

Heritage Potato Collection

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Department of Environment & Primary Industries,
Victoria

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PT13009

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Final Report for Horticulture Australia

Project No: PT13009 (28th February 2014)

Project Title: Heritage Potato Collection

Authors: Tony Slater

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Victoria



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Media Summary

Australia is a signatory to the International Treaty on Plant Genetic Resources for Food and Agriculture. This treaty is an international agreement to ensure the sustainable use of plant genetic resources and the sharing of benefits that arise from that use. This treaty covers most of the globally important crop and forage species, including potato.

As a result of the treaty, Australia has 5 major plant genetic resource centres, with a number of minor genetic collections generally managed by recognised government agricultural agencies. The potato genetic resource collection contains c. 250 accessions, and is maintained in a vegetative state rather than as seed, to retain the integrity of the cultivars.

This project has successfully propagated 207 cultivars through 2 glasshouse pot trials.

The cultivars within the potato genebank include fresh market types with a variety of coloured skins (white, cream, yellow, pink, red and purple) and coloured flesh (white, cream, yellow, pink and purple). There are also cultivars suitable for the crisping and French fry processing industries with a variety of traits. Importantly there are also cultivars with resistances to important pathogens including common scab, powdery scab, potato cyst nematodes and the tuber necrotic strain of PVY.

The collection is also from a diverse range of geographic and breeding sources, which should represent a large proportion of the global genetic diversity as potatoes are genetically highly heterogeneous.

It is important to maintain this diversity, for the future of the Australian potato industry, as this will enable the industry to rapidly access cultivars if markets change or develop. It will also enable the local development of new germplasm suitable to Australian production conditions. Recently, the development of new breeding techniques has seen the breeding cycle reduced in potato from over 10 years to 4 years, and it is anticipated to reduce further in the near future, making it more efficient and appropriate to develop future germplasm in Australia.

Technical Summary

Australia is a signatory to the International Treaty on Plant Genetic Resources for Food and Agriculture. This treaty is an international agreement to ensure the sustainable use of plant genetic resources and the sharing of benefits that arise from that use. This treaty covers most of the globally important crop and forage species, including potato.

As a result of the treaty, Australia has 5 major plant genetic resource centres, with a number of minor genetic collections generally managed by recognised government agricultural agencies. The potato genetic resource collection of c. 250 accessions was held at the Toolangi Research Station, under the management of the National Potato Breeding Program. It was maintained in a vegetative state rather than as seed, and due to the relatively short dormancy of potato tubers, the cultivars need to undertake an annual growth cycle.

This project has successfully propagated 207 cultivars through 2 glasshouse pot trials. Most cultivars grew and regenerated new tubers, although a number simply regenerated new tubers.

The cultivars within the potato genebank include fresh market types with a variety of coloured skins (white, cream, yellow, pink, red and purple) and coloured flesh (white, cream, yellow, pink and purple). There are also cultivars suitable for the crisping and French fry processing industries with a variety of traits. Importantly there are also cultivars with resistances to important pathogens including common scab, powdery scab, potato cyst nematodes and the tuber necrotic strain of PVY.

The collection is also from a diverse range of geographic and breeding sources, which should represent a large proportion of the global genetic diversity as potatoes are genetically highly heterogeneous. Importantly, the collection also contains a number of cultivars that were bred under Australian production conditions, or are “locally adapted” cultivars. These cultivars will contain combinations of genes that cannot be identified in breeding programs conducted in other production environments.

It is important to maintain this diversity, as well as introducing new genetics, for the future of the Australian potato industry. Maintaining genetic resources will enable the industry to rapidly access cultivars if markets change or develop. While access can be obtained from global sources, the introduction of this material takes a number of years of processing including under quarantine to maintain Australia’s level of biosecurity.

Maintaining this diversity will also enable the local development of new germplasm suitable to Australian production conditions, resistant to Australian pathogens, and productive under new environmental stresses such as climate variation and drought. The development of modern breeding techniques globally will see the maintenance of this local germplasm collection important for the future rapid development of new germplasm that will be productive under these changing conditions. Recently, the development of new breeding techniques has seen the breeding cycle reduced in potato from over 10 years to 4 years, and it is anticipated to reduce further in the near future, making it more efficient and appropriate to develop future germplasm in Australia.

Introduction

Australia is a signatory to the International Treaty on Plant Genetic Resources for Food and Agriculture. This treaty is a legally binding international instrument developed to ensure the sustainable use of plant genetic resources and the sharing of benefits that arise from that use. This treaty covers most of the globally important crop and forage species, including potato.

