

Michigan Regional Location

Local Coordinators:

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Cooperating Grower:

Tim & Todd Young
Sandyland Farms LLC
Howard City, MI

Cooperating Chip Processor:

Herr Foods, Inc.
Nottingham, PA

Trial Information:

Planting Date:	June 1, 2011
Vine Kill Date:	September 15, 2011
Harvest Date:	October 12, 2011 (133 Days)
Between Row & In Row	
Plant Spacing:	34" x 10"; irrigated
Plots:	Single rows for each entry, approximately 300' long
GDD, Base 40	3036

Trial Procedure:

Seed was mechanically cut on May 1, 2011, and delivered to the grower's seed storage three days later. No seed treatments were applied at the time of seed cutting.

One pre-harvest sugar profile was taken for each variety two weeks prior to vine kill on August 31st. The pre-harvest sugar profile protocol was as follows: obtained a minimum of 40 tubers from each variety, took all the tubers from each hill, even if that required collecting more than 40 tubers. A canopy rating was taken for each variety as a percent rating of green foliage. Canopy uniformity was noted as a percentage of how uniform the foliage health appeared. The number of hills required to obtain 40 tubers was recorded, along with the total number of stems harvested. From the tubers harvested, specific gravity, a glucose value (a percent by fresh weight), a sucrose rating (a percent by fresh weight X10) and an average tuber weight (in ounces) was established.

At harvest, three plot areas of 23 feet were harvested from each entry and were used to determine yield, size distribution, specific gravity and internal defects. Two, 40 lb. storage samples were collected from each entry and were placed in the grower's commercial storage for evaluation at a later date. One set of samples will be evaluated in the winter of 2011 and the other in the spring of 2012. Eighteen, 40 tuber samples were also collected for each variety at harvest. All eighteen samples were stored at the Michigan Potato Industry Commission's Cargill Demonstration Storage Facility at approximately 48°F or 55°F for a monthly sugar profile evaluation at Techmark, Inc. Nine, 40 tuber samples were stored at each temperature for

evaluation October 2011 through June 2012. The storage sugar profiles began the day of harvest. Two out-of-the-field chip samples were taken for each variety at harvest. One was sent to Herr Foods, Inc. for processing and the additional sample was processed at Michigan State University.

A plant growth and vine vigor observation was made on June 27th. MSJ126-9Y and ND8305-1 appeared to have the slowest rate of vine growth, whereas, CO00188-4W was the most vigorous at this date. A vine maturity rating was taken for each variety on September 2, 2011, approximately two weeks prior to vine kill. W2978-1 was the most mature variety and NYE106-4 appeared to be the most immature at this date.

Growing Season Weather:

Weather conditions during the 2011 growing season were warmer than average. Growing degree days base 40 recorded for this time period was the second highest in six years at 3036. Total rainfall from June 1st through September 15th was approximately 7.39". The daytime temperatures during this growing period exceeded 90°F four days. The nighttime temperatures during this period, June through mid-September, were the second highest in six years. The tuber yield and specific gravity, for potato production in Michigan, was below average as a result of the increased nighttime heat stress.

Results:

Table 1 summarizes the yield, size distribution, and specific gravity data at harvest. NY140 topped the yield table in 2011, followed by a group of lines that yielded above average. These lines were: Atlantic, W2310-3 (Tundra), NYE106-4, Snowden, W5015-12 and MSL292-A. NY140 and Atlantic had the largest percentage of recorded oversize tubers. CO00188-4W, W2978-3, MSJ126-9Y and CO00197-3W had very low specific gravities.

