2024 Michigan Regional Trial

2024 Potatoes USA – SNAC International Trial
Yield Trial Report

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Materials and Methods

The trial was conducted in 2024 at Sandylands Farms in Montcalm County, MI on sandy loam soil, and included 11 potato entries: AF6206-3, AF6206-5, Lamoka, MSBB058-1, ND13220C-3, NY174, NY177, Snowden, W17043-37, W17066-34, and W17AF6670-1, with Lamoka and Snowden as checks. Seed potatoes were received at MSU Agronomy Farm, Lansing, MI, in spring 2024. Tubers, cut to an average of 2.5 oz, were treated with Cruiser Maxx® Vibrance® (9.17 mL/100 lb) and suberized at 50°F before planting. Planting occurred on May 1, 2024, at Sandylands Farm, Howard City, MI, in single 300-ft rows with 34-inch row spacing and 10-inch in-row spacing under irrigation. Fertilization and management followed local grower practices.

Rainfall during the 2024 season was 8% higher and 33% lower, while cumulative growing degree days (CGDD) were 5% higher and 3% lower than previous years (Table 1). Vine vigor was rated on June 3, 2024, on a scale of 1 (slow emergence) to 5 (vigorous growth). Vine maturity was assessed on August 22, 2024, using a scale of 1 (fully senesced) to 5 (vigorous growth, some flowering). A minimum of 40 tubers per entry were collected on August 14 (105 days after planting) and August 27 (118 days after planting), three and one week before vine-kill, respectively. Samples were labeled and submitted to Techmark, Inc., Lansing, MI (http://www.techmark-inc.com/) for chemical maturity analysis, including specific gravity, glucose, and sucrose content.

The crop was vine-killed on August 28, 2024, and harvested on October 3, 2024. Three 23 ft sections per test entry were sampled to evaluate tuber yield, specific gravity, and quality attributes. Data were analyzed using ANOVA in SAS, with mean separation performed using LSD at $P \leq 0.05$.

A 20 lb sample of field tubers from each entry was collected and submitted to Herr Foods, Inc., Nottingham, PA, for chip processing and evaluation. Chips were assessed for Snacking Nutrition and Convenience (SNAC), specific gravity, and external and internal defects on October 7, 2024. SNAC color was rated using the SNAC color scale, where 1 = lightest and 5 = darkest.

Additionally, 50 tubers from each entry were sampled for black spot bruise evaluation at harvesting. Of these, 25 tubers were held at room temperature for two weeks, then abrasively peeled and scored for bruises. The remaining 25 tubers were held at 50°F for 12 hours, placed in a six-sided plywood drum, rotated 10 times to simulate bruising, and then held at room temperature for one week before being abrasively peeled and scored for bruises. Both the control and simulated bruise samples were evaluated for bruising on October 25, 2024.

Table 1. Weather data for rainfall and cumulative degree days for five years (2019-2024) during growing season ranging from 17 May through 10 October.

Year	Rainfall (inches)	$CGDD_{40}$
2019	21	3,950
2020	13	3,694
2021	21	3,758
2022	16	4,003
2023	17	3,685
2024	14	3,883
Mean	17	3,829

Source: enviroweather.msu.edu

Results

Both check varieties, Lamoka and Snowden, were 25 to 40% less vigorous compared to other entries (Table 2). Entries AF6206-3 and W17043-37 matured 17 to 29% earlier than the other entries.

Table 2. Vine vigor and maturity for 11 entries grown at Sandyland Farms, MI, 2024.

Entry	Vine vigor	Vine maturity
ND13220C-3	2.5	3.5
AF6206-5	2.0	3.0
AF6206-3	2.0	2.5
W17AF6670-1	2.0	3.0
NY174	2.5	3.0
NY177	2.5	3.0
W17066-34	2.0	3.0
Snowden	**1.5**	**3.0**
MSBB058-1	2.0	3.0
W17043-37	2.0	2.5
Lamoka	**1.5**	**3.0**

Glucose content decreased with physiological maturity across most entries, except AF6206-5 and Snowden. Similarly, sucrose levels declined, except for AF6206-5, NY174, and Lamoka. However, specific gravity increased with maturity for most entries, except for AF6206-5, Lamoka, and ND13220C-3 (Table 3).

