Psa year in review 2015 /16 growing season

Summary observations

Psa had little impact on overall production levels throughout the 2015/16 growing season with most orchards achieving excellent production. A cold, wet start to the 2015 winter led to concerns that spring may see a significant increase in Psa levels. Fortunately, most regions experienced a relatively dry spring, reducing the overall Psa risk.

Surprisingly, in most regions Hayward leaf spotting and budrot was below levels seen in previous years. The adoption of a pre-flower trunk girdle (pictured right) for budrot control on around 26% of Hayward orchards was a contributing factor, and highlighted the industry's ability to quickly adopt new technology when supported by good science. There was an increase in the reporting of Gold3 showing signs of cane dieback with a number of orchards suffering production impacts. This was particularly prevalent in colder, more challenged areas.

There is some concern that following a number of years of relatively low Psa pressure, growers may become more complacent. However, the overall level of Psa management by growers was pleasing. Its important growers are aware that Psa impacts increase following prolonged periods of high-risk weather; and the need for ongoing orchard hygiene to reduce long-term risk is also essential.

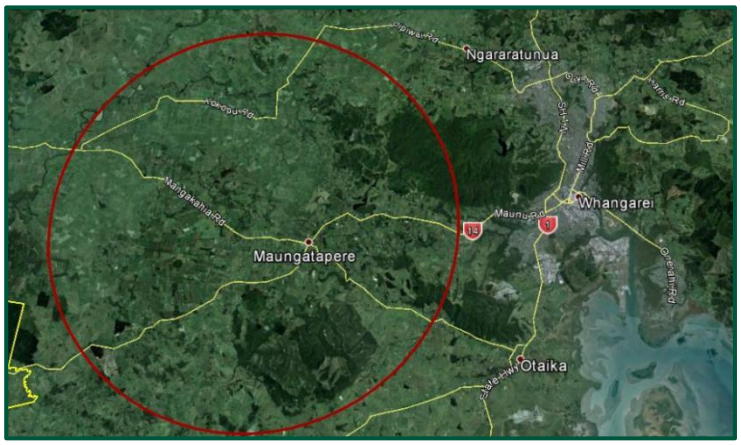
Regional summaries

Kerikeri (Recovery region)

The number of Kerikeri orchards with Psa increased from 60 to 73 KPINS representing 68% of orchards. The region's classification changed from 'containment' to 'recovery' in December 2015. Overall, the impact of Psa has been minimal, even on the remaining Hort16A orchards. Warmer conditions in the region appear to have slowed infection spread. The last of the uncovered Hort16A orchards were removed following harvest, further reducing Psa risk. Some notch-grafted Gold3 showed significant infection going into winter. These orchards will require a proactive cut-out and spray programme to minimise the impacts going forward.

Whangarei (Exclusion region with Controlled Area in place)

The first Psa positive orchard in Whangarei was confirmed in a Hort16A block in September 2015 and an 8km radius Controlled Area was put in place (pictured right). A combination of the swift removal of infected vines by the affected grower, along with the proactive Psa management plans already in place by Whangarei growers, means the disease has not been identified on any other orchards in the Whangarei region to date. Two monitoring rounds were completed by KVH in October focussing on orchards close to the positive site and Hort16A orchards.



The region remains an exclusion region with a controlled area notice in place. The last of the uncovered Hort16A has been removed.

North West Auckland (Containment region)
KVH carried out a monitoring round in this region in early November which resulted in one additional orchard confirmed with Psa, bringing the total in the region to three.

One of the positive orchards removed the Hort16A, however, infection has established in the young Gold3. The last of the Hort16A in this region was removed over winter 2015. Overall, Psa has had very little impact in this region.

Status of this region changed from Exclusion with a Controlled Area in place to a Containment region in December.

South Auckland (Recovery region)
Early spring of 2015 saw significant Psa pressure in the region, particularly on young Gold3 grafts on orchards in the cooler Ardmore area. Oozing and die back on these blocks led to significant cut out on some orchards with cut out continuing into late January. Challenged Hayward sites in the region continued to face Psa pressure with oozing in male vines common. Pre flower trunk girdling was widely used in the area to reduce budrot and production impacts. A drier, late spring and summer, along with proactive management, has enabled most orchards to stay on top of Psa and achieve good production. KVH worked closely with a number of growers facing challenges in this region.

Above right: Gold3 buds have not broken on this South Auckland orchard.

