

KVH

ANNUAL UPDATE 2014



**MOST
UNWANTED**

GLOBAL
PSA UPDATE

2014 RESEARCH AND
DEVELOPMENT UPDATE

Peter Ombler – Chairman

FOREWORD



It is now four years since Psa-V was first confirmed in New Zealand. This period in our industry's history has been tremendously challenging so it is heartening that growers and the industry have come through the Psa-V crisis with sturdy resilience and the industry's future pathway is looking more positive than ever.

With the help of many research organisations, including Zespri's Innovation Team and Orchard Productivity Centre, and Plant & Food Research, we now have a tool box for controlling Psa-V and a much better understanding of best-practice management to remain profitable in a Psa-V environment.

The support from growers and postharvest, who have adopted these new management techniques, and the efforts and contributions from all corners of the industry and the New Zealand Government to implement them, means we are much more engaged and prepared for future biosecurity risks.

Psa-V has taught the industry many things, and the importance of being prepared for future biosecurity outbreaks is one of them. Therefore it is essential we don't forget the lessons learnt from Psa-V and we consider them for future biosecurity planning.

While KVH was initially established to lead the Psa-V response, it has more recently been given the mandate to lead wider biosecurity on behalf of the kiwifruit industry.

With the change in readiness and response policy under Government Industry Agreements (GIA), KVH has been the leading industry body in seeing the benefits of a partnership with government. As such we were the first industry to sign the GIA Deed with the Ministry for Primary Industries (MPI).

While we recognise the role of MPI, we strongly believe that together with industry the biosecurity outcomes will improve from what MPI can achieve alone. As an industry that has been seriously impacted by a major biosecurity event, we must be doing everything we can to stop this happening again.

We are very focused on the risks to our industry from a potential fruit fly incursion, and KVH has taken the lead in the development of a fruit fly operational agreement along with others in the horticultural sector and MPI. The agreement is in the process of being finalised and will be signed by the parties involved in early 2015. This will provide a higher level of protection to our industry.

KVH has also identified the other known major biosecurity risks that could impact on New Zealand kiwifruit production and is in the process of developing preparedness and response plans to reduce the industry impact should they be identified here. In addition, KVH has been proactively engaging with MPI to ensure the pre-border and border efforts are focused on keeping biosecurity threats out of New Zealand.

While we acknowledge that it may not be possible to stop every biosecurity risk to our industry, we will however do everything we possibly can to reduce the chances of another major biosecurity event happening.

Over the past four years the KVH team has changed to meet the tasks the industry has set it to do. However, it remains a small team and is committed to identifying and minimising biosecurity risks that could harm our industry; and strengthening our readiness and response plans should such an incursion occur.



Martyn Dunne, DG MPI; Peter Ombler & Barry O'Neil, KVH;
Hon Nathan Guy, Minister for Primary Industries – signing the GIA Deed.

KVH WORKING TO PROTECT THE KIWIFRUIT INDUSTRY

In the last
2 YEARS

KVH has worked with Regional Councils and local growers to **reduce** the number of abandoned orchards from

102 TO **13**

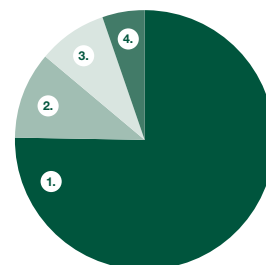
[read more on page 13 – Abandoned Orchards]

KVH

was the first primary industry to formally partner with Government for biosecurity readiness and response

[read more on page 4 – Border and Post-Border]

OUT OF 102 ABANDONED ORCHARDS...



- 1. Abandoned orchards removed since February 2013: 82%
- 2. KVH working with owners: removal or return to management yet to start: 7%
- 3. Removal underway: 6%
- 4. Abandoned orchards returned to management: 5%

KVH developed the Kiwifruit Plant Certification Scheme.

Three nurseries have already joined the Scheme and in 2015 they will provide certified kiwifruit plants to the industry

[read more on page 5 – Supply Chain Biosecurity]

KVH REPRESENTED THE KIWIFRUIT INDUSTRY ON three biosecurity responses in 2014, including two fruit fly responses

[read more on page 4 – Post Border]



[read more on page 4 – Border and Post-Border]

KVH advocated for changes to the way **biosecurity on yachts and cruise ships** is managed.

This resulted in the Ministry for Primary Industries (MPI) starting to routinely use detector dogs and 8 additional MPI Inspectors on this pathway.

MPI has agreed to, and is now pursuing KVH's proposal that all fruit and vegetables on New Zealand-bound cruise vessels comply with the **New Zealand Import Health Standards** for fruit and vegetables.

[read more on page 4 – Border and Post-Border]

The KVH website has received more than **53,600 hits** in the last 12 months, with users viewing more than **227,422 pages!**

This symbol indicates where further info can be found at www.kvh.org.nz



EMERGING RISKS:

KIWIFRUIT'S

MOST UNWANTED!

Kiwifruit Vine Health (KVH) is undertaking readiness and response planning to prepare for future biosecurity incursions that might affect the industry. Accurately predicting the organism that poses the greatest risk to the kiwifruit industry is a challenging task that involves assessing the likelihood of an organism entering and establishing in New Zealand, and then determining the potential industry impacts either through loss of production and/or loss of access to international markets.

From a list of almost fifty pests and pathogens identified as potential threats to the industry, a draft top priority list has been created using a risk matrix developed specifically for this purpose. Both the matrix and the results produced have been peer reviewed by independent experts and will be periodically updated to reflect changes in pathogen status internationally.

Organisms identified as top priority threats will be the focus of readiness and response planning. Given the limitations in accurately predicting the next invasive organism of consequence, generic response plans will also be prepared to cover each of the broad categories of bacteria, fungi, virus and arthropod to enable a response to any organism beyond those specifically anticipated.

