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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 2009 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 2009 with 38,000 acres of Covington reportedly produced. 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. Please encourage growers to contact us if they have any problems with Covington so we can learn about its limitations.
2. Hatteras developed internal necrosis during storage in much of the 2008 crop. Drs. Pestic-ZanEsbroeck and Schultheis have been investigating the cause and will be reporting their findings in a report to the Sweetpotato Commission. It has shown up again shortly after harvest in 2009. Based on this it was decided that Hatteras should not be increased and sold commercially until the exact cause is known and we determine how to minimize the problems discovered. Needless to say, we are disappointed that that internal problems have arisen in Hatteras as it is a very high yielding and attractive clone. But we are thankful that Hatteras was not widely distributed before the problems with internal necrosis were discovered.
3. In our paired-cross and polycross breeding nurseries we harvested over 109,000 true seed. These crosses represent the foundation of our program's efforts. Roughly one-third will be planted in the field for evaluation during 2010.
4. In our table-stock early generation breeding plots, we planted 41,600 true seed in research station and on-farm sites, and made 1,403 new seedling selections, a record for the program. We also planted 903 second-year and 216 third-year selections at the HCRS and CRS as 25-hill and 100-hill plots from which 150 and 55 selections were made, respectively. Each of these selections has the potential to be a new variety.
5. In our preliminary and advanced clone evaluations, we conducted 11 replicated yield trials at the Horticultural Crops Research Station (HCRS), Clinton and the Cunningham Research Station (CRS), Kinston. Hatteras was the top performer in eight of the nine it was present in for total marketable yield. Covington performed well overall for yield, overall appearance and packout. No new clones were better than the Covington and Hatteras checks for yield, shape and size uniformity

- and appearance.
6. We completed our twelfth year of the Grower-Participatory Breeding Project (GPBP) and in addition to seedlings evaluated 22 advanced or preliminary lines table stock lines, 5 specialty lines and 5 purple flesh lines in unreplicated trials at our two GPBP sites. Detailed results of these evaluations are reported on in the GPBP report.
 7. In our disease nurseries, we evaluated 204 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.
 8. 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. These evaluations are reported on in the MPU report.
 9. We 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 Hatteras, and continued our project to determine the inheritance of anthocyanins in purple-fleshed sweetpotatoes and their potential nutraceuticals and natural colorant properties.
 10. We continued our collaboration with Dr. Mike Jackson of the USDA in a long-term project to identify and develop sweetpotatoes more resistant to soil insects. We grew seed from the USDA of crosses of resistant germplasm and jointly selected material in NC growing conditions in Kinston. In 2010 we will grow this material and send material to Dr. Jackson to screen for insect tolerance. He screens for Wireworm, *Diabrotica*, and *Systema* (WDS), as well as grubs and flea beetle damage. This way we will be able to select for adaptation and insect tolerance at the same time.
 11. We have identified a few outstanding clones for processing traits, however none have a complete horticultural package necessary for release. We will continue to combine excellent field traits and processing traits in 2010.

Project Cooperators

Researchers	Extension	Growers
Dr. Charles Averre	Mr. Allan Thornton	Williams Farms
Dr. Mike Boyette	Mr. Howard Wallace	
Dr. Mari Chinn	Mr. William Little	Jones Farms
Dr. Nicolas George		
Dr. Zvezdana Pesic-VanEsbroeck		
Dr. Jonathan Schultheis		
Dr. Bryon Sosinski		
Dr. Den Truong		

2009 Polycross Breeding Nurseries

Two polycross nurseries were established at the Central Crops Research Station (CCRS) in Clayton in 2009. 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. This year we changed our second nursery. For the past several years we had a *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. This nursery has accomplished its goal and we now have good levels of *Streptomyces* tolerance in our breeding populations. For the second nursery, the **Tablestock/Processing Nursery**, we have turned the emphasis towards combined table stock and processing characteristics. Yield, shape and disease resistance are still very important, but we are adding starch and sugar profiles in for consideration that influence the quality of processing products especially chips and fries but also purees and suitability for microwaving. Table 1 provides results of the seed harvests per maternal parent for the Elite and Tablestock/Processing nurseries. This was a good year for seed production. Flowering was good for most of the summer and fewer hot days improved seed set. We collected over 109,000 seed not including frost saved seed, giving us more than enough seed for 2010. Distribution across parents was good, with most parents meeting our seed goals. Covington is female sterile, but produces good pollen so we continue to use it in the nurseries. 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.

First-Year Seedling Selections

Research Station Trials

Over 27,000 true seed from the 2008 Elite and SSR polycross nurseries were grown in the greenhouses at the Horticultural Crops Research Station in Clinton starting in February. This was our first year with seedlings there and plant quality was better than in our campus houses since we had better hardening off capabilities. In addition to seed from our polycross nurseries, we planted 3,340 seed from elite table stock and processing paired crosses and another 42,55 open pollinated processing oriented seed. We also continued our collaboration with Dr. Mike Jackson of the USDA Vegetable Lab, Charleston SC by planting 6,981 seed selected for insect tolerance. We also continued our purple flesh efforts with 5,345 seed from primarily paired crosses to bring in disease resistance and good horticultural traits. In the field, the seedlings were planted 27-30 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 CRS. A total of 359 selections were made from the 7,040 seed planted from the Elite nursery for a selection rate of 5.1%. The 6,600 seed from the Soil Rot nursery yielded 271 selections, a rate of 4.1%. Our long-term average is 1.5%. The difference is due mainly to the excellent weather conditions this year, with fewer hot days than average and timely, adequate moisture on the research station. Improved plant quality from the new greenhouses may have helped as well. Selections originating in good years will go through multiple years of selection and be subjected to typical stressful conditions. The paired crosses for table stock and processing qualities gave us 136 selections (4.1%), while the open pollinated seed resulted in 112 selections (2.6%). We would expect paired crosses to perform at a higher rate since in any given polycross there are crosses that will not give you all the traits needed. However, the efficiency of producing paired cross seed is very low due to the low fertility of sweetpotatoes. Seed for insect tolerance produced 86 selections at a rate of 1.2%, reflecting the unadapted backgrounds being used to bring in insect resistance.

On-Farm Trials

For the Grower-Participatory Breeding Project, two on-farm sites were used to evaluate 13,040 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>
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 between the sites. Selection criteria were based on the appearance of the check varieties Covington, Beauregard and Hatteras. These selections will be planted at the HCRS and CRS in 2010 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. The 7,040 seed from the 08 Elite nursery produced 284 selections (4.0%) while the 6,600 seed from the 08 SSR nursery yielded 155 selections (2.3%), with a number lost due to deer grazing.

During 2002, we established a second component to the GPBP and began evaluating promising breeding lines under commercial conditions. In 2009, 22 table-stock, 5 specialty and 5 purple-fleshed clones 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 2008, we made 903 first-year table-stock seedling selections. A few of these rotted in storage. The remaining clones were bedded in the greenhouses at the HCRS in Clinton in February of 2009. These were planted in 25-hill plots at both the CRS and HCRS in 2009. 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 150 selections, a 17% selection rate, similar to the typical 15%. 20 selections were chosen at both sites for an overlap of 13%.

