

# Chip-budding of mature grapevines

Curtis J. Alley



Figure 1. First cut is at a 30-degree angle about 2 cm into the trunk.

**T**-bud grafting of grapevines has enabled growers to change varieties on mature vines by cutting off the tops of the vines about 30 to 36 cm below the bottom wire and replacing them by T-budding. This works satisfactorily in vineyards where (1) close attention is paid to the details of budding, (2) the *base* of the trunk is slashed to encourage bleeding low rather than near the bud, and (3) there is a closely-watched "follow-up" procedure of training new shoots and deshoooting latent ones that arise near the top of the trunk.

There is a big drawback to this procedure: the grower cannot begin budding until the bark "slips," that is the bark (phloem) separates easily from the wood (xylem). In the San Joaquin Valley the time of slippage varies from the end of April until early May. A method is needed to change over the head of the vine earlier in the season other than by cleft grafting, which must be done at ground level, or wedge grafting, which requires considerable skill. The latter method requires asphalt grafting compounds which have decided

disadvantages. The asphalt grafting compounds are water-soluble. If the vines are bleeding, which is generally the case, the grafting compounds will be washed away. If a rain occurs before the compound dries, it will be washed away. A few days after the compounds dry, cracks frequently occur in the dried cover and may permit the scion to dry and fail to grow. The grafting compounds, which are black, must be covered over with a coating of white, water-soluble, interior latex paint; otherwise, the absorption of heat on a hot, clear day will cook the scion.

What is needed is a method that requires little skill, results in a satisfactory take, and does not use grafting compounds. The chip-bud method can meet this need.

Results of experiments in 1977 and particularly in 1978 at Davis indicate that this method provides benefits equivalent to T-budding. The greatest advantage is that it permits the budder to start at least two months earlier, about March 1. Work this spring at the Kearney Horticultural Field Station at Parlier indicates that it may be

possible to chip-bud in mid-February. This headstart permits the re-establishment of a full-size vine head nearly as large as the original. With this large head re-established, the wood (vine growth) is well matured by the end of the year, a most important factor. Many vines in this test produced from 1.5 to 2.5 kilograms of fruit in one year. These arose from secondary clusters that developed into primary clusters as a result of the high vine vigor arising from the 9-year-old rootstock system of the original vine.

Chip-budding began March 10, 1978 at Davis when the vines were just beginning to bleed. The tops of the vines were not cut off. The vines were chip-budded at the same level as the vines that were T-budded. Growers who T-budded last year suggested that the buds be placed on the trunk about 35 to 45 cm below the lower wire on a two-wire vertical trellis. Vine trunks up to 8 cm in diameter proved satisfactory to bud; for larger diameters it was uncertain whether a satisfactory take could be obtained. On a large vine the side of the trunk having the

Figure 2. Second cut begins about 3 to 5 cm above first cut and meets base of first cut.



Figure 3. Chip removed shows slot cut into trunk.



greatest curvature was used to keep the size of the cut slot to a minimum so that the bud filled as much of the cut surface as possible.

The vine is prepared for budding by removing loose and dead bark from that area which is to have the bud inserted. Smooth, straight areas free from branches, scars, or injury marks should be selected.

Chip-budding requires more skill than T-budding in cutting the slot into the trunk of the vine to be topworked. The cut (notch) into the trunk is made in two steps. The first cut (lower) is made using a leather knife (having a 10 cm blade) and tapping the blade into the trunk about 2 cm, at about a 40-degree angle with a small mallet or ball-peen hammer (figure 1). The second cut begins about 3 to 5 cm above the first cut, entering at a slight angle and meeting the base of the first cut so that the chip (wedge) of the trunk that is removed will be about .3 to .5 cm thick (figure 2). If the size of the slot is small (in width), it will be easier to cut a bud that will completely fill the slot (figure 3).

