

GROWING QUALITY WINEGRAPES

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Growing quality winegrapes has become increasingly important for the Australian wine industry. Over the last few years, there has been an emphasis by the industry to improve quality through reducing yield. However, grape composition and quality is the result of many complex interactions that occur in the field throughout the growing season and yield is only one part of the equation. Environmental factors and a whole range of viticultural practices all have a place in determining grape quality and composition and these are highlighted in Figure 1.

TEMPERATURE

Temperature has an important role throughout the whole grapegrowing process. Research has shown that whilst warm temperatures hasten the ripening process, temperatures in excess of 33°C slow down photosynthesis and subsequently berry ripening. It is not surprising therefore, that in the warm inland grapegrowing regions of Australia, viticulturists say their vines have “shut down” in very hot conditions during summer. Conversely, very cool temperatures also slow down the ripening process.

HUMIDITY

Without a doubt, humidity can cause many problems in a vineyard. Very humid conditions favour disease development and consequently it is important to consider some of the viticultural practices that can impact on vine growth and development. Excessive irrigation and high

fertiliser use will encourage a dense canopy that will not only shade fruit but will create a microclimate within the vineyard that encourages the spread of diseases.

RAINFALL AND IRRIGATION

Irrigation is one of the most powerful tools a viticulturist has to ensure quality fruit. Regulated deficit irrigation and partial rootzone drying are explored further in the Irrigation section of this guide and winegrape growers should familiarise themselves with these concepts. Successful viticulturists have a good understanding of their soils, monitor soil moisture and understand the importance of irrigation for quality winegrape production. In high rainfall zones, cover crops and inter row swards can be used to manage problems caused by excess moisture.

SUN EXPOSURE

Light and shade play an important part in fruit ripening and fruit quality. Leaves require light for photosynthesis and bunches need light to promote good colour and enhance aroma and flavour development. Generally speaking, wines made from fruit from shaded canopies have reduced sugar, colour and phenolics. Fruit that is overexposed and is subject to high temperatures can also be of lower quality because of the negative effect of high temperatures on aroma, colour and flavour development. Canopy management techniques should ensure that maximum light interception is achieved without the risk of sunburnt fruit.

SOILS

A good understanding of soils and their water and nutrient holding capacity is important so that you are better able to manage irrigation and fertiliser application. Soils can vary substantially across a vineyard and it is important that your irrigation/fertigation system can accommodate these changes.

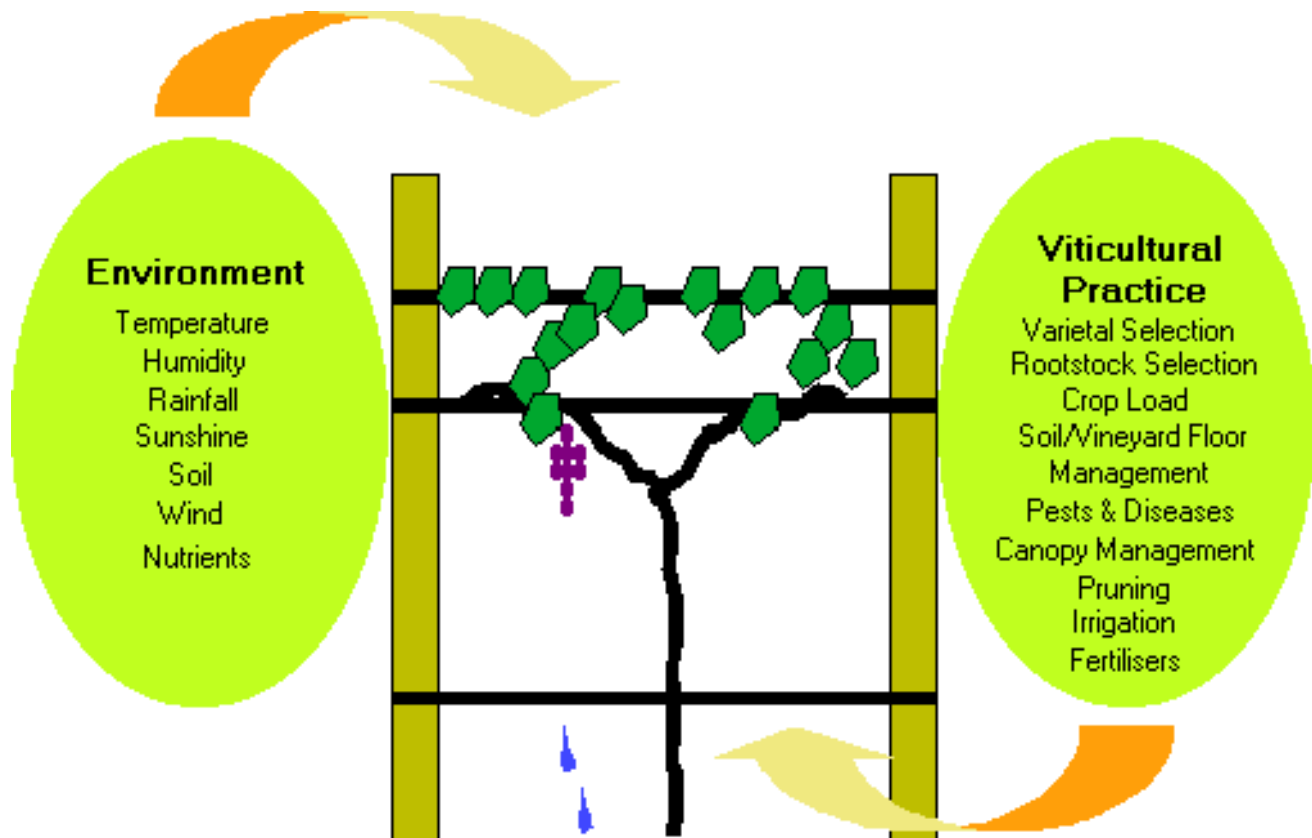


Figure 1 Environmental and viticultural inputs that impact on grape quality and composition

