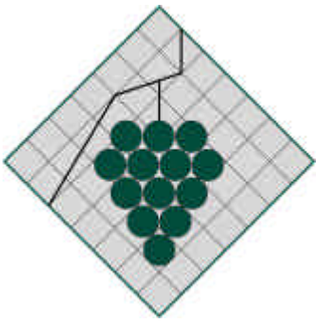


VineLOGIC demonstration to industry focus group meetings

CRCV Special Project Evaluation Report CRCV 2.1.3

FINAL REPORT to
Grape and Wine Research and Development Corporation

Project Number: **CRV 99/9**

Principal Investigator: **Karl J Sommer**

Research Organisation: **CSIRO Plant Industry, Horticulture Unit PMB Merbein, Victoria, 3505**

Date: **2000**

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1 EXECUTIVE SUMMARY

This report summarises the outcomes of 6 focus group workshops conducted at CSIRO Plant Industry, Merbein and the Plant Research Centre in Adelaide. The aim was to introduce the computer based simulation model VineLOGIC to a number of potential user groups from different areas of the wine and viticultural industries.

FOCUS GROUP FORMAT

The Focus Group format was designed with the aid of a marketing consultant from the University of South Australia.

Specific target groups were viticulture extension, education, consulting, corporate technical services and growers.

CRCV Viticare coordinator, Mr Noel Ainsworth, facilitated all sessions.

Feedback was audio-recorded and all comments were summarised and segregated according to target group. The principal feedback session was conducted with invited participants only. Project team members were asked to leave in order to ensure frank and open comments were provided.

Each workshop commenced with a facilitated discussion on current approaches to decision-making in relation to vineyard design, establishment and management. Participants were then informed about the aims and background of the VineLOGIC project. Subsequently, the VineLOGIC computer program was demonstrated to groups and thereafter individuals were given the opportunity to operate the software on a computer. Participants were then invited to comment on the software and to provide constructive criticism and guidance towards further development.

SUMMARY OF FEEDBACK

Overall the majority of participants endorsed VineLOGIC and expressed support for further development. Views on different applications of Vine LOGIC were quite diverse and in many cases depended on the specific requirements of individuals or groups within the viticulture Industry Main points in support of the package were as follows:

- excellent education tool
- good scope for extension, as a support tool in company-grower liaison and as a demonstration and teaching tool
- good scope for application as a corporate and consulting tool to assess areas of development or re-development
- provides a systematic way of predicting the outcome of a project
- good source of information for a given site by evaluating multiple management options
- good resource base because of its comprehensive data on weather, soil type and pruning
- opportunity to assess vineyard performance in "own" region by comparing modelled results to actual observations

The strongest endorsement of Vine LOGIC came from the area of education, namely Universities and TAFE colleges. Education representatives expressed strong interest in the package and saw immediate applications in the area of teaching. Groups from the fields of consulting, extension and the corporate sector also saw the potential of Vine LOGIC as an education tool.

Consultants saw applications of Vine LOGIC for salt and drainage management, especially for evaluating the long and short-term sustainability of a given management practice. Representatives from the corporate sector saw applications for site development and redevelopment and for a 'first go' evaluation of management strategies particularly for irrigation, salinity and drainage. Growers regarded most of the applications of VineLOGIC as strategic and therefore saw limited applications for day to day management issues.

Groups pointed out deficiencies that should be addressed in future developments. The most important are listed in order of priority:

- ability to simulate Total Soluble Solids (TSS) or Brix degree during fruit maturation
- ability to simulate rootstock effects on vine performance
- ability to adjust timing of irrigation and specific amounts of irrigation in simulating effects on vine growth and yield
- ability to simulate nutritional effects on vine performance
- ability to perform multiple season simulations to account for carry over effects from season to season
- inclusion of options for PRD and RDI.
- inclusion of options to simulate cover crop effects on vine growth and yield

There was a consensus amongst all participants that VineLOGIC should be made available for education purposes as soon as possible. There was also consensus for preparation of a professional version tailored to the needs of extension providers, consultants, corporate technical services and advanced growers.