As a result of the treaty, Australia has 5 major plant genetic resource centres, with a number of minor genetic collections generally managed by recognised state, territory and Commonwealth government agricultural agencies. The potato genetic resource collection of c. 250 accessions was held at the Toolangi Research Station, under the management of the National Potato Breeding Program. It was maintained by the National Potato Breeding Program instead of within one of the major genetic resource centres, as the cultivars need to be maintained in a vegetative state rather than as seed. Due to the physiology of potato tubers, which only have a relatively short dormancy period, the cultivars need to undertake an annual growth cycle.

The potato genetic resource was established for the Australian potato industry as a diverse collection of cultivars that would enable the breeding and identification of superior genetics to underpin the Australian industry. The collection enabled the retention of cultivars that were suited to Australian conditions, as well as containing genetic diversity.

Recently there has been a move from public to private breeding and several of the larger Australian companies are accessing new germplasm from outside Australia. With the current removal of public or levy funding from potato breeding in Australia, there is a need to support the maintenance of the potato genetic resource collection for the potato industry's future access to these cultivars or the investigation of superior germplasm for Australian production environments.

Objectives

The objectives of this project were to identify the cultivars within the public potato genebank that are not maintained elsewhere, and to undertake an annual growth cycle of these cultivars in order to maintain their physiological viability.

Materials and Methods

A list of public cultivars was identified for propagation. A tuber of each of these cultivars was then taken from cool storage at 4°C and placed into 20°C for one week in darkness to acclimatise.

After one week, the tubers were planted directly or cut into viable setts for planting. The cut surface of the tubers was allowed to air dry for one day to ensure the cut surface is cured. The tuber pieces were then be planted in 15 – 20 cm pots and placed on benches in a glasshouse. The plants were then maintained and allowed to grow to maturity for daughter tuber formation.

The cultivars were then unpotted, and all undamaged tubers collected for storage. When tubers were not produced or not in optimal condition for storage, these cultivars were identified for replanting for another growth cycle. The tubers were then labelled and bagged separately for storage at 4°C for 1 year.

This process was undertaken twice, due to the number of cultivars that needed to be propagated.

The propagation will enable the on-going maintenance of the cultivars as a genetic resource for the next year.

Results

Cultivar	Propagated	Comment	Country of origin	Comment
ADMIRAL	yes		GB	Fresh mid maturity cultivar, cream flesh, good boil, no ACD, mod Res CS & PS, Res PCN
AGRIA	yes		NL	Fresh mid-late maturity cultivar, yellow flesh, multi-use, no ACD, Res PCN
AILSA	yes		Sc	Fresh mid maturity cultivar, waxy flesh, multi-use
ALL BLUE	yes		USA	Gourmet mid-late maturity cultivar, blue dappled flesh, mod SG, OK boil cook, mod Res CS
ALL RED	yes		USA	Gourmet very early maturity cultivar, pale pink flesh, mod SG, OK boil cook
ALLEGANY	yes		USA	Fresh & crisp mid maturity cultivar, mod SG, good crisp cook, Res PCN
ALMERA	yes		UK	Fresh mid maturity cultivar, light yellow flesh, good boil cook, Res PCN
ALTURUS RUSSET	yes		USA	French fry cultivar, low SG, reasonable fry, no ACD
AMOROSA	yes		NL	Fresh early maturity cultivar, red skin, yellow flesh, good boil cook, no ACD, Res PLRV
ANDOVER	yes		USA	Fresh and crisp cultivar, high SG, good crisp, reasonable boil
ARGOS		to do	GB	Fresh mid-late maturity cultivar, good boil, Res PCN
ATLANTIC	yes		USA	Crisp mid-late maturity cultivar, tubers can be large with hollows, deep crown & heel, good SG and crisp cook, mod Res CS, Res PVA, PVX, PCN
ATLANTIC C		to do	USA	A selection of Atlantic
AVIVA	yes			Crisp early maturity, good SG and crisp cook, mod Res CS
BALFOUR		to do	UK	syn Lady Balfour, high yielding organic cultivar, low fertilizer
BANANA	yes			Gourmet mid-late maturity cultivar, waxy cigar, good SG, good crisp and boil cook
BANNOCK RUSSET (A81473-2)	yes		USA	French fry cultivar, very late maturity, very long dormancy, mod SG, reasonable crisp cook, Res PS, mod Res CS

