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The bean trial in Canterbury, part of a project involving A Lighter Touch, Process Vegetables NZ, processing companies Heinz-Wattie's (Kraft-Heinz) and McCain Foods, and research partner Plant & Food Research

BENEFITS EMERGING FROM BIOLOGICALS

A project evaluating biological controls in two process vegetable crops has the potential to put New Zealand process growers ahead of the curve internationally in biological crop protection use.

Gina Jewell : A Lighter Touch programme

That's the view of Canterbury grower and Process Vegetables NZ chair David Hadfield. He's talking about a project involving A Lighter Touch, Process Vegetables NZ, processing companies Heinz-Wattie's (Kraft-Heinz) and McCain Foods, and research partner Plant & Food Research. It aims to identify biofungicides and biostimulants which are effective against two of the key diseases, fusarium and sclerotinia, in peas and dwarf beans.

The project came about due to a number of factors; loss of chemistry through regulatory change, risk of resistance building up in remaining control options, and changing overseas market access requirements, driven by supermarket chains and distributors not wanting certain chemicals used on the produce they were buying.

"It was a trend we could only see continuing into the future. Biologicals are the future direction for crop protection, and if we're reasonably early adopters by establishing through this project what works and how, New Zealand process growers will be ahead of the curve on a world stage."

Some of the biological products being evaluated as part of the project are not yet registered for use in New Zealand. They are subject to an Environmental Protection Authority containment and field trial approval, which enables them to be included in the project trials.

Results from the first two seasons are so far looking promising in terms of finding products that will be effective against fusarium in peas and sclerotinia in beans, and a third season of trials has just been completed, with the data now being analysed.



These beans grown in Canterbury are part of the trial evaluating 26 biological products, generating a wealth of data about their efficacy

Plant & Food Research senior scientist Dr Soonie Chng, who has led the research, says the project has been a challenging one, with so many variables – two different crops, two different diseases, one above ground and one below ground.

“These are biological products, so you’re dealing with living organisms, that’s also one of the challenges. And that’s why you’re never going to have exactly the same performance from them all the time.”

This has been reflected in the trial results which saw a number of stand-out products in the first season in terms of performance. However, in the second season, the impact of different disease pressure, an early season frost and weed competition in the bean trial, impacted their efficacy.

“Despite being under that pressure, there were a couple of products that stood out and stayed consistent. The control was not extremely high in the second season, like we saw in the first year, but the consistency was there, which is very promising,” Soonie says.

“We’re working with living organisms, so we have to learn how they’re going to perform under different weather conditions. Whether they’re going to stay on the plant, stay in the soil, how long they will stay viable, if they’ll get washed off because of the rain.”

The combination of products working together is also key to success. Heinz-Wattie’s has partnered in the project since it began, and senior agronomist Nigel Rowe-Lucas says what has become clear is treatments need to be in combination, “there’s never going to be a silver bullet.”

While the first two seasons of trials were in Canterbury only, in the third year, a bean trial has also been set up on a Hawke’s Bay site, selected by McCain’s who have now joined the project. Next season, in the project’s fourth year, a Hawke’s Bay pea trial will also be included, enabling North and South Island comparisons.

The 350 process vegetable growers in New Zealand are located across the two Islands, and Soonie says having data from both Canterbury and Hawke’s Bay is important. “We need to make sure we understand how the products work in both regions, with different soil conditions and climatic conditions.”

HOW YOU COULD BENEFIT:



Get ahead of global competitors through early biological control adoption



Control fusarium and sclerotinia **without relying fully on chemicals** that face resistance or regulatory restrictions



Reduce spray applications with **better disease cycle understanding**



Meet changing market expectations about the use of some chemicals



Explore potential yield increases by applying biologicals



WHAT ARE BIOLOGICALS?

Biologicals is a broad term used to describe crop management products derived from natural sources, including plants, fungi, and bacteria. The term can also be used to encompass biocontrol organisms, also known as natural enemies, beneficial insects and biological control agents depending on the context.

Biological products which are applied to a crop include biofungicides, bioinsecticides and bioherbicides, collectively known as biopesticides. Biopesticides include live microbes (such as bacteria, fungi and viruses) and/or their extracts, crude or purified plant extracts, pheromones and other natural biochemicals.

Biostimulants are products used to stimulate plant growth and optimise plant health, and biofertilisers are substances that contain natural products/ living organisms used to increase fertility of the soil or directly on plant foliage.

Any biological product that makes a management claim, such as pest, disease or weed control, must be registered under the ACVM Act 1997 and, where relevant, have Environmental Protection Authority approval to import or manufacture. The regulatory approval and registration processes for biopesticides currently follow a similar pathway to synthetic agrichemicals.

It is also the project team's intention to use next season's trials as demonstration sites, enabling growers and representatives from processing companies to visit and observe trial performance by appointment. In the fifth and final year of the project, demonstration trials will be used to host field walks with growers and agronomists to share findings on the use of biological products in a disease management programme.

Nigel says extending knowledge from the trials to growers is critical to the project. "Explaining how the products work and how to get the best out of them is vital. Some growers have used biologicals, but a lot are not familiar with them, so there is a lot for growers to learn and it's about walking them through that."

The focus of this third season of trials has been on refining the products and ground-truthing the findings from the first two seasons. The third and fourth year of trials will also generate data for application timing of these products.

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26 products have been evaluated across the two crops, generating a wealth of data about their efficacy

However, what the project has learned about application timing is not just restricted to when and how the biological products are most efficacious. As part of their work, Soonie and her team at Plant & Food Research have established a much greater understanding of the disease cycle in sclerotinia in beans, meaning spray applications can be reduced.

"We identified it was actually at flowering when the disease infection started, which is something you visually can't see. By the time you see the colour change (indicating disease presence), it's too late, basically the damage is done. The flowers are infected and you see a lot of them being aborted by plants."

Understanding the life cycle of the disease and how it coincides with the crop cycle is a significant step forward in terms of reducing fungicide inputs and the ongoing sustainability of products - helping to prolong their longevity by avoiding over-use.

Where growers used to spray every 10-14 days, this year's trials have reduced the number of applications to a pre-flowering and mid-flowering spray, Soonie says.

This is another example of the multi-faceted nature of the project and the benefits it is delivering, not only for process growers, but also potentially for other crop sectors. In the project to date, 26 products have been evaluated across the two crops, generating a wealth of data about their efficacy.

What this has created is an appetite from some product companies to investigate wider use of their products, Soonie says.

"What we're seeing is for some of the companies, because their product has shown efficacy in peas and beans, they're now looking at expanding that research to other crops and diseases, even on fruit crops."



Process Vegetables NZ chair David Hadfield says biologicals are the future direction for crop protection

The two diseases which are the focus of this project are common to other crops, and within A Lighter Touch fresh vegetables has already taken products that showed efficacy for sclerotinia in the bean trials and have trialled them in lettuce crops.

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...you're dealing with living organisms, that's also one of the challenges

For Process Vegetables NZ, the data and knowledge generated through this project is just the first step on the journey. David says some of the products investigated in the project achieved yield increases but no disease control efficacy.

“They've been dropped from this project because they're not achieving what this project is funded to focus on, but we intend to go back and look at the best ones to see whether we can achieve yield increases from them.”

He is also keen to look at the potential for the use of biological products for control of other diseases and in other crops, such as carrots.

“Going forward beyond this project, that's one of the things we'll be looking at, what's the next project we can do in this area that benefits both the processor in their marketing and the grower in the way they farm.” ●

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