

Virus control strategies for the farm

Viruses causing diseases of potato were among the first plant viruses to be studied, and researchers started examining them about 100 years ago. In this article Roger Jones, Plant Virologist, looks at the main viruses and their control strategies.

At that time, newly released potato varieties soon degenerated and had to be replaced by others due to contamination of seed tubers with virus disease. The virus disease complex responsible was 'leaf curl', now known to be caused by two aphid-transmitted viruses – potato leaf roll virus (PLRV) and potato virus Y (PVY) – and the contact-transmitted potato virus X (PVX).

Researchers recommended that seed stocks be multiplied by growers from carefully selected healthy plants in districts with low aphid populations, such as cool mountainous areas or windswept coastal areas.

The seed schemes that developed expanded and became more sophisticated,

gradually including further control measures that helped to remove the source of virus infection or suppress virus spread by aphid or contact transmission.

Such schemes became so successful at reducing virus levels that complacency eventually set in and, more recently, control measures and standards in seed production relaxed in some States. As a result, some seed stocks have become reinfected and inadvertently sold into the market, leading to increased virus disease problems in farm potato crops.

I advocate a return to first principles to bring seed production standards back to earlier levels.

The viruses

The most common viruses causing diseases in Australian potato crops are PLRV, PVX, potato virus S (PVS), and tomato spotted wilt virus (TSWV). Less commonly, potatoes in some states have become infected with PVY, potato virus A (PVA)

and alfalfa mosaic virus (AMV). There are a few other viruses that occur very occasionally and are unlikely to trouble growers.

Table 1 summarises the main viruses, methods of transmission, occurrence, impacts, and main sources of infection. The most damaging of the viruses in terms of the yield losses they cause are PLRV, PVY and TSWV. TSWV also causes severe tuber quality defects that can render affected tubers unsaleable; this also occurs with PLRV in the Russet varieties.

Apart from AMV and TSWV, the viruses in Table 1 pass through all tubers harvested from infected plants to their progeny plants. AMV and TSWV are not viruses predominantly of potato but are ones with broad host ranges that spread from time to time to the crop from other infected plant hosts. They only pass through a relatively small proportion of the tubers produced by infected plants to infect progeny plants.

Control strategies

Growers must aim for an integrated virus disease management approach, combining diverse control measures that act in different ways to minimise spread.

Table 2 summarises virus control strategies for the farm and their effectiveness against the different viruses. The most important combination of measures is the cultural ones (hygiene and agronomy) but chemical control of aphid or thrips vectors, and virus resistant varieties are also available for some of the viruses.

(continued page 4)



Russet Burbank potato plant infected with tuber-borne PLRV. Note upward rolling of leaves, leaf pallor and purpling, and plant stunting.

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Chips #19 Newsletter



Comparison of Majestic potato plants with tuber-borne PVY symptoms (right) versus healthy (left). Note leaf deformation and plant stunting.

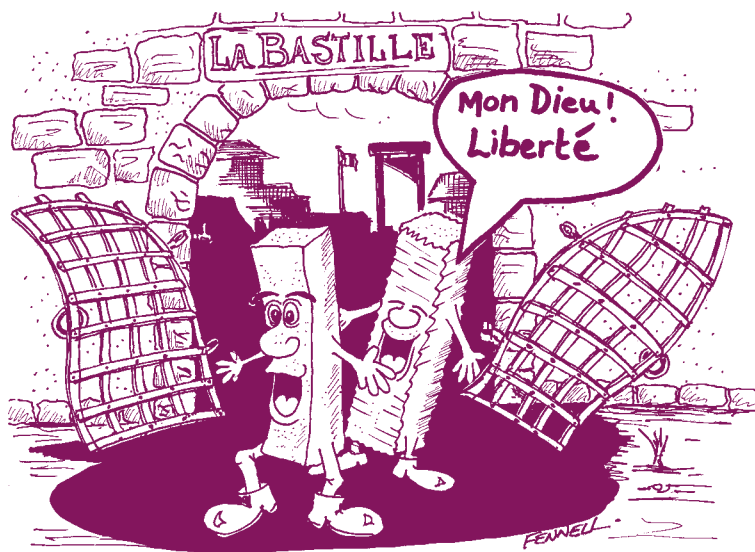
Editorial

When food and politics mix...

News agencies around the world have reported a move by US politicians to change the name of "French fries" to "freedom fries", in protest against France's refusal to support the US invasion of Iraq.

Republicans Bob Ney and Walter Jones launched the name change at a news conference, saying it was a "small but symbolic effort" to demonstrate their anger at the French Government's stance.

Menus at three White House cafes have been changed to read "freedom fries", and French toast has also been renamed to "freedom toast". Private restaurants across the US are following suit by renaming their fries.



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Laurie Eldridge and his wife, Janice, follow strict virus prevention practices on their seed potato property in WA.

Preventing viruses on-farm

Laurie Eldridge grows seed potatoes at Albany in Western Australia. He uses a range of management approaches to prevent insects from colonising his crop and to keep insect-spread viruses at bay.

In recent years, Laurie has seen an increase in insect populations, possibly due to an expansion in the variety and growing seasons of horticultural crops in his area. His flexibility to grow crops during times of minimal insect activity is limited as he farms on swamp country near the coast.

For these reasons, he has had to adopt spraying as a key control strategy. Aphids are the main problem, particularly towards the end of the season.

"We do preventative spraying with Nitifol, rather than wait until we see aphids. By the time you've seen them, they've already infected your plants. I believe it's too late then; they've already colonised in one area of your crop and can move to other plants and varieties," he said.

Laurie sprays before the plant tops become too thick, to minimise damage, which can make the plants susceptible to fungal diseases. When the potatoes are closing up in the rows, he sometimes follows up with a Confidor mix and, once the tops are down in the rows, he uses another Nitifol spray.

"All our G1 seed stocks are tested for viruses in Western Australia, which gives an added confidence that they're very clean.

"We get very few volunteers here, but any area that has been spelled and not grazed, we'll spray it to keep thrips under control."

Laurie also carries out strict hygiene control practices in the shed, including cutting all early-generation seed by hand and sterilising cutting machines between different varieties and generations.

In the field, tractor work always starts with the lowest generation and moves progressively up to the highest generation crop, to avoid possible virus spread.

SPAG brief

The Seed Potato Advisory Group held its biannual meeting in early December 2003 in Crookwell, New South Wales, to review the National Standard for Seed Potatoes and discuss issues arising out of the certification operations in each of the participating states.

Representatives attended from New South Wales, Victoria, South Australia, Western Australia and Tasmania. Tony Gietzel (Arnotts Snackfoods) chaired the meeting.

The meeting proposed the following changes to the National Standard for the Certification of Seed Potatoes:

- Growers may choose to retain and grow (in small plots) identified samples of their own certified seed for variety and disease identification purposes, to demonstrate their own quality assurance and to provide a benchmark should any complaint arise. Such plots are to be identified in the field and treated as commercial crops for isolation purposes. Growing these plots does not compromise their eligibility as Certified Seed Growers. The produce from these plots is not to be sold as seed.
- Change to the National Standard: The discovery of any quarantinable disease will automatically lead to the rejection of the crop from certification.
- Introduce the following tolerance for tuber borne *Rhizoctonia* in the National Standard: No more than 5% of tubers affected at the slight (5% in the National Standards tuber pictures) level. If a higher level is recorded, an agreed tolerance can be negotiated between the buyer and seller and conveyed to the certifying authority in writing.

These recommendations are being presented for industry consultation in each of the certifying States and, if approved, will be forwarded to APIC for endorsement.