Table 1. Yield ,Size Distribution*, Specific Gravity								
Entry	Yield (cwt/A)		Percent Size Distribution					Specific Gravity
	US#1	TOTAL	US#1	Small	Mid-Size	Large	Culls	
NY140	491	571	90	9	84	6	1	1.079
Atlantic	415	483	89	8	81	8	3	1.087
W2310-3	357	411	90	8	85	5	2	1.083
NYE106-4	345	434	79	21	76	3	0	1.087
Snowden	342	418	82	18	78	4	0	1.075
W5015-12	318	444	72	28	70	2	0	1.085
MSL292-A	291	340	86	14	81	5	0	1.074
CO00188-4W	252	367	69	31	69	0	0	1.068
W4980-1	242	342	71	28	66	5	1	1.073
ND7519-1	240	316	77	22	75	2	1	1.078
W2978-3	216	361	60	40	60	0	0	1.065
ND8331C5-2	212	351	60	37	60	0	3	1.081
MSJ126-9Y	205	265	78	20	75	3	2	1.068
MSR061-1	202	298	69	30	67	2	1	1.078
ND8305-1	177	277	64	34	64	0	2	1.085
CO00197-3W	157	271	58	38	58	0	4	1.071
MEAN	279	372	75	24	72	3	1.3	1.077

*small <1 7/8"; mid-size 1 7/8"-3 1/4"; large >3 1/4"

Table 2 summarizes the at-harvest tuber quality. Internal quality across the trial was generally acceptable. Hollow heart was prevalent in Atlantic and to a lesser degree in MSL292-A, ND8305-1 and W5015-12. ND7519-1 displayed three internal brown spots and Snowden and NY140 each recorded 5 vascular discoloration.

Table 2. At-Harvest Tuber Quality. Sandyland Farms, Howard City, Michigan.					
Entry	Internal Defects¹				Total Cut
	HH	VD	IBS	BC	
NY140	1	5	0	0	30
Atlantic	12	1	0	1	30
W2310-3	0	0	1	0	30
NYE106-4	0	1	0	0	30
Snowden	2	5	1	0	30
W5015-12	3	1	0	0	30
MSL292-A	5	0	0	0	30
CO00188-4W	0	1	0	0	30
W4980-1	0	0	1	0	30
ND7519-1	0	2	3	1	30
W2978-3	0	0	0	0	30
ND8331C5-2	0	0	0	0	30
MSJ126-9Y	1	1	0	0	30
MSR061-1	0	1	1	0	30
ND8305-1	3	0	0	0	30
CO00197-3W	1	0	0	0	30
¹ Internal Defects. HH = hollow heart, VD = vascular discoloration, IBS = internal brown spot, BC = brown center.					

Table 3 shows the post-harvest chip quality based on samples collected at harvest on October 12th and processed at Herr Foods, Inc. on October 17th. Chip color was generally acceptable across the trial, with MSL292-A having the highest Agtron score of the trial at 69.4. This is the second consecutive year that MSL292-A has displayed the highest Agtron score. The varieties listed in ranked order based on quality observations from Herr Foods, Inc. are as follows: ND8331C5-2, ND7519-1, MSL292-A, Snowden, W4980-1, NYE106-4, MSJ126-9Y, W2310-3 (Tundra), ND8305-1, MSR061-1, CO00188-4W, NY140, W5015-12, CO00197-3W and W2978-3.

Table 3. 2011 Post-Harvest Chip Quality¹.

Entry	Agtron Color	SFA ² Color	Specific Gravity	Percent Chip Defects ³		
				Internal	External	Total
NY140	55.1	3	1.078	29.3	3.5	32.8
Atlantic	N/A	N/A	N/A	N/A	N/A	N/A
W2310-3	60.5	3	1.072	19.2	6.9	26.1
NYE106-4	57.9	3	1.080	23.1	4.7	27.8
Snowden	62.2	2	1.071	5.4	8.0	13.4
W5015-12	57.3	3	1.074	9.7	22.3	32.0
MSL292-A	69.4	2	1.071	2.7	3.4	6.1
CO00188-4W	59.2	3	1.075	5.5	16.3	21.8
W4980-1	61.1	3	1.076	5.6	16.1	21.7
ND7519-1	58.4	3	1.074	12.2	7.9	20.1
W2978-3	58.7	4	1.064	29.2	7.5	36.7
ND8331C5-2	60.2	2	1.076	3.7	5.9	9.6
MSJ126-9Y	55.2	2	1.067	23.2	3.3	26.5
MSR061-1	57.0	2	1.073	8.9	7.4	16.3
ND8305-1	54.3	2	1.083	2.0	18.9	20.9
CO00197-3W	56.1	3	1.069	22.4	11.8	34.2

¹ Samples collected at harvest October 12th and processed by Herr Foods, Inc., Nottingham, PA on October 17, 2011(5 days).

