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2021 POTATO VARIETY EVALUATIONS

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INTRODUCTION

Each year, the MSU potato breeding and genetics team conducts a series of variety trials to assess advanced potato selections from the Michigan State University and other potato breeding programs at the Montcalm Research Center (MRC). In 2021, we tested over 205 varieties and breeding lines in the replicated variety trials, 130 lines in the North Central Regional trial plus over 153 lines in the National Chip Processing Trial (NCPT). The variety evaluation also includes disease testing in the scab nursery (Montcalm Research Center) and foliar late blight evaluation (MSU Campus Plant Pathology Farm). The objectives of the evaluations are to identify superior varieties for fresh or chip-processing markets (chip, round white/yellow table, specialty/red and russet). The varieties were compared in groups according to market class, tuber type, skin color, and to the advancement in selection. Each season, total and marketable yields, specific gravity, tuber appearance, incidence of external and internal defects, chip color (from the field as well as from 45°F (7.2°C) storage at 3 and 6 months), along with susceptibilities to common scab, late blight (foliar and tuber), and blackspot bruising are determined.

We would like to acknowledge the collaborative effort of the Michigan Potato Industry and research colleagues Matthew Klein and the MSU Potato Breeding Team (especially graduate students Natalie Kaiser, Sarah Lee, Kaela Panicucci and Will Behling) for helping to get the field research done.

PROCEDURE

The field variety trials were conducted at the Montcalm Research Center in Entrican, MI. Due to COVID-19-related university research constraints, trial replication was reduced to a maximum of two. A randomized complete block design was used. The plots were 23 feet (7 m) long and spacing between plants was 10 inches (25.4 cm). Inter-row spacing was 34 inches (86.4 cm). Supplemental irrigation was applied as needed. Nutrient, weed, disease and insect management were similar to recommendations used by the commercial operations in Montcalm County. The field experiments were conducted on a sandy loam soil that has been out of potato production for 5 years. Oats were grown in 2020 on this ground. A few severe rain events in 2021 flooded the northern tiers of some of the trials. There was no serious damage from insects, diseases or weeds.

The most advanced selections were tested in the Advanced chip and tablestock trials, representing selections at a stage after the preliminary trials. The other field trials were the Preliminary (chip-processors and tablestock), Preliminary Pigmented, the NCPT and the early observational trials.

2021 was the eleventh year of the National Chip Processing Trial (NCPT). The purpose of the trial is to evaluate early generation breeding lines from the US public breeding programs for their use in chip-processing. The NCPT has 9 trial locations (Northern sites: NY, MI, WI, ND, OR and Southern: NC, FL, CA, TX) in addition to a scab trial Wisconsin. The North Central trial was reformatted to have 15-hill plots of earlier generation selections for a total of 130 lines plus controls for the chip, russet and table markets.

In each of these trials, the yield was graded into four size classes (pick outs, Bs, As, oversize) using the new Kerian sizer on the grading line, incidence of external and internal defects in >3.25 in. (8.25 cm) diameter potatoes were recorded. Samples were taken for specific gravity, chip-processing, disease tests and bruising tests. Chip quality was assessed on composite tuber samples, taking two slices from each tuber. Chips were fried at 345°F (174°C) for 2 minutes 15 seconds or until fully cooked. The chip color was measured visually with the SFA 1-5 color chart. Stem end scores were also recorded. Tuber samples were also stored at 45°F (7.2°C) for chip-processing out of storage in January and April. The lines in the agronomic trials were assessed for common scab resistance at the nursery at the Montcalm Research Center. There has been very strong scab disease pressure at the new Montcalm Scab Disease Nursery for nine years now. The 2021 late blight trial was conducted at the MSU campus Plant Pathology Farm. The simulated blackspot bruise (from 50°F tuber temperature) results for average spots per tuber have also been incorporated into the summary sheets.

RESULTS

A. Advanced Chip-Processing Trials (Table 1)

A summary of the 39 entries evaluated in the trial results is given in **Table 1**. Overall, the yields for the Advanced trial (145 days) were above average. The check varieties for this trial were Lamoka, Manistee, Snowden and Atlantic. The highest yielding and most promising lines were MSBB630-2, MSAA252-7, MSBB626-11, MSAA217-3, Mackinaw, Huron Chipper and MSAA076-6. Internal defects were noted with some lines showing susceptibility to hollow heart, IBS or brown center. Specific gravity was average with a trial average of 1.082. Snowden and Atlantic had a specific gravity of 1.084 and 1.089, respectively. All chip-processing entries in the trial had excellent chip-processing quality out of the field, with an SFA score of 1.0. Almost all of the MSU breeding lines have scab resistance. Twenty-four MSU chipping lines were classified as having scab resistance scores equal or better than Lamoka. Mackinaw (MSX540-4) has PVY and late blight resistance while MSZ614-15 and MSBB630-2 has scab, PVY and late blight resistance. Other promising lines to watch are Petoskey, MSZ242-13, MSDD247-11, MSDD247-07, MSBB058-3, MSBB230-1 and MSBB058-4.

B. North Central Regional Trial (Table 2)

This trial provided a new format to test our fourth-year material in Michigan as well as ND, MN and WI. The trial with 130 lines was evaluated after 125 days. The promising chippers in the trial were MSFF007-2, MSFF037-17, MSFF017-1 and MSFF097-6. Our promising table lines are MSFF353-R, MSFF182-1R, MSFF130-1R. At this time are results are showing that we are obtaining lines with scab and PVY resistance.

C. Adaptation Trial (Table 3)

The Adaptation Trial of the tablestock lines was harvested after 145 days and the results of 37 lines are summarized in **Table 3**. The many of the lines evaluated in the Adaptation Trial were tested in the Preliminary Trials the previous year. The reference cultivars Yukon Gold and Superior are reported in the tablestock trial. In general, the yields were average and internal defects were observed in some lines. The promising lines were MSZ416-8RY, MSZ109-8PP, MSDD483-1, MSV093-1Y, MSBB371-1YSPL, MSCC553-1R and MSZ551-1. MSZ551-1 combines high yield with scab, PVY and late blight resistance. We are hoping to commercial MSV093-1Y as Bonafide. Scab tolerance is becoming more prevalent among the advanced selections, but the challenge remains to combine scab, PVY and late blight resistance with a commercial skin finish. Other promising lines in the trial are MSV179-1, MST252-1Y and Blackberry. MSU has obtained PVP for Blackberry. Blackspot bruising was low for most lines.

D. Preliminary Trials (Tables 4, 5 and 6)

The Preliminary trials (chip, table, pigmented) are the first trials for evaluating new advanced selections from the MSU potato breeding program. The division of the trials was based upon pedigree assessment for chip-processing and tablestock utilization. In 2021, there were 83 harvested entries trialed in the three Preliminary trials at 132 days. PVY resistance is found in over a third of the lines tested.

The chip-processing Preliminary Trial (**Table 4**) had 55 harvested entries after 132 days. Most of the lines chip-processed well from the field but only 14 lines had specific gravity values greater than Snowden at 1.084. Internal quality weakness was predominantly hollow heart. Scab resistance was prevalent among the lines. Promising MSU lines are MSDD376-4, MSFF079-16, MSEE207-2, MSEE063-6, MSEE035-4, MSDD244-05, MSEE101-2, MSDD372-07 and MSEE031-3 combining yield, specific gravity, scab resistance and chip quality. Most of these lines also have PVY resistance. We continue to make progress selecting for chip-processing with scab resistance with 27 lines in the trial with scab ratings equal or lower than 1.7, whereas Snowden had a scab rating of 3.0.

Table 5 summarizes 21 harvested tablestock entries evaluated in the Preliminary Tablestock Trial. Reba was the check variety. This tablestock trial was harvested and evaluated after 132 days. MSDD088-1, MSEE048-2Y, MSEE075-1 and FF120-2Y all have high yield potential, low internal defects and scab resistance, as well as low blackspot bruising. In general, the level of scab resistance and internal quality are improving in this pool of lines. We are working towards better skin finish also.

The interest in the specialty market continues to increase. In 2021, 19 harvested entries were evaluated in the Preliminary Pigmented Trial (**Table 6**), which was harvested at 132 days. This trial evaluated breeding lines with unique skin and flesh colors. Many of these MSU lines have commercial agronomic performance and specialty characteristics, but scab resistance varied among the lines. Eight lines were scored as scab resistance. Blackspot bruising is low and internal defects were mostly hollow heart. MSW476-4RY, MSFF247-2Y, MSFF142-2SPL, MSBB308-2P and MSFF305-1RY combine yield and scab resistance.

E. Diploid Replicated trial (Table 7)

16 Diploid lines were agronomically evaluated against Atlantic and Lamoka. The trial was harvested at 132 days. Four lines were comparable in yield to Atlantic and Lamoka. Three lines that yielded well in 2020 were much lower in yield. We attribute this to virus in the seed used. This trial demonstrates that we are achieving greater yield potential as we breed at the diploid level. We will continue to focus on yield but we will put more emphasis on market traits as we continue to breed and select.

F. Potato Common Scab Evaluation (Tables 8 and 9)

Each year, a replicated field trial is conducted to assess resistance to common scab. The scab trial is now located at the Montcalm Research Center where high common scab disease pressure was observed in the previous nine years. This location is being used for the early generation observational scab trial (119 lines) and the scab variety trial (185 lines) and diploid scab trial (188). In 2021, the scab infection was a good level with the susceptible controls having some coverage of pitted scab.

We use a rating scale of 0-5 based upon a combined score for scab coverage and lesion severity. Usually examining one year's data does not indicate which varieties are resistant but it should begin to identify ones that can be classified as susceptible to scab. Our goal is to evaluate important advanced selections and varieties in the study at least three years to obtain a valid estimate of the level of resistance in each line. The 2019-2021 scab ratings are based upon the Montcalm Research Center site. **Table 8** categorizes many of the varieties and advanced selections tested in 2021 over a three-year period. The varieties and breeding lines are placed into nine categories based upon scab infection level and lesion severity. A rating of 0 indicates zero scab infection. A score of 1.0 indicates a trace amount of infection. A moderate resistance (1.2 – 1.5) correlates with <10% infection without pitting. Scores of 4.0 or greater are found on lines with >50% surface infection and severe pitted lesions.

The check varieties Russet Norkotah, GoldRush, Red Norland, Yukon Gold, Pike, Atlantic, and Snowden can be used as references (in bold, **Table 8**). The table is sorted in ascending order by 2021 scab rating. This year's results continue to indicate that we have been able to breed numerous lines with resistance to scab. Average scab ratings ranged from 0.2 – 3.5 for the variety trial. A total of 101 entries tested had a scab rating of 1.5 or lower in 2021. Most notable scab resistant MSU lines are found in the trial summaries **(Tables 1-7)**. Of the 119 early generation selections that were evaluated, 59 had scab resistance (scab rating of ≤ 1.5) (**Table 9**).

F. Late Blight Trial (Table 10)

In 2021, the late blight trial was planted at the East Lansing campus Plant Pathology farm. All entries were planted in early June for late blight evaluation. These include lines tested in a replicated manner from the agronomic variety trial and entries in the early generation observation plots. The trials were inoculated two times in August with the US-23 genotype of *P. infestans*. Late blight infection was progressed well and data was collected into September. Sixteen of 42 lines were classified as late blight resistant in the replicated trial. Twelve of the lines also PVY resistant.

G. Blackspot Bruise Susceptibility (Table 11)

Evaluations of advanced seedlings and new varieties for their susceptibility to blackspot bruising are also important in the variety evaluation program. Based upon the results collected over the past years, the non-bruised check sample has been removed from our bruise assessment. A composite bruise sample of each line in the trials consisted of 25 tubers (a composite of 4 replications) from each line, collected at the time of grading. The 25-tuber sample was held in 50°F (10°C) storage overnight and then was placed in a hexagon plywood drum and tumbled 10 times to provide a simulated bruise. The samples were peeled in an abrasive peeler in October and individual tubers were assessed for the number of blackspot bruises on each potato. These data are shown in **Table 11**. The bruise data are represented in two ways: percentage of bruise free potatoes and average number of bruises per tuber. A high percentage of bruise-free potatoes is the desired goal; however, the numbers of blackspot bruises per potato is also important. Cultivars which show blackspot incidence greater than Atlantic are approaching the bruise-susceptible rating. In addition, the data is grouped by trial, since the bruise levels can vary between trials. In 2021, the bruise levels were higher than previous years. There are many lines with lower blackspot bruise potential across the trials. Some of our advanced selections are similar to or less than Atlantic and Snowden in their level of bruising. A few lines will high susceptibility to bruise were identified and will be discontinued from testing. All the bruise ratings are also found in the variety trial tables (**Tables 1-7**).

H. National Chip Processing Trial (NCPT) data available on-line

The Potatoes USA-funded National Chip Processing Trial (NCPT) is an effort to synergize the strengths of the public breeding programs in the U.S. to identify improved

chip-processing varieties for the industry. Cooperating breeding programs include the USDA (Idaho and Maryland) and land grant universities (Colorado, Maine, Michigan, Minnesota, North Carolina, North Dakota, New York, Oregon, Wisconsin and Texas). The coordinated breeding effort includes early-stage evaluation of key traits (yield, specific gravity, chip color, chip defects and shape) from coordinated trials in 10 locations. Since the inception of the trial in 2010, over 1,000 different potato entries, including reference varieties, have been evaluated. The data for all the lines tested are summarized on a searchable, centralized database housed at Medius (https://potatoesusa.medius.re). More than 40 promising new breeding lines from the trials have been fast-tracked for larger-scale commercial trials and processor evaluation. The NCPT is also a feeder for the national SNAC International trials. We are using the NCPT trials to more effectively identify promising new selections. Notable MSU lines that have been identified are MSW485-2 (Huron Chipper), MSX540-4 (Mackinaw), MSV030-4 (Petoskey), MSW474-1, and MSZ242-13. Our newest graduates of the NCPT are MSBB230-1, MSAA217-3 and MSBB626-11. Minituber production and/or commercial seed have been produced of the newer lines and will be tested in Michigan in 2022.

