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2015 USPB/SFA Chip Variety Trials

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

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Dr. Craig Yencho, North Carolina State University, Raleigh, NC
Dr. Sagar Sathuvalli, Oregon State University, Hermiston, OR
Mr. Robert Leiby, PA CO-OP Potato Growers, Inc., Harrisburg, PA
Dr. Felix Navarro, University of Wisconsin, Hancock, WI

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Introduction

The search for new and improved chipping 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 promising chip processing clones from the various US potato breeding programs. The eleven trial locations for the 2015 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 112 advanced potato breeding lines and varieties (Table 5) evaluated and compared with potato chip industry standards. Forty-one of these lines have been named and released and twenty-four are currently in national commercial seed production. The most recently released varieties are Lamoka, Lelah, Manistee, McBride, Pinnacle, Sebec, Tundra and Waneta - with a total of 2,521 acres of US seed in 2015. 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 acceptable chip quality from long-term cold storage temperatures below 50°F and do not have susceptibility to scab and other organisms.

Note: advanced storage studies on sugar levels and chip color from multiple temperatures and sample dates will be conducted on the 2015 USPB-SFA chip trials in ID, ME, MI, ND and WI and will be reported in a separate report which will complement the yield trial reports.

2015 USPB-SFA Trials

Potato breeding lines with potential for chipping are entered into the USPB-SFA trials for three growing seasons and then replaced with new entries. If an entry experiences problems early it may be dropped from the testing program before the 2nd or 3rd year of trials. On occasion an entry may be in trials for the 4th year if it is deemed that more data needs to be collected. All 11 chip trials have both Atlantic (for yield and specific gravity) and Snowden (for cold temperature storage chipping) as check varieties. The low temperature-low sugar variety Lamoka was added as a long-term storage standard for the 7 northern trials. Eleven entries evaluated in the 2015 USPB-SFA chip trials and their sources are listed below (with year in trials):

The following 7 entries were scheduled for testing in all eleven states:

AC03433-1W (year 1) Colorado State University – David Holm
AF4648-2 (year 1) University of Maine – Greg Porter
BNC202-3 (year 1) USDA-ARS, Beltsville, MD – Kathy Haynes
CO02024-9W (year 2) Colorado State University – David Holm
CO03243-3W (year 3) Colorado State University – David Holm
NY152 (year 1) Cornell University – Walter De Jong
W6822-3 (year 1) University of Wisconsin – Jeff Endelman

The following two entries were scheduled for testing only in the four southern trials (CA, FL, MO, NC):

MSK061-4 (year 2) Michigan State University – David Douches
W8822-1 (year 1) University of Wisconsin – Jeff Endelman

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

A00188-3C (year 3) (not planted in ME) USDA-ARS, Aberdeen, ID – Rich Novy
AC01151-5W (year 3) Colorado State University – David Holm

Eleven state trial coordinators for 2015:

California Brian Kirschenmann, Kirschenmann Farms, Inc., Bakersfield, CA
Florida Lincoln Zotarelli, 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
North Carolina Craig Yencho, NC State University, Raleigh, NC
Oregon Sagar Sathuvalli, Oregon State University, Hermiston, OR
Pennsylvania Bob Leiby, PA CO-OP Potato Growers, Inc., Harrisburg, PA
Red River Valley Marty Glynn, USDA Potato Research Worksite, East Grand Forks, MN
Wisconsin Felix Navarro, University of Wisconsin, Hancock, WI

Summary comments on 2015 trial performance:

The 2015 USPB-SFA trials provided a wealth of evaluations on field performance of 7 potato breeding lines over all eleven state locations, 2 in six or seven northern states, and 2 in four southern states. The performance of our chipping industry varieties Atlantic and Snowden were again confirmed as important benchmark standards. Atlantic had an average total yield of 413 cwt/acre in the four southern trials and 442 cwt/acre in the seven northern trials. Snowden had an average total yield of 410 cwt/acre in the four southern trials and 528 cwt/acre in the seven northern trials. Specific gravity data indicates that overall Atlantic had the highest gravity in the seven northern trials, averaging 1.091, and was well above average for the four southern trials at 1.078. Atlantic had the highest gravity in CA, ID, ME, MI, ND and WI trials. Snowden averaged 1.076 and 1.087 for the southern and northern trials, respectively.

A00188-3C (year 3, 6 northern trials) Total and marketable yield near trial averages and comparable to Atlantic but at 80% that of Snowden. Had high specific gravity in ID and ND and averaged 1.084 across the 6 northern trials, 7 units below Atlantic. Very good field chip color, better than Atlantic.

AC01151-5W (year 3, 7 northern trials) Excellent total and marketable yield, averaging 117% and 105% of Atlantic's total and marketable yield, respectively. Specific gravity in the middle range, averaging 1.083, 8 units below Atlantic and 4 units below Snowden. Field chip color variable and below 7 trial average.

AC03433-1W (year 1, all 11 trials) Total and marketable yield at 92% and 84% that of Atlantic (82% and 75% of Snowden). Specific gravity in a lower range, averaging 1.069 in the 4 southern trials and 1.078 in the northern trials (9 and 13 units below Atlantic, respectively). Field chip color better than Atlantic.

AF4648-2 (year 1, all 11 trials) Total and marketable yield at 87% and 84% that of Atlantic (78% and 75% of Snowden). Specific gravity above trial averages at 1.083, 3 units below Atlantic but equal to Snowden. Field chip color similar to Atlantic and Snowden. Lower bruising.

BNC202-3 (year 1, 10 trials) Line was originally listed as BNC182-5 but now believed to be BNC202-3. Consistently highest yielder but with low specific gravity. Total and marketable yield at 118% and 115% of Atlantic. Specific gravity averaged 1.069 for southern trials and 1.076 for northern trials (9 and 17 units below Atlantic, respectively). Field chip color similar to Atlantic and Snowden.

CO02024-9W (year 2, originally planned for 11 trials, seed limited to MO and ND trials) Total yield averaged 72% of Atlantic in MO and 90% in ND, while marketable yield averaged 63% and 69% of Atlantic in MO and ND, respectively. Specific gravity was 1.075 in MO and 1.094 in ND, falling 9 and 15 units below Atlantic. Field chip color similar to Atlantic and Snowden.

CO03243-3W (year 3, all 11 trials) Good total and marketable yield for both southern and northern trials, averaging 104% and 103% of Atlantic. Lower specific gravity, averaging 1.068 in the southern trials and 1.079 in the northern trials (10 and 12 units below Atlantic). Average field chip color scores. Late maturity.

MSK061-4 (year 2, 4 southern trials) Below average yield with total yield at 92% that of Atlantic and marketable yield at 89% of Atlantic. Specific gravity ran at 1.072, 6 units below Atlantic. Good field chip scores.

NY152 (year 1, all 11 trials) High yielding with moderate specific gravity. Total yield averaged 110% of Atlantic in the southern trials while it averaged 120% of Atlantic in the northern trials. Marketable yield ran at 103% and 117% of Atlantic in the southern and northern trials, respectively. Specific gravity averaged 1.070 in the south while it ran at 1.083 in the north (8 units below Atlantic in both regions). Field chip scores were as good or better than Atlantic and Snowden in all trials.

W6822-3 (year 1, all 11 trials) Total and marketable yield averaged 97% and 90% that of Atlantic (89% and 80% of Snowden). Specific gravity averaged 1.078 in the south while it ran at 1.089 in the north (Atlantic averaged 1.078 in the south while producing 1.091 in the north). Field chip color as good or better than Atlantic. Late maturity.

W8822-1 (year 1, 4 southern trials, plus OR and WI) Total and marketable yield averaged 107% and 101% that of Atlantic (108% and 103% of Snowden) in the southern trials. Total yield ran at 84% of Atlantic in the OR trial and 99% in the WI trial. Specific gravity averaged 1.078 in the south (Atlantic averaged 1.078) and was also equal to Atlantic in the OR and WI trials. Field chip color variable across locations. Very late maturity.

Data from the 11 state USPB-SFA trials conducted in 2015 follow in Table 1 (Total Yield), Table 2 (Marketable Yield), Table 3 (Specific Gravity), and Table 4 (Field Chip Color).

USPB-SFA TRIALS - 2015 - DATES AND GROWING DAYS

State	City	Planting Date	Vine Kill Date	Harvest Date	Days from Planting to Vine Kill	Days from Planting to Harvest
CA	Bakersfield	15-Jan-15		7-Jun-15		143
FL	Hastings	13-Feb-15		27-May-15		103
ID	Aberdeen	4-May-15	2-Sep-15	24-Sep-15	121	143
ME	Presque Isle	20-May-15	3-Sep-15	22-Sep-15	106	125
MI	Howard City	26-May-15	17-Sep-15	21-Oct-15	114	148
MO	Charleston	23-Mar-15		13-Jul-15		112
NC	Columbia	19-Mar-15		30-Jun-15		103
ND	Larimore	30-Apr-15	8-Sep-15	18-Sep-15	131	141
OR/WA	Burbank, WA	29-Apr-15	4-Sep-15	10-Oct-15	128	164
PA	Chambersburg	6-May-15		24-Sep-15		141
WI	Hancock	5-May-15	2-Sep-15 (vk 2, 8, 14)	22-Sep-15	120	140

TABLE 1. 2015 USPB-SFA CHIP TRIALS - TOTAL YIELD (cwt/acre)

		SOUTHERN TRIALS					NORTHERN TRIALS								entry
ENTRIES / STATES		CA	FL	MO	NC	avg.	ID	ME	MI	ND	OR	PA	WI	avg.	avg.
ATLANTIC	all	512	296	535	309	413	475	273	452	319	698	396	479	442	431
SNOWDEN	all	579	307	406	346	410	452	270	634	311	1096	402	533	528	485
LAMOKA	7N	na	na	na	251	251	469	255	379	293	878	na	390	444	416
A00188-3C	6N	na	na	na	na	na	332	na	487	288	782	358	476	454	454
AC01151-5W	7N	na	na	na	na	na	520	300	542	318	981	398	543	515	515
AC03433-1W	all	666	248	372	260	387	479	226	375	216	713	377	428	402	396
AF4648-2	all	516	274	402	239	358	404	263	493	121	595	327	509	387	377
BNC202-3	all	683	320	550	379	483	467	325	na	291	955	479	596	519	505
CO02024-9W	all	na	na	387	na	387	na	na	na	286	na	na	na	286	337
CO03243-3W	all	696	236	415	375	431	457	233	446	289	932	392	448	457	447
MSK061-4	4S	519	280	423	301	381	na	na	na	na	na	na	na	na	381
NY152	all	666	307	451	401	456	534	304	676	262	950	447	545	531	504
W6822-3	all	652	276	344	366	410	417	306	435	224	680	443	457	423	418
W8822-1	4S	662	312	444	348	442	na	na	na	na	589	na	476	533	472
state average		615	286	430	325	414	455	276	492	268	821	402	490	455	442

VERY LOW LOW / BELOW AVERAGE GOOD / ABOVE AVERAGE VERY HIGH

TABLE 2. 2015 USPB-SFA CHIP TRIALS - MARKETABLE YIELD (cwt/acre)

		SOUTHERN TRIALS					NORTHERN TRIALS								entry
ENTRIES / STATES		CA	FL	MO	NC	avg.	ID	ME	MI	ND	OR	PA	WI	avg.	avg.
ATLANTIC	all	477	213	489	259	360	434	250	418	231	630	345	333	377	371
SNOWDEN	all	518	230	386	273	352	397	244	579	159	982	362	443	452	416
LAMOKA	7N	na	na	na	182	182	343	239	344	212	622	na	288	341	319
A00188-3C	6N	na	na	na	na	na	265	na	384	163	723	305	398	373	373
AC01151-5W	7N	na	na	na	na	na	423	244	400	183	812	307	412	397	397
AC03433-1W	all	626	149	318	175	317	354	194	320	145	556	268	306	306	310
AF4648-2	all	414	211	356	188	292	338	235	457	83	510	240	392	322	311
BNC202-3	all	617	221	502	320	415	426	296	na	181	802	410	433	425	421
CO02024-9W	all	na	na	308	na	308	na	na	na	160	na	na	na	160	234
CO03243-3W	all	647	143	384	319	373	412	213	384	191	799	356	363	388	383
MSK061-4	4S	488	200	400	201	322	na	na	na	na	na	na	na	na	322
NY152	all	583	181	402	312	370	430	274	596	81	862	405	446	442	416
W6822-3	all	588	165	292	264	327	330	267	356	140	553	384	321	336	333
W8822-1	4S	580	216	388	272	364	na	na	na	na	556	na	414	485	404
state average		554	193	384	251	346	377	246	424	161	701	338	379	370	364

VERY LOW LOW / BELOW AVERAGE GOOD / ABOVE AVERAGE VERY HIGH

TABLE 3. 2015 USPB-SFA CHIP TRIALS - SPECIFIC GRAVITY

		SOUTHERN TRIALS					NORTHERN TRIALS								entry
ENTRIES / STATES		CA	FL	MO	NC	avg.	ID	ME	MI	ND	OR	PA	WI	avg.	avg.
ATLANTIC	all	87	69	84	70	78	96	93	81	109	76	100	82	91	86
SNOWDEN	all	86	73	78	67	76	85	86	79	99	74	103	80	87	83
LAMOKA	7N	na	na	na	67	67	92	88	77	100	74	na	78	85	82
A00188-3C	6N	na	na	na	na	na	93	na	79	95	76	87	75	84	84
AC01151-5W	7N	na	na	na	na	na	86	89	72	86	72	99	74	83	83
AC03433-1W	all	71	67	82	57	69	83	76	68	89	71	88	71	78	75
AF4648-2	all	76	72	90	61	75	90	84	78	101	75	101	80	87	83
BNC202-3	all	77	65	74	59	69	80	73	na	89	67	81	67	76	73
CO02024-9W	all	na	na	75	na	75	na	na	na	94	na	na	na	94	85
CO03243-3W	all	76	66	69	62	68	87	77	70	97	71	77	73	79	75
MSK061-4	4S	80	69	77	63	72	na	na	na	na	na	na	na	na	72
NY152	all	82	67	na	62	70	93	84	74	87	75	92	76	83	79
W6822-3	all	86	72	83	72	78	95	91	79	103	77	97	82	89	85
W8822-1	4S	83	69	87	74	78	na	na	na	na	75	na	82	79	78
state average		80	69	80	65	74	89	84	76	96	74	93	77	84	80

VERY LOW LOW / BELOW AVERAGE GOOD / ABOVE AVERAGE VERY HIGH

TABLE 4. 2015 USPB-SFA CHIP TRIALS - FIELD CHIP COLOR

		SOUTHERN TRIALS								NORTHERN TRIALS									
ENTRIES / STATES		CA	FL	MO	NC	NC	NC	SFA avg.	A&H avg.	MI	MI	ND	ND	OR	PA	WI	WI	SFA avg.	A&H avg.
ATLANTIC	all	1.0	56.5	72	1.5	1.5	59.1	1.3	57.8	4	58.2	2	66	2.25	57.6	64.2	56.2	2.8	60.4
SNOWDEN	all	1.0	58.7	74	1.5	1.5	61.2	1.3	60.0	3	62.8	1	72	2.00	59.5	64.8	58.4	2.0	63.5
LAMOKA	7N	na	na	na	1.5	1.5	61.3	1.5	61.3	3	64.9	1	73	1.75	na	65.1	59.5	1.9	65.6
A00188-3C	6N	na	na	na	na	na	na	na	na	2	62.2	1	75	1.75	63.0	66.7	57.5	1.6	64.9
AC01151-5W	7N	na	na	na	na	na	na	na	na	3	53.1	1	72	2.00	58.5	60.4	55.0	2.0	59.8
AC03433-1W	all	1.0	60.1	74	2.0	2.0	60.9	1.7	60.5	3	56.2	1	74	1.25	60.4	65.8	57.7	1.8	62.8
AF4648-2	all	1.0	61.8	74	2.0	2.0	61.0	1.7	61.4	3	62.0	1	73	1.75	62.8	65.4	58.2	1.9	64.3
BNC202-3	all	1.0	61.0	74	2.0	2.0	60.4	1.7	60.7	na	na	1	72	1.75	63.0	64.4	57.8	1.4	64.3
CO02024-9W	all	na	na	74	na	na	na	na	74.0	na	na	1	71	na	na	na	na	1.0	71.0
CO03243-3W	all	1.0	59.7	72	2.0	2.0	58.5	1.7	59.1	2	62.1	1	70	1.75	61.0	62.6	56.4	1.6	62.4
MSK061-4	4S	1.0	63.8	74	2.0	2.0	60.5	1.7	62.2	na	na	na	na	na	na	na	na	na	na
NY152	all	1.0	62.6	na	1.5	2.0	63.4	1.5	63.0	3	65.2	1	77	2.00	60.6	65.3	60.0	2.0	65.6
W6822-3	all	1.0	63.0	74	2.0	2.0	60.2	1.7	61.6	2	61.3	1	74	1.75	59.4	66.2	59.6	1.6	64.1
W8822-1	4S	1.0	60.5	74	2.5	2.0	60.5	1.8	60.5	na	na	na	na	2.50	na	63.8	54.6	2.5	59.2
state average		1.0	60.8	74	1.9	1.9	60.6	1.6	61.8	2.8	60.8	1.1	72.4	1.88	60.6	64.6	57.6	1.8	63.7
days harvest to chipping					1	1	1			14	14				1	3	33		

VERY LOW | LOW / BELOW AVERAGE | HIGH

Table 5. USPB-SFA Chip Trial Entry Summary: 1985 - 2015

Atlantic, 1985-2015 and Snowden, 1988-2015 as Standards

WNC672-2, 1985-1987
WNC521-12, 1985-1986
W879, 1985-1986
W833, 1985
TXA17-1, 1985-1986
A70369-2, 1985-1986
ND860-2, 1985-1986
G670-11, 1985
BR7093-24 (**Gemchip**), 1986-1988
W848 (**Niska**), 1986-1987
NY71 (**Kanona**), 1986-1988
NY81 (**Steuben**), 1986-1988
NY72 (**Allegany**), 1987-1989
AF236-1 (**Somerse**t), 1987-1989
MS700-70, 1987-1989
AC80545-1 (**Chipeta**), 1987-1989
LA01-38 (**LaBelle**), 1988-1990
MS716-15, 1988-1990
MS700-83 (**Spartan Pearl**), 1988-1990
W855 (**Snowden**), 1988-1990
Saginaw Gold, 1988-1990
AF875-16 (**Mainechip**), 1989-1991
D195-24, 1989
ND2008-2, 1990
Coastal Chip, 1990
CS7232-4, 1990-1992
Andover, 1991-1993
Pike, 1991-1993
NY87 (**Reba**), 1991
W887, 1991-1993
W870, 1991-1993
A80559-2, 1991-1993
NDA2031-2, 1992-1994
Suncrisp, 1992-1994
B0178-34, 1992-1994
NDO1496-1 (**Ivory Crisp**), 1993-1995
NY95, 1993
AF875-15, 1994-1996
ND2417-6 (**NorValley**), 1994-1996
ND2471-8, 1994-1996
NY102 (**Monticello**), 1994-1995
NY103 (**Eva**), 1995-1997
BCO894-2, 1995-1997
ATX85404-8, 1996-1998
AF1433-4, 1996-1998
ND2676-10 (**Dakota Pearl**), 1997-1999
B0564-8 (**Harley Blackwel**l), 1997-1999
B0564-9, 1997-1999
NY115, 1997-1999
W1313, 1999
NY112 (**Marcy**), 1998-2000
AF1668-60, 1998-2000
MSNT-1, 1998-2000
MSA091-1 (**Liberator**), 1999-2001
B0766-3, 2000-2002
AF1775-2, 2000-2002
W1431, 2000-2002
NY120, 2000-2002
AF1424-7, 2001-2003
MSG227-2, 2001-2003
W1355-1 (**White Pearl**), 2001-2003
NDTX4930-5W, 2001-2003
ND2470-27 (**Dakota Crisp**), 1999, 2003-2004
A91790-13, 2002-2004
MSF099-3, 2002-2004
B1240-1, 2004
W1773-7, 2004
ND5822C-7 (**Dakota Diamond**), 2003-2005
W1201 (**Megachip**), 2003-2005
AF2211-9, 2004-2006
MSJ461-1, 2004-2006
NY132, 2004-2006
MSJ316-A, 2005-2007
W2133-1 (**Nicolet**), 2005-2007
Beacon Chipper, 2006-2008
CO95051-7W, 2006-2008
MSJ147-1, 2006-2008
W2324-1 (**Accumulator**), 2006-2008 (2009 4S)
CO96141-4W, 2007-2009
MSJ036-A (**Kalkaska**), 2008-2009
AF2291-10, 2008-2010
CO97043-14W. 2008-2010
CO97065-7W, 2008-2010
NY138 (**Waneta**), 2008-2010
NY139 (**Lamoka**), 2008-2010
W2717-5 (**Lelah**), 2008-2010
MSJ126-9Y **(McBride)**, 2009-2011
W2310-3 (**Tundra**), 2008,2010-2011
W2978-3, 2010-2012
W5015-12 **(Pinnacle)**, 2010-2012 (7N)
ND8331Cb-2, 2011
AF0338-17 **(Sebec)**, 2011-2013 (4S)
CO00197-3W, 2011-2013
MSL292-A **(Manistee)**, 2010-2013
MSQ086-3, 2010-2013 (4S)
MSR061-1, 2011-2013 (7N)
NY140, 2011-2013
NY148, 2011-2013
W4980-1. 2011-2013
W6483-5, 2012-2013
A01143-3C, 2012-2014 (4S+6N)
AF4157-6, 2012-2014
CO02321-4W, 2012-2014
MSL007-B, 2012-2014
W5955-1, 2012-2014
A00188-3C, 2013-2015
AC01151-5W, 2013-2015
CO03243-3W, 2013-2015
W6609-3, 2013-2014
CO02024-9W, 2014-2015
MSK061-4, 2014-2015 (4S)
AC03433-1W, 2015

