

ANNUAL UPDATE 2023/24



Ensuring we're prepared for
unwanted pests and diseases

Research is our backbone
when responding

Collaborations bringing out
the best in biosecurity

KO TĀTOU
THIS IS US
Biosecurity protects what you love

BIOSECURITY PROTECTS OUR SECTOR



Over **37,000** insect pest surveillance traps across the country, including **7,600** for exotic fruit flies such as the Queensland Fruit Fly.

16

kiwifruit post-harvest sites have **2 Brown Marmorated Stink Bug (BMSB) traps** each.

16,132 wild kiwifruit vines controlled across **85 properties**.

78 pest and disease reports to KVH.

99%

of passengers do the right thing when crossing the border and meet biosecurity requirements.



KVH social media content seen thousands of times by users: **10k on X, 769k on Facebook, and 307k on Instagram.**

70  orchard

visits by the KVH team.

39 nurseries are registered members of the Kiwifruit Plant Certification Scheme (KPCS).

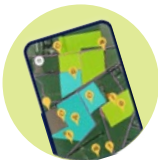
24 industry groups now signed up to the Government Industry Agreement for Biosecurity Readiness and Response (GIA), and **KVH was the first.**

1.7million passenger arrivals during the first three months of 2024 and **2,579 infringement notices issued at the border.**

189,360 sea container arrivals during the first three months of 2024 and **3.2million** mail items screened.



99.7% of mail arriving in New Zealand **meets biosecurity requirements.**



735 kiwifruit properties use **Onside** to keep track of plant material movements.

*Biosecurity protects our border' facts as at time of printing, July 2024, and include latest data released by Biosecurity New Zealand.

WHAT'S HAPPENING AROUND THE WORLD?

NORTH AMERICA

- Spotted Lanternfly (SLF) spread continues. It is now present across 18 states in northeast USA and population levels are said to be increasing.
- Yellow-Legged Hornet was spotted for the first time. Six nests have been destroyed over recent months in Savannah, Georgia. While not a direct kiwifruit pest, it is a significant threat to our pollinators.
- California is reporting increasing pressure from fruit flies. The state is managing four separate fruit fly outbreaks: the Queensland Fruit Fly (QFF), Tau Fruit Fly, Mediterranean Fruit Fly (MedFly), and Oriental Fruit Fly are all under eradication. This is the first time QFF has ever been reported in North America.

SOUTH AMERICA

- Many South American countries continue to battle fruit fly incursions. Unseasonable warmer weather has provided the perfect conditions for MedFly to proliferate in Northern Chile and Peru.
- A recent KVH visit to Chile has highlighted that *Verticillium Wilt* is still a significant threat to the production of yellow-fleshed kiwifruit. With no management techniques available, breeding for resistance is currently considered the only way forward.
- In Chile, Brown Marmorated Stink Bug (BMSB) continues to spread north and is now found in northern regions outside of metropolitan Santiago. However, there are no reports of BMSB present in commercial growing regions to the south.
- Research has highlighted that there are other *Ceratocystis* species that can impact our kiwifruit varieties, not just the Brazilian one - emphasising the need to consider the risk of *Ceratocystis* as a whole, and not just have a species-specific focus.

Keeping pace with change: Biosecurity risk constantly changes as new organisms are discovered, expand their host range, or invade new geographic areas. This map illustrates some of the key international events over the past 12 months that influence risk for the New Zealand kiwifruit industry, and are closely monitored by KVH, using our international research and intelligence networks.

EUROPE

- Oriental Fruit Fly worries many European countries. Italy continues their eradication programme. In Naples, the eradication is on track, with the infestation zone being reduced significantly through mass trapping and response measures. France remains concerned about its spread after multiple detections. Intercepted for the first time in Belgium, end of 2023.
- The Asian Hornet, another threat to pollinators, continues to spread across Europe. With a staggering increase in sightings in the UK, it is thought likely established in this new region. New AI tools are being rolled out to increase chances of early detection.
- There was a rise in BMSB numbers in Europe this year, particularly in France. Weather conditions during the 2023 European summer helped boost numbers.
- Samurai Wasp releases to combat BMSB will begin in the Italian region of Lazio - the only region yet to have releases. The focus will be the hazelnut production area.
- Kiwifruit Vine Decline Syndrome (KVDS) continues to be troublesome for Italian growers. Different factors have been associated with it, including the presence of pathogens but recent research suggests that recovery can be achieved where early onset is recognised by adapting irrigation to needs and improved soil management.

CHINA

- KVH and Zespri are continuing to collaborate and fund research based in China.
- Recent research has highlighted that all stages of the SLF are present in kiwifruit orchards, but sooty mould issues were minimal. The impact of SLF appears to be variable in different regions and at this stage we do not know the potential impact to New Zealand growers if it were to establish here.

AUSTRALIA

- South Australia has been battling QFF for over two years now and currently have more than 51 outbreaks across the region. It has also been detected in Adelaide in early 2024 after being eradicated from the region in late 2021.
- A car carrying vessel from China was sent out of Australian waters due to the presence of large numbers of Yellow Spotted Stink Bug (YSSB) onboard - a close relative of the BMSB.
- Australia continues to partner with New Zealand on a joint offshore scheme that sets the conditions for the regulation of offshore biosecurity treatment providers. Expanded from just BMSB, this programme is not pest and pathway specific, allowing for a future proof system that can proactively respond to an increasing number of priority biosecurity risks.

FOREWORD FROM THE BOARD CHAIR



KVH – and our growers – are in a good position to meet current and future biosecurity challenges.

Firstly, I want to acknowledge how difficult the last year has been for many of us. Poor bud breaks, storms, frosts and floods have done significant damage to vines and crops across the industry. It is pleasing to note that as a whole we've bounced back with a record crop being harvested, however this will hide the fact that for a number of growers, there is a long path to recovery in front of them.

The poor growing season last year also stretched to industry organisations who all suffered with the significantly reduced crop. KVH was no exception and at the start of the year was forecasting a loss for the current year in the vicinity of \$700k. I would like to acknowledge the leadership of our Chief Executive Leanne Stewart, and her team, who have done a great job of managing costs, whilst still delivering the high levels of service that is expected of KVH, and in the end made a saving of \$280k during this period.

While there is a lot outside of our control, and always will be, we are doing all we can to increase our readiness and preparedness and achieve the best possible outcomes for the kiwifruit industry.

