

Final Report

Extension of technologies and best management practices to the Australian table grape industry

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Australian Table Grape Association

Project code:

TG19000

Project:

Extension of technologies and best management practices to the Australian table grape industry (TG19000)

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Public summary

The Australian table grape industry is made up of approximately 400 corporate or family run entities, producing table grapes on 25,000 acres across Australia's mainland states and the Northern Territory. Annual table grape production is approximately 230,000 tonnes, with a gross production value of over \$700 million in 2019, rising to \$918 million in 2023. Despite the challenges of COVID19, shortages of seasonal labour, environmental pressure, regulatory changes, rising production costs, reduced availability of chemicals, a decline in vineyard health and unseasonal weather events, the export value of \$557 Million in 2019 stayed stable into 2023. Most exports come from Victoria, although the landscape is changing with producers in central Queensland and Western Australia commencing exports as well.

In 2021 the inaugural national extension team was established (TG19000) to:

- Create positive change in priority areas, high-quality production, biosecurity/plant protection, climate variability and exports through delivery of communications and extension capability and
- Provide opportunity for engagement between industry, producers, and relevant stakeholders.

These outcomes are aligned with the current and previous Table Grape Strategic Investment Plans.

Between March 2021 and February 2024, TG19000 delivered the following outputs in line with those primary objectives:

- Interacted with nearly 1700 producers and visited over 300 farms across all Australian growing regions.
- Undertook 89 vineyard surveys to benchmark practices and identify areas for change.
- Assisted producers with sampling and analytics for various vine health concerns.
- Interacted with approximately 800 agronomic service providers and specialists each year.
- Delivered 53 events (field days, workshops etc.)
- Established five field demonstration trials to address a range of current and anticipated vine health issues.
- Contributed to 46 articles in *The Vine* magazine and fortnightly contributions to *Pick of the Bunch* e-news.
- Produced 12 factsheets, 10 videos and 9 tools.

Additionally, the project team represented table grape producers on several industry relevant committees, established multiple communities of practice (CoP's) and developed networks to address emerging industry issues.

The strong extension and development program allowed producers and a broad stakeholder base to build knowledge, awareness, and skills, and enhance their aspiration to change (KASA). The team increased industry cohesion, and ensured access to information regardless of background, technical capacity, or geographical location. Feedback indicates that TG19000 delivered a successful extension and development project and that producers feel heard.

Recommendations for future table grape industry extension and development programs include:

- Implement the Extension Strategy developed by TG19000.
- Ensure the program continues to provide relevant, quality, and timely information to engage industry, build industry trust and cohesion, and enhance adoption of available programs e.g. through events, factsheets, videos and tools.
- Collaborate with other industries to leverage and amplify impact- learning and sharing concepts and ideas.
- Continue with the CoP concept and local viticultural groups to deal with cross industry issues and to mentor new entrants into the industry.

Keywords

Australian Table Grape Association; ATGA; extension; development; best management practice; vine health; pest & disease; biosecurity; sustainability; innovation.

Introduction

The Australian table grape industry is made up of approximately 400 corporate or family run entities producing table grapes on 25,000 acres across Australia’s mainland states and the Northern Territory. Annual table grape production is approximately 230,000 tonnes, with a gross production value of over \$700 million in 2019, rising to \$918 million in 2023. Despite the challenges of COVID19, shortages of seasonal labour, environmental pressure, regulatory changes, rising production costs, reduced availability of chemicals, a decline in vineyard health and unseasonal weather events, the export value of \$557 Million in 2019 stayed stable into 2023. Most exports come from Victoria, although the landscape is changing with producers in central Queensland and Western Australia commencing exports as well.

Despite the significant economic value of the table grape industry there was no national extension and development service. TG19000 was initiated to address this gap. The objective of the project was to maintain and improve the Australian table grape industry’s sustainability and profitability through the development and delivery of industry extension and development activities.

These activities were built to ensure the knowledge and technologies produced through the Hort Innovation table grape R&D program and other relevant research had an increased likelihood of adoption by industry participants. Industry extension and adoption have been critical elements of the implementation of the Australian Table Grape Industry Strategic Investment Plan’s actions to address issues across the supply chain aimed at better managing costs and risks, improving yields and quality and market development.

Methodology

The TG19000 project team were guided by the initial project plan and then used a range of approaches to extension and development depending on the audience, considering producer and other stakeholder, issues, needs and attitude.

A team with experience in research, development and extension was employed by ATGA to:

- Develop an extension and best management work plan with six-monthly reviews under the guidance of a Project Reference Group (PRG).
- Establish multiple Communities of Practice (CoPs) and engaged and consulted with a wide variety of other stakeholders, using the stakeholder engagement plan.
- Identify best management practice at project outset, via a producer survey.
- Represent the industry on a range of relevant industry committees.
- Establish a Rapid Response Framework to address vine health issues such as Restricted Spring Growth (RSG) and associated diagnostics.
- Establish field demonstration trials on a variety of vine health issues (current and future).
- Provide industry development and extension services at a regional level in a strategic and coordinated manner including:
 - Events – workshops, field days and regional forums over the life of the project to inform participants of research, technologies, and Best Management Practices (BMPs) relevant to growing and producing table grapes.
 - Industry tools developed to facilitate the commercial adoption and adaptation of research outcomes and extension of technologies.
 - Technical articles written for the industry national magazine *The Vine* and the ATGA’s e-newsletter *Pick of the Bunch*.
 - Videos to further extend information portrayed at field days or on issues that require improved effort by the relevant parties.
 - Fielding producer enquiries/interactions and undertaking farm visits to address issues and assist with adoption of new technologies/best practice.
- Assist in the implementation of a monitoring and evaluation (M&E) framework to track program delivery and impact through TG19004.
- Liaise with Hort Innovation personnel, including the Extension and Adoption unit, to amplify project impact.
- Facilitate the R&D feedback loop.

Results and discussion

ATGA successfully delivered achievement criteria and outputs as part of the Extension of Technologies and Best Management Practices to the Australian Table Grape Industry project, TG19000.

As part of the project, TG19000:

- Visited table grape growing regions throughout Australia.
- Surveyed producer management practices.
- Interacted with over 1600 producers and conducted over 60 farm visits.
- Held 53 events (workshops, field days, forums, meetings, community of practice).
- Contributed to 46 technical and industry articles in the Vine magazine through the communications project TG18004.
- Had input into fortnightly editions of the industry newsletter, *Pick of the Bunch*.
- Produced 12 factsheets, 9 tools, and 10 videos to assist adoption of better practices.
- Held 5 field demonstration trials.
- 2533 samples collected for diagnostic analysis, mainly regarding Restricted Sprin Growth (RSG)
- Prepared the Table Grape extension strategy for 2024 and beyond.
- Attended industry development, training, and information sessions.
- Representing the ATGA and its’ producers on several industry relevant committee
- Initiated multiple communities of practice (cop’s) e.g., Mallee Horticultural Technical Network (MHTN) as well as networks to address seasonal labour and flood relief issues.

As a result of these activities, Australian table grape producers now have access to a wide range of up-to-date information in a variety of formats. This will assist producers to be more sustainable and future-proof their businesses.

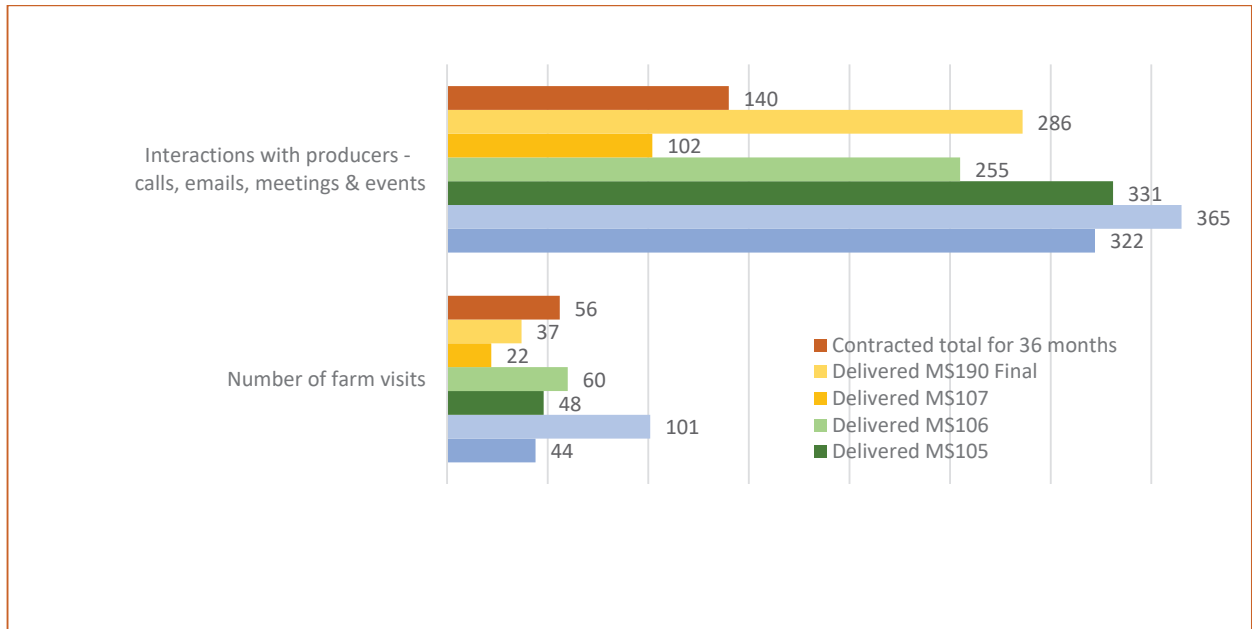


Figure 1: TG19000 Interactions with producers – contracted vs delivered.

