



## Local Research News

### Cover Crop Performance and Weed Control

So as to investigate cover crop performance and weed control, eight cover crop treatments were applied for 12 consecutive years on a medium-textured soil in a vineyard near Robertson in the Western Cape. These included triticale (top right), vetch (bottom right) and a rye/faba bean mixture. Triticale has the ability to produce significantly more dry matter than the local weeds over the long term if sown in mid-April, irrespective of the management practice applied. Rotating triticale and vetch annually or biennially did not improve the dry matter production of these two species over the long term. Meaningful differences in weed control efficacy between treatments became evident only three years after application.



Under similar environmental conditions, mono-cropping can be applied with triticale or vetch for as long as 11 years without a significant loss in the production of dry matter. Triticale, a rye/faba bean mixture, or a biennial rotation of triticale and vetch, as cover crop, in combination with full surface chemical control during bud break, as well as combining full surface straw mulch with full surface chemical control during bud break, may achieve total summer weed control after eight years of application. This would allow producers to omit the herbicide spray that is usually applied in this semi-arid region when the grapevine berries reach pea size. A permanent cover crop, or mechanical cultivation in the work row did not suppress the winter- and summer-growing weeds significantly. [www.sawislibrary.co.za/dbtextimages/FourieJC9.pdf](http://www.sawislibrary.co.za/dbtextimages/FourieJC9.pdf)



## International Research News

### Effect of N, P and K supply on Pinot noir Grapevines

Pinot noir grapevines (self-rooted Pommard clone) were grown in a pot-in-pot sand culture vineyard in western Oregon to examine the impact of low nitrogen (N), phosphorus (P), and potassium (K) supply on vine growth and physiology. Four-year-old vines were given either full nutrition, or reduced levels of N, P, and K supplied at 50%, 20%, or 10% of the full nutrition rate, with all other nutrients held constant over three years (2006-2008). Vine growth, nutrient status, photosynthetic parameters, yield, and berry quality were monitored. Juice YAN (yeast assimilable nitrogen) levels were greatly reduced by low N supply in 2007 and 2008, although YAN was lower in 2007 across all treatments. Low P and low K supply did not alter growth or yield. Low P supply reduced juice P concentrations, but low K supply did not alter juice K.

Reduced yield, growth, and juice YAN levels in low N treatments provide a framework to refine leaf blade and petiole N standards for Pinot noir grown in the region, but limiting levels of P and K were not as clearly defined. Leaf blade N values of 25 g N/kg at bloom and 1.8 g N/kg at veraison were required to maintain yield and provide adequate YAN in berries. Leaf blade P values of 2.3 g P/kg at bloom appear to be required to provide juice P concentrations of ~ 100 mg P/L. Leaf blades were better indicators than petioles for N and P status, while petioles were a better indicator for K status. Visual symptoms of low N and low P levels in Pinot noir leaves, and instantaneous vine growth and physiological responses were not reliable indicators of potential deficiencies of N or P. <http://dx.doi.org/10.5344/ajev.2012.12064>

### Detection of *Brettanomyces* in red wines

In the wine industry, *Brettanomyces bruxellensis* is generally considered a spoilage yeast of red wine and is often referred to as brett, with its metabolic products imparting undesirable aromas to wine. A study has compared sensitivity and effectiveness of conventional microbiological culture with real-time polymerase chain reaction (Q-PCR) methods for *Brettanomyces* detection and quantification, and demonstrates a positive correlation between the two methods. An improved DNA extraction protocol enabled quantification of *Brettanomyces* cells by Q-PCR down to 20 cells/mL in turbid red wines, in a total of 324 samples. It is also concluded that while conventional culture analysis is time-consuming, it is lower-cost than Q-PCR, and it is simple and efficient in quantifying viable *Brettanomyces*, as it requires less equipment and possesses the lowest threshold (1 cfu/mL) for detecting viable *Brettanomyces* spoiling cells in wine. <http://dx.doi.org/10.5344/ajev.2012.12047>

### Effect of Pruning Systems and Canopy Management on Syrah

A production trial in the San Joaquin Valley (SJV) of California was conducted in which the canopy microclimate of Syrah05/SO4 grapevines was altered through three pruning systems (by hand to 44 nodes each, mechanically box-pruned to a 10 cm hedge, or cane pruned by hand to six, 8-node canes arranged in opposing directions of the row with horizontal canopy separation), and two leaf removal treatments (outer surface layer of leaves were removed mechanically 20 days post-bloom on the east side of the canopy in a 45 cm zone above the cordon in the fruit zone, or they were not). The cane pruning method described in this papers decreased berry and cluster weight while increasing yield. Although spur and mechanical box pruning are more cost efficient than cane pruning, the yields of cane pruning were superior.