CLONE: **A00188-3C**

PROGRAM: USDA-ARS - ABERDEEN, ID - RICH NOVY

PEDIGREE: A91790-13 X DAKOTA PEARL

USE: Chip from Northern locations

MATURITY: MIDSEASON

TRIALS: 6 Northern Years: 2013 - 2015

TOTAL YIELD (6N-2015)	454	cwt/a	97% of Atlantic's total yield at 470 cwt/a
TOTAL YIELD (6N-2014)	433	cwt/a	100% of Atlantic's total yield at 434 cwt/a
TOTAL YIELD (6N-2013)	425	cwt/a	82% of Atlantic's total yield at 517 cwt/a
MARKETABLE YIELD (6N-2015)	373	cwt/a	93% of Atlantic's marketable yield at 399 cwt/a
MARKETABLE YIELD (6N-2014)	341	cwt/a	93% of Atlantic's marketable yield at 368 cwt/a
MARKETABLE YIELD (6N-2013)	362	cwt/a	76% of Atlantic's marketable yield at 476 cwt/a
SPECIFIC GRAVITY (6N-2015)	1.084		7 units below Atlantic's specific gravity of 1.091
SPECIFIC GRAVITY (6N-2014)	1.087		1 unit above Atlantic's specific gravity of 1.086
SPECIFIC GRAVITY (6N-2013)	1.082		7 units below Atlantic's specific gravity of 1.089

SUMMARY: Finished 3 years of USPB-SFA trials
Total and marketable yield averages for 2014 and 2015 near Atlantic,
but 18% to 24% below Atlantic in 2013.
Specific gravity averaged 7 units (0.007) below Atlantic in 2013 and 2015,
but specific gravity average within 1 unit of Atlantic in 2014.
Very good field chip color, better than Atlantic.
Good chip color Dec - June at 45F (WI-2014).
Very little common scab (WI).

CLONE: **AC01151-5W**

PROGRAM: COLORADO STATE UNIVERSITY - DAVID HOLM

PEDIGREE: COA96142-7 X NDA2031-2

USE: Chip potential from 42F storage

MATURITY: MIDSEASON

TRIALS: 7 Northern Years: 2013 - 2015

TOTAL YIELD (7N-2015)	515	cwt/a	117% of Atlantic's total yield at 442 cwt/a
TOTAL YIELD (7N-2014)	475	cwt/a	113% of Atlantic's total yield at 421 cwt/a
TOTAL YIELD (7N-2013)	398	cwt/a	81% of Atlantic's total yield at 492 cwt/a
MARKETABLE YIELD (7N-2015)	397	cwt/a	105 % of Atlantic's marketable yield at 377 cwt/a
MARKETABLE YIELD (7N-2014)	360	cwt/a	100% of Atlantic's marketable yield at 360 cwt/a
MARKETABLE YIELD (7N-2013)	311	cwt/a	69% of Atlantic's marketable yield at 451 cwt/a
SPECIFIC GRAVITY (7N-2015)	1.083		8 units below Atlantic's specific gravity of 1.091
SPECIFIC GRAVITY (7N-2014)	1.081		6 units below Atlantic's specific gravity of 1.087
SPECIFIC GRAVITY (7N-2013)	1.078		11 units below Atlantic's specific gravity of 1.089

SUMMARY: Finished 3 years of USPB-SFA trials
Total and marketable yield averages for 2014 and 2015 equal or significantly above Atlantic, but 19% to 31% below Atlantic in 2013.
Highest tuber set, highest % undersize (OR, WI).
Specific gravity is mid-range to low, averaged 6 to 11 units below Atlantic.
Bad common scab in WI in 2015.
Field chip color variable and below 7 trial average.
Very good chip color from 42F (ME-2014).

CLONE: **AC03433-1W**

PROGRAM: COLORADO STATE UNIVERSITY - DAVID HOLM

PEDIGREE:

USE: Chip from field or storage

MATURITY: MEDIUM-LATE

TRIALS: all 11 states Year: 2015

TOTAL Yield (4S):	387	cwt/a	94% of Atlantic's total yield at 413 cwt/a
TOTAL Yield (7NS):	402	cwt/a	91% of Atlantic's total yield at 442 cwt/a
MARKETABLE Yield (4S):	317	cwt/a	88% of Atlantic's marketable yield at 360 cwt/a
MARKETABLE Yield (7N):	306	cwt/a	81% of Atlantic's marketable yield at 377 cwt/a
SPECIFIC GRAVITY (4S):	1.069		9 units below Atlantic's specific gravity of 1.078
SPECIFIC GRAVITY (7N):	1.078		13 units below Atlantic's specific gravity of 1.091

SUMMARY: Not to be planted in 2016 USPB-SFA trials
Very good yield in CA, low or lowest in rest of states.
High percentage of culls - green.
Lowest specific gravity across all states.
Field chip color better than Atlantic.
Higher bruise susceptibility.
Hollow heart (30% MO, 40% MI).

CLONE: **AF4648-2**

PROGRAM:	UNIVERSITY OF MAINE - GREG PORTER		
PEDIGREE:	NY132 X LIBERATOR		
USE:	Chips from 50F, does not chip well from cold storage		
MATURITY:	MIDSEASON		
TRIALS:	all 11 states		Year: 2015
TOTAL Yield (4S):	358	cwt/a	87% of Atlantic's total yield at 413 cwt/a
TOTAL Yield (7NS):	387	cwt/a	88% of Atlantic's total yield at 442 cwt/a
MARKETABLE Yield (4S):	292	cwt/a	81% of Atlantic's marketable yield at 360 cwt/a
MARKETABLE Yield (7N):	322	cwt/a	85% of Atlantic's marketable yield at 377 cwt/a
SPECIFIC GRAVITY (4S):	1.075		3 units below Atlantic's specific gravity of 1.078
SPECIFIC GRAVITY (7N):	1.087		4 units below Atlantic's specific gravity of 1.091

SUMMARY: To be planted in 7 northern (7N) USPB-SFA trials in 2016
Low or lowest yields except for MI, MO, & WI.
Best specific gravity in MO, good in FL & WI, rest are average.
Field chip color similar to Atlantic and Snowden.
Larger tuber size, lower tuber set, hence higher percent ovesize.
Good bruise resistance.

CLONE: **BNC202-3**

PROGRAM:	USDA-ARS, BELTSVILLE, MD - KATHY HAYNES		
PEDIGREE:	B1240-1 X BTD0157-7		
USE:	Chip directly from field or long-term storage		
MATURITY:	MEDIUM-LATE		
TRIALS:	all 11 states		Year: 2015
TOTAL Yield (4S):	483	cwt/a	117% of Atlantic's total yield at 413 cwt/a
TOTAL Yield (7NS):	519	cwt/a	117% of Atlantic's total yield at 442 cwt/a
MARKETABLE Yield (4S):	415	cwt/a	115% of Atlantic's marketable yield at 360 cwt/a
MARKETABLE Yield (7N):	425	cwt/a	113% of Atlantic's marketable yield at 377 cwt/a
SPECIFIC GRAVITY (4S):	1.069		9 units below Atlantic's specific gravity of 1.078
SPECIFIC GRAVITY (7N):	1.076		15 units below Atlantic's specific gravity of 1.091

SUMMARY: Seed mix-up, not replanted in 2016. Originally labeled BNC182-5.
K. Haynes will work on genetic confirmation for potential future testing.
Consistently highest yielder across all states.
Very low specific gravity, lowest in 5 states.
Low bruise susceptibility.
Field chip color similar to Atlantic and Snowden.

CLONE: **CO02024-9W**

PROGRAM: COLORADO STATE UNIVERSITY - DAVID HOLM

PEDIGREE: A91790-13W X CO95051-7W

USE: Chip potential from 42F storage

MATURITY: MIDSEASON

TRIALS: all 11 states Year: 2014
2 Northern Year: 2015 - only planted MO & ND

TOTAL Yield (2015): - MO	387	cwt/a	100% of Atlantic's total yield at 387 cwt/a
TOTAL Yield (2015): - ND	286	cwt/a	90% of Atlantic's total yield at 319 cwt/a
TOTAL Yield (4S-2014):	363	cwt/a	92% of Atlantic's total yield at 395 cwt/a
TOTAL Yield (7N-2014):	438	cwt/a	104% of Atlantic's total yield at 421 cwt/a
MARKETABLE Yield (2015): - MO	308	cwt/a	63% of Atlantic's marketable yield at 489 cwt/a
MARKETABLE Yield (2015): - ND	160	cwt/a	69% of Atlantic's marketable yield at 231 cwt/a
MARKETABLE Yield (4S-2014):	267	cwt/a	82% of Atlantic's marketable yield at 325 cwt/a
MARKETABLE Yield (7N-2014):	363	cwt/a	101% of Atlantic's marketable yild at 360 cwt/a
SPECIFIC GRAVITY (2015): - MO	1.075		9 units below Atlantic's specific gravity of 1.084
SPECIFIC GRAVITY (2015): - ND	1.094		15 units below Atlantic's specific gravity of 1.109
SPECIFIC GRAVITY (4S-2014):	1.074		5 units below Atlantic's specific gravity of 1.079
SPECIFIC GRAVITY (7N-2014):	1.082		5 units below Atlantic's specific gravity of 1.087

SUMMARY: Not planted in 2016 USPB-SFA trials
Only average or lower yields.
Below average specific gravity.
Field chip color similar to Atlantic and Snowden.
Lower Agtrons at 56F and 52F (MI-2014).

CLONE: **CO03243-3W**

PROGRAM: COLORADO STATE UNIVERSITY - DAVID HOLM

PEDIGREE: BC0894-2W X A91790-13

USE: potential for 42F storage

MATURITY: MEDIUM-LATE to LATE

TRIALS: all 11 states Years: 2013 - 2015

TOTAL Yield (4S-2015):	431	cwt/a	104% of Atlantic's total yield at 413 cwt/a
TOTAL Yield (7N-2015):	457	cwt/a	103 % of Atlantic's total yield at 442 cwt/a
TOTAL Yield (4S-2014):	421	cwt/a	107% of Atlantic's total yield at 395 cwt/a
TOTAL Yield (7N-2014):	452	cwt/a	107% of Atlantic's total yield at 421 cwt/a
TOTAL Yield (4S-2013):	339	cwt/a	115% of Atlantic's total yield at 296 cwt/a
TOTAL Yield (7N-2013):	453	cwt/a	92% of Atlantic's total yield at 492 cwt/a
MARKETABLE Yield (4S-2015):	373	cwt/a	104% of Atlantic's marketable yield at 360 cwt/a
MARKETABLE Yield (7N-2015):	388	cwt/a	103% of Atlantic's marketable yield at 377 cwt/a
MARKETABLE Yield (4S-2014):	359	cwt/a	110% of Atlantic's marketable yield at 325 cwt/a
MARKETABLE Yield (7N-2014):	377	cwt/a	105% of Atlantic's marketable yield at 360 cwt/a
MARKETABLE Yield (4S-2013):	294	cwt/a	124% of Atlantic's marketable yield at 237 cwt/a
MARKETABLE Yield (7N-2013):	398	cwt/a	88% of Atlantic's marketable yield at 451 cwt/a
SPECIFIC GRAVITY (4S -2015):	1.068		10 units below Atlantic's specific gravity of 1.078
SPECIFIC GRAVITY (7N-2015):	1.079		12 units below Atlanti's specific gravity of 1.091
SPECIFIC GRAVITY (4S-2014):	1.070		9 units below Atlantic's specific gravity of 1.079
SPECIFIC GRAVITY (7N-2014):	1.082		5 units below Atlantic's specific gravity of 1.087
SPECIFIC GRAVITY (4S-2013):	1.073		13 units below Atlantic's specific gravity of 1.086
SPECIFIC GRAVITY (7N-2013):	1.081		8 units below Atlantic's specific gravity of 1.089

SUMMARY: Finished 3 years of USPB-SFA trials
Except for the 7 northern trials in 2013, total and marketable yield averages were very high relative to Atlantic (103% to 124% of Atlantic).
Speific gravity ran low, averaging 5 to 13 units below Atlantic.
Medium-late to late maturity.

CLONE: **MSK061-4**

PROGRAM:	MICHIGAN STATE UNIVERSITY - DAVID DOUCHES		
PEDIGREE:	MSC148-A X ND2676-10		
USE:	Southern chipper		
MATURITY:	MIDSEASON		
TRIALS:	4 Southern		Years: 2014 - 2015
TOTAL Yield (4S-2015):	381	cwt/a	92% of Atlantic's total yield at 413 cwt/a
TOTAL Yield (4S-2014):	338	cwt/a	86% of Atlantic's total yield at 395 cwt/a
MARKETABLE Yield (4S-2015):	322	cwt/a	89% of Atlantic's marketable yield at 360 cwt/a
MARKETABLE Yield (4S-2014):	280	cwt/a	86% of Atlantic's marketable yield at 325 cwt/a
SPECIFIC GRAVITY (4S-2015):	1.072		6 units below Atlantic's specific gravity of 1.078
SPECIFIC GRAVITY (4S-2014):	1.081		2 units above Atlantic's specific gravity of 1.079

SUMMARY: Not replanted in 2016 USPB-SFA TRIALS
Total and marketable yield below Atlantic by 8% to 14%.
Specific gravity averaged 2 to 6 units below Atlantic.
Good field chip scores, had best chip color in FL.

CLONE: **NY152**

PROGRAM:	CORNELL UNIVERSITY - WALTER DE JONG		
PEDIGREE:	B38-14 X MARCY		
USE:	long term storage and chipping from 40F to 42F		
MATURITY:	Medium-Late		
TRIALS:	all 11 states		Year: 2015
TOTAL Yield (4S):	456	cwt/a	110% of Atlantic's total yield at 413 cwt/a
TOTAL Yield (7NS):	531	cwt/a	120% of Atlantic's total yield at 442 cwt/a
MARKETABLE Yield (4S):	370	cwt/a	103% of Atlantic's marketable yield at 360 cwt/a
MARKETABLE Yield (7N):	442	cwt/a	117% of Atlantic's marketale yield at 377 cwt/a
SPECIFIC GRAVITY (4S):	1.070		8 units below Atlantic's specific gravity of 1.078
SPECIFIC GRAVITY (7N):	1.083		8 units below Atlantic's specific gravity of 1.091

SUMMARY: Planted in 2016 for 2nd year of USPB-SFA trials
Yield equal to Atlantic and usually 5% to 15% higher.
Specific gravity averages 0.008 less than Atlantic.
Moderate to good resistance to common scab.
Tuber dormancy about 4 weeks longer than Atlantic.
Medium-Late maturity.
High tuber set, hence high % undersize.
Low bruise susceptibility.

CLONE: **W6822-3**

PROGRAM:	UNIVERSITY OF WISCONSIN - JEFF ENDELMAN		
PEDIGREE:	WHITE PEARL X DAKOTA PEARL		
USE:	Chip from field and long-term cold storage		
MATURITY:	Medium-Late		
TRIALS:	all 11 states		Year: 2015
TOTAL Yield (4S):	410	cwt/a	99% of Atlantic's total yield at 413 cwt/a
TOTAL Yield (7NS):	423	cwt/a	96% of Atlantic's total yield at 442 cwt/a
MARKETABLE Yield (4S):	327	cwt/a	91% of Atlantic's marketable yield at 360
MARKETABLE Yield (7N):	336	cwt/a	89% of Atlantic's marketable yield at 377 cwt/a
SPECIFIC GRAVITY (4S):	1.078		equal to Atlantic's specific gravity of 1.078
SPECIFIC GRAVITY (7N):	1.089		2 units below Atlantic's specific gravity of 1.091

SUMMARY: Planted in 2016 for 2nd year of USPB-SFA trials
Yield variable, good to poor, trends lower than trial averages.
Excellent specific gravity - always well above trial averages.
gravity equal to Atlantic in Southern trials, 2 units below in Northern trials.
Lighter chip color than Snowden after 6 months of cold storage.
Susceptible to common scab.
High bruise susceptibility (ME, MI).
Smaller size profile.

CLONE: **W8822-1**

PROGRAM: UNIVERSITY OF WISCONSIN - JEFF ENDELMAN

PEDIGREE: FASAN X TUNDRA

USE: Chip from field and long-term cold storage

MATURITY: LATE

TRIALS: 4 Southern Year: 2015
2 Northern

TOTAL Yield (4S):	442	cwt/a	107% of Atlantic's total yield at 413 cwt/a
TOTAL Yield (OR/WI):	533	cwt/a	90% of Atlantic's total yield at 589 cwt/a
MARKETABLE Yield (4S):	364	cwt/a	101% of Atlantic's marketable yield at 360 cwt/a
MARKETABLE Yield (OR/WI):	485	cwt/a	129% of Atlantic's marketable yield at 377 cwt/a
SPECIFIC GRAVITY (4S):	1.078		equal to Atlantic's specific gravity at 1.078
SPECIFIC GRAVITY (OR/WI):	1.079		equal to Atlantic's specific gravity at 1.079

SUMMARY: Planted in 2016 for 2nd year of USPB-SFA trials
Good yields in 4 southern trials.
High specific gravity in 4 southern and 2 northern trials.
Late maturity.
Nice size distribution.
Very little common scab (WI).