Coromandel (Recovery region)
Most orchards in this region had limited impact from Psa over the 2015 /16 growing season and this has resulted in little impact on production. 34 of the 45 KPINs are confirmed with Psa representing 76% of orchards. As in many regions, there are exceptions and the more challenged growing sites continue to face significant Psa pressure. A number of these sites also have environmental issues like drainage impacting on vine health.

Waihi (Recovery region)
Colder sites in the Waihi area have been challenged by Psa for a number of years and this year was no exception. Some have struggled to get Gold3 established and in one case the grower has elected to sell licence and return to Hayward. A number of cold Hayward organic blocks had severe Psa in males (pictured right), leading to budrot. Bactericides were used on colder, conventional Hayward orchards where exudate in males was present.

Waikato (Recovery region)

Parts of this region again faced significant Psa challenges, particularly through late winter and into spring. The Karaprio area was hardest hit with Gold3 and Hayward production levels impacted. The cold winter appears to have led to increased expression of exudate in the spring. This was seen mainly in male vines, and the associated inoculum pressure led to extensive budrot in Hayward, which impacted fruit numbers. A number of Gold3 orchards suffered from significant oozing (right) and cane die back, with up to 40% of canes removed in the worst affected orchards. This region has a high number of organic growers. One Gold3 block converted to conventional growing this year and a number of others may consider moving to conventional growing to increase the range of tools available for Psa management. KVH has worked closely with a number of the more challenged orchards in this region.

Right: ongoing Gold3 cut out in a Waikato orchard

Katikati / Tauranga (Recovery regions)

With the colder, wetter winter there was a higher level of Psa expression in early spring than seen in the previous two seasons. Many Gold3 blocks had exudate and cane dieback at levels not seen before, and cut out occurred on many colder blocks. As spring progressed and warmer, drier conditions prevailed things quickly improved. Symptoms significantly reduced and most orchards went on to produce excellent crops. The Tarapiro area continued to show symptoms for longer than many other areas and a number of orchards had to cut back young Gold3, impacting on production.

Te Puke (Recovery region)

The majority of the wider Te Puke growing region had little impact from Psa in spring with many Hayward orchards going on to produce record crops. Gold3 is well established on many sites in the region and although symptoms were more prevalent in early spring, Psa has had very little impact on this year's production. Colder, low lying sites are the exception, with Psa hot spots continuing to cause some canopy loss.

Whakatane / Opotiki (Recovery regions)

The cold, wet winter led to some orchards showing significant Psa symptoms in early spring. As Psa pressure has been greater for a number of years in the region many growers are more proactive with their cut out and spray programmes but hot spots remain. Pre-flowering trunk girdling of green varieties was widely adopted in the region and most orchards were able to get a good fruit set and go on to produce excellent crops.

Poverty Bay (Containment region)

Spring saw an increase in Psa pressure with 16 additional orchards confirmed as Psa positive, bringing the number of infected orchards to 37. 67% of orchards in the region are now confirmed positive for Psa. There was some Psa infection in Gold3 males in the region. Although more orchards were confirmed positive, Psa had negligible impact on Hort16A and Gold3 crop volumes. Leaf spotting was an issue on a number of Hayward orchards, but overall the impact has been minimal.

Growers converting from Hort16A to Gold3 with colder sites, or more severely affected stumps, experienced difficulty achieving high winter graft success. Re-grafting continued through summer.

The last of the Hort16A orchards in the region were removed following harvest.

Hawkes Bay (Containment region)
A number of Hayward orchards showed leaf spotting for the first time in November 2015, following a high-risk weather event. Two orchards went on to suffer from budrot and production loss. Contamination of tools saw one young Gold3 block hit hard with dieback over spring. Other Gold3 orchards saw an increase in Psa symptoms over early spring but a dry, late spring and early summer saw symptoms significantly reduce. Overall, the region appears to be maintaining good control with more than 60% of the orchards in this region remaining Psa Not Detected.

Whanganui (Recovery region) Psa has become more established in the Psa positive orchards in this region over the last 12 months. One additional Hayward orchard was identified with Psa in spring; and 10 of the 17 orchards in the region are now confirmed as Psa positive. Severe Psa was evident in males on some Hayward orchards in spring, impacting pollination. While this was partly offset by artificial pollination there was still a need to remove volumes of poorly-pollinated fruit. One Gold3 block where Psa was established removed 5-7 percent of canopy due to Psa infection.

The region's two G14 blocks have both been badly affected by Psa. Severe flooding over winter 2015 saw a number of orchards covered in silt (pictured right). One of these was removed and others have shown increased levels of Psa.

