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2012 USPB/SFA Chip Variety Trials

Sponsored by
The United States Potato Board
&
The Snack Food Association

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Introduction

The search for new and improved potato varieties is an ongoing and challenging task. The annual United States Potato Board (USPB) & Snack Food Association (SFA) Chip Variety Trials are designed to evaluate advanced and promising seedlings from the various US potato breeding programs. The eleven trial locations for the 2012 USPB-SFA chip variety trial research program were California, Florida, Idaho, Maine, Michigan, Missouri, North Carolina, North Dakota, Oregon, Pennsylvania, and Wisconsin. These sites provide a wide range of climates, soil types and cultural practices to help assess the strengths and weaknesses of new potato varieties. The typical growing season for chipping potatoes ranges from January through May for Southern locations, which provide out-of-field chip product, while Northern sites grow from May through September, with cold storage chipping of their production to begin in October and run through April or later.

Since the USPB-SFA chip trials began in 1985, there have been 93 advanced potato breeding lines and varieties (Table 5) evaluated and compared with potato chip industry standards. Thirty-six of these lines have been named and released and twenty-five are in national commercial seed production. The most recently released varieties are Accumulator, Beacon Chipper, Lamoka, Nicolet, Tundra and Waneta - with a total of 719 acres of US seed in 2012. These new varieties offer the chipping industry higher yield potential, longer storage life and more consistent chip quality.

The goal for the USPB-SFA chip trials is to identify superior new potato lines which will be well adapted for their production area and utilization market. The potato characteristics that the chip industry is looking for are high, stable yield, disease and pest resistance, stress tolerance, specific gravity (high dry matter), bright potato chip color, potatoes free from defects, and long-term cold storage capabilities. For Southern production an earlier variety to replace Atlantic is needed which does not have internal heat necrosis or soft rot problems. Northern production would benefit from advanced selections that offer the potential of providing acceptable chip quality from long-term cold storage temperatures below 50°F and does not have susceptibility to scab and other organisms.

Note: advanced storage studies on sugar and chip color from multiple temperatures and sample dates are being conducted on the 2012 test crop in ID, ME, MI, ND and WI and will be reported in a separate report in May of 2013 once all the long-term storage experiments have been concluded.

2012 USPB-SFA Trials

Note that Oregon was added as a new trial site in 2011, bringing the total number of trials to eleven states. All chip trial coordinators have both Atlantic (for yield and specific gravity) and Snowden (for cold temperature storage chipping) as check varieties in their trials. Entries evaluated in the 2012 SPB-SFA chip trials and their sources are listed below:

The following 14 entries were tested in all eleven states:

A01143-3C USDA-ARS, Aberdeen, ID – Rich Novy
AF4157-6 University of Maine – Greg Porter
CO00188-4W Colorado State University – David Holm
CO00197-3W Colorado State University – David Holm
CO02321-4W Colorado State University – David Holm
MN99380-1Y University of Minnesota – Christian Thill
MSL292-A Michigan State University – David Douches
ND8304-2 North Dakota State University – Susie Thompson
ND8305-1 North Dakota State University – Susie Thompson
NY140 Cornell University - Walter DeJong
NY148 Cornell University - Walter DeJong
W2978-3 University of Wisconsin – Felix Navarro
W4980-1 University of Wisconsin – Felix Navarro
W6483-5 University of Wisconsin – Felix Navarro

The following five entries were tested only in the four southern trials (CA, FL, MO, NC):

AF0338-17 University of Maine – Greg Porter
MSL007-B Michigan State University – David Douches
MSQ086-3 Michigan State University – David Douches
MSR127-2 Michigan State University – David Douches
W5955-1 University of Wisconsin – Felix Navarro

The following two entries were tested in only the seven northern states (ID, ME, MI, MN/ND, OR, PA and WI):

MSR061-1 Michigan State University – David Douches
W5015-12 University of Wisconsin – Felix Navarro

Eleven state trial coordinators for 2012:

California Brian Kirschenmann, Kirschenmann Farms, Inc., Bakersfield, CA
Florida Doug Gergela, University of Florida, Hastings, FL
Idaho Jeff Stark, University of Idaho, Aberdeen, ID
Maine Greg Porter, University of Maine, Presque Isle, ME
Michigan Chris Long, Michigan State University, East Lansing, MI
Missouri Travis Dirnberger, Black Gold Farms, Charleston, MO
North Carolina Craig Yenko, NC State University, Raleigh, NC
Oregon Phil Hamm, Oregon State University, Hermiston, OR
Pennsylvania Bill Lamont, Penn State University, University Park, PA
Red River Valley Marty Glynn, USDA Potato Research Worksite,
East Grand Forks, MN
Wisconsin Mary LeMere, University of Wisconsin, Hancock, WI

The 2012 USPB-SFA trials provided a wealth of evaluations on field performance of 14 potato breeding lines over all eleven state locations, 2 in seven northern states, and 5 in four southern states. The performance of our chipping industry varieties Atlantic and Snowden were again confirmed as important benchmark standards. Atlantic always had specific gravity at or near the top while Snowden had yields near the top in these trials.

Of the 21 clones evaluated in the southern trials, 13 clones generally had average or greater total and marketable yields in all locations, and average or better specific gravity in all locations: A01143-3C, AF0338-17, AF4157-6, CO002321-4W, MSL292-A, MSQ086-3, MSR127-2, NY140, NY148, Snowden, W2978-3 and W4980-1. NY140 had the highest average total and marketable yield (385 cwt/a) while MSL007-B had the lowest yield total and marketable yield (193 cwt/a). Five clones had lower than average total and marketable yield in three of the four southern locations, and lower than average specific gravity in all four locations: CO00188-4W, CO00197-3W, ND8304-2, W5955-1 and W6483-5. ND8305-1 had lower than average total and marketable yield, but had the highest specific gravity (1.093) averaged over the 4 southern trials (4 units above Atlantic). ND8304-2 and W6483-5 had the lowest specific gravity, averaging 1.073 and 1.072 (16 and 17 units below Atlantic) respectively. Chip scores from processing from the field were all acceptable, with MSL007-B and W5955-1 the brightest.

Of the 18 clones evaluated in the northern trials, 10 clones had average or greater total and marketable yields in all locations, and average or better specific gravity in all locations: AF4157-6, Atlantic, CO00197-3W, CO002321-4W, MSL292-A, MSR061-1, NY148, Snowden, W4980-1, and W5015-12. While W5015-12 had the highest average total yield (445 cwt/a), it did significantly better in some locations (PA, WI) but poorer at others (MI). Snowden, W5015-12 and NY148 had the highest marketable yields. Five clones had lower total and marketable yields and lower than average specific gravity: CO00188-4W, MN99380-1Y, ND8304-2, W2978-3 and W6483-5. ND8305-1 had lower than average total and marketable yields, but the highest average specific gravity (1.089), 5 units above Atlantic. Chip scores from processing from the field were almost all

acceptable, with MSL292-A and ND8305-1 averaging the brightest and W4980-1 the darkest.

Of the 16 clones tested at all 11 state sites, 7 clones had average or greater total and marketable yields in all locations, and average or better specific gravity in all locations: AF4157-6, Atlantic, CO002321-4W, MSL292-A, NY148, Snowden and W4980-1. Three clones had lower than average total and marketable yield and lower than average specific gravity: CO00188-4W, ND8304-2 and W6483-5. NY140 had the highest average total yield (441 cwt/a) while Snowden had the highest average marketable yield (376 cwt/a) over the 11 states. ND8305-1 had the highest average specific gravity at 1.090 which was 4 units above Atlantic.

TABLE 1. 2012 USPB-SFA CHIP TRIALS - TOTAL YIELD (cwt/acre)

ENTRIES / STATES	SOUTHERN TRIALS					NORTHERN TRIALS								overall
	CA	FL	MO	NC	avg.	ID	ME	MI	ND	OR	PA	WI	avg.	avg.
ATLANTIC all	370	317	479	322	372	482	225	551	204	720	237	485	415	399
SNOWDEN all	440	325	501	373	410	541	270	495	149	647	286	705	442	430
A01143-3C all	437	307	486	396	407	517	na	386	123	661	291	503	414	411
AF0338-17 4S	478	327	462	337	401	na	na	na	na	na	na	na	na	401
AF4157-6 all	327	276	467	383	363	446	220	453	203	585	199	632	391	381
CO00188-4W all	414	259	381	281	334	382	192	376	130	635	146	528	341	339
CO00197-3W all	491	256	402	388	384	555	249	451	157	711	243	527	413	403
CO002321-4W all	455	237	515	400	402	387	224	437	115	601	189	467	346	366
MN99380-1Y all	na	na	527	415	471	422	210	401	157	729	193	304	345	373
MSL007-B 4S	311	189	369	201	268	na	na	na	na	na	na	na	na	268
MSL292-A all	140	294	473	263	293	486	220	430	169	613	270	425	373	344
MSQ086-3 4S	306	236	539	316	349	na	na	na	na	na	na	na	na	349
MSR061-1 7N	na	na	na	na	na	513	246	438	204	655	219	319	371	371
MSR127-2 4S	411	274	440	277	351	na	na	na	na	na	na	na	na	351
ND8304-2 all	480	269	477	318	386	298	191	339	138	481	133	678	323	346
ND8305-1 all	464	249	432	333	370	453	195	279	167	460	na	610	361	364
NY140 all	506	293	537	494	458	724	292	540	160	786	262	257	432	441
NY148 (E106-4) all	372	284	570	414	410	603	282	513	177	780	300	423	440	429
W2978-3 all	271	234	501	356	341	416	227	500	174	577	189	287	339	339
W4980-1 all	413	294	475	367	387	368	256	521	201	569	238	460	373	378
W5015-12 7N	na	na	na	na	na	558	288	408	206	684	297	671	445	445
W5955-1 4S	437	199	503	388	382	na	na	na	na	na	na	na	na	382
W6483-5 all	464	262	408	338	368	464	221	460	266	582	159	582	391	382
average	399	269	474	350	373	479	236	443	172	638	227	492	386	380

TABLE 2. 2012 USPB-SFA CHIP TRIALS - MARKETABLE YIELD (cwt/acre)

ENTRIES / STATES	SOUTHERN TRIALS					NORTHERN TRIALS								overall avg.
	CA	FL	MO	NC	avg.	ID	ME	MI	ND	OR	PA	WI	avg.	
ATLANTIC all	344	239	435	280	325	356	203	504	170	439	217	428	331	329
SNOWDEN all	367	257	452	339	354	424	245	446	136	530	268	677	389	376
A01143-3C all	372	225	366	292	314	393	na	288	106	572	208	492	343	331
AF0338-17 4S	428	262	393	282	341	na	na	na	na	na	na	na	na	341
AF4157-6 all	254	167	403	314	285	313	180	367	185	488	188	575	328	312
CO00188-4W all	372	179	266	202	255	159	142	242	116	544	136	474	259	257
CO00197-3W all	315	178	317	308	280	395	192	315	133	514	203	473	318	304
CO002321-4W all	385	172	456	316	332	316	171	365	105	406	178	390	276	296
MN99380-1Y all	na	na	454	302	378	304	139	243	140	496	152	273	250	278
MSL007-B 4S	212	121	302	138	193	na	na	na	na	na	na	na	na	193
MSL292-A all	95	212	411	205	231	358	185	392	154	472	259	401	317	286
MSQ086-3 4S	244	178	398	228	262	na	na	na	na	na	na	na	na	262
MSR061-1 7N	na	na	na	na	na	407	208	374	193	525	212	265	312	312
MSR127-2 4S	342	224	378	179	281	na	na	na	na	na	na	na	na	281
ND8304-2 all	386	166	406	225	296	141	142	252	124	379	121	623	255	270
ND8305-1 all	327	155	316	235	258	222	118	164	154	379	na	556	266	263
NY140 all	447	180	472	439	385	595	251	498	133	273	243	235	318	342
NY148 (E106-4) all	307	148	450	326	308	444	244	438	162	670	276	348	369	347
W2978-3 all	210	182	425	276	273	321	192	368	160	462	168	269	277	276
W4980-1 all	350	232	441	300	331	290	219	484	188	449	207	446	326	328
W5015-12 7N	na	na	na	na	na	438	228	272	188	576	237	644	369	369
W5955-1 4S	413	140	467	277	324	na	na	na	na	na	na	na	na	324
W6483-5 all	434	183	364	272	313	373	167	377	200	361	139	515	305	308
average	330	190	399	273	298	347	190	355	153	474	201	449	310	305

TABLE 3. 2012 USPB-SFA CHIP TRIALS - SPECIFIC GRAVITY

ENTRIES / STATES	SOUTHERN TRIALS					NORTHERN TRIALS								overall
	CA	FL	MO	NC	avg.	ID	ME	MI	ND	OR	PA	WI	avg.	avg.
ATLANTIC all	100	81	99	77	89	96	85	77	81	82	79	85	84	86
SNOWDEN all	89	72	96	78	84	96	85	70	87	80	77	81	82	83
A01143-3C all	82	69	84	69	76	87	na	75	90	72	77	78	80	78
AF0338-17 4S	91	74	90	77	83	na	na	na	na	na	na	na	na	83
AF4157-6 all	91	77	94	80	86	95	80	64	82	77	77	74	78	81
CO00188-4W all	78	74	80	78	78	95	77	62	73	76	73	66	75	76
CO00197-3W all	85	73	83	75	79	91	80	67	92	77	70	76	79	79
CO002321-4W all	92	75	92	82	85	99	86	73	92	79	83	83	85	85
MN99380-1Y all	na	na	77	72	75	85	72	65	74	72	63	68	71	72
MSL007-B 4S	95	69	94	80	85	na	na	na	na	na	na	na	na	85
MSL292-A all	94	71	92	75	83	95	78	68	89	81	73	72	79	81
MSQ086-3 4S	88	69	80	66	76	na	na	na	na	na	na	na	na	76
MSR061-1 7N	na	na	na	na	na	94	79	71	86	76	77	73	79	79
MSR127-2 4S	96	74	90	75	84	na	na	na	na	na	na	na	na	84
ND8304-2 all	79	66	74	73	73	84	75	58	71	69	65	62	69	71
ND8305-1 all	96	87	99	88	93	105	87	75	94	87	na	83	89	90
NY140 all	96	74	85	71	82	86	79	72	77	65	80	78	77	78
NY148 (E106-4) all	100	78	97	78	88	91	87	83	91	79	88	91	87	88
W2978-3 all	90	70	85	70	79	85	77	59	78	68	63	61	70	73
W4980-1 all	91	75	84	72	81	89	80	64	78	77	68	81	77	78
W5015-12 7N	na	na	na	na	na	97	85	76	82	77	68	80	81	81
W5955-1 4S	86	64	96	69	79	na	na	na	na	na	na	na	na	79
W6483-5 all	77	66	78	67	72	78	71	59	76	65	69	62	69	70
average	90	73	88	75	81	92	80	69	83	76	74	75	78	79

TABLE 4. 2012 USPB-SFA CHIP TRIALS - FIELD CHIP COLOR

ENTRIES / STATES	SOUTHERN TRIALS						NORTHERN TRIALS					
	CA	FL	MO	NC	SFA avg.	AGT avg.	MI	ND	OR	PA	SFA avg.	AGT avg.
ATLANTIC all	1.5	64.6	69	1.5	1.5	66.8	60.1	71	1.3	53	1.3	61.4
SNOWDEN all	1	67.5	70	1	1.0	68.8	60.6	74	1	49	1.0	61.2
A01143-3C all	2.5	64.2	70	1	1.8	67.1	59.4	74	1.6	53	1.6	62.1
AF0338-17 4S	1	62.1	69	1.5	1.3	65.6	na	na	na	na	na	na
AF4157-6 all	2	66.1	70	1	1.5	68.1	53.7	73	1	54	1.0	60.2
CO00188-4W all	1	65.5	69	1.5	1.3	67.3	59	74	1	53	1.0	62.0
CO00197-3W all	1.5	65.2	70	1.5	1.5	67.6	59.6	76	1.1	52	1.1	62.5
CO002321-4W all	1.5	64.1	70	1.5	1.5	67.1	55.9	74	1.1	53	1.1	61.0
MN99380-1Y all	na	na	69	2	2.0	69.0	63.9	74	1.5	40	1.5	59.3
MSL007-B 4S	2	68.9	72	2	2.0	70.5	na	na	na	na	na	na
MSL292-A all	2	63.8	70	1.5	1.8	66.9	60.9	76	1.4	54	1.4	63.6
MSQ086-3 4S	1.5	64.8	69	1	1.3	66.9	na	na	na	na	na	na
MSR061-1 7N	na	na	na	na	na	na	60.5	71	1.6	51	1.6	60.8
MSR127-2 4S	2.5	63	68	2	2.3	65.5	na	na	na	na	na	na
ND8304-2 all	2	62.7	72	1.5	1.8	67.4	57.8	72	1.3	52	1.3	60.6
ND8305-1 all	2	63.3	70	1	1.5	66.7	59.9	72	1	na	1.0	66.0
NY140 all	1	68.1	69	2	1.5	68.6	61.5	74	1.8	50	1.8	61.8
NY148 (E106-4) all	2	65.1	69	1	1.5	67.1	55.3	71	2.1	50	2.1	58.8
W2978-3 all	2	66.5	72	1.5	1.8	69.3	55.5	74	1.3	54	1.3	61.2
W4980-1 all	2	65.4	69	1.5	1.8	67.2	57.4	71	1.4	41	1.4	56.5
W5015-12 7N	na	na	na	na	na	na	60.7	73	1.3	51	1.3	61.6
W5955-1 4S	1.5	na	70	2	1.8	70.0	na	na	na	na	na	na
W6483-5 all	1.5	66.5	70	1.5	1.5	68.3	57.3	74	1	49	1.0	60.1
average	1.7	65.1	70	1.5	1.6	67.5	58.8	73.2	1.3	50.5	1.3	60.9

Table 5. USPB-SFA Chip Trial Entry Summary: 1985 - 2012

Atlantic, 1985-2012 and Snowden, 1988-2012 as Standards

WNC672-2, 1985-1987	W870, 1991-1993	W1355-1 (White Pearl), 2001-2003
WNC521-12, 1985-1986	A80559-2, 1991-1993	NDTX4930-5W, 2001-2003
W879, 1985-1986	NDA2031-2, 1992-1994	ND2470-27 (Dakota Crisp), 1999, 2003-2004
W833, 1985	Suncrisp , 1992-1994	A91790-13, 2002-2004
TXA17-1, 1985-1986	B0178-34, 1992-1994	MSF099-3, 2002-2004
A70369-2, 1985-1986	NDO1496-1 (Ivory Crisp), 1993-1995	B1240-1, 2004
ND860-2, 1985-1986	NY95, 1993	W1773-7, 2004
G670-11, 1985	AF875-15, 1994-1996	ND5822C-7 (Dakota Diamond), 2003-2005
BR7093-24 (Gemchip), 1986-1988	ND2417-6 (NorValley), 1994-1996	W1201 (Megachip), 2003-2005
W848 (Niska), 1986-1987	ND2471-8, 1994-1996	AF2211-9, 2004-2006
NY71 (Kanona), 1986-1988	NY102 (Monticello), 1994-1995	MSJ461-1, 2004-2006
NY81 (Steuben), 1986-1988	NY103 (Eva), 1995-1997	NY132, 2004-2006
NY72 (Allegany), 1987-1989	BCO894-2, 1995-1997	MSJ316-A, 2005-2007
AF236-1 (Somerset), 1987-1989	ATX85404-8, 1996-1998	W2133-1 (Nicolet), 2005-2007
MS700-70, 1987-1989	AF1433-4, 1996-1998	Beacon Chipper , 2006-2008
AC80545-1 (Chipeta), 1987-1989	ND2676-10 (Dakota Pearl), 1997-1999	CO95051-7W, 2006-2008
LA01-38 (LaBelle), 1988-1990	B0564-8 (Harley Blackwell), 1997-1999	MSJ147-1, 2006-2008
MS716-15, 1988-1990	B0564-9, 1997-1999	W2324-1 (Accumulator), 2006-2008 (2009 4S)
MS700-83 (Spartan Pearl), 1988-1990	NY115, 1997-1999	CO96141-4W, 2007-2009
W855 (Snowden), 1988-1990	W1313, 1999	MSJ036-A (Kalkaska), 2008-2009
Saginaw Gold , 1988-1990	NY112 (Marcy), 1998-2000	AF2291-10, 2008-2010
AF875-16 (Mainechip), 1989-1991	AF1668-60, 1998-2000	CO97043-14W, 2008-2010
D195-24, 1989	MSNT-1, 1998-2000	CO97065-7W, 2008-2010
ND2008-2, 1990	MSA091-1 (Liberator), 1999-2001	NY138 (Waneta), 2008-2010
Coastal Chip , 1990	B0766-3, 2000-2002	NY139 (Lamoka), 2008-2010
CS7232-4, 1990-1992	AF1775-2, 2000-2002	W2717-5 (Lelah), 2008-2010
Andover , 1991-1993	W1431, 2000-2002	MSJ126-9Y (McBride), 2009-2011
Pike , 1991-1993	NY120, 2000-2002	W2310-3 (Tundra), 2008,2010-2011
NY87 (Reba), 1991	AF1424-7, 2001-2003	W2978-3, 2010-2012
W887, 1991-1993	MSG227-2, 2001-2003	W5015-12 (Pinnacle), 2010-2012 (7N)
		ND8331Cb-2, 2011

