

NCSU SWEETPOTATO BREEDING PROGRAM
SUMMARY OF CULTIVAR DEVELOPMENT WORK

2001

Craig Yencho and Kenneth Pecota
Department of Horticulture
NC State University
Raleigh NC, 27695-7609
Craig_Yencho@NCSU.edu
Ken_Pecota@NCSU.edu

We gratefully acknowledge the help of the following people without whose help this work could not have been done Cindy Pierce and Mark Clough, research technicians in sweetpotatoes and potatoes, respectively; Jim Carlos Cervantes, Adam Bruckner, and Adrienne Bryan, graduate students; and Jonathan Schultheis and Dennis Adams, Horticulture Department; Jimmy Prince, Steve Warren, Steve Honrine and staff, Horticultural Crops Research Station, Clinton; Sandy Barnes, Randy Herring and staff, Cunningham Research Station; George Clark, Kirby Jones and staff, Central Crops Research Station, Clayton; Pam Britt and staff, Tidewater Research Station; W.R. Jester, Allan Thornton and William Little, Extension; Zvezdana Pesic-VanEsbroeck, Gerald Holmes, Charles Averre, Plant Pathology; and Timothy Ketchie our summer helper, for excellent support.

NOT FOR REPRODUCTION OR PUBLICATION WITHOUT PERMISSION

Program Objective(s): The objectives of the Sweetpotato Breeding and Genetics Program are: 1) to develop high yielding sweetpotato varieties for growers that possess acceptable appearance, table-stock quality, and disease and insect resistance; and 2) to conduct breeding and genetic studies to identify and incorporate important traits into sweetpotato germplasm and new cultivars.

Project Highlights

Highlights of our 2001 activities are listed below. A detailed description of the overall activities of the breeding program follows the highlights section.

1. We planted 36,000 true seed, which resulted in 390 seedling selections. Generally, we plant an equal number of seed from each of the previous years parents and keep records of the number of clones selected per female parent. This information is used to determine each parent's relative worth, and to develop improved nurseries and, from them, superior varieties.
2. We conducted 11 yield trials of preliminary and advanced clones at the Horticultural Crops Research Station (HCRS), Clinton and the Cunningham Research Station (CRS), Kinston.
3. We completed our fourth year of the Grower Participatory Breeding Project (GPBP) in which first year seedlings are selected at three on-farm sites with the assistance of growers, Extension Agents and Specialists.
4. We evaluated our most advanced lines in unreplicated trials at the three GPBP sites. This signals a shift in the focus of the GPBP. We are beginning to increase our emphasis on advanced lines that are in the program as information gathered on the advanced lines on-farm will help us to rapidly identify and advance superior clones for variety release.
5. We conducted our fourth season of *Streptomyces* soil rot (SSR) field screening and evaluated 200 clones for field resistance to SSR. This long-term project will give us a critical tool for assessing the suitability of material for NC growing conditions. All 200 clones were also screened for Fusarium wilt and root-knot nematode resistance in the greenhouse.
6. We collaborated with the Micropropagation Unit (MPU) by evaluating six trials at the HCRS and CRS to select superior mericlones of Hernandez, Jewel, and other specialty varieties for release to NC growers.
7. We collaborated with the MPU to conduct studies of the effect of advanced generations (G0, G1, G2, G3, G4 and G5) and the accumulation of SPFMV and deleterious mutations on Beuregard yield and root quality.
8. To address long-term breeding needs in sweetpotato and develop new breeding tools for sweetpotatoes, we initiated a genomics project with Dr. Bryon Sosinski, Director, CALS Genome Research Laboratory and Assistant Professor in Horticultural Science.

2001 Polycross Breeding Nurseries

We established four polycross nurseries in 2001. The **Elite Nursery**, relocated to the Central Crops Research Station in Clayton, is designed to produce materials with the potential to become varieties. In this nursery, cultivars and near-commercial clones that are outstanding for particular characteristics, such as yield, appearance, and disease and insect resistance are combined and crossed. The **Streptomyces Soil Rot (SSR) Nursery**, also located at the Central Crops Research Station in Clayton, is dedicated to developing parents with high levels of soil rot resistance. An Earliness Nursery, at the Horticultural Field Lab, was focused on developing early

sizing, but produced very little seed. The **Parallel Nursery**, designed to develop parents with a combination of soil rot, root-knot nematode resistance, and high dry matter, was discontinued. The offspring, while having a good combination of the focus traits were starting to lose some of the yield and horticultural characteristics. These nurseries are composed primarily of breeding material developed by NCSU, LSU, and the USDA-ARS sweetpotato breeding projects. The USDA lines are primarily used for disease and insect resistance. Table 1 provides results of the seed harvests per maternal parent for the Elite and SSR nurseries. The fourth nursery, our **High Dry Matter/Biomass Nursery**, was located at the Horticultural Crops Research Station in Clinton, is designed to develop lines with high levels of dry matter suitable for industrial purposes including ethanol production. High dry matter incorporated into orange flesh materials will produce sweetpotatoes with processing potential not currently available. Frost on October 19th ended the seed season, which otherwise could have continued into December. Despite this, sufficient seed was obtained for next year.

First-Year Seedling Selections

Over 36,000 true seed from the 2000 and 1998 polycross nurseries were grown in the Horticultural Department and Vernon G. James Research and Extension Center greenhouses starting in February. Most of the seedlings from the 2000 Elite Nursery (ca. 13,000) and 2000 SSR nursery (ca. 10,000) were evaluated for storage root color prior to field transplanting in May. Only those seedlings with a uniform orange, or a pure white flesh color were planted. This step, combined with losses from non-germinating seed, reduced the seedling population by almost 50%. Selection at harvest was based on 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 by maternal parent selected at the CRS. From the nearly 26,000 seed from the SSR or Elite nurseries 390 were selected for further evaluation. This is a selection rate of 1.5%, which is typical. This was a cooler than normal season which would favor the selection of earliness, an important consideration for NC varieties.

As part of the Grower Participatory Breeding Project, three on-farm sites were used to evaluate seedlings from 18,000 of the true seed listed above. The parents and selections are shown in Table 3. Cooperators involved in this project were:

Researchers	Extension	Growers
Jonathan Schultheis	Wilfred R. Jester	Kendall Hill
Dennis Adams	William Little	Sonny Scott
	Allan Thornton	Dewey Scott
		Terrill Williams
		Johnny Williams

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. Selections were made in cooperation with extension personnel and growers. Growing conditions varied from site to site, but all sites yielded selections that had better appearance than the check variety Beauregard. These selections will be planted at the HCRS and CRS in 2002 as unreplicated 20 hill plots for the second cycle of selection.

During 2002, we established a second component to the GPBP and began evaluating promising breeding lines under commercial conditions. Fourteen

advanced breeding lines and six check lines were grown and evaluated at each location as single-row, 100 hill plots. Notes on how they performed at each location were taken and these will be combined with research station data to determine the potential of each as a variety.