Research will be undertaken on other organisms where necessary to ensure we fully understand the potential risks they present, and to look for control options.

The following organisms are some of those identified using the risk matrix as high priority threats to the kiwifruit industry.

FRUIT FLIES

*(Mediterranean,
Oriental and
Queensland species)*



- High likelihood of entry with eight post border incursions since 1989.
- Production impacts for a wide range of horticultural crops.
- Severe market access restrictions, particularly for Queensland Fruit Fly which is not present in nearly all the kiwifruit industry's major markets.

BROWN MARMORATED STINK BUG

(Halymorpha halys)



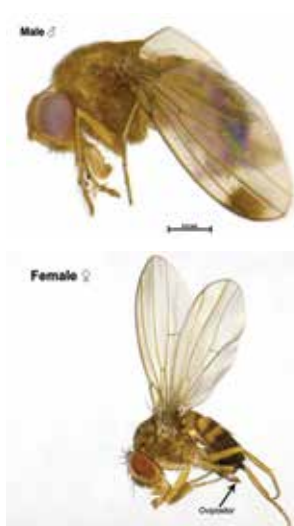
- High likelihood of entry as a hitchhiker species on inanimate objects such as shipping containers, used cars and passenger luggage.
- New Zealand's climate is considered favourable for establishment should it be introduced.
- Highly mobile and capable of spreading rapidly.
- Native to parts of Asia and undergoing rapid expansion in both USA and Europe.
- Significant production impacts on many horticultural crops causing cosmetic damage that makes produce unfit for sale. Kiwifruit is a known host.

PSA – strains not yet in New Zealand



- Different outbreaks of Psa have been caused by four related, but genetically distinct lineages of *Pseudomonas syringae* and it is likely that many more exist in wild kiwifruit populations.
- Psa-1 and Psa-2 (strains found in Japan and Korea respectively) are of particular concern as they appear more virulent against Hayward cultivars than the Psa-3 (Psa-V) strain currently in NZ.
- The introduction of any new strain is a concern as it introduces new genetic material that can be horizontally transferred with our existing strain of Psa-V, causing new variants of the bacteria.
- New Psa strains could be more virulent and impact what we currently know as “Psa tolerant” cultivars.

SPOTTED WING DROSOPHILA (*Drosophila suzukii*)



- Serious horticultural pest resulting in major economic impact through control costs, production impacts and market access implications.
- Lays eggs in ripening fruit making it soft and unmarketable.
- High likelihood of establishment if it were to enter as surveillance trapping has limited effectiveness.
- New Zealand climate is considered suitable with 10 C to 25 C the optimal temperature range for the organism
- Native to South East Asia and has been invading Europe and North America.
- A rapid invader. After four years of first being detected in continental USA in 2008, the species had spread across 27 states.
- Fresh produce is a potential pathway so establishment in New Zealand would likely result in market access implications

CERATOCYSTIS FIMBRIATA



- Fungal pathogen complex causing significant damage to kiwifruit orchards in Brazil with some growers reporting over 50 percent vine loss.
- Hayward on Bruno rootstock also affected.
- Vine death can occur extremely rapidly following expression of symptoms.
- No known effective treatments.

For more information about these pests go to www.kvh.org.nz/emerging_risks

What should you do if you think you have seen these pests?

Phone MPI on 0800 80 99 66 or KVVH on 0800 665 825



05

**Kiwifruit
Biosecurity
Risks**

PRE-BORDER, BORDER AND POST-BORDER

PRE-BORDER and BORDER

Preventing new kiwifruit pests and diseases from establishing in New Zealand is an important focus for KVH. It involves making sure New Zealand's pre-border and border biosecurity operates effectively.

KVH is focused on being proactive and to date has included:

- Understanding where the key risks to our industry lie, including a review of risk associated with Port of Tauranga and Rotorua Airport and KVH has profiled key areas of potential risk, such as cruise ships, recreational yachts and transitional facilities.
- Advocating for changes to the way biosecurity for cruise ships is managed. This has resulted in the Ministry for Primary Industries (MPI) starting to routinely use detector dogs on this pathway and record interceptions (dogs were used to screen passengers across 150 cruise ship visits, resulting in the interception of 500 biosecurity risk items, 76 percent of which were fresh produce). MPI has agreed to, and is now pursuing KVH's proposal that all fruit and vegetables loaded onto cruise vessels bound for New Zealand comply with the New Zealand Import Health Standards for fruit and vegetables.
- Initiating a partnership focused on achieving 'Operational Biosecurity Excellence at Port of Tauranga'. This brings together the port community (Port of Tauranga Ltd, government, commercial operators within the port and kiwifruit, dairy and forestry industries) to pursue this goal.
- Advocating for establishment of performance targets for marine ports, and transparent ranking of New Zealand marine ports for their biosecurity performance (this involves a set of proposals which MPI is evaluating).
- Supplying input to reviews of key Import Risk Analyses and Import Health Standards, including two relating to kiwifruit ('pollen' and 'germplasm') and others relating to other fresh produce imports.
- Participation in a review of 'pathways of entry for fruit flies', following two Queensland Fruit Fly finds in early 2014.
- Working with Zespri, MPI and other industries to pre-negotiate market access arrangements for New Zealand kiwifruit in the event of a fruit fly outbreak (so that trade impacts can be minimised).

POST-BORDER

KVH is working with MPI to respond when high-risk organisms are detected, and to ensure both government and industry are well prepared for any future biosecurity outbreaks.

