New potato cultivar evaluation for McCain Foods (Aust) Pty Ltd

David Ryan
McCain Foods (Aust) Pty Ltd

Project Number: PT08018

PT08018

This report is published by Horticulture Australia Ltd to pass on information concerning horticultural research and development undertaken for the potato industry.

The research contained in this report was funded by Horticulture Australia Ltd with the financial support of McCain Foods (Aust) Pty Ltd.

ISBN 0 7341 2091 5

Published and distributed by:
Horticulture Australia Ltd
Level 7
179 Elizabeth Street
Sydney NSW 2000
Telephone: (02) 8295 2300
Fax: (02) 8295 2399

Final Report for

Horticulture Australia Limited

Project Number: **PT08018**
(Completion date 30/8/09)

New Potato Cultivar Evaluation for McCain Foods (Aust) Pty Ltd Safries Pty Ltd

David Ryan

Research Provider:
McCain Foods (Aust) Pty Ltd &
Safries Pty Ltd

August 2009

Final Report HAL Project

Project No : **PT08018 continuation of PT07021**
Project Leader : David Ryan
McCain Foods (Aust) Pty Ltd.
P.O Box 105 Wendouree 3355

Project Team: Roger Kirkham
Private Consultant.
292 Cummins Lane Yea, Victoria 3717

Leon Hingston
Tasmanian Institute of Agricultural Research
PO Box 303, Devonport, Tas., 7310

Purpose of Report: This report provides the final report on this project in which new French fry potato cultivars have been evaluated in 3 regional trials and one seed multiplication plot during 2008-2009.

Acknowledgement: The author wishes to acknowledge the following support:-

1. Horticulture Australia Limited for the financial support provided from matched potato industry levy funds.
2. McCain Foods Grower groups in Victoria, New South Wales and Tasmania as well as the Safries Grower group in South Australia for their financial support in supplying voluntary contributions.
3. The numerous potato growers and research facilities that have contributed to the work, in time and resources over the past twelve months.

Date: August 2009

Table of Contents **Page**

List of Tables

Media Summary

The evaluation and identification of new French fry cultivars with improved processing and agronomic characteristics adapted to different production regions of Australia is essential for the French fry Potato Industry to remain competitive, profitable and sustainable.

New Varieties need to have yield and French fry processing parameters equal to or greater than existing processing varieties. Cultivar selection requires the variety to have improved specific French fry quality parameters and show stable high yields. Varieties need to be efficient or require reduced inputs such as chemical and fertilisers to have minimum impact on the environment and reduce the costs of production.

McCain Foods (Aust) Pty Ltd and Safries Pty Ltd in partnership with the McCain growers groups in Victoria, New South Wales and Tasmania and the Safries grower group in South Australia along with matching funds from HAL have tested potential new potato lines for the French fry industry over the past twelve months. Trials were conducted in Ballarat (Victoria), Forthside (Tasmania) and Penola (South Australia).

This project has evaluated and identified potential new varieties for the French fry Industry. Under previous evaluation projects some varieties were selected as potential replacements and these continue to be evaluated.

Further evaluation of breeding lines across production environments is needed to determine their potential for commercialisation. It is planned that this project is continued next season to carry out further evaluation of some highly potential varieties. Assessments of advanced cultivars are showing very good results and the likely chance of a replacement cultivar is high, with one Australian breed cultivar in early stages of commercialisation.

Historically we have had a replicated trial site in N.S.W at Berrigan, assessing early delivery schedule cultivars. However during season 2008 - 2009 water allocations in the Riverina were minimal therefore our early delivery crops were not planted taking away the opportunity for a trial site.

Technical Summary

Potato genotypes introduced from the Potato Breeding program at Toolangi were evaluated in field experiments in 3 major potato growing regions of South Eastern Australia. In the 3 trial sites new cultivars were grown in randomised block experiments, with 3 replicates per entry, 2 trials were located within commercial crops and compared against current French fry commercial cultivars and the Tasmanian trial was located on the Forthside research facility. All cultivars that are included in the program are maintained at the Toolangi research farm as seed for future variety work. Also as part of the project there was a seed multiplication observational plot at Forthside.

