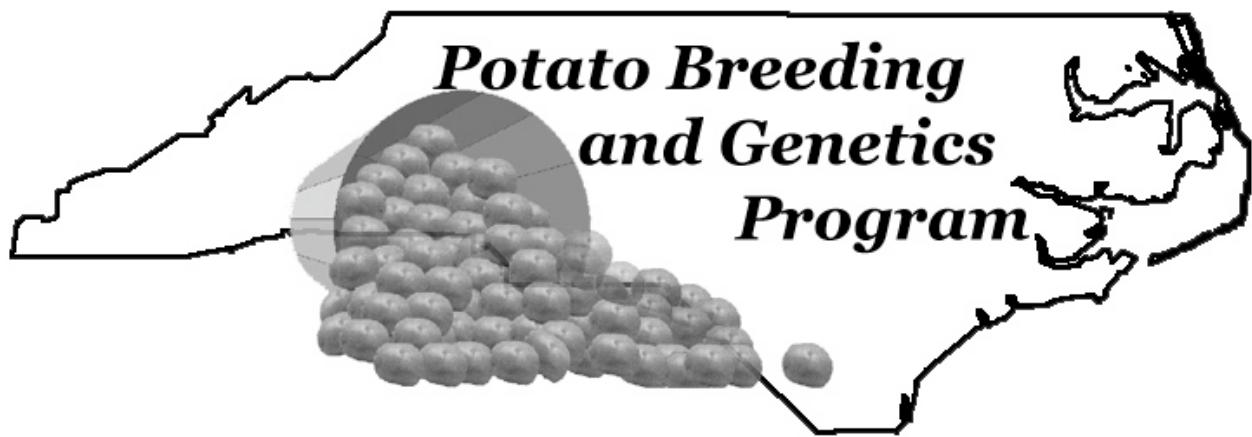


NC STATE UNIVERSITY

NORTH CAROLINA POTATO VARIETY TRIAL AND BREEDING REPORT

2019



G. C. Yencho, Professor and Leader, Potato
and Sweetpotato Breeding and Genetics
Programs
Department of Horticultural Science
North Carolina State University
214A Kilgore Hall, Raleigh NC, 27695
Tel: 919-513-7417
Fax: 919-515-2505
Email: Craig_Yencho@ncsu.edu

M. E. Clough, Research Scholar and Extension
Associate, Potato Breeding and Genetics Program
Department of Horticultural Science
North Carolina State University
Vernon G. James Research and Extension Center
207 Research Station Rd., Plymouth NC 27962
Tel: 252-793-4428 Ext 156
Fax: 252-793-5142
Email: Mark_Clough@ncsu.edu

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

I. OBJECTIVES AND RESEARCH SPONSORS:

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

Our variety development research efforts are supported by the USDA National Institute of Food and Agriculture (NIFA) Northeast Region 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, Cornell University 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. This year we decided to transition from a single hill to a 3-hill format for the first cycle of selection of our general material and to do away with a separate first cycle of 4-hill selections for our specialty trials. We have continued the separate trial for Colorado potato beetle resistance breeding as 4-hill plots in cycle one. Planting, selection and advancement to 6-hill or 12-hill (Traditionally used for advancement of the specialty plots in cycle two. From 2020 on, will be used to push those that have a higher set ahead faster.), 20-hill, 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 2019, we planted 16,671 cycle one clones and selected 909 clones resulting in a 5.5% selection rate (this includes 3-hill plots, CPB 4-hill plots and single hills from Cornell University). Out of the 865 clones in our cycle two plots (this includes 6-hills, 12-hills and bulk plots), 124 (14.3%) were selected for future evaluation. In the 20-hill, specialty 60-hill plots, and 60-hill plots 272 clones were planted with 32 (11.8%) 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 704 4-hill plots for selection. We selected 205 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 2020. In this year's 2by3 trial, 185 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 36 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 48 clones for CPB resistance and for adaptation in our non-replicated 20-hill plots simultaneously. We selected 7 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 16 clones and 11 of those were selected for evaluation next year. The 4by10 trial is our most advanced screening trial and the most advanced clones will remain in this trial until testing is complete, also some of the clones with promise will be placed in yield trials if they have the appropriate agronomic characteristics.

Yield Trials

In our 11 yield trials, we evaluated 162 preliminary and advanced clones. The evaluations were conducted either on-farm, and/or at the TRS/VGJREC. We typically evaluate advanced clones at more than one site in NC. The results of the yield trials are summarized later in this report, and in Tables 1-11. Each table has two parts, the first (a) being devoted to yield information, specific gravity measurements, and chip color scores, and the second (b) providing potato plant and tuber quality characteristics. This report can also be viewed and downloaded at our website <http://potatoes.ncsu.edu>

III. 2019 PROMISING LINES:

Chip-stock clones

NC470-3

Developed by: NC State Univ.

Released: N/A

trials evaluated: 9 since (2017)

Merit Score: 2 (since 2017)

Skin Color: Brown

Flesh Color: White

Historical Data;

Maturity: late

% Standard (Atlantic): MKTB YLD 106%

% Standard (Snowden): MKTB YLD 95%

Specific Gravity: 1.066 (Atlantic 1.070)

Chip score: 1.9 (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 bulking mid-season 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 and has shown tolerance of common scab in Wisconsin and Pennsylvania and foliar resistance to late blight in Pennsylvania as well.*

Chip-stock clones cont.

NY162

Developed by: Cornell Univ.

Released: N/A

trials evaluated: 3 since (2018)

Merit Score: 2 (since 2018)

Skin Color: tan to light brown

Flesh Color: White

Historical Data;

Maturity: mid to late season

% Standard (Atlantic): MKTB YLD 95%

% Standard (Snowden): MKTB YLD 118%

Specific Gravity: 1.067 (Atlantic 1.069)

Chip score: 1.2 (exceptional to excellent)

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This is a mid to late maturing clone with good yield, gravity and chip scores. Its maturity is similar to Snowden. The size profile on this clone also tends to be mostly medium, we **saw in one trial this past season a slight amount of internal heat necrosis but not enough to raise alarm.** This clone is in the SNaC trial and has just finished it's 2nd year of testing with promising results.

Red Skin Table-stock clones

CO99076-6R

Developed by: Colorado State Univ.

Released: N/A

trials evaluated: 2 since (2019)

Merit Score: 2.1 (since 2019)

Skin Color: Red

Flesh Color: White

Historical Data;

Maturity: mid - maturing

% Standard (Chieftain): MKTB YLD 116%

% Standard (Dark Red Norland): MKTB YLD 89%

Specific Gravity: 1.054

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 similar to Chieftain but it is a very uniform variety with 3/4 of yield between 1 7/8 and 3 1/4". Tubers are round to oblong with shallow eyes. We look forward to trialing this clone in the future.

Red Skin Table-stock clones cont.

Red Endeavor

Developed by: Univ. of Wisconsin

Released: 2015

trials evaluated: 7 since (2017)

Merit Score: 2 (since 2017)

Skin Color: Red

Flesh Color: White

Historical Data:

Maturity: mid to late maturing

% Standard (Chieftain): MKTB YLD 120%

% Standard (Dark Red Norland): MKTB YLD 130%

Specific Gravity: 1.052

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.*

NCB2607-3

Developed by: NC State Univ.

Released: N/A

trials evaluated: 14 since (2008)

Merit Score: 2.6 (since 2016)

Skin Color: Red

Flesh Color: **Yellow**

Historical Data:

Maturity: early to medium maturing

% Standard (Chieftain): MKTB YLD 49%

% Standard (Dark Red Norland): MKTB YLD 53%

Specific Gravity: 1.069

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. We recognize the yield potential of this clone is low but we believe for a direct market operation there may be merit in growing something of this nature.*

Yellow Skin Table-stock clones

Belmonda

Developed by: Solana

Released: 2016

trials evaluated: 3 since (2017)

Merit Score: 2 (since 2017)

Skin Color: Yellow

Flesh Color: Lt Yellow

Historical Data:

Maturity: very late maturing

% Standard (Atlantic): MKTB YLD 207%

% Standard (Yukon Gold): MKTB YLD 218%

Specific Gravity: 1.059

Skin Texture: Smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: *This variety has been evaluated in 3 trials over the last 3 years, 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.*

Yellow Skin Table-stock clones cont.

Natascha

Developed by: Solana

Released: 2012

trials evaluated: 11 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 87%

% Standard (Yukon Gold): MKTB YLD 189%

Specific Gravity: 1.058

Skin Texture: Smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This variety has been evaluated in 11 trials over the last 5 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.

NC606-23

Developed by: NC State Univ

Released: N/A

trials evaluated: 6 since (2017)

Merit Score: 2 (since 2017)

Skin Color: Yellow

Flesh Color: Yellow

Historical Data;

Maturity: mid to late maturing

% Standard (Atlantic): MKTB YLD 59%

% Standard (Yukon Gold): MKTB YLD 159%

Specific Gravity: 1.058

Skin Texture: Smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: This variety has been evaluated in 6 trials over the last 3 years. It is an attractive yellow skin potato with a deep yellow flesh it is later than Yukon Gold the maturity is more like Snowden and the flesh color is a slightly darker yellow than Natascha. This clone carries the Ryadg PVY resistance gene.

Vivaldi

Developed by: HZPC

Released: 2012

trials evaluated: 38 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 84%

% Standard (Yukon Gold): MKTB YLD 115%

Specific Gravity: 1.062

Skin Texture: Smooth

Overall Appearance: 7 (good)

Other Attributes or Comments: This variety has been evaluated in 38 trials over the last 18 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. Worthy of note is that this was the best looking yellow flesh clone in all yield trials this year.

Specialty Table-stock clones

Peter Wilcox

Developed by: USDA/ARS – Beltsville MD

Released: 2007

trials evaluated: 51 since (2000)

Merit Score: 2 (since 2016)

Skin Color: Purple

Flesh Color: Yellow

Historical Data;

Maturity: slightly early to mid maturing

% Standard (Atlantic): MKTB YLD 77%

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

% Standard (Yukon Gold): MKTB YLD 98%

Specific Gravity: 1.068

Skin Texture: Moderately Smooth

Overall Appearance: 6 (better than fair)

Other Attributes or Comments: *This is an attractive purple skin and yellow flesh variety for the table market. Most of the marketable yield falls in the 1 7/8 to 3 1/4" category but it is an oblong potato so if we sized by ounces the profile might indicate a larger size. Over the years this variety has been evaluated by a number of organizations and without exception Peter Wilcox is a top variety for eating quality.*

Specialty Chip-stock clones

NC502-10

Developed by: NC State Univ.

