

Routine orchard monitoring is essential for early Psa-V detection



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A case study about orchard observation, preparedness and protectant programmes - with Alan Thorn, Grower Services Manager, Aongatete Coolstores Ltd, Katikati

When Psa-V first hit Te Puke in November 2010 the industry had little or no knowledge about how to manage the disease. Since then, through international and local observations as well as shared information, the industry has a better insight into planning and decision making.

This case study provides an example of a planned and sustained approach to using current Psa-V information from available sources, applying this information by taking early protectant actions, monitoring regularly, detecting symptoms early, acting promptly to successfully minimise and help prevent the spread of the disease - and the importance of continuing to keep up with best available knowledge.

Monitor orchards and share information

Regular orchard monitoring is essential to detect new incursions early and to enable time to manage Psa-V cost effectively. It is also vital for the greater good of neighbouring orchards. As orchard and packhouse managers in the Psa-V environment we need to use all the information that is available to us to make informed management decisions. This includes thinking about each orchard as having its own biosecurity border. For Aongatete, Katikaiti has provided an interesting example of using available knowledge from the KVH website www.kvh.org.nz, the weekly technical meetings held in Te Puke, the research and development briefings and the regional meetings - and then applying this information by getting in early to monitor and detect symptoms.

I have had a parallel experience to disease response while working in the avocado industry with two diseases ASBVd (Avocado Sun Blotch Viroid) and Avocado Scab (*Sphaceloma perseae*). These diseases had the potential to disturb export markets and also required industry to work through with MAF the identification and control processes required around new incursions. Luckily both diseases proved false alarms but the 'alert' gave me personally a rehearsal about the importance of orchard boundaries as biosecurity borders and the importance of orchard hygiene. All the things that have now become part of orchard best practice for the kiwifruit industry in the Psa-V environment were already highlighted to me. Practices such as not moving tools between orchards, regular cleaning procedures for tools and footwear and personal hygiene were obvious practices to implement when we learnt more about Psa-V through the Italian experience.

But because of the avocado experience we saw the necessity to move quickly. So instead of just talking about it we swung into action immediately with monitoring and hygiene practices.

Early on, we made the assumption the Psa-V inoculum level was spread throughout the Bay of Plenty region, especially after it was first detected in Waihi last September. On that basis we became much more diligent and focused with our monitoring on both our leased and managed orchards and in working with our growers. To that end we took on KVH best practices and guidelines.

During winter 2011, we had already commenced training several horticulture graduates working in our business so that by spring they were up to speed. We had a skilled resource with observant people who knew how and what to look for. This certainly was the right decision. We took the opportunity to educate our staff on Psa-V through first-hand observations of infected orchards in Te Puke. We made two specific trips - one for the orchard staff and one for our technical team. We also encouraged our suppliers to attend the Friday Tours organised by KVH in Te Puke last year to see for themselves symptoms first hand. Additionally, we had direct information from some of our senior growers who had been to Italy last year. These first-hand observations were very sobering experiences. Psa-V was no longer just in Italy. We now had our own 'little Italy' not far away in Te Puke.

Because our district had had a 'head start' we were able to educate our RSE workers from offshore (recognised seasonal employees) about Psa-V and how it is transmitted. Our RSE work programme



Aongatete's Nathan Johnson, Production Supervisor; Margaret Miller Technical Leader; and Adam Goldwater, Production Supervisor - looking for leaf spotting in a Hayward orchard.

has been consistent over the last four years, working only on our orchards. The RSE workers are well known to us and so we have had good control about who and, more importantly, what equipment is coming on and off our orchards.

For our monitoring we selected people who we knew would be good observers and would work systematically for us in the field. We initially monitored Gold males then Green males. We then extended our monitoring to the Gold females and then the Green females. We have continued to maintain a routine and systematic monitoring procedure on our orchards at least fortnightly.

Be prepared

We had a sense that Katikati was experiencing Psa-V somewhat differently - whether by good luck, wind and climate factors - but also through a great deal more preparedness.

We were well prepared when we experienced a Psa-V outbreak in late October, early November last year with our monitoring plan in place and have continued methodically since.

