

Adoption of Precision Viticulture on the rise



Tony Proffitt
AHA Viticulture
Precision Viticulture Australia



Erika Winter
GrapeLinks

Adoption of Precision Viticulture is on the rise around the world, with Chile showing particular interest amongst global wine competitors. In Australia, the Mornington Peninsula and King Valley are taking steps to further their understanding of PV technologies.

Following the introduction of Precision Viticulture (PV) technologies to the Australian wine industry in the late 1990s and the associated research during the intervening years, an increasing number of grapegrowers and wine producers are recognising the value of understanding and managing variability within their vineyards. With the dramatic rise in the cost of inputs over the past few years, growers are using PV technologies to minimise expenditure by applying those inputs (eg. water, fertilisers, labour, machinery) more efficiently. Similarly, the technology is being used to harvest fruit parcels of uniform quality and to improve vineyard sampling techniques (eg. crop estimation, fruit maturity assessment, pest and disease monitoring).

Obtaining information on vine performance across a whole vineyard can be both difficult and expensive. However, vines, like any plant, generally integrate the effects of their local environment

(eg. climate, soil, disease, nutrient and water status) and express them strongly through their canopy characteristics. Remote sensing using light aircraft provides a means by which such information can be easily collected and is therefore often the 'entry point' for new adopters due to the potential high return on investment. This form of data acquisition is not to be confused with satellite remote sensing whereby imagery is acquired from satellites operating at hundreds of kilometres above the earth. Imagery is generally represented as either vine-only data or a continuous surface of vegetation index values (eg. Plant Cell Density). Grapegrowers and wine producers have embraced the use of airborne digital multi-spectral imagery (DMSI) followed by ground-truthing as a means to reduce or maintain costs of crop production and in some cases substantially improve the retail value of wine.

Commercial service providers such as 'SpecTerra Services' (www.specterra.com.au) recommend acquiring airborne DMSI at 0.5m resolution at flowering and/or veraison (± 2 weeks and before the application of bird netting). They provide a service to most grapegrowing regions within Australia and in 2008 flew a total area of 7229ha. The use of airborne DMSI is also being embraced around the world and SpecTerra Services now has airborne sensors available in Spain, France, Portugal, Chile and Argentina. Chileans in particular are strong adopters of the technology with the total area of vineyard flown more than doubling from 3000ha in 2007 to 7500ha in 2008. In Australia the cost of obtaining DMSI ranges from \$37/ha for vineyards of between 15-50ha to \$29/ha for vineyards greater than 500ha. For vineyards less than 15ha the cost is a fixed price.

The use of other PV technologies is also on the increase within Australia. For example, grapegrowers are now acquiring high resolution soil and elevation data to gain a better understanding of soil and topography-related factors controlling the variability in vine performance across their vineyards. Such data has also become an important source of information for irrigation and drainage designers who require the data to ensure that designs meet specification criteria. A number of soil sensors are commercially available with the type of sensor in use and survey cost dependant on the service provider within the region. With the development of soil sensing equipment and the ability to obtain accurate elevation data (± 2 cm) at the same time, the collection of data can now be performed at a greater spatial resolution and at a price which can be much more cost-effective than using traditional manual methods. The preferred time of year to gather such information is when the soil is relatively moist.

There has been a steady increase in the number of harvest contractors and wine companies installing yield monitors to their mechanical harvesters. The most widely used commercial yield monitor available in Australia is manufactured by Advanced Technology Viticulture (www.atv.net.au). The output in the form of yield maps has been welcomed by growers and wine producers since they are now able to identify areas of different crop yield, and in some cases different fruit quality attributes, within individual vineyard blocks. Yield maps do not require ground-truthing since they represent actual as opposed to surrogate measures. They are

CROP PROTECTION




NEW OSPREY modular design bird netting machine. Simply add extra components to suit the size and style of your vineyard. Order as a **FALCON, EAGLE or TREE BUILD.**

FROST-STOPPA portable anti-frost wind machine 1-3 H. No planning permit required. External heat can be added.

