



Riverlink Wine Grape Symposium

Thursday 14 June, 2007

Supported by:



Program

Time	Activity	Speaker
8.30am	Name tags and handouts	
9.00am	Welcome and introduction to Riverlink	Peter Clingeleffer, Riverlink Program Leader – Viticulture
9.10am	Managing soil and water to target quality and reduce environmental impact	Ian Goodwin, Vic DPI
9.30am	Vineyard evapotranspiration and irrigation efficiency measured by micrometeorological methods	Julie Styles, SARDI
9.50am	Influence of sustained deficit irrigation on premium wine grape varieties	Jeff Milne, Vic DPI
10.10am	Morning tea	
10.30am	Saline horticulture	Joanne Pech, SARDI
10.50am	Long-term effects of deficit irrigation	Everard Edwards, CSIRO
11.10am	Low input management and production efficiency	Peter Clingeleffer, CSIRO
11.30am	Introduction of Riverlink Wine Grape Industry RDE Committee – aims and objectives Presentation of Riverlink Wine Grape Industry RDE priorities – process of developing priorities – current list, summary of priorities – feedback access	Liz McGuire, Chair
12.10pm	Lunch	

Time	Activity	Speaker
12.50pm	Soft scale insects in the Australian vineyard	Adrian Rakimov, Vic DPI
1.10pm	Vineyard mothballing	Greg Moulds, NSW DPI
1.30pm	Viticulture management of grape tannin and anthocyanin levels to achieve desired wine quality specifications	Mark Downey, Vic DPI
1.50pm	Sustainable salt exclusion by salt tolerant rootstocks	Rob Walker, CSIRO
1.50pm	Rootstock breeding and development for Australian wine grapes	Peter Clingeleffer, CSIRO
2.20pm	Review of and packaging of current viticultural nutritional management information for Australia's major wine grape varieties	Nicole Dimos, Vic DPI
2.40pm	Thank you and evaluation	Peter Clingeleffer, Riverlink Program Leader – Viticulture

Managing soil and water to target quality and reduce environmental impact

Ian Goodwin, Department of Primary Industries, Tatura
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Aim: Investigate Shiraz vine characteristics such as yield, growth, fruit composition, water stress and nutrition in vineyards across Australia. Explore how these components relate to both management inputs and environmental factors.

Better soil and water management to achieve specific quality targets and reduce adverse environmental impacts is critical for the wine industry to maintain its international competitiveness.

Resource management needs to be economically justified, environmentally sustainable and potentially flexible for rapid adjustment to changing markets and weather conditions.

This project proposes to use multivariate, spatial and temporal statistical techniques to improve our knowledge of the interaction of climate and soil characteristics with soil, water and nutrition management and its impact on yield and quality of fruit and wine.

Data has been collected over two seasons to describe the spatial and temporal variation in environment (climate and soil physical and chemical properties), vine performance (growth, yield, water and nutritional status, and fruit composition) and management (irrigation, soil and fertiliser) of five vineyards across viticultural regions in Australia (Riverina, central Victoria, Sunraysia, Great Southern and Langhorne Creek).

A combination of whole block parameters such as soil EC and yield, and discrete field measurements of parameters such as berry composition and soil properties from vines distributed through each block have been measured. Spatial variation in wine composition has been described by zoning vineyard blocks by cluster analysis using soil and vine properties. Preliminary results of the project will be presented.

Vineyard evapotranspiration and irrigation efficiency measured by micrometeorological methods

Julie Styles, SARDI, Loxton
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Aim: To accurately quantify the evapotranspiration (ET) of a vineyard and orchard in the Riverland using micrometeorological techniques, and to estimate drainage.

This project aims to quantify crop water use and deep drainage in a vineyard in the Riverland using eddy covariance flux measurements of evapotranspiration (ET). Concurrent climate and soil moisture measurements will allow evaluation and improvement of ET estimates calculated by indirect methods such as via reference evapotranspiration ET_0 .

The eddy covariance technique allows ET to be quantified with greater accuracy than other available methods. Footprint analysis reveals the area of vegetation surrounding the flux tower providing the dominant influence on the measurements, and periods where undesirable influences from vegetation or pasture outside the area of interest can be identified and excluded.

