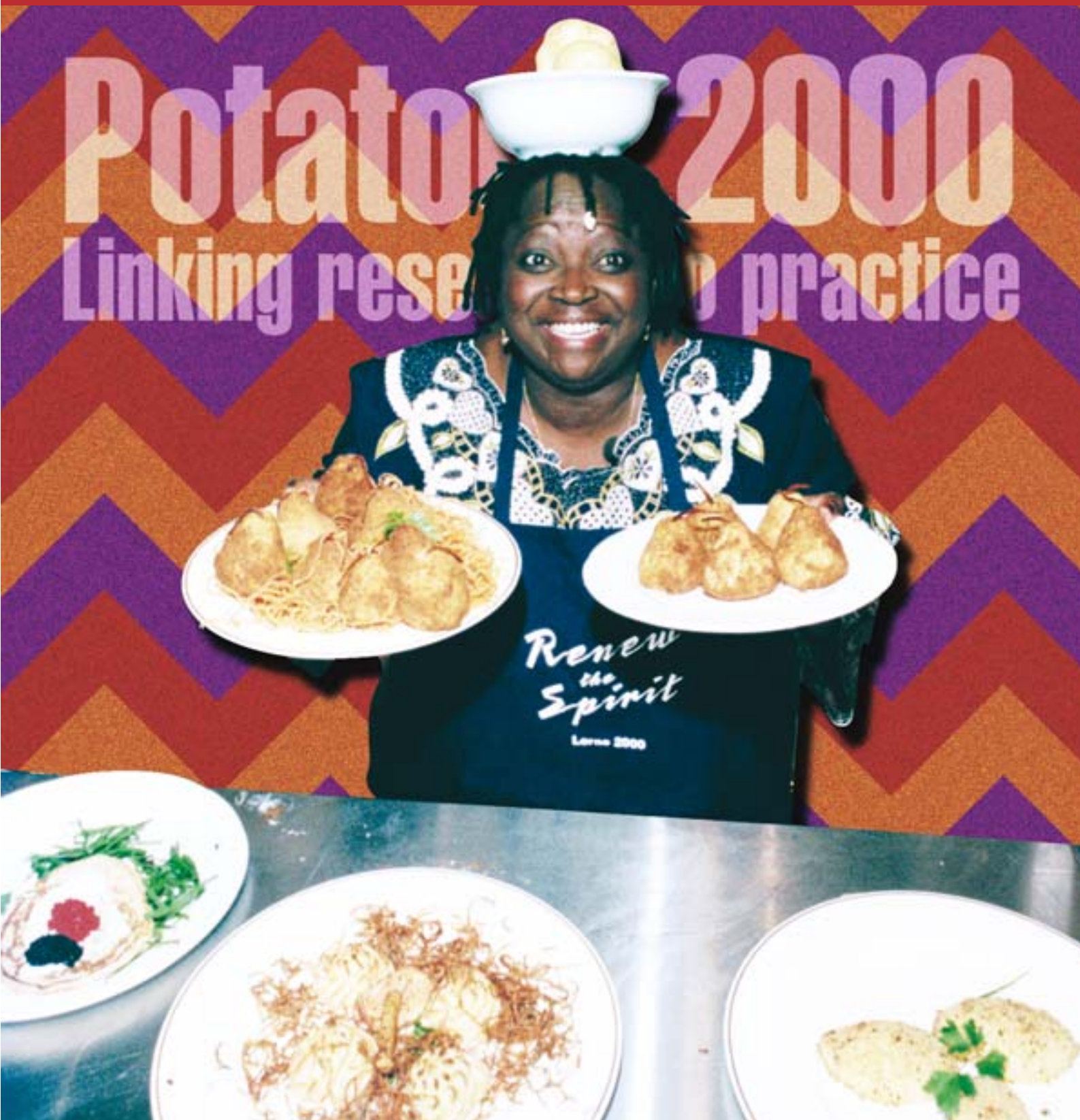
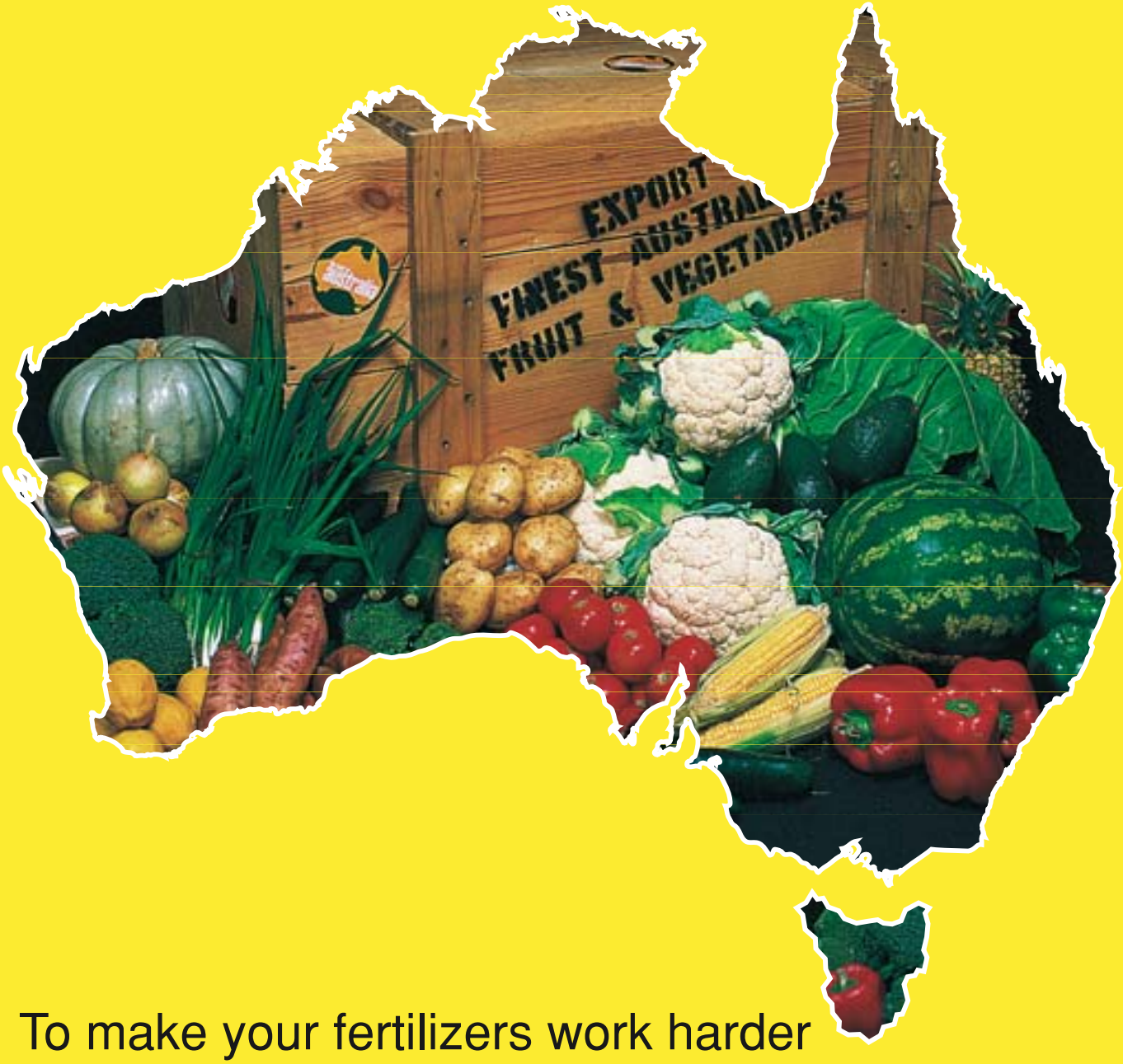
Potato Australia

PUBLISHED BY THE AUSTRALIAN POTATO INDUSTRY COUNCIL

VOLUME 11 SEPTEMBER 2000 ISSN 1036 – 8558



Australian horticulture... working hard for Australia



To make your fertilizers work harder and to find out more about your exact requirements, see your local Incitec dealer today.

Incitec
FERTILIZERS
Certainty. In an uncertain world.

Potato Australia

PUBLISHED BY THE AUSTRALIAN POTATO INDUSTRY COUNCIL

VOLUME 11 SEPTEMBER 2000 ISSN 1036 – 8558

Editorial

The Potatoes 2000 conference held in Adelaide just a few weeks ago really was the event not to be missed in the potato industry this year. In almost 17 years of involvement with potatoes, I've never seen so many people from all facets of the potato industry in one place at the one time.

As you will see in our conference feature, starting on page 26, the 300-plus delegates took up the offer from the Honorable Mr Rob Kerin, the South Australian Deputy Premier and Minister for Primary Industries, to "mix work and play," whilst enjoying the South Australian hospitality.

Hopefully each delegate also took note of Mr Kerin's plea to "go away from this important conference a little wiser" since a number of issues were raised that will require some hard decisions to be made in the near future. These include:

- the need to fund market research and promotion in order to regain market share.
- how can the breeding program be restructured to encourage private investment but avoid closed loop marketing?
- how can an effective R&D program be maintained in the face of rising research costs?
- what should be the potato industry's response to GMO's?

Finding a way through these issues will require many people in the industry to question their current views and vision for the industry in order to foster the creation of innovative solutions. Unless this happens the industry may find it is unable to compete. As Malcolm Kentish reminded us, "Insanity is doing what you have always done and expecting a different result."

And whilst on the subject of change, after seven years as Editor, this 2000 edition of *Potato Australia* will be my last. As it goes to print, I will be taking up the position of Industry Development Manager – Communication, based with the Australian Citrus Growers Inc.

I would like to sincerely thank all those who have been involved in the production of the industry publications over those seven years, in particular Leigh Walters, Helen Sims, Bruce Beattie, John Fennell, our state based editorial support team and distribution agents, our advertising managers, our printer, Sprinta Print and, very importantly, all the contributors, for all their input, support and assistance.

Nathalie Jarosz - Editor

Leigh Walters - Assistant Editor

Leigh Walters will take on the role of Acting Editor until a new editor is appointed in the coming months.

Finally I wish everyone the very best for their future and for the future of the industry.

Nathalie Jarosz

Contents

	Page
Chairman's Report	4
Your levy at work	6
HRDC Potato R&D Projects for 2000-2001	8
New projects approved by HRDC	10
R&D projects in progress	12
Common scab resistance in processing potatoes is possible	20
Managing bacterial breakdown in washed potatoes	22
Enhanced biodegradation of metham sodium – could you be feeding bacteria a costly meal	24
Potatoes 2000 - Linking research to practice	26
How technology is improving my business	30
Does too much phosphorus fertiliser increase the risk of high tuber cadmium concentrations	34
Sustainable use of reclaimed water in irrigation Northern Adelaide - SA.	36
Development and implementation of national seed potato certification standards	37
Better soil and water management on sandy soils in South Australia	38
Fulfilling South East Asian seed demands	40
Phytotoxicity of metribuzin to different potato cultivars in southern Australia	41
Potato exports to Asia - Can Australia become a major exporter of potatoes	42
Putting information where it counts	44
1999 World Trade Organisation research program for the Australian horticultural industries	46
Nadine: she looks good but she can be difficult to live with	47
R&D funding - are states getting their fair share	48
Potato Breeding and New Varieties	50
A supply chain approach to potato export market development	54

ACKNOWLEDGEMENT

Designed and printed by sprinta PRINT

We thank the Horticultural Research Development Corporation (HRDC) for its financial contribution towards the production and distribution of *Potato Australia*.

Chairman's report

MILTON RODDA
Chairman
Australian Potato Industry Council
☎ (03) 5339 2241

As I write this, my first report as APIC Chairman, I cannot help but drift back to the early days of 1988 when the Council had its birth. I was a member of the steering committee that was formed to examine various options for the formation of a national body and subsequently found myself appointed to the Council as a processor representative at its launch in May 1989. Little did I suspect at that time that I would be given the honour of chairing the Council a decade on.

It seems to me that since then many issues have not shifted greatly as I can vividly recall the discussions that took place around price, supply, need for promotion, alternate foods, etc. that are still popular topics for discussion today.

This is not to say that we have not progressed as I have also witnessed considerable change within the industry such as improvements in irrigation methods, development of new areas, a greater shift towards contract growing, new varieties and ever changing technologies which have all impacted on our industry to bring it to where it is today.

This ongoing change has involved your Council in many issues in the short time since I have been appointed. The release of two documents of note being the Strategic Plan and the Communication Plan which give a clear guide forward for industry. In addition, the vitally important Research and Development Plan is currently being revised by the R & D Committee to ensure it remains relevant to member expectations and industry driven.

Council is presently involved in considering the ratification of the National Seed Potato Certification Standards, exploring closer R & D ties with New Zealand, the development of a National PCN management plan and consideration of the Council's policy position on GMOs.

Industry continues to grapple with the concept of fresh potato promotion via a levy system with ongoing discussions taking place in an attempt to reach consensus on the issue. It is agreed that there is a need for promotion but a way needs to be found to fund such promotion that is acceptable to all.

The two bodies responsible for R & D and Promotion within our industry, namely the Horticultural Research and Development Corporation (HRDC) and the Australian Horticultural Corporation (AHC) are, as a result of a decision of the Federal Government, to be merged into a single body to be known as Horticulture Australia. This body will take the form of a company and will be charged with the task of delivering world class marketing and R & D services to the horticultural industry. Your Council is presently involved in consideration of a suitable person or persons to nominate for a position on the board of this new company so as to have your industry represented.

This represents a summary of the issues that are presently confronting our industry and your Council will continue to address them on your behalf. ■

Potato Australia **is produced by the Department of Primary Industries, Water and Environment, Tasmania, on behalf of the Australian Potato Industry Council.**

Editor
Until a new editor is appointed please direct all enquiries to the Assistant Editor

Assistant Editor
Leigh Walters
South Australian Farmers Federation
PO Box 6014
Halifax Street
Adelaide SA 5000
Ph: (08) 8232 5555
Fax: (08) 8232 1311
e lwalters@saff.com.au

Production Assistant
Helen Sims
Department of Primary Industries,
Water and Environment
PO Box 303
Devonport TAS 7310
Ph: (03) 6421 7601
Fax: (03) 6424 5142
e Helen.Sims@dpiwe.tas.gov.au

Advertising Manager
Any advertising enquiries direct to :
Zillah Thompson
Target Media Sales
18 Gregory Street
Sandy Bay TAS 7005
Ph: (03) 6224 2933
Fax: (03) 6224 2939
e info@targetmedia.com.au

Potato Australia
PUBLISHED BY THE AUSTRALIAN POTATO INDUSTRY COUNCIL

Advisory Group
The advisory group provides editorial support in identifying issues, organising content and ensuring the newsletter meets grower needs.

Stephen Wade (NSW)
NSW Agriculture
Ph: (03) 5883 1644
Fax: (03) 5883 1570
e stephen.wade@agric.nsw.gov.au

Michael Hughes (QLD)
Department of Primary Industries
Ph: (07) 4095 8229
Fax: (07) 4095 8258
e hughesm@dpi.qld.gov.au

Bob Peake (SA)
Primary Industries and Resources SA
Ph: (08) 8724 2913
Fax: (08) 8723 1941
e peake.bob@saugov.sa.gov.au

Linda Wilson (TAS)
Department of Primary Industries,
Water and Environment
Ph: (03) 6421 7642
Fax: (03) 6424 5142
e Linda.Wilson@dpiwe.tas.gov.au

Andrew Henderson (VIC)
Department of Natural Resources and Energy
Ph: (03) 9210 9222
Fax: (03) 9800 3521
e hendersona@nre.vic.gov.au

Peter Dawson (WA)
Agriculture Western Australia
Ph: (08) 9892 8461
Fax: (08) 9841 2707
e pdawson@agric.wa.gov.au

Tasmania
DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and* ENVIRONMENT

Distribution
The following people are responsible for sending out the newsletter in their state. Please send any corrections to mailing lists to the Assistant Editor.

Stephen Wade (NSW)
NSW Agriculture
Ph: (03) 5883 1644
Fax: (03) 5883 1570
e stephen.wade@agric.nsw.gov.au

Tina Hill (QLD)
Queensland Fruit &Vegetable Growers
Ph: (07) 3213 2482
Fax: (07) 3213 2480
e thill@qfvg.org.au

Simone Pemberton (SA)
South Australian Farmers Federation
Ph: (08) 8232 5555
Fax: (08) 8232 1311
e simonep@saff.com.au

John Rich (TAS)
Tasmanian Farmers & Graziers Association
Ph: (03) 6331 6377
Fax: (03) 6331 4344
e jrich@tassie.net.au

Tony Pitt (VIC)
AG-Challenge
Ph: (03) 5623 4788
Fax: (03) 5623 4596
e agchallenge@qedsystems.com.au

Jim Turley (WA)
Potato Growers Association of WA
Ph: (08) 9481 0834
Fax: (08) 9481 0834
e potatoga@iinet.net.au

Aventis

NEW IDEAS
FOR HORTICULTURE

Regent® 200 SC

Rovral®

Afalon® Flowable

Monitor†

Marlin®

Sertin® 186 EC

Formed through the merger of Rhône-Poulenc Rural and AgrEvo, Aventis CropScience has a flexible portfolio of complementary crop protection products for horticulture – including these six for potatoes. With many more on the way.

Aventis CropScience Pty Ltd
ACN 000 226 022
391-393 Tooronga Road
Hawthorn East Vic 3123
Ph (03) 9248 6888
Fax (03) 9248 6800
www.aventis.com.au

AHT7004/PA/0008

Your levy at work

Potato Australia now reports on all the potato projects funded through HRDC.

The table _HRDC Potato R&D Projects for 2000-2001_ (p8) lists all projects whether they are commencing this year (p10), finishing this year or still in progress. For those projects finishing or still in progress there is either a full article or a progress report (p12).

JONATHAN ECCLES
Program Manager
HRDC
☎ (02) 9418 2200
jonathane@hrdc.gov.au

Money collected through the potato levy is used to invest in research and development important in helping the potato industry meet market needs and remain profitable in a rapidly changing world.

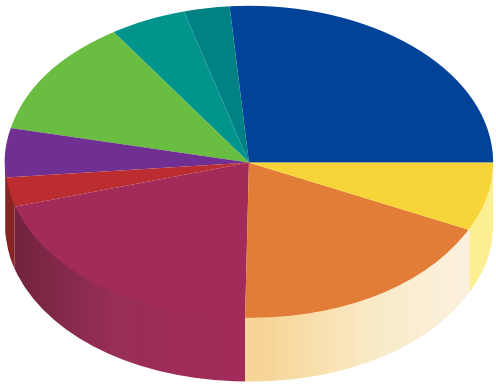
Projects are funded based on industry priorities, the likelihood of a good return on the money invested and the ability of the research and development team to do the work.

How does the system work

In 1991 a national potato levy was introduced to fund research and development (R&D) projects for the benefit of the industry.

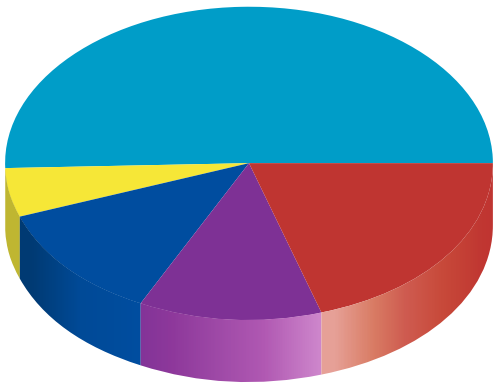
The levy is paid by growers and processors, based on 50 cents/tonne and is collected at the first point of sale. In most cases market agents or merchants collect the levy when potatoes are sold on the fresh market and processors collect it for potatoes destined for processing.

How is the Money Spent 2000/2001



- Crop Management 7%
- NaPIES 18%
- Pest,disease & weed management 20%
- Post harvest 3%
- Seed development 5%
- Technology Transfer 12%
- AusHort 5%
- Industry Management 3%
- Unallocated money 26%

Source of Funds for Projects in 2000



- Fresh, Seed & Export Growers 20%
- Processing Growers 12%
- Processors 12%
- Voluntary Contributions 6%
- Commonwealth Government 50%

All collectors are legally required to forward the levy to the Levies Management Unit (LMU) (Internet address - www.affa.gov.au/levies/), a section within the Commonwealth Department of Agriculture, Fisheries and Forestry (AFFA). The LMU then forwards the levy to the Horticultural Research and Development Corporation (HRDC).

Levies collected in one financial year are invested in the following financial year. The levy is matched by the Commonwealth Government 'dollar for dollar' at the time the levy money is spent on R&D.

Projects can also be financially supported by voluntary contributions (VCs) from individuals, companies or groups. VCs can also be eligible for matching Commonwealth Government funds. The voluntary contribution is separate to the levy payments. This option can be very useful if an industry group wants work done that is regionally specific or is short term. VC funding is useful in encouraging support for projects for sectors within the industry who are not levy payers.

Outcomes from the finished work can be found in the 84 HRDC Final Reports (see p45 for recently finished reports) and in publications such as this one, _Eyes on Potatoes_ and specially designed information packages. Many projects also involved field days and other group activities during the period of the projects.

How do researchers obtain funding

A preliminary application, called a concept development proposal (CDP), is submitted to the HRDC by the end of July and considered by the APIC R&D Committee in September/October. Applicants whose proposals meet industry priorities are requested to put in full proposals with a detailed budget by the end of November.

The full proposals are considered by the Committee in February/March and recommendations are made as to what projects should be supported by the Board of HRDC. These recommendations must be endorsed by APIC. The HRDC Board has the responsibility to approve expenditure from both the levy and matching Commonwealth funds and ensure projects meet both the industries needs as well as the Government priorities.

How industry influences government

The Potato Levy is a very effective way for industry to influence government spending.

Under the current arrangements, the Commonwealth Government provides 50% of the HRDC funds and yet most of the decisions as to what to fund rests with the industry based committee. In addition to this, state governments often provide additional funds to support HRDC projects. This means that industry can also influence the direction of state government spending and leverage funds for potato R&D far in excess than is raised by the potato R&D levy.

If industry is to fully capitalise on this arrangement it is important that they input through their representatives on the APIC R&D Committee.

The Commonwealth is after all providing 50% of the funding. The Board has the right to reject the recommendations from the R&D Committee but rarely has this occurred.

The successful applicants are notified in May with new projects starting in July or as soon as contracts are finalised.

Some projects are also commissioned by the Committee to meet specific needs of the industry not addressed through the normal application process. This type of approach is likely to increase once the new Research & Development Plan has been completed. The plan will provide the 'blueprint' for what needs to be done.

Throughout the project researchers are required to report back to HRDC to ensure the project objectives are being met and the money is being spent wisely.

