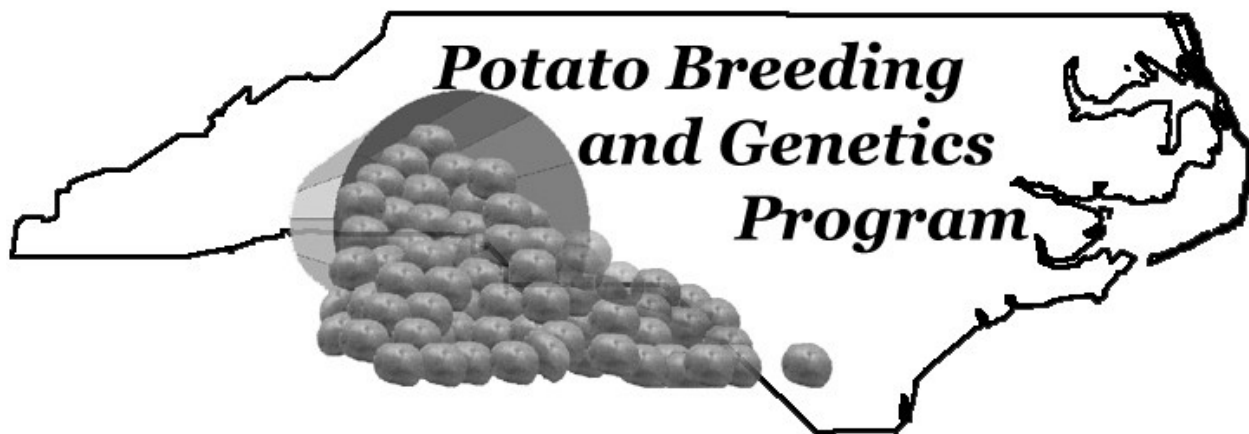


NORTH CAROLINA POTATO VARIETY TRIAL AND BREEDING REPORT

2015



G. C. Yencho, Professor and Leader, Potato M. E. Clough, Researcher and Extension Associate,
and Sweetpotato Breeding and Genetics Potato Breeding and Genetics Program
Programs

Department of Horticultural Science
North Carolina State University
214A Kilgore Hall, Raleigh NC, 27695
Tel: 919-513-7417
Fax: 919-515-2505
Email: Craig_Yencho@ncsu.edu

Department of Horticultural Science

North Carolina State University
Vernon G. James Research and Extension Center
207 Research Station Rd., Plymouth NC 27962
Tel: 252-793-4428 Ext 156
Fax: 252-793-5142
Email: Mark_Clough@ncsu.edu

Web Address: <http://potatoes.ncsu.edu>

I. OBJECTIVES AND RESEARCH SPONSORS:

The objective of the NC State University potato breeding and genetics program is to develop new potato varieties that contribute to a more sustainable and economically viable potato production system for North Carolina. To achieve this objective, we collaborate extensively with the eastern US potato breeding and variety development community, and also with programs around the US and internationally. A common goal of all our project collaborations is the development of high yielding, disease and insect resistant, table- and chip-stock potato varieties for potato growers in the eastern US. Because our research sites are primarily located in the hot, humid, lower coastal areas of the mid-Atlantic, we expect that the materials selected and developed in our environment will also perform well in the broader southeastern US geographic region.

Our variety development research efforts are supported by the USDA National Institute of Food and Agriculture (NIFA) 1231 Multistate Potato Variety Development and Evaluation Project, the USDA NIFA Potato Special Research Grants Program, the NC Potato Association, and the US Potato Board and the Snack Food Association, as well as several other industry members.

II. PROJECT SUMMARY

Our program focuses on three areas: the development of new potato germplasm and varieties through our own breeding efforts; collaborative early-generation breeding and selection projects with the USDA-ARS, and the University of Maine; and the evaluation of preliminary and advanced breeding clones for adaptation to NC from a wide range of potato breeding programs in the US and Canada.

Breeding Program

Our in-house efforts to develop varieties begin with crossing in the greenhouses at the NC Department of Agriculture and Consumer Services Tidewater Research Station/NC State University Vernon G. James Research and Extension Center (TRS/VGJREC) in Plymouth, NC. Planting, selection and advance to 6-hill or 12-hill (for clones from the specialty 3-hill trial), 20-hill (and 60-hills for specialty clones), and 60-hill plots depend on relative performance at each of these stages over a period of four years. Clones that survive the first four cycles of selection are entered into a 160-hill increase plot to generate enough seed for preliminary yield trials conducted at the TRS/VGJREC the following year. In subsequent years all surviving clones are maintained in 320-hill plots and included in preliminary and advanced yield trials conducted at the TRS/VGJREC and on-farm.

During 2015, we planted 19,694 single-hills and selected 506 clones resulting in a 2.6% selection rate. This is on par with our average selection rate. Out of the 343 clones in our 6-hill and 12-hill plots, 62 (18%) were selected for future evaluation. In the 20-hill and specialty 60-hill plots, 84 clones were planted with 26 (31%) being selected for further evaluation. In our 60-hill plots, 28 clones were planted and 8 (29%) were selected.

In our Colorado potato beetle (CPB) nursery we continued our project to select and screen specific families with potential CPB resistance. We planted 997 2-hill plots for selection purposes and also planted a duplicate set in our CPB nursery for resistance screening. We selected 41 clones that will be advanced for CPB screening as two replicated 3-hill plots (2by3 trial), and for parallel horticultural adaptation selection as non-replicated 6-hill plots in 2016. In this year's 2by3 trial, 86 clones were evaluated for CPB resistance and adaptation in our non-replicated 6-hill plots simultaneously. After making our selections in both of these trials, we decided to advance 18 clones to next year's screening trial of three replications with 5-hills each (3by5 trial) and for parallel horticultural adaptation selection as non-replicated 20-hill plots in 2016. In this years 3by5 trial we evaluated 9 clones for CPB resistance and for adaptation in our non-replicated 20-hill plots simultaneously. We selected 3 clones for advancement to next year's four replications by 10-hills (4by10) and our non-replicated 60-hill trial. In this year's 4by10 we had a total of 13 clones and 2 of those were selected for evaluation next year. The 4by10 trial is our most advanced screening trial and the most advanced clones will remain in this trial until testing is complete, also some of the clones with promise will be placed in yield trials if they have the appropriate agronomic characteristics. The low number of clones remaining in the 4by10 trial is also due to high virus pressure in our seed plots this year.

Yield Trials

In our 13 yield trials, we evaluated 241 preliminary and advanced clones. The evaluations were conducted either on-farm, and/or at the TRS/VGJREC. We typically evaluate advanced clones at more than one site in NC. The results of the yield trials are summarized later in this report, and in Tables 1-13. Each table has two parts, the first (a) being devoted to yield information, specific gravity measurements, and chip color scores, and the second (b) providing potato plant and tuber quality characteristics. This report can also be viewed and downloaded at our website <http://potatoes.ncsu.edu>

III. 2015 PROMISING LINES:

Chip-stock clones

AF4552-5

Developed by: Univ. of Maine

Released: N/A

trials evaluated: 4 since (2011)

Skin Color: Tan to Light Brown

Flesh Color: White

Historical Data:

Maturity: slightly later than mid season

% Standard (Atlantic): MKTB YLD 103%

% Standard (Snowden): MKTB YLD 96%

Specific Gravity: 1.072

Chip score: 2 (good)

Overall Appearance: 5 (fair)

Other Attributes or Comments: *We have seen this clone in enough trials to begin to look more closely at its historical performance. It doesn't have the overall appearance scores to make it as a table but the internal quality and chip scores suggest that it should be considered as a chip type clone.*

Chip-stock clones cont.

B2833-8

Developed by: USDA/ARS-Beltsville
Released: N/A
trials evaluated: 6 since (2010)
Skin Color: Tan to Light Brown
Flesh Color: White

Historical Data;
Maturity: mid season
% Standard (Atlantic): MKTB YLD 93%
% Standard (Snowden): MKTB YLD 73%
Specific Gravity: 1.078
Chip score: 2 (good)
Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This clone has a maturity that places in competition with Atlantic. While its yield is slightly lower to date it has not had any internal issues and has chipped well every year. In the one trial it was in this year its gravity was 1 point better than Atlantic and only one trial out of the six it has been in has had a specific gravity less than Atlantic.

NC0349-3

Developed by: North Carolina State Univ.
Released: N/A
trials evaluated: 18 since (2007)
Skin Color: Tan to Light Brown
Flesh Color: White

Historical Data;
Maturity: medium to late
% Standard (Atlantic): MKTB YLD 95%
% Standard (Snowden): MKTB YLD 87%
Specific Gravity: 1.071
Chip score: 2.0 (excellent)
Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This is a promising clone from our program with good performance overall since 2007. This clone has shown susceptibility to IHN but incidence and severity has been low overall. Yields have always been similar to Atlantic and it has consistently chipped well.

Sebec(AF0338-17)

Developed by: Univ. of Maine
Released: 2013
trials evaluated: 23 since (2006)
Skin Color: Tan to Light Brown
Flesh Color: White

Historical Data;
Maturity: medium to late
% Standard (Atlantic): MKTB YLD 94%
% Standard (Snowden): MKTB YLD 87%
Specific Gravity: 1.075
Chip score: 2.0 (excellent)
Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This is a later than mid maturing clone with good yield, gravity and chip scores. Its maturity places it between Atlantic and Snowden and fills the need for an Atlantic like potato that holds up better in a longer season. **This clone is available for testing on a larger scale if growers are interested.**

Chip-stock clones cont.

B2833-16

Developed by: USDA/ARS-Beltsville
Released: N/A
trials evaluated: 9 since (2010)
Skin Color: Tan to Light Brown
Flesh Color: White

Historical Data:
Maturity: mid season
% Standard (Atlantic): MKTB YLD 92%
% Standard (Snowden): MKTB YLD 78%
Specific Gravity: 1.075
Chip score: 2 (good)
Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This clone is a sibling of B2833-8 and has very similar numbers though it has been trialed in a few more plots over the course of the same years. Its maturity places it in competition with Atlantic. Yields are slightly lower, to date it has not had any internal issues and has chipped well every year with the exception of 2012 where it scored a 3 (good).

Dual-Use (Chip/Table) clones

BNC182-5

Developed by: USDA/ARS-Beltsville
Released: N/A
trials evaluated: 13 since (2008)
Skin Color: Tan to Light Brown
Flesh Color: White

Historical Data:
Maturity: late
% Standard (Atlantic): MKTB YLD 114%
% Standard (Snowden): MKTB YLD 98%
Specific Gravity: 1.070
Chip score: 2 (good)
Overall Appearance: 7 (good)

Other Attributes or Comments: This is a late maturing clone with good yield and overall appearance. Because of its maturity it fits into a later season for table but will also chip at an acceptable level for the chip market.

NC182-5

Developed by: North Carolina State Univ.
Released: N/A
trials evaluated: 15 since (2009)
Skin Color: Tan to Light Brown
Flesh Color: White

Historical Data:
Maturity: late
% Standard (Atlantic): MKTB YLD 103%
% Standard (Snowden): MKTB YLD 93%
Specific Gravity: 1.070
Chip score: 2.0 (good)
Overall Appearance: 7 (good)

Other Attributes or Comments: This is a full-sibling as BNC182-5 and not the same clone. Like its sibling this clone is late maturing, yields have consistently been good and the shapes are very round. Even though the skin nets the conformity of this clone and the gravity suggest it may have a place as a dual-purpose clone.

Table-stock clones

AF4138-3

Developed by: Univ. of Maine

trials evaluated: 7 since (2010)

Skin Color: Tan to Light Brown

Flesh Color: White

Historical Data:

Maturity: medium maturing

% Standard (Atlantic): MKTB YLD 99%

% Standard (Superior): MKTB YLD 117%

Specific Gravity: 1.057

Skin Texture: Slightly Netted

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: *This clone has been evaluated in seven trials since 2010 and has typically had higher marketable yields than either Atlantic or Superior. The skin texture has averaged out across the years and trials to be slightly netted but we have seen smooth and moderately smooth skins as well. We don't often have recommendations for white table potatoes but given the marketable yield of this clone and clean internals we will be looking at it again in the future for that purpose.*

IV. RESEARCH STATION AND ON-FARM COOPERATOR LOCATIONS:

Tidewater Research Station (NCDA&CS)/Vernon G. James Research and Extension Center,
(NCSU), Plymouth, NC (Washington Co.)
Black Gold Farms, Gum Neck, NC (Tyrrell Co.)
James Brothers Farms, Weeksville, NC (Pasquotank Co.)
Sackette Potatoes / International Farming Corporation, Bayboro, NC (Pamlico Co.)

COOPERATING COUNTY EXTENSION AGENTS:

Tom Campbell, Elizabeth City, Pasquotank Co.
Daniel Simpson, Bayboro, Pamlico Co.