Measurements commenced in mid-February 2007. Results to date show that while the vines were actively growing from mid-February to mid-March, ET was largely driven by soil moisture. Photosynthesis outweighed respiration during this period and gross primary productivity (GPP) followed ET. Water use efficiency, defined as GPP/ET , decreased with increasing vapour pressure deficit.

After mid-March respiration outweighed photosynthesis. ET declined and responded most strongly to precipitation events. For the three months from mid-February to mid-May, the effective crop factor calculated as ET/ET_0 was 0.31, 0.23 and 0.27, respectively. The ratio of ET to applied water (irrigation plus precipitation) was 1.7, 0.7 and 0.5, respectively.

The results show promise in improving understanding and prediction of the response of crop water and carbon relations to environmental conditions and providing guidance for irrigation practices for efficient water use.

Influence of sustained deficit irrigation on premium wine grape varieties

Jeff Milne, Department of Primary Industries, Mildura
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Aim: Investigate the effects of sustained water deficit on the physiological responses of vines, changes in grape and wine composition and impact of seasonal variation and vineyard variability.

This project is funded by a Vic state government initiative - Our Rural landscapes (ORL) that is aiming to develop more environmentally sustainable farming systems. The project is part of a multi-skilled team that is exploring ways of improving water use efficiency across the horticulture, grains and dairy industries in Victoria.

The horticulture component is based at Vic DPI-Mildura with Yasmin Chalmers, Nardia Baker and Mark Krstic working on the project.

To address the objectives, field sites on Shiraz and Cabernet Sauvignon were established under a range of sustained deficit irrigation treatments. There have also been glasshouse trials established on Shiraz, Cabernet Sauvignon, Grenache and Tempranillo to relate varietal differences in abiotic stress response to physiological characteristics such as the transport and utilisation of root-sourced chemical signals like abscisic acid (ABA).

Overall this work is about understanding the response of each cultivar to water deficit in expectation of designing the most appropriate irrigation strategies to maximise both yield and quality, whilst improving water use efficiency.

Also the impact these deficit irrigation levels may have on grape and wine composition will be considered, as well as the sustainability (carbohydrate reserves) of irrigating grapevines at deficit irrigation levels.

Saline horticulture viticulture projects

Joanne Pech, SARDI, Loxton
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Aim: Sustaining improved irrigation practices from high boron saline sodic sub-soils.

Objectives

1. Identify grapevine rootstocks and varieties which exhibit tolerance to high boron and low calcium in soil solution under saline conditions.
2. Increase understanding of physiology of grapevine boron tolerance.

In the Sunraysia-Riverland region, drainage water collected in subsoils above the widespread Blanchetown clay layer is saline and high in boron. Excess boron concentrations suppress grapevine growth. Salinity may moderate this effect. This research investigated how 26 grapevine genotypes tolerated this combination of stressors.

Managing post salinity losses in grapevines.

Objectives

1. Produce a vine model to investigate after effects of exposure to salinity over the relatively short time-periods of two seasons.
2. Use this model to identify organs responsible for carry-over following a period of dormancy after exposure to salinity and investigate whether the effect varies with cultivar and rootstock.
3. Characterise the physiological basis of salinity carry-over.

A successful salinity management strategy must minimise the effects of salinity stress on the vine during the periods of exposure to saline water and the periods of recovery afterwards. A previous grapevine field trial has shown yield losses in three seasons after saline irrigation were greater than those during three seasons of saline irrigation. These post salinity losses continued after salts were flushed from the soil, after the level of chloride in metabolically active leaf tissue fell below nonsaline controls and at a soil sodicity which was well below that shown to be associated with yield loss in a separate experiment.

Long-term effects of deficit irrigation

Everard Edwards, CSIRO Plant Industry, Merbein
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Aim: Determine the long-term, multi-year, effect of the use of deficit irrigation on vine status and productivity.

