To graft or not to graft

By Tony Hoare

Many growers are looking at reworking vineyards in an effort to better meet winery expectations and keep pace with the ever-changing popularity of different winegrape varieties.

There seems to be a consolidation of what varieties work best in particular regions and have the greatest value for growers and wineries into the future. Field grafting, or top working as it is sometimes known, is a popular option for reworking vines to change varieties or clones. There are many questions growers will ask when comparing this option to replanting and I will endeavour to provide a few answers.

Commonly asked questions regarding field grafting or topworking

T BUD, CLEFT GRAFT OR CHIP BUD?

Each of these methods of grafting grapevines have their merits. Chip budding seems to be the most popular because of speed in covering large areas and high strike rate. Generally speaking, strike rates of greater than 90% should be expected from field grafting using the chip bud method.

WHAT CAN I GRAFT?

Almost any combination is possible with a trunk diameter above the size of a 10¢ piece. While an older trunk diameter is no limitation, they are more prone to trunk diseases such as Eutypa (Dead Arm) which will reduce the area for bud placement and can spread to kill the bud with time. Successful strike will also depend on compatibility of the scion (bud) and rootstock as well as virus status of all vine material which can be tested. So, onto the next point...

CAN I DO IT MYSELF?

Grafting is a skill that some people can acquire quickly while others struggle.

Part of the skill of the grafter relies on having four cuts made well. The back of the bud needs to be perfectly flat. The base of the bud needs to have enough of an angle and surface area to allow for a successful callus to form. The third cut made on the rootstock with the budding knife should be flat and have as small a surface area as possible exposed once the bud is placed in the cut. The fourth cut is the small "wedge" that is made at the bottom of the grafting cut in which the bud will sit. A dull "snap" sound should be heard when the bud is pushed into the wedge cut on the trunk and should sit firmly prior to taping. Consistency of cuts is then required to ensure a good strike and it helps to have a strong back.

TAPING

The art of taping is another separate skill that looks easy but can bring undone a perfect graft if not performed properly. Taping and tape selection are important. The white, one-inch tape is best. The textured version with good elastic strength makes taping easier. On average you can budget for 50 vines per roll (around 50m). This will increase with trunk diameter and depend on the efficiency of the taper. A figure-eight taping pattern around the bud going above and below the bud should allow an 'eye' pattern to secure the bud in place. Taping is not really that important in holding the bud in place and is more important for creating an airtight seal to maintain moisture in the bud before callusing occurs four to five weeks after grafting. If the 'eye' is not as small as possible without covering the bud, then the bud is likely to dry out and die. The ability to cover the ground in good time is an important consideration for taping and most experienced grafters have a separate taper to follow them and try to stay no more than five vines ahead to lower the risk of buds drying out.

Field grafted vines after one month, Barossa Valley, 2007.

TIMING

Optimal timing for grafting is September to February depending on the region. The warmer the region, the earlier start date, so long as the risk of frost has past. The buds are protected naturally before budburst from frost, however, any green tissue is then vulnerable to damage from extreme cold or frost. If there is a risk of frost, it is worth waiting until it has past. Wet spring conditions and water-logged vineyards should also be allowed to dry out prior to grafting commencing.

DOUBLES VERSUS SINGLES

Double buds or two buds per vine are highly recommended for the reason of insurance and for the simple reason of increased strike and maximum vineyard uniformity. Vine training passes are better used where at least one bud has shot. Some grafting contractors offer a free single bud 'regraft' service to cover replacement of small percentages of buds not taken first time around. This does not cover replacement of buds lost through the owner's or management's neglect or post-grafting responsibilities as discussed further in this article.

Pre-grafting preparation

VIRUS TEST ROOTSTOCK – WAITE DIAGNOSTICS

This is important as incompatibility between the rootstock and scion is caused by virus and this will interrupt the cohesion of the two. Symptoms of incompatibility are failure of the bud to callus or shoot, restricted shoot growth, reduced yield and delayed grape maturity or sudden death of the shoot.

From my experience, traditional clones of Merlot and Grenache tend to have the highest incidence of virus, with most having multiple viruses which increase the risk in grafting these varieties.

For further information on virus test rootstock work, contact Dr Nuredin Habili, Waite Diagnostics, The University of Adelaide, telephone (08) 8303 7426.

SCION WOOD

Purchase scion wood only from a reputable nursery and only use certified material. Each vine 'stick' should yield around four to five viable buds.

Scion wood should be disease-free and kept at between 2-5°C to keep dormancy prior to grafting. Re-hydration of the scion wood should be done 48 hours prior to grafting as a minimum and the wood stored in water at all times close to where grafting is occurring. This can be done in a picking bin or dam. Water quality should not be salty. Once buds are cut, they should also be kept in clean water and signs of oxidation monitored. Browning of the buds or floating buds should be discarded.

CUTTING OFF THE EXISTING CORDONS

Traditional vine removal by hand had been a limiting factor in deciding to graft or top work vines. The invention of a vine mulcher has allowed much more economic removal of vine cordons. This work can be done after a barrel pruner has removed the previous season's cane growth. The quality of the cut made by the vine mulcher is fine for grafting and it is up to personal preference whether to clean cut afterwards with a chainsaw. The beauty of the vine mulcher is that the cordon wire remains intact. Cuts should be made about 10cm to 15cm below the cordon. If the gap is too close then buds can be dislodged when bending canes onto the wire during training. Bookings are essential for the machine and work can commence anytime after leaf fall or dormancy.

