

Potato Variety Trial Report – 2020



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A potato variety trial was planted at the Harrington Research Farm of Agriculture and Agri-Food Canada on May 28, 2020 as part of a Potato Research Cluster Project funded through the Canadian Agricultural Partnership's Agri-Science Program. The objective of the trial was to compare the performance of recently released varieties and advanced breeding selections to standard varieties for yield and quality under Prince Edward Island soil and climate conditions. Findings from this study should provide growers with valuable information on the suitability of these varieties and selections for production in Prince Edward Island.

The trial was conducted in a field with a soil pH and organic matter content of 6.5 and 3.1%, respectively. Plots were 25' long single rows, replicated four times in a randomized complete block design. Varieties were grouped together according to end-market type to lessen field variability. Fertilizer was banded, at planting at 130 kg ha⁻¹ N, 195 kg ha⁻¹ P₂O₅, 130 kg ha⁻¹ K₂O and 25 kg ha⁻¹ Mg. All plots received extra N at 50 kg ha⁻¹ on June 30 with the exception of Lamoka and Manistee which received 67 kg ha⁻¹ of additional N. Seed spacing was 10" and 36", within and between-rows, respectively the exception being Defender, F14021, Russet Burbank, VF14016, Mackinaw chipper, Manistee and Line 1 at 12" spacing. Products for pest control were Admire, Capture, Sencor, Orondis Ultra, Luna Tranquility, Reason and Double Nickel.

Crops prior to potatoes were Sorghum Sudangrass and Brown Mustard in 2018 and 2019, respectively. Final cultivation and hilling took place on June 30 and the first application of Reglone was on September 28, 123 days after planting. Harvest of the Fresh-Market and Chip entries took place on October 5 and the French-fry varieties were dug on October 13.

Tubers were graded according to one of the following size standards using an Optical Potato Grader. Fresh-Market Round: (1) < 1½" in diameter; (2) 1½" to 2" (Canada No. 1 Small); (3) 2" to 3½" (Canada No. 1, with 60% by weight ≥ 2¼"); (4) 3½" to 4½" (Canada No. 1 Large); (5) Cull and (6) Sunburn. Chip: (1) < 1½" in diameter; (2) 1½" to 1⅞"; (3) 1⅞" to 3½"; (4) 3½" to 4½"; (5) Cull and (6) Sunburn. French-fry: (1) < 2" in diameter; (2) 2" in diameter to 10 ounces in weight; (3) > 10 ounces in weight; (4) Cull and (5) Sunburn.

Forty tubers of Canada No. 1 size (10/rep) were cut and assessed for internal defects. Tuber specific gravity was determined using the weight in air / weight in water method.

Total rainfall for May, June, July, August, September and October was 70, 30, 45, 31, 96 and 88 mm, respectively. Mean monthly temperature was about normal for May and above normal for June, July, August, September and October by 1.6, 0.6, 1.7, 1.1 and 0.8 °C, respectively. The 2020 growing season at the Harrington farm was predominantly hot and dry with only 105 mm of rainfall being recorded between May 31 and September 2.

Differences in means described in this report are significant at a 95% confidence level or greater.

Table 1. Plant stand, vigor, vine senescence and tuber appearance for three types of potatoes grown at AAFC, Harrington in 2020.

