Horticulture Innovation Australia

Final Report

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

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McCain Foods (Aust) Pty Ltd

Project Number: PT06012

PT06012

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Final Report HAL Project

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Purpose of Report: This report provides the final report on this project in which new French fry potato cultivars have been evaluated in 4 regional trials and one seed multiplication plot during 2006-2007.

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1. Horticulture Australia Limited for the financial support provided from matched potato industry levy funds.
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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 2007

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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 Berrigan (N.S.W), 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.

Technical Summary

Potato genotypes introduced from the Potato Breeding program at Toolangi were evaluated in field experiments in 4 major potato growing regions of South Eastern Australia. In the 4 trial sites new cultivars were grown in randomised block experiments, with 3 replicates per entry, 3 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 98-109-1, 00-33-17, 02-71-37, 03-81-2 and 03-85-3 (Ballarat) 00-33-17, 01-31-1, 02-71-37 and 03-84-2 (Riverina) 00-33-17, 02-71-37, and Daisy (Tas) 00-33-17 01-31-1 and 98-109-1 (S.A).

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.

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 Russet Burbank), 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 Shepody and Riverina Russets). 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. 3 of the 4 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) 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 (Riverina trial and 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), Savernake near Berrigan – N.S.W (32 Entries), Mingbool near Penola – S.A. (12 entries) and Forthside Research Farm – Tasmania (8 entries). The Victorian trial was planted in mid November and harvested in early May, the Tasmanian trial was planted in late October and lifted in late April, the South Australian trial was planted in October and harvested in early April whilst the N.S.W trial was planted in October and as explained above was not harvested. Ballarat and Forthside soil types are similar Krasnozem types and both Mingbool and Savernake are sandy type soils.

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 2006-2007 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	S.A+	Tas+	Rivϕ
Daisy	65.6 (99)	56.4 (99)	73.6 (100)	61.2 (100)
Russet Burbank	55.0 (100)	41.6 (93)	71.9 (100)	
Shepody			62.4 (97)	45.9 (93)
98-109-1	56.1 (100)	44.9 (97)		
00-33-17	51.1 (95)	50.3 (99)	83.6 (95)	46.5 (100)
01-31-1	44.8 (100)	24.3 (99)	62.7 (100)	49.7 (97)
02-71-37	55.9 (100)		67.5 (100)	40.2 (100)
02-76-8			58.5 (100)	
03-81-2	56.5 (100)			30.9 (100)
03-84-2	52.1 (99)			50.1 (100)
03-85-3	59.6 (100)			33.8 (99)
LSD* P=0.05	7.8 (11.2)		9.1 (na)	9.5 (3.6)

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.

Daisy

Daisy has been imported to Australia by a private firm. It has performed well again in Ballarat with yield results as seen above (Table M1) being the highest ranked above 75-gram variety in the Ballarat trial for the third year in a row. Daisy has typically emerged very quick but it does has a very late maturity. Tuber shape can be bold at times and the yellow flesh may cause problems with the factory. It was really the first time we have seen results from the Riverina trial where it struggled a bit with the heat and showed some common scab and secondary growth characteristics. It was also noted as being very susceptible to target spot in that climate. In South Australia it was also affected by heat stress, but results show good shape and high yields. Tasmanian results showed misshapen tubers when the sample is large and uneven tuber size. We will be continuing with this variety with the breeding company prepared to do work with us in evaluating the variety. Minitubers will be planted in November 2008.

Russet Burbank

Russet Burbank 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. Russet Burbank is not suited to the early districts of the Riverina. Russet Burbank 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. Russet Burbank has the ability to be stored for an extended period of time and still retain its processing attributes.

Shepody

Shepody is the main early to mid variety 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. Shepody is not stored by McCain Foods (Aust). Shepody sets only average tubers per plant and can produce larger size tubers, which are undesirable for processing.

98-109-1

98-109-1 Showed some potential in the Ballarat trial with reasonable shape and yield returns (Table M1). Tuber numbers were down but not to any great determent on the results. 98-109-1 performed reasonably well in South Australia with the odd rough tuber. It is a strong plant and handled the heat last season. We have some minitubers ordered for this variety and we will look at bulking up a small volume and assessing it in the factory over the next few years.