When we talk about "being prepared" in the biosecurity space, it isn't centred around having one plan at the KVH office and opening it when we need to, telling people what to do. We're here to help you, our grower members, post-harvest facilities, and industry organisations we all interact with, to understand what could be at risk if we aren't vigilant to spot, and then ready to react, to any new, harmful pest or disease. Likewise, with support of growers last year, KVH now works in the Emergency Response Management (ERM) space to ensure the industry is prepared and can be resilient against future severe adverse events that impacts vine health.

It's about everyone having a place in biosecurity and emergency preparedness and being

accountable, so that we can protect what we've got and keep our orchards, businesses, and communities safe and productive.

As such, much of our work in this readiness space is undertaken in collaboration with others, as you'll read in articles on pages 16. KVH has long been an active and influencing partner in the Government Industry Agreement for Biosecurity Readiness and Response (GIA), creating clear plans in advance for how we – KVH, other industry groups, and government – jointly respond to specific incursions, including cost-sharing. GIA celebrated its 10-year anniversary this May, and you'll see in the article reflecting on this that there are numerous continuing benefits for kiwifruit growers.

Collaboration is also key to how we practice our responses. We talk about exercises on page 10, in particular "Exercise Tracey" which was run alongside Biosecurity New Zealand and Onside at the KVH Symposium in 2023. Over 100 people in the room that day – from across the kiwifruit industry and wider biosecurity roles in and outside the region – teamed up to work through an immersive simulation of an incursion of *Ceratocystis Wilt* in Te Puke.

With so much wide-ranging experience and skillsets in the room, not only do these exercises hone our response expertise, but they also bring forth another important element of readiness. New questions, new "what ifs", creating new queries, and finding new ways of answering what can often be quite complex questions.

This is invaluable. Being a grower myself, I know how important it is to feel confident that not only are we capable to respond appropriately, but we're also capable of pivoting and changing with new and emerging risks and challenges. In a response (as many of us will recall from Psa and perhaps other incursions you've been involved in) this can happen every day.

Which brings me to what can often be the backbone or foundation of a biosecurity response. Science and research. When events are regularly changing, situations evolving, and prediction becoming increasingly important to limiting on-orchard impacts, we continue to turn to our research – and our research partners – for input.

The kiwifruit industry biosecurity research portfolio is of particular interest to the KVH Board, and innovation is one of the priorities of KVH's organisational strategy. From page 17 onwards you will see summaries of several projects undertaken within this portfolio over the last year, their scientific findings, and practical output.

KVH and Zespri Innovation collaboratively fund and support this research portfolio. Without it, we'd very likely find ourselves on the back foot and unable to catch up if we were knee-deep in an incursion.

The case studies we've included in this Annual Update prove that by investing in science and innovation we improve our knowledge and understanding of biosecurity threats and create better tools for responding so that we lessen impacts.

They also demonstrate that sometimes, especially in cases of unusual symptoms being seen on vines, the various research projects and people we have as resources to refer to, help effectively and quickly ascertain whether something is new to New Zealand versus newly discovered, any new variants at play, and how widespread, or not, it may be.

Neonectria microconidia is a great example of how KVH investigated a new detection and worked with Zespri Innovation and research providers to deliver knowledge to understand the organism; provide management advice; and then transitioned this knowledge into the crop protection space.

I strongly believe that the organisation is in a position this year, and going forward, to meet all its goals on behalf of kiwifruit growers and help ensure a ready and resilient kiwifruit industry.

Thank you to the KVH team and my fellow Board members for another successful year and your continued dedication.

FOREWORD FROM THE CHIEF EXECUTIVE



Looking back over the past year, KVVH has achieved many things, not least a successful inaugural Biosecurity Symposium.

Held in August 2023, the aim of creating the event was to showcase how far we've come (as an organisation and industry) in our biosecurity practices, preparedness, and adaptability to changes in risk. We also wanted to create an environment of shared biosecurity experience and knowledge, so that we all continue to raise the biosecurity bar and ensure our continued resilience to pest and disease threats.

As the Board Chair notes, the Symposium included a response simulation (read more on page 10). The practicalities of a response - real or as part of a training exercise - is something I want to highlight, because this is the level of readiness that we need to successfully meet our response goals if we are ever faced with a major incursion.

We have had a big focus at KVVH, and through our KiwiNet network of champions, on building capability and ensuring the kiwifruit industry is ready to respond if needs be. This means getting down to such practical elements as training, practicing, writing plans, creating templates, arranging logistics, having the right tools and software. All things that enable us to effectively initiate support activities for growers and get it right, from the start.

The same model for biosecurity readiness and response is what KVVH will use if we are facing a significant adverse event that severely impacts vine health, under our expanded mandate of managing the industry's Emergency Response Management framework. You can read about this in detail on page 13, including work that has been underway to prepare for events and response training across the wider industry.

KVVH's new role in this space is backed by industry and facilitates a more co-ordinated and cohesive approach to supporting growers in times of need.

As you'll see throughout this year's Annual Update it isn't only at such times that we are directly undertaking engagement with growers. It's all the time, and it's fundamental to what we do. Feeding back information directly to growers at events and workshops has proven yet again over the last year to be a popular and preferred method for us to interact and share everything from details about the work we're currently doing and what's coming up; to orchard visits and demonstrations of unusual symptoms, sampling, and monitoring; to distributing brand new KVVH-produced education resources; to latest research findings and how this might help on-orchard practices, as we did alongside Plant & Food Research in Northland (page 23).

Collaboration with such research partners, and others, is something covered a lot in this year's update. The Government Industry Agreement for Biosecurity Readiness and Response (GIA), mentioned by the Board Chair, continues to be key to our preparedness efforts.

The partnership celebrated its 10-year anniversary in May 2024, providing us a fitting opportunity to reflect. KVVH was the first industry partner to sign up to the GIA Deed, signalling our intent to work constructively with others for the benefit of our growers – and we have proven that intent (and beyond) with a successful decade of advocating for our growers and industry and having direct influence on decisions that are made in relation to prevention and management of pests and diseases that can have a devastating effect on our orchards.

I was in Australia in May at the Plant Health Australia annual meetings with other New Zealand government and industry representatives to learn how the Australians work together under their collaborative partnership to prepare for and respond to biosecurity threats.

There are some similarities between our GIA and the Australian model, but also ways we differ to meet our individual country needs. The insights

from this visit will be helpful to shape the future of the New Zealand GIA partnership, which I have full confidence will continue to be successful in delivering better response outcomes for growers. You can read more about GIA and the operational agreements KVVH has been actively involved in on behalf of the kiwifruit and kiwiberry industries on page 15.