Variety	Stand (%)	Mid-season Vigor	VS* (%)	Tuber Appearance	Notes
Defender	100	Mod-Strong	30	Ave to Good	Some pitted scab, Uniform shape
F14021	100	Mod-Strong	60	Good	Clean, Very uniform shape
Goldrush	100	Mod-Strong	65	Ave to Good	Clean, Uniform shape, relatively small
Russet Burbank	100	Mod-Strong	45	Average	Clean, Relatively small in size
VF14016	100	Moderate	20	Ave to Good	Clean, Uniform shape
AAC Hamer	100	Mod-Strong	90	Very Good	Clean, Bright, Uniform shape & size
AR2018-07	100	Strong	70	Average	Clean, Uniform shape, slightly lumpy
Atlantic	99	Moderate	60	Average	Clean, Uniform shape
Lamoka	100	Mod-Strong	55	Good	Some black scurf, Uniform shape
Mackinaw	100	Mod-Strong	30	Average	Clean, Uniform shape
Manistee	100	Mod-Strong	75	Average	Clean, Somewhat flattened
Line 1	100	Strong	50	Average	Minor black scurf, Uniform shape
Line 2	98	Mod-Strong	20	Ave to Good	Some black scurf, Uniform shape
Excellency	95	Strong	45	Very Good	Clean, Bright
F14119	100	Strong	80	Good	Clean, Uniform shape and size
Norland	99	Strong	80	Very Good	Clean, Bright
Yukon Gold	100	Mod-Strong	70	Very Good	Some black scurf otherwise clean
LSD (0.05)	NS				* VS = % Vine Senescence on August 24

French-fry varieties / selections

Emergence was excellent at 100% plant stand (Table 1). VF14016 and Defender exhibited the least amount of vine senescence on August 24 at 20 and 30%, respectively.

Defender and Russet Burbank produced the greatest total number of tubers with no significant difference between the two and with the exception of Russet Burbank, Defender had the highest total yield (Table 2). Although numerical differences in marketable yield existed between entries the differences were not statistically significant. This would probably be attributed to the relatively large variation among plots. Although small, the average tuber size of VF14016 and F14021 was greater than that of Russet Burbank.

Specific gravities values were high, ranging from 1.089 to 1.100. No sign of hollow heart was noted in any of the French-fry entries with the exception of Russet Burbank where 2.5% of the tubers displayed hollow heart (data not shown).

Pictures of French-fry potatoes can be found in Figure 1.

Table 2. Tuber yield and count by size class, specific gravity and mean tuber weight for french-fry potatoes grown at AAFC, Harrington in 2020.

Entry	Total	2" to			Culls	Mkt*	Specific Gravity
		< 2"	10 oz.	> 10 oz.			
----- (Metric tonne / Ha) -----							
Defender	40.0	15.0	23.3	1.41	0.34	24.7	1.100
F14021	28.7	8.2	19.5	0.71	0.26	20.3	1.089
Goldrush	27.1	11.8	15.3	0.0	0.03	15.3	1.089
Russet Burbank	32.4	13.8	18.0	0.23	0.44	18.2	1.093
VF14016	29.8	5.2	23.8	0.43	0.38	24.3	1.098
Mean	31.6	10.8	20.0	0.55	0.29	20.5	1.094
CV%	17	21	32	225	112	35	0.2
LSD (0.05)	8.0	3.6	NS	NS	NS	NS	0.003
----- (tubers / m ²) -----							
Defender	43.9	26.8	16.5	0.40	0.22	16.9	91.0
F14021	28.4	14.1	13.9	0.22	0.18	14.1	101.2
Goldrush	33.2	20.8	12.4	0.0	0.04	12.4	81.4
Russet Burbank	43.3	28.0	15.0	0.07	0.32	15.1	74.9
VF14016	28.0	10.3	17.3	0.14	0.25	17.4	106.8
Mean	35.4	20.0	15.0	0.17	0.20	15.2	91.1
CV%	9	21	28	220	104	29	14
LSD (0.05)	5.0	6.6	NS	NS	NS	NS	20.2

* Mkt = Marketable (2" to 10 oz. and > 10 oz.)

Ave. Wt. = mean tuber weight (g)

Chipping varieties / selections

Emergence was very good at 98% plant stand or higher (Table 1). Line 2 and Mackinaw chipper displayed the least amount of vine senescence on August 24 at 20 and 30% , respectively.