This includes:

- KVH leading kiwifruit industry input to four responses:
 - Unauthorised kiwifruit imports in Mt Albert (August 2013; relating to a historic border breach)
 - Queensland fruit fly in Whangarei (January 2014)
 - White peach scale in Tauranga (February 2014)
 - Queensland fruit fly in Whangarei (April 2014)
- KVH became the first signatory to Government Industry Agreements (GIA) for Biosecurity Readiness and Response.
- KVH/NZKGI initiated the development of an Operational Agreement for fruit flies (being the mechanism, under GIA, for reaching agreement on how fruit fly risks will be managed and costs shared) and a coordinated, pan-horticulture approach to this.
- KVH is formalising how the kiwifruit industry will participate in future biosecurity responses, through a project that establishes the industry's governance, systems and capability needed to join a response under GIA.



05

Kiwifruit
Biosecurity
Risks

SUPPLY CHAIN

BIOSECURITY

SUPPLY CHAIN BIOSECURITY

Better biosecurity across the kiwifruit supply chain

Long term growth and success of the kiwifruit industry requires biosecurity risks to be managed right across the supply chain. This is about restricting spread of any newly introduced (or newly evolved) pests and diseases and give the industry the best shot at eradication and minimising impacts.

Psa-V has had a significant impact on the New Zealand kiwifruit industry, and it is unlikely to be a one-off event. Plant-based incursions are not rare. In fact, they account for around 70 percent of New Zealand biosecurity incursions. There are around 40 plant-based incursions each year in New Zealand, each with the potential to cause significant harm to the New Zealand horticulture industry's supply and distribution. This level of risk is increasing as global trade continues to expand and as we increasingly trade with developing nations that take biosecurity less seriously than New Zealand does.

The industry has responded to the challenge of Psa-V by implementing some good biosecurity practices and raising the standard of biosecurity throughout the industry. It is critical we learn from this experience and maintain the gains; we can't afford to let complacency set in. But we need to transition from our current approach and practices designed for Psa-V, to what is right for the industry long term and in light of wider biosecurity risks. In 2015, KVH will be engaging with some of our top growers and technical experts to assist with developing such practices and how we approach this transition.

Many incursions, both in New Zealand and internationally, have been traced to the movement of plant material throughout the supply chain. In 2014, KVH has initially focused on the nursery pathway.

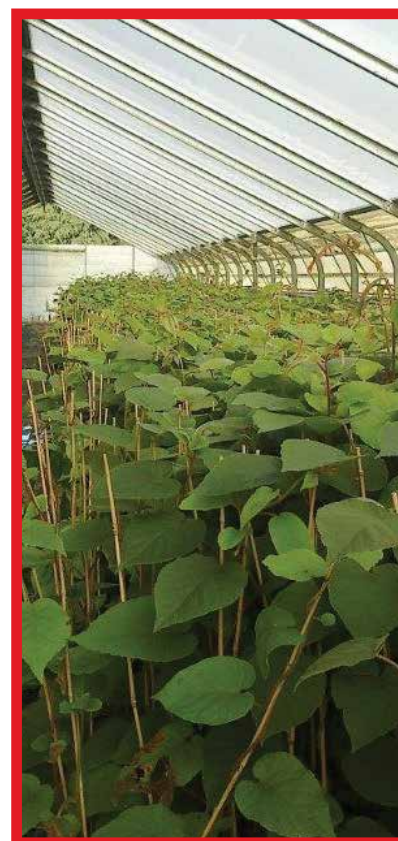
Kiwifruit Plant Certification Scheme

In 2014, KVH launched the Kiwifruit Plant Certification Scheme (KPCS) to manage the biosecurity risk associated with nursery plant movements. The KPCS is being phased in over a transition period, enabling nurseries and the industry to adjust to the scheme. It will come into full effect in October 2016.

The new scheme gives growers greater confidence that nurseries supplying our industry implement effective biosecurity practices and are minimising supply chain biosecurity risks. Growers purchasing certified plants give their orchards the best start and increase the prospects of successful vine establishment by starting with disease-free material.

The new scheme once fully developed will have two Standards that nurseries can produce to: the 'Core Standard' and the 'High Health' Standard (currently only the 'Core Standard' is available). These Standards provide growers purchasing plants with a choice in terms of the level of quality assurance sought. Confidence in the health status of plants produced under the KPCS is achieved through independent systems audits. Health status is verified with independent monitoring and diagnostic testing following protocols developed by Plant and Food Research.

Growers are encouraged to purchase certified plants to support nurseries that are managing supply chain biosecurity risks. The Standards mean growers can be confident these nurseries are doing all they can to protect orchards and the future of the industry.



