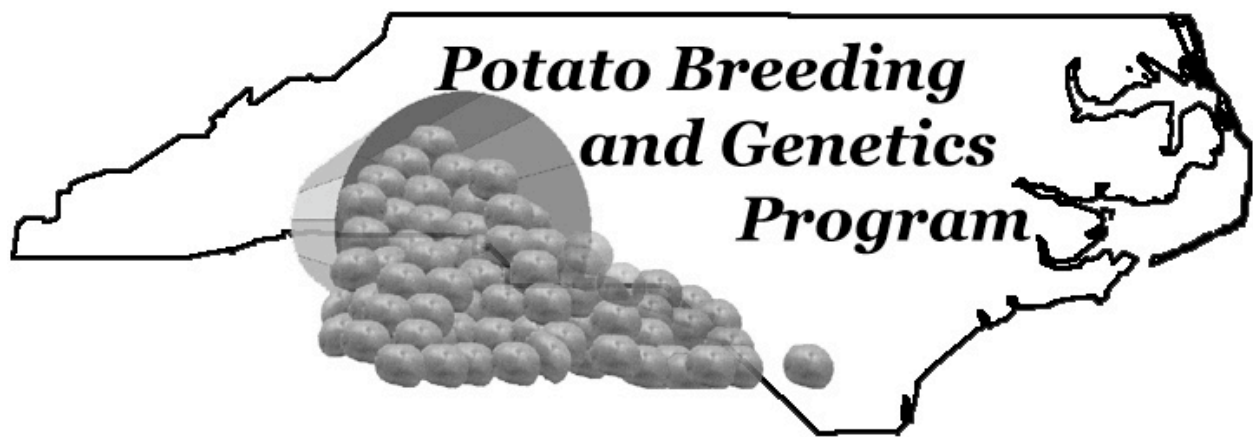


# NC STATE UNIVERSITY

---

## NORTH CAROLINA POTATO VARIETY TRIAL AND BREEDING REPORT

2016



---

G. C. Yencho, Professor and Leader, Potato  
and Sweetpotato Breeding and Genetics  
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](mailto:Craig_Yencho@ncsu.edu)

M. E. Clough, Researcher and Extension Associate,  
Potato Breeding and Genetics Program  
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](mailto: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) Northeast Region 1231 Multistate Potato Variety Development and Evaluation Project, the USDA NIFA Potato Special Research Grants Program, the NC Potato Association, Potatoes USA and Snacking, Nutrition and Convenience International (SNAC), 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. In the first cycle of selection materials are planted as single hills unless they were developed in the Colorado potato beetle resistance breeding plots or the specialty plots, these start as 4 hills. Planting, selection and advancement to 6-hill or 12-hill (for clones from the specialty 4-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 2016, we planted 12,817 single-hills and selected 946 clones resulting in a 7.4% selection rate. This is three times our average selection rate of 2.5%. Out of the 610 clones in our 6-hill and 12-hill plots, 167 (27%) were selected for future evaluation. In the 20-hill and specialty 60-hill plots, 63 clones were planted with 37 (59%) being selected for further evaluation. In our 60-hill plots, 26 clones were planted and 13 (50%) were selected.

In our Colorado potato beetle (CPB) nursery we continued our project to select and screen specific families with potential CPB resistance. For the first cycle of selection this year we

changed from screening duplicated 2-hill plots for CPB resistance and adaptability separately, to a single 4-hill plot and selected on yield and overall appearance. This is because we are now planting all trials at the research station with a 2-row carousel planter and 2 hill plots are difficult to keep organized where as 3 and 4 hill plots are manageable. We planted 969 4-hill plots for selection purposes. We selected 330 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 2017. In this year's 2by3 trial, 40 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 7 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 2017. In this years 3by5 trial we evaluated 17 clones for CPB resistance and for adaptation in our non-replicated 20-hill plots simultaneously. We selected 6 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 5 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.

### **Yield Trials**

In our 11 yield trials, we evaluated 166 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 1-11. 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. 2016 PROMISING LINES:**

#### **Chip-stock clones**

##### **AF4552-5**

*Developed by: Univ. of Maine*

*Released: N/A*

*# trials evaluated: 6 (since 2011)*

*Merit Score: 2.5 (since 2016)*

*Skin Color: Tan to Light Brown*

*Flesh Color: White*

##### **Historical Data;**

*Maturity: slightly later than mid season*

*% Standard (Atlantic): MKTB YLD 102%*

*% Standard (Snowden): MKTB YLD 98%*

*Specific Gravity: 1.071*

*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.

### AF5040-8

*Developed by: Univ. of Maine  
Released: N/A  
# trials evaluated: 3 (since 2013)  
Merit Score: 2 (since 2016)  
Skin Color: Tan to Light Brown  
Flesh Color: White*

*Historical Data:*  
*Maturity: medium maturing  
% Standard (Atlantic): MKTB YLD 118%  
% Standard (Snowden): MKTB YLD 117%  
Specific Gravity: 1.072  
Chip score: 2 (good)  
Overall Appearance: 5 (fair)*

***Other Attributes or Comments:*** *This clone has moved fast through the national screening process coming up through the National Chip Processors Trial and is now in the SNAC Trial. It has performed reasonably well with no significant internal defects. Maturity is similar to Atlantic for us in NC though maybe slightly later.*

### Sebec(AF0338-17)

*Developed by: Univ. of Maine  
Released: 2013  
# trials evaluated: 25 since (2006)  
Merit Score: 2 (since 2016)  
Skin Color: Tan to Light Brown  
Flesh Color: White*

*Historical Data:*  
*Maturity: medium to late  
% Standard (Atlantic): MKTB YLD 94%  
% Standard (Snowden): MKTB YLD 88%  
Specific Gravity: 1.074  
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. We have seen rot issues associated with late season rains and so this is something to keep in mind with this clone*

## Table-stock clones

### **AF4138-8**

*Developed by:* Univ. of Maine

*Released:* N/A

*# trials evaluated:* 10 since (2010)

*Merit Score:* 2 (since 2016)

*Skin Color:* Tan to Light Brown

*Flesh Color:* White

*Historical Data;*

*Maturity:* medium maturing

*% Standard (Atlantic):* MKTB YLD 101%

*% Standard (Superior):* MKTB YLD 107%

*Specific Gravity:* 1.056

*Skin Texture:* Moderately Smooth

*Overall Appearance:* 6 (better than fair)

***Other Attributes or Comments:*** This clone has been evaluated in ten 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 moderately smooth slight netting in some trials. 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.

## Early Generation Watch List

### **NC503-30**

*Developed by:* NC State Univ.

*Released:* N/A

*# trials evaluated:* 1 since (2016)

*Merit Score:* 2 (since 2016)

*Skin Color:* Red with White

*spectacles around eyes*

*Flesh Color:* Red

### **Specialty Type**

*Historical Data;*

*Maturity:* medium maturing

*% Standard (Atlantic):* MKTB YLD 121%

*% Standard (Dark Red Norland):* MKTB YLD 115%

*Specific Gravity:* 1.074

*Skin Texture:* Moderately Smooth

*Overall Appearance:* 6 (better than fair)

***Other Attributes or Comments:*** This clone will fry and produce an acceptable red chip, it also exhibits clear definition in the color transition on the skin between the white around the eyes and the deep red skin.

### **ND8068-5Russ**

*Developed by:* ND State Univ.

*Released:* N/A

*# trials evaluated:* 1 since (2016)

*Merit Score:* 2 (since 2016)

*Skin Color:* Brown

*Flesh Color:* White

### **Russet Type**

*Historical Data;*

*Maturity:* early maturing

*% Standard (Russet Norkotah):* MKTB YLD 130%

*% Standard (Russet Burbank):* MKTB YLD 185%

*Specific Gravity:* 1.073

*Skin Texture:* Light Russet

*Overall Appearance:* 6 (better than fair)

***Other Attributes or Comments:*** We decided to give this clone attention because it had an acceptable appearance score, good yield and was early. We hope to be able to evaluate this clone again in the coming year to confirm these very positive results.

#### 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.)

#### 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 1	Jun 20	111
James Brothers	Perquimans silt loam	Mar 3	Jun 23	112
TRS/VGJREC	Portsmouth fine sandy loam	Mar 8 to 18	Jun 13 to Jul 14	Variable 95 - 114

**EXPERIMENTAL DESIGN:** All yield trials were planted in a randomized complete block design with 4 replications except the Potatoes USA/Snacking Nutrition and Convenience International Chip Trial (SNAC) Trial that had 5 replications per clone. Forty-six clones in three trials were evaluated on-farm at Black Gold Farms and seventeen clones at James Brothers. Plots at the TRS and Black Gold consisted of one row with 25 hills spaced 10 inches apart. Plots with James Brothers consisted of one row with 28 hills spaced 9 inches apart. Spacing between rows was 34 inches at Black Gold Farms, 40 inches at James Brothers and 38 inches for all other trials at the TRS. Planting on farm was done by hand planting at the TRS/VGJREC was done using a two row carousel planter. 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. All trials were graded to five 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 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 SNAC 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.

This year, for each trial in table "a" we have added a new "merit score" rating. The merit score is a composite rating of 5 traits associated with variety performance. This rating combines yield, internal quality, the overall appearance score assigned to each clone during grading, and its chip score and specific gravity. The merit score scale ranges from 1 to 4; where 1 = outstanding,

advance, 2 = keep evaluating, 3 = marginal performance and 4 = drop. The merit score rating is used in the National Chip Processors trial to evaluate a clone's overall performance in a given trial. We have decided to use the merit score in all our trials as it helps us to present the data more concisely. However, it must be noted that when the same clone appears in multiple trials it may have a different merit score assigned to it depending on its individual performance in that specific trial. Also since this is a composite score within a trial, it needs to be noted that all traits are weighted equally; however, a specific trait can trigger a drop recommendation if it is excessively bad. For example Atlantic is a standard variety that was included in 8 of our 11 trials this year. In two of the trials, it received a merit score of 2, in five it received a 3 and in one trial it received a 4. Atlantic was given ratings of 3 and 4 due to poor internal quality and grader appearance. Overall this averages to roughly a 2.9 merit score with an overall marginal rating, owing primarily to internal issues.