Table 1

MICHIGAN STATE UNIVERSITY
POTATO BREEDING and GENETICS

ADVANCED CHIP-PROCESSING TRIAL
MONTCALM RESEARCH CENTER
May 5 to September 27, 2021 (145 days)
DD Base 40°F 3402[9]

														PERCENT (%)						LB[8]	3-YR AVG
	PVY		CWT/A		PERCENT OF TOTAL[1]						CHIP	OTF	TUBER QUALITY[4]							RAUDPC	US#1
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	SCORE[2]	SED[3]	HH	VD	IBS	BC	SCAB[5]	MAT[6]	BRUISE[7]	x100	CWT/A
MSBB630-2	PVYR	2	598	642	93	6	93	0	1	1.078	-	-	0	0	10	0	1.3	3.5	4.0	0.1	-
MSAA252-7	PVYR	2	551	565	98	2	87	11	0	1.081	1.0	3	0	5	45	0	1.5	4.0	3.3	1.5	470*
MSY022-2		2	495	529	93	5	93	0	2	1.079	1.0	0	35	0	0	0	0.5	3.0	1.8	-	-
MSCC725-232	PVYR	2	463	490	94	5	94	0	1	1.075	1.0	1	50	5	0	5	1.8	3.0	2.1	-	-
MSAA076-6		2	429	498	86	14	86	0	0	1.083	1.0	1	0	0	0	0	0.8	2.5	2.8	-	366
MSBB613-7	PVYR	2	426	438	97	2	97	0	1	1.077	-	-	45	10	0	5	0.3	3.0	-	0.9	-
MSBB626-11	PVYR	2	418	435	96	4	95	1	0	1.084	1.0	1	0	5	0	5	1.4	3.5	2.8	4.3	398*
MSAA217-3		2	417	440	95	5	94	1	0	1.094	1.0	3	70	0	0	0	2.3	3.0	3.0	-	332*
Mackinaw	PVYR	2	415	448	93	7	93	0	0	1.081	1.0	0	0	0	0	0	1.8	3.0	2.2	2.1	294
Huron Chipper		2	414	453	91	9	91	0	0	1.082	1.0	2	5	15	0	10	1.8	3.0	1.2	0.5	327
MSAA091-1		2	413	451	91	9	91	0	0	1.084	1.0	0	5	5	0	0	2.3	3.0	1.2	28.4	-
MSDD247-11	PVYR	2	400	429	93	6	93	0	1	1.091	1.0	0	10	0	0	0	1.0	2.0	3.0	11.4	-
MSBB075-1Y		2	400	436	92	6	91	1	2	1.078	1.0	0	0	5	0	0	2.1	2.0	2.0	-	-
MSBB058-3	PVYR	2	390	406	96	4	96	0	0	1.080	1.0	0	0	0	0	0	1.4	4.0	3.8	0.2	-
MSBB635-14	PVYR	2	379	418	90	10	90	0	1	1.070	-	-	0	10	0	0	1.3	2.5	-	1.4	349*
MSZ242-13		2	374	395	95	4	95	0	1	1.093	1.0	0	0	0	0	0	1.4	3.0	2.2	-	284
MSBB614-15	PVYR	2	364	377	97	3	96	1	0	1.078	1.0	0	15	0	0	5	0.7	2.5	1.6	1.1	-
MSAA328-4		2	363	379	96	4	96	0	0	1.079	-	-	0	0	0	0	1.2	2.5	-	-	355*
MSCC058-1		2	362	376	96	4	96	0	0	1.083	1.0	0	5	35	0	0	1.2	2.5	4.0	-	326*
MSBB230-1		2	360	423	85	15	85	0	0	1.088	1.0	0	0	0	5	0	2.3	2.5	2.3	-	-
MSBB058-4	PVYR	2	359	402	89	11	89	0	0	1.079	1.0	0	0	0	0	0	1.8	4.0	1.6	7.7	-
Petoskey		2	352	414	85	13	85	0	2	1.090	1.0	0	15	0	0	0	1.3	3.0	2.6	-	250
Petoskey (POP)		2	340	402	85	15	85	0	0	1.089	-	-	0	0	0	5	2.3	3.0	2.6	-	-
Atlantic		**2**	**330**	**358**	**92**	**8**	**92**	**0**	**0**	**1.089**	**1.0**	**2**	**25**	**10**	**0**	**0**	**2.8**	**2.0**	**2.7**	**39.7**	**233**
MSZ242-07		2	330	356	92	7	92	0	1	1.092	1.0	0	0	0	0	0	1.3	3.0	3.1	-	285*
Snowden		**2**	**321**	**372**	**86**	**14**	**86**	**0**	**0**	**1.084**	-	-	**0**	**25**	**0**	**0**	**3.0**	**2.0**	**2.8**	**10.1**	239
MSDD247-07	PVYR	2	308	339	91	9	91	0	0	1.095	1.0	2	0	0	20	5	0.8	3.0	3.2	-	-
MSBB611-3	PVYR	2	307	382	80	18	79	1	2	1.083	-	-	0	0	0	25	1.5	3.0	3.6	0.4	314*
Lamoka		**2**	**306**	**352**	**87**	**12**	**87**	**0**	**0**	**1.080**	**1.0**	**0**	**0**	**20**	**0**	**0**	**1.5**	**2.0**	**1.6**	**28.6**	258

													PERCENT (%)							LB[8]	3-YR AVG
	PVY		CWT/A		PERCENT OF TOTAL[1]						CHIP	OTF	TUBER QUALITY[4]							RAUDPC	US#1
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	SCORE[2]	SED[3]	HH	VD	IBS	BC	SCAB[5]	MAT[6]	BRUISE[7]	x100	CWT/A
MSBB017-1		2	287	341	84	15	84	0	1	1.080	1.5	1	20	15	0	0	1.8	2.0	2.6	-	-
MSAA498-18		2	277	288	96	4	96	0	0	1.081	1.0	0	0	0	5	5	0.8	2.5	1.5	10.8	290*
MSAA260-3		2	275	319	86	12	85	1	3	1.083	1.0	1	0	0	10	35	1.3	3.0	3.6	-	263*
MSW474-1		2	274	350	78	22	78	0	0	1.078	-	-	0	0	0	0	0.7	2.0	2.5	-	-
MSAA311-1		2	274	308	89	11	89	0	0	1.076	1.0	0	0	5	0	5	1.3	2.0	2.1	-	-
MSDD040-01		2	273	290	93	6	92	1	1	1.074	-	-	10	0	0	0	1.1	2.0	-	-	-
MSDD244-15	PVYR	2	238	265	90	9	90	0	1	1.073	-	-	0	0	15	0	1.0	3.0	-	-	-
Manistee		2	229	265	87	13	87	0	1	1.080	1.0	0	0	5	0	0	2.8	1.5	1.1	-	229
MSDD085-13	PVYR	2	206	284	72	28	72	0	0	1.082	-	-	0	5	0	5	0.7	1.0	2.0	-	-
MEAN			361	398						1.082							1.5	2.7	2.5		276
$HSD_{0.05}$			241	232						0.011											

[1]SIZE: B: < 2 in.; A: 2-3.25 in.; OV: > 3.25 in.; PO: Pickouts.

[2]CHIP SCORE: SNAC Scale (Out of the field); Ratings: 1-5; 1: Excellent, 5: Poor.

[3]SED: Stem End Defect, Based on Paul Bethke's (USDA/UWisconsin - Madison) 0 - 5 scale. 0 = no SED; 3 = significant SED; 5 = severe SED

[4]QUALITY: HH: Hollow Heart; BC: Brown Center; VD: Vascular Discoloration; IBS: Internal Brown Spot. Percent of 40 Oversize and/or A-size tubers cut.

[5]SCAB DISEASE RATING: MSU Scab Nursery; 0: No Infection; 1: Low Infection <5%; 3: Intermediate; 5: Highly Susceptible.

[6]MATURITY RATING: August 24, 2021; Ratings 1-5; 1: Early (vines completely dead); 5: Late (vigorous vine, some flowering).

[7]BRUISE: Simulated blackspot bruise test, average number of spots per tuber.

[8]LB RAUDPC: Late blight (*P. infestans* US-23) foliar disease reaction.

Plant Date:	5/5/2021
Vine Kill:	9/8/2021
Days from planting to vine kill:	126

[9]Enviroweather: Entrican Station. Planting to vine kill

Table 2

MICHIGAN STATE UNIVERSITY
POTATO BREEDING and GENETICS

NORTH CENTRAL REGIONAL TRIAL
MONTCALM RESEARCH CENTER
May 5 to September 7, 2021 (125 days)
DD Base 40°F 3072[6]

			CWT/A		PERCENT OF TOTAL[1]								PERCENT (%) TUBER QUALITY[4]				
LINE	PVY Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	CHIP SCORE[2]	OTF SED[3]	HH	VD	IBS	BC	MAT[5]
Chip																	
MSFF007-2		1	563	606	93	7	93	0	0	1.079	1.0	1.0	0	10	0	0	4.0
MSFF036-1	PVYR	1	551	592	93	7	91	3	0	1.072	1.0	1.0	0	10	0	0	3.0
W17039-31		1	533	622	86	14	86	0	0	1.093	1.0	1.0	0	10	0	0	4.0
ND14251B-5		1	527	553	95	4	95	0	1	1.074	-	-	0	0	0	0	4.0
W17AF6685-2		1	508	601	84	14	84	0	1	1.080	1.0	1.0	0	0	0	0	3.0
ND14247CAB-2		1	506	545	93	7	93	0	0	1.080	1.0	1.0	10	10	0	0	2.0
MSFF037-17	PVYR	1	498	567	88	11	88	0	1	1.082	1.5	1.0	0	20	0	0	4.0
W17039-7		1	479	592	81	19	81	0	0	1.085	1.5	1.0	0	0	0	0	3.0
W17AF6670-1		1	476	520	91	9	91	0	0	1.082	1.0	0.0	0	0	0	0	3.0
MN18AF6730-6		1	459	527	87	8	87	0	5	1.068	2.5	3.0	20	20	0	0	3.0
MSFF038-3	PVYR	1	446	487	92	8	92	0	0	1.078	1.0	1.0	0	10	0	0	3.0
MN18AF6675-2		1	436	539	81	9	81	0	11	1.074	1.0	2.0	0	0	0	0	3.0
MN18W17043-17		1	432	472	92	8	92	0	0	1.084	-	-	30	0	10	0	3.0
MN18W17039-5		1	427	475	90	10	90	0	0	1.080	-	-	0	0	10	0	3.0
Atlantic		**2**	**424**	**461**	**92**	**6**	**92**	**0**	**2**	**1.088**	**1.0**	**1.0**	**35**	**0**	**0**	**0**	**2.5**
MSFF017-1		1	423	466	91	7	91	0	2	1.083	1.0	1.0	0	10	0	0	3.0
W17066-11		1	418	487	86	13	86	0	1	1.084	1.0	0.0	10	10	0	0	3.0
MSFF050-1		1	410	477	86	11	83	3	3	1.071	1.0	1.0	10	0	0	10	3.0
W17043-37		1	406	496	82	18	82	0	0	1.089	1.0	1.0	0	0	0	0	3.0
W17060-9		1	399	551	73	27	73	0	0	1.089	1.0	1.0	0	10	0	0	4.0
MSFF206-2	PVYR	1	397	446	89	8	89	0	3	1.076	1.5	2.0	0	10	0	0	4.0
W17065-21		1	396	469	84	8	84	0	8	1.079	1.0	0.0	30	0	10	0	3.0
W17067-1		1	396	501	79	21	79	0	1	1.087	1.0	1.0	0	0	0	0	3.0
MSFF097-6	PVYR	1	395	476	83	17	83	0	0	1.084	1.0	1.0	0	0	0	0	3.0
MSFF217-1	PVYR	1	383	463	83	16	83	0	1	1.076	1.0	1.0	20	0	0	0	3.0
MN18AF6730-5		1	382	444	86	11	86	0	3	1.079	1.5	2.0	0	10	0	0	2.0
W17037-3		1	362	439	82	15	82	0	3	1.080	1.0	1.0	0	0	0	0	3.0
MN18W17037-34		1	358	394	91	9	91	0	0	1.081	1.0	1.0	0	10	0	0	3.0
Lamoka		**2**	**355**	**399**	**89**	**10**	**89**	**0**	**2**	**1.081**	**1.0**	**2.0**	**0**	**10**	**5**	**0**	**2.0**
MN18W17052-6		1	349	389	90	10	90	0	0	1.082	1.5	1.0	0	0	0	0	3.0

