

Pennsylvania Potato Research Report, 2022

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EXECUTIVE SUMMARY

Penn State's Department of Plant Pathology & Environmental Microbiology potato research program can be categorized into four areas: 1) variety breeding and evaluation, 2) breeding for disease resistance (focused on early blight, late blight and common scab), 3) biology and genetic variability of potato pathogens (focused on early and late blight and common scab), and 4) integrated pest management of potatoes. Many of these projects are long term and only results of 2022 field trials are presented here.

1. Variety Breeding and Evaluation

Potato variety evaluation trials were conducted at four locations in PA. At the Rock Springs location the variety trial included 114 round whites with a few yellow flesh, 26 red-skinned (a few purple skinned) and 33 russet or long white types. An early season variety trial of 25 varieties was conducted at Rock Springs. An early season papa criolla (small yellow potato) variety trial of 8 varieties was conducted at Rock Springs. The Lehigh County location and Erie County location had 35 and 37 varieties, respectively. Snack Food Association trial of 10 chipping varieties was conducted in Franklin County. Breeding lines were contributed by USDA-ARS, Maine, New York, North Carolina, Michigan, Idaho, Colorado, Wisconsin and a few other sources. See **Pennsylvania Regional Potato Germplasm Evaluation Program, 2022 on pages 1-2, data tables from different locations on pages 3-33, trial management information on page 34, descriptions of promising varieties for Pennsylvania on pages 35-38, supplemental processing (chipping and French Fry) report on pages 42-43, and processing data tables from different locations on pages 44-51.**

2. Breeding for Disease Resistance

In three separate field trials, 38 potato varieties and advanced breeding lines were evaluated for resistance to common scab, late blight and early blight, respectively at Rock Springs.

In common scab screening trial, cultivars Russet Burbank and Shepody were included as a tolerant and a susceptible check for common scab, respectively. Numerically, although not statistically, Dark Red Norland, AF5819-2, NDAF113484B-1, Russet Norkotah, AF6338-6, NDAF113476CB-3, AF5762-8, Superior, AF5735-8 and MSAFB609-12 had a lower disease severity score and disease incidence than Russet Burbank and were considered as tolerant to common scab. See **Evaluation of potato cultivars and breeding lines for resistance to common scab on page 39.**

In late blight screening trial, the most susceptible plots reached 100% disease severity by the end of the season. Cultivar Kennebec was a moderately resistant check. Based on AUDPC values, AF5406-7, MSAFB609-12, AF6075-8, AF5735-8, NY165, AF5750-16, AF5707-1, AF6194-4, AF6338-6 and Lakeview Russet were significantly more resistant

than cv. Kennebec. See **Evaluation of potato cultivars and breeding lines for resistance to late blight on page 40.**

In early blight screening trial, disease pressure from early blight was high and the most susceptible plots reached 100% disease severity by the end of the season. Cultivars Kennebec and Russet Burbank were included as moderately resistant checks and Dark Red Norland was included as a susceptible check. Twelve cultivars/lines (AF5406-7, AF6338-6, Katahdin, AF5762-8, AF5071-2, Lakeview Russet, AF5521-1, AF5707-1, AF5750-16, Snowden, Shepody and AF6075-8) were characterized as moderately resistant because their AUDPC values were not significantly different from the moderately resistant check Russet Burbank and lower than the moderately resistant check Kennebec. See **Evaluation of potato cultivars and breeding lines for resistance to early blight on page 41.**

Progress Report---December 2022

Pennsylvania Regional Potato Germplasm Evaluation Program, 2022

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The objective of this project is to find new potato varieties and advanced breeding lines that have adaptation to Pennsylvania potato growing regions, and have qualities that are suitable for either processing or tablestock use. We cooperate with the project leaders of several other potato breeding programs from the Northeast US and a few programs from the Midwest US and Canada by evaluating their potato germplasm. Data from this project helps breeders determine which lines to focus on for potential release as new varieties and also allows you to focus on very specific lines that may be released in the near future.

Replicated and non-replicated variety evaluation plots were established at the following locations: Lehigh Co. (Tables 1- 2), Erie Co. (Tables 3-4) and Rock Springs, Centre Co. (Tables 5-12). The Lehigh location and Erie location had 35 and 37 varieties/lines in non-replicated trial, respectively. At the Rock Springs location the trials included 55 round whites with a few yellow flesh, 13 red-skinned (a few purple skinned) and 20 russet or long white types in replicated plots, and an additional 59 whites, 13 red-skinned and 13 russet or long white types planted in non-replicated observational plots. At Lehigh and Erie locations, the seed spacing was 9-inch within a 20-ft plot except for the russets that were at 12-inch. The weather was hot and dry during growing season at Lehigh location. At Rock Springs location, the seed spacing was 9-inch within a 10-ft plot except for the russets and some whites that were at 12-inch. An early variety trial of 25 varieties was conducted at Rock Springs, Centre Co. (Tables 13-14). An early season papa criolla (small yellow potato) variety trial of 8 varieties was conducted at Rock Springs, Centre Co. (Tables 15). Snack Food Association trial of 10 chipping varieties was conducted by PA co-op at Bryan Bender's Farm in Chambersburg (Tables 16-17). Management information for each site is provided in Table 18. We assessed yield, tuber size, overall appearance, internal defects and external defects, skin color, texture, tuber shape, specific gravity, French Fry and chip qualities.

To interpret this data, one needs to know the yields for the check cultivars such as Atlantic, Snowden, Katahdin, Chieftain, Dark Red Norland, Russet Norkotah or Superior on your farm. Then compare the typical yield for this year on your farm to the data presented here. The yields tend to be inflated from these small plots but the ranking of the yields over the cultivars/lines usually is fairly consistent. Also the same method can be used to compare specific gravity and some of the other parameters. There are a few lines that will be very specific to certain environments so make the comparison to the location that best matches your own or use the Rock Springs location as a fairly typical area for most of PA.

Results:

Lehigh County trial:

At the Lehigh location the following lines had marketable yield higher than Atlantic: Chieftain, AF5280-5, Abbot and Agate.

Erie County trial:

At the Erie location, Snowden, Chieftain, AF5280-5, Agate, NY163, NY165, NY168, NY177, MSAFB609-12, SP327, Bridget and Donata had marketable yield higher than Atlantic.

Round white planted 9-inch apart in Rock Springs:

Based on data of replicated trials at Rock Springs, there were 5 round white clones with marketable yields significantly higher than Atlantic: AF5819-2, AF6165-9, AF6555-2, WAF14096-5, and NY168; there were another 11 round white clones with marketable yields higher than Atlantic. In non-replicated trial, there were 22 round white clones with marketable yields higher than Atlantic.

Red-skinned planted 9-inch apart in Rock Springs:

Based on data of replicated trials at Rock Springs, A08122-9RY and NC981-01 had marketable yields significantly higher than Chieftain; there were another 7 red-skinned or purple-skinned clones with marketable yields higher than Chieftain: Dark Red Norland, CO15205-4R, CO15211-1R, AAF11546-3, AAF11611-2, BNC839-5 and A11582-1R. In non-replicated trial, 12 clones had marketable yields higher than Chieftain.

Russet-skinned or white planted 12-inch apart in Rock Springs:

Based on data of replicated trials at Rock Springs, Russet Burbank, Lakeview Russet, AAF10596-1, AF5071-2, AF5406-7, AF5707-1, AF5750-16, AF6075-8, NDAF113476CB-3 and AFA5661-8 had marketable yields higher than Russet Norkotah. In non-replicated trial, AF6377-13, AF6855-4, AAF16069-2 had marketable yields higher than Russet Norkotah.

Early season variety trial in Rock Springs:

Based on data of replicated trials at Rock Springs, Agate, Paroli, NDA8512C-1R, W8893-1R, BNC917-2, Atlantic, B2869-29, NY165, MegaChip, Mainstee, Mackinaw, SP327, Russet Norkotah and Donata had marketable yields significantly higher than Superior.

The Pennsylvania Potato Research Program, the Pennsylvania Department of Agriculture and USDA funded this research in conjunction with donations. This research is the result of cooperation of growers, industry and PSU staff. The growers hosting the plots provided contributions (land, fertilizer, pesticides, time, etc.). University of Maine, Cornell University, USDA Beltsville, USDA Idaho, Colorado State University, Michigan State University, North Carolina State University, University of Wisconsin potato breeding programs and Solanum International, Parkland Seed, Sterman Masser Inc. provided seed. Special thanks to Bob Leiby who made sure this project was completed.

Table 1. Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pick outs and specific gravity for potato evaluation trial in Timothy and Deborah Geiger's Farm, Lehigh County, 2022

Variety/Line	Yield (cwt/A) ¹		% of		% by size class ³					%PO ⁴	Specific Gravity
	Total	>1 7/8"	US#1	Standard ²	1	2	3	4	5		
Atlantic	139	120	86	100	10	47	31	8	0	4	1.097
Katahdin	104	86	82	72	18	64	18	0	0	0	1.081
Snowden	99	65	66	54	34	58	8	0	0	0	1.097
Superior	135	120	89	100	11	72	17	0	0	0	1.082
Chieftain	157	130	83	109	17	66	17	0	0	0	1.070
AF5280-5	156	140	90	117	10	60	25	5	0	0	1.074
AF5819-2	123	90	73	75	23	56	18	0	0	3	1.087
AF5931-1	94	81	87	68	8	53	34	0	0	5	1.090
BNC811-33	118	100	85	84	15	54	31	0	0	0	1.095
NY161	72	48	67	40	18	47	20	0	0	15	1.081
NY171	79	51	65	43	28	40	25	0	0	7	1.077
NY178	141	118	84	99	16	48	28	8	0	0	1.074
W15240-2Y ^y	109	82	75	68	23	69	6	0	0	1	1.077
NC708-3 ^y	62	44	71	37	17	42	28	0	0	12	1.080
Abbot	143	124	87	103	13	44	37	6	0	0	1.077
Agate ^y	145	124	86	104	12	46	40	0	0	2	1.067
Alaska Gold ^y	134	110	82	92	18	73	10	0	0	0	1.094
Laperla ^y	123	106	86	88	14	39	43	4	0	0	1.067
Paroli ^y	127	92	73	77	25	64	8	0	0	2	1.068
MSAFB609-12	104	76	73	63	27	61	11	0	0	0	1.096
MSAFB635-15	65	46	71	39	29	55	16	0	0	0	1.093
NY163	103	79	76	66	24	63	13	0	0	0	1.090
NY165	130	121	93	101	7	52	36	5	0	0	1.091
NY168	99	81	82	68	18	74	8	0	0	0	1.095
AF6289-2	136	119	88	100	12	46	42	0	0	0	1.061
NDAF113484B-1	144	123	86	103	14	71	15	0	0	0	1.065
Rosara ^y	52	41	79	35	5	57	22	0	0	16	1.065

Variety/Line	Yield (cwt/A) ¹		%	US#1	% of		% by size class ³					Specific Gravity
	Total	>1 7/8"			Standard ²	1	2	3	4	5	%PO ⁴	
CO15205-4R	97	58	59	41	48	57	3	3	0	0	0	1.076
W8893-1R	107	87	81	19	72	68	10	10	3	0	0	1.061
SP327 ^y	107	83	77	23	69	70	6	6	0	0	0	1.090
Donata	135	110	82	18	92	57	25	25	0	0	0	1.097
Bridget	59	48	81	19	40	34	39	39	9	0	0	1.086
Palace ^y	130	107	82	18	90	62	20	20	0	0	0	1.084
River Russet	81	60	74	13	50	38	16	16	20	0	13	1.075
Russet Norkotah	94	65	70	22	54	43	23	23	4	0	9	1.077

¹Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.

²Percentage of the standard, Atlantic, for >1 7/8" yield.

³Percentage of total yield according to size class. 1=<1.875 in., 2=1.875-2.5 in., 3=2.5-3.25 in., 4=3.25-4.0 in., 5=>4.0 in.

⁴Percentage of total that are pickouts.

Non-replicated trial.

Russet varieties were planted 12-in. apart with 20 seed pieces per 20-ft plot, all other varieties were spaced 9-in. apart with 27 seed pieces per 20-ft plot.

Varieties with colored flesh are indicated by ^y for yellow.

Table 2. Tuber characteristics, internal defects for potato evaluation trial in Timothy and Deborah Geiger's Farm, Lehigh County, 2022

Variety/Line	Tuber Characteristics ¹				Internal Defects ²			Reasons for Pickouts	
	TA	C	TX	Sh	TED	TCS	% HH		% IB
Atlantic	5	6	5	2	5	5	0	0	PO=Growth cracks
Katahdin	5	8	7	3	6	5	0	0	
Snowden	5	6	5	2	5	5	0	0	
Superior	4	7	6	3	5	5	0	0	
Chieftain	5	2	7	2	5	6	0	0	
AF5280-5	5	7	7	3	5	6	0	0	
AF5819-2	5	7	6	2	5	6	0	10	PO=Misshape
AF5931-1	6	8	8	3	6	5	0	0	PO=Misshape
BNC811-33	5	6	6	2	6	5	0	0	
NY161	4	9	7	2	5	5	0	10	PO=Growth cracks
NY171	5	8	7	3	7	5	0	0	PO=Misshape
NY178	5	8	7	3	6	5	0	0	
W15240-2Y	6	9	8	3	6	5	0	10	PO=Green
NC708-3	4	9	6	3	6	5	0	0	PO=Misshape
Abbot	4	6	7	2	6	5	0	0	
Agate	5	9	7	3	6	6	0	0	PO=Green
Alaska Gold	5	8	7	3	6	5	0	0	
Laperla	5	9	8	2	6	5	0	0	
Paroli	5	9	8	2	5	5	0	0	PO=Misshape
MSAFB609-12	5	7	6	2	6	6	0	0	
MSAFB635-15	5	6	6	2	6	6	0	0	
NY163	5	8	7	2	6	6	0	0	
NY165	5	7	6	2	6	6	0	0	
NY168	5	7	7	2	6	6	0	0	
AF6289-2	5	2	7	2	6	5	0	0	
NDAF113484B-1	6	2	8	2	5	6	0	30	
Rosara	4	3	7	3	7	5	0	0	PO=Misshape

Variety/Line	Tuber Characteristics ¹							Internal Defects ²			Reasons for Pickouts
	TA	C	TX	Sh	TED	TCS	% HH	% IB			
CO15205-4R	5	2	8	2	6	6	0	0			
W8893-IR	6	2	8	2	6	5	0	0			
SP327	5	7	7	2	6	6	0	0			
Donata	5	9	7	3	6	5	0	0			
Bridget	5	6	6	3	6	5	0	10			
Palace	5	9	6	3	5	5	0	0			
River Russet	4	5	4	4	7	5	0	0		PO=Misshape	
Russet Norkotah	5	5	3	4	7	5	0	0		PO=Misshape	

¹Tuber Characteristics: TA = tuber appearance: 1 = very poor, 5= fair, 9 = excellent.

