



Local Research News

The effect of mulches on insect communities

The benefits of the use of mulches in orchards and vineyards are well documented. However, the increasing use of mulches in the South African fruit and wine industry requires that the effects of such practices on insect communities be investigated. A preliminary investigation into differences in arthropod diversity in vineyards with and without mulches has been carried out. In 4 vineyards a total of 5 plots with mulch and 4 without (control) were selected. Plots were about one hectare in size. A total of forty different families of insect and springtail were found in pitfall traps over the 9 sites. There was a greater diversity of insects in the mulched sites than in the controls, but significantly, more pest insects were found in the control sites than in the mulched sites. www.sawislibrary.co.za/dbtextimages/AddisonP7.pdf

Use of boundary lines to determine the effects of salinity-associated soil variables on grapevines

Viticultural practices should be adapted to minimise the uptake and accumulation of problematic ions in the soil by grapevines. A study investigated whether the 'boundary line concept' could be used to determine the effects of salinity-associated soil variables on grapevine growth, yield and juice characteristics. The boundary line concept entails plotting a scatter diagram of plant response against a plant growth factor. In most cases it is possible to draw a boundary line, or lines, which confine the data. These boundary lines then describe the sole effect of a plant growth factor.

The boundary line concept was used to assess grapevine responses to salinity-associated soil variables. The chemical status and grapevine responses were measured in 13 vineyards in the Breede River Valley during the 2001/2002 season. Chardonnay grafted onto 110 Richter and 101-14 Mgt, as well as Ruby Cabernet on the same two rootstocks, was included. The selected vineyards were representative of the variation in salinity associated soil variables, as well as of leaf and juice element contents previously reported for South African vineyards. Under the prevailing conditions, the four scion-rootstock combinations responded similarly to the salinity-associated variables. The results confirmed that soil pH should be at least 6.0 for grapevines. The salinity threshold for vineyards in the Breede River Valley as measured by conductivity in deci-Siemens per metre (dS/m) should be between 0.7 dS/m and 1.5 dS/m to avoid growth and yield reductions. To reduce the risk of Na (sodium) toxicity, the sodium adsorption ratio (SAR) should be below 3, and the soluble Na content in the soil should not exceed 5 mg/kg. If gypsum is used to reduce soil Na, it should be applied judiciously to avoid soil sulphate accumulation, thereby reducing the risk of potassium and magnesium deficiencies. Under the prevailing conditions, boron and chloride toxicity apparently contributed to reduced vegetative growth. The boundary line concept proved to be useful for determining the effect of a single salinity-associated soil variable on grapevine response. www.sawislibrary.co.za/dbtextimages/84337.pdf

International Research News

Reducing the economic impact of grapevine leafroll disease

Grapevine leafroll disease (GLRD) is a devastating viral disease found across all grape-growing regions. GLRD can have devastating effects on yield and on grape quality. Vineyard managers adopt varied strategies for managing GLRD including roguing (uprooting and destroying) individual symptomatic vines and replacing them with certified vines derived from clean, virus-tested stocks; applying insecticides targeting mealybug vector populations in order to reduce disease spread and minimize long-term impacts; fully replanting vineyards at the onset of disease symptom development; while some elect to not control GLRD at all. A survey has analysed data from vineyard managers throughout the major California grape-growing areas to estimate the economic impact of GLRD on Cabernet Sauvignon and identify cost-minimizing management strategies.

It was found that the economic cost of GLRD in California ranges from \$29 902 to \$226 405 per hectare. The study concluded that vineyard managers experiencing a low GLRD prevalence (approximately between 5-10%) can minimize losses by roguing and replanting symptomatic vines, while those managing a higher disease incidence level, generally beyond 25%, should consider minimizing the GLRD economic impact by pursuing a full vineyard replacement strategy. Results showed that the net present value (NPV) benefit of roguing, replanting, and treating insect vectors is often a preferable strategy regardless of the market targeted (from premium to ultra-premium) or production region, rather than not controlling GLRD in any way. <http://dx.doi.org/10.5344/ajev.2014.14106>

Sugar foam as an alternative to lime

Calcium (Ca) deficiency and aluminium (Al) toxicity are considered major chemical constraints that limit vine growth in acid soils under Mediterranean conditions. Liming is the most widely used long-term method of soil acidity amelioration. A study has investigated the use of sugar foam for this purpose. Sugar foam is a waste by-product when sugar is extracted from beets. The name 'sugar' is a misnomer, and the foam is very rich in active lime, with a calcium carbonate equivalent of 757 gm per 1000 gm of sugar foam. Its Ca content is due mainly to the presence of Ca in the form of slaked lime $[Ca(OH)_2]$ and, to a

lesser extent, as calcium carbonate. It also contains abundant organic matter, as well as nutrient elements such as phosphorous, iron, copper and zinc. A study evaluated the effects of three doses of sugar foam (900, 1800 and 2700 kg calcium carbonate per hectare) on five soil properties over three seasons. It was found that the higher doses of sugar foam were the most effective in decreasing Al exchangeable and increasing Ca exchangeable contents. In addition, the sugar foam slightly increased Ca content in petioles and decreased Ca content in canes. www.sawislibrary.co.za/dbtextimages/84331.pdf