04

National Pest
Management
Plan

PSA –

GLOBAL UPDATE

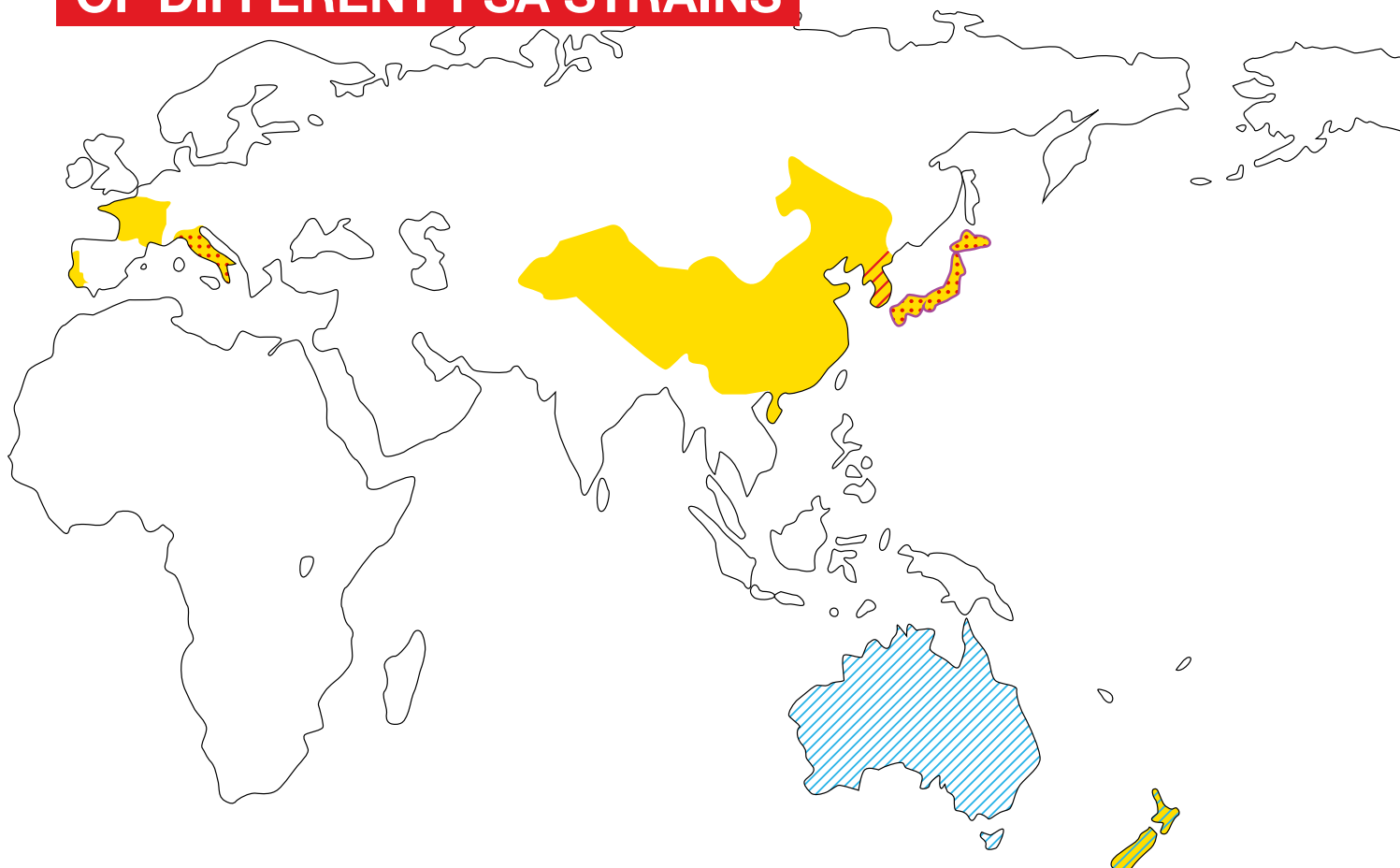
Not all countries are dealing with the same strain of PSA. In fact, genomic analyses indicate there are at least five different strains of PSA affecting kiwifruit-growing countries around the world (see Figure 1). This includes PSA-3 (PSA-V) which has significantly impacted the New Zealand kiwifruit industry. Different strains of PSA have evolved from a single source into strains that not only differ in virulence, but also impact different kiwifruit cultivars. Studies indicate new PSA strains can be expected to evolve in the future, either within New Zealand or elsewhere.

For the grower there are two significant messages:

- Strains of PSA that are not present in New Zealand must be kept out. This includes PSA-1 and PSA-2 which are currently present in Japan and Korea. These strains appear more virulent against Hayward varieties than PSA-3, currently present in New Zealand.
- New strains of PSA are expected to evolve within New Zealand and may be more or less virulent to kiwifruit varieties. Good biosecurity practices are vital to prevent the spread of new and existing strains.

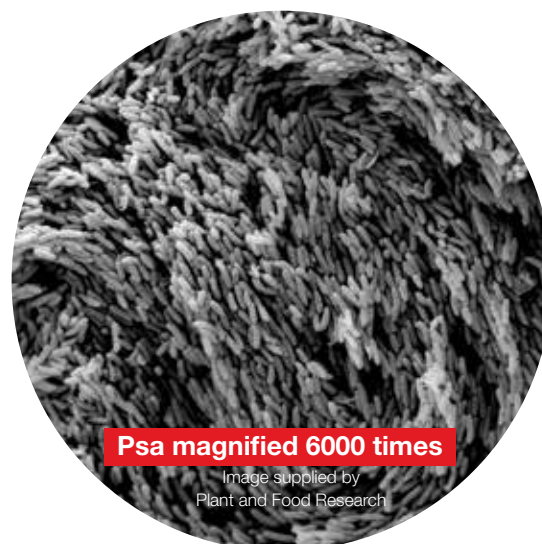
GLOBAL DISTRIBUTION

OF DIFFERENT PSA STRAINS








Global Update-2014

- **Japan:** Psa-3 (Psa-V) was identified for the first time in 2014 and is now present in seven Japanese prefectures. Japan has had Psa-1 since the 1980s.
- **Korea:** Psa-3 (Psa-V) was identified for the first time in 2014 and is now present on the mainland and Jeju Island. Korea also has Psa-2 present.
- **Chile:** This year the Chilean Kiwifruit Committee called for greater government control of nurseries and orchards as grower complacency was believed to be putting the industry at risk. In 2014, Psa-3 (Psa-V) advanced further north in Chile entering Region VI (Bernardo O'Higgins). Psa-3 is now present in Region VI (Bernardo O'Higgins), Region VII (Maule) and Region VIII (Bio Bio), the three largest kiwifruit production regions in Chile that together account for almost 90% of the country's kiwifruit production by area.
- **Europe:** Psa-3 (Psa-V) is now present in all major growing areas across Europe. Psa-1 is also present in Italy. A European wide movement control programme of kiwifruit plant material (plants, graftwood and pollen) remains in place. A phytosanitary passport is required before any movement can occur. This requires all plant material to be certified. Inspection and testing protocols are in place.
A nursery certification scheme was launched in Emilia Romagna (Italy) to prevent the spread of Psa. Nurseries must not be located within 500m of kiwifruit orchards or within 4.5km of Psa-positive orchards.



