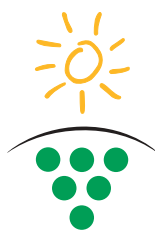


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May–June 2002



COOPERATIVE
RESEARCH CENTRE
for
VITICULTURE

Newsletter

Inside

- CEO's Report 2
- International approach to mapping grapevine genome 3
- New approach to phylloxera detection 4
- New PhD students for CRCV 5
- Positive response to sub-licensed workshops 6
- The secret is in the soil 7
- Fast facts from the CRCV 8

Cooperative Research Centre for Viticulture

Adelaide University

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

The Dried Fruits Research and
Development Council

Wine Industry National Education
& Training Advisory Council Inc.



CRCV CEO Dr Jim Hardie and CRCV researcher Mark Gisben in The Australian Wine Research Institute laboratory, looking at the NIR equipment.

CRCV trials rapid colour testing method

A rapid colour testing method being trialed this vintage could lead to benefits for the entire industry by providing better and more timely information on the quality of red winegrapes. The CRCV has been developing the use of the technology, Near Infra Red Reflectometry (NIR), with The Australian Wine Research Institute and major wine companies. The colour testing method works by measuring the reflectance of near infra red radiation from chemical compounds in winegrapes, using a sophisticated and unique calibration. The calibration is a mathematical equation used by NIR instruments to analyse data and calculate accurate test results. With research now showing a significant correlation between colour and red winegrape quality, the technology could offer significant advantages to growers and winemakers. "It is hoped that this CRCV NIR colour measurement technique will enable growers and winemakers to

objectively and conscientiously measure this grape quality attribute," said CRCV CEO Dr Jim Hardie. Jim said this vintage the CRCV's NIR colour measurement will be used in conjunction with traditional testing procedures and information gathered will help target the new method for the whole industry in the 2003 harvest. The calibration is being trialed with two instruments with feedback from the field being used to better understand the industry's instrument requirements. The CRCV has received significant contributions from BRL Hardy and additional input from Orlando Wyndham and Southcorp. Commercialisation assistance is being provided by SA's Centre for Innovation, Business and Manufacturing through its Program Nova where organisations with significant state or national business development opportunities are assigned a specialist to work on a specific growth objective.

CEO's Report

The Cooperative Research Centre for Viticulture has received the final report of the Commonwealth Government's Second Year Review of the Centre.



Jim Hardie

Stage 2 of the review was carried out by a panel appointed by the Commonwealth CRC

Committee. It addressed a wide range of issues including strategic direction, cooperation among participant agencies and with industry, application of

research, education and training, management, budget and the performance evaluation of the Centre.

Most importantly, I am pleased to report that funding for the Centre, which began in 1999, has been continued and will be reviewed again at the end of the Centre's fifth year in 2004. In relation to the CRCV's three research programs, the review found that they continued to be relevant and driven by industry priorities – something of which we are particularly proud. As noted by the panel, our contact with industry is essential and must be maintained. In acknowledgement of this, the CRCV Industry Reference Group membership has itself been reviewed recently. The Group, under the Chairmanship of Philip Laffer with

Roger Hoare, Deputy Chair, has been enlarged and now includes a representative from each of the Program Reference groups to ensure that industry is well informed on Centre activities and is well placed to provide advice to the CRCV Board.

Protecting our intellectual property

One of the review panel's main recommendations was the completion of a clear Intellectual Property (IP) Management Strategy. The CRCV has recognised the need to address this as a matter of priority to ensure that any Intellectual Property developed out of its projects is identified and protected appropriately. While the focus of the Centre will remain on promoting the broadest possible application of research outcomes throughout the industry, we need to ensure that any direct value of IP ownership will be captured for the benefit of the industry and the broader Australian community. On a related matter, the review panel highlighted the Centre's need for a Strategy for commercialisation of the Centre's outputs. The CRCV maintains a view of commercialisation as the application of outputs in the commercial sector of grape and wine production. However we recognise that the path to application by end-user's within the industry does require well-planned strategies; that delivery to the end-user is often most effectively achieved through collaborative arrangements with other businesses and that this process is commonly under-resourced. With these aspects in mind, the attention in the next few months will be focussed on completion of a compre-

hensive commercialisation strategy as recommended by the review panel.