Cultivar	Propagated	Comment	Country of origin	Comment
BC0894-2	yes	2 small tubers	USA	Fresh early cultivar, good appearance, mod SG, good crisp and boil cook, Res PVY ^{NTN}
BELRUS	yes		USA	French fry early maturity cultivar, good SG and crisp cook, russet skin, Res PS & PLRV
BILLABONG	yes		AU	Fresh & French fry cultivar, good SG & crisp cook, reasonable boil cook, locally adapted, Res PCN
BINTJE	yes		NL	Heritage fresh cultivar, yellow flesh, long oval tubers, mod SG, good crisp cook, OK boil cook
BISMARCK	yes		GER?	Heritage cultivar, white skin with purple eyes, mod SG, OK boil cook
BISON	yes		USA	Fresh early cultivar, red skin, white flesh, mod SG, good crisp & boil cook, poor ACD
BLAZER RUSSET (A8893-1)	yes		USA	French fry mid-early cultivar, good SG and crisp cook
BLISS (90-2-6)	yes		AU	Crisp mid-late cultivar, high SG and good crisp cook, high yielding, locally adapted
BONDI		to do		French fry cultivar, reasonable yield
BORDEN	yes			French fry mid maturity cultivar, uniform appearance, good SG & crisp cook, mod Res PS
BRORA	yes		UK	Fresh mid maturity cultivar, red skin, good SG, multi-use
BROWNELL	yes		USA	Heritage cultivar, brownish-pink skin, good SG, multi-use
BUTTE	yes		USA	French fry late maturity cultivar, mod SG, Res PS & CS
CABARET	yes		UK	French fry mid maturity cultivar, mod SG, reasonable crisp cook, no ACD, mod Res CS, Res PCN
CADIMA	yes	redo, 3 small tubers		French fry mid-late maturity cultivar, good SG and crisp cook, mod Res CS & PS, Res PCN
CAMPBELL 14	yes		USA	Fresh mid maturity cultivar, large tubers, mod SG, multi-use
CANDY CANE	yes			Gourmet cultivar, red and cream flesh, mod SG, reasonable boil cook
CAREN	yes			Fresh mid maturity cultivar, mod SG, reasonable boil cook

Cultivar	Propagated	Comment	Country of origin	Comment
CARLINGFORD	yes		IRE	Fresh early maturity cultivar with slight textured skin, mod SG, good boil cook, no ACD, mod Res CS, Res PVY ^{NTN}
CARMAN	yes		NL	Fresh late maturity cultivar, uneven tubers, mod SG, reasonable boil cook
CARRERA	yes			Fresh cultivar with light yellow flesh, mod SG, good boil cook
CATANI (86-34-4)	yes		AU	French fry mid-late maturity, high SG and very good crisp cook
CECILE	yes			Fresh crimson cultivar with yellow flesh, mod SG, good boil cook
CELINE	yes		GB	Fresh cultivar with light crimson skin and yellow flesh, good boil cook, Res PS, CS, PCN
CHERRY RED (DT6063-1R)	yes		USA	Fresh mid maturity cultivar, red skin with white flesh, mod SG, reasonable boil
CHIPBELLE	yes	5 small tubers	USA	Crisp mid maturity cultivar, good SG and crisp cook, Res PCN
CMK	yes			Fresh cultivar, pink-red skin with white lenticels, light yellow flesh, high SG, good crisp & boil cook, Res PCN
COASTAL CHIP (B9792-157)	yes		USA	Short French fry or crisp cultivar, mid-early maturity, mod SG, good crisp cook, mod Res PS, Res PCN
COLIBAN	yes		AU	Fresh late maturity cultivar, multi-use, drought tolerant, locally adapted
COLIBAN CADWELL	yes		AU	A selection of Coliban made in Cadwell
COURAGE	yes	Redo, 3 small tubers	NL	Fresh mid-early maturity cultivar, red skin, light yellow flesh, good SG and crisp cook, Res PCN
CRISPA (90-7-17)	yes		AU	Crisp mid-late maturity cultivar, high number of uniform tubers, good SG and crisp cook
CRYSTAL	yes		USA	Fresh mid-late maturity cultivar, smooth white skin, good boil cook, Res PVX
CUNERA	yes		NL	Fresh mid maturity cultivar, yellow flesh, good boil cook, Res PCN
DAISY	yes		FR	Fresh & French fry early-mid maturity cultivar, multi-use, Res PVA, PVX & PCN
DARIUS	yes		RSA	French fry mid maturity cultivar, good SG & crisp cook, Res PLRV

