



GROWER
SUCCESS
STORIES

REAL RESULTS FROM THE FRESH POTATO R&D LEVY



LIST OF LEVY-FUNDED PROJECTS IN THE HORT INNOVATION FRESH POTATO FUND CONTRACTED IN 2017/18

CODE	TITLE	SERVICE PROVIDER
PT15007	Potato industry communication program 2016-2019	AUSVEG
PT15008	Extension of the PreDicta Pt potato diagnostic service	South Australian Research and Development Institute (SARDI)
PT16000	Extension activities for the Australian potato industry - literature review and survey	AgAims
PT16000	Extension activities for the Australian potato industry - pest and disease app	AuSPICA (formerly ViCSPA)
PT16001	Impact of groundwater quality on management of centre pivot grown potato crops	Serve-Ag (E.E. Muir & Sons)
PT16002	Exploring <i>Spongospora</i> suppressive soils in potato production	Plant & Food Research New Zealand
PT16004	Review of the national biosecurity plan for the potato industry and development of a biosecurity manual for potato producers	Plant Health Australia
PT16005	Potato industry minor use program	Hort Innovation
PT17000	Developing and implementing high throughput diagnostic test for <i>Candidatus Liberibacter solanacearum</i> (CLso)	South Australian Research and Development Institute (SARDI)
PT17000	Diagnostic capability to detect <i>Candidatus Liberibacter solanacearum</i> (CLso)	The Victorian Department of Economic Development, Jobs, Transport and Resources (DEDJTR)
PT17002	Program approach for pest and disease potato industry investments	RMCG
PT18000	Review of bacterial blackleg diseases and R&D gaps with a focus on the potato industry	Crop Doc Consulting
MT16009	An IPM extension program for the onion and potato industries	IPM Technologies
MT16018	National tomato-potato psyllid (TPP) program coordinator	AUSVEG
ST17000	Generation of data for pesticide applications in horticulture crops 2018	Peracto

INTRODUCTION

NATIONAL FRESH POTATO LEVY

The growers profiled in this publication have benefited from their involvement or engagement with Hort Innovation Fresh Potato Fund levy investments, by taking the outcomes of levy-funded research and development projects and applying them on their farms to generate success for their business.

WHAT IS THE LEVY?

Levies are collected by the government from potato growers to support research and development projects that are designed to increase the productivity, profitability and competitiveness of the industry. The levy rate as of 1 October 2018 is 60 cents per tonne, with:

- 48 cents per tonne dedicated to research and development projects;
- 2 cents per tonne dedicated to biosecurity; and
- 10 cents per tonne dedicated to the Emergency Plant Pest Response (EPPR) Levy to pay industry's share of costs to the tomato-potato psyllid biosecurity response and a 12-month Transition to Management program.

“Ideas for research projects, or ‘concepts’, can be made by anyone in the industry, including growers.”

WHO MANAGES THE RESEARCH AND DEVELOPMENT LEVY?

Research and development levies are managed by Research and Development Corporations, which for the Australian horticulture industry is Hort Innovation. The biosecurity and EPPR Levies are administered by Plant Health Australia.

HOW IS THE LEVY INVESTED?

Hort Innovation invests research and development levy funds with advice from Strategic Investment Advisory Panels (SIAPs), which are groups (primarily growers) that provide advice to Hort Innovation about the best ways to invest these funds to increase the productivity, profitability and competitiveness of the industry. These panels are guided by the Strategic Investment Plan (SIP) for their industry, which provides insight into how best to invest these levy funds to ensure the highest return on investment for growers according to the desired outcomes.

Ideas for research projects, or ‘concepts’, can be made by anyone in the industry, including growers. The process for submitting a concept is straightforward and quick. A concept for a research project can be made online via the Hort Innovation Concept Portal (visit.edms.horticulture.com.au/Forms/ConceptFormV2), or by contacting the Hort Innovation Relationship Manager for the fresh

the highest quality to achieve the best return for growers.