Second-Year Selections

In 2000, we made 715 first-year seedling selections for tablestock sweetpotatoes. A few of these rotted in storage or did not sprout in the spring. The remainder (ca. 700) were planted in 20-hill plots at the HCRS and CRS. 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. From these, 48 selections were made at the CRS, and 16 at the HCRS. Three selections were chosen at both sites, for a total of 61 selections remaining. These clones are designated as NC00-xxx, having been named when they were selected as single hills in 2000, NC00-001 being the first seedling hill selected in 2000. The Clinton site was on soil that was a bit heavy and resulted in many clones cracking severely.

Third-Year Selections

The 96 second-year selections made in 2000 were planted as unreplicated 100-hill plots at the HCRS and CRS. We selected 23 of these for further evaluation with 8 selected in both locations, 5 only at the HCRS and 10 only at the CRS. Our evaluation criteria remained the same but we become stricter for any flaws. Also with more plants we get a better idea of the yield in comparison to the Beauregard check rows. 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 assessment of their adaptability across environments/soil-types.

Advanced Selection Trials

Fifteen advanced selections were evaluated this year. Two of our most promising selections to date (**NC96-61** and **NC97A-04**) appear to have serious limitations. NC96-61 and NC97A-04 both appear to have broad adaptability, good yield, Fusarium and soil rot resistance and good eating quality, but they each have important weaknesses. NC96-61, a very sweet line, does not sprout well, and is susceptible to russet crack, similar or perhaps a little worse than Beauregard. We will be testing virus screened G2 NC96-61 material in 2002 to see if the russet crack can be controlled through micropropagation. However, extended pre-sprouting did not seem to help the sprouting problem. NC97A-04 showed some souring this season, and it has moderately prominent lenticels detracting from its appearance. NC97A-04 was in the National Collaborators test this year so we will get feedback from around 14 tests around the country as to how well it performs elsewhere.

A new clone, **NC98-608** has been elevated to advanced status based on its performance over the last two years. It is similar to Beauregard in appearance, but has been more uniform in shape and has packed out quite well. It is less prone to making jumbo's than Beauregard. It will be widely tested in 2002 both on the research stations and in on-farm tests. Disease resistance needs further evaluation, but so far it has tested resistant to Fusarium wilt and root-knot nematodes.

Fifteen additional advanced clones are still being evaluated. The results of

yield tests that included these clones and other promising selections are presented in Tables 4-14, with the comment codes used in the tables described after the tables in the Comment Codes Section. All yields are reported as 50 lb. bushels.

The following clones represent our most promising selections and their disposition:

NC96-61

Description

Vine: Trailing, highly branched, dense canopy
Leaves: Heart-shaped, green, green veins
Sprout production: Poor
Transplant survival: Good

Storage roots:
Shape: Fusiform (tapered on both ends)
Skin color: Rose
Flesh Color: Moderately deep orange, uniform
Skin Surface: Smooth

Characteristics

Yield: High
Season: Mid
Fusarium stem rot: Resistant
Pox: Moderately resistant
Root-knot nematodes: Moderately susceptible
Russet crack: Susceptible
Storability: Good
Consumer quality: Very good, very sweet when baked
Remarks: Poor sprouting and susceptibility to russet crack have made release doubtful. However, NC96-61 may have a limited role as a specialty variety known for its exceptional sweetness and eating quality.

Yield Trial Data: 109% of Beauregard marketable yield in 15 tests over 5 years
105% of Hernandez marketable yield in 8 tests over 2 years

Disposition: Will be evaluated in advanced and on-farm trials during 2002 using G2 planting stock.

NC97A-04

Description

Vine: Slightly trailing, dense canopy
Leaves: Heart-shaped, green
Sprout production: Good, a bit late
Transplant survival: Good

Storage roots:
Shape: Fusiform
Skin color: Light rose
Flesh Color: Orange, uniform
Skin Surface: Smooth, some scattered lenticels

Characteristics

Yield:	High
Season:	Mid
Fusarium stem rot:	Resistant
Pox:	Resistant
Root-knot nematodes:	Moderately resistant
Storability:	Good
Consumer quality:	Good
Remarks:	Some souring and excessive length problems have been noted under moist conditions that may limit acceptance. In 2001 National Collaborators tests.
Yield Trial Data:	108% of Beauregard marketable yield in 14 tests over 3 years 112% of Hernandez marketable yield in 11 tests over 2 years
Disposition	Will be evaluated in advanced, on-farm and in NSPCG trials during 2002.

NC98-608**Description**

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

Storage roots:	
Shape:	Blocky to fusiform
Skin color:	Light rose
Flesh Color:	Moderately deep orange, uniform
Skin Surface:	Smooth

Charateristics

Yield:	High
Season:	Mid to early
Fusarium stem rot:	Resistant
Pox:	Moderately susceptible?
Root-knot nematodes:	Unknown
Storability:	Unknown
Consumer quality:	Unknown
Remarks:	A promising preliminary selection. Desirable attributes include highly attractive, short roots and high packout. Very similar to Beauregard. Eating quality and disease resistance need further testing..
Yield Trial Data:	118% of Beauregard marketable yield in 3 tests in 2001 102% of Hernandez marketable yield in 3 tests in 2001
Disposition	Will be evaluated in advanced and on-farm trials during 2002.

Disease Resistance Screenings

In addition to the selection and yield evaluation trials, we screened 37 advanced and 79 preliminary selections, and 54 parental lines for resistance to Fusarium wilt. Thirty-four of the advanced lines, 76 of the preliminary

lines, and 41 of the parental lines had moderate to high levels of resistance. Two hundred lines including all the above advanced and preliminary lines were also screened for root-knot nematode and Streptomyces soil rot (pox), however both of these tests were weak and will not be relied on. Lines not resistant to Fusarium wilt are eliminated on the basis of these evaluations.

Biomass Types

Recently in NC there was revived interest in using sweetpotatoes as a feedstock for ethanol production. While economics do not support the use of sweetpotatoes vs corn, there is potential utility if production costs can be reduced and dry matter percentage and yield increased. High starch and high dry matter sweetpotatoes may also be useful in the development of new food products, especially if there can be a reduction in production costs. We have initiated a small effort to identify clones with suitable qualitative characteristics that are adapted to NC growing conditions. We screened over 100 clones, mostly PI's, for dry matter and adaptability in both Kinston and Clinton. Most proved poorly adapted, and dry matter percentage ran lower in NC than reported elsewhere. HiDry, one of highest in the trials averaged 34% dry matter. It is not uncommon to see it reported over 40%.

In addition to observing clones, we grew out seed from a biomass polycross nursery grown in 2000 and seed acquired from CIP. The seedlings were selected for yield and basic horticultural characteristics (you had to recognize it as a sweetpotato). Family means ranged from 30-37%, with a grand mean of 32%. Individual selections ranged from 21-43% (Table 3b). All clones below 30% were discarded. A polycross nursery was grown in 2001 as well and generated 31,000 seed. A portion of these seed will be grown in 2002 to help evaluate these clones as parents.