The project forms a part of the Grape and Wine Research Development Council (GWRDC) Soil and Water Initiative, Sunraysia experimental site at Wingara. It builds on the CRC for Viticulture research that has been aimed at development of integrated strategies to manage seasonal variation in wine grape maturation, and CSIRO Flagship research to enhance wine flavour. This research is being conducted primarily on the Deakin Estate, Wingara property.

The Cabernet Sauvignon site has been established to assess the effects of water stress treatments and seasonal temperature conditions on crop development, fruit maturation and long-term productivity (such as vine capacity).

It has shown significant effects of water stress on i) canopy size and function (including photosynthesis, stomatal conductance and leaf temperature), ii) crop development and sugar accumulation, and iii) wine aroma, flavour and colour. Significant seasonal (temperature, in particular) impacts have previously been demonstrated on the experimental site.

Because treatments have been established for a number of seasons, the site is ideal and can be modified to address the specific question of whether current deficit irrigation is economically sustainable in the longer term. The aim is to refine vineyard management systems (particularly with respect to irrigation management) to deliver grapes of specified quality and economically acceptable yields while ensuring sustainability of the vineyard soil and water resource.

Low input management and production efficiency

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Adoption of low input management systems, based on mechanisation of harvest and pruning, has underpinned the development of an efficient, internationally competitive Australian wine industry. This has led to substantial savings in the cost of production and improved profitability without compromising quality.

Recent studies have shown that further potential gains in production efficiency may be achieved through integrated approaches of management involving low input management systems; optimisation of water applied for irrigation to enhance water use efficiency; application of techniques for yield stabilization with the aim to produce a consistent supply of quality fruit from year to year and in the longer term, adoption of new low-medium vigour rootstocks have suited to high density plantings to increase yields per hectare and vineyard water use efficiency and adoption of high yielding varieties suited to specific wine styles.

This presentation will provide updates on recent research results in the areas identified above and in particular, further address the complex issue of the management of crop load to give consistent supply and meet quality specifications. With regard to the latter, a number of Australian studies have shown very poor relationships between yield and quality across red winegrape growers.

These studies have however demonstrated that quality (for example, high levels of colour and phenolics in berries) can be attributed to attainment of a high degree of ripeness and development of small bunches with small berries. Such results indicate that differences in quality are related to site and grower management practices, in particular vigour management which result in the development of small bunches with small berries rather than to yield.

Riverlink Wine Grape Industry RDE Committee

Background

A 'Review of Research and Development Planning for Riverlink Regions' was conducted in October 2006 to investigate the scope and appropriateness of Riverlink research planning and priority setting. This review meeting was attended by representatives from Riverlink, Murray Valley Winegrowers, Riverland Winegrape Growers Association, Riverland Wine Industry Development Council, winery and grower industries.

The outcome from the meeting was to develop a Riverlink Wine Grape Industry RDE Committee to formalise the process of planning and setting research priorities, and to follow through submissions and projects.

Liz McGuire, Murray Valley Winegrowers Inc Industry Development Officer (IDO), has been elected as Chair. Development of research priorities has been the main activity for the committee, which has been done through consultation with growers by the Murray Valley Winegrowers, Riverland Winegrape Growers Association and Riverland Wine Industry Development Council.

Process

The Committee will receive proposed research, development and extension (R,D&E) concepts for prioritisation and research planning from regional growers through their representative organisation, the Murray Valley Winegrowers Inc and Riverland Wine Industry Development Council Inc.

The Riverlink Wine Grape Industry RDE Committee will meet regularly three times a year to review submissions, track current research projects, consider arising priorities and plan future directions. These meetings will be held prior to each Riverlink Council meeting to allow for reporting purposes. Other meetings can be convened as necessary.

A wine grape symposium will be held to present research outcomes, highlight priorities planning and gather additional priority issues from the industry. These issues will be fed into the planning and prioritisation processes of the grower organisations and technical groups, prior to submission to the Riverlink Wine Grape Industry RDE Committee meeting.

Purpose

To encourage cohesive research planning through the development of a partnership based Riverlink Wine Grape Industry RDE (research, development and extension) Committee, consisting of representatives from Riverlink, Murray Valley Winegrowers Inc, Riverland Wine Industry Development Council Inc and Riverland Winegrape Growers' Association Inc.