Growers concerned about these proposals should contact their state SPAG representative (NSW – David Carter, Vic – Keith Blackmore, WA – Mark Holland, SA – John Fennell, Tas – Iain Kirkwood).

In addition the group discussed the following issues:

- The group recommended that there be consultation with leading common scab researchers on the issue of scoring for the disease during tuber inspections. A report and a recommended scoring model will be presented to the group before the next meeting.
- Following consultation with leading plant pathologists, a list of specific diseases and tolerances will be presented to the next meeting.
- Agriculture Victoria want to reduce the number of public varieties being maintained *in-vitro* by offering the ownership rights of cultures of public varieties that are rarely used by growers, to individuals or companies.
- A management plan for the control of contact transmitted potato viruses will be presented to the group before the next meeting.
- The group supported the introduction of a national virus testing program.

The group would like to thank the Crookwell Potato Association in particular David and Barbara Carter for hosting the meeting and for organising the opportunity for the delegates to meet with local seed growers.

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Virus control strategies for the farm *(continued)*

The **cultural control measures** are:

1) Plant certified potato seed, preferably from virus tested stocks, as in the WA scheme, to avoid introduction of viruses at damaging levels in seed tubers

2) Avoid virus spread from nearby potato volunteers and crops by not overlapping plantings in close proximity, planting upwind and eliminating volunteer potatoes to remove an important infection source for virus spread to crops by aphid vectors

3) Avoid virus spread from other host crops and volunteers, by removing other vegetable or ornamental crops and crop volunteers (this removes a key infection source for TSWV)

4) Minimise spread from weeds by removing weed hosts near to and within the crop (this removes another important infection reservoir for TSWV)

5) Avoid spread on seed tuber cutting instruments by cleaning thoroughly to prevent spread of the contact-transmitted viruses (PVX and PVS)

6) Avoid spread of the contact-transmitted viruses on vehicles and farm machinery by cleaning before entering a healthy crop

7) Plant a non-host barrier crop (e.g. a vegetable brassica) around the perimeter of a potato crop to reduce spread of TSWV by thrips vectors that carry the virus from external infection sources

8) Promote early canopy cover by planting at close spacings and optimum planting depth. Early canopy cover helps by shading out early or tuber-infected, stunted virus source plants

9) Manipulate planting date to reduce virus spread by avoiding exposure of vulnerable young plants at peak flight times of aphids or thrips that can carry the virus

10) Early roguing out of plants with visible viral symptoms reduces the internal virus source for spread within the crop

11) Crop rotation reduces the numbers of volunteer potatoes that act as virus sources.



Leaf mottle caused by PVY in leaves of King Edward potato.

Virus resistant potato varieties are available for some of the viruses. Ones that also possess suitable commercial attributes such as tuber yield, appearance and quality are the most suitable to grow.

Chemical control with insecticides using seed dressings, soil or foliar applications is useful against the persistently insect-transmitted viruses, PLRV and TSWV. It is too slow acting to help with the non-persistently insect transmitted viruses (PVY, PVA, PVS and AMV), unless used frequently (**not a recommended strategy**, as insecticides should always be used sparingly because of environmental concerns and because insecticide resistance can develop readily in green peach aphid and thrips). **Insecticide application should never be the only virus control measure employed in potato growing.** Also it has no effect against contact transmitted viruses.

'Once grown' seed

'Once grown' seed production on farm is an option particularly where aphid populations are low. During the growing period, such seed crops need to be carefully and regularly monitored for plants with virus symptoms and colonising aphids. As many as possible of the control measures should be employed to minimise virus spread. Where producing 'once grown' seed of adequate health status is difficult, certified seed should be purchased every year instead.

Table 1. The main viruses of potato crops in Australia

Virus	Transmission	Occurrence	Damage	Main sources
Major viruses				
Potato leaf roll virus (PLRV)	Aphids (P); 100% <i>via</i> tubers	Common	Reduced yield & tuber size; quality defects in Russet varieties	Infected seed tubers & volunteers
Potato virus X (PVX)	Plant-to-plant contact; 100% <i>via</i> tubers	Common	Some yield reduction	Infected seed tubers & volunteers
Potato virus Y (PVY)*	Aphids (NP); 100% <i>via</i> tubers	Infrequent	Reduced yield & tuber size	Infected seed tubers & volunteers
Tomato spotted wilt virus (TSWV)	Thrips (P); partial <i>via</i> tubers	Common	Reduced yield & tuber size, unmarketable tubers	Infected weeds, & nearby vegetables or ornamentals
Minor viruses				
Potato virus S (PVS)	Mainly by plant to plant contact but sometimes by aphids (NP); 100% <i>via</i> tubers	Common	Little yield reduction	Infected seed tubers & volunteers
Potato virus A (PVA)*	Aphids (NP); 100% <i>via</i> tubers	Rare	Reduced yield & tuber size	Infected seed tubers & volunteers
Alfalfa mosaic virus (AMV)	Aphids; partial <i>via</i> tubers	Infrequent	Reduced yield & unmarketable tubers	Infected weeds & pasture legumes

P Persistently insect transmitted; NP Non-Persistently insect transmitted.

*Absent from potatoes in Western Australia.

Virus control strategies for the farm

Ware Production

For ware production, the most critical control measures are planting certified seed from a trusted source where virus testing is a part of the seed production process, avoiding virus spread from nearby potato crops and volunteers, using crop rotation, and applying insecticide. Where TSWV is a problem for ware production, additional control measures are needed that include avoiding spread from other host crops (e.g. tomato and capsicum), minimising spread from weeds, planting non-host barrier crops, and manipulating planting date to avoid exposing young plants to peak thrips vector species populations. The extent to which growers use each control measure will depend on the additional cost and labour involved, and the level of inconvenience from disruption of standard practices for potato production.

Summary

Diverse strategies for virus control in potato crops 'on farm' are well established. An integrated approach concentrating particularly on cultural control measures is recommended.

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Contact transmitted viruses

These are spread when infected sap enters small wounds created during contact. Such spread occurs between potato tubers and a contaminated surface like a cutter, between plants in the paddock or through machinery and vehicle contact with plants in the paddock.

Persistently insect transmitted viruses

Once the insect is infective it remains so for the rest of its life regardless of whether it feeds on infected or healthy plants.

Non-persistently insect transmitted viruses

An infective insect picks up a virus rapidly when feeding on an infected plant but then loses it rapidly when it probes healthy plants, after which it no longer transmits virus.

Vectors

Anything that transmits a virus, such as aphids and thrips.

