Murray Valley Winegrowers' Inc

Australian Government
Grape and Wine Research and Development Corporation

Nutrition in Focus



FINAL REPORT to
GRAPE AND WINE RESEARCH & DEVELOPMENT CORPORATION

Project Number: **RT 04/01 -1**

Principal Investigator: **Susan Byrne & Liz M^{c}Guire**

Research Organisation: **Murray Valley Winegrowers' Inc.**

Date: **8/12/05**

Executive Summary

Nutrition is an important management tool for vine health, vigour and fruit quality. Growers' are regularly looking for nutrition information to improve their best nutrient management practices. The aim of this project was to provide growers with relevant nutritional information and to identify the gaps in the nutritional information available.

A number of workshops were organised by the Industry Development Officer Susan Byrne. The workshops contained presentations from nutrition and fertigation experts which covered key macro and micronutrient topics. The information was well received by growers, with many indicating they had learnt something that could be implemented into their management strategies.

To complement the workshops, the text "Soil Irrigation and Nutrition" edited by Phil Nicholas was promoted as wealth of vineyard management information relevant to all winegrape growers.

Scholefield Robinson Mildura were contracted to design and conduct structured interviews with winegrape industry stakeholder groups to identify the gaps in the nutritional information available. Nutritional gaps identified were presented to the Riverlink priorities meeting in September 2005 with the expectations to address future nutritional information needs.

Background

Growers continually identify grapevine nutrition as a focus for additional research and extension. This has been demonstrated in numerous surveys and workshops conducted in the Murray – Darling and Swan Hill regions. For example at a research and development priorities workshop organised by Murray Valley Winegrowers' Inc and facilitated by Jon Lamb in 2003, growers rated nutrition as the number one priority with horticultural advisors rating it as a second priority.

While in general grapevine nutrition has been a top priority for growers/horticultural advisors, the specific topic areas of grapevine nutrition that require more extension have been harder to identify. This seems to be due largely to a gap of understanding / situation between researchers and growers. Workshops were proposed to address extension of nutrition information and illustrate current relevant research.

Objectives

The aims of the project were to:

1. Bridge the gap between researchers and growers, having relevant scientists speak about research outcomes associated with the role nutrition plays in wine quality.
2. Identify the specific areas of nutrition that require additional research and extension from the viewpoint of different industry stakeholders.
3. Promote the text "Soil, Irrigation and Nutrition" by Phil Nicholas.
4. Formulate a web-based discussion on grapevine nutrition to obtain more specific information, which could be used by growers to improve wine grape production.
5. Conduct two one-day workshops on macronutrients and two one-day workshops on micronutrients.

Extension Methodology

It was proposed that the objectives were delivered through the following methodology:

1. Workshops
2. Promotion of "Soil, Irrigation and Nutrition" edited by Phil Nicholas through the Murray Valley Winegrowers Magazine "The Grapevine" (see Appendix 1)
3. Structured Interviews with different viticultural stakeholders (see Appendix 2)
4. Formulate a web-based discussion on grapevine nutrition to obtain more specific information, which could be used by growers to improve wine grape production.

The web-based discussion was discarded on the basis of minimal interest from growers' in using this form of communication.

Method

Two workshops titled "Grapevine Nutrition and Fertiliser Use – Background and decision making in the vineyard" were organised and held in Mildura. The workshops were formulated and presented by Ben Thomas and Ben Robinson from Scholefield Robinson Horticultural Services Pty Ltd. The topics covered in the presentations are listed on the invitation flyer (Appendix 3) and correlate with the original objectives of providing relevant information on macro and micronutrients.