Third-Year Selections

The 216 second-year selections made in 2008 were planted as unreplicated 50 to 100-hill plots at the HCRS and CRS in 2009. We selected 55 for further evaluation with 12 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

Sixty-seven advanced selections were evaluated this year. Thirty-seven have been dropped, ten have been designated as breeding lines only, and the remaining 20 will be tested again in 2010. The most promising clones are described below.

NC04-032 - Rose skin, orange flesh, moderately smooth skin, mid season, elliptic shapes. Occasionally some curved roots, and secondary roots. R – FW, R – SSR, S – RKN. 20% dry matter. Parent: NC97-433.

NC05-257 – Dark rose skin, deep orange flesh, moderately smooth skin, mid season, Hernandez shapes with many curved from a moderately tight set, high root number. High yield. Moderately deep eyes. MR – FW, MR – SSR, MS – RKN. 19% dry matter. Good chipping ability. Parent: Hernandez.

NC06-524 – Light orange skin, orange flesh, moderately smooth skin, elliptic, blocky and ovoid shapes, mid season. Typically moderate root set with good sizing. MR – FW, R – SSR, S – RKN. 16% dry matter. Parent: Hatteras.

NC06-557 – Dark rose skin, orange flesh, moderately smooth skin, elliptic and blocky shapes, mid season. Shapes similar to Covington. R – FW, MR – SSR, HR - RKN 19% dry matter. Parent: NC02-459.

Update on Hatteras

Last year Hatteras was evaluated by many seed growers across the state. While yield and appearance were generally exceptional, an internal necrosis developed in storage roots in many grower storage rooms. The cause of this problem has not been positively identified. The work addressing this issue will be presented in Drs. Pesic Van-Esbroeck and Schultheis' report. Given the very serious nature of this problem and the difficulty in detecting it without cutting the root, we recommend a cautious approach to planting Hatteras until the nature of the problem, and a cure if any, are determined. In addition to the internal issues Hatteras can produce an excessive amount of latex, which will leave a stain mark on roots that in severe cases makes them unmarketable.

Purple-Fleshed Breeding Project

Nine 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 six years we made paired crosses using the best purple-fleshed material we had, with well adapted US clones. Considerable progress has been made for

incorporating shape and appearance traits and fusarium wilt resistance. Soil rot resistance is still lacking in most lines and root-knot nematodes resistance is present in about one-third of the lines. Yields have improved nicely and some are now comparable to orange-fleshed table stock material. However many are still full season clones. There are two probable reasons for this; the first is because most have a high dry matter content, which requires significant energy. When compared on a dry weight basis the yields are similar or higher than table stock clones. The second is that there appears to be a yield cost associated with producing the anthocyanin pigments. We continue to collaborate with Dr. Den Truong in Food Science to determine the levels and ratios of the various purple pigments to develop profiles for the various uses of purple-fleshed sweetpotatoes, and to gain a greater understanding of the nutritional value of these pigments. Our goals are quite diverse for the purple-fleshed materials and include 1) fresh market cultivars, 2) use as a natural colorant and 3) chipping lines. Crosses have been made between purple-fleshed clones and clones varying widely in dry matter and beta-carotene 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, with selection standards not quite as stringent. Prototype lines were tested on the GPBP trials starting in 2005. This will continue in 2010 to help us identify clones adapted to NC growing conditions. So far none have the complete package for fresh market. We are testing 6-8 lines for anthocyanin extraction in collaboration with Drs. Chinn in BAE and Truong, USDA-ARS to see if the economics are feasible.

Table Stock Clones with Improved Processing Quality

Interest in sweetpotatoes as a food ingredient continues to increase. Current major cultivars do not cover the full range of characteristics required to meet the needs of all the products. To address some of these needs we have begun screening germplasm for suitable dry matter, sugars and starch profiles, and pigment contents. Our goal is to identify clones that can be used first for table stock, but whose seconds could be used to enhance the range of products derived from sweetpotatoes. Tables 13-15 show the yield and appearance results for clones that have low reducing sugars or higher dry matter content and produce superior chips and fried products to Covington, Beauregard or Hatteras. Higher dry matter content, while useful for certain cooked products, also tends to reduce fresh yield or require a longer season to size.

Disease Resistance Screenings

In addition to the selection and yield evaluation trials, we screened 204 advanced, preliminary, and parental lines for resistance to *Streptomyces* soil rot in the field and 129 of these in the GH. Ninety-seven of the field lines were dropped prior to rating. Of the remaining 107, 23 were resistant, 32 moderately resistant, 26 moderately susceptible and 26 susceptible to soil rot. Of the 129 clones tested in the greenhouse, 22 were resistant, 23 moderately resistant, 52 moderately susceptible and 32 susceptible. Most of the susceptible lines were either high dry matter or purple-fleshed clones. Greenhouse screening of 137 clones for southern root-knot nematode revealed 55 resistant, 21 moderately resistant, 26 moderately susceptible, 35 susceptible clones. Our Fusarium test included 245 clones with 114 resistant, 53 moderately resistant, 45 moderately susceptible, and 33 testing susceptible. All cultivars released from the program must have fusarium resistance. Orange-fleshed table stock lines must also have soil rot resistance.

Our field SSR screening nursery has completed its twelfth year. Soil rot incidence was good. There was also considerable circular spot and some root-knot nematode damage. In the replicated trial we saw a few clones with lenticels infected with fusarium and other rots. Russet crack was also fairly severe in a number of clones. The presence of other diseases makes it harder to rate for soil rot damage, but any clones thriving 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 2009 test (Table 12) show large differences in marketable yield, this year mostly due to reduced production, but in some cases due to culls for cracking and rotting. Covington performed well for both yield and appearance and had very little disease damage. Beauregard, our other resistant check line, yielded only 60% of Covington and had a poor appearance score. This is a bit unusual since Beauregard usually does reasonably well in this trial. It may be in part due to the use of

G3 seed and a significant amount of russet crack. One of our better chipping lines, NC05-257 performed well in the trial, this is important because it had scored moderately resistant in all our greenhouse screenings which can relate either better or worse in field conditions, in this case, better. NC03-302, a white-fleshed line had the highest yield, confirming the greenhouse tests. This line is being used as a parent to bring in multiple disease resistance into both high and low dry matter white-fleshed populations. Besides affects on yield, the field trial provides 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.

2009 National Sweetpotato Collaborator Trials

In 2009 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. Hatteras had the highest total marketable yield, and very good appearance scores. Covington was also a standout, not quite as high in total yield as Hatteras, but with a higher percent No.1's. Both had very low cull percentages. Beauregard (B94-14 G2) had a high yield in the HCRS trial, and also the highest percentage jumbo's, and russet crack. In the CRS trial, Beauregard yield was off compared to Covington, though appearance was good. Evangeline, now being grown fairly widely in LA, was also low compared to Covington. Much of this may be related to the use of G4 planting material versus G2 for the Covington, Hatteras and Beauregard. In both locations there were mixed sizes. L05-111 is a new LSU Collaborators entry for the orange-fleshed table stock market. It is in the process of being cleaned up so the material in these trials is G5, which may have affected performance. Shapes and size distribution were good, but severe russet crack in Clinton produced many culls.

