larger trees

While patch budding is more commonly used on smaller trees, with some adaptation in technique it can be successfully used on larger trees with scaffold limbs 6 inches or greater in diameter. One problem with larger trees is that the bark on the limb to be grafted is much thicker than the bark of the patchbud and it can be difficult to insure adequate contact of the cambial layers to allow the patch bud to grow to the limb. One way of overcoming this limitation is to use the bark from the limb to press and hold the patch in place. To do this, remove the patch from the scion as described previously. With larger limbs it is helpful to use larger patches (buds cut from scions ½ inch in diameter or greater). In some cases, it may be desirable to use buds from two year old shoots. Hold the patch on the limb in the place where the bud is to be placed and cut through the bark of the limb to be grafted on the sides and top of the bud. Pry up the resulting bark flap and slip the patch bud underneath the bark (Figure 6). Wrap a piece of twine tightly several times around the limb (Figure 7) to press the bark flap tightly to the bud to hold it tightly in place. This method of patch budding is generally easier and more successful on smooth barked limbs as compared older limbs with cracked or fissured bark. This is probably because the smooth bark is more pliable and easier to conform to the bud. Thinning old fissured bark by removing the outer layer of the bark with a knife prior to inserting the buds will leave the more pliable inner bark which can be conformed more easily to the inserted bud.

Figure 5. *Well healed patch buds.*

A bud should be placed every three to five inches around the limb at the same level on the branch (similar to budstick spacing in bark grafting). All of the buds on the limb can be secured with one piece of twine at the same time.

It will take longer for the buds to grow to the scion on larger limbs. One month appears to be minimal and longer may be preferable before forcing the buds. After a month some of the ties should be removed and the buds inspected. If the buds appear healthy and well “healed”, the limb can be removed just above the new buds

Figure 6. *Patch bud being slipped under bark.*

Figure 7. *Wrap twine tightly around the limb.*

to force them to grow. The buds can also be forced to grow by removing a strip of bark just above the inserted bud (Figure 8). The time required for the buds to heal to the limbs may result in a short growing season. If the buds are forced too soon, their survival rate may be reduced. An alternative to forcing the buds the same year is allow them to remain dormant underneath the bark flap during the season of the budding and force them out the following spring. This alternative will allow a long budding "window" (easily from May through August) and can result in a higher survival rate, especially compared to forcing them too early.

Figure 8. *Bud forced to grow by cutting through bark just above the band.*

As with other types of topworking, one or two scaffolds are left on the south side of the tree to serve as "nurse limbs" to help maintain the root system. These are normally removed after one or two years when the buds have made adequate growth.

One possible drawback to budding larger limbs is the risk of the new shoots breaking off before they are adequately supported by the rootstock. These buds grow very rapidly and can quickly become quite large. They are only secured to the tree by the new wood that develops after they begin to grow and some limb breakage has to be expected. There are usually enough buds that grow to make up for the ones which are lost. If the buds grow rapidly, the risk of breaking out can be reduced by pruning the tips of the new growth to slow down the growth or by tying the new shoots to sticks or lath that is nailed to the tree.

Follow up

After the buds begin to grow, remove the competing buds that grow below the new buds to force rapid growth of the new buds. This may need to be done one to several times the first and second season. If this is not done, growth from the rootstock will outgrow the new buds and their growth will be limited.

Although much less problematic than with bark grafts, developing buds should be watched for infestation with American Plum borer (*Euzophera semifuneralis*) whose larvae feed on the callus tissue that knits the scion tissue to the rootstock. Their presence is indicated by the presence of frass (reddish sawdust-like fecal material) at the base of the developing buds. Their feeding can threaten the survival of the new shoots. Additionally, the developing growth from the buds may be damaged by feeding from cribriate weevils (*Otiorhynchus cribricollis*). These nocturnal feeders cause a characteristic notching of the leaves. Feeding damage on mature trees is normally of little consequence. However, because feeding damage is normally concentrated on the lower part of the tree where the buds are located, the growth of the buds may be stunted or even killed. Watch the buds for insect damage from these or other insects and, if noticed, treat with a registered insecticide.

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