

New world responses to old world terroir

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Summary

This paper will address the emerging trends for progressive New World vigneron to allow for "terroir" effects in their production. It is recognized that some New World vigneron disregard the existence of terroir from a marketing viewpoint. I accept it as real and a factor which can be incorporated into modern vineyard management.

The first topic to be discussed is that of why is there a difference in New and Old World appreciation of terroir? Reasons are put forward dealing with property size and inheritance effects, mechanization, tradition differences etc. The main reason however is to do with use of irrigation in the New World, since soil properties determining water supply capability to vines are the most important aspect of terroir. Professor Gerard Seguin's classical study at Bordeaux reinforcing this viewpoint will be presented.

The modern way in which New World vineyard managers account for soil variation is discussed. The aim of this work is to reduce variation in fruit composition in any one fruit parcel, which has been shown to increase wine quality. In turn this variation in fruit composition has been shown related to soil differences, especially those affecting water supply. Vineyards are soil mapped, and then are designed so that there is uniform soil on any one block. This facilitates irrigation design, and as well allocation of rootstocks and varieties.

Finally modern approaches to variety use using homoclimates will be presented. These include computer matching of climate and so facilitating choice of varieties based on their known performance elsewhere. Want to know where is a Burgundy look-alike climate in California, Australia or Chile? Or maybe where in Europe to grow Sauvignon Blanc like that in Marlborough? Alternatively, which varieties might be best suited to your proposed vineyard site. This approach will tell all. Climate is after all the overriding factor determining wine style and quality

Die vorliegende Abhandlung befasst sich mit den jüngsten Trends progressiver Winzer der Neuen Welt, „Terroir“-Effekte in ihre Produkte einfließen zu lassen. Es ist bekannt, dass einige Neue-Welt-Winzer die Existenz von Terroir aus Marketing-Gründen ablehnen. Ich nehme es als gegeben an und betrachte es als Faktor, der in der modernen Weingartenpflege durchaus seine Berechtigung haben kann.

Die erste Frage, die zu diskutieren sein wird, besteht darin, warum Terroir in der Neuen und in der Alten Welt unterschiedlich bewertet wird. Es werden Gründe dargelegt, die sich mit der Besitzgröße und den Auswirkungen von Vererbung, der Mechanisierung, den Unterschieden in der Tradition, etc. auseinandersetzen. Der Hauptgrund hat jedoch mit dem Einsatz von Bewässerung in der Neuen Welt zu tun, da die Eigenschaften eines Bodens, die die Wasserversorgbarkeit der Weinstöcke regeln, den wichtigsten Aspekt von Terroir darstellen. Zur Untermauerung dieser Ansicht wird eine klassische Studie von Professor Gerard Seguin aus Bordeaux präsentiert.

Es wird diskutiert, wie moderne Vineyard Manager der Neuen Welt auf die unterschiedlichen Böden eingehen. Ziel dieser Arbeit ist eine Verringerung der Abweichungen in der Fruchtzusammensetzung innerhalb einer Parzelle, wodurch erwiesenermaßen die Qualität gesteigert wird. Dabei hat sich gezeigt, dass diese Abweichungen in der Fruchtzusammensetzung auf Unterschiede im Boden zurückzuführen sind, insbesondere auf jene, die die Wasserversorgung beeinflussen. Die Weingärten werden nach Böden kartiert und dann so angelegt, dass in jedem einzelnen Block ein einheitlicher Boden vorherrscht. Das vereinfacht das Bewässerungskonzept und ebenso die Zuteilung von Unterlagsreben und Sorten.

Schließlich wird ein neuer Lösungsweg für die Verwendung von Rebsorten anhand von Homoklimata vorgestellt. Dabei wird ein bestimmtes Klima per Computer ausgesucht, um so die Wahl der Rebsorten aufgrund ihres Leistungsverhaltens, das von anderen Orten her bekannt ist, zu erleichtern. Wollen Sie wissen, wo in Kalifornien, Australien oder Chile ein Klima ähnlich wie im Burgund herrscht. Oder vielleicht wo man in Europa einen Sauvignon Blanc wie in Marlborough anpflanzen kann. Oder aber welche Rebsorten für ein neues Weinbergprojekt am besten geeignet sind. Antwort darauf gibt dieser neue Lösungsweg. Das Klima ist nämlich jener Faktor, der vor allen anderen den Stil und die Qualität eines Weins bestimmt.