00-33-17

00-33-17 (Mirridong) has shown us that it has potential to be a very good variety. In Ballarat there was some slight powdery scab and one replication was low yielding. Tuber shape was excellent again. Riverina results were good with tuber size down on what would be ideal, but the potential is there. Tasmanian trial was not replicated but yields and quality were excellent. In South Australia it performed on a similar basis as last season with plenty of tuber numbers and yield in a high range. It did have a high percentage of smalls in the South Australian trial

We have backed this variety and put it into tissue culture with a large volume of generation 1 seed coming through the system and a small volume of generation 2 seed to be planted this season. Results from early seed multiplication are excellent.

01-31-1

01-31-1 showed a lot of potential in past seasons and as such we have included it into tissue culture. Ballarat trial results were not a standout the second year in a row with low yield (Table M1), small tubers and powdery scab, it will be discarded from Ballarat. Tasmanian results show scab as a concern and it tended to be bold in shape. Riverina trial showed a better sample with slightly round tubers but not extreme. There was some common scab on the sample. In the South Australian trial we found it was slightly susceptible to heat stress. It had good shaped tubers but yield was only moderate to low. We will continue with this variety in the sandy soil type trials for one last assessment

02-71-37

Was one of the standout tuber shape varieties in the Ballarat trial. Yield was only marginal in one replication but very good in the other two. Solids are slightly low and something to watch. In the Riverina it performed below par with only a marginal yield result and tuber shape slightly round. Possible wedge type in the sand. Results in Tasmania showed good shape and good tuber numbers, which was against the indication of other trials. We will continue with this variety in all areas.

02-76-8

02-76-8 was only included in the Tasmanian trials last season. It showed good tuber shape and was one of only a few cultivars that showed no signs of common scab infection. We will grow this variety in a small bulk plot next season.

03-81-2

03-81-2 showed good shape in the Ballarat trial with just the odd tuber slightly round at times. There was a touch of powdery scab present which is something to watch. In the Riverina this variety struggled to perform with small tubers and plants that struggled to shut the rows. Results from Tasmania show small tuber size and will be discarded from there. We will continue with this variety in Ballarat at a wider spacing to try and gain yield.

03-84-2

03-84-2 was a low yielding cultivar with tubers showing signs of Rhizoctonia distortion in the Ballarat trial. However, 03-84-2 performed quite well in the Riverina. It had high tubers per plant and tuber shape was very good. Maturity is late with some sign of stolen attachment however. In the Tasmanian seed plot 03-84-2 showed signs of bad common scab and will be discarded from further trials. We will continue with this variety in NSW and South Australia.

03-85-3

03-85-3 is a high yielding cultivar (Table M1) with slightly uneven size distribution but overall showed enough potential to continue in the trials. Shape was typically blocky with just the odd tuber slightly pointed at times. 03-85-3 was a poor performer in the Riverina trial with slow emergence and very late maturity. In Tasmania this cultivar was pointed and the only one to show colour at harvest cook tests. We will continue with this variety in Ballarat only.

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.

In addition to the field day in Ballarat, local growers representatives and research personnel were invited to the other 3 trial harvest days. 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 four seasons have shown, that with the industry groups taking a far greater ownership in variety evaluation and commercialisation of new cultivars, interest in the four 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 two seasons we have included 3 varieties into tissue culture that have shown potential. These cultivars 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 00-33-17 will be trialled in small factory production runs next year. The plan is to expand commercial trials in 2009 and 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 2006-2007. 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 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 2006-2007. 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 24th April 2007.

