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June/July 2012

Anthony Pratt

Paper, packaging and recycling: VISY's evolution

2012 AUSVEG National Convention

National Awards
for Excellence

Late blight:
closer to home than we think

Researcher of the Year Calum Wilson

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AUSVEG

2013 National Convention
Trade Show and Awards for Excellence



Adelaide

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potatoes australia

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FRONT COVER:

Calum Wilson

Photograph by Phil Hargreaves

John Brent AUSVEG Chairman

The 2012 AUSVEG National Convention, Trade Show and Awards for Excellence held in Tasmania in May provided members of the Australian horticulture industry with an invaluable opportunity to meet fellow growers and other members of the supply chain, but also learn about new products and farming techniques from agribusinesses, researchers and other industry experts. It was certainly a memorable occasion and I am sure that all who attended benefited from the experience.

This year's convention featured some prominent Australian figures, who took the time to show their support for our industry, including leading researchers, influential members of the media and key members of the industry.

Political representatives also showed their support for the industry, including the Parliamentary Secretary for Agriculture, the Honourable

Sid Sidebottom, Victorian Senator John Madigan, and the newly appointed Leader of the Australian Greens, Senator Christine Milne.

I welcome the participation and support shown by these politicians and other Federal and State Parliamentarians who attended the event. Further engagement with our nation's political representatives, from all sides of politics, will be vital if we are to ensure that the long-term interests of Australian potato growers and processors, and the wider horticulture industry are properly addressed.

It was very pleasing to see such widespread involvement at this year's convention from people representing the many different areas of our industry. I was encouraged by the strong presence of younger generation growers and the enthusiasm they are bringing to the table. It is critical that we nurture these leaders and that we help them to grow with the same passion

we have for the crops we grow in our soils. It will be through their passion and determination that our industry will be able to meet the future challenges that it faces and build on the achievements that have already been made. The next generation of the industry is clearly upon us and it is up to all of us to provide our young growers with the support they need to take over the reins.

I would like to congratulate all of the award winners from the 2012 National Awards for Excellence. I am proud to say that we work alongside some of the hardest working, resilient and most passionate people I know, and the awards night presented a fantastic opportunity for industry to recognise the efforts and contributions made to our sector by these amazing people and organisations.

And finally, I would like to thank all those who took time out to participate in this year's

event. It was terrific to see so many new faces there, as well as many familiar ones returning. The success of this year's convention solidifies the importance of our industry coming together to deliver a united front.



John Brent
Chairman
AUSVEG

Richard Mulcahy AUSVEG Chief Executive Officer

I am very pleased to report that AUSVEG has received a great deal of positive feedback from members of the industry regarding the 2012 AUSVEG National Convention, Trade Show and Awards for Excellence.

It truly was a resounding success and I am looking forward to an even more impressive event at the 2013 Convention, which will be held in Adelaide, South Australia.

It was heartening to see so many members of the potato industry in attendance, from growers to researchers, as well as key suppliers. The involvement and support by several Federal and State Parliamentarians at this year's convention was also appreciated and will hopefully allow for the establishment of greater communication and consultation between industry

and policymakers.

Congratulations also goes to all of the award winners and finalists at this year's AUSVEG National Awards for Excellence.

The Strategic Investment Plan for the potato industry has made substantial progress in the analysis and development of objectives, priorities, visions and missions for the fresh and processed sectors. Through an extensive consultation with industry stakeholders, the 2012-2016 plans contain contemporary emphases that reflect the current landscape of the industry, including its volatility and capacity. With two separate analyses, it was identified that the objectives for both the fresh and processed sectors should revolve around increased industry innovation, a greater adoption of practical research findings, enhanced understanding of

the market for fresh potatoes and an effective industry communication strategy. At this time, the Strategic Investment Plan has been endorsed in principle by the Industry Advisory Committees, and will be submitted to Horticulture Australia for final approval.

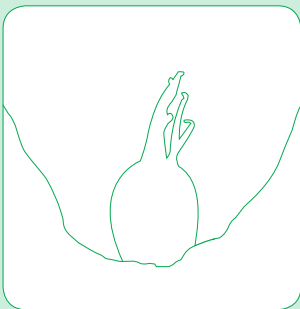
After the success of the inaugural Potato Extension Workshop held in Devonport, Tasmania earlier this year, AUSVEG will host a second event in Ballarat, Victoria on 28 June. As part of the Potato Industry Extension Program, the free seminar will focus on Potato Research and Development activities. Key industry speakers will discuss R&D benefits for growers and processors, and how it can be implemented practically in an on-farm setting. Presenting an opportunity to see where potato levy funding is going and

the benefit that growers and industry are receiving, this will be an important event not to be missed by those in the industry.



Richard J Mulcahy
Chief Executive Officer
AUSVEG

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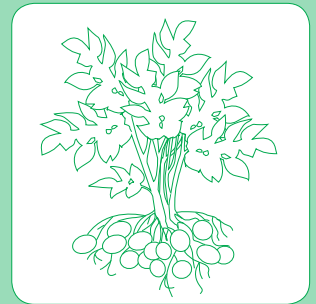
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Editorial



Executive Chairman of VISY, Anthony Pratt.



AUSVEG 2012 Gala Dinner and National Awards for Excellence.

The 2012 AUSVEG National Convention, Trade Show and Awards for Excellence proved to be a huge success. Held in Hobart in May, the event provided an invaluable opportunity to hear from key members of the industry, influential political figures and widely respected international speakers. Culminating with the spectacular Gala Dinner and National Awards for Excellence, the event acknowledged significant contributions made to the industry by researchers, agribusiness organisations and growers.

This edition of *Potatoes Australia* showcases some of the influential speakers at the convention, including an interview with Chief Scientist of Sustainable Systems at the

South Australian Research and Development Institute, Dr Kathy Ophel Keller (pg 14). We report on one of the highlights of the speaker sessions, a presentation by the Professor of Agribusiness Economics at Massey University New Zealand, Hamish Gow, on functional branding and creating value (pg 13). Meanwhile, Parliamentary Secretary for Agriculture, Fisheries and Forestry, the Honourable Sid Sidebottom, discussed the importance of the Australian horticulture industry, the challenges facing the sector and opportunities for the future (pg 12). See a wrap up of all of the National Award winners (pg 10), and prominent speakers events from this year's convention (pg 34).

Speaking as a guest at

the AUSVEG Board meeting held in Melbourne recently, the Executive Chairman of packaging and recycling giant VISY, Mr Anthony Pratt, discussed some of the major issues currently affecting both the horticulture industry and VISY in regards to domestic manufacturing and future opportunities for exports. With some 70 per cent of VISY's customers operating in the food sector, VISY are an important contributor to the supply chain and will continue to help shape the future of the industry (pg 21).

This edition's featured R&D includes an article from Richard Falloon of Plant & Food Research New Zealand on Powdery scab (pg 16), while Dr Dolf de Boer, from

the Department of Primary Industries Victoria, details the particulars of Late blight in potatoes (pg 18). An interview with Dr Fiona Constable, from the Department of Primary Industries Victoria, discusses a project to identify risk associated with a pathogen causing Zebra chip (pg 24). Also featured is the bi-monthly update of the Potato Extension Program (pg 26).

As well as a selection of industry news, *Potatoes Australia's* regular features, Ask the industry (pg 28), Soil solutions (pg 29) the International R&D update (pg 31) and the Young grower profile (pg 32) are featured, and the Pests and diseases profile makes a return (pg 30).

TOP SPEED
PROTECTION AGAINST POTATO MOTH



BELT

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News in brief

Significant event for the potato industry

The 2012 Potato Conference will be held in Ballarat from 29-31 July, attracting delegates from all areas of the potato industry for an informative and important occasion.

The 2012 Potato Conference aims to provide valuable information on all areas of the potato industry, including the processed, fresh and seed sectors, and celebrate the successes and contributions made by members of the industry.

Delegates will have the opportunity to learn about a range of contemporary farming practices, and will hear from prominent international and local speakers on a range of topics

including agronomy, finance and disease management. The conference will also serve to foster greater communication throughout the industry.

Amongst the leading experts who will provide professional and practical information at the conference, is Dr Stuart Wale, from the Potato Consultancy and Research division of the Scottish Agricultural College. Joining the conference as an international guest, Dr Wale will present on potato

agronomy. Professor Phillip Nolte from the University of Idaho will also discuss Potato virus Y management and experiences. Dr Tonya Wiechel from the Department of Primary Industries Victoria and Dr Kathy Ophel Keller from the South Australian Research and Development Institute, both working on the Australian Potato Research Program, will present various outcomes and report on progress of their respective research. Professor Jim Pratley from the Australian

Council of Agricultural Deans will discuss the need to attract young people into the agriculture industry.



For more information:

The 2012 Potato Industry Conference has been arranged through a partnership between ViCSPA and Seed Potatoes.

