2007 PROGRESS REPORT
To
North Carolina SweetPotato Commission

TITLE: Sweetpotato Breeding and Variety Development Support

LEADERS: G. C. Yencho and K. V. Pecota

DEPARTMENT: Horticultural Science

REPORT:

Project Objective(s): The objectives of the Sweetpotato Breeding and Genetics Program are: 1) to develop high quality sweetpotato varieties for North Carolina growers that possess exceptional yield, appearance, quality, and disease and insect resistance characteristics; and 2) to conduct basic and applied breeding and genetics studies focused on identifying and incorporating traits of economic importance into sweetpotato germplasm and new cultivars.

Project Summary
Funds provided by the North Carolina Sweetpotato Commission supported all aspects of the breeding program’s research. Highlights of our 2007 activities are listed below. A detailed description of the overall activities of the breeding program, advanced clone comments, and tables presenting the results of our advanced, preliminary and National Sweetpotato Collaborators trials follow the project summary. Overall, we experienced a very productive year.

1. Covington, officially released during 2005, continued to grow in importance in NC during 2007 with over 25,000 acres of Covington produced in 2007. Many, but not all, reports on the performance of Covington (yield, shape, storage quality, pack-out potential, plant bed productivity and plant stand establishment) have been very favorable, but we are monitoring its performance very closely since it is so new.

2. The U.S. Patent and Trademark Office has informed us that the Plant Patent for Covington has been approved, and will be officially issued early in 2008. The licensing fee and royalty agreement established for in-state and out-of-state producers developed in consultation with the NCSPC and the NCCSPSGA has been fully implemented and is being closely monitored. Revenue generated will benefit the breeding program and contribute to its long-term sustainability.

3. Our most promising advanced clone, NC99-573, performed well in both research station and on-farm trials this year. It was evaluated by five seed growers in large-scale trials during 2007, and will be evaluated during 2007-2008 in commercial storage and processing systems. This line will be considered for release after the next season of grower and research station trials.

4. In our paired-cross and polycross breeding nurseries we continued our vigorous breeding efforts generating nearly 70,000 true seed. These crosses represent the foundation of our program’s efforts. Roughly two-thirds will be planted in the field for evaluation during 2008.

5. In our table-stock early generation breeding plots, we planted 47,600 true seed in research station and on-farm sites, and made a record setting 987 new seedling selections. We also planted 662 second-year and 79 third-year selections at the HCRS and CRS as 25-hill and 100-hill plots from which 97 and 21 selections were made, respectively. Each of these selections has the potential to be a new variety, but further testing is required.

6. In our preliminary and advanced clone evaluations, we conducted 9 replicated yield trials at the Horticultural Crops Research Station (HCRS), Clinton and the Cunningham Research Station (CRS), Kinston. NC99-573 was grown for the first time as virus-indexed material and performed well. In 2008, it will be entered into several more replicated trials, our on-farm evaluations and into the National Sweetpotato Collaborators Group Trials.

7. We completed our tenth year of the Grower-Participatory Breeding Project (GPBP) and evaluated 24 advanced or preliminary lines in unreplicated trials at our three GPBP sites. Detailed results of these evaluations are reported on in the GPBP report.
8. In our disease nurseries, we evaluated 182 clones for field resistance to Streptomyces soil rot (SSR) in replicated 5-hill plots in our disease nursery at the HCRS. These clones were also screened for Fusarium wilt and root-knot nematodes in replicated greenhouse trials.

9. With the MPU, we continued our long-standing collaboration with Dr. Zvezdana Pesic-VanEsbroeck by providing new clones for clean-up and testing, and assisting with the evaluation of the “seed source” tests conducted at the HCRS. Detailed results of these evaluations are reported on in the MPU report.

10. We also continued our collaboration with Dr. Den Truong, USDA-ARS to evaluate the processing and fresh cut potential of several orange-fleshed clones including Beauregard, Covington and NC99-573, and continued our project to determine the inheritance of anthocyanins in purple-fleshed sweetpotatoes and their potential nutraceutical and natural colorant properties.

11. We continued a long-term project to identify and develop sweetpotatoes more resistant to soil insects. We have established a permanent field insect nursery at the NCDA&CS Lower Coastal Research Station, which should allow us to increase pressure from grubs and flea beetles. Wireworm Diabrotica and Systena pressure remains very high. Several putative insect resistant parents have been identified in this project to date and we have begun making paired crosses amongst them.

12. We established a collaborative project with Dr. Mike Jackson, Entomologist and the new Leader of the USDA-ARS Sweetpotato Breeding Program at the US Vegetable Laboratory in Charleston to bring in insect resistance from USDA material into NC adapted clones.

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**Project Cooperators**

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<tr>
<td>Dr. Bryon Sosinski</td>
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<td>Dr. Zvezdana Pesic-VanEsbroeck</td>
<td>Mr. Allan Thornton</td>
<td>Williams Farms</td>
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<td>Dr. Jonathan Schultheis</td>
<td>Mr. Howard Wallace</td>
<td>Wayne E. Bailey Farms</td>
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<td>Dr. Den Truong</td>
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<td>Dr. Gerald Holmes</td>
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<td>Dr. Charles Averre</td>
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**2007 Polycross Breeding Nurseries**

Two polycross nurseries were established at the Central Crops Research Station (CCRS) in Clayton in 2007. The **Elite Nursery**, designed to produce materials with the potential to become varieties, contains cultivars and near-commercial clones that are outstanding for particular characteristics, such as yield, appearance, and disease and insect resistance and are combined and crossed. The **Streptomyces Soil Rot (SSR) Nursery**, dedicated to developing parents with high levels of soil rot resistance has parental breeding material developed by NCSU, LSU, and the USDA. Table 1 provides results of the seed harvests per maternal parent for the Elite and SSR nurseries. This was a fair year for seed production. Flowering was excellent for most of the summer but the relentless heat and very low humidity led to low seed set. Distribution across parents was good, with most parents meeting our seed goals. Covington is sterile as a female, but does have viable pollen so is represented as a male in the crossing blocks. We also have a large amount of very good remnant seed from the previous several years. We will look at the performance of the offspring from these nurseries and plant seed from the lots that produced the best advanced and breeding clones. This may actually increase the average quality of the seedlings in 2008.

**First-Year Seedling Selections**

**Research Station Trials**

Over 36,000 true seed from the 2006 Elite and SSR polycross nurseries were grown in the Horticultural Department greenhouses starting in February. An additional 2,550 were grown from selected parents from the 2005 Elite and 3,000 from the 2005 SSR nurseries. We also went back to the 2004 Elite (1,020 seed) and 2004 SSR (2,100 seed) nurseries from seed lots that produced a good percentage of selections previously. Seedlings were not evaluated for flesh color because less than 10% of the seedlings screened for this trait are white or cream-fleshed. Also, we are actively pursuing white-fleshed clones with soil rot resistance for the dry matter crosses and this is a way to obtain them. In the field, the
seedlings were planted thirty inches apart so they remained as distinct hills at harvest. Selection at harvest was based on relative yield, shape, flesh color, skin texture, size distribution, root number, earliness, and observable diseases or defects.

Table 2 contains a list of the selections made by nursery and maternal parent at the LCPRS. A total of 248 selections were made from the 10,530 seed planted from the Elite nursery for a selection rate of 2.4%. The 10,939 seed from the Soil Rot nursery yielded 214 selections, a rate of 2.0%. Our long-term average is 1.5%. The 2005 seed yielded 60 and 74 selections from the Elite and SSR nurseries for selection rates of 2.4% and 2.5%. The 2004 seed yielded 22 and 53 selections from the Elite and SSR nurseries for selection rates of 2.2% and 2.5%.