Also new from LSU is L05-29, a cream-rose-skinned, cream-fleshed cultivar aimed at replacing O'Henry in the white-fleshed market. It is also in the process of being cleaned up, meaning material in the trial is G5. Even with G5 seed the L05-29 yielded the same as O'Henry in Kinston, and with a better packout. In Clinton it out yielded O'Henry and had a similar packout. Disease resistance is good and the culinary quality is reported to be more appropriate than O'Henry for the white market, meaning a drier texture and different flavor. It has an unusual skin color, a cream base with a blush of rose. Both L05-29 and L05-111 will likely be entered in 2010 and we will be provided with G1 plants.

Below are descriptions of the clones in the National Collaborators Trials.

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).

Lower Coastal Plains Research Station National Sweetpotato Collaborators Trial - 2009 Description of Official Entries -

Beauregard (B94-14 G2) - Rose skin, orange flesh, moderately smooth skin, elliptic and blocky shapes, mid season. Some cracking and end-to-end color variation, length/diameter ratio = 2.5. Overall appearance = 6.5.

Covington (G2) - Rose skin, orange flesh, moderately smooth skin, blocky shapes, mid season. Very good size distribution, some end-to-end color variation, length/diameter ratio = 2.0. Overall appearance = 7.7.

Evangeline (L99-35) – Rose skin, very deep orange flesh, slightly flakey skin, blocky and elliptic shapes, mid season. Mix of sizes, moderate grooving, some bumpiness, length/diameter ratio = 2.75. Overall appearance = 5.5.

Hatteras (G2) – Rose skin, deep orange flesh, moderately smooth skin, blocky and elliptic shapes, mid to early season, heavy latex, some sprouts, length/diameter ratio = 2.0. Overall appearance = 7.0.

L05-111 (G5) - Rose skin, orange flesh, moderately smooth skin, elliptic and blocky shapes, mid season, lots of tapered shapes, some end to end color variation, 1 russet crack, length/diameter ratio = 2.5. Overall appearance = 6.2.

L05-29 (G5) – Cream skin with a rose blush, cream flesh, smooth skin, elliptic shapes, mid season, moderate cracking, 1 russet crack, length/diameter ratio = 2.75. Overall appearance = 5.2. Potential replacement for O’Henry, being considered for more consistent sizing and shapes and more appropriate baking characteristics for the white market.

O’Henry (G2) – Cream skin, yellow flesh, smooth skin, blocky shapes, mid season. Some cracks, longish, length/diameter ratio = 3.0. Overall appearance = 5.5.

Horticultural Crops Research Station National Sweetpotato Collaborators Trial - 2009 Description of Official Entries -

Beauregard (B94-14 G2) - Rose skin, orange flesh, moderately smooth skin, blocky and elliptic shapes, mid to early season. 1 russet crack, length/diameter ratio = 2.0. Overall appearance = 5.5.

Covington (G2) – Copper rose skin, orange flesh, slightly flaky skin, elliptic to round elliptic shapes, mid to early season. Very chunky, mod. attachment, length/diameter ratio = 1.5. Overall appearance = 6.2.

Evangeline G4? (L99-35) – Rose skin, very deep orange flesh, slightly flaky skin, blocky, elliptic and irregular shapes, mid season. Moderately tight attachments, mixed sizes, some irregular shapes. length/diameter ratio = 2.0. Overall appearance = 3.8. Must be kept close to virus-indexed source.

Hatteras (G2) – Rose skin, deep orange flesh, moderately smooth skin, round elliptic and blocky shapes, early season, very chunky to round, mod. latex, length/diameter ratio = 1.5. Overall appearance = 6.0.

L05-111 (G5) - Rose skin, light orange flesh, moderately smooth skin, elliptic shapes, mid season, severe russet crack, length/diameter ratio = 2.0. Overall appearance = 4.3. Needs to be kept close to virus indexed stock.

L05-29 (G5) – Light pink skin, cream flesh, moderately smooth skin, elliptic shapes, late season, lots of curved roots, lots of petites, some tails, some cracking, a little russet crack, length/diameter ratio = 2.5. Overall appearance = 4.5.

O’Henry (G2) – Cream skin, yellow flesh, smooth skin, elliptic and blocky shapes, mid season, some russet crack length/diameter ratio = 2.5. Overall appearance = 5.7.

Table 1. Sweetpotato True Seed Harvested in 2009.

Maternal Parent	No. Seed/Polycross Nursery		Total
	Elite	Tablestock/Proc	
NC 1528	2838	---	2838
NC 96-61	3781	2853	6634
NC 97A-04	10,890	10,841	21,731
NC 97A-45	3337	---	3337
NC 97-433	3361	---	3361
NC 99-026	3243	---	3243
NC 02-423	2681	---	2681
NC 02-459	6510	5161	11,671
NC 03-007	---	2561	2561
NC 03-302	---	2415	2415
NC 03-417	---	3218	3218
NC 04-412	---	1844	1844
NC 04-531	1213	1050	2263
NC 05-108	---	1939	1939
NC 05-151	---	2011	2011
NC 05-257	---	1640	1640
NC 05-284	---	1649	1649
NC 05-447	---	602	602
NC 05-528	---	236	236
NC 06-185	---	4060	4060
Ch. Scarlet	2996	---	2996
Covington	0	---	0
NC DM04-001	---	6031	6031
NC DM06-123	---	3431	3431
Evangeline	2618	---	2618
Hatteras	4480	4045	8525
L05-111	4713	---	4713
Ruddy	1374	---	1374
Totals	54,035	55,587	109,622

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

Table 2. 2009 Sweetpotato seedlings selected at the CRS, Kinston.

Maternal parent	No. of selections	Maternal parent	No. of selections
<i>Seed from the 2008 Elite nursery</i>			
NC 1528	29	NC 01-214	24
NC 96-61	27	NC 02-423	25
NC 97A-45	48	NC 02-459	17
NC 97-433	25	NC 03-066	16
NC 99-026	30	NC 03-380	6
NC 99-524	19	Evangeline	19
NC 99-573	25	Ruddy	9
NC 01-156	31	Tib 4	9
Total			359
<i>Seed from the 2008 SSR nursery</i>			
NC 93-17	23	NC 04-412	35
NC 99-573	26	NC 05-408	16
NC 01-156	19	NC DM04-206	12
NC 02-350	25	Murasaki-29	7
NC 02-459	8	Ruddy	19
NC 03-030	20	Tib 4	17
NC 03-302	9	TIS 70683	22
NC 04-090	13		
Total			271
<i>Seed from paired crosses 2008</i>			
Maternal parent		Paternal parent	No. of selections
NC 03-030		Kyukie 97	1
NC 04-090		Hatteras	2
NC 04-090		NC 04-412	6
NC 04-090		NC 04-531	7
NC 04-090		NC 05-108	2
NC 04-090		Covington	1
NC 04-090		OP USTL	1
NC 04-090		CProc OP	30
NC 04-412		NC DM04-001	1
NC 04-412		CProc OP	10
NC 04-484		NC 93-17	1
NC 04-531		Hatteras	7
NC 04-531		NC 04-090	3
NC 04-531		NC 04-412	6
NC 04-531		Covington	1
NC 04-531		NC DM04-001	2
NC 04-531		Evangeline	3
NC 04-531		NC 05-289	1
NC 04-531		NC DM04-206	1
NC 04-531		CProc OP	38
NC 04-531		KProc OP	5
NC 05-108		NC 04-090	15
NC 05-108		NC 04-412	3
NC 05-108		NC 05-528	2
NC 05-108		Covington	1
NC 05-108		NC DM04-001	1
NC 05-108		Evangeline	5
NC 05-108		KProc OP	1
Beauregard		NC 93-17	1