California Regional Trial

PLANTED: JANUARY 15, 2015 HARVESTED JUNE 7, 2015
KIRSCHENMAN FARMS - BAKERSFIELD, CALIFORNIA

VARIETY	TOTAL YIELD cwt/acre	MARKETABLE YIELD cwt/acre	% mkt yld	% undersize	% mid-size	% OVER 3"	% CULLS	oz/tuber	SPECIFIC GRAVITY
SNOWDEN	579	518	89	9.1%	81.8%	9.1%	1.4%	4.1	1.086
ATLANTIC	512	477	93	5.4%	71.1%	23.5%	1.4%	5.4	1.087
W8822-1	662	580	88	11.1%	84.2%	4.7%	1.3%	4.2	1.083
AF4648-2	516	414	80	5.0%	84.0%	11.0%	14.7%	5.9	1.076
CO03243-3W	696	647	93	3.2%	68.1%	28.7%	3.8%	6.2	1.076
W6822-3	652	588	90	8.6%	86.8%	4.6%	1.2%	4.5	1.086
NY152	666	583	88	11.0%	80.8%	8.2%	1.4%	4.4	1.082
MSK061-4	519	488	94	4.9%	84.8%	10.3%	1.2%	5.3	1.080
BNC202-3	683	617	90	6.7%	86.9%	6.4%	2.9%	6.1	1.077
ACO3433-1W	666	626	94	2.9%	58.4%	38.7%	3.0%	6.3	1.071

VARIETY	CHIP COLOR	CHIP DEFECTS	CHIP COMMENTS	notes: CULLS
SNOWDEN	1.0	0%	GOOD	DRY ROT & GROWTH CRACKS
ATLANTIC	1.0	0%	GOOD	green,wet, growth crack
W8822-1	1.0	0%	YELLOW	wet
AF4648-2	1.0	4%	PVY necrosis?	growth cracks,green, wet
CO03243-3W	1.0	0%	GOOD	growth cracks,green, wet
W6822-3	1.0	0%	NICE APPEAR/	greening, growth cracks
NY152	1.0	0%	NICE APPEAR/	greening
MSK061-4	1.0	4%	PVY necrosis?	growth cracks, green
BNC202-3	1.0	0%	GOOD	green
ACO3433-1W	1.0	4%	PVY necrosis?	growth cracks, green

FLORIDA REGIONAL LOCATION

Local Coordinators:

Pam Solano
University of Florida/IFAS
Hastings Agricultural Extension
Center Research Farm
Hastings, FL 32145-0728

Dr. Lincoln Zotarelli
Assistant Professor
University of Florida/IFAS
Horticultural Sciences Department
Gainesville, FL 32611

Cooperating Grower:

University of Florida/IFAS
Hastings Agricultural Extension
Center Research Farm

Cooperating Chip Processor:

Utz Quality Foods Inc.
Hanover, PA

Trial Data:

Planting Site:	University of Florida/IFAS, Hastings Agricultural Extension Center Research Farm
Planting Date:	February 13, 2015
Harvest Date:	May 27 and 28, 2015 (103 days)
Growing Conditions:	Overall growing conditions for the 2015 growing season were rated as fair to good. There was a good distribution of rainfall throughout the season without large rainfall events. Relative good stands and plant vigor were observed. Overall temperatures were near normal for the season. There was one single freeze event at 6 days after planting, but before plant emergence. Total and marketable yields were good for most clones tested in this trial with few exceptions. Overall tuber specific gravity was lower than previous yeas for most of varieties test in this and other trials. There were only few incidences of internal defects.
Experimental Design:	This was a randomized complete block, four replication experiment designed in eight 275 ft rows with plots of two rows by 20 ft.
Row Spacing:	8 inches in-row, 40 inches between-rows.
Fertilizer:	Preplant: 14-6-12 (100 lb/acre N); Side-dress: 14-0-12 (100 lb/acre N)
Pest Control:	Pic-Clor 60 Fumigant, 11 Gallons/A, pre-plant Admire Pro, 8.7 oz/A, Quadris, 10.4 oz/A, and Vydate C-LV, 64 oz/A in furrow at planting Boundary, 24 oz/A at “boarding off” for weed control Fungicides and Insecticides 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. Chip scores are presented in Table 2.

Table 1. Production statistics for the 2015 USPB Snack Food Association Trial potato selections.

	Total	Marketable Yield[1]		Size Distribution by Class (%)[2, 3]						Size Class Range (%)		Specific
Clone	Yield (cwt/A)	(cwt/A)	% of standard	C	B	A1	A2	A3	A4	A1 to A3	A2 to A3	Gravity
Season–103 days												
Atlantic	296	213	100	3	10	68	13	7	0	87	20	1.069
Snowden	307	230	108	2	16	76	4	2	0	82	6	1.073
AF4648-2	274	211	99	3	10	70	12	5	0	87	17	1.072
BNC182-5	320	221	104	4	13	77	5	1	0	83	6	1.065
AC03433-1W	248	149	70	4	15	69	9	4	0	81	12	1.067
CO02024-9W	-	-	-	-	-	-	-	-	-	-	-	-
CO03243-3W	236	143	67	5	18	67	6	4	0	77	9	1.066
MSK061-4	280	200	94	3	19	75	2	1	0	78	3	1.069
NY152	307	181	85	5	23	68	3	1	0	72	4	1.067
W6822-3	276	165	78	6	20	60	8	6	0	74	15	1.072
W8822-1	312	216	102	4	19	67	5	4	0	77	9	1.069
MSD[4]	67	72		3	9	13	9	8	0	10	13	0.008
P Value	*0.0020*	*0.0012*		*0.0042*	*0.0003*	*0.0052*	*0.0016*	*0.1435*	*0.4635*	*<0.0001*	*0.0021*	*0.0104*

[1]Marketable Yield: size classes A1 to A3.

[2]Size classes: C = 0.5 to 1.5" , B = 1.5 to 1.88", A1 = 1.88 to 2.5", A2 = 2.5 to 3.25", A3 = 3.25 to 4", A4 = >4"

[3]Size Class Distribution: calculated based on weight using the formula, Class Wt / (Total Yield Wt – Cull Wt) * 100.

[4]Means separated within columns by Tukey's Studentized Range (HSD) Test.

Table 2. Plant growth and tuber characteristics for the 2015 USPB Snack Food Association Trial potato selections.

	Plant Growth Characteristics[1]				Tuber Characteristics[2]						
Clone	% Stand	Early Vigor	Vine Type	Vine Maturity	IFC	SC	ST	TS	ED	APP	Chip Rating[3]
Atlantic	97	9	7	6	1	6	6	2	8	6	56.5
Snowden	95	9	9	5	1	6	6	2	7	7	58.7
AF4648-2	97	9	6	8	1	6	7	3	9	5	61.8
BNC182-5	96	9	6	6	2	7	7	2	9	7	61.0
AC03433-1W	95	9	6	6	1	6	6	2	9	4	60.1
CO02024-9W	-	-	-	-	-	-	-	-	-	-	-
CO03243-3W	97	9	9	5	1	6	7	3	9	6	59.7
MSK061-4	94	9	8	6	2	7	7	2	9	7	63.8
NY152	93	9	6	6	1	6	6	3	9	7	62.6
W6822-3	98	9	9	5	1	7	7	3	9	6	63.0
W8822-1	98	9	9	6	2	6	5	2	8	8	60.5

[1]**Percent Stand**: final stand / number of seeds planted per plot * 100 where number of seeds was 30 for 20 ft plot, 8 in spacing. **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.

[2]**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 = partial russet, 2 = heavy russet, 3 = moderate russet, 4 = light russet, 5 = netted, 6 = slightly netted, 7 = moderately smooth, 8 = smooth, 9 = very smooth. **Tuber Shape (TS)**: 1 = 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 (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.

[3]**Chip 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 the 2015 USPB Snack Food Association Trial potato selections.

	% External Tuber Defects					% Internal Defects[2]						
	Growth	Mis-	Sun-	Rotten	Total					Brown Center		
Clone	Cracks	shapen	burned	& misc.	Culls[1]	HH	BR	CRS	IHN	L	M	H
Atlantic	0	0	0	17	17	1	0	0	0	0	0	0
Snowden	0	0	0	9	9	0	0	0	0	0	0	0
AF4648-2	1	0	1	10	12	0	0	0	0	0	0	0
BNC182-5	0	0	0	18	18	0	0	0	0	0	0	0
AC03433-1W	0	0	0	28	29	0	0	0	0	0	0	0
CO02024-9W	-	-	-	-	-	-	-	-	-	-	-	-
CO03243-3W	0	0	0	22	22	0	0	0	0	1	0	0
MSK061-4	0	0	0	8	9	0	0	0	0	0	0	0
NY152	0	0	0	19	19	0	0	0	0	0	0	0
W6822-3	1	0	0	19	20	0	0	0	0	1	0	0
W8822-1	0	0	0	11	11	0	0	0	0	0	0	0
MSD[3]	1	0	1	11	11	1	0	0	0	2	0	0
P Value	*0.0060*	*0.4635*	*0.1855*	*<0.0001*	*<0.0001*	*0.4635*	-	-	-	*0.0678*	-	-

[1]Percent of Total Yield. Total culls include the sum of growth cracks, misshapen, sunburned and rotten/misc.

[2]Percent tubers; HH = hollow heart, BR = brown rot, CRS = corky ringspot, IHN = internal heat necrosis, Brown Center: L = Light, M = Moderate, H = Heavy.

[3]Means separated within columns by Tukey's Studentized Range (HSD) Test.

2015 Idaho Snack Food Trial

Local Coordinator:
Jeff Stark
Peggy Bain
Chelsey Lowder
Justin Hatch

University of Idaho
Aberdeen R&E Center
Aberdeen, Idaho

Trial Data

PLANTED 4-May-15
VINE KILLED 2-Sep-15
Chemical (Reglone)
HARVESTED 24-Sep-15

PLOT LENGTH	18'	**HARVEST LENGTH**	18'		
HILL SPACING	10.6"	**ROW SPACING**	36"		
HILLS PER PLOT	20	**ROWS/ PLOT**	3	**REPS**	4

METHOD OF HARVEST Grimme Machine

FERTILIZER

Pre plant	Nitrogen	Phosphorous	Potassium	Zn-MG
Soil test	19	25	290	1.4-2.8
Pre-Plant	125	80	0	7.0 - 7.0

In-Season	Date	Rate	Product
Injection	9-Jul	30 Units	Uran
Injection	30-Jul	30 Units	Uran
Injection	13-Aug	30 Units	Uran

HERBICIDES APPLIED

Spray Coupe	4-Jun	1.0 pt/A	TriCor 4F
Spray Coupe	4-Jun	1.5 oz/A	Matrix
Injection	8-Jun	5.0 pt/A	Eptam 7-E
Spray Coupe	2-Sep	2.0 pt/A	Reglone

INSECTICIDES APPLIED/HILLING

Shanked	18-May	8 oz/A	Admire

FUNGICIDES APPLIED

Injection	16-Jul	2.0 lbs/A	Gavel
Injection	30-Jul	1.5 pt/A	Bravo
Injection	13-Aug	2.0 lbs/A	Gavel
Injection	21-Aug	1.5 pt/A	Bravo

IRRIGATION

~92 Hours/20 Inches
Week of 25-May and 1-June No irrigation due to rain

ENVIRONMENTAL FACTORS

Wet Spring

Table 1. IDAHO TRIAL 2014, Yield, Size Distribution, Specific Gravity

Clone	Yield (cwt/A)		Percent Size Distribution				%	Specific
	US No1	Total	<2"	2-2.5"	2.5-3"	>3.25"	Unusable	Gravity
Atlantic	433.5	475.1	5	10	29	52	4	1.096
NY152	429.7	534.3	15	25	40	15	4	1.093
BNC202-3	425.6	467.1	6	9	28	53	3	1.080
AC01151-5W	422.7	520.3	12	20	33	27	7	1.086
CO03243-3W	411.8	457.0	4	9	26	55	6	1.087
Snowden	397.2	452.1	10	21	45	22	2	1.085
AC03433-1W	354.0	478.9	8	11	30	32	19	1.083
LAMOKA	342.8	468.5	3	3	20	50	24	1.092
AF4648-2	337.8	403.8	11	18	39	26	6	1.090
W6822-3	330.0	416.5	12	17	41	21	8	1.095
A00188-3C	265.3	331.5	8	17	36	26	12	1.093
Mean	**377**	**455**	**9**	**15**	**34**	**35**	**9**	**1.089**

Table 2. IDAHO TRIAL 2014, Tuber characteristics.

Clone	Tuber Appearance	Fresh Merit Score [1]	Tubers/ Plant	Avg. Tuber Size (oz.)	Tuber Shape[2]
Atlantic	Rot, D Ends, Shatter, GRN	2.6	5.6	8.5	2.3
NY152	Round, Scab, Uniform, GRN, Few ATS/D Ends/Flat	3.4	9.7	5.5	1.9
BNC202-3	Rot, Lumps, GRN, Flat, Few ATS/Shatter	2.3	5.5	8.5	2.5
AC01151-5W	Round, Scab, Skinned, Bumps, ATS, Few GRN	3.2	8.5	6.3	1.8
CO03243-3W	Big, Rot, Not Uniform, D Ends, ATS, GRN, MS, Some Shatte	2.3	5.4	8.7	2.3
Snowden	Round, Lumps, D Ends, Few ATS/Flat	2.9	7.3	6.4	2.1
AC03433-1W	D Ends, "Tooth" Shaped, ATS, GC, GRN, Some Skin	1.8	6.8	7.1	1.9
LAMOKA	GRN, Skinned, Big, Ugly, Flat, Few D Ends/ATS	2.2	4.7	10.8	3.1
AF4648-2	GRN, SD Ends, ATS, Few MS,	2.5	6.5	6.3	2.5
W6822-3	Bumps, Shatter, SD Eyes, GRN	2.8	7.8	6.0	2.4
A00188-3C	GC, MS, Shatter, ATS, Rot, Few Points	2.1	4.9	6.7	2.5
Mean		**2.5**	**6.6**	**7.3**	**2.3**

[1] (1-5) 5=Best Preference Score

[2] (1-5) 1=Round

ATS=Attached Stolon, SD=Slightly Deep, D=Deep, MS=Mis-Shapen, GC=Growth Crack, GRN=Green

Table 3. IDAHO TRIAL 2014, External and Internal Defects.

	External defects[3]				Internal Defects[5]			
Clone	Scab	Growth Cracks	Knobs	Eye Depth[4]	% HH	% BC	% IBS	% VD
Atlantic	4.5	4.7	5.0	2.3	33	0	0	0
NY152	3.1	5.0	5.0	2.9	48	0	0	0
BNC202-3	4.5	5.0	5.0	2.8	5	0	0	0
AC01151-5W	2.7	4.4	5.0	3.1	18	0	0	0
CO03243-3W	4.5	4.5	5.0	3.1	0	0	0	0
Snowden	3.4	5.0	5.0	2.0	5	0	0	0
AC03433-1W	4.0	1.9	5.0	2.6	28	0	1	0
LAMOKA	4.5	4.8	5.0	3.1	10	0	0	0
AF4648-2	5.0	4.5	5.0	3.3	3	0	0	0
W6822-3	4.0	5.0	5.0	2.3	18	0	0	0
A00188-3C	5.0	2.6	5.0	3.0	13	0	0	0
Mean	**4.1**	**4.3**	**5.0**	**2.8**	**16.2**	**0.0**	**0.1**	**0.0**

[3] (1-5) 5=None

[4] (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

Maine Regional Trial

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

US POTATO BOARD/SNACK FOOD ASSOCIATION
POTATO CHIP VARIETY TRIAL, MAINE 2015

Cooperators:

Local Coordinator:
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Cooperating Grower(s):
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University of Maine
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Presque Isle, ME 04769

Cooperating Processor:
Cape Cod Chips
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SFA Coodinator:
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Variety Entries:

Atlantic (Field Std.)	
Lamoka (Storage Std.)	
Snowden (Storage Std.)	
ACO1151-5W	CO, San Luis Valley Res. Ctr., David Holm
ACO3433-1W	CO, San Luis Valley Res. Ctr., David Holm
AF4648-2	ME, University of Maine, Greg Porter
BNC202-3	USDA-ARS, Beltsville, Kathy Haynes
CO03243-3W	CO, San Luis Valley Res. Ctr., David Holm
NY152	NY, Cornell Univ., Walter De Jong
W6822-3	WI, Univ. of Wisconsin, Jeffrey Endelman

Trial Information:

Location:	Aroostook Research Farm, Presque Isle, ME
Soil Type:	Caribou loam
Soil Test:	pH 5.8 Avail P (MH), K (MH), Ca (H), Mg (H) 3.1% soil organic matter
Previous Crop:	clover/timothy (2014), oats (2013), potatoes (2012)
Planting Date:	May 20, 2015

Plot size/design:	36” row spacing, plots 2 rows x 30’
	Randomized (RCBD), four replicates per variety
Fertilization:	168-168-168 at planting
	Foliar boron applied July 2
In-row Spacing:	10” except Snowden (12”) and AF4648-2 (8”)
Crop Management:	Typical of commercial production in the area
Sprout Inhibitor:	MH-30 applied August 10
Vinekill Date:	September 3, 2015 (106 DAP)
Harvest Date:	September 22, 2015
Processing Date:	TBD

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 2015. Vine desiccation was accomplished using a standard chemical desiccant. No supplemental irrigation was available for this trial site. There were brief low rainfall periods during July and August; however, rainfall was generally abundant and well distributed (Table 1). June and July were cooler than normal. 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 when sufficient tubers were available. Specific gravity was determined on a 4-kg sample using the weight-in-air/weight-in-water method. A 100-lb sample was collected at harvest and placed in 50F storage prior to shipment to a commercial chip plant for evaluation of chip quality. Additional tuber samples were placed in controlled storage for evaluation of chip color during the storage season.

Results:

There were brief periods of low rainfall during July and August; however, rainfall was generally abundant and well distributed (Table 1). June and July were cooler than normal. All of the clones had good vigor throughout the growing season and remained vigorous until the vines were desiccated (Table 2). No late blight was observed in the plots during 2015. Several of the potato clones had low to moderate incidence of verticillium wilt; however, late-season vigor was generally very good for all clones in the trial (Table 2).

Yields were lower than expected in the trial; however, tuber quality was generally quite good and specific gravities of the check varieties were quite high (Tables 3 and 4). Given that vie vigor was excellent late in the season, yields would have improved if vine desiccation had been delayed. BNC202-3, NY152, and W6822-3 were highest yielding, while ACO3433-1W and CO03243-3W had relatively low yields (Table 3). AC01151-5W had an especially small tuber size profile. CO03243-3W had reasonably good yields and tuber size. Atlantic, Lamoka, Snowden, ACO1151-5W, and W6822-3MSL007-B had specific gravities exceeding 1.085. ACO03433-1W, BNC202-3, CO03243-3W had unacceptably low specific gravities.

The incidence of tuber external defects was quite low for all clones in the trial (Table 4). ACO01151-5W, ACO3433-1W, and W6822-3 had the highest incidence. Hollow heart incidence was also quite low, though hollow heart was detected in six of 10 clones and incidence in NY152 and CO03243-3W exceeded 5%.

Tuber characteristics are summarized in Table 5. Lamoka, AF4648-2, and W6822-3 had the best external tuber appearance. Lamoka was the only clone that had more oblong tubers than would be desirable for chipping. Snowden and Atlantic had indented stem ends and/or deep apical eyes which would make peeling difficult. Off shapes reduced the acceptability of W6822-3. ACO01151-5W had scab problems, while growth cracks were a significant defect in ACO3433-1W. BNC202-3 tubers were yellow fleshed and quite flat.

Susceptibility to skinning and bruising was evaluated by tumbling tuber samples in a drum (Table 6). Atlantic, Snowden, BNC202-3, and W6822-3 were especially resistant to skinning, while Lamoka and ACO1151-5W were relatively susceptible. Lamoka, ACO1151-5W, and NY152 were relatively resistant to fresh bruise damage. Atlantic, Snowden, ACO3433-1W, CO03243-3W, and W6822-3 were relatively susceptible to fresh bruise damage. These samples will be abrasively peeled and examined for bruise losses from storage in late November or December to further evaluate bruise susceptibility.

