

**Fresh Potato Variety  
Evaluation Victoria 2007  
2008**

Keith Blackmore  
Victorian Certified Seed Potato  
Authority Inc

Project Number: PT07052

## **PT07052**

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**PTO7052**

**Fresh Potato Variety Evaluation Victoria**

**2007/2008**

**Final Report Compiled by**

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## **Fresh Potato Variety Evaluation Victoria, 2007/2008**

### ***-New Fresh Market Varieties for the Brushed Market-***

#### ***A Fresh Market Trial at Thorpdale, Victoria, 2007 – 2008***

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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#### **Funding Sources:**

- Horticulture Australia Ltd
- Elders Ltd
- Durkin Produce Australia Ltd

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## **Media Study**

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

This is the fifth year of fresh variety evaluation in Victoria. As with the first four years, a commercial farm in Thorpdale was chosen to host the trial. The reason being that the varieties are being evaluated are being produced for commercial production in the brushed potato market. This year 30 cultivars were trialed, 11 new "04" series cultivars from the National Breeding Program at Toolangi, 13 were from previous years trials, and there were 4 varieties submitted by sponsors and two 'standard' varieties, Coliban and Sebago, that were used as the base comparison.

The evaluation has identified three varieties that are recommended for commercial release this year. The three varieties out performed the current popular fresh varieties on the commercial markets in Australia after three and four years of comparison and evaluation in fresh trials. The three cultivars recommended for release are: 01-66-1, 01-75-2 & 03-19-3.

## **Technical Summary**

This project was conducted with the purpose to identify new potential potato varieties for the future fresh market in Australia.

This is the fifth year of fresh variety evaluation in Victoria. As with the previous years, a commercial farm in Thorpdale was chosen to host the trial. The trial site was in a commercial crop of Sebago potatoes being grown for the fresh market. Three replications were planted in a block. The trial was positioned in the commercial crop so as to ensure that it received an even cover of water when irrigated and did not need to be driven through when the crop was sprayed.

The evaluation has identified three varieties that are recommended for commercial release. The three varieties out performed the current popular fresh varieties on the commercial markets in Australia after two to four years of comparison and evaluation in fresh trials.

The source of cultivars used for all of the breeding trials in Australia is the NPBP (National Potato Breeding Program). The NPBP 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. The entries for Thorpdale trial have been selected from those 20 or 30 advanced selections from the NaPIES program. The cultivars that were planted at Thorpdale in 2007/08 are from different seed lines bred between 2001 and 2004.

Emergence and growth notes were taken during the growth period.

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

## **Executive Summary**

This is the fifth year of fresh variety evaluation in Victoria. As with the first four years, a commercial farm in Thorpdale was chosen to host the trial. The reason being that the varieties we are evaluating are being produced for commercial production in the brushed potato market.

The trial this year could not have gone ahead without the support of our generous sponsors, whose contributions and interest ensured that the trial was again a success this year. Horticulture Australia (HAL) had allocated funding to each State doing variety trial work. The sponsors this year were also invited to submit varieties of their own for trialing, and Elders Limited submitted one variety for comparison, while Durkin Produce submitted 3 varieties, which were planted along with the rest of the trial for assessment and comparison.

This trial has confirmed that there are three varieties that are possibly ready for commercial release.

### **01-66-01**

Tubers: Bright white smooth to slightly textured skin, white flesh. Oval to oblong, thick shaped tubers, medium size, shallow eyes and heel. Late maturity, equivalent to Coliban, and long dormancy. Specific Gravity (SG): 1.065.

Cooking Quality: A good boiling potato – little slough, very slight after cooking darkening (ACD), quite soft. Taste: good smooth creamy/buttery flavour.

General Comments: It has a bright skin and oval shape that makes for easy handling on harvesters and grading equipment. Generally attractive tubers, but can have growth cracks. In the four years of trialling it has consistently produced a high marketable yield. This cultivar is considered to have potential as a brushed cultivar.

### **01-75-2**

Tubers: Bright white to cream smooth skin, white flesh. Round to oval, flat shape, medium size, moderate crown eyes and shallow heel. Late maturity, equivalent to Coliban, and long dormancy. SG: 1.071.

Cooking quality: A good boiling potato – very slight slough, no ACD. Taste: good smooth creamy/buttery flavour.

General Comments: It is an attractive cultivar that has a moderate to high yield with moderate to high tuber numbers. In the four years of trialling it has consistently produced a high marketable yield. This cultivar is considered to have potential as a brushed cultivar.