## **VI. RESULTS:**

### **Environmental Summary**

Planting began on the 1<sup>st</sup> of March this year. Temperatures and rainfall were favorable for most of the planting window allowing us to finish on time or slightly earlier this year on March 18<sup>th</sup>. Coincidentally the 18<sup>th</sup> was when we started planting in 2015. On April 10<sup>th</sup> after much of the materials had emerged a freeze/frost event occurred burning of tops, setting back the early-emerged plants and cancelling any advantage the plants would have gained from early emergence. Despite this setback conditions continued to favor good plant growth and the crop appeared to make up much of the ground lost in the early April freeze. Then beginning the 29<sup>th</sup> of May until the 7<sup>th</sup> of June significant rainfall occurred in the region and caused flooding in many fields. This resulted in patchy yields where plots that were under water lost much of the yield potential due to rot, while several rows over yields may have been only minimally impacted. The exception to both these significant environmental events was the James Brothers trial in Pasquotank County. This trial was sited near the mouth of New Begun Creek off the Pasquotank River in a high well-drained field and this is reflected in the yield data. Harvest of the plots began on June 13<sup>th</sup> and finished on the 14<sup>th</sup> of July allowing us to avoid most of the significant heat of the summer that came on in late July.

### **A. Yield Trials**

#### **1. On-Farm Trials**

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

Five clones in this trial received a merit score of 2 (keep): AF5245-1, Dark Red Chieftain, Envol, NC276-2 and NCB2607-3. The marketable yields of the 14 clones in this trial were compared to Chieftain (306 cwt/a). None of the clones had a higher marketable yield, Superior (287 cwt/A) was the next highest. Only NCB2607-3 had an overall appearance rating of 7 (good) all other overall appearance scores were better than fair (6) or lower. Two clones had internal heat necrosis (IHN) at 10% or greater incidence: Dark Red Norland (10% with a heat necrosis severity rating (HNR) of 8.9) and Superior (13% with an HNR of 8.9). No other internal defects were recorded at 10% or greater incidence. External defects observed in the trial were sunscald, silver scurf, 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)**

Four of the sixteen varieties in the trial received a merit score of 2: AF4552-5, Atlantic, BNC369-4 and Snowden. Atlantic, the standard, had a marketable yield of 322 cwt/a, four others had higher marketable yields: NC280-89 (337 cwt/a), AF4552-5 (322 cwt/a), Snowden (321 cwt/a) and BNC369-4 (317 cwt/a) though none were significantly greater. Gravities in the trial ranged from a low of 1.066 to 1.084, Atlantic had a gravity of 1.076 and four clones had higher gravities: NC252-49 (1.084), Snowden (1.080), B2904-2 (1.079) and B3084-3 (1.078). Three clones had a chip score rating of 1 (exceptional): Atlantic, B3084-3 and Snowden. One clone had an overall appearance score of 8 (better than good), BNC369-4 and two clones: BNC182-5 and Pike had overall appearance scores of 7 (good). No significant incidence of IHN was recorded in the trial this year. One clone from 2 sources: NC0349-3 NC0349-3-ft, had 43% incidence of hollow heart (HH). The “-ft” seed came from the Potatoes USA Fast track program and the other seed was generated at the TRS/VGJREC. 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, infected lenticels, soft rot and skin blemishes due to Rhizoctonia.

### **SNAC Trial at Black Gold Farms (Tables 3a and 3b)**

Five clones in this trial received a merit score of 2 (keep): CO07070-10W, NDTX0981648CB-13W, Snowden, W6822-3 and W8822-1. Atlantic had a marketable yield of 344 cwt/a. Only W6822-3 (359 cwt/a) had a greater marketable yield but it was not significantly higher. Atlantic had a gravity of 1.072 and six clones had gravities equal to or higher: CO07070-10W, (1.079), W8822-1 (1.079), W6822-3 (1.076), Snowden (1.074), B2727-2 (1.072) and NDTX0981648CB-13W (1.072). Seven clones in the trial received a chip score rating of 1.5 (excellent to exceptional) in the 24 to 48 hour chip test: Atlantic, B2727-2, NDTX0981648CB-13W, Snowden, TX09396-1W, W6822-3 and W8822-1. Two clones: B2727-2 and Snowden received a chip score rating of 1.5 (excellent to exceptional) in the 5 to 7 day chip test. One clone received an overall appearance rating of 8 (good to excellent), NC0349-3 and three clones rated a 7 for overall appearance: CO07070-10W, W6822-3 and W8822-1. Three clones had HH at levels greater than 10% incidence: NC0349-3 (56%), Atlantic (18%) and MSW485-2 (18%). No other internal defects were observed at levels greater than 10%. Other external defects observed were: sunscald, misshapes, growth cracks, soft rot, secondary growth, infected lenticles, common scab and skin blemishes due to Rhizoctonia.

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

Two clones in this trial received a merit score of 1 (outstanding): AF4138-8 and BNC201-1. Six clones received merit scores of 2: AF5245-1, Chieftain, Dark Red Norland, Sebec(AF0338-17), Snowden and Yukon Gold. In this trial three yield standards were chosen: Atlantic (round white standard), Chieftain (red standard) and Yukon Gold (yellow flesh standard). Across all clones only the yellow flesh Soraya (446 cwt/a) had marketable yield greater than Atlantic (394 cwt/a). Within the class of reds and purples, two of the clones: AF5245-1 (381 cwt/a) and BNC201-1 (351 cwt/a) had higher marketable yields than Chieftain (349 cwt/a). Two yellow flesh clones had greater marketable yields than Yukon Gold (270 cwt/a): Soraya (446 cwt/a), and BNC201-1 (351 cwt/a). Clones with an overall appearance score of 7 were: AF4138-8, Atlantic, B2834-8, Dark Red Chieftain, Envol, NC0349-3, NCB2607-3, Sebec(AF0338-17), Snowden and Superior. The specific gravity for Atlantic in this trial was 1.076 and two other clones had equal or higher specific gravity: B2843-8 (1.076) and Snowden (1.078) all others

were lower. Four clones: Atlantic, B2834-8, NC0349-3 and Snowden had chip score ratings of 1.0 (exceptional). Three clones: AF4138-8, Sebec(AF0338-17) and Superior also had a chip score ratings of 1.5 (excellent to exceptional). One clone expressed HH at greater than 10% incidence: NC0349-3 (25%). One clone expressed soft rot (SR) at 10% or greater incidence levels: NCB2607-3 (20%). 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, infected lenticels, and skin blemishes due to Rhizoctonia.

## **2. TRS/VGJREC Yield Trials**

### **Round White Trial One & Two (Tables 5a and 5b)**

This year we combined the materials new to the program (Round White Trial One) with those that are of early or mid-season maturity (Round White Trial Two) due to limited numbers in both cases as a result this trial had 21 clones. Unfortunately this trial was in one of the more wet locations at the research station and was flooded for longer than many of the others. As a result yields were lower than they might have been and many of the clones had significantly rot issues during grading.

Four clones received a merit score of 2 these were: 05-152, BNC469-11, Jennifer and NDAF102629C-4. Atlantic had a marketable yield of 84 cwt/a. Twelve clones in this trial had greater marketable yields than Atlantic, while none were significantly greater the top five yielders in the trial were: Jennifer (136 wt/a), BNC472-3 (130 cwt/a), NDAF1022629C-4 (129 cwt/a), AF5558-13 (129 cwt/a) and WAF10636-1 (120 cwt/a). Atlantic had a gravity of 1.073, gravities for all other clones were lower. Two clones had a chip score of 1.5: WAF10636-1 and WAF10636-3. None of the clones in this trial had an appearance score greater than 5 (fair). One clone expressed IHN at 10% or greater incidence, AF5569-12 (10% IHN with an HNR of 8.8). Two clones expressed vascular ring discoloration (VR) at 10% or greater incidence: AF5585-2 (38%) and AF5574-16 (23%). Two clones expressed SR at 10% or greater incidence: AF5429-3 (15%) and Envol (10%). No other internal defects of 10% or greater incidence were recorded in this trial. Common external defects were lots of soft rot, infected lenticels, misshapes, sunscald, common scab, growth cracks, secondary growth and skin blemishes attributed to Rhizoctonia.

### **Round White Trial Three (Tables 6a and 6b)**

Of the twelve clones in this trial, six received merit scores of 2: Atlantic, BNC470-13, BNC470-16, Pike, Sebec(AF0338-17) and Snowden. Atlantic had an average marketable yield of 215 cwt/A, five clones had higher average marketable yields higher though none were significantly greater: Snowden (248 cwt/a), Pike (245 cwt/a), WAF10664-3 (225 cwt/a), BNC470-16 (224 cwt/a) and Sebec(AF0338-17) (217 cwt/a). Atlantic had the highest specific gravity in the trial at 1.082 the next closest were Snowden and Pike at 1.078. Two clones received a chip rating of 1.5: Atlantic and Sebec(AF0338-17). One clone, BNC470-16 received an overall appearance rating of 8 and the variety Pike received overall appearance score of 7. Two clones expressed HH at 10% or greater incidence: AF5563-5 (18%) and AF5563-2 (13%). No other internal defects were expressed at levels of 10% or greater. Common external defects were misshapes, high incidence of soft rot, sunscald, misshapes, growth cracks, common scab, infected lenticels and skin blemishes attributed to Rhizoctonia.