C = skin color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

TX = skin texture: 1 = partial russet, 2 = heavy russet, 3 = mod. russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.

Sh = tuber shape: 1 = round, 2 = mostly round, 3 = round-oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong-long, 7 = mostly long, 8 = long, 9 = cylindrical.

TED = tuber eye depth: 1 = very deep, 5 = medium, 9 = very shallow. TCS = tuber cross section: 1 = very flat, 5 = intermediate, 9 = very round.

²Internal Defects: HH = hollow heart, IB = internal browning. Percent of total number observed out of 10 tubers. 0 = not observed.

Table 3. Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pickouts and specific gravity for potato evaluation trial in Mark Troyer Farm, Erie County, 2022

Variety/Line	Yield (cwt/A) ¹		% US#1	% of Standard ²	% by size class ³					%PO ⁴	Specific Gravity
	Total	>1 7/8"			1	2	3	4	5		
Atlantic	324	229	71	100	3	15	42	14	0	26	1.089
Katahdin	333	251	75	110	2	15	33	27	0	23	1.072
Snowden	250	234	93	102	2	17	59	17	0	5	1.081
Superior	215	170	79	74	5	24	38	16	0	16	1.066
Chieftain	377	346	92	151	3	19	52	19	2	5	1.071
Yukon Gold	178	172	97	75	3	12	31	54	0	0	1.077
AF5280-5	242	235	97	103	3	20	55	22	0	0	1.064
AF5819-2	239	200	84	87	5	19	53	11	0	12	1.066
NY171	202	124	62	54	3	13	17	26	5	36	1.068
NC708-3	193	115	59	50	18	57	2	0	0	23	1.076
Paroli ^y	284	149	52	65	5	32	19	2	0	43	1.060
Alaska Gold ^y	286	151	53	66	10	22	27	4	0	37	1.081
Abbot	183	146	80	64	9	38	30	11	0	11	1.072
Agate ^y	338	296	88	129	3	29	48	10	0	10	1.055
CO10098-5w/y ^y	175	114	65	50	28	55	10	0	0	7	1.096
BNC839-5	221	169	77	74	7	16	44	17	0	16	1.067
AF6289-2	284	222	78	97	3	16	42	21	0	19	1.061
NDAF113484B-1	245	170	69	74	4	13	38	18	0	26	1.060
CO15211-IR	228	193	85	84	12	25	45	15	0	4	1.069
Rosara ^y	147	89	60	39	11	44	13	3	0	29	1.058
NY163	259	240	92	105	3	32	47	14	0	5	1.082
NY165	337	290	86	127	3	15	45	27	0	11	1.079
NY168	382	340	89	149	2	16	43	30	0	9	1.084
NY177	278	257	92	112	6	38	47	8	0	2	1.093
MSAFB609-12	388	340	88	148	3	20	52	15	0	10	1.084
W15125-4	291	168	58	73	3	10	16	32	0	39	1.081
NC821-30	168	136	81	60	5	25	32	24	0	13	1.090

Variety/Line	Yield (cwt/A) ¹		US#1	%	% of Standard ²		% by size class ³					%PO ⁴	Specific Gravity
	Total	>1 7/8"			US#1	%	Standard ²	1	2	3	4		
SP327	324	246	76	76	107	3	18	41	14	3	21	1.070	
Bridget ^y	494	380	77	77	166	6	30	39	6	2	17	1.089	
Donata ^y	423	254	60	60	111	5	24	28	8	0	34	1.079	
Russet Norkotah	270	138	51	51	60	8	21	17	14	0	41	1.064	
Lakeview Russet	272	163	60	60	71	3	11	23	25	0	37	1.076	
AF5735-8	217	72	33	33	32	1	2	18	13	0	66	1.069	
River Russet	242	110	46	46	48	3	12	19	14	0	51	1.056	
AF5762-8	308	201	65	65	88	5	20	22	24	0	29	1.082	
A11175-12TE	254	209	82	82	91	9	38	33	11	0	9	1.075	
W13008-1rus	230	140	61	61	61	9	26	20	15	0	30	1.076	

¹Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.

²Percentage of the standard, Atlantic, for >1 7/8" yield.

³Percentage of total yield according to size class. 1=<1.875 in., 2=1.875-2.5 in., 3=2.5-3.25 in., 4=3.25-4.0 in., 5=>4.0 in.

⁴Percentage of total that are pickouts.

Non-replicated trial.

Russet varieties * were planted 12-in. apart with 20 seed pieces per 20-ft plot, all other varieties were spaced 9-in. apart with 27 seed pieces per 20-ft plot.

Varieties with colored flesh are indicated by ^y for yellow.

Table 4. Tuber characteristics, internal defects for potato evaluation trial in in Mark Troyer Farm, Erie County, 2022

Variety/Line	Tuber Characteristics ¹				Internal Defects ²		Reasons for Pickouts		
	TA	C	TX	Sh	TED	TCS		% HH	% IB
Atlantic	5	6	5	2	6	6	20	10	PO=Green, growth cracks
Katahdin	5	7	6	3	6	5	10	0	PO=Green
Snowden	6	6	5	2	6	7	30	0	PO=Green
Superior	5	7	6	3	5	4	60	10	PO=Green, misshape
Chieftain	7	2	7	3	3	6	0	10	PO=Green
Yukon Gold	5	7	6	3	5	6	20	0	PO=Green, growth cracks
AF5280-5	6	7	6	3	5	6	0	0	
AF5819-2	5	7	6	2	7	7	0	10	PO=Green
NY171	6	7	7	5	4	5	0	0	PO=Green
NC708-3	6	9	6	3	5	5	0	0	PO=Green
Paroli	7	9	6	3	6	6	0	0	PO=Green, growth cracks
Alaska Gold	5	7	7	3	7	6	20	0	PO=Green, misshape, knobs
Abbot	5	7	6	3	5	4	10	0	PO=Green
Agate	7	9	7	3	6	5	0	10	PO=Green
CO10098-5w/y	7	7	7	2	6	6	0	0	PO=Green
BNC839-5	5	2	7	2	4	6	0	0	PO=Green
AF6289-2	5	2	7	3	4	6	0	0	PO=Green
NDAF113484B-1	6	2	7	2	3	6	0	0	PO=Green
CO15211-IR	7	2	7	2	3	5	0	50	PO=Green
Rosara	5	3	7	4	4	3	0	10	PO=Knobs, green
NY163	5	7	6	2	6	5	0	0	
NY165	5	6	6	2	7	4	0	0	PO=Green, knobs
NY168	5	6	6	2	7	5	0	0	PO=Green, misshape
NY177	5	7	6	2	7	6	0	0	PO=Green
MSAFB609-12	5	7	6	2	6	5	0	0	PO=Green
W15125-4	5	6	5	2	7	6	0	0	PO=Green
NC821-30	5	7	6	2	5	7	10	0	PO=Green

Variety/Line	Tuber Characteristics ¹						Internal Defects ²		Reasons for Pickouts
	TA	C	TX	Sh	TED	TCS	% HH	% IB	
SP327	5	7	6	3	5	5	0	0	PO=Green, knobs
Bridget	5	7	6	3	5	5	10	0	PO=Green, misshape
Donata	5	9	6	3	7	4	10	0	PO=Green, knobs
Russet Norkotah	4	4	3	7	4	5	20	10	PO=Knobs, green, misshape
Lakeview Russet	5	5	3	7	5	5	10	0	PO=Green, knobs, second tubers
AF5735-8	4	4	2	7	6	6	20	10	PO=Green, misshape
River Russet	3	4	2	6	7	5	30	0	PO=Green, knobs, misshape
AF5762-8	5	4	2	8	5	4	80	10	PO=Green, knobs, misshape
A1175-12TE	5	6	4	8	5	5	20	0	PO=Green
W13008-Irus	5	5	3	8	5	5	0	10	PO=Green, knobs

¹Tuber Characteristics: TA = tuber appearance: 1 = very poor, 5 = fair, 9 = excellent.

C = skin color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

TX = skin texture: 1 = partial russet, 2 = heavy russet, 3 = mod. russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.

Sh = tuber shape: 1 = round, 2 = mostly round, 3 = round-oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong-long, 7 = mostly long, 8 = long, 9 = cylindrical.

TED = tuber eye depth: 1 = very deep, 5 = medium, 9 = very shallow. TCS = tuber cross section: 1 = very flat, 5 = intermediate, 9 = very round.

²Internal Defects: HH = hollow heart, IB = internal browning. Percent of total number observed out of 10 tubers. 0 = not observed.

Table 5. Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pickouts, and specific gravity for round white potato evaluation trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Yield (cwt/A) ¹		% US#1	% of Standard ²		% by size class ³					%PO ⁴	Specific Gravity	
	Total	>1 7/8"		1	2	3	4	5					
Replicate													
Atlantic	352	322	91	100	3	9	41	39	3	6	1.085		
Katahdin	332	296	89	92	1	14	38	31	6	10	1.069		
Snowden	386	361	93	112	4	23	56	13	1	2	1.082		
Superior	214	202	95	63	3	21	58	17	0	2	1.072		
Yukon Gold ^y	186	164	89	51	1	6	46	36	0	11	1.080		
AF5280-5	368	294	80	92	5	21	43	16	0	15	1.061		
AF5819-2	494	451	92	140	1	10	49	30	3	7	1.071		
AF5931-1	366	333	91	104	5	30	39	22	0	5	1.072		
AF5933-4	186	176	94	55	3	46	46	3	0	3	1.086		
AF6194-4	166	163	98	51	1	30	45	18	5	1	1.071		
CO10098-5W/Y ^y	149	37	25	11	65	25	0	0	0	11	1.086		
MSAFB609-12	451	413	92	128	3	24	59	8	0	5	1.084		
MSAFB635-15	273	249	91	77	5	34	47	9	0	4	1.084		
NY163	305	276	90	86	5	15	53	21	0	5	1.075		
NY165	309	289	93	90	3	15	29	44	6	4	1.080		
NY171	410	361	88	112	2	19	48	21	0	10	1.069		
NC818-24	254	224	88	70	3	8	28	41	11	9	1.076		
AF5973-3	295	243	83	76	1	11	33	39	0	16	1.086		
AF6165-9	506	456	90	142	1	22	49	19	0	9	1.091		
AF6200-7	222	168	76	52	1	4	16	50	6	23	1.090		
AF6206-3	354	328	92	102	1	10	36	43	4	7	1.081		
AF6206-5	308	203	67	63	2	17	37	11	2	31	1.085		
AF6522-1	406	370	91	115	3	31	48	12	0	6	1.076		
AF6550-2	303	193	64	60	2	8	27	28	0	35	1.079		
AF6551-4	242	233	96	72	1	12	37	44	3	3	1.066		
AF6552-2	436	377	86	117	1	7	33	34	12	13	1.077		
AF6555-2	479	453	95	141	1	7	44	36	7	5	1.081		
AF6567-4	487	415	85	129	5	12	36	35	2	10	1.085		
AF6582-1 ^y	188	181	97	56	2	19	56	21	0	1	1.087		

Variety/Line	Yield (cwt/A) ¹		% US#1	% of Standard ²	% by size class ³					%PO ⁴	Specific Gravity
	Total	>1 7/8"			1	2	3	4	5		
AF6601-2	286	269	94	84	3	31	61	3	0	3	1.073
AF6603-5	335	321	96	100	1	10	57	24	4	3	1.082
NDAF1489-4 ^y	296	257	87	80	9	41	42	5	0	4	1.069
WAF14096-5 ^y	535	438	82	136	4	21	47	14	0	13	1.073
WAF16107-2	252	224	89	70	2	7	47	34	0	9	1.084
AF6543-2	222	180	81	56	5	26	41	14	0	14	1.090
BNC811-33	322	272	85	85	1	9	20	48	7	14	1.084
BNC815-7	416	325	79	101	4	20	38	17	3	18	1.073
BNC816-3	203	189	94	59	2	30	58	5	0	4	1.076
B3379-2	182	171	94	53	5	38	46	9	0	2	1.092
B3403-6	291	262	91	82	8	46	39	6	0	2	1.091
NY161 ^y	260	215	83	67	3	22	45	15	0	14	1.072
NY168	622	529	86	165	1	10	37	34	5	13	1.085
NY177	372	331	89	103	2	9	52	26	1	9	1.091
NY178	291	246	85	76	1	10	50	25	0	14	1.064
W15240-2Y ^y	265	226	85	70	9	46	34	6	0	6	1.065
W1525-4	268	254	94	79	2	21	38	25	9	4	1.082
CO11266-1w/y ^y	335	218	65	68	21	50	13	2	0	13	1.073
MSZ615-2 ^y	229	201	87	62	2	11	47	23	6	10	1.078
NC669-48	353	286	81	89	3	13	31	35	2	16	1.070
NC708-3 ^y	100	75	75	23	4	51	20	3	0	21	1.082
NC821-30	143	137	96	43	1	6	19	53	18	3	1.093
Alaska Gold ^y	543	212	39	66	5	14	20	5	0	56	1.075
Bridget	248	133	53	41	1	11	26	16	0	45	1.077
Palace ^y	516	421	81	131	4	20	47	15	0	14	1.080
SP327	392	387	99	120	1	17	61	21	0	0	1.075
Non-replicate											
Atlantic	380	346	91	100	2	7	46	28	10	7	1.085
Katahdin	157	142	90	41	0	3	56	20	13	10	1.076
WAF16220-4	338	317	94	91	0	13	46	34	0	6	1.082