**CALIFORNIA REGIONAL TRIAL
USPB-SFA CHIP TRIAL - 2012
KIRSCHENMANN FARMS - BAKERSFIELD, CA**

VARIETY OR LINE#	TOTAL YIELD (cwt/acre)	MARKETABLE YIELD (cwt/acre)	Percent of total yield					AVG. TUBER WT - OZ.	SPECIFIC GRAVITY	CHIP COLOR
			< 1 7/8	1 7/8 - 3	3 - 4	> 4	CULLS			
ATLANTIC	370	344	8	81	11	0	0	3.7	1.100	1.5
SNOWDEN	440	367	17	81	3	0	0	2.6	1.089	1.0
A01143-3C	437	372	14	80	6	0	0	2.6	1.082	2.5
AF0338-17	478	428	8	88	4	0	3	4.0	1.091	1.0
AF4157-6	327	254	23	73	3	0	0	2.6	1.091	2.0
CO00188-4W	414	372	10	82	7	0	0	2.9	1.078	1.0
CO00197-3W	491	315	25	70	5	0	11	3.5	1.085	1.5
CO002321-4W	455	385	10	77	13	0	6	4.3	1.092	1.5
MSL007-B	311	212	32	68	0	0	1	2.0	1.095	2.0
MSL292-A	140	95	24	67	9	0	9	2.8	1.094	2.0
MSQ086-3	306	244	20	79	1	0	0	2.6	1.088	1.5
MSR127-2	411	342	17	83	1	0	0	2.8	1.096	2.5
ND8304-2	480	386	19	80	0	0	0	2.5	1.079	2.0
ND8305-1	464	327	28	71	1	0	4	2.6	1.096	2.0
NY140	506	447	8	77	13	2	4	4.5	1.096	1.0
NY148	372	307	17	81	2	0	1	2.7	1.100	2.0
W2978-3	271	210	24	65	6	5	0	2.5	1.090	2.0
W4980-1	413	350	14	82	4	0	1	2.9	1.091	2.0
W5955-1	437	413	6	86	6	2	0	4.2	1.086	1.5
W6483-5	464	434	4	62	29	5	3	5.5	1.077	1.5

PLANTING DATE:

HARVEST DATE: JUNE 11, 2012

FLORIDA REGIONAL LOCATION

Local Coordinators:

Mr. Doug Gergela
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Cooperating Grower:

University of Florida/IFAS
Hastings Demonstration Unit, Hastings, FL

Cooperating Chip Processor:

Utz Quality Foods Inc.
Hanover, PA

Trial Data:

Planting Site:	University of Florida/IFAS, Hastings Demonstration Unit Research Farm, Hastings, FL
Planting Date:	February 1, 2012
Harvest Date:	May 30, 2012 (119 days)
Growing Conditions:	Overall, the growing conditions in the region for the 2012 growing season were rated as fair. Seven days saw temperatures at or below freezing, however there were only two freezing events from the planting date forward. Overall, temperatures were warmer than normal in March, April and May. February, March and April were drier than normal. The combination of hotter and drier than normal conditions stressed the vines at times and reduced the bulking of many clones. The very warm soil temperatures also contributed to some tuber rot. Overall, total and marketable yields were below average for most clones.
Experimental Design:	Each variety/clone was planted in a single 250 ft row as directed by the SFA protocol. Four 20 ft sections of each row were harvested and graded. This was not a randomized and replicated experiment. Only means were calculated.
Row Spacing:	Machine planted. Approx. 8 inches in-row, 40 inches between-rows.
Fertilizer:	pre-plant: 50-100-150/A; side-dress: 1 application of 75-0-125/A and 1 application of 75-0-0/A (N-P-K per Acre)
Pest Control:	Fumigant: Pic-Clor 60, 11 Gallons/A, pre-plant Admire Pro, 8.7 oz/A, Quadris, 10.4 oz/A, and Vydate C-LV, 68 oz/A in furrow at planting Dual Magnum, 1 pt/A and TriCor DF, 8 oz/A at boarding off for weed control Fungicides and Insecticides sprayed as needed. IPM program used.
Chip Ratings:	Chips were prepared and rated following the procedures outlined in the Snack Food Association Chipping Potato Handbook (1995). Chips were prepared and fried by Utz Quality Foods, Hanover, PA. Chip scores are presented in Table 2.

Table 1. Production statistics for SFA clones.

Clone	Tuber Yield				Size Class Distribution ^{3,4} (%)					Size Class Range ⁴ (%)		Specific Gravity
	No.1 ¹ cwt/A	Total cwt/A	% No.1 ²	% Culls	1	2	3	4	5	2 to 4	3 to 4	
Atlantic	239	317	95	21	4	57	23	15	0	95	38	1.081
Snowden	257	325	86	7	12	78	7	0	0	86	7	1.072
AF0338-17	262	327	93	14	7	72	21	0	0	93	21	1.074
AF4157-6	167	276	82	27	15	81	1	0	0	82	1	1.077
A01143-3C	225	307	78	8	20	75	3	0	0	78	4	1.069
CO00197-3W	178	256	80	13	16	74	6	1	0	80	6	1.073
CO02321-4W	172	237	84	13	13	64	15	6	0	84	21	1.075
CO00188-4W	179	259	75	8	21	71	5	0	0	75	5	1.074
MSL007-B	121	189	72	11	24	72	0	0	0	72	0	1.069
MSL292-A	212	294	87	17	11	67	12	8	0	87	20	1.071
MSQ086-3	178	236	86	12	12	76	9	1	0	86	10	1.069
MSR127-2	224	274	91	10	7	73	14	5	0	91	19	1.074
ND8304-2	166	269	83	26	14	64	10	10	0	83	19	1.066
ND8305-1	155	249	68	8	28	65	1	2	0	68	3	1.087
NY140	180	293	91	33	7	61	22	8	0	91	30	1.074
NY148	148	284	65	20	29	65	0	0	0	65	0	1.078
W6483-5	183	262	92	24	6	55	24	12	0	92	37	1.066
W4980-1	232	294	93	15	6	68	21	4	0	93	25	1.075
W5955-1	140	199	89	22	9	72	15	3	0	89	17	1.064
W2978-3	182	234	87	11	11	75	9	4	0	87	12	1.070
Average	190	269										1.073

¹No.1 Yield: marketable yield, size classes 2 to 4

²Percent No. 1: calculated based on weight using the formula, No. 1 Wt / Total Yield Wt

³Size Class Distribution: calculated based on weight using the formula, Class Wt / (Total Yield Wt – Cull Wt).

⁴Size Classes: 1 = 1.5 to 1 7/8", 2 = 1 7/8 to 2.5", 3 = 2.5 to 3.25", 4 = 3.25 to 4", 5 = > 4"; Class size C (<1.5") was recorded and is included in Total Yield but is not shown as a separate size category.

Table 2. Plant growth and tuber characteristics for SFA clones.

Clone	Plant Growth Characteristics ¹				Tuber Characteristics ²						
	Percent Stand	Early Vigor	Vine Type	Vine Maturity	IFC	SC	ST	TS	ED	APP	Chip Rating ³
Atlantic	96	6	9	1.0	2	6	5	3	5	7	64.6
Snowden	85	4	7	1.0	1	6	5	2	4	6	67.5
AF0338-17	84	6.5	8-5	1.0	1	6	5	3	7	7	62.1
AF4157-6	79	5.5	8	1.0	1	7	6	3	6	3	66.1
A01143-3C	87	6	9-6	1.0	1	7	5	3	4	6	64.2
CO00197-3W	89	6.3	5	1.0	2	7	6	4	4	7	65.2
CO02321-4W	84	5.8	8	1.0	2	7	6	3	3	5	64.1
CO00188-4W	82	7	8	1.0	1	7	5	3	5	7	65.5
MSL007-B	81	4	7	1.0	1	6	5	3	6	7	68.9
MSL292-A	104	6	8	1.0	2	6	5	2	5	6	63.8
MSQ086-3	88	6	7	2.0	1	7	6	3	6	6	64.8
MSR127-2	79	5	8-7	1.0	1	6	5	3	6	7	63.0
ND8304-2	78	4.5	7	1.0	2	7	6	3	4	5	62.7
ND8305-1	103	5.3	8	1.0	2	7	6	3	3	5	63.3
NY140	70	5.3	8	1.0	1	7	6	4	5	6	68.1
NY148	93	6.3	9	1.0	2	7	6	2	7	3	65.1
W6483-5	75	6.3	8	1.0	1	8	7	3	6	6	66.5
W4980-1	92	6	8-5	1.0	2	6	5	3	5	7	65.4
W5955-1	90	5.8	8	1.0	1	6	5	3	6	7	na
W2978-3	78	5	7	1.0	1	7	6	3	6	6	66.5

¹Plant Growth Characteristics.

Percent Stand: based on machine planted 8 inch in-row spacing, 20 ft plot.

Early Vigor: 1 = no emergence, 2 = leaves in rosette, 3 = plants < 2 in., 4 = plants 2 to 4 in., 5 = plants 4 to 6 in., 6 = plants 6 to 8 in., 7 = plants 8 to 10 in., 8 = plants 10 to 12 in., 9 = plants > 12 inches.

Vine Type: 1 = decumbent - poor canopy, 2 = decumbent - fair canopy, 3 = decumbent - good canopy, 4 = spreading - poor canopy, 5 = spreading - fair canopy, 6 = spreading - good canopy, 7 = upright - poor canopy, 8 = upright - fair canopy, 9 = upright - good canopy.

Vine Maturity: 1 = completely dead, 3 = yellow and dying, 5 = moderately senesced, 7 = starting to senesce, 9 = green and vigorous.

²Tuber Characteristics.

Internal Flesh Color (IFC): 1 = white, 2 = cream, 3 = light yellow, 4 = medium yellow, 5 = dark yellow, 6 = pink, 7 = red, 8 = blue, 9 = purple.

Skin Color (SC): 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

Skin Texture (ST): 1 = partially russet, 2 = heavy russet, 3 = moderate russet, 4 = light russet, 5 = netted, 6 = slightly netted, 7 = moderately smooth, 8 = smooth, 9 = very smooth.

Eye Depth (ED): 1 = very deep, 3 = deep, 5 = intermediate, 7 = shallow, 9 = very shallow

Overall Appearance (APP): 1 = very poor, 3 = poor, 5 = fair, 7 = good, 9 = excellent.

³Chip Rating: Chips were prepared and rated following the procedures outlined in the Snack Food Association Chipping Potato Handbook (1995). A sub-sample of potatoes from the trial was shipped to Utz Quality Snacks, chipped and scored according to the Hunter Lab rating.

Table 3. External and internal defects for SFA clones.

Clone	% External Tuber Defects ¹					% Internal Tuber Defects ²			
	Growth Cracks	Mis-shapen	Sun-burned	Rotten & misc.	Total Culls	HH	BR	CRS	IHN
Atlantic	1	0	3	18	21	0	0	4	6
Snowden	0	0	1	6	7	0	0	10	10
AF0338-17	0	0	1	13	14	0	0	0	0
AF4157-6	2	0	0	25	27	0	0	12	0
A01143-3C	0	0	2	6	8	0	0	3	5
CO00197-3W	0	0	3	9	13	0	0	1	1
CO02321-4W	1	0	5	8	13	0	0	1	1
CO00188-4W	0	0	1	6	8	0	0	4	1
MSL007-B	0	0	1	10	11	0	0	4	0
MSL292-A	1	0	2	14	17	0	0	5	1
MSQ086-3	0	0	1	11	12	0	0	0	0
MSR127-2	1	0	2	8	10	0	0	3	1
ND8304-2	0	0	2	24	26	0	0	1	0
ND8305-1	0	0	1	7	8	0	0	6	3
NY140	0	0	4	29	33	0	0	1	0
NY148	0	0	2	18	20	0	0	11	3
W6483-5	2	0	1	22	24	0	0	1	0
W4980-1	1	0	2	12	15	0	0	0	19
W5955-1	0	0	2	20	22	0	0	3	0
W2978-3	0	0	0	10	11	0	0	14	6

¹**External Tuber Defects:** Total Culls is sum of growth cracks, misshapen, sunburned and rotten/miscellaneous.

²**Percent Internal Tuber Defects:** percent of tubers showing defects; HH = hollow heart, BR = brown rot, CRS = corky ringspot, IHN = internal heat necrosis.

2012 Idaho Snack Food Trial

Local Coordinator:

Jeff Stark
Peggy Bain
Melvin Chappell

University of Idaho
Aberdeen R&E Center
Aberdeen, Idaho

Trial Data

PLANTED 30-Apr-12

VINE KILLED 30-Aug-12

Mechanical

HARVESTED 20-Sep-12

PLOT LENGTH	18'	HARVEST LENGTH	18'
HILL SPACING	10"	ROW SPACING	36"
HILLS PER PLOT	20	ROWS/ PLOT	1
REPS	4		

METHOD OF HARVEST Grimme Machine

FERTILIZER

120 N - 220 P - 65 K - 8 lb zinc- pre-plant
100 units injected through water

INSECTICIDES APPLIED/HILLING

Admire Pro (8 oz/A) - Shankd May 14

FUNGICIDES APPLIED

Pennco Zeb 75 DF 2lb/A
11-Jul

HERBICIDES APPLIED

Spray Coupe- June 15
Establish 18 oz/A
Prowl H20 2.1 pint/acre
Metri 4F 1pt/A /A
Metrix 1.5 oz / acre
Metribuzin 2/3 lb /A

ENVIRONMENTAL FACTORS

Warm dry growing season

Table 1. IDAHO TRIAL 2012, Yield, Size Distribution, Specific Gravity

Clone	Yield (cwt/A)		Percent Size Distribution				% Unusable	Specific Gravity
	US No1	Total	0-4 oz.	4-6 oz.	6-10 oz.	>10 oz.		
NY140	595	724	6	9	32	41	12	1.086
NY148	444	603	23	30	36	8	3	1.091
W5015-12	438	558	20	32	35	11	2	1.097
Snowden	424	541	20	31	40	7	2	1.096
MSR061-1	407	513	20	24	41	15	1	1.094
CO00197-3W	395	555	25	29	32	11	4	1.091
A01143-3C	393	517	16	22	37	17	8	1.087
W6483-5	373	464	9	17	34	29	11	1.078
MSL292-A	358	486	25	33	33	7	1	1.095
Atlantic	356	482	9	9	27	38	17	1.096
W2978-3	321	416	22	31	40	6	1	1.085
CO02321-4W	316	387	16	22	42	23	2	1.099
AF4157-6	313	446	28	32	32	6	2	1.095
MN99380-1Y	304	422	25	32	34	6	3	1.085
W4980-1	290	368	21	32	37	10	0	1.089
ND8305-1	222	453	44	31	16	2	7	1.105
CO00188-4W	159	382	58	32	9	1	0	1.095
ND8304-2	141	298	52	31	16	0	1	1.084
Mean	347	479	24	27	32	13	4	1.092

Table 2. IDAHO TRIAL 2012, Vine and tuber characteristics.

Clone	Vine Size ¹	Vine Maturity ²	Tubers/ Plant	Fresh Merit Score ³	Avg. Tuber Size (oz.)	Tuber Shape ⁴
NY140	3.5	3.6	8.8	2.0	8.0	2.9
NY148	2.5	3.4	12.4	3.3	4.9	1.3
W5015-12	2.5	3.0	11.0	2.8	5.2	2.0
Snowden	2.5	2.8	10.6	3.0	5.1	1.5
MSR061-1	3.3	2.8	9.4	3.8	5.4	1.0
CO00197-3W	2.8	2.0	11.7	2.5	4.7	2.3
A01143-3C	3.0	3.5	8.8	2.3	5.8	1.8
W6483-5	2.0	1.1	6.8	2.5	7.0	2.6
MSL292-A	2.0	1.5	10.3	3.0	4.7	1.3
Atlantic	2.8	2.9	6.4	1.5	7.9	2.5
W2978-3	2.5	2.1	8.5	3.6	4.9	2.0
CO02321-4W	2.3	2.5	6.9	3.6	5.6	1.5
AF4157-6	1.8	1.3	9.9	3.3	4.5	2.1
MN99380-1Y	2.3	1.4	9.0	2.8	4.7	1.8
W4980-1	2.3	2.5	7.1	3.8	5.0	1.0
ND8305-1	2.5	2.8	11.5	2.3	3.9	2.0
CO00188-4W	1.3	1.0	11.1	3.3	3.5	1.0
ND8304-2	1.0	1.0	8.4	2.3	3.5	1.0
Mean	2.4	2.3	9.4	2.8	5.2	1.7
¹ (1-5) 5=Large						
² (1-5) 5=Late						
³ (1-5) 5=Best Preference Score						
⁴ (1-5) 1=Round						

Table 3. IDAHO TRIAL 2012, External and Internal Defects.

Clone	External defects ⁴			Eye Depth ⁵	Internal Defects ⁶			
	Scab	Growth			% HH	% BC	% IBS	% VD
		Cracks	Knobs					
NY140	3.3	5.0	4.5	2.8	8	0	0	0
NY148	3.3	5.0	5.0	3.5	0	0	0	0
W5015-12	4.5	5.0	5.0	3.8	8	0	0	0
Snowden	4.0	5.0	4.8	2.3	0	0	0	0
MSR061-1	4.3	5.0	5.0	3.3	13	0	0	0
CO00197-3W	2.0	5.0	4.8	3.8	0	3	0	3
A01143-3C	4.8	4.0	4.5	3.8	0	0	0	0
W6483-5	2.5	5.0	4.8	4.3	0	3	0	0
MSL292-A	4.3	5.0	5.0	2.8	0	0	0	0
Atlantic	4.0	3.5	3.3	3.0	23	0	0	0
W2978-3	3.8	5.0	5.0	4.3	0	0	0	0
CO02321-4W	2.8	5.0	5.0	3.8	0	0	0	0
AF4157-6	3.5	5.0	5.0	3.5	3	0	0	0
MN99380-1Y	3.0	4.8	4.8	3.0	3	3	0	0
W4980-1	4.8	5.0	5.0	3.0	0	0	0	0
ND8305-1	3.3	5.0	4.5	3.8	0	0	0	0
CO00188-4W	3.8	5.0	5.0	3.8	0	0	0	0
ND8304-2	3.3	4.8	5.0	3.2	0	0	0	0
Mean	3.6	4.8	4.8	3.4	3.1	0.4	0.0	0.1
⁴ (1-5) 5=None								
⁵ (1-5) 1=deep, 5=shallow.								
⁶ Percent of defects on 10 large tubers								
HH=hollow heart, BC=brown center, IBS=internal brown spot, VD=vascular discoloration								

Table 4. IDAHO TRIAL 2012, Harvest Quality Report and Field Diseases

Clone	Appearance comments	Chip color	Early blight	Verticillium wilt
NY140	large tubers, slightly flattened	na	3.3	2.8
NY148	misshaped, deep ends		3.1	2.9
W5015-12	russetted, size varies, pink eyes		3.0	2.0
Snowden	deep ends		2.8	2.0
MSR061-1	nice, uniform		2.3	2.3
CO00197-3W	elongated, flattened		2.3	1.5
A01143-3C	slightly flat, some rough with GC		3.0	3.0
W6483-5	misshaped, deep ends		1.8	1.0
MSL292-A	deep ends		2.0	1.5
Atlantic	rough tubers, greening		3.0	2.0
W2978-3	flat		1.8	1.5
CO02321-4W	uniform, stolons attached		2.6	1.9
AF4157-6	smooth and uniform		1.3	1.0
MN99380-1Y	elongates with size		1.8	1.0
W4980-1	uniform		2.5	1.5
ND8305-1	misshaped, deep ends		2.5	2.3
CO00188-4W	small tubers		1.0	1.0
ND8304-2	few, small tubers, misshapped,		1.0	1.0
Mean			2.3	1.8
⁷ (1-5) 1=severe.				

