Pennsylvania Potato Research Report, 2009

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

Penn State's Department of Plant Pathology 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 powdery scab), 4) chemical control and 5) integrated pest management of potatoes. Many of these projects are long term and only yearly results are presented here.

1. Variety Breeding and Evaluation

At the Rock Springs location the trials included 90 round whites with a few yellow flesh, 31 red-skinned (a few purple skinned) and 34 russet or long white types. The Lehigh location had 50 lines and 29 specialty lines. The Erie location had 50 lines. Breeding lines were contributed by the USDA-ARS, New York, Maine, Michigan, Colorado, North Carolina, Idaho and a few other sources. See **Progress report - Pennsylvania Regional Potato Germplasm Evaluation Program, 2009 on pages 1-2 and tables from different locations on pages 3-30, and supplemental progress report on pages 45-46 and tables from different locations on pages 47-60.**

2. Breeding for Disease Resistance

There are several projects focused around a cultivated diploid species hybrid population that can be easily intercrossed with common varieties. These are long term projects dealing with early and late blight resistance as well as common and powdery scab resistance. Results of these projects will not be presented here but results of small trials evaluating soon to be released lines for their reaction to early blight, late blight and powdery scab are presented. In three separate field trials, 80, 30 and 30 varieties and advanced breeding lines were evaluated for disease resistance to late blight, early blight, and powdery scab, respectively.

Late blight symptoms were first observed on treatment plots in early Aug. Kennebec was considered the moderately resistant check. AF2376-5, NY140, B2628-10, AF2574-1, MSL268-D, MSQ176-5, MSM182-1, AWN86514-2, MSQ070-1, B0718-3, B2431-23, A97066-42LB, Patagonia, B0692-4, AF4121-3, AC99375-1RU, MSM171-A, OR03029-2, A96814-65LB, Yukon Gem (NDA5507-3Y), and AF3317-15 were resistant to moderately resistant. See **Severity of Late Blight on Potato Cultivars and Breeding Lines, 2009 page 31.**

Ten cultivars were classified as moderately resistant to early blight, and they were: Russet Burbank (Idaho clone), NYB38-40, AF2376-5, NY140, NY141, Lehigh, B1992-106, AF 2291-10, Kennebec and Rio Grande Russet. See **Severity of Early Blight on Potato Cultivars and Breeding Lines, 2009 page 32.**

The levels of powdery scab were moderate to high based on Kennebec, the susceptible check cultivar, which had 68.1% of tubers infected. None of the cultivars could be classified as resistant; however, Rio Grande Russet, Russet Burbank (Idaho clone), Blazer Russet (A8893-1), and Russet Norkotah #3117 were moderately resistant. See **Severity of Powdery Scab on Potato Cultivars and Breeding Lines, 2009 page 33.**

3. Chemical Control of Potato Diseases

In the late blight fungicide trial 10 different treatments were compared to an untreated control. All treatments suppressed late blight to levels lower than the control. See **Fungicidal Control of Late Blight on Potato, 2009 pages 34.**

In the early blight fungicide trial 7 different treatments were compared to an untreated control. All treatments had significantly less early blight than the untreated control. See **Fungicidal Control of Early Blight on Potato, 2009 pages 35.**

4. Potato Late and Early Blight Management for Pennsylvania on pages 36-44.

Progress Report—December 21, 2009

Pennsylvania Regional Potato Germplasm Evaluation Program, 2009

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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 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 plots were established at the following locations: Lehigh Co. (Tables 1, 2 & 3), Erie Co. (Tables 4 & 5) and Rock Springs, Centre Co. (Tables 6-13). The Lehigh location had 19 lines with four replications, 31 lines non-replicated and 29 non-replicate specialty lines. The Erie location had 15 lines with four replications and another 35 lines non-replicated. At the Rock Springs location the trials included 74 round whites with a few yellow flesh, 22 red-skinned (a few purple skinned) and 27 russet or long white types and an additional 16 whites, 9 red-skinned and 7 russet or long white type planted in replicated plots and non-replicated observational plots, respectively. The seed spacing was 8-inch within a 10-ft plot except for the russets that were at 10–inch. At the Rock Springs location, a mustard green manure crop was grown and incorporated into the field the previous year. After the wheat harvest, the mustard variety ‘Caliente 119’ was planted on 29 July 2008. On 15 Aug 2008, the mustard crop was flail chopped and plowed down to incorporate. The field was irrigated with 1.2 in of water on 17 Aug 2008 and the potato crop was planted the following spring. All other pertinent information for individual trials is found within the data tables or in Table 14. We assessed yield, internal defects and external defects, skin color, texture, tuber shape, specific gravity and overall appearance. Vine maturity was assessed for the Rock Springs plots only (Table 6, 8, 10 & 12). Chip quality tests and culinary tests will be conducted over the next few months. The spring was wet followed by cool conditions across the state for most of the growing season. The yield data seem low this year for Erie County. The rain and snow made the ground muddy, it was just hard to find all of the tubers for each plot. Management information for each site is provided in Table 14.

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:

Across the three trials there were only a few varieties and lines in common. Of those in common the following had high yields relative to Atlantic yield in each of the locations. These varieties or lines were: Yukon Gem, NY129, and King Harry.

In the Lehigh location the following lines also had high yield: Lehigh, NY140, D40-263, D40-323, and LF2326. In Erie Co. the following also had high yields: Snowden, AF3001-6, NDA7985-1R, AC97521-1R/Y, Yukon Gold, E43-10, and F11-1.

In the trial at Rock Springs, there were 54 and 20 round white clones in the replicated and non-replicated part, respectively with marketable yield similar to Atlantic. However, any clone with marketable yield between 423-647 cwt is not statistically different than yield of Atlantic.

Round White Chip-stock:
Based on data from replicated trials at Rock Springs, the following lines had yields similar to Atlantic and have specific gravities suitable for chipstock: Beacon Chipper, Snowden, B1992-106, NY139, NY140, BNC182-5, and E110-1.

Round White Tablestock:
Based on data from replicated trials at Rock Springs, the following lines had yields similar to Atlantic and had specific gravities suitable for tablestock: Katahdin, Kennebec, AF2376-5, AF2574-1, AF0338-17, NYB38-40, Lehigh, NY141, Yukon Gem, NY140, King Harry, D40-323, E61-6, MSM171-A, F39-1, and D40-263.

Red-skinned:
Based on data of replicated trials at Rock Springs, there were 2 red-skinned or purple-skinned clones with marketable yields significantly greater than Dark Red Norland: NY129 and NDA7985-1R; there were another 5 red-skinned or purple-skinned clones with marketable yields greater than Dark Red Norland: Chieftain, B2152-17, F36-3, and AC97521-1R/Y. Any clone with marketable yield between 356-542cwt is not statistically different from the yield of Dark Red Norland.

Russet-skinned or long white:
Based on data of replicated trials at Rock Springs, there was 1 russet-skinned clone with marketable yields greater than Russet Norkotah #3117: AF3001-6. Any clone with marketable yield between 392-618cwt is not statistically different from the yield of Russet Norkotah #3117.

The Pennsylvania Potato Research Program and a USDA grant 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.). Many of the pesticides used at Rock Springs location were donations from numerous chemical companies. The New York, USDA, Maine, Wisconsin, Idaho, Colorado and Michigan breeding programs provided seed. Special thanks to Chad Moore, Bob Leiby, Andy Muza, and Sara May 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 Lehigh County, Forrest Wessner Farm, 2009

Variety/Line	Yield (cwt/A)[1]		%	%	% by size class[3]				%PO[4]	Specific Gravity
	Total	>1 7/8"	US#1	of Standard[2]	2	3	4	5		
Atlantic	685	624	91	100	25	46	16	5	4	1.086
Snowden	682	620	91	99	39	44	9	0	3	1.087
Katahdin	587	516	88	83	18	44	25	1	9	1.068
Chieftain	634	518	82	83	14	38	27	2	15	1.061
Superior	477	448	94	72	31	55	9	0	1	1.075
B1992-106	672	599	89	96	32	45	12	0	2	1.086
Lehigh[yt]	725	664	92	106	16	48	28	0	4	1.078
NY138	609	552	91	89	15	44	25	6	5	1.079
NY139	628	560	89	90	15	49	23	3	8	1.089
NY140	809	680	84	109	13	44	25	1	10	1.074
NY141	665	556	84	89	19	45	19	2	11	1.081
B13-1	645	504	78	81	52	26	0	0	2	1.060
D40-330	560	491	88	79	37	45	5	0	3	1.086
E61-6	573	525	92	84	16	65	10	1	4	1.081
Rio Colorado	625	480	77	77	33	43	1	0	12	1.068
Beacon Chipper	683	623	91	100	14	42	26	9	5	1.075
Dakota Diamond	670	582	87	93	21	50	16	0	8	1.082
Dk Red Norland*	634	508	80	81	26	50	4	0	14	1.068
B2152-17*[yf]	655	566	86	91	36	40	11	0	5	1.073
NY129*	880	818	93	131	17	64	12	0	2	1.066
Dakota Jewell*	561	469	84	75	26	43	14	0	8	1.063
NDA7985-1R*	563	456	81	73	21	55	5	0	11	1.062
F36-3*	584	519	89	83	34	47	8	0	3	1.068
King Harry*	723	642	89	103	24	61	4	0	5	1.078
MSN105-1*	532	443	83	71	38	39	7	0	5	1.090
MSM171-A*	646	606	94	97	22	62	9	0	2	1.065
Yukon Gem*[yf]	793	720	91	115	22	52	17	0	5	1.071
E43-10*	701	598	85	96	42	42	2	0	3	1.066
Yukon Gold*[yt]	587	379	65	61	10	31	24	0	33	1.076
F11-1*[yf]	673	580	86	93	31	52	3	0	2	1.073
NorValley*	523	473	90	76	32	45	14	0	1	1.080
D40-50*	502	484	96	78	15	69	12	0	1	1.070
D40-263*	857	832	97	133	19	47	24	7	2	1.068
D40-266*	500	419	84	67	34	50	0	0	2	1.085

Variety/Line	Yield (cwt/A)[1]		%	%	% by size class[3]				%PO[4]	Specific
	Total	>1 7/8"	US#1	of Standard[2]	2	3	4	5		Gravity
D40-323*	830	713	86	114	35	47	3	0	7	1.074
Russet Norkotah*	362	273	75	44	26	43	6	0	11	1.068
AF3001-6*	832	597	72	96	22	46	4	0	22	1.082
AF3008-1*	315	148	47	24	26	21	0	0	46	1.086
AF2936-2*	561	329	59	53	46	13	0	0	27	1.068
AC96052-1RU*	381	316	83	51	63	20	0	0	8	1.066
CO95172-3RU*	487	291	60	47	28	32	0	0	30	1.079
CO94035-15RU*	546	458	84	73	26	57	0	0	12	1.067
Classic Russet*	613	497	81	80	30	42	9	0	16	1.070
LSD	97	98	6		7	11	8	4	7	

[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.

Replicated trials are the average of 4 replicates except for those lines with * which were non-replicated.

LSD indicates least significant difference (p=0.05), calculated for replicated varieties only.

Varieties with colored flesh are indicated by [yt] for yellow.

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 2. Tuber characteristics, internal and external defects for potato evaluation trial in Lehigh County, Forrest Wessner Farm, 2009

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	HH	IB	Rhizoc	H	Gr	K	G	Sc	Sp	T
Atlantic	5	6	5	2	5	5	2	9	1	0	0	1	2	0	0	0
Snowden	4	6	5	2	4	5	0	0	0	0	0	1	2	0	0	0
Katahdin	5	7	7	3	5	5	0	0	2	0	0	0	2	1	0	0
Chieftain	5	3	6	3	5	5	2	1	2	0	1	0	3	0	0	1
Superior	5	6	6	3	4	5	0	0	0	0	0	0	1	0	0	0
B1992-106	6	6	5	3	6	6	1	0	1	0	0	1	1	0	0	0
Lehigh[yt]	5	6	6	3	5	5	0	0	1	0	0	0	2	0	0	0
NY138	5	6	6	3	5	5	0	0	1	0	0	0	2	0	0	0
NY139	5	6	6	3	4	5	0	0	2	0	0	0	2	0	0	0
NY140	5	7	7	3	5	5	0	0	1	0	0	0	2	1	0	0
NY141	4	7	7	3	5	5	0	0	1	0	0	0	2	0	2	1
B13-1	4	2	7	3	7	5	0	0	2	0	1	0	0	0	0	0
D40-330	6	7	7	2	7	6	0	0	1	0	0	0	1	0	0	0
E61-6	5	6	6	2	5	5	0	0	1	0	0	0	1	0	0	0
Rio Colorado	4	2	8	3	6	5	0	0	1	0	1	0	2	0	0	0
Beacon Chipper	5	7	6	3	5	5	1	0	2	0	0	0	2	0	1	1
Dakota Diamond	4	7	6	3	6	5	6	0	2	0	1	1	1	0	0	0
Dk Red Norland*	5	2	7	2	6	6	0	0	0	0	0	0	2	0	0	0
B2152-17*[yf]	5	2	6	2	6	5	0	0	1	0	0	0	1	0	0	0
NY129*	5	2	6	2	5	6	0	0	2	0	0	0	1	0	0	0
Dakota Jewell*	5	2	7	2	5	5	1	0	1	0	0	0	2	0	0	0
NDA7985-1R*	5	2	8	3	6	6	0	0	0	0	0	0	2	0	0	0
F36-3*	5	2	6	2	5	5	0	0	0	0	1	0	1	0	0	0
King Harry*	5	7	6	2	5	5	0	0	0	0	0	0	1	0	0	0
MSN105-1*	5	7	7	2	6	4	0	0	0	0	0	0	1	0	0	0
MSM171-A*	5	6	6	3	4	4	0	0	0	0	0	0	0	0	0	0
Yukon Gem*[yf]	5	6	6	3	6	4	1	0	0	0	0	0	1	0	0	0
E43-10*	6	7	7	2	7	5	0	0	1	0	0	0	1	0	0	0
Yukon Gold*[yf]	5	6	6	3	6	5	0	0	0	0	0	0	3	0	0	0
F11-1*[yf]	6	6	6	3	6	5	0	1	0	0	0	0	1	0	0	0
NorValley*	5	7	7	3	6	5	0	0	0	0	0	0	0	0	0	0
D40-50*	6	7	7	2	5	6	1	0	0	0	0	0	0	0	0	0
D40-263*	5	7	7	3	6	5	0	0	0	0	0	0	1	0	0	0
D40-266*	5	8	7	3	6	5	0	0	0	0	0	0	0	0	0	0
D40-323*	5	6	6	2	6	5	0	0	0	0	0	0	2	0	0	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	HH	IB	Rhizoc	H	Gr	K	G	Sc	Sp	T
Russet Norkotah*	5	5	3	4	7	5	1	0	0	0	0	0	1	0	0	0
AF3001-6*	4	6	5	5	7	4	0	0	1	0	1	0	1	0	0	0
AF3008-1*	3	6	5	4	7	4	0	1	0	0	0	4	1	0	0	0
AF2936-2*	6	5	3	4	6	5	0	0	0	0	0	0	3	0	0	0
AC96052-1RU*	5	5	3	4	7	5	0	0	0	0	0	0	1	0	0	0
CO95172-3RU*	5	6	4	4	6	5	0	0	1	0	0	0	2	0	0	0
CO94035-15RU*	5	6	4	4	7	5	0	0	0	0	0	0	0	0	0	0
Classic Russet*	5	6	4	4	7	5	0	0	0	0	0	1	0	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. Total number observed out of 16 tubers for replicated trials and total number out of 4 for non replicated trials (marked with *). 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.

Table 3. Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pick outs and specific gravity for specialty potato evaluation trial in Lehigh County, Forrest Wessner Farm, 2009

Variety/Line	Yield (cwt/A)[1]		%	%	% by size class[3]				Notes
	Total	>1 7/8"	US#1	of Standard[2]	2	3	4	5	
Dark Red Norland	459	425	93	100	42	48	3	0	
Yukon Gold	477	463	97	109	13	54	26	4	
Katahdin	363	324	89	76	37	47	6	0	
Superior	369	350	95	82	34	50	12	0	
B1816-5	411	357	87	84	64	23	0	0	Purple; Yellow flesh
B2152-17	466	385	83	91	49	32	3	0	Red; Yellow flesh
BCO01044-2	416	405	97	95	42	49	6	0	Purple; Purple flesh
BCO01306-2	343	289	84	68	47	37	0	0	Red; Purple flesh
BD659-11	149	40	27	9	27	0	0	0	Red; Yellow Flesh
BD664-13	174	46	26	11	26	0	0	0	Red; Yellow flesh
Blue Mac	260	183	70	43	57	13	0	0	Light Blue
Prince Hairy	341	286	84	67	46	32	7	0	
F7-1	394	340	86	80	32	40	17	0	Red splotchs around eyes
Adirondack Red	526	455	86	107	67	19	0	0	Red; Red flesh
Adirondack Blue	418	366	88	86	54	28	6	0	Purple; Purple flesh
MSL228-1SPL	433	389	90	91	51	37	3	0	Purple splotchs on skin
MSN215-2P	323	286	88	67	37	39	14	0	Purple
Purple Majesty	373	296	79	70	61	19	0	0	Purple; Purple flesh
CO97232-1R/Y	253	188	74	44	50	24	0	0	Red; Yellow flesh
CO97227-2P/PW	395	173	44	41	44	0	0	0	Purple, Purple and white flesh
CO97222-1R/R	443	291	66	68	64	2	0	0	Red; Red flesh
CO97232-2R/Y	345	299	87	70	37	50	0	0	Red; Yellow Flesh
CO97226-2R/R	336	209	62	49	48	14	0	0	Red; Red flesh
AC97521-1R/Y	447	345	77	81	62	15	0	0	Red; Yellow Flesh
A99331-R/Y	199	127	64	30	41	23	0	0	Red with white splotchs; Yellow flesh
Lehigh	446	424	95	100	19	54	24	0	Yellow flesh

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

[2]Percentage of the standard, Dark Red Norland, 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.

