Dr. Donald Halseth, Coordinator
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# 2011 USPB/SFA Chip Variety Trials

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

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# 2011 USPB/SFA Chip Variety Trials

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**Introduction**

The search for new and improved potato varieties is an ongoing and challenging task. The annual United States Potato Board (USPB) & Snack Food Association (SFA) Chip Variety Trials are designed to evaluate advanced and promising seedlings from the various US potato breeding programs. The eleven trial locations for the 2011 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 though 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 90 advanced potato breeding lines and varieties (Table 4) evaluated and compared with potato chip industry standards. Thirty-five of these lines have been named and released and twenty-five are in national commercial seed production. The most recently released varieties are Beacon Chipper, Dakota Crisp, Dakota Diamond, Lamoka, and Megachip, Nicolet, Tundra and Waneta - with a total of 1,232 acres of US seed in 2011. These new varieties offer the chipping industry higher yield potential, longer storage life and more consistent chip quality.

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

Note: advanced storage studies with multiple temperatures and sample dates are being conducted on the 2011 test crop in ID, ME, MI, ND and WI and will be reported in a

separate report in May of 2012 once all the long-term storage experiments have been concluded.

**2011 USPB-SFA Trials**

Seventeen entries for the 2011 USPB-SFA chip trials and their source are listed below: All chip trial coordinators also have both Atlantic (for yield and specific gravity) and Snowden (for cold temperature storage chipping) as check varieties in their trials.

The following 10 entries were tested by USPB-SFA trial coordinators in all eleven states:
CO00188-4W Colorado State University – David Holm
CO00197-3W Colorado State University – David Holm
MSL292-A Michigan State University – David Douches
ND7519-1 North Dakota State University – Susie Thompson
ND8305-1 North Dakota State University – Susie Thompson
ND8331Cb-2 North Dakota State University – Susie Thompson
NY140 Cornell University – Walter DeJong
W2310-3 University of Wisconsin – Felix Navarro
W2978-3 University of Wisconsin – Felix Navarro
W4980-1 University of Wisconsin – Felix Navarro

The following three entries were only sent to the seven northern trials (ID, ME, MI, ND, OR, PA, WI):
MSJ126-9Y Michigan State University – David Douches
MSR061-1 Michigan State University – David Douches
W5015-12 University of Wisconsin – Felix Navarro

The following one entry was only sent to four northern trials (ID, OR, PA, WI):
MN99380-1Y University of Minnesota – Christian Thill

The following one entry was only sent to three northern trials (ME, MI, OR):
NY148 (formerly line E106-4) Cornell University – Walter DeJong

The following two entries were only sent to the four southern trials (CA, FL, MO, NC):
AF0338-17 University of Maine – Greg Porter
MSQ086-3 Michigan State University – David Douches

The 2011 USPB-SFA trials provided a wealth of evaluations on field performance of ten potato breeding lines over all eleven state locations, three in seven northern states, one each in three and four states, and two in four southern states. The performance of our chipping industry varieties Atlantic and Snowden were confirmed as important standards. Both varieties had total and marketable yields at or near the top in all 11 state trials. Atlantic had the second highest specific gravity on average, with the highest or second highest dry matter in 6 out of the 11 trials. NY140 had the highest total yield in two

southern and three northern trials, averaging 463 cwt/acre over all 11 states. NY140 had the highest or second highest marketable yield in 5 states, averaging 318 cwt/acre over all 11 state trials. Other entries with good marketable yield were MSL292-A (11 state average of 294 cwt/acre), MSR061-1 (7 northern state average of 324 cwt/acre), NY148 (3 northern state average of 485 cwt/acre), and W4980-1 (11 state average of 271 cwt/acre). Specific gravity in the 4 southern states was highest for Atlantic, ND7519-1, ND8305-1 and W2310-3, while CO00188-4W and W2978-3 were the lowest. In the 7 northern trials Atlantic and ND8305-1 had the highest specific gravity while CO00188-4W and W2978-3 were the lowest. Out-of-field chip scores in the four southern trials were generally very good. All 12 entries in the FL trial had chip color better than Atlantic, with W2978-3 the best. All entries in the NC trial were as good or better than Atlantic, with ND8305-1 having the best color. Eight entries had significantly fewer chip defects than Atlantic in the MO trial, while three were equal to Atlantic and one had a very high percentage of defects. W2310-3 had the lowest percent (only 4.4%), while ND8331Cb-2 had the highest (93.2%).

Attached are three summary tables which provide data on all 17 entries (plus the standards Atlantic and Snowden) tested in the USPB-SFA field trials in 2011. Table 1 provides total yield (cwt/acre), Table 2 provides marketable yield (cwt/acre), and Table 3 provides specific gravity. Note that not all lines are in every state trial. The Chip Committee has determined that if breeder data exists to make a good estimate of a clone's range of adaptation, entries may be placed in only southern or northern trials.

# TABLE 1. 2011 USPB-SFA CHIP TRIALS - TOTAL YIELD (cwt/acre)

| | | SOUTHERN TRIALS | | | | NORTHERN TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ENTRIES / STATES** | | **CA** | **FL** | **MO** | **NC** | **ID** | **ME** | **MI** | **ND** | **OR** | **PA** | **WI** | **average** |
| **ATLANTIC** | **all** | **345** | **407** | **216** | **245** | **452** | **314** | **483** | **220** | **1265** | **125** | **530** | **418** |
| **SNOWDEN** | **all** | **232** | **357** | **201** | **237** | **447** | **291** | **418** | **391** | **1047** | **357** | **591** | **415** |
| **AF0338-17** | **4S** | **208** | **381** | **243** | **240** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **268** |
| **CO00188-4W** | **all** | **228** | **297** | **159** | **237** | **345** | **300** | **367** | **152** | **566** | **140** | **383** | **289** |
| **CO00197-3W** | **all** | **243** | **402** | **235** | **232** | **326** | **253** | **271** | **168** | **752** | **273** | **437** | **327** |
| **MN99380-1Y** | **4N** | **na** | **na** | **na** | **na** | **375** | **-** | **-** | **-** | **941** | **353** | **701** | **593** |
| **MSJ126-9Y** | **7N** | **na** | **na** | **na** | **na** | **364** | **303** | **265** | **261** | **729** | **105** | **333** | **337** |
| **MSL292-A** | **all** | **195** | **378** | **224** | **236** | **426** | **344** | **340** | **317** | **849** | **288** | **583** | **380** |
| **MSQ086-3** | **4S** | **309** | **451** | **203** | **219** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **296** |
| **MSR061-1** | **7N** | **na** | **na** | **na** | **na** | **393** | **273** | **298** | **357** | **859** | **271** | **439** | **413** |
| **ND7519-1** | **all** | **198** | **406** | **169** | **161** | **278** | **272** | **316** | **178** | **788** | **214** | **471** | **314** |
| **ND8305-1** | **all** | **307** | **345** | **161** | **118** | **245** | **208** | **277** | **208** | **763** | **239** | **456** | **302** |
| **ND8331Cb-2** | **all** | **162** | **243** | **120** | **62** | **272** | **271** | **351** | **339** | **725** | **83** | **581** | **292** |
| **NY140** | **all** | **189** | **477** | **279** | **236** | **508** | **376** | **571** | **346** | **1307** | **253** | **552** | **463** |
| **NY148** (E106-4) | **3N** | **na** | **na** | **na** | **na** | **-** | **379** | **434** | **-** | **1054** | **-** | **-** | **622** |
| **W2310-3** | **all** | **340** | **301** | **182** | **210** | **350** | **272** | **411** | **114** | **817** | **251** | **502** | **341** |
| **W2978-3** | **all** | **250** | **423** | **176** | **183** | **386** | **328** | **361** | **323** | **736** | **128** | **483** | **343** |
| **W4980-1** | **all** | **245** | **437** | **209** | **275** | **338** | **334** | **342** | **114** | **723** | **254** | **449** | **338** |
| **W5015-12** | **7N** | **na** | **na** | **na** | **na** | **383** | **340** | **444** | **229** | **1005** | **364** | **181** | **421** |
| **average** | | **247** | **379** | **198** | **207** | **368** | **304** | **372** | **248** | **878** | **231** | **480** | **355** |

# TABLE 2. 2011 USPB-SFA CHIP TRIALS - MARKET YIELD (cwt/acre)

| | | SOUTHERN TRIALS | | | | NORTHERN TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ENTRIES / STATES** | | **CA** | **FL** | **MO** | **NC** | **ID** | **ME** | **MI** | **ND** | **OR** | **PA** | **WI** | **average** |
| **ATLANTIC** | **all** | **298** | **303** | **134** | **182** | **371** | **268** | **415** | **131** | **804** | **100** | **494** | **318** |
| **SNOWDEN** | **all** | **197** | **307** | **170** | **147** | **307** | **243** | **342** | **239** | **776** | **301** | **567** | **327** |
| **AF0338-17** | **4S** | **189** | **291** | **150** | **172** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **201** |
| **CO00188-4W** | **all** | **213** | **138** | **93** | **140** | **162** | **240** | **252** | **99** | **444** | **105** | **338** | **202** |
| **CO00197-3W** | **all** | **206** | **228** | **152** | **133** | **169** | **173** | **157** | **95** | **528** | **138** | **390** | **215** |
| **MN99380-1Y** | **4N** | **na** | **na** | **na** | **na** | **197** | **-** | **-** | **-** | **712** | **175** | **582** | **417** |
| **MSJ126-9Y** | **7N** | **na** | **na** | **na** | **na** | **261** | **279** | **205** | **147** | **563** | **83** | **321** | **266** |
| **MSL292-A** | **all** | **162** | **275** | **170** | **147** | **279** | **297** | **291** | **187** | **639** | **251** | **531** | **294** |
| **MSQ086-3** | **4S** | **285** | **260** | **103** | **105** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **188** |
| **MSR061-1** | **7N** | **na** | **na** | **na** | **na** | **306** | **223** | **202** | **195** | **688** | **228** | **426** | **324** |
| **ND7519-1** | **all** | **166** | **296** | **125** | **72** | **169** | **202** | **240** | **109** | **559** | **135** | **441** | **229** |
| **ND8305-1** | **all** | **240** | **233** | **120** | **39** | **74** | **87** | **177** | **104** | **561** | **92** | **419** | **195** |
| **ND8331Cb-2** | **all** | **109** | **113** | **53** | **7** | **147** | **190** | **212** | **214** | **512** | **45** | **545** | **195** |
| **NY140** | **all** | **157** | **327** | **229** | **184** | **351** | **326** | **491** | **200** | **518** | **196** | **516** | **318** |
| **NY148** (E106-4) | **3N** | **na** | **na** | **na** | **na** | **-** | **303** | **345** | **-** | **806** | **-** | **-** | **485** |
| **W2310-3** | **all** | **317** | **239** | **150** | **135** | **245** | **229** | **357** | **74** | **676** | **139** | **465** | **275** |
| **W2978-3** | **all** | **228** | **336** | **113** | **112** | **245** | **233** | **216** | **168** | **552** | **97** | **450** | **250** |
| **W4980-1** | **all** | **207** | **356** | **159** | **190** | **270** | **290** | **242** | **67** | **560** | **217** | **419** | **271** |
| **W5015-12** | **7N** | **na** | **na** | **na** | **na** | **205** | **281** | **318** | **115** | **822** | **194** | **148** | **298** |
| **average** | | **212** | **264** | **137** | **126** | **235** | **242** | **279** | **143** | **631** | **156** | **441** | **261** |

# TABLE 3. 2011 USPB-SFA CHIP TRIALS - SPECIFIC GRAVITY

| | | SOUTHERN TRIALS | | | | NORTHERN TRIALS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ENTRIES / STATES** | | **CA** | **FL** | **MO** | **NC** | **ID** | **ME** | **MI** | **ND** | **OR** | **PA** | **WI** | **average** |
| **ATLANTIC** | **all** | **1.103** | **1.080** | **1.080** | **1.087** | **1.097** | **1.085** | **1.087** | **1.093** | **1.087** | **1.086** | **1.089** | **1.089** |
| **SNOWDEN** | **all** | **1.090** | **1.076** | **1.064** | **1.094** | **1.093** | **1.085** | **1.075** | **1.096** | **1.079** | **1.075** | **1.081** | **1.083** |
| **AF0338-17** | **4S** | **1.097** | **1.079** | **1.064** | **1.088** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **1.082** |
| **CO00188-4W** | **all** | **1.102** | **1.071** | **1.067** | **1.074** | **1.090** | **1.079** | **1.068** | **1.086** | **1.071** | **1.068** | **1.068** | **1.077** |
| **CO00197-3W** | **all** | **1.094** | **1.079** | **1.060** | **1.081** | **1.090** | **1.081** | **1.071** | **1.089** | **1.072** | **1.070** | **1.076** | **1.078** |
| **MN99380-1Y** | **4N** | **na** | **na** | **na** | **na** | **1.082** | **-** | **-** | **-** | **1.074** | **1.070** | **1.074** | **1.075** |
| **MSJ126-9Y** | **7N** | **na** | **na** | **na** | **na** | **1.088** | **1.079** | **1.068** | **1.075** | **1.073** | **1.065** | **1.075** | **1.075** |
| **MSL292-A** | **all** | **1.095** | **1.075** | **1.070** | **1.086** | **1.086** | **1.082** | **1.074** | **1.075** | **1.077** | **1.071** | **1.080** | **1.079** |
| **MSQ086-3** | **4S** | **1.094** | **1.075** | **1.064** | **1.081** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **1.079** |
| **MSR061-1** | **7N** | **na** | **na** | **na** | **na** | **1.089** | **1.081** | **1.078** | **1.089** | **1.079** | **1.071** | **1.073** | **1.080** |
| **ND7519-1** | **all** | **1.104** | **1.080** | **1.070** | **1.094** | **1.090** | **1.091** | **1.078** | **1.088** | **1.078** | **1.072** | **1.086** | **1.085** |
| **ND8305-1** | **all** | **1.109** | **1.089** | **1.069** | **1.092** | **1.099** | **1.089** | **1.085** | **1.097** | **1.089** | **1.088** | **1.083** | **1.090** |
| **ND8331Cb-2** | **all** | **1.114** | **1.079** | **1.079** | **1.087** | **1.101** | **1.089** | **1.081** | **1.084** | **1.085** | **1.081** | **1.082** | **1.087** |
| **NY140** | **all** | **1.107** | **1.074** | **1.068** | **1.083** | **1.082** | **1.082** | **1.079** | **1.083** | **1.072** | **1.064** | **1.086** | **1.080** |
| **NY148** (E106-4) | **3N** | **na** | **na** | **na** | **na** | **-** | **1.087** | **1.087** | **-** | **1.074** | **-** | **-** | **1.083** |
| **W2310-3** | **all** | **1.099** | **1.089** | **1.076** | **1.099** | **1.099** | **1.087** | **1.083** | **1.091** | **1.074** | **1.084** | **1.085** | **1.088** |
| **W2978-3** | **all** | **1.098** | **1.072** | **1.057** | **1.075** | **1.081** | **1.082** | **1.065** | **1.084** | **1.068** | **1.064** | **1.068** | **1.074** |
| **W4980-1** | **all** | **1.094** | **1.074** | **1.056** | **1.082** | **1.090** | **1.083** | **1.073** | **1.103** | **1.073** | **1.069** | **1.074** | **1.079** |
| **W5015-12** | **7N** | **na** | **na** | **na** | **na** | **1.090** | **1.085** | **1.085** | **1.076** | **1.084** | **1.076** | **1.081** | **1.082** |
| **average** | | **1.100** | **1.078** | **1.067** | **1.086** | **1.090** | **1.084** | **1.077** | **1.087** | **1.077** | **1.073** | **1.079** | **1.082** |

# Table 4. USPB-SFA Chip Trial Entry Summary: 1985 - 2011

Atlantic, 1985-2011 and Snowden, 1988-2011 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
ND8331Cb-2, 2011

# CALIFORNIA USPB-SFA CHIP TRIAL - 2011

Kirschenmann Farms, Inc., Bakersfield, CA

| NAME | TOTAL | MARKT | UNDER < 1 7/8" | MED | OVER > 4" | # TUBERS | SOLIDS | SPECIFIC GRAVITY |
|---|---|---|---|---|---|---|---|---|
| | cwt/acre | cwt/acre | cwt/acre | cwt/acre | cwt/acre | | | |
| **ATLANTIC** | 345 | 298 | 48 | 298 | 0 | 230.7 | 20.9 | 1.103 |
| **SNOWDEN** | 232 | 197 | 35 | 197 | 0 | 156.0 | 18.6 | 1.090 |
| **AF0338-17** | 208 | 189 | 19 | 189 | 0 | 125.3 | 19.7 | 1.097 |
| **CO00188-4W** | 228 | 214 | 14 | 214 | 0 | 116.0 | 20.7 | 1.102 |
| **CO00197-3W** | 243 | 206 | 37 | 206 | 0 | 167.7 | 19.3 | 1.094 |
| **MSL292-A** | 195 | 162 | 33 | 162 | 0 | 136.3 | 19.4 | 1.095 |
| **MSQ086-3** | 309 | 285 | 24 | 285 | 0 | 169.7 | 19.2 | 1.094 |
| **ND7519-1** | 198 | 166 | 33 | 166 | 0 | 126.3 | 21.0 | 1.104 |
| **ND8305-1** | 307 | 240 | 67 | 240 | 0 | 209.7 | 21.9 | 1.109 |
| **ND8331CB-2** | 162 | 109 | 53 | 109 | 0 | 147.3 | 22.8 | 1.114 |
| **NY140** | 189 | 157 | 33 | 157 | 0 | 126.3 | 21.6 | 1.107 |
| **W2310-3** | 340 | 317 | 23 | 317 | 0 | 165.3 | 20.2 | 1.099 |
| **W2978-3** | 250 | 228 | 22 | 228 | 0 | 150.3 | 19.9 | 1.098 |
| **W4980-1** | 245 | 207 | 38 | 207 | 0 | 175.7 | 19.3 | 1.094 |
| average- | 246.6 | 212.4 | 34.2 | 212.4 | 0.0 | 157.3 | 20.3 | 1.100 |

# FLORIDA REGIONAL TRIAL

| Local Coordinators: | Cooperating Grower: | Cooperating Chip Processor: |
|---|---|---|
| Mr. Doug Gergela<br>Research Coordinator<br>University of Florida/IFAS<br>Hastings Demonstration Unit<br>Hastings, FL 32145-0728<br><br>Dr. Lincoln Zotarelli<br>Assistant Professor<br>University of Florida/IFAS<br>Horticultural Sciences Department<br>Gainesville, FL 32611 | University of Florida/IFAS<br>Hastings Demonstration Unit, Hastings, FL | Utz Quality Foods Inc.<br>Hanover, PA |

**Trial Data:**

| | |
|---|---|
| Planting Site: | University of Florida/IFAS, Hastings Demonstration Unit Research Farm, Hastings, FL |
| Planting Date: | February 1, 2011 |
| Harvest Date: | May 16, 2011 (105 days) |
| Growing Conditions: | Overall, weather conditions in the region for the 2011 growing season were rated as good to fair. There were no freezing events from the planting date forward. February and March had temperatures and rainfall near normal, however April and May were hotter and drier than normal. Total yields were average to fair for most clones, but marketable yields were considered low for some clones, as the tubers did not bulk due to the late season weather related stress. Entry ND8331cb-2 was extremely late to emerge, which is the primary reason that yields were very low for this clone. |
| Experimental Design: | Each variety/clone was planted in a single 250 ft row as directed by the SFA protocol. Four 20 ft sections of each row were harvested and graded. This was not a randomized and replicated experiment. Only means were calculated. |
| Row Spacing: | Machine planted. Approx. 8 inches in-row, 40 inches between-rows. |
| Fertilizer: | pre-plant: 50-100-150/A; side-dress: 1 application of 75-0-125/A and 1 application of 75-0-0/A (N-P-K per Acre) |
| Pest Control: | Pic-Clor 60, 11 Gallons/A, pre-plant<br>Temik 15G, 20 lb/A, and Amistar, 3.25 oz/A in furrow at planting<br>Boundary 1.5 pt/A at hilling for weed control<br>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).<br>Chips were prepared and fried by Utz Quality Foods.<br>Chip scores are presented in Table 2. |

