

Dr. Donald Halseth, Coordinator
Department of Horticulture
Cornell University
Ithaca, New York 14853

2014 USPB/SFA Chip Variety Trials

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

Cooperators:

Mr. Brian Kirschenmann, Kirschenmann Farms, Inc., Bakersfield, CA
Dr. Lincoln Zotarelli, University of Florida, Hastings, FL
Dr. Jeff Stark, University of Idaho, Aberdeen, ID
Dr. Greg Porter, University of Maine, Orno, ME
Mr. Chris Long, Michigan State University, East Lansing, MI
Mr. Martin Glynn, USDA-ARS, East Grand Forks, MN
Mr. Jeremy Buchman & Travis Dirnberger, Black Gold Farms, Charleston, MO
Dr. Craig Yencho, North Carolina State University, Raleigh, NC
Dr. Sagar Sathuvalli, Oregon State University, Hermiston, OR
Mr. Robert Leiby, PA CO-OP Potato Growers, Inc., Harrisburg, PA
Dr. Felix Navarro, University of Wisconsin, Hancock, WI

2014 USPB-SFA Chip Variety Trials

Dr. Donald E. Halseth - Coordinator
Department of Horticulture
Cornell University
Ithaca, New York 14853

Introduction

The search for new and improved chipping potato varieties is an ongoing and challenging task. The annual United States Potato Board (USPB) & Snack Food Association (SFA) Chip Variety Trials are designed to evaluate promising chip processing clones from the various US potato breeding programs. The eleven trial locations for the 2014 USPB-SFA chip variety trial research program are California, Florida, Idaho, Maine, Michigan, Missouri, North Carolina, North Dakota, Oregon, Pennsylvania, and Wisconsin. These sites provide a wide range of climates, soil types and cultural practices to help assess the strengths and weaknesses of new potato varieties. The typical growing season for chipping potatoes ranges from January through May for Southern locations, which provide out-of-field chip product, while Northern sites grow from May through September, with cold storage chipping of their production to begin in October and run through April or later.

Since the USPB-SFA chip trials began in 1985, there have been 105 advanced potato breeding lines and varieties (Table 5) evaluated and compared with potato chip industry standards. Forty-one of these lines have been named and released and twenty-six are in national commercial seed production. The most recently released varieties are Lamoka, Lelah, Manistee, McBride, Pinnacle, Sebec, Tundra and Waneta - with a total of 1,467 acres of US seed in 2014. These new varieties offer the chipping industry higher yield potential, longer storage life and more consistent chip quality.

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

Note: advanced storage studies on sugar levels and chip color from multiple temperatures and sample dates will be conducted on the 2014 test crop in ID, ME, MI, ND and WI and will be reported in a separate report which will complement the yield trial reports.

2014 USPB-SFA Trials

Potato breeding lines with potential for chipping are entered into the USPB-SFA trials for three growing seasons and then replaced with new entries. If an entry experiences problems early it may be dropped from the testing program before the 2nd or 3rd year of trials. On occasion an entry may be in trials for the 4th year if it is deemed that more data needs to be collected. All chip trials have both Atlantic (for yield and specific gravity) and Snowden (for cold temperature storage chipping) as check varieties. The twelve entries being evaluated in the 2014 USPB-SFA chip trials and their sources are listed below (with year in trials):

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

A01143-3C (year 3) USDA-ARS, Aberdeen, ID – Rich Novy
AF4157-6 (year 3) University of Maine – Greg Porter
CO02024-9W (year 1) Colorado State University – David Holm
CO02321-4W (year 3) Colorado State University – David Holm
CO03243-3W (year 2) Colorado State University – David Holm
W5955-1 (year 3) University of Wisconsin – Jeff Endelman
W6609-3 (year 2) University of Wisconsin – Jeff Endelman

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

MSK061-4 (year 1) Michigan State University – David Douches
MSM246-B (year 1) Michigan State University – David Douches
Note: only enough seed of MSM246-B for NC trial, so MSR061-1 was planted in CA and FL trials and MSL007-B in MO trial in its place.

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

A00188-3C (year 2) USDA-ARS, Aberdeen, ID – Rich Novy
AC01151-5W (year 2) Colorado State University – David Holm
MSL007-B (year 3) Michigan State University – David Douches

Eleven state trial coordinators for 2014:

California Brian Kirschenmann, Kirschenmann Farms, Inc., Bakersfield, CA
Florida Dana Fourman, University of Florida, Hastings, FL
Idaho Jeff Stark, University of Idaho, Aberdeen, ID
Maine Greg Porter, University of Maine, Presque Isle, ME
Michigan Chris Long, Michigan State University, East Lansing, MI
Missouri Jeremy Buchman, Black Gold Farms, Charleston, MO
North Carolina Craig Yenko, NC State University, Raleigh, NC
Oregon Sagar Sathuvalli, Oregon State University, Hermiston, OR
Pennsylvania Bob Leiby, PA CO-OP Potato Growers, Inc., Harrisburg, PA
Red River Valley Marty Glynn, USDA Potato Research Worksite,
East Grand Forks, MN
Wisconsin Felix Navarro, University of Wisconsin, Hancock, WI

Summary comments on 2014 trial performance:

The 2014 USPB-SFA trials provided a wealth of evaluations on field performance of 7 potato breeding lines over all eleven state locations, 3 in seven northern states, and 4 in one to four southern states. The performance of our chipping industry varieties Atlantic and Snowden were again confirmed as important benchmark standards. Atlantic had an average total yield of 395 cwt/acre in the four southern trials and 421 cwt/acre in the seven northern trials. Snowden had an average total yield of 406 cwt/acre in the four southern trials and 438 cwt/acre in the seven northern trials. Specific gravity data indicates that overall Atlantic had the highest gravity in the seven northern trials, averaging 1.087, and was well above average for the four southern trials at 1.079. Atlantic had the highest gravity in ID, ME, MI, MO, OR, and WI trials. Snowden averaged 1.079 and 1.086 for the southern and northern trials, respectively.

A00188-3C (year 2, 7 northern trials) Total and marketable yield above trial averages, highest specific gravity of all entries in ID and PA trials, and best field chip scores in MI and WI.

A01143-3C (year 3, all 11 trials) Good total and marketable yields across all 11 states, with the highest average marketable yield for the 7 northern trials (highest yielder for ID and OR), had the lowest average specific gravity (1.077), and excellent field chip color in NC and PA.

AC01151-5W (year 2, 7 northern trials) Good total and marketable yield, with the highest marketable yield in ND and WI, tied for lowest average specific gravity (1.081) and good field chip scores.

AF4157-6 (year 3, all 11 trials) Better yields in southern trials, had lowest marketable yield for MI, ND and PA, the lowest specific gravity of ID, ME and ND trials, and had excellent field chip scores.

CO02024-9W (year 1, all 11 trials) Good southern trial yield except for FL, above average northern yields, lower specific gravity in northern trials (1.082 average), and average field chip scores.

CO02321-4W (year 3, all 11 trials) Average total yields, below average marketable yield, high specific gravity (except 1.048 in NC??), and excellent field chip scores (highest for FL and ND).

CO03243-3W (year 2, all 11 trials) Best total and marketable yield averages for both southern and northern trials, specific gravity lowest in southern trials and marginal in northern trials, and very good field chip scores.

MSK061-4 (year 1, 4 southern trials) Variable yields, lowest in FL, had highest specific gravity average in southern trials (1.081), and very good field chip scores.

MSL007-B (year 2, 7 northern trials & 1 southern trial substitution) Yields generally at overall trial average or lower, lowest in ME and ND, tied for highest specific gravity (1.087) in the northern trials, and field chip scores were adequate (equal to Atlantic).

MSM246-B (year 1, planned for 4 southern trials but only NC got seed) Below trial averages for total and marketable yield, specific gravity good at 1.074, and field chip score acceptable.

MSR061-1 (tested earlier in 2011-2013 USPB-SFA trials, planted in 2 southern trials as substitution) Total and marketable yield above average, specific gravity higher in CA and lower in FL and field chip scores were acceptable.

W5955-1 (year 3, all 11 trials) Total and marketable yield near trial averages, specific gravity at trial average (all 7 northern trials had 1.080 or higher), and field chip scores were good (better than Atlantic).

W6609-3 (year 2, all 11 trials) Variable and generally lower yields, had lowest average total and marketable yield for both the southern and northern trials, average specific gravity, and field chip scores were equal or better than Atlantic.

Data from the 11 state USPB-SFA trials conducted in 2014 follow in Table 1 (Total Yield), Table 2 (Marketable Yield), Table 3 (Specific Gravity), and Table 4 (Field Chip Color).

TABLE 1. 2014 USBP-SFA CHIP TRIALS - TOTAL YIELD (cwt/acre)

| | | SOUTHERN TRIALS | | | | | NORTHERN TRIALS | | | | | | | | | | overall |
|------------------|-------|-----------------|-----|-----|-----|------|-----------------|-----|-----|-----|-----|-----|-----|------|------|--|---------|
| | | CA | FL | MO | NC | avg. | ID | ME | MI | ND | OR | PA | WI | avg. | | | |
| ENTRIES / STATES | | CA | FL | MO | NC | avg. | | ID | ME | MI | ND | OR | PA | WI | avg. | | avg. |
| ATLANTIC | all | 489 | 248 | 441 | 400 | 395 | | 388 | 342 | 482 | 225 | 576 | 241 | 693 | 421 | | 411 |
| SNOWDEN | all | 560 | 304 | 308 | 451 | 406 | | 426 | 285 | 388 | 167 | 848 | 227 | 726 | 438 | | 426 |
| A00188-3C | 7N | na | na | na | na | na | | 445 | na | 440 | 197 | 567 | 382 | 569 | 433 | | 433 |
| A01143-3C | all | 582 | 321 | 235 | 414 | 388 | | 517 | na | 524 | 207 | 826 | 277 | 624 | 496 | | 453 |
| AC01151-5W | 7N | na | na | na | na | na | | 581 | 299 | 437 | 234 | 769 | 287 | 715 | 475 | | 475 |
| AF4157-6 | all | 481 | 234 | 318 | 484 | 379 | | 311 | 241 | 285 | 173 | 545 | 157 | 521 | 319 | | 341 |
| CO02024-9W | all | 465 | 188 | 325 | 475 | 363 | | 503 | 284 | 500 | 247 | 651 | 291 | 588 | 438 | | 411 |
| CO02321-4W | all | 520 | 270 | 270 | 467 | 382 | | 281 | 241 | 350 | 217 | 520 | 282 | 447 | 334 | | 351 |
| CO03243-3W | all | 606 | 331 | 327 | 418 | 421 | | 412 | 301 | 535 | 194 | 730 | 441 | 549 | 452 | | 440 |
| MSK061-4 | 4S | 482 | 189 | 259 | 421 | 338 | | na | na | na | na | na | na | na | na | | 338 |
| MSL007-B | 7N+1S | na | na | 266 | na | na | | 354 | 217 | 412 | 192 | 701 | 330 | 422 | 375 | | 362 |
| MSM246-B | 1S | na | na | na | 352 | 352 | | na | na | na | na | na | na | na | na | | 352 |
| MSR061-1 | 2S | 546 | 334 | na | na | 440 | | na | na | na | na | na | na | na | na | | 440 |
| W5955-1 | all | 581 | 269 | 350 | 326 | 382 | | 459 | 265 | 417 | 177 | 689 | 344 | 538 | 413 | | 401 |
| W6609-3 | all | 537 | 190 | 349 | 246 | 331 | | 191 | 194 | 320 | 181 | 414 | 277 | 449 | 289 | | 304 |
| average | | 532 | 262 | 313 | 405 | 378 | | 406 | 267 | 424 | 201 | 653 | 295 | 570 | 407 | | 393 |

TABLE 2. 2014 USPB-SFA CHIP TRIALS - MARKETABLE YIELD (cwt/acre)

| ENTRIES / STATES | SOUTHERN TRIALS | | | | | | NORTHERN TRIALS | | | | | | | | overall |
|------------------|-----------------|-----|-----|-----|------|--|-----------------|-----|-----|-----|-----|-----|-----|------|---------|
| | CA | FL | MO | NC | avg. | | ID | ME | MI | ND | OR | PA | WI | avg. | |
| ATLANTIC all | 319 | 201 | 418 | 363 | 325 | | 332 | 311 | 432 | 197 | 514 | 204 | 527 | 360 | 347 |
| SNOWDEN all | 440 | 262 | 256 | 416 | 344 | | 322 | 252 | 318 | 156 | 749 | 172 | 601 | 367 | 359 |
| A00188-3C 7N | na | na | na | na | na | | 288 | na | 322 | 187 | 487 | 323 | 438 | 341 | 341 |
| A01143-3C all | 430 | 234 | 184 | 357 | 301 | | 403 | na | 433 | 155 | 770 | 138 | 453 | 392 | 356 |
| AC01151-5W 7N | na | na | na | na | na | | 351 | 236 | 321 | 213 | 595 | 201 | 604 | 360 | 360 |
| AF4157-6 all | 402 | 172 | 285 | 416 | 319 | | 220 | 208 | 208 | 149 | 499 | 109 | 456 | 264 | 284 |
| CO02024-9W all | 331 | 83 | 250 | 402 | 267 | | 394 | 246 | 436 | 206 | 564 | 194 | 501 | 363 | 328 |
| CO02321-4W all | 409 | 192 | 244 | 347 | 298 | | 209 | 201 | 281 | 207 | 453 | 214 | 293 | 265 | 277 |
| CO03243-3W all | 476 | 272 | 300 | 387 | 359 | | 345 | 278 | 478 | 183 | 583 | 348 | 426 | 377 | 371 |
| MSK061-4 4S | 394 | 134 | 220 | 370 | 280 | | na | na | na | na | na | na | na | na | 280 |
| MSL007-B 7N+1S | na | na | 246 | na | 246 | | 239 | 197 | 389 | 166 | 642 | 299 | 307 | 320 | 311 |
| MSM246-B 1S | na | na | na | 260 | 260 | | na | na | na | na | na | na | na | na | 260 |
| MSR061-1 2S | 402 | 246 | na | na | 324 | | na | na | na | na | na | na | na | na | 324 |
| W5955-1 all | 412 | 190 | 318 | 285 | 301 | | 363 | 238 | 348 | 161 | 600 | 272 | 361 | 335 | 323 |
| W6609-3 all | 353 | 126 | 294 | 209 | 246 | | 97 | 174 | 239 | 164 | 367 | 229 | 351 | 232 | 237 |
| average | 397 | 192 | 274 | 347 | 302 | | 297 | 234 | 350 | 179 | 569 | 225 | 443 | 331 | 319 |

TABLE 3. 2014 USPB-SFA CHIP TRIALS - SPECIFIC GRAVITY

| ENTRIES / STATES | SOUTHERN TRIALS | | | | | | NORTHERN TRIALS | | | | | | | | | overall |
|------------------|-----------------|----|----|----|------|--|-----------------|----|----|-----|----|----|----|------|--|---------|
| | CA | FL | MO | NC | avg. | | ID | ME | MI | ND | OR | PA | WI | avg. | | avg. |
| ATLANTIC all | 85 | 77 | 82 | 73 | 79 | | 87 | 98 | 87 | 86 | 87 | 80 | 87 | 87 | | 84 |
| SNOWDEN all | 91 | 75 | 74 | 76 | 79 | | 83 | 92 | 79 | 107 | 78 | 80 | 83 | 86 | | 83 |
| A00188-3C 7N | na | na | na | na | na | | 87 | na | 84 | 96 | 75 | 95 | 84 | 87 | | 87 |
| A01143-3C all | 80 | 76 | 68 | 64 | 72 | | 83 | na | 80 | 95 | 74 | 80 | 74 | 81 | | 77 |
| AC01151-5W 7N | na | na | na | na | na | | 85 | 95 | 72 | 87 | 74 | 75 | 77 | 81 | | 81 |
| AF4157-6 all | 84 | 76 | 78 | 73 | 78 | | 81 | 83 | 79 | 79 | 80 | 81 | 81 | 81 | | 80 |
| CO02024-9W all | 81 | 72 | 78 | 64 | 74 | | 80 | 83 | 77 | 96 | 75 | 83 | 77 | 82 | | 79 |
| CO02321-4W all | 90 | 70 | 83 | 48 | 73 | | 86 | 91 | 77 | 100 | 82 | 80 | 84 | 86 | | 81 |
| CO03243-3W all | 76 | 68 | 71 | 65 | 70 | | 84 | 86 | 76 | 91 | 77 | 85 | 78 | 82 | | 78 |
| MSK061-4 4S | 85 | 79 | 83 | 76 | 81 | | na | na | na | na | na | na | na | na | | 81 |
| MSL007-B 7N+1S | na | na | 68 | na | na | | 82 | 92 | 82 | 99 | 78 | 93 | 80 | 87 | | 84 |
| MSM246-B 1S | na | na | na | 74 | 74 | | na | na | na | na | na | na | na | na | | 74 |
| MSR061-1 2S | 88 | 69 | na | na | 79 | | na | na | na | na | na | na | na | na | | 79 |
| W5955-1 all | 84 | 66 | 74 | 70 | 74 | | 85 | 86 | 80 | 89 | 81 | 91 | 84 | 85 | | 81 |
| W6609-3 all | 84 | 64 | 79 | 70 | 74 | | 81 | 85 | 79 | 104 | 81 | 83 | 85 | 85 | | 81 |
| average | 84 | 72 | 76 | 68 | 75 | | 84 | 89 | 79 | 94 | 79 | 84 | 81 | 84 | | 81 |

