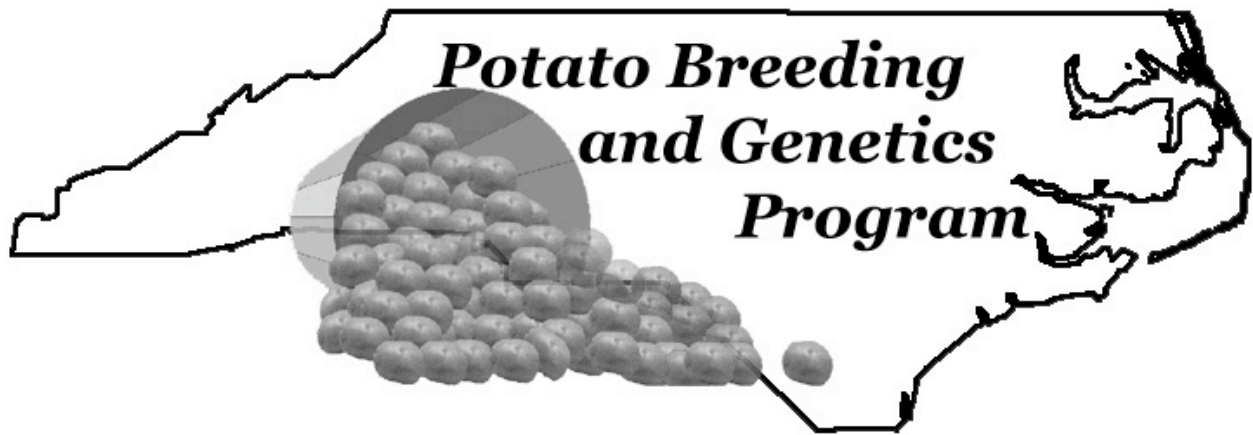


NC STATE UNIVERSITY

NORTH CAROLINA POTATO VARIETY TRIAL AND BREEDING REPORT

2018



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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 1731 Multistate Potato Variety Development and Evaluation Project, the USDA NIFA Potato Special Research Grants Program, the NC Potato Association, Potatoes USA and Snack Nutrition and Convenience International (SNaC), as well as 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 2018, we planted 14,419 single-hills and selected 562 clones resulting in a 3.9% selection rate. Out of the 740 clones in our 6-hill and 12-hill plots, 158 (21%) were selected for future evaluation. In the 20-hill, specialty 60-hill plots, and 60-hill plots 337 clones were planted with 150 (45%) being selected for further evaluation.

In our Colorado potato beetle (CPB) nursery we continued our project to select and screen specific families with potential CPB resistance. We planted 903 4-hill plots for selection. We selected 185 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 2019. In this year's 2by3 trial, 220 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 48 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 2019. In this years 3by5 trial we evaluated 44 clones for CPB resistance and for adaptation in our non-replicated 20-hill plots simultaneously. We selected 12 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 3 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 12 yield trials, we evaluated 157 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 1-12. 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. 2018 PROMISING LINES:

Chip-stock clones

AF5040-8

Developed by: Univ. of Maine

Released: N/A

trials evaluated: 7 (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 93%

% Standard (Snowden): MKTB YLD 86%

Specific Gravity: 1.073

Chip score: 1.5 (excellent to exceptional)

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 well with no significant internal defects. Maturity is similar to Atlantic for us in NC though maybe slightly later.*

Chip-stock clones cont.

B2869-29

*Developed by: USDA-ARS Beltsville
Released: N/A
trials evaluated: 9 since (2011)
Merit Score: 2 (since 2016)
Skin Color: Tan to Light Brown
Flesh Color: White*

*Historical Data;
Maturity: medium maturing
% Standard (Atlantic): MKTB YLD 97%
% Standard (Snowden): MKTB YLD 78%
Specific Gravity: 1.076
Chip score: 1.8 (excellent)
Overall Appearance: 5 (fair)*

Other Attributes or Comments: *This is a mid-maturing clone with good yield, gravity and good chip scores. Its maturity is similar to Atlantic and fills the need for an Atlantic like potato without significant internal issues.*

B3084-3

*Developed by: USDA-ARS Beltsville
Released: N/A
trials evaluated: 6 since (2015)
Merit Score: 2 (since 2016)
Skin Color: Tan to Light Brown
Flesh Color: White*

*Historical Data;
Maturity: later than medium
% Standard (Atlantic): MKTB YLD 100%
% Standard (Snowden): MKTB YLD 89%
Specific Gravity: 1.070
Chip score: 1.4 (excellent to exceptional)
Overall Appearance: 6 (better than fair)*

Other Attributes or Comments: *This is a later than mid-maturing clone with good yield, gravity and very good 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.*

BNC426-2

*Developed by: USDA-ARS Beltsville
Released: N/A
trials evaluated: 4 since (2017)
Merit Score: 2 (since 2017)
Skin Color: Tan to Light Brown
Flesh Color: White*

*Historical Data;
Maturity: later than medium
% Standard (Atlantic): MKTB YLD 118%
% Standard (Snowden): MKTB YLD 105%
Specific Gravity: 1.068
Chip score: 1.9 (excellent)
Overall Appearance: 6 (better than fair)*

Other Attributes or Comments: *This is a later than mid-maturing clone with good yield, gravity and very good 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.*

Chip-stock clones cont.

NC470-3

Developed by: NC State Univ.

Released: N/A

trials evaluated: 7 since (2017)

Merit Score: 2 (since 2017)

Skin Color: Brown

Flesh Color: White

Historical Data;

Maturity: late

% Standard (Atlantic): MKTB YLD 110%

% Standard (Snowden): MKTB YLD 106%

Specific Gravity: 1.067

Chip score: 1.7 (excellent)

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: *The vine maturity is late, yields have been excellent, the gravity while appearing low has always been within 2 to 4 points of Atlantic within the same trial and chip scores have been good. It also appears this clone begins to bulk early so with the strong top that it has late in the season it has excellent potential for the southern chip market. This clone carries the Ryadg PVY resistance gene.*

NCB3171-7

Developed by: NC State Univ.

Released: N/A

trials evaluated: 5 since (2017)

Merit Score: 2 (since 2017)

Skin Color: tan to light brown

Flesh Color: White

Historical Data;

Maturity: mid-season

% Standard (Atlantic): MKTB YLD 81%

% Standard (Snowden): MKTB YLD 88%

Specific Gravity: 1.074

Chip score: 1.7 (excellent)

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: *This is a mid-maturing clone with good yield, gravity and chip scores. Its maturity is similar to Atlantic. The size profile on this clone also tends to be small to medium so it could possibly be used for smaller chip bags. This clone carries the Ryadg PVY resistance gene.*

Red Skin White Flesh Table-stock clones

Fenway Red

Developed by: HZPC

Released: 2016

trials evaluated: 2 since (2018)

Merit Score: 2.6 (since 2018)

Skin Color: Red

Flesh Color: White

Historical Data;

Maturity: mid to late maturing

% Standard (Chieftain): MKTB YLD 78%

% Standard (Dark Red Norland): MKTB YLD 75%

Specific Gravity: 1.063

Skin Texture: Smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: *This is the first year we have evaluated this clone but we believe its performance was good enough to merit comment under the promising varieties section. It is later than Dark Red Norland and earlier than Chieftain but it is a very uniform variety with roughly 1/3 of yield smaller than 1 7/8" and around 50% of its yield between 1 7/8 and 2 1/2".*

Red Skin White Flesh Table-stock clones cont.

Red Endeavor

Developed by: Univ. of Wisconsin

Released: 2015

trials evaluated: 5 since (2017)

Merit Score: 2 (since 2017)

Skin Color: Red

Flesh Color: White

Historical Data;

Maturity: mid to late maturing

% Standard (Chieftain): MKTB YLD 102%

% Standard (Dark Red Norland): MKTB YLD 119%

Specific Gravity: 1.053

Skin Texture: Smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This is a nice looking mostly oblong bright red skin potato. The vines are later than both Dark Red Norland and Chieftain but it is a very uniform variety with 73% of its yield between 1 7/8 and 3 1/4" and it out yielded Chieftain which is impressive for any variety.

Red Skin Yellow Flesh Table-stock clones

BNC201-1

Developed by: USDA-ARS Beltsville

Released: N/A

trials evaluated: 12 since (2009)

Merit Score: 2 (since 2016)

Skin Color: Red

Flesh Color: Light Yellow

Historical Data;

Maturity: later than medium maturing

% Standard (Chieftain): MKTB YLD 86%

% Standard (Dark Red Norland): MKTB YLD 98%

Specific Gravity: 1.074

Skin Texture: Moderately Smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This is an attractive red skin light yellow flesh clone though the yellow flesh is light enough it may still be able to go for a main crop red. Yields have been good across all trials and while this clone is attractive a close watch should be kept on it in years with sporadic large rain events as it can growth crack significantly. This clone is slated for release and PVP soon.

NCB2607-3

Developed by: NC State Univ.

Released: N/A

trials evaluated: 11 since (2008)

Merit Score: 2.7 (since 2016)

Skin Color: Red

Flesh Color: Yellow

Historical Data;

Maturity: early to medium maturing

% Standard (Chieftain): MKTB YLD 47%

% Standard (Dark Red Norland): MKTB YLD 54%

Specific Gravity: 1.070

Skin Texture: Smooth

Overall Appearance: 7 (good)

Other Attributes or Comments: This is a small size potato with 86% of its yield below 2 1/2". It has a smooth skin and rich red skin color. Also because it is reasonably early the skin typically sets well. Culls for this variety typically stay below 10% and it is very uniform in size profile.

Yellow Skin Table-stock clones

Belmonda

Developed by: Solana

Released: 2016

trials evaluated: 2 since (2017)

Merit Score: 2 (since 2017)

Skin Color: Yellow

Flesh Color: Lt Yellow

Historical Data;

Maturity: very late maturing

% Standard (Atlantic): MKTB YLD 141%

% Standard (Yukon Gold): MKTB YLD 231%

Specific Gravity: 1.060

Skin Texture: Smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This variety has been evaluated in 2 trials over the last 2 years, so while still a bit early in the process we believe it is attractive enough to include in the promising varieties list. It is a yellow skin potato with a light yellow flesh. It is also resistant to nematodes Ro1 and Ro4, potato Wart race 1, late blight, Rhizoctonia, common scab, PVYntn and moderately resistant to PLRV.

Natascha

Developed by: Solana

Released: 2012

trials evaluated: 8 since (2015)

Merit Score: 2 (since 2016)

Skin Color: Yellow

Flesh Color: Yellow

Historical Data;

Maturity: slightly later than medium maturing

% Standard (Atlantic): MKTB YLD 115%

% Standard (Yukon Gold): MKTB YLD 209%

Specific Gravity: 1.058

Skin Texture: Smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This variety has been evaluated in 8 trials over the last 4 years. It is an attractive yellow skin potato with a deep yellow flesh it is later than Yukon Gold and the flesh color is a more rich yellow. It is also resistant to nematodes Ro1 and Ro4, potato Wart race 1, late blight, Rhizoctonia, black leg, bruising, PVY and PVY ntn.