VINE MAINTENANCE





COLLARD green trimmers, pre-pruners and leaf removers.

BOISSELET undervine weeding/mowing, de-budding and cane sweeping. Freecall **0800 737 733.**

LANGLOIS mechanical vineyard cane stripper 3km/hr.

Tatura Engineering P/L
Contact **Alex Carter** Ph **0408 241 998** Email acarter@tateng.com.au
www.tateng.com



Fig. 1. Surveying block boundaries using a differential Global Positioning System (DGPS). Courtesy of Adams Road Vineyard, Margaret River, WA.

being used to improve crop forecasts, identify areas which are under-performing and batch fruit of similar quality characteristics during the harvesting process.

By combining these various layers of spatial information, relationships can be examined and 'management zones' created which form the basis for differential vineyard management. However, it is important when using a number of service providers that the spatial information is acquired to industry standards and processed according to industry protocols so that the pixels in each layer correspond to each other. One of the most important tasks when starting to implement Precision Viticulture is to collect accurate block boundary information (Figure 1). If done correctly, it will only need to be done once and should preferably be supplied before imagery or maps are purchased. A service provider such as Precision Viticulture Australia (www.pvaustralia.com.au) provides



Fig. 2. Grapegrowers and winemakers from the Mornington Peninsula Vignerons Association listening to Tony Proffitt in a Precision Viticulture workshop held in the barrel room at Willow Creek Winery.

advice on the acquisition of spatial data, undertakes data processing and analysis using a Geographical Information System (GIS), and delivers the information in digital form which can be readily accessed using supplied software which allows the user to view and analyse the maps.

Mornington Peninsula, King Valley host PV workshops

The latest region to become interested in learning more about Precision Viticulture is the Mornington Peninsula in Victoria. The Mornington Peninsula Vignerons Association hosted a workshop on 31 October 2008 with Tony Proffitt (Precision Viticulture Australia) as the main presenter (Figure 2). James Wright (Australian Institute of Viticulture) also shared his experiences in the use of PV with the

Omnia introduces new plant health foliar products

A complete range of plant health foliar products consisting of GN2 Plus, Greenseal Plus and coming soon Mega-Kel-P Plus and High Yield Plus. For the control of Eutypa dieback of grapevines.



Our new products are part of a health concept especially designed to help reduce the effects of disease in a wide range of trees, vine and field crops. These products stimulate the plants own defence mechanisms to assist in the battle against fungal invasion.