Aim

- To promote cooperative planning of research, development and extension (R,D&E) priorities for the wine and grape industry in the Sunraysia-Riverland region.
- To facilitate a committee that will prioritise R,D&E issues, facilitate grower awareness of and access to existing research information, encourage progression of appropriate projects and provide reporting mechanisms.

Members

Chris Byrne, Riverland Wine Growers Association

Peter Byrne, CCW

Tim Smythe, Riverland Wine Industry Development Council

Shane Phillips, Riverland Wine Industry Development Council

Len Schliefert, Murray Valley Wine Grape Industry Development Council

Ben Fler, Fosters Group

Liz McGuire, Murray Valley Winegrowers

Jeff Mitchell, Murray Valley Wine Grape Industry Development Council

Peter Clingeffer, Riverlink Program Leader – Viticulture

Bob Emmett, Riverlink Program Leader – Plant Protection

Rob Stevens, Riverlink Program Leader – Sustainable Horticulture

Lee Byrne, Riverlink Communication and Development Officer

Riverlink Wine Grape Industry RDE Committee

Murray Valley and Riverland Common Research Priorities

Title: Low input viticulture

Murray Valley

- What is the lowest amount of inputs (eg water, nutrients etc) that can be added to the vineyard to produce maximum production (yield/quality), efficiency and vineyard unit health?
- Areas of interest: nutrients, water, organic matter, pest and disease, soils, rootstocks, trellising, pruning methods, spray programs.
- How do the volumes of inputs used affect yield / fruit quality?

Riverland

Over the last several years grapegrowers have faced market conditions that have, in a number of cases, negatively impacted the profitability of their businesses. As a result, there is an increasing pressure on grapegrowers to trim production costs. To do this there needs to be an understanding of the costs associated with each practice involved in the normal function of a vineyard.

Title: Nutrient relationship to grape and wine attributes

Murray Valley

- Nutrients that affect colour and flavours.
- Review of nutrient standards and testing types / timings e.g. petioles at flowering, blade, sap etc
- Nutrient uptake under minimal water availability.

Riverland

By understanding how different nutrients (both individually and in combination) impact vine performance and berry composition the industry is better positioned to manipulate those relationships and delivery quality outputs.

Title: Variety / Rootstock Selection: improvement and management of existing rootstocks, evaluation and selection of new rootstocks for planting.

Murray Valley

- Index of variety / rootstock characteristics (efficiencies and susceptibilities) and interactions.
- Warm inland climate suited varieties.
- Index of suitability of varieties in the warm inland regions based on winemaking potential.

Riverland

Better information on rootstock scion combinations and the environments in which they perform best would be invaluable to the industry. More informed decisions on planting material could deliver substantial rewards in both productivity and quality.

Title: Cropping / Soils / Cover Crops: vineyard microclimate modification – canopy and vineyard floor management

Murray Valley

- Cropping levels versus quality levels
- Native ground covers – benefits to the vineyard
- Soil Biota – Combinations of soil microbiology in the local soils used to manipulate yield / fruit quality / vineyard health
- Vineyard cooling techniques

Riverland

Australian wine is heavily exposed to the export market, therefore the industry must do everything it can to develop superior products at the relevant price points. Manipulating the vineyard to provide ideal temperature for grape maturation (sugar, flavour, colour, tannin and acid) has the potential to improve the quality of Australia's warm climate wines and make them more desirable in the market place.

Title: Climate Change: developing plans to adjust to conditions, risk assessment, disease and pest management, and irrigation adaptation

Murray Valley

- Maintaining sustainability and productivity under hotter / drier conditions.
- Climate change effects on yield / quality
- Variety suitability to the Murray Valley climate under hotter conditions

Riverland

Increasing temperatures and the potential for reduced rainfall and runoff events poses significant issues to the viticultural regions along the Murray Darling basin. Consequences for reduced flows and significant water restrictions if flows are similar to that in the 1890-1900 decade would pose significant management and soil issues for the region. The potential consequences to the engine room of the Australian wine industry cannot be easily discounted. Other issues on the ongoing drought will have significant implications in the other major wine districts in South Australia, Victoria and New South Wales.

