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Cover. Dan Hodges of Peninsula Fresh Organics - The drive for driverless tech. See page 32.

AUSVEG **Hort Innovation**

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MESSAGE FROM THE AUSVEG Chair

Since my last message, the federal election has been run, won and lost.

Congratulations go to Prime Minister Albanese and his Government, as well as Julie Collins MP on being reappointed Minister for Agriculture.

Congratulations also to Senator Anthony Chisholm on his return as Assistant Minister for Agriculture, as well as new and returning faces in portfolios like Trade, Home Affairs, Health, Environment, and Workplace Relations, among others which are all important to the vegetable industry.

We'll look forward to continuing dialogue with the horticulture industry from across the Government to address the issues Australian growers are continuing to face.

Just as the election saw no change of Government, vegetable growers have seen no let up in the challenges of recent years – with the high costs of doing business and difficulties securing viable returns continuing.

These risks to our long-term viability as growers mean our industry's issues need to be addressed as an urgent priority for the returning Government.

As we have done over the last three years, AUSVEG will continue building on our work engaging with all relevant Ministers and across all relevant portfolios – making sure vegetable, potato and onion growers' key issues stay on the political agenda.

Back in November, AUSVEG launched our 2025 Federal Election Priorities, which outlined the major challenges facing the sector, as well as the commitments needed to fix them.

Since then, our efforts to raise awareness about our industry's big issues, and the solutions needed mean there can be no excuses from politicians that they don't know about the tough times growers are facing.

In addition to our busy media schedule, and our behind-the-scenes engagement with politicians from all political parties, during the election campaign AUSVEG hosted, the Future-Proofing the Fresh

Vegetable Supply Chain event in northern Tasmania.

With Labor, Coalition, Australian Greens, Jacqui Lambie Network and independent representatives all attending, this was a chance for politicians to hear directly from leading vegetable growers about their key challenges, and commit to positive action.

Thank you to AUSVEG's Tasmanian Grower-Director, Mark Kable, from Harvest Moon, for hosting the event.

While politicians at the forum were open to the views and challenges facing the growers in the room – and across the country – they stopped short of the big-ticket commitments that are needed to address the cost-of-production crisis, and lack of profitability leading so many growers to question their futures.

It was a similar story in the wider election campaign, where political parties and their leaders were more focused on the consumer cost-of-living crisis, rather than the many issues facing the agriculture sector.

Despite the lack of major announcements, there were some commitments with potential to have a positive impact on vegetable growers – provided they are done right.

Leading into the election campaign, the Government committed \$3.5 million towards the development of a National Food Security Strategy, while the Coalition unveiled its Food Security Plan, in the dying days before the poll.

Bipartisan recognition of national food security as an issue is welcome, but what we need now is detail and action, not more talk-fests and consultation.

The many unknowns, and the lack of a detailed agenda from the Government regarding food security is a concern for vegetable growers – particularly after the last term where we saw major changes to industrial relations and workforce schemes leading to major additional cost and compliance pressures on vegetable growers.

If the Government wants to truly address food security, then we need to see plans to address the industry's cost-of-production crisis. We need to see detail about how skills and workforce shortages are going to be resolved, and we need to see detail about how the Government is going to encourage growers to invest in their businesses again, when challenging conditions have made that almost impossible.

We also need to see a Government commitment to lifting vegetable consumption, which is still at dangerously low levels, for both the health of Australians, and Australia's vegetable industry.

If the Food Security Strategy is going to achieve what it's meant to, then these issues need to be addressed, and addressed now.

With the major pressures on vegetable growers continuing, AUSVEG will continue advocating constructively with the Government – and forcefully when needed – to secure the changes and improvements that growers want and need.

Speaking of engagement, another fast-approaching opportunity to network, socialise and connect with colleagues from across the industry is fast approaching.

Hort Connections 2025, will be held this year in Brisbane from 4 to 6 June, and is once again shaping up as a not-to-be-missed gathering of Australia and New Zealand's horticulture industries, following the record-breaking event in Melbourne in 2024.

After another challenging 12 months, this will be another key opportunity for growers in our wider horticulture industry to take some time off the farm, and come together for what is guaranteed to be another showcase of how great our industry can be.

I'll look forward to seeing you in Brisbane.

Bill Bulmer
AUSVEG CHAIR

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THE STATE OF THE SECTOR WITH THE **AUSVEG CEO**

After the volatility and ongoing severe challenges of recent years, growers in Australia's vegetable industry need certainty now more than ever.

The 3 May federal election has delivered that in terms of who will lead the country for the next three years – with the clear return of the Albanese Government.

However, what is less clear is how the returning administration will address the persistent challenges and difficulties being faced by businesses across the economy, and specifically by growers in the national vegetable industry

Congratulations to new and returning Ministers in portfolios relevant to the vegetable industry, including Julie Collins MP and Senator Anthony Chisholm, on their re-appointments as Minister for Agriculture and Assistant Minister for Agriculture respectively.

Returning Ministers, Senator Don Farrell in the Trade portfolio, Tony Burke MP as Home Affairs Minister, Mark Butler MP as Health Minister, Pat Conroy MP as Minister for Pacific Island Affairs, Andrew Leigh MP as Assistant Minister for Competition, and Andrew Giles MP as Skills and Training Minister, will also provide a sense of continuity.

Congratulations also to Senator Murray Watt on being named as the new Minister for Environment and Water and Amanda Rishworth MP who has been named as the new Minister for Employment and Workplace Relations.

Addressing the industry's ongoing cost-of-production crisis, difficulties securing viable returns for produce, compliance overload and workforce shortages is bigger than any one portfolio and requires a whole-of-government approach.

As this new term of Government progresses, AUSVEG remains committed to the work of engaging across all relevant portfolios, and with all relevant stakeholders, to progress urgently-needed initiatives that improve short, medium and long-term outcomes for the vegetable industry and Australian growers.

The bigger picture

During the previous term of government, Australia severely felt the impact of global and macro-economic pressures and volatility. These, as well as a range of domestic factors, contributed to persistent high inflation, peaking at 7.8 percent in December 2022. While gradually declining, CPI remained stubbornly high until recent months.

Prolonged high inflation in turn fuelled the consumer and household cost-of-living crisis, which has dominated the political and media narrative, as well as the major political parties' attention during the 2025 federal election campaign.

While households and consumers have unquestionably been feeling the pinch, the challenging economic conditions have also taken a toll on businesses across the economy, including in the vegetable industry.

The extended period of pressure can be seen at a macro level in the Australian Securities and Investments Commission's official

insolvency statistics. These revealed more than 11,000 business failures in the 2023-24 financial year – slightly higher than previous peaks in 2011-12, and 2012-13.

As a sign of the lingering impacts, despite moderating inflation, insolvency rates for the 2024-25 financial year – almost 11,500 to the end of April – have already surpassed last year's levels.

While CPI has now retreated into territory the Reserve Bank feels more comfortable with, clearly it may be some time before relief flows through to households, businesses, and growers in the vegetable industry.

Vegetable industry challenges

The economic challenges of recent years have resulted in a perfect storm of compounding pressures, flowing from the unique position Australian vegetable, potato and onion growers occupy in both the national economy and food supply chain.

As a sector heavily reliant on international factors, and imported farm inputs, global volatility has been a significant contributor to the vegetable industry's cost-of-production crisis, pushing the prices of key farm inputs like fertiliser, fuel, seed and freight higher, at the same time costs of other inputs like energy, water and labour also climbed considerably.

Wage costs have soared, with an almost 20 percent increase in the National Minimum Wage from 2020 to 2024. Compared to other OECD countries like the UK, Canada, the United States of America and New Zealand, Australia's national minimum wage, and Level 1 Award Rate under the Horticulture Award, is already the highest. It is little wonder then that labour remains among the largest cost confronting growers in the running of their businesses – making up an average of 41 percent of total production costs, and reaching as high as 72 percent in AUSVEG's most recent grower sentiment survey from January.

As cost pressures have ramped up, growers have continued to be hit with a mounting and overwhelming compliance burden – covering everything from industrial relations, building and works approvals, resource use, machinery transportation, food safety, business administration, environmental schemes and more. These have proliferated, not only from governments of all levels, but from customers, suppliers and other third parties.

While cost pressure and compliance overload have continued to place pressure on the production side of growers' businesses, the squeeze is also occurring beyond the farmgate.

Amid the consumer cost-of-living crisis, growers have remained under increasing pressure to accept unsustainably low prices for their produce – which often won't even cover the cost of production, let alone return a profit.

Given growers have traditionally been price-takers in the fresh food supply chain, they have often been left with little choice

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THE STATE OF THE SECTOR WITH THE AUSVEG CEO

but to accept, or – as repeated AUSVEG industry sentiment surveys since 2023 have shown – consider getting out of the industry entirely.

As was the case leading into the election, unless these issues are addressed, the indicators are extremely concerning for the long-term viability of the industry, as well as Australia's future food security.

Looking ahead

The economic challenges and uncertainty which have hit international and Australian economies have played a role in the difficulties facing commercial vegetable growers.

However, many of the issues contributing to the crisis in vegetable farm viability also flow from legislative, regulatory and policy settings imposed on the industry, which have exacerbated, rather than mitigated current challenges.

Leading into and during the election campaign, AUSVEG took every opportunity to highlight and promote our 2025 Federal Election Priorities, aimed at constructively addressing the vegetable industry's many challenges.

These included seeking a \$125 million, five-year federal investment in a consumer behaviour change campaign to boost vegetable consumption by one serve per-person, per-day by 2030, alongside initiatives to shore-up national food security, cut compliance and governance overload, address major skills and workforce shortages and promote business investment and opportunities.

While agriculture broadly, and the vegetable industry specifically, did not get the attention from politicians deserving of a sector so critical to food security and the health of Australians, leading into and during the campaign, we did see some commitments with potential benefits for growers in the vegetable industry.

These included funding announced for the development of a national food security strategy, as well a funding commitment for industry bodies to upskill growers to more effectively negotiate with retailers, and understand and exercise their rights under the strengthened Food and Grocery Code.

While these measures are welcome, current unknowns around the returning Government's wider agenda may be of more concern for growers. This is particularly valid following the previous term of government, where significant industrial relations adjustments, retrograde changes to the PALM scheme and the (now abandoned) Biosecurity Protection Levy were introduced, with little to no warning – let alone consideration of the impacts on Australian vegetable growers.

With the challenges facing the Australian vegetable industry now widely known, addressing them in the interests of the long-term viability of growers in our sector and future food security, should be at the top of the Government's priority list.

This is a case AUSVEG will continue to press in its ongoing engagement with the returning Government, as well as the fact many growers in the industry are in no position to absorb more unwelcome surprises.

With inflation having now moderated, and speculation mounting about the likelihood of further interest rate cuts later in the year, the Government has already signalled an intention to focus on increasing productivity during its next term in office.

As a starting point, they would be well placed to look at some of the prevailing issues in the vegetable industry, and address unsustainable cost and compliance pressures with a view to achieving this.

Lifting vegetable consumption

In the wake of its election victory, the Government also now has a chance to act decisively, and commit to the measures needed, not only to boost Australia's vegetable industry, but to improve the health and wellbeing of all Australians.

A key commitment sought by AUSVEG in our 2025 federal election priorities was the securing of a \$125 million, five-year federal investment in a consumer behaviour change campaign to lift vegetable consumption by one serve per person.

By achieving this goal by 2030, we stand to unlock more than \$4.7 billion in net economic benefits. This includes a \$3.3 billion boost to the vegetable supply chain, the creation of 13,000 new jobs, and \$1.4 billion in healthcare budget savings.

With vegetable consumption among Australians tracking at just 1.8 serves per person per day against the recommended five daily dietary serves, turning this dire metric around must be a national priority – for the health of Australians, for the national economy, and the long-term viability of Australia's vegetable growers.

Hort Connections

As we continue pushing for a federal investment in a consumer behaviour change campaign, boosting vegetable consumption among Australians remains a key priority for AUSVEG, and a theme which will feature heavily during Hort Connections 2025, at the Brisbane Convention Centre from 4 to 6 June.

With last year's event attracting a record-breaking crowd of over 4,200 delegates, this centrepiece of the Southern Hemisphere's horticultural calendar will once again provide plenty of opportunities to connect with industry colleagues, and learn more about the latest innovations, research and trends within our industry, at a time when that is becoming more important than ever.

New AUSVEG Agrichemical Manager

As part of our ongoing commitment to delivering the services and resources that growers want and need, I am also pleased to announce the appointment of David Daniels as National Agrichemical Manager to lead AUSVEG's agrichemical program.

In this new AUSVEG role, David will work closely with growers, plant science companies, industry partners, innovators and regulators to identify and fill the gaps in pest and disease management in the vegetable industry.

David brings significant horticulture industry experience having spent 13 years at Citrus Australia as the General Manager – Market Development, leading Citrus Australia's Market Development and Market Access program.

This appointment has been driven by vegetable grower-identified needs, and the Australian Pesticides and Veterinary Medicines Authority's (APVMA's) increasing scrutiny of the agrichemical toolbox within food and fibre industries.

Keep an eye on regular AUSVEG communications channels for updates on the agrichemical program.



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ADVOCACY UPDATE

2025 federal election



The 2025 federal election campaign finished on Saturday 3 May with the Albanese Labor Government scoring an emphatic victory and regaining a majority in the lower house of Parliament.

Election day marked the culmination of months of build-up and more than five weeks of official campaigning, dominated by the consumer cost-of-living crisis.

Amid the heightened political focus on the severe pressures facing Australian households, Australia's vegetable industry has been grappling with its own cost-of-production crisis – made worse by ongoing challenges securing viable returns for produce, compliance overload, workforce shortages, a lack of capacity to invest in innovation, and low and declining vegetable consumption among Australians.

These pressures have intensified and compounded to the point where one in three growers continue reporting to AUSVEG that they are considering leaving the industry in the next 12 months – and that a further third would go if someone offered a fair price for their farm.

AUSVEG advocacy and political engagement on the key challenges facing Australian vegetable potato and onion growers has intensified as the pressures facing Australia's commercial vegetable, potato and onion growing businesses has become more pronounced, largely due to the prolonged period of suppressed returns.

In anticipation of the federal election, AUSVEG last November launched its 2025 Federal Election Priorities, outlining 21 specific commitments needed to address the industry's key challenges – across the four pillars of Secure Supply, Skills and Workforce Stability, Structural Supports for Business and Sustainable Future.

These included a \$125 million, five-year investment in a consumer behaviour change campaign to boost vegetable consumption by one serve per-person, per-day by 2030, alongside initiatives to shore-up national food security, cut compliance and governance overload, address major skills and workforce shortages and promote business investment and opportunities.

Political response

Unquestionably, all political parties and their leaders were more firmly focussed on the consumer cost-of-living crisis – rather than the vegetable industry's cost-of-production crisis during the 2025 federal election campaign.

While the major issues and challenges facing Australia's vegetable industry, and the flow on implications for future national food security, may not have received the full attention they deserved, there were some significant policy commitments of relevance to the vegetable industry during and leading into the election campaign.

These included bi-partisan support for a National Food Security Strategy or Plan, as well as a range of commitments on other key issues facing the sector.

Leading into and during the election campaign, AUSVEG engaged tirelessly with all political parties and candidates across the political spectrum, to ensure the vegetable industry's needs and challenges are well understood – and to emphasise the urgent need for commitments to the industry's election priorities.

This included at the recent Future-Proofing the Fresh Vegetable Supply Chain Forum, on 15 April where Labor, Coalition, Australian Greens, Jacqui Lambie Network and independent political representatives heard directly from leading vegetable growers about their key challenges and were given the opportunity to commit to positive action.

As part of our regular political engagement, AUSVEG was also present in Canberra the week before the election, representing the vegetable industry during the Coalition's launch of its National Food Security Plan, and received a formal response from the ALP campaign headquarters to our 2025 federal election priorities.

Throughout the campaign, AUSVEG has also emphasised and highlighted the industry's key challenges, and necessary solutions during regular media appearances. There is no one silver bullet to solve the current industry downturn but what AUSVEG advocated for is a suite of measures that together aim to ease the current cost-of-production crisis.

While neither major party made a firm commitment on our ongoing call for a \$125 million, five-year investment in a consumer behaviour change campaign to boost vegetable consumption by one serve per person per day by 2030, we have welcomed the strong support of Tarnian Senator Jacqui Lambie, from the Jacqui Lambie Network, for this initiative.

The issue of boosting vegetable consumption among Australians will remain a key focus of AUSVEG's political advocacy on behalf of industry into the next term of government.

While the analysis below against the 2025 AUSVEG Federal Election Priorities shows some welcome commitments, the urgent and pressing nature of the major challenges facing vegetable, potato and onion growers across the country will need to be a critical priority for the next term of government.

With the election result now settled, AUSVEG will continue to push for the policies and commitments that growers want and need, to ensure they remain viable, and can continue supplying the fresh vegetables that Australians depend upon.

Above. The AUSVEG Future-Proofing the Fresh Vegetable Supply Chain Forum drew significant media attention.

Election commitments against AUSVEG 2025 Federal Election Priorities

1. Secure supply

1.1 Consumption and engagement

AUSVEG election priority

Increase domestic vegetable consumption by one serve per person per day by committing to a \$125 million, long-term, national multi-channel behavioural change campaign. (\$25 million per year over 5 years.)

Political response

Neither major party made a firm commitment to this critical national priority, despite the potential for \$4.7 billion in net economic benefits, including a \$3.3 billion boost to the vegetable supply chain, the creation of 13,000 new jobs, and \$1.4 billion in healthcare budget savings. This issue remains a key priority for AUSVEG, and we have welcomed the support of Senator Jacqui Lambie from the Jacqui Lambie Network for initiatives to lift vegetable consumption, as discussed at the recent Future-Proofing the Fresh Vegetable Supply Chain Forum, convened by AUSVEG.

1.2 Food security

AUSVEG election priority

AUSVEG has called for a range of measures to bolster long-term national food security, including the development and urgent implementation of a national food security strategy, alongside measures to boost sovereign food, and key farm input manufacturing capability.

Political response

In early March the Albanese Labor Government announced a \$3.5 million commitment for the development of a National Food Security Strategy, if re-elected.

On 24 April the Coalition announced its National Food Security Plan, to be underpinned by the proposed \$20 billion Regional Australia Future Fund. The announcement also included an intention to develop sovereign manufacturing capability and cut regulatory burden.

While the bipartisan recognition of national food security as an issue is welcome, these latest commitments cannot just result in more talk-fests and rounds of consultation. Action is long overdue and the Feeding the Nation report released in November 2023 clearly outlined key recommendations that are actionable in the short term.

1.3 Competition

AUSVEG election priority

AUSVEG has called for any relevant recommendations from the recent ACCC inquiry into supermarkets to be incorporated into the strengthened Food and Grocery Code of Conduct, while also calling for funding for industry organisations and peak bodies to increase industry capacity to train growers on retail negotiations and the new Food and Grocery Code.

Political response:

Following the release of the ACCC supermarket inquiry in March, the Labor Government released its initial response, pledging to provide \$2.9 million over three years for fresh produce industry associations to deliver targeted education programs, ensuring suppliers understand and can enforce their rights under the Food and Grocery Code. Later in March, at the beginning of the official election campaign, the Labor Party pledged to make price gouging illegal.

On the same day, the Coalition reaffirmed its plans for \$2 million on the spot fines for code contraventions by supermarkets, increased powers for the ACCC to conduct random audits of major supermarkets, the appointment of a Supermarket Commissioner and sector-specific divestiture powers for the ACCC and courts, as a last resort.

Throughout the many recent inquiries into the supermarkets AUSVEG has repeatedly emphasised the fundamental point that growers need to receive a fair and viable prices for their produce, while also cautioning against interventions that may artificially distort free market dynamics, or result in additional compliance and red tape burden for growers.

2. Structural supports for business

AUSVEG election priority

AUSVEG called for range of measures that rein-vigorate growers' capacity to re-invest in their businesses, in the face of the current industry profitability crisis, and lack of funds to invest in innovation. This includes the need to introduce an instant asset write-off – immediate deduction with a \$50,000 threshold for businesses with a turnover of \$50 million or less – for investment in productivity-increasing farm assets, such as machinery and processing equipment, as well as capital assets like accommodation. AUSVEG has also identified the need to establish an independent review into levels of compliance and regulation detrimentally affecting the productivity and profitability of the horticultural sector.

Political response

The Labor Party committed to extend the instant asset write-off of \$20,000 for small businesses with turnover up to \$10 million for another year, while the Coalition committed to an ongoing instant asset write-off of \$30,000 and also signalled its intent to cut compliance burden for business in its food security plan.

AUSVEG's position remains that both the threshold for the write-off and the size of business eligible should be expanded to \$50,000 and turnover up to \$50 million respectively, to give more growers opportunities to invest in profitability and productivity enhancements.

2.1 Trade and market access

AUSVEG election priority

AUSVEG called for higher prioritisation of horticulture commodities in international trade negotiations, including ministerial involvement in negotiations and delegations, as well as increased resourcing for the Department of Agriculture, Fisheries and Forestry and Department of Foreign Affairs and Trade to focus on non-tariff trade barrier and red tape reduction for horticulture commodities.

Political response

While much of the election campaign discussion on international trade was dominated by a focus on the USA, the need to develop new and expanded international markets for Australian vegetables remains an important industry priority. This is particularly the case given the need to ensure the international competitiveness of our domestic vegetable industry in the face of the current cost-of-production crisis. It is welcome that the intent to re-start FTA negotiations with the EU was flagged as a post-election priority.



Future-Proofing the Fresh Vegetable Supply Chain Forum

On 15 April in northern Tasmania vegetable industry representatives came face to face with a panel of sitting MPs, Senators, and candidates from all parties to be part of the AUSVEG Future-Proofing the Fresh Vegetable Supply Chain Forum.

AUSVEG convened the forum to address the key challenges facing the vegetable industry, which, as two years of sentiment surveys has shown, is at a tipping point.

In attendance was the eventual winner of the seat of Braddon Labor's Anne Urquhart, Senator the Hon Richard Colbeck and Liberal candidate for Braddon Mal Hingston. As well, Senator Jacqui Lambie from the Jacqui Lambie Network and Independent Senator Tammy Tyrell attended, as did the Australian Greens' candidate for Braddon Erin Morrow.

AUSVEG Chair Bill Bulmer opened proceedings by pointing out that the election campaign was coinciding with a period of extreme challenges, and lack of profitability, making the future viability of many vegetable growers uncertain.

With commitments urgently needed from all political parties and candidates to secure the future of a sector that is critical to national food security, the forum was an opportunity for political representatives in attendance to hear directly from leading vegetable growers about their key challenges and commit to positive action. AUSVEG would like to thank Mark Kable and his team at Harvest Moon for hosting the forum.

Above. The AUSVEG Future-Proofing the Fresh Vegetable Supply Chain Forum put growers and representatives in the same room as candidates from all parties.

3. Skills and workforce stability

3.1 Workforce and Immigration

AUSVEG election priority

AUSVEG has continued to call for a range of initiatives and measures to address the industry's workforce and skills shortages. This has included, once again, the need to introduce a properly resourced National Labour Hire Licensing Scheme, as well as increasing industry capacity to upskill and educate horticulture businesses to navigate increasingly complex industrial relations, and other workforce regulations. In acknowledgment that international workers are critical to the vegetable industry, AUSVEG has also called for a suite of fit-for-purpose solutions and measures, that make it easier for growers to fill vacancies across the spectrum of skill sets in full-time, part-time and temporary positions. These include, committing to maintaining the current status of the Working Holiday Maker Visa – including the 88-day work requirement – the review, streamlining and expansion of medium-term workforce schemes, like PALM, as well as the introduction of a specific Agriculture or Harvest Visa, to provide additional short-term opportunities for suitable overseas workers to earn money in Australia.

Political response

In announcing its Food Security Plan, the Coalition signalled its intent to reinstate the Agriculture Visa, review the PALM scheme, and reverse aspects of Labor's industrial relations reforms. The Coalition also announced its intent to retain the 88-day specified work requirement for Working Holiday Maker Visa Holders. The Labor Party has indicated ongoing commitment to the PALM scheme, including potential expansion, but has not indicated any broad scale reforms or winding back of the changes that have caused angst in the vegetable industry. Labor has offered support for the establishment of a National Labour Hire Licensing Scheme during the last term of government. Labor's position on retention of the 88-day Working Holiday Maker Visa remains unclear, post-election, and there is nervousness around what additional industrial relation changes will be introduced, given the sweeping reform post the last election.

4. Sustainable future

4.1 Biosecurity

AUSVEG election priority

Commit long-term, sustainable biosecurity funding, including increasing plant biosecurity agencies' capacity and resources to combat incursions.

Political response

The Coalition committed to legislating a sustainable biosecurity funding model, including an Import Container Levy. Leading into the election, the Labor Party withdrew its contentious Biosecurity Protection Levy from the Senate.

Additional announcements

The following announcements relating to agriculture were made by the major parties leading up to or during the election campaign.

To note, the below does not capture announcements on issues like health, childcare, major infrastructure and other topics which may also have associated benefits for regional communities, and the horticulture industry.

Agricultural trade events

A Labor commitment of \$23.8 million over three years from 2025–26 to sponsor agricultural trade events.

Tasmanian Freight Equalisation Scheme

The Labor party committed to increasing assistance for the (TFES) providing an additional \$95 million for the scheme over two years, including a review.

The Coalition has committed an initial \$65 million over one year to support TFES, including a review.

Weather forecasting/Disaster preparedness

Both the Coalition and the Labor Party committed \$10 million for a new weather radar in regional Queensland.

Farm safety

Both the Coalition and the Labor Party pledged \$2.5 million to enhance farm safety through Farmsafe Australia.

Buy Australian

The Labor Party committed \$20 million to encourage consumers to buy Australian made products through the Buy Australian campaign.

Regional roads and infrastructure

The Coalition committed \$1 billion to for local councils to deliver critical community infrastructure and road projects, through the Local Roads and Community Infrastructure Program.

While the election is now over, the major challenges facing Australian vegetable, potato and onion growers remain, and are increasingly urgent to address. Throughout this next term of government, AUSVEG will continue strongly advocating for the measures needed to secure the viability of Australian vegetable, potato and onion growers' businesses.



Primary school students level up their veg

AUSVEG has recognised inspiring primary school students who are using school gardens, farms and kitchens to learn about growing vegetables and cooking them in healthy dishes.

Last year grade five and six students at Sunbury Primary School in Victoria won the *Level Up Your Veg* category of the 2024 National Kitchen Garden Awards, run by the Stephanie Alexander Kitchen Garden Foundation (SAKGF). The category was sponsored by AUSVEG, and recognised a school which grew a vegetable crop it had never tried before.

In February, AUSVEG visited the school to see their impressive garden first-hand, and to present teachers and students with a new Thermomix to help with their healthy and delicious lessons.

In 2024 students and teachers at the school decided to try growing Jerusalem artichoke, a vegetable which had never been attempted at the school. They then began researching what was needed to grow it successfully and create a plan to ensure a continuous supply of the crop over its growing period.

They then used the crop, combined with other ingredients grown in their kitchen garden, including eggs from their chickens, to prepare and cook a Jerusalem artichoke tart.

Sunbury has had a school garden for many years, but it had fallen into disrepair. In 2018 school parent De'arne Houston found the abandoned garden at the back of the school, which had nothing growing in it apart from weeds and some fruit trees. With the school's support and a \$5,000 grant from the Stephanie Alexander Kitchen Garden Foundation, De'arne and other volunteers reestablished the garden and set up a mobile kitchen for students to access during their recess and lunch time.

They both became a hit with the students, so much so that then school principal Amanda Busuttill decided the learning benefits for students from spending time in the garden was worth including in the school's curriculum. Unfortunately, COVID delayed its inclusion until 2022, with De'arne employed as an Education Support Officer (ESO).

In 2023 current teacher Natalie Abbott took over, and with one of the school buildings now used as a dedicated kitchen and teaching area the learning program has been developed around seasonal produce.

"If we aren't growing it in the patch, we aren't using it," says Natalie.

"Occasionally I get students asking why we don't cook a chocolate cake. I tell them 'We don't grow chocolate in our garden' so we won't be cooking with it."

All Sunbury students from prep to grade six spend time in the garden and kitchen, and Natalie believes the lessons they learn there flow into their wider education.

"We link to the curriculum with literacy skills, reading and interpreting recipes, reading garden tags, learning about plant families and nutrition. Also with numeracy with measurements, science with weather patterns, life cycles and insects."

To prepare and cook the Jerusalem artichoke tart last year, Natalie brought in her own Thermomix. AUSVEG decided that to help students continue experimenting with vegetables in the kitchen, it would gift a brand-new Thermomix to the school. In February AUSVEG CEO Michael Coote travelled to the school to present the new Thermomix alongside Mietta Marchingo from the SAKGF.

"Recent statistics show that Australians aren't eating enough vegetables," says AUSVEG Chief Executive Michael Coote.

"But schools like Sunbury are helping to change that by showing students how vegetables can be part of a healthy diet. We know many schools are already doing this, but would encourage others to do the same and encourage parents and families to continue these lessons at home."

The SAKGF began providing resource and support to schools and other foundations to teach children about eating healthily in 2004. It now has over 1,000 kitchen garden members and estimates that in 2023/24 more than 100,000 children took part in its programs.

Above L-R. Mietta Marchingo of SAKGF, Michael Coote of AUSVEG, De'arne Houston and Natalie Abbott with the newly donated Thermomix.

L-R. Sunbury Primary ESO De'arne Houston, Acting Principal Sunbury Primary Rohan Moat and AUSVEG CEO Michael Coote, with Sunbury Primary School students.



Program launched to unlock grower solutions for Australia's biggest horticulture challenges

BY HORT INNOVATION

Hort Innovation Frontiers, in partnership with Startupbootcamp and Cluster Connect, has announced the launch of a new program designed to drive innovation that will tackle the most pressing challenges in horticulture.

The Australian-Grown Innovation program, which is for Australian growers and those across the horticulture supply chain, will accelerate grower-led innovation through three stages of mentorship. The aim is to turn great ideas into commercially viable products and services that make a real difference on the ground.

Over the next five years, the program will run a number of cohorts through three stages of mentorship to unlock transformative opportunities and deliver practical solutions to real industry challenges such as: climate resilience strategies, value-added product innovation, technology-driven solutions harnessing AI, and supply chain improvements to improve productivity.

All solutions created will deliver on solving these challenges through a requirement to meet one of the five overarching Frontiers themes: healthy living, adaptation and resilience, market access, disruptive technologies and capability building.

The three stages of mentoring

Engage

Local workshops for growers and supply chain participants where they will learn about innovation in horticulture, gain insights and a practical toolkit from real people in the industry with lived experience of innovating. This is open to all growers in the horticulture sector.

Incubate

Following the engagement session, a cohort of 10 are selected based on an expression of interest. This cohort will participate in a six-week incubation program which offers hands-on support via workshops and mentoring to refine, test and create market viable opportunities. Participants will also learn about global best practice in their areas of innovation.

Build

A 12-week program offering participants an opportunity to develop a test version of their idea and trial it in a real-world market environment. Selected participants may also take part in a global immersion experience, where they explore partnership opportunities, participate in site visits, learn international best practices, connect with global experts, and learn from leading innovators to help scale their idea.

Who can apply?

The program is open to all growers, producers, entrepreneurs, and businesses across the horticulture supply chain who want to develop or refine problem-solving ideas and turn them into real-world products or services.

Why apply?

Innovation is often seen as discretionary. This program will help growers, and the supply chain, learn how to bring innovation into their day-to-day businesses and de-risk the associated investment.

For more information or to register your interest, please visit frontiers.au/agi

The Australian Grown Innovation project is funded through Hort Innovation Frontiers, and contributions from the Australian Government.

Hort Innovation
Frontiers



SHIFting gears on future investment planning

BY HORT INNOVATION

Hort Innovation's investment planning system is critical to achieving the vision of a prosperous and sustainable horticulture industry, built on innovation.

With the current system of five-year industry Strategic Investment Plans (SIPs) due to expire by 30 June 2026, Hort Innovation is actively partnering with industry to design future investment planning.

In order to make the transformative investments that will underpin future success, a sound investment framework is required, as well as a partnership with industry built on trust, transparency and a rigorous focus on impact from grower levy investments.

Through the Strategic Horticulture Investment Framework (SHIFt) program, Hort Innovation stakeholders are being brought together to design future investment planning and reporting that is effective, fit for purpose and delivers returns for growers.

SHIFt aims to simplify and streamline strategic investment planning and reporting, so that we can achieve greater impact for growers, and make the plans clearer and easier to use.

Why do we need a new framework?

The current framework is centred around a five-year horizon for each SIP, and a siloed approach to industry-based investment planning. While these are a useful way to map investments to levy funds, a more flexible and ambitious planning approach has the potential to capture new opportunities for impact.

Issues with the current system were part of the discussion with Peak Industry Body (PIB) leaders at the PIB Forum in July 2024, and Hort Innovation team members were also consulted during 2024.

This has resulted in a summary of issues set out in a Discussion Guide (section headed 'Observations on the current SIPs'), which has been published to ignite thoughts and conversations about the future of Australian horticulture. You will find it on the Hort Innovation website at horticulture.com.au/shift.

What are the three stages of the SHIFt program?

The program is set out in three distinct stages:

- **Investment framework** – the planning model, structure, horizon, coverage/domain and governance;
- **Investment plan content** – the priorities, activities, projected outcomes and measures that will become investments; and
- **User needs and tools** – exploring the full range of industry participants who might use the plans, and building digital-first light touch processes and systems to serve those needs.

What changes do we expect?

Given the issues identified with the previous SIPs, it is unlikely that this process will result in 37 static industry-based SIPs.

We strongly encourage all industry participants to consider a more creative and impact-focused approach to the investment framework. This may include greater cooperation across industries, a different timing horizon, or some mechanism for 'mid-term' review.

Industry feedback

We are inviting the broadest possible range of views in relation to the development of the new planning system.

Initially, this will involve all PIB leaders, key delivery partners, interested growers and Industry Representative Bodies (IRBs), as well as individual advisers – especially members of Strategic Investment Advisory Panels, project evaluation panels and Project Reference Groups.

Industry members were invited earlier in 2025 to share their ideas on a new investment framework (first phase) that will best serve growers and industry.

Consultation on the content of investment plans (second phase) will then begin in August 2025 and continue through until May 2026. Further industry feedback will be sought during that period.

Hort Innovation's SHIFt team is currently consulting with industry personnel across the nation, in-person and online. The team is keen to meet with and hear from anyone wishing to provide feedback.

If you'd like to have a say, please contact Hort Innovation in any of the following ways:

- Email the SHIFt team at shift@horticulture.com.au
- Speak with Hort Innovation contacts, including your Industry Service Manager (ISM), whose contact details are available on the Hort Innovation website: horticulture.com.au/industry-service-delivery-managers.

FOR MORE INFORMATION

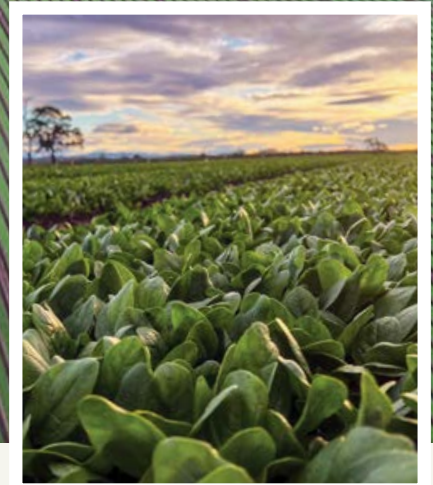
SHIFt webpage – horticulture.com.au/shift
Current SIPs – horticulture.com.au/strategic-investment-plans

**Hort
Innovation**

GROWER PROFILE

Big growth from baby leaves after 50 years of Hussey & Co

Fifty years of growth has seen Hussey & Co develop from a 40-acre farm to a transcontinental business with its brands in global markets.



Half a century ago in rural France, Victorian vegetable grower Brian Hussey saw French farmers spreading seed on their fields, and harvesting the leafy vegetables that sprang up while they were still small.

This 'mesclun', a French term for a mixed salad made with young, tender greens, was a new concept to Brian, as it was to most of Australia. He brought the idea home and began producing Australia's first 'baby leaf' product on his Pearcedale farm on the Mornington Peninsula.

The product was a hit with chefs, and in the decades since has gone on to become one of Australia's largest vegetable categories.

"He really pioneered the whole baby leaf industry in Australia," says Jeremy Haw, the Managing Director of Hussey Group.

Some years down the track, however, Brian Hussey sold the company to a group of New Zealand investors who were looking to import salad from Australia.

They ran it for two years before Jeremy, a recent migrant from South Africa, joined the business as its sales manager.

"I was there for three months, then they asked me to be the GM," he says. "It was a very small business at that point, and it wasn't making any money. We managed to turn it around and make it profitable, and I ran it for the next three years."

Jeremy was renovating houses in Melbourne on the side, and had always wanted to run his own business, and eventually asked Hussey & Co's owners if he could buy the company.

"They said no, because it was going quite well and making money," he says. "But I really wanted to work for myself, so I left the business, sold all the houses I was renovating and moved into a motel to think about what I was going to do next."

By coincidence, a friend in Sydney rang and asked Jeremy if he could source some spinach for him.

"I rang up a grower I knew and bought some spinach from him, shipped it to Sydney, and I made \$1 per box!" says Jeremy.

"I thought that was pretty good, so I started up my own business doing that, Rootz, as a joint venture with a partner in Queensland."

The business model Jeremy built with Rootz set a template for his later strategy with Hussey & Co. Rootz established relationships with a number of suppliers in Victoria and Queensland to ensure consistent supply.

"Rootz traded for two and a half years on its own and it was doing alright, but eventually I realised I needed my own production," says Jeremy.

That realisation prompted him to approach the owners of Hussey & Co in 2009 with another offer to buy the company.

"By that point it was losing money again, so they agreed, and I bought it for less than I'd offered a few years previously," he says.

Despite some ups and downs, the business has grown significantly in the years since, acquiring farms in Newry and Bushy Park to complement the expanded Pearcedale farm, adding a state-of-the-art processing facility on the Mornington Peninsula, and recently acquiring a West Australian business.

Opportunities overseas

When Jeremy took over the company, Hussey & Co was selling around 12 tonnes of salad leaves a week on the domestic market. Looking for opportunities to grow, he saw potential for Australian salads in Asia.

With only a small share of Australia's vegetable production exported, Jeremy largely had to start from scratch in developing an export model for salads.

"I booked a stand at the Food and Hotel Asia trade show in Singapore, and flew over boxes of salad," Jeremy says.

Hussey & Co was the only vegetable supplier at the event, and it turned out there was plenty of interest. Singapore Airlines



quickly signed up as the grower's first export customer, and with word spreading through the grapevine of airline chefs, numerous other regional airlines followed. "Off we went," says Jeremy. "We supplied all their business class and first class salads, then Cathay Pacific, then on and on."

Hussey & Co developed a close relationship with an importer in Singapore, and Jeremy set up import company Pick N Pack in Hong Kong in partnership with a local produce trader.

But in the years since, Asian markets have become much more competitive, and many of the airlines are now sourcing from new local salad suppliers, a trend exacerbated during the COVID-19 pandemic when it was very hard to send product into overseas markets.

"When I started there, we were the main people in the market. At one stage we supplied all the major Asian airlines," Jeremy says.

"We helped pioneer it, but now there's cheaper options available. The airfreight is very expensive from Australia's east coast."

New name for an expanded footprint

Hussey's exports may soon get a shot in the arm, however. The business recently acquired a share in a West Australian salad grower and processor, and with a new transcontinental footprint has come a new name.

Coinciding with the business's 50th anniversary in 2025 is a new 'Hussey Group' brand. The national grower-processor business now spans six farms in Victoria and Western Australia, with ready-to-eat processing facilities in both states.

The advantages for Hussey are year-round consistency of supply and resilience against seasonal disruptions, and the ability to supply customers nationally.

"We now supply all states and territories around Australia, so if we launch a new SKU, we can do it nationally," says Jeremy.

The West Australian side of the business may also give Hussey Group an opportunity to reinvigorate its export business.

"We will grow it again, we will refocus on it," says Jeremy. "From the WA side, the airfreight is much cheaper, so we're reintroducing our product to customers in Asia from there."

"There's more competition now, and the Asian market is getting more and more supplied, but as opportunity comes up, we'll be in a position to take advantage of it."

A focus on technology

Jeremy has always kept a keen eye out for new technology that can help Hussey & Co be more efficient, improve quality or value-add.

"Early on, I knew if I was going to supply retail, I needed to upscale my technology," he says. "I invested in the biggest air-drying tunnel ever developed, a triple-wash system, and I was the first in the Australian salad industry to install optical sorting."

Replacing a centrifuge dryer, Hussey's air dryer was imported from Holland in 2015, and meant the business could increase output, control moisture more accurately, and importantly decrease bruising of delicate loose-leaf salad.

The business also introduced an x-ray machine to the packhouse to detect foreign object contamination, and its Victorian factory has the largest solar panel installation on the Mornington Peninsula.

Hussey & Co's packhouse has always been central to Jeremy's vision for the company. "As a salad grower, it's very easy to sell to a processor – that's a very easy entry level," he says.

"But I avoided doing that because I wanted to become a grower and a processor, which I've done. It makes me very difficult to compete with – the grower-processor vertically integrated business is definitely the model we're focusing on. It's a very strong model."

While export markets are competitive, they're also more numerous. On the domestic market, however, there's only so much space on the shelves.

"In fresh produce in Australia, it's like trench warfare; it's box warfare," says Jeremy. "If you drop the ball, someone else will take your space."

Value-adding and, critically, delivering consistently high quality is the name of the game.

"That's the future – keep strengthening our business model and building strong relationships," says Jeremy. "But at the end of the day, you have to focus on quality. It doesn't matter that you've been going since 1975 – if you put rubbish in a box, you'll fail."





export/ trade + update

AUSVEG Southeast Asia Trade Mission SINGAPORE, MALAYSIA AND THAILAND

In April 2025, AUSVEG led a delegation of Australian vegetable, onion and melon grower-exporters on a trade mission to Southeast Asia.

The trade mission forms part of the industry's ongoing efforts to develop export opportunities and strengthen international trading relationships with these important markets. The five-day program took the trade mission delegates through three major export markets, including Singapore, Kuala Lumpur and Bangkok.

In each location the program included a market insights tour, business matching with fresh produce buyers, and networking opportunities with retailers, importers, and wholesalers. The Southeast Asia trade mission delegates also attended the FHA – Food & Beverage trade event in Singapore.

Singapore

The mission began in Singapore with the delegation attending day one of the FHA – Food & Beverage Event at Singapore Expo. FHA is Southeast Asia's largest food and beverage exhibition. With over 65,000 attendees and exhibitors from more than 50 countries, FHA provides an exclusive platform for businesses to showcase their products and to explore global trends, engage with international buyers, and discover innovative products in the fresh produce sector. The event's scale and diversity allowed Australian growers to better understand emerging demands and consumer preferences in Asia.

Change in Australian vegetable exports to Singapore

TABLE 1. JANUARY TO DECEMBER 2024

Source: Global Trade Atlas 2025

CROP	2023		2024		% ↑ 2023–2024	
	AUD\$	TONNES	AUD\$	TONNES	AUD\$	TONNES
Total fresh vegetable exports to Singapore	\$42,324,477	24,814	\$45,468,838	24,737	7%	0%
Cauliflower & broccoli	\$8,194,935	2,536	\$11,666,289	3,281	42%	29%
Carrot	\$10,073,231	11,548	\$9,534,966	10,684	-5%	-7%
Pumpkin	\$3,512,663	2,602	\$4,127,473	2,652	18%	2%
Potato	\$3,729,761	2,390	\$4,024,404	2,490	8%	4%
Celery	\$3,143,176	1,983	\$2,940,155	1,841	-6%	-7%
Lettuce	\$2,761,124	687	\$2,573,665	382	-7%	-44%
Tomato	\$2,291,747	435	\$2,136,501	398	-7%	-9%
Asparagus	\$1,887,652	262	\$1,925,503	277	2%	6%
Onion	\$1,419,729	1,139	\$1,763,271	1,780	24%	56%
Vegetable (other)	\$2,603,237	622	\$1,525,068	286	-41%	-54%

Singapore is the top destination for Australian fresh vegetable exports, with exports increasing 7 percent last year to be valued at \$45 million and totalling 24,737 tonnes. The six most exported vegetables to Singapore are broccoli and cauliflower, carrots, pumpkins, potatoes, and celery.

Australia was the Partner Country for FHA-Food & Beverage 2025, and 2025 marks 60 years of diplomatic relations between Australia and Singapore. This underscores the depth of the bilateral relationship between Australia and Singapore and demonstrates Australia's broader commitment to the region.

This year, Australian growers had the opportunity to walk through the entire FHA exhibition rather than exhibiting at a stand, as AUSVEG has traditionally done in the past. Having a full day to explore the show allowed participants to better understand the broader market landscape, discover new trends, and meet potential buyers.

