Varieties, cultural practices, and post-harvest management of sweetpotatoes for New England

Becky Sideman, becky.sideman@unh.edu
UNH Cooperative Extension, 38 Academic Way, Durham, NH 03824
Published in the proceedings of the New England Veg & Fruit Conference, Dec 2013

Although sweet potato (*Ipomoea batatas*) is a tropical crop that benefits from high temperatures and a long growing season, some varieties can be grown successfully in Northern climates. With their diverse colors, excellent flavor and long storage life, sweet potatoes may make a nice addition as a specialty crop for Northern growers. From 2006-2013, we evaluated over 18 varieties of sweet potatoes at the University of New Hampshire in Durham, NH (USDA hardiness zone 5B). Our primary objective was to determine which varieties produced high yields of good-tasting and marketable roots in Northern New England.

Sweet potatoes 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 10, when soil temperature is consistently above 60F. If slips could not be transplanted within 2 days, bundles were temporarily set into pots with potting mix and were kept moist until the field was ready. Transplant dates ranged from June 6 to June 22.

Slips were planted on raised beds covered with black biodegradable plastic mulch (BioTelo, Dubois Agrinovations, Quebec CA). Following soil test recommendations, 25 lbs N and 200 lbs K_2O per acre were incorporated prior to laying plastic. Slips were transplanted 9 inches apart in single rows on 3' wide raised beds spaced 6' on centers.

Sweet potatoes were harvested as late as possible in the fall while the soil remained above 60F. Harvest dates ranged from September 27 to October 15. After hand-digging, sweet potatoes were graded, sorted and removed from the field. Roots were cured for 5-8 days in an empty unheated greenhouse, which fluctuated between 85F day and 60F night. 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.

All experiments were planted in replicated designs with at least three replicates of 8 slips per plot. Varieties that did not perform well in the first two years were dropped, and plot sizes and number of replicates were expanded in subsequent years for those varieties that showed good quality and high yield potential. Data from experiments completed over several years are reported in summary form. The specific methods used are described below.

Yield: Roots were classified as: marketable – few blemishes, tapered at either end, and >1" in diameter; #2 – undersized (<1" diameter); and #3 – unmarketable due to severe blemishes that would compromise storage.
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: Sweet potatoes were baked, cooled, and sliced into discs. Participants sampled and rated each variety for flavor and appearance, using the following ratings: 1-poor, 2-below average, 3-average, 4-very good, and 5-outstanding. Each year, each variety was rated by at least 22 people.

Results: Yields varied between years. In general, the highest yielding varieties produced approximately 2.5 lbs or more per slip, which corresponded to 24,000 lbs per acre at the spacing used in our experiments.

Sweet potato flavor ratings were consistent between years. Visual appearance affected overall ratings; many tasters commented unfavorably on white-fleshed roots, which did not fit their image of a typical sweet potato. While all varieties had average or better flavor, there were significant differences between varieties. Average brix (% soluble solids) ranged from 8.5-11.5%. After harvest, brix values increased steadily for the 21 days after harvesting, and then began to level off. High brix measurements were correlated with good flavor ratings. Therefore, eating quality improves dramatically during storage of roots after digging.

Based on both yield and flavor ratings, the varieties most suitable for commercial production were the orange-fleshed cultivars Beauregard and Covington. O'Henry, White Yam, Japanese, and Carolina Ruby performed well, but would require markets interested in novel colors and textures. Georgia Jet, Vardaman, and Centennial each had significant limitations but may be worth consideration, depending on marketing options and the desire for novel products.

Table 1. Varieties evaluated in replicated trials over multiple years (>2) in Durham, NH.

Variety	Slip Source[1]	Skin Color	Flesh Color	Yield Potential	Flavor	Comments
Beauregard	St, Sc, GPF	Rose-Copper	Orange	High	Good	Prior to the release of Covington, this moist orange-fleshed variety was the standard for commercial production. Attractive, high marketable yields.
Covington	Sc	Rose-Copper	Orange	High	Excellent	More uniform, higher marketable yields, and sweeter than Beauregard.
O'Henry	Sc, St	White	Yellow	High	Good	Flesh is creamy yellow and moist when baked. White sport of Beauregard, skin greens with sun exposure.
White Yam	St	Tan	White	High	Good	Starchy and drier, slightly less sweet than other varieties. Smaller roots, attractive and uniform
Japanese	Sc	Rose-Purple	White	High	Good	Smooth and starchy white flesh has a unique smooth texture. Attractive purple skin.
Carolina Ruby	Sc, GPF	Dark Red	Deep Orange	Medium	Good	Unusual deep red, rough, skins. Produced variable and odd shaped roots.

Georgia Jet	St, GPF	Red-Copper	Orange	Medium	Excellent	Severe cracking tendency, especially in moist conditions. For home gardeners only.
Vardaman	St, GPF	Gold-Brown	Deep Orange	Low	Excellent	Slender roots did not size up, limited yield potential. Very high carotenoid content, excellent flavor.
Centennial	St	Copper	Orange	Low	Good	Slender roots did not fatten in NH growing season.

[1] Slip sources are as follows: St - Steele Plant Company, Gleason TN; Sc - Scott Farms, Lucama NC; GPF -George's Plant Farm, Martin TN.

We also evaluated the following varieties in small replicated trials. None of these advanced to larger replicated trials because they either had very low yield potential, or slips were available in extremely limited quantities, or both. We felt that both of these factors precluded commercial production in our region.

Table 2. Varieties not recommended for commercial production based on limited trials in NH.

Variety	Skin Color	Flesh Color	Comments
Gold Star	Pink	Light Orange	Showed good potential, limited slip availability
Regal	Red	Deep Orange	Showed good potential, limited slip availability
Frazier White	White	White	Showed good potential, limited slip availability
Tainung 65	Purple	White/light pink	Produced very few roots, all of which were oversized and irregularly shaped.
Darby	Red	Deep Orange	Very poor yields, limited slip availability
Nancy Hall	Tan	Yellow	Very poor yields, limited slip availability
Porto Rico	Tan-Orange	Orange	Very poor yields
Korean Purple	Purple	Purple	Very poor yields, limited slip availability
Orange Oakleaf	Pale orange	Orange	Severe scurf, poor yields, limited slip availability
Jewell	Pale orange	Yellow-Orange	Low yields, limited slip availability

Conclusions:

- Several sweetpotato varieties can be grown in Northern New England.
- Brix levels (and corresponding eating quality) increase dramatically after harvest. Regardless of variety, to get best flavor, it is important to wait at least three (3) weeks after harvest before eating.

Acknowledgements: Special thanks to Jim Ballerstein, John McLean, Evan Ford, Jennifer Noseworthy, Otho Wells, Frank Mangan, Ken Pecota, the National Sweetpotato Collaborators' Group, and to the many undergraduate and graduate students that assisted with field experiments. Thanks also to the New England Vegetable and Berry Growers' Association and the New Hampshire Agricultural Experiment Station for financial support of this work.