A biomass yield test was conducted in both Clinton and Kinston (Tables 15-16). Whitestar produced nearly three times as much dry matter in Kinston as it did in Clinton, but most clones performed similarly in both locations. Dry matter percentage was higher in Clinton by an average of 1.6 percentage points. Nearly all storage roots were suitable for processing, with the exception of some severe cracking, especially in HiDry in the Clinton location.

2001 National Sweetpotato Collaborator Trial

A cool spring delayed plant growth in our beds, and may have adversely affected sprouting in some clones in this test. Because of the poor sprouting, we were only able to establish one test in one location (CRS). Weather-wise, the summer was relatively cool with rainfall well spread out during the growing season. In contrast, the fall harvest season was very dry. Root shapes and overall appearance were good with most culls due to shape defects. Insect damage, especially wireworm, was widespread and in all clones. Overall appearance is a subjective 0-9 scale with 0 = very poor, 3= poor, 5=fair, 7=good and 9= excellent.

Description of Official Entries

Beauregard (B94-14) - Rose skin, orange flesh, moderately smooth skin, blocky uniform shapes. Some russet crack in G2 roots, none observed in G1 roots. G1 roots shorter on average than G2 roots. Overall appearance = 7 for G1, = 6 for

G2.

L94-96 - Rose skin, orange flesh, moderately smooth skin, elliptic to long elliptic shapes, set many roots and was mid to late season, some russet crack. Overall appearance = 4

MSI52 - Light copper skin, light orange flesh, smooth skin, elliptic shapes, mid to late season, may have had a mix of clones since skin color varied. Overall appearance = 4.

MSK39 - Rose skin, orange flesh, smooth skin, elliptic shapes, relatively few roots, many jumbo's for length, early season. Overall appearance = 6.

NC97A-04 - Rose skin, orange flesh, moderately smooth skin, elliptic and long elliptic shapes, midseason, some pimples, overall too long. Overall appearance = 5.

W311 - Rose skin, light orange flesh with a yellow cortical ring, smooth skin, long elliptic and elliptic shapes, mid to late season, set many roots, some veins and skin discoloration. Overall appearance = 4.

W328 - Copper skin, light orange flesh with some yellow mottling, moderately smooth skin, elliptic to long elliptic shapes, midseason. Overall appearance = 5.

W334 - Light copper skin, light orange flesh with some yellow mottling, smooth skin, elliptic to long elliptic shapes, mid to late season. Overall appearance = 4.

W352 - Copper skin, orange flesh, smooth skin, elliptic and ovoid shapes, many long, late season, secondary roots. Overall appearance = 3.

W359 - Rose skin, orange flesh with grainy appearance, smooth skin, elliptic shapes, midseason, moderate pimpling, some shallow veins. Overall appearance = 5.

W365 - Light copper skin, orange flesh, smooth skin, elliptic and tapered shapes, mid to late season, russet crack. Overall appearance = 4.

W370 - Copper-rose skin, orange flesh, moderately smooth skin, elliptic and long elliptic shapes, too long, late season, too many veins. Overall appearance = 4.

Unofficial entries in the 2000 National Sweetpotato Collaborator Trial for comparison:

Hernandez G2- orange skin, deep orange flesh, moderately smooth skin, elliptic shapes, moderate pimples, overall appearance =7.

NC96-61 - rose skin, orange flesh, moderately smooth skin, elliptic to long elliptic shapes, some shallow veins, russet crack, overall appearance =7.

NC98-608 - rose skin, orange flesh, moderately smooth skin, elliptic to blocky shapes, some veins, some skin discoloration, mild yellow cortical ring, overall appearance =8.

Table 1a. Sweetpotato True Seed Harvested in 2001.

Maternal Parent	No. Seed/Polycross Nursery		Total
	Clayton Elite	Clayton SSR	
NC92-08	298	230	528
NC93-50	---	3829	3829
NC96-13	---	161	161
NC96-27	2424	---	2424
NC96-61	650	159	809
NC97A-04	3834	---	3834
NC97A-45	---	123	123
NC97-433	---	1240	1240
NC98-576	---	203	203
Beauregard	---	1376	1376
C-58	2532	933	3465
Excel	---	1372	1372
Goldstar	9228	---	9228
Hernandez	2608	2802	5410
Ihuanco	---	474	474
Jasper	1966	413	2379
Kumara Enea	3529	---	3529
LA54-89	---	818	818
L78-21	---	552	552
L80-62	981	267	1248
L86-33	4176	1495	5671
L94-96	7104	5314	12418
W99	3512	---	3512
W244	---	1556	1556
W250	3009	1237	4246
W271	8793	---	8793
Total	54644	24554	79198

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

Table 1b. Sweetpotato True Seed Harvested in 2001 - Biomass Nursery.

Maternal Parent	Origin	%DM in 2001	Seed
394	Vanuatu	25	923
1880	NC	31	4356
A88	NC	32	659
BM83-4	US	30	41
BM85-42	US	32	1266
CIP 420024	CIP	35	16
CN 1280-3	AVRDC	19	0
CN 1489-43	AVRDC	29	55
CN1443-57	AVRDC	32	0
Costeno	Peru	34	93
FT3-89	NC	32	3040
FTA94	NC	32	1329
Hebei 351	China	31	157
HiDry	USDA (1985)	33	291
Kogame-genga	Japan		284
Kogane-sengan	Japan	34	1610
MD P217-84	US	28	3831
Minamiyutaka	Japan		3930
Pelican			
Processor	US	29	323
SPV 73	P. Rico	22	98
Sumor	USDA (1987)	19	1417
Suwon 147	Korea	24	2234
Tanzania	Uganda	26	0
Tinian	Tinian islands	32	17
WB-16	NC	32	681
Whitestar	USDA (1948)	30	507
Woksaken (N-71)	PNG	29	4669
Average/Total		29	31827

Table 2. 2001 Sweetpotato seedlings selected at Kinston.

Maternal parent	# selections	Maternal parent	# selections
<i>Seed from the 2000 Elite nursery</i>			
NC1528	6	Hernandez	2
NC91-14	7	L80-62	7
NC94-03	6	L94-96	13
NC96-27	14	L95-95	5
NC97A-04	14	NC412	12
Beauregard	16	W99	1
Excel	4	W271	9
Goldstar	8		
		Total	124
<i>Seed from the 2000 SSR nursery</i>			
NC91-14	3	FT92-36	3
NC92-08	2	Hernandez	7
NC93-50	5	L78-21	2
NC96-13	2	L80-62	4
NC96-61	4	L84-74	2
NC97A-45	3	L94-96	8
Beauregard	4	NC412	2
C58	1	Southern Delite	2
Eureka	4	W271	4
Excel	1		
		Total	63
<i>Seed from the 2000 Parallel nursery</i>			
NC93-11-11	4	Hernandez-8	4
NC93-15-5	1	L86-33-1	8
NC93-65-14	2	L87-95-16	4
NC93-71-17	1	L87-105-14	4
NC93-92-10	2	MD810-13	1
NCA193-14	1	Resisto-8	1
DW8-3	11	W268-5	2
Golden Sweet-17	2	W271-2	2
		Total	50
		Grand Total	237

Table 3a. 2001 Sweetpotato seedlings selected on farm.