In addition to the above, we planted seed from a breeder in Uruguay who has similar breeding goals and a similar climate. We also planted seed from Dr. Michael Jackson of the USDA-ARS US Vegetable Lab in Charleston from a population with high levels of insect resistance. These will be entered into our insect screens in 2008. This represents a new collaborative project with the USDA-ARS Sweetpotato Breeding program and we are pleased to be working with Dr. Jackson on this insect resistance project.

On-Farm Trials
For the Grower-Participatory Breeding Project, three on-farm sites were used to evaluate 15,300 seedlings. The parents and selections are shown in Table 3. A more detailed report on this project is presented in our GPBP report. Cooperators involved in this project were:

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<th>Extension Personnel</th>
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<tr>
<td>Howard Wallace</td>
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<td>William Little</td>
<td>Jones Farms, Nash County</td>
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<td>Allan Thornton</td>
<td>Williams Farms, Sampson County</td>
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</table>

Field sites were located within commercial fields and the trials were treated in the same fashion as the commercial fields (fertilizer, herbicides, etc.) except for the three-foot in-row spacing of seedlings. Selections were made in cooperation with extension personnel and growers. Growing conditions varied from site to site. Selection criteria were based on the appearance of the check varieties Beauregard and Covington. These selections will be planted at the HCRS and CRS in 2008 as unreplicated 25-hill plots for the second cycle of selection. It is very useful for us to select under commercial conditions to identify material adapted to actual growing conditions. Selection percentage over all on farm tests was 1.8%.

During 2002, we established a second component to the GPBP and began evaluating promising breeding lines under commercial conditions. In 2007, 24 advanced and preliminary lines were evaluated. Notes on how they performed at each location were taken and these are combined with research station data to determine the potential of each as a variety.

Second-Year Selections
In 2006, we made 662 first-year table-stock seedling selections. A few of these rotted in storage or did not sprout in the spring. The remainder (ca. 600) were planted in 25-hill plots at the LCRS and CRS in 2007. Selection criteria were essentially the same as for the first-year single-hill selections, but having a row instead of a hill allows for a better idea of shape and size consistency, and relative yield. This year we made 97 selections, 19 selections were chosen at both sites for an overlap of 20%. Selection percentage was 15%, which is typical for this level of material.

Third-Year Selections
The 79 second-year selections made in 2006 were planted as unreplicated 100-hill plots at the HCRS and CRS in 2007. We selected 21 for further evaluation with four being selected in both locations. Our evaluation criteria remain the same as our second-year selections, but we become stricter for any flaws in appearance, yield and disease susceptibility, etc. at this stage. Next season these clones will go into replicated yield tests in multiple locations. The most promising will be entered into the on-farm trials for a more rapid assessment of their adaptability across environments.
Advanced Selection Trials

Forty-three advanced selections were evaluated this year. Twenty-nine have been dropped, ten have been designated as breeding lines only, and the remaining 14 will be tested again in 2008. The most promising clones are described below.

NC99-573

This clone produces attractively shaped, smooth skinned, rose-colored roots. Yield is high with a growing season similar to or slightly longer than Beauregard. Rows of eyes are a concern for appearance, and lenticels are fairly prominent in wet conditions. It is susceptible to root-knot nematodes like Beauregard, but appears to resist cracking in the same fashion as Beauregard also. This clone is now virus-indexed and was evaluated as G2 material in 2007.


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<th>CLONE</th>
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<td>B94-14 G2</td>
<td>866</td>
<td>764</td>
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<td>Covington</td>
<td>794</td>
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Size Distribution by Class (% of total yield)

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<tr>
<td>59</td>
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<td>11</td>
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SUMMARY DESCRIPTION - NC99-573

Parentage: L87-95, open pollinated from the 1998 Parallel nursery

Plants:
Vine: Trailing, dense canopy
Leaves: Heart-shaped to slightly lobed, green
Sprout production: Good
Transplant survival: Good

Storage roots:
Shape: Fusiform to blocky
Skin color: Rose
Flesh Color: Moderately deep orange, uniform
Skin Surface: Smooth

Characteristics
Yield: High
Season: Mid to early
Fusarium stem rot: Resistant
Pox: Resistant
Root-knot nematodes: Susceptible, but appears tolerant to cracking
Storability: Has not been stored commercially yet
Consumer quality: Good baking quality, canning quality being tested
Remarks: Desirable attributes include highly attractive, smooth skinned fusiform roots. Yields are very high. Storage needs to be tested under commercial conditions. Can set a high number of roots making it late. Spacing and fertility need to be optimized. Very similar shapes and appearance to Beauregard. Rows of moderately deep eyes.

Yield Trial Data: see table above
Disposition Is being stored commercially in winter 2007-08, will be commercially

NC99-573 has been entered into the MPU and been virus indexed. It does have moderately prominent rows of eyes and can be long on occasion. It tends to set more roots than Beauregard.

Fourteen additional advanced clones will be evaluated in 2008. Many clones that fall short of becoming a named variety are used as parents based on the multiple tests gathered for release potential. We have ten lines that are being evaluated for breeding potential and inclusion in the 2008 nurseries, several are lines from insect tolerant backgrounds. The results of yield tests that included these clones and other promising selections are presented in Tables 4-12. The comment codes used in the tables are described in the Comment Codes Section after the tables. All yields are reported as 50 lb. bushels per acre units.

**Purple-Fleshed Breeding Project**

Seven years ago we began breeding for sweetpotatoes with high levels of anthocyanin content. Our initial efforts focused on identifying material with purple flesh from the US germplasm repository, and acquiring germplasm from international sources. During the last four years we made paired crosses using the best purple-fleshed material we had, with well adapted US clones. In 2004, we planted 6,653 seed resulting in 117 selections. Twenty-nine of these were selected in 2005 based on field performance and 14 selected in 2006 based on field performance and anthocyanin content in collaboration with Dr. Den Truong in Food Science. During 2007 we began testing the culinary potential of our best purple-fleshed clones, the results of which will direct the next cycle of crosses, to begin the winter of 2007-08. Our focus is now on improving the disease resistance, culinary quality, yield and horticultural traits among the purple-fleshed lines.

Our goals are quite diverse for the purple-fleshed materials and include 1) fresh market cultivars, 2) chipping lines, and 3) natural food coloring. Crosses have been made between purple-fleshed clones and clones varying widely in dry matter content to produce a wide range of physical properties suited for these different purposes. Evaluation for horticultural traits is being done the same as for table-stock lines, though selection standards will not be as strict until better lines are obtained. Prototype lines were tested on the GPBP trials starting in 2005. This will continue in 2008 to help us rapidly identify clones adapted to NC growing conditions. So far none have held up well across our trials. Our collaboration with Dr. Truong to characterize both the pigments and physical properties is vital for the success of this project.