Who is on the APIC R&D Committee

The Committee members consist of one grower representative from each state, a representative from each of the crisping and French fry processing industries and a merchant. The HRDC Program Manager for potatoes and the Technology Transfer Manager are advisers. The Committee is chaired by an independent chairman with a scientific background and the secretarial support is provided by APIC. ■

Current members on the APIC R&D Committee

Dr Jack Meagher (Chairman) Brian Newman (Secretary)

Growers

Clinton Zerella (SA) John Doyle (NSW)
Dom Della (WA) Frank Rovers (Vic)
David Addison (Tas) Anthony Rehbein (Qld)

HRDC

A Director has the option to attend.
Jonathan Eccles (Program Manager)

Merchant

Neville Beaumont (NSW)

Processors

Tony Gietzel (Snack Brands) Paul Frost (Safries)

Technology Transfer Adviser

Leigh Walters (Technology Transfer Manager)

HRDC Potato R&D Projects for 2000-2001

Project title	Chief investigator	☎	Page
Crop management			
Coordination of the National Cadmium Minimisation Strategy	Dr Mike McLaughlin, CSIRO Land & Water	08 8303 8433	12
Determination of the biochemical and genetic factors affecting cadmium accumulation in potato tubers	Dr Christopher Davies, CSIRO Plant Industry	08 8303 8629	12
Developing soil and water management systems for potato production on sandy soils in Australia	Robert Peake, Primary Industries and Resources South Australia	08 8724 2913	38
Effect of calcium nutrition on decay of summer sown seed potatoes	Dr Greg Howell, NSW Agriculture	02 6951 2510	12
Mechanisms of cadmium accumulation by potatoes	Dr Mike McLaughlin CSIRO Land & Water	08 8303 8433	13
More economic and environmentally responsible use of phosphorus fertiliser in potato cropping on krasnozem soils in Australia	Peter Johnson, Tasmanian Institute of Agricultural Research	03 6336 5271	13
Potato tuber quality management in relation to environmental and nutritional stress	Stephen Harper, Queensland Horticultural Institute	07 5466 2222	14
Remote sensing as an aid to horticultural crop recording and husbandry	Dr Rowland Laurence, Tasmanian Institute of Agricultural Research	03 6430 4901	14
Sustainable use of reclaimed water in irrigation, Northern Adelaide Plains, SA	Dr Daryl Stevens, CSIRO Land & Water	08 8303 6700	36
National Potato Improvement & Evaluation Scheme			
Breeding crisp potato varieties - Stage 2	Dr Roger Kirkham, Agriculture Victoria	03 5962 9218	50
Breeding French fry potato varieties - Stage 2	Dr Roger Kirkham, Agriculture Victoria	03 5962 9218	50
Breeding fresh market potato varieties - Stage 2	Dr Roger Kirkham, Agriculture Victoria	03 5962 9218	50
Development of fresh and export markets by varietal improvement	Peter Dawson, Agriculture WA	08 9892 8461	50
Evaluation and development of new potato genotypes - South Australia	Dr Chris Williams, SA Research and Development Institute	08 8389 8808	50
Potato breeding & cultivar evaluation - Western Australia	Peter Dawson, Agriculture WA	08 9892 8461	50
Potato cultivar accession and testing in Tasmania	Dr Rowland Laurence, Tasmanian Institute of Agricultural Research	03 6430 4901	50
Potato cultivar evaluation in Victoria and New South Wales	Dr Roger Kirkham, Agriculture Victoria	03 5962 9218	50
Selection and evaluation of potato cultivars in Queensland	Dr Ken Jackson, Queensland Horticultural Institute	07 5466 2288	50
Technology transfer of new potato cultivars	Dr Roger Kirkham, Agriculture Victoria	03 5962 9218	50
Pest, disease & weed management			
Biofumigation - bioactive brassica rotations for IPM of soil-borne pests and diseases	John Matthiessen, CSIRO Entomology	08 9333 6641	14
Biofumigation - optimising biotoxic brassica rotations for soil-borne pest and disease management	John Matthiessen, CSIRO Entomology	08 9333 6641	10
Biological and chemical control of Rhizoctonia (VC only)	Dr Trevor Wicks, SA Research and Development Institute	08 8303 9563	14
Cleaning and disinfestation practices for Australian farms	Dr Dolf de Boer, Agriculture Victoria	03 9210 9222	14
Control of pink rot in field and storage	Liz Oxspring, SA Research and Development Institute	08 8303 9587	15
Development of extreme resistance (immunity) to common scab disease within current commercial potato cultivars	Dr Calum Wilson, Tasmanian Institute for Agricultural Research	03 6226 2638	20
Enhanced biodegradation of soil-applied pesticides - determination, risk assessment and prevention strategies	John Matthiessen, CSIRO Entomology	08 9333 6641	24
Influence of rotation and biofumigation on soil borne diseases of potatoes	Dr Dolf de Boer, Agriculture Victoria	03 9210 9222	15
Investigation on common scab disease of potatoes and development of control methods	Dr Hoong Pung, Serve-Ag Research	03 6427 0800	15
Management of tomato spotted wilt virus in potatoes	Dr Calum Wilson, Tasmanian Institute of Agricultural Research	03 6226 2638	10

Project title	Chief investigator	☎	Page
Pest, disease & weed management (continued)			
National PCN Management Strategy	Gordon Berg, Agriculture Victoria	03 9210 9222	16
National strategy for the management of western flower thrips and tomato spotted wilt virus	Dr David Cook, Agriculture WA	08 9368 3250	16
New chemical treatments for fungal diseases of seed potatoes	Dr Dolf de Boer, Agriculture Victoria	03 9210 9222	16
Postharvest			
Increasing the opportunities for use of organic wastes in the Tasmanian vegetable industry	John McPhee, Tasmanian Department of Primary Industries, Water and Environment	03 6421 7674	16
Innovative transport and disease control systems: potato exports to Asia	Dr Alister Sharp, Food Science Australia	02 9490 8342	42
Managing bacterial breakdown in washed potatoes	Dr Trevor Wicks, SA Research and Development Institute	08 8303 9563	22
Potato export market development	Russell Sully, Agriculture Victoria	03 9210 9222	54
Seed development			
An agronomic and economic blueprint for a round seed system for Australia's processing potato industry	John Maynard, Davey and Maynard	03 6424 9311	17
Development and implementation of National Seed Potato Certification Standards	Russell Sully, Agriculture Victoria	03 9210 9222	37
DNA fingerprints and cryopreservation of potato cultivars for improved quality assurance	James Hutchinson, Agriculture Victoria	03 9210 9222	17
Improving seed potato production	Dr Phillip Brown, University of Tasmania	03 6226 2716	18
Production and assessment of virus resistant potato cultivars	James Hutchinson, Agriculture Victoria	03 9210 9222	18
Technology transfer			
Australian potato research & technology transfer conference	Dr Chris Williams, SA Research and Development Institute	08 8389 8808	26
Coordinating technology transfer in the Australian potato industry	Leigh Walters, SA Farmers Federation	08 8232 5555	18
Implementing the potato industry's Communication Plan	Leigh Walters, SA Farmers Federation	08 8232 5555	10
Making past industry information from R&D more accessible	Leigh Walters, SA Farmers Federation	08 8232 5555	10
Technology transfer of R&D outcomes and communication within the potato industry through '*Potato Australia*' and '*Eyes on Potatoes*'	Nathalie Jarosz, Tasmanian Department of Primary Industries, Water and Environment	03 6421 7637	#
AusHort (Projects funded by all horticultural levy paying industries)			
1999 World Trade Organisation research program for the Australian Horticultural Industries	Roger van Hilst, ABARE	02 6272 2000	46
Addressing quality management and food safety issues in horticulture	Richard Bennett, Australian Horticultural Corporation	03 5831 3919	11
Advancing horticulture's response to the Existing Chemical Review Program	Kevin Bodnaruk, AKC Consultancy	02 9499 3833	19
GMOs in Horticulture - consultation forum	Russell Sonderlund, HRDC	03 9210 9365	19
Horticultural Environmental Audit	Leigh Sparrow, HRDC	03 6336 5379	19
Horticulture Emergency Plan	Libby Abraham, HRDC	02 9418 2200	11
Improved labelling of pesticides to encourage optimum use in horticultural crops	Adrian Jones, ChemCert	03 5682 2384	11
Understanding the implications of Codex issues to horticulture	Kevin Bodnaruk, AKC Consultancy	02 9499 3833	11

■ **New projects that have been approved and will commence once contracts have been finalised or have commenced this year.**

■ **Ongoing projects**

■ **Projects ending in late 1999 and 2000**

VC only – Voluntary contribution only, no Potato Levy money used.

 # Amalgamates the production of *Potato Australia* and *Eyes on Potatoes* into one project. No report is produced as the outcome is sent out to everyone.

In some cases projects that are supported for funding do not commence. Any new projects listed last year that are not listed this year did not go ahead. Projects that are listed as ending this year that were not listed last year are short term projects that are approved after the production of *Potato Australia*.

New projects approved by HRDC

National potato improvement and evaluation scheme

Developing fresh and export markets by varietal improvement

The project team aims to help the Western Australian potato industry become more competitive and to expand into new export markets. The expansion of exports is vital following the loss of production brought about by the closure of the Simplot French fry factory at Manjimup in August 1999.

Greater competitiveness and expansion in the export market will be achieved by selecting improved varieties, which will better meet market demands and better suit the growing conditions of Western Australia.

Specifically, the fresh market requires high yielding varieties with versatile culinary quality. The export crisp trade requires varieties that have improved storage. The fresh export trade will require potatoes with yellow skin and flesh with high yield and improved storage characteristics.

Project duration: 3 years

PETER DAWSON
Agriculture Western Australia
☎ **(08) 9892 8461**
✉ **pdawson@agric.wa.gov.au**

Pest, diseases & weed management

Biofumigation - optimising biotoxic brassica rotations for soil-borne pest and disease management

Biofumigation refers to rotation and green manuring with biologically-active plants to suppress soil-borne pests and diseases in horticultural production systems.

The primary focus of this research is on the use of Brassica species that produce toxic isothiocyanates. These compounds are similar to the toxin produced by the soil fumigant metham sodium which is widely used in horticulture, but for which there are no harmless chemical alternatives should problems with its use arise.

The toxins exist in brassicas in complex mixtures that vary with species, cultivar and plant part. Most commercial brassicas have, however, been bred for other purposes, which has generally resulted in reduced toxin levels.

The basis of this project is that improvement in biofumigation capability in brassicas will be achievable through research that reveals the basis of toxic effects and thus guides how best to improve them.

Chemical analysis and testing of toxicity against pest organisms will be used to determine the best chemical characteristics of brassicas for biofumigation, and the influence of environmental factors such as soil type. Collaboration with plant breeders and applied agronomists will then enable appropriate selections and their application to optimise biofumigation.

The outcome of the research will be alternative and biologically-based means of suppressing soil-borne pests and diseases in horticulture, furthering Australia's 'clean-green' production image.

Project duration: 3 years

JOHN MATTHIESSEN
☎ **(08) 9333 6641**
✉ **johnm@ccmar.csiro.au**

Management of tomato spotted wilt virus in potatoes

Tomato spotted wilt virus (TSWV) is a very serious disease of many horticultural crops and a sporadic but important disease of potato. In recent years several devastating epidemics of TSWV have occurred in Australian potato seed and ware crops resulting in significant losses. Currently there are no recommended management strategies for potatoes and no means of predicting likely outbreaks. Furthermore, current certification guidelines may not be appropriate for this virus, as virus transmission to tubers is inefficient, reducing risk of carryover in seed.

This project aims to consolidate recent outcomes from prior and current projects to achieve the following:

1. Review and refine tolerance levels of TSWV infection in seed crops so that they reflect the real risk to purchasers. This work will include information on the risk of virus transmission for different cultivars to seed tubers and the potential effect of different virus strains on tuber infection.
2. The identification, monitoring and importance of different insects involved in the spread of TSWV.
3. The evaluation of control options for insects associated with TSWV epidemics.
4. The collation of information on the life cycle of the virus to better understand TSWV epidemics.
5. Technology transfer of key management strategies and revised certification tolerance levels.

Project duration: 3 years

CALUM WILSON
Tasmanian Institute of Agricultural Research
☎ **(03) 6233 6841**
✉ **Calum.Wilson@dpiwe.tas.gov.au**

Technology transfer

Implementing the potato industry's Communication Plan

The aim of this project is to employ a Technology Transfer Manager (Potatoes) to facilitate the implementation of the national Communication Plan which has been developed for the Australian potato industry.

The Communication Plan has been prepared to replace the original concept of a national technology transfer strategy proposed under the project "Coordinating technology transfer in the Australian potato industry." The project had been a pilot to determine the value of national coordination and facilitation of communication activities.

Given the success of the pilot project a new project has been developed to continue and build on the work.

The Communication Plan and the Technology Transfer Manager (Potatoes) will be overseen by the R&D Committee with a local management committee dealing with day to day issues.

Project duration: 5 years

LEIGH WALTERS
South Australia Farmers Federation
☎ **(08) 8232 5555**
✉ **lwalters@saff.com.au**

Making past industry information from R&D more accessible

The project will provide the means for industry to easily look up past information produced in HRDC final reports, *Potato Australia* and *Eyes on Potatoes* using the internet or a computer CDROM.

The information from these publications will be electronically stored and will be able to be searched using simple tools. So if someone wants to find what has been published on powdery scab then all they will need to do is enter powdery scab and all the articles and final reports produced containing powdery scab will be listed. Any of the publications or articles listed can then be selected and viewed.

A lot of research has been reported in *Potato Australia,* industry newsletters,

workshop notes, information leaflets and HRDC Reports. Many of the publications that are more user friendly for industry, such as *Potato Australia,* have not always been kept and prior to the problems in the distribution system being sorted out, not necessarily received.

Given the number of publications it is often difficult to find what you need, assuming you still have the relevant publication. This does not help the industry to capitalise on their significant investment in R&D. We need a simple way for people to gain access to information that has been generated by the research program, when they need it.

You may ask why not supply the information in printed form. The answer is that in printed form it would amount to an enormous document. At this stage we have 11 editions of *Potato Australia* with about 40 pages of information per edition - a total of 440 pages. There have been 10 editions of *Eyes on Potatoes,* each with about 13 pages of editorial - a total of 130 pages. There are over 80 HRDC Final Reports of about 50 pages each, which amounts to 4000 pages.

Then there is a problem of how you index all this information so people can find what they want quickly. So pulling all this into one document is not very practical. It would also be very expensive.

The CDROM and internet have several advantages. They are relatively cheap and simple tools can be designed to enable users to find information quickly and easily.

This will not replace the potato publications but rather provide access to past articles and publications that may or may not still be in circulation.

Given there is industry support, the range of publications included could be expanded and this will be investigated in the early stages of the project.

In summary the CDROM provides rapid access to a large amount of information that has been generated for industry. It also allows people to simply access information when they need it.

Project duration: 9 months

LEIGH WALTERS
South Australian Farmers Federation
☎ (08) 8232 5555
✉ lwalters@saff.com.au

AusHort

Addressing quality management and food safety issues in horticulture

This project seeks to tackle an area sometimes considered a movable feast in horticulture, quality and food safety. A reference group has been formed with the aim of highlighting and addressing industry concerns in this area. For example, the need for multiple audits, which concerns many growers as an unacceptable cost to business.

The reference group aims to involve supermarkets and accreditation organisations, and also link with federal government initiatives to reduce the burden of food safety requirements on the horticultural industries.

This is a clear example of an area of concern to growers across horticulture that is best tackled by the industries working together to provide strength in numbers and enough funding to make things happen.

RICHARD BENNETT
Australian Horticultural Corporation
☎ (03) 5831 3919
✉ bennettr@mcmedia.com.au

Horticulture Emergency Plan

The Horticulture Emergency Plan (HEP) is the national emergency management plan for the combined horticulture industries in Australia.

HEP is a template that has been developed to ensure that industries are equipped to prepare for emergencies that may affect more than one horticulture industry, or overwhelm a single industry. Each industry or sector can use this template to develop their own emergency management plan for emergencies impacting on it. Practically speaking, this means that industries are well prepared with a plan of actions that can quickly be turned on when a potential emergency becomes a reality. An example of a potato industry emergency is PCN.

The long-term success of Australia's horticultural industries in securing prosperous local and international markets relies on the industries' commitment to product integrity and quality management. This commitment will be reflected in the industries' skill in rapidly identifying and responding to potential or actual problems that may result in emergency situations. An effective response will ensure that each industry maintains its sound reputation as a producer, supplier, processor or retailer of quality products.

The AusHort R&D Committee have decided to support the fostering and testing of the Plan for 12 months to ensure its effectiveness and usability. The HEP will reside on the Horticultural Research and Development Corporation and Australian Horticultural Corporation website for easy access to all industries, www.horticulture.com.au

LIBBY ABRAHAM
HRDC
☎ (02) 9418 2200
✉ libbya@hrdc.gov.au

Improved labelling of pesticides to encourage optimum use in horticultural crops

The aim of this project is to identify the various issues regarding labels on pesticides. These could range from anomalies (such as recommendations varying between States), to missing information (such as recommendations for different sprayer types), lack of clarity (such as size of print or volume of information), or any other issue.

Based on this information the research team will develop an action plan to enable the horticultural industries, with National Registration Authority and Avcare (the chemical companies association) to address these issues.

Some of these issues have moved from a nuisance to a potential threat to businesses, with the advent of quality management systems, spray records and the need to prove strict adherence to label recommendations at all times. If anything can be done to help growers manage this part of their business, then this is a chance to do it.

ADRIAN JONES
ChemCert
☎ (03) 5682 2384
✉ amjones@dcsi.net.au

Understanding the implications of Codex issues to horticulture

At the September 1999 AusHort R&D Committee meeting an overview of Codex issues was provided by Dr Melanie O'Flynn, Agriculture Fisheries and Forestry, Australia. It was suggested that horticulture should consider investing resources into this area, as among other things, the Codex organisation has world-wide responsibility for setting MRLs for food products.

The AusHort R&D Committee has since decided to conduct a needs analysis to provide background information on the Codex organisation and determine what, if any, investment in Codex issues is required for horticulture, the most appropriate funding source(s) and suggested mechanisms by which these needs can be met.

The AusHort R&D Committee have appointed the co-ordinator for horticulture's response to the National Registration Authority Existing Chemical Review Program to conduct this analysis.

KEVIN BODNARUK
AKC Consultancy
☎ (02) 9499 3833
✉ akc_con@zipworld.com.au ■

R&D projects in progress

Crop Management

Coordination of the National Cadmium Minimisation Strategy

(VG - Project started June 2000)

This project is jointly funded by the Fertilizer Industry Federation of Australia, Grains Research and Development Corporation and HRDC.

The National Cadmium Minimisation Strategy is an outcome of a resolution made by the Standing Committee on Agriculture and Resource Management (SCARM). SCARM established the Strategy as a result of continuing concerns over accumulation of cadmium in agriculture. A National Cadmium Management Committee will oversee the Strategy.

Members of the Committee are Dr Lindsay Cook (Chair) (NSW Agriculture), Mr Bruce Shelley (Agriculture Victoria), Mr George Rayment (Queensland), Dr Ian McPharlin (Agriculture Western Australia), Dr Chris Etherton (Primary Industries and Resources South Australia). Dr McLaughlin has been appointed as a coordinator on a part-time basis for the Committee.

The Committee has the following terms of reference:

- provide a central focus for the collection and analysis of data and information on cadmium in agriculture and food in Australia and worldwide;
- collect, analyse and interpret data on cadmium in soils and farm produce in Australia;
- identify where additional data is required, and seek resources to obtain that data;
- assist the fertiliser industry to develop and monitor the success of its code of practice;
- assist state Departments of Agriculture to develop area and crop specific best management practices for high-risk situations in conjunction with all sectors of industry;
- monitor any trade implications of cadmium content of food and agricultural products worldwide;
- provide policy advice on cadmium issues to SCARM and individual SCARM members as appropriate or requested;
- liaise with the Australia New Zealand Food Authority on issues of cadmium contamination of food;
- report annually to SCARM and twice per year, or as they require, to the funding bodies on the activities and outcomes of the position;
- monitor the implementation and success of the National Strategy for the Minimisation of Cadmium in Agriculture.

MIKE MCLAUGHLIN,
CSIRO Land and Water
☎ (08) 8303 8433
✉ mike.mclaughlin@adl.clw.csiro

Determination of the biochemical and genetic factors affecting cadmium accumulation in potato tubers

(PT - Project yet to commence)

Although funded in 1999, this project has not yet commenced. The objective of the project is to investigate the biochemical and genetic factors involved in the uptake of cadmium from the soil by potatoes.

This will involve a biochemical investigation into the mechanisms of cadmium uptake, transport and storage by "high" and "low" accumulating lines and more detailed molecular investigation of the genes and gene products involved in these processes. This may allow the development of molecular markers to assist in the breeding of low cadmium lines by conventional breeding.

Other important issues to be addressed include how and where cadmium is stored within the plant and what factors influence the amount of cadmium stored.

Results of this work should allow more informed farming practices to be developed, the production of molecular markers to assist conventional breeding and will provide the potential to control cadmium levels in tubers via molecular breeding at a later stage.

CHRIS DAVIES
CSIRO Plant Industry
☎ (08) 8303 8629
✉ Chris.Davies@pi.csiro.au

Effect of calcium nutrition on decay of summer sown seed potatoes

(PT - Project started January 1999)

Seed-piece breakdown continues to be a problem for Australian sand-hill potato growers in the MIA, Riverina and Riverland areas and is also a common problem in most sand production systems throughout the world.

Research studies have shown a clear relationship between the calcium content of tubers and their ability to resist Erwinia induced soft rots, however, effective control under field conditions has eluded most growers.

A project at Yanco in NSW is currently exploring the relationship between calcium nutrition of potatoes grown for seed tubers and their susceptibility to breakdown in the field. How growers manage the problem is also being looked at.

Plant establishment was measured at Yanco for seed obtained from various growers in the Riverina and MIA over the last two years. No relationship was found between calcium levels and establishment for the year 1999. The source of the seed and perhaps the cultivar appeared to have a much greater influence on establishment than the calcium levels. It would seem that the presence of Erwinia in or on the seed was far more important than any protective role that the calcium may have had in slowing soft-rot development.

The establishment trial was carried out again this year but calcium extractions have not yet been completed.

Establishment was usually highest in the cultivars where certified seed was used. As is usual practice in the Riverina/MIA, most of the seed provided was from small tubers graded from the previous crop, which is grown from certified seed.

