

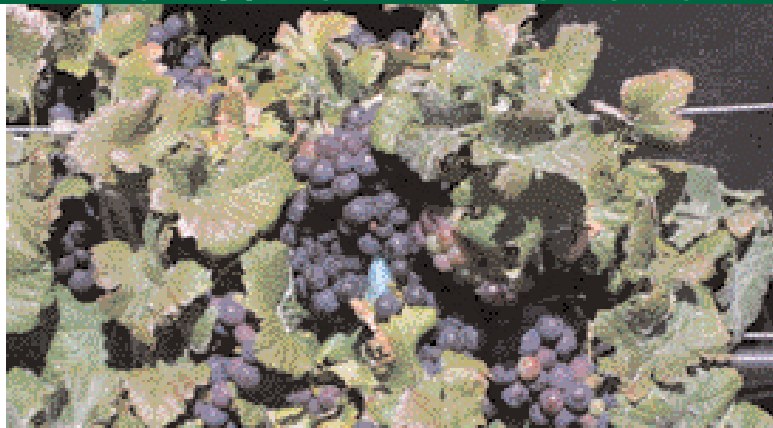
Volume 8 no 6

November–December 2002



COOPERATIVE
RESEARCH CENTRE
for
VITICULTURE

Newsletter



Fruit grown from the single layer of Pinot Meunier tissue and known as the L1 Mutant.

Inside

- CEO's Report 2
- Finding the gaps in vine and water knowledge 3
- Spotlight on PRD 3
- Margaret River growers reinforce green image 4
- Australia leads the way with environment strategy 5
- Making sure PRD suits all soil types 6
- Briefs; Diary Dates 8

Cooperative Research Centre for Viticulture

The University of Adelaide

The National Wine and Grape Industry Centre
(Charles Sturt University, NSW Agriculture)

The Australian Wine Research Institute

CSIRO

Department of Natural Resources
and Environment, Victoria

Primary Industries & Resources, SA

The Australian Dried Fruits Association Inc.

Winemakers' Federation of Australia Inc.

Winegrape Growers' Council of Australia Inc.

Grape and Wine Research
and Development Corporation

Horticulture Australia Limited

Wine Industry National Education
& Training Advisory Council Inc.

Natural mutations providing clues to grapevine gene function

The natural changes or mutations that can occur in grapevines and indeed all plant species, are providing viticultural researchers with knowledge about the function of genes, particularly those related to growth, vigour and fruitfulness.

CRCV researchers based at CSIRO have been closely studying Pinot Meunier, the naturally-occurring mutant of Pinot Noir. A new grapevine type, grown from a single layer of Pinot Meunier tissue and called the L1 Mutant, is quite stunted in appearance and grows small bunches of grapes along the stem where there would usually be tendrils. And it turned out that these changes were due to a difference in just one gene.

Project Leader Dr **Mark Thomas** said the mutation in this vine has potential implications for the possible control of grapevine vigour and fruitfulness. "Mutations are interesting because they often show useful traits and characteristics and we can examine the differences in their genes by comparing them to the conventional variety," Mark said.

"Our interest in this mutation is what it reveals about gene function and the role of gibberellic acid (GA), which is a growth hormone produced in plants. "We believe it might be possible to

develop new varieties that are less vigorous but just as fruitful using knowledge gained from this Pinot Meunier mutant."

Initial research showed that the mutation responsible for the altered form of Pinot Meunier arises from one of the two cell layers from which the grapevine develops. Researchers went on to grow vines from each of the two separated lines and found that the outer layer – known as the L1 layer – contains the mutated gene called GAI (Gibberellic Acid Insensitive). This gene stops the vine from responding to GA, resulting in a "dwarfed vine". The vine grown from the second (L2) layer was a normal Pinot Noir.

"The smallness of the vine is a feature we already knew about, but what was interesting and surprising was that the grape bunches, growing where the tendrils should have been, are not smaller themselves," Mark said.