Variety/Line	Yield (cwt/A) ¹		US#1	% of Standard ²	% by size class ³					%PO ⁴	Specific Gravity
	Total	>1 7/8"			1	2	3	4	5		
AF6541-3	446	283	63	82	3	13	37	13	0	34	1.072
AF6618-2	348	277	79	80	2	7	28	45	0	19	1.089
AF6652-3	338	329	98	95	2	21	53	13	11	0	1.073
AF6664-8	318	218	69	63	6	24	33	12	0	25	1.078
AF6664-9 ^y	454	433	95	125	1	5	40	43	8	4	1.090
AF6665-3	350	299	85	86	7	23	46	16	0	8	1.069
AF6668-3	408	373	91	108	4	20	35	37	0	4	1.073
AF6669-10	479	461	96	133	2	18	52	27	0	2	1.078
AF6671-10	420	403	96	116	2	14	61	21	0	2	1.089
AF6675-1	478	395	83	114	5	21	51	11	0	12	1.071
AF6684-9	584	473	81	137	3	9	30	30	12	16	1.079
AF6687-3	460	315	68	91	1	5	35	29	0	31	1.083
WAF17045-2	355	319	90	92	9	29	55	7	0	1	1.081
NDAF14188-5	268	261	97	75	2	33	48	16	0	1	1.075
AF6867-1	231	172	74	50	8	29	38	2	5	18	1.085
AF6871-4 ^y	369	304	82	88	5	21	43	18	0	13	1.077
AF6871-14 ^y	320	308	96	89	2	11	58	27	0	1	1.078
AF6872-11	433	356	82	103	2	19	41	22	0	16	1.096
AF6876-18	363	311	86	90	1	11	41	34	0	13	1.086
AF6877-12	378	354	94	102	5	22	49	23	0	2	1.079
AF6878-15	441	241	55	70	5	15	40	0	0	41	1.083
AF6878-18	255	156	61	45	8	22	39	0	0	31	1.082
AF6878-22	527	459	87	132	1	9	24	54	0	12	1.087
AF6880-9	409	369	90	107	1	7	55	28	0	9	1.071
AF6881-4	320	292	91	84	4	44	44	3	0	5	1.073
AF6883-4	403	301	75	87	3	18	39	17	0	23	1.087
AF6883-8	456	341	75	99	5	17	42	17	0	21	1.082
AF6886-3	620	539	87	156	2	20	38	29	0	11	1.071
AF6888-9	544	512	94	148	1	8	47	39	0	5	1.069
AF6888-15 ^y	289	271	94	78	3	11	52	23	7	4	1.076
AF6892-6	344	286	83	83	4	16	60	7	0	13	1.068
AF6894-5	294	261	89	75	5	12	53	23	0	6	1.083
AF6894-12	349	275	79	79	4	10	48	20	0	17	1.086

Variety/Line	Yield (cwt/A) ¹		US#1	% of Standard ²		% by size class ³					%PO ⁴	Specific Gravity
	Total	>1 7/8"		%	Standard ²	1	2	3	4	5		
AF6896-1	301	275	91	79	5	34	48	9	0	4	1.082	
AF6898-1	448	367	82	106	6	26	38	18	0	12	1.077	
AF6901-8	322	297	92	86	4	33	47	12	0	3	1.080	
AF6907-15	348	305	87	88	5	25	48	14	0	8	1.071	
AF6908-2	425	381	89	110	5	25	49	15	0	6	1.084	
AF6908-7	346	335	97	97	1	23	60	14	0	3	1.078	
AF6911-4	408	387	95	112	3	19	65	10	0	2	1.082	
AF6926-8	474	428	90	124	4	20	47	18	4	6	1.069	
AF6951-8	355	343	96	99	2	14	39	44	0	2	1.072	
AF6952-6	350	305	87	88	7	34	53	0	0	5	1.070	
AF6955-1 ^y	595	438	74	126	2	4	21	38	10	24	1.067	
AF6956-8	407	257	63	74	8	21	30	13	0	29	1.073	
AF6957-10	387	355	92	102	4	39	52	0	0	5	1.069	
AF6978-1	531	458	86	132	2	4	14	54	14	12	1.078	
AF6979-3	353	297	84	86	4	26	46	12	0	12	1.076	
AF6980-1	261	204	78	59	13	52	26	0	0	9	1.069	
AF6981-4	284	263	93	76	4	22	59	12	0	3	1.075	
NDAF1710Y-1 ^y	487	456	94	132	4	35	52	7	0	3	1.078	
AF6868-6	355	309	87	89	9	37	50	0	0	4	1.084	
AF6889-4 ^y	525	438	83	126	3	9	53	21	0	14	1.087	
AF6903-3 ^y	368	313	85	90	3	21	32	24	7	12	1.074	
AF6969-3 ^y	482	412	85	119	2	11	44	27	4	13	1.067	
AF6883-15	178	138	77	40	2	6	20	42	9	21	1.070	
LSD	110	101	11		3	15	18	19	8	11		

¹Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.

²Percentage of the standard, Atlantic, for >1 7/8" yield.

³Percentage of total yield according to size class. 1=<1.875 in., 2=1.875-2.5 in., 3=2.5-3.25 in., 4=3.25-4.0 in., 5=>4.0 in.

⁴Percentage of total that are pickouts.

Planted 9-in. apart with 13 seed pieces per 10-ft plot. Yellow flesh varieties are indicated with ^y.

Replicated trials are the average of 3 replicates and the rest are non-replicated.

LSD indicates least significant difference ($P = 0.05$), calculated for replicated varieties.

Table 6. Tuber characteristics, internal defects for round white potato evaluation trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Tuber Characteristics ¹					Internal Defects ²		Reasons for Pickouts	
	TA	C	TX	Sh	TED	TCS	% HH		% IB
Replicate									
Atlantic	5	6	5	2	5	5	0	0	PO=Green
Katahdin	4	8	8	3	6	5	0	0	PO=Green, Growth cracks
Snowden	4	6	5	2	4	4	33	0	PO=Green
Superior	5	7	6	3	6	4	0	0	PO=Green
Yukon Gold	5	7	7	2	6	5	8	17	PO=Green, pinkeye
AF5280-5	4	7	6	3	6	5	0	0	PO=Misshape, Green, growth cracks
AF5819-2	6	7	6	2	6	5	0	0	PO=Green, misshape
AF5931-1	5	8	7	2	6	5	0	0	PO=Green, Growth cracks
AF5933-4	4	7	6	2	6	5	0	0	PO=Misshape, green
AF6194-4	5	7	7	3	6	5	0	0	PO= 1 tuber Gc
CO10098-5W/Y	5	9	6	3	7	5	0	0	PO=Misshape, green
MSAFB609-12	5	7	6	2	6	5	0	0	PO=Green, misshape
MSAFB635-15	5	6	5	2	6	6	0	0	PO=Green
NY163	5	7	7	2	6	5	0	0	PO=Green
NY165	4	7	6	3	6	5	0	0	PO=Green
NY171	5	9	7	3	6	4	8	0	PO=Green, misshape
NC818-24	4	7	5	2	6	6	0	0	PO=Scab, green
AF5973-3	6	7	6	2	6	6	42	0	PO=Green, Growth cracks
AF6165-9	4	6	7	2	5	4	49	0	PO=Green, knobs
AF6200-7	4	6	5	3	6	4	25	8	PO=Knobs, green
AF6206-3	5	6	7	2	5	5	8	0	PO=Green, knobs
AF6206-5	4	6	6	2	7	5	0	0	PO=Growth cracks, green
AF6522-1	6	6	5	2	6	5	0	8	PO=Green
AF6550-2	4	8	7	3	6	5	0	8	PO=Growth cracks, green
AF6551-4	5	6	6	2	6	6	0	0	PO=Green
AF6552-2	5	9	6	2	6	6	17	0	PO=Green, growth cracks
AF6555-2	5	6	5	2	5	6	0	0	PO=Green
AF6567-4	4	6	5	3	6	5	0	0	PO=Green, growth cracks, misshape
AF6582-1	5	9	7	2	6	5	0	0	PO=Green

Variety/Line	Tuber Characteristics ¹						Internal Defects ²			Reasons for Pickouts
	TA	C	TX	Sh	TED	TCS	% HH	% IB		
AF6601-2	6	7	6	2	6	6	0	0	PO=Green	
AF6603-5	5	7	6	2	6	6	8	0	PO=Green	
NDAF1489-4	5	9	7	3	6	5	0	0	PO=Misshape, green	
WAF14096-5	5	9	6	2	6	6	0	0	PO=Green, misshape	
WAF16107-2	4	6	5	2	6	6	0	0	PO=Green	
AF6543-2	4	5	5	2	6	5	33	0	PO= Green, scab	
BNC811-33	5	7	6	2	6	5	8	17	PO=Green, growth cracks	
BNC815-7	5	7	6	3	5	5	0	0	PO=Green, growth cracks	
BNC816-3	6	6	5	2	7	6	0	0	PO=Green	
B3379-2	5	6	6	2	7	6	25	0	PO=Green	
B3403-6	5	5	5	2	7	6	0	0	PO=Green	
NY161	5	9	6	3	5	5	0	0	PO=Growth cracks, green	
NY168	4	7	6	2	7	4	0	0	PO=Green, misshape	
NY177	5	7	6	2	6	5	0	0	PO=Green, misshape	
NY178	5	8	7	3	7	5	33	0	PO=Green, growth cracks	
W15240-2Y	5	9	8	3	7	5	0	0	PO=Green, misshape	
W1525-4	5	6	5	2	6	6	0	0	Po=Green	
CO11266-1w/y	4	6	5	3	7	5	0	0	PO=Misshape, green	
MSZ615-2	5	7	6	3	7	5	0	17	PO=Green, growth cracks	
NC669-48	4	7	7	2	5	5	33	0	PO=Green	
NC708-3	5	9	6	3	7	5	0	0	PO=Misshape, green	
NC821-30	5	6	5	2	6	6	51	0	PO=Green	
Alaska Gold	4	8	8	3	7	6	25	0	PO=Misshape, green	
Bridget	5	6	6	4	6	4	0	0	PO=Green, misshape	
Palace	4	7	7	3	7	6	8	0	PO=Misshape, green	
SP327	5	7	7	2	5	5	0	0	PO=Green	
Non-replicate										
Atlantic	5	5	5	2	5	5	0	0	PO=Green	
Katahdin	5	8	8	2	6	5	0	25	PO=Green, scab	
WAF16220-4	5	9	7	3	5	6	0	0	PO=Green, misshape	

Variety/Line	Tuber Characteristics ¹					Internal Defects ²				Reasons for Pickouts
	TA	C	TX	Sh	TED	TCS	% HH	% IB		
AF6541-3	5	7	6	2	6	5	0	0	PO=Scab, green	
AF6618-2	4	6	5	2	4	5	0	0	PO=Green, knobs	
AF6652-3	4	7	6	2	4	6	0	0		
AF6664-8	3	8	7	3	6	5	0	0	PO=Misshape, green	
AF6664-9	5	9	7	3	6	6	25	25	PO=Green	
AF6665-3	4	5	5	2	6	5	0	0	PO=Growth cracks, green	
AF6668-3	5	7	6	3	5	5	0	0	PO=Green	
AF6669-10	5	7	6	2	6	6	0	0	PO=Green	
AF6671-10	5	6	5	3	5	5	0	0	PO=Green	
AF6675-1	3	7	7	3	6	6	0	0	PO=Green, misshape	
AF6684-9	4	5	5	2	4	6	25	0	PO=Green	
AF6687-3	3	6	6	3	6	6	0	75	PO=Green, knobs	
WAF17045-2	4	5	5	2	5	6	0	0	PO=Green	
NDAF14188-5	5	7	7	2	7	4	0	0	PO=Green	
AF6867-1	3	5	6	2	5	5	0	50	PO=Green, misshape	
AF6871-4	4	6	6	3	5	4	0	0	PO=Green	
AF6871-14	4	9	6	3	5	5	0	0	PO=Green	
AF6872-11	5	6	6	2	7	5	0	0	PO=Green, misshape	
AF6876-18	5	6	5	3	7	5	0	0	PO=Green	
AF6877-12	5	7	7	3	6	5	0	0	PO=Green	
AF6878-15	3	8	7	3	6	4	0	0	PO=Green, 2nd tubers, green	
AF6878-18	4	9	7	2	5	5	0	0	PO=2nd tubers, misshape, green	
AF6878-22	4	6	6	3	6	4	0	0	PO=Green, misshape	
AF6880-9	5	5	5	2	5	6	0	0	PO=Green, misshape	
AF6881-4	4	7	6	3	6	5	0	0	PO=Green	
AF6883-4	4	5	6	2	7	5	50	0	PO=Green, knobs	
AF6883-8	4	5	5	2	7	5	0	0	PO=Green, growth cracks, knobs	
AF6886-3	3	6	5	3	7	6	0	0	PO=Green	
AF6888-9	5	7	6	2	5	6	0	0	PO=Green	
AF6888-15	5	9	6	2	6	5	0	0	PO=Pinkeye	
AF6892-6	5	5	5	2	6	6	0	0	PO=Green	
AF6894-5	4	6	5	2	5	5	0	0	PO=Green, misshape	
AF6894-12	4	6	6	2	6	5	0	0	PO=Green, misshape	

Variety/Line	Tuber Characteristics ¹					Internal Defects ²			Reasons for Pickouts
	TA	C	TX	Sh	TED	TCS	% HH	% IB	
AF6896-1	5	5	5	2	7	6	0	0	PO=Green
AF6898-1	4	6	6	3	6	6	0	0	PO=Green
AF6901-8	4	6	6	2	7	5	0	0	PO=Green
AF6907-15	3	5	5	3	6	5	0	0	PO=Green
AF6908-2	4	6	5	2	5	5	25	0	PO=Green
AF6908-7	5	6	5	2	6	5	0	0	PO=Green
AF6911-4	5	6	5	2	6	6	0	0	PO=Green
AF6926-8	5	6	5	2	5	6	0	0	PO=Green
AF6951-8	5	6	6	2	6	6	0	0	PO=Green
AF6952-6	5	7	7	3	7	6	0	0	PO=Green
AF6955-1	4	9	7	2	6	5	50	0	PO=Green, growth cracks
AF6956-8	3	7	6	2	6	5	0	0	PO=Green, misshape
AF6957-10	5	7	7	2	6	5	0	0	PO=Misshape
AF6978-1	4	6	5	3	4	6	0	0	PO=Green
AF6979-3	4	6	5	2	5	6	0	0	PO=Green, misshape
AF6980-1	4	7	6	2	6	5	0	0	PO=Misshape
AF6981-4	5	8	7	2	6	5	0	0	PO=Green
NDAF1710Y-1	5	9	6	2	7	6	0	0	PO=Green
AF6868-6	5	9	5	2	6	6	0	0	PO=Green, misshape
AF6889-4	5	9	6	2	5	6	0	50	PO=Green, misshape
AF6903-3	4	9	6	3	6	5	0	0	PO=Green, misshape
AF6969-3	5	9	6	2	4	6	0	25	PO=Green, misshape
AF6883-15	4	7	7	2	7	5	0	0	PO=Scab, green

¹Tuber Characteristics: TA = tuber appearance: 1 = very poor, 5=fair, 9 = excellent.
C = skin color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

TX = skin texture: 1 = partial russet, 2 = heavy russet, 3 = mod. russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.

