Pennsylvania Potato Research Report, 2018

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EXECUTIVE SUMMARY

Penn State's Department of Plant Pathology & Environmental Microbiology potato research program can be categorized into five areas: 1) variety breeding and evaluation, 2) breeding for disease resistance (focused on early and late blight and common and powdery scab), 3) biology and genetic variability of potato pathogens (focused on early and late blight and common scab), 4) chemical control and 5) integrated pest management of potatoes. Many of these projects are long term and only results of 2018 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 101 round whites with a few yellow flesh, 37 red-skinned (a few purple skinned) and 44 russet or long white types. An early variety trial of 27 varieties and a seed spacing trial of 3 varieties were also conducted at Rock Springs. The Northampton location and Erie location had 38 and 39 varieties, respectively. Snack Food Association trial of 12 chipping varieties was conducted in Chambersburg. Breeding lines were contributed by the USDA-ARS, New York, Maine, North Carolina, Michigan, Idaho, Wisconsin, Colorado and a few other sources. See **Pennsylvania Regional Potato Germplasm Evaluation Program 2018 progress report on pages 1-2 and tables from different locations on pages 3-35; management information for each sites on page 36; descriptions of promising varieties for Pennsylvania on pages 37-39; supplemental progress report on pages 45-46 and tables from different locations on pages 47-56; and notes on fresh colors of potato varieties/lines on pages 57-58.**

2. Breeding for Disease Resistance

In three separate field trials, 40 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, Russet Norkotah and Russet Burbank were included as check cultivars which are tolerant to common scab. Shepody was included as a susceptible check cultivar. Four cultivar/lines had lower disease severity and disease incidence than Russet Norkotah and Russet Burbank and they were considered as resistant or moderately resistant. These four cultivar/lines are: AF5312-1, WAF10073-3Rus, AF5414-1 and Reveille Russet. Only few small superficial lesions were observed on some of tubers of these cultivar/lines. **Field evaluation of potato cultivars and breeding lines for resistance to common scab in Pennsylvania, 2018 on page 40.**

In late blight screening trial, late blight disease pressure was high and the most susceptible plots reached 100% disease severity by the end of the season. Cultivar

Kennebec was the moderately resistant check. Seven other cultivar/lines were considered resistant or moderately resistant: AF5412-3, AF5414-1, AF4648-2, AF5450-7, NY152, AF5429-3 and AF5225-1. See **Field evaluation of potato cultivars and breeding lines for resistance to late blight in Pennsylvania, 2018 on page 41.**

In early blight screening trial, Kennebec and Russet Burbank were included as moderately resistant check cultivars. Eight other cultivars/lines were characterized as moderately resistant: AF5225-1, Katahdin, AF4648-2, BNC364-1, NY151, NY162, Snowden and NY149. See **Field evaluation of potato cultivars and breeding lines for resistance to early blight in Pennsylvania, 2018 on page 42.**

3. Chemical Control of Potato Late Blight and Early Blight

In late blight fungicide trial, 6 different treatments were compared to an untreated control. All treatments significantly reduced foliar late blight compared to the untreated control. All treatments significantly increased tuber yield. See **Evaluation of foliar fungicides for control of potato late blight in Pennsylvania, 2018 on page 43.**

In early blight fungicide trial, 8 different treatments were compared to an untreated control. All treatments significantly reduced foliar early blight compared to the untreated control. All treatments significantly increased yield of healthy tubers. See **Evaluation of foliar fungicides for control of potato early blight in Pennsylvania, 2018 on page 44.**

Progress Report---January 2019

Pennsylvania Regional Potato Germplasm Evaluation Program, 2018

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The objective of this project is to find new 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: Northampton Co. (Tables 1- 2), Erie Co. (Tables 3-4) and Rock Springs, Centre Co. (Tables 5-12). The Northampton location and Erie location had 38 and 39 varieties/lines in non-replicated trial, respectively. At the Rock Springs location the trials included 73 round whites with a few yellow flesh, 21 red-skinned (a few purple skinned) and 33 russet or long white types in replicated plots, and an additional 28 whites, 16 red-skinned and 11 russet or long white types planted in non-replicated observational plots. At Northampton Co. and Erie locations, the seed spacing was 8-inch within a 20-ft plot except for the russets that were at 10-inch. At Rock Springs location, the seed spacing was 8-inch within a 10-ft plot except for the russets and some whites that were at 10-inch. An early variety trial of 27 varieties was conducted at Rock Springs, Centre Co. (Tables 13-14). A seed spacing trial of 3 varieties was conducted at Rock Springs, Centre Co. (Table 15). Snack Food Association trial of 12 chipping varieties was conducted at Bryan Bender's Farm in Chambersburg (Tables 16-17). We assessed yield, tuber size, internal defects and external defects, skin color, texture, tuber shape, specific gravity and overall appearance. French Fry and chip quality tests and culinary tests will be conducted over the next few months.

Management information for each site is provided in Table 18. We had late planting in 2018. 2018 was a challenging year to grow potatoes. In parts of Pennsylvania rainfall during July and August was the highest over the last 124 years of recorded weather records. This excessive moisture impacted potato trials in a number of ways: potato plants were stunted because of standing water, a lack of soil air, and leaching of fertilizers; lenticels opened on tubers and allowed soft rot and other infections to enter the tuber; yield and specific gravity were lower than usual.

Descriptions of promising varieties for Pennsylvania are in Table 19.

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:

Northampton county trials:
In the Northampton location the following lines had marketable yield higher than Atlantic: Snowden, Katahdin, Chieftain, Yukon Gold, Norwis, AF4138-8, AF5225-1, NY149, NY151, Tosciana, Avalanche, Electra, NC606-23, NY152, MSX540-4, W9968-5, and MSX569-2R.

Erie county trials:
In the Erie location the following lines had marketable yield higher than Atlantic: Snowden, Chieftain, AF4138-8, AF5225-1, NY149, Tosciana, Wendy, Moonlight, B2152-17, AF4831-2, NCB2607-3, NY152, NY162, NY157, L8-12, AF5040-8, MSX540-4, W9968-5, W9433-1Rus, CO07015-4ru, and Reveille Russet.

Round White planted 8-inch apart in Rock Springs:
Based on data of replicated trials at Rock Springs, there were 15 round white clones with marketable yields significantly higher than Atlantic: AF5225-1, AF5280-5, AF5429-3, AF5450-7, B2904-2, B3183-6, BNC469-7, NY151, NY152, NY157, NY161, NY162, AF4138-8, AF5677-4, AF5677-6, B3083-11, N35-9, BNC470-13, B3156-2, B3265-7, B3265-9, BNC369-4, L8-12, MSV358-3, MSX540-4, MSW485-2, NC606-23, and Melody,

Red-skinned planted 8-inch apart in Rock Springs:
Based on data of replicated trials at Rock Springs, AF4831-2 had marketable yields significantly higher than Chieftain; there was another 8 red-skinned or purple-skinned clone with marketable yields higher than Chieftain: AF5412-3, Cerata, B2152-17, BNC201-1, MSX324-1P, CO98012-5R, and W8405-1R,

Russet-skinned or white planted 10-inch apart in Rock Springs:
Based on data of replicated trials at Rock Springs, AF507-13, CO07015-4RU, and Colomba had marketable yield significantly higher than Russet Norkotah. There were another 21 clones with marketable yields higher than Russet Norkotah: Russet Burbank, Reveille Russet, AF5164-19, AF5312-1, Shepody, WAF10073-3Rus, WAF10612-1, AF4172-2, A08422-2VR, A08422-4VRsto, A08510-1LB, A10021-5TE, CO8231-1RU, CO07049-1RU, CO03276-5RU, CO98067-7RU, W9133-1rus, W9433-1rus, CWO8071-2rus, Belmonda, and WW 40–46.

Early season variety trial in Rock Springs:
Based on data of replicated trials at Rock Springs, NDAF113458-2 and Electra had marketable yields higher than Superior.

Seed spacing trial in Rock Springs:
Based on data of replicated trials at Rock Springs, among three seed spacing distances (8, 10, 12 inches), NY140 had highest yield with 8-inch seed spacing, NY152 had highest yield with 12-inch seed spacing, and Atlantic had highest yield with 8-inch seed spacing.

The results of chipping, French fry and culinary quality tests will be available in March 2019.

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, University of Wisconsin, Michigan State University, North Carolina State University potato breeding programs and Sunrain, Solanum International, Hanse Seed, HZPC companies 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 Joel Sherwood Geiger's Farm, Northampton County, 2018

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific Gravity
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		
Atlantic	286	221	77	100	33	36	8	0	16	1.058
Snowden	300	274	91	118	41	50	0	0	3	1.054
Katahdin	327	259	79	102	37	42	0	0	18	1.042
Superior	299	185	62	80	33	24	6	0	30	1.037
Chieftain	391	347	89	115	31	58	0	0	5	1.035
Yukon Gold	262	223	85	110	23	37	24	0	12	1.039
Norwis	242	228	94	122	26	49	18	0	2	1.038
AF4138-8	297	238	80	104	54	26	0	0	11	1.035
AF5225-1	376	322	86	111	69	16	0	0	4	1.034
NY149 [yf]	315	281	89	116	65	24	0	0	3	1.042
NY151	268	228	85	110	47	33	5	0	6	1.029
Tosciana [yf]	343	270	79	102	49	30	0	0	9	1.035
Atrice	275	210	76	99	40	33	3	0	12	1.021
Moonlight	312	188	60	78	34	27	0	0	33	1.030
Wendy [yf]	305	184	61	78	54	6	0	0	18	1.028
Alegria [yf]	281	194	69	89	57	12	0	0	19	1.039
Avalanche	360	245	68	88	33	30	5	0	26	1.034
Electra [yf]	338	252	74	96	54	21	0	0	14	1.027
NC606-23 [yf]	342	299	87	113	58	28	1	0	2	1.038
NY152	320	289	90	117	47	39	5	0	3	1.047
NY162	250	209	83	108	44	34	6	0	11	1.052
AF5040-8 [yf]	280	199	71	92	21	35	15	0	25	1.054
MSX540-4	323	275	85	110	52	32	1	0	7	1.059
W9968-5	340	241	71	92	23	34	14	0	25	1.052
MSX569-2R	340	273	80	104	46	24	10	0	11	1.019
AAC Alta Rose	193	118	61	79	36	25	0	0	32	1.030
MSW343-2R	274	217	79	102	27	52	0	0	13	1.020

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific Gravity
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		
Labella [yf]	389	222	57	74	46	9	2	0	33	1.028
AF4831-2	256	130	51	66	47	3	0	0	12	1.022
Autum Rose	110	19	17	23	17	0	0	0	37	1.028
Reba	272	194	71	92	36	33	2	0	14	1.042
Russet Norkotah	201	133	66	86	56	10	0	0	18	1.036
Colomba [yf]	277	211	76	98	51	25	0	0	11	
Belmonda [yf]	463	397	86	111	45	41	0	0	9	1.046
AF4172-2	266	141	53	69	31	20	2	0	24	1.042
NY157	269	224	83	108	52	31	0	0	8	1.043
Big Rosa [yf]	173	104	60	78	49	11	0	0	30	1.027
Alta Cloud	263	119	45	59	22	20	4	0	38	1.040

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

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

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

[4]Percentage of total that are pickouts.

Non-replicated trial.

Russet varieties were planted 10-in. apart with 24 seed pieces per 20-ft plot, all other varieties were spaced 8-in. apart with 30 seed pieces per 20-ft plot.

Yellow flesh varieties are indicated with [yf].

Table 2. Tuber characteristics, internal defects for potato evaluation trial in Joel Sherwood Geiger's Farm, Northampton County, 2018

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
Atlantic	3	5	6	2	5	5	30	0
Snowden	5	5	5	2	4	5	80	0
Katahdin	5	7	7	3	5	5	0	10
Superior	3	6	6	3	4	4	10	0
Chieftain	5	2	7	3	5	5	0	10
Yukon Gold	4	7	7	3	4	4	40	0
Norwis	5	7	7	3	4	5	0	0
AF4138-8	5	7	6	2	6	5	0	0
AF5225-1	6	7	6	2	6	6	0	0
NY149	6	9	7	3	6	5	50	0
NY151	6	7	7	2	6	6	0	0
Tosciana	5	9	7	3	7	4	0	0
Atrice	5	9	8	3	5	5	0	0
Moonlight	4	6	7	2	4	6	0	0
Wendy	4	9	7	3	7	5	0	0
Alegria	5	9	8	3	6	5	0	0
Avalanche	4	7	6	3	5	5	0	10
Electra	5	7	7	2	7	6	0	0
NC606-23	5	7	7	3	5	4	0	10
NY152	4	6	6	2	5	5	10	10
NY162	5	7	7	3	5	6	40	0
AF5040-8	4	6	6	3	4	5	30	0
MSX540-4	5	5	5	2	4	4	20	0
W9968-5	5	5	5	2	5	5	90	0
MSX569-2R	6	2	7	3	5	5	0	0
AAC Alta Rose	5	2	6	3	6	6	10	0
MSW343-2R	4	2	7	3	3	5	0	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
Labella	4	3	7	3	6	5	0	0
AF4831-2	6	2	8	2	7	6	0	0
Autum Rose	4	2	8	3	6	5	0	0
Reba	4	6	6	3	5	5	0	0
Russet Norkotah	5	4	3	5	7	5	20	0
Colomba	5	9	8	2	6	5	0	0
Belmonda	6	9	8	3	6	5	20	0
AF4172-2	3	6	4	4	7	5	50	0
NY157	5	6	6	3	7	5	20	10
Big Rossa	3	2	7	3	6	5	0	10
Alta Cloud	2	5	3	6	6	4	60	0

[1]Tuber 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.