Credit for our initiatives and collaboration

The panel was impressed with the CRCV's Viticare program and its achievements in engaging and increasing the number of industry groups in the process of information exchange and regional validation of new technology. Several suggestions were put forward to extend its industry reach. The panel, through its discussions with industry stakeholders, noted that senior management in the major wine producing companies would benefit from involvement with the Viticare program.

The Education and Training program was also commended for its achievements. The review noted that the CRCV was committed to an extensive professional development program for its PhD students and recommended it be strengthened by placing more emphasis on management training. The CRCV was praised for its collaborative arrangements, with at least four participant agencies contributing to each of the research programs and strong international links in place. The report is a great endorsement of the accomplishments of all the participants and supporters of the CRCV. It does highlight opportunities for further improvement. I look forward to addressing those recommendations with your cooperation. However, right now I do thank each one of you for your contributions to a most comprehensive review process.

Jim Hardie,
CEO

Newsletter

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

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International approach to grapevine genome mapping

A map of the entire grapevine genome, similar to the map of the human genome, could be a significant outcome of recent moves for greater international collaboration in grapevine genome research.

Two international meetings have been held in the past eight months, the most recent in January in San Diego, to discuss the need to reduce research duplication and fast-track outcomes through major grape research nations including Australia, France, United States, Chile, Germany, Italy, South Africa and Spain, sharing their knowledge.

CRCV and CSIRO researcher **Dr Mark Thomas** is the chair of the steering committee that was set up after the San Diego meeting and has coordinated the production of a draft proposal paper. “Researchers are looking for the best way to go about using and collating the existing knowledge we have about grapevine genes and the best way to

advance research,” Mark said. “Although genomics offers the best way to determine the function of all grapevine genes, it is costly and time-consuming research. To ensure rapid scientific advances, the cooperation of all nations involved in such research is essential.”

The draft paper, which is available, details the long and short-term goals of the International Grape Genome Project. Some of the goals include: developing a framework genetic map to cover the complete genome; developing a mechanism for the distribution of DNA and plant material to researchers; developing genetic maps based on new marker types; and applying information for genetic improvement.

Mark said the international project would greatly benefit Australian programs, including the CRCV’s grapevine gene discovery project.



Mark Thomas

“In the CRCV project we are trying to find as many grapevine genes as we can and work out whether they are important and what roles they perform,” Mark said.

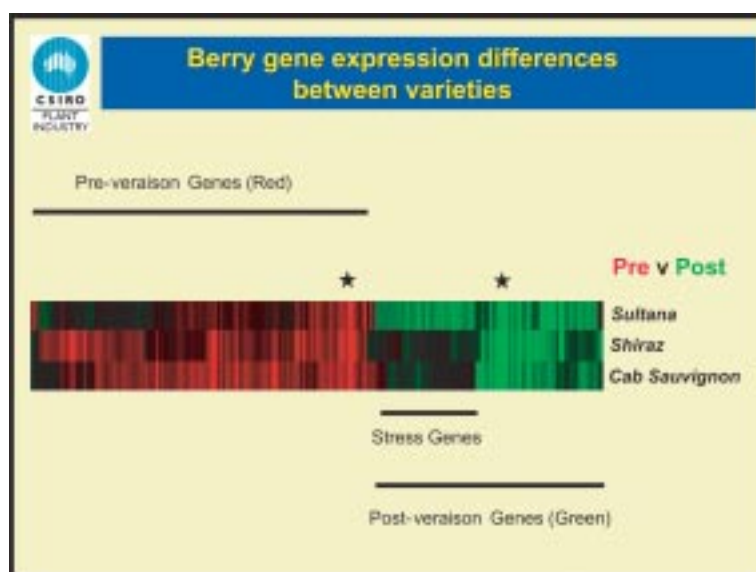
“We currently have found 2,500 genes, but based on other plant estimates, we believe there are about 25,000 genes in the grape genome. If we can work with other nations on finding all these genes, we can move on to working out how the genes work and affect one another and make some significant advances in understanding how grapevines respond to changes in management and environmental conditions and which genes are best to target for grapevine improvement.”

For more information about the International Grape Genome Program or a copy of the draft paper, email Mark Thomas at Mark.R.Thomas@csiro.au

Grapevine gene discovery

This figure represents some of the work done in the CRCV’s Grapevine Gene Discovery project involving **Chi Hua, Chris Davies and Mark Thomas**. It shows a ‘barcode’ of gene expression differences in pre and post-veraison berries of different varieties. Each vertical thin line in the barcode represents a single gene. Genes highly expressed during pre-veraison are coloured red while those expressed at post-veraison are coloured green.