For more information contact:
ViCSPA (03) 5962 0000
or www.spv.org.au



[L-R] Denis Persley, Dr Calum Wilson and Richard Dickman.

Researcher of the Year Award presented to prominent potato industry figure

Associate Professor in Plant Pathology at the University of Tasmania, Dr Calum Wilson, has won this year's prestigious Researcher of the Year Award at the 2012 AUSVEG National Awards for Excellence.

Sponsored by Bayer CropScience, the Researcher of the Year Award acknowledges researchers who have made an outstanding contribution to the Australian vegetable industry.

The 2012 winner was Dr Wilson who said he was excited and humbled to be presented with the award. A recent major success for Dr Wilson was a breakthrough in managing

Common scab in potatoes.

"Through the use of novel tissue culture of potato varieties, we've found new types of commercial potatoes with very high resistance to Common scab, which has been exciting for the potato industry," Dr Wilson said.

Working in plant disease research for over 20 years, Dr Wilson has focused his research on the vegetable industry and

more specifically potatoes, working with viruses, bacterial, fungal and protozoan diseases.

Seen as one of the foremost experts in the industry, Dr Wilson is starting to focus on Powdery scab disease as well.

"We're finding that some of the approaches for Common scab will work with Powdery scab as well, and this opportunity could be more economically

significant for growers than the Common scab in terms of crop protection."

"I love the science but the practical application really excites me, to see the impact that our work can have in terms of reducing crop losses or increasing profitability through making diseases less common than they were before," Dr Wilson said.

Eating vegetables whole may assist with weight struggles

A new study has found that eating larger intact pieces of vegetables can have an impact on how full we feel.



It has been identified that eating vegetables in chunks or slices is an effective approach to staving off hunger. If a person feels full, they are more likely to eat less. The findings of the study, conducted by the Smart

Food Centre at the University of Wollongong, were part of a broader research effort by the vegetable industry to identify the importance of consuming different types of vegetables in controlling weight fluctuation.

The results revealed that in order to achieve maximal satiety levels, or the feeling of being full, vegetables should be eaten intact rather than pureed or mashed. Researchers commented that vegetables could be an ideal

food group for promoting satiety due to a generally low energy density, high levels of swellable fibre and diverse phytochemical content.

Update for growers in southern areas of New South Wales

With excessive rainfall and flooding threatening some potato crops in southern New South Wales earlier in the year, growers are looking towards the future of production in the region.

In good news for the industry, the Crookwell Growers Association has reported no sign of disease as a result of waterlogging from flooding earlier in 2012. Some crops in the district were virtually unaffected, with others suffering

more moderate losses. President of the Crookwell Potato Association, Matthew Gay, said with potato paddocks now dried out, crops are yielding well with no disease reported. "This is great news for

Crookwell producers after extreme rainfall in March threatened crops. There has been some loss due to waterlogging in some paddocks but due to no follow-up rain in late March the crops came through extremely well."

"Crookwell growers are supplying quality seed to their clients and are committed to growing and preparing Certified Seed to the highest standard for the potato industry now, and well into the future," he said.

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Phillip Beswick – Farmer, Sisters Creek, Tasmania

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AUSVEG National Awards for Excellence

2012

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Rising Star of the Year Award
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Young Grower of the Year Award
2012 Winner - Mr Michael Vorrasi



Grower of the Year Award
2012 Winner - Mr Frank Ruffo



The Industry Impact Award was accepted on behalf of Mrs Joyce Babun by vegetablesWA Executive Officer, Mr Jim Turley.

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Industry Impact Award
2012 Winner - Mrs Joyce Babun



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Women in Horticulture Award

2012 Winner - Mrs Tina Lamattina



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Industry Recognition Award

2012 Winner - Ms Denise Kreyborg



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Researcher of the Year Award

2012 Winner - Dr Calum Wilson



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The Innovative Marketing Award was accepted on behalf of Aussie Farmers Direct by Mr Andrew Fletcher, National Fruit and Vegetable Manager.

Innovative Marketing Award

2012 Winner - Aussie Farmers Direct



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The Environmental Award was accepted on behalf of Mr Steve Newman by Adelaide Produce Markets CEO, Mr Angelo Demasi.

Environmental Award

2012 Winner - Mr Steve Newman



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The Productivity Partner Award was accepted on behalf of VISY by Mr Wayne Dunne, National Sales Manager - Fibre Packaging.

Productivity Partner Award

2012 Winner - VISY

Forward thinking for the Australian horticulture industry

Speaking at the AUSVEG National Awards for Excellence in Hobart, Parliamentary Secretary for Agriculture, Fisheries and Forestry, the Honourable Sid Sidebottom, discussed the importance of the Australian horticulture industry, the challenges facing the sector and opportunities for the future.

Parliamentary Secretary for Agriculture, Fisheries and Forestry, the Honourable Sid Sidebottom, spoke at the 2012 AUSVEG National Awards for Excellence. Mr Sidebottom acknowledged the outstanding achievements in the horticulture industry made by growers, researchers and businesses around Australia, placing emphasis on the importance and value of the industry today.

"As I travel from my home each day and now around Australia, I am constantly reminded and amazed at the ingenuity and innovation I see in this sector."

"The Australian horticulture industry has always played an important role in Australian agriculture. The vegetable and potato industries alone play a significant role in the Australian economy, with an estimated gross value of production of around \$3.3 billion in 2009-10, and contributing around seven per cent to Australia's gross value of agricultural production," said Mr Sidebottom.

"Continuing along the 20 year trend of growth, vegetable production is forecast to increase to \$4 billion in real terms by 2016-17. With figures and growth projections like this, vegetable producers will remain

important suppliers of food to the domestic market, and increasingly export markets."

Recent struggles

Reflecting on the recent price wars seen in major supermarket chains, Mr Sidebottom noted some welcome support on the horizon for Australian producers.

"I am very pleased to note Coles' recent announcement that all of their own frozen vegetable lines will be Australian. One hopes they must be reacting to something in the marketplace. This is a positive sign for domestic consumption. But I believe we must increasingly lift our eyes to the horizon and beyond and look to our nearest neighbours to our north."

"Projections by the UN Food and Agriculture Organisation indicate that by 2050 world food demand may increase by 70 per cent, with much of the increase due to rising consumer incomes in regions like Asia," said Mr Sidebottom.

"Growth is not only in China or India. ASEAN countries like Brunei, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam currently have around 150 million middle-class

consumers who want our higher quality and niche products, and increasingly they have the money to pay for them. We should be looking at supplying this need."

Challenges and opportunities

Mr Sidebottom also discussed the recent closures of some of the industry's largest processing plants, and the urgent need to attract younger people into the industry.

"It is regrettable that there have been recent closures of food production and processing facilities - a situation Tasmania knows only too well over the last few years. Reported reasons for the closures include the high Australian dollar, increased competition from imported products and high input costs, including labour, in Australia. Some reports have also sought to blame grocery pricing and stocking policies by the two major retailers. I hope the recent Coles announcement will be followed by others and this trend will be reversed," said Mr Sidebottom.

"It is a fact, however, that the industry is rapidly ageing and now has one of the oldest workforces in the country.

Today's youth are faced with an incredible choice of career options, with many industries vigorously competing to attract the best and brightest young minds. Unfortunately, many young people don't appreciate the breadth and depth of careers available in Australian agriculture and we are losing these people to other industries such as mining," he said.

"There is room to improve not only the levels of tertiary education in agriculture but also vocational and skills training. This is why Minister for Agriculture, Fisheries and Forestry, Senator Joe Ludwig, has given me portfolio responsibility for skills development in agriculture in my role as Parliamentary Secretary. Last month, Minister Ludwig announced that the National Rural Advisory Council would pursue a new work program from July 2012. This will include a focus on skills and the workforce capabilities of agricultural employers."

Mr Sidebottom's speech was a welcome addition to the event, as industry works to ensure closer collaboration with Government on these important issues.



Cracking the value puzzle

Professor of Agribusiness Economics at Massey University New Zealand, Hamish Gow, gave a captivating presentation on functional branding and value creation for his part in the 2012 AUSVEG National Convention speaker sessions.

Professor Hamish Gow is the Director of the Centre of Agribusiness Policy and Strategy, and AgriCommerce Programs at Massey University, NZ. Professor Gow has led numerous market development projects in over 50 countries and acted as a consultant for domestic and international organisations. Earlier in his career, Professor Gow was Director of the Partnerships for Food Industry Development - Fruits and Vegetables - a USAID funded value chain development and capacity building project supporting farmers and SMEs from across the world. Recently awarded the 2011 Effective Practice Award from the Sloan Consortium as founder of the Food Safety Knowledge Network, Professor Gow is also currently assisting the World Bank to establish an open source Global Food Safety Partnership.