Phenolic compounds and antioxidant activity of red wine made from grapes treated with different fungicides

One of the least studied of factors influencing the phenolic composition of grapes and wines is without doubt the possible effect of pesticide residues. The effect of treating grapes with six fungicides on the levels of phenolic compounds and antioxidant activity of red wines of Monastrell variety has been studied. The fungicide residues in the treated wines were well below the maximum values allowed for wine, so the use of these fungicides would not present any toxicological risk to the consumer. All treatments reduced the contents of hydroxycinnamics and flavonols. The wine prepared from grapes treated with quinoxifen showed a greater increase of phenolic compounds than the control wine. In contrast, the wine obtained from grapes treated with trifloxystrobin showed a lower total concentration of phenolic compounds, including stilbenes, whilst treatments with kresoxim-methyl, fluquinconazole, fenhexamid and famoxadone slightly reduced their content. Hence, the use of these last four fungicides could cause a decrease in possible health benefits to consumers. Antioxidant activity hardly varied in the assays with quinoxifen, fluquinconazole, fenhexamid and famoxadone, and decreased in the other wines. The greatest reduction in anthocyanins was produced by treatment with fluquinconazole. <http://dx.doi.org/10.1016/j.foodchem.2015.01.141>

Phenylalanine and urea foliar applications to grapevine

As phenolic compounds play a key role in the organoleptic properties of wines a study has evaluated the effect of foliar applications of phenylalanine and urea, each at two different doses, on wine phenolic composition. The variously treated Tempranillo grapes were then harvested at their optimal maturity and their respective wines were produced at small scale. The phenolic composition of the wines was determined. Results revealed that the levels of several anthocyanins and flavonols was increased by the application of both phenylalanine doses and by the application of the low dose of urea. In contrast, flavanols and non-flavonoid compounds were less affected by the foliar treatments. The findings seem to be related to the time of application, since anthocyanins and flavonols are accumulated after veraison. Contrary to the researchers' expectations, phenylalanine did not have a greater influence on phenol levels than did the application of urea. In conclusion, nitrogen foliar fertilization increased the phenolic content of Tempranillo wines. This could be of interest since the increase of anthocyanin and flavonol content may be associated with an increased wine quality, since both groups of compounds are related to wine colour and its long-term stability by means of copigmentation reactions. <http://dx.doi.org/10.1016/j.foodchem.2015.02.008>

Genetics of grape powdery mildew

Left untreated, powdery mildew destroys grape quality and yield. It is caused by the fungal pathogen *Erysiphe necator*. Now a team has elucidated the structure of the *E. necator* genome, which they found is exceptionally large and dynamic and can evolve quickly to adapt to strong selective pressure such as repeated treatments with fungicides, leading to fungicide resistance. The findings should help in combatting the disease. <http://dx.doi.org/10.1186/1471-2164-15-1081>

Other News

Unmanned robot will help manage vineyards

An European research consortium is working on the development of an unmanned robot (see picture), equipped with non-invasive advanced sensors and artificial intelligence systems, which will help to manage vineyards. The robot will provide reliable, fast and objective information on the state of vineyards, such as vegetative development, water status, production and grape composition. The project plans to use the robot to make available via wireless transmission a large quantity of automatically obtained data that any user will be able to interpret easily as it will be represented on simple maps. The first working year has focused on the robot's mobility in the field, improving the suspension and traction systems in order for it to climb up slopes with weeds, and the development and improvement of the different sensors that will be included in the robot. The focus is now on allowing the robot the autonomy to safely drive between the vineyard lines using stereoscopic vision, and integrating a side camera which will provide information about the vegetation status of the plants and grape bunches. The project is funded with more than 2m euros and should be completed at the end of next year. www.sciencedaily.com/releases/2015/01/150128113713.htm



Code of practices in order to avoid or limit contamination by *brettanomyces*

The International Organisation of Vine and Wine (OIV) has published a code of good vitivinicultural practices in order to avoid or limit contamination by *brettanomyces*. Among processes that deteriorate wine quality, the production of bad smelling volatile phenols by *brettanomyces* species is widespread and increasingly problematic. The maintenance of the best possible hygiene conditions in the cellar is highly recommended and preventive actions are preferable to curative processes. The 7 page code of practices may be downloaded from: www.oiv.int/oiv/files/3%20-%20Resolutions/EN/2014/OIV-OENO%20462-2014.pdf

Winetech Scan is available on the Winetech website www.winetech.co.za

To subscribe please email Gerard Martin: marting@winetech.co.za