Project tenders are then subject to a selection and advisory process, where a panel that may be made up of growers, relevant industry experts, Hort Innovation staff and SIAP members select the preferred provider for the project based on areas including cost-effectiveness, potential impact to industry and previous history of project delivery. Each successful provider must provide a detailed budget, and adhere to a strict reporting, monitoring and evaluation process so that projects are carefully managed to deliver ongoing benefits to growers.

Once these projects progress through the contracting process, the Federal Government also contributes funding to them, which means that growers receive an even greater return on their investment from levy funds.

FRESH POTATO SIP

Levy investments for the fresh potato industry are guided by the outcomes listed in the industry's SIP, which include:

- Improving industry profitability to increase the value of product sold on the domestic market;
- Growing export markets to result in increased average returns to growers;
- Improving average yields to result in reduced cost of production; and
- Increasing innovation and agility in potato businesses to result in a sustainable industry that can adapt to highly dynamic markets.

The potential impact of the SIP for the fresh potato industry is \$34.6 million return on an estimated investment of \$4.96 million over the next five years. The SIP can be found on the Hort Innovation website at horticulture.com.au/potato.



Photography by Nigel Marple.



Photography by Rowena Dione.

BRYAN HART

FIGHTING THE POWDERY SCAB BATTLE

Bryan Hart is always thinking outside the square when it comes to potato production.

As Senior Crop Manager of one of New Zealand's biggest potato growing operations, A.S. Wilcox & Sons, Bryan is responsible for planning and managing its potato program throughout the supply chain. This involves planning the seed requirements of exclusive varieties as well as the agronomic aspects of supply, through to working closely with the commercial team to meet customer needs.

Based in Pukekohe in the Auckland region of the North Island, Wilcox is a leading supplier of washed premium potatoes in New Zealand, and Bryan says skin finish is critical to achieving a successful crop.

"Powdery scab is the scourge of ware crop growers and costs the business a lot of money every year. Current chemical controls aren't effective to meet our

a strategic levy investment under the Hort Innovation Fresh Potato and Potato Processing Funds. It is supported by Hort Innovation and Potatoes New Zealand Incorporated.

INVESTIGATING SOILS

During the project, Wilcox collected soil samples from a number of farms with a range of cropping histories to help determine if there was a link between soil biology and disease presence and expression in potato crops.

"We are interested in this because currently there are few tools of limited effect at managing the disease, especially when you receive seed lines that are infected or you grow varieties that are highly susceptible to the disease," Bryan says.

SHARING KNOWLEDGE

Collaboration in science is always valuable, according to Bryan. While the real benefits of this project have yet to make it to a practical level, he encourages his Australian counterparts to undertake a similar project.

"The soil types there will be different and learnings can be shared across borders for the benefit of all," he says.

"It is critical to focus energy in regions growing potato seed crops, otherwise we, as growers, are just inoculating new land all the time with this disease."

SUMMARY

- Project PT16002 is a three-year project that is examining if different field soils affect the development of powdery scab in potato crops across New Zealand.
- In collaboration with scientists from Plant & Food Research New Zealand, A.S. Wilcox & Sons and its Senior Crop Manager Bryan Hart collected soil samples from its farms to study the potential links between soil biology and powdery scab presence and expression in potato crops. This resulted in the discovery of different physical and chemical levels in similar soil types.
- If proven to hold biological organisms, this information could assist growers in selecting those soils as preferable locations for ware potato production to limit the development of powdery scab.
- *Exploring Spongospora suppressive soils in potato production* is funded by Hort Innovation using the fresh potato and potato processing research and development levies and contributions from the Australian Government. The project is supported by Hort Innovation and Potatoes New Zealand Incorporated.

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KERRI-ANN LAMB

LEADING THE WAY

The transformational journey of Wickham Farms Managing Director Kerri-Ann Lamb began with the Women's Leadership Forum in 2016.

The former teacher joined the Killarney-based family business more than a decade ago and has advanced to helm the Queensland potato growing company, which employs around 75 staff. However, her true understanding of the business started at the one-off forum.