Table 1. Rainfall and temperature, 2015 Aroostook Research Farm, Presque Isle, ME

Month	Week (inches)				Total	Average (°F)	
	1	2	3	4	(inches)	High	Low
May	0.08	0.55	0.42	1.96	3.01	67.4	44.0
June	0.45	1.50	0.75	0.67	3.37	67.1	48.7
July	0.44	0.08	1.37	0.50	2.39	74.7	54.2
August	0.70	0.06	1.11	1.65	3.52	78.1	58.3
September	0.19	1.93	0.15	1.83	4.10	72.7	50.1
Grand total					16.39		

Table 2. Plant characteristics, UPSB/SFA Chip Variety Trial, Maine, 2015.

Variety/Clone	% Plant Stand	% Cover 7/2	7/15	8/13	8/29	Vine Mat.[1]	Foliage Color	Verticillium Wilt[2]
Atlantic	96	44	83	95	87	5.2 Med.	Med. Green	3.0 Med-L
Lamoka	93	33	73	98	91	6.5 M. Late	Lt.-Med. Green	2.5 Med-L
Snowden	97	33	70	98	90	6.3 M. Late	Med. Green	2.8 Med-L
ACO1151-5W	99	40	80	100	96	7.0 Late	Med. Green	1.3 Low
ACO3433-1W	94	38	75	95	90	6.0 M. Late	Lt.-Med. Green	1.8 Low
AF4648-2	98	40	85	98	89	5.5 Med.	Lt.-Med. Green	2.5 Med-L
BNC202-3	99	36	83	98	88	6.3 M. Late	Med. Green	2.5 Med-L
CO03243-3W	93	29	68	95	90	6.3 M. Late	Med. Green	2.3 Low
NY152	97	38	75	96	90	6.0 M. Late	Med. Green	3.5 Med
W6822-3	91	34	78	100	93	6.3 M. Late	Med. Green	2.8 Med-L
LSD $_{k=100}$	3	9	9	3	7	0.6		0.8

[1]Vine Mat.: 1 to 9 where 1=very early; 3=early; 5=mid-season; 7=late; 9=extremely late.
[2]Verticillium wilt: 1 to 9 where 1=none; 9=completely dead.

Table 3. Yield, size distribution, and specific gravity, UPSB/SFA Chip Variety Trial, Maine, 2015.

Variety/Clone	Yield (cwt/A)[1]			Size Distribution (% by weight)[2]							Spec.
	Tot.	US#1	%Std	1	2	3	4	5	1-7/8 to 4”	2-1/2 to 4”	Grav.
Atlantic	273	250	100	4	68	26	2	0	96	28	1.093
Lamoka	255	239	96	2	43	43	12	0	98	55	1.088
Snowden	270	244	98	6	55	35	4	0	94	39	1.086
ACO1151-5W	300	244	98	12	75	13	0	0	88	13	1.089
ACO3433-1W	226	194	78	6	68	23	2	0	94	25	1.076
AF4648-2	263	235	94	7	72	21	0	0	93	21	1.084
BNC202-3	325	296	118	5	56	34	5	0	95	39	1.073
CO03243-3W	233	213	85	2	46	39	11	2	96	49	1.077
NY152	304	274	110	6	63	28	3	0	94	31	1.084
W6822-3	306	267	107	5	58	32	5	0	95	37	1.091
Mean	275	275							94	33	1.085
CV(%)	10.9	12.6							2	27	0.404
LSD(k=100)	45	50							3	12	0.006

[1]US#1 yield was calculated as yield from 1⅞ to 4” diameter, minus tubers with external defects.
[2]Size Classes: 1=1½ to 1⅞”; 2=1⅞ to 2½”; 3=2½ to 3¼”; 4=3¼ to 4”; 5= over 4”

Table 4. External tuber defects and hollow heart incidence, UPSB/SFA Chip Variety Trial, Maine, 2015.

Variety/Clone	External Defects (% by weight)						Hollow Heart[1]
	Total	Sunb	Mshp	Grck	Scab	Rot	(%)
Atlantic	3.8	1.0	1.4	0.6	0.2	0.6	3.2
Lamoka	4.7	2.0	2.2	0.0	0.0	0.4	4.0
Snowden	4.4	0.7	3.3	0.2	0.0	0.2	0.0
ACO1151-5W	8.2	1.8	0.5	0.2	5.7	0.1	2.9
ACO3433-1W	8.0	2.0	1.5	3.7	0.5	0.2	2.2
AF4648-2	4.1	1.5	2.2	0.2	0.0	0.2	0.0
BNC202-3	4.5	2.2	1.6	0.0	0.2	0.5	0.0
CO03243-3W	4.8	1.2	2.6	0.1	0.4	0.4	6.3
NY152	4.2	1.7	2.4	0.1	0.0	0.0	8.2
W6822-3	8.2	2.4	4.1	0.0	1.6	0.0	0.0
Mean	5.3	1.6	2.1	0.5	0.8	0.3	2.7
CV(%)	52.6						
LSD(k=100)	5.5						

[1]Tubers were cut in the size classes from 2½ to 4" diameter; 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, 2014.

Variety/Clone	Shape	Skin Tex-ture	Eye Depth	Gen. Appear.	Comments
Atlantic	R-O	Net	M-D	F	dse,dae, dull, netted
Lamoka	O-R	Sln.	M-S	F-G	oblongs
Snowden	R-O	Net	M-D	F-P	dull, dse, dae, netted, dark
ACO1151-5W	R	Sln.	M-S	F	small, dull, scab
ACO3433-1W	R-O	Net	M-S	F	dull, netted, growth cracks
AF4648-2	R-O	Sln.	M-S	F-G	bright, small
BNC202-3	R-O	Sln.	M-S	F	yellow (YF), flat
CO03243-3W	R-O	Net	M-S	F	netted, dull, dark
NY152	R	Net	M-S	F	netted
W6822-3	R-O	Sln.	M-S	F-G	some off shapes

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. Bruise susceptibility scores, September, UPSB/SFA Chip Variety Trial, Maine, 2015.

Variety/Clone	Skinning & Bruise (tumble method)[1]				
	Prior to Peeling		Peeled Tubers		Comments on peeled tubers
	Index	% Thumbnail Cracks	% Incid.	% Surf.	
Atlantic	0.75	44.6			
Lamoka	3.45	23.3			
Snowden	0.82	46.7			
ACO1151-5W	3.35	15.0			
ACO3433-1W	2.72	42.5			
AF4648-2	1.75	23.4			
BNC202-3	0.69	30.0			
CO03243-3W	1.25	36.7			
NY152	1.31	4.9			
W6822-3	0.93	80.0			
Mean	1.61	35.6			
CV(%)	32.1	50.4			
LSD(k=100)	0.69	26.3			

[1]Sixty tubers were evaluated per variety/clone. Fifteen tubers per plot were tumbled on September 22 (0 days 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 26. Percent incidence (% of tubers with visible bruise) and surface area values are combined scores for shatter and blackspot rated on peeled tubers (November xx, 2015). The peeled scores will be available later in the storage season.

Variety/Clone Summary 2015 (ranked by U.S. #1 yield):

BNC202-3: Medium-late vine maturity, round to oblong, flattened, yellow-fleshed tubers with slightly netted skin and moderately-shallow eyes. Good yields, low external defects incidence, low specific gravity, no hollow heart incidence, and low to moderate bruise susceptibility.

NY152: Medium-late vine maturity, round tubers with netted skin and moderately-shallow eyes. Good yields, low external defects incidence, moderate specific gravity, relatively high hollow heart incidence, and low bruise susceptibility.

W6822-3: Medium-late vine maturity, round to oblong tubers with slightly netted skin and moderately-shallow eyes. Good yields, moderate external defects incidence, high specific gravity, no hollow heart incidence, and moderate to high bruise susceptibility. Off-shaped tubers were the most common external defect.

Atlantic: Medium vine maturity, round to oblong tubers with netted skin and moderately-deep eyes. Good yields, low to moderate external defects incidence, high specific gravity, relatively high hollow heart incidence during 2015, and moderate to high bruise susceptibility.

ACO01151-5W: Late vine maturity, round tubers with slightly netted skin and moderately-shallow eyes. Good yields, small tuber size profile, moderate external defects incidence (scab), low to high specific gravity depending on the year, relatively high hollow heart incidence during 2013, and relatively high skinning susceptibility.

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

Lamoka: Medium-late vine maturity, oblong to round tubers with smooth to slightly netted skin, moderately-shallow eyes, and good appearance. Moderate yields, low external defects incidence, high specific gravity, low to moderate hollow heart incidence, and relatively high skinning susceptibility.

AF4648-2: Medium vine maturity, round to oblong tubers with smooth to slightly netted skin, moderately shallow eyes, and good appearance. Moderate yields, low external defects incidence, moderate specific gravity, no hollow heart incidence, and relatively good bruise resistance scores.

CO03243-3W: Medium-late to late vine maturity, round to oblong tubers with netted skin and moderately shallow eyes. It had good yields in 2014, but relatively low yields in 2015. Low to moderate external defects incidence has been observed, along with low to moderate specific gravity, low to high hollow heart incidence depending on the year, and acceptable bruise susceptibility.

ACO3433-1W: Medium-late vine maturity, round to oblong tubers with netted skin and moderately-shallow eyes. Low to moderate yields, moderate external defects incidence

(growth cracks, greening), low specific gravity, low hollow heart incidence, and moderate to high bruise susceptibility.

2015 Michigan Regional Trial Location

Local Coordinators:	**Cooperating Grower:**	**Cooperating Chip Processor:**
Chris Long, Aaron Yoder & Dave Douches Michigan State University East Lansing, MI	Tim & Todd Young Sandyland Farms LLC Howard City, MI	Herr Foods, Inc., Nottingham, PA & E. K. Bare and Son's, Bird-in-Hand, PA

Trial Information:

Planting Date:	May 26th, 2015
Vine Kill Date:	September 17th, 2015
Harvest Date:	October 21st, 2015 (148 Days, Planting to Harvest)
Between Row & In Row Plant Spacing:	34″ x 10″; irrigated
Plots:	Single rows for each entry, approximately 300′ long
GDD, Base 40	3076 (114 Days, Planting to Vine Kill)

Trial Procedure:

Seed was hand cut on May 8th, 2015, and delivered to the grower's seed storage three days later. Syngenta Crop Protection Cruiser Maxx® Potatoes was applied at the time of seed cutting to aid in Colorado Beetle control.

Two pre-harvest sugar profiles were taken this season. One on August 13th, and the second on September 1st, for each variety, approximately three weeks and one week prior to the vine kill date. The pre-harvest sugar profile protocol was as follows: obtained a minimum of 40 tubers from each variety, taking 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, the 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 trial yield averages, tuber size distribution, specific gravity and quantity of internal defects present. Two, 40 lb. storage samples were collected from each entry and were placed in the grower's commercial storage for evaluation at later dates (January and April 2016). Sixteen, 40 tuber samples were also collected for each variety at harvest. All sixteen samples were stored at the Michigan Potato Industry Commission's Cargill Demonstration Storage Facility at approximately 48ºF or 54ºF for a monthly sugar profile evaluation at Techmark, Inc. Eight, 40 tuber samples were stored at each temperature for evaluation, November 2015

through June 2016. The storage sugar profiles began October 21st, 2015. 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 24th, 2015. AC03433-1W appeared to have the slowest rate of vine growth. The stand also proved to be rather poor for this variety on this date. A00188-3C, CO03243-3W and Lamoka were the most vigorous varieties observed on this date. A vine maturity rating was taken for each variety on August 31st, 2015, approximately 17 days prior to vine kill. W6822-3, Atlantic and Snowden were the most mature varieties and AC01151-5W appeared to be the most immature on this date.

Growing Season Weather:

Weather conditions during the 2015 growing season remained moderate and slightly wetter than the 15 year average. The months of April, June and September experienced above average rainfall. Nineteen and a half inches of total rainfall was recorded April through September, approximately two inches higher than the 15 year average. One day during the growing season experienced daytime high temperatures over 90 °F while twenty-two nights recorded temperatures over 70 °F. These were well below the temperatures recorded during the past six seasons (2010 - 2015). Growing degree days base 40 recorded from May 1st through September 30th, 2015 were 3789. This was very similar to the 12 year average of 3741 GDD for this same time period. The tuber specific gravity, for potato production in Michigan, was above average as a result of the moderate nighttime heat stress. Commercial potato yields overall exceeded yield projections and are reported to have reached all-time high levels.

Results:

Table 1 summarizes the yield, size distribution, and specific gravity data at harvest. NY152 and Snowden topped the yield table in 2015, followed by AF4648-2 which also yielded above the trial average. AF4648-2 and Atlantic had the largest percentages of recorded oversize tubers, followed closely by AC03433-1W. AC03433-1W, CO03243-3W, AC01151-5W and NY152 recorded specific gravity values below the trial average of 1.076. AC01151-5W recorded a disproportionately high amount of undersize potatoes when compared to other varieties in this trial.

Table 1. Yield , Size Distribution*, Specific Gravity

	Yield (cwt/A)		Percent Size Distribution					
Entry	US#1	TOTAL	US#1	Small	Mid-Size	Large	Culls	Specific Gravity
NY152	596	676	88	10	81	7	2	1.074
Snowden	**579**	**634**	**91**	**6**	**79**	**12**	**3**	**1.079**
AF4648-2	457	493	93	4	68	25	3	1.078
Atlantic	**418**	**452**	**93**	**4**	**68**	**25**	**3**	**1.081**
AC01151-5W	400	542	74	24	71	3	2	1.072
CO03243-3W	384	446	86	12	77	9	2	1.070
A00188-3C	384	487	79	13	76	3	8	1.079
W6822-3	356	435	82	12	76	6	6	1.079
Lamoka	**344**	**379**	**91**	**6**	**75**	**16**	**3**	**1.077**
AC03433-1W	320	375	85	7	62	23	8	1.068
MEAN	**424**	**492**	**86**	**10**	**73**	**13**	**4**	**1.076**

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

Table 2 summarizes the at-harvest raw internal tuber quality. The internal quality across the trial was generally acceptable, but the evidence of in-season environmental stress was observed in some lines. A significant level of hollow heart was present in Atlantic and AC03433-1W. Lamoka and W6822-3 displayed a moderate level of internal brown spots. CO03243-3W, Lamoka, Snowden and AC03433-1W recorded above average amounts of vascular discoloration.

Table 2. At-Harvest Tuber Quality. Sandyland Farms, Howard City, Michigan.

	Raw Tuber Quality[1] (%)			
Entry	**HH**	**VD**	**IBS**	**BC**
NY152	0	13	3	0
Snowden	**3**	**23**	**3**	**0**
AF4648-2	0	3	0	0
Atlantic	**30**	**3**	**0**	**0**
AC01151-5W	3	10	3	0
CO03243-3W	0	27	0	0
A00188-3C	0	7	0	0
W6822-3	3	13	10	0
Lamoka	**0**	**27**	**23**	**0**
AC03433-1W	40	20	0	0

[1]Internal Defects. HH = hollow heart, VD = vascular discoloration, IBS = internal brown spot, BC = brown center.

Table 3 shows the post-harvest chip quality based on samples collected on October 21st, 2015, and processed at Herr Foods, Inc. on November 3rd. Chip color was generally acceptable across the trial, with NY152 having the highest Agtron score of the trial at 65.2. AC01151-5W recorded the fewest total chip defects at 13.3 percent. The varieties, listed in ranked order based on quality observations from Herr Foods, Inc., are as follows: A00188-3C, W6822-3, Snowden, AC03433-1W, CO03243-3W, Lamoka, NY152, AF4648-2, AC01151-5W and lastly Atlantic.

Table 3. 2015 Post-Harvest Chip Quality[1]

Entry	Agtron Color	SFA[2] Color	Specific Gravity	Percent Chip Defects[3] Internal	External	Total
NY152	65.2	3.0	1.077	16.5	11.1	27.6
Snowden	**62.8**	**3.0**	**1.075**	**31.1**	**16.4**	**47.5**
AF4648-2	62.0	3.0	1.083	30.3	22.5	52.8
Atlantic	**58.2**	**4.0**	**1.072**	**29.3**	**40.3**	**69.6**
AC01151-5W	53.1	3.0	1.068	9.3	4.0	13.3
CO03243-3W	62.1	2.0	1.074	22.5	30.9	53.4
A00188-3C	62.2	2.0	1.075	9.7	16.4	26.1
W6822-3	61.3	2.0	1.076	14.2	16.4	30.6
Lamoka	**64.9**	**3.0**	**1.075**	**19.8**	**12.9**	**32.7**
AC03433-1W	56.2	3.0	1.067	14.5	23.9	38.4

[1]Samples collected October 21st and processed by Herr Foods, Inc., Nottingham, PA on November 3rd, 2015.

Chip defects are included in Agtron and SFA samples.

[2]SFA Color: 1= lightest, 5 = darkest

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

Table 4 summarizes the results of the samples collected for black spot bruise evaluation. 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 ºF, then placed in a 6 sided plywood drum and rotated 10 times to produce a simulated bruise. Ten days 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 AF4648-2, A00188-3C and AC03433-1W. W6822-3, Snowden, Atlantic, NY152 and Lamoka showed the lowest percent bruise free tubers in the trial.

Table 4. Black Spot Bruise Test

	A. Check Samples[1]									B. Simulated Bruise Samples[2]								
	# of Bruises Per Tuber						Total	Percent Bruise	Average Bruises Per	# of Bruises Per Tuber						Total	Percent Bruise	Average Bruises Per
Entry	0	1	2	3	4	5	Tubers	Free	Tuber	0	1	2	3	4	5	Tubers	Free	Tuber
NY152	14	9	1				24	58	0.5	10	9	3	2			24	42	0.9
Snowden	**19**	**5**					**24**	**79**	**0.2**	**9**	**9**	**6**	**1**			**25**	**36**	**1.0**
AF4648-2	20	1					21	95	0.0	19	5					24	79	0.2
Atlantic	**20**	**3**	**1**				**24**	**83**	**0.2**	**10**	**10**	**3**			**1**	**24**	**42**	**0.9**
AC01151-5W	20	4					24	83	0.2	16	7	1				24	67	0.4
CO03243-3W	22	2					24	92	0.1	14	10					24	58	0.4
A00188-3C	21	2	1				24	88	0.2	20	4					24	83	0.2
W6822-3	19	6					25	76	0.2	1	5	9	2	2	5	24	4	2.6
Lamoka	**21**	**3**					**24**	**88**	**0.1**	**10**	**9**	**3**	**1**			**23**	**43**	**0.8**
AC03433-1W	20	4					24	83	0.2	18	6					24	75	0.3

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

[2]Tuber samples collected at harvest, held at 50ºF 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 5A - 5B summarize the results of the pre-harvest panel data collected on August 12th and August 31st, 2015. Lamoka exhibited an elevated sucrose value on August 12th, 2015. A00188-3C and W6822-3 had elevated sucrose readings on the August 31st sample date. Most varieties appeared to be physically immature at both sampling dates. The August 31st samples were collected 17 days prior to vine kill. Based on the out-of-the-field chip quality data, no chemical maturity issues appear to have negatively impacted chip processing quality for any of the varieties tested. AC01151-5W recorded a very low specific gravity on August 31st and Atlantic had the largest average tuber weight in the trial (Table 5B).