**Disease Resistance Screenings**

In addition to the selection and yield evaluation trials, we screened 182 advanced, preliminary, and parental lines for resistance to Streptomyces soil rot in the field and 116 of these in the GH. Fifty six of the field lines were dropped prior to rating. Of the remaining 126, 26 were resistant, 30 moderately resistant, 21 moderately susceptible and 49 susceptible to soil rot. The greenhouse test data has not been completed yet. Most of the susceptible lines were either high dry matter or purple-fleshed clones. 124 of these lines were also screened for resistance to southern root-knot nematode with 79 resistant, 12 moderately resistant, 22 moderately susceptible, and 11 testing susceptible. Resistance and susceptibility was across all types. The Fusarium test included 190 clones with 59 resistant, 60 moderately resistant, 43 moderately susceptible, and 29 testing susceptible. All cultivars released from the program must have fusarium resistance.

Our field SSR screening nursery has completed its tenth year. Soil rot incidence was good, helped by the hot, dry summer. There was considerable root-knot nematode damage and some circular spot, though less than the past couple of seasons. In the replicated trial we saw several clones with root-knot nematode damage and subsequent infection with fusarium and other rots. The presence of other diseases makes it harder to rate for soil rot damage, but any clones surviving in this site have high levels of multiple disease resistance. This plot has allowed us to pick parents with multiple disease resistances under field conditions for use in our nurseries. Part of the plot is used for a replicated yield trial used to
measure yield reduction caused by SSR on advanced clones being considered for release. Results of the 2007 test (Table 12) show large differences in marketable yield, but clones differ in the reason why. Some have very high total yield, but the diseases made many of them culls (ex. NC02-423), while for others the total yield is vastly reduced versus resistant clones (ex. Jewel). Besides affects on yield the field trial gives information on whether SSR is able to form lesions on the storage root. Our greenhouse test, while very useful, doesn’t give us storage root lesion data. Soil rot may affect primarily fibrous roots, storage roots or both depending on the clone and knowing this will help us in developing clones resistant to both.

2007 National Sweetpotato Collaborator Trials

In 2007 we conducted two National Sweetpotato Collaborators trials, one at the HCRS in Clinton, the other at the CRS in Kinston. Tables 4 and 5 present the results of the trials. In the CRS trial, NC99-573 had the highest marketable yield, though this was not significantly different from Beauregard. Covington and NC99-573 and Evangeline (L99-35) had the best appearance scores, with B94-14 G2 Beauregard one step down due mainly to crooked shapes. A number of lines in this trial showed some color variation from end to end, including Beauregard and Covington. B63 Beauregard, the LA check in this trial, was significantly lower for both total and marketable yield and is clearly not as well adapted to NC as B94-14. Evangeline, released this year by LSU, looked good but only had 87% of the yield of B94-14. It is similar to Beauregard in appearance, but is more tapered and generally has more consistent shapes as we saw in this trial. L01-29 has now been released as Murasaki-29. It is a purple-skinned, cream-fleshed cultivar aimed at replacing the current Japanese clones. It has much better disease resistance, including soil rot, fusarium and root-knot nematode resistances. It did not size up well in the CRS trial, with only 37% of the roots being #1’s vs. 53% for the Japanese from the NCSU MPU. Both these lines are longer season lines and would perform much better given an extra few weeks to size. This trial was dug at 112 days. It set a large number of roots in this test which could further delay sizing.

In the HCRS trial, NC99-573 was a clear standout. It was significantly greater for total yield, total marketable yield and appearance than all other entries. Covington, Beauregard and Evangeline yielded similarly but Covington and Evangeline had much better shapes and appearance than Beauregard with scores of 6.2, 5.8 and 4 respectively. Covington stayed short with an average Length/Diameter ratio = 1.5. Beauregard was very long with an L/D ratio = 4. In the Murasaki-29 and Japanese comparison, both needed more time to size but had a similar yield. Pack-out favored Murasaki-29 because of a high percentage of culls in the Japanese mainly for cracking, length and some russet crack. We do not know if Murasaki-29 is susceptible or resistant to russet crack.

Overall appearance was rated using a subjective 0-9 scale with 0 = very poor, 3 = poor, 5 = fair, 7 = good and 9 = excellent. Appearance ratings such as a 6 mean that a clone, in our opinion, was a little bit better than fair (6), but still not good (7).
**Cunningham Research Station National Sweetpotato Collaborators Trial - 2007**

**Description of Official Entries**

**Beauregard (B94-14 G2)** - Rose skin, orange flesh, moderately smooth skin, fusiform and blocky shapes, early to mid season. Significant curved roots and some end to end color variation, length/diameter ratio = 3.25. Overall appearance = 6.

**Beauregard (B63 G2)** - Rose skin, orange flesh, moderately smooth skin, blocky and fusiform shapes, early to mid season. Significant curved roots and some end to end color variation. Slightly shorter than B94-14, length/diameter ratio = 3. Overall appearance = 5.7.

**Covington (G2)** - Rose skin, orange flesh, moderately smooth skin, fusiform and blocky shapes, mid season. Some end to end color variation, some tails, length/diameter ratio = 2. Overall appearance = 5.7.

**Evangeline (L99-35 (G4))** – Copper-rose skin, deep orange flesh, smooth skin, elliptic shapes, mid season. Some end to end color variation, length/diameter ratio = 2. Overall appearance = 6.8.

**NC99-573 (G2)** – Rose skin, deep orange flesh, smooth skin, elliptic shapes, early to mid season, rows of eyes, length/diameter ratio = 2. Overall appearance = 7.3.

**Murasaki-29 (L01-29 (G3))** – Purple skin, cream flesh, moderately smooth skin, elliptic and blocky shapes, late season, high number of roots set, tails, length/diameter ratio = 3. Overall appearance = 5.8.

**NC Japanese (G2)** – Dark rose skin, cream flesh, smooth skin, blocky and elliptic shapes, mid to late season. Deep eyes, some tails and some russet crack, shows skinning, length/diameter ratio = 3. Overall appearance = 5.

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**Horticultural Crops Research Station National Sweetpotato Collaborators Trial - 2007**

**Description of Official Entries**

**Beauregard (B94-14 G2)** - Rose skin, orange flesh, moderately smooth skin, elliptic, long elliptic and irregular shapes, early to mid season. Significant curved roots, long, length/diameter ratio = 4. Overall appearance = 4.

**Beauregard (B63 G2)** - Rose skin, orange flesh, moderately smooth skin, irregular and long elliptic shapes, mid season. Predominantly curved roots, very long, length/diameter ratio = 4.5. Overall appearance = 3.3.

**Covington (G2)** - Rose skin, orange flesh, smooth skin, round elliptic and blocky shapes, mid season. Some round roots, some tight attachments, length/diameter ratio = 1.5. Overall appearance = 6.2.

**Evangeline (L99-35 (G4))** – Rose skin, deep orange flesh, smooth skin, elliptic shapes, mid season. Some long and some tapered roots but many nice shapes. length/diameter ratio = 2. Overall appearance = 5.8.

**NC99-573 (G2)** – Rose skin, orange flesh, smooth skin, elliptic shapes, early season, rows of eyes, nice shapes, length/diameter ratio = 2.5. Overall appearance = 7.5.

**Murasaki-29 (L01-29 (G3))** – Purple skin, cream flesh, moderately smooth skin, elliptic shapes, mid season, variable sizes, some tight attachments, length/diameter ratio = 3. Overall appearance = 3.5.

Table 1. Sweetpotato True Seed Harvested in 2007.

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Totals           | 30244                       | 39377 |     | 69621 |

--- line was not in this nursery.
Table 2. 2007 Sweetpotato seedlings selected at the LCPRS, Kinston.