Table 4. Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pickouts and specific gravity for potato evaluation trial in Erie County, Mark Troyer Farm, 2009

Variety/Line	Yield (cwt/A)[1]		%	%	% by size class[3]				%PO[4]	Specific Gravity
	Total	>1 7/8"	US#1	of Standard[2]	2	3	4	5		
Atlantic	404	290	72	100	19	39	14	0	22	1.095
Snowden	787	674	86	232	42	38	1	0	6	1.093
Katahdin	364	263	72	91	21	46	5	0	24	1.072
Chieftain	423	336	79	116	15	44	18	0	18	1.073
B1992-106	459	377	82	130	33	43	6	0	10	1.089
Lehigh[yf]	424	361	85	124	31	51	3	0	9	1.087
NY129	450	406	90	140	21	57	12	0	3	1.073
NY138	372	288	77	99	26	43	8	0	17	1.079
NY139	446	334	75	115	22	45	8	0	21	1.092
NY140	444	308	69	106	19	44	5	0	24	1.087
NY141	377	268	71	92	13	44	11	0	27	1.082
B13-1	462	381	82	131	50	31	1	0	3	1.065
E61-6	384	331	86	114	28	56	2	0	7	1.082
D40-266	260	201	77	69	52	24	1	0	7	1.082
MSJ147-1*	472	366	78	126	46	31	0	0	6	1.090
MSK409-1*	398	331	83	114	29	50	4	0	11	1.094
MSL268-D*	434	351	81	121	46	35	0	0	7	1.091
NorValley*	430	309	72	107	23	42	7	0	20	1.079
Dakota Diamond*	519	253	49	87	12	27	10	0	50	1.083
D40-35*	474	380	80	131	48	32	0	0	6	1.090
Russet Norkotah*	232	166	72	57	18	41	12	0	22	1.071
Classic Russet*	422	228	54	79	20	34	0	0	41	1.085
AC96052-1RU*	359	274	76	94	46	30	0	0	9	1.079
CO95172-3RU*	376	166	44	57	21	23	0	0	43	1.084
CO94035-15RU*	394	279	71	96	34	36	0	0	19	1.080
AF3012-4*	374	174	46	60	16	31	0	0	41	1.087
AF4002-1*	417	80	19	28	12	7	0	0	77	1.086
AF4002-2*	518	282	54	97	14	40	0	0	42	1.092
AF3016-2*	357	324	91	112	41	50	0	0	4	1.080
AF3001-6*	708	481	68	166	14	38	13	3	29	1.087
AF3008-1*	350	247	71	85	34	36	0	0	16	1.099
Dakota Jewell*	235	180	77	62	30	37	9	0	15	1.073
NDA7985-1R*	569	477	84	164	16	63	4	0	12	1.066
A99331-2R/Y*	538	350	65	121	41	17	7	0	11	1.075
CO97232-1R/Y*[yf]	341	239	70	83	54	16	0	0	5	1.066

Variety/Line	Yield (cwt/A)[1]		%	%	% by size class[3]				%PO[4]	Specific Gravity
	Total	>1 7/8"	US#1	of Standard[2]	2	3	4	5		
CO97227-2P/PW*	610	343	56	118	55	2	0	0	1	1.090
CO97222-1R/R*	501	320	64	110	52	12	0	0	6	1.070
CO97232-2R/Y*[yt]	257	171	66	59	32	34	0	0	24	1.063
AC97521-1R/Y*[yf]	744	603	81	208	45	30	6	0	6	1.084
CO97226-2R/R*	516	363	70	125	58	13	0	0	3	1.079
BCO01306-2*	404	301	74	104	36	38	0	0	9	1.080
Yukon Gem*[yt]	753	622	83	214	17	50	15	0	12	1.077
Yukon Gold*[yt]	501	452	90	156	18	47	26	0	9	1.088
E43-10*	660	555	84	191	47	37	0	0	1	1.069
F11-1*[yt]	467	407	87	140	31	39	18	0	6	1.081
King Harry*	422	369	87	127	38	49	0	0	4	1.081
Prince Hairy*	507	336	66	116	20	37	9	0	26	1.079
E48-2*	246	164	67	57	40	23	3	0	25	1.080
D40-323*	455	347	76	120	31	38	7	0	18	1.082
LSD	222	230	15		11	15	10	0	15	

[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.

Replicated trials are the average of 4 replicates except for those lines with * which were non-replicated.

LSD indicates least significant difference (p=0.05), calculated for replicated varieties only.

Yellow flesh varieties are indicated with [yt].

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 5. Tuber characteristics, internal and external defects for potato evaluation trial in Erie County, Mark Troyer Farm, 2009

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	HH	IB	Rhizoc	H	Gr	K	G	Sc	Sp	T
Atlantic	5	6	5	2	4	5	12	0	1	0	1	1	3	0	0	0
Snowden	5	6	5	2	5	5	1	0	2	0	0	1	2	0	0	0
Katahdin	5	7	7	3	5	5	5	0	1	0	0	0	2	2	0	0
Chieftain	5	2	7	3	5	5	0	0	1	0	0	1	2	0	1	0
B1992-106	5	6	5	3	6	6	1	0	2	0	0	0	2	0	0	0
Lehigh[yt]	4	6	6	3	5	5	1	0	2	0	1	0	2	0	0	0
NY129	6	2	4	2	4	6	0	0	0	0	0	0	1	0	0	0
NY138	5	7	7	3	6	5	1	0	1	0	0	0	2	0	0	0
NY139	5	7	6	3	5	5	0	0	1	0	0	0	2	0	0	0
NY140	4	7	6	3	4	4	3	0	1	0	0	0	2	0	0	0
NY141	5	6	6	3	5	5	1	0	1	0	0	0	2	0	2	0
B13-1	5	2	7	3	6	5	0	0	1	0	0	0	0	0	0	0
E61-6	5	6	6	3	5	5	2	0	2	0	0	0	2	0	0	0
D40-266	5	8	7	3	6	5	1	0	1	0	0	0	1	0	0	0
MSJ147-1*	5	7	6	3	6	5	2	0	0	0	0	0	1	2	0	0
MSK409-1*	4	6	6	3	4	5	1	0	2	0	0	0	1	0	0	0
MSL268-D*	5	6	6	3	6	4	0	0	0	0	0	0	1	0	0	0
NorValley*	4	7	7	3	6	5	1	0	0	0	0	0	2	0	0	0
Dakota Diamond*	4	7	6	3	6	5	3	0	2	0	0	1	2	0	0	0
D40-35*	5	6	6	2	5	4	0	0	0	0	0	0	1	0	0	0
Russet Norkotah*	5	5	3	4	6	5	0	0	1	0	0	0	1	0	0	0
Classic Russet*	4	6	4	4	7	5	1	0	0	0	0	1	3	0	0	0
AC96052-1RU*	6	5	3	4	6	5	0	0	0	0	0	0	1	0	0	0
CO95172-3RU*	4	6	1	4	6	5	0	0	1	0	0	0	2	0	0	0
CO94035-15RU*	4	5	3	4	6	5	1	0	0	0	0	0	1	0	0	0
AF3012-4*	4	7	7	4	7	5	0	0	2	0	0	1	3	0	0	0
AF4002-1*	2	7	6	4	7	6	0	0	0	0	0	2	4	0	0	0
AF4002-2*	3	7	6	4	6	4	1	0	0	0	0	1	3	0	0	0
AF3016-2*	5	7	6	4	6	4	0	0	0	0	0	0	1	0	0	0
AF3001-6*	4	6	6	4	6	5	1	0	0	0	0	2	2	1	0	0
AF3008-1*	3	6	6	4	6	4	1	0	1	0	0	1	1	0	0	0
Dakota Jewell*	5	2	7	3	4	5	1	0	0	0	0	1	1	0	0	0
NDA7985-1R*	6	2	7	3	5	6	0	0	1	0	0	0	1	0	0	0
A99331-2R/Y*	5	2	8	2	5	5	0	0	0	0	0	0	2	0	0	0
CO97232-1R/Y*[yt]	5	2	8	3	6	5	0	0	0	0	0	0	1	0	0	0
CO97227-2P/PW*	5	1	7	3	6	5	2	0	0	0	0	0	0	0	0	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	HH	IB	Rhizoc	H	Gr	K	G	Sc	Sp	T
CO97222-1R/R*	5	2	5	3	5	5	0	0	0	0	0	0	1	0	0	0
CO97232-2R/Y*[yt]	5	2	6	3	5	5	1	0	0	0	0	0	2	0	0	0
AC97521-1R/Y*[yt]	4	2	6	3	4	5	0	0	0	0	0	1	1	0	0	0
CO97226-2R/R*	4	2	5	2	3	6	0	0	0	0	0	0	1	0	0	0
BCO01306-2*	5	2	5	2	5	5	0	0	0	0	0	0	1	0	0	0
Yukon Gem*[yt]	5	6	6	3	5	4	1	0	0	0	0	0	2	0	0	0
Yukon Gold*[yt]	5	6	6	3	6	5	2	0	0	0	0	0	1	0	0	0
E43-10*	6	8	8	2	6	5	1	0	1	0	0	0	0	0	0	0
F11-1*[yt]	5	6	6	3	5	5	1	0	0	0	0	0	1	0	0	0
King Harry*	4	7	6	2	4	4	0	0	0	0	0	0	0	0	0	0
Prince Hairy*	4	6	6	2	4	4	3	0	1	0	1	0	2	0	0	0
E48-2*	4	6	7	3	6	4	0	0	0	0	1	0	1	0	0	0
D40-323*	5	7	7	2	5	5	1	0	1	0	0	0	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. Total number observed out of 16 tubers for replicated trials and total number out of 4 for non replicated trials (marked with *). 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.

Yellow flesh varieties are indicated with [yf].

Table 6. 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 Rock Springs, Plant Pathology Farm, 2009

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific	Vine
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity	Maturity
Atlantic	562	535	95	100	19	52	24	1	2	1.096	ML
Beacon Chipper	529	506	96	95	8	47	37	4	2	1.086	ML
Dakota Diamond	480	424	88	79	24	46	20	0	8	1.092	ML
Katahdin	486	459	95	86	16	61	17	1	4	1.073	ML
Kennebec	646	576	89	108	7	35	40	11	9	1.083	M
Snowden	532	499	94	93	39	49	5	2	1	1.091	M
Superior[5]	492	422	86	79	16	55	15	0	14	1.082	ME
Yukon Gold[yf]	473	423	89	79	17	45	27	4	9	1.086	ME
AF2291-10	478	440	92	82	23	52	13	4	7	1.099	ML
AF2376-5[yf]	538	501	93	94	30	52	12	0	3	1.094	L
AF2574-1	650	612	94	114	11	51	27	6	5	1.087	ML
B1992-106	545	513	94	96	33	46	14	1	0	1.089	ML
B2452-3	649	612	94	114	12	53	31	0	3	1.083	ML
NY138[5]	579	458	79	86	14	54	15	0	17	1.079	ML
NY139	515	466	90	87	29	49	12	1	7	1.093	ML
NY140	596	541	91	101	16	47	28	3	7	1.086	ML
NY141	558	522	94	98	9	47	40	0	4	1.080	M
NYB38-40	543	505	93	94	20	68	5	0	5	1.077	M
NorValley	574	533	93	100	33	50	10	0	3	1.081	M
AF0338-17	588	538	91	100	22	56	15	0	5	1.091	ML
AF2497-2	472	426	90	80	13	52	27	0	7	1.092	L
AF3318-6	457	412	90	77	52	38	1	0	1	1.087	ME
AF3310-5[5]	455	347	76	65	43	30	0	0	19	1.080	M
AF4058-1[yf]	620	518	83	97	24	46	13	1	12	1.080	ME
AF4108-3	566	492	87	92	7	35	42	9	11	1.078	ML
BNC182-5	629	584	93	109	27	56	10	0	2	1.093	ML
King Harry	546	509	93	95	24	64	6	0	4	1.084	M
Lehigh[yf]	512	440	86	82	11	38	42	1	12	1.086	M
D40-35	533	436	82	81	49	31	2	0	4	1.092	M
D40-50	389	369	95	69	14	63	18	0	3	1.081	M
D40-263	601	577	96	108	17	60	20	0	2	1.073	ML
D40-266	488	443	91	83	40	45	6	0	3	1.084	ME
D40-323	672	582	87	109	26	48	15	0	10	1.078	M

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific	Vine
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity	Maturity
D40-330	536	486	91	91	42	45	4	0	2	1.091	M
E18-7	499	443	89	83	10	51	31	0	9	1.091	ML
E43-10	620	558	90	104	42	42	6	1	1	1.068	M
E48-2	350	326	93	61	44	48	1	0	1	1.083	ME
E61-6[5]	503	432	86	81	10	52	23	2	17	1.085	L
E110-11	601	554	92	104	13	49	28	4	5	1.086	M
F10-6[5]	421	312	74	58	14	42	22	0	27	1.084	ML
F11-1[yf]	537	491	91	92	43	47	2	0	1	1.082	ML
F16-1	441	402	91	75	32	49	10	0	2	1.092	ML
F16-4[yt]	602	534	89	100	17	55	19	0	5	1.098	ML
F17-4	463	448	97	84	32	55	9	1	0	1.099	ML
F17-7	518	474	91	89	29	54	9	0	3	1.088	ML
F22-9	464	439	95	82	23	56	15	2	4	1.075	ME
F25-7	666	532	80	99	61	18	0	0	2	1.076	M
F28-3	497	461	93	86	21	64	8	0	5	1.092	ML
F29-1	490	439	90	82	37	42	12	0	3	1.080	M
F31-3	519	454	87	85	30	49	9	0	7	1.076	M
F39-1	583	540	93	101	20	60	14	0	5	1.077	M
F43-1	473	437	92	82	16	54	23	1	5	1.088	ME
F43-2	411	403	98	75	26	65	7	0	0	1.087	ME
F44-2	417	374	90	70	48	41	1	0	0	1.080	ME
F47-3	532	479	90	90	41	45	5	0	1	1.089	M
F47-4	447	422	94	79	19	62	13	0	2	1.088	ML
F47-5	443	406	92	76	39	49	5	0	2	1.083	M
F48-4	384	355	92	66	50	41	1	0	1	1.077	ME
F52-1	636	382	60	71	52	7	0	0	1	1.089	M
F55-1[yf]	360	334	93	63	30	54	10	0	2	1.065	M
F57-3	536	490	91	91	38	52	2	0	1	1.090	ML
F57-4	323	279	87	52	60	26	0	0	2	1.075	M
F57-5	514	480	93	90	42	46	6	0	2	1.091	M
MSQ176-5	564	449	80	84	12	38	29	5	17	1.076	L
MSN105-1	454	390	86	73	38	43	6	0	6	1.090	M

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific	Vine
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity	Maturity
MSM171-A	581	532	92	99	22	61	10	0	5	1.067	ME
MSL228-1SPL	428	407	95	76	28	55	14	0	2	1.096	ME
MSJ147-1	359	258	72	48	56	16	0	0	2	1.093	ML
MSK409-1	457	418	92	78	21	62	9	0	5	1.093	M
MSL268-D	551	487	88	91	37	45	7	0	3	1.091	M
Yukon Gem[yt]	552	512	93	96	36	46	12	0	3	1.079	M
A00188-3C	543	465	86	87	27	46	13	1	10	1.088	ML
A00286-3Y[yf]	706	625	89	117	34	52	3	0	5	1.086	L
A99433-5Y[yf]	539	482	90	90	43	41	5	1	2	1.089	L
AF4006-1*	428	356	83	66	39	36	10	0	8	1.089	ML
AF4006-3*	579	543	94	102	15	64	16	0	2	1.089	L
AF4006-5*	431	368	85	69	55	31	0	0	4	1.087	M
AF4015-2*	481	403	84	75	41	33	11	0	5	1.074	ME
AF4054-1*	491	346	71	65	21	39	15	0	25	1.100	L
AF4057-2*[yf]	476	417	88	78	27	55	6	0	1	1.086	M
AF4121-1*[yf]	528	460	87	86	17	49	24	0	7	1.087	VL
AF4121-3*	531	413	78	77	32	38	5	4	13	1.080	VL
AF4122-3*[yf]	421	348	83	65	49	31	4	0	3	1.087	ML
AF4138-7*	430	411	96	77	31	64	0	0	1	1.076	L
AF4147-4*	395	232	59	43	24	31	5	0	33	1.082	ME
AF4147-5*[5]	414	201	48	38	21	27	0	0	44	1.080	E
B2492-7*	502	488	97	91	32	49	17	0	0	1.064	ME
B2628-4*	542	503	93	94	13	50	33	0	4	1.087	L
B2628-10*	527	497	94	93	13	49	35	0	4	1.091	ML
Prince Hairy*	671	609	91	114	25	56	10	0	2	1.081	ME
LSD	92	118	16		10	15	12	3	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, 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. [5]Variety with high percentage of pickouts due to the high number of misshapen tubers caused by Rhizoctonia.