"The visual effect is a dwarf vine loaded with bunches of normal sized grapes." Mark said less vigorous vines appealed to growers because they needed less water and nutrients, but less vine vigour in the past had been equated with smaller berries and therefore lower yield. "Many grapevines produce more vegetative growth than is required to

continued overleaf

CEO's Report

CRCV wins interview for supplementary funding bid

The Commonwealth Government has given all Cooperative Research Centres a chance to apply for additional funding for the remainder of their seven-year terms. The CRCV has sought an extra \$4.3m in funding to assist us in achieving our goals by linking more closely with the products and services sector of the viticultural industry.



Jim Hardie

Our proposal to strengthen the Australian viticultural innovation network seeks to accelerate innovation within the industry by involving small and medium enterprises (SMEs) from the viticultural service and supply sector in the development and

delivery of new and existing technologies arising from CRCV research.

I am pleased to say that our application has been shortlisted and we have been invited to present our proposal to the CRC selection panel at the end of October.

The proposal acknowledges the excellent research outputs being achieved by the Centre and the need to maximise this potential commercially and the need to most effectively deliver information and technologies to the industry.

We have spent a lot of time and energy on the application and many people have been involved in the planning and interviewing stages including the CRCV Industry Reference Group, program industry reference groups, project leaders

and a range of SMEs in the viticultural field. I would like to thank all involved for their efforts.

Proposals require significant additional co-investment by CRCV participants and industry. Our proposal also includes significant new funding commitments from service-sector SMEs, the corporate wine sector and additional industry contributions through the GWRDC to be met by an increase in the industry's R&D Levy. This funding will enable the CRCV to take the next step forward in engaging the businesses that provide viticultural services and equipment in the delivery of the outcomes arising from CRCV research. We expect to know by the end of the year if we have been successful.

The last couple of months have also been a busy time for our industry reference groups who have been helping us review and plan the future direction of our research projects. They will be making recommendations about any changes that will further strengthen our projects. These recommendations will be reflected in our proposals to the GWRDC later this year for project co-investment.

Finally, as this is the last newsletter for the year, I would like to thank all of the staff and personnel involved in the CRCV for all their hard work in 2002. I hope everyone has a happy and safe Christmas and New Year break and I look forward to seeing everyone in 2003.

Jim Hardie
CEO

Natural mutations *continued from page 1*

support the crop. Growers often prune during summer to open up the vine and help ripening. It would certainly be an advantage to have a less vigorous vine that required less water, less pruning and still produced the same yield and quality fruit," he said.

The research team is growing a small number of the dwarf vines to get a better idea of actual yield and grape quality and these attributes will be assessed.

Another aspect of research into Pinot Meunier being undertaken by the team is looking at the hairy leaves of the plant, which are quite different to Pinot Noir, the variety from which Pinot Meunier arose more than 400 years ago. The team is using molecular research to determine the exact nature of the gene that causes leaf hairiness in Pinot Meunier.

Farewell to David Hall



The CRCV would like to take the opportunity to thank **David Hall**, former Executive Officer of the Grape and Wine Research and Development Corporation for his valued contribution to the CRCV. David, who has recently resigned for family reasons, was a member of the CRCV Board and a strong promoter of the CRCV. He did a great job to streamline and strengthen the relationships between both organisations. We wish him well.

Newsletter

The Cooperative Research Centre for Viticulture Newsletter is produced bi-monthly. All contributions are welcome, especially reports from conferences, seminars and international trips.

Editorial: **Sally Raphael**

Fuller Communications

58 Rundle Street, Kent Town SA 5067

Phone: (08) 8363 6811

Fax: (08) 8363 6822

Email: sally.raaphael@fuller.com.au

Published by: The Cooperative Research Centre for Viticulture, Plant Research Centre,

Hartley Grove, URRBRAE SA

Phone: (08) 8303 9405

Fax: (08) 8303 9449

Finding the gaps in vine and water knowledge

Identifying the gaps in knowledge about the water requirements of vines and vineyards was the subject of discussion at a recent workshop in Adelaide, hosted by the Australian Society of Viticulture and Oenology and supported by GWRDC and the CRCV. Researchers and extension providers from throughout Australia gathered at the Plant Research Centre at the Waite Campus to hear formal presentations and take part in informal sessions related to water use efficiency.