RECOMMENDATIONS

To achieve the outcomes identified by Focus Group participants the following recommendations are made:

1. Prepare and release an education version within one year (by June 2001).

2. Address medium term deficiencies (rootstocks, irrigation options, multiple years) and prepare an up-dated version for evaluation in a workshop setting at the Eleventh Australian Wine Industry Technical Conference, Adelaide, Oct➢ober 2001.

3. Address long-term deficiencies, subject to available resources, with delivery of an enhanced version; incorporating total soluble solids (TSS) by Dec. 2002 and nitrogen nutrition and cover crops by June 2004.

FUNDING

- Recommendation 1 can be met with CRCV budgeted resources (2000/2001).
- Recommendation 2 can be partially met with CRCV budgeted resources (2000/2001) but will require additional resources in the 2001/2002 financial year to ensure completion.
- Recommendation 3 will be dependent on increased resources through the CRCV.

2. INTRODUCTION

This report summarises the outcomes of a series of focus group meetings held at CSIRO Plant Industry, Merbein (May 30', June 1 & 2) and at the Plant Research Centre in Adelaide (June 5, 6, 7). The objective of the meetings was to introduce VineLOGIC, a computer based simulation model of grapevine growth and water use to potential users. The following target groups were thought to be representative of a cross section of the wine and viticultural 51 industries:

- Education
- Extension
- Consulting
- Wine industry corporate technical services
- Advanced growers and industry representatives

3. AIMS

Individual focus group meetings were organised to achieve the following aims:

- provide background information on the VineLOGIC project
- introduce VineLOGIC to potential users
- demonstrate potential applications of VineLOGIC
- provide the opportunity for 'hands on' experience of the software ,
- gain feedback on the use ability of Vine LOGIC
- gain feedback on potential for improvement of Vine LOGIC
- seek guidance for future development of VineLOGIC

4. STRUCTURE OF FOCUS GROUP MEETINGS.

Consultation on format of the Focus Groups was undertaken with Anthony Lowe, Lecturer in Market Research and Consumer Behaviour, of the University of South Australia.

A principal factor in design of the Focus Group format was to ensure the project team was 'divorced' from the feedback process. The team was present at each session, its task was to provide an outline of Vine LOGIC, answer questions of clarification and assist users in 'hands-on' demonstration of the package. The team absented itself from the main feedback session, which was audio-recorded to ensure *all* comments were obtained and considered.

CRCV Viticare coordinator, Mr Noel Ainsworth, facilitated each Focus Group.

Each meeting was opened with an introductory session in which participants were invited to share their experiences regarding decision-making processes in viticultural management and on the type of support tools used to facilitate the decision-making process.

The introduction was followed by an overview and background information on the VineLOGIC project. The main objectives and experimental requirements leading to the development of Vine LOGIC were briefly described.

Subsequently, an overview of the VineLOGIC menus as they appear on the computer screen was presented. This was followed by a demonstration of typical simulation scenarios including menu selections for different soil types, irrigation scenarios, level of salinity in the soil, level of salinity in the irrigation water, the presence or absence of drainage etc. Impact of the various scenarios on growth and yield was highlighted. After the demonstration participants were invited to ask questions and provide comments. Thereafter, an opportunity was provided for the members of each group to operate the software on a number of computers.

Finally, in a 'feedback session' the members of each focus group were asked to evaluate VineLOGIC from their perspective within the field of viticulture. They were asked to comment freely on what they perceived as positive and negative aspects and to provide constructive criticism regarding potential use ability and applicability of Vine LOGIC. They were also asked to comment on shortcomings of the current development and to suggest possible improvements. 'Feedback sessions' were chaired by Noel Ainsworth, the CRVC Viticare coordinator, and were recorded on audiotape. Recommendations given in this report are largely based on the audiotape records of the 'feedback sessions' and on notes taken during the workshops.