Planted 8-in. apart with 15 seed pieces per 10-ft plot. Yellow flesh varieties are indicated with [yt].

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 only.

Table 7. Tuber characteristics, internal and external defects for round white potato evaluation trial in Rock Springs, Plant Pathology Farm, 2009

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	HH	IB	Rhizoc	H	Gr	K	G	Sc	Sp	T
Atlantic	5	6	5	2	5	5	2	0	2	0	0	0	1	1	0	0
Beacon Chipper	5	6	6	2	4	5	0	0	2	0	0	0	1	0	0	0
Dakota Diamond	5	7	6	3	5	5	2	0	2	0	0	0	2	0	0	0
Katahdin	5	7	7	3	5	5	0	0	1	0	0	0	1	1	0	0
Kennebec	4	7	7	3	5	4	0	0	2	0	0	1	1	0	0	0
Snowden	5	6	5	2	4	5	0	0	2	0	0	0	1	0	0	0
Superior	5	6	6	3	5	5	0	0	1	0	1	1	1	0	0	0
Yukon Gold[yf]	5	6	7	3	6	5	2	0	2	0	1	1	1	0	0	0
AF2291-10	4	6	6	3	5	5	0	0	2	0	0	0	1	0	0	0
AF2376-5[yf]	5	7	7	3	5	5	0	8	2	0	0	0	1	0	0	0
AF2574-1	5	6	6	3	4	5	0	0	2	0	0	0	1	0	1	0
B1992-106	4	6	5	3	6	6	0	0	3	0	0	0	0	0	0	0
B2452-3	4	6	6	3	5	6	0	0	2	0	0	0	1	0	0	0
NY138	6	7	7	3	6	5	0	0	2	0	0	1	2	0	0	0
NY139	5	6	7	3	5	5	0	0	2	0	1	0	1	0	0	0
NY140	5	7	7	3	6	5	0	0	2	0	0	0	2	0	0	0
NY141	5	7	7	3	5	5	0	0	2	0	0	1	1	0	0	0
NYB38-40	6	6	7	3	6	6	0	0	1	0	0	0	2	1	0	0
NorValley	5	7	6	3	6	5	1	0	1	0	1	0	1	0	0	0
AF0338-17	4	6	5	2	6	5	0	0	2	0	0	0	1	1	0	0
AF2497-2	5	7	7	3	5	5	0	0	3	0	0	1	1	0	0	0
AF3318-6	5	7	6	2	5	6	0	0	2	0	0	0	0	0	0	1
AF3310-5	5	7	7	2	5	6	1	0	2	0	1	1	1	0	0	0
AF4058-1[yf]	4	6	7	3	5	5	0	0	2	0	1	2	1	0	0	0
AF4108-3	4	6	6	3	4	5	1	0	2	0	1	1	1	0	0	0
BNC182-5	5	6	6	2	5	6	1	0	1	0	0	0	1	0	0	0
King Harry	5	7	6	2	4	4	0	0	1	0	0	0	1	0	0	0
Lehigh[yf]	5	6	7	3	5	5	0	0	2	0	0	1	1	0	0	0
D40-35	5	7	7	2	5	4	0	0	1	0	0	0	0	1	0	0
D40-50	6	7	7	2	5	5	0	0	1	0	0	0	0	1	0	0
D40-263	5	7	7	3	5	5	0	0	1	0	0	0	0	0	0	0
D40-266	6	8	7	2	6	4	0	0	1	0	0	0	1	1	0	0
D40-323	5	7	6	2	6	6	0	0	1	0	0	1	1	1	0	0
D40-330	5	7	7	2	6	6	0	0	2	0	0	0	1	0	0	0
E18-7	5	7	7	2	5	6	0	0	1	0	0	0	0	0	0	0
E43-10	5	7	7	2	6	6	0	0	1	0	0	0	0	0	0	0
E48-2	4	6	7	3	6	4	0	0	1	0	0	0	0	0	0	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	HH	IB	Rhizoc	H	Gr	K	G	Sc	Sp	T
E61-6	5	6	6	3	5	6	0	0	2	0	1	1	1	0	0	0
E110-11	5	6	6	3	6	5	0	0	1	0	0	0	1	0	0	0
F10-6	5	6	6	3	5	5	1	0	2	0	1	1	1	0	0	0
F11-1[yf]	5	6	7	3	6	5	0	0	1	0	0	0	0	0	0	0
F16-1	5	6	6	2	5	5	0	0	2	0	0	0	1	0	0	0
F16-4[yf]	5	6	7	2	5	5	0	0	2	0	1	1	1	0	0	0
F17-4	4	7	6	2	5	5	0	0	1	0	0	0	0	0	0	0
F17-7	5	6	7	3	6	4	0	0	0	0	1	0	1	0	0	0
F22-9	5	7	7	2	6	6	0	0	0	0	0	0	0	0	0	0
F25-7	5	7	7	3	6	5	0	0	1	0	0	0	0	0	0	0
F28-3	5	6	6	2	6	5	0	0	1	0	0	1	0	0	0	0
F29-1	5	6	6	3	6	5	2	0	1	0	0	0	1	0	0	0
F31-3	5	6	5	2	5	5	0	0	1	0	0	0	1	0	0	0
F39-1	4	6	6	3	6	4	0	0	2	0	1	0	1	0	0	0
F43-1	4	6	7	2	5	4	0	0	2	0	0	0	1	0	0	0
F43-2	5	7	7	3	5	4	0	0	3	0	0	0	0	0	0	0
F44-2	5	6	6	3	6	5	0	1	2	0	0	0	0	0	0	0
F47-3	5	6	6	3	5	5	0	0	1	0	0	0	1	0	0	0
F47-4	5	6	5	2	5	4	0	0	1	0	0	0	1	0	0	0
F47-5	4	6	5	3	4	5	0	0	2	0	0	0	0	0	0	0
F48-4	5	7	7	2	6	5	0	1	1	0	0	0	1	0	0	0
F52-1	6	8	8	2	6	5	0	1	2	0	0	0	1	0	0	0
F55-1[yf]	5	7	7	2	6	5	0	0	2	1	0	0	0	0	0	0
F57-3	5	6	6	2	6	5	0	0	1	0	0	0	0	1	0	0
F57-4	5	7	7	3	6	5	0	0	1	0	0	1	0	0	0	0
F57-5	5	7	7	2	6	5	0	0	1	0	0	0	0	1	0	0
MSQ176-5	4	6	6	2	5	7	2	0	2	0	0	0	1	2	0	0
MSN105-1	5	7	7	3	5	5	0	0	2	0	0	1	1	0	0	0
MSM171-A	4	6	5	3	3	4	0	0	0	0	0	0	1	1	0	0
MSL228-1SPL	5	7	7	3	4	5	0	0	0	0	0	0	1	0	0	0
MSJ147-1	5	7	7	3	6	5	0	0	1	0	0	0	0	1	0	0
MSK409-1	5	6	6	3	5	5	0	0	2	0	0	0	1	0	0	0
MSL268-D	6	6	6	2	6	5	0	0	1	0	0	0	1	0	0	0
Yukon Gem[yf]	5	6	6	3	5	4	0	0	1	0	0	0	1	0	0	0
A00188-3C	5	6	6	2	5	5	2	0	2	0	1	1	1	0	0	0
A00286-3Y[yf]	5	6	7	3	5	5	0	0	1	0	0	1	1	0	0	1
A99433-5Y[yf]	5	6	6	2	5	5	0	0	2	0	0	0	0	0	0	0

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	HH	IB	Rhizoc	H	Gr	K	G	Sc	Sp	T
AF4006-1*	4	7	6	2	5	4	0	0	2	0	1	1	1	0	0	0
AF4006-3*	5	6	7	3	4	5	0	0	2	0	1	0	0	0	0	0
AF4006-5*	5	7	7	3	6	5	0	0	3	0	0	0	1	0	0	0
AF4015-2*	5	6	6	2	5	5	0	0	1	0	0	0	1	0	0	0
AF4054-1*	4	6	6	3	5	5	0	0	2	0	0	1	1	0	0	0
AF4057-2*[yf]	6	7	6	2	5	6	0	0	2	0	0	0	0	0	0	0
AF4121-1*[yf]	5	6	6	3	5	5	0	4	1	0	0	0	0	0	0	0
AF4121-3*	3	6	6	3	6	5	0	0	3	0	0	0	1	0	1	0
AF4122-3*[yf]	6	6	6	2	6	5	0	0	2	0	0	0	1	0	0	0
AF4138-7*	5	7	7	3	5	5	0	0	2	0	0	0	0	0	0	0
AF4147-4*	4	6	6	2	4	5	0	0	2	0	0	1	2	0	0	0
AF4147-5*	3	6	7	3	6	5	0	0	4	0	0	3	3	0	0	0
B2492-7*	6	7	7	2	5	6	0	0	1	0	0	0	0	0	0	0
B2628-4*	5	7	7	3	6	4	0	0	1	0	0	0	1	0	0	0
B2628-10*	6	6	6	3	6	5	2	0	1	0	0	0	1	0	0	0
Prince Hairy*	4	7	6	2	4	4	0	0	1	0	0	1	0	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. 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.

[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.

Table 8. 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 Rock Springs, Plant Pathology Farm, 2009

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific	Vine
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity	Maturity
Chieftain	570	512	90	114	18	50	23	1	5	1.071	ML
Dakota Jewell	441	393	89	87	25	53	13	0	7	1.076	ME
Dk Rd Norland	506	449	89	100	22	58	10	0	6	1.070	E
AF2393-7[yf]	467	425	91	95	55	34	1	0	0	1.070	E
B2152-17[yf]	592	537	91	119	55	35	0	0	1	1.074	E
BCO01306-2[pur]	474	413	87	92	43	40	5	0	2	1.081	M
BCO01357-4[rd]	647	518	80	115	21	55	6	0	15	1.080	ME
B1816-5[yf]	457	414	90	92	38	52	0	0	4	1.074	ME
NY129	601	549	91	122	23	55	14	0	6	1.075	ML
B13-1	482	425	88	95	37	50	2	0	4	1.063	M
F36-3	502	468	93	104	48	45	0	0	2	1.071	E
F7-1[yf]	519	443	85	83	23	46	19	0	9	1.062	ML
Rio Colorado	462	382	83	85	42	38	4	0	9	1.082	ME
CO97232-1R/Y[yf]	384	290	76	65	33	42	0	0	12	1.074	ME
CO97227-2P/PW[pur]	532	307	58	68	55	2	0	0	3	1.088	M
CO97222-1R/R[rd]	473	340	72	76	51	21	0	0	5	1.068	M
CO97232-2R/Y[yf]	478	447	94	100	49	44	0	0	1	1.065	M
AC97521-1R/Y[yf 5]	661	514	78	114	36	36	5	0	13	1.083	ML
CO97226-2R/R[rd]	489	371	76	82	65	11	0	0	1	1.076	ML
MSN215-2P	292	261	89	58	37	50	3	0	4	1.078	E
NDA7985-1R	657	581	88	129	26	51	13	0	6	1.069	M
A99331-2RY[yf]	583	410	70	91	37	32	1	0	14	1.079	M
A02267-5PY[yf]	493	437	89	97	49	36	3	0	2	1.082	ME
BCO01044-2*	445	398	89	88	33	43	15	0	6	1.077	ME
BD659-11*[yf]	98	16	17	4	17	0	0	0	0	1.088	E
BD664-13*[yf]	302	132	44	29	44	0	0	0	0	1.120	ME
B2676-2*	520	451	87	100	48	39	0	0	2	1.087	ME
BNC193-1*	506	459	91	102	54	37	0	0	3	1.075	ME
Blue Mac*	728	556	76	124	37	39	0	0	13	1.094	L

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific	Vine
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity	Maturity
Adirondack Red*[rd]	555	475	86	106	45	41	0	0	2	1.069	ME
Adirondack Blue*[pur]	474	334	70	74	42	28	0	0	22	1.073	ME
Purple Majesty*[pur]	608	411	68	91	33	34	0	0	12	1.079	M
LSD	80	93	8		11	11	7	1	7		

[1]Yield Total = all yield including pickouts. Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.
[2]Percentage of the standard, Dark Red Norland, 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]Variety with high percentage of pickouts due to the high number of misshapen tubers caused by Rhizoctonia.
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 only.
Varieties with colored flesh are indicated by [yf] for yellow, [pur] for purple, and [rd] for red.
Plots consisted of 10-ft rows with 15 seed pieces spaced 8-in. apart.

Table 9. Tuber characteristics, internal and external defects for red skinned potato evaluation trial in Rock Springs, Plant Pathology Farm, 2009

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	HH	IB	Rhizoc	H	Gr	K	G	Sc	Sp	T
Chieftain	5	2	7	3	5	5	0	0	1	0	0	0	1	0	0	0
Dakota Jewell	5	2	7	2	4	5	0	0	2	0	0	1	1	0	0	0
Dk Rd Norland	5	2	7	3	6	5	0	0	1	0	1	1	1	0	0	0
AF2393-7^{yf}	5	2	7	2	5	5	0	0	1	0	0	0	0	0	0	0
B2152-17^{yf}	5	2	6	2	6	5	0	0	1	0	0	0	1	0	0	0
BCO01306-2^{pur}	5	2	7	2	6	5	0	0	1	0	0	0	1	0	0	0
BCO01357-4rd	4	2	7	3	5	5	0	0	0	0	0	1	1	1	0	0
B1816-5^{yf}	5	1	7	3	6	5	0	0	0	0	0	1	0	1	0	0
NY129	5	2	5	2	5	5	0	0	1	0	0	1	1	0	0	0
B13-1	5	2	7	3	7	5	0	0	1	0	0	0	0	0	0	0
F36-3	5	2	7	2	6	5	0	0	0	0	0	0	0	0	0	0
F7-1^{yf}	5	2	8	2	6	5	0	0	1	0	0	0	1	0	2	0
Rio Colorado	5	2	8	3	7	5	0	0	1	0	0	1	1	0	0	0
CO97232-1R/Y^{yf}	5	2	7	3	6	5	0	0	1	0	0	1	0	0	0	0
CO97227-2P/PW^{pur}	5	1	7	3	6	5	0	0	0	0	1	1	0	0	0	0
CO97222-1R/Rrd	5	2	7	3	5	5	0	0	1	0	1	1	1	0	0	0
CO97232-2R/Y^{yf}	5	2	6	2	6	5	0	0	1	0	0	0	0	0	0	0
AC97521-1R/Y^{yf}	5	2	7	3	6	5	0	0	2	0	1	1	2	0	0	0
CO97226-2R/Rrd	5	2	6	2	5	5	0	0	0	0	0	0	0	0	0	0
MSN215-2P	5	1	7	3	6	5	0	0	0	0	1	0	0	0	0	0
NDA7985-1R	5	2	8	2	6	6	0	0	1	0	0	1	1	0	0	0
A99331-2RY^{yf}	4	2	7	2	5	5	0	0	1	0	0	1	1	0	0	0
A02267-5PY^{yf}	5	1	7	2	5	6	0	0	1	0	1	0	1	0	0	0
BCO01044-2*	4	1	6	3	5	5	0	0	0	0	0	1	0	0	0	0
BD659-11*^{yf}	4	2	7	2	7	6	0	0	1	0	0	0	0	0	4	2
BD664-13*^{yf}	4	2	7	4	7	5	0	0	0	0	0	0	0	0	2	0
B2676-2*	6	2	7	2	6	5	0	0	0	0	0	1	0	0	0	0
BNC193-1*	5	1	7	2	5	5	0	0	0	0	0	0	0	0	0	0
Blue Mac*	4	1	6	2	5	5	0	0	1	0	0	0	1	0	0	0
Adirondack Red*rd	5	2	8	3	7	5	0	0	0	0	0	0	1	0	0	0
Adirondack Blue*^{pur}	4	1	7	3	5	5	0	0	0	0	0	2	0	0	0	0
Purple Majesty*^{pur}	5	1	7	3	6	5	0	0	0	0	0	2	0	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. 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.

[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.