"Business and leadership skills are not something that are taught - they are something that you're expected to absorb on the job. You do absorb a lot, but you don't always know the theories behind it," Kerri-Ann says.

That understanding started becoming clearer at the forum, which was attended by women from the mango, nursery, citrus, potato and vegetable industries. After sharing their experiences, it became evident that new leadership programs were needed for emerging and established leaders, and that they needed to be designed by women, for women.

"It was a forum for women to talk about their ideas and how we could support other women in the industry," Kerri-Ann says.

"In high-level management and leadership roles, there are very few women. But there's a lot of women in middle management. It's about being able to bridge that gap and get the strategic focus and acumen around the business that propels you to the next level."

The Women's Leadership Forum (MT16003) was a strategic levy investment under multiple funds facilitated by Hort Innovation.

NEXT STEP

Recognising the need to encourage the next generation of women to build fulfilling careers, the forum recommended that Hort Innovation offer scholarships "for women to be inspired when they have a talent and

a passion". The result for Kerri-Ann was a Women & Leadership Australia program.

She was glowing in her praise of the program, which ran from June 2017 until July 2018. Its wide-ranging content included mindfulness, presence, communication, conduct, team-building and leading change.

It is already reaping rewards within the business.

"It was amazing. I learned more about myself and my leadership skills and what I actually bring to the business," she says.

"The before-and-after pictures of my leadership are like chalk and cheese."

In practical terms, Kerri-Ann has implemented improved processing efficiencies with the addition of an optical eye-sorter, which has led to product innovations. But, more importantly, sharing her learnings on the importance of good communication, results and transparency with managers has allowed her to identify future female leaders within the company.

"Our fresh-cut division is predominantly females, but I can definitely see some of our supervisors stepping up. And by doing this course, it has made me more proactive in doing training with our supervisors around teamwork and managing work styles and other areas," she says.

"Working for food manufacturers or quick-service restaurants, we have to be innovative because they're always looking for something different on their menu.

"You're always having to change for your customers ... and everything changes quite quickly. You have to be reactive and resilient and have to be looking to strategically plan to cope with what's coming around the corner."

REAL CHANGE

Overall, Kerri-Ann said the biggest lesson she had learned was to harness the courage to step up and have the confidence in your ability to strategise.

"Having more women in leadership brings a different perspective to the table; a balance and greater diversity that can challenge traditional thinking," she says.

"It's perceived that men are the problem solvers, but women are extremely good problem solvers because they solve all day, every day, every little problem.

"It is taking a long time to change that thinking. But the more women we have in leadership roles, the more that thinking changes and the more opportunities women have, and the better it is for everyone."

SUMMARY

- In the interest of creating fulfilling career paths and having more females represented at a board level, the Women's Leadership Forum (Project MT16003) focused on overcoming barriers and lifting professional development in courses designed by women, for women.
- As a result of the forum, horticulture scholarships for Women & Leadership Australia programs were established. The creation of these scholarships by Hort Innovation has enabled women to undertake courses to enhance their leadership skills.
- Undertaking this scholarship has allowed Queensland potato grower Kerri-Ann Lamb to implement efficiencies into her potato growing operation, as well as share her knowledge to empower other women within the business.
- *The Women's Leadership Forum* was funded by Hort Innovation using research and development levies from various industries and contributions from the Australian Government.

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"The soil types [in Australia] will be different and learnings can be shared across borders for the benefit of all."

customer demands (of perfect skin finish) and increasing knowledge of the disease is fundamental to developing long-term solutions," he says.

To investigate ways to reduce the effect of powdery scab disease (and its pathogen *Spongospora subterranea*), Bryan and his team reached out to Plant & Food Research New Zealand. Led by Richard Falloon, a project is being conducted to determine if different field soils affect the development of powdery scab on potatoes. Phase two of the project will investigate whether soil physical, chemical and/or biological characteristics influence this disease.

Exploring Spongospora suppressive soils in potato production (PT16002) is

Results from the project identified different levels of several physical and chemical factors from similar soil types, including soil texture, organic matter, and fertility and nutrient availability. Bryan says this raises questions around what makes these soils different.