### **03-19-3**

Tubers: Bright white smooth to very slightly textured skin, white flesh. Oval, slightly flat shape, medium to large size, shallow to moderate crown eyes and heel. Mid late maturity, and short dormancy of 4 to 6 weeks, SG: 1.050.

Cooking quality: A good boiling potato – no sloughing and no ACD. Not suitable for crisping or frying. Taste: smooth light texture with moderate creamy flavour.

General Comments: A very attractive cultivar, that consistently has produced a high number of uniform tubers. In the two years of trialling it has consistently produced a high marketable yield. In 2006/07 the crop grew in very dry conditions and some common scab was observed. This cultivar showed no response to greening or bruising when tested. This cultivar is considered to have potential as a washed cultivar.

The standard varieties for comparison this year were Coliban and Sebago. Over 13 varieties from the breeding program in this trial out yielded Sebago, but only 6 out yielded Coliban.

01-66-01, 01-75-2 and 03-19-3 have the potential to provide improvements in yield and tuber quality over Sebago which is the major variety presently being grown.

As such we recommend that these varieties be offered to industry for bulk multiplication and release. The process of licensing the varieties should recognise the financial input of the sponsors that enabled these trials to be conducted.

## **Introduction and Background**

The Potato Growers Council policy on breeding is for a continuation of fresh market cultivar work, both crossing and evaluation. Victoria has the only potato breeding program in Australia. Without a breeding program, new cultivar releases within Victoria will be limited to proprietary varieties from overseas which will be bought in and evaluated, and controlled by companies that could then obtain a market advantage. While these proprietary varieties have a role in the industry, the Potato Growers Council does not believe it to be a healthy situation for the industry to be solely dependant on imported cultivars that are not available to all growers. Australia has many unique aspects to our climate, our production systems, and consumer preferences, and there is a clear role for breeding new cultivars in Australia.

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, Wilwash, Lustre 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 series of trials in Thorpdale have evaluated varieties for the fresh potato industry (brushed), where the evaluations will need to meet the requirements of demanding fresh markets.

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 appearance. 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 2007/08 Thorpdale trial involved 30 different cultivars, with Sebago and Coliban varieties used as a standard. The breeding years range from 2001 to 2004, with the

earlier lines already extensively tested at Toolangi and other sites, or having being used before in other trials. The aim of the trial is to select varieties that could become commercially available for the fresh market and to increase fresh market grower efficiencies by reducing input costs and increasing price or size of the market.

## **Methodology**

The source of cultivars used for all of the breeding trials in Australia is the NPBP (National Potato Breeding Program). The NPBP 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. The entries for Thorpdale trial have been selected from those 20 or 30 advanced selections from the NPBP program. The cultivars that were planted at Thorpdale in 2007/08 are from different seed lines bred between 2001 and 2004.

The trial was planted in an area that was being used to grow fresh market potatoes at the time of planting. The position in the paddock was negotiated with Mr David Blackshaw, whose farm was being used for the trial. The 90 plots (30 entries x 3 repetitions including the varieties submitted by sponsors) 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 maturity, tuber assessment of harvest, and measurement of yield and tuber number and grading.

The trial was hand-planted on the 19<sup>th</sup> of November 2007 in mild to warm conditions. A red variety seed piece was planted at the beginning and end of each plot of white skinned varieties to minimise the end plant effect. Row spacing was 800mm and the inter-row spacing was 200mm, with a 1 metre walkway was left between each repetition. The 30 varieties were planted over three replications in a random grid, where each variety appeared once in each replication. The plots were labelled and fertiliser was applied at the same rate as the farmer used. During the growing period, two crop observation and one plant maturity assessment were completed.

This year was the third year that half of the cultivars in the trial were being tested. Planting the trial in the middle of a commercial crop exposes the crossbred lines to the same watering procedure, disease control and general care that they would receive in commercial production systems.

After harvest, the trial was graded in the shed of the grower whose farm the trial was planted on.

## **Results**

The trial was harvested on 22nd April 2008. Field assessments of tuber bloom, shape, and general marketable appearance were made on each cultivar prior to bagging. Each plot was then taken to a nearby shed where it was graded for size and weighed.

The emergence count was taken almost 2 months before harvest, so that most of the plants were well above the ground at the time of the count. The results of the Emergence count are in Table 1.



