ANNUAL REPORT 2016/17

Global Unwanted Pest Update

Good Biosecurity Means Good Business: Growers Setting the Example

Ceratocystis fimbriata

Three Days from Symptoms until Death

10–30% Vine Mortality

KIWIFRUIT BIOSECURITY RISK:

Are We Prepared?

CHAIRMAN'S FOREWORD

COMMITTED TO BIOSECURITY AND READY TO ACT

New Zealand is one of very few countries to proactively manage its borders against biosecurity incursions. The ramifications to our primary industries, our economy and our native flora and fauna through a major incursion can be huge, as we saw with Psa and we are starting to see play out more with myrtle rust.

The threat of a biosecurity breach remains, with the number of people entering our borders increasing, the number of mail packages almost doubling and the number of shipping containers arriving at our ports also significantly increasing.

In the past, the Ministry for Primary Industries (MPI) was tasked with the responsibility for biosecurity. However, there has been a significant shift and in-depth rethink about how to manage biosecurity for New Zealand. It is evident that if we are to successfully protect our industry and what is uniquely New Zealand, a collective and collaborative effort will be required. Every New Zealander must take responsibility for biosecurity.

In December, MPI released their Strategic Direction on biosecurity – Biosecurity 2025. It focuses on several key direction statements and you can read more about KVH's participation in the creation of the directions on page 13 of this Annual Report.

"Every New Zealander must take responsibility for biosecurity"

To ensure it continues to be effective, KVH has undergone a strategic refresh to provide a fit for purpose and focused industry body. It is based on a three pronged defence – protection, readiness and response, and management.

In terms of protection, that means the work KVH does helps stop any biosecurity risk before it reaches our border (through global scanning to identify new risks and influencing government and industry) and ensures nothing arrives here that we didn't already know about.

This includes influencing policy setting and working with regulators to develop and implement legislation that affects the industry. KVH is a key partner in the Government Industry Agreement (GIA) achieving maximum value for the industry in the delivery of cost-effective biosecurity operations.

The organisation will continue to focus on readiness and response activities so the industry is prepared and ready to respond quickly to an incursion. This involves having robust plans in place that are explicit about the roles and responsibilities of all parties, testing those plans (through simulation exercises and workshops), and making sure everyone involved has the tools, systems and resources they need to be effective.

In the event of an incursion, KVH will undertake ongoing management, including on-orchard management strategies should pests establish and ensuring everything the industry does is well co-ordinated with other sectors and MPI. A large part of this work is identifying and promoting 'best practice' to reduce biosecurity risk to growers and the industry. Proactively communicating this to all growers and industry leaders, in a range of ways, is more important than ever.

Underpinning the strategy is a three-tier comprehensive communication, awareness and influence campaign that ensures growing biosecurity awareness, and a KVH/Zespri funded Research and Development programme that is providing viable and pragmatic solutions to some of our biosecurity issues.

The new strategy reflects the significant change KVH has been through since its inception in 2011 when activities focused on Psa, to an organisation that now leads biosecurity protection on behalf of kiwifruit growers and industry, and exerts considerable influence in the biosecurity area more generally in order to benefit kiwifruit growers.

Through the activities of the past 12 months and its clear strategy for the future, KVH is committed to ensuring the kiwifruit industry does its part for biosecurity efforts in New Zealand, and ensuring a biosecurity resilient kiwifruit industry. This year's Annual Report clearly demonstrates that. »

THE KVH STRATEGY 2017-2020 IS BUILT ON A THREE PRONGED DEFENCE.

1. PROTECTION

Stopping any biosecurity risk before it reaches our border, through global scanning to identify new risks and influencing (government and industry) to prevent the arrival of new threats.

2. READINESS & RESPONSE

Being prepared and ready to respond quickly to an incursion by having plans in place that are explicit about the roles and responsibilities of all parties. Several joint workshops have been held to focus on details that will need to be worked through in the event of an incursion, including possible movement restrictions and control approaches for example, how information will be distributed to growers, and how joint activities will be cost shared.

3. MANAGEMENT

The ongoing management of an incursion, including on-orchard management strategies should pests establish and ensuring everything the industry does is well co-ordinated with other sectors and MPI.

The KVH team have been instrumental in driving biosecurity solutions and lifting awareness within the kiwifruit industry and within New Zealand. The industry was a first mover in signing the GIA deed - read more on page 12 - and has been a leader in developing plans for readiness and response to horticultural and kiwifruit specific threats, Brazilian Wilt as an example. This proactive stance is providing strong leadership and influence in Wellington within MPI and among other sector groups.

An example of KVH's efforts in the leadership space includes the work undertaken advocating for tighter controls on the import of Italian kiwifruit to reduce the risk of White Peach Scale (WPS) entering our borders. There has also been significant engagement with kiwifruit importers to ensure they are aware of the threat WPS poses and the measures they can take to reduce risk.

MPI data shows that interceptions of WPS have declined significantly this past season despite a similar level of on-orchard infestation reported offshore.

KVH has also demonstrated its leadership through the joint Biosecurity Operational Excellence project at Port of Tauranga, which aims to have no biosecurity incursions at the port and create a community committed to biosecurity. You can read more about the success of this initiative on page 15.

The change in strategic approach and future focus means doing considerably more biosecurity – and correspondingly less Psa – over time. As such, the funding basis for each should be amended and for approval at this year's Annual General Meeting (AGM) is the reversal of the two levies (National Pest Management Plan levy order and Biosecurity Psa-V kiwifruit levy order). By simply reversing the two, the total amount growers pay is identical to last year and fiscally neutral.

What this does mean however is that the biosecurity level will be set at its maximum level allowable. Tray numbers have decreased from what was estimated this year and this significantly impacted on KVH's budget. This, along with the organisations increasing biosecurity work and commitments under GIA mean we will be coming to growers to have a discussion about changing the levy order to ensure the best biosecurity protection is provided.

I do hope you enjoy reading the articles in this year's Annual Report. I thank the Board and the team at KVH for their continued efforts.

In particular, I would like to acknowledge Lorry Leydon, who has completed his two-year associate director term, and current KVH Chief Executive Barry O'Neil whose contract finishes in March 2018. While the Board regrets that Barry has decided to move on, we have accepted this and begun the process of finding his replacement. ■

Adrian Gault – Board Chairman

CHIEF EXECUTIVE'S FOREWORD

THE FOUNDATIONS WE'RE PUTTING IN PLACE NOW WILL PAVE THE WAY FOR TOMORROW

As an organisation, and industry, the last few years have taught us much about the importance of ongoing biosecurity efforts.