Maine Regional Trial

****YIELD, GRADE, AND OUT-OF-FIELD QUALITY REPORT****

US POTATO BOARD/SNACK FOOD ASSOCIATION POTATO CHIP VARIETY TRIAL, MAINE 2012

Cooperators:

Local Coordinator:

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Aroostook Produce Distributors
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Cooperating Processor:

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SFA Coodinator:

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Variety Entries:

Atlantic (Field Std.)
Snowden (Storage Std.)
AF4157-6
CO00188-4W
CO00197-3W
CO02321-4W
MN99380-1
MSL292-A
MSR061-1
ND8304-2
ND8305-1
NY140
NY148 (E106-4)
W2978-3
W4980-1
W5015-12
W6483-5

ME, University of Maine, Greg Porter
CO, San Luis Valley Res. Ctr., David Holm
CO, San Luis Valley Res. Ctr., David Holm
CO, San Luis Valley Res. Ctr., David Holm
MN, Univ. of Minnesota, Christian Thill
MI, Michigan State Univ., David Douches
MI, Michigan State Univ., David Douches
ND, N. Dakota State Univ., Susie Thompson
ND, N. Dakota State Univ., Susie Thompson
NY, Cornell University, Walter DeJong
NY, Cornell University, Walter DeJong
WI, University of Wisconsin, Felix Navarro
WI, University of Wisconsin, Felix Navarro
WI, University of Wisconsin, Felix Navarro
WI, University of Wisconsin, Felix Navarro

Trial Information:

Location:	Aroostook Research Farm, Presque Isle, ME
Soil Type:	Caribou loam
Soil Test:	pH 5.8 Avail P (MH), K (H), Ca (MH), Mg (H) 3.9% soil organic matter
Previous Crop:	oats (2011), potatoes (2010)
Planting Date:	May 18, 2012
Plot size/design:	36" row spacing, plots 2 rows x 30' Randomized (RCBD), four replicates per variety
Fertilization:	140-140-140 at planting Foliar boron applied July 23
In-row Spacing:	10" except Snowden (14"), NY140 (8")
Crop Management:	Typical of commercial production in the area
Sprout Inhibitor:	MH-30 applied August 22
Vinekill Date:	August 31, 2012 (105 DAP)
Harvest Date:	September 20, 2012
Processing Date:	October xx, 2012

Procedures:

Seed potatoes were received from the cooperating programs listed above and held under controlled storage conditions at Aroostook Research Farm, Presque Isle, ME. The seed potatoes were warmed and hand-cut about two weeks prior to planting. They were suberized in controlled storage and hand-planted without a commercial seed treatment.

The trial was managed using practices typical of the production area. Weeds were controlled with a standard herbicide program followed by normal cultivation and hilling. Insect pests were controlled with an in-furrow insecticide. Subsequent foliar insecticides were applied based on insect pressure determined by regular scouting for pests. Foliar diseases were controlled using a conventional spray program based on the University of Maine Cooperative Extension's IPM program. Late blight was not observed in this trial during 2012. Vine desiccation was accomplished using a standard chemical desiccant. Natural rainfall was abundant during June 2012 season, but July 2012 rainfall was far below the 30-year average (Table 1). No supplemental irrigation was available for this trial site. The plots were harvested with a hand crew following lifting with a one-row, research-scale potato digger. All tubers were weighed and a 50-lb sample was graded for external defects and sized using a spool-type sizer. Ten tubers per size class were examined for hollow heart. Specific gravity was determined on a 5-kg sample using the weight-in-air/weight-in-water method. A 50-lb sample was collected at harvest and shipped to Frito-Lay's Dayville plant for evaluation of chip quality. Additional tuber samples were placed in controlled storage for evaluation of chip color during the storage season.

Results:

Following a wet June there was very little rainfall during July 2012 (Table 1). Early crop growth was good; however, dry conditions during July reduced yield potential

(Table 2). No late blight was observed in the plots during 2012. Several of the potato clones senesced early due to the dry conditions (Table 2). The later maturing varieties generally had better yields than the varieties that senesced early.

NY140, NY148 (NYE106-4), and Snowden had the highest US#1 yields in the experiment (Table 3). W5015-12, W4980-1, and MSR061-1 also had US#1 yields that were at or above those of Atlantic. CO00188-4W, ND8304-2, MN99380-1, and ND8305-1 were especially low yielding. Atlantic, CO02321-4, NY148, Snowden, W5015-12, and ND8305-1 had particularly high specific gravity. ND8305-1 had a very small tuber size profile. AF4157-6, CO00188-4W, CO00197-3W, CO02321-4W, MN99380-1, ND8304-2, and W5015-12 also had smaller tuber size profiles than would be ideal.

Most of the clones had low external defects incidence (Table 4). MN99380-1 and W6483-5 had greater than 10% external defects. Off shapes were the most prevalent external defect in these clones. Relatively little hollow heart was observed in 2012. Atlantic and W6483-5 were that we observed hollow in during 2012; however, small tuber size profiles in many of the clones may have masked susceptibility.

Tuber characteristics are summarized in Table 5. AF4157-6, CO00188-4, CO00197-3W, CO02321-4W, NY140, and W2978-3 had the best external tuber appearance. Snowden and MSL292-A had indented stem ends and/or deep apical eyes which would make peeling difficult. Off shapes reduced the acceptability of MN99380-1 and W6483-5. MN99380-1 flesh color was very yellow.

Chip color quality evaluations were conducted at the Frito-Lay plant in Dayville, CT (Table 6). Atlantic, CO00197-3W, MSR061-1, NY140, and Snowden had relatively high incidence of chip defects, while ND8305-1, NY148, W4980-1, and W5015-12 had moderate levels of chip defects. The remaining eight clones had low levels of chip defects. CO00188-4W, MN99380-1, ND8304-2, ND8305-1, NY140, W2978-3, and W6483-5 had total solids below 17.0%.

Susceptibility to skinning and bruising was evaluated by tumbling tuber samples in a drum (Table 7). AF4157-6, CO00188-4W, ND8304-2, MSR061-1, and Snowden were especially resistant to skinning, while NY148, MSL292-A, ND8305-1, W4980-1, and W5015-12 were relatively susceptible. CO00197-3W, CO00188-4W, MN99380-1, MSL292-A, ND8304-2, W2978-3, and W6483-5 were relatively resistant to bruise damage. ND8305-1 and W4980-1 were especially susceptible to bruise damage. NY148, Atlantic, MSR061-1, and NY140 were also relatively susceptible to bruising.

Table 1. Rainfall and temperature, 2012 Aroostook Research Farm, Presque Isle, ME

Month	Week (inches)				Total (inches)	Average (°F)	
	1	2	3	4		High	Low
May	0.09	1.89	0.36	0.80	3.14	65.1	44.2
June	0.02	1.31	0.00	5.60	6.93	72.3	51.5
July	0.03	0.05	0.23	0.07	0.38	80.5	57.0
August	1.35	0.59	2.15	0.84	4.93	80.7	57.8
September	0.79	1.01	0.76	0.68	3.24	69.2	46.9
Grand total					18.62		

Table 2. Plant characteristics, UPSB/SFA Chip Variety Trial, Maine, 2012.

Variety/Clone	%	Plant Stand	Vigor Early	Vigor Late	Vine Mat.	Foliage Color	Verticillium
							Wilt
NY140	99	G	VG	Late	Med. green	Very Slight	
Snowden	98	F	VG	M. Late	Med. green	Moderate	
NY148	99	G	VG	Late	Dk. med. Green	None	
W5015-12	94	G	VG	Late	Med. green	None	
W4980-1	99	G	Fair	M. Early	Pale green	Sl.- Mod.	
MSR061-1	99	F	VG	M. Late	Med. green	Very Slight	
Atlantic	93	G	VG	M. Late	Med. green	Sl.- Mod	
CO00197-3W	98	G	Good	Medium	Med. green	Slight	
W2978-3	98	G	Fair	M. Early	Med. green	Sl.- Mod.	
MSL292-A	100	VG	Good	Medium	Med. green	Sl.- Mod.	
AF4157-6	99	G	Fair	Early	Pale green	Sl.- Mod.	
CO02321-4W	98	G	Good	Medium	Med. green	Sl.- Mod.	
W6483-5	98	G	Poor	V. Early	Pale green	Sl.- Mod.	
CO00188-4W	94	G	Poor	V. Early	Med. green	Moderate	
ND8304-2	99	G	Poor	V. Early	Med. green	Moderate	
MN99380-1	99	G	Poor	V. Early	Pale green	Moderate	
ND8305-1	84	P	VG	Late	Dk. med. green	None	

Table 3. Yield, size distribution, and specific gravity, UPSB/SFA Chip Variety Trial, Maine, 2012.

Variety/Clone	Yield (cwt/A) ¹			Size Distribution (% by weight) ²						Spec. Grav.	
	Tot.	US#1	%Std	1	2	3	4	5	1-7/8 to 4"		2-1/2 to 4"
NY140	292	251	124	11	64	24	0	0	89	25	1.079
Snowden	270	245	121	7	74	20	1	0	93	20	1.085
NY148	282	244	120	11	83	5	0	0	89	5	1.087
W5015-12	288	228	112	19	75	6	0	0	81	6	1.085
W4980-1	256	219	108	10	81	8	1	0	90	9	1.080
MSR061-1	246	208	103	12	77	11	0	0	88	11	1.079
Atlantic	225	203	100	4	61	31	4	0	96	35	1.085
CO00197-3W	249	192	95	19	76	4	0	0	81	4	1.080
W2978-3	227	192	95	12	75	12	0	0	88	12	1.077
MSL292-A	220	185	91	13	81	26	6	0	87	6	1.078
AF4157-6	220	180	89	15	81	5	0	0	85	5	1.080
CO02321-4W	224	171	84	19	73	8	1	0	81	8	1.086
W6483-5	221	167	82	5	54	33	8	1	94	41	1.071
CO00188-4W	192	142	70	25	72	3	1	0	75	3	1.077
ND8304-2	191	142	70	23	74	3	0	0	77	3	1.075
MN99380-1	210	139	68	21	77	2	0	0	79	2	1.072
ND8305-1	195	118	58	40	60	0	0	0	60	0	1.087
Mean	236	190							84	12	1.080
CV(%)	10.5	13.7							4.5	51.5	0.33
LSD(k=100)	34	35							5	8	0.005

¹US#1 yield was calculated as yield from 1 7/8 to 4" diameter, minus tubers with external defects.

²Size Classes: 1=1 1/2 to 1 7/8"; 2=1 7/8 to 2 1/2"; 3=2 1/2 to 3 1/4"; 4=3 1/4 to 4"; 5= over 4"

Table 4. External tuber defects and hollow heart incidence, UPSB/SFA Chip Variety Trial, Maine, 2012.

Variety/Clone	External Defects (% by weight)						Hollow Heart by Size Class ¹ (%)		
	Total	Sunb	Mshp	Grck	Scab	Rot	3	4	5
NY140	3.3	1.1	1.2	0.4	0.0	0.6	0.0	n/a	n/a
Snowden	3.1	0.5	2.3	0.1	0.2	0.1	0.0	0.0	n/a
NY148	2.9	0.3	1.4	0.0	0.0	1.2	0.0	n/a	n/a
W5015-12	2.1	0.9	0.7	0.1	0.3	0.2	0.0	n/a	n/a
W4980-1	5.5	3.3	0.8	0.4	0.3	0.9	0.0	0.0	n/a
MSR061-1	3.8	0.6	1.2	0.0	1.4	0.7	0.0	n/a	n/a
Atlantic	6.8	1.5	3.1	0.1	0.0	2.0	0.0	16.7	n/a
CO00197-3W	5.0	1.2	3.2	0.3	0.2	0.1	n/a	n/a	n/a
W2978-3	3.6	0.8	2.1	0.6	0.0	0.2	0.0	n/a	n/a
MSL292-A	2.9	1.4	0.4	0.7	0.3	0.1	0.0	n/a	n/a
AF4157-6	4.1	2.1	1.7	0.0	0.1	0.2	n/a	n/a	n/a
CO02321-4W	5.6	2.2	0.9	0.7	1.4	0.4	0.0	0.0	n/a
W6483-5	19.3	4.7	12.3	0.3	1.7	0.4	0.0	12.5	n/a
CO00188-4W	2.2	0.6	0.6	0.5	0.0	0.5	n/a	n/a	n/a
ND8304-2	4.2	0.8	2.7	0.3	0.3	0.1	n/a	n/a	n/a
MN99380-1	16.2	0.9	14.0	1.1	0.0	0.2	n/a	n/a	n/a
ND8305-1	1.9	0.4	1.2	0.0	0.1	0.3	n/a	n/a	n/a
Mean	5.4								
CV(%)	47.2								
LSD(k=100)	3.4								

¹Size Classes: 3=2½ to 3¼”; 4=3¼ to 4”; 5= over 4”; n/a indicates that there weren’t enough tubers available to examine for hollow heart in this size category.

Table 5. Tuber characteristics, UPSB/SFA Chip Variety Trial, Maine, 2012.

Variety/Clone	Shape	Skin Tex- ture	Eye Depth	Gen. Appear.	Comments
NY140	R-O	M-S	M-S	G	bright, nice
Snowden	R-O	Net	M-D	F-P	dull, off shapes, dse, dae
NY148	R-O	Net	M-D	F	netted, dae, a few msh
W5015-12	R-O	Net	M-S	F	netted, russeting, pe
W4980-1	R	Net	M-S	F	netted
MSR061-1	R	Net	M-S	F-P	netted, non-uniform
Atlantic	R-O	Net	M-D	F	netted, some off shapes
CO00197-3W	R-O	Sl. Net	M-S	G	small, bright, nice
W2978-3	R-O	M-S	S	G	bright, nice
MSL292-A	R-O	Net	M-D	F-P	netted, some off-shapes, dae
AF4157-6	R	Sl. Net	S	G	small, bright, nice
CO02321-4W	R	M-S	S	G	bright, nice, trace scab
W6483-5	R	S	S	F	bright, nice, off shapes
CO00188-4W	R-O	M-S	S	G	bright, nice
ND8304-2	R	M-S	M-S	F-G	small, bright, non-uniform
MN99380-1	R-O	Sl. Net	M-S	F-P	off shapes, yellow fleshed
ND8305-1	R-O	M-S	M-S	F-P	very small, bright

Shape: R=mostly round; R-O=round to oblong; O-R=oblong to round; O=oblong
 Skin Texture: S=smooth; M-S=moderately smooth; Sln.=slight net; Net=strongly netted
 Eye Depth: S=shallow; M-S=moderate to shallow; M-D=moderate to deep; D=deep
 Flesh Color: Wh=white; OW=off white; YF=yellow fleshed, higher numbers indicate
 brighter yellow; dse=deep stem end; dae=deep apical end.

Table 6. Chip quality one week after harvest, UPSB/SFA Chip Variety Trial, Maine, 2012.

Variety/Clone	Frito-Lay Plant Data, Dayville, CT (October 2012)					
	Total Solids	Color ¹	Defects (%)			Comments
			Ext.	Int.	Tot.	
NY140	16.3	n/a	6.9	6.1	13.0	1.5% UDC
Snowden	17.8	n/a	7.4	4.2	11.6	0.9% Greening
NY148	17.8	n/a	7.0	1.8	8.8	None
W5015-12	18.1	n/a	7.7	0.0	7.7	None
W4980-1	17.0	n/a	3.0	4.3	7.3	None
MSR061-1	17.3	n/a	11.8	3.5	15.3	None
Atlantic	18.5	n/a	3.3	8.2	11.5	None
CO00197-3W	17.7	n/a	11.0	9.8	20.8	None
W2978-3	15.7	n/a	0.0	0.0	0.0	None
MSL292-A	17.8	n/a	0.4	0.9	1.3	None
AF4157-6	18.0	n/a	3.1	0.0	3.1	None
CO02321-4W	18.0	n/a	0.0	1.2	1.2	None
W6483-5	16.0	n/a	3.0	0.0	3.0	None
CO00188-4W	16.9	n/a	0.6	0.0	0.6	None
ND8304-2	16.3	n/a	0.0	1.3	1.3	None
MN99380-1	16.4	n/a	0.0	0.0	0.0	None
ND8305-1	16.7	n/a	4.3	1.3	5.6	None

¹L- and A-values were not provided in 2012.

Table 7. Bruise susceptibility scores, October 2012, UPSB/SFA Chip Variety Trial, Maine, 2012.

Variety/Clone	<u>Skinning & Bruise (tumble method)¹</u>				Comments on peeled tubers
	<u>Prior to Peeling</u>	<u>Peeled Tubers</u>			
	Index	% Skin Cracks	% Incid.	% Surf.	
NY140	3.45	4.7	89.0	12.1	
Snowden	1.76	1.6	80.9	9.6	deep eyes
NY148	5.30	14.1	91.0	17.8	deep eyes, blackspot
W5015-12	4.17	15.6	74.7	9.7	deep eyes
W4980-1	4.14	15.8	91.6	23.7	
MSR061-1	1.21	6.3	85.7	12.2	
Atlantic	2.15	11.1	89.0	14.3	
CO00197-3W	3.20	4.7	65.3	7.5	
W2978-3	2.64	25.0	59.4	6.6	
MSL292-A	3.68	4.8	58.2	6.6	deep eyes
AF4157-6	1.67	46.5	74.5	8.8	
CO02321-4W	2.89	1.5	72.8	9.2	
W6483-5	2.13	17.2	54.7	6.7	
CO00188-4W	1.37	45.9	72.8	9.2	
ND8304-2	1.19	60.2	61.2	7.0	
MN99380-1	2.59	65.0	56.6	5.3	yellow fleshed
ND8305-1	6.12	25.1	94.4	29.7	
Mean	2.92	44.0	74.3	11.4	
CV(%)	12.9	44.0	14.2	29.8	
LSD(k=100)	0.48	12.2	14.4	4.4	

¹Sixty tubers were evaluated per variety/clone. Fifteen tubers per plot were tumbled on September 21 (1 day after harvest) in a paddled drum for 1 minute at 15 rpm. Index scores indicate combined severity of skinning plus fresh bruise (higher values indicate more severe bruising) rated on September 21. Percent incidence (% of tubers with visible bruise) and surface area values are combined scores for shatter and blackspot rated on peeled tubers (November xx, 2012)

Variety/Clone Summary 2012 (ranked by U.S. #1 yield):

NY140: Late vine maturity, round to oblong with moderately- smooth skin and moderately-shallow eyes. Good yields, low external defects incidence, moderate specific gravity, no hollow heart, moderately-high October chip defects incidence along with some undesirable color, and relatively high bruise susceptibility. Tubers were more oblong than would be desirable during 2011.