<b>Table 1 : Emergence Count</b>			
<b>Name of Cultivar</b>	<b>Rep 1</b>	<b>Rep 2</b>	<b>Rep 3</b>
01-66-1	3	2	2
01-75-2	3	3	3
02-19-2	4	4	3
02-37-10	4	3	3
02-88-5	3	4	3
03-06-06	2	3	2
03-19-03	2	2	2
03-19-12	3	2	3
03-19-2	2	3	3
03-52-5	3	2	2
03-80-17	5	5	5
04-172-06	3	3	4
04-174-01	2	4	3
04-174-08	3	4	4
04-174-10	4	3	4
04-174-19	3	4	4
04-174-23	5	5	5
04-183-04	4	3	4
04-184-02	3	4	4
04-194-01	2	1	3
04-195-04	4	3	4
04-196-03	5	3	5
Coliban	2	3	4
Crop 13	2	3	3
Crop 17	2	4	3
Crop 8	3	2	3
Sebago	2	3	3
Valor	4	3	3

**Emergence rating 0 = very even, 1 = good, 2 = average, 3 = somewhat uneven, 4 = uneven, 5 = very uneven/no emergence**

The harvest assessments (see Table 2), 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.

Table 2. Harvest and Grading notes			Recommendations for further trial work based on visual assessment.		
Cultivar	Harvest notes	Grading notes	Release	Discard	Orphan or Retest
01-66-1	Some growth cracks	Growth cracks, good sample	X		
01-75-2	Nice size, bright, nice yield	Lenticels visible, nice round, bright	X		
02-19-2	Bright, slightly irregular in shape	Some growth crack, greening. Small Powdery scab observed		X	X
02-37-10	Firm skin? Nice brightness, good shape	No skinning, small to medium, round/oval			X
02-88-5	Ugly	Lots of growth crack, irregular shapes		X	
03-06-06	Unattractive, small yield	Discard		X	
03-19-03	Good set, bright, attractive	Needs more size. Unremarkable. Powdery scab observed	X		
03-19-12	Small	Very small, uneven			X
03-19-2	Bright, smooth skin, attractive	Smalls, nice shape			X
03-52-5	Purple blush, bright	Skinning, small			X
03-80-17	Nice shape, attractive skin	Washed potato? Good size			X
04-172-06	Irregular shapes	Prominent lenticels, deep heel, not suitable. Powdery & Common scab observed		X	
04-174-01	Common scab, ugly, small, deep eyes	Discard. Significant common scab		X	
04-174-08	Bright eyes, good set	Skinning, high yield. Some Common scab			X
04-174-10	Small, off-white	Russet skin, some common scab in each replication		X	
04-174-19	Round, even sample	Pink blush, attractive, needs spacing			X
04-174-23	Scab visible, low yield?	Nice skin/shape. Full of scab		X	
04-183-04	Ugly - discard	Discard. Some Powdery scab		X	
04-184-02	Very ugly, small yield	Discard		X	
04-194-01	Very good set, medium eyes	Bright, smooth, good yield Powdery scab observed			X
04-195-04	Unattractive, low yield	Discard		X	
04-196-03	Skinning, shatters easily	Discard		X	
Coliban	Some skinning, large marketable yield	Skinning, not many smalls			
Crop 13	Looks a little rough	Small, good sample			
Crop 17	Round, small sample, large spuds	Very big tubers, round and flat shape			
Crop 8	Very small, looks good on ground	Medium yield, small			
Sebago	Visible lenticels	Lenticels still visible, some skinning			
Valor	Odd shapes, skinning	Very bad skinning after harvest. Powdery scab observed			

The trial was hand graded over a two day period. 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. The results of the grading can be seen in table 3.

Table 3. Trial Assessment Results. Varieties in bold are proposed for release								
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)		
04-194-01	2	7	48	4	0	0	1	15
03-19-12	3	10	42	2	0	.6	2	17
<b>01-75-2</b>	<b>2</b>	<b>6</b>	<b>40</b>	<b>3</b>	<b>1</b>	<b>.5</b>	<b>3</b>	<b>12</b>
<b>03-19-03</b>	<b>2</b>	<b>11</b>	<b>37</b>	<b>2</b>	<b>0</b>	<b>.5</b>	<b>4</b>	<b>16</b>
Valor	1	4	36	9	3	1.0	5	11
04-174-10	2	9	36	1	0	.8	6	14
Crop 17	1	2	35	15	16	.6	7	10
02-88-5	1	3	34	9	0	.6	8	11
Coliban	1	2	33	19	4	.5	9	10
04-174-08	2	6	33	3	0	1.1	10	11
03-52-5	2	11	33	1	0	.3	11	13
02-37-10	1	6	32	12	6	.9	12	12
Crop 13	1	5	32	7	3	.2	13	10
<b>01-66-1</b>	<b>1</b>	<b>4</b>	<b>32</b>	<b>6</b>	<b>0</b>	<b>1.2</b>	<b>14</b>	<b>10</b>
04-172-06	1	5	32	1	0	.6	15	11
04-174-01	1	5	30	37	1	.4	16	10
02-19-2	1	4	29	9	3	.6	17	9
Crop 8	3	11	29	3	0	.6	18	13
Sebago	1	5	29	3	1	.6	19	9
04-174-23	1	4	26	2	0	1.4	20	8
04-174-19	2	11	26	1	0	.1	21	12
03-80-17	1	4	24	4	1	.7	22	7
03-19-2	3	11	21	0	0	.8	23	12
03-06-06	-	-	-	-	-	-	-	-
04-184-02	-	-	-	-	-	-	-	-
04-183-04	-	-	-	-	-	-	-	-
04-195-04	-	-	-	-	-	-	-	-
04-196-03	-	-	-	-	-	-	-	-