Discussing the intricacies surrounding value creation and generic branding, Professor Gow identified the need to rethink how we as an industry

view markets, value creation and strategy. Looking at what a product will provide, what it will offer to the consumer and where the performance and



Pre-packaged chicken product prior to functional branding.

opportunity gaps reside, was a key talking point of the speaker session.

The presentation considered questions surrounding how to create value, including: identifying what problem will be solved, what needs should be satisfied, what constraints will be overcome, and what attributes are being offered. Professor Gow used the example of 'easy braai' chicken - contrasting generic packaging featuring a

cling wrapped piece of chicken on a meat tray with a product developed by an organisation that had identified the branding attributes and features needed



Post re-branding and value creation methods.

to produce a useful and attractive package. Professor Gow analysed elements such as convenience, visual appeal and differentiated branding, and showed how these assist in the creation of value and also the distinction between products perceived as having a higher quality. Prices for the consumer need not play such a pivotal role according to Professor Gow. If a product is filling a specific need (niche) and purports an image

of quality through branding, then consumers would conceivably be more likely to pay more. Creating functional branded experiences based upon specific differentiating attributes and signalling this to the consumer was a captivating component of the speaker session.

Some of the main points of the presentation included methodologies for the creation of value:

Creating Value

- Product leadership: state of the art technology, R&D and brand promotion.
- Operational excellence: lead in price and convenience, costs, optimal processes and high efficiency.
- Customer intimacy: tailor and shape offers for individual customers, understand needs, finding solutions.

Plant health, soil-borne pathogens and helping growers to manage risk



Chief Scientist of Sustainable Systems at the South Australian Research and Development Institute, Dr Kathy Ophel Keller, presented recently at the 2012 AUSVEG National Convention speaker sessions. *Potatoes Australia* spoke with Dr Ophel Keller, where she discussed rapid soil testing, issues with communicating R&D to industry, and the skill shortages facing the industry.

Working across numerous plant health projects, Dr Kathy Ophel Keller heads the soil diagnostics program in the Australian Potato Research Program (APRP2), which works to connect researchers, domestic and abroad, to develop DNA tests measuring the risk of soil-borne pathogens of potatoes, in soil and seed. Dr Ophel Keller has worked on the development of DNA diagnostics for over 15 years and was involved in the development of the Root Disease Testing Service, a world-first service to grain-growers to measure disease risk in soil. The technology has a broad range of applications including monitoring root growth and beneficial organisms in soil.

Identifying the importance of the AUSVEG National Convention to connect members of the industry, Dr Ophel Keller said the chance to interact with the broader industry and particularly to get the broader perspectives on issues that affect the industry as a whole, was a highlight.

"I think as researchers we don't always hear those perspectives from different areas of the sector. Research has an important place in the industry but we need the context of the broader industry

to understand where we fit, so I think it's been really useful from that point of view," she said.

Communicating R&D

Dr Ophel Keller also said that communicating research and development outcomes to growers and the wider industry has proven to be a challenge for the research community.

“Research has an important place in the industry but we need the context of the broader industry to understand where we fit.”

"It is a difficult step. I think using a new crop cultivar, a new variety or using a new seed dressing or fungicide treatment is in some ways easier than a new practice or using a new tool."

"The issue of how people change behaviour and how people change their use of technology or their overall management strategy is not easy, so we really try to think

about how you can make something that people can use in a practical way. It's not always a trivial undertaking and we generally want to do things in partnership with industry to figure out how they can use the research that we've been doing. Because I think most researchers want to see what they've been working on, being utilised," she said.

The importance of young people

Discussing the skills shortage facing the industry in coming years, Dr Ophel Keller stressed the need to attract younger people into the industry.

"I think younger people are interested in food prep, like what we see in shows such as *MasterChef*. I can see it in my own daughters who are in

their teens, they have a strong interest in these shows that then leads into an interest in regional food."

"It's just trying to get that connection to where their food comes from, and it is frustrating. Australia is quite an urban population and people don't have a strong interest in plant science. Schools in particular have a lot to answer for. I think science is very poorly taught and they don't do much with plant science or agriculture at a school level. But I think that interest in food preparation and where food comes from could be used to help drive some of that," said Dr Ophel Keller.

"It's not so much getting a job from a degree for university students, but more so getting people into the degrees in the first place. I think some of the younger people who are starting to work in the industry could play a strong role in attracting other young people, as having people my age trying to attract a younger generation into agriculture is not the way to go. It needs to be driven by some of the young people who are really passionate. The careers can be very interesting in agriculture and there are a lot of pathways, we just need to get the message out to the young people."

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Powdery scab: *the inside story*

As a common disease of potatoes, Powdery scab can reduce the marketability and value of tubers. With the spread of infection in root systems, growth and yields can be reduced.

Caused by the pathogen *Spongospora subterranea*, Powdery scab is a common disease of potatoes. This disease gets its name from the brown “powdery” scabs caused by the pathogen on the surfaces of potato tubers, typically associated with cool, wet weather.

The economic impact

The disease reduces the marketability and value of potato tubers. Tolerances for scab on seed potatoes are low (no more than two per cent of tubers with scab), but growers may reject consignments with any sign of scab. Tubers with Powdery scab are also prone to secondary rots during storage. Powdery scab-infected potatoes for processing may be rejected or de-valued because extra skin removal is required during processing of diseased tubers. Reduced value of produce, additional labour costs for grading and wastage can all contribute to the economic burden of this disease.

Although the disease is most obvious on tubers, the first sign of *Spongospora* infection is on plant roots, as small light-coloured galls between 1-10 mm in diameter. The galls become brown and powdery as they age. On the tubers, Powdery scab is first seen as light coloured warts that break out, eventually turning brown and powdery as typical “Powdery scab”.

The disease cycle

The galls on the roots and scabs on tubers contain hundreds of

spore balls, each of which is a mass of very many thick-walled resting spores. These can lie dormant in the soil for many years in the absence of a host. *Spongospora subterranea* is an obligate parasite, which means it cannot reproduce without host plants. The pathogen can infect solanaceous hosts other than potato, including nightshade weeds.

Resting spores germinate to produce zoospores, which

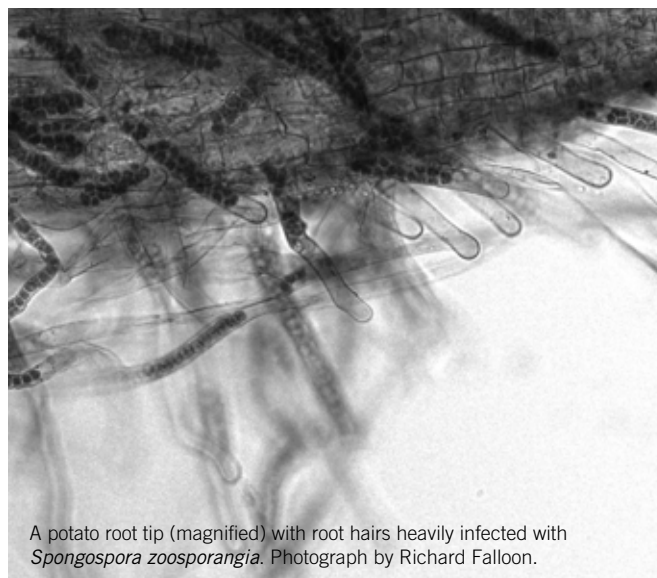
require soil moisture for their motility, and are released in response to chemical stimuli from host roots. The zoospores initiate infections of the root cells, and these develop to produce more zoospores, a process that can only be observed using a microscope. Several cycles of multiplication may occur on roots with successive periods of cool, wet conditions. The disease cycle is complete when infection results

in the development of galls on the roots and Powdery scab on the tubers.

The hidden menace

There is evidence of a hidden cost to this disease, that of damage to roots, which may result in reduced water and nutrient uptake by plants, and consequently reduced plant growth and tuber yield. There has been increasing realisation,

“ Potato varieties differ considerably in their susceptibility to Powdery scab on tubers. ”



A potato root tip (magnified) with root hairs heavily infected with *Spongospora zoosporangia*. Photograph by Richard Falloon.



both from research results and from industry observation, that the root infection has the potential to reduce tuber yields from potato crops. This needs to be confirmed in field experiments. Also, cultivars with very low susceptibility to tuber Powdery scab can develop severe *Spongospora* root galling.

Infection can occur at temperatures ranging from 9 to 20°C, but in controlled environment experiments, tuber disease was most severe on plants grown at 12°C, whereas root galls were most abundant on plants grown at 17°C. The highest risk of infection of roots and tubers is when periods of optimum temperatures coincide with wet soil. Roots can be infected at any time. Galls can be found on young plants, as well as on mature plants. The greatest risk of tuber infection is during tuber initiation when tubers are at their most susceptible, a period of 4-6 weeks midway through crop growth. However, the scab pustules will not develop until later as the tubers mature. It is not uncommon to observe galls on roots and not see Powdery scab on tubers at harvest of a susceptible variety. This is because tubers may escape infection if conditions are not favourable during the tuber initiation period, even though they are susceptible to infection at this stage.