Introduction

One can often hear New World wine producers being cynical about Old World notions of “terroir”. The extreme viewpoint is that advocacy of “unique terroir” is a last ditch marketing ploy to prevent yet more market share loss to the New World.

In the paper which follows I will discuss terroir from a viticultural viewpoint. I believe that there are sound reasons why the New World has not previously embraced the concept of terroir, but that the situation is changing and terroir recognition is becoming very much a part of modern vineyard management by discerning and quality conscious New World producers. This paper is very much a companion to that of Daniel Bosch of Robert Mondavi, also to be heard in this session. This was not planned by us but a coincidence, which will serve to emphasise my point about how the New World is becoming more aware of terroir effects.

An understanding of terroir

My understanding of terroir embraces both soil and mesoclimate influences on grape growth and wine quality. The scale of terroir is in meters to tens of meters, and very occasionally to hundreds of meters.

In my experience terroir effects are far more frequently soil rather than climate effects. I think this is generally true for all but the cold vineyard sites, where an opportunity offered by wind protection or aspect and slope may make critical differences in fruit ripening. There are however examples of variable mesoclimates in vineyard regions subject to coastal influences, such as the Stellenbosch region of South Africa and the Central Coast of California. In both of these places on-shore cool breezes have an important impact on viticulture, and differences in topography have a major impact on their flow patterns.

If terroir is generally about soil effects, then we need to ask the important question as to whether these are soil chemistry or soil physical effects? Fortunately there have been scientific studies addressing this important question. To my mind the primary definitive study of terroir effects has been by Professor Gerard Seguin of the University of Bordeaux. This study has now been followed by others in the Loire and Languedoc.

Bordeaux studies of terroir

Seguin studied the chemical properties of soils around Bordeaux, including famous chateaux. He found that a common feature of the best Bordeaux crus was their poverty in soil nutrients, but this was somewhat compensated for by deep root systems. These best crus were often acidic gravels, and showed magnesium deficiency due to high potassium, and also low nitrogen levels. Despite the above generalisations, Seguin however found that soil chemical composition did not seem to have a specific influence on wine quality. Excellent wine could be produced on acid, alkaline and neutral soils; excellent wine can also be produced on soils with balanced chemistry and also those with nutrient deficiencies. Indeed, and paradoxically, the soils of the Premier Grand Crus of Médoc are higher in organic matter, nitrogen, phosphorus and potassium in the surface, because the owners are able to afford manure and other amendments.

In conclusion Seguin says that "... it is impossible to establish any correlation between quality of wine and the soil content of any nutritive element ... If there were such a correlation it would be easy, with the appropriate chemical additives, to produce great wine anywhere".

What does make a great terroir then? The answer is found in soil physical properties which regulate water supply to the vine. The soil factors important here are those which determine the amount of water stored in the soil (texture) and rooting depth. Seguin found that the majority of Grands Crus Classés of the High Médoc had water tables within reach of the roots, and whose level drops progressively from spring to autumn. In August the receding water table no longer supplies water, and vine growth stops on schedule at around veraison (when berries change colour). The best soils also drain freely, and so do not store excessive water after heavy rainfall. During the latter part of the summer when ripening takes place, rainfall is the major water supply to the vine.

Best quality years are dry and warm to hot. Older vines with deep roots are well able to tolerate drought. So old vines on free draining soils are able to perform well in wet years as in dry ones. And interestingly Seguin was able to explain that the limestone soils of St. Emilion and the clay soils of Pomerol provided the vines with a similar water supply. Sandy soils on the other hand provided surplus water supplies to the vine.

Why has the New World often disregarded terroir effects?