Summary of Psa strains – Figure 1

Biovar		Countries present	Virulence
Psa-1		Italy Japan	HIGH. More virulent to Hayward cultivars than Psa-3.
Psa-2		Korea	HIGH. More virulent to Hayward cultivars than Psa-3.
Psa-3 (Psa-V)		Chile China France Italy Japan Korea New Zealand Portugal	HIGH. Particularly to Hort16A cultivar.
Psa-4 (Psa-LV)		Australia New Zealand	Low
Psa-5		Japan	Low



PSA-V UPDATE

KVH

KIWIFRUITVINEHEALTH



NATIONAL UPDATE

As of 1 November 2014, 2595 kiwifruit orchards have been recorded as Psa-V positive. This represents 79 percent of New Zealand kiwifruit orchards.

The disease has been identified in fourteen of the sixteen growing regions in the country. To date, it has not been identified in the Whangarei or South Island regions.

The movement of Psa-V into more geographically remote regions is thought to have occurred through the movement of infected plant material or contaminated orchard equipment.

In areas where the disease is well-established, removal of the highly-susceptible Hort16A variety and replacing with the more-tolerant Gold3 variety has been a significant factor in the overall reduction in disease inoculum levels and subsequent symptoms.

Gold3 has provided an effective Hort16A exit strategy, but while it has proven to be significantly more tolerant to Psa-V, it's important to remember all varieties require a proactive monitoring, removal and spray programme to contain the disease within orchards, in addition to managing overall vine health.

Where growers have been proactive, we have seen the impact of Psa-V on Gold3 orchards minimised; and where growers have not been proactive and/or where orchard's risk factors have not been addressed, we have seen the disease continue to impact.

Gold9, although a lot more tolerant to Psa-V than Hort16A, has shown to be more susceptible than Gold3. Many growers within the Bay of Plenty have experienced considerable Psa-V impacts in Gold9 and have chosen to graft over to Gold3. These decisions were made before discussions began about the possible future de-commercialisation of Gold9 for other reasons.

Hayward has shown a different degree of susceptibility to Psa-V in some orchard environments. While it is less susceptible to the more common symptoms like dieback and cankers, the impact on males and flower buds, and the associated bud-rot attributed in part to Psa-V, is of particular concern.

This has had a major impact on orchard production in some regions. It is estimated 5–10 percent of average production on some orchards has been lost. Work is actively underway to help growers develop management practices to reduce the presence of bud-rot. Green14 has also shown a susceptibility to Psa-V associated bud-rot.

Progression of Psa-V outside the Bay of Plenty region has generally been slower than the rate of expression that was initially seen within the Bay of Plenty. This is largely attributed to growers adopting the learnings from the Bay of Plenty region, and the uptake of best practice management through Psa-V Orchard Management Plans.

The lower concentration of orchards outside the Bay of Plenty and improved education around reducing inoculum levels in orchards are also contributing factors.

Growers in these regions are still actively encouraged to move away from Hort16A and graft to more tolerant varieties to reduce their risk over the longer term.

New Zealand kiwifruit growing regions have differing needs according to their Psa-V status and risk of Psa-V infection. Therefore Regional Coordinators and Committees have played a vital role actively supporting Psa-V management at a local level. Regional Coordinators work effectively with local growers, postharvest and contractors to ensure the industry is working collectively at an orchard and regional level.

Confirmed Psa-V Positive KPINs Per Year						
Region	2010	2011	2012	2013	2014	Total
Coromandel	0	0	16	4	6	26
Franklin	0	4	34	18	15	71
Gisborne	0	0	4	6	5	15
Hawkes Bay	0	0	2	2	4	8
Kaikati	0	9	225	69	65	368
Kerikeri	0	0	1	7	35	43
Northwest Auckland	0	0	0	1	0	1
Opotiki	0	28	111	42	18	199
South Island	0	0	0	0	0	0
Tauranga	0	62	312	89	63	526
Te Puke	23	753	282	22	4	1084
Waihi	0	10	27	1	3	41
Waikato	0	0	18	23	13	54
Wanganui/Horowhenua	0	0	1	4	3	8
Whangarei	0	0	0	0	0	0
Whakatane	0	46	71	14	20	151
Total positive KPINs	23	912	1104	302	204	2595