[2]Internal 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, 2018

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity
Atlantic	298	177	60	100	10	36	14	0	40	1.047
Snowden	312	218	70	123	27	41	2	0	27	1.040
Katahdin	262	134	51	76	13	25	10	4	46	1.028
Superior	103	87	85	49	32	43	9	0	12	1.020
Chieftain	408	321	79	181	21	51	7	0	19	1.030
Norwis	241	165	69	93	8	48	13	0	29	1.027
AF4138-8	462	354	77	200	22	39	16	0	16	1.023
AF5225-1	604	390	65	220	13	35	17	0	33	1.031
NY149 [yf]	287	189	66	107	30	30	6	0	29	1.031
NY151	299	117	39	66	7	21	12	0	59	1.016
Tosciana [yf]	403	274	68	155	23	41	4	0	26	1.022
Wendy [yf]	500	330	66	186	30	30	6	0	27	1.021
Alegria [yf]	159	39	24	22	12	6	6	0	72	1.025
Moonlight	336	213	63	120	22	32	9	0	31	1.021
BNC201-1 [yf]	118	79	67	44	33	28	5	0	27	1.027
B2152-17 [yf]	422	309	73	174	36	34	4	0	16	1.029
NY164	257	138	54	78	20	30	4	0	37	1.025
AF4831-2	336	254	75	143	32	37	7	0	15	1.020
AAC Alta Red	245	154	63	87	13	27	23	0	35	1.020
NCB2607-3 [yf]	282	212	75	120	44	31	0	0	14	1.039
NY152	339	195	58	110	9	40	9	0	39	1.027
NY162	310	189	61	106	8	32	21	0	37	1.034
NY157	320	205	64	115	21	33	10	0	32	1.033
L8-12	344	199	58	112	7	26	16	9	40	1.037
AF5040-8 [yf]	329	265	80	149	26	41	13	0	18	1.047
MSV358-3	195	152	78	86	29	36	12	0	18	1.033
MSX540-4	292	264	90	149	5	50	33	2	8	1.041

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific Gravity
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		
W9968-5	419	267	64	151	10	28	21	5	34	1.038
Norkotah	65	47	72	26	27	45	0	0	25	1.010
Belmonda [yf]	239	172	72	97	18	31	23	0	23	1.032
Colomba [yf]	241	152	63	86	28	26	10	0	29	1.012
W9133-1Rus	403	153	38	86	13	20	6	0	59	1.026
W9433-1Rus	465	250	54	141	8	11	17	17	46	1.039
CO07015-4ru	389	279	72	157	29	29	13	0	20	1.035
A08422-2VR	114	80	70	45	8	24	20	18	27	1.021
A10021-5TE	297	171	58	97	17	19	21	0	36	1.033
A10130-1	216	90	41	51	15	18	9	0	49	1.034
A07769-4	103	49	48	28	14	14	20	0	52	1.010
Reveille Russet	321	208	65	117	20	35	10	0	28	1.025

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

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

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

[4]Percentage of total that are pickouts.

Non-replicated trial.

Russet varieties were planted 10-in. apart with 24 seed pieces per 20-ft plot, all other varieties were spaced 8-in. apart with 30 seed pieces per 20-ft plot.

Yellow flesh varieties are indicated with [yf].

Table 4. Tuber characteristics, internal defects for potato evaluation trial in in Mark Troyer Farm, Erie County, 2018

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
Atlantic	3	5	5	3	4	5	80	0
Snowden	5	5	5	2	5	5	40	30
Katahdin	4	8	7	3	5	4	10	30
Superior	4	7	6	3	4	4	10	0
Chieftain	5	2	7	3	5	5	20	0
Norwis	5	7	7	3	6	5	40	0
AF4138-8	6	7	6	3	5	5	20	0
AF5225-1	5	7	7	2	5	5	30	0
NY149	4	9	7	3	5	5	20	0
NY151	6	8	7	3	5	6	0	10
Tosciana	5	9	8	3	7	4	0	10
Wendy	5	9	8	3	6	5	10	0
Alegria	4	9	7	3	6	5	0	0
Moonlight	4	9	7	3	6	5	0	0
BNC201-1	6	2	7	2	4	5	0	0
B2152-17	3	2	7	3	6	5	0	0
NY164	4	2	7	2	6	5	0	0
AF4831-2	6	2	7	3	5	5	10	0
AAC Alta Red	4	2	7	3	6	5	10	0
NCB2607-3	6	2	8	3	6	6	0	0
NY152	5	7	6	2	5	6	60	0
NY162	5	7	7	3	5	5	40	0
NY157	5	7	6	2	6	5	20	0
L8-12	5	7	6	2	5	5	0	0
AF5040-8	3	7	7	3	4	5	20	0
MSV358-3	5	5	5	2	6	5	30	0
MSX540-4	4	6	6	2	4	5	0	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
W9968-5	3	6	6	2	4	5	100	0
Norkotah	4	5	3	5	6	5	0	0
Belmonda	5	9	7	3	7	4	0	0
Colomba	4	9	8	3	4	5	0	0
W9133-1Rus	4	6	4	5	7	5	20	0
W9433-1Rus	4	6	4	5	7	4	10	0
CO07015-4ru	6	4	3	5	6	5	0	0
A08422-2VR	4	7	6	5	7	5	0	0
A10021-5TE	3	6	4	5	7	5	20	0
A10130-1	3	6	1	5	7	5	0	0
A07769-4	4	6	4	5	7	5	0	0
Reveille Russet	3	4	3	5	7	5	10	0

[1]Tuber 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.

[2]Internal 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, 2018

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]					Specific
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5	%PO[4]	Gravity
Atlantic	120	90	70	100	15	49	6	0	26	1.047
Katahdin	174	154	89	171	50	40	0	0	4	1.033
Snowden	219	157	75	175	39	33	2	0	14	1.049
Superior	173	129	77	144	41	31	5	0	11	1.035
Yukon Gold	181	135	74	151	15	34	26	0	22	1.044
AF4648-2	218	164	74	183	26	47	1	0	23	1.054
AF5040-8 [yf]	231	201	86	225	44	42	0	0	10	1.060
AF5225-1	366	334	92	373	38	51	3	0	1	1.037
AF5280-5	260	230	85	257	39	45	2	0	10	1.033
AF5429-3	331	268	82	299	22	54	6	0	11	1.046
AF5450-7	274	236	85	263	37	46	2	0	8	1.046
B2869-29	218	197	88	220	38	45	6	0	3	1.063
B2904-2	319	282	87	314	55	30	2	0	3	1.059
B3012-1	230	187	80	209	58	22	0	0	2	1.051
B3183-6	295	275	92	307	28	47	17	0	3	1.051
BNC364-1	236	182	77	203	35	42	0	0	19	1.048
BNC469-7	329	278	84	310	43	38	4	0	5	1.052
NDAF102629C-4	188	153	81	170	35	37	9	0	7	1.042
NY149 [yf]	261	226	88	252	42	40	5	0	5	1.041
NY151	316	231	72	257	16	38	18	0	24	1.028
NY152	364	335	92	373	50	36	6	0	0	1.049
NY157	271	236	86	264	33	43	10	0	8	1.048
NY161 [yf]	352	284	81	317	40	38	2	0	9	1.039
NY162	276	259	93	289	41	44	8	0	1	1.052
AF4138-8	318	266	77	296	35	41	1	0	11	1.035
AF5484-3	106	67	71	75	11	60	0	0	21	1.044
AF5563-2	119	98	85	110	52	30	4	0	5	1.045
AF5563-5	170	139	83	155	10	55	18	0	15	1.046
AF5677-4	281	254	89	283	20	48	18	3	9	1.047

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]					Specific
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5	%PO[4]	Gravity
AF5677-6 yf	295	258	87	288	30	49	8	0	8	1.050
AF5682-3	175	145	79	162	34	36	9	0	16	1.054
NDAF113470C-3	168	125	74	139	42	32	0	0	15	1.043
WAF10664-3	251	212	83	236	36	45	2	0	7	1.045
AF5658-6 yf	189	124	72	138	58	13	2	0	15	1.046
B2869-28	202	173	85	193	37	48	0	0	4	1.048
BNC481-6 yf	226	125	54	140	18	23	13	0	38	1.044
B3083-4	259	134	51	149	25	24	2	0	45	1.046
B3083-11	280	244	88	272	29	47	12	0	7	1.053
N35-3	181	144	80	161	54	26	0	0	2	1.046
N35-9	274	232	85	259	43	41	1	0	7	1.037
BNC470-13	337	281	80	313	51	30	0	0	12	1.055
B3156-2	253	230	90	257	39	48	2	0	2	1.046
B3263-2	232	153	66	171	37	27	3	0	26	1.054
B3084-3	172	151	86	168	29	52	6	0	8	1.048
B3265-7	302	263	85	293	44	41	0	0	6	1.046
B3265-9	339	250	73	278	53	20	0	0	13	1.046
B3270-10	262	222	85	247	60	19	6	0	4	1.057
BNC369-4	292	260	89	290	20	55	14	0	8	1.053
L8-12	343	307	89	342	27	51	11	0	7	1.052
MSY111-1	171	135	82	151	25	32	24	0	13	1.033
MSV358-3	275	240	84	267	52	31	1	0	3	1.050
MSX540-4	301	261	87	291	50	37	0	0	5	1.063
MSU161-1	178	155	78	173	53	25	0	0	0	1.038
MSW485-2	310	265	84	295	40	44	0	0	6	1.055
MSZ219-13	178	168	86	187	30	56	0	0	10	1.040
MSZ219-46	213	177	83	198	39	39	4	0	13	1.047
MSZ222-19	216	194	90	216	27	56	7	0	8	1.052
AC01144-1W	251	200	80	223	48	29	2	0	10	1.040
NC426-2 yf	215	151	70	169	23	45	3	0	25	1.052
W9968-5	244	176	73	196	17	46	10	0	21	1.053
W9576-11Y yf	247	190	79	212	29	42	9	0	14	1.026
W8822-1	182	161	83	180	39	42	2	0	2	1.055

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]					Specific
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5	%PO[4]	Gravity
NCB3171-7	298	217	69	242	38	29	3	0	17	1.052
NC470-3	201	163	74	181	36	34	5	0	13	1.052
NC606-23 yf	298	248	80	277	51	29	0	0	9	1.036
NC600-10 yf	154	71	46	79	26	20	0	0	47	1.038
Connect yf	220	148	66	165	34	32	0	0	20	1.041
Melody yf	283	237	83	264	38	44	1	0	4	1.040
Krone yf	223	160	68	178	48	20	0	0	23	1.036
Toscana yf	196	124	64	139	34	30	0	0	25	1.039
Wendy yf	291	181	61	202	45	16	0	0	21	1.033
Alegria yf	160	84	52	93	21	29	2	0	41	1.039
Moonlight	253	160	66	179	30	29	8	0	27	1.034
Non-replicate										
Atlantic	135	98	73	100	46	26	0	0	19	
AF5920-3 yf	160	154	96	158	31	65	0	0	0	1.040
AF5960-4	250	154	61	157	46	16	0	0	27	1.060
AF6030-1	237	198	84	203	43	40	0	0	3	1.064
WAF14104-5	273	248	91	254	36	55	0	0	0	1.046
NDAF14477C-7	168	102	61	105	43	18	0	0	21	1.049
WAF14096-5 yf	232	191	83	195	54	28	0	0	3	1.047
B3175-8	206	135	65	138	23	34	9	0	30	1.053
B3255-2	234	184	79	189	57	22	0	0	6	1.040
B3263-7	290	179	62	183	37	25	0	0	30	1.042
BNC626-7	210	178	85	182	62	16	7	0	9	1.049
BNC626-8	310	234	75	239	31	44	0	0	16	1.048
BNC626-15	252	185	73	189	22	51	0	0	24	1.049
BNC648-1 yf	330	262	80	268	29	51	0	0	8	1.054
B3292-5	348	287	83	294	27	36	19	0	12	1.039
B3297-1	267	215	80	220	37	43	0	0	8	1.044
B3299-4 yf	331	240	73	246	61	8	4	0	15	1.054
B3304-1	147	111	76	114	63	13	0	0	10	1.055
B3304-12	199	152	76	156	60	17	0	0	10	1.044
B3307-5	265	175	66	179	49	17	0	0	18	1.038
B3325-6	125	79	64	81	41	23	0	0	35	1.030

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]					Specific
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5	%PO[4]	Gravity
B3326-3	154	96	63	98	38	25	0	0	24	1.044
B3340-3	248	159	64	162	34	30	0	0	25	1.048
B3344-2	213	176	83	180	27	49	7	0	12	1.040
BNC726-1 yf	197	165	84	168	21	54	9	0	12	1.056
BNC730-1	234	196	83	200	65	18	0	0	4	1.056
B3335-2	328	209	64	214	39	25	0	0	27	1.051
NDAF113458-2	188	148	79	151	23	32	24	0	12	1.024
LSD	152	138	15		21	22	10	1	14	

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

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

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

[4]Percentage of total that are pickouts.