Snowden: Medium-late vine maturity, round to oblong tubers with netted skin and moderately-deep eyes. Good yields, low external defects incidence, high specific gravity, no hollow heart incidence, moderately-high October chip defects incidence along with some greening, and moderate bruise susceptibility.

NY148 (NYE106-4): Late vine maturity, round to oblong tubers with netted skin and moderately-deep eyes. Good yields, low external defects incidence, high specific gravity, no hollow heart incidence, moderate October chip defects incidence, and relatively high bruise susceptibility.

W5015-12: Late vine maturity, round to oblong tubers with heavily netted skin and moderately-shallow eyes. Good yields, small tuber size, low external defects incidence, high specific gravity, no high hollow heart incidence, moderate October chip defects incidence, and moderate bruise susceptibility.

W4980-1: Mid-season to early vine maturity, round tubers with netted skin and moderately-shallow eyes. Fair to good yields, low external defects incidence, moderate specific gravity, no hollow heart incidence, moderate October chip defects incidence, and very high bruise susceptibility.

MSR061-1: Medium-late vine maturity, round tubers with netted skin and moderately-shallow eyes. Fair to good yields, low external defects incidence, moderate specific gravity, no hollow heart incidence, moderately-high October chip defects incidence, and moderately-high bruise susceptibility.

Atlantic: Medium-late vine maturity, round to oblong tubers with netted skin and moderately-deep eyes. Fair to good yields, low to moderate external defects incidence, high specific gravity, moderate hollow heart incidence, moderately-high October chip defects incidence, and moderately-high bruise susceptibility.

CO00197-3W: Mid-season vine maturity, round to oblong tubers with slightly netted skin and moderately-shallow eyes. Fair to good yields, small tuber size, low external defects incidence, moderate specific gravity, no hollow heart incidence, relatively high October chip defects incidence, fair September chip quality, and relatively low bruise susceptibility.

W2978-3: Medium-early vine maturity, round to oblong tubers with moderately smooth skin and moderately-shallow eyes. Fair to good yields, low external defects incidence, moderate specific gravity, no hollow heart incidence, very low October chip defects incidence, and relatively low bruise susceptibility.

MSL292-A: Mid-season vine maturity, round to oblong tubers with netted skin and moderately-deep eyes. Fair yields, low external defects incidence, moderate specific gravity, no hollow heart incidence, low October chip defects incidence, and relatively low bruise susceptibility.

AF4157-6: Early vine maturity, round tubers with slightly netted skin and shallow eyes. Fair yields, low external defects incidence, moderate specific gravity, no hollow heart incidence, low October chip defects incidence, and moderate bruise susceptibility.

CO02321-4W: Mid-season vine maturity, round tubers with moderately smooth skin and shallow eyes. Fair yields, small tubers, low external defects incidence, high specific gravity, no hollow heart incidence, low October chip defects incidence, and moderate bruise susceptibility.

W6483-5: Early vine maturity, round tubers with smooth skin and shallow eyes. Fair yields, high external defects incidence (mostly off shapes), low specific gravity, moderate hollow heart incidence, low October chip defects incidence, and relatively low bruise susceptibility. Non-uniform tuber shape was a problem for this clone.

CO00188-4W: Early vine maturity, round to oblong tubers with moderately smooth skin and shallow eyes. Fair to poor yields, small tuber size, low external defects incidence, moderate specific gravity, no hollow heart incidence, low October chip defects incidence, and relatively low bruise susceptibility.

ND8304-2: Early vine maturity, round tubers with moderately smooth skin and moderately-shallow eyes. Fair to poor yields, small tuber size, low external defects incidence, moderate to low specific gravity, no hollow heart incidence, low October chip defects incidence, and relatively low bruise susceptibility.

MN99380-1: Early vine maturity, round to oblong tubers with slightly netted skin and moderately-shallow eyes. Fair to poor yields, small tuber size, high external defects incidence (mostly off shapes), low specific gravity, no hollow heart incidence, very low October chip defects incidence, and relatively low bruise susceptibility. Non-uniform tuber shape was a problem for this clone.

ND8305-1: Late vine maturity, round to oblong, with moderately smooth skin and moderately-shallow eyes. Poor US#1 yields, very small tuber size, low external defects incidence, high specific gravity, no hollow heart incidence, moderate October chip defects incidence, and very high bruise susceptibility. An extremely small tuber size profile combined was serious problem for this clone.

Michigan Regional Location

Local Coordinators:

Chris Long
Dave Douches
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 Information:

Planting Date:	May 10, 2012
Vine Kill Date:	September 3, 2012
Harvest Date:	October 4, 2012 (148 Days)
Between Row & In Row	
Plant Spacing:	34" x 10"; irrigated
Plots:	Single rows for each entry, approximately 300' long
GDD, Base 40	3178

Trial Procedure:

Seed was mechanically cut on May 4, 2012, and delivered to the grower's seed storage three days later. No seed treatments were applied at the time of seed cutting.

Two pre-harvest sugar profiles were taken for each variety, three weeks and one week prior to vine kill on August 13th and August 27th, respectively. The pre-harvest sugar profile protocol was as follows: obtained a minimum of 40 tubers from each variety, take all the tubers from each hill, even if that required collecting more than 40 tubers. A canopy rating was taken for each variety as a percent rating of green foliage. Canopy uniformity was noted as a percentage of how uniform the foliage health appeared. The number of hills required to obtain 40 tubers was recorded, along with the total number of main stems harvested. From the tubers harvested, specific gravity, a glucose value (a percent by fresh weight), a sucrose rating (a percent by fresh weight X10) and an average tuber weight (in ounces) was established.

At harvest, three plot areas of 23 feet were harvested from each entry and were used to determine yield averages, size distribution, specific gravity and internal defects. Two, 40 lb. storage samples were collected from each entry and were placed in the grower's commercial storage for evaluation at a later date. One set of samples will be evaluated in the winter of 2012 and the other in the spring of 2013. Eighteen, 40 tuber samples were also collected for each variety at harvest. All eighteen samples were stored at the Michigan Potato Industry Commission's Cargill Demonstration Storage Facility at approximately 48°F or 55°F for a monthly sugar profile evaluation at Techmark, Inc. Nine, 40 tuber samples were stored at each temperature for evaluation, October 2012 through June 2013. The storage sugar profiles began October 5th, 2012. Two out-of-the-field chip samples were taken for each variety at harvest.

One was sent to Herr Foods, Inc. for processing and the additional sample was processed at Michigan State University.

A plant growth and vine vigor observation was made on June 6th, 2012. MSL292-A, MN99380-1Y and ND8305-1 appeared to have the slowest rate of vine growth, whereas, W4980-1 and W6483-5 were the most vigorous on this date. A vine maturity rating was taken for each variety on August 22nd, 2012, approximately 10 days prior to vine kill. W6483-5, W2978-1, AF4157-6 and CO00188-4W were the most mature varieties and NY140, NY148 and A01143-3C appeared to be the most immature on this date.

Growing Season Weather:

Weather conditions during the 2012 growing season were warmer than average. Growing degree days base 40 recorded from May 10th through September 3rd were the third highest in six years at 3178. Total rainfall for this time period was approximately 8.6". The daytime temperatures during this growing period exceeded 90°F fifteen days. This growing season saw the highest number of days above 90 °F in six years. The nighttime temperatures greater than 70 °F experienced during this period, May through early-September, were the third highest in six years. The tuber specific gravity, for potato production in Michigan, was below average as a result of the increased nighttime heat stress. Commercial potato yields overall met average yield projections.

Results:

Table 1 summarizes the yield, size distribution, and specific gravity data at harvest. Atlantic and NY140 topped the yield table in 2012, followed by a group of lines that yielded above average. These lines were: W4980-1, Snowden, NY148 (NYE106-4), MSL292-A, W6483-5, MSR061-1, W2978-3, AF4157-6, CO02321-4W. NY140 had the largest percentage of recorded oversize tubers. W4980-1, W6483-5, W2978-3, AF4157-6, ND8304-2, and CO00188-4W had very low specific gravities.

Table 1. Yield ,Size Distribution*, Specific Gravity								
Entry	Yield (cwt/A)		Percent Size Distribution				Specific Gravity	
	US#1	TOTAL	US#1	Small	Mid-Size	Large		Culls
Atlantic	504	551	92	6	85	7	2	1.077
NY140	498	540	93	6	80	13	1	1.072
W4980-1	484	521	75	25	64	11	0	1.064
Snowden	446	495	90	10	81	9	0	1.070
NY148	438	513	86	14	85	1	0	1.083
MSL292-A	392	430	91	9	88	3	0	1.068
W6483-5	377	460	75	13	68	7	12	1.059
MSR061-1	374	438	86	13	75	11	1	1.071
W2978-3	368	500	73	25	73	0	2	1.059
AF4157-6	367	453	81	18	80	1	1	1.064
CO02321-4W	365	437	83	16	81	2	1	1.073
CO00197-3W	315	451	70	29	70	0	1	1.067
A01143-3C	288	386	75	12	75	0	13	1.075
W5015-12	272	408	59	41	59	0	0	1.076
ND8304-2	252	339	74	23	74	0	3	1.058
MN99380-1Y	243	401	61	34	61	0	5	1.065
CO00188-4W	242	376	64	36	64	0	0	1.062
ND8305-1	164	279	59	41	59	0	0	1.075
MEAN	355	443	77	21	73	4	2.3	1.069

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

Table 2 summarizes the at-harvest tuber quality. Internal quality across the trial was generally acceptable, but the evidence of in-season environmental stress was observed in some lines. Hollow heart was present in Atlantic and Snowden, and to a lesser degree in NY140, MSR061-1, AF4157-6 and CO02321-4W. W4980-1 and W6483-5 displayed significant internal brown spots. NY140, Snowden, W6483-5, AF4157-6, CO0197-3W and MN99380-1Y each recorded above average amounts of vascular discoloration.

Table 2. At-Harvest Tuber Quality. Sandyland Farms, Howard City, Michigan.					
Entry	Internal Defects¹				Total Cut
	HH	VD	IBS	BC	
Atlantic	8	1	2	0	30
NY140	1	9	0	0	30
W4980-1	0	3	10	0	30
Snowden	6	8	0	0	30
NY148	0	0	0	1	30
MSL292-A	0	3	1	0	30
W6483-5	0	8	5	0	30
MSR061-1	1	4	0	0	30
W2978-3	0	1	1	0	30
AF4157-6	1	8	0	0	30
CO02321-4W	1	0	0	0	30
CO00197-3W	0	9	0	0	30
A01143-3C	0	2	0	0	30
W5015-12	0	4	0	0	30
ND8304-2	0	1	0	0	30
MN99380-1Y	0	8	0	1	30
CO00188-4W	0	0	0	0	30
ND8305-1	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 on October 2nd, 2012 and processed at Herr Foods, Inc. on October 4th. Chip color was generally acceptable across the trial, with MN99380-1Y having the highest Agtron score of the trial at 63.9. The varieties, listed in ranked order based on quality observations from Herr Foods, Inc. are as follows: Atlantic, Snowden, NY148, W5015-12, CO00188-4W, MSL292-A, W2978-3, AO1143-3C, W4980-1, MSR061-1, MN99380-1Y, ND8305-1, NY140, CO00197-3W, W6483-5, CO02321-4W, ND8304-2 and AF4157-6.

Table 3. 2012 Post-Harvest Chip Quality¹						
Entry	Agtron Color	SFA² Color	Specific Gravity	Percent Chip Defects³		
				Internal	External	Total
Atlantic	60.1	3	1.062	15.1	19.6	34.7
NY140	61.5	4	1.060	32.5	27.6	60.1
W4980-1	57.4	4	1.055	24.3	27.0	51.3
Snowden	60.6	3	1.068	20.3	6.2	26.5
NY148	55.3	2	1.077	20.9	25.9	46.8
MSL292-A	60.9	3	1.061	12.0	31.6	43.6
W6483-5	57.3	4	1.060	34.7	33.0	67.7
MSR061-1	60.5	4	1.067	35.2	7.6	42.8
W2978-3	55.5	3	1.060	32.2	17.9	50.1
AF4157-6	53.7	4	1.055	12.2	51.2	63.4
CO02321-4W	55.9	4	1.060	19.6	50.9	70.5
CO00197-3W	59.6	4	1.055	18.3	57.2	75.5
A01143-3C	59.4	3	1.072	13.0	5.0	18.0
W5015-12	60.7	3	1.060	13.6	28.6	42.2
ND8304-2	57.8	4	1.055	14.4	54.9	69.3
MN99380-1Y	63.9	4	1.055	25.9	0.1	26.0
CO00188-4W	59.0	2	1.060	10.0	12.2	22.2
ND8305-1	59.9	4	1.060	7.2	26.1	33.3

¹Samples collected October 2nd and processed by Herr Foods, Inc., Nottingham, PA on October 4, 2012.

Chip defects are included in Agtron and SFA samples.

²SFA Color: 1= lightest, 5 = darkest

³Percent 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, after holding the samples at room temperature, all samples were abrasively peeled and scored for the presence of black spot bruise. Among the “Simulated Bruise” samples, the best entries were MSL292-A, W6483-5, W2978-3, AF4157-6, CO02321-4W, CO00197-3W, A01143-3C, and CO00188-4W. Atlantic, NY140, NY148, W5015-12 and ND8305-1 showed the lowest percent bruise free.

Table 4. Black Spot Bruise Test																	
Entry	A. Check Samples¹							B. Simulated Bruise Samples²									
	# 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
Atlantic	11	12	2			25	44	0.6	2	8	8	5	1	1	25	8	1.9
NY140	16	8	1			25	64	0.4	5	6	7	5		2	25	20	1.8
W4980-1	20	5				25	80	0.2	8	15	1	1			25	32	0.8
Snowden	17	7	1			25	68	0.4	12	10	1	2			25	48	0.7
NY148	8	7	5	5		25	32	1.3	1	2	4	1	6	11	25	4	3.7
MSL292-A	19	6				25	76	0.2	14	10	1				25	56	0.5
W6483-5	23	2				25	92	0.1	19	5	1				25	76	0.3
MSR061-1	23	2				25	92	0.1	12	11	1	1			25	48	0.6
W2978-3	23	2				25	92	0.1	16	8	1				25	64	0.4
AF4157-6	23	2				25	92	0.1	20	5					25	80	0.2
CO02321-4W	18	6	1			25	72	0.3	16	5	4				25	64	0.5
CO00197-3W	19	5	1			25	76	0.3	15	10					25	60	0.4
A01143-3C	20	3	2			25	80	0.3	17	5	3				25	68	0.4
W5015-12	19	3	1	1	1	25	76	0.5	1	8	3	10	2	1	25	4	2.3
ND8304-2	20	5				25	80	0.2	16	4	5				25	64	0.6
MN99380-1Y	20	5				25	80	0.2	13	10		1	1		25	52	0.7
CO00188-4W	22	3				25	88	0.1	21	2	2				25	84	0.2
ND8305-1	12	12	1			25	48	0.6	2	6	7	7	3		25	0	3.1

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.

Tables 5 A and 5 B summarize the results of the pre-harvest panel data. All varieties appeared to have stable sugar levels prior to harvest with the exception of A01143-3C. This line appeared to be chemically immature at harvest, but did not chip process poorly at Herr Foods on October 4th, 2012. A number of lines died early from the seasonal heat stress based on the canopy ratings (Table 5B). Atlantic and W6483-5 had the largest average tuber size recorded on August 27th, 2012 (Table 5B).

Table 5A. Pre-Harvest Panels, 8/13/12

Entry	Specific Gravity	Glucose ¹ %	Sucrose ² Rating	Canopy		Number of		Average ⁵ Tuber Weight
				Rating ³	Uniform. ⁴	Hills	Stems	
Atlantic	1.080	0.002	0.643	75	90	4	12	4.37
NY140	1.064	0.002	0.486	90	90	3	8	4.68
W4980-1	1.067	0.004	0.540	40	80	4	12	4.39
Snowden	1.069	0.002	0.527	75	50	4	15	4.65
NY148	1.075	0.002	0.419	95	95	4	13	4.21
MSL292-A	1.072	0.002	0.660	50	50	4	13	4.19
W6483-5	1.063	0.008	0.632	30	80	4	18	5.00
MSR061-1	1.070	0.002	0.482	75	80	5	13	4.26
W2978-3	1.060	0.003	0.686	40	50	4	11	3.33
AF4157-6	1.067	0.011	0.546	20	60	4	12	3.33
CO02321-4W	1.079	0.004	0.443	60	75	3	14	4.04
CO00197-3W	1.072	0.003	0.748	50	90	3	14	2.48
A01143-3C	1.069	0.005	1.232	85	90	7	29	2.58
W5015-12	1.074	0.002	0.409	75	90	2	12	2.04
ND8304-2	1.064	0.002	0.703	20	80	4	18	3.23
MN99380-1Y	1.064	0.002	0.677	65	75	4	10	2.57
CO00188-4W	1.066	0.002	0.366	25	80	3	18	2.12
ND8305-1	1.079	0.003	0.488	60	70	4	15	1.83

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

2 Sucrose 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.

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

Table 5B. Pre-Harvest Panels, 8/27/12

Entry	Specific Glucose ¹		Sucrose ²		Canopy		Number of		Average ⁵ Tuber Weight
	Gravity	%	Rating	Rating ³	Uniform. ⁴	Hills	Stems		
Atlantic	1.078	0.003	0.722	5	85	4	13	6.88	
NY140	1.075	0.001	0.512	30	95	3	10	4.59	
W4980-1	1.065	0.002	0.729	10	90	4	22	4.46	
Snowden	1.067	0.002	0.727	50	95	4	17	4.68	
NY148	1.080	0.001	0.32	50	100	4	18	3.46	
MSL292-A	1.069	0.002	0.892	15	90	3	12	4.32	
W6483-5	1.061	0.001	0.546	0	100	5	20	5.37	
MSR061-1	1.070	0.002	0.804	25	90	4	13	4.39	
W2978-3	1.059	0.002	0.802	0	100	4	14	3.45	
AF4157-6	1.063	0.002	0.823	0	100	4	17	3.29	
CO02321-4W	1.078	0.002	0.791	0	100	4	14	3.79	
CO00197-3W	1.071	0.002	0.922	0	100	3	13	2.94	
A01143-3C	1.076	0.003	1.195	50	100	3	19	3.69	
W5015-12	1.075	0.002	0.922	10	90	3	15	2.71	
ND8304-2	1.060	0.002	1.058	0	100	4	19	3.59	
MN99380-1Y	1.062	0.002	0.916	0	100	3	12	2.60	
CO00188-4W	1.064	0.001	0.505	0	100	4	19	3.02	
ND8305-1	1.076	0.001	0.630	15	90	3	19	1.97	

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

² Sucrose 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.

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

Variety Comments:

Atlantic: This was the highest yielding variety in the 2012 trial, having a 504 cwt./A US#1 yield with an above average specific gravity of 1.077 (Table 1). This variety had seven percent oversize tubers, of which 27 percent of them were hollow. Herr's ranked Atlantic to have the best out-of-the-field chip quality of the trial (Table 3). Atlantic showed the fourth highest black spot bruise susceptibility.

NY140: This was the second highest yielding variety in the 2012 variety trial with a 498 cwt./A US#1 yield and an above average specific gravity at 1.072 (Table 1). The variety had the largest number of oversize tubers in the trial at 13 percent. This variety had nine tubers with vascular discoloration, which was the highest in the trial for this defect (Table 2). NY140 performed in the bottom half of the group at Herr Foods on October 4th, 2012, and recorded the 6th highest percent of internal chip defects of any variety, totaling 60.1 percent (Table 3). NY140 exhibited a moderate level of black spot bruise susceptibility (Table 4). It appears to be a full season variety.

W4980-1: W4980-1 yielded 484 cwt./A US#1 with a specific gravity of 1.064 (Table 1). This variety had the second largest amount of oversize tubers in the trial at 11 percent. The specific gravity was below the trial average. The variety had 10 internal brown spots in thirty cut tubers, which was the highest in the trial for this defect (Table 2). Herr's ranked this variety 9th in the overall chip quality with the seventh highest percentage of defects at 51.3 (Table 3). The line appears to have an average tolerance to black spot bruise (Table 4) and was mature at the time of vine kill (Table 5B).