Table 2. Effectiveness of different control measures against potato viruses

Control measure	PLRV	PVY	PVX	PVS	TSWV
Plant certified seed stocks	++++	++++	++++	++++	+
Avoid spread from nearby potato crops & volunteers	++++	++++	++++	++++	+
Avoid spread from other crops & crop volunteers	+	+	-	-	++++
Minimise spread from weeds	+	+	-	-	++++
Avoid spread on tuber cutting implements	-	-	++++	++++	-
Avoid spread on vehicles & farm machinery	-	-	++++	++++	-
Sow non-host barrier crop	+	++	+	+	++++
Promote early canopy cover	+++	+++	-	-	++
Manipulate planting date	+++	+++	-	-	+++
Early roguing	++++	+++	+	-	+
Use crop rotation	++++	++++	++++	++++	+
Plant virus resistant varieties	+++	+++	++++	-	+**
Apply insecticide	++++	+	-	-	++++

++++ Very effective +++ Effective ++ Moderately effective + Relatively ineffective - Ineffective

** With TSWV refers to varieties with low virus transmission rates via tubers to progeny plants.



Managing virus diseases of potato crops

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AG-4	✓✓✓	✓
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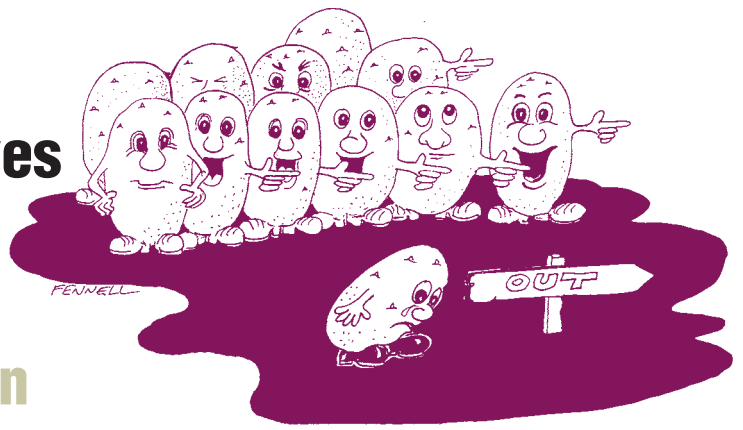
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1. Balali et al. Anastomosis group and pathogenicity of isolates of *Rhizoctonia solani* from potato crops in South Australia. Plant Pathology 1995
2. Data on file

Time to dust off the shelves

- Rationalising the National Potato Tissue Culture Collection



There are over 300 different potato varieties held in tissue culture at the Department of Primary Industries (DPI) at Knoxfield with a duplicate collection at Toolangi in Victoria. You will know the names of some varieties such as *Coliban*, *Atlantic* and *Russet Burbank* but there are many you won't know and have not been seen in a paddock for a long time.

Keeping varieties in the collection that are no longer of value to the industry costs money. It is time for a spring clean and the industry needs to decide what it wants to keep and what can be thrown out.

Why is the collection important?

One reason for the high productivity of potatoes across Australia is that the industry uses seed potatoes derived from pathogen tested stocks held in tissue culture. These tubers form the basis of the seed potato certification schemes and can also provide large volumes of healthy potatoes for the rapid assessment of new varieties.

The collection can be accessed at any time of the year and tissue culture techniques used to propagate healthy plants, which can then be used to produce healthy tubers (minitubers).

The tissue cultured plants start from sprouts taken from disease tested tubers (pathogen tested) and held in a controlled environment where they can be kept indefinitely (with a little attention from time to time).

Public collections

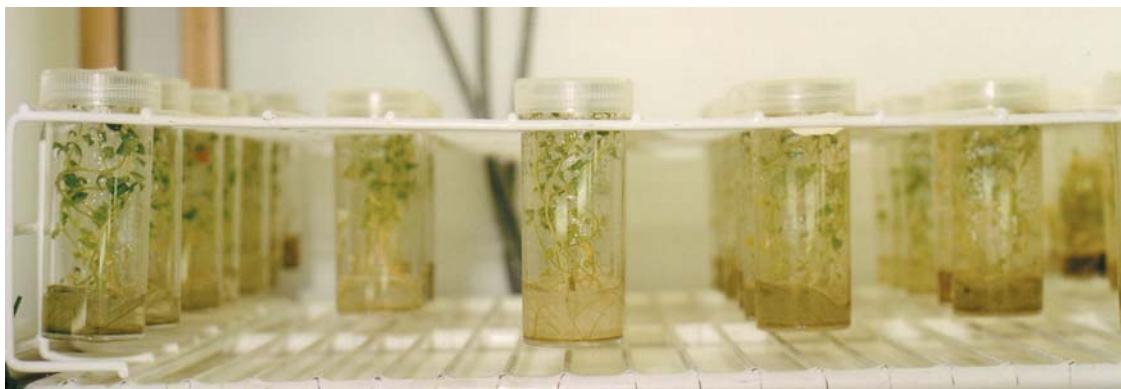
The public collection is made up of two parts:

(i) The National Certified Seed Public Potato Variety Collection

This consists of varieties used for certified seed production. It is "owned" by VICSPA on behalf of the Australian potato industry. The collection is maintained by Agriculture Victoria Services (company of DPI) under contract to VICSPA and is currently funded by a Horticulture Australia project.

(ii) Public Potato Variety Collection

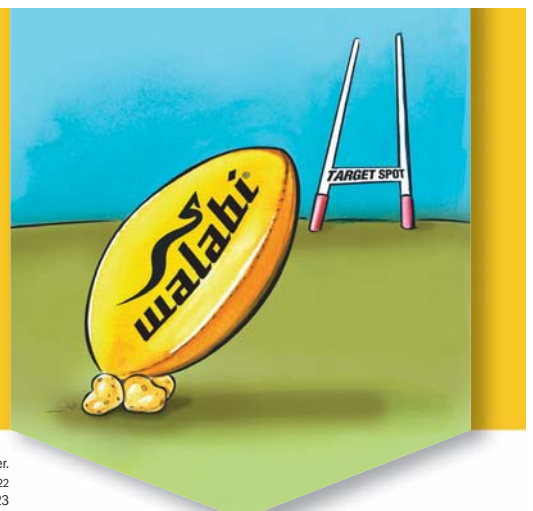
This consists of potato varieties from the International Potato Centre (CIP) which are largely used for export to Asia, and public varieties not commonly used for seed potato production. The DPI funds this collection.



Pathogen tested stocks are held in tissue culture as plantlets at Toolangi and Knoxfield. The plantlets survive in this form for approximately six months. A 'cutting' is then taken from each plantlet and new plantlets are grown.

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Larissa Coridas checking a plantlet.

Where did they all come from?

Many public varieties were imported from overseas: *Purple Congo*, *Patrones* and International Potato Centre (CIP) varieties (*Granola*, *Eben* and *KT3*). Many lines are in fact selections of the same variety made at different times. For example, there are currently seven different selections of *Kennebec* in the collection.

But like a library, the shelves start to become cluttered over time if nothing is sorted out. What happens to varieties that are no longer used or if they are only used by one or two growers? How many selections of each variety should we keep? Do all of these public varieties need to be maintained?

To aid in the housekeeping a process has been developed in consultation with industry to determine what varieties should be kept in the collection and what varieties should become orphans and possibly discarded if nobody wants to support them.

The process will mean that the national public collection will no longer be carrying any unnecessary varieties, while at the same time individuals will be able to access varieties they consider important.

How it will work

There are five categories of varieties in the National Collection:

1) Public varieties used for certified seed

Varities that are in the public domain including those owned by industry/DPI/Horticulture Australia and are maintained by Agriculture Victoria Services on behalf of industry.

- Are frequently used and grown as seed by more than one grower.
- Have a minimum area of seed produced per year of 1ha.
- VICSPA (with support from Horticulture Australia) or a similar agency pays for maintenance as they provide wide industry benefit

2) Private Commercial varieties

Varities owned by a commercial entity and usually protected by Plant Breeders Rights (PBR).

- Only available with written permission from the owner.
- Paid for by the owner.

3) Breeding lines

- Lines required for use in the breeding program.
- Jointly funded by DPI and Horticulture Australia.

4) Privately maintained public varieties

When a line is no longer needed for breeding and does not provide broad industry benefit it becomes an orphan. If an individual or company wants to retain the line in the collection they can request to pay for its maintenance.

- The individual or company will not own the variety but will have the right over who has access to the tissue culture plants from the collection through agreed licence arrangements.
- Paid for by an individual or company.

5) Discarded varieties

These are varieties no longer required and are destroyed. If a variety is discarded from the collection, it is still possible to reintroduce that variety into tissue culture if there are tubers available or the variety can be imported from overseas.