Early and proactive involvement in GIA and operational agreement development processes has meant that equitable cost share agreements have been able to be established. Fiscally responsible, and beneficial use of grower levies – that deliver positive and better outcomes for growers – is inherent in our strategy and operations.

This financial year (2023/24) the KVVH Board and team of staff have made savings that we are happy to say have left us in a better place than what could have been, without such strong commitment. Overall, KVVH was able to save \$280k on expenditure last year through careful financial management, while ensuring we still provided a high level of biosecurity support to the kiwifruit industry.

I'm sure you will enjoy the Annual Update and thank you for continued support of KVVH, and our activities. A big thanks in particular to all those we regularly work alongside, including our peers at Zespri and NZKGI.

Lastly, to the KVVH Board and team, thank you for another successful and productive year of supporting New Zealand kiwifruit growers and industry to protect themselves from biosecurity threats.

OVERVIEW: HOW READY ARE WE?



KVH enhances BMSB surveillance in kiwifruit growing regions by running an industry led trap and inspection programme with support from post-harvest.

KVH was established to manage the initial response and subsequent long-term management of Psa and over time our role has transitioned to an increasing focus on ensuring the kiwifruit industry is well prepared for the next biosecurity incursion. This transition has been a steady evolution from a reactive role to a proactive approach, reflecting the needs and priorities of the kiwifruit industry.

We recently marked a major milestone in this evolution, with the removal of the National Psa-V Pest Management Plan (NPMP), successful implementation of the new Pathway Plan, and as such, transition of some Psa management activities to Zespri.

KVH retains responsibility for high-risk Psa activities such as preparing for and responding to new forms of Psa and protecting growers and regions who do not have Psa. Legal controls also remain for the movement of risk goods that may spread Psa, but these controls are not specific to only Psa and allow for the management of a broad range of organisms.

This milestone is an appropriate time to reflect on our level of preparedness for the next biosecurity incursion and how well we have addressed the lessons learned from the 2010 Psa response.

Generally speaking, biosecurity responses are more likely to have favourable outcomes if a

new organism is detected early, is in limited distribution at the time of detection, and there are tools available to manage or control the organism. Using these key headings, we can reflect on our state of readiness and key priorities going forward.

EARLY DETECTION

New Zealand has national surveillance programmes for some of our high-risk pests such as Brown Marmorated Stink Bug (BMSB) and fruit flies which are administered by the Ministry for Primary Industries (MPI) but utilise research outputs from the Government Industry Agreement for Biosecurity Readiness and Response (GIA) Councils of which KVH is a member, representing the kiwifruit industry.

In addition to these national surveillance programmes, KVH enhances BMSB surveillance in kiwifruit growing regions by funding additional traps to supplement the national programme, and running an industry led surveillance programme with support from our post-harvest champions – who we are hugely thankful to for their commitment, collaboration, and time.

Pathogen surveillance in the kiwifruit industry largely consists of monitoring and testing undertaken as part of Kiwifruit Plant Certification Scheme (KPCS), Pathway Plan requirements and the industry reporting anything unusual observed on-orchard.

These formal surveillance programmes and our industry reporting systems provide a solid foundation, however over the longer term KVH is working towards a dedicated formal kiwifruit surveillance programme, and we currently have a multi-year project underway with Zespri Innovation to determine what this would entail. Outcomes from this work will be available for sharing with the industry this time next year, so watch this space.

MEASURES TO CONTAIN AN ORGANISM

One of the primary objectives of the Pathway Plan is to have an industry that has routine biosecurity practices in place in advance of the next biosecurity incursion, so that if something new is detected we increase the likelihood that the organism is in limited distribution and therefore eradication might be possible.

The KPCS is a key achievement in this area, ensuring all plant material movements meet a specified biosecurity standard, which is the pathway of highest risk of spread. Other practices such as biosecurity plans for growers, contractors and post-harvest operators are designed to identify risks and implement practices to mitigate these risks. Most importantly, traceability records provide an opportunity to follow up where spread may have occurred to identify the source and other properties that may be at risk.

A recent focus has been to provide digital tools through our ongoing partnership with Onside to allow growers to enter traceability data and enable KVH to utilise it easily and accurately. We currently have about 735 orchards who have enabled plant material recording on this app, and the more this grows so will our ability to utilise this promising tool (functionality to record plant material movements is available on the free version of Onside).

We also realise that biosecurity threats are not only spread through movement of kiwifruit plant material and have been working with other sectors to support Plant Pass, a voluntary biosecurity certification scheme to reduce risk across all plant movements in New Zealand. Uptake of this scheme continues to grow with more nurseries coming on board and as more purchasers look to source only biosecurity certified plants this will further reduce risk to the entire plant sector including kiwifruit growers.

TOOLS TO MANAGE OR CONTROL THE ORGANISM

KVH works on many layers to ensure we have the best chance to eradicate or reduce the impact of future biosecurity incursions.

At a national level we work with our GIA partners to pre-agree cost shares for responses for key threats so that a response can kick into action immediately. This includes readiness programmes to deliver tools and knowledge that can better prepare us for these organisms.

For kiwifruit specific threats, KVH works with Biosecurity New Zealand on readiness plans for priority pests and diseases that can be applied more generically to other similar organisms and tests these plans with exercises and simulations to ensure they are fit for purpose, but also to develop our own industry capability so that we are well prepared to respond.

With funding from Zespri Innovation, Zespri and KVH collaborate on biosecurity research with a dedicated Biosecurity Portfolio for research on threats not present in New Zealand. This portfolio not only provides knowledge but is building an arsenal of tools so that we are better prepared generically for whatever might arrive, and also to have specific tools for some of our high-risk threats.

These collaborations are key to leverage off each other's efforts and ensure an aligned approach – particularly where we have shared interests in biosecurity outcomes.

KVH is also increasingly engaging with international networks to learn about threats offshore and see first-hand how those on the ground are managing these threats. Each year we look to bring an international speaker to our Biosecurity Symposium and at the 2023 event we heard from the Fruit Fly Response Manager in South Australia about the increasing ongoing Queensland Fruit Fly incursions and the challenge this presents for growers there.

WHAT'S NEXT?

The activities highlighted above and throughout this Annual Update provide the kiwifruit industry with an excellent platform to be well prepared for the next biosecurity incursion.

However, reflecting a quote from the recent KPMG Agribusiness Agenda – “In responding to Covid-19, it was the small things like washing hands and wearing masks that did the most to protect us from infection. With the threats we face, it will be good farm management practices and hygiene standards that will offer the most protection”.