Leader of the CRCV Sustainable Vineyard Systems Program, **Dr Rob Walker**, said the workshop was valuable in quantifying current knowledge about key components of water use efficiency in vineyards and discussing the areas that needed further research. "We not only looked at the physiology of vine water use and whole vine transpiration, we also looked at water use within a vineyard as a whole, including cover crops, vine transpiration, water loss by evaporation from the soil surface or through drainage," Rob said.

"One of the surprises was the scarcity of information which has been developed on water use by cover crops. It also seemed that the actual water used by vines is lower than previously thought. If this is validated it will be worth investigating the reduction of water lost by soil evaporation as a means of further increasing water use efficiency." Speakers included **Richard Hamilton** from Southcorp Wines who provided an industry perspective on issues related to vineyard water use and **Steve Green** from Hort Research in New Zealand who spoke about some of the devices and procedures being used by researchers in NZ to measure water use at both the vine and vineyard level.

A report drafted at the conclusion of the conference highlighted areas of research where a more coordinated approach would be of benefit, including the further application of micro-meteorological and sap flow techniques to quantify water use, the need to better understand the effects of vapour pressure deficit or humidity effects on stomatal control of transpiration and its interaction with the effects of soil moisture deficit.

The workshop report has been emailed to all attendees and further communication in the coming months will address the issues highlighted and seek industry feedback on any proposed new research.



PRD workshop attendees.

Focus on Shiraz Berry Shivel

Team members from the CRCV's two Shiraz berry shivel projects recently met at the National Wine and Grape Industry Centre in Wagga Wagga to share their progress and coordinate future research directions. Innovative approaches are being taken by both teams to understand the problem, including the application of dyes to trace the movement of water and solutes into the berries, transpiration chamber work to monitor water loss from whole bunches and mini pressure probe application to understand the water relations of berries. Discussion centred around the nature of possible factors that contribute to the problem, especially the possibility of back flow of water out of the berry under certain conditions and a range of ideas were discussed to further investigate this phenomenon.

The teams will continue to interact regularly through phone conferencing and will meet in Adelaide in 2003.

Spotlight on PRD

CRCV Researchers and invited industry representatives from around Australia met in Adelaide in early October to discuss research and extension of Partial Rootzone Drying (PRD) at a workshop facilitated jointly through the GWRDC and CRCV.

International guest Professor **Bill Davies**, Director of Environment, Lancaster University, UK, presented outcomes of research on PRD in Europe.

John Kennedy of Orlando Wyndham presented results of PRD trials at Langhorne Creek and CRCV researchers presented their results. Although PRD is performing well in most situations, there was considerable discussion about situations where PRD is not performing as well, with soil factors seen to be the main reason.

The meeting identified a range of knowledge gaps including soil influences (particularly water permeability factors), genotype (rootstock and scion) responses and the question of a possible threshold for root dryness and/or quantity of dry roots necessary to illicit a marked PRD response.

The meeting concluded with a commitment to further refine the knowledge gaps and address them through further research and to action a review and re-positioning of PRD extension strategy, particularly to focus on situations where PRD is working well.

Margaret River growers reinforce clean image

Margaret River grapegrowers have shown their commitment to environmental management and provided feedback about the CRCV's Viticulture Environmental Risk Assessment (VERA) tool at a recent workshop.

CRCV EMS Officer **David Baker** and **Catherine Nind** from the Department of Agriculture in WA ran a four-hour interactive workshop for 25 people as part of a series of workshops planned by the Margaret River Wine Industry Association to trial components of an Environmental Management System (EMS).

Catherine said funding from GWRDC and CRCV was providing WA growers with the chance to build EMS into the day-to-day operations of running a vineyard. Those attending the workshop were able to apply VERA to their own businesses and draft a simple environmental action plan.

