Project Report

Alberta Potato Variety Development 2017
CDCS, Brooks, AB

N Response
Chipping Potatoes

Prepared for:
Old Dutch Foods

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Introduction

In Alberta, potato industry stakeholders are looking for replacement varieties that use less nitrogen, less water, less pesticide, yet yield superior processing or culinary quality and tonnage. An ideal chipping variety would produce a good yield of medium sized tubers, be relatively tolerant of environmental fluctuations, have few defects, and have high specific gravity in the desired range (above 1.085). Tubers with a good skin set, good maturity at harvest and low concentration of reducing sugars are also very desirable. Varieties that store well at cooler temperatures are an asset. Varieties from breeding programs in Canada, Europe and the United States are often being assessed. Many breeding programs target disease resistance, nitrogen use efficiency and excellent storage potential in addition to increased yield. Tuber yield potential and nutritional requirements are impacted by variety characteristics and by environmental characteristics such as the length of the growing season (Westerman, 1993). As noted by Love et al. (2003), the full potential of a new variety may not be realized until proper management is implemented. There is increasing pressure on potato producers to utilize best management practices to reduce the environmental footprint for potatoes. The costs of such shifts in production practices will be borne primarily by producers.

The purpose of this project was to pool resources to evaluate potential varieties from a range of sources, using a cooperative approach. This trial was established to collect local agronomic data on varieties from breeding programs in Canada, the U.S. and elsewhere. The varieties were planted in replicated plots at the Crop Diversification Centre in Brooks, AB and were provided with 180 lbs/ac N and, if requested, 100 lbs/ac N. Alberta data is essential when selecting varieties appropriate for our climate, our customers and industry stakeholders.

Objectives

A. To evaluate potential new varieties for chip processing;
B. To provide the potato industry an opportunity to assess varieties grown under local conditions;
C. To compare varieties from several breeding programs (including AAFC) under Alberta conditions; and
D. To determine the response of new chipping varieties to nitrogen fertilizer rates.

Materials and Methods

The variety evaluation was conducted in small plots at the Crop Diversification Centre South in Brooks, AB. Fertility for the low N plots (100 lbs/ac) was achieved through a combination of soil fertility (83 lbs/ac N; 253 lbs/ac P) and broadcast fertilizer (90 lbs/ac of 11-52-0) incorporated prior to planting. Low N plots received an additional top-dressing (15 lbs/ac of 46-0-0) at hilling, for a total of 100 lbs/ac N. Moderate N plots received an additional top-dressing (189 lbs/ac of 46-0-0) at hilling, for a total of 180 lbs/ac N. Within each level of nitrogen, varieties were planted in four replicate rows in a randomized complete block design along with standard varieties (Atlantic, AC Vigor and Monticello). Each block was planted adjacent to guard rows to reduce any edge effects (see plot plans, Appendix A).

Eptam 8E (1.8 L/ac) was applied prior to planting (May 4) to control weeds. Seed of standard cultivars was provided by Edmonton Potato Growers and seed of test cultivars was provided by each participant. Potatoes were planted May 30, 2017 (Low N Main) and May 29, 2017 (Moderate N Main) approximately 12 to 15cm deep using a two-row tuber unit planter. Seed was planted at 30cm spacing in 6m rows spaced 90cm apart. The plots were irrigated to maintain soil moisture close to 70%. Foliar fungicides were applied twice during the growing season to prevent early and late blight from developing (Table 1).

Table 1: Foliar fungicides applied to the potato crop in 2017 to prevent early and late blight development.

Date of Application	*Fungicide*	*Rate*
7 July	Ridomil Gold/Bravo	0.83L/ac
25 July	Quadris	324mL/ac

Figure 1: Variety evaluation trial at CDCS in Brooks, AB June 26, 2017.

Reglone was applied (1.0 L/ac) September 1 to the Low N and Medium N plots. The Low N plots were harvested September 14 to 15, 2017 and Moderate N plots were harvested September 12 to 13 using a 1-row Grimme harvester.