Released: N/A

trials evaluated: 5 since (2016)

Merit Score: 2.7 (since 2016)

Skin Color: Purple

Flesh Color: Purple

Historical Data;

Maturity: slightly later than medium maturing

% Standard (Adirondack Blue): MKTB YLD 104%

% Standard (Atlantic): MKTB YLD 60%

Specific Gravity: 1.069

Skin Texture: Moderately Smooth

Overall Appearance: 5 (fair)

Other Attributes or Comments: *Even though this clone has fair overall appearance 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 it's fried.*

NC508-37

Developed by: NC State Univ.

Released: N/A

trials evaluated: 5 since (2016)

Merit Score: 2.5 (since 2016)

Skin Color: Purple

Flesh Color: Purple

Historical Data;

Maturity: medium maturing

% Standard (Adirondack Blue): MKTB YLD 132%

% Standard (Atlantic): MKTB YLD 77%

Specific Gravity: 1.066

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 3 points lower than NC502-10.*

Russet clones

ND8068-5Russ

Developed by: ND State Univ.

Released: N/A

trials evaluated: 4 since (2016)

Merit Score: 2 (since 2016)

Skin Color: Brown

Flesh Color: White

Historical Data:

Maturity: early maturing

% Standard (Russet Norkotah): MKTB YLD 133%

Specific Gravity: 1.072

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.*

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 15	Jul 1, Jul 2	108, 109
James Brothers	Barclay silt loam	Mar 18	Jun 20	94
TRS/VGJREC	Portsmouth fine sandy loam	Apr 4, 5	Jul 11 to Jul 22	Variable 98 - 108

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 and two preliminary yield trials at the TRS that each have 2 replications. Fifty clones in three trials were evaluated on-farm at Black Gold Farms and twenty-seven clones at James Brothers. Plots at the TRS consisted of one row with 25 hills spaced 10 inches apart. Unless the plots were russet trials then they had one row with 21 hills spaced 12 inches apart. Plots at 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 within 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 6 of our 11 trials this year. In two trials it received a merit score of 2.6 and 2.7 (rounded to 3) and in the rest it received a merit score of 4. Atlantic was given ratings of 4 due largely to poor internal quality. Overall this averages to 3.5 rounded to a 4 merit score with an overall drop rating. It also should be noted that last year Atlantic averaged a 2.3 or keep rating.

VI. RESULTS:

Environmental Summary

Planting began on the 15th of March this year and was completed by the first week in April. Rainfall ahead of planting kept us out of the field in early March and delayed us in the middle of March as well. After planting was complete rainfall was scarce throughout the season and only two rainfall events of significance occurred, one in late May and the other just ahead of harvest at the TRS in late June. Temperatures in late May spiked to unusual highs for about ten days to 2 weeks into the mid to upper 90's broken by a rain event which kept the heat at bay for about 5 to 7 days and then the heat returned in early June. Lack of moisture and high heat during bulking led to reduced yields and high levels of rot and common scab across plots at the TRS. While this is unfortunate for yield trials these extreme conditions allowed us to evaluate susceptibility to internal heat necrosis and brown center, an important part of our programs mission.

A. Yield Trials

1. On-Farm Trials

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

This year all of the trials at Black Gold farms in Gum Neck were located on land with sub-surface irrigation. This technology not only allowed Black Gold to increase soil moisture but also enabled the drawing off of excess moisture as well. This ability to control the water table beneath the plants appears to be evident in the yields with regard to the other trials, both on-farm and at the TRS where yields were significantly diminished this season. In fact marketable yields were up slightly in the trials with Black Gold this year as opposed to the last.

Ten of the twenty-six clones in this trial received a merit score of 2 (keep): Belmonda, CO99076-6R, Envol, MSX569-1R, Natascha, Prada, Red Endeavor, Soraya, Superior and Vivaldi. The marketable yields in this trial were compared to Chieftain (242 cwt/a) for the red skins, Yukon Gold (175 cwt/a) for the yellow flesh clones and Superior (256 cwt/a) for the white skins. Three of the red skin clones had a higher marketable yield than Chieftain: MSW343-2R

(296 cwt/a), Red Endeavor (283 cwt/a) and CO99076-6R (253 cwt/a). Five yellow flesh clones had significantly higher marketable yields than Yukon Gold : Soraya (392 cwt/a), Belmonda (351 cwt/a), Prada (315 cwt/a), Vivaldi (309 cwt/a) and Natascha (267 cwt/a). Superior had the highest marketable yield of the white skins. One clone had an overall appearance rating of 7 (good); NCB2607-3. Eight clones had overall appearance ratings of 6 (better than fair): Belmonda, CO99076-6R, MSX569-1R, Natascha, Soraya, Strawberry Paw, Superior and Vivaldi. Three clones expressed internal heat necrosis (IHN) at 10% or greater incidence, Sunshine (33% IHN with an heat necrosis rating (HNR) of 7.5), Captain (10% IHN with an HNR of 8.3) and Chieftain (10% IHN with an HNR of 8.5). Only SFVario (10%) expressed soft rot (SR) with an incidence equal to or greater than 10%. No other significant internal defects were recorded. External defects observed in the trial were soft rot, growth cracks, misshapes, sunscald, common scab, infected lenticels, secondary growth and skin blemishes due to Rhizoctonia.

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

Four of the fifteen varieties in the trial received a merit score of 2. Atlantic, the standard, had a marketable yield of 299 cwt/a, two clones had a higher marketable yield: NC470-3 (320 cwt/a) and CO03242-3W (303 cwt/a), though neither was significantly greater. Gravities in the trial ranged from a low of 1.059 to 1.070, Atlantic had a gravity of 1.070, only NC470-3 had an equal gravity all other clones in the trial were lower. Six clones had chip ratings of 1.5 (excellent to exceptional): AACValley Crisp, Atlantic, NCB3259-1, ND12180ABC-8, Snowden and Waneta. Two clones had overall appearance scores of 8 (better than good), CO03242-3W and NC470-3. Two clones: AACValley Crisp and BNC182-5 had overall appearance scores of 7 (good). Atlantic expressed 28% incidence of IHN with an HNR of 7.7 and Brown Center (BC) at 13% incidence. One clone, NC508-37 had 18% incidence of SR. No other internal defects were recorded at incidence levels greater than 10%. External defects observed in the trial were soft rot, sunscald, growth cracks, misshapes, common scab, infected lenticels and skin blemishes due to Rhizoctonia. Chip defects were primarily vascular ring discoloration, insect damage, brown center and internal heat necrosis.

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

Three clones in this trial received a merit score of 2 (keep): Mackinaw(MSX540-4), MSV030-4 and NY162. Atlantic had a marketable yield of 254 cwt/a and one clone, NY162 (269 cwt/a) had higher marketable yield, Atlantic had a gravity of 1.072, Snowden had an equal gravity and MSV030-4 (1.073) had higher gravity all others were less than Atlantic. Two clones in the trial received a chip score rating of 1 (exceptional) in the 24 to 48 hour chip test: MSV030-4 and NY162. In the 5 to 7 day chip test the highest rating was 1.5 (excellent to exceptional), received by NY162. Two clones received an overall appearance rating of 7 (good): Atlantic and CO10073-7W. Atlantic expressed 20% incidence of IHN with an HNR of 7.7. Two clones expressed Vascular Ring Discoloration (VR) at 10% or greater incidence: Atlantic (12%) and CO10073-7W (10%). AOR09034-3 expressed 10 incidence of BC. No other internal defects were observed at levels equal to or greater than 10%. External defects observed were: soft rot, sunscald, misshapes, growth cracks, common scab, infected lenticels and skin blemishes due to Rhizoctonia. Chip defects included vascular ring discoloration, insect damage, brown center, soft rot, and stem end browning.

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

Of the Twenty-seven clones in the trial eleven received a merit score of 2: CO98012-5R, CO99076-6R, Dark Red Norland, NC606-23, NC640-2, NC640-3, NCB2607-3, NCB3171-3, ND8068-5Russ, Peter Wilcox and Vivaldi. Three marketable yield standards were chosen: Atlantic (197 cwt/a, round white standard), Chieftain (118 cwt/a, red standard) and Yukon Gold (115 cwt/a, yellow flesh standard). Across all clones Dark Red Norland (243 cwt/a) had the highest marketable yield, this may have been because moisture was extremely limited and Dark Red Norland was able to capitalize on available moisture in the ground early in the season left from pre-plant rain events. None of the white clones had higher marketable yields than Atlantic, Both Dark Red Norland and Peter Wilcox (213 cwt/a) had significantly higher marketable yields than Chieftain. While six clones yellow flesh clones had higher marketable yields than Yukon Gold only Peter Wilcox and NC606-23 (164 cwt/a) were significantly greater. Clones with an overall appearance score of 7 were: NC606-23, NC640-2, NC640-3, NCB2607-3, NCB3171-7, ND8068-5Russ and Vivaldi. The specific gravity for Atlantic in this trial was 1.070, of the chip stock clones none had a higher gravity, though one yellow flesh clone was higher, NC640-2 (1.071). Only three clones were chipped in this trial and the best rated was NCB3171-7 rating a 2 (excellent). Two clones expressed IHN at 10% or greater incidence: Atlantic (20% incidence with a 8.3 HNR) and CO052211-4R (13% incidence with a 7.6 HNR). 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, common scab, infected lenticels, secondary growth and skin blemishes due to Rhizoctonia. Chip defect were vascular ring discoloration and soft rot.

2. TRS/VGJREC Yield Trials

Yield trial planting at the TRS occurred the first week of April this year and while we typically plant mid to late March this delayed planting, lack of moisture and high late May heat caused these trial to suffer in plant growth and yield.

Round White Trial (Tables 5a and 5b)

None of eighteen clones in this trial received a merit score better than a 3 (marginal). Atlantic had a marketable yield of 63 cwt/a and three clones in the trial had higher marketable yield: BNC369-4 (84 cwt/a), AF5819-2 (81 cwt/a) and BNC426-2 (81 cwt/a) One clone, NCB3259-2 received an overall appearance score of 7 (good). Three clones received an overall appearance score of 6 (better than fair): B2869-29, B3175-8 and BNC369-4. Atlantic had a specific gravity of 1.068, four clones had higher gravities: B2834-8 (1.078), NC587-10 (1.077), NC636-5 (1.071) and B2869-29 (1.070). For chipping two clones were rated exceptional (1.0): B2904-1 and B3175-8. Seven clones chipped rated 1.5 (excellent to exceptional): AF5819-2, Atlantic, B2834-8, B2869-29, B3265-9, NCB4259-2 and Snowden. Four clones expressed 10% or greater incidence of IHN: Atlantic (38% IHN with an HNR of 6.6), BNC369-4 (25% IHN with an HNR of 7.0), Snowden (15% IHN with an HNR of 8.1) and Jennifer (10% IHN with an HNR of 8.1). Six clones expressed 10% or greater incidence of BC: Snowden (43%), NC587-10 (40%), BNC369-4 (28%), Atlantic (25%), B2869-29 (15%) and NCB3259-2 (10%). 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, secondary growth and skin blemishes attributed to Rhizoctonia. Chip defects included insect damage, internal heat necrosis, vascular ring discoloration, stem end browning and brown center.

