

2007 PROGRESS REPORT  
To  
North Carolina SweetPotato Commission

TITLE: Sweetpotato Breeding and Variety Development Support

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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 of 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 *Systema* 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.

### Project Cooperators

Researchers	Extension	Growers
Dr. Bryon Sosinski	Mr. William Little	Jones Farms
Dr. Zvezdana Pesic-VanEsbroeck	Mr. Allan Thornton	Williams Farms
Dr. Jonathan Schultheis	Mr. Howard Wallace	Wayne E. Bailey Farms
Dr. Den Truong		
Dr. Gerald Holmes		
Dr. Charles Averde		

### 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:

<u>Extension Personnel</u>	<u>Growers</u>
Howard Wallace	Wayne E. Bailey Farms, Columbus County
William Little	Jones Farms, Nash County
Allan Thornton	Williams Farms, Sampson County

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.

**Average performance of NC99-573, B94-14, Beauregard and Covington over 1 yield test in 2002, 4 in 2003, 4 in 2004, 4 in 2005, 5 in 2006 and 7 in 2007.**

CLONE	Total Yield		Marketable Yield		Size Distribution by Class (% of total yield)			
	bu/A	bu/A	%Beau	%Cov	No.1's	Canners	Jumbo's	Culls
NC99-573	890	813	112	112	54	27	11	8
B94-14 G2	866	764	100	103	54	21	14	11
Covington	794	736	102	100	59	23	11	7

### 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:

Disposition

see table above

Is being stored commercially in winter 2007-08, will be commercially

bedded in 2008 then extensively trialed in advanced and on-farm trials during 2008. Potential release in fall 2008.

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 = 7.2.

**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 = 2.5. 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.

**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.

**NC Japanese (G2)** – Purple skin, cream flesh, moderately smooth skin, blocky shapes, late season. Deep eyes, long, some sprouting, length/diameter ratio = 4. Overall appearance = 4.

Table 1. Sweetpotato True Seed Harvested in 2007.

Maternal Parent	No. Seed/Polycross Nursery		Total
	CCRS, Clayton		
	Elite	SSR	
96-61	1354	3457	4811
97A-04	1853	---	1853
97A-45	2760	3078	5838
97-433	1934	---	1934
99-026	2186	2570	4756
99-524	2506	---	2506
99-573	3559	3131	6690
00-720	---	2372	2372
00-748	---	872	872
01-156	1135	1765	2900
01-214	3950	---	3950
02-350	---	4910	4910
02-423	---	1581	1581
02-459	---	4290	4290
03-030	---	3260	3260
03-302	---	85	85
03-380	980	---	980
C58	3525	---	3525
Covington	0	0	0
L87-95	236	---	236
L95-95	1485	---	1485
L99-35	698	---	698
L01-29	---	4514	4514
Ruddy	2083	1780	3863
Tib 4	---	1712	1712
Totals	30244	39377	69621

'---' line was not in this nursery.



Table 2. 2007 Sweetpotato seedlings selected at the LCPRS, Kinston.

Maternal parent	# selections	Maternal parent	# selections
<i>Seed from the 2006 Elite nursery</i>			
NC96-61	19	NC01-214	11
NC97A-04	21	NC C58	14
NC97-166	19	L97-95	11
NC97-433	35	L95-95	14
NC98-524	23	L99-35	17
NC99-573	39	Ruddy	18
NC00-677	7		
		<b>Total</b>	<b>248</b>
<i>Seed from the 2006 SSR nursery</i>			
NC1880	23	NC02-350	16
NC96-61	11	NC02-423	11
NC97A-45	13	NC02-459	22
NC99-026	12	NC C58	3
NC99-573	24	Ruddy	22
NC00-720	17	Tib 4	23
NC01-156	17		
		<b>Total</b>	<b>214</b>
<i>Seed from the 2005 Elite nursery</i>			
NC93-50	6	L99-35	7
NC97-433	9	Ruddy	12
NC99-573	26		
		<b>Total</b>	<b>60</b>
<i>Seed from the 2005 SSR nursery</i>			
NC96-61	6	L99-35	8
NC97A-45	12	Ruddy	15
NC99-573	20	Tib 4	13
		<b>Total</b>	<b>74</b>
<i>Seed from the 2004 Elite nursery</i>			
NC96-61	15	NC97A-45	7
		<b>Total</b>	<b>22</b>
<i>Seed from the 2004 SSR nursery</i>			
NC93-50	11	Hernandez	4
NC97-433	17	Tib 4	17
NC C58	4		
		<b>Total</b>	<b>53</b>
		<b>Grand Total</b>	<b>671</b>