Chipping tubers were stored at 14.5˚C until graded. Tubers were graded into size categories (less than 48mm, 48 – 88mm, and over 88mm). A sample of twenty-five tubers (48 – 88mm) from each replicate was used to determine specific gravity using the weight in air over weight in water method. These tubers were cut longitudinally to assess internal defects. A composite sample of 8 tubers (2 per rep) was stored at 10˚C until culinary analyses were performed. Samples were evaluated for chip color using a Hunter Colorimeter in October 2017.

Marketable potatoes were made available to cooperators for additional storage evaluations, but data will not be provided here.

The data presented here have been statistically analyzed using ANOVA and Tukey's Multiple Comparison Test; (SPSS; $p \leq 0.05$). Statistical summaries are available upon request. T-tests were used to compare results for each variety at different levels of N.

Results and Discussion – Chippers

Sample hills of each variety were dug for a field day at CDCS August 24, 2017. Photos of these varieties are shown in Figure 2.

Figure 2. Chipping varieties at CDCS field day August 24, 2017: a) AC Hamer, b) AC Vigor, c) ODF007, d) ASPI17-5, e) Atlantic, f) Destiny, g) ODF009, and h) Monticello.

Yield data (total yield; ton/ac) and specific gravities of each of the chipping cultivars are shown in Table 2. When grown on moderate nitrogen (180 lbs/ac), total yield ranged from 22.4 ton/ac for ODF009 to over 30 ton/ac for AC Vigor and ASPI17-5. The yields of Destiny and ODF009 were significantly lower than yield of ASPI17-5, Atlantic and AC Vigor, but were not statistically different from Monticello or other cultivars in the trial. When grown on low N (100 lbs/ac), yield ranged from 24.1 ton/ac for Destiny and ODF009 to over 30 ton/ac for ODF007, but none of the yields were statistically different at this level of N. ASPI17-5 yielded significantly more on medium N (180 lbs/ac) compared to the low rate of N (100 lbs/ac) indicating that nitrogen fertilizer is required to optimize yield. On moderate N, specific gravity of tubers ranged from 1.088 for AC Hamer and AC Vigor to 1.107 for ODF009. Specific gravities ranged from 1.093 for ASPI17-5 to 1.109 for ODF009 when grown on lower N. All specific gravity measurements were above the threshold for light chip color, in fact, many were

perhaps too high. In 2017, the specific gravity of four entries were significantly reduced when grown on the moderate rate of N, AC Hamer, ODF007, Atlantic, and Destiny.

Further addressing the agronomic needs of each variety may well result in improvements to yield and size profiles when compared to the results in this trial.

Table 2: Estimated total yield (ton/acre) and specific gravity for each chipping variety grown on approximately 180 lbs/ac nitrogen (Moderate N) and 100 lbs/ac nitrogen (Low N). Data shown is the mean of four replicates. Data followed by the same letter in each column of the table are not significantly different at the $p < 0.05$ level.

CDCS	Yield (ton/ac)	SG
Moderate N		
AC Hamer	26.6 abc	1.088 c‡
AC Vigor	30.3 ab	1.088 c
ODF007	27.9 abc	1.097 b‡
ASPI17-5	32.0 a‡	1.087 c
Atlantic	28.9 ab	1.097 b‡
Destiny	22.6 c	1.101 ab‡
ODF009	22.4 c	1.107 a
Monticello	24.7 bc	1.103 ab
Low N		
AC Hamer	24.4 a	1.105 a‡
AC Vigor	26.7 a	1.097 bc
ODF007	30.2 a	1.103 ab‡
ASPI17-5	25.4 a‡	1.093 c
Atlantic	26.9 a	1.106 a‡
Destiny	24.1 a	1.108 a‡
ODF009	24.1 a	1.109 a
Monticello	26.7 a	1.108 a

‡ Data between the regular and low N plots was statistically different at the $p \leq 0.05$ level.

