PREPARING FOR THREATS SPECIFIC TO KIWIFRUIT

Pests like fruit flies and the Brown Marmorated Stink Bug are threats to most New Zealand horticultural sectors and as a result are the focus of large multi-sector readiness efforts. However, for threats specific to kiwifruit its up to KVH to drive readiness efforts, supported by our biosecurity partner, the Ministry for Primary Industries (MPI).

These readiness and response activities and associated cost shares are formalised under the GIA Sector Operational Agreement (OA) for Kiwifruit and Kiwiberry.

What is Brazilian Wilt?

Brazilian Wilt, caused by the pathogen *Ceratocystis fimbriata*, has been the sector specific threat of focus for recent readiness efforts under the OA, prioritised because of its severe impacts to kiwifruit overseas, and the lack of scientific knowledge about the organism currently available. Infected kiwifruit orchards in Brazil have suffered 50% vine loss over the past five years and with no viable treatment, this pathogen threatens the viability of kiwifruit in the region.

Our activities to make sure we're prepared for Brazilian Wilt have included completing a readiness plan (the first under GIA), which KVH tested and refined with an industry simulation. There has also been more than $200k invested in research through the Zespri Innovation portfolio to overcome knowledge gaps such as the susceptibility of our cultivars, and to develop diagnostic tools to detect the pathogen should it arrive here.

Our work on this organism is far from complete however, with many fundamental knowledge gaps remaining, such as the susceptibility of kiwifruit to closely related species impacting Hawaiian 'ōhi'a trees, and how many vines we should remove if infection is discovered. Additional research is being commissioned for the year ahead in partnership with Zespri and MPI and will be used to refine our response strategies.

Of course, we cannot predict what organism will trigger the next biosecurity incursion, so while this research is underway KVH continues looking into other sector specific pathogens, such as Verticillium Wilt.

What is Verticillium Wilt?

Verticillium Wilt, like Brazilian Wilt, is caused by a soil borne fungal pathogen and has resulted in significant impacts to a South American kiwifruit industry - in this case Chile. Our knowledge about this pathogen is also relatively limited so we will be undertaking research in the year ahead to better understand the potential biosecurity risk to New Zealand and to develop detection tools and plans for how we would respond should it arrive.

The impact of Verticillium Wilt was first observed about 15 years ago, when a small number of growers were granted licences to grow Hort16A in Chile resulting in 140 hectares of planting. Within two years these vines showed symptoms and began dying. On some sites, 80% of vines were dead within five years. By 2009, most of the crop had been removed and about 60 hectares remained.

The decline was attributed to Verticillium Wilt and initially thought to be caused by Verticillium albo-atrum. Later, the pathogen was identified as *Verticillium nonalfalfae*, which has caused wilt in several different plants, but never before has it been associated with disease in kiwifruit.

The fungi doesn't kill the vine immediately but grows up through vascular tissue and colonises the whole plant from roots to canes. A toxin is then produced causing wilting and death of leaf tissue. The most severe impacts have only been reported on Hort16A, however inoculation lab trials have demonstrated that the species is also pathogenic to Hayward, but to a lesser degree.

The first signs of disease in canopy plants is leaf death and drop. Photo credit Bob Fullerton, Plant & Food Research

Despite the severity of the impacts, relatively little is known about this pathogen and even its identity was debated for years before being identified as V. nonalfalfae in 2007. The host range and distribution of the Chilean strains is based on circumstantial evidence and therefore not well understood. Hosts may include other crops of economic importance to New Zealand, and it may also be carried in plants that do not show symptoms.

For the year ahead, the immediate priority is to develop diagnostic tools that can distinguish Verticillium in Chile from that present in New Zealand, and to develop a readiness plan that will identify our current level of preparedness, how we will respond to an incursion, and the knowledge gaps that should be pursued to underpin these strategies.

Underground reduction in root system. Healthy vine on the left, unhealthy vine on the right. Photo credit: Bob Fullerton, Plant & Food Research

How can growers reduce their risk?

We can never be sure that organisms identified as the highest risk will be next to arrive on our shores, and there are examples where major responses have occurred for organisms that were new to science or not considered a high priority threat.

The good news is that there are several practices we can implement as an industry that will reduce risk regardless of what our next incursion is, and by maintaining these practices growers can more effectively help protect their investment when faced with the next biosecurity challenge.

On-orchard biosecurity best practice not only protects an individual's investment, it makes the whole industry better off as an incursion is more likely to be confined to a smaller area at the time of detection. For many organisms, whether it be a pest like BMSB or a disease pathogen like Brazilian Wilt, this is crucial if we are to have a shot at eradication.

Read more about how biosecurity is integral to protecting your growing investment on page 12.