V. PROCEDURES:

SITE, SOIL TYPE, PLANTING AND HARVEST DATES FOR YIELD TRIALS

Site	Soil Type	Planting Date	Harvest Date	Days to Harvest
Black Gold	Weeksville silt loam	Mar 19	Jun 30	103
James Brothers	Hyde mucky silt loam	Mar 18	Jun 25	99
Sackette Potatoes	Stockade loamy fine sand	Mar 31	Jul 14	105
TRS/VGJREC	Portsmouth fine sandy loam	Mar 24 to Apr 6	Jun 22 to Jul 28	Variable 88 - 114

EXPERIMENTAL DESIGN: All yield trials were planted in a randomized complete block design with 4 replications except the US Potato Board/Snack Food Association (USPB/SFA) Trial that had 5 replications per clone. Forty-two clones in three trials were evaluated on-farm at Black Gold Farms, twenty-four clones at James Brothers Farm and sixteen at Sackette Potatoes. Plots at the TRS and Black Gold consisted of one row with 25 hills spaced 10 inches apart. Plots with Sackette's and James Brothers consisted of one row with 28 hills spaced 9 inches apart. Spacing between rows was 34 inches at Black Gold Farms, and 38 inches for all other trials including the TRS. Weed and pest control practices for on-farm trials were in accordance with those practiced by the cooperators (Appendix 1).

The on-farm trials were dug using a single-row digger and hand harvested. The TRS/VGJREC trials were harvested using a two-row harvester modified to dig one row at a time. James Brothers was graded using a portable Lockwood Grader which sorts to two grades: A+B's $\geq 1 \frac{7}{8}$ "; and C's $< 1 \frac{7}{8}$ ". Black Gold, Snack Food, Sackette's and the TRS/VGJREC trials were graded to five classes: 1's $< 1 \frac{7}{8}$ "; 2's $> 1 \frac{7}{8}$ to $2 \frac{1}{2}$ "; 3's $> 2 \frac{1}{2}$ to $3 \frac{1}{4}$ "; 4's $> 3 \frac{1}{4}$ to 4"; 5's > 4 ". Culls were removed and weighed separately in all trials. Each clone was evaluated for tuber quality and appearance during grading using standardized NE-1231 rating codes. A description of the rating codes is provided in Appendix 2.

After grading and weighing, 40 marketable tubers (10 tubers/replication) were randomly sampled from each entry, and 50 tubers were sampled from the USPB/SFA trial. The tubers were cut and scored for the presence of hollow heart, IHN and any other internal defects. A second sub-sample of marketable tubers from each replication was taken for specific gravity readings and a third sub-sample was collected and bulked by entry for chipping tests. Specific gravity was determined using the weight-in-air/weight-in-water method. Chip evaluations were conducted at the TRS/VGJREC for all trials. Chipping at the TRS/VGJREC was done with in 48 hrs of harvest.

VI. RESULTS:

Environmental Summary

Planting began on the 18th of March this year and stretched beyond the normal (late February through March) timeframe to the 6th of April. The later start to planting was due to rain events early in the month, patchy rain occurred at all locations in roughly one-week intervals until the end of March. Two of our on-farm trial locations were planted on the 18th and 19th of March and our final on-farm location was planted on March 31st. Temperatures at planting were also cold early on and moderated later in the planting window. Following planting rains were adequate throughout the season prior to bulking. Largely rainfall

was insignificant during the bulking phase and did not increase until harvest. Throughout harvest rains were insufficient to delay activities and we were able to finish at the TRS before the end of July.

A. Yield Trials

1. On-Farm Trials

Black Gold Tablestock Variety Trial (Tables 1a and 1b)

The marketable yields of the 12 clones in this trial were compared to Chieftain (283 cwt/a). None of the clones had a higher marketable yield, AF5245-1 (241 cwt/A) was the next highest. Two clones, AF5275-1 and BNC201-1 had overall appearance ratings of 7 (good) all other overall appearance scores were better than fair (6) or lower. Only one clone in this trial had internal heat necrosis (IHN) at 10% or greater incidence: Chieftain (20% with a heat necrosis severity rating (HNR) of 7.5). Some level of soft rot (SR) was observed in all but two clones, BNC201-1 and Chieftain, though only two clones had incidence greater than 10%: AF4550-2 (13%) and Yukon Gold (13%). No other internal defects were recorded at 10% or greater incidence. External defects observed in the trial were sunscald, misshapes, soft rot, growth cracks, common scab, secondary growth, infect lenticels and skin blemishes due to Rhizoctonia.

Black Gold Chip Variety Trial (Tables 2a and 2b)

Atlantic, the standard, had a marketable yield of 251 cwt/a, and only one clone, AF4552-5 (331 cwt/A) was significantly higher. Gravities were low overall in the trial, Atlantic had a gravity of 1.073 (4 points less than it historically averages) two clones had higher gravities: NC252-49 and NC317-12, all others were lower. Three clones had a chip score rating of 1 (exceptional): Atlantic, NC311-9 and NCJ106-2. One clone had an overall appearance score of 8 (better than good), NC317-12 and three clones: NC0349-3, NC182-5 and NCJ106-2 had overall appearance scores of 7 (good). No significant incidence of IHN was recorded in the trial this year. Three clones had greater than 10% incidence of SR: NCJ106-2 (13%), NC252-49 (10%) and NC311-9 (10%). No other internal defects were recorded at incidence levels greater than 10%. External defects observed in the trial were sunscald, growth cracks, misshapes, common scab, secondary growth, heat sprouts, potato virus Y, infected lenticels, Fusarium dry rot and soft rot.

US Potato Board/Snack Food Association Trial at Black Gold Farms (Tables 3a and 3b)

Atlantic had a marketable yield of 259 cwt/a. Six clones had greater marketable yields though were significantly greater. Atlantic had a gravity of 1.070 and two clones had higher gravities: W8822-1 (1.074) and W6822-3 (1.072). Four clones in the trial received a chip score rating of 1.5 (excellent to exceptional) in the 24 to 48 hour chip test: Atlantic, Lamoka, NY152 and Snowden. Three clones: Atlantic, Lamoka and Snowden received a chip score rating of 1.5 (excellent to exceptional) in the 5 to 7 day chip test. Two clones rated a 7 for overall appearance: Atlantic and Snowden. Two clones had vascular ring discoloration (VR) at levels greater than 10% incidence: MSK061-4 (20%) and NY152 (16%). No other internal defects were observed at levels greater than 10%. Other external defects observed were: sunscald, misshapes, growth cracks, soft rot, secondary growth, Fusarium dry rot, common scab and skin blemishes due to Rhizoctonia.

James Brothers Variety Trial (Tables 4a and 4b)

In this trial three yield standards were chosen: Atlantic (round white standard), Chieftain (red standard) and Yukon Gold (yellow flesh standard). Across all clones none had marketable yields greater than Atlantic (324 cwt/a). Within the class of reds, four of the clones: HZC07-6040 (272 cwt/a), Dark Red Norland (270 cwt/a), BNC201-1 (265 cwt/a) and Red Sunset (257 cwt/a) had higher marketable yields than Chieftain (219 cwt/a). Three yellow flesh clones had equal or greater higher marketable yields than Yukon Gold (264 cwt/a): Soraya (272 cwt/a), Natascha (267 cwt/a) and BNC201-1 (265 cwt/a). Clones with an overall appearance score of 7 were: Atlantic, NCJ107-6 and Snowden. The specific gravity for Atlantic in this trial was 1.079 and two other clones had higher specific gravity: NCB2901-3 (1.085) and Snowden (1.082) all others were lower. Two clones: NCJ106-2 and NCJ107-6 had a chip score rating of 1.0 (exceptional). Two clones: Atlantic and Snowden also had a chip score ratings of 1.5 (excellent to exceptional). Six clones had incidence of IHN at 10% or greater levels: Soraya (33% with an HNR of 7.3), Atlantic (28% with an HNR of 7.8), Yukon Gold (28% with an HNR of 7.5), Chieftain (23% with an HNR of 6.8), NC282-8 (20% with an HNR of 7.6) and Baby Rose (18% with an HNR of 8.4). Two clones expresses hollow heart (HH) at greater than 10% incidence: BNC2901-3 (23%) and Yukon Gold (13%). Two clones expressed vascular ring (VR) at 10%: Dark Red Norland and Superior all other clones had less 10% or no VR. One clone, Merlot expressed brown center (BC) at 13% all other clones had less 10% or no BC. No other internal defects of 10% or greater incidence were recorded in this trial. Culls were primarily due to misshapes, common scab, soft rot, sun scald, growth cracks, secondary growth, and skin blemishes due to Rhizoctonia.

Sackette-IFC Variety Trial (Tables 5a and 5b)

Atlantic, the standard, had a marketable yield of 163 cwt/a, three other clones had significantly higher marketable yields: Snowden (301 cwt/a), NC182-5 (279 cwt/a) and NY152 (279 cwt/a). Gravities were low overall in the trial, Atlantic had a gravity of 1.068 (9 points less than the historical average) three clones had equal or greater gravities: BNC317-8 (1.074), B2869-29 (1.068) and MSK061-4 (1.068). Atlantic had a chip score of 1.0 (exceptional) and five others had a chip score rating of 1.5 (excellent to exceptional): AF4648-2, BNC318-9, NC311-9, NY152 and Snowden. One clone, NY152, had overall appearance score of 7 (good). Two clones had 10% or greater symptoms of IHN: CO3243-3W (58% with an HNR of 5.6) and Atlantic (23% with an HNR of 7.8). Three clones expressed HH at greater than 10% incidence: BN318-9 (40%), Atlantic (25%) and NC0349-3 (18%). One clone, MSK061-4 expressed vascular ring (VR) at 10%. Four clones expressed incidence of BC at levels greater than 10%: BNC318-9 (33%), Atlantic (15%), CO3243-3W (13%) and NC0349-3 (13%). Two clones had 10% or greater incidence of SR: CO3243-3W (20%) and BNC318-9 (13%). External defects observed in the trial were sunscald, growth cracks, skin blemishes due to Rhizoctonia, misshapes, common scab, secondary growth and soft rot.

2. TRS/VGJREC Yield Trials

Round White Trial One (Tables 6a and 6b)

Atlantic had a marketable yield of 195 cwt/a. Six of the fourteen clones in this trial had greater marketable yields and one of these, AF5225-1 (288 cwt/a) was significantly greater than Atlantic. Atlantic had a gravity of 1.071 and four clones had equal or greater gravities: NC329-9 (1.078), NC372-2 (1.075), NC371-7 (1.074) and Kea (1.071). One clone, NC329-9 had a chip score of 1 and two clones had a chip

score of 1.5: Atlantic and B3084-3. One clone, NC363-4 had an overall appearance rating of 8 and one clone, B3084-3 had an overall appearance rating of 7. One clone expressed IHN at 10% or greater incidence, Kea (48% IHN with an HNR of 6.8). One clone, NC329-9 (13%) expressed HH at 10% or greater incidence. No other internal defects of 10% or greater incidence were recorded in this trial. Common external defects were misshapes, sunscald, soft rot, common scab, growth cracks, secondary growth and skin blemishes attributed to Rhizoctonia.

Round White Trial Two (Tables 7a and 7b)

Of the fourteen clones in this trial, seven had higher average marketable yields higher than Atlantic (248 cwt/A) though only one, B2950-9 (371 cwt/a) was significantly greater. Atlantic had a specific gravity of (1.071) and two clones had equal or greater specific gravity: B2833-8 (1.072) and B2834-8 (1.071). Two clones received a chip rating of 1.0: Atlantic and NCH4-3 and two clones received a chip rating of 1.5: B2833-8 and NCH6-4. Two clones: B2833-8 and B2834-8 received an appearance score of 7. Two clones had 10% or greater symptoms of IHN: NCH4-3 (60% with an HNR of 7.4) and Atlantic (20% with an HNR of 7.6). Two clones expressed HH at levels equal to or greater than 10% incidence: BNC371-1 (35%) and NCJ106-2 (20%). No other internal defects were expressed at levels of 10% or greater. One clone, BNC371-1 (20%) expressed BC at levels greater than 10%. Common defects were misshapes, soft rot, sunscald, growth cracks and skin blemishes attributed to Rhizoctonia.

Round White Trial Three (Tables 8a and 8b)

Of the ten clones in this trial, five had higher average marketable yields higher than Atlantic (129 cwt/A) and one was significantly greater: Snowden (207 cwt/a). Atlantic had a specific gravity of 1.067, five clones had a greater gravity: B2833-16 (1.074), B2904-2 (1.074), Snowden (1.072), BNC177-5 (1.069) and BNC369-4 (1.069). Five clones received a chip rating of 1.5: B2833-16, BNC177-5, BNC396-4, Sebec(AF0338-17) and Snowden. One clone, BNC369-4 received overall appearance score of 7. No internal defects were expressed at levels of 10% or greater. Common external defects were misshapes, high incidence of soft rot, sunscald, growth cracks, common scab, infected lenticels and skin blemishes attributed to Rhizoctonia.