Managing the problem

A disease resistant variety is the best control option. Potato varieties differ considerably in their susceptibility to Powdery scab on tubers. Many commercial varieties tend to be moderate to highly susceptible. Tubers of Atlantic, Shepody, Trent, Pike and Simcoe, for example, are moderately susceptible, whereas tubers of Russet Burbank, Ranger Russet, Innovator and FL 18 67 are relatively low in susceptibility. While the relative susceptibility of cultivars to root infection is not yet well characterised, some tuber-resistant varieties, for example, Russet Burbank, can develop very heavy root galling and may suffer yield reductions as a result.

Growers can reduce the risk of Powdery scab using several strategies. Practice crop rotation, at least five years between crops is recommended if possible, to minimise the



A potato tuber with typical (severe) Powdery scab.
Photograph by Robert Lamberts.

“ Practice crop rotation, at least 5 years between crops is recommended if possible, to minimise the build-up of the pathogen population in soil. ”

Evaluating Powdery scab risk before you plant

A pre-planting DNA soil test has been developed to enable growers to identify fields, and zones within fields, that have a low, medium or high risk of Powdery scab development.

This can assist growers when making management decisions. Growers may use the results in choosing fields or to match varieties (high or low susceptibility) and planting schedules to available fields. Knowledge of the risk of Powdery scab may influence other strategies adopted such as irrigation scheduling during the critical tuber infection period. Along with the soil, DNA tests can be applied to seed, to assess whether planting material is a potential inoculum source.

In understanding disease risk, factors including environmental conditions, variety and end use of the crop need to be taken into account. The Powdery scab test will be offered by SARDI to growers as an integrated package within the next 12 months.

build-up of the pathogen population in soil. Control self-sown potatoes in the rotation. Avoid planting very susceptible cultivars in paddocks with high disease risk. Use certified seed potatoes, but when planting in new ground, obtain seed from growers who do not have Powdery scab. Seed tubers from traditional production areas may be contaminated with the pathogen, despite the absence of scab symptoms. Reduce the frequency and volume of irrigation around the critical tuber set period of crop growth.

Powdery scab is a priority for research in the current Australia Potato Research Program Phase 2 (APRP2) which is focussing on managing soil and plant nutrients to control the disease.

This project has been funded by HAL using the processed potato industry levy, voluntary contributions and matched funds from the Australian Government.

This article was contributed by Richard Falloon, Plant & Food Research NZ, Dolf de Boer, DPI VIC and Michael Rettke, SARDI.

THE BOTTOM LINE

- Financial issues caused by Powdery scab include reduced value and additional labour costs for grading and wastage.
- The pathogen which causes Powdery scab, *Spongospora subterranea*, cannot reproduce without host plants.
- The first sign of infection is on plant roots, they appear as small light coloured galls (1-10 mm in size).



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Project: PT09026 & PT09023



Late blight:

closer to home than we think

Potato growers, crop consultants and field officers were caught off guard this season by outbreaks of potato Late blight disease detected in crops in south-eastern Australia during the spring and summer, following very unseasonal warm and humid weather conditions.

Late blight, caused by the fungal-like pathogen *Phytophthora infestans*, is the most economically damaging disease affecting potatoes worldwide. The economic impact of this disease is measured in the billions of dollars. Although it is a serious problem for our nearest neighbours (India, Pakistan, South East Asia, China, Papua New Guinea and New Zealand), in Australia we have been fortunate that Late blight occurs only sporadically and locally (not widespread), usually in northern New South Wales, Victoria (Otway Ranges,

Central Highlands, Thorpdale), the limestone coast region of South Australia and the north coast of Tasmania. Over the past decade, the disease has been very rare because of prolonged drought. However, when conditions are right, the disease can quickly take hold and destroy large areas of a potato crop within several days if left uncontrolled.

The weather driven disease

Late blight is a weather driven disease favoured by still conditions with high humidity or

moisture (mist, dew and rain) and moderate temperatures for periods of several days. Typically, Late blight will develop when there are periods of moist air combined with stagnant or slow moving depressions that give rise to lengthy periods of still, humid, overcast weather. Spring and summer weather patterns in the past two years have been strongly driven by tropical lows pushing south through to Victoria, resulting in very favourable conditions for Late blight. Most years, weather conditions are generally too dry for this disease, with the exception of the north coast of

Tasmania, where mild, humid conditions are more common.

The disease cycle

The disease cycle begins with a potato tuber infected with dormant mycelium (fungal threads) (e.g. volunteer potatoes). When environmental conditions become favourable, the infected shoots develop lesions on the stems and the foliage. Delicate chains of sporangia (spore bodies) are produced on the outside of the lesions and are dispersed by air currents. The sporangia land on new foliage to start a new infection cycle, which can take

as little as 4-5 days to complete. These infection cycles are repeated as long as conditions are favourable. Moisture above 90 per cent relative humidity and temperatures of 3-29°C (optimum 16-21°C) are needed to stimulate spore production and germination. Late blight often appears after several cool nights with regular dews in still, humid weather. The disease is often first seen in small “hot spots”, which get larger as the pathogen spreads under favourable conditions. Sporangia can be washed down into the soil to infect tubers.

The first signs of infection are small pale green patches with tiny irregular necrotic (dead) flecks, usually near the tips or edges of the leaves where dew is retained longest. These enlarge into dark brown to black blotches, water-soaked or greasy in appearance, with a dry dead centre. Under humid and cool conditions, delicate white chains of sporangia are produced at the margins of the lesions, particularly on the underside of the leaf, giving the edge of the lesions a cottony-like appearance. The lesions can expand down the petioles and stems, destroying the whole potato plant. If weather conditions dry out, however, disease development will stop and lesions will dry out.

The pathogen

The pathogen, *Phytophthora infestans*, exists in two forms, known as mating types A1 and A2. In Australia, to the best of our knowledge, we have a

single strain of the A1 mating type that is characteristic of old populations of this pathogen found all over the world until the 1980s. The spread of new strains of both mating types into North America and Europe from Mexico have resulted in the development of new populations of very aggressive and highly adaptable strains of both A1 and A2 that now occur worldwide, with Australia being one of the few exceptions. Samples of

New Guinea, which links the Management of potato Late blight in that country with an improved biosecurity preparedness for possible incursion of new strains of *P. infestans* into Australia.

Managing Late blight disease

Be prepared each season. Understand the weather conditions that drive this

crops if there is a high disease risk. Apply eradicant fungicides that can enter the plant tissues (systemic or translaminar) if the disease has been detected in your crop or in nearby crops. Generally, Late blight risk is highest during mid to late summer. A good target spot spray program should also help protect mature crops from infection by the potato Late blight pathogen.

This article was contributed by Dr Dolf de Boer, DPI VIC.


“ Late blight is a weather driven disease favoured by still conditions with high humidity or moisture and moderate temperatures for periods of several days. ”

Late blight collected from crops in south-eastern Australia and New Zealand over the past two seasons have been sent to the James Hutton Institute in Scotland for analysis of strain type, to confirm that we do not have the new aggressive strains. This testing is made possible because of a project by the Australian Centre for International Agricultural Research (ACIAR) in Papua

disease (e.g. the influence of the tropical lows) and watch for weather forecasts predicting still, warm humid conditions with rain or heavy dews. Consult your chemical resellers for information on fungicide products registered for Late blight control. Fungicides are the only way to effectively control this disease as most varieties are susceptible. Apply protectant fungicides on young

THE BOTTOM LINE

- Late blight is a weather driven disease favoured by still conditions with high humidity, moisture and moderate temperatures.
- The first signs of infection are small pale green patches with tiny irregular flecks, usually near the tips or edges of the leaves.
- Most potato varieties are susceptible; growers need to be prepared each season. Monitoring weather patterns and understanding registered fungicides for effective control is crucial to management of Late blight.

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Typical Late blight symptoms on potato foliage. Photographs by Dolf de Boer.

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Paper, packaging and recycling: VISY's evolution

A well-established family-run enterprise, VISY is undoubtedly one of the most recognisable packing and recycling brands in the world. With several new innovative developments on the horizon, including a waste to energy venture, VISY stands as a key figure in the future of the horticulture industry. Executive Chairman Anthony Pratt was a guest at the AUSVEG Board meeting in February, where he spoke with Caitlin Rodé.

Having begun in Melbourne as a corrugated cardboard box manufacturer, the modest VISY business was founded by the Pratt family and their original partners in 1948. With the appointment of Richard Pratt as Chairman in 1969, the organisation expanded its enterprise into paper recycling mills, developed new plants across regional communities in Australia, and was bolstered by the establishment of the Pratt Foundation.