Table 5A. Pre-Harvest Panel 8/12/15

Entry	Specific Gravity	Glucose[1] %	Sucrose[2] Rating	Canopy Rating[3]	Canopy Uniform.[4]	Number of Hills	Number of Stems	Average[5] Tuber Weight
NY152	1.077	0.004	0.271	100	100	3	9	2.84
Snowden	1.073	0.004	0.621	100	100	4	20	3.31
AF4648-2	1.076	0.011	0.740	100	100	3	17	2.79
Atlantic	**1.078**	**0.005**	**0.927**	**100**	**100**	**4**	**10**	**3.94**
AC01151-5W	1.073	0.011	0.626	100	100	3	14	1.84
CO03243-3W	1.076	0.004	0.372	100	100	4	13	3.38
A00188-3C	1.072	0.007	0.912	100	100	4	25	3.20
W6822-3	1.079	0.004	0.733	100	100	4	13	4.04
Lamoka	**1.075**	**0.006**	**2.025**	**100**	**100**	**4**	**15**	**4.95**
AC03433-1W	1.070	0.007	0.718	100	100	4	12	3.74

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 Panel, 8/31/15

Entry	Specific Gravity	Glucose[1] %	Sucrose[2] Rating	Canopy Rating[3]	Canopy Uniform.[4]	Number of Hills	Number of Stems	Average[5] Tuber Weight
NY152	1.074	0.002	0.305	100	100	4	12	3.98
Snowden	1.076	0.002	0.411	100	100	3	14	5.17
AF4648-2	1.070	0.008	0.546	100	100	3	11	4.28
Atlantic	**1.078**	**0.004**	**0.454**	**75**	**100**	**4**	**12**	**6.85**
AC01151-5W	1.067	0.010	0.574	100	100	3	10	2.59
CO03243-3W	1.078	0.003	0.550	100	100	3	14	3.33
A00188-3C	1.075	0.004	1.150	100	100	4	25	2.97
W6822-3	1.079	0.003	1.011	75	100	4	9	3.54
Lamoka	**1.081**	**0.003**	**0.761**	**75**	**100**	**3**	**15**	**4.06**
AC03433-1W	1.087	0.007	0.649	100	75	5	14	3.87

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:

NY152: This variety recorded the top overall yield in the 2015 trial with a 596 cwt./A US#1 yield. The specific gravity was below the trial average at 1.074 (Table 1). Raw internal tuber quality was generally acceptable with 13 percent of the tubers expressing vascular discoloration and 3 percent internal brown spot (Table 2). Chip quality at Herr Foods was below average, ranking 7th of 10 for overall appearance, in spite of the fact that this line recorded the highest AGTRON score at 65.2 (Table 3). An above average amount of black spot bruise was observed for NY152, recording 0.9 bruises per tuber on average (Table 4). The tubers appeared to have been chemically mature at the time of harvest (Tables 5A - 5B).

Snowden: Snowden was the second highest yielding variety in the 2015 variety trial with a 579 cwt./A US#1 yield and an above average specific gravity of 1.079 (Table 1). Internal raw tuber quality was moderate at harvest with 3 percent hollow heart, 23 percent vascular discoloration and 3 percent internal brown spot observed (Table 2). This variety was above average in chip performance at Herr Foods out-of-the-field fry test, ranking third in the trial overall. Snowden had an above average susceptibility to black spot bruise with one bruise being observed per tuber on average (Table 4). Pre-harvest panel data for this line appeared acceptable on both sampling dates (Tables 5A - 5B).

AF4648-2: This variety was the third highest yielding line in the 2015 trial. The US#1 yield was 457 cwt./A, with a slightly above average specific gravity at 1.078 (Table 1). The tuber size distribution consisted of 68 percent mid-size and 25 percent oversize tubers. In general, the internal raw tuber quality for this line was very good (Table 2). AF4648-2 ranked 8th of 10 lines tested at Herr Foods for overall chip quality and appearance on November 3rd. It recorded one of the highest levels of total chip defects in the trial at 52.8 percent (Table 3). AF4648-2 appears to be tolerant of black spot bruise, recording only 0.2 bruises per tuber under simulated conditions (Table 4). This line was potentially, moderately physically and chemically immature

when the pre-harvest panels were collected (Tables 5A - 5B). The slightly elevated glucose levels at both pre-harvest panel dates could potentially explain the marginal chip quality performance at Herr Foods on November 3rd.

Atlantic: This variety had an average yield performance in the 2015 trial, yielding 418 cwt./A US#1, 6 cwt./A below the trial average of 424 cwt. (Table 1) The specific gravity was the highest in the trial at 1.081. This variety had twenty-five percent oversize tubers, of which 30 percent of them were hollow (Table 2). Herr's ranked Atlantic least desirable at the out-of-the-field chip quality evaluation on November 3rd, 2015, recording the highest percentage of total chip defects at 69.6 percent (Table 3). From the 2015 black spot bruise test, Atlantic appeared among the most susceptible varieties, recording 0.9 bruises per tuber (Table 4). Pre-harvest panel data showed Atlantic to be both chemically and physically mature prior to harvest.

AC01151-5W: This variety recorded the fifth highest yield in this year's trial (Table 1). AC01151-5W had one of the lowest specific gravity in the trial at 1.072. The tuber size distribution consisted of 74 percent US#1 size tubers and 24 percent undersize tubers. This was the largest percent of undersize in the trial. Internal tuber quality was average, with 3 percent of the oversize tubers expressing hollow heart, 10 percent of tubers expressing vascular discoloration and 3 percent having internal brown spots (Table 2). This clone ranked 9th at Herr's for chip quality and appearance on November 3rd, 2015, in spite of having the least amount of total chip defects of all the varieties (Table 3). AC01151-5W appeared to have an average level of tolerance to black spot bruise (Table 4). The glucose level was elevated at both pre-harvest panel dates, possibly contributing to the poor chip quality performance (Tables 5A - 5B).

CO03243-3W: This variety had a below average yield of 384 cwt./A US#1, tied for 6th highest yield overall. The specific gravity of this line was 1.070 which was recorded as the lowest specific gravity in the trial. Raw internal tuber quality was generally acceptable with 27 percent of cut tubers expressing vascular discoloration (Table 2). CO03243-3W ranked 5th of 10 varieties at Herr's for chip quality out-of-the-field. The variety exhibited an average susceptibility to black spot bruise, with only 0.4 black spot bruises being recorded for each tuber observed (Table 4). This variety appeared to have been chemically mature at the time of harvest (Tables 5A - 5B).

A00188-3C: A00188-3C yielded below the trial average at 384 cwt./A US#1, tying CO03243-3W for the 6th overall highest yield (Table 1). Specific gravity for A00188-3C was above the trial average at 1.079. The tuber size distribution consisted of 79 percent US#1 size tubers and 13 percent undersize tubers, 3 percent large and 8 percent culls. The variety had good internal raw tuber quality (Table 2). Herr's ranked this variety 1st of 10 in chip performance out-of-the-field. A00188-3C appeared to have a low susceptibility to black spot bruising (Table 4). The tubers of this variety appeared to be chemically immature on August 31st, recording 0.003 percent glucose and a sucrose rating of 1.150, but surprisingly, this high level of sucrose did not result in a poor chip quality performance at Herr's (Table 5B).

W6822-3: The yield for W6822-3 was below the trial average at 356 cwt./A US#1 with 12 percent of the total yield being small potatoes (Table 1). The specific gravity was above the trial average at 1.079. Internal tuber quality was acceptable (Table 2). This variety ranked second for overall chip quality at Herr Foods on November 3rd (Table 3). W6822-3 scored poorly in tolerance to black spot bruise, with an average of 2.6 bruises per tuber reported (Table 4). This variety exhibited the most black spot bruise susceptibility in the trial. The sucrose level was

elevated at the second pre-harvest panel date (Tables 5A - 5B). This did not prove to cause any negative effect on finished chip quality at Herr's.

Lamoka: This variety recorded the second lowest US#1 tuber yield of the trial at 344 cwt./A (Table 1). The specific gravity was slightly above the trial average at 1.077. Lamoka's oversize tubers contained 27 percent vascular discoloration and 23 percent internal brown spots which was the highest in the trial for this tuber defect (Table 2). The at-harvest chip fry test ranked this variety 6th out of 10 varieties for overall appearance (Table 3). Lamoka recorded a very good overall AGTRON score at 64.9. This variety expressed slightly above average susceptibility to simulated black spot bruising, averaging 0.8 bruises per tuber (Table 4). The plant vines appeared to be physiologically maturing on August 20th (Table 5A).

AC03433-1W: This variety yielded below the trial average, recording only 320 cwt./A US#1 with a specific gravity of 1.068 (Table 1). The tuber size distribution consisted of 62 percent mid-size, 23 percent large size tubers, 7 percent undersize and 8 percent cull tubers. This variety had the 3rd largest recorded amount of oversize in this year's trial at 23 percent. Raw internal tuber quality was poor with 40 percent of the tubers expressing hollow heart and 20 percent of the tubers having vascular discoloration (Table 2). AC03433-1W ranked 4th of the ten varieties tested at Herr's for chip quality on November 3rd. The variety exhibited a tolerance to black spot bruise, with only 0.3 black spot bruises being recorded per tuber (Table 4). The glucose level for this variety was elevated at both pre-harvest dates, but the variety appeared to be chemically mature based on chip quality results from the processor evaluation (Tables 5A – 5B).

Missouri Regional Trial

Local Coordinators:

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Trial Data:

Planting Site:	Black Gold Farms, Charleston, Mississippi County, MO
Planting Date:	March 23, 2015
Harvest Date:	July 13, 2015 (112 days)
Growing Conditions:	Planting was delayed by two weeks due to heavy snowfall in late February/early March. Conditions were good for planting and very favorable temperatures persisted throughout most of the growing season with low nighttime temperatures which lead to very high specific gravities as found in the trial. Total rainfall was 7.36 in from planting to harvest: March 1.08 in, April 1.97 in, May 1.25 in, June 1.90 in and July 1.16 in. Irrigation of 12.0 in was supplemented for a total of 19.36 in total throughout the season. The entire March amount of rainfall occurred one day after planting and we had some standing water in the field which affected stands in some plots.
Soil Type:	Broseley loamy fine sand
Experimental Design:	Four row plot (10 seed pieces per row) with single center row harvested. Randomized complete block design with 4 replications. QC sample was pooled into a single sample for each variety.
Row Spacing:	Spaced 10 inches apart, 34" row width.
Fertilizer:	247N, 60P, 230K, 1.12 Zn lbs/A
Weed Control:	Matrix 0.1 lbs/A Select 0.2 lbs/A
Insect Control:	Wrangler – 8 fl oz/A in furrow
Disease Control:	Quadris in furrow 8 fl oz/A Vydate in furrow 2.1 pts/A Bravo 1.5 pt/A Manzate 4.5 fl pt/A

Clone Comments

AC03433-1W: Lumpy, rough shape, breakdown noted in the plots.

AF4648-2: Slightly oblong-long tuber shape, smooth white flesh.

Atlantic: Deep bud ends and per shapes noted.

BNC202-3: Pear shapes, smooth skin and pale yellow flesh.

CO02024-9W: Was supposed to have been pulled from the trial due to the detection of mop top in the seed but was not. Smooth skin, cream flesh.

CO03243-3W: Round, consistent size and bright white flesh.

MSK061-4: Slightly oblong shape with very bright white flesh. Breakdown noted in the plots as was secondary growth.

NY152: Round to slightly oblong shape.

Snowden: Round with nice size.

W6822-3: Rough shapes with points and pears. Wet breakdown noted in the plots.

W8822-1: Shape was oblong, with a heavy russet and pale yellow flesh color.

MISSOURI 2015 USPB-SFA Chip Trial Report

Rep	Variety	Stand	Stems	% Stand	Stems per plant	Tubers per plant	< 1 7/8" US Wt	< 1 7/8" US #	1 7/8" to 4" MK Wt	1 7/8" to 4" MK #	> 4" OS Wt	> 4" OS #	Total TT Wt	Total TT #
1	AC03433-1W	9	25	90%	2.8	7.7	2.7	26	9.1	43	0	0	11.8	69
2	AC03433-1W	8	28	80%	3.5	12.9	2.3	23	22.6	80	0	0	24.9	103
3	AC03433-1W	9	24	90%	2.7	10.6	3.7	29	15.2	66	0	0	18.9	95
4	AC03433-1W	10	34	100%	3.4	12.2	2.9	34	22.1	88	0	0	25	122
	average:	**9.0**	**27.8**	**90%**	**3.1**	**10.8**	**2.9**	**28.0**	**17.3**	**69.3**	**0.0**	**0.0**	**20.15**	**97**
1	AF4648-2	10	31	100%	3.1	10.7	3.9	41	17.5	66	0	0	21.4	107
2	AF4648-2	10	35	100%	3.5	9.0	1.5	14	24	76	0	0	25.5	90
3	AF4648-2	10	26	100%	2.6	8.6	3.1	32	11.1	54	0	0	14.2	86
4	AF4648-2	10	36	100%	3.6	10.2	1.5	17	24.6	85	0	0	26.1	102
	average:	**10.0**	**32.0**	**100%**	**3.2**	**9.6**	**2.5**	**26.0**	**19.3**	**70.3**	**0.0**	**0.0**	**21.8**	**96**
1	Atlantic	10	37	100%	3.7	13.0	2.3	23	29.4	107	0	0	31.7	130
2	Atlantic	10	34	100%	3.4	11.9	2.8	26	26.1	93	0	0	28.9	119
3	Atlantic	9	28	90%	3.1	12.8	2.6	24	25.6	91	0	0	28.2	115
4	Atlantic	9	33	90%	3.7	12.1	2.3	20	24.8	89	0	0	27.1	109
	average:	**9.5**	**33.0**	**95%**	**3.5**	**12.4**	**2.5**	**23.3**	**26.5**	**95.0**	**0.0**	**0.0**	**28.98**	**118**
1	BNC202-3	9	27	90%	3.0	15.7	3.4	41	31.1	100	0	0	34.5	141
2	BNC202-3	8	23	80%	2.9	13.5	1.2	12	32.4	96	0	0	33.6	108
3	BNC202-3	9	28	90%	3.1	13.6	4.4	43	20.4	79	0	0	24.8	122
4	BNC202-3	10	30	100%	3.0	10.1	1.5	14	24.9	87	0	0	26.4	101
	average:	**9.0**	**27.0**	**90%**	**3.0**	**13.1**	**2.6**	**27.5**	**27.2**	**90.5**	**0.0**	**0.0**	**29.83**	**118**
1	CO02024-9W	8	26	80%	3.3	13.9	6.5	62	9.8	49	0	0	16.3	111
2	CO02024-9W	9	35	90%	3.9	14.8	2.2	22	23.8	111	0	0	26	133
3	CO02024-9W	9	26	90%	2.9	11.6	4.3	42	13.9	62	0	0	18.2	104
4	CO02024-9W	10	34	100%	3.4	17.6	4.1	89	19.3	87	0	0	23.4	176
	average:	**9.0**	**30.3**	**90%**	**3.4**	**14.6**	**4.3**	**53.8**	**16.7**	**77.3**	**0.0**	**0.0**	**20.98**	**131**
1	CO03243-3W	8	17	80%	2.1	11.9	2.4	25	13.3	70	0	0	15.7	95
2	CO03243-3W	10	32	100%	3.2	8.9	1.1	10	28.1	79	0	0	29.2	89
3	CO03243-3W	9	30	90%	3.3	11.7	2.5	26	21.4	79	0	0	23.9	105
4	CO03243-3W	9	24	90%	2.7	7.6	0.6	7	20.5	61	0	0	21.1	68
	average:	**9.0**	**25.8**	**90%**	**2.9**	**9.9**	**1.7**	**17.0**	**20.8**	**72.3**	**0.0**	**0.0**	**22.48**	**89**

MISSOURI 2015 USPB-SFA Chip Trial Report

Rep	Variety	Stand	Stems	% Stand	Stems per plant	Tubers per plant	< 1 7/8" US Wt	< 1 7/8" US #	1 7/8" to 4" MK Wt	1 7/8" to 4" MK #	> 4" OS Wt	> 4" OS #	Total TT Wt	Total TT #
1	MSK061-4	11	28	110%	2.5	9.0	1.9	19	21.5	80	0	0	23.4	99
2	MSK061-4	10	24	100%	2.4	9.6	1	8	26.7	88	0	0	27.7	96
3	MSK061-4	9	22	90%	2.4	8.2	1.5	16	17.6	58	0	0	19.1	74
4	MSK061-4	10	26	100%	2.6	6.8	0.6	6	20.9	62	0	0	21.5	68
	average:	**10.0**	**25.0**	**100%**	**2.5**	**8.4**	**1.3**	**12.3**	**21.7**	**72.0**	**0.0**	**0.0**	**22.93**	**84**
1	NY152	8	23	80%	2.9	11.0	2.3	27	13.5	61	0	0	15.8	88
2	NY152	9	31	90%	3.4	14.3	2.6	23	26.7	106	0	0	29.3	129
4	NY152	8	28	80%	3.5	15.8	3.1	29	25.2	97	0	0	28.3	126
	average:	**8.3**	**27.3**	**83%**	**3.3**	**13.7**	**2.7**	**26.3**	**21.8**	**88.0**	**0.0**	**0.0**	**24.47**	**114**
2	Snowden	10	38	100%	3.8	10.4	1.8	17	24.7	87	0	0	26.5	104
3	Snowden	10	30	100%	3.0	6.6	0.9	7	17.5	59	0	0	18.4	66
4	Snowden	10	34	100%	3.4	8.1	0.6	6	20.5	75	0	0	21.1	81
	average:	**10.0**	**34.0**	**100%**	**3.4**	**8.4**	**1.1**	**10.0**	**20.9**	**73.7**	**0.0**	**0.0**	**22**	**84**
1	W6822-3	6	19	60%	3.2	9.8	2.3	24	11.3	35	0	0	13.6	59
2	W6822-3	9	18	90%	2.0	11.9	2.1	23	23.6	84	0	0	25.7	107
3	W6822-3	9	20	90%	2.2	8.3	4.1	44	6.8	31	0	0	10.9	75
4	W6822-3	9	19	90%	2.1	10.8	2.7	25	21.7	72	0	0	24.4	97
	average:	**8.3**	**19.0**	**83%**	**2.3**	**10.2**	**2.8**	**29.0**	**15.9**	**55.5**	**0.0**	**0.0**	**18.65**	**85**
1	W8822-1	10	29	100%	2.9	8.9	2.8	30	17.5	59	0	0	20.3	89
2	W8822-1	8	35	80%	4.4	13.9	2	18	25.3	93	0	0	27.3	111
3	W8822-1	10	29	100%	2.9	11.1	4.9	45	17.7	66	0	0	22.6	111
4	W8822-1	10	29	100%	2.9	9.9	2.4	22	23.6	77	0	0	26	99
	average:	**9.5**	**30.5**	**95%**	**3.2**	**10.8**	**3.0**	**28.8**	**21.0**	**73.8**	**0.0**	**0.0**	**24.05**	**103**

Scab rating is a (0-10) scale of severity: 0 is no scab noted and 10 is severe pitted scab over most of the surface.