Bidding for orphans

Orphans are varieties that no longer meet the criteria for public varieties or are not required for use as breeding lines. They will be maintained at the request and expense of individuals or companies after an Expression of Interest (EOI) or tender process.

If there is no interest in a variety it will be destroyed.

A list of potential orphan varieties follows. If you are interested in any of these varieties, require a list of the public varieties held in the collection, or would like to find out more about the process, please contact me.

Corina Horstra
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How much does it cost

To pathogen test and introduce a variety into the collection from tubers costs approximately \$1,200.

The annual cost of maintaining a variety in the collection is approximately \$220 per year.



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List of Varieties no longer required in the collection

Public	Atlantic (WA)	CIP	384068.17 FLS-1
Public	Ballarat Russet		IHD114
Public	BP 1	CIP	384091.11 FLS-2
Public	BP 13		IHD115
Public	Campbell 14	CIP	32.2(TK94.10)
Public	Darwinia		IHD153
Public	Delaware (Line C)	CIP	44.1(TK94.2)
Public	Delaware (Line D)		IHD154
Public	Delaware (Line F)	CIP	IP 84004-7(TPS-67)
Public	Exodus		IHD157
Public	Fontenot	CIP	IP 84004-7(TPS-7)
Public	Frescoe		IHD158
Public	Frescoe	CIP	385131-41 FLS-11
Public	Oneida		IHD159
Public	Red Ruby	CIP	385130-77 FLS-7
Public	S.acaule P.I. 217450		IHD160
Public	Toohy's Russet Burbank	CIP	384080-8 FLS-17
			IHD161
Public	White Rose (WA)	CIP	385131-52 FLS-12
AVS	Brake Light (87-57-9)		IHD162
AVS	Crispa (90-7-17)	CIP	38510-9 FLS-14
AVS	Dalmore		IHD163
AVS	Evans	CIP	385144-31 FLS-13
AVS	Hart (90-73-11)		IHD164
AVS	Knox	CIP	TK 93.3 IHD168
AVS	Sleeping Beauty (89-19-2)	CIP	TK 94.1 IHD169
		CIP	TK 96.1 IHD170
AVS	Winlock -	CIP	TK 95.3 IHD171
AVS	Winter Gem (90-105-16)		
VICSPA	Katahdin (Line B)		
VICSPA	Kennebec (Line A)		
VICSPA	Otway Red		
VICSPA	Patrones	KEY:	
VICSPA	Purple Congo	CIP International Potato centre	Varieties
VICSPA	Red Craig's Royal	VICSPA: part of the National	Potato Public Variety Collection
VICSPA	Redsen	Public: part of the Public	Potato variety collection
VICSPA	Rideau	AVS: public varieties owned by	Agriculture Victoria Services.
VICSPA	Russet Burbank British Columbia		
VICSPA	Sequoia (Line B)		
VICSPA	Snowchip		

Seed potatoes to Indonesia

– a developing market

Processing potato growers in West Java are learning about improved production through a project demonstrating the benefits of using both high quality seed from Australia and good management.

The project, 'A partnership to build crisping potato capacity of West Java and Australian seed potato sales', has completed its first harvest of *Atlantic* potatoes for crisping in West Java, with Western Australian seed yielding greater than the yield of crisping potatoes from European seed suppliers.

Western Potatoes, PT Indofood, Horticulture Australia and the Department of Agriculture, Western Australia, are funding the project, which will make processing potato production more attractive to growers and improve supply to the factory.

Western Australian seed potatoes grown in East Java have also performed well, in particular the *Atlantic* and *Dawmor* varieties. Lake Jasper Certified Seed Potatoes and I&R Resources from Western Australia have pioneered this trade.

Granola seed potatoes from Western Australia are also being supplied to East Java table market growers. Yields for crops grown in Java from *Granola* seed have been high for Indonesian potato crops.

Indonesian farmers are also benefiting from visits to Western Australia during the seed growing season, to experience high yield potato production 'the Western Australian way'.

The trade in seed potatoes between Indonesia and Western Australia is still relatively small: 152 tonnes exported in 2002/03. However, this is up from 30 tonnes in the previous year and confidence in the development of the Indonesian market for Australian seed potatoes is increasing.

Obstacles remain to be overcome for this trade to continue developing. Indonesian quarantine officials have reacted to the outbreak of Potato Cyst Nematode in Java by strengthening the import conditions for potatoes. This has had a severe effect on supplies of seed from Europe and has resulted in increased demand for seed from Western Australia. However, import conditions for Australian seed are also becoming more challenging.

The export seed potato industry would benefit by Indonesian quarantine officers gaining an increased understanding of the safety of seed from Western Australia. Negotiations are underway for Indonesian quarantine officials to visit Western Australia to view the seed production process.

Peter Dawson & Ian McPharlin
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PCN outbreak

Just before Christmas, routine sampling detected Potato Cyst Nematode (PCN) in Victoria's Koo Wee Rup swamp region. The affected farm was quarantined.

In February, a second paddock in the Koo Wee Rup region tested positive. This had still to be confirmed at the time of going to press.

Implications

Current plant health regulations in New South Wales, Queensland and South Australia restrict importation of potatoes from within 20 km of a known detection of PCN. Tasmania and Western Australia prohibit importation of potatoes from the whole of Victoria.

For the crisping industry this has come at a particularly bad time, as the swamp is a major supplier of potatoes for factories in New South Wales, Queensland, South Australia and Victoria during summer and autumn. Around 40,000 tonnes was ready for harvest to be processed interstate. Without supply from the swamp some of the factories were at risk of shutting down until other areas were ready to harvest.

What has happened to date

Urgent high-level negotiations commenced over Christmas with quarantine authorities and potato industry representatives in New South Wales, Queensland and South Australia.

Protocols for strictly monitored, secure movement of potatoes for processing were developed and have been accepted by industry in New South Wales, Queensland and South Australia.

The protocols consist of property testing and not detecting PCN cysts, potatoes having minimal soil attached by being brushed or washed (depending on their destination), strict inspection, secure transport, designated transport routes and secure burial or treatment of wastes during processing.

The protocol enables potatoes to be processed at minimal risk while reducing the immediate social and economic impact of the outbreak.

Social and economic impact

The quarantining of properties and restrictions on trade can have a serious social and economic impact on potato growing communities.

Everyone within the industry needs to be mindful of this, as nobody can be sure PCN won't occur on their property.

David Beardsell

Plant Standards Branch

Department of Primary Industries

Victoria

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Commonwealth Government

investing in potato R&D

The Commonwealth Government contributes significantly towards research and development (R&D) in the Australian potato industry by matching the potato levy and Voluntary Contributions (VC) dollar for dollar. If industry contributes \$1,000 towards R&D, the Commonwealth Government matches it with \$1,000. This process is managed by Horticulture Australia.

Government priorities

As a major investor in potato R&D, the Commonwealth Government requires a return on its investment.

The Commonwealth Government's main goal is to develop competitive, profitable and sustainable Australian agricultural industries that promote economic development and job creation, particularly in rural and regional Australia.

Its current rural research priorities are:

- sustainable natural resource management
- improving competitiveness through a whole-of-industry approach that emphasises efficient and effective supply chain management
- maintaining confidence in the integrity of Australia's food, fish and forestry products
- improving trade and market access
- making use of 'frontier' technologies
- protecting Australia from invasive diseases and pests
- creating a culture of innovation, largely by investing in the sector's most important asset - its people.

How the priorities influence R&D

These priorities are considered during the strategic planning process undertaken by industry. As there is a large overlap between industry and government priorities (as would be expected) the process of ensuring both groups' needs are taken into account is usually fairly easy.