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

Table 10. Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pickouts, and specific gravity for russet skinned or long white potato evaluation trial in Rock Springs, Plant Pathology Farm, 2009

Variety/Line	Yield (cwt/A)[1]		%	% of	% by size class[3]				%PO[4]	Specific	Vine
	Total	>1 7/8"	US#1	Standard[2]	2	3	4	5		Gravity	Maturity
Blazer Russet (A8893-1)	522	417	80	83	31	37	12	1	17	1.084	ML
Rio Grande Russet[5]	661	486	74	96	27	45	1	1	20	1.092	ML
Russet Burbank (Idaho clone)	621	373	60	74	22	37	1	0	36	1.089	ML
Russet Norkotah #3117	554	505	91	100	31	55	6	0	4	1.079	ML
AF2596-2	525	420	80	83	29	41	12	0	16	1.083	ML
AF2850-9	475	397	84	79	51	32	1	0	0	1.101	ML
AF2936-2	396	299	75	59	55	20	0	0	6	1.068	ME
AF3000-1	381	330	86	65	38	48	0	0	7	1.090	ME
AF3001-6	616	553	90	110	19	62	10	0	7	1.089	ML
AF3008-1[5]	418	248	59	49	27	31	2	0	34	1.105	M
AF3012-4	497	383	77	76	38	39	0	0	14	1.092	ML
AF3016-2	463	295	64	58	29	34	0	0	26	1.083	M
AF3317-15	509	423	83	84	31	51	1	0	12	1.097	L
AF3325-2	302	230	76	46	24	52	0	0	17	1.073	E
AF3327-28	542	459	85	91	33	51	1	0	10	1.082	M
AF3362-1	500	434	87	86	21	60	5	1	10	1.087	M
AF4004-1	365	317	87	63	43	44	0	0	7	1.082	M
AF4096-1[5]	410	257	63	51	16	37	9	2	31	1.081	M
AF4096-2	433	277	64	55	27	34	0	0	27	1.073	ML
AC96052-1RU	374	303	81	60	45	33	4	0	10	1.082	ML
CO95172-3RU	588	496	84	98	42	43	0	0	7	1.091	ML
CO94035-15RU	453	357	79	71	39	40	0	0	12	1.085	ML
Classic Russet[5]	400	286	71	57	12	50	5	0	33	1.078	ML
Clearwater Russet	455	391	86	77	38	47	0	0	6	1.089	ML
A02062-1	475	431	91	85	25	66	0	0	6	1.082	ML
A01025-4	453	318	70	63	26	42	3	0	24	1.087	ML
Russet Norkotah	352	286	81	57	24	45	15	0	15	1.071	ME
AF4002-1*	430	148	34	29	34	0	0	0	50	1.098	ML
AF4002-2*	504	182	36	36	6	30	0	0	57	1.100	ML
AF4026-3*	340	281	83	56	45	34	5	0	10	1.076	ME
AF4040-2*	568	397	70	79	14	42	19	0	27	1.089	ME
AF4116-9*	390	315	81	62	20	61	0	0	15	1.076	ME
AF4141-1*	544	418	77	83	46	31	0	0	9	1.105	VL
AF4144-1*	455	360	79	71	55	25	0	0	4	1.094	ML
LSD	74	113	19		12	16	8	2	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 #3117 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]Variety with high percentage of pickouts due to the high number of misshapen tubers caused by Rhizoctonia.
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 only.
Plots consisted of 10-ft rows with 12 seed pieces spaced 10-in. apart.

Table 11. Tuber characteristics, internal and external defects for russet skinned or long white potato evaluation trial in Rock Springs, Plant Pathology Farm, 2009

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	HH	IB	Rhizoc	H	Gr	K	G	Sc	Sp	T
Blazer Russet (A8893-1)	4	6	4	3	6	5	1	0	2	0	0	1	0	0	0	0
Rio Grande Russet	4	6	3	4	6	5	2	0	2	0	1	1	2	0	0	0
Russet Burbank (Idaho clone)	4	6	4	3	6	5	0	0	2	0	1	2	2	0	0	0
Russet Norkotah #3117	5	5	3	4	6	5	0	0	1	0	0	0	1	0	0	0
AF2596-2	4	6	6	4	7	5	6	0	2	0	0	1	1	0	0	0
AF2850-9	4	6	5	4	7	4	0	0	1	0	0	0	0	0	0	0
AF2936-2	5	5	3	4	6	5	0	0	1	0	0	0	0	0	0	0
AF3000-1	3	6	6	4	6	5	1	0	1	0	0	0	1	0	0	0
AF3001-6	5	6	6	4	6	4	0	0	3	0	0	1	1	0	0	0
AF3008-1	3	6	6	4	6	5	2	0	2	0	0	2	1	0	0	0
AF3012-4	4	6	6	4	6	5	0	0	1	0	1	1	1	0	0	0
AF3016-2	4	6	6	4	5	5	0	0	2	0	0	2	1	0	0	0
AF3317-15	5	5	3	4	6	5	0	1	2	0	0	0	1	0	0	0
AF3325-2	5	4	3	4	6	5	0	0	2	0	1	1	0	0	0	0
AF3327-28	5	6	4	4	6	4	0	0	2	0	0	0	2	0	0	0
AF3362-1	6	6	5	4	6	5	0	0	2	0	0	0	1	0	0	0
AF4004-1	5	7	7	3	6	5	0	0	1	0	0	1	1	0	0	0
AF4096-1	5	6	5	4	6	4	1	0	2	0	0	2	1	0	0	0
AF4096-2	4	6	4	4	6	4	0	0	1	0	0	2	2	0	0	0
AC96052-1RU	5	5	3	4	6	5	0	0	1	0	1	1	1	0	0	0
CO95172-3RU	5	6	4	4	6	5	0	0	3	0	1	0	2	0	0	0
CO94035-15RU	5	5	3	4	6	5	1	0	2	0	0	1	1	1	0	0
Classic Russet	4	6	4	4	6	5	1	0	2	0	1	2	1	0	0	0
Clearwater Russet	4	6	4	4	6	5	0	0	2	0	0	1	1	0	0	0
A02062-1	5	6	3	4	6	5	0	0	0	0	0	0	1	0	0	0
A01025-4	4	6	6	4	7	5	0	0	1	0	0	1	1	0	0	0
Russet Norkotah	5	5	3	4	6	5	1	0	2	0	0	1	1	0	0	0
AF4002-1*	3	7	7	4	6	4	0	0	1	0	0	3	1	0	0	0
AF4002-2*	3	6	7	4	6	5	0	0	1	0	0	4	1	0	0	0
AF4026-3*	4	6	6	4	6	5	0	0	2	0	0	1	1	0	0	0
AF4040-2*	3	6	6	4	6	5	0	0	1	0	0	2	1	0	0	0
AF4116-9*	5	5	4	4	6	5	0	0	1	0	0	0	1	0	0	0
AF4141-1*	5	6	4	4	7	4	0	0	2	0	0	1	0	0	1	0
AF4144-1*	5	7	6	4	6	4	0	0	1	0	0	0	1	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. Total number observed out of 12 tubers for replicated trials and total number out of 4 for nor replicated trials (marked with *). 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.

Table 12. Total yield, greater than 1 7/8" percent of standard, size distribution, percent pickouts, and specific gravity for NE1031 potato evaluation trial in Rock Springs, Plant Pathology Farm, 2009

Variety/Line	Yield (cwt/A)[1]		%	%	% by size class[3]				%PO[4]	Specific	Vine
	Total	>1 7/8"	US#1	of Standard[2]	2	3	4	5		Gravity	Maturity
Atlantic	571	542	95	100	18	53	24	1	3	1.096	ML
Beacon Chipper	532	511	96	94	10	46	37	3	2	1.086	ML
Blazer Russet (A8893-1)	515	411	80	76	31	37	14	1	16	1.084	ML
Chieftain	573	515	90	95	18	52	22	1	6	1.071	ML
Dakota Diamond[5]	428	318	74	59	18	34	21	0	31	1.092	ML
Dakota Jewell	447	392	88	72	26	52	12	0	7	1.076	ME
Dk Rd Norland	502	441	88	81	21	58	10	0	6	1.070	E
Katahdin	494	462	94	85	14	61	18	1	4	1.073	ML
Kennebec	654	576	88	106	8	39	37	9	10	1.083	M
Rio Grande Russet[5]	582	371	64	68	21	34	16	1	38	1.092	ML
Russet Burbank (Idaho clone)[5]	582	279	48	52	16	28	2	0	52	1.089	ML
Russet Norkotah #3117	561	516	92	95	28	57	7	0	4	1.079	ML
Snowden	548	510	93	94	41	46	5	1	2	1.091	M
Superior[5]	494	436	88	81	16	57	15	0	11	1.082	ME
Yukon Gold[yf]	481	441	92	81	16	47	28	3	7	1.086	ME
AF2291-10	477	427	89	79	18	50	20	3	9	1.099	ML
AF2376-5[yt]	518	486	94	90	31	53	11	0	3	1.094	L
AF2393-7[yf]	453	408	90	75	54	35	1	0	0	1.070	E
AF2574-1	662	604	91	111	10	48	31	5	7	1.087	ML
B1992-106	548	510	93	94	36	46	11	1	0	1.089	ML
B2152-17[yf]	597	542	91	100	54	37	0	0	1	1.074	E
B2452-3	663	626	94	116	11	53	31	0	3	1.083	ML
BCO01306-2[pur]	476	410	86	76	48	35	4	0	2	1.081	M
BCO01357-4[rd]	626	508	81	94	22	55	4	0	13	1.080	ME
NY138[5]	561	462	82	85	16	56	15	0	13	1.079	ML
NY139	516	450	87	83	28	48	12	1	10	1.093	ML
NY140	621	560	90	103	15	47	26	4	7	1.086	ML
NY141	554	520	94	96	10	54	32	0	4	1.080	M
NYB38-40	552	514	93	95	18	70	5	0	5	1.077	M
LSD	90	124	18		10	15	13	4	19		

[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. Varieties with colored flesh are indicated by [yf] for yellow, [pur] for purple, and [rd] for red.

[5]Variety with high percentage of pickouts due to the high number of misshapen tubers caused by Rhizoctonia.

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.

Table 13. Tuber characteristics, internal and external defects for NE1031 potato evaluation trial in Rock Springs, Plant Pathology Farm, 2009

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]		External Defects[3]							
	TA	C	TX	Sh	TED	TCS	HH	IB	Rhizoc	H	Gr	K	G	Sc	Sp	T
Atlantic	5	6	5	2	5	5	2	0	2	0	0	0	1	1	0	0
Beacon Chipper	4	6	6	2	4	5	1	0	3	0	0	0	1	0	0	0
Blazer Russet (A8893-1)	4	6	4	3	6	5	1	0	2	0	0	1	0	0	0	0
Chieftain	5	2	7	3	5	5	0	0	2	0	0	1	1	0	1	0
Dakota Diamond	5	7	6	3	5	5	2	0	2	0	0	0	2	0	0	0
Dakota Jewell	5	2	7	2	4	5	0	0	2	0	0	1	1	0	0	0
Dk Rd Norland	5	2	7	3	6	5	0	0	1	0	1	1	1	0	0	0
Katahdin	5	7	7	3	5	5	0	0	1	0	0	0	1	1	0	0
Kennebec	4	7	7	3	5	4	0	0	2	0	0	1	2	0	0	0
Rio Grande Russet	4	6	3	4	6	4	2	0	2	0	2	2	2	0	0	0
Russet Burbank (Idaho clone)	4	6	4	3	6	5	0	0	2	0	1	2	2	0	0	0
Russet Norkotah #3117	5	5	3	4	6	5	0	0	1	0	0	0	1	0	0	0
Snowden	5	6	5	2	4	5	0	0	2	0	0	0	1	0	0	0
Superior	5	6	6	3	5	5	0	0	1	0	1	1	1	0	0	0
Yukon Gold[yf]	5	7	3	6	5	5	2	0	2	0	1	1	1	0	0	0
AF2291-10	4	6	6	2	5	5	1	0	2	0	0	1	1	0	0	0
AF2376-5[yf]	5	7	7	3	5	5	0	10	2	0	0	0	1	0	0	0
AF2393-7[yf]	5	2	7	2	5	5	0	0	1	0	0	0	0	0	0	0
AF2574-1	5	6	6	3	4	5	0	0	2	0	0	0	1	0	1	1
B1992-106	4	6	5	3	6	6	0	0	3	0	0	0	0	0	0	0
B2152-17[yf]	5	2	6	2	6	5	0	0	1	0	0	0	1	0	0	0
B2452-3	4	6	6	3	5	6	0	0	2	0	0	0	1	0	0	0
BCO01306-2[pur]	5	2	7	2	6	5	0	0	1	0	0	0	1	0	0	0
BCO01357-4[rd]	4	2	7	3	5	5	0	0	0	0	0	1	1	1	0	0
NY138	6	7	7	3	6	5	0	0	2	0	0	2	2	0	0	0
NY139	5	6	7	3	5	5	0	0	2	0	1	0	1	0	0	0
NY140	5	7	7	3	6	5	0	0	3	0	0	1	2	0	0	0
NY141	5	7	7	3	5	5	0	0	2	0	0	1	1	0	0	0
NYB38-40	6	6	7	3	6	6	0	0	1	0	0	1	2	1	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. Total number observed out of 16 tubers for replicated trials and total number out of 4 for nor replicated trials (marked with *). 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.

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

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 14: Management of Evaluation Trials, 2009

Erie County

Planting Date:	1 June
Harvest Date:	15 Oct
Previous Crop:	Corn
Fertilizer Rate/A:	At planting: 30 gal/A 10-34-0 (N-P-K); at Hilling: 20 gal/A 30% N
Herbicide:	Broadcast pre-emergence: Metolachlor, Prowl, Sencor
Fungicide:	Dithane, Bravo, Copper, Tin, Curzate, Acrobat
Insecticide:	Admire, Dimethoate, Assana
Vine Kill:	1 Oct
Rainfall (inches):	Jun (1.4), July (6.0), August (2.2), September (0.0)
Irrigation:	None

Lehigh County

Planting Date:	30 April for both germplasm and specialty trials
Harvest Date:	6 Aug for specialty trial; 24 Sep for germplasm trial
Previous Crop:	N/A
Fertilizer Rate/A:	N/A
Herbicide:	N/A
Fungicide:	N/A
Insecticide:	N/A
Vine Kill:	N/A
Rainfall (inches):	N/A
Irrigation:	N/A

Rock Springs

Planting Date:	18 and 19 May
Harvest Date:	1, 7, 8, 12 Oct
Previous Crop:	Wheat followed by Mustard Green Manure
Fertilizer Rate/A:	Pre-plant: 85 lb/A 0-0-60 (N-P-K); at planting: 900 lb/A 10-10-10 (N-P-K)
Herbicide:	Eptam, Dual Magnum and Sencor, Matrix
Fungicide:	11 applications including Gravel 75DF, Tanos, Penncozeb 75DF, Forum, HeadLine, Dithane DF and Bravo WS
Insecticide:	Mocap, Admire Pro, Baythroid 2, Avaunt
Vine Kill:	4 Sep and 10 Sep
Rainfall (inches):	June (4.56), July (4.30), August (2.72), September (3.39)
Irrigation:	None

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

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Severity of late blight on potato cultivars and breeding lines, 2009.

In two experiments, eighty potato cultivars and advanced breeding lines were evaluated at the Russell E. Larson Agricultural Research Center at Rock Springs, PA. The soil type was a Hagerstown silty clay loam. The previous crop was corn. Potatoes were planted on 15 Jun. The experimental design was a randomized complete block with three replicates in both experiments. The plots were 4-ft long with five seed pieces planted in each plot and 5-ft breaks between plots within a row. Fertilization was 593 lb/A of 20-10-10 (N-P-K) banded in the row during planting. On 9 and 16 Jul, 33 lb/A and 16.5 lb/A of liquid N fertilizer was applied while hilling, respectively. Precipitation was 4.56, 4.30, 2.72, and 3.39 in. for Jun, Jul, Aug, and Sep, respectively. Irrigation was applied at 1.4 in. on 17 Jul. Each treatment row had one adjacent spreader row. Natural infection occurred in late July. Disease ratings were determined by visually assessing each 4-ft plot and estimating the percentage of diseased foliage caused by late blight. Assessments were made on 7, 11, 14 and 19 Aug for experiment #1 and on 7, 11, 14, 19 and 25 Aug for experiment #2. 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.

Kennebec was considered the moderately resistant check for experiment #1; therefore, AF2376-5, NY140, B2628-10, and AF2574-1 were considered resistant to moderately resistant. In experiment #2, B0718-3 was the resistant control. Lines MSL268-D, MSQ176-5, MSM182-1, AWN86514-2, MSQ070-1, B0718-3, B2431-23, A97066-42LB, Patagonia, B0692-4, AF4121-3, AC99375-1RU, MSM171-A, OR03029-2, A96814-65LB, Yukon Gem (NDA5507-3Y), and AF3317-15 also were resistant to moderately resistant.