The mean percentage of total tuber number in each size category is shown in Table 3. The majority of tubers for each variety fell into the marketable category (48 – 88mm) for all cultivars except Destiny whether grown on moderate or low N. AC Hamer and Destiny produced a significantly higher percentage of tubers in the small size category and a significantly lower percentage of medium sized tubers compared to the standard cultivars when grown on moderate N. When grown on moderate N, AC Hamer, Destiny and ASPI17-5 produced a significantly higher percentage of small tubers than the standard entries. All of the entries produced significantly lower percentages of oversized tubers than Atlantic grown on low N. ASPI17-5 was the only variety with a significant shift in the percentage of tubers in each size category as a response to N fertility, with a shift toward larger tuber size in response to moderate N.

Table 3: Percentage of total tuber number in each size category (< 48mm, 48 to 88mm, > 88mm, and deformed) for each chipping variety grown on moderate nitrogen (approximately 180 lbs/ac) and 100 lbs/ac nitrogen (Low N). Data shown is the mean of four replicates. Data followed by the same letter in each column of the table are not significantly different at the $p < 0.05$ level.

CDCS	< 48mm	48 to 88mm	> 88mm	Deformed
Moderate N				
AC Hamer	44.8 b	54.5 c	0.3 b	0.5 a
AC Vigor	26.3 c	71.0 ab	1.8 b	0.5 a
ODF007	28.8 c	69.8 ab	0.5 b	1.3 a
ASPI17-5	31.0 c‡	66.3 abc‡	2.3 ab‡	0.5 a
Atlantic	14.8 d	78.0 a	6.3 a	0.8 a
Destiny	59.3 a	40.3 d	0.0 b	0.8 a
ODF009	35.0 bc	63.5 bc	1.3 b	0.0 a
Monticello	28.8 c	68.3 ab	3.0 ab	0.0 a
Low N				
AC Hamer	42.3 a	57.3 bc	0.2b	0.3 b
AC Vigor	26.8 b	72.3 a	0.5 b	0.0 b
ODF007	25.8 b	71.5 ab	1.5 b	1.0 b
ASPI17-5	41.5 a‡	52.3 c‡	0.0 b‡	6.3 a
Atlantic	19.8 b	71.3 ab	7.3 a	2.0 ab
Destiny	49.3 a	49.5 c	0.0 b	1.3 b
ODF009	28.8 b	69.3 ab	0.3 b	1.0 b
Monticello	27.0 b	70.5 ab	2.0 b	0.5 b

‡ Data between the regular and low N plots was statistically different at the $p \leq 0.05$ level.

The yield of tubers (estimated ton/ac) of each variety is shown by size category in Table 4. Yield of medium sized tubers ranged from 14.7 ton/ac for Destiny to 26.2 ton/ac for ASPI17-5 on the moderate N plots. Yield of medium potatoes ranged from 18.1 ton/ac for ASPI17-5 to 25.7 ton/ac for ODF007 when grown on low N plots. When grown at a moderate rate of N, Destiny yielded significantly higher yield of tubers under 48mm than other cultivars and significantly lower yield of tubers of marketable size than other entries. Atlantic yielded more tubers over 88mm than other varieties at both levels of N. There were no significant differences in yield of deformed tubers from the moderate N plots, but on low N, ASPI17-5 produced significantly more deformed tubers than other cultivars. When grown on moderate rates of N, ASPI17-5 produced significantly greater yields of tubers 48 to 88mm and over 88mm than when grown on low N.

Table 4: Estimated yield (ton/ac) in each size category (< 48mm, 48 to 88mm, > 41mm, and deformed tubers) for each chipping variety grown on moderate nitrogen (approximately 180 lbs/ac) and at a lower rate of N (100 lbs/ac). Data shown is the mean of four replicates. Data followed by the same letter in each column of the table are not significantly different at the $p < 0.05$ level.