Cultivar	Propagated	Comment	Country of origin	Comment
DAWMOR (89-55-6)	yes		AU	Crisp mid-late maturity cultivar, high tuber number & yield, good SG and OK crisp cook
DELAWARE	yes		USA	Fresh mid maturity cultivar, long tubers, mod SG, OK boil cook
DENALI		no material		
DESIREE		to do	NL	Fresh mid-late maturity cultivar, pink-red skin, waxy light yellow flesh, mod SG, multi-use, Res PVA, PVX
DEVLIN	yes		RSA	Fresh & French fry mid maturity cultivar, good SG, multi-use, mod Res CS, Res PLRV
DURANGO RED (C086218-2)	yes	Redo, sprouting	USA	Fresh mid maturity cultivar, dark red skin, white flesh, mod SG, good boil cook
DUTCH CREAM	yes			Fresh cultivar, yellow flesh, mod SG, good boil cook, Res PCN
DYNAMITE (91-153-1)	yes		AU	French fry mid-early cultivar, good SG and crisp cook, Res PCN
EBEN	yes		CIP	Tropical cultivar, mid-early maturity, mod SG, multi-use
EOS	yes		NL	French fry & fresh, low SG, good crisp & boil cook, Res PCN
EVA	yes	Redo, 2 tubers, 1 good	USA	French fry & fresh mid-early maturity cultivar, low SG, good crisp cook, Res PCN & PVY ^{NTN}
EXTON	yes	2 small tubers	AU	Fresh mid-late maturity cultivar, mod SG, multi-use
EXTON C	yes		AU	A selection of Exton
FERGI FRY (92-37-1)	yes		AU	French fry very late maturity cultivar, good SG, OK crisp cook, Res PCN
FLAME (98-34-11)	yes		AU	Fresh red skin cultivar with white flesh
FONTENOT		to do	USA	Fresh very early maturity cultivar, red skin, white flesh, good SG & crisp cook, mod Res PS
FOXTON	yes		GB	Fresh mid maturity cultivar, pale pink skin, yellow flesh, good SG & crisp cook, Res PVA, PVX
FRIAR	yes		UK	Fresh & crisp mid maturity cultivar, light yellow flesh, good SG, multi-use, Res PVY ^{NTN}
GALIL	yes	redo		Fresh mid maturity cultivar, mod SG, multi-use, Res PVY ^{NTN}

Cultivar	Propagated	Comment	Country of origin	Comment
GEM RUSSET (A8495-1)	yes		USA	French fry mid maturity cultivar, long tubers, low SG, good crisp cook
GRANOLA	yes		NL	Fresh mid-late maturity cultivar, yellow flesh, good boil cook, Res PCN
HARBOROUGH HARVEST	yes	redo	UK	Crisp cultivar, good SG & crisp cook, Res PCN
HARMONY	yes		GB	Fresh mid maturity cultivar, good boil cook, mod Res CS & PS
HERTHA		to do	NL	French fry & fresh mid-late maturity cultivar, multi-use, Res PCN
HUDSON	yes		USA	Fresh mid-early maturity cultivar, large tubers, mod SG, OK boil cook, Res PCN
ILAM HARDY	yes		NZ	Fresh mid-late maturity cultivar, mod SG, good boil, PCN Sus control
INOVA	yes		NL	Fresh early cultivar, yellow skin and flesh, mod SG, good boil cook, Res PCN
IVORY CRISP	yes	redo, green	USA	Crisp cultivar, good SG and crisp cook,
JERSEY ROYAL	yes	redo, sprouting	?	Gourmet russet skin cultivar, mod SG, multi-use, mod Res PS
KAIMAI (169/6)	yes		NZ	Fresh very late maturity cultivar, cream-yellow flesh, high SG, multi-use
KALAROP KING (88-71-9)	yes		AU	Fresh late maturity cultivar, mod SG, good boil cook, Res PCN
KATAHDIN	yes		USA	French fry & fresh mid maturity cultivar, good SG, multi-use, Res PVA & PVX
KENNEBEC	yes	redo, 1 tuber	USA	French fry & fresh mid maturity cultivar, good SG, multi-use
KENNEBEC 11	yes		USA	A selection of Kennebec
KENNEBEC B	yes		USA	A selection of Kennebec
KESTREL	yes		GB	Fresh early maturity cultivar, cream skin with purple eyes and splash, good SG, multi-use, Res PVA & PLRV
KING EDWARD	yes		GB	Fresh mid-late maturity, pink and white skin, good SG, multi-use
KIPFLER	yes		NL	Gourmet mid maturity cultivar, cigar shape, waxy flesh, high SG, good crisp & boil cook
KNOX (Wilcrisp) (79-5-2)	yes		AU	French fry mid-late maturity cultivar, mod SG and crisp cook
KT3	yes		CIP	Tropical cultivar, very late maturity, mod SG, good boil cook, Res PVY ^{NTN}
KURODA	yes		FR	Fresh early-mid maturity cultivar, red skin, cream-yellow flesh, good SG, multi-use, Res PCN