Sh = tuber shape: 1 = round, 2 = mostly round, 3 = round-oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong-long, 7 = mostly long, 8 = long, 9 = cylindrical.

TED = tuber eye depth: 1 = very deep, 5 = medium, 9 = very shallow. TCS = tuber cross section: 1 = very flat, 5 = intermediate, 9 = very round.

²Internal Defects: HH = hollow heart, IB = internal browning. Percent of total number observed out of 12 tubers for replicated trials and total number out of 4 for non replicated trials. 0 = not observed.

Table 7. Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pickouts, and specific gravity for red or purple skinned potato evaluation trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Yield (cwt/A) ¹		% of Standard ²					% bv size class ³					%PO ⁴	Specific Gravity
	Total	>1 7/8"	US#1	Standard	1	2	3	4	5					
Replicate														
Chieftain	274	250	92	100	1	13	57	22	0	7	1.064			
Dark Red Norland	284	262	93	105	3	25	49	17	2	4	1.063			
AF6289-2	228	216	95	87	3	29	51	14	0	3	1.066			
CO15205-4R	315	273	87	109	5	31	53	3	0	8	1.082			
CO15211-1R	366	323	88	129	7	34	47	8	0	5	1.067			
NDAF113484B-1	192	179	94	72	3	33	55	7	0	3	1.066			
AAF11546-3	418	284	67	114	2	14	39	14	0	30	1.063			
AAF11611-2 ^y	360	315	88	126	4	22	56	9	0	8	1.075			
BNC839-5	292	259	88	104	4	21	51	17	0	8	1.072			
BNC559-1	188	172	92	69	7	29	59	5	0	1	1.062			
A08122-9RY ^y	438	394	90	158	7	41	43	6	0	3	1.073			
A11582-1R	477	319	67	128	13	39	25	3	0	21	1.053			
NC981-01	398	360	90	144	2	15	39	33	3	8	1.068			
Non-replicate														
Chieftain	171	171	100	100	0	12	34	44	10	0	1.064			
NDAF141Y-3	396	392	99	229	1	29	64	6	0	0	1.073			
AF6692-1	245	201	82	118	3	11	51	19	0	15	1.067			
AF6694-1	280	240	86	140	4	46	38	2	0	11	1.056			
AF6930-1	318	285	90	167	6	14	61	14	0	4	1.060			
AF6932-4	505	458	91	268	1	5	41	40	5	8	1.068			
AF6932-6	376	348	93	204	5	27	51	14	0	2	1.060			
AF6938-4	629	594	94	347	3	12	45	38	0	3	1.058			
AF6942-5	373	323	87	189	6	20	45	21	0	8	1.066			
AF6963-1	440	430	98	251	2	18	60	20	0	0	1.072			
AF6963-8	384	363	94	212	1	7	70	17	0	5	1.072			
AF6965-5	291	278	96	163	0	13	69	13	0	4	1.073			
NDAF1727Y-1	494	457	93	267	3	8	48	33	4	5	1.065			
LSD	103	100	9	9	3	10	17	9	1	9				

¹Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.

²Percentage of the standard, Chieftain, for >1 7/8" yield.

³Percentage of total yield according to size class. 1=<1.875 in., 2=1.875-2.5 in., 3=2.5-3.25 in., 4=3.25-4.0 in., 5=>4.0 in.

⁴Percentage of total that are pickouts.

Replicated trials are the average of 3 replicates and the rest are non-replicated. LSD indicates least significant difference (P = 0.05), calculated for replicated varieties. Varieties with colored flesh are indicated by ^y for yellow, ^{pk} for pink. Plots consisted of 10-ft rows with 13 seed pieces spaced 9-in. apart.

Table 8. Tuber characteristics, internal defects for red skinned potato evaluation trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Tuber Characteristics ¹				Internal Defects ²		Reasons for Pickouts		
	TA	C	TX	Sh	TED	TCS		% HH	% IB
Replicate									
Chieftain	4	2	7	3	7	5	0	0	PO=Growth cracks
Dark Red Norland	5	2	8	3	5	6	0	0	PO=Misshape
AF6289-2	5	2	7	3	6	5	0	0	PO=Green, Growth cracks
CO15205-4R	5	2	8	2	7	5	0	0	PO=Misshape, Growth cracks
CO15211-1R	3	2	8	2	6	5	0	33	PO=Growth cracks, misshape
NDAF113484B-1	4	2	8	2	5	5	0	0	PO=Misshape
AAF11546-3	5	2	8	3	6	5	0	0	PO=Growth cracks, misshape
AAF11611-2	4	9	6	3	5	4	0	0	PO=Green, misshape
BNC839-5	5	2	7	2	6	6	0	0	PO=Misshape, green
BNC559-1	4	1	7	3	5	5	0	8	PO=Misshape
A08122-9RY	5	2	7	3	6	5	0	0	PO=Misshape
A11582-1R	4	2	8	2	7	5	0	0	PO=Misshape, knobs
NC981-01	5	2	5	2	5	6	8	0	PO=Misshape, green
Non-replicate									
Chieftain	4	3	7	3	4	5	0	25	
NDAF141Y-3	5	2	7	2	4	6	0	0	
AF6692-1	4	2	8	3	6	4	0	0	PO=Growth cracks, misshape
AF6694-1	4	1	7	3	6	5	0	0	PO=Misshape
AF6930-1	4	2	7	3	5	6	0	0	PO=Misshape
AF6932-4	6	2	7	2	5	6	0	0	PO=Green, growth cracks
AF6932-6	5	2	7	3	6	5	0	0	PO=Growth cracks
AF6938-4	3	2	7	2	5	6	0	25	PO=Misshape
AF6942-5	4	3	6	3	5	5	0	0	PO=Green
AF6963-1	5	2	6	2	6	6	0	0	
AF6963-8	5	3	8	2	6	5	0	0	PO=Growth cracks
AF6965-5	5	3	7	3	5	5	0	0	PO=Growth cracks
NDAF172Y-1	4	2	7	2	5	5	0	0	PO=Misshape, green

¹Tuber Characteristics: TA = tuber appearance: 1 = very poor, 5 = fair, 9 = excellent.

C = skin color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

TX = skin texture: 1 = partial russet, 2 = heavy russet, 3 = mod. russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.

Sh = tuber shape: 1 = round, 2 = mostly round, 3 = round-oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong-long, 7 = mostly long, 8 = long, 9 = cylindrical.

TED = tuber eye depth: 1 = very deep, 5 = medium, 9 = very shallow. TCS = tuber cross section: 1 = very flat, 5 = intermediate, 9 = very round.

²Internal Defects: HH = hollow heart, IB = internal browning. Percent of total number observed out of 12 tubers for replicated trials and total number out of 4 for non replicated trials. 0 = not observed.

Table 9. Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pickouts, and specific gravity for russet skinned or white potato evaluation trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Yield (cwt/A) ¹		%	US#1	% of Standard ²		% by size class ³					%PO ⁴	Specific Gravity
	Total	>1 7/8"			1	2	3	4	5				
Replicate													
Russet Norkotah	247	179	73	100	3	25	31	14	2	24	1.070		
Russet Burbank	367	196	55	109	3	12	31	10	3	43	1.077		
Lakeview Russet	302	203	68	113	1	4	17	29	19	30	1.072		
AAF10596-1	328	223	68	124	4	16	21	25	6	28	1.085		
AF5071-2	353	184	53	103	4	15	23	14	0	43	1.080		
AF5406-7	338	202	60	113	2	11	16	28	5	38	1.075		
AF5707-1	361	211	59	118	5	21	27	9	1	36	1.078		
AF5735-8	231	148	63	83	4	21	29	13	0	34	1.080		
AF5750-16	344	184	53	103	6	22	19	13	0	40	1.077		
AF5762-8	241	177	74	99	2	15	35	19	5	24	1.088		
AF6075-8	345	187	61	104	7	26	11	21	3	32	1.072		
AF6338-6	324	172	53	96	6	11	17	25	0	41	1.081		
NDAF113476CB-3	250	192	78	107	1	24	28	26	0	21	1.088		
AF5736-16	175	127	73	71	1	11	30	31	0	26	1.091		
AF6340-6	170	137	81	77	6	37	34	10	0	13	1.065		
AAF12147-6	185	93	52	52	10	29	18	4	0	39	1.080		
W13008-1rus	333	170	51	95	6	17	19	14	2	43	1.075		
A11175-12TE	227	152	67	85	9	28	25	13	0	24	1.081		
AFA5661-8	273	186	63	104	1	12	23	28	0	36	1.079		
River Russet	313	134	44	75	4	13	21	11	0	52	1.071		
Non-replicate													
Russet Norkotah	391	233	60	100	2	12	11	24	13	39	1.070		
AF6314-12	341	179	53	77	0	13	23	17	0	47	1.086		
AF6377-10	252	120	48	52	0	1	11	25	10	52	1.076		

Variety/Line	Yield (cwt/A) ¹		US#1	%	% of Standard ²	% by size class ³					%PO ⁴	Specific Gravity
	Total	>1 7/8"				1	2	3	4	5		
AF6377-12	399	215	54	92	4	9	10	25	9	42	1.080	
AF6377-13	385	252	65	108	0	7	21	32	5	34	1.085	
AF6384-2	439	305	70	131	3	6	29	26	8	28	1.078	
AF6465-7	352	229	65	98	1	16	11	38	0	34	1.075	
AAF14025-2	343	164	48	70	5	8	33	7	0	47	1.085	
AF6749-3	354	214	60	92	1	18	29	10	3	38	1.078	
AF6855-4	342	251	73	108	4	30	37	7	0	23	1.081	
AAF16069-1	443	210	47	90	3	13	23	3	8	49	1.071	
AAF16069-2	412	264	64	114	5	12	25	27	0	31	1.074	
COAF16277-4	336	200	59	86	1	7	14	27	11	39	1.075	
LSD	122	75	18		5	21	14	17	6	20		

¹Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.

²Percentage of the standard, Russet Norkotah for >1 7/8" yield.

³Percentage of total yield according to size class: 1=<1.875 in., 2=1.875-2.5 in., 3=2.5-3.25 in., 4=3.25-4.0 in., 5=>4.0 in.

⁴Percentage of total that are pickouts.

Replicated trials are the average of 3 replicates and the rest are non-replicated.

LSD indicates least significant difference ($P = 0.05$), calculated for replicated varieties.

Plots consisted of 10-ft rows with 10 seed pieces spaced 12-in. apart. Yellow flesh varieties are indicated with ^y.

Table 10. Tuber characteristics, internal defects for russet skinned or white potato evaluation trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Tuber Characteristics ¹				Internal Defects ²			Reasons for Pickouts	
	TA	C	TX	Sh	TED	TCS	% HH		% IB
Replicate									
Russet Norkotah	5	5	3	4	7	5	8	0	PO=Mishape, green
Russet Burbank	4	6	4	5	7	5	0	0	PO=Mishape, knobs, green
Lakeview Russet	5	6	4	5	7	5	8	17	PO=Green, mishape, knobs
AAF10596-1	4	5	3	5	7	4	0	0	PO=Mishape, green
AF5071-2	4	6	3	4	6	5	25	0	PO=Mishape, green, scab
AF5406-7	3	5	3	5	7	4	0	0	PO=Green, mishape, growth cracks
AF5707-1	4	5	3	4	7	4	0	0	PO=Mishape, green, growth cracks
AF5735-8	5	5	3	5	6	4	0	0	PO=Mishape, green
AF5750-16	3	7	5	5	7	5	0	0	PO=Mishape, green
AF5762-8	5	5	3	5	7	5	33	0	PO=Green, mishape
AF6075-8	2	6	4	5	6	4	33	8	PO=Mishape, green, knobs
AF6338-6	3	5	3	5	7	5	8	17	PO=Growth cracks, mishape, green
NDAF113476CB-3	5	5	3	5	7	5	0	0	PO=Mishape, green, knobs
AF5736-16	5	5	3	5	7	5	0	0	PO=Mishape
AF6340-6	4	6	4	5	5	5	0	0	PO=Mishape
AAF12147-6	3	6	4	4	7	5	8	0	PO=Mishape, green
W13008-1rus	4	5	3	5	7	5	0	0	PO=Green, mishape
A11175-12TE	4	5	3	4	7	5	0	0	PO=Mishape, green
AFA5661-8	5	6	6	5	6	5	0	0	PO=Mishape, green, growth cracks
River Russet	4	5	3	5	7	5	8	8	PO=Green, mishape, growth cracks
Non-replicate									
Russet Norkotah	4	5	3	5	6	4	25	0	PO=Mishape, green
AF6314-12	3	6	4	4	6	5	0	0	PO=Green, mishape, growth cracks
AF6377-10	3	6	3	3	6	5	0	0	PO=Green, mishape, growth cracks

Variety/Line	Tuber Characteristics ¹					Internal Defects ²			Reasons for Pickouts
	TA	C	TX	Sh	TED	TCS	% HH	% IB	
AF6377-12	4	5	3	4	7	5	0	0	PO=Green, misshape, growth cracks
AF6377-13	4	4	4	5	7	5	0	0	PO=Misshape, growth cracks, green
AF6384-2	4	6	4	5	7	5	0	50	PO=Misshape, green
AF6465-7	4	5	5	4	6	5	0	0	PO=Misshape, green
AAF14025-2	3	6	4	4	7	5	0	0	PO=Misshape, green, knobs
AF6749-3	3	6	4	4	6	4	0	0	PO=Misshape, green
AF6855-4	4	5	3	4	7	5	0	0	PO=Misshape, green
AAF16069-1	3	6	4	4	7	5	0	0	PO=Green, misshape, knobs
AAF16069-2	5	5	4	5	6	5	0	0	PO=Misshape, green, growth cracks
COAF16277-4	4	5	3	5	6	4	0	0	PO=Growth cracks, misshape, green

¹Tuber Characteristics: TA = tuber appearance: 1 = very poor, 5 = fair, 9 = excellent.

C = skin color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

TX = skin texture: 1 = partial russet, 2 = heavy russet, 3 = mod. russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.

Sh = tuber shape: 1 = round, 2 = mostly round, 3 = round-oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong-long, 7 = mostly long, 8 = long, 9 = cylindrical.

TED = tuber eye depth: 1 = very deep, 5 = medium, 9 = very shallow. TCS = tuber cross section: 1 = very flat, 5 = intermediate, 9 = very round.