**NE-1231 Round White Trial. (Tables 7a and 7b)**

Five clones received a merit score of 2: AF4138-8, AF5040-8, NY154, NY157 and Snowden. Of the fifteen clones in this trial nine had greater marketable yield than Atlantic (117 cwt/A), though none were significantly higher the clone with the highest marketable yield in the trial was AF5040-8 (182 cwt/a). Atlantic had a specific gravity of 1.076 and only AF4050-8 (1.078) had a greater gravity, all others were lower than Atlantic. Five clones had a chip rating of 1.5: AF5040-8, BNC364-1, NY154, NY157 and Snowden. The highest overall appearance rating in the trial was 6 and was given to Yukon Gold. One clone expressed SR at 10% or greater incidence, Kennebec (13%). No other internal defects were expressed at levels of 10% or greater. The most common culls were misshapes, sunscald, soft rot, infected lenticels, Fusarium dry rot, growth cracks, common scab and skin blemishes attributed to Rhizoctonia.

**NE-1231 Red Trial. (Tables 8a and 8b)**

Seven of the fifteen clones in this trial received a merit score of 2: AAF08155-1, AF4831-2, AF5245-1, BNC244-10, BNC480-2, BNC481-6 and NDAF102696C-1. The standard, Chieftain, had a marketable yield of 220 cwt/a, two other clones had higher marketable yields though none were significant: AAF08155-1 (247 cwt/a) and Dark Red Norland (226 cwt/a). Two clones received an overall appearance score of 7: AF4831-2 and BNC481-6. One clone expressed SR at 10% or greater incidence, BNC481-2 (13%). 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 9a and 9b)**

Two of the nine clones in this trial received a merit score of 2: AF5312-1 and ND8068-5Russ. The standard, Russet Norkotah, had a marketable yield of 158 cwt/A. Three clones in the trial had higher marketable yields though none were significantly greater: ND8068-5Russ, AF5164-19 and AF5312-1. Russet Norkotah had the lowest specific gravity in the trial at 1.057 the clone with the highest gravity was ND8068-5Russ at 1.073. The highest overall appearance rating given in the trial was 6 and two clones received this score: AF5312-1 and ND8068-5Ru. No internal defects were expressed at levels of 10% or greater. Culls were mostly soft rot, misshapes, sunscald, growth cracks, infected lenticels, Fusarium dry rot and skin blemishes attributed to Rhizoctonia.

**Yellow Flesh Trial. (Tables 10a and 10b)**

Six of sixteen clones received a merit score of 2: AF5215-2, Anushka, Augusta, Natascha, Peter Wilcox and Soraya. Yukon Gold had a marketable yield of 194 cwt/a and two clones in the trial had higher average marketable yields: Natascha (236 cwt/a) and Peter Wilcox (196 cwt/a). Like the RWT1&2 trial this trial was also in one of the more wet locations in the field. Three clones had specific gravities that were equal to or higher than Yukon Gold (1.068): BD982-15 (1.092), Atlantic (1.082) and Augusta (1.068). Only Augusta received an overall appearance rating of 7. Three clones did receive overall appearance ratings of 6: AF5215-2, Peter Wilcox and Yukon Gold. AF5225-1 (10%) was the only clone to express VR at equal to or greater than 10% incidence. No other internal defects were expressed at levels of 10% or greater. Culls were mostly soft rot, infected lenticels, misshapes, sunscald, growth cracks and skin blemishes attributed to Rhizoctonia.

**Specialty Trial (Tables 11a and 11b, Figure 1)**

This trial contains clones that have pigmented flesh although Atlantic is included in this trial as a standard for yield and chipping. Five of the thirteen clones in the trial received a merit score of 2: NC414-2, NC499-14, NC499-31, NC503-50 and NC508-37. Five clones had greater average marketable yields than Atlantic (135 cwt/a): NC499-14 (212 cwt/a), NC503-50 (164 cwt/a), NC4141-2 (160 cwt/a) and NC508-37. Of these only NC499-14 was significantly greater than Atlantic. Two clones in the trial had gravities that were greater than Atlantic (1.073): NC414-2 (1.074) and NC503-50. All clones in the trial were chipped 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 slightly netted. For overall appearance four clones were rated 6: NC414-2, NC499-14, NC499-31 and NC503-50. NC508-17 (13%) was the only clone to express HH at equal to or greater than 10% incidence. Chieftain (18%) was the only clone to express VR at equal to or greater than 10% incidence. No other internal defects were expressed at levels of 10% or greater. Common external defects included soft rot, misshapes, growth cracks, sun scald and secondary growth.

## **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 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, 12,817 single-hills were planted and 946 clones were selected averaging a 7.4% selection rate.

In our second to fourth year selection plots out of the 568 clones planted in our 6-hill plots (Yr. 2), 137 (24%) were selected for future evaluation. While in the 20-hill plots (Yr. 3), 52 clones were planted with 31 (60%) being selected for further evaluation. In our 60-hill plots (Yr. 4), 26 clones were planted and 13 (50%) were selected. Across the board this was a high percentage selection year for us in NC.

### **Specialty Clone Evaluation**

We begin selection with 4-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 4 hills we have more seed in the 2<sup>nd</sup> 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 952 clones and selected 152 (16%) as 4-hill plots. In our 12-hill plots we evaluated 42 and selected 30 (71%) and in the specialty 60-hill plot 11 were evaluated and 6 were selected (55%).

### **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*. This year we changed the format of the first year materials to a single 4-hill selection plot. We did this because we are now using a 2-row carousel planter to put all the trials in at the TRS. What we found last year was 2-hill mini-tuber plots are difficult to manage because of the small tuber and plot size. So we created a single 4-hill plot and selected with extremely relaxed selection pressure allowing us to get larger seed for the two 3-hill plots and the one 6-hill plot next year. We planted roughly 969 clones to evaluate resistance and selected 330 clones. 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, 41 of the 568 clones came from this CPB resistance project. From the 41 CPB clones, 7 were selected for advancement to the 20 hill selection plots and the next cycle of CPB resistance screening. Of the 52 clones in our 20 hill plots 18 clones were part of the CPB resistance screen and 6 of those were selected for advancement to the 60 hills. Of the 26 clones in this year's 60 hill plots 3 were CPB clones 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 265 ME clones and 62 of them received a merit score of 1 or 2. These will be evaluated in 2017 in a non-replicated 25-hill plot in a yield trial.

### **Observational Trial.**

Thirty-six 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 2<sup>nd</sup> 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 assigned a merit score of 1 or 2 to 9 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), Pennsylvania State University (PA) and the University of Maine (ME). Each state received 8 hills of the same 94 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 gave 38 clones a merit score of 1 or 2. Next year we will reevaluate these clones in our non-replicated 25-hill yield trial (Unreplicated trial).

### **Unreplicated Trial.**

Forty-one 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 2<sup>nd</sup> 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 assigned a total of 10 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; 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, SNAC International, the USDA-NIFA Potato Special Research Grants program, UTZ Quality Foods Inc, Potatoes Canada 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 111 DAP<sup>1</sup> at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield			Size Distribution by Class <sup>3</sup> (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>
			cwt/A	%Chf.	%Sup.	%Yuk.	1's	2's	3's	4's	5's	Culls			
AF4138-8	3	405	254	85	89	146	10	23	34	6	0	27	63	40	1.056
AF4831-2	3	402	246	82	86	142	20	45	15	0	0	19	61	15	1.058
AF4985-1	4	425	282	96	98	162	10	22	38	6	0	24	66	44	1.059
AF5245-1	2	392	246	82	86	141	20	42	20	0	0	18	63	20	1.069
BNC201-1	3	361	259	87	90	148	10	25	38	8	0	19	72	47	1.076
Chieftain	3	445	306	100	107	179	9	25	41	3	0	23	69	44	1.058
Dark Red Chieftain	2	377	282	94	98	165	14	28	45	2	0	11	75	47	1.055
Dark Red Norland	4	337	204	68	71	118	11	24	35	2	0	29	61	37	1.059
Envol	2	366	276	93	96	155	8	16	51	8	0	17	75	59	1.065
NC276-2	2	394	261	89	91	152	18	34	30	2	0	16	66	32	1.062
NCB2607-3	2	273	157	53	54	89	27	43	14	0	0	16	57	14	1.069
Soraya	4	430	241	80	84	139	16	38	17	0	0	28	56	17	1.055
Superior	4	391	287	97	100	166	8	21	49	3	0	18	73	52	1.065
Yukon Gold	4	309	177	60	62	100	10	15	30	11	0	33	57	41	1.071
<b>Grand Mean</b>		379	248												
<b>CV(%)</b>		65	69												
<b>LSD(k=100)</b>		11	17												

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> 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 111 DAP<sup>1</sup> at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF4138-8	7	8	8	5	6	7	5	7	3	7	6	5	4	0	9.0	0	0	0	0	^rz,ss,gc,sr
AF4831-2	8	7	8	5	2	8	6	6	5	8	4	6	5	0	9.0	0	0	3	3	^sr,ss,ms,gc,rz
AF4985-1	9	8	8	6	2	8	6	7	2	7	6	8	3	5	9.0	0	5	0	35	gc,^ms(lumpy),sr,ss,rz
AF5245-1	7	8	8	5	1	8	3	8	3	8	5	7	6	0	9.0	0	0	0	5	sr,il,ss,sisc,rz
BNC201-1	9	7	8	6	2	7	6	7	2	7	7	4	3	0	9.0	0	0	0	0	sr,sisc,ss,gc,il,rz
Chieftain	9	7	8	6	1	7	4	5	4	7	7	5	3	0	9.0	3	0	0	0	^rz,gc,ss,sg,il,ms,cs
Dark Red Chieftain	9	8	8	6	2	7	7	7	2	8	5	6	6	0	9.0	0	3	0	3	ss,sr,cs,rz,il,gc
Dark Red Norland	5	7	8	3	2	7	5	7	5	6	7	7	3	10	8.9	0	0	0	5	ss,s,gc,ms,rz
Envol	5	7	8	4	6	6	3	7	5	7	8	7	6	0	9.0	0	0	0	0	sr,il,ss,ms
NC276-2	5	8	8	4	7	8	5	7	2	6	4	8	6	3	9.0	0	0	3	5	sg,ss,ms,sr
NCB2607-3	5	7	8	3	2	8	7	7	2	8	3	8	7	0	9.0	0	0	0	0	light yld,cs,sr,ss,gc
Soraya	8	9	8	8	7	8	5	7	6	8	6	4	3	0	9.0	0	0	0	0	^ss,^ms(pts, lumpy),gc,sr,^rz
Superior	5	8	8	4	6	6	4	6	5	6	7	7	6	13	8.9	5	0	0	3	ms,rz,ss,cs,sr
Yukon Gold	7	7	8	5	7	8	6	7	5	8	8	5	3	0	9.0	0	0	0	3	cs,sr,gc,ss,rz

