

Michigan Regional Location

Local Coordinators:

Chris Long
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Michigan State University
East Lansing, MI

Cooperating Grower:

Tim & Todd Young
Sandyland Farms LLC
Howard City, MI

Cooperating Chip Processor:

Herr Foods, Inc.
Nottingham, PA

Trial Data:

Planting Date:	May 14, 2007
Vine Kill Date:	September 5, 2007
Harvest Date:	October 4, 2007 (143 DAP)
Row & Plant Spacing:	34" x 11.5"; irrigated
Plots:	Single rows for each entry approximately 300' long
DD, Base 40	3161

Trial Procedure:

Seed was mechanically cut on April 23, 2007 and delivered to the grower's storage the following day. No seed treatments were applied at the time of seed cutting. A91814-5 was dropped from the trial this season due to reported high levels of virus infection.

Pre-harvest sugar profiles were taken for each variety approximately three weeks (August 9th) and one week (August 21st) prior to vine kill. The protocol is to obtain a minimum of 40 tubers from each variety, taking all the tubers from each hill even if that requires collecting more than 40 tubers. A canopy rating was taken for each variety as a percent rating of green foliage and 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) were established.

At harvest, three plot areas of 23 feet were harvested from each entry and were used to determine yields, 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. One set of samples will be evaluated in the winter of 2007 and the other in the spring of 2008. Twenty-five tuber samples were also collected at harvest and stored at the Michigan Potato Industry Commission's Cargill Demonstration Storage Facility at approximately 48°F and 55°F for a monthly sugar profile evaluation at Techmark Inc. 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 vigor observation was made on June 14th. Atlantic and W2324-1 appeared to be the most vigorous vine types. The CO95051-7W and MSJ147-1 appeared to have the slowest rate of vine growth on this date.

Growing Season Weather:

Weather conditions during the 2007 growing season were dryer and warmer than average. July was the wettest month, receiving 2.4" of rainfall. Total rainfall from May 14th through October 4th, was 7.9". There was one day in June, four in July, one in August and one in September where daytime temperatures exceeded 90°F. The most daytime heat stress occurred during the last days of July and the first few days of August. Nighttime temperatures during the period May through October were higher for a longer period of time than during the same period in 2006. The average specific gravity in Michigan was below average as a result of the nighttime heat stress.

Results:

Table 1 summarizes the yield, size distribution, and specific gravity data at harvest. Beacon Chipper and W2324-1 appear to be very strong yielding varieties. CO96141-4W falls far below acceptable levels for specific gravity. W2133-1 is an average yielding line with excellent chip quality and a good specific gravity. CO95051-7W and MSJ147-1, although both lines appear to yield below average, have excellent long term storage qualities.

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	
Beacon Chipper	585	600	97	2	79	18	1	1.077
W2324-1	564	598	95	3	82	13	2	1.081
Snowden	487	501	97	3	81	16	0	1.078
Atlantic	404	434	93	4	79	14	3	1.079
W2133-1	378	403	94	5	84	10	1	1.083
CO96141-4W	366	385	95	5	92	3	0	1.067
MSJ316-A	351	384	92	7	89	3	1	1.076
CO95051-7W	238	279	85	15	85	0	0	1.074
MSJ147-1	184	259	71	29	71	0	0	1.085
MEAN	395	427	91					1.078

*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 acceptable with hollow heart being prevalent in Atlantic. Beacon Chipper exhibited four hollow heart in thirty oversize tubers, similar to Snowden. Overall vascular discoloration was observed in almost every line.

Table 2. At Harvest Tuber Quality. Sandyland Farms, Howard City, Michigan.					
Entry	Internal Defects¹				Total Cut
	HH	VD	IBS	BC	
Beacon Chipper	4	3	0	0	30
W2324-1	2	2	0	0	30
Snowden	5	5	0	1	30
Atlantic	14	3	1	0	30
W2133-1	1	2	0	0	30
CO96141-4W	0	4	0	0	30
MSJ316-A	0	2	0	1	30
CO95051-7W	0	1	0	0	30
MSJ147-1	0	0	0	0	30

¹Internal 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 4th and processed at Herr Foods Inc. on October 8th, 4 days after harvest. Chip colors were generally acceptable, with Beacon Chipper having the highest Agtron score of 68.0. The varieties listed in ranked order based on observations from Herr Foods Inc. are as follows: MSJ147-1, CO96141-4W, CO95051-7W, MSJ316-A, W2133-1, W2324-1, Beacon Chipper, Snowden and Atlantic.