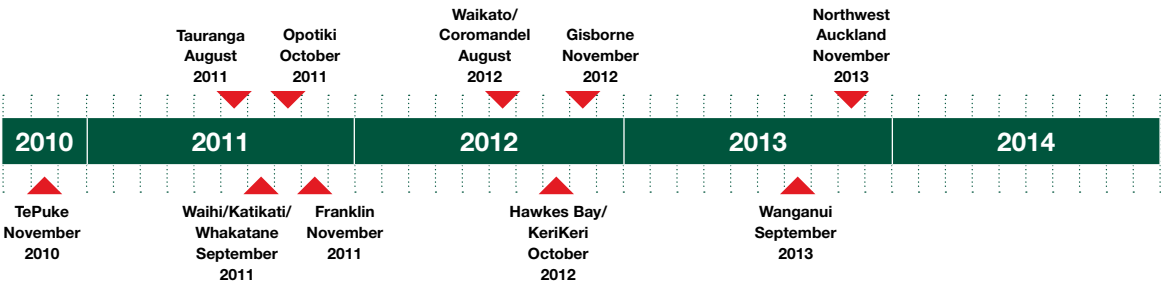
As at 1 Nov 2014



1. Kerikeri 106 KPINs 43 KPINs PSA-V positive (40%)	5. Waikato 85 KPINs 54 KPINs Psa-V positive (64%)
2. Whangarei 50 KPINs 0 KPINs Psa-V positive (0%)	6. Coromandel 45 KPINs 26 KPINs Psa-V positive (57%)
3. North West Auckland 25 KPINs 1 KPINs Psa-V positive (0.4%)	7. Waihi 43 KPINs 41 KPINs Psa-V positive (95%)
4. Franklin 104 KPINs 71 KPINs Psa-V positive (68%)	8. Katikati 459 KPINs 368 KPINs Psa-V positive (80%)
	9. Tauranga 614 KPINs 526 KPINs Psa-V positive (85%)
	10. Te Puke 1092 KPINs 1084 KPINs Psa positive (99%)
	11. Whakatane 162 KPINs 151 KPINs Psa-V positive (93%)
	12. Opotiki 223 KPINs 199 KPINs Psa-V positive (89%)
	13. Gisborne 66 KPINs 15 KPINs Psa-V positive (22%)
	14. Hawkes Bay 51 KPINs 8 KPINs Psa-V positive (15%)
	15. Whanganui/Horowhenua 22 KPINs 8 KPINs Psa-V positive (36%)
	16. South Island 140 KPINs 0 KPINs Psa-V positive (0%)

Psa-V

Psa-V Timeline in New Zealand



NATIONAL PSA-V PEST MANAGEMENT PLAN

The National Psa-V Pest Management Plan (NPMP) came into effect in May 2013, setting out the industry strategy for managing Psa-V into the future.

Its implementation enabled the kiwifruit industry to work collectively at an orchard, regional and national level to reduce the spread and impacts of Psa-V. Without this approach, the effects of Psa-V would have been far more difficult to manage.

The NPMP has rules in place including orchard management plans, movement controls, monitoring, reporting, incursion response and disease management. There is also a continued focus on education and awareness of best-practice.

SO WHAT'S MANDATORY UNDER THE NPMP? Psa-V Orchard Management Plans

All New Zealand kiwifruit growers must have a Psa-V Orchard Management Plan in place outlining their strategy for managing Psa-V. It must include vine hygiene, monitoring and reporting, protective spray programmes and management of diseased vines.

Psa-V Risk Management Plans

Psa-V Risk Management Plans are required to manage significant movements of risk items including people, vehicles, equipment and plant material that can spread Psa-V. Postharvest operators and kiwifruit processors must have, and operate in accordance with, a Psa-V Risk Management Plan. KVH also requires all nurseries, pollen operators and budwood suppliers to register with KVH and implement a Psa-V risk management plan.

Movement Controls

New Zealand kiwifruit growing regions have movement controls in place. These are outlined in a set of KVH Protocols and they are mandatory. Movement controls also apply to some associated industries, such as nurseries and beekeepers.

Reporting Psa-V

Psa-V symptoms, or potential symptoms found for the first time on an orchard must be reported to KVH within 48 hours of detection.

Mandatory Monitoring

New Zealand kiwifruit growers must report the results of their orchard Psa-V mandatory monitoring to KVH. For growers in Exclusion and Containment regions this reporting requirement falls twice a year with reporting due by 10 September; and 10 December. Growers with 'not detected' orchards in Recovery regions must report their monitoring once a year by 10 December.

Crop Protection Programme

Kiwifruit orchards must have an effective crop protection programme in place that includes, at a minimum, application of at least one crop protection product from KVH's

Recommended Product List as part of their Psa-V Risk Management Programme. KVH recommends effective crop protection options through its seasonal management guide, and strongly encourages growers to apply this.

The Recommended Product List includes a broad range of effective products, including copper-based products, antibiotics, elicitors and biological controls to give growers the biggest possible choice. All products on the KVH Recommended Product List have ACVM registration for efficacy against Psa-V.

Unmanaged Orchards

Kiwifruit orchards must be proactively managed to ensure the amount of Psa-V infected material in the orchard is minimised; and does not result in a significant and deteriorating Psa-V situation that creates a serious infection risk to others. Under the NPMP, KVH can intervene in significant cases where an orchard is in an unmanaged state and could spread Psa-V infection to other orchards.

Abandoned Orchards

Growers must ensure kiwifruit vines on their orchard are winter pruned and tied by 1 October each year. The majority of the commercially-viable fruit must be harvested by 1 July each year.

Wild kiwifruit

KVH works closely with Regional Councils to identify and destroy wild kiwifruit infestations. Wild kiwifruit may harbour pests which are harmful to commercial kiwifruit orchards. Wild kiwifruit may also reduce the biodiversity value of native forests or the production value of exotic forest.

The basis of the NPMP is a collective grower and industry commitment to ensure one grower's hard work to keep their orchard clean is not undone by a neighbour's indifference and inaction.



04

National Pest
Management
Plan



ABANDONED ORCHARDS

Over the last 18 months, KVH has facilitated the removal, or return to management, of 47 kiwifruit orchards. They total approximately 46.5 canopy hectares in area. Many of these were small orchards of one hectare or less and some had been abandoned for up to 20 years.

KVH, in partnership with some Regional Councils, has assisted with costs of removing abandoned orchards, alongside landowner contributions. This recognises landowner responsibility, the interests of the industry, and benefit to the local environment and economy to have these orchards removed or managed. Other assistance includes technical advice and arranging contractors to complete the work.

Most landowners have been very cooperative. KVH regional committees have also played a key role in identifying and contacting and assisting the owners of abandoned orchards.

KVH has received outstanding cooperation from Northland, Auckland and Bay of Plenty Regional Councils in partnering the abandoned orchard removal programme.

A small number of abandoned orchards (13) remain. They are generally in isolated locations where the risk of Psa-V infecting other orchards is low, but remains significant. KVH is actively working with these land owners to progress solutions.