"It is very early in the piece, however if there are biological organisms in those suppressive soils, then long-term it may be possible for either selecting those soils as preferable locations for ware potato production or potentially even for the manufacture of those organisms to be incorporated in-furrow at planting.

"If these facets turn out to be realised then I would encourage all growers to adopt them."

JOHN CRESSWELL

MINIMISING DISEASE RISK FOR A SUSTAINABLE FUTURE

Prevention is better than cure for Branxholm potato grower John Cresswell, particularly when it comes to controlling soilborne pathogens before planting potato crops.

Replacing “gut feel” with science, John said using the PreDicta Pt DNA-based soil testing service with Simplot’s R&D Research Manager Frank Mulcahy has enhanced his understanding of plant physiology and farm management practices (including irrigation, fertilising and field rotations) on his 191-hectare farm in Tasmania.

John says it’s a highly effective tool that helps determine if you have an issue with the soil before you plant, rather than adopt a “wait and see” approach at the end of the crop.

Working a farm in which the soil is 70 per cent rich-red krasnozem and about 30 per

was conducted by the South Australian Research and Development Institute (SARDI) and diagnostic services can be accessed through accredited SARDI-trained agronomists.

PREDICTING DISEASE

The pre-planting and post-harvest testing identifies if powdery scab, black dot and root knot nematode, among others, pose a significant risk to crops before planting on John’s eight-year growing cycle.

“I haven’t got a big farm and everything I do is high production. But it allows you to manage the crop in a way that would give you more certainty of a good outcome,” John says.

“It can be quality over quantity. Yield isn’t always the winner. If you had pink rot, for example, you could manage the crop so

INDUSTRY COMMUNICATION

Passionate about spreading the word via grower committees and information sessions, John says there is scope for a grower template to be developed so others can benefit from the findings.

“It would be really nice Australia-wide so they end up with scientific data across their whole farm and it becomes part of the management process,” he says.

“It’s surprising how quickly something is taken up if you can show the benefit of what you’re doing. If it’s something that’s working for us and is working for the Tasmanian industry, it can also be passed on nationally.”

SUMMARY

- PreDicta Pt (Project PT09023) is a DNA-based soil testing service that assists potato growers with paddock soil testing and management. It identifies whether soilborne pathogens pose a major risk to potato crops prior to planting.
- Tasmanian potato grower John Cresswell has been using the testing service for more than a decade and it has led to improvements in quality, yields and farm practices, including irrigation and field rotations. In addition, the DNA testing has identified greater levels of powdery scab after poppy crops; the effectiveness of some biofumigants; and it has allowed John to improve the potato varieties he already grows.
- PreDicta Pt soil testing technology was funded by Hort Innovation using the fresh potato and potato processing research and development levies and contributions from the Australian Government.

cent grey loam, John says employing DNA mapping for soil-testing sites over more than a decade has helped him determine if diseases follow where soil texture changes occur (as well as highlight the location of drainage, stones and clay).

“Now we have more than 10 years of history and all our reference points for DNA testing are by GPS. We can go back to any of those points at any time, draw soil and have it re-analysed so we can measure the ebb and flow of the pathogens and, consequently, the risk to a potato crop by planting back into those areas,” John says.

PreDicta Pt soil testing technology (PT09023) is a strategic levy investment under the Hort Innovation Fresh Potato and Potato Processing Funds. The project

it might not maximise yield to its absolute potential, but it might give you a really good yield that maintains the quality and minimises wastage.”

John says the DNA soil testing has shed light on the effectiveness of some biofumigants, and also found that growing poppies before potatoes was not recommended due to poppies being a host for powdery scab.

“The testing is allowing us to look at different techniques and ways of doing things to try to improve the varieties we’re already growing. For example, we know if we can go into lower-pathogen soils that we can get better crops of Russet Burbank. And if we can improve the roots on a Russet Burbank crop, we can improve the yield.”



Photography by Chris Crerar.





L-R: Paul Pezzaniti, Dr Paul Horne and Pat Virgara. Image courtesy of IPM Technologies.