Kuala Lumpur Malaysia

The program in Malaysia commenced with a market briefing at the Australian High Commission in Kuala Lumpur. The delegation was welcomed by Gregory Harvey, Trade and Investment Commissioner, Austrade Malaysia & Brunei, followed by an opening address from AUSVEG CEO, Michael Coote.

The delegation received market access updates from Kate Wiencke, Agriculture Counsellor to Malaysia, who provided insights into regulatory developments affecting market access for fresh vegetable exports to Malaysia. In addition, Patricia Lee, Senior Investment Manager from Austrade Malaysia, provided updates on upcoming initiatives in 2024-25 for the Malaysian market, highlighting opportunities for Australian exporters.

The morning's discussions were valuable for growers seeking to navigate the complex landscape of import regulations, consumer trends, and logistics in Malaysia. It also reinforced the importance of engagement and collaboration between AUSVEG, Austrade and DAFF in facilitating trade.

Malaysia is the third-largest export destination for Australian fresh vegetables, with exports valued at \$23 million and totalling 21,231 tonnes. The five most exported vegetables to Malaysia are carrots, celery, onion, potato and spinach.

VEGETABLES
ONIONS

Change in Australian vegetable exports to Malaysia

TABLE 2. JANUARY TO DECEMBER 2024

Source: Global Trade Atlas 2025

CROP	2023		2024		% ↑ 2023–2024	
	AUD\$	TONNES	AUD\$	TONNES	AUD\$	TONNES
Total fresh vegetable exports to Malaysia	\$24,743,211	23,561	\$23,305,837	21,231	-6%	-10%
Carrot	\$10,909,878	14,201	\$10,443,928	13,430	-4%	-5%
Celery	\$2,954,697	1,861	\$3,187,508	1,910	8%	3%
Onion	\$4,278,379	4,449	\$3,137,362	3,252	-27%	-27%
Potato	\$2,919,679	2,254	\$2,881,757	1,855	-1%	-18%
Spinach	\$1,042,131	161	\$1,365,121	266	31%	65%
Cauliflower & broccoli	\$899,892	220	\$926,158	203	3%	-8%
Vegetables (other)	\$1,124,567	176	\$378,931	71	-66%	-60%
Brussels sprouts	\$81,180	18	\$267,445	35	229%	94%
Pumpkin	\$174,208	108	\$194,721	92	12%	-15%
Asparagus	\$106,908	10	\$164,892	23	54%	130%

After the briefing, the group visited Euro-Atlantic. With nearly three decades of experience in the industry, Euro-Atlantic has raised the bar in the Malaysian fresh produce import business with their continuous search for new and emerging food sources and heavy investments in state-of-the-art cold rooms and equipment. They are the leading importer and distributor of specialty fruits, vegetables, marine produce and gourmet groceries since 1992.

The afternoon featured a targeted Business Matching and Networking Event at W Kuala Lumpur. This session enabled participants to present their product offerings, discuss potential exports, and lay the groundwork for future collaborations and export opportunities.

Bangkok Thailand

The Thailand program commenced with a briefing and retail tour with one of Thailand's leading retailers, CP Axta, which operates the Makro wholesale and Lotus's retail chains. The group visited Lotus's Pattanakarn branch, where CP Axta executives provided an overview of the Thai retail market and consumer trends, specifically in fresh produce.

CP Axta was established in 1988 under the name of Siam Makro Company Limited, opening the first Makro branch in Ladprao, Bangkok. In 2023, Makro changed its company name from Siam Makro PCL to CP Axta.

The group then toured Villa Market at Gaysorn Amarin, another premium retail outlet popular with both local and expatriate communities. These retail visits highlighted the importance of premium branding, packaging requirements, and the increasing demand for traceability and sustainability in food products in Thailand.

Thailand is the fifth-largest export destination for Australian fresh vegetables, with exports valued at \$13 million and totalling 13,474 tonnes. The five most exported vegetables to Thailand are onions, carrots, potato, lettuce and spinach.

Change in Australian vegetable exports to Thailand

TABLE 3. JANUARY TO DECEMBER 2024

Source: Global Trade Atlas 2025

CROP	2023		2024		% ↑ 2023–2024	
	AUD\$	TONNES	AUD\$	TONNES	AUD\$	TONNES
Total fresh vegetable exports to Thailand	\$13,981,315	13,530	\$13,102,043	13,474	-6%	0%
Onion	\$8,304,803	10,921	\$7,921,938	9,991	-5%	-9%
Carrot	\$1,927,657	1,893	\$1,671,492	1,916	-13%	1%
Potato	\$220,255	132	\$1,095,020	1,129	397%	755%
Lettuce	\$880,735	112	\$667,201	82	-24%	-27%
Spinach	\$640,189	70	\$605,939	69	-5%	-1%
Cauliflower & broccoli	\$1,146,571	246	\$479,026	147	-58%	-40%
Celery	\$247,072	66	\$226,179	74	-8%	12%
Vegetable (other)	\$246,850	36	\$141,486	19	-43%	-47%
Salad Beets	\$104,711	19	\$114,162	21	9%	11%
Brussels sprouts	\$82,977	10	\$60,211	11	-27%	10%

The final day of the mission was packed with high-value engagements, including a business-to-business matching session at Centara Grand Hotel in the morning. The grower-exporters had the opportunities to meet with top Thai importers, distributors and retailers, exploring partnership possibilities, discussing procurement processes, and promoting the high quality, safety, and consistency of Australian vegetables.

The delegation then toured Tops Retail, one of Thailand's major supermarket chains. A working lunch followed with the Tops Fresh Team, offering deeper insights into procurement priorities and promotional initiatives aimed at increasing demand in premium imported Australian produce.

The trade mission concluded with a cooking demonstration event at 'The Stage'. A local celebrity chef demonstrated creative

dishes using Australian vegetables, showcasing the versatility, flavour, and freshness of Australian produce to the delegation, Tops management team and a captivated audience.

Strategic outcomes and future prospects

The Southeast Asia Trade Mission highlighted the region’s great potential for Australian vegetable exports. Singapore, Malaysia and Thailand are all characterised by rapidly growing middle classes, increasing health consciousness among consumers, and an appetite for premium imported goods. Australian vegetables, known for their good quality and high safety standards, are well positioned to meet this rising demand.

The delegation visited Jaya Grocer in Malaysia, Lotus’s, Villa Market and Tops in Thailand during the trade mission. The retail store visits provided Australian grower-exporters a deeper understanding of supply chain expectations, promotional strategies, emerging consumer preferences, and competitive offerings.

In addition, the trade mission highlighted the important role of market development, market engagement and market intelligence in export success.

Through the Multi-Industry Export Program funded by Hort Innovation, AUSVEG has been provided with great opportunities to showcase the Australian vegetable, onion and melon industry to international buyers and to provide a platform for Australian grower-exporters to engage with international retailers, importers and wholesalers directly to gain feedback as well as allowing growers to better align their products with market needs and consumer demands.

The AUSVEG Southeast Asia Trade Mission also reinforced the importance of ongoing collaboration with Austrade and DAFF, especially through the facilitation of the business-to-business matching sessions. This government support is critical in assisting the industry and Australian businesses in navigating regulatory requirements, promoting Australian produce abroad, and providing exporters with the tools needed to succeed in competitive markets. The program would not be a success without the ongoing collaboration between the industry and government.

AUSVEG, on behalf of the Australian vegetable and onion industries, would like to acknowledge and thank Austrade and DAFF in Singapore, Malaysia and Thailand for their continued support and effort in assisting the industry to expand its exporting.

Participant reflections

Participants expressed overwhelming appreciation for the tightly organised and action-packed program. Many noted the balance between market briefings, site visits, and business meetings as a key strength of the mission. The opportunity to meet directly with potential buyers, visit premium retail outlets, and gain insights from in-market experts provided a holistic view of export opportunities and challenges in these markets.

Some growers highlighted the valuable feedback they received during business matching sessions, which would help them refine their product offerings, branding, and logistics arrangements for future exports. Others emphasised the importance of continuous engagement and the need for follow-up communications to convert promising leads into lasting partnerships.

Looking ahead

With Southeast Asia’s economies continuing to grow and their consumers becoming ever more discerning, Australian vegetable, onion and melon grower-exporters are encouraged to maintain their market share through consistent supply and quality.

Building on the momentum of this highly successful mission, AUSVEG plans to organise further initiatives in the region, offering even greater support to Australian growers seeking to expand their international footprint.

As Australian growers continue to deliver high quality produce to the international market, trade missions like this play a crucial role in ensuring that the industry’s future in international trade remains synonymous with quality, safety, and excellence throughout Southeast Asia and beyond.

International trade events 2025

Through the *Multi-industry export program (Vegetables, Onions, Melons)* project, AUSVEG coordinates grower participation in and exhibition at several international trade missions aligned with major trade events in regions.

EVENT	2025	LOCATION
Gulfood	16–21 February	Dubai World Trade Centre (DWTC)
Foodex	10–14 March	Tokyo Big Sight, Japan
South East Asia Trade Mission	April	Thailand, Malaysia & Singapore (TBC)
AUSVEG Fresh Produce Showcase	4 June	Brisbane, QLD
Reverse Trade Mission (inbound)	29 May –4 June	Queensland
Asia Fruit Logistica	3–5 Sept	Asia World Expo (Hong Kong)



FIND OUT MORE

Please contact Andrea Lin, International Trade Specialist, AUSVEG andrea.lin@ausveg.com.au or +61 3 9882 0277

The *Multi-industry export program (Vegetables, Onions and Melons)* project is funded by Hort Innovation using the vegetable, onion and melon research and development levies and contributions from the Australian Government.

Project: MT21009



VEGETABLE FUND



ONION FUND



MELON FUND

INTERNATIONAL TRADE UPDATE

Australian vegetable exports
2024 OVERVIEW

The Australian fresh vegetable export landscape has experienced various changes and challenges in recent years. Fluctuating demand across global markets, evolving international trading conditions and the reduction or elimination of tariffs for competing countries in key markets have impacted Australia’s competitive position.

Despite these pressures, the Australian vegetable industry continues to adapt, actively pursuing new opportunities and working to strengthen its presence in key export markets. In 2024, total vegetable exports declined by 5 percent in both export value and volume, representing a reduction of \$12 million and drop of 9,717 tonnes. Carrot, potato and onion remained the top three most exported crops, with potato exports increased by 20 percent in value, from \$40 million to \$48 million, and 14 percent rise in volume to 48,295 tonnes.

From January to December 2024, Australian fresh vegetable exports were valued at \$235 million, with a total export volume of 197,221 tonnes. Singapore, the United Arab Emirates, Malaysia, South Korea and Thailand were the top five markets for fresh vegetable exports over this period.

Singapore held its position as the top Australian fresh vegetable export destination by value, with an increase in export value by 7 percent, from \$42 million to \$45 million and export volume maintained at 24,737 tonnes. Exports to the United Arab Emirates decreased by 10 percent in value, from \$33 million to \$30 million, and dropped 12 percent in volume, from 39,691 tonnes to 34,810 tonnes. Growth continued in the South Korean market, recording a 22 percent increase in export value and a 22 percent climb in volume. Australian fresh vegetable exports to Thailand dropped 6 percent in value for close to the same volume as the previous year (refer to Table 1).

FIND OUT MORE
Please contact Andrea Lin, International Trade Specialist, AUSVEG andrea.lin@ausveg.com.au or +61 3 9882 0277
The Multi-industry export program (Vegetables, Onions and Melons) project is funded by Hort Innovation using the vegetable, onion and melon research and development levies and contributions from the Australian Government. Project: MT21009

Change in Australian vegetable exports by global market

TABLE 1. JANUARY TO DECEMBER 2024

Source: Global Trade Atlas 2025

TRADE PARTNER	2023		2024		% ↑ 2023–2024	
	AUD\$	TONNES	AUD\$	TONNES	AUD\$	TONNES
Total fresh vegetable exports	\$246,741,005	206,938	\$234,775,038	197,221	-5%	-5%
Singapore	\$42,324,477	24,814	\$45,468,838	24,737	7%	0%
United Arab Emirates	\$33,826,654	39,691	\$30,446,960	34,810	-10%	-12%
Malaysia	\$24,743,211	23,561	\$23,305,837	21,231	-6%	-10%
Korea, South	\$16,863,160	20,851	\$20,645,124	25,351	22%	22%
Thailand	\$13,981,315	13,530	\$13,102,043	13,474	-6%	0%
Hong Kong	\$14,102,575	6,185	\$12,671,758	4,922	-10%	-20%
Saudi Arabia	\$14,837,769	17,152	\$11,501,526	14,766	-22%	-14%
Japan	\$8,952,882	3,992	\$10,000,932	5,162	12%	29%
New Zealand	\$12,402,494	3,619	\$9,785,067	2,304	-21%	-36%
Taiwan	\$12,429,320	9,765	\$9,282,377	7,361	-25%	-25%

Vegetable export by crop

JANUARY TO DECEMBER 2024

Root vegetables such as carrots, potatoes and onions remained the top three export crops for the industry. Asparagus exports increased by 18 percent in value and six percent in volume to 4,444 tonnes. Celery exports had a year of positive growth in 2024, growing nine percent in value and 27 percent in volume (refer to Table 2).

Change in vegetable exports by crop

TABLE 2. JANUARY TO DECEMBER 2024

Source: Global Trade Atlas 2025

CROP	2023		2024		% ↑ 2023–2024	
	AUD\$	TONNES	AUD\$	TONNES	AUD\$	TONNES
Carrot	\$81,407,949	98,726	\$68,466,758	85,515	-16%	-13%
Potato	\$40,289,167	42,238	\$48,456,809	48,295	20%	14%
Onion	\$43,893,098	42,853	\$40,266,902	42,390	-8%	-1%
Cauliflower & Broccoli	\$14,255,018	4,199	\$16,780,774	4,444	18%	6%
Asparagus	\$10,173,760	1,251	\$11,069,043	1,585	9%	27%
Celery	\$7,846,451	4,642	\$7,780,596	4,506	-1%	-3%
Beans	\$7,605,977	1,794	\$6,292,266	1,214	-17%	-32%
Lettuce	\$5,586,550	1,173	\$5,293,442	797	-5%	-32%
Pumpkin	\$4,722,579	3,191	\$5,166,163	3,242	9%	2%
Tomato	\$6,315,144	1,459	\$4,209,278	813	-33%	-44%

Australian onion exports

2024 OVERVIEW

Australian onion exports saw a mixed performance in 2024, with overall value dropping by 8 percent from \$44 million to \$40 million, and a slight reduction in export volume of 463 tonnes to 42,390 tonnes compared to previous year.

Thailand, the United Arab Emirates, Netherlands, Malaysia and Japan were the top five export destinations for Australian onions.

The United Arab Emirates recorded modest growth of 5 percent in value despite a slight 2 percent dip in volume. The Netherlands saw a 25 percent rise in export value from \$3.5 million to \$4.3 million, with an increase in export volume of 50 percent, from 2,583 tonnes to 4,087 tonnes. Japan performed strongly in 2024, with a 40 percent increase in export value from \$2.1 million to \$3 million and 65 percent increase in volume, from 1,575 tonnes to 2,593 tonnes.

Belgium, Singapore and Germany also recorded positive growth, especially with onion exports to Belgium climbing 49 percent in value and 62 percent in volume. On the other hand, Spain recorded a sharp decline, with both value and volume falling by 62 percent and 66 percent respectively (refer to Table 3).

Change in Australian onion exports by global markets

TABLE 3. JANUARY TO DECEMBER 2024

Source: Global Trade Atlas 2025

TRADE PARTNER	2023		2024		% ↑ 2023–2024	
	AUD\$	TONNES	AUD\$	TONNES	AUD\$	TONNES
Total fresh onion exports	\$43,893,098	42,853	\$40,266,902	42,390	-8%	-1%
Thailand	\$8,304,803	10,921	\$7,921,938	9,991	-5%	-9%
United Arab Emirates	\$4,378,606	4,275	\$4,576,607	4,209	5%	-2%
Netherlands	\$3,482,150	2,583	\$4,342,129	4,087	25%	58%
Malaysia	\$4,278,379	4,449	\$3,137,362	3,252	-27%	-27%
Japan	\$2,115,809	1,575	\$2,952,742	2,593	40%	65%
Taiwan	\$4,180,324	4,411	\$2,794,511	3,497	-33%	-21%
Belgium	\$1,483,348	1,323	\$2,207,447	2,140	49%	62%
Singapore	\$1,419,729	1,139	\$1,763,271	1,780	24%	56%
Germany	\$1,237,671	1,287	\$1,596,939	1,881	29%	46%
Spain	\$3,501,322	3,546	\$1,331,271	1,215	-62%	-66%
Norway	\$685,922	596	\$1,310,381	1,381	91%	132%
Indonesia	\$2,179,086	1,717	\$1,230,969	1,724	-44%	0%

Market outlook for onions

Indonesia

From January to December 2024, Australian onion exports to Indonesia were worth \$1.2 million at 1,724 tonnes. Tasmanian onions accounted for approximately 85 percent of this volume.

Historically, Tasmanian onions have held a reasonable market share of Indonesian onion imports. However, the market dynamics and trading conditions shifted significantly in September 2024 when New Zealand successfully negotiated the removal of pre-export methyl bromide fumigation requirements with the Indonesian government.

This development is a strong achievement for New Zealand's Ministry for Primary Industries (MPI) in ensuring a viable export pathway for New Zealand's onion industry.

As a result, New Zealand onion exports to Indonesia have resumed with reduced import conditions and fumigation requirements, eroding the market share previously held by Australian onion exporters. While Australian onions are now subject to strict fumigation requirements, the removal of this barrier for New Zealand onions has serious implications for Australian onions' future market access and market share in the Indonesian market.

AUSVEG has been actively engaging with the Department of Agriculture, Fisheries and Forestry (DAFF) and Australian onion grower-exporters to resolve the current trade challenges and seek improved market access conditions in Indonesia.

While the situation remains complex and uncertain, there are ongoing efforts between the industry and government to ensure that Australian onions remain competitive in key export markets, including Indonesia. Grower-exporters will be kept informed of developments, and AUSVEG remains committed to supporting the industry through constructive engagement with government and international stakeholders.

Europe

Australian onion exports to Europe are a significant contributor to Australia's vegetable exports, with countries like the Netherlands, Spain, and Belgium being major importers.

Australian onion exports to Europe are expected to decline in 2025, primarily due to the New Zealand-European Union (NZ-EU) Free Trade Agreement (FTA) entering into force on 1 May 2024, which saw the 9.6 percent New Zealand onion tariff eliminated, giving New Zealand onions a competitive advantage in the market over Australian onion exports.

The delay in finalising the FTA between Australia and the European Union has disadvantaged the Australian onion industry. With trade tensions, tariff measures and disruptions to the global trading environment, it is critical that the recommencement of negotiations for the Australia-European Union FTA is prioritised by whomever forms the next Australian federal government.

Encouragingly, in March 2025 the EU's top diplomat in Australia called for the urgent resumption of the stalled FTA negotiations between Australia and the 27-nation EU bloc, stating that an FTA between Australia and the EU is a 'no-brainer' as the US tariffs continue to disrupt the global trading landscape.

The recommencement of negotiations would be strongly welcomed by the Australian onion industry and AUSVEG will engage with the Australian FTA negotiators to seek the same tariff elimination outcome on Australian onion imports to the EU that was agreed in the previous deal.



Trust in the next generation key to success of historic family business

The Brimblecombes have been farming in Queensland's salad bowl, the Lockyer Valley, for close to 150 years with a story that begins with a shipwreck and very nearly ended during World War One.

For family patriarch Linton Brimblecombe, a key attribute that has been shared down the years has been keeping an eye on the future.

"Empowerment of the next generation is just something so key to this conversation," Linton said.

Each steward of the family property has brought their own approach, starting with grazing and fodder production, before transitioning to cotton and later vegetables.

"My great, great grandfather came in with the gold rush heading to Ballarat in the mid-to-late 1800s but he got shipwrecked off the coast of Newcastle," Linton said.

"He met a lady, got married and had two boys, John and William, and they made their way to Queensland to farm the black soil plains of Forest Hill.

The shot that changed their lives

"The call of war came with World War One and my grandfather, who was a student teacher, joined the light horse in 1917."

His campaign ended in a bloody battle which killed five of his eight men and left

him with gunshot wounds to his wrist and hip. In 1925 he bought the block that remains in the family a century later.

"Grandpa lived with the challenge of his war wound for the rest of his life," Linton said.

"He retired in his fifties and said to my dad, 'Allan, I want you to have this and I think that expression of faith in the next generation started at that point.

"And in the same way, I guess I'm a little tired now and my son Mitch has taken over the management of the farm."

Mitch said it was a daunting challenge at the age of 20 but he had wanted to be a farmer for as long as he can remember.

"When I'd get home from school I'd want to go out and follow dad around and probably was more of a hindrance than a help," Mitch said.

"But it's always been a passion. It's a great industry with a lot of great people and there's so many different aspects of the business whether it's agronomy, machinery operation, earthworks, finance or future direction."

Planning has been a critical part of the Brimblecombe's management at Moira

Farming, particularly with the operational needs of a farm that grows cotton and vegetables across hundreds of hectares.

Part of their planning Linton says is ensuring they have the right tools in their toolkit.

"To be a farmer you need a few more tools in your toolkit and they're generally big," Linton said.

Their fleet of John Deere machinery supports their mixed farming operations and is essential to the success and sustainability of their operation.

Whether they are preparing the soil, planting seeds, spraying weeds or harvesting produce, they require equipment that is dependable and efficient, fitted with Precision Ag technology that helps them to manage their workload effectively, especially during peak seasons.

With a large horticultural operation, having a versatile and reliable workhorse to rely on such as their 6120R John Deere tractors allows the Brimblecombes to focus more on their crops so they can stay productive for the long-term.

Above L-R. Linton Brimblecombe with his 6120R John Deere tractor. The Brimblecombe family have been farming in Queensland's salad bowl, the Lockyer Valley, for close to 150 years.

FIND OUT MORE

For more information visit [deere.com.au](https://www.deere.com.au)

vegetable fund update



This project has been funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

**Hort
Innovation** **VEGETABLE
FUND**

Increasing vegetable consumption by 2030: the Plus One Serve initiative

The Plus One Serve of Vegetables by 2030 program is a bold, collaborative initiative aimed at significantly increasing vegetable consumption across Australia by implementing evidence-based strategies and behaviour change interventions.

The ultimate goal of the new Plus One Serve project is to elevate the average daily vegetable intake by one serve per person by the year 2030.

Despite the Australian Dietary Guidelines recommending a daily intake of five serves of vegetables and two serves of fruit, only 6.1 percent of Australians meet this standard regularly. The average daily consumption currently stands at just 1.8 serves per person, resulting in an annual shortfall of 18 to 27 billion vegetable serves. This underconsumption presents a significant missed opportunity for Australia's vegetable industry, with a potential retail value of \$4-6 billion being unrealised.

To address this challenge, the Plus One Serve program will implement a comprehensive, multi-project strategy designed to increase vegetable consumption in Australia by one serve per person per day by 2030.

Utilising annual workshops, quarterly reporting, and opportunities for ideas exchange, a series of specialised, settings-based R&D projects will be conducted to build scientific evidence for behaviour change. These projects will target consumers with interventions that enhance value perception, improve literacy and skills, inspire enjoyment, normalise vegetable consumption, and positively transform environments where Australians live, learn, shop, and play.

Serving as the project coordinator, AUSVEG will oversee expert-led interventions in

settings like early childhood learning, schools, retail, and homes, identified through extensive stakeholder consultation. Barriers to consumption will be systematically addressed through rigorous scientific experimentation and innovative, practical solutions, enhancing existing efforts.

The project follows on from the *Plus One Serve National Strategy and Baseline Review project* (VG23005), which was completed in 2024. That project laid the groundwork for the ongoing Plus One Serve project, which is now underway.

With only 6.4 percent of vegetables exported and one third of growers considering leaving the industry, boosting domestic consumption is critical. Adding one daily serve could generate a \$2 billion revenue increase, alongside health, economic, and social benefits.

An additional daily serve of vegetables (75 grams or 1/2 cup) per person would lead to over 9.1 billion more serves consumed annually in Australia, increasing production from 3.7 million tonnes to over 4.6 million tonnes, accounting for 25 percent in-home food waste.

Achieving this goal would deliver widespread benefits, including a \$4.68 billion increase in value to the vegetable industry, \$3.30 billion in net supply chain economic benefits, 12,841 new regional jobs, and a \$1.38 billion reduction in healthcare costs. Over six years, each dollar invested in the program is expected to yield a \$12.30 return.



Increasing the vegetable consumption of Australians by just one extra serve per person per day (75g) will deliver a powerful triple-bottom-line of benefits:

\$1.38B

Healthcare savings

Thriving, healthy Aussie kids, families and communities.

\$3.3B

Vegetable supply chain

Grower and industry economic benefits.

13,000

New jobs

Sustainable communities and jobs creation.

One additional serve of vegetables per day would also boost volume for Australian growers and supply chain operators by \$1.3 billion, requiring a 30 percent production increase for a 21 percent rise in consumer demand, and add \$1.6 billion in economic value across the supply chain.

Learn more at plusoneserve.com.au

This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.
Project: VG23016

Hort Innovation **VEGETABLE FUND**



GLOBAL AGTECH ON DISPLAY IN AN AUSTRALIAN-FIRST AT Gatton AgTech Showcase

BY CLAIRE QUINN AND SOPHIE VOLKER,
QUEENSLAND DEPARTMENT
OF PRIMARY INDUSTRIES

The Queensland Department of Primary Industries and Hort Innovation are excited to announce the return of the Gatton AgTech Showcase at the Gatton Smart Farm on 15-16 October 2025.

The Gatton AgTech Showcase will provide an opportunity for vegetable growers to see new global agtech in action for the first time on Australian soil and to talk to agtech manufacturers about how these technologies can help their businesses be more productive and profitable.

Attendees will be treated to Australian-first demonstrations of agtech options including the Ecorobotix ARA Smart Sprayer and a range of protected cropping technologies.

Department of Primary Industries Director of Vegetables, Systems and Supply Chains Ian Layden said the event – delivered as part of the Queensland Smart Farm initiative – was created to fill a gap in the market for automated and practical on-farm solutions.

"We are thrilled to announce the return of the Gatton AgTech Showcase for 2025, particularly off the back of the massive success of the 2023 event," Mr Layden said.

"The live demonstration in 2023 attracted 800 people, including 200 growers from across Australia, with feedback indicating growers and technology companies see value in an interactive regional event that demonstrates the technologies in real world conditions.

"Our Gatton Smart Farm is the perfect location to host an event like this, providing a unique opportunity to grow crops in the field and under protected cropping and apply technological solutions to those environments.

"Our goal is to find the best agtech for Australian growers, with this year's showcase set to highlight those technologies in action."

Hort Innovation's Research and Development Manager Tom McCue said the 2025 showcase would further strengthen Australia's position on the global agtech map.

"Through this program, we're seeing international manufacturers starting to seriously consider Australia as a key market for their technology – not just because of the scale of our industry, but because events like the Gatton AgTech Showcase create a platform for direct engagement with growers," Mr McCue said.

"For manufacturers, this is a rare opportunity to understand the unique challenges of Australian farming and to shape their products to suit local conditions. For growers, it's about seeing this technology working in the paddock and having real conversations about whether it fits their operation."

The Australian Agritech Association (AusAgritech) – the peak body for agritech in Australia – is also partnering to support the 2025 Gatton AgTech Showcase through a speaking program designed for growers, agritech providers and students.

AusAgritech Executive Officer Meg Lovegrove said the showcase delivered "agritech in action" through practical insights, direct grower engagement and future-focused conversations.

"With real-time demonstrations, validated data and a speaking program grounded in grower needs, the showcase connects producers, innovators, and students to what's working now and what's coming next," she said.

AUSVEG CEO Michael Coote said the peak body for vegetable growers also welcomed the return of the showcase, which would assist with some of the increased pressures facing growers in recent years.

"We certainly welcome events like the Gatton AgTech Showcase, which provide firsthand opportunities for growers to see and learn about the latest developments," he said.

"Finding and adopting new agricultural technology has the potential to address some of the energy, labour and input cost challenges that are continuing to put growers under pressure."

After its successful first event in November 2023, the showcase's innovative style was recognised by winning the 2024 VISY Industry Impact Award at the Australian Horticulture Awards for Excellence.

LEARN MORE

Contact Ian Layden, Queensland Department of Primary Industries, at ian.layden@daf.qld.gov.au
The Gatton AgTech Showcase has been funded by Hort Innovation, using the vegetable and onion research and development levies, contributions from the Australian Government, and co-investment from the Queensland Department of Primary Industries.

Project: AS20007

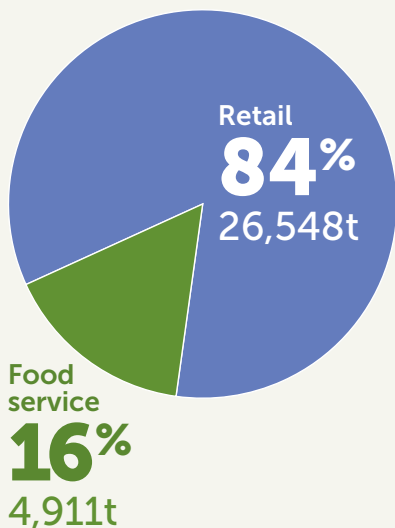
Hort Innovation **VEGETABLE FUND**
Hort Innovation **ONION FUND**

COMMODITY PROFILE

Beans

Beans have shown double-digit dollar sales growth (11.9 percent) but a significant decline in kilogram sales (-16.1 percent).

96% of fresh supply is sent to Australian retail and food service.



Beans experienced the highest price increase per kilogram (+33.4 percent) among comparable vegetables (peas, broccoli, capsicum, zucchini, and sweet corn).

Fewer households are buying beans than the prior year, and those that do are buying less frequently. Annual purchase volumes have declined by 500g per household.

The prepacked format is the primary contributor to the loss of beans sales in major supermarkets this year, with fewer households purchasing this format.

1,382 tonnes of fresh beans are exported, with a FOB value of \$6m.

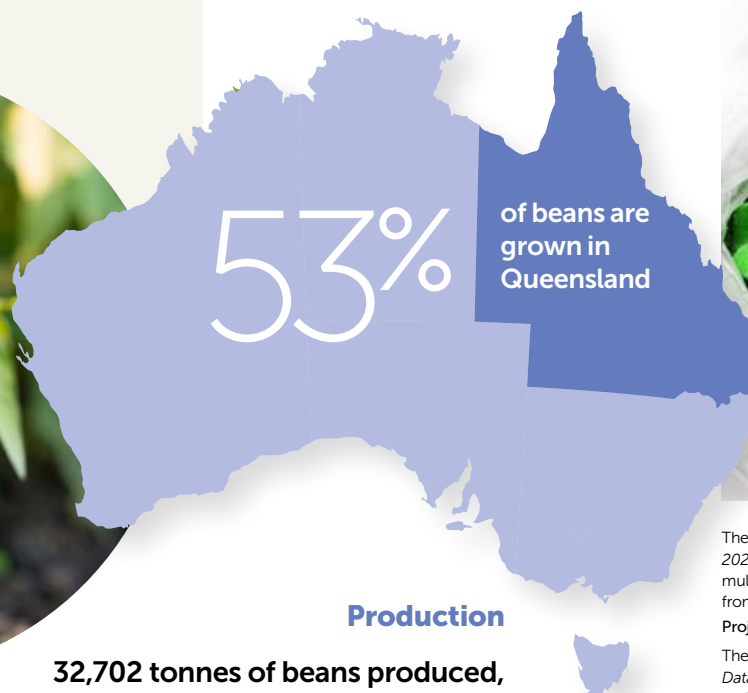
Source: Hort IQ, Nielsen Beans Comprehensive Review Jan 2025, covering the 52 weeks to 26/01/2025.



The latest edition of the Handbook was released in February 2025, unpacking the Beans sector's performance during the financial year of 2023/24.

Beans have experienced the sharpest increase in average price per kilogram this year of

+33.4%



Production

32,702 tonnes of beans produced, with a farmgate value of \$117m, an increase of 12% from the 22-23 FY.

Source: Hort Stats Handbook 2023/2024. Year ending June 2024.



The Australian Horticulture Statistics Handbook 2021-22 to 2023-24 project has been funded by Hort Innovation using multi-industry research and development levies and funds from the Australian Government.

Project Number: MT21006

The Harvest to Home Consumer Behavioural Retail Data project has been funded by Hort Innovation using multi-industry research and development levies and contributions from the Australian Government.

Project Number: MT21004

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The drive for **driverless** agtech



There are risks to adopting new agricultural technologies, but for Dan Hodges of Peninsula Fresh Organics the opportunities are too good to ignore.

Historically, Australian producers have been rapid adopters of new technology and innovation, and the current generation is no different.

Growers are looking to new agricultural technologies, or agtech for short, to help them confront the pressure from climate change, labour shortages, rising input costs and changing market demands.

The technologies being explored read like a list of TED Talks keywords; artificial intelligence, autonomous vehicles, drones, big data, and the internet of things.

Above. Peninsula Fresh Organics is an early adopter of new agtech, such as spray drones.

Understanding, sourcing and trialling these new technologies can be time consuming and costly, however, so last year Hort Innovation launched a \$4.1 million levy-funded project to help Australian vegetable growers adopt advanced mechanisation technology, *Advanced vegetable mechanisation program to maximise labour and cost efficiency.*

Run by the Queensland Department of Primary Industries over three years, the project will deliver field days, showcase events, demonstrations, international study tours, webinars and more to help growers engage directly with the latest equipment and manufacturers.

In October 2024, the project took a group of 16 vegetable growers on a study tour to the US, where they attended the FIRA-USA International Forum for Agricultural Robotics in California.

One of those growers was Dan Hodges from Peninsula Fresh Organics in Victoria. Among the many hats he wears, Dan pilots the grower's new spray drone, which Peninsula Fresh Organics bought after seeing one demonstrated at a VegNET event in Gippsland in 2024.

Dan's an enthusiastic adopter of new tech on the grower's two properties on the Mornington Peninsula, and what he saw at the FIRA-USA event in the US sparked some ideas.

"It was one of these ag shows where you go and have a look at different technologies and what's coming out," Dan says.

"It was interesting because it was sort of a blend of Silicon Valley and what they're bringing across, and what the universities are bringing across into the ag space."

Dan was hoping the study tour would give him a view of what the future held for agtech, and what Australian growers need to prepare for.

“[Automation] took that person off manually watering, and now they were able to go out and do another job, which is fantastic.”



Australian growers saw a range of cutting-edge agtech demonstrations during the US study tour.

“I wanted to see what technology was coming in the future and what’s in the pipeline,” he says. “That, and what can we then bring back to Australia? What perhaps do we need to change on-farm ourselves to be ready for that technology when it comes?”

There were several new technologies that stood out to Dan, including new laser weeders, crop monitoring using remote sensing technologies like drones, and robotic harvesters.

“There were a few different technologies which I thought would work really well for us,” he says.

Opportunities for agtech in Australia

The fundamental problems for Australian vegetable growers are the same as those faced by growers around the world, according to Dan; the cost and availability to labour, weed management and harvesting, and water management.

Much of the agtech developed overseas is thus applicable in Australia.

Peninsula Fresh Organics has already got its feet wet on agtech that addresses these challenges.

The grower’s spray drone, for instance, has reduced the labour requirement for chemical application.

“We’ve just taken to that really well,” he says. “We actually haven’t used a tractor sprayer at all since we bought it – all we’ve done is spray with the drone.”

Some of the more mature technologies in use by the grower are automated irrigation and water sensing tools.

“A lot of these technologies help us save time on farm,” says Dan. “We used to have someone go around all day to open and close all these taps just to manually water.

“Well, automating that took that person off manually watering, and now they were able to go out and do another job, which is fantastic.”

Dan believes the opportunities presented by agtech are great in Australia.

“We’re early adopters of things, we’re pretty tech savvy, and we like playing with new toys,” he says.

“I think we’re just at the cusp of some really big changes in technology for on farm use.”

Challenges to adoption

While Australian growers may be keen on new agtech offerings, our distance from most manufacturers is a significant challenge.

Manufacturers have been slow to develop a presence in Australia due to the distance and a lack of awareness of the Australian market. That has meant limited availability of new agtech, and problems getting after-sales support and servicing for early adopters.

Some new technologies also require changes on-farm to suit automated systems.

“When I was over in the US, I was looking at what I need to change on farm to adapt to these technologies in the future,” says Dan.

“Simple things like having GPS guidance on the tractors so the rows are dead straight, so that if we look at using a robotic

weeder, that can follow a dead straight row. If our rows are curved, it has trouble following the rows.”

The complexity of some of the new technologies on offer can also present a hurdle.

“Having the skillset on farm, having someone who’s across technology and agriculture is a bit of a challenge,” Dan says.

“Having someone who’s across that and can integrate it is really important. There’s a lot of work in agtech being done with data and AI, and you almost have to be a statistical analyst to be able to pull that data together, and we just don’t have those skills on farm.”

The risk and the payoff

All those hurdles contribute an element of risk to the adoption of new agtech by growers. Some of this new equipment is expensive, and commercially unproven in Australia.

“Taking on a new technology, [there’s a risk] it may not work, we may do our money here,” says Dan.

“I think that risk averseness that we sometimes get with new stuff, although good, it can stifle innovation, so we’ve got to be willing to have a go and see what happens with different technology, and have the patience to see it work.”

This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.

Project: VG23016

Hort Innovation **VEGETABLE FUND**

Tap into a wealth of soil and crop health resources

BY PAULETTE BAUMGARTL, APPLIED HORTICULTURAL RESEARCH

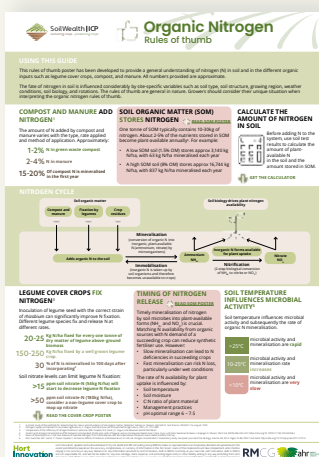
With a decade of research behind it and new content developed regularly, the Soil Wealth ICP project continues to equip vegetable and melon growers with practical, evidence-based resources in soil management and plant health to support productivity, profitability and sustainability.

Over the past 10 years the Soil Wealth and Integrated Crop Protection (Soil Wealth ICP) project has developed a substantial body of work focused on improving soil and plant health in the Australian vegetable industry. The project's online library has become an essential tool for growers, advisors, and service providers seeking evidence-based guidance across a wide range of production issues.

Developed by the project team at RMCG and AHR, the resources aim to bridge the gap between research and practical application. The Soil Wealth ICP website hosts a variety of resource types, including fact sheets, case studies, webinars, videos, and podcasts, covering topics such as soil health, crop health, input use efficiency and managing carbon and climate.

The project continues to prioritise the delivery of reliable, practical information that supports on-farm decision-making. Recognising the increasing complexity of production challenges, the Soil Wealth ICP team designs resources to be practical, accessible, evidence-based, and directly applicable to commercial vegetable and melon growers.

Here are just a few of the valuable new additions now available:



POSTER:

Organic nitrogen rules of thumb

Understanding the contribution of organic inputs to soil nitrogen levels can be a challenge. The *Organic nitrogen rules of thumb* poster simplifies the complex dynamics of nitrogen in soil, providing a general framework to estimate nitrogen release from sources like legume cover crops, compost and manure.

While the numbers are approximate and dependent on local conditions, the poster gives growers a starting point for nutrient budgeting and decision-making. It also highlights key factors influencing nitrogen availability, such as soil biology, structure and environmental conditions.

View at: soilwealth.com.au/2024/11/organic-nitrogen-rules-of-thumb/

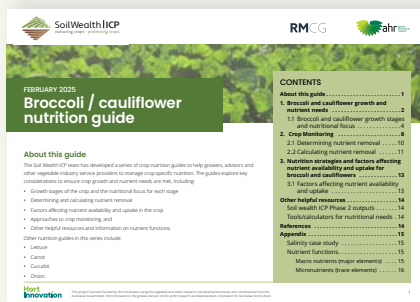
HANDBOOK: Best practice guide: broccoli and cauliflower nutrition

Tailored crop nutrition support is now easier to access with the new *Broccoli/ cauliflower nutrition guide*, part of a growing series that aims to help growers manage crop-specific nutrition throughout the season. This guide outlines:

- Nutritional focus for each crop growth stage
- How to calculate nutrient removal
- Factors influencing nutrient uptake and availability
- Monitoring strategies.

This guide supports growers in making informed fertiliser decisions that support plant health while avoiding over-application and nutrient loss.

View at: soilwealth.com.au/2025/02/broccoli-cauliflower-nutrition-guide



Visit soilwealth.com.au to access the full resource library.

PODCAST: Growing more with less – input use efficiency

Managing inputs efficiently is not just about cutting costs – it's about getting better value from what you use. In the *Growing more with less* podcast episode Soil Wealth ICP team member Carl Larsen speaks with irrigation and nutrient management experts about strategies to optimise water and fertiliser use.

Guests Ivor Gaylard (Swan Systems), Medi Zaboli (Sentek) and Doris Blasing (RMCG) share practical tips, including the role of technology in improving monitoring, data-driven decisions and how to link productivity with resource efficiency.

View at: soilwealth.com.au/2024/10/growing-more-with-less-input-use-efficiency

WEBINAR: Internal fruit rot of capsicum

A must-watch for capsicum growers, the *Internal fruit rot of capsicum* webinar delves into the outcomes of the VG17012 project. Presented by a panel of experts, including Dr Jenny Ekman and Dr Len Tesoriero, the session explores:

- Pathogen identification
- In-field and postharvest management strategies
- Future recommendations to reduce disease risk and improve product quality.

Internal fruit rot can be a hidden but significant issue – this webinar equips growers with the knowledge to stay one step ahead.

View at: soilwealth.com.au/2025/02/internal-fruit-rot-of-capsicum-webinar

Supporting evidence-based practice

All resources are freely available via the Soil Wealth ICP website, which continues to be updated as new information becomes available. The website's search functionality enables users to filter content by crop, region, topic, and resource type, supporting more efficient access to relevant information.

FIND OUT MORE

For further information, contact project leaders Dr Gordon Rogers at gordon@ahr.com.au and Carl Larsen at carl@rmcg.com.au

The Soil Wealth ICP project is funded by Hort Innovation using the vegetable and melon research and development levies and contributions from the Australian Government. Project: MT22004

Hort Innovation VEGETABLE FUND
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Recapturing water and nutrients on WA's deep sands



A world-first drainage approach could be a breakthrough for vegetable production on Western Australia's deep sands.

The deep, sandy soils of Western Australia's Swan Coastal Plain are among the most infertile in the world. They're also where many of the state's vegetables are produced, and growers have long struggled with the low ability of these soils to retain nutrients or moisture.

More than 60 percent of irrigation water and nitrogen fertiliser applied to vegetables on the sandy soils of the Swan Coastal Plain can potentially leach past the rootzone. The story's not much better for phosphorus or potassium.

Against that backdrop, input costs continue to grow, water allocations tighten, and concerns about fertiliser runoff into waterways and wetlands increase.

In an effort to address this problem, Western Australia's Department of Primary Industries and Regional Development (DPIRD) has launched a new levy-funded project to develop a system for capturing leached nutrients and irrigation water from below the crop's root zone, and recycling this water back onto crops as irrigation.

The project, which runs until February 2030, will investigate the use of geomembranes installed below the root zone of crops to collect leachate and divert it into dams for reuse.

"Most of the vegetables in WA are growing in sandy soils, and we're talking about sandy soils with a typical 2 percent clay content," says Dr Valeria Almeida Lima, the DPIRD research scientist leading the project.

"Think beach sand; it's structureless, and so that's the main challenge."

Dr Lima says that past vegetable trials have shown that 50-60 percent of the water and nitrogen fertilisers applied leach beyond the root zone. Nitrate in particular leaches very readily in sandy soils.

"So that's not being utilised by the plants, and that incurs a loss for the farmer because you can't really recover that," says Dr Lima.

DPIRD has worked for many years on helping WA vegetable growers to improve their water use efficiency. Those approaches have largely focused on applying water and fertiliser based only on timely plant demand to minimise leaching.

But managing that is difficult across different crops, or even the same crop in different growing stages. It's also complicated by rainfall.

Another angle that is being pursued is to lift the low clay content of the soil.

"Some growers are working on increasing the clay content of the soils to improve water and fertiliser retention, but it's not widespread," says Dr Lima.

"We do have researchers working on that area, identifying good amendments that we can add to the soil to increase that retention of nutrients and water. So, we're working on different fronts."

Dr Lima proposed a different approach, however.

"The challenge I proposed to my supervisor was, well, what if we just collect everything?" she says.

"It sounded like a crazy idea, but it's been three or four years in the making before this project was approved."

Collecting the water and fertiliser leachate has a number of benefits. Most obviously, if growers can collect it, they can reuse it, avoiding the loss of increasingly expensive inputs.

An additional benefit that's relevant to growers on WA's Swan Coastal Plain is the reduction of fertilisers entering groundwater.

