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Kiwifruit microbiome study summary

There is a new concept in the biological world ‘holobiont’. The concept is that a plant is not a stand-alone organism rather it is a holobiont of plant and microorganisms and the two can't survive without each other. With the importance of this concept in mind Zespri and KVH commissioned a piece of work to understand the microbiome or collection of microorganisms on our kiwifruit in New Zealand.

The team at Plant & Food Research over the course of three years studied the microorganisms in both historical stored samples (some pre the Psa incursion) and samples collected from kiwifruit throughout New Zealand in 2017 and 2018 in two seasons.

The end result is an impressive set of reports and a culture collection that has significantly increased our understanding of our kiwifruit microbiome. These reports contain information that could potentially be of benefit to the kiwifruit industry in the form of biological control agents so for IP reasons we are keeping the deep details on the down-low. High level outcomes from the project are summarised below.

The objective of this three-year project was to establish the baseline microbiota of New Zealand kiwifruit plants, in order to understand the microbe-microbe interactions of Psa with a view to identifying potential biological control agents. The roles of key environmental factors – plant genotype, geography and seasonality – in shaping the kiwifruit microbiome were also investigated.

Key points of interest:

- The kiwifruit microbiota shares great similarities with that of other plants including species that are being investigated in other crops as potential probiotic agents to benefit general plant health (cf research that has been done on human gut health and has spawned an entire industry of products).
- Differences in microbiota were observed over the course of the season, and between regions. Few differences were observed between Gold3 and Hayward.
- Sizeable collections of fungi and bacteria have been isolated and curated from New Zealand kiwifruit providing a resource for further studies of the kiwifruit microbiota, including as potential biocontrol agents.
- This report details microbiome analysis of samples taken from kiwifruit before and after the Psa incursion. The aim of the study was to identify which groups of microorganisms were able to compete effectively with Psa and could potentially be used as biological control agents. The work identified several micro-organisms that are known to have potential biological control activity that were found in higher levels in the pre-Psa samples than the post-Psa samples.

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