Improving the Yield and Quality of Sweet Potatoes: Year 1

Chuck Bornt, CCE Capital District
Vegetable and Small Fruit Program

In 2010, one on-farm research project was conducted at Samascott Orchards in Kinderhook, NY. The trial evaluated 6 different varieties on two different types of plastic mulch (traditional black and infrared transmitting or IRT mulch). We also evaluated plant spacing; single row at 15" versus a double staggered row at 18" to determine the effects on root uniformity and yield. We also compared the use of transplants to bare slips to observe differences in earliness, yield and root quality. The entire research trial was planted on June 4, 2010 and harvested on September 30, 2010. In all cases, plants were planted into raised beds on 6.5' centers with single rows of plants spaced at a 15" in-row spacing. The exception to this was the spacing trial. Roots were cured and stored until November 23, 2010 when they were graded, counted and weighed.

Variety Trial: The following varieties were evaluated: Covington, O'Henry, Beauregard, Centennial, Georgia Jet and Carolina Ruby. Results can be found in Table 1. Covington and Beauregard produced the nicest, most uniform roots of all orange skinned, orange fleshed varieties with very acceptable yields. O'Henry produced the nicest quality roots for a white skin, white fleshed variety and decent yields as well. Carolina Ruby, although very attractive, did not produce very many roots. Georgia Jet did not produce very many high quality roots and resulted in a fair amount of culls due to soft rots and malformed roots.

Covington – Very similar to Beauregard, roots have a traditional copper/orange colored skin with orange flesh; roots are fairly uniform, smooth textured (not a lot of marks on surface) and very attractive. Produces a high percentage of "Large" (1.0 – 2.0 lb) category roots. Flesh is moist and sweet and stores well. Highly recommended for growing in NYS.

Beauregard – Beauregard is the industry standard in North Carolina and is widely adapted to our climate. Again, roots had the traditional copper colored skin with orange flesh; it is very similar to Covington with good yield and a decent percentage of marketable roots – more "Jumbo" (2lbs +) compared to Covington. Moist, sweet tasting flesh. Good yield and traditional skin and flesh color make this well worth trying either in a home garden or for farm market.

Carolina Ruby –Purplish red skinned tubers with orange flesh; skin was thicker than others and roots were not nearly as uniform in size or shape compared to Covington or Beauregard. However, because the skin color is not the traditional copper color, it may have a place in fresh market production.

O'Henry – This was the only white skinned variety trialed with yellow white flesh. Very attractive roots that tend to be concentrated in a hill under the plant. Roots are generally uniform in size with good yield and a decent marketable percentage roots. Flesh is drier then above mentioned varieties, but has good sweet flavor. This variety is worth trying and has an ethnic following in certain markets. One of only two varieties that did better on IRT plastic mulch – may require as many heating units as possible in order to maximize production.

Centennial – Produces light colored orange skinned and orange fleshed roots that are ribbed or had "veins" running through them that make them somewhat unattractive. Much lighter in orange color then Beauregard and Covington. Also lacked the root uniformity that we saw with the other varieties. Root quality in terms of evenness of shape has also somewhat poor.

Georgia Jet – Probably one of the first sweet potatoes grown in this area but very poor slip quality and poor root quality for what was produced. They are light orange skinned and fleshed but outside of roots have a fair amount of cosmetic problems. Although it was the highest yielding in the trial, it also resulted in the highest number of cull roots. With the root quality issues I saw in regards to soft rots at harvest, this is one that I would not store very long. I am told that there are two strains of Georgia Jet on the market, one being better than the other. We were not impressed with the flavor or texture of our Georgia Jet, but others say it is hard to beat.

Plastic Mulch Study: This trial was designed to evaluate any differences in yield and quality between traditional black plastic mulch and IRT or infrared transmitting mulch. The growing season of 2010 was one of the hottest and driest on record in eastern NY. Differences observed were variety specific with O'Henry producing the most Jumbo roots on IRT mulch. However, in the "Large Root" category, traditional black mulch resulted in high yields. Therefore, no differences were observed between the two types of mulches. Results can be found in Table 4.