Vivaldi

Developed by: HZPC

Released: 2012

trials evaluated: 35 since (2001)

Merit Score: 2 (since 2016)

Skin Color: Yellow

Flesh Color: Lt Yellow

Historical Data;

Maturity: slightly later than medium maturing

% Standard (Atlantic): MKTB YLD 93%

% Standard (Yukon Gold): MKTB YLD 126%

Specific Gravity: 1.062

Skin Texture: Smooth

Overall Appearance: 7 (good)

Other Attributes or Comments: This variety has been evaluated in 35 trials over the last 17 years. It is an attractive yellow skin potato with a light yellow flesh. It is also resistant to potato Wart race 1, PVA, PVX, PVY and PLRV.

Specialty Table-stock clones

NC509-16

Developed by: NC State Univ.

Released: N/A

trials evaluated: 3 since (2016)

Merit Score: 2 (since 2016)

Skin Color: Purple

Flesh Color: Purple

Historical Data;

Maturity: slightly later than medium maturing

% Standard (Adirondack Blue): MKTB YLD 111%

% Standard (Atlantic): MKTB YLD 67%

% Standard (Dark Red Norland): MKTB YLD 97%

Specific Gravity: 1.058

Skin Texture: Moderately Smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This is an attractive purple skin and flesh clone for the table market. Most of the marketable yield falls in the 1 7/8 to 2 1/2" category but it is an oblong potato so if we sized by ounces the profile might indicate a larger size.

Specialty Chip-stock clones

NC502-10

Developed by: NC State Univ.

Released: N/A

trials evaluated: 4 since (2017)

Merit Score: 2.7 (since 2017)

Skin Color: Purple

Flesh Color: Purple

Historical Data;

Maturity: slightly later than medium maturing

% Standard (Adirondack Blue): MKTB YLD 129%

% Standard (Atlantic): MKTB YLD 60%

Specific Gravity: 1.069

Skin Texture: Smooth

Overall Appearance: 5 (fair)

Other Attributes or Comments: Even though this clone is not as pretty as NC509-16 we believe its worth mentioning because of how well it chipped when we sent it to UTZ for testing in 2017. This clone has chipped well for us at the TRS as well giving us rich dark blue chips each time its fried.

NC508-37

Developed by: NC State Univ.

Released: N/A

trials evaluated: 4 since (2017)

Merit Score: 2 (since 2017)

Skin Color: Purple

Flesh Color: Purple

Historical Data;

Maturity: medium maturing

% Standard (Adirondack Blue): MKTB YLD 141%

% Standard (Atlantic): MKTB YLD 86%

Specific Gravity: 1.067

Skin Texture: Moderately smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: As compared to NC502-10 this clone fries almost as well and has higher yields and better appearance. Where this clone falls short of the previous is in its shape as it tends to elongate and its gravity is 2 points lower than NC502-10.

Russet clones

ND8068-5Russ

Developed by: ND State Univ.

Released: N/A

trials evaluated: 3 since (2016)

Merit Score: 2 (since 2016)

Skin Color: Brown

Flesh Color: White

Historical Data:

Maturity: early maturing

% Standard (Russet Norkotah): MKTB YLD 133%

% Standard (Russet Burbank): MKTB YLD 177%

Specific Gravity: 1.071

Skin Texture: Light Russet

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This is a very early maturing russet potato, earlier than Dark Red Norland and it may be suited for our NC market. We look forward to future trials to evaluate its potential.

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 16	Jul 2, Jul 3	108, 109
James Brothers	Chapanoke silt loam	Mar 6	Jun 19	105
TRS/VGJREC	Portsmouth fine sandy loam	Mar 27, 29	Jul 5 to Jul 18	Variable 100 - 114

EXPERIMENTAL DESIGN: All yield trials were planted in a randomized complete block design with 4 replications except the Potatoes USA/Snack Nutrition and Convenience International Chip Trial (SNaC) Trial that had 5 replications per clone. Forty-seven clones in three trials were evaluated on-farm at Black Gold Farms and twenty-eight 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 digger and hand harvested. All trials were graded at the TRS/VGJREC 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-1731 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, internal heat necrosis (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 hours of harvest.

Merit Score: The merit score is a composite rating of 6 traits associated with variety performance. This rating combines yield, percent culls, internal quality, the overall appearance score assigned to each clone during grading, chip score and specific gravity. The merit scale ranges from 1 to 4; where 1 = outstanding, advance; 2 = keep evaluating; 3 = marginal

performance and 4 = drop. The merit 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 12 trials this year. In one trial, it received a merit score of 1, in four it received a 2 and in three trials it received a 3. Atlantic was given ratings of 3 due to marginal internal quality and grader appearance. Overall this averages to 2.25 rounded to a 2 merit score with an overall keep rating.

VI. RESULTS:

Environmental Summary

Planting began on the 6th of March this year and was completed within the month. Rainfall ahead of planting and throughout the season was greater than normal and regionally by the end of July some locations in eastern NC had received as much as 10" above normal for the year. Temperatures during the growing season were moderate though humidity was high. On July 9th and 10th we also had two mornings that were in the mid-50's, an unusual respite from the normal 70 to 80° mornings most years. At the TRS wet conditions caused water to stand on the trials for over 24 hours leading to high levels of rot in lower spots in the field. Also gravities across all trials were lower than normal likely because of the wet conditions.

A. Yield Trials

1. On-Farm Trials

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

Five of the Seventeen clones in this trial received a merit score of 2 (keep): Belmonda, Envol, Natascha, NC600-10 and Soraya. The marketable yields in this trial were compared to Chieftain (201 cwt/a) for the red skins, Yukon Gold (110 cwt/a) for the yellow flesh clones and Superior (155 cwt/a) for the white skins. None of the red skin clones had a higher marketable yield than Chieftain. All but one yellow flesh clone had higher marketable yields than Yukon Gold the two with the highest marketable yields were Soraya (186 cwt/a) and NC600-10 (185 cwt/a). Envol (241 cwt/a) had a higher marketable yield than Superior. Three clones had an overall appearance rating of 7 (good) these were: Envol, Natascha and NCB2607-3. Two clones expressed internal heat necrosis (IHN) at 10% or greater incidence, Montreal (18% IHN with an heat necrosis rating (HNR) of 6.1) and Yukon Gold (10% IHN with an HNR of 8.2). Only Toscana (15%) expressed vascular ring discoloration (VR) with an incidence greater than 10%. Four clones expressed incidence of soft rot (SR) at incidence of 10% or greater: Red Endeavor (20%), NCB2607-3 (18%), Dark Red Chieftain (13%) and Strawberry Paw (10%) No other significant internal defects were recorded. External defects observed in the trial were soft rot, growth cracks, misshapes, sunscald, common scab, secondary growth and skin blemishes due to Rhizoctonia.

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

Nine of the nineteen varieties in the trial received a merit score of 2. Atlantic, the standard, had a marketable yield of 240 cwt/a, one clone had a higher marketable yield: WAF10664-3 (250 cwt/a), though not significantly greater. Gravities in the trial ranged from a low of 1.054 to 1.072, Atlantic had a gravity of 1.066 and five clones: B2869-29 (1.072), BNC426-2 (1.068), NC508-37 (1.067), AF4157-6 (1.066) and Snowden (1.066) had equal or higher gravities. One clone, B3084-3 had a chip score rating of 1 (exceptional). Four clones had chip ratings of 1.5 (excellent to exceptional): B2834-8, B3175-5, BNC426-2 and Snowden. One clone had an overall appearance score of 8 (better than good), AF4157-6 and three clones: Atlantic, NC470-3 and Snowden had overall appearance scores of 7 (good). In this trial NC473-2 had 13% incidence of hollow heart (HH). The only clone with greater than 10% VR was BNC470-13 (18%). Two clones had 10% or greater incidence of SR: B3175-5 (20%) and NC508-37 (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, soft rot infected lenticels and skin blemishes due to Rhizoctonia.

SNaC Trial at Black Gold Farms (Tables 3a and 3b)

Four clones in this trial received a merit score of 2 (keep): AF5040-8, Atlantic, NY162 and Snowden. Atlantic had a marketable yield of 219 cwt/a and no other clones had higher marketable yields, Snowden was closest with an average marketable yield of 181 cwt/a. Atlantic had a gravity of 1.068 only AF5040-8 (1.071) had an equal or higher gravity all others were less than Atlantic. Three clones in the trial received a chip score rating of 1 (exceptional) in the 24 to 48 hour chip test: AF5040-8, Atlantic and NY162. In the 5 to 7 day chip test the highest rating was 2.0 (excellent), received by three clones: AF5040-8, MSV030-4 and Snowden. Two clones received an overall appearance rating of 7 (good): MSX540-4 and Snowden. No internal defects were observed at levels equal to or greater than 10%. External defects observed were: sunscald, misshapes, growth cracks, soft rot, common scab and skin blemishes due to Rhizoctonia.

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

This trial was planted on the 6th of March and it should be noted that as we were finishing up the trial a heavy packing rain came and we believe that this negatively effected stands for the trial. Plots at this site are 21' long and have 28 pieces planted per plot Only three of Twenty-eight clones had complete stands across all reps: MSQNDU407-04R, New Norland and Red Endeavor. Nine clones had stands less than 80%: NDAF113484B-1 (76%), Modoc (75%), Yukon Gold (74%), B2152-17 (63%), NC470-3 (62%), BNC201-1 (57%), NCB3171-7 (55%), NY164 (52%) and Dakota Ruby (49%). As such yield data was slightly discounted in accessing the merits of these clones. Interestingly gravities in this trial were higher than all others this year.

Of the Twenty-eight clones in the trial two, Atlantic and Red Endeavor received a merit score of 1 (outstanding), and sixteen clones received merit scores of 2. Three yield standards were chosen: Atlantic (round white standard), Chieftain (red standard) and Yukon Gold (yellow flesh standard). Across all clones only Red Endeavor (259 cwt/a) had a higher marketable yield than Atlantic (252 cwt/a). One clone, Red Endeavor received an overall appearance rating of 8. Clones with an overall appearance score of 7 were: NC606-23, NDAF113484B-1, Snowden and Vivaldi. The specific gravity for Atlantic in this trial was 1.087, of the chip stock clones none had a higher gravity, though three clones were clones behind: NCB3171-7 (1.086), Snowden (1.086) and NC470-3 (1.085). Three clones: Atlantic, NCB3171-7 and Snowden had chip score

ratings of 1.0 (exceptional). The only other clone chipped was NC470-3 and it received a chip score of 1.5 (excellent to exceptional). Two clones expressed VR at 10% or greater incidence: New Norland (10%) and Superior (10%). No other internal defects of 10% or greater incidence were recorded in this trial. Culls were primarily due to misshapes, soft rot, sun scald, growth cracks, tight stolon attachments, enlarged lenticels, and skin blemishes due to Rhizoctonia.

2. TRS/VGJREC Yield Trials

As mentioned in the environmental summary, trials at the TRS were underwater in late June for more than 24 hours. As a result many of the trials have very poor yields and numbers reported in the summaries below should be reviewed in this context.