MISSOURI 2015 USPB-SFA Chip Trial Report

Variety	Total Yield cwt/acre	Markt Yield cwt/acre	MK %	Under-size %	Mid-size %	Over-size %	Scab Rating	Out of 10 tubers % HH	% IHN	% GC
AC03433-1W	217.7	167.9	77.1%	22.9%	77.1%	0.0%	0	10%	10%	0%
AC03433-1W	459.4	417.0	90.8%	9.2%	90.8%	0.0%	1	50%	0%	0%
AC03433-1W	348.7	280.4	80.4%	19.6%	80.4%	0.0%	2	30%	0%	0%
AC03433-1W	461.3	407.7	88.4%	11.6%	88.4%	0.0%	0	30%	0%	0%
average:	**371.8**	**318.3**	**85.6%**	**14.4%**	**85.6%**	**0.0%**	**0.8**	**30%**	**3%**	**0%**
AF4648-2	394.8	322.9	81.8%	18.2%	81.8%	0.0%	0	0%	0%	20%
AF4648-2	470.5	442.8	94.1%	5.9%	94.1%	0.0%	0	0%	0%	0%
AF4648-2	262.0	204.8	78.2%	21.8%	78.2%	0.0%	0	0%	0%	0%
AF4648-2	481.5	453.9	94.3%	5.7%	94.3%	0.0%	0	0%	0%	0%
average:	**402.2**	**356.1**	**88.5%**	**11.5%**	**88.5%**	**0.0%**	**0.0**	**0%**	**0%**	**5%**
Atlantic	584.9	542.4	92.7%	7.3%	92.7%	0.0%	0	10%	10%	0%
Atlantic	533.2	481.5	90.3%	9.7%	90.3%	0.0%	0	20%	50%	0%
Atlantic	520.3	472.3	90.8%	9.2%	90.8%	0.0%	0	0%	10%	0%
Atlantic	500.0	457.6	91.5%	8.5%	91.5%	0.0%	0	0%	30%	0%
average:	**534.6**	**488.5**	**91.4%**	**8.6%**	**91.4%**	**0.0%**	**0.0**	**8%**	**25%**	**0%**
BNC202-3	636.5	573.8	90.1%	9.9%	90.1%	0.0%	0	0%	0%	0%
BNC202-3	619.9	597.8	96.4%	3.6%	96.4%	0.0%	0	0%	0%	0%
BNC202-3	457.6	376.4	82.3%	17.7%	82.3%	0.0%	0	0%	0%	0%
BNC202-3	487.1	459.4	94.3%	5.7%	94.3%	0.0%	0	0%	0%	0%
average:	**550.3**	**501.8**	**91.2%**	**8.8%**	**91.2%**	**0.0%**	**0.0**	**0%**	**0%**	**0%**
CO02024-9W	300.7	180.8	60.1%	39.9%	60.1%	0.0%	0	0%	0%	0%
CO02024-9W	479.7	439.1	91.5%	8.5%	91.5%	0.0%	2	0%	0%	0%
CO02024-9W	335.8	256.5	76.4%	23.6%	76.4%	0.0%	2	0%	0%	0%
CO02024-9W	431.7	356.1	82.5%	17.5%	82.5%	0.0%	0	0%	0%	0%
average:	**387.0**	**308.1**	**79.6%**	**20.4%**	**79.6%**	**0.0%**	**1.0**	**0%**	**0%**	**0%**
CO03243-3W	289.7	245.4	84.7%	15.3%	84.7%	0.0%	5	20%	10%	0%
CO03243-3W	538.7	518.4	96.2%	3.8%	96.2%	0.0%	0	0%	20%	0%
CO03243-3W	441.0	394.8	89.5%	10.5%	89.5%	0.0%	2	0%	0%	0%
CO03243-3W	389.3	378.2	97.2%	2.8%	97.2%	0.0%	0	0%	0%	0%
average:	**414.7**	**384.2**	**92.7%**	**7.3%**	**92.7%**	**0.0%**	**1.8**	**5%**	**8%**	**0%**

MISSOURI 2015 USPB-SFA Chip Trial Report

Variety	Total Yield cwt/acre	Markt Yield cwt/acre	MK %	Under-size %	Mid-size %	Over-size %	Scab Rating	Out of 10 tubers % HH	% IHN	% GC
MSK061-4	431.7	396.7	91.9%	8.1%	91.9%	0.0%	0	0%	0%	0%
MSK061-4	511.1	492.6	96.4%	3.6%	96.4%	0.0%	1	0%	0%	0%
MSK061-4	352.4	324.7	92.1%	7.9%	92.1%	0.0%	0	10%	10%	0%
MSK061-4	396.7	385.6	97.2%	2.8%	97.2%	0.0%	0	0%	0%	0%
average:	**423.0**	**399.9**	**94.5%**	**5.5%**	**94.5%**	**0.0%**	**0.3**	**3%**	**3%**	**0%**
NY152	291.5	249.1	85.4%	14.6%	85.4%	0.0%	0	0%	0%	0%
NY152	540.6	492.6	91.1%	8.9%	91.1%	0.0%	0	10%	0%	0%
NY152	522.1	464.9	89.0%	11.0%	89.0%	0.0%	0	20%	10%	0%
average:	**451.4**	**402.2**	**89.1%**	**10.9%**	**89.1%**	**0.0%**	**0.0**	**10%**	**3%**	**0%**
Snowden	488.9	455.7	93.2%	6.8%	93.2%	0.0%	2	0%	0%	0%
Snowden	339.5	322.9	95.1%	4.9%	95.1%	0.0%	0	10%	0%	0%
Snowden	389.3	378.2	97.2%	2.8%	97.2%	0.0%	0	0%	0%	0%
average:	**405.9**	**385.6**	**95.0%**	**5.0%**	**95.0%**	**0.0%**	**0.7**	**3%**	**0%**	**0%**
W6822-3	250.9	208.5	83.1%	16.9%	83.1%	0.0%	0	0%	0%	0%
W6822-3	474.2	435.4	91.8%	8.2%	91.8%	0.0%	2	10%	0%	0%
W6822-3	201.1	125.5	62.4%	37.6%	62.4%	0.0%	0	0%	0%	0%
W6822-3	450.2	400.4	88.9%	11.1%	88.9%	0.0%	0	0%	0%	0%
average:	**344.1**	**292.4**	**85.0%**	**15.0%**	**85.0%**	**0.0%**	**0.5**	**3%**	**0%**	**0%**
W8822-1	374.5	322.9	86.2%	13.8%	86.2%	0.0%	0	0%	0%	0%
W8822-1	503.7	466.8	92.7%	7.3%	92.7%	0.0%	1	0%	0%	0%
W8822-1	417.0	326.6	78.3%	21.7%	78.3%	0.0%	1	0%	0%	0%
W8822-1	479.7	435.4	90.8%	9.2%	90.8%	0.0%	0	0%	0%	0%
average:	**443.7**	**387.9**	**87.4%**	**12.6%**	**87.4%**	**0.0%**	**0.5**	**0%**	**0%**	**0%**

MISSOURI 2015 USPB-SFA Chip Trial

Variety	Dry Weight	Wet Weight	Specific Gravity	Chip Score Agtron	Undesirable Color		Green		Internal Defects		External Defects		Total Sample Weight	% Total Defects
					Weight	%	Weight	%	Weight	%	Weight	%		
Snowden	19.622	1.412	1.0775	74	0	0%	0	0%	0	0%	0	0%	65	0%
Atlantic	19.547	1.512	1.0838	72	0	0%	0	0%	0	0%	2	3%	68	3%
AF4648-2	19.778	1.646	1.0900	74	0	0%	0	0%	0	0%	0	0%	75	0%
AC03433-1W	19.849	1.497	1.0815	74	0	0%	0	0%	0.5	1%	0.5	1%	50	2%
CO03243-3W	19.581	1.266	1.0691	72	0	0%	0	0%	0	0%	2	3%	76	3%
BNC202-3	19.562	1.349	1.0741	74	0	0%	0	0%	0	0%	0	0%	72	0%
MSK061-4	19.560	1.395	1.0768	74	0	0%	0	0%	0	0%	2	3%	76	3%
CO02024-9W	19.546	1.370	1.0754	74	0	0%	0	0%	0	0%	2	3%	67	3%
W6822-3	19.413	1.562	1.0825	74	0	0%	0	0%	0	0%	0	0%	78	0%
W8822-1	19.669	1.579	1.0870	74	0	0%	0	0%	0	0%	0	0%	74	0%
NY152	Missing QC Data													

North Carolina Regional Trial

Local Coordinators:

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207 Research Station Rd.
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Cooperating Grower:

Jeff Spruill
Black Gold Farms
2815 N Gum Neck Road
Columbia, NC 27925

Cooperating Chip Processor:

Utz Quality Foods
Hanover, PA

Trial Data:

Planting Site:	Black Gold Farms, Columbia, Tyrrell County, NC
Planting Date:	March 19, 2015
Harvest Date:	June 30, 2015 (103 days)
Growing Conditions:	Planting was within the normal range, between the last week in February and the end of March for North Carolina. Conditions were wet to moist and cool at planting. Followed by adequate rainfall and favorable temperatures throughout most of the season. In the middle of June both day and nighttime temperatures increased from the mid 80s and mid to upper 60s respectively to the mid 90s during the day and mid 70s to low 80s at night. This persisted for roughly 10 days causing the canopy to loose vigor. Also this season more than half of the rainfall for the crop in this trial fell in June with a 2.72 in rain occurring 4 days prior to harvest causing the specific gravity recorded in this trial to be lower than it might have otherwise been. Total rainfall was 21.10 in from planting to harvest: March 1.78 in, April 2.64 in, May 4.69 in and June 11.99 in.
Soil Type:	Weeksville Silt loam
Experimental Design:	Randomized complete block design with 5 replications.
Row Spacing:	25 hills, spaced 10 inches apart, 34” row width.
Fertilizer:	221N, 103P, 201K, 0.25 Zn lbs/A
Weed Control:	Dual Magnum 2 pts/A Glory 0.67 lbs/A
Insect Control:	Admire Pro – 8 fl oz/A in furrow
Disease Control:	Quadris in furrow 8 fl oz/A Bravo 8 pt/A (in 4 applications) Revus Top 6.2 fl oz/A Curzate 3.2 oz/A

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	2	3	4	5	Culls	$1^{7}/_{8}$ to 4"	$2^{1}/_{2}$ to 4"	Specific Gravity[2]	Chip Color[3] 24 to 48 hrs	Chip Color[3] 5 to 7 days
AC03433-1W	260	175	11	37	30	1	0	22	67	30	1.057	2.0	2.0
AF4648-2	239	188	7	29	46	4	1	13	79	50	1.061	2.0	2.0
Atlantic	309	259	12	46	30	8	0	4	84	38	1.070	1.5	1.5
BNC182-5[4]	379	320	10	42	41	1	0	6	84	43	1.059	2.0	2.0
CO03243-3W	375	319	12	40	42	2	0	5	83	44	1.062	2.0	2.0
MSK061-4	301	201	13	44	22	0	0	20	67	22	1.063	2.0	2.0
Lamoka	251	182	17	55	17	0	0	12	71	17	1.067	1.5	1.5
NY152	401	312	18	57	21	0	0	4	78	21	1.062	1.5	2.0
Snowden	346	273	16	59	19	0	0	5	79	20	1.067	1.5	1.5
W6822-3	366	264	12	37	33	1	0	16	72	35	1.072	2.0	2.0
W8822-1	348	272	14	45	33	0	0	9	78	33	1.074	2.5	2.0
Grand	325	251											
CV (%)	14	21											
LSD(k=100)	70	77											

[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.

[4] **BNC182-5**
This clone was misidentified as BNC182-5 it is believed that it is likely BNC202-3

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.

	Plant Data[1]				Tuber Data[2]									% Internal Defects[3]					
Clone	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR
AC03433-1W	7	8	8	9	6	6	5	4	2	8	6	8	4	0	9	8	2	0	2
AF4648-2	6	6	7	9	8	6	3	6	4	6	7	8	5	0	9	0	0	0	0
Atlantic	6	5	7	8	6	5	6	5	3	7	7	8	7	0	9	0	0	0	4
BNC182-5[4]	6	7	7	8	7	7	6	7	2	6	6	6	5	0	9	0	0	0	4
CO03243-3W	9	8	8	9	6	7	3	5	3	8	7	8	6	4	8.6	0	0	0	4
MSK061-4	8	5	6	8	6	6	5	7	5	8	7	5	3	0	9	0	20	0	6
Lamoka	7	7	8	9	6	6	6	7	4	7	6	5	4	0	9	0	0	0	0
NY152	6	7	7	8	6	6	5	7	3	7	4	8	7	0	9	0	16	2	2
Snowden	9	7	7	8	5	5	5	6	2	5	6	7	5	0	9	0	0	0	4
W6822-3	9	8	8	9	6	6	6	5	2	7	7	6	4	4	8.6	0	0	0	6
W8822-1	9	9	7	9	5	5	5	5	3	8	6	7	6	2	8.4	0	0	0	0

[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

[4] **BNC182-5**

This clone was misidentified as BNC182-5 it is believed that it is likely BNC202-3

Table 3. UTZ Quality Foods Chip Data.

Clone	% Defects Internal	% Defects External	%Total Defects	Specific Gravity	Defect Descriptions[1]	Chip Color[2] Hunter Lab
AC03433-1W	0%	0%	0%	1.073	NO DEFECTS	60.9
AF4648-2	0%	2%	2%	1.072	INT: SEB, ID	61.0
ATLANTIC	0%	5%	5%	1.082	INT: SEB, HN	59.1
BNC182-5[3]	0%	0%	0%	1.074	NO DEFECTS	60.4
CO03243-3W	0%	3%	3%	1.082	INT: ID, HN	58.5
LAMOKA	0%	2%	2%	1.084	INT: SEB,ID(ROT)	61.3
MSK061-4	0%	3%	3%	1.082	INT: SEB, VB, ID(ROT)	60.5
NY152	0%	2%	2%	1.070	INT: SEB, VB	63.4
SNOWDEN	0%	1%	1%	1.081	INT: SEB	61.2
W6822-3	0%	0%	0%	1.083	NO DEFECTS	60.2
W8822-1	0%	1%	1%	1.091	INT: ID (ROT)	60.5

[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

[3] **BNC182-5**

This clone was misidentified as BNC182-5 it is believed that it is likely BNC202-3

Clone Summaries

AC03433-1W: This was the first year of testing of this clone in NC. Maturity for this clone was mid to late season, stand counts averaged 98% and vigor was fair. Shapes were mostly round, size was slightly larger than medium and overall appearance was less than fair. Marketable yields were 69% of Atlantic, gravity was 1.057 and chip color was excellent in both the 24 to 48 hour chip test and the 5 to 7 day test. External defects included many growth cracks, sunscald, common scab and soft rot.

AF4648-2: This clone was slightly later than mid-maturing and had 99% stands with better than fair vigor. Shapes were mostly oblong, size was medium to large and overall appearance was fair. Marketable yields were 75% of Atlantic (historically 60%), gravity was 1.061 (historically 1.068) and chip color was excellent in both the 24 to 48 hour and 5 to 7 day chip tests. External defects included sunscald, misshapes, soft rot common scab and soft rot.

Atlantic: Maturity for our main crop standard was mid-season, stands were 100% and vigor was good. Shapes were round to oblong, size was medium large and overall appearance was good. Gravity was 1.070 (historically 1.077) and chip color was excellent to exceptional for both the 24 to 48 hour chip test and the 5 to 7 day chip test. External defects included growth cracks, sunscald, misshapes, soft rot and common scab.

BNC182-5: This clone was mid to late maturing and had 98% stands with better than fair plant vigor. Shapes were mostly round, size was slightly larger than medium, with a yellow flesh and overall appearance was fair. Marketable yields were 127% of Atlantic, gravity was 1.059 and chip scores were excellent for both the 24 to 48 hour chip test and the 5 to 7 day chip test. External defects were sunscald, virus and soft rot. It is also believed that this clone is actually BNC202-3 which has a yellow flesh and not the white flesh that BNC182-5 should have.

CO03243-3W: Maturity for this clone was late season with 98% stands and better than fair plant vigor. Shapes were round to oblong, size was medium to large and overall appearance was better than fair. Marketable yields were 124% of Atlantic (historically 115%), gravity was 1.062 (1.061 historically) and chip scores were excellent for both the 24 to 48 hour and the 5 to 7 day chip tests. External defects included sunscald and soft rot.

Lamoka: : Maturity for this clone was mid to late season with 100% stands and good plant vigor. Shapes were mostly oblong, size was slightly larger than medium and overall appearance was less than fair. Marketable yields were 71% of Atlantic (historically 91%), gravity was 1.067 (1.071 historically) and chip scores were exceptional to excellent for both the 24 to 48 hour and the 5 to 7 day chip tests. External defects included growth cracks, soft rot and sunscald.

MSK061-4: Maturity for this clone was mid to late season, stands were 100% and vigor was better than good. Shapes were oblong, size was medium to large and overall appearance was poor. Marketable yields were 80% of Atlantic (historically 101%), gravity was 1.063 (historically 1.071) and chip scores were excellent for both the 24 to 48 hour chip test and 5 to 7 day chip test. External defects were sunscalds, secondary growth, growth cracks, soft rot, and skin blemishes due to Rhizoctonia.

NY152: This clone was slightly later than mid-season and had 99% stands with good vigor. Shapes were round to oblong, size was slightly smaller than medium, and overall appearance was good. Marketable yields were 124% of Atlantic (historically 176%), gravity was 1.062 historically (1.062), and chip scores were exceptional to excellent for the 24 to 48 hour and excellent for the 5 to 7 day tests. External defects included misshapes, sunscald, soft rot and skin blemishes due to Rhizoctonia.

Snowden: Our late season standard had a mid to late maturity with 100% stands and better than good vigor. Shapes were mostly round, size was slightly larger than medium and overall appearance was fair. Marketable yields were 109% of Atlantic (historically 113%), gravity was 1.067 (historically 1.074) and chip scores for the 24 to 48 hour and 5 to 7 day chip test were exceptional to excellent. External defects included sunscald, soft rot and common scab.

W6822-3: This was the first year of testing of this clone in NC. Maturity for this clone was late and stands were 97% with better than fair vigor. Shapes were mostly round, size was medium to large and overall appearance was less than fair. Marketable yields were 105% of Atlantic, gravity was 1.072 and chip scores were excellent for both the 24 to 48 hour and the 5 to 7 day chip test. External defects included sunscald, common scab, soft rot, misshapes and skin blemishes due to Rhizoctonia.

W8822-1 This was the first year of testing of this clone in NC. Maturity was very late season, stands were 94% and vigor was fair. Shapes were round to oblong, size was slightly larger than medium and overall appearance was better than fair. Marketable yields were 108% of Atlantic, gravity was 1.074 and chip scores were good to excellent in the 24 to 48 hour chip test and excellent in the 5 to 7 day test. External defects sunscald, secondary growth, Fusarium dry rot and skin blemishes due to Rhizoctonia.

Clone Pictures:

NC 24 to 48 hr chip **NC 5 to 7 day chip**

AC03433-1W

AF4648-2

Atlantic

BNC182-5

NC 24 to 48 hr chip **NC 5 to 7 day chip**

CO03243-3W

NC 24 to 48 hr chip	NC 5 to 7 day chip
	
Lamoka	
	
MSK061-4	
	
NY152	
	
Snowden	
	
W6822-3	

NC 24 to 48 hr chip

NC 5 to 7 day chip

W8822-1

North Dakota Regional Trial

Table 1. 2015 North Dakota total yield, percentage of total yield by size class, specific gravity, and chip ratings.

	Total Yield	US #1 Yield[1]	% Size Distribution by Class[2,3]							Chip Rating[5]	
Clone	cwt/A	cwt/A	1	2	3	4	5	Cull	Specific Gravity[4]	AGT	CC
AC01151-5W	318	183	33.1	31.7	17.8	8.0	2.4	6.9	1.086	72	1
AC03433-1W	216	145	27.3	36.1	23.0	8.1	1.7	3.8	1.089	74	1
AF4648-2	121	83	13.3	29.7	22.3	16.8	10.7	7.2	1.101	73	1
A00188-3C	288	163	37.1	34.5	16.4	5.6	0.7	5.7	1.095	75	1
Atlantic	319	231	11.0	24.5	26.8	21.1	8.3	8.4	1.109	66	2
BNC182-5[6]	291	181	11.3	21.2	24.0	17.2	11.8	14.7	1.089	72	1
CO02024-9W	286	160	38.5	37.7	15.7	2.7	0.3	5.0	1.094	71	1
CO03243-3W	289	191	8.6	19.5	22.8	23.9	11.2	14.0	1.097	70	1
Lamoka	293	212	11.3	28.5	26.0	18.1	8.9	7.2	1.100	73	1
NY152	262	81	57.8	26.3	4.3	0.3	0.4	10.9	1.087	77	1
Snowden	311	159	35.2	27.2	14.3	9.7	4.8	8.8	1.099	72	1
W6822-3	224	140	25.1	33.8	17.7	10.9	5.3	7.3	1.103	74	1

[1] US # 1 Yield is size classes 2 to 4.