Planted 8-in. apart with 15 seed pieces per 10-ft plot. Yellow flesh varieties are indicated with yf.
Replicated trials are the average of 3 replicates except for those lines with * which were 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, 2018

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
Atlantic	4	6	5	2	4	5	33	0
Katahdin	5	8	8	3	6	5	8	0
Snowden	5	6	5	2	4	5	0	0
Superior	4	7	6	3	5	4	0	0
Yukon Gold	5	7	7	3	6	5	8	0
AF4648-2	4	8	7	3	5	4	8	0
AF5040-8	4	9	7	3	5	4	0	0
AF5225-1	5	6	6	3	5	5	0	0
AF5280-5	4	7	6	3	6	5	8	17
AF5429-3	5	7	7	2	5	4	67	0
AF5450-7	4	6	6	2	4	5	0	0
B2869-29	4	7	7	2	4	5	17	0
B2904-2	4	6	6	2	5	5	50	0
B3012-1	5	7	6	2	6	5	0	0
B3183-6	5	7	6	2	6	4	50	0
BNC364-1	4	7	7	3	6	5	0	0
BNC469-7	5	7	6	2	6	6	17	8
NDAF102629C-4	5	8	7	2	6	5	0	0
NY149	5	6	7	3	6	5	17	0
NY151	5	7	7	2	5	6	0	0
NY152	5	6	5	2	5	5	33	0
NY157	4	6	6	3	6	5	25	0
NY161	4	9	7	3	4	5	17	0
NY162	4	7	7	3	6	5	17	0
AF4138-8	4	7	6	3	5	5	8	0
AF5484-3	4	7	7	2	6	4	0	0
AF5563-2	5	7	7	3	3	5	0	0
AF5563-5	4	8	7	3	4	5	42	0
AF5677-4	3	7	7	2	4	5	33	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
AF5677-6	4	6	6	3	3	6	25	0
AF5682-3	4	9	8	3	5	5	42	25
NDAF113470C-3	5	7	7	2	6	5	0	0
WAF10664-3	3	7	6	2	4	6	0	0
AF5658-6	4	7	7	3	6	4	0	0
B2869-28	4	7	7	2	4	5	0	0
BNC481-6	4	7	7	2	5	5	0	0
B3083-4	3	7	7	3	6	5	0	0
B3083-11	4	6	7	3	5	5	25	0
N35-3	5	8	8	2	6	6	0	0
N35-9	5	8	7	2	7	4	0	0
BNC470-13	4	6	7	3	6	6	25	0
B3156-2	5	7	7	2	5	4	0	0
B3263-2	5	6	6	2	6	5	0	0
B3084-3	5	7	6	2	6	5	17	0
B3265-7	4	6	5	3	6	6	92	0
B3265-9	5	6	6	3	6	6	8	0
B3270-10	5	8	6	3	6	4	0	0
BNC369-4	6	7	6	3	6	6	50	0
L8-12	5	7	7	2	6	5	67	0
MSY111-1	4	7	6	2	4	5	0	0
MSV358-3	5	6	6	2	5	6	0	0
MSX540-4	5	7	6	2	5	5	8	0
MSU161-1	5	7	7	3	6	5	0	0
MSW485-2	5	6	6	3	4	6	17	0
MSZ219-13	5	6	5	3	4	6	50	0
MSZ219-46	4	7	6	3	5	5	0	0
MSZ222-19	3	6	6	2	4	3	17	0
AC01144-1W	4	7	6	2	5	5	17	0
NC426-2	5	7	7	3	5	6	0	8
W9968-5	5	6	5	3	6	5	8	0
W9576-11Y	4	9	6	3	6	5	0	0
W8822-1	5	5	5	2	6	6	0	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
NCB3171-7	5	8	7	2	6	6	25	0
NC470-3	5	5	5	3	6	5	42	0
NC606-23	5	7	6	3	5	5	0	0
NC600-10	5	7	7	2	5	6	8	8
Connect	4	9	7	3	7	4	0	0
Melody	4	7	7	3	6	5	8	0
Krone	4	9	7	3	7	5	17	0
Toscana	5	9	7	3	7	5	0	8
Wendy	4	9	7	3	7	4	0	0
Alegria	4	9	7	3	6	5	0	0
Moonlight	3	7	6	3	5	4	0	0
Non-replicate								
Atlantic	5	6	5	2	5	5	75	0
AF5920-3	5	7	6	2	5	5	0	0
AF5960-4	4	6	6	3	7	5	0	25
AF6030-1	5	6	6	2	5	6	25	0
WAF14104-5	5	9	7	3	5	6	0	0
NDAF14477C-7	3	6	6	2	4	6	0	0
WAF14096-5	6	9	7	2	6	5	0	0
B3175-8	4	8	7	2	6	5	0	0
B3255-2	5	6	6	2	6	6	50	0
B3263-7	4	6	6	2	6	5	0	0
BNC626-7	5	7	7	2	6	6	25	0
BNC626-8	6	7	6	2	5	6	50	0
BNC626-15	5	7	7	3	5	5	0	0
BNC648-1	4	6	7	2	6	5	25	0
B3292-5	6	6	6	2	6	6	0	0
B3297-1	6	6	5	2	5	6	0	0
B3299-4	6	7	6	2	7	6	0	0
B3304-1	6	7	6	3	7	5	25	0
B3304-12	5	7	6	2	7	6	0	0
B3307-5	3	7	6	3	7	5	0	0
B3325-6	5	6	5	2	5	6	0	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
B3326-3	5	6	5	3	5	4	0	0
B3340-3	5	7	7	2	6	6	0	0
B3344-2	4	7	6	3	4	5	50	0
BNC726-1 (#2933)	5	6	7	2	4	6	25	0
BNC730-1	5	7	6	2	5	5	0	0
B3335-2	4	7	7	3	6	6	25	0
NDAF113458-2	4	7	7	2	5	5	0	0

[1]Tuber 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.

[2]Internal 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 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, 2018

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity
Chieftain	269	207	85	100	26	59	0	0	9	1.040
AF5412-3 pur	290	264	90	128	34	54	3	0	3	1.035
AF5414-1 pin	237	196	83	95	51	32	0	0	0	1.048
Dark Red Norland	241	180	75	87	41	34	5	0	11	1.035
AF4831-2	379	310	82	150	36	48	0	0	6	1.029
AF5245-1	215	190	90	92	49	40	0	0	3	1.043
B3278-3	225	132	59	64	46	11	1	0	26	1.043
Cerata	324	247	76	119	40	30	6	0	12	1.033
NDAF113484B-1	208	167	80	81	27	49	3	0	13	1.030
AF5806-1	251	198	78	96	53	22	3	0	3	1.037
B2152-17 yf	354	288	82	139	35	41	6	0	11	1.038
BNC201-1	365	297	81	144	48	23	6	0	9	1.045
NY164	189	145	77	70	45	29	2	0	11	1.031
MSX324-1P	246	234	95	113	46	39	5	0	1	1.048
CO98012-5R	282	230	79	111	45	34	0	0	5	1.042
N10114-3R	138	113	81	55	44	26	11	0	3	1.031
W8405-1R	286	239	83	116	32	45	6	0	7	1.027
NCB2607-3 yf	230	188	79	91	46	28	0	0	12	1.051
Autumn Rose	216	100	45	48	36	3	0	0	29	1.041
AAC Alta Red	212	170	80	82	19	41	20	0	16	1.037
QSNDSU07-04	198	137	66	153	50	18	0	0	9	1.039
Non-replicate										
Chieftain	245	167	68	100	39	29	0	0	18	1.033
BNC559-1	268	209	78	126	52	27	0	0	7	1.038
BNC568-1 yf	216	190	88	114	50	37	0	0	3	1.037
B3311-3	244	223	92	134	36	56	0	0	3	1.038
BNC716-1	186	151	81	154	22	54	6	0	13	1.024
BNC718-1 yf	203	195	96	117	38	58	0	0	0	1.050
BNC718-2 yf	170	141	83	85	60	23	0	0	0	1.047

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity
BNC720-1	165	144	88	86	75	13	0	0	1	1.041
BNC751-1	256	171	67	102	49	18	0	0	21	1.055
AF5831-2	95	62	65	37	28	37	0	0	22	1.026
MSAFB603-2	235	168	72	101	58	13	0	0	0	1.042
MSAFB607-4 [pur]	281	148	53	89	51	2	0	0	5	1.040
NDAF12198B-5	318	249	78	149	63	15	0	0	3	1.038
AF6043-1	178	105	59	63	45	14	0	0	20	1.024
AF6048-3	218	112	51	67	29	22	0	0	37	1.026
AF6052-1	387	290	75	174	28	41	6	0	18	1.027
LSD	121	101	11		21	22	6		9	

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

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

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

[4]Percentage of total that are pickouts.

Replicated trials are the average of 3 replicates except for those lines with * which were non-replicated.

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

Varieties with colored flesh are indicated by [yf]for yellow, [pur] for purple, [pin] for pink..

Plots consisted of 10-ft rows with 15 seed pieces spaced 8-in. apart.

Table 8. Tuber characteristics, internal defects for red skinned potato evaluation trial in Plant Pathology Farm, Rock Springs, 2018

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
Chieftain	5	2	7	2	5	5	0	0
AF5412-3	4	1	7	3	3	5	0	0
AF5414-1	5	2	7	3	6	5	0	0
Dark Red Norland	4	2	7	3	5	5	0	0
AF4831-2	5	2	7	3	6	5	0	0
AF5245-1	5	1	7	2	6	5	25	0
B3278-3	4	2	7	3	6	5	0	0
Cerata	5	2	7	3	5	5	0	0
NDAF113484B-1	4	2	7	3	5	5	0	0
AF5806-1	5	2	7	2	6	6	0	0
B2152-17	5	2	7	3	6	4	0	0
BNC201-1	5	2	7	2	4	6	17	0
NY164	5	2	7	2	6	6	0	0
MSX324-1P	4	1	7	2	5	6	0	8
CO98012-5R	5	2	7	2	6	6	0	0
N10114-3R	5	2	8	2	5	5	0	8
W8405-1R	4	2	7	2	5	4	0	0
NCB2607-3	6	2	7	3	6	5	0	0
Autumn Rose	4	2	6	3	7	5	0	0
AAC Alta Red	5	2	6	3	5	6	33	0
QSNDSU07-04	4	2	8	3	5	5	0	0
Non-replicate								
Chieftain	4	2	7	2	5	4	0	0
BNC559-1	5	1	7	3	5	4	0	0
BNC568-1	5	1	7	3	5	5	0	0
B3311-3	5	2	7	2	5	4	0	0
BNC716-1	5	2	6	2	5	6	0	0
BNC718-1	5	1	7	3	6	6	0	0
BNC718-2	6	1	7	3	6	5	0	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
BNC720-1	5	1	6	2	6	6	0	0
BNC751-1	5	2	6	3	5	5	0	0
AF5831-2	4	2	7	3	5	5	0	0
MSAFB603-2	5	1	7	3	7	4	0	0
MSAFB607-4	5	1	7	3	5	5	0	0
NDAF12198B-5	5	2	7	2	6	6	0	0
AF6043-1	4	2	7	3	6	5	0	0
AF6048-3	4	2	7	2	4	5	0	0
AF6052-1	5	2	7	2	5	4	0	0

[1]Tuber 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.

[2]Internal 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 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, 2018

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity
Russet Norkotah	177	125	70	100	32	32	6	0	20	1.036
Russet Burbank	263	135	50	108	32	15	3	0	43	1.046
Reveille Russet	259	126	46	101	25	20	2	0	44	1.038
AF4872-2	170	96	58	77	28	30	0	0	36	1.049
AF5164-19	239	152	64	122	14	32	16	2	33	1.036
AF5312-1	295	166	55	133	40	16	0	0	34	1.038
Shepody	315	184	58	147	20	23	15	0	32	1.042
ND8068-5Russ	162	106	67	85	33	34	0	0	24	1.054
WAF10073-3Rus	333	154	48	123	21	23	4	0	44	1.032
AF5071-2	153	101	66	81	23	28	10	4	25	1.055
WAF10612-1	267	187	67	150	34	28	5	0	22	1.048
AF507-13	323	256	76	205	35	39	3	0	17	1.049
AF4172-2	235	157	66	126	43	21	2	0	25	1.050
A08422-2VR	261	192	72	154	32	33	5	2	25	1.051
BNC364-1	184	89	41	71	13	28	0	0	44	1.047
A07769-4	137	75	55	61	23	32	0	0	34	1.048
A08422-4VRsto	210	148	70	119	30	40	0	0	22	1.049
A08510-1LB	284	166	58	133	30	27	0	0	30	1.052
A10021-5TE	284	147	51	118	27	19	6	0	38	1.051
A10130-1	176	91	51	73	44	8	0	0	24	1.048
CO07015-4RU	312	229	73	184	62	11	0	0	9	1.047
CO8231-1RU	195	148	74	119	32	42	0	0	13	1.052
CO07049-1RU	197	144	71	115	47	24	0	0	14	1.049
CO03276-5RU	220	143	62	114	24	28	10	0	28	1.045
CO98067-7RU	252	183	71	146	31	37	4	0	20	1.040
W9133-1rus	210	140	68	113	24	40	4	0	25	1.037
W9523-1rus	178	95	55	76	33	20	1	0	40	1.042
W9433-1rus	215	141	63	113	13	34	16	0	33	1.044

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity
CWO8221-5rus	194	117	59	94	33	21	4	0	29	1.032
CWO8071-2rus	245	184	73	148	26	46	2	0	16	1.046
Belmonda [yf]	232	142	57	114	23	34	0	0	37	1.045
Colomba [yf]	431	345	80	277	26	49	5	0	16	1.023
WW 40 - 46	282	181	63	145	49	14	0	0	11	1.054
Non-replicate										
Russet Norkotah	102	47	46	100	18	29	0	0	40	
AF5644-8	143	56	39	118	39	17	0	0	22	1.046
AF5661-13	216	78	36	164	49	29	0	0	15	1.058
COAF11112-13	185	78	42	165	28	40	10	0	16	1.036
AF6130-4	158	63	40	133	36	27	0	0	31	1.035
WAF14010-3	115	57	49	119	13	26	17	0	39	1.040
WAF14167-3	205	55	27	115	30	25	0	0	33	1.045
AF6119-1	159	63	39	132	18	44	0	0	28	1.044
AAF11263-1	98	56	56	117	38	18	0	0	31	1.043
WAF10612-1	201	56	28	119	18	39	0	0	37	1.045
AF4172-2	234	70	30	148	42	29	0	0	23	1.054
LSD	120	102	19		18	21	11	3	18	

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

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

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

[4]Percentage of total that are pickouts.