TABLE 4. 2014 USPB-SFA CHIP TRIALS - FIELD CHIP COLOR

| ENTRIES / STATES | SOUTHERN TRIALS | | | | | | | | NORTHERN TRIALS | | | | | | | |
|------------------|-----------------|------|----|------|-----|----------|----------|--|-----------------|-----|------|-----|------|------|----------|----------|
| | CA | FL | MO | NC | NC | SFA avg. | AGT avg. | | MI | MI | ND | OR | PA | WI | SFA avg. | AGT avg. |
| ATLANTIC all | 1 | 57.6 | 70 | 61.4 | 1.0 | 1.0 | 63.0 | | 58.2 | 4.0 | 62 | 2.5 | 60.6 | 61.2 | 3.3 | 60.5 |
| SNOWDEN all | 1 | 59.5 | 72 | 62.9 | 1.0 | 1.0 | 64.8 | | 58.1 | 4.0 | 63 | 2.2 | 59.7 | 63.8 | 3.1 | 61.2 |
| A00188-3C 7N | na | na | na | na | na | na | na | | 66.6 | 4.0 | 66 | 2.0 | 60.8 | 67.3 | 3.0 | 65.2 |
| A01143-3C all | 1 | 60.6 | 72 | 63.0 | 1.0 | 1.0 | 65.2 | | 56.9 | 3.0 | 64 | 2.0 | 62.2 | 64.0 | 2.5 | 61.8 |
| AC01151-5W 7N | na | na | na | na | na | na | na | | 57.6 | 4.0 | 65 | 1.7 | 60.2 | 62.1 | 2.9 | 61.2 |
| AF4157-6 all | 1 | 59.6 | 72 | 63.2 | 1.0 | 1.0 | 64.9 | | 65.0 | 3.0 | 66 | 1.7 | 60.8 | 62.8 | 2.4 | 63.7 |
| CO02024-9W all | 1 | 59.5 | 72 | 61.0 | 1.0 | 1.0 | 64.2 | | 56.7 | 4.0 | 66 | 1.5 | 59.3 | 63.6 | 2.8 | 61.4 |
| CO02321-4W all | 1 | 61.2 | 70 | 61.5 | 1.0 | 1.0 | 64.2 | | 63.9 | 3.0 | 67 | 1.7 | 61.4 | 65.9 | 2.4 | 64.6 |
| CO03243-3W all | 1 | 59.5 | 72 | 62.2 | 1.5 | 1.3 | 64.6 | | 62.8 | 4.0 | 67 | 2.0 | 60.0 | 64.2 | 3.0 | 63.5 |
| MSK061-4 4S | 1 | 60.4 | 72 | 63.3 | 1.5 | 1.3 | 65.2 | | na | na | na | na | na | na | na | na |
| MSL007-B 7N+1S | na | na | 72 | na | na | na | 72.0 | | 58.7 | 3.0 | 64 | 1.7 | 58.2 | 60.9 | 2.4 | 60.5 |
| MSM246-B 1S | na | na | na | 61.3 | 1.5 | 1.5 | 61.3 | | na | na | na | na | na | na | na | na |
| MSR061-1 2S | 1 | 60.3 | na | na | na | 1.0 | 60.3 | | na | na | na | na | na | na | na | na |
| W5955-1 all | 1 | 59.3 | 72 | 62.2 | 1.5 | 1.3 | 64.5 | | 64.9 | 3.0 | 66 | 1.8 | 60.1 | 65.7 | 2.4 | 64.2 |
| W6609-3 all | 1 | 57.4 | 72 | 61.6 | 1.5 | 1.3 | 63.7 | | 62.4 | 3.0 | 65 | 1.5 | 61.0 | 65.7 | 2.3 | 63.5 |
| average | 1.0 | 59.5 | 72 | 62.1 | 1.2 | 1.1 | 64.4 | | 61.0 | 3.5 | 65.1 | 1.9 | 60.4 | 63.9 | 2.7 | 62.6 |

Table 5. USPB-SFA Chip Trial Entry Summary: 1985 - 2014

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

| | | | | | | | | | | |
|----------------------------|------------|------------|----------------------------------|------------------------|-------|------|--------|--------|----------|-------|
| | | | <u>California Regional Trial</u> | | | | | | | |
| | | | | | | | | | | |
| USPB-SFA CHIP TRIAL - 2014 | | | | | | | | | | |
| | | | | | | | | | | |
| VARIETY | TOTAL | MARKETABLE | PERCENT | Percent of Total Yield | | | TUBERS | AVG WT | | |
| OR | YIELD | YIELD | US #1 | < 1 7/8 | 1 7/8 | > 4 | PER FT | TUBERS | SPECIFIC | CHIP |
| LINE # | (cwt/acre) | (cwt/acre) | (%) | | to 4 | | of ROW | (OZ.) | GRAVITY | COLOR |
| | | | | | | | | | | |
| ATLANTIC | 489 | 319 | 65 | 9.0 | 65.2 | 25.8 | 10.4 | 4.6 | 1.085 | 1 |
| SNOWDEN | 560 | 440 | 79 | 13.2 | 78.6 | 8.2 | 14.1 | 3.9 | 1.091 | 1 |
| | | | | | | | | | | |
| A01143-3C | 582 | 430 | 74 | 21.1 | 74.0 | 4.9 | 19.6 | 2.9 | 1.080 | 1 |
| AF4157-6 | 481 | 402 | 84 | 11.6 | 83.6 | 4.8 | 12.4 | 3.8 | 1.084 | 1 |
| | | | | | | | | | | |
| CO02024-9W | 465 | 331 | 71 | 19.8 | 71.2 | 9.0 | 15.3 | 3.0 | 1.081 | 1 |
| CO02321-4W | 520 | 409 | 79 | 11.9 | 78.6 | 9.5 | 12.7 | 4.0 | 1.090 | 1 |
| CO03243-3W | 606 | 476 | 79 | 9.6 | 78.6 | 11.8 | 14.6 | 4.1 | 1.076 | 1 |
| | | | | | | | | | | |
| ELKTON | 287 | 112 | 39 | 2.8 | 38.8 | 58.4 | 3.3 | 8.6 | 1.083 | 1 |
| | | | | | | | | | | |
| MSK061-4 | 482 | 394 | 82 | 11.5 | 81.9 | 6.7 | 10.8 | 4.4 | 1.085 | 1 |
| MSR061-1 | 546 | 402 | 74 | 7.5 | 73.5 | 18.9 | 11.7 | 4.6 | 1.088 | 1 |
| | | | | | | | | | | |
| W5955-1 | 581 | 412 | 71 | 9.2 | 70.9 | 19.9 | 12.4 | 4.6 | 1.084 | 1 |
| W6609-3 | 537 | 353 | 66 | 12.9 | 65.8 | 21.3 | 12.6 | 4.2 | 1.084 | 1 |
| | | | | | | | | | | |
| average | 511 | 373 | 72 | 11.7 | 71.7 | 16.6 | 12.5 | 4.4 | 1.084 | 1 |

FLORIDA REGIONAL TRIAL

Local Coordinators:

Ms. Allison Beyer
Research Coordinator
University of Florida/IFAS
Partnership for Water,
Agriculture, and
Community Sustainability at
Hastings, FL 32145-0728

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

Ms. Dana Burhans
Biological Scientist
University of Florida/IFAS
Horticultural Sciences Department
Hastings, FL 32145-0728

Cooperating Grower:

University of Florida/IFAS
Partnership for Water,
Agriculture, & Community
Sustainability at Hastings

Cooperating Chip Processor:

Utz Quality Foods Inc.
Hanover, PA

Trial Data:

| | |
|----------------------|---|
| Planting Site: | University of Florida/IFAS, Florida Partnership for Water, Agriculture and Community Sustainability at Hastings |
| Planting Date: | February 6, 2014 |
| Harvest Date: | June 9, 2014 (123 days) |
| Growing Conditions: | Overall, weather conditions in the region for the 2014 growing season were rated as poor to fair. The beginning of the season was very wet with above average rainfall in February and March. As a result, low stands and plant vigor were observed. Overall temperatures were near normal for the season. There were no freeze events from the planting date forward. Total and marketable yields were fair for most clones. |
| Experimental Design: | Each variety/clone was planted in a single 250 ft row as directed by the SFA protocol. Four 20 ft sections of each row were harvested and graded. This was not a randomized and replicated experiment. Only means were calculated. |
| Row Spacing: | Machine planted. Approx. 8 inches in-row, 40 inches between-rows. |
| Fertilizer: | Emergence side-dress: 14-6-12 (100 lb/acre N); 2 nd side-dress: 14-0-12 (100 lb/acre N) |
| Pest Control: | Pic-Clor 60 Fumigant, 11 Gallons/A, pre-plant Admire Pro, 8.7 oz/A, Quadris, 10.4 oz/A, and Vydate C-LV, 64 oz/A in furrow at planting Dual Magnum, 1 pt/A and Tri Cor DF, 8 oz/A at hilling for weed control Fungicides and Insecticides as needed. IPM program used. |
| Chip Ratings: | Chips were prepared and rated following the procedures outlined in the Snack Food Association Chipping Potato Handbook (1995). Chips were prepared and fried by Utz Quality Foods. Chip scores are presented in Table 2. |

Table 1. Florida - Production statistics for SFA clones.

| Clone | Tuber Yield | | | % Culls | Size Class Distribution ^{3, 4} (%) | | | | | Size Class Range ⁴ (%) | | Specific Gravity |
|------------------|----------------------------|----------------|------------------------|---------|---|----|----|----|---|-----------------------------------|--------|------------------|
| | No.1 ¹ cwt/A | Total cwt/A | % No.1 ² | | 1 | 2 | 3 | 4 | 5 | 2 to 4 | 3 to 4 | |
| Atlantic | 201 | 248 | 100 | 5 | 12 | 64 | 9 | 12 | 0 | 85 | 21 | 1.077 |
| Snowden | 262 | 304 | 131 | 3 | 9 | 49 | 24 | 16 | 0 | 89 | 40 | 1.075 |
| Harley Blackwell | 104 | 157 | 52 | 10 | 22 | 50 | 15 | 9 | 0 | 73 | 23 | 1.059 |
| A01143-3C | 234 | 321 | 117 | 6 | 19 | 72 | 3 | 2 | 0 | 77 | 6 | 1.076 |
| AF4157-6 | 172 | 234 | 86 | 2 | 22 | 75 | 0 | 0 | 0 | 75 | 0 | 1.074 |
| CO02024-9W | 83 | 188 | 41 | 8 | 40 | 46 | 0 | 0 | 0 | 46 | 0 | 1.072 |
| CO02321-4W | 192 | 270 | 96 | 4 | 22 | 67 | 6 | 1 | 0 | 74 | 7 | 1.070 |
| CO03243-3W | 272 | 331 | 136 | 3 | 13 | 70 | 12 | 3 | 0 | 85 | 15 | 1.068 |
| MSK061-4 | 134 | 189 | 67 | 3 | 24 | 70 | 4 | 0 | 0 | 73 | 4 | 1.079 |
| MSL061-1 | 246 | 334 | 122 | 2 | 22 | 68 | 4 | 3 | 0 | 75 | 7 | 1.069 |
| W5955-1 | 190 | 269 | 95 | 9 | 18 | 58 | 11 | 8 | 0 | 78 | 20 | 1.066 |
| W6609-3 | 126 | 190 | 63 | 10 | 21 | 69 | 6 | 0 | 0 | 75 | 6 | 1.064 |
| Average | 185 | 253 | | | | | | | | | | |

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. Florida - Plant growth and tuber characteristics for SFA clones.

| Clone | Plant Growth Characteristics ¹ | | | | Tuber Characteristics ² | | | | | | |
|------------|---|-------------|-----------|---------------|------------------------------------|----|----|----|----|-----|--------------------------|
| | Percent Stand | Early Vigor | Vine Type | Vine Maturity | IFC | SC | ST | TS | ED | APP | Chip Rating ³ |
| Atlantic | 49 | 6 | 9-6 | 2 | 2 | 6 | 5 | 3 | 6 | 6 | 57.6 |
| Snowden | 57 | 6 | 9 | 3 | 1 | 6 | 5 | 3 | 4 | 6 | 59.5 |
| Harley | 32 | 7 | 5-8 | 1 | 1 | 7 | 6 | 3 | 5 | 7 | 62.2 |
| Blackwell | 54 | 7 | 6 | 3 | 1 | 6 | 6 | 3 | 6 | 5 | 60.6 |
| A01143-3C | 53 | 6 | 5-8 | 1 | 1 | 7 | 6 | 3 | 6 | 8 | 59.6 |
| AF4157-6 | 43 | 6 | 6-9 | 1 | 2 | 6 | 6 | 3 | 5 | 5 | 59.5 |
| CO02024-9W | 62 | 7 | 6-9 | 1 | 2 | 8 | 7 | 3 | 6 | 7-8 | 61.2 |
| CO02321-4W | 65 | 6 | 6-9 | 2 | 1 | 7 | 6 | 3 | 6 | 7 | 59.5 |
| CO03243-3W | 39 | 6 | 9-6 | 2 | 2 | 7 | 6 | 3 | 7 | 8 | 60.4 |
| MSK061-4 | 74 | 7 | 9-6 | 2 | 2 | 6 | 5 | 3 | 6 | 7 | 60.3 |
| MSL061-1 | 45 | 6 | 6-9 | 3 | 2 | 7 | 5 | 3 | 6 | 7 | 59.3 |
| W5955-1 | 44 | 7 | 5-8 | 3 | na | Na | na | na | na | na | 57.4 |
| W6609-3 | | | | | | | | | | | |

¹Plant Growth Characteristics.

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

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

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

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

²Tuber Characteristics.

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

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

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

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

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

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

Table 3. Florida - 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 | 1 | 1 | 2 | 5 | 4 | 0 | 0 | 14 |
| Snowden | 0 | 1 | 0 | 1 | 3 | 1 | 0 | 0 | 0 |
| Harley Blackwell | 0 | 1 | 1 | 9 | 10 | 0 | 0 | 0 | 0 |
| A01143-3C | 0 | 3 | 0 | 2 | 6 | 0 | 0 | 0 | 0 |
| AF4157-6 | 0 | 1 | 0 | 2 | 2 | 1 | 0 | 0 | 0 |
| CO02024-9W | 1 | 2 | 1 | 4 | 8 | 1 | 0 | 0 | 1 |
| CO02321-4W | 0 | 1 | 2 | 2 | 4 | 0 | 0 | 0 | 6 |
| CO03243-3W | 0 | 1 | 1 | 1 | 3 | 0 | 0 | 0 | 1 |
| MSK061-4 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 0 |
| MSL061-1 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| W5955-1 | 1 | 1 | 2 | 5 | 9 | 0 | 0 | 0 | 15 |
| W6609-3 | 0 | 1 | 1 | 7 | 10 | 1 | 0 | 0 | 6 |

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

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

Idaho Regional Trial

2014 USPB-SFA Trial

Local Coordinator:

Jeff Stark
Peggy Bain
Melvin Chappell
Chelsey Lowder

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

Trial Data

PLANTED 2-May-14
VINE KILLED 2-Sep-14

Mechanical

HARVESTED 25-Sep-14

| | | | |
|-----------------------|-------|-----------------------|-----|
| PLOT LENGTH | 18' | HARVEST LENGTH | 18' |
| HILL SPACING | 10.6" | ROW SPACING | 36" |
| HILLS PER PLOT | 20 | ROWS/ PLOT | 1 |
| REPS | 4 | | |

METHOD OF HARVEST Grimme Machine

FERTILIZER

125 N - 160 P - 60 K - 4 lb zinc— pre-plant
130 units injected through water

INSECTICIDES APPLIED/HILLING

Admire Pro (8 oz/A) 8 oz./A

FUNGICIDES APPLIED

| | |
|------------------|----------|
| Manzate flowable | 1.5 qt/A |
| Echo | 1.5 pt/A |
| Gavel | 2 lb/A |

HERBICIDES APPLIED

| | |
|-----------|-------------|
| Eptam 7E | 6.5 pints/A |
| TriCor 4F | 1 pint/A |
| Matrix | 1.5 oz./A |

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

| Clone | Yield (cwt/A) | | Percent Size Distribution | | | | % Unusable | Specific Gravity |
|--------------|----------------------|--------------|----------------------------------|----------------|-----------------|-------------------|-----------------------|-----------------------------|
| | US No1 | Total | 0-4 oz. | 4-6 oz. | 6-10 oz. | >10 oz. | | |
| A01143-3C | 403 | 517 | 16 | 27 | 41 | 10 | 6 | 1.083 |
| CO02024-9W | 394 | 503 | 19 | 30 | 39 | 9 | 3 | 1.080 |
| W5955-1 | 363 | 459 | 15 | 25 | 32 | 22 | 6 | 1.085 |
| AC01151-5W | 351 | 581 | 37 | 32 | 25 | 3 | 3 | 1.085 |
| CO03243-3W | 345 | 412 | 13 | 25 | 41 | 18 | 3 | 1.084 |
| Atlantic | 332 | 388 | 8 | 13 | 33 | 39 | 6 | 1.087 |
| Snowden | 322 | 426 | 20 | 31 | 35 | 10 | 5 | 1.083 |
| A00188-3C | 288 | 445 | 34 | 33 | 27 | 5 | 1 | 1.087 |
| MSL007-B | 239 | 354 | 33 | 36 | 24 | 7 | 1 | 1.082 |
| AF4157-6 | 220 | 311 | 27 | 31 | 35 | 4 | 2 | 1.081 |
| CO02321-4W | 209 | 281 | 22 | 24 | 34 | 16 | 4 | 1.086 |
| W6609-3 | 97 | 191 | 45 | 26 | 20 | 5 | 4 | 1.081 |
| Mean | 297 | 406 | 24 | 28 | 32 | 12 | 4 | 1.084 |

Table 2. IDAHO TRIAL 2014, Vine and tuber characteristics.

| Clone | Tuber Appearance | Fresh Merit Score ¹ | Tubers/ Plant | Avg. Tuber Size (oz.) | Tuber Shape² |
|--|---------------------------------|---------------------------------------|----------------------|------------------------------|--------------------------------|
| A01143-3C | skinned, folded ends | 3.0 | 9.6 | 5.5 | 1.8 |
| CO02024-9W | oval, flat, misshapen, deepends | 2.3 | 10.3 | 5.2 | 1.8 |
| W5955-1 | some lumps and points | 3.3 | 6.8 | 5.9 | 1.3 |
| AC01151-5W | uniform, scab, attached stolons | 2.8 | 15.5 | 3.9 | 1.0 |
| CO03243-3W | med, buff, uniform, nice | 4.0 | 7.2 | 5.8 | 1.3 |
| Atlantic | big, few | 2.5 | 5.6 | 7.6 | 1.8 |
| Snowden | deepends | 2.8 | 8.1 | 5.2 | 1.5 |
| A00188-3C | small, uniform | 3.3 | 10.2 | 4.1 | 1.0 |
| MSL007-B | scaley buff, uniform, round | 3.8 | 9.1 | 4.3 | 1.0 |
| AF4157-6 | misshapen, flat | 3.0 | 6.9 | 4.6 | 1.6 |
| CO02321-4W | varied sizes, scab, skinned | 3.0 | 5.4 | 5.2 | 1.4 |
| W6609-3 | small, few, pear shape | 2.7 | 4.8 | 3.6 | 1.3 |
| Mean | | 3.0 | 8.3 | 5.1 | 1.4 |
| ¹ (1-5) 5=Best Preference Score | | | | | |
| ² (1-5) 1=Round | | | | | |

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

| Clone | External defects ³ | | | Eye Depth ⁴ | Internal Defects ⁵ | | | |
|--|-------------------------------|------------|------------|------------------------|-------------------------------|------------|------------|------------|
| | Scab | Growth | | | % | % | % | % |
| | | Cracks | Knobs | | HH | BC | IBS | VD |
| A01143-3C | 4.5 | 4.8 | 4.8 | 3.0 | 0 | 0 | 0 | 0 |
| CO02024-9W | 4.2 | 5.0 | 5.0 | 3.8 | 3 | 0 | 0 | 0 |
| W5955-1 | 4.7 | 5.0 | 4.3 | 3.3 | 17 | 0 | 0 | 0 |
| AC01151-5W | 3.2 | 4.5 | 5.0 | 3.5 | 0 | 0 | 0 | 0 |
| CO03243-3W | 4.3 | 5.0 | 5.0 | 3.8 | 0 | 0 | 0 | 0 |
| Atlantic | 4.5 | 4.3 | 5.0 | 3.3 | 30 | 0 | 0 | 0 |
| Snowden | 4.5 | 4.5 | 4.5 | 2.8 | 0 | 0 | 0 | 0 |
| A00188-3C | 4.7 | 5.0 | 5.0 | 3.7 | 13 | 0 | 0 | 0 |
| MSL007-B | 5.0 | 5.0 | 5.0 | 3.3 | 0 | 0 | 0 | 0 |
| AF4157-6 | 3.5 | 4.8 | 4.8 | 3.0 | 3 | 0 | 0 | 0 |
| CO02321-4W | 3.3 | 5.0 | 5.0 | 3.8 | 3 | 0 | 0 | 0 |
| W6609-3 | 4.7 | 4.7 | 4.7 | 3.7 | 3 | 0 | 0 | 0 |
| Mean | 4.2 | 4.8 | 4.8 | 3.4 | 5.9 | 0.0 | 0.0 | 0.0 |
| ³ (1-5) 5=None | | | | | | | | |
| ⁴ (1-5) 1=deep, 5=shallow. | | | | | | | | |
| ⁶ Percent of defects on 10 large tubers | | | | | | | | |
| HH=hollow heart, BC=brown center, IBS=internal brown spot, VD=vascular discoloration | | | | | | | | |

Idaho 2013 Snack Food Association Trial Grown at Aberdeen, Idaho.