Table 2 con't. 2009 Sweetpotato seedlings selected at the CRS, Kinston

Maternal Parent	Paternal parent	No. of selections
Beauregard	Evangeline	1
NC DM02-180	Evangeline	15
NC DM02-291	NC 93-17	1
NC DM02-291	NC DM04-206	2
NC DM04-001	Hatteras	7
NC DM04-001	NC 04-412	5
NC DM04-001	Covington	13
NC DM04-001	Evangeline	2
NC DM04-001	CProc OP	13
NC DM04-226	08 SSR	1
NC DM05-156	NC DM02-291	1
Evangeline	NC DM04-001	1
Evangeline	OP USTL	2
Evangeline	NC 93-17	6
Evangeline	MD810	2
Hatteras	NC 04-090	1
Hatteras	Covington	1
Hatteras	NC DM04-001	1
Hatteras	Evangeline	1
Tib 4	Hatteras	1
Tib 4	NC 04-531	1
Tib 4	Evangeline	1
Unk	CProc OP	11
Total		248

Seed from Dr. Jackson, USDA Vegetable Lab, Charleston

Maternal parent	No. of selections	Maternal parent	No. of selections
Beauregard	1	W-341 (Liberty)	3
Excel	3	W-353	1
Regal	5	W-361	1
Sumor	2	W-366	1
W 02-101	1	W-375	2
W 02-300	2	W-376	1
W 02-378	1	W-376	1
W 02-515	1	W-382	2
W 02-519	1	W-383	2
W 02-544	4	W-384	1
W 95-145	3	W-384	4
W 97-016	1	W-385	6
W 97-081	1	W-386	4
W 97-095	3	W-387	7
W 98-142	2	W-390	2
W-287	7	W-392	6
W-328	1	W-393	2
W-333	1		
Total		86	
Grand Total		964	

Seedling Selections Continued on Next Page

Table 3. 2009 Sweetpotato seedlings selected on farm.

Maternal parent	No. of selections	Maternal parent	No. of selections
<i>Jones Farms, seed from the 2008 SSR nursery</i>			
NC 93-17	17	NC 04-412	4
NC 01-156	3	NC 05-408	24
NC 02-350	8	Hatteras	15
NC 02-459	9	Murasaki-29	14
NC 03-030	27	Ruddy	10
NC 03-302	11	TIS 70683	6
NC 04-090	7		
		Total	155
<i>Williams Farms, seed from the 2008 Elite nursery</i>			
NC 1528	13	NC 02-423	20
NC 96-61	21	NC 02-459	8
NC 97-433	17	NC 03-066	19
NC 97A-45	31	NC 03-380	5
NC 99-026	30	Evangeline	22
NC 99-524	9	Hatteras	25
NC 01-156	27	Ruddy	12
NC 01-214	12	Tib 4	13
		Total	284
		On Farm Grand total	439

Table 4a. 2009 National Sweetpotato Collaborators Yield Trial, CRS, Kinston, NC Planted: 09Jun09; Harvested: 05Oct09; Days to Harvest: 118.

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
B94-14 G2	740	705	.	85	67	17	11	5
Covington G2	844	834	121	.	74	18	7	1
Evangeline G4?	719	686	99	84	59	33	4	4
Hatteras G2	949	925	134	111	54	16	27	3
L05-111 G5	765	741	106	90	69	23	4	4
L05-29 G5	760	714	102	86	61	21	11	6
O'Henry G2	779	714	103	86	53	33	5	9
Grand Mean	795	762	111	91	63	23	10	4
CV (%)	14	16	18	17	11	22	49	83
LSD (p=0.05)	137	147	24	19	8	6	6	4

All trials are reported in 50 lb. bu.

Table 4b. 2009 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
B94-14 G2	M	17	2.5	rs	Ms	3	8	8	3,6	6.5	6.5	~CRK,~CV VG size dist.,
Covington G2	M	19	2	cu rs	Ms	3	7	7	6	8	7.7	~CV
Evangeline G4?	M	17	3	rs	sflk	3.5	8	7	6,3	6	5.6	~GR, B, mixed sizes
Hatteras G2	ME	18	2	rs	Ms	3.25	8	7	3,6	7	7.0	~spr,^LT ^TP,CV,some
L05-111 G5	M	20	3	rs	Ms	3	8	8	3,6	6	6.2	RC
L05-29 G5	M	21	2.75	cr rs	Sm	1.5	7	7	3	6	5.2	~CRK,T, 1 RC
O'Henry G2	M	20	3	cr	Sm	2	8	8	6	6	5.5	~CRK, L ,FS?

Comments: Overall a high yielding test with good shaped roots. Hatteras had the highest marketable yield, but had considerable jumbo's. Covington had very good yield and the highest packout of No.1's. The Evangeline was either G4 or G5 material and appears to have run down, as have the L05-29 and L05-111. L05-29 is a white type aimed at replacing O'Henry. It was entered as one that sizes more evenly and has culinary attributes better suited for that market. However it has a blush skin that can be pinkish.

Table 5a. 2009 National Sweetpotato Collaborators Yield Trial, HCRS, Clinton, NC Planted: 11Jun09; Harvested: 06Oct09; Days to Harvest: 117.

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
B94-14 G2	1224	1123	.	119	51	6	35	8
Covington G2	1100	1039	93	.	64	11	20	6
Evangeline G4?	704	614	55	65	54	29	5	13
Hatteras G2	1268	1218	109	119	56	12	28	4
L05-111 G5	949	768	68	79	54	11	15	20
L05-29 G5	1066	958	83	88	58	16	15	10
O'Henry G2	942	872	78	94	58	16	19	7
Grand Mean	1035	941	81	94	56	14	20	10
CV (%)	14	15	18	19	13	26	36	56
LSD (p=0.05)	174	171	18	22	NS	5	9	7

All trials are reported in 50 lb. bu.

Table 5b. 2009 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
B94-14 G2	EM	19	2	rs	Ms	3	8	8	6,3	6	5.5	RC
Covington G2	ME	19	1.5	cu rs	sflk	3	7	6	3,2	6	6.2	~AT, chunky
Evangeline G4?	M	15	2	rs	sflk	3.5	7	7	3,6,7	5	3.8	AT, ~IRR, mixed sizes
Hatteras G2	E	18	1.5	rs	Ms	3.25	7	6	2,6	6	6.0	v chunky, ~LT, RND
L05-111 G5	M	18	2	rs	Ms	2.75	8	7	3	5	4.3	^RC
L05-29 G5	L	21	2.5	lt pi	Ms	1.5	7	7	3	5	4.5	^CRK, T, ^petites
O'Henry G2	M	20	2	cr	Sm	2.5	8	8	3,6	7	5.7	

Comments: This test could have been harvested a bit earlier, especially the Beauregard and Hatteras which had considerable jumbo's. Shapes were nearly round for Covington and Hatteras and even Beauregard stayed short. Russet crack was moderately severe in Beauregard and L05-111. Evangeline was off, only 55% and 65% of Beauregard and Covington. And it had a mix of sizes and considerable irregularly shaped roots.