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	Fry Colour *					
Entry	cm	0-75g	75-170g	170-340g	>340g	>75g	Grade	Plant	Matter %	0	1	2	3	4	Ends
Bliss	25.0	1.8	18.3	29.1	11.2	58.6	=8	7.3	24.0	100					
Daisy	31.2	0.6	10.6	29.5	25.5	65.6	1	7.4	20.7	99	1				
Russet Burbank	38.4	0.8	11.9	26.7	16.4	55.0	23	9.4	20.4	100					
98 - 96 - 31	28.0	1.4	13.7	31.3	17.5	62.3	3	7.9	22.3	99	1				
98 - 109 - 1	35.7	1.4	19.3	27.0	9.8	56.1	=18	9.5	21.8	100					1
00 - 23 - 1	28.0	1.1	11.5	24.8	21.1	57.4	12	6.8	20.4	99	1				
00 - 33 - 17	33.4	0.8	16.0	25.3	9.8	51.1	29	8.4	22.0	95	4	1			
01 - 31 - 1	31.2	2.2	17.6	21.3	5.9	44.8	31	8.6	21.7	100					
01 - 49 - 29	28.0	0.8	14.3	28.1	16.2	58.6	=8	7.1	19.5	98	2				
02 - 1 - 2	31.2	2.8	26.7	24.4	7.0	58.1	=10	11.7	17.5	98	1	1			
02 - 30 - 9	33.4	2.8	21.7	26.3	13.3	61.3	4	10.9	20.6	100					
02 - 30 - 26	31.2	1.3	13.9	28.3	7.4	49.6	30	8.7	21.7	100					
02 - 32 - 5	31.2	2.2	17.1	24.9	14.4	56.4	17	9.3	20.3	100					
02 - 71 - 14	35.7	2.5	19.3	30.8	6.6	56.7	=14	11.6	19.5	100					
02 - 71 - 27	31.2	1.3	19.3	30.3	5.7	55.3	=21	9.0	20.4	100					
02 - 71 - 37	31.2	2.2	18.1	30.4	7.4	55.9	20	9.2	18.7	100					
02 - 73 - 6	28.0	2.4	22.4	28.6	7.7	58.7	7	9.7	23.1	99	1				
02 - 92 - 14	33.4	1.4	15.1	25.9	12.2	53.2	25	8.8	22.4	99		1			
03 - 15 - 2	33.4	1.5	15.4	32.2	13.3	60.9	5	8.9	21.9	100					
03 - 25 - 3	31.2	1.3	12.2	25.1	14.6	51.9	28	7.1	22.1	54	39	7			1
03 - 29 - 34	31.2	0.7	15.1	32.8	10.2	58.1	=10	8.1	23.6	100					
03 - 30 - 5	31.2	1.3	16.9	23.7	12.3	52.9	26	7.9	22.2	95	5				
03 - 31 - 12	31.2	2.0	21.3	28.7	6.9	56.9	13	9.9	24.3	100					
03 - 36 - 6	33.4	1.4	16.2	21.4	3.9	41.5	32	7.4	22.6	96	1	3			
03 - 40 - 6	31.2	1.7	16.5	26.0	10.8	53.3	24	8.2	22.5	100					
03 - 60 - 18	31.2	4.0	25.5	23.0	7.6	56.1	=18	11.6	21.6	99	1				1
03 - 69 - 17	33.4	3.1	23.8	32.1	6.6	62.5	2	12.7	22.9	100					
03 - 70 - 18	31.2	1.8	11.6	31.4	13.7	56.7	=14	7.7	20.8	100					
03 - 81 - 2	31.2	1.4	18.9	29.3	8.3	56.5	16	8.9	21.3	100					
03 - 84 - 2	28.0	1.4	14.7	22.3	15.1	52.1	27	7.4	20.7	99	1				
03 - 84 - 7	33.4	2.2	16.8	25.8	12.7	55.3	=21	9.3	21.4	100					
03 - 85 - 3	28.0	1.7	12.0	27.6	20.0	59.6	6	7.2	21.5	100					
LSD [P=0.05]		1.1	5.6	5.0	6.7	7.8			1.5	11.2					
LSD [P=0.01]		1.4	7.3	6.4	8.7	10.1			2.0	14.4					

* Fry Colour at harvest (USDA colour chart)

New South Wales variety evaluation trial 2006-2007. Riverina (Savernake) is an early delivery district for McCain Foods Ballarat processing plant and the Safries processing plant in Penola. Planted in early September, the trial was lifted on the 8th of February 2007.