Growers should expect certified seed to carry less disease than non-certified seed as it has had less field exposure. The trial suggests that seed, that is only one generation away from a certified generation, often experiences an increase in Erwinia levels. The seed is either becoming infected through rough handling and poor hygiene or infected tubers are being selectively retained as seed.

Work is continuing at Yanco to

produce a tuber crop with enhanced calcium levels so that a more rigorous investigation can be made of the role of calcium in preventing or slowing soft-rot development.

GREG HOWELL
NSW Agriculture
☎ **(02) 6951 2510**
✉ **greg.howell@agric.nsw.gov.au**

Mechanisms of cadmium accumulation by potato tubers

(PT - Project started July 1997)

This project aims to determine the pathways of cadmium accumulation in potato tubers and is being undertaken as a PhD study program by Ms Kelly Dunbar enrolled through the University of Adelaide (Department of Soil and Water).

Cadmium is an impurity present in fertilizers and soil amendments (eg. gypsum, manures and composts) which may accumulate through the food chain and pose a potential hazard for human health.

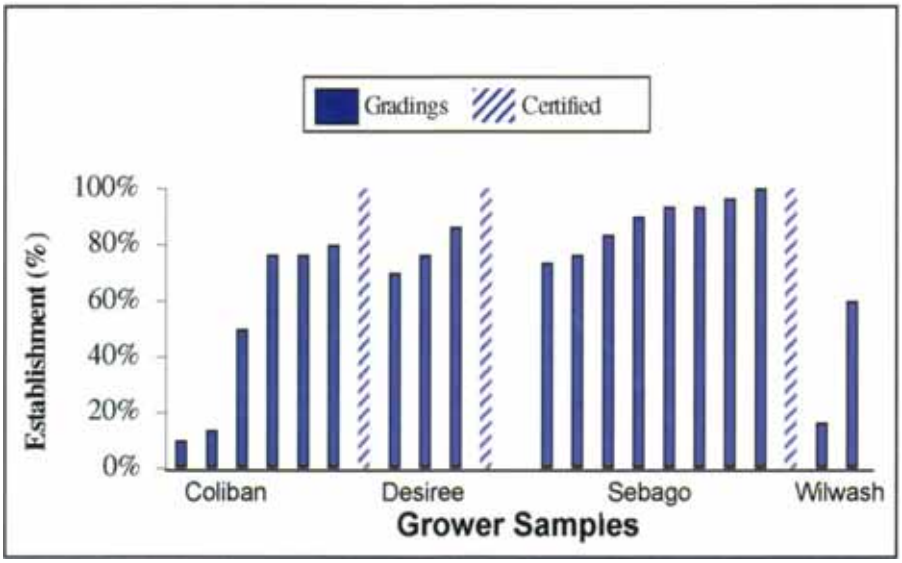
The Australian maximum permitted concentration of cadmium in potato tubers is currently set at 0.1 milligrams cadmium per kilogram of fresh weight. With cadmium concentrations in horticultural soils increasing over time, attention has been focused on ways to limit cadmium accumulation in the tubers.

Experiments over the last 12 months have investigated the uptake of cadmium by Wilwash (a low cadmium accumulator) and Kennebec (a high cadmium accumulator) in relation to uptake of zinc. Zinc is known to reduce cadmium uptake by plants and differences between potato cultivars in terms of cadmium accumulation in tubers may be related to different uptake and transport mechanisms of zinc in the plants.

Results show very different patterns of accumulation of cadmium and zinc in the two cultivars. As expected, Wilwash had lower cadmium concentrations in tubers than Kennebec, but had higher concentrations of cadmium in leaves and roots. Zinc on the other hand, accumulated to higher concentrations in leaves and tubers of Kennebec compared to Wilwash, but root zinc concentrations were lower in Kennebec.

We deduce that zinc is playing a role in the different patterns of movement of cadmium from the leaves to the tubers in the two cultivars and further experiments are underway to determine the mechanisms involved. Addition of zinc to soils will certainly play a role in the management of cadmium accumulation in potato tubers.

MIKE MCLAUGHLIN
CSIRO Land and Water
☎ **(08) 8303 8433**
✉ **mike.mclaughlin@adl.clw.csiro**



Results from an establishment trial at Yanco using grower's seed from last summer's planting season.

More economic and environmentally responsible use of phosphorus fertiliser in potato cropping on krasnozem soils in Australia

(PT - Project started February 1998)

Previous work has indicated the amount of water available to the plants early on in crop growth might be very important in the efficient use of fertiliser phosphorus. There are also indications that red soils may be prone to drying out in the hill, limiting the availability of any fertiliser phosphorus put there.

Last season's field trials were seeking to confirm these issues but were inconclusive due to unexpected uneven irrigation across the trial site which also appeared to affect the time the plants died off within the trial and subsequently tuber size and yield.

The interaction between water and phosphorus observed under field conditions tallies with information from pot trials also undertaken as part of this project. These trials showed that there is

an optimum phosphorus concentration to promote early root growth but that early root growth is also sensitive to the application of water alone.

Another year of field work is planned which will look at the interaction between irrigation and phosphorus use early in crop growth. This work will not be funded by the potato levy.

PETER JOHNSON and LEIGH SPARROW
Tasmanian Institute of Agricultural Research
☎ (03) 6336 5271
✉ Peter.Johnson@dpiwe.tas.gov.au

RICHARD DOYLE
University of Tasmania
☎ (03) 6226 2622

Potato tuber quality management in relation to environmental and nutritional stress

(PT - Project started May 2000)

This project has just commenced and hence there are no outcomes to date. The current work is evaluating the effect of different temperature regimes on the incidence of brown fleck. The ultimate aim of the project is to develop a package to help growers better manage brown fleck.

STEPHEN HARPER
QLD Department of Primary Industries
☎ (07) 5466 2222
✉ harpers@dpi.qld.gov.au

Remote sensing as an aid to horticultural crop recording and husbandry

(VG - Project started August 1997)

Now in its third year, this project aims to determine if satellite imagery can be used to accurately distinguish between individual horticultural crops.

If successful, such imagery would enable a relatively cheap database of cropping history to be compiled over time, providing a management and accreditation tool for individuals and organisations and also possibly provide a means of predicting paddock yields.

By mid 1999 two consecutive seasons of images had been acquired and these are continuing to be computer analysed. At present, the accuracy of prediction of seventeen crops and fallow has reached about 80 per cent overall, with some crops reaching over 90 per cent accuracy. This accuracy has been determined by ground checking of some 400 paddocks in 1998-99 in north west Tasmania where a very wide range of horticultural crops are grown.

Work is continuing to improve these overall rates of accuracy. Rules inferred from monitored cropping sequences can further improve these predictions and are being added to the image analysis program. Such rules would be strengthened by longer-term data acquisition.

In addition to ongoing work by the above project team, Agrecon at the University of Canberra has been commissioned to provide an alternative analysis of the data. The Agrecon results will provide a comparison of the levels of success achieved in crop recognition. All results will be formally presented to industry and the industry will be invited to participate in planning the priorities for the remainder of the project.

ROWLAND LAURENCE
Tasmanian Institute of Agricultural Science
☎ (03) 6430 4901
✉ Rowland.Laurence@utas.edu.au

Pest, diseases & weed management

Biofumigation - bioactive brassica rotations for IPM of soil-borne pests and diseases

(VG - Project started July 1997)

Research in this project is now focusing on collaboration with a brassica breeder and seed companies to evaluate the toxicity and chemical profile of the various fumigant-like compounds in a wide variety of brassicas.

The objective is to enable breeders to select the most appropriate lines and make the best crosses for development of new varieties that can be marketed specifically for biofumigation.

Until now, the lines released by seed companies for biofumigation have been 'best bet' selections of the most potent types currently available from commercially available varieties. These have been developed primarily for other purposes, such as oil production or palatable forage.

Our research indicates that specific selection for biofumigation capacity, which is essentially the opposite of the traits upon which selection for these other attributes has been based, should lead to much more potent biofumigant types.

The free twice yearly *Biofumigation Update* newsletter produced as a component of this project is now sent to about 500 interested growers, consultants and researchers. The newsletter aims to disseminate and share information related to biofumigation or similar options related to soil-borne pest and disease suppression. It is available by contacting John Matthiessen.

John Matthiessen & John Kirkegaard in brassica plots

JOHN MATTHIESSEN
CSIRO Entomology
☎ (08) 9333 6641
✉ johnm@ccmar.csiro.au

Biological and chemical control of Rhizoctonia

(PT - Project started August 1998)

Damage caused by the fungus *Rhizoctonia solani* is common in potato crops world wide resulting in reduced yields and poor quality tubers. The black scurf symptom (reddish-black crusty structures on the skin that cannot be washed off) has become a major problem for washed, fresh market and seed potatoes growers.

Laboratory, shadehouse and field experiments were carried out to evaluate two potential biological agents and six fungicides for the control of *Rhizoctonia solani.*

Overall these studies showed that the biological agents tested could not be recommended for the control of Rhizoctonia in potatoes. Monceren®, Maxim® and two of the experimental fungicides could all be recommended as seed treatments. Amistar® and Monceren® also show promise as in furrow treatments for the control of *Rhizoctonia*. Further work should be undertaken on this aspect.

TREVOR WICKS
South Australian Research and Development Institute
☎ (08) 8303 9563
✉ wick.trevor@saugov.sa.gov.au

Cleaning and disinfestation practices for Australian farms

(PT - Project started July 1988)

The common potato pathogens that cause silver scurf, black dot, black scurf, powdery scab and common scab were detected in dust samples collected from the floors of potato sheds in two major seed production areas of Victoria. This shows that healthy seed potato stocks are at risk from contamination in the farm shed or store.

Disinfectants representing all the major classes of disinfectant chemicals

were screened against three bacterial (black leg, bacterial wilt, common scab) and three fungal pathogens (dry rot, silver scurf, black scurf) of potatoes in laboratory tests.

A peracetic acid/peroxide based disinfectant and a phenolic disinfectant were the most effective against all the pathogens and were not deactivated by organic matter. Testing disinfectants against pathogens on wood, plastic, metal and concrete surfaces gave variable results because of interactions between the pathogens, surface type and chemical group.

Tests now in progress aim to combine cleaning and disinfection treatments and will ultimately lead to hygiene protocols for potato sheds.

DOLF DE BOER
Agriculture Victoria
☎ **(03) 9210 9222**
✉ **dolf.deboer@nre.vic.gov.au**

Control of pink rot in field and storage

(PT - Project started September 1997)

Ridomil is still the most effective treatment for the control of pink rot. However, because of the reliance on Ridomil as a control measure, the development of Ridomil resistant strains of the pink rot fungus overseas and recent reports of breakdown of Ridomil in soil, more work needs to be carried out to develop alternative control methods.

This project has undertaken studies to determine if there are strains of the fungus associated with pink rot *(Phytophthora erythroseptica)* showing resistance to Ridomil in Australia.

Testing of samples of pink rot affected potatoes collected from South Australia, Tasmania and Victoria showed that the fungus from all samples was sensitive to Ridomil, however the range of sensitivity varied. This variation means that monitoring for resistance to Ridomil needs to be ongoing.

Potential chemical agents for the control of pink rot have been screened in laboratory, glasshouse and field trials. Of the twelve fungicides tested thus far, Ridomil was the most effective. Trials have also been established to determine the most efficient and cost effective means of applying Ridomil. In these trials different rates of Ridomil have been applied in-furrow and at planting.

Initial field experiments showed Ridomil granules applied at planting provided almost complete control of pink rot. Foliar sprays of Ridomil at tuber initiation and 10-14 days later also provided good control and was the most economic way of controlling the disease. Yield increases of up to 11-17 tons per hectare resulted from the application of either Ridomil formulation. Results from in furrow applications of Ridomil are in the process of being analysed.

Experiments were also set up to determine how far Ridomil and other fungicides move through the soil profile. Soil columns drenched with the fungicides showed that Ridomil was the most effective treatment and moved to a depth of 25cm in the soil.

Other studies have been carried out to evaluate the potential of using alternatives to control pink rot. Mustard Meal and Mustard Pellets (active ingredient *Brassica juncea* at 100% and 25% respectively) which release isothiocyanates when moistened, are highly toxic to a number of fungi. Laboratory tests showed that these inhibited the growth of the pink rot fungus. However, tests in the field were inconclusive due to the failure of the disease to develop in the trial plantings.

We thank the growers and staff who assisted in the field trials.

LIZ OXSPRING
South Australian Research and Development Institute
☎ **(08) 8303 9587**
✉ **oxspring.liz@saugov.sa.gov.au**

Influence of rotation and biofumigation on soil-borne diseases of potatoes

(PT - Project started July 1999)

This project is studying the effects of rotation crops on disease, yield and the quality of potatoes.

In a laboratory study, the volatile chemicals (isothiocyanates) released from the leaves of various *Brassica* species and the meal of Indian mustard seed, inhibited the growth of the fungal pathogens that cause pink rot *(Phytophthora erythroseptica)*, black dot *(Colletotrichum coccodes)*, verticillium wilt *(Verticillium dahliae)* and black scurf *(Rhizoctonia solani)*.

Chemicals released by the Indian mustard were more potent than those released by the fodder *Brassica* varieties. *P. erythroseptica* was the most sensitive to those chemicals, *V. dahliae* and *C. coccodes* the least sensitive and *R. solani* intermediate in sensitivity.

Brassica green manures (biofumigation) have so far not been proven to cause significant reductions in the incidence of potato diseases in several glasshouse and field trials conducted in Victoria and South Australia.

Chemical tests have shown that the concentration of fumigants released from ploughed-in *Brassica* crops is only about one tenth of that released after soil fumigation with the commercial isothiocyanate metham sodium.

A two-year extension of this project has been approved enabling more extensive evaluation of the role of brassica crops in controlling potato diseases.

DOLF DE BOER
Agriculture Victoria
☎ **(03) 9210 9222**
✉ **dolf.deboer@nre.vic.gov.au**

Investigation on common scab disease of potatoes and development of control methods

(PT - Project started July 1996)

There has been uncertainty in the potato industry of the significance of tuber seed infected with common scab in commercial seed lines and their potential for transmitting the disease onto new tubers. The aim of the 1999/2000 studies therefore, was to determine and clarify the relevance of seed-borne infections.

Control studies were also conducted to identify potential chemical products and develop application methods to control common scab due to either seed-borne or soil-borne inoculum in pot and field trials. Treatment methods included chemical seed dressings, soil applications, or both.

The incidence of common scab disease on seed tubers can vary according to climatic conditions. In low rainfall seasons common scab can be widespread even on certified seed. However, low levels of common scab on infected certified seed tubers can be controlled with chemical seed treatments.

A recent trial showed that mancozeb treatment of seed tubers gave good control of common scab incidence on new tubers produced from seed lines that had common scab levels ranging from 2 to 50%.

A high percentage of new tubers produced from the infected seed tubers had common scab lesions. The increased severity of common scab on seed potato tubers increased the incidence and severity of the disease on the new tubers. Laboratory tests showed that the deep common scab lesions were found to have higher pathogen levels than the superficial lesions.

All mancozeb-based products, Pencozeb®, Dithane®, Tato dust® and Tato bark®, reduced the incidence and severity of common scab infections on new tubers. The level of common scab control achieved with mancozeb was similar to that achieved with Shirlan®and Maxim®.

Mancozeb based products provide an economical treatment for common scab control (eg. approximate cost of Dithane® is $8/kg and Tato dust® is $5/kg compared to $205/L for Shirlan®). Seed tubers can be treated before or after storage, and can be dusted or sprayed.

However, in paddocks where the common scab pathogen level is high and widespread, all chemical seed or soil treatments tested in this project had little or no effect in reducing common scab incidence.

Other materials examined in this study, such as manganese sulphate, gypsum, phosphonic acid and mustard meal, did not reduce common scab due to high levels of soil-borne inoculum.

HOONG PUNG
Serve-Ag Research
☎ **(03) 6427 0800**
✉ **hpung@serve-ag.com.au**

National PCN Management Strategy

(PT - Project started February 2000)

This project aims to build on information gathered in the past to develop a National PCN Management Strategy. Currently the occurrence of PCN in Australia on a localised scale has resulted in restrictions on trade and market access for Australian potatoes. This has occurred despite the original outbreak sites being under official control and no recent new sites being found. There has been no nationally agreed strategy implemented to manage PCN in Australia.

The plan will include strategies for minimising the risk of PCN outbreaks, dealing with a PCN outbreak should they occur and managing areas affected by PCN outbreaks. Information from earlier reports, consultants and other sources has been assembled. A Steering Committee has been formed and a wider stakeholder network developed. These groups will assist in the development of a draft document, which will then be used as the basis for a workshop to resolve any outstanding issues. Endorsement of the plan will be sought from both industry and government stakeholder groups.

GORDON BERG
Agriculture Victoria
☎ **(03) 9210 9222**
✉ **gordon.berg@nre.vic.gov.au**

National strategy for the management of western flower thrips and tomato spotted wilt virus

(HG - Project started July 1997)

This project addressed the expanding threat that western flower thrips (WFT) poses to the Australian horticultural industry in terms of both direct feeding damage and the spread of tomato spotted wilt virus (TSWV) across a broad range of horticultural crops including potatoes.

The objective of this project was to provide the horticultural industry with short-term and long-term control strategies against WFT and TSWV. Of relevance to the potato industry was determining the risk that TSWV poses to important cultivars of seed potatoes.

Horticultural industries now have a comprehensive range of chemical, biological and cultural control strategies in place to combat the thrips/virus complex. Rearing techniques have been developed for large-scale production of several biological control agents (two phytoseiid mite species and a predatory bug). These agents have been evaluated in vegetable and ornamental crops against thrips and other mite pests. The commercialisation of these agents is well advanced with several companies investing considerable support.

The key components of insecticide control involve a strategy of applying insecticides each week for three weeks (to contact all WFT life stages) and then rotating to another insecticide. More effective insecticides have been identified against WFT, including spinosad, fipronil and chlorfenapyr; minor use and/or full registration of these insecticides is being pursued.

TSWV Management

A robust disease management strategy is in place for controlling sources and spread of TSWV in crops such as potatoes. This strategy revolves around either the removal or avoidance of the infection source. Insecticide application to crops has only limited benefit in reducing TSWV spread. Dr Calum Wilson (University of Tasmania) has completed the second season's monitoring and assessment of thrips vectors and levels of TSWV in seed potatoes in Tasmania and he will report on these results in the next issue of *Potatoes Australia.*

A wide range of extension publications and training sources are available to industry by contacting IHD, Knoxfield, Victoria on (03) 9210 9222.

DAVID COOK
Agriculture WA
☎ **(08) 9368 3250**
✉ **dfcook@agric.wa.gov.au**

New chemical treatments for fungal diseases of seed potatoes

(PT - Project started July 1997)

In two years of field trials on new ground (no previous history of potatoes, 40-years of pasture), planting seed treated with Rhizoctonia selective fungicides significantly reduced the incidence of black scurf on daughter tubers but had no significant impact on the incidence of stem canker.

Stem canker in this case appears to be caused by a strain of Rhizoctonia that inhabits the pasture, whereas the black scurf on tubers probably came from sclerotia on the seed potato. In contrast, planting treated seed in old ground (paddocks with a history of potato production), where populations of the Rhizoctonia fungus are relatively high resulted in zero to moderate reductions in the incidence of both stem canker and black scurf.

The fungicides pencycuron and fludioxonil were generally more effective than tolclofos-methyl and iprodione, although this depended on cultivar, year and soil type.

These trials demonstrate that it is important for potato growers to trial all available seed treatments on their own farms over a number of seasons to determine which will give the best results in their specific environments.

DOLF DE BOER
Agriculture Victoria
☎ **(03) 9210 9222**
✉ **dolf.deboer@nre.vic.gov.au**

Postharvest

Increasing the opportunities for use of organic wastes in the Tasmanian vegetable industry

(VX - Project started 2000)

Organic wastes are potential sources of nutrients and organic matter for horticulture. The use of recycled organic materials could assist with environmentally sustainable production methods and help with efforts to meet market demands for environmental QA requirements. However, there are some barriers to the more widespread use of recycled organic materials in horticulture, and this HRDC/RIRDC project aims to address some of these issues in Tasmania.

The project has four objectives:

1. Determine the amount of organic waste available for horticultural end use in Tasmania.
2. Identify alternative processing and reuse options for recycled organic materials.
3. Compare the economics and logistics of processing recycled organic materials for on-farm use in small scale on-farm, medium scale regional and large scale centralised operations.
4. Identify QA and HACCP issues relevant to food safety and environmental sustainability with regard to processing and use of these materials, and review these issues in the context of the further developments in the use of recycled organic materials as a component of sustainable agriculture.

Although the project is behind schedule due to funding delays, some useful feedback has been obtained from discussions with various industry sectors.

There is increasing interest from both the production and marketing sectors in the use of recycled organic materials. The practice is recognised as being able to enhance the sustainability of production systems, which is of interest to producers. Marketers see value in the use of recycled organic materials from the perspective of being able to market the sustainability image.

Both sectors of the industry have qualifications on their support for recycled organic materials. For producers, it must be economically feasible, and for marketers, the practice must not compromise food safety and QA requirements.

The amount of organic material that could potentially be used in agricultural production in Tasmania, either in a basic or a processed form, totals about 1,600,000 tonnes per year.

Recycled organic material - a resource for agriculture

JOHN MCPHEE
Department of Primary Industries, Water and Environment
☎ (03) 6421 7674
✉ john.mcphee@dpiwe.tas.gov.au

Seed development

An agronomic and economic blueprint for a round seed system for Australia's potato processing industry

(PT - Project started July 1999)

This project is attempting to find firstly, the best way of producing round seed and secondly, to determine an equitable payment system for seed growers. In this work, round seed has been defined as tubers 30-60 mm in diameter x 85mm or less in length.

Two successful field trials were conducted in the first year of this project. They were located on a sandy loam soil at Cressy, in Tasmania's northern midlands and on a red ferrosol soil at Riana, in the State's north west.

At each site, TECHNITUBERS® were compared to round and cut sets and planted at densities ranging from 1.5 to 20 sets per square metre.

The results are still being analysed but some preliminary observations have been made.

At both sites, the highest yield of round seed was achieved at a density of 20 plants per square metre. This pattern was identical for the number of tubers of round seed size.

Across all densities at Cressy, cut and round sets produced similar total yield and total tuber number as well as yield and number in the 'round seed' category. At Riana, cut sets were superior in all of these categories except total yield.

In most categories, cut and round sets produced superior results to TECHNITUBERS.

Economic comparisons between treatments have yet to be determined. However, the required round seed sized tubers comprised a greater proportion of the total number of tubers produced than the total yield. This may have implications when an equitable payment system for round seed is calculated.