With Anthony Pratt succeeding his late father as Executive Chairman in 2009, VISY has continued to expand, with group sales for the brand now in excess of \$3 billion. Establishing itself as the world's largest privately-owned packaging, paper and recycling company, VISY now employs over 5,500 staff and operates in over 120 sites in Australia, New Zealand, Thailand, Vietnam and Malaysia. VISY also has trading offices located in Singapore and China, with a further 3,500 staff in the USA working under the Pratt Industries USA brand.

Production

Over the past two years, VISY has produced more than 680,000 tonnes of fibre packaging, 623 million steel food cans, 1.4 billion beverage cans, 836 million beverage cartons, 2 billion PET containers and 646 million units of food plastics. The principle recycling mantra - "paper becomes packaging, plastic becomes bottles, waste becomes energy" - is integrated within the core values of production at the packaging giant.

In the same period, VISY recovered 1.4 million tonnes of paper and cardboard, 489 thousand tonnes of glass, 67 thousand tonnes of plastic and 30 thousand tonnes of metal.

With a 30 per cent increase in paper since 2009, and an 8 per cent decrease in water use (per tonne of paper), VISY managed to produce 1.3 million tonnes of paper across 2010-11. In an effort to minimise its environmental impact, raw materials were innovatively used to advance the progression of the organisation as a provider of sustainable product.

As a major supplier of packaging and transport for the Australian horticulture industry, VISY has forged strong ties with members of the supply chain and key members of the sector during the past 60 years of production.

Industry focus

Speaking at a recent AUSVEG Board meeting in Melbourne,

“The big issues facing AUSVEG and its members today are also of great concern for VISY.”

Anthony Pratt stressed that the horticulture sector needs continued support from other industries to ensure its long-term survival.

“The big issues facing AUSVEG and its members today are also of great concern for VISY,” said Mr Pratt.

“Food imports, country of origin labelling, the decline of our food processing industry, the concentrated pricing power of the supermarket sector, soil degradation and access to water are all threatening the future viability of our food industry

from paddock to plate.”

Mr Pratt also stressed the significance of the food industry with respect to other high profile equivalents.

“Some industries, like car manufacturing, are getting big handouts,” said Mr Pratt.

“I’m not going to get into the pros and cons of whether Australia needs a viable car industry, but I have no doubt at all that we need a viable food industry.”

Discussing future innovations for packaging, and more specifically those for the horticulture sector, Mr Pratt detailed several developments that are of focus to the organisation and the industry.

“We will be broadening our services, such as a packaging supermarket concept in stores. In other words, instead of just

offering boxes, we will also offer lots of other things that farmers use. I also think that there’s going to continue to be lighter base weights of packaging, and that will save costs for farmers.”

“I think if the dollar stays high, there will be a lot more imported product. If the dollar goes low again then Australia could benefit as an exporter of food; then we could be the clean food bowl of Asia. It is about how much food is here now, that should be the focus. Hopefully we can feed 200 million people and become a

major exporter to Asia of clean food,” said Mr Pratt.

“It is said that the Australian farm sector supports some 320,000 direct jobs, with a flow-through of about 1.6 million jobs across the nation. VISY’s past, present and future is bonded to the future of the Australian vegetable industry, with some 70 per cent of our customers operating in the food sector,” he said.

Food security

In a recent keynote address at the Global Foundation’s National Conference, Mr Pratt detailed the importance of sustainable production at a farm level.

“Australia needs to embark on a wave of farming innovation, like boosting soil carbon levels which increases the nutrient supply to plants, better water use efficiency, new crop genetics, promotion of best farming practice, and a serious increase in R&D investment.”

“Now is not the time for governments to be cutting their budgets for innovation support for the farm and food production sector. They need to continue to support the many leading Australian farmers who are ahead of the curve in modern sustainability practices,” said Mr Pratt.

“The loss of much of our food manufacturing capacity has gone largely unnoticed because it happens in small increments, yet we have a competitive advantage because of the quality of our food.”

Clean energy generation

Using recycled resources and converting them into electricity - the waste to energy or ‘clean energy’ evolution - is a venture that has seen millions of dollars in local and international investment in





[L to R] - AUSVEG Director, Luis Gazzola, Executive Chairman VISY, Anthony Pratt and AUSVEG CEO, Richard Mulcahy.

the past decade. In light of an increasingly environmentally-conscious community, the prospect of 'clean energy' reducing emissions, energy consumption and landfill is a vision that could win favour with discerning consumers. In recent years, Pratt Industries, VISY's US brand, commissioned a \$60 million energy plant in Georgia that transfers waste

from manufacturing into gas. The first standalone waste to energy plant in Australia, located in Coolaroo, Victoria, is a \$50 million investment in clean energy technology that takes waste from recycling and recycled paper mill operations and transfers it to electricity and thermal energy. Stressing a commitment to environmental causes and sustainable

practices, Mr Pratt cites clean energy as one of the innovative developments that will progress new divisions for the multi-billion dollar organisation. The establishment of waste to energy plants signifies the implementation of Mr Pratt's commitment to invest \$1 billion in paper recycling and waste-to-energy infrastructure made at the Clinton Global Initiative

meeting in New York in 2007.

In spite of growing internal and external market pressures, and the shifting of many aspects of the Australian industry offshore, VISY seems certain to remain a key and green part of the country's paper, packaging and recycling future.



Protocols to protect Australian potatoes against Zebra Chip

Scientific technology is leading the fight to keep potentially crippling phytoplasmas and Liberibacter pathogens from arriving on Australian shores, writes David Hastie.

Potato growers Australia-wide will welcome the news that *Candidatus Liberibacter (Ca. L.) solanacearum*, which is associated with serious diseases in several solanaceous crops, including Zebra Chip and psyllid yellows of tomato and capsicum, has not been found in Australia. A 12-month study by the

Victorian Department of Primary Industries (DPI) in conjunction with researchers at Crop and Food Research in Lincoln, New Zealand, found that the high-risk pathogen was not present in tests conducted.

Dr Fiona Constable of the Victorian Department of Primary Industries said the project

intended to improve Australia's preparedness for an incursion of *Ca. L. solanacearum*.

"It's about ensuring that we have an appropriate, validated and peer-reviewed protocol so that we've got a really good tool to detect these quarantinable pathogens of solanaceous crops," Dr Constable said.

"The aim of the project was to validate a whole lot of molecular-based tests for the detection of *Candidatus Liberibacter solanacearum*. While it is infecting potatoes in New Zealand and in other countries around the world, we don't have evidence that it's here in Australia."

“The main aim was to validate those protocols and see how they worked in our environment,” she said.

Nested and semi-nested Polymerase Chain Reaction (PCR) assays were used for the detection of phytoplasmas and *Ca. L. solanacearum*. The new semi-nested PCR assays are molecular methods that detect and make multiple copies of the small fragment

validating these tests is so that we have them up and running and we know how they perform in our environment,” Dr Constable said.

“If for some reason we have an incursion, we will be able to act very quickly in terms of detecting the pathogen and seeing how wide spread it is.”

As the phytoplasmas and *Ca. L. solanacearum* possess a very similar effect on potato

validated diagnostic protocols in place for both *Ca. L. solanacearum* and phytoplasmas, to be able to react quickly to identify which pathogen is present and to enable a prompt response to any suspected incursion. *Ca. P. australiense*, which is also found in New Zealand, is yet to have been reported in Australian potatoes. While this phytoplasma is also endemic to Australia and found in other crops, tests found *Ca. P. australiense* had not infected any of the samples.

Dr Constable said preliminary test results appeared to show some plants suffering from Tomato big bud phytoplasma, which is known to infect potatoes in Australia. A previously uncharacterised phytoplasma was also detected.

“Because of the symptoms they were showing, we suspected phytoplasma and Liberibacter based on those symptoms,” she said.

“We didn’t detect Liberibacter but we did detect phytoplasma with the universal PCR assay, but we didn’t detect *Candidatus Phytoplasma australiense*. Our industry was quite concerned that this particular phytoplasma was found in potatoes over in New Zealand and we had never reported it in our potatoes here.”


“It was important that if the phytoplasma was occurring in potato crops here, that we identify it because it does occur in Australia in a number of different crops including grapevines, strawberries and also in pumpkin,” Dr Constable said.

The study, which was

completed at the end of September 2011, was funded by Horticulture Australia Limited using the National Potato Levy with matched funds from the Australian Government.

THE BOTTOM LINE

- *Ca. L. solanacearum* was not detected in samples taken from Western Australia, Victoria and Tasmania using the nested and semi-nested PCR assays.
- While phytoplasmas were detected in several potato plants displaying symptoms such as purpling and aerial tubers, preliminary sequencing results indicate that the phytoplasma that was detected is Tomato big bud phytoplasma, not *Ca P australiense*. A previously uncharacterised phytoplasma was also detected.
- The Australian potato industry will be better prepared for an incursion of *Ca. L. solanacearum*, while early detection will better allow the industry to manage an outbreak of associated diseases.