All projects funded through Horticulture Australia are monitored against economic, environmental and social indicators as a measure of their benefit.

John Oakeshott

Horticulture Australia

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Keeping pace with name changes

Queensland Department of Primary Industries last month became the **Queensland Department of Primary Industries and Fisheries**.

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Horticulture Australia initiatives

Horticulture Australia has initiated a new approach to across-industry programs, which replaces AusHORT. Over the next year we will talk about the different initiatives and what they have to offer the potato industry.

The potato industry has been paying 5% of its levy receipts to fund across industry projects. There are many issues that would be difficult for the potato industry to justify funding on their own. By working in with other industries we have been able to gain the same returns for a much smaller investment.

Previously these across industry projects were managed by the AusHORT R&D Committee, which contained a representative from each of the industries.

A new group has been formed with a different charter that has representatives from each of the major industries called the Industry Management Committee (IMC). In addition to overseeing all major across industry projects, the committee is also overseeing five new initiatives. The committee will meet two to three times a year. Potato representation on the committee is still being finalised.

The initiatives are:

- Development of an eating quality scheme for selected fruit and vegetables.
- Promoting the health advantages of fruit and vegetables to increase their consumption.
- Water rights, water use and sound environmental outcomes: a policy position for horticultural industries.
- Export strategies for horticultural industries.
- Improving information technology transfer for fruit and vegetable growers.

This article focuses on the water initiative.

Water – our most precious resource

One of the main limiting factors for the expansion of horticultural industries in Australia is water. Competition for this precious resource will be fierce and the horticultural industries through their various organisations need to be proactive if they are to continue to prosper.

The water initiative has focused on key issues where Horticulture Australia can play an important role.

The objective of the water initiative is to ensure ongoing access to water for horticulture. To achieve this objective the problem will be tackled through two approaches.

1. Grow profitable crops with less water

- Audit the uptake so far of improved practices - we believe horticulture overall to be an efficient user of water, but there is little hard data to prove it.
- Understand drivers of adoption - what are the barriers to uptake of better practice (e.g. financial, educational, physical). Do these vary between crops?
- Assess optimal training levels - what are the training needs of irrigators and is there a gap that Horticulture Australia could help fill?
- Develop an extension policy - what is the best way for Horticulture Australia program outcomes to fit in with existing networks? Are more irrigation Industry Development Officers needed?
- Studies on water quality impacts - are there any situations where water quality could affect the health of the crop, soil or consumer?
- Management of salinity, nutrients - R&D may be needed for specific crops on their susceptibility to, and generation of, nutrients, salt and biocides in water.

2. Ensure policymakers take horticulture into account

- Demonstrate high value per mega litre of water from horticulture.
- Compile and monitor water policy programs - the Horticulture Australia water coordinator continues to monitor evolving policy at federal, state and catchment level and develop responses with the Steering Group and Horticulture Australia Council.
- Define horticulture's water service needs - to ensure that water providers cater for the needs of horticulture.
- Define water use efficiency - existing measures of water use efficiency may be unfavourable to horticulture.
- Support packages/leadership training - could be valuable in equipping horticultural irrigators to represent their interests. Coordinated environmental management system development - as "conditions of use" develop, we need to ensure they are based on meaningful measures of environmental impacts that minimise compliance costs.

The initiative can only succeed by working in closely with the many organisations, groups and research programs involving water. These include: the National Program for Sustainable Irrigation, the Horticulture Australia Council and the horticultural industry itself.

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Horticulture Australia

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R&D Planning entering last phase

The research and development (R&D) planning by the IAC Processing sub-committee is entering the last phase. The subcommittee met with key industry managers from research institutions in December to go through in the requirements for developing an R&D program.

The managers were asked to produce, as a group, a Business Plan, taking into account industry priorities and the available budget. The IAC will consider this Business Plan at its March meeting.

Unlike past funding approaches, this puts the focus on the researchers to work as a team to identify how best to achieve industry outcomes with available funding resources. It places the onus back onto researchers to work with business managers to identify ways of attracting extra money and resources for the program.

Other issues raised by the IAC included:

- Importance of students in the program to ensure future involvement of young scientists in the industry.
- The need to link with the Breeding and Communication programs and projects related to the priorities.

This is an exciting venture with the potential to produce significant benefits for our industry.

Change of this magnitude though is never easy. The IAC and research groups will be putting in a lot of work to ensure the new R&D program works. The aim is to have the new R&D program start in the next financial year.

John Gallagher
IAC Chairman

Potato Technology Transfer survey

Unfortunately we only received 22 replies to the survey sent out with last years Potato Australia – 15 farmers and seven others.

Due to the low interest I have cancelled the proposed series of articles on improving hygiene on the farm. I will revisit the issue at a later date if there is sufficient interest.

Thank you to those who did respond. I apologise for any inconvenience.

The following are the responses received for the disease hygiene question. The responses to the other questions were insufficient in number to report.

Improving hygiene on the farm – disease management

Which of the following would you like to see articles on in the potato publications?

Responses	Topic
9	Controlling volunteer weeds
3	Managing cull piles
4	Stock management
15	Weeds – how important are they
8	Shed management
15	Water use management
9	Cleaning machinery
11	Using disinfectants
3	Managing waste soil
4	Controlling people movement on the farm
15	Rotations
9	Designing the farm to reduce risk
14	Seed storage
12	Receiving and handling seed
2	Drainage management

Leigh Walters
Technology Transfer Manager
Australian Potato Industry

Priority areas of work

- Soil borne diseases and soil health
- Potato viruses X, Y & S
- Tomato Spotted Wilt Virus

Resources required will differ greatly between the priorities.



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At the Knoxfield Climate Change Forum (l to r): Tony Slater and Brendan Rodoni (PIRVic); Bruce Stone (Latrobe University); Ted Hayes (Victorian Coordinator, ATSE Crawford Fund); Luis Salazar (CIP); and Jack Meagher (former Chairman, Australian Potato Industry Council R&D Committee).

World expert warns climate change may bring new virus challenges

Potato growers should be prepared to face new plant disease scenarios as global climate changes take effect, according to leading international plant pathologist, Dr Luis Salazar.

Speaking at a Victorian Department of Primary Industries (DPI) forum at Knoxfield, Dr Salazar said climate changes were contributing to an increase in viruses and their vectors (insects that transmit the viruses).

"Changes in vector populations can bring new viruses into crops or allow the spread of normally less frequent viruses," he said. "Examples of these two situations have already been observed in South American potato crops."

He said because viruses could only be controlled by prevention, sensitive, accurate, easy-to-apply and low-cost methods for virus detection were urgently required.

Dr Salazar, who heads the Crop Protection Department at the International Potato Centre (CIP) in Peru, was in Australia to receive the prestigious ATSE Crawford Fund Derek Tribe Award (as reported in December EOP). His visit generated the possibility of collaborative work between DPI and CIP on virus resistance in potatoes, which holds considerable potential benefits for the Australian industry.



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Industry Development Order – Victoria



Horticulture Australia

The establishment in Victoria of an Industry Development Order to enable the collection of a state levy was put to the vote late last year.

One hundred and forty nine votes were received by the due date with 70 in favour, 78 against and one informal. With no clear majority, the Minister for Agriculture did not proceed with a proclamation to establish an Industry Development Order for the Victorian potato industry.

What is an Industry Development Order?

New legislation in Victoria enables industries to establish their own levy to fund industry activities. How the money is used is determined by industry.