I believe that there are good reasons why the New World has not been so aware of the terroir effect. One of the most obvious is that winemaking experience is limited on many sites, often to less than a generation. In The Old World by way of contrast, experiences with vineyard sites has often been accumulated over many generations. And also there is the effect of vineyard size. Some New World vineyards are hundreds of hectares in size, while some in the more traditional parts of Europe are fractions of a hectare. This is because of inheritance subdivisions over generations. This also means that when large vineyards are machine harvested in the New World, different terroirs are blended and their individual winemaking attributes are never discovered.

However, irrigation as practiced in the New World is the most important reason why terroir differences are not appreciated. We have seen above that soil properties regulating water supply to the grapevine are important components of the terroir effect. It is easy to see how these soil differences are diminished in effect when irrigation provides the major water supply. This is not to say that irrigation is a bad thing, just that it makes the vine less sensitive to other soil and climate factors which are more important without irrigation.

Modern New World approaches to terroir- soil mapping

A good example of modern vineyard approaches to soil mapping is provided by Orlando Wines of South Australia, makers of the distinguished Jacobs Creek brand. Dr Don Lester explains that through research his company has found that wine quality is enhanced by fermenting homogeneous lots of fruit. The company investigated the cause of this variation in loads of delivered grapes, and found that soil variation was the principal cause. Further investigation showed that soil effects were not taken into

account in irrigation design, and so different soils were receiving the same amount of water, hence creating variability in the vines and their fruit.

The solution is simple for new vineyards. Backhoe pits are dug systematically over the property (on spacings like 70m by 70m, sometimes closer) and soil profiles described by a soil scientist, and samples taken. Each soil profile can be described by the estimated vine rooting depth, and how much “vine-available” water this depth of soil can hold. Maps are then made of zones of similar “Readily Available Water” or RAW, and this map is the basis of vineyard design. The concept of long, straight rows parallel to the property boundary are long since gone; now individual blocks are matched as closely to the soil natural boundaries as possible. Similarly the soil and RAW maps are a guide to choice of rootstock, variety and even trellis system. The results are very clear. Grape maturity is more homogeneous than for a vineyard designed without sub blocks, and wine quality is improved. A similar soil mapping procedure can be done with existing vineyards, but here there is less opportunity to modify irrigation system.

Homoclimate searches to match variety to terroirs

There now exist data banks of climate information for vineyard regions around the world. Normally this is in the form of long-term average data for a central recording station. More recently climatologists have used this basic climate data to predict climate on a much smaller scale, say for 2 km x 2 km grids as are used in the USA and Australia. It is therefore possible to compare any one vineyard property (or terroir) to a world wide data base and look for climate matches. This process is done with a computer, using statistical procedures for the sorting. Temperature and rainfall are the most important climate components to match, with sunshine and humidity of lesser importance. Examples will be given of how this procedure can be used to find homoclimates and thus guide variety selection. Some details of this procedure are given at the web site www.smartvit.com.au.

Ultra violet radiation – a new key to our understanding of sunlight effects on wine

At the time when I wrote “Sunlight into Wine” in 1991 I was unsure as to why wine quality might be improved by bunch exposure to the sun. There was evidence of effects on photosynthesis and phytochrome, but the evidence was not compelling. Now recent research into UV effects on grapevines might provide the missing link. Experiments have shown that grapes produce polyphenols to protect themselves from UV light. These polyphenols are biochemical precursors to flavour and colour compounds so important to wine quality. Experiments have shown that protecting vines from UV produces colourless and flavourless grapes.

UV levels are higher in the Southern Hemisphere, primarily due to the ozone hole which develops in summer over Antarctica. This information raises the intriguing possibility as to whether more southerly latitudes might not have a wine quality advantage, as might also elevated sites. I doubt that this audience will respond very favourably to the notion that their atmospheric pollution is giving the Southern Hemisphere a wine quality advantage!

Figure 1. A map of Readily Available Water, Orlando Wyndham Clements Road Vineyard, Langhorne Creek (by courtesy of Dr Don Lester)

Figure 2. The map of block and variety allocation on the same property. Note the irregular boundaries, which as much as possible match the soil map.

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