Replicated trials are the average of 3 replicates except for those lines with * which were non-replicated.

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

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

Table 10. Tuber characteristics, internal defects for russet skinned or white potato evaluation trial in Plant Pathology Farm, Rock Springs, 2018

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
Russet Norkotah	5	5	3	4	7	5	58	42
Russet Burbank	3	5	3	5	6	4	42	0
Reveille Russet	4	5	3	5	7	5	0	0
AF4872-2	4	6	6	4	7	5	8	0
AF5164-19	3	6	4	4	5	5	33	0
AF5312-1	4	5	3	4	7	5	8	8
Shepody	3	7	7	4	7	4	0	0
ND8068-5Russ	4	6	6	4	7	5	17	17
WAF10073-3Rus	4	5	3	5	7	4	0	0
AF5071-2	3	6	4	4	7	5	50	0
WAF10612-1	5	5	4	5	7	4	67	0
AF507-13	5	6	4	5	7	5	17	0
AF4172-2	4	6	7	4	6	5	42	0
A08422-2VR	4	6	6	4	7	4	25	0
BNC364-1	4	7	7	3	6	5	33	0
A07769-4	3	6	6	3	7	5	42	0
A08422-4VRsto	5	6	4	4	6	5	0	0
A08510-1LB	4	6	4	4	6	4	25	0
A10021-5TE	3	5	3	4	7	5	17	0
A10130-1	4	6	6	4	7	5	8	0
CO07015-4RU	5	5	3	5	7	5	8	0
CO8231-1RU	5	6	3	4	7	5	25	0
CO07049-1RU	5	5	3	5	6	4	8	0
CO03276-5RU	4	5	3	5	7	4	8	0
CO98067-7RU	5	5	3	5	7	5	33	17
W9133-1rus	5	6	6	4	7	5	0	8
W9523-1rus	5	5	3	4	7	5	0	0
W9433-1rus	4	6	7	5	7	4	8	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
CWO8221-5rus	5	5	3	5	7	5	8	25
CWO8071-2rus	5	6	4	5	6	5	75	0
Belmonda	5	9	7	3	6	5	33	0
Colomba	4	9	8	3	3	5	0	0
WW 40 - 46	4	5	4	4	6	4	58	8
Non-replicate								
Russet Norkotah	4	5	5	4	7	5	0	0
AF5644-8	5	5	3	4	7	5	0	0
AF5661-13	4	6	4	4	7	5	75	0
COAF11112-13	5	5	3	4	7	5	0	0
AF6130-4	3	5	1	4	6	5	100	0
WAF14010-3	4	5	4	6	7	4	0	0
WAF14167-3	3	6	6	5	7	4	0	0
AF6119-1	4	6	4	4	7	4	0	0
AAF11263-1	4	6	6	4	6	4	0	0
WAF10612-1	5	5	3	5	6	5	100	0
AF4172-2	4	6	6	4	7	4	50	0

[1]Tuber 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.

[2]Internal 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 NE1731[1] potato evaluation trial in Plant Pathology Farm, Rock Springs, 2018

Variety/Line	Yield (cwt/A)[2]		%	% of	% by size class[4]				%PO[5]	Specific	Merit
	Total	>1 7/8"	US#1	Standard[3]	2	3	4	5		Gravity	Score[6]
Atlantic	115	79	68	100	16	48	4	0	26	1.049	3
Katahdin	160	136	85	173	46	39	0	0	8	1.033	2
Snowden	211	158	78	200	38	38	2	0	13	1.049	2
Superior	149	120	80	151	43	33	4	0	11	1.035	2
Yukon Gold	197	155	78	196	16	39	23	0	19	1.044	2
AF4648-2	214	163	75	206	26	48	0	0	21	1.054	2
AF5040-8 [yf]	230	204	88	259	48	40	0	0	8	1.060	2
AF5225-1	354	326	92	412	37	49	6	0	1	1.037	1
AF5280-5	148	128	85	163	46	38	1	0	7	1.033	3
AF5412-3 [pur]	270	248	92	314	38	52	2	0	2	1.035	1
AF5414-1 [pin]	254	209	82	265	51	32	0	0	0	1.048	1
AF5429-3	328	264	81	334	23	52	7	0	13	1.046	4
AF5450-7	282	241	85	304	34	46	4	0	8	1.046	2
B2869-29	229	210	90	266	36	48	5	0	3	1.063	3
B2904-2	305	265	86	335	51	33	2	0	6	1.059	4
B3012-1	231	187	80	236	55	24	0	0	4	1.051	2
B3183-6	267	248	92	314	29	51	13	0	3	1.051	3
BNC364-1	222	176	80	222	39	41	0	0	15	1.048	2
BNC469-7	291	244	83	309	40	39	4	0	7	1.052	3
NDAF102629C-4	186	158	85	200	30	42	13	0	5	1.042	2
NY149 [yf]	249	216	87	273	46	38	4	0	5	1.041	3
NY151	284	206	71	261	18	41	13	0	25	1.028	2
NY152	356	324	90	410	49	37	5	0	1	1.049	2
NY157	253	218	85	276	30	43	12	0	10	1.048	2
NY161 [yf]	323	260	80	330	41	38	2	0	10	1.039	2
NY162	261	244	93	309	40	44	9	0	1	1.052	2
Chieftain	309	258	83	326	29	54	0	0	10	1.040	1
Dark Red Norland	158	121	79	153	43	31	4	0	8	1.035	2
AF4831-2	156	123	78	155	43	36	0	0	4	1.029	2

AF5245-1	277	228	86	288	47	38	0	0	2	1.043	2
Russet Norkotah	195	137	70	174	31	31	9	0	21	1.036	4
Russet Burbank	277	147	52	187	35	15	2	0	42	1.046	4
Reveille Russet	278	137	48	174	24	21	2	0	42	1.038	2
AF4872-2	201	102	54	129	26	28	0	0	41	1.049	3
AF5164-19	231	142	62	180	14	28	18	2	33	1.036	3
AF5312-1	296	165	55	209	38	17	0	0	34	1.038	3
Shepody	279	168	60	213	20	29	11	0	31	1.042	3
ND8068-5Russ	148	100	67	126	38	30	0	0	23	1.054	4
WAF10073-3Rus	345	160	48	203	21	23	3	0	45	1.032	2
LSD	123	105	12		15	16	9	1	12		

[1]NE1731 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. This project focuses on systematic cooperation of potato variety breeding and screening efforts. Varieties like Lehigh, Lamoka, Waneta, Caribou Russet have all been released by eastern university potato breeders from this group.

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

[3]Percentage of the standard, Atlantic, for >1 7/8" yield.

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

[5]Percentage of total that are pickouts.

[6]Merit 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 10-in. apart with 12 seed pieces per 10-ft plot, all other varieties were spaced 8-in. apart with 15 seed pieces per 10-ft plot.

Varieties with colored flesh are indicated by ^{yf} for yellow, ^{pur} for purple and ^{pin} for pink.

Table 12. Tuber characteristics, internal and external defects for NE1731 potato evaluation trial in Plant Pathology Farm, Rock Springs, 2018

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	% HH	% IB	R	H	Gr	K	G	Sc	Sp	T
Atlantic	4	6	5	2	4	5	38	0	1	0	1	0	1	0	0	0
Katahdin	5	8	9	3	6	5	13	0	2	0	1	0	2	0	0	0
Snowden	5	6	5	2	4	5	6	0	1	0	0	0	1	0	0	0
Superior	4	7	6	3	5	4	0	0	1	0	2	0	2	0	0	0
Yukon Gold	5	7	7	3	5	5	6	0	1	0	2	0	2	0	0	0
AF4648-2	4	8	7	3	5	4	6	0	0	0	2	1	1	0	0	0
AF5040-8	4	9	7	3	5	4	0	0	1	0	0	0	1	2	0	0
AF5225-1	5	6	6	3	5	5	0	0	0	0	1	0	1	0	0	0
AF5280-5	4	7	6	3	6	5	6	13	0	0	0	0	2	0	0	0
AF5412-3	4	1	7	3	3	5	0	0	0	0	1	0	0	0	0	0
AF5414-1	5	2	7	3	6	5	0	0	0	0	0	0	0	0	0	0
AF5429-3	5	7	7	2	5	4	56	0	0	0	0	0	2	0	0	0
AF5450-7	4	6	6	2	4	5	0	0	1	0	1	1	1	0	0	0
B2869-29	4	7	7	2	4	5	13	0	1	0	1	0	1	0	0	0
B2904-2	4	6	6	2	5	5	63	0	1	0	1	0	0	0	0	0
B3012-1	5	7	6	2	6	5	0	0	1	0	0	0	0	0	0	0
B3183-6	4	7	6	2	6	4	38	0	1	0	0	0	1	0	0	0
BNC364-1	4	7	7	3	6	5	0	0	1	0	2	0	1	0	0	0
BNC469-7	5	7	6	2	6	6	13	6	1	0	0	0	1	0	0	0
NDAF102629C-4	5	8	7	2	6	5	0	0	0	0	1	0	1	0	0	0
NY149	5	6	7	3	6	5	25	6	1	0	1	0	1	0	0	0
NY151	5	7	7	2	5	6	0	0	2	0	0	0	2	0	0	0
NY152	5	6	5	2	5	5	25	0	1	0	0	0	0	0	0	0
NY157	4	6	6	3	6	5	19	0	1	0	1	0	1	0	0	0
NY161	4	9	7	3	4	5	13	0	0	0	1	0	0	0	0	0
NY162	4	7	7	3	6	5	13	0	1	0	0	0	0	0	0	0
Chieftain	5	2	7	2	5	5	0	0	2	0	1	0	1	0	0	0
Dark Red Norland	4	2	7	3	5	5	0	0	1	0	1	0	1	0	0	0
AF4831-2	5	2	7	3	6	5	0	0	1	0	1	0	0	0	0	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	% HH	% IB	R	H	Gr	K	G	Sc	Sp	T
AF5245-1	5	1	7	2	6	5	19	0	1	0	1	0	0	0	0	0
Russet Norkotah	5	5	3	4	7	5	63	44	0	0	0	1	1	0	0	0
Russet Burbank	3	5	3	5	6	4	31	0	0	0	0	3	0	0	0	0
Reveille Russet	4	5	3	5	7	5	0	0	0	0	2	3	1	0	0	0
AF4872-2	4	6	6	4	7	5	6	0	0	0	2	3	0	0	0	0
AF5164-19	3	6	4	4	5	5	31	0	2	0	2	0	2	0	0	0
AF5312-1	4	5	3	4	7	5	13	6	2	0	2	0	1	0	0	0
Shepody	3	7	7	4	7	4	6	0	0	0	0	2	2	0	0	0
ND8068-5Russ	5	6	6	4	7	5	19	13	0	0	1	0	2	0	0	0
WAF10073-3Rus	4	5	3	5	7	4	0	0	0	0	2	2	2	0	0	0

[1]Tuber 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.

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

[3]External Defects: R = Rhizoctonia, H = hairline cracks, Gr = growth cracks, K = knobs, G = sunburn, Sc = scab, Sp = sprouts, T = secondary tubers.
Scale = 0-4, with 0 = not observed, 1 = slight to 4 = very severe.

Russets were planted 10-in. apart with 12 seed pieces per 10-ft plot, all other varieties were spaced 8-in. apart with 15 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, 2018

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity
Superior	358	303	84	100	32	53	0	0	10	1.035
Yukon Gold	316	261	81	86	10	47	24	0	16	1.042
AF5533-2	334	259	78	86	48	29	0	0	13	1.032
NDAF113458-2	363	315	87	104	46	40	0	0	4	1.023
AF4831-2	373	282	75	93	61	15	0	0	3	1.024
Wendy	380	234	61	77	43	19	0	0	14	1.025
Peter Wilcox [yf]	275	237	86	78	53	33	0	0	4	1.039
AC97521-1R/Y [yf]	241	117	49	39	36	12	0	0	18	1.031
W8893-1R	191	144	73	48	22	51	0	0	19	1.020
Erika [yf]	390	231	60	76	42	18	0	0	23	1.032
Bonnata [yf]	321	218	68	72	45	22	0	0	15	1.036
Sporano [yf]	368	206	56	68	24	28	3	0	36	1.024
Big Rossa [yf]	347	213	61	70	24	31	7	0	32	1.028
Labella [yf]	370	230	61	76	28	28	5	0	34	1.023
Noya	207	120	58	40	55	3	0	0	4	1.026
Primbella	273	178	65	59	23	30	12	0	29	1.021
Picobella [yf]	300	193	64	64	36	28	0	0	23	1.027
Electra	429	308	72	102	35	38	0	0	18	1.023
Actrice [yf]	253	150	59	50	20	35	3	0	35	1.020
CO98012-5R	180	104	57	34	45	12	0	0	17	1.029
Alegria [yf]	141	78	57	26	26	31	0	0	28	1.026
MSW343-2R	53	49	86	16	28	52	5	0	0	
Avalanche	351	191	55	63	19	27	9	0	37	1.017
B2152-17 [yf]	365	295	81	97	43	38	0	0	6	1.031
CO05037-3W/Y [yf]	306	164	53	54	29	24	0	0	24	1.031
NCB2607-3 [yf]	236	187	79	62	56	22	0	0	9	1.040
AAC Alta Rose	262	214	81	71	31	51	0	0	7	1.025
LSD	114	102	18		15	16	11		16	

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

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

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

[4]Percentage of total that are pickouts. Varieties with colored flesh are indicated by [yf]for yellow.

