Managing young vines and vineyards to achieve stable yield and quality

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Introduction
The rapid expansion of vineyard area across Australia has resulted in many new challenges for those working within the viticultural industry. Among these are the procedures involved in managing young vines to achieve a uniform vineyard development which delivers stable yields of high quality fruit in the longer term via a profitable production system.

In recent times growers have been subject to somewhat mixed messages in terms of the management of young vineyards. During the periods of acute shortages of desired varieties (1992-1997), growers were encouraged to plant more vines and crop at moderate to high levels from as early as the second year of vine growth. Problems can, and have, arisen as the common aim of many managers of young vineyards is to obtain rapid and vigorous growth in the first and second year of the vineyard development and possibly a crop in year two. Whilst not always the case, in some instances the management practices involved in promoting vigorous young vine growth are not necessarily consistent with those required to produce long-term stable yields of high quality.

Today, with grape supply and demand coming into more of an equilibrium and the Australian wine industry entering a period of unprecedented international competitiveness, the emphasis must be on the production of grapes of consistently high quality. Management of a winegrowing enterprise requires the preparation of a business plan for both the development year and the ongoing operational years.

The business plan
A new business venture, the decision to embark on a new grape production enterprise should have its foundations in a well-researched business plan. There must be clear objectives for the vineyard's performance. Only those growers with desirable varieties grown in a manner such as to meet particular winemakers' specifications will thrive in this industry. A thorough knowledge of the soil and climate of a particular vineyard gives a very good indication of the potential of the site in terms of vine growth, the level of vigour a vine will develop, its likely cropping levels and most importantly the achievable fruit quality. Such knowledge also clearly indicates which varieties can be grown with greatest reliability with respect to ripening and flavour development, and enables a realistic assessment of a vineyard's financial performance.

Put very simply, the plan must provide answers to the following issues:
- Why enter the winegrape growing industry or why establish a vineyard?
- Which varieties of grapes to grow—and why?
- The production system to use—i.e. how to grow the vines and produce the fruit
- The market for the fruit
- How to achieve winemakers' specifications

Where to establish a vineyard?
The selection of site offers a fundamental opportunity to influence many factors which impact on the production of stable yields and quality. Not everyone has the luxury of selecting a site with a complete 'kit' of ideal characteristics—however an appreciation of desirable characteristics can limit the number and scope of problems which need to be overcome at a later date.

On a regional level, differences in fruit composition, cost of production and end use suitability become apparent. On a site-specific basis factors such as soil type, slope, aspect, water availability/suitability, drainage and frost risk etc. need to be considered. Compromise on one or more of these factors will most likely make the attainment of stable yield and quality more difficult.

Which varieties to grow
Answers to this question are becoming increasingly complex as rapidly evolving consumer preferences influence winery intake requirements.

It is beyond the scope of this paper to analyse intake projections. What is apparent is that to ensure longer term viability, the core of chosen varieties should be drawn from those with an established reputation for quality wine production.

It is important that planting material is sourced from registered source blocks with a known performance and disease history.

The production system
There are many site- and regional-specific factors that will influence the chosen method of production; however there are certain fundamentals which are universally applicable to the management of young vines to achieve stable yield and quality. These fundamentals will form the basis of this discussion.

It is necessary to consider production methods at an early stage of the vineyard project. This will enable accurate costings to be projected to assist with budgetary planning.

An understanding of the production process allows for activities to be planned to ensure that the timing of activities, whether it be vine planting, training, spray application or ultimately harvest, is correct.

The market for the fruit
A competitive manufacturer or provider of goods and services who will purchase their product and a customer profile will be provided, most likely in some detail. Why then do many young vineyard developments proceed today without the grower or developer being able to provide an answer to this question?

A grape purchase agreement not only establishes the business relationship between the grower and grape purchaser but provides direction to the grower in terms of vineyard management.