With this technology researchers can look at thousands of genes at once to answer previously intractable questions. In this example, researchers wanted to know which genes were common between varieties during berry development (stars) and which ones were differently expressed. One interesting result is the large number of stress-related genes which are expressed in the berry at the post-veraison stage. It is now feasible to think about screening many more genes using this technology to identify the genes responsible for berry quality and an international effort to obtain all grapevine genes would greatly assist this aim.



New approach to phylloxera detection



Ralph Brown (left) and David Lamb (right) conducting leaf spectral measurements on phylloxera-infested vines in Victoria.

The early detection of phylloxera could be made easier with the use of new sensing technology. CRCV researchers are conducting a preliminary investigation into whether a field radiometer could discriminate

between vines infected with phylloxera and vines that are disease-free. According to CRCV researcher **Dr David Lamb**, who is working on the project with visiting Canadian scholar, **Professor Ralph Brown** of the University of Guelph, Ontario, Canada, it is the first time such an experiment has been conducted at this level. "We have never used this technology to test for phylloxera before and we jumped at an opportunity to access this state-of-the-art portable field radiometer on short term loan," David said. The field radiometer is similar to a laboratory-based near-infrared spectrometer (NIRS), and records the reflectance characteristics of individual grape leaves.

This time of the year is when vines show phylloxera symptoms and thanks to fellow CRCV researcher Dr Kevin Powell, the researchers were able to gain access to a phylloxera-infested vineyard in Victoria and some expert knowledge in

phylloxera identification.

The preliminary investigation involved picking one hundred single leaves from both phylloxera-infested and disease-free vines of Cabernet Sauvignon and Cabernet Franc varieties. The reflectance spectra of each of the leaves was measured under an artificial light source.

"Sampling leaves from all over these large blocks may allow us to factor out the effect of water and nutrient variations on the measured spectral signature of the leaves, and provide us with a phylloxera-only fingerprint" David said. David said the next step is a detailed statistical analysis of the data and future applications might include developing a field-portable sensor in its own right or an aerial remote sensing experiment for detecting phylloxera by taking aerial images of vineyards.

For more information contact David Lamb on (02) 6773 3565 or email dlamb@pobox.une.edu.au

Revised Training Package reflects industry needs

Technological advances, increasing sophistication of processing techniques and the growth of the industry have given rise to a revision of the wine industry Training Package, Certificates 1-3 in Food Processing (Wine).

The revised Training Package is under consideration by the Australian National Training Authority (ANTA) and is anticipated to be available to industry in late July or early August. Leader of the CRCV's Education Project 4.2 (New Industry-responsive Education and Training Solutions), **Peter Mansfield**, said the revision reflected industry needs. "It is the first major overhaul since the first wine industry-specific Training Package was launched in 1998. Since then training needs of the industry have changed considerably, so a revision is timely," Peter said.

The Training Package includes AQF Certificate Levels 1-3 – and covers all facets of grapegrowing and wine production from viticulture to cellar door. It is widely used by industry employers and about 2500 personnel Australia-wide are currently being trained using the Training Package.

Revision of the Training Package involved broad consultation with industry representatives from each state of Australia. This led to almost half of the existing 132 units of competency being amended, the addition of 38 new units and a change to the structure of the qualifications.

Once the revised Training Package is endorsed by ANTA, it will be available from WINETAC and according to Peter, organisations have some flexibility in how they implement it.

"There will be a 12-month transition period in which organisations can enroll new learners under the old or revised Training Package. Learners part way through a certificate can continue using the old Package, or transfer to the revised one to finish their qualification," he said.

"We now have a Training Package with an improved structure to the original and will serve the industry for many years to come, requiring only minor adjustments to the units of competency to ensure they are up-to-date."

It is anticipated the revised Training Package will be available July/August, with exact release dates available soon. For more information please contact WINETAC on (08) 8373 7091 or email info@winetac.com.au

CRCV's new generation of innovation expands

The CRCV has recently recruited seven new PhD students. Here we introduce you to four of them and will profile the other three in the next newsletter.

The CRCV PhD Professional Development program also has a new Project Leader, with WINETAC's **Peter Mansfield** replacing **Libby Boschen**.