Field trials will continue next season. Trials will concentrate on cut and whole sets at a reduced number of densities, with and without Carvone. Trials will also be conducted with modern potato planters to evaluate their suitability for handling round seed.

Harvesting round seed trials at Riana

JOHN MAYNARD
Davey & Maynard Agricultural Consulting
☎ (03) 6424 9311
✉ davey.maynard@tassie.net.au

DNA fingerprints and cryopreservation of potato cultivars for improved quality assurance.

(PT - Project started July 1997)

Methods have been developed to rapidly distinguish and identify important potato cultivars using DNA fingerprints. Over the last three years we have achieved the following outcomes.

- Compared the potato cultivar collection kept in tissue culture at IHD-Knoxfield with the field collection kept at Toolangi to ensure there has been no cultivar mix-ups.
- Generated DNA fingerprints for 64 cultivars.

- Compared the DNA fingerprints from clonal lines of each of the cultivars *Atlantic, Sebago, Kennebec, Delaware* and *Russet Burbank* using two different methods. No differences were found which is not an unexpected result since the amount of genetic change in clonal lines is likely to be small. More sensitive techniques that have recently been developed may be able to distinguish clonal lines.
- Forty cultivars have been cryopreserved using a droplet freeze technique. Shoot tips are presently being recovered and assessed for survival and growth after 12-24 months in storage. (Cryopreservation is a method where material is kept in liquid nitrogen and is used in medicine and by vets to preserve semen and embryos.)

In addition, some extremely useful unexpected outcomes have occurred during the course of the project:

- A DNA sequence was found in some cultivars of tissue culture plants that was not present in filed grown plants. This was analysed and found to be not of plant origin, but most likely to be of bacterial origin. A bacterial contaminant was subsequently isolated from tissue culture plants and identified as *Bacillus circulans*, which is commonly known as 'White Ghost'. A rapid diagnostic test has been developed which is specific for this bacterium and has the potential to screen tissue culture plants for White Ghost contamination.
- The data generated from the DNA fingerprints has been used to analyse the genetic relationships and genetic variability amongst the most commonly grown cultivars. The results show that many of the cultivars have close genetic relationships according to known breeding history and have narrow genetic variation.

DANIEL ISENEGGER and JAMES F. HUTCHINSON
Agriculture Victoria
☎ (03) 9210 9222
✉ daniel.isenegger@nre.vic.gov.au

Improving seed potato production

(PT - Project started November 1998)

Physiological age is one of the most important aspects of seed tuber quality but few methods are available to improve this aspect of seed production.

A short report explaining physiological age and reviewing strategies to improve seed tuber physiological condition has been compiled and is available from the project chief investigator.

One method of manipulating seed physiological condition is the use of d-carvone, a reversible sprout inhibitor, to increase the number of stems emerging from seed pieces and increase tuber number and uniformity in size.

In trials conducted this season, seed tubers treated with d-carvone produced more vigorous sprout growth than untreated tubers, produced a higher stem number per seed piece and increased total number of tubers and proportion of tubers in the whole seed size class.

PHIL BROWN
Tasmanian Institute for Agricultural Research
☎ (03) 6226 2716
✉ Phil.Brown@utas.edu.au

Production and assessment of virus resistant potato cultivars

(PT - Project started July 1997)

This project is using genetic engineering to develop new cultivars and breeding lines with resistance to potato leaf roll virus (PLRV) and potato virus Y (PVY).

There are no natural sources of PLRV and PVY resistance that can be easily transferred into commercial potatoes, so genetic engineering offers a practical approach to developing resistant lines. Our achievements to date include the following.

- Genes providing resistance to PLRV and/or PVY have been introduced to the cultivars *Sebago, Crystal* and *80-90-5*. Our ability to engineer potato cultivars has recently improved due to a major change in the way we grow our cultures.
- Transgenic plants have been screened in glasshouse trials for their response to PLRV and PVY. Plants passing these tests have been studied in field trials.
- Transgenic plants have been grown in two field trials. Transgenic plants were screened at Toolangi for their agronomic performance with all plants screened to date growing normally with no significant difference in yield. In the other field trial at the CSIRO Ginnendara Experimental Station (ACT), transgenic plants were inoculated with PVY and the resistance demonstrated in glasshouse trials was found to hold up in the field.
- Marker genes have also been included in the engineered plants to allow quick and easy identification of which plants have been engineered. This should be particularly useful if engineered plants are used as parents in breeding programs.
- During the National Potato Growers Field Day at IHD Toolangi (February 1999), we had a taste test of engineered potatoes. This was most likely the first occasion that the potato industry has had to taste genetically engineered food.

JAMES HUTCHINSON and PETER WATERHOUSE
Agriculture Victoria and CSIRO Plant Industry
☎ (03) 9210 9222
✉ james.hutchinson@nre.vic.gov.au

Technology transfer

Coordinating technology transfer in the Australian potato industry

(PT - Project started August 1996)

The objectives of the project have been to improve adoption of outcomes from the research and development program, improve communication in the industry and develop a Code of Practice for Potato Cyst Nematode (PCN).

The Code of Practice component was later expanded to include other diseases to make it more relevant to the day-to-day needs of farmers and to increase the likelihood of it being adopted.

Work in the last 12 months includes:

- Releasing Version 3 of the Potato Internet Starter Pak in March this year.
- Completing National industry Communication Plan with a summary in the June *Eyes on Potatoes.*
- In conjunction with Nathalie Jarosz and Barry Philp, developing a proposal for an industry internet site.
- Assisting in the organisation of the Potatoes 2000 conference.
- Running 36 industry workshops throughout Australia on *"Gaining value from your investment in R&D"* and four talks to researchers on *"How to write better research submissions"*. More sessions still to be run.

- Commencing the potato archives project which had been deferred from last year due to lack of funding. (Potato archives will provide access via

the internet and CDROM to HRDC Final Reports and past articles of *Potato Australia* and *Eyes on Potatoes*.)

- Continuing work on the Code of Practice.

These activities are in addition to my regular commitments as Assistant Editor for the national potato publications (*Potato Australia* and *Eyes on Potatoes*), Technology Transfer Adviser to the APIC R&D Committee, coordinating and updating the distribution system for the national publications, providing support to researchers on technology transfer needs and facilitating networking in the industry.

This project will conclude during the later part of this year. A new project, *Implementing the potato industry's communication plan*, will carry on the work (see page 10).

LEIGH WALTERS
Technology Transfer Manager - Potatoes
☎ (08) 8232 5555
✉ lwalters@saff.com.au

AusHort

Advancing horticulture's coordinated response to the Existing Chemical Review Program

This is a key project in the AusHort R&D program and follows on from the project *Horticultural industries' coordinated response to the National Registration Authority's Existing Chemical Review Program* which was one of the Committee's first investments.

The current project employs a consultant to provide a coordinated response from horticulture to the National Registration Authority (NRA) Existing Chemical Review Program (ECRP).

This project is initially addressing endosulfan and methyl parathion. Below is a snapshot of some of the achievements to date:

- Use patterns in horticultural crops have been confirmed.
- Residue data requirements have been agreed with the NRA.
- Proposals for specific industry data requirements have been developed and forwarded to relevant peak industry bodies.
- Negotiations with chemical companies for coordinated involvement in data generation.
- Ongoing liaison and negotiation regarding the Occupational Health and Safety requirements.
- Ongoing liaison with chemical companies with respect to potential alternative pest management solutions.

A large part of the project supports communication with industry associations and Industry Development Officers, which in turn is disseminated out to growers via association newsletters and industry media.

KEVIN BODNARUK
AKC Consultancy
☎ (02) 9499 3833
✉ akc_con@zipworld.com.au

GMOs in Horticulture - consultation forum

In October 1999, 31 representatives including horticultural growers, peak industry bodies, state departments of agriculture, Australian Horticultural Corporation (AHC), Agriculture Fisheries and Forestry, Australia (AFFA), Horticultural Research and Development Corporation (HRDC) and invited speakers met to discuss genetically modified organism (GMO) related issues of major importance to horticulture.

The forum had two purposes:

- To bring the leaders of Australian horticultural grower peak industry bodies up to date on the wider issues related to biotechnology and GMOs including how consumers view GMOs, how the food industry views GMOs, the relevant health and environmental aspects and other associated issues.
- To provide an opportunity to join in discussions with AFFA on the horticultural aspects of important issues related to GMOs that need to be considered by the government in developing its Agri-food biotechnology strategy.

Major areas discussed were:

- Trade in genetically modified commodities, processed food and fibres.
- Changes in agri-food production and processing systems.
- Research, development and intellectual property management.

The major issues of concern for horticulture arising from this forum were the low level of understanding of the technology by industry and consumers, compliance costs associated with labelling and certification of origin, consumer requirements for product labelling and transparent information, government regulation and statutory requirements, access to enabling technologies (particularly for smaller industries), and intellectual property management of GMOs and associated technologies.

Based on recommendations from the GMO forum, the AusHort R&D Committee decided to support the development of a strategy to manage the GMO debate for horticulture. In addition, a GMO forum will be established on the HRDC and AHC website (www.horticulture.com.au) to allow growers and other industry members to express their views on GMO related issues as they affect horticulture. Individual horticultural industry groups will also be encouraged to include sessions on GMOs in their annual conferences.

RUSSELL SODERLUND
HRDC
☎ (03) 9210 9365
✉ hrdcrs@hrdc.gov.au

Horticultural Environmental Audit

This project is another one of the first investments by the AusHort R&D Committee, which is being conducted in conjunction with the National Land and Water Audit. It involves documenting the use of natural resources by Australian horticulture, understanding the extent of current impacts of those resources, both positive and negative, and assessing the industries level of adoption of good management practices, and the need to move to a more sustainable basis.

The data and information collected will assist in:

- Industry planning and policy development.
- Identifying critical R&D gaps in the area of environmental management.
- Identifying where R&D investment in environmental issues is likely to result in the highest returns for industry.

One of the outcomes from the first stage will be user friendly fact sheets containing production maps and associated environmental information on individual horticultural industries. These will be available on the Horticultural Research and Development Corporation and Australian Horticultural Corporation website, www.horticulture.com.au and the National Land and Water Audit and associated website, www.nlwra.gov.au.

LEIGH SPARROW
HRDC
☎ (03) 6336 5379
✉ Leigh.Sparrow@dpiwe.tas.gov.au ■

Common scab resistance in processing potatoes is possible

GREG LUCKMAN
Research Scientist
Tasmanian Institute of Agricultural Research
☎ (03) 6233 6851
✉ Greg.Luckman@dpiwe.tas.gov.au

Research under way in Tasmania has shown that it should be possible to develop resistance to common scab in commercial cultivars used for French fry production

Common scab disease is one of the greatest economic constraints facing the Australian French fry industry and is an important disease of potatoes world wide. Presence of the disease on Australian potatoes also threatens export markets for quality seed.

Although not directly affecting tuber yields, disease lesions markedly reduce tuber value and require extra processing steps during French fry production. In its most severe form common scab causes deep pitting in the surface of the potato and can lead to the rejection of the crop for processing purposes.

Methods for sustainable management of the disease based on resistance to the pathogen are needed to provide an alternative to the short term strategies currently in use.

Developing resistance

Using plant tissue culture, the research has found cell lines derived from the cultivars *Shepody* and *Russet Burbank* that have much higher tolerance of a toxin produced by the common scab organism, *Streptomyces scabies*. Discovery of the resistance is the first and most crucial step in a process that is designed to make available clones of the cultivars that are resistant to common scab.

The project is making use of recently discovered toxins produced by the bacterial pathogen that causes the disease. This toxin, called thaxtomin, is believed to play a crucial role in the development of the disease symptoms. Plant tissue culture procedures are being used to develop potatoes that are not affected by this toxin.

Selection for tolerance of the toxin provides a way to develop resistance to the disease organism in existing cultivars without reducing other important agronomic characteristics such as yield and tuber shape.

Callus cultures, cells of potato grown on tissue culture media, have been isolated which show significantly greater tolerance to thaxtomin than the unselected parent cultures. The researchers expect that when plants are regenerated from these cultures they will also show tolerance to thaxtomin. When grown in the field these clones should be less prone to damage from common scab.

Experiments are under way to obtain whole plants from the cell cultures. Regeneration of whole plants from the tolerant cell lines is required in order to determine if the tolerance observed in cell cultures is expressed in organised tissues.

Once whole plants have been obtained from the cell cultures, pot and field trials are planned to measure the degree of disease resistance as a result of tolerance to the toxin. Yield and quality assessments will also be required to confirm that there have not been any negative effects from the thaxtomin tolerant lines.

Selection for toxin resistance is a technique that has been used successfully in potato and other crops to develop resistance to a number of other diseases. It has the additional benefit that it does not involve genetic engineering and so avoids much of the rigorous testing required for GMOs and reduces the potential for difficulties with consumer acceptance. ■

RIZOLEX® AND SUMISCLEX®

POTATO HEAVEN

Use RIZOLEX® at planting to provide world class protection against Rhizoctonia.

Follow up with SUMISCLEX® for powerful, reliable and highly cost effective control of Target Spot and Sclerotinia.

RIZOLEX and SUMISCLEX - powerful partners in the business of potato growing.

SUMITOMO CHEMICAL

Sumitomo Chemical Australia Pty Ltd
(ACN 081 096 255)
501 Victoria Avenue Chatswood NSW 2067 Australia.
Telephone 02 9904 6499 Facsimile 02 9904 7499

SUMI/IMC 6903 June 00

Managing bacterial breakdown in washed potatoes

BARBARA MORGAN
South Australian Research and Development Institute
☎ (08) 8303 9588
✉ Morgan.Barbara@saugov.sa.gov.au

A South Australian study shows that one third of potatoes are infected with bacteria causing soft rot whilst still in the paddock. Infection levels rise as the tubers move through the washing cycle.

This study was undertaken to evaluate management strategies to minimise bacterial breakdown of washed potatoes.

The first stage of the study was a survey of four main potato washing plants in South Australia to determine:

- where tubers become infected along the production line
- the level of *Erwinia* in wash water from the different areas of the washing process

Potato tubers were taken from the field bins, initial dumping tank, tumbler sites, final rinse sprayers and at the end line just prior to packaging. The tubers were induced to rot using a test that provided ideal conditions for soft rot to develop. Thus the levels obtained were much higher than those normally occurring in most washing plants.

Water was also sampled at these sites and from the outside ponds that held recycled water. The levels of *Erwinia* bacteria in these different water samples were measured.

Laboratory tests were also carried out to evaluate six chemicals as potential sanitisers to reduce levels of *Erwinia* in wash water. The chemicals evaluated were bromochloro dimethlyl hydantoin (Nylate®), calcium chlorite (Klorman®), chlorine dioxide (Oxine® and Phosphoric acid®), didecyldimethyl ammonium chloride (Sporekill®), sodium hypochlorite (Liquid Pool Chlorine®) and peroxyacetic acid hydrogen perioxide acetic acid (Proxitane®) at concentrations between 0.1 to 100 ppm.

Major findings

Where tubers become infected

Tubers were contaminated with *Erwinia* bacterium in the field. On average, 32% of recently harvested tubers were contaminated with the soft rotting bacterium before entering the washing process. In some cases as many as 70% were contaminated with the soft rotting bacterium.

After coming into contact with the wash water, the incidence of tuber soft rot increased further and remained high at the other sites on the washing plant.

Levels of *Erwinia* in the wash water

In most of the washing plants sampled, the wash water was recycled and contained high levels of bacterium. Contaminated water was used in the initial washing tank and tumbler region where the highest levels of *Erwinia* were found. Once the tubers were immersed in this water, bacteria infiltrated into the potato tubers resulting in higher incidence and severity of tuber soft rot. These results highlight the need to reduce the level of bacteria in the wash water before entering the washing plant.

Potato washer in action

Some of the washing plants sampled added a sanitising agent at the final rinsing stage. Our results showed this did not reduce the incidence of rot and emphasises that reducing bacteria in the wash water should be of more concern.

Effective sanitation

Preliminary results showed that the six sanitisers reduced the levels of bacterium in wash water. Recycled water has however, high levels of organic matter and clay, which reduce the effectiveness of the sanitisers. Investigations are under way to evaluate methods of reducing the amount of soil and clay in the water.

Future investigations

A mini potato washing plant has been installed at the South Australian Research and Development Institute, Plant Research Centre. It features an initial washing tank, tumbler, final rinse sprayers, an air drier and brushes. The unit has been built to replicate the action of commercial washing plants. We will be able to evaluate factors such as inoculum levels, timing and depth of immersion, rinsing sprays, drying methods, etc.

Acknowledgements

We wish to thank the washing plants for allowing unlimited access for sampling.

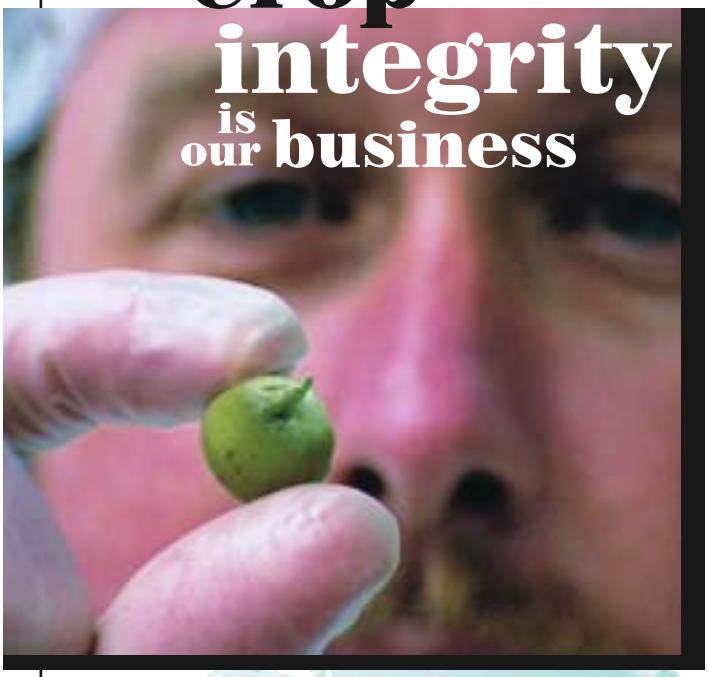
■

potato washer panel

MULTI-AWARD WINNING...

TECHNICO

your **crop integrity** is our **business**



Contact us for all your seed potato requirements

TECHNITUBER® technology

Technico owns the TECHNITUBER® technology process which enables the mass production, on a year round basis of a unique potato propagule, - a miniature seed potato named TECHNITUBER® seed - now a registered trade mark.

Early Generation Seed Production

As a result of the establishment of extensive field programs and the application of advanced agronomy protocols Technico delivers commercially competitive, high quality early generation seed potato material.

- Technico is committed to the production of quality assured, early generation, seed potato products and the rapid introduction of new potato varieties worldwide.
- Technico practices a limited generation seed program which reduces the number of field multiplications required to produce economic volumes of affordable seed.

By minimising the number of field generations Technico is able to provide seed which has:

- Reduced exposure to field borne diseases
- Reduced accumulation of tuber borne diseases

An ongoing commitment to research, development and technology enhancements will ensure Technico stays at the leading edge of improved seed potato production.

Contact us for all your seed potato requirements

TECHNICO

NEW SOUTH WALES
226 Argyle Street Moss Vale NSW 2577
Telephone 02 - 4869 4588 · Facsimile 02 - 4869 4599
Web Site www.technituber.com.au

SOUTH AUSTRALIA
10 Tandara Street Mt Gambier SA 5290
Telephone 08 - 8723 2688 · Facsimile 08 - 8725 7512

Worlds leading high technology potato seed company delivering total supply chain solutions

Enhanced biodegradation of metham sodium – could you be feeding bacteria a costly meal

JOHN MATTHIESSEN
Principal Research Scientist
CSIRO Entomology
☎ (08) 9333 6641
✉ johnm@ccmar.csiro.au

BEN WARTON
Research Chemist
CSIRO Entomology
☎ (08) 9333 6638
✉ Benw@ccmar.csiro.au,

Have you ever said, "Such-and-such a soil pesticide used to work well, but it doesn't seem so good any more?"

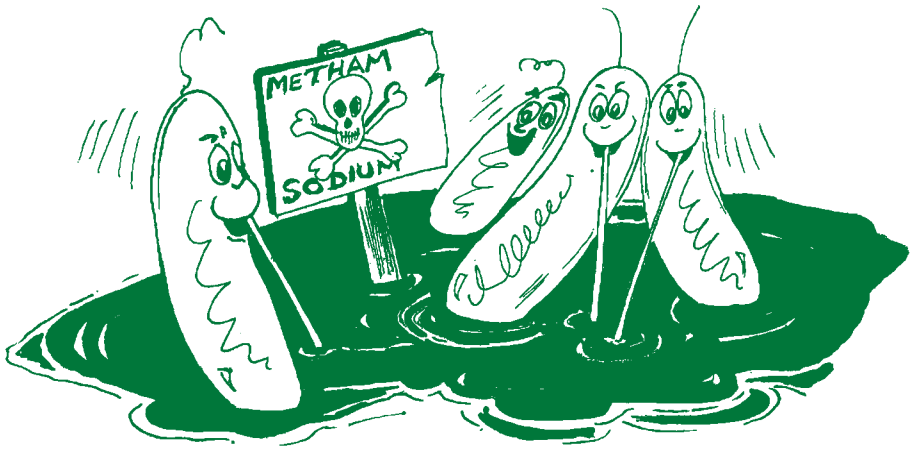
If so, this should be heeded as a warning signal for a problem that is growing in significance and which can lead to wasted money and unsustainable production practices. The problem has its basis in the invisible microbial populations of the soil.

Metham sodium is a very useful pesticide used widely in horticulture for controlling soil-borne pests and diseases. Its use in Australia is increasing rapidly, partly as a result of the phasing-out of methyl bromide and partly because it is seen as a one-shot 'cure all' for soil-borne pests and diseases.

The increased use of metham sodium has also been occurring in the potato industry. While growers can readily see at harvest the upside value of using metham sodium, there is a potentially significant downside cost that could come to haunt them if they do not understand its cause and adopt preventative management.

Metham sodium

With today's extreme quality demands and intensifying production systems, growers are under pressure to use all means at their disposal to turn out a top-quality product. For an underground crop like potatoes, metham sodium offers a remarkably powerful solution to control a wide range of soil-borne pests and diseases including fungal pathogens, nematodes, soil insects and weeds.



Difficult as it is to believe, some bacteria in soil can thrive using pesticides as food! One pesticide that bacteria can find delicious is metham sodium. Could you be paying good money to give a horde of greedy bacteria a free lunch?