Table 6a. 2009 Advanced Yield Trial at CRS, Kinston, NC. Planted: 09Jun09; Harvested: 05Oct09; Days to Harvest: 118.

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
04-531	670	651	77	81	61	36	1	3
05-108	706	661	79	82	66	21	7	6
05-198	900	864	103	107	70	23	3	4
05-553	837	772	93	96	54	10	29	7
06-185	694	665	78	83	66	24	5	4
B94-14 G2	879	860	.	107	72	14	12	2
Covington G2	829	807	96	.	75	20	3	3
Hatteras G2	983	955	113	118	65	13	20	3
Grand Mean	812	779	91	96	66	20	10	4
CV (%)	10	11	9	11	8	23	31	87
LSD (p=0.05)	122	121	12	16	8	7	5	NS

Table 6b. 2009 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
04-531	ML	25	2.75	rs	Ms	3	8	6	3	6.5	5.25	^TP,~CV,~PI's ,~LT~SPR
05-108	ML	22	2	dk rs lt cu	Ms	3	7	7	3,2	5	4.25	^T,^TS,^STR, ~VN
05-198	ME	18	3.5	or	ms	3	8	8	6,4	7	6	L,~CRK,RC? ~T,^CV,~CRK,
05-553	EM	17	2.75	dk rs	ms	3	7	7	3,2	5	5	~RC,~TP ~SPR,~VN,~T,
06-185	ML	21	2.5	red	sflk	3.25	7	7	3,6	6	5.25	~TP,RC? ^CV,~CRK,
B94-14 G2	ME	17	2.5	rs	sflk	2.75	8	8	3,6	5.5	6	~TP
Covington G2	M	18	2.25	cu rs	sflk	3	8	7	6,3	7	7.25	^CV,~T ^LT,~T,~SPR,
Hatteras G2	E	17	2.5	rs	sflk	3	7	8	6,3	7	7.5	~TS

Comments: A good test, most clones both yielded well and had a good appearance and few culls. Hatteras was the top yielder. 05-198 yielded well but was too long, Beauregard also yielded well followed by Covington. Hatteras and Covington had the best appearance scores. Two of the higher dry matter clones, 04-531 and 06-185 could have used a longer season to size up.

Table 7a. 2009 Advanced Yield Trial at HCRS, Clinton, NC. Planted: 09June09; Harvested: 06Oct09; Days to Harvest: 119.

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
04-531	837	814	76	67	56	39	2	3
05-108	839	750	71	56	63	19	8	10
05-198	1219	1121	105	95	65	15	11	8
05-528	848	777	73	68	58	13	21	8
06-185	1042	938	88	77	59	15	16	10
B94-14 G2	1188	1070	.	92	46	6	38	10
Covington G2	1257	1184	109	.	65	9	21	6
Hatteras G2	1447	1353	127	116	52	15	26	7
Grand Mean	1079	995	92	82	58	16	18	8
CV (%)	11	11	11	11	10	22	25	50
LSD (p=0.05)	173	170	15	16	9	6	7	NS

Table 7b. 2009 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
04-531	L	23	2.5	dk rs	ms	3.25	7	7	3	7	6.0	low yld, strong elliptic
05-108	ML	23	1.5	dk rs	ms	3	7	6	2,3	5	5.0	T
05-198	M	17	3.5	org	ms	3	8	7	6,4	7	6.0	L, tubular,CRK
05-528	ML	22	1.5	lt org	sflk	3.5	7	4	6,3, 2	5	4.0	^^LE's,~T,RC, short
06-185	M	24	2.5	red	ms	3.25	7	7	3	6	6.0	~VN,good AT, strong elliptic
B94-14 G2	E	18	2	rs	ms	3	8	7	6	5	5.0	^jumbos,~sh, decent
Covington G2	M	18	2	rs	ms	3	7	7	6	7	6.0	Exc sz dist, ~CV
Hatteras G2	E	18	2	rs	ms	3.25	7	7	3,6	7	6.0	^yld,^jumbos, ~LT

Comments: A good test, most clones both yielded well and had a good appearance. Hatteras and Covington were the top two for yield. 05-198 yielded well but was long (L/D=3.5), especially when considering everything else had between a 1.5 and 2.5 length/diameter ratio. Beaugard needed to have been dug earlier to avoid the high percentage of jumbo's (38%), while 04-531 could have used a couple more weeks to size (39% canners). Four of these lines have dry matters in the 20's and may have favorable processing ability. Typically more starch means a longer season to size up.

Table 8a. 2009 Preliminary 1 Yield Trial at CRS, Kinston, NC. Planted: 09June09; Harvested: 06Oct09; Days to Harvest: 119.

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
04-032	701	677	74	101	66	27	4	3
05-198	910	844	93	125	67	22	3	7
05-257	850	811	89	122	65	28	2	5
05-422	668	643	71	96	58	29	9	4
06-185	800	769	85	114	59	29	9	4
06-189	591	563	62	83	70	18	7	5
06-290	798	762	85	114	58	25	11	5
B94-14 G2	934	912	.	135	72	13	13	2
Covington G2	702	678	75	.	67	19	11	3
Hatteras G2	1024	985	108	146	60	14	22	4
Grand Mean	798	764	82	115	64	22	9	4
CV (%)	14	16	17	16	16	39	88	97
LSD (p=0.05)	160	174	20	26	NS	NS	12	NS

Table 8b. 2009 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
04-032	M	21	3	rs lt cu	sflk	3	8	7	3	6	6.0	~LT,~CRK, ~STR
05-198	ME	19	3.5	or	ms	3	7	7	3,6	6	6.0	~SPR,too long?,~CRK
05-257	M	21	2.5	red	sflk	3	7	7	3,8	6	6.0	tight hills, ~T, ^#roots,CV
05-422	M	19	2	tn or	ms	3	8	7	3,6	6	5.0	var sz dist ~SPR, too
06-185	L	23	3	red	ms	3	7	7	3,4	7	5.0	late?, BRD
06-189	E	27	3	red	ms	3	7	6	3	7	6.0	few roots, ^TP
06-290	ME	16	3.5	rs	ms	3	7	7	6,7	7	6.0	L, ~AC
B94-14 G2	EM	17	2	rs	sflk	2.75	8	8	3,6	6	6.0	~SPR,CV
Covington	M	19	2	rs	sflk	3	7	7	6	6	6.0	CV
Hatteras G2	EM	18	2	rs	ms	3	8	8	3,6	8	8.0	~LT

Comments: Hatteras top yielder and in appearance, though with moderate latex. Hatteras could have been harvested earlier judging by the 22% jumbo's. Overall quality good though significant end to end color variation (CV) on Beauregard, Covington and 05-257, lighter at the distal end. Covington yield off in this trial.

Table 9a. 2009 Preliminary 1 Yield Trial at HCRS, Clinton, NC. Planted: 04Jun09; Harvested: 29Sept09; Days to Harvest: 117.