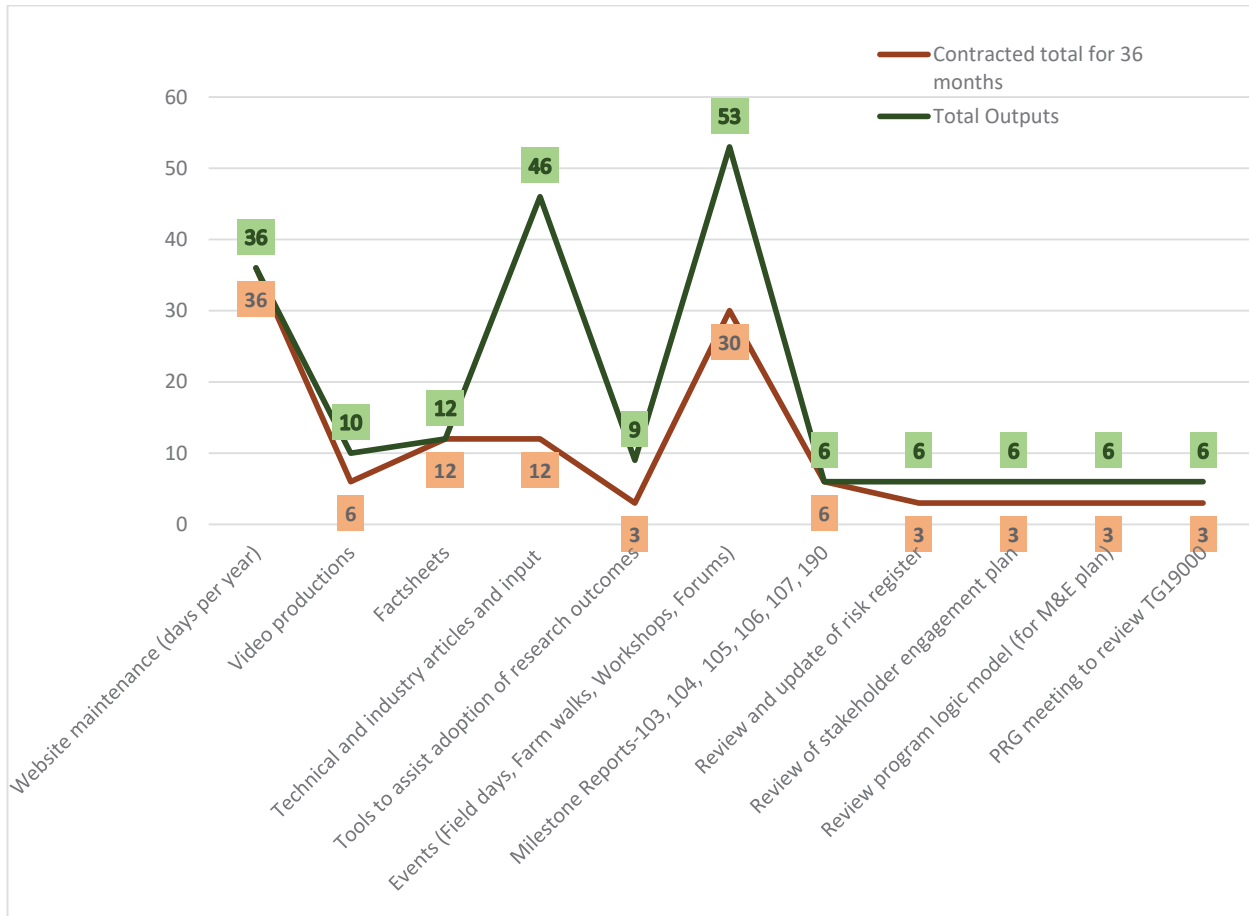


Figure 2: TG19000 Outputs – contracted vs delivered.

Outputs

Table 1. Output summary.

Output	Description	Detail
All activities and topic selection in the work plan and outlined below as outputs were strategic and based on current or future issues of concern - requested, suggested, or anticipated by producers, the PRG, the team or grape industry service providers. These stakeholders are also the intended audience.		
Annual national extension and best management practice work plan: 3 of each contracted 6 of each delivered	Annual review of the work plan delivered in milestones and to the PRG.	Six-monthly reviews of: Annual work plan - including Gantt chart Stakeholder engagement plan Risk management plan Program logic
Farm visits and interactions with producers:	The audience were levy-paying producers. Face-to-face, email and phone communications. Some are initiated	Direct communication is a highly valued source of information for levy payers. Topics include labour, water, new technology, yield estimation, trade, export requirements

<p>56 contracted 312 delivered</p> <p>Producer phone/email enquiries, including at meetings and events</p> <p>140 contracted 1661 delivered</p>	<p>by producers, others initiated by the TG19000 team.</p> <table border="1"> <thead> <tr> <th>Milestone</th> <th>Interactions</th> <th>Visits</th> </tr> </thead> <tbody> <tr> <td>MS103</td> <td>322</td> <td>44</td> </tr> <tr> <td>MS104</td> <td>365</td> <td>101</td> </tr> <tr> <td>MS105</td> <td>331</td> <td>43</td> </tr> <tr> <td>MS106</td> <td>255</td> <td>60</td> </tr> <tr> <td>MS107</td> <td>102</td> <td>22</td> </tr> <tr> <td>MS190</td> <td>286</td> <td>37</td> </tr> </tbody> </table>	Milestone	Interactions	Visits	MS103	322	44	MS104	365	101	MS105	331	43	MS106	255	60	MS107	102	22	MS190	286	37	<p>(audits, export registration) biosecurity, best practice management, pest and disease management, crop monitoring, chemical availability, chemical use, export MRLs, residue testing, flood recovery, Hort Innovation projects and more.</p> <p>Emails from the team sent via the CEO are important for engaging hard-to-reach growers who only read <i>Pick of the Bunch</i> sporadically and may miss posts on social media.</p>
Milestone	Interactions	Visits																					
MS103	322	44																					
MS104	365	101																					
MS105	331	43																					
MS106	255	60																					
MS107	102	22																					
MS190	286	37																					
<p>Events: field days, workshops, and regional forums:</p> <p>30 contracted 53 delivered</p>	<p>The audience were producers, agronomic service providers and specialists.</p> <p>Events were held in all major growing regions across Australia as face-to-face, online or hybrid events</p> <p>Most events evaluated using Survey Monkey</p>	<p>During 2021, events were presented online due to Covid travel restrictions but nonetheless well attended.</p> <p>2022-23 saw a strong return to face-to-face events, as well as continuation of on-line or hybrid events, with positive survey feedback. Many survey responses agreed that <i>more events like this should be held</i>.</p> <p>Topics: labour, automation, spray application, pest management, yield estimation, quality.</p> <p>See Appendix 1 – Events</p>																					
<p>Fact sheets: 12 contracted 12 delivered.</p>	<p>Distributed at events and farm visits Australia wide and available online www.australiangrapes.com.au</p>	<p>Topics: Labour, Covid, Food safety, Maturity, Pest and disease, Spray drift.</p> <p>See Appendix 2 – Factsheets</p>																					
<p>Tools to aid practice change: 3 contracted 9 delivered</p>	<p>Shared at events and farm visits Australia wide.</p> <p>Available as hardware (*) or digitally (#)</p> <p>www.australiangrapes.com.au</p> <p>Audience: All tools are for producers except the EHI tool which is for consultants and other PIBs.</p>	<p>Ongoing updates to the MRL app reported each milestone as a tool (# - 570+ downloads of the app. Example of use - 185 users between Jan-May 2023 averaged 11 minutes per use of the app).</p> <p>EHI tool (#)</p> <p>Cost comparison tool for fruit fly baiting (#)</p> <p>Sprayer maintenance checklist (#)</p> <p>Sonic bath for cleaning sprayer nozzles (*)</p> <p>Field kit for spray application (*)</p> <p>Benchtop nozzle calibrator (*)</p> <p>See Appendix 3 – Tools</p>																					
<p>Videos: 6 contracted 10 delivered 4 still in production</p>	<p>Ten videos produced in collaboration with TG18004 & TG22001, available online:</p> <p>www.australiangrapes.com.au</p> <p>www.facebook.com/AustralianTableGrapeAssociation</p> <p>https://www.instagram.com/austablegrapes/</p> <p>https://ca.linkedin.com/company/australian-table-grape-association</p> <p>https://www.youtube.com/@austablegrapes</p>	<p>Video topics: Labour, Crop monitoring, Pest and disease, Sprayer maintenance, Spray application</p> <p>See Appendix 4 – Videos and views</p>																					
<p>Technical articles: 12 contracted 46 delivered</p>	<p>12 editions of the quarterly industry magazine <i>The Vine</i></p> <p>800-900 print copies are sent.</p>	<p>Topics: Labour, Mental health, Food safety, Quality assurance, Marketing, Maturity, MRLs,</p>																					

	The digital edition reaches an average of 850 reads per edition.	Biosecurity, Vineyard hygiene, Sustainability, Responsible farm waste disposal, Pest & disease, Soft chemistry, Optimising spray application, Innovations in agriculture - new technologies, robotics, protected cropping. TG19000 updates in each edition. See Appendix 5 – Technical Articles.
Social media, E-news and direct email: Not contracted	e-news <i>Pick of the Bunch</i> Facebook, Instagram, LinkedIn, and Twitter WhatsApp for the MHTN CoP Emails from the CEO	Contributions to each fortnightly <i>Pick of the Bunch</i> e-news. ATGA social media used to notify the producer community; (e.g. to send timely disease alerts), and to extend the reach of TG19000 outputs. The CoP use WhatsApp to share information, raise questions and for discussion, and for event notices. Sensitive content is distributed via email from the CEO.
Representation: forums and advisory panels N/A contracted (not quantified) 194 delivered 73 initiated by ATGA 121 externally organized	The project represented the interests of levy-paying producers and the ATGA. Most of the committees were externally organized, however the TG19000 team saw a need to establish and lead committees and the Communities of Practice to address specific industry-related issues.	ATGA initiated: Sunraysia Seasonal Worker network Flood Support Local viticulture industry group MHTN CoP for scientists. CoP for agronomic service providers. Committees – Other: Biosecurity –Consultative Committee on Emergency Plants (CCEPP), Plant Industry Forum Committee, DAWE Xylella working group, local Greater Sunraysia Pest Free Area working group, Urban Plant Health Network, Biosecurity Extension Community, National Phylloxera Management Action Plan Committee, National Grapevine Collection group, Oriental Fruit Fly exercise planning group Consultative panel providing input to the Independent Review of the Pesticides and Veterinary Medicines Regulatory System. COVID-19 stakeholder committee led by Agriculture Victoria Fruit Fly Murray Valley committee (chair) Horticulture Industry Network (Agriculture Victoria) Mallee CMA climate change in horticulture reference group MDBA Sunraysia and Lower Darling Community Forum Ad Hoc State and national horticulture industries VAMMVA