The project identified new varieties with potential French fry processing capabilities. Promising newly bred lines were identified at each trial site and further evaluation will be required before possible commercial release. Cultivars will be tested over a number of seasons to determine if they are consistent in results. The cultivars that will be evaluated further include Cultivar 53, Cultivar 22, Cultivar 62, Cultivar 67, Cultivar 68, Cultivar 95, Cultivar 111, Cultivar 140 and Cultivar 145.

The promising new varieties in this project are not yet in commercial production so it is not possible to accurately estimate the improved financial gain, estimate market share, costs of growing new lines, reduced chemical inputs and financial gains at present. However, the high potential yields and reduced input costs of new varieties will result in future substantial financial gains.

McCain Australia has progressed one cultivar, Cultivar 53, into the commercialisation program entering year 2 of large scale commercial trials in 2010. The company will process a reasonable volume of trial material in 2010 enabling accurate data to assist with the future direction of Cultivar 53. During season 2008-2009 the commercial trials of Cultivar 53 has shown mixed results with some major concerns about the ability of bulk storage of the cultivar a major concern due to damage to the tubers over commercial harvesters.

Introduction

New Potato varieties with improved French fry characteristics are required to help maintain and increase the competitive position of French fry potato growers and to improve the processing recovery rates of French fry processing plants. Such improved varieties must meet the demands of the processing potato grower and the processor at the same time, with high yield, reduced cost of growing and excellent processing attributes.

Existing varieties are not ideally suited to all Australian production areas and systems. Common problems with current French fry processing varieties include: susceptibility to physiological disorders such as misshapen tubers, second growth and hollow heart (mainly Cultivar 5), susceptibility to disease's such as Target Spot, Common Scab, Powdery Scab, Pink Rot, Rhizoctonia and Late Blight and susceptibility to Virus's such as Potato Leaf Roll and Tomato Spotted Wilt Virus (mainly Cultivar 6). Other problems include geographical constraints with environmental conditions limiting varietal options available to growers and processors.

In partnership with grower groups from each major potato growing area, McCain Foods (Aust) Pty Ltd has undertaken this variety development program with high importance. As a research priority McCain Foods has given variety breeding, selection and development it's highest level of commitment and we believe that the potential for a positive result is very likely.

Methods

Experimental design

Crossbred lines and new or check varieties used in this project have been either bred in Australia or introduced under private arrangements by McCain Foods (Aust) Pty Ltd or commercial partners. The Department of Primary Industries, Toolangi, Victoria carried out the breeding. Each of these new lines were grown from botanical seed in a glasshouse and after 3 field generations, during which time selection begins and seed is multiplied, clones are then selected to be entered into district variety trails. All trials were planted with seed produced, harvested and stored under the same conditions to obtain seed of the same physiological age for valid comparisons.

Field experiments were conducted using a randomised block design replicated in each of the 3 blocks. 2 of the 3 experiments were grown within commercial crops with the Tasmanian replicated trial and seed multiplication plot being grown at the Forthside research facility. Within each experiment the common commercial variety for the particular time of delivery and district was used as standard controls. Individual plots were either 4 or 5 metres long (depending upon trial site) with 2 rows per plot. Coloured maker plants (Ruby Lou or Toolangi Delight) were planted at the beginning and end of each plot in a one-metre strip to prevent mixing of varieties at planting and harvest. During the growing season, plots were assessed for emergence, vigour, maturity and pest and disease susceptibility. At harvest plots were assessed for tuber characteristics including colour, texture, shape, distortion, eye characteristics, size and evenness. Each plot was yield graded by size's specific to processing parameters for French fry processing.

Samples from each plot were removed after grading, with one sample from each plot assessed at McCain Foods (Aust) Pty Ltd testing facilities for Dry Matter content and cooking ability. Also removed from each plot (Tasmanian seed multiplication plot not included) was a storage sample which is held in commercial storage facilities by McCain and at 3 staggered intervals during the next 7 months one replicate of samples will be removed and tested for processing attributes again.