Anne Penrose

Anne grew up in Brisbane and gained a First Class Honours degree in Botany from the University of Queensland, focusing on the physiology of plant drought stress and hormonal stress. She has work experience in molecular plant biology, including a summer scholarship at the Quality Wheat CRC and a six-month stint in the Plant Genetic Engineering Laboratory at the University of Queensland. Now based at CSIRO Plant Industry at the Waite Campus in Adelaide and supervised by Drs Brian Loveys and Jim Speirs, Anne is working on the project titled 'Water use efficiency in grapevines' (Program 2, Sub-project 2.1.1).

Maria de Sa

Maria grew up in London and obtained a Bachelor of Science (Honours) in Applied Chemistry from the Brunel University in Middlesex, England before gaining a Master of Philosophy in Physical Chemistry at Nottingham University, England.

Maria has extensive work experience in a variety of laboratories in England and Canada, including employment as a formulation chemist for SunChemical News Inks and as a University research technician studying the expansion and carbonation of concrete under normal and accelerated conditions.

Her project is titled 'Wine grape tannin and colour specification' (Program 1, Sub-Project 1.2) which will involve looking at the constituents of colour in red wine. She is based at The Australian Wine Research Institute and is supervised by Dr Markus Herderich.

Matthew Hayes

Matthew grew up in Melbourne and studied a Bachelor of Science (Honours) at La Trobe University, majoring in microbiology and genetics. Having spent the past eighteen months

Viticulture and Oenology at the University of Adelaide, Matthew is supervised by Dr Robyn van Heeswijk.

Joanne Tilbrook

Joanne Tilbrook grew up in Adelaide and left to work as a Dental Therapist in Queensland before moving to the Northern Territory, initially employed by NT Health before joining the NT Police as a uniformed officer and a Drug Squad detective.

Joanne completed a Bachelor of Science (Honours) at Flinders



PhD students Matthew Hayes, Joanne Tilbrook, Anne Penrose and Maria de Sa.

working in medical research using molecular and cellular biology techniques, Matthew said research in the grape and wine industry was a new challenge.

He is working on a project titled 'Molecular characterisation of grapevine response to root pest invasion' (Program 3, Sub-Project 3.2.1). The project focuses on root-knot nematodes and phylloxera. Based at the Department of Horticulture,

University in 2001, majoring in plant, molecular and environmental biology. Based at the Department of Horticulture, Viticulture and Oenology at the University of Adelaide, Joanne is supervised by Professor Steve Tyerman. She is working on the project titled 'Shiraz berry weight loss at sub-optimal maturity – defining the problem' (Program Two, Sub-Project 2.4.1).

Positive response to sub-licenced workshops

Victorian grapegrowers have responded positively to a recent powdery mildew workshop, one of the first workshops to be sublicensed by the CRCV's Research to Practice® Viticulture program to another industry organisation. Research to Practice® Viticulture Leader **Dr Robert Sward** said the feedback from growers was highly encouraging and they had appreciated the way the package was customised to suit their regional needs. More than 150 growers in the Murray Darling and Swan Hill regions attended the workshops, which aimed to refresh

grower skills in controlling powdery mildew, following major problems in the district with the fungal disease in the 2000/2001 season. "The workshop contained elements of the existing Research to Practice® IPM and Spray Application workshops, focusing on topics such as understanding the disease, early identification, monitoring, chemical use and spray set up," Rob said. "Because the package targeted the exact needs of the growers in this region, the growers learnt a lot from the workshop and only acquired the precise skills they needed."

The powdery mildew package was sub-licensed to the Victorian and Murray Valley Winegrape Growers' Council and the workshops were run by their Industry Development Officer Susan Byrne with support from David Braybrook and John Lopresti of the Research to Practice® Viticulture team. Funding was received from the GWRDC's Regional Innovation and Technology Adoption (RITA) grants to assist with the development and delivery of the sublicensed package. For more information contact Rob Sward on (03) 9210 9222 or robert.sward@nre.vic.gov.au

Growers urged to attend 3rd day of workshops

Anyone who attended the first two days of any Research to Practice® workshop is being urged to attend the third and final day. This day is often considered to be the most interesting and valuable as it allows participants more time for discussion and is less formal than the first two days. The dates for the third day of the workshops are as follows:

Grapevine Nutrition with Mary Retallack

| Organisation | Date | Location |
|-------------------------------------|---------|--------------|
| Clare Region Winegrape Growers SAFF | 20 June | Clare |
| Geelong Winegrowers Assoc. | 21 June | McLaren Flat |
| Grampians Winemakers Inc | 25 June | Geelong |
| | 26 June | Ararat |

Winegrape Quality Management with Erika Winter

| Organisation | Date | Location |
|---|--------------|----------------|
| Agriculture WA | 1 May | Cowaramup |
| Agriculture WA | 1 May | Margaret River |
| NRE Tatura | 9 May | Nagambie |
| SAFF | 16 May | McLaren Vale |
| Murray Valley Winegrape Growers Assoc. | 21 May | Mildura |
| Riverland Wine Industry Development Council | 23 May | Berri |
| Grapecheque | 5 June | Knox |
| NSW Ag | 24th October | Griffith |

Spray Application for Viticulture with John Lopresti

| Organisation | Date | Location |
|--------------------------|-----------|----------------|
| Robe Grapegrowers Assoc. | 15 July | Robe |
| Southcorp | 16 July | Coonawarra |
| SAFF – McLaren Vale | 17 July | McLaren Vale |
| Adelaide Hills | 18 July | Adelaide Hills |
| NRE | 20 August | Perricoota |
| NRE | 23 August | Nagambie |
| Swan Hill | 27 August | Swan Hill |

Water Management for Grape Production with Gayle Greiger

| Organisation | Date | Location |
|-----------------------------------|--------|------------|
| Granite Belt Wine Industry Assoc. | 29 May | Ballandean |

Some of the practical skills and outcomes from the Powdery Mildew Control Package:

ENVIRONMENTAL – The workshops advocated more effective and efficient use of chemicals through correct dosage, timing and sprayer set up.

ECONOMIC – Growers who use the advice given in the workshop should see a decrease in the incidence of powdery mildew occurring on their property, which will help lower chemical usage, reduce farm inputs and decrease payment penalties for poor quality fruit.

VINEYARD MANAGEMENT – The early detection of powdery mildew is vital for early control measures and maintaining fruit quality. The workshops taught growers about early detection and how to set up and evaluate spray equipment for getting the optimum chemical dosages.

COMMUNITY – Growers were taught correct spray procedures, which decreases the likelihood of spray drift into residential properties and chemical residues entering the environment.

The secret is in the soil

Predicting the long-term effects of marginal quality (saline) irrigation water on vineyard soils will be made easier for CRCV researchers with the use of a predictive computer model. Although researchers know from experimental work that marginal quality water affects vines and vineyard soils, it has been difficult to predict the response in other sites.

CRCV PhD student **Louise Clark** is using a computer model, designed by Dr John Hudson from Flinders University, to help researchers predict future impacts and make recommendations to the industry.



Louise Clark with a soil sample.

For the past 18 months Louise has taken regular soil samples from field sites in the Barossa Valley and McLaren Vale to chart the physical and chemical properties of the soil, including the movement and accumulation of salts through the soil and the affect of rainfall on these properties. This data is then incorporated in the computer model which allows a series of potential outcomes to be simulated.

“We need to investigate changes in soil properties, as this will underpin the development of improved practices to ensure the sustainability of irrigated viticultural soils,” Louise said.

Besides using the computer prediction software, Louise is researching the seasonal changes in soil chemical and

physical properties following various rates of gypsum (0,4 and 8 ton/ha), and for different irrigation histories.

A study on the clay mineralogy is being conducted by Louise to compare changes which have occurred over the last million years with more recent changes due to irrigation.

Louise believes the ability to work with other CRCV researchers had been a great benefit to her research.

“In the Barossa, Shannon Pudney and I are working in the same vineyard to investigate the effect of marginal quality water on both soils (Louise) and vines (Shannon). Through integrating

findings we have been able to get a better overall picture of the effects of these water treatments,” Louise said. Keren Bindon, another CRCV PhD student based at the Waite Campus, has also collected some fruit samples from the same vineyard.

Louise is supervised by Dr Mike McCarthy, Dr Rob Fitzpatrick, Dr David Chittleborough, Dr Rob Murray and Dr John Hudson, and her project is ‘Sustainability of marginal irrigation water usage on viticulture soils with respect to soil chemical, physical and mineralogy properties’. She will be attending an international soil conference in Bangkok in August to deliver a presentation on her research findings.