Table 2.
Riverina 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	Fry Colour *				
Entry	cm	0-75g	75-170g	170-340g	>340g	>75g	Grade	Plant	Matter %	0	1	2	3 4	Ends
Bliss	25.0	4.6	34.8	17.7	0.0	52.5	9	9.6	23.3	100				
Daisy	31.2	2.8	32.8	28.6	0.0	61.2	2	10.6	19.7	100				4
Ranger Russet	35.7	2.5	27.1	22.3	1.5	50.9	11	10.3	21.4	100				
Shepody	31.2	2.5	27.0	18.9	0.0	45.9	19	9.4	19.1	93	7			3
99 - 33 - 46	35.7	3.1	32.5	15.6	0.0	48.1	16	11.4	22.9	98	1	1		
00 - 33 - 17	33.4	6.0	33.7	12.8	0.0	46.5	18	12.6	21.3	100				
01 - 3 - 3	28.0	6.6	38.8	16.6	0.5	55.9	4	11.4	21.6	100				5
01 - 31 - 1	33.4	3.5	34.0	15.7	0.0	49.7	14	11.7	23.3	97	3			
01 - 34 - 19	35.7	6.9	40.3	14.2	0.0	54.5	5	16.2	20.5	100				
01 - 46 - 27	28.0	3.0	36.6	25.7	0.0	62.3	1	10.2	21.3	100				4
01 - 80 - 63	31.2	4.8	33.3	19.7	0.0	53.0	7	11.2	21.2	100				
02 - 3 - 15	33.4	5.7	23.3	18.0	0.0	41.3	24	10.6	22.7	97	3			
02 - 30 - 26	28.0	4.2	28.2	13.6	0.2	42.0	23	8.9	22.4	91	8	1		
02 - 32 - 5	31.2	3.7	35.6	9.7	0.0	45.3	20	10.7	20.7	99	1			1
02 - 69 - 29	31.2	11.4	32.3	2.8	0.0	35.1	28	12.8	20.8	98	1	1		
02 - 71 - 30	31.2	7.1	39.4	14.5	0.0	53.9	6	13.0	22.0	100				
02 - 71 - 37	28.0	4.3	25.3	14.9	0.0	40.2	25	8.3	19.9	100				
02 - 80 - 6	31.2	3.0	34.7	23.1	0.4	58.2	3	10.4	22.7	100				
02 - 91 - 3	31.2	6.8	38.3	6.5	0.0	44.8	21	11.7	19.6	99	1			
03 - 15 - 2	33.4	5.5	35.6	16.2	0.0	51.8	10	11.6	21.4	100				
03 - 25 - 3	31.2	7.7	22.5	1.2	0.0	23.7	31	9.6	21.7	100				
03 - 29 - 34	31.2	5.7	30.6	6.3	0.0	36.9	27	10.1	23.4	100				
03 - 30 - 5	31.2	3.7	24.1	20.2	0.0	44.3	22	7.7	21.8	100				7
03 - 36 - 6	33.4	3.2	11.2	3.6	0.0	14.8	32	5.2	23.1	100				
03 - 40 - 6	31.2	4.9	30.2	19.7	0.0	49.9	13	10.1	20.6	100				
03 - 60 - 18	31.2	13.2	38.9	8.9	0.0	47.8	17	15.4	20.9	97	3			4
03 - 69 - 17	33.4	6.3	38.5	10.6	0.0	49.1	15	14.0	21.3	93	7			3
03 - 70 - 18	31.2	5.4	31.7	19.3	1.7	52.7	8	11.3	21.1	97	3			1
03 - 81 - 2	31.2	6.9	24.0	6.9	0.0	30.9	30	10.3	21.2	100				
03 - 84 - 2	28.0	9.5	34.7	15.4	0.0	50.1	12	13.0	20.6	100				1
03 - 84 - 7	33.4	6.8	28.3	11.7	0.0	40.0	26	12.0	19.6	100				5.2
03 - 85 - 3	28.0	4.8	21.4	12.2	0.2	33.8	29	7.6	24.7	99		1		
LSD [P=0.05]		2.7	7.3	7.0	0.6	9.5			1.7	3.6				
LSD [P=0.01]		3.5	9.5	9.0	0.7	12.3			2.2	4.4				

* Fry Colour at harvest (USDA colour chart)

South Australian variety evaluation trial 2006-2007

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 on the 14th May 2007.