Prior to closing, all Focus Groups were asked to read and comment on a draft colour leaflet, prepared to outline VineLOGIC and its capabilities. The aim was to engage participants in a 'reality-check' of the capability statements made in the leaflet, against a background of what they had learned during the sessions.

5. BRIEF DESCRIPTION OF VINELOGIC SOFTWARE

VineLOGIC is a computer based simulation model that describes growth, water use and potential yield of the grapevine. The calculations of VineLOGIC are performed using daily weather records, namely minimum and maximum temperate, rainfall and solar radiation as well as information on oil, irrigation and vineyard. Vine related computation routines in VineLOGIC simulate vine growth stages, canopy growth and Yield formation. They were largely derived from two long-term experiments, carried out as part of the VineLOGIC project. Soil-related computational procedures in VineLOGIC were adapted from SWAGMAN DESTINY a crop simulation model developed by CSIRO Land and Water. Computations in VineLOGIC are performed on a daily basis. A typical simulation run is performed for a specific location and season for which weather records are available.

5.1 Mode of operation

The current version of VineLOGIC can be run in two modes, namely a *specific* and a *generalised* mode.

Generalised mode addresses a number of generic simulation scenarios that do not require input data specific to a particular vineyard or experiment.

Specific mode may be set up to suit the special requirements of a particular vineyard or experimental treatment.

5.1.1 Generalised mode

Generalised mode was designed to be user friendly but at the same time allow enough flexibility for the user to specify a wide variety of simulation scenarios. *Generalised* mode is menu driven from a computer screen and does not require special user expertise. To set up a simulation the user is asked to select one of the offered choices within each of the following 51 areas:

➢**WEATHER**	➢**VARIETY**	➢**IRRIGATION SCHEDULE**
➢**SOIL TYPE**	➢**ROOTSTOCK**	➢**WATER TABLE DEPTH**
➢**PRUNING SYSTEM**	➢**IRRIGATION TYPE**	➢**SOIL SALINITY**
➢**TRELLIS TYPE**	➢**IRRIGATION WATER SALINITY**	

Once the inputs have been chosen the user presses simulate and thus invokes the short computational process. After a few seconds the user is presented with information on the potential performance of the vineyard based on the selected inputs. The information appears as on-screen outputs and provides summary information on the timing of growth stages, vine water usage, climatic indices and degree of stress between growth stages (Figure 1) as well as an estimate of potential yield and associated yield components.