Table 1. Production statistics for SFA clones.

| Clone | Tuber Yield | | | | Size Class Distribution[3, 4] (%) | | | | | Size Class Range[4] (%) | | Specific Gravity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No.1[1] cwt/A | Total cwt/A | % No.1[2] | % Culls | 1 | 2 | 3 | 4 | 5 | 2 to 4 | 3 to 4 | |
| Atlantic | 303 | 407 | 80 | 7 | 17 | 46 | 19 | 15 | 0 | 80 | 34 | 1.080 |
| Snowden | 307 | 357 | 93 | 7 | 6 | 58 | 20 | 14 | 0 | 93 | 34 | 1.076 |
| AF0338-17 | 291 | 381 | 83 | 9 | 15 | 72 | 11 | 0 | 0 | 83 | 11 | 1.079 |
| CO00188-4W | 138 | 297 | 57 | 18 | 34 | 57 | 0 | 0 | 0 | 57 | 0 | 1.071 |
| CO00197-3W | 228 | 402 | 63 | 10 | 31 | 60 | 2 | 0 | 0 | 63 | 2 | 1.079 |
| MSL292-A | 275 | 378 | 77 | 6 | 20 | 56 | 15 | 6 | 0 | 77 | 21 | 1.075 |
| MSQ086-3 | 260 | 451 | 62 | 9 | 28 | 59 | 3 | 0 | 0 | 62 | 4 | 1.075 |
| NY140 | 327 | 477 | 73 | 6 | 22 | 64 | 9 | 1 | 0 | 73 | 9 | 1.074 |
| ND7519-1 | 296 | 406 | 80 | 9 | 16 | 65 | 13 | 2 | 0 | 80 | 15 | 1.080 |
| ND8305-1 | 233 | 345 | 70 | 4 | 27 | 69 | 1 | 0 | 0 | 70 | 1 | 1.089 |
| ND8331cb-2 | 113 | 243 | 49 | 4 | 43 | 49 | 0 | 0 | 0 | 49 | 0 | 1.079 |
| W2310-3 | 239 | 301 | 84 | 6 | 14 | 79 | 5 | 0 | 0 | 84 | 5 | 1.089 |
| W2978-3 | 336 | 423 | 82 | 3 | 13 | 68 | 10 | 4 | 0 | 82 | 14 | 1.072 |
| W4980-1 | 356 | 437 | 91 | 10 | 8 | 66 | 21 | 3 | 0 | 91 | 24 | 1.074 |
| Average | 264 | 379 | | | | | | | | | | |

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

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

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

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

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

| | Plant Growth Characteristics[1] | | | | Tuber Characteristics[2] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Clone | Percent Stand | Early Vigor | Vine Type | Vine Maturity | IFC | SC | ST | TS | ED | APP | Chip Rating[3] |
| Atlantic | 83 | na | 9 | 3 | 2 | 6 | 5 | 3 | 5 | 7 | 59.4 |
| Snowden | 72 | na | 8 | 4.5 | 2 | 6 | 5 | 3 | 4 | 7 | 60.3 |
| AF0338-17 | 82 | na | 8-5 | 5.5 | 1 | 6 | 5 | 3 | 4 | 7 | 60.8 |
| CO00188-4W | 73 | na | 8-5 | 1 | 1 | 7 | 5 | 3 | 5 | 6 | 59.6 |
| CO00197-3W | 83 | na | 8-5 | 1 | 2 | 7 | 6 | 4 | 5 | 5 | 61.2 |
| MSL292-A | 89 | na | 8 | 4.5 | 1 | 6 | 5 | 3 | 5 | 6 | 59.4 |
| MSQ086-3 | 87 | na | 7-4 | 5.5 | 1 | 7 | 5 | 3 | 5 | 6 | 61.9 |
| NY140 | 90 | na | 9-6 | 3.5 | 1 | 7 | 6 | 3 | 5 | 7 | 61.3 |
| ND7519-1 | 78 | na | 8 | 2.5 | 1 | 6 | 6 | 4 | 6 | 7 | 62.0 |
| ND8305-1 | 57 | na | 8 | 7 | 2 | 7 | 6 | 4 | 3 | 5 | 61.2 |
| ND8331cb-2 | na | na | na | 8 | 1 | 6 | 5 | 3 | 3 | 5 | 60.8 |
| W2310-3 | 76 | na | 9 | 4.5 | 2 | 6 | 5 | 4 | 6 | 6 | 61.8 |
| W2978-3 | 67 | na | 8-7 | 5 | 2 | 7 | 6 | 4 | 5 | 7 | 62.8 |
| W4980-1 | 76 | na | 9-6 | 3.5 | 2 | 6 | 5 | 3 | 3 | 7 | 60.1 |

[1]**Plant Growth Characteristics.**

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

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

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

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

[2]**Tuber Characteristics.**

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

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

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

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

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

[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 SFA clones.

| Clone | % External Tuber Defects[1] | | | | | % Internal Tuber Defects[2] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Growth Cracks | Mis-shapen | Sun-burned | Rotten & misc. | Total Culls | HH | BR | CRS | IHN |
| Atlantic | 1 | 0 | 4 | 2 | 7 | 6 | 0 | 0 | 5 |
| Snowden | 0 | 0 | 3 | 3 | 7 | 1 | 0 | 0 | 0 |
| AF0338-17 | 2 | 0 | 4 | 3 | 9 | 1 | 0 | 0 | 3 |
| CO00188-4W | 2 | 2 | 9 | 5 | 18 | 0 | 0 | 0 | 0 |
| CO00197-3W | 0 | 1 | 5 | 3 | 10 | 0 | 0 | 0 | 0 |
| MSL292-A | 0 | 0 | 3 | 3 | 6 | 0 | 0 | 0 | 0 |
| MSQ086-3 | 3 | 1 | 3 | 2 | 9 | 0 | 0 | 0 | 0 |
| NY140 | 0 | 0 | 4 | 1 | 6 | 1 | 0 | 3 | 0 |
| ND7519-1 | 1 | 2 | 5 | 2 | 9 | 0 | 0 | 1 | 0 |
| ND8305-1 | 0 | 0 | 2 | 2 | 4 | 0 | 0 | 3 | 0 |
| ND8331cb-2 | 0 | 2 | 2 | 1 | 4 | 0 | 0 | 0 | 0 |
| W2310-3 | 0 | 1 | 4 | 1 | 6 | 0 | 0 | 0 | 0 |
| W2978-3 | 0 | 1 | 1 | 1 | 3 | 0 | 0 | 0 | 0 |
| W4980-1 | 1 | 0 | 9 | 0 | 10 | 0 | 0 | 0 | 51 |

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

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

# 2011 Idaho Snack Food Trial

**Local Coordinator:**
Jeff Stark
Peggy Bain
Melvin Chappell

**University of Idaho**
**Aberdeen R&E Center**
**Aberdeen, Idaho**

**Trial Data**

| | |
|---|---|
| **PLANTED** | 4-May-11 |
| **VINE KILLED** | 6-Sep-11 |
| | Mechanical |
| **HARVESTED** | 29-Sep-11 |

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

**METHOD OF HARVEST** Grimme Machine

**FERTILIZER**
120 N - 160 P -15 0 K - 50S - 8 lb zinc– pre-plant
120 units injected through water

**INSECTICIDES APPLIED/HILLING**
Admire Pro (8 oz/A) - Shanked May 24

**FUNGICIDES APPLIED**
Echo 1.5 pints/acre
July 14 & 24

**HERBICIDES APPLIED**
Metri 47(12oz/A) & Matrix (1.5oz/A)
+Eptam 6.5 pints/acre
Metribuzin, Rimsulfuron - 5ethyl dipropylthiocarbamate
Spray Coupe- June 7

**ENVIRONMENTAL FACTORS**
Cool June, Summer not as hot of temperatures as some years

**Table 1. IDAHO TRIAL 2011, Yield, Size Distribution, Specific Gravity**

| | Yield (cwt/A) | | Percent Size Distribution | | | | % | Specific |
|---|---|---|---|---|---|---|---|---|
| Clone | US No1 | Total | <1 7/8 " | 1 7/8-2.5" | 2.5-4" | >4" | Unusable | Gravity |
| ATLANTIC | 371 | 452 | 12 | 17 | 50 | 15 | 6 | 1.097 |
| NY140 | 351 | 508 | 15 | 18 | 42 | 9 | 16 | 1.082 |
| SNOWDEN | 307 | 447 | 30 | 31 | 34 | 4 | 2 | 1.093 |
| MSR061-1 | 306 | 393 | 21 | 23 | 50 | 4 | 1 | 1.089 |
| MSL292-A | 279 | 426 | 32 | 31 | 32 | 3 | 3 | 1.086 |
| W4980-1 | 270 | 338 | 19 | 30 | 46 | 4 | 1 | 1.090 |
| MSJ126-9Y | 261 | 364 | 15 | 23 | 44 | 4 | 13 | 1.088 |
| W2978-3 | 245 | 386 | 35 | 31 | 31 | 2 | 2 | 1.081 |
| W2310-3 | 245 | 350 | 24 | 32 | 37 | 1 | 6 | 1.099 |
| W5015-12 | 205 | 383 | 46 | 34 | 19 | 0 | 0 | 1.090 |
| MN99380-1 | 197 | 375 | 45 | 35 | 16 | 2 | 2 | 1.082 |
| CO00197-3W | 169 | 326 | 37 | 23 | 28 | 2 | 11 | 1.090 |
| ND7519-1 | 169 | 278 | 38 | 35 | 25 | 1 | 1 | 1.090 |
| CO00188-4W | 162 | 345 | 53 | 36 | 11 | 0 | 1 | 1.090 |
| ND8331CB-2 | 147 | 272 | 42 | 30 | 23 | 1 | 3 | 1.101 |
| ND8305-1 | 74 | 245 | 69 | 25 | 5 | 0 | 1 | 1.099 |
| **Mean** | **235** | **368** | **33** | **28** | **31** | **3** | **4** | **1.090** |

**Table 2. IDAHO TRIAL 2011, Vine and tuber characteristics.**

| Clone | Vine Size [1] | Vine Maturity[2] | Tubers/ Plant | Fresh Merit Score [3] | Avg. Tuber Size (oz.) | Tuber Shape[4] |
|---|---|---|---|---|---|---|
| ATLANTIC | 2.0 | 2.3 | 7.6 | 2.5 | 6.3 | 2.3 |
| NY140 | 2.5 | 3.0 | 9.1 | 1.0 | 5.5 | 2.6 |
| SNOWDEN | 2.0 | 3.0 | 10.1 | 2.2 | 4.4 | 1.5 |
| MSR061-1 | 2.0 | 2.8 | 8.4 | 3.6 | 5.0 | 1.3 |
| MSL292-A | 2.5 | 1.8 | 10.7 | 2.3 | 4.1 | 1.0 |
| W4980-1 | 1.5 | 2.0 | 6.8 | 3.2 | 5.1 | 1.8 |
| MSJ126-9Y | 1.5 | 2.5 | 7.4 | 2.5 | 5.6 | 1.5 |
| W2978-3 | 2.0 | 1.5 | 9.2 | 3.3 | 4.1 | 1.5 |
| W2310-3 | 2.0 | 2.0 | 8.1 | 2.5 | 4.5 | 2.3 |
| W5015-12 | 2.5 | 2.8 | 12.2 | 1.8 | 3.4 | 1.3 |
| MN99380-1 | 1.0 | 1.0 | 11.2 | 2.0 | 3.6 | 1.3 |
| CO00197-3W | 2.0 | 2.0 | 11.8 | 2.5 | 3.9 | 2.3 |
| ND7519-1 | 2.0 | 2.0 | 10.7 | 3.2 | 3.9 | 1.5 |
| CO00188-4W | 1.5 | 1.0 | 10.8 | 3.0 | 3.3 | 1.0 |
| ND8331CB-2 | 2.0 | 2.0 | 9.2 | 1.8 | 3.5 | 1.0 |
| ND8305-1 | 2.0 | 2.3 | 12.6 | 1.5 | 2.1 | 2.0 |
| **Mean** | **1.9** | **2.1** | **9.7** | **2.4** | **4.3** | **1.6** |

[1] (1-5) 5=Large

[2] (1-5) 5=Late

[3] (1-5) 5=Best Preference Score

[4] (1-5) 1=Round

**Table 3. IDAHO TRIAL 2011, External and Internal Defects.**

| | External defects[4] | | | | Internal Defects[6] | | | |
|---|---|---|---|---|---|---|---|---|
| | | Growth | | Eye | % | % | % | % |
| Clone | Scab | Cracks | Knobs | Depth [5] | HH | BC | IBS | VD |
| ATLANTIC | 3.3 | 4.8 | 4.5 | 3.3 | 60 | 0 | 0 | 0 |
| NY140 | 2.8 | 5.0 | 4.5 | 2.8 | 8 | 0 | 0 | 0 |
| SNOWDEN | 3.8 | 4.8 | 4.8 | 1.8 | 0 | 0 | 0 | 0 |
| MSR061-1 | 3.3 | 4.7 | 5.0 | 2.9 | 68 | 0 | 0 | 0 |
| MSL292-A | 4.0 | 5.0 | 5.0 | 2.5 | 13 | 0 | 0 | 0 |
| W4980-1 | 4.3 | 5.0 | 5.0 | 3.5 | 3 | 0 | 0 | 0 |
| MSJ126-9Y | 4.0 | 4.5 | 5.0 | 2.2 | 25 | 0 | 0 | 0 |
| W2978-3 | 3.5 | 5.0 | 5.0 | 3.5 | 15 | 0 | 0 | 0 |
| W2310-3 | 4.0 | 4.8 | 5.0 | 2.9 | 3 | 0 | 0 | 0 |
| W5015-12 | 3.3 | 5.0 | 5.0 | 3.8 | 3 | 0 | 0 | 0 |
| MN99380-1 | 3.0 | 5.0 | 4.3 | 3.0 | 0 | 0 | 0 | 0 |
| CO00197-3W | 3.5 | 5.0 | 4.0 | 4.0 | 3 | 0 | 0 | 0 |
| ND7519-1 | 3.7 | 4.7 | 5.0 | 4.0 | 0 | 0 | 0 | 0 |
| CO00188-4W | 4.8 | 5.0 | 5.0 | 3.0 | 0 | 0 | 0 | 0 |
| ND8331CB-2 | 4.0 | 4.8 | 4.5 | 2.5 | 8 | 0 | 0 | 0 |
| ND8305-1 | 3.8 | 4.8 | 4.5 | 3.3 | 0 | 0 | 0 | 0 |
| **Mean** | **3.7** | **4.8** | **4.8** | **3.0** | **12.8** | **0.0** | **0.0** | **0.0** |

[4] (1-5) 5=None

[5] (1-5) 1=deep, 5=shallow.

[6] Percent of defects on 10 large tubers

HH=hollow heart, BC=brown center, IBS=internal brown spot, VD=vascular discoloration

**Table 4. IDAHO TRIAL 2011, Harvest Quality Report and Field Diseases**

| Clone | Appearance comments | Chip color | Early Blight[7] | Verticillium Wilt[7] |
|---|---|---|---|---|
| ATLANTIC | Nonuniform shape, attached stolons | na | 2.3 | 2.3 |
| NY140 | nonuniform shape | | 3.0 | 2.8 |
| SNOWDEN | deep eye, attached stolons | | 2.5 | 2.5 |
| MSR061-1 | Nice, round, scaley buff | | 2.0 | 2.3 |
| MSL292-A | Compressed with deep ends | | 2.0 | 1.8 |
| W4980-1 | Nice, round, scaley buff, small | | 2.3 | 2.0 |
| MSJ126-9Y | Some misshaped, deepends | | 2.0 | 2.0 |
| W2978-3 | white, oval, flat, attached stolons | | 1.3 | 1.5 |
| W2310-3 | Buff, flat, nonuniform | | 2.3 | 2.0 |
| W5015-12 | Round, scaley, flat, attached stolons | | 2.5 | 2.0 |
| MN99380-1 | Yellow, scaley, elongated, sprouting | | 1.0 | 1.0 |
| CO00197-3W | Some elongated, | | 1.5 | 2.0 |
| ND7519-1 | white, small, misshaped | | 2.3 | 1.8 |
| CO00188-4W | very small round white | | 1.0 | 1.0 |
| ND8331CB-2 | small, round buff, deep eyes, | | 2.5 | 1.8 |
| ND8305-1 | very small, yellow | | 2.0 | 2.0 |
| **Mean** | | | **2.0** | **1.9** |

[7] (1-5) 1=severe.

# Maine Regional Trial

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

**US POTATO BOARD/SNACK FOOD ASSOCIATION**
**POTATO CHIP VARIETY TRIAL, MAINE 2011**

**Cooperators:**


Local Coordinator:
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Aroostook Produce Distributors
Gerry Miller
Houlton, ME 04730

Cooperating Processor:
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SFA Coodinator:
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Ithaca, NY 14853
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**Variety Entries:**

| | |
|---|---|
| Atlantic (Field Std.) | |
| Snowden (Storage Std.) | |
| AF2291-10 | ME, University of Maine, Greg Porter |
| CO00188-4W | CO, San Luis Valley Res. Ctr., David Holm |
| CO00197-3W | CO, San Luis Valley Res. Ctr., David Holm |
| MSJ126-9Y | MI, Michigan State Univ., David Douches |
| MSL292-A | MI, Michigan State Univ., David Douches |
| MSR061-1 | MI, Michigan State Univ., David Douches |
| ND7519-1 | ND, N. Dakota State Univ., Susie Thompson |
| ND8305-1 | ND, N. Dakota State Univ., Susie Thompson |
| ND8331Cb-2 | ND, N. Dakota State Univ., Susie Thompson |
| NY140 | NY, Cornell University, Walter DeJong |
| NYE106-4 | NY, Cornell University, Walter DeJong |
| W2310-3 | WI, University of Wisconsin, Jiwan Palta |
| W2978-3 | WI, University of Wisconsin, Jiwan Palta |
| W4980-1 | WI, University of Wisconsin, Jiwan Palta |
| W5015-12 | WI, University of Wisconsin, Jiwan Palta |

**Trial Information:**

| | |
|---|---|
| Location: | Aroostook Research Farm, Presque Isle, ME |
| Soil Type: | Caribou loam |
| Soil Test: | pH 5.6 Avail P (MH), K (MH), Ca (M), Mg (MH)<br>2.8% soil organic matter |
| Previous Crop: | timothy/clover (2010), oats (2009) |
| Planting Date: | May 26, 2011 |
| Plot size/design: | 36" row spacing, plots 2 rows x 30'<br>Randomized (RCBD), four replicates per variety |
| Fertilization: | 154-154-154 at planting<br>Foliar boron applied July 19 |
| In-row Spacing: | 10" except Snowden (14"), AF2291-10 (8"), NY140 (8") |
| Crop Management: | Typical of commercial production in the area |
| Sprout Inhibitor: | MH-30 applied August 12 |
| Vinekill Date: | August 31, 2011 (97 DAP) |
| Harvest Date: | September 13, 2011 |
| Processing Date: | September 19, 2011 |

**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 2011. Vine desiccation was accomplished using a standard chemical desiccant. Natural rainfall was abundant throughout the 2011 season and far exceeded the 30-year average (Table 1). No supplemental irrigation was applied. The plots were harvested with a hand crew following lifting with a one-row, research-scale potato digger. All tubers were weighed and a 50-lb sample was graded for external defects and sized using a spool-type sizer. Ten tubers per size class were examined for hollow heart. Specific gravity was determined on a 5-kg sample using the weight-in-air/weight-in-water method. A 50-lb sample was collected at harvest and shipped to Frito-Lay's Dayville plant for evaluation of chip quality. Additional tuber samples were placed in controlled storage for evaluation of chip color during the storage season.