Out of Storage Quality Report

| CLONE | 6 week cool down 8 weeks storage | | 3 week recondition | | Shatter Bruise* | Blackspot Bruise* | Processing Defects |
|------------|-------------------------------------|------------|-----------------------|-----------------------|--------------------|----------------------|-----------------------|
| | Chip 40 | Chip 50 | Chip 40 | Percent Sugar Ends | | | |
| NY140 | 3.0 | 1.0 | 1.2 | 0 | 2.4 | 3.2 | dark vascular |
| Atlantic | 4.8 | 1.1 | 1.2 | 3 | 3.4 | 2.4 | |
| W5955-1 | 4.4 | 1.0 | 1.0 | 0 | 4.1 | 2.3 | |
| CO03243-3W | 2.7 | 1.0 | 1.1 | 6 | 2.6 | 2.4 | sprouting |
| A01143-3C | 2.6 | 1.0 | 1.0 | 6 | 2.7 | 2.7 | |
| NY148 | 4.7 | 1.1 | 1.2 | 0 | 3.2 | 3.0 | |
| MSR061-1 | 4.0 | 1.2 | 1.0 | 0 | 2.6 | 3.1 | dark vascular |
| AC01151-5W | 3.9 | 1.2 | 1.2 | 0 | 3.0 | 3.0 | |
| CO00197-3W | 3.3 | 1.0 | 1.0 | 0 | 3.4 | 4.0 | |
| Snowden | 4.5 | 1.0 | 1.0 | 0 | 3.2 | 3.7 | dark vascular |
| W4980-1 | 3.8 | 1.0 | 1.0 | 0 | 3.4 | 2.3 | |
| A00188-3C | 3.4 | 1.0 | 1.0 | 0 | 2.6 | 2.2 | |
| MSL292-A | 3.8 | 1.0 | 1.0 | 0 | 4.0 | 2.3 | sprouting |
| MSL007-B | 3.5 | 1.0 | 1.0 | 3 | 3.6 | 2.9 | |
| W6483-5 | 3.0 | 1.1 | 1.0 | 6 | 3.7 | 2.0 | |
| CO02321-4W | 2.0 | 1.0 | 1.0 | 3 | 2.0 | 3.1 | sprouting |
| AF4157-6 | 2.8 | 1.0 | 1.0 | 0 | 4.1 | 1.5 | |
| W6609-3 | 3.4 | 1.0 | 1.0 | 3 | 3.2 | 1.7 | |
| Mean | 3.53 | 1.04 | 1.06 | 1.5 | 3.2 | 2.6 | |

Samples harvested September 19 and gradually cooled to 50°.

Samples stored at 40 and 50° for 10 weeks.

Samples reconditioned at 60° for 2 weeks.

Held at temperature until fry date January 14-16, 2014

11

Maine Regional Trial

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

US POTATO BOARD/SNACK FOOD ASSOCIATION POTATO CHIP VARIETY TRIAL, MAINE 2014

Cooperators:

Local Coordinator:

Greg Porter
5722 Deering Hall, Room 415
University of Maine
Orono, ME 04469-5722
(207) 581-2943
porter@maine.edu

Cooperating Grower(s):

Aroostook Research Farm
University of Maine
59 Houlton Road
Presque Isle, ME 04769

Cooperating Processor:

Cape Cod Chips
Snyder's-Lance
Jeff Thomas/Patrick Blake
Hyannis, MA
PBlake@snyderslance.com
JThomas@snyderslance.com
(508) 418-1012

SFA Coordinator:

Donald E. Halseth
Cornell University
150 Plant Science Building
Ithaca, NY 14853
(607)255-5460
deh3@cornell.edu

Variety Entries:

Atlantic (Field Std.)
Snowden (Storage Std.)
AF4157-6
ACO1151-5W
CO02024-9W
CO02321-4W
CO03243-3W
MSL007-B
W5955-1
W6609-3

ME, University of Maine, Greg Porter
CO, San Luis Valley Res. Ctr., David Holm
CO, San Luis Valley Res. Ctr., David Holm
CO, San Luis Valley Res. Ctr., David Holm
CO, San Luis Valley Res. Ctr., David Holm
MI, Michigan State Univ., David Douches
WI, Univ. of Wisconsin, Jeffrey Endelman
WI, Univ. of Wisconsin, Jeffrey Endelman

Trial Information:

| | |
|----------------|--|
| Location: | Aroostook Research Farm, Presque Isle, ME |
| Soil Type: | Caribou loam |
| Soil Test: | pH 5.8 Avail P (MH), K (VH), Ca (M), Mg (H) 3.4% soil organic matter |
| Previous Crop: | clover/timothy (2013), oats (2012), potatoes (2011) |
| Planting Date: | May 30, 2014 |

| | |
|-------------------|---|
| Plot size/design: | 36" row spacing, plots 2 rows x 30' Randomized (RCBD), four replicates per variety |
| Fertilization: | 168-168-168 at planting Foliar boron applied July 10 |
| In-row Spacing: | 10" except Snowden (14") |
| Crop Management: | Typical of commercial production in the area |
| Sprout Inhibitor: | MH-30 applied August 21 |
| Vinekill Date: | September 12, 2014 (105 DAP) |
| Harvest Date: | September 25, 2014 |
| Processing Date: | TBD |

Procedures:

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

The trial was managed using practices typical of the production area. Weeds were controlled with a standard herbicide program followed by normal cultivation and hilling. Insect pests were controlled with an in-furrow insecticide. Subsequent foliar insecticides were applied based on insect pressure determined by regular scouting for pests. Foliar diseases were controlled using a conventional spray program based on the University of Maine Cooperative Extension's IPM program. Late blight was not observed in this trial during 2014. Vine desiccation was accomplished using a standard chemical desiccant. Natural rainfall was abundant through July; however, August and September had very low rainfall (Table 1). No supplemental irrigation was available for this trial site. The plots were harvested with a hand crew following lifting with a one-row, research-scale potato digger. All tubers were weighed and a 50-lb sample was graded for external defects and sized using a spool-type sizer. Ten tubers per size class were examined for hollow heart when sufficient tubers were available. Specific gravity was determined on a 4-kg sample using the weight-in-air/weight-in-water method. A 100-lb sample was collected at harvest and placed in 50F storage prior to shipment to a commercial chip plant for evaluation of chip quality. Additional tuber samples were placed in controlled storage for evaluation of chip color during the storage season.

Results:

Cold, wet conditions in April and May resulted in delayed planting. Rainfall was abundant through July, but was far below typical levels during August and September (Table 1). MSL007-B had particularly slow crop growth during the early season, while Atlantic, AF4157-6, and CO02024-9W had very good early growth (Table 2). AF4157-6 was particularly early maturing and it did not maintain productive foliage through late August. No late blight was observed in the plots during 2014. Several of the potato clones had moderate incidence of verticillium wilt; however, late-season vigor was generally good to very good for all clones except AF4157-6 (Table 2).

The dry weather in August following the later than usual planting resulted in lower than average yields for this trial; however, tuber quality was generally quite good and specific gravities were quite high (Tables 3 and 4). Atlantic was highest yielding, while AF4157-6, MSL007-B, and W6609-3 had relatively low yields (Table 3). ACO1151-5W, AF4157-6, CO02024-9W, CO02221-4W, and MSL007-B had very small tuber size profiles. CO03243-3W had reasonably good yields and tuber size. Atlantic, Snowden, ACO1151-5W, CO02321-4W, and MSL007-B had specific gravities exceeding 1.090.

The incidence of tuber external defects was quite low for all clones in the trial (Table 4). Hollow heart incidence was also quite low, though hollow heart was detected in Atlantic, CO02024-9W, CO03243-3W, and W5955-1.

Tuber characteristics are summarized in Table 5. ACO1151-5W, AF4157-6, CO02024-9W, CO02321-4W and W6609-3 had the best external tuber appearance. None of the clones had more oblong tubers than would be desirable for chipping. Snowden and Atlantic had indented stem ends and/or deep apical eyes which would make peeling difficult. Off shapes reduced the acceptability of W5955-1.

Susceptibility to skinning and bruising was evaluated by tumbling tuber samples in a drum (Table 6). AF4157-6 and MSL007-B were especially resistant to skinning, while ACO1151-5W, CO02024-9W, CO03243-3W were relatively susceptible. CO03243-3W, CO02321-4W and Snowden were relatively resistant to fresh bruise damage. Atlantic, AF4157-6, CO02024-9W, MSL007-B, W5955-1, and W6609-3 were relatively susceptible to fresh bruise damage. These samples will be abrasively peeled and examined for bruise losses from storage in late November or December to further evaluate bruise susceptibility.

Table 1. Rainfall and temperature, 2014 Aroostook Research Farm, Presque Isle, ME

| Month | Week (inches) | | | | Total (inches) | Average (°F) | |
|-------------|---------------|------|------|------|-------------------|--------------|------|
| | 1 | 2 | 3 | 4 | | High | Low |
| May | 0.59 | 0.31 | 1.72 | 0.51 | 3.13 | 63.0 | 42.1 |
| June | 0.02 | 1.27 | 1.42 | 0.84 | 3.55 | 74.6 | 51.9 |
| July | 4.40 | 0.24 | 0.25 | 0.42 | 5.31 | 79.5 | 59.4 |
| August | 0.04 | 1.00 | 0.24 | 0.00 | 1.28 | 77.0 | 54.0 |
| September | 0.69 | 0.60 | 0.22 | 0.16 | 1.67 | 67.9 | 47.3 |
| Grand total | | | | | 14.94 | | |

Table 2. Plant characteristics, UPSB/SFA Chip Variety Trial, Maine, 2014.

| Variety/Clone | % Plant Stand | | | | Vine Mat. ¹ | Foliage Color | Verticillium Wilt ² |
|----------------------|------------------|---------|------|-----|---------------------------|----------------|-----------------------------------|
| | 7/8 | % Cover | 7/18 | 9/3 | | | |
| Atlantic | 99 | 48 | 80 | 75 | 5.8 M. Late | Med. green | 3.3 Med-L |
| Snowden | 93 | 30 | 65 | 70 | 6.0 Late | Lt.-Med. green | 4.0 Mod. |
| ACO1151-5W | 98 | 38 | 70 | 89 | 7.0 Late | Med. Dk. green | 1.0 None |
| AF4157-6 | 99 | 53 | 85 | 18 | 3.0 Early | Lt.-Med. green | 7.0 Sev. |
| CO02024-9W | 99 | 45 | 80 | 75 | 5.5 M. Late | Lt.-Med. green | 3.0 Med-L |
| CO02321-4W | 88 | 33 | 78 | 65 | 5.3 Med. | Med. green | 3.5 Mod. |
| CO03243-3W | 92 | 35 | 65 | 76 | 6.5 Late | Med. Dk. green | 1.3 V. Low |
| MSL007-B | 97 | 20 | 33 | 68 | 6.5 Late | Med. green | 1.5 V. Low |
| W5955-1 | 94 | 30 | 65 | 70 | 6.5 Late | Med. green | 2.8 Med-L |
| W6609-3 | 86 | 38 | 68 | 84 | 6.3 M. Late | Med. green | 4.0 Mod. |
| LSD _{k=100} | 6 | 7 | 10 | 10 | 0.5 | | 0.6 |

¹Vine Mat.: 1 to 9 where 1=very early; 3=early; 5=mid-season; 7=late; 9=extremely late.

²Verticillium wilt: 1 to 9 where 1=none; 9=completely dead.

Table 3. Yield, size distribution, and specific gravity, UPSB/SFA Chip Variety Trial, Maine, 2014.

| Variety/Clone | <u>Yield (cwt/A)¹</u> | | | <u>Size Distribution (% by weight)²</u> | | | | | | | Spec. Grav. |
|---------------|----------------------------------|------|------|--|----|----|---|---|----------------|----------------|----------------|
| | Tot. | US#1 | %Std | 1 | 2 | 3 | 4 | 5 | 1-7/8 to 4" | 2-1/2 to 4" | |
| Atlantic | 342 | 311 | 100 | 2 | 44 | 46 | 7 | 1 | 97 | 53 | 1.098 |
| Snowden | 285 | 252 | 81 | 4 | 57 | 33 | 5 | 0 | 96 | 38 | 1.092 |
| ACO1151-5W | 299 | 236 | 76 | 17 | 76 | 7 | 0 | 0 | 83 | 7 | 1.095 |
| AF4157-6 | 241 | 208 | 67 | 8 | 76 | 15 | 0 | 0 | 92 | 16 | 1.083 |
| CO02024-9W | 284 | 246 | 79 | 11 | 72 | 16 | 2 | 0 | 89 | 18 | 1.083 |
| CO02321-4W | 241 | 201 | 65 | 12 | 68 | 19 | 1 | 0 | 88 | 20 | 1.091 |
| CO03243-3W | 301 | 278 | 89 | 3 | 50 | 41 | 5 | 0 | 97 | 46 | 1.086 |
| MSL007-B | 217 | 197 | 63 | 8 | 80 | 10 | 1 | 0 | 92 | 11 | 1.092 |
| W5955-1 | 265 | 238 | 76 | 3 | 45 | 43 | 9 | 1 | 97 | 52 | 1.086 |
| W6609-3 | 194 | 174 | 56 | 7 | 61 | 30 | 2 | 0 | 93 | 32 | 1.085 |
| Mean | 267 | 234 | | | | | | | 92 | 29 | 1.089 |
| CV(%) | 10.6 | 12.6 | | | | | | | 2.8 | 21.0 | 0.23 |
| LSD(k=100) | 39 | 41 | | | | | | | 4 | 8 | 0.003 |

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

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

Table 4. External tuber defects and hollow heart incidence, UPSB/SFA Chip Variety Trial, Maine, 2014.

| Variety/Clone | <u>External Defects (% by weight)</u> | | | | | | Hollow Heart ¹ |
|---------------|---------------------------------------|------|------|------|------|-----|---------------------------|
| | Total | Sunb | Mshp | Grck | Scab | Rot | <u>(%)</u> |
| Atlantic | 6.7 | 2.5 | 2.4 | 0.6 | 0.8 | 0.4 | 6.4 |
| Snowden | 7.9 | 1.9 | 5.2 | 0.3 | 0.2 | 0.3 | 0.0 |
| ACO1151-5W | 5.2 | 2.7 | 1.1 | 0.6 | 0.7 | 0.0 | n/a |
| AF4157-6 | 5.9 | 1.1 | 2.3 | 1.1 | 1.1 | 0.4 | 0.0 |
| CO02024-9W | 3.0 | 0.7 | 0.9 | 0.6 | 0.7 | 0.1 | 11.1 |
| CO02321-4W | 5.3 | 2.3 | 2.2 | 0.3 | 0.4 | 0.1 | 0.0 |
| CO03243-3W | 4.8 | 1.2 | 2.1 | 0.4 | 0.4 | 0.8 | 2.6 |
| MSL007-B | 1.9 | 0.4 | 1.1 | 0.0 | 0.1 | 0.3 | 0.0 |
| W5955-1 | 7.8 | 2.4 | 3.6 | 0.6 | 0.7 | 0.6 | 2.0 |
| W6609-3 | 4.0 | 0.7 | 2.0 | 0.4 | 0.6 | 0.3 | 0.0 |
| Mean | 5.3 | | | | | | |
| CV(%) | 46.8 | | | | | | |
| LSD(k=100) | 4.3 | | | | | | |

¹Tubers were cut in the size classes from 2½ to 4” diameter; n/a indicates that there weren’t enough tubers available to examine for hollow heart in this size category.