- In which area to grow grapes
- Which varieties
• A nicipated cropping levels
• Target maturities
• Quality parameters
• W hat price can be expected

Uniformity in vineyards
Consistent yield, quality and profitability can only be achieved if the principal objective in the development and management of a young vineyard is uniformity. Uniformity in a young vineyard is achieved if:

• Secure finance and timely cash flow is available.
• There is a clear understanding of the potential of a site and therefore of the manner in which vines respond to climatic and soil features.
• Excellent planning is in place.
• Timely development occurs:
  - Early soil preparation (summer/autumn of year of planting)
  - Correct soil amelioration
  - Early planting with strong material maximises the opportunities to grow strong vines in their first season, allowing for a uniform approach to vine training and then to pruning at the end of that first year.
  - Where the vines are planted late and in less than ideal conditions, it is virtually impossible to develop a uniform vineyard where all vines can be treated in the same manner. In these situations they cannot be expected to produce similar crop loads and similar quality fruit in their early years. Wherever replants are required, the probability of mixed maturity of fruit exists and this leads to a lower overall quality of the fruit from any particular block. While a few replants are unavoidable, vineyards with 25–30% of replants are simply the result of very poor management and poor planning; they also cause major problems in the early years of cropping because of the different maturity levels of the fruit from any one block.
• Pruning objectives are realistic; taking into account:
  - Vine development and capacity
  - Uniformity, or not, of growth
  - Labour skills
  - Size of the vineyard
  - Often the hard decision is the right one!

Managing young vine growth
The system for managing a young vineyard, and also older ones, must have clear objectives and be based on a realistic assessment of the vine’s performance.

Year 1
In moderate to low potential sites, objectives should be for a first crop in the third growing season and therefore there can be no emphasis on vine training in Year 1.
• Train the vine to and beyond the wire during the first year with the objective of top tying at the wire at pruning time.
• Do not attempt to fill the wire in this first growing season.
• Consider allowing vine to sprawl and prune to two buds at end of first season. Vines will almost certainly fill the wire with strong growth in Year 2 and be ready for crop in Year 3. A disadvantage is the difficulty with weed control.
In moderate to high potential sites:
• If it is desired to fill the wire, vines must be planted early (August/September) and growth pushed with water and nitrogen until mid-summer. Then reduce fertiliser levels, and possibly water, to allow the vine to consolidate its growth and lay down good carbohydrate reserves.

Year 2
• Train the vine to fill the wire. Use irrigation as necessary but be more sparing with fertiliser.
• Beware of over-cropping—if a vine is thrown out of balance in this year it can be very difficult for it to recover.
• Consequences (besides possibly poor quality fruit) are uneven/poor budburst in the next season, leading to difficulty in developing spur positions and permanent cordons.

Year 3
If the vineyard has been soundly developed and vines have grown uniformly, this is the year of the first significant crop.
• Overcropping must be avoided so as not to prejudice the vines ability to lay down carbohydrates and grow on steadily. A balance between vegetative growth (canopy) and crop level is imperative.
• Shoot thinning and bunch thinning are commonly used to achieve this balance in situations where the vine has either grown too vegetatively in its early years, or where too many buds have been left at pruning time resulting in more bunches than the vine can carry. Growers should not shy away from manipulating shoot/bunch number to ensure the crop can be ripened adequately and to avoid ongoing imbalance.

Year 4
In this year the vine’s final framework should be nearing completion and the vine’s bearing pattern stabilised.
• If the viticultural objective is to have a multi-level (two or more) vines, then it is imperative that the lowest cordon wire be filled first with a spur-bearing cordon. If higher cordons are desired later, they should be taken up only after the lower cordon has been developed.

Year 5
In this year the mature cropping level should be achieved. If care has been taken in developing the vineyard uniformly, paying attention to vine capacity throughout, then this yield should be sustainable in the long-term.

Nutrition
• Do not over-use nitrogen
• Be conscious of micro-nutrient requirements at all times
• Be aware of ramifications of working with highly acidic and sodic soils (more common than desirable in many newer Australian grape-growing regions)

Pest and disease control
• Monitoring very important.
• Strong vine growth is a result of healthy functional leaves. The canopy should be protected from disease in the pre-cropping years as well as during its cropping life.

Irrigation
• During the first two years, irrigation is necessary (perhaps guided by moisture monitors, but be aware of smaller root systems), to ensure unrestricted development of vine root systems from the time of planting.
• Once the vine enters its cropping phase, irrigation scheduling is critical to both vine growth and crop quality. Moisture monitors and experience must be used to ensure that irrigation is used to its best effect to allow production of a high quality crop.