The first occurrences became apparent two to three weeks following a storm event. We made a number of finds during the October and November 2011 period. Of the infected orchards detected in Katikati at that time four related to Aongatete. Initially, only one vine in each orchard demonstrated symptoms, which we subsequently confirmed by laboratory analysis:

- a Hayward male,
- a Bruno rootstock seedling ungrafted under a Gold3 canopy,
- a sucker on a Bruno stumps under a Green14 canopy, and
- a Hayward female.

In each case the symptoms found were just a few leaf spots. The infected plants were removed and incinerated within 24–48 hours (and often before the analysis was back from the lab). In two instances we sprayed KeyStrepto™ to knock down inoculum levels and followed with Copper protectants as we didn't want to compromise our orchards or those neighbouring. This gave us a bit of experience with the disease and time to consider what to do by way of cutting out. Generally, in all these cases we continued to monitor at least fortnightly with more focus after the rain events.

Due to rapid interventions to remove infected plants and application of protectants (as well as lower inoculum levels in the environment), we have not seen the rapid expansion observed in Te Puke.

We have learned to focus our monitoring 10 to 14 days after any weather event, which has three to four days of prolonged rain and wetness in the canopy. We didn't detect anything more until early January this year, which probably coincided with the rain and infection period over New Year. In general we found a low-level of infection (spotting on an individual plant).

Proactive protectant programmes

Across orchards we have been very proactive with protectant programmes both directly after harvest (protecting fruit stalks) and throughout the leaf-fall pruning periods. Post-harvest, we used copper protectants - primarily Nordox and following bud burst, low rates of Liquicop with Sporekill. During flowering, we used the biological Blossom Bless. Post-flowering, we have continued to apply Kocide Opti at the summer rate around anticipated weather events. In all cases we have resisted the temptation to use spreader and wetting adjuvants - instead relying on well-calibrated sprayers, checked with water sensitive paper to ensure desired coverage was

being achieved. Investing in both an Atom and a Fantini sprayer also became part of our strategy to ensure the best coverage we could achieve. We have not observed any significant phytotoxicity problems. In the mix, on Gold orchards where we thought we had higher risk, we also used an elicitor - Actigard® - via two applications at 100gms per hectare applied 10 to 14 days apart.

Out there, we are aware of a perception by some that copper doesn't work. But from our experience with copper, considering the risk and biological consequences of the various protectants and other available chemistries and being smart with application technology, we believe it is the way to go. Through our experiences combined with information gained from the various technical forums we now know a lot more about how to use protectants. Copper has been used in horticultural practices and industries worldwide for many years such as in the wine and avocado industries, and has proved an effective tool. It is not the silver bullet in regard to Psa-V, and yes there are risks with Copper in the environment, but they are significantly less than those posed by Psa-V in the orchard. It has been the backbone of our Psa-protectant programme. Within the allowable periods we used KeyStrepto™ and Actigard® in our toolkit where we perceived high risk existed.

Our strategy is to get all of our Gold crop through this season, despite the higher susceptibility to Psa-V. We recognised the importance of plant health and we backed off nitrogen inputs in our fertiliser programme on the basis of the observations/interaction between increased Psa-V susceptibility with high nitrogen levels. We have been using elicitor and protectant programmes and, wherever possible, combining seaweed in the tank mix to assist canopy health and a whole vine-health approach.

We have two different Psa-V strategies with our management operations. For Gold, we apply sealant to all cuts with various combinations of gels, bacseal and grip-set. For Hayward, because of the time and financial considerations we made a broad decision to take a less aggressive approach - not sealing all cuts - and resolved to only work in dry conditions with a 12 to 24 hour window post-operation predicted.

On the premise that males are more susceptible to Psa-V infection, for all males we applied a sealant on the major cuts on leaders and treated the complete canopy with a knapsack application of Copper protectant on completion of pruning. We came to the conclusion not to manage Green in this way as we hadn't seen the rapid expansion of Psa-V on Hayward orchards in Katikati.

Regardless of variety or approach we haven't reduced our monitoring as we see this as a vital element in our Psa-V programme to enable instant action on infection if needed.