The question KVH pose to the kiwifruit industry is are we doing the little things well enough? Our future might depend on it.



READINESS THROUGH PREPAREDNESS



EXERCISING TO ENSURE WE'RE PREPARED

During the inaugural KVH Biosecurity Symposium, Onside and Biosecurity New Zealand joined KVH to run “Exercise Tracey”, which simulated responding to an incursion of *Ceratocystis Wilt* in Te Puke.

During this immersive exercise, attendees teamed up in the room to respond to the finding of the pathogen, learning how Biosecurity New Zealand conduct responses and how Onside technology could help speed up actions and help with a quick and effective biosecurity response.

The exercise stressed the importance of traceability when it comes to a quick and effective biosecurity response – including teams working through the specific differences data and record keeping make to decision making and actions that limit impacts on growers.

In the event of an incursion the goal is to reduce impact and increase the likelihood of successful outcomes. We know that one of the biggest challenges we will face is knowing where the disease, or pest is. Which orchards? Which nurseries? Has it spread to more than one growing region? As well as natural spread – as is the case with Psa and wind for example – plant material, equipment, machinery, people, and their footwear can all be contaminated and spread the problem potentially far and wide. Added to that, there can be several months between the initial incursion and detection of visible symptoms on vines and plants.

For almost two years now KVH has partnered with tracing technology providers Onside to offer kiwifruit growers’ biosecurity traceability within the well-used app, which identifies and analyses linkages between properties. After working in our groups through different response phases and challenges, we were then able to see via an Onside dashboard demonstration how this data would be used in a response and most importantly, see firsthand how it helps make efficient response decisions – especially around things like zoning, surveillance locations, and priority areas for potential new locations.



GIA HOLDS A UNIQUE POSITION CONNECTING INDUSTRY AND GOVERNMENT

The Government Industry Agreement for Biosecurity Readiness and Response, or GIA as its commonly known, is a partnership between government and industry for improving New Zealand’s biosecurity.

Under GIA, industry organisations – such as KVH – and the Ministry for Primary Industries (MPI) sign a deed that formally establishes the biosecurity partnership.

The GIA Deed outlines the principles for the partnership and the commitments that each Signatory makes to engage in the wider biosecurity system and co-invest to improve the collective biosecurity capacity and capability of industry and government in readiness and response – essentially, ensuring we are prepared and can hit the ground running in the event of a response.

Deed Signatories negotiate and agree the priority pests and diseases of most concern to them and agree actions to minimise risk and prepare for a response if an incursion occurs. Joint decision-making and cost-sharing helps to ensure that industry organisations have a formal role, alongside government, in managing their biosecurity risks.



AS A LEADING PARTNER IN GIA, KVH WORKS TO IMPROVE AND FUTURE-PROOF BIOSECURITY READINESS AND RESPONSE FOR KIWIFRUIT GROWERS BY INFLUENCING MANY AVENUES:



Shared decision-making and responsibilities in managing threats.



Shared costs of managing threats.



Creating awareness campaigns and education programmes to improve biosecurity performance.



Participating in working groups, which prepare for specific threats and incursions.



Collating and sharing information about New Zealand's biosecurity system and potential changes in risk.



Hosting and taking part in open forums to decide how to improve the biosecurity system.

During the last Queensland Fruit Fly responses in Auckland, we worked with MPI to decide how to respond to the incursion and provided technical support and resources, especially through the skilled KiwiNet network.

INDUSTRY ON THE LOOKOUT FOR THE UNUSUAL

Industry campaigns, roadshows, regional visits, KVH Bulletin articles, social media posts and regular industry catch-ups are all KVH focus areas to ensure that as an industry we stay on our toes in the reporting and follow-up of “the unusual”.

In the past year there has been a definite upswing in reports to KVH through the unusual symptoms process with 91 logged enquiries (from 1 June 2023 to 30 May 2024).

Amongst the unusual we found new associations, a new to New Zealand beetle and an oomycete (water mould) species not previously reported here. These additional snippets of information add to industry knowledge and follow-ups continually test and build readiness skills and working relationships between KVH, industry and MPI.

48

pathogen reports
(38 fungal/10
bacterial/nil viruses)

32

pest reports
(21 insects/11
nematodes)

3

offshore
enquiries

8

others
(2 nutritional/2 spray related
/2 environmental/2
management related)

Weather related issues have prompted many vine symptom reports and there are also great examples where growers have noticed and reported the unusual while carrying out every day orchard tasks.

BIOSECURITY RISK IS IDENTIFIED

A grower noted unusual galls or swellings when planting replacement rootstocks. Follow-up diagnostics confirmed the root knot nematode as causal. This was a new association for kiwifruit but with no biosecurity impacts.

KVH visited the grower's site to check additional plants for symptoms and surveyed and sampled a range of nurseries supplying bare-rooted plants. Diagnostics did not detect any further nematodes. Traceback and discussion with the original source nursery identified positive management changes to eliminate risk of nematodes going forward.

August 2023



February 2024



Reports of increased vine stress in the Gisborne region prompted a KVH visit to view symptom progression and discuss patterns of decline with affected growers.

The orchards visited had not been directly affected by flooding but were suffering the impacts of poor root condition after months of wet weather. Diagnostics of soil and plant samples ruled out the presence of exotic or new-to-the-area pathogens. *Oomycetes* (water moulds) were identified from soil and root samples and nematodes were also found in some samples.

A brightly coloured beetle resting in a Gold3 canopy in Te Puke piqued the interest of an observant grower who captured, photographed, and reported the visitor to KVH.

The find represented a first record of this *Paropsisterna* sp. leaf beetle in New Zealand and a first association with kiwifruit. MPI visited the orchard, and searched the surrounding area but found no evidence of an established beetle population. Further enquiry established that no biosecurity risk was associated with the detection for kiwifruit or other primary sectors and the investigation was closed.

March 2024



Being sure that any possible biosecurity risk is identified and managed and that growers are well supported if any further action is needed is always front of mind when completing these follow-ups.

SUPPORTING GROWERS IN AN EMERGENCY

A new Emergency Response Management (ERM) framework for the kiwifruit industry has been developed, with KVH at the helm, to facilitate a more coordinated and cohesive approach to supporting growers in times of need.

During a biosecurity response, the industry is well prepared and ready to come together - led by KVH - to develop and implement various activities quickly and effectively that limit impacts on growers and orchards and support continuing production.