Chip defects are included in Agtron and SFA samples.

² SFA Color: 1= lightest, 5 = darkest

³ Percent Chip Defects are a percentage by weight of the total sample; comprised of undesirable color, greening, internal defects and external defects.

N/A = Not Available

Table 4 summarizes the results of the samples collected for black spot bruise. Two, 25 tuber samples were collected at harvest. One sample served as a check and the second sample was stored for at least 12 hours at 50°F, then placed in a 6 sided plywood drum and rotated 10 times to produce a simulated bruise. Two to three weeks later, all samples were abrasively peeled and scored for the presence of black spot bruise. Among the “Simulated Bruise” samples, the best entries were CO00188-4W, W2978-3, MSJ126-9Y, MSR061-1 and CO00197-3W. NYE106-4, ND8305-1, W5015-12 and W2310-3 (Tundra) showed the lowest percent bruise free.

Entry	A. Check Samples ¹						B. Simulated Bruise Samples ²					
	# of Bruises Per Tuber					Total Tubers	# of Bruises Per Tuber					Total Tubers
	0	1	2	3	4		0	1	2	3	4	
NY140	17	7	1			25	68					0.4
Atlantic	9	12	4			25	36					0.8
W2310-3	11	9	4	1		25	44					0.8
NYE106-4	12	12	1			25	48					0.6
Snowden	17	8				25	65					0.3
W5015-12	15	9	1			25	60					0.4
MSL292-A	19	6				25	76					0.2
CO00188-4W	20	5				25	80					0.2
W4980-1	16	8	1			25	64					0.4
ND7519-1	13	12				25	52					0.5
W2978-3	23	2				25	92					0.1
ND8331C5-2	20	5				25	80					0.2
MSJ126-9Y	24	1				25	96					0.0
MSR061-1	13	7				20	65					0.4
ND8305-1	15	10				25	60					0.4
CO00197-3W	20	6				26	77					0.2

¹Tuber samples collected at harvest and held at room temperature for later abrasive peeling and scoring.

²Tuber samples collected at harvest, held at 50°F for at least 12 hours, then placed in a 6 sided plywood drum and rotated 10 times to produce simulated bruising. They were then held at room temperature for later abrasive peeling and scoring.

Table 5 summarizes the results of the pre-harvest panel data. All varieties appeared to have stable sugar levels prior to harvest with the exception of CO00197-3W and possibly ND7519-1. The chip quality of CO00197-3W ranked poorly at Herr Foods on Oct. 17th which may have been the result of the sugar immaturity observed on August 31st. CO00188-4W and W4980-1 were the earliest maturing varieties based on the canopy rating. NY140 and Atlantic had the largest average tuber weight at this date.

Table 5. Pre-Harvest Panels, 8/31/11

Entry	Specific Glucose ¹		Sucrose ²	Canopy		Number of		Average ⁵
	Gravity	%	Rating	Rating ³	Uniform. ⁴	Hills	Stems	Tuber Weight
NY140	1.078	0.001	0.314	80	85	3	11	4.56
Atlantic	1.084	0.002	0.630	80	85	4	18	4.54
W2310-3	1.078	0.005	0.370	65	70	4	13	4.43
NYE106-4	1.074	0.002	0.376	85	80	3	15	2.43
Snowden	1.074	0.001	0.656	65	80	4	19	3.29
W5015-12	1.081	0.002	0.445	80	70	2	11	2.81
MSL292-A	1.070	0.001	0.576	40	75	3	11	3.76
CO00188-4W	1.062	0.002	0.378	5	95	3	16	2.55
W4980-1	1.066	0.001	0.366	15	45	3	13	2.44
ND7519-1	1.073	0.002	0.987	30	75	3	16	3.18
W2978-3	1.067	0.006	0.796	45	80	2	12	2.12
ND8331C5-2	1.082	0.002	0.808	50	75	3	13	2.52
MSJ126-9Y	1.069	0.001	0.798	50	85	3	17	3.30
MSR061-1	1.081	0.001	0.348	75	80	3	14	2.97
ND8305-1	1.083	0.002	0.430	50	60	3	19	3.14
CO00197-3W	1.072	0.006	1.200	70	75	3	12	2.43

¹Percent Glucose is the percent of glucose by weight in a given amount of fresh tuber tissue.