For vine mulcher bookings contact Nepenthe Viticulture Mark Vella, contract services manager, on mobile 0421 351 401 or email mvella@nepenthe.com.au

Vine Mulcher in action. ***Photograph courtesy of Mark Vella, Nepenthe Viticulture, 2007.***

WOUND TREATMENT

Any cut made over the size of a 20¢ piece should be protected from trunk diseases such as Eutypa sp. using an acceptable barrier paint or wound treatment.

DE-BARKING

This involves removing bark from the trunk around where buds are to be grafted. It is not essential to do this, however, on some thicker-barked varieties it does make grafting easier and faster having a bare trunk.

SHOOTS ON THE ROOTSTOCK

These need to be removed from around the trunk prior to grafting except for one or two shoots at the top of the vine which is explained later. Any shoots emerging from the base of the vine can be kept trimmed below the graft and then removed after grafted shoots reach five to 10cm length.

Post-grafting care

The main factors influencing graft strike are post-graft management of the vineyard. The following areas need to be addressed and I have listed them in order of importance.

1 SAP FLOW

Too much water – If there is sap bleeding from the tape a small cut needs to be made under the graft tape to relieve the pressure of sap build-up. Look for a wet trunk under the grafts. A saw cut needs to be made as soon as the sap is obvious or else callusing will be compromised and the bud will literally be pushed away from the graft cut where it will dry out and die. A small cut from a bushsaw is usually enough. Ask the grafting contractor for guidance as cuts too deep will cut off all sap and kill the bud. It is usually only a problem in waterlogged sites when soils are at field capacity after a wet winter.

Too little water – In the event of a dry winter it is important to maintain available soil moisture levels for viable trunk sap flow. If trunks are allowed to dry out they can split and die back to ground level or die completely.

2 DESUCKERING ROOTSTOCK SHOOTS

There will be an explosion of growth from these shoots which will need to be managed to ensure no grafts are compromised. The danger is that shoots emerging from below the grafts compete for sap flow and starve the grafted buds. Because they have higher vigour that also shade out and can knock off grafted shoots in windy conditions, ideally, these lower shoots should be trimmed or removed completely. Shoots emerging above

A well-tied vine heading up onto the cordon wire, Mount Compass, South Australia, 2007.

Weevil chewing damage of a young grafted shoot, Mount Compass, South Australia, 2007.

the grafts can be maintained to assist with positive sap flow up the trunk so long as they do not shade out or knock the grafted buds. Once the grafted shoots have reached two to three leaves then all sucker shoots can be removed with no harm to the vine.

3 WEED MANAGEMENT

Weeds need to be kept under control and will require hand spraying and/or hand hoeing to avoid any drift onto emerging grafted shoots or suckers. If suckers are removed, a clean trunk remains and grafted shoots are trained along the cordon wire then non-systemic herbicides could be used and applied using conventional equipment. A pre-emergent herbicide prior to grafting is also a good idea if there is a clean undervine. Weeds will shade out grafted buds and knock them off on windy days.

4 TYING AND TRAINING GRAFTED SHOOTS

This is a high priority which needs to happen as soon as shoots emerge. Tying-up should be done immediately after grafts are done as the rate of growth usually is fast after budburst because of the established root systems. The risk of not training vines in a timely manner is that shoots become too heavy for the callus to support and the bud breaks off. This is especially a problem in windy sites or during storms. Once at the cordon wire shoot training techniques are up to personal preferences and are the same as establishing any new vine onto a permanent cordon wire.

5 PEST AND DISEASE MANAGEMENT

The grafted shoots are especially vulnerable to chewing insects such as weevils (See photo), snails and earwigs. Barrier glues applied below the grafts and clean undervine cultural management are preferred options for IPM control instead of insecticides. Once the shoots have emerged, they are subject to the same risks of other pest and diseases and need to be monitored accordingly to ensure timing of controls prevents any permanent damage.

6 IRRIGATION

Short frequent irrigations are recommended to avoid any excess sap seepage around the grafted buds. The buds need to have some sap flow from the trunks to callus properly and therefore some moisture is required to prevent trunks drying out.

Field grafting has many advantages as an option to reworking a vineyard.

For further information or to make a booking for grafting contracting for 2007-08, please contact Tony Hoare at tony@hoareconsulting.com.au ■

Budgeting guide – estimated grafting expenses (excluding GST).

Virus testing	$155 per sample	Test for 12 major viruses and certification of virus status (Waite Diagnostics).

Budget item	$/vine	Comments
Barrel pruning	$0.08	Recommended to remove canes and improve mechanical cordon removal.
Mechanical cordon removal	$0.20-$0.80	Cost varies according to trunk diameter, topography, post and wire height, etc.
Double chip bud grafting	$2.40	Includes taping. Excludes cost of tape which varies according to trunk diameter. Can vary from year to year.
Tying-up	$0.30*	Excluding string.
Training	$1.20*	Four training passes at $0.30/pass excluding ties.
Regrafts. Allow for 10% replacement	$0-2.40	Some contractors offer a free single bud regraft done in that season or the following spring. Otherwise, allow for complete regrafting costs.

*** Costs kindly provided by Jeniffer Doyle, Rolling Vineyards, New South Wales.**