Maternal parent	# selections	Maternal parent	# selections
<i>Williams Farm, seed from the 2000 Elite nursery</i>			
NC1528	2	Goldstar	10
NC91-14	8	Hernandez	8
NC97A-04	18	L94-96	14
Beauregard	18	W99	2
Excel	4	W271	9
Total			93
<i>Scott Farms</i>			
<i>2000 SSR nursery</i>		<i>1998 SSR nursery</i>	
NC97A-45	9	Beauregard	2
L80-62	3	L80-62	3
L94-96	6	L91-189	1
		MD810	2
Total			26
<i>Tull Hill Farms, seed from the 2000 SSR nursery</i>			
NC96-61	6	NC412	11
C58	12	W99	1
L84-74	4		
Total			34
Grand total			153

Table 3b. 2001 Biomass seedling selections

Family	Average %DM	# selected	Std dev	Max	Min
CIP199044	37.1	9	3.25	43.0	33.0
CIP199049	35.5	15	3.07	40.9	30.7
CIP199050	35.2	10	3.82	42.4	30.6
CIP199051	32.7	9	3.31	37.3	26.2
CIP199062	29.9	15	2.85	36.7	24.7
Minamiyutaka	33.6	26	4.97	42.8	26.0
NC A208	31.2	9	3.84	36.9	22.4
NC FTA94	32.4	32	3.84	39.6	25.6
NC PDM P3	30.8	21	3.92	37.5	23.8
Pelican					
Processor.	30.2	16	3.60	35.8	20.7
PI344120	32.0	10	4.73	40.1	25.0
Sumor	29.5	18	2.83	35.6	25.4
Tinian	32.2	18	3.49	38.3	26.8
Whitestar	33.6	5	5.22	42.5	28.6
GRAND	32.3	213	4.20	43.0	20.7

Table 4a. 2001 National Sweetpotato Collaborators yield trial, CRS, Kinston, NC Planted: 19Jun01; Harvested: 08Oct01; Days to Harvest: 111.

CLONE	Total Yield bu/A	Marketable Yield			Size Distribution by Class (% of total yield)			
		Bu/A	%Beau	% Hern	No.1's	Canners	Jumbo's	Culls
BeauB94-14 G1	588	574	100	78	68	17	12	2
BeauB94-14 G2	687	631	114	84	60	28	4	8
Hernandez G2	779	752	139	100	61	35	0	4
L94-96	655	599	111	80	44	47	1	9
MSI52	860	788	143	105	55	33	4	9
MSK39	812	786	149	105	63	22	12	3
NC96-61	740	697	124	93	38	56	1	6
NC97A-04	616	576	107	77	36	57	1	6
NC98-608	772	757	136	102	67	30	1	2
W311	692	638	119	85	47	44	1	8
W328	628	595	109	80	54	40	1	5
W334	563	496	93	66	50	36	2	12
W352	402	388	72	51	36	61	0	3
W359	610	570	103	76	49	42	2	7
W365	530	473	88	63	36	54	0	11
W370	571	513	98	68	27	63	0	10
Grand Mean	657	616	113	82	49	42	2	7
CV (%)	13	14	15	15	14	17	131	61
LSD (p=0.05)	102	102	19	14	8	8	4	5

All trials are reported in 50 lb. bu.

Table 4b. 2001 National Sweetpotato Collaborators Yield Trial at CRS, Kinston, NC - quality data. (See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
B94-14 G1	E-M	27	2.5	Rs	ms	3	7	7	3	6	6	
B94-14 G2	M	21	3	Rs	ms	3	8	7	3	6	7	RC
Hern G2	M	24	3	cu	ms	3.5	6	7	3	7	7	~PI
L94-96	M-L	26	4	rs	ms	3.25	8	8	3,4	6	4	RC, ^roots
MSI52	M-L	27	3	lt cu	sm	2.75	7	8	3	5	4	mixed, TP
MSK39	E	26	3.5	rs	sm	3.25	8	6	3	5	6	few roots, jumbos for length
NC96-61	M-L	26	3	rs	ms	3.25	8	8	3,4	6	7	RC, ^roots
NC97A-04	M	20	3.5	rs	ms	3.25	8	7	3,4	6	5	too long
NC98-608	M	30	2.5	rs	ms	3.25	7	7	3,6	8	8	~SD
W311	M-L	26	4.5	rs	sm	2.75	7	7	4,3	6	4	~VN, YCR, SD, ^roots
W328	M	25	3.5	cu	ms	2.75	7	8	3,4	7	5	flesh mottled
W334	M-L	21	3.5	lt cu	sm	2.75	6	8	3,4	6	4	flesh mottled
W352	L	25	3.5	cu	sm	3	6	7	3,5	4	3	TP, 2ndary roots
W359	M	29	3	rs	sm	3.25	7	5	3	6	5	VN, ^PI
W365	M-L	33	3	lt cu	sm	3	6	6	3	6	4	RC, ^tapers
W370	L	25	4	cu rs	ms	3	7	7	3,4	6	4	VN, ^long,

Comments: Dry matter data not to be trusted in this test.

Table 5a. 2001 Advanced Yield Trial at HCRS, Clinton, NC. Planted: 07Jun01; Harvested: 24Sept01; Days to Harvest: 110.

CLONE	Total Yield	Marketable Yield			Size Distribution by Class (% of total yield)			
	bu/A	bu/A	%Beau	%Hern	No.1's	Canners	Jumbo's	Culls
NC96-61	712	605	68	77	42	42	1	15
NC97-433	579	552	61	70	56	31	8	5
NC97A-04	869	787	88	99	60	26	5	9
NC97A-18	838	665	74	83	54	23	3	21
NC97A-45	849	766	86	96	68	12	10	10
NC98-608	875	836	93	105	68	22	6	4
BeauB94-14 G2	1043	905	100	114	63	12	13	13
Hernnadez G3	897	799	89	100	65	21	3	11
Grand Mean	833	739	82	93	59	24	6	11
CV (%)	10	10	10	10	10	16	57	32
LSD (p=0.05)	118	109	13	13	9	5	5	5

Table 5b. 2001 Advanced Yield Trial at HCRS, Clinton, NC - quality data. (See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC96-61	L	21		rs	sm	3.25	8	8	3	6	6	RC, VN
NC97-433	M	19		rs	ms	3.25	7	7	6,3, 2	6	5	STR, too short
NC97A-04	M	17		rs	ms	3	7	6	3	6	6	some souring
NC97A-18	M	20		dk rs	ms	3	5	7	3	6	4	VN,GRV, deep eyes
NC97A-45	M-E	19		cu	sm	3	8	8	6	8	7	~CR, nice shapes
NC98-608	E-M	20		rs	sm	3	7	6	6,3	7	7	stays mod. short
Beau B94-14 G2	E	18		rs	sm	3	8	7	3	7	7	~RC, a little souring
Hernandez G3	M	19		cu	ms	3.5	6	7	3	7	7	

Comments: Beaugard sized earlier, but further sizing would lead to more jumbo's. Both NC98-608 and Hernandez would have produced a much higher packout than Beaugard if left to size another week or two.