The trial was replicated trial with 2 replications. LSD indicates least significant difference (P = 0.05). Planted 8-in. apart with 15 seed pieces per 10-ft plot.

Table 14. Tuber characteristics, internal defects for potato early variety trial in Plant Pathology Farm, Rock Springs, 2018

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
Superior	4	7	6	3	4	4	0	0
Yukon Gold	5	7	7	3	5	4	50	13
AF5533-2	6	9	6	2	4	5	0	0
NDAF113458-2	4	7	7	2	4	5	0	0
AF4831-2	6	2	8	3	6	5	0	0
Wendy	5	9	7	3	6	4	0	0
Peter Wilcox	5	1	7	3	6	5	0	0
AC97521-1R/Y	3	2	7	3	6	4	0	0
W8893-1R	5	2	7	3	5	5	13	0
Erika	5	9	7	4	7	4	0	0
Bonnata	5	9	8	2	5	4	0	0
Sporano	3	9	7	5	7	4	0	0
Big Rossa	4	2	7	4	6	5	50	0
Labella	4	3	7	4	6	5	25	0
Noya	6	8	8	2	6	5	0	38
Primbella	4	9	8	3	6	5	0	0
Picobello	4	9	8	3	5	5	0	0
Electra	4	9	6	2	6	5	0	0
Actrice	3	9	7	3	5	4	0	0
CO98012-5R	5	2	8	2	4	5	0	0
Alegria	5	9	7	3	6	5	13	0
MSW343-2R	4	2	7	2	3	5	0	0
Avalanche	2	8	7	2	5	6	0	13
B2152-17	5	2	7	2	6	4	0	0
CO05037-3W/Y	4	7	7	3	5	4	0	0
NCB2607-3	6	2	7	2	5	6	0	0
AAC Alta Red	4	2	8	2	5	5	0	0

[1]Tuber 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.

[2]Internal Defects: HH = hollow heart, IB = internal browning. Percent of total number observed out of 4 tubers per rep, 2 reps. 0 = not observed.

Table 15. Total yield, greater than 1 7/8" yield, size distribution, percent pick outs and internal defects for a potato spacing trial with three spacing distances between seed for 3 varieties in Plant Pathology Farm, Rock Springs, 2018

Variety/Line	Space between potatoes in a row (inch)	Yield (cwt/A)[1]		%	% by size class[2]				%PO[3]	Internal Defects[4]	
		Total	>1 7/8"	US#1	2	3	4	5		% HH	% IB
NY140	8 in	207	197	95	26	55	13	0	0	38	0
	10 in	200	188	93	28	56	9	0	0	28	3
	12 in	192	182	94	29	45	15	4	0	25	0
NY152	8 in	233	214	92	46	40	6	0	0	41	0
	10 in	179	162	90	46	42	2	0	0	38	0
	12 in	244	227	93	41	50	2	0	0	22	0
Atlantic	8 in	270	260	96	30	55	11	0	0	66	6
	10 in	240	231	96	33	54	9	0	0	53	6
	12 in	262	253	96	27	54	14	1	0	59	0

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

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

[3]Percentage of total that are pickouts.

[4]Internal Defects: HH = hollow heart, IB = internal browning. Total number observed out of 8 tubers per rep, 4 reps. 0 = not observed.
Replicated trial with 4 replicates.

Table 16. Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pickout, merit score and specific gravity for Snack Food Association Trial in Bryan Bender's Farm, Chambersburg , PA, 2018

Variety/Line	Yield (cwt/A)[1]		% US#1	% of	% by size class[3]				% PO[4]	Merit	Specific
	Total	>1 7/8"		Standard[2]	2	3	4	5		Score[5]	Gravity
AF5040-8	383	292	76	79	44	32	0	0	13	3	1.075
AF5429-3	294	208	71	56	32	25	14	0	18	3	1.074
MSV030-4	445	355	79	96	27	42	11	0	15	3	1.074
MSW044-1	346	274	79	74	39	39	2	0	10	4	1.076
Mackinac (MSX540-4)	564	521	92	140	45	48	0	0	2	2	1.078
NY162	403	343	85	92	48	35	3	0	7	2	1.075
NDA081453CAB-2C	277	216	78	58	38	37	3	0	11	2	1.076
NDTX081648CB-13W	453	350	77	94	30	40	7	0	12	4	1.073
W9968-5	439	219	48	59	29	17	1	0	45	4	1.065
Lamoka	418	323	77	87	25	47	4	0	18	2	1.071
Snowden	426	371	87	100	48	38	1	0	3	2	1.071
ND7519-1	464	282	61	76	33	26	2	0	27	4	1.076
LSD[6]	74	77	12		11	16	5		11		

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

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

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

[4]Percentage of total that are pickouts.

[5]Merit Score: 1 = excellent; 2 = keep; 3 = marginal; 4 = drop.

[6]LSD indicates least significant difference (*P= 0.05*). 3 replications.

Table 17. Tuber characteristics and internal defects for Snack Food Association Trial in Bryan Bender's Farm, Chambersburg , PA, 2018

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	% HH	% IB
AF5040-8	4	7	6	2	6	5	3	0
AF5429-3	4	7	7	3	5	5	27	7
MSV030-4	5	5	5	2	7	4	7	0
MSW044-1	4	6	6	2	6	5	7	3
Mackinac (MSX540-4)	6	5	5	2	5	4	3	0
NY162	5	7	6	3	6	5	0	10
NDA081453CAB-2C	5	7	7	3	6	6	13	7
NDTX081648CB-13W	3	7	7	3	6	5	43	0
W9968-5	3	5	5	3	7	5	23	3
Lamoka	5	6	6	3	5	5	3	0
Snowden	5	5	5	2	4	4	17	0
ND7519-1	4	6	6	2	6	5	7	0

[1]Tuber 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.

[2]Internal Defects: HH = hollow heart, IB = internal browning. Total number observed out of 30 tubers (10 tubers per rep, 3 reps). 0 = not observed.

Table 18: Management of evaluation trials, 2018

Rock Springs

Trial	Germplasm and Spacing trials
Planting Date:	26 June
Harvest Date:	22-25 October
Previous Crop:	Wheat
Fertilizer Rate/A:	9 May: top dress Gypsum at 915 lb/A with 10 ft Gandy 15 May: top dress 0-0-62 (N-P-K) at 130 lb/A with 10 ft Gandy 26 June: 931 lb/A of 20-10-10 (N-P-K) at planting
Herbicide:	Eptam 7E, Medal EC, TriCor DF
Fungicide:	Bravo WS, Elatus, Tanos, Ridomil Gold MZ, Quadris Opti, Zing, Endura, Zampro
Insecticide:	Admire Pro, , Lambda T2
Vine Kill:	30 September and 5 October
Rainfall (inches):	June (5.01), July (8.89), August (7.17), September (8.02)

Trial	Early variety trial
Planting Date:	18 June
Harvest Date:	18-19 October
Previous Crop:	Wheat
Fertilizer Rate/A:	15 May: top dress 0-0-62 (N-P-K) at 130 lb/A with 10 ft Gandy 18 June: 931 lb/A 10-10-10 (N-P-K) at planting
Herbicide:	Eptam 7E, Medal EC, TriCor DF
Fungicide:	Bravo WS, Ridomil Gold MZ, Quadris Opti, Zing, Endura
Insecticide:	Admire Pro, Lambda T2
Vine Kill:	11 and 22 September
Rainfall (inches):	June (5.01), July (8.89), August (7.17), September (8.02)

Erie Co.

Planting Date:	28 May
Harvest Date:	31 October
Previous Crop:	Corn
Fertilizer Rate/A:	15 May: 400 lb/A Potash 0-0-60 and 700 lb/A Gypsum 28 May: 300 lb/A Potash 1-1-1
Herbicide:	Metoolachor, Metrix, Prowl H2O< hinge, Clethodim
Fungicide:	Ariston, Manzate, Azoxy 2SC, Ridamil
Insecticide:	Mantanm 2F, Lambda Select, Belay
Vine Kill:	19 September
Rainfall (inches):	May (2.12). June (5.49), July (2.28), August (5.15)

Table 19. Descriptions of promising varieties for Pennsylvania.

Reds

AF4831-2 from University of Maine

- A medium-early season variety, with smooth skin and oval shape tubers.
- At Rock Springs over 5 years, marketable yields average 95% of Chieftain and 120% of Dark Red Norland.
- Tubers in the 1⅞" to 3¼" size average 77% compared to Chieftain 64% in the same size class.
- 1 trial in Lehigh County AF4831-2 average 69% of Chieftain.
- Specific gravity averages 1.070 compared to Chieftain 1.075.
- Has a low level of pickouts mostly sunburn, internal defects are equal to Chieftain.
- Has moderate resistance to common scab.

AC97521-1R/Y from Colorado State University

- A mid-season variety, with moderately smooth skin and oval shape tubers. A yellow flesh variety, flesh is darker than Yukon Gold.
- At Rock Springs over 4 years, marketable yields average 96% of Chieftain and 108% of Dark Red Norland.
- Tubers in the 1⅞" to 3¼" size average 68% compared to Chieftain 63% in the same size class.
- Specific gravity average 1.076 compared to 1.067 for Chieftain.
- Pickouts average 16% (misshapes) compared to Chieftain at 12%.

Fresh Market

AF5225-1 from University of Maine

- A medium late season variety, with slightly netted skin and oval shape tubers.
- At Rock Springs over 3 years, marketable yields average 147% of Atlantic and 155% of Katahdin.
- Tubers in the 2½" to 4" size average 63% compared to Atlantic and Katahdin 67% in the same size class.
- In the Lehigh County trial over 3 years AF5225-1 average 114% of Atlantic and 124% of Katahdin.
- Specific gravity average 1.076 compared to Katahdin at 1.070.
- Has low levels of pickouts (misshapes).

NY151 from Cornell University

- A medium late variety, with moderately smooth skin and mostly round tubers.
- At Rock Springs over 7 years, marketable yields average 116% of Atlantic and 129% of Katahdin.
- Tubers in the 2½" to 4" size average 63% compared to Atlantic and Katahdin 67% in the same size class.
- In the Lehigh County trial over 4 years NY151 average 111% of Atlantic and 115% of Katahdin.

- In the Erie County trial over 3 years NY151 average 74% of Atlantic and 95% of Katahdin.
- Over the 3 locations NY151 specific gravity has average 1.063 compared to Katahdin 1.070. Pickouts have average 19% (sunburn).
- Has moderate resistance to common scab.

Chippers

Huron Chipper (MSW485-2) from Michigan State University

- A medium late season variety with netted skin and mostly round tubers.
- In one trial at Rock Springs Huron Chipper yield average 156 % of Atlantic and 135% of Snowden. Tubers in the 1⅞" to 3¼" size class average 70% compared to Atlantic 40% and Snowden 71% in the same size class. Specific gravity was 1.095 compared Atlantic 1.096 and Snowden 1.091. Had 19% pickouts (sunburn).
- Has resistance to late blight.
- Chip color is acceptable out of 45° storage and recondition at 55°.
- In our trial this variety was planted at 8" spacing, a 10" spacing might have been better.

Niagara (NY152) from Cornell University

- A medium late season variety with slightly netted skin and oval shape tubers.
- At Rock Springs over 3 years Niagara marketable yield average 113% of Atlantic and 98% of Snowden. Tubers in the 1⅞" to 3¼" size average 73% compared to Atlantic 55% and Snowden 81% in the same size class.
- 1 trial in Lehigh County, Niagara marketable yield was 69% of Atlantic and 110% of Snowden.
- 1 trial in Erie County, Niagara marketable yield was 129% of Atlantic and 120% of Snowden.
- Low levels of pickouts (sunburn) and varying levels of hollow heart.
- Over the 3 locations specific gravity has average 1.079 compared to Atlantic 1.088 and Snowden 1.082.
- Chip color has been equal to Snowden.
- Moderate to good resistance to common scab.

Hodag (W5955-1) from University of Wisconsin

- A medium late season variety with slightly netted skin and oval shape tubers.
- At Rock Springs over 3 years Hodag marketable yield average 117% of Atlantic and 111% of Snowden. Tubers in the 1⅞" to 3¼" size average 55% compared to Atlantic 55% and Snowden 68% in the same size class.
- In the Lehigh County trial over 3 years Hodag average 77% of Atlantic and 89% of Snowden.
- 1 trial in Erie County trial Hodag average 97% of Atlantic and 90% of Snowden.
- Pickouts average 17% (sunburn).
- Over the 3 locations specific gravity has average 1.081 compared to Atlantic 1.090 and Snowden 1.090.
- Chip color is equal to Snowden.
- Has Common scab resistance.

Early Season Varieties – 89 days

Colomba from HZPC

- Has moderately smooth skin, oval shape tubers, with yellow flesh. The flesh color is equal to Yukon Gold.
- At Rock Springs over2 years Colomba marketable yield average 148% of Superior and 138% of Dark Red Norland. Tubers in the 1⅞" to 3¼" size average 62% compared to Superior 66% and Dark Red Norland 81% in the same size class.
- Pickouts average 18% (misshapes).
- Specific gravity average 1.050, compared to Superior 1.069 and Dark Red Norland 1.059.

Oriana from SunRain

- Has smooth skin, oval shape tubers, with yellow flesh. The flesh color is equal to Yukon Gold.
- At Rock Springs over2 years Oriana marketable yield average 110% of Superior and 104% of Dark Red Norland. Tubers in the 1⅞" to 3¼" size average 65% compared to Superior 66% and Dark Red Norland 81% in the same size class.
- Pickouts average 16% (misshapes).
- Specific gravity average 1.066, compared to Superior 1.069 and Dark Red Norland 1.059.