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<th>Maternal parent</th>
<th># selections</th>
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<tr>
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<tr>
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<td>NC02-423</td>
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<tr>
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<td>NC02-459</td>
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<td>NC C58</td>
<td>3</td>
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<td>NC99-573</td>
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<td>Ruddy</td>
<td>22</td>
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<td>NC01-156</td>
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<tr>
<td>NC97-433</td>
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<tr>
<td>NC97A-45</td>
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<td>Ruddy</td>
<td>15</td>
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<tr>
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<td>Tib 4</td>
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<td>Hernandez</td>
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<td>NC C58</td>
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<td><strong>Total</strong></td>
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<td></td>
<td></td>
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<tr>
<td><strong>Grand Total</strong></td>
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Table 3. 2006 Sweetpotato seedlings selected on farm.

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<th># selections</th>
<th>Maternal parent</th>
<th># selections</th>
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<td>NC00-720</td>
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<td>NC99-026</td>
<td>18</td>
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<td>8</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>130</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **George Wooten, Wayne E. Bailey Farm, seed from 2006 SSR nursery** | | | |
| NC97A-45        | 7            | NC02-350        | 14           |
| NC99-026        | 5            | NC02-423        | 9            |
| NC99-573        | 3            | NC02-459        | 13           |
| NC00-720        | 1            | Ruddy           | 1            |
| NC01-156        | 20           |                 |              |
| **Total**       | **73**       |                 |              |

<table>
<thead>
<tr>
<th><strong>Jones Farms</strong></th>
<th><strong>2006 Elite nursery</strong></th>
<th><strong>2006 SSR nursery</strong></th>
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</thead>
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<td>NC96-61</td>
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<tr>
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<td>NC99-573</td>
</tr>
<tr>
<td>NC99-524</td>
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<td>NC02-350</td>
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<tr>
<td>NC99-573</td>
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</table>

<table>
<thead>
<tr>
<th><strong>On Farm Grand total</strong></th>
<th><strong>279</strong></th>
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</table>
Table 4a. 2007 National Sweetpotato Collaborators Yield Trial, CRS, Kinston, NC Planted: 12Jun07; Harvested: 02Oct07; Days to Harvest: 112.

<table>
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<tr>
<th>CLONE</th>
<th>Total Yield bu/A</th>
<th>Marketable Yield bu/A</th>
<th>% Beau</th>
<th>% Cov</th>
<th>%No.1's</th>
<th>Canners</th>
<th>Jumbo's</th>
<th>Culls</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC99-573 G2</td>
<td>884</td>
<td>808</td>
<td>110</td>
<td>123</td>
<td>59</td>
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<td>8</td>
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<td>646</td>
<td>572</td>
<td>79</td>
<td>88</td>
<td>54</td>
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<td>12</td>
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<td>B94-14 G2</td>
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<td>742</td>
<td>.</td>
<td>114</td>
<td>57</td>
<td>23</td>
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<td>9</td>
</tr>
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<td>663</td>
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<td>64</td>
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<td>4</td>
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<td>513</td>
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<td>638</td>
<td>87</td>
<td>98</td>
<td>59</td>
<td>31</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
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<td>571</td>
<td>79</td>
<td>87</td>
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<table>
<thead>
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<th>CLONE</th>
<th>Total Yield bu/A</th>
<th>Marketable Yield bu/A</th>
<th>% Beau</th>
<th>% Cov</th>
<th>No.1's</th>
<th>Canners</th>
<th>Jumbo's</th>
<th>Culls</th>
</tr>
</thead>
<tbody>
<tr>
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<td>98</td>
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<td>8</td>
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<tr>
<td>CV (%)</td>
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<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>20</td>
<td>63</td>
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</tbody>
</table>

All trials are reported in 50 lb. bu.

Table 4b. 2007 National Sweetpotato Collaborators Yield Trial at CRS, Kinston, NC - Trait Data. Please see Keys to Tables section at the end of this report for descriptions to the abbreviations.

<table>
<thead>
<tr>
<th>CLONE</th>
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<th>EYE</th>
<th>LEN</th>
<th>SH</th>
<th>SHV</th>
<th>APP</th>
<th>Comments</th>
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<td>7</td>
<td>3</td>
<td>8</td>
<td>7.3</td>
<td>EY</td>
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<tr>
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<td>ME</td>
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<td>3</td>
<td>lt</td>
<td>ms</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>7</td>
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<td>^CRK, CV</td>
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<td>ms</td>
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<td>6.3</td>
<td>5.0</td>
<td>EY, ^T, RC</td>
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<td>cu</td>
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<td>ms</td>
<td>1.75</td>
<td>7</td>
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<td>6</td>
<td>5.8</td>
<td>^#roots, ~T</td>
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Table 5a. 2007 National Sweetpotato Collaborators Yield Trial, HCRS, Clinton, NC Planted: 26Jun07; Harvested: 08Oct07; Days to Harvest: 104.

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<tr>
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<th>Size Distribution by Class (%) of total yield</th>
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<td>Bu/A</td>
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<td>346</td>
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All trials are reported in 50 lb. bu.

Table 5b. 2007 National Sweetpotato Collaborators Yield Trial at HCRS, Clinton, NC - Trait Data. Please see Keys to Tables section at the end of this report for descriptions to the abbreviations.

<table>
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<th>CLONE</th>
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<th>LEN</th>
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<th>SHV</th>
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<th>Comments</th>
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<td>rs</td>
<td>sm</td>
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<td>7</td>
<td>3</td>
<td>8</td>
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<td>lt cu</td>
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<td>5</td>
<td>3.5</td>
<td>AT, var size</td>
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Comments: A tough test due to drought. NC99-573 a standout for yield and appearance.
Table 6a. 2007 Advanced Yield Trial at CRS, Kinston, NC. Planted: 12Jun07; Harvested: 03Oct07; Days to Harvest: 113.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>Total Yield</th>
<th>Marketable Yield</th>
<th>Size Distribution by Class (%) of total yield</th>
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</thead>
<tbody>
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<td></td>
<td>bu/A</td>
<td>bu/A</td>
<td>%Beau</td>
</tr>
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</tr>
<tr>
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<td>92</td>
</tr>
<tr>
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<td>705</td>
<td>89</td>
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<tr>
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<td>794</td>
<td>734</td>
<td>94</td>
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<td>885</td>
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<tr>
<td>Covington G2</td>
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<td>699</td>
<td>88</td>
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<tr>
<td>Evangeline</td>
<td>776</td>
<td>753</td>
<td>95</td>
</tr>
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</table>

NC99-573 G2: 573 G2
NC02-423: 807 728
NC03-066: 734 705
NC04-165: 794 734
NC04-531: 658 635
B94-14 G2: 885 835
Covington G2: 717 699
Evangeline: 776 753

Grand Mean: 788 743 92 103
CV (%): 9.9 8.1 7.5 8.7
LSD (p=0.05): 115 89 10 13

Table 6b. 2007 Advanced Yield Trial at CRS, Kinston, NC - Trait Data. Please see Keys to Tables section at the end of this report for descriptions to the abbreviations.