²Internal Defects: HH = hollow heart, IB = internal browning. Percent of total number observed out of 12 tubers for replicated trials and total number out of 4 for non replicated trials (marked with *). 0 = not observed.

Table 11. Total yield, greater than 1 7/8", percent of standard, size distribution, percent pickouts, specific gravity and merit score for NE1731¹ potato evaluation trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Yield (cwt/A) ²		% US#1	% of Standard ³	% by size class ⁴					%PO ⁵	Specific Gravity	Vine Maturity	Merit Score ⁶
	Total	>1 7/8"			1	2	3	4	5				
Atlantic	334	309	93	100	3	11	40	39	2	4	1.085	ML	2
Chieftain	272	248	92	80	1	12	56	23	0	7	1.064	ML	2
Dark Red Norland	274	254	93	82	3	23	51	17	1	4	1.063	E	2
Katahdin	348	311	89	101	1	14	37	34	4	9	1.069	ML	2
Russet Norkotah	235	168	72	54	3	22	35	13	2	26	1.070	M	3
Russet Burbank	388	186	50	60	3	12	25	10	2	47	1.077	L	3
Snowden	408	382	94	124	4	21	49	23	1	3	1.082	ML	2
Superior	212	202	95	66	3	21	58	16	0	1	1.072	M	2
Yukon Gold ^y	177	161	91	52	1	5	42	44	0	8	1.080	E	3
Lakeview Russet	299	199	67	65	1	7	16	28	16	31	1.072	L	3
AAF10596-1	334	219	65	71	3	12	24	24	4	32	1.085	ML	2
AF5071-2	332	179	55	58	4	13	28	15	0	41	1.080	L	3
AF5280-5	338	269	79	87	4	23	39	17	0	16	1.075	ML	2
AF5406-7	336	193	58	63	2	10	15	25	7	40	1.061	L	3
AF5707-1	358	215	60	70	5	17	28	13	2	35	1.078	L	2
AF5735-8	244	166	66	54	3	19	33	15	0	31	1.080	ML	2
AF5750-16	309	171	56	55	9	28	16	12	0	35	1.077	ML	3
AF5762-8	239	177	74	57	2	14	35	20	5	24	1.088	ML	3
AF5819-2	474	436	92	141	1	11	48	31	2	6	1.071	ML	1
AF5931-1	371	335	90	109	4	30	39	21	0	5	1.072	ML	2
AF5933-4	170	162	96	52	2	46	48	2	0	2	1.086	ME	2
AF6075-8	380	196	57	63	5	22	15	18	2	37	1.072	L	4
AF6194-4	148	146	99	47	1	23	44	28	4	1	1.071	ML	2
AF6289-2	237	224	95	73	3	25	56	14	0	2	1.066	E	2
AF6338-6	291	170	61	55	4	10	23	29	0	34	1.081	L	4

Variety/Line	Yield (cwt/A) ²		%		% by size class ⁴					%PO ⁵	Specific Gravity	Vine Maturity	Merit Score ⁶
	Total	>1 7/8"	US#1	Standard ³	1	2	3	4	5				
CO10098-5W/Y ^y	140	32	23	10	68	23	0	0	0	10	1.086	ME	3
CO15205-4R	320	269	85	87	5	32	48	5	0	10	1.082	ML	2
CO15211-1R	405	359	89	116	7	30	47	11	0	5	1.067	ML	3
MSAFB609-12	442	403	91	131	3	23	58	11	0	6	1.084	ML	1
MSAFB635-15	276	248	90	80	5	38	46	7	0	5	1.084	ML	2
NDAF113476CB-3	234	180	78	58	2	21	31	26	0	20	1.088	ML	2
NDAF113484B-1	184	173	95	56	3	30	56	9	0	2	1.066	ML	2
NY163	309	278	90	90	5	19	51	20	1	5	1.075	ML	2
NY165	314	291	93	94	3	15	29	42	6	4	1.080	ML	2
NY171	391	342	88	111	2	17	49	22	0	10	1.069	ML	2
LSD	104	79	12		4	16	16	17	6	13			

¹NE1731 is an integrated, seven-state (Florida, Maine, North Carolina, New York, Ohio, Pennsylvania, and Virginia) potato breeding and variety development project for the eastern U.S.

²Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.

³Percentage of the standard, Atlantic, for >1 7/8" yield. ⁴Percentage of total yield according to size class. 1=<1.875 in., 2=1.875-2.5 in., 3=2.5-3.25 in., 4=3.25-4.0 in., 5=>4.0 in.

⁵Percentage of total that are pickouts. ⁶Merit score: 1 = outstanding; 2 = keep; 3 = marginal; 4 = drop.

Replicated trials are the average of 4 replicates. LSD indicates least significant difference ($P = 0.05$).

Russets were planted 12-in. apart with 10 seed pieces per 10-ft plot, all other varieties were spaced 9-in. apart with 13 seed pieces per 10-ft plot. Varieties with colored flesh are indicated by ^y for yellow.

Table 12. Tuber characteristics, internal and external defects for NE1731 potato evaluation trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Tuber Characteristics ¹				Internal Defects ²			Reasons for Pickouts ³	
	TA	C	TX	Sh	TED	TCS	% HH		% IB
Atlantic	5	6	5	2	5	5	0	13	PO=G
Chieftain	4	2	7	3	7	5	0	0	PO=Gc
Dark Red Norland	5	2	8	3	5	6	0	0	PO=Misshape
Katahdin	4	8	8	3	6	5	0	0	PO=G,Gc
Russet Norkotah	5	5	3	4	7	5	6	0	PO=Mishape,G
Russet Burbank	4	6	4	5	7	5	0	0	PO=Mishape, K, G
Snowden	4	6	5	2	4	4	25	0	PO=G
Superior	5	7	6	3	5	4	0	0	PO=G
Yukon Gold	5	7	7	2	6	5	6	13	PO=G, pinkeye
Lakeview Russet	5	6	4	5	7	5	13	13	PO=G, misshape, K
AAF10596-1	4	5	3	5	7	4	0	0	PO=Misshape, G
AF5071-2	3	6	3	4	6	5	19	0	PO=Misshape, G, Sc
AF5280-5	4	7	6	3	6	5	0	6	PO=Misshape, G, Gc
AF5406-7	3	5	3	5	7	4	0	0	PO=G, misshape, Gc
AF5707-1	4	5	3	4	7	4	6	0	PO=Misshape, G, Gc
AF5735-8	5	5	3	5	7	4	0	0	PO=Misshape, G
AF5750-16	3	7	5	5	7	5	0	0	PO=Misshape, G
AF5762-8	5	5	3	5	7	5	33	0	PO=G, misshape
AF5819-2	6	7	6	2	6	5	0	0	PO=G, misshape
AF5931-1	5	8	7	2	6	5	0	0	PO=G,Gc
AF5933-4	4	7	6	2	6	5	0	0	PO=misshape,G
AF6075-8	2	6	4	5	6	4	25	6	PO=Misshape, G, K
AF6194-4	5	7	7	3	6	5	0	0	PO= 1 tuber Gc
AF6289-2	5	2	7	3	6	5	0	0	PO=G, Gc
AF6338-6	3	5	3	5	7	5	6	13	PO=Gc, misshape, G

Variety/Line	Tuber Characteristics ¹						Internal Defects ²			Reasons for Pickouts ³
	TA	C	TX	Sh	TED	TCS	% HH	% IB		
CO10098-5W/Y	5	9	6	3	7	5	0	0	PO=Misshape, G	
CO15205-4R	5	2	8	2	7	5	0	0	PO=Misshape, Gc	
CO15211-1R	3	2	8	2	6	5	0	44	PO=Gc, misshape	
MSAFB609-12	5	7	6	2	6	5	0	0	PO=G, misshape	
MSAFB635-15	5	6	5	2	6	6	0	0	PO=G	
NDAF113476CB-3	5	5	3	5	7	5	0	0	PO=Misshape, G, K	
NDAF113484B-1	4	2	8	2	5	5	0	0	PO=misshape	
NY163	5	7	7	2	6	6	0	0	PO=G	
NY165	4	7	6	3	6	5	0	0	PO=G	
NY171	5	9	7	3	6	4	6	0	PO=G misshape	

¹Tuber Characteristics: TA = tuber appearance: 1 = very poor, 5 = fair, 9 = excellent.

C = skin color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

TX = skin texture: 1 = partial russet, 2 = heavy russet, 3 = mod. russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.

SH = tuber shape: 1 = round, 2 = mostly round, 3 = round-oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong-long, 7 = mostly long, 8 = long, 9 = very smooth.

TED = tuber eye depth: 1 = very deep, 5 = medium, 9 = very shallow. TCS = tuber cross section: 1 = very flat, 5 = intermediate, 9 = very round.

²Internal Defects: HH = hollow heart, IB = internal browning. Percent of total number observed out of 16 tubers (4 per replication). 0 = not observed.

³G = Green, Gc = Growth Crack, K = knob.

Russets were planted 12-in. apart with 10 seed pieces per 10-ft plot, all other varieties were spaced 9-in. apart with 13 seed pieces per 10-ft plot.

Table 13. Total yield, greater than 1 7/8", size distribution, percent pickouts, and specific gravity for potato early variety trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Yield (cwt/A) ¹		% of		% by size class ³					%PO ⁴	Specific Gravity
	Total	>1 7/8"	US#1	Standard ²	1	2	3	4	5		
Superior	142	113	78	100	5	32	40	6	0	17	1.074
Yukon Gold ^y	143	130	91	115	1	10	28	35	18	8	1.077
Abbot	214	142	66	125	24	35	26	5	0	10	1.072
Agate ^y	249	216	87	190	10	58	28	1	0	3	1.070
Laperla ^y	185	132	72	117	3	20	36	16	0	24	1.058
Paroli ^y	250	178	69	156	5	28	36	6	0	25	1.067
NY171	162	142	88	125	8	30	49	10	0	4	1.065
Dk. Rd. Norland	172	143	83	126	7	38	39	6	0	10	1.068
Rosara ^y	151	88	59	78	5	26	25	9	0	36	1.067
NDA8512C-IR	178	167	93	147	4	21	61	11	0	3	1.070
CO99076-6R	115	98	85	86	7	29	44	12	0	8	1.070
W8893-IR	203	172	85	151	13	58	27	0	0	2	1.069
BNC833-2	46	41	90	36	10	51	39	0	0	0	1.073
BNC916-3	146	98	66	86	29	60	7	0	0	4	1.087
BNC917-2 ^y	226	208	92	183	5	20	59	13	0	3	1.069
Atlantic	265	239	90	211	4	16	55	20	0	6	1.080
B2869-29	230	201	87	177	9	35	42	10	0	3	1.083
NY165	259	239	92	210	4	24	57	12	0	4	1.080
MegaChip	267	240	90	212	4	32	50	8	0	6	1.080
Mainstee	277	245	88	216	4	17	58	14	0	8	1.071
Mackinaw	256	217	85	191	4	27	42	15	0	12	1.079
SP327	205	192	93	169	1	20	56	18	0	6	1.071
Russet Norkotah	242	173	74	153	2	22	30	20	2	24	1.068
River Russet	201	100	50	88	2	14	17	20	0	47	1.063
Donata ^y	303	216	71	190	8	30	36	5	0	20	1.075
LSD	58	54	15	17	6	17	19	14	6	13	

¹Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.

²Percentage of the standard, Superior, for >1 7/8" yield.

³Percentage of total yield according to size class. 1=<1.875 in., 2=1.875-2.5 in., 3=2.5-3.25 in., 4=3.25-4.0 in., 5=>4.0 in.

⁴Percentage of total that are pickouts. Varieties with colored flesh are indicated by ^y for yellow, ^p for purple.

Replicated trials are the average of 3 replicates. LSD indicates least significant difference (P = 0.05) for replicated trial. Planted 9-in. apart with 13 seed pieces per 10-ft plot.

Table 14. Tuber characteristics, internal defects for potato early variety trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Tuber Characteristics ¹					Internal Defects ²		Reasons for Pickouts	
	TA	C	TX	Sh	TED	TCS	% HH		% IB
Superior	5	7	6	3	5	5	0	0	PO=Sc(surface scab), misshape
Yukon Gold	5	9	8	2	7	5	8	17	PO=Green, misshape
Abbot	4	7	6	3	6	5	0	0	PO=Green, misshape
Agate	5	9	7	3	6	6	0	0	PO=Green
Laperla	4	7	7	2	6	5	0	33	PO=misshape
Paroli	4	9	7	3	7	5	0	8	PO=Sc(surface scab), green
NY171	5	7	7	3	7	4	0	0	PO=Green
Dk. Rd. Norland	5	2	8	3	6	6	0	0	PO=Misshape, green
Rosara	4	3	8	3	7	4	0	0	PO=Misshape
NDA8512C-1R	5	2	7	2	5	5	0	0	PO=Green
CO99076-6R	6	2	8	2	6	5	0	8	PO=Misshape, growth cracks
W8893-1R	3	2	8	2	5	6	0	0	100% scab, no scab TA=6
BNC833-2	5	1	7	3	6	5	0	0	PO=misshape
BNC916-3	5	1	8	2	6	5	0	0	PO=Misshape
BNC917-2	5	1	7	3	5	5	0	0	PO=Misshape, growth cracks
Atlantic	5	6	5	2	5	6	0	0	PO=Green, growth cracks
B2869-29	5	7	6	2	6	5	0	0	PO=Green, misshape
NY165	5	7	6	2	7	6	0	0	PO=Green
MegaChip	5	6	5	2	5	6	0	0	PO=Misshape, green
Mainstee	5	5	5	2	6	6	0	0	PO=Green
Mackinaw	5	6	6	2	6	5	0	0	PO=Green, scab(surface scab)
SP327	5	7	7	2	6	5	17	17	PO=Green
Russet Norkotah	4	5	3	5	6	5	0	0	PO=Misshape, green
River Russet	5	5	3	4	7	5	0	0	PO=Green, misshape
Donata	5	9	6	3	6	5	0	0	PO=Misshape, green

¹Tuber Characteristics: TA = tuber appearance: 1 = very poor, 5= fair, 9 = excellent.

C = skin color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

TX = skin texture: 1 = partial russet, 2 = heavy russet, 3 = mod. russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.

Sh = tuber shape: 1 = round, 2 = mostly round, 3 = round-oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong-long, 7 = mostly long, 8 = long, 9 = cylindrical.

TED = tuber eye depth: 1 = very deep, 5 = medium, 9 = very shallow. TCS = tuber cross section: 1 = very flat, 5 = intermediate, 9 = very round.