Line 1 and Line 2 had the greatest yield of tubers > 1 7/8" in diameter and the highest marketable and total tuber yield with no significant differences between the two (Table 3). With the exception of Line 1, AR2018-07 outranked all other entries in total tuber production. Line 1, Line 2 and Mackinaw chipper outperformed Atlantic in marketable yield. Although small, the average tuber size of Lamoka was greater than that of any other chipping entry with the exception of Atlantic.

Specific gravities values were high, ranging from 1.091 to 1.105. No sign of hollow heart was noted in any of the chipping entries tested (data not shown).

Pictures of chipping potatoes can be found in Figure 2.

Table 3. Tuber yield and count by size class, specific gravity and mean tuber weight for chipping potatoes grown at AAFC, Harrington in 2020.

Variety	Total	1 ½" to 3 ½" to				Culls	Mkt*	Specific Gravity
		< 1 ½"	1 ⅞"	3 ½"	4 ½"			
----- (metric tonne / Ha) -----								
AAC Hamer	24.6	1.0	8.2	15.4	0	0.13	23.5	1.095
AR2018-07	26.1	2.4	11.1	12.3	0	0.23	23.4	1.099
Atlantic	24.2	0.7	3.8	19.5	0	0.09	23.4	1.102
Lamoka	25.0	0.6	3.2	20.9	0	0.23	24.1	1.096
Mackinaw	27.7	1.6	5.8	20.3	0	0.03	26.0	1.104
Manistee	21.7	0.8	5.6	15.0	0	0.40	20.6	1.105
Line 1	33.8	1.3	6.6	25.8	0	0.08	32.4	1.096
Line 2	33.5	1.4	6.3	25.6	0	0.18	31.9	1.091
Mean	27.1	1.2	6.3	19.4	0	0.17	25.7	1.098
%CV	5	24	24	12	0	112	5	0.2
LSD (0.05)	1.9	0.4	2.2	3.6	*	NS	2.1	0.003
----- (tubers / m ²) -----								
AAC Hamer	42.3	4.8	17.2	20.2	0	0.22	37.3	58.3
AR2018-07	51.3	10.9	24.0	15.9	0	0.47	39.9	51.1
Atlantic	31.6	3.6	7.8	20.1	0	0.14	27.9	76.8
Lamoka	29.6	3.0	6.5	19.8	0	0.25	26.4	84.7
Mackinaw	42.6	7.7	12.6	22.3	0	0.04	34.9	65.2
Manistee	33.8	3.6	11.7	17.7	0	0.79	29.4	64.3
Line 1	47.5	5.7	13.8	27.9	0	0.14	41.7	71.0
Line 2	47.0	7.0	13.5	26.2	0	0.25	39.7	71.6
Mean	40.7	5.8	13.4	21.3	0	0.29	34.7	67.9
%CV	7	22	24	10	0	111	6	8
LSD (0.05)	4.1	1.9	4.8	3.1	*	NS	3.0	8.2

* Mkt = Marketable (1 ½" to 4 ½")

Ave. Wt.=mean tuber weight (g)

Table 4. Tuber yield and count by size class, specific gravity and mean tuber weight for fresh market potatoes grown at AAFC, Harrington in 2020.

Entry	Total	< 1½"	No. 1	Canada	No. 1	Culls	Mkt*	Specific Gravity
			Small	No. 1	Large			
----- (metric tonne / Ha) -----								
Excellency	38.0	0.4	4.9	32.4	0	0.29	37.3	1.092
F14119	30.7	1.9	21.2	7.1	0	0.52	28.2	1.085
Norland	30.9	0.8	19.4	10.1	0	0.60	29.5	1.082
Yukon Gold	24.7	0.4	3.5	20.1	0	0.75	23.6	1.100
Mean	31.1	0.9	12.2	17.4	0	0.54	29.6	1.090
CV%	5	29	13	7	0	88	6	0.1
LSD (0.05)	2.3	0.4	2.5	2.0	*	NS	2.6	0.002
----- (tubers / m ²) -----								
Excellency	31.2	1.9	7.6	21.5	0	0.21	29.1	122.7
F14119	48.8	8.9	33.4	5.8	0	0.65	39.2	62.8
Norland	39.7	4.2	27.3	7.6	0	0.50	34.9	78.2
Yukon Gold	23.9	2.1	6.5	14.8	0	0.54	21.3	103.4
Mean	35.9	4.3	18.7	12.4	0	0.48	31.1	91.8
CV%	7	28	13	7	0	84	7	8
LSD (0.05)	4.1	1.9	3.8	1.5	*	NS	3.6	11.1