<p>Best practice and vine health surveys: 1 contracted 1 delivered</p>	<p>2021- 56 initial surveys to help establish a production activities baseline 2022- 33 patches surveyed to investigate possible links between Vine health (mainly RSG) and production practices Data was analysed and. de-identified results were aggregated to share with producers.</p>	<p>The data was used to explore Best Management Practices. This was used to inform the project work plan and allow tracking adoption over time. Some initial data were presented to the PRG as a ‘heat map’. The TG19000 best management practice table, showing baseline and progressive practices, with links to outputs, is the first step to benchmarking the industry. See Appendix 6 – Best Management Practices</p>
<p>Vine health response framework</p>	<p>A multi-step procedure for responding to emerging vine health issues.</p>	<p>Scope the issue – extent/severity/symptoms Seek input from the research community Ascertain capability/accreditation of laboratories to undertake diagnostic testing Seek input from agronomic consultants and viticulturists via the Agronomic CoP Facilitate diagnostic testing Data management Communicate with table grape producers Survey of producer practices Review relevant literature See Appendix 7 – Vine Health Response Framework</p>
<p>Vine health demonstration trials: Not contracted 5 delivered</p>	<p>Five demonstration trials were established on commercial vineyards in response to producer enquiries and discussions about efficacy of alternatives to Dormex® and chlorpyrifos and potential causes of RSG. Data collected from each site was shared with levy payers and agronomic service providers. Three open field walks were held.</p>	<p>Dormancy breaker trial: comparison of 10 dormancy breakers plus untreated controls in Red Cliffs, 2022-2024. Three field walks attracted 42 attendees and summary reports were provided to the collaborating companies. Mealybug control post-harvest: comparison of 10 post- harvest treatments plus untreated control in Robinvale 2021/22. Results reported in The Vine. No field walks were held as low population across the entire trial obscured treatment effects. Carbohydrates, mites, and micronutrients: comparison of RSG symptomatic and non-symptomatic vines in Red Cliffs and Merbein, 2022/23. Preliminary data was collected and shared with the CoP and hosting producers, however the latter removed vines to redevelop before field walks could be scheduled.</p>
<p>Communities of Practice: (agronomic consultants and researchers) 1 contracted 2 delivered</p>	<p>CoPs initiated by TG19000. CoP for agronomists has now evolved into the Mallee Hort Technical Network (MHTN), with cross industry collaboration and a structured format. Sessions facilitated and coordinated to bring agronomic consultants and/or researchers together, to share expertise etc.</p>	<p>Prior to TG19000, producers deferred to their agronomic consultants for advice. The CoPs provide those agronomists with peer support, a hub for discussion, up to date information about relevant R&D, and is a conduit for resources from ATGA. Attendance at CoP events is testament to its relevance and value to members.</p>

	Topics are identified by the participants and TG19000.	
Facilitate diagnostics related to Restricted Spring Growth (RSG) Not contracted 2521 delivered	Samples were collected by TG19000 and delivered to accredited facilities to investigate possible causes of RSG.	ALTSA laboratory, Merbein South, Vic: Bacterial testing – 5 leaf samples Crop Health Services, AgVic: Virus – 157 leaf samples Phytoplasma – 25 leaf samples Root & soil mould, fungus & nematode – 6 root and soil samples Charles Sturt University, NSW: Trunk disease – 8 whole vine trunks collected and delivered for analysis SARDI, PIRSA. Entomology Diagnostics, Urrbrae, SA: Bud mites – 100 bud stick samples collected for bud mite testing AgriTechnovation, Plant Pathology Research Centre, South Africa Carbohydrates – 60 leaf and root samples ATGA: Micro-nutrient testing – 2160 readings
Facilitate investigative pathology or other testing Unquantified in contract 12 Delivered	Sampled to identify a pathogen Facilitated residue testing to ensure total usage complied with export MRLs for phosphorous acid.	Symptoms of an unknown pathogen were prevalent across Sunraysia at flowering 2022. One composite sample - confirmed as infected with bacteria <i>Pseudomonas syringae</i> – Crop Health Services, AgVic. 11 samples from vineyards treated using potassium phosphonate. Measured residues were compared with application (g/ha).
Project reference group meetings: 1 contracted 6 delivered	Project reference group	Online meetings to review project progress and seek input to the work plan.
Training	TG19000 Courses relevant to Industry development and extension activities.	See Appendix 8 – Personal Development & Training
Website maintenance: 36 days contracted 36 days delivered	Availability of information via the website was paramount to the success of the project deliverables.	See technical articles, factsheets, tools, and videos
Extension Strategy Table Grape 2024-2028 Not contracted 1 delivered	Extension strategy to inform and guide future table grape extension projects	Industry overview Vision and priorities Extension gap analysis Priorities to drive change See Appendix 9 – Extension strategy

Outcomes

Table 2. Outcome summary

Outcome	Alignment to fund outcome, strategy and KPI	Description	Evidence
Practice change: Increased adoption of R&D outputs from levy-funded research projects and changed behaviour from current practice.	Strategic Investment Plan 2022-2026: Strategy 3.1: Create positive change in priority areas, high-quality production, biosecurity/plant protection, climate variability and exports through delivery of communications and extension capability.	<u>Best practice</u> Improved ability to manage production risk and optimise performance. Better informed producer base across Australia.	Event attendance, Event evaluation, Incremental changes in producer practice since initial benchmarking survey, Feedback – producers and CoPs, Number of interactions, Information hits/ downloads, Producers requesting topics
		<u>Biosecurity</u> Improved industry preparedness for exotic pests. Initiatives can be better tailored to the table grape in dustry.	Range and types of committees TG19000 is contributing to. Elevated profile of the table grape industry on state and national biosecurity committees.
		<u>Vine Health</u> Producers are more informed about vine health. Producers are more aware of their MRL obligations.	Requests for information, Event attendance Event evaluation, Feedback – producers and CoPs , Number of interactions, Information hits/ downloads, Metrics for the MRL App
Industry development: Improved industry capability for adoption of best management practices and innovation from levy funded R&D outputs and other innovative technological developments	Table grape Strategic Investment Plan 2022-2026: Strategy 3.2: Provide opportunity for engagement between industry, producers and relevant stakeholders	<u>Stakeholder Engagement</u> Stakeholders are well informed and have input into TG19000 activities. TG19000 contributes to other relevant cross industry projects.	Requests for information, Reach on socials, and material produced by TG19000, Feedback – producers and CoPs, Number of interactions, Stakeholder-driven topics Also see TG19004
		<u>R & D reach</u> Stakeholders are aware/informed of ongoing R&D. Table grapes are on the radar of Government and private R & D providers.	Number and range of R&D presentations at events, Reach on socials, and material produced by TG19000, Elevated profile of the table grape industry on state and national committees, Collaboration on field demonstration trials
		<u>Innovation</u> Producers are more aware of new and/or more sustainable technologies. Producers can trial new technologies.	Event attendance, Event evaluation, Incremental changes in producer practice, Requests for tech info, Feedback – producers and CoPs, Information hits/ downloads, Producer driven topics

Monitoring and evaluation

The final monitoring and evaluation report was contracted by Hort Innovation as a separate project and is reported elsewhere under Project TG19004.

A selection of highlights from producer feedback collected during the project are summarized below:

- Queensland participants of regional workshops and forums thanked the team and presenters profusely, commented positively on the breadth & depth of topics and asked when the team would be back. They were very appreciative of the information packages the team brought to the session, which included material on seasonal workers, labour hire, employer and employee obligations and mental health. Additionally, producers invited the team to visit them on site.
- The evaluation feedback for Sunraysia RSG workshops showed the value of direct emails from the CEO. Eleven table grape producers out of 15 responded to the evaluation request and gave the session a 4.5 rating out of 5, and a 4.1 for the usefulness of the corresponding discussion. The session managed to increase the producers understanding of the complexity of understanding RSG by 7 points from 54 (out of a 100) to 61 (out of a 100). When asked for suggestions to improve future events, most were happy with the status quo.
- Feedback from WA
 - “Thank you for the seminar, it was good information. Even though we had a few tech issues, it was great to have everyone able to get to hear and using this new technology!”*
 - “Brilliant thing is you will fine tune and get better”*
 - “Thought the mealybug talk was very interesting, because it’s important to us at the moment”*
 - “Can’t wait for you to come back for another workshop”*
- Tech workshops Sunraysia
 - “Loved it – keep it up”*
 - “I did send a summary of yesterday to our growers who did not attend”*
 - “I think it was a great session; I love the stuff that you did”*
- In a recent ATGA comms survey, producers identified that the 2022 spray application workshops were *“a great day”* and *“please organize more events like this.”*

Case study of impact and adoption – Queensland Fruit Fly 2024

ATGA – TG19000 were very aware of Queensland fruit fly (Qfly) build-up and anticipated that high numbers would appear in grapes in Sunraysia after mid-December when berries in start to soften. The TG19000 team worked with TG22001 to disseminate information that addressed the immediate concerns or uncertainties of producers and agronomists. The following sequence illustrates the progress of support provided to producers in Sunraysia.

September 2023 – March 2024

- Alerts in almost every issue of *Pick of the Bunch* e-news.

November 2023

- Tech Breakfasts held for producers in NSW and Vic: featured RapidAim™ fruit fly traps and distributed Qfly factsheets.
- Qfly session with agronomist focussed on biology, the trapping program, and drivers & barriers to adoption.

December

- Agronomists & producers contacted ATGA – re Qfly pressure, chemical availability and overuse.

Adoption barriers identified	ATGA action – tools and factsheets
Perception that baiting is costly	Baiting Cost Calculator Tool
Poor knowledge about bait options	Updated Qfly factsheets

January

- Producers contacted ATGA with questions or suggestions about baiting, access to chemicals, identification, trapping.
- Videos created (in collaboration with a contractor, a grower & TG22001)

Adoption barriers identified	ATGA action – videos
Unfamiliar with how to mix bait	<i>Bait Like a Boss</i> Part 1 (1200+ views)

Not confident to identify fruit fly	<i>Bait Like a Boss</i> Part 2 (660+ views)
Unclear about where to land bait	<i>Bait Like a Boss</i> Part 3 (740 + views)

Distribution

- Videos on Facebook, Instagram, LinkedIn, YouTube
- Mallee Horticultural Technical Network
- Agronomists have forwarded to their clients
- Growers have forwarded to their workers
- Dissemination by Dried Fruits Australia, Murray Valley Winegrowers, Goulburn Murray Valley Fruit Fly and other agencies/organisations.