[2] Size class distribution: calculated based on weight using the formula, Class Wt./(Total Yield Wt. - Cull Wt.)*100.

[3] Size classes: 1 = 1 ½ to 1 7/8'', 2 = 1 7/8 to 2 ½ '', 3 = 2 ½ to 3 ¼ '', 4 = 3 ¼ to 4'', 5 = > 4''; Class Size C (<1.5'') was not reported in the table, but was recorded for total yield calculations; cull is defined as percentage of all defective potatoes.

[4] Specific gravity was determined by weight in air/water method.

[5] Chip ratings were performed with Agtron (AGT) or rated according to procedures outlined in the Snack Food Association Chipping Potato Handbook (1995).

[6] BNC182-5 clone was misidentified and is likely BNC202-3.

OREGON - WASHINGTON REGIONAL TRIAL USPB-SFA CHIP TRIAL - 2015

Clone	Unders CWT/Acre	Culls CWT/Acre	13/4' to 21/2' CWT/Acre	21/2" to 4' CWT/Acre	over 4' CWT/Acre	Total Yield CWT/Acre	Mlt. Yld. CWT/Acre	% Mkt. Yld. %	Specific Gravity
ATLANTIC	12	37	82	548	20	698	630	90	1.076
SNOWDEN	10	57	94	888	47	1096	982	90	1.074
LAMOKA	13	179	76	546	63	878	622	71	1.074
A00188-3C	28	20	104	619	11	782	723	93	1.076
AC01151-5W	73	96	216	596	0	981	812	83	1.072
AC03433-1W	20	123	80	477	15	713	556	78	1.071
AF4648-2	16	34	51	459	35	595	510	86	1.075
BNC202-3	28	69	106	696	56	955	802	84	1.067
CO03243-3W	34	66	102	697	34	932	799	86	1.071
NY152	27	34	174	688	28	950	862	91	1.075
W6822-3	26	59	137	416	42	680	553	81	1.077
W8822-1	14	19	104	452	0	589	556	94	1.075

Clone	Skin color 1-12	Flesh Color Actual	Russ 1-9	Eye depth 1-5	Tuber Shape Actual	Uniformity 1-5	Growth Crack 1-5	Scab 1-5	Shatterbruise 1-5
ATLANTIC	4.75	White	5.75	3.25	Round-Comp	3.75	5	3.75	3.75
SNOWDEN	4.25	White	5.25	3	Round-Comp	3.25	4.75	4	4
LAMOKA	4	White	7.25	3.5	Comp-Ob	3	4.75	4.75	4
A00188-3C	4.5	White	5.5	3.5	Comp-Round	3.25	4.75	4.25	4.5
AC01151-5W	4.25	White	7	3.25	Round-Comp	3.75	4.5	4	4.75
AC03433-1W	4.5	White	7.25	3.75	Round-Slight	3.75	4.5	3.5	4.75
AF4648-2	4	White	7.5	3	Round-Comp	3.5	5	4.25	4.5
BNC202-3	4	Light Yellow	7	3.25	Round-Comp	3.25	5	4	3.75
CO03243-3W	4.5	White	6	3	R-Ob	3.75	4.5	4.5	4.25
NY152	5	White	5.5	3.5	Round	4	5	3.25	5
W6822-3	4.5	White	6	3	Round-Pty	3	5	4.75	4.25
W8822-1	5	Light Yellow	4.25	3.25	Round-Ob	4	5	5	5

OREGON - WASHINGTON REGIONAL TRIAL USPB-SFA CHIP TRIAL - 2015

Clone	Skin set	Greening	Hollow Heart	Brown center	Internal Brown spot	Black Spot Bruise	Vascular Discoloration	Transculent End	Fry Color At Harvest
	1-9	1-5	%	%	%	%	%	%	1-5
ATLANTIC	6.5	3.75	5	0	25	5	5	0	2.25
SNOWDEN	6.75	4.75	0	0	10	0	20	0	2
LAMOKA	5.75	2.25	0	5	0	5	0	0	1.75
A00188-3C	7.25	4.5	0	5	5	15	0	0	1.75
AC01151-5W	7.5	2.75	0	0	5	10	0	0	2
AC03433-1W	7.25	3	5	0	0	5	25	0	1.25
AF4648-2	6.5	4	0	0	0	5	5	0	1.75
BNC202-3	6.25	3.75	0	0	0	0	10	0	1.75
CO03243-3W	7.75	3.75	5	0	15	15	0	0	1.75
NY152	7	4.25	5	0	40	0	5	0	2
W6822-3	7	2.75	0	5	20	30	0	0	1.75
W8822-1	7.5	4.5	0	0	0	20	0	0	2.5

Clone	Sugar Ends	Tubers/Plant	Emergence	Maturity
	1-5		%	% Green Left at Harvest
ATLANTIC	2.5	7.7	91.7	10
SNOWDEN	1.5	10.4	100.0	60
LAMOKA	2	8.4	91.7	45
A00188-3C	2.5	8.3	100.0	35
AC01151-5W	2	15.1	100.0	45
AC03433-1W	1	8.4	87.5	65
AF4648-2	2	6.9	79.2	50
BNC202-3	1.5	10.9	95.8	10
CO03243-3W	1.5	9.8	100.0	82.5
NY152	2	12.5	100.0	45
W6822-3	2	8.7	100.0	7.5
W8822-1	3	6.6	83.3	17.5

Trial location: Burbank, WA

Planting date: April 29, 2015
Vine Kill date: Sept 4, 2015
Harvest date: Oct 10, 2015

Pennsylvania Regional Trial

Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pickouts, and internal defects for USPB-SFA Trial in PA, 2015

Variety/Line	Yield (cwt/A)[1]		%US#1	% of	% by size class[3]				%PO[4]
	Total	>1 7/8"		Standard[2]	2	3	4	5	
Atlantic	396	345	86	100	18	51	17	0	12
Snowden	402	362	90	105	33	45	12	0	5
A00188-3C	358	305	85	88	42	38	5	0	6
AF4648-2	327	240	73	70	27	39	7	0	21
BNC202-3	479	410	86	119	28	46	12	0	10
AC01151-5W	398	307	77	89	50	25	2	0	7
AC03433-1W *	377	268	71	78	28	32	11	0	25
CO03243-3W	392	356	90	103	19	46	25	0	6
NY152	447	405	90	118	47	39	4	0	3
W6822-3	443	384	87	111	28	45	14	0	8
LSD[5]	61	67	7		9	9	7	0	7

[1]Yield Total = all yield including pickouts. US#1 Yield >1 7/8" = categories 2, 3, 4 and 5 excluding pickouts.

[2]Percentage of the standard, Atlantic, for >1 7/8" yield.

[3]Percentage of total yield according to size class. 2=1.875-2.5 in., 3=2.5-3.25 in., 4=3.25-4.0 in., 5=>4.0 in.

[4]Percentage of total that are pickouts.

[5]LSD indicates least significant difference (*P= 0.05*).

* AC03433-1W had high % Pick Outs due to suspected glyphosate injury. No other entries in this trial showed these symptoms.

Tuber characteristics, internal and external defects for USPB-SFA Chip Trial in PA, 2015

Variety/Line	Tuber Characteristics[1]						Internal Defects[2]	
	TA	C	TX	Sh	TED	TCS	HH	IB
Atlantic	5	6	5	2	5	5	11	5
Snowden	4	6	5	2	4	5	9	0
A00188-3C	5	7	7	2	6	5	5	0
AF4648-2	4	7	7	2	5	5	0	0
BNC202-3	4	7	7	3	6	5	0	0
AC01151-5W	5	7	8	2	5	5	7	0
AC03433-1W	4	7	7	2	4	6	10	0
CO03243-3W	5	6	6	3	5	6	1	15
NY152	5	6	6	2	4	5	1	0
W6822-3	3	6	6	3	3	5	7	0

Variety/Line	External Defects[3]							
	Rhizoc	H	Gr	K	G	Sc	Sp	T
Atlantic	1	0	0	0	2	1	0	0
Snowden	2	0	0	0	1	1	0	0
A00188-3C	1	0	1	0	1	2	0	0
AF4648-2	1	0	1	0	2	1	0	0
BNC202-3	0	0	0	0	2	4	0	0
AC01151-5W	1	0	1	0	2	1	0	0
AC03433-1W	0	0	0	0	2	1	0	0
CO03243-3W	1	0	0	0	1	1	2	0
NY152	0	0	0	0	1	2	0	0
W6822-3	2	0	0	1	2	2	0	0

[1]Tuber Characteristics: TA = tuber appearance: 1 = very poor, 5= fair, 9 = excellent.
C = skin color: 1 = purple, 2 = red, 3 = pink, 4 = dark brown, 5 = brown, 6 = tan, 7 = buff, 8 = white, 9 = cream.
TX = skin texture: 1 = partial russet, 2 = heavy russet, 3 = mod. russet, 4 = light russet, 5 = netted, 6 = slight net, 7 = mod. smooth, 8 = smooth, 9 = very smooth.
Sh = tuber shape: 1 = round, 2 = mostly round, 3 = round-oblong, 4 = mostly oblong, 5 = oblong, 6 = oblong-long, 7 = mostly long, 8 = long, 9 = cylindrical.
TED = tuber eye depth: 1 = very deep, 5 = medium, 9 = very shallow. TCS = tuber cross section: 1 = very flat, 5 = intermediate, 9 = very round.

[2]Internal Defects: HH = hollow heart, IB = internal browning. Total number observed out of 40 tubers. 0 = not observed.

[3]External Defects: R = Rhizoctonia, H = hairline cracks, Gr = growth cracks, K = knobs, G = sunburn, Sc = scab, Sp = sprouts, T = secondary tubers. Scale = 0-4, with 0 = not observed, 1 = slight to 4 = very severe.

2015 PENNSYLVANIA SFA VARIETY TRIAL
CHIP SAMPLE RESULTS
BENDER FARMS - CHAMBERSBURG, FRANKLIN CO., PA.
PROCESSOR: UTZ QUALITY FOODS, INC.

HARVEST DATE: 9/24/15
SAMPLE DATE: 9/25/15

VARIETY	TRIAL	% EXTERNAL DEFECT	% INTERNAL DEFECT	% TOTAL DEFECT	HUNTER LAB SCORE	GRAV.	MERIT SCORE	DEFECT DESCRIPTION/COMMENTS
A00188-33C	PA. SFA-15	0%	18%	18%	63.0	1.087	12	STEM-END BROWN
AC01151-5W	PA. SFA-15	0%	9%	9%	58.5	1.099	9	PRIMARILY STEM-END BROWN, INTERNAL DISCOLORATION(LIGHT)
AC03433-1W	PA. SFA-15	0%	2%	2%	60.4	1.088	3	STEM-END BROWN, HOLLOW HEART
AF4648-2	PA. SFA-15	0%	7%	7%	62.8	1.101	8	STEM-END BROWN, INTERNAL DISCOLORATION
ATLANTIC	PA. SFA-15	0%	18%	18%	57.6	1.100	11	STEM-END BROWN, INTERNAL DISCOLORATION (DARK & BLOTCHY)
BNC202-3	PA. SFA-15	0%	3%	3%	63.0	1.081	6	STEM-END BROWN
CO03243-3W	PA. SFA-15	0%	10%	10%	61.0	1.077	10	STEM-END BROWN, INTERNAL DISCOLORATION (DARK)
NY152	PA. SFA-15	0%	9%	9%	60.6	1.092	7	STEM-END BROWN, VASCULAR BROWN
PINNACLE	PA. SFA-15	0%	0%	0%	63.3	1.100	1	NO DEFECTS…VERY BRIGHT CHIP COLOR
SNOWDEN	PA. SFA-15	1%	2%	3%	59.5	1.103	4	BRUISE/HOLLOW HEART, STEM-END BROWN
W5955-1	PA. SFA-15	0%	4%	4%	59.7	1.101	5	STEM-END BROWN
W6822-3	PA. SFA-15	0%	1%	1%	59.4	1.097	2	STEM-END BROWN (MINOR)

U.S. Potato Board/Snack Food Association National Chip Trial – 2015-16
University of Wisconsin-Madison
Hancock Agricultural Research Station
November 2015 Progress Report

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Objectives: The main objectives of the USPB/SFA trial in Wisconsin are to evaluate new clones and compare to the standard cultivar Snowden to identify clones with superior processing characteristics and field performance compared to Snowden. These data will be used with other US Northern location to identify long storage chipping processing varieties.

Trial Procedure
Seed was received from trial cooperators during the first two weeks of April, 2015 and 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 a week prior to cutting. Cutting was done by hand on April 28, 2015 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 to promote drying and suberizing prior to planting. Planting took place on May 5, 2015 manually. Varieties were planted in two rows of 30 feet in length. Rows were spaced 36 in. apart. Seed pieces were placed 12 in. apart within each row. Plots were vine-killed with Diquat E at 1.5 pints/a and non-ionic surfactant at 1pint/a on September 2 and 14, 2015.

Plots were maintained according to standard production practices recommended by the University of Wisconsin-Madison. Irrigation schedules and application rates were based on in-hill soil moisture monitors and daily field observations helped by a checkbook method following the WISP2012 Irrigation Management software.

Fertility: 0-0-60 @450lbs/a and 0-0-0-17S-21Ca, Calcium sulfate @ 500 lbs/a April 15, 6-30-22-4S+micros @550 lb/a (starter at planting on May 5, 21-0-0-24S @360 lbs/a @ side-dress-hilling, May 21, 34-0-0 @350 lbs/a airflow spread, June 10, and 34-0-0 @ 110 lbs/a airflow spread, July 2, 2015 followed by a second application of 34-0-0 @ 110 lbs/a airflow

spread, July 20, 2015 following petiole analyses for Snowden and recommendations from the UW-Extension A3422 publication: Commercial Vegetable Production in Wisconsin.

Weed Control: May 21: Parallel 1 pt/a, Metribuzin 75DF 0.5 lb/a. June 10: Matrix 1.25 oz/a + Non-ionic surfactant 80/20 @ 1 pt/a.

Insect and Disease Control: 10/29/14: Vapam HL 40 gal/a on October 29, 2014. May 5: Platinum impregnated to starter fertilizer. June 12: Revus 8 floz/a + Crop Oil Conc. 1 pt/a. June 19: Blackhawk at 3.3 dry oz/a + Asana XL 3 floz/a + Revus 8 floz/a + Crop Oil Conc. 1 pt/a. June 25: Bravo Zn 2.25 pt/a. July 3: Blackhawk at 3.3 dry oz/a + Tanos 8 dryoz/a + Bravo Weather Stik 1.50 pt/a. July 10: Zampro at 14 floz/a + Bravo Zn 1.50 pt/a. July 17: Headline at 12 floz/a + Forum at 6 floz/a + Bravo Weather Stik 1.50 pt/a. July 23: Bravo Weather Stik 1.50 pt/a + Zampro at 14 floz/a. July 31: Coragen at 5 floz/a + Revus Top at 7 floz/a + Bravo Weather Stik 1.50 pt/a + Non Ionic Surfactant 80/20. August 6: Bravo Weather Stik 1.50 pt/a + Zampro at 14 floz/a. August 13: MSO at 24 floz/a + Coragen at 3.5 floz/a + Penncozeb 75DF at 1.5 lb/a + Revus Top at 7 floz/a + Non Ionic Surfactant 80/20. August 20: Tanos at 8 dryoz/a + Coragen at 3.5 floz/a. August 27: Manzate Pro-Stick at 1.5 pt/a + Super Tin 80WP at 3 dryoz/a. September 4: Manzate Pro-Stick at 1.5 pt/a + Super Tin 80WP at 3 dryoz/a. September 11: : Manzate Pro-Stick at 1.5 pt/a.

Vine Kill: September 2: Diquat E at 1.50 lb/a + Non-Ionic Surfactant 80/20 at 1 pt/a. September 8: Diquat E at 1.50 lb/a + Non-Ionic Surfactant 80/20 at 1 pt/a. September 14: Diquat E at 1.50 lb/a + Non-Ionic Surfactant 80/20 at 1 pt/a.

Harvest: September 22 using a self-propelled one row Gallenberg plot harvester.

Rainfall: 19.15 in
Irrigation: 16.2 in
Soil type: Plainfield loamy sand

The 2015 growing season in Wisconsin was characterized by lower than usual temperatures and moderate and well distributed rain episodes (Fig. 1). The first half of September, after vine kill was particularly wet. Supplemental irrigation of 16.2 was provided as required.

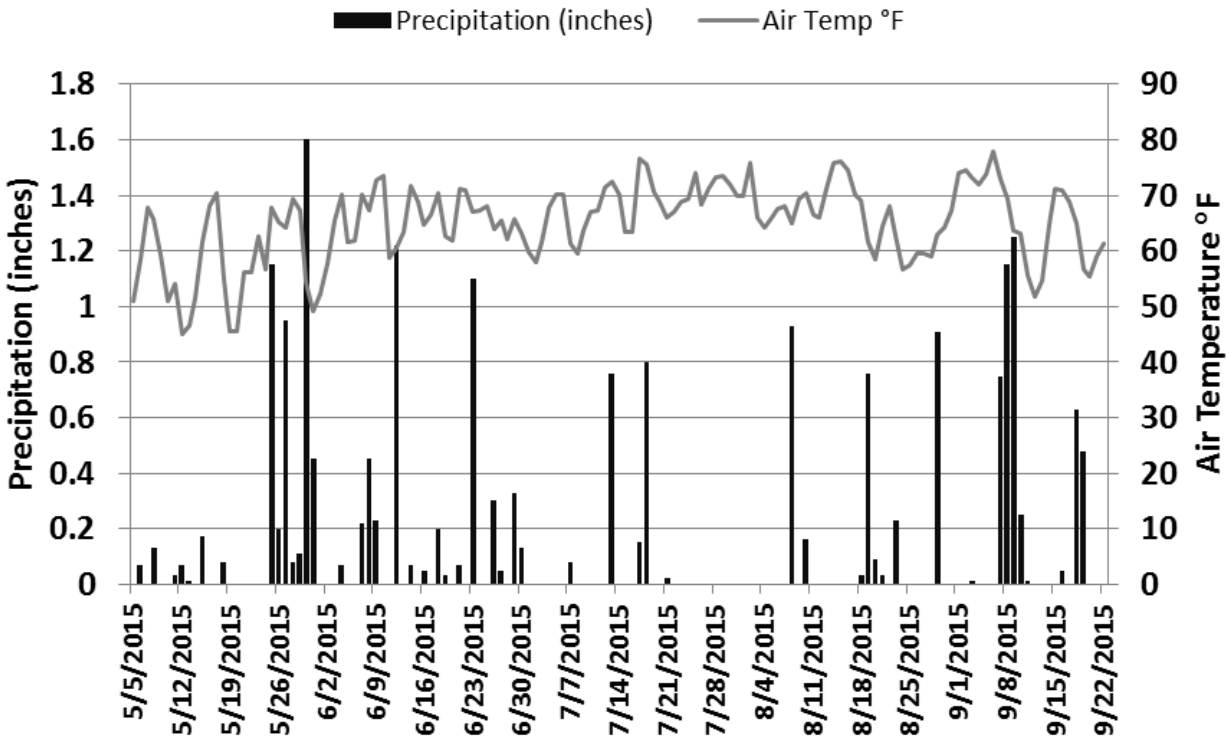

Fig. 1. Precipitation (inches, bar data) and average daily temperature (°F, line data) from May 5 (planting date) to September 22, 2015 (Harvest date).

