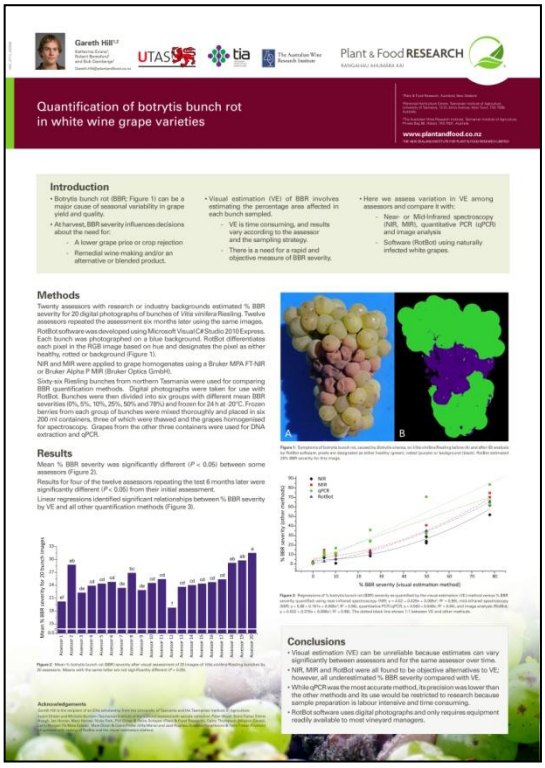
15th Australian Wine Industry Technical Conference – student travel



FINAL REPORT to

GRAPE AND WINE RESEARCH & DEVELOPMENT CORPORATION

Project Number: **GWT 1318**

Principal Investigator: **Katherine J. Evans**

Research Organisation: **Tasmanian Institute of Agriculture, University of Tasmania.**

Date: **05/08/2013**

Abstract

Mr Gareth Hill, a PhD student working with the Tasmanian Institute of Agriculture and Plant and Food Research, New Zealand, has been developing methods for quantifying botrytis bunch rot (BBR) in white grapes. Mr Hill attended the 15th Australian Wine Industry Technical Conference where he was awarded a prize for the Best Fresh Research Presentation – Viticulture, as well as displaying a poster and presenting his work at a bunch rot workshop (W29). Mr Hill's work generated much discussion, with industry proponents expressing interest in the image analysis software called RotBot. Options for developing and releasing this software to industry are being explored.

Executive Summary

Mr Gareth Hill is a PhD student enrolled at the University of Tasmania (UTAS). He is supervised by Dr Katherine Evans, Tasmanian Institute of Agriculture (TIA) at UTAS, and Dr Bob Dambergs, Australian Wine Research Institute, based at TIA. Gareth's PhD research is supported by a UTAS scholarship and his host institution, Plant and Food Research, New Zealand.

Mr Hill attended the 15th Australian Wine Industry Technical Conference (AWITC) in order to present work from his PhD project regarding methods for the quantification of botrytis bunch rot (BBR) in white grapes. These methods include near and infra-red spectroscopy, quantitative PCR and colour image analysis. This work was presented in three formats: a poster (abstract below), an invited presentation in the Fresh Research session and a presentation at workshop W29 *Measuring and managing botrytis and other bunch rots*. Mr Hill was awarded a prize for the Best Fresh Research Presentation – Viticulture.

Mr Hill's presentation at workshop W29 generated much discussion regarding the best methods for quantification of BBR in vineyards and whether the visual estimation method, the current standard, should still be used by the industry. A report about workshop W29 is presented. In particular, there was a lot of interest in the digital analysis software known as RotBot developed by Mr Hill. RotBot is software that measures BBR severity according to colour hue from digital photographs of grape bunches. This method has the potential to replace the visual estimation method by providing the wine industry with an accurate, objective method for the quantification of BBR. A number of industry proponents expressed interest in RotBot for practical application in the vineyard. The Tasmanian Institute of Agriculture and Plant & Food Research are exploring two options; namely, identification of co-investors to develop RotBot into a commercial product (requiring protection of intellectual property), or publishing the information in the referred literature for open access.

Attendance at AWITC also enabled Mr Hill and Dr Evans to share knowledge with Prof. Chris Steel, who is leading a project on 'Assessment of fungal rots of grapes and their impact on wine quality.' Prof. Steel will visit Tasmania in November, 2013, for a meeting with Dr Evans to review project progress and plan future research in relation to the industry needs expressed through workshop W29 and other industry forums.