Table 3
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
Daisy	31.2	3.7	21,5	31.1	3.8	56.4	2	10.2	18.6	99	1					
Russet Burbank	33.4	5.0	`4.9	21.3	5.5	41.6	8	9.3	18.5	93	3				4	
98 - 109 - 1	35.7	5.4	16.2	23.9	4.8	44.9	6	11.0	19.6	97	1				2	
00 - 33 - 17	35.7	10.2	24.5	22.6	3.3	50.3	4	14.5	19.1	99	1					
01 - 3 - 3	31.2	4.2	17.1	27.9	3.9	49.0	5	9.3	17.7	97	1				2	
01 - 31 - 1	33.4	12.5	11.7	12.7	0	24.3	11	11.9	19.9	99	1					
01 - 46 - 27	31.2	8.4	17.5	32.0	8.7	58.3	1	12.9	18.4	100						
02 - 30 - 26	28.0	8.2	29.0	24.0	1.1	54.0	3	11.6	20.1	99					1	
02 - 71 - 14	31.2	6.0	13.1	19.8	2.3	35.2	9	9.0	16.6	99					1	
02 - 71 - 27	31.2	7.8	10.0	11.2	0.4	21.6	12	8.3	18.3	99					1	
02 - 71 - 37	28.0	4.9	9.7	14.5	0.3	24.5	10	6.4	17.5	100						
02 - 92 - 14	31.2	5.3	19.3	21.1	1.3	41.7	7	10.6	19.7	100						
LSD [P=0.05]																

* Fry Colour at harvest (USDA colour chart)

Tasmanian seed multiplication bulk trial evaluation 2006-2007

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 2007. 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 4

Observation notes from Forthside seed multiplication plots.

Harvest comments. Forthside seed multiplication plots			
Cultivar	**Comments at harvest**	**Target spot susceptibility (early March)**	**L/W Ratio**
RB Ruen	fairly even but small sample, few tubers	slight	1.91
Shepody	lot of mishapes, scab!, large are lumpy, shape variation	slight	1.84
02 - - 1 - 2	small, lot of tubers, scab!	moderate/severe	1.48
02 32 5	even sample, good size, roundish?	moderate/severe	1.62
02 71 27	odd mishape, too long & thin, lot of smalls	moderate/severe	1.88
03 - - 15 - 2	large are lumpy, fairly good sample, plant wider?	moderate/severe	1.66
03 - - 25 - 3	very good shape but cracking, go again?, tuber number?	slight	1.61
03 - - 29 - 34	odd mishape, scab?, lot of tubers	slight	1.8
03 - - 30 - 5	very even but small, good shape, lot of tubers		1.44
03 - - 31 - 12	large are slightly lumpy, lot of tubers	slight	1.78
03 - - 36 - 6	lot of tubers but small, large are lumpy		1.49
03 - - 40 - 6	cracking, scab!, too pointy?	moderate/severe	1.74
03 - - 60 - 18	shape?, size variation, scab!	slight	1.55
03 - - 67 - 7	scab?, large are lumpy, odd crack, big sample but shape	slight	1.47
03 - - 69 - 17	scab?, too pear?, odd mishape	moderate/severe	1.62
03 - - 70 - 18	scab?, shape?, big sample, lot of tubers	slight	1.37
03 - - 81 - 2	too small?, lot of tubers	slight	1.79
03 - - 84 - 2	mishapes!, scab?, large are lumpy, deep pitted scab = common, hollow	slight	1.8
03 - - 84 - 7	good shape but small - plant wider?	moderate/severe	1.69
03 - - 85 - 3	too many pears?	slight	1.6

Forthside seed multiplication plots.

Cultivar	Flesh Colour	Days to Maturity	Bruise Ratings			Specific Gravity	% Dry Matter	Fry Assessment					Quality	
			Stem end	Rose end	Shatter			%0	%1	%2	%3	%4	Dark End%	Fry & Bruise comment
RB Ruen	1	152	5.7	0.9	0.0	1.084	20.9	100						very slight vascular ring
Shepody	1	152	4.7	0.4	0.0	1.074	18.9	100					50	
02-1-2	5	147	0.0	0.0	0.0	1.061	16.2	100					10	"agria" yellow flesh colour, yellow fry colour, very slight vascular ring
02-32-5	1	147	6.1	3.6	0.0	1.087	21.6	100						
02-71-27	4	147	3.7	1.6	0.0	1.086	21.4	100						yellow fry colour
03-15-2	2	157	6.6	6.6	1.0	1.090	22.2	100						1 tuber brown fleck
03-25-3	1	152	2.7	0.4	0.0	1.084	20.9	100						very slight vascular ring
03-29-34	2	161	2.8	1.6	0.0	1.096	23.4	100					10	slightly yellow fry
03-30-5	1	152	6.3	4.1	0.0	1.086	21.4	100						
03-31-12	2	165	5.3	3.8	0.0	1.108	25.9	100						
03-36-6	5	161	3.1	0.0	0.0	1.087	21.6	100						"agria" yellow flesh colour, yellow fry colour, very slight vascular ring
03-40-6	1	147	3.3	3.2	0.0	1.086	21.4	100						
03-60-18	1	152	4.1	0.5	0.0	1.088	21.8	60					40	very slight vascular ring
03-67-7	1	161	7.2	6.7	0.5	1.095	23.2	100						5 hollow tubers discarded, vascular ring
03-69-17	1	152	5.6	2.1	0.0	1.092	22.6	100						
03-70-18	1	157	5.9	1.6	0.0	1.086	21.4	100						
03-81-2	1	147	0.7	1.0	0.5	1.086	21.4	100						excellent fry colour
03-84-2	1	157	3.5	2.4	0.0	1.083	20.7	100						very slight vascular ring
03-84-7	1	147	4.1	4.2	1.0	1.084	20.9	100						excellent fry colour
03-85-3	1	157	4.2	3.7	0.0	1.082	20.5	90	10					1 hollow, very slight vascular ring