Many of WA's vegetable growing centres in the state's southwest are close to sensitive wetland environments. Those around Perth sit atop aquifers that supply half of the city's water.

How it will look in the field

The way Dr Lima envisions this idea being applied in the field is with an impermeable membrane placed underneath the plants, with draining pipes taking the collected leachate to a dam or holding tank.

The first step is to determine the spacing of the pipes, and what the impermeable layer should be made of.

Dr Lima says the project is looking at placing drainage pipes at a depth of around 70cm to 1m, and will use computer modelling to determine the final depth.

"The challenge with the drainage system design is how deep you place your pipes and how far apart you place them," she says. "That's what we're hoping to design with some the help of some modelling."

"The models have the capacity to simulate the yield of the crop that you're going to have, the quality of the water in terms of salinity, nitrogen recovery, etc."

The next step is figuring out the best way to insert the membrane under a field.

"Depending on what we decide is going to be the best depth for our soils, we're going to remove a deep layer of soil and place an impermeable layer underneath like a geotextile membrane," says Dr Lima.

Once the leachate water is taken out of the field with the drainage pipes, it will be stored in a reservoir of some sort and reused.

"The reservoir will depend on if the property already has a dam, then we can redirect that water to the existing dam, or we can calculate how much of a reservoir you need for that system," says Dr Lima. "And then we recycle that water back as irrigation."

"The ins and outs and the technical features of it are yet to be determined during the project."

Above. A soil pit profile of the pale deep sands in WA's Swan coastal plain. ©WA Department of Primary Industries and Regional Development.

Left: WA's Myalup Irrigated Agricultural Precinct, a vegetable production hub, is close to several sensitive waterways and wetlands. ©Grant Swan/UNE.



A new way of looking at drainage

While sub-surface drainage systems are not new, they're typically installed in heavy, waterlogged soils.

"Normally when you drain, you have an impermeable layer, like a clay layer, that would prevent water going deep down into the soil profile, so it will accumulate and build up," says Dr Lima.

"In our case, because we've got sandy soils, we must install an impermeable layer."

The project will test a number of different materials to determine their suitability for that layer. Dr Lima says the team will draw inspiration from sports fields, which often have similar drainage systems, particularly under artificial turf.

Using impermeable membranes under an entire field is a new concept for horticulture. Research from Michigan State University in the US has installed polyethylene membrane in U-shaped strips directly under a crop's root zone, but not across the whole field. That research demonstrated a nearly three-fold yield increase for corn and cotton.

US research in the 1960s trialled the use of subsurface asphalt barriers to improve sugar cane yields in sandy soils, demonstrating a 50 percent increase in yield and a two-thirds reduction in irrigation requirements. A similar approach has had anecdotal success under kiwifruit vines in South Australia.

None of these earlier systems have incorporated a drainage system, however, as proposed by this project.

Future field trials

While the first stage of the project will develop the design of the system, the second stage will deploy the system in a proof of concept, small-pilot scale trial.

This will include a subsurface geomembrane barrier, drainage collection system, water storage tank, water treatment and recycling systems. Over two years, the trial will grow a range of vegetable crops, including brassicas, celery, and lettuce, to determine the effect of recycled water on crop growth and management procedures.

"That's when we're going to really have numbers quantified for the improvements in water use efficiency, fertiliser use efficiency, the microbiological and chemical composition of the water and how safe it is," says Dr Lima.

"We also want to check the economic feasibility of the system. After we've assessed all of that through the pilot scale in years two and three of the project, we're going to assess if this is worth going ahead with a trial on a larger area."

If the pilot results support it, the final two years of the project will extend to a farm trial, working with a vegetable grower on the Swan coastal plain to see how the system performs at a commercial level.

MORE INFORMATION

Please contact Dr Valeria Almeida Lima at Valeria.AlmeidaLima@dpird.wa.gov.au

The *Evaluating on farm water and nutrient recapture in Western Australia production systems* project is funded by Hort Innovation Frontiers and contributions from the Australian Government.

Project: AS23009

Hort Innovation
Frontiers

New tech offers promise on pumpkin brown etch puzzle

BY MARLO MARLINARO

PHD CANDIDATE, LA TROBE UNIVERSITY

No clear cause has been identified for brown etch in pumpkins, but researchers are turning to new technologies to dive deeper into the puzzle.

Brown etch is a mysterious condition affecting pumpkin growers in Australia. While it only impacts the outer skin of the fruit, its presence reduces market value and causes significant economic losses (*Figure 1*).

What makes brown etch particularly frustrating is that, despite years of research, its cause remains unknown. Unlike diseases caused by *Stagonosporopsis cucurbitacearum* (gummy stem and black fruit rot), brown etch doesn't damage the fruit's inner tissues. This subtlety has led to confusion in diagnosis and makes management challenging.

With no clear culprit, growers often rely on preventive measures like careful handling and reducing field time to limit brown etch, but these strategies only offer partial relief. Fungicides and post-harvest storage adjustments have shown limited success.

The lack of an identifiable pathogen or environmental trigger leaves scientists with few clues. This highlights a broader issue in plant pathology: many emerging disorders defy easy explanation, especially when they don't follow clear patterns of pathogen transmission or host response.

New tools are giving researchers hope, however. Molecular techniques such as DNA and RNA sequencing, along with advanced microscopy, are helping to explore potential links between microbes, the environment, and plant health.

Metagenomics, in particular, is proving valuable. By studying the microbial communities living on and around the pumpkin, scientists may uncover hidden interactions that contribute to brown etch. Understanding these microbial ecosystems could eventually lead to effective management strategies.

Beyond immediate field applications, solving the mystery of brown etch holds broader significance. Any insights gained will expand the genetic resources available to pumpkin breeders, helping them select for resistance to this disorder and other pests and diseases. For an industry built on tight margins and consumer expectations for blemish-free produce, these advances could be game-changing.

Above. *Figure 1.* Bin full of rejected pumpkins, including those affected by brown etch. Image ©Marlo Molinaro.



A closer look at brown etch symptoms

Brown etch manifests as superficial brown markings on the pumpkin's skin. These blemishes don't penetrate the inner flesh, which is why brown etch is often confused with diseases caused by fungal pathogens like *S. cucurbitacearum* or *Fusarium spp.*

While similar in appearance, however, the two issues behave differently. *S. cucurbitacearum* typically invades deeper tissues and can lead to fruit rot, whereas brown etch remains confined to the surface (*Figure 2*).

The visual similarity to fungal infections can mislead even experienced growers, causing them to apply fungicides unnecessarily or make premature decisions about fruit quality. This confusion complicates both diagnosis and management, further frustrating efforts to control the disorder.

To date, no environmental factor or pathogen has been consistently linked to brown etch. Variables such as humidity, temperature, or mechanical damage have been studied, but none provide a definitive answer. This points to a complex interaction of potential factors, reinforcing the need for advanced investigative approaches.



L-R. *Figure 2.* *Stagonosporopsis cucurbitacearum*, ©Marlo Molinaro. Brown etch, ©Claire Fecteau, Laboratory of Expertise and Diagnosis in Plant Protection (MAPAQ). The symptoms of these conditions show high similarity.



Exploring possible causes

Researchers suspect that brown etch might not have a single cause, but rather result from a combination of environmental stresses, plant defence mechanisms, insect, and microbial interactions (Figure 3).

Environmental triggers like fluctuating humidity, extreme temperatures, or mechanical damage during handling could weaken the fruit's defences. This may open the door for opportunistic microbes to colonise the surface, leading to the visible symptoms of brown etch. Which may set off a defence response within the pumpkin that does not stop with the initial symptoms.

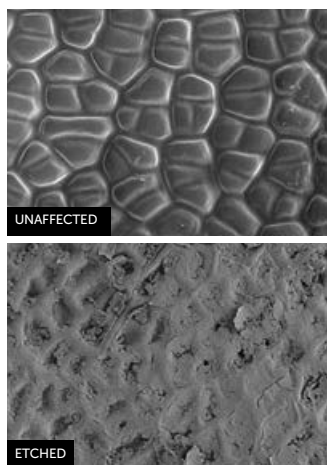


Figure 4. Surface view of butternut pumpkin skin scanning electron microscopy. Top: unaffected, healthy tissue. Bottom: etched. UD/3.0 kV (Hitachi SU7000 FE). ©Marlo Molinaro.

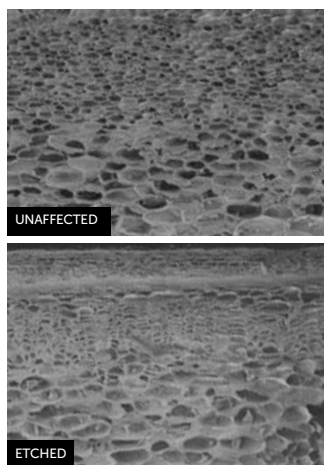


Figure 5. Cross section of butternut pumpkin skin scanning electron microscopy. Top: unaffected, healthy tissue. Bottom: etched. UD/3.0 kV (Hitachi SU7000 FE). ©Marlo Molinaro.

Modern technologies are opening new paths for understanding these complex dynamics. High-throughput DNA sequencing allows scientists to study the entire microbial community on the fruit's surface, identifying bacteria, fungi, and viruses that might play a role. By comparing healthy and affected pumpkins, researchers can spot differences in microbial populations that could explain the onset of symptoms.

Advanced imaging techniques, including electron microscopy, can also reveal structural changes in the fruit's skin at a microscopic level. Scanning electron microscopy has shown a difference between unaffected and etched skin for both surface (Figure 4) and cross section samples of butternut pumpkin (Figure 5).

The surface on unaffected pumpkins shows a smooth surface, while the etched pumpkin surface has cuticle damage and a rough appearance of unknown substance. The cross section shows a degradation of the cuticle layer (surface) and a collapse of cells between the skin and fruit layers. Combined with molecular data, this can help piece together the puzzle of how brown etch develops.

The road ahead: solutions for growers

For growers, the uncertainty surrounding brown etch makes decision-making difficult. Without a clear cause, management of the problem must focus on risk reduction rather than targeted treatments. Gentle handling, minimising field time, and prompt cooling after harvest remain the best practices, even though they don't guarantee full protection.

Research into breeding pumpkin varieties with tougher skin or improved resistance to environmental stresses offers promise. Advances in genetic studies and molecular breeding techniques could one day enable this.

Industry collaboration will also play a vital role. Sharing data and insights between researchers, growers, and industry bodies can accelerate progress. Initiatives that combine traditional horticultural knowledge with cutting-edge science will be key to finding answers.

Ultimately, solving the brown etch mystery is about more than just protecting pumpkins — it's about strengthening Australia's position as a reliable supplier of high-quality horticultural products. By investing in research and embracing new technologies, the industry can safeguard its future and continue to thrive.

Top Left. Figure 3. Butternut pumpkin grown in temperature-controlled glasshouse with brown etch. Each centre point is potentially a separate starting site. ©Marlo Molinaro.

Marlo Molinaro is a PhD Candidate in the Department of Ecological, Plant and Animal Sciences at La Trobe University. The *Revisiting brown etch of pumpkins* (VG22012) project is the subject of his PhD research.

Revisiting brown etch of pumpkins is funded by Hort Innovation using the vegetable industry research and development levy and contributions from the Australian Government. Project: VG22012

Hort Innovation **VEGETABLE FUND**

CASE STUDY

Grower embraces benchmarking for success

BY SANDRA GODWIN



After becoming an independent agronomist and mum of two in 2020, Jessica Volker realised she had bitten off more than she could chew.

Jessica and husband, Luke, were already producing mangoes under the Lower Don Organics name at the small farm they had bought three years earlier near Bowen, in North Queensland.

The couple decided to expand and diversify production, planting spare land to passionfruit and eggplant, which allowed Luke to leave his job as a boilermaker and work full-time on the farm.

"Being certified organic works really well, because I'm not in competition with the clients that I work for, and it's a good little niche market," Jessica said.

"Every year since that first year when we started, we've added a new type of crop into production."

Over time, they have trialled cherry tomatoes, gourmet tomatoes, green beans and capsicums, and – as well as leasing land – last year bought a bigger property.

Jessica said they have always been able to sell everything they grow. Most is sold through agents in the Brisbane, Sydney and Melbourne wholesale markets, with smaller volumes going to a local organic store and the on-farm shop which operates on an honesty system.

Opportunities and risks

Bowen's climate presents unique opportunities and hazards. Known as the 'dry tropics', and Australia's largest winter vegetable growing region, the summer wet season replenishes underground aquifers and dams, providing water for use through efficient trickle irrigation systems.

"If you want to grow a good vegetable, you don't want any water touching that fruit, because it reduces the quality," Jessica said.

"You get little cracks in the fruit, and fungal diseases, so Bowen is really the optimal place to grow what we grow here."

However, organic farming limits Jessica's ability to use fungicides when it does rain. A tropical low delivered more than 500mm of rain from late January to mid-February, causing minor to moderate flooding across the region, and her green beans were rotting.

"It's understandable," she said.

"We've already decided that we're going to get another shade house and plant in there at the start of the year, and push our plantings back a little bit to try and reduce this risk next year."

Top. Jessica Volker explains the role of beneficial insects in a crop of eggplant during a farm visit by Collinsville State School students. **Inset.** The Volkrs produce a range of fruit and vegetables at their farm, including smaller volumes of specialty items for the local market.



Challenges

Running a small organic farm comes with other challenges and Jessica is the first to admit time management is a constant struggle.

As an agronomist working with local growers during peak seasons, she often finds herself stretched thin, but that income has been essential for building the business.

"We've been able to purchase a lot of new equipment because when you're starting a farm, you don't have anything," she said.

"Every single year we're buying new infrastructure, new equipment."

The couple has ambitious plans for the next five years. Paying off their new property is a top priority, along with increasing production and expanding the area under protected cropping.

By keeping workers busy year-round through greenhouse operations, they aim to reduce downtime during the summer off-season and maintain a steady income.

Making every dollar count

As a member, and treasurer, of the Bowen Gumlu Growers Association, Jessica is always on the lookout for grants and funding to help offset the cost of new infrastructure, which can be a major expense when setting up a new farm.

The Volkerts installed two tunnel houses with assistance from the Australian Government's Horticultural Netting Program and found them suitable for growing good crops of organic capsicums, which had struggled in the field.

They also signed up for the Level Up Hort program, which gives vegetable and onion growers access to free specialist business advice for up to five years.

Jessica admits their data collection ahead of the first year was rudimentary. They had been changing crops and weren't tracking production and sales by commodity or costs by individual categories such as labour and fertiliser.

They weren't surprised to learn insurance premiums were well above the average – given their location in a cyclone and flood-prone area – but growing expenses also were identified as above the norm.

With guidance from Planfarm consultant Maria Fathollahi, they have improved record keeping and Jessica said the upcoming round of benchmarking results would be pivotal for business decisions.

"This next report will give us a clearer picture of what's going on, which commodities are performing well and which aren't," she said.

"We need year on year figures to see trends. I think it's going to show the Roma tomatoes were a waste of money last year, and I've already taken them out. To hear them say that will be confirmation that we're on the right track."

Jessica said some of her grower clients were already doing their own benchmarking.

"But there are some other established growers that would be wasting money because they aren't," she said.

"I think if you're not doing it yourself, you definitely need someone to point out where you could be losing money."

Why benchmarking matters

Benchmarking is not just about comparing numbers; it's about driving meaningful change within farm businesses.

A five-year initiative fully funded through Hort Innovation, the Level Up Hort program equips vegetable and onion growers to analyse costs, yields and profitability against their own and industry benchmarks.

Business consultants from experienced project partners Planfarm or RMCG undertake specialised business reviews with each participant, valued at up to \$10,000 per year.

They receive two confidential reports each year – a full business analysis and a benchmarking report – identifying both strengths and areas for improvement.

The broader industry also benefits from de-identified, aggregated data published in a national report that informs policy advocacy and research and development priorities.

Above L-R. The Volkerts grow premium capsicums in the shade house. Sorting and packing organic red and yellow capsicums at Lower Don Organics, near Bowen.

FOR MORE INFORMATION

To enquire or enrol in the *Level Up Hort* program, contact project manager Steff Carstairs on 0428 712 852, email steff@planfarm.com.au or go to the website leveluphort.com.au for more information and FAQs on who to contact in your region.

Level Up Hort is funded by Hort Innovation using the vegetable and onion research and development levies together and contributions from the Australian Government Project: MT2200

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Current projects

HORT INNOVATION VEGETABLE FUND

Hort Innovation conducts a number of R&D projects funded by grower levies. Here is a list of some of the projects currently underway.

V Plus one serve of vegetables by 2030: Program Coordinator VG23016

DELIVERY PARTNER: AUSVEG

The *Plus one serve of vegetables by 2030* program is a bold, collaborative initiative aimed at significantly increasing vegetable consumption across Australia by implementing evidence-based strategies and behaviour change interventions. The ultimate goal is to elevate the average daily vegetable intake by one serve per person by the year 2030.

Challenge

Despite the Australian Dietary Guidelines recommending a daily intake of five serves of vegetables and two serves of fruit, only 6.1 per cent of Australians meet this standard regularly. The average daily consumption currently stands at just 1.8 serves per person, resulting in an annual shortfall of 18 to 27 billion vegetable serves. This underconsumption presents a significant missed opportunity for Australia's vegetable industry, with a potential retail value of \$4-6 billion being unrealised.

Response

To address this challenge, the program will implement a comprehensive, multi-project strategy designed to increase vegetable consumption in Australia by one serve per person per day by 2030. Utilising annual workshops, quarterly reporting, and opportunities for ideas exchange, a series of specialised, settings-based R&D projects will be conducted to build scientific evidence for behaviour change. These projects will target consumers with interventions that enhance value perception, improve literacy and skills, inspire enjoyment, normalise vegetable consumption, and positively transform environments where Australians live, learn, shop, and play.

A project coordinator will oversee expert-led interventions in settings like early childhood learning, schools, retail, and homes, identified through extensive stakeholder consultation. Barriers to consumption will be systematically addressed through rigorous scientific experimentation and innovative, practical solutions, enhancing existing efforts.

With only 6.4 per cent of vegetables exported and one third of growers considering leaving the industry, boosting domestic consumption is critical. Adding one daily serve could generate a \$2 billion revenue increase, alongside health, economic, and social benefits.



V Guava root knot nematode identification and management VG23007

DELIVERY PARTNER: DEPARTMENT OF PRIMARY INDUSTRIES QUEENSLAND

This project is developing rapid diagnostic tools, enhancing targeted surveillance, identifying effective management strategies, and engaging stakeholders for effective guava root-knot nematode (GRKN) management.

The GRKN is a highly pathogenic plant parasite that poses a significant threat to the Australian vegetable industry due to its broad host range and ability to overcome resistance genes in various crops.

Challenge

The primary challenge of this project is efficiently identifying and managing GRKN, a newly detected threat to Australian horticulture that jeopardises crop health and yield. Due to its recent detection, GRKN's broad host range and capacity to overcome root-knot resistance genes in various crops, it is difficult to contain and manage.

Therefore, rapid, reliable diagnostic tools and targeted surveillance are essential for tracking the spread of GRKN and other root-knot nematode species. Developing effective management strategies, including resistant crops and biological control methods, alongside effective industry communication to raise awareness and readiness, is critical to minimising the impact of GRKN.

Response

In response to these challenges, the project is taking a comprehensive approach that includes the development of diagnostic tools that can quickly detect GRKN in large volumes of samples and conducting targeted surveillance to map the distribution of GRKN and other root-knot nematode species.

The project is also identifying management options, such as resistant cover crops, suitable weed hosts, and potential biological control agents.

A strong emphasis is placed on communication and extension of best practices, fostering collaboration among stakeholders, such as growers, agronomists, and policymakers, while leveraging international expertise to improve awareness of GRKN management strategies.

CODE

V Vegetable **O** Onion **P** Potato **M** Melon

Current projects

HORT INNOVATION VEGETABLE FUND

V Management options for reducing the reliance on insecticides for fall armyworm in sweet corn

VG23006

DELIVERY PARTNER: QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES

This investment is providing vegetable growers with reliable crop monitoring methods and a broad suite of tactics to reduce frequency of insecticide applications and ensure ongoing viability sweet corn and capsicum production in high-risk fall armyworm regions.

This project will deliver the following outputs:

- Evaluation of the potential to adapt the maize/sorghum thresholds to provide sweet corn growers with economic thresholds for fall armyworm in vegetative sweet corn.
- Demonstration of a suite of non-chemical management tactics that could reduce their reliance on conventional insecticides.
- Characterisation of fall armyworm oviposition and larval establishment in flowering and fruiting capsicum as a basis for crop scouting recommendations.
- Grower and advisor engagement and discussion of concepts and trial outcomes through collaboration with the *National fall armyworm innovation system for the Australian vegetable industry* (VG22006) project team. The team will participate in field walks at VG23006 trials to provide growers and advisors access to trial sites at Gatton and Bowen and communicate project outcomes to the industry via the Fall Armyworm e-hub and newsletter.



Key outcomes from the project will be:

- A recommendation around the potential for vegetative-stage economic thresholds to guide decisions on fall armyworm control in sweet corn, including grower perception of the value of thresholds.
- Recommendations for capsicum growers on effectively monitoring fall armyworm during flowering and fruiting stages.
- Improved understanding of growers and advisors around non-chemical management options for fall armyworm and their practical implementation.

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Current projects

HORT INNOVATION VEGETABLE FUND

V Antimicrobial resistance in the vegetable industry VG23004

DELIVERY PARTNER: SAAFE LTD

This project is investigating the risks and impacts of antimicrobial resistance (AMR) in the Australian levy vegetable supply chain. The goal is to assess how AMR and chemical-resistant pathogens could evolve within the industry and identify necessary actions to mitigate this.

Challenge

Antimicrobial resistance (AMR) occurs when microorganisms - such as bacteria, fungi, viruses, and parasites - develop resistance to treatments that were previously effective. A reliance on antimicrobial products in agriculture, the environment, and healthcare has made AMR a global concern.

In crop production, AMR can lead to untreatable plant diseases, resulting in significant crop losses and economic setbacks. It also places regulatory pressure on affected industries and disrupts trade both domestically and internationally.

Currently, there are no consistent regulatory measures addressing AMR in agriculture. This presents an opportunity to reevaluate both pre- and post-harvest microbial management strategies and enhance the industry's capacity to mitigate the risks associated with AMR and chemical-resistant pathogens.

Response

The project will analyse various pathways, behaviours, and practices within the vegetable supply chain, including:

- The use of seeds, water, soil, and agronomic inputs.
- Pest, disease, and weed management strategies.
- Post harvest handling practices.

Findings will be synthesised into a relative risk assessment tailored to the vegetable industry. This will account for diverse growing



conditions, from production to processing, and examine various environmental factors such as neighboring properties, water and soil sources, and equipment and facility cleaning processes.

V Advanced vegetable mechanisation program to maximise labour and cost efficiency VG23003

DELIVERY PARTNER: QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES

This program will boost the adoption of advanced mechanisation technology in the Australian vegetable industry, reducing the industry's high input costs and labour challenges that affect grower profitability.

Challenge

The vegetable industry faces high input costs of energy, labour, chemicals and fertilisers which has a dramatic effect on grower profitability. Technology exists to address these challenges, but the process of sourcing information, engaging in discussion with manufacturers, importing and trialling machinery is time consuming and costly, which can make it prohibitive to individual growers.

Response

The program will deliver field days, showcase events, international study tours, webinars and more for growers to engage directly with the latest equipment and manufacturers. Demonstration sites will also provide qualitative and quantitative data to highlight the potential efficiency benefits from mechanised machinery solutions, which will help growers make bolder decisions about the technology they invest in.

Benefit

This program will provide the vegetable industry with unparalleled access to engage with the latest available equipment together with the information they need to make informed business decisions.

Current projects

FRONTIERS PROGRAM

V A platform for gene editing vegetative propagated crops AS20000

DELIVERY PARTNER: QUEENSLAND UNIVERSITY OF TECHNOLOGY

This investment is using gene editing technology to develop two new banana cultivars that will contribute to improved production and biosecurity outcomes for industry. In Australia, there is concern that the banana industry is too dependent on the Cavendish banana which is susceptible to Panama Disease tropical race 4 (TR4). There is a need to create greater cultivar diversity, as well as disease-resistant varieties.

Gene editing provides the ability to alter single traits within highly desirable cultivars and will be used to (a) improve varietal diversity and (b) improve disease-resistance. Importantly, these gene editing technologies are deemed to be essentially equivalent to natural processes and do not require any additional regulation other than for conventionally bred cultivars and will not require any specific labelling.

Specifically, the project aims to develop:

- Cavendish banana lines that have high-level resistance to Panama disease tropical race 4
- Goldfinger banana lines with enhanced levels of fruit quality.
- This research will benefit growers across the industry, such as:
- Growers already affected by TR4 or who are growing susceptible bananas adjacent or close to previous outbreaks
- Growers considering the future threat of TR4 spread
- Growers interested in expanding the diversity of bananas that they produce without the concern of disease threats.

Current projects

FRONTIERS PROGRAM

Hort Innovation

Frontiers

V Growing horticulture through protected cropping innovation

AS23001

DELIVERY PARTNER: APPLIED HORTICULTURAL RESEARCH

This investment is helping protected cropping growers maintain profitability by advancing the industry's approach towards sustainability, agronomy, automation to reduce labour costs, energy, and improving staff skills and management.

Challenge

The *Australian Protected Cropping Strategy 2021-2030* was developed through extensive industry consultation and outlines opportunities for research, development and extension to support the adoption of protected cropping in the Australian horticulture industry. This project will address key opportunities that were identified in the Strategy, bringing together researchers, growers and industry specialists.

Response

The key project activities include:

- **New technology:** Innovating a two-dimensional avocado canopy for automated pruning, automated tomato pollination, crop

spraying with robots, and tomato truss packing and harvesting systems to minimise labour, a supplemental LED lighting system for Australian conditions, and labour-saving automated equipment for avocado cultivation.

- **Attracting and retaining people:** Creating a high-tech horticulture training program in South Australia, developing a software to monitor farm worker training, and enhancing skills of farm staff in avocado cultivation.
- **Sustainability:** Developing a system for recycling perlite growing media and strategies to enhance strawberry cultivation with reduced nitrate leaching in Northern NSW.
- **Advanced agronomy:** Establishing a cutting-edge research facility in South Australia, introducing an AI-based growing system for local growers, creating a quality management system for avocado substrate cultivation, tools to manage biennial avocado bearing, optimising light interception for better yield in containerised avocados. Research will support the design of netting, rain covers, and solar panel protected cropping systems to consistently produce high yields of quality fruit, increase resilience to extreme climate events, and potentially generate electricity for onsite and offsite use.

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Adaptable solutions for evolving challenges



Controlling diamondback moths has become a major issue for brassica growers in recent years. DBM is a very destructive pest, its populations can explode to quickly overwhelm traditional control measures, and resistance has made many of the old standbys ineffective. So, the launch of BASF's Cimegra® Insecticide last year into brassica crops has, as anticipated, made a real difference.

"Twelve months ago, we were predicting that Cimegra would quickly become the new first choice for controlling DBM in brassicas and it's on track to achieve that," says Serge Usatov, the Horticulture Portfolio Manager at BASF. "It will soon also be registered in leafy vegetables, and we expect it to have an equally positive impact in that market."

"DBM pressure hasn't been as high in the last 12 months as in previous seasons, but plenty of farms in the major growing areas are already using Cimegra. Just as importantly, our team is getting plenty of positive feedback."

Serge says that despite its strong start there will be growers who haven't tried Cimegra yet. He expects that the very positive word of mouth within the industry will encourage them to soon give it a go.

"The farming community's communication methods have changed, but 'word of mouth' is still what most growers rely on to work out whether new products are worth trying. They trust other growers' judgement and experience, so when they hear good reports about something – whether across the fence, at the store, or on social media – they tend to get on board."

Serge says BASF have seen how influential that process still is as they've steadily launched their other very effective novel insecticides into more and more crops over the last few years.

"Both Versys® and Efficon® have been taken up very widely soon after registration. Versys quickly established itself as the go-to solution for aphids as growers saw what it could do and spread the word. It also controls whiteflies in vegetable crops, but that wasn't its big point of difference. Then Efficon came along as the perfect complement to Versys. It certainly makes an ideal back-up spray following Versys with its own excellent aphid control, but growers have noticed it's even stronger on whiteflies."

The bottom line, Serge says, is that the growers and their advisers soon sort out which products are worth adding to their programs.

"It's all about performance, especially against a pest that's become as hard to control as DBM, and that's where Cimegra excels. It's a rare insecticide in that it works through both ingestion and contact, so its control is very robust. We know growers are also happy with its very fast knockdown, its length of control – which is up to three weeks – and its harvest withholding period of just a single day."

Looking further ahead than the forthcoming registration of Cimegra in leafy vegetables, BASF is still working to register Merivon®, the co-formulated Group 7 and Group 11 fungicide already used in cucurbits and fruiting vegetables, for the control of multiple diseases in lettuce.

"As always, we're aiming to fill a gap in growers' spray programs and looking to provide long-term solutions," Serge says. "We've been able to bring a lot of new chemistry to market in the last few years and then steadily make those products available to more growers to address more threats. Not just specific pests and diseases, but the threat of resistance and regulatory crackdowns that has taken older products out of the toolbox as well. We're very grateful to everyone in the horticulture industry who helps us conduct trial work. That helps us collect the data we need to achieve the most helpful and productive registrations. In the case of products as effective as Cimegra, it also builds anticipation and can start the very positive word of mouth before they are even launched."

"Now that Cimegra is available everywhere brassica crops are grown – and will soon be registered in leafy vegetables too – we hope the growers who haven't tried it yet will buy some to see how it can help them grow even more marketable crops."

Always read and follow label directions. The information submitted in this publication is based on current BASF knowledge and experience.



The BASF crop protection team and Nunhems will be at the Hort Connections event 4-6 June.

Come and see us and find out how Nunhems seed varieties and BASF crop protection can help you have your best season yet.

FOR MORE INFORMATION

Speak to your local BASF representative or visit crop-solutions.basf.com.au



onion fund update

This project has been funded by Hort Innovation using the onion research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

**Hort
Innovation** **ONION
FUND**

Australian Onions campaign sizzles with success

BY HANNAH PARRY, HORT INNOVATION



Australian Onions Ambassador Mary Kalifatidis has hit 4.11 million impressions with her onion social media content.

The Australian Onions Marketing Campaign is repositioning onions as the essential first ingredient in everyday meals.

With 53 percent of Australian households currently purchasing onions every four weeks, the Australian Onions Marketing Campaign is targeting 8.8 million 'light buyers' to boost purchase frequency and drive domestic demand.

Focusing on the pillars of taste, versatility, and health, the campaign is using cultural calendar moments to create engaging, topical content that keeps onions in the spotlight year-round. Through earned media, social-led activations, and an onions ambassador, the program seeks to improve consumer awareness, attitudes, and intent to purchase – ultimately increasing onion consumption.

Campaign activity and results so far

Funded by the onion marketing levy and delivered by Hort Innovation, the campaign was launched in October 2024 and has since achieved strong momentum and successfully kept Australian Onions top-of-mind for consumers.

The campaign kicked off with the announcement of ambassador and popular media personality Mary Kalifatidis, whose interview with *9Honey* reached 1.1 million readers and helped amplify the campaign messages of taste and versatility. Mary also announced her Australian Onions partnership with her social media followers via an engaging video, achieving a reach of over 75k and 3,000 engagements.

Two major earned media spikes, aligning with key calendar moments, have so far driven strong visibility for Australian Onions, spotlighting their taste and versatility in home cooking, and reinforcing their role as the 'first ingredient'.

Spike 1

NOVEMBER 2024

Featured Mary Kalifatidis' 'Aussie Onion Smashburger' recipe, inspired by the globally-trending Oklahoma Onion Smashburger. Pitched to top-tier news, lifestyle and food outlets, 10 pieces of coverage achieved a reach of 3.9 million Australians. Mary's recipe video post, shared across Meta and TikTok, further extended the reach of this media moment to over 880,000 users and delivered 8,000+ engagements.

Spike 2

DECEMBER 2024

Showcased an 'Aussie Onion Dip', a twist on the traditional French onion dip. Tapping into the cost-of-living narrative, the recipe was used to demonstrate how Aussies can entertain on a budget during the festive season without compromising on flavour. This moment delivered a total reach of 33 million Australians, with coverage across *The Morning Show*, *7NEWS*, and top-tier lifestyle media. Mary's onion dip recipe video, shared across Instagram and TikTok, reached over 749,000 users and delivered 7,000+ engagements and simultaneously educated consumers on the flavour profile of onions.

Overall, the campaign has so far delivered a total of:

- Over 37 million Australians reached via earned media (exceeding the KPI of 24 million).
- 21 media placements including standout coverage in the *Sydney Morning Herald's* 'My Day on a Plate', where Mary Kalifatidis spotlighted Australian red and brown onions.
- 1.24 million reach and 4.11 million impressions across Instagram and TikTok – assisted by a paid social strategy that boosted Mary's content and branded advertisements.

What's next for Australian Onions?

Looking ahead, the campaign will sustain momentum with an optimised media strategy and an always-on social media approach to reinforce the 'first ingredient' messaging and keep Australian Onions top-of-mind for consumers.

Key approaches:

- **Paid social:** ongoing Meta advertising from March to June 2025 will maintain consistent brand presence. Static branded ads will promote onion-centric recipe ideas, driving strong reach and awareness between major media moments.
- **Owned social content:** across May and June, organic social posts will spotlight onions' versatility, seasonality, and health benefits, featuring all onion varieties. Recipe imagery will showcase onions across various meal occasions, helping cement onions as the 'first ingredient' and keep the brand top-of-mind.
- **Ambassador content:** Mary Kalifatidis will share two new videos:
 - A lifestyle vlog showing how she uses onions in lunch and dinner to highlight their versatility.
 - A winter-themed recipe video demonstrating her go-to onion soup, with a health-focused narrative.

Spike 3

'Under or Over?'

MAY 2025

To coincide with the federal election, the campaign will hijack the moment with a playful cultural debate: *Do onions belong under or over the sausage?*

Drawing on the insight that onions are the first and most nostalgic ingredient to hit the BBQ for every sausage sizzle, the campaign will showcase how to perfect caramelise onions – and confirm once and for all where they belong in the beloved sausage sandwich.

Ambassador Mary Kalifatidis and Alex Dawson, founder of the Democracy Sausage website (a map of sausage sizzles during election time), will go public with their bold stance - *it's onions under, every time* – to spark debate. The duo will champion their cause with exclusive interviews and cooking segments on *TODAY* and *TODAY Extra*, reaching a combined audience of around 2.47 million. The campaign will also be brought to life through a BBQ activation, media outreach, and scroll-stopping social content across Mary's and Australian Onions' platforms, ensuring this debate gets hotter than the grill itself.



Above. Mary's onion dip recipe reached more than 749,000 users on Instagram and TikTok.

The Onion domestic marketing plan FY25 is supported by industry marketing levies through Hort Innovation.

Project: VN24601

Hort Innovation **ONION FUND**

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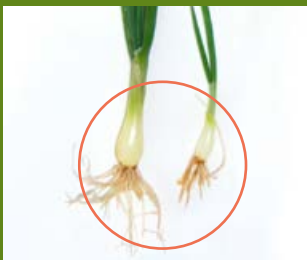
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Soilborne diseases in onions

ONIONS

FACTSHEET

FUNGI	Germination/ emergence	Crop establishment to bulb initiation	Bulb maturation	Management approaches
Damping Off <i>Fusarium</i> , <i>Pythium</i> , and/or <i>Rhizoctonia solani</i> (teleomorph: <i>Thanatephorus cucumeris</i>), often as disease complex 	SYMPTOMS. Wilting or death of seedlings at and after emergence leading to bare patches. Seedlings that do emerge may have yellow to light brown discolouration around the base of the stem. Significant stunting of root systems may be evident. CONDITIONS. Cool temperatures of 5°C–15°C, moist and compacted soil are ideal conditions for infection. Image: ©2016 disease poster.			Crop rotation with non-host cash, cover and biofumigation crops. Balanced nutrition programs based on nutrient budgets and monitoring. Do not over irrigate during flag leaf and first true leaf stage. Improve soil drainage by reducing tillage, using raised beds and avoiding excessive irrigation. Precision Ag tools (drainage plans based on elevation) may be used to improve overall paddock drainage.
Onion Stunt <i>Rhizoctonia solani</i> AG 8, potentially also caused by A G2.1, 3 and 4 	SYMPTOMS. Circular to irregular patches in the crop varying in size from 1m to 25m in diameter with distinct difference between stunted and healthy plants. Seeds may rot before germinating and seedlings may decay before emergence. Most obvious 6–12 weeks after sowing. Diseased plants may be less than 60 per cent the size of healthy plants. CONDITIONS. Soil temperatures less than 15°C and high <i>R. solani</i> inoculum level assist disease development. Image: ©SARDI			<i>Rhizoctonia solani</i> AG8 is a significant soilborne pathogen of cereal roots in semi-arid Mediterranean regions of Australia. Onion stunting by the same pathogen causes major economic loss in South Australia. Avoid following cereals with onions in these areas. Avoid potatoes in the rotation. Use of brassicas or legume cover crops can reduce or prevent buildup of the pathogen. Soil DNA testing (Predict B or Pt) can identify <i>R. solani</i> AG8 and other AG groups. Tillage on the top soil can break up the mycelium of the pathogen. However, frequent tillage will affect soil structure and drainage negatively, and foster soilborne diseases in general.
White Rot <i>Sclerotium cepivorum</i> , synonym <i>Athelia rolfsii</i> 	SYMPTOMS. Brown to black rot of the stem near the soil line. As the disease progresses, white fluffy fungal growth will appear at the base of the stem, as well as poppy seed sized black survival structures (sclerotia = long lived resting bodies). Initial yellowing and dieback of leaf tip occurs, later foliage will wilt. Roots also rot, and the plant can be pulled from the ground easily. CONDITIONS. Disease development is favoured by cool, moist soil conditions. The soil temperature range for infection is 10°C–24°C, with an optimum of 15–18°C. At soil temperatures above 25.5°C, the disease is markedly inhibited. Soil moisture conditions that are favourable for onion growth are also ideal for white rot development. Image: ©gd.eppo.int			Hygiene measures are vital to avoid spreading the disease with soil between paddocks. As few as one sclerotium per 10 kilograms of soil can initiate disease. Sclerotia survive 20–30 years in the soil. Paddocks considered to be at risk of having onion white rot are best planted later in the season when temperatures are higher, or not at all. Fungicide applications should generally target the top 100mm of soil.
Pink Root <i>Phoma terrestris</i> syn. <i>Pyrenochaeta terrestris</i> 		SYMPTOMS. Roots show light pink colour that becomes deeper pink/ purple/ brown as they shrivel and disintegrate. Leaves wilt, turning white, yellow or brown at tip and eventually die. Some <i>Fusarium</i> species can also cause pink roots, particularly on dead or old roots. Field diagnosis of pink root can only be accurately accomplished by observing pink roots on actively growing plants. CONDITIONS. Occurs in ground with poor rotations and becomes more destructive over time. Wounds are not necessary for infection, and weak plants are more susceptible. Optimum temperatures for growth of the pathogen and disease development are 24°C–28°C. It can persist in soil indefinitely and may spread via water or dirty equipment. Image: ©David B. Langston, Bugwood.org		Long term rotation (4–6 years) with non-host crops. Planting onions after cereals or sweet corn can increase the risk of this disease because the inoculum potential generally becomes greater with these crops. Use resistant varieties if possible that 'work' in the region. Maintain good soil structure and drainage as well as fertility via balanced nutrition programs and monitoring. Control insects and other diseases to maintain healthy plants.

FUNGI		Germination/emergence	Crop establishment to bulb initiation	Bulb maturation	Management approaches
Black Mould <i>Aspergillus niger</i> 			SYMPTOMS. Black discoloured areas on neck of bulb with small black spore masses. CONDITIONS. Most common when temperatures are higher than 30°C in the field or 24°C in storage. Spores of this fungus are very common in the air and soil. Image: I©Anna L. Snowden		Monitor established crops. Withdraw irrigation 21 days before harvesting, if crops are affected. Storage conditions should be cool and dry; bruising or other mechanical damage of bulbs should be avoided. Avoid storing crops that have already shown symptoms in the field.
Fusarium Basal Rot <i>Fusarium oxysporum f. sp. Cepae</i> 			SYMPTOMS. Pinkish, brown rot that becomes covered with a whitish, fluffy fungal growth. Leaf tips yellow, entire leaves wilt. CONDITIONS. Most common in warm temperatures above 25°C. Infection is limited below 15°C. Infections occur when soil moisture is high and especially when there is physical crop damage e.g. mechanical, herbicide, fertiliser or insect damage.		Crop rotation with cereal crops (if there is no risk of <i>Rhizoctonia</i> or <i>Phoma</i> infections)/ cover crops; biofumigation crops. Balanced nutrition programs based on nutrient budgets and monitoring. Improve soil drainage by reducing tillage, use raised beds and regulate soil moisture by avoiding excessive irrigation. Precision Ag tools (drainage plans based on elevation) may be used to improve overall paddock drainage.
NEMATODES					
Bulb Eelworm <i>Ditylenchus dipsaci</i> 		SYMPTOMS. The base of infected seedlings are stunted, pale, have swollen areas along the cotyledons and may appear split. Twisted and malformed leaves, with slightly raised yellowish-brown spots, can be short and thickened and stem swelling (bloating) can occur. CONDITIONS. Optimum soil temperature of 20°C–22°C for nematode movement and symptom development, while free moisture favours nematode longevity and activity.			Good on-farm hygiene, minimum 3-year break in onion cropping and consider pre-plant soil DNA testing to identify risks. Improve soil health by adding organic matter, and improve soil structure by reducing tillage and using biofumigation crops. Improve drainage using raised beds, Precision ag tools and by avoiding excessive irrigation.
Root Knot Nematode <i>Meloidogyne spp.</i> 		SYMPTOMS. Small, swollen galls (1-2 mm) can be found on the roots. The shape of the galls can be round or spindly, and with or without short root branches that rise from the upper part of galls. White to dark brown egg masses on the surface of the roots may occur. Above ground symptoms may include stunting and yellowing and poor or irregular plant stands. CONDITIONS. Damage is more severe in sandy soils than in clay soils.			Biofumigation, crop rotation to a non-host or a long fallow period helps to reduce populations of root knot nematodes. Fallow periods, however, lead to carbon loss.
INSIGHTS		Germination/emergence	Crop establishment to bulb initiation	Bulb maturation	Management approaches
		- Consider growing a biofumigant crop. - Minimise tillage. Try to avoid root damage during cultivation. - Consider a pre-plant DNA test to identify disease risks. Obtain seed from a reputable source; conduct seed health tests. - Consider moving planting time depending on disease risks. - Good soil calcium levels and calcium supplements used early may help reduce the impact of diseases. - Ensure good irrigation, drainage and nutrition management – monitor crop and soil. - Avoid plant stress as a result of soil compaction, unbalanced nutrition, herbicide damage and soil moisture extremes.	- Increase irrigation according to water demand at this stage of the crop. - Conduct soil and plant tests to monitor fertility and crop nutrition. - Monitor soil moisture and nutrient uptake. - Nitrate fertilisers are a better option than ammonium fertilisers, do not overuse nitrogen especially close to and after bulbing. Balanced nutrition and adequate calcium supply are essential. - Screen field regularly for pests and diseases. Consider using remote imaging via satellites or drones to identify problem areas in the crop.	- Cease irrigations seven days prior to harvest. - Check available soil nitrate levels in the soil. They should be below 50kg/ha to 30cm depth. If higher than that there is an increased risk of postharvest breakdown e.g. bacterial soft rot and skinning.	- Stop the movement of contaminated crop inputs, vehicles, equipment and water between paddocks and farms. - Farm hygiene and biosecurity measures are key. Refer to: farmbiosecurity.com.au/wp-content/uploads/2019/03/Biosecurity-Manual-for-Onion-Growers.pdf - Microbial biocontrols may be of use, check that their benefit is proven; consider adding organic matter to improve soil health refer to: soilwealth.com.au - Rotate to non-allium crops for four years if disease is present and avoid host crops and weeds. - Ask a diagnostician to confirm the pathogen type if issues are detected.

Focus on soil health and agtech at this year's **TAPG Ag Innovation Expo**

HAGLEY, TASMANIA

BY TAYLA FIELD AND PRUE ROTHWELL, VEGNET TASMANIA



The 11th Ag Innovation Expo 2025 brought together farmers, service providers, agribusiness, researchers, students and technology exhibitors for two days of innovation, collaboration, and practical insights into soil health, paddock preparation, and emerging ag tech.

Held on 15-16 April at Hagley, Tasmania, the Ag Innovation Expo 2025 once again delivered a great opportunity for hands-on learning and collaboration in agriculture. Organised by the Tasmanian Agricultural Productivity Group (TAPG), this year's theme—Soil Health and Paddock Preparation—drew interest from growers, service providers, educators, students, and ag industry stakeholders.

TAPG Executive Officer Terry Brient highlighted one of the standout moments of the event: a live soil management demonstration led by UK soil mechanics expert Professor Dick Godwin.