Two workshops titled "Fertigation" were held in co-operation with DPI Mildura and DPI Swan Hill. This workshop was designed to cover nutrition in a number of different crop in order to value add for producers that have mixed enterprises. The outlines of the sessions are as follows:

Mildura – 14th July 2004

1. Greg Hocking – Yandilla Park Agribusiness
2. Peter Henry – Netafim
3. Dr. Michael Treeby – CSIRO Plant Industry
4. Ken Orr – Incitec Pivot

Swan Hill – 12th August 2004

1. Dr Michael Treeby – CSIRO Plant Industry
2. Peter Henry – Netafim
3. Matt Thomas – Multifert
4. Heather Field – DPI Swan Hill

The text "Soils, Irrigation and Nutrition" edited by Phil Nicholas contains a lot of relevant vineyard management information, all three topic areas being integral part of nutrient management. This text would be of interest and useful to all winegrape growers. This text was promoted in the Murray Valley Winegrowers' magazine in co-operation with Winetitles at a special price.

Structured interview questions were developed by Scholefield Robinson Mildura to determine the gaps in nutrition as seen from different viticultural stakeholders. Groups interviewed include:

1. Winegrape growers
2. Viticultural Consultants
3. Fertiliser Resellers
4. Scientists

5. Winery Representatives

Results were presented to the Riverlink priorities meeting to be held in September 2005.

Results / Discussion

Both workshops were received with great interest from the winegrape stakeholders. The macro and micro nutrient topics were condensed into the one workshop to concentrate interest from growers and to save time.

Attendees were asked to nominate the topics of most importance in regards to topics discussed within the workshops and the need for further relevant information.

Topics listed in order of most important to least are:

1. Influence of nutrients on grape and wine quality
2. Value for money in fertilisers
3. Fertiliser program
4. Discussion of fertilisers and their composition
5. Application methods

Growers' comments indicated that information on nutrition in regards to wine quality, which fertilisers to use, fertiliser rates and application timings were all relevant to the day to day running of the vineyard especially with regards to developing good quality fruit.

Growers' comments indicated that information provided by workshops that would be implemented into vineyard management would include a lot more in field monitoring of nutrition management and a lot more record keeping to be able to compare alternate year's results.

The promotion of the text "Soil, Irrigation and Nutrition" was met with little interest from growers' despite indications from growers' that this was the type of information needed.

The results from the structured interviews are compiled in a report (see Appendix 2). The structured interviews with different stakeholders of the winegrape industry have given good insight into the gaps in nutritional information and the potential for future direction. The top responses have indicated the following areas of importance:

- Review of petiole standards taking into consideration variety, yield and fruit quality.
- Development of nutrition standards for the sap analysis measurement technique.
- Better understanding of the fundamental concepts of fertigation in the vineyard.
- Soil fertility and health.
- The role of nutrition in grape and wine quality.
- Crop nutrient removal.
- Rootstock effects on plant nutrition.
- Environmental impacts of nutrition.

These results were presented to the Riverlink priorities setting meeting with expectations to include some of these issues in future projects.

This report compiled by Scholefield Robinson Mildura has also been listed on the Murray Valley Winegrowers' Inc webpage www.murrayvalleywinegrapes.com.au

Outcome / Conclusion

The workshops were a very successful method of delivering current nutrient information to winegrape growers. The information presented in the workshops summarized a lot of what growers' were looking for to improve "best management nutrient practices" on their properties, with many participants looking to implement new ideas into their vineyards.

The presenters were very knowledgeable in the topic area of nutrition and they delivered information that was easily understood. Acknowledgements are made to all presenters involved in this project and recommendations are made to others in the viticultural industry when searching for a presenter in the topic area of nutrition.

Investigation into the lack of interest of the text "Soil, Irrigation and Nutrition" would help determine the best methodology in which to advertise the information growers' are seriously searching for.

The structured interviews illustrated the need for more detailed information in nutrient management. These results provide the opportunity to develop future more detailed projects to address the needs of growers'.

Acknowledgements are made to GWRDC for providing funding for this project.

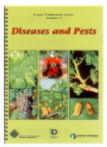
APPENDIX 1

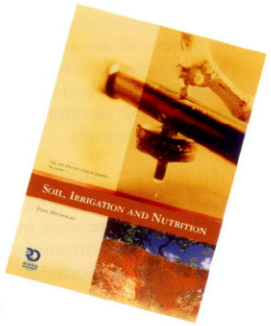
MURRAY VALLEY WINEGROWERS'

Limited Special Price!