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Project: PT10019

“If for some reason we have an incursion we will be able to act very quickly in terms of detecting the pathogen and seeing how wide spread it is.”

of DNA from the target of interest. The Liberibacter pathogen has caused significant losses to production in the countries it has affected, and with the disease now found in neighbouring New Zealand, Dr Constable says we must remain vigilant. The tests were validated by analysing 188 potato samples and three other solanaceous plants collected from Victoria, Tasmania and Western Australia.

“One of the reasons for

plants, Dr Constable said symptoms displayed by some of the samples - such as aerial tubers, swelling of the nodes, or purpling of the leaves - could well have pointed to the existence of diseases associated with either bacterium in Australia.

“After testing all of the samples with both of the tests, we didn’t detect any Liberibacter species, which is really good,” she said.

It is important to have



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Potato Extension Program

Research and Development projects have the potential to alleviate potato industry problems. R&D can improve cultivating, uncover new varieties, assist in managing pests and diseases, and improve on-farm technologies. But in order for R&D to be implemented practically, growers and processors must be made aware of R&D programs, and the projects need to be understood.

R&D for the industry

Project: Managing the nematode threat - MT09067

Tasmanian Institute of Agriculture (TIA)
South Australian Research and Development Institute (SARDI)

The issue: Root-knot nematode (RKN) are amongst the most destructive of plant pathogens, causing significant losses in a wide range of vegetable crops in Australia and worldwide.

RKN are minute, worm-like pests that are very common in soil. They have a wide host range, and cause problems in many annual and perennial crops.

In potatoes, RKN can cause many problems: rejection of seed crops, loss in yield of ware crops, and symptoms on and within tubers which reduce the marketability of fresh potatoes

and their ability to be processed.

Over the years, growers have become more reliant upon chemical options for the control of nematodes. However, *nematicides* are often expensive, and some are being removed from the market due to environmental impacts and toxicity. As such, alternative treatment options are required.

The Research: MT09067 is a national project coordinated by the Tasmanian Institute of Agriculture (TIA) under Frank Hay, through which South Australian operations are undertaken by Greg Walker (SARDI).

The focus of the project is to investigate a more integrated strategy for the control of RKN, for both the fresh and processed sectors. As part of this strategy, SARDI has developed a DNA based soil test which quantifies and identifies species of RKN in the soil. This information is

being used in a survey (WA, SA, VIC, QLD, TAS) to identify the main species of RKN associated with potato production in different regions. Further research is being conducted to validate the DNA test so that it may become available for growers as part of a pre-plant test.

SARDI, along with other investigators in Department of Employment, Economic Development and Innovation (QLD), Department of Agriculture and Food (WA), and Plant and Food NZ, are screening various plant species which might be used as non-host break/cover crops in rotations to reduce RKN numbers prior to planting. The project will provide a list of suitable potential break crops for different states.

Investigators in Queensland (Biological Crop Protection) are developing a systems approach to managing RKN, which is

based on surface mulching, suitable rotations and break/cover crops and strategies to increase the ability of the soil to suppress RKN. Investigators in Victoria (Crop Protection Research) are screening new 'biological' and chemical options which are becoming available.

The project is also enhancing knowledge of RKN which will help define the risk that a given pre-plant population of RKN may pose to a crop. Importantly, the temperature/time needed to complete the nematode life cycle have been defined, which will enable a better prediction of crop damage in a season and more effective management strategies.

What can be achieved:

Identification and the use of more resistant break/cover crops can reduce RKN populations and crop damage. Improved management of RKN will reduce the rejection of seed

potato, improve marketable yield (quality) of fresh and processing potato and reduce wastage during processing. Using treatment options other than *nematicides* will improve environmental sustainability and provide a more cost-effective control.

Putting it into practice: At the conclusion of the project in April 2013, a web-based booklet containing recommendations for the management of nematodes will be made available to growers. The booklet will incorporate project results and general information on Root-knot nematode.

In the meantime, growers need to identify if they have a nematode problem and be aware of what is going on underground. Soil tests and monitoring nematode populations should become the norm, not the exception. Growers should also be aware of whether their rotations, cover crops or weeds are contributing to the nematode problem.

A manual soil test for nematodes costs approximately \$100 depending on state of jurisdiction.

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R&D

Project: Improved virus diagnostics to support the Victorian Seed Potato Association - PT08008

Victorian Department of Primary Industries (VICDPI)

The issue: In Australia, viruses in seed potatoes are primarily detected by visual inspections and tests, called the *Enzyme-Linked Immunosorbent Assay* or 'ELISA' test, conducted on field grown plants. However, hidden or symptomless virus infections of field crops are almost impossible to detect based on visual inspections, and field conditions can reduce virus levels in a potato plant to a point in which they cannot be detected by the ELISA tests conducted on the plants themselves. Such limitations complicate potato seed certification in Australia, particularly for viruses such as

Potato Virus Y (PVY), which is emerging as a major virus threat for the Australian potato industry.

The Research: PT08008 had two main intentions:

1. To investigate fluctuations in *Potato leafroll virus* (PLRV), *Potato Virus Y* (PVY), *Tomato Spotted Wilt Virus* (TSWV) and *Potato Virus S* (PVS) in field grown potato plants.
2. To compare virus levels in field grown potato plants using the ELISA test and *Reverse transcription polymerase chain reaction* or 'RT-PCR' tests.

Findings: Visual inspections were not 100 per cent reliable for the identification of virus infected field grown potato plants for the entire growing season.

Although the ELISA test can be highly reliable for detecting viruses in field grown potato crops, its ability to detect PVY and PVS was more dependent on the timing in which field samples were collected during the growing season. Fluctuations in virus inoculum levels, particularly towards the end of the growing season, made the ELISA test less reliable in detecting these viruses. In the 2008/09 growing season the ELISA test detected PVY in only five of 16 plants known to be infected with PVY.

Results from the tests conducted on field plants, harvested tubers and grow-on plantlets revealed that in all instances, the RT-PCR test detected the same levels of virus as the ELISA tests, and in some instances, proved to be more sensitive.

In contrast to the ELISA post-harvest test, which can take up to 6-8 weeks to complete, the RT-PCR test is quick, cost effective and a successful alternative for detecting potato viruses in tubers. The RT-PCR test was equally as effective in detecting potato viruses on tubers harvested either directly from the field, or from tubers harvested randomly from potato bins in the packing shed.

Importantly, potato tubers can be submitted for the direct tuber testing during harvest (collected in the field), after harvest (collected on the grading line) or before planting (collected from storage bins and bags). Additionally, it is possible to test bulked samples and to detect a single infected tuber in a sample of 200 healthy tubers. It should



Upcoming events

Potato Extension Workshops

A Potato Extension Workshop will be held in Ballarat, Victoria on Thursday 28 June 2012. Victorian Department of Primary Industries researchers Dr Brendan Rodoni, Dr Tonya Wiechel and Dr Dolf de Boer will present on their research programs.

This is an excellent opportunity for growers and processors to hear about how R&D can be implemented practically, and what it can offer in the short and long term. Event details will be advertised shortly.

Further AUSVEG Potato Industry Extension Program Workshops are tentatively scheduled as follows:

SOUTH AUSTRALIA

Mid August 2012

Warragul, VICTORIA

Mid November 2012

More details will be available shortly.

be noted, however, that while bulk testing of tubers to detect potato viruses can reduce costs to industry, virus level estimates for each seed lot will not be as precise.

A further finding of this project was in relation to TSWV. Less than 10 per cent of the plantlets which sprouted from infected tubers were positive for TSWV. This suggests that there is a very low rate of virus transmission from the tuber to the sprout, and that TSWV is self-eliminating when propagated vegetatively from tubers.

levels in a seed potato crop. These tests will allow growers to have greater confidence in the quality of seed potato stocks traded both nationally and internationally.

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Ask the industry

with
Scott Mathew



Scott Mathew, Technical Services Lead from Syngenta.

Residual herbicides can remain active in the soil for some time, potentially causing damage to a subsequent crop. Scott Mathew answers your questions in this edition of Ask the industry.

As spring approaches, many growers in southern Australia will be assessing their paddocks for the suitability of potato production for the coming season. A common scenario that often arises is that of wanting to plant potatoes into soil that has previously been treated with a residual herbicide or a herbicide that has a plant back interval recommendation on the label. The issue here is that some herbicides, be they primarily, pre or post emergent, can remain active in the soil for many weeks, months or even years after they have been applied and as such will be potentially damaging to the following crop that is planted into that soil.

Question: What effect can herbicide residue in the soil have on potato plant growth?

In many instances, the overall effect can be economically devastating, with total or partial crop loss occurring. However, the likely crop effect is very difficult to determine and will depend primarily on the herbicide that was used previously and many environmental factors that contribute to the herbicide breaking down within the soil over time. Herbicides within the soil are broken down or depleted to harmless levels via microbial, chemical or photo degradation with chemical degradation relating to factors such as soil type, moisture levels and soil temperature. The critical note here is that not all herbicides are the same and as such, the individual characteristics of each herbicide must be considered by growers.