Professor Godwin shared insights into managing soil compaction, highlighting its key impacts on farm productivity:

- Reduced crop yield
- Increased tillage draught force (resistance encountered by tillage tools) and thus fuel use
- Decreased water infiltration due to reduced pore size.

In discussing solutions, Professor Godwin pointed to Australia's leadership in controlled traffic farming and emphasised strategies such as using track systems, lowering tyre pressure, and reducing machinery weight.

"Prevention is better than cure," he said, highlighting the need to minimise random traffic, maintain effective drainage, and reduce both load and pressure to preserve soil structure.

Australia is also leading in the use of strip tillage for row crops, especially vegetables, previously showcased by VegNet Tasmania (see more at: ausveg.com.au/knowledge-hub/video-strip-till-in-action-in-tasmania).

Showcasing the FarmDroid autonomous seeder and weeder in action

The event's twilight VegNET demonstration on 15 April drew more than 60 attendees to explore how drone technology and autonomous machinery can be used in vegetable production. A highlight was a discussion led by VegNET Regional Development Officer Tayla Field with grower James Terry from Cloud Farming, who trialled the FarmDroid autonomous seeder and weeder in North Motton, Northwest Tasmania during the summer.

The North Motton trial was part of the VegMech project (VG23003), a national project delivered through the Queensland Department of Primary Industries (QDPI) to advance mechanisation in vegetable production and reduce labour needs. During the event, Ian Layden, QDPI's Director of Vegetables, Systems and Supply Chain, and Troy Qualichefski, owner of the trial FarmDroid and Director at Qualipac Farms, joined James Terry for a Q&A session.

Ian reflected on his return to the Expo after first attending 11 years ago.

"Back then, 'agtech' wasn't even part of the conversation. It's incredible to see how quickly the landscape has shifted—autonomous machines, laser weeders, precision sprayers—these are now commercially viable," he said.

James reported that after five years of direct seeding broccoli, the FarmDroid delivered his most accurate results to date. It impressed him with its ability to navigate variable paddock conditions, including overcoming obstacles like stubble build-up.

Challenges remain, such as manual switching between seeding and weeding functions and limitations on steeper terrain. However, James believes the benefits—particularly the precision planting and weed control—far outweigh the drawbacks. He's hopeful the FarmDroid can remain in Tasmania. He can see a use for it in other industries such as pyrethrum production.

In Queensland, Troy planted over 200 acres of broccoli with the FarmDroid last year. New features are on the way, including attachments for planting larger seeds (e.g. sweet corn and green beans) and a smart precision sprayer attachment to further enhance its capabilities.

Ian noted that the return on investment (ROI) from technologies like the FarmDroid isn't driven by labour savings. Early trial data suggests the real value lies in marketable yield and quality improvements thanks to even plant stands and early weed management.

Above. FarmDroid Demonstration Ag Innovation Expo.



Drone spraying demonstration

The event also featured a drone spraying demonstration by Octodrones, a new family-run business offering aerial application services across a range of agricultural systems. The demonstration highlighted the advantages of drone spraying—particularly on saturated or difficult-to-access terrain. The presenters noted that limited registered chemistries for drone application remains a challenge.

For the demonstration, a UV-sensitive paint was mixed with the water spray applied to the crop. This, once viewed under UV light at sunset, revealed excellent coverage delivered via the vortex effect created by the drone's rotors.

The Ag Innovation Expo hosted three drone operators as exhibitors, highlighting the increase in availability of services on offer for growers in Tasmania, including remote imagery, spraying and fertiliser spreading.

Delving into drivers of onion pack out in Tasmania

After lunch on 16 April, Dr Doris Blaesing of RMCG, who provides technical support to the *Onion communications and extension project* managed by AUSVEG, led a panel discussion on key factors influencing onion quality and pack-out volumes in Tasmania. The panel included Tim Groom (Charlton Farms & Wynyon), James Burbury (Sumich), Dylan Bellchambers (Harvest Moon), and Ian Layden (QDPI).

Doris opened with the question: What are the essential factors for a successful onion crop?

James Burbury, reflecting on insights from European production systems and export requirements, emphasised the importance of aligning crop programs with market goals—whether targeting fresh or processing markets. He also highlighted the critical role of an appropriate fungicide program and understanding and managing crop vigour.

Dylan Bellchambers pointed to the need for good soil health and balanced soil nutrition from the outset to achieve good bulb quality and overall crop performance.

The panel agreed that field issues during production often carry through to post-harvest storage, markets and export success, making in-field management vital. Weed control was another major topic.

"The crop is growing skinning leaves between the 3-8 leaf stage, and with a range of weed pressures in Tasmania, getting through a compact herbicide program at the right time, before skinning, is crucial," Dylan said.

Volunteer potatoes were noted as a recurring challenge, requiring management through crop rotation and timely herbicide use.

Ian introduced the concept of alternative weed control technologies, including laser weeders and smart sprayers. With herbicide resistance on the rise, mechanical and precision approaches are becoming essential tools for growers.

Interest is also growing in ultra-high precision spraying technologies like Ecorobotix, which recently arrived at the Queensland Smart Farm for local assessment before being trialled more widely in industry.

The panel then explored post-harvest crop loss which goes to waste.

"You can't manage what you don't measure," Tim noted, highlighting the role of LEAN management in reducing waste at Charlton Farms. Issues like mechanical damage, stones, clods, and weeds at lifting can all impact final pack-out and the volume of out-of-spec onions ending up in waste.

Drainage also emerged as a critical point. Ian shared that underground drainage consistently benefits growers, especially when rain events threaten spray scheduling or seed drilling and establishment. Effective drainage enables timely field access and healthier crop development due to eliminating root damage due to water logging.

Finally, the conversation turned to seed quality. Tim advised that a botrytis test before purchasing onion seed is ideal, though recent supply constraints have limited growers' ability to test pre-purchase. James reinforced the need to plant varieties bred for the local climate, stressing that genetics significantly influence success.

The panel's key takeaways were to invest in quality seed, ensure strong early establishment, manage drainage and crop inputs carefully, and choose technologies that support long-term productivity.

Looking ahead

The Ag Innovation Expo 2025 was a valuable event for those working in agriculture, offering hands-on experiences, expert insights, and opportunities for connection. Whether it was learning about soil management practices or cover crops, discovering advanced technologies, or simply catching up with industry colleagues, the event provided plenty of useful takeaways for the agricultural community.

With its practical focus and emphasis on real-world applications, the expo reinforced its role as an important, accessible event in the Tasmanian agricultural calendar.

Above L-R. Professor Dick Godwin Soil Pit Demonstration at Hagley Farm School. Getting the most out of your onion crop panel discussion.



Growers interested in joining the VegMech project can submit an expression of interest via the QR code.

FIND OUT MORE

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TAPG: Terry Brient - terry.brient@gmail.com

VegMech Project: Janaina Fabris - Janaina.Fabris@daf.qld.gov.au

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VegNET 3.0 is funded by Hort Innovation using the vegetable and onion research and development levies and contributions from the Australian Government.
Project: VG21000

Accelerating the adoption of best management practices for the Australian onion industry is funded by Hort Innovation using the onion industry research and development levy and contributions from the Australian Government.
Project Number: VN21000

Advanced vegetable mechanisation program to maximise labour and costs efficiency is funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government.
Project code: VG23003

Hort Innovation ONION FUND

Hort Innovation VEGETABLE FUND

Current projects

HORT INNOVATION ONION FUND

Hort Innovation conducts a number of R&D projects funded by grower levies. Here is a list of some of the projects currently underway.

Onion nutrition education program for health professionals and the food service industry

VN20002

DELIVERY PARTNER: BITE COMMUNICATIONS

This investment is delivering evidence-based information about the health benefits of Australian onions to health and food service professionals in Australia.

On average, Australian adults consume just three grams of onion per day. In contrast, consumers in the United States and Europe consume twice as many onions as Australians. In order to close this gap, initiatives to educate health professionals and the food service industry are key as they are significant influencers of consumer food behaviour.

This project will extend previous research conducted by levy-funded project *Australian onions nutrition literature review* (VN18002) and the *Onions food service farm tour and education pilot* (VN18000) by communicating the nutritional benefits of onions to health professionals, food service professionals and industry stakeholders.

Optimising chemical and cultural management of onion white rot

VN20007

DELIVERY PARTNER: ARVENSIS

This investment is developing a more effective integrated disease management strategy for control of onion white rot. Onion white rot is a highly destructive fungal disease of commercial onion crops. This project seeks to improve current control methods for the disease, as well as identify new methods that can be used to combat onion white rot.

The research will incorporate:

- Development of a pre-plant soil DNA test to identify disease risk prior to planting
- Identification and development of natural germination stimulants to reduce disease inoculum levels prior to planting
- Optimisation of spray timing and dose rates of current fungicides
- Identification of new fungicides and biological controls for onion white rot.

The project team will work closely with the onion industry to extend any new findings to onion growers. Regular updates will be provided to industry, as well as trial sites visits later on in the project to demonstrate the integrated onion white rot management program developed.

Australian Onion Industry Communications

VN21000

DELIVERY PARTNER: AUSVEG

This investment ensures the onion industry is equipped with the information and resources they need to adopt best management practices.

Onion growers will be brought into the existing VegNET 3.0 program for the vegetable industry to support increased awareness and adoption of R&D.

VegNET is a nationally-coordinated, regionally-delivered extension program that increases the industry's awareness of and engagement with best practices in high-priority areas. The program has regional development officers (RDOs) in ten key vegetable-growing regions around Australia.

A vital component of the program is the establishment of five regionally-based onion grower groups in Tasmania, Queensland, New South Wales, Western Australia and South Australia. The relevant RDO will work with each group to identify regionally-specific issues facing onion growers and work with them to host seasonal activities, including demonstration sites, field days, and grower walks.

VOP Chemical residue report to support Australia's Country Recognition Arrangement (CRA) with Indonesia (2024-2029)

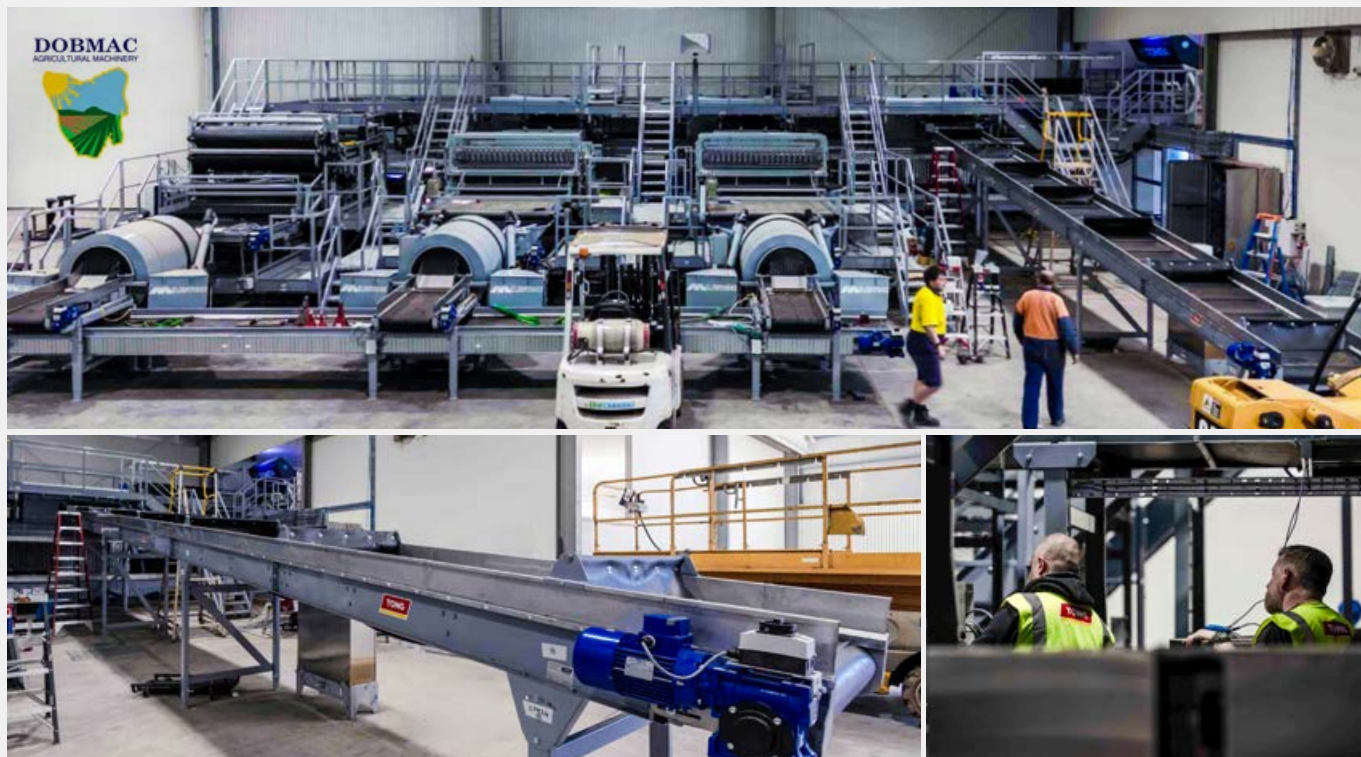
MT24007

DELIVERY PARTNER: FRESH MARKETS AUSTRALIA

This project will provide a report of national residue testing data to the Department of Agriculture, Fisheries and Forestry (DAFF) for their utilisation in renewal of Australia's Country Recognition Arrangement (CRA) with Indonesia.

CODE

O Onion P Potato V Vegetable M Melon



17 years of innovation: The Dobmac–Tong Partnership transforming Australian vegetable handling

In 2008, a strategic partnership was formed between Tasmania-based Dobmac Agricultural Machinery and UK manufacturer Tong Engineering, bringing together two leaders in agricultural equipment to serve the evolving needs of Australian vegetable growers. Over the years, this collaboration has delivered a range of innovative and reliable solutions, tailored to the specific challenges faced by growers across Australia and New Zealand.

Tong Engineering, established in Lincolnshire over 90 years ago, is a global name in vegetable handling systems. Known for their robust and advanced equipment, Tong supplies machinery for washing, grading, conveying, and complete processing lines. Their reputation for quality and customisation has seen their equipment installed in more than 50 countries, with strong growth in export markets. Tong continues to lead the way in developing technology that helps growers improve efficiency and meet quality standards.

Dobmac brings decades of local knowledge and manufacturing expertise to the partnership. Since 1983, the Tasmanian-based company has been designing, building, and supporting machinery specifically suited to root crop production in Australia. From planters and harvesters to processing equipment, Dobmac has earned a strong reputation for supporting the full crop cycle. Their close relationships with growers allow them to offer machinery that's practical, reliable, and well-suited to Australian conditions, crops, and business needs.

Over the past 17 years, Dobmac has worked closely with Tong to supply and install a wide range of advanced vegetable handling equipment across Australia. This includes complete onion and potato grading lines, carrot wash lines and grading systems, bin fillers, bulk bag fillers and other bespoke vegetable handling equipment. Grading lines supplied by Tong cater for multiple crop types and can be configured with screen graders, lift rollers, or optical sorting depending on the application. Bin fillers and bin tippers have been supplied in various capacities to suit both small and large-scale packhouse operations, while Tong's conveyor

systems and inspection tables improve handling efficiency.

Graders are often paired with Tong's box fillers and integrated with other packing equipment to create a seamless flow from raw intake to final product. All equipment is designed and manufactured by Tong in the UK and installed, commissioned, and supported by the Dobmac team in Australia, ensuring each solution is tailored to the grower's crop type, throughput needs, and facility layout.

By working together, Dobmac and Tong Engineering have brought international-quality systems to Australia, customised for local needs. The partnership has supported growers in improving quality, reducing waste, and increasing throughput without compromising on gentle handling. This has helped to futureproof operations and strengthen the competitiveness of Australian produce in local and export markets.

An important aspect of the Dobmac–Tong partnership is the emphasis on long-term support and service. Beyond installation, Dobmac provides ongoing technical backup, training, and spare parts to ensure equipment continues to perform to its full potential. This local presence gives growers the confidence to invest in more advanced systems, knowing they have knowledgeable support just a phone call away. With machinery that often forms the backbone of post-harvest operations, this combination of international engineering and local service has proven invaluable to producers seeking both performance and peace of mind.

Looking forward, the relationship between Dobmac and Tong remains focused on innovation and practical outcomes for growers. Both companies are committed to continuous improvement and adapting to industry changes. With a shared focus on service, reliability and technology, this partnership will continue to deliver benefits to the horticulture sector well into the future.

FIND OUT MORE Visit dobmac.com.au

potato update

This project has been funded by Hort Innovation using the potato - fresh and processing research and development levy and funds from the Australian Government. For more information on the fund and strategic levy investment visit horticulture.com.au

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Current projects

HORT INNOVATION POTATO FUND

Hort Innovation conducts a number of R&D projects funded by grower levies. Here is a list of some of the projects currently underway.

VOP Horticulture Trade Data 2022–25 MT22005

DELIVERY PARTNER: IHS GLOBAL

This investment provides Hort Innovation with a subscription to the Global Trade Atlas Database. Access to this trade data is used to validate export performance and assist with forming ongoing strategy and focus areas in the area of international trade. This information is shared with relevant industry bodies and delivery partners.

VP Industry Preparedness for exotic root knot nematode

Meloidogyne enterolobii
MT22012

DELIVERY PARTNER: CSIRO

Identification of root-knot nematodes via morphological methods is time intensive, requires significant specialist expertise, and the fingerprint-like patterns present on the female body which are traditionally used to diagnose species are subject to human interpretive error. Molecular identification would be more accurate and high-throughput, however, nearly all historic material was preserved using formaldehyde-based solutions, which are generally thought to inhibit DNA extraction.

This research project aims to improve root-knot nematode identification through a two-prong approach.

1. National Research Collections Australia (NRCA) is developing artificial intelligence-based image recognition for pests like Brown Marmorated Stink Bug and various weeds. This research project will develop a similar tool for rapid species-level identification of root-knot nematodes using images of perineal patterns, which are a fingerprint-like pattern of lines on the outside of adult females used for identification. The research team envision the tool as being able to provide a same-day, species-specific identification based on light-microscopy images of perineal patterns requiring minimal training to prepare. The results would thus be far quicker, cheaper, and easier than other identification methods available.
2. Despite the general assumption that DNA cannot be obtained from formalin-preserved material, a method doing just that has recently been pioneered by CSIRO. This research project will use this method to screen historic formalin preserved plant material for evidence of *M. enterolobii* infestation.

VOP Horticulture Impact Assessment Program 2023/24 to 2025/26 MT24005

DELIVERY PARTNER: ACIL ALLEN CONSULTING

Hort Innovation engages independent consultants to evaluate the impact of our R&D investments, providing insights into the type and magnitude of impacts that are being generated across the company's strategic levy programs.

This is a key piece of investment evaluation work, and a yearly process for the company, which began through the projects *Ex-post impact assessment* (MT18011) and *Horticulture Impact Assessment Program 2020/21 to 2022/23* (MT21015).

The consultants will draw on a random sample of levy-funded projects each year, adhering to the Council of Rural Research and Development Corporations (CRRDC) guidelines to assess the economic, social, governance and environmental impacts of these projects.

Four grower-focused case studies will also be developed each year to illustrate and communicate how these projects have delivered impact.

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Current projects

HORT INNOVATION POTATO FUND

VOP Chemical Residue Report to Support Australia's Country Recognition Arrangement (CRA) with Indonesia (2024-2029)

MT24007

DELIVERY PARTNER: FRESH MARKETS AUSTRALIA

This project will provide a report of national residue testing data to the Department of Agriculture, Fisheries and Forestry (DAFF) for their utilisation in renewal of Australia's Country Recognition Arrangement (CRA) with Indonesia.



CODE

O Onion **P** Potato **V** Vegetable **M** Melon

P Potato Industry Communication and extension program

PT20000

DELIVERY PARTNER: APPLIED HORTICULTURAL RESEARCH

Beginning in 2021, this investment is tasked with supporting Australian potato growers in adopting improved practices on-farm and keeping up to date with the latest industry news, information, resources and technologies.

The project delivers a nationally coordinated but locally implemented program which employs regional delivery partners who provide specialist skills and knowledge to the industry. The role of the regional delivery partners is a broad one, with all activities geared towards improving the circulation and uptake of information within the industry.

As well as extension activities, the project produces key communication channels for the potato industry, including a hard copy quarterly R&D magazine, online webinars and podcasts, social media, and a dedicated website to host industry resources.

VOP Generation of Data - Crop Protection 2022

ST22001

DELIVERY PARTNER: AGRECO, EUROFINS AGROSCIENCE SERVICES AND KALYX

The generation of pesticide residue, efficacy and crop safety data is required to support label registration and minor use permit applications and renewals made to the Australian Pesticides and Veterinary Medicines Authority (APVMA).

These multi-industry projects are generating the data needed to support a range of existing minor use permits across various horticulture crops to ensure growers have continued access to safe and effective chemicals for managing pests, weeds, and diseases.

Specific industries that will benefit from ST22001, ST22003 and ST22004's data generation work include avocado, citrus, custard apple, fresh potato, lychee, macadamia, mango, olive, onion, papaya, passionfruit, persimmon, pineapple, raspberry and blackberry, strawberry, sweetpotato, and vegetable.

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INNOVATION

Minor Use Permits

ISSUED MAY 2025

The below minor use permits were recently issued by the Australian Pesticides and Veterinary Medicines Authority (APVMA). This information is circulated as part of Hort Innovation's Growing Innovation e-newsletter, which members and interested horticulture participants receive monthly. Sign up at horticulture.com.au/growers/become-a-member.

Permit ID	Description	Dates	Permit holder	Jurisdiction
PER11949 Version 5	Lambda-Cyhalothrin / radish & beetroot / various insects	1 April 2010–30 Nov 2029	Hort Innovation	All states & territories, except VIC
PER10988 Version 5	Cyanazine / snow & sugar snap peas / weeds as per label	10 Aug 2009–30 Nov 2029	Hort Innovation	All states & territories except VIC
PER80099 Version 4	Alpha-Cypermethrin / fruiting vegetables, except cucurbits / Mediterranean fruit fly and Queensland fruit fly	26 Feb 2015–30 Nov 2029	Hort Innovation	All states & territories, except VIC
PER13305 Version 7	Glyphosate (shielded sprayer) / carrots / certain broadleaf and grass weeds	28 May 2012–30 Nov 2029	Hort Innovation	All states & territories, except VIC
PER80138 Version 4	Alpha-cypermethrin / cucurbits / cucumber fruit fly	26 Feb 2015–31 Dec 2029	Hort Innovation	All states & territories
PER83797 Version 3	Ridomil Gold 25G (metalaxyl-M) / parsley / Pythium & Phytophthora	6 Dec 2024–31 Dec 2029	Hort Innovation	All states & territories, except VIC
PER95049 Version 1	Chlorantraniliprole / cane berries / Lepidopteran pests including cutworm and Fall armyworm	3 Jan 2025–3 Jan 2027	Hort Innovation	All states & territories except VIC
PER82341 Version 4	Bifenazate / various crops / mites	6 Jan 2025–31 Jan 2030	Hort Innovation	All states & territories, except VIC
PER12351 Version 4	Imidacloprid / leafy lettuce & okra / Silverleaf Whitefly	30 March 2018–30 April 2026	Hort Innovation	All states & territories, except VIC
PER88349 Version 2	Glufosinate-ammonium / various weeds / capsicum, snow peas and sugar snap	17 April 2020–31 Jan 2030	Hort Innovation	All states & territories except VIC
PER88430 Version 3	Versys Insecticide (Afidopyropen) / carrots / aphids including green peach aphid and carrot aphid	3 Jul 2020–31 Jan 2028	Hort Innovation	All states & territories, except VIC

All efforts have been made to provide the most current, complete and accurate information on these permits, however you should always confirm all details on the APVMA website at: portal.apvma.gov.au/permits. Details of the conditions of use associated with these permits can also be found on the APVMA site. You can also access the Non-Performance Reporting Form for Horticultural Pesticides at horticulture.com.au. This form should be completed when an adverse experience occurs as a result of using a permit. A 'non-performance' is an unintended or unexpected effect on plants, plant

products, animals, human beings or the environment, including injury, sensitivity reactions or lack of efficacy associated with the use of an agricultural chemical product(s) when used according to label (or permit) directions.

Users are advised that while the pesticide can be applied legally under the APVMA minor use permit, there can be a significant delay until the MRL gazetted by the APVMA is adopted in the Australia New Zealand Food Standards Code. Until this occurs the MRL may not be recognised and a zero tolerance may be imposed for

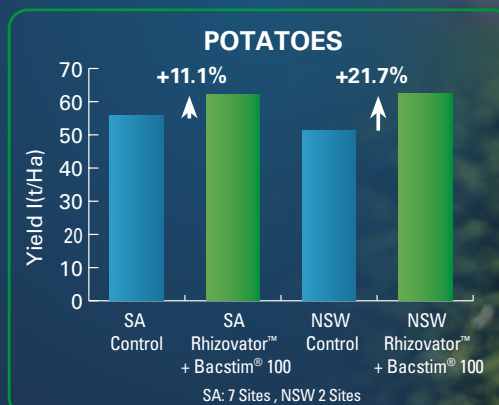
residues of the pesticide resulting from its use according to the APVMA permit.

Please be aware that in the absence of an MRL in the Food Standards Code, the use of the pesticide according to the permit may result in the suspension of the produce in the marketplace. Please check the FSANZ website or the **Australian Government ComLaw website: legislation.gov.au/series/F2015L00468** to confirm if there are MRL established by the Australia New Zealand Food Standards Code.

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Cover: Trial by Washington State University researchers, who are examining the effects of increased temperature during tuberisation. Image: J Blauer.





FROM PETER O'BRIEN ...



Welcome to this issue where we present progress in disease research, technology advancements, and soil health management.

We present some highlights from the recent Australian Soilborne Disease Symposium, including a predictive model for potato powdery scab disease and the role of cover crops as hosts of pink rot.

In technology, we explore advancements in weeding and energy efficiency, innovations which not only improve productivity, but also contribute to the sustainability of farming practices, ensuring a healthier planet for future generations.

In a feature interview, PotatoLinks' Steph Tabone sits down with Andrew Tempira, a WA grower committed to improving soil health. Andrew discusses his motivation, actions taken, and the outcomes on his farm.

Shakira Johnson takes us back to basics with biosecurity, providing a timely refresher on its fundamentals. Meanwhile, Dr Jenny Ekman shares her latest findings on alternatives to CIPC, fresh from the International Postharvest Symposium in New Zealand.

While we know summer is a busy season for many, we hope you find time for a rest to enjoy the magazine.

And please remember, your feedback is invaluable to us. Please don't hesitate to share your thoughts or suggestions as we continue to evolve and improve. For our online readers, subscribing to a hard copy is just a click away - don't miss out on having these stories delivered directly to your doorstep.

Enjoy the read!

Peter O'Brien, PotatoLink Project Coordinator

Send your feedback to info@potatolink.com.au

IN THIS SUPPLEMENT

New research on adjusting planting time to manage high temperatures

Ag-tech: Speed and accuracy

Ag-tech: Using AI to predict potato vigour through microbiome analysis

Monitoring key soil-borne diseases of fresh potato in WA

**PotatoLink on the road in Tasmania and Victoria
Ask the Spud GP**

**Farewell and thank you
Peter Philp**

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HOT POTATOES – NEW RESEARCH ON ADJUSTING PLANTING TIME TO MANAGE HIGH TEMPERATURES

A research team from Washington State University has been digging into how planting time and temperature influence potato growth, yield, and processing quality. Over two growing seasons, the researchers examined the performance of *Shepody* and *Russet Norkotah* under different planting schedules.

Potatoes are grown in 150 countries across 20 million hectares, producing over 360 million tons each year. And they all have one thing in common – they like to keep cool. Temperature has a major impact on key aspects of potato growth, including sprouting, tuber formation, shape, yield, and maturity.

As global warming makes extreme weather events like heat waves more common, research into how potatoes respond, and how growers can adapt while waiting for new cultivars more adapted to extreme heat, is very welcome.

Research in controlled environments has shown that air temperatures above 30°C and soil temperatures above 20°C can lead to more vine growth but fewer tubers. However, until now, there has been little research on how day and night temperature variations in air and soil affect potato development under field conditions.

HEAT AND POTATOES

The impact of high temperatures depends on both the variety of potatoes grown and their stage of development when high temperatures occur. There is a strong interaction between potato genetics and environment, so it is important to pick the right variety for the expected weather conditions.

- Relatively warm temperatures at planting generally stimulate faster and more even emergence.
 - However, there is a variety-dependant threshold for this effect, with excessive heat-reducing yield
 - Optimum soil temperatures for sprout emergence are around 10-13°C
 - Once sprouts have emerged, higher average air temperatures of 20-22°C increase growth
- If extreme heat occurs when tubers are just starting to form, the plants tend to grow more vines at the cost of producing tubers.
- High temperatures during tuber bulking can cause irregular tuber shapes, increase disease risk, and lead to lower-quality potatoes.
- Increased soil temperature during tuber bulking can result in smaller tubers with lower density, which makes them less suitable for processing into fries or chips.
- Additionally, heat exposure shortens dormancy, reduces shelf life, and causes tubers to age faster. In the case of potato seed, this can potentially affect their performance the following season.
 - Seed potatoes exposed to excessive heat during production, especially early in the season, may be prematurely aged
 - The impact of temperature on tuber age is an interaction of time/ timing, duration and intensity
 - However, storage time and temperatures are likely to have more impact on seed tuber age than growing conditions

There are currently no potato varieties specifically marketed as high temperature tolerant. While breeding programs continue to work on this issue, growers must find other ways to manage rising temperatures. This could include manipulation of planting time, plant spacing and depth, and nutrition program.

Farmers in South Australia's Mallee and Queensland's Lockyer Valley are well accustomed to extreme heat and have developed irrigation strategies to cope. However, as weather patterns become more unpredictable, heatwaves are likely to present increasing challenges to potato production, even in Australia's traditionally cooler regions.



Read more about this in PotatoLink Issue 11.

This detailed two-year study by masters student, Morgan Southern, and Drs Mohan Kumar and Jacob Blauer, starts to pull apart the complex interplay between weather, seed performance, and potato plant productivity.

WHAT THEY DID

The Washington State University team conducted their trials over two seasons (2021 and 2022) at their research site in Othello, Washington (WA). Certified Generation 3 (G3) seed tubers of *Russet Norkotah* and *Shepody* were stored at 4°C plus 95% relative humidity (RH) for 210 days (early planting), 231 days (mid planting), or 253 days (late planting). Seeds were hand cut into 50-64g seed pieces, cured for three days and then planted according to normal commercial practice in Northwestern US.

Soil and air temperatures were recorded every 15 minutes throughout both growing seasons. Daily average, maximum, and minimum temperatures were calculated using readings taken from two locations at either end of the test rows.

Emergence and stem numbers

Plant emergence was tracked from 22 days after planting (DAP) until final stand establishment at about 60 days. The percentage of emerged plants was calculated based on the total seed pieces planted.

At row closure (approximately 60 DAP), the number of main stems per plant was recorded to assess differences in plant growth among the planting times. Visual differences in growth between the planting times are shown in Figure 1A.

Figure 1B shows plots after the early harvest, when the haulm had been mechanically removed from the mid planting and the late planting was still in the active tuber bulking phase.

Harvest

The impact of planting time on yield and tuber size distribution was studied across the 2021 and 2022 growing seasons. After 120 days, vines were removed mechanically using a flail mower. Fourteen days later, tubers were harvested using a Braco® single-row bagger harvester.

After harvest, tubers were washed, weighed, counted, and sorted into

six size categories (<113g, 113–170g, 170–283g, 283–340g, 340–396g, and >396 g).

Total yield (MT/ha) and marketable yield (US No 1 and No 2) were calculated based on these size categories, following USDA grading standards.

In 2022 the researchers also assessed fry colour, as an indicator of reducing sugar levels. This test was conducted within a few days of harvest, and again using tubers stored for 60 days at the cold-induced-sweetening temperature of 4°C (95% RH).

Assessment of processing quality

To determine how planting time and storage affected tuber quality, fry colour was analysed as an indicator of reducing sugar levels.

Within a week after harvest, and again after 60 days of storage at 4°C (95% RH), tubers were tested for fry colour. Medium size tubers were cut into 9.5-mm thick, 2.9-cm wide steak fries, rinsed to remove surface starch, and fried at 190°C for 3.5 minutes. Fry colour was measured at the stem and bud ends to determine uniformity.

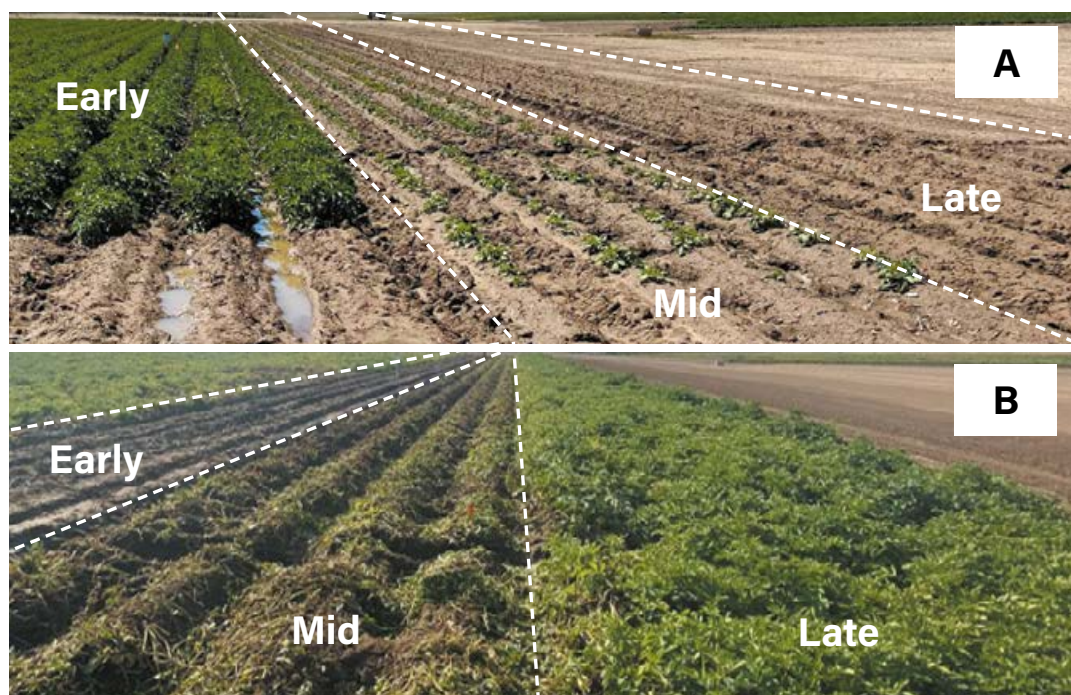


Figure 1. Effect of staggered plantings on relative plant growth of early, mid and late plantings at A) 54, 33 and 11 days after planting and B) 141 (empty plot due to harvest at 134 days after planting), 120 (day haulm was removed), and 98 days after planting. Crop haulms were mechanically removed 120 days after planting. Images: J Blauer.

WHAT THEY FOUND

Temperatures during crop growth

Soil and air temperatures were monitored throughout the 2021 and 2022 growing seasons (Figure 2). Key observations include:

- 2021 had higher temperatures overall than 2022, especially during early growth stages (emergence to tuberisation).
- A 'heat dome' in 2021 pushed air temperatures as high as 45.5°C from late June to early July; this coincided with emergence for the late planting and tuberisation for the mid-planting.
- Early and mid plantings in 2021 experienced higher average soil and air temperatures during tuberisation than in 2022.
- Temperatures peaked around 30 days earlier in 2021 than in 2022.
- Temperatures during tuber bulking were higher in 2022 for mid and late plantings.
- As planting date was pushed back, average air and soil temperatures during tuberisation increased and temperatures during bulking decreased.

In short, changing the planting date changed the balance of temperatures occurring during different growth stages of the plants.

Prior research in controlled environmental conditions (such as greenhouses) suggest that air temperatures above 30°C and soil temperatures higher than 20°C affect tuber initiation and development. The daily variations above these critical thresholds are presented in Figure 3.

As shown here, temperatures above these thresholds can occur frequently in field production settings (depending on the time of year and geography). Potato plants in the field may respond to these variations quite differently from those grown in controlled greenhouse studies.

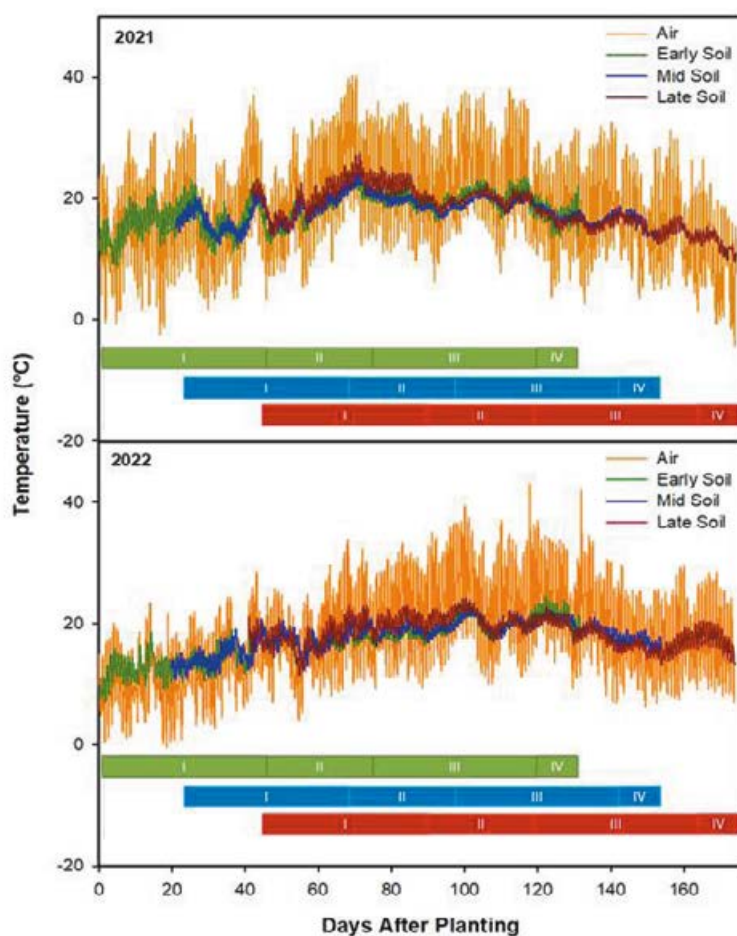


Figure 2. Air and soil temperatures recorded during crop production (April to October) in 2021 and 2022. Bars indicate early (green), mid (blue) and late season (red) plantings, divided into relative growth stages I – Emergence, II – Tuberisation, III – Tuber bulking and IV – Maturation.

Sprout emergence and stem numbers

Rapid emergence is normally seen as a good sign, suggesting a uniform crop stand as well as increasing the period during which plants can capture solar energy.

In these trials, soil and air temperatures immediately after planting had a major impact on the speed with which plants emerged. Late plantings emerged faster than earlier plantings in both seasons, as soil and air temperatures increased.

However, differences between planting dates were dwarfed by the change in emergence rate between 2021 and 2022. This relates primarily to soil temperatures. Average soil temperature during the initial 28 days

of the trials were 16.0°C and 12.2°C during 2021 and 2022 respectively. As a result, 93% and 80% of Russet *Norkotah* and *Shepody* emerged within 28 days after planting in 2021. In contrast, only 12% and 5% of the two varieties emerged within this period in 2022 (Figure 4).

Delaying planting also meant that the seed was stored longer. Increased chronological seed age is often associated with more stems. This was confirmed in these trials, with a consistent trend to increased stems per plant with later planting dates (Figure 5). Similar effects were recorded in 2021 and 2022, despite differing soil and air temperatures between planting and emergence. This suggests that the number of stems

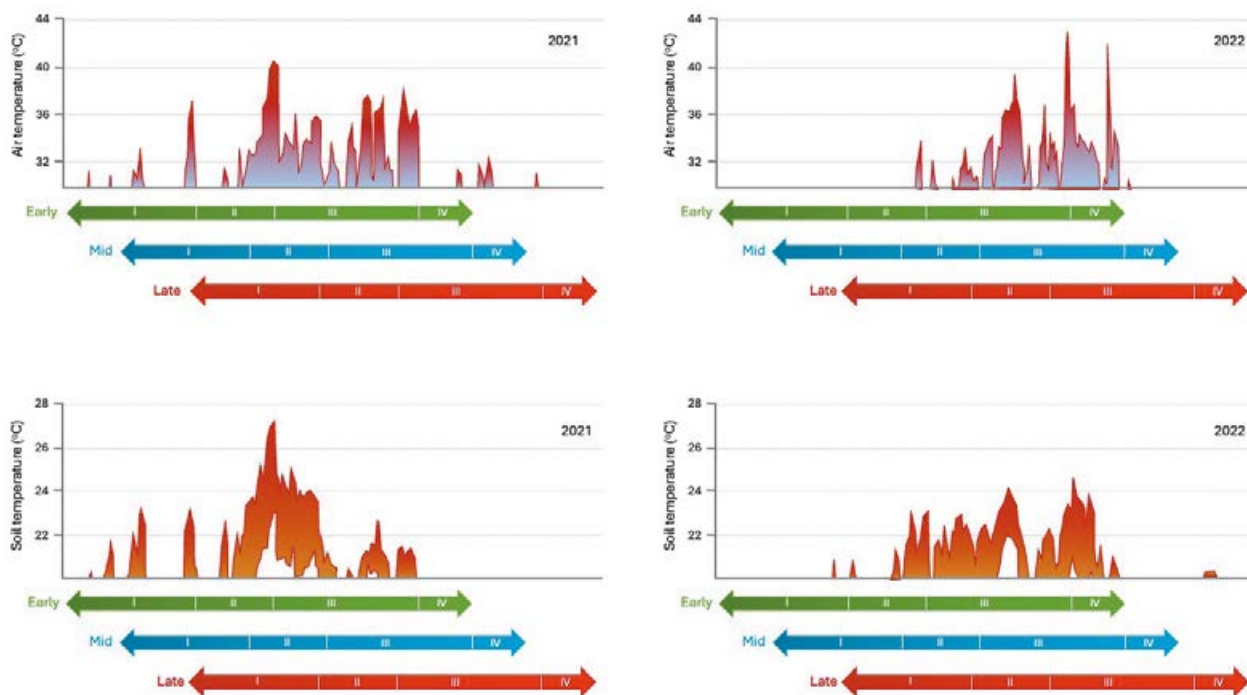


Figure 3. Air and soil temperatures recorded during crop production in 2021 and 2022 (April - October), showing air temperatures above 30°C (top) and soil temperatures above 20°C (below), these being the nominated thresholds for tuberisation / bulking. Note that soil temperatures are maximums across planting dates; soil temperatures were 1 to 3.5°C lower when crop canopy was present.

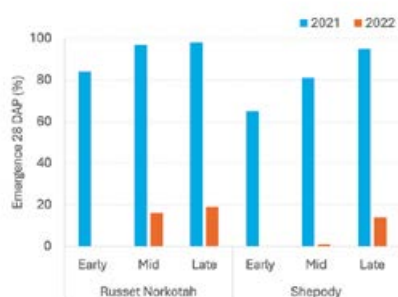


Figure 4. Impact of planting time on the number of plants emerged 28 days after planting (DAP) in 2021 and 2022.

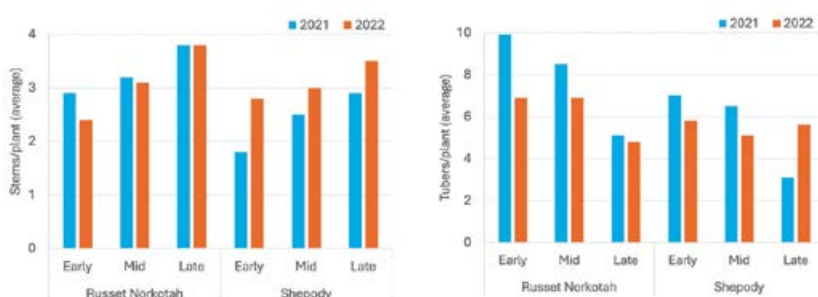


Figure 5. Impact of planting time and, therefore, seed age, on the average number of stems/plant at 60 DAP (left) and the average number of tubers/plant at harvest (134 DAP) (right)

which develop is most strongly driven by the chronological age of seed when planted.

High numbers of stems are commonly associated with more (potentially smaller) tubers. However, this is not what happened in these trials. In fact, the opposite occurred, with **fewer** tubers/plant at later planting dates (Figure 5). For example, delaying planting from early to late in the season reduced the number of *Russet Norkotah* tubers by 48% in 2021 and 30% in 2022.

The researchers suggest that the warmer temperatures that occurred during tuberisation in 2021 likely

increased photosynthesis. This sustained the development of more tubers, despite the plants having fewer stems.