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> See NE1231 Standard Potato Rating System for to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> 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 111 DAP<sup>1</sup> at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class <sup>3</sup> (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>	Chip Color <sup>5</sup>
					1's	2's	3's	4's	5's	Culls					
AF4552-5	2	438	322	105	10	19	48	6	0	17		74	55	1.073	2
Atlantic	2	457	309	100	9	21	43	3	0	23		68	46	1.076	1
B2834-8	3	334	251	81	11	24	39	12	0	14		75	51	1.076	2
B2904-2	4	380	224	74	13	25	29	4	0	29		58	34	1.079	1.5
B3084-3	3	407	276	90	11	25	36	7	0	21		68	43	1.078	1
BNC182-5	3	415	302	98	13	24	45	4	0	14		73	48	1.069	2
BNC369-4	2	433	317	103	12	31	41	2	0	15		73	43	1.068	1.5
Lamoka	4	414	224	73	10	16	29	8	0	37		53	37	1.068	2
NC0349-3	4	401	289	94	12	27	41	4	0	16		72	45	1.072	1.5
NC0349-3-ft <sup>6</sup>	4	425	265	87	11	19	41	3	0	26		63	44	1.072	1.5
NC252-49	4	430	278	90	23	48	17	0	0	13		64	17	1.084	2.5
NC280-89	3	461	337	110	13	37	33	3	0	14		73	36	1.066	1.5
NC371-3	3	374	249	81	14	29	38	0	0	20		66	38	1.066	1.5
Pike	3	402	278	90	11	24	39	5	0	21		68	45	1.073	2
Sebec	3	401	280	91	9	17	44	9	0	21		70	52	1.071	1.5
Snowden	2	424	321	104	10	27	43	6	0	14		76	49	1.080	1
<b>Grand Mean</b>		412	283												
<b>CV(%)</b>		7	14												
<b>LSD(k=100)</b>		50.2	65												

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> Determined by weight in air / water method.

<sup>5</sup> 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

<sup>6</sup> NC0349-3-ft is the same as NC0349-3 only the seed came from the Potatoes USA fasttrack program instead of the NCSU potato breeding program

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 111 DAP<sup>1</sup> at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF4552-5	8	8	8	5	6	7	6	7	2	7	6	6	6	0	9.0	0	0	0	0	rz,ss,il,sr,dae,dse,ms,lumpy
Atlantic	6	9	7	5	6	5	5	6	3	7	6	5	5	0	9.0	3	0	0	0	^rz,ss,sr,gc
B2834-8	5	7	8	4	6	6	5	7	3	7	7	7	5	5	9.0	3	0	0	3	rz,ss,il,sr,ms,chip(vr)
B2904-2	9	9	9	8	6	6	6	7	3	7	6	4	3	0	9.0	8	0	0	0	ss,^rz,^gc,sr,chip(bc)
B3084-3	7	9	8	6	6	6	6	7	3	7	5	6	4	0	9.0	0	0	0	0	^rz,^gc,^ss
BNC182-5	6	9	8	8	6	7	5	7	2	8	5	8	7	0	9.0	0	0	0	0	rz,ss
BNC369-4	6	9	8	7	6	7	6	7	3	8	6	8	8	0	9.0	3	0	0	0	rz,ss,rz,il,chip(bc,hh)
Lamoka	9	8	7	6	6	6	6	6	4	8	7	4	3	0	9.0	0	5	5	0	^^rz,^gc,^ss
NC0349-3	8	9	8	6	6	6	6	6	2	8	6	5	5	0	9.0	43	0	0	0	gc,ss,ms,il,sr,chip(hh)
NC0349-3-ft <sup>5</sup>	9	8	8	7	6	6	6	6	2	8	6	4	4	0	9.0	43	0	0	0	^cs,ss,sr,ms,il,^rz,gc,chip(hh)
NC252-49	9	9	9	9	6	7	4	7	3	8	4	6	5	3	8.9	3	10	3	0	sr,rz,ms,ss,il
NC280-89	6	9	9	8	8	8	4	7	3	8	7	6	5	0	9.0	0	5	0	0	ms,sr,il,ss,cs
NC371-3	5	8	8	4	6	6	6	7	2	8	5	7	6	5	9.0	0	5	0	5	ss,gc,ms,il,rz,cs
Pike	8	9	8	7	6	6	5	7	2	7	6	8	7	0	9.0	0	3	0	0	ss,rz,ms
Sebec	9	9	8	7	6	6	6	7	5	7	7	6	4	0	9.0	3	5	0	0	^gc,^rz,^ss,ms
Snowden	9	9	8	7	5	5	6	6	3	6	6	8	5	0	9.0	0	0	0	0	rz,ms,il,ss,dae,dse

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> See NE1231 Standard Potato Rating System for to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> See Appendix 3 for comments codes

<sup>5</sup> NC0349-3-ft is the same as NC0349-3 only the seed came from the Potatoes USA fasttrack program instead of the NCSU potato breeding program

Table 3a. SNAC Trial. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores of potato clones of potato clones harvested 111DAP<sup>1</sup> at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield cwt/A % Atl.	Size Distribution by Class <sup>3</sup> (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>	Chip Color <sup>5</sup>	
				1's	2's	3's	4's	5's	Culls					24 to 48hrs	5 to 7Days
AF5040-8	2	420	327 95	10	25	47	5	0	13		77	52	1.074	1.5	2.0
Atlantic	4	458	344 100	8	22	44	9	0	17		75	53	1.072	1.5	2.0
B2727-2	4	288	182 54	12	39	25	0	0	25		64	25	1.072	1.5	1.5
CO07070-10W	2	350	244 72	19	42	28	0	0	12		70	28	1.079	2.0	2.0
CO07070-13W	3	361	263 78	16	41	31	0	0	12		73	31	1.068	2.0	2.0
Lamoka	4	373	205 60	9	21	29	5	0	36		55	34	1.053	2.5	2.5
MSR127-2	4	292	169 49	22	39	18	0	0	22		57	18	1.068	2.0	3.0
MSW485-2	4	348	185 53	21	39	14	0	0	26		53	14	1.070	2.0	3.0
NC0349-3	4	421	341 100	9	22	53	6	0	10		81	59	1.068	2.0	2.5
NDTX0981648CB-13W	2	376	276 81	16	42	32	0	0	11		73	32	1.072	1.5	2.0
NY152	4	425	324 96	13	35	41	0	0	11		76	41	1.070	2.5	2.0
NY157	4	377	269 79	12	30	38	3	0	17		71	41	1.067	2.0	2.0
Snowden	2	414	334 98	9	28	47	6	0	10		81	53	1.074	1.5	1.5
TX09396-1W	3	352	251 74	11	25	40	6	0	18		71	46	1.070	1.5	2.0
W6822-3	2	436	360 107	10	29	47	7	0	8		83	54	1.076	1.5	2.0
W8822-1	2	378	295 86	14	42	34	2	0	9		78	36	1.079	1.5	2.5
<b>Grand Mean</b>		379	273												
<b>CV(%)</b>		9	14												
<b>LSD(k=100)</b>		52	55												

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> Determined by weight in air / water method.

<sup>5</sup> 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 3b. SNAC 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 111 DAP<sup>1</sup> at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF5040-8	5	8	8	5	6	6	4	7	4	6	7	8	6	0	9.0	0	0	0	2	^ss,sr,rz,ms(knobs,pears),el
Atlantic	6	8	7	5	6	5	5	6	3	7	7	7	5	0	9.0	18	0	0	0	cs,ms,rz,ss,gc,sr,chip(bc)
B2727-2	5	8	6	5	6	6	5	7	6	8	6	5	3	0	9.0	2	0	0	2	rz,cs,ss,ms,gc
CO07070-10W	6	7	8	4	6	7	6	5	2	7	3	8	6	0	9.0	0	0	0	0	ss,rz,cs
CO07070-13W	6	8	7	5	6	6	6	6	2	7	5	8	7	0	9.0	0	0	0	0	ss,gc,ms,il
Lamoka	9	9	7	7	6	6	5	5	5	8	6	4	3	0	9.0	0	2	0	0	^rz,ss,gc,sr
MSR127-2	9	9	8	9	5	5	6	5	2	7	4	4	4	0	9.0	0	0	0	0	GC,^rz,sc,ms,chip(vr)
MSW485-2	8	9	8	9	6	6	7	5	2	6	5	4	4	4	8.9	18	0	0	0	ss,rz,gc,ms,chip(bc,vr)
NC0349-3	8	9	8	6	6	5	6	6	2	6	8	8	8	0	9.0	56	0	0	0	ms,ss,cs,sr,chip(bc,vr,hh)
NDTX0981648CB-13W	8	9	9	8	6	7	4	7	4	7	5	8	5	0	9.0	0	0	0	2	sg,sr,rz,el,ms(lumpy),ss
NY152	8	8	7	5	6	7	6	7	2	8	4	8	6	0	9.0	0	0	0	0	ss,ms,il,sr,rz,stst
NY157	6	7	8	5	6	6	6	6	3	7	6	5	4	0	9.0	2	0	0	0	^rz,ss,gc,il
Snowden	9	9	7	7	6	5	4	5	3	6	6	8	6	0	9.0	0	0	0	0	ss,ms(lumpy),sr,rz,gc
TX09396-1W	9	9	9	9	6	6	5	5	4	6	8	8	3	0	9.0	0	0	0	0	gc,ss,rz,ms,il,chip(vr)
W6822-3	7	9	9	7	6	6	5	6	2	7	7	8	7	0	9.0	0	0	0	0	sr,rz,ss,cs
W8822-1	8	9	8	8	5	5	5	6	3	8	7	8	7	0	9.0	0	0	0	0	sr,cs,il,rz