Table 5. Tuber characteristics, UPSB/SFA Chip Variety Trial, Maine, 2014.

| Variety/Clone | Shape | Skin Tex- ture | Eye Depth | Gen. Appear. | Comments |
|---------------|-------|----------------------|--------------|-----------------|------------------------------|
| Atlantic | R-O | Net | M-D | F | dse,dae, dull, growth cracks |
| Snowden | R-O | Net | M-D | F-P | dull, dse, dae |
| ACO1151-5W | R | M-S | M-S | F-G | small, trace scab |
| AF4157-6 | R-O | M-S | M-S | F-G | small |
| CO02024-9W | R | Sln. | M-S | F-G | trace scab |
| CO02321-4W | R | M-S | M-S | F-G | small, trace scab |
| CO03243-3W | R-O | Net | M-S | F | netted, trace msh |
| MSL007-B | R | Net | M-S | F | netted, small, dull |
| W5955-1 | R-O | Sln. | M-S | F-P | points, msh |
| W6609-3 | R-O | Sln. | M-S | F-G | large |

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

Table 6. Bruise susceptibility scores, September, UPSB/SFA Chip Variety Trial, Maine, 2014.

| Variety/Clone | Skinning & Bruise (tumble method) ¹ | | | | Comments on peeled tubers |
|---------------|--|------|---------------|---------|------------------------------|
| | Prior to Peeling | | Peeled Tubers | | |
| | Index | % | % Incid. | % Surf. | |
| | Thumbnail Cracks | | | | |
| Atlantic | 2.60 | 68.3 | | | |
| Snowden | 2.63 | 13.0 | | | |
| ACO1151-5W | 5.99 | 23.4 | | | |
| AF4157-6 | 1.73 | 93.3 | | | |
| CO02024-9W | 4.48 | 45.3 | | | |
| CO02321-4W | 2.50 | 18.3 | | | |
| CO03243-3W | 4.03 | 21.7 | | | |
| MSL007-B | 1.83 | 55.7 | | | |
| W5955-1 | 2.90 | 58.3 | | | |
| W6609-3 | 2.78 | 51.7 | | | |
| Mean | 3.14 | 44.9 | | | |
| CV(%) | 18.9 | 31.3 | | | |
| LSD(k=100) | 0.79 | 19.0 | | | |

¹Sixty tubers were evaluated per variety/clone. Fifteen tubers per plot were tumbled on September 26 (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 26. Percent incidence (% of tubers with visible bruise) and surface area values are combined scores for shatter and blackspot rated on peeled tubers (November xx, 2014). The peeled scores will be available later in the storage season.

Variety/Clone Summary 2014 (ranked by U.S. #1 yield):

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, relatively high hollow heart incidence, and moderate bruise susceptibility.

CO03243-3W: Late vine maturity, round to oblong tubers with netted skin and moderately shallow eyes. Good yields, low to moderate external defects incidence (off shapes, growth cracks), moderate specific gravity, low to high hollow heart incidence depending on the year, and acceptable bruise susceptibility.

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

CO02024-9W: Medium-late vine maturity, round tubers with slightly netted skin and moderately-shallow eyes. Moderate yields, small tuber size profile, low external defects incidence, moderate specific gravity, moderate hollow heart incidence, and relatively susceptible to skinning and bruising.

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

W5955-1: Late vine maturity, round to oblong tubers with slightly netted skin and moderately-shallow eyes. Points and misshapes were observed in 2014. Moderate to high yields, large tuber size, low external defects incidence, moderate specific gravity, low to high hollow heart incidence depending on the year, and acceptable bruise susceptibility.

AF4157-6: Early to medium-early vine maturity, round to oblong tubers with slightly netted skin and moderately shallow eyes. Moderate yields, small tuber size profile, low external defects incidence, moderate to high specific gravity depending on the year, low to high hollow heart incidence depending on the year, and acceptable bruise susceptibility.

CO02321-4W: Medium to medium-late vine maturity, round to oblong tubers with smooth to slightly netted skin and moderately shallow eyes. Moderate to high yields, small tubers, low to moderate external defects incidence, moderate to high specific gravity, no hollow heart incidence, and relatively good bruise resistance scores.

MSL007-B: Slow early growth and late vine maturity, round to oblong tubers with netted skin and moderately-shallow eyes. Low to moderate yields, small tubers, low external defects incidence, moderate to high specific gravity, no hollow heart incidence, and good skinning and bruise resistance.

W6609-3: Medium-late vine maturity, round to oblong tubers with netted skin and moderately-shallow eyes. Low to moderate yields, small to moderate tuber size profile, low external defects incidence, moderate to high specific gravity, low to high hollow heart incidence depending on the year, and acceptable bruise susceptibility.

Michigan Regional Trial

Local Coordinators:

Chris Long, Aaron Yoder
& 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 st , 2014 |
| Vine Kill Date: | September 8 th , 2014 |
| Harvest Date: | October 9 th , 2014 (144 Days, Planting to Harvest) |
| Between Row & In Row | |
| Plant Spacing: | 34" x 10"; irrigated |
| Plots: | Single rows for each entry, approximately 300' long |
| GDD, Base 40 | 2670 (99 Days, Planting to Vine Kill) |

Trial Procedure:

Seed was mechanically cut on May 12th, 2014, and delivered to the grower's seed storage three days later. No seed treatments were applied at the time of seed cutting.

Two pre-harvest sugar profiles were taken this season. One on August 20th, and the second on September 2nd, for each variety, three weeks and one week prior to the vine kill date. The pre-harvest sugar profile protocol was as follows: obtained a minimum of 40 tubers from each variety, taking all the tubers from each hill, even if that required collecting more than 40 tubers. A canopy rating was taken for each variety as a percent rating of green foliage. Canopy uniformity was noted as a percentage of how uniform the foliage health appeared. The number of hills required to obtain 40 tubers was recorded, along with the total number of main stems harvested. From the tubers harvested, the specific gravity, a glucose value (a percent by fresh weight), a sucrose rating (a percent by fresh weight X10) and an average tuber weight (in ounces) was established.

At harvest, three plot areas of 23 feet were harvested from each entry and were used to determine trial yield averages, tuber size distribution, specific gravity and quantity of internal defects present. Two, 40 lb. storage samples were collected from each entry and were placed in the grower's commercial storage for evaluation at later dates (January and April 2015). Sixteen, 40 tuber samples were also collected for each variety at harvest. All sixteen samples were stored at the Michigan Potato Industry Commission's Cargill Demonstration Storage Facility at approximately 48°F or 54°F for a monthly sugar profile evaluation at Techmark, Inc. Eight, 40 tuber samples were stored at each temperature for evaluation, November 2014 through June 2015. The storage sugar profiles began October 9th, 2014. 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 30th, 2014. MSL007-B, AC01151-5W, CO03243-3W, CO02024-9W, Snowden, and CO02321-4W appeared to have the slowest rate of vine growth, whereas, A00188-3C, A01143-3C, Atlantic, W5955-1, W6609-3 and AF4157-6 were the most vigorous on this date. A vine maturity rating was taken for each variety on August 26th, 2014, approximately 13 days prior to vine kill. AF4157-6, W6609-3, Atlantic, Snowden and CO02024-9W were the most mature varieties and AC01151-5W appeared to be the most immature on this date.

Growing Season Weather:

Weather conditions during the 2014 growing season were cooler and wetter than average. The time period from June 1st to October 9th, 2014, saw 13.40 inches of natural rainfall. During this same span of time only two days recorded over 35 growing degree days. No daytime high temperatures were recorded over 88 °F while sixteen nights recorded temperatures over 65 °F. Growing degree days base 40 recorded from June 1st through September 8th were 2670. This was almost 100 degree day units less than the five year average of 2766 GDD for this same time period. The tuber specific gravity, for potato production in Michigan, was above average as a result of the moderate nighttime heat stress. Commercial potato yields overall met average to above average yield projections.

Results:

Table 1 summarizes the yield, size distribution, and specific gravity data at harvest. CO03243-3W and CO02024-9W topped the yield table in 2014, followed by a group of lines that yielded above average. These lines were: A01143-3C, Atlantic, and MSL007-B. W5955-1 had the largest percentage of recorded oversize tubers, followed closely by Atlantic and MSL007-B. AC01151-5W recorded a very low specific gravity value. Additional lines with marginal specific gravities were CO03243-3W, CO02024-9W and CO02321-4W.

| Table 1. Yield , Size Distribution*, Specific Gravity | | | | | | | | |
|---|---------------|------------|---------------------------|-----------|-----------|-----------|----------|------------------|
| Entry | Yield (cwt/A) | | Percent Size Distribution | | | | | Specific Gravity |
| | US#1 | TOTAL | US#1 | Small | Mid-Size | Large | Culls | |
| CO03243-3W | 478 | 535 | 89 | 10 | 82 | 7 | 1 | 1.076 |
| CO02024-9W | 436 | 500 | 87 | 13 | 85 | 2 | 0 | 1.077 |
| A01143-3C | 433 | 524 | 82 | 10 | 80 | 2 | 8 | 1.080 |
| Atlantic | 432 | 482 | 90 | 6 | 80 | 10 | 4 | 1.087 |
| MSL007-B | 389 | 412 | 95 | 5 | 85 | 10 | 0 | 1.082 |
| W5955-1 | 348 | 417 | 84 | 10 | 73 | 11 | 6 | 1.080 |
| A00188-3C | 322 | 440 | 74 | 24 | 73 | 1 | 2 | 1.084 |
| AC01151-5W | 321 | 437 | 73 | 25 | 72 | 1 | 2 | 1.072 |
| Snowden | 318 | 388 | 82 | 17 | 77 | 5 | 1 | 1.079 |
| CO02321-4W | 281 | 350 | 80 | 19 | 75 | 5 | 1 | 1.077 |
| W6609-3 | 239 | 320 | 75 | 22 | 73 | 2 | 3 | 1.079 |
| AF4157-6 | 208 | 285 | 73 | 24 | 73 | 0 | 3 | 1.079 |
| MEAN | 350 | 424 | 82 | 15 | 77 | 5 | 3 | 1.079 |

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

Table 2 summarizes the at-harvest tuber quality. Internal quality across the trial was generally acceptable, but the evidence of in-season environmental stress was observed in some lines. Hollow heart was present in Atlantic and to a lesser extent in CO03243-3W and AC01151-5W. AC01151-5W displayed a moderate level of internal brown spots which was at a high enough level to impact finished quality. AF4157-6, Snowden, A00188-3C and W6609-3 recorded above average amounts of vascular discoloration.

| Table 2. At-Harvest Tuber Quality. Sandyland Farms, Howard City, Michigan. | | | | | |
|--|-------------------------------------|-----------|------------|-----------|------------------|
| Entry | Internal Defects¹ | | | | Total Cut |
| | HH | VD | IBS | BC | |
| CO03243-3W | 5 | 0 | 0 | 1 | 30 |
| CO02024-9W | 0 | 3 | 2 | 0 | 30 |
| A01143-3C | 0 | 6 | 0 | 0 | 30 |
| Atlantic | 14 | 3 | 0 | 1 | 30 |
| MSL007-B | 0 | 6 | 0 | 0 | 30 |
| W5955-1 | 0 | 6 | 0 | 3 | 30 |
| A00188-3C | 1 | 9 | 0 | 1 | 30 |
| AC01151-5W | 2 | 1 | 5 | 2 | 30 |
| Snowden | 0 | 10 | 0 | 0 | 30 |
| CO02321-4W | 0 | 6 | 0 | 0 | 30 |
| W6609-3 | 0 | 8 | 0 | 1 | 30 |
| AF4157-6 | 0 | 11 | 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 on October 9th, 2014, and processed at Herr Foods, Inc. on October 13th. Chip color was generally acceptable across the trial, with A00188-3C having the highest Agtron score of the trial at 66.6. The varieties, listed in ranked order based on quality observations from Herr Foods, Inc. are as follows: W5955-1, CO02321-4W, AF4157-6, A01143-3C, W6609-3, A00188-3C, CO02024-9W, Snowden, MSL007-B, AC01151-5W, CO03243-3W and lastly Atlantic.

Table 3. 2014 Post-Harvest Chip Quality¹

| Entry | Agtron Color | SFA ² Color | Specific Gravity | Percent Chip Defects ³ | | |
|-----------------|--------------|------------------------|------------------|-----------------------------------|-------------|-------------|
| | | | | Internal | External | Total |
| CO03243-3W | 62.8 | 4.0 | 1.077 | 22.0 | 11.0 | 33.0 |
| CO02024-9W | 56.7 | 4.0 | 1.077 | 32.0 | 2.8 | 34.8 |
| A01143-3C | 56.9 | 3.0 | 1.085 | 14.0 | 12.0 | 26.0 |
| Atlantic | 58.2 | 4.0 | 1.090 | 38.0 | 14.0 | 52.0 |
| MSL007-B | 58.7 | 3.0 | 1.081 | 34.0 | 5.0 | 39.0 |
| W5955-1 | 64.9 | 3.0 | 1.086 | 21.0 | 4.0 | 25.0 |
| A00188-3C | 66.6 | 4.0 | 1.083 | 20.0 | 8.0 | 28.0 |
| AC01151-5W | 57.6 | 4.0 | 1.078 | 33.0 | 7.0 | 40.0 |
| Snowden | 58.1 | 4.0 | 1.084 | 29.0 | 12.0 | 41.0 |
| CO02321-4W | 63.9 | 3.0 | 1.082 | 16.0 | 9.0 | 25.0 |
| W6609-3 | 62.4 | 3.0 | 1.087 | 27.0 | 9.0 | 36.0 |
| AF4157-6 | 65.0 | 3.0 | 1.078 | 9.0 | 19.0 | 28.0 |

¹ Samples collected October 9th and processed by Herr Foods, Inc., Nottingham, PA on October 13, 2014.

Chip defects are included in Agtron and SFA samples.

² SFA Color: 1 = lightest, 5 = darkest

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

Table 4 summarizes the results of the samples collected for black spot bruise. Two, 25 tuber samples were collected at harvest. One sample served as a check and the second sample was stored for at least 12 hours at 50 °F, then placed in a 6 sided plywood drum and rotated 10 times to produce a simulated bruise. Two weeks later, after holding the samples at room temperature, all samples were abrasively peeled and scored for the presence of black spot bruise. Among the “Simulated Bruise” samples, the best entries were AF4157-6, W5955-1, A01143-3C, A00188-3C, CO02321-4W, AC01151-5W and CO03243-3W. Snowden, W6609-3, Atlantic, CO02024-9W and MSL007-B showed the lowest percent bruise free.

| A. Check Samples ¹ | | | | | | | | | | B. Simulated Bruise Samples ² | | | | | | | | |
|-------------------------------|------------------------|----|----|---|---|---|--------------|---------------------|---------------------------|--|----|----|---|---|---|--------------|---------------------|---------------------------|
| Entry | # of Bruises Per Tuber | | | | | | Total Tubers | Percent Bruise Free | Average Bruises Per Tuber | # of Bruises Per Tuber | | | | | | Total Tubers | Percent Bruise Free | Average Bruises Per Tuber |
| | 0 | 1 | 2 | 3 | 4 | 5 | | | | 0 | 1 | 2 | 3 | 4 | 5 | | | |
| CO03243-3W | 6 | 11 | 5 | 2 | 1 | | 25 | 24 | 1.2 | 9 | 5 | 6 | 2 | 2 | | 24 | 38 | 1.3 |
| CO02024-9W | 1 | 7 | 12 | 4 | | 1 | 25 | 4 | 1.9 | 4 | 3 | 10 | 2 | 5 | 1 | 25 | 16 | 2.2 |
| A01143-3C | 12 | 12 | 2 | | | | 26 | 46 | 0.6 | 11 | 10 | 3 | | 1 | | 25 | 44 | 0.8 |
| Atlantic | 4 | 10 | 8 | 2 | 1 | | 25 | 16 | 1.4 | 1 | 7 | 9 | 4 | 4 | | 25 | 4 | 2.1 |
| MSL007-B | 3 | 5 | 10 | 3 | 3 | 1 | 25 | 12 | 2.0 | 3 | 4 | 7 | 7 | 1 | 3 | 25 | 12 | 2.3 |
| W5955-1 | 15 | 7 | 2 | | | | 24 | 63 | 0.5 | 10 | 12 | 3 | | | | 25 | 40 | 0.7 |
| A00188-3C | 10 | 10 | 5 | | | | 25 | 40 | 0.8 | 9 | 11 | 6 | | | | 26 | 35 | 0.9 |
| AC01151-5W | 13 | 10 | 2 | | | | 25 | 52 | 0.6 | 8 | 8 | 8 | 1 | | | 25 | 32 | 1.1 |
| Snowden | 5 | 7 | 8 | 5 | | | 25 | 20 | 1.5 | 4 | 7 | 8 | 6 | | | 25 | 16 | 1.6 |
| CO02321-4W | 7 | 12 | 5 | 2 | | | 26 | 27 | 1.1 | 7 | 11 | 7 | | | | 25 | 28 | 1.0 |
| W6609-3 | 4 | 12 | 8 | 1 | 1 | | 26 | 15 | 1.3 | 3 | 10 | 7 | 3 | 2 | | 25 | 12 | 1.6 |
| AF4157-6 | 15 | 9 | 1 | | | | 25 | 60 | 0.4 | 13 | 7 | 5 | | | | 25 | 52 | 0.7 |

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

²Tuber samples collected at harvest, held at 50°F for at least 12 hours, then placed in a 6 sided plywood drum and rotated 10 times to produce simulated bruising. They were then held at room temperature for later abrasive peeling and scoring.

Tables 5A-B summarize the results of the pre-harvest panel data. A00188-3C exhibited elevated sucrose and glucose values at both sample dates. Glucose dropped substantially from August to September, but even with the canopy rating declining across this period, the sucrose value remained elevated. This variety appeared to be chemically and physically immature on these evaluation dates. A00188-3C had the largest number of stems per hill and appeared to have a small overall tuber size profile (Tables 5A-B). At Herr Foods, on October 13th, 2014, this same line ranked highest for recorded AGTRON score from the trial (Table 3). Herr Foods ranked A00188-3C, 6th overall for chip quality performance on October 13th, 2014 (Table 3). Atlantic and A01143-3C exhibited the largest average tuber size recorded on September 2nd, 2014 (Table 5B).