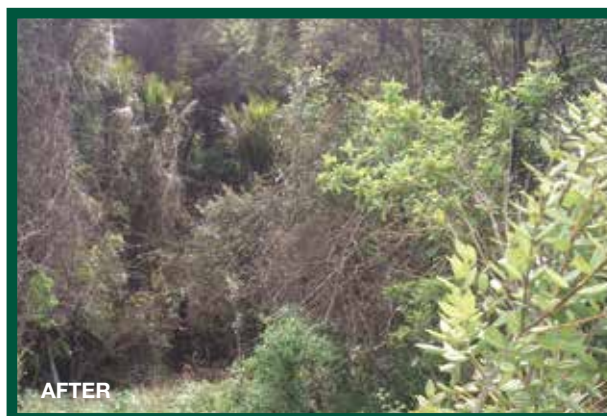


Above: Bay of Plenty abandoned kiwifruit orchard before (left) and after removal.

WILD KIWIFRUIT

In the last 12 months contractors have controlled almost 1,500 wild kiwifruit vines. Most of this work was within the Bay of Plenty and Auckland Regions. KVH contributes toward the cost of wild kiwifruit control through formal Memorandum of

Understanding (MOU) agreements with Councils. The Bay of Plenty Regional Council is a key partner in the wild kiwifruit programme, controlling thousands of wild vines yearly since 1998. Further infestations have been mapped ready for control over the 2014/15 year.



Wild kiwifruit in native forest at Pohuehue, North Auckland, before and after control earlier this year.



“We now have a tool box for managing Psa-V, and our understanding of appropriate plant husbandry has progressed significantly. We’re starting to really understand the pyramid between bacteria, plant, environment and grower.”

Dr David Tanner, General Manager Science and Innovation, Zespri

Understanding and Managing Psa-V

Over the past year, there have been significant advances in understanding Psa-V, and in finding tools and solutions to enable growers to remain productive.

The learning and experience of researchers, technical staff and growers is confirming that, with the right tools and orchard management activities, kiwifruit can be grown profitably in a Psa-V environment. With the very-evident willingness of growers to use new tools, and with Gold3’s greater tolerance to Psa-V compared to that of Hort16A, there’s a strong pathway forward.

KVH and Zespri’s Innovation team continue to work on the Psa-V Research and Development (R&D) programme which was established in 2011.

Key work in the 2013/14 year has included research into how the plant defends itself against bacterial disease through its chemical composition. Also, there has been work focused on understanding critical periods of plant growth. This work will support the development and uptake of effective orchard management activities.

KVH and Zespri product testing continues, focusing on finding a range of appropriate chemical and biological products for the control of Psa-V. This work is in collaboration with Hort Evaluation, Plant & Food Research and various agrichemical companies. Testing confirms how well each product works, helping to create a platform for the uptake of effective products across the industry.

No kiwifruit variety is resistant to Psa-V. Different varieties simply show varying levels of tolerance. Regardless of grower or region, all varieties can be susceptible. Likewise, Psa-V infection worsens in response to adverse weather events. Consequently, as we progress through the fourth year of operating in the Psa environment, the importance of awareness, readiness, vigilance and fast response cannot be overstated.

Looking ahead to the 2020s and beyond, the new cultivar breeding programme is progressing on track. Last year 12,300 fruiting seedlings were evaluated. Budwood from 59 promising seedling selections was grafted into clonal trials. Two cultivars

are in pre-commercial trials. Our seven-to-15 year objective is to identify cultivars that are even more tolerant (or ultimately resistant) to Psa-V – at the same time as ticking all the other boxes in delivering long-term value and profitability to both growers and the industry as a whole.

The New Zealand research strategy for Psa-V recovery has recently been reviewed and updated to provide greater focus in the research programme and greater coordination between the research groups in New Zealand. The research strategy has been refined and ratified by KVH, Zespri and Plant & Food Research.

The research activities for each of these themes span ‘Horizons’; the short term (2011 to 2014) referred to as ‘Horizon 1’, medium term (2014 to 2018) referred to as ‘Horizon 2’, and long term (2018-2026) referred to as ‘Horizon 3’.

In ‘Horizon 1’ (0–3 years from Psa-V arrival), the output from the five themes will look to deliver effective decision support tools and ‘off-the-shelf’ biological and chemical control options for Psa-V to growers. More Psa-V tolerant cultivars from existing cultivars will be identified and made available to growers.

In ‘Horizon 2’, integrated control options will be pursued, and in ‘Horizon 3’ truly resistant cultivars will be delivered to growers.

The research programme has been structured around five broad themes:

- 1. Detection** – is focused on being able to locate and confirm the presence of Psa-V.
- 2. Understanding the Bacteria** – aims to characterise the host, environment and management interactions associated with Psa-V infection and spread.
- 3. Chemical and Biological Control** – aims to identify and deliver chemical and biological control options for Psa-V to growers.
- 4. Management** – is targeted at the delivery of tools, growing methods and production systems that are resilient to Psa.
- 5. Finally, a major effort has commenced on breeding new fruiting cultivars, rootstocks and pollinisers that are resistant to Psa-V.** This is captured in Figure 1.

KVH and Zespri would like to thank the sponsors of the Psa R&D Programme for their support over the past three-and-a-half years.