Round White Trial One (Tables 5a and 5b)

Two of eleven clones received a merit score of 2 these were: B3195-5 and NCB3259-1. Atlantic had a marketable yield of 42 cwt/a and all but one clone in the trial had higher marketable yield. Atlantic had a gravity of 1.058, four clones had higher gravities: NC636-5 (1.064), B3159-5 (1.060), NCB3259-1 (1.060) and NCB3259-2 (1.059). Three clones had chip scores of 1.5: Atlantic, NCB3259-1 and Snowden. Three clones had an overall appearance score of 6 (better than fair): B3195-5, NCB3259-1 and Snowden. Atlantic expressed 10% incidence of IHN with an HNR of 8.3. No other internal defects of 10% or greater incidence were recorded in this trial. Common external defects were soft rot, infected lenticels, misshapes, sunscald, common scab, growth cracks, and skin blemishes attributed to Rhizoctonia.

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

Five of the eleven clones in this trial received a merit rating of 2: Atlantic, B2869-29, BNC426-2 and NC470-3. Atlantic had a marketable yield of 72 cwt/a. All but two clones in the trial had higher marketable yields. Atlantic had a gravity of 1.052, two clones B2869-29 (1.056) and BNC426-2 (1.054) had higher gravity. One clone, Atlantic, had a chip score of 1 and one clone, B2869-29, had a chip score of 1.5. One clone had an overall appearance score of 6 (better than fair): NC470-3 and others were fair or lower. One clone, BNC543-2, had incidence of HH at 13% and brown center (BC) at 15%. Atlantic had internal incidence of soft rot (SR) at 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, and skin blemishes attributed to Rhizoctonia.

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

Of the thirteen clones in this trial, five received merit scores of 2: Atlantic, B3084-3, BNC538-3, NC470-3 and NC472-1. Atlantic had an average marketable yield of 36 cwt/A, eight clones in the trial had higher marketable yields and the only clone that had a significantly greater yield was NC470-3 (85 cwt/a). Atlantic had a chip score of 1 and four clones received a chip score of 1.5: BNC538-3, NC472-1, NC540-18 and Snowden. Three clones received overall appearance score of 7: B3084-3, BNC182-5 and NC470-3. Two clones expressed internal SR at 10% or greater incidence: Snowden (18%) and BNC182-5 (10%). No other internal defects were expressed at levels of 10% or greater. Common external defects were soft rot, sunscald, misshapes, growth cracks, infected lenticels and Fusarium dry rot.

NE-1731 Round White Trial. (Tables 8a and 8b)

Eight clones received a merit score of 2: AF5040-8, AF5429-3, B2869-29, B2904-2, B3012-1, BNC469-7, NY152 and Snowden. Of the twenty-two clones in this trial all but six had greater marketable yield than Atlantic (135 cwt/A), though only two had significantly higher marketable yields, AF5225-1 (218 cwt/a) and Snowden (212 cwt/a). Atlantic had a specific gravity of 1.068 and two clones: AF4050-8 (1.075) and B2869-29 (1.073) had greater gravity, all others were lower than Atlantic. Six clones had a chip rating of 1.5: AF5040-8, AF5280-5, Atlantic, B2904-2, NY157 and Snowden. The only clone to rate an overall appearance rating of 7 in the trial was B3012-1. Four clones expressed IHN at 10% or greater incidence: Yukon Gold (25% incidence with an HNR of 8.0), Atlantic (15% incidence with an HNR of 7.8), Katahdin (15% incidence with an HNR of 8.0), and B3012-1 (13% incidence with an HNR of 7.3). Clones expressing 10% or greater incidence of HH were: B2904-2 (20%) and Atlantic (10%). Two clones expressed 10% or greater incidence of BC: Yukon Gold (13%) and Katahdin (10%). One clone expressed 10% internal incidence of SR, B3186-6. No other internal defects were expressed at levels of 10% or greater. The most common culls were misshapes, sunscald, soft rot, growth cracks, common scab and skin blemishes due to Rhizoctonia.

NE-1731 Red Trial. (Tables 9a and 9b)

Only one of the eleven clones in this trial received a merit score of 2: NC554-1. The standard, Chieftain, had a marketable yield of 87 cwt/a, two clones had higher marketable yields: Dark Red Norland (98 cwt/a) and NC554-1 (82 cwt/a). One clone received an overall appearance score of 6: NC554-1 all others were lower. All but three clones in the trial had internal incidence of SR at levels 10% or higher: BNC716-2 (0%), Dark Red Norland (5%) and AF5245-1 (8%). No other internal defects were expressed at levels of 10% or greater. Culls were due mostly to high levels of soft rot, misshapes, sunscald, growth cracks and skin blemishes due to Rhizoctonia.

NE-1731 Russet Trial. (Tables 10a and 10b)

Three of the seven clones in this trial received a merit score of 2: Easton, ND8068-5Russ and Russet Norkotah. The standard, Russet Norkotah, had a marketable yield of 81 cwt/A. Three clones in the trial had greater average marketable yields: ND8068-5Russ (142 cwt/a), Easton (129 cwt/a) and AF5312-1 (116 cwt/a), though only ND8068-5Russ was significantly greater. The only clone in the trial to have an overall appearance of 7 was ND8068-5Russ. One clone expressed IHN at 10% or greater incidence: Russet Burbank (13% incidence with an HNR of 7.8). The only clone to express BC at 10% or greater incidence was Russet Burbank (13%). Two clones to expressed SR at 10% or greater incidence: Shepody (13%) and AF5312-1 (10%). No other internal defects were expressed at levels of 10% or greater. Culls were mostly soft rot, misshapes, sunscald, growth cracks, common scab and skin blemishes attributed to Rhizoctonia.

Yellow Flesh Trial. (Tables 11a and 11b)

Seven of fourteen clones received a merit score of 2: Natascha, NC640-2, NC640-3, and NC640-7, NC674-37, NC699-61 and Vivaldi. Yukon Gold (84 cwt/a) was the standard in the trial and seven clones had higher average marketable yields: Soraya (192 cwt/a), NC674-37 (178 cwt/a), NC600-10 (161 cwt/a), Vivaldi (129 cwt/a), Natascha (100 cwt/a), NC640-2 (91 cwt/a) and NC606-23 (86 cwt/a). Six clones received an overall appearance rating of 6: Natascha, NC640-2, NC640-3, NC699-61 and Vivaldi. Two clones expressed IHN at 10% or greater incidence: NC600-10 (18% incidence with an HNR of 8.2) and Vivaldi (10% incidence with an HNR of 7.8). NC600-10 also expressed 10% incidence of SR. Soraya expressed 25%

incidence of BC. No other internal defects were expressed at levels of 10% or greater. Culls were mostly soft rot, misshapes, sunscald, growth cracks, common scab and secondary growth.

Specialty Trial (Tables 12a and 12b)

This trial mostly contains clones that have pigmented flesh although Atlantic is included in this trial as a standard for yield and chipping. Six of the twenty-three clones in the trial received a merit score of 2: AAF08155-1, NC508-37, NC509-16, NC651-2, NC674-45 and NDAF113458-2. Three clones had greater average marketable yields than Atlantic (113 cwt/a): NC508-37 (125 cwt/a), NDAF113458-2 (115 cwt/a) and NC651-2 (109 cwt/a). None of the clones in the trial had gravities that were greater than Atlantic (1.065) but three had gravities within 2 points: NC502-10 (1.064), NC674-53 (1.064) and NC508-37 (1.063). Twelve clones were chipped at the TRS, Atlantic had a score of 1.5. 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 three clones were rated 7: Atlantic, NC507-15 and NC651-2. Only Atlantic (15% incidence with an HNR of 7.9) expressed IHN at 10% or greater incidence. NC694-80 expressed 13% HH. Six clones expressed internal incidence of SR at levels of 10% or greater: NC674-53 (20%), Adirondack Blue (13%), NC508-17 (13%), Adirondack Red (12%), NC502-10 (10%) and NC693-51 (10%). No other internal defects were expressed at levels of 10% or greater. Common external defects included soft rot, misshapes, growth cracks, sun scald common scab, 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 come from the USDA-ARS and our own crosses made at the TRS. This year we also had materials from Cornell University as well. 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, 14,419 single-hills were planted and 562 clones were selected averaging a 3.9% selection rate.

In our second to fourth year selection plots out of the 651 clones planted in our 6-hill plots (Yr. 2), 148 (23%) were selected for future evaluation. While in the 20-hill plots (Yr. 3), 256 clones were planted with 114 (45%) being selected for further evaluation. In our 60-hill plots (Yr. 4), 51 clones were planted and 26 (51%) were selected.

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 siblings per family. Because we start with 4 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 300 clones and selected 34 (11.3%) as 4-hill plots. In our 12-hill plots we evaluated 89 and selected 10 (11.2%) and in the specialty 60-hill plot 30 were evaluated and 10 were selected (33%).

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*. Like the specialty trials these clones are selected from 4-hill plots in year one. Unlike the specialty trials though, their primary trait of interest is unable to be evaluated in year one so effectively the 4-hill plots are used to increase this set of materials so that in year two we can plant both a CPB resistance screen plot and a selection plot. The only clones removed from the set are those that are low yielding or have other extremely poor agronomic traits. We planted roughly 903 clones to evaluate resistance and selected 185 clones. These will be advanced next year in both our CPB nursery as two 3-hill plots and as 6 hill plots for selection purposes. In our 6 hill plots this year, 216 of the 651 clones came from this CPB resistance project. From the 216 CPB clones, 48 were selected for advancement to the 20 hill selection plots and the next cycle of CPB resistance screening. Of the 256 clones in our 20 hill plots 44 clones were part of the CPB resistance screen and 12 of those were selected for advancement to the 60 hills. Of the 57 clones in this year's 60 hill plots 3 were CPB clones and three 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 Maine (UME) and they use the information when they select their materials. This year we evaluated 254 ME clones and 43 of them received a merit score of 2 none received a 1 this year. These will be evaluated in 2019 in a non-replicated 25-hill plot in a yield trial.

Observational Trial.

Thirty clones were evaluated in this trial as well as the standards: Atlantic, Chieftain, Dark Red Norland, Envol, Russet Norkotah, 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 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 selection. We assigned a

merit score of 2 to eight 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 126 clones, this year however we chose to place 83 of these in the early generation southern selection trial because they were selected from chipping crosses the remaining 43 clones were placed in this trial. All were weighed for total yield, rated for the nine standard NE1731 external ratings, and ten tubers from each plot were cut for internal evaluations as well. At our location we gave 10 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.

Fifty-five clones were evaluated in this trial as well as the standards: Atlantic, Chieftain, Dark Red Norland, Envol, 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. A total of 8 clones received a merit score of 2. 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. Dan Peers, Mr. Tyler Bradley and the rest 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 Potatoes USA, SNAC International, the USDA-NIFA Potato Special Research Grants program, UTZ Quality Foods Inc, Real Potatoes Ltd and Hanse Seed. Their continuing support is very much appreciated.