NE-1231 Round White Trial. (Tables 9a and 9b)

Only one of the twelve clones, AF4157-6 (316 cwt/A) in this trial had greater marketable yield than Atlantic (282 cwt/A), though not significantly higher. Atlantic had a specific gravity of 1.066 two clones had equal gravity: AF4157-6 and B2833-16 all others were lower. Only Atlantic received a chip rating of 1 two other clones had a rating of 1.5: B2833-16 and Snowden. The highest overall appearance rating in the trial was 6 and three clones were given this rating: AF4138-8, Atlantic and Yukon Gold. Two clones expressed IHN at levels at 10% or greater incidence: Atlantic (23% IHN with an HNR of 7.3) and Snowden (13% IHN with an HNR of 8.4). One clone expressed HH at 10% or greater incidence: Atlantic (10%). No other internal defects were expressed at levels of 10% or greater. The most common culls were misshapes, sunscald, soft rot, growth cracks and common scab.

NE-1231 Red Trial. (Tables 10a and 10b)

The standard, Chieftain, had a marketable yield of 225 cwt/a, three other clones had higher marketable yields though none were significant: AF5412-3 (261 cwt/a), Dark Red Norland (246 cwt/a) and NDAF1012573-2 (228 cwt/a). Two clones received an overall appearance score of 7: AF5278-3 and NCB2607-3. One clone expressed IHN at levels at 10% or greater incidence: Chieftain (38% IHN with an HNR of 7.3). One clone, Merlot expressed BC at 45%. No other internal defects were expressed at levels of 10% or greater. Culls were due mostly to soft rot, misshapes, sunscald, growth cracks, secondary growth, and skin blemishes attributed to Rhizoctonia.

NE-1231 Russet Trial. (Tables 11a and 11b)

The standard, Russet Norkotah, had a marketable yield of 162 cwt/A. Of the nine clones in the trial three had higher marketable yields and one of those, Easton(AF3001-6) (234 cwt/a) was significantly greater. One clone, AF4615-5 (1.068) had a higher specific gravity than Russet Norkotah (1.065). Russet Norkotah was the only clone with an overall appearance rating of 7. Three clones expressed IHN at levels at 10% or greater incidence: AF4615-5 (20% with an HNR of 8.0), Russet Burbank (18% with an HNR of 7.3) and Easton(AF3001-6) (15% with an HNR of 7.3). No other clones internal defects were expressed at levels of 10% or greater. Culls were mostly soft rot, misshapes, sunscald, growth cracks and secondary growth.

Yellow Flesh Trial. (Tables 12a and 12b)

This is the first year we have established a trial exclusively for yellow flesh clones. Though not yellow fleshed Atlantic was included in the trial for comparative purposes. The standard for evaluation in this trial is Yukon Gold, its marketable yield was 101 cwt/a and all but one of the fifteen other clones in the trial had higher average marketable yields. Nine of these were significantly greater: Alegria (293 cwt/a), Atlantic (274 cwt/a), 08-326 (239 cwt/a), Anushka (236 cwt/a), Natascha (236 cwt/a), Peter Wilcox (236 cwt/a), AF5153-1 (208 cwt/a), Soraya (193 cwt/a) and Wega (182 cwt/a). All specific gravities in the trial were lower than Yukon Gold (1.062) with the exception of Atlantic (1.069). Only NCH85-2 received an overall appearance rating of 7. Four clones did receive overall appearance ratings of 6: Atlantic, NC201-1, NC276-1 and Peter Wilcox. Four clones expressed IHN at levels at 10% or greater incidence: 08-326 (53% with an HNR of 7.7), NC276-1 (53% with an HNR of 7.8), Atlantic (40% with an HNR of 7.7) and Augusta (23% with an HNR of 7.4). NCH85-1 (15%) was the only clone to express BC at greater than 10% incidence. No other clones internal defects were expressed at levels of 10% or greater. Culls were mostly soft rot, misshapes, sunscald, common scab and secondary growth.

Specialty Trial (Tables 13a and 13b, Figure 1)

This trial contains clones that have pigmented flesh although Atlantic is included in this trial as a standard for yield and chipping. Because these are largely not mainstream potato types it is not surprising that none of the thirteen other clones in the trial had greater average marketable yields than Atlantic (253 cwt/a). Regarding size profile of the clones Atlantic was the largest with 58% of total yield in the 2 ½ to 3 ¼" range and 11% in the 3 ¼ to 4" range. The size range for all other clones in the trial was predominately in the 1 ⅞ to 2 ½" category and many had 1/3 or more of yield below 1 ⅞". The smallest clone in the trial was NC414-1 with 38% below 1 ⅞", a yellow flesh clone with purple eyes. All clones in the trial were chipped though specific gravities were all lower than Atlantic (1.070) and pictures of these chips can be seen in Figure 1. Skin textures for all clones in this trial were smooth or moderately smooth with the exception of Atlantic that was netted. For overall appearance three clones were rated 7: Atlantic, NC201-1 and NC293-7. Atlantic was the only clone in the trial to express incidence of any internal defect at 10% or greater incidence: IHN (35% with an HNR of 6.9) and HH (13%). Common external defects included soft rot, misshapes, growth cracks, sun scald, common scab, secondary growth, silver scurf and skin blemishes due to Rhizoctonia.

B. Breeding and Early Generation Selection Efforts

NCSU Potato Variety Development Efforts

Our efforts to develop varieties in North Carolina begin with selection as single-hill plots in year one. Because potatoes are clonally propagated via tubers each hill selected has the potential to become a new variety. The single-hill selections are advanced to 6-hill and 20-hill plots with selection in years two and three, respectively. Following this, materials are placed in a 60-hill plot in year four for a final cycle of selection and then increased in a 160-hill plot in year 5 and sometimes a 320-hill plot in year 6 before entering into yield trials. Our single-hill materials have come from the USDA-ARS and our own crosses made at the TRS. Evaluation of germplasm from different breeding programs allows us to review a wider breadth of materials increasing the likelihood of developing varieties suitable not only for NC and the Southeast, but with broad adaptability overall. Mini-tubers, which are planted in the field as single-hills, are generated in the TRS greenhouses. This year, 19,694 single-hills were planted and 506 clones were selected averaging a 2.6% selection rate.

In our second to fourth year selection plots out of the 292 clones planted in our 6-hill plots (Yr. 2), 52 (18%) were selected for future evaluation. While in the 20-hill plots (Yr. 3), 84 clones were planted with 26 (31%) being selected for further evaluation. In our 60-hill plots (Yr. 4), 28 clones were planted and 7 (25%) were selected.

Specialty Clone Evaluation

We begin selection with 3-hill plots each year to give us a better look at these clones and typically only plant out around 50 to 60 tubers per family. Because we start with 3 hills we have more seed in the 2nd year so instead of planting a 6-hill plot we plant a 12-hill plot for each clone in year 2. In year 3 we move into a specialty 60-hill plot that is distinct from our other 60-hill plot for more traditional types of potatoes. This effectively allows us to skip one cycle of selection because in year 4 these materials are included in our 160-hill increase plots in preparation for yield trials. This year we evaluated 2233 clones and selected 42 (1.9%) as 3-hill plots. In our 12-hill plots we evaluated 51 and selected 11 (22%) and in the specialty 60-hill plot 26 were evaluated and 10 were selected (38%). Figure 2 shows the nine clones from the specialty 60-hill plot after chipping.

Germplasm Enhancement for CPB Resistance

Parental material used in crosses to generate the families come from one or more of three species of potato: *Solanum tuberosum*, *S. chacoense*, and *S. berthaultii*. Unlike our other variety development work, the CPB resistance project requires two identical plots to be planted the first year materials go to the field. To get a better look at the clones, we plant 2-hill plots in both the CPB screen and selection trials. This year we planted roughly 997 clones to evaluate resistance and selected 41 clones for resistance and for agronomic traits. These will be advanced next year in both our CPB nursery and as 6 hill plots for selection purposes. In our 6 hill plots this year, 86 of the 292 clones came from this CPB resistance project. From the 86 CPB clones, 18 were selected for advancement to the 20 hill selection plots and the next cycle of CPB resistance screening. Of the 84 clones in our 20 hill plots 9 clones were part of the CPB resistance screen and 2 of those were selected for advancement to the 60 hills. Of the 28 clones in this year's 60 hill plots 2 was a CPB clone and none were selected for further evaluation.

Early Generation Selection Trials

Early generation selection involves selection and evaluation of materials at early stages in the breeding/variety development process. By selecting early generation materials in multiple environments we hope to identify materials that are broadly adapted. Early generation selection efforts also promote collaboration and reduce overall breeding costs, and they are especially important when the success of a variety depends on seed being produced in the north while the crop is produced in the south as is the case with all varieties grown in NC.

University of Maine Trial

In this trial, we evaluate clones from Maine as 8-hill plots in NC and make selections. These clones have already been through two cycles of selection in Maine. After selection in NC, we send a list of selected clones to our cooperators at the University of Maine (UME) and they use the information when they select their materials. This year we evaluated 333 ME clones and selected 102. These will be evaluated in 2016 in a non-replicated 25-hill plot in a yield trial.

Observational Trial.

Seventy-four clones were evaluated in this trial as well as the standards: Atlantic, Chieftain, Dark Red Norland, Russet Norkotah and Yukon Gold. Each 25-hill plot was non-replicated. This trial is part of an early generation study we are conducting with the UME and is our 2nd opportunity to evaluate them. Last year we selected these clones in an 8-hill non-replicated format. This year we made notes on these clones and indicated which ones we thought had potential as cultivars and made another round of selections. We selected a total of 19 clones. Next year we will see some of the survivors from this trial in replicated yield trials provided they survive selection in ME.

USDA-ARS Trial

This is a multistate selection trial initiated by the USDA-ARS, the institutions/states involved are: The University of Florida (FL), NC State University (NC), USDA-ARS (MD, trial location in ME), The University of Maryland (MD), Pennsylvania State University (PA) and the University of Maine (ME). Each state received 8 hills of the same 121 clones. All were weighed for total yield, rated for the nine standard NE1231 external ratings, and ten tubers from each plot were cut for internal evaluations as well. At our location we selected a total of 51 clones. Next year we will reevaluate these clones in our non-replicated 25-hill yield trial (Unreplicated trial).

Unreplicated Trial.

Eighty-nine clones were evaluated in this trial as well as the standards: Atlantic, Chieftain, Dark Red Norland, Snowden, Superior and Yukon Gold. Each 25-hill plot was non-replicated. This trial is part of an early generation study we are conducting with the USDA-ARS and is our 2nd opportunity to evaluate them. Last year we selected these clones in an 8-hill non-replicated format. This year we made notes on these clones and indicated which ones we thought had potential as cultivars and made another round of selections. We selected a total of 11 clones. We will evaluate some of these clones in a replicated yield trial next year.

VII. ACKNOWLEDGMENTS

This work could not be conducted without the assistance of the growers, county extension agents and NCDA&CS TRS staff. We are grateful for their continued support and assistance. Seed for the trials was provided by: Dr. Walter De Jong, Cornell University; Dr. Creighton Miller, Texas A&M; Dr. Dave Douches, Michigan State University; Dr. Greg Porter, University of Maine; Dr. Richard Veilleux, Virginia Tech University; and Dr. Kathleen Haynes, USDA/ARS, Beltsville, MD. Also a special thanks goes to Mr. Todd Bradley and the staff at Maine Farmers Exchange, Presque Isle, ME for their efforts to procure small amounts of seed for shipment to NC. This project is funded in part by The North Carolina Potato Growers Association, the U.S. Potato Board, the Snack Food Association, the USDA-NIFA Potato Special Research Grants program, UTZ Quality Foods Inc and Real Potatoes Ltd. Their continuing support is very much appreciated.

Table 1a. Black Gold Farms Tablestock Variety Trial. Total and marketable yield, percentage of total yield by size class, specific gravity, and chip scores of potato clones harvested 103 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ² (% of total yield)									Specific Gravity ³
		cwt/A	%Chf.	%Yuk.	1's	2's	3's	4's	5's	Culls	1 7/8 to 4"	2 1/2 to 4"	
AF4550-2	284	200	72	113	16	44	26	0	0	14	70	26	1.063
AF4831-2	296	157	58	89	20	41	9	0	0	29	50	9	1.053
AF5245-1	354	241	85	132	8	41	26	1	0	23	68	27	1.068
AF5275-1	263	152	55	85	18	47	10	0	0	25	57	10	1.068
Anushka	350	229	83	134	21	55	10	0	0	15	65	10	1.059
BNC201-1	307	223	80	123	8	24	48	1	0	19	73	48	1.073
Chieftain	407	283	100	157	9	34	34	1	0	21	70	36	1.054
Dark Red Chieftain	248	162	58	88	12	28	36	0	0	23	65	37	1.056
Dark Red Norland	273	188	66	104	9	39	29	0	0	22	69	29	1.054
Peter Wilcox	308	217	79	122	14	56	14	0	0	15	70	14	1.062
Soraya	336	211	76	118	10	41	21	0	0	28	63	21	1.053
Yukon Gold	273	186	66	100	10	27	39	2	0	23	67	41	1.067
Grand Mean	308	204											
CV(%)	13	21											
LSD (k=100)	69	71											

¹ DAP= Day After Planting; DVK= Days of Vine Kill

² 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.