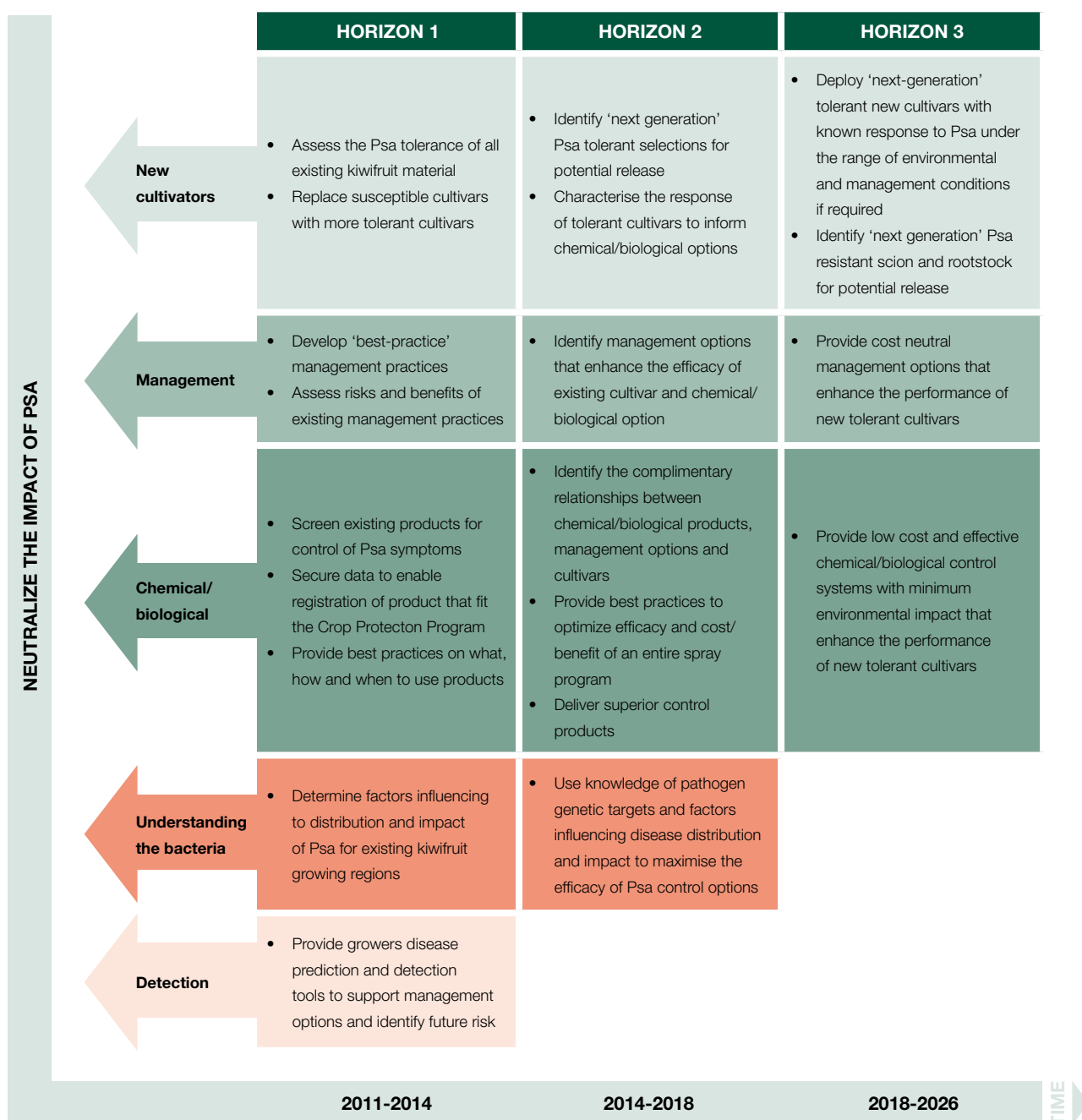


Figure 1: New Zealand Psa R&D Strategy.

TURNING KNOWLEDGE INTO ACTION



Overall, industry yields continue to increase despite an increase in the number of Psa-V infected orchards. This reflects the growing resilience of the production base as growers adapt their orchard management practices to combat Psa-V. The KVH Technical Team, in conjunction with Zespri's Orchard Productivity Team (OPC), have supported this recovery with a comprehensive range of activities which has further educated orchardists on Psa-V control options to mitigate disease impact in their orchards.

What helped us achieve this in 2014?

- Over 100 field days, regional meetings, discussion groups and industry meetings sharing best-practice information
- 19 Bay of Plenty meetings with postharvest Technical Reps
- Weekly KVH Bulletins circulated to over 2000 growers
- Regular Psa-related New Zealand Kiwifruit Journal and Kiwiflier articles
- Over 53,600 hits to the KVH website
- The first Psa-V focussed webinar run in conjunction with postharvest facilities across the country
- Seasonal revision of the KVH Seasonal Management Guides and the production of an annual KVH Wall Chart
- Implementation of an orchard auditing programme resulting in over 1065 applications of KeyStrepto™ across 13 growing regions. No honey contamination or streptomycin residues resulted from applications.
- During the 2013–2014 growing season, there were over 34,000 spray applications of registered Psa-V protectants recorded on all varieties of kiwifruit throughout New Zealand.

The KVH and Zespri OPC teams would like to acknowledge the many growers, contractors, KVH Regional Coordinators, packhouse personnel, merchants, chemical companies and scientists who have shared their knowledge and experiences with fellow growers at organised events.

Orchard productivity in a Psa-V environment is achievable. However, growers must consider three important factors to ensure vines and yields remain healthy.

PLANT

- Replace susceptible varieties with more-tolerant varieties
- Recognise male vines are more susceptible than female vines
- Recognise young vines are more susceptible than mature vines

MANAGEMENT

- Monitor regularly
- Maintain protective spray programmes
- Implement good orchard hygiene
- Remove infected material
- Address stressed vines
- Time orchard activities to appropriate weather
- Manage vines for low canopy vigour

ENVIRONMENT

- Optimise orchard shelter
- Protect orchards from frost
- Improve soil and drainage
- Recognise more vulnerable areas of the orchard



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