CDCS	Yield of <48mm (ton/ac)	Yield of 48 to 88mm (ton/ac)	Yield of > 88mm (ton/ac)	Yield of deformed (ton/ac)
Moderate N				
AC Hamer	4.9 b	21.4 ab	0.2 b	0.1 a
AC Vigor	2.9 c	25.3 a	1.6 b	0.5 a
ODF007	3.4 c	23.6 a	0.5 b	0.4 a
ASPI17-5	3.4 c	26.2 a‡	2.2 ab‡	0.3 a
Atlantic	1.4 d	22.0 ab	4.9 a	0.5 a
Destiny	7.6 a	14.7 c	0.0 b	0.3 a
ODF009	3.4 c	17.8 bc	1.2 b	0.0 a
Monticello	2.5 cd	20.5 ab	1.8 b	0.0 a
Low N				
AC Hamer	5.0 ab	19.0 a	0.2 b	0.2 b
AC Vigor	2.7 cd	23.1 a	0.7 b	0.2 b
ODF007	2.6 cd	25.7 a	1.6 b	0.3 b
ASPI17-5	4.5 abc	18.1 a‡	0.0 b‡	2.8 a
Atlantic	1.5 d	20.1 a	4.9 a	0.3 b
Destiny	5.8 a	17.9 a	0.0 b	0.4 b
ODF009	3.2 bcd	20.2 a	0.4 b	0.3 b
Monticello	2.8 cd	22.0 a	1.8 b	0.1 b

‡ Data between the regular and low N plots was statistically different at the $p \leq 0.05$ level.

Tubers were assessed subjectively for Uniformity of Size and Overall Appearance. Scores are presented in Table 5. There were no significant differences in Uniformity of Size between cultivars grown at either rate of N. At a moderate rate of N, Destiny was scored significantly lower in overall appearance compared to other cultivars. At a lower rate of N, Atlantic scored lowest for overall appearance. AC Hamer, AC Vigor and Monticello scored significantly better than Atlantic for overall appearance. In 2017, there were no significant differences in overall appearance scores by cultivars between low and moderate N.

Table 5: Subjective tuber assessments: Uniformity of Size was subjectively assessed on each replicate by the same individual during the grading process. Overall Appearance was based on uniformity of size and uniformity of shape, skin colour, deformities and eye depth. Data shown is the mean of 4 replicates.

	Uniformity of Size[1]	Overall Appearance[2]
Moderate N		
AC Hamer	3.8 a	3.8 a
AC Vigor	3.5 a	3.5 a
ODF007	3.8 a	3.5 a
ASPI17-5	3.5 a	3.3 a
Atlantic	2.3 a	2.5 ab
Destiny	2.5 a	1.8 b
ODF009	3.0 a	3.3 a
Monticello	3.0 a	3.3 a
Low N		
AC Hamer	3.3 a	3.3 ab
AC Vigor	3.3 a	3.5 a
ODF007	3.0 a	2.8 abc
ASPI17-5		
Atlantic	2.0 a	2.0 c
Destiny	2.8 a	2.3 bc
ODF009	3.3 a	3.0 abc
Monticello	3.0 a	3.3 ab

[1] Uniformity of Size: 1 (very variable) - 5 (very uniform)

[2] Overall Appearance: 1 (very poor) - 5 (outstanding)

ǂ Data between the regular and low N plots was statistically different at the $p \leq 0.05$ level.

Tuber samples used to measure specific gravity were evaluated for hollow heart, brown center, stem-end discoloration, other types of internal necrosis and scab. At the moderate rate of N, very few tubers exhibited hollow heart or brown center. Many of the samples had some level of stem-end discoloration or vascular discoloration but these were not tested for wilt organisms. Some level of black scurf was noted on several entries, especially AC Hamer, but no seed treatment was used in the trial. Common scab was noted on isolated tubers from a number of samples, including ODF007, ASPI17-5, and Monticello. At the low rate of N, very few tubers exhibited hollow heart or brown centre. A few tubers showed some stem-end discoloration or vascular discolouration. Internal necrosis was evident in a small percentage of ODF007, Atlantic, and Monticello. Black scurf was noted on AC Hamer, AC Vigor, Atlantic, and Destiny, but no seed treatment was used in the trail. Scab was present at low levels on AC Vigor, Atlantic, Destiny and Monticello. Two cultivars in the low N trial, ODF009 and Atlantic, showed signs of white knot, which is often present in tubers with exceptionally high dry matter.