Soil Irrigation and Nutrition edited by Phil Nicholas

Belonging to either Murray Valley Winegrowers' or Riverland Winegrape Growers' Association means that the new publication Soil, Irrigation and Nutrition (pictured) can be purchased for the discounted price of $66.00 (GST inc) instead of $77.00. **(The discount applies when 20 or more orders have been placed with Murray Valley Winegrowers').**
Soil, Irrigation and Nutrition is the second text in the Grape Production Series. Many of you will be familiar with the first text Diseases and Pests edited by Phil Nicholas, Peter Magarey and Malcolm Wachtel (pictured) which is known for its straightforward, detailed and practical information.
Soil Irrigation and Nutrition follows the same guidelines and is packed full of information useful to all winegrape growers.





Topics include:

- Soil treatments and amendments,
- Cover crop types and rates,
- Irrigation water supply and quality,
- Irrigation systems and management,
- Vine nutrition and management.

Please tick ❑
I would like to purchase Soil, Irrigation and Nutrition for $66.00 (GST inc)
I will collect the book from the Murray Valley Winegrowers' Office 62 Madden Avenue, Mildura.

Please tick ❑
I would like to purchase Soil, Irrigation and Nutrition for $66.00 (GST inc) + $7.70 postage. Please post to the mailing address below.

Tax Invoice:
This document will be a Tax Invoice for GST purposes when payment is received - ABN: 27 375 625 539
Post to:
Murray Valley Winegrowers' Inc, PO Box 2745 Mildura Vic 3502
OR Fax
to (03) 5023 2335

Name .....

Mailing Address .....

Telephone .....

Method of payment

Cheque - payable to Murray Valley Winegrowers Inc.

Credit card - please circle one: MasterCard Visa Bankcard

Card Number .....

Name on Card ..... Expiry Date .....

Amount $ ..... (inc GST) Signature .....

APPENDIX 2

Scholefield Robinson
HORTICULTURAL SERVICES

Results of a Survey to Identify the Issues Relating to Nutrition, Fertilizer Use and Soil Management for the Murray Valley Wine Industry

Prepared for : **Murray Valley Winegrowers' Inc**

By : **Garth Swinburn and Susan Saris**

Date : **August, 2005**

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INTRODUCTION

Murray Valley Winegrowers' Inc, (MVW) has identified wine grape nutrition as a research and development (R&D) priority. Scholefield Robinson Mildura Pty Ltd (SRM) was engaged by MVW to identify the issues relating to nutrition, fertilizer use and soil management for the Murray Valley wine industry.

SRM approached this project by surveying forty people from the Murray Valley wine industry including;

- 20 growers
- 5 consultants
- 5 fertilizer resellers
- 5 researchers
- 5 winery personnel.

Surveyed participants were asked to identify wine grape nutrition issues that they considered to be important in the industry and to highlight possible gaps in the current research into wine grape nutrition.

The surveys were conducted using a combination of face-to-face and telephone interviews. The survey directed specific questions to grape growers, consultants, fertilizer resellers, researchers and winery personnel. The questions were:

Survey Questions for Growers

1. What do you find is the biggest challenge for managing wine grape nutrition?
2. What research do you believe needs to occur in wine grape nutrition?
3. Where do you get your information about vine nutrition and fertilisers?

Survey Questions for Consultants, Fertiliser Resellers, Researchers and Winery Personnel

1. What do you believe is the biggest challenge for growers managing wine grape nutrition?
2. What research do you believe needs to occur in wine grape nutrition?

SURVEY RESULTS

The responses from the survey were recorded and reported as commentary (see below) as well as in table format (Table 1) showing frequency of topics mentioned or statements made about a particular issue.

The key issues and points raised in the survey have been listed and discussed under the following headings:

Petiole and Soil Standards

Generally, plant and soil samples are collected in vineyards and submitted to a laboratory for analysis. The resultant data are then compared to accepted industry standards for grapevines which aid decision making in regards to fertilizer applications and nutrition management.