- Varieties in **bold** are the varieties proposed for release

**Table 4** Comparison of 3 years trials

Cultivar	2005/06 Results		2006/07 Results		2007/08 Results	
	Rank by #1 Grade	Tuber number per plant	Rank by #1 Grade	Tuber number per plant	Rank by #1 Grade	Tuber number per plant
01-66-01	1	9	14	5	14	10
01-75-2	8	10	2	7	3	12
03-19-3	-	-	11	6	4	16
Sebago	22	8	20	5	19	9
Coliban	5	10	16	5	9	10

Table 4 shows a large difference between the tuber numbers per plant between this year and last year for all varieties. Last years the trial was planted in 'drought' conditions, thus the low tuber numbers across the entire trial. The tuber per plant for 01-66-1 & 01-75-2 cultivars result appears consistent in both the 05/06 and 2007/08 seasons. It is interesting to note all three varieties out yielded the standard variety, Sebago, each year.

Pictures were taken of each variety for a visual comparison when they were graded to their correct categories. These pictures demonstrate the shape, colour and yield (for some).

## **Discussion**

This was the fifth year of fresh market cultivar trials conducted at Thorpdale. This year's trial was well grown by the Blackshaw family and optimised the potential of each cultivar. We are pleased to recommend 3 varieties for commercialisation using the results from this trial and the data obtained from the previous two years trials.

01-66-01, 01-75-2 and 03-19-3 have the potential to provide improvements in yield and tuber quality over Sebago which is the major variety presently being grown.

As such we recommend that these varieties be offered to industry for bulk multiplication and release. The process of licensing the varieties should recognise the financial input of the local growers who assisted and sponsors that enabled these trials to be conducted.

There were a number of varieties that had their first year of being subjected to growing under the Thorpdale conditions. Most of these varieties will not be trialled again, but there are enough varieties that showed potential for another year of trial work to be undertaken in the Thorpdale area. As funding is limited, bulk trials have been suggested as a different and more economical assessment method for the coming year.

## **Recommendations**

This years trial was the first time the "04" series cultivars were seen by the public. Some of those cultivars showed some extremely attractive characteristics and the growers have requested that another year of trial work be done to determine whether they are varieties that perhaps have a future in the market in Australia.

We cannot determine whether a variety has potential for commercialisation after only one year of trial work, so at least one more year will ensure we get maximum benefit from these last few public varieties from the National Potato Breeding Program.

## **Technology Transfer**

Information about the trial harvest was distributed by the Victorian Potato Growers Council (VPGC) industry newsletter, and harvest notification reminders were sent out via fax and e-mail by the VPGC, ViCSPA and Seed Potatoes Victoria (SPV). The VPGC contacted sponsors and others who are interested in the trials, and the Victorian Department of Primary Industries contacted interstate growers who were interested in coming to the trial.

There was great interest at harvest with most district potato growers in attendance. At harvest a record sheet was provided to each grower. Other information provided included previous specific gravities and tubers per plant (from Toolangi results) and a table showing the effect of SG on cooking qualities. It was most pleasing to see the high level of interest in the variety trial.

The trial harvest itself was accompanied by a small field day, with presenters from the DPI and industry giving brief talks, as well as answering questions about the varieties and other issues in the Thorpdale area.

Potatoes Australia will be doing an article in the August edition detailing the release procedure for the varieties we have recommended for release, and Potatoes in Print has already released an article describing the varieties and the other trial results.

There will also be grower meetings between interested parties to discuss the future of the varieties that have been marked for commercial release or have been 'orphaned'.

## **Acknowledgments**

The 2007/2008 trial could not have gone ahead without the generous donations of the sponsors, and the support of the Thorpdale growers.

A special thanks to David Blackshaw for providing an ideal site, his management of the crop, for allowing us freedom of access to the trial on his property and for his staff's invaluable assistance in harvesting the trial.