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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 108 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2018

Clone	Merit ² Score	Total Yield		Marketable Yield			Size Distribution by Class ³ (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ⁴
		cwt/A	cwt/A	%Chf.	%Sup.	%Yuk.	1's	2's	3's	4's	5's	Culls			
7four7	4	211	84	42	54	76	20	34	4	0	0	42	38	4	1.034
Belmonda	2	280	178	89	115	161	25	52	11	0	0	12	63	11	1.052
Chieftain	3	289	201	100	129	182	14	37	30	1	0	17	69	31	1.042
Dakota Ruby	3	301	160	80	103	145	28	47	6	0	0	19	53	6	1.043
Dark Red Chieftain	4	158	82	41	53	75	28	47	4	0	0	20	52	4	1.037
Dark Red Norland	3	196	133	66	86	120	20	50	18	0	0	12	68	18	1.040
Envol	2	287	241	120	155	218	6	37	44	2	0	10	84	46	1.048
Montreal	4	235	145	72	94	131	22	51	11	0	0	16	62	11	1.047
Natascha	2	233	126	63	81	114	36	50	4	0	0	10	54	4	1.048
NC600-10	2	273	185	92	119	167	17	38	28	1	0	16	67	29	1.054
NCB2607-3	3	152	51	25	33	46	43	30	3	0	0	24	33	3	1.053
Red Endeavor	4	144	54	27	35	49	25	30	5	0	0	39	36	5	1.037
Soraya	2	301	186	93	120	168	24	58	3	0	0	15	61	3	1.038
Strawberry Paw	3	155	100	50	65	91	14	36	28	1	0	21	64	29	1.040
Superior	3	219	155	77	100	140	6	41	27	2	0	25	69	28	1.051
Toscana	4	239	62	31	40	56	49	25	0	0	0	26	25	0	1.044
Yukon Gold	4	204	110	55	71	100	8	22	29	2	0	38	54	32	1.053
Grand Mean		228	132												
CV(%)		19	26												
LSD(k=100)		74	58												

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

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

³ 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.

⁴ 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 108 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2018

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
7four7	6	6	8	7	8	6	5	7	6	7	5	5	4	0	9	0	0	3	8	^SR,CS,RZ,SS,MS
Belmonda	9	8	7	9	7	7	7	7	5	8	5	8	5	0	9	0	0	0	0	SR,SS,SG,MS
Chieftain	6	7	8	6	3	6	6	6	4	7	6	6	5	3	8.5	0	0	0	0	^SR,SG,CS,RZ,STST
Dakota Ruby	6	8	9	6	2	8	6	7	2	8	3	6	5	0	9	0	0	0	8	SS,SR,GC,RZ
Dark Red Chieftain	7	7	8	6	2	8	7	7	2	8	3	7	5	0	9	0	5	0	13	SR,STST,SISC
Dark Red Norland	5	5	8	3	2	7	6	7	5	7	5	7	5	0	9	0	3	0	0	SR,GC,MS,SS,SISC
Envol	5	6	8	3	6	7	5	7	5	7	7	8	7	0	9	0	3	0	0	SS,SR,MS,GC
Montreal	5	6	8	5	6	8	6	7	3	7	5	7	6	18	6.1	0	3	0	0	^SR,MS,SS,SG
Natascha	9	8	8	7	7	7	6	7	5	7	3	8	7	0	9	0	0	0	0	MS,SR,SS,knobs,SG,CS
NC600-10	9	8	9	8	7	7	6	7	3	7	6	7	5	5	8.0	0	0	0	0	^GC,SR,MS,SS
NCB2607-3	5	6	8	4	2	8	7	7	2	8	3	7	7	0	9	0	0	3	18	SR,GC,SR,SS,SISC
Red Endeavor	6	6	8	6	2	8	6	7	5	8	4	5	4	0	9	0	3	0	20	^SR,il,SS,GC
Soraya	9	8	8	7	7	7	6	7	7	8	6	7	5	0	9	0	0	0	0	MS,SR,SS
Strawberry Paw	9	8	8	7	2	7	7	5	4	7	7	8	5	0	9	0	0	0	10	MS,RZ,SR,SS,GC
Superior	5	8	8	4	6	7	5	7	5	6	7	6	5	0	9	0	0	0	5	SR,MS,SS,GC
Toscana	9	8	9	9	7	7	6	7	4	8	3	7	4	0	9	0	15	0	0	SG,MS,SR
Yukon Gold	9	7	8	5	7	7	7	7	3	7	7	6	4	10	8.3	3	0	0	8	^SR,SS,MS

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

² See NE1231 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 108 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2018

Clone	Merit ² Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ³ (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ⁴	Chip Color ⁵
			cwt/A	% Atl.	1's	2's	3's	4's	5's	Culls					
AF4157-6	2	291	220	93	19	51	24	0	0	6	75	24	1.066	2.0	
Atlantic	2	289	240	100	11	41	39	3	0	6	83	42	1.066	2.0	
B2834-8	3	215	148	63	11	35	32	2	0	20	69	34	1.065	1.5	
B2869-29	2	326	218	92	22	52	15	0	0	11	67	15	1.072	2.0	
B3084-3	3	241	175	74	16	46	26	0	0	12	72	26	1.063	1.0	
B3168-3	3	244	133	58	19	32	11	1	0	37	44	12	1.061	2.0	
B3175-5	3	251	176	74	14	42	28	0	0	16	70	28	1.060	1.5	
BNC426-2	3	268	191	80	19	48	23	0	0	11	71	23	1.068	1.5	
BNC470-13	3	242	124	51	41	45	5	0	0	8	51	5	1.058	2.0	
NC470-3	2	286	232	98	14	51	30	1	0	5	81	31	1.064	2.0	
NC472-1	3	181	110	47	30	46	15	0	0	10	61	15	1.059	3.0	
NC473-2	3	200	169	71	29	22	42	1	1	5	65	43	1.054	2.0	
NC502-10	3	191	87	36	46	44	1	0	0	9	45	1	1.065	2.5(p2)	
NC508-37	2	279	185	78	27	62	4	0	0	6	66	4	1.067	3.0(p2)	
NCB3171-7	3	228	143	60	24	42	21	0	0	13	63	21	1.064	2.0	
NDAF113470C-3	3	266	188	79	20	56	15	0	0	9	71	15	1.060	2.5	
Sebec	2	238	200	84	6	37	46	1	0	10	84	47	1.064	2.0	
Snowden	2	280	214	89	21	51	26	0	0	2	77	26	1.066	1.5	
WAF10664-3	2	324	250	107	19	55	21	0	0	5	76	21	1.057	2.0	
Grand Mean		255	181												
CV(%)		15	20												
LSD(k=100)		62	60												

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

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

³ 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.

⁴ Determined by weight in air / water method.

⁵ 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; p1 = light purple, p2 = medium purple color, p3 = dark purple

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 108 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2018

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
AF4157-6	6	8	9	4	6	6	7	7	3	7	5	8	8	0	9	0	3	0	3	SS,GC,SR,MS
Atlantic	6	8	8	5	6	6	7	6	3	7	6	8	7	0	9	0	5	0	3	CS,SS,SR
B2834-8	6	8	8	5	6	7	7	7	2	7	4	6	6	0	9	0	8	0	3	SR,SS
B2869-29	6	8	9	4	6	7	6	7	2	7	5	8	5	0	9	0	3	0	0	SR,SS,IL,RZ,CS,GC
B3084-3	8	8	7	6	6	6	7	7	2	8	5	8	5	0	9	0	0	0	8	^GC,MS,RZ,SS,IL,CS,SR
B3168-3	8	8	8	6	6	7	7	7	2	7	4	7	5	0	9	0	3	0	3	SR,SS,MS,RZ,CS,IL
B3175-5	6	8	8	5	6	7	6	7	3	7	4	7	5	0	9	0	0	0	20	^CS,MS,SR,SS
BNC426-2	7	8	8	8	6	6	6	7	4	8	6	8	5	0	9	0	3	0	3	SS,GC,RZ,SR,SG,MS
BNC470-13	7	8	9	7	6	6	7	6	2	8	3	8	5	0	9	0	18	0	3	SR,SS,IL,MS,CS
NC470-3	9	8	8	8	5	5	6	6	4	8	6	8	7	0	9	0	0	0	3	SS,SR,GC,
NC472-1	8	8	7	9	6	5	7	7	2	8	4	8	5	0	9	0	3	0	3	SR,SS,MS,IL,RZ
NC473-2	9	8	8	8	5	5	7	7	2	7	7	8	6	0	9	13	0	0	0	SS,SR,CS,RZ
NC502-10	6	8	8	6	1	7	4	7	5	8	3	8	5	0	9	0	0	0	8	SR,SISC,PTS,MS,HS,STST
NC508-37	6	8	8	5	1	7	5	7	5	7	5	8	6	0	9	0	0	0	10	SR,MS,STST
NCB3171-7	6	8	8	6	6	7	6	7	2	7	5	8	6	0	9	0	0	0	5	MS,SR,SS
NDAF113470C-3	8	8	9	4	6	8	5	7	3	8	5	6	4	0	9	0	0	0	5	^CS,SR,SS,SG
Sebec	9	8	8	7	6	6	7	7	4	7	7	7	6	0	9	0	0	0	0	CS,GC,SR,IL
Snowden	9	8	7	7	5	5	7	6	2	6	5	8	7	0	9	0	0	0	0	SR,SS,IL,STST,RZ
WAF10664-3	9	8	8	5	6	7	7	7	2	7	4	8	6	0	9	0	0	0	0	SR,MS,SS,GC

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

² See NE1231 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. 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 109DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2018

Clone	Merit ² Score	Total Yield cwt/A	Marketable Yield cwt/A	% Atl.	Size Distribution by Class ³ (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ⁴	Chip Color ⁵	
					1's	2's	3's	4's	5's	Culls	24 to 48hrs				5 to 7Days	
AF5040-8	2	202	138	61	21	48	17	0	0	14	64	17	1.071	1.0	2.0	
Atlantic	2	283	219	100	15	44	31	2	0	8	77	33	1.068	1.0	2.5	
MSV030-4	3	209	125	57	16	41	18	0	0	25	59	18	1.066	1.5	2.0	
MSW044-1	3	168	104	47	32	56	5	0	0	6	61	5	1.062	1.5	2.5	
Mackinaw	3	153	95	44	27	55	7	0	0	11	62	7	1.065	1.5	2.5	
ND7519-1	3	233	172	79	17	52	22	0	0	9	74	22	1.067	2.0	2.5	
NDTX081648CB-13W	3	215	155	71	16	43	29	0	0	11	72	29	1.060	2.0	2.5	
NY162	2	240	170	78	14	45	25	0	0	16	70	25	1.064	1.0	2.5	
Snowden	2	238	181	83	17	60	16	0	0	8	75	16	1.062	1.5	2.0	
W9968-5	3	193	114	52	32	50	7	0	0	11	58	7	1.066	1.5	3.0	
Grand Mean		213	147													
CV(%)		20	28													
LSD(k=100)		64	60													

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

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

³ 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.