Chip colour scores of composite samples are presented in Table 6. All of the samples gave excellent chip scores in 2017. A higher L-value indicates a lighter chip. At the moderate rate of N, the lightest chips were produced from ASPI17-5 and AC Hamer. At the low rate of N, the lightest chips were produced from AC Vigor, AC Hamer and Destiny. AC Hamer, AC Vigor, Destiny, ODF009 and Monticello had lighter chips when grown with low N, while Atlantic and ODF007 produced lighter chips from the moderate N plots. These are composite samples from one year of testing and additional testing may be required to determine optimal agronomic conditions for chip quality.

Table 6: Chip colour scores from subsamples of each variety grown at moderate nitrogen (approximately 180 lbs/ac) and at a lower rate of N (100 lbs/ac). Data shown is the mean of duplicate analyses of a composite sample evaluated on a Hunter Colorimeter (L is a lightness score; higher numbers are lighter).

	L (Moderate N)	L (Low N)
AC Hamer	69.9	72.3
AC Vigor	67.4	72.3
ODF007	65.2	57.2
ASPI17-5	69.0	n/a
Atlantic	68.8	64.0
Destiny	68.1	72.6
ODF009	65.4	69.3
Monticello	63.6	68.0

Conclusions

The 2017 variety trial included 5 chipping potato cultivars with potential in southern Alberta. Atlantic, AC Vigor and Monticello were included in the trial as check varieties at both rates of N.

Total yield of Destiny and ODF009 was significantly lower than that of Atlantic when provided with moderate rates of N, but differences in total yield were not significant on the low N plots. Specific gravity was significantly higher for ODF007, Destiny, AC Hamer and ODF009 grown on low N compared to moderate N.

Yield of marketable sized tubers was greatest for ASPI17-5, although only significantly higher than Destiny and Kibbbitz on moderate N. This variety also responded positively to additional N.

All samples gave excellent chip colour. On Moderate N plots, the lightest chips were observed for ASPI17-5 and AC Hamer. On low N plots, AC Hamer, AC Vigor and Destiny had the highest chip scores.

The trial was designed to provide regional data for a wide range of potato cultivars. Addressing the agronomic needs of each variety may well result in improvements to yield and size profiles when compared to the results in this year of the trial.

Recommendations

- Varieties should be grown in southern Alberta for at least 3 years and these results need to be compiled to ensure a reasonable evaluation.
- To establish better estimates of yield potential and size profile for the varieties, each variety should be grown under optimal agronomic conditions (fertility, plant density, etc.).

References

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Alberta Seed Producers Inc.
ConAgra Foods, Lamb Weston Division
Edmonton Potato Growers
Little Potato Company
Old Dutch Foods
McCain Foods
Parkland Seed Potatoes
Prairie Gold Produce
Rockyview Seed Potatoes
Solanum International Inc.
Tuberosum Technologies Inc.