Tasmanian variety evaluation trial 2006-2007.

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 2007.

Table 5
Forthside trial comparison of potato lines for different tuber yield weight grades, tubers per plant and processing parameters.

Entry	Spacing in Rows cm	Yield, Tonnes per Hectare					Rank by Fry Grade	Tuber No. Per Plant	Quality					
		Chats 0-100g	Small 100-170g	Large 170-340g	Over Size >340g	Fry Grade >100g			Dry Matter %	Fry Colour * 0	1	2	3	Ends
Daisy	30	1.7	8.0	41.9	21.3	73.6	1	7.9	21.6	100				
Russet Burbank	32.5	2.6	12.0	29.3	18.0	71.9	2	8.9	22.1	100				
Shepody	20	3.2	10.8	32.6	12.6	62.4	6	5.3	19.8	97		3		16
01 - 31 - 1	27.5	4.8	20.5	30.7	6.2	62.7	3	8.9	23.4	100				
02 - 30 - 26	27.5	3.2	19.2	31.7	4.8	59.2	7	8.2	23.2	100				
02 - 71 - 37	27.5	10.4	20.3	32.5	3.9	67.5	4	11.4	19.9	100				
02 - 76 - 8	27.5	5.4	16.8	31.3	5.0	58.5	8	8.8	20.7	100				3
02 - 92 - 14	30	8.3	27.9	24.6	3.9	68.1	5	13.1	23.3	97		3		
LSD P=0.05		1.6	5.6	6.7	3.5	9.1		2.1	1.1					
LSD P=0.01		2.2	7.8	9.2	4.9	ns		2.9	1.5					
CV%		18.4	19.0	11.9	21.4	7.9		13.1	2.4					

Fry Colour at harvest (USDA colour chart)

Entry	**Days to Maturity**	**Quality**			**Hollow Assessment**					
		Bruise Ratings			**1st 10 Hollow %**	**1st 10 Brown Centre%**	**1st 10 total %**	**2nd 10 Hollow %**	**2nd 10 Brown Centre%**	**2nd 10 total%**
		Stem end	**Rose end**	**Shatter**						
Daisy	155	4.6	0.7	0	0	0	0	0	0	0
Russet Burbank	157	6.2	1.3	0	3	10	13	3	23	27
Shepody	150	4.6	2.1	0	3	3	7	0	0	0
01 - 31 - 1	157	4.4	2.2	0	0	0	0	0	0	0
02 - 30 - 26	152	4.7	3.8	0.8	7	3	10	3	0	3
02 - 71 - 37	157	4.1	1.7	0	0	0	0	0	0	0
02 - 76 - 8	165	0.5	0.8	0	3	0	3	0	0	0
02 - 92 - 14	163	6.5	4.3	0	3	7	10	3	0	3
LSD P=0.05	3.1	1.2	2.2	0.2	ns	ns	ns	ns	4	6
LSD P=0.01	4.3	1.7	ns	0.2	ns	ns	ns	ns	5	9
CV%	1.1	15.8	59.5	98.0	188	223	153	302	70	89

Entry	**Length Width Ratio**
Daisy	1.4
Russet Burbank	1.85
Shepody	1.64
01 - 31 - 1	1.44
02 - 30 - 26	1.6
02 - 71 - 37	1.57
02 - 76 - 8	1.49
02 - 92 - 14	1.97
LSD P=0.05	0.15
LSD P=0.01	0.21
CV%	5.5