²Internal Defects: HH = hollow heart, IB = internal browning. Percent of total number observed out of 12 tubers for replicate trial and 4 tubers for non replicated trial. 0 = not observed.

Table 15. Total yield, size distribution, and external characteristic for early season papa criolla (small yellow potato) variety trial in Plant Pathology Farm, Rock Springs, 2022

Variety/Line	Estimated Yield (cwt/A) ¹			% by size class ²			Tuber Characteristics ³			Notes		
	Total	1		2		3		TA	C		TX	Sh
		1	2	3	4	5	6					
BD1435-3	75	13	81	6	5	9	6	2	yellow skin, yellow flesh, uniform shape			
BD1339-2	82	1	95	4	4	2	8	3	Red/pink skin, yellow flesh, not uniform			
BD1403-5	62	6	88	6	3	2	7	3	Nice red color, nice yellow flesh, rhizoc severe			
BD910-2	75	4	78	18	6	9	7	2	yellow skin, nice yellow flesh			
BD932-3	75	4	87	9	3	9	8	3	yellow skin, nice yellow flesh, lots of shapes			
BD1153-7	124	1	59	40	5	9	7	3	yellow skin, nice yellow flesh, a few misshape			
BD1222-1	156	3	76	21	6	9	8	3	yellow skin, yellow flesh, sprouts			
BD1265-5	27	14	86	0	5	3	8	2	nice yellow flesh			

¹Yield Total = yield including all size categories 1, 2, and 3.

²Percentage of total yield according to size class. 1 = < 1 in., 2 = 1 - 1.625 in., 3 = > 1.625 in.

³Tuber Characteristics: TA = tuber appearance: 1 = very poor, 5 = fair, 9 = excellent.

C = skin color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

TX = skin texture: 1 = partial russet, 2 = heavy russet, 3 = mod. russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.

SH = tuber shape: 1 = round, 2 = mostly round, 3 = round-oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong-long, 7 = mostly long, 8 = long, 9 = cylindrical.

Planted 9-in. apart with 13 seed pieces per 10-ft plot.

Table 16. Total yield, greater than 1 7/8" yield, percent of standard, size distribution and percent pickout for SNAC Chip Trial in Pennsylvania, 2022

Variety/Line	Yield (cwt/A) ¹		% US#1	% of Standard ²	% by size class ³					% PO ⁴
	Total	>1 7/8"			1	2	3	4	5	
Snowden	302	273	91	100	5	35	44	11	0	4
Lamoka	229	196	86	72	3	17	49	20	0	11
W15125-4	368	323	88	118	3	15	37	34	1	9
W15NYR11-13	324	242	73	89	3	23	37	13	0	24
MSAFB609-12	337	306	91	112	3	28	47	16	0	6
MSAFB635-15	168	134	80	49	7	38	35	7	0	13
MSW474-1	256	221	86	81	4	22	47	15	1	11
MSZ242-13	222	130	59	48	2	9	25	26	0	38
NY163	267	250	93	91	5	41	43	10	0	2
NY168	311	275	89	101	3	22	44	21	1	8
LSD ⁵	72	79	20		3	7	12	16	2	20

¹Yield Total = all yield including pickouts. US#1 Yield >1 7/8" (marketable yield) = categories 2, 3, 4 and 5 excluding pickouts.

²Percentage of the standard, Snowden, for US#1 >1 7/8" yield.

³Percentage of total yield according to size class. 1=<1.875 in., 2=1.875-2.5 in., 3=2.5-3.25 in., 4=3.25-4.0 in., 5=>4.0 in.

⁴Percentage of total that are pickouts.

⁵LSD indicates least significant difference ($P=0.05$). 3 replications.

Table 17. Tuber characteristics and internal defects for SNAC Chip Trial in Pennsylvania, 2022

Variety/Line	Tuber Characteristics ¹						Internal Defects ²			Reasons for Pickouts ³
	TA	C	TX	Sh	TED	TCS	% HH	% IB		
Snowden	5	5	5	2	4	5	67	0	PO=G, Sc	
Lamoka	5	7	6	3	6	5	0	0	PO=G	
W15125-4	6	6	5	2	6	6	0	0	PO=G, misshape	
W15NYR11-13	4	6	5	2	5	6	0	0	PO=Sc, 2nd tubers, Gc	
MSAFB609-12	5	7	6	2	5	5	0	0	PO=G, Sc	
MSAFB635-15	5	6	5	2	6	5	0	0	PO=G	
MSW474-1	4	6	5	2	4	5	0	0	PO=G	
MSZ242-13	4	6	5	3	4	4	0	0	PO=G, GC, misshape	
NY163	5	7	6	2	6	5	0	0	PO=G, misshape	
NY168	4	7	6	2	6	4	0	0	PO=G, K	

¹Tuber Characteristics: TA = tuber appearance: 1 = very poor, 5 = fair, 9 = excellent.

C = skin color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

TX = skin texture: 1 = partial russet, 2 = heavy russet, 3 = mod. russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.
 Sh = tuber shape: 1 = round, 2 = mostly round, 3 = round-oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong-long, 7 = mostly long, 8 = long, 9 = cylindrical.
 TED = tuber eye depth: 1 = very deep, 5 = medium, 9 = very shallow. TCS = tuber cross section: 1 = very flat, 5 = intermediate, 9 = very round.

²Internal Defects: HH = hollow heart, IB = internal browning. Percent of total number observed out of 12 tubers (4 tubers per rep, 3 reps).

³External Defects: Gc = growth cracks, K = knobs, G = sunburn (green), Sc = scab.

Table 18: Management of Evaluation Trials, 2022

Erie County

Planting Date: 1 June
 Harvest Date: 3 October
 Previous Crop: Corn

Northampton County

Planting Date: 9 May
 Harvest Date: 20 September
 Previous Crop: Oats with clover cover crop

Rock Springs

Trial Germplasm trial
 Planting Date: 6 June
 Harvest Date: 20, 21 October
 Previous Crop: Wheat, cover crop in fall
 Fertilizer Rate/A: 12 May: 0-0-62 (N-P-K) at 325 lb/A with 10 ft Gandy
 13 May: 21-0-0 (N-P-K) at 875 lb/A with 10 ft Gandy
 3 June: 20-10-10 (N-P-K) at 630 lb/A with 10 ft Gandy
 7 July: liquid N (39 lb/A) at Hilling
 Herbicide: Eptam 7E, Medal EC, Ommi Mrtribuzin 75DF
 Fungicide: Luna Tranquility, Manzate Pro-Stick, Elatus, Endura, Tanos, Revus
 Top, Orondis Opti, Omni Chlorothalonil 720SC, Equus
 Insecticide: Lambda T2, Montana 4F, Radiant SC
 Vine Kill: 26 September and 3 October
 Rainfall (inches): June (3.14), July (2.26), August (3.13), September (3.40)

Trial Early variety trial
 Planting Date: 6 June
 Harvest Date: 29 September
 Previous Crop: Wheat, cover crop in fall
 Fertilizer Rate/A: 12 May: 0-0-62 (N-P-K) at 325 lb/A with 10 ft Gandy
 13 May: 21-0-0 (N-P-K) at 875 lb/A with 10 ft Gandy
 3 June: 20-10-10 (N-P-K) at 630 lb/A with 10 ft Gandy
 7 July: liquid N (39 lb/A) at Hilling
 Herbicide: Eptam 7E, Medal EC, Ommi Mrtribuzin 75DF
 Fungicide: Luna Tranquility, Manzate Pro-Stick, Elatus, Endura, Tanos, Revus
 Top, Orondis Opti, Omni Chlorothalonil 720SC, Equus
 Insecticide: Lambda T2, Montana 4F, Radiant SC
 Vine Kill: 8, 15 September
 Rainfall (inches): June (3.14), July (2.26), August (3.13), September (3.40)

Table 19. Promising Varieties for Pennsylvania

FRESH MARKET

AF5280-5: a fresh market variety with medium maturity from University of Maine

- In Rock Springs trials over 8 years marketable yield averaged 126% of Atlantic.
- In Southeastern Pennsylvania trials over 4 years marketable yield averaged 119% of Atlantic.
- In Erie County trials over 2 years marketable yield averaged 105% of Atlantic.

Tubers are round to oblong with slightly net skin. Low levels of pickouts; misshape and sunburn have been observed. It had average 2% hollow heart and 9% internal browning. Over 14 trials specific gravity had averaged 0.023 less than Atlantic. Has moderate scab resistance.

AF5819-2: a fresh market variety with medium maturity from University of Maine

- In Rock Springs trials over 4 years marketable yield averaged 132% of Atlantic.
- In Southeastern Pennsylvania trials over 2 years marketable yield averaged 115% of Atlantic.
- In Erie County trials over 3 years marketable yield averaged 132% of Atlantic.

Tubers are mostly round with slightly net skin. Low levels of pickouts; sunburn and misshapen have been observed. Over 9 trials specific gravity had average 0.014 less than Atlantic, and it had average 5% internal browning and had no hollow heart. Has moderate scab and soft rot resistance.

BNC815-7: a fresh market variety with medium maturity from USDA-ARS Beltsville

- In Rock Spring trials over 4 years marketable yield averaged 113% of Atlantic.

Tubers are mostly round with slightly net skin. Pickouts averaged 12%, mostly sunburn and a few growth cracks. Specific gravity averaged 0.005 less than Atlantic.

Agate: a fresh market variety with medium early maturity from Solanum International

- In one Rock Springs trial marketable yield was 95% of Atlantic.
- In Southeastern Pennsylvania trials over 2 years marketable yield averaged 119% of Atlantic.
- In one Erie County trial marketable yield was 129% of Atlantic.

Tubers are round to oblong with slightly net skin. Low levels of pickouts; sunburn and misshapen have been observed. Over 4 trials specific gravity averaged 0.024 less than Atlantic.

REDS

NDAF113484B-1: a red skin variety with medium early maturity from University of Maine

- In Rock Springs trials over 6 years marketable yield averaged 85% of Chieftain.
- In Southeastern Pennsylvania trials over 3 years marketable yield averaged 111% of Chieftain.
- In Erie County trials over 3 years marketable yield averaged 67% of Chieftain.

Tubers are mostly round with smooth skin. Low levels of pickouts; sunburn have been observed. Over 12 trials specific gravity averaged 0.003 less than Chieftain. Average yields are similar to Dark Red Norland, holds its color well in storage. It has moderate scab, shatter and black spot resistance.

A08122-9RY: a red skin variety with yellow flesh and medium maturity from USDA-ARS Idaho

- In Rock Springs trials over 3 years marketable yield averaged 135% of Chieftain.

Tubers are round to oblong with slightly net skin. Low levels of pickouts; sunburn and secondary tubers have been observed. Specific gravity averaged 0.008 more than Chieftain.

AF6289-2: a red skin variety with medium early maturity from University of Maine

- In Rock Springs trials over 3 years marketable yield averaged 113% of Chieftain.
- In one Southeastern Pennsylvania trial the marketable yield was 92% of Chieftain.
- In Erie County trials over 2 years marketable yield averaged 79% of Chieftain.

Tubers are round to oblong with smooth skin. Low levels of pickouts; sunburn has been observed. Specific gravity averaged 0.003 less than Chieftain. It has moderate shatter and blackspot resistance.

CHIPPING

NY163: a chip variety with medium maturity from Cornell University

- In Rock Springs trials over 5 years marketable yield averaged 119% of Atlantic.
- In Southeastern trials over 3 years marketable yield averaged 75% of Atlantic.
- In Erie County trials over 4 years marketable yield averaged 105% of Atlantic.

Tubers are smooth mostly round with smooth skin. Over 12 trials tubers averaged 42% in the 1 $\frac{7}{8}$ " to 2 $\frac{1}{2}$ " size class and 36% in the 2 $\frac{1}{2}$ " to 3 $\frac{1}{4}$ " size class. Low levels of pickouts; sunburn and gowthcracks have been observed. Specific gravity averaged 0.003 less than Atlantic. Chip color has been equal to Snowden. It has moderate scab resistance. NY163 is also being evaluated in the SNAC trials.

MSAFB609-12: a chip variety with medium late maturity from University of Maine

- In Rock Springs trials over 5 years marketable yield averaged 138% of Atlantic.
- In Southeastern trials over 2 years marketable yield averaged 84% of Atlantic.
- In Erie County trials over 2 years marketable yield averaged 130% of Atlantic.

Tubers are mostly round with slightly net skin. Over 8 trials tubers averaged 35% in the 1 $\frac{7}{8}$ " to 2 $\frac{1}{2}$ " size class and 43% in the 2 $\frac{1}{2}$ " to 3 $\frac{1}{4}$ " size class. Low levels of pickouts; sunburn and misshape have been observed. Specific gravity averaged 0.002 less than Atlantic. Chip color has been equal to Snowden. It has scab and late blight resistance. MSAFB609-12 is in the SNAC trials.

EARLY SEASON (from 2015 to 2022 average 91 days)

Agate from Solanum International

- A fresh market variety with yellow flesh, tubers are round to oblong with smooth yellow skin.
- In Rock Springs trials over 2 years marketable yield averaged 160% of Superior. Tubers averaged 52% in the 1 $\frac{7}{8}$ " to 2 $\frac{1}{2}$ " size class. It has no internal defects and pickouts averaged 10% growth cracks and green. Specific gravity is equal to Superior.

NY171 from Cornell University

- A fresh market variety, tubers are round to oblong with smooth skin and purple around eyes.
- Marketable yield was 125% of Superior. 30% of the tubers were in the 1 $\frac{7}{8}$ " to 2 $\frac{1}{2}$ " size class and 49% in the 2 $\frac{1}{2}$ " to 3 $\frac{1}{4}$ " size class. It has no internal defects and low levels of pickouts. Specific gravity was 0.009 less than Superior. Intermediate reaction to common scab.

BNC917-2 from USDA-ARS Beltsville

- A fresh market variety with yellow flesh. Tubers are round to oblong with smooth purple skin.
- Marketable yield was 183% of Superior. 20% of the tubers were in the 1 $\frac{7}{8}$ " to 2 $\frac{1}{2}$ " size class and 59% in the 2 $\frac{1}{2}$ " to 3 $\frac{1}{4}$ " size class. It has no internal defects and low levels of pickouts. Specific gravity was 0.005 less than Superior.

NDA8512C-1R from USDA-ARS Idaho

- Tubers are mostly round with smooth red skin.
- Marketable yield was 147% of Superior. 21% of the tubers were in the 1 $\frac{7}{8}$ " to 2 $\frac{1}{2}$ " size class and 61% in the 2 $\frac{1}{2}$ " to 3 $\frac{1}{4}$ " size class. It has no internal defects and it had low levels of pickouts. Specific gravity was 0.004 less than Superior.