⁴ Determined by weight in air / water method.

⁵ 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 109 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2018

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
AF5040-8	7	8	8	5	6	8	6	7	2	7	4	7	6	0	9.0	0	0	0	0	SR,SS,RZ,MS,IL,CS
Atlantic	6	8	8	5	6	5	7	5	3	8	6	7	6	8	8.4	0	0	0	0	SS,SR,MS,GC,RZ,CS,
MSV030-4	8	8	8	5	6	5	7	5	2	7	5	7	5	0	9.0	0	8	2	0	GC [^] ,MS,RZ, [^] SR,IL
MSW044-1	7	8	8	6	8	7	6	7	2	7	3	8	6	0	9.0	0	2	0	0	IL,MS,SS,STST,DAE
Mackinaw	9	8	7	5	6	6	7	7	2	7	3	8	7	0	9.0	0	0	0	4	SS,SR,IL,RZ,GC
ND7519-1	8	8	8	7	6	7	5	6	3	7	5	8	5	8	7.7	0	0	6	0	MS,IL,GC,RZ,SR,SS,CS
NDTX081648CB-13W	8	8	9	7	6	6	6	7	3	7	5	7	5	0	9.0	0	0	0	0	SR,SS,MS,GC,STST
NY162	8	8	9	9	6	6	7	7	3	7	4	8	6	0	9.0	0	0	0	0	RZ,MS,SS,CS,SR,IL
Snowden	9	8	8	7	5	5	7	7	2	6	5	8	7	0	9.0	0	0	0	2	SR,SS,CS
W9968-5	8	8	8	8	6	6	7	7	3	8	3	7	5	0	9.0	0	6	0	2	SS,SR,MS,CS,GC,RZ

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

² See NE1231 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 105 DAP¹ at James Brothers Farm, Weeksville, Pasquotank Co., NC - 2018

Clone	Merit ² Score	Total Yield cwt/A	Size Distribution by Class ³ (% of total yield)									1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ⁴	Chip Color ⁵	
			Marketable Yield			Culls										
			cwt/A	%Atl	%Chf.	%Yuk.	1's	2's	3's	4's	5's	Culls				
AF5677-4	2	255	155	61	113	149	33	51	9	0	0	7	60	9	1.076	.
Atlantic	1	327	252	100	182	248	20	63	14	0	0	3	77	14	1.087	1.0
B2152-17	2	178	74	29	63	65	54	38	1	0	0	6	39	1	1.063	.
BNC201-1	2	178	138	55	92	145	20	52	24	0	0	4	76	24	1.069	.
BNC559-1	2	228	128	50	98	121	42	55	1	0	0	3	56	1	1.059	.
CEG#012	2	220	130	52	96	126	37	54	5	0	0	4	59	5	1.060	.
Chieftain	3	249	166	67	100	180	31	61	4	0	0	4	65	4	1.063	.
Dakota Ruby	2	116	45	18	29	46	60	38	0	0	0	2	38	0	1.053	.
Dark Red Norland	3	223	161	64	122	157	20	60	10	0	0	10	71	10	1.049	.
Envol	3	240	168	68	102	176	12	47	19	0	0	22	66	19	1.057	.
Fenway Red	2	225	139	55	96	137	34	54	7	0	0	4	61	7	1.066	.
Modoc	3	182	97	39	71	95	37	50	3	0	0	10	53	3	1.052	.
Montreal	3	281	156	62	110	158	36	52	3	0	0	8	55	3	1.064	.
MSQNDSU407-04R	3	232	124	49	93	121	36	51	2	0	0	11	53	2	1.060	.
MSW343-2R	3	207	131	52	103	123	20	46	17	0	0	17	63	17	1.049	.
NC470-3	2	118	73	29	42	78	32	55	6	0	0	7	61	6	1.085	1.5
NC554-1	3	194	136	54	91	137	22	63	7	0	0	8	70	7	1.055	.
NC606-23	2	303	149	59	101	149	46	49	0	0	0	5	49	0	1.069	.
NCB3171-7	2	157	99	40	62	104	30	61	4	0	0	5	65	4	1.086	1.0
NDAF113484B-1	2	236	174	70	116	182	20	60	14	0	0	5	74	14	1.055	.
New Norland	2	280	212	84	160	202	18	64	11	0	0	7	75	11	1.052	.
NY164	3	88	31	12	20	32	55	36	0	0	0	9	36	0	1.065	.
Red Endeavor	1	341	259	103	184	262	21	62	14	0	0	4	76	14	1.054	.
Red Marker #2	2	204	98	39	71	97	50	45	2	0	0	2	48	2	1.076	.
Snowden	2	202	134	53	98	132	32	58	8	0	0	2	67	8	1.086	1.0
Superior	3	282	209	83	152	211	10	46	27	0	0	17	73	27	1.067	.
Vivaldi	2	248	141	56	111	133	35	53	3	0	0	8	57	3	1.069	.
Yukon Gold	2	143	107	42	84	100	19	57	19	0	0	5	76	19	1.071	.
Grand Mean		219	139													
CV(%)		23	32													
LSD(k=100)		84	73													

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

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

³ 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.

⁴ Determined by weight in air / water method.

⁵ 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 105 DAP¹ at James Brothers Farm, Weeksville, Pasquotank Co., NC – 2018

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
AF5677-4	9	9	9	7	8	8	6	7	2	7	4	7	5	0	9	0	0	0	0	^RZ,MS,SS,SR,GC
Atlantic	6	9	8	5	5	6	6	6	3	7	5	8	6	0	9	0	3	0	0	SS,SR,GC,MS,CS,GC,RZ
B2152-17	8	9	9	6	2	8	7	6	2	8	2	8	6	0	9	0	0	0	0	MS,SS,SR,GC,RZ
BNC201-1	9	9	9	6	2	8	7	7	2	8	5	8	6	0	9	0	0	0	0	MS,EL,GC,RZ,STST,SS
BNC559-1	8	9	8	7	1	8	6	7	4	8	2	8	5	0	9	0	0	0	0	SS,SR,EL,MS,STST,GC
CEG#012	6	9	8	5	2	7	7	7	2	7	5	8	5	0	9	0	0	0	0	RZ,EL,MS,SR,STST
Chieftain	9	9	7	6	1	7	5	6	4	7	5	8	4	0	9	0	0	0	0	GC,EL,RZ,MS,SS,SG
Dakota Ruby	7	9	8	6	2	8	7	6	2	8	2	8	6	0	9	0	0	0	0	SR,MS,GC,SS,STST
Dark Red Norland	5	9	8	3	2	8	6	7	5	6	5	6	5	0	9	0	3	0	0	^SR,EL,RZ,MS,SS
Envol	5	7	8	4	6	8	4	7	5	8	5	6	5	0	9	0	0	0	3	^SR,MS,SS
Fenway Red	9	9	9	7	2	8	7	6	2	7	4	8	6	0	9	0	0	0	0	MS,SG,SS,CS,RZ
Modoc	7	9	9	6	2	7	6	7	5	8	4	7	6	0	9	0	5	0	3	SS,SR,RZ,MS,EL,GC
Montreal	8	9	9	5	8	8	6	7	4	8	5	8	5	0	9	0	0	0	3	^MS,SS,RZ,CS,GC,EL,SR
MSQNDSU407-04R	6	8	8	5	2	8	6	6	3	8	4	8	5	0	9	0	0	0	0	^GC,MS,RZ,SR,EL
MSW343-2R	7	9	7	5	3	8	7	7	2	5	6	8	3	0	9	0	0	0	0	^GC,^MS,RZ,SS,SG,STST,SR
NC470-3	9	9	9	8	6	6	6	7	4	8	5	8	5	0	9	0	0	0	0	SS,GC,SS,EL,STST - no rot
NC554-1	7	4	8	6	2	7	6	5	5	8	5	7	4	0	9	0	0	0	0	MS,SS,GC,EL,SR
NC606-23	9	9	9	8	7	8	5	7	5	8	4	8	7	0	9	0	0	0	3	MS,SR,SS
NCB3171-7	8	9	9	7	6	7	7	6	2	7	3	9	5	3	8.8	5	0	0	0	MS,SS,STST,GC
NDAF113484B-1	8	9	9	6	2	8	5	7	3	7	5	8	7	5	8.5	0	0	0	0	MS,SR,SS,EL,
New Norland	5	8	8	3	2	8	6	7	5	7	5	7	5	0	9	0	10	0	0	SS,MS,EL,SR,SISC
NY164	9	9	8	7	2	8	6	5	2	8	2	8	3	0	9	0	0	0	0	MS,SR,EL,STST,RZ
Red Endeavor	8	9	8	6	2	8	7	7	5	8	5	8	8	0	9	0	3	0	0	MS,SR
Red Marker #2	9	9	9	7	2	8	7	7	2	6	3	8	6	0	9	0	0	0	0	MS,SS,STST
Snowden	9	9	9	7	6	6	6	6	2	6	5	8	7	0	9	0	0	0	0	SS,MS,SR,EL,DAE,DSE
Superior	5	9	8	4	6	7	6	7	5	6	6	8	4	0	9	0	10	0	0	SS,MS,RZ,EL,GC,SR
Vivaldi	9	9	7	7	7	8	7	7	5	8	5	8	7	0	9	0	0	0	0	SS,HS,MS,SS
Yukon Gold	8	9	8	6	7	7	6	6	4	7	5	8	6	0	9	0	0	0	0	SR,SS,RZ,MS,EL

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

² See NE1231 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. 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 103 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

Clone	Merit ² Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ³ (% of total yield)							Specific Gravity ⁴	Chip Color ⁵	
			cwt/A	% Atl.	1's	2's	3's	4's	5's	Culls	1 7/8 to 4"			2 1/2 to 4"
Atlantic	3	60	42	100	15	50	15	0	0	19	65	15	1.058	1.5
B3195-5	2	110	45	137	47	39	0	0	0	14	39	0	1.060	2.0
Envol	3	129	98	319	10	41	32	1	0	16	75	33	1.046	2.5
NC630-3	3	150	92	320	24	50	10	0	0	17	60	10	1.048	2.5
NC636-5	3	129	52	171	35	36	4	0	0	25	40	4	1.064	2.0
NCB3259-1	2	100	46	172	38	44	3	0	0	15	47	3	1.060	1.5
NCB3259-2	3	124	59	153	36	41	1	0	0	22	42	1	1.059	2.0
NCB3260-1	3	110	57	200	25	45	8	0	0	23	52	8	1.057	2.0
NCB3260-2	3	45	20	65	19	38	4	0	0	39	42	4	1.052	3.0
Snowden	3	138	86	288	19	46	13	0	0	22	60	13	1.052	1.5
Superior	4	102	70	206	8	42	23	0	0	27	65	23	1.041	3.0
Grand Mean		109	61											
CV(%)		35	52											
LSD(k=100)		64	53											

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

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

³ 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.

⁴ Determined by weight in air / water method.

