Characteristics of Successful Planting Material

BRUCE CHALMERS
Chalmers Nurseries, Euston NSW

The unprecedented expansion of plantings in Australia over the last two seasons has stretched the production of propagation material and planting material to the limit.

In a perfect situation, supply equals demand, and demand is satisfied with vineyards receiving all vines as well-grown, one-year-old graftlings and rootlings, whether produced in the field or in containers. In reality, what has happened is that the vine improvement associations have had to severely ration the available rootstock and scion material from registered source areas.

With nurseries receiving as little as 10% of the cutting material ordered it has been necessary to produce a huge number of vines from rootstock cuttings that, in the past, have been considered too small for propagation material. The use of this material has generally enabled orders to be met and in most cases vineyards to establish successfully.

To assist in the production of the numbers of vines required it has also been necessary to propagate from clients' own preferred sources of private vineyards. With the expansion of registered source areas over recent years we hope to see the vine improvement associations come closer to being able to satisfy demand for cuttings.

Late decisions to establish vineyards have also necessitated the use of techniques such as the planting of callused graftlings and cuttings. This is a less than ideal way to establish a planting. However, it has a place in the industry, at the moment, and when carefully managed can be very successful.

Many vines have also been produced in biodegradable containers with as little as 6 weeks lead time, generally very successfully.

All of our own recent vineyard plantings have been completed with these rapidly propagated vines and these have performed very well, with yields, for example, at two-and-a-half years, not less than 14 tonnes per hectare and up to 30 tonnes per hectare.

With regard to the characteristics of successful planting material, we suggest that growers look for the following.

**Dormant field-grown graftlings:**
2. Well developed root system with preferably at least 6 to 8 inches of growth.
3. A firm well healed graft union.
4. Three or four clear buds of well lignified scion growth.

**Dormant field-grown rootlings:**
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**Dormant container-grown graftlings:**
1. Look for evidence of strong fibrous root system.
2. Soil-less potting mix.
3. Even though scion development may be small it should be well lignified.

**Biodegradable container-grown graftlings:**
1. Look for actively growing shoots.
2. Evidence of adequate union.
3. Evidence of root development at base of pot.
4. Soil-less mix.
5. A deceptly 'hardened off' vines, preferably treated with an anti-transpirant to minimise root shock.

**Callused graftlings:**
1. Preferably larger diameter cuttings i.e. 8–12mm.
2. Evidence of good callus development at union.
3. Good basal callus and/or root initiation.
4. A deceptly top cover of wax right to the planting depth to prevent desiccation.

Obviously it is also important to procure vines that have been produced from material supplied by the vine improvement associations. However this is not always possible.

Packaging is also very important. It is absolutely vital that all dormant vines be supplied in sealed packaging with adequate but not excess moisture retained within.

Providing vines received comply with the above recommendation, the chances of successful establishment are very high.

The most critical period in relation to successful establishment is the period from receipt of the vines from the nursery to 8 weeks after planting. It is most important to follow these steps:

1. Prepare the site well; ripping, hoeing, base fertilizer dressings as required.
2. Ensure that there is not a recent history of harmful residual herbicide applications, particularly with vines produced by rapid methods such as by biodegradable pots and callused graftlings and cuttings.
3. Plant suitable windbreaks, such as cereal rye. This will help prevent wind damage to young vines and perhaps, more importantly, will create a micro-climate in the vine row that will be very conducive to rapid plant growth.
4. Do not trim dormant vine roots too severely. This is often done to facilitate planting, but in our opinion is detrimental to rapid establishment.
5. Never allow vines to throt prior to planting even for only a few minutes.
6. Planting is best undertaken by means of a water jet, thus leaving the vines well watered in with air pockets around the roots expelled.
7. Provide support early, especially for potted vines and callused vines. This can either be achieved by tying to an inexpensive bamboo stake in the situations where trellising is not installed in the first year, or alternatively, stringing to a pre-installed trellis system.
8. Do not allow weed competition. It has been noticed that the majority of poorly established plantings have been a result of excessive weed competition in the first season of growth. It is preferable to protect the vines with a vine wrap at least 400mm high. This vine protector must allow adequate ventilation, but not allow the vine to come into

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Characteristics of Successful Planting Material: Nursery Perspective

MARK CLEGGETT
Glenavon Nurseries, Langhorne Creek, SA

Background
Glenavon Nurseries is operated by Mark & Annette Cleggett at Langhorne Creek, South Australia. We have been propagating vines commercially since 1988 and our bench-grafting program commenced in 1992. We are currently propagating around 900,000 vines per annum. We sell dormant one-year-old rootlings and grafted rootlings. We also contract-grow stock for customers.