Measures of success of TG19000 information

- High number of views of each video within 48 hours of release
- Evidence of repeat views, shares and saves indicate grower willingness to adopt
- Positive feedback about videos being short (60-90 secs), funny and to the point
- Insecticide used for baiting is now in short supply in Sunraysia
- ATGA are receiving enquiries about sourcing contractors
- Other agencies have disseminated ATGA material (e.g. Dried Fruits Australia, Murray Valley Winegrowers, Goulburn Murray Valley Fruit Fly)

Recommendations

Recommendations for future table grape industry extension and development programs include:

1. Use the extension strategy developed by TG19000 to guide project activities.
2. Ensure the program continues to provide relevant, quality, and timely information to engage industry, build industry trust and cohesion, and enhance adoption of available programs e.g. through events, factsheets, videos, and tools.
3. Collaborate with other industries to leverage and amplify impact; learning and sharing concepts and ideas.
4. Continue with the Communities of Practice for agronomic service providers and for researchers, to maximise reach for cross industry issues.
5. Foster the Murray Horticultural Tech Network to strengthen support networks within the industry and mentor new viticulturist entrants into the industry.

Refereed scientific publications

None to report.

References

Not applicable.

Intellectual property

No project IP or commercialisation to report.

Acknowledgements

The TG19000 team would like to acknowledge the assistance and support of:

Table Grape Producer organisations –

- Grape Growers Association of WA Inc (GGAWA),
- Sunraysia Table Grape Growers Association (STGGA),
- Robinvale and District Table Grape Growers Association (R&DTGGA),
- Queensland Table Grape Growers (QTGG)

TG19000 Project Reference Group

TG18004 and TG22001 Table Grape Industry Communications Program

Table grape producers Australia-wide: for participating in surveys, generously hosting events, hosting demonstration trials, sharing expertise and interacting with the ATGA team.

All the many presenters who shared their knowledge, skills and technologies at events.

The agronomists, consultants and other service providers who shared their expertise and ideas.

Researchers associated with –

- Agriculture Victoria (DEECA)
- Department of Primary Industries and Regions, South Australia (PIRSA)
- Department of Primary Industries and Regional Development, Western Australia (DPIRD)
- New South Wales Department of Primary Industries
- South Australian Research and Development Institute (SARDI)
- Queensland Department of Agriculture and Fisheries (QDAF)
- Charles Sturt University (CSU)
- Australian Wine Research Institute (AWRI)

Chemical industry regulatory and field staff.

Peak Industry Bodies –

- Dried Fruits Australia (DFA)
- Murray Valley Winegrowers Inc. (MVWI)
- Cherry Growers Australia (CGA)
- Summerfruit Australia Ltd (SAL)

Rural Research and Development Corporations –

- Wine Australia
- Horticulture Innovation

Appendices

The appendices to MS 109 for project TG19000 provide detail regarding project deliverables. Appendices 1 to 5 describe outputs under the reporting period for each contracted milestone.

MS103:	March 2021 to August 2021
MS104	September 2021 to February 2022
MS105	March 2022 to August 2022
MS106	September 2022 to February 2023
MS107	March 2023 to August 2023
MS190	September 2023 to February 2024

Appendix 1: Events and event evaluations

Evaluation prior to September 2021 was recorded in project notes from verbal feedback. From September 2021-March 2024, the project team used Survey Monkey to evaluate events, in response to new reporting requirements.

MS103 Events

- In person – Emerald, QLD, 19/04/2021 - Regional forum (10 attendees incl: 7 producers, 2 ATGA) (+ 6 Farm visits)
- In person – Mundubbera, QLD, 20/04/2021 - Regional forum (6 attendees incl: 3 producers, 2 ATGA) (+ 3 Farm visits)
- In person – St George, QLD, 21/04/2021 - Regional forum (7 attendees incl: 4 producers, 1 Industry, 2 ATGA) (+ 1 Farm visit)
- In person – Swan Valley, WA, 10/05/2021 - Regional forum (22 attendees incl: 15 producers, 7 Industry) (+ 14 Farm visits)
- In person – Carnarvon, WA, 12/05/2021 - Regional forum (14 attendees incl: 10 producers, 4 Industry) (+ 1 Farm visit)

MS104 Events

- Online – Labour – AE Workshop – 07/09/21, ATGA, AgVic, (37 attendees, incl. 18 growers)
<https://www.surveymonkey.com/results/SM-PDJCDG6J9/>
- Online – QFF CoP session – consultants, and pest scouts, 16/09/2021, (12 attendees)
- Online – RSG session – 14/10/21, Scientists 12-1pm; (15 attendees)
- Online – RSG session – 14/10/21, Growers 2-3pm, (50 attendees, incl. presenters)
- RSG CoP session - consultants, breeders, and pest scouts, 28/10/2021, (18 attendees)
- RSG CoP session - consultants, breeders, and pest scouts, 19/11/2021, (10 attendees)
- In person – RSG, GVGP –, 06/12/2021, ATGA – update for growers – held at ALTSA, Merbein South, (30 attendees incl presenters and ATGA)
<https://www.surveymonkey.com/results/SM-HJ3VYG6J9/>
- In person – Grower session – Robinvale – 13/12/2021, (41 attendees + presenters)
<https://www.surveymonkey.com/results/SM-8ZGBDG6J9/>
- In person – Grower session – Mildura – 14/12/2021, (57 attendees + presenters)
<https://www.surveymonkey.com/results/SM-8ZGBDG6J9/>

MS105 Events

- Online – RSG presentation and discussion about diagnostic results 31/03/22, (21 attendees: 17 researchers and extension + 4 ATGA)
- In person – CoP Agronomists – presentation and discussion about diagnostic results, DFA, Mildura Vic, 01/04/22, (16 attendees: 12 agronomists including two online + 4 ATGA)
- In person & online – Workshop & Forum – Mixed topics, Emerald Qld, 26/04/2022, (15 attendees: 6 producers present; 5 industry / government on-line; 4 ATGA)
- In person & online – Workshop & Forum – Mixed topics, Mundubbera Qld, 28/04/2022, (15 attendees: 4 producers present+ 2 online; 1 industry/government present + 4 on-line; 4 ATGA)
- In person – RSG presentation and discussion about diagnostic results, AgVic. Irymple, 19/05/2022, (11 attendees: 3 producers, 3 industry; 5 ATGA)
https://www.surveymonkey.com/results/SM-P8ay6onbjNQZGjh7XqDpkQ_3D_3D/
- In person – RSG presentation and discussion about diagnostic results, Euston NSW, 20/05/2022, (16 attendees: 11 producers, 1 industry; 4 ATGA)
https://www.surveymonkey.com/results/SM-P8ay6onbjNQZGjh7XqDpkQ_3D_3D/

- In person & online – Vine Health, Swan Valley & Carnarvon WA, 15/06/2022, (45+ attendees: Swan Valley = 21 producers + 11 Industry; Carnarvon= 5 producers + 12 school children; Online= 4; + 4 ATGA+ 2 DPIRD)
https://www.surveymonkey.com/results/SM-hPOu3FAj0o_2Fg3QgSgETiiQ_3D_3D/
- In person – New Tech Recirculating sprayer & autonomous tractor, Cardross Vic, 26/07/2022, (27 attendees: 18 producers, 2 industry; 4 ATGA, 3 AME)
https://www.surveymonkey.com/results/SM-YlbpwzMbky5YyIv4NFkcg_3D_3D/
- In person – New Tech Recirculating sprayer & autonomous tractor, Workshop & forum, Euston NSW, 27/07/2022, (36 attendees: 26 producers, 3 industry; 4 ATGA, 3 AME)
https://www.surveymonkey.com/results/SM-YlbpwzMbky5YyIv4NFkcg_3D_3D/
- In person – Export Registration Session, Euston NSW, 08/08/2022, (87 attendees: 84 producers, & industry; 3 ATGA)
https://www.surveymonkey.com/results/SM-2TaHvYz1oK5zAxVSSaQraA_3D_3D/
- In person – Export Registration Session, Mildura Vic, 09/08/2022, (106 attendees: 102 producers, & industry; 4 ATGA)
https://www.surveymonkey.com/results/SM-2TaHvYz1oK5zAxVSSaQraA_3D_3D/

MS106 Events

- In person – Dormancy- Field walk @ budburst, Red Cliffs Vic, 19/09/22, (21 attendees: 7 producers; 9 industry / government; 5 ATGA)
- In person – Spray Application in table grapes – Workshop, Irymple Vic, 10/10/2022, (33 attendees: 18 producers; 3 service providers, 9 Presenters, 3 ATGA).
https://www.surveymonkey.com/results/SM-EGNZShFn8yV50enbNDdszg_3D_3D/
- In person – Spray Application in table grapes – Workshop, Euston NSW, 11/10/2022, (23 attendees: 12 Producers; services providers; 8 presenters; 3 ATGA).
https://www.surveymonkey.com/results/SM-aPJf_2FsO2S1rN8q6Mh9UfyQ_3D_3D/
- In person – Spray Application in table grapes – Workshop, Swan Valley WA, 19/10/2022, (33 attendees: 22 producers; 3 service providers, 2 presenters, 1 ATGA, 2 DPIRD, 3 HI).
https://www.surveymonkey.com/results/SM-6_2FyMNgQL_2BHnSBPBGXRgOKQ_3D_3D/
- In person – Dormancy- Field walk @ flowering, Red Cliffs Vic, 24/11/22, (6 attendees: 0 producers- 3 calls after event; 2 industry / government; 4 ATGA).
- Online – RSG – COP Scientists – diagnostics & discussions – 19/02/23, (8 attendees: 5 researchers and 3 ATGA).