NE-1731 Round White Trial. (Tables 6a and 6b)

One clone, NY162, out of the twenty-one in this trial received a merit score of 2. Two clones had greater marketable yield than Atlantic (70 cwt/A), though only Snowden (118 cwt/a) had significantly higher marketable yield. Atlantic had a specific gravity of 1.066, five clones had higher gravity: AF4050-8 (1.073), Niagara (1.071), NY165 (1.069), NY162 (1.068) and B3012-1 (1.067). Eight of thirteen clones chipped had a chip rating of 1.5: AF5040-8, AF5563-5, AF5677-4, Atlantic, BNC469-7, NY151, Niagara and NY162. The only clone to rate an overall appearance rating of 7 in the trial was NY162. Seven clones expressed IHN at 10% or greater incidence: Katahdin (80% incidence with an HNR of 4.5), Atlantic (68% incidence with an HNR of 5.7), AF5225-1 (35% incidence with an HNR of 6.9), Yukon Gold (25% incidence with an HNR of 7.7), Snowden (18% incidence with an HNR of 7.5), AF5563-5 (10% incidence with an HNR of 7.6) and NY151 (10% incidence with an HNR of 7.9). One clone expressed 10% internal incidence of HH, AF5677-4 (10%). One clone expressed 10% or greater incidence internal incidence of VR, AF5677-4 (73%). Nine clones expressed 10% or greater incidence of BC: Snowden (68%), Yukon Gold (38%), AF5225-1 (25%), BNC469-7 (20%), AF5429-3 (18%), Katahdin (15%), Atlantic (10%), Envol (10%) and NY162 (10%). No other internal defects were expressed at levels of 10% or greater. The most common culls were soft rot, misshapes, secondary growth, growth cracks, common scab, sunscald and skin blemishes due to Rhizoctonia. Chip defects included brown center, insect damage, vascular ring discoloration and stem end browning.

NE-1731 Red Trial. (Tables 7a and 7b)

Two of the eleven clones in this trial received a merit score of 2: BNC201-1 and NDAF113484B-1. The standard, Chieftain, had a marketable yield of 41 cwt/a, three clones had higher marketable yields: NDAF113484B-1 (56 cwt/a), BNC201-1 (44 cwt/a) and Fenway Red (42 cwt/a). One clone received an overall appearance score of 7: NCB2607-3 all others were lower. Four clones expressed IHN at 10% or greater incidence: AF5245-1 (20% incidence with an HNR of 7.9), Chieftain (18% incidence with an HNR of 7.5), AF5414-1 (15% incidence with an HNR of 8.1) and Fenway Red (10% incidence with an HNR of 8.6). 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, common scab and skin blemishes due to Rhizoctonia.

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

The highest merit score in this trial was 3 (marginal), this rating was assigned to five of the eight clones: AF4872-2, AF5492-6, Gold Rush, ND8086-5Russ and Russet Norkotah. The standard, Russet Norkotah, had a marketable yield of 62 cwt/A, one clone, Gold Rush (70 cwt/a), had greater average marketable yield. The best appearance score in the trial was 5 (fair), 4 clones were assigned this rating: AF5492-2, Gold Rush, ND8086-5Russ and Russet Norkotah. One clone expressed IHN at 10% or greater incidence: Russet Burbank (25% incidence with an HNR of 7.5). Four clones expressed BC at 10% or greater incidence: Reveille Russet (28%), Russet Burbank (13%), Russet Norkotah (13%) and Shepody (13%). No other internal defects were expressed at levels of 10% or greater. Culls were mostly soft rot, misshapes, sunscald, secondary growth, growth cracks, common scab and skin blemishes attributed to Rhizoctonia.

Yellow Flesh Trial. (Tables 9a and 9b)

Two of twelve clones received a merit score of 2: NC640-2 and NC640-3. This trial was so effected by the environmental conditions this year that the highest marketable yield was Soraya

at 24 cwt/a, typically this clone will yield greater than ten times that amount. Yukon Gold the standard yellow flesh only had a marketable yield of 6 cwt/a. Overall appearance scores were less than fair and the best overall appearance in the trial was fair, given to three clones: NC606-23, NC640-2 and NC640-3. Three clones expressed IHN at 10% or greater incidence: Vivaldi (23% incidence with an HNR of 7.4), Paroli (13% incidence with an HNR of 7.4) and Soraya (10% incidence with an HNR of 8.0). One clone, NC678-42 expressed 10% VR. Four clones expressed 10% or greater incidence of BC: NC678-42 (47%), Yukon Gold (15%), NC606-23 (13%) and Soraya (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 secondary growth.

Two-Replication Trials

All of the experimental clones for these trials come from the University of ME this year. The two-replication trials were designed to gain more robust information on clones that are too early in the pipeline to supply the full amount of seed necessary for a yield trial with four replications but have been trialed in our non-replicated yield trials.

Russet Trial (Tables 10a and 10b).

With an increasing emphasis on russet type potatoes from the University of ME we have been given the opportunity to evaluate more of this class of potato. This year there were 10 clones in the trial and only one, AAF1070736-2 received a merit score of 2. Like the yellow flesh trial marketable yields were very low, the standard Russet Norkotah was 30 cwt/a and is normally five times that amount. Two clones in the trial had significantly higher marketable yields: NDAF113476CB-3 (117 cwt/a) and NDAF113555CB-2 (92 cwt/a). Two clones received overall appearance scores of 6 (better than fair): AAF1070736-2 and NDAF113476CB-3. Two clones expressed IHN at 10% or greater incidence: NDAF113476CB-3 (20% incidence with an HNR of 7.8) and NDAF113555CB-2 (15% incidence with an HNR of 8.2). Three clones expressed 10% or greater incidence of BC: NDAF113555CB-2 (55%), AF5745-3 (15%) and COAF13004-1 (10%). No other internal defects were expressed at levels of 10% or greater. Culls were mostly soft rot, misshapes, sunscald, growth cracks, common scab, secondary growth and skin blemishes attributed to Rhizoctonia.

General Trial (Tables 11a and 11b).

There were twenty-eight clones in this trial, the highest merit rating was 3 and that was assigned to thirteen of the clones. This trial contained round whites, and red skin clones so we chose Atlantic for a round white standard and Chieftain for our red standard. Atlantic had a marketable yield of 89 cwt/a, three clones had higher marketable yields: AAF09055-2WH (98 cwt/a), AF5715-6 (94 cwt/a) and MSAFB609-12 (91 cwt/a). None of the red skin clone had a higher marketable yield than Chieftain (119 cwt/a). Only one clone in the trial, NDAF102696C-5 received a 7 for overall appearance. Incidence for IHN was higher in this trial than all other yield trials this season fifteen clones expressed 10% or greater incidence, the worst in trial were: AF5716-6 (100% incidence with an HNR of 2.6), Atlantic (55% incidence with an HNR of 6.1) and MSAFB636-1 (55% incidence with an HNR of 5.3). Three clones expressed 10% or greater incidence of HH: AF5891-1 (25%), AAF09055-2WH (10%) and NDAF14424-1 (10%). Two clones expressed 10% or greater incidence of VR: AF6050-1 (20%) and AF5931-1 (10%). Eleven clones expressed 10% or greater incidence of BC, the worst four were: AF5891-1 (50%), AAF09055-2WH (30%), AF5994-2 (30%) and AF6016-2 (30%). One clone, AF6048-4

expressed 10% incidence of SR. Culls were mostly soft rot, misshapes, sunscald, growth cracks, common scab, secondary growth and skin blemishes attributed to *Rhizoctonia*.

B. Breeding and Early Generation Selection Efforts

NCSU Potato Variety Development Efforts

Historically our efforts to develop varieties in North Carolina begin with selection as single-hill plots in year one. This year we transitioned to 3-hill plots in year one with the intent of being able to skip what would be equivalent to the 3rd year of selection (20-hill plots). However since we receive remnant mini-tubers from the Cornell program as a supplement of 1st generation materials and these are planted as single hills we will likely have a dual track program. Beginning in 2020 clones that set enough tubers regardless of whether they are a 3-hill or single hill plot in year one will go to a 12-hill format. Those clones with lower yields will stay in the current increase pattern and go to 6-hill plots in year 2. In year 3 selections from 12-hill plots will advance to 60-hills and 6-hills will advance to 20-hills. After 60-hill plots surviving clones move to 160-hill plots and on to 320-hills the following year. Increase to plots of higher volumes than 320-hills is dependent on perceived demand for a given clone by the market and interested cooperators.

This year in our 1st generation of field material we planted a total of 9626 clones in our 3-hill, and 6341 single hill plots for a total of 15,967 clones. We selected 555 clones from our 3-hills and 149 from our singles for a total of 704 clones or 4.4%. In our year 2, 6-hill plot we planted 735 clones and selected 109 (14.8%). In our 20-hill plot, year 3, we planted 148 clones and selected 20 (13.5%) and in our 60 hill, year 4 plot we planted 114 clones and selected 11 (9.6%).

Specialty Clone Evaluation

Because we have moved the 1st cycle of selection of NCSU clones to a 3-hill format we will no longer partition the specialty variety development program. Because we started with 4 hills in 2018 we had enough seed in the 2nd year to plant 12-hill rather than 6-hill plots 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. In year 4 these materials are included in our 160-hill increase plots in preparation for yield trials. In our 12-hill plots we evaluated 36 clones and selected 5 (13.9%) and in the specialty 60-hill plot 10 were evaluated and 1 was selected (10%).

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 704 clones to evaluate resistance and selected 205 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, 185 of the 735 clones came from this CPB resistance project. From the 185 CPB clones, 36 were selected for advancement to the 20 hill selection plots and the next cycle of CPB

resistance screening. Of the 148 clones in our 20 hill plots 48 clones were part of the CPB resistance screen and 7 of those were selected for advancement to the 60 hills. Of the 114 clones in this year's 60-hill plots 12 were CPB clones and two 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 134 ME clones and 9 of them received a merit score of 2, one clone, AF6526-7 received a 1 this year. These will be evaluated in 2012 in a non-replicated 25-hill plot in a yield trial.

Observational Trial.

Fifty-two clones were evaluated in this trial as well as the standards: Atlantic, Chieftain, Dark Red Norland, Snowden, Adirondack Blue, 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 evaluated 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 three 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 50 clones, this year however we chose to place 21 of these in the early generation southern selection trial because they were selected from chipping crosses the remaining 29 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 1 clone a merit score of 2 none received a 1 this year. Next year we will reevaluate these clones in our non-replicated 25-hill yield trial (Unreplicated trial).

Unreplicated Trial.