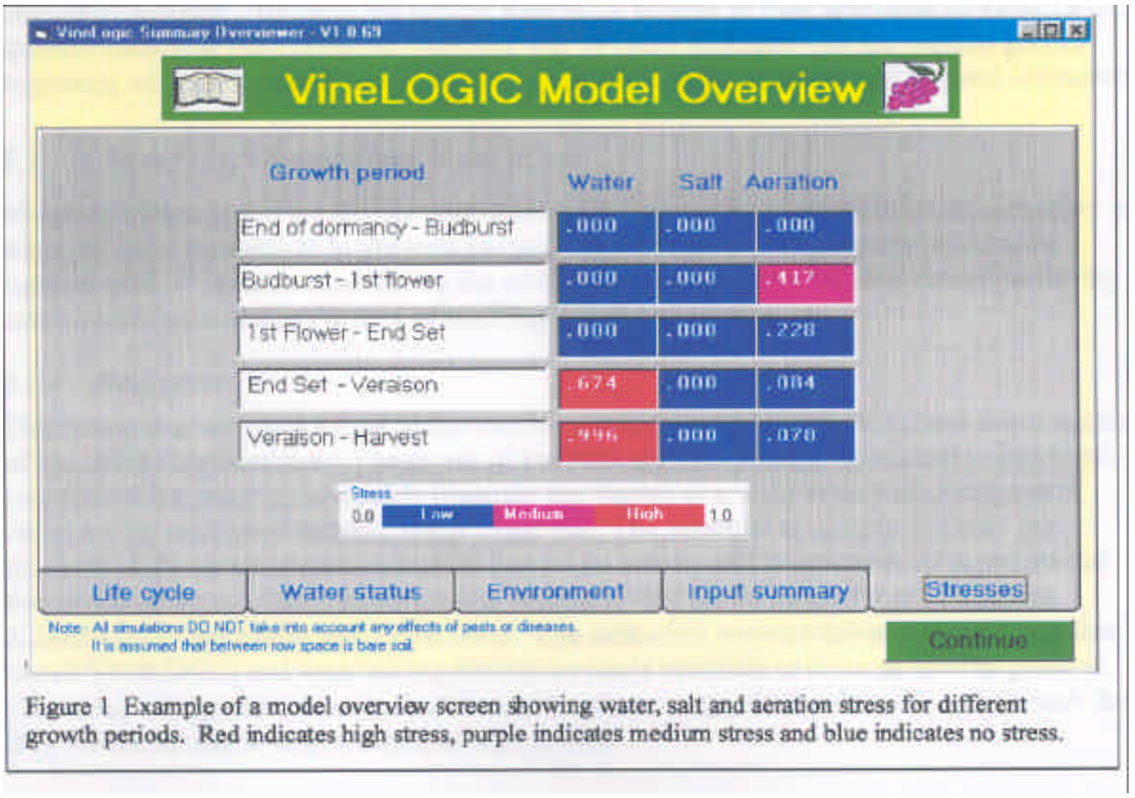


Figure 1 Example of a model overview screen showing water, salt and aeration stress for different growth periods. Red indicates high stress, purple indicates medium stress and blue indicates no stress.

5.1.2 *Specific mode*

The *specific* mode requires more user expertise than the *generalised* mode and may require provision of data for input towards the model. The *specific* mode has the advantage to allow the user assembly of management scenarios that are tailored for a particular vineyard or experiment. The user is able to define specific inputs such as soil type or the timing and amount of irrigation etc. Specific inputs are stored as text files and therefore may require editing and the provision of detailed data on the part of the user.

Focus group presentations were largely conducted in *generalised* mode but *specific* mode applications were also briefly demonstrated.

5.2 Feedback

In a 'feedback session' members of the various target groups were encouraged to provide constructive criticism regarding potential use-ability and applicability of Vine LOGIC. They were also asked to point out shortcomings of the current development and indicate potential improvements. The feedback sessions were recorded on tape and are the main source for this report. Other records are based on notes taken during the workshops by the organisers.

6 OUTCOMES

The majority of the representatives from the various focus groups endorsed the package. There were marked differences regarding the way different groups viewed potential applications of the package depending on their functions and specific requirements within the viticulture industry. Because the groups were quite diverse in their approach to VineLOGIC specific outcomes from different meetings will be listed separately for the various groups beginning with information providers from the areas of Education, Consulting and Extension.

6.1 Education, Consulting, Extension

Members of this group are largely concerned with the transfer of information from teacher to students, from consultants to growers and government agencies to growers or technical support staff. It became clear during the workshops that VineLOGIC was viewed as having considerable potential in the area of teaching and demonstration.

6.1.1 Education

This group was very supportive of the current development of Vine LOGIC and saw a number of immediate applications. The power of the package, specifically for education purposes, was seen in its potential to quickly illustrate the impact of a wide variety of management, decisions on yield performance, water usage etc. The potential to quickly evaluate and illustrate different simulation scenarios that might correspond to a number of experimental treatments or management scenarios was seen as a very useful support tool in teaching students at the university and T AFE level. The education representatives saw an immediate use of VineLOGIC and were asking for it to be made available to them as soon as possible. There was a suggestion that students should be given a copy of VineLOGIC on CD such that they would be able to explore the package in detail.