²Sucrose Rating is the percent of sucrose by weight in a given amount of fresh tuber tissue X10.

³The Canopy Rating is a percent rating of green foliage (0 is all brown dead foliage, 100 is green vigorous foliage).

⁴The Canopy Uniformity is a percentage of how uniform the foliage health is at the date of observation.

⁵The Average Tuber Weight is the total tuber weight collected divided by the number of tubers reported in ounces.

Variety Comments:

NY140: This was the top yielding variety in the 2011 variety trial with a 491 cwt./A US#1 yield and an above average specific gravity at 1.079. The variety had the second largest number of oversize tubers in the trial at 6 percent. Internal raw tuber defects were moderate. NY140 performed in the bottom group at Herr Foods on October 17th, 2011, and recorded the highest percent of internal chip defects of any variety, totaling 29.3 percent. NY140 exhibited a moderate level of black spot bruise tolerance. It appears to be a full season variety.

Atlantic: This was the second highest yielding variety, exhibiting a 415 cwt./A US#1 yield and the highest specific gravity in the trial at 1.087. This variety had eight percent oversize tubers, but 40 percent of them were hollow. Atlantic showed the second highest black spot bruise susceptibility. The vines appeared to hold-on this growing season for an extended period of time.

W2310-3 (Tundra): The US#1 yield for W2310-3 was above the trial average at 357 cwt./A. The specific gravity was good at 1.083. Internal tuber defects were low. The chip quality at Herr's was average, ranking eight of 15 varieties in out-of-the-field chip performance. Black spot bruise tolerance was moderate with an average of 0.8 bruises per tuber recorded.

NYE106-4: The variety was among the top yielders in the 2011 trial with a 345 cwt./A US#1 yield. This variety was tied with Atlantic for the highest specific gravity in the trial at 1.087. Raw internal tuber quality was excellent. This variety exhibits some common scab tolerance under moderate disease pressure. Chip quality ranking at Herr Foods on October 17th was good. This variety exhibited the most black spot bruise susceptibility of the trial in 2011 with 1.5 bruises per tuber being recorded. On August 31st, this variety appeared to have good vine vigor with a low sugar profile.

Snowden: Snowden was the fifth highest yielding variety in the 2011 variety trial with a 342 cwt./A US#1 yield and a below average specific gravity of 1.075. Internal raw tuber quality was moderate at harvest with 6 percent hollow heart and 16 percent vascular discoloration observed. This variety was above average in chip performance at Herr Foods out-of-the-field fry test. Snowden had a lower than average susceptibility to black spot bruise in the trial.

W5015-12: This variety had an average yield of 318 cwt./A US#1 with a specific gravity of 1.085. Internal tuber defects were moderate at harvest with 10 percent hollow heart present. Common scab susceptibility could be an issue for this variety. W5015-12 ranked 13th of 15 varieties at Herr's for chip quality out-of-the-field. The variety exhibited an above average susceptibility to black spot bruise, with one black spot bruise being recorded for each tuber observed. This variety appeared to be maturing normally in the August 31st pre-harvest panel.

MSL292-A: MSL292-A was above average in yield at 291 cwt./A US#1 with 5 percent oversize recorded. The specific gravity for this variety was slightly below the trial average of 1.074. This variety exhibited 17 percent hollow heart at harvest. MSL292-A is common scab susceptible. This variety ranked highest at Herr's out-of-the-field chip evaluation for Agron color at 69.4 and the lowest for total percent chip defects at 6.1. MSL292-A was moderately resistant to black spot bruise and ranked near the trial average. This variety appeared to be mature based on the

pre-harvest panel data from August 31st where the sucrose rating was 0.576, the glucose level was 0.001 and the canopy rating was 40 percent.