Forty 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 evaluated 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 2 clones received a merit score of 2. We will evaluate some of these clones in a replicated yield trial next year.

Cornell University Trial

This was the 1st year of collaboration at this level with Cornell University. As with the other early generation projects we received 8 hills of 153 clones. Because this was such a challenging year yield and specific gravity were largely excluded from consideration for merit and instead we focused on grader appearance and internal quality. We gave 10 clones a merit score of 2 none received a 1. Data was returned to Cornell University to aid in the decision for advancement with in their program.

VII. ACKNOWLEDGMENTS

This work could not be conducted without the assistance of the growers, county extension agents and NCDA&CS TRS staff. We are grateful for their continued support and assistance. Seed for the trials was provided by: Dr. Walter De Jong, Cornell University; Dr. Creighton Miller, Texas A&M; Dr. Dave Douches, Michigan State University; Dr. Greg Porter, University of Maine; Dr. Kathleen Haynes, USDA/ARS, Beltsville, MD; and Dr. Asunta Thompson, North Dakota State University. 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.

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 109 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2019

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
			Marketable Yield												
			cwt/A	%Chf.	%Sup.	%Yuk.	1's	2's	3's	4's	5's	Culls			
BalticFire	4.0	407	206	89	81	121	18	37	13	1	0	31	51	13	1.044
Belmonda	1.8	425	351	151	137	206	10	51	29	2	0	7	82	31	1.057
Captain	4.0	388	221	91	86	133	3	23	28	5	0	40	57	34	1.049
CEG-012	2.8	312	192	82	77	116	22	49	11	0	0	18	60	11	1.055
Chieftain	4.0	368	242	100	95	147	6	26	38	2	0	29	65	39	1.052
CO99076-6R	2.1	343	253	108	100	151	9	40	34	0	0	17	74	34	1.054
Dark Red Norland	2.9	321	224	96	91	137	8	37	30	2	0	23	69	32	1.052
Envol	2.3	290	241	102	96	145	8	42	41	0	0	8	83	41	1.064
Lucera	2.8	408	120	51	50	76	53	29	0	0	0	18	29	0	1.044
Modoc	3.3	273	144	62	56	84	17	41	12	0	0	31	53	12	1.054
MSW343-2R	4.0	403	296	129	118	176	7	27	42	5	0	19	74	47	1.050
MSX569-1R	2.3	353	214	92	85	127	30	55	5	0	0	10	60	5	1.046
Natascha	1.9	360	267	114	106	160	12	63	11	0	0	13	74	11	1.057
NC606-23	2.9	319	195	87	81	118	15	44	16	0	0	25	60	16	1.056
NCB2607-3	2.5	205	120	51	49	73	29	53	5	0	0	13	58	5	1.063
ND8068-5Russ	2.6	249	192	83	75	113	13	68	9	0	0	10	77	9	1.067
Nixie	4.0	317	141	63	59	85	14	37	7	0	0	42	44	7	1.053
NorlandRP	2.7	319	207	86	83	126	9	37	27	0	0	27	64	27	1.051
Prada	2.3	450	315	136	127	189	9	47	22	0	0	21	70	23	1.052
Red Endeavor	2.4	414	283	121	112	170	11	36	32	0	0	21	68	32	1.049
SFVario	4.0	380	80	34	32	47	11	19	2	0	0	68	21	2	1.047
Soraya	2.0	486	392	165	157	238	9	64	16	0	0	11	80	16	1.050
Strawberry Paw	2.6	303	199	88	78	116	6	18	43	3	0	29	65	47	1.053
Sunshine	4.0	356	131	55	52	80	14	36	1	0	0	49	37	1	1.046
Superior	2.0	294	259	111	100	151	5	32	52	4	0	8	88	56	1.063
Vivaldi	1.9	415	309	130	124	189	10	52	21	1	0	15	74	22	1.050
Yukon Gold	4.0	253	175	77	68	100	6	20	38	11	0	24	69	49	1.065
Grand Mean		348	221												
CV(%)		13	21												
LSD(k=100)		75	75												

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 109 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2019

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	
BalticFire	9	9	8	8	3	7	5	7	5	8	3	6	3	0	9.0	0	0	0	0	SR,SG,MS,SS
Belmonda	9	9	8	8	7	7	6	7	5	7	5	8	6	0	9.0	0	0	3	3	SS,SG,MS,SR
Captain	9	9	8	7	6	8	5	7	4	8	7	7	3	10	8.3	0	0	3	5	SR,MS,SG,GC,SS
CEG-012	6	9	8	3	2	7	6	7	2	7	4	6	4	0	9.0	0	0	0	0	RZ/CS,SR,SS,MS,SG
Chieftain	9	9	8	6	3	8	5	7	5	8	6	5	3	10	8.5	0	0	0	5	SS,RZ,CS,SR,SG,GC
CO99076-6R	6	7	6	6	2	8	7	7	2	8	4	6	6	0	9.0	0	0	0	0	SS,GC,SG,SR,MS,RZ/CS
Dark Red Norland	6	9	8	3	2	7	5	7	5	6	6	8	5	8	8.0	0	3	3	3	SR,SS,MS,GC,RZ,SG,SISC
Envol	5	9	8	3	6	7	4	7	5	6	6	8	5	0	9.0	0	0	0	0	SS,SR,MS,RZ,V
Lucera	7	9	9	7	9	8	6	7	6	8	2	8	4	0	9.0	0	0	0	0	MS,SR,GC,SS,CS
Modoc	6	9	8	3	2	7	6	6	4	7	5	5	4	0	9.0	0	0	0	5	GC,SS,SR,SG,RZ
MSW343-2R	6	9	7	4	3	7	6	7	2	5	7	6	3	0	9.0	0	0	0	5	SS,SR,SG,GC,RZ,
MSX569-1R	5	9	9	2	2	8	5	7	3	7	3	7	6	3	8.8	0	0	3	3	SR,MS,SS
Natascha	9	9	8	6	7	7	6	7	5	8	5	7	6	0	9.0	0	0	3	0	SR,SS,MS,SG
NC606-23	9	9	8	7	7	7	5	7	4	8	4	6	4	3	8.8	0	0	0	0	SR,IL,RZ/CS,SS
NCB2607-3	6	4	8	3	2	8	7	7	2	7	3	8	7	0	9.0	0	0	0	0	SS,SR,MS,GC
ND8068-5Russ	5	9	8	2	5	4	6	7	6	8	5	7	5	0	9.0	0	0	0	0	SR,SS,GC,RZ/CS
Nixie	9	9	8	8	7	8	6	7	5	8	6	7	3	0	9.0	0	0	0	3	SR,IL,RZ/CS,MS,SG,HS,Knobs
NorlandRP	6	9	8	3	2	7	5	7	5	7	5	7	5	0	9.0	0	3	0	0	SR,SS,MS,SISC
Prada	6	9	8	5	7	8	6	7	7	8	7	7	5	0	9.0	0	0	3	0	SG,HS,SS,SR,IL,MS
Red Endeavor	9	9	8	7	2	8	6	7	5	8	6	7	5	3	8.8	0	0	3	3	SR,SS,SG,CS
SFVario	6	9	8	8	7	7	5	7	6	8	5	7	2	8	8.7	0	0	0	10	SR,MS,SS,SG,HS,CS
Soraya	8	9	8	7	7	8	6	7	6	8	7	8	6	5	8.5	0	0	3	5	SR,MS,RZ,SS,GC
Strawberry Paw	9	9	8	7	2	7	6	5	5	7	8	8	6	0	9.0	0	0	3	8	SR,SS,MS,GC,SISC
Sunshine	6	9	8	5	7	8	4	7	6	8	5	7	4	33	7.5	0	0	0	3	SR,CS,SS,MS,SG
Superior	6	9	8	4	6	7	4	7	4	6	6	8	6	0	9.0	0	0	3	0	SS,SR,MS,RZ
Vivaldi	9	9	8	7	7	8	7	6	6	8	6	7	6	3	8.8	0	0	0	0	IL,SR,MS,SS,CS
Yukon Gold	9	9	8	6	7	7	6	7	4	8	7	6	3	8	8.5	3	0	5	0	SR,IL,MS,SS,CS

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 109 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2019

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					
AACValleyCrisp	4.0	397	285	95	17	48	23	1	0	12		72	23	1.061	1.5
Atlantic	4.0	372	299	100	8	38	39	3	0	12		81	43	1.070	1.5
BNC182-5	2.4	360	260	87	11	42	30	0	0	17		72	30	1.065	2
CO03242-3W	2.4	373	303	102	7	37	42	2	0	11		82	44	1.063	2
Meera	2.1	368	298	100	11	50	30	1	0	8		81	31	1.069	2
NC470-3	1.7	367	320	107	5	31	53	4	0	7		87	56	1.070	2
NC475-3	4.0	222	105	36	10	27	21	1	0	41		49	22	1.059	2
NC502-10	2.6	255	181	60	18	51	18	0	0	13		69	18	1.069	Purple
NC508-37	3.3	259	154	51	29	53	6	0	0	12		59	6	1.063	Purple
NCB3171-7	2.9	248	167	56	14	42	25	0	0	19		67	25	1.068	2
NCB3259-1	2.9	265	151	51	15	41	15	0	0	28		57	16	1.065	1.5
NCB3260-1	3.0	250	135	46	18	45	9	0	0	28		54	9	1.066	2
ND12180ABC-8	3.1	202	104	34	13	34	14	1	0	38		49	15	1.063	1.5
Snowden	2.6	342	250	83	10	44	26	0	0	20		71	26	1.065	1.5
Waneta	4.0	336	255	85	5	28	45	3	0	19		76	48	1.060	1.5
Grand Mean		303	255												
CV(%)		16	21												
LSD(k=100)		80	74												

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 109 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2019