Introduction
Over the years we have propagated many different types of vines in the nursery, with our fair share of successes and failures. We have developed methods that work for us in both the propagation of own rooted and bench grafted vines. The following is a brief summary of some of the characteristics of successful planting material.

Sourcing material
Currently, the majority of our material is sourced from vine improvement committee source areas which are either Class 'A' or Class 'B'. Ideally we would prefer Class 'A' material only, but the current strong demand does not allow that. All our rootstocks are sourced from the South Australian Vine Improvement Committee. We have established a private Class 'A' rootstock block under the auspices of SAVIC, but these vines are 2-3 years off production.

Timing of cuttings
Quite simply, we have found that the best cutting material is always the material cut the earliest. As soon as leaf fall has occurred, cuttings may be taken. A sthe vine's reserves are gradually depleted over the winter months, cuttings taken earlier have the highest nutrient levels, and will normally be more successful. Ideally, we would like all cuttings taken by the end of June each year, but this is not possible due to the constraints of vine improvement societies. The same principle applies for rootstock cuttings, but like vinifera cuttings, SAVIC cannot have them cut early due to constraints of labour and time.

Standards of cutting material
We believe that the following represents a suitable standard for cutting material that we handle.

Vinifera cuttings
Length: 30-40 cm
Diameter: 6-12 mm
General: A sthe vine’s reserves are gradually depleted over the winter months, cuttings taken earlier have the highest nutrient levels, and will normally be more successful. Ideally, we would like all cuttings taken by the end of June each year, but this is not possible due to the constraints of the vine improvement societies. The same principle applies for rootstock cuttings, but like vinifera cuttings, SAVIC cannot have them cut early due to constraints of labour and time.

Vinifera Bench Grade
The same as ordinary vinifera cuttings, but ideally the base and top cuts should be half way between buds so the bottom and top buds are useable.

Rootstocks
Length: 40 cm
Diameter: 5-12 mm

We are sourcing standard grade rootstocks rather than bench graft grade, mainly because of their greater availability. The cut at the base should be around 1 cm or more below the bud to allow us to recut it later.

A II cuttings should be free of disease. It is not uncommon to see powdery mildew scarring on the canes, especially in Chardonnay. Whilst this material can still be propagated, it is not preferred.

Cuttings taken off the ground must not have been exposed to frost or be collected more than three days after pruning.

Cuttings should be delivered, or be able to be picked up as quickly as possible, preferably on the same day.

Nursery handling
We find that one of the most important processes is to properly hydrate all cuttings, whether they are root stock or vinifera. Bundles of cuttings must soak in water for 12-24 hrs before the next process begins. We use rainwater in our tanks. From here, vinifera cuttings to be propagated on their own roots are taken to sand beds and callused. Root stocks are heat-treated in hot water for 30 minutes at 50°C. This is to reduce the incidence of crown gall. We are trialling the heat treatment of vinifera cuttings for grafting, but we have not reached any conclusions as to whether it is required for crown gall control. All vine material for grafting is now dipped in a 0.5% Chinosol solution and packaged into potato boxes lined with a plastic bag. These vines are cool stored at around 2°C.

We are careful to monitor the cool room temperature. Freezing can damage cuttings and higher temperatures can bring on bud movement which can make material unsuitable for grafting.

Nursery site
We have found that soils that are well drained are the best for planting out material. Waterlogged areas are unsuitable. Windbreaks are useful, but not always practical to install. We believe that virgin soil is essential for the nursery site, with no previous history of nematode infestation, e.g. potatoes. We are currently leasing different blocks of land each year to serve this purpose. We do not fumigate soil. A good water supply with a total dissolved salts of less than 1,000mg/L is ideal.

Nursery hygiene
With bench grafting, we have found that it is important to take steps to reduce the risk of disease. We keep floors and benches as clean as possible. Secateurs and cutting machinery are routinely sterilised.