6.1.2 Consulting

Representatives from the area of consulting saw the main value of the package in its application as an educational tool. The quick illustration of the impact of management changes with regard to irrigation and drainage, or the importance of site selection for a given variety was seen as a major advantage. Another positive aspect was seen in the evaluation of salinity and drainage related issues. For example, for private or corporate growers, it is very difficult to quantify the long-term impact of vine irrigation using saline irrigation water. The practice is currently being applied in the Barossa Valley and in Padthaway. At the moment VineLOGIC is able to address this question on an annual but not on a perennial basis. It was argued that adding the capability of being able to simulate long-term, i.e. perennial, scenarios would add value to VineLOGIC as a tool for consulting purposes.

6.1.3 Extension

Benefits of Vine LOGIC as an educational tool were highlighted again. In addition, it was suggested to apply the package for evaluation of hypothetical experimental treatments as a tool to assist in the development of appropriate treatments in a field experiment.

The lack of predicting sugar level or total soluble solids (TSS) at the time of harvest was pointed out as a serious deficiency in the current version of Vine LOGIC. It was argued that total soluble solids (TSS) is an important indicator of fruit quality and if VineLOGIC is to be taken seriously in the market place it will have to be able to provide an assessment of berry TSS as an indicator of fruit maturity.

The lack of predicting rootstock effects in the model was also pointed out as a serious deficiency in the demonstrated package. The model already has the provision for the inclusion of rootstocks but this capacity has not been validated at the present stage. Currently there is no difference in the outcome of a simulation run regardless of which rootstock has been selected.

6.2 Corporate technical services

Again there was a strong opinion that VineLOGIC would be a valuable education tool. Applications as a support tool for site selection and vineyard development or re-development were also foreseen. A view was expressed that a number of issues need to be addressed before the package would be fully applicable in that role.

It was emphasised that validation of the rootstock component of the model was essential for the package to gain acceptance in the corporate environment.
The irrigation menu in the *generalised* version was criticised for the lack of options to input growth stage specific irrigation as well as given irrigation amounts. A number of participants expressed the opinion that the irrigation rules as they currently stand in the *generalised* version are not flexible enough.

This group also was critical of the fact that VineLOGIC currently does not provide an estimate of total soluble solids (TSS) as an indicator of ripeness and must quality. It was felt that such an indicator would be essential in using the model for assessing the impact of management strategies, such as application of different irrigation amounts.

Some representatives expressed enthusiasm for using the specific version of Vine LOGIC while others expressed apprehension because of the requirement of having to provide detailed input data.

Doubt was expressed about the accuracy of theoretical yield estimates for certain cool climate sites. It was suggested that more validation work based on industry experience should be conducted.

Representatives from the corporate area felt that they would use VineLOGIC as an additional tool within a suite of other information sources.

6.3 Growers

The majority of this group indicated that they would be the least likely to benefit from using VineLOGIC neither as an education nor a decision support tool. A view was expressed that growers are mostly preoccupied with the day-to-day management of their vineyards particularly with regard to irrigation and disease management. It was felt that VineLOGIC is less suitable to address day-to-day, tactical management issues. Instead its design is more applicable to long-term strategic management decisions.

One grower commented that he would like to have available the chance to phone somebody able to run the package so that he could ask for various scenarios to be compared. Another commented that he would use the package to run scenarios, but it was likely that once the results of these scenarios were learned he would be less likely to use it thereafter.

6.4 Dot point summary

Positive attributes of VineLOGIC as well as deficiencies that were expressed by the various groups are summarised in dot point format for the benefit of the reader.

