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BEYOND VINEYARD ECOSYSTEMS Growing for the Future

27-28 September 2022 Te Pae Christchurch Convention Centre



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Funding for the Vineyard Ecosystems research programme has been provided by



MINISTRY OF BUSINESS, INNOVATION & EMPLOYMENT HIKINA WHAKATUTUKI



Travel assistance for this event has been provided by Horticentre Charitable Trust to assist growers from far-reaching areas and up-and-coming industry professionals to attend.

WELCOME TO BEYOND VINEYARD ECOSYSTEMS Growing for the Future

Bragato Research Institute has brought scientists and winegrowers together for this two-day conference to share researchbased approaches to sustainable vineyard management. The Vineyard Ecosystems programme began in 2015 as a shift in the way that we look at our operations, from an issue-based reactive approach to one that views and tries to solve problems as part of a wider system.

Over the course of two days, this event will feature programme findings, spin-off projects, international perspectives on key topics, and grower experiences from both within and outside of the programme. Thank you for joining us here in Christchurch, and we hope that the stories shared over these two days spark new ideas and practical approaches for your own operations.

Vineyard Ecosystems was funded by the New Zealand Winegrowers' levy and the Ministry of Business, Innovation & Employment. Additional funding was provided by Plant & Food Research, which was also one of two major researcher providers in the programme alongside the University of Auckland.



RESEARCH INSTITUTE RANGAHAU KAREPE, WÁINA O AOTEAROA



Download the **Slido app** from the app/play store, so you can participate in the Q&A sessions.

Code: #BVE2022



Please visit our sponsors and exhibitors on Day 1 during morning tea, lunch and afternoon networking; and Day 2 during morning tea and lunch.



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TUESDAY 27 SEPTEMBER

	MORNING: VIRUS AND MEALYBUG SESSION SPONSORED BY BASF
9.00am	Welcome Jeffrey Clarke, Bragato Research Institute
9.05am	Vineyard Ecosystems Nick Hoskins, Programme Manager
9.15am	Keynote: From the vineyard – the rationale for change Richard Leask, Leask Agri, and Hither and Yon
9.40am	The evolution of mealybug control and the future Vaughn Bell, Plant & Food Research
10.05am	Groundcover as a host for mealybug Rebecca Gough, Plant & Food Research
	10.30AM: MORNING TEA
11.10am	Welcome back Nick Hoskins, Programme Manager
11.15am	Virus ID, influences, and the other leafrolls Karmun Chooi, Plant & Food Research
11.35am	Industry perspective: Mealybug Jonathan Hamlet, Craggy Range
11.55am	Virus & Mealybug Panel Moderator: Tracy Taylor, Accolade Wines
	12.35PM: LUNCH
	AFTERNOON: VINEYARD LONGEVITY
1.30pm	Trunk disease: Re-plant or rejuvenate? Nick Hoskins, Programme Manager
1.35pm	An Australian perspective: Trunk disease research in the programme Mark Sosnowski, South Australian Research and Development Institute
2.00pm	Evaluating the effects of remedial surgery to trunk disease affected vines on Sauvignon Blanc wine quality Tanya Rutan and Len Ibbotson, Bragato Research Institute
2.20pm	The prototype: Vine gaps model Joris Besamusca and Affan Rachman, Integrape
2.35pm	Industry perspective: Pruning wound protection Jeff Sinnott, Constellation Brands
	3PM-5PM: MIX AND MINGLE WITH WINE AND NIBBLES IN THE EXHIBITION HALL

WEDNESDAY 28 SEPTEMBER

	MORNING: SOIL
9.00am	Welcome Nick Hoskins, Programme Manager
9.15am	Vineyard Ecosystems: Soil, water and nutrients Brent Clothier, Plant & Food Research and President, Royal Society Te Apārangi
9.40am	Microbial biodiversity: Programme findings and beyond Sarah Knight, University of Auckland
	10.05AM: MORNING TEA
10.45am	International conference support provided by AGMARDT Stephanie Flores, Bragato Research Institute
10.50am	What can the microbiome tell us about the state of our soil? Andrew Neal, Rothamsted Research
11.35am	Industry perspective: Soils in the context of a vineyard ecosystem Robert Holdaway, Lowlands Wines
12.00pm	Concluding thoughts Nick Hoskins, Programme Manager
	12.05PM: LUNCH
AFTI	ERNOON: RE-THINKING CHEMISTRY SESSION SPONSORED BY HORTICENTRE/TASMANCROP
1.00pm	Welcome Nick Hoskins, Programme Manager
1.05pm	Powdery mildew and soft chemistry Andrew Blakeman, AJB Solutions NZ
1.30pm	Conservation biocontrol Charles Merfield, Merfield Agronomy
1.55pm	Industry perspective: Reducing reliance on herbicide Paul Robinson, Indevin/Villa Maria
2.20pm	Cover Cropping Panel Moderator: Sarah Phillips, Indevin/Villa Maria
2.55pm	Concluding thoughts Nick Hoskins, Programme Manager
	3.00PM: END TIME