Cultivar	Propagated	Comment	Country of origin	Comment
LADY CHRISTL	yes		NL	Fresh very early cultivar, good boil, Res PVA, PVX, PVY ^{NTN} , PLRV, PCN
LADY CLAIRE	yes		NL	Crisp cultivar, yellow flesh
LADY JAYNE (92-19-4)	yes		AU	Fresh mid maturity tropical cultivar, mod SG, multi-use,
LADY JO	yes		NL	Crisp cultivar, yellow flesh
LADY OLYMPIA	yes		NL	French fry early maturity cultivar, mod SG, good crisp cook, Res PVA, PVX, PLRV
LADY ROSETTA	yes	redo, soft	NL	Crisp & Fresh early cultivar, red skin, good SG, crisp and boil cook, Res PVA, PCN
LAURA	yes		Austria	Fresh cultivar, dark red skin and dark yellow flesh, Res PCN
LEGEND (C008 3008-1)	yes		USA	French fry mid-late maturity cultivar, high SG, good crisp cook, Res CS & PS
LEVEN	yes		AU	Fresh very late maturity cultivar, good SG, reasonable crisp cook
LISETA	yes		NL	Fresh mid-early maturity cultivar, cream-yellow flesh, good boil cook, Res PCN
LUSTRE	yes		AU	Fresh early maturity cultivar, good skin, multi-use
MACRUSSET (89-27-33)	yes		AU	French fry mid-late maturity cultivar, high SG, good crisp cook
MAIFLOWER	yes			Fresh cultivar, good SG, multi-use, Res PCN
MAINESTAY	yes		USA	Fresh mid-early maturity cultivar, good SG, multi-use
MALIN	yes		IRE	Fresh mid maturity cultivar, cream skin with pink eye & splash, mod SG, multi-use
MARANCA	yes		NL	Fresh mid maturity cultivar, yellow flesh, low SG, good boil cook
MARILYN		to do	NL	Fresh mid-early maturity cultivar, light yellow flesh, mod SG, good boil cook
MARIS PIPER	yes		GB	French fry & fresh mid-late maturity cultivar, high SG, good crisp cook, Res PVA, PVX, PCN
MAXINE		to do	GB	Fresh mid maturity cultivar, bright pale pink skin, mod SG, multi-use, Res PCN
MAY QUEEN	yes		UK	Heritage fresh cultivar, very early maturity, mod SG
MELODY	yes		NL	Fresh mid-late maturity cultivar, Res PCN

Cultivar	Propagated	Comment	Country of origin	Comment
MERRIMACK	yes		USA	Fresh mid-late maturity cultivar, good SG and crisp cook, mod Res CS & PS
MIDAS	yes		GB	Crisp & fresh mid-late maturity cultivar, good SG & crisp cook, good boil, Res PLRV, PCN
MIRRIDONG (00-33-17)	yes		AU	French fry mid-late maturity cultivar, high yield & uniform tubers, good SG and crisp cook, locally adapted
MONDIAL	yes		NL	Fresh late maturity cultivar, mod SG, good boil cook, mod Res PS, Res PVX, PCN
MONONA	yes		USA	Fresh early maturity cultivar, mod SG, multi-use
MY FRY	yes		AU	French fry very late maturity cultivar, good SG, OK crisp cook
NADINE	yes		GB	Fresh early maturity cultivar, low SG, good boil cook, Res PVA, PVX, PCN
NECTAR	yes		IRE	Fresh mid-early maturity cultivar, cream skin with slight pink eye, waxy flesh, good boil cook
NETTED GEM	yes		USA	A selection of Russet Burbank
NICOLA	yes		GER	Fresh mid maturity cultivar, yellow skin & flesh, good SG, multi-use, Res PS, PVA, PVX, PCN
NOOKSACK	yes		USA	French fry late maturity cultivar, good storage, good SG & crisp cook
NORLAND (red)	yes		USA	A selection of Norland WSR
NORLAND WSR	yes	redo, no tubers	USA	Fresh red skin early maturity cultivar, white flesh, mod SG, good boil cook
NOVITA	yes		NL	Fresh early maturity cultivar, yellow flesh, mod SG, good boil cook, Res PCN
ONKA (62-34-6)	yes		AU	Fresh mid-late maturity cultivar, mod SG, multi-use
ORION (89-A9-14)	yes		AU	Crisp mid-early maturity cultivar, good SG, crisp & boil cook
ORLA	yes		IRE	Fresh early-mid maturity cultivar, mod SG, multi-use
OSPREY	yes		GB	Fresh early maturity cultivar, cream skin with pink eyes and splash, multi-use
OTWAY RED (80-93-4)	yes		AU	Fresh mid-late maturity, red skin cultivar, white flesh, mod SG, multi-use
PENTLAND CROWN	yes		GB	Fresh & French fry mid maturity cultivar, good SG, crisp & boil cook