All our grafting media is steam pasteurised at 60°C for 30 minutes. Chlorinated water is used throughout the process.

Vine quality standards
We are selling dormant one-year-old rootlings and dormant one-year-old grafted vines. These are the quality standards that we use.

One-year-old rootling
Should have at least 3 strong base roots. Should have at least one strong shoot with at least 6 buds. Should not show any signs of disease or mechanical handling damage.
One-year-old grafted vines
The same as above, but they must pass a ‘touch test’ to prove the strength of the graft union. Any vines with a weak union are discarded.

We sell vines in bundles of 50, as we find they are easier to handle and roots do not dry out as easily in the middle of the bundles if stored in sand. Coloured labels are used on the bundles which we find useful for quick visual differentiation of variety types and clones. All of our vines, whether grafted or grown on their own roots, are heat treated.

This procedure is for vines to be immersed in hot water for 5 minutes at 52°C. This method safeguards us and the grower against the possibility of nematode and phylloxera transmission by planting material. Although we have a number of safeguards in place to prevent transmission of these pathogens, we believe that hot water treatment is good insurance for ourselves and our customers.

A longer planting material
We only produce dormant one-year-old rootlings and grafted vines, although there are other options for planting material that growers may use. Callused cuttings are commonly used by growers who cannot source one-year-old material. They are cheaper to buy, although their survival rate is sometimes erratic and they require good management. If large losses are encountered, growers may find they have an uneven vineyard with increased training costs and delays in grape production. Aiso callused vines cannot be effectively graded or heat treated, so there is reduced quality assurance.

Potted (banded) grafted vines are another option for people requiring rootstocks. These are vines grafted in the normal way and then potted in biodegradable tubes. They spend 2–3 months in the glasshouse before being sent out into the field. They have advantages in being a little cheaper to buy and can be sourced earlier than one-year-old vines. Unfortunately they are often difficult for growers to handle. They are hard to transport and cannot be stored for long periods. They require very careful planting (which usually precludes machine planting) and wind protection. Also they are normally planted in late October or November when frost risks are reduced, they can be subject to spells of hot weather which can cause high losses. Also, the vines cannot be satisfactory graded or heat treated. Higher losses, coupled with increased management cost and delayed production, does not allow us to recommend this option.

Storage of dormant rootlings
We are frequently asked how to store rootlings after they are picked up from the nursery. Firstly, we recommend that growers keep the vine roots moist at all times. When vines are picked up, they should be covered by a tarpaulin in the trailer or truck. If planting is to occur within 2 weeks, we suggest keeping the vine roots immersed in water. If the vines are kept for longer periods, say up to 4 weeks, heeling the vines into a trench works well. Longer periods before planting may require the vines to be cool-stored to prevent bud and root movement. If this is done, it is usually advantageous to trim the vines first to conserve space. They can be dipped in a 0.1% solution of Chinosol and held in potato bins lined with a plastic bag. A temperature of 1–2°C is recommended. Do not let the vines dry out under any circumstances, as this seems to be one of the biggest causes of vine mortality when establishing a vineyard.

Conclusion
These are a few methods and ideas that we have found work for us. Propagation material undergoes many different processes and we find the best results are obtained when material is competently and carefully handled. We have found that the operation of a vine nursery requires a lot of hard work and financial commitment. There are a number of ‘backyarders’ in the industry, but if growers want quality planting material, they should source material from a nursery that uses material from accredited sources and which undertakes to maintain a high degree of hygiene and quality control measures.

Contact with the herbicide. Commence a knockdown spray program immediately after planting.

A uniform vineyard will be established very rapidly if given the attention mentioned.

In conclusion it is well recognised that there have been a number of problems with establishment this last season. However, there have been many new vineyards established satisfactorily under extreme circumstances, such as exposed, unprotected sites, excessive heat and wind and very late decisions to plant.

The attention given to a new vineyard, with due regard to budgeting, will carry over to a uniform and highly productive vineyard which will move into a positive cash flow situation at an early stage.

You will find that most reputable nurseries are happy to discuss problems that a grower may have from time to time and I encourage this. It is also our intention to produce and supply a video, with individual orders, that will help convey our suggestions on handling and planting of our own vines.