<sup>1</sup> DAP = Days After Planting; DVK = Days to Vine Kill

<sup>2</sup> See NE1231 Standard Potato Rating System for key to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> 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 112 DAP<sup>1</sup> at James Brothers Farm, Weeksville, Pasquotank Co., NC - 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield			Size Distribution by Class <sup>3</sup> (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>	Chip Color <sup>5</sup>
			cwt/A	%Atl	%Chf.	%Yuk.	1's	2's	3's	4's	5's	Culls				
AF4138-8	1	394	356	91	109	132	7	24	60	7	1	2	90	66	1.054	1.5
AF5245-1	2	431	381	98	119	142	8	24	57	7	0	4	88	64	1.071	.
Atlantic	3	430	394	100	120	146	7	41	50	1	0	1	92	51	1.076	1.0
B2834-8	3	362	289	75	88	107	15	25	54	3	0	2	83	58	1.076	1.0
BNC201-1	1	384	351	90	108	131	6	18	64	9	0	3	91	74	1.074	.
Chieftain	2	406	349	89	100	130	9	26	57	2	0	6	85	59	1.056	.
Dark Red Chieftain	3	300	262	68	79	98	10	37	50	0	0	3	87	50	1.056	.
Dark Red Norland	2	356	306	80	95	114	8	28	56	2	0	6	86	57	1.059	.
Envol	3	374	331	87	102	123	6	22	63	3	0	6	88	66	1.064	2.0
NC0349-3	4	345	308	80	97	116	9	34	52	3	0	1	89	55	1.067	1.0
NC363-4	3	357	308	79	95	115	12	35	50	1	0	2	86	51	1.069	2.0
NCB2607-3	4	250	186	48	56	70	22	54	20	0	0	4	74	20	1.071	.
Sebec(AF0338-17)	2	400	345	88	103	127	7	30	56	0	0	7	86	56	1.070	1.5
Snowden	2	385	350	89	110	129	8	48	43	0	0	1	91	43	1.078	1.0
Soraya	3	508	446	115	139	166	7	39	48	1	0	5	88	49	1.052	.
Superior	3	429	393	101	120	147	6	29	62	2	0	2	92	63	1.068	1.5
Yukon Gold	2	293	270	69	83	100	5	26	63	3	0	3	93	66	1.071	.
<b>Grand Mean</b>		377	331													
<b>CV(%)</b>		14	14													
<b>LSD(k=100)</b>		84	79													

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> Determined by weight in air / water method.

<sup>5</sup> 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 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 112 DAP<sup>1</sup> at James Brothers Farm, Weeksville, Pasquotank Co., NC – 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF4138-8	6	9	8	5	6	7	5	6	5	7	8	8	7	0	9.0	0	0	0	0	gc,ss,ms
AF5245-1	6	8	7	6	1	7	4	7	5	8	6	6	6	0	9.0	0	0	0	3	gc,cs,ss,rz,sr,il
Atlantic	6	9	8	5	6	5	5	6	3	7	5	9	7	8	8.9	0	0	0	0	gc,ms,ss
B2834-8	6	9	8	4	6	6	6	7	2	8	5	8	7	0	9.0	0	0	0	3	ms,ss,sr
BNC201-1	9	9	9	6	2	7	7	5	2	8	6	9	6	0	9.0	0	0	0	0	ss,ms,gc
Chieftain	9	9	7	6	3	8	4	5	5	7	7	8	5	5	9.0	0	5	5	0	sg,gc,sr,ms,ss
Dark Red Chieftain	7	8	7	6	2	7	7	7	2	7	5	8	7	0	9.0	0	0	0	8	gc,rz,ms
Dark Red Norland	5	8	7	3	2	7	5	7	5	8	6	8	6	0	9.0	0	0	5	3	gc,ms,sr,ss,ac
Envol	6	9	8	5	6	7	4	7	5	7	7	8	7	0	9.0	0	3	3	3	^ss,ms,rz,gc
NC0349-3	8	9	8	6	6	5	7	7	2	6	6	8	7	0	9.0	25	0	0	0	ss,sr,rz,il
NC363-4	9	9	9	9	6	6	6	6	4	8	7	8	6	0	9.0	0	0	0	0	rz,ss,ms
NCB2607-3	5	8	8	4	2	7	7	7	2	8	3	8	7	0	9.0	0	0	0	20	sr,ms,gc,ss
Sebec(AF0338-17)	9	9	8	6	6	5	4	7	5	8	7	8	7	0	9.0	0	0	0	0	sr,ss,ms
Snowden	9	9	6	7	5	5	7	6	2	6	5	9	7	0	9.0	0	0	0	0	ss
Soraya	9	9	7	8	7	8	6	7	6	8	6	8	6	8	8.9	0	0	0	0	ms,ss,gc,rz
Superior	6	9	8	4	6	6	5	6	4	6	6	9	7	5	9.0	0	3	0	0	ms,ss
Yukon Gold	8	8	6	5	7	8	5	7	3	8	7	8	6	0	9.0	0	0	0	0	cs,ms,ss,rz

<sup>1</sup> DAP = Days After Planting; DVK = Days to Vine Kill

<sup>2</sup> See NE1231 Standard Potato Rating System for key to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> See Appendix 3 for Comment Codes

Table 5a. Round White Trial One & Two. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores of potato clones of potato clones harvested 106 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class <sup>3</sup> (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>	Chip Color <sup>5</sup>
					1's	2's	3's	4's	5's	Culls				
05-152	2	186	107	194	25	50	7	0	0	18	57	7	1.047	5.0
AF5416-2	4	74	45	53	7	27	28	0	0	38	53	23	1.059	2.5
AF5426-3	4	88	49	99	8	29	23	1	0	39	56	21	1.063	2.5
AF5429-3	4	171	105	143	11	32	27	1	0	29	54	26	1.065	3.0
AF5481-4	4	153	73	117	8	33	14	0	0	44	61	31	1.055	2.0
AF5558-13	3	198	129	248	15	51	13	0	0	22	47	14	1.062	2.0
AF5569-12	4	177	112	166	19	58	4	0	0	19	58	14	1.061	3.0
AF5574-16	4	169	115	154	15	41	21	0	0	22	62	5	1.058	2.0
AF5585-2	4	98	59	96	9	47	9	0	0	35	58	6	1.065	1.5
Atlantic	3	138	84	100	12	55	5	0	0	29	69	25	1.073	1.5
BNC469-11	2	173	112	160	17	62	2	0	0	20	56	9	1.053	2.0
BNC472-3	3	196	130	229	10	57	9	0	0	24	60	7	1.068	2.0
Envol	4	102	73	132	5	43	15	1	0	35	62	2	1.065	3.0
Jennifer	2	237	136	232	25	53	1	0	0	21	60	1	1.058	2.5
NDAF102573-2	4	177	97	172	19	51	1	0	0	29	67	11	1.055	3.0
NDAF102629C-4	2	182	129	209	9	52	17	0	0	21	60	16	1.055	2.0
Parella	4	138	57	107	13	37	3	0	0	48	61	5	1.051	4.5
Superior	3	111	76	128	12	44	22	0	0	23	49	1	1.056	3.5
WAF10131-11	4	57	31	35	22	40	0	0	0	38	56	6	1.053	2.0
WAF10636-1	4	230	120	216	3	31	22	0	0	44	68	16	1.059	1.5
WAF10636-3	4	143	85	137	12	46	14	0	0	28	40	3	1.064	1.5
<b>Grand Mean</b>		152	92											
<b>CV(%)</b>		37	50											
<b>LSD(k=100)</b>		91	74											

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> Determined by weight in air / water method.

<sup>5</sup> 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 5b. Round White Trial One & 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 106 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
05-152	7	8	8	9	8	8	4	7	6	8	5	7	5	0	9.0	0	0	0	0	il,sr,ss,sg,gc,ms,rz
AF5416-2	8	6	7	5	6	6	6	7	3	8	6	3	4	0	9.0	8	5	3	5	^^ss,ss,chip(vr,bc)
AF5426-3	8	7	8	6	8	7	6	7	3	7	5	6	5	3	9.0	5	8	0	5	ss,sr,ms,v,rz,il
AF5429-3	7	7	8	6	9	7	5	7	4	8	4	6	4	8	8.9	0	0	3	15	ss,sr,v,rz,gc,il,ms,cs,chip(vr)
AF5481-4	6	7	8	5	6	6	5	7	5	8	6	3	3	0	9.0	5	3	0	3	^sr,ss,gc,ms,il
AF5558-13	8	6	8	6	6	6	6	7	2	7	4	7	5	0	9.0	0	0	3	0	sr,ss,ms,rz,il,gc
AF5569-12	8	8	8	6	6	7	5	7	2	7	4	5	4	10	8.8	0	0	0	0	ss,ms,sr,il,rz
AF5574-16	6	7	7	5	6	7	4	7	4	7	5	6	5	5	8.9	0	23	0	8	ss,ms,sr,gc,rz,chip(vr,seb)
AF5585-2	9	7	9	7	6	7	5	7	2	7	4	5	4	0	9.0	3	38	0	0	cs,ss,sr,il,gc,ms,chip(seb,vr)
Atlantic	6	7	8	5	6	5	6	6	3	7	5	5	4	0	9.0	5	8	0	3	ss,sr,ms,gc,il,rz
BNC469-11	9	7	7	6	8	6	6	7	3	7	6	7	5	0	9.0	3	0	0	0	sr,il,ms,ss,rz,chip(vr,bc)
BNC472-3	8	6	8	5	6	6	6	5	3	8	5	7	4	0	9.0	5	0	5	0	sr,ms,ss,il
Envol	6	5	8	4	6	6	3	7	5	7	7	4	4	3	9.0	5	5	0	10	sr,il,ss,chip(vr)
Jennifer	8	6	8	8	8	8	6	7	6	8	6	7	5	0	9.0	3	0	0	0	ss,sr,il,ms,rz
NDAF102573-2	9	5	8	4	2	7	6	7	3	7	4	6	3	0	9.0	0	0	0	3	ss,sr,gc,ms,rz,il
NDAF102629C-4	8	7	8	7	8	8	7	7	3	8	6	7	5	0	9.0	0	3	3	0	ss,stst,sr,il,ms,sg,gc,chip(vr)
Parella	9	6	8	7	9	8	6	7	7	8	6	5	2	0	9.0	0	0	0	8	il,ms,sg,ss,sr,gc,chip(vr)
Superior	5	6	8	4	6	7	4	7	4	5	5	7	4	0	9.0	0	0	0	3	ms,sr,gc,ss
WAF10131-11	8	7	8	7	8	7	6	7	2	7	5	6	4	3	9.0	0	3	0	0	gc,ss,sr,il
WAF10636-1	9	6	8	5	6	6	6	7	5	8	7	7	4	3	9.0	0	0	0	0	^gc,ss,sr,ms
WAF10636-3	8	5	8	6	6	6	5	6	3	7	5	7	3	0	9.0	5	3	0	3	sr,ms,s,il,gc