														PERCENT (%)			
	PVY		CWT/A		PERCENT OF TOTAL[1]						CHIP	OTF	TUBER QUALITY[4]				
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	SCORE[2]	SED[3]	HH	VD	IBS	BC	MAT[5]
Snowden		**2**	**347**	**406**	**85**	**15**	**85**	**0**	**0**	**1.086**	**1.0**	**1.0**	**0**	**20**	**0**	**0**	**3.0**
ND14247CAB-4		1	345	458	75	12	75	0	13	1.073	-	-	40	0	0	0	3.0
MSFF077-4	PVYR	1	344	371	93	7	93	0	0	1.073	1.0	1.0	0	10	0	0	2.0
MSFF022-2		1	342	392	87	13	87	0	0	1.076	1.5	2.0	0	0	0	0	3.0
MN18W17037-26		1	322	356	91	7	91	0	2	1.079	1.5	2.0	0	10	0	0	3.0
MSFF303-3	PVYR	1	319	429	74	26	74	0	0	1.074	1.0	1.0	0	10	0	0	3.0
MN18AF6658-5		1	314	349	90	7	90	0	3	1.080	1.0	1.0	20	10	0	0	3.0
MSFF058-1		1	314	353	89	10	89	0	1	1.077	1.0	1.0	0	0	0	0	2.0
MN18W17057-5		1	312	337	93	7	93	0	0	1.072	1.0	1.0	0	20	30	0	2.0
MN18AF6717-6		1	310	377	82	6	82	0	11	1.072	1.0	1.0	10	0	0	10	4.0
W17060-22		1	308	343	90	10	90	0	0	1.082	1.0	1.0	0	0	10	0	2.0
ND14138AB-9		1	307	368	83	17	83	0	0	1.081	1.0	1.0	0	10	0	0	3.0
W17066-34		1	301	395	76	24	76	0	0	1.083	1.0	1.0	0	0	0	0	2.0
MSFF292-1		1	296	354	84	15	84	0	1	1.090	1.0	1.0	0	0	0	0	3.0
MN18W17037-11		1	295	325	91	9	91	0	0	1.081	1.0	1.0	10	10	0	10	2.0
MSFF206-1	PVYR	1	295	375	79	20	79	0	2	1.077	1.0	1.0	0	10	0	0	2.0
W17067-13		1	294	477	62	38	62	0	1	1.088	1.0	1.0	0	10	0	0	2.0
W17049-10		1	288	387	74	26	74	0	0	1.093	1.0	1.0	0	10	0	0	2.0
MN18W17039-25		1	285	349	82	18	82	0	0	1.088	1.5	1.0	10	0	10	0	3.0
MN18W17043-6		1	275	328	84	7	84	0	9	1.085	1.0	1.0	0	0	0	0	2.0
ND14246CAB-4		1	268	364	74	26	74	0	0	1.070	1.0	1.0	0	10	0	0	1.0
MSFF061-1		1	265	306	87	12	87	0	2	1.081	1.0	2.0	0	0	10	0	3.0
MN18W17037-38		1	258	290	89	11	89	0	0	1.070	1.0	1.0	0	0	80	0	2.0
MN18AF6717-2		1	258	338	76	22	76	0	1	1.092	1.0	1.0	10	10	0	0	3.0
MN18W17052-4		1	247	334	74	26	74	0	0	1.098	1.0	1.0	0	0	0	0	4.0
ND14163AB-4		1	245	320	76	23	76	0	0	1.073	1.5	1.0	0	20	0	0	2.0
ND14192B-1		1	238	330	72	26	72	0	2	1.076	1.5	1.0	0	10	0	0	1.0
MN18W17037-21		1	218	267	81	19	81	0	0	1.083	1.0	1.0	20	10	10	0	2.0
ND14165AB-2		1	194	258	75	22	75	0	3	1.073	1.5	1.0	10	0	0	0	2.0
MN18AF6643-13		1	133	220	61	28	61	0	11	1.072	1.0	0.0	0	20	0	0	3.0
ND14199CAB-5		1	118	454	26	74	26	0	0	1.085	1.0	0.0	10	0	0	0	2.0
ND14193ABC-4		1	53	257	21	79	21	0	0	1.071	1.0	1.0	0	0	0	0	1.0
MEAN			352	425						1.080					3.0	0.5	2.7

														PERCENT (%)				
	PVY		CWT/A		PERCENT OF TOTAL[1]						CHIP	OTF	TUBER QUALITY[4]				
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	SCORE[2]	SED[3]	HH	VD	IBS	BC	MAT[5]
Russet																	
W17091-5rus		1	593	661	90	9	90	0	1	1.076	-	-	0	0	0	0	4.0
ND14172B-2Russ		1	524	620	84	14	84	0	2	1.090	-	-	30	0	0	0	3.0
W17098-43rus		1	477	591	81	17	81	0	2	1.080	-	-	0	0	0	0	2.0
W17079-4rus		1	456	655	70	28	70	0	3	1.081	-	-	0	0	0	0	4.0
W17069-53rus		1	436	502	87	10	87	0	3	1.083	-	-	10	0	0	0	4.0
W17099-6rus		1	393	504	78	14	78	0	8	1.076	-	-	0	0	0	0	2.0
W17096-14rus		1	373	488	76	16	76	0	7	1.083	-	-	0	0	0	0	2.0
ND14172B-1Russ		1	353	487	72	23	72	0	5	1.083	-	-	0	0	0	0	3.0
MN18W17079-11		1	350	391	90	10	90	0	0	1.079	-	-	0	10	0	0	4.0
W17086-10rus		1	335	453	74	26	74	0	0	1.080	-	-	0	0	0	0	2.0
W17073-3rus		1	327	446	73	26	73	0	1	1.087	-	-	0	0	0	0	2.0
ND14172B-4Russ		1	309	361	86	13	86	0	2	1.081	-	-	0	20	0	0	2.0
W17098-19rus		1	305	408	75	20	75	0	5	1.091	-	-	0	0	0	0	2.0
W17081-2rus		1	299	436	69	26	69	0	5	1.084	-	-	0	20	0	0	2.0
W17092-2rus		1	296	361	82	12	82	0	6	1.072	-	-	0	0	0	0	2.0
ND14173-2Russ		1	295	421	70	25	70	0	5	1.076	-	-	0	10	0	0	1.0
Russet Burbank		**2**	**279**	**482**	**58**	**33**	**58**	**0**	**9**	**1.072**	**-**	**-**	**10**	**10**	**0**	**0**	**1.5**
MN18W17091-5		1	264	380	69	31	69	0	0	1.072	-	-	0	0	0	0	1.0
Goldrush		**2**	**252**	**366**	**68**	**27**	**68**	**0**	**5**	**1.070**	**-**	**-**	**0**	**15**	**0**	**0**	**1.5**
Russet Norkotah		**1**	**242**	**350**	**69**	**30**	**69**	**0**	**1**	**1.073**	**-**	**-**	**10**	**0**	**0**	**10**	**1.0**
ND14261B-1Russ		1	191	336	57	39	57	0	4	1.082	-	-	0	20	0	0	2.0
MN18AF6758-2		1	128	241	53	42	53	0	5	1.086	-	-	10	10	0	0	2.0
ND14174-1Russ		1	45	260	17	75	17	0	8	1.077	-	-	0	50	0	0	1.0
MEAN			327	443						1.080					0.0	0.4	2.2

														PERCENT (%)				
	PVY		CWT/A		PERCENT OF TOTAL[1]						CHIP	OTF	TUBER QUALITY[4]				
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	SCORE[2]	SED[3]	HH	VD	IBS	BC	MAT[5]
Red																	
MSFF353-1R		1	636	674	94	6	94	0	0	1.073	1.5	2.0	0	10	0	0	4.0
W17005-3R		1	503	617	82	16	82	0	2	1.066	-	-	0	20	0	0	2.0
ND14302-8R		1	471	531	89	11	89	0	0	1.065	-	-	0	0	0	0	2.0
ND14151-9R		1	469	551	85	15	85	0	0	1.071	-	-	0	0	0	0	3.0
MN18CO15083-6		1	424	605	70	30	70	0	0	1.074	-	-	0	10	0	0	4.0
MN18W17009-1		1	400	479	84	14	84	0	2	1.067	-	-	0	0	0	20	2.0
W17AF6698-1R		1	393	497	79	20	79	0	1	1.065	-	-	0	10	0	0	2.0
MN18W17026-2		1	392	540	73	24	73	0	3	1.064	-	-	0	10	0	0	2.0
W17027-3R/Y		1	370	449	83	17	83	0	0	1.070	-	-	30	0	0	0	2.0
ND14151-24R		1	370	449	82	15	82	0	2	1.063	-	-	0	0	10	0	3.0
W16025-5R		1	358	485	74	26	74	0	1	1.064	-	-	0	10	0	0	1.0
ND14336-6R		1	334	412	81	16	81	0	3	1.057	-	-	0	0	0	10	1.0
W17002-13R		1	312	467	67	32	67	0	1	1.067	-	-	0	0	10	0	1.0
W16030-4R		1	311	429	73	27	73	0	1	1.066	-	-	0	0	0	0	1.0
W17026-4R		1	304	460	66	34	66	0	0	1.058	-	-	0	0	0	0	2.0
ND14151-15R		1	303	429	71	29	71	0	0	1.073	-	-	10	0	0	0	3.0
Red Norland		**2**	**296**	**352**	**84**	**16**	**84**	**0**	**0**	**1.061**	**-**	**-**	**10**	**20**	**0**	**0**	**1.0**
MN18CO15117-2		1	296	384	77	20	77	0	3	1.075	-	-	0	0	0	0	2.0
MN18SR00011-2		1	292	405	72	28	72	0	0	1.073	-	-	0	10	0	0	2.0
MSFF182-1R	PVYR	1	260	475	55	45	55	0	1	1.085	1.5	2.0	0	30	0	0	3.0
ND14151-20R		1	257	405	63	36	63	0	1	1.064	-	-	0	20	0	0	3.0
Dark Red Norland		**2**	**255**	**302**	**85**	**15**	**85**	**0**	**1**	**1.060**	**-**	**-**	**5**	**10**	**0**	**0**	**1.5**
W17027-2R		1	240	439	55	44	55	0	2	1.061	-	-	0	0	0	0	1.0
Red LaSoda		**1**	**234**	**289**	**81**	**18**	**81**	**0**	**1**	**1.067**	**-**	**-**	**0**	**10**	**0**	**10**	**2.5**
MSFF130-1R	PVYR	1	203	365	56	44	56	0	0	1.067	-	-	0	10	0	0	2.0
ND14299-3RY		1	202	293	69	30	69	0	1	1.070	-	-	0	20	0	0	1.0
ND14168B-2R		1	179	370	48	49	48	0	3	1.084	-	-	0	0	0	0	2.0
W17007-5R		1	171	306	56	42	56	0	2	1.063	-	-	0	20	0	0	1.0
MSFF160-1R		1	121	218	56	42	56	0	2	1.058	-	-	0	10	0	0	4.0
MSFF145-2R		1	110	265	42	58	42	0	1	1.070	-	-	0	0	0	0	1.0
MSFF223-1RY	PVYR	1	108	269	40	57	40	0	3	1.077	1.5	2.0	0	0	0	0	1.0
MSFF228-1RY		1	63	321	20	80	20	0	0	1.064	-	-	0	0	0	0	1.0
MEAN			301	423						1.068					0.6	1.3	2.0

														PERCENT (%)				
	PVY		CWT/A		PERCENT OF TOTAL[1]						CHIP	OTF	TUBER QUALITY[4]					
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	SCORE[2]	SED[3]	HH	VD	IBS	BC	MAT[5]	
Speciality																		
MSFF335-2RR		1	545	654	83	17	83	0	0	1.063	2.0	2.0	0	0	0	0	4.0	
MN18TX17760-2		1	484	544	89	4	89	0	6	1.067	2.0	3.0	0	0	0	0	3.0	
MSFF351-1RR		1	369	496	74	19	74	0	6	1.064	-	-	0	0	0	10	3.0	
MN18CO16154-9		1	310	441	70	29	70	0	1	1.089	-	-	0	0	100	0	2.0	
MSFF335-1RR		1	279	566	49	51	49	0	0	1.069	-	-	0	0	0	0	3.0	
MN18TX17730-8		1	194	426	46	53	46	0	2	1.072	1.5	2.0	0	10	0	0	3.0	
MSFF134-2RR		1	141	274	51	47	51	0	2	1.066	-	-	0	20	0	0	1.0	
MN18CO16213-2		1	63	253	25	75	25	0	0	1.075	1.5	2.0	0	0	0	0	2.0	
MEAN			298	457						1.070					12.5	1.3	2.6	
$HSD_{0.05}$			303	361						0.009								

[1]SIZE: B: < 2 in.; A: 2-3.25 in.; OV: > 3.25 in.; PO: Pickouts.

[2]CHIP SCORE: SNAC Scale (Out of the field); Ratings: 1-5; 1: Excellent, 5: Poor.

[3]SED: Stem End Defect, Based on Paul Bethke's (USDA/UWisconsin - Madison) 0 - 5 scale. 0 = no SED; 3 = significant SED; 5 = severe SED

[4]QUALITY: HH: Hollow Heart; BC: Brown Center; VD: Vascular Discoloration; IBS: Internal Brown Spot. Percent of 40 Oversize and/or A-size tubers cut.

[5]MATURITY RATING: August 24, 2021; Ratings 1-5; 1: Early (vines completely dead); 5: Late (vigorous vine, some flowering).