Metham sodium is an unusual pesticide. The product is not the toxin; rather, it reacts with moisture in soil to produce toxic MITC (methyl isothiocyanate).

Metham sodium is commonly called a soil fumigant and most people probably imagine that it works as a gas moving through the soil pore spaces. However, MITC is actually a solid at room temperature! But it is highly water-soluble and is more likely to act by diffusing through the soil in the water film on the soil particles.

A highly desirable attribute of metham sodium is that it does not leave persistent residues in the way that some earlier pesticides did – a subject that many potato growers do not need reminding about. However, there are other issues that have the potential to limit the benefits growers obtain from the modern non-persistent pesticides like metham sodium if they are not used prudently.

Enhanced biodegradation

Modern pesticides are more easily broken down in the environment, which is a good thing. But if it happens so fast that the pesticide doesn't get the chance to do its job before it's gone, pest control failure can result.

This is precisely what happens with the phenomenon of *enhanced* (also called *accelerated*) *biodegradation*.

This occurs when microbes in the soil that are able to use the chemical as a food source build up in response to the chemical being applied. This can often occur surprisingly quickly and metham sodium is susceptible.

It is important to realise that this phenomenon is totally different from the development of pesticide resistance. In resistance, rare members of the pest population with the capacity to detoxify the pesticide build up. The detoxifying ability comes at a cost to the organism as it must expend energy that could otherwise be used on growth.

In enhanced biodegradation, it is not the pest population that alters. Rather, it is other organisms in the soil - most commonly bacteria, but it can be fungi.

Instead of expending energy to detoxify the pesticide, rare individuals have the capacity to use it for direct benefit as a food or energy source. Consequently, they thrive and begin to dominate the population.

If the new 'food' is supplied regularly enough, the adapted organisms continue building up to a point where they become so numerous and so greedy they consume so much of the compound that it becomes ineffective against the real targets. The problem becomes most intense where some degree of residual activity of the pesticide is required for it to be effective against the target pest.

Although the effect is biological, different soils react differently. So it is important to understand the risks of enhanced biodegradation developing in various soil types.

It is also important to relate the risk to the type of production system – a short-rotation intensive system with frequent pesticide application will have a greater risk than a system where longer rotations are practiced.

The question is: *just exactly what are the risks of the problem developing in different soils and production systems?* This project aims to provide this information so that we can give growers advice about best-practice, sustainable use of metham sodium.

A severe example

To begin this project, samples of soil from a vegetable production site where metham sodium has been used frequently for some years were analysed to see if enhanced biodegradation of metham sodium could be detected.

Soil was collected from a part of the farm that had been treated annually for several years, and from an area that had never been treated. The results showed a spectacular example of the phenomenon.

After applying metham sodium to soil with no previous history of use, 93% of the active MITC (methyl isothiocyanate) toxin was produced and it took 17 days to disappear.

In stark contrast, the previously treated soil only allowed 43% of the MITC production and it disappeared in 7 hours.

To prove that the effect was biological, a sample of the previously treated soil was sterilised to kill all the microbes present. When metham sodium was then applied to the soil, it behaved very much like the soil that had never been treated - producing 88% of its MITC potential, which disappeared in 18 days.

It is important to stress that this example is likely to be an extreme case, as we deliberately selected an intensive metham sodium use situation. The key point is that it illustrates what can happen.

Also, enhanced biodegradation is only a problem if the breakdown becomes so fast that the pest control effect is no longer achieved. Otherwise, it is probably good - in rapidly getting the chemical out of the environment. The biological impact will depend on the pests being controlled and the type of production system.

No cures

Enhanced biodegradation cannot be cured (except by sterilising the soil – an almost impossible and certainly an unwise task). Once induced, it takes much longer to fade away than it took to set off and it resumes very sharply after another application of the pesticide if it has not completely disappeared.

The only sensible option is prevention, and that can only come through research establishing risk profiles to enable growers to make informed decisions about their use of the pesticide. This, and assessing how readily soils 'recover' from enhanced biodegradation, is the next phase of the project.

Metham sodium is too useful a product to be robbed of sustainable use by enhanced biodegradation. We don't want it to happen to you.

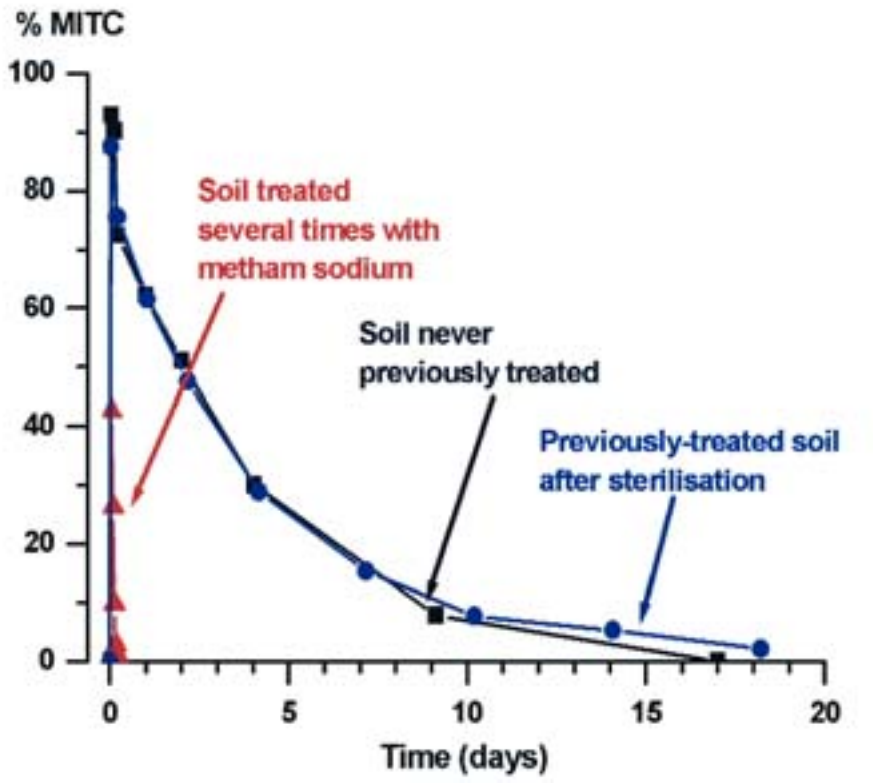
Applying metham sodium to control soil-borne pests and diseases. Without careful use, this could be an expensive meal on wheels for soil bacteria with the munchies. (Photo by Stewart Learmonth, Agriculture WA).

Acknowledgements

The project is funded largely from the vegetable and potato levies, with voluntary contributions from the Australian Processing Tomato Research Council and Queensland Fruit & Vegetable Growers.

We thank Dr Margaret Roper, a research microbiologist with CSIRO Plant Industry who is collaborating with us to identify the bacteria causing the enhanced biodegradation in the example given in this article. We also thank collaborators in various horticultural regions around Australia for collecting soil for analysis.

A free 'How Degrading' newsletter on enhanced biodegradation is produced. If you would like to receive it, contact John Mathiessen ■



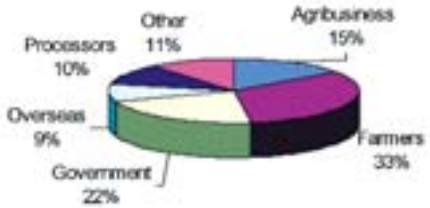
Potatoes 2000

Linking research to practice

Australian Potato Research, Development and Technology Transfer Conference: July 31 - August 3 2000 Adelaide South Australia

Who came

As you can see from the chart, one third of the conference participants were farmers. Processors and agribusiness made up the next biggest group, followed by government people.



What the conference was all about

- lots of listening, lots of talking and lots of fun!

The Stamford Grand at Glenelg in South Australia came alive on Sunday 30 July when potato delegates started arriving from around Australia and overseas. Just over 300 delegates attended Potatoes 2000.

Many delegates took advantage of the local cafes later in the evening to relax and catch up with old and new acquaintances. Great weather made for a very relaxing night and start to the conference. Even the Queenslanders didn't complain too much about the 'cooler' southern climate!

The conference was opened by the Deputy Premier, the Hon Rob Kerin and quickly moved into presentations on current and future directions.

Malcolm Kentish, a grower/exporter from Mount Gambier left the audience in no doubt about the importance he placed on promotion and why he thought the industry needed to relook at its stance on this very important topic.

The next session on plant improvement generated a lot of interest with speakers from Australia, New Zealand and South Africa setting the scene which was then followed by an open forum workshop. Dr Jack Meagher talked about the breeding review and reported on the outcome of the APIC R&D Committee meeting held on Sunday. He announced that the committee did not support closed loop marketing when levy money was being used to fund the breeding component. This caused

quite a reaction from some of the delegates. Undoubtedly this will not be the last we hear on this subject.

Following afternoon tea we had another open forum workshop on the thorny subject of genetically modified potatoes. This discussion was interesting but left me feeling that we were a long way away from addressing community concerns about this new and exciting technology.

After the technical part of the day, the Potato Growers of South Australia hosted a session with support from the Potato Industry Trust and Food for the Future. Delegates could grab a drink, view the trade exhibition, sample various potato dishes and watch our celebrity chef, Dorinda Hafner in action. Dorinda is a born entertainer and a tremendous ambassador for the potato industry. Like Malcolm Kentish early in the day, Dorinda was keen to see the potato industry promote it's product a lot more.

On the Tuesday, the delegates heard from speakers talking on management of diseases, chemical control, management of insect pests and crop nutrition. There was a lot of information presented and many questions asked. It was a very full day. A workshop on seed and soil borne diseases was not as lively as the previous two workshops but probably highlighted that the delegates had by that stage had most of their concerns answered in the talks and panel discussions. Or they could have just been saturated with all the information they had to take in!

That night we went down to the BRL Hardy Winery at Reynella for the conference dinner. It was a lively night with a jazz band and plenty of networking amongst the delegates.

On Wednesday we launched into sessions on crop agronomy and sustainable farming systems followed by future directions and observations from overseas speakers. A theme from all our overseas visitors was the need to work together on common problems.

Two of our farmers, Terry Buckley and Geoff Moar then talked about putting research into practice on their farms. Their experiences not only brought home some of the practical realities of implementing new technology but also highlighted its importance in the evolution of the farm.

Tony Biggs, the Editor of *Good Fruit and Vegetables* then did an excellent summation of the conference. Towards the end of his talk Tony wondered why people started giggling until he realised a photo show had started on the screen behind him of candid snaps taken throughout the conference.

About a hundred people stayed around for drinks and then headed down to one of the local restaurants for dinner. Those who stayed were mostly delegates going on the field tours the next day.

Given the original forecast was for rain, the day turned out perfect for the tours. By the time the groups returned back from the field tours everybody looked rather relaxed. The delegates then enjoyed lunch in the atrium at the Plant Research Centre. Their final tour around the Waite Research Precinct was a low stress affair focusing on the breadth of activity at the facility and the beauty of the setting and some of the old buildings such as Urrbrae House.

After waving to the last busload of delegates – time for a rest!

Outcomes

So what did people get out of the conference? That is not an easy question for any one person to answer as everyone that attended would have had slightly different expectations and different reasons for coming.

Some delegates thought the conference was terrific. One person said to me that they were aware of most of the issues raised in the presentations except for one. For that one presentation, which provided something new and valuable to them, they said the conference was well worth coming to.

Other delegates were happy to just meet their colleagues who work in the industry. Some people had talked to colleagues on the phone for many years but they had never met. The opportunity to strengthen relationships and develop new ones was an important motivator for many who attended.

For some, what they learnt through the trade exhibitions probably helped them solve problems or in some cases raised questions as to whether tasks could be done a better way.

At the Information Central stand, it was the first time all of the HRDC final reports and most of the potato publications were on display in one place. A large number of people perused the stand and some delegates will undoubtedly obtain some of the publications after the conference.

The demonstrations of the *Potato Internet Starter Pak and Crop Test – Potato Crop Nutrient Evaluation System* at lunchtime drew only small crowds but generated a lot of interest for additional information. Seeing something in action can often help people decide quickly whether it is going to be of value to them or not.

Hopefully, everyone went away with new information and ideas, new or renewed business contacts and, in Rob Kerin's words, "a little wiser."

LEIGH WALTERS
Technology Transfer Manager
Australian Potato Industry

After the conference, the Tasmanian delegates organised a debriefing session to clarify how some of the issues and information presented at the conference impacted on the Tasmanian potato industry and what action was needed.

Cooking up a spud storm

Dorinda Hafner, Diva of the Delicious, lived up to her larger than life media image as she delighted conference delegates with a potato cooking demonstration.

Keeping everyone in 'peelings' of laughter, Dorinda and her offsider, Camelot Heaven (yes, it is her real name), whipped up attractive golden pears made from mashed potato and then potato pancakes with wasabi and horseradish cream topped with caviar.

The ultimate was her demonstration of the perfect potato kiss, engaging a very willing John Fennell as her red-faced helper.

Malcolm Kentish

Where are we at in marketing

- If we can't sell it, why grow it?

In one of the most confronting presentations of the conference, Malcolm Kentish, a grower/exporter from Mt Gambier, questioned why Australian growers are prepared to spend $350 million per year on growing potatoes (land, seed, machinery,

chemicals etc) but spend virtually nothing on making sure there is a market for those potatoes.

Australia produces 1.37 million tonnes of potatoes annually with a value of between $300 million and $515 million, depending on the year. Malcolm argued that the $215 million difference could be the result of bad marketing. He said this works out to be a gamble that growers take every year to the extent of about $98,000 per grower and that better strategies are needed.

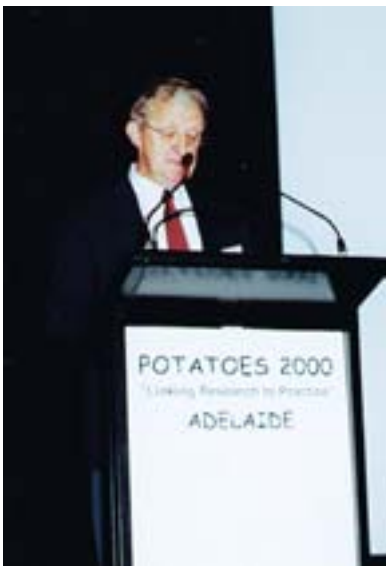
He suggested a number of approaches that could be adopted by the industry:

- partnerships with other food groups and other food competitors – a whole meal approach
- exploitation of the acceptance our domestic consumers have of potatoes as a staple of their diet – help them to eat more potatoes
- export promotion – if Australia could tap into 1/8 of the opportunity in Asia, it would double the size of our industry

Malcolm argued that if the industry doesn't begin to fund and undertake marketing activities, then it cannot justify funding any further production research and development.

He concluded with the following quote.

"Destiny should not be a matter of chance but a matter of choice."



Milton Rodda

Industry Priorities for R&D

Milton Rodda, the Chairman of APIC, reminded the researchers that levy payers have a right to expect a return on their investment and it was therefore encumbent on them to be aware of the issues confronting the industry and to direct their effort in those areas.

He also said that equally, levy payers must also ensure that they clearly communicate their needs to the APIC R&D Committee by working through their sector organisations and that the R&D Committee must listen to these needs.

Milton said that with such a diverse industry, the R&D committee was faced with some very hard decisions when assessing funding applications, particularly with a limited funding base.

The basis for those decisions is currently centered on the industry Strategic Plan which was released last year. A new Research and Development plan is currently being prepared and will be released in 2001.

The Strategic Plan identifies three major areas for effort, each with a number of objectives. These goals form the basis of the R&D priorities into the future and issues must fall into this framework to gain acceptance.

Market Development

- national research program to identify customer needs
- national marketing program to increase sales of potatoes
- improve quality through better packaging and handling in domestic markets
- identify and support new market opportunities
- improve handling, storage and transport for export markets

Profitability and sustainability

- improve quality and industry returns
- develop business management skills and systems
- reduce reliance on agricultural chemicals
- address environmental and sustainability concerns

Industry support

- facilitate industry development
- provide information for industry

How technology is im

Two farmers, Terry Buckley from Mt Gambier in South Australia and Geoff Moar from Berrigan in New South Wales, both spoke about how their farm had changed over the years with the implementation of new technologies.

Terry Buckley

"Advances in technology have not only increased our productivity, but have been the backbone of our sustainability in a very competitive industry. The principle advancements in technology have been in the areas of farm machinery and crop agronomy."

Summary of changes in potato production from 1966 to 2000

Potato production	1966	2000
Area grown	8 ha	200 ha
Yields	37 t/ha	47 t/ha
Total tonnage	300	10,000
Harvest capacity	40 t per week	1000 t per week
Delivery system	65 kg bags	26 tonne bulk trailers
Markets	Fresh	French fry & crisping
Varieties	Kennebec, Pontiac	Shepody, Russet Burbank, Atlantic

Agronomy technology adoption from 1985 to 2000

Practices	1985	2000
Soil treatments	Nil	Clay spreading Lime spreading
Soil mapping	Nil	Identify changes in soil type
Seed	Fresh cut seed	Cut & dusted with lime/dithane then cured in 1 tonne boxes
Fertilizer	Used regional recommendations for N:P:K only 4:6:8 + S @ 600 kg/ha	Based on a combination of support software (Nutritest) & review of historical data for macro & micro nutrients 9:10:16 + Mg, Zn, Cu & B @ 1100 kg/ha base +500kg/ha @moulding + fertigationas required
Fertilizer type	Low analysis	High analysis special blends
Chemicals	Use 3 - 4 sprays of Bravo for target spot, no set program, apply with plane	Use set 7 day program, use dithane with odd Rovral/Score for target spot, apply with ground rig fitted with air assisted boom for better canopy penetration
	Nil insect sprays	Insect sprays - Karate as required

proving my business

Geoff Moar

" The adoption of new technology has permitted an increase in the number, area, tonnage and yields of the potato crops grown by my farm business since 1967. Improved farm machinery, agronomic and marketing practices have increased the productivity and the sustainability of potato production in the Riverina. These new technologies have increased on-farm returns despite the declining terms of trade for the potato industry over the past thirty three years."

Changes in on-farm potato production from 1967 to 2000

Potato production	1967	2000
Crops per year	2	3
Area	2.5 hectares	280 hectares
Yields	20 tonnes/hectare	38 tonnes/hectare
Production	50 tonnes	10,640 tonnes
Staff	1	5
Productivity	50 tonnes/person	2,128 tonnes/person
Price	$70/tonne	$220/tonne
Markets	fresh	fresh, crisping, French fry
Customers	1	6

Adoption of farm machinery technology from 1967 to 2000

Farm machinery	1967	2000
Plough	disc	scarifier
Planter	1 row	6 row
Tractor size	30 horsepower	120 horsepower
Irrigator	hand shift spray line	centre pivot
Sprayer	8 metre boom	20 metre boom
Harvester	1 row digger	2 row windrower 2 row digger
Grading	harvester	grading line
Handling	manual labour	fork lift
Storage	shed	cool room
Transport	8 tonne truck	38 tonne B double trailer
Maintenance	paddock	workshop

Adoption of improved agronomic technology from 1967 to 2000

Growing practice	1967	2000
Tillage	ploughing	minimum tillage
Varieties	Sebago	Sebago, Coliban, Desiree, Atlantic, Shepody
Seed	uncertified	Certified
Seed treatment	nil	preconditioned
Seed cutting	hand feed cutter	Betterbuilt seed cutter
Seed coating	lime	Douglas fir bark
Soil testing	nil	Pivot
Fertiliser	low analysis	high analysis
Pest and diseases	spray schedules	IPM
Harvesting	visual inspection	camera monitored
Crop rotation	fallow canola	wheat, barley, lupins,







Conference Tour A – Impressions of the Marks' Potato Farm

The Potatoes 2000 Conference Tour A on the 3rd August involved a field tour and trial inspection of Gordon and Stephen Marks' potato farm at Purnong, which was located 90 kilometres east of Adelaide near Murray Bridge in South Australia.

The 600 hectare property was located on a scenic bend of the Murray River, which provided irrigation water for the 150 hectares of early and late potato crops grown for the fresh market. These crops were planted on a silty sandy soil overlying limestone bedrock. A distinctive feature of the area was the piles of white limestone rocks stacked on the edges of the paddocks. While the Marks' crops were irrigated with centre pivots, further irrigation development in the Purnong district had declined in recent years as the price of new licences approached a $1000/Megalitre.

The demonstration trial had a range of fresh, crisping and French fry potato varieties sown as part of a late crop on the 28th January 2000. Of particular interest were the adjacent rows of young and cool stored seed planted within the trial. The young seed came from a previous early crop trial harvested on the 3rd December 1999. The cool stored seed was dug during the winter of 1999 in Victoria and had been cool stored until planting. The trial clearly showed the differences between physiologically young and old seed with the potato plants in the young seed rows producing a few large tubers per plant while the potatoes in the old cool stored seed rows produced many small tubers per plant.

After inspecting the trial the tour bus circled around the pivot of potatoes before heading back to the Marks' packing shed. On the way back we passed the farm staff washing down the potato harvester with a mobile water tanker after it had finished digging.

At the packing shed the tour inspected the packing of the potatoes that had been dug from this pivot. The shed operated under the farm's SQF 2000CM quality assurance program and was very well sign posted with numerous food safety and occupational health warning signs and markers. The packing line consisted of washing, grading and packing sections packing washed consumer packs, 20 kilogram paper and 20 kilogram hessian bags of Coliban potatoes. The premium washed potatoes were sold under the Pelican brand name.

Of interest outside the packing shed were a combination of three concrete tanks used for recycling water. These were only used to recycle the preliminary washing water after the dirt had settled out in the bottom of the concrete tanks. A front end loader blade was pushed along the concrete tank floors to clean them out. The washing water from the rest of the packing line was not recycled for food safety reasons. With a dry climate and expensive water licences it was easy to see why recycling tanks were a common sight at many packing sheds in South Australia.

On leaving the Marks' farm the tour headed back to Adelaide for lunch and an inspection of the research facilities at the Waite Precinct in the afternoon.

STEPHEN WADE
District Horticulturist (Finley)
NSW Agriculture

Field Trip – Tour B

The field trip to the North Adelaide Plains to take in the massive recycling program was a fitting finish to Potato 2000. We were able to see and hear about how over 200 growers will use 28,000 million litres of Class A reclaimed water for the production of a range of horticultural crops.

We first went to the sewerage treatment plant at Bolivar where the final clean up of wastewater using a Dissolved Air Flotation and Filtration technique took place. The final product could be likened to a weak nutrient solution.

To prevent mixing with other piped water sources the Class A water was pumped into on-farm storage. On a farm where the water was already in use and at the Virginia Horticultural Centre, we were informed of a very comprehensive research and extension program to establish Farm Best Practice for this valuable resource.