**Results:**

There was excess rainfall through most of the 2011 growing season (Table 1). Early crop growth was good and most of the clones were still growing vigorously at vinekill (Table 2). No late blight was observed in the plots during 2011. Early dying

was not a problem either and most of the varieties were still green and vigorous at the time of vine desiccation (Table 2, 97 days after planting).

NY140, NYE106-4, AF2291-10, and MSL292-A had the highest US#1 yields in the experiment (Table 3). ND7519-1, ND8331Cb-2, CO00197-3W, and ND8305-1were relatively low yielding. ND7519-1, ND8331Cb-2, ND8305-1, NYE106-4, W2310-3, and AF2291-10 had particularly high specific gravity. ND8305-1 had a very small tuber size profile. CO00188-4W, CO00197-3W, MSR061-1, ND7519-1, ND8331Cb-2, NYE106-4, and W5015-12 also had smaller tuber size profiles than would be ideal.

NY140 and MSJ126-9Y had low external defects incidence (Table 4). CO00197-3W, ND7519-1, ND8305-1, ND8331Cb-2, and W2978-3 had greater than 10% external defects. Scab was the most prevalent external defect, especially in ND8305-1, W2978-3, and ND7519-1; however, off-shapes (CO00197-3W, ND8331Cb-2, Snowden), growth cracks (Atlantic, Snowden), and sunburn (CO00197-3W, ND7519-1) were prevalent in several clones. Greater than 15 percent hollow heart was observed in 2-1/2 to 3-1/4" tubers of NY140, MSJ126-9Y, W5015-12, Atlantic, Snowden, W2978-3, and MSR061-1. No hollow heart was observed in NYE106-4, ND8331Cb-2, and ND8305-1 (Table 4). There were too few tubers in the larger tuber size classes to allow collection of meaningful hollow heart data in large-sized tubers.

Tuber characteristics are summarized in Table 5. CO00188-4, ND7519-1, NY140, and W2978-3 had the best external tuber appearance. Atlantic, Snowden, MSJ126-9Y, MSL292-A, and NYE106-4 had indented stem ends and/or deep apical eyes which would make peeling difficult. Tubers of W5015-12, NYE106-4, W2310-3, and ND8305-1 were judged to have an undesirably flat cross section. NY140, CO00197-3W, AF2291-10, and ND8305-1 were more oblong than is desirable for chipping.

Chip color evaluations were conducted at the Frito-Lay plant in Dayville, CT (Table 6). W2978-3 and MSR061-1 had undesirable color and a relatively high incidence of chip defects otherwise the chip samples were fair (Atlantic, Snowden, NY140, NYE106-4, ND7519-1, CO00197-3W) to good (all others).

Susceptibility to skinning and bruising was evaluated by tumbling tuber samples in a drum. MSJ126-9Y, CO00188-4W, and MSR061-1 were especially resistant to skinning, while CO00197-3W, W4980-1, ND8305-1, MSL292-A, and W5015-12 were relatively susceptible. ND8331Cb-2, MSJ126-9Y, CO00197-3W, and CO00188-4W were relatively resistant to bruise damage, while ND8305-1 and NYE106-4 were quite susceptible (Table 7).

Table 1. Rainfall and temperature, 2011 Aroostook Research Farm, Presque Isle, ME

| Month | Week (inches) | | | | Total | Average (°F) | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | (inches) | High | Low |
| May | 2.39 | 0.63 | 0.78 | 2.13 | 5.93 | 63.8 | 43.5 |
| June | 0.45 | 3.59 | 1.20 | 3.40 | 8.64 | 72.6 | 51.0 |
| July | 0.67 | 0.59 | 1.30 | 3.26 | 5.82 | 80.0 | 57.0 |
| August | 2.67 | 1.82 | 1.15 | 3.37 | 9.01 | 76.2 | 56.5 |
| September | 2.00 | 0.46 | 0.41 | 0.10 | 2.97 | 71.1 | 49.0 |
| Grand total | | | | | 32.37 | | |

Table 2. Plant characteristics, UPSB/SFA Chip Variety Trial, Maine, 2011.

| Variety/Clone | % Plant Stand | Vigor Early | Vigor Late | Vine Mat. | Foliage Color | Foliar Disease Problems |
|---|---|---|---|---|---|---|
| NY140 | 100 | G | VG | Late | Med. green | None |
| NYE106-4 | 99 | F-G | VG | Late | Med. green | None |
| AF2291-10 | 96 | F-G | VG | Late | Med. green | None |
| MSL292-A | 99 | F-G | VG | M. Late | Med. green | None |
| W4980-1 | 99 | G | G | Mid-season | Med. green | None |
| W5015-12 | 91 | F-G | VG | Late | Pale green | None |
| MSJ126-9Y | 86 | F-G | F | Late | Dk. Med. green | None |
| Atlantic | 92 | F-G | VG | M. Late | Med. Green | None |
| Snowden | 99 | F-G | VG | Late | Pale green | None |
| CO00188-4W | 99 | G | G | Mid-season | Med. green | None |
| W2978-3 | 99 | G | VG | M. early | Pale green | None |
| W2310-3 | 97 | F-G | VG | M. Late | Dk. Med. green | None |
| MSR061-1 | 89 | F-G | VG | M. Late | Pale green | None |
| ND7519-1 | 82 | F-P | VG | Late | Med. green | None |
| ND8331Cb-2 | 100 | F-G | VG | Mid-season | Pale green | None |
| CO00197-3W | 80 | F-G | VG | M. Late | Med. green | None |
| ND8305-1 | 92 | F-P | G | Late | Med. green | None |

Table 3. Yield, size distribution, and specific gravity, UPSB/SFA Chip Variety Trial, Maine, 2011.

| | Yield (cwt/A)[1] | | | Size Distribution (% by weight)[2] | | | | | | | Spec. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Variety/Clone | Tot. | US#1 | %Std | 1 | 2 | 3 | 4 | 5 | 1-7/8 to 4" | 2-1/2 to 4" | Grav. |
| NY140 | 376 | 326 | 122 | 10 | 31 | 40 | 19 | 0 | 90 | 19 | 1.082 |
| NYE106-4 | 379 | 303 | 113 | 14 | 43 | 34 | 9 | 0 | 86 | 9 | 1.087 |
| AF2291-10 | 341 | 299 | 112 | 7 | 26 | 40 | 27 | 0 | 93 | 27 | 1.086 |
| MSL292-A | 344 | 297 | 111 | 8 | 26 | 36 | 28 | 1 | 92 | 29 | 1.082 |
| W4980-1 | 334 | 290 | 108 | 6 | 29 | 35 | 27 | 3 | 94 | 30 | 1.083 |
| W5015-12 | 340 | 281 | 105 | 13 | 35 | 33 | 16 | 2 | 87 | 18 | 1.085 |
| MSJ126-9Y | 303 | 279 | 104 | 5 | 21 | 36 | 33 | 6 | 95 | 39 | 1.079 |
| Atlantic | 314 | 268 | 100 | 6 | 24 | 32 | 34 | 3 | 94 | 37 | 1.085 |
| Snowden | 291 | 243 | 91 | 7 | 25 | 36 | 29 | 3 | 93 | 32 | 1.085 |
| CO00188-4W | 300 | 240 | 90 | 13 | 37 | 36 | 14 | 0 | 87 | 15 | 1.079 |
| W2978-3 | 328 | 233 | 87 | 11 | 33 | 35 | 20 | 0 | 89 | 20 | 1.082 |
| W2310-3 | 272 | 229 | 85 | 10 | 29 | 37 | 25 | 0 | 90 | 25 | 1.087 |
| MSR061-1 | 273 | 223 | 83 | 12 | 35 | 33 | 20 | 0 | 88 | 20 | 1.081 |
| ND7519-1 | 272 | 202 | 75 | 12 | 35 | 38 | 14 | 0 | 88 | 15 | 1.091 |
| ND8331Cb-2 | 271 | 190 | 71 | 18 | 37 | 32 | 13 | 0 | 82 | 13 | 1.089 |
| CO00197-3W | 253 | 173 | 65 | 18 | 35 | 29 | 17 | 0 | 82 | 18 | 1.081 |
| ND8305-1 | 208 | 87 | 32 | 43 | 44 | 12 | 1 | 0 | 57 | 1 | 1.089 |
| Mean | 306 | 245 | | | | | | | 87 | 22 | 1.084 |
| CV(%) | 10.1 | 13.9 | | | | | | | 5.3 | 30.4 | 0.31 |
| LSD(k=100) | 42 | 45 | | | | | | | 6 | 9 | 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, 2011.

| Variety/Clone | External Defects (% by weight) | | | | | | Hollow Heart by Size Class[1](%) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | Sunb | Mshp | Grck | Scab | Rot | 3 | 4 | 5 |
| NY140 | 3.4 | 1.6 | 1.1 | 0.3 | 0.3 | 0.1 | 20.0 | n/a | n/a |
| NYE106-4 | 7.6 | 0.3 | 0.9 | 0.2 | 5.8 | 0.4 | 0.0 | n/a | n/a |
| AF2291-10 | 6.4 | 1.4 | 2.9 | 0.4 | 1.1 | 0.6 | 15.0 | 100 | n/a |
| MSL292-A | 6.3 | 2.7 | 1.0 | 1.0 | 1.0 | 0.6 | 12.5 | 67 | n/a |
| W4980-1 | 7.2 | 1.3 | 3.9 | 0.4 | 1.1 | 0.5 | 2.5 | 13 | 0 |
| W5015-12 | 5.6 | 2.4 | 2.1 | 0.9 | 0.0 | 0.3 | 27.5 | 71 | n/a |
| MSJ126-9Y | 3.1 | 1.2 | 0.8 | 0.9 | 0.0 | 0.2 | 17.5 | 31 | n/a |
| Atlantic | 8.7 | 2.3 | 2.4 | 2.0 | 0.6 | 1.5 | 40.0 | 100 | n/a |
| Snowden | 9.5 | 2.2 | 4.9 | 2.2 | 0.0 | 0.2 | 20.0 | 57 | n/a |
| CO00188-4W | 8.6 | 1.4 | 0.6 | 0.3 | 6.1 | 0.2 | 2.5 | 100 | n/a |
| W2978-3 | 19.1 | 1.3 | 0.8 | 0.2 | 14.1 | 2.7 | 17.5 | 0 | n/a |
| W2310-3 | 6.7 | 1.1 | 1.7 | 1.3 | 1.5 | 1.1 | 5.0 | n/a | n/a |
| MSR061-1 | 7.8 | 0.9 | 1.1 | 0.9 | 2.8 | 2.1 | 17.5 | n/a | n/a |
| ND7519-1 | 14.7 | 4.0 | 1.6 | 0.0 | 8.7 | 0.3 | 2.5 | 0 | n/a |
| ND8331Cb-2 | 14.8 | 3.0 | 7.2 | 1.2 | 2.4 | 1.0 | 0.0 | n/a | n/a |
| CO00197-3W | 16.7 | 3.9 | 5.6 | 1.0 | 3.9 | 2.4 | 5.0 | 0 | n/a |
| ND8305-1 | 29.6 | 2.8 | 1.9 | 0.4 | 23.1 | 1.3 | 0.0 | n/a | n/a |
| | | | | | | | | | |
| Mean | 10.3 | | | | | | | | |
| CV(%) | 54.0 | | | | | | | | |
| LSD(k=100) | 7.8 | | | | | | | | |

[1]Size Classes: 1=1½ to 1⅞"; 2=1⅞ to 2½"; 3=2½ to 3¼"; 4=3¼ to 4"; 5= over 4"; n/a indicates that no tubers were examined for hollow heart in this size category.

Table 5. Tuber characteristics, UPSB/SFA Chip Variety Trial, Maine, 2011.

| Variety/Clone | Shape | Skin Tex-ture | Eye Depth | Gen. Appear. | Comments |
|---|---|---|---|---|---|
| NY140 | O-R | M-S | M-S | F-G | too oblong |
| NYE106-4 | R | Sln | M-D | F | dse, dae, flat |
| AF2291-10 | O-R | Sln. | M-S | F | pears, non-uniform shape |
| MSL292-A | R-O | Net | M-D | F | dull, dse, dae |
| W4980-1 | R | Net | M-S | F | dull, small |
| W5015-12 | R-O | Net | M-S | F-P | flat, dark, heavy net |
| MSJ126-9Y | R-O | Net | M-D | F | dae, dse |
| Atlantic | R-O | Net | M-D | F | dse, dae, lenticels |
| Snowden | R-O | Net | M-D | F-P | dull, off shapes, dse, dae |
| CO00188-4W | R-O | Sln. | M-S | F-G | nice |
| W2978-3 | R-O | M-S | M-S | F-G | bright, small, scab |
| W2310-3 | R-O | Net | M-S | F-P | tan, flat, dull, lenticels |
| MSR061-1 | R | Net | M-S | F | dull |
| ND7519-1 | R-O | M-S | M-S | F-G | bright |
| ND8331Cb-2 | R-O | Sln. | M-S | F-P | pears, off shapes |
| CO00197-3W | Obl | Sln. | M-S | F-P | too oblong, off shapes |
| ND8305-1 | O-R | Sln. | M-S | F-P | tiny, flat, off shapes, scab |

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

Table 6. Chip quality one week after harvest, UPSB/SFA Chip Variety Trial, Maine, 2011.

| | Frito-Lay Plant Data, Dayville, CT (September 19, 2011) | | | | | |
|---|---|---|---|---|---|---|
| Variety/Clone | Total Solids | Color[1] | Defects (%) Ext. | Int. | Tot. | Comments |
| NY140 | n/a | 67.5 | 2.5 | 5.3 | 8.8 | Defects had color |
| NYE106-4 | n/a | Good | 10.0 | 2.2 | 12.2 | Lots of color |
| AF2291-10 | n/a | Good | 0.0 | 0.0 | 0.0 | Very nice |
| MSL292-A | n/a | Good | 2.2 | 0.0 | 2.2 | Very nice |
| W4980-1 | n/a | Good | 1.2 | 2.3 | 3.5 | Very nice |
| W5015-12 | n/a | Good | 1.3 | 0.0 | 1.3 | Very nice |
| MSJ126-9Y | n/a | Good | 2.4 | 4.5 | 6.9 | A bit of everything |
| Atlantic | n/a | Good | 5.3 | 1.1 | 6.4 | Some color, externals |
| Snowden | n/a | Good | 1.0 | 6.0 | 7.0 | Lots of color |
| CO00188-4W | n/a | Good | 0.0 | 0.0 | 0.0 | Very nice |
| W2978-3 | n/a | Poor | 7.0 | 16.0 | 23.0 | Very bad color |
| W2310-3 | n/a | Good | 0.0 | 0.0 | 0.0 | Very nice |
| MSR061-1 | n/a | Good | 11.0 | 6.0 | 17.0 | Externals, poor color |
| ND7519-1 | n/a | 68.9 | 3.6 | 6.4 | 10.0 | Vascular ring color |
| ND8331Cb-2 | n/a | Good | 0.0 | 0.0 | 0.0 | Very nice |
| CO00197-3W | n/a | Good | 0.0 | 3.5 | 3.5 | Some internal color |
| ND8305-1 | n/a | Good | 1.3 | 4.0 | 5.3 | Not bad |

[1]Higher L-values indicate lighter color. All A-values were rated "good" except for ND7519-1 (-0.41), NY140 (+1.1), and W2978-3 (not good).

Table 7. Bruise susceptibility scores, October 2011, UPSB/SFA Chip Variety Trial, Maine, 2011.

| Variety/Clone | Skinning & Bruise (tumble method)[1] | | | | |
|---|---|---|---|---|---|
| | Prior to Peeling | | Peeled Tubers | | Comments on |
| | Index | % Skin Cracks | % Incid. | % Surf. | peeled tubers |
| NY140 | 5.50 | 13.2 | 88.9 | 7.9 | |
| NYE106-4 | 6.06 | 20.0 | 95.0 | 15.3 | |
| AF2291-10 | 5.56 | 8.3 | 76.7 | 6.2 | |
| MSL292-A | 6.36 | 16.7 | 81.4 | 8.9 | |
| W4980-1 | 6.47 | 13.3 | 85.8 | 9.9 | white |
| W5015-12 | 6.37 | 10.0 | 86.7 | 7.6 | |
| MSJ126-9Y | 3.42 | 31.7 | 58.3 | 3.5 | yellow |
| Atlantic | 4.20 | 21.7 | 91.4 | 9.1 | |
| Snowden | 4.17 | 18.1 | 79.3 | 6.1 | |
| CO00188-4W | 2.99 | 32.4 | 63.3 | 4.8 | |
| W2978-3 | 4.75 | 15.8 | 78.3 | 6.6 | white |
| W2310-3 | 5.86 | 15.4 | 85.0 | 7.7 | |
| MSR061-1 | 3.23 | 11.6 | 78.3 | 5.3 | |
| ND7519-1 | 6.34 | 28.2 | 70.0 | 5.5 | |
| ND8331Cb-2 | 5.98 | 15.0 | 61.7 | 3.7 | |
| CO00197-3W | 6.62 | 18.3 | 75.0 | 5.1 | |
| ND8305-1 | 6.40 | 44.4 | 98.1 | 30.6 | |
| | | | | | |
| Mean | 5.29 | 19.6 | 79.6 | 8.5 | |
| CV(%) | 13.2 | 57.1 | 11.5 | 28.5 | |
| LSD(k=100) | 0.92 | 18.1 | 12.7 | 3.1 | |

[1]Sixty tubers were evaluated per variety/clone. Fifteen tubers per plot were tumbled on September 21 (1 day after harvest) in a paddled drum for 1 minute at 15 rpm. Index scores indicate combined severity of skinning plus fresh bruise (higher values indicate more severe bruising) rated on September 21. Percent incidence (% of tubers with visible bruise) and surface area values are combined scores for shatter and blackspot rated on peeled tubers (October 28, 2010)

**Variety/Clone Summary 2011:**

NY140: Late vine maturity, oblong to round tubers with moderately- smooth skin, and moderately-shallow eyes. Good yields, low external defects incidence, moderate specific gravity, moderate hollow heart incidence, fair September chip quality, and moderate bruise susceptibility. Tubers were more oblong than would be desirable.

NYE106-4: Late vine maturity, round slightly flattened tubers with slightly netted skin, and moderately-deep eyes. Good yields, low external defects incidence, high specific gravity, low hollow heart incidence, fair September chip quality, and moderate to high bruise susceptibility.

AF2291-10: Late vine maturity, oblong to round tubers with slightly netted skin, and moderately-shallow eyes. Good yields, low external defects incidence, high specific gravity, moderate hollow heart incidence, good September chip quality, and moderate bruise susceptibility. Non-uniform tuber shape was a problem with this clone.

MSL292-A: Medium-late vine maturity, round to oblong tubers with netted skin, and moderately-deep eyes. Good yields, low external defects incidence, moderate specific gravity, moderate hollow heart incidence, good September chip quality, and moderate bruise susceptibility.

W4980-1: Mid-season vine maturity, round tubers with netted skin, and moderately-shallow eyes. Good yields, low external defects incidence, moderate specific gravity, low hollow heart incidence, good September chip quality, and moderate bruise susceptibility.

W5015-12: Late vine maturity, round to oblong flattened tubers with heavily netted skin, and moderately-shallow eyes. Good yields, low external defects incidence, high specific gravity, moderately high hollow heart incidence, good September chip quality, and moderate bruise susceptibility.