⁵ 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. 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 the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

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	8	8	5	6	5	6	6	3	7	5	7	5	10	8.3	5	0	0	15	SR,SS,GC,MS,IL
B3195-5	8	8	8	8	9	7	7	7	2	8	4	6	6	0	9	0	0	0	3	GC,SS,SR,CS,IL
Envol	5	7	7	4	6	7	4	7	5	7	6	7	5	0	9	0	0	0	3	SR,SS,CS,MS,SG,GC
NC630-3	6	7	8	5	6	7	7	7	2	6	4	7	5	0	9	0	0	0	0	SS,SR,RZ,MS,CS,GC
NC636-5	7	8	8	7	6	7	6	7	2	7	4	6	5	0	9	0	0	0	3	SR,MS,SS,MS
NCB3259-1	7	7	8	5	6	7	7	7	2	8	4	7	6	0	9	0	0	0	0	SS,SR,CS,GC
NCB3259-2	8	8	8	6	6	6	6	7	2	7	4	6	5	0	9	0	0	0	3	SR,SS,CS
NCB3260-1	8	8	8	8	9	8	6	7	3	7	5	6	5	0	9	0	0	0	3	SS,SR,CS,IL
NCB3260-2	9	8	8	7	9	7	5	7	5	7	5	6	3	0	9	0	0	0	3	SS,SR,GC,CS,SG,MS
Snowden	9	8	8	7	5	5	6	6	2	6	5	7	6	0	9	0	0	5	3	SR,SS,CS
Superior	5	7	7	4	6	7	5	7	5	7	6	6	4	3	8.8	0	0	8	0	SS,SR,CS,GC,MS

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

² See NE1231 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 Two. Total and marketable yield, percentage of total yield by size class, specific gravity and chip scores of potato clones of potato clones harvested 103 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

Clone	Merit ² Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ³ (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ⁴	Chip Color ⁵
			cwt/A	% Atl.	1's	2's	3's	4's	5's	Culls					
Atlantic	2	118	72	100	9	42	18	0	0	31	59	18	1.052	1.0	
B2869-29	2	114	56	123	20	46	1	0	0	33	47	1	1.056	1.5	
B3083-11	3	112	65	104	5	32	25	0	0	38	57	25	1.050	2.0	
B3083-4	3	79	34	83	5	21	22	0	0	51	44	22	1.030	3.0	
BNC426-2	2	158	100	206	15	43	19	0	0	24	61	19	1.054	2.5	
BNC543-2	3	110	64	146	8	28	27	1	0	36	55	27	1.039	2.0	
Envol	3	122	91	216	6	32	41	0	0	21	73	41	1.042	3.0	
NC470-3	2	100	68	160	10	45	18	0	0	26	63	18	1.042	2.0	
NC606-11	4	49	18	24	5	24	9	0	0	62	33	9	1.023	3.5	
NCB3171-7	3	81	28	79	16	23	6	0	0	55	28	6	1.047	2.0	
Superior	3	103	76	116	6	43	27	0	0	24	70	27	1.048	2.5	
Grand Mean		104	61												
CV(%)		48	62												
LSD(k=100)		80	65												

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

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

³ 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.

⁴ Determined by weight in air / water method.

⁵ 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 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 103 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

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	7	8	5	6	5	6	7	3	7	5	6	5	2	7.8	3	0	3	10	^SR,SS,MS,GC
B2869-29	6	8	8	5	9	8	7	7	2	8	4	5	4	0	9	0	0	0	5	^SR,MS,SS,CS
B3083-11	8	8	8	5	6	7	6	7	5	8	5	5	4	0	9	3	0	3	3	^SR,GC,SS,RZ,MS
B3083-4	7	8	8	5	6	6	6	7	3	7	5	6	3	0	9	0	0	0	0	SR,^GC,MS
BNC426-2	8	8	8	6	6	6	6	7	4	7	5	7	5	0	9	0	0	0	0	SR,GC,SS,MS,IL,SG
BNC543-2	9	9	9	8	6	6	6	7	5	8	6	6	5	0	9	13	0	15	3	SR,SS,MS,GC,RZ
Envol	7	6	7	4	6	7	5	7	5	7	7	7	5	0	9	0	0	8	3	SR,SS,MS,SG,CS,RZ
NC470-3	9	9	8	8	5	5	7	7	3	8	5	7	6	0	9	0	0	0	0	SR,CS
NC606-11	9	9	9	8	7	8	7	7	3	7	5	6	3	1	8.3	3	0	5	3	SR,SS,MS,RZ,CS,IL
NCB3171-7	9	9	8	6	6	7	6	7	3	7	4	7	5	0	9	0	0	8	5	SR,CS,SG,RZ
Superior	5	6	8	4	6	7	5	7	4	6	6	7	5	0	9	0	0	5	3	SR,RZ,CS,SS,MS,IL

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

² See NE1231 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 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 - 2018

Clone	Merit ² Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ³ (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ⁴	Chip Color ⁵
			cwt/A	% Atl.	1's	2's	3's	4's	5's	Culls					
AF5484-3	3	47	26	72	15	47	4	0	0	34	51	4	.	2.0	
Atlantic	2	60	36	100	27	57	6	0	0	10	63	6	.	1.0	
B3084-3	2	88	65	173	11	60	9	0	0	19	69	9	.	2.0	
BNC182-5	3	106	78	211	18	66	4	0	0	12	70	4	.	2.5	
BNC364-1	3	73	41	113	25	56	0	0	0	19	56	0	.	2.0	
BNC369-4	3	107	73	197	18	60	2	0	0	20	62	2	.	2.0	
BNC470-13	2	69	36	99	36	54	0	0	0	11	54	0	.	2.0	
BNC538-3	2	48	23	67	41	40	0	0	0	19	40	0	.	1.5	
NC470-3	2	114	85	234	21	68	5	0	0	6	73	5	.	2.0	
NC472-1	2	116	78	216	19	59	6	0	0	15	66	6	.	1.5	
NC473-2	3	37	22	61	23	46	4	0	0	27	50	4	.	3.0	
NC540-18	3	66	40	110	12	55	6	0	0	26	62	6	.	1.5	
Snowden	3	70	47	132	20	57	6	0	0	17	63	6	.	1.5	
Grand Mean		74	49												
CV(%)		56	68												
LSD(k=100)		69	54												

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

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

³ 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.

⁴ Determined by weight in air / water method.

⁵ 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. 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 - 2018

Clone	Plant Data ²				Tuber Data ²									% Internal Defects ³					Comments ⁴	
	TYPE	DIS	POLL	MAT	CLR	TXT	TCX	TSS	SHF	EYE	SIZE	DIS	APP	HN	HNR	HH	VR	BC		SR
AF5484-3	9	8	8	7	6	8	7	7	2	8	5	5	5	0	9	0	0	0	8	SR,IL,GC,FS,MS
Atlantic	6	8	8	5	6	6	6	6	3	7	5	7	5	5	8.5	5	5	5	3	SR,SS,GC
B3084-3	8	8	8	7	6	7	7	7	2	7	5	8	7	0	9	0	0	3	3	SR,SS,FS,IL
BNC182-5	7	8	8	7	6	7	6	7	2	8	5	8	7	0	9	3	0	0	10	SR,SS
BNC364-1	7	8	8	6	6	8	6	7	5	8	4	7	6	0	9	0	0	0	5	SS,SR,IL,GC,MS
BNC369-4	8	8	8	7	6	7	6	7	3	8	5	8	4	0	9	0	0	0	5	SR,SS,MS,IL,FS,GC
BNC470-13	8	8	8	7	6	7	6	7	2	8	4	8	5	0	9	0	0	0	3	SS,SR,GC
BNC538-3	9	8	8	8	6	6	7	7	2	8	5	8	5	0	9	0	0	0	3	SS,SR,SG,IL
NC470-3	8	9	8	7	5	5	6	7	4	8	5	8	7	0	9	0	0	0	8	SS,SR,MS
NC472-1	7	9	8	8	6	5	7	7	3	7	4	8	6	0	9	0	0	0	0	MS,SR,IL,SS
NC473-2	7	8	8	7	6	5	6	7	3	7	7	7	6	0	9	3	0	0	0	MS,SR,FS,GC,SS
NC540-18	9	6	8	6	5	6	7	7	2	7	5	8	4	0	9	0	0	3	5	GC,MS,SS,SR,CS
Snowden	9	8	8	7	5	5	7	6	2	6	5	7	6	0	9	0	0	3	18	SS,SR,FS

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

² See NE1231 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. NE-1731 Round White Trial. Total and marketable yield, percentage of total yield by size class, specific gravity, and chip scores of potato clones harvested 106 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

Clone	Merit ² Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ³ (% of total yield)							1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ⁴	Chip Color ⁵
			cwt/A	% Atl.	1's	2's	3's	4's	5's	Culls					
AF4648-2	3	207	111	83	10	36	18	0	0	37	54	18	1.064	2.0	
AF4872-2	3	222	170	128	3	45	31	1	0	20	77	32	1.065	3.0	
AF5040-8	2	178	123	92	14	53	16	0	0	17	69	16	1.075	1.5	
AF5225-1	3	284	218	165	12	49	29	0	0	11	77	29	1.048	4.0	
AF5280-5	3	213	169	128	7	50	29	0	0	14	79	29	1.051	1.5	
AF5429-3	2	244	193	148	8	45	32	1	0	13	79	34	1.067	2.0	
AF5450-7	3	225	169	125	11	48	27	0	0	14	75	27	1.058	2.5	
Atlantic	3	190	135	100	6	28	41	2	0	23	71	42	1.068	1.5	
B2869-29	2	252	169	127	22	63	4	0	0	11	67	4	1.073	2.0	
B2904-2	2	217	183	140	11	52	32	0	0	5	84	33	1.062	1.5	
B3012-1	2	292	211	159	21	60	12	0	0	7	72	12	1.065	2.0	
B3183-6	3	274	218	163	8	35	44	0	0	13	79	44	1.061	2.5	
BNC469-7	2	264	198	148	16	47	28	0	0	9	75	28	1.057	2.0	
Katahdin	3	134	89	66	10	35	30	0	0	25	65	30	1.049	2.5	
Kennebec	3	127	82	63	5	34	31	0	0	30	65	31	1.046	3.0	
NY149	3	182	91	67	24	48	2	0	0	26	50	2	1.053	.	
NY151	3	252	173	127	10	34	34	0	0	23	67	34	1.051	2.5	
NY152	2	236	153	116	25	61	4	0	0	10	65	4	1.062	2.0	
NY157	3	175	133	100	11	46	29	0	0	13	76	29	1.061	1.5	
Snowden	2	248	212	161	9	48	37	0	0	5	85	37	1.065	1.5	
Superior	3	197	148	112	7	47	28	0	0	18	75	28	1.058	2.5	
YukonGold	4	114	69	53	7	35	25	1	0	31	61	26	1.054	.	
Grand Mean		215	155												
CV(%)		13	18												
LSD(k=100)		45	44												

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

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

³ 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.

⁴ Determined by weight in air / water method.