Snowden: Snowden was the fourth highest yielding variety in the 2012 variety trial with a 446 cwt./A US#1 yield and an average specific gravity of 1.070 (Table 1). Snowden had 9 percent oversize tubers. Internal raw tuber quality was moderate at harvest with 20 percent hollow heart and 27 percent vascular discoloration observed (Table 2). This variety was above average in chip performance at Herr Foods out-of-the-field fry test, ranking second in the trial overall. Snowden had an average susceptibility to black spot bruise (Table 4).

NY148 (NYE106-4): The variety was among the top yielders in the 2012 trial with a 438 cwt./A US#1 yield (Table 1). NY148 recorded the highest specific gravity in the trial at 1.083. Raw internal tuber quality was excellent (Table 2). Chip quality ranking at Herr Foods on October 4th was good, ranking 3rd behind Atlantic and Snowden. This variety exhibited the most black spot bruise susceptibility of the trial in 2012, with 3.7 bruises per tuber being recorded (Table 4). NY148 was the most black spot bruise susceptible in the 2011 trial as well. On August 27th, this variety appeared to have good vine vigor with a low sugar profile.

MSL292-A: MSL292-A was above average in yield at 392 cwt./A US#1 with 3 percent oversize tubers recorded. The specific gravity for this variety was slightly below the trial average of 1.068 (Table 1). This variety exhibited no hollow heart at harvest, with only a slight amount of vascular discoloration and internal brown spot recorded (Table 2). MSL292-A was moderately resistant to black spot bruise and ranked below the trial average (Table 4). This variety appeared to be mature based on the pre-harvest panel data from August 27th, where the sucrose rating was 0.892, the glucose level was 0.002 and the canopy rating was 15 percent (Table 5B).

W6483-5: The US#1 yield for W6483-5 was above the trial average at 377 cwt./A. The specific gravity was below average at 1.059 (Table 1). Internal tuber quality was moderate with eight tubers expressing vascular discoloration and five tubers expressing internal brown spot (Table 2). The chip quality at Herr's was below average, ranking 15 of 18 varieties in out-of-the-field chip performance. Black spot bruise tolerance was good with an average of 0.3 bruises per tuber recorded (Table 4). The plant canopy was dead on August 27th with stable glucose and sucrose values observed (Table 5B).

MSR061-1: The yield on MSR061-1 was above average at 374 cwt./A US#1 with 13 percent B-size potatoes and 11 percent oversize tubers (Table 1). The specific gravity was slightly above the trial average at 1.071. Internal tuber quality was good with few defects reported (Table 2). This variety ranked slightly below average for chip quality at Herr Foods on October 4th. MSR061-1 scored very well in tolerance to black spot bruise with an average of 0.6 bruises per tuber reported (Table 4). This variety appeared to have a mid to late season maturity based on plant maturity on August 27th (Table 5B).

W2978-3: The yield on W2978-3 was slightly above the trial average at 368 cwt./A US#1. The specific gravity was the lowest in the 2010 and 2011 trials at 1.065 and was recorded to be 1.059 in the 2012 trial (Table 1). Raw internal tuber quality was very good with only a slight number of defects being recorded (Table 2). The ranking at Herr's was just above the trial mean for this variety. Black spot bruise tolerance was good but somewhat expected with such a low specific gravity reported (Table 4).

AF4157-6: This variety had a US#1 tuber yield, slightly above average, at 367 cwt./A and a tuber size distribution that consisted of 80 percent A-size and 18 percent undersize tubers (Table 1). The specific gravity was below the trial average at 1.064. Raw internal tuber quality was acceptable, with 8 tubers with vascular discoloration and one tuber with hollow heart reported (Table 2). The at-harvest chip fry test ranked this variety 18th out of the 18 varieties for overall appearance. AF4157-6 had the 5th highest amount of total chip defects in the trial (Table 3). This variety was excellent for black spot bruise tolerance in the 2012 trial, averaging only 0.2 bruises per tuber (Table 4). Vine maturity appears to be mid-season for this variety (Table 5B).

CO02321-4W: This variety had slightly above average yield of US#1 tubers at 365 cwt./A and a tuber size distribution that consisted of 81 percent A-size and 16 percent undersize tubers (Table 1). The specific gravity was above the trial average at 1.073. Raw internal tuber quality was generally good (Table 2). The at-harvest chip fry test ranked this variety 16th out of the 18 varieties for overall appearance. CO02321-4W had the 2nd highest amount of total chip defects in the trial (Table 3). This variety exhibited good black spot bruise tolerance in the 2012 trial (Table 4). The vine maturity appears to be mid-season for this variety (Table 5B).

CO00197-3W: This variety had a below average yield in the 2012 trial. The US#1 yield was 315 cwt./A with a below average specific gravity (Table 1). The tuber size distribution consisted of 70 percent A-size and 29 percent undersize tubers. Nine tubers with vascular discoloration in thirty cut tubers were observed. CO00197-3W ranked 14th of 18 lines tested at Herr Foods for overall chip quality and appearance on October 4th. CO00197-3W had the highest amount of total chip defects in the trial at 75.5 percent (Table 3). The variety appeared to be tolerant to black spot bruise (Table 4). This line was completely dead on August 27th with what appears to be stable glucose and sucrose values (Table 5B).

A01143-3C: This variety had an average yield of 288 cwt./A US#1 with a specific gravity of 1.075 (Table 1). Thirteen percent of the total yield was cull potatoes. Raw internal tuber quality was good with only two tubers expressing vascular discoloration (Table 2). A01143-3C ranked 8th of 18 varieties at Herr's for chip quality out-of-the-field. Of all the varieties in the 2012 trial, this variety had the least amount of total defects recorded at Herr Foods on October 4th, 2012 (Table 3). The variety exhibited a below average susceptibility to black spot bruise, with only 0.4 black spot bruises being recorded for each tuber observed (Table 4). This variety was very chemically immature on August 13th, with a 0.005 glucose and a 1.232 sucrose value recorded (Table 5A). On August 27th, 2012, the glucose and sucrose levels remained high with the vines still appearing quite green for this time in the season (Table 5B). The chip quality for A01143-3C was much better out-of-the-field than expected given these observations.

W5015-12: This variety had an average yield of 272 cwt./A US#1 with a specific gravity of 1.076 (Table 1). The tuber size distribution consisted of 59 percent A-size and 41 percent undersize tubers. Raw internal tuber quality was good with only four tubers expressing vascular discoloration (Table 2). W5015-12 ranked 4th of 18 varieties at Herr's for chip quality out-of-the-field. The variety exhibited an above average susceptibility to black spot bruise, with 2.3 black spot bruises being recorded for each tuber evaluated (Table 4). This variety appeared to be physiologically mature at the August 27th pre-harvest panel date (Table 5B).

ND8304-2: ND8304-2 yielded below the trial average at 252 cwt./A US#1. Specific gravity was the lowest recorded in the trial at 1.058 (Table 1). The tuber size distribution consisted of 74 percent A-size and 23 percent undersize tubers. The variety had only one tuber with vascular discoloration (Table 2). Herr's ranked this variety 17 of 18 in chip performance out-of-the-field. This variety also had the third highest amount of total chip defects at Herr Foods (Table 3). ND8304-2 appeared to have a low susceptibility to black spot bruising (Table 4). The plant canopy of this variety was very mature on August 13th with no green tissue present on August 27th (Tables 5A and 5B).

MN99380-1Y: This variety recorded the third lowest yield in this year's trial (Table 1). MN99380-1Y had a below average specific gravity of 1.065. The tuber size distribution consisted of 61 percent A-size and 34 percent undersize tubers. Internal tuber quality was generally good with eight tubers reported having vascular discoloration (Table 2). This clone ranked 11th at Herr's for chip quality and appearance on October 4th, 2012. This variety recorded the highest Agron color score of the trial at 63.9 (Table 3). MN99380-1Y appeared to have an average susceptibility to black spot bruise (Table 4). This clone appeared to be mature on August 27th, 2012 (Table 5B).

CO00188-4W: This variety was below the trial average with a 242 cwt./A US#1 yield. The specific gravity was also below average at 1.062 (Table 1). The tuber size distribution consisted of 64 percent A-size and 36 percent undersize tubers. Raw internal tuber quality was excellent (Table 2). Chip quality at Herr Foods was above average, ranking 5th of 18 for overall appearance. CO00188-4W ranked as one of the best varieties for black spot bruise tolerance (Table 4). This variety exhibits an early vine maturity, scoring a 25 percent canopy rating on the August 13th pre-harvest panel (Table 5A).

ND8305-1: This variety was the lowest yielding clone in the trial with a 164 cwt./A US#1 yield and an above average specific gravity of 1.075. The tuber size distribution consisted of 59 percent A-size and 41 percent undersize tubers (Table 1). No internal defects were observed in thirty cut oversize tubers at harvest (Table 2). Herr's ranked this variety 12th for overall chip quality. Zero percent of the ND8305-1 tubers were bruise free, ranking it as the second most bruise susceptible line in the 2012 trial (Table 4). The vine maturity appeared to be mid to late season.

MISSOURI REGIONAL TRIAL

Charleston, Missouri - Black Gold Farms - 2012

Planting Date: 3/14/2012

Harvest Date: 6/28/2012 (106 DAP)

Variety	< 1 7/8"		Marketable Yield		> 4"	Total Yield	% of Standard's Marketable Yield		Specific Gravity
	# of tubers	cwt/ac	# of tubers	cwt/ac			Atlantic	Snowden	
					cwt/ac	cwt/ac			
ATLANTIC	17.8	44	77.3	435	0	479	100	96	1.099
SNOWDEN	24.0	50	98.5	452	0	501	104	100	1.096
A01143-3C	68.3	120	96.5	366	0	486	84	81	1.084
AF0338-17	38.5	69	83.8	393	0	462	90	87	1.090
AF4157-6	30.8	64	91.5	403	0	467	93	89	1.094
CO99188-4W	62.0	115	74.0	266	0	381	61	59	1.080
CO00197-3W	43.3	85	64.8	317	0	402	73	70	1.083
CO002321-4W	33.8	59	97.0	456	0	515	105	101	1.092
MN99380-1	39.0	73	97.3	454	0	527	104	100	1.077
MSL007-B	37.3	67	74.5	302	0	369	69	67	1.094
MSL292-A	28.0	62	73.0	411	0	473	94	91	1.092
MSQ086-3	78.3	142	94.8	398	0	539	91	88	1.080
MSR127-2	22.0	62	82.8	378	0	440	87	84	1.090
ND8304-2	34.0	71	95.0	406	0	477	93	90	1.074
ND8305-1	51.0	115	76.8	316	0	432	73	70	1.099
NY140	30.3	65	101.3	472	0	537	108	104	1.085
NY148	60.3	121	111.0	450	0	570	103	99	1.097
W2978-3	25.0	75	95.0	425	0	501	98	94	1.085
W4980-1	14.5	34	80.8	441	0	475	101	98	1.084
W5955-1	17.8	36	88.5	467	0	503	107	103	1.096
W6483-5	21.8	45	68.8	364	0	408	84	80	1.078

MISSOURI REGIONAL TRIAL

Charleston, Missouri - Black Gold Farms - 2012

Planting Date: 3/14/2012

Harvest Date: 6/28/2012 (106 DAP)

Variety	COOK SAMPLE						% SMALL	% MED	% LARGE
	CLR	UC	GRN	ID	ED	TOTAL			
ATLANTIC	69	0	0	0	28	28	9	91	0
SNOWDEN	70	0	0	0	4	4	10	90	0
A01143-3C	70	0	0	0	8	8	25	75	0
AF0338-17	69	3	0	0	6	9	15	85	0
AF4157-6	70	0	1.5	0	1.5	3	14	86	0
CO99188-4	69	0	0	0	6	6	30	70	0
CO00197-3	70	4	0	4	0	8	21	79	0
CO002321-4	70	1.5	3	0	3	7.5	11	89	0
MN99380-1	69	3	0	0	5	8	14	86	0
MSL007-B	72	0	0	0	0	0	18	82	0
MSL292-A	70	0	1	0	1	2	13	87	0
MSQ086-3	69	3	0	0	16	19	26	74	0
MSR127-2	68	0	0	0	20	20	14	86	0
ND8304-2	72	0	3	0	0	3	15	85	0
ND8305-1	70	0	0	0	4	4	27	73	0
NY140	69	0	0	3	4	7	12	88	0
NY148	69	4	0	0	9	13	21	79	0
W2978-3	72	0	0	0	0	0	15	85	0
W4980-1	69	0	1	4	14	19	7	93	0
W5955-1	70	0	0	0	5	5	7	93	0
W6483-5	70	0	0	0	4	4	11	89	0

CLR = CHIP COLOR - AGTRON READING

North Carolina Regional Trial

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Cooperating Chip Processor:

Utz Quality Foods
Hanover, PA

Trial Data:

Planting Site: Black Gold Farms, Gum Neck, Tyrrell County, NC

Planting Date: March 2, 2012

Harvest Date: June 18, 2012 (108 days)

Growing Conditions: Planting was within the normal timeframe this year. Conditions were favorable for growth early in the season with adequate rainfall throughout. Rains tapered off in mid-June just prior to harvest and it remained relatively dry until completion of harvest. Temperatures during the growing season were conducive to production of a good crop and marketable yields are within a more normal range than they have been the past two seasons. Temperatures started the season with a warm March and then a moderate April and May. By the middle to the end of June temperatures rose quickly with average daily, maximum and minimum temperatures during the period June 1 - 18 of 70.9, 80.0, and 60.7, respectively.

Soil Type: Weeksville silt loam

Experimental Design: Randomized complete block design with 5 replications.

Row Spacing: 28 hills, spaced 9 inches apart, 34" row width.

Fertilizer: 228 N, 123 P, 121 K, 1 ZN (lbs/A)

Weed Control: Metribuzin 1 lbs/A
Intensity 10 fl oz/A

Insect Control: Admire Pro in-furrow 8 oz/A

Disease Control: Quadris in furrow 6.2 oz/A
Bravo 6 pt/A
Revus Top 6.2 fl oz/A

Special Notes: After planting and prior to stand counts it was communicated to our program from the Michigan State University program that some of their seed plots had been injured with an herbicide in 2011. This is likely a factor as it relates to yields and overall performance data of the MS clones included in this report, especially in the clone summaries when referring to percent stand counts and vigor.

Table 1. North Carolina. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores sorted by Marketable Yield.

Clone	Total Yield cwt/A	Marketable Yield cwt/A	% Size Distribution by Class ¹							1 ⁷ / ₈ to 4"	2 ¹ / ₂ to 4"	Specific Gravity ²	Chip Color ³	
			1	2	3	4	5	Culls	24 to 48 hrs				5 to 7 days	
NY140	494	439	7	25	64	0	0	5	89	64	1.071	2	2.5	
Snowden	373	339	8	53	38	0	0	1	91	38	1.078	1	2	
NY148	414	326	19	66	13	0	0	3	79	13	1.078	1	1.5	
CO02321-4W	400	316	8	25	50	3	0	13	79	53	1.082	1.5	2	
AF4157-6	383	314	14	56	26	0	0	4	82	26	1.080	1	2	
CO00197-3W	388	308	16	53	26	0	0	5	79	26	1.075	1.5	2	
MN99380-1	415	302	12	37	34	1	0	15	72	35	1.072	2	2	
W4980-1	367	300	9	38	43	0	0	10	82	43	1.072	1.5	2	
A01143-3C	396	292	13	52	22	0	0	13	73	22	1.069	1	2	
AF0338-17	337	282	12	34	45	2	0	7	81	47	1.077	1.5	2	
Atlantic	322	280	7	35	49	2	0	6	87	52	1.077	1.5	2	
W5955-1	388	277	6	20	50	2	0	22	71	51	1.069	2	2	
W2978-3	356	276	12	44	34	0	0	11	77	34	1.070	1.5	2	
W6483-5	338	272	4	16	64	0	0	15	80	64	1.067	1.5	2.5	
ND8305-1	333	235	27	68	2	0	0	3	70	2	1.088	1	1.5	
MSQ086-3	316	228	20	43	28	1	0	8	72	29	1.066	1	2	
ND8304-2	318	225	19	57	14	0	0	11	71	14	1.073	1.5	2	
MSL292-A	263	205	7	33	44	1	0	15	78	45	1.075	1.5	2	
CO00188-4W	281	202	24	54	18	0	0	5	72	18	1.078	1.5	2	
MSR127-2	277	179	18	55	10	0	0	17	65	10	1.075	2	2.5	
MSL007-B	201	138	18	53	16	0	0	13	69	16	1.080	2	2	
Grand Mean	350	273												
CV(%)	14.6	18.8												
LSD (k=100)	61.4	61.5												

¹ **Size Classes:**

1's < 1 7/8"; 2's 1 7/8 to 2 1/2"; 3's 2 1/2 to 3 1/4"; 4's 3 1/4 to 4"; 5's ≥ 4"; Culls = all defective potatoes.

² **Specific Gravity**

Determined by weight in air/water method.

³ **Chip Color**

Ratings conducted by the NCSU Potato Breeding Program at the TRS/VGJREC within 48 hrs and again in 5 to 7 days after harvest: 1 = no defects, exceptionally bright; 2 = excellent, bright; 3 = good, light or golden; 4 = dark defects, marginal; 5 = not acceptable.

Table 2. North Carolina. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes.

Clone	Plant Data ¹				Tuber Data ²									% Internal Defects ³					
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR
A01143-3C	7	9	8	7	6	6	4	5	2	6	6	8	5	0	9.0	0	0	0	0
AF0338-17	8	7	8	6	6	5	5	7	2	7	7	8	8	0	9.0	0	0	0	0
AF4157-6	7	8	8	5	6	6	7	7	2	7	5	6	6	0	9.0	0	0	0	0
Atlantic	5	7	7	5	5	5	7	7	2	6	8	8	7	0	9.0	2	0	2	0
CO00188-4W	5	5	7	4	8	7	5	7	2	7	5	8	7	0	9.0	0	0	0	0
CO00197-3W	6	8	7	6	6	6	4	7	4	7	7	8	6	0	9.0	0	0	6	0
CO02321-4W	6	8	8	5	9	7	7	7	2	7	8	9	8	2	8.0	0	0	0	0
MN99380-1	7	8	8	6	7	7	7	7	2	7	7	8	5	0	9.0	2	0	2	0
MSL007-B	6	6	6	6	4	5	7	7	2	7	6	5	6	0	9.0	4	0	0	0
MSL292-A	9	9	9	8	5	6	5	7	2	5	7	6	3	0	9.0	0	0	0	0
MSQ086-3	9	8	8	9	9	8	7	5	2	6	7	6	5	0	9.0	0	0	2	0
MSR127-2	9	9	8	9	6	6	7	6	2	7	7	3	3	0	9.0	2	0	0	0
ND8304-2	5	8	8	5	6	7	7	7	2	6	6	7	5	0	9.0	0	0	0	0
ND8305-1	8	8	6	5	9	7	5	7	3	4	5	7	4	0	9.0	0	0	0	0
NY140	9	9	8	8	6	7	5	7	5	7	8	7	6	0	9.0	0	0	0	0
NY148	7	7	7	6	6	6	7	7	2	7	6	8	7	0	9.0	0	0	0	0
Snowden	9	9	7	7	5	5	7	6	2	5	7	8	7	0	9.0	0	0	0	0
W2978-3	9	8	8	6	9	7	7	7	2	7	7	6	6	0	9.0	0	0	0	0
W4980-1	8	8	7	5	5	7	7	6	2	7	8	7	8	4	8.0	0	0	0	0
W5955-1	9	8	7	8	5	5	6	6	3	7	9	6	5	0	9.0	0	0	14	0
W6483-5	6	7	6	4	9	8	5	7	3	6	9	8	4	0	9.0	2	0	4	8

¹ **Plant Data:**

Vine Type: 1 = decumbent –poor canopy, 2 = decumbent – fair canopy, 3 = decumbent – good canopy, 4 = spreading – poor canopy, 5 = spreading – fair canopy, 6 = spreading - good canopy, 7 = upright – poor canopy, 8 = upright – fair canopy, 9 = upright good canopy.