Leaf removal treatments improved the canopy microclimate, but the vines were physiologically unresponsive to this treatment, evidenced with inconsistent results on berry phenolic composition. The key to obtaining higher yields was to expose more nodes per shoot, increasing the height of the canopy, and separating it with the cane pruning method. It was recommended that a quadrilateral training system be used with a cordon height of 1.8 m for an ameliorated ratio of row spacing to canopy height. However, in the absence of a financial incentive to install a horizontally separated canopy, the method of cane pruning and laying the canes on existing catch wires has proven successful in this study. The study identified a pruning system management for vineyards in warm climates that can be applied instead of spur or mechanical box pruning that can sustain yields and provides canopy management information for growers on how to rejuvenate vines that have declined in productivity. <http://dx.doi.org/10.5344/ajev.2012.12056>

### An enzymatic alternative to Bentonite fining

Bentonite can adsorb large amounts of protein molecules from aqueous solutions and this property is used in winemaking to remove excessive amounts of protein from white wines, which would otherwise precipitate undesirable flocculent clouds or hazes upon exposure to warmer temperatures, as the proteins denature. Proteases (enzymes) potentially represent an alternative to bentonite for removing haze inducing proteins in wine by hydrolysis (cleavage) of the peptide bonds that link amino acids together in proteins, but so far none has shown satisfactory activity under winemaking conditions. A promising candidate is AGP, a mixture of Aspergillopepsins I and II, a food grade, well characterized and inexpensive protease, active at wine pH and at high temperatures (60–80°C). AGP was added to two clarified grape juices with and without heat treatment (75°C, 1 min) prior to fermentation. AGP showed some activity at fermentation temperatures (20% total protein reduction compared to control wine) and excellent activity when combined with juice heating (90% total protein reduction).

The more heat stable grape proteins, i.e. those not contributing to wine hazing, were not affected by the treatments and accounted for the remaining 10% of protein still in solution after the treatments. The main physicochemical parameters and sensorial characteristics of wines produced with AGP (including heat treatment) were not different from controls. Under these conditions the enzyme showed excellent activity and almost completely eliminated chitinases and thaumatin-like proteins (TLPs), thus eliminating the need to bentonite fine the wines. Preliminary process economic analysis suggests that AGP could provide a significant operating cost saving when compared with traditional batch bentonite treatment. AGP is currently not approved in Australia as a wine additive, despite being rated as food grade. <http://dx.doi.org/10.1016/j.foodchem.2012.05.042>

## Other News

### STABIWINE

STABIWINE, a 3 year-long 1.6 million euro project to investigate the use of biopolymers (polymers such as polynucleotides, polypeptides and polysaccharides produced by living organisms) for sustainable stabilization of quality wines, is under way in the European Union. To avoid formation of cloudiness or precipitates in wines, producers preventively treat it by mean of physical methods or additives, however, the present practices are not suitable for all wine types and production facilities, in particular small wineries. The aim of the project is to test the effectiveness and suitability in winemaking of biopolymers to inhibit the formation of tartrate crystals, and to absorb proteins in a selective way. The project will address process efficiencies, wine quality, sustainability and the effect of the treatments on human health and the environment. [http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ\\_RCN=13144261](http://cordis.europa.eu/search/index.cfm?fuseaction=proj.document&PJ_RCN=13144261)

### ASEV best paper awards

The American Society for Enology and Viticulture (ASEV), founded in 1950, is a non-profit, scientific organization dedicated to promoting the interests of oenologists, viticulturists, and others in the fields of wine and grape research and production throughout the world. Each year the ASEV Best Paper Committee selects one paper in the field of enology and one in the field of viticulture that is deemed outstanding in its content and a substantial contribution to the field. The papers selected in 2012 are Best Viticulture Paper: Powdery Mildew Severity as a Function of Canopy Density: Associated Impacts on Sunlight Penetration and Spray Coverage by Craig N. Austin, Gary G. Grove, James M. Meyers, and Wayne F. Wilcox, *Am. J. Enol. Vitic.* 62:23-31 (2011) [www.ajevonline.org/content/62/1/23](http://www.ajevonline.org/content/62/1/23); and Best Enology Paper: Relative Efficacy of High-Pressure Hot Water and High-Power Ultrasonics for Wine Oak Barrel Sanitization by Frank Schmid, Paul Grbin, Andrew Yap, and Vladimir Jiranek, *Am. J. Enol. Vitic.* 62:519-526 (2011). [www.ajevonline.org/content/62/4/519](http://www.ajevonline.org/content/62/4/519)

### Vineyard robot

The Wall-Ye V.I.N. is 50cm tall and 60cm wide, has four wheels, two arms and six cameras, and can prune 600 vines a day. The French developed robot can prune and de-sucker while collecting valuable data on the health and vigour of the soil, fruit and vine stocks. Bordeaux's first growth Château Mouton-Rothschild have offered their vineyards as a trial venue for the 20kg robot. Wall-Ye draws on tracking technology, artificial intelligence and mapping to move from vine to vine, recognize plant features, and capture and record data. A built-in security mechanism is designed to thwart would-be robot-snatchers. The price is about 25 000 Euros. [www.wine-searcher.com/m/2012/09/a-robot-winemaker-enters-the-labor-market](http://www.wine-searcher.com/m/2012/09/a-robot-winemaker-enters-the-labor-market)



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