Seedling Selections Continued on Next Page

Table 3. 2006 Sweetpotato seedlings selected on farm.

Maternal parent	# selections	Maternal parent	# selections
<i>Williams Farms, seed from the 2006 SSR nursery</i>			
NC1880	14	NC00-720	6
NC96-61	14	NC02-350	14
NC97A-45	26	NC02-423	14
NC99-026	18	NC02-459	4
NC99-573	12	Ruddy	8
<b>Total</b>			<b>130</b>
<i>George Wooten, Wayne E. Bailey Farm, seed from 2006 SSR nursery</i>			
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		
<b>Total</b>			<b>73</b>
<i>Jones Farms</i>			
<i>2006 Elite nursery</i>		<i>2006 SSR nursery</i>	
NC96-61	4	NC96-61	2
NC97-433	6	NC99-573	13
NC99-524	3	NC02-350	12
NC99-573	5	Ruddy	8
NC01-214	10	Tib 4	13
<b>Total</b>			<b>76</b>
<b>On Farm Grand total</b>			<b>279</b>

Table 4a. 2007 National Sweetpotato Collaborators Yield Trial, CRS, Kinston, NC Planted: 12Jun07; Harvested: 02Oct07; Days to Harvest: 112.

CLONE	Total Yield bu/A	Marketable Yield		Size Distribution by Class (% of total yield)				
		Bu/A	%Beau	% Cov	No.1's	Canners	Jumbo's	Culls
NC99-573 G2	884	808	110	123	59	24	8	8
B63 G2	646	572	79	88	54	22	12	12
B94-14 G2	819	742	.	114	57	23	11	9
Covington G2	699	663	91	.	64	27	4	5
Japanese	576	513	70	79	52	35	2	11
L99-35	670	638	87	98	59	31	5	5
L01-29	594	571	79	87	37	58	1	4
Grand Mean	698	644	86	98	55	31	6	8
CV (%)	13	13	13	13	13	20	63	52
LSD (p=0.05)	103	100	13	15	8	7	5	5

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.

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC99-573 G2	ME	15	2	rs	sm	3.25	6	7	3	8	7.3	EY
B63 G2	ME	16	3	lt rs	ms	3	8	7	6,3	5	5.7	^CRK, CV
B94-14 G2	ME	17	3.25	lt rs	ms	3	8	7	3,6	6	6.0	CRK, CV
Covington G2	M	19	2	rs	ms	3	7	7	3,6	8	7.2	CV, T
Japanese	ML	34	3	dk rs	sm	1.5	5	7	6,3	6	5.0	EY, ^T, RC
L99-35	M	16	2.5	cu rs	sm	3.25	8	8	3	6	6.8	CV
L01-29	L	29	3	p	ms	1.75	7	8	3,6	6	5.8	^#roots, ~T

Comments: A good test, NC99-573 and Beauregard standout for yield. Covington and NC99-573 standout for appearance.

Table 5a. 2007 National Sweetpotato Collaborators Yield Trial, HCRS, Clinton, NC Planted: 26Jun07; Harvested: 08Oct07; Days to Harvest: 104.

CLONE	Total Yield bu/A	Marketable Yield		Size Distribution by Class (% of total yield)				
		Bu/A	%Beau	% Cov	No.1's	Canners	Jumbo's	Culls
NC99-573 G2	650	622	140	151	66	21	8	4
NC04-069	347	344	77	83	61	33	6	1
B63 G2	415	346	77	84	46	27	12	16
B94-14 G2	515	452	.	110	54	23	11	12
Covington G2	450	416	94	.	58	23	12	8
Japanese	352	286	64	69	45	25	13	17
L99-35	423	396	89	95	66	22	5	6
L01-29	351	341	77	83	54	41	2	3
Grand Mean	438	400	88	97	56	27	9	8
CV (%)	17	16	17	18	18	27	88	77
LSD (p=0.05)	87	77	18	20	12	9	NS	8

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.