Heavier soils will retain moisture longer and if irrigation is not managed properly, waterlogging can result. Vines that have waterlogged roots are unable to function at optimum levels, thereby slowing down the ripening process. Naturally, lighter soils will not hold water for as long as heavier soils and these soils will require shorter, more frequent irrigations. To be able to manage irrigation better, your vineyard practices should include the use of soil moisture monitoring devices. There is a range of devices that can be used for soil moisture monitoring and they include:

- gypsum blocks;
- capacitance probes (EnviroSCAN® and Gopher®);
- radiation monitoring (neutron probes); and
- tensiometers

Using soil moisture monitoring devices allows the grapegrower to take the guesswork out of irrigation scheduling.

NUTRIENTS AND FERTILISERS

Applications of fertiliser should be based on the results of soil and petiole tests. High levels of nutrition coupled with adequate temperatures and moisture will result in increased shoot vigour that in turn can result in a shaded canopy with negative effects on fruit quality. Some research has shown that an increase in fungal infection has occurred after high nitrogen applications. High levels of potassium can have a detrimental effect on wine quality. Fertilisers should be used judiciously and only on the basis of objective information provided by a petiole analysis.

CROP LOADS

It is generally believed that heavy crop loads inhibit the development of quality winegrapes and many winemakers are showing a preference for fruit sourced from low yielding vineyards. Studies have shown that increased yields do have a negative effect on grape composition and subsequent wine quality. High crop loads generally delay ripening and if the crop load is too high, grapes may not ripen to a desirable level. However, other research has shown that there was little response to variations in yield. In some cases an increase in crop load coupled with improvements in canopy microclimate led to improvements in berry composition. During the 1980s in Bordeaux some of the finest vintages came from vineyards in which yields were relatively high.

Field trials performed by NSW Agriculture in the Riverina over the 98/99 and 99/00 seasons indicated that only loose inverse correlations existed between yield and colour and yield and total soluble solids. It is clear that the yield/quality relationship is not a straightforward one and winegrape growers should investigate their own optimum yields that will still produce quality winegrapes.

CANOPY MANAGEMENT AND PRUNING

Canopy management and pruning are without doubt some of the most researched areas in viticulture. Pruning can have a significant impact on the configuration of the canopy the following season. Severe pruning results in few shoots with high vigour and reduces the potential crop. Light pruning results in less vegetative growth and more potential crop. However, the vigour and capacity of the vine needs to be carefully assessed and the pruning technique should result in a vine that is in balance. If inappropriate pruning is carried out, the resultant canopy may encourage shading, higher humidity and a reduction in airflow can also be experienced.

Congested canopies with poor airflow encourage disease incidence.

Some of the canopy management techniques that grapegrowers utilise for maximum benefit to fruit quality include shoot thinning, shoot positioning, bunch thinning, leaf plucking and summer hedging. Care should be exercised when summer hedging to ensure that hedging is not too severe. If too many photosynthetically active leaves are removed, grapegrowers run the risk of slowing down fruit ripening. Leaf plucking techniques should ensure that fruit is not subject to overexposure and subsequent sunburn.

PESTS AND DISEASES

Every grower wants a vineyard that is free of pests and diseases and fortunately most Australian vineyards are located in areas that experience warm, dry conditions throughout the growing season. Pest and disease management is discussed in much more detail in the Integrated Pest and Disease Management section in this guide. Disease is generally minimised if the canopy is open and has good airflow. Growers should aim to create an ecosystem within their vineyard that supports a competitive environment for pests and diseases. One way to achieve this is by establishing a vineyard floor that is botanically diverse. This encourages a wide range of insect species and beneficial predators.

VARIETY/ROOTSTOCK SELECTION

Whilst varietal selection is partly market driven, winegrape growers should endeavour to select varieties and rootstocks that are adapted to local conditions. Some rootstocks are able to tolerate acid soils, salinity and nematodes better than others. Similarly, some varieties are more prone to diseases than others. For example, Chardonnay is more susceptible to disease than Shiraz is. Winegrape growers should carefully

evaluate their own vineyards and decide which varieties suit them best, in consultation with their winery.

CONCLUSION

Clearly, there are many factors that contribute to winegrape composition and quality. Producing high quality winegrapes requires a good knowledge of all of these factors as well as an understanding of the vineyard environment. As the wine industry becomes increasingly more competitive, winegrape growers will need to put in place a cycle of continuous improvement in their viticultural practice, to ensure that they remain profitable and sustainable.

FURTHER READING

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