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Appendix A Plot Plan

Low N Variety Trial 2017 - September harvest

20 Seed pieces per row

24 X 66 = 1584 m2

N

Guard = Russet Burban

24	Guard	Guard	Guard	Guard	Guard	Guard	Guard	Guard
23	1001 PGP17-2	1011 TT17-3	1021 TT17-2	1031 Monticello	2001 TT17-10	2011 ODF009	2021 RV013	2031 Yukon Gold
22	1002 TT17-5	1012 EPG17-3	1022 TT17-7	1032 Shepody	2002 TT17-7	2012 TT17-1	2022 EPG17-2	2032 PGP17-2
21	1003 PGP17-4	1013 RV008	1023 AC Hamer	1033 EPG17-2	2003 AC Hamer	2013 Destiny	2023 PGP17-3	2033 Norland
20	1004 TT17-9	1014 ODF007	1024 Blazer Russet	1034 RV013	2004 RV008	2014 Kennebec	2024 EPG17-3	2034 TT17-9
19	1005 TT17-10	1015 RV014	1025 TT17-4	1035 PGP17-3	2005 PGP17-4	2015 ODF010	2025 TT17-4	2035 Monticello
18	1006 AC Vigor	1016 Kennebec	1026 Destiny	1036 RV010	2006 RV011	2016 AC Vigor	2026 Shepody	2036 ODF007
17	1007 Norland	1017 ODF009	1027 TT17-6	1037 Yukon Gold	2007 Lollipop	2017 Blazer Russet	2027 ASPI010	2037 TT17-6
16	1008 RV011	1018 ASPI010	1028 RV009	5001 ODF007	2008 ASPI17-2	2018 TT17-2	2028 TT17-5	5004 AC Hamer
15	1009 TT17-8	1019 ODF010	1029 Atlantic	5002 ODF009	2009 Atlantic	2019 TT17-3	2029 RV009	5005 Destiny
14	1010 ASPI17-2	1020 TT17-1	1030 Lollipop	5003 ODF010	2010 TT17-8	2020 RV014	2030 RV010	5006 AC Vigor
13	Guard	Guard	Guard	Guard	Guard	Guard	Guard	Guard
	6m	3 m						6m
12	Guard	Guard	Guard	Guard	Guard	Guard	Guard	Guard
11	3001 AC Vigor	3011 Destiny	3021 TT17-2	3031 PGP17-2	4001 ASPI010	4011 TT17-9	4021 PGP17-2	4031 TT17-6
10	3002 AC Hamer	3012 Shepody	3022 ASPI010	3032 TT17-4	4002 TT17-1	4012 Monticello	4022 Kennebec	4032 TT17-10
9	3003 TT17-6	3013 PGP17-3	3023 ASPI17-2	3033 Norland	4003 Norland	4013 TT17-5	4023 Shepody	4033 PGP17-4
8	3004 Atlantic	3014 RV014	3024 ODF009	3034 Yukon Gold	4004 TT17-4	4014 TT17-3	4024 TT17-2	4034 EPG17-2
7	3005 ODF007	3015 TT17-8	3025 Lollipop	3035 TT17-9	4005 RV011	4015 PGP17-3	4025 ODF007	4035 ODF009
6	3006 Kennebec	3016 EPG17-3	3026 Monticello	3036 RV010	4006 ASPI17-2	4016 TT17-7	4026 EPG17-3	4036 Yukon Gold
5	3007 TT17-3	3017 EPG17-2	3027 TT17-10	3037 RV008	4007 AC Vigor	4017 RV014	4027 ODF010	4037 Lollipop
4	3008 RV011	3018 RV009	3028 TT17-5	5007 Atlantic	4008 Destiny	4018 Atlantic	4028 RV009	
3	3009 Blazer Russet	3019 PGP17-4	3029 TT17-7	5008 Monticello	4009 TT17-8	4019 RV013	4029 AC Hamer	
2	3010 RV013	3020 ODF010	3030 TT17-1		4010 RV010	4020 Blazer Russet	4030 RV008	
1	Guard	Guard	Guard	Guard	Guard	Guard	Guard	Guard
	6m	3 m				3m	3m	3m

