

# Benefits and pitfalls of field grafting winegrapes – Part 2



By Tony Hoare

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***In Part 1 of this article, which was published in the March/April issue of the Wine & Viticulture Journal, Tony dispelled some grafting myths, explored the reasons why grafting over vines might be considered and the pros and cons of the practice versus new plantings. In this article he discusses the risks to success of field grafting and proposes a timetable for post-grafting management.***

## RISKS TO SUCCESS

**Substandard budwood – not virus tested, allowed to dry out before storage; too thick, too thin**

It is recommended that budwood be sourced from a reputable vine nursery. They provide virus testing, trueness to type and correct cane diameter for grafting. A nursery also will have the facilities to treat cuttings and store them properly. A year's growth can be lost when budwood is not cut, stored or even transported correctly prior to grafting and is not useable.

**Incorrect storage and handling of budwood – too dry, too warm, not rehydrated**

Budwood needs to be stored in a coolroom with a constant temperature of 2°C. The vines should be rehydrated prior to storage and wrapped in an airtight bag and taped. They should be kept in the dark and only taken out a few days prior to grafting. They should then be fully submerged in fresh water with no chemicals and kept in a cool place out of direct sunlight. Buds that have dried out of burst are not able to be grafted, and this can lead to a 12 month wait until the following year for grafting to occur.

### Virus

Always virus test prior to grafting both the scion and rootstock. Scion wood sourced from a reputable nursery should come with certification that it is virus-free. Rootstocks need to be tested and it is the responsibility of the grower to have this organised. The virus status of vines will dictate whether they are suitable for grafting. Virus will cause incompatibility and growth issues with grafted vines. It is still possible to graft with virus-affected vine material with some success, however, the risk is that

there will be a poor strike rate or issues with growth or fruitfulness down the track.

**Mistimed training and follow-up; attaching strings, taping to strings, watershoot management**

Failure to keep up with vine training will result in a low success rate. Grafted shoots have a rapid rate of growth once they shoot and need to have regular training passes depending on the growth rate. The initial pass is the most important to secure the grafted shoots onto strings and prevent 'blowouts'. A blowout will occur when the grafted shoot is not secured and is broken away from the trunk. This is usually caused by wind. One windy day can cause massive damage to a grafted vineyard. Large crews are better suited for grafted vine training, as the rate of growth is rapid and smaller crews will struggle to keep up. Wind damage may then occur as a result.

### Watershoots

Watershoots will germinate from all over the trunks when the cordons have been removed. Before grafting work begins, watershoots will need to be removed, except for the top two which can be retained. It is advisable to tip these watershoots and leave three to five leaves. The watershoots closest to the top of the trunk are good insurance to leave growing until a grafted bud shoots. If there is no growth from the grafted buds, then the watershoots should be retained until regrafting or even the next season. Without some vegetative growth, vine trunks will die in the space of one season.

### Pests and diseases

Chewing insects, animals and birds are an ever-present threat to the success of grafting. Earwigs, snails,



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weevils, birds, kangaroos, rabbits and hares have a particular liking for grafted buds and shoots. Powdery mildew is the most devastating disease of grafted leaves and shoots, as it will scar the canes and cause them to have stunted growth and even die back completely.

### Excess moisture – too much irrigation or rainfall

Too much available water during the early stages of callusing will cause high failure rates in grafted vineyards. Water should only be applied sparingly in short, weekly irrigations at the most. The danger of excess sap flow is that the moisture pressure builds up behind the grafted bud, forcing it away from the trunk. When this happens, the bud cannot callus successfully and

then dies. A technique to overcome this problem is to make a single saw cut under the grafted buds, which allows the escape of the excess sap flow and the bud can then callus. Your grafting contractor should be contacted before doing this to demonstrate how it should be performed.

#### Too dry – lack of irrigation of rainfall, dry grown vineyards

A lack of water will adversely affect sap flow. Without sap flow, callusing does not occur and grafted buds dry out. Dry-grown vineyards can be grafted, however, it is recommended that this be done as early as possible when the soil profile has enough moisture to sustain callusing and growth of the grafted buds. As grafted vines have very little foliage, their ability to 'pull' water up to the top where grafted buds are usually placed is diminished. That is why short, frequent irrigations are recommended until the grafted buds grow adequate foliage.