⁵ 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 8b. NE-1731 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 106 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

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	8	8	8	7	6	7	6	7	3	8	5	8	4	0	9	0	0	0	0	^GC,^RZ,SR,MS,SS
AF4872-2	9	9	8	8	5	3	6	7	7	8	7	8	6	0	9	0	0	0	0	MS,SS,SR,SS,GC
AF5040-8	9	8	8	6	6	8	7	7	2	8	4	7	4	0	9	0	0	0	0	CS,SR,SS,RZ,GC,STST
AF5225-1	9	8	8	8	6	6	5	7	3	7	5	7	5	8	8.5	0	0	0	0	SR,MS,CS,SS,GC
AF5280-5	8	7	7	6	9	8	5	7	5	6	6	6	4	0	9	0	0	0	0	MS,SR,SS,CS,GC,V
AF5429-3	9	9	8	7	6	7	6	7	5	7	7	7	6	0	9	5	0	0	0	GC,MS,SS,SR,RZ
AF5450-7	8	9	8	7	6	6	6	7	3	7	6	7	6	0	9	5	0	0	0	SR,SS,RZ,GC
Atlantic	6	8	8	5	6	5	6	7	3	7	7	7	5	15	7.8	10	0	3	0	GC,SR,MS,SS
B2869-29	6	8	8	5	6	7	6	7	2	7	4	7	6	0	9	0	0	0	0	SS,SR,GC,MS
B2904-2	9	9	8	7	6	6	6	7	2	7	4	8	6	0	9	20	0	0	0	SR,SS,GC,MS
B3012-1	6	8	8	5	6	6	6	7	3	8	4	8	7	13	7.3	0	0	0	0	SS,SR,RZ,CS,GC
B3183-6	9	8	8	7	6	6	5	7	5	8	6	8	4	0	9	0	0	0	10	SR,RZ,MS,GC,SS,SG
BNC469-7	9	9	8	7	6	6	6	7	4	8	7	7	5	0	9	3	0	5	0	CS,SR,SS,SG,MS,RZ
Katahdin	8	8	8	7	6	7	5	7	4	7	5	7	5	15	8	5	0	10	0	SR,GC,RZ,CS,SS,MS
Kennebec	9	8	8	7	9	7	5	7	6	8	7	7	3	0	9	0	0	0	0	GC,MS,SR,SS
NY149	9	8	8	6	7	6	7	7	4	8	4	5	3	8	8.3	0	0	8	0	^GC,SR,^RZ,STST,SS,MS,
NY151	8	8	8	8	6	7	7	7	3	8	5	7	6	0	9	0	0	8	0	SS,SR,RZ,CS,MS,DAE
NY152	7	8	8	6	6	6	6	7	2	8	4	7	5	0	9	0	3	0	0	CS,SR,IL,SS,RZ,STST
NY157	7	8	8	6	6	6	5	7	3	8	5	7	5	3	8.5	0	0	8	5	SR,SS,RZ,IL,GC,STST
Snowden	8	8	7	7	5	5	6	7	2	6	5	8	6	0	9	8	0	0	0	SR,CS,SS
Superior	6	8	8	4	6	7	4	7	5	6	6	6	4	5	8.5	0	0	0	0	CS,SR,GC,MS,SS,RZ
YukonGold	8	8	8	5	7	7	6	7	4	8	6	5	3	25	8	0	0	13	0	^SR,SS,CS,GC

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

² See NE1231 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-1731 Red Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 104 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC – 2018

Clone	Merit ² Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ³ (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ⁴
			cwt/A	%Chf.	1's	2's	3's	4's	5's	Culls			
AF5245-1	3	105	45	89	9	26	15	0	0	50	41	15	1.062
AF5412-3	4	73	29	42	10	27	6	0	0	57	33	6	1.049
AF5414-1	3	109	53	92	7	30	8	0	0	54	38	8	1.059
BNC556-1	4	86	31	45	5	21	15	0	0	59	36	15	1.057
BNC568-1	3	108	75	137	10	57	12	0	0	20	69	12	1.057
BNC716-2	3	79	50	93	9	37	21	0	0	33	58	21	1.050
Chieftain	3	199	87	100	10	26	15	0	0	49	41	15	1.047
DarkRedNorland	3	168	104	183	21	56	4	0	0	19	60	4	1.050
Fenway Red	3	126	59	72	21	37	6	1	0	35	44	7	1.060
NC554-1	2	150	99	159	10	52	14	0	0	24	65	14	1.047
NY164	4	40	12	18	10	25	7	0	0	58	32	7	1.051
Grand Mean		113	59										
CV(%)		39	57										
LSD(k=100)		72	57										

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

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

³ 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.

⁴ Determined by weight in air / water method.

Table 9b. NE-1731 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 104 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

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
AF5245-1	6	8	8	6	1	8	5	7	5	8	5	5	3	0	9	0	0	3	8	^SR,^RZ,^GC,SS
AF5412-3	7	8	8	7	1	7	6	7	5	8	6	6	3	0	9	0	0	0	20	SR,SS,MS,RZ,STST
AF5414-1	7	8	8	6	2	7	5	7	2	7	5	6	5	0	9	0	0	0	13	^SR,SG
BNC556-1	8	9	8	6	1	8	6	7	4	8	6	7	4	0	9	3	0	5	35	^GC,SR,RZ
BNC568-1	7	9	8	6	1	7	6	7	5	7	5	7	5	0	9	0	0	0	23	SR,SS,MS,IL,SISC,RZ,SG
BNC716-2	6	8	8	6	3	7	6	7	6	7	6	6	3	0	9	0	0	0	0	SR,RZ
Chieftain	6	8	8	6	3	7	6	7	4	7	6	5	4	0	9	0	0	0	13	^SR,SG,MS,^GC
DarkRedNorland	5	5	7	3	2	7	6	7	5	7	4	6	5	0	9	0	0	0	5	SR,SISC
Fenway Red	7	6	7	5	2	8	7	7	2	7	5	7	5	0	9	0	0	8	13	SR,IL
NC554-1	6	6	8	6	2	7	6	6	5	7	5	8	6	3	8.8	0	0	3	10	SR,RZ,GC
NY164	8	6	8	7	2	7	7	7	3	7	5	6	4	0	9	0	0	0	10	^SR,SS,MS

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

² See NE1231 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-1731 Russet Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 114 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

Clone	Merit ² Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ³ (% of total yield)							Specific Gravity ⁴	
			cwt/A	%R.Nor	1's	2's	3's	4's	5's	Culls	1 7/8 to 4"		2 1/2 to 4"
AF5071-2	3	107	50	68	9	44	2	0	0	46	45	2	.
AF5312-1	3	148	116	149	6	66	12	0	0	16	78	12	.
Easton (AF3001-6)	2	174	129	181	8	59	15	0	0	18	74	15	.
ND8068-5Russ	2	174	142	188	11	77	4	0	0	8	81	4	.
RussetBurbank	3	146	78	105	11	50	2	0	0	37	52	2	.
RussetNorkotah	2	113	81	100	9	56	17	0	0	18	72	17	.
Shepody	3	69	41	54	12	63	3	0	0	22	66	3	.
Grand Mean		133	90										
CV(%)		27	33										
LSD(k=100)		66	51										

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

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

³ 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.

⁴ Determined by weight in air / water method.

Table 10b. NE-1731 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 114 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

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	
AF5071-2	9	9	9	8	5	3	6	7	8	7	7	7	3	0	9.0	3	0	0	3	GC,MS,SR,RZ,SS,Knobs
AF5312-1	7	8	8	6	5	3	6	7	6	8	6	7	5	0	9.0	0	0	0	10	SR,SG,GC,MS,SS
Easton (AF3001-6)	9	9	9	9	6	4	5	6	7	7	7	7	5	0	9.0	0	0	3	5	SR,MS,FS,GC,IL
ND8068-5Russ	5	6	7	3	6	4	6	7	6	8	5	8	7	0	9.0	0	0	0	8	SR,SS,MS,GC
RussetBurbank	9	9	9	8	6	3	6	6	6	8	6	8	3	13	7.8	0	0	13	3	MS,SR,SS,SG,GC,Knobs
RussetNorkotah	6	8	8	5	5	3	6	7	6	8	6	7	6	0	9.0	3	0	0	3	MS,SR,SS,CS
Shepody	6	8	7	6	6	7	5	7	7	8	7	6	4	0	9.0	0	0	3	13	SR,MS,SS

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

² See NE1231 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. Yellow Flesh Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 106 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

Clone	Merit ² Score	Total Yield cwt/A	Marketable Yield		Size Distribution by Class ³ (% of total yield)							Specific Gravity ⁴	
			cwt/A	%Yuk	1's	2's	3's	4's	5's	Culls	1 7/8 to 4"		2 1/2 to 4"
Natascha	2	164	100	112	24	54	2	0	0	20	56	2	1.058
NC600-10	3	235	161	196	14	54	13	0	0	19	68	13	1.063
NC606-23	3	196	86	102	40	41	2	0	0	17	43	2	1.053
NC640-2	2	155	91	114	33	56	3	0	0	8	59	3	1.069
NC640-3	2	118	60	76	38	51	0	0	0	11	51	0	1.065
NC640-7	2	180	71	85	50	39	0	0	0	11	39	0	1.068
NC641-1	4	157	64	77	9	27	13	0	0	51	40	13	1.057
NC674-37	2	266	178	215	17	53	14	0	0	16	67	14	1.075
NC678-3	3	166	48	57	63	26	3	0	0	9	29	3	1.078
NC678-42	3	92	38	47	48	41	0	0	0	11	41	0	1.073
NC699-61	2	153	72	84	39	46	0	0	0	14	46	0	1.060
Soraya	3	278	192	228	10	62	6	0	0	22	68	6	1.047
Vivaldi	2	199	129	151	19	61	2	0	0	17	63	2	1.050
Yukon Gold	3	137	84	100	11	34	26	1	0	28	61	27	1.060
Grand Mean		178	98										
CV(%)		20	33										
LSD(k=100)		60	56										

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

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

³ 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.

⁴ Determined by weight in air / water method.