"The workshop also provided us with an opportunity to provide feedback on the environmental work being done by the CRCV," she said.

"We want a system of environmental management that is practical and relevant which means there has to be two-way communication between growers and the CRCV."

The VERA tool has been developed by the CRCV as a starting point for growers who want to begin incorporating environmental considerations into their businesses in a structured manner. It guides growers through a list of questions about their vineyard management practices and encourages them to think about how real or potential problems can be addressed.

The advantage to the VERA tool is that it forms part of a larger environmental management framework which builds toward a system that meets international standards, allowing



Margaret River grapegrowers learning about the CRCV's VERA tool.

growers the flexibility to determine what level of structured environmental certification is appropriate for them. Executive Officer of MRWIA Caroline Ing said the Margaret River region was keen to promote itself as a "clean and green" area and the use of the VERA tool as a starting point towards developing an EMS would be crucial in showing the rest of the nation and the

world the high environmental standards of Margaret River producers. For more information about WA environmental management activities contact Catherine Nind on (08) 9274 5355 or email cnind@agric.wa.gov.au. Information about the CRCV's VERA tool can be obtained by contacting David Baker on (08) 8340 0506 or email dbaker@senet.com.au.

EMS moves to Program Two

The CRCV's Environmental Management Systems (EMS) project is now part of Program Two 'Sustainable Vineyard Systems'. The EMS project was previously part of the Viticare program but has moved to create closer synergies with the research outputs of Program Two, particularly those that relate to water use efficiency, salinity management and the use of agrichemicals. One of the fundamental aims of the EMS project is to reflect best

management practice and the close link with the wide range of research projects within Program Two will benefit the EMS team and allow research outcomes to be more readily transferred to industry.

The project will keep its current reference group and will also receive feedback from the Program Two reference group. For more information about the EMS project, contact project leader **Anne Maree Boland** anne-maree.boland@nre.vic.gov.au.

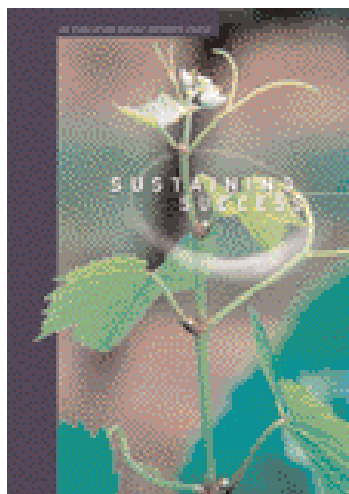
Australia leads the way with environment strategy

The Australian wine industry now has an environmental strategy that provides a framework for ensuring the production of grapes and wine is achieved in a sustainable and environmentally accountable manner. ‘Sustaining Success – the Australian Wine Industry’s Environment Strategy’ was launched at the end of August at the National Wine Centre in Adelaide by noted environmentalist and wine industry identity **Dr Barbara Hardy**. The strategy has taken two years to develop, with the project initiated and coordinated by the South Australian Wine and Brandy Industry Association (SA Wine & Brandy) with input from a wide range of industry organisations and wine companies including the CRCV, GWRDC, Winemakers’ Federation of Australia, Yalumba, Southcorp, BRL Hardy, Orlando Wyndham and Beringer Blass.

Australia is the first in the world to introduce an environmental strategy for the wine industry. The goal is to increase the rate of adoption of ecologically-sustainable practices through all aspects of production from viticulture to winemaking and packaging.

“While the Australian industry has demonstrated a commitment towards minimising environmental impacts, this strategy will provide a cohesive approach and will work towards demonstrating actual environmental performance,” said **David Baker** from the CRCV’s Environmental Management Systems project and one of two representatives from the CRCV on the Strategy working committee (along with CRCV CEO **Jim Hardie**).

“The document is a reinforcement of the environmental work the CRCV and other organisations have been doing and provides a common direction for everyone working in this field and for the industry who will be incorporating



The cover of the wine industry’s environmental strategy.

environmental management into their everyday management.”