The same response model, and way of working, has been adopted for use during other types of responses to significant adverse events. Why? Because with industry backing, KVH has expanded its strategic mandate to also coordinate responses to emergencies of significant scale

and impact (other than biosecurity) to the kiwifruit industry, through development of an ERM framework. Many different kiwifruit organisations provide support to growers during emergencies; however, by putting in place dedicated coordination of that support from one organisation, we can ensure that everything we do as an industry to help growers is efficient and effective, and limits further impacts. This enhancement to KVH's role provides value to growers by helping the industry be more prepared for emergency events and help aid in faster recovery. KVH has been successfully managing biosecurity and readiness and response activities for over a decade – we have proven internal readiness and response capability and strong relationships with others who also have a key role in emergency response management – such as the Ministry for Primary Industries (MPI).

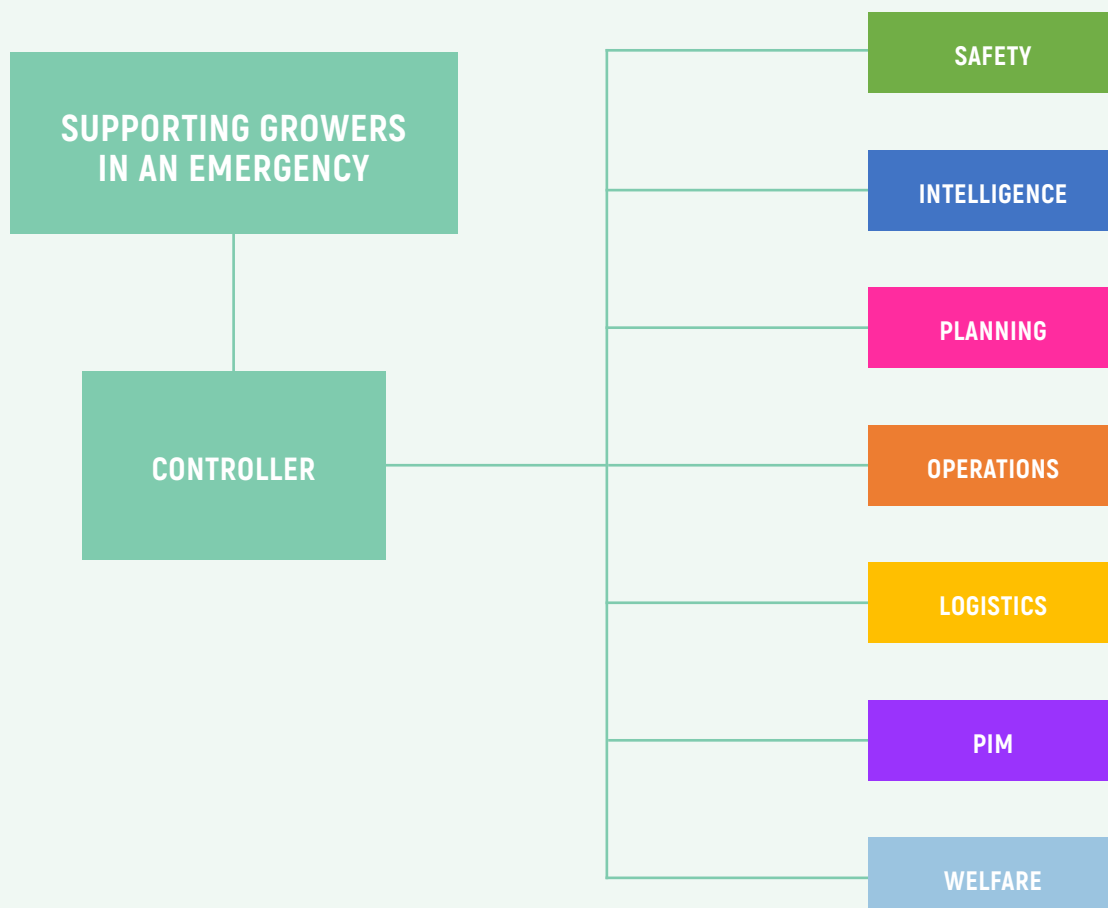
What is the framework?

The framework itself is a living document, updated as readiness work progresses.

Its purpose is to facilitate KVH coordination of governance and operational activities during an emergency response and there are a range of triggers that would be considered to activate the framework. In some instances when an emergency is extreme, it will be obvious that activation is necessary, in other instances there may need to be an assessment of criteria before any recommendation is made.

The framework that KVH intends to use to coordinate a response is the proven Coordinated Incident Management System (CIMS) that is used by emergency services across New Zealand. By following the CIMS framework the industry is using best practice during a response and can align with other response agencies as necessary.

CIMS RESPONSE STRUCTURE:



READINESS THROUGH COLLABORATION



SUCCESSFUL SYMPOSIUM BRINGS OUT THE BEST IN BIOSECURITY

The inaugural KVH Biosecurity Symposium took place over two days in August 2023 and was hugely successful, with a wide range of presentations, demonstrations, networking, and of course a big response simulation experience.

Onside and Biosecurity New Zealand joined KVH on day one to run “Exercise Tracey”, which simulated responding to an incursion of *Ceratocystis Wilt* in Te Puke and stressed the importance of traceability when it comes to a quick and effective biosecurity response – including teams working through the specific differences data and record keeping make to decision making and actions that limit impacts on growers. You can read more about this in detail on page 10.

Day two centred on the ways we are adapting to change as an organisation and industry, to ensure we continue to manage biosecurity risks and are

resilient against our priority pest and disease threats. What is out there that we need to prepare for, and how do we prepare for it? What impacts will changes in climate continue to have, and how do we know what is on the horizon? How are we innovating and using science to create tools for change?

There are too many presentation highlights from the day to mention, but a crowd favourite was Nick Secomb from the Department of Primary Industries and Regions in South Australia, who joined us via live video link to fittingly bring all the elements of biosecurity readiness and response together in one discussion about the numerous fruit fly responses underway across the state. He provided a fascinating insight into the approach, tools, and resources that they use to manage and limit impacts.

Several interactive panel discussions were held, including a closing session that provided an opportunity to nicely wrap the Symposium’s main themes together and focused on how changes in international trade and other megatrends (like

climate change) will significantly affect future biosecurity risks.

The group discussed how we prepare for a changing future, what lessons we can take from other experiences and how we innovate and adapt. Members included Dr Beccy Ganley, Plant Pathology Science Group Leader at Plant & Food Research (and Co-Chair of Tauranga Moana Biosecurity Capital); Craig Thompson, grower and KVH Director; and Dr Juliet Ansell, Head of Core & Resilience Innovation at Zespri.