Please ensure you fill out the Priorities Feedback form before leaving the Symposium.

Soft scale insects in the Australian vineyard

Adrian Rakimov, Department of Primary Industries, Mildura and University of Melbourne, PhD student
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The ultimate aim of the project is to yield fundamental information on the biology and ecology of the grapevine scale (and other soft scales) in Australian vineyards, in order to improve current control measures.

The following will be determined:

- Soft scale species present in Australian vineyards.
- Distribution of soft scales within vineyards.
- Predators and parasites of soft scales in Australian vineyards.
- The lifecycle of the grapevine scale.
- Molecular diagnostic techniques for soft scale identification.

Supervisors:

Dr Greg Buchanan, Department of Primary Industries, Mildura
Dr Mali Malipatil, Department of Primary Industries, Knoxfield
Prof Ary Hoffmann, University of Melbourne

Funding:

Department of Primary Industries, Victoria
University of Melbourne
Grape and Wine Research Development Council
Australian Research Council

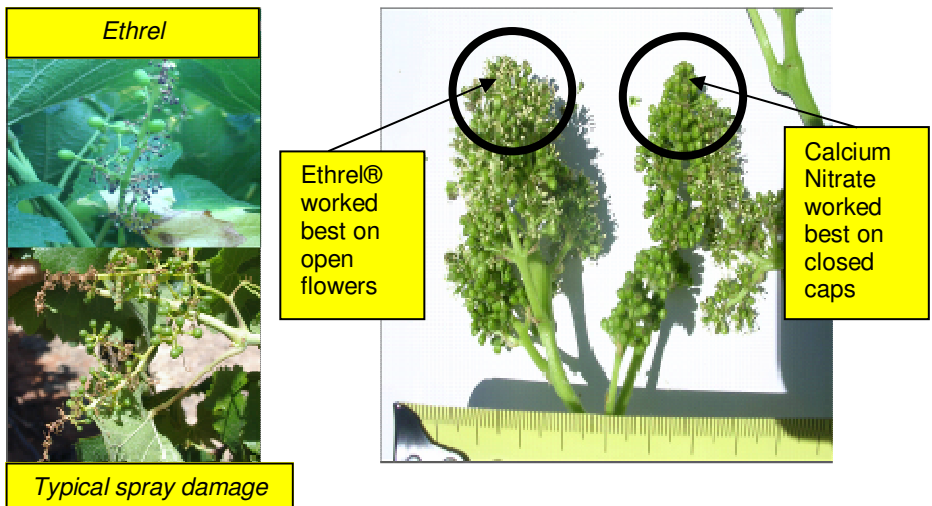
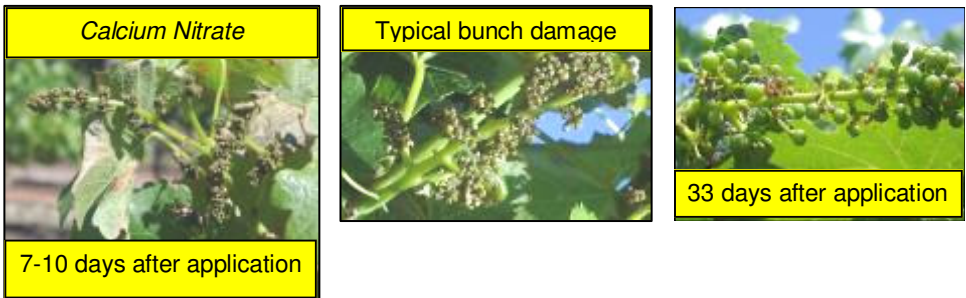
Vineyard mothballing