Table 6a. 2001 Advanced Yield Trial at CRS, Kinston, NC. Planted: 29Jun01; Harvested: 18Oct01; Days to Harvest: 111.

CLONE	Total Yield	Marketable Yield			Size Distribution by Class (% of total yield)			
	bu/A	bu/A	%Beau	% Hern	No.1's	Canners	Jumbo's	Culls
NC96-61	613	453	106	85	36	36	1	26
NC97-433	364	347	82	66	48	48	0	4
NC97A-04	560	542	128	102	48	46	2	3
NC97A-45	454	419	100	80	57	32	3	8
NC98-576	718	625	148	118	52	27	8	13
NC98-608	565	526	126	100	62	29	3	7
BeauB94-14 G2	545	426	100	80	53	15	11	21
Hernandez G2	564	530	125	100	63	21	11	6
Grand Mean	548	484	114	91	52	32	5	11
CV (%)	13	13	13	13	14	25	123	43
LSD (p=0.05)	107	93	22	17	11	12	9	7

Table 6b. 2001 Advanced Yield Trial at CRS, Kinston, NC - quality data. (See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC96-61	M-L	19	3	rs	sm	3.25	7	7	3	6	6	^RC, ~VN, ^roots
NC97-433	M-L	18	1.5	rs	sm	3.25	8	7	6,3	7	7	too short, low yield
NC97A-04	M-L	19	4	rs	ms	3	7	5	4	7	5	Long, PI
NC97A-45	M	17	2.5	lt cu	sm	3.25	7	6	3,6	7	6	air CR, PI
NC98-576	M	18	3	cu-rs	ms	3.5	7	6	3,8	6	6	~PI
NC98-608	M-E	18	2	rs	sm	3.25	7	6	6,3	7	7	~SD, stays short, nice
B94-14 G2	E-M	18	3	rs	ms	3	8	7	3,6	5	5	~RC
Hern G2	M-E	19	2	cu o	ms	4	6	7	3,2	7	7	~PI

Comments: Russet crack affected Beauregard and NC96-61 significantly in this trial, causing many culls.

Table 7a. 2001 Preliminary 1 Yield Trial at HCRS, Clinton, NC. Planted: 01Jun01; Harvested: 17Sept01; Days to Harvest: 109.

CLONE	Total Yield bu/A	Marketable Yield			Size Distribution by Class (% of total yield)			
		bu/A	%Beau	% Hern	No.1's	Canners	Jumbo's	Culls
NC95-01	450	307	54	60	38	31	0	32
NC95-17	487	347	58	68	34	36	0	30
NC96-09	859	693	119	137	57	14	10	19
NC96-13	487	432	74	86	43	45	0	12
NC96-61	444	390	68	76	34	53	0	12
NC97A-04	563	444	75	88	56	18	5	21
NC97A-42	435	284	52	59	43	20	3	34
NC98-550	512	476	86	94	64	29	0	7
NC98-576	813	656	113	128	51	26	5	19
BeauB94-14 G2	688	633	100	122	62	14	15	9
Excel	341	179	30	34	33	19	0	48
Hernandez G3	617	516	87	100	60	23	0	17
NCC58	637	475	79	95	57	8	9	26
Grand Mean	564	448	77	88	49	26	4	22
CV (%)	21	25	25	24	21	35	135	31
LSD (p=0.05)	170	159	27	30	15	13	7	10

Table 7b. 2001 Preliminary 1 Yield Trial at HCRS, Clinton, NC - quality data.
(See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC95-01	L	21		rs tn	ms	2.75	7	7	3	5	4	~CR
NC95-17	M	20		tn	sm	3.25	8	7	3	5	5	~GC, RC?
NC96-09	E-M	20		rs	sm	3	8	5	3	6	5	T, ~GC
NC96-13	M-L	19		dk rs	ms	2.5	8	7	3	6	6	~VN, RC
NC96-61	M-L	20		rs	sm	3	9	8	3	6	6	~VN
NC97A-04	M	19		rs	sm	3	7	6	3	5	5	~ rots
NC97A-42	M	14		lt cu	sm	3.25	7	7	2	4	4	~GC, ~VN
NC98-550	M	18		dk rs	sm	3	8	7	3	6	6	
NC98-576	E-M	21		rs	ms	3.25	7	6	3	5	6	^curves, ~LT
B94-14 G2	E-M	19		rs	ms	3	7	6	3	5	6	
Excel	L	28		rs	ms	2.5	8	6	5	4	2	^T, GC, 2 ⁰ roots
Hern G3	M-L	20		or	ms	3	6	7	3	6	6	~ 2 ⁰ roots
NCC58	M	18		rs	mflk	3	7	3	3	5	4	prominent lenticels

Comments: NC98-576 looked promising except for a tendency to produce curved roots, many enough to be culled. Considerable culls in many clones for shapes.

Table 8a. 2001 Preliminary 1 Yield Trial at CRS, Kinston, NC. Planted: 21Jun01; Harvested: 05Oct01; Days to Harvest: 111.

CLONE	Total Yield bu/A	Marketable Yield			Size Distribution by Class (% of total yield)			
		bu/A	%Beau	% Hern	No.1's	Canners	Jumbo's	Culls
NC96-09	777	727	130	201	46	14	33	6
NC96-13	360	325	58	87	39	52	0	9
NC97A-04	566	540	97	144	61	33	2	5
NC98-576	581	537	96	148	52	36	4	8
BeauB94-14 G2	622	561	100	155	52	16	22	10
Excel	293	257	47	68	41	45	1	13
Hernandez G3	409	385	70	100	53	27	13	7
Grand Mean	515	476	86	129	49	32	11	8
CV (%)	11	15	13	20	19	19	40	111
LSD (p=0.05)	86	104	16	39	14	9	6	14

Table 8b. 2001 Preliminary 1 Yield Trial at CRS, Kinston, NC - quality data.
(See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC96-09	E	20		rs	sm	3	6	5	2,3	6	6	~CR
NC96-13	L	19		rs	ms	2.5	8	7	3	6	4	~rot
NC97A-04	M-L	20		rs	ms	3	7	6	3	6	5	~PI
NC98-576	M	21		rs cu	ms	3.5	7	6	3	5	6	
B94-14 G2	E	19		rs	ms	3	8	6	6,3	7	6	RC
Excel	L	27		rs	sm	2.75	7	6	3,2	3	2	low yld
Hern G3	M	20		or	ms	3.5	6	7	3,2	5	4	balls

Table 9a. 2001 Preliminary 2 Yield Trial at HCRS, Clinton, NC. Planted: 01Jun01; Harvested: 17Sept01; Days to Harvest: 109.