Cutting the chip-bud is similar to cutting a T-bud. The largest bud sticks and buds are best to used because they most nearly fill the slot cut into the trunk. The bud is cut by starting about 3 to 5 cm above the bud and cutting in at a gradual angle to about 0.7 to 0.8 cm below the bud (figure 4). The second cut is made starting just below the bud in the leaf scar or with large buds, preferably about 0.2 cm below the bud, cutting in at about a 30-degree angle to intersect with the first cut. The chip is removed and examined to ascertain that the cut surface is flat (figure 5). Generally, the bud will be about 0.6 cm thick at the base. On bud sticks that are not straight the bud upon removal may have an angular surface below the bud; this must be straightened by

recutting the surface to flatness.

The bud is inserted into the slot of the trunk. On a trunk that is 5 to 8 cm in diameter, the bark will be about 0.3 cm thick. There is a distinct line of demarcation between the color of the live bark (light green) and sap wood (white). The cambium of the bud, located practically at the edge of the bud's cut surface, should line up with the cambium of the stock, which is where the inner edge of the bark meets the wood. On properly inserted buds, cut bark surface can be seen just outside the bud shield (figure 6). If the cut slot and bud are the same width, the bud will cover the slot entirely. However, when the bud is smaller in width than the slot, the bud will be inserted to have cambium contact on just one side of the bud and slot (figure 6).

On vine trunks from 2 to 3 cm in diameter, generally two buds are inserted on opposite sides. They do not have to line up in the vine row. Areas on the trunk having greatest curvature are given more importance for locating buds rather than having the buds positioned in the vine row.

The method of tying the bud(s) with white plastic tape has been changed from that used in T-budding. To conserve tape and time, the first wrap is made at the top of the bud to hold the bud shield in place (figure 7). The budder moves the tape from this position down to about 1 cm below the cut and starts wrapping upward. On trunks over 2.0 cm in diameter, 2.5 cm-wide plastic tape is used. On smaller trunks 1.2 cm-diameter tape is used. As the wraps proceed upward from below the bud, the tape should overlap about 0.6 cm. A complete single wrap is made over, centering the bud in the tape; this occurs only when 2.5 cm-wide tape is used. The 1.2 cm tape is wrapped around the bud.

The tape is stretched at all times as it is wrapped around the trunk. Wrapping is continued to about 1 cm above the top of the bud shield. The last wrap should be about 2 to 4 cm above the bud and held in place by lapping the end under the last wrap (figure 8). Locate the exact position of the bud under the tape; generally, it will protrude and form a smooth round bump. A vertical slit (0.3 to 0.6 cm) should be made carefully over the bud with the knife slitting only the tape and not into the bud. This slit will be enough to permit the bud to push through the tape. This slitting technique is much easier than trying to wrap around the bud as in T-budding. If the budder does not have a delicate touch, he/she should use the conventional method of tapping around the bud.

The top of the vine is not cut off until the buds on the canes or spurs of the old head have pushed out 3 to 5 cm. Studies from 1978 indicate that bleeding does not affect the take and growth of the chip buds as it does with T-buds.

After growth of the buds in spring, it may be necessary to slit and pull away the tape from just above the bud to prevent the shoot growth at the base from overgrowing the tape at this location. Because the last wrap of the tape is located well above this area, the tape will not unravel. The top wrap of the tape should remain in place above the bud and should not be disturbed until the end of the growing season.

The post-budding "followup" care in training the new head is as important, if not more important, than the budding itself. The shoots grow rapidly and must be frequently tied for support. The latent shoots arising from the top of the trunk must be removed.

*Curtis J. Alley is a Specialist, Department of Viticulture and Enology, U.C., Davis.*

Figure 4. First cut on bud stick begins 3 to 5 cm above bud and angles slightly to 0.7 to 0.8 cm below bud.



Figure 5. Chip bud removed shows cut surface below bud and basal thickness of about 0.4 to 0.6 cm.



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Figure 6. Cambiums are aligned on left side of inserted bud. A strip of cut bark can be seen to left of bud.



Figure 7. Taping of bud starts at the top.



Figure 8. Taping is completed with final wrap 2 to 4 cm above bud. Nose of bud protrudes from slit in tape.



Figure 9. New head growth is evident by end of season.