Cultivar/Line	AUDPC[z]	Cultivar/Line	AUDPC	Cultivar/Line	AUDPC
Experiment #1		Experiment #1 (continued)		Experiment #2 (continued)	
AF2376-5	55.5 l[y]	Dakota Jewel	965.0 ab	AF2376-5	250.5 mno
NY140 (NYY36-4)	89.0 l	B2452-3	1006.7 a	Classic Russet (A95109-1)	304.0 mn
B2628-10	147.0 l			AF2574-1	318.2 mn
Kennebec	169.7 l			CO99053-3RU	355.8 lm
AF2574-1	174.5 l			A00286-3Y	375.0 klm
Snowden	377.3 k	Experiment #2		LBR5	382.2 klm
Katahdin	483.3 jk	MSL268-D	14.8 t	LBR9	461.7 jkl
Dakota Diamond	507.5 i-k	MSQ176-5	38.0 st	AO96164-1	505.0 ijk
Lehigh	535.8 h-k	MSM182-1	44.5 st	CO99053-4RU	537.2 ij
Beacon Chipper	549.2 g-k	AWN86514-2	54.2 st	AO96141-3	555.8 hij
Rio Grande Russet	567.3 g-j	MSQ070-1	58.0 st	A98345-1	564.2 hij
NYB38-40	567.5 g-j	B0718-3	70.7 rst	AO96305-3	601.5 ghi
Chieftain	575.0 f-j	B2431-23	80.7 q-t	AO96365-2	684.0 gh
AF2291-10	590.8 e-j	A97066-42LB	83.7 q-t	AO96160-3	729.3 fg
Yukon Gold	624.2 d-j	Patagonia	84.0 q-t	A99331-2RY	850.3 ef
Russet Burbank (Idaho clone)	627.5 d-j	B0692-4	89.5 p-t	A0008-1TE	901.3 de
NY138	648.3 d-j	AF4121-3	90.3 p-t	Clearwater Russet (AOA95154-1)	908.2 de
NY139 (NYY28-9)	676.7 d-i	AC99375-1RU	112.3 p-t	Alpine Russet (A9305-10)	994.8 cd
Russet Norkotah #3117	678.3 d-i	MSM171-A	113.7 p-t	CO98012-5R	1065.7 bc
NY141 (NYY41-67)	702.5 d-h	OR03029-2	115.7 p-t	CO98067-7RU	1080.3 bc
Atlantic	722.5 d-g	A96814-65LB	119.3 o-t	BNC182-5	1095.7 bc
Blazer Russet (A8893-1)	748.3 c-f	Yukon Gem (NDA5507-3Y)	127.8 o-t	B2634-3	1099.0 bc
B1992-106	754.2 c-f	AF3317-15	140.2 o-t	B2492-7	1111.3 bc
B2152-17	761.7 cde	B2423-65	160.7 o-s	CO98368-2RU	1123.7 bc
Superior	763.3 cde	A00324-1	193.7 n-r	B2152-17	1174.2 ab
BCO01306-2	798.3 bcd	LBR7	203.3 n-r	BNC49-1	1188.3 ab
BCO01357-4	907.5 abc	LBR1R2R3R4	208.3 n-q	B2501-10	1192.5 ab
AF2393-7	958.3 ab	AF4121-1	217.3 nop	CO99100-1RU	1270.0 a

[z] AUDPC = Area under the disease progress curve.
[y] Means followed by the same letter within experiment are not significantly different at P = 0.05 as determined by Fisher's protected least significant difference test.

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

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Severity of early blight on potato cultivars and breeding lines, 2009.

Thirty potato cultivars and advanced breeding lines were evaluated at the Russell E. Larson Agricultural Research Center at Rock Springs, PA. The soil type was a Hagerstown silty clay loam. The previous crop was corn. Entries were planted on 20 May in a randomized complete block design with three replicates. Plots consisted of a single row 4-ft long with five seed pieces planted in each plot with a 4-ft break between plots. Each entry had an adjacent row of the susceptible cultivar Dark Red Norland. Fertilization was 900 lb/A of 10-10-10 (N-P-K) banded in-the-row during planting. Precipitation was 4.56, 4.30, 2.72, and 3.39 in. for Jun, Jul, Aug, and Sep, respectively. Spreader rows were inoculated with the early blight pathogen on 30 Jul. A mixture of three isolates of *Alternaria solani*, with a concentration of 2.5×10^5 spores/ml, was used to promote a uniform spread of the pathogen to all treatment plots. For each plot, the percentage of diseased foliage was visually assessed on 12, 17, 21 and 28 Aug. 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.

Ten cultivars were classified as moderately resistant, and they were: Russet Burbank (Idaho clone), NYB38-40, AF2376-5, NY140, NY141, Lehigh, B1992-106, AF 2291-10, Kennebec and Rio Grande Russet.

Cultivar/Line	AUDPC[Z]	Cultivar/Line	AUDPC
Russet Burbank (Idaho clone)	153.0 m[Y]	B2452-3	488.2 i-l
NYB38-40	252.5 lm	Snowden	522.5 h-k
AF2376-5	285.8 klm	Katahdin	523.3 h-k
NY140 (NYY36-4)	294.2 klm	Beacon Chipper	555.0 g-j
NY141 (NYY41-67)	324.2 j-m	Chieftain	685.8 f-i
Lehigh	344.8 j-m	BCO01306-2	749.2 e-h
B1992-106	353.3 j-m	Blazer Russet (A8893-1)	785.8 d-g
AF2291-10	357.5 j-m	Russet Norkotah #3117	795.0 d-g
Kennebec	389.2 j-m	BCO01357-4	843.3 c-f
Rio Grande Russet	392.5 j-m	Yukon Gold	934.2 b-e
AF2574-1	428.3 jkl	Dakota Jewel	998.3 a-d
Dakota Diamond	449.2 i-l	Superior	1025.8 a-d
NY138	461.7 i-l	B2152-17	1066.7 abc
Atlantic	480.8 i-l	AF2393-7	1163.3 ab
NY139 (NYY28-9)	482.5 i-l	Dark Red Norland	1225.0 a

[Z] AUDPC = area under the disease progress curve.
[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.

POTATO (*Solanum tuberosum*)
Powdery scab; *Spongospora subterranea*

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Incidence of powdery scab on potato cultivars and breeding lines, 2009.

Thirty potato cultivars and advanced breeding lines were planted in a naturally infested field in Potter Co., PA on 13 May. The previous crop was clover. Plots consisted of 10-ft rows, which were arranged in a randomized complete block design with three replications. Within each plot, 15 seed pieces were spaced 8-in. apart. Fertilizer was banded in-the-furrow at a rate of 1000 lb/A 13-13-21 (N-P-K). Standard crop management procedures were followed. A recommended program for control of early and late blight was followed. Reglone was applied as a vine kill on 15 Aug. Plants were harvested on 5 Oct. The tubers were visually assessed, and the number of tubers with powdery scab was determined from the total number of tubers per plot. Disease incidence was calculated as the percentage of tubers with powdery scab. Data was subjected to an analysis of variance test, and means were separated using Fisher's protected least significant difference test.

The levels of powdery scab were moderate to high based on Kennebec, the susceptible check cultivar, which had 68.1% of tubers infected. None of the cultivars could be classified as resistant; however, Rio Grande Russet, Russet Burbank (Idaho clone), Blazer Russet (A8893-1), and Russet Norkotah #3117 were moderately resistant.

Cultivar/Line	Powdery Scab Incidence (%)	Cultivar/Line	Powdery Scab Incidence (%)
Rio Grande Russet	0.9 h[z]	Atlantic	67.2 a-d
Russet Burbank (Idaho clone)	17.7 gh	Dakota Jewel	67.7 a-d
Blazer Russet (A8893-1)	21.3 f-h	Yukon Gold	67.9 a-d
Russet Norkotah #3117	29.8 e-h	Kennebec	68.1 a-d
AF2574-1	41.5 d-g	Katahdin	69.4 a-d
Snowden	43.6 d-g	B1992-106	69.5 a-d
NY138	43.6 d-g	Chieftain	75.0 a-c
Beacon Chipper	49.0 c-f	AF2291-10	76.2 a-c
NY140 (NYY36-4)	50.3 b-f	B2452-3	78.6 a-c
NY139 (NYY28-9)	50.8 b-f	BCO01357-4	79.1 a-c
B2152-17	56.7 a-e	Dakota Diamond	79.6 ab
Superior	58.5 a-e	BCO01306-2	80.2 ab
NY141 (NYY41-67)	65.5 a-d	Shepody	81.8 a
AF2393-7	66.2 a-d	AF2376-5	84.8 a
NYB38-40	67.2 a-d	Dark Red Norland	85.4 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.

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

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Fungicidal control of late blight on potato, 2009.

Fungicides were tested on 'Atlantic' potatoes at the Russell E. Larson Agricultural Research Center at Rock Springs, PA. The soil type was a Hagerstown silty clay loam. The previous crop was corn. Potatoes were planted on 10 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. Fertilization was 593 lb/A of 20-10-10 (N-P-K) banded in the row during planting. On 9 and 16 Jul, 33 lb/A and 16.5 lb/A of liquid N fertilizer was applied while hilling, respectively. Precipitation was 4.56, 4.30, 2.72, and 3.39 in. for Jun, Jul, Aug, and Sep, respectively. Irrigation was applied at 1.4 in. on 17 Jul. 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 sprayed. Natural infection occurred in late July. Disease ratings were determined by visually assessing the middle row of each plot for the percentage of diseased foliage caused by late blight. The plots were rated on 11, 14, 19, 25 and 31 Aug and the assessments were used to calculate the area under the disease progress curve (AUDPC). Plants were vine killed on 4 and 15 Sep with Reglone at 2 pt/A and 1.5 pt/A, respectively. The middle row of each plot was harvested on 5 Oct. Tubers were sorted and yield data was collected. Disease and yield data were subjected to analysis of variance and Fisher's protected least significant difference test.

No early blight infection occurred this season due to the cool weather. The late blight epidemic started in early August and progressed quickly. All treatments suppressed late blight to levels lower than the control. Treatment 10 had the lowest level of late blight. Yield was low for the control and all treatments due to the high number of rotted tubers.

Treatment and rate of product per acre	AUDPC[z]	Yield (cwt/A)[y]
1. Untreated Control	1328.1 a[x]	132.7 ab
2. Bravo 1.5 pt (A, B, C, D)[w]	755.5 cd	168.3 ab
3. Mancozeb 2 lb (A, B, C, D)	779.4 cd	172.9 a
4. QRD709 l lb (A, B, C, D)	933.6 bcd	150.9 ab
5. QRD709 2 lb (A, B, C, D)	870.5 bcd	161.3 ab
6. QRD709 3 lb (A, B, C, D)	708.8 cd	155.5 ab
7. Kocide3000 1.75 lb (A, B, C, D)	1000.5 bc	136.3 ab
8. Tanos 2.75 oz (A, B, C, D)	700.4 cd	149.8 ab
9. Regalia Max 16 fl oz (A, B, C, D)	1129.4 ab	140.8 ab
10. Regalia Max + Bravo WS 8 fl oz + 1.5 pt (A, B, C, D)	645.9 d	161.7 ab
11. Regalia Max 16 fl oz (A, C) Bravo WS 1.5 pt (B, D)	881.1 bcd	130.1 b

[z] AUDPC = Area under disease progress curve.
[y] cwt/A = hundred weight per acre for tubers with diameter greater than 1.875 inches.
[x] Means followed by the same letter are not significantly different at P = 0.05 as determined by Fisher's protected least significant difference test.
[w] Dates of fungicide applications were as follows: A = 5 Aug, B = 11 Aug, C = 18 Aug, D = 25 Aug.

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

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Fungicidal control of early blight on potato, 2009.

Fungicides were tested on 'Atlantic' potatoes at the Russell E. Larson Agricultural Research Center at Rock Springs, PA. The soil type was a Hagerstown silty clay loam. The previous crop was corn. Potatoes were planted on 21 May. 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. Fertilization was 900 lb/A of 10-10-10 banded in row at planting. Precipitation was 4.56, 4.30, 2.72, and 3.39 in. for Jun, Jul, Aug, and Sep, respectively. Spreader rows were inoculated with the early blight pathogen on 30 Jul. A mixture of three isolates of *Alternaria solani*, with a concentration of 2.5×10^5 spores/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 sprayed. On 17, 21, 28 Aug and 4 and 11 Sep each plot was visually assessed for the percentage of diseased foliage caused by early blight. The five visual assessments of early blight infection were used to calculate the AUDPC[z]. Plants were vine killed on 15 and 21 Sep with Reglone at 1.5 pt/A and 2 pt/A, respectively. The middle row of each plot was harvested on 1 Oct. Disease and yield data were subjected to analysis of variance and Fisher's protected least significant difference test.

All treatments had significantly less early blight than the untreated control. Treatment 3 had the lowest level of early blight. There was no significant yield difference between the control and all treatments.

Treatment and rate of product per acre	AUDPC[z]	Yield (cwt/A)[y]
1. Untreated Control	1273.8 a[x]	400.8 a
2. USF2018A500SC 11 oz (A-H)[w]	292.3 d	448.2 a
3. USF2018A500SC 11 oz (A, C, E, G) Echo 2 pt (B, D, F, H)	67.0 e	473.3 a
4. Bravo 1.5 pt (A-H)	374.0 d	469.5 a
5. Bravo 1.5 pt (A, C, E, G) Gravel 75DF 2 lb (B, D, F, H)	348.9 d	457.9 a
6. Regalia Max 16 fl oz (A-H)	1150.0 b	435.5 a
7. Regalia Max + Bravo 8 fl oz + 1.5 pt (A-H)	355.4 d	459.9 a
8. Regalia Max 16 fl oz (A, C, E, G) Bravo WS 1.5 pt (B, D, F, H)	632.1 c	439.3 a

[z] AUDPC = Area under disease progress curve.

[y] cwt/A = hundred weight per acre for tubers with diameter greater than 1.875 inches.

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

[w] Dates of fungicide applications were as follows: A = 21 Jul, B = 28 Jul, C = 3 Aug, D = 12 Aug, E = 19 Aug, F = 26 Aug, G = 2 Sep, H = 9 Sep.

Potato Late and Early Blight Management for Pennsylvania, 2009

Barbara J. Christ, Sara R. May and Xinshun Qu, Department of Plant Pathology

A. Eliminate sources of disease carryover.

The late blight fungus survives the winter in potato tubers. Practices that will help to reduce the amount of the fungus in the growing area include:

- Dispose of all cull potatoes including those originating from loading and unloading of storage, debris mixed in with soil from the storage area, and culls removed from seed lots prior to planting or cutting.
- Proper disposal includes complete freezing of cull tubers, complete consumption by livestock, burial at least three feet deep to prevent sprouting, or composting.
- Destroy volunteer plants.

B. Plant certified disease free seed.

Make personal contact with the seed grower. Ask questions.

- There is a 1% tolerance allowed for late blight in certified seed. Symptoms are difficult to detect and isolation of the fungus is unreliable. Late blight is not at uniform levels across a production area; therefore, generalizations cannot be made concerning levels of blight that may be expected in seed.
- If there is concern that seed may have been exposed to late blight, there are seed treatments that will decrease the spread of the late blight pathogen and increase plant emergence and stand uniformity. **See "Seed Treatments"** on page 38 for Tops-MZ or Evolve.
- When blighted seed pieces are planted, most will immediately rot and not sprout. However, when contaminated seed pieces (exposed to the pathogen, but not showing symptoms) are planted some will germinate, but the sprouts will be killed before emergence, some will emerge with late blight infections, and some will escape disease entirely.

C. Scout fields and be aware of late blight in nearby areas.

- Growers should scout fields twice a week or more, especially if there have been several days of fog or rainy weather. Check areas where dew periods are prolonged by natural obstructions, such as overhanging tree lines, which can induce ideal conditions for infection. Check areas where it is difficult to get adequate coverage when applying fungicides. Also, check the early maturing varieties first and more frequently.
- **Symptoms of Late Blight:** Irregular, blackish-brown lesions on stems or leaves. When the relative humidity is high, there should be white mold on these lesions especially on the lower leaf surface or on stems. Be sure to check within the plant canopy on the lower stems. **See "Identifying Potato Diseases in Pennsylvania"** for sale through the Penn State College of Agricultural Sciences Publication Distribution Center, 112 Agricultural Administration Building, University Park, PA 16802 or call 814-865-6713. Information can also be found at our potato health website, http://potatohealth.cas.psu.edu.

D. Monitor your weather.

Stations monitoring the weather are limited; therefore you must use common sense to be aware of your own weather conditions. Ideal conditions for blight are: daytime temperature between 60-75ºF and nighttime temperature between 50-60ºF, accompanied by fog, heavy dews or rain over a four to five day period. Extended periods of high relative humidity are also important for this disease.

Growers can visit the PA-PIPE website to obtain current disease risk information and spray recommendations. (http://pa-pipe.zedxinc.com)

E. Cultural practices:

- **Rotate.** Planting potatoes in fields as far from last year's potato fields as possible will provide a distance between your crop and volunteer potatoes. Also, we have established that you can reduce early blight severity by increasing the distance between fields, even short distances.
- **Hill plants**. Proper hilling will promote healthier plants and reduce late blight infections on tubers.
- **Avoid excessive nitrogen.** Excessive vine growth can promote conditions for late blight. However, proper nitrogen levels will reduce early blight susceptibility.

• **Vine-kill.** Thoroughly killing vines and keeping fungicides on plants until the plants are completely dead will reduce tuber infections.

F. Controlling soil borne diseases

Tuber blemish diseases such as black scurf, silver scurf, black dot, and common scab are becoming important problems as consumers are paying more attention to the look of the potato skin. There are no chemical controls for these diseases in fields where there is already inoculum present. The organisms that cause these diseases survive in the field on other hosts, as resting structures in the soil, or as saprophytes on decaying plant material. Chemical controls such as seed and in-furrow treatments will only prevent disease from spreading if it is on the seed piece and will not protect the daughter tubers from the inoculum that exists in the soil.

Currently, crop rotation is the best strategy for reducing amounts of these organisms and lowering disease severity. Use the following table as a guide for choosing rotational crops based on the disease problems in your fields.

Disease	Rotational Crops to Consider	Rotational Crops to Avoid
Common Scab	Alfalfa, Rye, Soybeans	Red Clover, Carrot, Beet, Radish, Spinach
Rhizoctonia (black scurf, stem canker)	Grasses, Wheat, Oats, Rye, Barley	Tomato, Soybean
Black Dot	Wheat, Barley, Rye, Alfalfa, Corn, Orchard Grass*	Soybean, Tomato, Oat, Mustard, Canola
Silver Scurf	---	Crop debris of Oats, Corn, Wheat, Rye, Red Clover, Alfalfa
Pink Rot	Legumes	Wheat, Barley, Tomato
*Note: Many of these crops could promote silver scurf.		

G. Protect plants with fungicides.

Begin the protectant program when plants are about 6 inches tall or after the first cultivation. If conditions are ideal for late blight early in the season you should reduce your spray schedule to 5-day intervals to protect the newly developed leaves.