Purpose

The purpose of the order was to collect a pool of funds that could be managed by industry for the industry. Initially it was envisaged that there would be three areas of expenditure:

- Undertake fresh market evaluation trials in Victoria
- Appoint an industry development officer
- Undertake PCN soil testing on a systematic basis statewide.

A Committee of Management consisting of growers would make the day-to-day decisions. Projects to be funded would be determined annually through a poll.

Where to next

The Potato Growers Council will now have to examine alternative ways of funding activities or simply not undertake the work. This will be a major topic of discussion at the late February meeting.

Tony Pitt

Executive Officer

Victorian Potato Growers Council

Latest R&D reports

The following is a list of Horticulture Australia Final Reports released in the last three months.

Ballarat potato drip irrigation study tour	PT03043
Breeding Australia's potato germplasm: the resource for varietal development	PT01032
Fresh Produce Retail Service - Potatoes	PT02041
Market research for potato nutrition software	PT03055
Nitrogen dynamics in commercial seed potato crops and its effect on seed yield, quality, storage and subsequent commercial crop performance	PT99057
Potato cultivar accession and testing in Tasmania	PT96005
Potato variety evaluation, commercialisation and adoption: Interim project	PT01033
Virus testing of early generation certified seed potato crops in Western Australia	PT01048

These reports are available from Horticulture Australia for \$22.00 in Australia or \$US30 outside Australia including postage. To obtain reports send a cheque or money order with a note quoting the project name/s and project number/s to:

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Clinton Griffiths, Stuart Wale and Aaron Haby at the Mannum seminar in SA

Stuart Wale discusses UK trends

Dr Stuart Wale from the Scottish Agricultural College (SAC) recently spoke at farmer seminars in Mannum, Parilla and Penola, and at the Third Australasian Soilborne Diseases Symposium in South Australia. He also presented a potato storage workshop at the Department of Primary Industries at Knoxfield in Victoria.

Stuart manages the SAC potato team and edits the Potato Newsletter, which is one of only three potato publications in the UK. His team provides research and extension consultancy services to businesses in the UK and overseas.

One of the interesting issues Stuart raised was that UK potato farmers were increasingly being asked to demonstrate their environmental credentials in order to supply produce to large supermarket chains.

This has created the need for more recording of information, auditing and the need to develop better ways of describing chemical practices and their impact on the environment.

The grower seminars in South Australia and Stuart's visit were organised by the South Australian Research and Development Institute and his trip sponsored by Horticulture Australia and the local potato industry.

Potato Storage workshop

Thirty-eight growers, processors, packers and other industry people participated at the storage workshop featuring Stuart Wale and hosted by the Victorian Department of Primary Industries at Knoxfield. Participants gave very positive feedback about the workshop, with 87% intending to put into practice some aspects of the advice presented.

For more information about the workshop contact:

Dolf de Boer
 Department of Primary Industries
 Knoxfield
 ☎ (03) 9210 9222
 ✉ dolf.deboer@dpi.vic.gov.au



Right: The Portland contingent - Peter Lyons, John Alexander and Neville Hann.

Below: Workshop participants



SAC Potato Newsletter

The UK Potato Newsletter is produced quarterly (March, June, September and December) and costs £40 a year including postage for subscribers outside Great Britain. The British Potato Council supports the publication.

For those wishing to subscribe send a letter, fax or email to:

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Agriculture Notes



Potato virus Y

Jane Moran and Brendan Rodoni, Knoxfield

This Agriculture Note describes Potato virus Y in potatoes.

Potato virus Y (PVY) is found worldwide, and is widespread but uncommon in most parts of Australia. It infects potato and a number of other solanaceous crops such as tomato and capsicum and weeds such as species of nightshade. In potatoes, it is particularly important in seed crops, because it can be passed on to successive crops in seed tubers.

There are a number of strains of PVY known, and most strains are likely to occur in Australia. The most common is the '0' strain (PVY⁰), and this does not appear to be a major threat to seed potatoes in Australia. PVY⁰ causes

Plants grown from infected tubers may be mottled, crinkled leaves. Generally, the mottling is of a very fine pattern. The leaves occasionally die. Some infected plants remain symptomless.

Potato tubers

In most instances, no tuber symptoms are present, only a slight reduction in tuber size may occur. Certain strains of the virus can cause tuber necrosis in some cultivars. In the UK, the early blight susceptible 'Superfina' is particularly affected.

Potato AgNotes can be downloaded free from the DPI website.

Information Notes

Victorian Department of Primary Industries

The following information notes are available free from the Victorian Department of Primary Industries (DPI) internet site at – www.dpi.vic.gov.au. Once in the site, follow these links:

- [Agriculture and Food](#)
- [Horticulture](#)
- [Horticulture – Information Notes](#)
- [Vegetables](#)

Then scroll down to Potatoes

Information notes as at 2/3/2004

- [A growth regulator for potatoes and onions](#)
- [A simple chamber for curing cut seed potatoes](#)
- [Common scab of potatoes](#)
- [Cool storage of seed potatoes](#)
- [Cultivation of potatoes](#)
- [Fertilisers for potatoes](#)
- [Fusarium wilt of potatoes](#)
- [Greening of potatoes](#)
- [Growing seed potatoes](#)
- [Handling seed potatoes for export](#)
- [Handling seed potatoes for planting](#)
- [Insects of potato crops - southern Victoria](#)
- [Killing potato tops](#)
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- [Potato varieties](#)
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- [Potato Y virus](#)
- [Potatoes - bacterial wilt](#)
- [Potatoes - black leg and soft rot](#)
- [Potatoes - Irrigation](#)
- [Potatoes - management strategies for pests and diseases](#)
- [Potatoes - mechanical damage](#)
- [Potatoes - phoma or gangrene](#)
- [Potatoes - seedbed preparation](#)
- [Potatoes: factors affecting dry matter](#)
- [Potatoes: measurement of specific gravity](#)
- [Potatoes: round seed improves crop health](#)
- [Retail handling of fresh potatoes](#)
- [Rhizoctonia or black scurf disease of potatoes](#)
- [Root knot nematode on potatoes](#)
- [Target spot \(early blight\) of potatoes](#)
- [The potato moth](#)
- [Tomato spotted wilt virus in potatoes](#)
- [Wireworm in potatoes](#)

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PCN workshop

discusses draft management plan

A workshop at the AQIS/Customs complex at Melbourne Airport in mid February discussed the draft National Potato Cyst Nematode Management Plan.

The 26 participants included the project team and state representatives, the steering committee, the Office of Plant Protection, AQIS, Biosecurity Australia, Plant Health Australia, Horticulture Australia and AUSVEG.

The draft Management Plan is well advanced and generally the group was happy with much of the content - but some areas still provoked considerable debate. Where possible, issues were resolved during the workshop. In some cases, issues were referred to specialist groups for further development.

Balancing the needs of all parties concerned and managing the risks in an appropriate way is not easy. Some issues have a number of widely differing perspectives.

One such contentious issue is 'area freedom'. At present NSW, Queensland and South Australia do not usually accept potatoes from within a 20 km radius of an outbreak (although this restriction has been eased under strict protocols in some cases related to the current outbreak – see article on page 10). Other states use state boundaries. For somebody receiving potatoes from interstate the 20 km zone it may seem quite reasonable, as it appears to offer a good safety margin. However, for those in the affected area, the zone may not reflect the risk in a quantifiable way.

For example, the zone may encompass two valleys separated by a range with no direct connections. The people in the valley on the other side of the range to the outbreak may believe the zone unfairly discriminates against them. Others believe zones should be based on catchments, which better reflect the risk. In some areas this might be feasible but in other areas such as the Mallee and the Riverina with very large catchment areas it becomes more difficult.