Yield Data and Tuber Quality

Tubers were graded and sized using a custom-built Gallenberg grader and AgRay X-ray sizer. Specific gravity measurements were taken for each variety using a Weltech PW-2050 Dry Matter Assessment System; this uses a weight in air/weight in water method. Specific gravity, total yield (cwt/a), yield (cwt/a) of undersize (tubers < 1 7/8" in diameter), mid-size (1 7/8" – 3 ¼ in diameter)", oversized (tubers with more than 3 ¼" diameter) and culls are presented in **Table 1**. **Table 2** indicates the number of tuber per grading size category. Internal defects were evaluated as a percent of 60 individual tubers, 20 from each replication, including hollow heart, brown center, internal brown spot, vascular discoloration, stem end discoloration and black spot bruise. **Table 3** shows tuber external characteristics and external defects including Common Scab: 1= no symptoms to 5: more than 60%of the tuber area covered with pitted or raised scab. Preference: 1= most preferred to 5= worst tuber appearance. Eye Depth: 1= smooth to 5= very deep eyes. Skin set: 1= strong skin set, 5= skinning tubers. Skin finish: 1= very polished, 5=very coarse skin.

In 2015, yields were relatively lower than for typical for the control varieties Snowden and Atlantic (Table 1). Plants per tuber were typical for Snowden and Atlantic and internal defects very low (Table 2). Several important rain episodes of more than one inch occurred after hilling date of May 21 and before canopy closure in early July (Fig. 1); this provoked some erosion to the hills and may have conditioned some potato varieties to develop a higher number of green potatoes than would otherwise be observed. Greening was the

single most and the only significant tuber external defect observed in this experiment (Table 3). Common scab data from a separate common scab evaluation experiment in a permanent field were provided with tuber external defect data in Table 3.

Table 1. Specific gravity, total tuber yield, yield of undersize tuber (less than 2 inches in diameter), yield of tubers of 1 7/8-31/4 inches in diameter, oversize (more than 31/4 inches) and culls, USPB-SFT clones, Hancock ARS, WI. Significance vs. Snowden

Clone	Total Yield	Tubers <1 7/8"		Tubers 1 7/8 To 3 1/4"		Tubers >3 1/4"		Culls		Tubers /Plant
	(cwt/a)	cwt	(%)	cwt	(%)	cwt	(%)	cwt	(%)	
SNOWDEN	533	48.5	9.1	456	85.7	14.6	2.7	13.2	2.5	13.3
A00188-3C	476^{NS}	49.7^{NS}	10.4	410^{NS}	86.2	4.5^{NS}	0.9	11.7^{NS}	2.5	12.5^{NS}
AC01151-5W	543^{NS}	79.7**	14.7	433^{NS}	79.9	7.6^{NS}	1.4	21.8^{NS}	4.0	14.7^{NS}
AC03433-1W	428**	17.4**	4.1	349**	81.6	18.5^{NS}	4.3	42.8**	10.0	8.1**
AF4648-2	509^{NS}	15.1**	3.0	409^{NS}	80.8	63.5**	12.5	18.6^{NS}	3.7	8.5**
ATLANTIC	479^{NS}	17.7**	3.7	361**	75.5	70.9**	14.8	28.7^{NS}	6.0	8.7**
BNC202-3	596^{NS}	20.4**	3.4	458^{NS}	77.0	90.3**	15.2	26.0^{NS}	4.4	11.1**
CO03243-3W	448*	24.6**	5.5	376**	84.1	33.2^{NS}	7.4	13.5^{NS}	3.0	10.2**
LAMOKA	390**	17.9**	4.6	315**	80.9	29.5^{NS}	7.6	27.2^{NS}	7.0	7.5**
NY152	545^{NS}	46.5^{NS}	8.6	468^{NS}	86.1	5.9^{NS}	1.1	23.0^{NS}	4.2	13.7^{NS}
W6822-3	457*	23.2**	5.1	361**	79.0	32.8^{NS}	7.2	39.9**	8.7	9.7**
W8822-1	476^{NS}	33.8*	7.1	418^{NS}	88.1	17.0^{NS}	3.6	5.8^{NS}	1.2	11.7**
StdErr for TukeyHSD	13.65	2.57		12.37		5.30		0.226		0.31

Note: Culled tubers include tubers that are green, deformed, knobby and with growth cracks. Tukey HSD test = $(Mean_{clone}-Mean_{Snowden})$/StdErr was used to compare the statistical significance of these clones vs. Snowden. NS = performance similar to Snowden cultivar, * Significant at 5% type I error, ** Significant at 1% type I error.

Total Yield, Tuber Size, Culls and Tubers/Plant: Four clones had yield that were not statistically different to the Snowden check; these include BNC202-3, NY152, A00188-3C, AF4648-2, AC01151-5W, Atlantic and W8822-1. Lamoka, AC03433-1W, CO03243-3W and W6822-3 had significantly lower yield than Snowden (Table 1). AC01151-5W had significantly smaller tuber size profile with 14.7% of the tubers in the < 1 7/8 size class vs. 9.1% for Snowden; also AC01151-5W had statistically similar number of tubers/plant (Table 1). On the other extreme, BNC202-3, Atlantic and AF4648-2 were characterized by large tuber size profile with significantly lower small size tubers and statistically significant larger magnitudes for the >3 ¼ size category compared to Snowden (Table 1). BNC202-3, Atlantic and AF4648-2 were the three clones with the lowest number of tubers per plant; which is related to tuber size. Two clones, AC03433-1W and W6822-3 had statistically significant higher cull amounts than Snowden; AC03433-1W and W6822-3 had a significant amount of green tubers that accounted for most of their culled tubers (Table 1 and Table 3).

Internal and External Defects:
In 2015 a low percentage of internal defects and moderate magnitudes of tuber internal defects were observed for this trial (Table 2). All twelve clones performed statistically similar to Snowden for hollow heart, brown center, vascular discoloration and stem end discoloration (raw tubers). Only Atlantic had significantly higher internal brown spot and black spot bruise compared to Snowden (Table 2).

Snowden is a common scab susceptible variety. It is a goal that new varieties have better common scab resistance than Snowden. Among clones with better common scab performance is: W8822-1, A00188-3C, AF4648-2, Lamoka and NY152. AC01151-5W showed worse common scab performance than. AC03433-1W, Atlantic, BNC202-3, CO03243-3W and W6822-3 showed as much common scab susceptibility as Snowden (Table 3). Preference scores at this time only represent tuber aspect coming off the field and may not represent the total value of a new clone. All clones had eyes that were shallower than Snowden (Table 3). Skin set (skinning) is a component of tuber maturity; Lamoka, AC03433-1W and AC01151-5W had higher skinning than Snowden which may create challenges to their long storage.

Table 2. Tuber internal characteristics and external defects on USPB-SFT 2015 clones, Hancock ARS, WI.

Clones	Hollow Heart	Brown Center	Internal Brown Spot	Vascular Discoloration	Stem End Discoloration	Black Spot Bruise
SNOWDEN	0.0	0.0	0.0	0.0	0.0	0.0
A00188-3C	1.7	3.3	0.0	1.7	0.0	0.0
AC01151-5W	1.7	0.0	0.0	6.7	1.7	1.7
AC03433-1W	5.0	1.7	0.0	0.0	0.0	0.0
AF4648-2	0.0	0.0	1.7	0.0	0.0	0.0
ATLANTIC	0.0	0.0	9.5**	0.0	0.0	9.5**
BNC202-3	0.0	0.0	0.0	1.7	0.0	0.0
CO03243-3W	1.7	0.0	0.0	6.7	0.0	3.3
LAMOKA	0.0	0.0	0.0	0.0	0.0	0.0
NY152	1.7	0.0	0.0	1.7	0.0	1.7
W6822-3	0.0	0.0	0.0	5.0	0.0	0.0
W8822-1	0.0	0.0	0.0	5.0	0.0	0.0
StdErr for Mean Difference	NS	NS	0.59	NS	NS	1.02

Note: In all tables, estimates of tuber traits are given, also the standard error for the difference is included. Performance of each clone is compared to that of Snowden and this is expressed in each table as follows: ** = indicates that this clone shows highly significant difference compared to Snowden. NS and unmarked trait performance indicates that this clones is statistically similar to Snowden in performance.

Table 3. Tuber external characteristics and external defects on USPB-SFT 2015 clones, Hancock ARS, WI.

Clone	Common Scab (1-5)	Preference 1-5 Scale	Eye Depth 1-5 Scale	Skin Set 1-5 Scale	Skin Finish 1-5 Scale	Green (cwt/a)	All Culls	
							(cwt/a)	(%)
SNOWDEN	3.5	2.4	3.0	2.0	2.9	10.7	13.2	2.5
A00188-3C	1.7*	2.4	2.3**	2.1	2.2	9.3	11.7	2.5
AC01151-5W	4.3	2.6	2.4**	3.0*	2.2	19.0	21.8	4.0
AC03433-1W	3.1	2.5	2.2**	3.3**	2.2*	34.4**	42.8**	10.0
AF4648-2	2.1	2.2	2.3**	2.7	2.1*	19.6	18.6	3.7
ATLANTIC	3.2	2.3	2.3**	2.5	2.5	22.4	28.7	6.0
BNC202-3	3.3	2.0	2.0**	1.9	1.9*	24.4	26	4.4
CO03243-3W	3.6	1.9	1.9**	2.2	2.5	9.7	13.5	3.0
LAMOKA	2.4	2.4	2.3**	3.1**	2.0*	25.0	27.2	7.0
NY152	2.4	2.2	2.2**	2.2	2.2	19.7	23	4.2
W6822-3	3.4	2.6	2.5**	2.3	2.5	37.1**	39.9**	8.7
W8822-1	1.8*	1.9	1.8**	1.8	3.4	4.6	5.8	1.2
StdErr for Mean Difference	0.72	0.12	0.08	0.20	0.14	3.28	0.23	

Note: Tukey HSD test = (Clone mean-Snowden mean)/StdErr was used to compare the statistical significance of these clones vs. Snowden : * Significant at 5% type I error, ** Significant at 1% type I error. Unmarked: no statistically different than Snowden. Commons Scab: 1= no symptoms to 5: more than 60%of the tuber area covered with pitted or raised scab. Preference: 1= most preferred to 5= worst tuber appearance. Eye Depth: 1= smooth to 5= very deep eyes. Skin set: 1= strong skin set, 5= skinning tubers. Skin finish: 1= very polished, 5=very coarse skin.

Storage Fry Quality and Sugars Profiling

Storage: Samples of each variety were stored at 55°F and 95% relative humidity for several weeks to allow for wound healing. Sprout inhibitor Chlorpropham (CIPC) was applied to storage locker on November 7, 2015. Lockers will set to ramp to 45 and 48°F on November 25 for long-term storage at the rate of 0.1°F every twelve hours. Processing for the period of September and October reflects storage temperatures of 55°F.

Chip Processing: Tubers were selected randomly from each sample held at the Hancock Storage Research facility in lockers 45°F and 48°F respectively for long storage processing evaluation. Tubers were cut in half lengthwise (along stem end to bud end axis); one half of the tuber was discarded. Three slices were taken from the remaining half of each tuber. Slices were approximately one millimeter thick. The first slice from each tuber half was discarded and the second was used for the processing evaluation. Each slice was rinsed twice in cold water to remove free starch granules and then drained on a terry-cloth towel. The slices were placed in a specially designed wire basket to hold them in a vertical position while frying. The slices were fried in cottonseed oil at 360°F for two minutes and ten seconds. Slices were drained in the frying basket for a short period of time and then placed on paper towels for further draining. Processed chip samples were evaluated using a Hunter Lab D25LT and presented as an average of 36 chips. Hunter Lab L values of 55 or greater are generally considered acceptable color. Stem end defect evaluation was done using a 0-5 scale provided by Wang et al (Amer. Journal Potato Res 89: 392-399); only chips with

rating ≥3 are considered commercially undesirable. The percentage of chips with a chip discoloration rating ≥3 was calculated. Data from processing evaluations are reported in

Specific gravity in 2015 for Snowden and Atlantic was in the mid to moderately low range, about 0.003 and 0.006 lower compared to the average of previous years at Hancock, WI; but suitable for processing (1.080 for Snowden and 1.082 for Atlantic) (Table 4). Varieties with significantly lower specific gravity than Snowden were: BNC202-3 (1.067), AC03433-1W (1.071), CO03243-3W (1.073) and AC03433-1W (Table 4).

Table 4. Specific gravity, storage fry quality and stem end discoloration of fry processed chips (September and October) from 55°F for USPB/SFA 2015 entries, Hancock WI.

Clone	Specific Gravity	Sept 25 (3 days after harvest)			Oct 25 (33 days after harvest)			Nov		
		L	a	Stem End Defect%	L	a	Stem End Defect%	L	a	Stem End Defect%
SNOWDEN	1.080	64.8	-0.28	4.5	58.4	2.5	6.9			
A00188-3C	1.075	66.7	-0.70	18.4	57.5	3.5	19.4			
AC01151-5W	1.074**	60.4**	-0.23	7.3	55.0*	3.0	16.7			
AC03433-1W	1.071**	65.8	-1.04	0.0	57.7	2.0	9.7			
AF4648-2	1.080	65.4	-0.44	11.5	58.2	2.8	13.9			
ATLANTIC	1.082	64.2	-0.02	15.6	56.2	3.3	16.7			
BNC202-3	1.067**	64.4	-0.14	0.0	57.8	3.3	2.8			
CO03243-3W	1.073**	62.6	0.08	4.5	56.4	3.5	5.6			
LAMOKA	1.078	65.1	-0.38	7.3	59.5	2.6	26.4			
NY152	1.076	65.3	-0.86	8.7	60.0	1.4	6.9			
W6822-3	1.082	66.2	-0.09	0.0	59.6	1.2*	2.8			
W8822-1	1.082	63.8	0.15	11.5	54.6*	3.7	25.0			

AC01151-5W, CO03243-3W, Lamoka, NY152 and W6822-3 had the highest sucrose values in September 25 around harvest time; these were all similar to Snowden (0.996 mg/g of tuber fresh weight (Table 5). By October 25, all clones showed sucrose values <0.4 mg/g of tuber fresh weight; this indicates that at this time they have a suitable sucrose profile conducive to long storage (Table 5). Glucose values in September 25 were low. All clones, except for W8822-1 had lower glucose values than Snowden (0.037 vs 0.031 mg/g) (Table 6). Values increased from September 25 to October most likely due to the inversion of initially higher sucrose concentration observed in September 25 (Table 5 and 6). Atlantic, AF4648-2, BNC202-3 and W8822-1 had the highest glucose values for the October 25 fry (Table 6).

Table 5. Sucrose values (mg/g of tuber fresh weight) for USPB/SFA 2015 potato clones from 55°F storage lockers, Hancock WI.

Clone	Sept25 (3dah)	Oct25 (33dah)	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
SNOWDEN	0.996	0.309								
A00188-3C	0.567**	0.267								
AC01151-5W	1.037	0.306								
AC03433-1W	0.429**	0.029**								
AF4648-2	0.562**	0.193								
ATLANTIC	0.762*	0.380								
BNC202-3	0.68*	0.017**								
CO03243-3W	1.045	0.328								
LAMOKA	0.902	0.309								
NY152	0.903	0.255								
W6822-3	1.163	0.390								
W8822-1	0.596**	0.329								

Table 6. Glucose values (mg/g of tuber fresh weight) for USPB/SFA 2015 potato clones from 55°F storage lockers, Hancock WI.

Clone	Sept25 (3dah)	Oct25 (33dah)	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
SNOWDEN	0.031	0.023								
A00188-3C	0.016*	0.036								
AC01151-5W	0.013*	0.037								
AC03433-1W	0.006**	0.019								
AF4648-2	0.013*	0.066*								
ATLANTIC	0.012**	0.091**								
BNC202-3	0.037	0.065**								
CO03243-3W	0.007**	0.030								
LAMOKA	0.012**	0.020								
NY152	0.013*	0.017								
W6822-3	0.010**	0.013								
W8822-1	0.037	0.066*								

Clone Summary:

Snowden, the control cultivar had among the highest both for total yield (533 cwt/a) as for the yield of tubers in the 1 7/8 to 3 ¼" size category (456 cwt/a) (Table 1). Snowden specific gravity was 1.080 which 0.003 below a typical specific gravity for Hancock, WI (Table 4). Fry color off the field was good for Snowden and stem end defects were low (Table 4).Tuber sucrose started at 0.996 mg/g, around the higher values in the group of clones tested but significantly decreased by October 25 (Table 5).

Atlantic: had moderate total yield (479 cwt/a) but still statistically similar to Snowden (533 cwt/a); however, a statistically significant high percentage of oversize tubers (14.8%) contributed to a significantly lower yield in the 1 7/8 to 3 ¼" size category (361 cwt/a) compared to Snowden (456 cwt/a). Atlantic poor colors and high glucose from storage, and served as a good control for varieties that lack of long storage ability.

A00188-3C: In 2015 tuber total (476 cwt/a) and yield of tubers of 1 7/8 to 3 ¼" size (410 cwt/a) were numerically lower, but statistically similar to Snowden. Tuber size distribution and tubers per plant and internal defects were similar to Snowden. In 2015, common scab performance was better than Snowden. Specific gravity was 0.005 lower than Snowden (Table 4). Chip color and sugar values were good and consistent with the good chip colors observed in 2014 (Table 4-6).

AC01151-5W: Relatively high total and tubers of 1 7/8 to 3 ¼" size, similar to Snowden (Table 1). However, for a second consecutive year, specific gravity was 0.006 under Snowden; proportion of small tubers was relatively large (8.4). Sugars and chip quality are still adequate (Tables 4-6) but fry color significantly deteriorated between September 25 and October 25. Specific gravity may be a weakness to produce this clone in Wisconsin.

AC03433-1W: Relatively lower total yield (428 cwt/a) and yield of tubers of 1 7/8 to 3 ¼" size is lower than those of Snowden (Table 1). AC03433-1W showed a high significant 10% of green tubers that contributed to a higher cull magnitude compared to Snowden Table 1 and 3). In addition, AC03433-1W had one of the lowest specific gravity (Table 4). This is a combination of performances that may limit its potential in Wisconsin.

AF4648-2: High total tuber yield specific gravities similar to Snowden (Table 1 and 4). However, AF4648-2 showed a tendency to grow large tubers in a proportion similar to Atlantic. This is probably due to a low number of tubers per plant of 8.5 vs. 13.3 for Snowden (Table 1). AF4648-2 also had better scab performance compared to Snowden; additional data necessary for confirming scab resistance (Table 4). So far AF4648-2 profile is good.

BNC202-3: Probably the highest yielding clone of all tested in 2015 (Table 1); however, its specific gravity was probably the lowest of all twelve clones (Table 4), which will limit its potential in Wisconsin.

CO03243-3W: Total yields are lower than Snowden at 448 cwt/a compared to 533 cwt/a for Snowden (Table 1). For a second consecutive year, specific gravity was significant lower gravity compared to Snowden (Table 4). Low specific gravity may limit the success of CO03243 in Wisconsin.

Lamoka: In this 2015 USPB/SFA trial, Lamoka biggest weakness was its significant lower yield (390 cwt/a) compared to Snowden (533 cwt/a). An additional weakness of Lamoka was its skinning, which may complicate its storage ability. Lamoka showed better scab performance compared to Snowden, an attractive feature to Wisconsin growers.

NY152: High yield, similar to Snowden, with tuber size profile and high tubers/plant similar to Snowden. NY152 had better scab performance compared to Snowden. Specific gravity was numerically smaller but statistically similar to Snowden. So far chip color has been among the lightest.

W6822-3: Lower total and 1 7/8 to 3 ¼" size yield than Snowden. W6822-3 has a tendency to produce a larger percentage of green tubers than Snowden (8.7% vs 2.5% respectively). Specific gravity and chip processing quality similar and potentially better than Snowden.

W8822-1: Total yield for W8822-1 was numerically lower but statistically similar to Snowden (Table 1). W8822-1 is probably the smoother clone and more round-shaped tuber type in the group. In addition, it had much better common scab performance compared to Snowden (Table 3). Specific gravity of 1.082 was numerically higher but statistically similar to Snowden. Fry color significantly deteriorated between September 25 and October 25.