‘Sustaining Success’ has identified several key priorities for the industry including:

- Water quality and water use efficiency
- Generation and disposal of wastewater from winemaking and packaging
- Management of solid waste products such as grape marc, filter material and treated timber vineyard posts
- Responsible use of vineyard chemicals
- The maintenance and enhancement of natural ecological systems
- Conflicting land uses with local communities and other industries
- Ramifications of future greenhouse gas induced climate change on viticulture

A National Wine Industry Environment Committee has been formed under the auspices of the Winemakers’ Federation of Australia to oversee the implementation of the strategy with outcomes to include a national code of practice, guidelines on high priority environmental issues, industry-based environmental reporting, benchmarking, best practice environmental management and industry support tools.

WANTED: Grower participants for VERA trial

The Viticare Environmental Risk Assessment tool – or VERA – is the tool developed by the CRCV as a starting point for growers to begin building environmental management into their overall vineyard management planning. A number of workshops have been held to explain VERA to growers and to assist the CRCV in further developing the tool. For practical reasons the majority of the workshops are being conducted with regional groups. However, growers with an interest in environmental management who are not linked to any groups still have a chance to participate.

Several workshops are available to growers who wish to trial VERA and contribute to its refinement through the feedback process. The free workshop(s) are tentatively planned for early – mid November with the exact date and locations still to be determined.

If you would like to participate in one of these VERA workshops or would simply like to find out more about VERA please contact David Baker (EMS Officer) (08) 8340 0506 or dbaker@senet.com.au.

Making sure PRD suits all soil types

Although the use of Partial Rootzone Drying (PRD) has tremendous potential, there are still some practical issues that need to be clarified to ensure this recently developed technique reduces the amount of water applied to grapevines without having a detrimental effect on yield or fruit quality.

The impact of modifying effective root-volume on the application of PRD and if PRD needs to be altered to suit different soil types are some of the questions that need to be answered.

CRCV PhD student **Lexie**

McClymont is halfway through a project that is aiming to answer these questions and eventually provide growers with advice about how to best use PRD in their vineyards.

“The majority of PRD trials to date have been conducted in deep soils and there is a need to look at shallow soils and determine if the same rules hold true and what adjustments to the application of PRD need to be made in these soils,” Lexie said.

She said shallow soils had different drying patterns to deeper soils and root restrictions that effect vine growth and vigour need to be taken into account. “Growers in this region already have a strong knowledge about soil amelioration



Lexie McClymont at her field trial experiments in the Goulburn Valley.

techniques such as deep-ripping to manage shallow soils, but we hope to be able to provide information that allows them to make informed decisions about optimal soil volumes for balanced vines and provide a better understanding of soil volume-PRD interactions,” she said. A field trial in the Goulburn Valley has been established which involves vines planted in a range of large containers. The trial is looking at three different irrigation treatments and five root restriction treatments. The first irrigation treatment is full irrigation at what is considered a normal level, the second is PRD that irrigates half of the rootzone for 10-14 days at a time and the final PRD treatment is irrigating alternate

quarters of the rootzone as opposed to halves.

“The quarter treatment will provide us with some interesting results that will determine whether water use efficiency can be taken a step further and also show us what might happen when growers are not entirely accurate with the application of regular PRD treatment on half of the rootzone,” she said.

A range of data has been collected from the experiment including measurements on vine growth, yield and fruit composition such as total soluble solids, titratable acidity

and pH. Berry samples will also be assessed for colour. Planting of vines in drainage lysimeters has also enabled accurate measurement of drainage and vine water use.

“This project will also provide much-needed data on the water use of young vines. Water use studies in the past have focused on the water requirements of established vines so this is new information for growers,” she said. Lexie is based at the Department of Natural Resources and Environment Victoria in Tatura and is supervised by **Ian Goodwin** (NRE), **Greg Dunn** (NRE), **Judy Tisdall** (La Trobe University) and **Blair McKenzie** (La Trobe University).