[6]Enviroweather: Entrican Station. Planting to vine kill

Plant Date: 5/5/2021

Vine Kill: 8/27/2021

Days from planting to vine kill: 114

Table 3

MICHIGAN STATE UNIVERSITY
POTATO BREEDING and GENETICS

ADAPTATION TRIAL, TABLESTOCK LINES
MONTCALM RESEARCH CENTER
May 5 to September 27, 2021 (145 days)
DD Base 40°F 3402[7]

											PERCENT (%)							LB[6]
	PVY		CWT/A		PERCENT OF TOTAL[1]						TUBER QUALITY[2]							RAUDPC
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	HH	VD	IBS	BC	SCAB[3]	MAT[4]	BRUISE[5]	x100
MSZ551-1	PVYR	2	548	588	93	5	91	2	2	1.077	0	20	20	5	1.2	4.0	2.1	0.2
MSX245-2Y		2	511	547	93	6	92	1	1	1.087	0	10	0	0	1.7	4.0	2.4	10.4
MSX156-1Y		2	482	502	96	2	84	12	2	1.069	0	0	0	0	2.2	3.0	-	29.9
MSBB343-2Y		2	474	502	95	5	92	3	0	1.082	5	10	0	0	1.8	2.0	1.2	-
MSV093-1Y		2	451	494	91	6	91	0	2	1.078	0	0	0	0	1.7	3.0	1.0	-
Blackberry		2	429	530	81	19	81	0	0	1.062	0	0	0	0	2.2	3.0	0.4	-
MSV179-1		2	427	445	96	2	95	1	2	1.064	5	5	5	0	1.5	3.0	1.9	-
MSZ109-08PP		2	413	476	87	11	87	0	2	1.064	0	0	0	0	1.3	2.5	0.5	-
MSCC447-1WR		2	397	436	91	9	90	1	0	1.074	0	0	0	0	2.2	3.5	2.1	24
MSCC447-01WP		2	379	447	84	16	84	0	1	1.076	0	0	0	0	2.7	3.5	2.9	-
MSAA174-1	PVYR	2	375	413	91	7	90	0	3	1.065	0	10	15	25	1.8	3.0	1.7	-
MSCC302-1		2	372	444	82	17	82	0	0	1.079	0	0	0	5	2.0	2.0	2.4	8.2
MSDD483-1	PVYR	2	364	461	79	21	79	0	1	1.077	0	0	10	0	2.0	2.5	-	-
MSZ615-2		2	346	369	94	6	94	0	0	1.071	0	5	0	0	1.5	1.5	1.4	-
MSZ590-1SPL		2	344	404	85	14	85	0	1	1.068	10	0	0	0	1.3	2.5	1.5	14
MST252-1Y		2	332	416	80	14	80	0	6	1.072	0	5	0	0	1.5	1.0	1.5	27.3
MSZ416-8RY		2	332	380	87	9	87	0	4	1.059	0	5	0	0	1.0	2.0	0.5	-
MSZ598-2		2	330	357	92	7	91	1	1	1.073	0	10	0	0	1.8	2.0	1.3	-
MSAA101-01RR		2	324	431	75	25	75	0	0	1.079	0	0	0	0	1.2	2.5	2.2	-
MSZ427-3R		2	313	378	83	17	83	0	0	1.062	0	5	0	0	2.7	1.5	1.2	-
MSCC553-1R	PVYR	2	305	342	89	9	88	1	1	1.071	0	0	0	0	2.5	3.0	1.1	12.4
MSZ513-2		2	286	317	90	9	90	0	1	1.074	0	0	0	0	1.7	2.0	0.9	-
MSBB371-1YSPL		2	280	330	85	15	85	0	0	1.077	0	5	0	0	1.3	1.5	1.3	-
Yukon Gold		**2**	**261**	**289**	**91**	**6**	**91**	**0**	**3**	**1.076**	**35**	**5**	**5**	**0**	**1.8**	**1.5**	**0.8**	**43.1**
MSCC720-1WP		2	240	407	59	41	59	0	0	1.081	0	0	0	0	3.3	2.0	2.2	-
MSBB351-1		2	237	261	91	9	89	2	0	1.053	0	0	0	0	1.2	1.5	0.2	16.3
MSAA127-1PP		2	227	318	71	28	71	0	1	1.056	0	0	0	0	1.5	1.5	1.4	-
MSCC614-1RYSPL		2	224	413	54	46	54	0	0	1.082	0	5	0	0	1.7	2.5	nd	30.4
MSDD254-1SPL		2	220	244	90	9	89	1	1	1.062	10	5	0	5	1.8	1.0	0.2	-

											PERCENT (%)							LB[6]
	PVY		CWT/A		PERCENT OF TOTAL[1]						TUBER QUALITY[2]							RAUDPC
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	HH	VD	IBS	BC	SCAB[3]	MAT[4]	BRUISE[5]	x100
MSBB364-1		2	213	228	93	5	93	0	2	1.051	0	0	0	0	1.5	3.0	0.6	-
MSZ157-3		2	208	322	65	34	65	0	1	1.078	0	0	0	5	2.5	2.0	0.5	-
MSZ427-1R		2	201	339	62	18	61	1	19	1.066	0	10	0	0	1.5	2.5	0.6	-
Superior		**2**	**169**	**209**	**81**	**19**	**81**	**0**	**0**	**1.071**	**0**	**5**	**0**	**0**	**0.7**	**1.0**	**1.0**	-
MEAN			334	395						1.071					1.8	2.3	1.3	
$HSD_{0.05}$			270	260						0.013								

[1]SIZE: B: < 2 in.; A: 2-3.25 in.; OV: > 3.25 in.; PO: Pickouts.

[2]QUALITY: HH: Hollow Heart; BC: Brown Center; VD: Vascular Discoloration; IBS: Internal Brown Spot. Percent of 40 Oversize and/or A-size tubers cut.

[3]SCAB DISEASE RATING: MSU Scab Nursery; 0: No Infection; 1: Low Infection <5%; 3: Intermediate; 5: Highly Susceptible.

[4]MATURITY RATING: August 24, 2021; Ratings 1-5; 1: Early (vines completely dead); 5: Late (vigorous vine, some flowering). Plant Date: 5/5/2021

[5]BRUISE: Simulated blackspot bruise test average number of spots per tuber. Vine Kill: 9/8/2021

[6]LB RAUDPC: Late blight (*P. infestans* US-23) foliar disease reaction. [7]Enviroweather: Entrican Station. Planting to vine kill 126

Table 4

MICHIGAN STATE UNIVERSITY
POTATO BREEDING and GENETICS

PRELIMINARY TRIAL, CHIP-PROCESSING LINES
MONTCALM RESEARCH CENTER
May 5 to September 14, 2021 (132 days)
DD Base 40°F 3402[9]

													PERCENT (%)							LB[8]
	PVY		CWT/A		PERCENT OF TOTAL[1]						CHIP	OTF	TUBER QUALITY[4]							RAUDPC
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	SCORE[2]	SED[3]	HH	VD	IBS	BC	SCAB[5]	MAT[6]	BRUISE[7]	x100
MSBB190-2		1	564	583	97	3	96	1	0	1.081	1.0	2.0	0	0	0	0	1.7	3.0	3.2	-
MSDD376-4	PVYR	1	560	600	93	5	92	1	1	1.093	1.0	0.0	10	0	0	0	1.5	3.0	3.4	-
MSFF079-16	PVYR	1	551	565	98	2	89	9	0	1.078	1.0	1.0	20	10	0	0	-	3.0	2.1	-
MSEE207-2	PVYR	1	534	562	95	5	95	0	0	1.080	1.0	1.0	0	0	0	0	0.5	3.0	1.6	-
MSFF031-3	PVYR	1	517	591	88	12	88	0	0	1.074	1.0	1.0	0	10	0	0	1.2	2.0	1.7	-
MSEE063-6	PVYR	1	508	537	95	5	93	1	1	1.079	2.0	3.0	10	10	0	0	0.7	3.0	2.3	-
MSFF031-6	PVYR	1	507	557	91	9	91	0	0	1.070	1.0	2.0	0	0	0	0	1.0	3.0	2.3	-
MSEE035-4	PVYR	1	472	514	92	8	91	1	1	1.089	1.0	1.0	10	0	0	0	1.2	4.0	4.1	-
MSFF008-1		1	455	485	94	6	93	1	0	1.074	-	-	0	0	0	0	1.2	3.0	-	-
MSX495-2		1	442	475	93	3	93	0	4	1.079	1.0	0.0	20	0	0	0	2.2	3.0	2.9	0.3
MSDD244-05	PVYR	1	426	460	93	6	91	1	2	1.088	1.5	3.0	20	20	0	0	1.3	3.0	2.9	-
MSEE101-2		1	405	435	93	6	93	0	0	1.090	1.5	1.0	20	0	0	0	0.5	2.0	2.9	-
MSDD372-07	PVYR	1	400	469	85	15	85	0	0	1.093	1.0	1.0	0	0	0	0	1.7	3.0	3.2	-
MSEE163-1		1	397	444	89	10	89	0	0	1.072	-	-	0	30	0	0	1.0	2.0	-	-
MSEE169-1	PVYR	1	397	425	93	5	93	0	2	1.071	-	-	0	50	50	0	1.2	3.0	-	-
MSEE031-3	PVYR	1	392	431	91	6	91	0	3	1.086	1.0	2.0	10	10	0	0	1.3	3.0	3.3	-
MSBB029-1Y		1	387	466	83	14	83	0	2	1.081	1.0	1.0	0	0	0	0	1.0	2.0	1.8	-
Atlantic		**1**	**381**	**415**	**92**	**6**	**92**	**0**	**2**	**1.092**	**1.0**	**1.0**	**40**	**20**	**0**	**0**	**2.8**	**3.0**	**2.5**	**39.7**
MSDD553-1	PVYR	1	365	386	95	5	95	0	0	1.079	1.0	1.0	0	0	0	0	2.2	4.0	1.7	-
MSBB008-3		1	357	395	91	9	91	0	1	1.085	1.0	2.0	20	0	0	10	1.0	2.0	2.5	-
MSDD249-9	PVYR	1	337	354	95	5	94	1	0	1.081	1.0	2.0	0	0	10	0	1.8	3.0	2.6	-
MSEE016-07		1	333	347	96	4	96	0	0	1.092	1.0	1.0	10	0	0	0	1.8	3.0	2.0	-
MSBB190-3		1	326	339	96	4	96	0	0	1.076	-	-	0	0	0	0	2.0	3.0	-	-
MSFF029-10	PVYR	1	324	390	83	17	83	0	0	1.090	1.0	1.0	0	20	0	0	1.8	3.0	1.0	-
MSEE016-10	PVYR	1	322	378	85	15	85	0	0	1.091	1.0	1.0	0	0	0	0	2.0	3.0	3.5	-
MSZ218-5	PVYR	1	319	337	95	5	95	0	0	1.078	-	-	50	10	0	0	1.3	3.0	-	-
MSDD372-15		1	314	329	96	4	96	0	0	1.084	1.0	2.0	10	0	0	0	1.0	4.0	2.0	-
MSAA678-1		1	314	359	87	12	87	0	1	1.075	-	-	10	0	0	0	1.0	2.0	-	-
MSV241-2		1	305	334	91	8	91	0	1	1.091	1.5	1.0	50	20	0	0	2.2	3.0	3.4	-
MSEE002-3		1	304	345	88	12	88	0	0	1.091	1.0	2.0	0	0	0	0	2.2	3.0	2.2	-
MSFF072-1Y	PVYR	1	294	353	83	7	83	0	9	1.085	1.5	1.0	10	0	0	0	1.8	3.0	2.2	-
MSFF073-3	PVYR	1	293	329	89	10	89	0	1	1.089	1.0	2.0	0	0	0	0	0.8	3.0	2.3	-
MSY089-2		1	290	307	94	6	91	3	0	1.076	-	-	0	60	0	10	2.5	3.0	-	-
MSZ042-07		1	288	301	96	3	93	2	2	1.073	-	-	70	20	0	0	1.7	3.0	-	-

													PERCENT (%)							LB[8]
	PVY		CWT/A		PERCENT OF TOTAL[1]						CHIP	OTF	TUBER QUALITY[4]							RAUDPC
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	SCORE[2]	SED[3]	HH	VD	IBS	BC	SCAB[5]	MAT[6]	BRUISE[7]	x100
MSFF002-1		1	277	318	87	13	87	0	0	1.078	1.0	1.0	0	10	0	0	1.5	2.0	1.7	-
MSAA241-1		1	277	291	95	5	95	0	0	1.075	-	-	0	50	0	0	0.8	2.0	-	-
MSFF035-2	PVYR	1	271	330	82	13	82	0	5	1.079	1.0	1.0	10	0	0	0	1.5	1.0	2.8	-
Snowden		**1**	**267**	**309**	**86**	**14**	**86**	**0**	**0**	**1.084**	**1.0**	**2.0**	**0**	**10**	**0**	**0**	**3.0**	**2.0**	**2.6**	**10.1**
MSEE191-3Y	PVYR	1	249	265	94	5	88	5	1	1.072	-	-	30	0	0	0	2.2	4.0	-	-
Pike		**1**	**232**	**263**	**88**	**12**	**88**	**0**	**0**	**1.083**	**1.0**	**2.0**	**0**	**0**	**0**	**0**	**1.0**	**2.0**	**1.8**	-
MSAA266-1		1	202	232	87	4	87	0	9	1.066	-	-	0	0	0	0	1.5	2.0	-	-
MSEE182-3	PVYR	1	114	149	76	24	76	0	0	1.080	1.0	0.0	0	0	10	10	1.7	2.0	0.6	-
MSAA309-15		1	69	120	57	39	57	0	4	1.074	-	-	0	0	0	0	0.8	1.0	-	41.7
MEAN			357	392						1.081							1.5	2.7	2.4	

[1]SIZE: B: < 2 in.; A: 2-3.25 in.; OV: > 3.25 in.; PO: Pickouts.

[2]CHIP SCORE: SNAC Scale (Out of the field); Ratings: 1-5; 1: Excellent, 5: Poor.

[3]SED: Stem End Defect, Based on Paul Bethke's (USDA/UWisconsin - Madison) 0 - 5 scale. 0 = no SED; 3 = significant SED; 5 = severe SED

[4]QUALITY: HH: Hollow Heart; BC: Brown Center; VD: Vascular Discoloration; IBS: Internal Brown Spot. Percent of 40 Oversize and/or A-size tubers cut.