There are several protectant fungicides available. **See "Specifics of fungicides to select from"** on page 40. It is wise to have more than one available for use during the season. Some pathogens may become resistant to a family of chemicals or you may run into chemical use restrictions such as the amount per acre one can legally apply during the growing season. The first five categories have efficacy for both early and late blight.

• **EBDC products** (Dithane, Penncozeb, Manzate, Polyram and Maneb)

• **Chlorothalonil** (Bravo, Equus, Echo)

• **Tin- based products** (Super Tin, Agri Tin)

• **Copper-based products** (Kocide, Champ and others)

• **Strobilurin** (Quadris, Amistar, Gem, Headline) - Excellent control of early blight and has activity towards late blight.

• **Fungicides specific for late blight**:

o Cymoxanil (Curzate) - The cymoxanil compound provides the kickback activity from the time of application. The kickback is effective for 24 hours post application.

o Propamocarb (Previcur) - Propamocarb has a limited anti-sporulant activity and may be able to hold the infection for several days. However, the infection is not cured.

o Dimethomorph (Acrobat) - Dimethomorph has an anti-sporulant activity.

H. Spray Equipment.

Fungicides applied with high-volume boom sprayers are most effective. These should be operated at ground speed of 4 mph or less, using 50-60 gal/A, and with 60-100 psi of pressure. Hollow cone or flat fan nozzles give the best coverage.

I. Management of late blight for fields in close proximity to a late blight outbreak.

Curzate will give some "kickback activity" incase spores already reached your field. Curzate no longer has mancozeb mixed with it so use a protectant companion such as mancozeb or chlorothalonil. Use a 5-7 day spray schedule depending on the weather conditions. Alternate the chemicals, for example use Curzate and a companion fungicide for the first week and the following week use one of the companion protectants alone. The label for Curzate allows a maximum of 5 applications. There is also Previcur (former Tattoo without the chlorothalonil) (maximum of 11.5 pt/A) and Acrobat (also without the mancozeb) (maximum of 5 applications). Curzate performs best with very actively growing plants, whereas Previcur will work even on much older plants. Therefore save the Previcur for later in the season.

J. Harvest only after vines are dead.

Harvest when the soil is dry. Also, those fields with high incidence of late blight that might have resulted in tuber rot should be harvested last. Under situations without late blight when other soft rots are prevalent, harvest those fields last. This will allow rotting potatoes to decay prior to harvest. Do not harvest rotting potatoes. Rogue out blighted tubers at grading. Take every feasible step to keep rotting potatoes out of your storage.

K. Manage the storage environment to suppress late blight and soft rots.

Manage storage conditions to promote complete suberization of harvest wounds then lower the temperature to appropriate long-term storage conditions. Do not attempt to store lots that have greater than 2% blighted tubers. Avoid placing wet tubers into storage. Moisture provides conditions promoting rot. Good air circulation is required to prevent wet pockets. Also, relative humidity should be below 85% to prevent condensation on the tubers.

L. Seed Treatments vs. In-furrow treatments:

Rhizoctonia control: There are several seed treatments that will reduce Rhizoctonia (black scurf). The best control of Rhizoctonia would be both a seed treatment containing mancozeb and an in-furrow application of Quadris. Seed treatments with the highest activity towards Rhizoctonia are Maxim MZ or MonCoat MZ. Tops MZ and Evolve are the seed treatments of choice if seed borne late blight is a concern. There are no effective seed treatments for silver scurf. If Quadris is used in-furrow, it does not mix well with Ridomil Gold for the in-furrow application. The end result, if you are not careful is "cottage cheese." If the two chemicals are to be mixed, make a slurry of each chemical and gradually mix the two.

Pink Rot Control: Ridomil Gold used in–furrow may not be the best use of the chemical. Keep in mind it is systemic and is expected to be taken up by the plant and the tubers. However, by applying Ridomil early in the season at planting especially for in-determinant or late maturing varieties, the chemical will only be found in the first formed tubers and not in those formed later in the season. Therefore you will not have full protection of all the tubers toward pink rot or Pythium leak.

Ranman is now labeled for pink rot control. It can be applied in-furrow and then also as a side dressing at hilling or as a foliar application. Phostrol is another systemic fungicide that can be used to control pink rot as a foliar application or applied to the tubers going into storage. Research has shown Phostrol to be significantly more effective than Oxidate for late blight and pink rot control on tubers going into storage.

M. Resistance Management:

There are seed treatments and in-furrow fungicides that are the same chemistry, such as Moncoat MZ (seed treatment) and Moncut (in-furrow). Make sure that you do not follow Moncoat MZ with a Moncut in-furrow treatment.

There are several foliar fungicides that have the same chemistry, such as the strobilurins. Fungicides such as Azoxystrobin, Pyraclostrobin, and Trifloxystrobin belong to the Quinone Outside Inhibitor (QoI) target site group. This group has a high risk for the development of resistance, this means that pathogen populations could lose sensitivity to these fungicides. Therefore follow the label carefully. These fungicides should be alternated with a standard protectant, such as chlorothalonil, mancozeb, or a fungicide from another chemical class. Fungicides from within this group (group 11) should not be used with each other. (Do not apply 6 applications of one strobilurin and then shift to a second one.) Here are some guidelines for strobilurin use:

1) Do not use a strobilurin alone without having a companion protectant.
2) Do not make sequential applications of a strobilurin fungicide.
3) If applying a strobilurin, no more than 1/3 of the total season's fungicide applications may be a strobilurin.

4) There are also in-furrow and foliar fungicides of the same chemistry especially in group 11, the strobilurins. If a strobilurin is used in-furrow, do not apply a strobilurin fungicide as the first foliar spray.

The following fungicides are medium risk for resistance:

- Acrobat (dimethomorph) (Group 15)
- Curzate (cymoxanil) (Group 27)
- Previcur Flex (propamocarb hydrochloride) (Group 28)

Tank mix these with an appropriate protectant fungicide. Rotate these chemicals such that after 3 applications are made of one chemical, switch to another.

For multiple-site fungicides that are low risk, such as mancozeb (group M3), chlorothalonil (group M5), and SuperTin (group 30), rotate among classes of fungicides, especially if early blight has not been controlled in the past.

N. Integrated Pest Management (IPM):

Another facet to disease management is to select varieties that have some level of resistance. If a variety is listed as resistant that does not necessarily mean the disease will not occur. Therefore all other appropriate management procedures should be followed. However, fungicide usage may be reduced to maintain adequate management of the disease. See the table below for varieties and their susceptibility.

The best management of any disease will incorporate scouting, weather monitoring, performing appropriate cultural practices combined with a fungicide program. A fungicide program using protectants for the majority of the applications with one of the late blight specific chemicals for critical periods should do a good job.

Early blight is the second most important foliar disease on potatoes. If fungicides are applied to control late blight, early blight may also be controlled. The best fungicides for early blight control are Quadris, mancozebs, manebs, chlorothalonil and metiram.

Most other potato diseases are managed by a combination of fungicide seed treatments, resistant varieties, manipulating the environment and performing appropriate cultural practices. Manipulating the environment includes proper irrigation management.

Varieties suggested for PA and resistance characteristics:

Variety	Late Blight	Early Blight	Common Scab
Atlantic	S	MS	MS
Andover	S	S	MR
Chieftain	S	MS	MS
E11-45	S	MS	MR
Elba	MR	MR	MS
Eva	S	MS	MR
Katahdin	MS	MR	MS
Kennebec	MR	MR	MS
Keuka Gold	S	S	R
Norland	S	VS	R
Norvalley	S	S	MR
Norwis	S	S	S
Pike	MR	MR	R
Red Pontiac	S	S	S
Reba	S	MS	MR
Russet Norkotah	S	VS	MR
Salem	S	MS	R
Sebago	MR	MR	MR
Snowden	MS	MR	MS
Superior	S	S	R
Yukon Gold	S	VS	S

R= resistant, MR= moderately resistant, MS= moderately susceptible, S= susceptible and VS= very susceptible.

Where trade names are used, no discrimination is intended and no endorsement by the Cooperative Extension Service is implied.

Specifics of fungicides to select from:

PLEASE NOTE: The fungicide resistance action committe (FRAC) group is listed for each class of fungicides. These groups will be appearing on fungicide labels in the near future and will help growers with resistance management. To prevent the development of resistance, rotate to chemicals in different groups. If more than one product containing an EBDC active ingredient (maneb, mancozeb, or metiram) is used on a crop during the same season and the EBDC products allow the same maximum poundage of active ingredient per acre per season, then the total poundage of all these products must not exceed any one of the specified individual EBDC product maximum limits. If the maximum poundage of active ingredient per acre per season is different for these EBDC products, then the total poundage of all these products must not exceed the lowest specified individual EBDC product maximum limit.

FRAC Group	Fungicide Class	Trade names and rates	Days to harvest	Re-entry interval (REI)	Interval between applications	Maximum amount per season
M5	Chlorothalonil	Bravo S 3.0-4.25pt Bravo Ultrex 0.7, 0.9-1.36 lb Bravo Zn 1.0, 1.5-2.25 pt Bravo Weather Stik 0.75, 1.0-1.5 pt Equus DF 0.7, 0.9-1.36 lb Equus 500 Zn 1.0, 1.4-2.1 pt Equus 720 0.75, 1.0-1.5 pt Echo 720 0.75, 1.0-1.5 pt Echo 90DF 0.625, 0.875-1.25 lb Echo Zn 1.0, 1.5-2.125 lb	7	48 hrs	5-10 days; Bravo S is 7-10 days	Do not exceed 13.6 lb for Bravo Ultrex and Equus DF, 22.5 pt for Bravo Zn, 21.6 pt for Equus 500 Zn and 15 pt for Bravo Weather Stik and Equus 720, and no more than 10 applications per season for Bravo S. In general do not exceed 12 lb active ingredient of any formulation of chlorothalonil. Use the lowest rate early in the season and apply the higher rates when vines close between rows, or late blight has been forecasted.
M3	Maneb	Maneb 75DF 1.5-2.0 lb Manex 0.8-1.6 qt	3	24 hrs	5-10 days	Do not exceed 11.2 lb active ingredient EBDC per acre per growing season. EBDC materials include maneb, mancozeb and metiram.
M3	Mancozeb	Dithane DF 0.5-2.0 lb Dithane DF Rainshield 0.5-2.0 lb Dithane F-45 Rainshield 0.4-1.6 qt Dithane M45 0.5-2.0 lb Manzate 75DF 1.0-2.0 lb Penncozeb 75DF 0.5-2.0 lb Penncozeb 80WP 0.5-2.0 lb Penncozeb 4FL 0.4-1.6 qt	3	24 hrs	5-10 days	Do not exceed 11.2 lb active ingredient EBDC per acre per growing season. EBDC materials include maneb, mancozeb and metiram.
M3	Metiram	Polyram 80 DF 1.5 - 2.0 lbs	14	24 hrs	5-10 days	Do not exceed 7 applications or 14 lb of product per acre per season. This is an EBDC product and must be within the EBDC limit.
M1	Elemental Copper	Basicop 3.0 - 6.0 lb				Apply at first sign of disease and repeat every 7-10 days. Use high rate where disease pressure is heavy or is expected to be so.

FRAC Group	Fungicide Class	Trade names and rates	Days to harvest	Re-entry interval (REI)	Interval between applications	Maximum amount per season
M1	Copper hydroxide	Kocide 101 1-4 lb Kocide DF 1-4 lb Kocide 4.5LF 0.667-2.667 pt Kocide 2000 0.75-3.0 lb Champ Formula 2F 0.667-1.0, 2.0-2.667 pt Champ DP 0.667-1.0, 2.0-2.667 lb Champion WP 1.0-1.5, 3.0-4.0 lb Tenn-Cop 5E 3 pt	14	24 hrs	7-10 days; Champ Formula is 3-10 days; Tenn-Cop is 7 days	Can be tank mixed with maneb, mancozeb or chlorothalonil. Do not tank mix with insecticides containing methamidophos, such as Monitor, because of reduced efficacy of the insecticide. Do not mix with foliar fertilizers. Do not mix Kocide DF with Diquat. Do not apply on red potato varieties, injury of foliage may occur.
M3 & M1	Mancozeb and Copper	Mankocide DF 1.5-5.0 lb	3		5-10 days	Do not exceed 74.66 lb of product /Acre/season.
Group 30	Triphenyltin hydroxide (TPTH)	Super-tin 80WP 2.5-3.75 oz Agri Tin 2.5-3.75 oz Tank mix with mancozeb (Dithane M45 80WP, 75DF or Manzate 200, 75DF or Penncozeb 80WP, 75DF), or metiram (Polyram 80DF 1.5 lb).	7	48 hrs		Do not exceed 11.25 oz/A formulation per season. Apply at 7 day intervals. TPTH combined with MH-30 and some EC insecticides can cause serious crop injury. Some varieties, such as Superior and Norland, are sensitive to high rates of TPTH.
Group 27	Cymoxanil	Curzate 60DF 3.2 oz.	14	12 hrs	5-7 days	This product works best when used on actively growing plants during the first half of the growing season. Note: Curzate 60DF does not contain mancozeb, therefore, tank mix with mancozeb or chlorothalonil.
Group 15	Dimethomorph	Acrobat 50WP 4.0-6.4 oz Forum 4.0-6.0 oz	4	12 hrs	5-10 days	Maximum 5 applications per season. Do not exceed 32 oz./A in 1 season for Acrobat 50WP and 30 oz./A for Forum. Note: Acrobat 50WP and Forum do not contain mancozeb and requires a companion protectant product such as mancozeb or chlorothalonil.
Group 28	Propamocarb	Previcur Flex 0.7 pt, 0.9 pt, 1.2 pt	14	12 hrs	7-10 days	Do not exceed 6.0 pt per acre per season.

PLEASE NOTE: Curzate, Acrobat, and Previcur Flex are **not** intended to be used as curatives. These chemicals are most effectively used in conjunction with a good traditional protectant program, which includes the mancozebs, chlorothalonil and copper hydroxides. Curzate, Acrobat, and Previcur Flex are most effective when late blight has been spotted within the region and the grower is concerned that he/she has not had appropriate coverage by a protectant and therefore, the crop could be exposed to the fungus in the near future. A second scenario is if the grower is concerned about a very rainy period and the forecast is predicting more rain, which would wash off the protectant. The compounds are rainfast and would provide protection that could not be provided by the traditional protectant. All three fungicides have some systemic activity.

FRAC Group	Fungicide Class	Trade names and rates	Days to harvest	Re-entry interval (REI)	Interval between applications	Maximum amount per season
Group 22 & M3	Zoxamide and Mancozeb	Gavel 75WG 1.5-2.0 lb Contains 8.3% zoxamide and 66.7% mancozeb.	3	48 hrs	7-10 days	Maximum of 6 applications per year. Do not exceed 12 lb of product per acre. Follow the maximum allowed EBDC.
Group 11	Azoxystrobin (Strobilurin)	Quadris 6.2-15.4 fl oz Amistar 2.0-5.0 oz	14	4 hrs	7 days for Quadris and 5-7 days for Amistar	Maximum of 6 applications per year. Do not exceed 3.75 qt of product per acre per season for Quadris and 2.5 lb per acre per season for Amistar. Use in a one to one alternation with fungicides that have a different mode of action. Do not alternate or tank mix with fungicides to which resistance has developed.
Group 11	Pyraclostrobin (Strobilurin):	Headline 500F 6-9 fl oz for early blight, 6-12 fl oz for late blight	3	12 hrs	7-14 days	Maximum of 6 applications per year. Do not exceed 72 fl oz of product per acre.
Group 11	Trifloxystrobin (Strobilurin)	Gem 6-8 oz for early blight, 8 oz for late blight	7	12 hrs	7-10 days	Do not exceed 48 oz per acre per season.
Group 11 and M5	Azoxystobin (Strobilurin) and Chlorothalonil	Quadris Opti 1.6 pt	14	12 hrs	5 -14 days	Do not exceed 1.5 lb a.i. per acre per season for azoxystrobin and 11.25 lbs a.i. per acre per season for chlorotalonil.
Group 4	Metalaxyl /mefanoxam	Ridomil Gold/Bravo 2.0 lb oz Ridomil Gold/Copper 2.0 lb Ridomil Gold MZ 2.5 lb Flouronil 2.0 lb	14, Ridomil Gold MZ 3 days	48 hrs	14 days	Do not exceed 3 applications per season. Those growers who store potatoes should consider Ridomil Gold for control of tuber rots such as pink rot and Pythium leak. Please note that it is not effective toward tuber rot caused by late blight. If Ridomil is used to control other tuber rots, apply at bloom and 14 days later. Ridomil Gold/Copper should be tank mixed with 0.8 lb a.i. of maneb, mancozeb, metiram, or chlorothalonil. Ridomil Gold EC and Ultra Flourish are now registered as an at-planting soil application for control of pink rot and Pythium leak. Look over the plant back restrictions.
New Fungicides:						
Group 29	Fluazinum	Omega 500F 5.5 fl oz	14	48 hrs	7-10 days	Do not exceed 3.5 pt of product per acre per season. Targets late blight and white mold.
Group 11 and 27	Famoxadone and Cymoxanil	Tanos 6-8 oz/A Use lower rate for early blight and high rate for late blight	14	12 hrs	7-10 for early blight and 5-7 for late blight	Do not exceed 72 oz/A per season. Tank mix with an appropriate contact – protectant fungicide. Follow resistance management directions for Group 11 fungicides.
Group 7	Boscalid	Endura 70%WDG 2.5-10 oz/A Use 2.5-4.5 oz rate for early blight and the 5.5-10 oz rate for white mold.	30	12 hrs		Do not exceed 4 applications for early blight or 2 applications for white mold or a maximum of 20.5 oz/A per season. Do not make more than 2 sequential applications before alternating to a different mode of action and do not exceed 4 applications per season.