MS107 Events

- In person – EHI workshop, Tullamarine Vic, 05/05/2023, (26 attendees: 22 Industry & service providers + 4 presenters)
- In person – CoP Agronomists – MHTN, 02/06/2023, (26 attendees: 17 agronomic service providers & 9 Industry).
[Mallee Horticulture Technical Network - Responses | SurveyMonkey](#)
- In person – Irrigation Workshop, Swan Valley WA, 13 & 14/06/2023, (Attendees: Day #1- 21 producers, 15 ind. Day #2- 17 producers, 12 ind.)
[Swan Valley Irrigation Management Workshops - 13 & 14 June - Responses | SurveyMonkey](#)
- In person – Grower forum, Swan Valley WA, 13/06/2023, (25 attendees: 21 producers; 3 ATGA, 1 DPIRD)
- In person – Business Skills for the Future Workshop, Mildura Vic, 12 & 25/07/2023, (Attendees: Day #1- 12 producers, 4 Ind. Day #2- 6 producers, 5 ind.)
- Two Online – EHI workshops, 10/08/2023 (6 attendees), 24/08/2023, (6 attendees)
- In person – CoP Agronomists – Mallee Horticulture Technical Network, 24/08/2023, (31 attendees: 21 agronomic service providers & 10 Industry)

MS190 Events

- In person – Dormancy breaker field walk 26 September. Red Cliffs. (13 attendees: 3 producers, 3 ATGA, 7 service providers)
- In person – Bitwise Agronomy; Agri Automation; Aerobotics; RapidAim, Red Cliffs Vic, 14/11/2023, (27 attendees: 18 producers, 1 industry; 3 ATGA, 4 presenters)
https://www.surveymonkey.com/results/SM-SbPiF9yhKsdw7cETNTRj7w_3D_3D/
- In person – Bitwise Agronomy; Agri Automation; Aerobotics; RapidAim, Euston NSW, 15/11/2023, (17 attendees: 9 producers, 1 industry; 3 ATGA, 4 presenters)
https://www.surveymonkey.com/results/SM-jmH60FN4YZ_2FEwQF5icUilg_3D_3D/
- In person – Export Information Session, Euston NSW, 16/10/2023, (Attendees: 43)
- In person – Export Information Session, Mildura Vic, 16/10/2023, (Attendees: 71)
- Online – MHTN: Pest & Disease information session, 12/10/2023
https://www.surveymonkey.com/results/SM-IAhbl45OB1sTsM4k_2FSGczQ_3D_3D/
- Online – Mallee Horticulture Technical Network, QFFly information session, 19/10/2023
https://www.surveymonkey.com/results/SM-RDt7DoIV08TGKN0CPkL1_2Bg_3D_3D/
- In person – Emerald QLD, 30-31/10/2023, (6 Farms, 7 Producers + Dinner Forum 4 producers)
- In person – St George QLD, 31/10-1/11/2023, (3 Farms, 3 Producers + Dinner forum 1 Producer)
- In person – Mundubbera QLD, 3/11/2023, (5 Farms, 5 Producers + Breakfast forum 5 Producers)
- In person – MHTN: UV-C technology and Irrigation management, 7/12/2023, (16 attendees)
https://www.surveymonkey.com/results/SM-kapCullL0QcKc7ThvcQDBg_3D_3D/

Appendix 2: Factsheets

MS103 Factsheets

Approved Employer

https://australiangrapes.com.au/wp-content/uploads/2022/02/AE-Factsheet_2022.pdf

Labour Hire Contractors

https://australiangrapes.com.au/wp-content/uploads/2022/02/ATGA-Labour-Hire-Company-info-sheet_2022.pdf

Employers

https://australiangrapes.com.au/wp-content/uploads/2022/02/ATGA-Employer-info-sheet_2022.pdf

Employees

https://australiangrapes.com.au/wp-content/uploads/2022/02/ATGA-Employee-info-sheet_2022.pdf

MS104 Factsheets

COVID Safety compliance & preparedness

<https://australiangrapes.com.au/covid-safe-plan/>

Food safety and quality assurance – a ten-part series on auditing processes

<https://australiangrapes.com.au/a-guide-to-quality-assurance-and-food-safety-programs/>

On-Farm Pre-Harvest Testing of Table Grapes

On-Farm Testing of Table Grapes During Picking

Table Grape Maturity Testing in a Distribution Centre

<https://australiangrapes.com.au/table-grape-maturity-testing-procedures/>

Managing the risk of Redback spiders in table grapes

<https://australiangrapes.com.au/managing-redback-spiders-in-table-grapes/>

MS107 Factsheets

Accidental spray drift into vineyards

<https://australiangrapes.com.au/accidental-spray-drift-into-vineyards/>

Appendix 3: Tools

MS104 Tools

- Checklist for Sprayer Maintenance two-page downloadable checklist
<https://australiangrapes.com.au/sprayer-maintenance-checklist/>

MS105 Tools

- MRL App – frequent and regular revisions and updates to the MRL data in the app.
<https://australiangrapes.com.au/mrls-app/>

MS106 Tools

- MRL App – ongoing frequent and regular updates
- Field Kit for sprayer calibration and configuration
- Benchtop nozzle calibrator initiated by ATGA and manufactured by Interlink (see Figure 3)
- Sonic Bath (see Figure 4)

MS107 Tools

- EHI Tool Kit
<https://australiangrapes.com.au/beneficial-insects-and-the-impact-of-some-pesticides-on-grapes-at-a-glance/>
<https://australiangrapes.com.au/beneficial-insects-and-the-toxicity-of-some-pesticides-guide/>

MS190 Tools

- MRL App – ongoing frequent and regular updates
- Queensland fruit fly treatment comparison tool,
<https://australiangrapes.com.au/queensland-fruit-fly-treatment-comparison-tool/>



Figure 3: Benchtop nozzle calibrator



Figure 4: Sonic cleaner

Appendix 4: Video productions

MS104 videos

- Green Atlas crop monitoring – Facebook Video
<https://www.facebook.com/search/top?q=green%20atlas>
- Early monitoring for long-tail mealybug (334 views)
<https://www.facebook.com/AustralianTableGrapeAssociation/videos/1077209459760667>

MS106 videos

- Sprayer maintenance (1100+ views)
<https://australiangrapes.com.au/early-season-sprayer-maintenance-tips/>

MS107 videos

- Managing fruit fly, (Time lapse)
<https://www.youtube.com/watch?v=wFISpQVIVSg>
- Optimising spray application 3 of 5 part series completed
[Optimising Spray Application: Part 1 – Basic principles](#)
[Optimising Spray Application: Part 2 – Targets](#)
[Optimising Spray Application: Part 3 – Droplets](#)

MS190 videos

- *Bait Like a Boss*, (Fruit Fly Baiting). Three completed videos in a 5-part series. The series has attracted more than 2600 views in five weeks since the first video was released (1200+; 660+; 740+).
[Bait Like a Boss Part 1 – What's in fruit fly bait?](#)
[Bait Like a Boss Part 2 – Recognising fruit fly](#)
[Bait Like a Boss Part 3 – Where to land bait](#)

Appendix 5: Technical articles

MS103 Technical articles

The Vine Magazine, Vol 17, Issue 3, August 2021

- Viticulture Biosecurity Manual (table grape specific content, review & feedback) - Plant Health Australia
- Annual ATGA biosecurity statement - Plant Health Australia (EPPRD)
- New faces look to the future
- New team on the block – ID&E report
- Operation Mealybug.
- Workshops and Workers

https://issuu.com/vine-magazine/docs/vine_magazine_august_2021

MS104 Technical articles

The Vine Magazine, Vol 18, Issue 1, March 2022

- Going online
- Goodbye 2021, Hello 2022 – ID&E report
- Limiting risk: MRLs, EHIs, and the benefits to industry & consumer,

https://issuu.com/vine-magazine/docs/18_1

MS105 Technical articles

The Vine Magazine, Vol 18, Issue 2, May 2022

- Spring Into Action – Cover story
- Out And About – ID&E report
- Cool To Be Clean – Pruning Hygiene
- Soft on Nature, Not on Results
- Soft Chemistry
- Late Season Botrytis – Pest and Disease
- A New Life for Old Grape covers & Irrigation tube
- All hands on tech – Innovations in Agriculture

<https://australiangrapes.com.au/the-vine-magazine-may-2022/>

The Vine Magazine, Vol 18, Issue 3, August 2022

- Going Green – Sustainability in Action
- Active Over Winter – ID&E report
- Big and Small Spray Solutions – Effective Ag spraying
- Spot The Difference – QFFly vs Med Fly
- Early action the key to a positive fruit fly season – QFFly
- All hands on tech – Innovations in Agriculture

<https://australiangrapes.com.au/the-vine-magazine-august-2022/>

MS106 Technical articles

The Vine Magazine, Vol 18, Issue 4, Nov 2022

- Ripe for the picking– Maturity sampling critical for success
- Ready, Set, Grow – ID&E report
- Grapevine Red Blotch virus
- At Risk – Milder season disease threats

<https://australiangrapes.com.au/vine-magazine-november-2022/>

The Vine Magazine, Vol 19, Issue 1, February 2023

- Reducing uncertainty in chemical use (WHPs, EHIs, MRLs)
- From Floods to Bugs and Everything in between – ID&E report
- Hold Firm and Harvest Right– Maturity project.
- Sharing the load–Growers speak up on benefit of reaching out.
- Quality matters– understanding food safety and quality assurance

<https://australiangrapes.com.au/vine-magazine-february-2023/>

MS107 Technical articles

The Vine Magazine, Vol 19, Issue 2, May 2023

- Unlocking potential – Cover story
- Data gathering grows insights – ID&E report
- Trading up – 2023 International promotion and marketing highlights
- Safeguarding beneficial insects in vineyards
- A season with a reason – ID&E report
- Horticulture focus for Vic regulator
- Red imported fire ants

<https://australiangrapes.com.au/vine-magazine-may-2023/>

MS190 Technical articles

The Vine Magazine, Vol 19, Issue 4, Nov 2023

- Protecting Assets- Protected Cropping – Cover story
- Future Planning ID&E Report
- Flick The Thrip- managing Chilli Thrip
- Managing grapevine disease with UV-C.

<https://australiangrapes.com.au/vine-magazine-november-2023/>

The Vine Magazine, Vol 20, Issue 1, Feb 2024

- Industry Develop Support to Extend – Cover story
- All Wrapped Up – ID&E Report
- Fruit Fly Fun Facts
- New Resources on Pest and Disease Management

https://issuu.com/vine-magazine/docs/20_1_vinemag_fin2_digital

Appendix 6: Best Management Practices – baseline survey and management plan

Baseline survey of production 2021-2022

An initial survey in 2021 at project outset established a baseline of management practices, priorities, and concerns. The main focus of the survey was to document practices. It also provided an opportunity to explore producers' attitudes and aspirations, established a benchmark for practice change and adoption, and identify some barriers to adoption.

- The survey was comprehensive, addressing agronomic practices, varieties, and inputs at the time.
- 56 producers from across Australia participated in the initial baseline survey.

The baseline survey data was summarised as a heat map and presented to the PRG. The heat map (Figure 5) provides insight into concerns about aspects of production (as they were in early 2021). It also highlights management topics that were not on producers' radars at the time. The PRG accepted the heat map as a basis for developing extension activities. Note that the degree of concern changed significantly during the life of the project.

The data was used to define Baseline, Better and Best practices (Table 3 - Best Management Plan). The Plan guided issues that TG19000 needed to focus on to support producers and shaped the design and delivery of extension activities.

TG19000 was the inaugural extension project for the industry, and the 3-year period has been too short to accurately gauge significant practice change during that time. Moreover, producers were reluctant to be re-surveyed after what seemed such a short time.

Instead of repeating the formal survey, the TG19000 team measured practice change, or intention to make change, by:

- tracking enquiries from producers and service providers
- informal surveying during farm visits or any other interactions
- evaluating each event
- recording social media hits
- recording downloads of documents

The establishment of the CoP provided a strong platform for understanding practices and practice change. The CoP and MHTN discuss management practices and introduce concepts and opportunities within each group.