Ten growers in the survey (out of the 20 surveyed) indicated that they used soil and petiole analysis as a method of monitoring the nutrition status of their vineyard or identifying specific causes of poor vine performance.

Some of the growers in the survey (3) queried the ability of these tests to adequately depict the nutrient levels in the vine and soil.

One grower questioned the amount of soil sampled and whether the results from the small sample would adequately reflect the vast area of soil in a vineyard.

Two growers had concerns with the timing of sampling. These growers wondered whether sampling needed to occur over the whole growing season to get a sense of the peaks and troughs of nutrient levels, for example a low level may not reflect a deficiency but rather a time in the season when that nutrient was not needed.

Ten participants strongly voiced their opinion that the petiole standards used to determine nutritional deficiency or toxicity are in need of revision. The reasons given for lack of confidence in the standards were that the standards were;

1. Developed from large sultana vines that were not used for wine. This indicates that the participants in the survey believe the level of adequate nutrient levels will be different in vines grown for wine production and in varieties other than sultana.
2. Developed in grape growing regions of America. This suggests that the participants believe there is a regional affect on the quantities of nutrients vines need. The petiole analysis standards used in Australia are in fact based on those developed in California with adjustments made for Australian conditions.
3. Undertaken 20-30 years ago. This suggests that growers lose faith in 'old' data. They have a sense that 'technology' has moved forward in the last 20 to 30 years and perhaps we have better methods for measuring nutrient levels and therefore the standards could be 'refined'.
4. Not linked to wine grape quality. This reason was suggested by three participants who believe that it is important that any new standards should be based on some quality or performance criteria, however these respondents were unable to be specific about how this would be done or which performance criteria should be used (berry colour? yield? baume?).

Two participants did mention that vine nutrient standards should be somehow linked to berry composition but could not be any more specific.

One participant proposed that the current petiole standards were becoming outdated due to the changing practices of applying fertilizers. Many growers are moving away from broadcasting fertilizer and using fertigation to deliver smaller quantities of nutrients, more often over the course of a whole season. This particular respondent believed that research is needed to examine and determine appropriate standards for vines fertilized in this manner.

Four people in the survey thought we should perhaps focus on developing new petiole standards for a small number of nutrients to begin with; however there was divided opinion on whether we should examine macro or micronutrients first.

Five of the survey participants believed standards need to be developed for different soils, scions, rootstocks and regions (two of these five respondents thought that research should focus on variety-specific nutrient requirements only). After further discussion with this group, some individuals went on to comment on the difficulty and enormity of this task.

Two respondents believed that the petiole standards were only a guide to the nutrient status of their vineyard and that the variation between vineyards in this region would make it difficult to be prescriptive about nutrient analysis and fertilizer programs.

These same two people were also frustrated at their inability to measure the impact of fertilizer inputs on wine grape yield and fruit quality and therefore the difficulty in developing a fertilizer program that was suited to their vineyard.

In contrast to these growers, there were a few growers who wanted an industry accepted fertilizer program that detailed amounts and timing of nutrient applications. This is usually not possible due to large variations in soil type, variety, yield targets etc.

Two people mentioned the need to look at blade analysis standards.

Four people believed databases containing information on nutrition levels and related crop parameters could be explored to develop new petiole standards. The people who made this comment believed these databases existed within wineries, private consultant companies and government research bodies.

Sap Analysis

In recent years, some companies and growers have been utilising vine sap analysis to determine vine nutrient status. It is a quick and relatively inexpensive method of monitoring vine nutrition. However, there has not been sufficient work done on this procedure to establish nutrient level standards. Without standards it is difficult to ascertain whether the data are high or low for that particular time of the season.

Sap analysis was mentioned by nine people as an area that warranted research funding.

This diagnostic technique was highlighted as a measuring method that could solve one of the main impediments associated with tissue analysis, which is the long turn around time for results.