Vine Disease: 1 = very severe, 5 = moderate, 9 = none.

Vine Pollution: 1 = very severe, 5 = moderate, 9 = none.

Vine Maturity: 1= very early, 5 = mid-season, 9 = very late.

² **Tuber Data:**

Skin Color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan to light brown, 7 = buff, 8 = white, 9 = cream.

Skin Texture: 1= partial russet, 2 = heavy russet, 3 = moderate russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = moderately smooth, 8 = smooth, 9 = very smooth.

Cross Section: 1 = very flat, 3 = flat, 5 = intermediate to oval, 7 = mostly round, 9 = very round.

Skin Set: 1 = very poor, 5 = fair, 9 = excellent.

Shape: 1 = very round, 2 = mostly round, 3 = round to oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong to long, 7 = mostly long, 8 = long, 9 = cylindrical.

Eye Depth: 1= very deep, 5 = medium, 9 = very shallow.

Size: 1 = small, 5 = medium, 9 = large.

Tuber Disease: 1 = very severe, 5 = moderate, 9 = none.

Overall Appearance: 1 = very poor, 5 = fair, 9 = excellent.

³ **Internal Defects:**

Percentage determined from 10 randomly selected potatoes /rep (40 total) in size classes 3 and 4. HN=heat necrosis; HNR=average heat necrosis rating (Rating Scale: 1= very severe to 9 = absent); HH=hollow heart; VR=vascular ring discoloration; BC=brown center; SR=soft rot

Table 3. UTZ Quality Foods Chip Data.

Clone	% Defects		%Total Defects	Specific Gravity	Defect Descriptions ¹	Chip Color ² Hunter Lab
	Internal	External				
A01143-3C	0	0	0	1.085		64.5
AF0338-17	0	0	0	1.094		66.9
AF4157-6	0	0	0	1.092		69.7
Atlantic	1	0	0.01	1.087	ID	66
CO00188-4W	0	0	0	1.091		65.1
CO00197-3W	3	0	0.03	1.098	ID,SB	63.1
CO02321-4W	1	0	0.01	1.084	ID(minor)	65.9
MN99380-1	0	0	0	1.082	chip slight yellow cast	66.9
MSL007-B	0	0	0	1.086		64.6
MSL292-A	0	0	0	1.090		68
MSQ086-3	3	0	0.03	1.076	ID (light)	67.2
MSR127-2	5	0	0.05	1.081	ID	65.2
ND8304-2	0	0	0	1.084		68.6
ND8305-1	0	0	0	1.103		67
NY140	0	0	0	1.083		69
NY148	0	0	0	1.097		68.2
Snowden	0	0	0	1.088		68.7
W2978-3	2	0	0.02	1.079	ID	66.9
W4980-1	0	0	0	1.087		64.2
W5955-1	0	0	0	1.091		67
W6483-5	7	0	0.07	1.081	ID,SB	66.2

¹ **Defect Descriptions:**

BC = Brown Center; BR = Bruising; ED = External Discoloration; HH = Hollow Heart; ID = Internal Discoloration; IHN = Internal Heat Necrosis; SB = Stem End Browning; VB = Vascular Browning; WW = Wire Worm.

² **Chip Color:**

Hunter Lab Scores

Taken with defective chips included in sample

Clone Summaries

A01143-3C: Maturity for this clone was late season and stand counts averaged 99% and vigor was better than good. Shapes were mostly round, size was larger than medium and overall appearance was fair. Marketable yields were 106% of Atlantic, gravity was 1.069 and chip color was exceptional in the 24 to 48 hour chip test and excellent in the 5 to 7 day test. External defects included misshapes, high numbers of tubers with secondary growth and skin blemishes due to Rhizoctonia.

AF0338-17: Maturity for this clone was mid to late season and stand counts averaged 94% and vigor was good. Shapes were mostly round, size was medium to large and overall appearance was better than good. Marketable yields were 98% of Atlantic (historically 97%), gravity was 1.077 (historically 1.080) and chip color was excellent in the 24 to 48 hour and the 5 to 7 day chip tests. External defects included misshapes, and sunscald.

AF4157-6: This clone was mid-maturing and had 91% stands with better than good vigor. Shapes were mostly round, size was medium and overall appearance was better than fair. AF4157-6 was the 5th highest yielding clone in the trial. Marketable yields were 115% of Atlantic (historically 108%), gravity was 1.080 (historically 1.081) and chip color was exceptional in the 24 to 48 hour chip test and excellent in the 5 to 7 day test. External defects included sunscald, misshapes, and many skin blemishes due to Rhizoctonia.

Atlantic: Maturity for our main crop standard was mid-season, stands were 96% and vigor was good. Shapes were mostly round, size was large and overall appearance was good. Gravity was 1.077 (historically 1.079) and chip color was excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects included growth cracks, sunscald, misshapes and skin blemishes due to Rhizoctonia.

CO00188-4W: Maturity for this clone was slightly earlier than mid-season with 99% stands and better than good plant vigor. Shapes were mostly round, size was medium and overall appearance was good. Marketable yields were 74% of Atlantic (historically 76%), gravity was 1.078 (historically 1.076) and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects included misshapes, growth cracks, and skin blemishes due to Rhizoctonia.

CO00197-3W: This clone was slightly later than mid-maturing and had 94% stands with better than good plant vigor. Shapes were mostly oblong, size was medium to large, and overall appearance was better than fair. Marketable yields were 112% of Atlantic (historically 92%), gravity was 1.075 (historically 1.078%) and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects were sunscald, soft rot, and misshapes.

CO02321-4W: Maturity for this clone was mid-season with 97% stands and good plant vigor. Shapes were mostly round, size was medium-large to large and overall appearance was better than good. CO02321-4W was the 4th highest yielding clone in the trial. Marketable yields were 116% of Atlantic, gravity was 1.082 and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects were many sunscalded potatoes.

MN99380-1: Maturity for this clone was later than mid-season, stands were 98% and plant vigor was better than good. Shapes were mostly round, size was medium to large and overall appearance was fair. Marketable yields were 118% of Atlantic gravity was 1.072 and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects were high numbers of sunscalds, secondary growth and misshapes due to points.

MSL007-B: Maturity for this clone was slightly later than mid-season, stands were 94% and vigor was better than poor. Shapes were mostly round, size was slightly larger than medium and overall appearance was better than fair. Marketable yields were 53% of Atlantic, gravity was 1.080 and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects were sunscalds, lots of scab, and skin blemishes due to Rhizoctonia.

MSL292-A: This clone was late-maturing and had 59% stands with better than poor vigor. Shapes were mostly round, size was medium to large, and overall appearance was poor. Marketable yields were 77% of Atlantic (historically 82%), gravity was 1.075 historically (1.077), and chip scores were excellent for the 24 to 48 hour and the 5 to 7 day tests. External defects included misshapes, common scab, sunscald and skin blemishes due to Rhizoctonia.

MSQ086-3: This clone was very late-maturing and had stands of 97% with poor vigor. Shapes were mostly round, size was medium to large, and overall appearance was fair. Marketable yields were 85% of Atlantic (historically

86%), gravity was 1.066 (historically 1.067), and chip scores were exceptional the 24 to 48 hour test and excellent for the 5 to 7 day chip test. External defects included high amounts of common scab, high amounts of skin blemishes due to Rhizoctonia, sunscald, misshapes, and growth cracks.

MSR127-2: Maturity for this clone was very late, stands were 87% and vigor was poor. Shapes were mostly round, size was medium to large and overall appearance was poor. Marketable yields were 70% of Atlantic, gravity was 1.075 and chip scores for the 24 to 48 hour test were excellent and acceptable for the 5 to 7 day test. External defects included high amounts of powdery scab, high amounts of skin blemishes due to Rhizoctonia, sunscald, and growth cracks.

ND8304-2: Maturity for this clone was mid-season, stands were 96% and vigor was better than fair. Shapes were mostly round, size was larger than medium and overall appearance was fair. Marketable yields were 86% of Atlantic, gravity was 1.073, and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects included high numbers of sunscalds, misshapes, growth cracks and deep apical and stem ends.

ND8305-1: Maturity for this clone was mid-season, stands were 97% and vigor was better than good. Shapes were round to oblong, size was medium, and overall appearance was less than fair. Marketable yields were 87% of Atlantic (historically 55%), gravity was 1.088 (historically 1.090), chip scores were exceptional for the 24 to 48 hour test and excellent for the 5 to 7 day test. External defects included sunscald, common scab, skin blemishes due to Rhizoctonia and misshapes.

NY140: This clone had stands of 100%, and was late-maturing with better than good vigor. Shapes were mostly oblong, size was large and overall appearance was better than fair. It was the top yielding clone in the trial. Marketable yields were 167% Atlantic (historically 115%), gravity was 1.071 (historically 1.071), and chip scores were excellent in the 24 to 48 hour and good in the 5 to 7 day test. External defects included sunscald and skin blemishes due to Rhizoctonia.

NY148: Maturity for this clone was slightly later than mid-season, stands were 99% and vigor was better than good. Shapes were mostly round, size was slightly larger than medium and overall appearance was good. NY148 was the third highest yielding clone in the trial. Marketable yields were 123% of Atlantic (historically 86%), gravity was 1.078 (historically 1.087) and chip scores were exceptional for the 24 to 48 hour test and excellent for the 5 to 7 day test. External defects included sunscald, and skin blemishes due to Rhizoctonia.

Snowden: Our late season standard had a mid to late maturity with 97% stands and better than good vigor. Shapes were mostly round, size was medium to large and overall appearance was good. Marketable yields were 127% of Atlantic (historically 112%), gravity was 1.078 (historically 1.076) and chip scores for the 24 to 48 hour test were exceptional and excellent for the 5 to 7 day chip test. External defects included sunscald, soft rot and misshapes.

W2978-3: Maturity for this clone was slightly later than mid-season, and had 99% stands with better than fair vigor. Shapes were mostly round, size was medium to large and overall appearance was better than fair. Marketable yields were 106% of Atlantic (historically 85%), specific gravity was 1.070 (historically 70), and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day tests. External defects included sunscald, misshapes, growth cracks, common scab and skin blemishes due to Rhizoctonia.

W4980-1: Maturity for this clone was mid-season and stands were 96% with better than good vigor. Shapes were mostly round, size was large, and overall appearance was better than good. Marketable yields were 111% of Atlantic (historically 109%), gravity was 1.072 (historically 1.077), and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day tests. External defects included sunscald, soft rot and skin blemishes due to Rhizoctonia.

W5955-1: Maturity for this clone was late-season and stands were 96% with good vigor. Shapes were round to oblong, size was very large and overall appearance was fair. Marketable yields were 105% of Atlantic, gravity was 1.069 and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects included sunscald, misshapes, high amounts of common scab, and high amounts of skin blemishes due to Rhizoctonia.

W6483-5: Maturity was slightly earlier than mid-season, stands were 97% and vigor was better than fair. Shapes were round to oblong, size was very large and overall appearance was better than fair. Marketable yields were 102% of Atlantic, gravity was 1.067 and chip scores were excellent for the 24 to 48 hour test and good for the 5 to 7 day test. External defects included common scab, sunscald, growth cracks, misshapes, and soft rot.

Clone Pictures:

NC 24 to 48 hr chip



NC 5 to 7 day chip



A01143-3C



AF0338-17



AF4157-6



Atlantic



CO00188-4W

NC 24 to 48 hr chip



NC 5 to 7 day chip



CO00197-3W



CO02321-4W



MN99380-1



MSL007-B



MSL292-A

NC 24 to 48 hr chip



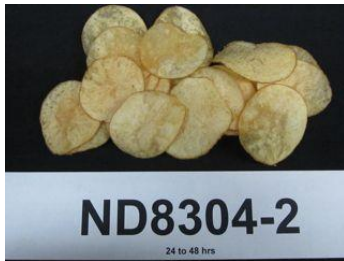
NC 5 to 7 day chip



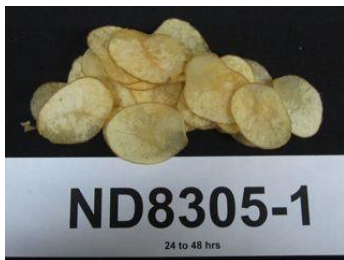
MSQ086-3



MSR127-2



ND8304-2



ND8305-1



NY140

NC 24 to 48 hr chip



NY148

24 to 48 hrs

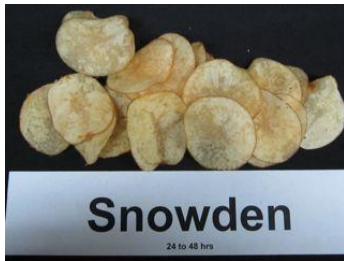
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NY148

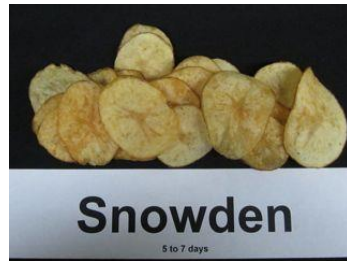
5 to 7 days

NY148



Snowden

24 to 48 hrs



Snowden

5 to 7 days

Snowden



W2978-3

24 to 48 hrs



W2978-3

5 to 7 days

W2978-3



W4980-1

24 to 48 hrs



W4980-1

5 to 7 days

W4980-1



W5955-1

24 to 48 hrs



W5955-1

5 to 7 days

W5955-1

NC 24 to 48 hr chip



NC 5 to 7 day chip



W6483-5

NORTH DAKOTA REGIONAL LOCATION

Local Coordinators:

Mr. Martin Glynn
Food Technologist
USDA, ARS
Potato Research Worksite
East Grand Forks, Mn 56721

Cooperating Grower:

Oberg Farms
Hoople, ND

Cooperating Chip Processor:

USDA, ARS
Potato Research Worksite
East Grand Forks, MN 56721

Trial Data:

Planting Site: Oberg Farms, Hoople, ND

Planting Date: May 17, 2012

Harvest Date: September 13, 2012 (120 days)

Growing Conditions: Overall, weather conditions in the region for the 2011 growing season were poor. A very dry spring and summer delayed tuber development and also delayed emergence. Temperatures in June to August were hot very little moisture and conditions did not improve until late August. Total yields were below average to fair for most clones, and tubers in general were under sized.

Experimental Design: Each variety/clone was planted in a single 250 ft row as directed by the SFA protocol. Four 20 ft sections of each row were harvested and graded. This was not a randomized and replicated experiment. Only means were calculated.

Row Spacing: Machine planted. Approx. 12 inches in-row, 36 inches between-rows.

Fertilizer: Awaiting data

Pest Control: Awaiting data

Chip Ratings: Chips were prepared and rated following the procedures outlined in the Snack Food Association Chipping Potato Handbook (1995). Chips were prepared and fried on 1/20 size chip line at USDA, ARS Potato Research Worksite, East Grand Forks, MN 56721 Chip scores are presented in Table 2.

Table 1. Production Statistics for SFA clones

Clone	US #1 Yld	Total Yld	#1	culls	Distribution (%)					Size class range	
	cwt/A	cwt/A	%	%	1	2	3	4	5	2 to 4	3 to 4
CO 00188-4W	116	129.8	90	0	42	28	12	3	2	45	16
MSL 292-A	154	168.7	92	0	24	26	23	13	4	64	37
W 6483-5	200	266.1	75	0	8	17	17	18	13	53	36
W 2978-3	160	173.9	92	0	17	22	25	18	8	67	44
W 4980-1	188	200.9	94	0	20	30	25	12	4	69	38
MSR 061-1	193	203.8	95	0	23	27	25	12	7	64	37
W 5015-12	188	206.3	91	0	36	28	17	7	1	54	25
AO 1143-3C	106	122.6	87	0	33	26	19	5	2	51	24
CO 00197-3W	133	157.4	85	0	31	27	14	9	3	51	24
NY 148	162	177.2	92	0	27	28	19	11	4	60	31
NY 140	133	159.8	83	0	12	19	22	18	10	60	41
ATLANTIC	170	2.03.9	84	0	19	20	19	13	11	53	33
SNOWDEN	136	148.8	92	0	29	31	14	10	7	56	25
MN 99380-1Y	140	156.7	90	0	37	30	13	6	3	50	20
ND 8304-2	124	138.4	90	0	32	28	16	8	5	53	25
ND 8305-1	154	167.4	93	0	40	31	14	6	0	52	21
CO 02321-4W	105	115.43	92	0	26	26	20	12	5	60	34
AF 4157-6	185	202.5	92	0	27	27	21	12	4	40	12

1No.1 Yield: marketable yield, size classes 2 to 4

2Percent No. 1: calculated based on weight using the formula, No. 1 Wt / Total Yield Wt

3Size Class Distribution: calculated based on weight using the formula, Class Wt / (Total Yield Wt – Cull Wt).

4Size Classes: 1 = 1.5 to 1 7/8", 2 = 1 7/8 to 2.5", 3 = 2.5 to 3.25", 4 = 3.25 to 4", 5 = > 4"; Class size C (<1.5") was recorded and is included in Total Yield but is not shown as a separate size category.

Table 2. Plant growth and tuber characteristics for SFA clones.

Clone	Plant Growth Characteristics ¹				Tuber Characteristics ²						
	Percent Stand	Early Vigor	Vine Type	Vine Maturity	IFC	SC	ST	TS	ED	APP	Chip Rating ³
CO00188-4W	83	na	9	3	1	6	6	3	7	7	71
MSL 292-A	72	na	8	3	1	7	7	3	7	7	73
W 6483-5	82	na	6	3	1	6	6	3	7	7	75
W 2978-3	73	na	8	5	1	6	6	3	6	7	74
W 4980-1	83	na	6	3	2	6	7	4	5	8	72
MSR 061-1	89	na	8	4	1	6	5	3	7	8	74
W 5015-12	87	na	8	4	1	6	6	3	7	7	74
AO 1143-3C	90	na	8	3	1	6	5	3	7	7	76
CO00197-3W	78	na	8	4	1	6	6	4	7	8	75
NY 148	57	na	8	7	1	6	6	4	7	7	79
NY 140	na	na	6	5	1	6	6	3	7	8	75
ATLANTIC	76	na	9	3	1	8	6	4	6	7	75
SNOWDEN	67	na	8	3	1	6	6	4	6	7	75
MN 99380	76	na	8	5	2	6	7	5	5	7	74
ND 8304-2	75	na	8	4	1	6	7	4	5	7	75
ND 8305-1	80	na	8	3	1	6	5	4	7	6	74
CO 002321-4W	85	na	8	4	1	6	6	3	5	7	74
AF 4157-6	73	na	6	4	1	7	5	4	6	8	70

¹Plant Growth Characteristics.

Percent Stand: based on machine planted 12 inch in-row spacing, 20 ft plot.

Early Vigor: 1 = no emergence, 2 = leaves in rosette, 3 = plants < 2 in., 4 = plants 2 to 4 in., 5 = plants 4 to 6 in., 6 = plants 6 to 8 in., 7 = plants 8 to 10 in., 8 = plants 10 to 12 in., 9 = plants > 12 inches.

Vine Type: 1 = decumbent - poor canopy, 2 = decumbent - fair canopy, 3 = decumbent - good canopy, 4 = spreading - poor canopy, 5 = spreading - fair canopy, 6 = spreading - good canopy, 7 = upright - poor canopy, 8 = upright - fair canopy, 9 = upright - good canopy.

Vine Maturity: 1 = completely dead, 3 = yellow and dying, 5 = moderately senesced, 7 = starting to senesce, 9 = green and vigorous.

²Tuber Characteristics.

Internal Flesh Color (IFC): 1 = white, 2 = cream, 3 = light yellow, 4 = medium yellow, 5 = dark yellow, 6 = pink, 7 = red, 8 = blue, 9 = purple.

Skin Color (SC): 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.