FRAC Group	Fungicide Class	Trade names and rates	Days to harvest	Re-entry interval (REI)	Interval between applications	Maximum amount per season
Group 11	Fenamidone	Reason 500SC Apply 5.5 – 8.2 fl oz/A for early blight. Use 0.178 – 0.267 lb ai/A for late blight.	14	12 hrs	5-10 days	Do not apply more than 24.6 fl oz (0.80 lb ai/A) per growing season. Do not make more than 1/3 of total spray applications / season with any of the Group 11 fungicides.
Group 9	Pyrimethanil	Scala 7 fl oz/A	7	12 hrs	7-14 days	Use only in tank mix with the recommended dose rate of another effective early blight fungicide. Do not rotate to cereal grains or root crops for 30 days following the last application of Scala.
Group 21	Cyazofamid	Ranman 1.4 - 2.75 fl oz/A for late blight; 0.42 fl oz/1000 linear ft in-furrow for pink rot control and 2.75 fl oz/A side-dress or foliar for pink rot control.	7	12 hrs	7-10 days	Do not apply more than 10 sprays per crop. Do not apply more than 27.5 fl oz/A per crop.

Seed Treatments:

FRAC Group	Fungicide Class	Trade names	Rates
Group 12	fludioxonil 40.3 %	Maxim 4FS	Apply at the rate of 0.08 fl oz. of product per 100 lbs. of seed pieces. Maxim 4FS protects against seed-borne and soil-borne fungi which cause decay, damping-off, and seedling blight. Maxim 4FS does not contain mancozeb, so a mancozeb seed treatment dust should be applied after liquid treatment or an in-furrow application of Quadris at 0.40 fl. oz./1000 ft of row or Amistar at 0.13 fl. oz./1000 ft of row.
Group 12 & M3	fludioxonil 0.5% and 9.6% mancozeb	Maxim MZ	Apply at the rate of 0.5 pounds of product per 100 pounds of seed pieces. Maxim MZ has activity towards Rhizoctonia (black scurf/stem canker), Silver scurf, Fusarium dry rot, black dot and common scab.
Group 1 & M3	thiophanate methyl 2.5% and 6% mancozeb	Tops MZ	Apply at 0.75 to 1.0 pounds per 100 pounds of cut seed pieces. Tops MZ has activity towards Rhizoctonia (black scurf/stem canker), Silver scurf, Fusarium dry rot, and seed-piece late blight.
Group 1, M3, 27	thiophanate methyl 2.5%, 6% mancozeb and 1% cymoxanil	Evolve	Apply at 0.75 to 1.0 pounds per 100 pounds of cut seed pieces. Evolve has activity towards Rhizoctonia (black scurf/stem canker), Silver scurf, Fusarium dry rot, and better activity towards seed-piece late blight than Tops MZ.
Group M3	6% mancozeb		Apply at 1 lb per 100 lbs of cut seed.
Group M3	mancozeb	Dithane	Dip whole or cut potato tubers in 1 1/4 lbs. DITHANE DF fungicide per 50 gallons of water. Dithane has activity towards Rhizoctonia (black scurf/stem canker), Silver scurf, Fusarium dry rot, common scab and seed-piece late blight.

Seed Treatments:

FRAC Group	Fungicide Class	Trade names	Rates
Group 1 & M3	thiophanate methyl 2.5%, 6% mancozeb and 1.25 % imidacloprid	Tops-MZ-Gaucho	Apply at 0.75 to 1.0 pounds per 100 pounds of cut seed pieces.
			Tops MZ has activity towards Rhizoctonia (black scurf/stem canker), Silver scurf, Fusarium dry rot, and seed-piece late blight. Also there will be the added protection towards aphids and Colorado Potato beetle.
Group 7 & M3	1.5% flutolonil , 6% mancozeb	MonCoat MZ	Apply at 0.75 to 1.0 pounds per 100 pounds of cut seed pieces.
			It has activity towards Rhizoctonia (black scurf/stem canker), Silver scurf, Fusarium dry rot, and seed-piece late blight.

In-furrow applications:

FRAC Group	Trade names	Rates
Group 14	Blocker (PCNB) 10 G or Flowable	Apply as an in-furrow 8.5 inch band at a rate of 1.65 lbs per linear 1000 feet of row. Direct in the furrow over the seed piece and cover. Do not harvest within 45 days of application. Suppresses Rhizoctonia.
Group 4	Ridomil Gold EC	Apply at .42 fl.oz./1,000 ft as 6-8 inch band directly over seed piece in furrow
		Apply over seed pieces at planting for control of pink rot, Pythium leak, and Pythium seedling disease. Look over the plant back restrictions.
Group 7	Moncut 70DF	Apply this flutolonil fungicide at a rate of 0.71-1.1 lbs/A to control Rhizoctonia.

Supplemental Progress Report, 2009----------March 20, 2010

Pennsylvania Regional Potato Germplasm Evaluation Program, 2009

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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: Lehigh, Erie and the Russell E. Larson Agricultural Research Center at Rock Springs, Centre Co. Please see the Progress Report from December 2009 for details.

During the winter months, tests were performed to evaluate germplasm for chip, french fry processing and culinary qualities. Storage ability, sprouting, and other traits were also noted as the tests were conducted. Presented in this report are the chip processing results (tables 1-4), french fry results (tables 5-8), and the culinary quality results (table 9). 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 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 sliced. Center slices (12 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; see tables 5-8 for details.

Results

Yield results and listings of noteworthy varieties/lines were provided in the December 2009 progress report.

Chipping (Tables 1-4)
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.

There were many noteworthy lines from the short term storage chipping in December. Five lines from the Lehigh County trial (NY139, NY140, D40-330, King Harry, D40-266); three from the Erie County trial (NY138, E61-6, MSJ147-1); and four from the Rock Springs trial (D40-35, E48-2, F47-3, F47-4).

From the results of the 3 week reconditioning the noteworthy lines are: Lehigh (NY139, E61-6, D40-266); Erie (NY138, NY140, E61-6, MSJ147-1, E48-2); Rock Springs (D40-35, E48-2, F47-3, F47-4, F48-4, F57-3).

From the results of the 6 week reconditioning the noteworthy lines are: Lehigh (D40-266); Erie (NY138, NY140, E61-6, MSJ147-1, D40-35, E48-2, D40-323); Rock Springs (NY139, D40-35, E18-7, E48-2, F47-4, F57-3).

From the results of the chipping directly from 45°F the noteworthy lines are: Erie (NY138, NY140, MSJ147-1, E48-2); Rock Springs (NY139, D40-35, F47-4). There were no noteworthy lines from the Lehigh trial for the chipping directly from 45°F.

Overall the following lines have potential as excellent chip varieties: NY138, NY139, MSJ147-1, E61-6, E48-2 and D40-35.

French fry Tests (Tables 5-8)
From the Lehigh County location, AF3001-6 had the best french fry color; at Erie County, AC96052-1RU, CO94035-15RU, AF3016-2 and AF3001-6 had the best fry color and at Rock Springs, AF2596-2, AF2850-9, AF3001-6, AF3016-2, AC96052-1RU, Clearwater Russet and A01025-4 had the best color.

Tablestock Tests (Table 9)
There were several new lines tested for tablestock varieties. Many of the lines that were boiled retained their white or yellow color with no sloughing therefore, suggesting that they are better suited for this purpose than Katahdin. Of the 156 lines tested for culinary characteristics, 27 were unacceptable for color, texture or sloughing.

This research was funded in part by the Pennsylvania Potato Research Program and a Special USDA grant. Growers, industry and cooperating breeding programs contributed to this project. We would like to acknowledge Chad Moore, Bob Leiby, Andy Muza, Sara May, and other part time staff. Without their assistance to this project, we could not accomplish all the research and prepare this report.

Table 1. Chip color results of potato evaluation in Lehigh County, Forrest Wessner Farm, 2009 - 2010

Variety/ Line	Specific Gravity	Chip Color			
		Dec.[1]	Feb.[2]	Feb.[3]	Feb.[4]
Atlantic	1.086	5	6	6	7
Snowden	1.087	3	5	5	5
Superior	1.075	6	6	7	8
B1992-106	1.086	5	7	8	8
Lehigh[YF]	1.078	6	7	7	8
NY138	1.079	4	5	4	5
NY139	1.089	3	3	4	4
NY140	1.074	3	5	5	6
NY141	1.081	6	8	8	8
D40-330	1.086	3	5	6	5
E61-6	1.081	5	3	4	6
Beacon Chipper	1.075	5	8	6	7
Dakota Diamond	1.082	6	7	6	8
King Harry	1.078	3	6	7	7
MSN105-1	1.090	8	8	8	8
MSM171-A	1.065	8	10	10	10
Yukon Gem[YF]	1.071	5	7	6	7
E43-10	1.066	6	9	9	8
Yukon Gold[YF]	1.076	6	10	10	10
F11-1[YF]	1.073	6	10	8	8
NorValley	1.080	4	4	6	6
D40-50	1.070	4	5	5	6
D40-263	1.068	5	4	6	6
D40-266	1.085	3	3	3	5
D40-323	1.074	5	5	5	6

[1] Dec. = Stored at 55^0F from November 13, 2009 and chipped on December 16, 2009
[2] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F three weeks prior to chipping on February 1, 2010.
[3] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F six weeks prior to chipping on February 23, 2010.
[4] Feb. = Stored at 45^0F from November 20, 2009 and chipped on March 3, 2010.

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 Erie County, Mark Troyer Farm, 2009 - 2010

Variety/ Line	Specific Gravity	Chip Color			
		Dec.[1]	Feb.[2]	Feb.[3]	Feb.[4]
Atlantic	1.095	6	6	6	7
Snowden	1.093	4	3	5	5
B1992-106	1.089	6	5	5	6
Lehigh[YF]	1.087	5	7	6	7
NY138	1.079	3	3	3	3
NY139	1.092	4	4	5	4
NY140	1.087	4	3	3	3
NY141	1.082	6	7	6	8
E61-6	1.082	3	3	3	4
D40-266	1.082	6	6	6	5
MSJ147-1	1.090	3	3	3	3
MSK409-1	1.094	4	4	4	4
MSL268-D	1.091	6	7	6	7
NorValley	1.079	5	6	5	6
Dakota Diamond	1.083	6	6	5	7
D40-35	1.090	4	4	3	5
Yukon Gem[YF]	1.077	6	6	7	6
Yukon Gold[YF]	1.088	10	8	6	10
E43-10	1.069	8	10	8	8
F11-1[YF]	1.081	10	8	8	10
King Harry	1.081	5	6	6	6
Prince Hairy	1.079	10	9	7	10
E48-2	1.080	4	3	3	3
D40-323	1.082	7	4	3	5

[1] Dec. = Stored at 55^0F from November 13, 2009 and chipped on December 16, 2009
[2] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F three weeks prior to chipping on February 1, 2010.
[3] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F six weeks prior to chipping on February 22, 2010.
[4] Feb. = Stored at 45^0F from November 20, 2009 and chipped on March 5, 2010.

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 at Rock Springs, Centre County, 2009 - 2010

Variety/ Line	Specific Gravity	Chip Color			
		Dec.[1]	Feb.[2]	Feb.[3]	Feb.[4]
Atlantic	1.096	5	6	6	7
Beacon Chipper	1.086	6	6	6	6
Dakota Diamond	1.092	6	6	6	7
Katahdin	1.073	8	8	8	10
Kennebec	1.083	8	7	7	8
Snowden	1.091	5	5	5	6
Superior	1.082	9	8	8	9
Yukon Gold[YF]	1.086	10	8	9	10
AF2291-10	1.099	5	5	4	6
AF2376-5[YF]	1.094	7	7	7	7
AF2574-1	1.087	8	8	9	8
B1992-106	1.089	7	6	6	7
B2452-3	1.083	8	7	7	8
NY138	1.079	5	4	4	5
NY139	1.093	5	4	3	3
NY140	1.086	4	5	6	4
NY141	1.080	7	8	7	8
NYB38-40	1.077	6	6	6	7
NorValley	1.081	6	6	6	7
AF0338-17	1.091	6	7	7	6
AF2497-2	1.092	6	6	5	6
AF3318-6	1.087	6	7	7	7
AF3310-5	1.080	7	6	7	7
AF4058-1[YF]	1.080	7	6	6	7
AF4108-3	1.078	10	9	9	10
BNC182-5	1.093	6	7	7	9
King Harry	1.084	6	6	6	7
Lehigh[YF]	1.086	6	7	6	7
D40-35	1.092	3	3	3	3
D40-50	1.081	6	5	5	4
D40-263	1.073	6	5	6	5
D40-266	1.084	6	6	6	6
D40-323	1.078	6	6	5	6
D40-330	1.091	4	5	4	6
E18-7	1.091	4	4	3	6
E43-10	1.068	8	8	8	8
E48-2	1.083	3	3	3	4
E61-6	1.085	4	5	3	4
E110-11	1.086	6	6	6	6
F10-6	1.084	7	7	7	9
F11-1[YF]	1.082	8	8	9	8
F16-1	1.092	5	4	4	4
F16-4[YF]	1.098	6	5	5	6
F17-4	1.099	5	6	6	5
F17-7	1.088	7	6	6	6
F22-9	1.075	6	7	6	7
F25-7	1.076	7	6	6	7
F28-3	1.092	6	5	4	6

Table 3. continued.

Variety/ Line	Specific Gravity	Chip Color			
		Dec.[1]	Feb.[2]	Feb.[3]	Feb.[4]
F29-1	1.080	8	7	6	7
F31-3	1.076	7	6	6	7
F39-1	1.077	6	6	6	7
F43-1	1.088	7	7	7	8
F43-2	1.087	5	6	6	6
F44-2	1.080	6	7	6	6
F47-3	1.089	3	3	4	6
F47-4	1.088	3	3	3	3
F47-5	1.083	6	6	4	6
F48-4	1.077	5	3	4	5
F52-1	1.089	7	6	7	7
F55-1[YF]	1.065	8	8	8	8
F57-3	1.090	5	3	3	5
F57-4	1.075	6	6	5	6
F57-5	1.091	6	6	5	6
MSQ176-5	1.076	7	7	7	8
MSN105-1	1.090	8	8	8	9
MSM171-A	1.067	10	10	10	10
MSL228-1SPL	1.096	7	6	6	6
MSJ147-1	1.093	4	5	4	4
MSK409-1	1.093	5	4	5	6
MSL268-D	1.091	4	7	5	6
Yukon Gem[YF]	1.079	6	6	6	7
A00188-3C	1.088	6	5	5	6
A00293-2Y[YF]	1.086	7	6	6	7
A99433-5Y[YF]	1.089	6	8	7	8
AF4006-1	1.089	8	10	10	10
AF4006-3	1.089	7	8	7	8
AF4006-5	1.087	8	7	9	9
AF4015-2	1.074	7	8	8	8
AF4054-1	1.100	7	6	6	7
AF4057-2[YF]	1.086	5	5	6	6
AF4121-1[YF]	1.087	7	7	8	8
AF4121-3	1.080	10	8	8	8
AF4122-3[YF]	1.087	7	7	7	8
AF4138-7	1.076	10	9	8	10
AF4147-4	1.082	8	6	7	8
AF4147-5	1.080	7	7	7	8
B2492-7	1.064	6	6	6	6
B2628-4	1.087	6	6	7	7
B2628-10	1.091	6	6	6	7
Prince Hairy	1.081	8	7	7	8

[1] Dec. = Stored at 55^0F from November 13, 2009 and chipped on December 14 & 15, 2009
[2] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F three weeks prior to chipping on February 4 & 5, 2010.
[3] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F six weeks prior to chipping on February 24 & 25, 2010.
[4] Feb. = Stored at 45^0F from November 20, 2009 and chipped on March 9 & 10, 2010.
Chip color is based on a 1 – 10 scale with 1 = lightest, 10 = darkest, 1 – 5 = acceptable chip color.
YF = Yellow Flesh

Table 4. Chip color results of potato evaluation for NE1031 at Rock Springs, Centre County, 2009 - 2010

Variety/ Line	Specific Gravity	Chip Color			
		Dec.[1]	Feb.[2]	Feb.[3]	Feb.[4]
Atlantic	1.096	5	6	6	7
Beacon Chipper	1.086	6	6	6	6
Dakota Diamond	1.092	6	6	6	7
Katahdin	1.073	8	8	8	10
Kennebec	1.083	8	7	7	8
Snowden	1.091	5	5	5	6
Superior	1.082	9	8	8	9
Yukon Gold[YF]	1.086	10	8	9	10
AF2291-10	1.099	5	5	4	6
AF2376-5[YF]	1.094	7	7	7	7
AF2574-1	1.087	8	8	9	8
B1992-106	1.089	7	6	6	7
B2452-3	1.083	8	7	7	8
NY138	1.079	5	4	4	5
NY139	1.093	5	4	3	3
NY140	1.086	4	5	6	4
NY141	1.080	7	8	7	8
NYB38-40	1.077	6	6	6	7

[1] Dec. = Stored at 55^0F from November 13, 2009 and chipped on December 14 & 15, 2009
[2] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F three weeks prior to chipping on February 4 & 5, 2010.
[3] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F six weeks prior to chipping on February 24 & 25, 2010.
[4] Feb. = Stored at 45^0F from November 20, 2009 and chipped on March 9 & 10, 2010.

