Sweetpotatoes in Northern New England

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Although sweetpotato (*Ipomoea batatas*) is a tropical crop that benefits from high temperatures and a long growing season, some varieties can be grown successfully in New England. With their diverse colors, excellent flavor and nutritional value, sweetpotatoes may make a nice addition as a specialty crop for Northern growers. In 2006 and 2007, we evaluated sixteen varieties of sweetpotatoes at the University of New Hampshire in Durham, NH. Our objectives were to: 1) determine which varieties produced high yields of good-tasting marketable roots in Northern New England, and 2) evaluate the importance of postharvest curing.

Sweetpotatoes were started as 'slips', or rooted cuttings, which were obtained from several suppliers (See Table 1). Slips were shipped in bundles near our target plant date of June 1. Soil temperature should be above 60F at planting time to prevent chilling. In 2006, one shipment arrived when soil was still too cold (5/1). Slips from the 5/1 shipment were transplanted into deep-well 6-packs and maintained in the greenhouse until transplanting. They got slightly rootbound, which negatively affected final root shape. In 2006, slips were transplanted on 6/22 and in 2007, slips were transplanted on 6/5, 6/9, and 6/12. When shipments arrived, if they could not be transplanted within 2 days, bundles were temporarily set into pots and kept moist until the field was ready. When transplant conditions were good (cloudy, cool), almost all slips survived despite being stressed (wilted and shriveled) at transplanting. In 2007, slip survival was reduced due to poor transplanting conditions (hot, dry, sunny weather immediately following transplant).

All experiments were planted in replicated randomized complete block designs. The variety trial included three replicates of 16 varieties each. Each plot included The variety trial was planted on black plastic-covered raised beds. In an additional experiment, we compared mulches (infrared-transmitting, IRT vs. black), and rowcovers (slitted poly vs. spunbonded vs. none) in a replicated trial using only two varieties (Beauregard, Georgia Jet) – *data not shown*.

25 lbs N and 200 lbs K_2O per acre were incorporated preplant (based on soil tests), prior to laying plastic. The sweetpotatoes were sidedressed twice with 50 lbs soluble N through drip irrigation lines. The field was irrigated as needed throughout the growing season. Slips were transplanted 9 inches apart in single rows on 3' wide raised beds with black plastic mulch. *Note:* Wider spacing has been used in experiments done at other sites; other researchers have reported that roots become oversized with increased spacing (12 or 18 inches).

Sweetpotatoes were harvested as late as possible in the fall while the soil remained above 60F. Durham had not yet received the first fall frost prior to the harvest dates; 9/27/06 and 10/10/07. After hand-digging, sweetpotatoes were left to dry on top of raised beds until the following day, when they were graded, sorted and removed from the field. Sweetpotatoes are normally cured at 80-90F, 85-90% relative humidity for 5-7 days to heal wounds and suberize skin prior to storage. At UNH, roots were cured for 0, 4, or 8 days in an empty unheated

greenhouse, which fluctuated between 85F day and 60F night. To maintain high humidity, the floor beneath greenhouse benches was watered on alternate days. After curing, roots were transferred to long-term storage, 55-60F and 75-80%RH. Brix, dry matter, and taste tests were done in mid-November, 30-39 days after harvest.

Data:

Yield: Roots were classified as: 1 – no blemishes that would compromise storage, tapered at either end, 2 – slight blemishes only, 3 – undersized/too small (<1" diameter), and 4 – unmarketable due to severe blemishes. Yield is shown as weight of marketable (no.1 and 2) roots per plant.

Brix: This measures percent soluble solids in the flesh, most of which are sugars. Small cubes (1-2cm^2) of flesh were frozen and thawed. Juice was then squeezed onto a hand-held refractometer.

Flavor: Plain sweetpotatoes were baked, cooled, and sliced into discs. Participants sampled and rated each variety: 1-poor, 2-below average, 3-average, 4-very good, and 5-outstanding. Each variety was rated by at least 22 people.

Results:

The best performing varieties in 2006-7 and their characteristics are listed below in Table 1. Yields ranged from 0.2-2.5 lbs per plant in 2006, and 0.3-1.6 lbs per plant in 2007. These yields are lower than those reported in other studies (Maynard 2003, Ballerstein 2005). Deer damage (2006) and competition from living mulch intercrop (2007) may have reduced yields, so we believe that these are very conservative estimates. The highest yielding varieties in both years included: Beauregard, Georgia Jet, Carolina Ruby, O'Henry and White Yam.

Sweetpotato flavor ratings were consistent between years. In both years, Vardaman received the top rating, whereas White Yam, O'Henry, and Beauregard were among the four lowest rated. It is important to note that even the lowest rated varieties had ratings near 3 ("average"). Visual appearance likely factored into flavor ratings. Tasters frequently commented unfavorably on white-fleshed roots, which did not fit their image of a typical sweetpotato.

Based on both yield and flavor ratings, the most promising varieties were Beauregard, Georgia Jet, Vardaman, and Carolina Ruby. O'Henry, White Yam, Japanese, Jewell, and Centennial may be worth considering, depending on marketing options and the desire for novel products. Descriptions and limitations of each are described in Table 1. Other varieties showed promise but need further evaluation: GoldStar, Regal and Frazier White. Some varieties had such severe limitations that they could not be recommended. These include Bush Porto Rico, Nancy Hall, Darby, and Superior, which had very low yields, Tainung 65, which produced very few extremely large and unattractive roots, and Orange Oakleaf, which had severe scurf, poor storage, and only moderate flavor.

