

Fresh Potato State Variety Evaluations - Victoria

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Project Number: PT06024

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Fresh Potato State Variety Evaluation - Victoria

2006/2007

Final Report

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Fresh Potato State Variety Evaluation - Victoria

- NEW FRESH MARKET VARIETIES FOR THE BRUSHED MARKET –

A fresh market variety trial at Thorpdale, Victoria, 2006 - 2007

This project was conducted with the purpose to identify potential new potato varieties for the future fresh market in Australia. The aim is to select high yielding varieties with good appearance and consistent culinary qualities

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Media Study

Fresh Potato - State Variety Evaluation - Victoria

NEW FRESH MARKET VARIETIES FOR THE BRUSHED MARKET – A fresh market variety trial at Thorpdale, Victoria, 2006 - 2007

This project was conducted with the purpose to identify new potato varieties for the future fresh market in Australia. The aim is to select high yielding varieties with good appearance and consistent culinary qualities. Four varieties have been released from the 2005/2006 trial.

This is the fourth year of fresh variety evaluation in Victoria. Twenty-four cultivars were grown in a randomised block amongst a commercial crop of Coliban fresh market potatoes. The trial consisted of 6 new lines of G3 selections from the National Potato Breeding program at Toolangi in Victoria, 11 lines were carried over from the previous trial (including 3 lines released to industry from last years trial), 4 varieties from sponsors and Sebago and Coliban as standard varieties for comparison.

The drought did reduce the yield of the plots. While several varieties did show promise because of their yield and appearance, the management group has agreed to plant these lines for a further year in order to make a thorough assessment of their potential for release. A further 10 lines from the National Potato Breeding program along with 10 carried over from this years trial will be used for the 2007/08 trial.

Technical Summary

This project was conducted with the purpose of identifying new potential potato varieties for the future fresh market in Australia. The focus is on new varieties for the “brushed” fresh market. Several varieties with potential have been identified. However due to the drought the yield potential was difficult to assess. The trial will need to be repeated next summer.

This is the fourth year of fresh variety evaluations in Victoria. This trial was planted using a spacer planter. Four rows of potential new varieties were planted either side of the trial. The emergence of a number of plots was reduced due to the drought and water restrictions.

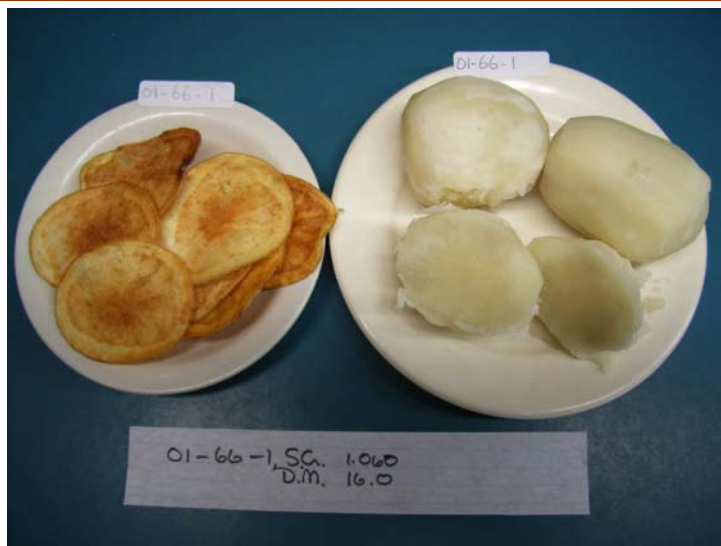
The source of cultivars used for all of the breeding trials in Australia is from the National Potato Breeding program. This program produces seed through crossbreeding each year, and then evaluates them over 3 generations after cross breeding. This results in around 20 or 30 lines for further testing in district trials. When released from Toolangi for industry testing each cultivar has been described in detail and has had the dry matter (specific gravity) boiling and fry qualities assessed. The entries for the Thorpdale trial have been selected from those 20 or 30 advanced selections from the NaPIES program. The new cultivars that were planted at Thorpdale in 2006/07 are from different seed lines bred between 2002 and 2003.