Cultivar	Propagated	Comment	Country of origin	Comment
PIKE	yes		USA	Crisp mid-late maturity cultivar, good SG, good crisp cook, mod Res PS, Res CS, TSWV, PCN
PINK EYE	yes			Heritage gourmet early-mid maturity cultivar, cream & pink skin, deep eyes, waxy flesh, good SG, crisp & boil cook
PINK FIR APPLE	yes		FR	Gourmet very late maturity cultivar, pink cigar, good SG, crisp & boil cook, mod Res PS & CS
PO 3	yes		CIP	Tropical fresh cultivar, Res PVY ^{NTN}
PONTIAC	yes		USA	Fresh early-mid maturity, red skin cultivar, deep eyes, mod SG & boil cook
PURPLE CONGO	yes			Gourmet very late maturity cultivar, purple skin & flesh, deep eyes, v high SG
RANGER RUSSET	yes		USA	French fry mid maturity cultivar, good SG & crisp cook, Res PS, PVA, PVX
RED GEM	yes			Fresh mid maturity cultivar, pale red skin, mod SG, good boil cook, mod Res PS
RED LA SODA	yes	redo, no tubers	USA	Fresh mid-early maturity cultivar, red skin, white flesh, mod SG, multi-use
RED RASCAL	yes		NZ	Fresh very late maturity, red skin cultivar, white flesh, good SG, multi-use, mod Res PS
REMARKA	yes		NL	Fresh mid maturity cultivar, mod SG, good crisp & boil cook
RHINE RED	yes	redo, sprouting		Fresh mid-early maturity red skin cultivar, mod SG, mod crisp & boil cook
RIDEAU	yes		CAN	Fresh mid-early maturity cultivar, light crimson shin, white flesh, mod SG, OK boil cook
RIVERINA RUSSET (Eureka)(89-12-1)	yes		AU	French fry mid-late maturity cultivar, good SG & crisp cook, locally adapted, Res PCN
RODEO	yes		NL	Fresh late maturity cultivar, crimson skin, yellow flesh,
ROMEIO	yes			Fresh cultivar, dark pink skin
RONA	yes		AU	French fry cultivar, use for exceptionally long dormancy
ROSA	yes			Fresh mid maturity cultivar, red skin, cream flesh, mod SG, good crisp cook, Res PCN

Cultivar	Propagated	Comment	Country of origin	Comment
ROYAL BLUE	yes		NL	Fresh mid maturity cultivar, blue-violet skin, yellow flesh, white lenticels, good SG, multi-use, Res PVY ^{NTN} , PCN
RUA	yes		NZ	Fresh very late maturity cultivar, mod SG, good boil cook
RUBY LOU	yes		AU	Fresh mid-late maturity cultivar, pink skin, cream flesh, good SG, multi-use
RUSSET BURBANK	yes		USA	French fry mid-late maturity cultivar, russet skin, distorted, good SG, crisp & boil cook, good dormancy
RUSSET BURBANK BC	yes		USA	A selection of Russet Burbank
RUSSET BURBANK Ruen	yes		USA	A selection of Russet Burbank
RUSSET BURBANK Tas	yes		USA	A selection of Russet Burbank
RUSSET BURBANK Vanc	yes		USA	A selection of Russet Burbank
SAGINAW GOLD	yes		USA	Fresh mid-late maturity cultivar, mod SG, good crisp cook, OK boil cook, Res PVX, PLRV
SANTANA	yes		NL	French fry early-mid maturity cultivar, good SG & crisp cook, Res PVA, PCN
SAPPHIRE	yes			Gourmet mid maturity cultivar, purple skin, mottled purple flesh, good boil cook, Res PVA, PVX, PLRV
SATURNA	yes		NL	Fresh mid-late maturity cultivar, good SG & crisp cook, Res PVA, PCN
SEBAGO	yes		USA	Fresh mid-late maturity cultivar, mod SG, good boil cook
SEBAGO C	yes		USA	A selection of Sebago
SEBAGO E	yes		USA	A selection of Sebago
SEBAGO NB	yes		USA	A selection of Sebago
SEQUOIA C	yes	redo, 1 tuber	USA	Fresh late maturity cultivar, deep eyes, mod SG, OK boil cook
SERAFINA	yes	redo, 2 small tubers	GER	Fresh very early maturity cultivar, yellow skin & flesh, mod SG, multi-use, Res PVA, PCN
SEYMOUR GOLD	yes			Gourmet very early maturity cultivar, yellow flesh, low-mod SG, multi-use
SHEPODY	yes		CAN	French fry mid maturity cultivar, mod SG, good crisp cook, OK boil cook
SHINE (90-105-14)	yes	redo, rots	AU	Fresh early maturity cultivar, good SG, multi-use, Res PCN
SIEGLINDE	yes		GER	Fresh mid-early cultivar, mod SG, good boil cook