Table 3. 2007 Post-Harvest Chip Quality¹.						
Entry	Agtron Color	SFA² Color	Specific Gravity	Percent Chip Defects³		
				Internal	External	Total
Beacon Chipper	68.0	1	1.075	4.2	10.0	14.2
W2324-1	62.9	2	1.078	1.5	13.9	15.4
Snowden	61.8	2	1.073	1.1	15.2	16.3
Atlantic	63.9	2	1.073	21.7	12.8	34.5
W2133-1	61.4	2	1.078	2.2	6.4	8.6
CO96141-4W	61.4	2	1.062	1.6	7.9	9.5
MSJ316-A	64.0	2	1.072	4.9	3.1	8.0
CO95051-7W	64.0	2	1.074	1.2	8.2	10.0
MSJ147-1	59.7	2	1.080	2.0	3.8	5.8

¹ Samples collected at harvest October 4th and processed by Herr Foods Inc., Nottingham, PA on October 8, 2007 (4 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.

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 black spot bruise. Among the “Simulated Bruise” samples, the best entries were Atlantic, CO96141-4W, MSJ147-1 and MSJ316-A. Beacon Chipper showed the lowest percent bruise free.

Table 4. Black spot Bruise Test

Entry	A. Check Samples ¹									B. Simulated Bruise Samples ²								
	# of Bruises Per Tuber						Total Tubers	Percent Bruise Free	Average Bruises Per Tuber	# of Bruises Per Tuber						Total Tubers	Percent Bruise Free	Average Bruises Per Tuber
	0	1	2	3	4	5				0	1	2	3	4	5			
Beacon Chipper	18	7					25	76	0.3	4	10	6	4	1		25	16	1.5
W2324-1	23	2					25	92	0.1	15	5	5				25	60	0.6
Snowden	25						25	100	0.0	12	8	4	1			25	48	0.8
Atlantic	22	0	2	1			25	88	0.3	17	6	2				25	68	0.4
W2133-1	19	2	2	2			25	76	0.5	10	11	4				25	40	0.8
CO96141-4W	23	1	1				25	92	0.1	19	4	1	1			25	76	0.4
MSJ316-A	25						25	100	0.0	18	5	2				25	72	0.4
CO95051-7W	25						25	100	0.0	13	9	2	1			25	52	0.6
MSJ147-1	23	2					25	92	0.1	18	5	2				25	72	0.4

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 & 6 summarize the results of the pre-harvest panel data. MSJ147-1 appeared to be very immature on August 9th with a 1.067 specific gravity which increased to 1.080 on August 21st. CO96141-4W was one of the earliest maturing varieties second to Atlantic. Atlantic appeared to be mature on August 21st. Beacon Chipper had the largest average tuber weight of 6.37 oz. on August 21st.

Table 5. Pre-Harvest Panel, 8/9/07

Entry	Specific Glucose ¹		Sucrose ²	Canopy		Number of		Average ⁵
	Gravity	%		Rating ³	Uniform. ⁴	Hills	Stems	Tuber
			Weight					
Beacon Chipper	1.070	0.004	1.006	95	100	4	16	4.68
W2324-1	1.068	0.003	0.568	95	100	2	10	2.27
Snowden	1.068	0.003	0.613	95	100	5	16	2.67
Atlantic	1.074	0.002	0.673	85	100	3	14	4.02
W2133-1	1.075	0.001	0.497	80	90	4	14	3.51
CO96141-4W	1.069	0.001	0.243	75	90	4	15	3.48
MSJ316-A	1.063	0.014	1.860	100	100	6	14	2.74
CO95051-7W	1.072	0.001	0.514	80	90	5	19	2.92
MSJ147-1	1.067	0.004	0.776	95	100	4	13	1.87

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.