[5]SCAB DISEASE RATING: MSU Scab Nursery; 0: No Infection; 1: Low Infection <5%; 3: Intermediate; 5: Highly Susceptible.

[6]MATURITY RATING: August 24, 2021; Ratings 1-5; 1: Early (vines completely dead); 5: Late (vigorous vine, some flowering).

[7]BRUISE: Simulated blackspot bruise test average number of spots per tuber.

[8]LB RAUDPC: Late blight (*P. infestans* US-23) foliar disease reaction.

Plant Date: 5/5/2021

Vine Kill: 9/8/2021

Days from planting to vine kill: 126

[9]Enviroweather: Entrican Station. Planting to vine kill

Table 5

MICHIGAN STATE UNIVERSITY
POTATO BREEDING and GENETICS

PRELIMINARY TRIAL, TABLESTOCK LINES
MONTCALM RESEARCH CENTER
May 5 to September 14, 2021 (132 days)
DD Base 40°F 3402[7]

			CWT/A		PERCENT OF TOTAL[1]						PERCENT (%) TUBER QUALITY[2]							LB[6] RAUDPC
LINE	PVY Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	HH	VD	IBS	BC	SCAB[3]	MAT[4]	BRUISE[5]	x100
MSCC300-1		1	530	600	88	10	87	2	2	1.072	20	0	0	0	2.8	3.0	1.0	-
MSDD088-1		1	525	558	94	6	93	1	0	1.073	0	0	0	0	1.7	3.0	0.4	47.1
MSEE048-2Y	PVYR	1	467	489	95	5	95	0	0	1.077	0	0	0	0	0.7	3.0	1.8	-
MSDD251-2Y		1	455	500	91	9	91	0	0	1.072	60	0	0	0	2.5	2.0	0.7	27.1
MSEE075-1	PVYR	1	453	461	98	2	91	7	0	1.074	0	10	0	0	2.0	3.0	2.0	-
MSFF211-2	PVYR	1	448	477	94	5	94	0	1	1.065	40	0	0	10	1.3	3.0	0.4	-
MSFF191-1Y	PVYR	1	440	476	92	8	92	0	0	1.068	60	0	0	10	2.0	3.0	0.6	-
MSFF120-2Y		1	405	432	94	6	94	0	0	1.076	0	0	0	10	1.0	2.0	1.4	-
MSZ610-3		1	402	422	95	4	91	4	1	1.082	10	30	50	0	-	3.0	2.8	-
MSEE052-5		1	346	379	91	5	91	0	3	1.073	0	0	0	0	1.7	3.0	0.4	-
MSBB213-1SPL		1	289	319	91	9	88	3	0	1.075	0	10	0	0	1.8	4.0	3.0	-
Reba		**1**	**283**	**305**	**93**	**6**	**93**	**0**	**1**	**1.071**	**10**	**0**	**0**	**0**	**2.2**	**2.0**	**1.6**	-
MSBB323-1		1	276	298	93	7	93	0	0	1.089	0	0	0	50	1.3	3.0	1.0	-
MSX137-6	PVYR	1	260	338	77	21	77	0	2	1.074	0	10	0	0	2.8	2.0	1.4	-
MSDD107-1Y		1	234	329	71	29	71	0	0	1.075	0	0	0	0	1.8	5.0	1.2	-
MSFF055-1Y		1	208	311	67	33	67	0	0	1.068	0	0	0	0	1.0	2.0	1.2	-
MSFF189-1Y		1	199	230	86	14	86	0	0	1.063	0	0	0	0	2.0	1.0	0.2	-
MSFF178-1		1	189	214	88	12	88	0	0	1.066	0	0	0	0	0.8	3.0	0.5	-
MSZ263-4		1	147	191	77	23	77	0	0	1.073	0	0	0	0	1.7	3.0	0.3	-
MSBB262-1YSpl		1	130	259	50	50	50	0	0	1.066	0	0	0	0	2.0	1.0	0	53.1
MSCC512-1PP		1	124	369	34	66	34	0	0	1.068	0	0	0	0	2.5	2.0	1.3	-
MEAN			324	379						1.072					1.8	2.7	1.1	

[1]SIZE: B: < 2 in.; A: 2-3.25 in.; OV: > 3.25 in.; PO: Pickouts.

[2]QUALITY: HH: Hollow Heart; BC: Brown Center; VD: Vascular Discoloration; IBS: Internal Brown Spot. Percent of 40 Oversize and/or A-size tubers cut.

[3]SCAB DISEASE RATING: MSU Scab Nursery; 0: No Infection; 1: Low Infection <5%; 3: Intermediate; 5: Highly Susceptible.

[4]MATURITY RATING: August 24, 2021; Ratings 1-5; 1: Early (vines completely dead); 5: Late (vigorous vine, some flowering).

[5]BRUISE: Simulated blackspot bruise test average number of spots per tuber.

[6]LB RAUDPC: Late blight (*P. infestans* US-23) foliar disease reaction.

Plant Date: 5/5/2021
Vine Kill: 9/8/2021
Days from planting to vine kill: 126

[7]Enviroweather: Entrican Station. Planting to vine kill

Table 6

MICHIGAN STATE UNIVERSITY
POTATO BREEDING and GENETICS

PRELIMINARY TRIAL, PIGMENTED LINES
MONTCALM RESEARCH CENTER
May 5 to September 14, 2021 (132 days)
DD Base 40°F 3402[7]

											PERCENT (%)							LB[6]
	PVY		CWT/A		PERCENT OF TOTAL[1]						TUBER QUALITY[2]							RAUDPC
LINE	Resistant	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	HH	VD	IBS	BC	SCAB[3]	MAT[4]	Bruise[5]	x100
MSEE055-1R	PVYR	1	525	576	91	9	90	1	0	1.074	0	0	0	0	3.0	3.0	1.4	-
MSW476-4RY		1	418	473	88	12	87	1	0	1.078	10	20	0	0	1.3	2.0	1.2	-
MSFF230-2PY		1	409	469	87	10	87	0	3	1.077	0	10	0	0	3.3	4.0	1.8	-
MSBB281-1PY		1	400	423	95	5	95	0	0	1.076	10	0	0	0	2.5	3.0	-	-
MSFF247-2Y	PVYR	1	396	477	83	16	83	0	1	1.069	0	0	0	0	2.0	2.0	0.8	-
MSFF230-1		1	393	605	65	34	65	0	1	1.086	0	0	0	0	3.5	4.0	1.5	-
MSFF200-4PYSPL	PVYR	1	387	507	76	24	76	0	0	1.065	0	10	0	0	2.3	2.0	1.5	-
MSFF142-2Spl		1	379	421	90	10	90	0	0	1.071	0	0	0	10	1.0	2.0	0.8	-
MSBB308-2P		1	367	408	90	10	90	0	0	1.062	0	0	0	0	1.2	2.0	0.9	-
MSFF134-1PP		1	365	444	82	18	82	0	0	1.075	0	0	0	0	1.8	2.0	0.0	-
MSAA157-2PY		1	341	421	81	19	81	0	0	1.071	70	0	0	0	3.3	3.0	1.7	32.0
MSFF305-1RY	PVYR	1	334	385	87	11	87	0	2	1.066	0	10	0	0	1.7	3.0	0.6	-
MSFF034-4P	PVYR	1	321	417	77	19	77	0	5	1.067	40	10	40	0	2.2	3.0	0.6	-
MSFF142-1P		1	317	461	69	31	69	0	0	1.073	0	10	0	0	1.5	4.0	-	-
Dark Red Norland		**1**	**310**	**386**	**80**	**18**	**80**	**0**	**2**	**1.063**	**0**	**0**	**0**	**0**	**1.2**	**1.0**	**0.2**	-
MSX324-1P		1	296	351	84	15	84	0	1	1.086	0	10	0	0	0.5	2.0	2.0	11.6
MSFF334-1Pinto		1	124	205	61	39	61	0	1	1.058	0	0	0	0	0.7	5.0	-	-
MSFF030-1WR	PVYR	1	102	174	59	35	59	0	7	1.059	0	0	0	0	1.2	2.0	-	-
MSFF198-13PY	PVYR	1	101	262	39	61	39	0	0	1.065	0	0	0	0	1.0	4.0	0.6	
MEAN			331	414						1.071					1.9	2.8	1.0	

[1]SIZE: B: < 2 in.; A: 2-3.25 in.; OV: > 3.25 in.; PO: Pickouts.

[2]QUALITY: HH: Hollow Heart; BC: Brown Center; VD: Vascular Discoloration; IBS: Internal Brown Spot. Percent of 40 Oversize and/or A-size tubers cut.

[3]SCAB DISEASE RATING: MSU Scab Nursery; 0: No Infection; 1: Low Infection <5%; 3: Intermediate; 5: Highly Susceptible.

[4]MATURITY RATING: August 24, 2021; Ratings 1-5; 1: Early (vines completely dead); 5: Late (vigorous vine, some flowering).

[5]BRUISE: Simulated blackspot bruise test, average number of spots per tuber.

[6]LB RAUDPC: Late blight (*P. infestans* US-23) foliar disease reaction.

Plant Date: 5/5/2021
Vine Kill: 9/8/2021
Days from planting to vine kill: 126

[7]Enviroweather: Entrican Station. Planting to vine kill

Table 7

MICHIGAN STATE UNIVERSITY
POTATO BREEDING and GENETICS

DIPLOID REPLICATED TRIAL
MONTCALM RESEARCH CENTER
May 5 to September 14, 2021 (132 days)
DD Base 40°F 3402[8]

		CWT/A		PERCENT OF TOTAL[1]								PERCENT (%) TUBER QUALITY[4]						
LINE	N	US#1	TOTAL	US#1	Bs	As	OV	PO	SP GR	CHIP SCORE[2]	OTF SED[3]	HH	VD	IBS	BC	SCAB[5]	MAT[6]	BRUISE[7]
MSHH1037-01	2	435	520	84	16	84	0	1	1.076	2.0	3	0	5	0	0	1.8	3.0	1.5
MSGG685-05	2	395	550	72	24	72	0	5	1.071	1.5	3	0	0	0	0	1.5	3.5	1.1
MSGG863-A1	2	374	405	93	7	93	0	0	1.079	1.0	1	0	5	0	0	2.3	2.5	2.1
Atlantic	**2**	**366**	**393**	**93**	**6**	**93**	**0**	**1**	**1.091**	**1.0**	**1**	**20**	**0**	**0**	**5**	**2.8**	**2.0**	**1.7**
MSHH699-02	2	336	482	70	27	69	0	3	1.073	2.0	2	20	5	5	0	2.8	4.0	1.6
Lamoka	**2**	**324**	**375**	**86**	**13**	**86**	**0**	**1**	**1.086**	**1.0**	**1**	**0**	**10**	**0**	**0**	**1.5**	**2.0**	**1.9**
MSEE815-06	2	266	332	80	15	80	0	6	1.078	1.0	1	20	10	15	40	1.5	2.0	2.8
MSHH618-01	2	251	389	65	31	65	0	4	1.063	2.5	3	0	0	0	0	1.3	3.0	0.8
MSDD829-09	2	230	298	76	22	76	0	1	1.070	2.5	2	0	0	0	0	2.0	4.0	1.3
MSHH1056-01	2	212	290	73	24	73	0	3	1.074	2.0	2	50	5	15	20	2.5	4.0	2.0
MSGG623-A2	2	210	437	48	47	48	0	5	1.083	2.0	2	75	0	0	0	2.3	3.0	1.0
MSGG653-A2	2	205	478	43	50	43	0	7	1.082	2.5	2	0	0	0	0	2.5	3.5	1.5
MSGG676-01	2	192	307	63	33	63	0	4	1.073	1.5	2	10	5	0	0	1.5	3.0	1.3
MSEE824-04	2	186	271	69	31	69	0	0	1.086	1.0	1	65	0	0	0	2.0	2.0	1.1
MSHH701-01	2	145	332	44	53	44	0	3	1.081	1.5	2	5	10	5	10	1.5	4.0	2.4
MSGG600-06	2	131	356	37	61	37	0	2	1.098	1.0	1	0	0	0	0	1.3	2.5	1.4
MSHH972-03	2	106	379	28	72	28	0	0	1.076	2.0	1	0	0	5	0	1.8	3.5	2.2
MSGG603-A5	2	52	342	15	84	15	0	1	1.078	2.5	3	20	0	0	0	2.8	2.0	1.2
MEAN		245	385						1.079							2.0	3.0	1.6
$HSD_{0.05}$		138	162						0.012									

[1]SIZE: B: < 2 in.; A: 2-3.25 in.; OV: > 3.25 in.; PO: Pickouts.

[2]CHIP SCORE: SNAC Scale (Out of the field); Ratings: 1-5; 1: Excellent, 5: Poor.

[3]SED: Stem End Defect, Based on Paul Bethke's (USDA/UWisconsin - Madison) 0 - 5 scale. 0 = no SED; 3 = significant SED; 5 = severe SED

[4]QUALITY: HH: Hollow Heart; BC: Brown Center; VD: Vascular Discoloration; IBS: Internal Brown Spot. Percent of 40 Oversize and/or A-size tubers cut.

[5]SCAB DISEASE RATING: MSU Scab Nursery; 0: No Infection; 1: Low Infection <5%; 3: Intermediate; 5: Highly Susceptible.

[6]MATURITY RATING: August 24, 2021; Ratings 1-5; 1: Early (vines completely dead); 5: Late (vigorous vine, some flowering).

[7]BRUISE: Simulated blackspot bruise test, average number of spots per tuber.