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC99-573 G2	E	17	2.5	rs	sm	3	6	7	3	8	7.5	NS, EY
NC04-069	L	19	3	lt cu	sm	3	6	7	3	7	6	low # roots
B63 G2	M	17	4.5	rs	ms	3	7	7	7,4	3	3.3	L, MSH
									3,4,			
B94-14 G2	EM	19	4	rs	ms	3	7	7	7	4	4	L, CRK
Covington G2	M	20	1.5	rs	sm	3	6	7	2,6	6	6.2	RND, AT
Japanese	L	26	4	p	ms	1.5	6	7	3,6	6	4	L, SPR
L99-35	M	20	2	rs	sm	3.25	7	7	3	7	5.8	NS, L, TP
L01-29	M	30	3	p	ms	1.5	7	7	3	5	3.5	AT, var size

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.

CLONE	Total Yield bu/A	Marketable Yield		Size Distribution by Class (% of total yield)				
		bu/A	%Beau	% Cov	No.1's	Canners	Jumbo's	Culls
NC99-573 G2	932	857	108	119	59	22	11	8
NC02-423	807	728	92	100	68	18	4	9
NC03-066	734	705	89	98	62	29	5	4
NC04-165	794	734	94	101	49	37	7	7
NC04-531	658	635	80	88	63	26	7	3
B94-14 G2	885	835	.	116	61	25	8	6
Covington G2	717	699	88	.	63	30	5	2
Evangeline	776	753	95	104	70	23	4	3
Grand Mean	788	743	92	103	62	26	7	5
CV (%)	9.9	8.1	7.5	8.7	6.6	19.7	56	56
LSD (p=0.05)	115	89	10	13	6	8	NS	4

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.

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC99-573 G2	ME	15	2.5	rs	sm	3.25	6	7	3,6	7	6.75	
NC02-423	ME	16	2	cu rs	sm	3.25	8	6	6,5	5	5.75	~ESC, T, SF
NC03-066	M	17	3	cu	ms	3.25	7	7	6	7	6	~T, ~CRK, var. lengths
NC04-165	M	17	2	red	sm	3	7	8	3	6	5	~T, tapered AT
NC04-531	M	22	2	dk rs	sm	3.25	8	7	3	6	5.75	~T, strong elliptic shapes
B94-14 G2	M	15	3	cu rs	ms	3	8	7	6,3	5	5.5	^CRK, CV
Covington G2	M	17	2	cu rs	ms	3	7	7	3,6	6	6	CV, ~T
Evangeline	M	16	2	cu rs	ms	3.5	8	8	3	6	6.5	CV, strong elliptic shapes

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.

CLONE	Total Yield bu/A	Marketable Yield		Size Distribution by Class (% of total yield)				
		bu/A	%Beau	% Cov	No.1's	Canners	Jumbo's	Culls
NC99-573 G2	861	818	103	126	57	15	23	5
NC02-423	657	523	65	79	56	14	9	22
NC03-066	581	459	57	70	48	27	3	21
NC03-417	645	497	62	76	40	37	0	23
B94-14 G2	882	796	.	124	57	13	20	10
Covington G2	688	651	82	.	57	21	17	5
L99-35	588	532	67	83	59	16	15	9
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	11	8	7	12

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.

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC99-573 G2	E		2	rs	ms	3.25	6	6	3,6	7	7.5	NS
NC02-423	ME		2	lt cu rs	sm	3.5	7	7	3,6	7	6	CR, SF, ~AT, ~SPR
NC03-066	LM		3	cu	sflk	3.5	8	8	3	6	5.25	~SF, ~CR, mixed lengths
NC03-417	L		2	dk rs	sm	3.5	8	6	3,5	7	5.25	^CR, ~SPR, ~VN,
B94-14 G2	E		3	rs	ms	3	8	8	3,6, 7	5	5.5	mix SH
Covington G2	M		2	cu rs	ms	3	8	7	6,3	8	6.75	~2 <sup>o</sup> R
L99-35	M		3	rs	ms	3.5	8	8	3,7	5	5.75	~MSH, ~SG

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.