The scars of Psa are still there for us all to see and management of the disease remains an important element of our day-to-day work. It's clear though that we must also be focused on the identification and mitigation of other biosecurity threats to the kiwifruit industry. We're in a relatively good space now but we can't rest on our laurels. We must do everything we can to remain well prepared and quickly able to respond to any biosecurity incursion.

Over the last year we've continued to work closely with central Government to advocate for the very best kiwifruit biosecurity. Since 2014 when we were the first primary industry to sign the Government Industry Agreement (GIA) deed we've made it a priority to actively pursue further operational agreements.

First there was a Fruit Fly one in May 2016, and then in March 2017 we signed a second agreement for four of the most common threats to kiwifruit and kiwiberry industries. We were also part of a group that developed one for the Brown Marmorated Stink Bug.

The Biosecurity 2025 Direction Statement has been essential to the work of KVH and we provided input to it throughout the drafting process. I'm pleased with all five of the final directions within the statement. They're a step forward and the things we've learnt from Psa are well reflected–this will help us better manage any similar incursions further down the line.

Research and Development is also a priority and will continue to be so into the future. It's a critical part of finding better and more sustainable solutions.

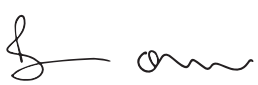
Education and communication continue to be a focus for KVH. Growing biosecurity awareness within the industry is one thing, but increasing knowledge amongst the wider public is another. It's a necessity and the only way we're going to ensure a fully integrated system where everyone is on the lookout for and reporting anything unusual.

We've recently initiated social media channels to engage with the wider public (and growers that are online) about biosecurity in a quick, uncomplicated way. That's not to say we won't be continuing to meet with growers like we always have. We often get feedback that meeting face-to-face and having the opportunity to discuss concerns or new ideas is the preferred method of communication for the majority of growers. We're committed to continuing to be a trusted source of valuable information that growers–and the industry–can rely on.

Finally, reflecting the changes KVH has been through and the future of the organisation, you'll notice this year's update has a refreshed look and feel to it – including an updated logo. This too reflects the organisation moving forward. We're no longer only about Psa and have a much wider breadth of responsibilities. Over the coming months, we'll progressively introduce this design as we replace stocks of material like signage and posters.

Included in this update is a copy of a leaflet called About Us. It's new and helps us to promote our story: who we are, what we do, and how we do it. We've designed it in a way that helps all our audiences gain a clearer and more concise understanding of KVH now, and into the future. I hope you find it useful, do share it and feel free to order more from us.

Finally, and in tune with the theme of this column being about the future, this is my final address in the Annual Report as Chief Executive of KVH. I will be stepping down from the role in March 2018 after a six-year term. My thanks to the KVH staff and Board for the constant support and commitment – not only to me but to the growers and industry. I have absolute confidence in the organisation going forward being a necessary protector for our fantastic industry. ■

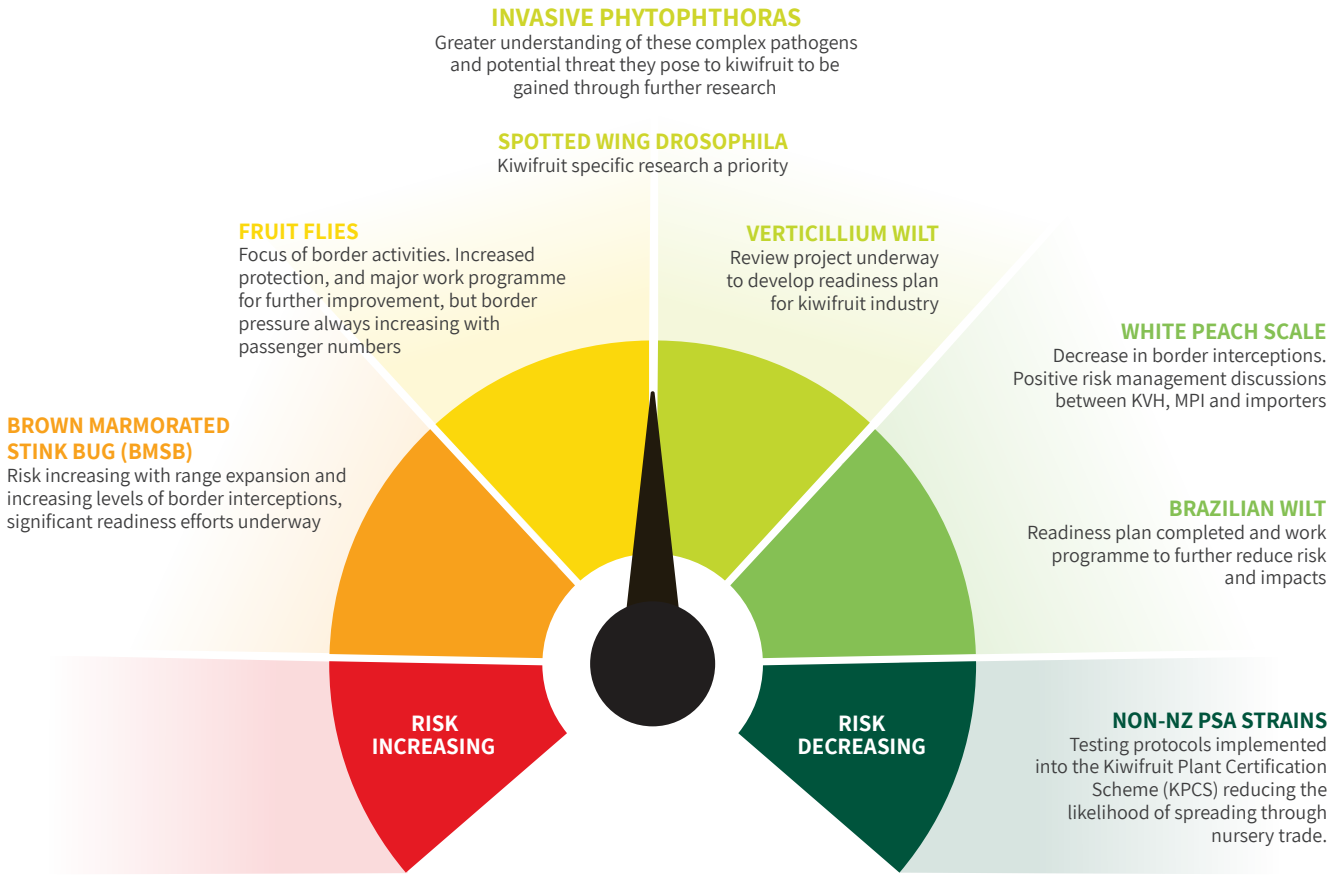


Barry O'Neil – Chief Executive

“The 2017 KPMG agribusiness leaders survey found the number one priority for leaders is the maintenance of a world-class biosecurity system”

‘Agribusiness Agenda 2017 – The recipe for action’
KPMG New Zealand.