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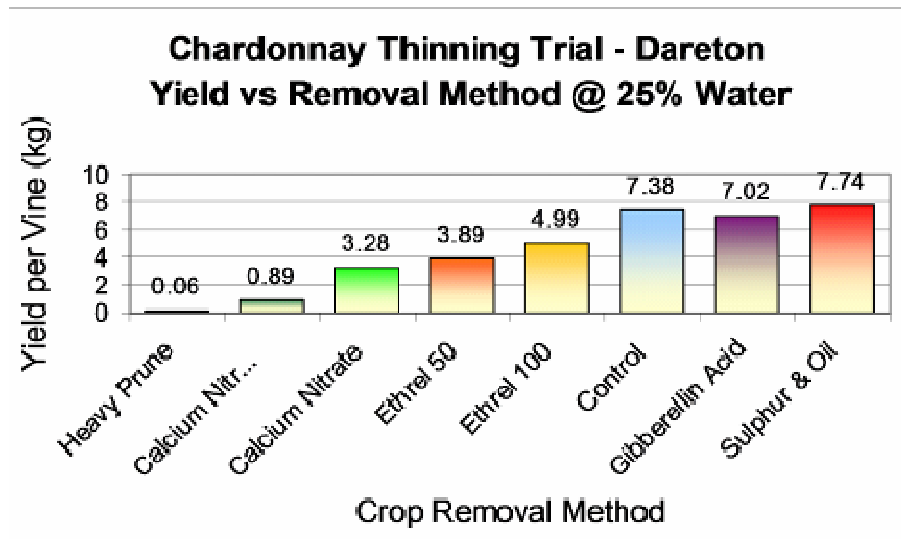
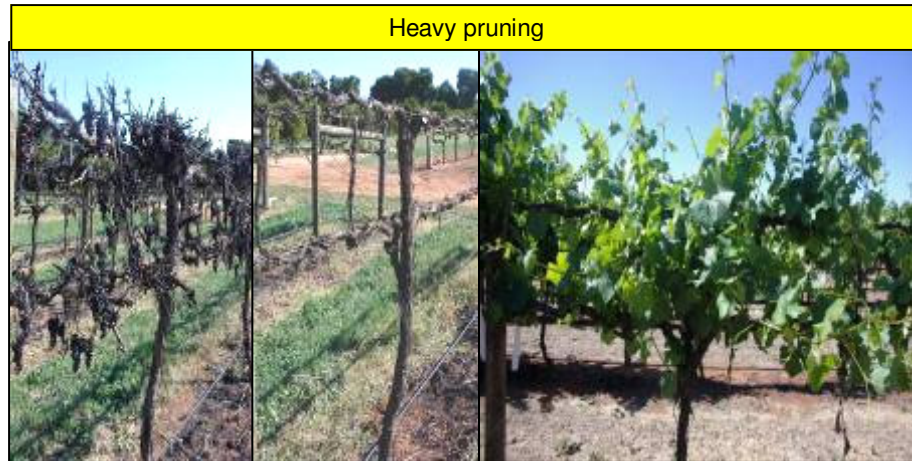
Liz McGuire, Murray Valley Winegrowers Inc, Mildura
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Aim: To maintain a non-producing vineyard with minimum but critical inputs to allow a rapid return to cropping for productive use/sale in the future when the industry situation has improved.

Trial results



Mothballing the vineyard: impacts and actions



Note: Treatments illustrated in this document are experimental and for demonstration purposes only. Ethrel is not registered for the removal of fruit in winegrapes. Use of the above treatments is at your own risk. No responsibility will be taken for any decisions and/or trials you may investigate within the boundaries of your property, based on the findings of this project.

Viticulture management of grape tannin and anthocyanin levels to achieve desired wine quality specifications

Mark Downey, Department of Primary Industries, Mildura
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Aim: An entire discovery project of grape tannins, variation between cultivars, site and seasons.

Tannins are an important component of red wine quality. While present in the grape, at much higher levels than the red pigments that give red wine their colour, tannins have not attracted a lot of industry attention because they are harder to measure.

Over the last 20 years, colour (anthocyanin) measures have become routine in many wineries. Payments based on colour have been implemented by wineries both in Australia and overseas.

Despite enthusiasm for this approach, the correlation between colour and quality is not universal. The Australian wine industry has commissioned this project to assist in the development of an alternative independent measure of quality based on grape and wine tannins.

The approach to tannin measurement as been two fold:

1. Develop a rapid analytical method that generates results for both tannin and anthocyanin (colour) simultaneously and instantaneously.
2. Generate a dataset of tannin values for cultivar, site and season that would allow wineries and growers to contextualise the data they would generate using the rapid analytical method.