CLONE	Total Yield bu/A	Marketable Yield		Size Distribution by Class (% of total yield)				
		bu/A	%Beau	% Cov	No.1's	Canners	Jumbo's	Culls
NC99-573 G2	906	861	112	112	61	14	20	5
NC99-573 BR	902	813	105	106	56	14	20	10
NC02-350	929	896	116	116	51	18	27	4
NC03-066	836	789	102	102	59	20	15	6
NC03-089	839	768	99	100	57	30	4	8
NC03-114	750	728	94	93	64	23	10	3
NC03-311	935	885	115	114	61	28	6	5
NC03-380	918	783	101	101	56	12	18	15
NC03-395	889	614	82	58	44	27	3	25
NC04-032	768	745	96	96	62	18	17	3
NC04-069	788	751	97	98	65	10	21	5
NC04-086	706	611	79	80	55	17	15	13
NC04-090	973	915	119	119	60	12	21	6
B94-14 G2	857	772	.	100	61	14	15	9
Covington G2	822	775	101	.	67	18	9	5
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.

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC99-573 G2	ME	14	2.5	rs	sm	3.25	6	7	3	7	6.3	RE, ~T
NC99-573 BR	ME	16	2.5	rs	sm	3.5	6	7	3	5	5.3	T
NC02-350	ME	18	2.5	lt cu rs	ms	3.25	8	7	6,3	6	5.3	~2 <sup>0</sup> roots mixed length, tubular
NC03-066	M	19	3	org	ms	3	8	7	6	6	6.0	long, ^CRK,
NC03-089	L	15	3.5	red	ms	3	7	7	6	6	4.3	^T, SP only
NC03-114	M	17	2.5	rs	sflk	3	7	5	3	6	6.3	LE, v elliptic
NC03-311	M	22	2.5	org	sflk	3	7	7	3,6	6	5.7	~CRK, ~T EY, bumpy,
NC03-380	ME	17	2	rs	sm	3	6	7	3	5	4.3	~T, ~ESC
NC03-395	ML	18	2.5	dk rs	ms	3	7	7	3	5	5.0	~CRK, ~T
NC04-032	M	21	2.5	dk rs	sm	3	8	8	3	6	6.0	v elliptic, ~T g size unif +
NC04-069	ME	18	2	lt cu	sm	3	7	7	3	7	6.0	finish
NC04-086	M	18	2	org	sm	3	7	7	3,2	6	5.7	~B LG, strong
NC04-090	ME	21	2.5	pur	sm	3	7	6	3	6	4.7	elliptic shapes
B94-14 G2	ME	14	2.5	lt cu rs	ms	3	8	7	6,3	7	5.3	variable reps
Covington G2	M	16	2	rs	ms	3	7	7	3,6	7	6.7	short,g sz dist

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.

CLONE	Total Yield bu/A	Marketable Yield		Size Distribution by Class (% of total yield)				
		bu/A	%Beau	% Cov	No.1's	Canners	Jumbo's	Culls
NC99-573 G2	651	630	111	98	62	26	9	3
NC99-573 BR	647	612	103	96	59	28	8	5
NC03-066	500	459	80	71	53	34	4	8
NC03-311	523	489	82	76	48	42	4	7
NC03-395	458	438	74	67	58	36	1	5
NC04-011	361	358	60	56	59	40	1	1
NC04-090	617	589	102	91	60	24	11	4
NC04-484	700	573	97	88	53	23	7	17
B94-14 G2	691	619	.	96	50	20	20	11
Covington G2	660	647	113	.	62	23	12	2
Grand Mean	581	541	91	82	56	30	8	6
CV (%)	18	17	16	18	11	27	81	75
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.