Erika from Solanum International

- Has moderately smooth skin, long oval shape tubers, with yellow flesh. The flesh color is darker than Yukon Gold.
- At Rock Springs over3 years Erika marketable yield average 93% of Superior. Tubers in the 1⅞" to 3¼" size average 60% compared to Superior 66% in the same size class.
- Pickouts average 19% (misshapes).
- Specific gravity average 1.071, compared to Superior 1.074.

Russets

Since demand for northwestern US produced russet potatoes remains steady and trucking cost continue to increase, PA potato growers see an opportunity to identify russet varieties that perform well in PA. In 2018 Pennsylvania Co-Operative Potato Growers received funding from USDA Specialty Crop Block Grant administered by the Pennsylvania Department of Agriculture. In 2018 we screened many russet varieties at 3 locations in PA. While excess rain interfered with our 2018 trials we will plant this trial again in 2019.

POTATO (*Solanum tuberosum*)
Common scab; *Streptomyces scabies*

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Field evaluation of potato cultivars and breeding lines for resistance to common scab in Pennsylvania, 2018.

Forty 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 24 May. The soil type was a Hagerstown silty clay loam. The experimental design was a randomized complete block design with two replications. The plots were 4-ft long with 5 seed pieces planted in each plot and 4-ft breaks between plots within a row. Precipitation was 5.01, 8.89, 7.17, and 8.02 in. for Jun, Jul, Aug, and Sep, respectively. Standard crop management practices and a recommended fungicide program for the management of early and late blight in Pennsylvania were followed. Plants were vine killed on 27 Sep and 5 Oct with Reglone (2.0 pt/A). Tubers were harvested on 17 Oct and were visually assessed on 19 to 21 Nov. 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 disease severity in each plot was calculated as follows: [Σ(Percent lesion coverage × predominant lesion type × number of tubers in each category) / (18 × total number of potato tubers evaluated)] × 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).

Russet Norkotah and Russet Burbank were included as check cultivars which are tolerant to common scab. Shepody was included as a susceptible check cultivar. Four cultivar/lines had lower disease severity and disease incidence than Russet Norkotah and Russet Burbank and they were considered as resistant or moderately resistant. These four cultivar/lines are: AF5312-1, WAF10073-3Rus, AF5414-1 and Reveille Russet. Only few small superficial lesions were observed on some of tubers of these cultivar/lines.

Cultivar/Line	Common scab severity	Common scab incidence (%)	Cultivar/Line	Common scab severity	Common scab incidence (%)
AF5312-1	0.6 k[z]	10.2 h	AF4831-2	6.9 d-k	89.6 abc
WAF10073-3Rus	0.9 jk	16.8 h	AF5450-7	7.4 c-j	90.2 abc
AF5414-1	1.5 ijk	25.3 gh	B2904-2	7.4 c-j	83.5 a-d
Reveille Russet	2.0 h-k	33.0 fgh	AF4648-2	7.7 c-i	89.3 abc
Russet Norkotah	3.5 g-k	49.6 efg	Atlantic	7.8 c-i	90.0 abc
Russet Burbank	3.7 f-k	52.6 d-g	AF5412-3	8.1 c-i	97.9 a
ND8068-5Russ	4.3 e-k	65.3 b-e	Chieftain	8.5 c-h	87.2 abc
NY161	4.3 e-k	64.2 c-f	Snowden	8.9 c-g	93.8 abc
Dark Red Norland	4.5 d-k	77.9 a-e	AF5429-3	9.3 c-g	94.9 abc
Superior	4.9 d-k	77.4 a-e	AF5164-19	9.5 c-g	98.0 a
B3012-1	5.0 d-k	73.8 a-e	B3183-6	9.9 c-g	82.9 a-d
NDAF102629C-4	5.3 d-k	68.9 a-e	Yukon Gold	10.3 c-f	97.4 ab
NY151	5.7 d-k	81.0 a-e	AF5225-1	10.4 cde	100.0 a
NY162	6.2 d-k	69.6 a-e	AF5245-1	10.8 cde	94.1 abc
NY152	6.4 d-k	95.7 abc	AF5040-8	11.0 b-e	74.4 a-e
AF4872-2	6.5 d-k	77.5 a-e	Katahdin	11.1 bcd	98.8 a
AF5280-5	6.5 d-k	85.9 abc	BNC469-7	14.0 abc	89.0 abc
B2869-29	6.6 d-k	76.8 a-e	BNC364-1	17.5 ab	100.0 a
NY157	6.7 d-k	78.5 a-e	Shepody	18.2 a	100.0 a
NY149	6.8 d-k	89.2 abc	Kennebec	19.1 a	100.0 a

[z] Means followed by the same letter are not significantly different at $P = 0.05$ as determined by Fisher's protected least significant difference test (LSD = 6.7 for severity and 32.3 for incidence).

POTATO (*Solanum tuberosum*)
Late blight; *Phytophthora infestans*

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Field evaluation of potato cultivars and breeding lines for resistance to late blight in Pennsylvania, 2018.

Forty 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 2 Jul. 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 5-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 5.01, 8.89, 7.17, and 8.02 in. for Jun, Jul, Aug, and Sep, respectively. On 30 Aug, spreader rows were spray-inoculated with a mixture of four isolates of *Phytophthora infestans* clonal lineage US-23, at a concentration of 1.85×10^5 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. Assessments were made on 8, 12, 16, 20 and 24 Sep. Disease data were expressed as area under the disease progress curve (AUDPC), subjected to analysis of variance, and means separated using Fisher's protected least significant difference test (SAS v. 9.4, SAS Institute, Cary, NC).

Late blight disease pressure was high and the most susceptible plots reached 100% disease severity by the end of the season. Cultivar Kennebec was the moderately resistant check. Seven other cultivar/lines were considered resistant or moderately resistant: AF5412-3, AF5414-1, AF4648-2, AF5450-7, NY152, AF5429-3 and AF5225-1.

Cultivar/Line	AUDPC[z]	Cultivar/Line	AUDPC
AF5412-3	12 q[y]	Atlantic	504 i-l
AF5414-1	13 q	AF4872-2	515 h-k
AF4648-2	125 pq	Snowden	518 h-k
AF5450-7	131 pq	AF5040-8	525 g-k
Kennebec	240 op	NY149	553 f-k
NY152	251 op	Chieftain	559 f-k
AF5429-3	263 nop	NDAF102629C-4	566 e-k
AF5225-1	278 nop	Dark Red Norland	579 e-j
B2904-2	339 mno	BNC364-1	596 d-j
NY151	350 l-o	B3183-6	605 c-i
Russet Burbank	353 l-o	B2869-29	671 b-h
Reveille Russet	417 k-n	Russet Norkotah	681 a-g
Yukon Gold	440 j-m	WAF10073-3Rus	681 a-g
NY157	453 i-m	NY162	695 a-f
Katahdin	465 i-m	Superior	697 a-f
Shepody	467 i-m	AF4831-2	724 a-e
AF5164-19	472 i-m	BNC469-7	751 a-d
AF5245-1	489 i-m	AF5312-1	758 abc
AF5280-5	501 i-l	B3012-1	791 ab
NY161	501 i-l	ND8068-5Russ	835 a

[z] AUDPC = Area under the disease progress curve was calculated from 8 to 24 Sep according to the formula: $\sum^{n}_{i=1}[(R_{i+1} + R_i)/2]\,[t_{i+1} - t_i]$, where R = disease severity rating (% of leaf surface affected) at the ith observation, t_i = time (days) since the previous rating at the ith observation, and n = total number of observations.

[y] Means followed by the same letter are not significantly different at $P = 0.05$ as determined by Fisher's protected least significant difference test (LSD = 159).

POTATO (*Solanum tuberosum*)
Early blight; *Alternaria solani*

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Field evaluation of potato cultivars and breeding lines for resistance to early blight in Pennsylvania, 2018.

Forty 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. Entries were planted on 7 Jun in a randomized complete block design with three replicates. 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 5.01, 8.89, 7.17, and 8.02 in. for Jun, Jul, Aug, and Sep, respectively. On 30 Jul, spreader rows were spray-inoculated with a conidial mixture of two isolates of *Alternaria solani*, at a concentration of 1.75×10^4 conidia/ml, to promote uniform spread of the pathogen to all treatment plots. For each plot, the percentage of symptomatic foliage was visually assessed on a 0 to 100% scale on 9, 16, 23 and 29 Aug and 5 and 11 Sep. Disease data were expressed as the area under the disease progress curve (AUDPC), subjected to an analysis of variance and means separated using Fisher's protected least significant difference test (SAS v. 9.4, SAS Institute, Cary, NC).

Kennebec and Russet Burbank were included as moderately resistant check cultivars. Eight other cultivars/lines were characterized as moderately resistant: AF5225-1, Katahdin, AF4648-2, BNC364-1, NY151, NY162, Snowden and NY149.

Cultivar/Line	AUDPC[z]		Cultivar/Line	AUDPC	
Russet Burbank	83	s[y]	Yukon Gold	388	h-o
AF5225-1	106	rs	AF5040-8	413	g-n
Katahdin	117	rs	AF5280-5	422	f-m
Kennebec	157	qrs	B3012-1	465	f-l
AF4648-2	164	p-s	AF5412-3	472	e-k
BNC364-1	219	o-s	NY152	482	e-j
NY151	240	n-s	AF5312-1	493	e-i
NY162	247	m-s	AF4872-2	502	e-i
Snowden	250	m-s	Shepody	515	d-h
NY149	255	m-s	Chieftain	539	c-h
BNC469-7	262	m-r	WAF10073-3Rus	580	c-g
AF5164-19	271	m-r	Dark Red Norland	582	c-g
B2904-2	273	m-r	B3183-6	591	c-f
Atlantic	277	m-r	AF4831-2	646	cde
NY157	294	l-q	AF5245-1	684	bcd
NDAF102629C-4	299	k-q	Reveille Russet	710	bc
AF5429-3	300	k-q	Russet Norkotah	844	b
AF5450-7	316	j-q	AF5414-1	1052	a
B2869-29	327	i-q	Superior	1120	a
NY161	336	i-p	ND8068-5Russ	1149	a

[z] AUDPC = area under the disease progress curve was calculated from 9 Aug to 11 Sep according to the formula: $\sum^{n}_{i=1}[(R_{i+1} + R_i)/2]\,[t_{i+1} - t_i]$, where R = disease severity rating (% of leaf surface affected) at the ith observation, t_i = time (days) since the previous rating at the ith observation, and n = total number of observations.

[y] Means followed by the same letter are not significantly different at $P = 0.05$ as determined by Fisher's protected least significant difference test (LSD = 175).

POTATO (*Solanum tuberosum* 'Atlantic')
Late blight; *Phytophthora infestans*

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Evaluation of foliar fungicides for control of potato late blight in Pennsylvania, 2018.

Fungicides were evaluated on potato cv. Atlantic at the Penn State Russell E. Larson Agricultural Research Center in Pennsylvania Furnace, PA. The soil type was a Hagerstown silty clay loam. Potatoes were planted on 25 Jun. The experimental design was a randomized complete block with four replicates. Plots were three-rows wide (36 in. spacing between rows) and 10-ft long with 8 in. seed-piece spacing. Precipitation was 5.01, 8.89, 7.17, 8.02 and 2.79 inches for Jun, Jul, Aug, Sep and Oct, respectively. On 30 Aug, spreader rows were spray-inoculated with a mixture of four isolates of *Phytophthora infestans* clonal lineage US-23, at a concentration of 1.85×10^5 sporangia/ml, to promote a 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. Fungicides were applied with a tractor-mounted, N_2-pressurized side boom sprayer at 30 psi and 44 gal/A. The spray boom was equipped with drop nozzles and boom nozzles so that both sides and the top of each plant were uniformly sprayed. Disease ratings were determined by visually assessing each plot for the percentage of late blight symptomatic foliage. The plots were rated on 8, 12, 16, 20, 24, 28 Sep and 4 Oct and the assessments were used to calculate the area under the disease progress curve (AUDPC). Plants were vine killed on 10 Oct with Reglone (2.0 pt/A). The middle row of each plot was harvested on 26 Oct. Yield data were collected for healthy tubers on 6 Nov. Disease and yield data were subjected to analysis of variance and Fisher's protected least significant difference test (SAS v. 9.4, SAS Institute, Cary, NC).

All treatments significantly reduced foliar late blight compared to the untreated control. All treatments significantly increased tuber yield.

Treatment and rate/A	Days after first application[z]	AUDPC[y]	Total Yield[x]
GWN-9790 10.9 fl oz + Echo 720 2.0 pt Orondis Opti 2.5 pt	0, 15, 29 7, 23	15 c[w]	477 a
GWN-9790 8.5 fl oz + Ranman 2.75 fl oz Orondis Opti 2.5 pt	0, 15, 29 7, 23	19 c	451 ab
GWN-9790 10.9 fl oz + Ranman 2.75 fl oz Orondis Opti 2.5 pt	0, 15, 29 7, 23	27 c	450 ab
Bravo Weather Stik 1.5 pt	0, 7, 15, 23,29	120 b	388 c
GWN-9790 8.5 fl oz + Echo 720 2.0 pt Ranman 2.75 fl oz	0, 15, 29 7, 23	125 b	416 bc
GWN-9790 12.8 fl oz + Echo 720 2.0 pt Zampro 14.0 fl oz	0, 15, 29 7, 23	157 b	410 bc
Untreated Control		1722 a	205 d
LSD (0.05)		71	50

[z] First fungicide application was 29 Aug.

[y] AUDPC = Area under disease progress curve was calculated from 8 Sep to 4 Oct according to the formula: $\sum^{n}{}_{i=1}[(R_{i+1} + R_i)/2][t_{i+1} - t_i]$, where R = disease severity rating (% of leaf surface affected) at the ith observation, t_i = time (days) since the previous rating at the ith observation, and n = total number of observations.