To my mind those involved in proving the safety of this water have done a first class job. I understand both Coles and Woolworths are supportive of the project and accept the potatoes, carrots, onions and leafy vegetables grown using the reclaimed Class A water.

The use of underground water from the complex of aquifers under the plains was presented and the potential for the recharge of one of the aquifers using the reclaimed water was seen. When horticulture was the main theme, the improvements in the Gulf St Vincent marine life only received a passing mention.

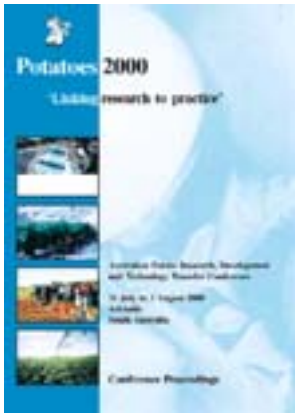
All organisations involved in this program should be congratulated on the progress to date. It is an example for Australia for which all states need to take notice. If you need to know more, contact Daryl Stevens, CSIRO Land and Water or Jim Kelly, University of Adelaide. Both are located at the Waite Research Precinct.

BRUCE BEATTIE
PhD student
Tasmanian Institute of Agricultural Research

A visitor's perspective

Reinette Gouws is a researcher from South Africa who presented a poster on common scab and biofumigation in South Africa. Reinette provided the following thoughts on the conference.

"The growers of Australia really impressed me. They tend to be very informed and professional. I was also very taken by their level of insight into some of the more complicated issues that they face for the future. I really enjoyed my stay tremendously and the hospitality and friendliness of the Aussies I met at the congress meant a lot to me. There is so much I would have liked to experience in and around Australia, which I just didn't get around to. I would really like to thank everyone that contributed to making my first trip to Australia a truly wonderful experience."



How to obtain a copy of the conference proceedings

The proceedings of ***Potatoes 2000 Linking Research to Practice*** are available at the PIRSA Information Centre for $40.00 or $45.00 with postage. Send your request, name and address and cheque or postal order to:

Farmers Information Centre
PO Box 469
MURRAY BRIDGE SA 5253
☎ 1800 356 446
Fax (08) 8535 6427
farmer.info@saugov.sa.gov.au

A message of thanks

I would like to take the opportunity to thank all the delegates for coming and contributing to the success of the Potatoes 2000 conference.

I would also like to thank my organising committee, the sponsors for their financial support, the trade exhibitors, the state coordinators, the review panel for the research papers, the presenters, those on the workshop panels, our workshop facilitator Iain Govern, the chairpersons, our cartoonist John Fennell, Sapro Conference Management and anybody I have missed who contributed to the success of the conference. Many people helped without hesitation and I am grateful for their contribution.

DR CHRIS WILLIAMS
Chairman
Organising Committee

Awards

HRDC

Malcolm Kentish	– best talk on market issues
Peter O'Sullivan	– grower prize for best talk on taking research and putting it into practice
Barbara Morgan	– best talk by a young researcher for clearest presentation of applied research work
Stuart Wale	– best joke

Does too much phosphorus fertiliser increase the risk of high tuber cadmium concentrations

LEIGH SPARROW
Tas Institute of Agricultural Research
☎ **(03) 6336 5379**
✉ **Leigh.Sparrow@dpiwe.tas.gov.au**

Potatoes have been estimated to contribute as much as 40% of the total dietary intake of cadmium in Australia because they are consumed in quantity and have relatively high cadmium concentrations.

While the vast majority of Australian potatoes meet current food standards, the industry still needs to manage cadmium responsibly. Phosphorus fertiliser, because it contains cadmium as an impurity, is a significant source of cadmium for potatoes.

Previous studies have shown that potato crops contained higher tuber cadmium when they were fertilised with phosphorus, but in those studies tuber yields also increased with the phosphorus fertiliser.

It would be useful to know if tuber cadmium keeps increasing as more and more phosphorus fertiliser is applied, because many growers tend to over-fertilise to avoid losing yield. Growers need to know if this increases the risk of high tuber cadmium concentrations in their crop.

Tasmanian trials

In two experiments on light-textured soils in northern Tasmania, tuber yield did not respond to phosphorus fertiliser, regardless of whether the phosphorus fertiliser was banded or broadcast. The soils must have had enough phosphorus in them already. (Average processing yields were 50-60 t/ha.)

This is consistent with results for banded phosphorus on sandy South Australian soils, and also from demonstration trials we conducted in Tasmania some years ago. However, recent work from Western Australia showed strong phosphorus responses on sandy soils at similar soil phosphorus concentrations. That work was with the cultivar Desiree, which may have a different phosphorus response pattern.

The interesting thing in the Tasmanian work is that tuber cadmium concentrations did not change with phosphorus fertiliser, even though more cadmium was added to the soil as more phosphorus fertiliser was applied.

We think that cadmium uptake from both the soil and from fertiliser could depend on the amount of roots the crop grows. In soils that lack phosphorus, adding phosphorus fertiliser increases root growth and increases cadmium uptake too. However, at our trial sites, there was enough soil phosphorus, so perhaps neither root growth nor cadmium uptake were stimulated by phosphorus fertiliser.

Conclusion

Excess phosphorus fertiliser does not appear to increase the risk of high tuber cadmium in the current potato crop. This argument should therefore not be used to convince growers to apply only the amount of phosphorus needed for optimum yield.

However, arguments about saving on fertiliser costs and reducing the long-term phosphorus and cadmium loading on soils are legitimate. Further studies of cadmium uptake in potatoes under controlled conditions are warranted. ■

You can't fool the e-sizer.™

When it comes to fast, incredibly accurate sizing, the e-sizer™ has no equal. Quite simply, edp® has created the most revolutionary sizing machine on the market today.

The e-sizer can optically size all kinds of fruit and vegetables, which gives you the advantage of being able to separate product by one, or a combination of, length, width or height. This leads to easy identification and translation to weight in even very irregularly shaped produce.

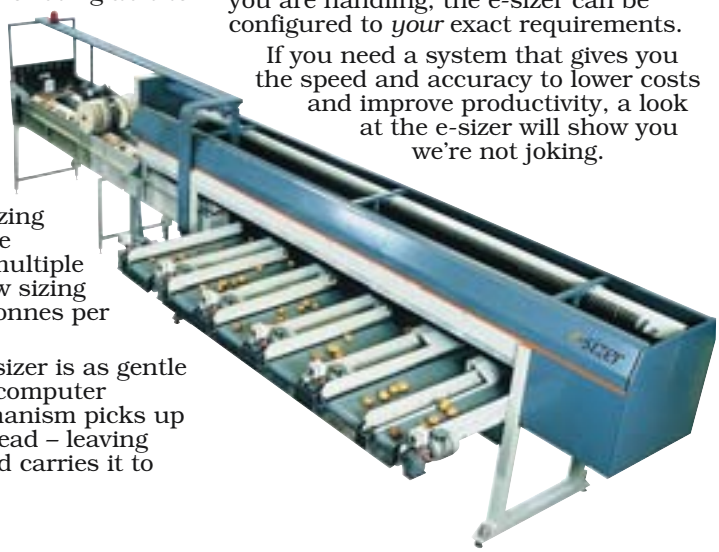
And this accurate sizing isn't just achieved at the expense of speed. The multiple lanes of the e-sizer allow sizing rates of more than 30 tonnes per hour.

Furthermore, the e-sizer is as gentle as it is fast. Its unique computer controlled "finger" mechanism picks up the produce from overhead – leaving any dirt to fall free – and carries it to the appropriate discharge point without any bruising or scuffing, placing it delicately onto the packing belt.

Advanced software ensures that *your* grading requirements are as easy as a touch of the keyboard.

Whatever type or volume of produce you are handling, the e-sizer can be configured to *your* exact requirements.

If you need a system that gives you the speed and accuracy to lower costs and improve productivity, a look at the e-sizer will show you we're not joking.



e-asy as...

edp®

edp® PACKAGING AND HANDLING SYSTEMS
33-37 O'Brien Street,
Mooroopna, Victoria 3629
Australia
Tel: 61-3-5825 2122
Fax: 61-3-5825 2758
email: edp@shepparton.net.au

See all about the e-sizer, as well as our other equipment at
www.edp.com.au

8862

Sustainable use of reclaimed water in irrigation - Northern Adelaide - SA

JIM KELLY
University of Adelaide

☎ **0427 821 625**

✉ **jim.kelly@adelaide.edu.au**

It is now over 10 months since the commissioning of the Dissolved Air Flotation and Filtration plant at Bolivar. The Northern Adelaide Plains (NAP) has seen the commencement of the largest high quality reclaimed water irrigation scheme in Australia and we believe the largest in the Southern Hemisphere.

Primary Industry and Resources South Australia (PIRSA) Rural Solutions, in collaboration with the University of Adelaide/CSIRO Land and Water (HRDC Project VG97081), have produced a Reclaimed Water Information Package in response to industry queries about irrigation with Class A Reclaimed Water and information gained from on going research.

The Information Package covers many topics relating to growing potatoes and many other horticultural crops with reclaimed water. Sections of the Information Package includes controlling algae in farm dams, reaction of reclaimed water with the different soil types, assessment of saline soils, sodicity; irrigation, cleaning your irrigation system; chloride, long-term effects of reclaimed water on soils; managing cadmium concentrations in produce, food quality; water quality and the environment.

The project team recently ran a series of consultant and grower meetings where the Information Package was presented to growers. The over-riding theme of the meetings was management. There are some new management issues relating to the use of reclaimed water, but these can generally be addressed through plant and soil testing, yield and produce assessment and good agronomic management.

This project is currently expanding the Information Package into a Reference Manual for horticultural extension officers and consultants to assist in the sustainable use of reclaimed water. ■

Development and implementation of national seed potato certification standards

RUSSELL SULLY
Industry Manager Potatoes
Agriculture Victoria
☎ **(03) 9210 9222**
✉ **russell.sully@nre.vic.gov.au**

Despite a long drawn out process national seed certification standards are within reach.

Certification of Australian seed potato crops is currently administered by individual states with each state agency having a different certification standard and terminology.

This creates confusion for growers buying seed on domestic markets and many overseas buyers do not realise the variation in standards between states.

To over-come this a national seed standards project was initiated with the following goals;

- identify the need for national certification standards
- develop national seed certification standards
- provide comprehensive information for the delivery of these standards
- develop an education program for the Australian potato industry about the new standards
- provide a foundation for long term quality improvement in the Australian seed potato industry.

Progress towards meeting the outcomes of the project

Stage 1

Stage 1 established a clear view that national standards will be of benefit to the industry nationally and on export markets. The benefits provided were seen as;

- easier purchasing of seed potatoes across Australia, based upon a uniform language and standards system
- greater ability to differentiate seed based on quality parameter
- easier movement of seed within Australia
- a uniform system to support export market development.

This stage also reviewed existing standards across Australia and internationally as a basis for development of a national standard.

During this stage industry consultation established the following principles;

- national standards should be developed
- any generation of seed could be certified and sold
- the new system should be able to differentiate the quality of seed independent of generation
- there needs to be a mechanism for national coordination and maintenance of the standards.

Stage 2 - Development of the national standards

Draft national standards were developed in December 1998. Since then extensive consultation, discussion and negotiation has taken place with the steering committee and key stakeholders including growers, certification authorities, processors and seed companies.

This has been a long drawn out process with many alterations, drafts and compromises being reached and possibly still some more before the National Standards are accepted by the industry as a whole.

The steering committee ratified the standards in September 1999, but due to concerns by some sections, the standards are still being revised. In May this year most sectors of the industry endorsed "in principal" the draft national standards and this was presented to APIC for their consideration. It is recognised that the standards will continue to evolve and with this in mind, the certification organisations met after the National Conference in August to refine the standards and discuss their implementation.

Although we are well behind the original timeline, I am confident that we are in reach of some widely acceptable national standards, which will serve the industry well into the future.

The next stage of the project will embrace a communication program so that the national standards are widely understood by all sectors of the industry. ■

Better soil and water management on sandy soils in South Australia

SHEA WATT
Project Officer - Potatoes
PIRSA Rural Solutions

ROBERT PEAKE
Senior Consultant (Potatoes)
PIRSA Rural Solutions
☎ (08) 8724 2913
peake.bob@saugov.sa.gov.au

Refining the methods of deep tillage in sandy soils susceptible to compaction has led to high yield increases for potato production. This study has also shown that use of wide beds and polyacrylamide soil conditioners offer growers a way to reduce the amount of water used.

The problem

Soil compaction has been shown as a major limiting factor to increasing yields on sandy soils in South Australia. While little is known about how compaction occurs, its effects are noticeable. These range from high density and penetration resistance of soil, to reduced drainage and water content.

Deep ripping has been trialed in this project and has been shown to reduce soil strength and increase root growth and yield of tubers. Techniques for ripper use have been refined in the final year of trials.

While compaction has some influence on soil-water relationships, other factors also influence how much water enters and remains in the soil, and these form the basis of other treatments also tested in the trials.

Surface sealing, low water-infiltration and low water-retention in sandy soil are factors that reduce the water content of soil for any given quantity of irrigation. Growers have adjusted their irrigation practices to compensate for this, and all trials conducted have been under irrigation management typical for these soil types in the region. Treatments aimed at increasing water volume in the soil have not had any impact on yields, but are more likely to allow growers to decrease the frequency and/or duration of irrigations.

Ripping appears to play a key part in improving soil water relations in sandy soil types. The quest for new methods of improving the efficient use of water in pivot-irrigation has also led to trials of a soil wetter and a polyacrylamide (PAM) soil conditioner in the final year.

This year's results

The main conclusion arising from the trials is that compaction in pivot grown potatoes on sandy soil was overcome by ripping, resulting in clear increases in yield. The most effective treatment used a five-tine Batswing® implement prior to planting, at 90 degrees to the direction of the ridges. Combining this treatment with post-planting ripping between the rows with Batswing tines resulted in further reduction of sub-soil strength and increases in yield of up to 25%.

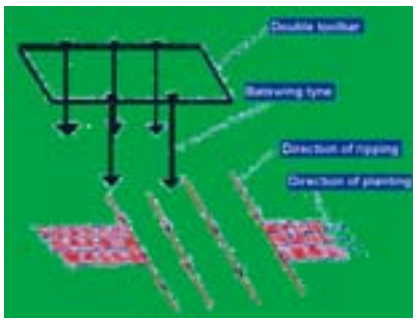
Refining the ripping process

Initial trials of a single-tine Batswing ripper resulted in yield increases of 7%. The project aimed to build on this knowledge to consider different designs of machinery and different tillage times. Two commercial companies loaned deep cultivation equipment to the project, and one company (Howard) has re-designed its equipment for commercial potatoes. The two designs of ripper used were the Yeoman's Batswing® and the Howard Paraplow®.

The Yeomans Batswing® deep ripper

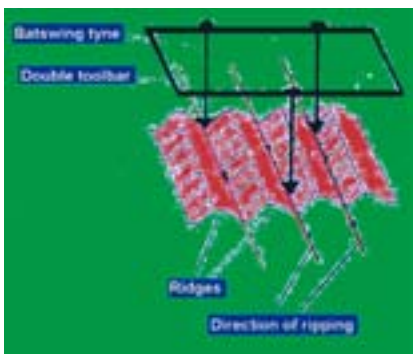
Batswing

Separate pre-planting and post-planting ripping treatments with the Batswing were trialed. The Batswing was modified for *pre-ripping* using five 50 cm deep tines on a two-row toolbar. This ripper was used within a week prior to planting at each property, at a 90° angle to the direction of the rows.



Pre-planting ripping with the Batswing®

For post-ripping, only three tines were used in the direction of the potato rows. This allowed one to run between each double row, thus ripping both sides of each ridge.

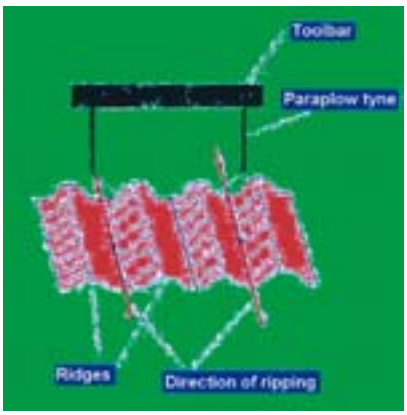


Post-planting ripping with Batswing®

The Howard Paraplow® deep ripper

Paraplow

The Paraplow was modified with Howard Australia to better suit the growing conditions of potatoes, as tines already in Australia had been designed for other industries. The final design comprised a left and right bent tyne designed to lift soil directly under the plants, running either side of a double bed in the direction of the rows. This design was only able to treat each row with one tine, as in early trials of the Batswing.



Post-planting ripping with Paraplow®

Paraplow tines were only used for post-ripping in this trial. The design had been modified to improve ripping in line with the bed structures and reach the required depth for potato roots of 50cm. Post-planting ripping with the Paraplow decreased soil strength to a greater extent than the Batswing. This did not however, translate to a significant increase in yield in the trials.

Effects on compaction

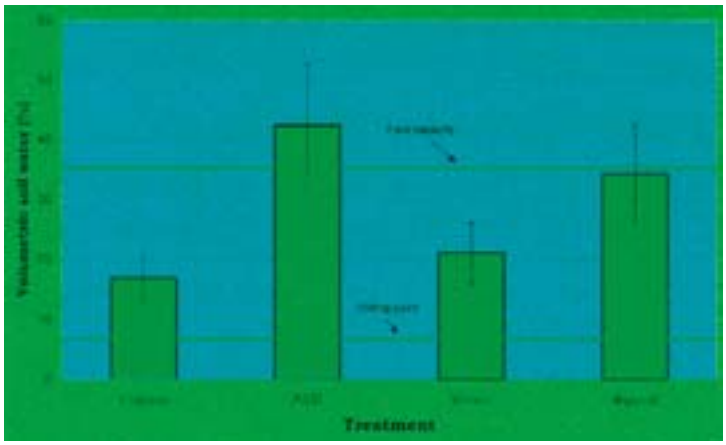
Soil strength was measured at 0-25cm and 25-50cm depths to compare the effects of the ripping treatments. At 0-25cm, post-planting ripping with the Batswing was the most effective treatment, decreasing soil strength by an average of 30%. This was followed by the Paraplow (16%) and then pre-planting ripping with the Batswing (4%). Combining each ripper with a pre-planting ripping treatment decreased the soil strength by a further small margin.

At 25-50cm, soil strength decreased by 22% with pre-ripping, 20% with Paraplow post-ripping and 8% with Batswing post-ripping. Combining pre-ripping and post-ripping (Batswing) gave the greatest decrease in soil strength (25%) and also translated to the greatest yield increase.

Good prospects for water use efficiency

A polyacrylamide (PAM) and a soil wetter were trialed to combat the effects of surface sealing and low water retention. The polyacrylamide used is a liquid designed to be applied through pivot irrigation systems and to be effective on low-clay soils. It is recommended for use in pulse-applications and is claimed to improve drainage, aeration, water absorption and retention. The soil wetter is a detergent commonly used to combat surface sealing. Both liquids were applied at their recommended rates, PAM at 45 l/ha and the wetter at 50 l/ha.

The soil conditioner results have been very encouraging; in particular a 151% increase in soil moisture with the use of the PAM. Ripping with the Batswing after planting resulted in an



The effects of ripping and soil conditioners on soil moisture (to 30cm depth)

increase in soil moisture of 103%. The soil wetter did not increase soil water content significantly but the combined use of ripping and the PAM have increased the volume of water in the soil to exceed the measured 'field capacity'.

Treatment of soil with this PAM could allow growers to decrease their consumption of water by 18% and still keep the soil at field capacity.

The cost per hectare of the PAM used in this trial is currently on a par with clay incorporation. However, the product used in this trial is fast becoming redundant for use on sands with a new generation of very viscous liquid PAMs now being imported from the US. While the cost of these new products is similar, the volumes used are substantially lower, and supposed to achieve much better results with a different mode of action.

Project conclusions

- Ripping with either ripper alleviated soil compaction for potato roots.
- Ripping before planting showed a greater yield increase than ripping after planting, but the two treatments combined produced the best results.
- Flattening and widening the structure of beds produced marginally increased yields and improved soil moisture. Use of polyacrylamide (PAM) soil conditioners also increased the volume of water in soil.

Both of these treatments hold promise for reducing the volume of irrigation required for potato production over the growing season.

This has been the final year of the project and a final report will soon be available from HRDC.

Acknowledgements

Our thanks to David Hansen, former PIRSA Irrigation Development Officer, and Bill Binks, PIRSA Irrigation Management Consultant, for completion of trials in the first two years of the project. Thanks also to Ben Dowling, Mark Heap and Alf Cass for leadership in the first two years. Technical support was provided by Paul Frost, Graham Henman and Calluna Denwood of Safries Pty Ltd and Bill Binks of PIRSA. We thank David Brear (Howard Australia), Leigh White (Yeoman's Plow Co.) for support with deep ripping equipment, and William Besz (Microscan Electronics) for support with measurement equipment. Much appreciation to the trial site growers Trevor and Mark Pridham, Forrest and Ross Young, David and Ross Wittwer and Tim Heyson for their continued involvement. Thanks also to the steering committee for their direction and advice, Tony Adams, Barry Philp, Duncan Tullett, Forrest Young, Paul Frost and Bill Binks.

■

Fulfilling South East Asian seed demands

PETER J. BATT
Senior Lecturer in Agribusiness Marketing (Horticulture)
Curtin University of Technology, WA
☎ (08) 9266 7596
battp@muresk.curtin.edu.au

To successfully export seed into South East Asia, Australian seed suppliers need to ensure that all seed delivered will satisfy the farmer's needs. Regrettably, repeated observations in both Indonesia and The Philippines suggest that as an industry, we have yet to embrace the basics.

For most countries in South East Asia, seed must be competitively priced, substantially free of pests and diseases, of the desired seed size and physiological age and be available when the farmer requires it for planting.

Unfortunately, the seed size delivered by Australian seed suppliers is generally too large and often, the seed is physiologically too old. In other instances, where seed suppliers have been unable to supply sufficient quantities of the variety requested, they have substituted alternative varieties. Such fundamental errors will make it very difficult for Australia to develop the reputation as a preferred seed supplier.

Factors influencing grower's seed buying decisions

For the majority of potato farmers in South East Asia, the decision to purchase seed evokes considerable risk. In the absence of a certified seed system, farmers have no way of knowing whether the seed they purchase from domestic seed suppliers will be of the desired size, variety and physiological age, or that the seed will be substantially free of pests and diseases.

Even for imported seed, there is often great variation in the size of the seed tubers delivered, the physiological age, the suitability of the variety to the growing conditions in-country and the constant threat of importing serious plant pathogens.