Field experiments were conducted at Dunnstown near Ballarat – Victoria (32 entries), Mingbool near Penola – S.A. (16 entries) and Forthside Research Farm – Tasmania (14 entries). The Victorian and South Australian trial's was planted in mid November and harvested in late April and the Tasmanian trial was planted in late October and lifted in late April. Ballarat and Forthside soil types are similar Krasnozem.

Data was analysed by standard analyses of variance procedures. Least significant differences (LSD) among treatment means were expressed at the probability of 5%. This means that the calculated LSD between treatment means is 95% due to the treatment per se (in this case the genotype) and only 5% due to chance or random effects such as irrigation or soil variations between plots (Williams 2004).

Results and Discussion

Complete results from harvest and processing assessments for the three experiments are included in Appendix 1 along with written assessment of the Tasmanian seed multiplication plot.

Table M1 below gives a comparison of selected French fry cultivars from the 3 field trials during the 2008-2009 growing season. Fry grade yield is expressed as tonnes per hectare and fry colour as a percentage.

Table M1.

Fry grade yield (t/ha) (fry colour in parentheses)

Entry	Vicϕ	Tas+	S.A.+
Cultivar 2	53.8 (100)	81.0 (100)	
Cultivar 5	44.7 (96)	75.3 (100)	62.9 (100)
Cultivar 22	47.0 (98.7)		61.4 (100)
Cultivar 53	48.9 (96)	94.4 (100)	81.7 (93)
Cultivar 62			84.8 (100)
Cultivar 67			82.1 (100)
Cultivar 68			86.1 (100)
Cultivar 95	49.7 (98.7)	70.7 (100)	54.8 (100)
Cultivar 111		64.7 (100)	
Cultivar 140	52.4 (98.7)		
Cultivar 145	46.9 (96)		
LSD* P=0.05	20.1 (12.4)	12.4 (NS)	8.3 (3.0)

Fry colour was assessed by the USDA chip colour chart. The zero category % fry colour is shown in brackets.
ϕ Fry grade yield is > 75grams
+ Fry grade yield is > 100grams
* LSD = Least significant difference.

Cultivar 5

Cultivar 5 is the main French fry processing variety that is grown in Australia, therefore it was used as a check variety in the Victorian, South Australian and Tasmanian trials and the Tasmanian seed multiplication plots. Cultivar 5 is a long maturing variety that requires significant inputs during the season. It requires certain environmental conditions to be in its favour to reduce the pest and disease incidence. Cultivar 5 has the ability to be stored for an extended period of time and still retain its processing attributes.

Cultivar 6

Cultivar 6 is one of the main early to mid varieties used for French fry production in Australia. It has a medium length maturity, which enables it to be used for December, January, and February processing. Cultivar 6 is not stored by McCain Foods (Aust). Cultivar 6 sets only average tubers per plant and can produce larger size tubers, which are undesirable for processing.

Cultivar 2

Cultivar 2 has been developed into a major variety for Australia. It is used in the trials as a check variety. Cultivar 2 has a yellow flesh colour and an early to mid maturity length, enabling it to be processed and stored earlier than Cultivar 5. Tuber shape is very good with dry matter on the lower end but that is common with this cultivar.

Cultivar 22

Cultivar 22 is a late maturing variety with the ability to have high tuber numbers per plant. Yield was only marginal at both sites last season (Table M1), with a high percentage in the smaller tuber grade. A small volume of minitubers was planted last season and we will look at bulking up a volume to enable us the opportunity to assess it in the factory over the next few years. If it were to continue this cultivar in the replicated plot program we would only include it in the Ballarat trial.