Residual herbicide damage in a potato crop.

Question: What does 'plant back interval' refer to regarding herbicides and where do growers find the information?

Herbicides that persist in the soil (such as a residual herbicide) generally have what is termed a plant back interval. This refers to the time period that must pass after the use of that herbicide before a sensitive crop is planted back into that soil. Such herbicides usually have detailed information contained on their label in relation to rotational crop restrictions that take into account the properties of the herbicide; the persistence of the herbicide in various soil conditions i.e. texture and pH; the effect of environmental factors such as rainfall or irrigation; and the sensitivity of the intended rotational crop.

Question: What happens if potatoes are not mentioned on the herbicide plant back interval restrictions?

In the first instance, always consult the manufacturer of the herbicide, who will be able to advise growers of an appropriate course of action. It is important that prior to planting (especially where growers are intending to lease ground), that all information regarding previous cropping history and therefore previous herbicide use is fully investigated and understood. The risk of crop loss is extremely high if this is not taken into account.

Ask the industry

For more information or to ask a question, please contact your local Syngenta Territory Manager, the Syngenta Advice Line on 1800 067 108, visit www.syngenta.com.au or email *Potatoes Australia*: info@ausveg.com.au. Please note that your questions may be published.

Soil solutions

with Rohan Davies

Fine tuning water use

Rohan Davies, Technical Agronomist at Incitec Pivot Fertilisers, discusses how to fine tune the use of water to improve nutrient efficiency in potato crops.



There are a number of mobile nutrients that are important in potatoes, including nitrate nitrogen and sulphate sulphur. Predicting leaching losses of mobile nutrients, and preventing them where possible with better management, can greatly enhance nutrient use efficiency.

Mobile nutrients

Water can move mobile nutrients below the root zone and away from potato crops when the amount of irrigation or rainfall received by the crop exceeds field capacity and evapotranspiration losses.

Evapotranspiration (ET) from the plant and soil system is the combination of water transpired by the plant and water evaporated from the soil.

Losses increase as temperature, light and wind speed intensity rise, or relative humidity decreases.

Evaporation losses are gauged using a Class A evaporation pan – this is a large vessel that contains a known volume of water which is measured to determine the amount of water lost to evaporation.

Typically, for a full canopy plant system with full watering,

plant transpiration rates are 70-90 per cent evaporation losses of a Class A pan. Growers can check the day to day variation in evaporation rates with local Bureau of Meteorology weather stations.

Where is the applied water going?

A litre of water spread over one square metre will apply a layer of 1 mm of water. The infiltration rate of the water and the depth it will travel will largely depend on the soil type.

The depth the water will travel per mm of water applied can be as little as 2 mm deep per 1 mm of water applied for a clay soil, to as much as 20 mm per 1 mm of water applied for a sand soil.

For example, to irrigate a sandy loam to the effective root zone for a potato crop (400 mm), assuming the water front moves 3 mm in depth per 1 mm water applied based on this soil type, would require 133 mm of water.

A travelling irrigator might apply 25 mm per hour, and would therefore need to run for more than five hours to apply this amount. However, remember that the soil will

already have some water in it, so the amount required to bring it up to field capacity will be less than 133 mm.

One way to estimate the volume of water required for a sandy loam is as follows:

Plant root mass to an effective soil depth of 40 cm x amount of water required to be removed from soil to maintain healthy growing plants, which is 1.1 mm water/cm depth of soil = 44 mm.

Therefore, by subtracting the ET amount from this volume of water and the amount which has fallen as rain, it is possible to determine how much water needs to be applied.

Applying more water could lead to vulnerable nutrients such as nitrate nitrogen being leached below the root zone.

For example, if Class A Evaporation is 4 mm per day, ET may be 80 per cent of this, or 3.2 mm/day.

If the soil is maintained at field capacity (44 mm of water) to a depth of 40 cm and 5 mm of irrigation is applied, it is likely that 1.8 mm of water will be pushed beyond the desired zone.

This has the potential to leach nutrients 5.4 cm past the root zone (3 x 1.8 = 5.4 cm).

If irrigations consistently push 1.8 mm past the root zone by applying 5 mm of water every day, it will take about 7.5 days for water to move from the surface to beyond the root zone and potentially take the nutrients applied at the surface with it.

This assumes that water moves in an orderly fashion down the profile. However, once wetted up, water could potentially move much faster than expected.

The losses may be much more significant following extensive rainfall.

Soil nutrition questions

Please send your soil nutrition questions to *Potatoes Australia*.

Email: info@ausveg.com.au

Phone: (03) 9822 0388

Pests & Diseases

Controlling sap-feeding insects in potatoes

In this edition of *Potatoes Australia* the Pests and Diseases profile, by Dow AgroSciences, looks at sap-feeding insects in potatoes and their management.



Aphids

Aphids are sap feeding insects that attack a variety of crops. The biology of aphids makes them a very difficult pest to manage. Aphids can build up rapidly in the crop and give birth to live young that already have offspring developing inside of them (known as telescoping). Aphids rapidly mature to adults in a matter of days and can produce many offspring per day. They also reproduce asexually, meaning that females give birth to clones of themselves, passing on any resistance to insecticides. These characteristics make aphids a formidable pest to control.

How do aphids damage the potato crop?

Aphids damage potatoes by

feeding directly on the sap stream and depriving the plant of nutrients required for its growth. Aphids also cause indirect damage via the production of honey dew (which promotes sooty mould growth) and most importantly, by vectoring plant viruses. Viruses that are spread by aphids in potato crops include Potato Leafroll Virus (PLRV) and Potato Virus Y (PVY). PLRV is persistently spread, meaning that once a colonising aphid acquires the virus from a host plant, it can theoretically spread that virus for the rest of its life.

Which is the most important species of aphid in potato crops?

Several species of aphids colonise potatoes. These include: cowpea aphid

(*Aphis craccivora*), foxglove aphid (*Aulacorthum solani*), potato aphid (*Macrosiphum euphorbiae*), and the most common one in potatoes: green peach aphid (*Myzus persicae*).

Integrated control measures

Management of aphids in potatoes should involve an integrated program of cultural and biological control methods, as well as the use of foliar sprays. Many parasites and predators attack aphids, but unfortunately most insecticides that are currently used are highly damaging to beneficial insect populations. Managing weeds that are alternative hosts of aphids, as well as planting disease-free seed to reduce the incidence of viruses, are important cultural practices.

Current insecticides

Insecticides are the predominant control measure for aphids in potatoes, with registered products including: pirimicarb, pyrethroids, and organophosphates. Resistance to these insecticide groups, however, is well documented, and these are also among the most damaging to beneficial insects. Post-application, aphids may still not be controlled, while the beneficial insect populations are decimated.

A new tool for potato growers

Transform™ is a new insecticide containing the active ingredient sulfoxaflor. Sulfoxaflor was discovered and developed by researchers at Dow

AgroSciences and is part of a new class of insecticides called the sulfoximines, which have no known cross resistance to any existing insecticide group (a new IRAC mode of action Group 4C).

The new insecticide can provide rapid knock-down and extended residual control of a wide range of sap-feeding insects. It has translaminar activity (moves from one side of the leaf to the other) and is also systemic in plants. Unlike many currently available insecticides, it has minimal impact on most beneficial arthropods, including bees, and predators such as lady beetles, lacewings, and predatory bugs.

Management

Aphids are a damaging and difficult pest to control in potatoes. Whenever possible, management of aphids in potatoes should include all cultural and biological methods available. When an application of a foliar insecticide is necessary, Transform™ (once it is registered) could prove to be a valuable tool for potato growers. With excellent efficacy on aphids and minimal impact upon beneficial insects, Transform™ clearly has some desirable attributes. Once registered, it could be a valuable new tool for the control of virus-vectoring aphids in potato crops and provide robust control of aphids in potatoes, including those species that are resistant to other insecticides.

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International R&D Update



Opportunities to increase food security

With 200 million people in low-income and marginalised areas of the developing world dependent upon roots, tubers and bananas for food security, nutrition and income, a new project is working towards substantiating the potential of these crops to create more diverse and robust food systems.

The research program - entitled Roots, Tubers and Bananas for Security and Income - aims to help increase food security, reduce poverty and improve livelihoods for disadvantaged communities in developing countries.

The joint research program under the wing of the Consultative Group on International Agricultural Research includes the International Potato Centre, Bioversity International, the International Centre for Tropical Agriculture and the International Institute of Tropical Agriculture, as well as a wide range of research and development stakeholders and partners.

Roots, tubers and bananas are true food security crops and provide diversity to reduce risks of food shortages and nutritional shortfalls, according to Program Director, Graham Thiele.