MSJ126-9Y: Late vine maturity, round to oblong tubers with netted skin, pale yellow flesh, and moderately-deep eyes. Good yields, low external defects incidence, moderate specific gravity, moderate hollow heart incidence, fair to good September chip quality, and low to moderate bruise susceptibility.

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

Snowden: Late vine maturity, round to oblong tubers with netted skin and moderately-deep eyes. Fair to good yields, moderate external defects incidence, high specific gravity, moderate hollow heart incidence, fair September chip quality, and moderate bruise susceptibility.

CO00188-4W: Mid-season vine maturity, round to oblong tubers with slightly netted skin and moderately-shallow eyes. Fair to good yields, moderate external defects incidence, moderate specific gravity, low hollow heart incidence, good September chip quality, and low to moderate bruise susceptibility.

W2978-3: Medium-early vine maturity, round to oblong tubers with moderately smooth skin and moderately-shallow eyes. Fair to good yields, high external defects incidence (mostly scab), moderate specific gravity, moderate hollow heart incidence, poor September chip quality, and moderate bruise susceptibility.

W2310-3: Medium-late vine maturity, round to oblong flattened tubers with netted skin and moderately-shallow eyes. Fair yields, moderate external defects incidence, high specific gravity, low hollow heart incidence, good September chip quality, and moderate bruise susceptibility.

MSR061-1: Medium-late vine maturity, round tubers with netted skin and moderately-shallow eyes. Fair yields, moderate external defects incidence, moderate specific gravity, moderate hollow heart incidence, poor September chip quality, and moderate bruise susceptibility.

ND7519-1: Late vine maturity, round to oblong tubers with moderately smooth skin and moderately-shallow eyes. Fair yields, moderately-high external defects incidence (mostly scab), high specific gravity, low hollow heart incidence, fair September chip quality, and moderate bruise susceptibility.

ND8331Cb-2: Mid-season vine maturity, round to oblong, small tubers with slightly netted skin and moderately-shallow eyes. Fair yields, moderately-high external defects incidence (mostly off-shapes), high specific gravity, very low hollow heart incidence, good September chip quality, and low to moderate bruise susceptibility. Non-uniform tuber shape was a problem with this clone.

CO00197-3W: Medium-late vine maturity, oblong, small tubers with slightly netted skin and moderately-shallow eyes. Fair to poor yields, moderately-high external defects incidence (mostly off-shapes), moderate specific gravity, low hollow heart incidence, fair September chip quality, and low to moderate bruise susceptibility. Non-uniform and oblong tuber shapes were a problem with this clone.

ND8305-1: Late vine maturity, oblong to round, very small tubers with slightly netted skin and moderately-shallow eyes. Poor yields, high external defects incidence (mostly scab), high specific gravity, very low hollow heart incidence, good September chip quality, and moderate to high bruise susceptibility. An extremely small tuber size profile combined with non-uniform tuber shape were serious problems for this clone.

# Michigan Regional Location


**Local Coordinators:**

Chris Long
Dave Douches
Michigan State University
East Lansing, MI

**Cooperating Grower:**

Tim & Todd Young
Sandyland Farms LLC
Howard City, MI

**Cooperating Chip Processor:**

Herr Foods, Inc.
Nottingham, PA


**Trial Information:**

| | |
|---|---|
| Planting Date: | June 1, 2011 |
| Vine Kill Date: | September 15, 2011 |
| Harvest Date: | October 12, 2011 (133 Days) |
| Between Row & In Row Plant Spacing: | 34″ x 10″; irrigated |
| Plots: | Single rows for each entry, approximately 300′ long |
| GDD, Base 40 | 3036 |

**Trial Procedure:**

Seed was mechanically cut on May 1, 2011, and delivered to the grower's seed storage three days later. No seed treatments were applied at the time of seed cutting.

One pre-harvest sugar profile was taken for each variety two weeks prior to vine kill on August 31st. The pre-harvest sugar profile protocol was as follows: obtained a minimum of 40 tubers from each variety, took 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 stems harvested. From the tubers harvested, specific gravity, a glucose value (a percent by fresh weight), a sucrose rating (a percent by fresh weight X10) and an average tuber weight (in ounces) was established.

At harvest, three plot areas of 23 feet were harvested from each entry and were used to determine yield, size distribution, specific gravity and internal defects. Two, 40 lb. storage samples were collected from each entry and were placed in the grower's commercial storage for evaluation at a later date. One set of samples will be evaluated in the winter of 2011 and the other in the spring of 2012. Eighteen, 40 tuber samples were also collected for each variety at harvest. All eighteen samples were stored at the Michigan Potato Industry Commission's Cargill Demonstration Storage Facility at approximately 48ºF or 55ºF for a monthly sugar profile evaluation at Techmark, Inc. Nine, 40 tuber samples were stored at each temperature for

evaluation October 2011 through June 2012. The storage sugar profiles began the day of harvest. Two out-of-the-field chip samples were taken for each variety at harvest. One was sent to Herr Foods, Inc. for processing and the additional sample was processed at Michigan State University.

A plant growth and vine vigor observation was made on June 27th. MSJ126-9Y and ND8305-1 appeared to have the slowest rate of vine growth, whereas, CO00188-4W was the most vigorous at this date. A vine maturity rating was taken for each variety on September 2, 2011, approximately two weeks prior to vine kill. W2978-1 was the most mature variety and NYE106-4 appeared to be the most immature at this date.

**Growing Season Weather:**

Weather conditions during the 2011 growing season were warmer than average. Growing degree days base 40 recorded for this time period was the second highest in six years at 3036. Total rainfall from June 1st through September 15th was approximately 7.39". The daytime temperatures during this growing period exceeded 90ºF four days. The nighttime temperatures during this period, June through mid-September, were the second highest in six years. The tuber yield and specific gravity, for potato production in Michigan, was below average as a result of the increased nighttime heat stress.

**Results:**

*Table 1* summarizes the yield, size distribution, and specific gravity data at harvest. NY140 topped the yield table in 2011, followed by a group of lines that yielded above average. These lines were: Atlantic, W2310-3 (Tundra), NYE106-4, Snowden, W5015-12 and MSL292-A. NY140 and Atlantic had the largest percentage of recorded oversize tubers. CO00188-4W, W2978-3, MSJ126-9Y and CO00197-3W had very low specific gravities.

**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 |
| NY140 | 491 | 571 | 90 | 9 | 84 | 6 | 1 | 1.079 |
| **Atlantic** | **415** | **483** | **89** | **8** | **81** | **8** | **3** | **1.087** |
| W2310-3 | 357 | 411 | 90 | 8 | 85 | 5 | 2 | 1.083 |
| NYE106-4 | 345 | 434 | 79 | 21 | 76 | 3 | 0 | 1.087 |
| **Snowden** | **342** | **418** | **82** | **18** | **78** | **4** | **0** | **1.075** |
| W5015-12 | 318 | 444 | 72 | 28 | 70 | 2 | 0 | 1.085 |
| MSL292-A | 291 | 340 | 86 | 14 | 81 | 5 | 0 | 1.074 |
| CO00188-4W | 252 | 367 | 69 | 31 | 69 | 0 | 0 | 1.068 |
| W4980-1 | 242 | 342 | 71 | 28 | 66 | 5 | 1 | 1.073 |
| ND7519-1 | 240 | 316 | 77 | 22 | 75 | 2 | 1 | 1.078 |
| W2978-3 | 216 | 361 | 60 | 40 | 60 | 0 | 0 | 1.065 |
| ND8331C5-2 | 212 | 351 | 60 | 37 | 60 | 0 | 3 | 1.081 |
| MSJ126-9Y | 205 | 265 | 78 | 20 | 75 | 3 | 2 | 1.068 |
| MSR061-1 | 202 | 298 | 69 | 30 | 67 | 2 | 1 | 1.078 |
| ND8305-1 | 177 | 277 | 64 | 34 | 64 | 0 | 2 | 1.085 |
| CO00197-3W | 157 | 271 | 58 | 38 | 58 | 0 | 4 | 1.071 |
| **MEAN** | **279** | **372** | **75** | **24** | **72** | **3** | **1.3** | **1.077** |

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

*Table 2* summarizes the at-harvest tuber quality. Internal quality across the trial was generally acceptable. Hollow heart was prevalent in Atlantic and to a lesser degree in MSL292-A, ND8305-1 and W5015-12. ND7519-1 displayed three internal brown spots and Snowden and NY140 each recorded 5 vascular discoloration.

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

| | Internal Defects[1] | | | | |
|---|---|---|---|---|---|
| **Entry** | **HH** | **VD** | **IBS** | **BC** | **Total Cut** |
| NY140 | 1 | 5 | 0 | 0 | 30 |
| **Atlantic** | **12** | **1** | **0** | **1** | **30** |
| W2310-3 | 0 | 0 | 1 | 0 | 30 |
| NYE106-4 | 0 | 1 | 0 | 0 | 30 |
| **Snowden** | **2** | **5** | **1** | **0** | **30** |
| W5015-12 | 3 | 1 | 0 | 0 | 30 |
| MSL292-A | 5 | 0 | 0 | 0 | 30 |
| CO00188-4W | 0 | 1 | 0 | 0 | 30 |
| W4980-1 | 0 | 0 | 1 | 0 | 30 |
| ND7519-1 | 0 | 2 | 3 | 1 | 30 |
| W2978-3 | 0 | 0 | 0 | 0 | 30 |
| ND8331C5-2 | 0 | 0 | 0 | 0 | 30 |
| MSJ126-9Y | 1 | 1 | 0 | 0 | 30 |
| MSR061-1 | 0 | 1 | 1 | 0 | 30 |
| ND8305-1 | 3 | 0 | 0 | 0 | 30 |
| CO00197-3W | 1 | 0 | 0 | 0 | 30 |

[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 at harvest on October 12th and processed at Herr Foods, Inc. on October 17th. Chip color was generally acceptable across the trial, with MSL292-A having the highest Agtron score of the trial at 69.4. This is the second consecutive year that MSL292-A has displayed the highest Agtron score. The varieties listed in ranked order based on quality observations from Herr Foods, Inc. are as follows: ND8331C5-2, ND7519-1, MSL292-A, Snowden, W4980-1, NYE106-4, MSJ126-9Y, W2310-3 (Tundra), ND8305-1, MSR061-1, CO00188-4W, NY140, W5015-12, CO00197-3W and W2978-3.

**Table 3.** 2011 Post-Harvest Chip Quality[1].

| Entry | Agtron Color | SFA[2] Color | Specific Gravity | Percent Chip Defects[3] Internal | External | Total |
|---|---|---|---|---|---|---|
| NY140 | 55.1 | 3 | 1.078 | 29.3 | 3.5 | 32.8 |
| **Atlantic** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** |
| W2310-3 | 60.5 | 3 | 1.072 | 19.2 | 6.9 | 26.1 |
| NYE106-4 | 57.9 | 3 | 1.080 | 23.1 | 4.7 | 27.8 |
| **Snowden** | **62.2** | **2** | **1.071** | **5.4** | **8.0** | **13.4** |
| W5015-12 | 57.3 | 3 | 1.074 | 9.7 | 22.3 | 32.0 |
| MSL292-A | 69.4 | 2 | 1.071 | 2.7 | 3.4 | 6.1 |
| CO00188-4W | 59.2 | 3 | 1.075 | 5.5 | 16.3 | 21.8 |
| W4980-1 | 61.1 | 3 | 1.076 | 5.6 | 16.1 | 21.7 |
| ND7519-1 | 58.4 | 3 | 1.074 | 12.2 | 7.9 | 20.1 |
| W2978-3 | 58.7 | 4 | 1.064 | 29.2 | 7.5 | 36.7 |
| ND8331C5-2 | 60.2 | 2 | 1.076 | 3.7 | 5.9 | 9.6 |
| MSJ126-9Y | 55.2 | 2 | 1.067 | 23.2 | 3.3 | 26.5 |
| MSR061-1 | 57.0 | 2 | 1.073 | 8.9 | 7.4 | 16.3 |
| ND8305-1 | 54.3 | 2 | 1.083 | 2.0 | 18.9 | 20.9 |
| CO00197-3W | 56.1 | 3 | 1.069 | 22.4 | 11.8 | 34.2 |

[1] Samples collected at harvest October 12th and processed by Herr Foods, Inc., Nottingham, PA on October 17, 2011 (5 days).
Chip defects are included in Agtron and SFA samples.

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

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

N/A = Not Available

*Table 4* summarizes the results of the samples collected for black spot bruise. Two, 25 tuber samples were collected at harvest. One sample served as a check and the second sample was stored for at least 12 hours at 50ºF, then placed in a 6 sided plywood drum and rotated 10 times to produce a simulated bruise. Two to three weeks later, all samples were abrasively peeled and scored for the presence of black spot bruise. Among the "Simulated Bruise" samples, the best entries were CO00188-4W, W2978-3, MSJ126-9Y, MSR061-1 and CO00197-3W. NYE106-4, ND8305-1, W5015-12 and W2310-3 (Tundra) showed the lowest percent bruise free.

**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 |
| NY140 | 17 | 7 | 1 | | | | 25 | 68 | 0.4 | 12 | 9 | 4 | | | | 25 | 48 | 0.7 |
| **Atlantic** | **9** | **12** | **4** | | | | **25** | **36** | **0.8** | **11** | **5** | **3** | **4** | **1** | | **24** | **46** | **1.1** |
| W2310-3 | 11 | 9 | 4 | 1 | | | 25 | 44 | 0.8 | 9 | 13 | 4 | | | | 26 | 35 | 0.8 |
| NYE106-4 | 12 | 12 | 1 | | | | 25 | 48 | 0.6 | 5 | 9 | 7 | 2 | 2 | | 25 | 20 | 1.5 |
| **Snowden** | **17** | **8** | | | | | **25** | **65** | **0.3** | **13** | **10** | **1** | **1** | | | **25** | **52** | **0.6** |
| W5015-12 | 15 | 9 | 1 | | | | 25 | 60 | 0.4 | 6 | 12 | 5 | | | | 23 | 26 | 1.0 |
| MSL292-A | 19 | 6 | | | | | 25 | 76 | 0.2 | 12 | 6 | 5 | 1 | | | 24 | 50 | 0.8 |
| CO00188-4W | 20 | 5 | | | | | 25 | 80 | 0.2 | 21 | 4 | | | | | 25 | 84 | 0.2 |
| W4980-1 | 16 | 8 | 1 | | | | 25 | 64 | 0.4 | 11 | 8 | 6 | | | | 25 | 44 | 0.8 |
| ND7519-1 | 13 | 12 | | | | | 25 | 52 | 0.5 | 15 | 9 | 1 | | | | 25 | 60 | 0.4 |
| W2978-3 | 23 | 2 | | | | | 25 | 92 | 0.1 | 19 | 6 | | | | | 25 | 76 | 0.2 |
| ND8331C5-2 | 20 | 5 | | | | | 25 | 80 | 0.2 | 15 | 5 | 3 | 1 | | | 24 | 63 | 0.6 |
| MSJ126-9Y | 24 | 1 | | | | | 25 | 96 | 0.0 | 20 | 5 | | | | | 25 | 80 | 0.2 |
| MSR061-1 | 13 | 7 | | | | | 20 | 65 | 0.4 | 17 | 8 | | | | | 25 | 68 | 0.3 |
| ND8305-1 | 15 | 10 | | | | | 25 | 60 | 0.4 | 5 | 16 | 3 | 1 | | | 25 | 20 | 1.0 |
| CO00197-3W | 20 | 6 | | | | | 26 | 77 | 0.2 | 15 | 10 | | | | | 25 | 60 | 0.4 |

[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.

*Table 5* summarizes the results of the pre-harvest panel data. All varieties appeared to have stable sugar levels prior to harvest with the exception of CO00197-3W and possibly ND7519-1. The chip quality of CO00197-3W ranked poorly at Herr Foods on Oct.17th which may have been the result of the sugar immaturity observed on August 31st. CO00188-4W and W4980-1 were the earliest maturing varieties based on the canopy rating. NY140 and Atlantic had the largest average tuber weight at this date.

**Table 5.** Pre-Harvest Panels, 8/31/11

| Entry | Specific Gravity | Glucose[1] % | Sucrose[2] Rating | Canopy Rating[3] | Canopy Uniform.[4] | Number of Hills | Number of Stems | Average[5] Tuber Weight |
|---|---|---|---|---|---|---|---|---|
| NY140 | 1.078 | 0.001 | 0.314 | 80 | 85 | 3 | 11 | 4.56 |
| **Atlantic** | **1.084** | **0.002** | **0.630** | **80** | **85** | **4** | **18** | **4.54** |
| W2310-3 | 1.078 | 0.005 | 0.370 | 65 | 70 | 4 | 13 | 4.43 |
| NYE106-4 | 1.074 | 0.002 | 0.376 | 85 | 80 | 3 | 15 | 2.43 |
| **Snowden** | **1.074** | **0.001** | **0.656** | **65** | **80** | **4** | **19** | **3.29** |
| W5015-12 | 1.081 | 0.002 | 0.445 | 80 | 70 | 2 | 11 | 2.81 |
| MSL292-A | 1.070 | 0.001 | 0.576 | 40 | 75 | 3 | 11 | 3.76 |
| CO00188-4W | 1.062 | 0.002 | 0.378 | 5 | 95 | 3 | 16 | 2.55 |
| W4980-1 | 1.066 | 0.001 | 0.366 | 15 | 45 | 3 | 13 | 2.44 |
| ND7519-1 | 1.073 | 0.002 | 0.987 | 30 | 75 | 3 | 16 | 3.18 |
| W2978-3 | 1.067 | 0.006 | 0.796 | 45 | 80 | 2 | 12 | 2.12 |
| ND8331C5-2 | 1.082 | 0.002 | 0.808 | 50 | 75 | 3 | 13 | 2.52 |
| MSJ126-9Y | 1.069 | 0.001 | 0.798 | 50 | 85 | 3 | 17 | 3.30 |
| MSR061-1 | 1.081 | 0.001 | 0.348 | 75 | 80 | 3 | 14 | 2.97 |
| ND8305-1 | 1.083 | 0.002 | 0.430 | 50 | 60 | 3 | 19 | 3.14 |
| CO00197-3W | 1.072 | 0.006 | 1.200 | 70 | 75 | 3 | 12 | 2.43 |

[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:**

NY140: This was the top yielding variety in the 2011 variety trial with a 491 cwt./A US#1 yield and an above average specific gravity at 1.079. The variety had the second largest number of oversize tubers in the trial at 6 percent. Internal raw tuber defects were moderate. NY140 performed in the bottom group at Herr Foods on October 17th, 2011, and recorded the highest percent of internal chip defects of any variety, totaling 29.3 percent. NY140 exhibited a moderate level of black spot bruise tolerance. It appears to be a full season variety.

Atlantic: This was the second highest yielding variety, exhibiting a 415 cwt./A US#1 yield and the highest specific gravity in the trial at 1.087. This variety had eight percent oversize tubers, but 40 percent of them were hollow. Atlantic showed the second highest black spot bruise susceptibility. The vines appeared to hold-on this growing season for an extended period of time.

W2310-3 (Tundra): The US#1 yield for W2310-3 was above the trial average at 357 cwt./A. The specific gravity was good at 1.083. Internal tuber defects were low. The chip quality at Herr's was average, ranking eight of 15 varieties in out-of-the-field chip performance. Black spot bruise tolerance was moderate with an average of 0.8 bruises per tuber recorded.

NYE106-4: The variety was among the top yielders in the 2011 trial with a 345 cwt./A US#1 yield. This variety was tied with Atlantic for the highest specific gravity in the trial at 1.087. Raw internal tuber quality was excellent. This variety exhibits some common scab tolerance under moderate disease pressure. Chip quality ranking at Herr Foods on October 17th was good. This variety exhibited the most black spot bruise susceptibility of the trial in 2011 with 1.5 bruises per tuber being recorded. On August 31st, this variety appeared to have good vine vigor with a low sugar profile.