HOW BIOSECURITY RISK IS CHANGING



HOW KVH IS INFLUENCING BIOSECURITY RISK

Some of our activities to reduce risk include:

UNDERSTANDING OUR EMERGING RISKS

KVH works closely with the Ministry for Primary Industries (MPI), the science community and kiwifruit growers all over the world to learn about biosecurity threats. Our network is continually growing, giving us a better understanding of risks. Our website list of known threats to kiwifruit currently names 66 organisms, up from 58 this time last year.

EARLY DETECTION FOR THE BEST CHANCE OF ERADICATION

Early detection of BMSB has been a key focus for KVH this year. We have put significant efforts into raising awareness with the public, kiwifruit industry, and importers about where and how BMSB may enter the country.

READY TO RESPOND

KiwiNet, our industry biosecurity champions, tested our Brazilian Wilt readiness plan with a simulation in December 2016. A kiwifruit industry workshop, run as a crisis event, has developed a readiness plan to manage BMSB on-orchard, should it establish here in the future.

ON-ORCHARD BIOSECURITY

When growers report unusual vine symptoms, KVH ensures samples are submitted to MPI for testing. However monitoring and reporting hasn't reached the level required to confidently detect a new biosecurity threat at an early stage. KVH has made progress in developing on-orchard biosecurity plans, with input from industry champions.

Note: Green on the dashboards indicates where we are well prepared, red indicates where improvement is needed.

CREATING GOOD BIOSECURITY PRACTICE MAKES GOOD BUSINESS SENSE

Allan Dawson, Managing Director at Aongatete, talks to us about the importance of biosecurity and how it can be naturally integrated into an organisations day-to-day operations.

Allan Dawson, Aongatete

"Biosecurity is vitally important to the horticultural industry and New Zealand as a global exporter. New Zealand's ability to grow produce, to supply the world and to continue to prosper as a primary producing country depends on our ability to manage biological threats. These threats are growing due to the increased movement around the world of virtually everything that can act as a biological vector. Biosecurity is a moving target. That means our risk management practices must be continually 'honed' and upgraded to provide practical defence against, or control of, biological threats."

Allan has been involved with the kiwifruit industry for almost 40 years and although there have been significant improvements in biosecurity over the decades, he says the kiwifruit industry is at risk of becoming complacent, despite the devastation caused by Psa.

"We shouldn't forget that the Psa incursion has come at a huge cost to both growers and the community, however the incursion has faded into the background somewhat because of the outstanding success of the Gold3 cultivar. For an unproven variety to emerge from the Plant & Food/ Zespri breeding programme, to take over from 16A and become such an instant success is undeniably lucky. Regular monitoring, observation and recording is the smart way to achieving a sustainable growing regime on-orchard."

When thinking about how we control existing bacteria like Psa, Allan says we must use and continually evaluate the methods and practices that have been developed by the industry and which science has shown to work. This includes sprays, cultural techniques and pest monitoring.

"Healthy plants - just like healthy people - are less prone to disease and the removal of stress in our microclimate is a win-win situation; reducing stress and disease while increasing yield."

Mentioning health leads us to that all-important and all-encompassing topic of Health and Safety – something Allan says organisations have become used to incorporating as part of standard business practice and biosecurity should be the same.

"Incorporating biosecurity (and Psa procedures) into our day-to-day life is something akin to incorporating Health and Safety – both processes eventually become second nature and are good for business."

All staff must be trained in procedures and observation he says, especially when it comes to harvest and on-orchard hygiene.

"At Aongatete, we have a well-documented schedule of Psa procedures, which essentially follow KVH recommendations, and an in-house associated check list. It's interesting to note that people's powers of observation and their ability to accurately detect disease varies greatly and it is well worth finding and using these people in your monitoring team. In many respects achieving staff buy-in to Psa procedures is a bit like the buy-in required for Health and Safety. We must have commitment from the top down."

The key for Aongatete says Allan has been to think of it as a live process that becomes naturally integrated into everyday thinking and daily work plans, taking less time and trouble than some may realise.

"The training of people to be good biosecurity observers is really just part of being a good grower. Good growers are the first to notice small or subtle changes in vines and leaves. They always do everything on time, like spraying. Timing is critical for all horticultural operations when plant health and performance is concerned. Just as we say there is no place for the 'two weeks too late farmer' in agriculture the timing in horticulture is often as little as one day. Good plans for the future means good up-to-date maps; good documented processes and most importantly, good records. These things give the ability to check back and in doing so observe change. In a biosecurity sense, pinpointing an incursion can be worth billions of dollars and be the difference between eradication and control." ■

THE VALUE OF AN ON-ORCHARD BIOSECURITY STRATEGY

Mark Ericksen, fourth generation orchardist and former World Fruit Grower of the Year, is known for continually seeking innovative methods to improve production, but he says staying on top of the basics of good biosecurity can make all the difference.

"While our land values continue to escalate at what seems like a very rapid pace, it's all paper money and equity building to the entrenched multi-generational farmers of the land. The reality is, it can come tumbling back down to the values we had immediately after the arrival of Psa. I'm not being a pessimist. I'm a fair realistic Kiwi farmer. Biosecurity is an ever-present issue outside of market supply forces and it affects every one of us. Biosecurity in relation to fruit growing is defined as 'procedures or measures designed to protect the population against harmful biological or biochemical substances' so what does this translate to for us as growers? It's fungal or bacterial pathogens, insects or chemical residues not tolerated within our desired markets – diseases like Psa. Psa is real. It's taken seriously by the majority, yet taken light heartedly by a few, and those few can really affect those sky rocketing land and license values. Who in their wildest dreams would have thought that post Psa we would see million dollar per hectare values for Gold3!"

Complacency Mark says, is one thing that the kiwifruit industry cannot afford.