WELCOME Jeffrey Clarke | Bragato Research Institute

VINEYARD ECOSYSTEMS Nick Hoskins | Programme Manager

TUESDAY MORNING SESSION KEYNOTE

FROM THE VINEYARD – THE RATIONALE FOR CHANGE

Richard Leask | Leask Agri | Hither & Yon

The challenges facing the wine industry are well known, and not limited to erratic climatic conditions and events, increased input costs and labour shortages. Coupled with environmental challenges is the role of an increasingly curious consumer about the environmental footprint of products they purchase. This is placing pressure on producers to not only evolve their farming systems but make them more transparent. Given its direct line to the consumer, wine is uniquely placed to showcase its environmental credentials. but is sustaining our current practices going to be good enough? At its core, Regenerative Agriculture appears to be a simplistic set of principles. However, it underpins a paradigm shift in land management thinking and the way production systems interact with the changing environment around them. Regenerative agriculture has a land restoration agenda at its core that may be the next step in sustainability for the Australian wine industry. So, what's next for New Zealand?

TUESDAY MORNING SESSION VIRUS AND MEALYBUG

THE EVOLUTION OF MEALYBUG CONTROL AND THE FUTURE

Vaughn Bell | Plant & Food Research

Mealybugs are economically damaging insects. They transmit grapevine leafroll disease and are responsible for the black sooty mould observed on grapevines. Historically, a grower responding to mealybugs has had to tread a well-worn path taking time to look for them in vines and where necessary, to applying insecticides widely. This presentation describes recent results from vineyards and highlights some changed thinking about how best to respond to mealybugs. From added plant diversity to removing organophosphates from the spray schedule, we highlight implications for mealybug biological control and the role it can play in vineyards now and in the future. We propose re-thinking current settings for mealybug insecticides, so rather than a broad-acre response, growers are instead empowered to adapt according to circumstance and need. Now is a good time to take the insights from Vineyard Ecosystems and use them to advantage against mealybugs.

TUESDAY MORNING SESSION VIRUS AND MEALYBUG

GROUNDCOVER AS A HOST FOR MEALYBUGS

Rebecca Gough | Plant & Food Research

It's no secret that mealybug control is a cornerstone of managing grapevine leafroll disease (GLD), to prevent transmission from grapevine to grapevine. But what if you could influence mealybug populations in another way? With insecticide the first resort for many growers, what if you could shift where these insects live in the vineyard, away from the grapevines? Can groundcover plants in the vineyard break the disease cycle? Can they provide a habitat for mealybugs that is immune to GLD where mealybugs can feed and live - losing any disease they may carry? We'll describe how our understanding of the risks and benefits of groundcover in the vineyard has changed over time, and how clover is a non-host of GLD but an attractive habitat for mealybugs.

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TUESDAY MORNING SESSION VIRUS AND MEALYBUG

VIRUS ID, INFLUENCE, AND THE OTHER LEAFROLLS

Karmun Chooi | Plant & Food Research

Grapevine leafroll disease can be caused by viruses that include grapevine leafroll-associated virus 1 through 7. Of these, grapevine leafroll-associated virus 3 (leafroll 3) is the main cause of the disease in New Zealand, easily transmitted, and has the greatest impact on yield and quality in red varieties. The presence of leafroll 1 in Chardonnay Mendoza is well known, while the effect and distribution of leafroll 2 is less known. Similar to COVID-19 in humans, multiple strains of the same virus in grapevines can cause the host to express different symptoms. We discuss how different leafroll viruses and different strains of leafroll 3 influence symptom expression and visual symptom assessment. The presentation takes programme findings and the research beyond Vineyard Ecosystems to uncover emerging virus trends in New Zealand and overseasincluding promising solutions for viral diseases of grapevines.