Variety

In the highlands of both Indonesia and The Philippines, it is apparent that the single most important factor influencing a farmer's decision to purchase seed is the variety. Those factors considered most important are the physical characteristics of tubers (tuber size, tuber shape, skin colour and flesh colour) and the suitability of the variety to the tropical growing environment. Generally, the preferred varieties are fast maturing (70-90 days), resistant to disease (late blight) and high yielding.

While suitability of the variety is very much a subjective measure, primarily it is an indication of the farmer's desire to purchase a variety that will significantly improve the yields they are currently attaining.

Seed quality

A farmer's decision to purchase seed is also influenced by the seed quality, especially with consideration towards both the physiological age of the seed and seed sanitation. Since neither of these can readily be evaluated by a visual examination of the tuber, except for the obvious signs of wilting, desiccation and decay, the decision to purchase involves considerable risk.

Risk

In South East Asia, risk is manifested in many ways. Firstly, there is the risk of crop failure due to typhoons and other environmental factors including pests and diseases over which the farmer has no limited control. Then there is the risk of crop failure because of poor seed quality. There is also the risk of financial loss, because in a bumper season, while the productivity per hectare may be high, ware prices will be so low that the farmer may be unable to recover the purchase cost of the seed.

Finally, there is also the risk associated with purchasing new varieties which, despite all the favourable publicity from plant breeders and seed suppliers, often prove to be totally unsuitable to the agro-ecological conditions in-country.

Seed size

Seed size is important because of its influence on the quantity of seed the farmer must plant per hectare. Indications are that because of the relatively short crop duration, seed rates per hectare are significantly higher than those used in Australia. It is not uncommon for farmers to plant up to 70,000 tubers per hectare, provided that they can secure sufficient quantities of seed.

Financing the crop

Given that most potato farmers in South East Asia must borrow the capital to finance the crop and that interest rates are often very high, farmer's will seek some assurance from seed suppliers that, in the event of crop failure, they will be able to repay the loan over an extended period of time. Such financial arrangements often include the provision of agricultural chemicals and fertilisers as a total package, with the seed supplier seeking an assurance from the farmer that the seed supplier will be responsible for marketing of the ware crop.

Given the farmer's financial constraints and the importance of seed quality, not only for the current crop, but also for any other crops derived from that seed or grown in the same soil, seed suppliers should emphasise low price and high product quality. However, while such a marketing strategy may satisfy the farmer's needs, it is unlikely that it will be profitable for the seed supplier.

Australian seed suppliers must add value to the seed offer

With only limited land and even less opportunity to bring any additional land into production, potato farmers in the highlands are actively seeking ways of increasing productivity per hectare. Many farmers are constrained by their lack of knowledge and are generally reluctant to adopt new varieties or to purchase seed from relatively unknown suppliers without having first seen the crop. The farmer's perceived risk of adoption can be reduced through product demonstrations and trials. Similarly, most farmers are openly receptive to advice and technical support.

Further benefits can be provided by adapting the product offer to provide seed of those varieties that are required in-country and delivering seed of the desired physiological age when it is required.

Working with importers and supporting their relationships with their customers (the potato farmers) is expected to provide significant long-term benefits. In purchase situations where major problems exist, farmers reduce uncertainty by gathering additional information, spreading the risk by using multiple suppliers or, by purchasing from well-known reputable suppliers from whom they have purchased in the past. Favourable experiences over many years and after many transactions, will lead to strong source loyalty, which will, in turn, reduce the costs of marketing and ultimately result in higher profits. ■

Phytotoxicity of metribuzin to different potato cultivars in southern Australia

CHRIS WILLIAMS
South Australian Research and Development Institute
☎ (08) 8389 8808
✉ Williams.ChrisM@saugov.sa.gov.au

Limited research work has been conducted in Australia on the sensitivity of different potato cultivars to metribuzin which is the active ingredient (ai) of the herbicide Sencor®.

Recommended label rates of metribuzin range from 206 to 528 g ai/ha for both winter and summer crops. The aim of the work was to rank cultivars in tolerance to metribuzin damage.

Field experiments conducted on winter sown crops indicated that cultivars could be divided into three groups based on their sensitivity to metribuzin damage.

Bison was ranked as *highly sensitive* in winter crops and had significant yield losses (over 30%) when rates of 206 g ai/ha or more were applied. *Atlantic* and *Pontiac* were ranked as *moderately sensitive* for winter crops and rates of 206 to 350 g ai/ha were tolerated.

The cultivars *Desiree, Coliban, Sebago, Red La Soda, Russet Burbank*, and the lines 87-13-3 and 90-77-4 were ranked as *tolerant* to metribuzin. These showed nil or very slight short term yellowing and no yield reduction at all rates up to 528 g ai/hectare. ■

Feedback - *we need your ideas!*

Eyes on Potatoes and *Potato Australia* are your industry publications so we need to know what you think of them and how they can be improved. If you have any ideas for articles, comments on the format or any suggestions on how the publications can be made better please let us know. We welcome any feedback.

You can contact your nearest newsletter advisory group representative, details on page 4.

Or comments can be sent directly to:

Leigh Walters
South Australian Farmers Federation
PO Box 6014
Halifax Street
Adelaide SA 5000
☎ (08) 8232 5555
Fax: (08) 8232 1311
✉ lwalters@saff.com.au

Potato exports to Asia - Can Australia become a major exporter of potatoes

ALISTER SHARP
Transport Studies Consultancy
☎ (02) 9879 3664
✉ transtud@zeta.org.au

STEPHEN MORRIS
Sydney Postharvest Laboratory
☎ (02) 9490 8333
✉ scmorris@postharvest.com.au

BARBARA STEPHENS and ANOWARUL BOKSHI
CSIRO Food Science Australia
☎ (02) 9490 8333
✉ Barbara.Stephens@foodscience.afisc.csiro.au
✉ Anowarul.Bokshi@foodscience.afisc.csiro.au

With innovative transport and disease control systems, Australia could significantly increase the volume of potatoes it exports.

Australia exports only about 1.5% of its total production. This small quantity consists of fresh (ware) potatoes, seed potatoes and potatoes for processing.

There is now an increasing, but price-sensitive market for potatoes in Asia. Australia has the land available to increase production, but needs to reduce the landed cost in Asia. This means reducing the cost of transport. Other than for short journeys, premium-quality potatoes have usually been shipped in refrigerated containers, which is an expensive form of transport.

This HRDC *Potato Exports to Asia* project was established to continue previous work funded by the CSIRO *Food into Asia* program, which had investigated the possibility of adapting onion Fantainers to ship potatoes at ambient temperature.

The *Potato Exports to Asia* project has found that for export without refrigeration, potatoes must be:

- grown specifically for low disease levels and high storage quality
- harvested and graded to avoid damage
- graded to exclude all moderately and severely damaged tubers
- cured correctly and/or treated with fungicide
- packaged and stowed in the container appropriately.

Exporting potatoes without refrigeration

It is well known that potatoes can be stored for many months without refrigeration; if left underground the potato's powerful natural disease control mechanisms protect it from attack, and the high humidity prevents the loss of moisture.

Even after harvest, the potato is known to have the ability to cure wounds if held under favourable conditions (90 - 95%RH, 15 - 20ºC) for 5 to 7 days. Therefore it should be possible to transport potatoes without refrigeration, provided conditions are similar to those existing underground before the potato is harvested, and the potato is handled carefully.

We surveyed potatoes at Flemington wholesale markets in Sydney and found that mechanical injury was widespread, irrespective of the type of packaging. Then, in an extensive field survey, we found that most injuries were inflicted not during digging, but during washing, grading and packaging.

Controlling disease

In the laboratory we replicated various types of injury and then inoculated the wound sites with the organisms responsible for dry rot (*Fusarium*) and soft bacterial rot (*Erwinia*).

We found that sites of severe tissue damage (such as splits and scuffs) readily developed severe dry and soft rot infection (soft rots developed in less than 48 hours). Injuries involving less severe tissue damage (such as shallow scratches and skin grazes) developed less severe infection. Tubers with intact skin resisted all infection. Furthermore, we found that bacterial soft rot rarely develops on undamaged potatoes, and usually follows dry rot infection.

Hence by rejecting potatoes with other than very minor injuries and curing and/or dipping potatoes in fungicide, it is possible to prevent both types of rot.

We also looked at alternative ways to control pathogens, including compounds that increase the potato's natural resistance to diseases. Applying these to the growing plants, we found a small benefit for stored potatoes and the potential to control potato leaf diseases (a result outside the aims of this project).

Developing innovative transport systems

Besides appropriate postharvest handling and packing, the key to shipping potatoes without refrigeration is to maintain them in a high humidity, but dry. They must be dry when packaged and protected from 'sweating' throughout the journey.

One way to achieve this is with a 'Pot-Tainer', which is a general-purpose container, modified to ventilate the stow uniformly with air at high humidity. (At some times of the year it may also be possible to cure potatoes after loading into the container).

The Pot-Tainer is based on the onion Fantainer developed by CSIRO in the 1980s, except that whereas the onion Fantainer uses once-through ventilation to maintain a ***low*** humidity, the Pot-Tainer recirculates the air stream to generate a ***high*** humidity.

Bagged (or bulk) potatoes are stowed on an airflow floor (e.g. on pallets). Air is circulated through the stow by a fan fitted into a bulkhead. Humidity is controlled at around 90%RH by means of a humidity sensor, a controller and a motor-driven damper. Fresh air is admitted through a door left ajar or, when using P&O Fantainers, through the original fan opening.

Although containers could be built or permanently converted to Pot-Tainers, we developed the system for one-trip use (at the end of the journey the container is returned to general service).

Door end of a 'one-trip' Pot-Tainer conversion of a P&O-type onion Fantainer showing how the fan has been relocated from the door. The fan is now mounted in a temporary plywood bulkhead inserted after the container has been loaded with potatoes packed in jute bags on a layer of pallets. Note that the bottom of the bulkhead is cut away to allow air to return to the loadspace. A panel holding the control equipment and rotary damper (to regulate the rate of air freshening) has been fitted over the original fan opening in the left-hand door.

The final stage of the current project was to evaluate the Pot-Tainer system under commercial conditions. Using a commercial consignment of potatoes grown in the Mt Gambier district, we made a side-by-side comparison of a Pot-Tainer with a refrigerated container.

Both containers operated normally throughout the journey, but the potatoes had an excessive level of mechanical damage and had not been given the postharvest treatments specified in the export protocol. Consequently at outturn the quality was poor in both the refrigerated container and the Pot-Tainer. Potatoes from the Pot-Tainer were particularly poor because of the growth of disease organisms on sites of mechanical damage.

We are confident that potatoes from both containers would have arrived in good condition if the potatoes had been free of mechanical damage, cured and/or treated with fungicide, packed dry and stowed on appropriate pallets, as specified in the export protocol.

The Pot-Tainer is not the most critical part of the export protocol. For successful shipment without refrigeration ***potatoes must first be handled and packed so that disease potential is minimised.***

What happens now

The *Potato Export to Asia* project has reached the end of its term. We have found that it is possible to export potatoes successfully without the expense of refrigerated transport, provided they are handled according to the postharvest handling protocol developed during the project. Before this export system can be regarded as commercially available however, it will be necessary to:

- Find ways to simplify the container modifications required to convert general-purpose containers to Pot-Tainers so that costs are reduced,
- Confirm that the system works under commercial conditions, for other markets, for other routes, for other varieties and for shipment in other seasons. ■

The interim postharvest handling protocol developed during this project is available from CSIRO Food Science Australia, PO Box 52, North Ryde, NSW 2113

Putting information where it counts

The following information products have been released to the Australian potato industry during the last 12 months.

QA booklets

Australian Potato Industry Quality Assurance Guide for Potato Farmers

This guide provides advice on what you need to do to satisfy most of the requirements to become an approved supplier. It covers five key areas; traceability, food safety, food quality, training and self assessment (internal auditing).

Farm Chemical Storage Guide

This guide provides simple guidelines for the temporary on-farm storage of chemicals to help farmers fulfil their duty of care in lowering the risk of exposure and accident to both people and to the environment.

Both booklets were distributed free of charge to the potato industry in the December 1999 edition of *Eyes on Potatoes*. Further copies may be obtained from:

Eric Coleman
Queensland Horticulture Institute
☎ (07) 5466 2216
✉ colemae@dpi.qld.gov.au

Internet Starter Pak

Version 3 of the Starter Pak was released in March this year. The Starter Pak makes it quick and easy to find potato information available on the internet and has links to sites with information on growing potatoes, diseases, pests, marketing, finance, exporting, machinery, chemicals, government services and more.

The latest version has many more sites than before. It will also allow you to look up sites by country or state for Australia, Canada and USA. So if you are interested in finding out about what is being done on a problem in Idaho, you can look up just the Idaho sites.

There is also more information on financial management which has become a bigger issue as a result of the tax reforms.

You can obtain a copy of the new version by emailing: lwalters@saff.com.au

and include in the subject box - **Request for Starter Pak** (Note spelling!) In the area where you write your message, type - **Request**

Previous users who have not changed their email address should have already received their copy of the new version.

Communication Plan

A summary of the Australian Potato Industry Communication Plan was distributed with the June 2000 edition of *Eyes on Potatoes*. This plan outlines the initiatives and activities to aid communication throughout the industry and assist in the adoption of new and existing technology. Both the plan and the summary are available from HRDC by phoning (02) 9418 2200.

HRDC Final Reports

At the completion of each research or development project an HRDC Final Report is produced.

Following is a list of reports that have become available since the last edition of *Potato Australia.*

HRDC Final Reports

Phosphate, nitrogen and irrigation management in potatoes	PT213
Coordination meeting for reviewing cadmium issues in potatoes & vegetables	VX99040
Sustainable potato production in highland NSW - Stage III	PT97010
Control of black nightshade and other weeds in potatoes	PT96047
Screening potato and vegetable soil borne diseases that may be controlled by Eucalyptus leaf mulch - pilot study	VG98076
Non frozen fresh potato products	PT220
Development and application of training programs for IPM techniques in Southern Australia 1/7/92 - 30/6/93 and an integrated crop management program for crisping potatoes in SA 1/7/93 - 30/6/94	PT230/PT339
Integrated crop management and efficient irrigation for crisping potatoes in South Australia	PT424
Improved productivity of inland potato production	PT432

These are available from the Horticultural Research and Development Corporation for $20.00 each in Australia or $US30.00 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 :

Customer Services
Horticultural Research and Development Corporation
Level 6
7 Merriwa Street
Gordon NSW 2072
☎ (02) 9418 2200
Fax (02) 9418 1352
✉ hrdc@hrdc.gov.au

Alternatively, reports can be purchased through the HRDC/AHC internet site: www.horticulture.com.au

Posters

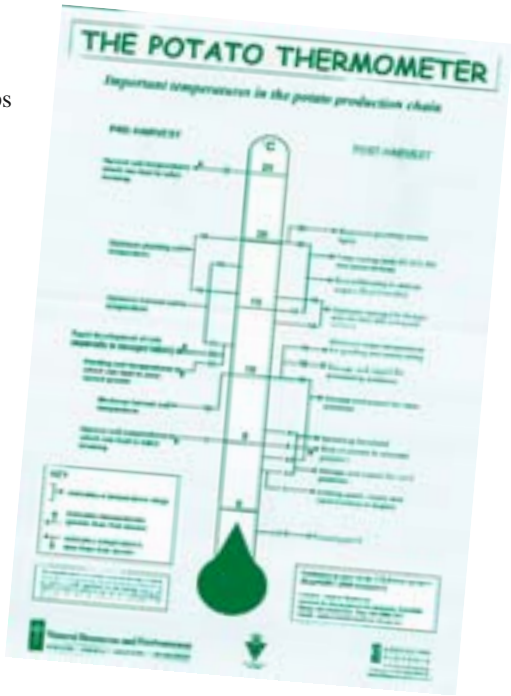
Australian Potato Production Areas

Produced in response to a request from exporters, this poster shows the times of the year when potatoes are harvested in the major production areas around Australia. This assists exporters to supply overseas markets throughout the year (or possibly at short notice) and in turn can provide new market opportunities for potato producers. The poster also has applications in domestic trade.

Potato Grading Chart

The Potato Grading Chart was developed from the Product Description Language - Potatoes. It is a summary version of the PDL and uses the same photographs to describe potato quality and enable standards for trade to be set. The Chart is designed for use in a grading shed, where it can be used to show grading staff which standards are acceptable for any particular consignment.

The Potato Thermometer



The Potato Thermometer groups together the important temperatures in the potato production chain and presents them in a graphic reference form. It includes both pre- and post-harvest temperatures and should prove useful to those involved in quality assurance systems.

Posters may be obtained from

Andrew Henderson
Agriculture Victoria, Knoxfield
☎ (03) 9210 9222
✉ andrew.henderson@nre.vic.gov.au ■

1999 World Trade Organisation research program for the Australian horticultural industries

ROGER VAN HILST
Senior Research Officer
ABARE
☎ (02) 6272 2000
✉ roger_vanhilst@abare.gov.au

This project ensured the preparation of information on the Australian horticultural industries, including potatoes, for the 1999 round of World Trade Organisation (WTO) talks in Seattle.

Initiated by the AusHort R&D Committee, the main aim was to ensure the availability of quality data for the Australian trade negotiators to assist in gaining further market access and trade reform in the international marketplace.

The Australian Bureau of Agriculture and Resource Economics (ABARE) prepared a working paper in conjunction with the Horticultural Research and Development Corporation (HRDC), AHC and the Horticultural Industry Market Access Committee.

Aspects covered in the working paper included;

- production, export trends, competition and Australian support programs
- horticulture and multilateral trade negotiations
- trade policy analysis and case studies on the European Union, USA, Japan, South Korea, Indonesia, China and Chinese Taipei
- profiles on 19 Australian horticultural industries including potatoes.

This project has been a valuable starting point for further WTO round research as well as an important step in the planning for further export growth and liberalisation of horticultural market access and trade.

Outcomes of the November 1999 round of World Trade Organisation negotiations

The Australian World Trade Organisation (WTO) negotiation team set out to support the Cairns Group in their agricultural challenge to the dominant European and USA trading blocs during the lead up to the WTO multi-lateral trade talks. Australia's reform agenda at Seattle in November 1999 included reductions in tariffs and quotas, domestic support arrangements and export subsidies.

The launch of the WTO round in Seattle was unfortunately not successful for a number of reasons, including:

- The WTO's ineptitude and outdated operating system to accommodate the expanded member countries which now totals 135.
- The USA President's position to appease local interest groups by placing domestic political interests in relation to anti-dumping and labour standards above those of world trade reform.
- The European and USA unwillingness to agree on an agriculture agenda for trade reform.
- Developed and developing countries' different agendas in relation to the application of multi-functionality.
- The failure of member countries to agree on several contentious areas, including agriculture, services, environmental standards and competition policy.

While talks on agriculture and service exports will continue, progress will be difficult. It is hoped that the next round of WTO talks will be launched later in 2000 and will be successful in negotiating new trade reform, liberalisation and lower barriers for agricultural trade.

While outcomes negotiated during the Uruguay round in 1995 resulted in the reduction in tariffs and the establishment of tariff rate quotas, the next WTO round still provides a very good opportunity to seek further reductions in support and protection.

Issues relating to high tariff and quota volume restrictions, stringent sanitary and phytosanitary regulations and trade-distorting domestic support arrangements in target markets and competitor countries will be addressed.

Other issues during the round could include matters of state trading enterprises, trade in genetically modified organisms, food safety and labelling, intellectual property rights and country equivalence.

Copies of the project report 'Australian horticulture in the global environment' are available from ABARE [phone (02) 6272 2000] and the Australian Horticultural Corporation for $48.00. ■

Nadine: she looks good but she can be difficult to live with

SANDRA LANZ
Lanz Agricultural Consulting
☎ (02) 4677 0198
✉ slanz@acenet.com.au

RENÉ DE JONG
National Potato Co-ordinator Elders
☎ 0418 523 710
✉ renedj@netconnect.com.au

The high visual appeal and good shelf life along with professional preparation for market has created a high demand for *Nadine* in the fresh wash market.

However, growers and agronomists have learnt that *Nadine* must be managed carefully in the field.

So what has been learnt

The variety *Nadine* has a high, even sized tuber set and therefore has a high yield potential. Special understanding and a high level of discipline by growers is required to get the best out of this potato. This variety sets many tubers early, which grow slowly until late in the growing cycle when rapid bulking takes place.

Growers in Virginia, South Australia have been driven by high priced markets in October to plant *Nadine* in May and June which presents high risks due to frosts and high winds. At the other end of the season, high water use during hot conditions presents the challenge of maintaining soil moisture to maximise yield and quality.

Irrigation

Nadine is less able to tolerate water stress than most other varieties, hence irrigation is one of the most important parts of managing this variety.

Shane Phillips from Elders, Loxton, has found that if planting in hot conditions, cooling the soil by irrigating before crop emergence and during tuber set is vital to ensure good crop establishment and tuber set.

Flat or slightly dipped hill tops, irrigation scheduling and ensuring soils are well irrigated ahead of hot weather are all important management factors in reducing the risk of water stress.

During hot conditions *Nadine* needs to be irrigated every two days otherwise crops may collapse early. Shane has found that the uniformity of water from the sprinkler nozzles is critical in avoiding water stress. On a solid set sytem, he recorded a yield reduction of 57% under sprinklers where the uniformity of distribution was poor.

Polymers have been tried on soils to improve water movement and soil water holding ability. This area shows great promise with positive results of yield increases in most cases.

Plant spacing

Plant spacing needs to be considered by growers to reduce the damaging effects of high winds. Growers need to weigh up whether to plant sets closer to provide support or further apart to get the tuber size for premium potatoes.

Nutrition

Adequate to high phosphorus levels are important to get a good strong plant structure so plants stand tall and have a large top to support high yields.

High applications of potassium fertiliser may not always mean adequate potassium levels in the leaves. Cold soils are believed to reduce the efficiency of the root system to pick up potassium.

So why grow *Nadine*

Knowing that markets are keen on *Nadine* potatoes, combined with excellent packouts and high yield potential plus favourable market prices, means that this cultivar offers the prospect of high income. ■

Elders Limited, own the marketing rights for Nadine in Australia under Plant Breeder's Rights (PBR).

R&D funding - are states getting their fair share

LEIGH WALTERS
Technology Transfer Manager – Potatoes
☎ (08) 8232 5555
✉ lwalters@saff.com.au

A number of people in the industry do not feel that the benefits of the research and development work are flowing back to them, especially when work is not done in their state or region. This article attempts to address the issue.

The benefits from Potato R&D are not always easy to appreciate.