"Whether it be a let up in a spray programme or hygiene protocols, we just can't afford incidents in this area. Growing a product like kiwifruit is like being part of a club that needs to work together to continue being successful. Staying one step ahead in terms of biosecurity, and having ambitious standards for the whole team is one of the jigsaw pieces that we need to add to the big picture if we're going to meet our goals."

Working in partnership with his wife Leah and parents Peter and Lesley to run the family operation and Waima Orchards, Mark adds that their business has embraced the creation and upkeep of good biosecurity practices.

"Growing fruit is complex. What we do today will help form the shell for tomorrow but we won't get there without a plan. Our company now has a detailed set of dynamic protocols and procedures to follow which helps mitigate risk. They're a set of living documents. For example, the spray plan is continually changing due to weather events and new findings or recent technology. Our team are fully focused on tool and personal hygiene too. We probably are over doing some things but we would rather have it that way than miss something and leave holes in our defense mechanisms. Like most others, we have extensive paper trails, yet these things are vital it we're going to face the ever-challenging goals that we seek. In our view, we can't afford to let our guard down and must be vigilant. Hope is not a strategy."

The focus isn't all on Psa for Mark and his company. There are wider biosecurity threats to be aware of, like the Brown Marmorated Stink Bug (BMSB).

"This little critter has been known to cause up to 30% fruit loss in crops and aside from that there are also ramifications faced with trade barriers, another area in which Zespri or us growers can ill afford to have incursions affecting. The BMSB or any one of a number of other serious threats could make their way across our borders at any time. There are things that we can't control, but there are some that we can. A few small changes regularly to the basics – to make sure you stay a step ahead - can make big differences for the future."

Mark agrees with the popular sentiment that everyone in the industry has to play their part and advice for those who think it's too big a hurdle is to just make a start and set some clear goals for the short-term that can then be expanded on.

"Don't wait to execute your plan – it's like playing Russian roulette. Timeliness and vigilance are the two basic principles needed to enact a plan. Talk to your neighbour, your spray rep or your Zespri Liaison Manager. Once the ball starts rolling it's amazing how quickly things will start to fall into place and the success will quickly show. Our basic rules include timely sprays; tool and people hygiene – especially new people coming onto your property; making sure contractors clean machinery before and after they visit; bin sanitisation; and being careful about product usage and product application rates. These things are good basic starting points that are important to control spread and minimise the risk of new pest or disease introductions. Look for the technology too."

All in all, for Mark, his family and business, it's about keeping up the focus on biosecurity to help ensure the New Zealand kiwifruit industry can grow the best kiwifruit possible.

"If we are all embracing timely, focused and appropriate management strategies to combat biosecurity concerns we can help make sure our kiwifruit remains the world's best." ■

WHAT'S HAPPENING AROUND THE WORLD?

Keeping pace with change

Biosecurity risk is constantly changing as new organisms are discovered, expand their host range or invade new geographic areas. This page illustrates some of the key events over the past 12 months that influence risk for the New Zealand kiwifruit industry.

USA

- Spotted Lantern Moth, a horticultural pest which includes kiwifruit in its host range, has been invading Pennsylvania since 2014, with 75 municipalities included in the quarantine area. Eradication of this pest is proving difficult.
- Brown Marmorated Stink Bug (BMSB) continues to cause public and horticultural impacts, however less are being detected on goods from the USA to New Zealand as a result of border measures. A potential biocontrol agent, the Samurai wasp, has been discovered in the wild, providing scientists an opportunity to observe the effectiveness of biological suppression of BMSB numbers.

CHILE

- BMSB has established in Santiago, the first population in the Southern Hemisphere, which potentially increases risk to New Zealand given our seasonal alignment.
- Grape Berry Moth has also established near Santiago resulting in an eradication attempt involving the release of 10,000 sterile insects. Kiwifruit is a known host of this pest with potential market access implications.
- Breeding populations of Spotted Wing Drosophila found in two Chilean regions.

URUGUAY

- Spotted Wing Drosophila, a serious horticultural pest, is now present in Uruguay.

EUROPE

- BMSB spreading through Europe, now present in 14 countries up from nine only a year ago.
- Spotted Wing Drosophila is also spreading through Europe, having recently expanded into Sweden, Bosnia and Herzegovina, Cyprus, Romania, Serbia, and Turkey.

ITALY

- BMSB populations growing in size and expanding range into rural areas including kiwifruit orchards where impacts of up to 30% fruit loss have been reported by growers.
- Phytoplasmas detected in Psa-infected kiwifruit orchards in north and central Italy.
- *Xylella fastidiosa*, one of the world's most deadly plant pathogens, is decimating the European olive industry resulting in the removal of up to a million olive trees. Kiwifruit is not a known host to this pathogen; however this is a serious biosecurity incursion.

CHINA

- New-to-science virus isolated from four *Actinidia* species across five provinces.
- New fungal pathogens on kiwifruit reported (*Diaporthe tulliensis* and *D. actinidiae*).
- First report of the Tospovirus *Tomato necrotic spot associated virus* infecting kiwifruit in China.
- *Tomato zonate spot virus* detected in *Actinidia* spp. samples in China.

NEW ZEALAND

- Tourism numbers continue to increase. Short term arrivals are up to a record 3.54 million and there are now 27 airlines entering from 44 international destinations. It is increasingly challenging for our biosecurity system to keep pace.
- Government Industry Agreement (GIA) moving beyond formative stages and undertaking detailed work to improve biosecurity readiness and response outcomes.
- Detection of myrtle rust resulted in a large-scale response. This pathogen doesn't affect kiwifruit but is a significant threat to some iconic native species and a timely reminder of the importance of maintaining a high level of biosecurity practice.

WORKING WITH GOVERNMENT TO FIGHT PEST THREATS

Roger Smith (MPI), Barry O'Neil (KVH CE), Adrian Gault (KVH Chairman)

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

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 increased capability to respond thanks to the formalising of the Government Industry Agreement (GIA) Deed and Operational Agreements for specific threats.

GIA commits the kiwifruit industry to work with government and other primary sector industries to improve readiness for future biosecurity events, and jointly respond to future outbreaks. Determining what capability exists within the industry and how we can rapidly deploy this is also a key part of GIA commitments.

KVH has so far finalised three separate operational agreements. The first was a multi-sector agreement for the management of Fruit Fly in New Zealand, which KVH has signed representing the kiwifruit industry, joining MPI as the Government's representative, along with organisations representing the pipfruit, avocado, citrus and vegetable sectors.