Snowden: Snowden was the fifth highest yielding variety in the 2011 variety trial with a 342 cwt./A US#1 yield and a below average specific gravity of 1.075. Internal raw tuber quality was moderate at harvest with 6 percent hollow heart and 16 percent vascular discoloration observed. This variety was above average in chip performance at Herr Foods out-of-the-field fry test. Snowden had a lower than average susceptibility to black spot bruise in the trial.

W5015-12: This variety had an average yield of 318 cwt./A US#1 with a specific gravity of 1.085. Internal tuber defects were moderate at harvest with 10 percent hollow heart present. Common scab susceptibility could be an issue for this variety. W5015-12 ranked 13th of 15 varieties at Herr's for chip quality out-of-the-field. The variety exhibited an above average susceptibility to black spot bruise, with one black spot bruise being recorded for each tuber observed. This variety appeared to be maturing normally in the August 31st pre-harvest panel.

MSL292-A: MSL292-A was above average in yield at 291 cwt./A US#1 with 5 percent oversize recorded. The specific gravity for this variety was slightly below the trial average of 1.074. This variety exhibited 17 percent hollow heart at harvest. MSL292-A is common scab susceptible. This variety ranked highest at Herr's out-of-the-field chip evaluation for Agtron color at 69.4 and the lowest for total percent chip defects at 6.1. MSL292-A was moderately resistant to black spot bruise and ranked near the trial average. This variety appeared to be mature based on the

pre-harvest panel data from August 31st where the sucrose rating was 0.576, the glucose level was 0.001 and the canopy rating was 40 percent.

CO00188-4W: This variety was below the trial average with a 252 cwt./A US#1 yield. The specific gravity was also below average at 1.068. Raw internal tuber quality was good. Chip quality at Herr Foods was below average, ranking 11 of 15 for overall appearance. CO00188-4W ranked as one of the best varieties for black spot bruise tolerance. This variety exhibits an early vine maturity, experiencing some significant early die symptoms and scoring a 5 percent canopy rating on the August 31st pre-harvest panel.

W4980-1: W4980-1 yielded 242 cwt./A US#1 with a specific gravity of 1.073. The variety had one internal brown spot in thirty cut tubers. Herr's ranked this variety 5th in the overall chip quality with the third highest Agtron score at 61.1. The line appears to have an average tolerance to black spot bruise and was very mature at the time of vine kill.

ND7519-1: ND7519-1 yielded below the trial average at 240 cwt./A US#1. Specific gravity was just above the trial average at 1.078. The variety had two tubers with vascular discoloration, three with internal brown spots and one with brown center in thirty cut tubers. Herr's ranked this variety 2 of 15 in chip performance out-of-the-field. ND7519-1 appeared to be one of the least susceptibile lines to black spot bruising. The plant canopy of this variety was mature on August 31st but the sucrose level appeared to be high at 0.987.

W2978-3: The yield on W2978-3 was below average at 216 cwt./A US#1. The specific gravity was the lowest in the 2010 and 2011 trials at 1.065. Raw internal tuber defects were very low with no defects being recorded. The ranking at Herr's was the lowest in the 2011 trial for out-of-the-field chip performance. Recorded total percent chip defects for W2978-3 was the highest in the trial at 36.7 percent. Black spot bruise tolerance was very good but somewhat expected with such a low specific gravity. This variety showed a higher than average glucose value on August 31st of 0.006. Vine maturity was average.

ND8331C5-2: This variety had a below average yield of US#1 tubers at 212 cwt./A and a tuber size distribution that consisted of 60 percent A-size and 37 percent undersize tubers. The specific gravity was above the trial average at 1.081. Raw internal tuber defects were very low with no defects being recorded. The at-harvest chip fry test ranked this variety 1st out of the 15 varieties for overall appearance. This variety was slightly above average for black spot bruise tolerance in the 2011 trial. Vine maturity appears to be mid to late season.

MSJ126-9Y: This variety recorded the fourth lowest yield in this year's trial. MSJ126-9Y was tied for the second to lowest specific gravity in the trial, which was 1.068. Internal tuber quality was generally good with only one hollow heart reported in thirty cut. This clone ranked 7th at Herr's for chip quality and appearance. The bruise free rating was 80 percent which ranked MSJ126-9Y as the second highest in black spot bruise tolerance. MSJ126-9Y appears to have a mid-season vine maturity.

MSR061-1: The yield on MSR061-1 was below average at 202 cwt./A US#1 with 30 percent B-size potatoes. The specific gravity was slightly above the trial average at 1.078. Internal tuber quality was good with few defects reported. This variety ranked slightly below average for chip quality at Herr Foods in spite of the fact that it was one of the varieties with the fewest recorded total chip defects. MSR061-1 scored very well in tolerance to black spot bruise with an average of 0.3 bruises pre tuber reported. This variety appeared to have a mid to late season maturity.

ND8305-1: This variety had a 177 cwt./A US#1 yield with an above average specific gravity of 1.085. Three hollow heart were observed in thirty cut oversize tubers at harvest. Herr's ranked this variety 9th for overall chip quality. Only 20 percent of the ND8305-1 tubers were bruise free, ranking it as one of the most bruise susceptible lines in the 2011 trial. The vine maturity appeared to be mid to late season.

CO00197-3W: This variety was the lowest yielding line in the 2011 trial. The US#1 yield was 157 cwt./A with a below average specific gravity. Only one hollow heart in thirty cut tubers were observed. CO00197-3W ranked 14th of 15 lines tested at Herr Foods for overall chip quality and appearance on October 17th. The variety appeared to be tolerant to black spot bruise. The line had the highest sucrose and glucose values in the trial at the time of vine kill indicating a lack of chemical maturity before harvest. This variety may have needed a longer growing season to reach maturity.

# USPB-SFA 2011 ChipTrial, Black Gold, Charleston, MO

**Location:** West of Diehlstadt (Scott County) 36 57' 34.61"N 89 30' 56.75" W

**Objective:** 1. Plant 14 different chip potato varieties within a randomized and replicated block design where all ag-practices would be consitent throughout the trial, 2. Monitor crop stages and, 3. Collect yield and tuber/fry quality data

**Rationale Statement:** We can expect varieties with greater yield and quality potential than others over all 4 replications

**Trial Outline:**

| | | |
|---|---|---|
| Field ID: | Best North | #030-1900 |
| Soil Test: | pH: 7.2 | P: 71 ppm K: 109 ppm OM: 1.00% |
| | B: 0.17 ppm | Mg: 142 ppm Ca: 647 ppm CEC: 4.74 meq |
| Soil Type: | Bosket Fine Sandy Lm (15.9ac.), Scotco Sand (25.2ac.), Diehlstadt Sandy Lm (12.2ac.) | |
| Soil Texture: | 1.4<Clay%<12.1 | 71.3<Sand%<91.1 |
| Treatments: | 14 | |
| Variety: | Total of 14 | |
| Planting Date: | 3/17/2011 | |
| Planting Method: | Harriston 8 Row Cup Planter | |
| Harvest Date: | 7/7/2011 | DAP 112 |
| Statistical Design: | Strip Trial - @ 0.0585399 acre per treatment | |
| Replications: | 4 | |
| Sample area: | 15.3 | feet |
| Row Spacing: | 34 | inches |
| Scale: | 1/ 1005 | of an Acre/Row |
| Seed Source: | NY / CO / MI / ND / WI / ME | |
| Seed Piece Size: | 2 to 4 | oz |
| Seed Spacing: | 10 | inches |
| Seed Treatment: | Fir Bark Flour + PenncoZeb 75DF | |
| In-furrow Treatments: | Telone / Quadris / Admire | |
| Total Fertilizer Applied: | N 283 / P 68 / K 210 / S 58 / B 1 | |

## **Treatments**: Include product(s), rates, carrier, application method- refer to past trial examples for ideas

| 1) Pre-emergence ag-inputs | | Method |
|---|---|---|
| 1/22/2011 | Telone II (7 Gal/A) | Fumigation |
| 3/4/2011 | 18-46-0 (22.7 Lb/A), 0-0-60 (231.6 Lb/A), 46-0-0 (108.3 L/A), K-Mag 0-0-22-11Mg-22S (45 Lb/A) , and 14.3% Borate (7.2 Lb/A) | Broadcast |
| 3/20/2011 | 10-34-0 (13.1 Gal/A), Admire Pro (7.5 Oz/A), Quadris (5.8 Oz/A), Zn Chelate 10% (1.8 Pt/A) | Side-dress |
| 4/13/2011 | 32-0-0 (19.3 Gal/A) | Side-dress |

| 2) Post-emergence ag-inputs | | Method |
|---|---|---|
| 5/9/2011 | AMS 28-0-0-24 (300 Lbs/A), Potash 0-0-60 (160 Lbs/A) | Air |
| 5/10/2011 | Intensity One (16 Oz/A), Bravo Zn (2 Pts/A), Citraplex Zn (0.5 Lb/A), Boronsol (1 Qt/A), Curzate (3.2 Oz/A) | Air |
| 5/16/2011 | N32 (3.4 Gal/A) | Irrigation |
| 5/17/2011 | Bravo Zn (2 Pts/A), Revus Top (7 Oz/A) | Air |
| 5/18/2011 | 28-0-0-4S (8.8 Gal/A) | Irrigation |
| 5/24/2011 | Bravo Zn (2 Pts/A), Citraplex Zn (0.5 Lb/A), Boronsol (1 Qt/A), Scala (7 Oz/A) | Air |
| 5/27/2011 | 28-0-0-4S (17.7 Gal/A) | Irrigation |
| 6/1/2011 | Ridomil Gold Bravo (2.5 Pt/A) | Air |
| 6/6/2011 | 28-0-0-4S (12.1 Gal/A) | Irrigation |
| 6/8/2011 | Bravo Zn (2 Pt/A) | Air |
| 6/13/2011 | Bravo Zn (2 Pt/A), Tomstone (1.6 Oz/A), Sable N28 (2 Gal/A) | Air |

## Trial Protocol:

Refer to Agronomy SOP 6.22 Large Field Trial Sampling for Yield and Fry Quality

## Weather, Growing Conditions:

| | | | | | |
|---|---|---|---|---|---|
| March | Rainfall | 6.35" | Soil Cond. Wet | Temp. F. | 37 to 68 F av. |
| April | | 12.10" | Saturated | | 48 to 77 F av. |
| May | | 7.75" | Wet | | 52 to 85 F av. |
| June | | 3.25" | Hot and Dry | | 74 to 88 F av. |

This season was not like any other: Excessive rainfall contributed to rise of water table, flooding, lenticel formation on roots and tubers, leaching of fertilizers that had to be reapplied by plane, poor canopy development that resulted in very poor ground cover, leading utlimately to exessive weed pressure (herbicides wshed off, or too much soil moisture to get a ground rig into the field). Overall, the crop suffered serious stress and did not have the opportunity for full yield potential.

# MISSOURI REGIONAL TRIAL

## Charleston, Missouri - Black Gold Farms - 2011

**Planting Date: 3/17/11** **Harvest Date: 7/7/11**

| Variety | Vine & Vigor Rating | Under Size 1" - 1 7/8" # of tubers | Under Size 1" - 1 7/8" cwt/ac | Marketable Yield 1 7/8" - 4" # of tubers | Marketable Yield 1 7/8" - 4" cwt/ac | Over > 4" cwt/ac | Total Yield cwt/ac | % of Standard's Marketable Yield Atlantic | % of Standard's Marketable Yield Snowden | Specific Gravity |
|---|---|---|---|---|---|---|---|---|---|---|
| ATLANTIC | 6 | 39.3 | 82 | 65.8 | 134 | 0 | 216 | 130 | 89 | 1.080 |
| SNOWDEN | 6 | 38.8 | 31 | 81.5 | 170 | 0 | 201 | 165 | 113 | 1.064 |
| AF0338-17 | 6 | 34.8 | 93 | 69.5 | 150 | 0 | 243 | 146 | 100 | 1.064 |
| C000188-4W | 2 | 27.0 | 66 | 46.8 | 93 | 0 | 159 | 90 | 62 | 1.067 |
| C000197-3W | 4 | 86.5 | 83 | 71.8 | 152 | 0 | 235 | 148 | 101 | 1.060 |
| MSL292-A | 4 | 45.8 | 54 | 48.5 | 170 | 0 | 224 | 165 | 113 | 1.070 |
| MSQ086 | 5 | 54.5 | 100 | 28.0 | 103 | 0 | 203 | 100 | 69 | 1.064 |
| ND7519-1 | 5 | 36.5 | 44 | 41.3 | 125 | 0 | 169 | 121 | 83 | 1.070 |
| ND8305-1 | 4 | 30.8 | 41 | 43.8 | 120 | 0 | 161 | 117 | 80 | 1.069 |
| ND8331Cb-2 | 6 | 53.0 | 67 | 22.0 | 53 | 0 | 120 | 51 | 35 | 1.079 |
| NY140 | 5 | 39.0 | 50 | 78.3 | 229 | 0 | 279 | 222 | 153 | 1.068 |
| W2310-3 | 7 | 30.8 | 32 | 75.0 | 150 | 0 | 182 | 146 | 100 | 1.076 |
| W2978-3 | 4 | 35.3 | 63 | 32.0 | 113 | 0 | 176 | 110 | 75 | 1.057 |
| W4980-1 | 5 | 37.5 | 50 | 62.0 | 159 | 0 | 209 | 154 | 106 | 1.056 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**Vine & Vigor Rating:**

1 = 100 % dead vines
2 = 90% defoliated, 80-90% dead vines
3 = 75% defoliated, 25-50% dead vines
4 = 25% defoliated, 10% dead vines
5 = 0-10% defoliated, yellowing leaves common
6 = Green, no new growth, some lower leaves yellowing.
7 = Green, no flowering
8 = Green, vigorous, 0-10% flowering

**Harvested Sample:** 4 Replications of 25 feet

# North Carolina Regional Trial


**Local Coordinators:**

Dr. Craig Yencho
North Carolina State University
214A Kilgore Hall
Raleigh NC, 27695

Mr. Mark Clough
North Carolina State University
207 Research Station Rd.
Plymouth NC 27962

**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, Gum Neck, Tyrrell County, NC |
| Planting Date: | March 9, 2011 |
| Harvest Date: | June 20, 2011 (110 days) |
| Growing Conditions: | Planting was within the normal time frame. Early season temperatures were favorable combined with adequate moisture through April. The crop had strong tops entering into the bulking phase. However, by early May, rains tapered off and conditions became hot and dry moving into June. As a result of these conditions, yield was depressed but overall internal quality was good. |
| Soil Type: | Cape Fear silt loam |
| Experimental Design: | Randomized complete block design with 5 replications. |
| Row Spacing: | 28 hills, spaced 9 inches apart, 34” row width. |
| Fertilizer: | 236 N, 119 P, 101 K, 1 ZN (lbs/A) |
| Weed Control: | Metribuzin 1.3 lbs/A<br>Volunteer 8 fl oz/A |
| Insect Control: | Admire Pro in-furrow 7.2oz/A |
| Disease Control: | Quadris in furrow 6.2/A<br>Bravo 6 pt/A<br>Revus Top 6.2 fl oz/A |

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

| 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 | 5 to 7 days |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AF0338-17 | 240 | 172 | 23 | 53 | 19 | 0 | 0 | 5 | 72 | 19 | 1.088 | 2 | 2 |
| Atlantic | 245 | 182 | 18 | 53 | 22 | 0 | 0 | 7 | 75 | 22 | 1.087 | 2 | 2 |
| CO00188-4W | 237 | 140 | 36 | 47 | 11 | 0 | 0 | 5 | 59 | 11 | 1.074 | 2 | 2 |
| CO00197-3W | 232 | 133 | 38 | 52 | 4 | 0 | 0 | 5 | 56 | 4 | 1.081 | 2 | 2 |
| MSL292-A | 236 | 147 | 28 | 56 | 6 | 0 | 0 | 10 | 62 | 6 | 1.086 | 2 | 1 |
| MSQ086-3 | 219 | 105 | 44 | 46 | 2 | 0 | 0 | 9 | 48 | 2 | 1.081 | 2 | 2 |
| ND7519-1 | 161 | 72 | 52 | 43 | 2 | 0 | 0 | 4 | 44 | 2 | 1.094 | 2 | 2 |
| ND8305-1 | 118 | 39 | 68 | 28 | 2 | 0 | 0 | 2 | 31 | 2 | 1.092 | 1 | 2 |
| ND8331Cb-2 | 62 | 7 | 86 | 9 | 1 | 0 | 0 | 4 | 10 | 1 | 1.087 | 2 | 2 |
| NY140 | 236 | 184 | 19 | 57 | 21 | 0 | 0 | 4 | 78 | 21 | 1.083 | 2 | 3 |
| Snowden | 237 | 147 | 38 | 55 | 5 | 0 | 0 | 2 | 60 | 5 | 1.094 | 2 | 2 |
| W2310-3 | 210 | 135 | 28 | 59 | 6 | 0 | 0 | 8 | 64 | 6 | 1.099 | 2 | 2 |
| W2978-3 | 183 | 112 | 37 | 53 | 8 | 0 | 0 | 2 | 61 | 8 | 1.075 | 2 | 2 |
| W4980-1 | 275 | 190 | 27 | 54 | 15 | 0 | 0 | 4 | 69 | 15 | 1.082 | 2 | 2 |
| **Grand Mean** | 207 | 126 | | | | | | | | | | | |
| **CV(%)** | 12.5 | 19.0 | | | | | | | | | | | |
| **LSD(K=100)** | 29.9 | 27.7 | | | | | | | | | | | |

[1] **Size Classes:**
1's < 1 7/8"; 2's 1 7/8 to 2 1/2"; 3's 2 1/2 to 3 1/4"; 4's 3 1/4 to 4"; 5's ≥ 4"; Culls = all defective potatoes.

[2] **Specific Gravity**
Determined by weight in air/water method.