Skin Texture (ST): 1 = partially russet, 2 = heavy russet, 3 = moderate russet, 4 = light russet, 5 = netted, 6 = slightly netted, 7 = moderately smooth, 8 = smooth, 9 = very smooth.

Eye Depth (ED): 1 = very deep, 3 = deep, 5 = intermediate, 7 = shallow, 9 = very shallow

Overall Appearance (APP): 1 = very poor, 3 = poor, 5 = fair, 7 = good, 9 = excellent.

³Chip Rating: Chips were prepared and rated following the procedures outlined in the Snack Food Association Chipping Potato Handbook (1995). A sub-sample of potatoes from the trial was shipped to Utz Quality Snacks, chipped and scored according to the Hunter Lab rating.

Table 3. External and internal defects for SFA clones.

Clone	% External Tuber Defects ¹					% Internal Tuber Defects ²			
	Growth Cracks	Mis-shapen	Sun-burned	Rotten & misc.	Total Culls	HH	BR	CRS	IHN
CO00188-4W	0	0	0	2	2	0	0	0	0
MSL 292-A	3	0	0	1	4	0	0	0	0
W 6483-5	0	2	0	0	2	0	0	0	0
W 2978-3	0	0	0	3	3	0	0	0	0
W 4980-1	2	1	2	2	7	0	0	0	0
MSR 061-1	0	0	0	1	1	0	0	0	0
W 5015-12	0	1	2	3	6	0	0	0	0
AO 1143-3C	2	0	0	1	3	0	0	0	0
CO 00197-3W	0	1	1	3	5	0	0	0	0
NY 148	0	1	0	2	3	0	0	0	0
NY 140	1	5	0	2	8	0	0	0	0
ATLANTIC	0	1	1	3	5	0	0	0	0
SNOWDEN	2	0	1	4	7	2	0	0	0
MN 99380-1Y	1	0	3	3	7	0	0	0	0
ND 8304-2	0	0	0	1	1	0	0	0	0
ND 8305-1	0	0	1	3	4	0	0	0	0
CO002321-4W	0	2	0	2	4	0	0	0	0
AF 4157-6	0	2	1	3	6	0	0	0	0

External Tuber Defects: Total Culls is sum of growth cracks, misshapen, sunburned and rotten/miscellaneous.

²Percent Internal Tuber Defects: percent of tubers showing defects; HH = hollow heart, BR = brown rot, CRS = corky ringspot, IHN = internal heat necrosis.

Snack Food Association Chip Variety Trial

Oregon Trial Cooperators
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Trial Information

Planting Date	March 23, 2012
Vine Kill Date	July 27, 2012
Harvest Date	August 17, 2012
Row Spacing	9.25" seed spacing in 34" beds
Plots	Single row spacing of 24 hills in four randomized blocks
GDD	1678.1

This trial was conducted to evaluate sixteen advanced cultivars and two control varieties in the Snack Food Association Trial for their chip processing qualities. This trial was grown for 127 days, providing evaluation of the cultivars under mid-season, early harvest conditions, in contrast to the SFA trial grown here last year, which was grown under a long season, late harvest conditions. Potatoes size up quickly in the Columbia Basin, so the early planting and harvest was attempted to reduce the amount of oversized potatoes that reduced the US No.1 yields in last years' trial. Perhaps when considering future evaluations in the Columbia Basin, the trial could be divided into early and late season trials. Some varieties still had a large percentage of oversized, but several varieties had not matured or sized up to their yield potential. The seed was cut by hand and planted on March 23rd. The vines were killed on July 27th and the plots were mechanically harvested on August 17th. The plots were grown in fine sandy loam soil following a small grains crop the previous year. The trial area was fumigated in September 2011 with 41 gallons per acre of Vapam with .6 inches of water. A pre-plant application of 63 pounds of nitrogen, 300 pounds of phosphorous, 200 pounds K₂O, 20 pounds of sulfur, 5 pounds of Zinc and 1.5 pounds of Boron was made. Dry fertilizer was banded at planting with 60 pounds nitrogen, 80 pounds of P₂O₅, and 40 pounds of sulfur per acre at planting. An addition 180 pounds of nitrogen as Solution 32 was applied with the irrigation water. The trial was irrigated by central pivot irrigation. The trial received management inputs normal for this area as indicated for insecticides and a weekly fungicide application were made. The harvest area was one row of 24 hills replicated four times for each cultivar. Plants were spaced at 9.25" in 34 inch rows.

Table 1 shows the yield, grade, specific gravity and SFA fry color index for all the selections. In addition to the yield as century weight per acre, the percentages are shown for each grade category. The overall yield in this trial ranged from 460 cwt/acre for ND8305-1 to 786 cwt/acre for NY140 (Table1). The lowest yield is just over 100 cwt/acre less than the lowest yielding selection last year (CO0188-4W), but the highest

yield for NY140 is just 60% of the yield for the 154 day growing period of last year. The shortened season did little to change the tuber size distribution for NY140. Last year 40% of NY140 tubers were in the US#1 size range, and this year it dropped to 35%, with slightly more undersized tubers. CO00188-4W performed much better under these conditions with a higher overall yield and US#1 yield 635 cwt/acre and 544 cwt/acre, respectively, compared to 566 cwt/acre and 444 cwt/acre for 2011. The second lowest yielding cultivar, ND8304-2, at 481 cwt/acre, had the earliest vine maturity of all the selections with nearly complete vine death at 127 days (Table 2). A longer growing season would likely not improve the yield although other disease factors may have influenced the early death of the ND8304-2 vines. The average percentage of US#1 compared to overall yield for the trial was slightly better than last year at 75% compared to 73%. Atlantic had more undersized tubers this year, but Snowden, a longer season variety, improved the percent of US#1 yield from 74% in 2011 to 82% for 2012. The highest percentage of undersized tubers, by percentage of total yield, was seen in ND8305-1 at 13%. This selection may do better under a longer season, but in 2011, the undersized percentage was even higher at 17%. Oversized tubers, greater than 4" diameter, were the highest in NY140 at 61% of the total yield in this category. Atlantic was second with 30% of the total yield oversized. The selection with the highest percentage of culls was observed in MN99380-1Y at 16% of total yield.

Specific gravities for the selections this year were down slightly from last year with Atlantic at 1.087 in 2011, and 1.082 in 2012. Snowden, however, was slightly better at 1.080 compared to 1.079. The highest specific gravity was observed in ND8305-1 (Table 1), at 1.087, which was last in total yield. The lowest specific gravities were seen in NY140 and W6483-5 at 1.065.

The selections all had acceptable Snack Food Chip color for out of the field frying. Zebra Chip infection was not a factor this year in the fry colors, and all but NY148 fried at less than a 2.0 SFA index score. NY148 had an index score of 2.1, which is still an acceptable color. Additional frying will be done after 3 months in cold storage.

Plant characteristics are summarized in Table 2 with emergence, stand, stems/plant, vine maturity flower color and average tubers per plant listed. Most notable in this table is the difference in the number of tubers per plant in 2012 versus 2011. For example, in 2011, Atlantic had 11.4 tubers/plant and in 2012 it had 8.4 tubers/plant and NY140 had 9.0 tubers/plant in 2011 and only 6.4 tubers/plant in 2012. This change, would impact the yield significantly, but would likely not have been different if the trial were grown and additional 30 days. Vine maturity was added to this table for 2012.

Table 3 summarizes the external tuber characteristics. Length/width and width depth ratios were added to the table this year. The length/depth ratio shows that most of the selections were compact to slightly oval. The lowest ratio as seen in MSL292-A indicated a very compact tuber shape, with the tuber being 16% wider than it is long. The width depth ratio shows the flatness of the tubers with 1.64 ratio for W5015-12 and 1.45 for NY140. Eye depth was the deepest for selections ND8304-2 and MSL292-A. Shape uniformity was the lowest for W6483-5 and MN99380-1Y. Poor shape for

MN99380-1Y resulted in the highest percentage of culls for all the selections. W6483-5 also had a high percentage of culls at 11% (Table1).

Internal defects as listed in Table 4 were lower overall in 2012 as compared to 2011. The shorter season, less heat stress days, as well as the lack of Zebra Chip infection, may have all played a part of the lower percentage of internal defects. For this evaluation, 25 tubers from each replication are sliced in half from stem to bud end and evaluated for defects. Hollow heart was highest in ND8304-2, which is odd because of the size of tubers that were evaluated. For this selection, smaller tubers were cut due to the lack of tubers in the oversized category, and 16% of the tubers exhibited hollow heart. MN99380-1Y also had 15% hollow heart. Atlantic only had 5% in 2012 compared to 25% in 2011. Brown center was highest in W6483-5 at 15% and 9% in Atlantic. The highest internal defects were seen in MS99380-1Y.

All the tubers for each grade and size category are counted and Table 5 illustrates the percent tubers by count for each size and grade category. It also lists the average tubers weight per size category including the overall average tuber size for each selection. The largest average tuber size was for NY140 at 9.9 ounces per tuber. The lowest was 4.2 ounces for ND8305-1. ND8305-1 also had the large percentage of tubers by count in the undersize category at 26% along with W4980-1. Poor tuber shape and knobs put MN99380-1Y in the lead for the highest number of tubers in the cull category at 17% by tuber count. NY140 had 40% of the tubers by count in the oversized category, followed by 16% of Atlantic in the over 4" diameter size. A01143-3C had the highest percentage for US#1 of total yield and also had most of the tubers by count in medium and large categories.

In review, the shorter season, in growing degree days as well as water/fertilizer inputs, showed yields were significantly less than those observed in 2011. The size distribution was not improved for NY140 or Atlantic which still had a high percentage of tubers in the oversized grade. The Colorado variety CO0188-4W improved in yield, size and specific gravity. Vine maturity in Table 2 may help to divide the selections into short and late season selections. The tubers per plant, which was much lower in 2012, likely contributed to the lower yields, and would probably not have changed if the plants were grown an additional 30 days, but the additional days would have allowed for bulking of the existing tubers. ND8305-1 had 26% of the tubers in the undersized category in 2011 and 31% in 2011, but the average ounces for these tubers was 2.1 in 2012 and 2.8 in 2011. Overall, the size distribution per size categories were similar for both years, the average size in ounces per tuber was higher in the longer season of 2011. The smaller size and lower set were probably both contributed to the lower yields. The growing degree days for this same period in 2011 was 1,410 GDD compared to 1,678 GDD's in 2012, over 268 GDD less, which may account for the lower tuber set due to the hotter days in 2012.

Cultivar Comments

Atlantic This variety was one of the control varieties in SFA trial. It had the fourth highest yield out of the eighteen cultivars in the trial. Last year under longer conditions, it had second highest yield after NY140. This year it had the second highest yield in oversize tubers. It had the third largest average tuber size of 7.1 ounces compared to 8.9 ounces in 2011. Atlantic had the second highest specific gravity of 1.082 and had an acceptable SFA chip index color of 1.3. It had the some internal defects with hollow heart at 5% compared to 25% in 2011 and internal brown spot was at 2%. Black Spot bruises made up the largest internal defect at 16%, the highest for all of the selections. Total internal defects was at 32%, the third highest in the trial. The Atlantic tubers were once again large, but had a nice shape.

Snowden Snowden was also planted in this trial as a control variety. Compared to Atlantic, Snowden is a later maturing variety, the total yield for Snowden was greatly reduced this year to the middle of the pack with a total yield of 647 cwt/acre compared to 1,047 cwt/acre for 2011. The percentage of US#1 increased from 74% in 2011 to 82% in 2012. The average tuber size decreased from 6.5 ounces to 5.6 ounces and the tubers per plant decreased from 12.8 to 9.5. The specific gravity was good at 1.080 and it fried at a perfect SFA chip index color of 1.0. It looked good in this trial, with minimal internal defects except for some black spot bruising. The tubers were nice, round, little flat with good shape.

A01143-3C The best US#1 percentage was observed in this selection from Idaho at 86.5%. The tube shape was questionable, with both deep stem and bud ends. The plant had not reached maturity and the tubers had attached stems. It was also one of the slower emerging selections with only 67% emerged at 45 days. It had the second highest tuber set with an average of 11 tubers per plant with an average size of only 4.8 ounces. This selection had very few tubers in the oversized category and the SFA color index was a bit higher than average at 1.6. A nice selection, it did have some growth cracks and shatter bruise. It would be a good selection for a longer season, later harvest evaluation.

AF4157-6 Although not among the higher yielding variety in this trial, the harvest notes indicate that all four replications had some of the best sized and shaped tubers. The total yield ranked 13th out of 18, in terms of total yield at 585 cwt/acre and 9th in terms of US#1 yield. Average tuber size was low at only 4.7 ounces and the average tubers per plant were on the higher side at 9.9. It has round tubers which are fairly thick and external characteristics such as eye depth, skin set and scab were very good, it did have some shatter bruise and growth cracks. Internal defects were low with only 4% hollow heart and 1% black spot bruise. The specific gravity was above average at 1.077 and it also fried with a perfect 1.0 SFA index color. This selection, as indicated by a vine maturity raring of 3.3 was starting to go down, but another 30 days would allow the tubers to bulk for a higher yield. I would recommend it for a longer season evaluation.

CO00188-4W This Colorado cultivar had the lowest yield of the seventeen in the 2011 SFA trial, but did much better in the 2012 evaluation. The overall yield came in at 10th place, with 635 cwt/acre, but due to the high percentage of US#1's (86%) it came in 4th

in terms of US#1 yield, ahead of both Atlantic and Snowden. The average tuber size was right at the average for the trial at 5.8 ounces (2011 average was 5.0 ounces) but the average tubers per plant was below average at 8.8. It had excellent external ratings and the internal defects were low with only a small amount of black spot bruising. The specific gravity was ok at 1.076 and the SFA index color was perfect at 1.0. This selection might do better with a longer season, but the conditions in 2012, yielded overall better results for this selection than those in the longer season of 2011.

CO00197-3W For this second year evaluation in the Columbia Basin, this selection performed about the same as last year. Yields were only slightly lower this year, even with almost 30 days less in the growing season. The average tuber size was 5.4 ounces last year and is 6.0 ounces this year. Specific gravities were higher this year at 1.077 compared to 1.072 in 2011. Comments during grading this year noted that the shape uniformity was on the poorer side with a few pointy ends and pear shaped tubers. The selection fried well with an index of 1.1. Internal brown spot was high in this selection at 10%. It also had hollow heart at 7% and black spot bruise at 13% for the second highest overall internal defects percent at 34%.

CO002321-4W This Colorado selection was the lowest yielding of the Colorado selections, but had the highest specific gravity at 1.079. The average tuber size was on the larger size at 6.9 ounces. Notes indicate visually it was one of the best overall tuber appearances. The tuber set was low at an average of only 7.5 tubers per plant, but the tubers were on the larger size with 23% by weight over 4" diameter and 12% by tuber count oversized. Internal brown spot may be an issue with a longer season, this year it was at 7%. The stand was the lowest by percentage of all the selections at 94%. Length/width and width/depth indicate it has the roundest, thickest shape of all the selections. Nice variety, definitely worth another look.

MN99380-1Y A yellow fleshed selection returned from last year, showed similar defects and tuber issues as seen in 2011, giving it the largest percentage of culls of the trial at 16%. Notes indicate that shape uniformity was the biggest issue externally and internally hollow heart was among the highest at 16%. Internal defects were the highest of all the selections at 36%. The specific gravity was on the low side at 1.072 and the SFA index color was good at 1.5. This was the only variety that had heat sprouts. The sprouts were 1" at frying. Notes also include bottlenecked shape, and knobs.

MSL292-A The tuber shape for this cultivar was extremely compact (length/width ratio of .84) making it the shortest widest tuber of the bunch. The eye depth was deep with a rating of 3.5 and a low shape uniformity rating of 3.3. These rating are consistent with ratings from 2011. These attributes made it the least desirable in appearance and difficult to process. Notes indicate it is ugly with some deep and some protruding eyes. Internal defects were low, specific gravity was good at 1.081 and the fry color was also good at 1.4 SFA color index. Overall, the poor tuber appearance and compact shape make it a discard.

MSR061-1 This selection is definitely a long season variety that should be reevaluated in a longer season trial. 21% of the tubers by count were under 1 7/8" in diameter, 8.5% by weight. It had above average tubers per plant at 9.7. External and Internal ratings

were above average for this selection. It is a russetted selection and although it had small tubers, it had the 6th highest US#1 yield (525 cwt/acre) with 80% of the yield in this category.

ND8304-2 This cultivar was second to last in total yield and 16th out of 18 in US#1 yield. Most notable characteristic of this selection was early vine death. Some white mold was observed on this selection during the growing season, which may have caused the early vine death and low yield. The emergence was also on the slow end. The specific gravity was low at 1.069 and internals were high with 16% hollow heart, the highest of all the selections. Grading notes indicate it was among the ugliest with very poor tuber appearance, some growth cracks and deep eyes and poor shape uniformity.

ND8305-1 This cultivar was in the middle of the pack with a total yield of 763 cwt/acre in 2011, but had the lowest total yield in 2012 at 460 cwt/acre. The specific gravity was the highest of the cultivars at 1.087, it was also the highest last year at 1.089. Shatter bruise was modest at 4.0, much better than last year's rating of 1.4. The internal defects were very low at only 1%, and the SFA color was excellent at 1.0. This selection had the lowest average tuber size of only 4.2 ounces and 26% of the tubers by count were undersized, and 13% by weight. A longer season may improve the bulking of the tubers, but under the conditions in 2011 with 154 day growing season, the yield was higher, but the average tuber size was only slightly larger at 4.9 ounces and 17% by weight were undersized and 31% by tuber count. This selection was also the slowest emerging with only 53% emerged at 45 days.

NY140 The largest yield (786 cwt/acre) was from NY140, but after subtracting oversize tubers from the US#1 yield, it ranked the last in US#1 yield with 273 cwt/acre. It had 479 cwt/acre of oversize tubers and 61% by count of oversized. The average tuber in the oversized grade weighed nearly one pound. The shorter season did nothing to redistribute the amount of tubers per size category. This short season actually yielded a lower percentage of US#1 tubers. In 2011, 40% were US#1 and this year only 35% by weight were. The selection produces large tubers very quickly. Maybe closer seed spacing could put some limit on the size. The tubers have somewhat deep eyes and some uniformity issues. The tubers are very large and flattened with a width/depth ration of 1.45, the second flattest in the trial. The average tuber size was 9.9 ounces, the largest in trial. Specific gravity was very low for this selection at 1.065, and internal defects were modest with overall defects at 12%, most notable being black spot bruise.

NY148 NY148 was evaluated last year as E106-4 and as with last year this selection ranked at the top with respect to total yield and US#1 yield. This year it ranked 1st in US #1 yield at 670 cwt/acre with a percentage of 86% of total yield. The tubers rank 2nd in compactness with a length/width ratio of .92, the tubers are wider than they are long. They are also a bit on the flat side. Specific gravity was on the higher side at 1.079. The chips fried at the darkest of all the selections at a SFA index of 2.1, which is still acceptable, but higher than the others. NY148 had the highest average tuber set per plant of all the selections at 12.4 tubers per plant. The average size was 5.1 ounces. This selection also had the lowest percentage of culls at 2% by weight.

W2978-3 For the second year this selection gets high scores in regards to shape and overall tuber appearance. The yield, however, remains lower than average. Last year it ranked 13th out of 17, and this year it moved up to 11 out 18. There were a large percentage of undersized tubers, 9% by weight and 21 % by count, but by comparison, last year 13% by weight and 29% by count were in the undersized grade so the shorter season did seemed to improve this ratio. The average tuber size was less, 4.8 ounces compared to 6.1 ounces for 2011. The average of tubers per plant was the same as last year 9.8 in 2012 and 9.7 in 2011. Internal and external defects were low, but so is the specific gravity at 1.068. The specific gravity was the lowest of all selections last year at 1.068. This selection should get another look, maybe in a longer season conditions, although in 2011, 154 days did not improve the yield significantly.