From a regulatory point of view any approach to area freedom has to be easily enforceable. It is simple to define a 20km radius around an outbreak. It is also easy to use a government division such as a shire or State as the borders are easy to identify on a map. A catchment is more difficult. How does a regulatory officer who has to establish a zone around an outbreak quickly define the catchment? Unless it can be done with certainty, the zone boundaries could be contested - possibly even leading to legal action.

In the case of the current outbreak of PCN the issue of supply to factories became critical. However, with secure transport and waste disposal protocols the risk is very low for potatoes that have tested negative to PCN from properties within the zone. However the risks associated with ware and seed potatoes can be quite different.

So defining the zone around an outbreak has to be considered from a range of perspectives while considering how the nematode might potentially spread into new areas.

Why is it important to contain PCN?

- PCN can cause considerable loss of yield for farmers.
- PCN is difficult to control once it is established – this is an increasing problem in the UK, even with integrated control strategies.
- The presence of PCN affects market access – not only for potatoes.
- The chemicals used to control PCN add considerably to the cost of growing potatoes and are also quite toxic – for most people the sort of chemicals they would avoid using if possible.

Where to next?

The workshop has progressed a number of issues.

The next stages proposed include:

- Formation of specialist working groups to undertake pest risk analysis and the development of area freedom requirements. These groups would seek input from specialist groups on a number of key issues.
- Redrafting the plan to incorporate the changes developed at the workshop. Then circulating the revised draft to workshop participants and the steering committee prior to it being sent to APIC for endorsement and then being sent to Horticulture Australia.
- Preparing a discussion paper regarding a national sampling plan for PCN.
- Eventually incorporating these further elements into the Draft Management Plan and circulating to stakeholders for endorsement.

The process has been prolonged but it is essential that we get it right if the plan is to be the blueprint for how the industry deals with PCN.

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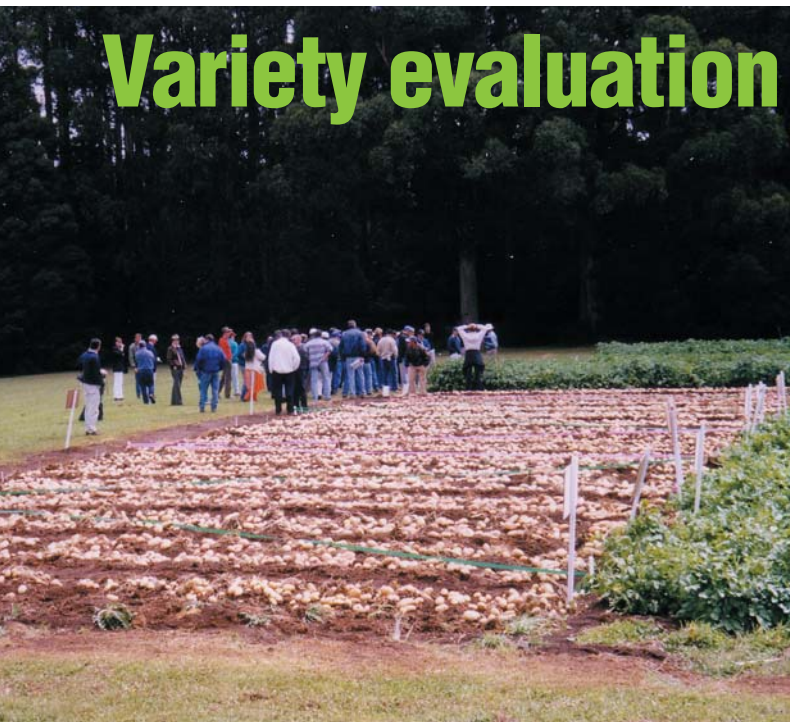


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Variety evaluation underway



Variety field day at Toolangi, Victoria

The potato breeding and evaluation program in Australia has undergone considerable change over the past nine months. The evaluation part of the program is now managed and paid for by industry with the opportunity of obtaining matching funding from Horticulture Australia.

Evaluation trials have been established for processing potatoes in New South Wales, South Australia, Tasmania and Victoria. Trials for fresh or ware potatoes have been established in South Australia and Victoria.

Over the next year the number and location of variety evaluation trials, particularly for the fresh industry varieties, is likely to expand.

The early generation trials for the breeding program have been established at Toolangi as in previous years.

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Royalties on new varieties:

Re-investment from success

Why are royalties collected?

Royalties are an internationally recognised way of collecting a "success fee" from the commercialisation of technology, which provides a return to the investors who developed the technology.

There is a risk in developing any new technology like potato varieties as that the technology or new variety may not be successful. Rather than recoup the cost of development on all varieties released, a small fee (royalty) is charged on those that are successful.

What happens to the royalties?

The money is paid to the equity partners who invest in the development of the technology. They are then free to reinvest into the program to develop the next generation technology.

In the case of the potato breeding program the main investors up to now have been Horticulture Australia using the Potato R&D Levy, which is matched on a dollar for dollar basis by the Commonwealth Government, and Department of Primary Industries Victoria.

In 1998, after consultation with APIC and Department of Primary Industries Victoria, it was agreed that certification authorities would collect royalties from certified seed of specific varieties. In line with the contract between Horticulture Australia and Department of Primary Industries Victoria the royalties paid to Agriculture Victoria Services are distributed on the basis of equity to the investors.

The portion of royalties flowing to Horticulture Australia is split 50/50 with the levy portion returning to the potato industry levy for future investment in R&D. However, this is not able to be matched dollar for dollar by the Commonwealth Government.

What are the benefits of royalties?

The money raised by the royalty is reinvested into R&D funds, which reduces the reliance on the industry levy, pegged at 50 cents per tonne since its inception. This helps to cover the increased cost of R&D and supports development of the industry.

What is the royalty?

At present the royalty is based on a sliding scale from \$110, \$220 to \$330/ha of certified seed, generally sold as G4 seed. In many cases it is based on a price per tonne and may vary from 10% to 25% depending on the commercial value of the new variety.

In some cases the royalty is paid on the commercial crop not the seed depending on which is the most.

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Current royalties

The following varieties have a royalty of \$330/ha – *Brakelight, Catani, Crispa, Dalmore, Dawmor, Donnelly Russet, Dynamite, Evans, Hart, Knox, Lustre (92-19-10), Mac Russet, Ruby Lou, Shine, Snow Gem, Sonic, Sleeping Beauty, Wilstore, Wilwash, Winlock, Winter Gem, Wont Scab, 86-31-5, 88-102-24, 90-77-4, 93-6-3, 93-38-9, 94-42-10 and 95-109-6.*

Lustre 92-19-10 and Fergifry 92-37-1 have a royalty of \$110/ha.



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State ROUND-UP

Western Australia

Most summer potato crops in the Manjimup and Pemberton districts have been planted, with harvest expected from March to May.

Wet and cloudy conditions during October and November caused the early planted (August) *Nadine* crops to produce lower than expected average yields (65 t/ha). The reduced yield was mainly due to smaller tuber size, but crop quality remained good. Later planted *Nadine* crops were higher yielding (75 t/ha) as the tuber size increased due to warmer and drier weather. Other varieties grown in the region, such as *Ruby Lou* and *Kestrel*, also yielded well (50 to 60 t/ha).

The harvest of processing potatoes has been progressing smoothly; with recently harvested *Atlantic* crops being of high quality, good size and yield.

