2013

Sweet Potato Cultivar Trial

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Abstract
Sweet potato, Ipomoea batatas, is a warmseason vegetable crop that is widely grown throughout the world. In the United States, commercial production is mainly in the southern states. Many parts of the plant are edible, including leaves, roots, and vines. Tender leaves are a delicacy in a number of Asian and Southeast Asian countries.

Keywords
RFR A1241, Horticulture

Disciplines
Agricultural Science | Agriculture | Horticulture

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RFR-A1241

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Introduction

Sweet potato, *Ipomoea batatas,* is a warm-season vegetable crop that is widely grown throughout the world. In the United States, commercial production is mainly in the southern states. Many parts of the plant are edible, including leaves, roots, and vines. Tender leaves are a delicacy in a number of Asian and Southeast Asian countries.

To grow successfully, sweet potatoes prefer both warm days and nights. Sweet potato plants require a long frost-free growing season to mature large, useful roots. In Iowa, short growing seasons often limit the production of this crop; however, they can be grown successfully in Iowa, with a little extra care and attention. Growing this crop on raised beds with black plastic mulch could warm the soil and accelerate crop growth. Planting sweet potato using slips early in the spring soon after last frost is critical to capture the entire growing period needed for optimal sweet potato growth and development.

Materials and Methods

On June 1, 2012, sweet potato slips were planted on raised beds covered with black plastic mulch. Beds were spaced six feet center-to-center. Spacing between plants was nine inches. Each treatment had three 20-ft long beds. Experimental design was a randomized complete block with four replications. Sweet potato slips were purchased from Jones Family Farms, Bailey, North Carolina. The study tested five cultivars (Beauregard, Covington, Diane, Evangeline, and Hernandez) primarily for their adaptability to Iowa growing conditions, root quality, and yield. Soil type was Clarion loam, moderately eroded, with 5 to 9 percent slope. Weed control was achieved by hand hoeing three times before plants started vining. Grass weeds were controlled by spraying Poast herbicide on June 20, 2012. Japanese beetle pressure was high in 2012 and they chewed on sweet potato leaves. Insecticide Sevin was sprayed on July 5, 2012 to control beetles. Plots were harvested on October 5, 2012 by mowing off tops of plants and lifting the roots with a tractor-pulled under cutter. Roots were then hand harvested and cured at 80°F and a relative humidity of 80 percent to 90 percent for 14 days. Roots were then pulled out, graded, and weighed to collect yield and quality data. Two roots were randomly picked from grade 1 and taken to the lab to analyze for sugar and acidity.

Results and Discussion

Description of cultivars is given in Table 1. Warm growing season in 2012 ensured optimal growing condition for sweet potatoes. Plants started vining mid-July and grew healthy shoots. Drip irrigation was effective in 2012, which was hot and dry with lower than normal precipitation. Although Japanese beetle infestation was severe and widespread, plants eventually grew out of it. Application of Sevin also helped. Yield of Jumbo grade roots was highest in Beauregard and Evangeline (Table 2). Grade 1 root yield ranged from 6,700 to 18,000 lb/acre. Grade 1 root yield was highest for Beauregard and Evangeline. Beauregard has been a standard workhorse cultivar in sweet potato growing areas of the United States. Evangeline is a relatively new cultivar with characteristics similar to those of Beauregard but with southern root-knot nematode resistance and higher sucrose content. There were no

statistically significant differences in yield for grade 2 roots among treatments.

Non-marketable or cull yield were higher for Evangeline and Hernandez. Cull yield was lowest for Covington. Roots with odd and abnormal shapes were higher in Hernandez and Diane as compared with Covington or Evangeline.

We also recorded the weight of roots that were attacked by mice to document any preference rodents might have for the cultivars. Highest mice damage to root yields were recorded for Beauregard. Rodents had the least preference for Diane. Although no particular rodent control measures were taken in this study, it is advisable to have a rodent management plan in place, especially if growing Beauregard.

Root quality in terms of average root length indicate no statistically significant difference among cultivars, however, average root width was significantly different among cultivars with largest width for Beauregard (Table 3). Average root width was smallest in Diane. Laboratory analysis of crushed sweet potato showed highest sugar concentration in cultivar Hernandez. Cultivar Beauregard had the lowest sugar content.

Results from this study indicate that Evangeline and Beauregard have excellent yields for Grade 1 roots. Covington also shows promise and could be grown as one of the sweet potato cultivar for production in Iowa. Cultivar pictures are shown in Figure 1.

Table 1. Sweet potato cultivar root descriptions and comments.

Cultivar	Description and comments
Beauregard	Light rose or copper skin; dark orange flesh; uniformly shaped; attractive smooth shape; good yield; stores well
Covington	Red skin; orange flesh; blocky shape; slightly sweeter than Beauregard; good yield; stores well
Diane	Red skin; deep orange flesh; roots are generally long and slender; roots showed some sprouting in field and in storage; roots have high latex content; average yield
Evangeline	Light rose skin; fades in storage; slightly more red than Beauregard at harvest; intense deep orange flesh color; excellent yield; stores well
Hernandez	Copper skin; dark orange semi-moist flesh; a lot of misshaped roots; average yield

Table 2. Sweet potato cultivar trial Jumbo, Grade 1, Grade 2, Non-marketable, Odd shaped, and Mice damaged yield in pounds per acre.

Cultivar	Jumbo[a†]	Grade 1[b]	Grade 2[c]	Non-marketable[d]	Odd shaped[e]	Mice damaged
Beauregard	3,428 a	14,661 ab	7,913[NS]	2,740 b	3,544 bc	4,564 a
Covington	840 b	12,134 b	9,577	2,233 b	2,743 c	2,887 b
Diane	69 b	6,718 c	8,297	2,765 b	4,588 ab	142 d
Evangeline	3,929 a	18,098 a	8,760	3,695 a	3,261 c	3,236 b
Hernandez	739 b	7,404 c	8,812	3,478 a	5,489 a	841 c

[a]Jumbo = roots 3 to 9 in. long and more than 3.5 in. in diameter.
[b]Grade 1 = roots 3 to 9 in. long and between 2.25 to 3.5 in. diameter.
[c]Grade 2 = roots 3 to 7 in. long and 1.5 to 2.25 in. diameter.
[d]Non-marketable = root less than 1.5 in. diameter.
[e]Odd shaped = malformed or abnormally shaped roots.
[†]Mean separation within columns; means followed by same letter(s) are not significantly different ($P \leq 0.05$).
[NS]Non-significant at $P \leq 0.05$.

Table 3. Root quality attributes of sweet potato.

Cultivar	Average root length (cm)	Average root width (cm)	Sugar content (Brix)
Beauregard	17.4[NS]	7.6 a*	8.5 d*
Covington	17.2	7.2 b	11.5 c
Diane	16.3	6.9 c	12.0 bc
Evangeline	17.2	7.2 b	12.3 b
Hernandez	17.6	7.2 b	13.7 a

[NS]Non-significant at $P \leq 0.05$.

*Mean separation within columns; means followed by same letter(s) are not significantly different ($P \leq 0.05$).

Figure 1. Sweet potato cultivars a) Beauregard, b) Covington, c) Diane, d) Evangeline, and e) Hernandez.