TUESDAY MORNING SESSION VIRUS AND MEALYBUG

INDUSTRY PERSPECTIVE: MEALYBUG

Jonathan Hamlet | Craggy Range

Managing leafroll virus in red varietals is a significant challenge in vineyards, where issues caused can delay harvest, reduce sugar accumulation and lower fruit quality. During the Vineyard Ecosystems programme, Jonathan and the Villa Maria team were successful in managing the virus and low mealybug numbers with no insecticides in a Hawke's Bay vineyard. This presentation re-visits the data and management practices of this block from the programme, including block attributes, historical management and ecological aspects that may have influenced this result. Potential management opportunities will also be discussed. Now the National Vineyards Manager for Craggy Range, Jonathan's journey with mealybug has led him beyond Vineyard Ecosystems to trialling pheromones as a monitoring tool. Among topics discussed are the practicalities of the method, the results, and how these results are guiding mealybug management into the future for both red and white varietals

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TUESDAY MORNING SESSION VIRUS AND MEALYBUG

VIRUS & MEALYBUG PANEL

Moderator: Tracy Taylor | Accolade Wines

During this industry-led session, growers and industry experts will share their insights and experiences in managing mealybugs and leafroll virus. The goal of the session is to create a formal opportunity for growers to share knowledge and to bridge experiences from both inside the programme and those beyond Vineyard Ecosystems.

- Jess Marston | Giesen
- Nick Hoskins | Vineyard Ecosystems
 Programme Manager
- Jonathan Hamlet | Craggy Range
- Vaughn Bell | Plant & Food Research

TUESDAY AFTERNOON SESSION VINE LONGEVITY

AN AUSTRALIAN PERSPECTIVE: TRUNK DISEASE RESEARCH IN THE PROGRAMME

Mark Sosnowski | South Australian Research and Development Institute

The most important grapevine trunk diseases in New Zealand are Eutypa and Botryosphaeria dieback. Research on managing trunk disease, with an Australian influence, has been ongoing for the past 12 years. Early research focussed on evaluation of wound protectants that can be applied efficiently with commercial sprayers, which was supported by an economic analysis. The Vineyard Ecosystems programme provided a boost to trunk disease research through two consecutive projects that involved a collaboration between SARDI, Plant & Food Research and Linnaeus. This research uncovered new information on the status of trunk disease in New Zealand through surveys and improved understanding of spore dispersal and wound susceptibility. Most recently, comprehensive remedial surgery trials have been established and are ongoing, providing new insights on the optimal methods, timing and short-term outcomes for production and disease. We discuss trunk disease in an international context and explore future implications and collaborations for New Zealand and Australia

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TUESDAY AFTERNOON SESSION VINE LONGEVITY

EVALUATING THE EFFECTS OF REMEDIAL SURGERY TO TRUNK DISEASE AFFECTED VINES ON SAUVIGNON BLANC WINE QUALITY

Tanya Rutan and Len Ibbotson | Bragato Research Institute

BRI is focused on delivering research specific to New Zealand's grape growing and winemaking needs. We undertook this trial to find out if Sauvignon Blanc wine quality is impacted by remedial surgery on trunk diseased vines.

There were no differences in berry weight, bunch weight or botrytis bunch rot levels between reworked or control vines. Similarly, the juice composition did not differ for all parameters assessed. There were no differences in the pH, total acidity, malic acid, volatile acidity, residual sugar, or alcohol of finished wines.

Wines made from reworked vines had significantly higher levels of 2-methoxy-3-iso-butylpyrazine (IBMP) compared to control vines. Reworked vines normally had higher levels of thiols, 3-mercaptohexyl acetate (3MHA) and 3-mercaptohexan-1-ol (3MH), although the difference was not found to be statistically significant.

These findings suggest that re-trunking of Sauvignon Blanc vines affected by trunk disease may result in wines with increased levels of IBMP, a key aroma compound responsible for the distinctive green and grassy aromas, characteristic of high-quality Marlborough Sauvignon Blanc wines.

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TUESDAY AFTERNOON SESSION VINE LONGEVITY

THE PROTOTYPE: VINE GAPS MODEL

Joris Besamusca and Affan Rachman | Integrape

As the leading cause of vine deaths in Marlborough Sauvignon Blanc, grapevine trunk disease is a growing problem affecting the viability of many older blocks. Our project focuses on a software-based approach to help growers plan ahead, by attempting to predict the rates of vine death progression. This presentation will cover the outcomes of the two-year study, including a brief comparison of the various options for quantifying the number of dead or missing vines and the final results of the surveys conducted. The outcome of this project-an interactive online calculator built on the prediction model-will also be presented. As part of the project, we have also prototyped a standard for an open geospatial-based vineyard data model. The benefits and challenges of modelling vineyard data in a geospatial structure will be discussed in this presentation. This includes the potential advantages of implementing a vine-based spatial standard for aggregating various types of information beyond the scope of this project.