Most people do not receive information generated from Potato R&D directly from the researchers through personal contact or while attending a group session such as a field day or workshop. It comes from other farmers, service providers (ie. local agribusinesses, consultants, field officers, government advisers), publications such as *Potato Australia* and more recently the internet.

A lot is learnt through other people and the Potato R&D program could have influenced many of them, particularly if their job is to provide the latest services to the farming community.

So when considering the benefits from the Potato R&D program give thought that a lot of its impact on your decision making is likely to be through indirect sources such as a neighbour or service provider.

Need to be realistic about what the Potato R&D program delivers

The R&D funding is not an endless bucket of money. The national research and development program spends about $2 million a year (see page 6 for how the money is spent). The average size of a project is about $50,000.

This would be less than what the state governments spend on research and development for the potato industry either in conjunction with the Horticultural Research and Development Corporation or independently.

It needs to be remembered that the potato levy was not set up to fund all state-based activities. There was always an expectation that state governments would contribute to the financing of local research, development and extension programs.

In most states though, the governments have been reducing their commitment to research, development and extension. Something particularly noticeable with the loss of field staff in some areas.

National vs regional projects

A commonly voiced concern is that there is not enough research done locally and when local projects are put up they are less likely to succeed.

The APIC R&D Committee does not always expect nationally focused projects. It does expect that if work can provide benefits to more than one area then it should do so. This is simply a matter of getting the most value from the money spent. Otherwise similar projects from other areas could be submitted, and if supported, quickly drain the Potato R&D fund.

Some projects also need to be nationally focused because they would be too expensive, not practical or too difficult to do for each state. Examples being the breeding program, cadmium work, technology transfer activities such as my project and the national potato publications - *Potato Australia* and *Eyes on Potatoes*.

My state is not getting its fair share of the levy

The Potato R&D money is **not** split up based on levy receipts from each state. To do so would result in a far less effective research program. The issue should be whether industry receives the benefits of the work, not where the money is spent.

Projects are funded based on industry priorities, the likelihood of a good return on the money invested and the ability of the research and development team to do the work. State borders have little relevance.

Another important consideration is whether the work has already been done. It is not uncommon for the APIC R&D Committee to receive research proposals to do work which has been completed elsewhere. In these instances the researchers have to provide a convincing argument to justify why further work needs to be done.

Skills and facilities to do particular tasks are not available in all states and in some instances not even in Australia. So work sometimes has to be done where the resources are located in order to get the best return on the money invested.

Work in other states is not relevant

In some cases this is true but in many cases it is not. Farmers and advisers are regularly using information from a wide range of sources including other states, USA and Europe.

The reality is that we cannot afford to replicate research in every region for each issue to validate results. If work is to be repeated then there has to be a good reason for doing so and this needs to be demonstrated in the project proposal submitted to the APIC R&D Committee.

The challenge in using information from other areas is interpreting it and this can be difficult. If the work is based on projects funded through the levy then the researchers can be contacted directly. The inclusion of contact details in *Potato Australia* and *Eyes on Potatoes* for authors of articles has been done to help address this problem.

In some areas the loss of trained people that can search out and interpret research results has also added to the problem.

We do not see researchers from other states

I would tend to agree that this does not happen enough but there are a few practical realities.

Last year I held 36 workshops around Australia and I still had not reached many areas. Whether we like it or not Australia is a big country and potato growing is spread over a very large area. Researchers do not have the time to travel to all areas and the industry cannot afford to fund it if they did.

That is not to say there are not ways around the problem. Many farmer groups have organised researchers to visit their areas. In most instances the farmers initiate the visit and through their local group or service industry organise the itinerary and invite the researcher.

This saves the researcher a lot of time and problems in trying to organise something in another state that may or may not be of interest to the farmers.

We do not hear about the outcomes of the research

All research funded by HRDC is reported in *Potato Australia* each year. Contact details are provided for the researchers so people can contact them to talk further about the work. This was the reason why *Potato Australia* was started and in recent years we have refined the reporting so that no projects are missed.

Past research information is currently being put onto CDROM and eventually the internet. This project has just started and once completed, past research information will be readily available. At present past work is available in HRDC Final Reports, which amounts to a stack about one metre high. Most projects have also been reported in the past through *Potato Australia*.

As indicated in the opening statements of this article, information comes from many sources, even though it may have originated from the one place. Information from the R&D program does impact on the advice provided by the service industry even though it may not be acknowledged at the time of its use.

How are the problems being addressed

The *Australian Potato Industry Technology Transfer Project* was initiated to address communication problems in the industry. This project is coming to an end and the next phase of work *(Implementing the potato industry's Communication Plan)* is about to commence. In the June *Eyes on Potatoes* the Communication Plan summary presents an overview of what is being done.

By being able to access and use information more easily, not only will many problems be solved, but also it will be easier to focus on what we really do not know.

How can industry influence the R&D program

Farmers can influence the Potato R&D program through their state representatives on the APIC R&D Committee.

Farmers should also be influencing the project proposals being put forward by research groups. The APIC R&D Committee, which assesses the proposals, look for evidence of industry consultation and support. Members of the committee would prefer to have the proposals driven by industry and research groups rather than research groups alone. Projects

Potato Breeding and New Varieties

ROGER KIRKHAM
Potato Geneticist
Agriculture Victoria
☎ (03) 5957 1204
✉ Roger.Kirkham@nre.vic.gov.au

STEPHEN WADE
District Horticulturalist
NSW Agriculture
☎ (03) 5883 1644
✉ stephen.wade@agric.nsw.gov.au

CHRIS WILLIAMS
Senior Research Scientist - Potatoes
South Australia Research & Development Institute
☎ (08) 8389 8808
✉ williams.chris@saugov.sa.gov.au

PETER DAWSON
Development Officer
Agriculture Western Australia
☎ (08) 9892 8461
✉ pdawson@agric.wa.gov.au

LEON HINGSTON
Technical Officer
Tasmanian Institute of Agricultural Research
☎ (03) 6430 4922
✉ Leon.Hingston@utas.edu.au

STEPHEN HARPER
Horticulturalist, Heavy Vegetables
Queensland Department of Primary Industries
☎ (07) 5466 2222
✉ harpers@dpi.qld.gov.au

Major changes are occurring in the way new varieties are being introduced to the Australian potato industry.

The Past

Australia has had a single potato breeding program based at Toolangi, which has a national focus and tests new varieties in a network of trials on growers' properties in major production areas throughout the country.

This project has released a number of important commercial varieties over the past 25 years.

Australian bred varieties

- Coliban
- Wilstore
- Snow Gem
- Wontscab
- Wilwash
- Catani

Imported overseas varieties

- Atlantic
- Denali
- Russet Burbank
- Shepody
- Desiree
- Nadine
- Crystal
- Ranger Russet
- Nooksack
- Spunta
- Red La Soda
- Simcoe
- Trent
- Bison

The Present

The breeding and variety testing projects receive levy funding from APIC matched by HRDC. The Australian bred varieties that have been released or are being tested are freely available to the whole industry.

New varieties that are in final commercial tests include:

French fry

- Umatilla Russet (imported from USA)
- Riverina Russet

Fresh

- Shine
- Ruby Lou
- 92-19-10
- Winter Gem

Crisp

- Hart
- Dawmor
- Sonic

The Future

Plant Breeders Rights (PBR) is a form of proprietary ownership that is impacting on the potato industry in Australia. PBR grants licensees the marketing rights for seed of new varieties, however this can be extended to ware/processing potatoes with 'closed marketing loops' where varieties have limited and conditional availability.

Imported varieties

In the future most imported varieties will only be released to a licensee who will have marketing rights for the variety in Australia.

These new varieties will not initially be available to the breeding/testing programs and there will be no independent assessment of imported varieties.

Australian bred varieties

HRDC and APIC are considering proposals which would change the way varieties from the Toolangi breeding program are tested and released in the future.

Variety posters

On the following pages we present extracts from posters displayed at Potatoes 2000.■

Technology transfer of new potato varieties

Roger Kirkham, potato breeder, showing new potato varieties at the March 2000 field day at the Bungaree Demonstration farm at Ballarat, Victoria

Local breeding program focuses on:

- Brightest skins for washed fresh market.
- White tuber flesh.
- Mediterranean latitude.
- Year round production system.
- Quick response to local problems (eg. PCN).
- Import best varieties from overseas for independent testing.

Crossing parent potato plants at Toolangi, Victoria

Breeding lines at Toolangi

Grading a variety trial at Koroit, Victoria

Breeding potato varieties resistant to Potato Cyst Nematode

Potato Cyst Nematode is an important pest of potatoes in most overseas countries. Localised outbreaks of PCN have been found in potato crops in Western Australia and Victoria. Resistant varieties are the most effective means of controlling the disease.

Lines from the Australian breeding program are tested for resistance in New Zealand in a collaborative research program.

Resistant varieties from this project

Australian bred

Dalmore
Wontscab
Shine
Riverina Russet
Winter Gem

Imported from overseas

Atlantic
Nadine

Breeding potato varieties resistant to powdery scab disease

Powdery scab is the most important disease of potatoes in Australia.

Incidence of powdery scab disease has increased due to:

- Planting earlier or 'out of season'
- Increased irrigation
- Growing susceptible varieties

Chemicals and rotation are ineffective for disease control.

A disease testing area was established by inoculation with the fungus. Potato varieties are grown during Spring when cold and wet conditions favour disease development. This area is used to select new varieties resistant to powdery scab disease.

Resistant varieties selected and released from this project include *Tarago*, *Wontscab* and *Ranger Russet*.

Sonic

Sonic is a new crisp processing variety bred and selected by the Australian industry's national potato breeding program. It has medium dry matter and light crisp colour and is recommended for direct crisp processing and also for storage.

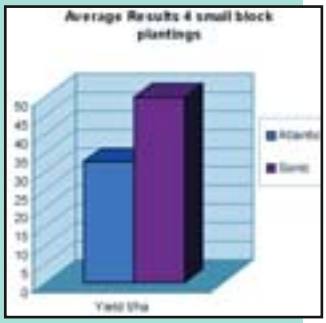
Sonic has vigorous plants with long growing period that produce high yield of medium sized round tubers with no internal defects.

PLANT TYPE

Upright vigorous plant.

MATURITY

3-4 weeks longer than Atlantic.



DISEASE REACTIONS

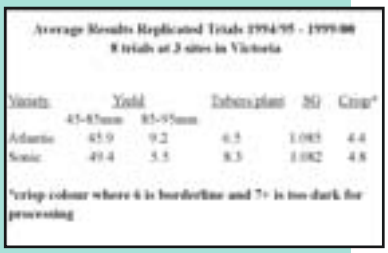
Resistant to target spot, slightly susceptible to powdery scab.

YIELD

High yield of crisp processing grade.

TUBER NUMBER PER PLANT

High, 8 per plant when *Atlantic* has 6 per plant.



TUBERS

Round even shape.

TUBER INTERNALS

Less susceptible to hollow tubers than *Atlantic*.

DRY MATTER

Medium, lower than *Atlantic*.

CRISP COLOUR

Sonic has very light crisp colour at harvest and after long term storage.

RECOMMENDATION

Plant at similar spacing to *Atlantic*, irrigate evenly through to end of growth.

SUMMARY

Sonic has vigorous late maturing plants. It also has high yield of crisp grade and is suitable for long term storage.

Shine

Shine is a new fresh market variety bred and selected by the Australian industry's national potato breeding program. It has bright white skin and is recommended for the washed fresh potato market.

Shine has excellent boiling qualities and flavour. It has short tuber dormancy, early plant maturity and early tuber bulking and is recommended for double cropping areas which use grower kept seed.

MATURITY

Short growing period. Early tuber bulking.

DORMANCY

Short

DISEASE REACTIONS

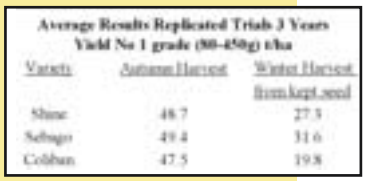
Resistant to potato cyst nematode PCN (RO1). Susceptible to target spot. Susceptible to powdery scab.

TUBER SKIN

Bright, white and smooth. Lenticels very small and not prominent. Resists greening.

TUBER SHAPE

Round with shallow eyes.



BRUISING

Resistant to tuber cracking or shatter.

COOKING QUALITY

Excellent flavour. Excellent boiling quality with little disintegration and no after cooking darkening.

RECOMMENDATION

Short dormancy, short growing period and early tuber bulking make *Shine* suitable for the dual cropping kept seed areas of the Riverina and Riverland. Growing recommendations are similar to *Pontiac*.

SUMMARY

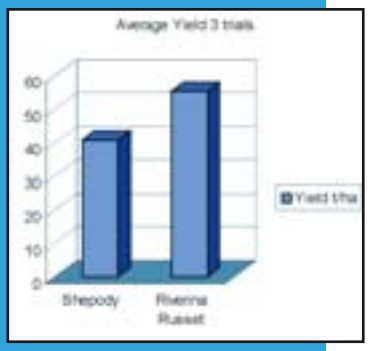
Shine has a white and unusually smooth skin with small lenticels making *Shine* suitable for the washed fresh potato market. *Shine* has short growing period, early tuber bulking and short dormancy making it more suitable than *Coliban* for double cropping potato areas. *Shine* is resistant to tuber greening and tuber shatter damage and has excellent boiling qualities.

Riverina Russet

Riverina Russet is a new French fry variety bred and selected by the Australian industry's national potato breeding program. It is recommended for direct delivery processing in mid and late Summer between *Shepody* and *Russet Burbank* varieties. *Riverina Russet* has vigorous plants, high yields and excellent French fry processing quality.

PLANT TYPE

Vigorous upright plant.



MATURITY

3-4 weeks later than *Shepody*. Forms tubers late in plant growth.

DISEASE REACTIONS

More resistant than *Shepody* to target spot. Resistant to Potato Cyst Nematode (RO1).

YIELD

Higher yield than *Shepody* (30%+).

Average Results Replicated Trials
(Summer Harvest)
3 trials

	Yield*	SG	%Yield >280g	Fry**
Shepody	40.5	1.075	27.7	7.8
Riverina Russet	55.3	1.080	37.8	6.3

*yield t/ha tubers 100g and over
**fry colour where 7 is borderline and 8+ is too dark for processing

TUBER NUMBER PER PLANT

Similar to *Shepody*.

TUBER SHAPE

Long oval shape when grown in sandy soils with few misshapen tubers.

TUBER INTERNALS

Hollow tubers or brown centre rarely seen.

DRY MATTER

Consistently higher than *Shepody*.

FRY COLOUR

Fry colour is light and even along the chip length with no stem end browning.

BRUISING

More susceptible to blackspot bruising than *Shepody*.

RECOMMENDATION

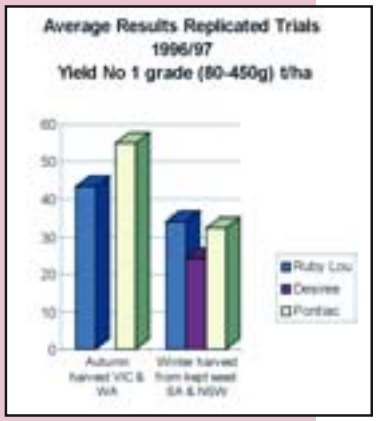
Plant at same spacing or slightly wider than *Shepody*. Apply less nitrogen fertiliser than *Shepody*. Continue to spray for target spot and irrigate crop through to end of growth.

SUMMARY

Higher yields, better tuber shape and vigorous plants with more resistance to hot growing conditions than *Shepody*. Long growing period and late tuber bulking are disadvantages.

Ruby Lou

A new red skinned fresh market variety bred and selected by the Australian industry's national potato breeding program. *Ruby Lou* has bright and smooth red skin and is recommended for the washed fresh potato market. *Ruby Lou* has excellent multipurpose cooking qualities with excellent flavour. *Ruby Lou* has short tuber dormancy, mid plant maturity and early tuber bulking and is recommended for double cropping areas, which use grower kept seed.



MATURITY

Medium growing period, early tuber bulking.

YIELD

High

DORMANCY

Short.

DISEASE REACTIONS

Susceptible to target spot, powdery scab and common scab.

TUBER SKIN

Light red, slightly darker than *Desiree*. More resistant to colour fading than *Pontiac*.

Average Results Replicated Trials 1996/97
Yield No1 grade (80-450g) t/ha

Variety	Autumn harvest Vic & WA	Winter harvest from kept seed SA & NSW
Ruby Lou	43.3	34.1
Desiree		24.4
Pontiac	54.9	32.4

TUBER SHAPE

Round-oval, prominent eyebrows. Smooth, suitable for washing.

FLESH

White flesh. Shiny without lenticels.

BRUISING

Resistant to skinning or scuffing. Resistant to tuber cracking or shatter.

COOKING QUALITY

Multipurpose with excellent flavour suitable for roasting, frying, boiling and salads.

RECOMMENDATION

Medium growing period, early tuber bulking and short dormancy make *Ruby Lou* suitable for dual cropping kept seed areas of the Riverina and the Riverland. Growing recommendations are similar to *Desiree* with less nitrogen fertiliser. *Ruby Lou* has a shiny red skin resistant to fading and tubers are resistant to skinning and cracking making this variety suitable for the washed fresh potato market.

SUMMARY

Ruby Lou retains red skin better than *Pontiac* and is more resistant to tubber cracking than *Pontiac*. *Ruby Lou* has better shape and colour than *Desiree* and is better suited to dual cropping kept seed areas than *Desiree*. *Ruby Lou* has good flavour and multipurpose cooking quality. Skin colour of *Ruby Lou* is lightened and eyebrows are prominent on large tubers.

A supply chain approach to potato export market development

RUSSELL SULLY
Industry Manager Potatoes
Agriculture Victoria
☎ (03) 9210 9222
✉ russell.sully@nre.vic.gov.au

RALPH CADMAN
Manager Regional Marketing
Agriculture Victoria
☎ (03) 9210 9222
✉ ralph.cadman@nre.vic.gov.au

In the past the Australian potato industry has been domestically focused and yet there are now significant opportunities for export of seed, fresh, fresh for processing and processed potatoes.

A study by the Centre for International Economics identified that inadequate scale and slow adoption of best practice was a major impediment to export growth and international competitiveness. The marketing chain was fragmented with insufficient commitment to export and lacked scale.

This market development project is aimed at the following outcomes:

- Developing strategic alliances among all sectors of the industry, to increase scale of operation and improve quality, service and competitiveness in export markets.
- Establishing a mechanism which builds on existing structures to support coordinated marketing and promotion of Australian potatoes on export markets.
- Establishing export protocols or quality standards and a mechanism for maintaining quality, to ensure that the industry maintains its reputation as reliable quality suppliers of potatoes.

The benefit to industry will be:

- Improved competitiveness on domestic and export markets.
- Increased demand for potatoes through growth in exports.
- Improved reliability of quality.
- Increased value of potatoes for domestic and export markets.

Progress towards meeting outcomes of the project

A study has been conducted by a team headed by David McKinna, which found seven key platforms that would help boost potato exports.

1. There are substantial opportunities for export growth and increased value of potatoes on domestic markets through improved quality management and branding associated with fitness for purpose **(Voluntary Uniform Product Description Labelling System).**
2. Formation of regional production clusters can help achieve economies of scale.
3. There is scope for increased demand and price through promotion of branded reliable quality product.
4. There are benefits from coordinated export market development including identification of market opportunities, participation in trade shows, trial shipments, market intelligence, market access protocols and freight regulation.
5. Improved market intelligence.
6. Strategic co-ordinated approach to market access.
7. Collective freight negotiation.

These strategies have been discussed with a wide range of industry participants who agree that these platforms need to be progressed through real case studies based around pro-active commercial trading companies. This is necessary due to the absence of clear direction from the grower/supplier side of the industry.

In particular the Voluntary Uniform Product Description Labelling System is seen as central to development of export and domestic markets. This will facilitate the development of integrated supply clusters, which will ultimately help implement the other platforms for market development.

A meeting with the project reference group in February this year concluded that the best way forward was through the conduct of two case studies in partnership with organisations to put together a business plan leading to the implementation of an export program.

These two case studies will be used to develop export markets, establish an industry brand and demonstrate the principles to be used across the industry.

This approach will produce some *commercial in confidence* information but there will also be information generated which will be available widely across the industry.

The advantages of this approach are:

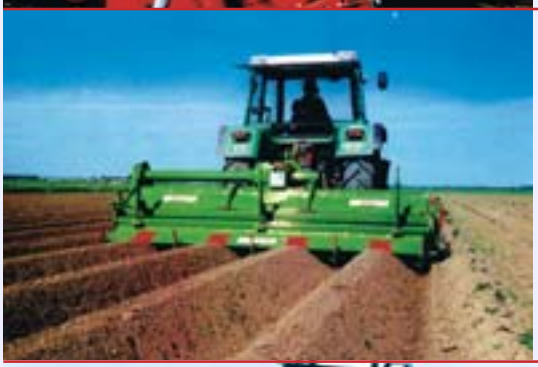
1. These are real world projects, which, if they succeed, will produce on-going exports in a very short time frame.
2. They provide an opportunity to demonstrate the seven strategic platforms in a real world situation.
3. Supermarkets to Asia have indicated willingness in principal to support the implementation stages of the project. ■

KVERNELAND - PLANTERS & HARVESTERS
KUHN - MOULDBOARD PLOUGHS
BASELIER - INTERROW CULTIVATORS

'When only the best will do'

KVERNELAND UNDERHAUG
Two & Four Row Linkage
Planters.
Four & Six Row Trailing Planters.

KVERNELAND UNDERHAUG
Single & Two Row
High Capacity
Potato Harvesters.



BASELIER
2, 4 & 6 Row
Inter Row Cultivators.
Bedformers & Haulmshredders.

KUHN
Mouldboard Ploughs.
Semi Mounted & Mounted.
3 to 15 Furrow.

VIN ROWE Farm Machinery

3 Endeavour St. Warragul. Vic. 3820 Ph (03) 5623 1362 Fax (03) 5623 4314

Wayne Mills 0417 945 584 or Rob Nelson 0418 595 679

More spuds. Not duds.

Monceren® 250 FS is the pink fungicide from Bayer – the company that really knows its potatoes. Monceren provides highly effective control of seed-borne *Rhizoctonia solani* in potatoes.

Monceren dramatically reduces stem canker and black scurf in your crop. The result is a dramatic increase in yield and a greater increase in your proportion of clean, marketable-sized tubers.

Monceren comes in a convenient, easy-to-use, flowable formulation with no dust or odour problems.

Why grow any old potatoes when you can grow Monceren potatoes?

Monceren®

More marketable potatoes.

Bayer