Tuber bulking soil and air temperatures were lower for late compared to early plantings, and for 2022 compared to 2021. This is likely key to the reduced number of tubers that developed.

Total tuber yield

It might be expected that fewer tubers per plant may be compensated – at least in part – by those tubers growing larger. This would leave yield less

affected. However, this also did not occur in these trials. Not only were both the total number of tubers and total yield reduced at later planting dates, but the percentage of the crop that were large tubers also decreased.

This observed decrease in both yield and tuber size was particularly pronounced in the late planting of *Shepody* in 2021. Total yield declined from approximately 76 MT/ha for early and mid plantings to only 27 MT/ha in the late planting.

At the same time, the percentage of mid to large tubers (>170g) fell from 82% (early and mid) to 64% (late planting). The percentage of jumbo



Figure 6. Total yield, divided into six size grades, for early, mid and late plantings of *Russet Norkotah* and *Shepody* in 2021 (left) and 2022 (right).

tubers likewise fell from 37% (mid) to 17% (late).

Shepody is a processing variety, so large tubers are desirable, but jumbo size often cannot be used. Avoiding both jumbo and small tubers maximises returns. However, the yield gains at early and mid planting dates more than compensated for the potential loss from rejection of jumbo tubers.

These effects were not as strongly apparent in 2022, when there was a sharp drop in yield for both varieties. This was strongly apparent in the early and mid planting dates for both varieties. It seems clear that the cooler conditions during spring of 2022 negatively affected yield; warmer conditions by the final planting resulted in similar yields to 2021.

It also seems clear that the impacts of temperature on tuber yield depend

on the crop growth stage. Although average air and soil temperatures often exceeded recommended maximums for photosynthesis (30°C day / 20°C night), there was a positive impact on total yield, a result which highlights the importance of in field research on plant response to temperature.

The results suggest that yield can be maximised by relatively higher temperatures in both air and soil during tuberisation, especially if followed by relatively warm, stable temperatures during tuber bulking. With photosynthesis powering, the plant can put more energy into the tubers.

In 2022, temperatures were relatively low during tuberisation (early and mid-plantings). Day and night temperatures then rose during tuber bulking. These conditions had a negative effect on photosynthate

accumulation, leading to reduced tuber yield.

While high temperatures during plant establishment favoured earlier and more uniform emergence (late plantings), this did not lead to increased yield at harvest. This may in part be due to the limited growth period of the varieties tested (120 days) and is an important area for future investigation.

Tuber quality

Size is important, but so is quality. In the US, potatoes are generally divided into US No. 1, No. 2 and unmarketable. One key difference between #1 and #2 is **shape**; #1 is defined as "well shaped" whereas #2 only needs to be "not seriously misshapen". The percentage of total yield that was classed as #1 declined with later planting dates in 2022, but not in 2021.

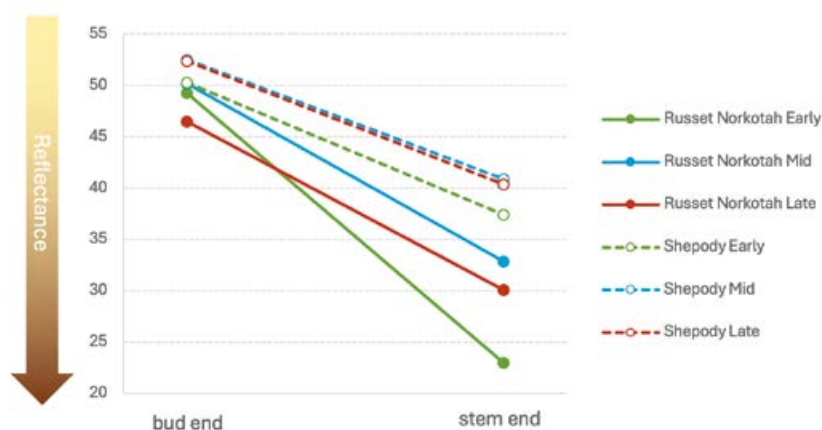


Figure 7. Effect of cultivar and planting time on colour of French fries prepared soon after harvest in 2022. Colour was measured at the apical (bud) and stem ends of each tuber. A difference of greater than 9 units indicates unacceptably non-uniform colour.



Figure 8. Munsell scale, with approximate reflectance values

Moreover, the average percentage of the crop classed as #1 was 68% in 2021, but only 59% in 2022.

Not only was the 2022 crop graded lower than that in 2021, there were also issues with internal quality.

Tubers exposed to high temperatures late in crop maturation are likely to have increased respiration rates at and immediately after harvest. Such tubers not only contain higher amounts of reducing sugars (RS) at harvest but can accumulate more through 'cold induced sweetening' during storage. Accumulation tends to be most pronounced at the stem end of the tuber, where carbohydrates may not have been converted into starch. During frying these sugars caramelize (Maillard reaction), producing unacceptably dark colours.

A standard measure of fry colour is reflectance on a scale of 0 to 100, where 100 units is white. A good

quality chip should not only be light coloured (>20 units, USDA colour score 2) after cooking, but also uniform between the stem and apical (bud) ends. The WSU team considers that a difference in reflectance of more than 9 units is 'non-uniform' (constituting 'sugar end') and therefore commercially unacceptable.

Noting that *Russet Norkotah* is not a processing variety, and *Shepody* is unsuitable for long storage, in 2022 fry colour was used to assess the impact of growing conditions on RS accumulation, both at harvest and after 60 days at 4°C.

French fries prepared from both varieties were distinctly darker at the stem end, especially when the tubers were sourced from the early planting.

For example, when prepared directly after harvest, the average difference between the two ends for mid and late

plantings was 17 and 5 units for *Russet Norkotah* and *Shepody* respectively. However, for early plantings, this difference increased to 26 and 10 units (Figure 7).

It has previously been shown that transient high temperatures during development increase accumulation of RS at the stem ends of tubers.

Tubers that have matured under warm conditions consistently produce darker coloured fries. This may be why the effects on colour were greatest for tubers from the early planting, which matured at comparatively higher temperatures.

The results also confirmed that 4°C is not a suitable storage temperature for either *Russet Norkotah* or *Shepody*; this was used purely for rapid assessment of potential sugar accumulation. After 60 days storage, average reflectance of the prepared

French fries declined by 12 to 26 units, indicating that fries were significantly browner overall.

In *Shepody*, differences between the bud and stem ends increased still further after storage. Although non-uniformity did not increase in Russet Norkotah, the stem ends of the fries were already very brown.

CONCLUSIONS

As global temperatures rise, many potato production areas are experiencing both higher and more variable temperatures. This can mean potato crops are exposed to soil and air temperatures considerably higher than normally considered 'optimum'.

In this trial, potato crops were planted early, mid and late during a hot year (2021) and a somewhat milder year (2022). In 2021, both soil and air temperatures exceeded the normal temperatures considered suitable for tuberisation and bulking.

Contrary to expectations, these conditions increased the number of tubers per plant, total yield, size and grade. Higher temperatures during tuberisation, followed by consistent, warm conditions during tuber bulking, appeared to have the greatest benefits. It has been observed that photosynthesis remains active at up to 38°C in some cultivars, and that seemed to be the case in this trial.

However, while yield, size and grade all improved with these warmer than usual conditions, there may be

negative effects on internal quality. While the fry colour test was only conducted for one season, the results appear to confirm previous findings that high temperatures close to harvest increase reducing sugar content in tubers, particularly at the stem end. When processed, the resulting fries may be dark and/or non-uniform.

As expected, stem numbers per plant increased with extended seed storage time. This effect was independent of seasonal temperature variations. However, increased stem counts were not reflected in increased numbers of tubers, tuber initiation being more influenced by temperature than pre-existing factors.

The authors conclude that:

"Adjusting planting time to coincide emergence with modest temperatures, tuberisation with warmer temperatures, and bulking with relatively cooler temperatures, has potential for maximising tuber yields. Furthermore, cooler temperatures during the latter part of bulking and maturation produce tubers of better processing quality."

NEXT STEPS

The team are continuing this research using late maturing varieties, further investigating the interaction between genotype and environment.

They are also examining the effect of environmental stresses on seed characteristics, when grown the following season.

KEY POINTS

The study examined how temperature affects potato growth and yield. Potatoes were planted at different times over two seasons, exposing them to natural temperature variations.

Researchers measured factors like stem and tuber numbers, tuber size, total yield, and quality. Results were related to temperature and seed age.

- Planting earlier in the season led to higher yields, while late planting reduced yield and tuber numbers.
- Longer seed storage times increased the number of stems per plant, but this did not increase tuber numbers.
- The best productivity occurred when seed was planted at cooler temperatures, tuberisation occurred during warmer conditions, and bulking was completed at cooler temperatures.

ARTICLE BASED ON:

Southern, M. D., Kumar, M. G. N., & Blauer, J. M. (2025). Cultivars and Their Developmental Phases Interact with Temperature Fluctuations to Modulate Growth, Productivity and Seed Tuber Physiology of Potatoes (*Solanum tuberosum* L.). *Plants*, 14(5), 750. <https://doi.org/10.3390/plants14050750>



Dr Blauer, together with Dr Banerjee and Mark Pavlek have developed these heat boxes (left and cover) to provide side-by-side comparisons of the effects of increased field temperatures. The boxes are open to the air, so have the same light, irrigation, pest pressure etc. as the control plants. In the example shown at left, temperatures are being manipulated during tuberisation. Image: J Blauer.

AG-TECH: SPEED AND ACCURACY WITH SEED SENSING TECHNOLOGY

Like many great technological innovations, this one stemmed from the frustration of a grower who, unable to find a solution on the market, decided to invent something himself.

Nearly a decade ago, Craig McCloskey, a potato grower from Prince Edward Island (PEI), Canada, went looking for a way to plant both faster and more consistently.

There was nothing on the market, so he decided to make his own.

Between 2015 and 2017, working on his home farm, Craig developed and patented a new system for planting potato seed. In 2017, he partnered with Allan Equipment Manufacturing Ltd. (AEML) to commercialise his press wheel system, manufacturing and selling the first three systems in 2018.

Over the next three years, AEML sold more than 80 press wheel kits across North America. In the same year, Craig founded Bluefield Seeding Solutions (BSSi) to develop the patented Seed Sensing Technology (SST).

From 2018 to 2021, BSSi focused on the development and commercialisation of SST. By 2022, the company began selling SST systems through its partner and distributor to over 45 farms across North America.

Following Craig's recent trip to Australia, this technology will soon be available to Australian growers also.

PotatoLink spoke with Craig to discuss the innovative sensing technology, compatible with the original press wheel, and its role in enhancing seeding efficiency.

Grower and inventor
Craig McCloskey
explaining the press
wheel.



HOW DOES THE TECHNOLOGY WORK?

Even seed spacing, essential for optimising yield, tuber size, and overall plant health, can be easier said than done.

Spacing influences competition for nutrients, water, and sunlight, directly affecting tuber development: If seed pieces are planted too closely, overcrowding can result in smaller tubers, increased disease pressure, and reduced airflow, which encourages fungal infections.

Conversely, excessive spacing, or skips, may lead to underutilisation of field space, a waste of inputs and reduce overall yield potential.

While ideal spacing always depends on the variety, soil conditions, and intended market use, maintaining the 'optimum-for-variety-and-conditions' spacing is the first step in a productive and profitable potato crop.

At the core of Bluefield system is the original press wheel. This enhances placement accuracy of potato planters by capturing the seed immediately after release. The soft surface of the press wheel gently absorbs the seed, holding it momentarily against the ground to eliminate forward movement. Simultaneously, this action tucks soil around the sides of each seed piece, preventing displacement when the soil is pushed back to close the furrow.

Building on this, the new sensor system integrates with the press wheel to record in real time where the seed was planted. Sensors built into the wheel actively measure seed depth by detecting the pressure exerted on the wheel as it rolls over the newly planted seed bed.

To achieve this, an algorithm interprets how the wheel interacts with the seeds. Fluctuations in air pressure occur as the seeds push slightly into the wheel. This allows the system to pinpoint the centre of the seed at the moment it becomes stationary relative

to the ground. By measuring the distance between seeds, the system evaluates placement accuracy.

The data is transmitted directly to the operator's display in the tractor cabin, enabling growers to monitor accuracy as they plant. If inconsistencies arise, immediate adjustments can be made to improve uniformity.

The recorded seeding data includes both total and per-row information, such as the number of seeds planted, ideal placements, less-than-ideal placements, misses, and doubles. Data is tracked per planter pass and field and stored for later access when connected to a network.

All this information allows growers to address issues pro-actively rather than waiting until the plants emerge. Reducing uncertainty provides peace of mind.

DOES IT MAKE A DIFFERENCE?

An analysis of traditional planting methods found that approximately 19ha of a 407ha farm was unproductive due to inconsistent planting. This was estimated to cost the grower \$160,000 in wasted inputs.

To test the impact of the sensor wheel, trials were carried out between 2022 to 2024 on PEI. Results showed that integrating SST significantly reduced these losses, leading to a net economic gain of over \$107,000.

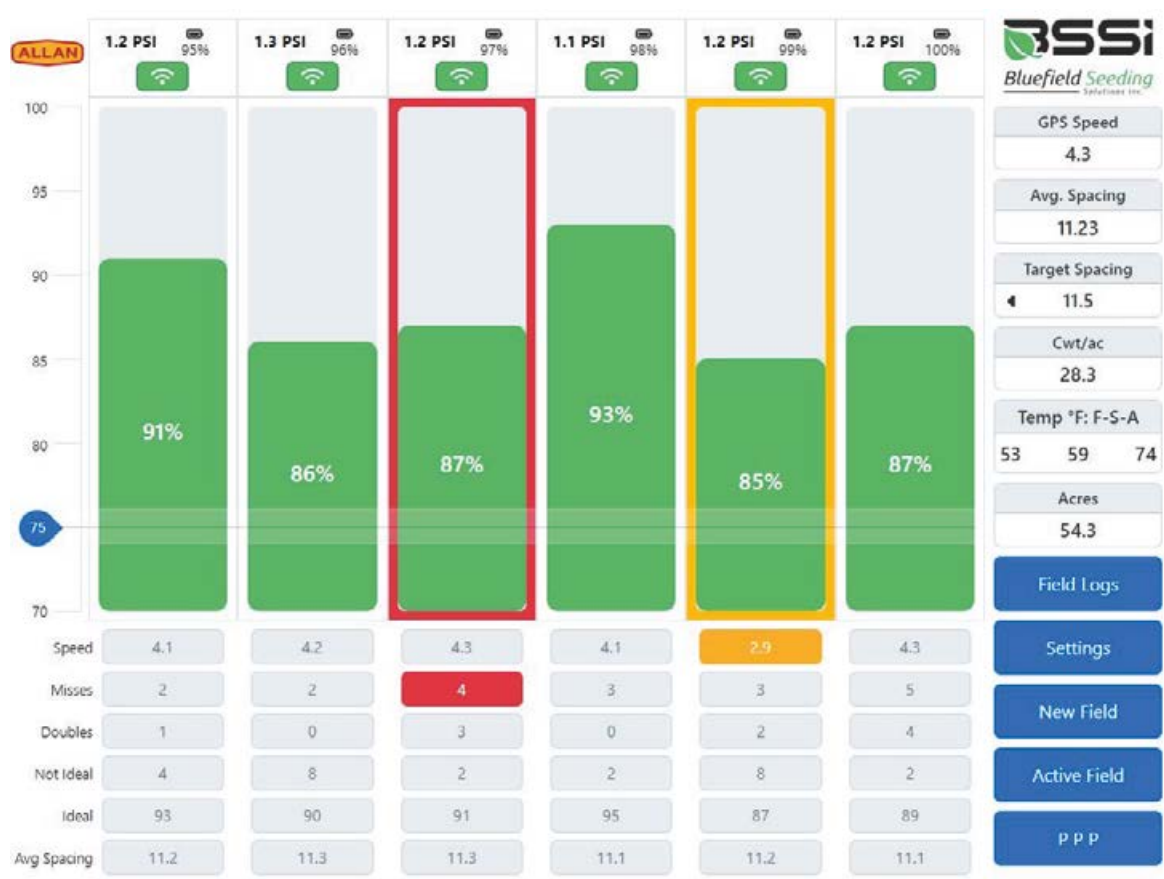
While this report primarily focuses on financial impacts, it also notes potential environmental benefits, such as improved soil cover, reduced fertiliser runoff, and increased carbon sequestration.



Animation video of the press wheel and seed spacing tech - [watch here \(bit.ly/4jqmJRX\)](https://bit.ly/4jqmJRX)



The seed spacing dashboard



The seed spacing dashboard provides real time data on skips, misses and doubles

Another 2022 study on PEI explored other measurable environmental benefits. This revealed that the seeding system allowed the planter to increase ground speed without any negative impact on crop yield or value, providing further efficiency.

Based on the French fry processing and fresh markets at the time of the review, the research team concluded that the farmer participating in the trials increased the overall value of their crop by more than CAN \$250/ha and CAN \$1482/ha for French fry and fresh market potatoes, respectively.

Significant time savings have also been reported. Terry Currely from Monaghan Farms (PEI) implemented the technology on two planters. Planting speed increased by 40–65%, with an overall planting efficiency boost of 18%. More importantly, accuracy improved from around 80% to 95%, as the press wheels prevented seed pieces from bouncing upon contact with the ground.

INSTALLATION AND SUPPORT

While not exactly an IKEA flat pack, the press wheel and seed sensing technology has been designed for a DIY install, with support from BSSi (<https://bluefieldseedingsolutions.com/support/>)

FUTURE DEVELOPMENTS?

BSSi are currently developing an additional component to the Press Wheel System; Precise Product Placement. This is expected to be available globally in 2026.

Precise Product Placement allows growers to apply fertiliser and fungicide/insecticide products with greater accuracy.

The system uses a bank of nozzles positioned behind the press wheel to apply in-furrow products. Unlike conventional methods, that spray continuously along the entire row, this

technology enables farmers to apply inputs only where needed – directly around the seed.

By reducing unnecessary application between seeds, Craig says it allows for a 50% reduction in product use.

TO LEARN MORE

Craig is more than happy to discuss options if you're interested in learning more about the Press Wheel System and Seed Sensing Technology.

EXPLORE FURTHER

The BSSi webpage has links to case studies, testimonials and other resources.

bluefieldseedingsolutions.com

A close-up photograph of a person wearing a white lab coat and blue nitrile gloves. They are using a pair of metal tweezers to examine a brown, textured potato tuber. The tuber has several small, yellowish-brown spots on its surface. The background is blurred, showing more of the lab environment with blue and white elements.

AG-TECH: USING AI TO PREDICT POTATO VIGOUR THROUGH MICROBIOME ANALYSIS

"Even though potato fields are filled with plants of the same variety, potato growth often varies widely. This puzzle has long intrigued farmers, biologists, and suppliers of seeds. Even genetically identical potato plants can differ significantly in size, yield, and resilience."

A Dutch research team has developed an AI tool that can predict how well seed potatoes will grow into healthy potato plants. The team from Utrecht University, in collaboration with the Delft University of Technology, recently published their breakthrough study in Nature Microbiology. Developed in collaboration with plant breeders, the tool uses DNA data from bacteria and fungi found on seed potatoes and drone images of potato fields.

This research provides new insights into the complex interactions between microbial communities and plant growth, highlighting the potential of microbiome-based strategies to enhance crop performance and improve agricultural efficiency.

THE ROLE OF THE MICROBIOME IN POTATO GROWTH

Potato vigour, which refers to the seed tuber's ability to support strong emergence and early development, has traditionally been connected to genetic and environmental factors such as soil composition, climate, and storage conditions.

However, this breakthrough study has demonstrated that the microbial community – microbiome – residing on seed tubers also plays a crucial role in determining plant performance.

The microbiome can influence nutrient uptake, disease resistance, and overall growth potential.

To investigate this, researchers conducted microbiome sequencing on seed tuber eyes and heel ends from six potato varieties grown in 240 fields. They collected samples immediately after harvest and analysed bacterial and fungal DNA using amplicon sequencing techniques. By tracking crop development through drone imaging in the following season, they were able to correlate specific microbial compositions with variations in potato vigour.

The study found that the field of origin significantly influenced the microbiome composition of seed tubers. Furthermore, differences in soil type, potato variety, and harvest year all affected the bacterial and fungal communities present.

KEY POINTS

- Microbial communities present on seed tubers can reliably predict their growth potential in the following season.
- Seed tubers from different fields carry distinct microbiomes influenced by soil type, potato variety, and environmental conditions, which impact their vigour.
- Three specific bacterial groups were found to correlate strongly with potato vigour.
- Researchers created a model that uses microbiome data to predict vigour with a high degree of accuracy, particularly for identifying high- and low-vigour seed lots.
- The model successfully classified seed lots into high, medium, and low vigour categories, achieving up to 85-100% accuracy for extreme cases, making it a potential tool for seed quality assessment.

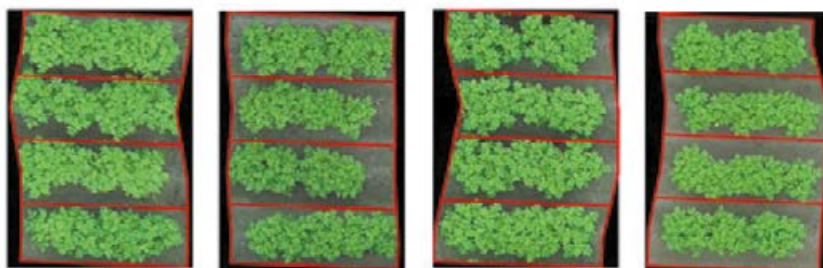
Statistical analysis confirmed this: *Microbiomes of tubers from the same field clustered together and were distinct from those of other fields.*

This demonstrated that each field imprints a unique microbial signature on seed tubers, which can persist into the next growing season.

MICROBIAL INDICATORS OF POTATO VIGOUR

Key microbial indicators of potato vigour were identified, with three unique DNA sequences (known as amplicon sequence variants (ASVs)) standing out:

- *Streptomyces*
- *Acinetobacter*
- *Cellvibrio*



Images were used to analyse canopy surface area (CSA) as an indicator of plant vigour; images show four replicate plots from the same seedlot

The presence of *Streptomyces* was positively correlated with potato vigour, suggesting a potential role in promoting plant growth.

In contrast, *Acinetobacter* and *Cellvibrio* were associated with reduced vigour. The abundance of *Acinetobacter* ASVs was found to negatively correlate with canopy surface area (CSA), an indicator of plant growth, reinforcing its potential role as a detrimental factor.

A PREDICTIVE MODEL FOR SEED QUALITY

Using advanced machine-learning techniques, the researchers developed an AI model that can predict how well seed potatoes will grow. The model combines two types of data: genetic data from microbes living on the seed potatoes and drone images of potato plants that emerged from the seed potatoes.

By analysing these data points using AI, the model uncovers patterns that help identify which microbes lead to the healthiest potato growth.

The AI model performed exceptionally well in identifying seed lots with extreme levels of vigour – either very high or very low. For the best-

performing variety, the model achieved a strong correlation between predicted and observed vigour.

When applied to seed tubers from fields not included in the initial training set, the model still produced significant correlations between microbiome data and plant performance, underscoring its robustness.

The model also provided a classification system, dividing seed lots into high, medium, and low vigour categories. Within-year predictions had a high precision rate, with 85–100% of seed lots classified correctly in the extreme vigour groups. Across-year predictions were slightly less accurate but still offered valuable insights for assessing seed quality.

WHERE TO NEXT?

While the AI model currently explains a significant portion of the variation in potato vigour, further refinements could improve its accuracy. Incorporating additional variables, such as soil properties, planting history, and tuber biochemistry, could enhance predictive capabilities. Future iterations of the model could also

integrate environmental data, storage conditions, and physiological markers of seed quality to create a more comprehensive assessment tool.

Advances in machine learning, including the use of neural networks and gradient boosting algorithms, may also improve the model's predictive power.

Identifying beneficial microbial strains associated with high vigour seed tubers opens the door for developing microbial inoculants or probiotics that could be applied to tubers before planting. Such interventions could help ensure more uniform crop emergence and higher overall yields.

The discovery that microbiome composition can be linked to future plant performance offers exciting possibilities for new ways of growing potatoes.

SOURCES

<https://www.uu.nl/en/news/smart-farming-ai-predicts-potato-growth-potential>

Song, Y., Atza, E., Sánchez-Gil, J.J. et al. Seed tuber microbiome can predict growth potential of potato varieties. *Nat Microbiol* 10, 28–40 (2025). <https://doi.org/10.1038/s41564-024-01872-x>



MONITORING KEY SOIL-BORNE DISEASES OF FRESH POTATO IN WA

by Dr Wossen Mengesha (WA DPIRD), Dr Julia Grassl and Neil Lantzke

Researchers monitored three major potato diseases – Powdery scab, common scab, and black dot – in Western Australia. The aim was to better understand how populations of disease-causing organisms in the soil before planting affect crop quality, and how this knowledge can support better management decisions.

INTRODUCTION

In Western Australia (WA), important potato diseases such as Powdery scab (caused by *Spongospora subterranea*), common scab (caused by *Streptomyces* spp), and black dot (caused by *Colletotrichum coccodes*) negatively impact tuber cosmetic qualities, and marketable yield. These tuber diseases can lead to downgrading during the wash-packing process, reducing the proportion of tubers being classed as the highest quality grade.

Soil inoculum and seed tubers are key sources of inoculum for disease development.

S. subterranea survives in the soil for many years as resting spores. It infects potato root cells and newly developing tubers. This leads to development of pustules over the tuber surface, causing the blemish disease powdery scab.

Similarly, common scab, caused by the pathogenic *Streptomyces scabies*, produces corky, superficial lesions on tubers. Initially introduced into a paddock via seed tubers, it spreads across farms through water and overwinters in the soil.

Infection of tubers with *C. coccodes*, causing black dot, originates from inoculum harbouring in soil as resting spores. It can also be introduced from seed.

Severity of these disease symptoms depends on range of factors including the levels of inoculum, susceptibility of potato cultivar and climatic conditions such as soil moisture and temperature.

Understanding the inoculum levels of these soil-borne pathogens in a paddock before planting has gained momentum in recent years as a tool for potato disease management.

In this study we used customised qPCR molecular assays (PREDICTA Pt, by South Australian Research Institute (SARDI)) to evaluate the relationship between pre-planting inoculum levels of potato pathogens and development of three key diseases: powdery scab, common scab, and black dot. Trials were conducted in the five main potato growing regions in WA (Figure 1).



Figure 1. Location of sampling sites in potato growing areas in Western Australia.

ACKNOWLEDGEMENT

The authors thank all growers involved for allowing access to their paddocks/sites and providing the materials required free of charge.



Figure 2. Examples of trial sampling sites: yellow rectangle represents the 1 ha site and dots show locations of 5 intensively sampled 1 m² quadrants.

APPROACH

Trial design and soil sampling

Twelve paddocks from five potato production regions – representing different climatic conditions – were selected in collaboration with commercial growers (Figure 1).

Prior to planting, one hectare of land was identified and mapped with a GPS. Within that area, five x 1 m² quadrants were selected for collection of an intensive composite sample. A site sample was collected by combining 40 soil cores, sampled in a 'W' pattern across the whole area (Figure 2). In addition, 20 soil cores were sampled and combined from each individual quadrant. The composite sample from the hectare, and the five samples from the quadrants, were considered separately.

Tuber harvest and disease scoring

Planting and paddock management were conducted by the growers. Prior to the commercial harvest, 100 tubers from each one-hectare site and 25 tubers from each set of five quadrants were sampled, following the location of pre-planting soils sampling.

Disease incidence was assessed for Powdery scab, Common scab, and Black dot and percent disease severity was calculated using mid-point values according to Peters et al¹.

To determine the level of pathogens on potato peel, a 2cm wide by 8–10cm long strip of peel was taken from each sub-sampled tuber and sent to SARDI for DNA concentration analysis².

RESULTS

Powdery scab

For Powdery scab, 90% of the soil samples collected from all sites showed low to undetectable DNA levels of *S. subterranea* (<1.3 log pg DNA/g soil) (Figure 3). From the remaining 10% of soil samples, 8% showed an inoculum level of >1.9 log (pg DNA/g soil) corresponding to high risk for disease development.

Visual assessment of tubers from all but one of the quadrants that indicated high risk revealed varying severity of Powdery scab symptoms (Figure 4), with purplish brown lesions, uniform in shape, coalescing together to form bigger scab surfaces (Figure 5). Based on WA fresh potato standard, tubers from these high-risk quadrants would have been considered as class 2 for packout,

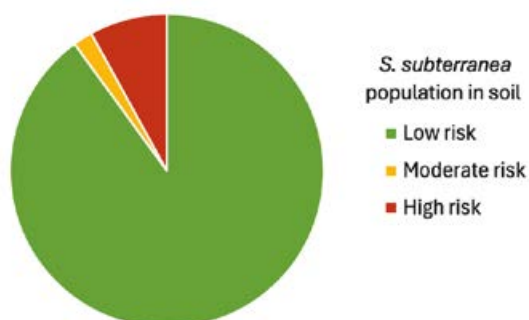


Figure 3. Percentage of soil samples representing three categories of soil DNA levels of *S. subterranea*, based on Predicta PT thresholds, being low risk (<1.3 log pg DNA/g soil); moderate risk (1.3 to 1.9 log pg DNA/g soil); high risk (>1.9 log pg DNA/g soil).

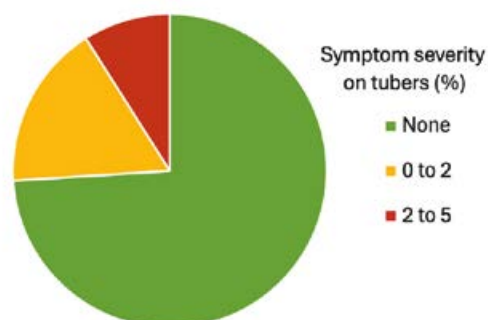


Figure 4. Average severity of powdery scab symptoms on tubers (n=72). Disease severity was calculated by multiplying the number of tubers in each score class (0-4) by the median value of the class (% affected tuber surface area)



Figure 5. Powdery scab symptom on tubers, caused by *S. subterranea*.

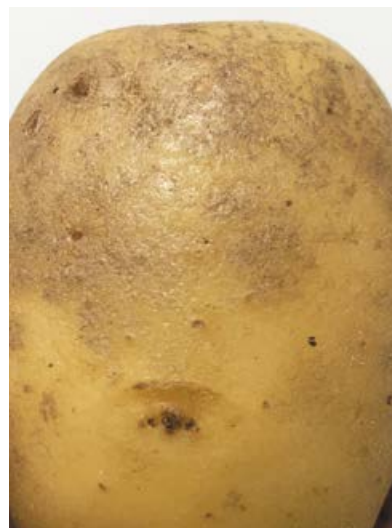


Figure 8. Black dot symptoms on potato tuber, caused by *C. coccodes*.

with class 1 being a higher quality than class 2³. No powdery scab symptoms were found on tubers assessed from 74% of quadrants across all paddocks. This reflects the low DNA concentrations found pre-planting.

In some areas with low soil DNA inoculum of *S. subterranea*, there was high disease severity on tubers (average of more than 2% surface area affected), particularly in areas where potatoes were planted in winter. *S. subterranea* can remain active in the soil and build up in a conducive environment, such as low temperature and high moisture. Cultivar susceptibility and weather conditions play an important role in development of powdery scab. These factors therefore need to be incorporated in management decisions along with pre-planting soil inoculum levels.

Black Dot

Pre-planting soil DNA test results showed *C. coccodes* had a wide distribution across most of the paddocks, with 46% of soil samples returning inoculum concentrations greater than 1.6 log (pg DNA/g soil). This is the threshold above which the disease risk for development of black dot disease is high, based on Predicta PT (Figure 6). On tubers where symptoms were detected (Figure 7), black, dot-like structures known as microsclerotia were observed on the blemished surfaces (Figure 8).

The relationship of pre-planting soil DNA inoculum and black dot severity in the samples from quadrants showed a linear relationship ($p < 0.001$), where higher levels of inoculum were strongly associated with increased disease severity in harvested tubers (Figure 9).

Most samples that had more than 5% surface area affected on average were associated with soil DNA inoculum levels above 1.6 log (pg DNA/g soil).

The relationship between disease severity and pre-plant soil inoculum levels was not as strong for the composite hectare samples as the intensive quadrants.

Black dot symptoms were detected on tubers from a majority of the sampling areas. On average, 30% of samples had more than 5% of tuber surface area affected.

Moreover, 80% of tuber peel samples returned more than 500 pg/g of *C. coccodes* DNA.

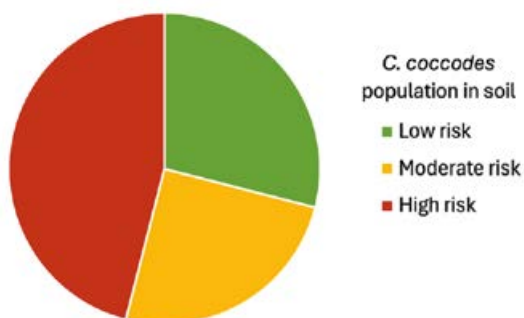


Figure 6. Percentage of soil samples representing three categories of soil DNA levels of *C. coccodes*, based on Predicta PT thresholds, being low risk (<0.8 log pg DNA/g soil); moderate risk (0.8 to 1.6 log pg DNA/g soil); high risk (>1.6 log pg DNA/g soil).

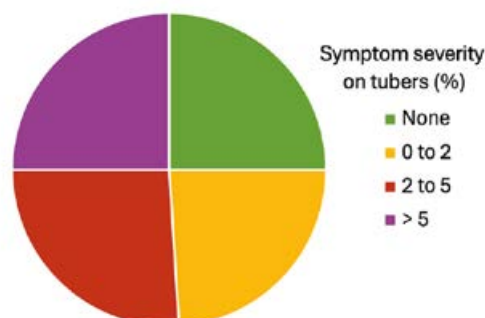


Figure 7. Average severity of black dot symptoms on tubers (n=72). Disease severity was calculated by multiplying the number of tubers in each score class (0-4) by the median value of the class (% affected tuber surface area)

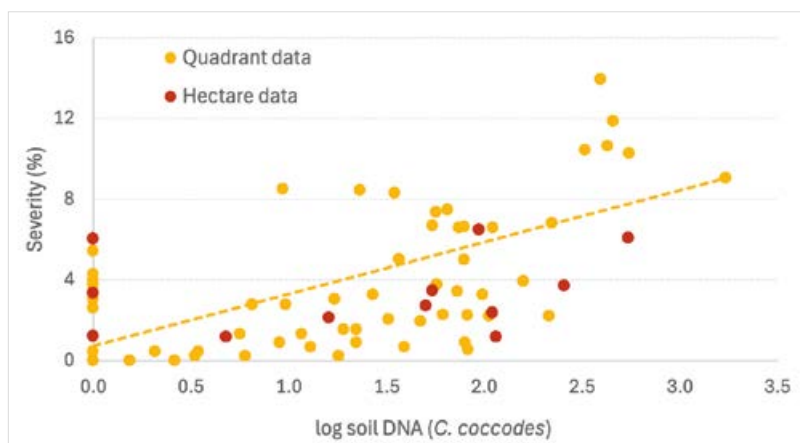


Figure 9. Relationship between pre-planting soil DNA (logPgDNA/g) levels of *Colletotrichum coccodes* and visual symptoms of black dot expressed as disease severity (severity %) on tubers.

As the pre-plant quantity of black dot DNA in the soil increases, the severity of disease symptoms on tubers also generally increases

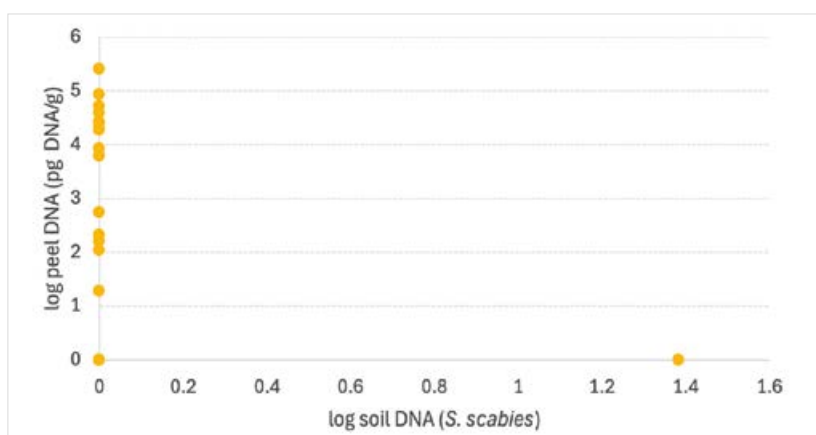


Figure 10. Relationship of pre-planting soil inoculum and tuber peel DNA levels of *Streptomyces scabies* (common scab)

Despite only a single detection of common scab DNA in soil, significant amounts of pathogen DNA were found in harvested tubers

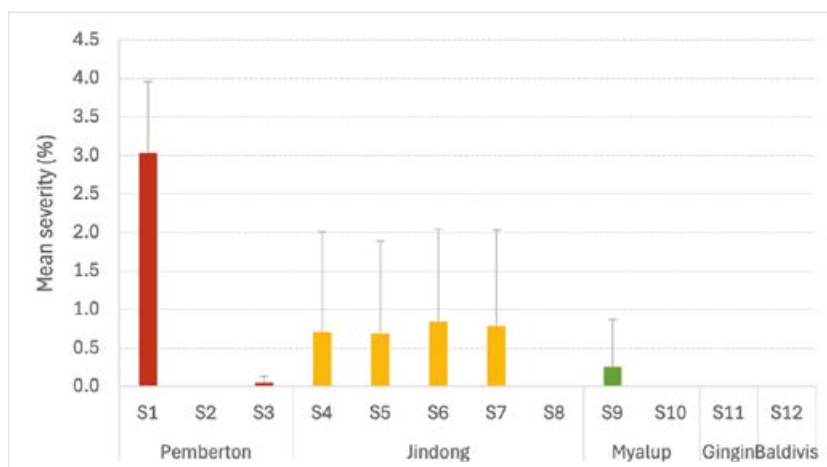


Figure 11. Mean disease severity of common scab in tubers harvested at 12 sites across 5 different regions of southwest WA.

Disease severity varied between paddocks and regions, with the highest average severity occurring at one site in Pemberton

The relationship between soil DNA inoculum levels of *C. coccodes* and symptom severity indicated that pre-planting soil testing can help predict black dot disease risk.

Understanding risk can inform management practices, such as in-furrow application of fungicides at planting, or delaying harvest. Such production decisions directly affect disease pressure, particularly when a high level of inoculum is present in the soil.

KEY POINTS

- Severe symptoms of powdery scab can occur on tubers where soil inoculum levels are low, especially under cool, wet conditions.
- In this season, powdery scab was not a major issue at the trial sites;
 - » 90% of soil samples contained 'low risk' levels of pathogen DNA
 - » 74% of harvested tubers had no symptoms.
- Soil DNA testing was useful for predicting the risk of black dot disease developing on tubers
 - » Results confirmed that more than log 1.6 pg DNA / g soil is associated with high disease risk.
- Symptoms of common scab can occur in soils where the pathogen DNA is not detectable.
- Weather, cultivar and seed quality must always be considered in disease management decisions.



Figure 12. Common scab symptoms on potato tuber caused by *S. scabies*.

Common scab

In this assessment, DNA of *S. scabies* was only detected in one of the 72 soil samples tested across the five regions. However, in 7 out of 12 paddocks, assessed tubers showed varying levels of common scab symptoms, characterised by irregular, angular, and pitted scabs (Figure 12).

Peel samples taken from harvested tubers were analysed for the presence of *S. scabies* DNA (Figure 10). Samples from paddocks in Gingin and Baldivis did not show common scab symptoms in the visual assessment and were negative in the peel DNA analysis.

Varying levels of disease severities were detected in paddocks in Jindong, Myalup and Pemberton, ranging from low (<1 %) to as high as 3% mean

disease severity in the assessed samples (Figure 11).

The results suggest that soil inoculum was either not present or present at levels too low to be detected using the Predicta PT test for *S. scabies*. It is also possible the pathogen was introduced on infected seed. Variability in disease expression between individual quadrants within some paddocks may have been due to different cultivars planted.

CONCLUSION

This one-year study of potato tuber diseases in WA showed that soil monitoring tools can provide a better understanding of the disease risk in a paddock, assisting growers in management decisions. Other factors,

such as weather conditions that favour disease development and the use of good-quality seed, are critical factors that need to be incorporated into potato disease management.

Our evaluation was conducted on one hectare of a paddock. Expanding the sampling area and increasing the number of samples could show different distribution of pathogen inoculum levels and resultant diseases.

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POTATOLINK ON THE ROAD - OPTIMISING FERTILISER USE IN TASMANIA AND VICTORIA

FIELD WALK AT NORTH MOTTON (TASMANIA) DEMONSTRATION SITE

Efficient nutrient management remains a high priority for growers across Australia. By refining fertiliser application, growers can reduce waste, enhance profitability, and minimise environmental impact.

The PotatoLink demonstration trial in North Motton, Tasmania, is investigating how sap testing can inform fertiliser decisions for Innovator potatoes. The trial is examining various fertiliser rates, application timings (pre-spread, planting, and top-dress), and program methods (crop sampling vs. conventional) to evaluate their effects on yield, marketability, and profitability within a single season.

To bring these findings into practice, a field walk was held at the PotatoLink demonstration site, drawing growers eager to explore strategies for optimising fertiliser management in potato crops.

Hosted by PotatoLink's regional rep Tim Walker, the event provided an opportunity to see first-hand how different fertiliser rates and application timings have influenced crop growth so far.

The event provided an opportunity for growers and agronomists to hear details about the fertiliser applied at different stages – pre-spread, planting, and top-dress – and discussed how these variations could impact yield and costs.

Another key focus of the event was comparing two fertiliser management approaches: a crop sampling-based program versus a conventional method. By analysing the sap test results gathered so far, attendees

gained insights into how data-driven fertiliser decisions can enhance efficiency and reduce unnecessary input costs.

Throughout the field walk, participants engaged in discussions with agronomists and researchers, reviewing crop sampling results and examining how these findings were shaping ongoing fertiliser strategies.

"These events really help bring growers together, providing a platform to exchange experiences and discuss nutrient management approaches," Tim said.

"The field walks also really help us discuss the insights that we are learning from the trials. There has been a lot of interest and we are looking forward to doing yield digs and sharing the results" Tim added.



FIELD WALK AT DEAN (VICTORIA) DEMONSTRATION SITE

The PotatoLink demonstration site in Dean has been set up to explore strategies that optimise fertiliser use while maintaining or improving yield and tuber quality.

The trial is primarily focussed on nitrogen inhibitor-based fertilisers, assessing their impact on potato crop performance at different application rates.

It also compares a crop sampling-based responsive fertiliser program with a conventional fertiliser approach, evaluating their effectiveness in improving fertiliser efficiency and overall gross margins. A variety of fertiliser rates was tested, alongside differences in side dressing, with soil

and sap testing playing a crucial role in shaping the nutrition program.

In February, growers and industry representatives gathered at the site for a field walk, hosted by PotatoLink's regional rep Stuart Grigg, and Ryan Hall. The event provided an opportunity to discuss the progress of the trial, examine crop sampling results, and explore the practical implications of different fertiliser strategies.

Attendees gained firsthand insights into how nitrogen inhibitors are performing under field conditions and how a responsive fertiliser program – based on real-time crop sampling – compares with a conventional

program. Soil and sap test results were shared, highlighting nutrient availability and uptake trends across the different treatments.

Discussions also centred around optimising fertiliser inputs to navigate rising costs while maintaining high-quality potato production. The results so far suggest that targeted fertiliser management, guided by crop sampling, has the potential to improve efficiency without compromising yield or quality.

As the season is shortly coming to the end, harvest results will provide valuable data and insights for Victorian potato growers.

Stay tuned for more updates as the season progresses!



ACKNOWLEDGEMENTS

TASMANIA: The PotatoLink team would like to thank grower Coby Badcock for hosting the demonstration site and his committed efforts to the demonstration trial.

VICTORIA: The PotatoLink team would like to thank grower Kain Richardson for hosting the demonstration site and his committed efforts to the demonstration trial.

Dear Spud GP

I have had problems with early blight in the past. Lately I've heard that increasing the amount of nitrogen the crop gets can improve resistance. As early blight usually turns up late in the season, is it OK to just put on some extra nitrogen at planting, or should I wait until closer to when the disease turns up in the paddock and then apply?



ASK THE SPUD GP



Early blight (*Alternaria solani*) is indeed most likely to cause problems later in the season. Not only are mature plants less resistant to attack than younger ones, early blight is a 'polycyclic pathogen'. That means it completes several cycles of infection during the season, so levels of inoculum build up during the cropping cycle. It is most likely to be a problem in warm weather – good for potato plants, but also good for the fungus.

You are right that potato plants with high leaf nitrogen (N) levels are less susceptible to early blight than plants with low levels. It's not completely clear why this is so. It may just be that well fed plants are more vigorous, delaying changes associated with ageing. High levels of soluble solids in leaf sap have also been linked with both high N and late blight resistance.