Table 3: Chemical maturity evaluation 105 and 118 days after planting

Entry	105 days after planting			118 days after planting		
	Glucose content (%)	Sucrose rating	Specific gravity	Glucose content (%)	Sucrose rating	Specific gravity
AF6206-3	0.003	1.204	1.092	0.002	0.965	1.094
AF6206-5	0.004	1.552	1.094	0.005	1.557	1.077
ND13220C-3	0.004	1.049	1.101	0.004	1.013	1.095
NY174	0.023	0.342	1.084	0.001	0.353	1.097
NY177	0.004	0.559	1.094	0.013	0.374	1.103
Lamoka	**0.003**	**0.718**	**1.088**	**0.003**	**0.860**	**1.085**
MSBB058-1	0.005	0.725	1.085	0.000	0.563	1.091
Snowden	**0.003**	**0.658**	**1.089**	**0.026**	**0.490**	**1.093**
W17043-37	0.003	0.647	1.082	0.002	0.598	1.091
W17066-34	0.004	0.763	1.088	0.004	0.531	1.098
W17AF6670-1	0.002	0.381	1.082	0.002	0.361	1.088

ND13220C-3 produced 18 to 155% higher US#1 yield compared to most entries, except AF6206-5 (Table 4). However, its A-size tuber yield was 5 to 8% lower than AF6206-5, AF6206-3, W17AF6670-1, NY174, W17066-34, and MSBB058-1. W17043-37 produced 1 to 15% higher B-size tuber yield than other entries. Lamoka and ND13220C-3 had 1 to 3% more pickouts, while AF6206-5 demonstrated a 0.3 to 1.8% higher specific gravity than other entries. AF6206-3 showed 14 to 220% greater susceptibility to scab compared to other entries.

Table 4. Means for US#1, total yield, %US#1, %Bs, %As, and % pickouts tubers, specific gravity and scab severity for eleven entries grown at Sandyland Farms, MI, 2024.

Entry	US#1	Total yield	%US#1	%Bs	%As	% Pickouts	Specific gravity	Scab Severity
ND13220C-3	563	725	78	19	78	3	1.095	2.7
AF6206-5	491	570	86	13	86	1	1.102	2.8
AF6206-3	476	567	84	15	84	1	1.097	3.2
W17AF6670-1	444	531	84	16	84	0	1.083	1.8
NY174	438	520	84	14	84	2	1.087	1.7
NY177	415	567	73	27	73	0	1.099	1.8
W17066-34	406	489	83	17	83	1	1.091	1.5
Snowden	**335**	**436**	**77**	**22**	**77**	**1**	**1.084**	**2.3**
MSBB058-1	326	390	84	15	84	1	1.090	1.0
W17043-37	262	368	71	28	71	1	1.086	2.2
Lamoka	**221**	**310**	**71**	**26**	**71**	**3**	**1.082**	**1.0**
LSD	74	71	6	6	6	1	0.004	0.6

Most entries demonstrated vascular discoloration ranging from 1% to 4%, except for ND13220C-3 and NY177, which had no vascular discoloration. None of the entries showed hollow heart, internal brown spots, or brown center (Table 5).

Table 5. Internal tuber quality attributes for 11 entries grown at Sandyland Farms, MI, 2024.

Entry	%HH	%VD	%IBS	%BC
ND13220C-3	0	0	0	0
AF6206-5	0	4	0	0
AF6206-3	0	1	0	0
W17AF6670-1	0	1	0	0
NY174	0	1	0	0
NY177	0	0	0	0
W17066-34	0	3	0	0
Snowden	**0**	**1**	**0**	**0**
MSBB058-1	0	1	0	0
W17043-37	0	3	0	0
Lamoka	**0**	**2**	**0**	**0**

Entries MSBB058-1, ND13220C-3, NY177, Snowden, W17043-37, and W17AF6670-1 had 50% higher SFA values compared to other entries. W17043-37 showed 2 to 24% fewer internal defects, while ND13220C-3 had fewer external defects than the other entries (Table 6).