Table 5A. Pre-Harvest Panel 8/20/14

| Entry | Specific Gravity | Glucose ¹ % | Sucrose ² Rating | Canopy | | Number of | | Average ⁵ Tuber Weight |
|-----------------|------------------|---------------------------|--------------------------------|---------------------|-----------------------|-----------|-----------|--------------------------------------|
| | | | | Rating ³ | Uniform. ⁴ | Hills | Stems | |
| CO03243-3W | 1.083 | 0.002 | 0.636 | 85 | 85 | 3 | 12 | 3.02 |
| CO02024-9W | 1.077 | 0.004 | 0.716 | 90 | 90 | 3 | 15 | 2.47 |
| A01143-3C | 1.076 | 0.005 | 1.357 | 90 | 85 | 3 | 18 | 2.81 |
| Atlantic | 1.054 | 0.003 | 0.750 | 85 | 85 | 5 | 15 | 5.66 |
| MSL007-B | 1.080 | 0.004 | 0.555 | 95 | 90 | 5 | 15 | 3.41 |
| W5955-1 | 1.072 | 0.005 | 1.077 | 95 | 85 | 4 | 12 | 3.62 |
| A00188-3C | 1.079 | 0.016 | 1.249 | 90 | 90 | 3 | 24 | 2.73 |
| AC01151-5W | 1.072 | 0.006 | 0.832 | 95 | 85 | 3 | 13 | 2.43 |
| Snowden | 1.080 | 0.003 | 0.830 | 90 | 85 | 3 | 15 | 3.97 |
| CO02321-4W | 1.100 | 0.004 | 0.604 | 85 | 90 | 3 | 15 | 3.06 |
| W6609-3 | 1.073 | 0.004 | 1.036 | 85 | 90 | 4 | 12 | 2.27 |
| AF4157-6 | 1.077 | 0.002 | 0.817 | 65 | 85 | 4 | 17 | 2.70 |

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

2 Sucrose Rating is the percent of sucrose by weight in a given amount of fresh tuber tissue X10.

3 The Canopy Rating is a percent rating of green foliage (0 is all brown, dead foliage; 100 is green, vigorous foliage).

4 The Canopy Uniformity is a percentage of how uniform the foliage health is at the date of observation.

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

Table 5B. Pre-Harvest Panel, 9/2/14

| Entry | Specific Gravity | Glucose ¹ % | Sucrose ² Rating | Canopy | | Number of | | Average ⁵ Tuber Weight |
|-----------------|------------------|---------------------------|--------------------------------|---------------------|-----------------------|-----------|-----------|--------------------------------------|
| | | | | Rating ³ | Uniform. ⁴ | Hills | Stems | |
| CO03243-3W | 1.077 | 0.003 | 0.428 | 40 | 80 | 3 | 13 | 4.23 |
| CO02024-9W | 1.078 | 0.004 | 0.608 | 70 | 90 | 3 | 21 | 2.98 |
| A01143-3C | 1.078 | 0.005 | 0.942 | 70 | 85 | 3 | 15 | 4.78 |
| Atlantic | 1.083 | 0.003 | 0.675 | 50 | 90 | 4 | 18 | 5.77 |
| MSL007-B | 1.081 | 0.004 | 0.701 | 40 | 70 | 4 | 8 | 4.17 |
| W5955-1 | 1.076 | 0.005 | 0.918 | 40 | 90 | 4 | 14 | 4.69 |
| A00188-3C | 1.080 | 0.005 | 1.249 | 60 | 90 | 3 | 26 | 3.16 |
| AC01151-5W | 1.075 | 0.007 | 0.716 | 40 | 70 | 2 | 10 | 3.36 |
| Snowden | 1.081 | 0.004 | 0.886 | 20 | 80 | 3 | 19 | 3.80 |
| CO02321-4W | 1.076 | 0.003 | 0.720 | 30 | 80 | 4 | 16 | 3.38 |
| W6609-3 | 1.076 | 0.003 | 0.860 | 40 | 90 | 4 | 16 | 2.89 |
| AF4157-6 | 1.073 | 0.003 | 0.750 | 30 | 90 | 3 | 14 | 3.02 |

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:

CO03243-3W: This variety recorded the top overall yield in the 2014 trial with a 478 cwt./A US#1 yield. The specific gravity was below the trial average at 1.076 (Table 1). Raw internal tuber quality was ok, but an above average amount of hollow heart was observed (Table 2). Chip quality at Herr Foods was below average, ranking 11th of 12 for overall appearance. An above average amount of black spot bruise was observed for CO03243-3W, recording 1.3 bruises per tuber on average (Table 4). The tubers appeared to have been physically and chemically mature at the time of harvest (Tables 5A-B).

CO02024-9W: This variety was the second highest yielding line in the 2014 trial. The US#1 yield was 436 cwt./A, with a below average specific gravity (Table 1). The tuber size distribution consisted of 85 percent mid-size and 13 percent undersize tubers. Three tubers with vascular discoloration and two tubers with internal brown spot were observed (Table 2). CO02024-9W ranked 7th of 12 lines tested at Herr Foods for overall chip quality and appearance on October 13th. In addition, this variety had the lowest AGTRON score of the trial at 56.7 (Table 3). CO02024-9W appears to be susceptible to black spot bruise (Table 4). This line was potentially, moderately physically and chemically immature when the pre-harvest panels were collected on September 2nd (Table 5B). The slightly elevated glucose levels at harvest could potentially explain the marginal chip quality performance at Herr Foods on October 13th.

A01143-3C: This variety had an average yield of 433 cwt./A US#1 with a specific gravity of 1.080 (Table 1). It was the third highest yielding line in the 2014 variety trial. Raw internal tuber quality was good with only six tubers expressing vascular discoloration (Table 2). A01143-3C ranked 4th of 12 varieties at Herr's for chip quality out-of-the-field. The variety exhibited a below average susceptibility to black spot bruise, with only 0.8 black spot bruises being recorded for

each tuber observed (Table 4). This variety was very chemically immature on August 20th, with a 0.005 glucose and a 1.357 sucrose value recorded (Table 5A). The vines appeared quite green on this date. At the second pre-harvest panel evaluation, A01143-3C was only slightly more chemically stable, having a 0.005 glucose and a 0.942 sucrose rating (Table 5B). This variety was one of the more immature on this evaluation date. The chip quality ranking for A01143-3C from Herr's did not reflect as much of this chemical immaturity as would have been expected.

Atlantic: This variety had an above average yield performance in the 2014 trial, yielding 432 cwt./A US#1. The specific gravity was the highest in the trial at 1.087 (Table 1). This variety had ten percent oversize tubers, of which 47 percent of them were hollow. Herr's ranked Atlantic least desirable for the out-of-the-field chip quality evaluation on October 13th, 2014. From the 2014 black spot bruise test, Atlantic appeared among the most susceptible varieties, recording 2.1 bruises per tuber (Table 4). Pre-harvest panel data showed Atlantic to be both chemically and physically mature prior to harvest.

MSL007-B: The yield for MSL007-B was above the trial average at 389 cwt./A US#1 with 10 percent of the total yield being oversize potatoes (Table 1). The specific gravity was above the trial average at 1.082. Internal tuber quality was acceptable, with 6 tubers out of thirty cut exhibiting vascular discoloration (Table 2). This variety ranked ninth for overall chip quality at Herr Foods on October 13th (Table 3). MSL007-B scored poorly in tolerance to black spot bruise, with an average of 2.3 bruises per tuber reported (Table 4). This variety exhibited the most black spot bruise susceptibility in the trial. Pre-harvest panel data appeared stable on both dates (Tables 5A-B).

W5955-1: This variety yielded just under the trial average, recording 348 cwt./A US#1 with a specific gravity of 1.080 (Table 1). The tuber size distribution consisted of 84 percent US#1 size tubers, 10 percent undersize and 6 percent cull tubers. This variety had the largest recorded amount of oversize in this year's trial at 11 percent. Raw internal tuber quality was acceptable with three tubers expressing brown center and six tubers with vascular discoloration (Table 2). W5955-1 ranked 1st of the twelve varieties tested at Herr's for chip quality on October 13th. The variety exhibited a tolerance to black spot bruise, with only 0.7 black spot bruises being recorded for each tuber evaluated (Table 4). This variety appeared immature at the August 20th pre-harvest panel evaluation (Table 5A), but was more chemically stable at the second evaluation date (Table 5B).

A00188-3C: A00188-3C yielded slightly below the trial average at 322 cwt./A US#1. Specific gravity was above the trial average at 1.084. The total yield for this variety was above the trial average (Table 1). The tuber size distribution consisted of 74 percent US#1 size tubers and 24 percent undersize tubers. The variety had nine tubers with vascular discoloration, ranking it among the highest in the trial (Table 2). Herr's ranked this variety 6 of 12 in chip performance out-of-the-field (Table 3). A00188-3C appeared to have a low susceptibility to black spot bruising (Table 4). The tubers of this variety were very chemically immature on August 20th, recording a percent glucose of 0.016 and a sucrose rating of 1.249 (Table 5A). Sucrose levels remained high through September 2nd, 2014 (Table 5B). This sugar immaturity may have been the basis for the average ranking at Herr Foods.

AC01151-5W: This variety recorded the fifth lowest yield in this year's trial (Table 1). AC01151-5W had the lowest specific gravity of the trial at 1.072. The tuber size distribution consisted of 73 percent US#1 size tubers and 25 percent undersize tubers. This was the largest percent of

undersize in the trial. Internal tuber quality was poor with two tubers expressing hollow heart, five tubers expressing internal brown spots and two tubers with brown center (Table 2). This clone ranked 10th at Herr's for chip quality and appearance on October 13th, 2014 (Table 3). AC01151-5W appeared to have an average level of tolerance to black spot bruise (Table 4). This clone was maturing acceptably at both pre-harvest panel dates (Tables 5A-B).

Snowden: Snowden was a below average yielding variety in the 2014 variety trial with a 318 cwt./A US#1 yield and an average specific gravity of 1.079 (Table 1). Internal raw tuber quality was moderate at harvest with 33 percent vascular discoloration observed (Table 2). This variety was average in chip performance at Herr Foods out-of-the-field fry test, ranking eighth in the trial overall. Snowden had an above average susceptibility to black spot bruise (Table 4). Pre-harvest panel data for this line appeared acceptable on both sampling dates (Tables 5A-B).

CO02321-4W: This variety had a below average yield of US#1 tubers at 281 cwt./A and a tuber size distribution that consisted of 80 percent US#1 and 19 percent undersize tubers (Table 1). The specific gravity was below the trial average at 1.077. Raw internal tuber quality was generally good (Table 2). The at-harvest chip fry test ranked this variety 2nd out of the 12 varieties for overall appearance (Table 3). This variety exhibited average black spot bruise tolerance in the 2014 trial (Table 4). The vine and tuber maturity appeared to be adequate for this variety to deliver good chip quality (Tables 5A-B).

W6609-3: The yield on W6609-3 was the second lowest in the 2014 trial at 239 cwt./A US#1. The specific gravity was recorded at 1.079 (Table 1). Raw internal tuber quality was acceptable with eight tubers with vascular discoloration and one with brown center being observed (Table 2). Herr's ranked this variety fifth in overall chip quality appearance. Black spot bruise tolerance was slightly below average at 1.6 bruises per tuber (Table 4).

AF4157-6: This variety recorded the lowest US#1 tuber yield of the trial at 208 cwt./A and a tuber size distribution that consisted of 73 percent US#1 size tubers and 24 percent undersize tubers (Table 1). The specific gravity was at the trial average of 1.079. AF4157-6 had eleven tubers with vascular discoloration which was the highest in the trial for this tuber defect (Table 2). The at-harvest chip fry test ranked this variety 3rd out of 12 varieties for overall appearance (Table 3). This variety expressed below average susceptibility to black spot bruise, averaging only 0.7 bruises per tuber (Table 4). The plant vines appeared to be physiologically maturing on August 20th (Table 5A).

Missouri Regional Trial

2014 - Black Gold Farms - Charleston, MO

| Variety | Yield | | | QC | | | | |
|------------|--------------|-----------------|--------------|-----------------|------------------|-------|------|------|
| | Yield, cwt/a | Marketable, cwt | % Marketable | Tuber set/plant | Specific Gravity | % IHN | % HH | % GC |
| Atlantic | 441 | 418 | 95% | 7.0 | 1.082 | 17.5% | 8.8% | 0.0% |
| Snowden | 308 | 256 | 83% | 7.9 | 1.074 | 0.0% | 0.0% | 0.0% |
| A01143-3C | 235 | 184 | 78% | 6.7 | 1.068 | 0.0% | 0.0% | 0.0% |
| AF4157-6 | 318 | 285 | 90% | 6.4 | 1.078 | 0.0% | 5.0% | 0.0% |
| CO02024-9W | 325 | 250 | 77% | 9.3 | 1.078 | 1.3% | 0.0% | 0.0% |
| CO02321-4W | 270 | 244 | 90% | 5.5 | 1.083 | 0.0% | 2.5% | 0.0% |
| CO03243-3W | 327 | 300 | 92% | 6.6 | 1.071 | 12.5% | 0.0% | 0.0% |
| MSK061-4 | 259 | 220 | 85% | 5.2 | 1.083 | 0.0% | 0.0% | 0.0% |
| MSL007-B | 266 | 246 | 93% | 5.6 | 1.068 | 0.0% | 7.5% | 0.0% |
| W5955-1 | 350 | 318 | 91% | 7.2 | 1.074 | 6.3% | 3.8% | 0.0% |
| W6609-3 | 349 | 294 | 84% | 8.6 | 1.079 | 7.5% | 0.0% | 0.0% |

| Variety | Cook Sample | | | | | | Comments |
|------------|-------------|------|------|------|------|-------|------------------------------------|
| | CLR | UC | GRN | ID | ED | Total | |
| Atlantic | 70 | 0.0% | 0.0% | 0.5% | 2.5% | 3.0% | |
| Snowden | 72 | 0.0% | 0.0% | 0.5% | 1.0% | 1.5% | Some minor scab |
| A01143-3C | 72 | 1.0% | 0.0% | 0.0% | 0.5% | 1.5% | Not good looking, secondary growth |
| AF4157-6 | 72 | 0.0% | 0.0% | 3.5% | 0.0% | 3.5% | Scab |
| CO02024-9W | 72 | 0.0% | 0.0% | 0.0% | 0.5% | 0.5% | |
| CO02321-4W | 70 | 0.0% | 0.0% | 0.0% | 3.0% | 3.0% | |
| CO03243-3W | 72 | 0.0% | 0.0% | 0.0% | 2.0% | 2.0% | |
| MSK061-4 | 72 | 0.0% | 0.0% | 1.0% | 1.5% | 2.5% | Secondary growth |
| MSL007-B | 72 | 0.0% | 0.0% | 0.5% | 0.0% | 0.5% | Nice-looking, round tubers |
| W5955-1 | 72 | 0.0% | 0.0% | 0.0% | 3.5% | 3.5% | |
| W6609-3 | 72 | 0.0% | 0.0% | 0.0% | 1.5% | 1.5% | Oblong tubers |

North Carolina Regional Trial

Local Coordinators:

Dr. Craig Yenko
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, Columbia, Tyrrell County, NC |
| Planting Date: | March 13, 2014 |
| Harvest Date: | July 2, 2014 (111 days) |
| Growing Conditions: | Planting was within the normal range, between the last week in February and the end of March) for North Carolina. Conditions were moist and cool at planting. Followed by adequate rainfall through Mid-May. Then in later May, our bulking period, the rains tapered off and conditions became hot and dry. These conditions persisted through June just prior to harvest when rains returned in a sporadically heavy manner these conditions persisted until the end of harvest in July. Total rainfall was 15.54 in from planting to harvest: March 2.10 in, April 5.57 in, May 4.57 in, June 3.30 in, and no precipitation in July prior to harvest. |
| Soil Type: | Hyde loam |
| Experimental Design: | Randomized complete block design with 5 replications. |
| Row Spacing: | 28 hills, spaced 9 inches apart, 34" row width. |
| Fertilizer: | 233N, 112P, 200K, 14Mg, 18S, 1.5Zn lbs/A |
| Weed Control: | Metribuzin 1 lbs/A Intensity one 12 fl oz/A Matrix SG 1 oz/A |
| Insect Control: | Admire Pro – in furrow |
| Disease Control: | Quadris in furrow 6.2 oz/A Bravo 8 pt/A (4 applications) Revus Top 6.2 fl oz/A Curzate 3.2 oz/A |

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

| Clone | Total Yield cwt/A | Marketable Yield cwt/A | % Size Distribution by Class ¹ | | | | | | | 1 ⁷ / ₈ to 4" | 2 ¹ / ₂ to 4" | Specific Gravity ² | Chip Color ³ | |
|-------------|----------------------|---------------------------|---|----|----|----|---|-------|-----------------|--|--|----------------------------------|-------------------------|--|
| | | | 1 | 2 | 3 | 4 | 5 | Culls | 24 to 48 hrs | | | | 5 to 7 days | |
| | | | | | | | | | | | | | | |
| A01143-3C | 414 | 357 | 12 | 68 | 18 | 0 | 0 | 2 | 86 | 18 | 1.064 | 1.0 | 2.5 | |
| AF4157-6 | 484 | 416 | 12 | 51 | 35 | 0 | 0 | 2 | 86 | 35 | 1.073 | 1.0 | 1.0 | |
| Atlantic | 400 | 363 | 5 | 23 | 59 | 9 | 0 | 4 | 91 | 67 | 1.073 | 1.0 | 2.0 | |
| CO02024-9W | 475 | 402 | 14 | 60 | 25 | 0 | 0 | 2 | 84 | 25 | 1.064 | 1.0 | 1.5 | |
| CO02321-4W | 467 | 347 | 16 | 32 | 44 | 0 | 0 | 8 | 76 | 45 | 1.048 | 1.0 | 2.0 | |
| CO03243-3W | 418 | 387 | 5 | 33 | 55 | 4 | 0 | 2 | 93 | 59 | 1.065 | 1.5 | 1.5 | |
| MSK061-4 | 421 | 370 | 8 | 38 | 49 | 1 | 0 | 5 | 88 | 50 | 1.076 | 1.5 | 2.0 | |
| MSM246-B | 352 | 260 | 5 | 32 | 41 | 1 | 0 | 21 | 74 | 42 | 1.074 | 1.5 | 2.0 | |
| Snowden | 451 | 416 | 7 | 46 | 45 | 1 | 0 | 1 | 92 | 46 | 1.076 | 1.0 | 1.5 | |
| W5955-1 | 326 | 285 | 5 | 22 | 56 | 10 | 1 | 7 | 88 | 66 | 1.070 | 1.5 | 1.5 | |
| W6609-3 | 246 | 209 | 11 | 35 | 49 | 1 | 0 | 4 | 85 | 50 | 1.070 | 1.5 | 1.5 | |
| Grand Mean | 405 | 347 | | | | | | | | | | | | |
| CV(%) | 13 | 11 | | | | | | | | | | | | |
| LSD (k=100) | 61 | 46 | | | | | | | | | | | | |

¹ **Size Classes:**

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

² **Specific Gravity**

Determined by weight in air/water method.