Much of the early research on this topic simply examined the effects of different fertiliser rates at planting. While phosphorus and potassium

supplementation has had mixed results, increasing nitrogen (N) has consistently been shown to reduce disease severity¹. For example, MacKenzie² found that adding more N (approx. 30kg N/ha over optimum rates) could provide reasonable control of this disease.

Other researchers have suggested that using such high levels of N is cost inefficient, polluting, and fails to provide adequate disease control.

However, higher N does appear to increase the effectiveness of fungicides, so, strategic fungicide application plus fertilisation may be the best strategy³. Not relying entirely on fungicides can also help prevent development of resistance.

From here, it seemed logical that putting the N where it was needed

– directly into the leaves – could strengthen its anti-*Alternaria* effects. However, foliar sprays with urea and KNO₃ failed to reduce disease severity compared to untreated controls⁴. This may be because N assimilation is far more efficient through the roots than the leaves.

As N content within the leaves is the critical factor, fertiliser strategies need ensure it is there when needed. Abuley et al⁵ measured nitrate content, disease expression, and yield of potatoes fertilised with 200kg/ha N. The N was applied before planting, at emergence or with application split between planting, emergence and flowering.

Plants were inoculated with early blight using barley grains infested with *A. solani*, ensuring high disease pressure.

Application of N at emergence resulted in the highest overall nitrate levels in leaves. Splitting application between emergence and flowering also gave good results.

Nitrate levels were lower when N was only applied pre-planting; the authors suggest that much of this N is lost to the environment before the plant roots develop enough to take it up.

Potato plants that received their entire quotient of N pre-planting were more susceptible to early blight than those that received either split applications or a one-time application at emergence. However, in these trials, the researchers did not use any fungicides. As a result, high leaf N delayed the onset of disease, but could not prevent it.

While it is concluded that N alone cannot control early blight, split applications can reduce disease severity. Split N applications also help the plant take up more of the N available, can promote tuber formation, and may even increase yield – a true win-win!

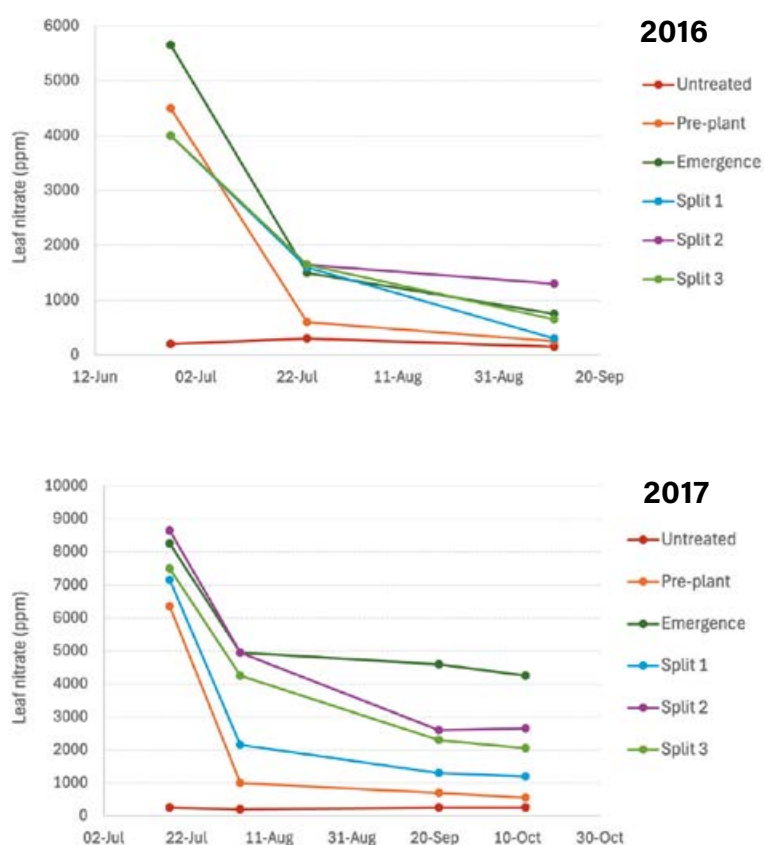


Figure 1. Leaf nitrate levels in potato plants grown over two seasons, with 200kg/Ha N applied pre-planting, at emergence or split between pre-planting and emergence (split 1) emergence and flowering (split 2) or pre-planting, emergence and flowering (split 3). No N was applied to untreated controls. High leaf N levels are associated with reduced development of early blight. From Abuley et al., 2018.

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FAREWELL AND THANK YOU PETER PHILP

THE POTATOLINK TEAM BIDS A FOND FAREWELL TO PETER PHILP

As our South Australian regional representative for the last four years, Peter's impact on the PotatoLink project and the broader South Australian potato industry has been significant.

Peter has been an invaluable part of the PotatoLink team, always committed to the project's success. His passion for knowledge-sharing extended beyond his official role, as he actively promoted project activities and fostered strong relationships with growers, industry stakeholders, and researchers alike.

Over his four years of involvement, Peter played a crucial role in delivering numerous industry events across key potato-growing regions, including Mount Gambier, Loxton, and Murray Bridge. His ability to build trust and rapport with local growers allowed him to tailor these events to address pressing industry challenges, ensuring that the expertise he brought in was relevant and impactful.

Peter also contributed significantly to this magazine, providing insightful content and innovative ideas,

always letting us know if an article would hit the mark (or not!). His deep understanding of the industry, spanning seed management, storage, disease control, production efficiencies, and input optimisation, was instrumental in shaping the educational and technical resources developed by the project.

Beyond South Australia, Peter maintained a keen awareness of broader industry trends, fostering collaboration and knowledge exchange between different potato-growing regions. His engagement with processors and the fresh sector gave him a unique perspective on how on-farm production practices influenced the entire supply chain, from paddock to plate.

One of Peter's standout contributions was his ability to connect international researchers with Australian growers. He played a key role in facilitating visits from global experts, ensuring that their insights were aligned with Australian growing conditions and farming systems. His ability to bridge international expertise with local industry needs has been invaluable to the project.

Peter's collaborative spirit and technical expertise provided an

essential sounding board for the PotatoLink team, ensuring that content remained relevant, practical, and scientifically sound. His efforts have contributed to tangible improvements in knowledge, skills, and practice adoption among South Australian potato growers.

As Peter embarks on his next adventure, the Applied Horticulture Research (AHR) team and the broader PotatoLink community extend their heartfelt thanks for his dedication and contributions. His work has left a lasting impact on the industry, and we wish him well in his future endeavours.



Dr Phil Wharton and Peter Philp at the WPC 2024





Next generation nematicide delivers long lasting and cost effective control

A valuable new tool in nematode management has arrived in Australia with the highly anticipated release of Velum® Prime by Bayer, a fast acting, long lasting nematicide that provides targeted control of plant-parasitic nematodes, while maintaining soil health.

Velum Prime offers growers a new mode of action to combat nematodes with extensive field trials across five Australian states that have demonstrated its effectiveness at safeguarding root and tuber vegetables including carrots, potatoes and sweet potatoes.

"Velum Prime's been a long time coming to Australia," Bayer Territory Business Manager for Horticulture, Darren Alexander, says.

"We already had registration in the United States and United Kingdom and the local trials have been incredibly positive."

Velum Prime's active ingredient fluopyram works by inhibiting complex II within the mitochondrial respiration chain in nematode cells, resulting in mortality.

"It is a different mode of action. There is no other registered nematicide that is working on the complex II mitochondria, so we're coming at the pest from a different angle," Darren says.

"When nematodes come into contact with fluopyram they aren't able to move on to the next stage of respiration, become paralysed and then subsequently die."

Classified as a Group N-3 nematicide and Group 7 fungicide, Velum Prime doesn't require specialist application equipment and can be applied as a broadcast spray, via trickle irrigation or directly in the furrow at planting.

"It was designed to be applied in soil and to target the juvenile stages of the nematode species prior to and at feeding on root tissue of a host plant," Damien Odgers, Bayer Crop Science National Sales Manager for Horticulture, says.

"Velum Prime is what we consider a new generation nematicide. This is important, because historically, growers in root and tuber vegetable crops have been using a range of other crop protection products, namely harsh organophosphate chemistries to control nematodes."

"These products aren't selective to just plant-parasitic nematode species, but also impact a range of beneficial microflora in soils.

"They've also had access to other tools such as soil fumigants, which are indiscriminate in the way they work.

Darren says Velum Prime is also highly residual. "It works by sitting in the soil, adhering to organic matter and soil particles, providing long lasting protection of root tissue as it's growing through the soil," he says.

Velum Prime was registered for use in August 2024, with strong demand from growers and agronomists who were ready and waiting to incorporate it into their nematode management systems, on the back of extensive field trials across Tasmania, Victoria, Queensland, South Australia and Western Australia.

"During the development phase in commercial demonstration trials, we measured the marketable yield improvements as a result of using Velum Prime in moderate to high pressure nematode locations," Damien says.



"Trials showed marketable yield benefits ranging between 5 and 20 percent against competitor products across the three main crops of sweet potato, potato and carrot.

Velum Prime forms part of Bayer's Root2Success offering, supporting growers from the ground up with a holistic approach to improving root and soil health.

"Root2Success is Bayer's global integrated solutions initiative, focused on enhancing root and soil health for growers," Darren Alexander says.

"In Australia, we're now offering growers a combination of three products from the Root2Success program; Emesto® Prime, Serenade® SOIL ACTIV and Velum Prime."

Emesto Prime is a Group 7 Rhizoctonia fungicide and Serenade SOIL ACTIV is a root colonising bacteria that helps plants access soil resources including improving water and nutrient absorption to support a healthier plant.

"Given its selectivity, Velum Prime is a very complimentary tool to the regenerative approach to growing food, and growers are looking for complimentary products to enhance, rather than antagonise that system," Damien Odgers adds.

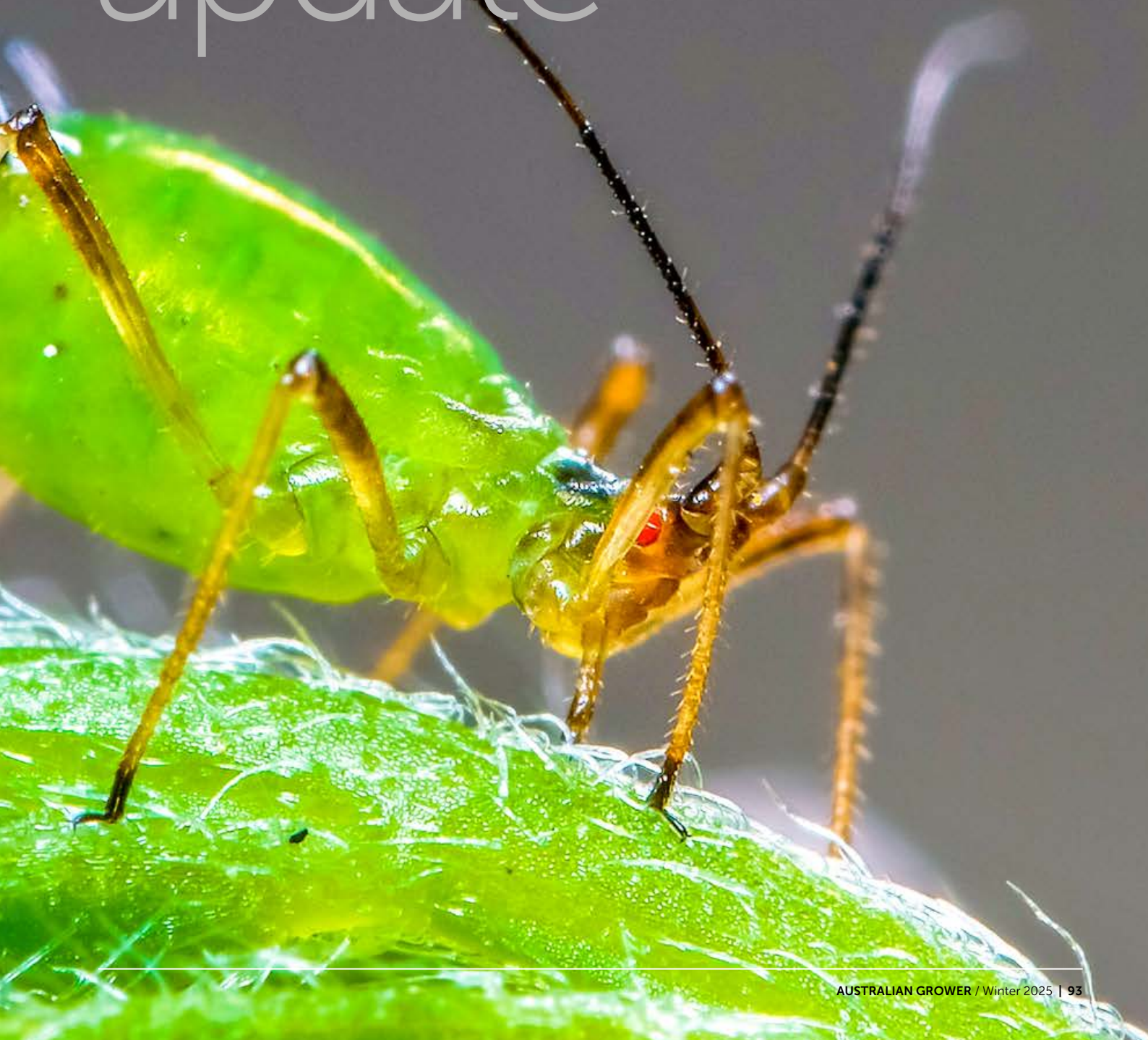
Velum®, Emesto® and Serenade® are Registered Trademarks of the Bayer Group.

Above. Bayer Business Development Manager - Horticulture Troy Mulcahy inspecting a SA Velum Prime trial in fresh market potatoes.

FIND OUT MORE

For further information on Velum Prime and its effectiveness in trials across the country, growers can contact their local Bayer representative. crop.bayer.com.au/find-a-rep

R&D + biosecurity update



Biosecurity

What is it all about anyway?



What you may be asked when you call the hotline

Just like when you are monitoring your crop for pests and diseases, if you suspect a new pest, collect as much information as you can about what you have seen, including:

- **What you found**
(e.g. wilting symptoms on the leaves of the crop)
- **When you found it**
(e.g. 9.00am this morning)
- **Where you found it**
(e.g. in the paddock by the dam)
- **What crop it was on**
(e.g. capsicum)
- **How many you saw, or how it has impacted the crop**
(describe the symptoms; e.g. the leaves are turning yellow and brown; I pulled up the roots and found them to be brown and stunted)
- **Anything else that catches your attention**
(e.g. there were more aphids than usual).

Reporting a biosecurity concern sets in motion a process designed to protect growers and keep the industry moving.

As a vegetable grower, or agronomist, it is likely that you have often been encouraged to 'report anything unusual' to the Exotic Plant Pest Hotline 1800 084 881. While the reluctance to report a new suspected exotic plant pest is understandable, reporting earlier may offer a greater chance of preventing a small, localised pest issue from becoming an industry wide problem. But what actually happens when a new pest is reported and confirmed? This article aims to explain the Australian biosecurity system and what it means for growers, particularly when a new pest is found.

Key points:

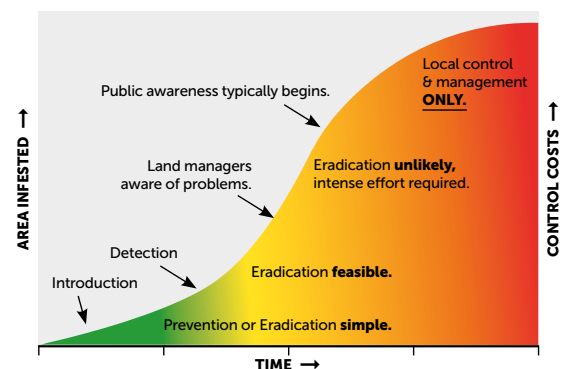
- Emergency responses, although run by the 'host state', are national and decision-making needs to consider both national and regional interests.
- AUSVEG is a signatory to the EPPRD and represents the vegetable, potato and onion industries during incursion responses.

- The site at which an exotic plant pest is found may be quarantined while activities are undertaken to establish how widespread the pest is.
- The CCEPP and NMG are responsible for making decisions about the response activities and costs.
- Response costs are shared between industry and government, depending on the impact of the pest on private and public sectors.
- Owner reimbursement costs are available to growers affected by response activities.
- Accurate record keeping is essential for claiming owner reimbursement costs.
- Having good biosecurity practices in place reduces the risk of a new pest coming onto your property.

Inset. After the largest agricultural biosecurity response in Australia's history, the efforts to eradicate varroa mite transitioned to management.

INVASION CURVE

Figure 1. The invasion curve shows what happens to a generalised pest population over time, after the introduction and establishment of a new pest into a new environment. ©Southwest Montana Science Partnership.



I've reported a pest that I have never seen before – what happens next?

When you call the Exotic Plant Pest Hotline (1800 084 881), your call is directed to the state or territory biosecurity agency for your region. You may be asked to send in photos or a sample, or biosecurity staff may ask to visit your property where the pest was found. All reports are investigated because it is better to have a false alarm than a failure to identify a serious plant pest or disease.

Samples of the suspect insect or disease are sent to a state diagnostic laboratory for identification and confirmation. It may take time to correctly diagnose the pest or disease and determine whether response or control actions are needed. Throughout this process and the duration of a response your personal information is not shared.

What happens at the site where the pest was found?

One of the biggest concerns is that the site at which a new pest is found may be quarantined – it may be your farm, your neighbour's farm or even the local community garden.

This means that an exclusion zone is set up and the movement of produce, host plants and other items may need to stop, with potential economic consequences for growers impacted by response activities.

The Emergency Plant Pest Response Deed (EPPRD) has provisions in place to reimburse growers for losses incurred because of response activities (keep reading to learn more about owner reimbursement costs (ORC)). It is also recognised that the stigma of being the 'infected farm' can also affect reputation and relationships.

Quarantine measures are implemented to reduce the risk of the pest from spreading any further and so that the actual extent of occurrence or spread of the pest can be determined. Understanding how widely the pest has spread will help to evaluate if eradication is feasible.

Who makes the decisions about what happens next?

If the result from the diagnostic laboratories confirm that the pest is indeed a new arrival to Australia, the state and federal governments as well as affected plant industries are notified through the Consultative Committee on Emergency Plant Pests (CCEPP).

Confirmation of the pest triggers a meeting of the CCEPP, who together with the National Management Group (NMG) are responsible for providing advice and agreement on the feasibility of eradication, developing response activities and agreeing on cost sharing. If it is agreed that eradication is feasible, then a response plan is developed. The development of the response plan is led by the biosecurity agency in the state where the pest was found, in consultation with other CCEPP members.

The state biosecurity agency leading the response will consult with the property owner and conduct tracing activities to determine where the pest came from and where it may have moved to. This will help to inform how far the pest may have spread, and what the potential is for eradication or management. Areas surrounding the first property on which the pest was detected may also be subject to quarantine measures and be checked for the presence or absence of the pest. The biology of pests or diseases can vary greatly, and this will influence how far and how quickly they could spread. For example, fall armyworm has been reported to fly several hundred kilometres in a night, making eradication very difficult. Where eradication is the goal, the response may require destruction of any crop or stored produce that could host or spread the pest. It may also require fallow periods. The details will differ depending on the pest and other factors specific to the incursion.

The lead agency together with the biosecurity representatives from Australian, state and territory governments, affected industries and Plant Health Australia, will continue to meet regularly through the CCEPP to progress the response.

If you are an affected vegetable, potato or onion grower, you will be represented in this process by AUSVEG, who will advocate on behalf of your industry as the signatory to the EPPRD.



Candidatus Liberibacter solanacearum (CLso), the cause of Zebra chip in potato, is not in Australia, but research and surveillance has taken place in case of its entry.

You may well ask: “Why should I report a new pest if there is a chance that my farm will be quarantined?” Conversely, is it worth the gamble that the pest might be manageable without official intervention?

What is an Emergency Plant Pest?

The EPPRD only applies for the eradication of pest that has been determined to meet the criteria of an emergency plant pest. A plant pest is an insect or an organism that causes a disease (for example, fungus, bacterium, virus, nematode) that has the potential to impact on crop production or the natural environment. Plant pests are considered 'emergency plant pests' (EPPs) when they are:

- Known to be a pest overseas but are not present in Australia.
- A variant of a pest already present in Australia
- An entirely new or unknown pest, or
- A pest that is present in some regions of Australia and is being controlled to minimise spread and manage impacts on market access.

In cases where there are measures in place to restrict movement of plant material and products within or between Australian regions, those states or regions in which a given pest does not occur may have area pest freedom and greater access to markets. International market access can also be affected by the presence or absence of some pests and diseases.

ACRONYMS

EPPRD – The Emergency Plant Pest Response Deed is an agreement between state and federal governments and plant industries that sets out the rules for how an emergency plant pest response is managed.

CCEPP – The Consultative Committee on Emergency Plant Pests is comprised of representatives from government and industry groups that have been identified as affected parties. Its role is to advise on technical activities and decisions about what should happen in the response.

NMG – The National Management Group is comprised of representatives from government and industry groups that have been identified as affected parties and is responsible for approving, or not approving, a response plan, including the budget and the application of cost-sharing between affected parties.



What happens next?

Once the lead agency has enough information to understand the size and nature of the new pest incursion, it can be determined whether a national eradication program will be undertaken.

The goal of responding is to eradicate the pest or disease and return to our 'proof of freedom' status, and if that isn't possible, determine the best options for managing the new pest, with the ultimate aim of getting the affected industries back to business as quickly as possible. The length of time that the response may take to achieve eradication will depend on the pest and the extent of its spread.

Who pays?

The budget for a response is determined and agreed upon by the CCEPP and NMG, respectively. The costs are divided between affected industries and governments, depending on the public and private benefits of eradicating the pest.

Individual industry contributions are based upon the value of the industry and the pest's impact rating for the industry. Where a pest is listed as high-impact for the vegetable industry, this means that the vegetable will contribute more to the cost sharing than an industry for which the pest is listed as a lower impact. Impact ratings for pests of the vegetable industry are determined during the development of the industry biosecurity plan. The cost-sharing process is administered by Plant Health Australia.

The EPPRD has a requirement that all funding parties remain engaged in cost sharing until the EPP eradication response is completed or no longer feasible. As a signatory to the EPPRD, the vegetable industry will remain involved in the response until the pest has been eradicated or it is determined that it is no longer possible to eradicate, and the plan transitions to management.

Owner reimbursement - what about the costs for my farming operation?

The EPPRD has an underlying principle that no one should be better or worse off due to a pest incursion. Therefore, the owner of a crop or property that is damaged or destroyed as a direct result of implementing an approved response plan may be eligible for reimbursement payments under the EPPRD.

These payments are known as owner reimbursement costs (ORCs). AUSVEG is a signatory to the EPPRD, meaning that directly affected vegetable, onion and potato growing businesses are eligible for ORCs to reimburse them for costs of any remediation actions that were taken during the incursion response.

When claiming ORCs, it is vital that you, as an affected growing business, have accurate records of your crop yield, earnings, and other business-related incomes and outgoings to provide as evidence of your loss of income or the value of your destroyed crop. You'll need these to demonstrate losses to the assessor and when submitting your claim for reimbursement. Once a claim is submitted, it will be reviewed by an independent assessor. AUSVEG can provide support during this process.

ORCs are a one-off payment, generally made at the end of the incursion response. You may need to wait some time before being reimbursed. Not all growers affected by an exotic pest incursion are entitled to claim ORCs and not all costs/losses incurred by a grower will form part of an ORC payment.

The Emergency Plant Pest Response Deed

A core component of the Australian plant biosecurity system is the Emergency Plant Pest Response Deed (EPPRD; often referred to as 'the Deed'), a legally binding agreement between the Australian Government, state and territory governments, national plant industry representative body signatories (including AUSVEG) and Plant Health Australia (PHA). The EPPRD provides a consistent, national approach for managing and funding responses to Emergency Plant Pest (EPP) incursions.

As a signatory to the EPPRD AUSVEG has several responsibilities that are either obligatory or are expected from its levy payers or other participants in the biosecurity continuum.

AUSVEG's obligations and expectations under the EPPRD, and as a member of PHA, include:

Obligatory

- A biosecurity statement published in the EPPRD
- Provide representatives to the CCEPP and NMG
- Staff trained in biosecurity matters surrounding the EPPRD and industry liaison
- Provide an owner reimbursement cost (ORC) framework to PHA
- Participate in PHA forums including annual general meetings
- Have an industry biosecurity plan.

Expected

- Support the use of on-farm biosecurity practices
- Work with regulators on matters relating to movement of produce within Australia
- Provide advocacy to government for levy payers on biosecurity policy
- Have arrangements in place to improve responses under the EPPRD
- Engage in suitable preparedness activities.



Eradication is not always possible. When fall armyworm was first reported in Australia, an assessment determined its eradication was not feasible.

Support during a response to a plant pest or disease

Being impacted by a biosecurity response can cause a great deal of stress and uncertainty. AUSVEG will support you by providing answers to questions and addressing any concerns you have about how the response is being conducted, and by liaising with the state lead agency and other relevant parties.

The lead agency will keep you informed of what actions you need to take and what is happening on your property. Through every stage of a response, it is important to keep up to date with the latest information as the situation and pace of the response can change. The Outbreak website (outbreak.gov.au) is a great resource to stay informed on the latest response information.

We're stronger together

If you're controlling the rabbits in your paddock but your neighbour isn't, it can get frustrating. The rabbits from your neighbour's farm come into yours, ignoring the boundary, even though you employ all the right management strategies to keep the rabbit population down.

We all need to work on biosecurity together as an industry. Not just in the case of exotic pests, but also to manage established pests and diseases. Biosecurity is inextricably linked to market access and trade and therefore underpins any industry that wants to be profitable and sustainable. By being prepared for the arrival of a new pest, you as a vegetable grower, and the vegetable industry as a whole, will be stronger and more competitive, even without a new pest arriving.

AUSVEG runs a number of programs to support vegetable growers to be prepared for and recover from pest incursions. For more information visit: ausveg.com.au/biosecurity-crop-protection.

What you can do now – before pests arrive?

- Check your crop and property regularly for pests and diseases. Don't ignore unusual symptoms. Record the results, even when nothing is found. Zeros are just as important as positive detections!
- Check out the **AUSVEG Farm Biosecurity Guide** to introduce good practices on your farm and reduce biosecurity risks.
- Familiarise yourself with the high-priority pests for the vegetable industry. Visit Plant Health Australia's resource centre to find out more: planthealthaustralia.com.au/resource/resource-centre
- Keep the **Exotic Plant Pest Hotline 1800 084 881** handy for all staff to see.
- Ensure your staff and contractors, including agronomists, are aware of their reporting obligations.

**EXOTIC PLANT PEST HOTLINE
1800 084 881**

The Vegetable industry biosecurity and business continuity strategy (VegWatch) is funded by Hort Innovation using the vegetable research and development levy and funds from the Australian Government.

Project: VG22004

Hort Innovation **VEGETABLE FUND**

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‘ToBRFV Resistant’ seal signals rugose resistance in Australia and New Zealand

Tomato Brown Rugose Fruit Virus (ToBRFV) has prompted a swift and concerted eradication program across Australia. It's an issue that Syngenta has observed globally, prompting the development of new tomato lines with intermediate resistance to ToBRFV, now available in Australia. While in no way intended to negate control efforts, this move illustrates a well-rounded approach to the challenge while ToBRFV eradication efforts continue.

Syngenta Vegetable Seeds launched a ‘ToBRFV Resistant’ seal in 2023 to indicate Tomato Brown Rugose Fruit Virus (ToBRFV) resistant varieties and now growers and nurseries will start seeing this seal down under!

The seal clearly marks our seed as ToBRFV resistant but is also highly symbolic of the quality we strive to maintain, encompassing general disease resistance, without compromising fruit quality, flavour, shelf life, consistency or transportability. It also symbolises our ongoing research for ever-better resistance trait that improve production.

ToBRFV resistance, fruit quality and flavour

Disease resistance alone isn't enough! Consumers have high expectations when it comes to flavour, and Syngenta is dedicated to protecting the flavour profiles consumers have come to know and love.

“As we continue to add new varieties to our lineup, we're making sure they still taste great,” said Dion Potter, JAK Territory Brand and Customer Head.

“Consumers love the taste of our tomatoes and choose them when they go to the grocery store, so with the introductions of new resistant varieties we want to make sure that growers can continue to deliver what consumers expect.”

“Growers can lose up to 70 percent of their produce due to the virus”. Potter who has also been the ANZ Solanaceae Portfolio Manager for many years and who visits

Europe yearly, further remarked “We're constantly looking for solutions to ToBRFV without compromising resistance to other critical diseases.”

Syngenta researchers are looking for the whole package – ToBRFV resistance without compromising resistance to other diseases, fruit quality, and flavour. The ToBRFV Resistant seal tells growers they're getting a full tomato package - whether it's leaf curl, pepino virus, tomato spot virus, or simply concerns about fruit colour and shelf life.

Continued research for new solutions against ToBRFV

The researchers at Syngenta are taking the resistance we currently have on the market and in progressing it into new varieties and new kinds of tomatoes. As these experts continue researching new solutions, they're committed to a stair-step approach to ToBRFV resistance, with each new mode of action discovered bringing a higher level of resistance than the last. **The reason is simple: viruses evolve.**

As researchers continue to seek new solutions, they're committed to a stair-step approach to ToBRFV resistance. This means each new mode of action commercialised will bring a higher level of resistance than the last because viruses evolve.

“We know the virus is changing and it can cause a lot of damage, especially in yield, impacting the plant and changing its behavior,” said Dion Potter. “Viruses

are unpredictable and hard to control.

The path to market with new resistance traits can take many unexpected turns but our investment in this field enables us to move at pace, with quality and customer satisfaction being priorities.

“We have intermediate resistance and have had it for several years – since 2020. But we're continuing to research many new varieties in the beef segments but also in mini cluster, saladette, beef cluster, and more,” he continued.

Discover our ToBRFV Information Centre to learn more virus mitigation tips

Syngenta Australia has created a ToBRFV Resource Centre as a central location for information about new ToBRFV resistant varieties for Australia and New Zealand, details on the virus and where it has spread, and phytosanitary tips.

The ToBRFV Resource Centre provides helpful tips for reducing transmission risk, including a video and downloadable checklist and infographic.

Stay up to date with hygiene tips, new variety announcements, and more by signing up!

Above R. Warehouse team and ToBRFV Seal.

FIND OUT MORE

For more information, please contact your local Syngenta representative or visit [Syngenta.com.au](https://www.syngenta.com.au)

FRONT LINE EXOTIC PEST PROFILE

Onion fly



Currently absent from Australia, the introduction of onion fly could lead to unmarketable crops and significant financial losses for growers.

The onion fly (*Delia antiqua*) is a major pest that infests onions, shallots, and leeks. Currently exotic to Australia, its introduction could severely impact the onion industry. To avert this risk, strong biosecurity measures are crucial for preventing its entry and establishment.

Known as the onion fly or onion maggot, *Delia antiqua* originates from Europe and is common throughout the Northern Hemisphere. Although its habitat is expected to increase, it tends to struggle in arid regions. This pest affects plants in the *Allium* family, such as onions and shallots. The onion fly can cause significant impact, compromising both crop yield and market value.

The onion fly lays its eggs near the base of these crops. Upon hatching, the larvae, or maggots, burrow into the developing bulbs and roots, causing rot and rendering them unsaleable. A single larva can destroy an average of 28 young onion seedlings during its development.

Its host range includes commercially important vegetables like onions, shallots, leeks, chives, and various bunching onions. South Australia and Tasmania are most at risk, as the largest producing states of onions in Australia.

Onion fly: underground attacks

The onion fly's presence is often indicated by damage from its burrowing larvae, which feed on roots and bulbs, creating tunnels that destroy plant tissue. This internal feeding can lead to secondary infections by bacteria and fungi, causing the plant to wilt, yellow and die.

In spring, adult flies lay small, white, striped eggs at base of onion plants. The hatching larvae move into the soil to feed on the roots and bulbs, disrupting nutrient uptake and causing significant damage. Once fully developed, they pupate in the soil and emerge as new adult flies, continuing the lifecycle. In warmer climates, multiple generations occur in one growing season, leading to unmarketable bulbs and plant death, especially in young seedlings.

Above. *Delia antiqua* perched on marsh spurge (*Euphorbia palustris*)
Image ©Dirk Daniel Mann. **Inset. Figure 1.** Onion damage yellowing and wilting.
Image ©Evtushkova Olga.



Above L-R. Figure 2. Onion bulb infested with onion fly larvae. Image ©Tomasz Klejdysz. Figure 3. *Delia petula*. Image ©Tomasz Klejdysz. Onion damage with collapsed leaves. Image ©Development of eCourse B.S (Agriculture).

...chemical options are primarily preventative. Once maggots are inside the bulb, rescue treatments are ineffective.

What to look out for

The first signs of an onion fly infestation is not the fly itself, but the visible decline of the onion plants. Keep an eye out for the following symptoms:

- Yellowing and wilting of the outer leaves (Figure 1).
- Drooping of healthy leaves.
- Plant collapse; in severe infestations, the weakened plant may be unable to support itself and collapse.
- Soft and rotten bulbs with a 'chewed' look and dark brown or black discolouration (Figure 2).
- Maggots may be visible on both the outside and inside of infested bulbs.
- Uneven crop growth with patches of wilting and dying plants.

How does it spread?

Preventing the spread of onion fly is crucial. The pest can be spread through:

- Contaminated soil: eggs, larvae or pupae can survive in soil. Movement of soil from infested areas poses a significant risk.
- Infested plant material: avoid moving unharvested plant material or cull onions, as these can harbour maggots.
- Poor biosecurity practices: inadequate hygiene when moving between production sites can unintentionally spread the pest.

How is it managed overseas?

Many overseas treatments rely on conventional (non-integrated pest management or IPM) insecticide treatments at planting in the furrow, furrow drench or seed treatment.

Cultural controls to manage onion flies effectively include multiple strategies such as crop rotation, delayed planting to help evade peak fly emergence periods, physical barriers to prevent adult flies from laying eggs, trap cropping, growing resistant or tolerant varieties like *Allium fistulosum* (spring onions or shallots) and practice soil disturbance by digging in autumn to destroy overwintering pupae. Lastly, regular monitoring and removal of infested plants and flowering weeds can help limit onion fly populations.

Biological control using natural enemies such as generalist predators, parasitoids and pathogens offers a more sustainable approach. Certain nematodes can effectively parasitise and kill onion fly larvae. Fungal pathogens can significantly impact adult fly populations under favourable conditions. However, these species are highly sensitive to fungicides and are difficult to produce commercially. Several beneficial insects have been reported to prey on onion fly at different stages of its lifecycle. Although, their impact as biological controls may be limited.

Currently, chemical options are primarily preventative. Once maggots are inside the bulb, rescue treatments are ineffective. Foliar cover sprays are ineffective towards adult flies since only a few are in the field at a given time, and they quickly lay eggs before moving on. Registered sprays for onions have a short duration of effectiveness, while seed treatments like coatings and 'at-plant' treatments are more effective.



Figure 4. *D. platura*.
Image ©Simon Hinkley and Ken Walker, PaDIL.



Figure 5. *D. antiqua*.
Image ©Caroline Harding, PaDIL.

KEY POINTS

- **Exotic threat:** onion fly (*D. antiqua*) is not in Australia but poses a major economic risk to the onion industry.
- **Damage:** larvae (maggots) burrow into bulbs and roots, causing rot and making crops unmarketable.
- **Signs:** look for wilting, yellowing plants, rotten bulbs, and visible maggots.
- **Spread:** spreads through contaminated soil, infested plants, and poor hygiene practices.
- **Differentiation:** distinguished from the existing *D. platura* pest by its five stripes (versus three) and focus on *Allium* crops.
- **Prevention is crucial:** Australia relies on preventing entry via strict biosecurity. Use clean planting sources, practice good hygiene ('come clean, go clean'), monitor crops closely.

Current management measures for established species

Australia has a similar established pest species called onion maggot or seed corn maggot (*Delia platura*) (Figure 3). While onion maggot also attacks *Allium* crops, it is polyphagous, feeding on a wider range of crops including corn, beans, brassicas, potatoes and spinach. The onion fly is more specialised on *Allium* crops.

Onion maggot (*D. platura*) flies are brownish grey with darker wings and have three dark stripes on their backs (Figure 4), whereas onion fly (*D. antiqua*) is yellowish grey with lighter wings and five stripes (Figure 5). Eggs, larvae and pupae are difficult to distinguish visually due to similar size and colour.

Management practices for onion fly are similar to those suggested for onion maggot, including promoting rapid seed germination, delaying sowing if conditions are unfavourable, allowing time for organic matter/manure to break down before planting, using seed treatments, and managing soil-dwelling predators.

What can you do to protect your property?

Preventing the onion fly from establishing in Australia is the most effective approach. Key actions include:

- **Recognise risk pathways:** understand how the pest could enter (imported plant material, contaminated soil/equipment).
- **Source clean planting material:** purchase seeds and seedlings only from reputable, certified suppliers. Do not illegally import soil or plant material (*Allium* bulbs, seedlings).
- **Implement farm biosecurity:** develop and enforce a farm biosecurity plan.
- **Practice 'come clean, go clean':** ensure all vehicles, equipment, tools, and footwear are cleaned thoroughly before entering and leaving production areas.
- **Control visitor access:** and ensure they follow hygiene protocols.
- **Monitor crops regularly:** train staff to recognise the symptoms of onion fly infestation and differentiate it from known pests like *D. platura*.
- **Integrated pest management (IPM):** incorporate cultural controls and encourage beneficial insects as part of a broader IPM strategy to build resilience.
- **Report suspected detections:** if you suspect you have found onion fly, report it immediately to the **Exotic Plant Pest Hotline on 1800 084 881**. Early detection is crucial for eradication.

Preventative biosecurity strategies are significantly cheaper and more effective than managing an established pest infestation long-term.



Four life stages of the Onion fly

Adults are 5-7mm in length, yellowish grey with five dark stripes on the thorax, light yellowish wings, black legs and antennae. Similar in appearance to a common house fly. ©Tomasz Klejdysz.

Eggs are elongated, white and about 1mm in length. Adult flies deposit eggs on the soil surface close to the stems. Females can lay 100-500 eggs during their lifetime. ©eCourse B.S (Agriculture).

Larvae (maggots) are tapered and creamy-white in colour and 8-10mm in size upon reaching maturity. ©Bayer Crop Science UK

Pupae are oval-shaped, reddish-brown to dark brown, and about 6-7mm long. Pupation occurs in the soil.

©Meigen, 1826. Bugwood.org



Muir's expanding innovation and modernisation to Grow Forward together with our Australian Hort growers

With the goal of simplicity and productivity across all business and customer facing activities, Muir's is intent on driving long-term growth and profitability for its clients.

Having been in the role for almost a year now, General Manager Muir's - James Muir is emphasising the importance of meeting farmers' needs now and for future generations.

"As we've said for a while, we are making a deliberate shift in how we approach our Branch network, product portfolio and agronomy services to best support the long-term prosperity of growers and the broader Australian horticulture sector."

"Our priorities are grower profitability, value-creation, industry support and future-proofing our industry to stay ahead of market needs.

"An integrated modernised and expansionary approach is key to this.

"While we also look ahead to what's coming down the pipeline and category intelligence, our growers are importantly focused on their immediate needs.

"We need to make sure we're supporting both."

Muir's portfolio spans pre-planting to post-harvest solutions for a diversity of horticulture and broadacre crop segments. The company is working to expand both existing and new market opportunities, with its national network of locations and expert technical and commercial team pivotal for delivering value to growers.

"We have a truly Australian national footprint with the recent transition of

Serve-Ag to Muir's, along with several new Branch sites that have enhanced our network, particularly in broadacre cropping regions such as Corrigin in Western Australia and growth regions," Mr Muir said.

"It means we work as one large team, collaborating across all our locations and crop segments. It enhances our ability to invest in industry expertise, leadership and integrated support.

"And we are also focussed on ensuring it is easier to engage with us, deliver effective solutions with streamlined business processes, order tracking and greater use of two-way digital comms to simplify operations."

Focussed on the sustainable growth of Australian agriculture, our company is also partnering with the Australian Packaging Covenant Organisation (APCO), BagMuster and DrumMuster on full product lifecycle initiatives, as well as providing significant ongoing local and industry sponsorships.

"I really believe it is incumbent on Muir's, with nearly 100 years of experience and leadership in Australian ag retail, to share our knowledge, expertise and reach in support of the next generation. *Together we all Grow Forward.*

Partnering for success

This forward-thinking approach is supported by close relationships with global R&D companies and international partners, enabling Muir's to develop and distribute innovative products tailored to Australian growers.

"Our product development programs are aligned to what we believe will be global value-led growth categories, with

defined commercial opportunities for our customers," Mr Muir said.

"This includes the development of sustainable nutrition, biologicals, yield enhancements, organics and natural pest solution products.

"We are engaged with drone application and soil monitoring technologies and are helping to develop fertiliser products with new coatings, enzymes and additives for improved nutrient efficiency.

"These complementary activities work both independently and in synergy to address grower challenges and opportunities," Mr Muir noted.

"Innovations that help them use fewer inputs while achieving the same results can enhance both their profitability and sustainability.

"We will continue to leverage our reach and agronomic skills of our expert staff for the benefit of our customers and partners.

"Supporting change and innovation across the industry is a challenge we embrace. Long Live Farming."

About Muir's

Muir's is a proudly Australian-owned fourth generation family business delivering innovation in products, services and expertise to help local agribusinesses grow and flourish. Through our national network of specialist staff, we create value for growers by improving farming efficiency, profitability and sustainability, so that the next generation can continue to Grow Forward®.

FIND OUT MORE

For more information visit muirs.co

AUSVEG

state update



NORTHERN TERRITORY

On 6-7 April 2025, the Northern Territory Farmers Association held the 6th Northern Australia Food Futures Conference (NAFF) in Darwin NT. NAFF brought together over 400 delegates and 70 national and international speakers from industry, research, government, and the private sector to discuss innovative agribusiness approaches under the theme '*Innovative Agribusiness in Northern Australia: Nurturing Natural Assets for Future Growth*'.

The event (pictured above) featured comprehensive coverage of both established and emerging agricultural sectors across Australia's northern states and regions, through engaging workshops, keynote, and plenary sessions. The conference had a revised two-day format as well as the Welcome Food Futures Conference Welcome Reception (held at Parliament House, hosted by the Minister of Lands, Planning and Environment, The Honourable Joshua Burgoyne MLA), the Elders 'Taste of the Territory' Cocktail Party and ancillary events.

Another key feature of the conference was the Harvest Table where attendees could try local produce supplied by local growers. Over the two days the Harvest Table featured: gold and white dragonfruit, rio red grapefruit, banana flower salad, pomelos, dried mango, and a non-alcoholic beverage with native ingredients. The Harvest Table also showcased locally produced vegetables such as okra, snake bean, chillies, Asian melons and much more.

If you are someone who works in, or is interested in northern agricultural development, I highly recommend attending the next NAFF conference held in 2027 in Darwin, NT. Everyone you need to know will be there, discussing everything you need to know; don't miss out!

Mariah Maughan | NT Farmers Association
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NEW SOUTH WALES

The horticulture sector is facing no shortage of challenges, and the NSW Farmers' Horticulture Committee has been hard at work advocating for better outcomes for industry through various activities.

Progress on our competition priorities continues, with the Australian Competition and Consumer Commission delivering its final report into the nation's supermarket sector in April this year.

This report confirmed that Australia's grocery giants had continued to increase their average product margins over the past five financial years, becoming among the most profitable supermarkets globally by pushing prices up at the checkout and down at the farmgate.

Recommending the introduction of measures for greater price transparency, a stronger Food and Grocery Code, and more fairness for farmers, this investigation confirmed what growers had been experiencing for decades.

Action must be taken to implement the report recommendations as soon as possible, but NSW Farmers notes that this report is not enough to address the ongoing profit push practices within the grocery sector.

A focus on farmers and the creation of tangible, effective measures such as divestiture powers is necessary to ensure fairer prices and behaviour from our nation's supermarkets.

Furthermore, work is also needed to improve and expand the PALM scheme, to ensure the horticulture workforce can grow strong and sustainable.

Recently, the Government extended the current averaging of minimum hours obligation to PALM scheme workers to 31 March 2026, instead of the originally planned end date of 30 June 2025. This means PALM scheme employers of short-term workers can continue to average the minimum work requirement over four weeks, ensuring at least 120 hours within that period.

While this is an improvement to the initial Government-proposed requirement of 30 hours of minimum work guarantee per week, this requirement remains challenging for some growers. NSW Farmers continues to work with and support the National Farmers' Federation in advocating for further improvements to the PALM scheme to better support industry needs, and we hope to share more updates in this space soon.

Meanwhile, NSW Farmers' Horticulture Committee also continues to engage with AUSVEG and the NSW Government on tomato brown rugose fruit virus (ToBRFV), since the initial detection in South Australia and subsequent detection in Victoria.