Growers often receive tissue analysis results after they have applied fertilizer. This means the results from tissue analysis are only valuable for fertilizer decisions to be made next season, or for identifying trends when data has been collected over a long period.

Some respondents were also concerned that nutritional deficiencies identified by tissue analysis could only be responded to, rather than prevented.

Sap analysis is able to supply same day results; the availability of this diagnostic tool would greatly aid growers' in-season fertilizer decisions. The ability to receive timely feedback on fertilizer applications would be especially useful for fertigation users who would be able to respond to the results with precision. It was suggested specific guidelines for sap analysis would need to be developed.

Fertigation

Fertigation is the method by which soluble fertilizer is delivered to the vines via the irrigation system, usually drip.

Six growers who used fertigation expressed their frustration at having the ability to place accurate amounts of fertilizer during the season, yet were unsure on how to maximize the use of this precision delivery of nutrients to the vine. They indicated they would like more information and research on the best way to use fertigation to its maximum potential.

In interviewing growers, there were a number of issues concerning fertigation of wine grapes, including:

- The difficulty in operating large fertigation systems.
- Which fertigation system was the 'best' option?

- Which fertilizers were the best choice for a fertigation system in terms of easy of use and efficient uptake?
- Should the fertigation system be separately designed to the irrigation system or retrofitted?
- Simple and quick methods for measuring uniformity distribution of fertilizers.

Soil Fertility and Soil Chemistry

Fertilizer use is closely linked with soil management practices – the improvement and maintenance of soil fertility and the balance of organic and inorganic components. Some growers are finding it difficult to effectively manage their nutrition program in the vineyard without a good understanding of the soil.

A number of participants (9) expressed a desire to learn and understand the methods used to improve soil fertility. Methods cited include adding organic matter to improve soil structure and inoculating soils with microbial cultures.

Only one participant explained why he wanted to undertake such practices, which was to improve nutrient and water availability to the plant. Others inferred that improved soil fertility would enhance nutrition uptake by the plant.

Six people wanted research to be undertaken that would increase our understanding of soil/nutrient/irrigation interactions.

One participant gave the following two examples:

- Examining the implications of carbon and nitrogen cycles on soil pH and soil structure
- Investigating the redistribution of nutrients within soil profiles as a function of irrigation management.

Five participants wanted to know the best chemical and physical forms of fertilizer to use i.e. liquid, granular or foliar, nitrate or ammonium. They wanted different products to be evaluated based on uptake efficiency and impact on soil chemistry i.e. significant changes in pH or salinity. They were also interested in the value-for-money perspective on these different forms of fertilizer.

One respondent believed that soil cation ratios need to be examined given that they were currently being touted as an important aspect of soil chemistry and nutrition management. However, according to this participant, there is little scientific research to support these claims. This participant believes more research is needed to clarify the role, if any, cation ratios play in viticultural production.

Sustainability

There is increasing pressure on horticultural producers to become environmentally aware and responsible for ensuring they are managing their vineyards in a sustainable manner. This mainly relates to water, nutrient and chemical management.

Two surveyed participants felt that increases in soil acidification through processes associated with viticulture needed to be examined to ensure the long term sustainability of viticultural land and to reduce environmental impacts.

Six participants would like information or help in applying the minimal amount of fertilizer possible to the vineyard, although the reasons for this request were not always clear. It is possible that growers want to reduce input costs or minimise fertilizer leakage from their vineyard to reduce negative impacts on the environment.

The latter reason is supported by feedback from five participants. They wanted more information and research on ways to measure leaching of nutrients from the vineyard. It was not evident that any of the respondents were currently collecting leaching samples and testing for nutrient concentrations.

One participant thought we should invest in research and development of sustainable nutritional management practices. He thought the Australian wine industry would be able to use 'sustainable viticulture practices' as a marketing tool in the global wine market. He believed it would help to further Australia's green reputation, which would aid export sales.

In relation to this, it is interesting to note the Winemakers Federation of Australia (WFA) has recently launched a wine industry stewardship program (AWIS) to achieve and demonstrate environmental stewardship to enhance 'Wine Brand Australia' through a range of initiatives.