The New Zealand Institute for Plant and Food Research is also acknowledged for supporting Mr Hill's travel to the 15th AWITC. TIA supported Mr Hill's annual visits to Tasmania to develop the methodology.

Report on workshop W29
Measuring and managing botrytis and other bunch rots

Date: 15 July, 2013
Location: 15th Australian Wine Industry Technical Conference
Time: 13:30 - 17:30

Convenor(s): Dr Kathy Evans, Tasmanian Institute of Agriculture, University of Tasmania

Speaker(s): Kathy Evans, Tasmanian Institute of Agriculture;
Chris Steel & Navideh Sadoughi, Charles Sturt University;
Natalie Fryar, Hill-Smith Family Vineyards;
Adrian Coulter, The Australian Wine Research Institute;
Gareth Hill, Plant & Food Research New Zealand

Time	Presentation Title	Presenter
13:30 – 13:40	Welcome and introduction	Kathy Evans
13:40 – 13:55	What rot is that?	Chris Steel
13:55 – 14:10	Key issues – an industry perspective	Natalie Fryar
14:10 – 14:30	Assessing risk and severity, plus pre-harvest management	Kathy Evans
14:30 – 14:45	More Q&A and panel discussion	Kathy Evans, Chris Steel & Natalie Fryar
14:45 – 15:05	Afternoon tea. View posters, collect hand-outs	
15:05 – 15:25	Improved tools: laccase assay	Adrian Coulter
15:25 – 15:55	New tools: image analysis, near infra-red spectroscopy	Gareth Hill
15:55 – 16:25	New tools: immuno-detection, off-flavours, ATR-FTIR	Chris Steel & Navideh Sadoughi
16:25 – 16:35	More Q&A and panel discussion	Adrian Coulter, Gareth Hill & Chris Steel
16:35 – 17:05	Facilitated discussions in small groups What information is relevant to your business? What else is needed?	ALL
17:05 – 17:30	Report Back, Evaluation and Close	ALL

What happened at this workshop?

There were 24 registrations and six presenters for this workshop.

A show of hands indicated participants representing each of these categories:

1. People not involved directly in managing vineyards (plant pathologists, Govt reps, service providers etc).

2. Vineyard managers/viticulturists in regions where bunch rot does not occur every year, but occasionally there are horror years (e.g. 2011).
3. People managing sites where bunch rot occurs every year but the severity varies (low to high severity).
4. People managing 'problem' sites where bunch occurs severely every season.

Each participant was given a GWRDC-labelled USB stick containing the presentations, GWRDC fact sheets, related AWITC posters, and other reference material. Selected fact sheets (a sub-set from the USB stick) were also provided as hard copies.

Chris Steel demonstrated his collection of bunch-rot fungi growing in Petri plates and distributed an A3 handout showing images of the different bunch rots.

Copies of any of the presentations can be obtained from Kathy Evans (Katherine.Evans@utas.edu.au). The panel discussion after each group of three presentations stimulated ideas that fed into the small-group discussions held towards the end of the proceedings, as documented below.

One person completed the workshop feedback form: "Good mixture of small group and questions with discussions. Good visual aids and use of data stick for background was good. Well done."

Participants needs for research, development and extension (RDE)

The following needs were derived from the facilitated discussions (documented below):

1. There is a strong need for a standardised objective measure of bunch rot. Industry needs to develop consensus on what objective measure to use and how to standardise its use.
2. Once bunch rot is measured objectively, then there is a need to relate disease severity to wine quality in order to set thresholds for each variety and wine style.
3. Agreement on bunch-rot tolerances is needed depending on the end-use of the wine and intended wine shelf life.
4. A better understanding of the effect of botrytis on wine chemistry is needed.
5. There is strong demand for further development of RotBot. RotBot uses image analysis and obviates the need for human visual assessment.
6. There is an opportunity to empower grape growers, or provide them with tools, to negotiate harvest time with grape buyers and winemakers.
7. There is a need for community-based reports and alerts for weather-based risks such as disease. There are large gaps in coverage in many regions. Effective risk prediction models for botrytis (e.g. Botrytis Decision Support) are yet to be delivered in Australia.
8. A rapid assessment of the extent of latent infection (disease potential) is needed to plan mid-late season disease management. (Note: Botrytis Decision Support model uses a weather-based index for early-season assessment of late-season risk).
9. Site and cultivar-specific temperature-based models are needed to predict key phenology dates such as 80% capfall.
10. Regarding the last spray for bunch rot, there are questions about when a fungicide residue ceases to be effective (in relation to harvest date).
11. Better criteria are needed for timing the late-season fungicide sprays. "If I apply a fungicide now, will it make any difference?"
12. There is a need for on-going extension and/or new approaches to improving the spray coverage on inflorescences and bunches, including the effect of surfactants.