Image courtesy of DPIRD.



Hamish Henke with two of his children Julian and Mayella.



Photography by Tanya Ewen.

PAT VIRGARA

A BENEFICIAL OUTCOME

Common sense plays an integral role in the life and work of South Australian potato grower Pat Virgara of Virgara Bros.

So, when the chance arose to work with Virginia-based Complete Ag and Seed Supplies agronomist Paul Pezzaniti, Pat was only too happy to put Integrated Pest Management (IPM) to work on his Angle Vale farm to control aphids. This transition was overseen by the IPM Technologies team, which is currently conducting an *IPM extension program for the potato and onion industries* (MT16009), a strategic levy investment under the Hort Innovation Fresh Potato, Potato Processing and Onion Funds.

IPM focuses on the suppression of pests through a combination of methods, such as biological control, habitat manipulation, modification of cultural practices, use of resistant crop varieties, weed control, paddock selection, planting time and targeted chemistry.

insects to a lot higher level, so that the beneficials can come in and make a difference," Pat says.

"We feel this is going to be a helpful strategy for potential future pests such as the tomato-potato psyllid.

"The weather has an influence on how beneficials build up. Extreme heat or cold can be an issue."

MONITORING AND ASSESSMENT

Adhering to IPM principles, Pat generally avoids the use of broad-spectrum insecticides before crop senescence or spray-off and allows naturally-occurring biological agents to control the aphids. He has also learned to assess and monitor beneficial species and pests, and employ cultural controls such as soil and irrigation management and planting of clean seed.

"We feel this is going to be a helpful strategy for potential future pests such as the tomato-potato psyllid."

Essentially, as Paul Pezzaniti explains, he monitors Pat's potato crops on a weekly basis and if they spot low levels of aphids one week and a build-up in numbers the next, they take action.

"We try and preserve the good insects that are naturally in the field (aphidius, lacewings, damsel bugs and ladybirds) by using a selective insecticide, such as Movento or MainMan," Paul says.

In the cooler months, Pat generally uses fewer insecticides and will tolerate moderate levels of pests, and only spray if thresholds are exceeded. As he maintains, "the beneficials just need a little bit of help and they do the rest by themselves".

"Having worked with Paul over some time, I have no doubt that we can tolerate

"Pat appreciates the whole project and can see its value. When the pressure is highest, that is when he would benefit most from the IPM," Paul says.

Soil management was key to long-term success in the Angle Vale area, which is located about 45 minutes from Adelaide.

"With potatoes, the IPM concept didn't work so well for some varieties as we couldn't seal up the cracks on our soil types. And unfortunately, the potato moth can still get into some of the shallow potatoes," Paul said.

Working on soil structure may reduce soil cracking and lessen the potato moth damage, or selecting soils that exhibit lower cracking in potato moth pressure timeslots.

Pat says that Virgara Bros is improving

soil structure issues by implementing three-year rotations and using cereal crops.

"Having cereal crops puts less pressure on the need for a devoted cover crop," he says.

"Pat predominantly grows fava beans but he's grown some lentils, canola, wheat and barley.

"The end goal for us is to conserve the natural chemistry, make life better for the grower and still maintain the highest possible quality and yield."

SUMMARY

- Project MT16009 is an Integrated Pest Management extension project for the potato and onion industries and is currently being coordinated by IPM Technologies.
- South Australian potato grower Virgara Bros has been involved in the project which uses beneficial insects and 'soft' chemistry to control pest populations (including aphids) in potato crops.
- Weekly visits from agronomist Paul Pezzaniti have helped Virgara Bros largely avoid the use of expensive insecticides to control aphids. Focusing on cereal crops and three-year rotations, Pat also uses naturally-occurring biological control agents, monitors beneficial species and pests, and employs soil and irrigation management strategies for maximum quality and yield.
- An *IPM extension program for the potato and onion industries* has been funded by Hort Innovation using the fresh potato, potato processing and onion research and development levies and contributions from the Australian Government.