In the double cropping area around Busselton, potatoes harvested prior to Christmas from the winter sown crop were generally high yielding despite increased cloud cover during the growing season. *Nadine* produced yields of 60 to 80 t/ha, while *Ruby Lou* (65 t/ha) and *Royal Blue* (55t/ha) also yielded well. Crop quality was high, with a low percentage of rejects. Over the summer months, seasonal conditions in the Busselton area were warm, with hotter and drier than normal planting conditions for the autumn grown crop leading to increased use of irrigation. Increased use of metham sodium prior to planting appeared to reduce the incidence of insects, diseases and weeds, with a general improvement in crop health and reduced need for post planting pesticides.

Growers in the double cropping area of Busselton are changing to a triple growing area. They are planting greater quantities of crisp processing crops to grow over summer, as yields are good and they don't have the autumn crop problems of planting into hot soil and harvesting under wet conditions.

The yield of ware potatoes delivered to Western Potatoes between August and October 2003 was higher compared to the same period in 2002. During August and September 2003, the average yield of *Mondial* was 38.5 t/ha, while the average yield of *Nadine* was 27.6 t/ha.

Rachel Lancaster
Research Officer
Department of Agriculture

SOUTH AUSTRALIA

Our summer has generally recorded very mild temperatures, few hot days, and high cloud cover, with reduced total sunshine hours and below average rainfall. Some crops have reportedly had high levels of Tomato Spotted Wilt Virus.

The main Lower South East *Russet Burbank* crop has grown very slowly due to these conditions, with plenty of top growth but slow tuber development. For the crop to mature successfully, it needs temperatures between 25°C and 30°C throughout February, with no heat waves. Some areas have reported many mornings with high moisture levels and this, combined with low daily temperatures and high cloud cover, has created opportunities for foliar fungal diseases.

Total irrigation requirement has been reduced in most crops due to the lower evaporation and crop water use. Potential crop yields are average at best but this will depend on the February climatic conditions. Many early sown crops are yielding below average, after mild weather followed by spasmodic hot days combined to slow their growth and curb tuber maturity.

The Lakes area is harvesting average yielding crops that have benefited from the mild and longer growing season. Water use restrictions, water availability and potential quality concerns have reduced the total area planted to potatoes in summer.

The Murraylands crops have had excellent growth and yields will reflect the benefits of a mild summer.

Bob Peake
Horticultural Consultant
Rural Solutions SA

VICTORIA

Victoria had a dry winter and a wet spring. In most districts the wet spring caused the potato crops to be planted up to three weeks late.

Soil moisture enabled the crop to get away to a good start, making up some of the lost time.

December was very hot and dry. January saw average temperatures with some rain, but by February the soil had dried, putting pressure back on irrigators.

Ballarat drip and solid set trial areas are proceeding well and other Victorian districts have irrigation trials in place. The industry recognises the importance of accurate irrigation with minimum time input to its future.

Generally the health of the Victorian crops is good this year. Rain at the end of January helped freshen up crops and catch up irrigation.

Yields were slightly down in early planted crops, but the main crop will yield well. Growers are encouraged to update their seed from Certified Seed crops to keep Potato Leaf Roll Virus levels low.

Thorpdale ware crops started harvesting in January and seed crops in February. Koroit completed harvest in early February. Crisping

growers on the Koo Wee Rup Swamp started harvesting in early February. Kinglake will start digging in mid March.

McCains at Ballarat received some *Atlantics* at the end of February and early March. McCains start receiving storage potatoes on 1 April. The late districts will have a mid March/April start to their harvest this year.

Internationally renowned potato researchers, Dr Stuart Wale (Scottish Agriculture College Aberdeen) and Dr Dolf De Boer (DPI Victoria) presented a workshop on potato store management at Knoxfield on 16 February. The workshop was open to growers, store managers, packers and postharvest potato handlers. Good potato harvest, storage and handling practices are essential in maintaining quality potatoes - seed, ware and processing.

Bruce Fry

Horticultural Extension Officer

Department of Primary Industries

Tasmania

After a wet spring, which delayed the planting of some crops, the summer started extremely dry and growers have struggled to keep the irrigation up to the crops.

High winds experienced throughout January have worsened the situation and directly affected many crops. These difficult conditions have led to erratic emergence in some areas. Crops have generally been slow to mature this season and the early harvests of *Kennebec* and *Shepody* have reflected this.

However, harvesting is now progressing well and yields are expected to be in the mid 50s per hectare. An unseasonal frost in mid January affected many crops and may well affect yield later in the season. The *Ranger Russet* crops are progressing well, but less will be placed in storage this year after problems with bruising out of store last year. Higher than normal levels of powdery scab recorded in seed crops last season have been reflected in commercial crops this year. The new Simplot line at the Ulverstone plant is now fully commissioned.

The Tasmanian potato industry will see the end of an era this season with the retirement of Mac Lette from Simplot at the end of January. Mac started with Kraft 38 years ago and, although the company has been through several name changes since, Mac has stuck with it through good times and bad. Simplot and growers in the northeast will sorely miss his industry experience.

Iain Kirkwood

Agriculture Officer (Potatoes)

Department of Primary Industries, Water and Environment

Queensland

Summer rains have fallen in all production areas. While everyone has welcomed the rain, in many areas there is still need for follow-up rain to continue the recharge of creeks, dams and aquifers.

Upper Atherton Tableland's November and December crops yielded well and still commanded good prices. Overall, quality was good although tuber moth damaged a couple of crops considerably, and there was some spotting in others.

Currently Upper Tableland growers are preparing for planting. At writing it appears this planting may be down slightly as some growers still have water supply issues.

Bundaberg has received good summer rains and is expecting to plant a normal crop in the coming season.

Lockyer Valley late crops generally held up well and received good prices, although a few crops suffered breakdown after summer storms. Growers are in the process of planting autumn crops. This planting may be slightly lower than normal, as a number of growers remain concerned about water supplies.

Darling Downs' producers have received good planting rains, and will plant their normal crops. They are currently experiencing some very high daytime temperatures, which they hope will ease in the near future.

Michael Hughes

Extension Agronomist

Department of Primary Industries

New South Wales

Digging of the early crop in the Riverina started in December and finished in February. With the dry spring and cool growing season, the fresh and French fry crops only produced average yields.

Conditions suited the crisping crops, which grew higher than usual yields of 50 t/ha. Strong demand over the Christmas period kept fresh prices firm at \$300/t on-farm for dirty, bulk potatoes. Fresh areas were down on last year, while processing areas have continued to expand.

The early crop harvest in the Dorrigo area started in December and ended in February. Despite the dry spring there were good falls of rain during the growing season. As a result, yields were high with dryland crops averaging 38 t/ha. Demand was firm with prices around \$30/bag (\$600/t) on-farm during the harvest. However, heavy rain during mid-January delayed digging by 10 days. Digging in the Ebor and Tyringham areas started in February and will finish in late March.

Sowing of the mid-season crop started in the Guyra, Orange and Crookwell districts in late October and was finished by Christmas. Main crop areas were similar to last season. Most early plantings benefited from sowing on full soil moisture profiles and the follow-up rains that fell during December and January. With the excellent growing conditions the seed crops have remained free of major diseases.

Harvesting of the mid-season crop in the Crookwell area is expected to start in late March and continue through to August. Overall the main crop yields are expected to be a little above average provided the weather doesn't get too hot during autumn and there is sufficient water to irrigate the later plantings through to harvest.

Sowing of the late crop in the Maitland district began in mid-January and finished in mid-February. Planting of the Dorrigo late crop commenced in late January and was completed by early February. With the good summer rains in the Dorrigo district soil moisture profiles and farm dams are now full. Planting of the Riverina late crop started in mid-February and finished in early March. Late crop areas in New South Wales are similar to last year.

Stephen Wade

District Horticulturist

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