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

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

| | 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 |
| AF0338-17 | 9 | 9 | 9 | 5 | 6 | 7 | 5 | 7 | 3 | 6 | 5 | 7 | 7 | 0 | 9 | 0 | 0 | 0 | 2 |
| Atlantic | 6 | 7 | 8 | 6 | 7 | 6 | 7 | 7 | 3 | 6 | 7 | 8 | 7 | 18 | 7.2 | 6 | 0 | 16 | 4 |
| CO00188-4W | 8 | 9 | 8 | 6 | 9 | 7 | 5 | 7 | 2 | 6 | 3 | 8 | 6 | 0 | 9 | 0 | 0 | 2 | 0 |
| CO00197-3W | 7 | 9 | 9 | 6 | 9 | 7 | 5 | 7 | 2 | 8 | 2 | 8 | 5 | 0 | 9 | 0 | 0 | 0 | 0 |
| MSL292-A | 7 | 9 | 8 | 6 | 6 | 6 | 5 | 5 | 2 | 2 | 4 | 4 | 4 | 0 | 9 | 0 | 0 | 0 | 0 |
| MSQ086-3 | 8 | 8 | 8 | 6 | 8 | 9 | 7 | 8 | 2 | 8 | 3 | 6 | 6 | 0 | 9 | 0 | 0 | 0 | 0 |
| ND7519-1 | 9 | 9 | 8 | 7 | 9 | 8 | 5 | 7 | 3 | 8 | 2 | 7 | 4 | 0 | 9 | 6 | 0 | 6 | 0 |
| ND8305-1 | 7 | 9 | 8 | 6 | 8 | 9 | 5 | 7 | 2 | 7 | 1 | 8 | 6 | 0 | 9 | 0 | 0 | 0 | 0 |
| ND8331Cb-2 | 8 | 9 | 8 | 6 | 9 | 6 | 7 | 7 | 2 | 6 | 2 | 8 | 4 | 0 | 9 | 0 | 0 | 0 | 0 |
| NY140 | 7 | 9 | 8 | 5 | 7 | 7 | 5 | 8 | 4 | 8 | 5 | 7 | 7 | 0 | 9 | 0 | 0 | 0 | 0 |
| Snowden | 9 | 9 | 8 | 6 | 6 | 6 | 7 | 7 | 2 | 4 | 5 | 7 | 6 | 0 | 9 | 0 | 0 | 0 | 0 |
| W2310-3 | 6 | 8 | 9 | 6 | 6 | 6 | 5 | 8 | 3 | 7 | 5 | 6 | 5 | 2 | 8.8 | 0 | 0 | 0 | 0 |
| W2978-3 | 6 | 8 | 9 | 6 | 8 | 9 | 7 | 7 | 2 | 8 | 5 | 8 | 8 | 0 | 9 | 2 | 0 | 4 | 0 |
| W4980-1 | 6 | 9 | 9 | 8 | 5 | 7 | 7 | 5 | 3 | 6 | 7 | 8 | 9 | 2 | 8.2 | 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

Table 3. UTZ Quality Foods Chip Data.

| Clone | % Defects | | %Total | Specific | Defect Descriptions[1] | Chip Color[2] | |
|---|---|---|---|---|---|---|---|
| | Internal | External | Defects | Gravity | | Hunter Lab | Agtron |
| AF0338-17 | 2% | 0% | 2% | 1.093 | ID(Light Cast) | 59.2 | 57.1 |
| Atlantic | 7% | 0% | 7% | 1.103 | IHN | 62.1 | 64.1 |
| CO00188-4W | 1% | 0% | 1% | 1.083 | ID(Light Cast) | 60.4 | 59.8 |
| CO00197-3W | 2% | 0% | 2% | 1.093 | SB, ID | 60.8 | 60.4 |
| MSL292-A | 0% | 0% | 0% | 1.099 | . | 62.1 | 64.1 |
| MSQ086-3 | 5% | 0% | 5% | 1.097 | VB, ID | 61.0 | 60.7 |
| ND7519-1 | 3% | 0% | 3% | 1.108 | SB | 60.5 | 59.9 |
| ND8305-1 | 3% | 0% | 3% | 1.098 | SB, VB | 60.2 | 59.5 |
| ND8331Cb-2 | 7% | 0% | 7% | 1.092 | SB, VB | 60.3 | 59.6 |
| NY140 | 2% | 0% | 2% | 1.095 | VB, ID | 60.6 | 60.1 |
| Snowden | 0% | 0% | 0% | 1.103 | . | 61.6 | 62.5 |
| W2310-3 | 1% | 0% | 1% | 1.106 | SB | 60.3 | 59.6 |
| W2978-3 | 1% | 0% | 1% | 1.082 | BC, ID | 59.6 | 58.1 |
| W4980-1 | 1% | 0% | 1% | 1.088 | SB, ID(Light Cast) | 59.7 | 58.3 |

[1] **Defect Descriptions:**

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

[2] **Chip Color:**

**Hunter Lab Scores**

Taken with defective chips included in sample

## Clone Summaries

AF0338-17: Maturity for this clone was mid-season (though more typically late) and stand counts averaged 96% and vigor was excellent. Shapes were round to oblong, size was medium to large and overall appearance was good. Marketable yields were 97% of Atlantic, gravity was 1.088 and chip color was excellent in the 24 to 48 hour and the 5 to 7 day chip tests. External defects included misshapes, soft rot, Fusarium dry rot and skin blemishes due to Rhizoctonia.

CO00188-4W: Maturity for this clone was mid-season with 99% stands and excellent plant vigor. Shapes were mostly round, size was small to medium and overall appearance was better than fair. Marketable yields were 77% of Atlantic, gravity was 1.074 and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects included misshapes, sunscald, growth cracks and common scab.

CO00197-3W: This clone was mid-maturing and had 92% stands with better than good plant vigor. Shapes were mostly round, size was small, and overall appearance was fair. Marketable yields were 72% of Atlantic, gravity was 1.081 and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects were sunscald, soft rot, skin blemishes due to Rhizoctonia and misshapes.

MSL292-A: This clone was mid-maturing and had 99% stands with excellent vigor. Shapes were mostly round, size was smaller than medium, and overall appearance was less than fair. Marketable yields were 82% of Atlantic, gravity was 1.086, and chip scores were excellent for the 24 to 48 hour test and exceptional for the 5 to 7 day test. External defects included misshapes, soft rot, deep apical and stem ends, common scab and sunscald.

MSQ086-3: This clone was mid-maturing and had stands of 96% with good vigor. Shapes were mostly round, size was small to medium, and overall appearance was better than fair. Marketable yields were 59% of Atlantic, gravity was 1.081, and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects included high amounts of common scab, high amounts of skin blemishes due to Rhizoctonia, soft rot and sunscald.

ND7519-1: This mid to late maturing clone had stands of 84% with better than fair plant vigor. Shapes were round to oblong, size was small, and overall appearance was less than fair. Marketable yields were 40% of Atlantic, gravity was 1.094, chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects included sunscald, skin blemishes due to Rhizoctonia and misshapes.

ND8305-1: Maturity for this clone was mid-season, stands were 85% and vigor was better than fair. Shapes were mostly round, size was very small, and overall appearance was better than fair. Marketable yields were 22% of Atlantic, gravity was 1.092, chip scores were exceptional for the 24 to 48 hour test and excellent for the 5 to 7 day test. External defects included sunscald, soft rot and misshapes.

ND8331Cb-2: This clone was mid-maturing, and stands were 94% with good vigor. Shapes were mostly round, size was small and overall appearance was less than fair. Marketable yields were 4% of Atlantic, gravity was 1.087, and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day chip tests. External defects included tight stem attachments, sunscald, and skin blemishes due to Rhizoctonia.

NY140: This clone had stands of 98%, and was mid-maturing (though more typically mid to late) with excellent vigor. Shapes were mostly oblong, size was medium and overall appearance was good. Marketable yields were 103% Atlantic, gravity was 1.083, and chip scores were excellent in the 24 to 48 hour and good in the 5 to 7 day test. External defects included soft rot, misshapes, and sunscald. Overall, this clone was one of the best clones in the trial.

W2310-3: This clone was mid-maturing with 97% stands and better than good vigor. Shapes were round to oblong, medium size, and fair for overall appearance. Marketable yields were 74% of Atlantic, gravity was 1.099, and chip scores were excellent in both the 24 to 48 hour and 5 to 7 day tests. External defects included high amounts of skin blemishes due to Rhizoctonia, soft rot, common scab and sunscald.

W2978-3: Maturity for this clone was mid-season, and had 93% stands with better than fair vigor. Shapes were mostly round, size was medium and overall appearance was better than good. Marketable yields were 62% of Atlantic, specific gravity was 1.075, and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day tests. External defects included sunscald, misshapes, common scab and soft rot.

W4980-1: Maturity for this clone was late and stands were 96% with excellent vigor. Shapes were round to oblong, size was medium to large, and overall appearance was excellent. Marketable yields were 106% of Atlantic, gravity was 1.082, and chip scores were excellent for both the 24 to 48 hour and 5 to 7 day tests. External defects included sunscald, common scab, skin blemishes due to Rhizoctonia and soft rot. Overall, this clone was one of the best clones in the trial.

## NORTH DAKOTA REGIONAL LOCATION

| Local Coordinators: | Cooperating Grower: | Cooperating Chip Processor: |
|---|---|---|
| Mr. Martin Glynn<br>Food Technologist<br>USDA, ARS<br>Potato Research Worksite<br>East Grand Forks, Mn 56721 | Oberg Farms<br>Hoople, ND | USDA, ARS<br>Potato Research Worksite<br>East Grand Forks, MN 56721 |

**Trial Data:**

| | |
|---|---|
| Planting Site: | Oberg Farms, Hoople, ND |
| Planting Date: | June 9, 2011 |
| Harvest Date: | September 19, 2011 (103 days) |
| Growing Conditions: | Overall, weather conditions in the region for the 2011 growing season were Poor. A very wet cool spring delayed planting and also delayed emergence. Temperatures in June were cool and conditions did not improve until in July. From August through harvest we had hot dry conditions.. Total yields were below average to fair for most clones, and tubers in general were under sized. |
| Experimental Design: | Each variety/clone was planted in a single 250 ft row as directed by the SFA protocol. Four 20 ft sections of each row were harvested and graded. This was not a randomized and replicated experiment. Only means were calculated. |
| Row Spacing: | Machine planted. Approx. 12 inches in-row, 36 inches between-rows. |
| Fertilizer: | Awaiting data |
| Pest Control: | Awaiting data |
| Chip Ratings: | Chips were prepared and rated following the procedures outlined in the Snack Food Association Chipping Potato Handbook (1995). Chips were prepared and fried on 1/20 size chip line at USDA, ARS Potato Research Worksite, East Grand Forks, MN .56721 Chip scores are presented in Table 2. |

Table 1. Production statistics for SFA clones.

Table 1. Production statistics for SFA clones

| Clone | US #1 Yld cwt/A | Total Yld cwt/A | #1 Y % | Culls % | Size Class Distribution (%) 1 | 2 | 3 | 4 | 5 | Size Class Range 2 to 4 | 3 to 4 | Specific Gravity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Atlantic | 145 | 220.4 | 66 | 0.0 | 30 | 52 | 7 | 6 | 0 | 66 | 13 | 1.095 |
| CO 00188-4W | 106 | 151.5 | 70 | 0.0 | 14 | 39 | 27 | 5 | 14 | 70 | 32 | 1.087 |
| CO 00197-3W | 115 | 168.2 | 68 | 0.0 | 15 | 40 | 16 | 12 | 13 | 68 | 28 | 1.910 |
| CV 97065-1 | 125 | 177.2 | 71 | 4.8 | 12 | 48 | 17 | 9 | 13 | 71 | 25 | 1.089 |
| MSJ 126-9Y | 164 | 260.9 | 63 | 0.0 | 20 | 41 | 15 | 7 | 12 | 63 | 21 | 1.078 |
| MSL 292-A | 226 | 316.6 | 72 | 0.0 | 20 | 44 | 15 | 12 | 5 | 72 | 28 | 1.082 |
| MSR 061-1 | 238 | 356.7 | 67 | 0.3 | 18 | 45 | 9 | 12 | 11 | 67 | 22 | 1.089 |
| ND 7519-1 | 115 | 177.8 | 64 | 0.0 | 23 | 46 | 15 | 3 | 7 | 64 | 19 | 1.089 |
| ND 8305-1 | 125 | 207.7 | 60 | 2.8 | 12 | 32 | 19 | 11 | 24 | 60 | 29 | 1.098 |
| ND8331CB-2 | 230 | 338.6 | 68 | 0.0 | 24 | 48 | 15 | 5 | 2 | 68 | 20 | 1.086 |
| NY 140 | 202 | 346.1 | 58 | 0.0 | 33 | 51 | 6 | 1 | 1 | 58 | 7 | 1.084 |
| Snowden | 278 | 391.2 | 71 | 0.0 | 18 | 45 | 16 | 10 | 7 | 71 | 26 | 1.089 |
| Starburst | 175 | 328.8 | 53 | 0.0 | 39 | 46 | 5 | 2 | 0 | 53 | 7 | 1.087 |
| W 2310-3 | 80 | 113.7 | 70 | 0.0 | 24 | 45 | 20 | 5 | 2 | 70 | 25 | 1.092 |
| W2978-3 | 216 | 323.0 | 67 | 1.7 | 8 | 39 | 14 | 15 | 22 | 67 | 29 | 1.088 |
| W 4980-1 | 76 | 114.3 | 66 | 0.0 | 17 | 45 | 14 | 7 | 14 | 66 | 21 | 1.092 |
| W 5015-12 | 144 | 229.3 | 63 | 0.0 | 11 | 35 | 15 | 13 | 24 | 63 | 28 | 1.078 |

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

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

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

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

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

| | Plant Growth Characteristics[1] | | | | Tuber Characteristics[2] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Clone | Percent Stand | Early Vigor | Vine Type | Vine Maturity | IFC | SC | ST | TS | ED | APP | Chip Rating[3] |
| Atlantic | 83 | na | 9 | 3 | 2 | 6 | 6 | 3 | 7 | 7 | 71 |
| CO 00188-4W | 72 | na | 8 | 3 | 1 | 6 | 5 | 3 | 5 | 7 | 73 |
| CO 00197-3W | 82 | na | 6 | 3 | 2 | 6 | 5 | 3 | 5 | 7 | 75 |
| Cv 97065-1 | 73 | na | 8 | 5 | 1 | 6 | 5 | 3 | 5 | 7 | 74 |
| MSJ 126-9Y | 83 | na | 1 | 3 | 3 | 6 | 6 | 4 | 5 | 8 | 72 |
| MSL292-A | 89 | na | 8 | 3 | 1 | 6 | 5 | 3 | 5 | 6 | 74 |
| MSR 061-1 | 87 | na | 8 | 4 | 1 | 6 | 6 | 3 | 5 | 7 | 74 |
| ND 7519-1 | 90 | na | 8 | 5 | 1 | 6 | 6 | 3 | 5 | 7 | 76 |
| ND 8305-1 | 78 | na | 8 | 4 | 2 | 6 | 6 | 4 | 5 | 7 | 75 |
| ND 8331cb-2 | 57 | na | 8 | 7 | 1 | 6 | 6 | 4 | 7 | 7 | 79 |
| NY 140 | na | na | 6 | 8 | 1 | 6 | 5 | 3 | 7 | 8 | 75 |
| SNOWDEN | 76 | na | 9 | 7 | 1 | 6 | 5 | 4 | 6 | 7 | 75 |
| STARBURST | 67 | na | 8 | 5 | 1 | 6 | 6 | 4 | 6 | 5 | 75 |
| W 2310-3 | 76 | na | 8 | 5 | 2 | 6 | 5 | 5 | 3 | 7 | 74 |
| W 2978-3 | 75 | na | 8 | 3 | 1 | 6 | 5 | 4 | 4 | 6 | 75 |
| W 4980-1 | 80 | na | 8 | 3 | 1 | 6 | 5 | 4 | 4 | 6 | 74 |
| W 5015-12 | 85 | na | 8 | 4 | 1 | 6 | 5 | 3 | 4 | 7 | 74 |

[1]**Plant Growth Characteristics.**

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

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

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

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

[2]**Tuber Characteristics.**

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

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

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

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

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

[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 SFA clones.

| Clone | % External Tuber Defects[1] | | | | | % Internal Tuber Defects[2] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Growth Cracks | Mis-Shapen | Sun-Burned | Rotten & misc. | Total Culls | HH | BR | CRS | IHN |
| Atlantic | 0 | 0 | 3 | 0 | 5 | 1 | 0 | 0 | 0 |
| CO 00188-4W | 0 | 0 | 0 | 2 | 4 | 0 | 0 | 0 | 0 |
| CO 00197-3W | 0 | 0 | 2 | 3 | 6 | 0 | 0 | 0 | 0 |
| CO00188-4W | 0 | 0 | 4 | 3 | 9 | 0 | 0 | 0 | 0 |
| CV 97065-1 | 0 | 3 | 6 | 1 | 10 | 0 | 0 | 0 | 0 |
| MSJ 126-9Y | 0 | 0 | 3 | 1 | 5 | 0 | 0 | 0 | 0 |
| MSL 292-A | 3 | 1 | 2 | 4 | 8 | 0 | 0 | 0 | 0 |
| MSR 061-1 | 0 | 0 | 4/ | 1 | 6 | 0 | 0 | 0 | 0 |
| ND7519-1 | 1 | 3 | 3 | 3 | 10 | 0 | 0 | 0 | 0 |
| ND8305-1 | 0 | 1 | 2 | 2 | 6 | 0 | 0 | 0 | 0 |
| ND8331cb-2 | 0 | 2 | 3 | 2 | 7 | 0 | 0 | 0 | 0 |
| NY 140 | 0 | 1 | 4 | 2 | 6 | 0 | 0 | 0 | 0 |
| SNOWDEN | 0 | 0 | 1 | 1 | 3 | 0 | 0 | 0 | 0 |
| STARBUST | 1 | 0 | 5 | 3 | 9 | 0 | 0 | 0 | 0 |
| W 2310-3 | 0 | 0 | 3 | 2 | 6 | 0 | 0 | 0 | 0 |
| W 2978-3 | 0 | 0 | 6 | 4 | 11 | 0 | 0 | 0 | 0 |
| W 4980-1 | 0 | 4 | 2 | 1 | 8 | 0 | 0 | 0 | 0 |
| W 5015-12 | 0 | 2 | 4 | 2 | 8 | 0 | 0 | 0 | 0 |

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

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

# Snack Food Association Chip Variety Trial

Oregon Trial Cooperators
Phil Hamm, Laurie Leroux, Fahrettin Goktepe
Oregon State University
Hermiston Agricultural Research and Extension Center
Hermiston, Oregon

Trial Information

| | |
|---|---|
| Planting Date | April 22, 2011 |
| Vine Kill Date | September 21, 2011 |
| Harvest Date | October 17, 2011 |
| Row Spacing | 9.25" seed spacing in 34" beds |
| Plots | Single row spacing of 24 hills in four randomized blocks |
| GDD | 2506.3 |

This trial was to evaluate fifteen advanced cultivars and two control varieties in the Snack Food Association Trial for their chip processing qualities. This trial was grown for 152 days, providing evaluation of the cultivars under long season, late harvest conditions. The seed was cut by hand and planted on April 22nd. The vines were killed on September 21st and the plots were mechanically harvested on October 17th. The plots were grown in fine sandy loam soil following a small grains crop the previous year. The trial area was fumigated in September 2010 with 41 gallons per acre of Vapam with .6 inches of water. A pre-plant application of 57 pounds of nitrogen, 200 lbs of K2O, 30 pounds of sulfur, 10 pounds of Zinc and 1.5 pounds of Boron was made. Dry fertilizer was banded at planting with 60 pounds nitrogen, 80 pounds of P2O5, and 40 pounds of sulfur per acre at planting. An addition 270 pounds of slow release nitrogen was top dressed on May 20th. The trial was irrigated by central pivot irrigation. The trial received management inputs normal for this area as indicated for insecticides and a weekly fungicide application was made. The harvest area was one row of 24 hills replicated four times for each cultivar. Plants were spaced at 9.25" in 34 inch rows.

The overall yields in this trial ranged from 566 cwt/acre for the Colorado cultivar CO00188-4W to 1,307 cwt/acre for the New York cultivar NY140 (Table 1). US #1 yields ranged from a low of 444 cwt/acre for CO00188-4W to 822 cwt/acre for the cultivar W5015-2. Specific gravities ranged from 1.068 for W2978-3 to 1.089 for ND8305-1. Processing color evaluation was conducted four days after harvest. Fourteen cultivars fried at an acceptable SFA color index of 1 to 2. Three cultivars had SFA color indexes above the acceptable range. W5015-12 had an index of 2.8, MN99380-1 had 3.3 index color and E106-4 had the highest index color of 5.0 (Table 1). It is important to note that vascular discoloration and the chip color may have been influenced by Zebra Chip, which was found for the first time this summer in the Columbia Basin. The disease pressure was high. Because of the occurrence of that disease, three separate ratings of the tubers were done. Rating 1 included 20 tubers from each replication from each

cultivar. Each tuber was cut lengthwise and any vascular discoloration was considered possible Zebra Chip, but hollow heart, brown center and IBS were rated separately. Information from Rating 1 was used to provide information for Table 4. Rating 2 involved 20 tubers from replication 1 and 2 from each cultivar. These were cut in half widthwise. Tubers without visual symptoms of any kind were selected for frying. SFA index color was made on those chips not expressing the Zebra Chip symptoms following frying. Rating 3 included tubers only from replication 4 from each cultivar. Twenty tubers were cut from each cultivar. A single tuber with the most extreme internal discoloration was selected along with a single tuber with the least internal discoloration and fried. Combine results from Ratings 2 and 3 are presented in Table 6. Several cultivars indicated reduced or no issues from frying, suggesting they may not have been infected by Zebra Chip or the disease did not impact fry color. Sampling tubers from Rep 3, currently in storage, using PCR analysis, might provide additional and valuable information to confirm Zebra Chip infection or not, and how that relates to fry color. The results from Rating 2 and 3 may suggest possible Zebra Chip resistance/tolerance and further field/lab testing is warranted.