Table 11b. 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 106 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

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	
Natascha	9	8	8	7	7	7	6	7	5	8	4	8	6	0	9.0	3	0	0	5	SR,MS,SS,SG,CS
NC600-10	9	8	8	7	7	7	7	7	3	7	5	7	5	18	8.2	0	0	0	10	SR,SS,MS,GC,CS,DAE
NC606-23	8	8	8	7	7	8	5	7	4	8	3	7	5	0	9.0	0	0	3	8	SR,MS,SS,SG,CS
NC640-2	6	7	8	5	7	8	4	7	5	8	4	7	6	3	8.5	5	0	3	0	SS,MS,CS,SR,RZ
NC640-3	5	6	7	3	7	7	6	7	5	8	3	8	6	0	9.0	0	0	0	0	SS,SR,MS,GC,CS
NC640-7	5	8	8	4	7	8	6	7	3	6	3	8	5	0	9.0	0	0	0	0	SS,MS,SR,GC,CS
NC641-1	5	7	7	6	7	7	6	7	5	7	5	6	3	8	8.8	0	0	0	0	^GC,^RZ,MS,SS,SR,CS
NC674-37	9	9	8	8	7	8	7	7	3	7	4	7	5	0	9.0	0	0	0	5	SR,SS,MS,SG,GC
NC678-3	5	3	8	2	7	8	7	7	1	7	2	8	5	3	8.5	3	0	0	0	SR,SS,CS
NC678-42	5	8	7	4	1	7	6	7	3	8	3	7	5	0	9.0	5	0	0	5	SR,SS,MS,GC,CS
NC699-61	6	7	8	6	2	7	6	7	5	7	3	7	6	0	9.0	0	0	0	5	SR,MS,CS
Soraya	9	8	8	8	7	8	6	7	6	7	6	8	5	0	9.0	0	0	25	0	SR,MS,SG,GC,CS,MS
Vivaldi	8	7	7	7	7	8	6	7	6	8	5	7	6	10	7.8	0	0	0	0	SR,MS,SS,CS,SG
Yukon Gold	8	7	7	5	7	7	6	7	3	7	5	6	4	3	8.5	0	0	8	0	GC,CS,MS,SR

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

² See NE1231 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. Specialty Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 104 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

Clone	Merit ² Score	Total Yield		Marketable Yield		Size Distribution by Class ³ (% of total yield)						1 7/8 to 4"	2 1/2 to 4"	Specific Gravity ⁴	Chip Color ⁵
		cwt/A	cwt/A	%Atl	1's	2's	3's	4's	5's	Culls	to 4"				
AAF08155-1	2	136	80	93	24	48	10	0	0	18	58	10	1.043	.	
Adirondack Blue	3	108	69	84	8	48	16	0	0	28	64	16	1.049	3.0(p1)	
Adirondack Red	4	35	12	14	19	27	0	0	0	54	27	0	1.049	2.5(r1)	
All Blue	3	85	26	32	48	30	0	0	0	22	30	0	1.047	.	
Amarosa	3	75	4	4	69	5	0	0	0	25	5	0	1.046	2.5(vr,r1)	
Atlantic	3	151	113	100	9	41	30	0	0	19	72	31	1.065	1.5	
NC502-10	3	150	80	99	30	47	3	0	0	20	50	3	1.064	2.0(p3)	
NC507-15	3	57	14	15	53	26	0	0	0	21	26	0	1.062	2.5(r1)	
NC508-17	4	37	8	12	24	21	0	0	0	54	21	0	1.029	.	
NC508-37	2	199	125	141	18	60	3	0	0	19	63	3	1.063	2.5(p3)	
NC509-16	2	176	90	93	36	49	2	0	0	14	51	2	1.053	3.0(p2)	
NC651-2	2	149	109	114	9	59	14	0	0	18	73	14	1.043	3.5(p1)	
NC674-32	3	164	33	37	31	20	0	0	0	49	20	0	1.058	.	
NC674-45	2	143	11	12	69	8	0	0	0	22	8	0	1.056	.	
NC674-53	3	72	19	21	61	26	0	0	0	13	26	0	1.064	2.0(p2)	
NC693-51	3	97	46	48	30	45	1	0	0	24	46	1	1.049	.	
NC694-80	3	77	32	32	32	40	1	0	0	26	42	1	1.045	.	
NC695-46	3	42	16	19	32	34	1	0	0	32	35	1	1.053	.	
NC703-16	3	63	23	31	43	34	0	0	0	23	34	0	1.043	.	
NDAF113458-2	2	197	115	121	23	49	9	0	0	19	58	9	1.043	.	
Purple Majesty	3	77	16	18	55	20	0	0	0	25	20	0	1.047	2.0(p1)	
Purple Pelisse	3	63	3	3	77	5	0	0	0	18	5	0	1.050	2.5(p1)	
US Blue	3	101	35	38	37	34	0	0	0	29	34	0	1.047	.	
Grand Mean		107	47												
CV(%)		33	53												
LSD(k=100)		57	40												

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

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

³ 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.

⁴ Determined by weight in air / water method.

⁵ 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; p1 = light purple, p2 = medium purple color, p3 = dark purple

Table 12b. 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 104 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2018

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
AAF08155-1	8	9	9	7	7	7	4	7	4	7	5	7	6	0	9	0	0	0	3	SS,SR,GC,MS,CS,SG
Adirondack Blue	6	7	8	6	1	7	5	7	5	6	7	7	4	0	9	0	0	0	13	SR,SISC,MS,GC,PF2
Adirondack Red	5	6	7	5	3	7	5	7	7	7	7	6	3	0	9	0	0	0	12	SR,MS,GC,SS,RZ,CS,SG,RF1
All Blue	8	7	8	7	1	6	6	7	7	8	5	6	3	0	9	0	0	0	8	^SISC,CS,SR,MS,Knobs,PF1
Amarosa	8	8	8	9	2	7	6	7	6	8	3	7	5	0	9	0	0	0	0	MS,CS,SR,SG,RF1
Atlantic	6	8	7	5	6	6	7	7	3	7	6	8	7	15	7.9	3	0	3	3	SR,SS,GC,CS
NC502-10	7	8	8	7	1	2	5	7	4	7	5	6	5	0	9	0	0	0	10	MS,SR,CS,PF2.5
NC507-15	5	6	8	4	2	7	6	7	6	8	3	7	7	0	9	0	0	0	3	SR,MS,CS,SISC,RF1.5
NC508-17	9	9	8	8	1	7	5	7	6	8	6	7	3	0	9	0	0	0	13	^GC,SISC,MS,SR,RZ,PF2
NC508-37	6	8	8	6	1	7	5	7	5	8	5	7	6	0	9	0	0	0	8	SR,SISC,MS,SS,PF2.5
NC509-16	9	9	8	7	1	8	6	7	5	8	5	8	6	0	9	0	0	0	5	SR,MS,GC,SG,IL,STST,PF2.5
NC651-2	6	7	8	6	1	7	7	6	5	8	7	8	7	0	9	0	0	3	8	SR,GC,PF1
NC674-32	9	9	9	9	1	7	7	7	3	8	3	8	2	0	9	0	0	0	0	SR,^SG,CS,IL,PF2
NC674-45	7	9	8	6	2	7	7	7	2	8	2	8	6	0	9	0	0	0	3	SG,SR,SS,RF0.5
NC674-53	6	6	8	5	1	7	6	7	5	8	3	8	6	0	9	3	0	0	20	SR,MS,GC,SS,PF2
NC693-51	5	6	7	5	1	8	6	7	6	5	6	7	3	0	9	0	0	0	10	SR,SS,MS,GC,PF1
NC694-80	6	6	8	5	3	7	6	7	3	7	4	6	3	0	9	13	0	3	3	SR,RZ,GC,RF1
NC695-46	5	5	8	4	3	8	6	7	5	8	4	5	3	0	9	0	0	0	0	GC,SR,RZ,CS,IL,RF1.5
NC703-16	6	6	8	6	1	7	6	7	4	8	2	7	5	0	9	0	0	0	3	SR,MS,IL,GC,PF2
NDAF113458-2	8	8	8	7	7	8	6	7	4	7	6	7	6	0	9	0	0	0	3	CS,GC,SR,SS,RZ,MS,SG
Purple Majesty	8	8	8	7	1	7	6	7	4	8	4	6	3	0	9	0	0	5	0	SG,SISC,SR,IL,PF2
Purple Pelisse	6	8	8	8	1	8	7	7	7	7	4	7	5	0	9	0	0	0	3	MS,SR,SISC,RZ,PF2
US Blue	6	8	7	6	1	7	7	7	7	6	5	7	3	0	9	0	0	0	5	SR,CS,RZ,MS,PF1.5

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

² See NE1231 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

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

Seed piece Treatment: None

Weed Control: Metribuzin 0.75 lbs/A
Dual Magnum 32 oz/A
Matrix SG 1 oz/A
Intensity One 15 oz/A
Liberate 8 oz/A

Fertilizer: 237N, 50P, 220K, 25% zinc

Insect Control: Wrangler 9 fl oz/A in furrow

Disease Control: Quadris in furrow 10 fl 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: Seventeen 21' rows at 34' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Metribuzin 0.75 lbs/A
Dual Magnum 32 oz/A
Matrix SG 1 oz/A
Intensity One 15 oz/A
Liberate 8 oz/A

Fertilizer: 237N, 50P, 220K, 25% zinc

Insect Control: Wrangler 9 fl oz/A in furrow

Disease Control: Quadris in furrow 10 fl oz/A

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

Seed piece Treatment: None

Weed Control: Metribuzin 0.75 lbs/A
Dual Magnum 32 oz/A
Matrix SG 1 oz/A
Intensity One 15 oz/A
Liberate 8 oz/A

Fertilizer: 237N, 50P, 220K, 25% zinc

Insect Control: Wrangler 9 fl oz/A in furrow

Disease Control: Quadris in furrow 10 fl 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-eight 21' rows at 40' row spacing, 28 hills per row
Seed piece Treatment: None
Weed Control: Boundry 2.3 pt/A
Matrix 1 oz/A
Fertilizer: 1185lbs, 16-07-17
Insect Control: Capture 1pt/A
Platinum 2.6 oz/A
Disease Control: Quadris 8 oz/A
Echo 2 pt/A (2 applications)
Revus top 9 oz/A
Vine Kill: None

Location: Tidewater Research Station, Plymouth, Washington Co., NC
Trial Title: Round White Variety Trial One
Trial Design: Randomized complete block, four replications
Plot Dimensions: Eleven 21' rows at 38' row spacing, 25 hills per row
Seed piece Treatment: None
Weed Control: Clethodim 10 oz/A – 2 applications
Fertilizer: 800lbs/A 18-18-18
25%N, 30 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 Two
Trial Design: Randomized complete block, four replications
Plot Dimensions: Eleven 21' rows at 38' row spacing, 25 hills per row
Seed piece Treatment: None
Weed Control: Clethodim 10 oz/A – 2 applications
Fertilizer: 800lbs/A 18-18-18
25%N, 30 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: Thirteen 21' rows at 38' row spacing, 25 hills per row
Seed piece Treatment: None
Weed Control: Clethodim 10 oz/A – 2 applications
Fertilizer: 800lbs/A 18-18-18
25%N, 30 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: Twenty-two 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Clethodim 10 oz/A – 2 applications

Fertilizer: 800lbs/A 18-18-18
25%N, 30 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: Eleven 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Clethodim 10 oz/A – 2 applications

Fertilizer: 800lbs/A 18-18-18
25%N, 30 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: Seven 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Clethodim 10 oz/A – 2 applications

Fertilizer: 800lbs/A 18-18-18
25%N, 30 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: Yellow Flesh 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: Clethodim 10 oz/A – 2 applications

Fertilizer: 800lbs/A 18-18-18
25%N, 30 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: Specialty Variety Trial

Trial Design: Randomized complete block, four replications

Plot Dimensions: Twenty-three 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Clethodim 10 oz/A – 2 applications

Fertilizer: 800lbs/A 18-18-18

25%N, 30 gal/A

Insect Control: Admire Pro 8 oz/A

Disease Control: None

Vine Kill: None

Appendix 2: STANDARDIZED NE1731 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.