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
04-032	1183	1121	102	104	66	7	22	5
04-531	731	709	63	65	73	21	3	3
05-257	1232	1090	95	103	60	14	14	12
05-284	843	748	62	69	69	14	5	11
05-431	905	880	75	83	66	20	11	3
05-528	795	739	64	68	67	10	17	7
06-220	942	879	75	83	59	11	23	7
06-261	725	634	54	60	51	36	1	12
06-651	1071	989	86	93	64	14	14	8
B94-14 G2	1237	1190	.	113	49	6	40	4
Covington G2	1179	1092	91	.	56	9	27	7
Hatteras G2	1352	1323	125	122	57	8	32	2
Grand Mean	1016	950	81	87	62	14	18	7
CV (%)	14	16	19	17	14	48	35	73
LSD (p=0.05)	226	237	26	23	14	10	10	NS

Table 9b. 2009 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
04-032	M/E	20	2	red	sm	3.25	7	7	6,3	7	7.0	
04-531	M	24	2	rs	ms	3.5	7	6	3,6	6	6.0	T
05-257	M	21	2.5	red	sflk	3.25	7	6	3	7	6.0	~PI
05-284	M	17	2	cu rs	sflk	3	7	6	6	6	6.0	SSR
05-431	M	16	2.5	rs	sm	3.5	8	7	6,3	6	6.0	
												T, chunky &
05-528	M	23	1.5	lt or	mflk	3.5	7	6	6,2	5	5.0	RND
06-220	M	16	2	rs	ms	3.5	8	6	6	6	6.0	AC
06-261	M/L	25	2.5	red	ms	3.5	7	6	3,6	5	6.0	low yld
06-651	M	23	2	red	ms	3.25	7	6	6	7	7.0	nice
B94-14 G2	E	19	2	cu rs	ms	3	7	6	6	6	6.0	RC
Covington G2	M/E	18	1.5	rs	ms	3.25	7	6	6,3	7	7.0	chunky
Hatteras G2	M/E	16	1.5	rs	ms	3.25	7	7	3,5	6	6.0	~LT

Comments: A very high yielding trial where Beauregard, Covington, Hatteras, 04-032 and 06-220 were past the optimal number one percentage, producing too many jumbo's. Hatteras was the top yielder, but had moderate latex. Roots overall were short with Covington and Hatteras with an average length/diameter ratio of 1.5, and Beauregard with a 2. Beta-carotene levels were high, with flesh colors running a quarter point darker than average for these clones. A number of the lower yielding clones will be dropped.

Table 10a. 2009 Preliminary 2 Yield Trial at CRS, Kinston, NC. Planted: 09June09; Harvested: 12Oct09; Days to Harvest: 125.

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
06-363	870	830	95	102	50	42	4	5
06-524	976	934	108	115	63	18	15	4
06-546	1096	1041	119	128	64	24	6	5
06-557	769	748	87	92	63	32	2	3
B94-14 G2	939	893	.	110	64	13	18	5
Covington G2	854	822	96	.	64	23	10	3
Hatteras G11	873	835	95	103	55	29	12	4
Hatteras G2	1176	1165	133	143	62	13	25	1
Grand Mean	944	908	105	113	61	24	11	4
CV (%)	11	11	10	12	14	37	69	89
LSD (p=0.05)	148	150	16	21	NS	13	12	NS

Table 10b. 2009 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
06-363	M	18	2.5	rs,cu	ms	3.25	7	7	3,6 3,6,	6	6.0	^#roots low root set,
06-524	ME	17	2	lt org	ms	3.25	7	7	5	6	5.0	~OV
06-546	M	19	2.5	dk rs	sflk	3.25	8	6	6,3	6	6.0	~PI's
06-557	M	17	2.5	rs	sflk	3	8	7	3,6	7	7.0	CV, ~Cov.
B94-14 G2	ME	17	2	rs	sflk	3	8	7	6	6	6.0	~T,CV
Covington G2	M	21	2	rs	sflk	3	8	7	6	7	7.0	CV g uniformity,
Hatteras G11	ME	17	2	rs	ms	3.25	7	7	6,3	7	7.0	~LT
Hatteras G2	E	18	2	rs	ms	3.25	7	7	6,3	7	7.0	~LT

Comments: Overall yields and quality were very good. Hatteras was the top yielding clone with G2 stock out yielding G11 stock by 28%. The Hatteras G2 was also ready to harvest two weeks earlier than the G11 judging by the size distribution. Covington yield was similar to Beauregard, though with more canners and fewer jumbo's. There was significant color variation (CV) from end to end in a number of clones, including Beauregard and Covington.

Table 11a. 2009 Preliminary 2 Yield Trial at HCRS, Clinton, NC. Planted: 04Jun09; Harvested: 30Sept09; Growing Days: 118.

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
04-531	1010	976	77	83	60	30	7	4
06-524	1264	1097	85	90	56	10	21	13
06-557	1142	1033	82	87	60	20	11	9
06-621	927	842	68	72	56	30	5	9
B94-14 G2	1410	1303	.	110	49	8	35	7
Covington G2	1273	1202	96	.	63	7	24	5
Hatteras G2	1503	1429	114	121	56	10	29	5
Grand Mean	1208	1112	87	94	57	17	18	8
CV (%)	14	13	11	13	17	40	45	77
LSD (p=0.05)	296	246	17	22	NS	12	14	NS

Table 11b. 2009 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
04-531	ML	23	2.5	dk rs	ms	3	8	6	3,6	7	6	Late
06-524	M	16	2	clr	ms	3	7	7	3,5	6	5	~ovoids, sm shapes
06-557	M	19	2	rs	sflk	3	7	7	6	6	6	~T, a bit late
06-621	M/L	24	2	rs/pur	ms	3.25	7	6	3,6	6	5	late, T, ~AT?
B94-14 G2	ME	18	2	rs	ms	3	8	7	6	6	6	E
Covington G2	M	18	1.5	rs	ms	3	7	7	3,6	7	7	~AT
Hatteras G2	EM	18	2	rs	sm	3	7	7	3,6	7	7	^LT

Comments: A very high yielding trial that could have been harvested earlier judging by the high percentage of jumbo's in the check lines Beauregard, Covington and Hatteras. No new clones outperformed the checks.

Table 12a. 2009 Soil Rot Yield Trial at HCRS, Clinton, NC. Planted: 01July09; Harvested: 28Oct09; Days to Harvest: 120.

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
03-302	810	727	195	111	59	24	7	10
04-032	699	584	147	86	43	37	4	16
04-531	688	608	162	93	52	32	4	12
05-106	836	681	188	105	51	22	9	18
05-108	634	449	116	67	38	29	4	29
05-198	754	621	158	92	38	40	6	16
05-257	728	653	161	96	43	46	1	11
05-284	667	424	116	66	38	24	3	35
05-349	654	413	101	59	33	23	0	43
05-528	626	568	138	82	51	40	1	8
05-553	690	396	105	60	31	21	7	41
06-185	626	479	124	73	42	28	6	24
B94-14 G3	546	414	.	60	35	36	5	24
Covington G2	797	679	171	.	49	36	1	14
Hatteras G2	698	578	152	87	45	31	7	17
Hernandez G2	481	397	105	61	24	57	1	17
Jewel G3	285	180	47	27	10	52	0	38
L05-111	584	448	113	67	38	34	6	21
Yellow Covington	838	720	186	108	58	22	6	14
Grand Mean	665	527	138	78	41	33	4	22
CV (%)	22	25	27	27	21	27	105	46
LSD (p=0.05)	212	189	53	30	12	13	6	14