<table>
<thead>
<tr>
<th>CLONE</th>
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<th>SKT</th>
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<th>EYE</th>
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<th>SH</th>
<th>SHV</th>
<th>APP</th>
<th>Comments</th>
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<tbody>
<tr>
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<td>rs</td>
<td>sm</td>
<td>3.25</td>
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<td>6.75</td>
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<tr>
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<td>5</td>
<td>5.75</td>
<td>~T, ~CRK, var. lengths</td>
</tr>
<tr>
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<td>ms</td>
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<td>NC04-531</td>
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<td>rs</td>
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<td>7</td>
<td>3</td>
<td>6</td>
<td>5.75</td>
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</tr>
<tr>
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<td>rs</td>
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<td>8</td>
<td>3</td>
<td>6</td>
<td>6.5</td>
<td>CV, strong elliptic shapes</td>
</tr>
</tbody>
</table>

Comments: A good test, most clones did well. NC04-165 and NC04-531 have higher dry matter and may be suited to both fresh market, chips and fries, depending on storage ability.
Table 7a. 2007 Advanced Yield Trial at HCRS, Clinton, NC. Planted: 27June07; Harvested: 01Nov07; Days to Harvest: 127.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>Total Yield</th>
<th>Marketable Yield</th>
<th>Size Distribution by Class (% of total yield)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bu/A</td>
<td>bu/A</td>
<td>%Beau</td>
</tr>
<tr>
<td>NC99-573 G2</td>
<td>861</td>
<td>818</td>
<td>103</td>
</tr>
<tr>
<td>NC02-423</td>
<td>657</td>
<td>523</td>
<td>65</td>
</tr>
<tr>
<td>NC03-066</td>
<td>581</td>
<td>459</td>
<td>57</td>
</tr>
<tr>
<td>NC03-417</td>
<td>645</td>
<td>497</td>
<td>62</td>
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<tr>
<td>B94-14 G2</td>
<td>882</td>
<td>796</td>
<td>124</td>
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<tr>
<td>Covington G2</td>
<td>688</td>
<td>651</td>
<td>82</td>
</tr>
<tr>
<td>L99-35</td>
<td>588</td>
<td>532</td>
<td>67</td>
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</table>

Grand Mean 700 611 73 93 53 21 12 14
CV (%) 9 12 13 15 14 25 37 59

LSD (p=0.05) 91 110 15 21

Table 7b. 2007 Advanced Yield Trial at HCRS, Clinton, NC - Trait Data. Please see Keys to Tables section at the end of this report for descriptions to the abbreviations.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>MAT</th>
<th>DM</th>
<th>L/D</th>
<th>SKC</th>
<th>SKT</th>
<th>FL</th>
<th>EYE</th>
<th>LEN</th>
<th>SH</th>
<th>SHV</th>
<th>APP</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC99-573 G2</td>
<td>E</td>
<td>2</td>
<td>rs</td>
<td>ms</td>
<td>3.25</td>
<td>6</td>
<td>6</td>
<td>3,6</td>
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<td>7.5</td>
<td>NS</td>
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<tr>
<td>NC02-423</td>
<td>ME</td>
<td>2</td>
<td>lt cu rs</td>
<td>sm</td>
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<td>7</td>
<td>7</td>
<td>3,6</td>
<td>7</td>
<td>6</td>
<td>CR, SF, ~AT, ~SPR</td>
<td></td>
</tr>
<tr>
<td>NC03-066</td>
<td>LM</td>
<td>3</td>
<td>cu</td>
<td>sflk</td>
<td>3.5</td>
<td>8</td>
<td>8</td>
<td>3</td>
<td>6</td>
<td>5.25</td>
<td>mixed lengths</td>
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<tr>
<td>NC03-417</td>
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<td>2</td>
<td>dk rs</td>
<td>sm</td>
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<td>8</td>
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<td>3,5</td>
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<td>5.25</td>
<td>~20R, ^CR, ~SPR, ^SF, ~CR, ~V, N, ~2R</td>
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<tr>
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<td>8</td>
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<td>6,3</td>
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<td>6.75</td>
<td>~2R, ~V, N, ~2R</td>
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<tr>
<td>L99-35</td>
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<td>rs</td>
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<td>3,7</td>
<td>5</td>
<td>5.75</td>
<td>~MSH, ~SG</td>
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</table>

Comments: This was a tough site, a lot of cracking and misshapen roots. Poor size distribution as shown by the high percentage of both canners and jumbo’s. NC99-573 and Beauregard best for yield, NC99-573 and Covington best for appearance.
Table 8a. 2007 Preliminary 1 Yield Trial at CRS, Kinston, NC. Planted: 07June07; Harvested: 09Oct07; Days to Harvest: 124.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>Total Yield</th>
<th>Marketable Yield</th>
<th>Size Distribution by Class (% of total yield)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>bu/A</td>
<td>bu/A</td>
<td>%Beau</td>
</tr>
<tr>
<td>NC99-573 G2</td>
<td>906</td>
<td>861</td>
<td>112</td>
</tr>
<tr>
<td>NC99-573 BR</td>
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<td>813</td>
<td>105</td>
</tr>
<tr>
<td>NC02-350</td>
<td>929</td>
<td>896</td>
<td>116</td>
</tr>
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<td>789</td>
<td>102</td>
</tr>
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<td>839</td>
<td>768</td>
<td>99</td>
</tr>
<tr>
<td>NC03-114</td>
<td>750</td>
<td>728</td>
<td>94</td>
</tr>
<tr>
<td>NC03-311</td>
<td>935</td>
<td>885</td>
<td>115</td>
</tr>
<tr>
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<td>918</td>
<td>783</td>
<td>101</td>
</tr>
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<td>889</td>
<td>614</td>
<td>82</td>
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<tr>
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<td>745</td>
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<td>915</td>
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<td>772</td>
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<tr>
<td>Covington G2</td>
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<td>775</td>
<td>101</td>
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</table>

Grand Mean 854 783 102 100 59 18 15 8
CV (%) 13 11 11 16 12 23 39 93
LSD (p=0.05) 165 125 17 23 11 6 8 11

Table 8b. 2007 Preliminary 1 Yield Trial at CRS, Kinston, NC - Trait Data. Please see Keys to Tables section at the end of this report for descriptions to the abbreviations.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>MAT</th>
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<th>L/D</th>
<th>SKC</th>
<th>SKT</th>
<th>FL</th>
<th>EYE</th>
<th>LEN</th>
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<th>SHV</th>
<th>APP</th>
<th>Comments</th>
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<td>15</td>
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<td>7</td>
<td>3,6</td>
<td>6</td>
<td>5.7</td>
<td>~CRK, ~T</td>
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<td>~T, ~ESC</td>
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<td>7</td>
<td>3</td>
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<td>5.0</td>
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</tr>
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<td>8</td>
<td>3</td>
<td>6</td>
<td>6.0</td>
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<td>sm</td>
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<td>7</td>
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<td>pur</td>
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<td>7</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>4.7</td>
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<td>lt cu</td>
<td>rs</td>
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<td>2</td>
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<td>ms</td>
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<td>3,6</td>
<td>7</td>
<td>6.7</td>
<td>6.7</td>
<td>short, g sz dist</td>
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</tbody>
</table>

Comments: High yields overall. Covington had the best packout and appearance. NC99-573 had a significant percentage of jumbo’s.
Table 9a. 2007 Preliminary 1 Yield Trial at HCRS, Clinton, NC. Planted: 14Jun07; Harvested: 24Oct07; Days to Harvest: 132.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>Total Yield</th>
<th>Marketable Yield</th>
<th>Size Distribution by Class</th>
<th>(% of total yield)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bu/A</td>
<td>bu/A</td>
<td>%Beau</td>
<td>% Cov</td>
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<td>NC99-573 G2</td>
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<td>111</td>
<td>98</td>
</tr>
<tr>
<td>NC99-573 BR</td>
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<td>612</td>
<td>103</td>
<td>96</td>
</tr>
<tr>
<td>NC03-066</td>
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<td>459</td>
<td>80</td>
<td>71</td>
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<tr>
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<td>523</td>
<td>489</td>
<td>82</td>
<td>76</td>
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<tr>
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<td>458</td>
<td>438</td>
<td>74</td>
<td>67</td>
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<td>56</td>
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<td>96</td>
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<td>647</td>
<td>113</td>
<td>113</td>
</tr>
</tbody>
</table>