Working towards a simple test for powdery mildew

A CRCV project is making good progress towards developing a fast and effective antibody that will quantify the presence of powdery mildew in grapes at the weighbridge. CRCV researcher **Dr Vicki Markovic** said industry was keen to use diagnostics.

“Visual assessment is really the only rapid method of detection for powdery mildew currently available. However,

when grapes are in large loads, especially when they have been machine harvested, visual assessment is often impractical and subjective,” Vicki said.

“Growers are looking for an accurate test for the levels of powdery mildew in their grapes, particularly if they are aiming to meet certain quality requirements. Wineries want to know the status of the grapes to determine how they will be blended.”

Researchers have developed an ELISA kit that detects proteins expressed by powdery mildew. A sample of grapes is blended and the juice is added to monoclonal antibodies. If the powdery mildew proteins are present, they bind to the antibodies and are subsequently detected. According to Vicki, although the test is providing encouraging results, timing is an issue.

“The problem is that the antibodies used

New collaboration with Agrilink for AusVit™

The CRCV is collaborating with one of Australia's leading agri-technology companies, Agrilink, to offer a Downy Mildew and Light Brown Apple Moth warning system.

The warning systems utilise components of the AusVit™ Vineyard Management system which have now been incorporated in Agrilink's Ag-WISE service to growers.

The result for growers is a status report issued via the internet when environmental conditions are favourable for the onset of Downy Mildew or Light Brown Apple Moth.



Upgraded AusVit™ chemical database available

The AusVit™ Chemical Database is being upgraded and will be distributed in November via a download from the CRCV website at www.crcv.com.au/ausvit.

The Chemical Database is an important component of the AusVit™ software package and is utilised in the spray-recording module to ensure accuracy in the documentation of chemicals applied in the vineyard and is also used in the pest and disease module to calculate the

coverage provided by various chemicals. The AusVit™ Chemical Database contains information from the labels and additional information of all chemicals registered for use in the Australian viticulture industry. This information includes:

- The chemical manufacturer
- Active ingredients
- Withholding periods
- State-by-state registration
- Restraints in the use of the chemical
- Safety and hazard categories
- Winery specific withholding periods
- Maximum Residue Limits (MRL) for grapes in Australia's major export locations

Contact Details

For further information about any of the CRCV's software applications, please contact the following:

- Bridget Ransome
Sales & Marketing enquiries
Phone: (08) 8339 4939 or (08) 8303 9405
Mobile: 0403 008 331
Email: philbri@senet.com.au OR ransome.bridget@saugov.sa.gov.au
- Edward Stow
Help Desk enquiries
Mobile: 0409 570 810
Email: estow@csu.edu.au

in this type of test provide a more accurate reading if they are given longer to react to the proteins," Vicki said. "At the moment the test takes about two days to provide a result. We are aiming to produce a test that provides a result in about 15 minutes, so we are currently working on speeding up the antibody reaction.

"We are working towards creating pre-prepared assay kits that can be distributed to weighbridges that can handle a small

juice sample and incubate this sample quickly, providing not only an indication of whether powdery mildew is present but also the severity of infection." Other methods of detection including Polymerase Chain Reaction (PCR) and Near Infrared Spectroscopy (NIR) have also been investigated for their potential to detect powdery mildew. In the next few months these three methods will be compared to determine which has the most potential for industry use.

CRCV Software Update

VineLOGIC Education package nears completion

Students in high schools, TAFE colleges and universities will next year be able to utilise the CRCV's VineLOGIC Education Package, which will enable them to experiment with a wide range of viticultural 'what-if' scenarios on the computer.

The VineLOGIC software package centres around a computer simulation model of grapevine growth and development and contains a database of soils, weather and varietal data that has been sourced from CRCV researchers. Software Products Coordinator for the CRCV's VineLOGIC and AusVit™ programs **Bridget Ransome** said the education package would be available in early 2003 and would be well-received by educators and teachers.