During the recent federal election, NSW Farmers conducted a program of activity to advocate for stronger, more sustainable biosecurity funding models, to ensure industry could be protected from threats such as ToBRFV into the future.

This work will continue to be one of NSW Farmers' priorities as we continue to monitor ToBRV and other biosecurity threats. Building a stronger future for farmers in the horticulture space is our focus, but this can only be achieved through continued efforts to improve our biosecurity, workforce sustainability and competition landscape.

NSW Farmers advocates for a profitable and sustainable New South Wales farming sector and you can find out more, including how to become a member, via our website nswfarmers.org.au.

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VICTORIA

Victoria's vegetable growers continue to demonstrate remarkable resilience in the face of mounting pressures. This season has brought relentless dry conditions, adding further strain to a sector already grappling with rising production costs, tightening margins, workforce shortages, and escalating regulatory demands. Many growers across the state are being forced to make hard decisions as input costs climb and weather patterns remain unpredictable.

Despite these challenges, the determination of Victorian growers remains unwavering—and this spirit was proudly celebrated at the 2025 AUSVEG VIC & Muirs Awards for Excellence, held earlier this month at Rydges Melbourne.

With over 250 growers, industry leaders, and stakeholders in attendance, the evening served as a powerful reminder of the strength and innovation driving Victoria's vegetable sector. It was a night to acknowledge outstanding individuals and businesses who are leading by example, finding solutions, and contributing to a more sustainable and connected industry.

2025 AWARD WINNERS

- **Muir's**
Vegetable Farm of the Year Award
Tripod Farms
- **Butler Market Gardens**
Environmental & Sustainability Award
Flavorite
- **Visy**
Young Person in Horticulture Award
Dean Gazzola, Gazzola Farms
- **Boomaroo Nurseries**
Women in Horticulture Award
Jill Briggs, Affectus
- **Elders Community Stewardship Award**
Matt Zagami, AvaGrow Farms
- **Hort Innovation R&D**
Adoption and Industry Impact Award
Nick Taranto, Taranto Farms
- **VEG Education**
Cultivating Talent & Industry Awareness Award
Matt Stewart, Australian Processing Tomato Research Council.



These recipients reflect the diversity, talent, and commitment within our industry from research & adoption to young leaders and community-minded operators. Their achievements offer inspiration during what has been a tough season for many, and AUSVEG VIC congratulates each of them on their contribution to our sector.

As we continue to advocate for support and practical solutions for the issues facing growers, celebrating our industry's best and brightest provides a much-needed opportunity to come together, share ideas, and recognise the hard work behind Australia's vegetable supply.

For more information on our advocacy efforts or to get involved with AUSVEG VIC, visit ausvegvic.com.au or contact us at info@ausvegvic.com.au.

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Understanding how your levy works

It is Hort Innovation's job to work with industry to invest the vegetable, potato and onion R&D levies and Australian Government contributions into initiatives to help growers be as productive and profitable as possible, through the Hort Innovation Levy Funds.

Research and development (R&D) levies are payable on potatoes, vegetables and onions that are produced in Australia. These levies are collected by the Australian Government and then entrusted to Hort Innovation. It is then Hort Innovation's responsibility to work with industry to invest the levies – together with Australian Government funds into strategic R&D initiatives.

How are levy investment decisions made?

Investments specific to Hort Innovation are guided by an industry's Strategic Investment Plan (SIP) and Annual Investment Plan (AIP). SIPs provide an overarching roadmap for industry to follow, and AIPs detail how levy dollars will be spent each year to achieve industry goals.

What is the Strategic Investment Plan?

The SIP is the roadmap that helps guide Hort Innovation's oversight and management of investment programs.

The SIP lays the foundation for decision making in levy investments and represents the balanced interests of the industry. The most important function of the SIP is to make sure that levy investment decisions align with industry priorities. In 2021, SIPs were refreshed to reflect the current needs of the respective industries. The refresh involved close consultation with growers, industry participants and the wider research community in each relevant sector.

The SIP details the industry's strategic goals centred around four outcome areas:

- industry supply, productivity and sustainability;
- demand creation;
- extension and capability;
- business insights.

Under each of those outcomes, there are industry specific strategies and key performance indicators that provide guidance on how industry will work towards achieving the outcomes.

Where a previous SIP is available, a performance report has been developed to demonstrate how investments delivered generated impact for growers.

The reports provide an overview of key achievements delivered through each levy investment, and how they relate to the industry's SIP outcomes and strategies. While this performance report provides a five-year review of the vegetable SIP 2017-2021, going forward an annual performance report will be provided for the vegetable SIP 2022-2026.

R&D LEVY RATES

Potatoes

48cents
PER TONNE

Unprocessed Potatoes

Vegetables

0.485%

of the gross sale value at
the first point of sale

Onions R&D AT

\$2.90
PER TONNE

marketing at \$1.00 per tonne

Hort Innovation POTATO – FRESH FUND

Hort Innovation VEGETABLE FUND

Hort Innovation ONION FUND

You can find full details on the levy rate, plus information on how to lodge a return and make a payment with the Department of Agriculture, Fisheries and Forestry, on the government website at: agriculture.gov.au/agriculture-land/farm-food-drought/levies/rates#horticulture.

LEVY-FUNDED COMMUNICATIONS PROGRAMS

Australian onion industry communications (VN21000); Vegetable industry communications program (VG22000); PotatoLink, Australian potato industry communication and extension project (PT20000).

	OUTCOME 1	OUTCOME 2	OUTCOME 3	OUTCOME 4
	Extension and capability	Industry supply, productivity & sustainability	Demand creation	Business insights
	To manage knowledge, relationships, systems and processes required to communicate effectively with internal and external stakeholders	To accelerate the application of production practices that optimise returns and reduce risk to growers	To maintain and strengthen consumer demand as the foundation for sustainable expansion of production and consumption in domestic and international markets	To deliver data and insights that is foundational to achieving success in the other three outcome areas of demand creation – supply, productivity and sustainability as well as extension and capability
POTATOES 	A change in knowledge, attitude, skills, aspiration (KASA) and practice for grower/industry profitability and sustainability through use of best practice and innovation. - Growers, value chain, media and governments being well informed on industry initiatives and achievements as a vital part of regional communities and networks. - Increased on-farm use of R&D outputs which will build a more resilient industry in addition to improved networks and cross-industry collaboration. - Proactive strategic and evidence-based decision making in businesses and for industry on investment, priorities and risk management.	Accelerating widespread use of existing and new R&D findings and proven management practices that will help growers to reduce the costs and impacts associated with pests, weeds and diseases. - Advances in productivity and biosecurity through a proactive and prepared industry. - New knowledge and understanding of sustainable production systems for Australian potato growers including precision inputs, management of salinity, enhanced soil health and improved water and nutrient use efficiency. - Proactively monitoring potential crop protection regulatory threats and having access to a broader suite of effective, socially acceptable and environmentally sound crop protection solutions.	Support product positioning with consistent quality, evidence of beneficial product nutrition attributes and responsible industry production practices. Identify and prioritise export and domestic market niches where there is demand and growth potential for competitive supply of quality Australian fresh potatoes.	Achieving the outcome will involve reliable baseline data and analysis to provide insights and understand current and emerging trends. Key investments will support the provision of consumer knowledge and tracking, trade data and independent reviews to enable better decision-making process at industry level and individual businesses.
VEGETABLES 	A change in knowledge, attitude, skill, aspiration and practice for grower/industry profitability and sustainability through use of best practice and innovation - Maintaining and improving industry cohesiveness, with the majority of businesses and the industry supply chain actively engaged in implementation of this strategy; - Growers, supply chain, media and governments being well-informed on industry initiatives and achievements as a vital part of regional communities and networks; - Increased on-farm use of R&D outcomes that will build a stronger, more resilient industry – in addition to improved networks and cross-industry collaboration; - Proactive strategic and evidence-based decision making in businesses and for industry on investment, priorities and risk management.	New knowledge and understanding of sustainable production systems for Australian vegetable growers including enhanced soil health, improved water and nutrient use efficiency, precision inputs and labour use efficiency; - Responding to environmental change and climate variability; - Advances in biosecurity and the management of pests and diseases through a proactive and prepared industry; - Optimising the supply chain to improve quality and traceability, as well as reduce wastage and improve sustainability of vegetable production systems; - Improvements in protected cropping and intensive production technologies; - Proactively monitoring potential crop protection regulatory threats and having access to a broader suite of effective, socially acceptable and environmentally sound crop protection solution.	Grow the value of Australian vegetable exports by supporting industry to market premium products, targeting higher value market segments; - Articulate the value proposition for Australian vegetables and pursue more targeted market and channel growth opportunities; - Develop strong relationships across the supply chain with a shared goal to grow the category; - Enhance opportunities for value-adding and packaging; - Improve stakeholder engagement with the foodservice sector and the education of health benefits to consumers.	Achieving the outcome will involve reliable baseline data and analysis to provide insights and understanding of current and emerging trends. Key investments will support the provision of consumer knowledge and tracking, access to trade data, production statistics, forecasting and independent reviews to enable better decision making process at industry level and individual businesses.

	OUTCOME 1	OUTCOME 2	OUTCOME 3	OUTCOME 4
	Extension and capability	Industry supply, productivity & sustainability	Demand creation	Business insights
ONIONS 	Increasing knowledge, attitude, skills, aspiration (KASA) and practice for grower and industry profitability and sustainability through use of best practices and innovation • Maintaining and improving industry cohesiveness, with most businesses and the industry supply chain actively engaged • Growers, value chain, media and governments being well informed on industry initiatives and achievements as a vital part of regional communities and networks • Increased on-farm use of R&D outcomes which will build a stronger, more resilient industry, in addition to improved networks and cross-industry collaboration • Proactive strategic and evidence-based decision-making in businesses and for industry on investment, priorities and risk management.	Developing fit-for-purpose sustainable pest and disease management strategies • Biosecurity awareness and preparedness • Continuous improvement in soil health • Improved input management that reduces costs while maintaining yield and quality • Proactively monitoring potential crop protection regulatory threats and having access to a broader suite of effective, socially acceptable and environmentally sound crop protection solutions.	Broaden consumer awareness so that onions are more top of mind and purchased more frequently • Develop strong relationships across the supply chain with a shared goal to grow the category • Identify and prioritise domestic and international market niches (market segmentation) where there is demand and growth potential for competitive supply of quality Australian onions.	Achieving the outcome will involve reliable baseline data and analysis to provide insights and understand current and emerging trends. Key investments will support the provision of consumer knowledge and tracking, trade data, production statistics, and forecasting, benchmarking and independent reviews to enable better decision-making process at industry level and individual businesses.

What is the Annual Investment Plan?

While a SIP provides an oversight of investment over the next five years, the AIP explains how levy funds are going to be invested over a 12 month period.

AIPs are developed each year by Hort Innovation, informed by the SIP and industry consultation, and then discussed with the industry SIAP for feedback and prioritisation. Investment decisions will be guided by the industry SIP and prioritised based on potential industry impact, as well as availability of levy funds.

The AIP provides detailed information on:

- Funding availability
- How the industry is investing against their SIP outcomes
- Details on current investments across R&D.

Where do investment ideas come from?

There are many avenues that investment ideas come through – such as growers, delivery partners, previous projects, research networks, industry bodies, regional extension plans, and extension personnel. Before any ideas are progressed, Hort Innovation will investigate whether investment aligns with the SIP and whether investment is needed in this area.

How are investments prioritised?

To gain industry insights for strategic levy investments, Hort Innovation consults with growers through the industry Strategic Investment Advisory Panel (SIAP).

Hort Innovation develops draft investment recommendations based on investment ideas that are aligned to the SIP. Each recommendation includes high-level information on the aims of the project, outcomes, deliverables and budget.

The recommendations are then taken to the relevant advisory panel for feedback and prioritisation based on potential impact and available funding. Details of projects that will be progressing are then featured in the AIP. The SIAP consists of supply-chain stakeholders from the relevant industries, most of whom are levy-paying growers. Panels also include industry representative body representation and, where applicable, a lead agency representative from within the National Horticulture Research Network. The SIAP is in place to discuss investment ideas, in order to provide advice to Hort Innovation on potential levy investments. The advice they give is guided by the industry SIP. The SIAP provides a vital link between meeting the priorities of industry and helping Hort Innovation to make decisions on how, where and when investments need to be made.

How are investments progressed?

After the investment has been prioritised, it's then up to Hort Innovation to get the project up and running. This involves a tender process where the best delivery partner is chosen to undertake the project. Each delivery partner needs to submit regular milestones that report on their progress and at the end of each investment, a final report is produced that is made available to industry on what the project has achieved.

How to keep track of investments

Investments in the Hort Innovation Fresh Potato; Onion Fund and Vegetable Fund are detailed in the Your Investments page of Hort Innovation's website. Resources that are produced by the projects – such as fact sheets and guides – are also available through the Research reports and more page. Hort Innovation also sends alerts about project updates to its members.

Paying a levy doesn't automatically make you a Hort Innovation member, but signing up is free. The levy-funded communications programs, also provides regular information on levy-funded activity.

HEAT AND CONTROL

Size reduction equipment for fresh produce



A nutritious alternative to traditional grain-based pasta, vegetable noodles are trending as an easy way to increase vegetable intake.

Industrial size reduction equipment is crucial in the food industry, offering the precision needed to slice, dice, cut, granulate, and shred various food products. This equipment ensures ingredients are consistently shaped and sized, enhancing uniformity and improving the efficiency of subsequent processing stages. Industry-leading equipment enables vegetable processors to produce popular cuts found in supermarkets, restaurants and fast-food meals.

Ready-to-eat vegetables and fruit

Innovative size reduction equipment is helping fruit and vegetable processors meet the growing consumer demand for pre-cut fresh and frozen vegetables. These high-performance cutting systems deliver clean, precise cuts that minimise moisture release and extend shelf life — a key advantage for both fresh and frozen applications.

Innovative cutting solutions

As demand grows for convenient, healthy eating options, processors are using creative cuts to provide eye catching, ready-to-use formats that elevate the consumer experience — from vibrant meal kits to quick prep sides. For example, zucchini and squash can be sliced into long, noodle-like strips, while beets and carrots can be transformed into playful bow tie shapes, moving beyond conventional straight cuts.

Additionally, this equipment helps processors increase their yields by repurposing previously discarded vegetable waste to create products such as juice or potato hash browns.

Understanding produce characteristics

Choosing the right equipment for vegetable and fruit processing hinges on understanding the characteristics of the produce. Some ingredients, like those

with higher density or structural fragility, are best processed using belt-fed systems where cutting is synchronised with belt speed — ideal for slicing leafy vegetables. Others, which are less delicate, may be more suited to gravity feeding.

Key factors to consider include density, structural fragility, temperature, and flowability. These considerations ensure you select equipment that maximises efficiency and maintains product quality. With a solid understanding of produce characteristics, you can select the most suitable equipment for efficient and precise processing.

Urschel a global leader in size reduction

Urschel is widely recognised as a pioneer in food cutting technology, with their equipment used globally by food processors. In Australia, Heat and Control exclusively represents Urschel, drawing on over 75 years of expertise in helping customers choose the right equipment. If you're interested in size reduction solutions for your fresh produce — contact them to arrange a free test cut of your product and they'll help you to identify the best Urschel machine for your production line.

Let's review two of Urschel's most innovative solutions for fresh produce.

Slicers

Belt-Fed, Wheel Slicer: A belt-fed, wheel slicer delivers produce onto two high-speed feed belts that form a 'V'-shaped trough. These belts are synchronised with a rotating slicing wheel to ensure consistent advancement of the product. Knives under tension, serving as spokes, support the wheel's rim and are slightly twisted to create a uniform pitch from hub to rim.

The TranSlicer™ by Urschel exemplifies this type of machine, which is well-suited for slicing leafy vegetables such as romaine, iceberg, kale, radicchio, cabbage, spinach,

celery, cucumbers, eggplant, honeydew, cantaloupe, and leek. Knife pitch helps pull the product through the wheel, ensuring precise slice thickness without crushing.

Slices are released into a sloped discharge chute to reduce speed before exiting the machine. This slicer handles firm and leafy products up to certain diameters, ideal for elongated items that benefit from proper orientation, minimising waste. For example, slicing carrots into 4.8mm flat slices can achieve capacities of 4,500 to 5,500kg per hour, while cucumbers at the same thickness can reach 3,600 to 4,500kg per hour.

Comminution Mincer/Slicer: In this type of slicer, produce is guided to a high-speed, rotating impeller within the cutting head. The impeller's centrifugal force propels the produce outward past the cutting edges of a stationary reduction head. These machines are used for dry, paste, and liquid size reduction applications, including purees for fruit juices and fruits and vegetables for baby food or soups. The Comitrol™ by Urschel is a great example of equipment suited for such applications.

Urschel Comitrol is used for dry, paste, and liquid size reduction applications, including purees for fruit juices and fruits and vegetables for baby food or soups.



FIND OUT MORE

For more information get in touch via info@heatandcontrol.com or heatandcontrol.com



vegnet update



National Vegetable Extension Network

VegNET

AUSVEG

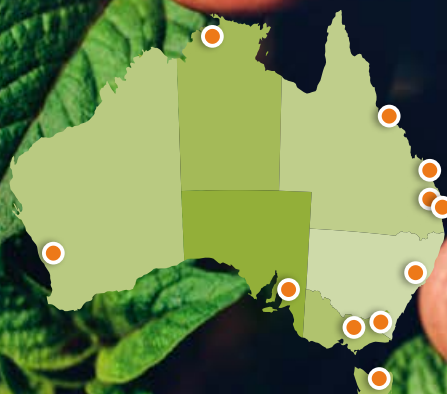
**Hort
Innovation**

**VEGETABLE
FUND**

**Hort
Innovation**

**ONION
FUND**

VegNET overview



VegNET is the vegetable and onion industry extension program that is run by growers, for growers and delivered by AUSVEG.

The program aims to keep Australian vegetable and onion growers informed about current R&D activities, results and resources – supporting the adoption of industry best practice and bolstering vegetable and onion productivity and profitability in key growing areas across the country.

Coordinated nationally by AUSVEG, VegNET is delivered 'on-the ground' by regional development officers (RDOs) in key growing regions who are responsible for developing and executing regional extension plans.

A critical step in ensuring growers receive assistance is the identification of each region's key priority issues, resources and connections requirements.

The most common challenges identified in consultation with industry are:

- Water (availability, quality and cost)
- Labour (availability, awards, HR and skills)
- Input costs
- Biosecurity
- Pest management
- Market development (including export)
- Post-harvest and marketing
- Urban encroachment
- Social license (environmental impact and chemical (mis)usage)
- Business management

Now in **Phase Three**, the VegNET program is running with RDOs based in organisations with strong grower networks in vegetable and onion production regions.

The program is overseen by a National Coordinator, who works with each regional group to ensure growers have consistent access to an industry-focused extension program that will put their needs first in their efforts to be productive, profitable and more competitive in an ever-increasingly global marketplace.

In 2016 Hort Innovation invested in 10 regional capacity building projects to effectively transfer R&D information to vegetable growers through regionally-based extension projects and associated coordination and training projects. These projects were contracted to delivery partners based in the ten major vegetable growing regions and were unified under a national brand – VegNET.

Phase One The first phase of VegNET finished in early 2020, with the regional development officers (RDOs) delivering R&D awareness and extension activities in their geographical regions.

Phase Two The second phase of VegNET finished in September 2021, and resulted in each region developing regional priority areas for extension. These regional priorities were collated into national priority areas to inform a national extension program that is nationally-consistent and regionally-specific.

VegNET is funded by Hort Innovation, using the vegetable and onion research and development levies and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

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VEGNET
National
UPDATE

2025 Northern Australia Food Futures Conference



Above L-R. It was great to see some of the team from Plant Health Australia, including CEO Sarah Corcoran and National Coordinator VegNET Cherry Emerick.

Mariah Maughan setting up the Harvest

FIND OUT MORE

Please contact Cherry Emerick AUSVEG on 0418 389 680 or email cherry.emerick@ausveg.com.au

VegNET 3.0 is funded by Hort Innovation using the vegetable and onion research and development levies and contributions from the Australian Government.
Project: VG21000

Hort Innovation VEGETABLE FUND

Hort Innovation ONION FUND

The Northern Australia Food Futures Conference 2025, Australia's leading event on agricultural development in the north, was held at the Darwin Convention Centre in early April, bringing together industry stakeholders to explore new opportunities for northern agriculture.

The biennial conference was presented by the NT Farmers Association in collaboration with AgForce Queensland, the Ord River District Co-operative, and the Kimberley Pilbara Cattlemen's Association. AUSVEG and Hort Innovation were also proud sponsors of the event.

The sixth Northern Australia Food Futures Conference convened over 400 delegates and 70 esteemed national and international speakers from across industry, research, government, and the private sector.

Under the theme 'Innovative Agribusiness in Northern Australia: Nurturing Natural Assets for Future Growth', the conference served as a platform for forward-thinking discussions and strategic insights into the region's agricultural future.

As the National Coordinator for VegNET, it was a privilege to be able to attend this conference and have the opportunity to talk to growers and organisations from the country's north to further collaborate and gain a stronger understanding of their needs.

This year's event featured an enriched program, offering comprehensive coverage of both established and emerging agricultural sectors through keynote addresses and plenary sessions. The revised two-day format provided an engaging experience, fostering collaboration and knowledge-sharing among participants.

A personal highlight for me was not only to hear Ronni Kahn from OzHarvest speak about her journey in collaboration and innovation, but to meet her in person. She's such an inspirational woman, full of passion for what she does.

Attendees also enjoyed a series of networking opportunities, including the Welcome Food Futures Conference Reception at Parliament House in Darwin, hosted by the NT Minister of Lands, Planning, and Environment, The Honourable Joshua Burgoyne MLA, as well as the Elders 'Taste of the Territory' Cocktail Party and various ancillary events. These gatherings celebrated the rich agricultural potential of northern Australia while facilitating valuable connections across the sector.

With an emphasis on innovation, sustainability, and growth, the conference reinforced its role as a vital forum for shaping the future of agribusiness in the region.

Top. The team from Centrefarm Aboriginal Horticulture Ltd, based north of Alice Springs, with VegNET Regional Development Officer Mariah Maughan.

VEGNET

Northern Territory

REGIONAL UPDATE

All things root-knot nematodes

A new program to identify root-knot nematodes in the NT is already showing results.

Root-knot nematodes (RKN) are unfortunately not a new guest to Northern Territory soils. Guava root-knot nematode (GRKN) was detected in the NT in 2022, however other RKN species have been disrupting agricultural production in the NT for much longer.

RKNs are plant-parasitic nematodes from the genus *Meloidogyne*. They exist in soil in areas with hot climates or short winters which are both very relevant to the greater Darwin region.

The nematode larvae infect plant roots, causing the development of root-knot galls that drain the plant of photosynthate and nutrients. Infection of young plants can kill a crop, whilst infection of mature plants can still cause significant yield losses. About 2,000 species of plants worldwide are susceptible to infection by RKNs, so it's no surprise that some of the common crops grown in the NT are susceptible.

The crop where RKNs appear most prominent in the Top End is okra. Okra is one of the NT's most common vegetable crops, supplying the southern domestic markets (Sydney, Melbourne, Adelaide and Perth) for most months of the year.

Whilst most crops struggle to manage the wet season conditions, okra can withstand higher pest pressures, wetter soils and hotter, more humid environments. Common signs of RKN infection in okra plants are wilting, pale green leaves, stunted growth and eventual reduced yields. Pulling up one of these plants should show galling on the roots.

Like many soil-borne diseases, there are few quick fixes that provide long term relief from RKNs. An integrated approach is likely to yield the best results using a number of methods such as crop rotation, organic amendments, new to market nematicides as well as other biological treatments.

If you are a grower in the NT who has crops impacted by RKNs you're in luck, as AUSVEG, the NT Government and VegNET are all assisting growers in this area. AUSVEG currently has a national GRKN identification and management project running, aimed at developing rapid diagnostic tools, enhancing targeted surveillance, identifying effective management strategies, and engaging stakeholders for effective GRKN management.

The project team visited Darwin in early April 2025 to run an interactive workshop on GRKN which included both presentations and laboratory sessions. Industry stakeholders including agronomists, extension officers and researchers attended the event. The following day VegNET organised farms for the AUSVEG project leads to visit in the greater Darwin region. These growers were cautious that they may have RKN on their farms.

The trip proved very helpful, with one farmer who was not aware they had GRKN on their property finding a positive diagnosis in their crop. At this stage the visual crop impact is limited to one plant so the team hopes early diagnosis can help minimise the impact to other areas of the property.



NT DAFF has recently hired a nematologist who will be working on the AUSVEG GRKN project on a local level. The nematologist is often on farms, working with growers to identify if they have RKNs on their property in particular GRKN, and to provide consultation on how they can best manage the incursion to minimise the impact to their production.

How does VegNET fit into these projects you may ask? VegNET often acts as the glue between growers and government or industry projects, knowledge and support. NT VegNET works with growers to make them aware of what services and support is available for issues they have such as nematode problems.

The project facilitates farm visits to allow researchers to meet with growers to better understand industry issues and for growers to get important information back from researchers about new knowledge. The VegNET project is also looking to run a RKN management trial on farm where different management techniques are tried over the 2025 season.

Top L-R. GRKN team visit to NT Farm. GRKN workshop Darwin. **Inset.** RKN identification in lab workshop.

FIND OUT MORE

Please contact Mariah Maughan on 0417 618 468 or email ido@ntfarmers.org.au

VegNET 3.0 is funded by Hort Innovation using the vegetable and onion research and development levies and contributions from the Australian Government.

Project: VG21000

Hort Innovation **VEGETABLE FUND**
Hort Innovation **ONION FUND**

Resilience, research and regional collaboration shape the future for vegetable growers in South-East Queensland

VEGNET SOUTH EAST QUEENSLAND

Lockyer Valley

REGIONAL UPDATE

The 2025 growing season has delivered its fair share of challenges to vegetable producers across South-East Queensland. From unpredictable weather events to the persistent threat of crop disease and insect pressure, growers have once again demonstrated resilience and adaptability in the face of adversity.

As these pressures mount, so too does the importance of collaboration, knowledge-sharing, and innovation across the industry. VegNET – South-East Queensland continues to play a vital role in uniting growers, researchers, and government to protect and future-proof vegetable production in one of Australia's key horticultural regions.

Floods and wet weather woes

Cyclone Alfred delivered a harsh blow to the region earlier this year, with significant rainfall and flooding impacting growing regions across Logan, Scenic Rim, and the Lockyer Valley. While the Lockyer Valley was largely spared from widespread flooding and crop loss, growers faced delays in planting and difficulties accessing wet paddocks for harvest. Following the cyclone persistent wet conditions also triggered further minor flooding across creeks and low-lying areas, compounding logistical issues.

This wet spell highlighted the importance of planning for flooding and ensuring infrastructure and management systems are in place to adapt quickly to changing conditions. While the damage was relatively limited this time, it served as a reminder of the region's vulnerability to extreme weather and the need for continued investment in flood mitigation.

Stemphylium in onions: a silent battle

Stemphylium continues to challenge onion producers, with the disease showing stubborn persistence in certain regions. While some progress has been made in understanding the underlying factors that encourage its presence—particularly the role of soil health—an Innovation Fund proposal to further research the disease has been sent back for revision, delaying much-needed investigation.

Encouragingly, early trials suggest that *Trichoderma* species may hold promise in suppressing the disease, although results are mixed and appear highly strain-specific. Researchers and agronomists are also exploring the influence of alternate host crops, irrigation systems, and fungicide strategies. With global concerns about fungicide resistance, especially to *Stemphylium*, the urgency to screen registered Australian fungicides for efficacy is growing.



Continued investment in research and robust on-farm trials will be critical to developing integrated disease management strategies that protect yield while reducing chemical reliance.



Agronomists breakfast: knowledge in action

On 21 March, VegNET SEQ hosted the latest Agronomists Breakfast—a cornerstone initiative under Focus Area 4: Biosecurity, Pests and Disease Preparedness. The event brought together 13 agronomists, growers, and managers alongside four QDAF presenters, a chemical industry representative, and VegNET facilitators. The breakfast served as a forum for updating frontline advisors on pest threats, management strategies, and the latest research developments.

Key topics included:

- **American serpentine leaf miner:** Identification, lifecycle, resistance patterns, and the role of beneficial predatory insects. *Presented by Praise Taddle (QDAF).*
- **Fall armyworm (FAW):** Updates on RapidAIM trap data, challenges with trap reliability, and field trial outcomes. *Presented by Darren Brown.*
- **Sweet corn IPM trials:** Use of sun hemp as a companion crop showed increased beneficial insects but no reduction in FAW pressure. Cob quality was maintained despite a slight reduction in cob mass.
- **Spray strategies:** Comparison between band and blanket spraying showed similar effectiveness, but band spraying significantly reduced chemical use. *Presented by John Duff (QDAF).*
- **Chemical efficacy:** Success Neo was highly effective on FAW but also detrimental to beneficials, raising concerns about long-term sustainability.

The feedback was overwhelmingly positive, with 78 percent of participants indicating they would change or consider changing their advice to growers based on the new information. There were also strong calls for future workshops on diamondback moth control, earwig management, spray application efficacy, and more practical field-based events. Several participants emphasised the need for stronger biocontrol solutions and more accessible updates on new chemistry, resistance trends, and minor use permits.

Towards stronger collaboration

In response to growing challenges, several industry bodies—including AUSVEG, Hort Innovation, QFF, QFVG, and VegNET—have expressed a shared interest in creating a more collaborative service delivery model for the South-East Queensland region. One concept currently under discussion is the establishment of a regional hub based at the University of Queensland, where researchers, industry leaders, and government representatives can meet regularly, share resources, and align efforts.

Above L-R. Agronomists watching a presentation on fall armyworm. Fall armyworm leaf damage.

The University of Queensland has shown interest in taking on a larger role in applied horticultural research and community engagement. Such a hub could serve as a dynamic centre for knowledge exchange, project coordination, and regional problem-solving—bringing together all corners of the vegetable industry to build stronger, more resilient production systems.

Looking forward

Despite the challenges of 2025 so far, the South-East Queensland vegetable industry is adapting, learning, and growing stronger. From flood recovery to disease suppression and pest preparedness, the focus remains clear: work together, share knowledge, and keep innovation at the forefront.

VegNET – South-East Queensland will continue to support growers, agronomists, and researchers through its tailored extension services, events, and industry-wide initiatives. With stronger collaboration, cutting-edge research, and boots-on-the-ground support, the region is well-positioned to overcome current threats and thrive into the future.

FIND OUT MORE

Please contact Darren Brown on 0456 956 340 or email ido@lockyervalle growers.com.au

VegNET 3.0 is funded by Hort Innovation using the vegetable and onion research and development levies and contributions from the Australian Government.

Project: VG21000

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VEGNET FAR NORTH
Queensland
REGIONAL UPDATE

A timely reminder of the importance of collaboration in the industry



Angelo Rigano (QRIDA) talking to Burdekin growers about the disaster recovery assistance grants available following the NQ region flooding events.

After a slow start to 2025 with wild and wet weather in North Queensland, workshops and industry meetings that would normally kick off the season had to be postponed.

In March this year, Bowen Gumlu Growers Association (BGGA) co-hosted two events in two locations to cover an assortment of important topics. These 'Timely Topics' sessions are the first in what will hopefully become a series that enable growers to get together, get the information they need at that time, and get on with their week.

These sessions were two to three hours long, so only took up an afternoon, but each session covered four important topics delivered by speakers in a streamlined and to-the-point fashion.

It seems that primary producers are being saturated with meeting requests from industry bodies, government departments, and agronomists. Little time and a lot of meeting requests mean growers are finding it increasingly difficult to get to all meetings and events, and are likely missing important industry messages and updates.

BGGA sees collaboration among industry representatives to be the most efficient way forward, and will hopefully result in more growers and industry reps attending. The idea is fewer events to attend, but more important topics covered in each session.

Wednesday's session in Bowen included Noel Ainsworth from DPI talking about carbon in the ag economy, the future of carbon sequestration, and what carbon credits mean for growers and suppliers. A large and complicated topic, Noel brought the important points to light and helped growers better understand their role in the carbon credits scheme.

Noel was also able to answer questions from the attendees and provided hand-outs and links to videos and further information. Having Noel attend was also a good guide for grower groups to understand what parts of the carbon conversation growers want to explore further or what they found confusing, so a worthwhile follow-up session can be organised in the future.

The second presenter was Billie White, an agronomist who specialises in soil science from Farmacist, an independent sugarcane agronomy firm in North Queensland. Billie came as a BGGA guest presenter to explain how soil characteristics and composition determine how it behaves in relation to wet weather and erosion.

This segment was part of our WaterWise Together project that looks at how reducing sediment loss from erosion can benefit growers and improve reef water quality by reducing sediment runoff. It follows on from last year's workshop on the benefits of cover cropping for soil retention and health.

Billie provided a practical demonstration of slaking and dispersion, and how soils respond differently under different conditions (pH levels, sodicity and salinity, and by different compositions). This is particularly important not only for reducing sediment loss, but also for understanding how the soil in a particular paddock will influence how water and nutrients are taken up by the plant, which means fertiliser choice and application, and chemical choice and application can be altered to get the most efficient and effective result. This workshop provided an important introduction to soils that will be built upon later in the year with another deep-dive – literally – into soil health with a soil pit and soil health workshop.

Kristy Banks from Queensland Fruit & Vegetable Growers (QFVG) presented at both Wednesday and Thursday Timely Topics about farm financial management, and offered tools and services to evaluate the strengths and weaknesses of the grower's own agribusiness.

Kristy unpacked the practical building blocks of a strong farm business—having a clear plan, understanding your financial position, keeping accurate records, and making sure your plan reflects your current risks. Through the Farm Business Resilience Program, growers can access support to take stock, identify what's working and what's not, and develop a clear, tailored plan using Growcom's HORT360 BMP program. That plan not only strengthens day-to-day decision-making but also opens the door to Queensland Rural and Industry Development Authority (QRIDA) drought preparedness grants and loans.

Above. Billie White (Pharmacist) gave an introduction on soil health, soil characteristics, and demonstrated how to determine soil structure including slaking and dispersion tests as part of the water quality project WaterWise Together.



Andrew Conway, also from QFVG, presented his benchmarking project at both sessions. His project aims to benchmark as many growers as possible. State-wide, over 40 percent (or ~32,000ha) has already been benchmarked. This project aims to prove that the industry is at best practice. As Andrew explains, "We know we are at best practice, but this puts it in writing with proof".

New North Queensland RDO Richelle Kelly also took the opportunity in these sessions to give a short introduction to growers about her background, and describe her role with BGGA and VegNet. It was a great opportunity to meet growers she hadn't previously been able to visit, and to explain how her role as RDO facilitates collaboration to provide solutions to challenges in the North Queensland region.

Richelle was also able to recap for growers the Fall Armyworm National Surveillance project that BGGA is leading, funded through the VegNET Innovation Fund, as well as the WaterWise project and her role in biosecurity. In a role that values collaboration, this Timely Topics series looks to be a great first step.

In an effort to keep the sessions short and manageable, the Thursday session in the Burdekin region focused on the QRIDA Disaster Recovery Grants. This grant is available to growers from Burdekin north, but does not include the Bowen region at this time.

Angelo Rigano is the North Queensland Regional Area Manager for QRIDA. Given the huge wet season and flooding encountered in the northern region and the subsequent disaster recovery grants on offer to primary producers, he was a very timely inclusion to the agenda.

Angelo talked to growers about how they can access the grant, how they need to record the damage to their property and equipment, and the process of submitting for funding. Angelo is extremely knowledgeable on the topic and, while not the assessor, is able to work through the application with growers to get through it as efficiently as possible.

The sessions also allowed time at the end for attendees to have food and drinks, and talk to each other. Some beneficial connections were made, and that was one goal of hosting these events. The feedback was very positive, and we look forward to holding more Timely Topics sessions in the future. These events are an example of the importance of collaboration across the industry, and how primary industry can benefit when the growing community works together.

FIND OUT MORE

Please contact Richelle Kelly on 0419 429 808 or email rdo@bowengumlogrowers.com.au.

VegNET 3.0 is funded by Hort Innovation using the vegetable and onion research and development levies and contributions from the Australian Government.

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VEGNET

Wide Bay Burnett

REGIONAL UPDATE

Cultivating success: insights from the Soil Field Walk in Bundaberg

On a crisp afternoon at a Bundaberg potato farm, growers, researchers, and industry experts gathered for a field day focused on soil health, crop sustainability, and farming innovations.

Organised by the VegNET, PotatoLink and Soil Wealth ICP projects and delivered by Applied Horticultural Research, the event featured demonstrations, discussions, and useful insights on challenges and opportunities in vegetable and potato farming.

Connecting over a BBQ

The event started with a BBQ, giving attendees a chance to share experiences, discuss farming challenges, and connect with others. This informal setting encouraged conversation and set the tone for the day.

Learning about soil health and cover crops

Despite some rain, the field walk continued, with researcher Steph Tabone and grower Mark Fritz leading a session on cover crops and their role in soil health and farm resilience. The session covered how legumes contribute nitrogen, how to manage nitrogen levels, when to terminate cover crops, and their effects on pests and diseases. Growers gained a better understanding of how to use cover crops and the benefits it can have on their farming systems.

Managing the fall armyworm problem

VegNET Regional Development Officer Jessy Logan shared details on upcoming VegNET activities for 2025 and insights from John Duff on the fall armyworm (FAW) eHUB. This session provided guidance on using the platform to stay informed on FAW developments.

A key topic was a recent spray trial on sweet corn, which compared band spraying to blanket spraying. Both methods showed similar control results. The session provided practical advice on FAW monitoring, management, and lessons from past trials.

Understanding environmental requirements

Environmental regulations are a growing concern in farming. Noel Ainsworth led a session on emissions reporting and ways to improve soil carbon. The discussion focused on the staged approach to emissions reporting, and what tools are available for farmers to determine their carbon number to meet potential reporting requirements in the future.

Growers raised concerns about increasing regulations, leading to a discussion on balancing compliance with everyday farming needs. Noel answered questions and encouraged an open conversation around these challenges farmers face.

Improving water and nutrient use

Using water and nutrients efficiently is key for productivity and sustainability. Naomi Diplock shared updates from the Soil Wealth ICP Bundaberg demonstration site, which has monitored water and nutrient use in capsicums, to identify opportunities for improved approaches that enhance crop health and input efficiencies.

Attendees also learned about spray coverage effectiveness for managing internal mould in capsicums. The project team invited growers to participate in testing spray efficiencies, showing how better spray techniques can reduce waste and costs.

Moving toward more sustainable farming

The Soil Field Walk event highlighted the importance of innovation, collaboration, and research-based practices in farming. Attendees left with practical insights and a stronger focus on soil health, efficient input use, and pest management.

Stay tuned for future event updates—let's keep improving together!

FIND OUT MORE

Please contact Jessy Logan, on 0407 366 797 or email vegnet@bfvg.com.au

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Top L-R. Attendees discussing machinery used for cover cropping. Attendees discussed cover crops at the Soil Field Walk. **Above.** Soil Field Walk attendees at Mark Fritz's farm.

VEGNET

New South Wales

REGIONAL UPDATE

Addressing pollination challenges in cucurbit production: enhancing resilience in Australia's horticultural sector

VegNET NSW Regional Development Officer Sylvia Jelinek has been working with Dr Lena Schmidt from the University of New England (UNE) to introduce her to commercial cucurbit growers in the Hawkesbury region to study insect visitors of field cucurbit flowers, mainly zucchinis and pumpkins.

Cucurbit production plays an important role in Australia's horticultural industry, but growers face a range of complex challenges that threaten the long-term sustainability of the sector.

One of the key challenges is pollination, a critical aspect of vegetable cultivation, which typically relies on insects to ensure effective fruit development, high yields and fruit quality. Cucurbits are monoecious plants, producing distinct male and female flowers on the same plant, which makes them particularly reliant on insect visitation for cross pollination.

Research aims to identify alternate pollinators

Since cucurbits are an introduced crop in Australia, they do not have native specialist pollinators, such as the North American squash bees. Instead, they rely primarily on European honeybees (*Apis mellifera*).

While European honeybees are widely used for pollination, this over-reliance on a single managed pollinator presents a significant risk, particularly with the challenges posed by disruptions in access to honeybee colonies. The incursion of the varroa mite (*Varroa destructor*) has had a significant impact on honeybee populations in NSW, disrupting both managed and feral colonies. This disruption underscores the need for more diverse pollination strategies to safeguard cucurbit production and ensure crop success.

Research has shown that a diversity of complementary pollinator species – including bees, flies and other insects – can improve pollination outcomes in a range of crops; however, there is limited information on the role of these species in Australian crop production, particularly for cucurbits.

In response to this challenge, UNE's research aims to identify native insects that visit cucurbit crops and explore their potential as supplementary pollinators. This is a crucial step in ensuring the sustainability and continued success of cucurbit production amid environmental challenges.

Surveys and findings of summer observations

Through close collaboration with industry stakeholders, the UNE team and research partner SeedPurity conducted extensive surveys across 10 farms in the Hunter and Hawkesbury production regions of NSW, and caged pollination efficiency trials using managed flies in Maitland, NSW.

Pollinator survey preliminary results indicate that solitary native bees, ants and other insects visit cucurbit flowers. Further research is needed to explore

ways of enhancing their populations. These surveys aim to identify key insect species to promote and develop targeted management strategies for enhancing pollination in cucurbit cropping systems.

"In the pursuit of alternative managed pollinators for cucurbits, we assessed the pollination potential of the drone fly, *Eristalis tenax*, for pumpkin and zucchini," says Dr Lena Schmidt.

"Over two summer seasons in the Maitland area of NSW, cage trials indicated that *E. tenax* infrequently visited pumpkin and zucchini flowers and fruit set was low, hence other alternative insects are being assessed."

Above L-R. Ants foraging on a zucchini flower. Native bee collecting nectar off a pumpkin flower. Hover fly resting on a pumpkin flower petal. Images ©Lena Schmidt.

FOR FURTHER INFORMATION

Please contact Dr Lena Schmidt lschmidt@une.edu.au, Romina Rader rrader@une.edu.au and Cameron Spurr cspurr@seedpurity.com, and Sylvia Jelinek on 0427 086 724 or sylvia.jelinek@lls.nsw.gov.au.

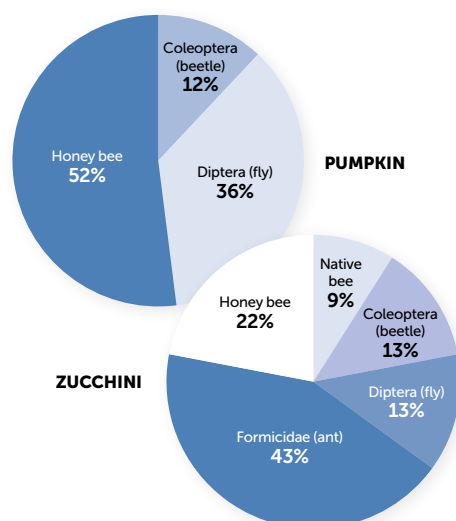
Acknowledgement. VegNET NSW would like to acknowledge Dr Lena Schmidt for contributing to this article.

This research is part of the *Expansion of flies as berry and cucurbit crop pollinators* (MT22007) project. This project has been funded by Hort Innovation, using the raspberry, blackberry, blueberry and vegetable research and development levies, and contributions from the Australian Government. VegNET 3.0 is funded by Hort Innovation using the vegetable and onion research and development levies and contributions from the Australian Government.

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Types of insects observed visiting pumpkin and zucchini flowers during surveys at a commercial farm in the Hawkesbury production region.

VEGNET
Tasmania
REGIONAL UPDATE

West Pine data crunching to improve future onion crop yield

Crop loss during harvest can be a challenge for vegetable farmers. This can be due to topography, paddock condition such as soil compaction, drainage or soil moisture, nutrition, pest, weed and disease management. West Pine, a farming and advisory business based in North West Tasmania, have shared their findings of onion volume left in the paddock after this season's harvest and their approach to measuring this.

West Pine is a diversified agri-food business based in Penguin, North West Tasmania, founded in 2018 by Rob Arvier and Mark Reeves. West Pine has diversified differently to most vegetable farming businesses in Tasmania. Alongside their vegetable crops, they run livestock, grow cereal and fodder crops and provide agri-business advisory services.

This highly diversified model not only offsets the risk involved with primary production but, as Rob emphasises, "allows us to put our advisory skills into the primary production space with our farm business informing how our advisory skills can be applied in practice".

In late 2024, the West Pine team expanded with Emily Roberts joining with over two and a half years' experience in carbon accounting in the corporate sector, helping businesses to quantify their carbon emissions in alignment with the current Greenhouse Gas Protocol.¹

New to the horticulture sector, Emily's curiosity and accounting mindset prompted her to question why and how many onions were left in the paddock after the 2024/25 harvest. Drawing on the true cost accounting approach, which looks to measure hidden or externalised costs involved in food production,² Emily explored the volume of leftover onions and the reasons behind it.