During the three grueling seasons of TG19000, producers' resources were limited, making them risk averse and only receptive to changes that were imposed (eg changes to the horticultural award) or related to their highest priorities (e.g. RSG, pest and disease). By way of example, table grape producers across Sunraysia are now initiated their own Area Wide Management programs, formally and informally: sharing trap counts, assisting each other with baiting, and using the ATGA resources.

Refer to Figure 5 (Heat Map) and Table 3 (Best Management Plan) below.

Vine health survey to correlate production with Restricted Spring Growth (RSG)

During Spring 2021, restricted spring growth affected vineyards across Sunraysia, and vine health became an urgent priority. In response, the original baseline survey was adapted to explore aspects of management that may correlate with expression of RSG.

Ten producers provided details on 33 separate blocks that had were symptomatic or asymptomatic with RSG. These blocks had also been virus tested. Test results were correlated with management practices. There appear to be varietal difference in susceptibility but despite detailed analysis of the data there was no definitive aspect of management, or vine age/rootstock/soil types/water source/pest or disease pressure or geography that correlated with severity of RSG.

Data from the 33 surveys undertaken to investigate RSG were merged with the initial survey data to support the Best Management Plan (Table 3).

Final report – Extension of Technologies and Best Management Practices to the Australian Table Grape Industry (TG19000)

Grower #	State/Region	Veg. Event	Phone	Water		Marketing		Agronomy	Nursery	Social	Chemical		Birds	Moth/bug	Thrip	Spells	Pest and Disease Presence or Issues		Eco	ProDGS	Phys/phys/lect	Bior/ow	Intersted In...
				Labour	Availability	Cost	Quality				Problems	Domestic					Export	Maturity					
1	SA	V	1	0	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	SA	V	1	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	SA	V	1	3	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	SA	V	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	SA	V	3	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	SA	V	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	SA	V	1	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	SA	V	1	3	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	SA	V	1	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	SA	V	1	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	SA	V	1	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	SA	V	1	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	SA	V	1	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	SA	V	1	2	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	SA	P	1	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	WA	V	3	1	2	1	2	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
2	WA	V	3	0	2	3	3	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
3	WA	V	3	2	1	2	2	2	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
4	WA	V	1	3	3	1	3	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
5	WA	V	3	2	2	1	3	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
6	WA	V	1	1	3	1	1	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
7	WA	V	2	2	3	2	2	2	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
8	WA	V	3	3	3	3	2	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
9	WA	V	1	2	2	2	2	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
10	WA	V	1	2	3	2	3	2	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
11	WA	V	2	2	3	2	3	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
12	WA	V	3	2	2	2	3	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
13	WA	V	3	2	3	1	3	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
14	WA	V	2	2	3	2	3	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
15	WA	V	1	1	3	2	3	3	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0
1	QLD	V	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	QLD	V	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	QLD	V	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	QLD	V	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	QLD	V	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	QLD	V	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	QLD	V	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	QLD	V	1	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	QLD	V	3	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	QLD	P	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	QLD	P	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	QLD	V	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	QLD	V	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	QLD	E	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	QLD	E	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Figure 5: Management practices presented as a heat map to highlight degrees of concern in early 2021

Best Management Practice Plan – Baseline, Better and Best Practice

Topic	Baseline	Better practice (baseline plus)	Best practice (better practice plus)	TG19000 Actions
TG19000	Find out what is /observations	What could be better?	What would be best?	What has TG19000 done to address these topics
GOVERNANCE/ COMPLIANCE				
<u>OH&S</u>	Knowledge gaps of some legal obligations & requirements	Knowing legal obligations & requirements	Implementing legal obligations & requirements	<p><u>Articles:</u> ‘Sharing the load–Growers speak up on benefit of reaching out’. <i>The Vine Magazine</i>, Vol 19, Issue 1, February 2023.</p> <p><u>Workshops:</u> Euston Resort 13th Dec 2021 Mildura Golf resort 14th Dec 2021 Henrietta Childs, CEO AgPick, showcased an innovative GPS-based picking app for crops to boost productivity, assuring traceability and helping producers to meet imminent Hort Award requirements.</p> <p><u>Fact sheets:</u> COVID Safety compliance & preparedness –/2021 Approved Employer Labour Hire Contractors Employers Employees Auditing Processes- Series comprised of several mini fact sheets.</p>
<u>Sustainability</u>				
Environmental	Improving environmental sustainability is seen as an additional cost burden on the business.	Pressure prompts curiosity about operational efficiency, packaging, and waste reduction.	Pressure prompts innovation in operational efficiency, packaging, and waste reduction.	<p><u>Articles:</u> ‘A New Life for Old Grape covers & Irrigation Tube’. <i>The Vine Magazine</i>, Vol 18, Issue 2, May 2022. ‘Going Green – Sustainability in Action’. <i>The Vine Magazine</i>, Vol 18, Issue 3, August 2022.</p>
	Producers are (i) unaware of the financial potential of sustainable opportunities associated with packaging or disposal, (ii) can’t access sustainable packaging options, and (iii) are	Producers are (i) aware of the financial potential of sustainable opportunities associated with packaging and disposal, (ii) seeking out more sustainable packaging options, and (iii) willing to review	Producers are (i) pursuing opportunities associated with adoption of more sustainable packaging or disposal, (ii) using more sustainable packaging options, and (iii) have reviewed the cost-	

	cautious about non-essential change.	the sustainability of practices.	benefits of sustainable packaging and disposal.	
	Producers have very restricted access to recycling collection and processing facilities out of the region and no access locally. Consequently, some incorrect disposal methods and stock piling occurs.	Producers will transport or get transport for their recyclable waste to local collection facilities for recycling	Using only products that are sustainable e.g. recycled plastic posts or plastic covers; plastic packaging replaced by biodegradable materials.	
Economical	Producers rely heavily on third party management of their business and finances	Producers have clear business objectives, and an active process for business planning and review, and seeking options for redevelopment.	Producers are implementing a business plan and have processes in place for any required redevelopments.	<u>Workshops:</u> Business Skills for the Future Mildura Vic - 12 & 25/07/2023
<u>Biosecurity</u>	Knowledge gaps about the importance of biosecurity and implications. Knowledge gaps about what to look for and how to report.	Develop farm biosecurity plan.	Farm biosecurity plan in place/implemented.	Viticulture Biosecurity manual Committee membership (PIF, BRG, Fruit fly MV) ILO training (to assist producers) <u>Articles:</u> 'Grapevine Red Blotch virus'. <i>The Vine Magazine</i> , Vol 18, Issue 4, Nov 2022. 'Red imported fire ants'. <i>The Vine Magazine</i> , Vol 19, Issue 3, August 2023
PRODUCTION				
<u>Vineyard establishment considerations</u>				Mallee Technical Horticulture Network (MTHN) – agronomist and service provider updates and feedback to any production questions/issues/new ideas
Land availability & vineyard design	Any/all available land is used for planting	More consideration given to land used for planting. (e.g. suitability of soils; Row direction	Further consider e.g. Biosecurity in design, such as partitioning of vineyards, limiting access by fencing etc	
Soil analysis	Pre-planning or initiation of soil health measures are nearly non-existent (only some have soil surveys)	Conduct soil analysis to ascertain suitability for rootstock and varietal selection	Soil management & Ground preparation practices are of high standards (agronomic input), pre-planned & maintained.	
Ground preparation	No specific ground preparation	Ground preparation practices are		

		developed with ad hoc nutrition and Irrigation knowledge		
Varietal & rootstock selection (Climatic & regional)	Variety is selected on variety characteristics or market potential	Variety selected to suit region, climate and/or soil type	Variety selected to suit not only region but specific soil type and topography	<u>Varietal & rootstock selection:</u> Membership of Victorian and Murray Valley Vine Improvement (VAMVVIA) board <u>Climate:</u> Contributions to CMA climate change report: Implications of climates change for horticulture in the Victorian Mallee (Final Report by Anna Roberts, Craig Beverly, Michael Treeby & Geoff Park, 1st August 2022)
	Rootstock selection directed by nursery availability. (Rarely regional or climatic considerations)	Rootstocks selected on average soil composition of whole property	Consideration given to rootstock suitability to specific soil types and nutrient composition within a vineyard	
Germplasm material used	Any available Germplasm material used as pre-ordering is minimal so can only be supplied with what's left.	Moderate health germplasm material used and pre ordered	High health germplasm material used	Membership of National Grapevine Collection stakeholder committee (NGC)
Planting techniques	Planting days can be rushed leading to possible root or graft damage with inexperienced labour force	Ensuring workers are trained in how to take care at planting times	Ensuring workers do take care and follow planting procedures with continued QA measures in place	
Trellis design	Trellis design varies in width and height and structure; replanting into old vineyard sites with old trellis designs is cheaper than purchasing newer systems.	More uniform systems regarding height and width, number of wires and trellis angle measurements to produce more consistent crops	Uniform trellis design allows for development of machinery used in production/harvest etc to be easily used over all vineyards saving costs	New trellis design options discussed with: Dr Richard Smart- Private consultant Alysson Barbosa- Agronomic consultant, Perfection Fresh, Australia. Hovav Weksler- Chief Agri consultant, Sun World, Israel
	Not very eco-friendly when replacement infrastructure is required because of suitability, availability, and cost.	Suitable recycled systems designed and available	Cheaper recycled systems made more available and accessible e.g. replacing CCA posts with recycled composites	
Permanent/temporary cover	No covers or older systems used. New systems costly	Pros and cons of many systems being investigated. Newer systems becoming more user friendly.	Beneficial cost effective systems in place	<u>Articles:</u> 'Protecting Assets- Protected Cropping'. <i>The Vine Magazine</i> , Vol 19, Issue 4, Nov 2023.
Production stage requirements				Networking with scientists and breeding companies re: optimal production requirements for varieties and seasonal conditions