Craig brought a grower perspective to the table, having been impacted by weather events in Gisborne early 2023. He discussed in detail what he observed on-orchard pre and post cyclone and how he worked through the KVH unusual symptoms process.

Juliet, then lead of the Zespri Innovation Resilience Platform (which is the home for biosecurity and climate change research), followed on from Craig’s comments to talk about research Zespri has underway to assist KVH and the industry prepare for future threats.



Signing the GIA Deed in 2014: Martyn Dunne, Director General of MPI, Peter Ombler, Chair of KWH, and Barry O'Neil, Chief Executive of KWH.

READINESS AND RESPONSE PLANNING WITH GOVERNMENT: A DECADE ON

There is always the risk of an unwanted exotic pest or disease making its way to New Zealand's shores and impacting kiwifruit.

While the industry has a good understanding of how to manage biosecurity risks, and the tools needed to identify emerging risks, there is also an engaged biosecurity relationship with government and a high level of capability to respond thanks to the Government Industry Agreement for Biosecurity Readiness and Response, or GIA.

The GIA partnership creates a framework where industry groups and the Ministry for

Primary Industries (MPI) - as the government's representative - participate in shared decision making and associated cost sharing for readiness and response activities, leading to better biosecurity outcomes for our growers.

Celebrating a successful 10-year partnership in May 2024, GIA's development was led by the strong desire for industry to be able to have a direct influence on decisions that are made in relation to prevention and management of pests and diseases that can have a devastating effect on our orchards.

There are now 24 industry partners signed up to GIA, of which KWH was the very first on 20 May 2014. This was a significant achievement and was driven on the back of the Psa outbreak and direct industry involvement in the management of the disease.

KWH works collaboratively with other industry groups and MPI through GIA Operational Agreements to undertake research so we can better understand the risks and management recommendations that can be applied in a practical sense for growers. And where knowledge gaps exist that are specific to the kiwifruit sector, KWH works collaboratively with Zespri Innovation to overcome these.

Early and proactive involvement in the GIA development process has meant that equitable cost share agreements have been able to be established in the respective Operational Agreements and our representation over recent years in key GIA leadership positions means we have an ability to influence policy (politically as well as within MPI) outcomes.

FIVE SEPERATE OPERATIONAL AGREEMENTS SIGNED BY KWH SO FAR:



Fruit fly: joining MPI and organisations representing the pipfruit, avocado, citrus, summerfruit and vegetable sectors.



Kiwifruit sector specific: for threats that may only impact the kiwifruit and kiwiberry sectors (such as *Ceratocystis fimbriata*, *Verticillium Wilt*, Psa-non-New Zealand strains, Invasive *Phytophthoras*): joining MPI.



BMSB: joining MPI and a wide range of industry groups.



Plant production biosecurity scheme: promoting risk management of all nursery material.



Lepidoptera Working Group: joining MPI and impacted horticultural, arable and forestry parties on readiness.

BIG THANKS FOR ONGOING PHEL SUPPORT

Unusual symptoms come through to KVH in many guises, from bugs in a jar or egg rafts on fruit, to unusual mushrooms on vines and reports of multiple vine collapse. Triage of reports for sampling and diagnostics involves ongoing collaboration with many networks to be sure that any biosecurity risk is identified and managed.

Often industry technical teams report unusual symptoms on behalf of growers and this group also offers a pool of experience to help identify possible nutritional, spray or environmental related problems. Scientists from Plant & Food Research are also on hand and are generous in helping with identifications and advice on next steps.

Routine Psa-like symptoms can be directed to Hill Laboratories for organism ID or resistance testing. This team also undertakes industry Kiwifruit Plant Certification Scheme (KPCS) testing programmes.

Samples related to kiwifruit trunk and root diseases are sent to Plant Diagnostics Ltd in Christchurch, with permissions for this North to South Island movement of plant material arranged by KVH. The team is experienced in analysis and diagnostics for fungal, bacterial, and viral plant disease issues, and can also support by providing management advice to share with growers.

Acting as the backstop for all investigations, we are privileged to have ongoing diagnostic support from the Plant Health and Environment Laboratory (PHEL) of the Ministry for Primary Industries

(MPI). This plant health reference laboratory is responsible for identifying and confirming all suspect new plant pests and diseases, and invasive plants found in New Zealand. Any apparent new to New Zealand finds, or new host associations are directed to the PHEL team for identification, and if required investigations to rule out the possibility of biosecurity risk.

Over the past year PHEL have supported 26 unusual symptoms investigations, Plant Diagnostics Ltd received 16 samples for diagnostics, and Plant & Food Research teams assisted with 28 pest and vine related reports. This ongoing support and sharing of information between collaborative groups ensures our unusual symptoms reporting is in good hands.

THE STRONG RELATIONSHIPS WITH PHEL AND OUR OTHER DIAGNOSTIC PARTNERS ENSURE OUR UNUSUAL SYMPTOMS REPORTS ARE IN GOOD HANDS.

In early 2024 KVH held a series of workshops with a wide range of experts to draw on their expertise and knowledge to help us focus our future readiness activities.

The first workshop was hosted in Auckland at PHEL where we were lucky enough to get 13 diagnostic and surveillance experts in the room. We spent some time walking them through the industry's experience from Psa, what our key biosecurity activities have been to date, and then workshopped focus areas where we could strengthen our resilience in the future.

The second workshop was held in Wellington and involved a range of Biosecurity New Zealand readiness and response experts. Again, drawing on their years of experiences in response to help highlight what areas KVH could develop to ensure that should we ever find ourselves in a response, we have the right tools and processes to give us the best chance at a successful eradication.

We organised these events as part of our GIA relationship and what we learnt from them will feed into our work programmes.



READINESS THROUGH SCIENCE

Biosecurity research is a bit like an insurance policy - by investing in science now, we can better protect and prepare for the possible impacts of pests and diseases in the future. If we don't have a plan in place now, we'll be too far behind if and when we're faced with a big incursion.

Biosecurity science and innovation underpins our ability to be prepared for our biggest biosecurity threats, now and into the future.

Research provides us with foresight and helps to ensure our resilience – not only by providing the knowledge to better manage a possible incursion of an unwanted pest or disease, but also by giving us the practical know-how to develop tools that will help prevent or slow their spread and manage them in a sustainable way.