Cultivar	Propagated	Comment	Country of origin	Comment
SIMCOE	yes		USA	Crisp early maturity cultivar, good SG & crisp cook, OK boil cook, mod Res PS, Res PCN
SINI	yes			Crisp mid-late maturity cultivar, good SG & crisp cook, Res PCN
SNOWDEN	yes		USA	Crisp mid maturity cultivar, good SG & crisp cook, mod Res PS & CS
SNOWGEM (80-98-16)	yes		AU	Fresh mid-early maturity cultivar, mod SG, mod Res PS
SOLO	yes			Crisp early maturity cultivar, good SG & crisp cook, mod Res CS
SONIC (91-106-1)	yes		AU	Crisp late maturity cultivar, good SG & crisp cook, OK boil cook, Res PCN
SOUTHERN CHOICE RED	yes			Fresh mid maturity cultivar, dark crimson skin, cream flesh, mod SG, multi-use, mod Res CS
SPEY (14981AC8-1)	yes		GB	French fry mid maturity cultivar, good SG & crisp cook, OK boil cook, Res PCN
SPRINT	yes		GB	Fresh very early maturity cultivar
SPUNTA	yes		NL	Fresh mid maturity cultivar, light yellow flesh, mod SG, OK boil cook
ST JOHNS	yes		USA	Fresh & French fry mid-late maturity cultivar, mod SG, good crisp and boil cook, Res PCN
STAMPEDE	yes		USA	French fry mid-late maturity cultivar, good SG & crisp cook, mod Res PS
STEUBEN	yes		USA	Crisp mid maturity cultivar, mod SG, good crisp cook, mod Res CS, Res PCN
SUMMERSIDE	yes			French fry very early maturity cultivar, mod SG, good crisp & boil cook, mod Res PS, Res PCN
SUMMIT RUSSET (A84118-3)	yes		USA	French fry mid-late maturity cultivar, mod SG, good crisp cook, OK boil cook, mod Res PS
SYMFONIA	yes		NL	Fresh mid maturity cultivar, dark pink skin, light yellow flesh, good SG, crisp & boil cook, mod Res PS & CS, Res PVA, PCN
TARAGO (71-18-4)	yes		AU	Crisp mid-late maturity cultivar, good SG, crisp & boil cook
TASMAN	yes		AU	Fresh mid-late maturity cultivar, pink skin, white flesh, mod SG, good boil cook
TOOLANGI DELIGHT (77-48-3)	yes		AU	Fresh early maturity cultivar, purple skin, white flesh, mod SG, good crisp & boil cook

Cultivar	Propagated	Comment	Country of origin	Comment
TRENT	yes		CAN	Crisp mid-early maturity cultivar, high SG, good crisp cook
TX 1385-12RU	yes		USA	French fry mid-early maturity cultivar, mod SG, good crisp & boil cook, mod Res PS
ULSTER SCEPTRE	yes		UK	Fresh early maturity cultivar, mod SG, good boil cook
ULTRA	yes		NL	Fresh mid-early maturity cultivar, good SG, multi-use, Res PCN
UMATILLA (Umatilla Russet) (A082611-7)	yes		USA	French fry mid-late maturity cultivar, good SG, crisp & boil cook, mod Res PS & CS
UP TO DATE	yes		GB	Heritage fresh cultivar, cream skin & flesh, good SG
VALOR	yes		GB	Fresh mid-late maturity cultivar, mod SG, Res PCN
VICTORIA	yes		NL	Fresh & French fry mid-early cultivar, yellow skin & flesh, mod SG, good crisp & boil cook, mod Res PS & CS, Res PCN
WARREN WONDER (89-42-6)	yes		AU	French fry mid maturity cultivar, good SG, OK crisp cook,
WAUSEON	yes		USA	Fresh mid-early maturity cultivar, mod SG, mod crisp & boil cook, mod Res PS, Res PCN
WHA	yes		NZ	Fresh very late maturity cultivar, good SG & crisp cook, mod boil cook
WHITE LADY	yes		HUN	Fresh mid maturity cultivar, mod SG, good boil cook, Res PVY ^{NTN} , PCN
WHITE STAR (Cassini) (97-38-2)	yes		AU	Fresh mid-late maturity cultivar, mod SG, good crisp & boil cook, Res PCN
WHITU	yes		NZ	Crisp very late maturity cultivar, good SG, OK crisp cook
WILSTORE (85-11-9)	yes		AU	Crisp mid-late maturity cultivar, good SG & crisp cook
WILWASH (80-98-14)	yes		AU	Fresh mid-early maturity cultivar, mod SG, OK boil cook
WINDSOR (96-141-12)	yes		AU	French fry late maturity cultivar, good uniform tubers, good SG & crisp cook, Res PCN
WINSTON	yes		GB	Fresh very early maturity cultivar, low SG, Res PCN
WINTER GEM (90-105-16)	yes		AU	Fresh mid-early maturity cultivar, mod SG, good crisp & boil cook, Res PCN
WONTSCAB (85-51-1)	yes		AU	Crisp mid-early maturity cultivar, good SG & crisp cook, mod Res PS, Res PCN
WONTSCAB B			AU	A selection of Wontscab