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	
AACValleyCrisp	6	9	9	5	9	8	6	7	3	6	4	7	7	0	9.0	0	0	0	0	SR,SS,GC
Atlantic	6	9	8	5	5	5	6	6	3	6	4	7	6	28	7.7	0	0	13	3	SR,SS,MS,GC,chip(IHN)
BNC182-5	9	9	8	7	6	5	6	7	2	6	5	7	7	0	9.0	0	0	0	0	SR,SS,CS,chip(VR,ID)
CO03242-3W	9	9	9	7	6	7	7	7	2	7	4	8	8	0	9.0	0	0	5	0	CS,SR,SS,RZ,chip(VR)
Meera	9	9	8	8	7	7	5	7	2	5	4	8	6	0	9.0	0	0	8	0	SS,SR,SG,chip(VR)
NC470-3	9	9	8	9	5	5	5	6	4	7	6	8	8	0	9.0	0	0	0	0	SS,GC,SR,chip(VR)
NC475-3	9	9	8	7	6	6	6	6	3	7	5	4	3	0	9.0	0	0	0	0	^RZ,SR,SS,GC,chip(VR)
NC502-10	6	9	8	5	1	7	3	7	5	7	3	7	5	3	8.8	0	0	0	10	SR,MS
NC508-37	6	9	8	6	1	7	6	7	3	7	4	8	6	0	9.0	0	0	0	18	SR,MS,SISC,
NCB3171-7	6	9	9	6	6	7	6	7	3	7	5	6	5	0	9.0	0	0	5	3	SR,MS,GC,RZ,chip(BC,VR)
NCB3259-1	9	9	9	7	6	7	6	7	2	7	3	6	6	0	9.0	0	0	0	3	SR,SS,IL
NCB3260-1	9	9	9	6	6	7	6	7	2	7	3	6	6	0	9.0	0	0	5	3	SR,SS,IL,RZ
ND12180ABC-8	6	9	8	4	9	8	5	7	2	7	3	6	6	0	9.0	0	0	0	5	SR,SS,MS
Snowden	9	9	8	7	5	5	5	6	3	5	4	7	6	3	8.8	0	3	0	8	SR,MS,SS
Waneta	9	9	8	7	6	7	6	6	3	7	6	8	6	0	9.0	0	0	5	5	SR,SS

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 108DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2019

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
AOR09034-3	2.6	312	240 98	8	36	40	1	0	16		77	41	1.070	2.0	2.0
Atlantic	2.6	327	254 100	9	41	34	2	0	13		77	36	1.072	2.0	2.5
CO10073-7W	4.0	206	141 59	14	45	23	0	0	18		67	23	1.066	1.5	2.0
Mackinaw	2.3	254	200 86	11	46	31	0	0	11		78	32	1.069	1.5	2.0
MSV030-4	2.4	234	176 75	8	33	41	1	0	18		75	41	1.073	1.0	2.0
MSW075-2	4.0	249	164 66	23	53	13	0	0	12		65	13	1.055	1.5	2.0
MSZ219-14	4.0	214	137 57	27	52	12	0	0	9		64	12	1.055	2.0	2.5
ND7519-1	4.0	242	168 65	9	39	29	0	0	22		69	29	1.071	1.5	2.0
NY162	2.2	347	269 110	7	36	41	0	0	16		77	42	1.067	1.0	2.0
Snowden	2.8	213	141 60	12	38	26	2	0	23		65	27	1.072	1.5	1.5
Grand Mean		290	189												
CV(%)		17	23												
LSD(k=100)		71	64												

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 108 DAP¹ at Black Gold Farms, Gum Neck, Tyrrell Co., NC - 2019

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	
AOR09034-3	9	9	8	7	9	7	7	7	2	8	6	5	6	4	8.6	0	2	10	6	SR,SS,IL,CS,RZ,GC
Atlantic	6	9	8	5	5	5	6	7	3	7	6	7	7	20	7.7	0	12	0	6	SR,SS,RZ
CO10073-7W	5	9	9	6	6	7	5	7	2	8	4	7	7	2	8.8	0	10	0	0	SR,SS,GC,RZ
Mackinaw	9	9	7	8	5	6	6	6	3	7	4	8	6	0	9.0	0	0	2	2	MS,SR,SS
MSV030-4	8	9	7	6	5	5	4	7	3	6	5	7	5	0	9.0	0	4	0	0	SR,MS,SS
MSW075-2	6	9	8	7	9	6	6	6	2	8	4	7	6	0	9.0	0	0	0	0	SR,SS,SG
MSZ219-14	9	9	6	7	5	5	6	6	2	7	4	6	6	0	9.0	0	2	2	0	SR,GC,RZ,SS
ND7519-1	9	8	8	7	6	7	5	7	3	7	6	7	5	2	8.4	0	8	0	2	SR,SG,MS,GC,SS,RZ
NY162	8	9	8	6	6	6	5	7	3	7	5	5	5	0	9.0	0	0	0	0	SR,SS,MS,GC
Snowden	9	9	8	7	5	5	6	7	3	6	4	5	5	2	8.6	0	2	0	2	SR,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 (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 94 DAP¹ at James Brothers Farm, Weeksville, Pasquotank Co., NC - 2019

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	%Chf.	%Yuk.	1's	2's	3's	4's	5's	Culls				
747	3.1	269	90	45	80	77	16	28	5	0	0	50	33	5	1.048	.
Atlantic	2.7	257	197	100	187	173	14	44	32	1	0	8	77	33	1.070	3.0
BNC559-1	2.9	228	110	57	106	96	26	43	5	0	0	25	48	5	1.048	.
Chieftain	3.2	230	118	60	100	101	14	44	6	0	0	35	50	6	1.051	.
CO052211-4R	2.9	101	26	13	24	22	67	24	1	0	0	8	25	1	1.053	.
CO07102-1R	2.9	131	75	38	73	67	26	56	1	0	0	16	58	1	1.054	.
CO98012-5R	2.4	166	92	48	73	76	38	52	4	0	0	6	56	4	1.057	.
CO99076-6R	2.1	201	163	83	142	141	13	49	29	2	0	7	80	30	1.054	.
Colorado Rose	2.8	165	127	65	125	112	14	52	24	0	0	9	76	25	1.048	.
Dark Red Norland	1.8	290	243	123	228	213	12	48	35	0	0	5	83	35	1.052	.
DT6063	3.2	123	92	47	72	76	15	49	26	0	0	10	75	26	1.060	.
Fenway Red	2.6	286	179	91	164	155	24	50	13	0	0	13	63	13	1.053	.
Natascha	2.8	207	95	49	89	83	25	41	5	0	0	29	46	5	1.057	.
NC470-3	2.7	185	151	78	143	132	14	62	19	0	0	5	81	19	1.060	3.0
NC606-23	2.0	257	164	84	162	145	31	52	12	0	0	5	64	12	1.054	.
NC640-2	2.3	141	67	34	64	58	51	45	2	0	0	2	47	2	1.071	.
NC640-3	2.4	121	59	31	57	51	47	46	1	0	0	5	48	1	1.068	.
NCB2607-3	2.2	161	96	49	92	83	39	58	1	0	0	2	59	1	1.067	.
NCB3171-7	2.4	178	131	68	119	113	25	55	15	2	0	2	73	18	1.066	2.0
ND8068-5Russ	2.3	185	138	70	126	120	16	66	7	1	0	9	74	8	1.068	.
Peter Wilcox	1.6	264	213	108	209	188	16	69	12	0	0	4	80	12	1.064	.
Red Endeavor	3.3	240	69	35	60	60	31	26	2	0	0	41	28	2	1.045	.
Sangre-S10	2.9	152	50	26	45	44	42	32	0	0	0	26	32	0	1.044	.
Soraya	3.1	243	118	61	122	105	22	46	3	0	0	29	49	3	1.051	.
Strawberry Paw	2.9	156	94	47	82	81	16	43	17	0	0	24	60	17	1.049	.
Vivaldi	2.3	228	142	72	133	124	28	59	3	0	0	10	62	3	1.054	.
Yukon Gold	2.8	158	115	59	107	100	15	45	27	1	0	12	73	28	1.061	.
Grand Mean		197	119													
CV(%)		16	25													
LSD(k=100)		50	47													

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 94 DAP¹ at James Brothers Farm, Weeksville, Pasquotank Co., NC – 2019

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	
747	6	9	9	6	8	7	5	6	5	8	7	6	3	0	9.0	0	0	0	0	MS,SS,SG,GC,CS
Atlantic	5	8	8	5	6	5	5	6	3	7	7	5	5	20	8.3	0	3	0	0	CS,GC,SS,MS,RZ
BNC559-1	6	9	8	5	1	7	4	5	5	8	6	8	5	0	9.0	0	0	0	0	SG,GC,IL,SS,MS,knobs
Chieftain	7	8	8	7	3	7	5	6	4	7	5	7	3	5	8.6	0	0	0	0	IL,SS,SG,GC
CO052211-4R	9	9	7	5	2	8	7	7	2	8	2	8	5	13	7.6	0	5	0	0	GC,V,MS,EL,small,nice color
CO07102-1R	6	7	8	7	2	8	4	6	5	8	4	7	4	3	8.8	0	0	0	0	MS,SS,IL,GC,SR
CO98012-5R	8	8	9	4	2	8	7	7	3	7	4	8	6	0	9.0	0	0	0	0	SS,MS,EL,GC
CO99076-6R	7	9	8	7	2	7	7	6	3	8	5	8	6	0	9.0	0	3	0	0	MS,SS,IL
Colorado Rose	8	9	8	6	2	7	6	5	4	7	5	8	4	3	8.8	0	3	3	0	MS,SG,IL,GC
Dark Red Norland	5	8	8	3	2	7	5	7	4	8	6	7	6	3	8.8	0	0	0	0	RZ,SS,GC,MS,knobs
DT6063	6	9	8	4	2	6	5	7	4	8	5	4	3	7	8.3	0	0	0	0	RZ,GC,SISC,MS
Fenway Red	8	9	8	6	2	7	5	7	5	7	4	7	3	0	9.0	0	0	3	0	MS,GC,IL,SG,SS,GC,lt red
Natascha	7	9	8	6	7	7	6	7	6	8	5	8	5	0	9.0	0	0	0	0	MS,knobs,SS,SG
NC470-3	9	9	8	9	6	5	6	6	4	8	5	7	5	3	8.5	0	0	0	0	IL,RZ,SS,MS,GC
NC606-23	8	9	8	8	7	8	5	7	4	8	4	8	7	0	9.0	0	0	0	0	SS,MS,SG
NC640-2	9	9	9	4	7	7	4	7	3	8	4	9	7	0	9.0	0	0	0	0	SG,MS,SS
NC640-3	5	3	8	4	7	8	7	7	2	8	3	9	7	0	9.0	0	0	0	0	MS,SS,SG
NCB2607-3	5	4	9	4	2	7	7	7	2	8	3	9	7	0	9.0	0	0	0	0	MS,SS,GC
NCB3171-7	6	5	9	6	8	7	7	6	2	7	5	9	7	5	8.5	0	0	3	0	MS,SS
ND8068-5Russ	5	9	9	2	6	4	5	7	6	7	5	7	7	0	9.0	0	3	0	0	MS,SS,SR,IL
Peter Wilcox	6	9	9	4	1	7	5	6	5	8	5	8	6	0	9.0	0	0	0	0	MS,SS,GC,RZ
Red Endeavor	6	9	8	7	2	7	5	6	4	8	6	9	3	0	9.0	0	0	0	0	^SG,MS,SS
Sangre-S10	9	9	8	8	2	7	7	5	4	8	5	7	2	0	9.0	0	0	0	0	^SG,MS,SS,RZ,GC
Soraya	9	9	8	8	7	8	6	7	7	8	5	8	3	0	9.0	0	0	0	0	SG,MS,SS,RZ,GC
Strawberry Paw	9	9	8	7	2	7	5	5	5	7	6	8	5	0	9.0	0	0	0	0	GC,MS,RZ
Vivaldi	9	9	8	7	7	8	7	7	7	8	5	8	7	0	9.0	0	0	0	0	MS,SS,SG,CS
Yukon Gold	9	9	8	5	7	7	7	7	3	7	6	7	5	3	8.3	0	0	0	0	IL,MS,SG,SS,CS