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TUESDAY AFTERNOON SESSION VINE LONGEVITY

INDUSTRY PERSPECTIVE: PRUNING WOUND PROTECTION

Jeff Sinnott | Constellation Brands

Grapevine trunk disease (GTD) is gradually spreading across our vineyard estate at varying rates depending on vine age, rootstock, soil type and management history. Data analysis of our vineyard population showed a vulnerability to GTD, particularly in older vineyards. Trunk disease is not just an issue with declining productivity; we identified higher incidences of pest and disease leading to issues with grape and wine quality. Using evidence gathered by the Vinevard Ecosystems programme, we identified an opportunity to intervene to limit the spread of GTD. Internal financial analysis revealed some quick wins in reducing the impact, particularly in younger vineyards. This led our organisation to implement a companywide wound protection programme in 2020. The programme's design and implementation factored in the major causal factors, most effective treatment(s), and most practical means of maintaining protection. Vineyards outside of this spray program have an alternate re-development strategy.

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WEDNESDAY MORNING SESSION SOIL AND WATER

VINEYARD ECOSYSTEMS: SOIL, WATER AND NUTRIENTS

Brent Clothier | Plant & Food Research

Through the Vineyard Ecosystems programme, researchers carried out five years of research to delve into soil-water dynamics and nutrient leaching in four Sauvignon Blanc vineyards. Two vineyards were in Hawke's Bay and two in Marlborough, each with one using contemporary practices and the other using future management. We measured water replenishment of aquifers during winter through drainage, which was more than the water-take from summer irrigation. Therefore, groundwater recharge occurred under these vineyards. Our drainage fluxmeters showed very low leaching of nitrogen, and this provides a compelling picture of the low impact on water quality of nitrate leaching from vineyards. Through new analyses we have found that takes only about 9L of irrigation to produce a glass of wine. The Food and Agriculture Organisation had reported a water footprint of a glass of wine to be 120L. Our water footprint is smaller, reflecting the parsimonious use of irrigation in New Zealand vineyards. However, tactical use of irrigation maintained a somewhat varying soil-water status throughout the various summers. This suggests further refinement in irrigation practices is still possible.

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WEDNESDAY MORNING SESSION SOIL AND WATER

MICROBIAL BIODIVERSITY: PROGRAMME FINDINGS AND BEYOND

Sarah Knight | University of Auckland

It is becoming increasingly apparent that microbes are vital to the health and resilience of ecosystems, both indigenous and economically managed. Agricultural intensification threatens microbial biodiversity and potentially ecosystem productivity. Vineyards are no exception. These complex ecosystems consist of many interacting parts, managed to produce high quality, distinctive wines. Thus, understanding how different management practices affect biodiversity has implications for quality wine production and industry sustainability. Here I highlight our key findings from within the Vineyard Ecosystems programme and aligned projects funded by Plant & Food Research. The effect of management on microbial biodiversity was investigated across different seasons, vintages, regions and habitats to reveal small, but significant differences. This highlights the importance of understanding how human interventions during the production of crops can alter biodiversity and potentially the ecosystem services they provide. Building on this foundation provided by the Vineyard Ecosystems programme and aligned projects, where do we go from here?

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WEDNESDAY MORNING SESSION SOIL AND WATER

WHAT CAN THE MICROBIOME TELL US ABOUT THE STATE OF OUR SOIL?

Andrew Neal | Rothamsted Research

Our ability to sequence large volumes of DNA has revolutionised the way we think about the microbiology of soil. This revolution brings with it new terms and concepts including the promise of new insights into how soils function and how we might manage microbiomes for crop and environmental benefits. Deeper microbiological insights bring a whole new facet to the term soil health, encouraging expectations that we can prescribe a community which defines optimal health. However, the new evidence defies expectations of simple explanations, instead exposing the complexity of soil microbiomes and their resilience to environmental change. Combined evidence from long running field experiments and studies of global soil microbiomes challenges assumptions that biodiversity alone can distinguish states which define optimal soil function. I will present an alternative holistic view-that 'who' is there is less important than 'what' they can do, within the context of a soil's emergent architecture

Thank you to AGMARDT for providing conference support to bring Dr Andrew Neal of Rothamsted Research from the UK to New Zealand for this event.