The second agreement is a direct contract between KVH and MPI and is for management of the four most common and agreed threats to the kiwifruit and kiwiberry sectors. *Ceratocystis fimbriata*, Verticillium Wilt, Psa-non New Zealand strains and Invasive Phytophthoras.

The third agreement for the management of Brown Marmorated Stink Bug (BMSB) was recently signed by a range of industry groups and Government.

By signing the agreements, KVH and MPI have committed to doing everything possible to stop another Psa-type event from occurring and working together to achieve the best possible outcomes should there be an incursion.

The agreements establish the operational details for readiness and response activities, include the roles and responsibilities of all the parties before, during and after a response, as well as cost-sharing detail.

Much of the work mentioned on pages 16 and 17 around how we prepare for the arrival of unwanted pests with industry partners, is part of these agreements.

What makes the GIA partnership so important to the kiwifruit industry is it enables us to proactively do everything we can to protect the industry from future biosecurity threats. The industry and MPI jointly decide what needs to be done, and importantly also the best way that we can make it happen, including utilising the resource within our own industry.

However, there is a cost associated with this protection which is currently funded through a biosecurity levy on exported trays. The levy has a maximum level of 1 cent per tray, and the KVH Board has agreed this will need to be reviewed in light of the investment that is needed to maintain the appropriate level of protection for the industry, as well as being able to fund our share of eradication responses when cost sharing for these starts in July 2018. ■

GIA
Biosecurity through Partnership

Biosecurity system engagement under the GIA

Pre-border	Border	Readiness & Response	Post Management

Joint decision-making and cost sharing through the GIA

MAKING OUR BIOSECURITY SYSTEM STRONGER

THE MINISTER FOR PRIMARY INDUSTRIES NATHAN GUY LAUNCHED THE DIRECTION STATEMENT FOR NEW ZEALAND'S BIOSECURITY SYSTEM IN NOVEMBER 2016

Biosecurity 2025 is essentially the main vehicle for improving biosecurity protection for kiwifruit and kiwiberry industries, and KVH has been in there, boots 'n' all.

We had significant input last year into the development of Biosecurity 2025, including:

- two workshops, jointly hosted by the Ministry for Primary Industries (MPI) and KVH, specifically for our industry,
- KVH participation within the core MPI group that developed Biosecurity 2025 proposals, and
- formal submissions to Government.

MPI invited Graeme Marshall (KVH Board member and Chair of the Minister's 'Biosecurity Ministerial Advisory Committee') to assist with implementation as part of the Biosecurity 2025 Governance Group. The Minister also invited KVH Chief Executive Barry O'Neil to assist his launch of Biosecurity 2025, as a champion for the new directions and invited him to participate in the Biosecurity Governance Working Group.

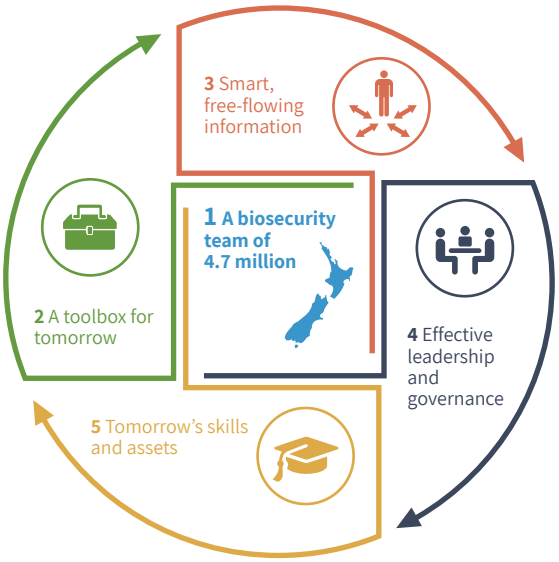
KVH Biosecurity Programmes Manager Andrew Harrison, was also invited to participate on the working group that leads implementation of the goal to have a biosecurity team of 4.7 million New Zealanders.

As an early input to Biosecurity 2025, KVH and DairyNZ jointly hosted a primary industries workshop with Dr Doug McKenzie-Mohr, an internationally-recognised commentator on design and delivery of community information programmes. This workshop focused on the science and psychology behind behaviour change initiatives, and how we (as primary industry organisations) can collectively influence the day-to-day biosecurity decisions and practices of those people who can protect our industries, or create risk.

Three examples of improvements KVH is seeking to achieve through Biosecurity 2025 are:

1. Establishment of new "Biosecurity System Governance". We believe there is a need for system governance which provides strong oversight, ongoing direction, role clarity, and measurement of performance. We also see a need for continued innovation and system improvement. We believe Government Industry Agreement (GIA) signatories, along with MPI and regional government, have such a core role as part of future system governance. »

Last year almost 215,000 crew and passengers, from 80 cruise ships, disembarked at the Port of Tauranga



2. A coordinated programme to influence the willingness of people to accept biosecurity activities in their back yard when necessary - for example, if we have a Brown Marmorated Stink Bug (BMSB) incursion in central Hamilton and need to apply targeted sprays in an urban environment. This programme also looks to improve biosecurity practices amongst key groups. This builds on the work of Dr McKenzie-Mohr.
3. Ports pursuing "biosecurity excellence" across New Zealand. KVH continues to work with Port of Tauranga Limited, MPI and other government and industry organisations, to develop biosecurity excellence at Port of Tauranga. We are seeking that Biosecurity 2025 pick up this model and commit to adapting and applying it across all New Zealand ports by 2025.

KVH welcomed the Minister for Primary Industries announcement, as part of 'Budget 2017', of $18.4 million allocated over four years to help further strengthen the biosecurity system and implement the Biosecurity 2025 direction statement. Helping to shape this investment and improvements is a strategic priority for KVH in the years ahead.

BIOSECURITY OPERATIONAL EXCELLENCE AT PORT OF TAURANGA

This partnership between industry and government encourages people working within and around Port of Tauranga to play their part in keeping pests out of New Zealand.

The initiative is driven by KVH, in partnership with Port of Tauranga Limited, MPI, local government and industry organisations. The goal is "No biosecurity incursions coming through the Port of Tauranga", and working together to achieve "A port community committed to biosecurity excellence".

Activities include biosecurity induction for all port workers, awareness campaigns focused on key pests such as BMSB, events and regular engagement with the wider port community.

Development of this approach at a national model has been boosted by a $1.85 million research project to trial new tools and technologies in the port environment, monitor biosecurity awareness in port workers and the local community, and measure the impacts of changes on residual biosecurity risks.