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. 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 - 2019

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				
AF5819-2	2.5	126	81	178	19	48	15	0	0	19	62	15	1.053	1.5
Atlantic	4.0	112	63	100	11	29	20	5	0	35	54	25	1.068	1.5
Audrey	3.5	162	30	55	29	18	0	0	0	52	19	0	1.052	3.5
B2834-8	2.7	47	17	31	18	31	5	0	0	46	36	5	1.078	1.5
B2869-29	2.7	95	49	94	19	41	11	0	0	30	51	11	1.070	1.5
B2904-2	3.0	78	35	59	12	26	19	0	0	44	45	19	1.063	1.0
B3148-12	3.0	100	40	74	15	28	10	0	0	47	38	10	1.066	2.0
B3175-8	2.5	106	52	96	23	42	7	0	0	28	49	7	1.064	1.0
B3265-9	3.0	75	27	47	38	35	0	0	0	28	35	0	1.059	1.5
BNC369-4	4.0	134	84	165	8	53	9	1	0	29	63	10	1.058	2.0
BNC426-2	2.6	126	81	156	15	55	9	0	0	20	64	9	1.062	2.0
Jennifer	3.7	128	16	24	24	12	0	0	0	64	12	0	1.053	3.0
NC587-10	4.0	109	33	66	44	31	0	0	0	25	31	0	1.077	2.0
NC630-3	3.3	86	29	58	28	32	0	0	0	40	32	0	1.059	2.0
NC636-5	3.0	115	45	87	19	38	1	0	0	41	40	1	1.071	2.0
NCB3259-2	2.7	89	59	101	18	56	6	3	0	17	65	9	1.053	1.5
NCB3260-2	3.1	81	42	96	18	48	1	0	0	33	49	1	1.059	2.0
Snowden	3.1	118	58	99	12	40	5	0	0	42	45	5	1.064	1.5
Grand Mean		105	47											
CV(%)		24	42											
LSD(k=100)		42	32											

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. 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 - 2019

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	
AF5819-2	8	9	8	8	6	7	5	7	2	7	4	7	5	3	8.5	0	0	0	3	SR,MS,GC,RZ,SG,CS,IL
Atlantic	6	8	8	5	6	5	6	6	3	7	6	6	4	38	6.6	5	0	25	0	SR,MS,CS,SS,GC
Audrey	6	9	9	8	9	8	6	7	4	8	4	7	3	0	9.0	0	0	0	0	SR,CS,MS,SG,HS,SS
B2834-8	5	8	8	2	6	6	6	7	2	7	5	5	4	0	9.0	0	0	0	0	SR,IL,SS
B2869-29	6	8	8	5	6	6	6	6	3	6	5	7	6	8	8.3	0	0	15	0	SR,MS,GC,RZ
B2904-2	8	7	8	5	6	6	6	7	2	7	6	6	4	0	9.0	0	0	0	0	GC,SR,IL,MS
B3148-12	7	9	8	4	5	7	6	7	3	8	4	7	5	5	8.6	0	0	5	0	SR,MS,GC,SS
B3175-8	8	6	8	6	9	7	6	6	3	7	4	7	6	0	9.0	0	0	0	3	SR,GC,SS,MS,CS
B3265-9	5	5	8	4	6	5	5	7	3	8	3	7	5	0	9.0	0	0	0	0	SR,MS,SG,SS,RZ
BNC369-4	6	7	8	7	6	6	6	6	4	8	5	7	6	25	7.0	0	0	28	0	SR,SS,GC,MS,CS
BNC426-2	9	4	8	7	6	6	6	7	3	8	6	7	5	3	8.8	0	0	0	0	SR,MS,RZ,SS,GC
Jennifer	9	9	9	7	9	7	5	7	6	8	5	3	2	10	8.1	0	0	3	0	CS,MS,SG,SR,knobs
NC587-10	6	7	8	7	7	7	5	7	5	7	3	7	5	0	9.0	0	0	40	0	MS,SS,SR,SG
NC630-3	7	3	8	6	6	6	6	6	3	7	4	6	5	3	8.0	0	0	0	0	SR,CS,MS
NC636-5	6	9	9	7	6	5	6	7	2	7	5	6	5	5	7.5	0	0	5	0	SR,CS,MS,SS
NCB3259-2	8	8	8	7	9	6	7	7	2	7	5	7	7	3	8.3	5	0	10	0	CS,GC,SR,SS
NCB3260-2	6	7	8	5	6	6	5	7	4	8	4	6	5	3	8.5	0	0	0	0	SR,MS
Snowden	9	8	8	7	5	5	6	6	3	6	5	6	5	15	8.1	0	0	43	0	SR,CS,MS,GC,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 6a. 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 102 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2019

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				
AF5040-8	2.6	57	25	42	17	32	6	0	0	44	38	6	1.073	1.5
AF5225-1	4.0	128	63	93	33	44	5	0	0	18	48	5	1.048	.
AF5280-5	3.1	94	49	75	14	35	12	0	0	39	47	12	1.059	.
AF5429-3	3.2	80	48	66	8	37	20	2	0	34	58	21	1.063	2.0
AF5563-5	3.1	57	36	56	9	31	31	0	0	29	62	31	1.063	1.5
AF5677-4	4.0	71	38	56	11	35	18	0	0	35	53	18	1.062	1.5
Atlantic	4.0	111	70	100	8	28	34	1	0	29	63	35	1.066	1.5
B3012-1	2.8	110	57	83	22	47	4	0	0	27	51	4	1.067	2.0
BNC469-7	3.2	113	54	84	25	42	6	0	0	28	47	6	1.059	1.5
Envol	3.4	116	62	90	10	31	22	0	0	38	52	22	1.059	.
Katahdin	4.0	95	50	77	11	38	13	0	0	38	51	13	1.045	.
Kennebec	3.4	108	28	39	9	24	1	0	0	67	25	1	1.056	.
NDAF102629C-4	3.0	61	25	35	30	39	0	0	0	31	39	0	1.060	.
NY151	3.3	55	21	29	10	34	0	0	0	56	34	0	1.061	1.5
Niagara	2.9	60	22	35	21	30	0	0	0	50	30	0	1.071	1.5
NY162	2.2	117	79	116	13	54	13	0	0	20	67	13	1.068	1.5
NY165	3.0	44	16	24	24	32	2	0	0	42	34	2	1.069	2.0
Snowden	4.0	180	119	178	7	39	25	1	0	27	65	26	1.063	2.0
Superior	3.7	40	19	27	12	31	4	0	0	53	35	4	1.056	.
WAF10664-3	3.1	106	41	64	28	36	1	0	0	35	36	1	1.058	2.0
Yukon Gold	3.8	56	15	21	8	20	6	0	0	65	26	6	1.059	.
Grand Mean		88	45											
CV(%)		33	38											
LSD(k=100)		47	35											

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. 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 102 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2019

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	6	7	9	5	6	7	6	7	3	8	4	5	4	0	9.0	0	0	0	0	SR,MS,CS
AF5225-1	9	9	8	9	5	7	5	7	2	7	3	7	5	35	6.9	8	3	25	0	SR,MS,RZ,SS,CS
AF5280-5	5	8	8	5	6	6	6	7	2	8	4	6	5	3	8.8	0	0	3	3	SR,MS,SG
AF5429-3	8	9	8	5	6	6	6	7	3	8	6	6	5	0	9.0	0	0	18	3	SR,SS,CS,MS
AF5563-5	7	8	8	5	6	7	5	7	4	7	5	7	3	10	7.6	0	0	8	0	SR,MS,SG,GC
AF5677-4	8	7	9	6	6	6	5	7	3	7	4	8	5	0	9.0	10	73	8	0	SR,MS,SG,GC,SS
Atlantic	6	8	8	5	6	5	6	6	3	7	5	6	5	68	5.7	5	0	10	0	SR,MS,SS,GC,CS
B3012-1	6	8	9	5	6	6	6	7	3	7	4	8	5	5	8.3	0	0	0	0	SR,MS,SG
BNC469-7	8	7	9	7	5	5	6	7	3	7	4	7	4	3	8.8	0	0	20	0	SR,SS,MS,GC,SG,CS
Envol	5	9	9	4	9	6	4	7	5	8	7	7	3	8	8.5	0	0	10	3	SR,MS,SG
Katahdin	7	9	8	7	9	7	5	6	5	7	4	7	3	80	4.5	3	0	15	0	SG,MS,GC,SR
Kennebec	8	9	8	8	9	9	4	4	5	7	7	7	2	3	8.8	0	0	0	0	SR,MS,GC,SS,SG
NDAF102629C-4	8	8	7	5	6	6	7	7	2	7	3	7	6	5	8.8	5	0	8	0	SR,MS
NY151	8	7	8	7	6	6	6	7	3	7	5	7	4	10	7.9	0	0	8	3	SS,SR,RZ,GC
Niagara	7	8	7	7	6	6	6	7	3	8	5	5	3	0	9.0	0	0	8	0	SR,SS
NY162	8	7	9	7	6	6	6	7	3	7	6	8	7	5	8.5	0	0	10	0	SR,MS,RZ
NY165	8	8	9	5	6	6	5	7	3	7	4	5	4	3	8.8	0	0	0	0	SR,RZ,MS
Snowden	9	9	8	7	5	5	6	6	3	5	7	6	5	18	7.5	3	0	68	0	SR,SG,CS,MS,SS,DAE
Superior	5	8	8	4	6	7	5	7	5	6	5	5	4	5	8.0	0	0	3	3	SR,MS,CS,RZ,SS
WAF10664-3	6	8	9	6	9	7	7	7	2	7	3	6	4	0	9.0	0	0	3	0	SR,MS,SS,CS
Yukon Gold	7	9	9	6	7	7	6	6	4	7	6	3	2	25	7.7	3	0	38	0	^CS,GC,SR,MS,SG,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 7a. NE-1731 Red Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 98 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC – 2019

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	4.0	41	16	38	28	34	0	0	0	38	34	0	1.064
AF5412-3	4.0	111	40	98	10	35	1	0	0	54	36	1	1.047
AF5414-1	3.0	60	27	65	30	39	0	0	0	31	39	0	1.058
B2152-17	3.1	43	12	28	46	26	0	0	0	28	26	0	1.071
BNC201-1	2.3	94	44	106	34	45	1	0	0	20	46	1	1.064
Chieftain	4.0	104	41	100	18	34	0	0	0	48	34	0	1.049
Dark Red Norland	4.0	65	28	69	24	40	0	0	0	35	40	0	1.046
Fenway Red	4.0	92	42	102	22	36	4	0	0	38	40	4	1.050
NCB2607-3	2.8	50	15	37	51	28	1	0	0	20	29	1	1.075
NDAF113484B-1	2.3	88	56	136	20	55	8	0	0	17	63	8	1.046
NY164	2.8	58	25	61	28	37	2	0	0	32	40	2	1.047
Grand Mean		73	31										
CV(%)		38	63										
LSD(k=100)		49	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.