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC99-573 G2	M	17	3	rs	sm	3	6	7	3,6	8	7	~LG, ~MSH
NC99-573 BR	M	17	3	rs	sm	3	6	7	3	6	6	~LG, ~MSH
NC03-066	ML	20	1.5	cu org	ms	3	7	7	3,2	5	5	MSH, ~rot
NC03-311	M	22	3	cu	sflk	3.5	7	7	6,3	6	6	~CRK
NC03-395	M	21	2.5	rs	sm	3	7	7	3,6	6	6	~CRK
NC04-011	ML	19	2	cu	sm	3	5	6	3,6	5	5	T, SPR, RE, ^DM org
NC04-090	M	25	2.5	red	ms	3	7	6	3,5	6	5	T, LE, ~LG
NC04-484	ME	21	3	cu	ms	3.5	5	6	3	6	5	RE, ~CR, ~CRK
B94-14 G2	E	19	3	rs	sm	3	6	6	3,6	8	8	Uniform shape very nice,
Covington G2	M	20	2.5	rs	ms	3	8	8	6,3	8	8	~2 <sup>0</sup> roots

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.

CLONE	Total Yield bu/A	Marketable Yield		Size Distribution by Class (% of total yield)				
		bu/A	%Beau	% Cov	No.1's	Canners	Jumbo's	Culls
NC04-097	785	763	79	101	58	35	4	2
NC04-120	756	724	75	96	58	37	1	4
NC04-197	969	833	86	110	53	23	11	14
NC04-198	957	808	84	106	54	16	14	16
NC04-259	904	787	82	103	52	22	13	13
B94-14 G2	1038	968	.	129	66	12	15	7
Covington G2	834	764	79	.	64	17	11	8
Evangeline	899	844	88	112	68	22	4	6
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.

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC04-097	LM	15	3	rs	sm	3	8	8	6,3	7	5.7	BRD SP
NC04-120	M	18	3	rs	sm	3.25	7	7	3	6	5.3	~T
NC04-197	M	17	2.5	cu	ms	3	7	7	6,3	6	6.0	~LG, ~T, ~Cov but longer
NC04-198	EM	15	2.5	cu rs	ms	3	7	7	3	6	5.0	~LG, ^MSH. ~rough Cov
NC04-259	ML	13	3.5	cu rs	ms	3.25	8	6	3	5	4.3	~VN,~PI,T,MS H,LG, BRD SP
B94-14 G2	E	16	2.5	rs	sm	3	8	8	3,6	6	6.0	
Covington G2	M	19	2	cu rs	sm	3	6	7	6,2	7	6.0	~T, chunky
Evangeline	M	19	3	rs	sm	3.5	8	8	3,2	6	4.3	~T, TP, mix sh and sizes

Comments: The site suffered some washout from a hard, though welcome rain. Beaugard 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.

CLONE	Total Yield bu/A	Marketable Yield		Size Distribution by Class (% of total yield)				
		bu/A	%Beau	% Cov	No.1's	Canners	Jumbo's	Culls
NC04-165	672	614	71	85	47	39	6	8
NC04-197	894	854	99	118	61	22	13	4
NC04-198	881	804	94	111	54	27	10	9
NC04-412	482	478	55	66	49	50	0	1
NC05-108	658	652	75	90	59	32	7	1
NC05-198	871	830	96	114	59	27	9	4
NC05-408	684	656	77	91	59	19	18	4
B94-14 G2	956	886	.	122	48	16	28	8
Covington G2	754	729	85	.	62	29	6	3
Grand Mean	761	723	81	100	55	29	11	5
CV (%)	11	11	9	12	14	20	56	99
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.

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

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.