Pruning	Contract pruners following specific instructions from producer who is guided by timing and standard, repetitive practices. Style- Spur or Cane (Cane selection & #) Minimal inter row or vine sterilization of pruning tools.	Adjust pruning by variety and yield specs developed by relevant plant breeding companies and hygiene considerations	Producer to develop variety spec sheet proforma for the property- recording practices yield and quality data. Pruning team better educated-able to vary pruning according to spec sheet (Variety needs, Cane/spur selection for optimum bud selection.) Hygiene made a priority	<u>Articles:</u> 'Cool To Be Clean – Pruning Hygiene'. <i>The Vine Magazine</i> , Vol 18, Issue 2, May 2022.
Bud burst	Bud burst- blanket application of plant growth regulators. Little understanding of benefits of bud fertility testing / assessment.	Agronomic advice or direction on growth regulator application needs/ reduction. Better education on benefits of bud analysis for fertility	Industry shift to non-carcinogenic methods of growth regulation. Widespread adoption of early professional bud fertility dissection analysis	<u>Trials & Analysis:</u> Investigated Dormancy breaker replacements for Dormex® Demonstration Trial established Aug 2022 Field walk 19/09/22, 24/11/22
Flowering Shoot Development				Bud, Flowering and Harvest assessments throughout the 2022/2023 season on dormancy breaker demonstration trial
Canopy Management				
Leaf removal	Some minimal leaf removal around bunches & weaker shoots removed	Variety based internal foliage removed to allow access to bunches for sizing & management sprays and bunch selection programs	Heavier earlier deleafing/shoot thinning varietal specific programs followed. (e.g. just after flowering to encourage growth of canes before sunburn becomes an issue and to reduce marking of berries during early development)	Green Atlas crop monitoring – YouTube Video AgriFutures project – Bitwise Agronomy to determine yield potential <u>Workshop:</u> Tech day – Burro, Bitwise and Aerobotics –14 & 15/11/23 Red Cliffs & Euston
Cane placement	Cane placement over foliage wires once or twice per season.	Reduced need for continual cane placement	Cane placement completed earlier allowing more growth devoted to this year's canopy and next seasons cane development as no competing foliage.	
Crop development				
Berry- number	Chemical thinning and sizing	Reduced bunch number and some trimming, but still	Greater reduction in bunch number and trim to specific berry	

Bunch-selection & manipulation Crop- load & finish	Minimum crop reduction with only weaker and double bunches removed.	have unfinished and smaller berry sized fruit at end of harvest	number with all bunches able to be marketed with a possible increase in berry size	
Harvest:	Harvest timing is usually by calendar or labour availability or market demands.	Harvest timing is by minimum maturity standards.	Harvest timing is by optimum maturity standards.	<p><u>Articles:</u></p> <p>‘Ripe for the picking– Maturity sampling critical for success’. <i>The Vine Magazine</i>, Vol 18, Issue 4, Nov 2022.</p> <p>‘Hold Firm and Harvest Right– Maturity project’. <i>The Vine Magazine</i>, Vol 19, Issue 1, February 2023.</p> <p>‘Quality matters– understanding food safety and quality assurance’ <i>The Vine Magazine</i>, Vol 19, Issue 1, February 2023.</p> <p><u>Factsheets:</u></p> <p>Auditing Processes – Series comprised of several mini fact sheets.</p> <p>Maturity X 3 – Pre harvest; At harvest; DC testing</p> <p>Managing the risk of Redback Spiders in table grapes</p> <p>Inspected a possible new harvesting concept developed by Gary Nielsen – Over row moving platform to collect packed boxes of grapes in field. This needs further refinements to cater for table grape trellis.</p> <p>Tried a Non-destructive maturity sampling device developed by Rubens Technology, to determine Brix of pome and stone fruit without removal or destruction. Before it can be used in table grapes it will need considerable refinement to be useful</p>
Maturity:	Maturity is not always at minimum or optimum standards	Producers unsure of maturity sampling procedures and relying on consultants to determine this	Producers able to and do conduct correct maturity sampling procedures and adhere to at least minimum standards	
Quality assurance Food safety Auditing	QA sometimes occurs after fruit has been harvested and so is dumped into inferior or lower graded marketplaces with poorer returns	Producers knowing maturity levels and proving fruit of a good standard means fruit goes into mid graded market categories with more return	Producers providing fruit at an optimum standard means fruit goes into higher graded market category with max return	
	Unripe fruit in the market can result in consumer palates are spoiled, and they may be slow to return to this commodity	Producers have some understanding of the consequences of sour fruit in the marketplace	Producers have a good understanding of the consequences of sour fruit in the marketplace and provide fruit of optimum standard (taste/sugar levels)	
Labour	Knowledge gap in Legal obligations regarding employment of and accommodation for workers	Aware of legal obligations re wages, conditions etc.	Transparency of employment conditions and requirements. Adequate on the job training and supervision	<p>Sunraysia Seasonal worker network (ongoing)</p> <p><u>Workshops:</u></p> <p>Online – Labour - AE workshop- 07/09/21</p> <p>Euston Resort 13/12/2021</p> <p>Mildura Golf resort 14/12/2021</p> <p>Henrietta Childs, CEO AgPick, showcased an innovative GPS based picking app for crops to boost productivity, assuring</p>
	Affected by shortage of approved accommodation	Sourcing or supplying approved accommodation and transport.	Know what labour is needed for any part of the production timeline in advance	

			and make sure it is secured	traceability and helping producers to meet imminent Hort Award requirements.
	Ad hoc advertising via socials; going through Labour Hire; some AE's	Advertising early and widely for labour or contacting LHA or labour service providers early	Using a mix of labour sources (PALM scheme, Backpackers, LHA)	Online – To attract labour-19/01/22 & 2/2/22 <u>Videos & brochure:</u> To attract labour
	Complete reliance on manual labour Labour costs are expensive relative to crop value. Labour shortages have meant some crop had to be sacrificed.	Open to labour saving opportunities – using autonomous technologies.	Seeking labour saving opportunities that are more affordable. Managing and sourcing the work force ethically, proactively, and strategically throughout the year and in advance. Able to keep the workforce engaged so they stay on-farm or are available to return	<u>Fact sheets:</u> Approved Employer-Labour Hire Contractors Employers Employees <u>Articles:</u> 'Workshops and Workers'. <i>The Vine Magazine</i> Vol 17, Issue 3, August 2021.
Post-Harvest Program	Post harvest nutrition (if any) after the whole vineyard (early, mid and late varieties) have been harvested; often governed by resellers	Post harvest nutrition governed by variety and applied annually	Nutritional status established to ensure plant requirements are going to be met thru post-harvest programs	Carbohydrate and nutrient testing to establish possible links to RSG
Emergency response and recovery				
COVID	Knowledge gaps of some legal obligations & requirements	Knowing legal obligations & requirements	Implementing legal obligations & requirements	<u>Fact sheets:</u> COVID Safety compliance & preparedness – 18/11/2021
Flood	Planting into any available land incl. flood plains	Pre-emptive preparation with time and resource investment	Appropriate use of land topography	Connecting producers to Rural Financial & well-being counselling services Investigating literature and information on flood recovery of inundated grape vines
RSG	Vineyard removal without causal evidence; replanting to untreated/same ground with a different variety	Taking samples according to guidelines, sending to accredited experienced labs before making decisions, implementing better vineyard hygiene	Sourcing high standard germplasm	<u>Workshops:</u> RSG producer sessions 14/10/21, 08/12/21, 19/05/22 & 20/05/22 Mildura & Euston RSG COP sessions –14/10/21, 28/10/21 19/11/21, 31/03/22, 01/04/22
Spray drift	Limited recognition of symptoms or sources of herbicide drift. No understanding of remediation practices	Some recognition of symptoms or sources of herbicide drift. Some understanding	Good recognition of symptoms or sources of herbicide drift. Good understanding	<u>Factsheets:</u> Accidental spray drift into vineyards

		of remediation practices.	of remediation practices	
Exotic pest/ plant incursion	Knowledge gaps of identification and legal obligations regarding reporting	Knowing how to identify an exotic pest and to report it	Biosecurity measures in place	ILO Training to assist producers.
MANAGEMENT				
Irrigation management Water quantity Water quality Irrigation efficiency	<p>Most producers do not have enough permanent water allocation to sustain existing and new plantings throughout the season.</p> <p>Water purchases can be quite often ad hoc as needed.</p> <p>Mix of water products (permanent, forward lease, temporary, parking of water)</p> <p>Gaps in knowledge re impact of a changing climate and legislative changes re water availability, deliverability and allocation.</p> <p>Gaps in knowledge of irrigation design, management, and maintenance as well as plant requirements, soils, and irrigation scheduling</p>	<p>Awareness of legislative changes and requirements</p> <p>Awareness of impacts of environmental factors on water deliverability & availability</p> <p>Knowledge of irrigation design, management, and maintenance as well as plant requirements, soils, and irrigation scheduling</p>	<p>Strategic planning of future vineyard developments.</p> <p>Future proof by using more advanced and integrated irrigation, plant and soil monitoring and weather forecasting technology.</p> <p>Implementation of suitable irrigation methods and infrastructure to suit the vineyard</p>	<p><u>Committees/ Groups:</u></p> <p>MHTN – Mallee Horticultural Technical Network, developed and regularly meet</p> <p>Working with DPI VIC, DEECA, LMW and commercial water brokers re; irrigation and water availability</p> <p>Membership MDB – Lower Darling Community group</p> <p><u>Workshops:</u></p> <p>Workshop 13 & 14/06/23 Swan Valley</p> <p>Aerobotics – 14 & 15/11/23 Red Cliffs & Euston</p>
Nutrition	Fertiliser selection is influenced by price and availability and may be determined by a salesperson or owner operator.	Fertiliser selection is based on agronomist or specialist knowledge about optimum rates and/or timing and based on results from plant and/or soil analyses.	Fertiliser choice and timing aim to avoid losses due to volatilisation or nitrification. Nutrition is tailored on a varietal needs basis.	
Pest and disease management				
Integrated pest management	Knowledge of integrated pest management (IPM) is basic with limited influence on the spray program	Several aspects of IPM have been adopted.	Vineyard managed according to an informed IPDM program.	<p><u>Workshops:</u></p> <p>RSG producer sessions 14/10/21, 08/12/21, 19/05/22 & 20/05/22 Mildura & Euston</p>