“So much of the media and global dialogue about feeding the world, food security, and supply and demand are focused on grain crops,” said Mr Thiele.

“Roots, tubers and bananas suffer from underinvestment and low visibility, in spite of their huge potential and clear role in creating a more robust food system.”

Providing food, employment and income as a cash crop for table, processing and industrial use in developing countries, potatoes are a major source of energy and protein with significant amounts of vitamin C, B6 and B1, folate, potassium, phosphorus, calcium, iron, and zinc. Other crops in this group, such as orange fleshed sweetpotato, are rich sources of vitamin A. It is possible for these crops to provide inexpensive sources of energy, key nutrients and up to 60 per cent of daily

calories.

“There is little awareness of the role roots and tubers play in terms of food security. Their high potential to strengthen food systems help buffer against grain price fluctuations, and also mitigate against natural or man made disasters and shifting conditions associated with climate change, urbanisation, and population growth,” said Mr Thiele.

Noting the significance of communication throughout the research program and between associated stakeholders, Mr Thiele emphasised the importance of fostering two-way communication between the research community, growers and decision makers.

“Just the other day some of our researchers were conducting a varietal evaluation with potato farmers in a very high and remote part of the

Peruvian Andes.”

“The farmers were asked to cast their votes to identify what they considered to be the most important traits like pest resistance, drought tolerance, taste, texture, look, shape, etc. In the end, the results were not those the scientists had expected, but were helpful for breeders to know as they try to develop varieties best suited to the needs and preferences of the end users,” he said.

The project, which is in its first year, aims by 2021 to play an enhanced role in a diversified global food security system; reduce risks of food shortages; and improve incomes for disadvantaged communities.



For more information visit:

<http://www.rtb.cgjar.org/>



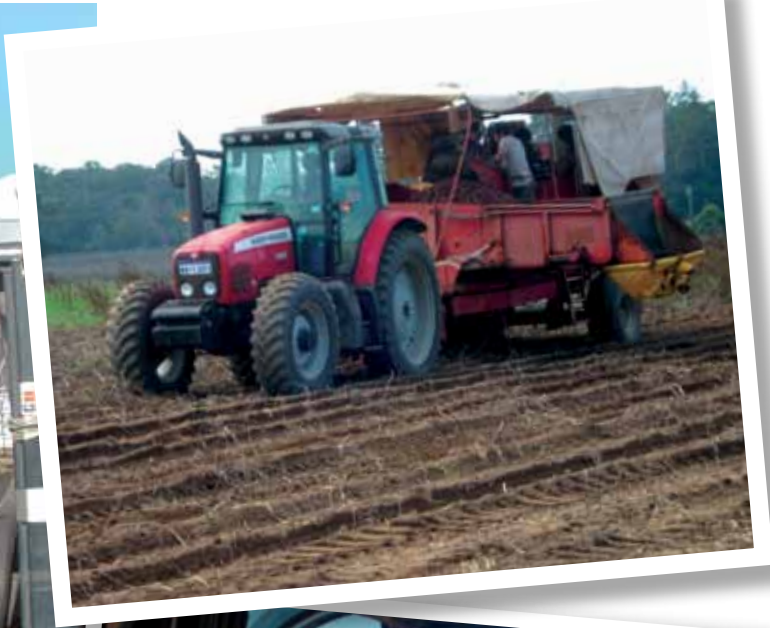
Q&A

Young grower profile

Raised on the family farm, Michael Omodei has been working to establish his own business since 2008.

Pemberton, WA





Name: Michael Omodei

Age: 37

Location of farm: Pemberton, WA 350 Kilometres south of Perth.

Potatoes farmed: We grow 20 hectares of mainly Nadine, Royal Blue, Whitestar, Rodeo and Carisma for the local ware market, and I am trialling a few others. We also grow 20 hectares of low generation seed, Royal blue, Whitestar, Banana, Atlantic and some other fresh market varieties.

Role in company: Operations Manager. Handling the everyday running of the business.

How did you get involved in the industry?

I was born into the family farm, but I have been working by myself since 2008.

What is your average day like?

Organising the workers, making phone calls, truck driving, tractor driving, irrigating - all the fun jobs.

What do you like most about your job?

Being outside - I couldn't work in an office. Growing a crop that heavily relies on your inputs and

decisions and how you can best adapt to Mother Nature can be very rewarding. Also it's your business so you get back what you put into it.

How do you think young people could be encouraged into the industry?

I think now is a good time for any young person to get into any vegetable industry. Things can only go up, they surely couldn't get any worse. It's a good time to learn how to tighten input costs, be innovative and to support yourself.

What do you think could help ease the stress on growers?

Regulated pricing. We are lucky here in the west to be regulated. Our prices are generally stable and if you have good spuds you will get good money. If you don't, at least you get something.

If you weren't working in the industry what would you be doing?

Probably working for another farmer watching him go broke! I don't really know. I want to stay in Pemberton with my family. Unfortunately there are

not many opportunities down here, the country towns are all struggling.

What do you think is the biggest threat to the potato industry?

Definitely viruses and diseases. We have a fairly clean virus area here in the south-west of Western Australia, and that's very important to me. Imports of cheaper alternatives and produce are also hurting our growers. We also need consumers to come back to eating potatoes. They are cheap, healthy and come in all shapes, colours and sizes.

AUSVEG National Convention, Trade Show and Awards for Excellence



Prominent speakers at the 2012 AUSVEG Convention included: [Top L-R] Mr Ed Gannon, Mr Paul Howes, Mr Glenn McGrath, Mr Richard Mulcahy, Senator Christine Milne, Professor Geoffrey Blainey, the Honourable Sid Sidebottom, [Bottom L-R] Mr Malcolm Jackman, Mr Joerg Ellmanns, Mr Will Hodgman, Mr Richard Macchiesi, Professor Hamish Gow, Senator John Madigan and Mr John Brent.

Please see opposite page for a snapshot of the 2012 AUSVEG National Convention and Trade Show: 1. AUSVEG Trade Show 2. Entertainer Matt Hollywood at the AUSVEG Gala Dinner 3. Speaker sessions at the AUSVEG National Convention 4. Senator John Madigan and Liam Quigley 5. AUSVEG Carnival and Trade Show 6. Callum Hann at the Celebrity Chef Luncheon 7. AUSVEG Chairman John Brent and National Secretary of the Australian Worker's Union Paul Howes 8. Convention Breakfast 9. AUSVEG Chairman John Brent, National Secretary of the Australian Worker's Union Paul Howes and AUSVEG CEO Richard Mulcahy 10. DuPont Historic Pub Night 11. AUSVEG Gala Dinner 12-14. AUSVEG Carnival and Trade Show 15. Tasmanian Food and Wine Festival 16. Andrew Simeonidis, Joerg Ellmanns and John Lloyd 17. DuPont Historic Pub Night 18. Steven Stillone, Mark Napper, Luis Gazzola and Nick Weckert 19. Young Grower Jet Boating Event 20. AUSVEG CEO Richard Mulcahy and Professor Geoffrey Blainey.

CALENDAR of events

28 June 2012

Potato Industry Extension Workshop

Where: Ballarat

What: As part of the Potato Industry Extension Program, a free seminar will focus on Potato R&D activities and applicable outcomes. Key industry speakers will discuss R&D benefits for growers and processors, and how it can be implemented practically in an on-farm setting. Presenting an opportunity to see where potato levy funding is going and the benefit that growers and industry are receiving, this will be an important event not to be missed by those in the industry.

Further information: AUSVEG (03) 9822 0388

or www.ausveg.com.au

29-31 July 2012

Potato Conference 2012

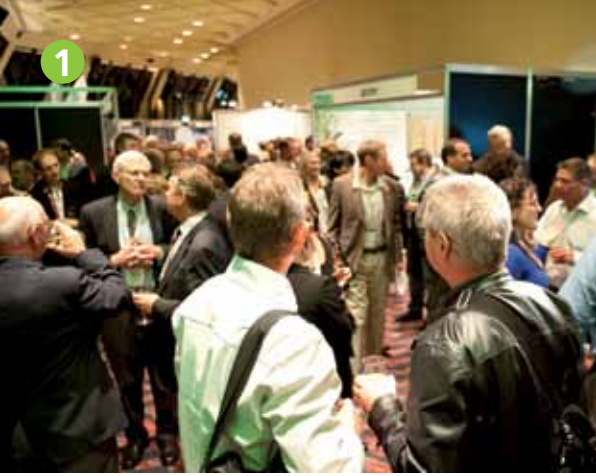
Where: Ballarat

What: The Potato Conference will provide valuable information on all areas of the potato industry and celebrate the successes and contributions made by members across the sector.

Delegates will have the opportunity to learn about a range of contemporary farming practices, and will hear from prominent international and local speakers detailing numerous topics relevant to production, R&D and agronomy.

Further information: VICSPA (03) 5962 0000

or www.spv.org.au



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