Table 6. Post-harvest chip quality from tuber samples of 11 entries processed and evaluated at Herr Foods Inc., Nottingham, PA, October 7, 2024.

Rank[1]	Entry	[2]SNAC color	Specific gravity	% internal defects	% external defects	Comment
1	AF6206-3	2	1.093	20	13	Minor vascular color. 1 ½ to 3 ¾ inches in size
2	**Lamoka**	**2**	**1.081**	**8**	**17**	**1 ¾ to 4 inches in size**
3	NY174	2	1.081	4	24	A little stem end. 2 ¼ to 3 ½ inches
4	W17043-37	3	1.08	2	24	Minor bruise and stem end with some scab. 1 ¾ to 4 inches in size
5	AF6206-5	2	1.095	11	20	A little scab. 1 ¾ to 3 ¾ inches in size
6	ND13220C-3	3	1.095	18	8	Stem end and a lot of scab. 2 to 4 ½ inches in size. A lot of oblong potatoes. Not a good shape for chipping. Kick out of trial
7	W17AF6670-1	3	1.081	12	22	A little scab, possible Fusarium. 1 ¾ to 3 ¾ inches in size
8	NY177	3	1.095	26	24	Bruise and scab. Some mechanical damage. 2 to 3 ¼ inches in size
9	W17066-34	2	1.088	4	11	Some stem end. 2 to 4 inches in size
10	MSBB058-1	3	1.089	8	38	A little scab with some edge color. 2 to 4 inches in size
11	**Snowden**	**3**	**1.085**	**7**	**29**	**Some scab and edge color. 2 to 3 ¼ inches in size**

[1]Results listed from highest to lowest rating
[2]SNAC color scale, 1 = lightest and 5 = darkest

Under the control treatment, W17043-37 showed 12 to 52% fewer bruised tubers, while W17066-34 showed 12 to 32% fewer bruise-free tubers in the simulated treatment. AF6206-3 and NY177 demonstrated higher susceptibility to bruising, with 4 to 52% and 4 to 32% more bruised tubers under the control and simulated treatments, respectively (Table 7).

Table 7. Black spot bruise evaluation for 11 entries grown at Sandyland Farms, MI, 2024

Control treatment										Simulated treatment									
Entry	Number of bruise/tuber (s)						Total tubers	[1]Bruise free tubers (%)	Average spots/tuber	Entry	Number of bruise/tuber (s)						Total tubers	[1]Bruise free tubers (%)	Average spots/tuber
	0	1	2	3	4	5+					0	1	2	3	4	5+			
W17043-37	14	9	2	0	0	0	25	56	1	W17066-34	8	5	7	3	1	1	25	32	2
Lamoka	**11**	**6**	**4**	**4**	**0**	**0**	**25**	**44**	**1**	**Lamoka**	**5**	**3**	**6**	**8**	**2**	**1**	**25**	**20**	**2**
W17AF6670-1	10	8	3	4	0	0	25	40	1	W17043-37	2	3	7	5	4	4	25	8	3
ND13220C-3	7	7	4	5	0	2	25	28	2	NY174	1	1	7	7	3	6	25	4	3
NY174	7	3	8	4	3	0	25	28	2	**Snowden**	**1**	**4**	**6**	**1**	**2**	**11**	**25**	**4**	**3**
W17066-34	7	7	7	3	1	0	25	28	1	AF6206-5	0	3	4	5	6	7	25	0	3
Snowden	**4**	**9**	**6**	**6**	**0**	**0**	**25**	**16**	**2**	W17AF6670-1	0	4	3	3	4	11	25	0	4
MSBB058-1	3	4	6	4	5	3	25	12	3	ND13220C-3	0	1	4	4	6	10	25	0	4
AF6206-5	2	1	4	3	6	9	25	8	3	AF6206-3	0	1	2	2	5	15	25	0	4
AF6206-3	1	2	5	8	4	5	25	4	3	MSBB058-1	0	0	2	4	5	14	25	0	4
NY177	1	1	5	4	6	8	25	4	3	NY177	0	0	0	1	3	21	25	0	5

[1]Ranked from the low-bruised to the highest-bruised