³ **Chip Color**

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

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

| Clone | Plant Data ¹ | | | | Tuber Data ² | | | | | | | | | % Internal Defects ³ | | | | | |
|------------|-------------------------|-----|------|-----|-------------------------|-----|-----|-----|-----|-----|------|-----|-----|---------------------------------|-----|----|----|----|----|
| | TYPE | DIS | POLL | MAT | CLR | TXT | TCX | TSS | SHP | EYE | SIZE | DIS | APP | HN | HNR | HH | VR | BC | SR |
| A01143-3C | 9 | 9 | 8 | 9 | 6 | 5 | 4 | 5 | 2 | 7 | 5 | 8 | 5 | 16 | 7.8 | 0 | 0 | 0 | 0 |
| AF4157-6 | 6 | 9 | 9 | 4 | 6 | 5 | 5 | 6 | 3 | 8 | 4 | 7 | 6 | 0 | 9 | 0 | 0 | 0 | 0 |
| Atlantic | 7 | 9 | 8 | 5 | 6 | 5 | 6 | 4 | 3 | 7 | 7 | 6 | 5 | 24 | 7.8 | 0 | 0 | 0 | 0 |
| CO02024-9W | 6 | 9 | 8 | 4 | 9 | 7 | 3 | 6 | 2 | 7 | 5 | 7 | 5 | 2 | 8.6 | 0 | 0 | 0 | 0 |
| CO02321-4W | 6 | 9 | 9 | 4 | 9 | 7 | 5 | 7 | 2 | 8 | 6 | 8 | 6 | 12 | 7.8 | 0 | 0 | 0 | 0 |
| CO03243-3W | 9 | 9 | 9 | 7 | 6 | 5 | 6 | 6 | 3 | 7 | 6 | 7 | 8 | 24 | 7.4 | 0 | 2 | 0 | 0 |
| MSK061-4 | 8 | 9 | 8 | 7 | 9 | 6 | 6 | 6 | 3 | 8 | 5 | 8 | 6 | 0 | 9 | 0 | 0 | 0 | 0 |
| MSM246-B | 9 | 9 | 8 | 7 | 6 | 5 | 5 | 6 | 2 | 7 | 6 | 5 | 3 | 2 | 8.8 | 2 | 0 | 0 | 2 |
| Snowden | 9 | 8 | 7 | 7 | 5 | 5 | 5 | 5 | 2 | 5 | 6 | 9 | 4 | 0 | 9 | 0 | 0 | 0 | 0 |
| W5955-1 | 8 | 9 | 8 | 8 | 6 | 5 | 6 | 7 | 2 | 8 | 8 | 5 | 5 | 24 | 7.4 | 0 | 0 | 38 | 0 |
| W6609-3 | 6 | 8 | 8 | 7 | 6 | 5 | 5 | 7 | 3 | 7 | 6 | 7 | 6 | 18 | 8.2 | 0 | 0 | 48 | 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 Defects | Specific Gravity | Defect Descriptions ¹ | Chip Color ² |
|------------|-----------|----------|----------------|------------------|----------------------------------|-------------------------|
| | Internal | External | | | | Hunter Lab |
| A01143-3C | 0% | 0% | 0% | 1.073 | . | 63.0 |
| AF4157-6 | 0% | 0% | 0% | 1.076 | . | 63.2 |
| Atlantic | 26% | 0% | 26% | 1.085 | IHN,VB | 61.4 |
| CO02024-9W | 0% | 0% | 0% | 1.075 | . | 61.0 |
| CO02321-4W | 1% | 0% | 1% | 1.078 | IHN | 61.5 |
| CO03243-3W | 1% | 0% | 1% | 1.072 | SB | 62.2 |
| MSK061-4 | 0% | 0% | 0% | 1.086 | . | 63.3 |
| MSM246-B | 0% | 0% | 0% | 1.081 | . | 61.3 |
| Snowden | 1% | 0% | 1% | 1.082 | SB | 62.9 |
| W5955-1 | 5% | 0% | 5% | 1.072 | ID,IHN | 62.2 |
| W6609-3 | 5% | 0% | 5% | 1.066 | BC,ID | 61.6 |

¹ **Defect Descriptions:**

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

² **Chip Color:****Hunter Lab Scores**

Taken with defective chips included in sample

Clone Summaries

A01143-3C: Maturity for this clone was late season, stand counts averaged 99% and vigor was excellent. Shapes were mostly round, size was medium and overall appearance was fair. Marketable yields were 98% of Atlantic (90% historically), gravity was 1.064 (1.067 historically) and chip color was exceptional in the 24 to 48 hour chip test and good in the 5 to 7 day test. External defects included misshapes, secondary growth, sunscald and skin blemishes due to Rhizoctonia.

AF4157-6: This clone was slightly earlier than mid-maturing and had 99% stands with good vigor. Shapes were round to oblong, size was slightly smaller than medium and overall appearance was good. Marketable yields were 116% of Atlantic (historically 100%), gravity was 1.073 (historically 1.076) and chip color was exceptional in both the 24 to 48 hour and 5 to 7 day chip tests. External defects included sunscald, misshapes, soft rot and skin blemishes due to Rhizoctonia.

Atlantic: Maturity for our main crop standard was mid-season, stands were 87% and vigor was good. Shapes were round to oblong, size was medium large and overall appearance was fair. Gravity was 1.073 (historically 1.078) and chip color was exceptional for the 24 to 48 hour chip test and excellent in the 5 to 7 day chip test. External defects included growth cracks, sunscald, misshapes and skin blemishes due to Rhizoctonia.

CO02024-9W: This clone was slightly earlier than mid-maturing and had 97% stands with better than good plant vigor. Shapes were mostly round, size was medium, and overall appearance was fair. Marketable yields were 111% of Atlantic, gravity was 1.064 and chip scores were exceptional for the 24 to 48 hour chip test and exceptional to excellent for the 5 to 7 day chip test. External defects were sunscald, misshapes and soft rot.

CO02321-4W: Maturity for this clone was slightly earlier than mid-season with 99% stands and excellent plant vigor. Shapes were mostly round, size was slightly larger than medium and overall appearance was better than fair. Marketable yields were 95% of Atlantic (historically 93%), gravity was 1.048 (historically 1.067) and chip scores were exceptional for the 24 to 48 hour chip test and excellent for the 5 to 7 day chip tests. External defects were soft rot, sunscald and misshapes.

CO03243-3W: Maturity for this clone was mid to late season with 91% stands and good plant vigor. Shapes were round to oblong, size was slightly larger than medium and overall appearance was better than good. Marketable yields were 107% of Atlantic (historically 102%), gravity was 1.065 (1.063 historically) and chip scores were exceptional to excellent for both the 24 to 48 hour and the 5 to 7 day chip tests. External defects included growth cracks, sunscald, misshapes, common scab and skin blemishes due to Rhizoctonia.

MSK061-4: Maturity for this clone was mid to late season, stands were 100% and vigor was better than good. Shapes were round to oblong, size was medium and overall appearance was better than fair. Marketable yields were 102% of Atlantic (historically 86%), gravity was 1.076 (historically 1.076) and chip scores were exceptional to excellent for the 24 to 48 hour chip test and excellent in the 5 to 7 day chip test. External defects were sunscalds, secondary growth, growth cracks, soft rot, and skin blemishes due to Rhizoctonia.

MSM246-B: This clone was mid to late season and had 99% stands with fair vigor. Shapes were mostly round, size was slightly larger than medium, and overall appearance was poor. Marketable yields were 72% of Atlantic (historically 72%), gravity was 1.074 (historically 1.068), and chip scores were exceptional to excellent for the 24 to 48 hour and excellent for the 5 to 7 day tests. External defects included misshapes, sunscald, common scab and significant amounts of skin blemishes due to Rhizoctonia.

Snowden: Our late season standard had a mid to late maturity with 99% stands and better than good vigor. Shapes were mostly round, size was slightly larger than medium and overall appearance was less than fair. Marketable yields were 115% of Atlantic (historically 113%), gravity was 1.076 (historically 1.074) and chip scores for the 24 to 48 hour test were exceptional and exceptional to excellent for the 5 to 7 day chip test. External defects included sunscald and misshapes.

W5955-1: Maturity for this clone was late and stands were 73% with better than fair vigor. Shapes were mostly round, size was large and overall appearance was fair. Marketable yields were 79% of Atlantic (historically 95%), gravity was 1.070 (historically 1.066) and chip scores were exceptional to excellent for both the 24 to 48 hour and the 5 to 7 day chip test. External defects included sunscald, common scab and skin blemishes due to Rhizoctonia.

W6609-3: Maturity was mid to late season, stands were 79% and vigor was fair. Shapes were round to oblong, size was slightly larger than medium and overall appearance was better than fair. Marketable yields were 58% of Atlantic (historically 74%), gravity was 1.070 (1.071 historically) and chip scores were exceptional to excellent for both the 24 to 48 hour and the 5 to 7 day tests. External defects misshapes, growth cracks and skin blemishes due to Rhizoctonia.

Clone Pictures:

NC 24 to 48 hr chip



NC 5 to 7 day chip



A01143-3C



AF4157-6



Atlantic



CO02024-9W

NC 24 to 48 hr chip



NC 5 to 7 day chip



CO02321-4W

NC 24 to 48 hr chip



NC 5 to 7 day chip



CO03243-3W



MSK061-4



MSM246-B



Snowden



W5955-1

NC 24 to 48 hr chip



NC 5 to 7 day chip



W6609-3

North Dakota Regional Trial

Local Coordinators: Cooperating Grower: Cooperating Chip Processor:

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

NPPGA
Grand forks, ND

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

Trial Data:

Planting Site: NPPGA Farm, Grand Forks, ND

Planting Date: May 18, 2014

Harvest Date: September 23, 2014 (127 days)

Growing Conditions: Growing conditions were good for the whole growing season. We got the SFA trials planted before the rains and before the warm weather in May. June was warm with timely rains 6.5 inches. July we had about 3.5 inches of nice timely rains. August & September was warm, but not overly hot with nice rains. Harvest season was in my mind ideal. This is probably the best crop we've had in the SFA trials

Experimental Design:

Each variety/clone was planted in a single 250ft row as directed by the SFA protocol. Four 20ft sections of each row were harvested and graded. This was not 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 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: North Dakota - Production Statistics for SFA Clones

| Clone | US #1 Yld | Total Yld | #1 | Culls | Distribution | | | | | | | Size Class Range | |
|------------|-----------|-----------|----|-------|--------------|----|----|----|----|--------|--------|------------------|--|
| | cwt/A | ctw/A | % | % | 1 | 2 | 3 | 4 | 5 | 2 to 4 | 3 to 4 | | |
| ATLANTIC | 197 | 224.6 | 86 | 0 | 7 | 34 | 28 | 17 | 6 | 86 | 45 | | |
| CO02321-4W | 207 | 217.1 | 95 | 0 | 4 | 19 | 39 | 21 | 10 | 95 | 60 | | |
| AC01151-5W | 213 | 233.7 | 91 | 0 | 11 | 23 | 41 | 18 | 7 | 82 | 59 | | |
| CO02024-9W | 206 | 247.2 | 83 | 0 | 10 | 31 | 43 | 16 | 8 | 90 | 59 | | |
| CO03243-3W | 183 | 193.8 | 94 | 0 | 3 | 36 | 31 | 22 | 11 | 89 | 53 | | |
| A00188-3C | 187 | 197.3 | 95 | 0 | 12 | 38 | 41 | 12 | 12 | 91 | 53 | | |
| A01143-3C | 155 | 207.3 | 75 | 0 | 17 | 36 | 42 | 14 | 10 | 92 | 62 | | |
| MSL007-B | 166 | 191.5 | 87 | 0 | 5 | 42 | 39 | 12 | 6 | 88 | 49 | | |
| AF4157-6 | 149 | 173.1 | 86 | 0 | 19 | 39 | 27 | 19 | 13 | 76 | 46 | | |
| W6609-3 | 164 | 181.4 | 91 | 0 | 11 | 51 | 26 | 11 | 17 | 87 | 37 | | |
| W5955-1 | 161 | 177.0 | 91 | 0 | 20 | 42 | 23 | 21 | 4 | 86 | 54 | | |
| SNOWDEN | 156 | 167.3 | 93 | 0 | 4 | 39 | 21 | 11 | 7 | 71 | 32 | | |

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

2 – Percent No. 1: calculated based on weight using the formula, NO. 1wt / 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: North Dakota - Plant Growth and tuber characteristics for SFA clones

| | Plant Growth Characteristics ¹ | | | | Tuber Characteristics ² | | | | | | | Specific Gravity |
|------------|---|-------|------|----------|------------------------------------|----|----|----|----|-----|--------------------------|------------------|
| | Percent | Early | Vine | Vine | | | | | | | | |
| Clone | Stand | Vigor | Type | Maturity | IFC | SC | ST | TS | ED | APP | Chip Rating ³ | |
| ATLANTIC | 89 | na | 9 | 2 | 1 | 6 | 6 | 3 | 6 | 6 | 62 | 1.086 |
| CO02321-4W | 80 | na | 9 | 3 | 1 | 6 | 6 | 3 | 7 | 7 | 67 | 1.100 |
| AC01151-5W | 82 | na | 9 | 3 | 1 | 6 | 7 | 3 | 6 | 7 | 65 | 1.087 |
| CO02024-9W | 78 | na | 9 | 3 | 2 | 6 | 6 | 3 | 5 | 7 | 66 | 1.096 |
| CO03243-3W | 85 | na | 8 | 4 | 1 | 6 | 6 | 4 | 6 | 7 | 67 | 1.091 |
| A00188-3C | 87 | na | 9 | 3 | 1 | 6 | 6 | 4 | 6 | 7 | 66 | 1.096 |
| A01143-3C | 87 | na | 9 | 3 | 1 | 7 | 7 | 3 | 6 | 5 | 64 | 1.095 |
| MSL007-B | 85 | na | 8 | 2 | 1 | 6 | 7 | 4 | 6 | 7 | 64 | 1.099 |
| AF4157-6 | 90 | na | 8 | 4 | 2 | 6 | 7 | 4 | 7 | 6 | 66 | 1.079 |
| W6609-3 | 75 | na | 9 | 3 | 2 | 6 | 6 | 3 | 7 | 7 | 65 | 1.104 |
| W5955-1 | 90 | na | 9 | 3 | 1 | 6 | 6 | 3 | 7 | 7 | 66 | 1.089 |
| SNOWDEN | 83 | na | 9 | 3 | 1 | 6 | 6 | 3 | 6 | 8 | 63 | 1.107 |

¹Plant Growth Characteristics

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

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

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

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

²Tuber Characteristics

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

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

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

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

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

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

| Table 3: North Dakota - External and Internal defects for SFA clones | | | | | | | | | |
|--|---------------------------------------|-----------|-----------|---------------|-------------|--------------------------|----|-----|-----|
| | % External Tuber Defects ¹ | | | | | % Internal Tuber Defects | | | |
| Clone | Growth Cracks | Misshapen | Sunburned | Rotten& Misc. | Total Culls | HH | BR | CRS | IHN |
| ATLANTIC | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 |
| CO02321-4W | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 |
| AC01151-5W | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| CO02024-9W | 0 | 2 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| CO03243-3W | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |
| A00188-3C | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 |
| A01143-3C | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MSL007-B | 2 | 0 | 1 | 1 | 3 | 0 | 0 | 0 | 0 |
| AF4157-6 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | 0 |
| W6609-3 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 |
| W5955-1 | 0 | 1 | 01 | 1 | 8 | 0 | 0 | 1 | 0 |
| SNOWDEN | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 |

¹External 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.