Plant Date: 5/5/2021
Vine Kill: 9/8/2021
Days from planting to vine kill: 126

[8]Enviroweather: Entrican Station. Planting to vine kill

Table 8

MICHIGAN STATE UNIVERSITY

POTATO BREEDING and GENETICS

2019-2021 SCAB DISEASE TRIAL SUMMARY
SCAB NURSERY, MONTCALM RESEARCH CENTER , MI

LINE	3-YR* AVG.	2021 RATING	2021 WORST	2021 N	2020 RATING	2020 WORST	2020 N	2019 RATING	2019 WORST	2019 N
Sorted by ascending 2021 Average Rating;										
MSZ052-13	0.4	0.2	0.5	3	0.5	0.5	3	0.7	1.0	3
MSBB613-7	-	0.3	0.5	3						
MSBB614-15	-	0.3	0.5	3						
MSCC282-3RR	0.5*	0.5	0.5	3	0.5	0.5	3			
MSDD085-13	-	0.5	0.5	3						
MSDD247-11	-	0.5	0.5	3						
MSEE101-2	0.8*	0.5	0.5	3	1.0	1.5	3			
MSEE207-2	0.6*	0.5	0.5	3	0.7	1.0	3			
MSEE247-6WP	0.8*	0.5	0.5	3	1.0	1.5	3			
MSW474-1	-	0.5	0.5	3						
MSX324-1P	0.9	0.5	0.5	3	1.0	1.0	3	1.3	1.5	3
MSEE048-2Y	-	0.7	1.0	3						
MSEE063-6	0.8*	0.7	1.0	3	1.0	1.0	3			
MSFF334-1Pinto	-	0.7	1.0	3						
Superior	**1.4**	**0.7**	**1.0**	**3**	**1.8**	**2.5**	**2**	**1.7**	**2.0**	**3**
MSAA076-04	-	0.8	1.0	2						
Goldrush Russet	**0.6**	**0.8**	**1.5**	**3**	**0.3**	**0.5**	**3**	**0.7**	**1.0**	**3**
MSAA076-6	1.3	0.8	1.0	3	1.3	1.5	3	1.8	2.5	3
MSAA241-1	1.0*	0.8	1.5	3	1.2	1.5	3			
MSAA309-15	-	0.8	1.0	3						
MSAA498-18	0.8*	0.8	1.0	3	0.8	1.0	3			
MSBB012-1Y	-	0.8	1.0	3						
MSCC376-1	-	0.8	1.5	3						
MSDD244-15	-	0.8	1.0	3						
MSFF073-3	-	0.8	1.0	3						
MSFF178-1	-	0.8	1.0	3						
MSY022-2	-	0.8	1.5	3						
MSY543-2	-	0.8	1.5	3						
MSZ242-09	1.2	0.8	1.5	3	1.3	2.0	3	1.5	1.5	2
MSZ248-02	1.3*	0.8	1.5	3	1.7	2.0	3			
Vanguard Russet	1.2	0.8	1.0	3	1.5	2.0	3	1.3	1.5	3
MSAA311-1	-	1.0	2.0	3						
MSAA678-1	-	1.0	1.5	3						
MSBB008-3	-	1.0	1.5	3						
MSBB029-1Y	-	1.0	2.0	3						
MSBB625-2	0.9*	1.0	1.0	3	0.8	1.0	3			
MSBB634-8	1.2	1.0	1.5	3	1.2	1.5	3	1.5	2.0	3
MSCC374-1Y	-	1.0	1.5	3						
MSCC542-1P	1.3*	1.0	1.0	3	1.5	2.0	3			

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LINE	3-YR* AVG.	2021 RATING	2021 WORST	2021 N	2020 RATING	2020 WORST	2020 N	2019 RATING	2019 WORST	2019 N
MSDD372-15	-	1.0	1.0	3						
MSEE054-20	-	1.0	1.5	3						
MSEE163-1	1.0*	1.0	1.0	3	1.0	1.0	3			
MSEE255-1	1.3*	1.0	1.0	3	1.5	1.5	3			
MSFF031-6	-	1.0	1.5	3						
MSFF055-1Y	-	1.0	1.0	3						
MSFF120-2Y	-	1.0	1.5	3						
MSFF142-2Spl	-	1.0	1.5	3						
MSFF198-13PY	-	1.0	1.5	3						
MSZ248-10	1.0*	1.0	1.5	3	1.0	1.5	3			
MSZ416-8RY	1.1	1.0	1.0	3	1.2	1.5	3	1.0	1.5	3
Pike	**1.1**	**1.0**	**1.0**	**3**	**0.8**	**1.0**	**3**	**1.5**	**2.0**	**3**
Dark Red Norland	**1.2***	**1.2**	**2.0**	**3**				**1.2**	**2.0**	**6**
MSAA101-1RR	0.9	1.2	1.5	3	0.8	1.0	3	0.8	1.5	3
MSBB017-1	1.5*	1.2	1.5	3	1.8	2.5	3			
MSBB058-4	-	1.2	1.5	3						
MSBB308-2P	1.2	1.2	1.5	3	1.2	2.0	3	1.2	1.5	3
MSBB351-1	1.0*	1.2	1.5	3	0.8	1.5	3			
MSBB626-11	1.0*	1.2	1.5	3	0.8	1.5	3			
MSBB635-14	1.3	1.2	1.5	3	1.7	2.0	3	1.2	1.5	3
MSDD247-07	-	1.2	1.5	3						
MSDD271-10	-	1.2	1.5	3						
MSEE035-4	-	1.2	1.5	3						
MSEE169-1	1.3*	1.2	1.5	3	1.3	1.5	3			
MSFF008-1	-	1.2	1.5	3						
MSFF030-1WR	-	1.2	1.5	3						
MSFF031-3	-	1.2	1.5	3						
MSZ551-1	1.6	1.2	2.0	3	1.8	2.5	3	1.8	2.0	3
Petoskey	1.3	1.3	2.0	6	1.3	1.5	3	1.3	2.0	3
MSAA036-3	-	1.3	2.0	3						
MSAA252-7	1.4*	1.3	2.5	3	1.5	2.0	3			
MSAA392-5Y	-	1.3	1.5	3						
MSBB323-1	-	1.3	1.5	3						
MSBB371-1YSpl	1.4	1.3	2.0	3	1.2	2.0	3	1.8	2.0	3
MSCC287-1	1.5*	1.3	1.5	3	1.7	2.0	3			
MSDD244-05	-	1.3	2.0	3						
MSEE031-3	1.2*	1.3	2.0	3	1.0	1.0	3			
MSEE074-1	-	1.3	1.5	3						
MSFF211-2	-	1.3	1.5	3						
MSW476-4RY	-	1.3	2.0	3	2.0	2.0	3			
MSX324-2R	1.2	1.3	2.0	3	1.2	1.5	3	1.2	2.0	3

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LINE	3-YR* AVG.	2021 RATING	2021 WORST	2021 N	2020 RATING	2020 WORST	2020 N	2019 RATING	2019 WORST	2019 N
MSZ109-8PP	1.3*	1.3	1.5	3	1.2	1.5	3			
MSZ218-5	-	1.3	1.5	3						
MSZ590-1	1.1	1.3	1.5	3	0.7	1.0	3	1.3	1.5	3
Lamoka	**1.3**	**1.5**	**2.0**	**3**	**0.8**	**1.0**	**3**	**1.5**	**2.0**	**3**
MSAA127-7PP	1.7	1.5	2.0	3	1.7	2.5	3	1.8	2.0	3
MSAA161-4RY	1.4	1.5	2.0	3	1.3	2.5	3	1.3	1.5	3
MSAA217-3	1.9*	1.5	2.0	3	2.3	3.0	3			
MSAA266-1	-	1.5	2.0	3						
MSAA328-4	1.4*	1.5	1.5	3	1.3	1.5	3			
MSBB364-1	1.4	1.5	1.5	3	1.5	2.0	3	1.3	1.5	3
MSCC058-1	1.6*	1.5	2.0	3	1.7	2.0	3			
MSDD376-4	-	1.5	2.5	3						
MSEE075-1Spl	-	1.5	1.5	1						
MSFF002-1	-	1.5	2.5	3						
MSFF035-2	-	1.5	2.0	3						
MSFF142-1P	-	1.5	2.0	3						
MST252-1Y	1.3	1.5	2.0	3	0.8	1.0	3	1.7	2.0	3
MSV179-1	1.5	1.5	1.5	3	1.5	2.5	3	1.5	2.0	2
MSV498-1	1.4	1.5	2.0	3	1.7	2.0	3	1.2	2.0	3
MSZ427-1R	1.0	1.5	2.0	3	0.8	1.0	3	0.7	1.5	3
MSZ615-2	1.4	1.5	2.0	3	1.5	1.5	3	1.2	1.5	3
Bonafide (MSV093-1Y)	1.5	1.7	2.0	3	1.7	2.0	3	1.2	1.5	3
MSAA196-1	1.7*	1.7	2.0	3	1.7	2.5	3			
MSAA260-3	1.4*	1.7	2.0	3	1.2	1.5	3			
MSBB058-3	-	1.7	2.0	3						
MSBB190-2	-	1.7	2.0	3						
MSBB630-2	-	1.7	2.0	3						
MSCC614-1RYSpl	1.7*	1.7	2.0	3	1.7	2.5	3			
MSDD040-01	-	1.7	2.0	3						
MSDD088-1	-	1.7	2.0	3						
MSDD372-07	-	1.7	2.0	3						
MSEE052-5	1.4*	1.7	2.0	3	1.2	1.5	3			
MSEE182-3	1.1*	1.7	3.0	3	0.5	1.0	3			
MSFF305-1RY	-	1.7	2.0	3						
MSX245-2Y	1.8	1.7	2.0	3	1.8	2.0	3	2.0	2.0	3
MSZ042-07	-	1.7	2.0	3						
MSZ263-4	-	1.7	2.0	3						
MSZ513-2	1.6	1.7	2.0	3	1.5	2.0	3	1.7	2.0	3
Huron Chipper	1.7	1.8	2.0	3	1.3	1.5	3	2.0	2.5	3
Mackinaw[PVYR, LBR]	1.7	1.8	2.5	3	1.7	2.0	3	1.5	2.0	3

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SCAB NURSERY, MONTCALM RESEARCH CENTER , MI

LINE	3-YR* AVG.	2021 RATING	2021 WORST	2021 N	2020 RATING	2020 WORST	2020 N	2019 RATING	2019 WORST	2019 N
MSAA174-1	1.7	1.8	2.5	3	1.7	2.0	3	1.5	1.5	3
MSBB213-1Spl	1.5	1.8	2.5	3	1.5	1.5	3	1.3	1.5	2
MSBB230-1	-	1.8	2.0	3						
MSBB343-2Y	-	1.8	2.0	3						
MSCC725-232	1.5*	1.8	2.0	3	1.2	1.5	3			
MSDD107-1Y	-	1.8	2.0	3						
MSDD249-9	-	1.8	2.0	3						
MSDD254-1Spl	-	1.8	2.0	3						
MSEE016-07	-	1.8	2.5	3						
MSFF029-10	-	1.8	2.0	3						
MSFF072-1Y	-	1.8	3.0	3						
MSFF134-1PP	-	1.8	2.0	3						
MSZ242-07	1.4	1.8	2.0	3	1.0	1.5	3	1.3	1.5	3
MSZ598-2	-	1.8	2.0	3						
Yukon Gold	**2.4**	**1.8**	**2.5**	**3**	**2.5**	**2.5**	**1**	**3.0**	**3.5**	**6**
MSAA072-5	-	2.0	3.0	3						
MSBB190-3	-	2.0	2.5	3						
MSBB262-1YSpl	-	2.0	3.0	3						
MSCC302-1	2.0*	2.0	2.5	3	2.0	2.5	3			
MSDD483-1	-	2.0	2.0	3						
MSEE016-10	-	2.0	2.0	3						
MSEE075-1	-	2.0	2.0	2						
MSFF189-1Y	-	2.0	2.0	3						
MSFF191-1Y	-	2.0	2.5	3						
MSFF247-2Y	-	2.0	2.5	3						
MSY544-5R	-	2.0	3.0	3						
MSZ242-13	1.4	2.0	2.0	3	1.2	1.5	3	1.2	1.5	3
Blackberry	1.6	2.2	3.0	3	1.3	1.5	3	1.2	1.5	3
MSCC447-1WR	2.0*	2.2	3.0	3	1.8	2.0	3			
MSCC576-1	2.0*	2.2	2.5	3	1.8	2.0	3			
MSDD553-1	-	2.2	2.5	3						
MSEE002-3	-	2.2	2.5	3						
MSEE191-3Y	-	2.2	2.5	3						
MSFF034-4P	-	2.2	4.0	3						
MSV241-2	-	2.2	3.0	3						
MSX156-1Y	2.3	2.2	2.5	3	2.2	2.5	3	2.7	3.0	3
MSX495-2	-	2.2	3.0	3						
MSZ436-2Spl	1.9	2.2	3.0	3	1.8	2.0	3	1.8	2.0	3
Reba	**2.4**	**2.2**	**2.5**	**3**	**2.7**	**3.0**	**3**	**2.5**	**2.5**	**2**
MSAA091-1	-	2.3	3.0	3						
MSBB075-1Y	2.2*	2.3	3.0	3				2.2	2.5	3

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2019-2021 SCAB DISEASE TRIAL SUMMARY
SCAB NURSERY, MONTCALM RESEARCH CENTER , MI

LINE	3-YR* AVG.	2021 RATING	2021 WORST	2021 N	2020 RATING	2020 WORST	2020 N	2019 RATING	2019 WORST	2019 N
MSFF200-4PYSpl	-	2.3	3.0	3						
MSBB032-1	-	2.5	3.5	3						
MSBB281-1PY	-	2.5	3.0	3						
MSCC512-1PP	2.3*	2.5	4.0	3	2.0	2.0	3			
MSCC553-1R	-	2.5	3.0	3						
MSDD251-2Y	-	2.5	3.5	3						
MSY089-2	-	2.5	3.0	3						
MSZ157-3	-	2.5	3.0	3						
MSBB611-3	2.6*	2.7	3.0	3	2.5	3.5	3			
MSCC447-01WP	-	2.7	3.0	3						
MSZ427-3R	2.0	2.7	3.5	3	2.0	2.5	3	1.3	2.0	3
Russet Norkotah	**2.4**	**2.7**	**3.0**	**3**	**2.5**	**3.0**	**3**	**2.2**	**3.0**	**3**
Atlantic	**2.4**	**2.8**	**3.5**	**3**	**1.9**	**3.0**	**6**	**2.5**	**2.5**	**3**
Manistee	2.8	2.8	3.0	3	2.5	3.0	3	3.0	3.5	3
MSBB375-1	-	2.8	3.5	3						
MSCC300-1	2.4*	2.8	3.5	3	2.0	2.0	3			
MSX137-6	2.3*	2.8	3.0	3	1.7	2.0	3			
MSAA240-5	-	3.0	3.0	3						
MSEE055-1R	2.5*	3.0	3.5	3	2.0	2.5	2			
Snowden	**2.7**	**3.0**	**3.5**	**3**	**2.4**	**3.5**	**6**	2.8	3.5	6
MSAA157-2PY	3.2	3.3	4.0	3	2.8	4.0	3	3.3	3.5	3
MSCC720-1WP	-	3.3	4.0	3						
MSFF230-2PY	-	3.3	4.0	3						
MSFF230-1	-	3.5	4.0	3						
MEAN		1.6			1.5			1.6		

SCAB DISEASE RATING: MSU Scab Nursery plot rating of 0-5; 0: No Infection; 1: Low Infection <5%, no pitted leisions; 3: Intermediate >20%, some pitted leisions (Susceptible, as commonly seen on Atlantic); 5: Highly Susceptible, >75% coverage and severe pitted leisions.