Emergence and growth notes were noted.

A two-row digger was used to harvest the plots. The produce from each plot was sized, counted and weighed.

While we believe that the crop emergence and yield were limited by dry conditions early in the growth of the plots, there were many varieties that out yielded the standard varieties Sebago and Coliban.

To be considered for release, varieties must have reliable cooking qualities.



Varieties considered for release have been test cooked at the Department of Primary Industry's Research Station at Toolangi before further field testing. This line "00-66-1" is more suited to boiling than frying and has potential for release.

Executive Summary

This is the fourth year of fresh variety evaluation in Victoria. Once again the trial was planted in a typical soil used for commercial production.

This year's trial could not have gone ahead without the support of our generous sponsors, whose contributions and interest ensured that the trial was again a success. Horticulture Australia (HAL) had allocated a sum to each State undertaking variety trial work. The sponsors this year were also invited to submit varieties of their own for trialing, and both Elders Limited and Durkin Produce submitted varieties of their own, which were planted along with the rest of the trial for assessment and comparison.

The standard varieties for comparison this year were Coliban and Sebago, as well as the four varieties that were released for further evaluation by a private company last year, 00-1-3, 00-20-50, 00-45-1 and 99-52-1. Over 15 varieties from the breeding program in this trial out yielded Coliban and 19 out yielded Sebago.

With the drought affecting crops across the Thorpdale district this year, the trial was also adversely affected. The results clearly showing reduced yields. However, there were some varieties that performed well this year under stressful situations.

Introduction and Background

The Victorian Farmers Federation Potato Growers Council policy on breeding is for a continuation of fresh market cultivar work, both crossing and evaluation. There is only one potato breeding program in Australia which is based at Toolangi.

Recently the Australian potato industry and HAL have reviewed the breeding program. Future breeding will only be carried out by the Department of Primary Industries under agreement and sponsorship for individual and industry groups. These companies/groups will be responsible for their own testing regimes.

This trial may be one of the last opportunities for the Victorian industry to tender for varieties that are trialed for them.

There has been successful commercial exploitation of new varieties nominated from the core-breeding program to improve cost competitiveness of the Australian fresh market industry. Some of the more notable examples are Coliban, Lustre, Catani, Wilwash, Wont Scab and Ruby Lou. The industry has agreed to restructure the evaluation process and develop commercial varieties that will encourage the uptake of new varieties commercially. This trial involving some of the potential cultivars that might be grown for fresh markets in Victoria was planted in the Thorpdale potato district.

The fresh market today is greatly influenced by consumer preference. Over 50% of the potatoes supplied to fresh markets are now washed before sale, and another 10% are red skinned varieties. The fresh market is strongly influenced by appearances. The change of market preference to appearance over the past few decades means that bright skinned, unblemished potatoes are in greater demand for both washed and brushed potatoes. The requirement for fresh market potatoes is for tubers weighing 80-450g, with the preferred size 120-300g.

The aim of the trial is to select varieties for the fresh market. To be successful and commercially viable for the fresh market the new varieties need to increase fresh market grower efficiencies by reducing input costs and increasing price or size of the market. Selected varieties must have "good" cooking qualities.

Methodology

The source of cultivars used for all of the breeding trials in Australia is National Potato Breeding program. This program produces a seedling population from botanical seed of selected crosses that are evaluated over three field generations at Toolangi. Only cultivars of merit that meet "commercial requirements" advance to district trials.

This results in around 20 or 30 lines for further testing. The entries for Thorpdale trial have been selected from those 20 or 30 advanced selections. The new cultivars that were planted at Thorpdale in 2006/07 are from different seed lines bred between 2002 & 2003.