Cultivar 53

Cultivar 53 as mentioned above has entered the commercial stage of the McCain variety program. Last season Cultivar 53 performed well in Ballarat trial with its overall appearance one of the better looking cultivars. In the Tasmanian trial Cultivar 53 was the highest yielding cultivar (Table 4) with the odd paired shape tuber. The odd tuber was noted as being lumpy in this trial, which is unusual for Cultivar 53, as it tends to hold its shape under all conditions. In the Penola trial it had excellent tuber appearance with high yields (Table M1). In both Ballarat and Penola there was some slight colour at harvest. Maturity of the cultivar is later than Russets, which is a major negative but with some planned agronomy trials of Nitrogen rates this may assist in reducing the length of its season.

We have processed a small commercial volume this past two seasons and it has performed well. The problems of cracking in the tubers was not a problem for direct delivery tubers, this may be revised after storage. Next season we will have a large volume of commercial potatoes for the plant. McCain Australia has exclusive rights to this cultivar and has entered into an agreement on worldwide exclusivity.

Cultivar 62

Cultivar 62 had a very high yield in the Penola trial (Table M1) with a large sample of tuber size. Shape was oblong and slightly distorted. In the past this variety has performed well under heat and shape has been good in the South East. We will continue with this cultivar in South Australia

Cultivar 67

Cultivar 67 is a yellow or slightly yellow flesh cultivar, it has performed very well in the Riverina trial prior to it being postponed and then it was held back after last seasons wash out in Penola. It has a flat long to oblong tuber shape, and can be slightly uneven in size. It has proved in a couple of trials it can have a very high yield with many tubers per plant. For the first time last season we have seen some slight powdery scab in the Penola trial.

We will continue with this variety in South Australia and include it in the Riverina trial next season.

Cultivar 68

Cultivar 68 is a mid maturity variety that was the highest yielding cultivar in the Penola trial (Table 2). This backs up its yield ability from a couple of seasons ago where it was the highest yielding cultivar in the Riverina trial. However there was some common scab in the Penola trial, which was severe enough to put doubt into the potential of this cultivar. Due to the common scab we will discard it from South Australia and put it into the Riverina trial to assess it for susceptibility on the soil types there.

Cultivar 95

Cultivar 95 typically has one of the better tuber shapes in trials however in the Tasmanian plots shape was not the best. In Penola the sample was small and round at times. Low solids and yield (Table 3) will eliminate it from further work in South Australia. The Tasmanian trial showed a low yield in comparison to the other entries, also tuber shape was not noted as being the best in the trial. Therefore we will not continue with it in Tasmania. In Ballarat it was only a marginal variety but in comparison to the other cultivars it was better than average (Table 1). We will continue with it in Ballarat increasing the spacing. We have found that this cultivar will crack from very minimal impact and something that we need to consider carefully before we continue any further.

Cultivar 111

Cultivar 111 has performed well in the last two seasons in the Tasmanian replicated plots. Tuber size was only marginal last season (Table 4) with a high percentage in the 100-170 gram range. This cultivar has the possible potential to space in future trials. Tuber shape was relatively good with the odd distorted tuber and some slight vascular discolouration. We will continue with this variety next season at a wider spacing in Tasmania.

Cultivar 140

Cultivar 140 is a late maturing variety, around 5 to 7 days longer than Cultivar 5. Tuber shape is long to oblong. There was some growth crack in replication of the Ballarat trial but overall it was a better looking variety than the check varieties. We have this cultivar in tissue culture and mini tubers will be coming through the system shortly. We will continue with this cultivar at all sites for at least this coming season.

Cultivar 145

Cultivar 145 has a mid late maturity. In the Ballarat trial tubers per plant were low and colour was present in the harvest cooks. The Tasmanian bulking plots showed similar tuber shape with a high tuber number per plant and a good yield. We will discard this variety from Ballarat but continue it into replicated plots in Tasmania.

Technology Transfer

A Field day was conducted during the harvest of the Victorian trial with members of the McCain Grower Group invited to attend, along with Department of Primary Industries (Vic) representatives and production personnel from McCain Food processing plant in Ballarat. Attendance and interest in the trial was satisfactory considering the trial was harvested in one of the busiest times for the growers. Ballarat's local growers were also welcome to inspect the trial site during the season with the local seed growers group visiting the site during the season.