13. On-going extension is needed around the three Ts for spray Timing, Technique and Treatment. Those responsible for spray operations in vineyards need to be given support from vineyard managers or owners to be present when key sprays need to be applied (e.g. vacation periods).
14. There appears to be a demand for biological control agents that could be integrated with other management measures. Currently there are very few options in Australia relative to New Zealand.
15. On-going extension is needed about canopy management. Site and cultivar-specific trials (on-farm trials) are needed to learn about the effects of the timing and extent of canopy management.
16. Cost-benefit studies of cultural management measures depending on price of grapes and yield targets would be helpful.
17. New technologies or methods for modifying bunch architecture are needed.

W29 Report Back from Group Discussions

Group 1 Notes – Facilitator: Kathy Evans

- We lack fungicides to use late season. There are years (severe bunch rot) when fungicides are not enough.
- We want to know when a product has 'run out' (lack of effective fungicide residue).
- How much time will a fungicide application buy if applied late season? "If I put a fungicide on now, will it make a difference?" (Capture this sort of information in a database).
- There is the issue of getting good coverage on the bunch. Questions about surfactants. Doing more harm than good?
- Visual assessment - there can be variability among assessors. It is subjective. Independent assessors may not concur.
- We want a quantitative measure. Take out the stress (no more tears!)
- One company was willing to take large sample sizes in 2011 in order to get a reliable estimate.
- Get consensus from industry on what objective measure to use. Standardise. Stop having to pay independent assessors.
- Reinforce that cultural management is just as important as the use of fungicides. Canopy management is a cost but growers need large canopies to get the extra yield (e.g. 20 tonne/ha). It can be hard to justify canopy management in tough times.
- Flowering test (for latent botrytis) is a measure of potential risk.

Group 2 Notes – Facilitator: Natalie Fryar

- Abandon human visual assessment – we need rapid digital techniques.
- Need a costing model (cost-benefit tools).
- We need phenological models so we don't miss 80% capfall spray.
- We need to support our growers to do the right thing. They might want to go on leave when there is a critical spray timing.
- We need agreed tolerances in the industry, based on end-use of wine, and what do the wines look like in 5 years time (effect on shelf life).
- We need a better understanding of botrytis-affected wine chemistry.
- Grape load assessment at weighbridge?
- Industry collaboration – grape growers – buyers – agreed method of assessment and tolerances. MOG is standard, so why can't disease be?
- What tools?
- Objective, comprehensive, rapid botrytis assessment

- Statistical models for determining physiological stages.
- Tolerances – agreed.

Group 3 Notes – Facilitator: Gareth Hill

- This group want RotBot now!
- Questions about RotBot. How much will it cost and how long until available?
- Need to manage grapevines better to manage disease better. (we could do everything better)
- Lack of community-based weather reports in some regions. E.g. frost risk, disease risk.
- Need a means to modify bunch architecture.
- Need to know the link between botrytis levels and what that means for the wine.
- Need monitoring systems to help predict risk.

Group 4 Notes – Facilitator: Chris Steel

- Given the multiple management measures needed (Kathy's pie chart), it would be good to go into detail and discuss methods for each one (each slice of the pie).
- Prevention better than cure.
- If we detect botrytis, then it is too late already. Once the infection is there it is too late.
- More information needed for the grape growers and not necessarily for the wineries.
- We can't necessarily pick earlier – viticulturalist doesn't decide.
- Chris Steel's project is about what wineries will accept and what they can't accept.
- Biological controls…NZ has had success, especially if integrated with cultural controls. Some not able to be used in Australia.
- More R&D: Lots more can be done to influence infection rather than just relying on spraying – possibility for more R&D?

Group 5 Notes – Facilitator: Dion Mundy, Plant and Food Research, NZ.

- Variation among wineries in their disease thresholds.
- RotBot. Even a quick scan or imprecise method could give a heads up that a more detailed assessment is needed.
- Need a RotBot for powdery mildew too.
- Need to plan to manage botrytis.