Brodie: a chipping variety that produces large tubers with oblong shape and is good choice for Pennsylvania growers.

Rock Springs - 2004, 2005, 2007-2012, 2014 & 2015 (replicated trials)														
Cultivar	CWT	CWT	%	%	%	%	%	%	%	%	%	%	%	%
	Total	>17/8"	US#1	Standard	2	3	4	5	PO	Specific Gravity	Vine Mat.	Dec	3wk	6wk
	517	455	88	121	15	45	27	2	10	1.079	ML	4	4	4
	450	389	86	100	17	43	24	2	12	1.091	ML	5	6	5
	453	409	90	109	28	46	14	1	7	1.087	ML	4	4	4
	427	374	87	98	17	47	22	1	10	1.075	ML	-	-	-
Lehigh - 2007-2011 (replicated trials)														
Cultivar	CWT	CWT	%	%	%	%	%	%	%	%	%	%	%	%
	Total	>17/8"	US#1	Standard	2	3	4	5	PO	Specific Gravity	Vine Mat.	Dec	3wk	6wk
	522	460	88	112	26	46	16	0	5	1.074	-	4	4	5
	457	414	90	100	39	44	16	2	4	1.084	-	5	5	6
	477	432	90	108	39	43	8	0	3	1.082	-	4	4	4
	437	381	87	94	29	43	14	0	8	1.068	-	-	-	-
Lehigh - 2012, 2014 & 2015 (non replicated trials)														
	485	396	80	101	29	36	11	3	12	1.081	-	4	4	3
	434	381	87	100	34	43	10	0	7	1.087	-	4	5	5
	420	375	88	96	43	40	5	0	2	1.085	-	4	3	4
	390	339	86	88	35	42	9	0	8	1.069	-	-	-	-
Erie - 2005, 2007-2010 (replicated trials)														
Cultivar	CWT	CWT	%	%	%	%	%	%	%	%	%	%	%	%
	Total	>17/8"	US#1	Standard	2	3	4	5	PO	Specific Gravity	Vine Mat.	Dec	3wk	6wk
	455	346	74	124	17	36	16	1	20	1.076	-	4	4	3
	374	286	75	100	19	36	14	1	20	1.086	-	4	5	5
	450	379	83	136	37	38	4	0	9	1.081	-	4	3	4
	356	253	69	87	18	35	11	0	33	1.068	-	-	-	-
Erie - 2012 & 2014 (non replicated trials)														
	450	325	72	132	29	29	15	0	22	1.081	-	4	4	4
	325	250	79	100	21	45	13	0	18	1.082	-	4	4	3
	352	275	80	110	31	39	10	0	14	1.081	-	4	4	4
	236	173	73	68	30	36	7	0	20	1.069	-	-	-	-

Evaluation of potato cultivars and breeding lines for resistance to common scab, 2022

Thirty-eight potato cultivars and advanced breeding lines were planted in a naturally infested field at The Pennsylvania State University Russell E. Larson Agricultural Research Center in Pennsylvania Furnace, PA on 23 May. The soil type was a Hagerstown silty clay loam. The experimental design was a randomized complete block design with three replications. The plots were 4-ft long with five seed pieces planted in each plot and 5-ft breaks between plots within a row. Precipitation was 3.14, 2.26, 3.13, and 3.40 in. for Jun, Jul, Aug, and Sep, respectively. Standard crop management practices, and a recommended fungicide program for the management of early and late blights in Pennsylvania, were followed. Plants were vine killed on 15 Sep with Reglone (2.0 pt/A). Tubers were harvested on 18 Oct and were visually assessed for common scab on 27, 28 Oct. Predominant lesion type was scored for each tuber on a 0 to 3 ordinal scale: 0 = no symptom, 1 = superficial, 2 = raised, and 3 = pitted. Percent lesion coverage for each tuber was scored on a 0 to 6 ordinal scale, where 0 = no scab, 1 = > 0 – 2%, 2 = >2 – 5%, 3 = >5 – 10%, 4 = >10 – 25%, 5 = >25 – 50%, and 6 = >50%. The ordinal data per plot were transformed to disease severity score as follows: $[\Sigma(\text{Percent lesion coverage} \times \text{predominant lesion type} \times \text{number of tubers in each category}) / (18 \times \text{total number of potato tubers evaluated})] \times 100$. Disease incidence was expressed as the percentage of tubers with common scab symptoms in each plot. Disease data were subjected to an analysis of variance test, and means were separated using Fisher's protected least significant difference test (SAS v. 9.4, SAS Institute, Cary, NC).

Cultivars Russet Burbank and Shepody were included as a tolerant and a susceptible check for common scab, respectively. Numerically, although not statistically, Dark Red Norland, AF5819-2, NDAF113484B-1, Russet Norkotah, AF6338-6, NDAF113476CB-3, AF5762-8, Superior, AF5735-8 and MSAFB609-12 had a lower disease severity score and disease incidence than Russet Burbank and were considered as tolerant to common scab.

Cultivar/Line	Common scab severity score	Common scab incidence (%)	Cultivar/Line	Common scab severity score	Common scab incidence (%)
Dark Red Norland	1.3 j ^z	21.2 m	Lakeview Russet	6.5 b-j	87.8 ab
AF5819-2	1.3 j	21.8 m	MSAFB635-15	7.4 b-i	88.5 ab
NDAF113484B-1	1.4 j	24.4 klm	CO10098-5W/Y	7.8 b-h	70.9 b-h
Russet Norkotah	1.4 j	23.4 lm	Snowden	7.9 b-h	59.2 b-j
AF6338-6	1.5 j	25.7 klm	AAF10596-1	8.0 b-g	69.5 a-h
NDAF113476CB-3	2.0 ij	30.2 j-m	AF5933-4	8.2 b-g	84.7 abc
AF5762-8	2.2 ij	36.0 j-m	AF5707-1	8.7 b-g	72.3 a-g
Superior	2.4 hij	37.2 i-m	AF5406-7	8.8 b-f	83.4 a-d
AF5735-8	3.2 g-j	41.8 h-m	AF5750-16	8.8 b-f	74.1 a-g
MSAFB609-12	3.6 f-j	46.1 g-m	Chieftain	8.8 b-f	80.0 a-f
Russet Burbank	3.7 e-j	47.7 g-m	AF5071-2	9.3 b-e	67.8 a-h
NY163	3.7 e-j	51.4 e-m	Yukon Gold	9.8 bcd	82.4 a-d
NY171	3.7 e-j	53.8 d-k	Kennebec	9.8 bcd	94.1 a
NY165	3.9 e-j	45.2 g-m	Shepody	10.3 bc	81.6 a-e
AF5280-5	4.0 e-j	49.7 f-m	Atlantic	10.5 bc	78.4 a-f
AF6075-8	4.2 d-j	58.9 b-j	AF6289-2	10.6 bc	72.7 a-g
CO15205-4	5.3 c-j	66.5 a-i	AF5521-1	11.9 b	74.1 a-g
AF6194-4	5.4 c-j	73.2 a-g	Katahdin	12.1 b	85.2 ab
CO15211-1R	6.0 c-j	54.6 c-k	AF5931-1	18.6 a	91.7 a

^z Means followed by the same letter are not significantly different within column category at $P = 0.05$ as determined by Fisher's protected least significant difference test (LSD = 5.6 for severity score and 30.4 for incidence). Each value is the mean of three replicates.

Evaluation of potato cultivars and breeding lines for resistance to late blight, 2022

Thirty-eight potato cultivars and advanced breeding lines were evaluated at The Pennsylvania State University Russell E. Larson Agricultural Research Center in Pennsylvania Furnace, PA. The soil type was a Hagerstown silty clay loam. Potatoes were planted on 10 Jun. The experimental design was a randomized complete block with three replicates. The plots were 4-ft long with five seed pieces planted in each plot and 4-ft breaks between plots within a row. Each treatment row had an adjacent row of the susceptible cv. Atlantic as a spreader row. Precipitation was 3.14, 2.26, 3.13, and 3.40 in. for Jun, Jul, Aug, and Sep, respectively. Natural late blight infection was not observed in the field. On 21 Aug, spreader rows were spray-inoculated with a mixture of four isolates of *Phytophthora infestans* clonal lineage US-23, at a concentration of 5.8×10^4 sporangia/ml, to promote uniform spread of the pathogen to all treatment plots. Overhead sprinklers were used for approximately one hour daily when the weather was dry and hot to increase humidity in the plant canopy after infection. Disease ratings were determined by visually assessing each 4-ft plot and estimating the percentage of late blight symptomatic foliage on a 0 to 100% scale. Ratings were taken on 2, 9, 16, 23, 30 Sep. Disease data were expressed as area under the disease progress curve (AUDPC), subjected to analysis of variance, and means were separated using Fisher's protected least significant difference test (SAS v. 9.4, SAS Institute, Cary, NC).

The most susceptible plots reached 100% disease severity by the end of the season. Cultivar Kennebec was a moderately resistant check. Based on AUDPC values, AF5406-7, MSAFB609-12, AF6075-8, AF5735-8, NY165, AF5750-16, AF5707-1, AF6194-4, AF6338-6 and Lakeview Russet were significantly more resistant than cv. Kennebec.

Cultivar/Line	Mean AUDPC ^z	Cultivar/Line	Mean AUDPC
AF5406-7	98 l ^y	Katahdin	788 fg
MSAFB609-12	116 kl	AF5521-1	865 ef
AF6075-8	153 kl	NY171	929 def
AF5735-8	188 kl	NDAF113476CB-3	940 def
NY165	191 kl	AAF10596-1	1100 cde
AF5750-16	197 kl	AF5280-5	1101 cde
AF5707-1	211 kl	Atlantic	1108 cde
AF6194-4	247 jkl	CO10098-5W/Y	1120 cde
AF6338-6	252 jkl	AF5819-2	1135 cd
Lakeview Russet	256 jkl	Chieftain	1138 cd
AF5762-8	363 i-l	NY163	1159 bcd
Russet Burbank	369 ijk	AF5931-1	1190 bcd
Snowden	490 hij	Superior	1233 bc
AF5071-2	502 hij	AF6289-2	1257 bc
Kennebec	560 ghi	Russet Norkotah	1268 bc
MSAFB635-15	708 fgh	CO15205-4	1309 bc
AF5933-4	751 fgh	Yukon Gold	1407 ab
CO15211-1R	778 fg	Dark Red Norland	1580 a
Shepody	785 fg	NDAF113484B-1	1649 a

^z AUDPC = Area under the disease progress curve was calculated from 2 to 30 Sep according to the formula: $\sum_{i=1}^n [(R_{i+1} + R_i)/2] [t_{i+1} - t_i]$, where R = disease severity rating (% of leaf surface affected) at the i th observation, t_i = time (days) since the previous rating at the i th observation, and n = total number of observations. Each value is the mean of three replicates.

^y Means followed by the same letter are not significantly different at $P = 0.05$ as determined by ANOVA followed by Fisher's protected least significant difference test (LSD = 267).

Evaluation of potato cultivars and breeding lines for resistance to early blight, 2022

Thirty-eight potato cultivars and advanced breeding lines were evaluated at The Pennsylvania State University Russell E. Larson Agricultural Research Center in Pennsylvania Furnace, PA. The soil type was a Hagerstown silty clay loam. Potatoes for each entry were planted on 19 May in plots arranged in a randomized complete block design with three replicates per entry. Plots consisted of a single 4-ft long row with five seed pieces planted in each plot, with a 4-ft break between plots. Each entry had an adjacent row of the susceptible cv. Dark Red Norland as a spreader row. Precipitation was 3.14, 2.26, 3.13, and 3.40 in. for Jun, Jul, Aug, and Sep, respectively. To promote uniform spread of the pathogen to all treatment plots, spreader rows were spray-inoculated with a conidial mixture of two isolates of *Alternaria solani*, at a concentration of 1.7×10^4 conidia/ml on 18 Jul. For each plot, the percentage of symptomatic foliage was visually assessed on a 0 to 100% scale on 5, 12, 18, 25, 28 Aug. Disease data were compared by calculating the area under the disease progress curve (AUDPC), subjected to analysis of variance, and means were separated using Fisher's protected least significant difference test (SAS v. 9.4, SAS Institute, Cary, NC).

Disease pressure from early blight was high and the most susceptible plots reached 100% disease severity by the end of the season. Cultivars Kennebec and Russet Burbank were included as moderately resistant checks and Dark Red Norland was included as a susceptible check. Twelve cultivars/lines (AF5406-7, AF6338-6, Katahdin, AF5762-8, AF5071-2, Lakeview Russet, AF5521-1, AF5707-1, AF5750-16, Snowden, Shepody and AF6075-8) were characterized as moderately resistant because their AUDPC values were not significantly different from the moderately resistant check Russet Burbank and lower than the moderately resistant check Kennebec.

Cultivar/Line	AUDPC ^z	Cultivar/Line	AUDPC
AF5406-7	74 l ^y	Superior	565 fgh
AF6338-6	93 l	Atlantic	566 fgh
Russet Burbank	103 l	NY163	577 e-h
Katahdin	136 l	AF5819-2	591 e-h
AF5762-8	137 l	MSAFB635-15	600 d-h
AF5071-2	142 l	NY165	630 d-g
Lakeview Russet	156 l	CO15211-1R	651 d-g
AF5521-1	157 l	AF5933-4	655 d-g
AF5707-1	183 kl	NDAF113476CB-3	734 c-f
AF5750-16	230 jkl	CO15205-4	769 c-f
Snowden	260 i-l	Russet Norkotah	788 cde
Shepody	262 i-l	Yukon Gold	821 bcd
AF6075-8	279 i-l	AF5280-5	881 bc
AF5735-8	385 h-k	AAF10596-1	937 bc
Kennebec	398 h-k	NDAF113484B-1	946 bc
AF6194-4	405 hij	CO10098-5W/Y	949 bc
MSAFB609-12	477 ghi	AF5931-1	1011 b
Chieftain	479 ghi	AF6289-2	1024 ab
NY171	479 ghi	Dark Red Norland	1239 a

^z AUDPC = area under the disease progress curve was calculated from 5 to 28 Aug according to the formula: $\sum_{i=1}^n [(R_{i+1} + R_i)/2] [t_{i+1} - t_i]$, where R = disease severity rating (% of leaf surface affected) at the i th observation, t_i = time (days) since the previous rating at the i th observation, and n = total number of observations. Each value is the mean of three replicates.