CLONE	Total Yield bu/A	Marketable Yield			Size Distribution by Class (% of total yield)			
		bu/A	%Beau	% Hern	No.1's	Canners	Jumbo's	Culls
NC97-024	490	339	76	81	41	27	0	32
NC97-075	564	373	84	90	40	26	0	34
NC97-079	278	190	40	45	20	45	0	35
NC97-122	296	220	47	52	26	48	0	26
NC97-145	353	282	61	67	19	59	0	22
NC97-166	873	677	151	162	51	18	7	23
NC97-242	307	266	58	64	34	52	0	14
NC97-290	555	421	95	101	34	42	0	24
NC97-433	424	386	86	92	41	47	3	9
NC97-539	465	422	92	101	45	45	1	10
NC98-616	344	193	43	46	32	20	4	44
BeauB94-14 G2	653	463	100	112	52	15	4	30
Hernandez G3	508	415	93	100	51	31	1	18
Kumara Enea	295	214	46	51	25	54	0	21
Grand Mean	457	347	76	83	37	38	1	24
CV (%)	17	20	22	20	29	29	181	35
LSD (p=0.05)	113	99	24	24	15	16	4	12

Table 9b. 2001 Preliminary 2 Yield Trial at HCRS, Clinton, NC - quality data.
(See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC97-024	M-L	17		rs	sm	3	8	6	3	4	4	
NC97-075	M	21		dk rs	sm	3.25	8	7	3	5	4	GC, CV
NC97-079	L	18		rs	ms	3.5	8	7	3,5	5	3	GC
NC97-122	M-L	19		rs	ms	2.75	7	6	3	6	4	CR
NC97-145	L	18		rs pi	mflk	3.25	7	7	4	5	3	Late
NC97-166	E-M	16		rs	ms	3	7	6	3	6	6	~VN
NC97-242	M-L	24		pur	ms	1	7	6	3	7	5	Boniato type, RC
NC97-290	M	19		dk rs	ms	3	7	6	3	5	4	STR, RC?
NC97-433	M-L	22		rs	sm	3.25	8	6	1	7	5	too round
NC97-539	M	18		tn	sm	3.25	7	5	3	6	4	Tapers
NC98-616	M-L	19		rs	ms	3	7	5	3	3	3	^VN, 2 ⁰ roots, poor sh
B94-14 G2	E-M	19		rs	ms	3	8	6	3	5	6	
Hern G3	M-L	19		cu rs	ms	3	6	6	3	7	6	
Kumara Enea	M	20		tn	sm	3	8	8	5	6	4	T, VN, 2 ⁰ roots

Comments: NC97-166 stood out for yield. Many culls for all clones except NC97-433, but yields and culinary quality on this clone are poor.

Table 10a. 2001 Preliminary 2 Yield Trial at CRS, Kinston, NC. Planted: 21Jun01; Harvested: 04Oct01; Days to Harvest: 111.

CLONE	Total Yield bu/A	Marketable Yield			Size Distribution by Class (% of total yield)			
		bu/A	%Beau	% Hern	No.1's	Canners	Jumbo's	Culls
NC97-024	650	573	102	105	55	17	16	12
NC97-075	680	564	101	104	56	27	0	18
NC97-079	521	466	84	84	45	43	1	11
NC97-081	578	537	95	96	67	21	5	8
NC97-166	912	831	148	149	70	18	4	8
NC97-242	531	497	89	89	50	42	2	6
NC97-290	502	447	81	81	49	38	2	11
NC97-433	466	452	80	81	51	40	6	3
BeauB94-14 G2	628	565	100	102	57	23	9	10
Hernandez G3	604	569	101	100	59	22	13	6
Kumara Enea	486	445	79	80	50	42	0	8
Grand Mean	596	541	96	97	55	30	5	9
CV (%)	13	15	14	15	15	23	73	69
LSD (p=0.05)	109	115	20	21	12	10	6	9

Table 10b. 2001 Preliminary 2 Yield Trial at CRS, Kinston, NC - quality data.
(See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC97-024	E	16	3	cu	ms	3	7	6	3,5	6	3	~LE, jum-length
NC97-075	M	15	3.5	rs pi	sm	3	6	7	3	6	6	~GC
NC97-079	M	16	2.5	lt rs	ms	3.75	7	7	3	6	5	^T, TP
NC97-081	E-M	18	2.5	rd	ms	3	7	7	3,5	6	6	
NC97-166	E	17	3	rs	sm	3.25	6	7	3,8	6	6	~LG, RE, curves
NC97-242	M	24		rd	sm	1.5	8	6	3	7	6	Boniato type, lenticels
NC97-290	M-L	18	2.5	rs	sm	2.75	8	6	3	6	5	~GC, SD, RC?
NC97-433	M	20		rs	sm	3.25	8	7	6,1	7	7	STR, round
B94-14 G2	E-M	19	3	rs	ms	3	8	6	3	7	6	~RC
Hern G3	E-M	18	2.5	cu or	ms	3.5	6	7	3	7	6	~PI, round
Kumara Enea	M	20	3	tn	sm	3	7	6	3	6	5	T, ~VN, TP

Comments: NC97-166 stood out for yield, but has a tendency to produce curved roots.

Table 11a. 2001 Preliminary 3 Yield Trial at HCRS, Clinton, NC. Planted: 06Jun01; Harvested: 21Sept01; Days to Harvest: 108.

CLONE	Total Yield	Marketable Yield			Size Distribution by Class (% of total yield)			
	bu/A	bu/A	%Beau	%Hern	No.1's	Canners	Jumbo's	Culls
NC97-709	953	663	115	98	41	7	22	30
NC97-743	740	590	103	87	52	17	12	20
NC97-753	532	387	67	57	37	35	1	27
NC97-753A	512	374	65	55	29	42	2	27
NC97-835	800	641	112	95	55	20	5	20
NC98-004	922	778	136	115	56	24	5	16
NC98-017	720	621	108	92	56	25	7	13
NC98-024	681	607	106	90	57	31	2	11
NC98-061	541	504	88	75	61	27	5	7
NC98-063	708	583	101	86	58	21	2	18
NC98-069	980	792	137	117	50	14	17	19
BeauB94-14 G2	654	574	100	85	61	21	5	12
Hernandez G3	709	676	118	100	64	28	4	5
W244	559	439	77	65	48	28	2	22
W250	268	192	34	28	34	38	0	29
Grand Mean	685	561	98	83	51	25	6	18
CV (%)	12	13	12	13	14	25	68	30
LSD (p=0.05)	114	101	17	15	10	9	6	8