External tuber characteristics are listed in Table 2. The most serious external defect that was present in all the cultivars was shatter bruise. All of the cultivars had shatter bruising to some extent. The most serious shatter bruising was observed in ND8305-1, W4980-1 and MSJ126-9Y. The high incidence of shatter bruising is also be a symptom of Zebra Chip infection, as seen in other trials at this station this past season. Some tubers with deep severe shatter bruising had already started to rot within 24 hours after harvest and was also noted 4 days later during chip frying.

Table 3 lists plant characteristics. One cultivar had poor emergence and stand percentage. ND7519-1 had a 45 days emergence of 41% and a final stand percentage of 81%, the lowest of all cultivars. MSR061-1 had the lowest tubers per plant rating of 8.1, and W5015-12 had the highest of 15.5 tubers per plant. ND8331Cb-2 had the smallest average tuber size of 4.5 ounces and NY140 had the largest average tuber size of 12.4 ounces.

Internal defects ratings were evaluated from 20 tubers in the largest size category from each of the four replications per cultivar, cut lengthwise. Internal defects were high, much of which was likely due to the Zebra Chip, listed as vascular discoloration (Table 4). Actual symptoms caused by Zebra Chip was less since the results from frying, in some cultivars, resulted in normal chip fry color when the expected results from infected tubers would have been unacceptable. Also the long growing season resulted in large tubers for the variety Atlantic where 25% hollow heart was observed. Internal brown spot was highest in ND7519-1 at 20%. Black spot bruise was notable in MN99380-1 at 12.5%.

Tuber percentage and average size (ounces) per grade category are displayed in Table 5. The table lists the percentage of tubers by count in each grade category. ND8331Cb-2 had the largest count of tubers by percentage in the undersize category of 41%. Several cultivars Including Snowden, ND8305-1, W4980-1, MSR061-1 and W5015-12

had around half of the tubers by count in the medium category with the average tuber weight of around 5.5 ounces. Atlantic had the largest count percentage in the large category of 42.9%. The long growing season may have resulted in the more tubers in the oversize category, with the highest amount of tubers by count size in oversize category for cultivar NY140 of 34.5% of the tubers in this grade and an average tuber size of 19.8 ounces.

**Cultivar Comments**

Atlantic This variety was one of the control varieties in SFA trial. It had the second highest yield out of the seventeen cultivars in the trial. It also had the second highest yield in oversize tubers. It has a second largest average tuber size of 8.9 ounces. Atlantic had the second highest specific gravity of 1.087 and had an acceptable SFA chip index color of 1.8. It had the most notable amount of hollow heart at 25% and internal brown spot was at 10%. Combined vascular discoloration it had a total of 73.8% of the tubers with internal defects, the highest in the trial. The Atlantic tubers were overall too large, with some greening and a few knobs.

Snowden This variety was also planted as a control variety. It had a high yield, specific gravity of 1.079 and a good SFA chip index color of 1.5. It looked good in this trial, with minimal internal defects except for vascular discoloration of 31.3%, likely due to Zebra Chip. The tubers were nice, round with good shape and some tuber greening.

CO00188-4W This Colorado cultivar had the smallest yield of the seventeen in the trial of 566 cwt/acre and the fourth highest percent of US#1, 79%, but still the smallest US#1 yield of 444 cwt/acre. It had a good SFA chip index color of 1.3 and had somewhat severe shatter bruise rating of 3.3. The tubers had a nice shape but were small and flattish. The most remarkable attribute of the cultivar was the low yield. Vascular discoloration, or Zebra Chip, was the second lowest of the trial with only 13.8% of the tubers with this defect and little fry color issues.

CO00197-3W This cultivar out of Colorado had the fourth lowest yield in this trial. It had moderate shatter bruising rating of 3.9 and somewhat low gravity of 1.072. Visual Zebra Chip symptoms as vascular discoloration was high at 42.5%. It had the second lowest percent of US#1 at 70%. The remarks during grading were flat, pointy, knobs and some green tubers.

MSL292-A The tuber shape for this cultivar was extremely compact, making it the shortest widest tuber of the bunch. The eye depth was deep with a rating of 3.0 and a low shape uniformity rating of 3.4. The tubers had attached stems and some of the tubers that were not compact, were oblong and flattish. These attributes made it the least desirable in appearance and difficult to process. The specific gravity was low at 1.072 and the yield was good with 639 cwt/acre for US#1. The internals defects were low, except for vascular discoloration of 40%.

ND7519-1 ND7519-1 had the lowest emergence rating at only 41% of the tubers emerging at 45 days. The stand was also the lowest at 81% of the tubers planted. This stand rating affected the overall yield, making the total yield 788 cwt/acre and US#1

yield of 559 cwt/acre. The external attributes were acceptable with the lowest characteristic being shatter bruise with a rating of 4.1. This cultivar fried somewhat dark with a SFA chip color rating of 2.0,but was still an acceptable color. ND7519-1 had internal brown spot in 20% of the tubers, making it the highest in the trial. The tubers had a nice round shape, some were a little flat. There were a large percentage of tubers by count in the undersize category (31.1%).

ND8305-1 This cultivar was in the middle of the pack with a total yield of 763 cwt/acre. The specific gravity was the highest of the cultivars at 1.089, and the worst shatter bruise rating of 1.4. The shatter bruising was so deep and severe on the bud end of the tubers that the tubers were beginning to rot with 24 hours of harvest. The cultivar also had poor shape uniformity (3.5 rating) with green and misshapen tubers. The internal defects included internal brown spot at 11.3% and vascular discoloration of 38.8%

ND8331Cb-2 ND8331Cb-2 had the nicest tubers with good color and shape. It also had the largest amount of undersize tubers by weight (172 cwt/acre) and by count (44.1%). Overall US#1 was the second lowest at 512 cwt/acre. The internal defects were the fourth lowest with total internal defects 31.3%. Shatter bruise for this cultivar was rated at 3.8 and the SFA chip color index was acceptable at 1.8. Tuber size is the most notable negative characteristic of this cultivar. Even with the long, late season harvest, this cultivar had too many undersize tubers. Fry issues due to possible Zebra Chip were low.

NY140 The largest yield (1,307 cwt/acre) was from NY140, but after subtracting oversize tubers from the US#1 yield, it ranked the third lowest in US#1 yield with 518 cwt/acre. It had 710 cwt/acre of oversize tubers and 34.5% by count of oversized, likely the result of the long growing season. This cultivar may be best suited for an early, short season harvest. The external defect most notable was deep eyes (3.5 rating) but it had had the second lowest shatter bruise rating of 4.5. Large tubers produced an average tubers size of 12.4 ounces, the largest in trial.

W2310-3 This cultivar also had large tubers. Harvest notes indicated that the tubers were large flat and misshapen, with a few knobs, giving it a shape uniformity rating of 3.5. The total yield was good with 817 cwt/acre with 83% falling into the US#1 grade category. The chips fried with an excellent SFA chip color index of 1.3. Specific gravity was below average at 1.074.

W2978-3 Specific gravity for this cultivar was the lowest of the seventeen cultivars at 1.068. The shape uniformity was very good with a rating of 4.8. The harvest notes reflect this value with remarks for each plot indicating good shape, size and color. The chips fried at a SFA chip color index of 1.5. US#1 yield was below average with 552 cwt/acre. Vascular discoloration was high at 43.8% of the tubers exhibiting this defect.

W4980-1 SFA chip color index was 1.0 for the cultivar, of which only two cultivars in the trial achieved. Shatter bruising was severe in this cultivar with a rating of 2.3 and with bud end shatter bruising starting to rot soon after harvest. Internal defects included hollow heart (1.3%), brown center (3.8%), internal brown spot (11.3%) and a high vascular discoloration percentage of 55% for a total of 73.8% total internals, tied with

Atlantic for the worst percentage in the trial. Specific gravity was below average at 1.073.

MN99380-1 This cultivar had the sixth highest total yield of 917 cwt/acre and the fifth highest US#1 yield of 712 cwt/acre. Specific gravity was below average at 1.074. This cultivar was one of three with an unacceptable SFA chip fry color of 3.3. The lowest skin set rating was noted for this cultivar at a rating of 3.4 and it also had the lowest growth crack rating of 3.9. Black spot bruising was at 12.5%, the highest of any cultivar. Notes at grading included protruding eyes, knobs, attached stems and flattish tubers, giving it highest percent (9.3%) of tubers by count in the culls category.

MSJ126-9Y Low tuber set was most notable of this cultivar, with an average of 8.1 tubers per plant, the lowest of all the cultivars. Despite the low tubers set, the yield was not the lowest in the trial. It had a total yield of 729 cwt/acre and a US#1 yield of 563 cwt/acre putting it in the middle of the pack for yield. The specific gravity was below average at 1.073, but it had a good SFA chip color rating of 1.3. This cultivar had 60% of the tubers with the internal defect of vascular discoloration. External rating included a shape uniformity rating of 4.1and an eye depth rating of 4.0. The shatter bruise rating of 2.3 was the second lowest for the trial. The tuber flesh was light yellow in color. Tuber distribution was good with 75.4% of the tubers in the medium and large range. Grading notes indicted some tubers with deep eyes, some with nice shape, and flat and misshapen tubers.

MSR061-1 This cultivar had a total yield of 859 cwt/acre and an above average US#1 yield of 688 cwt/acre, slightly above average. Specific gravity was above average at 1.079. It had a good SFA chip index color of 1.5. It had a lot of undersized tubers with 125 cwt/acre and 29.4% by count, with 48% of tubers by count in the medium category. Vascular discoloration was high at 41.3%. External tuber characteristic were among the best, with shatter bruise the only notable defect with a rating of 3.8. Grading notes indicate this cultivar to be the best looking with the best external characteristics of the bunch, with notes on the large amount of undersize and a few knobs.

E106-1(NY148) E106-1 was the most unique of the cultivars in terms of Zebra Chip and vascular discoloration. The internal defect table shows this cultivar to have the best rating in terms of percentage of vascular discoloration at 11.3%, the lowest of the entries. SFA chip color index for this cultivar was however a 5.0, the most unacceptable reading of all the cultivars. The tubers did not exhibit translucent end or jelly tuber, during cutting, an indication of sugar formation, but the chips fried very dark, a very uniform darkness on all of the chips. The cause of the chip darkening it undeterminable within our testing parameters, but is likely due to Zebra Chip. This may indicate that Zebra Chip symptom is not easily seen in raw tubers. Further glucose and ELISA testing may point to the cause of the chip darkening. The total yield was third highest for the trial at 1,054 cwt/acre and a US#1 yield of 806 cwt/acre. Specific gravity was below average at 1.074. External tuber characteristics worth noting are shape uniformity rating of 4.0 and a relatively good shatter bruise rating of 4.1. Total internal defects were the lowest of all the entries at 13.8%. Notes indicate the tubers were flat and lumpy in appearance.

W5015-12 W5015-12 is a high yielding cultivar with the fifth highest total yield of 1,005 cwt/acre and the highest US#1 yield of 822cwt/acre, a percentage of 82%. It had an unacceptable SFA chip index color of 2.8, which may be due to Zebra Chip. The level of vascular discoloration at grading was 56.3% of the tubers. This cultivar had the most russetting of all the entries, and some tubers had a coarse russet. The skin color was buff to light brown. It had an above average specific gravity of 1.084. Tuber size distribution shows 25% of the tubers by count in the undersize category and 58.4% in the medium size category, the highest percentage of all entries. Harvest notes include pink around the eyes on the tubers, the tubers were a little flat and that they had attached stems.

**Growing Season Weather Conditions**

The growing season temperatures for the period between 4/22/2011, planting date, and the vine kill date of 9/21/11 were cooler than average. The growing degree days for this period in 2011 was 2506.3 and the average of the previous five years (2006-2010) was 2704.9, nearly 200 GDD less than the average. The average GDD for the period was 16.3 and the average for the previous five years was 17.7. The maximum temperature in 2011 was 97 degrees compared to the five year average of 104.8 degrees (data compiled from the IRZ Consulting website weather report for Hermiston, OR). There was 2.01 inches of rain during this period combined with approximately 30” of irrigation water for a total of 32” for the growing period.

**Other Notes**

A sample from each plot, for a total of approximately 40 pounds of each entry, was sent to a commercial storage shed for a six month storage period and will then be sent to a commercial processor for frying. Results will be available next spring.

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

| Selection | Total Yield | US No. # Yield | % US #1 | Oversize >4 in. diam. | Large 3-4" diam. | Medium 1 7/8"-3" diam. | Culls | Undersize < 1 7/8" diam. | Specific Gravity | SFA Color |
|---|---|---|---|---|---|---|---|---|---|---|
| | <----------cwt/acre----------> | | | | | | | | | |
| Atlantic | 1265 | 804 | 64 | 356 | 597 | 207 | 69 | 36 | 1.087 | 1.8 |
| Snowden | 1047 | 776 | 74 | 151 | 415 | 362 | 39 | 81 | 1.079 | 1.5 |
| CO00188-4W | 566 | 444 | 79 | 12 | 102 | 342 | 7 | 101 | 1.071 | 1.3 |
| CO00197-3W | 752 | 528 | 70 | 59 | 245 | 283 | 59 | 106 | 1.072 | 1.0 |
| MSL292-A | 849 | 639 | 75 | 82 | 311 | 327 | 43 | 84 | 1.077 | 1.8 |
| ND7519-1 | 788 | 559 | 71 | 91 | 218 | 342 | 23 | 114 | 1.078 | 2.0 |
| ND8305-1 | 763 | 561 | 74 | 9 | 156 | 404 | 60 | 133 | 1.089 | 1.8 |
| ND8331Cb-2 | 725 | 512 | 71 | 4 | 140 | 372 | 37 | 172 | 1.085 | 1.8 |
| NY140 | 1307 | 518 | 40 | 710 | 434 | 84 | 70 | 9 | 1.072 | 2.0 |
| W2310-3 | 817 | 676 | 83 | 37 | 410 | 266 | 60 | 43 | 1.074 | 1.3 |
| W2978-3 | 736 | 552 | 75 | 56 | 262 | 290 | 34 | 95 | 1.068 | 1.5 |
| W4980-1 | 723 | 560 | 78 | 37 | 205 | 355 | 36 | 90 | 1.073 | 1.0 |
| MN99380-1 | 941 | 712 | 76 | 84 | 396 | 316 | 62 | 83 | 1.074 | 3.3 |
| MSJ126-9Y | 729 | 563 | 77 | 104 | 350 | 214 | 26 | 36 | 1.073 | 1.3 |
| MSR061-1 | 859 | 688 | 80 | 25 | 264 | 425 | 20 | 125 | 1.079 | 1.5 |
| E106-4 (NY148) | 1054 | 806 | 77 | 162 | 505 | 302 | 39 | 47 | 1.074 | 5.0 |
| W5015-12 | 1005 | 822 | 82 | 16 | 194 | 628 | 48 | 119 | 1.084 | 2.8 |
| Mean | 878 | 631 | 73 | 117 | 306 | 325 | 43 | 87 | 1.077 | 1.9 |

**Table 2- External Tuber Characteristics.**

| Selection Name | Skin color* | Russet | Eye Depth | Skin Set | Shape Uniformity | Scab | Growth Cracks | Shatter Bruise |
|---|---|---|---|---|---|---|---|---|
| | | 1-5=heavy | 1-5=shallow | 1-5=best | 1-5=best | 1-5=none | 1-5=none | 1-5=none |
| Atlantic | 1.3 | 1.6 | 5.0 | 4.6 | 5.0 | 5.0 | 4.9 | 4.1 |
| Snowden | 1.0 | 1.1 | 4.3 | 5.0 | 4.4 | 5.0 | 5.0 | 4.6 |
| CO00188-4W | 1.0 | 1.0 | 4.8 | 5.0 | 4.6 | 5.0 | 5.0 | 3.3 |
| CO00197-3W | 1.0 | 1.0 | 5.0 | 4.6 | 4.3 | 5.0 | 5.0 | 3.9 |
| MSL292-A | 1.0 | 1.5 | 3.0 | 4.8 | 3.4 | 5.0 | 5.0 | 4.6 |
| ND7519-1 | 1.0 | 1.3 | 4.6 | 4.9 | 4.5 | 5.0 | 5.0 | 4.1 |
| ND8305-1 | 1.0 | 1.0 | 4.3 | 4.9 | 3.5 | 5.0 | 4.8 | 1.4 |
| ND8331Cb-2 | 1.0 | 1.0 | 4.5 | 4.8 | 4.5 | 5.0 | 4.4 | 3.8 |
| NY140 | 1.0 | 1.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.0 | 4.4 |
| W2310-3 | 1.0 | 1.5 | 4.8 | 4.0 | 3.5 | 5.0 | 4.6 | 4.0 |
| W2978-3 | 1.0 | 1.0 | 5.0 | 4.6 | 4.8 | 5.0 | 4.1 | 3.4 |
| W4980-1 | 1.6 | 1.9 | 4.6 | 4.8 | 4.8 | 4.8 | 5.0 | 2.3 |
| MN99380-1 | 1.1 | 1.0 | 4.9 | 3.4 | 4.3 | 5.0 | 3.9 | 3.6 |
| MSJ126-9Y | 1.5 | 1.4 | 4.0 | 4.5 | 4.1 | 5.0 | 4.8 | 2.3 |
| MSR061-1 | 1.8 | 1.4 | 5.0 | 5.0 | 5.0 | 4.9 | 5.0 | 3.8 |
| E106-4 (NY148) | 1.1 | 1.0 | 4.8 | 4.3 | 4.0 | 5.0 | 5.0 | 4.1 |
| W5015-12 | 2.0 | 2.4 | 5.0 | 4.8 | 4.8 | 5.0 | 4.9 | 4.1 |
| Mean | 1.2 | 1.3 | 4.5 | 4.6 | 4.3 | 5.0 | 4.8 | 3.6 |

* 1=white, 2=buff, 3=light brown, 4=brown, 5= dark brown

**Table 3 - Field emergence, stand, stem count, tubers per plant and average tuber size.**

| Selection | 45 day Emergence | 60 day Stand | Stems/ Plant | Tubers/ Plant | Average Tuber Size |
|---|---|---|---|---|---|
| | <----------%----------> | | | | (oz.) |
| Atlantic | 84.4 | 100.0 | 2.6 | 11.4 | 8.9 |
| Snowden | 95.8 | 100.0 | 2.9 | 12.8 | 6.5 |
| CO00188-4W | 86.5 | 96.9 | 2.8 | 9.4 | 5.0 |
| CO00197-3W | 70.8 | 96.9 | 2.6 | 11.4 | 5.4 |
| MSL292-A | 81.3 | 99.0 | 2.2 | 10.8 | 6.4 |
| ND7519-1 | 40.6 | 81.3 | 2.7 | 14.0 | 5.6 |
| ND8305-1 | 82.3 | 97.9 | 2.5 | 12.8 | 4.9 |
| ND8331Cb-2 | 87.5 | 99.0 | 2.6 | 13.2 | 4.5 |
| NY140 | 83.3 | 94.8 | 2.1 | 9.0 | 12.4 |
| W2310-3 | 82.3 | 100.0 | 3.1 | 9.1 | 7.2 |
| W2978-3 | 89.6 | 100.0 | 2.8 | 9.7 | 6.1 |
| W4980-1 | 86.5 | 100.0 | 2.4 | 10.1 | 5.7 |
| MN99380-1 | 87.5 | 100.0 | 2.8 | 12.7 | 6.1 |
| MSJ126-9Y | 77.1 | 94.8 | 1.9 | 8.1 | 7.6 |
| MSR061-1 | 80.2 | 95.8 | 2.9 | 13.1 | 5.5 |
| E106-4 (NY148) | 77.1 | 100.0 | 2.5 | 10.8 | 7.8 |
| W5015-12 | 88.5 | 100.0 | 3.1 | 15.5 | 5.2 |
| Mean | 81.2 | 97.4 | 2.6 | 11.4 | 6.5 |