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WEDNESDAY MORNING SESSION SOIL AND WATER

INDUSTRY PERSPECTIVE: SOILS IN THE CONTEXT OF A VINEYARD ECOSYSTEM

Robert Holdaway | Lowlands Wines

This presentation will offer a grower's perspective on soils and their management in a commercial vineyard setting. By viewing the soil as a complex adaptive system, we see that soil structure emerges over time in response to plant carbon inputs. Instead of directly manipulating the species or communities present, soil management can target the inputs and disturbances that optimise the flux of energy through the system, and the dominance of grapevines. Examples will be provided of our approach to soil management, focusing on the minimisation of environmental constraints, optimisation of energy flows, the maintenance of diversity and the development of living soil structure to support healthy grapevines. Soil management is an adaptive process and we are always being challenged by uncertainties - but these uncertainties offer insights for future research.

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WEDNESDAY AFTERNOON SESSION RE-THINKING CHEMISTRY

POWDERY MILDEW AND SOFT CHEMISTRY

Andrew Blakeman | AJB Solutions NZ

A new look at the data from the Vineyard Ecosystems programme assessed the infection levels of grape bunch powdery mildew at veraison, across all 24 blocks and five successive vintages. Infection was found at levels likely to cause issues at harvest on five occasions, or 4.6% of assessments. All five of these instances occurred on two blocks without synthetic fungicides. An assessment of spray diaries was undertaken to identify possible causes of the control failures in these blocks and identify factors for the successful control of powdery mildew using soft chemistry in the remaining blocks. Spray diaries for blocks that controlled powdery mildew successfully did not differ significantly from those that failed and the successful control of powdery mildew by blocks using 'soft' chemistry indicates that the reason for the failures lies elsewhere. We examine chemical choice, chemical rates, spray intervals. the use of wetters, application volumes and coverage for good powdery mildew control

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WEDNESDAY AFTERNOON SESSION RE-THINKING CHEMISTRY

CONSERVATION BIOCONTROL

Charles Merfield | Merfield Agronomy

Agroecology is increasingly promoted by the likes of the United Nations and the European Union as the future of agri/horticulture. Biological control of pests is a key component of agroecology, comprising three approaches: introductory, augmentative and conservation. The latter is a particularly ecological technique, as it is based on manipulating species' interactions. This is often based on boosting effectiveness of pests' existing natural enemies through the provision of shelter, nectar, alternative prey and pollen (SNAP). Typically, this is achieved by adding plants known to provide SNAP to the vineyard. The additional plants can be both targeted at specific natural enemies in a targeted approach or a broad-brush approach where a large diversity of plant species (e.g. > 10) is added to the vineyard. The latter approach also brings a host of other benefits to both the vineyard and wider environment, such as improved soil health. N fixation, increased robustness and resilience, and better biodiversity.

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WEDNESDAY AFTERNOON SESSION RE-THINKING CHEMISTRY

INDUSTRY PERSPECTIVE: REDUCING RELIANCE ON HERBICIDE

Paul Robinson | Indevin/Villa Maria

Villa Maria has a long history of growing organically, going back to the early 2000s. Over this time, lessons have been learned and practices adapted to manage the undervine space without the use of herbicides. With these learnings, we've looked to expand these methods into our conventional blocks to reduce the amount of herbicide applications used, mainly through mechanical methods. In recent times we've taken this a step further to look at growing specific species of plants in the undervine area with the aim to not only reduce herbicide use, but also reduce mechanical passes through the vineyard as well. This presentation will look at some of the things we've tried, what's been successful in our conditions, what hasn't, and what other options are out there to help reduce our reliance on herbicides.

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WEDNESDAY FINAL SESSION BRIDGING SOIL AND CHEMISTRY

COVER CROPPING PANEL

Moderator: Sarah Phillips, Indevin/Villa Maria

Beyond Vineyard Ecosystems, Bragato Research Institute has already embarked on the next wave of soil research and resources for growers. This session aims to create a formal opportunity for growers to share knowledge, as well as explore how cover cropping is playing a role in their commercial vineyards. During this session, growers will share their insights and experiences in cover cropping to enhance soil health and grapevine performance, while reducing reliance on agrichemicals.

- Sarah Phillips | Indevin/Villa Maria
- Mike Saunders | Greystone
- Richard Leask | Hither & Yon
- Robert Holdaway | Lowlands Wines

This session sponsored by	
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