Table 12b. 2009 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
03-302	M	21	2.5	pur	ms	1.5	7	7	6	7	6.5	
04-032	M	21	3.5	rs	ms	3	7	6	6	6	5.3	L,tubular,1 RC
04-531	M	19	2	rs pi	ms	3.25	7	6	3	7	5.8	
05-106	M	15	2	dk rs	ms	3	6	5	3,5	5	5.3	~TP
05-108	M	19	2	pur rs	ms	3	8	6	5,3,2	4	4.5	RC,SSR, CS,^T
05-198	M	19	3	org	ms	3	7	6	6,3	6	5.5	~VN,L
05-257	M	19	3	red	sflk	3	6	7	3	6	5.8	
05-284	M	16	3	org	ms	3	6	6	6	6	4.5	^RC,^Inf LE's
05-349	ML	16	2	lt org	sm	3	6	7	3,6	6	4.0	ESC,CS,FW
05-528	M	21	2	lt org	sflk	3.5	7	6	3,6	6	5.8	~T, alittle SSR
05-553	M	18	3	dk rs	ms	3	7	5	3,5	4	4.0	RC, SSR, FW
06-185	M	21	2.5	red	ms	3	6	7	3,6	6	5.0	~SSR
B94-14 G3	M	17	3.5	rs	ms	3	7	6	6,7	4	4.0	~RC,^CRK
Covington G2	M	20	2	rs	sflk	3	6	6	6,3	6	6.5	~CV
Hatteras G2	M	17	3	dk rs	ms	3.25	7	6	6,3	7	6.0	~LT,~inf LE's
Hernandez G2	ML	18	3	org	ms	3.25	6	7	3	6	4.5	FW
Jewel G3	L	24	2.5	rs org	ms	3	6	6	6,3	5	2.5	^^SSR
L05-111	M	17	3	rs	ms	2.75	7	6	6,3	5	4.0	^RC,^ASTR
Yel. Covington	M	20	2	rs	ms	2 w/or	7	6	6,3	6	5.8	~T,25% or fl

Comments: A very tough site by design with high levels of soil rot, fusarium, circular spot and root knot nematodes producing many culls. This trial is used mainly to test potential parents for their overall disease resistance. Clones clean here have broad disease resistance. Covington was a standout.

Table 13a. 2009 Tablestock/Processing Yield Trial at HCRS, Clinton, NC. Planted: 22May09; Harvested: 24Sept09; Days to Harvest: 125.

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
1528	1205	1094	84	97	56	12	22	10
04-531	803	783	61	68	65	21	11	2
05-108	940	930	72	81	63	12	24	1
05-173	1380	1285	99	112	52	8	33	7
05-257	1105	1078	83	94	63	15	20	2
05-528	865	744	58	66	53	6	28	14
05-553	1144	1056	81	93	44	7	42	8
06-189	929	912	71	79	66	9	23	2
07-044	1069	1042	81	91	54	14	29	2
07-124	854	838	64	74	65	13	20	2
07-412	1056	996	77	86	61	15	18	6
07-441	953	876	68	77	52	17	23	7
07-519	1166	1068	82	93	46	6	39	9
07-979	792	729	57	64	57	9	27	7
DM06-123	935	821	63	71	52	4	31	12
B94-14 G2	1344	1307	.	114	47	4	46	3
Covington G2	1175	1153	89	.	63	13	23	2
Jewel G2	1330	1218	94	105	49	5	39	8
Grand Mean	1058	996	75	86	56	10	28	6
CV (%)	14	14	15	15	13	32	28	95
LSD (p=0.05)	209	202	16	18	10	5	11	8

Table 13b. 2009 Tablestock/Processing 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
1528	M	17	2.5	lt org	5	3	6	6	3	6	5	VN,AT,~RC
04-531	ML	24	2	rs	ms	3.25	7	6	6	6	6	sm shapes
05-108	L	23	1.5	rs	sflk	3	6	7	2,3	5	5	STR,~T
05-173	M	14	2	cu	sflk	3.25	6	7	3,2	6	6	
05-257	ML	20	2.5	dk rs	ms	3.5	6	6	3	6	6	AT,Hern sh,~T
05-528	ML	24	2	org	ms	3.5	7	7	3,2	6	5	Rd eyes,^RND
05-553	M	15	1.5	rs	sflk	2.75	7	5	3,2	5	5	~yel in fl, Pl's
06-189	M	25	2.5	rs	sm	3	6	8	6,3	6	6	Fr fry shape
07-044	ML	18	2.5	red	hflk	3.5	6	6	6,3	6	6	R sk, g set,~IRR
07-124	L	17	2.5	cu	ms	3	6	6	3,6	4	4	T
07-412	ML	19	3	cu	sflk	3.25	7	6	6,4	5	5	AT,~T
07-441	ML	25	3	lt rs	sm	3	6	6	6,4	6	5	~VN
07-519	M	19	2.5	lt rs	sm	2.75	7	7	6,3	6	6	Pythium?,L
07-979	M	18	2	rs	sm	3.5	7	5	6,2	5	5	
DM06-123	M	24	2	org	ms	3	6	7	6,3	6	6	SPR,AT,~rot
B94-14 G2	M	18	2.5	cu rs	ms	3	7	6	3,2,6	5	6	T
Covington G2	M	19	2	cu rs	ms	3	7	7	6,3	7	7	
Jewel G2	M	22	2.5	org	ms	3	5	6	3,6	6	5	GR,SSR

Comments: This was an early-planted trial given a full season to size up. Note that in general as dry matter % increases, fresh yield decreases. Jewel had good yield and higher dry matter, a good combination for processing types. Trials like this will help us identify earlier season clones with good dry matter content, or to determine the approximate growing season for a higher dry matter line.

Table 14a. 2009 Tablestock/Processing Yield Trial at CRS, Kinston, NC. Planted: 03June09; Harvested: 29Sept09; Days to Harvest: 118.

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
1528	864	796	105	103	60	24	8	8
96-61 G2	749	716	96	93	61	15	20	4
04-531	613	599	80	78	72	26	0	2
05-050	590	538	72	70	56	32	3	9
05-108	715	685	89	88	70	13	12	4
05-257	852	808	106	104	71	24	1	5
05-528	607	557	74	72	68	13	10	8
06-189	521	494	67	64	64	9	21	6
07-331	1132	1013	134	132	49	15	26	11
07-519	772	677	88	87	42	7	40	12
07-979	666	629	85	82	55	17	22	6
DM06-025	676	594	80	77	59	13	16	12
DM06-123	603	553	74	72	50	14	29	8
B94-14 G2	836	778	.	100	66	11	15	7
Covington G2	796	776	102	.	69	13	15	3
Jewel	919	790	105	103	55	9	21	15
Grand Mean	744	688	90	88	60	16	16	8
CV (%)	14	16	15	16	12	30	46	64
LSD (p=0.05)	149	155	19	20	11	7	11	7