CO00188-4W: This variety was below the trial average with a 252 cwt./A US#1 yield. The specific gravity was also below average at 1.068. Raw internal tuber quality was good. Chip quality at Herr Foods was below average, ranking 11 of 15 for overall appearance. CO00188-4W ranked as one of the best varieties for black spot bruise tolerance. This variety exhibits an early vine maturity, experiencing some significant early die symptoms and scoring a 5 percent canopy rating on the August 31st pre-harvest panel.

W4980-1: W4980-1 yielded 242 cwt./A US#1 with a specific gravity of 1.073. The variety had one internal brown spot in thirty cut tubers. Herr's ranked this variety 5th in the overall chip quality with the third highest Agtron score at 61.1. The line appears to have an average tolerance to black spot bruise and was very mature at the time of vine kill.

ND7519-1: ND7519-1 yielded below the trial average at 240 cwt./A US#1. Specific gravity was just above the trial average at 1.078. The variety had two tubers with vascular discoloration, three with internal brown spots and one with brown center in thirty cut tubers. Herr's ranked this variety 2 of 15 in chip performance out-of-the-field. ND7519-1 appeared to be one of the least susceptible lines to black spot bruising. The plant canopy of this variety was mature on August 31st but the sucrose level appeared to be high at 0.987.

W2978-3: The yield on W2978-3 was below average at 216 cwt./A US#1. The specific gravity was the lowest in the 2010 and 2011 trials at 1.065. Raw internal tuber defects were very low with no defects being recorded. The ranking at Herr's was the lowest in the 2011 trial for out-of-the-field chip performance. Recorded total percent chip defects for W2978-3 was the highest in the trial at 36.7 percent. Black spot bruise tolerance was very good but somewhat expected with such a low specific gravity. This variety showed a higher than average glucose value on August 31st of 0.006. Vine maturity was average.

ND8331C5-2: This variety had a below average yield of US#1 tubers at 212 cwt./A and a tuber size distribution that consisted of 60 percent A-size and 37 percent undersize tubers. The specific gravity was above the trial average at 1.081. Raw internal tuber defects were very low with no defects being recorded. The at-harvest chip fry test ranked this variety 1st out of the 15 varieties for overall appearance. This variety was slightly above average for black spot bruise tolerance in the 2011 trial. Vine maturity appears to be mid to late season.

MSJ126-9Y: This variety recorded the fourth lowest yield in this year's trial. MSJ126-9Y was tied for the second to lowest specific gravity in the trial, which was 1.068. Internal tuber quality was generally good with only one hollow heart reported in thirty cut. This clone ranked 7th at Herr's for chip quality and appearance. The bruise free rating was 80 percent which ranked MSJ126-9Y as the second highest in black spot bruise tolerance. MSJ126-9Y appears to have a mid-season vine maturity.

MSR061-1: The yield on MSR061-1 was below average at 202 cwt./A US#1 with 30 percent B-size potatoes. The specific gravity was slightly above the trial average at 1.078. Internal tuber quality was good with few defects reported. This variety ranked slightly below average for chip quality at Herr Foods in spite of the fact that it was one of the varieties with the fewest recorded total chip defects. MSR061-1 scored very well in tolerance to black spot bruise with an average of 0.3 bruises pre tuber reported. This variety appeared to have a mid to late season maturity.

ND8305-1: This variety had a 177 cwt./A US#1 yield with an above average specific gravity of 1.085. Three hollow heart were observed in thirty cut oversize tubers at harvest. Herr's ranked this variety 9th for overall chip quality. Only 20 percent of the ND8305-1 tubers were bruise free, ranking it as one of the most bruise susceptible lines in the 2011 trial. The vine maturity appeared to be mid to late season.

CO00197-3W: This variety was the lowest yielding line in the 2011 trial. The US#1 yield was 157 cwt./A with a below average specific gravity. Only one hollow heart in thirty cut tubers were observed. CO00197-3W ranked 14th of 15 lines tested at Herr Foods for overall chip quality and appearance on October 17th. The variety appeared to be tolerant to black spot bruise. The line had the highest sucrose and glucose values in the trial at the time of vine kill indicating a lack of chemical maturity before harvest. This variety may have needed a longer growing season to reach maturity.