6.4.1 Positive attributes

- powerful tool that allows combination and quick evaluation of different factors in what-if scenarios
- easy user-friendly front end *(Generalised user* interface is 'simple enough' to use)
- useful tool in education in its current form; "learn from different scenarios"; "makes people think a lot more"; "highlight some major responses of management"
- suitable tool to demonstrate the purpose of modelling
- evaluate different outcomes with regard to irrigation strategy

- has scope for application as a corporate tool to justify areas of development and re-development
- provides a systematic way of predicting the outcome of a project
- scope for extension, as a support tool in company-grower liaison and as a demonstration and teaching tool
- good resource base because of its comprehensive data base on weather, soil type and pruning
- useful to assess the potential for growing grapes in a new location (location analysis) good to explore "own" growth region; compare modelled results to actual observations in your own vineyard
- good source of additional information for a particular site; allows immediate integration of a number of management factors
- could have benefit in predicting the outcome of new developments as additional source of information when a new area is being developed or redeveloped

6.4.2 Deficiencies

- option to simulate the effect of cover crops on vine growth and yield, "need to get away from are earth in mid rows"
- simulation of nutritional effects on vine performance
- simulation of rootstock effects on vine performance
- no economic variables are being considered
- only one year of simulation is possible, therefore carry-over effects from season to season are disregarded (vine reserves, soil salinity, etc)
- not sufficiently validated ("like to see its reliability, what it can and can't do"; "dangerous if people rely on it for financial considerations")
- irrigation rules in *'Generalised'* mode are not flexible enough to allow growth stage and amount specific irrigation scenarios ("If I only have one mega litre of irrigation?")
- no option for PRD and RDI irrigation scenarios
- ability to simulate Brix, or date likely to achieve a certain Brix
- does not consider disease (nernatodes, wood rotting fungi, botrytis)

7 RECOMMENDATIONS

7.1 Release education version within one year

A strong demand for VineLOGIC was expressed from the area of education and teaching. Endorsement was strongest from university representatives and TAPE colleges who saw immediate applications in the teaching area. Other groups also highlighted the potential of VineLOGIC as a teaching tool. All groups regarded it as desirable to make VineLOGIC available for teaching as soon as possible.

We are therefore proposing to release an *education* version of Vine LOGIC within one year (June 2001). This will allow enough time to make a number of short-term improvements and to provide a pre-release version to educationists for further evaluation. It is anticipated that an updated version will be made available for evaluation within 8 months and that a final release will be available within one year.

We are also proposing the development of a marketing strategy for the new product. The market size and segments will be defined and branding, packaging and pricing strategies developed with the input of marketing specialists. Training programs and 'help-desk' options will be considered as a component of strategy development.

7.2 Address medium term deficiencies and have an updated version for evaluation in a workshop setting at the 11th Australian Wine Industry Technical Conference in October 2001.

Participants having a role in information transfer and technology diffusion within the industry, a group generally having tertiary training, i.e. a professional background in viticulture, expressed their interest in using VineLOGIC for various applications including: for decision making in relation to site development and redevelopment; for a 'first go' evaluation of management strategies, particularly in the areas concerned with irrigation, salinity and drainage; and as a guide to evaluate sustainability issues in the long and short term.

We are therefore proposing to prepare a ***professional*** version ready for further evaluation by industry in a workshop setting of the 11 Australian Wine Industry Technical Conference in Adelaide, October 2001. The updated version will address and remedy a number of deficiencies identified by the focus groups.

- the simulation of rootstock effects on vine performance
- the inclusion of growth stage and amount specific irrigation rules in the *Generalised mode*
- multi-year simulation runs

The *professional* version of Vine LOGIC would be mainly for the use of extension providers, corporate technical services, consultants and advanced growers.

7.3 Address long-term deficiencies

Other deficiencies raised by the focus groups were the capacity to simulate total soluble solids (TSS), nitrogen nutrition effects and cover crops. Inclusion of these attributes into VineLOGIC will require increased resources through the CRCV with potential delivery of and enhanced version incorporating TSS (by Dec. 2002) and nitrogen nutrition and cover crops (by June 2004).