Measuring onion crop loss at harvest

Following Emily's deep dive into data crunching, West Pine measured an estimated 13.5 tonnes of brown onions left in the 7ha paddock after harvest³ – this equates to approximately 14 one-tonne bins.

They measured the loss by taking random samples from 5m x 5m plots throughout the harvested area and 1m x 1m plots in weedy and unharvested rows. Approximate measurements of length and number of weedy/unharvested row as well as the unplanted sections were then taken to extrapolate their samples to the applicable areas.

TABLE 1

West Pine evaluation of onion crop loss at harvest from a 7ha paddock for this season, 2024-25⁴

	AREA (M ²)	ESTIMATED ONION VOLUME (TONNE)	DESCRIPTION
	1,800	2.4	Section overcome with weeds
	190	1.7	Unharvested rows
	65,210	9.5	Left behind from harvested rows
	2,800	–	Unplanted paddock area due to slope or access requirements.
TOTAL	70,000	13.7	

While some crop loss is unavoidable, the data collected from this season's harvest has enabled the West Pine team to look more closely into the reasons why and consider opportunities to improve yield in future seasons.

Rob notes that “you can’t manage what you’re not measuring”, drawing on the well-known quote from business management expert Peter Drucker.

Challenges contributing to the volume of crop loss:

- Paddock topography (slopes) and soil conditions, especially structure.
- Machinery type required to access different areas (i.e. unable to plant or unharvested due to steepness).
- Time restraints on intake due to varying reasons such as seasonal variations, pack shed capacity, market demand.
- Differing priorities of markets in size and quality of onions and how this pressure is applied down the supply chain.

Opportunities for future onion crop yield improvement by avoiding losses in the paddock:

- Utilising different paddocks to address topography barriers, plant with crop management and harvest in mind.
- Select paddocks with good soil structure, no compaction.
- Improved weed management.
- Review current rotations, check LISTmap for further paddock information (soil type, land capability, elevation/slope) and implement a whole of paddock plan to understand potential machinery restraints for different types of machinery for crop management and harvest.
- Avoid growing onions after other root crops that cause a decline in soil structure.

These opportunities would likely reduce otherwise wasted inputs on planting, spraying etc, to only include areas that can be fully serviced for the whole of crop life.

Given that productive crops have low emissions, West Pine calculated the emissions intensity of their previous season red onion crop (cradle to farm gate) to be 130 grams of CO₂-e per kilogram.⁵ Being able to measure and identify property level data per crop is an ideal state for carbon emission reporting, however the tools and support for this are not yet widely available.⁶

Rob notes that “you can’t manage what you’re not measuring”, drawing on the well-known quote from business management expert Peter Drucker. Identifying, categorising and quantifying costs and benefits at the farm level, farmers can make more informed decisions, clearly identify risks and rewards in the supply chain and better maximise their reward for input and effort.

FIND OUT MORE

Contact Prudence Rothwell, VegNET Tasmania Regional Support Officer, RMCg on 0477 182 408 prudencer@rmcg.com.au who can link you with relevant Hort Innovation Projects (VN23001 & MT22009) that aim to increase vegetable grower’s insights into production costs on their farm, quantify and benchmark costs involved with onion production and carbon emissions from cradle to gate.

Contact Emily Roberts, Carbon Accounting Advisor, West Pine emily@westpine.com.au to access their 2024 carbon assessment report.

Contact Donna Lucas, RMCg at donnal@rmcg.com.au to find out how to benefit from benchmarking for vegetables an onions and lifecycle assessments of emission for onion crops.

VegNET 3.0 is a strategic levy investment under the Hort Innovation Vegetable and Onion Funds. This project has been funded by Hort Innovation using the vegetable and onion research and development levies and contributions from the Australian Government.

Project: VG21000

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Onion harvest at West Pine. ©Lean Timms, supplied by West Pine.

Where to from here?

From an economic and environmental perspective, every year in Australia 7.6 million tonnes of food is not used. In the horticultural supply chain, an estimated 23.7 percent (908,403 tonnes) of food loss occurs during primary production and 10.7 percent (409,744 tonnes) during the processing stage.⁷

With farm-level emissions reporting and global transparency expectations on the horizon, West Pine is proactively preparing for future requirements. Through initiatives like the *Onion Life Cycle Assessment project* (Hort Innovation funded project VN23001), they are working to assess and reduce their costs, improve marketable yield and reduce inputs and environmental impact while strengthening their position for export market access and price premiums.

Tasmania’s horticultural sector is distinct from most mainland regions, with a strong presence of processors and packers, and varying grower arrangements involving direct contracts, land leasing or joint ventures with larger operations and packers. Many packing operations also manage their own farms, adding layers of complexity to addressing crop loss both on-farm and during processing.

West Pine see the need for a holistic, industry-wide approach to reducing crop loss and food waste, with a focus on improving crop recovery during production, harvesting, and packing—where cost-effective gains can be made by addressing issues like topography, equipment, soil and crop management, handling and grading damage. They are optimistic about the potential for collaboration and action across the supply chain, noting, “from cradle to gate (and beyond), there’s so much opportunity for improvement”.

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VEGNET
South Australia
REGIONAL UPDATE



Cultivating the future: industry engagement and education



Top L-R. Anthony De Ieso, General Manager and Sales Manager of Thorndon Park Produce. Anthony De Ieso conducting the farm tour.

Above. Jordan Brooke-Barnett, CEO of AUSVEG SA. Dr Len Tesoriero.

Two recent events highlighted both the present and future of horticulture in South Australia. The Regional Round-Up brought greenhouse growers together for a day of networking, updates, and shared insights, while the Investing in the Next Generation initiative gave horticulture students a behind-the-scenes look at the industry through an engaging and educational farm visit. Both events showcased the strength of the industry and the importance of supporting its growth—from established producers to emerging professionals.

Regional Round-Up event for greenhouse growers

VegNET SA continues to deliver high-value outcomes for our growers across the state, with recent initiatives under the VegNET program delivering critical industry updates, networking opportunities and education.

On 1 April 2025, the Regional Round-Up for Greenhouse Growers event was held at Sneaky's Restaurant in Angle Vale. This event was delivered in partnership with AUSVEG SA and coordinated by the VegNET SA Regional Development Officer Peta Coughlin. It brought greenhouse growers together from the Northern Adelaide Plains to hear timely updates on ToBRFV (tomato brown rugose fruit virus) as well as broader industry concerns.

Keynote speaker and renowned plant pathologist Dr Len Tesoriero, who travelled from NSW, provided deep technical insights into virus transmission and resistance breakdown, with a particular focus on how ToBRFV impacts capsicums.

Dr Tesoriero explained that when capsicum plants are grown in soil contaminated with ToBRFV, a hypersensitive response can be triggered, resulting in lesions on roots and stems. This often leads to stunted growth and eventual plant collapse.

Research by Matsushita et al. (2024) revealed that capsicum seeds transmitted ToBRFV at a notably higher rate (10.1 percent) compared to tomato seeds. However, they also found that capsicum varieties carrying the L3 resistance gene were not systemically infected, and no virus was detected in their progeny seeds or seedlings. Encouragingly, the development and availability of seedless capsicum varieties are expected to further reduce the risk of ToBRFV transmission through seed. This session delivered targeted, actionable knowledge to help growers adjust their hygiene, propagation, and varietal strategies.



Above L-R. Regional Round up for Greenhouse Growers. Enjoying the networking at the Regional Round up for Greenhouse Growers.

Growers also heard from Fabio Pappalardo of Enza Zaden on international breeding and genetics, including the latest resistant varieties and emphasised that “resistance does not mean immunity”, stressing the importance of continued hygiene and bio-security practices.

Shakira Johnson, Biosecurity Coordinator at AUSVEG, lead discussions on how the Emergency Plant Pest Response Deed (EPPRD) supports growers through coordinated responses to biosecurity incursions. AUSVEG SA CEO Jordan Brooke-Barnett gave his informed input during the Q&A discussion, where the potential value of introducing a dedicated biosecurity levy for tomato growers was a key point of lively debate.

These conversations reinforced the importance of coordinated advocacy, research, and communication in safeguarding South Australia’s vegetable sector. The event also allowed for informal networking, giving local growers the opportunity to connect directly with the speakers, raise individual questions, and share experiences with others in the industry.

Investing in the next generation

Thorndon Park Produce farm visit

Another calendar highlight was VegNET SA’s participation in a farm visit by University of Adelaide students studying the course Experiences and Insights in Agri-food Systems. The students had the opportunity to visit Thorndon Park Produce, operated by AUSVEG SA member Anthony De Ieso. Students were welcomed onto Anthony’s property with a demonstration of on-farm biosecurity protocols and then were led through a guided tour of the packing, wash, maintenance and cool room facilities.

Anthony invited VegNET SA’s new Regional Support Officer Kirsty Kittel to be a part of the presentation and farm tour. This gave Kirsty the opportunity to explain to the students how AUSVEG SA and VegNET SA work together to deliver programs and events for growers. During the visit, Anthony took time to talk about his collaboration with AUSVEG SA and VegNET SA projects, giving his participation towards the serpentine leafminer monitoring project as an example.

The visit offered students an unfiltered look at real-world challenges of production, sustainability, and market demands in bunch-line vegetables. Students saw firsthand how crop quality and size is influenced by environmental constraints, especially considering South Australia’s recent harsh summer.

Anthony demonstrated how certain areas of crop lines, like mid-bed sections, can remain under-watered despite regular irrigation due to spray coverage challenges. This led to a discussion about the trade-offs involved in switching to drip irrigation, which Anthony posed as being effective for long-term crops like rosemary, but less suited for short-cycle crops such as parsley and spring onions due to its cost and removal requirements.

The students also learned how post-harvest quality is directly influenced by environmental pressures. For example, multiple-cut crops like parsley fared better in the heatwave, as they were already established when the extreme temperatures hit, with strong root systems in place. In contrast, crops like beetroot and spring onions were planted at the start of summer for an autumn harvest, meaning their entire growth cycle — from seed to sale — occurred during the peak of the heatwave. As a result,

these crops experienced significant stress, leading to a noticeable reduction in yield.

Throughout the visit, students actively engaged with these challenges, asking insightful questions about farm inputs, climate resilience strategies, and diversification. They also discussed integrated pest management, the use of mulch (which can present a disease risk), and innovations in automation.

One master’s degree student in Global Food Science & Nutrition, Cheavita Lay, shared her thoughts: “In class, we learn about new technologies and methods to reduce costs or increase yield, but speaking with growers gives us real context. We start to understand why some practices aren’t widely adopted – it’s not just about what’s possible, but what’s practical and affordable.”

Kirsty reflected on the value of the day as both a professional development opportunity and a chance to show the next generation of horticulture professionals the diversity of careers in the industry.

The Regional Round-Up for Greenhouse Growers and the visit to Thorndon Park Produce highlight the ongoing efforts of VegNET SA to support growers to build a more informed, resilient, and future-ready horticultural sector.

FIND OUT MORE

Please contact Peta Coughlin, AUSVEG SA on 0409 029 745 or email peta.coughlin@ausveg.com.au

VegNET 3.0 is funded by Hort Innovation using the vegetable and onion research and development levies and contributions from the Australian Government.

Project: VG21000

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VEGNET NORTH, WEST & SOUTH-EAST

Victoria

REGIONAL UPDATE

Growing resilience and meeting regional needs

Victorian vegetable growers are facing mounting pressures across the board. Rising production costs, shrinking profit margins, prolonged dry conditions, ongoing workforce shortages, and growing regulatory demands are creating a tough environment for growers to navigate.

In response, many growers have come to understand that success in this environment requires resilience. To not just survive, but thrive, it is essential that they actively build their capacity to adapt and endure.

Developing resilience equips growers with the skills and mindset needed to manage stress, embrace change, remain connected to their networks, and maintain a sense of purpose and optimism.

VegNET Victoria is stepping up with targeted support where it's needed most—prioritising business resilience, workforce development, and region-specific initiatives shaped by growers themselves.

Moshi Business Training: funded through the VegNET Innovation Fund

This May, VegNET Victoria will host two free, hands-on business training sessions in partnership with a specialist consulting and Industry development firm, Moshie. This will be focused on building business resilience, continuous improvement, and long-term planning. These workshops are part of our continued commitment to deliver solutions tailored to grower feedback and have been made possible through the VegNET Innovation Fund.

Whether you're aiming to improve profitability, reduce stress, prepare for succession, or take back your weekends, these sessions offer practical tools and 12-month access to Moshie's proven strategy platform. They're designed specifically for vegetable producers and will include insights from fellow growers and industry service providers.

Focusing on what matters most – **2024–25 Regional Priorities**

This year, VegNET Victoria's activities are guided by three key focus areas, identified through industry engagement and grower feedback across Victoria's key growing regions:

- **Profitability:** improving input-use efficiency and linking growers to relevant agtech and research initiatives.
- **Product Integrity:** raising awareness of practices that maintain quality and reduce risk post-harvest.
- **Workforce & Skills:** supporting growers to attract, retain, and upskill staff through tailored extension and workforce development activities.

These priorities reflect the realities growers are facing on the ground and will continue to shape VegNET delivery through 2025.

New RDO contact details – and what's next

VegNET Victoria is currently transitioning between Regional Development Officers, with a new appointment expected to be in place from June 2025. During this period, growers are encouraged to reach out to the team via the updated contact details.

FIND OUT MORE

Please contact Zaine Watson at AUSVEG VIC on 0459 519 433 or email rdo@ausvegvic.com.au.
For ongoing updates and resources visit ausvegvic.com.au

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VEGNET VICTORIA
Gippsland
REGIONAL UPDATE



L-R. Riviera - Lasered weed. ©Riviera Farms. Carbon Robotics LaserWeeder ©Food and Fibre Gippsland.

Zapping weeds and changing minds: Riviera Farms' first season with a LaserWeeder

In the rolling fields of Gippsland, weed control has long been a balancing act—between rising chemical costs, tightening regulations, and the constant battle for labour. But for Riviera Farms, the introduction of the Carbon Robotics LaserWeeder has transformed how they manage their crops, protect their soils, and think about farming altogether.

Before investing in the LaserWeeder, Riviera Farms, like many others, struggled with the cost and environmental impact of herbicides. Restrictions were increasing, availability was decreasing, and the need for a long-term, sustainable alternative was becoming urgent. When they first came across Carbon Robotics online, the technology seemed like something from the future. But after attending a live demonstration and speaking with the company that future felt a lot closer.

Carbon Robotics didn't just make the sale—they backed it up. Within a week of delivery, and with full on-site support from three technicians the machine was set up and running in the field. The LaserWeeder's user-friendly interface, paired with 24/7 digital support and remote diagnostics through an online portal, made the transition surprisingly smooth.

Mick Cox, production manager at Riviera Farms, has overseen the LaserWeeder's introduction.

"From day one, we were out there shooting weeds," Mick said. "It hasn't stopped since—weather permitting."

The Carbon Robotics LaserWeeder is a purpose-built, AI-powered machine that uses advanced computer vision with 42 cameras in total and 30 x 150W industrial-grade CO₂ lasers to detect and destroy weeds with sub-millimetre precision—without disturbing the soil or harming nearby crops. Its robust design handles long hours, working between 60 to 70 hours per week during peak planting seasons and about 30 hours during

the quieter months. The machine also enables weeding in all manner of conditions whether it be dark, windy, or damp; and 24/7 when other means won't allow weeding.

In a region known for its variable weather, concerns around soil compaction and machine reliability were natural. However, Mick reports minimal issues. The machine's size and weight are manageable, and when wet conditions arise, Riviera Farms simply pause its operation when required to limit impact on fields. Wear-and-tear on components like bearings and cameras has been expected, but with the subscription service model, replacements and on-site repairs are fast and included.

The results have been profound. Within just four months, the farm has already eliminated the use of two herbicides entirely, with more on the chopping block. The reduced chemical use hasn't just saved money—it's improved crop health. Without the stress of chemical exposure, young seedlings are thriving. This has even led to an unexpected 1–2 percent increase in yield—an outcome that hadn't been anticipated so soon.

Soil health improvements are expected to follow, with fewer chemical inputs likely to benefit the microbiome and long-term fertility. For now, the most visible changes are in the plants themselves: stronger, more resilient crops that require less intervention.

Perhaps most significantly, the laser weeder has changed the way this grower thinks about technology on the farm. Initially sceptical about agtech, the success of the LaserWeeder has opened the door to exploring new tools, ideas and innovation, such as drone spraying.

According to Mick Cox, the LaserWeeder has been pivotal in the battle against weeds.

"There's no question—we'd buy it again," Mick said. "It's changed the way we farm."

"Ten years ago, I was out there hoeing weeds by hand. If someone had told me we'd be zapping them with lasers, I would've laughed."

Now, neighbours stop by just to see the machine in action. With planting happening 52 weeks a year on this farm, the LaserWeeder isn't just a novelty—it's become essential.

The technology performs as promised, but consistent use and early weed targeting are key to maximising ROI.

The Carbon Robotics LaserWeeder offers more than precision—it offers peace of mind. Fewer chemicals, healthier crops, and a step into a more sustainable, high-tech future.

FIND OUT MORE

Please contact Amanda Gould on 0474 500 380 or email amanda.gould@foodandfibregippsland.com.au

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VEGNET

Western Australia

REGIONAL UPDATE

WESTERN
AUSTRALIA

Above L-R. Carnarvon FAW digital trap deployment. Participants in the Vietnamese chemical cluster training program.

Growing regional relationships – expanding extension impact in WA's vegetable industry

The Growing Relationships communications sub-project within VegNET WA was initiated during 2024 to improve both the visibility and the impact of extension across Western Australia's diverse vegetable-growing regions.

With vegetable growers spread across a mosaic of regional locations, the Growing Relationships initiative focuses on building stronger, more consistent connections to increase awareness of VegNET, enhance engagement, and respond flexibly and promptly to region-specific needs.

A key objective of the subproject was to resource an expanded cross-regional presence. This approach supports strategic, locally informed extension practices by ensuring that challenges and opportunities specific to each growing area are acknowledged and included in wholistic project annual planning and decision making.

In addition to improving outreach, Growing Relationships plays a crucial role in expanding the Regional Extension Advisory Group (REAG) network. By inviting broader participation from growers across WA—including underrepresented regions—the project ensures a wider industry voice is included in guiding VegNET's priority focus areas, extension deliverables, and innovation fund initiatives.

This not only strengthens the relevance of project outcomes but also supports a more inclusive and collaborative approach to industry development.

Revitalising the project: strengthening regional engagement

A key step in revitalising VegNET WA was reassessing how project time and resources were allocated. It became clear that building meaningful relationships across regions required a greater investment. In response, a further 20 percent of total project time was dedicated to the Growing Relationships subproject, recognising the value of trust-building and consistent regional engagement.

Expanding the REAG was also a priority in the review; with most current members based in one production zone, efforts are now focused on recruiting regional growers to broaden representation and ensure local challenges are better understood and addressed.

The project has also increased its on-ground presence through more frequent regional visits and direct one-on-one engagement with growers. These actions are improving local connections, aligning considered support with grower needs, and laying the groundwork for stronger cross-regional collaboration—already showing results in the year's first quarter.

The following project snapshots of 2025 VegNET WA projects and initiatives currently underway provide an example of how building a stronger regional presence is translating projects outreach efforts into real, regionally relevant outcomes for the vegetable industry and gaining more traction across the Western Australian regions.

A SNAPSHOT OF KEY PROJECTS AND ENGAGEMENT

Carnarvon Field Day

The March Carnarvon Field Day, hosted by the Carnarvon Growers Association, offered a valuable platform for VegNET WA projects to connect with local growers, share resources, and spark new conversations.

The event was delivered alongside two new VegNET WA projects in the region, the deployment of fall armyworm (FAW) digital traps and a VegNET Innovation Fund bilingual chemical training project, cultivated engagement between VegNET and industry stakeholders and provided

valuable networking and information-sharing opportunities with the Carnarvon grower communities.

The field day opened important conversations on broader regional challenges, such as increasing pressure in the region from fall armyworm, chemical resistance, and the ongoing need for local agronomic support. These discussions reinforced the value of regionally focused projects that can deliver local solutions, and highlighting a collaborative effort to better equip the Carnarvon region for both resilience and prosperity.

FAW national VegNET digital trapping project

The March deployment of FAW RapidAIM digital traps for FAW moth monitoring in Carnarvon comes as pest pressure on sweetcorn and capsicum crops continues to rise. While initial pressure was low at the national project's start, the increase has since challenged local control efforts.

These traps are now helping collect essential pest pressure data, support regional discussions, and potentially contribute to a coordinated area-wide approach in Carnarvon and linkages with other regions through cross-regional data collection under the national VegNET initiative, with traps now deployed in three key growing areas in Western Australia.

Bilingual chemical training expands regional market access opportunities

Funded through the VegNET Innovation Fund, this first round marked a significant milestone—delivering the first successfully delivered bilingual chemical training in WA in over five years.

The first pilot round of nationally accredited bilingual chemical training was successfully



Participants in the Vietnamese chemical cluster training program.

delivered in both Carnarvon and Perth in March, providing 27 growers with essential chemical cluster units in safe chemical use, and the required training to update skills or to consider new market access food certification pathways.

Delivered in both Vietnamese and English by industry-experienced trainers and assessors from Veg Education Victoria, two regional two-day workshop sessions addressed critical knowledge gaps in the regions where access to bilingual agronomic support is limited.

VEG Education trainers and assessors co-delivered the pilot, with participants able to choose their own weighting of Vietnamese and English delivery, and choose to complete assessment in either Vietnamese or English. The program was tailored to meet individuals' specific learning needs, including English as a second language (ESOL) support, and it proved very successful with all participants succeeding in the assessment.

The training opened up valuable opportunities for growers to improve on food safety compliance, strengthen market access opportunities, and sharpen their skills-base and business practices. Participants provided valuable feedback to inform the design and delivery of the second round of training, offered up in November 2025.

Pathways for culturally and linguistically diverse (CALD) community leadership

A case study will be completed as part of the funded project to feature the co-production steps in developing a CALD learning program. In addition to training, a scholarship has been introduced to support a Vietnamese grower in obtaining a training and assessment qualification.

This Innovation Fund initiative aims to build long-term capacity for delivering industry skills training within Vietnamese growing communities across regional Western Australia.

OWL project: advancing precision weed control in Southwest regions WA

The OWL (OpenWeedLocator) project is a new VegNET Innovation Fund project initiated and launched by the Warren Cauliflower Improvement Group in Manjimup to support smarter, low-cost weed control solutions for vegetable crops, and to address financial access challenges in precision agriculture.

The project focuses on developing hardware based on open-source technology for implementing precision weed spraying using AI technology and a start-up of a comprehensive, publicly accessible weed image library in Australia.

At the heart of the initiative is the use of the OWL camera system to systematically capture and annotate images of key weed species—such as wild radish, ryegrass, and thistles—within crop environments. These images form the foundation of a growing dataset designed to train weed detection systems, enabling techniques like spot spraying. This targeted approach significantly reduces herbicide use, lowers input costs, and minimises environmental impact, while also offering farmers access to practical, DIY agtech solutions.

The funded project includes the assembly of OWL camera units and open-source training workshops, where growers can learn how to capture and annotate images, refine detection algorithms, and integrate the system into their existing farming operations. Initially targeting brassica crops, the project aims to provide scalable solutions that can be adapted to other regions and crop types over time.

Conclusion

As a result of these activities, the visibility of VegNET activities has improved in WA, helping growers better understand and access the tools, resources, and networks available through the project. Ultimately, this subproject is about growing more than just vegetables—it's about growing partnerships.



WESTERN AUSTRALIA



Jake from OWL project.

By fostering direct engagement and building stronger regional networks, VegNET WA is supporting a more connected, informed, and resilient vegetable industry, driven by the needs and insights of growers across the state.

Have a voice in shaping regional extension priorities

VegNET WA invites vegetable growers across Western Australia to join the Regional Extension Advisory Group (REAG). Your involvement will help guide the planning and delivery of key local projects, ensuring that future initiatives reflect the needs of the industry and progress Innovation

For more information on becoming a REAG member or to learn about the projects highlighted in this article, or to run an idea past the project for potential innovation funding please contact Katrina Hill.

FIND OUT MORE

Please contact Katrina Hill on 0427 373 037 or email katrina.hill@vegetableswa.com.au

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CASE STUDY

Robotic yield projection in Bundaberg eggplants

Introduction

Across the growing season, fruit yields fluctuate. Fruit loads vary as the plants respond to changes in temperature, disease load, humidity and other factors. These fluctuations present several challenges for growers. If actual yield exceeds what the grower expected, they may need to:

- Add members to their picking team
- Fold additional boxes
- Request packing line staff to undertake overtime
- Revoke an agreement to allow another grower to use their in-house packing line
- Secure an additional truck at short notice
- Find a buyer to purchase the additional fruit, often at a lower price.

The dynamics of the labour and produce markets vary between different crops and regions. So, the relative cost of these actions will vary. Accurate yield estimates are particularly important on large farms and in industries where selling fruit at short notice requires heavy discounting.



Image 1: Ambit Robotics trial at Bundaberg eggplant farm

A similar but inverted situation arises when yields underperform on expectations. The labour, transport and packaging capacity that the grower planned to use is partly underutilised, resulting in losses. The grower also faces repercussions from any customers whose orders can't be fulfilled.

Key messages

- In vegetable production, accurate yield estimations are critical for growers to confirm labour and transport requirements, meet contractual obligations and maintain profitability. However, yield fluctuations are an ongoing issue which is currently measured through manual counting.
- Throughout 2023, VegNET Queensland Wide Bay Burnett worked with Ambit Robotics to trial an imaging robot at a protected cropping eggplant facility in Bundaberg to determine if direct imaging had the potential to improve yield estimates.
- The trial adapted to challenges and successfully demonstrated that a robot can provide accurate counts and sizing of fruit. In addition, the Ambit team has responded to the navigation issues around the greenhouse by pivoting its focus on greenhouses that have pre-installed heating rails. These rails provide certainty of navigation, avoiding gaps in the final data stream.
- The VegNET Queensland Wide Bay Burnett project will continue to work with AgTech companies and growers who are looking at technology solutions that will increase on-farm efficiencies to support their uptake into the future.

Robotic yield projection in Bundaberg eggplants

The issue yield variability

While yield swings have a significant bearing on operational costs, they also have an impact on capital requirements. Costly capital items, including packing and harvesting equipment, must be sized to the greatest possible yield discrepancy from the initial budget projection. That is, a grower that can achieve high-accuracy estimates requires less equipment, as they can allocate what they have more efficiently.

To limit the impact of these yield swings, most growers will undertake a manual count in the lead-up to harvest to support decisions about transport, labour and packing, but also to reach contractual agreements with buyers. However, consistent hand counting is costly, and not always accurate.

Hand counting suffers from a variation in counts between team members. In many cases, only one or two team members are qualified to perform manual counting. This is particularly true in the case of longer-term projections, as they typically require significant experience. Such a limited pool of qualified counters presents a challenge when experienced counters are on leave and introduces an operational risk when these people exit the company.

A potential robotic solution

Automated yield projection technologies have been developed over several decades. The most widely used are based on mathematical crop models, which use statistical techniques to infer yields from measurements such as humidity, temperature, leaf area and carbon dioxide availability. These models provide some guidance to growers about likely yields.

Throughout 2023, the VegNET Queensland Wide Bay Burnett program set out to trial a new approach to yield estimation that showed the potential to add significant additional information to these statistical models, by automating the direct measurement of fruit load. The trial was established to determine if direct imaging of the fruit had the potential to improve yield estimates.

Ambit Robotics, a Melbourne-based start-up, was selected to provide the imaging technology and test its viability at an eggplant farm located at Moore Park, near Bundaberg in Queensland.

The Ambit team provided and installed an imaging robot at the site. The Basis+ robot was located in a 'hutch' near the door of the greenhouse. It was programmed to wake up each night and image hundreds of pieces of fruit.

About the Basis+ robot

The robot is a 4WD unit with a camera fixed above the main chassis. The camera can be tilted to capture the fruit.

The robot uses a set of laser-based sensors to navigate down the crop rows, and remain central within the row. Consistency of navigation proved to be important, allowing each piece of fruit to be imaged in the same way each night. This proved critical to spotting trends in fruit size and quantity.

The system is designed to operate at night to avoid colliding with staff and equipment during the day. Night-time operation also allows for the use of artificial lighting to illuminate the fruit. For the eggplants, the light proved beneficial because each piece of fruit reflected the light, which improved fruit detection even when the fruit was partly covered by leaves.

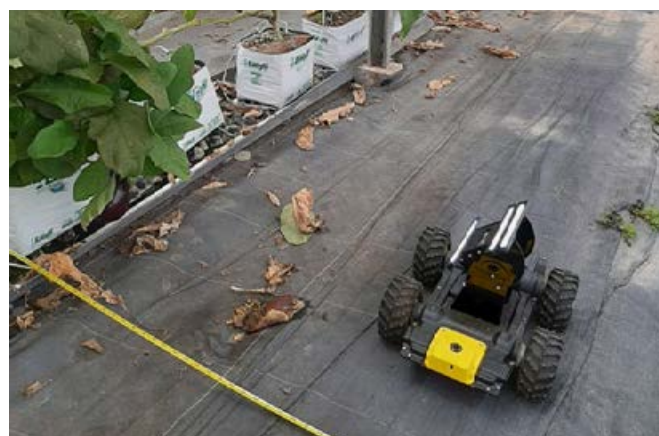


Image 2: An imaging robot was used in a trial to estimate eggplant yield near Bundaberg.

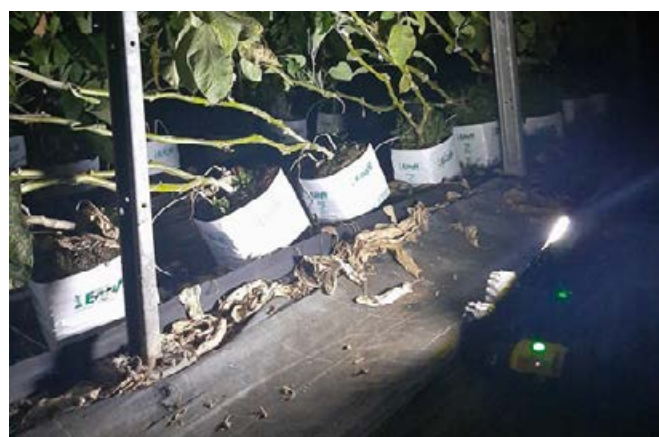


Image 3: The robot was designed to operate at night and used artificial lighting to illuminate the eggplant fruit.

Robotic yield projection in Bundaberg eggplants

Fruit detection and calibration

The Ambit team hand-labelled over 100 pieces of fruit to train a computer vision model to recognise eggplants. As size is the criteria that the picking team uses to determine pickability, it was important that the model could accurately size the fruit.

The model was therefore trained to project the size of the fruit, even when partially covered by leaves. Image 3 demonstrates how the model could project a fruit's total size using only an image of the exposed region of the fruit.

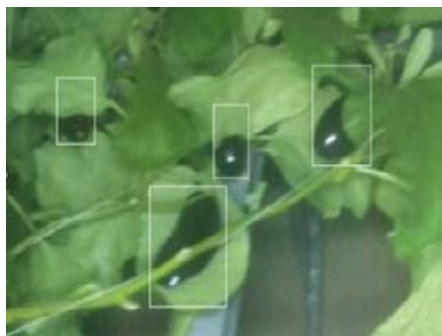


Image 3: The total size of an eggplant could be estimated using only an image of the exposed region of the fruit.

The team also physically tagged 10 pieces of fruit, and measured each piece's length before it was imaged by the robot. On the trial site the grower harvests at 185mm, so fruit was chosen that was both longer and shorter than this threshold. This allowed the relationship between the actual size and the size of the fruit in the image (the pixel size) to be calibrated.

The data demonstrated a strong (and perhaps obvious) relationship between actual size and pixel size. The accuracy of measurement of each piece of fruit varied;



the worst error was 15mm (9 per cent) while the average was 11mm (6 per cent). These estimates are shown in red in Figure 1.

By adjusting the measured size to account for the fruit's distance from the camera, the error in fruit sizing reduced from an average of 6 percent down to 3 percent, of just 5mm. These estimates are shown in yellow in Figure 1.

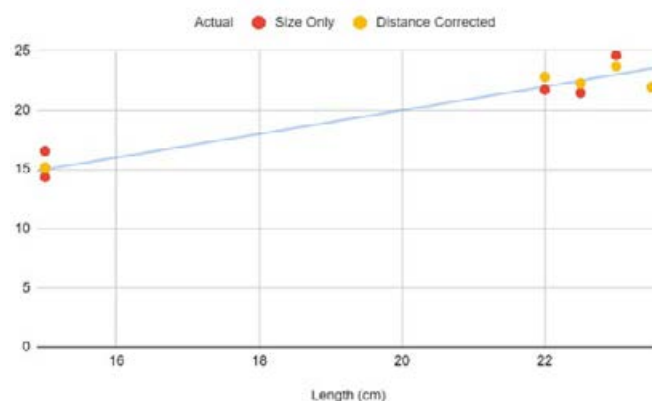


Figure 1: Eggplant sizing estimates taking into account distance from the camera.

The level of accuracy the robot achieved provides a solid basis on which to observe growth across hundreds of pieces of fruit and track fruit growth in real-time.

Observing growth

Figure 2 demonstrates how the robot mapped eggplant growth over two nights. The blue line shows the distribution of fruit on the first night, and red on the second. The daily growth varied between 5-8mm for smaller fruit and 4-10mm for larger pieces.



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Robotic yield projection in Bundaberg eggplants

Improving grower productivity, profitability, preparedness and competitiveness

The trial successfully demonstrated that a robot can be programmed to navigate a greenhouse and image fruit, providing accurate counts and sizing of the fruit.

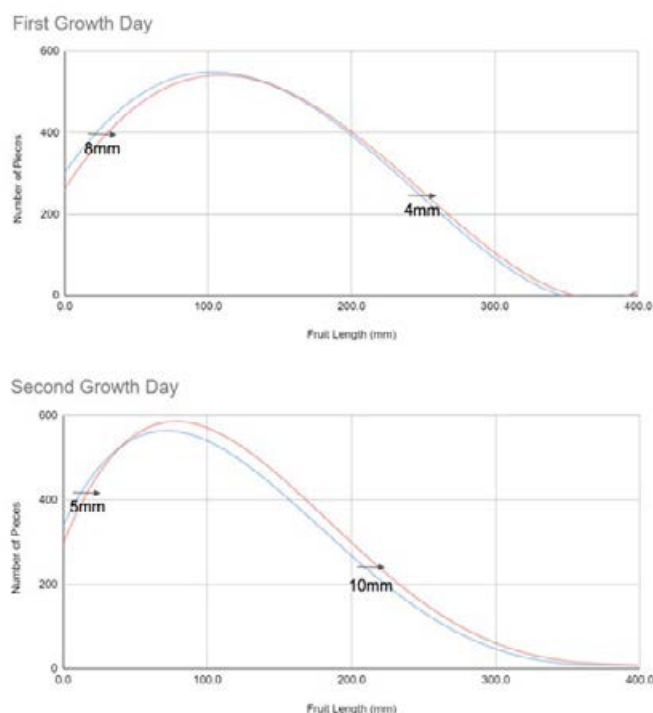


Figure 2: Comparison of eggplant growth across two nights.

The Ambit team is beginning to explore how to add value to forecasts through disease tracking, fruit grading and performance management.

The VegNET Queensland Wide Bay Burnett project will continue to work with AgTech companies and growers who are looking at technology solutions that will increase on-farm efficiencies to support their uptake into the future. The VegNET project will be inviting Ambit robotics and other tech companies back to the region to feature in the upcoming Bundaberg AgTech Showcase scheduled for 22-23 October 2024.

While the data showed strong potential to provide insights to growers, a significant challenge remained at the conclusion of the trial: robot traction issues on loose areas of weed-mat, difficulty avoiding obstacles within the rows and navigational issues. These issues prevented long-term (multi-week) data observation as they introduced critical gaps in the data stream from the robot.

The Ambit team has responded to these challenges by focusing on greenhouses with pre-installed heating rails. These rails provide certainty of navigation, avoiding gaps in the final data stream.

"The VegNET project gave us the opportunity to expand into a new crop; the highlight was gaining the perspective of new growers, and the different ways that yield forecasting helps them deal with customers and manage their farm," Ambit Robotics team member Paul Voutier said.

"For crops such as eggplants which are sold based on size, accurate measurement on the plant could have a real impact for growers. The rate at which eggplants grow each day varies significantly, and the robot showed significant potential to monitor this in real time each day."

Next steps

Consistent, daily observation of fruit has the potential to generate yield insights that provide a 'step change' in yield projection accuracy. While achieving higher accuracy, automation allows for constant monitoring of trends.

On many farms, the value of these insights in terms of operational savings is at least an order of magnitude greater than the cost of the hardware and computing power needed to deliver these estimates.

'Delivering' the camera on a fixed path night after night presents the most significant challenge to adoption. We are likely to see significant growth of this technology on railed farms where navigational issues are already solved. From there, expansion into the more traditional greenhouses is only a matter of time.

The trial was a meaningful learning opportunity for the VegNET program and Ambit team. This case study provides an opportunity for other technology providers and growers to also learn from the trial.

Further information

Contact VegNET Queensland Wide Bay Burnett Regional Development Officer Jessie Logan at vegnet@bfvg.com.au or 0407 366 797.

Find out more about the technology from Ambit Robotics at <https://ambitrobotics.com/>



National Vegetable Extension Network

VegNET

SOUTH AUSTRALIA

CASE STUDY

Predicting beet cyst nematode populations in brassicas

Introduction

Beet cyst nematode (*Heterodera schachtii*) is a major nematode pest of brassica crops worldwide.

Substantial productivity loss in brassica crops associated with cyst nematodes has been recorded on the Northern Adelaide Plains, with an estimated \$2.5 million in crop damage to date (past season) and a further \$5.5 million in damages estimated by regional agronomists over the next two years.

This regional issue poses significant challenges in the Northern Adelaide Plains production region and could potentially have flow-on effects to the supply of key crops such as broccoli, leading to price spikes for these commodities if not effectively managed.

Local agronomists and key growers approached AUSVEG SA to assess the problem and it was recommended by local industry to develop a Predicta Pt DNA test for this issue. This DNA-based soil testing service was available through the South Australian Research and Development Institute (SARDI) but came at a commercial cost, therefore investment was needed to help growers manage the issue effectively and sustainably.

The Beet Cyst Nematode Project received funding from the VegNET Innovation Fund for the initial development and extension costs to build a program around beet cyst nematode diagnosis and management. The development of the Predicta Pt DNA test was a vital first investment to ensuring industry could manage this significant problem.

Key messages

- The substantial productivity loss associated with cyst nematodes in brassica crops on the Northern Adelaide Plains presents a significant risk to the region.
- To better understand and manage these losses in productivity, growers required access to an accurate soil test that quantified beet cyst nematode populations. This would allow growers to identify paddocks with high beet cyst numbers and use a quantitative tool to evaluate the effectiveness of management strategies.
- VegNET SA worked with growers, agronomists and researchers from the South Australian Research and Development Institute (SARDI) to deliver a project which developed a Predicta Pt test – a DNA-based soil testing service – for beet cyst nematode diagnosis and management.
- The project successfully developed a DNA test that enables growers and their advisors to quantify *Heterodera schachtii* nematode populations on their properties.

Predicting beet cyst nematode populations in brassicas

From concept to reality

Twelve growers were involved in the project across three regions: eight in the Northern Adelaide Plains and two each from Western Australia (south west region) and Victoria (Werribee region) where similar issues had been identified.

SARDI was engaged to develop a Predicta Pt test and conduct a field evaluation with the work being led by research scientist Dr Michael Rettke. The project was conducted over 12 months, and an initial meeting with growers and agronomists was held in July 2023 where the strategy for the collection and testing of samples was confirmed.

The field evaluation was conducted by agronomists using the *H. schachtii* test. It enabled affected growers in the region to test and identify baseline nematode numbers on their properties, and therefore allow for the trial and adoption of product-based, cultural and rotational management practices to minimise and suppress numbers.

A total of 78 soil samples collected from 12 brassica growers were tested by SARDI.

Testing of samples – South Australia

Soil samples were collected from a range of cropping situations including prior to planting, in crops with and without symptoms of beet cyst nematode, and from areas with no history of brassica production.

Concentration of *H. schachtii* DNA ranged from below detection to 8245 kDNA copies/g soil. Review of the soil testing results with the collaborating agronomists indicated that the DNA levels of *H. schachtii* detected were consistent with beet cyst nematode symptoms and crop performance observed.

Testing of soil samples pre- and post-fumigation, and in association with use of a trap crop, indicated the test will be a useful quantitative tool for evaluating effectiveness of management strategies.

Testing of samples – interstate

Soil samples were obtained from brassica growing areas in Victoria and Western Australia where symptoms of beet cyst nematode were suspected to have caused damage in previous brassica crops. *H. schachtii* was detected at concentrations ranging from below detection to 1353 kDNA copies/g soil.

Detection of crucifer cyst nematode

Much lower-than-expected *H. schachtii* DNA concentration was detected in soil and plant root samples from a specific site when compared with manual counts of *Heterodera* spp. undertaken as part of test validation.

Polymerase Chain Reaction (PCR) testing (non-quantitative) confirmed crucifer cyst nematode (*H. cruciferae*) was the dominant cyst nematode species present at this site, with only low levels of *H. schachtii* present. Subsequent PCR testing indicated the presence of *H. cruciferae* in samples from the properties of seven from eight growers on the Adelaide Plains and both growers in Werribee.



Image: Effect of beet cyst nematode on growth of cabbage (left) compared to healthy cabbage (right). **Credit:** Robert Ingram, DAFF



Image: Stunted cabbage plant growth due to high beet cyst nematode numbers (54/250g soil)

Predicting beet cyst nematode populations in brassicas

Improving grower productivity, profitability, preparedness and competitiveness

The Beet Cyst Nematode Project demonstrated end-to-end problem solving in the region delivered by VegNET SA. The development of the test, field evaluation and field validation achieved the following objectives:

- Demonstrated applied soil health principles and allowed for measurement of future gains from application of management practices
- Provided a test for commercial agronomists to ascertain a base level of nematode populations to inform future trial work into new products and crop management
- Targeted extension work to address a key regional issue and demonstrate how effective integrated pest and soil management principles can address regional pest and disease issues.

This project successfully developed a DNA test that enables growers and their advisors to quantify *H. schachtii* nematode populations on their properties. Going forward, this test will assist in the trialling and adoption of product-based, cultural and rotational management practices to minimise and suppress beet cyst nematode numbers.

Platinum Ag agronomist Paul Pezzaniti worked with growers on the project and said: "This was a really valuable project because it's given growers the opportunity to measure levels of the pest in the soil in order to make management decisions that support their future productivity and profitability."

"They now have options to manage beet cyst nematode that they didn't have before, such as planting in less active time slots, planting other crops where levels are high, and fumigation where needed."

The detection of a second cyst nematode (*H. cruciferae*) infecting brassica crops in the Werribee and Adelaide Plains production areas was very significant as the treatment and management of this nematodes varies and may explain why some measures for beet cyst nematode have not worked as well as expected. SARDI developed a quantitative DNA test for *H. cruciferae* and included it in the SARDI Predicta services that are offered nationally.

The diagnostic test is a legacy asset from the VegNET 3.0 project funding. The Predicta Pt test can be used in any soil type (and can be applied in any affected area) and the SARDI Predicta services are offered nationally. A field validation would be required for different sites and the project proposed a structured program that could be applied to other regions.

The project outcomes can be shared across VegNET in regions with the same issues, such as Victoria.



Image: Field evaluation and crop performance observation



Image: Brassica grower on Northern Adelaide Plains

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Predicting beet cyst nematode populations in brassicas

Next steps

The growers and agronomists involved in the program commenced trials and changes to management practices at the end of the project once the test was developed, and soil samples were collected and tested to identify base levels of the nematode present. An initial trial with a biofumigant showed a reduction in the population where it was used but this was only on one site and requires further testing to demonstrate efficacy and sustainable results. This work is continuing and the growers and agronomists will meet to share their results and work together on management strategies.

A grower feedback session in September 2024 will share the results of the trials and management practices implemented so far. Dr Michael Rettke from SARDI will provide an overview of the test development and the initial findings, particularly the detection of the crucifer cyst nematode and the actions taken.

Paul Pezzaniti, a lead agronomist in this project, recommended further trials to understand the comparison of fumigants versus cover crops to produce long term, sustainable results. If the growers support this recommendation, VegNET SA will identify growers who want to participate in further trials and will liaise with commercial suppliers and other projects to support this work.

The opportunity to apply further funding to investigate the management of both the beet cyst nematode and the crucifer cyst nematode is also being considered. The management of these two nematodes is different, and as they are often found together, a combined approach to effective management is an area for further research.

Further information

Further information

Contact VegNET South Australia Regional Development Officer Peta Coughlin at peta.coughlin@ausveg.com.au or 0409 029 745.

- Predicta Research – PIRSA
pir.sa.gov.au/research/services/molecular_diagnostics/predicta_research
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