CLONE	Total Yield bu/A	Marketable Yield		Size Distribution by Class (% of total yield)				
		bu/A	%Beau	% Cov	No.1's	Canners	Jumbo's	Culls
99-573 G2	550	538	115	130	51	44	2	2
NC02-350	439	381	82	91	36	51	0	13
NC02-423	554	214	46	51	19	20	0	61
NC03-066	393	243	53	58	25	36	1	38
NC03-089	259	185	40	45	5	66	0	28
NC03-114	398	365	78	90	38	53	0	9
NC03-239	344	171	37	41	19	29	3	50
NC03-311	333	202	44	49	14	47	0	39
NC03-372	221	123	27	30	16	41	0	43
NC03-380	242	90	19	22	22	13	0	65
NC03-395	331	312	67	73	26	68	0	6
NC03-417	287	243	53	57	10	75	0	15
NC04-011	392	359	77	85	36	56	0	8
NC04-069	416	396	84	96	59	33	4	5
NC04-086	427	316	68	75	28	46	0	25
NC04-090	442	313	67	74	35	35	2	28
B94-14 G2	520	467	.	112	48	40	2	10
Covington G2	432	426	92	.	52	47	0	1
Hernandez G2	458	370	80	86	40	39	1	19
Jewel	135	26	6	6	4	15	0	81
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 12b. 2007 Soil Rot 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.

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC99-573 G2	M		3	rs	ms	3	6	7	3,6	6	6	no disease
NC02-350	M		3	rs	sflk	3	6	7	3	6	6	MSH
NC02-423	ME		2.5	lt org	ms	3	7	6	6	6	5	^^CR
NC03-066	M		2.5	org	sflk	6,3	6	8	7	6	5	^^CR, SF, no SSR
NC03-089	L		3	red	sflk	3	7	7	3	7	5	CR, SSR, long
NC03-114	M		2	rs	sflk	3	7	7	3,6	7	6	~VN, ~LG
NC03-239	M		2	rs	ms	3	8	6	3,6	5	5	^SSR lesions
NC03-311	ML		3	cu rs	sflk	3	7	7	6	5	5	^^CR, ^SSR
NC03-372	M		3	red	sflk	3	7	7	3	5	5	^SSR
NC03-380	ML		1.5	rs	ms	3	6	7	2	6	4	^^CR, ~RKN
NC03-395	M		2	rs	ms	3	7	7	3	6	5	SSR
NC03-417	M		2	red	ms	3	7	8	3	7	6	^CR
NC04-011	M		2	org rs	sflk	3	5	7	3,6	6	6	EY, almost no disease
NC04-069	M		2	tan	ms	2.75	7	8	3	6	6	~2 <sup>0</sup> roots
NC04-086	ML		2	org	ms	3	8	8	3	6	5	^CR - RKN
NC04-090	M		2	pur	sm	2.75	8	7	6,3	7	6	RC, ^SSR lesions
B94-14 G2	M		2	rs	sflk	3	8	7	6,3	5	6	~CR, little disease
Covington G2	M		1.5	rs	sflk	3	7	7	3	6	6	little disease
Hernandez G2	M		2	org	sflk	3.25	6	7	3	6	6	^CR w/SF
Jewel	L		2	lt org	sflk	2.75	6	7	3,6	6	4	SSR, CR, RKN

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

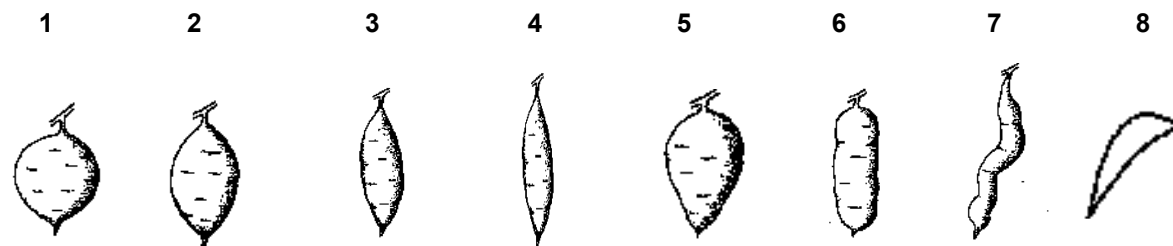
**Storage root data:** **MAT**=maturity E=early, M=mid and L=Late; **DM**=percentage dry matter; **L/D**=length/diameter ratio; **SKC**=skin color clr=clear cu=copper, lt=light, or=orange, pi=pink, pu=purple, rd=red, rs=rose, tn=tan wh=white; **SKT**= skin texture, m fl= moderate flakiness of skin, l 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**=misshappen roots; **NS**=nice 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



## Acknowledgements

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