^y Means followed by the same letter are not significantly different at $P = 0.05$ as determined by ANOVA followed by Fisher's protected least significant difference test (LSD = 221).

Supplemental Progress Report, 2022-----March 28, 2023

Pennsylvania Regional Potato Germplasm Evaluation Program, 2022

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The objective of this project is to find new potato varieties and advanced breeding lines that are well adapted to Pennsylvania potato growing conditions and have qualities that are suitable for processing use. We cooperate with the directors of several other potato breeding programs from the Northeast US and a few programs from outside the Northeast by evaluating their potato germplasm. Data from this project helps breeders determine which lines to consider for potential release as new varieties, thereby bringing about new potato varieties for you.

Regional trials were established in three counties across Pennsylvania: Lehigh Co., Erie Co., and the Russell E. Larson Agricultural Research Center at Rock Springs, Centre Co. Please see the Progress Report from January 2023 for details. During the winter months, tests were performed to evaluate germplasm for chip and French fry processing. Presented in this report are the chip processing results (Tables 1-4) and French fry results (Tables 5-7). The data are collected from small samples, which may not reflect all possible variations one may see within a commercial harvest.

Materials and Methods

From harvest until November, tuber samples were placed in a pole barn where they were subjected to fluctuating temperatures. Storage temperatures are listed at the bottom of each table. The chipping procedure at the PSU Chip Lab was as follows. Four tubers from each breeding line/variety were peeled, cut in half, and sliced. Eight slices from the center of each half were used for chipping. Slices were fried at 365°F. The chip samples were rated on a scale of 1-10, which is in accordance with the Snack Food Color Chart. The oil used for chipping was soy-based oil (Bakers Chef heavy-duty oil). French fry tests were conducted as follows. Four tubers were peeled and cut into strips. Center strips (36 over the 4 tubers) were blanched in water for 3 minutes at 185°F then fried for 3 minutes at 365°F. The samples were rated using the USDA scale.

Results

Yield results and listings of noteworthy varieties/lines were provided in the January 2023 progress report.

Chipping (Tables 1-4)

Atlantic and Snowden are the standard varieties to use for comparing the chip color of the other lines.

From out of field chipping at Rock Springs: NY165, MegaChip, Mainstee and SP327 had the best color; Atlantic, B2869-29 and Mackinaw had acceptable color.

From chipping after 3 week reconditioning: At Rock Springs, Snowden, MSAFB609-12, NY163, NC818-24, AF6522-1, AF6552-2 and NY168 had the best color; AF5933-4, MSAFB635-15, NY165, AF5973-3, AF6206-3, AF6206-5, AF6550-2, AF6555-2, AF6567-4, AF6601-2, AF6603-5, WAF16107-2, AF6543-2, BNC816-3, B3379-2, B3403-6, NC821-30, SP327, WAF16220-4, AF6618-2, AF6669-10, AF6671-10, AF6675-1, AF6684-9, AF6687-3, WAF17045-2 and NDAF14188-5 had acceptable color. At Lehigh County, NY163 and NY165 had the best color; Atlantic, Snowden, MSAFB609-12, MSAFB635-15, NY168 and SP327 had acceptable color. At Erie County, Snowden, NY165 and Y177 had the best color; NY163, NY168, MSAFB609-12, W15125-4, NC821-30 and SP327 had acceptable color.

From chipping after 6 week reconditioning: At Rock Springs, MSAFB609-12, NY163, AF6206-3, AF6522-1, AF6552-2, AF6567-4, AF6601-2, NY168 and AF6669-10 had the best color; Snowden, AF5933-4, MSAFB635-15, NY165, NC818-24, AF5973-3, AF6206-5, AF6550-2, AF6555-2, AF6603-5, WAF16107-2, AF6543-2, BNC816-3, B3379-2, W1525-4, NC821-30, SP327, WAF16220-4, AF6618-2, AF6671-10, AF6675-1, AF6684-9, AF6687-3, WAF17045-2 and NDAF14188-5 had acceptable color. At Lehigh County, MSAFB609-12 and SP327 had the best color; Atlantic, Snowden, MSAFB635-15, NY163, NY165 and NY168 had acceptable color. At Erie County, Snowden, NY163, NY165, NY168, NY177, MSAFB609-12 and NC821-30 had acceptable color.

From chipping directly from 45°F: At Rock Springs, AF6522-1 and NY168 had the best color; Snowden, AF5933-4, MSAFB609-12, NY163, NY165, NC818-24, AF6206-3, AF6206-5, AF6552-2, AF6567-4, B3403-6, SP327, WAF16220-4, AF6665-3, AF6669-10, AF6671-10, AF6675-1, AF6684-9, AF6687-3 and WAF17045-2 had acceptable color. At Lehigh County, MSAFB609-12 had the best color; Atlantic, Snowden, MSAFB635-15, NY163, NY168 and SP327 had acceptable color. At Erie County, Snowden, NY163, NY165, NY168, NY177 and MSAFB609-12 had acceptable color.

French fry Tests (Tables 5-7)

At Rock Springs, Russet Burbank, AAF10596-1, AF5406-7, AF5707-1, AF5762-8, NDAF113476CB-3, AF5736-16, A11175-12TE, Bridget, Palace, SP327, AF6314-12, AF6377-10, AF6377-12, AAF14025-2, AF6749-3, AF6855-4, AAF16069-1, AAF16069-2 and COAF16277-4 had the best color. At Lehigh County, SP327, Donata and Bridget had the best color. At Erie County, Lakeview Russet, Bridget, Donata, AF5762-8 and A11175-12TE had the best color.

The Pennsylvania Potato Research Program, the Pennsylvania Department of Agriculture and USDA funded this research in conjunction with donations. This research is the result of cooperation of growers, industry and PSU staff. The growers hosting the plots provided contributions (land, fertilizer, pesticides, time, etc.). University of Maine, Cornell University, North Carolina State University, USDA-ARS Maine, USDA-ARS Idaho, Colorado State University, Michigan State University, University of Wisconsin potato breeding programs and Solanum International, Parkland Seed, Pennsylvania Co-operative Potato Growers, Inc., Sterman Masser Inc. provided seed. Special thanks to Bob Leiby who made sure this project was completed.

Table 1. Out of field chip color results of early season potato evaluation in Centre County, Russell E. Larson Agricultural Research Center at Rock Springs, 2022.

Variety/line	Specific Gravity	Chip Color
Atlantic	1.080	4
B2869-29	1.083	4
NY165	1.080	3
MegaChip	1.080	3
Mainstee	1.071	3
Mackinaw	1.079	4
SP327	1.071	3

Harvest and chipping on September 2, 2022; 88 days from planting.

Chip color is based on a 1 – 10 scale with 1 = lightest, 10 = darkest, 1 – 5 = acceptable chip color.

Table 2. Chip color results of potato evaluation in Centre County, Russell E. Larson Agricultural Research Center at Rock Springs, 2022.

Variety/line	Specific Gravity	Chip Color		
		Feb ¹	Mar ²	Mar ³
Atlantic	1.085	6	6	8
Snowden	1.082	3	4	4
AF5933-4	1.086	4	4	5
MSAFB609-12	1.084	3	3	4
MSAFB635-15	1.084	4	4	6
NY163	1.075	3	3	4
NY165	1.080	4	5	5
NC818-24	1.076	3	4	5
AF5973-3	1.086	5	5	6
AF6165-9	1.091	6	6	7
AF6200-7	1.090	6	6	6
AF6206-3	1.081	4	3	4
AF6206-5	1.085	4	5	5
AF6522-1	1.076	3	3	3
AF6550-2	1.079	4	5	6
AF6552-2	1.077	3	3	4
AF6555-2	1.081	5	5	7
AF6567-4	1.085	4	3	5
AF6601-2	1.073	4	3	6
AF6603-5	1.082	4	4	6
WAF16107-2	1.084	5	5	6
AF6543-2	1.090	5	4	6
BNC816-3	1.076	5	4	6
B3379-2	1.092	5	4	6
B3403-6	1.091	5	6	5
NY168	1.085	3	3	3
W1525-4	1.082	6	5	7
NC821-30	1.093	5	4	6
SP327	1.075	5	5	5
WAF16220-4	1.082	4	4	4
AF6541-3	1.072	6	7	6
AF6618-2	1.089	4	5	6
AF6652-3	1.073	6	6	6
AF6664-8	1.078	6	6	6
AF6665-3	1.069	6	6	5
AF6668-3	1.073	6	6	7
AF6669-10	1.078	4	3	5
AF6671-10	1.089	5	5	5
AF6675-1	1.071	5	4	4
AF6684-9	1.079	5	4	4
AF6687-3	1.083	5	4	5
WAF17045-2	1.081	4	5	5
NDAF14188-5	1.075	5	4	6

¹ Feb. = Stored at 45°F from November 30, 2022 then transferred to 55°F three weeks prior to chipping on February 20, 2023.

² Mar. = Stored at 45°F from November 30, 2022 then transferred to 55°F six weeks prior to chipping on March 8, 2023.

³ Mar. = Stored at 45°F from November 30, 2022 and chipped on March 9, 2023.

Chip color is based on a 1 – 10 scale with 1 = lightest, 10 = darkest, 1 – 5 = acceptable chip color.

Table 3. Chip color results of potato evaluation in Lehigh County, Timothy and Deborah Geiger's Farm, 2022.

Variety/line	Specific Gravity	Chip Color		
		Feb ¹	Mar ²	Mar ³
Atlantic	1.097	5	4	5
Snowden	1.097	4	4	4
MSAFB609-12	1.096	4	3	3
MSAFB635-15	1.093	5	5	5
NY163	1.090	3	4	4
NY165	1.091	3	4	6
NY168	1.095	4	4	4
SP327	1.090	4	3	4

¹ Feb. = Stored at 45°F from November 30, 2022 then transferred to 55°F three weeks prior to chipping on February 20, 2023.

² Mar. = Stored at 45°F from November 30, 2022 then transferred to 55°F six weeks prior to chipping on March 8, 2023.

³ Mar. = Stored at 45°F from November 30, 2022 and chipped on March 9, 2023.

Chip color is based on a 1 – 10 scale with 1 = lightest, 10 = darkest, 1 – 5 = acceptable chip color.

Table 4. Chip color results of potato evaluation in Erie County, Mark Troyer’s Farm, 2022.

Variety/line	Specific Gravity	Chip Color		
		Feb ¹	Mar ²	Mar ³
Atlantic	1.089	6	6	7
Snowden	1.081	3	4	4
NY163	1.082	4	4	4
NY165	1.079	3	4	4
NY168	1.084	4	5	5
NY177	1.093	3	4	4
MSAFB609-12	1.084	4	4	5
W15125-4	1.081	5	7	7
NC821-30	1.090	4	5	7
SP327	1.070	5	7	7

¹ Feb. = Stored at 45°F from November 30, 2022 then transferred to 55°F three weeks prior to chipping on February 20, 2023.

² Mar. = Stored at 45°F from November 30, 2022 then transferred to 55°F six weeks prior to chipping on March 8, 2023.

³ Mar. = Stored at 45°F from November 30, 2022 and chipped on March 9, 2023.

Chip color is based on a 1 – 10 scale with 1 = lightest, 10 = darkest, 1 – 5 = acceptable chip color.

Table 5. French fry color for russet skinned or long white potato evaluation trial in Centre County, Russell E. Larson Agricultural Research Center at Rock Springs, 2022.

Variety/line	Specific Gravity	French Fry Color	
		Feb ¹	Mar ²
Russet Norkotah	1.070	1	2
Russet Burbank	1.077	00	0
Lakeview Russet	1.072	1	1
AAF10596-1	1.085	00	0
AF5071-2	1.080	0	1
AF5406-7	1.075	0	0
AF5707-1	1.078	0	0
AF5750-16	1.077	0	1
AF5762-8	1.088	00	00
AF6075-8	1.072	1	1
AF6338-6	1.081	0	1
NDAF113476CB-3	1.088	0	0
AF5736-16	1.091	00	00
AAF12147-6	1.080	0	1
A11175-12TE	1.081	00	0
Bridget	1.077	0	0
Palace	1.080	0	0
SP327	1.075	00	0
AF6314-12	1.086	00	0
AF6377-10	1.076	00	00
AF6377-12	1.080	0	0
AF6377-13	1.085	0	1
AF6384-2	1.078	1	1
AF6465-7	1.075	1	0
AAF14025-2	1.085	00	0
AF6749-3	1.078	0	0
AF6855-4	1.081	00	0
AAF16069-1	1.071	0	0
AAF16069-2	1.074	0	00
COAF16277-4	1.075	00	00

¹ Feb. = Stored at 45°F from November 30, 2022, then transferred to 55°F three weeks prior to frying on February 22, 2023.

² Mar. = Stored at 45°F from November 30, 2022, then transferred to 55°F six weeks prior to frying on March 10, 2023.

French Fry Color: USDA Scale Color Standers for Frozen Fried Potatoes with 000 = lightest, 4 = darkest.

Table 6. French fry color for russet skinned or long white potato evaluation trial in Lehigh County, Timothy and Deborah Geiger's Farm, 2022.

Variety/line	Specific Gravity	French Fry Color	
		Feb ¹	Mar ²
Russet Norkotah	1.077	1	1
SP327	1.090	00	00
Donata	1.097	0	0
Bridget	1.086	0	0
Palace	1.084	0	1

¹ Feb. = Stored at 45°F from November 30, 2022, then transferred to 55°F three weeks prior to frying on February 22, 2023.

² Mar. = Stored at 45°F from November 30, 2022, then transferred to 55°F six weeks prior to frying on March 10, 2023.

French Fry Color: USDA Scale Color Standers for Frozen Fried Potatoes with 000 = lightest, 4 = darkest.

Table 7. French fry color for russet skinned or long white potato evaluation trial in Erie County, Mark Troyer Farm, 2022.

Variety/line	Specific Gravity	French Fry Color	
		Feb ¹	Mar ²
Russet Norkotah	1.064	1	2
Lakeview Russet	1.076	0	0
Bridget	1.089	0	0
Donata	1.079	0	0
AF5762-8	1.082	0	0
A11175-12TE	1.075	0	0

¹ Feb. = Stored at 45°F from November 30, 2022, then transferred to 55°F three weeks prior to frying on February 22, 2023.

² Mar. = Stored at 45°F from November 30, 2022, then transferred to 55°F six weeks prior to frying on March 10, 2023.

French Fry Color: USDA Scale Color Standers for Frozen Fried Potatoes with 000 = lightest, 4 = darkest.