[x] Total Yield: cwt/A = hundred weight of healthy tubers per acre.

[w] Means followed by the same letter within columns are not significantly different at $P = 0.05$ as determined by Fisher's protected least significant difference test.

POTATO (*Solanum tuberosum* 'Atlantic')
Early blight; *Alternaria solani*

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Evaluation of fungicides for control of potato early blight in Pennsylvania, 2018.

Fungicides were evaluated for managing early blight on potato cv. Atlantic at the Penn State Russell E. Larson Agricultural Research Center in Pennsylvania Furnace, PA. The soil type was a Hagerstown silty clay loam. Potatoes were planted on 15 Jun. The experimental design was a randomized complete block with four replicates. Plots were three rows wide (36-in. spacing between rows) and 10-ft long with 8 in. seed-piece spacing. Precipitation was 5.01, 8.89, 7.17, and 8.02 in. for Jun, Jul, Aug, and Sep, respectively. Spreader rows were spray-inoculated on 30 Jul. A mixture of three isolates of *Alternaria solani*, with a concentration of 1.75×10^4 conidia/ml, was used to promote a uniform spread of the pathogen to all treatment plots. Fungicides were applied with a tractor-mounted, N_2-pressurized side boom sprayer at 30 psi and 45 gal/A. The spray boom was equipped with drop nozzles and boom nozzles so that both sides and the top of each plant were uniformly sprayed. On 9, 16, 23 and 29 Aug and 5, 11, 15 and 21 Sep each plot was visually assessed for the percentage of foliage with early blight. The eight visual early blight assessments were used to calculate the area under disease progress curve (AUDPC). Plants were vine killed on 27 Sep and 5 Oct with Reglone (2.0 pt/A). The middle row of each plot was harvested on 25 Oct. Tuber yield data were collected on 5 Nov. The data were subjected to analysis of variance and Fisher's protected least significant difference test (SAS v. 9.4, SAS Institute, Cary, NC).

All treatments significantly reduced foliar early blight compared to the untreated control. All treatments significantly increased yield of healthy tubers.

Treatment and rate/A	Days after first application[z]	AUDPC[y]	Total Yield[x]
Asterlit 15.5 oz + Koverall 2 lb+ Hasten 16 oz	0, 14, 28, 42		
Bravo Weather Stik 6 SC 1.5 pt	7, 20, 35, 50	32 c[w]	405 a
Asterlit 15.5 oz + Koverall 2 lb+ Hasten 16 oz	0, 42		
Bravo Weather Stik 6 SC 1.5 pt	7, 20, 35, 50		
Omega 8 oz	14		
Luna Tranquility 11 oz + Koverall 2 lb	28	37 c	384 ab
Omega 8 oz + Quash 3.5 oz	0		
Bravo Weather Stik 6 SC 1.5 pt	7, 20, 35, 50		
Asterlit 15.5 oz + Koverall 2 lb+ Hasten 16 oz	14, 42		
Endura 5 oz + Koverall 2lb	28	40 c	389 ab
Omega 8 oz + Quash 3.5 oz	0		
Bravo Weather Stik 6 SC 1.5 pt	7, 20, 35, 50		
Luna Tranquility 11 oz + Koverall 2 lb	14, 42		
Endura 5 oz + Koverall 2lb	28	42 c	370 abc
Miravis Prime 11.4 oz	0, 14, 28, 42		
Bravo Weather Stik 6 SC 1.5 pt	7, 20, 35, 50	81 bc	389 ab
Bravo Weather Stik 6 SC 1.5 pt	0, 14, 28, 42		
Miravis Prime 11.4 oz	7, 20, 35, 50	101 b	354 abc
Bravo Weather Stik 6 SC 1.5 pt	0, 14, 28, 42		
Miravis Prime 6.8 oz	7, 20, 35, 50	111 b	342 bc
Bravo Weather Stik 6 SC 1.5 pt	0, 7, 14, 20, 28, 35, 42, 50	125 b	319 c
Untreated Control		506 a	264 d
LSD (0.05)		56	51

[z] First fungicide application was 26 Jul.

[y] AUDPC = Area under disease progress curve was calculated from 9 Aug to 21 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 ith observation, t_i = time (days) since the previous rating at the ith observation, and n = total number of observations.

[x] Total Yield: cwt/A = hundred weight of healthy tubers per acre.

[w] Means followed by the same letter within columns are not significantly different at $P = 0.05$ as determined by Fisher's protected least significant difference test.

Supplemental Progress Report, 2018----------April 5, 2019

Pennsylvania Regional Potato Germplasm Evaluation Program, 2018

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The objective of this project is to find new breeding lines that are well adapted to Pennsylvania potato growing conditions and have qualities that are suitable for either processing or tablestock 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: Northampton Co., Erie Co., and the Russell E. Larson Agricultural Research Center at Rock Springs, Centre Co. Please see the Progress Report from January 2019 for details. During the winter months, tests were performed to evaluate germplasm for chip, French fry processing and culinary qualities. Presented in this report are the chip processing results (Tables 1-3), French fry results (Tables 4-7), and the culinary quality results (Table 8). 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. We did not perform out of the field chip testing this year. 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 slices (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 2019 progress report.

Chipping (Tables 1-3)

There was no chipping directly out of the field (within two-three days of harvesting). Atlantic and Snowden are the standard varieties to use for comparing the chip color of the other lines.

From the results of the 3 week reconditioning the noteworthy lines are: At Rock Springs, Snowden, NDAF102629C-4, NY 152, MSX540-4 and NDAF14477C-7 had the best color; Atlantic, AF5040-8, AF5280-5, AF5429-3, B2904-2, BNC469-7, NY157, AF5563-5, AF5682-3, B3265-9, B3270-10,

L8-12, MSY111-1, MSV358-3, MSW485-2, MSZ219-13, MSZ219-46, MSZ222-19, NC470-3, AF5960-4, AF6030-1, B3175-8, BNC626-7, BNC626-15 and B3304-12 had acceptable color. At Northampton County, NY152 and MSX540-4 had the best color; Atlantic, Snowden, NY162, W9968-5 and NY157 had acceptable color. At Erie County, Snowden and NY152 had the best color; NY157, L8-12 and W9968-5 had acceptable color.

From the results of the 6 week reconditioning the noteworthy lines are: At Rock Springs, Snowden , NDAF102629C-4, NY152, NY157, MSY111-1, MSX540-4, BNC626-7 and BNC626-15 had the best color; Atlantic, AF5040- 8, AF5280-5, AF5429-3, B2904-2, BNC469-7, NY161, NY162, AF5563-5, AF5682-3, B2869-28, BNC470-13, B3156-2, B3265-9, B3270-10, L8-12, MSV358-3, MSZ219-13, MSZ219-46, MSZ222-19, AC01144-1W, W9968-5, W8822-1, NCB3171-7, NC470-3, AF5960-4, AF6030-1, NDAF14477C-7, B3175-8, B3304-1, B3325-6, B3326-3, B3340-3 and B3344-2 had acceptable color. At Northampton County, Snowden, NY152 and MSX540-4 had the best color; Atlantic, NY162, AF5040-8, W9968-5 and NY157 had acceptable color. At Erie County, Snowden and NY162 had the best color; NY152, NY157, L8-12 and AF5040-8 had acceptable color.

From the results of the chipping directly from 45°F the noteworthy lines are: At Rock Springs, NDAF102629C-4 had the best color ; Snowden, AF4648-2, AF5280-5, NY152, NY157, NY162, BNC470-13, B3270-10, MSY111-1, MSV358-3, MSX540-4, MSZ219-13, AC01144-1W, AF6030-1, B3175-8, BNC626-15, B3304-1 and B3340-3 had acceptable color. At Northampton County, NY152 had acceptable color; Snowden, MSX540-4 and NY157 had acceptable color. At Erie County, NY157 had the best color; Snowden, NY152 and MSV358-3 had acceptable color.

French fry Tests (Tables 4-7)
At Rock Springs, ND8068-5Russ, AF5071-2, BNC364-1, A07769-4 and CO07015-4RU had the best French fry color. At Northampton County, Moonlight had the best color. At Erie County, A07769-4 had the best color.

Tablestock Culinary Tests (Table 8)
Of the 39 lines tested for culinary characteristics, 14 were unacceptable for color and sloughing or soggy.

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, University of Wisconsin, Michigan State University, North Carolina State University potato breeding programs and Sunrain, Solanum International, Hanse Seed, HZPC companies provided seed. Special thanks to Bob Leiby who made sure this project was completed.

Table 1. Chip color results of potato evaluation in Plant Pathology & Environmental Microbiology Farm, Centre County, 2018

Variety/ Line	Specific Gravity	Chip Color		
		Feb.[1]	Mar.[2]	Mar.[3]
Atlantic	1.047	5	5	7
Katahdin	1.033	9	8	7
Snowden	1.049	3	3	4
Superior	1.035	8	6	7
Yukon Gold[YF]	1.044	8	7	8
AF4648-2	1.054	6	6	5
AF5040-8[YF]	1.060	5	4	6
AF5225-1	1.037	9	8	8
AF5280-5	1.033	4	4	4
AF5429-3	1.046	5	5	6
AF5450-7	1.046	7	6	7
B2869-29	1.063	6	6	7
B2904-2	1.059	5	4	6
B3012-1	1.051	6	6	6
B3183-6	1.051	7	6	7
BNC364-1	1.048	6	6	6
BNC469-7	1.052	5	5	7
NDAF102629C-4	1.042	3	3	3
NY149[YF]	1.041	8	8	7
NY151	1.028	7	9	9
NY152	1.049	3	3	4
NY157	1.048	4	3	4
NY161[YF]	1.039	6	5	6
NY162	1.052	6	4	5
AF5563-5	1.046	5	4	6
AF5677-4	1.047	7	6	8
AF5682-3	1.054	5	5	6
WAF10664-3	1.045	6	6	7
AF5658-6[YF]	1.046	6	7	7
B2869-28	1.048	8	5	7
BNC481-6[YF]	1.044	6	6	7
B3083-4	1.046	10	9	10
B3083-11	1.053	7	7	7
N35-3	1.046	7	7	8
N35-9	1.037	7	8	8
BNC470-13	1.055	6	4	4
B3156-2	1.046	6	5	6
B3263-2	1.054	6	7	7
B3084-3	1.048	7	7	8
B3265-7	1.046	6	6	7
B3265-9	1.046	5	4	6
B3270-10	1.057	4	4	4
BNC369-4	1.053	6	6	7
L8-12	1.052	4	4	6
MSY111-1	1.033	5	3	4
MSV358-3	1.050	5	4	4
MSX540-4	1.063	3	3	5
MSU161-1	1.038	8	9	-
MSW485-2	1.055	5	6	7
MSZ219-13	1.040	4	4	4

Table 1. Continued

Variety/ Line	Specific Gravity	Chip Color		
		Feb.[1]	Mar.[2]	Mar.[3]
MSZ219-46	1.047	5	5	6
MSZ222-19	1.052	4	4	6
AC01144-1W	1.040	6	4	4
NC426-2^{YF}	1.052	6	6	6
W9968-5	1.053	6	4	7
W9576-11Y^{YF}	1.026	8	9	8
W8822-1	1.055	6	4	6
NCB3171-7	1.052	6	4	7
NC470-3	1.052	4	4	6
NC606-23^{YF}	1.036	7	7	8
NC600-10^{YF}	1.038	8	7	-
Atlantic	1.047	5	5	7
AF5960-4	1.060	4	5	6
AF6030-1	1.064	5	5	5
NDAF14477C-7	1.049	3	4	-
B3175-8	1.053	4	4	5
B3255-2	1.040	6	6	-
B3263-7	1.042	7	7	7
BNC626-7	1.049	5	3	6
BNC626-8	1.048	6	6	7
BNC626-15	1.049	4	3	5
BNC648-1^{YF}	1.054	8	7	7
B3292-5	1.039	7	6	7
B3297-1	1.039	6	6	6
B3299-4	1.054	6	7	-
B3304-1	1.055	6	4	4
B3304-12	1.044	5	6	6
B3307-5	1.038	7	7	8
B3325-6	1.030	6	4	6
B3326-3	1.044	6	5	-
B3340-3	1.048	6	5	5
B3344-2	1.040	6	5	6
BNC726-1^{YF}	1.056	6	6	6
BNC730-1	1.056	6	6	6
B3335-2	1.051	7	6	7
NDAF113458-2	1.024	10	9	9

[1] Feb. = Stored at 45^{0}F from December 20, 2018 than transferred to 55^{0}F three weeks prior to chipping on February 13 - 15, 2019.

[2] Mar. = Stored at 45^{0}F from December 20, 2018 than transferred to 55^{0}F six weeks prior to chipping on March 6 - 7, 2019.

[3] Mar. = Stored at 45^{0}F from December 20, 2018 and chipped on March 25 - 26, 2019.

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

YF = Yellow Flesh

Table 2. Chip color results of potato evaluation in Joel and Sherwood Geiger's Farm, Northampton County, 2018

Variety/ Line	Specific Gravity	Chip Color		
		Feb.[1]	Mar.[2]	Mar.[3]
Atlantic	1.058	5	5	6
Snowden	1.054	4	3	4
AF5225-1	1.034	7	9	8
NY149[YF]	1.042	8	7	8
NY151	1.029	9	8	8
NC606-23[YF]	1.038	7	7	7
NY152	1.047	3	3	3
NY162	1.052	4	5	6
AF5040-8[YF]	1.054	6	4	6
MSX540-4	1.059	3	3	4
W9968-5	1.052	5	5	6
NY157	1.043	4	4	4

[1] Feb. = Stored at 45^{0}F from December 20, 2018 than transferred to 55^{0}F three weeks prior to chipping on February 15, 2019.