<sup>1</sup> DAP = Days After Planting; DVK = Days to Vine Kill.

<sup>2</sup> See NE1231 Standard Potato Rating System for key to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> See Appendix 3 for Comment Codes

Table 6a. Round White Trial Three. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores of potato clones harvested 110 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class <sup>3</sup> (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>	Chip Color <sup>5</sup>
					1's	2's	3's	4's	5's	Culls				
AF5435-7	3	214	179	87	9	38	46	0	0	7	83	46	1.071	2.0
AF5563-2	4	226	169	78	9	29	43	1	0	18	73	44	1.070	2.0
AF5563-5	4	195	153	73	6	22	51	5	0	16	78	56	1.069	2.0
Atlantic	2	258	215	100	8	37	44	2	0	9	83	46	1.082	1.5
B3156-11	3	171	123	61	22	66	6	0	0	6	72	6	1.073	2.5
BNC470-13	2	258	165	82	32	59	3	0	0	6	63	3	1.075	2.0
BNC470-16	2	266	224	107	7	29	52	1	0	11	82	53	1.071	2.0
NC363-4	3	195	130	63	26	51	14	0	0	8	65	14	1.071	2.0
Pike	2	282	244	114	8	40	45	0	0	6	86	46	1.078	2.0
Sebec	2	264	217	111	7	25	52	4	0	12	81	56	1.071	1.5
Snowden	2	292	248	123	9	42	41	1	0	7	84	42	1.078	2.0
WAF10664-3	3	291	225	113	12	46	30	1	0	11	77	31	1.066	2.5
<b>Grand Mean</b>		243	191											
<b>CV(%)</b>		25	31											
<b>LSD(k=100)</b>		110	101											

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> Determined by weight in air / water method.

<sup>5</sup> 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 6b. 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 110 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF5435-7	9	9	8	8	6	6	5	7	3	8	6	6	5	0	9.0	0	0	0	0	il,sr,ms,ss,gc,chip(vr)
AF5563-2	9	7	7	6	6	6	5	7	3	7	7	6	6	3	8.9	13	5	0	0	ss,sr,il,gc,rz
AF5563-5	8	6	8	5	8	7	4	7	4	8	7	7	5	0	9.0	18	0	0	0	flatish,sr,ss,ms,il,gc
Atlantic	6	8	8	5	6	5	5	6	3	7	7	8	5	0	9.0	3	0	0	0	ss,sr,gc,ms
B3156-11	9	6	8	6	8	7	4	7	5	8	3	8	6	0	9.0	0	0	0	0	ms,ss,rz,il
BNC470-13	7	8	8	6	6	7	6	7	4	8	4	8	6	0	9.0	0	0	0	0	sr,ss,ms,il
BNC470-16	8	7	8	7	5	5	6	6	4	7	8	7	8	0	9.0	3	0	0	3	sr,ss,il
NC363-4	7	8	8	9	9	6	6	7	5	8	4	8	5	0	9.0	0	3	0	0	ss,ms,sr,il,int(v)
Pike	6	8	8	5	9	7	6	7	2	6	6	8	7	0	9.0	0	0	0	0	stst,ss,rz,il,sr,ms,chip(v),int(v)
Sebec	8	8	8	6	6	6	6	6	5	7	7	7	5	0	9.0	0	0	0	0	ms,cs,ss,sr,gc
Snowden	9	8	8	7	5	5	5	6	3	6	5	8	6	0	9.0	0	0	0	0	ss,stst,il,ms,dae,dse
WAF10664-3	7	8	8	5	9	7	6	7	3	7	6	8	5	3	8.9	0	3	0	0	ss,sr,il,fs,ms,gc,rz

<sup>1</sup> DAP = Days After Planting; DVK = Days to Vine Kill

<sup>2</sup> See NE1231 Standard Potato Rating System for key to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> See Appendix 3 for Comment Codes

Table 7a. 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 104 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class <sup>3</sup> (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>	Chip Color <sup>5</sup>
					1's	2's	3's	4's	5's	Culls				
AF4138-8	2	229	171	153	13	46	28	0	0	14	74	28	1.053	2.5
AF4552-5	3	169	102	102	12	44	15	1	0	28	60	16	1.066	2.0
AF4648-2	3	227	172	172	11	41	34	0	0	13	75	34	1.072	2.0
AF5040-8	2	258	182	177	13	49	22	0	0	16	70	22	1.078	1.5
AF5280-5	3	139	99	97	11	51	19	0	0	19	70	19	1.062	2.0
Atlantic	3	188	117	100	9	30	32	0	0	29	62	32	1.076	2.0
B3005-7	3	242	150	157	16	50	12	0	0	22	62	12	1.075	2.0
BNC364-1	3	206	130	128	13	47	15	0	0	25	62	15	1.072	1.5
Katahdin	4	153	95	97	12	51	10	1	0	27	61	11	1.056	2.5
Kennebec	4	147	88	86	9	33	26	0	0	33	59	26	1.051	2.5
NY154	2	183	121	129	19	55	8	0	0	19	63	8	1.069	1.5
NY157	2	210	149	145	14	44	26	0	0	16	70	26	1.070	1.5
Snowden	2	145	98	95	19	54	12	0	0	14	66	12	1.073	1.5
Superior	4	185	135	117	7	42	29	0	0	22	71	29	1.065	3.0
Yukon Gold	2	191	144	134	6	28	46	1	0	19	75	47	1.064	.
<b>Grand Mean</b>		191	130											
<b>CV(%)</b>		27	34											
<b>LSD(k=100)</b>		84	73											

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> Determined by weight in air / water method.

<sup>5</sup> 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 7b. 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 104 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF4138-8	6	6	8	5	6	7	6	7	3	7	5	6	5	0	9.0	0	3	0	0	sr,ss,rz,il,ms,fs,chip(vr)
AF4552-5	8	5	8	6	6	6	6	7	2	8	5	4	3	0	9.0	0	3	0	0	^^il,ss,sr,rz,gc,chip(bc,vr)
AF4648-2	6	8	8	6	8	8	7	7	2	8	4	6	5	0	9.0	0	0	0	0	sr,gc,ss,il,ms
AF5040-8	6	7	8	6	9	8	6	7	3	7	5	5	5	0	9.0	0	0	0	0	sr,ss,il,ms,gc
AF5280-5	7	6	8	5	8	8	6	7	3	6	5	6	5	0	9.0	0	0	0	3	sr,ss,il,ms(lumpy)
Atlantic	6	7	8	5	6	5	6	6	3	7	6	6	4	0	9.0	3	8	0	3	^gc,sr,ms,ss,il,fs
B3005-7	7	7	8	7	6	6	6	7	4	7	5	4	3	0	9.0	0	0	0	0	gc,ss,ms,sr,il,fs,rz,chip(vr,bc,seb)
BNC364-1	6	7	8	6	6	6	5	7	5	8	6	7	4	0	9.0	0	0	0	0	^gc,ss,sr,il,rz,chip(bc,vr)
Katahdin	6	7	8	7	9	8	5	7	5	8	4	6	3	0	9.0	0	0	0	3	sr,cs,ss,ms
Kennebec	9	7	8	8	6	7	4	5	6	7	6	6	3	0	9.0	0	3	0	13	sr,ss,ms,gc,il,sg,chip(vr,bc)
NY154	6	8	8	7	6	7	5	7	5	7	6	7	4	0	9.0	0	0	0	3	sr,fs,il,v,ss,ms
NY157	8	6	8	6	6	6	6	7	2	8	4	6	3	0	9.0	0	0	0	3	fs,sr,ss,il,gc,il,rz,chip(hh)
Snowden	9	8	8	7	5	5	5	6	2	6	3	7	5	0	9.0	0	0	0	3	ss,sr,fs,il,gc
Superior	5	7	8	4	6	7	4	7	4	7	6	6	3	0	9.0	0	0	0	5	ss,sr,il,gc
Yukon Gold	8	6	8	5	7	8	5	7	5	8	7	7	6	0	9.0	3	8	0	5	sr,stst,gc,il,ss

<sup>1</sup> DAP = Days After Planting; DVK = Days to Vine Kill

<sup>2</sup> See NE1231 Standard Potato Rating System for key to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> See Appendix 3 for Comment Codes

Table 8a. NE-1231 Red Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 91 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC – 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class <sup>3</sup> (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>
			cwt/A	%Chf.	1's	2's	3's	4's	5's	Culls			
AAF08155-1	2	336	247	118	19	55	17	2	0	8	73	18	1.062
AF4831-2	2	328	204	94	28	50	12	0	0	10	62	12	1.065
AF4985-1	4	313	199	94	14	31	33	0	0	23	64	33	1.059
AF5245-1	2	305	214	104	20	55	14	0	0	11	69	14	1.074
BNC244-10	2	279	173	78	37	53	8	0	0	2	61	8	1.080
BNC480-2	2	251	173	85	17	47	22	0	0	15	69	22	1.060
BNC481-2	4	218	105	49	38	40	7	0	0	16	46	7	1.070
BNC481-4	3	264	140	66	39	46	4	0	0	10	51	4	1.067
BNC481-6	2	263	130	57	45	42	5	0	0	8	48	5	1.060
Chieftain	4	328	220	100	16	47	20	0	0	17	67	20	1.063
CO00291-5R	4	144	71	33	33	45	3	0	0	19	49	3	1.048
CO098012-5R	3	258	156	75	29	58	3	0	0	11	60	3	1.069
Dark Red Norland	3	321	226	110	13	38	30	2	0	17	70	32	1.060
NDAF102696C-1	2	276	181	89	26	49	14	2	0	10	65	15	1.064
NDAF113303C-8	4	270	150	73	29	43	9	2	0	18	54	11	1.057
<b>Grand Mean</b>		277	172										
<b>CV(%)</b>		20	29										
<b>LSD(k=100)</b>		95	84										

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> Determined by weight in air / water method.