REPORTING THE UNUSUAL - TOP OF MIND

KVH continues to regularly receive calls, emails and visits from those in the industry and members of the public who think they may have found a pest or bug from the Kiwifruit's Most Unwanted list.

Although thankfully they have turned out to be native and not of further concern, the fact reports are being received is a good thing – it's exactly the type of behaviour we want to see as it shows people are on the lookout and increasingly aware of the need to report any unusual pests or disease symptoms.

KVH has also noticed that the reports and photos received are of bugs that have a number of very close similarities to unwanted exotic ones – this shows us people do know the size and physical attributes of the organisms that are considered highest risk to the kiwifruit industry.

With the launch of the Biosecurity 2025 Direction Statement aim of a biosecurity team of 4.7 million participating in managing risk to New Zealand, KVH continues to use news and social media, as well as community events to encourage awareness and spread the message amongst growers (as the key line of defense and best-placed to spot invaders early on), contractors and anyone else on-orchard as well as the public to stay vigilant, be on the lookout, and report anything unusual. ■

30%

Fruit loss from BMSB on some Italian kiwifruit orchards

147

Interception events at the New Zealand border in the summer of 2016/2017

500%

Increase in BMSB interceptions from Italy

80%

Reduction in BMSB egg numbers by the Samurai wasp, a potential biocontrol for BMSB

HORTICULTURE UNITES TO FIGHT OUR BIGGEST THREAT

Over the past year, the risk of Brown Marmorated Stink Bug (BMSB) entering New Zealand has risen to unprecedented levels. Border interceptions have increased and the potential impacts to our industry have become more apparent.

BMSB is one of the most significant threats facing our industry; almost every horticultural industry and New Zealand citizen could be affected if this pest were to establish here. That is why we're working with the Ministry for Primary Industries (MPI) to not only ensure that we are doing everything possible to keep it out, but also making sure we are well prepared if it were to arrive.

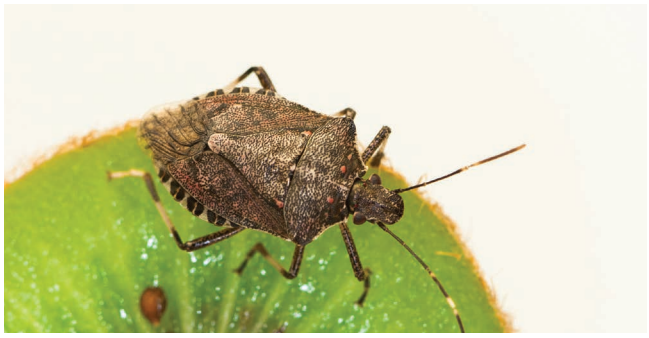
THE RISK IS INCREASING.

One of the greatest challenges in keeping BMSB out is the number of different goods that it can enter on, from passenger luggage through to empty containers, vehicles and machinery. Adding to this complexity is the number of countries it may enter from. BMSB is native to parts of Asia, but has been invading North America, and more recently Europe where it is now present in 14 countries.

The growing list of ways BMSB could enter creates enormous challenges for our border systems to keep pace and manage. So far, MPI has done an excellent job and as far as we know New Zealand remains free of BMSB (despite this past high-risk season where BMSB was intercepted on 147 separate occasions).

Over half of this season's interception events occurred on goods from Italy, where the pest is now undergoing significant population growth and range expansion. A recent discovery of an established population in Santiago, Chile suggests that risk profiles will continue to evolve going forward. The seasonal alignment of countries in the same hemisphere means that BMSB arriving from Chile would land here in a life stage suited to the current climate and have an increased chance of survival relative to BMSB arriving from the Northern Hemisphere.

Samuri Wasp



BMSB – Mike Lewis, Centre for Invasive Species, University of California

IMPACTS ON KIWIFRUIT ARE NOW BECOMING APPARENT.

Feeding trials, funded by KVH and Zespri at the University of California, indicate that BMSB will feed on both Hayward and Gold3 with equal preference. However, growers in Italy report that impacts are being observed on gold orchards exclusively.

Some Italian orchards report losses of 15% from fruit drop and a further 15% post-harvest because of storage rot. While these figures are largely anecdotal, current knowledge suggests that should BMSB establish in New Zealand, impacts could include:

- up to 30% fruit loss from fruit drop and storage rot (possibly only to gold fruit)
- challenges to operate within current Maximum Residue Limits (MRL) for some markets due to insecticide use (no direct market access issues however)
- disruption of current Integrated Pest Management (IPM) programmes and secondary pest outbreaks, due to insecticide use
- increased packing and quality assurance costs to prevent storage rot
- increased operational costs from insecticide use, netting, and labour

Collectively this is a major focus for readiness efforts. In addition to the significant research efforts that are underway both in New Zealand and offshore, Government Industry Agreement (GIA) partners have unified our approach in preparing for and responding to a BMSB incursion and how the costs for these activities will be shared between Government and respective industries, formalised under the GIA Operational Agreement for BMSB.

In March 2017, a simulation was held to test our response approach and identify plans and tools we can put in place now so that in the event of an incursion, we're able to get practical and timely information to growers about what is happening and what they should do.

One of the most promising control strategies being pursued is the development of a biological control, a natural enemy that can provide ongoing population suppression. KVH is a leading component of an industry/research government group seeking Environment Protection Authority (EPA) pre-approval to release the parasitoid wasp *Trissolcus japonicas* should BMSB establish here.

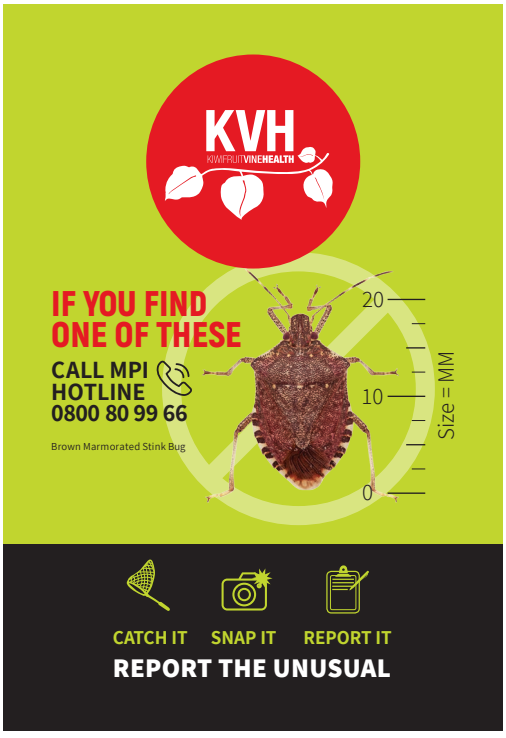
This wasp is thought to be effective in suppressing BMSB egg populations by up to 80%. A decision is expected by the EPA later this year.