The trial was planted in an area that was being used for commercial production. The 72 plots (24 entries - including the varieties submitted by sponsors x 3 repetitions) were planted in a randomised plot design.

The Thorpdale trial had input from the farming community at Thorpdale, who helped with planting and assessment of the cultivars at harvest and with the bagging up of each plot and grading measurements following the harvest.

Prime responsibility for agronomic measurement and observation however, rested with ViCSPA, who performed a range of quantitative assessments, which included emergence counts, assessment of crop growth, tuber assessment at harvest, and measurement of yield and tuber number at grading.

The trial was planted with a spacer planter on the 10th of November 2006 in mild to warm conditions. The red variety; 01-37-2 was planted at the beginning and end of each plot of white skinned varieties to minimise the end plant effect. The 24 varieties were planted over three replications in a random grid, where each variety appeared once in each replication. The plots were labelled and 1750kg/ha of 11-15-15 fertiliser was applied in furrow at planting.

Plot size: 2 rows, 15 sets per row @ 20 cm (8 inch spacing) plus end plants
Seed Preparation: Hand cut - no treatments

The variety 03-19-03 was planted down one side of the trial in 4 bulk rows, but was not evaluated formally. At harvest it produced an attractive yield of bright white skinned potatoes. For a visual "gourmet" evaluation, there were also 2 rows of 02-25-

2 and two rows of 02-1-02 planted down the other side of the trial. Both of these lines are being considered for release as niche varieties. (See last years report for more details)

After harvest, the trial was hand graded in the shed.

Results

The trial was harvested on 27th March 2007. Field assessments of tuber bloom, shape, and general marketable appearance were made on each cultivar prior to bagging. Assessments of powdery scab were made across all the replicate, with only a very insignificant amount of Desiree showing any sign of the fungus. The produce from each plot was then taken to a shed nearby where it was graded for size and weighed.

The results of the Emergence rating are in Table 1.

Variety	Rep 1	Rating	Rep 2	Rating	Rep 3	Rating
02-12-02	8	1	36	1	51	1
03-09-02	1	1	34	2	66	1
03-06-06	12	3	30	2	60	3
03-80-17	15	1	43	1	68	1
03-52-05	23	3	46	2+	63	3
03-19-03	17	2	40	1	55	2
03-19-12	11	3	27	1	58	3
00-1-3	6	2	25	1	53	2
02-19-2	10	3	38	1	52	1
00-20-50	14	2	48	3	65	2
02-21-7	21	3	32	2	61	2
00-45-1	20	1	45	2	69	1
02-37-10	7	2	41	1	57	1
01-20-21	24	4	44	3	70	3
02-37-7	16	2	28	1	49	1
01-66-1	19	1	42	2	62	1
02-88-5	13	2	33	2	67	1
01-75-2	2	1	47	2	72	2
Valour	9	2	35	2	59	2
Crop 8	18	2	29	2	71	2
Crop 13	5	2	39	1	54	1
Almera	22	2	26	1	64	1
Coliban	3	2	37	2	56	1
Sebago	4	2	31	2	50	2

Emergence rating (Plants not counted)

1 = Only a few have emerged, 2 = Mostly emerged but just up, 3 = Well established

In Table 2 shows the comparative differences in growth after nearly 90 days. Several plots were discarded due to poor emergence and growth due to the very dry conditions.

Variety	Rep 1	Rating	Rep 2	Rating	Rep 3	Rating
02-12-02	8	2	36	3	51	2
03-09-02	1	1	34	1	66	2
03-06-06	12	4	30	2	60	3
03-80-17	15	1	43	1	68	1
03-52-05	23	3	46	5	63	4
03-19-03	17	2	40	2	55	3
03-19-12	11	4	27	4	58	3
00-1-3	6	4	25	5	53	4
02-19-2	10	4	38	5	52	5
00-20-50	14	3	48	3	65	2
02-21-7	21	4	32	3	61	4
00-45-1	20	5	45	5	69	5
02-37-10	7	3	41	3	57	4
01-20-21	24	4	44	5	70	5
02-37-7	16	4	28	4	49	3
01-66-1	19	3	42	5	62	4
02-88-5	13	5	33	3	67	5
01-75-2	2	4	47	5	72	5
Valour	9	5	35	5	59	5
Crop 8	18	3	29	3	71	5
Crop 13	5	5	39	5	54	5
Almera	22	3	26	3	64	1
Coliban	3	5	37	5	56	5
Sebago	4	3	31	3	50	3