Grand Mean | 581 | 541 | 91 | 82 | 56 | 30 | 8 | 6 |

CV (%) 18 | 17 | 16 | 27 | 75 | 11 | 27 | 81 | 4 |

LSD (p=0.05) 149 | 132 | 21 | 22 | 9 | 12 | 9 | 7 |

Table 9b. 2007 Preliminary 1 Yield Trial at HCRS, Clinton, NC - Trait Data. Please see Keys to Tables section at the end of this report for descriptions to the abbreviations.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>MAT</th>
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<th>L/D</th>
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<th>SKT</th>
<th>FL</th>
<th>EYE</th>
<th>LEN</th>
<th>SH</th>
<th>SHV</th>
<th>APP</th>
<th>Comments</th>
</tr>
</thead>
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<tr>
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<td>M</td>
<td>17</td>
<td>3</td>
<td>rs</td>
<td>sm</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>3,6</td>
<td>8</td>
<td>7</td>
<td>~LG, ~MSH</td>
</tr>
<tr>
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<td>17</td>
<td>3</td>
<td>rs</td>
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<td>3,6</td>
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<td>~LG, ~MSH</td>
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<td>20</td>
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<td>cu</td>
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<td>ms</td>
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<td>3</td>
<td>5</td>
<td>6</td>
<td>3,6</td>
<td>5</td>
<td>5</td>
<td>^DM org, T, SPR, RE,</td>
</tr>
<tr>
<td>NC04-090</td>
<td>M</td>
<td>25</td>
<td>2.5</td>
<td>red</td>
<td>ms</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>3,5</td>
<td>6</td>
<td>5</td>
<td>T, LE, ~LG</td>
</tr>
<tr>
<td>NC04-484</td>
<td>ME</td>
<td>21</td>
<td>3</td>
<td>cu</td>
<td>ms</td>
<td>3.5</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>5</td>
<td>RE, ~CR, ~CRK</td>
</tr>
<tr>
<td>B94-14 G2</td>
<td>E</td>
<td>19</td>
<td>3</td>
<td>rs</td>
<td>sm</td>
<td>3</td>
<td>6</td>
<td>6,3</td>
<td>8</td>
<td>8</td>
<td>Uniform shape very nice,</td>
<td></td>
</tr>
<tr>
<td>Covington G2</td>
<td>M</td>
<td>20</td>
<td>2.5</td>
<td>rs</td>
<td>ms</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>6,3</td>
<td>8</td>
<td>8</td>
<td>~2øroots</td>
</tr>
</tbody>
</table>

Comments: A tough site with culls mainly for misshapen roots. Covington, NC99-573 and Beauregard all yielded and looked good.
Table 10a. 2007 Preliminary 2 Yield Trial at CRS, Kinston, NC. Planted: 07June07; Harvested: 09Oct07; Days to Harvest: 124.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>Total Yield</th>
<th>Marketable Yield</th>
<th>Size Distribution by Class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bu/A</td>
<td>bu/A</td>
<td>%Beau</td>
</tr>
<tr>
<td>NC04-097</td>
<td>785</td>
<td>763</td>
<td>79</td>
</tr>
<tr>
<td>NC04-120</td>
<td>756</td>
<td>724</td>
<td>75</td>
</tr>
<tr>
<td>NC04-197</td>
<td>969</td>
<td>833</td>
<td>86</td>
</tr>
<tr>
<td>NC04-198</td>
<td>957</td>
<td>808</td>
<td>84</td>
</tr>
<tr>
<td>NC04-259</td>
<td>904</td>
<td>787</td>
<td>82</td>
</tr>
<tr>
<td>B94-14 G2</td>
<td>1038</td>
<td>968</td>
<td>.</td>
</tr>
<tr>
<td>Covington G2</td>
<td>834</td>
<td>764</td>
<td>79</td>
</tr>
<tr>
<td>Evangeline</td>
<td>899</td>
<td>844</td>
<td>88</td>
</tr>
</tbody>
</table>

| Grand Mean | 893         | 811              | 82    | 108   | 59     | 23      | 9       | 9     |
| CV (%)     | 6           | 8                | 7     | 8     | 11     | 25      | 40      | 41    |
| LSD (p=0.05) | 99       | 112              | NS    | 16    | 12     | 10      | 6       | 6     |

Table 10b. 2007 Preliminary 2 Yield Trial at CRS, Kinston, NC - Trait Data. Please see Keys to Tables section at the end of this report for descriptions to the abbreviations.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>MAT</th>
<th>DM</th>
<th>L/D</th>
<th>SKC</th>
<th>SKT</th>
<th>FL</th>
<th>EYE</th>
<th>LEN</th>
<th>SH</th>
<th>SHV</th>
<th>APP</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC04-097</td>
<td>LM</td>
<td>15</td>
<td>3</td>
<td>rs</td>
<td>sm</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>6,3</td>
<td>7</td>
<td>5.7</td>
<td>BRD SP</td>
</tr>
<tr>
<td>NC04-120</td>
<td>M</td>
<td>18</td>
<td>3</td>
<td>rs</td>
<td>sm</td>
<td>3.25</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>6</td>
<td>5.3</td>
<td>~T, ~LG, ~T, ~Cov</td>
</tr>
<tr>
<td>NC04-197</td>
<td>M</td>
<td>17</td>
<td>2.5</td>
<td>cu</td>
<td>ms</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>6,3</td>
<td>6</td>
<td>6.0</td>
<td>~LG, ~T, ~Cov but longer</td>
</tr>
<tr>
<td>NC04-198</td>
<td>EM</td>
<td>15</td>
<td>2.5</td>
<td>cu</td>
<td>rs</td>
<td>ms</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>6</td>
<td>~LG, ~rough Cov, ~MG, ~MS</td>
</tr>
<tr>
<td>NC04-259</td>
<td>ML</td>
<td>13</td>
<td>3.5</td>
<td>cu</td>
<td>rs</td>
<td>ms</td>
<td>3.25</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>B94-14 G2</td>
<td>E</td>
<td>16</td>
<td>2.5</td>
<td>rs</td>
<td>sm</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>3,6</td>
<td>6</td>
<td>6.0</td>
<td>~T, chunky, H, LG, BRD SP</td>
</tr>
<tr>
<td>Covington G2</td>
<td>M</td>
<td>19</td>
<td>2</td>
<td>cu</td>
<td>rs</td>
<td>sm</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>6,2</td>
<td>7</td>
<td>6.0</td>
</tr>
<tr>
<td>Evangeline</td>
<td>M</td>
<td>19</td>
<td>3</td>
<td>rs</td>
<td>sm</td>
<td>3.5</td>
<td>8</td>
<td>8</td>
<td>3,2</td>
<td>6</td>
<td>4.3</td>
<td>~T, TP, mix sh and sizes</td>
</tr>
</tbody>
</table>