In addition to the readiness activities being undertaken in partnership with other horticultural sectors under GIA, KVH is also leading a work programme to develop approaches to manage BMSB within kiwifruit orchards.

A workshop was held with Zespri, KVH and MPI to identify challenges our industry may face and how we might overcome these through research, much of which will be conducted in Italy, an ideal pilot for testing. ■

"At the end of the day, this is a landscape scale pest that utilises so many hosts and habitats that there is no possible way that you can hope to manage those populations with insecticides, or traps, or other human tactic. Biological control, especially by the egg parasites, represents the ultimate solution for bringing this pest to economically acceptable levels"

— Chris Berg, Professor Entomology, Virginia Tech



PREPARING FOR THREATS SPECIFIC TO KIWIFRUIT

In Brazil, kiwifruit orchards infected with Brazilian Wilt (*Ceratocystis fimbriata*) have suffered up to 50% vine loss over the last five years. There is currently no effective treatment available.

In Chile, Verticillium Wilt (caused by a strain of *Verticillium albo-atrum*) is impacting gold varieties, with up to 80% vine mortality on some infected orchards. Infected plants of susceptible kiwifruit cultivars will almost always die and this typically happens very quickly.

The two examples above are considered kiwifruit specific threats, as we would likely be the only affected industry if these particular strains were to arrive in New Zealand. It is up to us to drive readiness programmes to ensure we are well prepared to manage their impacts, as opposed to multi-sector threats such as Brown Marmorated Stink Bug which are the focus of joint readiness programmes.

HOW ARE WE PREPARING?

Over the past 12 months, KVH has made significant progress in preparation for these sector specific threats.

Operational Agreements provide a platform for the development of Readiness Plans, which are completed in partnership with the Ministry for Primary Industries (MPI) for each specific organism.

The plans detail current knowledge gaps and research needs, and outline how we would respond should the organism be detected in New Zealand. The first of these was completed in May 2017 for Brazilian Wilt.

The Brazilian Wilt Readiness Plan is the culmination of efforts since we first heard of kiwifruit vines collapsing in Brazil - including visits to the region, a review by an international expert on the potential impacts to our industry and, a simulation at our December 2016 KiwiNet workshop to test the practicalities of the plan and further refine our approach.

The readiness plan is a living document as KVH and Zespri are funding research efforts to resolve knowledge gaps, and the plan will evolve in parallel. Meanwhile we are also funding research to develop the next readiness plan on Verticillium Wilt.

WHAT CAN GROWERS DO TO REDUCE RISK?

The KiwiNet simulation illustrated that Brazilian Wilt is completely different to Psa. Long distance spread will not occur naturally, only through human-assisted movements of infected plant material or soil on tools, dirty equipment, machinery and footwear. Eradication prospects are also completely different to Psa. With Brazilian Wilt, there is a very real chance of eradication should the pathogen be detected early in a confined area, an important concept for us all to understand. If it were to arrive it could establish and result in 10-30% vine losses per year on infected orchards, or we may be able to eradicate it forever.

The financial difference between these potential outcomes could not be more different for the New Zealand kiwifruit grower.

To achieve the latter and have a good shot at eradication, the pathogen must be contained. But, as we don't know how long it takes for symptoms to develop from the time of infection (months or years), containment of a pathogen that we cannot see is only feasible if the industry follows biosecurity best practice all the time. Source clean plant material, check and clean all inputs entering your orchard boundary, and report anything unusual.

This takes effort. However, biosecurity practices are your best form of insurance against a significant risk to your investment. ■

Verticillium Wilt – Bob Fullerton, Plant & Food Research

Brazilian Wilt (*Ceratocystis fimbriata*)

MANAGING THE RISK OF PESTS SPREADING IN NEW ZEALAND

It has become clear that good hygiene and high plant health practices are fundamental to the kiwifruit industry's response preparedness.

Plant material is our biggest risk for the spread of any disease, within and between plants, orchards and growing regions.

The Kiwifruit Plant Certification Scheme (KPCS) has been operating now for three years and has been compulsory since 1 October 2016. As of 1 July 2017, 34 nurseries across the regions have already met the scheme requirements and another 20 are progressing towards certification. The programme includes regular monitoring by nursery personnel for a range of target organisms aside from Psa, including those already present in New Zealand (for example cherry leaf roll virus) and those threatening kiwifruit orchards in other parts of the world, like Brazilian Wilt.

Additionally, independent monitoring, testing and auditing increases the likelihood of new pests and diseases being identified early - minimising potential damage that nursery-spread disease could cause.

KVH is working with the industry to maintain an integrated system where all members are taking personal responsibility for good biosecurity practices every day. »

NURSERIES SELLING KPCS PLANTS:

- Full Certification
- Within Region Only

Eastpack

KVH WORKS WITH...

34 KPCS KIWIFRUIT NURSERIES, ANOTHER 20 IN PROGRESS	**5** KIWIFRUIT IMPORTERS
46 PACKHOUSE SITES	**22** BUDWOOD SUPPLIERS
8 KIWIFRUIT PROCESSORS	APPROX **2500** KIWIFRUIT GROWERS
13 POLLEN MILLS	**12** MACHINERY IMPORTERS/ DISTRIBUTORS

High levels of interceptions of biosecurity threats to kiwifruit were reported by the Ministry for Primary Industries (MPI) at the border in 2015 and, as a result, kiwifruit importers were visited (including those importing Italian fruit, packhouse machinery and orchard equipment) to raise awareness around high-risk threats to the industry such as White Peach Scale (WPS) and Brown Marmorated Stink Bug (BMSB), and to ensure effective inspection and reporting systems are in place. It was pleasing to note that subsequent levels of interceptions, particularly for WPS on Italian kiwifruit imports, reduced as a result.

Packhouses, pollen mills, budwood suppliers and kiwifruit processors annually register with KVH and have biosecurity risk management plans detailing robust systems to support the protection of grower's biosecurity borders.

Associated protocols are regularly reviewed by KVH to ensure that any identified risk is managed appropriately and audits are completed at all sites annually.