KVH partners with Zespri Innovation to undertake scientific research, in collaboration with the Kiwifruit Biosecurity Advisory Group. The group provides expert advice, recommendations, and decision-making support to KVH/Zespri to set up strategic direction of the Innovation portfolio to ensure delivery of objectives.

The group aims to reduce the risk and impact of future incursions to the kiwifruit industry by reviewing current and emerging kiwifruit biosecurity risks, identifying knowledge gaps, and prioritising research accordingly.

Expert membership of the Advisory Group includes representatives from KVH and Zespri, as well as the Ministry for Primary Industries (MPI), Plant & Food Research, Scion and an external industry representative - currently from New Zealand Winegrowers.



THE KIWIFRUIT BIOSECURITY RESEARCH PORTFOLIO

The Kiwifruit Biosecurity Research Portfolio includes research projects on pests and pathogens that potentially represent a significant threat to the kiwifruit industry and have not yet been reported within New Zealand.



PROJECT

NEONECTRIA SYMPTOM SURVEY IN THE NORTH ISLAND

AIM

Neonectria symptoms can be mistaken for other vine decline issues. This project sought to gain a better understanding of symptomology.

FINDINGS

- *Neonectria* is not typically infecting kiwifruit vines in isolation.
- It often forms part of a complex of organisms associated with kiwifruit trunk disease (KTD).
- Symptoms are often visually indistinguishable from other KTD symptoms.

PRACTICAL OUTPUT

- Reinforced KTDs can be managed with similar management practices which are integral to slow the spread and reduce any significant implications to yield going forward.

PROJECT

MULTISPECTRAL IMAGING: WILD KIWIFRUIT

AIM

A proof-of-concept study to test whether remote sensing technology using satellite imagery could be utilised to identify wild kiwifruit infestations.

FINDINGS

- Remote sensing utilising satellite imagery data with artificial intelligence could be used to identify wild kiwifruit infestations.
- More work is needed with high-resolution data to overcome some challenges before use operationally with a high level of confidence.

PRACTICAL OUTPUT

- Provides data to suggest that remote sensing could be a valuable tool for detecting wild kiwifruit infestations.
- Further work commissioned to refine approach.

PROJECT

CHINESE TRANSLATION OF DISEASES

AIM

To provide an overview of selected key risk pathogens for kiwifruit reported in Chinese literature.

FINDINGS

- Several pathogens were highlighted from the literature to have a negative impact on kiwifruit.
- Viruses remain understudied.
- Good orchard hygiene was cited as a control method for multiple pathogens.

PRACTICAL OUTPUT

- The information gathered on impact, symptoms, host range etc. was fed into KVH risk assessments to evaluate the risk of these pathogens to the New Zealand kiwifruit industry.

PROJECT

CHILEAN VERTICILLIUM RISK ASSESSMENT

AIM

This project compared *Verticillium nonalfalfae* strains in New Zealand to highly damaging strains in Chile to evaluate the current risk of *Verticillium Wilt* in New Zealand kiwifruit production.

FINDINGS

- New gene sequence was identified to distinguish Chilean isolates from New Zealand.
- Molecular comparisons confirmed that the *Verticillium* isolates in Chile are genetically different from those found in New Zealand.

PRACTICAL OUTPUT

- A new diagnostic test can be developed to expand the toolbox for *Verticillium* diagnostics.
- Baseline knowledge of current *Verticillium* risk will ensure we react appropriately to any new detections.

PROJECT

UNDERSTANDING THE RISK OF CHERRY LEAF ROLL VIRUS (CLRV)

AIM

CLRV is a virus present in New Zealand and screened for in the Kiwifruit Plant Certification Scheme (KPCS) to prevent distribution in the industry. This project aimed to understand the impact of CLRV on Gold3.

FINDINGS

- CLRV infection in Gold3 negatively impacted cane and shoot growth, reducing crop yield.
- Variability in CLRV detection, requiring optimisation of sampling and testing protocol.

PRACTICAL OUTPUT

- Continued vigilance by the industry is crucial to prevent the spread of CLRV infection to and within planted kiwifruit orchards.
- New project underway to optimise the sampling and testing protocol for CLRV.

PROJECT

BMSB BIOCONTROL

AIM

This project sought to better understand the phenology of Brown Marmorated Stink Bug (BMSB) and refine release strategy for the biocontrol Samurai Wasp in kiwifruit orchards in China.

FINDINGS

- Organic orchards generally had a higher incidence of BMSB fruit damage.
- BMSB feeding damage occurred in kiwifruit soon after fruit set and continued until fruit harvest.
- Optimal biocontrol release numbers, timings, and frequency in kiwifruit were established, which reduced fruit damage in experimental orchards from 40% to 20%.

PRACTICAL OUTPUT

- This information can be used in a BMSB incursion to reduce impacts to New Zealand kiwifruit orchards.

BIOSECURITY RESEARCH PAINTS A PICTURE WHEN DEALING WITH PUZZLE PIECES

While much of our research in biosecurity is focused on preparing ourselves for an arriving threat, this does not mean that it just sits in the corner until we might need it. Our research creates knowledge that can be shared, and drawn on, without being faced with the next big incursion.

The following case studies highlight the value of this research and how we use this practically to piece together existing knowledge to ensure we are reacting appropriately – and sufficiently – to any emerging threats.



Phytophthora Investigation image from the affected orchard, showing specific impacted vines.

CASE STUDY:

PHYTOPHYTHUM INVESTIGATION: IS IT A NEW ARRIVAL, OR JUST NEWLY DISCOVERED?

Early in 2024, KVH received a report of a six-year old development block which had pockets of vines that had deteriorated over the past three years to the point where they were no longer producing a crop.

Symptoms included lack of cane and canopy development with the largest single impacted area being about 20 vines. Otherwise, the orchard was in good health.

KVH visited the grower and samples were taken as per our Unusual Symptoms process. Four pathogens were isolated - *Phytophthora littorale*; *Phytophthora citrophthora*; and *Fusarium* species (which are all present in

New Zealand); as well as *Phytophthora helicoides*, which represented the first New Zealand detection.

P. helicoides has been on the KVH unwanted list as a known offshore pathogen of kiwifruit. It has a wide host range of over 20 plant families, but the first published reports of impacts in kiwifruit were out of China in 2015 where initial symptoms included necrosis of leaf margins and leaf curl, followed by decline and plant death. Affected kiwifruit plants also exhibited root and collar rot. More recently, it has been identified in Kiwifruit Vine Decline Syndrome (KVDS) impacted vines in Italy.