* Mkt = Marketable (Small, No. 1 and Large)

Ave. Wt.=mean tuber weight (g)

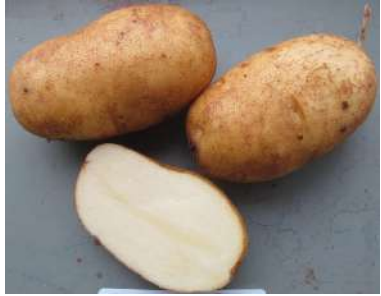
Fresh Market varieties / selections

Emergence was good at 95% plant stand or higher (Table 1). Excellency showed the least amount of vine senescence with 45% of the vines senesced on August 24. The skin colour of F14119 was lighter than that of Dark Red Norland.

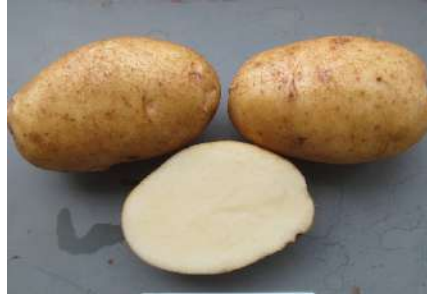
Excellency outperformed Yukon Gold in total, marketable and Canada No. 1 yield (Table 4). F14119 was equal to Dark Red Norland in total and marketable yield but not in Canada No. 1 yield. Excellency had a significantly higher average tuber weight than Yukon Gold while Dark Red Norland had a statistically higher mean tuber weight than F14119.

Specific gravities values ranged from 1.082 to 1.100. No sign of hollow heart was noted in any of the fresh market entries tested (data not shown).

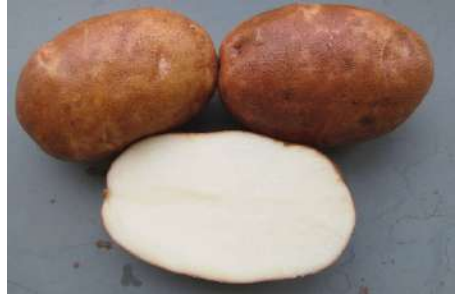
Pictures of fresh market potatoes can be found in Figure 3.