Comments: The site suffered some washout from a hard, though welcome rain. Beauregard best overall, Covington a little off for yield. Evangeline yielded well, but had a mix of shapes and sizes with many tapered roots.
Table 11a. 2007 Preliminary 2 Yield Trial at HCRS, Clinton, NC. Planted: 14Jun07; Harvested: 24Oct07; Growing Days: 132.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>Total Yield</th>
<th>Marketable Yield</th>
<th>Size Distribution by Class (% of total yield)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bu/A</td>
<td>bu/A</td>
<td>%Beau</td>
</tr>
<tr>
<td>NC04-165</td>
<td>672</td>
<td>614</td>
<td>71</td>
</tr>
<tr>
<td>NC04-197</td>
<td>894</td>
<td>854</td>
<td>99</td>
</tr>
<tr>
<td>NC04-198</td>
<td>881</td>
<td>804</td>
<td>94</td>
</tr>
<tr>
<td>NC04-412</td>
<td>482</td>
<td>478</td>
<td>55</td>
</tr>
<tr>
<td>NC05-108</td>
<td>658</td>
<td>652</td>
<td>75</td>
</tr>
<tr>
<td>NC05-198</td>
<td>871</td>
<td>830</td>
<td>96</td>
</tr>
<tr>
<td>NC05-408</td>
<td>684</td>
<td>656</td>
<td>77</td>
</tr>
<tr>
<td>B94-14 G2</td>
<td>956</td>
<td>886</td>
<td></td>
</tr>
<tr>
<td>Covington G2</td>
<td>754</td>
<td>729</td>
<td>85</td>
</tr>
</tbody>
</table>

Grand Mean | 761 | 723 | 81 | 100 | 55 | 29 | 11 | 5

CV (%) | 11 | 11 | 9 | 12 | 11 | 11 | 14 | 5

LSD (p=0.05) | 120 | 119 | 11 | 17 | 11 | 8 | 9 | NS

Table 11b. 2007 Preliminary 2 Yield Trial at HCRS, Clinton, NC - Trait Data. Please see Keys to Tables section at the end of this report for descriptions to the abbreviations.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>MAT</th>
<th>DM</th>
<th>L/D</th>
<th>SKC</th>
<th>SKT</th>
<th>FL</th>
<th>EYE</th>
<th>LEN</th>
<th>SH</th>
<th>SHV</th>
<th>APP</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC04-165</td>
<td>M</td>
<td>23</td>
<td>3</td>
<td>red</td>
<td>sm</td>
<td>3.25</td>
<td>6</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>IR ~SG, ~T, BRD</td>
</tr>
<tr>
<td>NC04-197</td>
<td>ME</td>
<td>17</td>
<td>2</td>
<td>cu rs</td>
<td>ms</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>6,3</td>
<td>5</td>
<td>5.3</td>
<td>AT, B</td>
</tr>
<tr>
<td>NC04-198</td>
<td>ME</td>
<td>17</td>
<td>2</td>
<td>cu rs</td>
<td>ms</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>6,3</td>
<td>5</td>
<td>5.3</td>
<td>AT, ~CR, ~CS</td>
</tr>
<tr>
<td>NC04-412</td>
<td>L</td>
<td>23</td>
<td>3</td>
<td>cu rs</td>
<td>ms</td>
<td>3.5</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>7</td>
<td>5.8</td>
<td>PI, late, CV ~T, ~SPR, EY, ^TP</td>
</tr>
<tr>
<td>NC05-108</td>
<td>ML</td>
<td>23</td>
<td>2.5</td>
<td>rs</td>
<td>sm</td>
<td>3.25</td>
<td>6</td>
<td>7</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>~VN, ~SPR, ^FB, long BRD, ~SPR, VN, ^DM</td>
</tr>
<tr>
<td>NC05-198</td>
<td>EM</td>
<td>20</td>
<td>3.5</td>
<td>cu org</td>
<td>ms</td>
<td>3.5</td>
<td>7</td>
<td>7</td>
<td>6,3</td>
<td>6</td>
<td>6</td>
<td>^MSH, CV, var sizes</td>
</tr>
<tr>
<td>NC05-408</td>
<td>ME</td>
<td>29</td>
<td>1.5</td>
<td>cr</td>
<td>ms</td>
<td>2.5</td>
<td>w/org</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>4.8</td>
</tr>
<tr>
<td>B94-14 G2</td>
<td>EM</td>
<td>21</td>
<td>3</td>
<td>rs</td>
<td>sm</td>
<td>3.25</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>4.8</td>
<td>~SPR, ^FB, long BRD, ~SPR, VN, ^DM</td>
</tr>
<tr>
<td>Covington G2</td>
<td>M</td>
<td>19</td>
<td>2</td>
<td>cu rs</td>
<td>ms</td>
<td>3.25</td>
<td>7</td>
<td>7</td>
<td>6,3</td>
<td>7</td>
<td>6.5</td>
<td></td>
</tr>
</tbody>
</table>

Comments: Beauregard best for yield, but should have been harvested earlier as indicated by the high percentage of jumbo’s. Beauregard appearance was rough with variable sizes and many misshapen roots, Covington much more consistent for shape and appearance.
Table 12a. 2007 Soil Rot Yield Trial at HCRS, Clinton, NC. Planted: 03July07; Harvested: 02Nov07; Days to Harvest: 122.

<table>
<thead>
<tr>
<th>CLONE</th>
<th>Total Yield</th>
<th>Marketable Yield</th>
<th>Size Distribution by Class (%) of total yield</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>bu/A</td>
<td>bu/A</td>
<td>%Beau</td>
</tr>
<tr>
<td>99-573 G2</td>
<td>550</td>
<td>538</td>
<td>115</td>
</tr>
<tr>
<td>NC02-350</td>
<td>439</td>
<td>381</td>
<td>82</td>
</tr>
<tr>
<td>NC02-423</td>
<td>554</td>
<td>214</td>
<td>46</td>
</tr>
<tr>
<td>NC03-066</td>
<td>393</td>
<td>243</td>
<td>53</td>
</tr>
<tr>
<td>NC03-089</td>
<td>259</td>
<td>185</td>
<td>40</td>
</tr>
<tr>
<td>NC03-114</td>
<td>398</td>
<td>365</td>
<td>78</td>
</tr>
<tr>
<td>NC03-239</td>
<td>344</td>
<td>171</td>
<td>37</td>
</tr>
<tr>
<td>NC03-311</td>
<td>333</td>
<td>202</td>
<td>44</td>
</tr>
<tr>
<td>NC03-372</td>
<td>221</td>
<td>123</td>
<td>27</td>
</tr>
<tr>
<td>NC03-380</td>
<td>242</td>
<td>90</td>
<td>19</td>
</tr>
<tr>
<td>NC03-395</td>
<td>331</td>
<td>312</td>
<td>67</td>
</tr>
<tr>
<td>NC03-417</td>
<td>287</td>
<td>243</td>
<td>53</td>
</tr>
<tr>
<td>NC04-011</td>
<td>392</td>
<td>359</td>
<td>77</td>
</tr>
<tr>
<td>NC04-069</td>
<td>416</td>
<td>396</td>
<td>84</td>
</tr>
<tr>
<td>NC04-086</td>
<td>427</td>
<td>316</td>
<td>68</td>
</tr>
<tr>
<td>NC04-090</td>
<td>442</td>
<td>313</td>
<td>67</td>
</tr>
<tr>
<td>B94-14 G2</td>
<td>520</td>
<td>467</td>
<td>.</td>
</tr>
<tr>
<td>Covington G2</td>
<td>432</td>
<td>426</td>
<td>92</td>
</tr>
<tr>
<td>Hernandez G2</td>
<td>458</td>
<td>370</td>
<td>80</td>
</tr>
<tr>
<td>Jewel</td>
<td>135</td>
<td>26</td>
<td>6</td>
</tr>
</tbody>
</table>