N = Number of replications.

*2-Year Average.

Table 9

MICHIGAN STATE UNIVERSITY

POTATO BREEDING and GENETICS

2021 SCAB DISEASE EARLY GENERATION TRIAL SUMMARY
SCAB NURSERY, MONTCALM RESEARCH CENTER, MI

LINE	2021 RATING	2021 N	LINE	2021 RATING	2021 N
Sorted by ascending 2021 Rating:					
MSFF132-1R	0.5	1	MSGGUNK-4Spl	1.0	1
MSGG088-4	0.5	1	MSFF292-1	1.5	1
MSGG242-1	0.5	1	MSFF321-1	1.5	1
MSGG242-3	0.5	1	MSFF335-2RR	1.5	1
MSGG267-2	0.5	1	MSGG008-11	1.5	1
MSGG268-4	0.5	1	MSGG041-3	1.5	1
MSGG275-1	0.5	1	MSGG080-4Spl	1.5	1
MSGG282-08	0.5	1	MSGG136-1P	1.5	1
MSGG282-09	0.5	1	MSGG190-3	1.5	1
MSGG349-3	0.5	1	MSGG214-08	1.5	1
MSGG394-1	0.5	1	MSGG221-3	1.5	1
MSGG426-2	0.5	1	MSGG248-1	1.5	1
MSGG445-11	0.5	1	MSGG260-7	1.5	1
MSFF017-1	1.0	1	MSGG275-6	1.5	1
MSFF160-1R	1.0	1	MSGG302-1	1.5	1
MSFF182-1R	1.0	1	MSGG302-3	1.5	1
MSFF223-1RY	1.0	1	MSGG331-3	1.5	1
MSFF334-1Pinto	1.0	1	MSGG356-3	1.5	1
MSFF351-1RR	1.0	1	MSGG409-3	1.5	1
MSGG001-7Y	1.0	1	MSGG436-3	1.5	1
MSGG072-3	1.0	1	MSFF022-2	2.0	1
MSGG087-2PY	1.0	1	MSFF037-17	2.0	1
MSGG158-11PP	1.0	1	MSFF077-4	2.0	1
MSGG186-2	1.0	1	MSFF097-6	2.0	1
MSGG190-1	1.0	1	MSFF134-2RR	2.0	1
MSGG282-07	1.0	1	MSFF149-1	2.0	1
MSGG282-10	1.0	1	MSFF206-1	2.0	1
MSGG282-20	1.0	1	MSFF303-3	2.0	1
MSGG333-1	1.0	1	MSFF338-1PP	2.0	1
MSGG349-2	1.0	1	MSFF353-1R	2.0	1
MSGG380-1	1.0	1	MSGG039-10	2.0	1
MSGG385-1	1.0	1	MSGG039-11	2.0	1
MSGG391-2	1.0	1	MSGG084-1	2.0	1
MSGG398-1	1.0	1	MSGG135-1R	2.0	1
MSGG406-1	1.0	1	MSGG137-1R	2.0	1
MSGG407-2	1.0	1	MSGG147-3P	2.0	1
MSGG409-1 (mini)	1.0	1	MSGG163-1	2.0	1
MSGG409-2	1.0	1	MSGG169-2	2.0	1
MSGG432-2	1.0	1	MSGG178-2	2.0	1

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POTATO BREEDING and GENETICS

2021 SCAB DISEASE EARLY GENERATION TRIAL SUMMARY
SCAB NURSERY, MONTCALM RESEARCH CENTER, MI

LINE	2021 RATING	2021 N	LINE	2021 RATING	2021 N
Sorted by ascending 2021 Rating:					
MSGG194-3	2.0	1	MSGG028-4Y	2.5	1
MSGG195-1	2.0	1	MSGG039-08	2.5	1
MSGG216-1	2.0	1	MSGG068-1	2.5	1
MSGG219-1	2.0	1	MSGG068-2	2.5	1
MSGG247-2	2.0	1	MSGG078-7	2.5	1
MSGG263-1	2.0	1	MSGG108-2RR	2.5	1
MSGG276-4	2.0	1	MSGG127-3R	2.5	1
MSGG289-1	2.0	1	MSGG181-5	2.5	1
MSGG290-1	2.0	1	MSGG190-4	2.5	1
MSGG294-1	2.0	1	MSGG207-1	2.5	1
MSGG320-5	2.0	1	MSGG212-2	2.5	1
MSGG328-3	2.0	1	MSGG212-4	2.5	1
MSGG328-5	2.0	1	MSGG254-3	2.5	1
MSGG343-1	2.0	1	MSGG260-6	2.5	1
MSGG365-1	2.0	1	MSGG030-2	3.0	1
MSGG391-1	2.0	1	MSGG030-3	3.0	1
MSGG415-7	2.0	1	MSGG102-1RR	3.0	1
MSGG433-2	2.0	1	MSGG105-1RP	3.0	1
MSGG437-4	2.0	1	MSGG018-2Y	3.5	1
MSFF335-1RR	2.5	1	MSGG156-12PP	4.0	1
MSFF335-3Pinto	2.5	1			

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MICHIGAN STATE UNIVERSITY
POTATO BREEDING and GENETICS

2021 MSU LATE BLIGHT VARIETY TRIAL
PLANT PATHOLOGY FARM, LANSING, MI

Line Sort:			*RAUDPC Sort:*				
		RAUDPC[1]			RAUDPC[1]	*Pedigrees go w/ RAUDPC Sort*	
LINE	N	MEAN	LINE	N	MEAN	Female	Male
Atlantic	**2**	**39.7**	MSBB630-2	3	0.1	Lady Liberty	Kalkaska
Huron Chipper	3	0.5	MSBB058-3	3	0.2	NY148	MSR127-2
Lamoka	**2**	**28.6**	MSZ551-1	3	0.2	MSM182-1	MSL268-D
Mackinaw	1	2.1	MSX495-2	2	0.3	MSQ131-A	Kalkaska
MSAA091-1	3	28.4	MSBB611-3	2	0.4	NY148	MSR128-4Y
MSAA157-2PY	2	32.0	Huron Chipper	3	0.5	MSQ070-1	MSR156-7
MSAA196-1	1	0.6	MSAA196-1	1	0.6	MSW151-5	MSQ440-2
MSAA252-7	3	1.5	MSBB634-8	3	0.6	Lady Liberty	MSR169-8Y
MSAA309-15	3	41.7	MSZ042-7	1	0.7	ND8331Cb-3	MSQ086-3
MSAA498-18	1	10.8	MSBB613-7	3	0.9	Saginaw Chipper	McBride
MSBB058-3	3	0.2	MSBB614-15	3	1.1	Saginaw Chipper	MSR127-2
MSBB058-4	3	7.7	MSBB635-14	3	1.4	Lady Liberty	MSS297-3
MSBB213-1Spl	3	12.1	MSAA252-7	3	1.5	NY148	MSQ089-1
MSBB262-1YSpl	2	53.1	Mackinaw	1	2.1	Saginaw Chipper	Lamoka
MSBB351-1	2	16.3	MSBB626-11	3	4.3	Saginaw Chipper	Kalkaska
MSBB611-3	2	0.4	MSBB058-4	3	7.7	NY148	MSR127-2
MSBB613-7	3	0.9	MSBB625-2	3	8.0	MSW242-1	MSS297-3
MSBB614-15	3	1.1	MSCC302-1	1	8.2	MST500-1	MSQ086-3
MSBB625-2	3	8.0	**Snowden**	**3**	**10.1**	**Lenape**	**Wischip**
MSBB626-11	3	4.3	MSX245-2Y	2	10.4	Manistee	McBride
MSBB630-2	3	0.1	MSAA498-18	1	10.8	MSV092-2	Elkton
MSBB634-8	3	0.6	MSDD247-11	3	11.4	Mackinaw	MSV383-B
MSBB635-14	3	1.4	MSX324-1P	2	11.6	MSN105-1	Colonial Purple
MSCC302-1	1	8.2	MSBB213-1Spl	3	12.1	MSS576-5	Lamoka
MSCC447-1WR	2	24.0	MSCC553-1R	2	12.4	Red Marker #2	ND7132-1R
MSCC553-1R	2	12.4	MSZ590-1Spl	2	14.0	Superior	Picasso
MSCC614-1RYSpl	2	30.4	MSEE247-6WP	2	15.8	MSX148-1WP	MSZ219-46
MSDD088-1	1	47.1	MSBB351-1	2	16.3	MSS483-1	MSQ440-2
MSDD247-11	3	11.4	MSCC447-1WR	2	24.0	MSX035-WP	MSQ086-3
MSDD251-2Y	2	27.1	MSDD251-2Y	2	27.1	Yukon Gem	MSM288-2Y
MSEE247-6WP	2	15.8	MST252-1Y	3	27.3	MSL024-AY	MSL211-3
MST252-1Y	3	27.3	MSAA091-1	3	28.4	MSS165-2Y	Lamoka
MSX156-1Y	3	29.9	**Lamoka**	**2**	**28.6**	**NY120**	**NY115**
MSX245-2Y	2	10.4	MSX156-1Y	3	29.9	MSI005-20Y	Boulder
MSX324-1P	2	11.6	MSCC614-1RYSpl	2	30.4	Gold Nugget	MSS934-4
MSX495-2	2	0.3	MSAA157-2PY	2	32.0	Spartan Splash	Purple Heart
MSY022-2	3	32.5	MSY022-2	3	32.5	MSS176-1	MST096-2Y
MSZ042-7	1	0.7	**Atlantic**	**2**	**39.7**	**Wauseon**	**Lenape**
MSZ551-1	3	0.2	MSAA309-15	3	41.7	Atlantic	Lamoka
MSZ590-1Spl	2	14.0	**Yukon Gold**	**1**	**43.1**	**W5279-4**	**Norgleam**
Snowden	**3**	**10.1**	MSDD088-1	1	47.1	NY154	MSQ086-3
Yukon Gold	**1**	**43.1**	MSBB262-1YSpl	2	53.1	MSN105-1	MSR241-4RY

[1]Ratings indicate the average plot RAUDPC (Relative Area Under the Disease Progress Curve).
LB Isolate used: US-23