Table 14b. 2009 Tablestock/Processing 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
1528	M	19	2	cr	ms	3	8	6	3,2,6	5	5	Var. sh,~T,AT
96-61 G2	ME	18	2	cu rs	ms	3.25	8	7	5,6	6	5	RC
04-531	M	22	3	rs	ms	3.25	7	6	3,6	6	6	PI's,g AT, TP
05-050	ML	17	2.5	org	ms	3.25	7	6	6,3	5	4	PI's,RC,BRD
05-108	M	22	2	rs	ms	3	7	7	3,5	4	5	T,TP
05-257	M	22	2.5	red	sflk	3.5	6	6	3,5	6	6	PI's,T,^roots, Hern sh, CRK
05-528	ML	19	2	lt org	mflk	3.5	7	7	6,5	5	4	var. sh
06-189	M	27	2.5	dk rs	ms	3.25	7	7	6	6	5	^AT,low #root PI,blocky,LT,T,
07-331	ME	17	2	red	ms	3.5	7	6	6	6	6	VN, FF
07-519	ME	17	3	lt rs	ms	2.75	6	6	6	5	4	↓rts,^L,2°rts
07-979	M	19	2	rs	sflk	3.25	6	7	3,2,6	5	5	var.sh,~2°rts
DM06-025	M	24	3	rs	hflk	3.25	7	7	3,7	3	3	R skn,ESC,BRD
DM06-123	ME	28	2.5	cu	sflk	3	6	7	6,3	6	3	R skn^^AT,VN
B94-14 G2	M	20	2.5	cu rs	ms	2.75	7	7	6,3	4	5	
Covington G2	M	20	2	cu rs	sflk	3	7	6	6	7	6	Chunky
Jewel	M	22	2.5	org	sflk	3	5	6	6	6	5	GR,DE,AT,^yld

Comments: A good test evaluating dual purpose tablestock and processing material. We have added Jewel as a moderate dry matter check. 07-331 had excellent fresh yields and flesh color, but has too many veins for the fresh market.

Table 15a. 2009 Late Tablestock/Processing Yield Trial at CRS, Kinston, NC. Planted: 29June09; Harvested: 29Oct09; 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
1528	673	552	87	81	46	33	3	18
96-61 G2	590	479	81	69	44	29	7	20
04-412	484	447	68	66	71	22	0	7
04-531	590	581	91	85	57	37	4	1
05-050	514	462	73	68	40	48	4	9
05-108	651	634	100	93	67	21	9	3
05-257	713	670	107	98	51	43	1	6
05-528	491	468	75	69	66	28	1	4
06-189	474	430	66	64	67	12	12	9
07-331	961	823	130	121	48	28	10	14
07-519	945	846	133	124	60	12	17	11
07-979	681	580	93	87	52	31	1	15
DM06-123	290	255	39	38	40	38	8	14
B94-14 G2	753	640	.	94	46	9	30	15
Covington G2	718	683	108	.	68	12	14	5
Jewel	611	471	76	69	50	22	5	23
Grand Mean	641	571	90	83	54	27	8	11
CV (%)	15	17	18	18	16	30	78	65
LSD (p=0.05)	150	149	24	23	13	12	10	11

Table 15b. 2009 Late Tablestock/Processing 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
1528	M	16	2	org	sflk	3	7	6	6,3	5	5	VN,CR
96-61 G2	M	20	2.5	rs	ms	3.25	7	7	6	7	7	nice sh, RC,VN
04-412	ML	18	3.5	rs	sflk	3.5	8	7	6	6	6	~CRK,nice flsh
04-531	M	22	3	rs	ms	3.25	7	6	3	6	6	VN,LE's,elliptic
05-050	ML	19	3	org	sflk	3.5	6	6	6	6	5	~CRK
05-108	M	20	2.5	rs	sflk	3.25	6	7	3	6	5	T
05-257	M	19	3	red	sflk	3.5	5	6	3,8	6	6	~Inf LE,CRK ^PI's,CR,nice flesh
05-528	M	19	2	org	sflk	3.5	7	7	6	6	6	flesh
06-189	M	24	2.5	red	5	3	7	6	6	6	6	low root set
07-331	M	17	3	dk rs	ms	3.5	7	7	6,3	5	5	^VN,^yld
07-519	ME	17	3	rs	ms	3/ycr	6	7	6	6	5	YCR,skin disc
07-979	M	19	2.5	red	sflk	3	7	6	6	6	6	~AC
DM06-123	ML	23	3	org	sflk	3	5	7	3,7	4	3	^VN,CRK
B94-14 G2	ME	16	3	rs	ms	2.75-3	6	6	6,3	6	5	
Covington G2	M	20	2	rs	ms	3	7	7	6	7	7	YCR,RC? CRK,SPR,^VN, GR
Jewel	M	21	2.5	org	sflk	2.75	6	7	6,3	5	5	GR

Comments: A similar test to the one above except planted later. Jewel, which did well earlier, fell off considerably. 07-331 still produced excellent fresh yields with blocky shapes and flesh color, but is still too veiny. These will all be processed as chips and fries and considered for processing ability and table stock attributes.

Keys to Tables

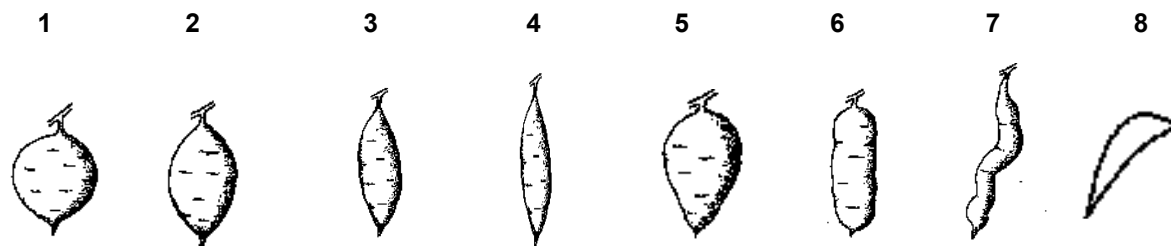
Storage root data: **MAT**=maturity E=early, M=mid and L=Late; **DM**=percentage dry matter; **L/D**=length/diameter ratio; **SKC**=skin color clr=clear cu=copper, lt=light, or=orange, pi=pink, pu=purple, rd=red, rs=rose, tn=tan wh=white; **SKT**= skin texture, m fl= moderate flakiness of skin, l fl= 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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FUNDS SPENT (2009): NCARS/NCCES CODE 00-03

FUNDS SPENT:	YEAR	YEAR	YEAR
	(2008)	(2009)	(2010)
EPA Salaries (Inc. fringe benefits)			
EPA-GRA Stipends			
Termination Date			
SPA Salaries (Inc. fringe benefits)	5,500	6,250	10,500
Part-time Labor (Inc. soc. sec. benefits)	5,500	4,500	5,500
Supplies	5,500	5,750	5,500
Equipment (greater than \$5,000)			
Travel	2,500	2,500	2,500
Other (Publication costs, etc)			
 TOTAL (DISBURSED AND SPENT)	 \$ 19,000	 \$19,000	

IMPACT STATEMENT:

NCARS/NCCES Code 00-03

North Carolina is the largest producer of sweetpotatoes in the nation and new varieties are always sought to address new disease and pest problems, and ever-changing market conditions. The funds provided through this grant have enabled the Sweetpotato Breeding and Genetics program to establish a large and dynamic program focused on developing new varieties adapted to NC's growing conditions. Covington, our most recent release, was produced on 38,000 acres in NC during 2009, about 90% of the NC acreage. We also have several other promising conventional, specialty, processing-type and industrial clones under evaluation of varying flesh and skin colors, and we believe that we are making good progress developing improved varieties for NC's sweetpotato growers enabling growers to retain and/or expand into new markets.