A hot, dry summer in the region saw Psa pressure diminish and most orchards went on to produce a good crop. Region status changed from containment to recovery in December 2015.

South Island (Exclusion region)
The South Island remains an exclusion region. KVH carried out a monitoring round in conjunction with Mainland Kiwi on 18 Hort16A orchards in November, covering 35 hectares. Sixteen samples were taken and tested for Psa-V, all came back not detected for Psa-V but positive for Pfm (previously known as Psa-LV). The majority of Hort16A blocks have been removed, and one grower will continue to grow Hort16A for harvest in 2017.

Resistance to Psa control products
The potential for Psa bacteria to develop resistance to control products has been a concern for KVH and the industry since Psa was discovered in NZ. As few products are known to have efficacy against Psa, the loss of one or more of these due to resistance would make the disease much more difficult to manage.

For this reason, a monitoring and testing programme has been in place since 2011 which tests Psa bacteria for any signs of product resistance.

Through this programme, streptomycin-resistant Psa was first identified in April 2015 and has since been detected on a small number of orchards across three growing regions.

Psa bacteria with resistance to copper was identified in mid-2015 and recent rounds of monitoring and testing have shown an increase in the number of samples with low levels of copper resistance.

While the level of resistance identified is still well below the concentration of copper in a spray tank (when applied at recommended rates), the development is concerning.

KVH has been actively working with the affected growers to reduce both the impact of Psa on their orchard, and the potential to spread the resistant bacteria to other orchards.

KVH has developed a 'Best Practice Guide' for growers to help limit resistance developing on orchards and is working with the New Zealand Committee on Pesticide Resistance to develop a national resistance management strategy.

In addition to the resistance monitoring programme, Otago University, Massey University and Plant and Food Research are undertaking studies looking at the genome sequence of Psa and how the bacteria are evolving on orchards. All these researchers have identified the presence of additional genes that they believe are associated with copper and streptomycin resistance in Psa. A PCR based test has been developed to detect the two genetic types of streptomycin resistance. However, copper resistance can be due to a larger number of genes, meaning it is difficult to develop a rapid test for this.

KVH grower support

Communication of best practice advice of Psa control has remained a KVH focus. KVH key messages included best practice to limit potential for resistance to Psa control products including the ongoing need for good hygiene practices, regular cut out of Psa symptoms and use of products at label rates. The development of a Psa-V Seasonal Management Wall Chart was well received by growers.

Spring grower meetings were held in Te Puke and containment and exclusion regions. The purpose of these meetings was to emphasise the value of reducing risks to Not Detected orchards. Messages also included key measures to reduce spread of Psa-V on positive orchards.

In addition to KVH regional meetings the team regularly attend the OPC FON fieldays and supported Zespri Crop Protection Road Shows to promote Psa best practices and answer grower questions.

One-on-one meetings with growers in areas where Psa pressure continues to have a significant impact on production, were held. These included growers in Kerikeri, Admore, Waihi, Waikato, Whakatane and Whanganui.

35 orchards who applied a third bactericide were visited by KVH to review overall Psa management practices and discuss cultural practices to reduce the dependency on bactericides. KVH also visited orchards where Psa product resistance had been identified.

Kiwifruit Vine Health

Psa - Statistics 4 August 2016

New Zealand Summary - orchards with Psa-V identified *

Orchards with Psa-V identified to date	2769
Hectares on orchards where Psa-V identified	12277
% of NZ kiwifruit hectares on an orchard with Psa-V identified	89%

	Orchards in region			
Regions	**Orchards with Psa-V**	**Total orchards in region**	**% orchards with Psa-V**	**% of hectares on an orchard with Psa-V identified***
Coromandel	34	46	74%	77%
Franklin	91	100	91%	96%
Hawkes Bay	24	49	49%	63%
Katikati	405	469	86%	89%
Kerikeri	77	108	71%	80%
Northwest Auckland	3	23	13%	18%
Opotiki	206	227	91%	95%
Poverty Bay	37	72	51%	67%
South Island	0	134	0%	0%
Tauranga	557	599	93%	97%
Te Puke	1075	1095	98%	99%
Waihi	40	40	100%	100%
Waikato	57	83	69%	85%
Wanganui/ Horowhenua	10	17	59%	75%
Whakatane	152	160	95%	97%
Whangarei	1	55	2%	2%
Grand Total	**2769**	**3277**	**84%**	**89%**