Thank you again to Cummaudo farms who have donated the bags used for harvest for the past few years.

We would also like to thank Horticulture Australia, who matched the sponsors funds with a Commonwealth Government grant under the Voluntary contribution scheme.

A thank you to Prime Super and Ag-Challenge Consulting who provided the BBQ meal and drinks at harvest.

Thank you to Des Jennings and his staff for helping with the planting and the harvest, and growing the seed plots this year. Des has been a supporter of this trial work.

Thank you to the ViCSPA team, who assisted us with the trial harvest and grading and for ensuring that the emergence assessments were completed on time.

A special thank you to Tony Slater and Graham Wilson from the Department of Primary Industries for their invaluable assistance.

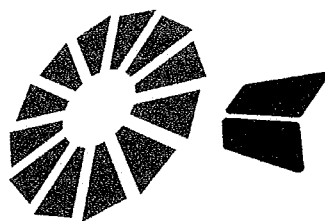
Thank you to Sharon Elphinstone from Elders Limited, who helped both during the harvesting of the trial.

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

ViCSPA: Keith Blackmore, Pauline McPherson and Daniel Grayling  
Ag-Challenge : Laura Bowles and Glenn Marriott

The trial sponsors for 2006 were:

Durkin Produce  
Elders Limited



# **Victorian Farmers**

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## **VFF Potato Growers Council**

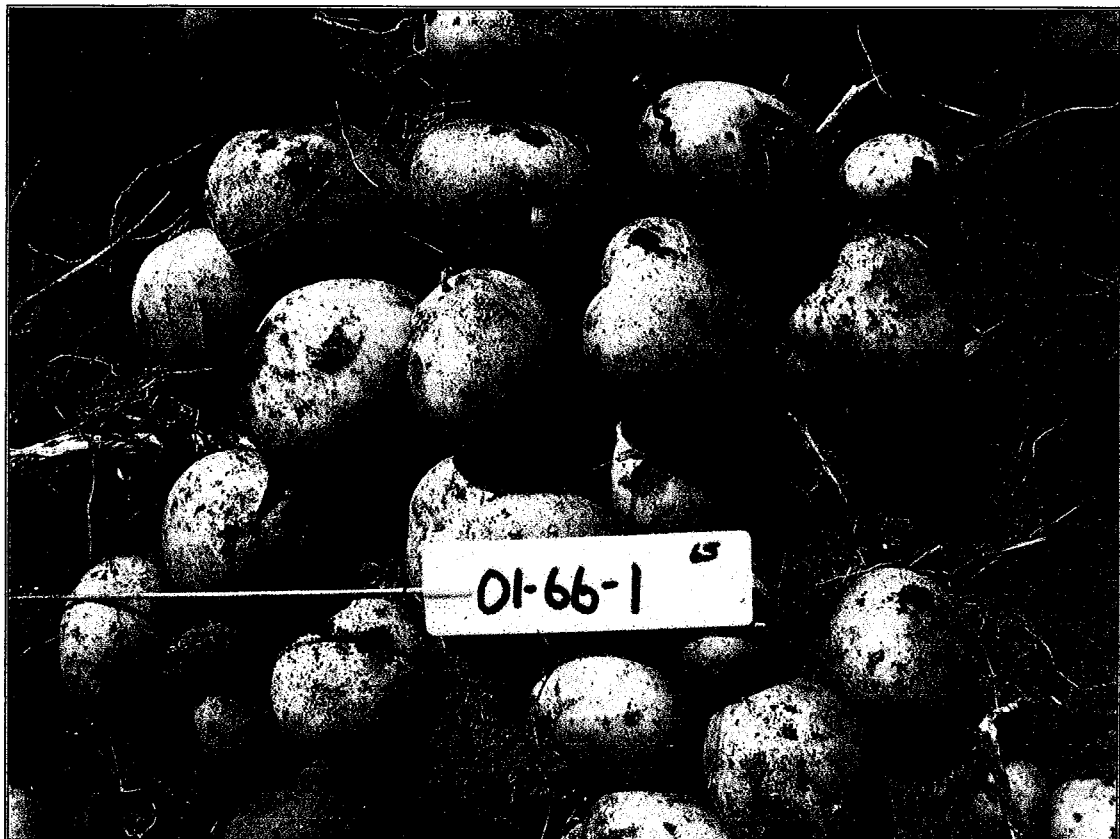


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03-19-03 Attractive evenly shaped tubers – smooth skin suits washing trade



01-661 Nice shape bright skin and good yields





01-75-2 More tubers per plant and higher yields than Sebago



2007/2008 trial site at harvest