Oregon-Washington Regional Trial

Field Location: Burbank, WA

Date of Planting: April 29 2014

Spacing: 9" x 34"

Date of Vine Kill: Sep 15 2014

Crop Duration: 140 Days

Date of Harvest: October 02 2014

Yield/acre (Cwt)

| Clone | Unders | Culls | 13/4" to 21/2" | 21/2" to 4" | over 4" | Total Yield | Specific Gravity | Fry Color |
|-------------------|--------|-------|----------------|-------------|---------|-------------|------------------|-----------|
| A01143-3C | 29 | 27 | 210 | 559 | 0 | 826 | 1.074 | 2.0 |
| A00188-3C* | 47 | 33 | 250 | 237 | 0 | 567 | 1.075 | 2.0 |
| AF4157-6 | 24 | 22 | 102 | 397 | 0 | 545 | 1.080 | 1.7 |
| AC01151-5W | 107 | 67 | 302 | 292 | 0 | 769 | 1.074 | 1.7 |
| CO02321-4W | 28 | 40 | 152 | 301 | 0 | 520 | 1.082 | 1.7 |
| CO03243-3W | 18 | 40 | 64 | 520 | 88 | 730 | 1.077 | 2.0 |
| CO02024-9W | 67 | 19 | 279 | 285 | 0 | 651 | 1.075 | 1.5 |
| MSL007-B | 26 | 32 | 155 | 488 | 0 | 701 | 1.078 | 1.7 |
| W5955-1 | 28 | 34 | 123 | 477 | 27 | 689 | 1.081 | 1.8 |
| W6609-3 | 37 | 9 | 119 | 248 | 0 | 414 | 1.081 | 1.5 |
| Atlantic | 25 | 30 | 120 | 394 | 6 | 576 | 1.087 | 2.5 |
| Snowden | 32 | 36 | 197 | 552 | 31 | 848 | 1.078 | 2.2 |

Tuber Count/plant

| Clone | Sugar Ends (1-5) | Unders | Culls | 13/4" to 21/2" | 21/2" to 4" | over 4" | No.of Tubers/pt | Flower Color |
|-------------------|------------------|--------|-------|----------------|-------------|---------|-----------------|--------------|
| A01143-3C | 2.3 | 1.1 | 0.5 | 3.7 | 5.2 | 0.0 | 10.5 | W |
| A00188-3C* | 2.5 | 1.8 | 0.6 | 4.6 | 2.5 | 0.0 | 9.5 | La |
| AF4157-6 | 2.0 | 0.8 | 0.3 | 1.7 | 3.6 | 0.0 | 6.4 | W |
| AC01151-5W | 2.7 | 3.9 | 1.3 | 5.8 | 3.1 | 0.0 | 14.0 | La-Pu |
| CO02321-4W | 1.7 | 0.9 | 0.6 | 2.4 | 2.6 | 0.0 | 6.6 | W |
| CO03243-3W | 2.0 | 0.7 | 0.4 | 1.1 | 3.9 | 0.3 | 6.5 | W-La |
| CO02024-9W | 2.3 | 2.3 | 0.4 | 4.9 | 3.3 | 0.0 | 10.8 | W |
| MSL007-B | 2.0 | 0.8 | 0.4 | 2.5 | 4.3 | 0.0 | 8.1 | W |
| W5955-1 | 2.7 | 1.0 | 0.5 | 2.1 | 3.9 | 0.1 | 7.6 | W |
| W6609-3 | 1.3 | 1.4 | 0.3 | 2.3 | 2.6 | 0.0 | 6.5 | W |
| Atlantic | 2.7 | 0.8 | 0.4 | 2.1 | 3.3 | 0.0 | 6.6 | W |
| Snowden | 2.7 | 1.1 | 0.5 | 3.7 | 5.3 | 0.1 | 10.7 | W |

Internal Defects (%)

| Clone | % green at Vine Kill | Hollow Heart | Brown center | Internal Brown spot | Black spot Bruise† | Vascular Discoloration | Translucent End |
|-------------------|----------------------|--------------|--------------|---------------------|--------------------|------------------------|-----------------|
| A01143-3C | 80 | 0 | 0 | 3 | 13 | 7 | 3 |
| A00188-3C* | 5 | 0 | 0 | 5 | 20 | 15 | 0 |
| AF4157-6 | 0 | 0 | 0 | 3 | 50 | 27 | 0 |
| AC01151-5W | 40 | 0 | 0 | 0 | 40 | 0 | 0 |
| CO02321-4W | 5 | 0 | 0 | 3 | 50 | 3 | 0 |
| CO03243-3W | 30 | 3 | 0 | 7 | 50 | 0 | 0 |
| CO02024-9W | 15 | 0 | 0 | 7 | 70 | 0 | 0 |
| MSL007-B | 40 | 0 | 0 | 30 | 43 | 0 | 0 |
| W5955-1 | 40 | 7 | 0 | 40 | 47 | 3 | 0 |
| W6609-3 | 0 | 0 | 10 | 0 | 50 | 13 | 0 |
| Atlantic | 20 | 0 | 0 | 47 | 87 | 0 | 0 |
| Snowden | 80 | 3 | 0 | 3 | 33 | 23 | 0 |

Oregon-Washington Regional Trial

| Clone | Skin color | Flesh Color | Russ | Eye depth | Tuber Shape | Uniformity |
|-------------------|------------|-------------|--------------|------------|-------------|---------------------|
| Rating | 1-12 | 1-9 | 1-9 (smooth) | 1-5 (deep) | | 1-5(highly uniform) |
| A01143-3C | 5.5 | White | 6.8 | 3.8 | R-cm | 3.7 |
| A00188-3C | 4.0 | White | 7.3 | 4.0 | R | 4.0 |
| AF4157-6 | 4.0 | White | 7.7 | 3.8 | R-ob | 4.0 |
| AC01151-5W | 3.7 | White | 8.0 | 3.7 | R-cm | 3.8 |
| CO02321-4W | 3.5 | White | 8.0 | 4.0 | ov-ob | 4.2 |
| CO03243-3W | 4.5 | White | 7.0 | 3.7 | R-ob | 3.8 |
| CO02024-9W | 3.8 | White | 7.7 | 3.7 | Cm-R | 3.8 |
| MSL007-B | 5.7 | White | 4.0 | 3.5 | R | 4.0 |
| W5955-1 | 5.3 | White | 6.0 | 3.5 | R | 3.8 |
| W6609-3 | 4.2 | White | 7.3 | 3.5 | R-cm | 3.7 |
| Atlantic | 5.0 | White | 6.0 | 3.0 | R-ob | 4.0 |
| Snowden | 5.5 | White | 5.5 | 3.0 | R-cm | 3.5 |

| Clone | Growth Crack | Scab | Shatterbruise | Skin set | Greening | Comments |
|-------------------|----------------|----------------|----------------|-----------|------------------|---|
| Rating | 1-5(resistant) | 1-5(resistant) | 1-5(resistant) | 1-9(good) | 1-5(no greening) | |
| A01143-3C | 5.0 | 4.5 | 4.0 | 4.0 | 4.7 | Rough, Sticky stolon, Folded Bud end |
| A00188-3C | 4.8 | 4.3 | 4.0 | 7.5 | 4.8 | Field rot, Prominent lenticels |
| AF4157-6 | 5.0 | 5.0 | 4.3 | 7.5 | 4.3 | Silver Scurf, Slightly compressed, Some rot |
| AC01151-5W | 4.7 | 2.8 | 4.2 | 7.5 | 3.5 | Pitted Scab, Greening, Sticky stolon |
| CO02321-4W | 4.8 | 4.7 | 4.5 | 7.3 | 4.0 | Patchy russet, Some rot |
| CO03243-3W | 4.7 | 4.7 | 4.5 | 7.7 | 4.5 | Folded bud end |
| CO02024-9W | 5.0 | 4.8 | 4.3 | 7.3 | 4.3 | Flat tubers, some rot |
| MSL007-B | 5.0 | 4.8 | 4.0 | 7.8 | 4.8 | Russet skin, some rot, Shatter Bruise x1 |
| W5955-1 | 4.0 | 4.7 | 4.0 | 7.5 | 4.2 | Flaky skin, Rot, Growth Cracks x1 |
| W6609-3 | 5.0 | 4.7 | 4.3 | 7.7 | 4.8 | compressed, Folded Bud End |
| Atlantic | 4.8 | 4.8 | 4.5 | 7.0 | 4.5 | Rot x3 |
| Snowden | 5.0 | 5.0 | 4.3 | 7.0 | 3.8 | Sticky Stolon, Greening, Folded Bud End |

Pennsylvania Regional Trial

USPB-SFA Chip Trial

2014

Pennsylvania

Trial Coordinator: Robert E. Leiby, Pennsylvania Co-Operative Potato Growers, Inc.
rleiby@pacooppotatoes.com

Farm Cooperator: David and Brian Bender, Orrstown, Franklin County, PA

Statistical Analysis: Dr. Xinshun Qu, Penn State University

Yield and Grading: Mike Peck, Penn State University

Chip Plant Cooperator: Mitch Keeney, UTZ Quality Foods, Inc.

Planting Date: May 15, 2014

Twelve Varieties were planted in a block of 12 rows in a commercial potato field.
Approximately 50 lbs. of seed from each variety was planted in a single row.

Four 15 feet long replicated random samples were harvested from each row/variety.

Rows: 36 inches apart

Seed Spacing: 9 inches in row

Weather conditions of note: 3.3 inches rain on trial within 24 hours of planting.

Trial site received several overhead irrigations

Harvest Date: October 2, 2014

Total yield, greater than 1 7/8" yield, percent of standard, size distribution, percent pickouts, and internal defects for SFA Trial in PA, 2014

| Variety/Line | Yield (cwt/A) ¹ | | %US#1 | % of Standard ² | % by size class ³ | | | | %PO ⁴ | Internal Defects ⁵ | |
|------------------|----------------------------|---------|-------|----------------------------|------------------------------|----|----|---|------------------|-------------------------------|----|
| | Total | >1 7/8" | | | 2 | 3 | 4 | 5 | | HH | IB |
| Atlantic | 241 | 204 | 85 | 100 | 39 | 38 | 7 | 0 | 7 | 0 | 0 |
| Snowden | 227 | 172 | 76 | 85 | 26 | 37 | 12 | 0 | 16 | 3 | 0 |
| A01143-3C | 277 | 138 | 49 | 68 | 21 | 24 | 4 | 0 | 42 | 0 | 0 |
| A00188-3C | 382 | 323 | 84 | 158 | 30 | 45 | 9 | 0 | 11 | 7 | 0 |
| AC01151-5W | 287 | 201 | 70 | 99 | 46 | 22 | 1 | 0 | 8 | 1 | 0 |
| AF4157-6 | 157 | 109 | 69 | 53 | 50 | 19 | 0 | 0 | 11 | 0 | 0 |
| CO02024-9W | 291 | 194 | 67 | 95 | 46 | 21 | 0 | 0 | 10 | 0 | 0 |
| CO02321-4W | 282 | 214 | 76 | 105 | 49 | 25 | 2 | 0 | 9 | 0 | 0 |
| CO03243-3W | 441 | 348 | 79 | 171 | 22 | 39 | 17 | 0 | 17 | 6 | 0 |
| MSL007-B | 330 | 299 | 90 | 147 | 35 | 45 | 10 | 0 | 5 | 1 | 2 |
| W5955-1 | 344 | 272 | 78 | 133 | 13 | 41 | 23 | 1 | 19 | 10 | 0 |
| W6609-3 | 277 | 229 | 83 | 113 | 36 | 41 | 6 | 0 | 8 | 3 | 0 |
| LSD ⁶ | 46 | 55 | 9 | | 8 | 9 | 6 | 1 | 10 | | |

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

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

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

⁴Percentage of total that are pickouts.

⁵Internal Defects: HH = hollow heart, IB = internal browning. Total number observed out of 32 tubers. 0 = not observed.

⁶LSD indicates least significant difference ($P=0.05$).

U.S. Potato Board/Snack Food Association National Chip Trial – 2014

Wisconsin Progress Report

-November, 2014-

Felix M Navarro, Research Manager, **Troy Fishler**, Hancock ARS, Storage Research Manager, Hancock University of Wisconsin-Madison Agricultural Research Station
Phone: 715-249-5961; E-mail: fmnavarro@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, and Staff of the Hancock Agricultural Research Station, Hancock Agricultural Research Station

Trial Procedure

Seed was received from trial cooperators during the first two weeks of April, 2014 and held in a locker in the Wisconsin Potato and Vegetable Storage Research Facility at 38°F until cutting. Seed was moved to 55°F to warm a week prior to cutting. Cutting was done by hand on May 2, 2014 with special attention paid to cutting uniform-sized, blocky seed pieces ranging from 2 to 2½ oz in weight. Cut seed was placed in well-ventilated plastic crates and held at 55°F for to promote drying and suberizing prior to planting. Planting took place on May 7, 2014 manually. Varieties were planted in two rows of 25 feet in length. Rows were spaced 36 in. apart. Seed pieces were placed 12 in. apart within each row. Plots were vine-killed with Diquat E at 1.5 pints/a and non-ionic surfactant at 1 pint/a on September 5 and 12, 2014 and using a custom-built Gallenberg plot harvester on October 1, 2014.

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

Fertility: 0-0-60 @450lbs/a and 0-0-0-17S-21Ca, Calcium sulfate @ 500 lbs/a April 11, 6-30-22-4S+micros @550 lb/a (starter at planting on May 7, 21-0-0-24S @360 lbs/a @ sidedres-hilling, May 23, 34-0-0 @350 lbs/a airflow spread, June 9, and 34-0-0 @ 217 lbs/a airflow spread, June 30, 2014.

Weed Control: Parallel 1 pt/a, Metribuzin 75DF 0.5 lb/a May 23, Matrix 1.50 oz/a + Non ionic surfactant 80/20 @ 1 pt/a

Insect Control: Platinum impregnated to starter fertilizer, Blackhawk at 3.3 dry oz/a, June 24, Blackhawk same rate @ July 3, Asana XL 3 floz/a + Coragen 5floz/a July 24, and Coragen 5 floz/a on August 7, 2014.

Disease Control: Vapam HL 40 gal/a in the fall, November 5, 2013; Bravo Zn 2.25 pt/a weekly from June 26 to August 14. Tanos 8 dry oz/a on July 3, Headline 12 floz/a July

17, Revus Top 7 floz/a on July 31, August 22, Penncozeb 75DF 1.50 lb/a weekly from August 22-September 12.

Rainfall: 17.26 in

Irrigation: 14.25 in

Soil type: Plainfield loamy sand

The 2014 growing season in Wisconsin was characterized by lower than usual temperatures and relatively wet, especially in the first half of the cycle. Planting was unusually delayed for this location due to low temperatures from mid-April to the first two weeks of May.

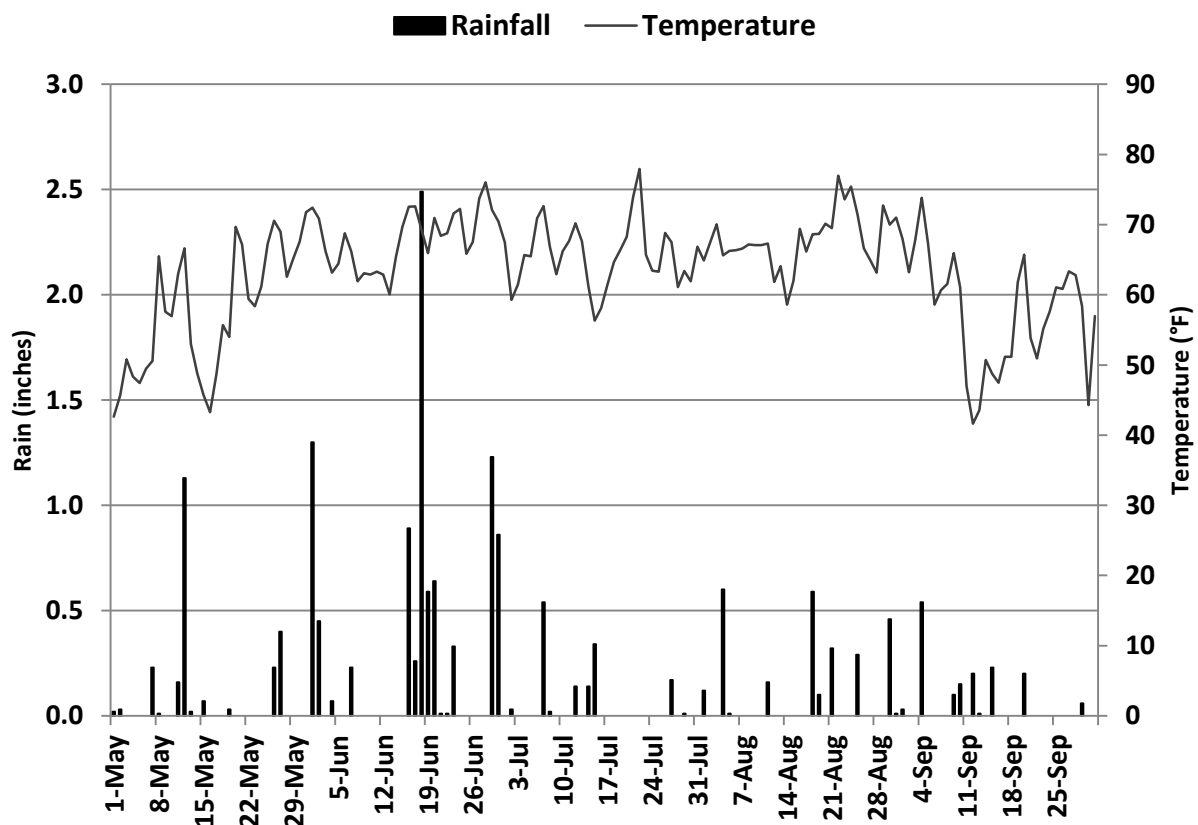


Fig. 1. Rainfall (inches, bar data) and average daily temperature (°F, line data) from May 1 to October 1, 2014. Planting data occurred on May 7 and harvest on October 1.

Yield Data, Tuber Quality and Storage Evaluation

Tubers were graded and sized using a custom-built Gallenberg grader and AgRay X-ray sizer. Specific gravity measurements were taken for each variety using a Weltech PW-2050 Dry Matter Assessment System; this uses a weight in air/weight in water method. Specific gravity, total yield (cwt/a), yield (cwt/a) of undersize (tubers with less than 2" diameter), oversize (tubers with more than 3.25" diameter) and culls are presented in **Table 1**. **Table 2** indicates the number of tuber per grading size category. Internal defects were evaluated as a percent of 60 individual tubers, 20 from each replication. Specifically for hollow heart, the data from all available harvested tuber, except the culled tubers. **Table 3** indicates percent incidence of brown center, hollow heart, internal brown spot, vascular discoloration, stem end discoloration and black spot bruise. **Table 4** shows tuber external characteristics and external defects. Clone summaries are presented at the end.

Storage profile is being pursued at the Hancock Agricultural Research Station Storage Research Facility from 45°F and 48°F. Potatoes are initially placed in a locker with controlled temperature and humidity. Data from the first processing evaluation is reported in **Table 5** ; we plan to collect data until June of 2015 and will be reported as they becomes available.