Growth rating: 1 to 5 when 1 = Smallest foliage growth & 5 represents large foliage often in flower.



= Discard plot due to poor emergence & growth

While the plots were planted into moist soil they struggled to emerge through dry and hot conditions. After irrigation they made effective growth.

Obvious Coliban self sowns were pulled out of the plots

The harvest assessments (see Table 3), proved useful in determining which varieties were not worth continuing with. Some varieties were deemed unsuitable and discarded after the evaluation of one replicated plot on the day. Detailed tuber descriptions are available from the Department of Primary Industries.

Table 3. Harvest and Grading notes			
Cultivar	Harvest notes	Grading notes	Action
00-1-3	Bold round tubers, good sets	Some scab	Tendered 2005/06
00-20-50	Small, bright, round shape	Some rhizoctonia and scab	Tendered 2005/06
00-45-1	Good yield of well shaped/size tubers	Nice shape, bold, slightly uneven	Tendered 2005/06
01-20-21	Round, growth cracks in large tubers. Serious cracking at harvest from seed area	Good yield, nice shape	Susceptible to harvest damage?
01-66-1	Uneven, textured skin, cracks	Many green potatoes, russet-type skin	Overall an attractive shallow eyed potato. Boils well. Try again
01-75-2	Flat, long, buff colour, uneven	Shallow eyes, skin flaking	Replant
02-12-02	Very small, uneven, cracks	Discard	X
02-19-2	Even, Few misshapen tubers	Smooth skin, badly shaped	Replant
02-21-7	Long, shallow eyes, large lenticels	Flat, long, shallow eyes	Red skinned
02-37-10	Bright, small, round	Thick, round, some skinning	Replant
02-37-7	Ugly, good yield?	Mixture?	Discard
02-88-5	Even large sample, good set At a	Nice skin, growth cracks	Replant
03-06-06	Low yield, round, flat	Flat, small sample, scabby	Replant
03-09-02	Low yield, smooth skin	Slight blush, purple stem ends	Replant
03-19-03	Very bright, good yield, even	Some scab, bright	Very attractive tubers that boil well. Replant
03-19-12	Even, buff, round, good shape	Round, nice skin, bright	Not quite as bright as 03-19-03, replant
03-52-05	Small, bright	Purple blush, few odd shapes. Will the blue blush be acceptable to markets?	Replant
03-80-17	No tubers, rot in few left	Discard	X
Almera	Uneven, large, yellow skin	Odd shapes, large sample	
Coliban	Even, large, growth cracks	Few growth cracks	
Crop 8	Small, good yield, even	Some scab, nice shapes	
Crop13	Slight texture to skin, nice shape	Bumpy? Small	
Sebago	Uneven, flat, bright skin	Good sample	
Valor	Pale colour, good yield	Some skinning	

The trial was hand graded. The potatoes from each repetition were counted individually and recorded on a custom made table. Varieties that had performed poorly in the field only had one repetition analysed, and if that was deemed poor again, the whole 3 reps were discarded without further analysis. A photograph has been taken of tubers of each variety.

The results from grading can be seen in table 4.