Table 7b. 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 98DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2019

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	8	8	8	6	1	8	5	6	6	8	4	6	4	20	7.9	0	0	0	5	SR,CS,RZ,MS
AF5412-3	6	9	8	9	1	7	6	7	7	8	6	7	3	5	8.5	0	3	0	0	MS,SR,SG,GC
AF5414-1	6	7	8	7	2	7	5	7	5	8	5	8	6	15	8.1	0	0	5	3	SG,SR,MS
B2152-17	8	7	8	5	2	7	6	7	2	8	3	7	5	0	9.0	0	0	3	3	SR,SS,MS
BNC201-1	6	9	8	6	2	7	6	7	2	7	4	7	5	0	9.0	0	0	0	0	SR,RZ,GC,MS,SS
Chieftain	8	8	8	6	3	7	5	7	4	7	5	6	3	18	7.5	0	0	0	5	SG,GC,SR,RZ,SS,CS,MS
Dark Red Norland	5	9	8	4	3	7	6	7	4	7	4	6	3	0	9.0	0	0	0	0	SR,RZ,MS,SS
Fenway Red	6	9	9	7	3	7	7	7	2	8	5	6	3	10	8.6	0	0	0	5	SR,SS,CS,MS,SG
NCB2607-3	6	3	8	4	2	8	7	7	2	7	3	7	7	0	9.0	0	0	0	0	SR,MS,SS
NDAF113484B-1	8	9	8	5	3	7	6	7	2	7	4	8	5	5	8.6	0	0	0	0	MS,SR,SS
NY164	8	9	9	6	3	7	6	7	3	7	4	8	5	0	9.0	0	0	0	0	SR,GC,MS,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 (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 Russet 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 - 2019

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	%R.Nor	1's	2's	3's	4's	5's	Culls			
AF4872-2	3.3	128	19	30	4	13	1	0	0	83	14	1	1.101
AF5492-6	3.2	78	28	45	15	36	0	0	0	50	36	0	1.087
Goldrush	2.9	139	70	112	17	50	0	0	0	34	50	0	1.060
ND8068-5Russ	2.9	91	43	69	12	47	0	0	0	42	47	0	1.085
Reveille Russet	3.7	116	38	62	10	28	4	0	0	58	31	4	1.070
Russet Burbank	3.9	51	0	0	57	40	3	0	0	100	43	3	1.062
Russet Norkotah	2.8	110	62	100	10	56	1	0	0	34	56	1	1.069
Shepody	3.5	72	16	28	21	22	0	0	0	57	22	0	1.069
Grand Mean		98	35										
CV(%)		26	42										
LSD(k=100)		44	26										

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 8b. 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 104 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2019

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	
AF4872-2	8	9	9	7	5	3	6	6	7	9	7	8	2	0	9.0	0	0	0	0	SR,GC,MS,CS,RZ,knobs
AF5492-6	8	8	9	8	5	4	5	7	7	7	6	7	5	0	9.0	0	0	8	0	MS,GC,SR,RZ
Goldrush	9	8	9	5	4	2	5	7	7	8	6	7	5	3	8.8	0	0	10	0	GC,MS,SR,CS,SG,knobs
ND8068-5Russ	5	8	9	3	5	4	5	7	5	8	5	6	5	0	9.0	0	0	0	3	SR,SS
Reveille Russet	8	9	9	8	4	3	5	6	7	8	7	8	4	5	8.5	0	0	28	0	knobs,MS,SR,GC
Russet Burbank	9	9	8	9	6	1	5	7	7	8	3	8	1	25	7.5	5	0	13	0	SG,MS,SS,RZ,GC,All culls
Russet Norkotah	9	9	8	5	4	3	5	6	6	8	7	7	5	0	9.0	0	0	13	3	MS,SR,GC,SS
Shepody	7	9	8	6	6	7	5	7	7	8	6	8	4	0	9.0	0	0	13	0	MS,SS,GC,SG,SR,HS,knobs

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. Yellow Flesh Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 102 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2019

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	%Yuk	1's	2's	3's	4's	5's	Culls			
Natascha	2.8	58	7	118	23	12	0	0	0	65	12	0	1.072
NC606-23	2.7	45	14	235	33	25	6	0	0	37	31	6	1.066
NC640-2	2.4	39	11	177	40	27	0	0	0	32	27	0	1.077
NC640-3	2.1	25	6	93	27	21	0	0	0	51	21	0	.
NC678-42	4.0	5	0	5	68	9	0	0	0	24	9	0	.
Paroli	3.1	63	17	280	10	23	2	1	0	64	26	4	1.061
Peter Wilcox	2.8	49	17	294	16	35	2	0	0	47	37	2	1.069
Soraya	3.1	90	24	409	21	26	1	0	0	53	27	1	1.060
Tacoma	2.8	62	13	215	23	21	0	0	0	56	21	0	1.070
Tokio	2.9	11	2	41	15	20	0	0	0	65	20	0	.
Vivaldi	3.3	46	10	167	17	21	0	0	0	61	21	0	1.078
Yukon Gold	3.4	34	6	100	10	11	7	0	0	72	18	7	1.055
Grand Mean		44	11										
CV(%)		25	44										
LSD(k=100)		18	8										

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. 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 102 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2019

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	8	8	8	6	7	7	6	7	6	7	3	8	4	0	9.0	0	0	3	3	SG,MS,SR,SS
NC606-23	8	9	9	6	7	7	5	7	4	8	4	7	5	0	9.0	0	0	13	0	SR,MS,SG,CS
NC640-2	4	3	9	5	7	7	6	7	3	8	2	7	5	0	9.0	0	0	8	0	SR,MS,SS,RZ,SG
NC640-3	4	5	9	4	7	7	7	7	2	7	3	8	5	3	8.8	0	0	3	0	SR,SS,SG,MS
NC678-42	7	9	9	5	1	7	6	7	5	7	1	8	4	0	9.0	0	10	47	3	MS,SR,SG
Paroli	9	9	8	6	7	7	6	7	3	6	6	7	3	13	7.4	0	0	0	0	SR,MS,GC,SS
Peter Wilcox	5	8	8	5	1	7	6	6	5	8	5	7	4	0	9.0	0	0	0	5	SR,SG,MS
Soraya	9	9	8	8	7	8	5	7	6	8	4	8	4	10	8.0	0	0	10	3	^MS,SR,CS
Tacoma	6	9	9	8	7	8	6	7	6	8	4	7	4	3	8.3	0	0	3	3	SR,SS,MS,CS,GC
Tokio	8	9	9	8	7	7	5	7	3	7	3	7	3	3	8.3	3	0	5	5	SR,CS,MS
Vivaldi	8	8	8	7	7	8	6	7	6	8	5	7	4	23	7.4	0	0	3	3	SG,MS,SR,CS
Yukon Gold	8	9	8	5	7	7	6	6	4	7	6	4	3	5	8.8	8	0	15	5	SR,MS,CS,GC,SG,SS

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 10a. Two Replication Russet 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 - 2019

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	%R.Nork.	1's	2's	3's	4's	5's	Culls			
AAF10736-2	2.4	157	79	262	23	46	0	0	0	31	46	0	1.065
AF5745-3	3.6	65	4	13	36	6	0	0	0	58	6	0	1.074
AF6075-9	4.0	65	6	21	4	10	0	0	0	86	10	0	1.138
AF6110-3	3.1	86	39	131	15	46	0	0	0	39	46	0	1.068
COAF13004-1	3.3	62	27	88	31	43	0	0	0	25	43	0	1.082
Goldrush	2.6	120	78	258	15	64	0	0	0	21	64	0	1.049
NDAF113476CB-3	2.8	156	117	387	10	73	0	0	0	17	73	0	1.071
NDAF113555CB-2	4.0	119	92	305	9	62	15	0	0	14	77	15	1.064
Russet Norkotah	3.1	77	30	100	6	37	0	0	0	58	37	0	1.076
Shepody	3.3	90	25	84	13	26	0	0	0	61	26	0	1.068
Grand Mean		100	50										
CV(%)		22	61										
LSD(k=100)		54	85										

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. Two Replication 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 104 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2019

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	
AAF10736-2	9	9	9	8	5	4	6	6	7	8	6	8	6	0	9.0	0	0	0	0	MS,SG,RZ,knobs
AF5745-3	7	9	8	8	5	3	6	7	7	8	3	4	3	0	9.0	0	0	15	5	RZ,CS,MS,SG,knobs
AF6075-9	8	9	8	7	5	4	6	7	6	8	3	6	2	0	9.0	0	0	0	0	MS,SR,GC,RZ,knobs
AF6110-3	7	9	9	9	6	4	5	7	7	8	7	8	4	0	9.0	0	0	0	0	SS,SR,MS
COAF13004-1	8	9	9	7	5	3	5	7	7	8	5	8	5	0	9.0	0	0	10	0	SR,GC,MS,RZ,SS
Goldrush	6	8	9	5	4	3	6	7	7	8	5	8	5	0	9.0	0	0	5	0	MS,SR,SG,SS,GC,knobs
NDAF113476CB-3	9	9	9	7	4	2	5	6	7	8	6	8	6	20	7.8	0	0	0	5	SS,SR,MS
NDAF113555CB-2	8	9	9	9	5	3	6	6	6	8	7	8	5	15	8.2	5	0	55	0	SR,MS,SG,SS
Russet Norkotah	8	9	8	5	5	4	6	7	7	8	6	8	5	0	9.0	0	0	5	0	MS,SR,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. Two Replication General Trial. Total and marketable yield, percentage of total yield by size class, and specific gravity, of potato clones harvested 102 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2019