Managing Psa has become 'business as usual' for many but the risk of a new pest or disease remains constant. The orchard management plans that growers have in place are currently under review to ensure that all are prepared for any new biosecurity risk to their livelihood.

Maintaining orchard hygiene practices is essential and has proven to be effective for other industries dealing with bacterial and viral infections – such as European canker in apples, grapevine leaf roll virus, and viruses in the New Zealand strawberry industry.

It is vital that we all maintain the practices that will assist in controlling future incursions. ■

Weather station deployed for frost monitoring in a Maketu orchard

THE SCIENCE BEHIND OUR GREATEST THREATS

PSA

Honing our knowledge on the environmental drivers of Psa infection, symptom expression and the link to seasonal vine susceptibility remains the key focus of the Psa Research and Development (R&D) programme.

Brainstorming sessions between local and international scientists, kiwifruit growers and industry representatives at the national Psa symposium held last year helped provide research direction and priority to the programme.

New research projects have included a more in-depth focus on understanding the link between climate and weather events, tissue susceptibility to Psa and the infection process. The outputs from these projects provide knowledge to upgrade the KVH Psa-V risk model for greater accuracy throughout the year. Establishing on-orchard cold temperature and frost trials across regions and kiwifruit varieties has been one such project.

Frost is recognised as a considerable risk factor with regards to Psa disease yet we know very little about vine acclimation to cold weather in New Zealand and how this impacts vine resistance to frost damage, Psa infection and symptom development. »

“Frost is recognised as a considerable risk factor with regards to Psa disease yet we know very little about vine acclimation to cold weather in New Zealand”

A PhD study in kiwifruit (Froud unpubl) showed that the risk of severe Psa symptoms in Hayward was three to four times higher in frost damaged blocks than in blocks with none. In other studies, increased Psa multiplication in kiwifruit tissues after artificial frosting has been observed (Ferrante & Scortichini 2014; Casonato et al. 2015; Kabir unpubl). This project will investigate the roles cold temperature and frost play in disease establishment in both gold and green kiwifruit. In addition to providing key information for the upgrade of the risk model that data will also help growers with frost fighting, and decision making on the use of protective sprays against Psa.

Psa control continues to rely heavily on copper, elicitors and other bactericides. Research has been underway for several years looking for additional control options, including to support the development of Kiwivax (Trichoderma) and the biological product YBCA5. However, the search is still ongoing for control agents and natural environments and ecosystems could also be potential sources of antimicrobial products.

With this in mind, Zespri and KVH are funding research in to the screening of natural products from the local marine environment in the search of economically feasible new Psa control products. Through a research programme developed with the University of Waikato and Plant & Food Research, five extracts from marine macroalgae found in the Bay of Plenty have already been identified as having significant anti-Psa activity *in vitro*. The next phase of research will look at testing the efficacy of these extracts *in planta* and eventually on orchard.

BIOSECURITY

In 2015 the Kiwifruit Biosecurity Steering Group was established, which includes biosecurity experts from KVH, Zespri, the Ministry for Primary Industries (MPI), Better Border Biosecurity (B3), and research institutes.

The group oversees a research portfolio into key high-risk pests and diseases including Brown Marmorated Stink Bug (BMSB), White Peach Scale and non-New Zealand Psa strains. The aim of the research is to fill knowledge or technical gaps in pathways of entry into New Zealand, surveillance, diagnostics, control, management and eradication of pests and diseases.

BMSB has been a key focus for this year and there is a lot of aligned research underway both in New Zealand and the USA. The steering group is funding specific research to control BMSB within kiwifruit orchards. ■

A recently completed trial performed at the University of California showed that BMSB had a feeding preference for both ripe green and gold kiwifruit, which is contrary to anecdotal observations in Italy and Korea, where it seems BMSB only feed on Gold3 kiwifruit. Images show the pitting marks made by BMSB feeding on Hayward and Gold3.

KVH REGIONAL COORDINATORS

Regional Coordinators are central to the work of KVH, locally managing biosecurity threats like Psa.

In their roles because of their skills and experience, Regional Coordinators provide updates and advice to KVH and lead action planning in kiwifruit growing regions including between contractors, post-harvest operators and growers.

To contact the regional coordinator in your area, refer to the contact list below. For regions not listed please contact KVH on 0800 665 825 or info@kvh.org.nz.

Region	Contact	Phone	Mobile	Email
Auckland / Franklin	Carol Craig	09 235 9671	021 623 596	carol.craig@slingshot.co.nz
Gisborne	Tim Egan	06 868 6699	021 222 0250	tim.egan@xtra.co.nz
	Trevor Lupton		027 230 8754	tlupton@lewiswright.co.nz
Hawkes Bay	John Ericksen		027 567 2427	kvh@kiwigold.co.nz
Nelson	Phil Jones		027 647 2258	home@vibrantearth.co.nz
Wanganui	David Wells	06 342 2933	027 289 5112	djcjwells@inspire.net.nz
Whangarei	Pauline Kell	09 434 6164	027 589 4263	welcomtokell@xtra.co.nz

OUR TEAM

CHIEF EXECUTIVE

Barry O'Neil
barry.oneil@kvh.org.nz
022 108 7007

BIOSECURITY TEAM

Andrew Harrison
Biosecurity
Programmes Manager
andrew.harrison@kvh.org.nz
027 742 6859

John Mather
NPMP Analyst &
Compliance Officer
john.mather@kvh.org.nz
027 838 8974

Matt Dyck
Biosecurity Analyst
matt.dyck@kvh.org.nz
027 838 7129

OPERATIONS TEAM

Peter Mourits
Operations Manager
peter.mourits@kvh.org.nz
027 445 8497

Karyn Lowry
Compliance &
Surveillance Advisor
karyn.lowry@kvh.org.nz
027 227 1157

Linda Peacock
Grower Services & Technical
Support Specialist
linda.peacock@kvh.org.nz
027 475 2909

SUPPORT TEAM

Jacqui Craig
Office & Accounts Manager
jacqui.craig@kvh.org.nz
027 622 2717

Lisa Gibbison
Communications Advisor
lisa.gibbison@kvh.org.nz
022 025 4724

Elyse Patchett
Administrative Coordinator
elyse.patchett@kvh.org.nz

Kiwifruit Vine Health
Suite 3, Level 1, Customhouse Building
314 Maunganui Road, Mount Maunganui
PO Box 4246, Mount Maunganui, 3149
New Zealand

Tel: 0800 665 825
Email: info@kvh.org.nz
www.kvh.org.nz