Confidential results from all trial sites will be presented to each grower group and also to the McCain Foods Variety evaluation committee. A public version of the results is available by contacting HAL.

Recommendations

Further evaluation and development of new French fry varieties is required prior to the commercialisation of any cultivar. The past six seasons have shown, that with the industry groups taking a far greater ownership in variety evaluation and commercialisation of new cultivars, interest in the variety trials conducted under this project has been very high. Industry groups are anticipating return on their investment into research and development and a superior variety to current varieties will achieve this. Over the past few seasons we have included 5 varieties into tissue culture that have shown potential. The cultivars that we continue with will be bulked up over the next few seasons during which we need to further develop agronomy programs for each specific cultivar. Currently this work is funded privately.

In further advanced commercialisation trials Cultivar 53 (Cultivar 53) was trialled last season in all processing plants. Initial results are reasonable with some problems with disease susceptibility and damage issues being assessed prior to any further expansion of volumes take place. The plan is to continue commercial trials as planned in 2009 and assess after storage and processing. A commercial quantity of seed has been funded by McCain Foods (Aust) Pty Ltd.

This project will continue next season (VC Project funding pending) in a similar capacity as season 2008-2009. Small plot trials give industry personnel a scientific result, with definitive answers arrived upon, making the selection process a constant variable from year to year. The size of the project over four states (water permitting) is also allowing for variability in cultivar performance due to environmental conditions to be evaluated, this is very important when the French fry processor is sourcing it's raw product from many different districts with different climatic constraints.

References

Williams, C. (2004) Evaluation and development of new potato genotypes in South Australia. Final Report HAL Project No. PT 02009.

Appendix 1.

Victorian variety evaluation trial 2008-2009. Ballarat (Dunnstown) is the main delivery and storage district for McCain Foods Ballarat processing plant. Planted in mid November, the trial was lifted on the 28th April 2009.

Table 1.
Ballarat trial comparison of potato lines for different tuber yield weight grades, tubers per plant and processing parameters.