Composite and Organic Fertilizer Products

Fertilizer manufacturers have joined the trend in the consumer market place by developing composite fertilizer products that contain a number of nutrients, in an easy-to-use form, attractive packaging and often with claims of improving specific aspects of wine grape production, for example grape colour.

Similarly, there have been many products entering the market that are organic (or claim to be organic) and provide benefits (often unsubstantiated) to the user.

It was a common complaint by surveyed participants that they were unsure of the effectiveness or value of certain 'organic' type fertilizers including kelp, seaweed and compost teas. These products were often referred to as 'snake oil'.

Twelve surveyed participants indicated they would like hard scientific data on what the products could 'do' for their soil, fruit quality and yield. Other growers felt that better extension material should be available that outlines the questions growers need to ask before purchasing and applying such products.

Some of the growers wanted to be able to trial the application of organic fertilizers and their potential affect on crop parameters or soil fertility; this is discussed further under the heading 'Extension'.

The Role of Nutrition in Grape and Wine Quality

Wine grape growers manage their vineyards using the inputs of irrigation, nutrition and pruning as the major 'levers' in determining grape yield and fruit quality. It is by no means clear to the wine grape growers in this region how each of these inputs broadly interact with each other during the season and over a number of seasons. It is even more challenging for the grower to relate nutrition management in their own vineyard, on their own soils, with specific rootstocks and irrigation systems.

The role of nutrition in grape and wine quality was mentioned by fifteen people as a good candidate for research funding. Three people clearly identified the need for research that examines the possible influence of nutrition on secondary metabolites, such as phenolics, in red grapes and red wine, as a good project for the industry to undertake.

Four respondents felt that valuable information could be generated from a regional benchmark that correlates petiole results with fruit composition.

It is interesting to note that a representative from CCW in the Riverland embarked on a project several years ago, correlating petiole data from all of Hardy's growers with berry composition data (colour, baumé, acid pH) to see what messages can be learned from this approach.

Plant Removals

Wine grape growers import nutrients into their vineyards on an annual basis by applying fertilizers. At harvest, a certain amount of nutrient is removed or exported from the vineyard in the fruit. Some nutrients need to be replaced for the following season, whereas other nutrients may be in ample supply in the soil and therefore do not need to be applied each year.

Three participants mentioned the potential usefulness of crop removal values as a tool that could be used each year for fertilizer decisions. A few of these participants commented that they were not satisfied with the current crop removal values for nitrogen as they believed the values needed to be linked to specific varieties.

One grower indicated that he understood such rates need to consider the loss of fertilizers via leaching, erosion and soil fixation and the values only worked if you had a good understanding of soil content before adding fertilizers.

Rootstocks

Most vineyards in this region are planted on a range of rootstocks for the protection against soil pests and pathogens, adverse soil conditions (chemistry) and to improve the vigour of the grape variety. It is difficult for grape growers to managed specific rootstocks if they are not aware of the effects they have on canopy vigour and wine grape quality.

Five respondents thought it would be a good idea to review the influence rootstocks have on the nutrient content of grape vines.

One of these respondents made the comment that he thought rootstocks were influencing the timing of nutrient mobilization in the vine rather than the amount of uptake. For example rootstock A may cause mobilisation of nitrogen in spring, whereas rootstock B may cause mobilisation of nitrogen in spring but continue through to veraison in summer.

Modelling

Wine grape growers are forever trying to gain an understanding and control of their vines to achieve a desired outcome. Modelling is often used by researchers to link and quantify causes and responses in a production system. Models are a useful analytical tool but can be complex and may have limited applications for growers to use in their day-to-day management of the vineyard. They may however become more important in future.

Modelling nutrient behaviour in vines was suggested by three participants.

One respondent thought it would be useful to design a model that allowed farmers to drive the vine to a defined finished product, rather than respond to the vine. He went on further to explain that there was still more research needed into what 'finished product' we were aiming for in regard to mineral composition. He believed the industry had a very good understanding of the nitrogen profile required for fermentation, but we still needed to investigate the mineral characterisation of berries that enhance aroma, flavour, colour etc.