[2] Mar. = Stored at 45^{0}F from December 20, 2018 than transferred to 55^{0}F six weeks prior to chipping on March 7, 2019.

[3] Mar. = Stored at 45^{0}F from December 20, 2018 and chipped on March 26, 2019.

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

YF = Yellow Flesh

Table 3. Chip color results of potato evaluation in Mark Troyer Farm, Erie County, 2018

Variety/ Line	Specific Gravity	Chip Color		
		Feb.[1]	Mar.[2]	Mar.[3]
Atlantic	1.047	7	6	6
Snowden	1.040	3	3	5
AF5225-1	1.031	9	9	8
NY149[YF]	1.031	10	9	8
NY151	1.016	10	9	9
NY152	1.027	3	4	5
NY162	1.034	6	3	6
NY157	1.033	5	4	3
L8-12	1.037	4	5	6
AF5040-8[YF]	1.047	6	5	6
MSV358-3	1.033	6	6	5
W9968-5	1.038	5	6	6

[1] Feb. = Stored at 45^{0}F from December 20, 2018 than transferred to 55^{0}F three weeks prior to chipping on February 15, 2019.

[2] Mar. = Stored at 45^{0}F from December 20, 2018 than transferred to 55^{0}F six weeks prior to chipping on March 7, 2019.

[3] Mar. = Stored at 45^{0}F from December 20, 2018 and chipped on March 26, 2019.

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

YF = Yellow Flesh

Table 4. Total yield, greater than 1 7/8" yield, specific gravity, and French fry color for russet skinned or long white potato evaluation trial in Plant Pathology & Environmental Microbiology Farm, Centre County, 2018

Variety/ Line	Yield (cwt/A) [1] Total	>1 7/8"	% of Standard[2]	Percent[3] Pickouts	Specific Gravity	French Fry Color[4] Feb.[5]	Mar.[6]
Russet Norkotah	177	125	100	20	1.036	2	2
Russet Burbank	263	135	108	43	1.046	1	1
Reveille Russet	259	126	101	44	1.038	2	1
AF4872-2	170	96	77	36	1.049	1	0
AF5164-19	239	152	122	33	1.036	1	0
AF5312-1	295	166	133	34	1.038	2	2
Shepody	315	184	147	32	1.042	3	2
ND8068-5Russ	162	106	85	24	1.054	0	0
WAF10073-3Rus	333	154	123	44	1.032	3	2
AF5071-2	153	101	81	25	1.055	0	00
WAF10612-1	267	187	150	22	1.048	2	2
AF5407-13	323	256	205	17	1.049	1	1
AF4172-2	235	157	126	25	1.050	1	1
A08422-2VR	261	192	154	25	1.051	1	2
BNC364-1	184	89	71	44	1.047	0	0
A07769-4	137	75	61	34	1.048	00	00
A08422-4VRsto	210	148	119	22	1.049	1	1
A08510-1LB	284	166	133	30	1.052	2	2
A10021-5TE	284	147	118	38	1.051	1	1
A10130-1	176	91	73	24	1.048	0	1
CO07015-4RU	312	229	184	9	1.047	0	0
CO8231-1RU	195	148	119	13	1.052	1	1
CO07049-1RU	197	144	115	14	1.049	1	1
CO03276-5RU	220	143	114	28	1.045	1	2
CO98067-7RU	252	183	146	20	1.040	1	1
W9133-1rus	210	140	113	25	1.037	1	2
W9523-1rus	178	95	76	40	1.042	1	1
W9433-1rus	215	141	113	33	1.044	1	2
CWO8221-5rus	194	117	94	29	1.032	2	1
CWO8071-2rus	245	184	148	16	1.046	1	1
WW 40 - 46	282	181	145	11	1.054	2	2
Moonlight					1.034	1	0
Non-replicate							
Russet Norkotah	102	47	100	40		2	2
AF5644-8	143	56	118	22	1.046	2	1
AF5661-13	216	78	164	15	1.058	1	1
COAF11112-13	185	78	165	16	1.036	1	1
AF6130-4	158	63	133	31	1.035	2	0
WAF14010-3	115	57	119	39	1.040	1	0
WAF14167-3	205	55	115	33	1.045	1	1
AF6119-1	159	63	132	28	1.044	1	0
AAF11263-1	98	56	117	31	1.043	2	1
WAF10612-1	201	56	119	37	1.045	2	2

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

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

[3] Percentage of total that are pickouts.

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

[5] Feb. = Stored at 45^0F from December 20, 2018 than transferred to 55^0F three weeks prior to

frying on February 19, 2019.

[6] Mar. = Stored at 45^0F from December 20, 2018 than transferred to 55^0F six weeks prior to frying on March 19, 2019.

Replicated trials are the average of 3 replicates except for those lines which were non-replicated.

Table 5. Total yield, greater than 1 7/8" yield, specific gravity, and French fry color for russet skinned or long white potato evaluation trial in Joel and Sherwood Geiger's Farm, Northampton County, 2018

Variety/ Line	Yield (cwt/A) [1] Total	>1 7/8"	% of Standard[2]	Percent[3] Pickouts	Specific Gravity	French Fry Color[4] Feb.[5]	Mar. [6]
Atlantic	286	221	100	16	1.058	-	-
Russet Norkotah	201	133	86	18	1.036	1	1
AF4172-2	266	141	69	24	1.042	1	2
Alta Cloud	263	119	59	38	1.040	1	1
Moonlight	312	188	78	33	1.030	0	0

[1] Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.
[2] Percentage of the standard, Atlantic for >1 7/8" yield.
[3] Percentage of total that are pickouts.
[4] French Fry Color: USDA Scale Color Standers for Frozen Fried Potatoes with 000 = lightest, 4 = darkest.
[5] Feb. = Stored at 45^0F from December 20, 2018 than transferred to 55^0F three weeks prior to frying on February 21, 2019.
[6] Mar. = Stored at 45^0F from December 20, 2018 than transferred to 55^0F six weeks prior to frying on March 20, 2019.

Non – replicated trial.

*= Russets and long whites were planted 10-in. apart with 24 seed pieces per 20-ft plot, Atlantic were spaced 8-in. apart with 30 seed pieces per 20-ft plot.

Table 6. Total yield, greater than 1 7/8" yield, specific gravity, and French fry color for russet skinned or long white potato evaluation trial in Mark Troyer Farm, Erie County, 2018

Variety/ Line	Yield (cwt/A) [1] Total	>1 7/8"	% of Standard[2]	Percent[3] Pickouts	Specific Gravity	French Fry Color[4] Feb.[5]	Mar. [6]
Atlantic	298	177	100	40	1.047	-	-
Russet Norkotah	65	47	26	25	1.010	2	2
W9133-1Rus	403	153	86	59	1.026	3	3
W9433-1Rus	465	250	141	46	1.039	2	1
CO07015-4ru	389	279	157	20	1.035	1	0
A08422-2VR	114	80	45	27	1.021	1	1
A10021-5TE	297	171	97	36	1.033	1	1
A10130-1	216	90	51	49	1.034	1	1
A07769-4	103	49	28	52	1.010	0	0
Reveille Russet	321	208	117	28	1.025	3	3
Moonlight	336	213	120	31	1.021	1	2

[1] Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.
[2] Percentage of the standard, Atlantic for >1 7/8" yield.
[3] Percentage of total that are pickouts.
[4] French Fry Color: USDA Scale Color Standers for Frozen Fried Potatoes with 000 = lightest, 4 = darkest.
[5] Feb. = Stored at 45^0F from December 20, 2018 than transferred to 55^0F three weeks prior to frying on February 21, 2019.
[6] Mar. = Stored at 45^0F from December 20, 2018 than transferred to 55^0F six weeks prior to frying on March 20, 2019.

Non – replicated trial.

*= Russets and long whites were planted 10-in. apart with 24 seed pieces per 20-ft plot, Atlantic were spaced 8-in. apart with 30 seed pieces per 20-ft plot.

Table 7. Total yield, greater than 1 7/8" yield, specific gravity, and French fry color for russet skinned or long white potato NE1731 evaluation trial in Plant Pathology & Environmental Microbiology Farm, Centre, 2018

Variety/ Line	Yield (cwt/A) [1] Total	>1 7/8"	% of Standard[2]	Percent[3] Pickouts	Specific Gravity	French Fry Color[4] Feb.[5]	Mar. [6]
Russet Norkotah	195	137	174	21	1.036	2	2
Russet Burbank	277	147	187	42	1.046	1	1
Reveille Russet	278	137	174	42	1.038	2	1
AF4872-2	201	102	129	41	1.049	1	0
AF5164-19	231	142	180	33	1.036	1	0
AF5312-1	296	165	209	34	1.038	2	2
Shepody	279	168	213	31	1.042	3	2
ND8068-5Russ	148	100	126	23	1.054	0	0
WAF10073-3Rus	345	160	203	45	1.032	3	2

[1] Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.
[2] Percentage of the standard, Atlantic for >1 7/8" yield.
[3] Percentage of total that are pickouts.
[4] French Fry Color: USDA Scale Color Standers for Frozen Fried Potatoes with 000 = lightest, 4 = darkest.
[5] Feb. = Stored at 45^0F from December 20, 2018 than transferred to 55^0F three weeks prior to frying on February 19, 2019.
[6] Mar. = Stored at 45^0F from December 20, 2018 than transferred to 55^0F six weeks prior to frying on March 19, 2019.

Replicated trials are the average of 4 replicates

Table 8. Boiling, microwaving results of tablestock test for NE1731 evaluation trial in Rock Springs, Plant Pathology Farm, Centre County, 2018.

Variety/	Boil[1]			Microwave[2]	
Line	Color[3]	Texture[4]	Sloughing[5]	Color	Texture
Atlantic	1	2	1	1	1
Katahdin	1	4	-	1	3
Snowden	4	3	-	1	1
Superior	4	4	-	1	3
Yukon Gold[YF]	3	3	-	3	2
AF4648-2	1	3	-	1	3
AF5040-8[YF]	3	2	-	2	2
AF5225-1	1	3	-	2	2
AF5280-5	4	4	-	1	3
AF5412-3	P	3	-	P	2
AF5414-1	*	3	-	*	2
AF5429-3	1	2	1	2	3
AF5450-7	1	3	-	1	3
B2869-29	4	2	-	1	2
B2904-2	4	3	-	1	1
B3012-1	1	3	-	1	2
B3183-6	2	2	1	2	2
BNC364-1	2	3	-	1	2
BNC469-7	4	3	-	1	2
NDAF102629C-4	4	4	-	1	3
NY149[YF]	3	3	-	3	2
NY151	2	3	-	2	3
NY152	2	3	-	2	2
NY157	1	2	-	1	2
NY161[YF]	3	2	-	3	2
NY162	4	3	-	1	3
Chieftain	1	3	-	1	2
Dark Red Norland	1	4	-	1	3
AF4831-2	1	4	-	1	2
AF5245-1	1	3	-	1	3
Russet Norkotah	4	2	-	2	1
Russet Burbank	1	3	-	1	2
Reveille Russet	1	3	-	1	2
AF4872-2	1	3	1	1	2
AF5164-19	2	3	-	1	2
AF5312-1	1	3	-	1	2
Shepody	1	3	-	1	3
ND8068-5Russ	2	3	-	2	1
WAF10073-3Rus	1	3	-	1	2

Tested: February 7 - 8, 2019

[1] Boil 20 minutes.

[2] Microwave 4 – 8 minutes.

[3] Color scored as follows: 1=white, 2=slightly yellow, 3=yellow, 4=white with gray edges, 5=gray with dark edges.

[4]Texture scored as follows: 1=dry (mealy, 3= medium, 5=soggy.

[5]Sloughing scored as follows: 1=some sloughing, 2= severe sloughing.

YF = Yellow Flesh

* = Red flesh

P = Purple flesh

Yellow Flesh Notes

We rated the yellow flesh in January.
We used Yukon Gold that was grown at Rock Springs

Scale:
YF1 - lighter than Yukon Gold
YF2 – equal to Yukon Gold
YF3 - darker than Yukon Gold

	YF 1	YF 2	YF 3
Rock Springs Germplasm Trial	BNC648-1	AF5040-8	AF5412-3
	BNC718-1 (purple skin)	AF5658-6	NY161
	NC426-2	AF5677-6	W9576-11Y
		AF5920-3	Connect
		WAF14096-5	Krone
		B2152-17 (red skin)	Belmonda
		BNC201-1 (red skin)	Toscana
		BNC481-6	Wendy
		BNC568-1 (purple skin)	Alegria
		BNC716-1 (red skin)	Colomba
		BNC718-2 (purple skin)	
		NY149	
		NCB2607-3 (red skin)	
		NC600-10	
		NC606-23	
		Melody	

Purple Flesh Variety

MSAB607-4 (Purple skin). Not solid purple flesh, had white streak in middle of tuber

AF5412-3 (Purple skin). Nice purple flesh

Red Flesh Variety

AF5414-1 (red skin). Pink flesh color, with white center

B3311-3 (red skin). Red flesh, with white center

Yellow Flesh Notes

We rated the yellow flesh in January.
We used Yukon Gold that was grown at Rock Springs

Scale:
YF1 - lighter than Yukon Gold
YF2 – equal to Yukon Gold
YF3 - darker than Yukon Gold

	YF 1	YF 2	YF 3
Rock Springs		Peter Wilcox (purple skin)	CO05037-3W/Y
Early Season Trial		B2152-17 (red skin)	AC97521-1R/Y (red skin)
		NCB2607-3 (red skin)	Erika
		Bonnata	Big Rossa (red skin)
		Sporano	Labella
		Picobello	Actrice
			Alegria