Table 1. Sweetpotato Yields and Flavors, 2006-7, Durham NH

Variety	Description	Skin Color	Flesh Color	Source[1]	Yield[2] lb/plant 06	Yield[2] lb/plant 07	Flavor 06	Flavor 07
Most promising for commercial growers:								
Beauregard	Best for commercial production. Good yields, large roots, like a "typical" supermarket sweetpotato.	rose/ copper	med orange	S	**1.7***	1.0	3.1	*2.9*
Georgia Jet	Very early, moist flesh. Severe crackir tendency, but excellent flavor. Ideal fo home use.	red/ copper	med orange	S	**2.5***	1.0	**3.7**	**3.3**
Vardaman	Most very small, a few with longitudin cracks. Outstanding flavor. Needs a lo growing season.	golden brown	med orange	S	*0.4*	*0.3*	**3.9**	4.0
Carolina Ruby	Unique textured red skin. Very deep o flesh color that tasters preferred, mar misshapen	dark red	deep orange	SF	1.2	**1.6**	3.3	**3.7**
Require special market situations:								
White Yam	Slender but nice shaped roots, more s than sweet.	white/ tan	white, greenish	S	0.9	0.8	*2.9*	*2.8*
O'Henry	Uniform shape, will green under sunlig some skin blemishes.	white	white/ cream	SF	**1.6**	0.9	*2.9*	*2.8*
Japanese	Variable shape, size. Polarizing texture flavor - hate it or love it.	rose	white	SF	0.7	1.1	**3.5**	3.1
Centennial	Long roots, more cylindrical than tape Bushy plants.	copper	med orange	S	*0.2*	1.0	**3.7**	**3.4**
Jewell	Mild cracking tendency, cooked flesh i attractive yellow-gold	light orange	salmon	S	*0.5*	0.8	*2.9*	**3.3**

[1] Sources: M - Mapple Farm, Weldon, NB, CANADA, S - Steele Plant Company, Gleason, TN, SF - Scott NC, SH - Sand Hill Preservation Center, Calamus, IA

[2] 2006 yields for Beauregard and Georgia Jet are from adjacent plots used for mulch/rowcover studie

Brix (% soluble solids) varied between varieties, with average ratings ranging from 8.5-11.5%. After harvest, we found that brix values steadily and clearly increased during storage (Figure 1). Brix measurements did correlate with good flavor ratings (data not shown), which tells us that eating quality will improve dramatically during storage of roots after digging. The brix values increased 4% on average during the 39 days after harvest. Values continued to increase steadily for the 21 days after harvesting, but at that point started to level off.

Curing time did not appear to affect final brix levels, or rate of sugar increase during storage. Figure 2 shows that, for the variety Beauregard, curing for 4 or 8 days did not change brix profiles during storage as compared with no curing at all. Results for Georgia Jet were similar. Although curing may prevent post-harvest rots and increase storage life, it does not appear to increase eating quality.

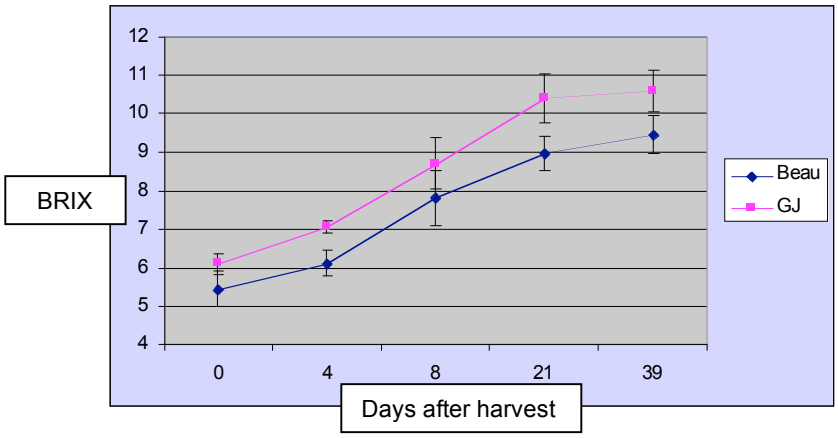

Figure 1. Brix increase after harvest

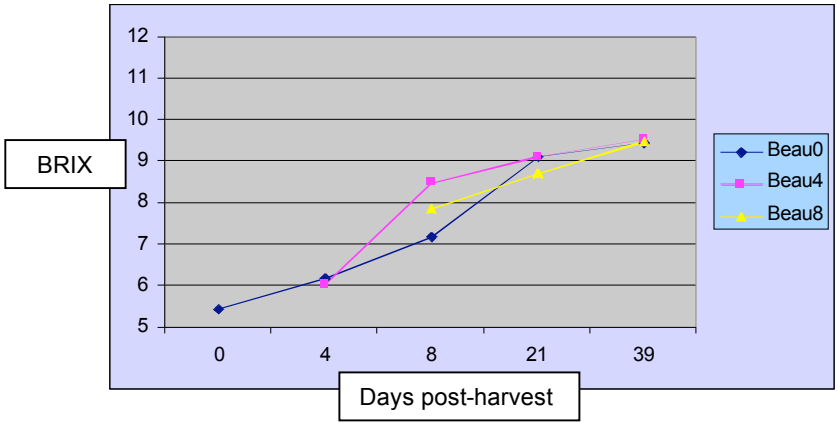

Figure 2. Curing time effects on Brix levels after harvest

Conclusions:

- Several sweetpotato varieties can be grown in Northern New England. A list of the most promising varieties is presented.
- Brix levels (and corresponding eating quality) increase dramatically after harvest. To get best flavor, it is important to wait at least three (3) weeks after harvest before eating.
- Curing under our modified (greenhouse) curing conditions did not improve flavor or speed up sugar development. We did not measure the effects of curing on storage life.

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References:

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