	Spacing	Yield, Tonnes per Hectare					Rank	Tuber	Quality					
	in Rows	Chats	Small	Large	Over Size	Fry Grade	by Fry	No. Per	Dry Matter	Fry Colour *				
Entry	cm	0-75g	75-170g	170-340g	>340g	>75g	Grade	Plant	%	0	1	2	3	4 Ends
Cultivar 2	33.4	2.7	13.4	30.0	10.4	53.8	3	8.8	19.0	100				
Cultivar 5	38.4	2.6	10.2	22.5	12.0	44.7	21	8.4	21.3	96	2.7	1.3		1.3
Cultivar 108	25.0	3.2	15.6	25.4	1.8	42.8	24	7.2	24.5	98.7	1.3			
Cultivar 22	38.4	3.6	15.9	26.7	4.4	47.0	18	10.9	23.3	98.7	1.3			
Cultivar 51	33.4	1.7	11.9	20.4	3.2	35.5	31	6.1	20.5	100				
Cultivar 53	33.4	2.6	18.5	26.6	3.8	48.9	14	8.9	23.4	96	4			
Cultivar 93	33.4	3.0	16.4	15.5	0.6	32.5	32	8.1	22.0	98.7	1.3			
Cultivar 95	33.4	5.0	21.9	26.4	1.4	49.7	13	11.1	20.7	98.7	1.3			
Cultivar 112	33.4	1.2	17.4	30.3	4.4	52.1	8	7.8	23.6	97.3	2.7			
Cultivar 114	35.7	5.3	25.1	17.7	1.8	44.6	22	11.4	24.2	100				
Cultivar 119	38.4	6.2	23.3	21.5	0.9	45.7	20	14.2	23.2	98.7	1.3			
Cultivar 121	38.4	2.4	13.7	21.3	3.3	38.3	29	8.6	21.7	97.3	1.3	1.3		
Cultivar 123	35.7	2.6	15.5	27.6	6.9	50.0	12	9.4	22.9	96	4			
Cultivar 135	38.4	3.0	22.8	24.0	4.1	50.9	10	11.5	23.3	93.3	6.7			
Cultivar 136	31.2	3.9	19.5	18.0	2.9	40.4	26	9.7	22.5	86.7	13.3			
Cultivar 137	33.4	2.0	12.8	31.5	7.2	51.5	9	7.8	24.0	98.7	1.3			
Cultivar 138	31.2	1.1	6.6	23.7	8.9	39.2	28	4.9	21.1	100				
Cultivar 139	31.2	4.8	20.4	26.9	0.5	47.8	16	10.3	21.2	97.3	2.7			
Cultivar 140	31.2	2.3	13.2	31.2	8.0	52.4	7	7.4	21.0	98.7	1.3			
Cultivar 141	33.4	2.4	19.8	18.6	0.9	39.3	27	8.1	21.9	69	16	15		
Cultivar 142	33.4	0.8	6.2	24.8	16.1	47.1	17	5.4	24.5	88	10.7	1.3		
Cultivar 143	31.2	2.3	18.6	31.5	2.9	53.0	5	8.8	20.3	100				
Cultivar 144	31.2	2.4	12.6	25.4	3.9	41.9	25	6.8	23.6	97.3	2.7			
Cultivar 145	31.2	0.9	6.0	24.2	16.7	46.9	19	5.2	21.1	96	2.7	1.3		1.3
Cultivar 146	33.4	1.5	13.8	33.6	5.9	53.3	4	8.0	23.9	100				
Cultivar 148	33.4	2.1	17.7	26.4	4.4	48.5	15	8.7	22.6	93.3	6.7			1.3
Cultivar 149	31.2	2.1	10.8	30.3	14.0	55.1	2	7.2	21.2	85.3	8	6.7		
Cultivar 150	31.2	4.5	18.3	26.6	5.3	50.2	11	9.3	22.1	94.7	1.3	4		
Cultivar 151	31.2	2.0	12.2	36.5	11.9	60.6	1	8.4	21.1	85.3	9.3	2.7	2.7	
Cultivar 152	31.2	3.0	21.6	20.9	0.8	43.3	23	8.6	20.0	90.7	5.3	4		
Cultivar 153	31.2	5.6	29.7	22.4	0.8	52.9	6	12.3	20.5	85.3	12	2.7		
Cultivar 154	31.2	2.9	12.6	21.6	2.6	36.8	30	7.3	20.7	85.3	14.7			
LSD [P=0.05]		2.2	5.4	13.2	8.4	20.1			1.5	12.4				
LSD [P=0.01]		2.8	7.0	17.1	10.8	26.1			2.0	16.0				

* Fry Colour at harvest (USDA colour chart)

South Australian variety evaluation trial 2008-2009

Penola district (South East S.A.) is the main delivery and storage district for Safries processing plant in Penola, as well as a source of February and March deliveries to McCain Foods Ballarat processing plant. Planted in late October, the trial was lifted early April 2009.

Table 2
Mingbool trial comparison of potato lines for different tuber yield weight grades, tubers per plant and processing parameters.