"Students will be able to use the package to trial all kinds of viticultural scenarios and learn about the impacts of different management decisions, without incurring the cost of experimenting in a real vineyard and without having to wait to see the actual results themselves," Bridget said.

The package has been developed with the assistance of a number of industry focus groups that included educators and researchers from TAFE colleges and universities and comes with a User Manual to explain the package. The CRCV is also developing AusVit™ as an educational tool to be used by universities, TAFE colleges and other education and training providers. Key training providers have been invited to participate in a series of meetings that will be conducted over the next year, to determine the best way forward with this project and to develop a user-friendly tool that will be complimentary to the VineLOGIC Education Package.

Brief News



Launch your career in the Australian grape and wine industry

The CRCV is currently looking for talented Honours graduates with an interest in grape and wine research to join its PhD Professional Development Program.

The Program currently has 22 PhD researchers and is aiming to award a further nine CRCV scholarships before the end of the year, with new students able to start between now and January 2003.

The 3.5-year PhD Program includes a stipend of \$22,771pa reviewed annually, a \$4000 professional development program and the opportunity to demonstrate skills to potential wine industry employees. The program ensures students have the ability to blend top quality science with a range of professional skills and industry knowledge to carve a long-term career in the grape and wine industries. In addition to science and research skills, students are encouraged to build strong industry networks and take part in a variety of professional development activities. The following PhD research positions are available:

- 1.1.1 Manipulation of grape & wine quality through targeted vine nutrition
- 1.2 Winegrape tannin & colour specifications
- 2.1.7 Plant-based sensing to monitor vine water stress

- 2.3.2 Irrigation & nitrogen management effects on grapevine vigour & the role of cytokinins
- 2.3.3 Management of mycorrhizal populations in vineyards using cover crops
- 2.3.4 Impact of irrigation on plant-available water-capacity of soil & on vine root growth
- 2.3.5 Sustainable salt exclusion by salt tolerant rootstocks
- 3.3.1 Flavonoid pathway genes in grapes
- 3.3.3 The control of tartaric acid accumulation in grapes

For further information and application details visit the CRCV website www.crcv.com.au/education/postgrad, email info@winetac.com.au or call Sarah Pearson on 08 8373 7090.

Applicants are encouraged to apply before the end of the year.

Correction

In the September/October 2002 edition of the CRCV newsletter, an article titled 'Study reveals truth about Ochratoxin contamination' appeared on page three. The measurements given in the article were milligram (mg/L) units and should have been microgram ($\mu\text{g/L}$) units. We apologise for any confusion that may have arisen due to this mistake.

Diary Dates

November 25-26

National Wine Industry Environment Conference and Exhibition
Adelaide, SA
Contact: South Australian Wine & Brandy Association
Ph: (08) 8222 9277
Website: www.winesa.asn.au/

December 3-6

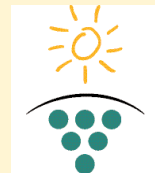
Vinitech – The World Vine, Wine and Spirits Equipment and Technology Exhibition
Bordeaux, France
Ph: +33 556 119 900
Website: www.vinitech-bordeaux.com

Program 4 Manager appointed

Peter Mansfield has been appointed as the Manager of CRCV Program 4 'Education, Training and Professional Development for a Sustainable Industry'. He has also been appointed Executive Officer of WINETAC, one of the CRCV's core participants. He has been acting program manager and executive officer since June 2002, following the departure of Libby Boschen.

Your CRCV

The Cooperative Research Centre for Viticulture is a joint venture between Australia's viticulture industry and leading research and education organisations.



It promotes cooperative scientific research to accelerate quality viticultural management from vine to palate. Australian grapegrowers and winemakers are key stakeholders in the CRCV, contributing levies matched by the Commonwealth Government and invested by the Grape and Wine Research and Development Corporation in the Centre.

Newsletter Disclaimer

While every effort has been made to ensure the accuracy of the information in this newsletter, the Cooperative Research Centre for Viticulture cannot accept responsibility for the consequences of the use of this information. The document provides you with an explanation of research in progress and is a guide only.