Slips versus Transplants: This was a non-replicated trial due to the fact that we were not able to obtain our slips early enough to transplant them into plug trays and grow them out. Therefore we worked with a limited number of transplants that were started by Jim Ballerstein at the New York Agricultural Experiment Station. Results can be bound in Table 2. We found that although slips produced the greatest total marketable root yields, transplanted plants resulted in larger average size jumbo and large roots. Transplants also resulted in the fewest small roots. Implications of this data could mean that transplanted plants may produce larger roots earlier in the season. This means growers could harvest some percentage of their crop for earlier markets.

Spacing Trial: Plants were either planted at the most common spacing we find in the Northeast which is 15" in row. We compared this with a double staggered row with a in-row spacing of 18". Using the double staggered rows resulted in fewer jumbo roots, but more large and small roots overall compared to the single row. Single row spacing resulted in the greatest number and slightly larger jumbo roots. Further evaluation of spacing is needed with the possibility of including 1 or 2 more spacing options. Results can be found in Table 3.

Table 1: 2010 CDVSFP Sweet Potato Variety Trial, Samascott Orchards, LLC, Kinderhook, NY

Variety Name	Plastic Type	# Jumbo roots/acre	Weight of Jumbo roots/acre (lbs)	Jumbo Average Size (lbs)	# Large roots/acre	Weight of Large roots/acre (lbs)	Large Average Size (lbs)	# Small roots/acre	Weight of Small roots/acre (lbs)	Small Average Size (lbs)	Weight of cull roots/acre (lbs)	Total # Marketable Roots/acre	Total Weight of Marketable Roots (lbs)	Overall Average Root Size (lbs)
Beauregard	black	1,072	3,341	3.1	20,725	13,471	0.65	17,509	4,002	0.23	1,054	39,307	20,815	0.53
Beauregard	IRT	357	1,622	4.5	18,939	16,652	0.88	12,507	4,038	0.32	2,716	31,803	22,312	0.70
Carolina Ruby	black	0	0	0.0	3,350	1,340	0.40	0	0	0.00	0	3,350	1,340	0.40
Carolina Ruby	IRT	0	0	0.0	8,040	5,226	0.65	13,400	3,417	0.26	0	21,440	8,643	0.40
Centennial	black	1,072	3,162	3.0	16,080	13,829	0.86	17,152	5,682	0.33	2,894	34,304	22,673	0.66
Centennial	IRT	0	0	0.0	10,720	8,201	0.77	4,288	1,179	0.28	2,841	15,008	9,380	0.63
Covington	black	357	1,072	3.0	23,584	16,330	0.69	13,221	3,037	0.23	554	37,163	20,439	0.55
Covington	IRT	0	0	0.0	18,377	12,577	0.68	8,040	1,455	0.18	651	26,417	14,032	0.53
Georgia Jet	black	5,360	21,440	4.0	42,880	30,552	0.71	0	0	0.00	26,800	48,240	51,992	1.08
O'Henry	black	0	0	0.0	25,728	17,608	0.68	11,256	2,037	0.18	2,814	36,984	19,644	0.53
O'Henry	IRT	3,216	8,147	2.5	11,256	12,462	1.11	20,368	6,325	0.31	2,224	34,840	26,934	0.77

Plants were planted on June 4, 2010 on raised beds mulched with either black emboss or IRT (infra-red Transmitting) mulch; Spacing = single row, 15", in-row and 6.5 between beds (center to center)

Size Categories: Jumbo = <2.0 lbs; Large = 1.0 - 2.0 lbs and at least 2 -3" in diameter; Small = 0.25 - 1.0 lbs and at least 1.5 -2.0" in diameter.