Entry	Yield, Tonnes per Hectare						Rank by No. 1 grade	Tuber No. per Plant
	Chats 0-70g	Small 70-120g	Medium 120-300g	Large 300-450g	Oversize >450g	Waste (% of yield in kg)		
03-19-12	1	5	21	5	0	8.5	1	8
01-75-2	1	5	19	3	1	5.9	2	7
Valor	2	5	18	6	0	1.8	3	7
01-20-21	2	5	18	4	0	7.6	4	7
Crop13	1	2	17	4	1	4.3	5	5
02-37-10	2	4	16	4	0	9.8	6	7
02-88-5	1	3	15	12	1	12.5	7	6
00-1-3	1	3	15	6	0	4.8	8	6
00-45-1	1	4	14	6	1	4.0	9	6
02-19-2	2	5	14	5	1	5.4	10	7
03-19-03	1	3	14	4	0	5.9	11	6
02-21-7	1	4	14	3	1	5.0	12	6
Almera	1	3	13	6	1	5.6	13	5
01-66-1	1	3	13	4	1	7.7	14	5
03-06-06	1	5	13	2	0	5.2	15	7
Coliban	1	1	12	10	1	10.1	16	5
00-20-50	2	7	12	1	1	8.6	17	7
Crop 8	2	7	11	1	0	3.5	18	7
03-52-05	3	8	11	0	0	2.8	19	7
Sebago	1	4	10	3	0	3.3	20	5
03-09-02	1	4	10	1	0	6.7	21	5
02-12-02	-	-	-	-	-	-	-	-
03-80-17	-	-	-	-	-	-	-	-
02-37-7	-	-	-	-	-	-	-	-

Discussion

Due to the drought, and subsequent reduced yields and tuber numbers, no varieties will be recommended for release this year.

The one stand out variety was the 03-19-03, which was planted in bulk at the side of the trial. This variety emerged and yielded well, was very even and looked very impressive on the ground. In the trial however, it did not prove to be the best variety as one plot was discarded due to poor strike. 03-19-12 was the highest yielding variety but was not as bright in the skin as 03-19-03. Both varieties have low specific gravities but do boil well.



03-19-03 & 03-19-12 have shown potential for release and will be included in the 2007/2008 trial

Recommendations

The very dry conditions this year have affected the tuber set and yield of the lines being tested. It is recommended that a number of varieties be replanted to fully assess their potential for the fresh market.

Autumn of 2007 will be the last time that there is public access to the “old” style breeding program at Toolangi. New material after that date will be specifically bred under contract for individuals and consortiums. 10 lines have been selected for next years trial.

It is recommended that this trial be continued for another two seasons to gain maximum benefit from the final batch of selections from the National Potato Breeding program.

Technology transfer

At harvest a mini field day was held with the assistance from the Victorian Department of Primary Industries. A BBQ lunch was supplied and growers and industry personal were able to view samples of each of the varieties in the trial as well as catch up with a number of other projects that are being carried out on their behalf.

In August 2007 another field day will be held at Thorpdale to report on a number of HAL projects including the fresh market trial.

Keith Blackmore will also cover the trial in his annual report to the ViCSPA Annual General Meeting.

Acknowledgments

The 2007 trial could not have gone ahead without the generous donations of the sponsors, and the support of the Thorpdale growers.

A special thanks to Neil Jennings for allowing us freedom of access to the trial on his property.

A special thank you to Cummaudo farms who donated the bags used for harvest.

Horticulture Australia again provided the base sponsorship for this trial.

Thank you to Des Jennings and his staff for helping with the planting and the harvest, and growing the seed plots this year. The job of growing seed for future trials and potential bulk plots is a significant but often unrecognised task.

A special thank you to Tony Slater and Graham Wilson from the Department of Primary Industries for their invaluable assistance in picking up the trial at harvest and expert knowledge when analyzing the tuber characteristics.

The Thorpdale Fresh Market Trial is administered by ViCSPA with much assistance from Ag-Challenge Consulting.

ViCSPA: Keith Blackmore, Pauline McPherson and Daniel Grayling

Ag-Challenge: Laura Bowles

The trial sponsors for 2006 were:

Durkin Produce,
And again Elders Limited
HAL