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

YF = Yellow Flesh

Table 5. Total and marketable yield, specific gravity, and French fry color for russet skinned or long white potato evaluation trial in Lehigh County, Forrest Wessner Farm, 2009 - 2010

Variety/ Line	Yield (cwt/A)[1] Total	>1 7/8"	% of Standard[2]	Percent[3] Pickouts	Specific Gravity	French Fry Color[4] Dec[5]	Feb.[6]	Mar.[7]
Atlantic	685	624	100	4	1.086			
Russet Norkotah*	362	273	44	11	1.068	0	1	1
AF3001-6*	832	597	96	22	1.082	0	0	00
AF3008-1*	315	148	24	46	1.086	0	0	1
AF2936-2*	561	329	53	27	1.068	00	0	1
AC96052-1RU*	381	316	51	8	1.066	0	0	1
CO95172-3RU*	487	291	47	30	1.079	1	1	1
CO94035-15RU*	546	458	73	12	1.067	0	1	1
Classic Russet*	613	497	80	16	1.070	1	2	1

[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] Dec. = Stored at 55^0F from November 13, 2009 and fried on December 18, 2009.
[6] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F three weeks prior to frying on February 10, 2010.
[7] Mar. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F six weeks prior to frying on March 2, 2010.

Replicated trials are the average of 4 replicates except for those lines with * which were non-replicated.

Table 6. Total and marketable yield, specific gravity, and French fry color for russet skinned or long white potato evaluation trial in Erie County, Mark Troyer Farm, 2009 - 2010

Variety/ Line	Yield (cwt/A)[1] Total	>1 7/8"	% of Standard[2]	Percent[3] Pickouts	Specific Gravity	French Fry Color[4] Dec[5]	Feb.[6]	Mar.[7]
Atlantic	404	290	100	22	1.095			
Russet Norkotah *	232	166	57	22	1.071	2	2	1
Classic Russet*	422	228	79	41	1.085	1	1	1
AC96052-1RU*	359	274	94	9	1.079	00	00	00
CO95172-3RU*	376	166	57	43	1.084	1	0	0
CO94035-15RU*	394	279	96	19	1.080	0	0	0
AF3012-4*	374	174	60	41	1.087	1	1	1
AF4002-1*	417	80	28	77	1.086	1	1	1
AF4002-2*	518	282	97	42	1.092	2	2	1
AF3016-2*	357	324	112	4	1.080	00	00	00
AF3001-6*	708	481	166	29	1.087	00	00	00
AF3008-1*	350	247	85	16	1.099	1	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] Dec. = Stored at 55^0F from November 13, 2009 and fried on December 18, 2009.
[6] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F three weeks prior to frying on February 12, 2010.
[7] Mar. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F six weeks prior to frying on March 2, 2010.

Replicated trials are the average of 4 replicates except for those lines with * which were non-replicated.

Table 7. Total and marketable yield, specific gravity, vine maturity, and French fry color for russet skinned or long white potato evaluation trial in Rock Springs Plant Pathology farm, 2009 - 2010

Variety/ Line	Yield (cwt/A)[1] Total	>1 7/8"	% of Standard[2]	Percent[3] Pickouts	Specific Gravity	Vine Maturity	French Fry Color[4] Dec[5]	Feb.[6]	Mar.[7]
Blazer Russet (A8893-1)	522	417	83	17	1.084	ML	1	1	1
Rio Grande Russet[8]	661	486	96	20	1.092	ML	1	1	1
Russet Burbank (Idaho clone)	621	373	74	36	1.089	ML	0	1	1
Russet Norkotah #3117	554	505	100	4	1.079	ML	2	2	2
AF2596-2	525	420	83	16	1.083	ML	0	0	0
AF2850-9	475	397	79	0	1.101	ML	0	0	0
AF2936-2	396	299	59	6	1.068	ME	2	2	1
AF3000-1	381	330	65	7	1.090	ME	1	2	1
AF3001-6	616	553	110	7	1.089	ML	0	00	0
AF3008-1[8]	418	248	49	34	1.105	M	1	1	0
AF3012-4	497	383	76	14	1.092	ML	1	1	1
AF3016-2	463	295	58	26	1.083	M	0	0	00
AF3317-15	509	423	84	12	1.097	L	2	1	1
AF3325-2	302	230	46	17	1.073	E	0	1	1
AF3327-28	542	459	91	10	1.082	M	1	2	2
AF3362-1	500	434	86	10	1.087	M	1	1	1
AF4004-1	365	317	63	7	1.082	M	2	2	3
AF4096-1[8]	410	257	51	31	1.081	M	1	1	1
AF4096-2	433	277	55	27	1.073	ML	1	1	1
AC96052-1RU	374	303	60	10	1.082	ML	00	0	00
CO95172-3RU	588	496	98	7	1.091	ML	1	1	0
CO94035-15RU	453	357	71	12	1.085	ML	1	1	1
Classic Russet[8]	400	286	57	33	1.078	ML	1	1	1
Clearwater Russet	455	391	77	6	1.089	ML	0	0	0
A02062-1	475	431	85	6	1.082	ML	00	1	0
A01025-4	453	318	63	24	1.087	ML	0	0	00
Russet Norkotah	352	286	57	15	1.071	ME	2	2	2
AF4002-1*	430	148	29	50	1.098	ML	1	1	2
AF4002-2*	504	182	36	57	1.100	ML	1	1	1
AF4026-3*	340	281	56	10	1.076	ME	0	1	0
AF4040-2*	568	397	79	27	1.089	ME	1	1	1
AF4116-9*	390	315	62	15	1.076	ME	1	1	1
AF4141-1*	544	418	83	9	1.105	VL	1	0	0
AF4144-1*	455	360	71	4	1.094	ML	0	1	1

[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 #3117 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] Dec. = Stored at 55^0F from November 13, 2009 and fried on December 17, 2009.
[6] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F three weeks prior to frying on February 9, 2010.
[7] Mar. = Stored at 45^0F from November 20, 2007 than transferred to 55^0F six weeks prior to frying on March 1, 2010.
[8]Variety with high percentage of pickouts due to the number of misshapen tubers caused by Rhizoctonia

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

Table 8. Total and marketable yield, specific gravity, vine maturity, and French fry color for russet skinned or long white potato NE1031 evaluation trial in Rock Springs Plant Pathology farm, 2009 - 2010

Variety/ Line	Yield (cwt/A)[1] Total	>1 7/8"	% of Standard[2]	Percent[3] Pickouts	Specific Gravity	Vine Maturity	French Fry Color[4] Dec[5]	Feb.[6]	Mar.[7]
Atlantic	571	542	100	3					
Blazer Russet (A8893-1)	515	411	76	16	1.084	ML	1	1	1
Rio Grande Russet[8]	582	371	68	38	1.092	ML	1	1	1
Russet Burbank (Idaho clone)[8]	582	279	52	52	1.089	ML	0	1	1
Russet Norkotah #3117	561	516	95	4	1.079	ML	2	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, 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] Dec. = Stored at 55^0F from November 13, 2009 and fried on December 17, 2009.
[6] Feb. = Stored at 45^0F from November 20, 2009 than transferred to 55^0F three weeks prior to frying on February 9, 2010.
[7] Mar. = Stored at 45^0F from November 20, 2007 than transferred to 55^0F six weeks prior to frying on March 1, 2010.
[8]Variety with high percentage of pickouts due to the number of misshapen tubers caused by Rhizoctonia

Replicated trials are the average of 4 replicates.

Table 9. Baking, boiling, microwaving results of tablestock test for Germplasm evaluation trial in Rock Springs, Plant Pathology Farm, 2009 - 2010

Variety/	Boil[1]			Bake[2]		Microwave[3]	
Line	Color[4]	Texture[5]	Sloughing[6]	Color	Texture	Color	Texture
Atlantic	1	3		1	2	1	2
Beacon Chipper	1	3		1	1	1	1
Dakota Diamond	1	2		1	2	1	1
Katahdin	1	3		1	3	1	2
Kennebec	1	3		1	3	1	2
Snowden	1	3		1	2	1	3
Superior	1	3		1	2	1	3
Yukon Gold[YF]	3	2		3	1	3	3
AF2291-10	1	2		1	2	1	3
AF2376-5[YF]	3	2		3	2	3	2
AF2574-1	1	3		1	3	1	3
B1992-106	1	3		1	2	1	2
B2452-3	1	3		1	3	1	1
NY138	1	3		1	3	1	3
NY139	1	3		1	3	1	2
NY140	1	3		1	2	1	1
NY141	2	3		1	3	1	2
NYB38-40	2	3		1	3	1	3
NorValley	1	2		1	2	1	3
AF0338-17	1	2		1	2	1	2
AF2497-2	1	2		1	3	1	3
AF3318-6	1	2		1	2	1	3
AF3310-5	1	3		1	2	1	1
AF4058-1[YF]	3	3		3	1	3	2
AF4108-3	1	3		1	1	1	2
BNC182-5	1	3		1	2	1	2
King Harry	2	3		1	3	1	2
Lehigh[YF]	3	3		3	2	3	2
D40-35	1	2		1	2	1	1
D40-50	1	3		1	3	1	3
D40-263	1	3		1	3	1	3
D40-266	1	2		1	3	1	3
D40-323	1	3		1	2	1	2
D40-330	1	3		1	3	1	3
E18-7	2	2		1	3	1	2
E43-10	1	3		1	3	1	3
E48-2	1	3		1	3	1	2
E61-6	1	3		1	3	1	3
E110-11	1	3		1	3	1	3
F7-1[YF]	3	4		3	3	3	3
F10-6	1	3		1	3	1	2
F11-1[YF]	3	1		3	2	3	1
F16-1	1	2	1	1	2	1	2
F16-4[YF]	3	1	1	3	1	3	2
F17-4	1	2		1	2	1	2
F17-7	1	2		1	2	1	3
F22-9	2	3		1	3	1	2
F25-7	1	3		1	3	1	3
F28-3	2	4	1	1	3	1	1
F29-1	1	3		1	2	1	2

Table 9. Continued.

Variety/ Line	Boil[1] Color[4]	Texture[5]	Sloughing[6]	Bake[2] Color	Texture	Microwave[3] Color	Texture
F31-3	1	3		1	2	1	2
F39-1	1	3		1	2	1	3
F43-1	1	3		1	3	1	3
F43-2	2	3		1	3	1	3
F44-2	1	3		1	3	1	1
F47-3	1	2		1	2	1	2
F47-4	1	3		1	2	1	1
F47-5	1	3		1	3	1	2
F48-4	1	2		1	2	1	3
F52-1	1	3	1	1	1	1	1
F55-1[YF]	3	3		3	3	3	2
F57-3	1	2	1	1	1	2	1
F57-4	1	3		1	3	1	2
F57-5	1	3		1	1	1	3
MSQ176-5	1	3		1	2	1	3
MSN105-1	1	2	1	1	1	1	2
MSM171-A	1	4		1	4	1	4
MSL228-1SPL	1	3		1	3	1	3
MSJ147-1	1	2		1	1	1	3
MSK409-1	1	2		1	2	1	2
MSL268-D	1	2		1	1	1	1
Yukon Gem[YF]	3	3		3	2	3	2
A00188-3C	1	2		1	2	1	3
A00293-2Y[YF]	3	3	1	3	2	3	2
A99433-5Y[YF]	3	2		3	2	3	2
AF4006-1	2	3		1	2	1	3
AF4006-3	1	3		1	2	1	2
AF4006-5	1	2	1	1	2	1	1
AF4015-2	1	4		1	3	1	2
AF4054-1	1	2		1	3	1	2
AF4057-2[YF]	3	2		3	2	3	2
AF4121-1[YF]	3	2	1	3	1	3	1
AF4121-3	1	2		1	1	1	2
AF4122-3[YF]	3	2		3	2	3	1
AF4138-7	1	3		1	2	1	3
AF4147-4	1	3		1	2	1	2
AF4147-5	1	3		1	2	1	3
B2492-7	1	4		1	3	1	3
B2628-4	1	3		1	2	1	2
B2628-10	1	3		1	1	1	1
Prince Hairy	1	3		1	2	1	2
Reds							
Chieftain	1	3		1	3	1	3
Dakota Jewell	1	3		1	3	1	3
Dk Rd Norland	1	3		1	3	1	3
AF2393-7[YF]	3	2		3	3	3	2
B2152-17[YF]	3	3		3	3	3	3
BCO01306-2[Pur]	Pk	2		Pk	3	Pk	4
BCO01357-4[Rd]	Pk	3		Pk	2	Pk	2
B1816-5[YF]	3	3		3	3	3	3

Table 9. Continued.

Variety/ Line	Boil[1] Color[4]	Texture[5]	Sloughing[6]	Bake[2] Color	Texture	Microwave[3] Color	Texture
NY129	1	3		1	3	1	3
B13-1	1	3		1	3	1	3
F36-3	1	3		1	3	1	3
Rio Colorado	1	3		1	2	1	2
CO97232-1R/Y^{YF}	3	3		3	3	3	2
CO97227-2P/PW^{Pur}	P	2		P	2	P	2
CO97222-1R/RRd	Pk	3		Pk	4	Pk	4
CO97232-2R/Y^{YF}	3	4		3	3	3	4
AC97521-1R/Y^{YF}	3	3		3	2	3	2
CO97226-2R/RRd	Pk	3		Pk	3	Pk	4
MSN215-2P	1	3		1	3	1	3
NDA7985-1R	1	3		1	3	1	3
A99331-2RY^{YF}	3	3		3	2	3	2
A02267-5PY^{YF}	3	3		3	3	3	3
BCO01044-2	P	1		P	1	P	1
BD659-11^{YF}	3	2		-	-	-	-
BD664-13^{YF}	3	1		-	-	-	-
B2676-2	1	2		1	2	1	1
BNC193-1	1	3		1	3	1	2
Blue Mac	1	1		1	2	1	2
Adirondack RedRd	Pk	3		Pk	3	Pk	3
Adrirondack Blue^{Pur}	P	3		P	3	P	3
Purple Majesty^{Pur}	P	3		P	3	P	3
Russets							
Blazer Russet (A8893-1)	1	3		1	3	1	3
Rio Grande Russet	1	2	1	1	2	1	2
Russet Burbank (Idaho Clone)	1	2		1	2	1	2
Russet Norkotah #3117	2	3		1	2	1	2
AF2596-2	1	3	1	1	2	1	2
AF2850-9	1	3	1	1	1	1	2
AF2936-2	1	3		1	3	1	3
AF3000-1	2	3		1	3	1	2
AF3001-6	1	3		1	3	1	3
AF3008-1	1	3	1	1	3	1	2
AF3012-4	2	3	1	1	3	1	3
AF3016-2	2	2		1	2	1	3
AF3317-15	1	3		1	2	1	1
AF3325-2	1	3		1	2	1	3
AF3327-28	2	3	1	1	1	1	2
AF3362-1	2	3		1	1	1	3
AF4004-1	2	3		1	2	1	2
AF4096-1	1	3	1	1	2	1	1
AF4096-2	1	2		1	2	1	2
AC96052-1RU	1	2		1	1	1	2
CO95172-3RU	1	3	1	1	2	1	1
CO94035-15RU	1	1	1	1	2	1	2
Classic Russet	1	3		1	3	1	2
Clearwater Russet	1	2		1	2	1	2
A02062-1	1	3		1	2	1	2
A01025-4	1	3		1	1	1	1
Russet Norkotah	2	3		2	2	2	2

Table 9. Continued.

Variety/ Line	Boil[1] Color[4]	Texture[5]	Sloughing[6]	Bake[2] Color	Texture	Microwave[3] Color	Texture
AF4002-1	1	3		1	3	1	2
AF4002-2	2	3		1	2	1	2
AF4026-3	1	3		1	3	1	2
AF4040-2	1	2		1	2	1	1
AF4116-9	2	4		1	2	1	2
AF4141-1	1	3		1	1	2	1
AF4144-1	1	3		1	2	1	2

Tested: January 25 thru 28, 2010. February 15 thru 18, 2010.
[1] Boil 20 minutes.
[2] Bake 45 min. – 1 hr.
[3] Microwave 4 – 8 minutes.
[4] Color scored as follows: 1=white, 2=slightly yellow, 3=yellow, 4=white with gray edges, 5=gray with dark edges.
5 Texture scored as follows: 1=dry (mealy, 3= medium, 5=soggy.
6 Sloughing scored as follows: 1=some sloughing, 2= severe sloughing.

YF = Yellow Flesh
Pur = Purple Flesh
Pk = Pink Flesh
Rd = Red Flesh

Yellow Flesh Notes

We rated the yellow flesh in December.
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

	YF1	YF2	YF3
Rock Springs:	AF2376-5	Yukon Gold	AC97521-1R/Y (red)
	F55-1	AF2393-7	
		AF4058-1	
		AF4057-2	
		AF4121-1	
		Lehigh	
		F7-1	
		F11-1	
		F16-4	
		B1816-2(purple)	
		B2152-17(red)	
		CO97232-1R/Y (red)	
		CO97232-2R/Y (red)	
		Yukon Gem	
		A00286-3Y	
		A02267-5PY (purple)	
		A99331-2RY (red)	
		A99433-5Y	