Cultivar	Propagated	Comment	Country of origin	Comment
YARDEN	yes			Fresh very late maturity cultivar, large tubers, high SG, good crisp cook, mod Res CS
YELLOW KING	yes			Fresh mid-late maturity cultivar, good SG, OK crisp cook, mod Res PS, Res PCN
YUKON GOLD	yes		CAN	Fresh mid-early maturity cultivar, yellow skin & light yellow flesh, good SG, multi-use

List of abbreviations

ACD	After cooking darkening
CS	Common scab
mod	moderate
PCN	Potato cyst nematode
PLRV	<i>Potato leaf roll virus</i>
PS	Powdery scab
PVA	<i>Potato virus A</i>
PVX	<i>Potato virus X</i>
PVY ^{NTN}	<i>Potato virus Y</i> tuber necrotic strain
Res	Resistant
Sus	Susceptible
SG	Specific gravity

Country abbreviations

AU	Australia
Austria	Austria
CAN	Canada
CIP	CIP Peru
FR	France
GB	Great Britain
GER	Germany
HUN	Hungary
IRE	Ireland
NL	Netherlands
NZ	New Zealand
RSA	South Africa
Sc	Scotland
UK	United Kingdom
USA	United States of America

Discussion

This project has successfully propagated 207 cultivars through 2 glasshouse pot trials, from the 218 cultivars listed, that are not being maintained in the tissue culture collections. Most cultivars grew normally and regenerated new tubers, although a number produced new tubers without producing an above ground plant. Eleven cultivars have not been planted to date, while a few did not produce new tubers or produced sub optimal tubers and these will be replanted.

The short description of these cultivars show that within the potato genebank there are fresh market types with a variety of coloured skins (white, cream, yellow, pink, red and purple) and coloured flesh (white, cream, yellow, pink and purple) types. There are also cultivars suitable for the crisping and French fry processing industries with a variety of traits. Importantly there are also cultivars with resistances to important pathogens including common scab, powdery scab, potato cyst nematodes and the tuber necrotic strain of PVY.

The collection is also from a diverse range of geographic and breeding sources. There are cultivars that originated in North America, Europe, South Africa and the centre of origin of potato in South America. This diversity of origin should represent a large proportion of the global genetic diversity, although not all, and it is very unlikely that it is the optimal combination for Australian production conditions. This diversity should also capture a large amount of the global genetic diversity as potatoes are genetically highly heterogeneous.

Importantly, the collection also contains a number of cultivars that were bred under Australian production conditions. It is likely that these cultivars will contain a large number of genes that make these cultivars suitable to Australian production conditions, or are “locally adapted” cultivars. These cultivars will contain combinations of genes that cannot be identified in breeding programs conducted in other production environments, such as those in northern America, northern Europe or tropical countries. Locally adapted cultivars are the target for all plant and animal based industries, not just the potato industry, as they provide a combination of small effect genes that are more productive under local production conditions.

It is important to maintain this diversity, as well as introducing new genetics, for the future of the Australian potato industry. Maintaining genetic resources will enable the industry to rapidly access cultivars if markets change or develop. While access can be obtained from global sources, the introduction of this material takes a number of years to be processed properly to maintain Australia’s level of biosecurity.

Maintaining this diversity will also enable the local breeding and development of new germplasm suitable to Australian production conditions, resistant to Australian pathogen problems, and productive under new environmental stresses such as changing climate and drought. The development of modern breeding techniques globally will see the maintenance of this local germplasm collection important for the future rapid development of new germplasm that will be productive under these changing conditions. Recently, the development of new breeding techniques has seen the breeding cycle reduced in potato from over 10 years to 4 years, and it is anticipated to reduce further in the near future, making it more efficient and appropriate to develop future germplasm in Australia.

Technology Transfer

No Technology Transfer has been undertaken during this very short project.

Recommendations

It is recommended that this potato genetic resource continue to be maintained for the future of the Australian potato industry. This will enable the future access and use of these cultivars by members of the Australian potato industry, if markets or production conditions change or develop.

As this maintenance needs to be done vegetatively and annually, a plan will need to be developed and the funding provided to ensure that it occurs.

It is recommended that the Australian potato industry consistently review scientific developments globally and locally in order to take advantage of the genetic resources within this collection, to tackle future issues for the Australian industry.

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