HAMISH HENKE

PROMOTING SUSTAINABLE SOIL STRATEGIES

Chatting about soil health with Tasmanian Institute of Agriculture scientist Dr Robert Tegg on a drizzly afternoon ticked plenty of boxes for Mumbannar-based potato grower Hamish Henke.

Dr Tegg had been leading a one-year, levy-funded research project that aimed to enhance the productivity and sustainability of Australia's potato industry through improved soil health management practices. Hamish says the insights gained at his farm in south-west Victoria, 15km from the South Australian border, confirmed he and his wife Anita were on the right track.

"I'm not the best at reading long scientific articles but talking to a bloke like that for a couple of hours was magnificent just to bounce ideas around and find out what they're researching and developing at the university," he says.

"I probably learned more from him than he learned from me. Everyone does things a bit differently, so finding out what can be transferred to your area is always valuable."

Hamish says many of Robert's recommendations were already being implemented on the farm, such as building organic matter through the use of cover crops and/or pastures; quick remediation after harvest; reducing compaction; ripping soils while moist; and getting cover back on the paddock quickly.

Their chat also produced other revelations which featured in a short video. This video was an output of PT16003 - *Navigating the wealth of soil health information and identification opportunities*, a strategic levy investment under the Hort Innovation Fresh Potato and Potato Processing Funds.

ENHANCING THE SOIL

Planting in late spring for an autumn harvest, Hamish grows 28 hectares of spuds - including crispers, chippers

and fresh market - on a seven-year rotation using certified seed from Dowling AGRITech.

"We try and plant mostly in sand, to make harvest easier," he says.

"If I was growing commercially, I could tighten up that rotation. But as I'm growing certified seed, it's got to be spot on. The bigger the rotation, the better."

Hamish adds that he will take Robert's advice to try mustard as a cover crop "to inhibit the bad nematodes in the soil", having learned a harsh lesson on cover cropping years back using a type of barley that may have hosted problem nematodes.

"I also had one year on a light sand soil that I had not cover cropped. All my potatoes were just about to emerge from the top of the hills, and this big north-west hot wind came and blew the hills away," he says.

Fertiliser choice is also vital for long-term soil health.

"Trying not to overwork the soils is one key. I always use sulfate of potash (SOP, or potassium sulfate). It's far nicer on my soils. I don't mind spending more on better fertiliser because I'll reap the benefit in years to come. Also, I keep away from chlorides if at all possible and use a lot of soil conditioners to promote biological activity - good bugs as opposed to bad bugs," Hamish says.

Hamish is using a range of in-field tools for optimal yields and plant health, including soil-moisture probes.

"Rather than going out and having a little dig and guessing at the soil moisture, we have this probe that's mounted at different heights in the soil that connects to my mobile phone, which I find fantastic," Hamish says.

"It helps make decisions on when to irrigate by looking at the weather forecast and how the soil moisture sits as of today.

"When it comes to plant health, my agronomist measures the different nutrient

levels in the plant sap. He tests the sap weekly in the crop and that gives you a snapshot of how the plant is looking on that day, which enables us to fertilise correctly."

Dr Tegg recommended that future soil health research needs to focus on plant pathology, soil science, agronomy and engineering, with changes tracked over long periods. Following his participation in the project, Hamish encouraged more collaboration through hands-on visits to farms and tours by specialists in addition to other communications such as website and email updates.

SUMMARY

- Project PT16003 looked at scientific studies and the real-world experiences of growers to identify the best strategies for sustainable soil health and where new research is needed.
- Led by Tasmanian Institute of Agriculture scientist Dr Robert Tegg, the project team interviewed potato growers from different regions and farming systems, including Victorian grower Hamish Henke. Although Hamish had undertaken many of the suggested soil health practices, new concepts and ideas were discussed.
- *Navigating the wealth of soil health information and identification opportunities* has been funded by Hort Innovation using the fresh potato and potato processing research and development levies, co-investment from the Tasmanian Institute of Agriculture and contributions from the Australian Government.