Monitoring	Pest and disease monitoring is performed by an agronomist or owner operator who does not have specialist skills for identification	Regular pest and disease monitoring by skilled pest scout.	Regular pest and disease monitoring by skilled pest scout, whose recommendations are followed carefully	QFF COP session – consultants, and pest scouts – 16/09/2021 RSG COP sessions –14/10/21, 28/10/21 19/11/21, 31/03/22, 01/04/22 <i>Botryosphaeria</i> , Qfly and new chemistry workshop QLD – Emerald & Mundubbera – 26 & 28/4/22 Vine Health– In person & online – Swan Valley & Carnarvon WA – 15/06/22
	Controls are reactionary or prescriptive based on history or regional pressure.	Control strategies are often but not always in response to trapping data or pest and disease monitoring. Some are based on previous experience or a calendar spray approach.	Control strategies (type, timing) are informed by pest and disease monitoring, trapping data, day degree models, weather data or other strong IPM justification.	<u>Articles:</u> 'Operation Mealybug'. <i>The Vine Magazine</i> , Vol 17, Issue 2, May 2021. 'Late Season Botrytis – Pest and Disease'. <i>The Vine Magazine</i> , Vol 18, Issue 2, May 2022
	Monitoring P&D only as required to comply with audit requirements or export phytosanitary protocols.	Monitoring P&D complies with audit requirements and enables early intervention	IPDM program is clearly understood and documented with records to track the success of IPDM program.	'At Risk – Milder season disease threats'. <i>The Vine Magazine</i> , Vol 18, Issue 4, Nov 2022
Encouraging beneficial insects	Aware of the importance of beneficial insects but not actively encouraging any particular species.	Know what beneficial insects are active and understand that chemical choices impact beneficial insects in vineyards and making appropriate chemical choices.	Very aware of beneficial insects that are present in the vineyard and also those absent, but which could be encouraged. IPDM program includes non-chemical control options, bio stimulants and otherwise 'soft' options for pest control	<u>Fact Sheet:</u> <i>Toxicity to beneficials of chemicals used in vineyards</i> (in collaboration with CGA, SFA and AgVic). <u>Videos:</u> Managing fruit fly. QFF time-lapse Early monitoring for long-tail mealybug Disease management by increasing sprayer efficiency
Disease resistance	Disease resistance to chemicals is not well understood.	Implications of disease resistance to chemicals is understood and being managed by following disease resistance strategies.	Producer is testing to confirm whether disease resistance is present in the vineyard and using results to make appropriate chemical/management choices.	<u>Trials and analysis:</u> RSG related sampling & analysis Mealybug trial Mite trial Carbohydrates
Chemical Management				
Chemical program	Chemical use adheres to label directions (withholding periods and resistance management strategies).	Chemical program planned with consideration of MRLs in export markets & resistance management strategies	Chemical program planned with careful consideration of MRLs in export markets, resistance management and IPDM.	<u>Articles:</u> 'Limiting risk: MRLs, EHIs, and the benefits to industry & consumer'. <i>The Vine Magazine</i> , Vol 18, Issue 1, March 2022.

Selection	Chemical selection is influenced by price and availability, with a focus on broad spectrum and older chemistry.	Chemical selection incorporates some softer chemistry but also using some broad spectrum chemistry	Chemical selection focusses on soft chemistry and toxicity of chemicals to particular beneficial insects.	‘Soft on Nature, Not on Results – Soft Chemistry’. <i>The Vine Magazine</i> , Vol 18, Issue 2, May 2022. ‘Big and Small Spray Solutions – Effective Ag spraying’. <i>The Vine Magazine</i> , Vol 18, Issue 3, August 2022.
Withholding periods	Relying on withholding periods prescribed on chemical labels, to meet domestic residue limits (MRLs)	Familiar with and using the ATGA MRL app.	Consistently using the ATGA MRL app for planning and to ensure compliance with export MRLs	‘Reducing uncertainty in chemical use (WHPs, EHIs, MRLs)’. <i>The Vine Magazine</i> , Vol 19, Issue 1, February 2023 ‘Safeguarding beneficial insects in vineyards’. <i>The Vine Magazine</i> , Vol 19, Issue 2, May 2023.
MRLs	MRL testing complies with minimum Freshcare domestic requirements.	MRL testing complies with the more stringent Global Gap requirements	MRL testing includes screens for all vineyard chemicals	
Equipment				<u>Workshops:</u> New Tech - Recirculating sprayer & autonomous tractor 26 & 27/07/22 Cardross & Euston Spray application workshops 10 & 11/10/22 in Irymple and Euston, 19/10/22 Swan Valley EHI workshop for horticultural industries 05/05/23 and online 10/8 & 24/8/23
Sprayer maintenance, calibration and optimisation	Sprayer is not ideal for the canopy type or has not been configured for the canopy	Sprayer has been selected or configured to match the canopy type and can direct air into the canopy avoiding off-target losses.	Sprayer has the capacity to recapture overspray. Sprayer is always configured to match the canopy and targets pest. Deposits measured, assessed, and recorded. Mitigation of drift risk is a key element in the sprayer configuration.	
	Spray equipment is serviced when something breaks	Spray equipment is regularly serviced	Spray equipment is regularly serviced, and nozzles also checked/cleaned/replaced regularly.	<u>Factsheets:</u> Accidental spray drift into vineyards
	Previous sprayer calibrations are assumed to be relevant to the current spraying	Spray equipment is regularly calibrated	Equipment and delivery are optimised according to chemistry.	<u>Videos:</u> Sprayer maintenance video
Mixing and safety	Chemicals are mixed by the operator, manually.	Chemicals are pre-mixed in a hopper with hands-free delivery to the tank.	Innovations to automate mixing and enhance operator safety are used.	<u>Tools:</u> Sprayer maintenance Checklist – ATGA Website Updating MRL app Sonic bath Field kit for sprayer calibration and configuration Benchtop nozzle calibrator <u>Trials & Analysis:</u> Dormancy breaker demonstration trial Extended harvest interval (EHI) trials Mealybug treatment comparison - demonstration trial (post-harvest control options)

Appendix 7: Vine Health Response Framework

Scope the issue – extent/severity/symptoms

1. Immediately commence visits to affected vineyards – to assess extent, range of symptoms, varieties affected etc.
2. Immediately contact relevant researchers with experience in vine health – circulate photographs and discuss symptoms and plan responses.
3. Encourage producers to think about and share theories - linking symptoms with vineyard practices.

Seek input from the research community

4. Bring a range of researchers together in a ‘think tank’ or Community of Practice, to share their expertise, discuss/review the situation and symptoms and provide guidance to the response plan. By including a breadth of research disciplines in the ‘think-tank’, the discussion encompassed many possible causes of RSG.
5. Formulate a plan and priorities for diagnostic testing based on the guidance from the research community.
6. Contact plant physiologists to include abiotic stressors in the thinking.

Ascertain capability/accreditation of laboratories to undertake diagnostic testing

7. Identify laboratories with capability and accreditation to undertake relevant diagnostic testing e.g., test for virus, trunk diseases, bacteria, soil pathogens, phytoplasma, nematodes, mites, nutrient status.
8. Review logistics, obtain quotes and time frames and ensure that the chosen lab is aware of context and urgency as well as capable of providing clear and concise feedback in laymen’s terms.
9. Negotiate a bulk price, if possible.

Seek input from agronomic consultants and viticulturists via the Agronomic CoP (Community of Practice)

10. Bring a range of agronomists, consultants, and viticulturists together, to share their expertise, discuss/review the situation and symptoms and provide guidance to the response plan. Service providers see diverse production systems and may be able to correlate their clients’ management practices with appearance of RSG.

Diagnostic testing

11. Determine and prioritise tests.
12. Ascertain best sampling methodology to ensure that sampling is done consistently and according to the chosen lab’s directions.
13. Clarify optimum timing for sampling, based on vine growth stages and pathogen or pest.
14. Ensure sample collection transport and handling of samples is as per lab instructions to ensure integrity of the samples.

Data management

15. Develop a confidential and secure platform (database) to store results.
16. Aggregate data and present only aggregated data at meetings, etc.

Communicate with table grape producers

17. Keep Table grape producers informed of any diagnostic outcomes, using social media, E-News, the Vine magazine, and meetings.
18. Transparency and confidentiality are crucial to maintain trust with producers. Maintain privacy by ensuring that producers only receive their personal results.

Survey of producer practices

19. Develop a comprehensive survey in consultation with researchers and the CoP of agronomic consultants to addresses producer management strategies (such as irrigation, crop load, post-harvest management, soil types, planting, varieties & rootstocks, chemical applications, fertiliser, compost sources, and other practices) to establish possible links to the occurrence of vine health issues.
20. Develop a purpose-built database to collate the data and assist in the analysis the results.

Literature review

21. Start collating relevant scientific articles to form the basis of a comprehensive literature review.

Appendix 8: Personal Development & Training

Date	Who	What	Topic	Purpose
04/03/2021	AM, JT	Mildura Regional Development	Innovations in Agriculture & Food seminar	Networking, information on new technologies
19/04/2021	KC	AgVic	Occasional Counsellor training	Mental health of growers
04/05/2021	JT	National Fruit Fly Symposium	Introduction & Overview of Fruit Fly in Australia	QFF updates as QFF impacts trade and production
05/05/2021	JT	National Fruit Fly Symposium	Fruit Fly & Trade	QFF updates as QFF impacts trade and production
06/05/2021	JT	National Fruit Fly Symposium	Fruit Fly & production	QFF updates as QFF impacts trade and production
03/06/2021	JT	AgVic	Occasional Counsellor training	Mental health
30/06/2021	AM, JT, KC	Global Grape Congress	Breeder updates, climate change etc.	
23/08/2021	JT, KC	AgVic/MeridianAg Business Planning Workshop	Labour Sourcing & Engagement Planning	Using better business strategies to source, attract and keep labour
06/09/2021	JT	Seminar	Fruit Fly predictive modelling and forecasting in Australia	Dealing with QFF
27/09/2021	JT	Seminar	Exotic Fruit Fly incursions session	How Gov is dealing with exotic incursions
04/10/2021	KC	Training	Industry Liaison Officer training	Biosecurity response & responsibility
10 & 11/11/2021	JT	Forum	National Biosecurity Forum	Latest initiatives in the biosecurity area
18/02/2022	JT	Summit	Agtech in Australia	Keeping abreast of latest trends/start ups
12/05/22	AM	Training for meeting chairpersons	Governance Institute of Australia	Practical guidance on the legal issues and core functions of meetings
17/05/2022	JT	Global Table Grape Conference	Traceability	Global Updates
07/04/2022	JT	PHA session	Data	Importance of data collection for biosecurity purposes
06/05/2022	JT	MRIC Smarter Mallee Ag-tech days	Ag-tech	
11 & 12/05/2022	JT & KC	Plant Biosecurity Research centre symposium	Advances in research	Updates, networking
18/07/2022	KC, AM	ChemCert refresher	Chem OHS	Safety

25/07/2022	KC, AM	First Aid refresher	Health OHS	Safety
27 & 28/09/2022	JT	Exercise Paratus: Masterclass: Decision making under pressure	Biosecurity	Preparedness
2-3/08/2023	JT / KC	ILO training	Biosecurity Incursion scenario	Preparedness
24/01/2024	AM	Training for meeting - chairpersons	Governance Institute of Australia	Meetings, Minutes and Resolutions