Table 8b. 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 91 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AAF08155-1	9	8	8	7	1	7	3	5	4	6	6	8	5	0	9.0	0	0	0	0	ss,sr,ms,lumpy
AF4831-2	8	8	7	5	2	8	5	6	5	8	4	7	7	0	9.0	0	0	0	0	sr,ss,rz,ms,gc
AF4985-1	9	7	8	5	2	8	7	4	2	7	6	8	3	0	9.0	3	0	0	10	^gc,sr,ms
AF5245-1	6	8	7	6	1	8	5	5	5	8	5	7	5	0	9.0	0	0	0	0	sr,ss,rz,el
BNC244-10	8	8	8	6	1	7	6	7	2	6	4	8	6	0	9.0	0	0	0	0	sr
BNC480-2	6	8	8	7	1	8	5	5	5	8	6	7	5	0	9.0	0	0	0	0	sr,ms
BNC481-2	6	7	8	5	1	8	5	6	5	8	4	6	5	0	9.0	0	0	0	13	^sr,ms
BNC481-4	6	7	8	4	1	7	5	6	4	8	4	6	5	0	9.0	0	0	0	0	sr
BNC481-6	6	8	8	6	1	8	6	7	2	8	3	8	7	0	9.0	0	0	0	0	sr,ms
Chieftain	9	7	8	6	3	7	5	4	5	7	6	8	3	0	9.0	0	0	0	0	sr,el,gc,ss,sg
CO00291-5R	8	8	8	7	2	8	6	5	4	8	3	8	4	0	9.0	0	0	0	0	gc,ms,sr,ss
CO098012-5R	9	8	8	6	2	7	7	6	2	7	3	8	4	0	9.0	0	0	0	0	sr,ss,el,il
Dark Red Norland	5	7	7	3	2	7	5	7	5	8	6	6	3	0	9.0	0	0	0	3	ss,sr,ms,gc
NDAF102696C-1	6	7	8	4	3	8	6	6	2	6	4	7	4	0	9.0	0	0	0	0	dae,dse,ms,sr,el
NDAF113303C-8	8	7	8	4	2	8	6	4	3	7	6	7	3	0	9.0	0	0	0	0	^gc,sr,ss,ms

<sup>1</sup> DAP = Days After Planting; DVK = Days to Vine Kill

<sup>2</sup> See NE1231 Standard Potato Rating System for key to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> See Appendix 3 for Comment Codes

Table 9a. NE-1231 Russet Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 113 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class <sup>3</sup> (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>
			cwt/A	%R.Nor	1's	2's	3's	4's	5's	Culls			
AF5164-19	3	214	165	104	9	68	7	0	0	16	75	7	1.067
AF5312-1	2	187	159	105	8	58	26	0	0	8	84	26	1.059
AF5487-2	4	157	91	58	14	56	0	0	0	30	56	0	1.062
AF5521-1	4	97	61	40	7	36	27	0	0	30	63	27	1.066
ND8068-5Russ	2	262	205	132	7	52	26	0	0	15	78	26	1.073
Russet Burbank	4	171	111	71	13	55	6	0	0	26	61	6	1.064
Russet Norkotah	3	209	158	100	6	53	21	0	0	19	74	21	1.057
Shepody	4	232	144	91	6	38	23	1	0	32	62	23	1.061
Teton Russet	4	221	130	84	7	41	18	0	0	35	58	18	1.061
<b>Grand Mean</b>		190	127										
<b>CV(%)</b>		36	49										
<b>LSD(k=100)</b>		112	105										

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> Determined by weight in air / water method.



Table 9b. 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 113 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
AF5164-19	6	7	8	6	6	4	5	7	8	8	6	7	5	0	9.0	0	8	0	5	ss,sr,ms,fs,il,rz,gc
AF5312-1	8	7	8	6	5	3	6	7	7	8	6	8	6	0	9.0	0	5	0	0	ss,sr,gc
AF5487-2	6	5	8	5	6	5	5	7	7	8	7	8	4	0	9.0	3	3	0	3	sr,ms,gc,il,fs,ss
AF5521-1	7	8	8	6	5	3	5	7	6	8	6	7	4	0	9.0	0	8	0	0	ss,sr,ms,stst
ND8068-5Russ	5	5	8	3	5	4	6	7	6	8	6	8	6	0	9.0	0	0	0	3	il,sr,ss,gc
Russet Burbank	7	8	8	7	5	1	5	7	6	8	5	8	3	0	9.0	3	5	0	8	sg,ms,ss,knobs,gc,sr
Russet Norkotah	5	6	8	5	5	3	5	7	7	8	7	7	5	0	9.0	3	0	0	8	ss,sr,il,gc
Shepody	7	7	8	6	8	8	5	7	7	8	7	7	2	0	9.0	3	5	0	0	ss,sg,^il,sr
Teton Russet	6	7	8	6	5	3	6	7	6	8	7	8	4	0	9.0	0	3	0	5	^gc,ss,sr,ms,il,rz

<sup>1</sup> DAP = Days After Planting; DVK = Days to Vine Kill

<sup>2</sup> See NE1231 Standard Potato Rating System for key to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> See Appendix 3 for Comment Codes

Table 10a. Yellow Flesh Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 90 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class <sup>3</sup> (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>
			cwt/A	%Yuk	1's	2's	3's	4's	5's	Culls			
08-407	3	310	185	93	30	43	11	1	0	15	56	13	1.056
AF5215-2	2	319	170	90	36	51	2	0	0	11	54	5	1.065
AF5225-1	4	304	178	92	27	48	8	0	0	17	52	2	1.057
AF5447-4	4	197	131	67	16	33	32	0	0	19	61	16	1.056
Alegria	3	292	176	90	19	39	20	0	0	23	65	32	1.064
Anushka	2	229	144	76	20	43	17	0	0	19	58	20	1.062
Atlantic	3	247	164	86	16	43	24	0	0	18	60	18	1.082
Augusta	2	272	169	88	22	39	20	2	0	16	63	20	1.068
BD982-15	3	210	60	32	56	29	0	0	0	15	65	24	1.092
Francisca	3	249	131	67	29	45	5	0	0	21	61	21	1.062
Natascha	2	342	236	127	17	49	20	0	0	14	29	0	1.057
NC276-2	3	275	183	95	23	41	22	2	0	12	43	3	1.062
Peter Wilcox	2	266	196	105	15	49	23	0	0	13	63	14	1.067
Soraya	2	269	164	87	21	44	16	0	0	19	67	20	1.057
Vivaldi	3	255	164	84	19	44	19	0	0	18	65	25	1.058
Yukon Gold	3	263	194	100	12	26	44	3	0	14	72	23	1.068
<b>Grand Mean</b>		269	165										
<b>CV(%)</b>		25	36										
<b>LSD(k=100)</b>		113	103										

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> Determined by weight in air / water method.

Table 10b. 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 90 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
08-407	8	6	8	6	7	7	5	7	3	8	3	6	4	0	9.0	0	0	0	0	sr,ss,il,rz,ms
AF5215-2	8	6	7	6	7	7	4	7	4	8	2	8	6	0	9.0	0	0	0	0	sr,el,rz,ms,ss
AF5225-1	8	6	7	7	7	7	5	7	4	8	4	6	3	0	9.0	0	10	3	0	sr,el,ms,ss
AF5447-4	9	6	8	6	7	7	5	7	3	8	5	5	3	0	9.0	0	0	0	0	sr,gc,sr,il
Alegria	8	7	7	7	7	7	5	7	5	8	5	5	4	5	8.7	0	3	0	0	sr,ss,ms,gc,ss,il
Anushka	7	6	8	5	7	7	5	7	6	8	5	4	5	0	9.0	0	3	0	0	sr,ss,il,el
Atlantic	6	8	8	5	6	5	6	5	3	7	6	5	5	0	9.0	8	0	0	0	sr,gc,ms,ss
Augusta	6	5	8	5	7	8	5	7	5	8	5	6	7	0	9.0	3	0	0	0	ms,ss,hs,sr
BD982-15	8	7	8	6	2	6	6	7	1	8	1	4	4	0	9.0	0	0	0	0	sr,il
Francisca	7	6	8	6	7	8	4	7	5	8	5	4	4	0	9.0	0	0	0	3	^sr,el,ms,ss
Natascha	6	6	8	6	7	8	5	7	6	8	6	5	5	0	9.0	0	0	0	0	sr,ss,ms,il
NC276-2	5	5	8	3	7	8	6	7	2	5	4	6	4	0	9.0	0	0	0	0	dse,sr,dae,ss
Peter Wilcox	5	5	8	4	1	8	6	6	5	8	6	7	6	0	9.0	0	0	0	0	sr,ms,el,sisc,gc
Soraya	8	7	8	7	7	8	4	7	7	8	6	6	5	0	9.0	0	3	0	0	sr,ms,ss,el
Vivaldi	8	6	8	6	7	7	5	7	6	8	5	6	4	0	9.0	0	0	0	0	sr,gc,ss,el,ms
Yukon Gold	8	5	8	4	7	7	6	7	4	7	6	7	6	0	9.0	0	5	0	0	sr,ss,gc,ms