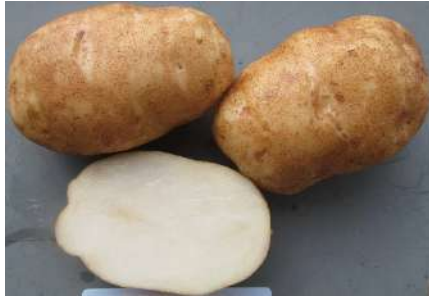
Defender



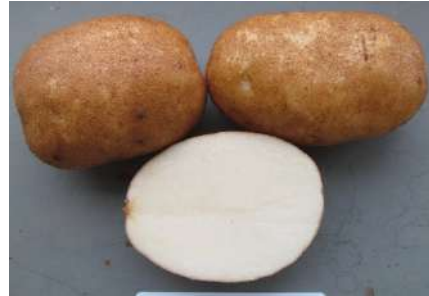
F14021



Goldrush



Russet Burbank



VF14016



Defender



F14021



Goldrush

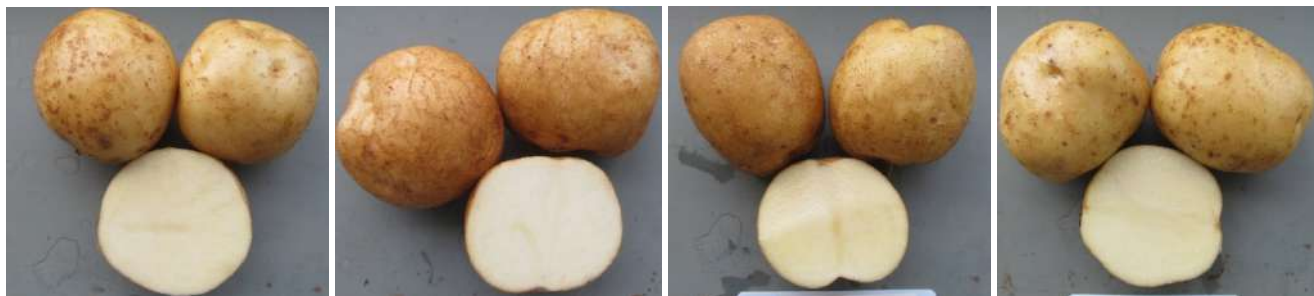


Russet Burbank



VF14016

Figure 1. Pictures of French-fry potatoes grown at AAFC, Harrington in 2020.

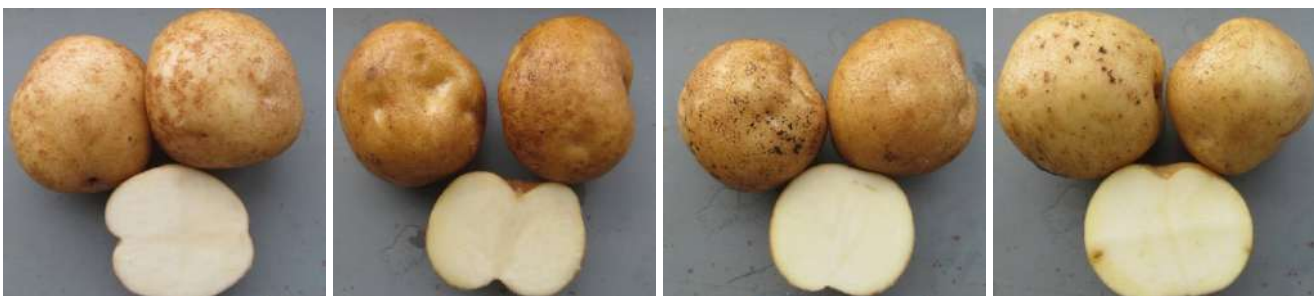


AAC Hamer

AR2018-07

Atlantic

Lamoka



Mackinaw chipper

Manistee

Line 1

Line 2



AAC Hamer

AR2018-07

Atlantic

Lamoka



Mackinaw chipper

Manistee

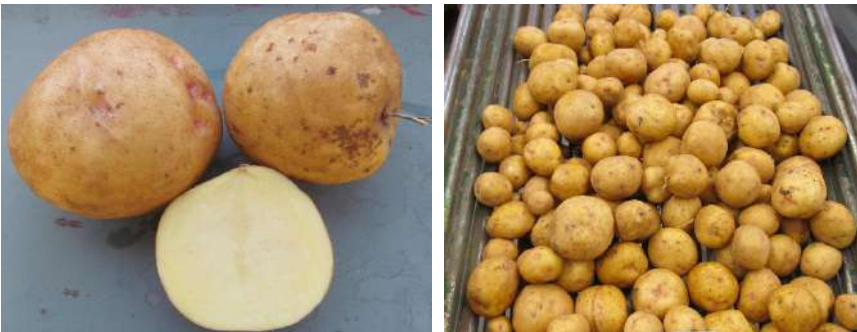
Line 1

Line 2

Figure 2. Pictures of chipping potatoes grown at AAFC, Harrington in 2020.



Excellency



Yukon Gold



F14119



Dark Red Norland

Figure 3. Pictures of fresh market potatoes grown at AAFC, Harrington in 2020.