#### Extreme heat events – 40°C-plus days leading to reduced sap flow and bud death through drying out

Until the grafted bud has callused and achieved budburst, it is in danger of drying out. While most grafters will rehydrate budwood and the tape around the grafted buds will keep them relatively airtight, they are still in danger of drying out to the point where they cannot survive. Vine trunks also seem to 'shut down' in extreme heat and sap flow is thought to be reduced in such weather. These factors in combination make it difficult for grafted buds to survive in extreme heat, despite adequate available soil moisture.

#### Lack of weed control

Weeds will compete with vines for moisture and nutrients that can negatively affect grafted strike rates. Annual grasses are less of an issue, as they are usually dormant when grafted buds are growing, however, rye and couch are particularly devigourating to grafted vines. Weeds can also impede grafters who sometimes need to graft low on the trunks. Trash build-up from weeds and prunings under vine can provide a haven for chewing insects such as grasshoppers, snails, weevils and earwigs which all love to eat grafted buds and shoots.

#### Inexplicable incompatibility – strike rates lower than 50%

If all risk management has been followed prior to grafting - vineyard preparation and follow-up management has been correctly applied, the weather suitable and grafters experienced - and a poor strike rate results, then this can only be explained as a compatibility issue. After a process of deduction, if all reasonable potential risks to a successful strike rate have been discounted, then a low strike rate of zero can only be attributed to a natural cause that cannot be explained. This is a rare occurrence, however, it is always a possibility when dealing with a living plant in an uncontrolled environment.

### TYPICAL TIMETABLE FOR POST-GRAFTING MANAGEMENT

#### Immediately after grafting

- Attach strings that will support grafted shoots
- Maintain a moist soil profile, being careful not to over irrigate
- Monitor sap flow around the buds
- Look for chewing pests.

#### First two weeks

- Manage watershoots – retain one or two of the highest watershoots and pinch out growing tip, leaving three to five leaves. Remove all other watershoots, especially those around the grafted buds. Maintain this approach until grafted buds have begun to shoot
- Monitor irrigation – maintain a moist profile, but not too wet

- Monitor sap flow. Look for signs of excessive sap flow around the grafted buds – dark bark from sap seepage. Squeeze either side of the buds and if there is a clear liquid apparent, then a saw cut may be required under the bud to relieve sap pressure which will force the bud away from the trunk and prevent callusing
- Pest and disease control – manage chewing pests that will target the emerging grafted buds. For example, earwigs, weevils, grasshoppers, snails can be a particular problem at the early stages of grafts emerging.

#### Weekly until cordons are established

- Once the grafted shoot has reached 5-10cm, fasten grafted shoots to strings using tape. Twisting shoots may result in damage to the grafted shoot and should be avoided
- Maintain a moist soil profile and irrigate to promote growth. Over-irrigating is not as critical after the buds have shot
- Manage watershoots by removing all of them after grafted buds have a green shoot. Failure to do this will result in reduced grafted shoot growth as watershoots dominate, and can risk vine trainers damaging grafted shoots by mistake
- When grafted shoots are close to the cordon wire, we recommend a crossing over of the canes. This strengthens the grafted shoots on the wire and allows for machine harvesting the following season. It is important to note that the crossing over needs to occur as the shoots are green. If they have lignified they are less flexible and can break at the graft union.

#### Pruning

- Grafted vines that have been well trained and have grown to create new cordons can be pruned as a mature vine. If laterals have grown, then a one-bud spur is recommended. If the grafted shoot is weak and short in length, then a single or double bud spur will allow it to have improved vigour next season to fill the wire.

### GRAFTING – A ONE, TWO OR THREE STEP PROCESS

If you decide to graft, then be prepared that it may be a one, two or three year process. Most vineyards have a successful grafting strike rate after one pass in year one. Regrafting is generally required to fill in a small percentage of vines that for one reason or another have not taken. If the strike rate is below 65%, then there is likely to have been an underlying issue as mentioned above. Grafting does not usually come with a guarantee because of all the factors discussed in this article. It is, however, a very useful tool for converting vineyards which in 95% of cases is a success. When planning for grafting, it is important to remember that there are many factors beyond the control of the grafters and a successful result may require further visits over a few years to fill in the block. 



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