Table 1. Specific gravity, total tuber yield, yield of undersize tuber (less than 2 inches in diameter), yield of tubers of 2-3.25 inches in diameter, oversize (more than 3.25 inches) and culls, USPB-SFT14 clones, Hancock ARS, WI.

| Clone | Spec. Grav. | Total | Tubers < 2" | | Tubers 2 to 3.25" | | Tubers > 3.25" | | Culls* | |
|----------------------------|--------------|------------|-------------|------------|-------------------|-------------|----------------|-------------|-------------|------|
| | | | cwt/a | (%) | cwt/a | (%) | cwt/a | (%) | cwt/a | (%) |
| A00188-3C | 1.084 | <u>569</u> | 27.1 | <u>4.8</u> | <u>438</u> | <u>77.0</u> | 83 | 14.6 | 20.4 | 3.6 |
| A01143-3C | <u>1.074</u> | <u>624</u> | 16.4 | 2.6 | <u>453</u> | <u>72.6</u> | 109 | 17.4 | <u>45.9</u> | 7.4 |
| AC01151-5W | <u>1.077</u> | 715 | <u>60.4</u> | <u>8.4</u> | 604 | 84.5 | 20 | 2.8 | <u>30.4</u> | 4.2 |
| AF4157-6 | 1.081 | <u>521</u> | <u>45.2</u> | <u>8.7</u> | <u>456</u> | 87.5 | 8 | 1.5 | 11.8 | 2.3 |
| Atlantic | 1.087 | 693 | 18.2 | 2.6 | <u>527</u> | <u>76.1</u> | <u>123</u> | 17.8 | <u>24.3</u> | 3.5 |
| CO02024-9W | <u>1.077</u> | <u>588</u> | <u>47.9</u> | <u>8.2</u> | <u>501</u> | 85.2 | 10 | 1.7 | <u>28.9</u> | 4.9 |
| CO02321-4W | 1.084 | <u>447</u> | 26.8 | <u>6.0</u> | <u>293</u> | <u>65.6</u> | 73 | 16.4 | <u>53.6</u> | 12.0 |
| CO03243-3W | <u>1.078</u> | <u>549</u> | 20.5 | 3.7 | <u>426</u> | <u>77.6</u> | 89 | 16.1 | 13.6 | 2.5 |
| MSL007-B | 1.080 | <u>422</u> | 16.4 | 3.9 | <u>307</u> | <u>72.9</u> | 91 | <u>21.6</u> | 6.8 | 1.6 |
| Snowden | 1.083 | 726 | 21.2 | 2.9 | 601 | 82.8 | 94 | 13.0 | 9.6 | 1.3 |
| W5955-1 | 1.084 | <u>538</u> | 22.4 | 4.2 | <u>361</u> | <u>67.0</u> | <u>131</u> | <u>24.4</u> | <u>23.9</u> | 4.4 |
| W6609-3 | 1.085 | <u>449</u> | <u>35.2</u> | <u>7.8</u> | <u>351</u> | 78.1 | 41 | 9.2 | <u>21.9</u> | 4.9 |
| StdErr for Mean Difference | 0.002 | 31.4 | 4.77 | 0.74 | 30.1 | 3.02 | 15.7 | 3.0 | 7.0 | |

Note: Culled tubers include tubers that are green, deformed, knobby and with growth cracks.

Underlined values indicate performance statistically worse than the control cultivar Snowden.

Highlighted values indicate performance statistically better than the control cultivar Snowden.

Table 2. Average tuber count/ 50 ft, average tuber count/ ft. and count of undersize (less than 2 inches in diameter), count of tubers of 2-3.25 inches in diameter, oversize (more than 3.25 inches) and culls, USBP-SFT14 clones, Hancock ARS, WI.

| Clone | Tubers/ 50 ft | Tubers/ linear ft | Tubers < 2" by 50 ft | | Tubers 2 to 3.25" by 50 ft | | Tubers > 3.25" by 50 ft | | Culled Tubers (50ft) | |
|---------------------------|------------------|----------------------|-------------------------|------|-------------------------------|-------------|----------------------------|------|-------------------------|------|
| | | | Count | (%) | Count | (%) | Count | (%) | Count | (%) |
| A00188-3C | <u>512.0</u> | 10.2 | 60.7 | 11.8 | <u>395.0</u> | <u>77.1</u> | 32.0 | 6.3 | 24.3 | 4.8 |
| A01143-3C | <u>462.0</u> | 9.2 | 36.3 | 7.9 | <u>351.0</u> | 76.0 | 42.3 | 9.2 | 32.3 | 7.0 |
| AC01151-5W | 794.7 | 15.9 | <u>139.0</u> | 17.5 | 600.3 | 75.5 | 9.0 | 1.1 | <u>46.3</u> | 5.8 |
| AF4157-6 | 597.3 | 11.9 | <u>103.0</u> | 17.2 | <u>473.7</u> | 79.3 | 3.7 | 0.6 | 17.0 | 2.8 |
| Atlantic | <u>547.7</u> | 11.0 | 40.3 | 7.4 | <u>444.0</u> | 81.1 | 44.0 | 8.0 | 29.0 | 5.3 |
| CO02024-9W | 655.3 | 13.1 | <u>107.0</u> | 16.3 | 504.0 | 76.9 | 4.7 | 0.7 | <u>39.7</u> | 6.1 |
| CO02321-4W | <u>390.3</u> | 7.8 | 61.3 | 15.7 | <u>262.7</u> | 67.3 | 26.0 | 6.7 | <u>60.5</u> | 15.5 |
| CO03243-3W | <u>457.0</u> | 9.1 | 46.7 | 10.2 | <u>364.3</u> | 79.7 | 34.0 | 7.4 | 18.0 | 3.9 |
| MSL007-B | <u>342.3</u> | 6.8 | 37.3 | 10.9 | <u>262.0</u> | 76.5 | 33.0 | 9.6 | 10.0 | 2.9 |
| Snowden | 625.0 | 12.5 | 46.7 | 7.5 | 526.7 | 84.3 | 37.7 | 6.0 | 14.0 | 2.2 |
| W5955-1 | <u>427.7</u> | 8.6 | 50.3 | 11.8 | <u>320.0</u> | 74.8 | 45.7 | 10.7 | 35.0 | 8.2 |
| W6609-3 | <u>453.7</u> | 9.1 | <u>81.0</u> | 17.9 | <u>321.3</u> | 70.8 | 16.7 | 3.7 | 34.7 | 7.6 |
| StdErr Mean Difference | 38.3 | | 10.6 | | 28.16 | | 5.6 | | 13.9 | |

Note: Culled tubers include tubers that are green, deformed, knobby and with growth cracks.

Underlined values indicate performance statistically worse than the control cultivar Snowden.

Highlighted values indicate performance statistically better than the control cultivar Snowden.

Table 3. Percentage of internal defects on USBP-SFT14 clones, Hancock ARS, WI.

| Clone | Tuber/ 50 ft | % Hollow Heart, by tuber size class | | | | Other Internal Defects on 60 tubers | | | | |
|---------------------------|-----------------|-------------------------------------|------|---------------|--------|-------------------------------------|-------------|-------------|--------------|--------------|
| | | All | < 2" | 2 to 3.25" | >3.25" | BC | IBS | VD | SED (Raw) | BSB (Raw) |
| A00188-3C | <u>512</u> | 1.2 | 0.0 | 1.3 | 2.0 | <u>10.00</u> | 5.0 | <u>33.3</u> | 0.0 | 6.7 |
| A01143-3C | <u>462</u> | 1.7 | 0.0 | 1.7 | 2.3 | 1.52 | 9.2 | 12.7 | 1.7 | 6.5 |
| AC01151-5W | 794.7 | 3.1 | 0.3 | 3.7 | 6.0 | 0.00 | 10.0 | 16.7 | 0.0 | 3.3 |
| AF4157-6 | 597.3 | 2.7 | 0.7 | 3.3 | 0.0 | 0.00 | 1.7 | 21.7 | 0.0 | 0.0 |
| Atlantic | <u>547.7</u> | 2.2 | 0.0 | 2.0 | 6.3 | 3.42 | <u>34.1</u> | 6.8 | 0.0 | 3.3 |
| CO02024-9W | 655.3 | 1.5 | 0.0 | 2.0 | 9.7 | 5.00 | 20.0 | 10.0 | 1.7 | 3.3 |
| CO02321-4W | <u>390.3</u> | 1.2 | 0.0 | 1.3 | 3.0 | 0.00 | 0.9 | 5.0 | 0.0 | 5.0 |
| CO03243-3W | <u>457</u> | 2.1 | 0.0 | 2.0 | 6.3 | 0.00 | 12.8 | <u>33.9</u> | 0.0 | 7.2 |
| MSL007-B | <u>342.3</u> | 1.9 | 0.0 | 1.7 | 3.0 | 9.52 | <u>25.7</u> | 20.4 | 0.0 | 10.7 |
| Snowden | 625 | 2.4 | 0.7 | 2.3 | 5.0 | 1.67 | 6.7 | 11.7 | 0.0 | 5.0 |
| W5955-1 | <u>427.7</u> | 2.1 | 0.0 | 2.0 | 4.7 | 1.75 | 5.1 | 17.0 | 0.0 | 5.2 |
| W6609-3 | <u>453.7</u> | 2.4 | 1.0 | 2.3 | 9.7 | 2.50 | 5.9 | 12.5 | 0.0 | 7.5 |
| StdErr Mean Difference | | 0.7 | 0.5 | 0.7 | 6.1 | 5.73 | 10.6 | 11.0 | 1.2 | 6.4 |

Note: Underlined values indicate performance statistically worse than the control cultivar Snowden.

Highlighted values indicate performance statistically better than the control cultivar Snowden.

Table 4. Tuber external characteristics and external defects on USB-SFT14 clones, Hancock ARS, WI.

| Clone | Preference 1-5 Scale | Eye Depth 1-5 Scale | Skin Set 1-5 Scale | Skin Finish 1-5 Scale | Green (cwt/a) | All Culls | |
|----------------------------|-------------------------|------------------------|-----------------------|--------------------------|------------------|-----------|-----|
| | | | | | | (cwt/a) | (%) |
| A00188-3C | 2.0 | 2.1 | 1.8 | 2.3 | <u>20.3</u> | 20.4 | 3.6 |
| A01143-3C | <u>2.2</u> | 2.3 | <u>2.8</u> | 2.3 | <u>33.9</u> | 45.9 | 7.4 |
| AC01151-5W | <u>2.2</u> | 1.8 | <u>2.0</u> | 2.2 | <u>24.9</u> | 30.4 | 4.2 |
| AF4157-6 | 2.1 | 1.9 | 1.4 | 2.2 | 7.5 | 11.8 | 2.3 |
| Atlantic | 1.5 | 2.1 | 1.8 | 2.5 | <u>19.8</u> | 24.3 | 3.5 |
| CO02024-9W | 2.1 | 1.7 | 1.8 | 2.1 | <u>22.6</u> | 28.9 | 4.9 |
| CO02321-4W | 1.9 | 1.6 | 1.8 | 2.2 | <u>42.8</u> | 53.6 | 12 |
| CO03243-3W | 1.6 | 1.7 | 1.6 | 2.3 | 7.5 | 13.6 | 2.5 |
| MSL007-B | 1.6 | 2.0 | 1.2 | 2.6 | 6.2 | 6.8 | 1.6 |
| Snowden | 1.8 | 2.8 | 1.5 | 2.7 | 8.2 | 9.6 | 1.3 |
| W5955-1 | 1.7 | 1.7 | 1.3 | 2.2 | <u>23.9</u> | 23.9 | 4.4 |
| W6609-3 | 1.7 | 1.6 | 1.7 | 2.3 | 17.0 | 21.9 | 4.9 |
| StdErr for Mean Difference | 0.19 | 0.17 | 0.21 | 0.14 | 5.99 | | |

Note: Underlined values indicate performance statistically worse than the control cultivar Snowden.

Highlighted values indicate performance statistically better than the control cultivar Snowden.

Table 5. Tuber fry characteristics, sugars, Lab color, and fry defects on USB-SFT14 clones, Hancock ARS, WI, Storage Facility, ARS. November 13, 2014.

| Clones | Sugars (mg/gFW) | | Lab Color | | | No. Tubers | Stem End Discoloration (Fried Chips) | | | | | |
|------------|-----------------|---------|-----------|-------|------|------------|--------------------------------------|---------------|----------|--------------|------------|-----------------|
| | Sucrose | Glucose | L | a | b | | None (0) | Very Mild (1) | Mild (2) | Moderate (3) | Severe (4) | Very Severe (5) |
| A00188-3C | 0.242 | 0.042 | 67.3 | -0.42 | 25.1 | 36 | 88.9 | 0.0 | 8.3 | 2.8 | 0.0 | 0.0 |
| A01143-3C | 0.212 | 0.012 | 64.0 | -0.73 | 24.1 | 36 | 72.2 | 13.9 | 13.9 | 0.0 | 0.0 | 0.0 |
| AC01151-5W | 0.555 | 0.063 | 62.1 | 1.21 | 25.7 | 36 | 69.4 | 11.1 | 19.4 | 0.0 | 0.0 | 0.0 |
| AF4157-6 | 0.320 | 0.005 | 62.8 | 0.17 | 26.2 | 36 | 94.4 | 5.6 | 0.0 | 0.0 | 0.0 | 0.0 |
| Atlantic | 0.453 | 0.080 | 61.2 | 2.58 | 26.0 | 36 | 80.6 | 2.8 | 16.7 | 0.0 | 0.0 | 0.0 |
| CO02024-9W | 0.278 | 0.035 | 63.6 | 0.20 | 25.6 | 36 | 88.9 | 5.6 | 5.6 | 0.0 | 0.0 | 0.0 |
| CO02321-4W | 0.308 | 0.003 | 65.9 | -0.96 | 25.6 | 36 | 72.2 | 5.6 | 22.2 | 0.0 | 0.0 | 0.0 |
| CO03243-3W | 0.340 | 0.012 | 64.2 | 0.24 | 25.0 | 36 | 86.1 | 11.1 | 2.8 | 0.0 | 0.0 | 0.0 |
| MSL007-B | 0.158 | 0.068 | 60.9 | 1.58 | 24.8 | 36 | 69.4 | 2.8 | 13.9 | 13.9 | 0.0 | 0.0 |
| Snowden | 0.408 | 0.022 | 63.8 | 1.62 | 26.9 | 36 | 83.3 | 8.3 | 8.3 | 0.0 | 0.0 | 0.0 |
| W5955-1 | 0.292 | 0.027 | 65.7 | 0.54 | 26.1 | 36 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| W6609-3 | 0.410 | 0.028 | 68.5 | -0.73 | 25.2 | 36 | 80.6 | 8.3 | 11.1 | 0.0 | 0.0 | 0.0 |

In Wisconsin, the 2014 growing season was characterized by lower than average air temperatures throughout the growing season. This pattern was most evident at the beginning of the growing season and during the months of July and August (Fig. 1). However, yields of varieties are relatively high and specific gravity was also average to high as observed for the variety controls Snowden and Atlantic. Several important rain episodes of more than one inch occurred after hilling date of May 23 and before canopy closure in late June; this provoked some erosions to the hills and may have conditioned some potato varieties to develop a higher number of green potatoes than they would otherwise. Greening was the single most and the only significant tuber external defect observed in this experiment.

For a second year now we were able to grade potatoes using an X-ray system to assess weight and hollow heart. This has provided individual data for weight, length, width and height. Tuber diameter to fulfill the reported size categories (Tables 1 to 3) was calculated as the average of tuber width and tuber height. We have been able to also evaluate hollow heart using all of the data from all harvested potatoes except the culled one and the data is presented by size category in Table 3.

In all tables, estimates of tuber traits are given, also the standard error for the difference is included. Performance of each clone is compared to that of Snowden and this is expressed in each table as follows: clones with similar font to Snowden are not statistically significant compared to Snowden; boldfaced-italics clone performance indicates better performance than Snowden and underlined values indicate worse performance than Snowden, all using a Tukey HSD value at a 5% error rate.

Processing evaluations from 55°F just prior to the applying CIPC sprout inhibitor indicated that chips for all of the varieties were light (L value > 60); most variability by November is found in the “a” value, indicating variability for chip redness that may be associated with stem end discoloration. Glucose values were correspondingly low, but there is more variation for sucrose that may be reflected in chip color in coming months. In previous years we have noticed that for long storage potatoes fry color may improve or stabilize after sucrose and glucose stabilize.

Clone Summary:

Snowden, the control cultivar had a very high yield with a high percentage of the tubers in the 2-3.25 inches of diameter. Snowden specific gravity was 1.083 which is its typical value in years of medium to high gravity in WI. Snowden hollow heart and other internal characteristics were acceptable.

Atlantic: had high total yield, statistically similar to Snowden, however, a high percentage of oversize tubers contributed to a significantly lower yield in the 2-3.5" size category. The weight of culls was relatively high, mostly due to green potatoes. It also had a significantly high internal brown spot, further affecting quality. Atlantic is showing among the largest sucrose values and a proportion of mild chip stem end discoloration likely corresponding to its poor ability to keep suitable chip color in storage.

A00188-3C: Clone had adequate total yield, but had a proportion of oversize potatoes of 14.6%, reducing the proportion of 2-3.25" yield. Specific gravity was high and chip color in November was very good. The most noticeable internal defect was vascular discoloration, but not likely to distract from chip quality.

A01143-3C: Most negative traits are a potential for low specific gravity; propensity for greening, which contributed to 7.4% culls. Although fry color is light and glucose and sucrose, a mild stem end discoloration of the fry products was observed in the November 13, 2014 fry reported here.

AC01151-5W: High total and 2-3.25" yield; however, specific gravity was 0.006 under Snowden; proportion of small tubers was relatively large (8.4). It may have a tendency to show greening in the tubers in sandy soils under similar conditions to 2014 in Hancock, WI. High glucose and sucrose values and a 19.4% of tubers are showing chip defects (mild stem end discoloration) by November 13, 2014. A negative factor is its small size profile.

AF4157-6: Moderate total yield in 2014 compared to exceptional yield for Snowden. Excellent fry color and very low glucose and sucrose values; minimal chip defects in November 13, 2014. A negative factor is its small size profile. This clone had 0% hollow heart for oversize tubers.

CO02024-9W: *Low specific gravity* and small size profile, although 85.2% of the potatoes were in the 2-3.5" range for diameter. Fry color is good in November, glucose value is borderline sucrose. This clone had a large proportion of hollow heart in tubers >3.25" in diameter.

CO02321-4W: Limited total yield and the lowest percentage of 2-3.25" diameter tubers. This clone was particularly affected by greening (12% of the tuber yield). Also 22.2% of tubers show a mild stem end discoloration at this point.

CO03243-3W: Moderately good total yield; *specific gravity may be low*, 0.005 under Snowden; significant incidence of vascular discoloration that may or not distract from chip color quality.

MSL007-B: Moderate yields and adequate specific gravity. Low proportion of 2-3.25" tubers due to a significant 21.6 % of the tubers being >3.25" in diameter. Lowest number of tubers per linear foot (6.8). In the Nov. 13 fry test chip color was good, however 11.1% had a mild stem end discoloration that may affect chip quality.

W5955-1: Clone selected in Wisconsin for the combination of common scab resistance and long storage ability and chip quality. In 2014 total yields were moderately high but the proportion of 2-3.25" tubers were affected by a large proportion of oversize tubers (>3.25" in diameter) and green tubers (4.4%). Thus far this clone has the best combination of specific gravity, chip color and no stem end discoloration.

W6609-3: Clone selected in Wisconsin for the combination of common scab resistance and long storage ability and chip quality. In 2014 total yield and yield of 2-3.25" tubers were low. The proportion of tubers <2" was relatively high (7.) and the proportion of green tubers responsible for culls was also relatively high. Also this clone has the tendency of producing hollow hearts when tubers grow to more than 3.25". Fry color and, specific gravity and sugars were at very good levels in November 13, 2014.