³ Determined by weight in air / water method.

Table 1b. Black Gold Farms Tablestock Variety Trial. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 103 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF4550-2	6	6	8	8	1	7	4	6	5	8	5	4	5	0	9.0	0	3	0	13	^SR,^CS
AF4831-2	9	6	8	9	3	7	5	7	5	8	5	4	6	3	8.8	0	3	0	8	^SR,MS,GC,SS,PTS,1IHN(8)
AF5245-1	6	5	7	8	1	7	4	7	5	7	7	3	6	3	8.8	0	0	0	3	^SR,SS,GC,1IHN(8)
AF5275-1	6	6	8	9	2	7	6	7	3	7	5	5	7	0	9.0	0	0	0	3	SR,RZ
Anushka	7	6	8	9	7	6	5	7	6	8	5	4	5	0	9.0	0	3	0	5	MS,SG,SS,SR,CS,YF2
BNC201-1	9	6	8	9	2	7	7	6	2	6	7	6	7	3	8.8	0	0	0	0	MS,EL,SR,SS,GC,SISC,YF1,1IHN(8)
Chieftain	9	6	7	8	3	7	5	6	5	7	7	7	4	20	7.5	0	0	0	0	^SG,SR,SS,MS,RZ,8IHN(4-8,4-7)
Dark Red Chieftain	9	7	8	8	2	7	6	7	2	7	6	4	5	0	9.0	0	0	0	5	SR,SS,RZ,GC,MS
Dark Red Norland	5	3	7	8	3	7	5	7	5	7	7	5	5	0	9.0	0	0	0	8	SR,SS,SG,MS,SISC
Peter Wilcox	5	4	7	8	1	6	6	7	5	7	4	4	5	0	9.0	0	0	0	3	SR,SS,CS,MS,PTS,IL,EL,YF2
Soraya	8	8	8	9	7	7	5	7	7	8	7	5	5	0	9.0	0	0	0	3	MS,SR,EL,SG,SS,YF2
Yukon Gold	8	5	7	8	7	7	6	6	4	7	7	5	5	0	9.0	0	0	3	13	CS,MS,SR,SS,GC,YF2

¹ DAP= Day After Planting; DVK= Days of Vine Kill

² See NE1031 Standard Potato Rating System for to scores in Appendix 2.

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

⁴ See Appendix 3 for comments codes

Table 2a. Black Gold Farms Chip Variety Trial. Total and marketable yield, percentage of total yield by size class, specific gravity, and chip scores of potato clones harvested 103 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class ² (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ³	Chip Color ⁴
				1's	2's	3's	4's	5's	Culls					
AF4552-5	382	331	135	10	42	44	1	0	3	86	45	1.070	2.0	
AF5320-1	354	260	104	23	56	17	0	0	4	73	17	1.066	2.0	
Atlantic	313	251	100	16	53	27	0	0	4	80	27	1.073	1.0	
B2869-20	279	185	75	12	40	26	1	0	22	66	26	1.071	1.5	
B2904-2	285	244	98	10	39	45	1	0	5	85	46	1.068	1.5	
NC0349-3	353	292	119	12	42	40	0	0	5	83	40	1.068	2.0	
NC182-5	352	271	109	19	47	29	0	0	4	77	30	1.067	2.0	
NC252-49	288	200	81	26	55	14	0	0	5	69	14	1.077	1.5	
NC280-89	356	278	111	13	41	36	1	0	9	78	37	1.065	2.0	
NC282-45	245	168	68	23	55	14	0	0	7	69	14	1.067	2.5	
NC282-8	254	202	82	11	41	36	3	0	9	80	39	1.061	2.0	
NC311-9	356	265	106	19	62	12	0	0	7	74	12	1.066	1.0	
NC317-12	328	271	109	15	45	35	2	0	2	83	38	1.077	2.0	
NCJ106-2	315	263	107	10	50	33	0	0	6	84	33	1.061	1.0	
NCJ107-6	214	174	71	13	42	38	1	0	6	81	39	1.060	2.0	
Sebec(AF0338-17)	246	190	76	15	50	27	0	0	7	77	27	1.062	2.0	
Snowden	366	301	122	16	62	20	0	0	2	82	20	1.067	1.5	
Grand Mean	305	239												
CV(%)	13	16												
LSD (k=100)	66	63												

¹ DAP= Day After Planting; DVK= Days of Vine Kill

² 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.

³ Determined by weight in air / water method.

⁴ Chip Color Ratings conducted by NCSU Potato Breeding Program at TRS/VGJREC:

1= no defects, exceptionally bright; 2= excellent, bright; 3= good, light or golden; 4= dark defects, marginal; 5= not acceptable

Table 2b. Black Gold Farms Chip Variety Trial. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 103 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF4552-5	6	6	8	8	6	6	5	7	2	5	5	8	5	0	9.0	0	3	0	0	DAE,DSE,SS,SR,IL,EL,MS
AF5320-1	6	7	7	9	8	8	4	7	2	7	3	8	5	0	9.0	3	0	5	0	GC,MS,SS,^SG,SR
Atlantic	6	5	6	8	6	5	6	6	3	7	6	8	6	3	8.5	3	0	0	0	GC,CS,SS,1IHN(7)
B2869-20	5	6	8	8	6	6	6	7	2	7	5	8	4	0	9.0	0	0	0	0	^HS,SR,GC,MS,SS
B2904-2	6	6	7	8	6	6	6	7	3	6	7	6	5	0	9.0	3	0	0	0	SR,FS,IL,EL,DAE
NC0349-3	6	6	8	9	6	5	7	7	1	7	6	7	7	0	9.0	3	0	0	3	PVY,FS,SR,SS,GC
NC182-5	6	8	8	9	6	7	6	7	2	7	5	7	7	0	9.0	0	0	0	3	MS,SS,SR,CS
NC252-49	9	9	8	9	6	6	5	6	3	7	4	8	5	0	9.0	0	0	0	10	STST,SR,MS,SS
NC280-89	8	8	8	9	6	7	5	7	4	7	7	7	4	0	9.0	0	3	0	3	SR,CS,MS,HS,STST,FS
NC282-45	5	5	8	7	6	7	6	7	3	7	4	6	5	0	9.0	0	0	5	8	SS,SR,MS,GC,PVY
NC282-8	6	8	8	8	5	5	5	6	5	8	7	8	6	0	9.0	0	0	0	3	SR,STST,GC,MS,SS
NC311-9	8	8	8	5	6	6	6	6	3	7	6	6	4	0	9.0	8	0	0	10	GC,SR,MS,PVY,CS
NC317-12	9	9	8	9	5	5	5	5	4	7	7	9	8	0	9.0	3	0	0	0	GC,MS
NCJ106-2	5	6	7	8	8	7	6	7	5	8	6	7	7	0	9.0	0	5	0	13	GC,SR,IL,EL,MS
NCJ107-6	5	5	6	7	6	5	6	6	2	8	5	7	6	0	9.0	0	3	0	0	MS,GC,SR,FS,PVY,SS
Sebec(AF0338-17)	8	7	7	7	6	6	5	7	3	7	6	6	6	0	9.0	0	0	0	0	^CS,SR
Snowden	9	7	7	8	6	5	4	6	2	5	5	7	5	0	9.0	0	0	0	5	SR,CS,DAE,DSE

¹ DAP= Day After Planting; DVK= Days of Vine Kill

² See NE1031 Standard Potato Rating System for to scores in Appendix 2.

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

⁴ See Appendix 3 for comments codes

Table 3a. US Potato Board/Snack Food Association Trial. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores of potato clones of potato clones harvested 103DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class ² (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ³	Chip Color ⁴	
				1's	2's	3's	4's	5's	Culls	24 to 48 hrs				5 to 7 Days	
AC03433-1W	260	175	69	11	37	30	1	0	22	67	30	1.057	2.0	2.0	
AF4648-2	239	188	75	7	29	46	4	1	13	79	50	1.061	2.0	2.0	
Atlantic	309	259	100	12	46	30	8	0	4	84	38	1.070	1.5	1.5	
BNC202-3	379	320	127	10	42	41	1	0	6	84	43	1.059	2.0	2.0	
CO03243-3W	375	319	124	12	40	42	2	0	5	83	44	1.062	2.0	2.0	
Lamoka	251	182	71	17	55	17	0	0	12	71	17	1.067	1.5	1.5	
MSK061-4	301	201	80	13	44	22	0	0	20	67	22	1.063	2.0	2.0	
NY152	401	312	124	18	57	21	0	0	4	78	21	1.062	1.5	2.0	
Snowden	346	273	109	16	59	19	0	0	5	79	20	1.067	1.5	1.5	
W6822-3	366	264	105	12	37	33	1	0	16	72	35	1.072	2.0	2.0	
W8822-1	348	272	108	14	45	33	0	0	9	78	33	1.074	2.5	2.0	
Grand Mean	325	251													
CV(%)	14	21													
LSD (k=100)	70	77													

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² 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.

³ Determined by weight in air/water method.

⁴ Chip Color Ratings conducted by the NCSU potato breeding program at the TRS/VGJREC and by Utz Quality Foods in Hanover PA: 1 = no defects, exceptionally bright; 2 = excellent, bright; 3 = good, light or golden; 4 = dark defects, marginal; 5 = not acceptable.

Table 3b. US Potato Board/Snack Food Association Trial. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 103 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AC03433-1W	7	8	8	9	6	6	5	4	2	8	6	8	4	0	9	8	2	0	2	^GC,SS,CS,SR
AF4648-2	6	6	7	9	8	6	3	6	4	6	7	8	5	0	9	0	0	0	0	SS,CS,SR,MS,GC
Atlantic	6	5	7	8	6	5	6	5	3	7	7	8	7	0	9	0	0	0	4	MS,SS,CS,GC,SR
BNC202-3	6	7	7	8	7	7	6	7	2	6	6	6	5	0	9	0	0	0	4	^SR,SS,PVY,YF1
CO03243-3W	9	8	8	9	6	7	3	5	3	8	7	8	6	4	8.6	0	0	0	4	SR,SS,2IHN(1-8,1-6)
Lamoka	7	7	8	9	6	6	6	7	4	7	6	5	4	0	9	0	0	0	0	^SR,GC,SS
MSK061-4	8	5	6	8	6	6	5	7	5	8	7	5	3	0	9	0	20	0	6	SS,SG,RZ,GC,SR,CHIP(VR)
NY152	6	7	7	8	6	6	5	7	3	7	4	8	7	0	9	0	16	2	2	SR,PVY,SS,MS,CHIP(VR)
Snowden	9	7	7	8	5	5	5	6	2	5	6	7	5	0	9	0	0	0	4	^SR,SS,CS
W6822-3	9	8	8	9	6	6	6	5	2	7	7	6	4	4	8.6	0	0	0	6	^CS,SS,SR,MS,2IHN(2-8)
W8822-1	9	9	7	9	5	5	5	5	3	8	6	7	6	2	8.4	0	0	0	0	RZ,FS,SS,SG,1IHN(6),YF1

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

³ Percentage determined from 10 randomly selected potatoes /rep (50 total) in size classes 3 and 4. HN=heat necrosis; HNR=average heat necrosis rating (Rating Scale: 1= very severe to 9 = absent); HH=hollow heart; VR=vascular ring discoloration; BC=brown center; SR=soft rot

⁴ See Appendix 3 for Comment Codes

Table 4a. James Brothers Variety Trial. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores of potato clones harvested 99 DAP¹ at James Brothers Farm, Weeksville, Pasquotank Co., NC - 2015

Clone	Total Yield		Marketable Yield			Size Distribution by Class ² (% of total yield)			Specific Gravity ³	Chip Color ⁴
	cwt/A	cwt/A	% Atl.	%Chf.	%Yuk	A's + B's	C's	Culls		
Atlantic	374	324	100	153	124	86	8	6	1.079	1.5
Baby Rose	265	152	46	72	59	56	32	13	1.069	.
BNC201-1	326	265	81	128	100	81	12	7	1.076	.
Chieftain	366	219	68	100	84	59	8	32	1.059	.
Dark Red Chieftain	213	151	45	69	59	69	18	14	1.057	.
Dark Red Norland	345	270	85	124	102	77	8	14	1.064	.
HZC07-6040	399	272	82	132	105	66	20	14	1.065	.
Merlot	312	138	42	66	53	44	43	14	1.058	.
Natascha	370	267	81	126	104	70	21	9	1.062	.
NC182-5	346	267	82	124	103	77	17	6	1.069	2.0
NC201-1	270	189	59	88	73	70	21	9	1.062	.
NC280-89	378	260	78	122	101	67	13	21	1.071	2.5
NC282-8	225	174	54	83	67	77	11	12	1.073	2.0
NC302-12	339	246	77	116	93	72	7	21	1.065	2.5
NCB2901-3	231	171	53	76	66	73	23	4	1.085	2.0
NCJ106-2	292	217	67	102	83	74	18	8	1.065	1.0
NCJ107-6	323	269	84	123	102	83	13	5	1.075	1.0
Red Sunset	334	257	78	117	100	75	20	5	1.056	.
Snowden	357	302	92	138	117	84	12	4	1.082	1.5
Soraya	358	272	83	124	105	76	13	11	1.059	.
Superior	268	212	64	97	82	78	8	14	1.072	3.5
Wega	387	241	74	112	93	61	23	16	1.060	.
Yukon Gold	325	264	84	126	100	81	7	12	1.076	.
Grand Mean	322	234								
CV(%)	26	34								
LSD (k=100)	139	126								

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² Size classes: A's + B's > 1 7/8"; C's ≤ 1 7/8"; Culls = all defective potatoes

³ Determined by weight in air/water method.