Plots were harvested on September 30, 2010 and placed into plactic totes and placed in a building for curing. Roots were then graded on November 23, 2010

Table 2: 2010 CDVSFP Sweet Potato Transplants versus Slips Trial, Samascott Orchards, LLC, Kinderhook, NY

Treatment	# Jumbo roots/acre	Weight of Jumbo roots/acre (lbs)	Jumbo Average Size (lbs)	# Large roots/acre	Weight of Large roots/acre (lbs)	Large Average Size (lbs)	# Small roots/acre	Weight of Small roots/acre (lbs)	Small Average Size (lbs)	# Cull Roots/acre	Weight of cull roots/acre (lbs)	Total # Marketable Roots	Total Weight of Marketable Roots (lbs)	Overall Average Root Size (lbs)
Slips	357	947	2.7	20,368	18,027	0.89	25,192	7,727	0.31	893	607	46,453	26,702	0.57
Transplants	2,403	7,227	3.0	9,611	11,395	1.19	16,265	5,037	0.31	2,772	822	28,279	23,658	0.84

Transplants were produced by collecting Beauregard variety slips from greenhouse plants in Geneva, NY and were placed in 72 cell trays in the greenhouse on May 12, 2010.

Slips and transplants were field planted on June 4, 2010 on raised beds mulched with IRT (infra-red Transmitting) mulch; Spacing = single row, 15", in-row and 6.5 between beds (center to center)

Plots were harvested on September 30, 2010 and placed into plactic totes and placed in a building for curing. Roots were then graded on November 23, 2010

Table 3: 2010 CDVSFP Sweet Potato Single Rows versus Double Staggered Rows, Samascott Orchards, LLC, Kinderhook, NY

Spacing Trt.	# Jumbo roots/acre	Weight of Jumbo roots/acre (lbs)	Jumbo Average Size (lbs)	# Large roots/acre	Weight of Large roots/acre (lbs)	Large Average Size (lbs)	# Small roots/acre	Weight of Small roots/acre (lbs)	Small Average Size (lbs)	Weight of cull roots/acre (lbs)	Total # Marketable Roots/acre	Total Weight of Marketable Roots (lbs)	Overall Average Root Size (lbs)
1X	1,061	2,680	2.5	16,192	13,241	0.82	15,243	4,266	0.28	969	32,495	20,187	0.62
2X	447	1,072	2.4	20,826	15,047	0.72	22,948	4,899	0.21	821	42,037	21,018	0.50

Spacings: 1X = 1 single row, 15" apart in the row and 6.5' between beds (center to center); 2X = a double staggered row, with plants spaced 18" in the row, with the two rows 12" apart and the same 6.5' between beds.

Plants were planted on June 4, 2010 on raised beds mulched with either black emboss or IRT (infra-red Transmitting) mulch; Spacing = single row, 15", in-row and 6.5 between beds (center to center)

Plots were harvested on September 30, 2010 and placed into plactic totes and placed in a building for curing. Roots were then graded on November 23, 2010

Table 4: 2010 CDVSFP Sweet Potato Plantings On IRT or Black Mulch Using Single Rows or Double Staggered Rows

Plastic Treatment	Spacing Treatment	# Jumbo roots/acre	Weight of Jumbo roots/acre (lbs)	Jumbo Average Size (lbs)	# Large roots/acre	Weight of Large roots/acre (lbs)	Large Average Size (lbs)	# Small roots/acre	Weight of Small roots/acre (lbs)	Small Average Size (lbs)	Weight of cull roots/acre (lbs)	Total # Marketable Roots/acre	Total Weight of Marketable Roots (lbs)	Overall Average Root Size (lbs)
black	1X	893	2,473	2.8	15,745	13,780	0.88	15,187	4,528	0.30	1,374	31,825	20,781	0.65
black	2X	447	1,016	2.3	23,227	17,353	0.75	25,013	4,696	0.19	882	48,687	23,065	0.47
IRT	1X	1,228	2,887	2.4	16,638	12,702	0.76	15,298	4,003	0.26	564	33,165	19,592	0.59
IRT	2X	447	1,128	2.5	18,425	12,741	0.69	20,882	5,103	0.24	759	39,753	18,972	0.48

Plants were planted on June 4, 2010 on raised beds mulched with either black emboss or IRT (infra-red Transmitting) mulch; Spacing = single row, 15", in-row and 6.5 between beds (center to center)
Size Categories: Jumbo = <2.0 lbs; Large = 1.0 - 2.0 lbs and at least 2 -3" in diameter; Small = 0.25 - 1.0 lbs and at least 1.5 -2.0" in diameter.

Plots were harvested on September 30, 2010 and placed into plactic totes and placed in a building for curing. Roots were then graded on November 23, 2010