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

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

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

Table 6. Pre-Harvest Panel, 8/21/07

Entry	Specific Glucose ¹		Sucrose ² Rating	Canopy		Number of		Average ⁵ Tuber Weight
	Gravity	%		Rating ³	Uniform. ⁴	Hills	Stems	
Beacon Chipper	1.077	0.002	0.546	95	90	4	12	6.37
W2324-1	1.078	0.003	0.462	90	85	3	16	4.13
Snowden	1.079	0.001	0.368	95	90	4	16	5.95
Atlantic	1.071	0.002	0.497	85	90	4	16	5.23
W2133-1	1.079	0.001	0.439	75	85	5	20	4.32
CO96141-4W	1.069	0.001	0.252	70	85	4	16	4.43
MSJ316-A	1.069	0.006	0.976	90	90	6	13	4.77
CO95051-7W	1.077	0.001	0.409	95	90	4	15	3.15
MSJ147-1	1.080	0.002	0.396	95	90	3	14	2.01

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:

Beacon Chipper: The US#1 yield for this variety was 585 cwt/A. This was 180 cwt above the average and 21 cwt higher than the next closest variety. The specific gravity was just below average for this trial at 1.077. Beacon Chipper recorded the highest amount of oversize tubers at 18% of the total yield with four hollow heart noted in 30 tubers cut. Chip quality was average overall, placing this variety 7th in this trial. Susceptibility to black spot was higher than desired at 1.5 bruises per tuber.

W2324-1: On June 14th this variety was expressing a vine vigor that was above average when compared to others in the trial. The US#1 yield was excellent with an acceptable specific gravity of 1.081 at harvest. Raw internal quality was acceptable in the tubers. Out of the field chip processing results from Herr Foods ranked this variety 6th in the Michigan trial. A minimal amount of black spot bruise was recorded in the bruise test. The only concern noted is the common scab susceptibility of this variety.

Snowden: The US#1 yield was above average at 487 cwt/A. This variety recorded the second highest percent of "oversize" potatoes at 16% with an average specific gravity at 1.078. Chip quality was the second poorest recorded with a high level of total chip defects at 16.3%. Black spot bruise susceptibility was average.

Atlantic: This variety had an average yield and specific gravity of 1.079 for this trial. The size profile was well distributed. Chip quality was worst among the varieties tested at Herr's. The black spot bruise susceptibility was low at 0.4 bruises per tuber.

W2133-1: This variety produced an average yield of good size potatoes. A good specific gravity was recorded at 1.083. Few internal defects were noted at harvest. W2133-1 was average in the overall chip score at Herr Foods on October 8, 2007. A slight amount of black spot bruise was recorded for this variety this year.

CO96141-4W: The US#1 yield for this variety was 29 cwt/A below the trial average with an unacceptable specific gravity of 1.067. Internal tuber quality was good with only a slight amount of vascular discoloration. Some pitted scab was noted at harvest. This variety was noted as second highest in chip quality at Herr Foods. Black spot bruise numbers were low.

MSJ316-A: This variety had a below average yield at 351 cwt/A and an average specific gravity of 1.076. MSJ316-A had good raw internal quality and above average chip quality when processed at Herr Foods out of the field. The percent of bruise free potatoes for this variety was among the top four of the varieties tested.

CO95051-7W: This variety recorded the second lowest yield in this year's trial. The specific gravity was marginal at 1.074. Raw internal quality was good. The chips recorded the third highest overall score in the trial for the second year. Black spot bruise susceptibility was noted as only a trace at 0.4 bruises per tuber.

MSJ147-1: US#1 yield was the lowest in the trial this year at 184 cwt/A. This variety recorded the highest percent of "small" potatoes at 29% with an acceptable specific gravity at 1.085. Chip quality was noted as the best overall, receiving the highest ranking in the Herr Foods scores. Black spot bruise susceptibility was slight. This variety appears to have excellent long term storage quality.