Potential uses for such a model would include winery intake logistics, predicted berry composition and ripening rates. The model would need to be holistic in that it takes into account irrigation, soil type etc.

Extension

The link between pure research and the users of that research has traditionally been done via extension services to growers, either through the public sector (for example DPI), industry associations (using levy funds) or the private commercial sector (for example fertilizer re-sellers and independent consultants).

Five surveyed participants felt that the industry should focus on producing good quality wine grape nutrition extension services/material (e.g. Fact Sheets). These resources need to contain concise messages and be easy to read and simple to follow. However, it was noted by respondents that extension and the communication of information was always a difficult task, regardless of the topic.

One suggestion for extension services was to develop a list of questions or statements that reflect best practices in regard to nutrition management. Growers could use such a document to identify practices or knowledge that they need to undertake or acquire in order to improve nutritional management on their vineyard.

Eight growers commented that they would like to learn how to trial different nutrition programs. These eight growers discussed the difficulty they had with setting up a trial, understanding what they needed to measure and interpreting the results.

It was suggested by one person that this could be addressed through the development of 'On-Farm' type programs and or literature that outlines how a grower may go about setting up a nutrition trial on their vineyard.

Ten survey respondents wanted more information on the best timing for fertilizer application. There was some debate about whether this type of information came under the extension banner or whether it was a research issue.

Some participants believed this information was already available but needed to be better communicated to growers. Other participants thought it was a topic that required more research. Often those who wanted more research on this issue were using fertigation and they felt current knowledge was not well-suited for fertigation.

Eight growers wanted information on the quantity of fertilizers to apply to specific wine grape varieties. It was not always clear why the growers wanted to know more about quantities, whether it was to achieve better fruit quality, more control over canopy growth, better environmental outcomes or to improve the gross profit per hectare (or a combination of these).

Two respondents thought this was a research issue, one believed this information could be gained from benchmark studies and one thought this could be gained from the databases held by wineries, private consultants etc.

Two participants (non-growers) felt that growers in the Murray Valley region may be under fertilising their vines. They believed that some growers had taken the 'use less fertilizer' message too far and had not found the middle ground.

Growers acquired information on wine grape nutrition from a range of sources. These are listed below in order of popularity:

- Their own past experience experimenting with different fertilizer programs,
- Talking to other growers,
- Printed literature,
- Consultants, resellers or winery personnel.

Interestingly, most growers who sourced information from resellers or consultants used this as there only source of information. This indicates that there is a sector of growers who like to only access information one-on-one.

Response summary

The following Table summarizes the survey results showing the number of times the statements were referred to or discussed in the 40 surveys undertaken in the study.

Table 1. Response summary

Statement	Mentioned in interview
Undertakes soil and petiole tests	10
Have faith in soil and petiole tests	3
Concerns with the timing of petiole tests	2
New petiole standards should be developed	10
Believe standards should be performance based	2
Information & research on macro elements (including new standards)	2
Information & research on micro elements (including new standards)	2
Believe petiole standards should be developed for different soils, scions, rootstocks and regions	5
Believe standards should be variety specific	2
Believe standards are only a guide	2
Industry accepted fertiliser program	2
More research into blade analysis	2
Explore nutrition databases for new petiole standards	4
Information & research into utilising precision fertigation	6
Information & research on minimal fertiliser use in a vineyard	6
Information & research on leaching	5
Develop Australia's sustainability image for marketing purposes	1
Information & research on soil acidification	2
Hard data on 'snake oil' fertiliser products	12
Information & research on ways to improve soil fertility	9
More research into soil/nutrient/irrigation interactions	6
Information & research on the best chemical/physical forms of fertiliser	5
Better extension material	5
Trial nutrition ideas	8
Information & research on the timing of fertiliser application	10
Information & research on fertiliser amounts that is variety specific	8
Fertiliser use is too low	2
Research into the role nutrition plays in grape and wine quality	15
Benchmarking and scoping studies that examines petiole results and berry composition	4
Revised crop removal values	3
Develop sap analysis standards	9
Information & research on the influence rootstocks have on wine grape nutrition	5
Modelling the behaviour of nutrition in the vine	3

Summary

- Much of the response from the participants was related to vine petiole and soil standards, as this aid to vineyard management was seen to be the basis on which nutrition decisions were made. Many felt that the published standards needed to be revised and more focused on wine grape varieties in this region.