⁴ Chip Color Ratings conducted by the NCSU Potato Breeding Program at the TRS/VGJREC: 1 = no defects, exceptionally bright; 2 = excellent, bright; 3 = good, light or golden; 4 = dark defects, marginal; 5 = not acceptable.

Table 4b. James Brothers Variety Trial. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 99 DAP¹ at James Brothers Farm, Weeksville, Pasquotank Co., NC – 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
Atlantic	6	5	8	8	6	5	5	6	3	7	6	7	7	28	7.8	3	0	3	0	GC,MS,SR,CS,RZ,11IHN(10-8,1-6)
Baby Rose	9	6	7	9	2	8	6	7	6	8	4	8	4	18	8.4	5	0	8	0	SG,SR,MS,SS,YF1,7IHN(6-8,1-6)
BNC201-1	6	5	9	9	2	8	7	6	2	7	7	6	6	0	9.0	0	0	0	0	SR,MS,CS,GC,YF1
Chieftain	9	6	7	8	3	7	5	5	4	7	5	5	3	23	6.8	0	0	0	0	^RZ,^SG,^SR,CS,9IHN(3-8,2-7,4-6)
Dark Red Chieftain	9	7	7	7	2	7	7	7	2	7	4	5	4	0	9.0	0	0	0	0	GC,SR,MS,FS,CS
Dark Red Norland	5	3	7	8	2	7	6	7	4	8	5	6	4	0	9.0	0	10	0	0	SR,GC,SS,SG,VARCLR
HZC07-6040	6	4	8	8	2	8	6	7	2	7	4	6	6	8	8.5	0	0	0	0	SR,SG,SS,GC,3IHN(3-8)
Merlot	9	9	8	9	3	7	6	6	6	8	3	8	4	0	9.0	0	0	13	0	MS(KNOBS),SG,YF1
Natascha	9	5	8	8	7	8	6	7	6	8	5	7	6	0	9.0	0	0	0	0	SR,MS,SG,CS,SS,YF2
NC182-5	8	8	8	9	6	5	7	6	2	7	4	5	5	0	9.0	5	0	0	5	SR,MS,GC
NC201-1	5	3	7	8	1	8	6	7	7	8	4	6	5	0	9.0	0	0	0	0	MS,SR,YF1.5
NC280-89	7	6	8	9	6	6	6	5	4	8	7	6	4	8	8.5	0	0	3	0	MS,SR,GC,SG,RZ,FS,3IHN(3-8)
NC282-8	6	8	8	8	6	6	5	6	4	7	4	7	5	20	7.6	0	0	0	0	GC,MS,SG,RZ,CS,8IHN(4-8,1-7,3-6)
NC302-12	6	5	8	7	6	6	5	7	5	7	7	7	4	0	9.0	0	0	0	0	SR,GC,SG,MS,RZ,CS
NCB2901-3	6	5	7	4	6	7	6	7	2	8	3	6	5	0	9.0	23	0	0	0	MS,SR,CS,SG
NCJ106-2	5	5	8	6	6	7	5	5	6	7	5	7	6	3	8.5	0	0	3	0	GC,SR,MS,SS,PVY,1IHN(7)
NCJ107-6	6	5	7	7	6	6	5	7	2	7	5	8	7	0	9.0	0	0	0	0	MS,SR,RZ,SS,PVY
Red Sunset	5	5	8	8	2	7	6	6	4	7	5	7	5	0	9.0	0	0	0	3	MS,SS,SR,CS,SG
Snowden	9	7	7	9	6	5	6	6	2	6	4	7	7	0	9.0	0	0	3	0	MS,SR,RZ,CS,GC,FS
Soraya	7	7	7	9	7	8	5	7	7	7	7	6	6	33	7.3	0	0	0	0	SG,MS,SR,GC,RZ,YF2,13IHN(5-8,7-7,2-6)
Superior	5	4	8	8	6	7	5	7	4	6	6	6	4	0	9.0	0	10	0	0	MS,SR,SG,SS,RZ,CS
Wega	7	6	7	8	7	8	6	7	6	7	4	6	5	0	9.0	0	0	0	0	SG,SS,MS,SR,CS,YF2
Yukon Gold	8	5	7	8	7	7	6	6	4	7	7	5	5	28	7.5	13	0	5	0	GC,SR,MS,CS,SG,YF1,11IHN(5-8,5-7,1-6)

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

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

⁴ See Appendix 3 for Comment Codes

Table 5a. Sackette-IFC Variety Trial. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores of potato clones of potato clones harvested 105 DAP¹ at the Sackette Potatoes Farm, Vandemere, Pamlico Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class ² (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ³	Chip Color ⁴
				1's	2's	3's	4's	5's	Culls					
AF4648-2	172	117	74	8	30	29	1	0	32	60	31	1.059	1.5	
Atlantic	240	163	100	4	14	37	15	0	31	65	51	1.068	1.0	
B2869-29	244	155	114	10	35	28	0	0	27	63	28	1.070	2.0	
BNC317-8	225	168	130	17	45	29	1	0	9	74	29	1.074	2.0	
BNC318-9	245	205	152	5	28	52	4	0	11	83	56	1.063	1.5	
CO03243-3W	276	193	143	4	17	45	6	0	28	67	50	1.052	2.5	
MSK061-4	321	190	156	8	33	26	0	0	33	59	26	1.068	2.0	
NC0349-3	256	217	159	10	35	47	3	0	5	85	50	1.056	2.0	
NC182-5	338	279	241	11	44	37	0	0	8	81	37	1.061	2.5	
NC311-9	211	128	95	16	43	18	0	0	24	61	18	1.058	1.5	
NY152	369	279	228	15	52	22	0	0	11	74	22	1.061	1.5	
Sebec(AF0338-17)	240	197	139	5	24	49	6	0	16	79	55	1.064	2.0	
Snowden	338	301	216	5	28	59	2	0	7	89	61	1.066	1.5	
Grand Mean	268	203												
CV(%)	23	31												
LSD (k=100)	101	107												

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² 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.

³ Determined by weight in air/water method.

⁴ Chip Color Ratings conducted by the NCSU Potato Breeding Program at the TRS/VGJREC: 1 = no defects, exceptionally bright; 2 = excellent, bright; 3 = good, light or golden; 4 = dark defects, marginal; 5 = not acceptable.

Table 5b. Sackette-IFC Variety Trial. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 105 DAP¹ at the Sackette Potatoes Farm, Vandemere, Pamlico Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF4648-2	7	7	8	9	6	7	5	7	3	7	6	7	4	0	9.0	3	3	5	3	^SR,SS,GC,SS
Atlantic	6	5	8	9	5	5	5	6	3	7	7	5	4	23	7.8	25	0	15	0	^SR,GC,CS,MS,SS,9IHN(5-8,3-7,1-6)
B2869-29	6	5	8	9	6	7	6	7	2	8	5	4	4	0	9.0	0	0	3	0	SS,SR,MS,^CS
BNC317-8	6	4	8	9	5	5	6	6	3	7	6	8	5	0	9.0	3	0	3	0	SS,SR,RZ,GC,MS
BNC318-9	6	5	8	9	5	5	7	6	5	8	7	7	6	0	9.0	40	0	33	13	SR,RZ,SS,MS,IL
CO03243-3W	9	9	9	9	6	6	6	7	2	8	7	5	4	58	5.6	0	0	13	20	GC,MS,SR,RZ, 23IHN(1-8,5-7,7-6,5-5,3-4,2-3)
MSK061-4	9	7	9	9	6	6	6	7	3	7	5	6	3	0	9.0	0	10	3	0	^SG,SR,SS,MS,RZ,GC
NC0349-3	8	6	8	7	6	5	6	6	2	7	6	8	6	0	9.0	18	0	13	0	SS,MS,SR,RZ
NC182-5	7	8	8	9	6	6	7	7	2	7	5	7	5	0	9.0	0	0	0	0	GC,SS,SR,RZ,MS
NC311-9	6	6	8	3	6	6	6	7	4	8	5	5	3	0	9.0	0	0	0	0	^CS,RZ,MS,SS,SR
NY152	8	7	8	9	6	6	6	7	3	7	5	7	7	0	9.0	0	3	0	0	SS,SR,MS,RZ,CS
Sebec(AF0338-17)	9	7	8	9	6	6	6	6	4	7	8	7	5	0	9.0	0	0	0	0	SS,SR,RZ,MS,SG,GC
Snowden	9	7	8	9	5	5	7	6	2	6	6	8	6	8	7.8	0	0	0	0	SS,SR,MS,CS,DAE,DSE, 3IHN(2-8,1-6)

¹ DAP = Days After Planting; DVK = Days to Vine Kill.

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

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

⁴ See Appendix 3 for Comment Codes

Table 6a. Round White Trial One. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores of potato clones of potato clones harvested 101 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class ² (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ³	Chip Color ⁴
				1's	2's	3's	4's	5's	Culls				
AF5225-1	337	288	154	12	52	32	1	0	3	85	33	1.053	3.5
AF5428-7	246	198	103	17	62	17	1	0	3	80	18	1.061	3.0
AF5435-7	211	169	85	9	39	40	0	0	12	80	40	1.062	3.0
Atlantic	232	195	100	8	41	43	0	0	8	84	43	1.071	1.5
B3084-3	227	195	100	11	44	41	1	0	3	86	42	1.070	1.5
Kea	190	86	44	20	34	9	0	0	36	44	9	1.071	3.0
NC329-9	206	177	93	8	37	49	0	0	6	85	49	1.078	1.0
NC363-4	286	254	133	9	39	49	1	0	2	88	50	1.060	2.0
NC371-3	159	112	56	24	60	8	1	0	7	69	9	1.070	2.0
NC371-7	196	164	86	11	55	29	0	0	6	83	29	1.074	2.0
NC372-2	191	150	77	14	59	19	0	0	8	79	19	1.075	2.5
NDAF092239CB-2	126	91	49	15	53	19	0	0	13	72	19	1.054	3.5
Snowden	291	254	132	10	62	24	1	0	3	87	25	1.068	2.0
Superior	181	154	80	9	62	22	1	0	7	85	23	1.062	3.5
Grand Mean	220	178											
CV(%)	21	24											
LSD (k=100)	74	73											

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² 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.

³ Determined by weight in air/water method.

⁴ Chip Color Ratings conducted by the NCSU Potato Breeding Program at the TRS/VGJREC: 1 = no defects, exceptionally bright; 2 = excellent, bright; 3 = good, light or golden; 4 = dark defects, marginal; 5 = not acceptable.

Table 6b. Round White Trial One. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 101 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF5225-1	9	8	8	9	6	6	6	7	3	7	5	8	6	3	8.8	0	0	0	0	CS,SS,SR,MS,1IHN(8)
AF5428-7	6	4	8	8	8	7	7	7	2	6	4	7	4	0	9.0	0	0	0	3	DAE,DSE,SS,SR,MS,CS
AF5435-7	9	8	8	9	6	6	6	7	2	7	6	6	4	0	9.0	0	0	0	0	^SR,SS,CS
Atlantic	6	5	8	9	5	5	6	6	3	7	6	7	5	5	8.5	5	0	3	8	GC,SS,SR,CS,2IHN(2-8)
B3084-3	6	6	8	8	6	6	6	6	3	8	5	8	7	0	9.0	3	0	0	8	SR,SS,GC,MS
Kea	9	9	9	9	7	6	6	7	4	8	5	8	2	48	6.8	0	0	0	5	SR,SS,^SG,GC, 19IHN(6-8,6-7,5-6,2-5),YF1
NC329-9	6	6	8	8	6	6	6	5	3	7	5	8	5	0	9.0	13	0	0	0	SS,GC,SR,CS
NC363-4	8	8	8	9	6	5	6	7	3	8	6	8	8	0	9.0	8	0	8	0	SS,SR,RZ
NC371-3	6	4	7	8	6	7	6	7	2	7	3	8	5	0	9.0	0	0	0	0	TOO SMALL,IL,SR,CS,SS
NC371-7	6	6	7	8	6	6	6	7	3	7	5	8	5	3	8.8	3	0	0	0	GC,SS,SR,IL,1IHN(8)
NC372-2	6	5	8	9	6	7	7	7	4	8	5	8	6	0	9.0	8	0	0	5	GC,SR,CS,PVY,SS
NDAF092239CB-2	5	5	8	9	9	8	6	7	6	8	5	8	5	3	8.8	0	0	0	0	SR,SS,MS,CS,PINK SPECS,1IHN(8)
Snowden	9	7	8	9	5	5	5	6	3	6	5	8	5	0	9.0	0	0	0	0	CS,SS,GC,SR
Superior	5	4	8	8	6	7	4	7	4	6	5	8	4	0	9.0	0	0	0	0	CS,MS,SS,SR

¹ DAP = Days After Planting; DVK = Days to Vine Kill.