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
			Marketable Yield											
			cwt/A	%Atl	%Chf	1's	2's	3's	4's	5's	Culls			
AAF09055-2WH	3.5	147	98	107	83	19	41	23	0	0	17	64	23	1.049
AF5648-3	3.6	81	40	46	34	23	42	7	0	0	28	49	7	1.051
AF5715-6	4.0	169	94	106	79	26	54	1	0	0	18	56	1	1.048
AF5870-2	3.4	53	18	19	15	26	28	5	0	0	41	33	5	1.057
AF5891-1	3.6	113	66	73	56	12	33	24	0	0	31	57	24	1.048
AF5931-1	3.4	123	62	69	52	19	38	13	0	0	31	50	13	1.051
AF5966-1	3.4	91	38	42	32	22	37	3	0	0	38	40	3	1.046
AF5994-2	4.0	69	35	39	30	28	43	8	0	0	21	51	8	1.049
AF6016-2	3.7	95	35	40	30	27	33	4	0	0	37	37	4	1.060
AF6027-2	3.3	116	39	43	33	40	31	2	0	0	27	33	2	1.048
AF6043-1	3.3	89	35	39	30	15	37	2	0	0	46	39	2	1.040
AF6048-4	3.5	124	37	42	30	10	22	4	0	0	64	26	4	1.044
AF6050-1	3.5	120	29	32	24	46	22	2	0	0	30	24	2	1.044
AF6052-1	3.8	152	61	68	51	20	36	3	0	0	40	39	3	1.044
Atlantic	4.0	157	89	100	75	7	27	27	3	0	36	57	30	1.063
Chieftain	3.1	223	119	133	100	8	32	20	1	0	39	53	21	1.045
Dark Red Norland	3.4	157	77	87	64	8	35	13	0	0	44	48	13	1.043
MSAFB609-12	4.0	148	91	101	77	17	43	17	0	0	23	60	17	1.058
MSAFB636-1	4.0	103	49	55	41	24	40	8	0	0	28	48	8	1.049
NDAF102696C-5	2.5	206	98	110	83	38	47	0	0	0	14	47	0	1.044
NDAF12129-6	3.5	87	44	50	37	25	47	4	0	0	24	51	4	1.051
NDAF12143-1	3.4	72	23	26	19	9	28	3	0	0	59	32	3	1.049
NDAF12238Y-2	3.4	117	33	37	27	30	31	0	0	0	39	31	0	1.046
NDAF14424-1	3.8	105	58	66	49	10	39	17	0	0	34	56	17	1.050
NDAF14424-2	2.8	122	83	93	72	11	55	14	0	0	20	69	14	1.040
WAF13058-1	3.2	144	77	86	65	10	36	17	0	0	37	53	17	1.053
WAF14096-5	3.3	166	69	77	58	19	33	9	0	0	39	42	9	1.052
Yukon Gold	3.8	89	34	38	28	7	15	23	0	0	55	38	23	1.054
Grand Mean		123	58											
CV(%)		29	37											
LSD(k=100)		85	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 11b. Two Replication General 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 102 DAP¹ at the NCSU VGJREC/NCDA TRS, Plymouth, Washington Co., NC - 2019

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	
AAF09055-2WH	7	8	9	8	6	6	6	5	3	6	5	7	4	35	8.6	10	0	30	0	SR,MS,GC,SS,SG
AF5648-3	8	9	8	8	6	6	6	6	4	7	4	8	4	10	8.8	0	0	5	0	MS,SR,GC,RZ
AF5715-6	6	9	8	6	6	5	6	7	4	8	4	8	5	100	2.6	0	0	0	0	SG,MS,SS,SR,V
AF5870-2	8	9	8	9	6	7	6	7	3	7	3	5	3	5	8.0	0	0	10	0	SG,MS,SS,SR,V
AF5891-1	9	9	9	5	6	6	6	5	4	7	5	7	5	0	9.0	25	0	50	0	SR,SS,MS,pink blush
AF5931-1	8	9	9	6	8	7	5	7	3	8	6	7	5	0	9.0	5	10	5	0	SR,CS,SS,GC,RZ,SG
AF5966-1	8	6	8	7	6	6	6	5	2	6	4	7	4	0	9.0	0	0	0	0	GC,MS,SS,SR
AF5994-2	8	9	8	8	6	6	5	5	5	7	3	3	1	20	8.6	0	0	30	0	GC,CS,MS-weighed culls = SR
AF6016-2	8	9	8	8	6	6	6	7	5	8	4	5	3	30	7.2	0	0	30	0	CS,RZ,GC,MS,SR,SS
AF6027-2	8	7	8	8	8	8	7	7	2	7	3	7	5	5	8.5	0	0	0	0	MS,SR,GC,SS,SG
AF6043-1	6	9	9	6	3	7	6	7	3	8	4	6	4	0	9.0	0	0	0	0	SR,MS,SS
AF6048-4	8	9	9	6	2	7	5	6	6	8	7	8	3	0	9.0	0	0	0	10	MS,SR,^GC
AF6050-1	9	9	9	7	2	8	6	7	3	7	3	6	5	10	8.5	0	20	0	0	MS,SS,RZ,GC
AF6052-1	6	9	8	6	3	7	5	7	4	7	3	8	4	20	8.5	0	0	5	0	SG,SR,GC,MS
Atlantic	6	9	8	5	6	5	6	6	3	7	7	7	6	55	6.1	5	0	15	0	SR,CS,GC
Chieftain	9	9	8	6	3	7	6	6	4	7	6	6	3	15	8.0	0	0	5	0	RZ,CS,MS,SG,SS,SR
Dark Red Norland	6	9	8	4	3	6	5	7	4	7	5	8	4	5	9.0	0	0	10	0	SG,SR,SS,MS
MSAFB609-12	9	9	8	7	6	6	6	7	2	7	3	8	6	30	8.5	0	0	0	0	CS,SR,SS,SG
MSAFB636-1	8	6	8	8	6	5	5	7	4	8	3	6	4	55	5.3	0	0	15	0	SR,MS,SS
NDAF102696C-5	7	9	8	7	2	7	6	7	2	7	3	8	7	5	7.0	0	0	0	0	SR,SS,GC,MS
NDAF12129-6	7	9	9	7	2	8	7	7	3	7	4	8	5	30	8.7	0	5	0	5	SR,MS,SS
NDAF12143-1	7	9	8	8	2	8	6	4	3	7	5	7	3	5	8.5	0	0	0	0	GC,SR,SS,MS
NDAF12238Y-2	8	9	8	6	3	8	7	7	2	7	3	8	3	0	9.0	0	5	0	0	SR,SS,SG
NDAF14424-1	9	9	9	6	3	7	5	6	5	7	5	6	3	10	7.5	10	0	15	0	SR,GC,SS
NDAF14424-2	7	9	8	6	3	7	7	7	2	7	4	7	6	0	9.0	5	0	15	0	SR
WAF13058-1	9	9	9	6	6	6	6	7	3	7	5	8	6	40	7.4	0	0	5	0	SR,GC,MS
WAF14096-5	9	9	9	6	6	6	6	7	3	8	4	7	3	0	9.0	0	0	5	0	SR,SG,SS,MS
Yukon Gold	9	9	8	5	7	6	6	7	4	7	5	2	2	30	7.6	5	0	15	0	^CS

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

Seed piece Treatment: None

Weed Control: Round Up Power Max II, 32oz/A (preplant)

LeadOff, 1.5 oz/A (preplant)

Dual Magnum 2pt/A

Fertilizer: 177N, 51P, 217K, 4 lb zinc

Insect Control: Wrangler 9 fl oz/A in furrow

Disease Control: Elatus in furrow 6.5 fl oz/A

Revus Top 6.2 floz/A

Bravo 2pt/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: Twenty-Seven 21' rows at 34' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Round Up Power Max II, 32oz/A (preplant)

LeadOff, 1.5 oz/A (preplant)

Dual Magnum 2pt/A

Fertilizer: 177N, 51P, 217K, 4 lb zinc

Insect Control: Wrangler 9 fl oz/A in furrow

Disease Control: Elatus in furrow 6.5 fl oz/A

Revus Top 6.2 floz/A

Bravo 2pt/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: Round Up Power Max II, 32oz/A (preplant)

LeadOff, 1.5 oz/A (preplant)

Dual Magnum 2pt/A

Fertilizer: 177N, 51P, 217K, 4 lb zinc

Insect Control: Wrangler 9 fl oz/A in furrow

Disease Control: Elatus in furrow 6.5 fl oz/A

Revus Top 6.2 floz/A

Bravo 2pt/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
Tricor 1 lb/A
Fertilizer: 142N – 80P – 160K
Insect Control: Capture 1pt/A
Platinum 2.7 oz/A
Disease Control: Quadris 7 oz/A
Elatus 6 oz/A
Ridomil Gold 5.4 oz/A
Revus top 9 oz/A
Vine Kill: None

Location: Tidewater Research Station, Plymouth, Washington Co., NC
Trial Title: Round White Variety Trial
Trial Design: Randomized complete block, four replications
Plot Dimensions: Eighteen 21' rows at 38' row spacing, 25 hills per row
Seed piece Treatment: None
Weed Control: Metribuzin 1 lb/A
Metolachlor 31.2 oz/A
Fertilizer: 921lbs/A 19-19-19
Insect Control: Verimark 7 oz/A
Torac 21oz/A
Disease Control: None
Vine Kill: None

Location: Tidewater Research Station, Plymouth, Washington Co., NC
Trial Title: NE 1731 White Variety Trial
Trial Design: Randomized complete block, four replications
Plot Dimensions: Twenty-one 21' rows at 38' row spacing, 25 hills per row
Seed piece Treatment: None
Weed Control: Metribuzin 1 lb/A
Metolachlor 31.2 oz/A
Fertilizer: 921lbs/A 19-19-19
Insect Control: Verimark 7 oz/A
Torac 21oz/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 1731 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: Metribuzin 1 lb/A
Metolachlor 31.2 oz/A

Fertilizer: 921lbs/A 19-19-19

Insect Control: Verimark 7 oz/A
Torac 21oz/A

Disease Control: None

Vine Kill: None

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

Trial Title: NE 1731 Russet Variety Trial

Trial Design: Randomized complete block, four replications

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

Seed piece Treatment: None

Weed Control: Metribuzin 1 lb/A
Metolachlor 31.2 oz/A

Fertilizer: 921lbs/A 19-19-19

Insect Control: Verimark 7 oz/A
Torac 21oz/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: Twelve 21' rows at 38' row spacing, 25 hills per row

Seed piece Treatment: None

Weed Control: Metribuzin 1 lb/A
Metolachlor 31.2 oz/A

Fertilizer: 921lbs/A 19-19-19

Insect Control: Verimark 7 oz/A
Torac 21oz/A

Disease Control: None

Vine Kill: None

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

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

Trial Title: Two Replication Russet Trial

Trial Design: Randomized complete block, two replications

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

Seed piece Treatment: None

Weed Control: Metribuzin 1 lb/A
Metolachlor 31.2 oz/A

Fertilizer: 921lbs/A 19-19-19

Insect Control: Verimark 7 oz/A
Torac 21oz/A

Disease Control: None

Vine Kill: None

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

Trial Title: Two Replication General Trial

Trial Design: Randomized complete block, two replications

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

Seed piece Treatment: None

Weed Control: Metribuzin 1 lb/A
Metolachlor 31.2 oz/A

Fertilizer: 921lbs/A 19-19-19

Insect Control: Verimark 7 oz/A
Torac 21oz/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.