Communication a key element

We continue to rely heavily on observations on our own orchards and by others on theirs along with the value added by the collaboration from KVH material being provided back to the industry. No one, individual or organisation can know what each other is doing without this shared approach to making information available. The value that's provided by everyone putting their data forward in a free, frank and open forum allows decisions to be made based on data - not on financial or emotional responses. We can work in the knowledge we are using the best available information from the whole region. Meeting together and talking about Psa-V - such as through KVH's weekly technical forums, the

research and development meetings and the New Variety sessions - also provides highly valuable information. At Aongatete, we've been trying to have at least one individual attend each of these forums so we can bring the information together and work with it on the basis of what we are seeing in the orchard. This approach enables us to continually modify our approach and hopefully apply best practices within the orchard by utilising the collective industry knowledge. But the bottom line is observation.

'The bottom line is observation'

We see communication as a key element in our approach and so have begun running a fortnightly drop-in session to share information gathered from the wider industry to our growers. We have interesting debates and we often draw on the 'number 8 wire' approach out there. We put all our thoughts and observations on the table together where we can, and I think this forms a valuable forum and resource for our suppliers.

'Communicating and sharing knowledge are key elements to managing Psa-V'

Think strategically

As orchardists in the Psa-V environment we have to think strategically and plan ahead. To build a strategy you have to do the following.

- Be actively involved and attend wider industry discussions - eg technical forums, R&D briefings and new variety sessions,
- You have to watch the weather - use the weather outlooks on KVH website www.kvh.org.nz/login,
- You need a protectant programme,
- You have to get out and walk around the orchard looking,
- You have to maintain vigilant orchard hygiene practices,
- You have to treat your orchard as a biosecurity zone and create your own wall around it.

Looking back and looking forward

When Psa was found New Zealand in November 2010, we started with no knowledge. When incursions appeared Katikati a year later in November 2011, we already had knowledge from observations and experiences in Italy, France and Te Puke to assist our Psa-V fight. KVH had also been in place for nearly a year by then and was sharing information across the industry. So in Katikati by November 2011 we had a bunch of knowledge to work with and we'd also been through a winter process of using Copper protectants. We've learnt the value of a well-constructed and implemented protectant programme. We have been in a continual learning phase all year. We will go into the next year with a lot more wisdom and with an improved and hopefully less costly approach as in the last year and with more tools at our disposal. However, it is all about managing risk and unless we see increased infection levels next spring it is likely we will take a more conservative approach. If we are in a different situation we will look again at the Te Puke experience and draw on their approaches in our decision process.

We have yet to understand this beast - it's tricky.

'It's all about managing risk'

Psa-V surveillance and monitoring - a two-way information flow

KVH requires on-going surveillance and monitoring of orchards to build an accurate picture about the extent of the Psa-V incursion. The information is needed for strategic decision-making about cost-effective management judgements, establishment of accurate bio-security boundaries and Priority Zones around new incursions. The information gathered is also used to monitor the progress of existing containment or eradication programmes and to help with protection and management processes for the whole kiwifruit industry. Surveillance and early detection through regular monitoring has benefits for the whole kiwifruit industry.

- Provides evidence Psa-V is absent from a region or defined area.
- Detects new incursions early to enable timely and cost-effective management.
- Enables establishment of accurate Priority Zone boundaries around new incursions.
- Monitors progress of existing containment or eradication programmes.
- Limits development of primary symptoms to secondary infections.
- Allows early control of inoculum produced by infected vines to limit Psa-V spread to neighbouring properties and regions.
- Helps KVH report to growers about extent and location of infection in local areas.
- Provides accurate crop estimates for post-harvest operators and marketers.
- Helps KVH with accurate reports of infection footprint to Biosecurity Minister via MAF.
- Assists growers make informed management decisions about spray programmes, hygiene practices and new planting.
- Promotes growers and post-harvest taking an active role and gaining experience in early-symptom identification.
- Enables kiwifruit producers to provide timely and consistent information to the industry.
- Supports regions to make informed decisions on where to source propagation materials and pollen.
- Promotes confidence that all growers are working responsibly for the industry's collective benefit.
- Helps to identify and investigate orchards that remain Psa-V free in otherwise highly infected areas so that successful management practices can be passed to other growers.

More information is on the KVH website at www.kvh.org.nz/monitoring.

Wild or garden kiwifruit

If you have any garden kiwifruit you think may have Psa-V symptoms or know of wild or abandoned kiwifruit phone KVH on 0800 665 825 or email info@kvh.org.nz to report the location and address of the plants and/or orchards, and leave your contact phone number. For a visual reference see the Psa-V symptoms guide on the KVH website monitoring page www.kvh.org.nz/monitoring. ■