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

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

⁴ See Appendix 3 for Comment Codes

Table 7a. Round White Trial Two. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores of potato clones harvested 93 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ² (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ³	Chip Color ⁴
		cwt/A	% Atl.	1's	2's	3's	4's	5's	Culls					
AF5280-5	319	309	138	3	23	68	3	0	4	93	71	1.053	2.5	
Atlantic	255	248	100	4	35	53	5	0	3	93	58	1.071	1.0	
B2833-8	227	223	89	20	55	23	1	0	2	78	24	1.072	1.5	
B2834-8	191	185	78	6	32	56	4	0	3	91	59	1.071	2.0	
B2869-20	217	204	86	5	32	56	1	0	6	88	57	1.063	2.0	
B2947-5	304	300	132	3	28	66	2	0	1	95	68	1.065	2.0	
B2950-9	376	371	158	18	59	21	0	0	1	80	21	1.064	2.0	
BNC371-1	308	285	125	5	28	58	2	0	8	87	59	1.066	2.0	
Eva	220	205	87	4	31	57	0	0	7	88	57	1.056	2.0	
NCH4-3	273	254	104	5	38	46	3	0	7	87	49	1.070	1.0	
NCH6-10	353	344	148	13	56	28	0	0	3	84	28	1.068	3.5	
NCH6-4	300	293	135	12	44	40	1	0	3	85	41	1.068	1.5	
NCJ106-2	203	180	76	8	43	37	1	0	11	81	38	1.061	2.0	
Superior	241	231	97	5	36	52	3	0	4	90	54	1.060	2.0	
Grand Mean	271	259												
CV(%)	22	23												
LSD (k=100)	98	99												

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² 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.

³ Determined by weight in air/water method.

⁴ Chip Color Ratings conducted by the NCSU Potato Breeding Program at the TRS/VGJREC: 1 = no defects, exceptionally bright; 2 = excellent, bright; 3 = good, light or golden; 4 = dark defects, marginal; 5 = not acceptable.

Table 7b. Round White Trial Two. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 93 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF5280-5	6	6	8	8	6	7	5	7	4	6	7	8	5	0	9.0	3	0	3	0	GC,SS,SR,MS
Atlantic	6	5	8	8	6	5	5	6	3	7	7	7	6	20	7.6	0	0	0	0	SS,GC,SR,CS,8IHN(5-8,2-7,1-6)
B2833-8	5	5	8	8	6	6	6	7	3	7	4	8	7	0	9.0	0	0	0	0	SS,CS,GC
B2834-8	5	4	8	8	6	6	7	7	2	7	6	8	7	0	9.0	0	3	0	0	SR,MS,SS
B2869-20	8	6	8	7	6	7	4	6	4	7	7	8	4	0	9.0	0	0	0	0	SR,SG,RZ,SS,MS
B2947-5	6	5	8	9	5	5	5	7	2	7	7	8	6	0	9.0	0	0	0	0	SS,SR
B2950-9	7	6	8	8	6	6	6	6	3	8	5	8	5	0	9.0	0	0	5	0	SS,SR
BNC371-1	6	5	8	9	6	7	6	7	4	8	6	8	4	3	8.8	35	0	20	0	GC,SS,MS,SR,1IHN(8)
Eva	6	6	8	8	6	7	6	7	4	8	5	7	5	0	9.0	0	0	3	0	RZ,GC,SR,MS,CS,IL
NCH4-3	9	6	9	7	6	7	6	4	3	7	6	8	3	60	7.4	0	0	0	0	GC,MS,RZ,24IHN(11-8,4-7,2-6,7-5)
NCH6-10	6	6	8	7	6	7	5	7	3	7	5	8	5	0	9.0	0	0	0	0	MS,SS,SR
NCH6-4	6	6	8	7	8	6	5	6	3	7	5	8	5	0	9.0	0	0	0	0	MS,RZ,SS,GC
NCJ106-2	6	6	8	6	6	7	6	5	5	7	6	7	4	0	9.0	20	0	8	0	SR,SS,GC,MS
Superior	5	4	8	8	6	7	5	7	4	5	7	8	3	0	9.0	0	3	0	0	GC,SS,MS,SR

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

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

⁴ See Appendix 3 for Comment Codes

Table 8a. Round White Trial Three. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores of potato clones harvested 114 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class ² (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ³	Chip Color ⁴
				1's	2's	3's	4's	5's	Culls					
Atlantic	170	129	100	12	45	29	1	0	14	74	29	1.067	2	
B2833-16	159	130	115	12	54	25	2	0	7	81	27	1.074	1.5	
B2904-2	182	137	122	10	41	34	1	0	15	76	34	1.074	2	
BNC177-5	170	99	77	12	30	26	0	0	32	56	26	1.069	1.5	
BNC182-5	241	176	151	12	48	24	0	0	16	72	24	1.060	2.5	
BNC369-4	197	165	155	8	42	41	0	0	9	84	41	1.069	1.5	
Kennebec	154	119	99	4	28	48	0	0	20	76	48	1.065	2	
NCJ107-6	160	99	91	18	46	17	0	0	20	62	17	1.056	2	
Sebec(AF0338-17)	144	108	88	8	31	42	0	0	19	73	42	1.064	1.5	
Snowden	247	207	177	11	55	28	0	0	6	83	28	1.072	1.5	
Grand Mean	182	137												
CV(%)	29	34												
LSD (k=100)	86	78												

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² 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.

³ Determined by weight in air/water method.

⁴ Chip Color Ratings conducted by the NCSU Potato Breeding Program at the TRS/VGJREC: 1 = no defects, exceptionally bright; 2 = excellent, bright; 3 = good, light or golden; 4 = dark defects, marginal; 5 = not acceptable.

Table 8b. Round White Trial Three. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 114 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
Atlantic	6	5	8	8	6	5	6	6	3	7	6	7	5	8	7.8	0	0	0	3	SR,GC,MS,CS,SS,3IHN(1-7,2-6)
B2833-16	6	5	7	8	6	5	6	7	3	8	5	8	6	0	9.0	3	0	0	3	SR,SS,CS
B2904-2	8	6	8	8	6	6	7	7	7	7	5	6	4	0	9.0	3	0	0	0	IL,SR,GC,SS
BNC177-5	9	8	8	9	6	6	6	7	3	8	6	4	4	0	9.0	0	0	0	0	^SR,^IL
BNC182-5	7	7	8	9	6	6	7	7	2	8	5	7	6	3	8.5	0	0	0	5	SR,SS,MS,1IHN(7)
BNC369-4	8	7	8	9	6	7	6	7	3	7	5	8	7	5	8.0	0	3	0	0	SS,SR,2IHN(1-8,1-6)
Kennebec	9	8	8	8	9	8	5	7	6	7	7	7	4	5	8.3	0	0	0	0	SR,SS,GC,SG,MS,RZ,2IHN(1-8,1-7)
NCJ107-6	6	6	7	7	6	6	6	7	2	8	4	6	5	0	9.0	0	0	0	0	SR,SS,V
Sebec(AF0338-17)	9	7	8	9	6	6	6	7	3	7	7	7	6	0	9.0	0	0	3	3	SR,GC,SS,GC
Snowden	9	7	8	9	6	5	6	6	3	6	5	8	5	0	9.0	0	0	0	0	CS,SS,SR,GC,DAE,DSE

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

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

⁴ See Appendix 3 for Comment Codes

Table 9a. NE-1231 Round White Trial. Total and marketable yield, percentage of total yield by size class, specific gravity, and chip scores of potato clones harvested 98 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class ² (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ³	Chip Color ⁴
				1's	2's	3's	4's	5's	Culls				
AF4138-8	239	225	81	10	39	44	2	0	6	84	46	1.049	2.0
AF4157-6	333	316	112	8	41	46	0	0	5	87	46	1.066	2.0
AF4648-2	197	172	62	10	39	37	1	0	12	78	38	1.064	2.5
AF4975-3	304	277	100	7	27	52	5	0	9	84	57	1.061	2.0
Atlantic	297	282	100	5	17	65	8	0	5	90	73	1.066	1.0
B2833-16	251	238	84	8	45	41	0	0	5	86	42	1.066	1.5
Katahdin	155	116	41	10	36	28	2	0	25	65	29	1.045	3.0
Kennebec	225	169	60	5	30	39	2	0	25	70	40	1.048	2.5
NY154(NYH15-17)	203	185	65	11	29	46	5	0	9	80	51	1.052	2.0
Snowden	252	239	85	8	28	56	3	0	5	87	59	1.062	1.5
Superior	239	230	82	8	47	40	1	0	4	89	41	1.064	3.0
Yukon Gold	232	216	78	4	29	59	1	0	7	89	61	1.060	.
Grand Mean	244	222											
CV(%)	16	17											
LSD (k=100)	64	65											

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² 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.

³ Determined by weight in air/water method.

⁴ Chip Color Ratings conducted by the NCSU Potato Breeding Program at the TRS/VGJREC: 1 = no defects, exceptionally bright; 2 = excellent, bright; 3 = good, light or golden; 4 = dark defects, marginal; 5 = not acceptable.

Table 9b. NE-1231 Round White Trial. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 98 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF4138-8	6	5	8	8	6	7	5	6	3	7	7	8	6	0	9.0	3	0	0	3	MS,SR,GC,SS,CS
AF4157-6	6	5	9	9	6	6	5	6	3	7	5	8	5	0	9.0	0	0	0	3	SS,SR,MS,GC
AF4648-2	6	5	7	8	8	7	5	7	3	6	5	8	4	0	9.0	0	0	0	0	SR,SS,SR,MS,GC,RZ
AF4975-3	6	5	8	9	6	6	5	6	3	7	6	8	4	3	8.8	3	0	3	0	GC,MS,SS,SR,RZ,SG,1IHN(8)
Atlantic	6	5	8	8	6	5	5	5	3	7	7	8	6	23	7.3	10	0	5	0	SS,SR,GC,9IHN(3-8,5-7,1-6)
B2833-16	8	5	8	8	5	5	5	7	3	7	5	8	4	0	9.0	0	0	0	0	SS,MS,GC,SG,SR
Katahdin	6	6	8	9	8	7	4	7	5	8	5	7	5	5	8.6	0	3	5	0	CS,MS,SR,SS,GC,2IHN(1-8,1-7)
Kennebec	8	7	8	8	8	7	4	7	6	7	7	7	3	3	8.8	3	0	0	0	SS,MS,SG,SR,GC,1IHN(8)
NY154 (NYH15-17)	9	7	8	9	6	6	5	7	3	7	7	8	5	0	9.0	0	0	0	0	GC,MS,SS,SR
Snowden	9	7	8	8	5	5	5	5	3	5	5	8	5	13	8.4	8	0	3	0	SS,SR,MS,DAE,DSE,5IHN(3-8,2-7)
Superior	5	4	8	9	6	7	4	7	4	6	6	8	4	0	9.0	0	0	3	0	SR,SS,MS,GC,CS
Yukon Gold	8	5	8	8	7	7	6	7	3	7	6	8	6	0	9.0	0	0	0	0	SS,CS,GC,SR,YF2

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

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

⁴ See Appendix 3 for Comment Codes

Table 10a. NE-1231 Red Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 105 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC – 2015

Clone	Total Yield cwt/A	Marketable Yield		Size Dist. by Class (%) ² (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ³
		cwt/A	% Chieftain	1's	2's	3's	4's	5's	Cull's				
08-181R	228	90	42	44	39	0	0	0	17	39	0	1.049	
AF5278-3	206	158	72	11	52	24	0	0	13	76	24	1.060	
AF5412-3	341	261	121	5	49	27	0	0	18	77	27	1.048	
Chieftain	387	225	100	5	19	38	1	0	37	58	39	1.048	
CO00291-5R	137	96	45	9	38	30	2	0	21	70	31	1.032	
CO098012-5R	237	159	74	18	44	23	0	0	14	67	23	1.054	
Dark Red Norland	324	246	111	8	36	40	0	0	16	76	40	1.052	
Merlot	338	204	94	21	59	1	0	0	18	60	1	1.051	
NCB2607-3	225	183	84	12	60	22	0	0	6	81	22	1.060	
NDAF102568C-2	261	145	67	8	36	17	2	0	36	55	19	1.037	
NDAF102573-2	299	228	106	8	38	38	1	0	15	76	39	1.050	
Strawberry Paw(NY136)	261	189	87	10	40	32	0	0	18	72	33	1.045	
Grand Mean	270	182											
CV(%)	10	15											
LSD (k=100)	45	45											

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² 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.