W4980-1 This selection ranked low again this year in yield (16 out of 17 in 2011, 16 out of 18 in 2012). There were a lot of undersized tubers. 13% by weight and 26% by tuber count. The tuber size distribution is similar to W2978-3, and like that selection, it also had a lot of undersized tubers in the longer season of 2011. US # 1 yield was 448 cwt/acre, only 66% of the highest US#1 yielding selection (670 cwt/acre for NY148). It does have a higher specific gravity than W2978-3 at 1.077. The internal defects were high at 24%, with 10% internal brown spot and 14% black spot bruise. Shatter bruise was higher in W4980-1 with a rating of 3.8.

W5015-12 This selection was nice this year as it was last year. In 2011, it ranked 1st with respect to US#1 yield, and it ranked 2nd this year. It was not 1st in total yield either year, but the percentage of US#1 places it above others with higher total yields. This year the tubers were very round, with a length/width ratio of .99, but had the flattest profile with a width/depth ratio of 1.64. It was the only selection with no internal defects noted. The specific gravity was good and the selection fried with a 1.0 SFA index color. Grading notes for both years noted the most remarkable characteristic being the tuber flatness. Average tuber size was 5.5 ounces and the tuber set was averaged at 10 tubers per plant. Vine rating indicates that the plots were near full maturity.

W6483-5 This is the first year in the SFA chip trial for this selection and it did not perform well compared to the other selections. The overall appearance was poor, with grading notes indicating the selection was pear shaped, with some tubers with a bottleneck shape. It also had the lowest shape uniformity of all the selections at 2.4. Shatter bruise was also poor at 3.8. The yield was very low at 361cwt/acre and had US#1 percentage at 62% of total yield. Culls made up 11% of the yield and 25% of the tubers were oversized. Specific gravities for W6483-5 were low at 1.065, matching NY140 for the lowest of the trial. This selection had the second highest average tubers weight of 7.4 ounces and like NY140 had a low tuber set with only 6.6 tubers per plant. Internal defects were also high at 25% with 5% hollow heart and 15% brown center. For the Columbia basin, this selection would be a discard.

Growing Season Weather Conditions

The growing season temperatures for the period between 3/23/12, planting date, and the vine kill date of 7/27/2012 were slightly warmer than average. The growing degree days for this period in 2012 was 1,678 GDD's and the average of the previous five years

(2007-2011) was 1,661. In 2011, the growing degree days for this period were only 1,410. The average GDD for the period was 13.2 and the average for the previous year was 11.1. The maximum temperature in 2011 was 97 degrees and in 2012, the highest temperature was 102, and six days were above the previous years' maximum of 97 degrees (data compiled from the Agrimet website weather report for HAREC, Hermiston, OR). There was 5 inches of rain during this period combined with approximately 18.5" of irrigation water for a total of 23.5" for the growing period.

Table 1 - Yield, grade, specific gravity and SFA chip color.

Selection	Total Yield	US # 1 Yield 1 ^{7/8} " - 3"		Medium 1 ^{7/8} "-3"	Large 3" - 4"	Oversize > 4"		Culls		Small < 1 ^{7/8} "		SFA Color	Specific Gravity
	cwt/acre	cwt/acre	%	cwt/acre	cwt/acre	cwt/acre	%	cwt/acre	%	cwt/acre	%		
Atlantic	720	439	61	270	169	213	30	25	4	43	6	1.3	1.082
Snowden	647	530	82	401	129	60	9	22	3	34	5	1.0	1.080
A01143-3C	661	572	86	469	103	7	1	34	5	48	7	1.6	1.072
AF4157-6	585	488	83	401	87	28	5	22	4	48	8	1.0	1.077
CO00188-4W	635	544	86	347	197	44	7	11	2	35	6	1.0	1.076
CO00197-3W	711	514	72	338	176	119	17	40	6	38	5	1.1	1.077
CO02321-4W	601	406	67	244	162	136	23	34	6	25	4	1.1	1.079
MN99380-1Y	729	496	68	382	114	72	10	118	16	43	6	1.5	1.072
MSL292-A	613	472	77	342	130	89	15	16	3	36	6	1.4	1.081
MSR061-1	655	525	80	385	140	61	9	14	2	56	8	1.6	1.076
ND8304-2	481	379	79	322	57	8	2	42	9	52	11	1.3	1.069
ND8305-1	460	379	82	344	36	3	1	19	4	59	13	1.0	1.087
NY140	786	273	35	127	146	479	61	20	3	15	2	1.8	1.065
NY148	780	670	86	555	116	35	4	15	2	61	8	2.1	1.079
W2978-3	577	462	80	401	62	40	7	20	4	54	9	1.3	1.068
W4980-1	569	449	79	397	51	33	6	14	2	73	13	1.4	1.077
W5015-12	684	576	84	441	135	52	8	17	2	39	6	1.3	1.077
W6483-5	582	361	62	189	172	145	25	61	11	14	2	1.0	1.065
Mean	638	474	75	353	121	90	13	30	5	43	7	1.3	1.075

Table 2- Plant Characteristics

Selection	Emergence	Stand	Stems/plant	Vine Maturity	Flower Color*	Average Tubers/plant
	45 days	60 days		1-5 = late		
Atlantic	69.8	99.0	2.0	4.5	3.0	8.4
Snowden	84.4	95.8	2.4	5.0	1.0	9.5
A01143-3C	66.7	100.0	2.8	5.0	1.0	11.0
AF4157-6	91.7	100.0	2.4	3.3	2.8	9.9
CO00188-4W	80.2	100.0	2.8	2.9	1.0	8.8
CO00197-3W	92.7	100.0	2.7	4.3	1.0	9.5
CO02321-4W	87.5	93.8	2.0	4.5	3.5	7.5
MN99380-1Y	96.9	97.9	2.7	3.9	3.0	10.8
MSL292-A	80.2	94.8	3.2	3.6	3.0	8.8
MSR061-1	88.5	100.0	2.8	4.8	1.0	9.7
ND8304-2	71.9	97.9	2.6	1.0	3.0	8.8
ND8305-1	53.1	99.0	2.3	3.8	1.0	8.8
NY140	86.5	100.0	1.9	5.0	1.0	6.4
NY148	82.3	100.0	3.2	4.9	1.0	12.4
W2978-3	66.7	100.0	2.8	3.4	3.0	9.8
W4980-1	94.8	100.0	1.8	3.5	5.0	10.0
W5015-12	97.9	100.0	2.1	2.5	1.0	10.0
W6483-5	88.5	96.9	1.8	3.0	1.0	6.6
Mean	82.2	98.6	2.5	3.8	2.0	9.3

* 1=white, 2=pink, 3=lavender, 4=purple, 5=blue

Table 4- Internal Tuber Defects						
Selection	Hollow Heart	Brown Center	Internal Brown Spot	Black Spot Bruise	Vascular Discoloration	Total Internal Defects
	←----- % -----→					
Atlantic	5	9	2	16	0	32
Snowden	0	0	0	9	2	11
A01143-3C	0	0	1	0	2	3
AF4157-6	4	0	0	1	0	5
CO00188-4W	0	0	0	5	1	6
CO00197-3W	7	1	10	13	3	34
CO02321-4W	0	1	7	3	2	13
MN99380-1Y	15	4	4	7	6	36
MSL292-A	1	1	0	2	1	5
MSR061-1	1	1	0	1	3	6
ND8304-2	16	0	0	4	2	22
ND8305-1	0	0	0	1	0	1
NY140	0	0	2	8	2	12
NY148	0	1	3	10	0	14
W2978-3	0	0	3	3	2	8
W4980-1	0	0	10	14	0	24
W5015-12	0	0	0	0	0	0
W6483-5	5	15	0	2	3	25
Mean	3.0	1.8	2.3	5.5	1.6	14.3

Table 5 - Average tuber size (ounces) and distribution (%) for each grade category by tuber count.

Selection	AVG Tuber Weight	Undersize		Culls		Medium 1 7/8"-3" diam.		Large 3-4" diam.		Oversize >4"	
	oz.	oz.	%	oz.	%	oz.	%	oz.	%	oz.	%
Atlantic	7.1	2.4	17.4	6.8	3.8	5.7	45.1	9.3	17.7	13.3	15.9
Snowden	5.6	2.3	13.2	3.7	5.2	5.4	65.7	9.0	12.1	12.0	3.9
A01143-3C	4.8	2.2	16.2	8.1	3.6	4.9	70.6	8.4	9.3	13.8	0.3
AF4157-6	4.7	2.1	18.7	5.5	3.7	4.9	67.6	8.8	8.3	12.0	1.7
CO00188-4W	5.8	2.3	14.0	4.4	2.6	5.4	58.8	8.5	21.2	12.0	3.4
CO00197-3W	6.0	2.2	14.5	5.2	6.5	5.3	54.1	8.9	16.8	12.2	8.1
CO02321-4W	6.9	2.3	12.5	5.5	7.3	5.8	48.3	9.1	19.9	13.3	12.0
MN99380-1Y	5.5	2.3	16.4	5.5	16.9	5.2	52.9	9.3	9.5	13.4	4.3
MSL292-A	6.0	2.3	15.0	4.1	3.6	5.5	61.1	9.0	14.1	13.7	6.2
MSR061-1	5.5	2.1	21.4	4.9	2.4	5.2	61.1	9.3	13.2	12.0	4.4
ND8304-2	4.5	2.1	23.3	2.7	11.1	5.1	59.4	9.5	5.6	12.1	0.6
ND8305-1	4.2	2.1	25.9	4.3	3.8	4.7	66.3	8.9	3.7	12.8	0.2
NY140	9.9	3.0	6.6	5.5	4.5	5.5	29.0	8.9	20.3	15.2	39.5
NY148	5.1	2.3	17.0	4.9	2.0	5.1	69.9	8.4	9.0	13.0	2.0
W2978-3	4.8	2.1	20.7	4.3	3.7	4.9	67.0	9.0	5.9	12.6	2.6
W4980-1	4.6	2.3	25.8	4.2	2.8	5.0	64.5	9.2	4.8	13.3	2.2
W5015-12	5.5	2.2	14.6	5.4	2.5	5.2	67.1	8.6	12.5	12.4	3.3
W6483-5	7.4	2.2	8.8	6.1	12.5	5.6	41.8	9.1	24.2	14.8	12.7
Mean	5.8	2.3	16.8	5.1	5.5	5.2	58.4	9.0	12.7	13.0	6.9

Three Month Storage Update

A sample of each of the entries was placed in cold storage after the plots were originally evaluated on August 18th. They were placed in a 46 degree Fahrenheit cooler at the Hermiston Agricultural Research and Extension Center on August 21st. The chip fry results are displayed in Table 6 below. Several selections showed a significant increase in SFA chip color, while others maintained a very light color at 1. The most notable increase occurred in MN99380-1Y, with the color darkening from 1.5 to 3.3 and NY148 increasing from 2.1 to 3.1. Atlantic and Snowden also increased from acceptable colors to just over 2. Several selections, as listed below, maintained the same SFA color that they had at harvest, or increased just slightly. Comments indicate the state of dormancy for the tubers, listing sprout length and tuber condition. The remaining tubers were not saved for a six month evaluation, due to sprouting.

Table 6 - SFA Chip Color at Harvest and after Three Month Storage @ 46 degrees Fahrenheit

Selection	Harvest Fry SFA Color	3 Month Storage SFA Color	3 Month Storage Remarks
Atlantic	1.3	2.3	1/2" sprouts, soft tubers
Snowden	1.0	2.1	peeping sprouts, soft tubers
A01143-3C	1.6	1.6	1" sprouts, firm tubers
AF4157-6	1.0	1.0	nice chips, tubers in good condition
CO00188-4W	1.0	1.0	1" sprouts, firm tubers
CO00197-3W	1.1	2.3	1/2" sprouts, firm tubers
CO02321-4W	1.1	1.1	1/2" sprouts, nice chips
MN99380-1Y	1.5	3.3	soft tubers, 2" sprouts
MSL292-A	1.4	2.4	no sprouts, firm tubers
MSR061-1	1.6	2.5	peeping sprouts, tubers a bit soft
ND8304-2	1.3	1.5	soft tubers, 3" sprouts
ND8305-1	1.0	1.0	nice chips, no sprouts
NY140	1.8	2.3	peeping sprouts, firm tubers
NY148	2.1	3.1	Dark chips, rot at bruise sites, soft tubers
W2978-3	1.3	2.1	no sprouts
W4980-1	1.4	1.4	peeping sprouts, firm tubers
W5015-12	1.3	1.6	peeping sprouts, tubers a little soft
W6483-5	1.0	1.1	1" sprouts, nice chips, nice tubers
Mean	1.3	1.9	

2012 Pennsylvania USPB-SFA Chipping Potato Trial	Planted May 2, 2012 Dug Sept. 17, 2012	Planted May 2, 2012 Dug Sept. 17, 2012	34 inches between rows 12 inches in the row	1,325 lbs of 13-13- 13	Grower: Jim Hite
Variety	Total Yield CWT/A	Marketable Yield Cwt/A	Specific Gravity	AGTRON #	Comments
A01143-3C	290.5	208.4	1.077	53	
AF4157-6	198.8	188.2	1.077	54	
C000197-3W	242.5	203.2	1.070	52	
C000188-4W	145.8	136.3	1.073	53	
C002321-4W	189.1	178.3	1.083	53	
Atlantic	237.1	216.5	1.079	53	
MSR061-1	218.9	211.7	1.077	51	
MSL292-A	270.4	259.0	1.073	54	
MN99380-1	192.8	152.0	1.063	40	Yellow flesh and all sprouted
ND8304-2	133.2	121.4	1.065	52	
NY140	262.1	243.0	1.080	50	
NY148	300.4	276.4	1.088	50	
Snowden	286.3	268.0	1.077	49	
W6483-5	158.8	139.0	1.069	49	
W2978-3	189.3	168.0	1.063	54	
W4980-1	237.9	207.0	1.068	41	
W5015-12	296.6	237.0	1.068	51	
ND8305-1					Seed was unusable for the trial

U.S. Potato Board/Snack Food Association National Chip Trial – 2012

Wisconsin Trial Site

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College of Agricultural and Life Sciences, University of Wisconsin-Madison

Trial Site

Hancock Agricultural Research Station, N3909 CTH V, Hancock, WI 54943

Technical Support

Amber Gotch, Hancock Agricultural Research Station

Trial Procedure

Seed was held in a locker in the Wisconsin Potato and Vegetable Storage Research Facility at 38°F until cutting. Seed was moved to 55°F to warm two days prior to cutting. Cutting was done by hand on April 13, 2012 with special attention paid to cutting uniform-sized, blocky seed pieces ranging from 2 to 2½ oz in weight. Cut seed was placed in well-ventilated plastic crates and held at 55°F for several days to promote drying and suberization prior to planting. Planting took place on April 20, 2012 using an Iron Age assist-feed planter. Varieties were planted in plots 200 ft. in length. Rows were spaced 36 in. apart. Seed pieces were placed 12 in. apart within each row. Plots were vine-killed on August 29 and September 4, 2012 and harvested using a custom-built Gallenberg plot harvester on September 13, 2012.

Plots were maintained according to standard production practices recommended by the University of Wisconsin-Madison. Elevated disease pressure resulted in frequent fungicide applications. Irrigation schedules and application rates were based on in-hill soil moisture monitors and daily field observations.

Fertility: 0-0-60; 0-0-0-17S-21Ca, 21-0-0-24S (360lbs 5-15), 34-0-0 (350lbs 6-6), 34-0-0 (250lbs 7-13)

Weed Control: Parallel, Metribuzin, Poast

Insect Control: Blackhawk, Brigade, Coragen

Disease Control: Revus Top, Bravo ZN, Headline, Endura, Dithane DF, Tanos, Agri Tin 80WP

Vine Kill: Reglone

Rainfall: 12.2 in

Irrigation: 26.1 in

Soil type: Plainfield loamy sand

Yield Data and Tuber Quality

Tubers were graded and sized using a custom-built Gallenberg grader and Exeter optical sizer. Specific gravity measurements were taken for each variety using a Weltech PW-2050 Dry

Matter Assessment System (weight in air/weight in water method). Specific gravity, total yield, U. S. No. 1 yield, undersize and culls are presented in Table 1. U. S. No. 1 size distribution data is presented in Table 2. Internal defects were evaluated as a percent of 50 randomly selected individual tubers. Table 3 indicates percent incidence of brown center, hollow heart, internal brown spot, vascular discoloration, and stem end discoloration.

Table 1. Specific gravity, Total yield, U. S. No. 1 yield, <1 7/8" and culls, 2012.

Variety	Specific Gravity	Total Yield	U. S. No. 1		<1 7/8 in.	Culls
		(cwt)	(cwt)	(%)	(%)	(%)
AF4157-6	1.074	632	575	91	2	7
AO1143-3C	1.078	503	492	98	1	0
Atlantic	1.085	485	428	88	4	8
CO00188-4W	1.066	528	474	90	4	6
CO00197-3W	1.076	527	473	90	5	5
CO02321-4W	1.083	467	390	83	9	8
MN99380-1	1.068	304	273	90	6	4
MSL292-A	1.072	425	401	94	3	3
MSR061-1	1.073	319	265	83	11	6
ND8304-2	1.062	678	623	92	4	4
ND8305-1	1.083	610	556	91	2	7
NY140	1.078	257	235	92	4	4
NY148	1.091	423	348	82	7	10
Snowden	1.081	705	677	96	3	1
W2978-3	1.061	287	269	94	3	3
W4980-1	1.081	460	446	97	2	1
W5015-12	1.080	671	644	96	2	2
W6483-5	1.062	582	515	89	3	8

Culls = tubers not meeting U. S. No. 1 standards due to external defects.

Table 2. U. S No. 1 size distribution, 2012.

Variety	U. S. No. 1 Size Distribution (% of U. S. No. 1 Yield)					
	2-4 oz.	4-6 oz.	6-10 oz.	10-13 oz.	13-16 oz.	>16 oz.
AF4157-6	16	19	27	20	15	3
AO1143-3C	20	25	41	12	2	0
Atlantic	19	19	35	18	8	1
CO00188-4W	51	24	20	5	0	0
CO00197-3W	53	27	16	2	2	0
CO02321-4W	50	30	19	1	0	0
MN99380-1	35	32	28	5	0	0
MSL292-A	45	24	24	6	2	0
MSR061-1	33	35	29	3	0	0
ND8304-2	26	25	36	9	3	0
ND8305-1	12	18	40	19	8	3
NY140	47	32	20	1	1	0
NY148	14	19	44	12	10	1
Snowden	19	34	33	9	5	0
W2978-3	37	30	27	5	1	0
W4980-1	21	19	37	15	6	1
W5015-12	22	26	42	9	0	0
W6483-5	25	22	36	12	4	1

Table 3. Percent External and internal defects based on 50 tubers, 2012.

Variety	External Defects (%)				Internal Defects (%)			
	GC	MS	SB	SC	BC	HH	IBS	VD
AF4157-6	0	0	0	20	0	0	0	2
AO1143-3C	0	0	0	0	0	0	0	0
Atlantic	0	6	0	10	0	0	28	0
CO00188-4W	0	0	0	0	0	0	2	0
CO00197-3W	0	0	0	24	0	0	0	2
CO02321-4W	0	0	0	16	0	0	0	4
MN99380-1	0	0	0	4	0	0	0	10
MSL292-A	0	0	0	8	0	0	0	2
MSR061-1	0	0	0	20	0	0	0	0
ND8304-2	0	0	0	10	0	0	0	2
ND8305-1	0	0	0	10	0	0	0	0
NY140	0	2	0	2	0	0	0	0
NY148	0	0	0	0	0	0	2	0
Snowden	0	0	0	10	0	4	0	0
W2978-3	0	0	0	18	0	0	0	0
W4980-1	0	0	0	2	0	0	10	2
W5015-12	0	0	0	20	0	0	14	2
W6483-5	0	0	0	0	0	0	0	4

External defects: GC = growth cracks; MS = misshapen; SB = sunburned; SC = scab

Internal defects: BC = brown center; HH = hollow heart; IBS = internal brown spot; VD = vascular discoloration