Sustainable salt exclusion by salt tolerant rootstocks

Rob Walker, CSIRO Plant Industry, Merbein
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Salt tolerance of grapevines, as measured by yield performance under saline conditions, is linked to rootstock vigour and rootstock ability for chloride exclusion.

Long term response to irrigation water with a salinity of approximately 2 dS/m of Shiraz and Chardonnay grapevines on their own roots or grafted to Ramsey, 1103 Paulsen, 140 Ruggeri and K51-40 rootstocks on a gradational yellow calcareous clay soil will be described.

Differences between good and poor chloride excluding rootstocks in terms of concentrations of salt in xylem will be outlined and mechanisms for regulating levels of chloride in xylem will be discussed. This will include a consideration of total chloride transported from the root system to the above ground parts of the vine and how poor ability for chloride exclusion can lead to excessive concentrations of accumulated salt in leaves and subsequent damage. Ways of managing with salinity will be described.

Rootstock breeding and development for Australian wine grapes

Peter Clingeleffer, CSIRO Plant Industry, Merbein
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Problems associated with adoption of high vigour rootstocks by the wine industry include negative impacts on berry composition associated with high potassium uptake, high grape juice pH, poor organic acid composition and reduced colour of wine.

Studies to develop new rootstocks for winegrape production to minimise these problems will be reported. These studies include assessment of ungrafted populations of rootstock hybrids for rooting ability, grafting ability, nematode tolerance, mineral element (particularly K⁺) discrimination, transpiration efficiency, drought tolerance and root architecture; identification of 20 rootstock genotypes for further evaluation as grafted vines; identification of 4 new, low-medium vigour rootstock genotypes for commercial release with Plant Breeders Rights (PBR) protection.

Compared to standard rootstocks the low-medium vigour rootstocks have reduced levels of juice potassium, require lower levels of tartaric acid for pH adjustment in winemaking, have enhanced wine spectral properties and have mild to high phylloxera and nematode tolerance. These new low-medium vigour rootstocks have potential to be components of an integrated approach for winegrape management using high density plantings with closer row spacings to increase yields per hectare, vineyard water use efficiency and sustainability.

Review of and packaging of current viticultural nutritional management information for Australia's major wine grape varieties

Nicole Dimos, Department of Primary Industries, Mildura
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Aim: This project aims to deliver a critical review of current grapevine nutrition knowledge and identify and prioritise current gaps in Australian wine grape industry knowledge on nutrition management of grapevines.

The project anticipates completing the following tasks;

1. Nutrition evaluation with growers

Currently, interviews for Victorian and South Australian winegrowing regions are underway, in an attempt to understand nutrition management, issues and preferences for information uptake.

2. Interviews with industry personnel and research scientists

Currently all participants have been interviewed in this component.

3. Literature review

The literature review has made significant progress with a completed first draft referencing over 200 papers from referred journals. The report discusses the effects of nutrition on vegetative/yield components as well as fruit and wine composition.

4. Review of current nutritional datasets

Petiole datasets from the Soil and Water Initiative project have been observed and statistical correlations and analyses are currently underway. It is anticipated that once these values are assessed against fruit composition, a similar analysis will be used with the petiole and fruit composition datasets available from corporate wineries and other organisations.

5. Project communications

An article for AusVit will be published later this year, and a workshop at the upcoming 13th Australian Wine Industry Technical Conference is scheduled.

The project has received positive support from both growers and industry, whom have all identified that wine grape nutrition has been a topic that has been neglected in the past decade.

www.riverlink.gov.au

Riverlink is a unique network of five federal and state government horticultural research agencies, located in four research stations throughout the Sunraysia-Riverland region:

- New South Wales Department of Primary Industries (NSW DPI), Dareton
- Victorian Department of Primary Industries (Vic DPI), Mildura
- CSIRO Plant Industry, Merbein
- South Australian Research and Development Institute (SARDI), Loxton
- Primary Industries and Resources South Australia (PIRSA), Loxton

Riverlink research agencies work together, sharing resources and expertise, to improve research and development services provided to Australian horticultural industries.

Contact

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