8 SHORT TERM TIMELINES AND TARGETS

Release education edition within one year

➢ Implement short-term improvements	Oct 2000
➢ Short trial phase	Nov 2000
➢ Review with educationists	Feb 2000
➢ Marketing strategy developed	Feb 2000
➢ Refine product	Apr 2001
➢ Release product	Jun 2001

Prototype of professional edition after one year

➢ Improve irrigation module	Dec 2000
➢ Activate rootstock option	Mar 2001
➢ Allow for annual and perennial mode	Apr 2001
➢ Refine prototype	Aug 2001
➢ 'Workshop' product (Wine Industry Tech. Conf.)	Oct 2001

9. FUNDING

- Recommendation 7.1 can be met with CRCV budgeted resources (2000/2001).
- Recommendation 7:2 can be partially met with CRCV budgeted resources (2000/2001) but will require additional resources m the 2001/2002 financial year to ensure completion.
- Recommendation 7.3 will be dependent on increases in CRCV resources[1].

[1] Inclusion of maturation scenarios within VineLOGIC is a sub-component of a current proposal to the CRCV and G WRDC to address seasonal, between vineyard and within vineyard variability in maturation, a problem, which was especially evident in season 2000.

10 APPENDIX

10.1 Listing of participants by sector

CORPORATE

Peter Fleming	Simeon Wines
Kery DeGarls	NSW Wine Grapes Marketing Board
Rob Hayes	Milburn Park
Samantha Hilliard	BRL Hardy
Sarah Law	BRL Hardy
Jeff Milne	Wingara Wine Group
Richard Neagle	Southcorp
Bill Whildon	BRL Hardy
Kevin Pfeiffer	Simeon Wines
Terry Evans	Southcorp Wines Pty Ltd
Syd Kyloh	Mildara Blass (Krondorf)
Stephen Guilbaud-Oulton	Orlando Wyndham
Anthony Koener	Gully view Vineyards
Kym Ayliffe	Rosemount Estate
Peter Hayes	Rosemount Estate
Steve Brunato	Wirra Wirra Winery
Kevin Fidderman	Rosemount Estate
Don Lester	Orlando Wyndham
Mardi Longbottom	Nepenthe Vineyards
Chris Dundon	Mildara Blass (Maglieri Wines)
Hugh Armstrong	Southcorp Wines Pty Ltd

EXTENSION

Greg Moulds	NSW Agriculture
Maxine Schache	DNRE Victoria
Jeremy Giddings	NSW Agriculture
Bob Emmett	DNRE Victoria
Phil Nicholas	SARDI
Greg Dunn	DNRE Victoria
Steve Martin	DNRE Victoria
Mark Skewes	PIRSA
Keith Leamon	DNRE Victoria
Deanne Burrows	Sunraysia Rural Water
Shayne Hackett	NSW Agriculture
Mark Krstic	DNRE Victoria
Sharon Legunis	Sunraysia Rural Water
John Whiting	DNRE Victoria

Sally-Jean Bell	Australian Wine Research Institute
Michael McCarthy	SARDI
Shannon Pudney	SARDI
Jenny Witherspoon	IAMA

CONSULTANTS

John Runting	Wine Network Australia
David Botting	Davidson Viticultural Consulting
Peter Scholefield	Scholefield and Robinson
Andrew Dunn	Yandilla Irrigation

EDUCATION

Ross Robertson	Sunraysia Institute of TAFE
Lindsay Miller	Sunraysia Institute of T AFE
Bob Barrett	Adelaide University
Judy Tisdall	La Trobe University

GROWERS

Merv Cupper	Merbein, Victoria
Alec McCracken	Irymple, Victoria
Howard Jones	Dareton, New South Wales
David Snook	Millicent, South Australia
Pam Snook	Millicent, South Australia
Kon Lymberopoulos	Clare, South Australia
Jock Harvey	Willunga, South Australia
Peter Read	King Valley Victoria

OBSERVERS

David Hall	Grape and Wine Research & Development Corporation
Jim Hardie	CRC for Viticulture
Wayne Meyer	CSIRO Land and Water