Table 11b. 2001 Preliminary 3 Yield Trial at HCRS, Clinton, NC - quality data. (See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC97-709	E	18		lt rs	ms	3.25	6	6	2	5	4	~CR
NC97-743	M	13		rs	ms	3.5	6	6	6	6	4	long
NC97-753	M-L	18		lt cu	sm	3	7	8	3	6	5	curves
NC97-753A	M-L	18		lt cu	sm	3	7	7	3	5	5	curves
NC97-835	E-M	15		rs	ms	3	8	6	3	5	4	~CR, long
												exc. skin except color
NC98-004	E	19		clr	vsm	3.25	7	8	3	6	5	
NC98-017	M	16		cu	mflk	3.25	8	7	3	5	5	
NC98-024	M	19		rs	ms	3	7	7	3	6	5	ring in cortex
												stays short, exc. size dist.
NC98-061	M	19		rs	ms	3	7	6	3,6	7	6	
NC98-063	M	18		dk rs	ms	3.5	7	7	3	5	5	~CR, ~LT
NC98-069	E	18		rs	ms	3	8	8	5	5	4	obovate
B94-14 G2	E	17		rs	sm	3	8	7	3,6	6	6	RC
Hern G3	M	19		or	ms	3.25	7	7	3	7	6	
												~RC, mixed shapes
W244	M-L	19		rs	ms	3.5	7	5	3	4	4	
W250	L	20		dk rs	ms	3	7	6	4	6	3	^LT, v. late

Table 12a. 2001 Preliminary 3 Yield Trial at CRS, Kinston, NC. Planted: 25Jun01; Harvested: 17Oct01; Days to Harvest: 114.

CLONE	Total Yield	Marketable Yield			Size Distribution by Class (% of total yield)			
	bu/A	bu/A	%Beau	%Hern	No.1's	Canners	Jumbo's	Culls
NC97-835	756	657	97	118	48	29	10	13
NC98-004	508	468	69	83	60	25	8	7
NC98-017	662	605	89	109	52	28	11	9
NC98-061	503	465	69	83	61	32	0	7
NC98-063	626	570	86	102	54	38	0	8
BeauB94-14 G3	700	676	100	121	59	13	25	3
Hernandez G3	587	560	84	100	68	24	3	4
W244	360	345	52	61	58	36	2	4
W250	281	270	40	48	41	55	0	4
Grand Mean	554	513	76	92	56	31	6	7
CV (%)	13	13	12	13	15	24	61	87
LSD (p=0.05)	105	100	14	18	13	11	6	9

Table 12b. 2001 Preliminary 3 Yield Trial at CRS, Kinston, NC - quality data.
(See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC97-835	E-M	17	3	rs	lt flk	3	7	6	3	6	6	
NC98-004	M-E	21	3.5	clr	sm	3.5	7	7	3	6	4	^insect damage, bumpy sh
NC98-017	M	18	2.5	cu or	flk	3.5	7	6	3,2	5	5	
NC98-061	M-L	20	2	rs	sm	3	7	6	3,5	6	6	stays short
NC98-063	M-E	19	3	red	ms	3.75	8	6	3,6	6	6	~VN,~GC
B94-14 G3	E	19	2.5	rs	ms	2.75	7	7	3,6	7	7	
Hernandez	M-E	22	2.5	cu rs	lt flk	3.5	6	7	3,6	7	7	~SPR, ~PI
W244	M	23	3.5	rs	ms	3.25	7	5	3	6	4	RC, ~VN, less insect damage
W250	L	24	3	red	ms	3.25	8	5	3	6	4	^LT, less insect dmg

Comments: 98-061 produced consistently short, nicely shaped roots, but yield is not on par with Beauregard or Hernandez.

Table 13a. 2001 Preliminary 4 Yield Trial at HCRS, Clinton, NC. Planted: 06Jun01; Harvested: 18Sept01; Days to Harvest: 105.

CLONE	Total Yield bu/A	Marketable Yield			Size Distribution by Class (% of total yield)			
		bu/A	%Beau	% Hern	No.1's	Canners	Jumbo's	Culls
NC98-076	642	388	99	79	39	16	5	40
NC98-084	649	535	129	110	50	26	7	18
NC98-157	529	370	94	73	41	23	5	31
NC98-175	790	318	81	64	28	13	0	58
NC98-265	621	483	119	95	49	26	2	22
NC98-342	633	502	131	101	59	20	1	21
NC98-419	581	491	120	100	56	25	4	16
NC98-482	498	318	83	64	32	32	0	36
BeauB94-14 G2	581	425	100	85	49	18	5	27
Hernandez G3	589	502	126	100	49	34	2	15
Grand Mean	611	433	108	87	45	23	3	28
CV (%)	21	23	23	23	19	33	133	21
LSD (p=0.05)	183	146	36	30	12	11	6	8

Table 13b. 2001 Preliminary 4 Yield Trial at HCRS, Clinton, NC - quality data. (See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC98-076	E-M	20		rs	ms	3	8	7	3	4	4	
NC98-084	E	16		tn	sm	3	6	7	3	7	8	skin color a problem
NC98-157		19										VN.T
NC98-175	E	16		lt cu	sm	3.5	4	7	3,6	6		^CR, ^LG, ^^culls
NC98-265	M	19		lt rs	ms	2.75	7	6	3	6	5	long
NC98-342	M	17		pu	flk	3.25	8	7	3	6	6	~VN, ~ 2 ⁰ roots
NC98-419	E-M	24		clr	sm	3.5	7	7	3	6	6	~LT, ~CR
NC98-482	L	15		lt rs	sm	3.25	7	8	3	5	4	
B94-14 G2	E	19		rs	sm	3	8	7	3	6	7	
Hern G3	L	18		cu	ms	3.25	6	7	3	7	7	~PI

Comments: NC98-342 looks promising as a red-skinned type, with fewer lenticels than Carolina Ruby.

Table 14a. 2001 Preliminary 4 Yield Trial at CRS, Kinston, NC. Planted: 25Jun01; Harvested: 17Oct01; Days to Harvest: 114.

CLONE	Total Yield bu/A	Marketable Yield			Size Distribution by Class (% of total yield)			
		bu/A	%Beau	% Hern	No.1's	Canners	Jumbo's	Culls
NC98-076	638	572	95	89	58	21	12	10
NC98-084	773	701	115	110	53	29	8	10
NC98-166	633	543	89	85	52	25	9	14
NC98-175	771	697	113	108	47	17	26	9
NC98-342	674	625	102	97	62	23	8	7
NC98-419	585	547	89	85	60	28	5	6
NC98-482	666	556	91	86	49	34	0	17
BeauB94-14 G3	700	621	100	96	61	18	10	11
Hernandez G3	715	649	106	100	62	27	2	9
Grand Mean	684	612	100	95	56	25	9	10
CV (%)	11	12	12	12	12	25	80	57
LSD (p=0.05)	112	107	17	16	10	9	10	9

Table 14b. 2001 Preliminary 4 Yield Trial at CRS, Kinston, NC - quality data.
(See Appendix 1 for keys to tables)