GLEN RYAN

WINNING THE POTATO PEST BATTLE

When whitefringed weevil was wreaking havoc with Glen Ryan's fresh market potatoes on his Quinninup farm in Western Australia in the 1990s, help was close at hand.

Together with his father Tony and brother Dean, Glen enlisted the expertise of entomologist Stewart Learmonth from the Western Australian Department of Agriculture (now known as the Department of Primary Industries and Regional Development) to tackle the problem. At the time, Stewart was leading the three-year project *Soil Insect Pests of Potatoes* (PT00021), a strategic levy investment funded by the potato levy through Hort Innovation.

Noting the weevil's life cycle, Stewart and the Ryan family collected samples, discovered how and where to find the females, and devised strategies. One was

QUALITY OUTCOMES

Seeding the oat crops up to 15 months before planting the potatoes has been the most successful formula, Glen says. It allowed the break crop to grow and then be smashed down by cattle over summer. The oats return as a green manure crop, which is mulched two months before planting potatoes.

"That's made a huge difference to the healthiness of our soil - turned it right around - and it has had a big bearing on the operation of our farm," Glen says.

"In our situation, the break crop works really well - not just for taking out the whitefringed weevil but also *Rhizoctonia* and nematodes to some extent. So there's a broad-spectrum effect that's not just a one-off.

"You've got to keep trying things and talking to growers. There's a lot of knowledge out there; you've just got to source it."

to eradicate the females through sprays, but its effect was minimal. The other was to remove the food source for the larvae that don't transform into the weevil, planting a break crop of oats between potato crops for four years.

"A small area (80 acres) was badly infested but they were still a problem over nearly all the rest of the 1,600 acre farm. Using oats, there was a significant depletion in the numbers. It didn't eradicate the larvae totally, but it made a huge difference. The success led us to start using break crops in all fields as we could see some benefits and it's something we're still doing today," Glen says.

Working with about 1,000 millimetres of rain annually, Glen said they had tried legumes as a break crop but found they were a favoured feeding crop for the larvae. Rye grass had its issues with *Rhizoctonia* and other diseases, and barley also had mixed results.

"We've been doing that for 10-12 years, actively using soil amendments and ameliorants that are microbe- and bug-friendly. The clay is pretty close to the surface in some places - it may only be 75 millimetres below the surface. But going down this path has meant we now have top soil in our paddocks that is double or triple that."

The project also addressed the "big problem" of African black beetle.

"They are tougher to control and we still use chemicals to control them, but the break crop certainly helped in reducing those numbers," Glen says.

KEEP TALKING

The collaboration with Stewart led to the formation of a Manjimup and Pemberton potato growers group, which travelled to Tasmania to study soils.

"The information transfer was fantastic and some of their guys have been over here since," Glen says.

"Collaboration opens up your mind. We went over there and saw a lot of things, we talked and found out more, and saw some things we could implement to make the soil as strong and vibrant and healthy as we can. That's led to the green manuring, compost and soil ameliorants.

"It all sounds like smooth sailing, but we've made a lot of mistakes along the way. You've got to keep trying things and talking to growers. There's a lot of knowledge out there; you've just got to source it."

SUMMARY

- Project PT00021 was a three-year project conducted in the 1990s that addressed the issues of whitefringed weevil and African black beetles in potato crops.
- After experiencing crop losses due to the whitefringed weevil, Western Australian potato grower Glen Ryan collaborated with entomologist Stewart Learmonth to study the weevil's life cycle and identify break crops to reduce the number of larvae.
- The use of oats has successfully controlled several soil insects, including whitefringed weevil and African black beetle, on Glen's farm. The improvements in soil health have included a doubling of topsoil in paddocks, greater potato quality and improved operational efficiencies.
- *Soil Insect Pests of Potatoes* was funded by Hort Innovation using the potato research and development levy, co-investment from the Western Australian Department of Primary Industries and Regional Development and CSIRO Division of Entomology, and contributions from the Australian Government.



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3 Glenarm Road, Glen Iris VIC 3146
Email: info@ausveg.com.au
Phone: 03 9882 0277
Website: ausveg.com.au