	Spacing	Yield, Tonnes per Hectare					Rank	Tuber	Quality						
	In	Chats	Small	Large	Over	Fry	by	No.							
	Rows				Size	Grade	Fry	Per	Dry	Fry Colour *					
Entry	Cm	0-100g	100-170g	170-340g	>340g	>100g	Grade	Plant	Matter %	0	1	2	3	4	Ends	Tips
Cultivar 53	33.5	4.2	31.8	44.2	5.7	81.7	5	15.7	19.4	93	7					
Cultivar 5	35.5	2.9	24.0	28.7	10.2	62.9	13	12.2	19.6	100						
Cultivar 22	35.5	2.8	26.2	31.2	4.0	61.4	14	12.5	20.4	100						
Cultivar 62	30.5	2.4	18.9	47.0	18.9	84.8	2	11.6	18.5	100						
Cultivar 66	33.5	3.0	29.2	38.4	8.8	76.4	6	14.0	20.2	100						
Cultivar 67	35.5	3.4	30.4	42.2	9.5	82.1	4	16.0	19.8	100						
Cultivar 68	30.5	1.7	28.2	44.4	13.4	86.1	1	13.3	20.2	100						
Cultivar 77	30.5	3.1	32.7	34.7	3.6	71.0	10	12.9	17.7	100						
Cultivar 93	33.5	3.9	33.9	21.6	1.0	56.5	15	13.6	18.5	100						
Cultivar 95	30.5	3.4	27.9	25.0	1.9	54.8	16	11.5	17.9	100						
Cultivar 100	30.5	2.4	25.5	38.8	11.0	75.3	8	11.8	18.1	100						
Cultivar 106	33.5	4.0	38.6	26.8	0.4	65.8	12	15.6	18.1	100						
Cultivar 107	33.5	3.1	30.6	32.8	7.8	71.2	9	13.9	20.4	100						
Cultivar 114	30.5	4.6	41.6	26.3	0.0	67.9	11	16.0	22.8	100						
Cultivar 119	33.5	3.9	44.4	30.6	1.0	76.0	7	17.3	18.5	100						
Cultivar 122	30.5	4.3	27.2	39.6	16.2	83.0	3	14.4	18.1	100					10	
LSD [P=0.05]		1.1	6.8	8.0	6.3	8.3			0.7	3.0						
LSD [P=0.01]		1.5	9.2	10.6	8.5	11.1			1.0	4.0						

* Fry Colour at harvest (USDA colour chart)

Tasmanian seed multiplication bulk trial evaluation 2008-2009.

Devonport district (Forthside) is one of the main delivery and storage district for McCain Foods Smithton processing plant. Planted in late October, the trial was lifted mid April 2009. No yield comparisons were taken, as it was not a replicated trial site. A replicated trial will be undertaken next season on cultivars that are retained.

Table 3.

Observation notes from Forthside seed multiplication plots.

Harvest Comments Forthside Seed Multiplication Plots			
Variety	**Comments**	**L/W Ratio**	**Days to Maturity**
Cultivar 2	very even sample, few tubers?	1.55	126
Cultivar 5	very small but even sample, good tuber set	1.39	144
Cultivar 6	pears, odd mishape, few tubers?	1.51	134
Cultivar 139	very slight common scab, generally small round sample, high tuber set	1.15	144
Cultivar 140	roundish?, shape variation, good tuber set	1.38	151
Cultivar 141	pears & rounds, very even size but small, high tuber set	1.31	144
Cultivar 142	odd mishape, shape & size variation, high tuber set	1.37	165
Cultivar 143	pears, shape & size variation	1.49	144
Cultivar 144	odd large tuber is lumpy, size variation, few tubers?	1.4	151
Cultivar 145	good yield, roundish & blocky = shape variation, few tubers?	1.31	144
Cultivar 146	smallish, round	1.09	159
Cultivar 148	some mishapes, too small, scab, good tuber set	1.47	144
Cultivar 149	roundish, size variation, few tubers?	1.35	151
Cultivar 150	size variation, too small?, odd mishape	1.36	144
Cultivar 151	scab!, shape variation, good tuber set	1.46	144
Cultivar 152	pears, scab, large are lumpy	1.49	144
Cultivar 153	cracks, roundish, odd mishape, good tuber set	1.23	151
Cultivar 154	odd mishape, pears, smallish, few tubers?	1.56	144

Tasmanian variety evaluation trial 2008-2009.

Devonport district (Forthside) is one of the main delivery and storage district for McCain Foods Smithton processing plant. Planted in late October, the trial was lifted during April 2009.

Table 4
Forthside trial comparison of potato lines for different tuber yield weight grades, tubers per plant and processing parameters.