**Table 4 - Internal Tuber defects.**

| Selection | Hollow Heart | Brown center | Internal Brown Spot | Black Spot Bruise | Vascular Discolor-ation | Internal Defect Totals |
|---|---|---|---|---|---|---|
| | <---------- %----------> | | | | | |
| Atlantic | 25.0 | 0.0 | 10.0 | 6.3 | 32.5 | 73.8 |
| Snowden | 5.0 | 1.3 | 1.3 | 0.0 | 31.3 | 38.8 |
| CO00188-4W | 0.0 | 0.0 | 0.0 | 1.3 | 13.8 | 15.0 |
| CO00197-3W | 0.0 | 0.0 | 2.5 | 0.0 | 42.5 | 45.0 |
| MSL292-A | 0.0 | 0.0 | 3.8 | 0.0 | 40.0 | 43.8 |
| ND7519-1 | 5.0 | 1.3 | 20.0 | 6.3 | 22.5 | 55.0 |
| ND8305-1 | 0.0 | 0.0 | 11.3 | 1.3 | 38.8 | 51.3 |
| ND8331Cb-2 | 0.0 | 1.3 | 2.5 | 2.5 | 25.0 | 31.3 |
| NY140 | 0.0 | 0.0 | 1.3 | 0.0 | 25.0 | 27.5 |
| W2310-3 | 0.0 | 0.0 | 0.0 | 5.0 | 20.0 | 25.0 |
| W2978-3 | 0.0 | 0.0 | 2.5 | 2.5 | 43.8 | 48.8 |
| W4980-1 | 1.3 | 3.8 | 11.3 | 2.5 | 55.0 | 73.8 |
| MN99380-1 | 0.0 | 0.0 | 5.0 | 12.5 | 28.8 | 46.3 |
| MSJ126-9Y | 0.0 | 0.0 | 2.5 | 0.0 | 60.0 | 62.5 |
| MSR061-1 | 0.0 | 0.0 | 0.0 | 0.0 | 41.3 | 41.3 |
| E106-4 (NY148) | 0.0 | 0.0 | 0.0 | 2.5 | 11.3 | 13.8 |
| W5015-12 | 0.0 | 0.0 | 2.5 | 1.3 | 56.3 | 60.0 |
| Mean | 2.1 | 0.4 | 4.5 | 2.6 | 34.6 | 44.3 |

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

| Selection | Undersize | | Culls | | Medium 1 7/8"-3" diam. | | Large 3-4" diam. | | Oversize >4" | |
|---|---|---|---|---|---|---|---|---|---|---|
| | oz. | % | oz. | % | oz. | % | oz. | % | oz. | % |
| Atlantic | 2.6 | *10.4* | 6.4 | *7.1* | 5.8 | *25.3* | 9.8 | *42.9* | 18.0 | *14.3* |
| Snowden | 2.5 | *19.6* | 5.0 | *4.9* | 5.5 | *41.9* | 9.6 | *26.8* | 14.6 | *6.7* |
| CO00188-4W | 2.8 | *31.5* | 5.4 | *1.4* | 5.4 | *55.7* | 9.2 | *10.4* | 13.5 | *0.9* |
| CO00197-3W | 2.5 | *31.8* | 5.3 | *7.7* | 5.3 | *38.2* | 8.9 | *20.0* | 19.1 | *2.3* |
| MSL292-A | 2.5 | *24.6* | 5.7 | *4.9* | 5.6 | *43.4* | 10.3 | *23.1* | 17.8 | *3.9* |
| ND7519-1 | 2.5 | *31.6* | 4.6 | *3.7* | 5.5 | *45.0* | 9.6 | *16.8* | 17.0 | *3.0* |
| ND8305-1 | 2.8 | *31.1* | 4.4 | *8.8* | 5.3 | *49.4* | 9.5 | *10.3* | 14.8 | *0.4* |
| ND8331Cb-2 | 2.4 | *44.1* | 5.2 | *4.0* | 5.4 | *42.5* | 9.4 | *9.3* | 17.2 | *0.2* |
| NY140 | 2.3 | *3.8* | 6.6 | *9.0* | 5.4 | *15.1* | 10.8 | *37.6* | 19.8 | *34.5* |
| W2310-3 | 2.6 | *14.8* | 7.3 | *7.0* | 5.8 | *40.5* | 10.2 | *35.6* | 16.5 | *2.1* |
| W2978-3 | 2.7 | *28.7* | 7.1 | *4.0* | 5.6 | *42.9* | 10.3 | *21.5* | 16.1 | *2.9* |
| W4980-1 | 2.5 | *28.4* | 5.4 | *5.1* | 5.8 | *48.9* | 10.0 | *16.0* | 20.4 | *1.8* |
| MN99380-1 | 2.6 | *20.8* | 5.4 | *9.3* | 5.1 | *40.7* | 9.8 | *26.3* | 16.2 | *3.0* |
| MSJ126-9Y | 2.6 | *14.3* | 6.9 | *4.1* | 6.0 | *37.0* | 9.4 | *38.4* | 17.0 | *6.2* |
| MSR061-1 | 2.7 | *29.4* | 4.5 | *2.8* | 5.7 | *48.0* | 9.1 | *18.8* | 16.9 | *1.0* |
| E106-4 (NY148) | 2.5 | *13.7* | 6.3 | *4.5* | 5.8 | *38.3* | 10.3 | *36.6* | 17.3 | *7.0* |
| W5015-12 | 2.5 | *25.0* | 4.8 | *5.4* | 5.6 | *58.4* | 9.3 | *10.6* | 13.6 | *0.6* |
| Mean | 2.9 | *23.7* | 5.7 | *5.5* | 5.6 | *41.8* | 9.7 | *23.6* | 16.8 | *5.3* |

Table 6. Combined results from Ratings 2 and 3 for Zebra Chip symptoms in chips.

| Entry # | Cultivar | Zebra Chip Rating* Raw Chips | Zebra Chip Rating* Fried Chips |
|---|---|---|---|
| 1 | Atlantic | + + | + + + |
| 2 | Snowden | + | + + |
| 3 | CO00188-4W | - | - |
| 4 | CO00197-3W | + + + | + + + |
| 5 | MSL292-A | + | + |
| 6 | ND7519-1 | + + + | + + |
| 7 | ND8305-1 | + + + | + + |
| 8 | ND8331Cb-2 | - | - |
| 9 | NY140 | + + | + + |
| 10 | W2310-3 | + + + | + + |
| 11 | W2978-3 | + | - |
| 12 | W4980-1 | + | + |
| 13 | MN99380-1 | + + + | + + + |
| 14 | MSJ126-9Y | + + + | + + |
| 15 | MSR061-1 | + | + + + |
| 16 | E106-4 (NY148) | - | + + + |
| 17 | W5015-12 | + + + | + + + |

*Rating

- none

+ mild

+ + moderate

+ + + severe or dark

# Pennsylvania Regional Location

## Patton, PA


**Local Coordinator:**

Dr. Bill Lamont
Penn State Univ.
Department of Horticulture
University Park, PA 16802

**Cooperative Grower:**

James Hite
Patton, PA 16668

Report Preparation: B. W. Dye

**Cooperating Chip Processor:**

Snyder of Berlin
Molly Baker
Berlin, PA 15530


**Trial Data:**

Planting Date: 24-May-11 Soil Temperature: 60ºF
Vine Kill Date: 12-Sep-11 (111 growing days)
Harvest Date: 11-Oct-11 Soil Temperature: 60ºF

Row and plant spacing: 34 inches between rows, 12 inches between plants; Plot length 25 feet, 4 replications.

Growing Season Weather: Most of the growing season was cool and moist with July becoming hot and very dry. A total of 24.22 inches of rain fell from May 1 through September 30, 2011. The plot was not irrigated.

| | *Avg. High ºF | *Avg. Low ºF | *Rain (inches) |
|---|---|---|---|
| May | 71 | 49 | 3.98 |
| June | 79 | 55 | 2.25 |
| July | 87 | 61 | 1.38 |
| August | 80 | 58 | 6.13 |
| September | 72 | 55 | 10.48 |
| Total Rainfall (May through September) | | | 24.22 |

*Temperatures and Rainfall as reported at Prince Gallitzin State Park / Patton, PA by Weather Warehouse®

# Pennsylvania Regional Location

## Patton, PA

Trial Information
- continued

**Trial Procedure:**

Previous crop: Wheat  Soil Type: shaley loam

Fertilizer: 13-13-13 1,250 pounds

Irrigation: Rainfall 24.22 inches

Herbicides: Before planting: Touchdown (0.75 quart/acre)
Metribuzin (2/3 pound/acre), Medal (1.3 pints/acre)

Insecticides: Baythroid (2 ounces) / Thionex (1.3 quarts)
Admire (7 ounces/acre), Corgen (5 ounces/acre)

Fungicides: Manzate® (1 pound/acre), Pennco-zeb (1 pound/acre)

Vine Kill: Reglone (1 pint)

# Pennsylvania Regional Trial

**Table 1. Yield, Size Distribution, and Characteristics of 2011 Snack Food varieties at Chest Springs, PA.**

| | Yield (cwt/A) | | Percent Size Distribution | | | | | Characteristics | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Entry | No. 1 | Total | No. 1 | Small | Mid-Size | Large | Culls | Agtron Score[a] | Specific Gravity[a] | # of Internal Defect | Major External Defects |
| W 5015-12 | 194 | 364 | 53 | 8 | 53 | 0 | 39 | 46 | 1.076 | 2 | SB SG GC PC SR |
| **Snowden** | **301** | **357** | **84** | **7** | **84** | **1** | **8** | **53** | **1.075** | **2** | **SB SG MS SR SC** |
| MN 99380-1 | 175 | 353 | 50 | 8 | 50 | 0 | 43 | 48 | 1.070 | 0 | SB SG GC PC SR |
| MSL 292-A | 251 | 288 | 87 | 5 | 87 | 0 | 8 | 52 | 1.071 | 1 | SB MS PC SR |
| CO 00197-3W | 138 | 273 | 51 | 16 | 51 | 0 | 33 | 42 | 1.070 | 4 | SB SG MS SR SC |
| MSR 061-1 | 228 | 271 | 84 | 8 | 84 | 2 | 7 | 50 | 1.071 | 4 | SB GC SC |
| W 4980-1 | 217 | 254 | 85 | 4 | 85 | 1 | 10 | 42 | 1.069 | 0 | SB MS PC SR |
| NY 140 | 196 | 253 | 77 | 7 | 77 | 0 | 15 | 51 | 1.064 | 0 | SB SG MS SR SC |
| W 2310-3 | 139 | 251 | 55 | 5 | 55 | 0 | 40 | 49 | 1.084 | 0 | SB SG MS SR SC |
| ND 8305-1 | 92 | 239 | 38 | 22 | 38 | 0 | 39 | 49 | 1.088 | 1 | MS ST PC SR SC |
| ND 7519-1 | 135 | 214 | 63 | 11 | 63 | 0 | 26 | 49 | 1.072 | 3 | SB SG GC SR SC |
| CO 00188-4W | 105 | 140 | 75 | 22 | 75 | 0 | 3 | 55 | 1.068 | 0 | SB SG PC SR |
| W 2978-3 | 97 | 128 | 76 | 21 | 76 | 0 | 3 | 52 | 1.064 | 0 | SB SG GC SC |
| **Atlantic** | **100** | **125** | **80** | **12** | **80** | **0** | **8** | **55** | **1.086** | **3** | **SB SG MS SC** |
| MSJ 126-9Y | 83 | 105 | 79 | 5 | 79 | 4 | 12 | 45 | 1.065 | 1 | SB SG PC SR |
| ND 8331Cb-2 | 45 | 83 | 55 | 19 | 55 | 0 | 27 | 60 | 1.081 | 0 | SB SG MS SR SC |
| Mean | 156 | 231 | | | | | | | | | |
| lsd 0.05 | 44.1 | 49.5 | | | | | | [a] Samples processed 13-Oct-11 by Snyder of Berlin | | | |
| CV% | 19.9 | 15.0 | | | | | | | | | |

External Defects: Internal Defects: Hollow Heart and internal Browning; 20 tubers sampled per entry.

SB = Sunburn PC = Pressure Crack GC = Growth Cracks SG = Secondary Growth

MS = Mis-shapen ST = Stone Damage SC = Scab SR = Secondary Rot (Dry/Wet)

U.S. Potato Board/Snack Food Association National Chip Trial – 2011

# Wisconsin Trial Site

Mary T. LeMere, Interim Superintendent, Hancock Agricultural Research Station
Phone: 715-249-5961; E-mail: lemere@wisc.edu
College of Agricultural and Life Sciences, University of Wisconsin-Madison

**Trial Site**
Hancock Agricultural Research Station, N3909 CTH V, Hancock, WI 54943

**Technical Support**
Amber Gotch, Hancock Agricultural Research Station

**Trial Procedure**
Seed was held in a locker in the Wisconsin Potato and Vegetable Storage Research Facility at 38°F until cutting. Seed was moved to 55°F to warm two days prior to cutting. Cutting was done by hand on April 18, 2011 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 three days to promote drying and suberization prior to planting. Planting took place on April 25, 2011 using an Iron Age assist-feed planter. Varieties were planted in single-row plots 250 ft. in length. Rows were spaced 36 in. apart. Seed pieces were placed 12 in. apart within each row. Plots were vine-killed on September 6 and 13, 2011 and harvested using a custom-built Gallenberg plot harvester on September 30, 2011.

Plots were maintained according to standard production practices recommended by the University of Wisconsin. Petiole nitrate monitoring following rain events led to an additional fertilizer application in July. Elevated disease pressure resulted in frequent fungicide applications. Irrigation schedules and application rates were based on in-hill soil moisture monitors and daily field observations.

Fertility: 0-0-60; 0-0-0-17S-21Ca, 6-30-22-4S (550lbs 4-25), 21-0-0-24S (360lbs 5-19), 34-0-0 (150lbs 7-6),

Weed Control: Parallel, Metribuzin

Insect Control: Abba, Coragen

Disease Control: Revus, Bravo ZN, Headline, Endura, Echo ZN, Dithane DF, Tanos, Super Tin 80WP

Vine Kill: Reglone

Rainfall: 17.7 in

Irrigation: 16.6 in

Soil type: Plainfield loamy sand

**Yield Data and Tuber Quality**

Tubers were graded and sized using a custom-built Gallenberg grader and Exeter optical sizer. Specific gravity measurements were taken for each variety using a Weltech PW-2050 Dry Matter Assessment System (weight in air/weight in water method). Specific gravity, total yield, U. S. No. 1 yield, undersize and culls are presented in Table 1. U. S. No. 1 size distribution data is presented in Table 2. Internal defects were evaluated as a percent of 20 individual tubers. Table 3 indicates percent incidence of brown center, hollow heart, internal brown spot, vascular discoloration, and stem end discoloration.

**Table 1.** Specific gravity, Total yield, U. S. No. 1 yield, <1 7/8" and culls, 2011.

| Variety | Specific Gravity | Total Yield | U. S. No. 1 | | <1 7/8 in. | Culls |
|---|---|---|---|---|---|---|
| | | (cwt) | (cwt) | (%) | (%) | (%) |
| Atlantic | 1.089 | 530.1 | 494 | 93 | 2 | 5 |
| CO00188-4W | 1.068 | 383.3 | 338 | 88 | 10 | 2 |
| CO00197-3W | 1.076 | 436.8 | 390 | 89 | 8 | 3 |
| MSJ126-9Y | 1.075 | 332.9 | 321 | 96 | 2 | 2 |
| MSL292-A | 1.080 | 583.0 | 531 | 91 | 2 | 7 |
| MSN99380-1 | 1.074 | 701.0 | 582 | 83 | 3 | 14 |
| MSR061-1 | 1.073 | 439.2 | 426 | 97 | 3 | 1 |
| ND7519-7 | 1.086 | 470.6 | 441 | 94 | 4 | 3 |
| ND8305-1 | 1.083 | 455.9 | 419 | 92 | 6 | 2 |
| ND8331CB-2 | 1.082 | 581.2 | 545 | 94 | 3 | 3 |
| NY140 | 1.086 | 552.3 | 516 | 93 | 3 | 4 |
| Snowden | 1.081 | 591.3 | 567 | 96 | 1 | 3 |
| W2310-3 | 1.085 | 501.7 | 465 | 93 | 3 | 5 |
| W2978-3 | 1.068 | 482.8 | 450 | 93 | 4 | 3 |
| W4980-1 | 1.074 | 448.7 | 419 | 93 | 2 | 4 |
| W5015-12 | 1.081 | 180.9 | 148 | 82 | 14 | 4 |

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

**Table 2.** U. S No. 1 size distribution, 2011.

| | U. S. No. 1 Size Distribution (% of U. S. No. 1 Yield) | | | | | |
|---|---|---|---|---|---|---|
| | 2-4 oz. | 4-6 oz. | 6-10 oz. | 10-13 oz. | 13-16 oz. | >16 oz. |
| Atlantic | 12 | 17 | 39 | 17 | 12 | 4 |
| CO00188-4W | 37 | 34 | 24 | 5 | 0 | 0 |
| CO00197-3W | 29 | 27 | 36 | 8 | 1 | 0 |
| MSJ126-9Y | 10 | 31 | 30 | 10 | 14 | 5 |
| MSL292-A | 8 | 22 | 40 | 19 | 11 | 1 |
| MSN99380-1 | 15 | 17 | 34 | 22 | 6 | 5 |
| MSR061-1 | 24 | 22 | 39 | 11 | 4 | 1 |
| ND7519-7 | 27 | 33 | 31 | 7 | 3 | 0 |
| ND8305-1 | 29 | 28 | 36 | 7 | 1 | 0 |
| ND8331CB-2 | 22 | 25 | 38 | 12 | 1 | 3 |
| NY140 | 12 | 15 | 35 | 22 | 12 | 5 |
| Snowden | 11 | 17 | 37 | 17 | 13 | 5 |
| W2310-3 | 15 | 21 | 35 | 18 | 11 | 0 |
| W2978-3 | 22 | 28 | 40 | 9 | 1 | 0 |
| W4980-1 | 17 | 19 | 44 | 16 | 3 | 1 |
| W5015-12 | 62 | 20 | 15 | 1 | 2 | 0 |

**Table 3**. External and internal defects, 2011.

| | External Defects (%) | | | | Internal Defects (%) | | | |
|---|---|---|---|---|---|---|---|---|
| Variety | GC | MS | SB | SC | BC | HH | IBS | VD |
| Atlantic | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 10 |
| CO00188-4W | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CO00197-3W | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| MSJ126-9Y | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 5 |
| MSL292-A | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| MSN99380-1 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 15 |
| MSR061-1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| ND7519-7 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| ND8305-1 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 |
| ND8331CB-2 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 |
| NY140 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Snowden | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| W2310-3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| W2978-3 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 |
| W4980-1 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 |
| W5015-12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

External defects: GC = growth cracks; MS = misshapen; SB = sunburned; SC = scab
Internal defects: BC = brown center; HH = hollow heart; IBS = internal brown spot; VD = vascular discoloration