Grand Mean | 379 | 287 | 60 | 67 | 29 | 43 | 1 | 27 |
CV (%)      | 23  | 22  | 23 | 25 | 26 | 23 | 216 | 35 |
LSD (p=0.05)| 124 | 91  | 20 | 24 | 11 | 14 | 2 | 13 |

Comments: A mixture of soil rot, circular spot, and cracking produced very high numbers of culls.
<table>
<thead>
<tr>
<th>CLONE</th>
<th>MAT</th>
<th>DM</th>
<th>L/D</th>
<th>SKC</th>
<th>SKT</th>
<th>FL</th>
<th>EYE</th>
<th>LEN</th>
<th>SH</th>
<th>SHV</th>
<th>APP</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>NC99-573 G2</td>
<td>M</td>
<td>3</td>
<td>rs</td>
<td>ms</td>
<td></td>
<td></td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>3,6</td>
<td>6</td>
<td>no disease</td>
</tr>
<tr>
<td>NC02-350</td>
<td>M</td>
<td>3</td>
<td>rs</td>
<td>sflk</td>
<td></td>
<td></td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>3,6</td>
<td>6</td>
<td>MSH</td>
</tr>
<tr>
<td>NC02-423</td>
<td>ME</td>
<td>2.5</td>
<td>lt org</td>
<td>ms</td>
<td></td>
<td></td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>NC03-066</td>
<td>M</td>
<td>2.5</td>
<td>org</td>
<td>sflk</td>
<td>6,3</td>
<td>6</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>SSR</td>
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<tr>
<td>NC03-089</td>
<td>L</td>
<td>3</td>
<td>red</td>
<td>sflk</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>7</td>
<td>5</td>
<td>CR, SSR, long</td>
<td>~2⁰roots</td>
</tr>
<tr>
<td>NC03-114</td>
<td>M</td>
<td>2</td>
<td>rs</td>
<td>sflk</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>3,6</td>
<td>7</td>
<td>6</td>
<td>~VN, ~LG</td>
<td>~CR</td>
</tr>
<tr>
<td>NC03-239</td>
<td>M</td>
<td>2</td>
<td>rs</td>
<td>ms</td>
<td>3</td>
<td>8</td>
<td>6</td>
<td>3,6</td>
<td>5</td>
<td>5</td>
<td>^SSR lesions</td>
<td>~CR, ~RKN</td>
</tr>
<tr>
<td>NC03-311</td>
<td>ML</td>
<td>3</td>
<td>cu</td>
<td>rs</td>
<td>sflk</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>^^CR, ^SSR</td>
</tr>
<tr>
<td>NC03-372</td>
<td>M</td>
<td>3</td>
<td>red</td>
<td>sflk</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>^SSR</td>
<td>^^CR</td>
</tr>
<tr>
<td>NC03-380</td>
<td>ML</td>
<td>1.5</td>
<td>rs</td>
<td>ms</td>
<td>3</td>
<td>6</td>
<td>7</td>
<td>2</td>
<td>6</td>
<td>4</td>
<td>^^CR, ~RKN</td>
<td>~CR</td>
</tr>
<tr>
<td>NC03-395</td>
<td>M</td>
<td>2</td>
<td>rs</td>
<td>ms</td>
<td>3</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>6</td>
<td>5</td>
<td>SSR</td>
<td>~CR</td>
</tr>
<tr>
<td>NC03-417</td>
<td>M</td>
<td>2</td>
<td>red</td>
<td>ms</td>
<td>3</td>
<td>7</td>
<td>8</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>^CR</td>
<td>--</td>
</tr>
<tr>
<td>NC04-011</td>
<td>M</td>
<td>2</td>
<td>org</td>
<td>rs</td>
<td>sflk</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>3,6</td>
<td>6</td>
<td>6</td>
<td>EY, almost no disease</td>
</tr>
<tr>
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<td>2.75</td>
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<td>8</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>~2⁰roots</td>
<td>~CR - RKN</td>
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<tr>
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<td>ML</td>
<td>2</td>
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<td>8</td>
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<td>RC, ^SSR</td>
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<td>~CR, little disease</td>
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<td>3</td>
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<td>6</td>
<td>little disease</td>
<td>~CR, little disease</td>
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<tr>
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<td>M</td>
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<td>org</td>
<td>sflk</td>
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<td>~CR, ~RKN</td>
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<td>4</td>
<td>SSR, CR, RKN</td>
<td>^CR w/SF</td>
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Comments: A very tough site by design with high levels of soil rot, fusarium, circular spot and root knot nematodes making for high levels of culls. This trial is used mainly to test potential parents for their overall disease resistance. If a clone comes out clean here, it has broad disease resistance. Beauregard, Covington and NC99-573 all performed well.
**Keys to Tables**

**Storage root data:** MAT=maturity E=early, M=mid and L=Late; DM=percentage dry matter; L/D=length/diameter ratio; SKC=skin color clr=clear cu=copper, lt=light, or=orange, pi=pink, pu=purple, rd=red, rs=rose, tn=tan wh=white; SKT= skin texture, m fl= moderate flakiness of skin, l fl= light flakiness to skin, ms=moderately smooth, sm=smooth; FL=flesh color (0-5 scale where 0=pure white, 1= cream, 2=yellow, 3= medium orange, 4=deep orange, 5= very deep orange; EYE=eyes(0-9); LEN= lenticels (0-9); SH=Shape (see diagram); SHV=shape variability(0-9); APP=overall appearance (0-9). All 0-9 scales go from low or poor to high or good.

**Comment codes:** AC=air cracking; AT=tough attachment; B=bumpy shapes; BL=blocky shapes; BON=Boniato type; BRD=breeding only; BSR=bacterial soft rot; CR=cracking; CRK= crooked shapes; CS=circular spot; CV=skin color variation end to end; D=drop; ESC=Early season cracking; EY=deep eyes; FB=fleabeetle damage; FS=Fusarium root rot; G=Geotricum; GR=grooves; HC=horizontal constrictions; ID=unspecified insect damage; IR=insect resistance; IRR=irregular; JL=jumbo’s for length; L=long; LE=lenticels; LG=longitudinal grooves; LR=Lateral rings; LT=latex; MSH=missshappen roots; NS=niche shapes; OV=ovate or pear shapes; PD=Plectris damage; PI=pimples (0-9); PN=pencil roots; PP=pulled plants; R=rodent; RC=russet crack; RG=restaurant grade; RH=root hairs; RKN=root-knot nematodes; RND=round; RSK=rough skin; RT=rot; SC=scurf; SD=skin discoloration; SF=surface Fusarium; SG=string roots; SH=sheen; SK=skinning; SO=souring; SPR=sprouts; SR=soft rot; SS=stays short; SSR=streptomyces soil rot; STR=striations; T=tails; TP=tapered roots; TS=tea staining; VN= veins; WB=whitefringed beetle; WG=white grub; WW=wireworm; YCR=yellow cortical ring; YLD=yield; 2^R=secondary roots.

^ = lots or high amount of, ~ = moderate or some, ↓ = little or poor

(Rating scale: 0 = very severe to 9 = absent)

**Shapes**

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<tr>
<th>1</th>
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