Considering this was a known pathogen to KVH and not previously detected in New Zealand, we notified the Ministry for Primary Industries (MPI) and a collaborative investigation was launched to determine the biosecurity risk and mitigation steps required.

It's not unusual to detect *Phytophthora* or *Phytophthora* species in samples submitted through KVH's Unusual symptom process (particularly in areas with excessive soil moisture), and while there was no evidence to suggest that *P. helicoides* is a new arrival to New Zealand, we wanted to be sure so that we were managing the risk appropriately.





Phytophthora Investigation image from the affected orchard, showing a specific impacted trunk.

First things first, we needed to manage any on-orchard risk while gathering information. This detection was relatively close to harvest, so to limit any possible spread early on we implemented a number of on-orchard hygiene practices including restricting access to the area where the sample was collected, avoiding harvesting fruit from affected vines, and preventing soil transfer from the area. Also, no movements of plant material from the orchard (other than fruit) were allowed.

Next, understanding the distribution within the orchard was important to learn more about how established it was within the initial detection area. Using a sampling plan provided by MPI, additional samples were collected from the block where *P. helicoides* was isolated.

From 10 additional sites *P. helicoides* was found in two soil samples and one vine. Samples collected from other blocks in the same orchard found *Phytophthora* species but not *P. helicoides*.

Once we knew it was established in the orchard, the last missing piece was whether it was present elsewhere in New Zealand - this would help us gauge how significant our next steps should be. With few specimens in the

National Reference Collection to analyse, we looked to pull on our knowledge recently gained through a Zespri Innovation funded project.

Originally, this project was looking to ascertain the baseline species of *Phytophthora* we have in our kiwifruit orchards in New Zealand. With 128 kiwifruit orchards surveyed, and over 500 samples collected from different kiwifruit growing regions in New Zealand, we had a big pool of potential knowledge we could tap into relatively easily. Fortunately, soil samples and some isolates from this survey were stored for future use, which proved to be an invaluable step in the process.

Phytophthora and *Phytophthora* are both *Oomycetes*, which are a group of fungal like organisms that thrive in wet conditions. For this project, vines located in *Oomycete*-favorable conditions were targeted for sampling, including wet and waterlogged areas, low-lying dips and hollows, and areas with heavier soils, promoting the likelihood of detecting this *Phytophthora* if it was present.

Next steps were for research providers to work with MPI to re-analyse samples collected from the *Phytophthora* survey to see if this organism

can be detected. Results highlighted there was a positive match found in a sample collected two years ago from a different region. This suggests this organism is likely well established in New Zealand and has been here a significant amount of time already, ultimately helping to conclude that it was not a recent arrival but rather a new detection of an established pathogen. This piece of information was a lynchpin that allowed us to move to close out the investigation with MPI and leave any residual risk management with KVH.

What became clear was that without this research, it would have been difficult to ascertain how widespread this pathogen was. It may have resulted in extensive sampling, movement controls remaining in place longer, and further risk management practices being put in place until we were able to establish this information ourselves.



CASE STUDY:

NEONECTRIA: BUILDING FOUNDATIONAL KNOWLEDGE

Neonectria microconidia is another good case study of how KVH investigated a new detection and worked with Zespri Innovation and research providers to deliver knowledge to understand this organism; provide management advice; and transitioned this knowledge into the crop protection space as we continue our hunt for and protection from, further new threats.

KVH's first encounter with *Neonectria microconidia* in 2015 was when a proactive North Island grower called to report unusual trunk and leader canker symptoms from three young G3 blocks.

This was the first formal identification of *Neonectria microconidia* in New Zealand. Further investigation by MPI and researchers found evidence that it had in fact been present as early as 2001 (and likely much longer) but was recognised under several different names. So, while we found out quite early that this organism was not a new arrival, we did not understand the risk it presented to the industry or how it could be managed.

When a South Island grower reported an increase in cane and leader dieback in G3

blocks, from which *Neonectria* was isolated, a dedicated research project commissioned by Zespri Innovation and KVH, was launched.

Five years on, we now know more about its host range, pathogenicity (ability to cause disease), life cycle, history and distribution in New Zealand and can conclude that this organism is part of the complex of organisms known to be associated with kiwifruit trunk disease (KTD). Research has told us:

Neonectria is not a new threat and is found throughout all our growing regions. It has been present in New Zealand since at least 2001.

G3 appears more susceptible to *Neonectria* infection, although all varieties can be impacted.

Neonectria is not typically infecting kiwifruit in isolation and often forms part of a complex of organisms associated with KTD. However, *Neonectria* can be a single pathogen issue too, particularly when it is infecting the wood up in the canopy.

Symptoms of these KTD complexes vary as they can include a variety of external and internal wood decay symptoms including swollen or

uniformly enlarged trunks, cracking, cankers or discrete bulges of the trunk or leader, collar rot/crown decay, sparse canopies and sudden death of a leader or the entire vine.

Neonectria symptoms are often visually indistinguishable from other KTD symptoms so management across all trunk diseases is needed.

While our research into KTDs has been valuable at filling some of those key knowledge gaps, given the results have not indicated the presence of new-to-New Zealand biosecurity threats, it was decided that any further research would be better suited to the crop protection portfolio opposed to biosecurity.

However, KVH is still here to support growers wanting to understand disease presence on-orchard, particularly if there are unexpected or sudden changes in your usual orchard health that could indicate the presence of something new.

Examples of swollen trunks, a common KTD symptom. Monitoring and tagging of symptomatic vines is a good way to track disease presence, location, and extent across an orchard.





FEEDING BACK TO GROWERS:

Alongside Plant & Food Research, KVH hosted a workshop to reconnect with Northland growers, share recent research outcomes and offer advice and strategies to help those faced with the challenge of KTD.

It was great to see over 30 growers and industry folk on the day, who came along to hear the results from an extensive five-year research programme on *Neonectria* and other associated vine decline. Results from the research formed the first session, setting the scene and generating questions and discussion; with everyone open to sharing their own experiences with KTD's across the region.

After an information filled morning, it was out into the field to observe symptoms first-hand. This was a great opportunity for growers to see up close and personally how KTD can typically present itself on impacted vines and reflect on what they are seeing in their own orchards.

It was obvious from the many discussions that KTD is a shared problem amongst growers and there is nothing like hearing firsthand about others' challenges, and successes, when managing trunk disease. There was a real focus on practical management strategies, and it was encouraging to see so many walking away from the workshop discussing the actions they would be implementing on their own orchards.

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