<sup>1</sup> DAP = Days After Planting; DVK = Days to Vine Kil

<sup>2</sup> See NE1231 Standard Potato Rating System for key to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> See Appendix 3 for Comment Codes

Table 11a. Specialty Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 90 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Merit <sup>2</sup> Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class <sup>3</sup> (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity <sup>4</sup>
			cwt/A	%Atl	1's	2's	3's	4's	5's	Culls			
Atlantic	3	232	135	100	16	38	20	0	0	27	58	20	1.073
Chieftain	4	179	94	74	20	44	8	0	0	28	52	8	1.056
Dark Red Norland	4	240	143	112	14	32	27	0	0	27	59	27	1.056
NC414-2	2	258	160	121	28	46	14	0	0	11	61	14	1.074
NC499-14	2	324	212	160	20	44	21	0	0	15	65	21	1.055
NC499-31	2	169	83	67	36	41	7	0	0	16	48	7	1.067
NC502-10	3	132	64	53	33	38	7	0	0	21	45	7	1.071
NC503-50	2	278	164	128	23	51	6	0	0	20	57	6	1.074
NC507-15	3	131	38	30	40	30	0	0	0	30	30	0	1.066
NC508-17	4	192	97	74	26	43	6	0	0	25	50	6	1.042
NC508-36	3	131	56	44	35	41	0	0	0	24	41	0	1.065
NC508-37	2	231	144	105	18	43	18	0	0	22	60	18	1.064
NC509-16	3	189	93	70	26	38	9	0	0	27	48	9	1.057
<b>Grand Mean</b>		206	114										
<b>CV(%)</b>		25	38										
<b>LSD(k=100)</b>		86	71										

<sup>1</sup> DAP= Day After Planting; DVK= Days of Vine Kill

<sup>2</sup> Merit Score (4 point scale): 1 = Outstanding; 2 = Keep; 3 = Marginal; 4 = Drop.

<sup>3</sup> 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.

<sup>4</sup> Determined by weight in air / water method.

Table 11b. 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 90 DAP<sup>1</sup> at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2016

Clone	Plant Data <sup>2</sup>				Tuber Data <sup>2</sup>									% Internal Defects <sup>3</sup>						Comments <sup>4</sup>
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHP	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC	SR	
Atlantic	6	8	7	5	6	6	5	6	3	7	6	6	5	0	9.0	3	0	0	0	gc,sr,ms,ss
Chieftain	9	6	7	6	3	7	5	4	5	7	5	4	2	0	9.0	0	18	0	0	^sr,gc,sg,ms
Dark Red Norland	5	5	7	3	2	7	5	6	5	7	6	5	3	0	9.0	0	5	0	3	^sr,ss,^gc,ms
NC414-2	6	8	8	6	1	7	6	6	2	6	4	8	6	0	9.0	0	0	0	0	ms,ss,sr
NC499-14	8	6	8	5	2	8	4	6	5	8	5	8	6	0	9.0	0	3	0	0	ms,sr,ss,sg
NC499-31	5	6	8	7	1	7	3	7	3	8	4	7	6	0	9.0	0	0	0	0	sr
NC502-10	8	7	8	6	1	7	4	7	6	8	5	6	5	0	9.0	0	0	0	0	sr,ms
NC503-50	7	8	8	6	2	7	6	7	2	6	5	6	6	0	9.0	0	3	0	0	sr,ms,gc
NC507-15	5	6	8	4	2	7	4	7	8	7	4	5	5	0	9.0	0	0	0	3	sr,ms,sg
NC508-17	7	8	8	7	1	8	6	6	7	8	6	5	5	0	9.0	13	5	0	0	^sr,ms,gc
NC508-36	9	8	8	7	2	8	4	7	4	7	3	7	5	0	9.0	0	3	0	3	sr,ms,sg
NC508-37	7	7	8	6	1	7	5	6	6	8	6	6	5	0	9.0	3	0	0	0	sr,ms,gc
NC509-16	9	7	8	6	1	7	4	6	5	8	5	6	5	0	9.0	0	3	0	3	sr,gc,ms

<sup>1</sup> DAP = Days After Planting; DVK = Days to Vine Kill

<sup>2</sup> See NE1231 Standard Potato Rating System for key to scores in Appendix 2.

<sup>3</sup> 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

<sup>4</sup> See Appendix 3 for Comment Codes

**Figure 1. Replicated Specialty Trial Chip Images.**

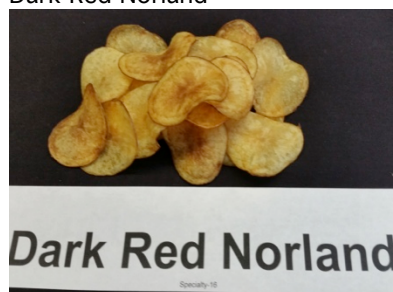
Atlantic



Chieftan



Dark Red Norland



NC414-2



NC499-14



NC499-31



NC502-10



NC503-50



NC507-15



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:** Sixteen 21' rows at 34' row spacing, 25 hills per row

**Seed piece Treatment:** None

**Weed Control:** Matrix 1 oz/A

Metribuzin 1 lbs/A

Intensity One 12floz/A

**Fertilizer:** 222N, 97P, 204K, 1.3 lbs/A Nortrace citraplex 25% zinc

**Insect Control:** Wrangler – 9 fl oz/A in furrow

**Disease Control:** Quadris in furrow 8 fl oz/A

Bravo 2 pt/A (4 applications)

Revus Top 6.2 fl oz/A

Curzate 60 DF 3.2 oz/A(4 applications)

**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:** Fourteen 21' rows at 34' row spacing, 25 hills per row

**Seed piece Treatment:** None

**Weed Control:** Matrix 1 oz/A

Metribuzin 1 lbs/A

Intensity One 12floz/A

**Fertilizer:** 222N, 97P, 204K, 1.3 lbs/A Nortrace citraplex 25% zinc

**Insect Control:** Wrangler – 9 fl oz/A in furrow

**Disease Control:** Quadris in furrow 8 fl oz/A

Bravo 2 pt/A (4 applications)

Revus Top 6.2 fl oz/A

Curzate 60 DF 3.2 oz/A(4 applications)

**Vine Kill:** None

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

**Trial Title:** SNAC Trial

**Trial Design:** Randomized complete block, five replications

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

**Seed piece Treatment:** None

**Weed Control:** Matrix 1 oz/A

Metribuzin 1 lbs/A

Intensity One 12floz/A

**Fertilizer:** 222N, 97P, 204K, 1.3 lbs/A Nortrace citraplex 25% zinc

**Insect Control:** Wrangler – 9 fl oz/A in furrow

**Disease Control:** Quadris in furrow 8 fl oz/A

Bravo 2 pt/A (4 applications)

Revus Top 6.2 fl oz/A

Curzate 60 DF 3.2 oz/A(4 applications)

**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:** Seventeen 21' rows at 40' row spacing, 28 hills per row

**Seed piece Treatment:** None

**Weed Control:** Boundry 2 pt/A

Tricor 2 oz/A

**Fertilizer:** 1064lbs, 17-4-18

Nitro Bor 1 qt/A

**Insect Control:** Capture 1pt/A

Mocap 1 gal/A

Blackhawk 3.5 oz/A

**Disease Control:** Quadris 8 oz/A

Echo 1.5 pt/A (2 applications)

Pencozeb 1 lb/A

**Vine Kill:** None

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

**Trial Title:** Round White Variety Trial One and Two

**Trial Design:** Randomized complete block, four replications

**Plot Dimensions:** Twenty-one 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 – 1 application

**Fertilizer:** 18-46-0, 195 lbs/A

0-0-60, 240 lbs/A

Lime 720 lbs/A

30% N, 25 gal/A

**Insect Control:** Admire Pro 8 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:** 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 – 1 application

**Fertilizer:** 18-46-0, 195 lbs/A

0-0-60, 240 lbs/A

Lime 720 lbs/A

30% N, 25 gal/A

**Insect Control:** Admire Pro 8 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:** Fifteen 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 – 1 application

**Fertilizer:** 18-46-0, 195 lbs/A  
0-0-60, 240 lbs/A  
Lime 720 lbs/A  
30% N, 25 gal/A

**Insect Control:** Admire Pro 8 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:** Fifteen 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 – 1 application

**Fertilizer:** 18-46-0, 195 lbs/A  
0-0-60, 240 lbs/A  
Lime 720 lbs/A  
30% N, 25 gal/A

**Insect Control:** Admire Pro 8 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 – 1 application

**Fertilizer:** 18-46-0, 195 lbs/A  
0-0-60, 240 lbs/A  
Lime 720 lbs/A  
30% N, 25 gal/A

**Insect Control:** Admire Pro 8 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 – 1 application

**Fertilizer:** 18-46-0, 195 lbs/A  
0-0-60, 240 lbs/A  
Lime 720 lbs/A  
30% N, 25 gal/A

**Insect Control:** Admire Pro 8 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:** Thirteen 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 – 1 application

**Fertilizer:** 18-46-0, 195 lbs/A  
0-0-60, 240 lbs/A  
Lime 720 lbs/A  
30% N, 25 gal/A

**Insect Control:** Admire Pro 8 oz/A

**Disease Control:** None

**Vine Kill:** None

## Appendix 2: STANDARDIZED NE1231 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
9. +

### 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), SNAC 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.