  This may suggest that wine grape growers (generally) are either placing too much emphasis on this analytical tool (and its accuracy) in their nutrition decision making or the interpretation of the data and the subsequent recommendations are providing a degree of confusion.

  There is perhaps a general lack of understanding by growers of the limitations of such analytical tools (including petiole and sap analysis) and a lack of appreciation of the magnitude of cost and resources required to revise the current standards.

- Fertigation is new to many wine grape growers in this region. Like most advances in precision technology, it requires a lifting of management skills and knowledge to maximize the benefits of the system. A number of respondents indicated that more resources need to be engaged in this area of extension.

- The forms of fertilizer and the timing of fertilizer application ranked highly with the respondents and many growers wanted 'hard data' on the costs and benefits of composite and organic type fertilizer products.

  There are some components of this topic that can be addressed through industry extension programs, such as seminars and workshops, however some of the more commercially sensitive areas of scrutinizing specific fertilizer products may not be appropriate at these industry forums.

- There was a great awareness of the impacts of fertilizer use on the soil and water environment, particularly in regards to nutrient leaching, better targeted fertilizing and increasing soil fertility in vineyards. Aspects of this are currently being addressed through a range of industry initiatives, but may require more resources.

- The specific topic of vine nutrition as it s relates to wine grape quality ranked very highly amongst the respondents. This included the relationship between specific nutrients and the production of secondary metabolites in red wine grapes.

  Related to this topic were the issues of rootstock effects on wine grape nutrition and determining just how much nutrient is exported from the vineyard in the fruit each season (kg/tonne) for specific varieties.

SCHOLEFIELD ROBINSON
MILDURA PTY LTD



GARTH SWINBURN
Senior Consultant
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APPENDIX 3

GRAPEVINE NUTRITION AND FERTILISER USE

BACKGROUND AND DECISION MAKING IN THE VINEYARD

Presented by Ben Thomas & Ben Robinson
of Schofield Robinson Horticulture Services Pty Ltd

Two sessions

Session one ➤ Nutrients needed by grapevines and their functional roles
- ➤ Influence of nutrients on grape and wine quality
- ➤ Uptake of nutrients from the soil and mobility of nutrients within the vine
- ➤ Nutrient deficiency symptoms
- ➤ Soil & plant tissue analysis
- ➤ Choosing a laboratory

Session two ➤ Discussion of fertilisers and their composition
- ➤ Application methods
- ➤ Soil acidification
- ➤ Value for money in fertilisers
- ➤ Fertiliser program - mature vineyard, establishing & organic approach
- ➤ Benchmarking

TUESDAY SEPTEMBER 14TH
Sunraysia Horticultural Centre
Corner of 11th St & Koorlong Ave

Session one: 8:30am - 12pm
Session two: 1pm - 4:30pm

FRIDAY OCTOBER 15TH
Sunraysia Horticultural Centre
Corner of 11th St & Koorlong Ave

Session one: 8:30am - 12pm
Session two: 1pm - 4:30pm

Murray Valley
Winegrowers' Inc

TO REGISTER

☏ Phone the Murray Valley Winegrowers' office on **50 213 911**
or Fax on **50 232 335**

☑ *Please tick which day & sessions you would like to register for:*

☐ I would like to attend the workshop on Tuesday September 14th
- ☐ Session one
- ☐ Session two

☐ I would like to attend the workshop on Friday October 15th
- ☐ Session one
- ☐ Session two

Name(s)……...

Phone number……..