Omnia Specialities Australia Pty Ltd

Tel: 03 5133 9118 Website: www.australianhumates.com Email: info@omnia.net.au

grapegrowing

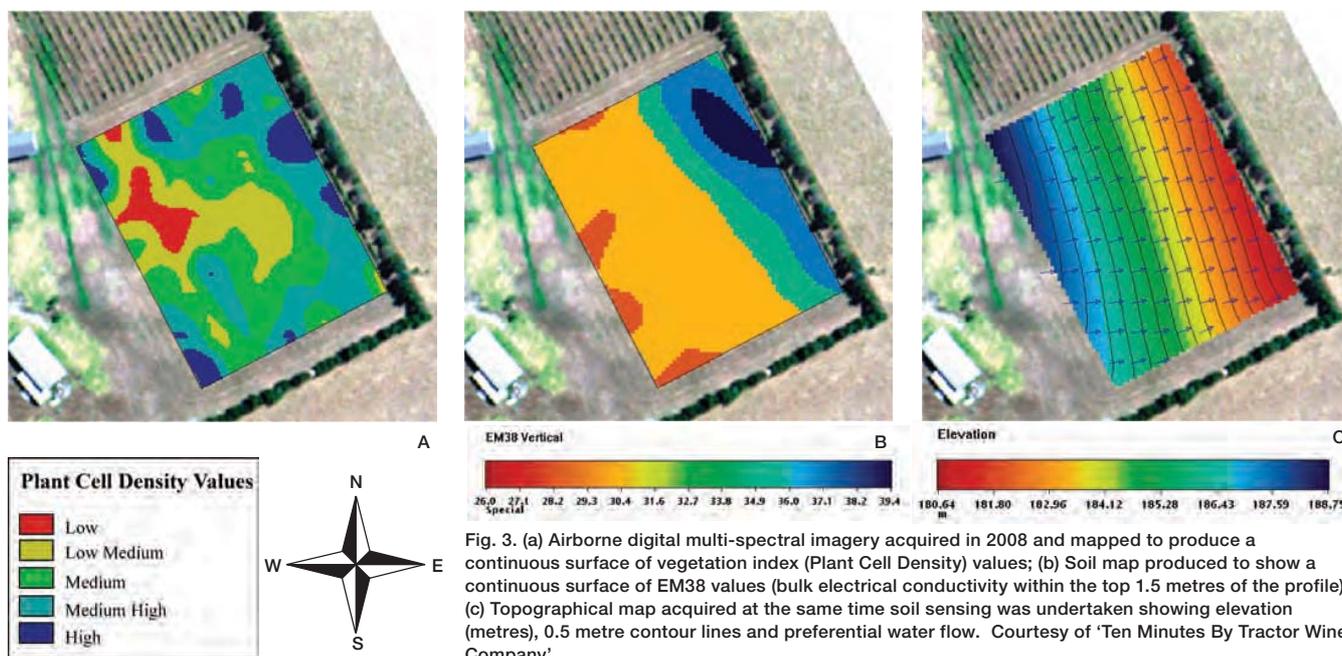


Fig. 3. (a) Airborne digital multi-spectral imagery acquired in 2008 and mapped to produce a continuous surface of vegetation index (Plant Cell Density) values; (b) Soil map produced to show a continuous surface of EM38 values (bulk electrical conductivity within the top 1.5 metres of the profile); (c) Topographical map acquired at the same time soil sensing was undertaken showing elevation (metres), 0.5 metre contour lines and preferential water flow. Courtesy of 'Ten Minutes By Tractor Wine Company'.

participants. Amongst the 20 participants was Alan Murray from Ten Minutes By Tractor Wine Company who has acquired DMSI for the past two growing seasons and also mapped the majority of his vineyard soils (using EM38 sensing equipment) and elevation. Changes in vineyard management practices have been implemented by Alan and his team who expect to see economic benefits. The map examples shown in Figure 3 indicate that vines with the greatest canopy biomass (ie. highest Plant Cell Density values) (Figure 3a) appear towards the eastern boundary of the vineyard block where the highest EM38 readings were recorded (Figure 3b) towards the bottom of the slope where water will naturally migrate (Figure 3c). Vine vigour in this case is likely to be driven by both soil characteristics and position in the landscape. The King Valley region is also embracing the technology and King Valley Vigneron's Project Officer Stephen Lowe is currently surveying block boundaries for all participants of the Landcare Benchmarking Project in preparation for acquiring DMSI at veraison.

Further information can be sourced from the following reference⁽¹⁾ which describes in detail the tools and technologies associated with Precision Viticulture. It contains checklists so that adopters of the technology understand the questions that need to be asked of service providers. The practical applications of Precision Viticulture are a central theme to the book and a number of commercial case studies are presented.

References

⁽¹⁾Proffitt, T., Bramley, R., Lamb, D. and Winter, E. 2006. Precision Viticulture - a new era in vineyard management and wine production. Winetitles, Adelaide.



BIRD NETTING

We have a huge range of Australasian diamond and hexagonal pattern Canopy and Throw-over bird nettings. Widths from 4 metres to 23 metres.

10 Season UV WARRANTY



Monbulk Rural Enterprises



MRE Post Caps

Cap your posts with easy-to-install, secure fit, high density plastic UV stabilized MRE Post Caps. No more nets snagging or tearing on posts.

- 180mm cap for Timber posts
- 105mm cap for Steel posts

Monbulk Rural Enterprises Pty Ltd

8 Old Emerald Road,
Monbulk, Vic 3793

Tel: (03) 9756 6355

Fax: (03) 9756 7548

E: info@monbulkrural.com.au

W: www.monbulkrural.com.au