³ Determined by weight in air/water method.

Table 10b. NE-1231 Red Trial. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 105 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
08-181R	9	8	8	9	3	6	4	7	5	8	4	8	4	0	9.0	0	0	3	0	SG,SS,SR,MS,YF1
AF5278-3	5	4	8	8	2	8	4	7	2	7	5	8	7	0	9.0	0	0	0	0	SR,SS,GC,RZ
AF5412-3	6	4	8	8	1	8	5	7	6	8	7	8	2	0	9.0	0	0	0	5	^^MS,SR,SG,PF1
Chieftain	9	6	8	9	3	7	5	6	5	7	7	8	3	38	7.3	0	0	0	0	^^SG,SR,GC,15IHN(6-8,8-7,1-6)
CO00291-5R	8	8	8	7	2	8	7	4	2	8	5	7	4	0	9.0	0	0	0	0	MS,GC,RZ,SS
CO098012-5R	8	6	8	9	2	7	6	6	3	8	4	7	6	0	9.0	0	0	0	0	SS,SISC,SR,MS,GC,RZ
Dark Red Norland	5	3	8	8	2	7	5	7	5	7	6	8	4	0	9.0	5	0	3	3	SS,SR,GC,MS
Merlot	9	9	8	9	3	6	5	7	6	8	4	8	4	0	9.0	0	0	45	0	SG,SS,MS,SR,YF1.5
NCB2607-3	6	5	9	9	2	8	7	6	2	8	4	8	7	0	9.0	0	0	0	0	GC,SS,SR,YF1
NDAF102568C-2	9	6	8	8	3	8	5	7	5	8	6	7	3	3	8.3	0	0	5	0	^SG,SS,SR,MS,GC,1IHN(6)
NDAF102573-2	8	6	8	8	2	7	6	5	5	8	5	8	6	0	9.0	0	0	0	3	SR,MS,RZ,SS,GC
Strawberry Paw(NY136)	9	7	8	7	2	7	5	5	6	8	7	8	6	0	9.0	0	0	0	0	GC,SR,SS,MS,IL

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

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

⁴ See Appendix 3 for Comment Codes

Table 11a. NE-1231 Russet Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 107 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ² (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ³
		cwt/A	% R.Nor	1's	2's	3's	4's	5's	Culls				
AF3001-6 (Easton)	257	234	150	2	33	58	0	0	8	91	58	1.058	
AF4615-5	212	142	89	4	44	23	0	0	28	67	23	1.068	
AF5164-19	182	139	86	5	48	27	0	0	20	76	27	1.057	
AF5312-1	219	174	113	4	50	29	0	0	17	79	29	1.060	
AF5314-2	180	124	79	5	43	26	0	0	26	69	26	1.058	
Russet Burbank	274	175	111	13	59	5	0	0	23	64	5	1.057	
Russet Norkotah	199	162	100	9	68	14	0	0	9	82	14	1.065	
Shepody	180	134	86	5	54	20	0	0	21	74	20	1.057	
Teton Russet	194	117	73	6	37	22	1	0	33	60	23	1.060	
Grand Mean	211	155											
CV(%)	16	18											
LSD (k=100)	56	50											

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² 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.

³ Determined by weight in air/water method.

Table 11b. NE-1231 Russet Trial. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 107 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF3001-6 (Easton)	9	9	8	9	6	4	5	5	8	8	9	9	5	15	7.3	0	0	3	0	MS,GC,SS,LUMPY,6IHN(2-8,3-7,1-6)
AF4615-5	9	9	9	8	6	7	5	7	8	8	6	5	2	20	8.0	0	0	8	3	IL,SG,MS,GC,SS,CS,SR,8IHN(5-8,3-7)
AF5164-19	6	6	9	8	6	4	5	7	7	8	7	8	6	3	8.5	0	0	0	0	SR,MS,GC,SS,SC,1IHN(7)
AF5312-1	8	7	8	8	5	2	5	7	6	8	6	8	4	3	8.8	0	0	0	0	SG,SS,SR,MS,1IHN(8)
AF5314-2	6	5	8	9	5	3	6	7	7	8	5	8	4	3	8.8	0	0	0	0	SS,GC,SR,MS,1IHN(8)
Russet Burbank	9	8	8	9	6	1	7	7	6	7	4	8	2	18	7.3	0	0	0	0	SG,MS,SS,SR,7IHN(1-8,5-7,1-6)
Russet Norkotah	6	6	8	9	5	3	6	7	7	7	6	8	7	0	9.0	0	0	0	0	SR,SS,FS,MS
Shepody	6	6	8	9	8	8	5	7	7	8	7	8	3	0	9.0	0	5	3	3	SR,MS,SG,SS
Teton Russet	6	6	8	9	5	3	6	7	7	8	6	8	4	0	9.0	8	0	5	0	SR,SG,GC,MS

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

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

⁴ See Appendix 3 for Comment Codes

Table 12a. Yellow Flesh Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 94 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ² (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ³
		cwt/A	%Atl	%Yuk	1's	2's	3's	4's	5's	Culls			
08-326	288	239	86	246	17	68	14	0	0	1	82	14	1.049
AF5153-11	231	208	78	209	4	31	55	4	0	6	90	59	1.060
AF5215-2	224	172	62	176	19	60	16	0	0	5	76	16	1.060
Alegria	348	293	108	298	5	37	47	0	0	11	84	47	1.059
Allora	204	145	53	148	19	55	16	0	0	10	71	16	1.054
Anushka	281	236	89	238	11	68	16	0	0	5	84	16	1.054
Atlantic	296	274	100	279	5	25	62	6	0	3	92	67	1.069
Augusta	250	178	67	178	16	59	12	0	0	13	71	12	1.061
Natascha	292	236	92	232	11	58	22	0	0	8	80	22	1.055
NC201-1	132	108	38	112	12	50	31	0	0	7	82	31	1.053
NC276-2	213	146	55	147	27	62	7	0	0	5	68	7	1.064
NCH85-2	99	68	24	70	28	38	28	0	0	6	66	28	1.052
Peter Wilcox	265	236	88	239	7	49	40	0	0	4	89	40	1.056
Soraya	259	193	70	197	10	48	23	0	0	19	71	23	1.046
Wega	254	182	67	185	24	67	3	0	0	5	71	3	1.044
Yukon Gold	149	101	39	100	6	25	40	2	0	27	68	42	1.062
Grand Mean	237	188											
CV(%)	21	26											
LSD (k=100)	83	81											

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² 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.

³ Determined by weight in air/water method.

Table 12b. Yellow Flesh Trial. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 94 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
08-326	9	9	9	9	7	7	5	7	4	8	4	8	2	53	7.7	0	0	0	3	ONLY SR & SS CULLED ALL OTHERS IN SIZED YLD - ALL CULLS,21IHN(14-8,7-7),YF2
AF5153-11	9	6	9	9	7	6	7	5	2	6	7	8	4	0	9.0	0	0	0	0	GC,RZ,SS,SR,YF1
AF5215-2	7	5	9	9	7	7	6	7	3	7	3	7	5	0	9.0	0	0	8	0	PINK SPECS,SR,MS,SS,YF1
Alegria	8	7	8	9	7	8	5	7	5	8	6	9	4	0	9.0	0	0	3	0	MS,SG,SS,YF2
Allora	7	6	8	9	7	8	5	7	5	8	5	8	4	0	9.0	0	0	0	0	MS,SS,SG,CS,YF1
Anushka	8	5	8	8	7	6	5	7	5	8	5	8	5	0	9.0	3	0	0	0	MS,SR,SG,SS,YF2
Atlantic	6	5	7	9	6	5	6	6	3	7	7	8	6	40	7.7	0	0	3	0	SR,SS,CS,MS,16IHN(11-8,4-7,1-6)
Augusta	7	6	9	8	7	8	5	7	5	8	5	8	4	23	7.4	0	0	3	0	SG,SS,MS,SR,RZ,9IHN(5-8,3-7,1-6),YF2
Natascha	9	7	8	8	7	8	4	6	6	8	6	8	5	0	9.0	3	0	0	0	SR,MS,SS,SG,YF1
NC201-1	5	3	8	7	1	7	5	7	6	8	6	7	6	0	9.0	0	0	0	0	SR,MS,SS,YF2
NC276-2	6	5	8	8	7	7	7	7	2	7	3	8	6	53	7.8	0	0	0	3	SR,SS,MS,SG,21IHN(16-8,4-7,1-6),YF2
NCH85-2	6	6	7	5	1	7	6	7	2	7	3	9	7	0	9.0	0	0	15	0	GC,SS,SR,MS,YF1
Peter Wilcox	5	4	8	9	1	6	6	7	5	7	6	8	6	0	9.0	0	0	0	0	SR,MS,SISC,SS,RZ,YF2
Soraya	9	8	8	9	7	7	6	7	6	8	7	9	3	0	9.0	0	0	5	0	MS,SS,SG,KNOBS,YF2
Wega	8	8	8	8	7	8	5	7	5	8	4	8	5	0	9.0	0	0	0	3	MS,SS,SR,YF2
Yukon Gold	8	5	8	8	7	7	6	7	3	7	6	5	3	3	8.8	3	0	0	0	MS,SS,^CS,SR,1IHN(8),YF1

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

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

⁴ See Appendix 3 for Comment Codes

Table 13a. Specialty Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 105 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ²								Specific Gravity ³	Chip Color ⁴
		cwt/A	% Atl.	(% of total yield)						1 7/8 to 4"	2 1/2 to 4"		
				1's	2's	3's	4's	5's	Culls				
Adirondack Blue	254	205	82	6	55	27	0	0	13	81	27	1.058	.
Adirondack Red	198	137	54	16	63	6	0	0	15	69	6	1.058	.
All Blue	149	75	30	29	48	2	0	0	21	50	2	1.054	.
Atlantic	290	253	100	4	18	58	11	0	8	87	69	1.070	2
Magic Molly	153	69	27	31	44	0	0	0	25	44	0	1.044	.
NC201-1	214	171	68	12	61	18	1	0	9	80	19	1.052	2.5
NC293-7	134	93	37	22	55	15	0	0	8	70	15	1.051	3
NC396-38	131	54	22	21	42	0	0	0	38	42	0	1.053	.
NC396-63	183	138	55	20	66	8	0	0	5	75	8	1.058	.
NC414-1	184	83	33	38	39	4	0	0	19	43	4	1.054	3
NC414-2	200	120	48	31	53	7	0	0	9	60	7	1.050	.
NCH85-2	106	64	26	31	51	9	0	0	9	61	9	1.049	.
Peter Wilcox	275	232	92	9	44	40	0	0	7	84	40	1.056	2.5
US Blue	227	127	50	30	53	3	0	0	14	56	3	1.054	.
Grand Mean	191	130											
CV(%)	26	26											
LSD (k=100)	77	53											

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² 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.

³ Determined by weight in air/water method.

⁴ Chip Color Ratings conducted by the NCSU Potato Breeding Program at the TRS/VGJREC: 1 = no defects, exceptionally bright; 2 = excellent, bright; 3 = good, light or golden; 4 = dark defects, marginal; 5 = not acceptable.

Table 13b. Specialty Trial. Plant vine type, disease and air pollution scores, maturity at ca. 3 weeks prior to harvest, and external and internal tuber attributes of potato clones harvested 105 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2015

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³						Comments ⁴
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
Adirondack Blue	6	5	8	8	1	7	5	7	6	9	8	7	4	0	9.0	3	0	0	0	UGLY,SISC,SR,MS,GC
Adirondack Red	8	5	8	8	2	7	4	7	6	7	6	8	4	0	9.0	0	0	0	0	SG,SS,RZ,MS,GC,SR
All Blue	9	7	8	7	1	7	5	7	7	7	5	7	2	0	9.0	0	0	0	0	SISC,SR,RZ,CS,SS,MS,PF1
Atlantic	6	5	8	9	6	5	5	6	3	7	7	8	7	35	6.9	13	0	0	0	SS,GC,SR,CS,14IHN(2-8,9-7,3-6)
Magic Molly	9	7	8	8	1	7	6	7	7	8	5	8	2	0	9.0	0	0	5	0	SG,SR,MS,GC,PF2
NC201-1	5	4	8	7	1	8	6	6	6	8	6	8	7	0	9.0	0	0	0	0	SR,SS,SISC,YF2
NC293-7	6	7	8	5	1	8	5	6	4	8	4	8	7	3	8.8	0	0	0	0	SR,MS,SG,SISC,1IHN(8)
NC396-38	6	6	8	7	1	7	6	7	5	8	4	8	3	0	9.0	0	0	0	0	^^GC,RZ,PF3
NC396-63	6	4	8	7	1	7	6	7	3	7	5	8	5	0	9.0	0	0	3	0	SR,GC,MS,SS,PF2
NC414-1	9	6	8	8	7	7	7	7	2	7	3	9	4	8	8.5	0	0	5	0	SG,GC,MS,3IHN(3-8)
NC414-2	9	8	9	9	1	7	7	7	2	8	4	8	5	0	9.0	0	0	0	3	SS,SG,SR,YF2/PF2
NCH85-2	6	5	8	5	1	8	7	7	2	7	3	8	6	0	9.0	3	0	3	3	SS,SR,GC,MS,YF2
Peter Wilcox	5	4	8	9	1	7	5	6	5	8	6	8	6	3	8.8	5	0	0	0	SS,MS,GC,RZ,SR,1IHN(8),YF2
US Blue	9	7	8	9	1	7	6	7	7	8	5	8	3	0	9.0	0	0	0	0	^MS,CS,SG,PF1

¹ DAP = Days After Planting; DVK = Days to Vine Kill

² See NE1031 Standard Potato Rating System for key to scores in Appendix 2.