Table 11

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2021 BLACKSPOT BRUISE SUSCEPTIBILITY TEST
SIMULATED BRUISE SAMPLES*

ENTRY	SP GR	NUMBER OF SPOTS PER TUBER						PERCENT (%) BRUISE FREE	AVERAGE SPOTS/TUBER
		0	1	2	3	4	5+		
ADAPTATION TRIAL, CHIP-PROCESSING LINES									
Manistee	1.080	8	9	6	1	1	0	32	1.1
Huron Chipper	1.082	10	6	5	3	1	0	40	1.2
MSAA091-1	1.084	5	12	5	3	0	0	20	1.2
MSAA498-18	1.081	7	6	6	5	1	0	28	1.5
MSBB614-15	1.078	5	7	7	6	0	0	20	1.6
Lamoka	**1.080**	**4**	**9**	**8**	**4**	**1**	0	**15**	**1.6**
MSBB058-4	1.079	3	11	5	5	1	0	12	1.6
MSY022-2	1.079	5	7	6	4	2	1	20	1.8
FL2137	1.087	4	7	5	5	3	1	16	2.0
MSDD085-13	1.082	0	7	12	6	0	0	0	2.0
MSBB075-1Y	1.078	3	7	6	5	3	1	12	2.0
MSCC725-232	1.075	1	1	8	2	1	0	8	2.1
MSAA311-1	1.076	3	4	8	8	1	1	12	2.1
MSZ242-13	1.093	3	7	6	4	2	3	12	2.2
Mackinaw	1.081	0	5	11	7	2	0	0	2.2
MSBB230-1	1.088	0	8	8	3	6	0	0	2.3
MSW474-1	1.078	2	4	7	6	4	2	8	2.5
MSBB017-1	1.080	1	4	5	10	4	1	4	2.6
Petoskey	1.090	2	3	6	8	4	2	8	2.6
Petoskey (POP)	1.089	1	4	5	9	6	0	4	2.6
Atlantic	**1.089**	**1**	**4**	**6**	**7**	**2**	**4**	**4**	**2.7**
MSAA076-6	1.083	0	4	7	7	5	2	0	2.8
MSBB626-11	1.084	2	5	5	4	3	6	8	2.8
Snowden	**1.084**	**2**	**3**	**1**	**12**	**3**	**3**	**8**	**2.8**
MSDD247-11	1.091	2	5	2	4	7	5	8	3.0
MSAA217-3	1.094	0	0	10	8	1	5	0	3.0
MSZ242-07	1.092	0	2	5	10	4	4	0	3.1
MSDD247-07	1.095	0	2	5	9	5	4	0	3.2
MSAA252-7	1.081	0	2	2	8	6	3	0	3.3
MSBB611-3	1.083	0	1	4	6	5	7	0	3.6
MSAA260-3	1.083	0	1	4	7	5	8	0	3.6
MSBB058-3	1.080	0	1	3	6	4	10	0	3.8
MSBB630-2	1.078	1	3	0	3	3	15	4	4.0
MSCC058-1	1.083	0	1	2	4	8	10	0	4.0
ADAPTATION TRIAL, TABLESTOCK LINES									
MSBB351-1	1.053	21	4	0	0	0	0	84	0.2
MSDD254-1SPL	1.062	20	5	0	0	0	0	80	0.2
Blackberry	1.062	17	8	1	0	0	0	65	0.4

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SIMULATED BRUISE SAMPLES*

ENTRY	SP GR	NUMBER OF SPOTS PER TUBER						PERCENT (%) BRUISE FREE	AVERAGE SPOTS/TUBER
		0	1	2	3	4	5+		
MSZ109-08PP	1.064	13	14	0	0	0	0	48	0.5
MSZ416-8RY	1.059	16	8	3	0	0	0	59	0.5
MSZ157-3	1.078	13	11	1	0	0	0	52	0.5
MSBB364-1	1.051	13	10	2	0	0	0	52	0.6
MSZ427-1R	1.066	14	7	4	0	0	0	56	0.6
Yukon Gold	**1.076**	**10**	**11**	**2**	**2**	0	0	**40**	**0.8**
MSZ513-2	1.074	9	10	4	1	0	0	38	0.9
Superior	**1.071**	**7**	**11**	**6**	**1**	0	0	**28**	**1.0**
MSV093-1Y	1.078	8	9	5	2	0	0	33	1.0
MSCC553-1R	1.071	7	10	6	2	0	0	28	1.1
MSZ427-3R	1.062	7	9	7	2	0	0	28	1.2
MSBB343-2Y	1.082	8	7	7	3	0	0	32	1.2
MSZ598-2	1.073	7	6	9	1	1	0	29	1.3
MSBB371-1YSPL	1.077	5	11	6	4	0	0	19	1.3
MSZ615-2	1.071	6	8	7	4	0	0	24	1.4
MSAA127-1PP	1.056	4	11	6	4	0	0	16	1.4
MSZ590-1SPL	1.068	7	4	8	5	0	0	29	1.5
MST252-1Y	1.072	3	9	10	1	1	0	13	1.5
MSAA174-1	1.065	4	7	6	4	2	0	17	1.7
MSV179-1	1.064	5	4	7	6	3	0	20	1.9
MSCC447-1WR	1.074	2	4	9	9	1	0	8	2.1
MSZ551-1	1.077	2	5	9	4	4	0	8	2.1
MSAA101-01RR	1.079	0	6	12	3	4	0	0	2.2
MSCC720-1WP	1.081	0	4	11	9	0	0	0	2.2
MSCC302-1	1.079	3	4	4	9	5	0	12	2.4
MSX245-2Y	1.087	1	3	9	8	4	0	4	2.4
MSCC447-01WP	1.076	0	3	1	5	2	2	0	2.9
PRELIMINARY TRIAL, CHIP-PROCESSING LINES									
MSEE182-3	1.080	13	9	2	1	0	0	52	0.6
MSFF029-10	1.090	10	7	7	1	0	0	40	1.0
MSEE207-2	1.080	2	9	9	4	0	0	8	1.6
MSFF002-1	1.078	0	11	11	1	1	0	0	1.7
MSDD553-1	1.079	3	9	7	5	1	0	12	1.7
MSFF031-3	1.074	2	11	7	2	3	0	8	1.7
Pike	**1.083**	**3**	**6**	**9**	**7**	**0**	**0**	**12**	**1.8**
MSBB029-1Y	1.081	4	6	8	5	1	1	16	1.8
MSDD372-15	1.084	4	6	7	6	2	1	15	2.0
MSEE016-07	1.092	3	3	7	10	0	0	13	2.0
MSFF079-16	1.078	3	5	7	6	4	0	12	2.1

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2021 BLACKSPOT BRUISE SUSCEPTIBILITY TEST
SIMULATED BRUISE SAMPLES*

ENTRY	SP GR	NUMBER OF SPOTS PER TUBER 0	1	2	3	4	5+	PERCENT (%) BRUISE FREE	AVERAGE SPOTS/TUBER
MSFF072-1Y	1.085	1	6	8	7	3	0	4	2.2
MSEE002-3	1.091	1	4	9	9	1	0	4	2.2
MSFF073-3	1.089	1	5	6	9	2	0	4	2.3
MSEE063-6	1.079	2	4	6	9	0	2	9	2.3
MSFF031-6	1.070	2	6	8	7	3	2	7	2.3
MSBB008-3	1.085	1	4	2	12	2		5	2.5
Atlantic	**1.092**	**1**	**5**	**4**	**12**	**2**	**1**	**4**	**2.5**
Snowden	**1.084**	**0**	**4**	**8**	**11**	**1**	**2**	**0**	**2.6**
MSDD249-9	1.081	0	7	3	10	2	3	0	2.6
MSFF035-2	1.079	1	4	3	11	4	2	4	2.8
MSEE101-2	1.090	1	1	6	10	6	1	4	2.9
MSDD244-05	1.088	0	2	5	10	7	0	0	2.9
MSX495-2	1.079	0	1	2	9	1	1	0	2.9
MSBB190-2	1.081	0	0	5	7	2	3	0	3.2
MSDD372-07	1.093	0	2	6	7	4	6	0	3.2
MSEE031-3	1.086	0	2	1	11	9	1	0	3.3
MSV241-2	1.091	0	1	2	12	7	3	0	3.4
MSDD376-4	1.093	0	3	1	9	5	6	0	3.4
MSEE016-10	1.091	0	0	3	8	9	3	0	3.5
MSEE035-4	1.089	0	0	0	5	8	8	0	4.1
PRELIMINARY TRIAL, TABLESTOCK LINES									
MSBB262-1YSpl	1.066	26	1	0	0	0	0	96	0.0
MSFF189-1Y	1.063	22	4	0	0	0	0	85	0.2
MSZ263-4	1.073	19	6	1	0	0	0	73	0.3
MSEE052-5	1.073	19	3	3	0	0	0	76	0.4
MSFF211-2	1.065	17	6	2	0	0	0	68	0.4
MSDD088-1	1.073	14	11	0	0	0	0	56	0.4
MSFF178-1	1.066	13	10	1	0	0	0	54	0.5
MSFF191-1Y	1.068	14	8	3	0	0	0	56	0.6
MSDD251-2Y	1.072	13	9	4	0	0	0	50	0.7
MSBB323-1	1.089	7	14	2	2	0	0	28	1.0
MSCC300-1	1.072	8	11	6	1	0	0	31	1.0
MSFF055-1Y	1.068	9	6	7	3	0	0	36	1.2
MSDD107-1Y	1.075	9	5	8	2	1	0	36	1.2
MSCC512-1PP	1.068	9	5	6	5	0	0	36	1.3
MSFF120-2Y	1.076	7	10	2	4	1	1	28	1.4
MSX137-6	1.074	5	10	4	6	0	0	20	1.4
Reba	**1.071**	**2**	**11**	**9**	**4**	**0**	**0**	**8**	**1.6**
MSEE048-2Y	1.077	3	10	3	6	2	0	13	1.8
MSEE075-1	1.074	2	8	7	3	5	0	8	2.0

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ENTRY	SP GR	NUMBER OF SPOTS PER TUBER 0	1	2	3	4	5+	PERCENT (%) BRUISE FREE	AVERAGE SPOTS/TUBER
MSZ610-3	1.082	0	1	9	9	5	1	0	2.8
MSBB213-1SPL	1.075	0	3	3	11	6	2	0	3.0
PRELIMINARY TRIAL, PIGMENTED LINES									
MSFF134-1PP	1.075	23	1	0	0	0	0	96	0.0
Dark Red Norland	**1.063**	**24**	**4**	**1**	**0**	**0**	**0**	**83**	**0.2**
MSFF034-4P	1.067	10	14	0	0	0	0	42	0.6
MSFF305-1RY	1.066	14	9	2	1			54	0.6
MSFF198-13PY	1.065	12	10	3	0	0	0	48	0.6
MSFF142-2Spl	1.071	8	16	0	1	0	0	32	0.8
MSFF247-2Y	1.069	10	9	6	0	0	0	40	0.8
MSBB308-2P	1.062	9	12	2	2	0	0	36	0.9
MSW476-4RY	1.078	8	8	6	3	0	0	32	1.2
MSEE055-1R	1.074	6	8	7	4	0	0	24	1.4
MSFF200-4PYSPL	1.065	4	9	8	4	0	0	16	1.5
MSFF230-1	1.086	2	12	8	3	0	0	8	1.5
MSAA157-2PY	1.071	3	6	10	4	0	0	13	1.7
MSFF230-2PY	1.077	0	11	9	5	0	0	0	1.8
MSX324-1P	1.086	0	7	8	6	1	0	0	2.0
DIPLOID REPLICATED TRIAL									
MSHH618-01	1.063	20	5	1	0	0	0	77	0.3
MSGG863-A1	1.079	6	10	7	2	0	0	24	1.2
MSHH699-02	1.074	3	10	11	1	0	0	12	1.4
MSHH1056-01	1.074	4	10	4	5	2	0	16	1.6
MSGG653-A2	1.081	4	2	12	7	0	0	16	1.9
MSHH701-01	1.081	2	7	8	4	1	1	9	1.9
Lamoka	**1.087**	**1**	**9**	**7**	**6**	**2**	**0**	**4**	**2.0**
MSEE824-04	1.086	1	6	6	11	1	0	4	2.2
MSEE815-06	1.078	1	5	5	10	3	0	4	2.4
MSGG676-01	1.073	0	4	8	9	3	1	0	2.6
MSHH972-03	1.076	0	4	9	7	2	3	0	2.6
MSHH1037-01	1.076	0	3	11	3	2	6	0	2.9
MSGG623-A2	1.083	0	3	3	3	2	3	0	2.9
MSGG600-06	1.098	0	3	7	6	6	3	0	3.0
Atlantic	**1.091**	**0**	**1**	**4**	**10**	**10**	**0**	**0**	**3.2**
MSGG603-A5	1.078	0	2	5	8	6	4	0	3.2
MSGG685-05	1.071	0	2	3	9	6	5	0	3.4
MSDD829-09	1.07	0	1	4	5	7	8	0	3.7

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		NUMBER OF SPOTS PER TUBER						PERCENT (%) BRUISE FREE	AVERAGE SPOTS/TUBER
ENTRY	SP GR	0	1	2	3	4	5+		
USPB/SFA TRIAL CHECK SAMPLES (Not bruised)									
NY163	1.083	19	5	1	0	0	0	76	0.3
NYOR14Q9-9	1.080	20	4	0	1	0	0	80	0.3
W12078-76	1.092	17	7	1	0	0	0	68	0.4
Lamoka	**1.082**	**13**	**9**	**3**	**0**	**0**	**0**	**52**	**0.6**
MSZ242-13	1.094	15	6	3	1	0	0	60	0.6
MSAFB605-4	1.078	12	11	1	1	0	0	48	0.6
MSW474-1	1.081	14	7	3	1	0	0	56	0.6
Snowden	**1.079**	**13**	**7**	**3**	**1**	**1**	**0**	**52**	**0.8**
NY165	1.081	8	9	6	2	0	0	32	1.1
USPB/SFA TRIAL BRUISE SAMPLES									
NY163	1.083	2	5	9	3	5	1	8	2.3
W12078-76	1.092	0	7	6	5	6	1	0	2.5
MSZ242-13	1.094	2	3	5	7	5	3	8	2.8
NYOR14Q9-9	1.080	1	5	3	6	8	2	4	2.8
Lamoka	**1.082**	**1**	**2**	**5**	**7**	**6**	**4**	**4**	**3.1**
MSAFB605-4	1.078	1	1	4	10	5	4	4	3.2
MSW474-1	1.081	0	1	3	3	4	14	0	4.1
NY165	1.081	0	1	1	1	3	19	0	4.5
Snowden	**1.079**	**0**	**0**	**0**	**1**	**3**	**21**	**0**	**4.8**

* Thirteen to twenty-five (dependent on the number of replications used) A-size tuber samples were collected at harvest, held at 50 F at least 12 hours, and placed in a six-sided plywood drum and tumbled to produce simulated bruising. Samples were abrasive-peeled and scored 10/26/21 (SNAC trial by POP) all other trials 11/11/2021 (PBG).

The table is presented in ascending order of average number of spots per tuber.