Retaining quality in prestige region

The long-term sustainability of one of Australia’s oldest and most prestigious grapegrowing regions, SA’s Barossa Valley, is the focus of a CRCV research project.

Of particular interest is how the use of poor quality bore water affects yield, wine grape quality and soil properties. CRCV researcher **Shannon Pudney** said it was important to establish if salt was transferred from irrigation water to the grapes and what was occurring in the soil.

“There are certain concerns about the use of highly saline water and keeping the chloride level below the Australian Food Standards limit for chloride and this long-term research is important to determine the most sustainable irrigation practice for this region,” Shannon said.

The trial block is one hectare of mature Chardonnay vines which have been irrigated with saline bore water for the past 15 years. Half of the block is now irrigated with low salinity mains water.

The bore and mains water have been divided into 5 irrigation treatments. They include standard drip irrigation and Partial Rootzone Drying (PRD) at two different dripper rates.

Shannon is using soil moisture sensors (C-Probe, EnviroSCAN and gypsum blocks) to schedule irrigations. She is also collecting data on shoot growth, berry weight, bunches per vine and berry quality indicators like pH, brix, titratable acidity, sodium and chloride.

She said the last season’s unusual weather conditions of a wet winter and very hot summer had confounded the first season’s results.

“We anticipate that it will take a few seasons before any clear results are evident, however, the study will culminate in the production of best practice irrigation management guidelines that aim to minimise soil salinity and sodicity, while maintaining grape quality and yield,” she said.

Fast Facts from the CRCV

The CRCV has produced a series of fact sheets to deliver the latest information about CRCV projects in an easy-to-understand format.

CRCV CEO **Dr Jim**

Hardie says the sheets contain practical details about the projects, high-

light the aims of the projects and also cover current and expected outcomes. "They are a great starting point for finding out more about CRCV projects. The advantage is that people can request the entire series or just one or two fact sheets that interest them," Jim said.

Although the fact sheets are primarily aimed at people working within the



CRCV CEO Dr Jim Hardie looking through some of the Fact Sheets.

grape and wine industry such as grape-growers and wine-makers, Jim said the sheets would appeal to a wide audience. "The sheets are not highly technical in their nature which means they will be useful to a range of

people from winemakers and grape-growers to other researchers, students and anyone who is interested in the industry," he said.

The first 10 fact sheets have been produced with a further 12 available in the next couple of months.

Order a fact sheet by phoning the CRCV office on (08) 8303 9405 or visit the CRCV website www.crcv.com.au

World-class winery opens

Australian wine science and viticultural students will benefit from a new state-of-the-art commercial winery, recently opened at Charles Sturt University.

The \$2.5 million winery, located at the University's Wagga Wagga Campus, is a complex that matches the best in the Australian wine industry, according to the Head of the School of Wine & Food Sciences, **Professor Geoff Scollary**.

"The modern, well-equipped winery is

equal to many wineries in Australia, providing students with real industry training and experience," Geoff said.

The winery redevelopment, funded through its own commercial ventures, was part of a multi-million dollar expansion and upgrade of the University's Ron Potter Centre, which included the \$1 million CD Blake Experimental Winery opened in June last year.

The new facility has the capacity to process up to 500 tonnes and has been designed to allow a flow of material from the delivery of grapes to fermentation to the finished wine product.

"Highly educated winemakers and viticulturists are essential to the ongoing success of the wine industry in Australia," Geoff said.

For more information about the winery visit www.csu.edu.au/winery



A toast to CSU's new winery: winemaker Greg Gallagher, Head of the Wagga Wagga Campus Professor David Green, Chancellor David Asimus AO, Federal Education Minister Dr Brendan Nelson, Member for Riverina Kay Hull and Vice-Chancellor Professor Ian Goulter.

Diary Dates

May 21–May 23

Irrigation Australia 2002
Exhibition and Conference
Sydney Convention Centre

Ph: (02) 9290 1234

Email: irrigation@sydney.etf.com.au

July 12

ASVO (Australian Society of
Viticulture and Oenology)
Viticulture Seminar

Mildura, Victoria

Contact: Val Rechner

Ph: (08) 8303 6607

Email: asvo@waite.adelaide.edu.au

August 2–August 5

Wine Australia
Fox Studios, Sydney

Ph: (08) 8362 5556

Fax: (08) 8362 9959

Web: www.wineaustralia2002.com

Email:

wineaustralia@wineaustralia.org

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 wine-makers 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.