Variety Medium N Brooks - 2017 - Ful

20 Seed pieces per row

24 x 88m = 2112m2

N

12" spacing

24	Guard		Guard		Guard		Guard		Guard		Guard				Guard		Guard			
23	3001		3011		3021		3031		3041		4001		4011		4021		4031			
	Destiny		EPG17-4		Russet Burbank Calif		Bonnata		ODF007		Yukon Gold		LW17-1		EPG17-1		EPG17-4			
22	3002		3012		3022		3032				4002		4012		4022		4032			
	Excellency		Monticello		Atlantic		ASPI17-9				ASPI17-5		ODF010		Norland		ODF007			
21	3003		3013		3023		3033				4003		4013		4023		4033			
	PGP17-1		Blazer Russet		ASPI17-4		Red Apple				AC Vigor		Russet Burbank		Shepody		Destiny			
20	3004		3014		3024		3034				4004		4014		4024		4034			
	Kennebec		ASPI17-2		Basin Russet		LW17-1				Russet Burbank Cali		ASPI010		ASPI17-2		ASPI17-7			
19	3005		3015		3025		3035				4005		4015		4025		4035			
	AC Hamer		ASPI17-1		Rosa Gold		ASPI17-7				Kennebec		Cerata		Bridget		LW17-2			
18	3006		3016		3026		3036				4006		4016		4026		4036			
	Bridget		ASPI17-8		ASPI010		LW17-2				ASPI17-9		Atlantic		RV012		AC Hamer			
17	3007		3017		3027		3037				4007		4017		4027		4037			
	RV012		Yukon Gold		ASPI17-5		EPG17-1				ASPI17-1		ASPI17-4		ASPI17-8		AC Hamer			
16	3008		3018		3028		3038				4008		4018		4028		4038			
	Norland		ODF010		EPG17-3		Russet Burbank				ODF009		PGP17-1		Red Apple		Bonnata			
15	3009		3019		3029		3039				4009		4019		4029		4039			
	EPG17-2		AC Vigor		Shepody		Cerata				Blazer Russet		EPG17-3		Basin Russet		Excellency			
14	3010		3020		3030		3040		4041		4010		4020		4030		4040			
	EPG17-5		AC Hamer		ODF009		ASPI17-2		Monticello		EPG17-2		Rosa Gold		EPG17-5		ASPI17-2			
13	Guard	3 m	Guard		Guard		Guard		Guard		Guard				Guard		Guard			

6m

12" spacing

Guard = Russet Burbank

12	Guard		Guard		Guard		Guard		Guard		Guard				Guard		Guard			
11	1001		1011		1021		1031		1041		2001		2011		2021		2031			
	ASPI17-2		ODF009		Destiny		EPG17-2		AC Hamer		ASPI17-2		ODF007		LW17-1		ASPI17-7			
10	1002		1012		1022		1032		5001		2002		2012		2022		2032			
	ASPI17-2		Basin Russet		Rosa Gold		Bonnata		ODF007		ASPI17-5		Destiny		ASPI17-9		EPG17-4			
9	1003		1013		1023		1033		5002		2003		2013		2023		2033			
	ASPI17-8		Bridget		Yukon Gold		ASPI17-4		ODF009		Basin Russet		EPG17-5		Rosa Gold		EPG17-1			
8	1004		1014		1024		1034		5003		2004		2014		2024		2034			
	Kennebec		RV012		EPG17-5		Russet Burbank		Monticello		Bridget		AC Vigor		AC Hamer		ODF009			
7	1005		1015		1025		1035		5004		2005		2015		2025		2035			
	Shepody		ODF010		Norland		ASPI17-5		ODF010		ASPI010		Atlantic		EPG17-3		EPG17-2			
6	1006		1016		1026		1036		5005		2006		2016		2026		2036			
	ASPI17-1		AC Vigor		LW17-1		EPG17-4		Atlantic		Excellency		PGP17-1		RV012		AC Hamer			
5	1007		1017		1027		1037		5006		2007		2017		2027		2037			
	ASPI17-9		LW17-2		AC Hamer		Russet Burbank Calif		AC Hamer		ASPI17-4		Red Apple		LW17-2		ASPI17-1			
4	1008		1018		1028		1038		5007		2008		2018		2028		2038			
	EPG17-1		PGP17-1		Atlantic		ASPI010		Destiny		Bonnata		Shepody		ASPI17-8		Kennebec			
3	1009		1019		1029		1039		5008		2009		2019		2029		2039			
	Monticello		Excellency		ODF007		Red Apple		AC Vigor		Russet Burbank		Russet Burbank Cali		Cerata		Yukon Gold			
2	1010		1020		1030		1040		2041		2010		2020		2030		2040			
	EPG17-3		Blazer Russet		ASPI17-7		Cerata		ODF010		ASPI17-2		Norland		Blazer Russet		Monticello			
1	Guard	3 m	Guard		Guard		Guard		Guard	13m	Guard		Guard		Guard		Guard			

6m