	Spacing	Yield, Tonnes per Hectare					Rank	Tuber	Quality						
	In Rows	Chats	Small	Large	Over Size	Fry Grade	by Fry	No. Per	Dry Matter	Fry Colour *					
Entry	Cm	0-100g	100-170g	170-340g	>340g	>100g	Grade	Plant	%	0	1	2	3	4	Ends
Cultivar 2	20	13.4	19.5	52.3	9.2	81.0	4	8.0	20.2	100					
Cultivar 5	30	13.5	21.0	43.2	11.2	75.3	9	12.5	22.0	100					
Cultivar 6	20	11.9	14.3	45.4	25.1	84.8	3	6.6	19.3	70	30				
Cultivar 51	30	2.7	29.3	41.1	6.6	76.9	7	13.6	20.4	100					
Cultivar 53	32.5	5.8	19.3	49.0	26.1	94.4	1	16.8	22.6	100					
Cultivar 61	30	8.7	16.2	48.3	9.9	74.3	10	10.2	21.1	100					
Cultivar 95	30	6.9	20.7	44.3	5.7	70.7	13	13.6	20.2	100					
Cultivar 99	30	3.9	28.4	42.5	5.9	76.8	8	13.7	21.8	100					
Cultivar 111	27.5	9.8	33.9	28.3	2.5	64.7	14	13.2	21.6	100					
Cultivar 114	32.5	8.5	33.7	43.8	9.1	86.7	2	19.8	24.9	100					
Cultivar 134	22.5	7.7	24.7	44.2	10.3	79.2	6	12.2	22.4	100					
Cultivar 136	25	2.4	22.7	42.0	6.5	71.2	11	10.9	20.6	100					
Cultivar 137	25	9.3	36.4	40.1	3.2	79.8	5	14.8	25.5	100					
Cultivar 155	32.5	3.7	37.0	32.8	1.0	70.8	12	16.6	22.1	100					
LSD P=0.05		2.5	7.6	9.3	6.8	12.4		1.2	0.9						
LSD P=0.01		3.4	10.3	12.6	9.2	16.7		1.7	1.2						
CV%		19.3	17.8	13.0	43.1	9.5		5.6	2.5						

* Fry Colour at harvest (USDA colour chart)

Entry	Days to Maturity	Quality			Hollow Assessment						Length Width Ratio
		Bruise Ratings			1st 10	1st 10	1st 10	2nd 10	2nd 10	2nd 10	
		Stem end	Rose end	Shatter	Hollow%	Brown Centre%	total%	Hollow%	Brown Centre%	Total%	
Cultivar 2	131.3	2.4	1.2	0.0	0	0	0	0	0	0	1.59
Cultivar 5	144.0	5.8	4.1	0.5	13	10	23	0	17	17	1.65
Cultivar 6	137.3	1.8	2.2	0.3	0	0	0	0	0	0	1.49
Cultivar 51	144.0	2.0	3.4	0.5	0	0	0	0	0	0	1.58
Cultivar 53	172.0	6.2	6.4	0.3	0	0	0	0	0	0	1.59
Cultivar 61	146.3	0.6	0.2	0.0	0	0	0	0	0	0	1.67
Cultivar 95	144.0	3.8	0.5	0.2	0	0	0	0	0	0	1.53
Cultivar 99	156.3	0.6	0.9	0.0	7	0	7	0	0	0	1.44
Cultivar 111	153.7	2.8	2.3	0.0	0	0	0	0	0	0	1.57
Cultivar 114	165.0	4.7	3.0	0.0	0	0	0	0	0	0	1.70
Cultivar 134	172.0	5.1	3.8	0.0	0	0	0	0	0	0	1.29
Cultivar 136	163.0	5.1	4.3	0.0	0	0	0	0	0	0	1.45
Cultivar 137	174.3	7.0	7.1	0.8	0	0	0	0	0	0	1.57
Cultivar 155	146.3	4.1	2.7	0.0	0	0	0	0	0	0	1.55
LSD P=0.05	7.1	1.7	1.7	0.4	6	4	6	na	ns	Ns	0.09
LSD P=0.01	9.6	2.3	2.2	0.5	8	6	8	na	ns	Ns	0.12
CV%	2.8	27.7	32.9	126.6	245	374	164	na	467	467	3.50