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
NC98-076	M	19	3	rs	ms	2.75	8	8	3	6	6	
NC98-084	E-M	16	3	tn	sm	2.75	7	6	3	6	5	poor skin color, TP
NC98-166	M	17		rs cu	ms	3.75	7	7	3	6	5	~AT, ~rots, RC?
NC98-175	E	18	3	or	ms	3.5	5	6	3,6	6	4	LG, eyes, ~PI, breeding
NC98-342	E-M	17	3	pu	lt flk	3	7	7	3,6	7	6	~YCR, replace C. Ruby?
NC98-419	M	25	2.5	clr	sm	3.5	7	6	3	7	6	skins
NC98-482	M	17	3.5	lt rs	ms	3	7	6	3	7	5	~CR, long
B94-14 G3	E	20	2.5	rs	ms	3	7	7	3,6	7	7	~YCR
Hern G3	M	20	2.5	cu or	ms	3	7	7	3,6	7	7	

Table 15a. 2001 Biomass Trial at HCRS, Clinton, NC. Planted: 25May01; Harvested: 05Oct01; Days to Harvest: 133.

Clone	Fresh weight								% Dry Matter ⁴
	Dry Matter ¹		Processable ²		Culls ³		%culls		
	MT/ha	Ton/ac	MT/ha	50 lb Bu/ac	MT/ha	50 lb Bu/ac			
FT3-89	12.2	5.5	37.0	660	0.6	10	2	33.1	
FTA94	11.4	5.1	32.3	576	0.3	5	1	35.3	
HiDry	11.2	5.0	33.3	594	7.3	130	18	33.7	
Japanese G2	11.0	4.9	33.7	602	0.6	10	2	32.5	
BM83-4	10.6	4.7	32.8	585	0.3	6	1	32.2	
FT4-89	9.1	4.0	29.3	523	0.0	0	0	30.9	
BM85-42	8.7	3.9	27.9	498	0.2	3	0	31.2	
PI508511	7.5	3.3	22.1	394	3.1	56	13	33.8	
Whitestar	5.7	2.6	18.7	334	1.3	23	8	30.6	
Pelican Processor	4.4	2.0	14.6	260	1.0	18	6	30.0	
Grand Mean	9.2	4.1	28.2	503	1.3	23	4.5	32.3	
CV (%)	27	27	27	27	157	157	162		
LSD (p=0.05)	3.7	1.6	11.4	203	3.0	54	11		
Pr>F	0.001	0.001	0.005	0.005	0.003	0.0030	0.04		

¹Dry matter determined by multiplying the processable fresh weight by %dry matter

²Processable -roots not rotten or cracked, can be any size or shape

³Culls -roots partially or completely rotten or severely cracked

⁴Dry matter -determined by taking 100g total of thin slices from 4 randomly selected 2-3 1/2" diameter roots. This sample is dried until constant in weight in a forced air oven at 70C.

Table 15b. 2001 Biomass Yield Trial at HCRS, Clinton, NC - quality data.

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
FT3-89												
FTA94												
HiDry	Observational data not recorded for this test											
Japanese G2												
BM83-4												
FT4-89												
BM85-42												
PI508511												
Whitestar												
Pelican Processor												

Table 16a. 2001 Biomass Trial at CRS, Kinston, NC. Planted: 05June01; Harvested: 23Oct01; Days to Harvest: 140.

Clone	Fresh weight							
	Dry Matter ¹		Processable ²		Culls ³		%culls	% Dry Matter ⁴
	MT/ha	Ton/ac	MT/ha	Bu/ac	MT/ha	Bu/ac		
Whitestar	15.1	6.7	50.5	901	2.8	50	5	29.9
BM85-42	11.4	5.1	36.0	642	0.4	8	1	31.6
FTA94	11.2	5.0	34.9	622	1.0	18	3	32.0
FT4-89	11.1	5.0	35.4	632	0.0	0	0	31.6
Japanese	11.0	4.9	36.7	655	0.0	0	0	30.3
FT3-89	10.1	4.5	32.7	583	1.7	30	5	31.0
BM83-4	10.0	4.5	33.3	594	1.0	18	4	29.8
HiDry	9.7	4.3	29.7	530	0.9	15	3	32.7
PI508511	8.0	3.6	26.0	464	0	0	0	30.7
Pelican Processor	7.5	3.4	27.3	488	1.2	21	4	27.6
Grand Mean	10.5	4.7	34.2	611	0.9	16	2.4	30.7
CV (%)	22	22	22	22	200	200	198	4
LSD (p=0.05)	3.4	1.5	11.1	199	NS	NS	NS	1.9
Pr>F	0.008	0.008	0.01	0.01	0.5	0.5	0.71	0.0006

¹Dry matter determined by multiplying the processable fresh weight by %dry matter

²Processable -roots not rotten or cracked, can be any size or shape

³Culls -roots partially or completely rotten or severely cracked

⁴Dry matter -determined by taking 100g total of thin slices from 4 randomly selected 2-3 1/2" diameter roots. This sample is dried until constant in weight in a forced air oven at 70C.

Table 16b. 2001 Biomass Yield Trial at CRS, Kinston, NC - quality data.

CLONE	MAT	DM	L/D	SKC	SKT	FL	EYE	LEN	SH	SHV	APP	Comments
Whitestar	M-E		3.5	wh	ms	1	6	6	3	6	5	
BM85-42	M		3	wh	ms	1	7	6	3	5	6	
FTA94	M		3	wh	ms	1	7	6	3	5	5	some cr
FT4-89	M		3	pur	ms	1.25	6	6	3	6	6	
Japanese G2	M		3.5	pur	ms	1.25	6	7	3	6	6	some gr
FT3-89	M		3	wh	ms	1	5	6	3	6	6	
BM83-4												
HiDry	M		3	wh	ms	1.25	5	6	3	5	5	some cr, ~ spr
PI508511	M-L		4	wh	sm	1.5	7	7	4	5	4	Long
Pelican Processor	M		3	wh	ms	1.25	5	6	3	5	5	sign cr

APPENDIX 1

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, lt 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: **AT**=tough attachment; **BSR**=bacterial soft rot; **CR**=cracking; **CS**=circular spot; **CV**=skin color variation end to end; **FB**=fleabeetle damage; **HC**=horizontal constrictions; **ID**=unspecified insect damage; **LG**=longitudinal grooves; **LR**=Lateral rings; **LT**=latex; **MSH**=misshapen roots; **PI**=pimples (0-9); **R**=rodent; **RC**=russet crack; **RKN**=root-knot nematodes; **SD**=skin discoloration; **SG**=string roots; **SPR**=sprouts; **SR**=soft rot; **SSR**=streptomyces soil rot; **STR**=Striations; **T**=tails; **TP**=tapered roots **VN**=viens; **SC**=scurf; **SF**=surface Fusarium; **WB**=whitefringed beetle; **WG**=white grub; **WW**=wireworm; **YCR**=yellow cortical ring.

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

Shapes