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

⁴ See Appendix 3 for Comment Codes

Figure 1. Replicated Specialty Trial Chip Images.

Adirondack Blue



Adirondack Red



All Blue



Atlantic



Magic Molly NC201-1



NC293-7



NC396-38 NC396-63



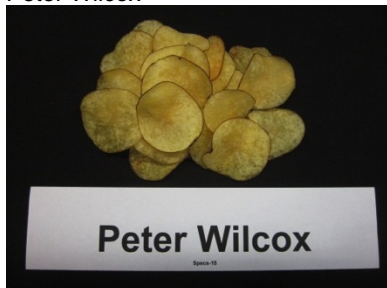
NC414-1



NC414-2 NCH85-2



Peter Wilcox



US Blue



Figure 2. Replicated Specialty 60-Hill Trial Chip Images.

NC499-14



NC499-31 NC502-10



NC503-50



NC507-15 NC507-35



NC508-17



NC508-36 NC508-37



NC509-16



Appendix 1: LAND MANAGEMENT CONDITIONS

Location: Black Gold Farms, Gum Neck, Tyrrell Co., NC

Trial Title: Black Gold Farms Variety Chip Trial

Trial Design: Randomized complete block, four replications

Plot Dimensions: Seventeen 21' rows at 34' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Dual Magnum 2 pts/A

Glory 0.67 lbs/A

Fertilizer: 221N, 103P, 201K, 0.25 Zn lbs/A

Insect Control: Admire Pro – 8 fl oz/A in furrow

Disease Control: Quadris in furrow 8 fl oz/A

Bravo 8 pt/A (4 applications)

Revus Top 6.2 fl oz/A

Curzate 3.2 oz/A

Vine Kill: None

Location: Black Gold Farms, Gum Neck, Tyrrell Co., NC

Trial Title: Black Gold Farms Variety Table Trial

Trial Design: Randomized complete block, four replications

Plot Dimensions: Twelve 21' rows at 34' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Dual Magnum 2 pts/A

Glory 0.67 lbs/A

Fertilizer: 221N, 103P, 201K, 0.25 Zn lbs/A

Insect Control: Admire Pro – 8 fl oz/A in furrow

Disease Control: Quadris in furrow 8 fl oz/A

Bravo 8 pt/A (4 applications)

Revus Top 6.2 fl oz/A

Curzate 3.2 oz/A

Vine Kill: None

Location: Black Gold Farms, Gum Neck, Tyrrell Co., NC

Trial Title: Snack Food Association Trial

Trial Design: Randomized complete block, five replications

Plot Dimensions: Eleven 21' rows at 34' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Dual Magnum 2 pts/A

Glory 0.67 lbs/A

Fertilizer: 221N, 103P, 201K, 0.25 Zn lbs/A

Insect Control: Admire Pro – 8 fl oz/A in furrow

Disease Control: Quadris in furrow 8 fl oz/A

Bravo 8 pt/A (4 applications)

Revus Top 6.2 fl oz/A

Curzate 3.2 oz/A

Vine Kill: None

Appendix 1: LAND MANAGEMENT CONDITIONS (Cont'd.)

Location: James Brothers Farms, Weeksville, Pasquotank Co., NC

Trial Design: Randomized complete block, four replications

Plot Dimensions: Twenty-three 21' rows at 40' row spacing, 28 hills per row

Seed piece Treatment: None

Weed Control: metolochlor 1.5 pt/A

Metribuzen 1 lb/A

Fertilizer: 835lbs, 17-9-14 with Ca broadcast

Insect Control: Mocap 10G 1 gal/A

Leverage 3.5 fl oz/A

Disease Control: Quadris 12fl oz/A

Headline 6 fl oz/A

Vine Kill: None

Location: Sackette Potatoes-IFC, Vandemere, Pamlico Co., NC

Trial Design: Randomized complete block, four replications

Plot Dimensions: Fifteen 21' rows at 38' row spacing, 28 hills per row

Seed piece Treatment: None

Weed Control: Dual Magnum 2 pt/A

Metribuzin 1 pt/A

Fertilizer: 266lbs, 0-0-60 Pre-plant

251lbs, 40-0-0 + 5.9S At-plant

30% UAN 54 units/acre sidedress

Micro Pak 1 qt/A w/fungicide

Insect Control: Admire Pro 7 oz/acre

Disease Control: Bravo Weathermax 1 pt/A (4 times)

Vine Kill: None

Appendix 1: LAND MANAGEMENT CONDITIONS (Cont'd.)

Location: Tidewater Research Station, Plymouth, Washington Co., NC

Trial Title: Round White Variety Trial One

Trial Design: Randomized complete block, four replications

Plot Dimensions: Fourteen 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Tricor 1/3 lbs/A
Clethodim 6 oz/A – 2 applications

Fertilizer: 19-19-19, 600 lbs/A

Insect Control: Abamectin 10 oz/A
Thionex 2/3 qt/A
Leverage 1.3 oz/A

Disease Control: None

Vine Kill: None

Location: Tidewater Research Station, Plymouth, Washington Co., NC

Trial Title: Round White Variety Trial Two

Trial Design: Randomized complete block, four replications

Plot Dimensions: Fourteen 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Tricor 1/3 lbs/A
Clethodim 6 oz/A – 2 applications

Fertilizer: 19-19-19, 600 lbs/A

Insect Control: Abamectin 10 oz/A
Thionex 2/3 qt/A
Leverage 1.3 oz/A

Disease Control: None

Vine Kill: None

Location: Tidewater Research Station, Plymouth, Washington Co., NC

Trial Title: Round White Variety Trial Three

Trial Design: Randomized complete block, four replications

Plot Dimensions: Ten 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Tricor 1/3 lbs/A
Clethodim 6 oz/A – 2 applications

Fertilizer: 19-19-19, 600 lbs/A

Insect Control: Abamectin 10 oz/A
Thionex 2/3 qt/A
Leverage 1.3 oz/A

Disease Control: None

Vine Kill: None

Appendix 1: LAND MANAGEMENT CONDITIONS (Cont'd.)

Location: Tidewater Research Station, Plymouth, Washington Co., NC

Trial Title: NE 1231 White Variety Trial

Trial Design: Randomized complete block, four replications

Plot Dimensions: Twelve 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Tricor 1/3 lbs/A
Clethodim 6 oz/A – 2 applications

Fertilizer: 19-19-19, 600 lbs/A

Insect Control: Abamectin 10 oz/A
Thionex 2/3 qt/A
Leverage 1.3 oz/A

Disease Control: None

Vine Kill: None

Location: Tidewater Research Station, Plymouth, Washington Co., NC

Trial Title: NE 1231 Red Variety Trial

Trial Design: Randomized complete block, four replications

Plot Dimensions: Twelve 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Tricor 1/3 lbs/A
Clethodim 6 oz/A – 2 applications

Fertilizer: 19-19-19, 600 lbs/A

Insect Control: Abamectin 10 oz/A
Thionex 2/3 qt/A
Leverage 1.3 oz/A

Disease Control: None

Vine Kill: None

Location: Tidewater Research Station, Plymouth, Washington Co., NC

Trial Title: NE 1231 Russet Variety Trial

Trial Design: Randomized complete block, four replications

Plot Dimensions: Nine 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Tricor 1/3 lbs/A
Clethodim 6 oz/A – 2 applications

Fertilizer: 19-19-19, 600 lbs/A

Insect Control: Abamectin 10 oz/A
Thionex 2/3 qt/A
Leverage 1.3 oz/A

Disease Control: None

Vine Kill: None

Appendix 1: LAND MANAGEMENT CONDITIONS (Cont'd.)

Location: Tidewater Research Station, Plymouth, Washington Co., NC

Trial Title: Yellow Flesh Variety Trial

Trial Design: Randomized complete block, four replications

Plot Dimensions: Sixteen 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Tricor 1/3 lbs/A
Clethodim 6 oz/A – 2 applications

Fertilizer: 19-19-19, 600 lbs/A

Insect Control: Abamectin 10 oz/A

Thionex 2/3 qt/A

Leverage 1.3 oz/A

Disease Control: None

Vine Kill: None

Location: Tidewater Research Station, Plymouth, Washington Co., NC

Trial Title: Specialty Variety Trial

Trial Design: Randomized complete block, four replications

Plot Dimensions: Fourteen 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Tricor 1/3 lbs/A
Clethodim 6 oz/A – 2 applications

Fertilizer: 19-19-19, 600 lbs/A

Insect Control: Abamectin 10 oz/A

Thionex 2/3 qt/A

Leverage 1.3 oz/A

Disease Control: None

Vine Kill: None

Appendix 2: STANDARDIZED NE1031 RATING CODES FOR PLANT AND TUBER CHARACTERISTICS

Tuber Color

1. purple
2. red
3. pink
4. dark brown
5. brown
6. tan/light brown
7. buff
8. white
9. cream

Tuber 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

Tuber Cross-section

1. very flat
2. --
3. flat
4. --
5. intermediate/oval
6. --
7. mostly round
8. --
9. very round

Tuber Skin Set

1. very poor
2. --
3. poor
4. --
5. fair
6. --
7. good
8. --
9. excellent

Tuber 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

Tuber Eye Depth

1. -
2. deep
3. +
4. -
5. medium
6. +
7. -
8. shallow
9. +

Tuber Size (GCY Scale)

1. small
2. --
3. small-medium
4. --
5. medium
6. --
7. medium-large
8. --
9. large

Tuber Appearance

1. very poor
2. --
3. poor
4. --
5. fair
6. --
7. good
8. --
9. excellent

Tuber Disease Rating

1. very severe
2. --
3. severe
4. --
5. moderate
6. borderline
7. slight
8. very slight
9. none

Plant 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

Plant Disease and Pollution Reaction

1. Dead
2. -
3. severe
4. +
5. moderate
6. -
7. +
8. slight
9. none

Maturity

1. -
2. early
3. +
4. -
5. medium
6. +
7. -
8. late

Appendix 3: COMMENT CODES FOR TABLE B

AC=air cracks	RZ=Rhizoctonia
BR=bruise	SEB=stem end browning
CPB=Colorado potato beetle	SC = star cracking
CS=common scab	SG=secondary growth
CT=chain tubers	SIS=silver scurf
DAE=deep apical eyes	SKN=skins
DSE=deep stolen end	SS=sun scald
EB=early blight	SR=soft rot
ECB= European corn borer	STST=sticky stolons, tight stolon attachment
EL= enlarged lenticels	TSWV=Tomato Spotted Wilt Virus
FS=fusarium wilt	VW=Verticillium wilt
GC=growth cracks	WSTD=weak stand
HI= herbicide injury	WW=wire worm
HN = Heat Necrosis (see below)	YF=yellow flesh (YF scale: 1=light yellow to 3=dark yellow)
HS=heat sprouts	RF=red flesh (RF scale: 1=light red or pink to 3 = dark red)
IL=infected lenticels	
LB=late blight	
LHD=leaf hopper damage	
MS=misshaped tubers	
PE=pink eye	
PR=pink rot	
PLRV=potato leaf roll virus	
PTS=very pointed tubers	
PS=powdery scab	
PVA, PVX, PVY=potato viruses A, X, Y	

Note: ^ before code = high levels; ^^ = very high; ~ = moderate or some

Heat Necrosis

10 tubers/replication are sampled, typically there are 4 replications in each trial (40 tubers total), USB/SFA trial has 5 reps (50 tubers) and the observational and unreplicated trials have 1 rep (10 tubers), rating is on a 1 to 9 scale, a rating of 9 indicates no incidence a rating of 1 indicates severe incidence

Reading the HN notation: e.g. 12IHN(2-6,5-7,5-8) - The '12' in this case, is the total number of tubers expressing incidence. The number after the dashes (6,7,and 8) are severity ratings. The sum of the numbers before each dash equals the number before the 'IHN', these are the number of tubers with a particular severity rating. So there were 2 tubers with a severity of 6, 5 with a severity of 7, and 5 with a severity of 8.