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Sugar Beet Demonstration Plantings

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Sugar Beet Demonstration Plantings

Abstract

This project investigated field production of a potential biofuel crop—sugar beet. Objectives included becoming familiar with cultural methods for growing sugar beet and determining expected yield levels for southeast Iowa. To accomplish this, half-acre trial plots were planted at the Muscatine Island Research Farm (MIRF), Fruitland and at the Southeast Research Farm (SERF), Crawfordsville, in 2008 and 2009. The two sites provided different soil types and growing environments to investigate the crop. Results from both years and locations demonstrate that sugar beets can be grown in southeast Iowa, and with good management and weather conditions, yields should equal or exceed the national average of 26.0 ton/acre.

Keywords

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Disciplines

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Vince Lawson, superintendent

Introduction

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Materials and Methods

Seed of five sugar or “energy” beet varieties was provided by Syngenta/Hilleshög for the project. A John Deere 33 vegetable planter was used to plant seed approximately 0.5–1 in. deep and 4.4 in. apart in rows spaced 30 in. apart. Each variety was planted in a single plot approximately 0.1 acre in size. Harvest data collected by digging roots in four randomly selected 20-ft sections of row of each variety. Foliage was removed at crown and dirt was knocked off the roots before counting and weighing. Approximately 20 roots from each variety were sent to Syngenta/Hilleshög for percent sugar determinations. Data from individual varieties were observational and didn’t differ much, so were combined for presentation in Tables 1 and 2.

Muscatine Island Research Farm, Fruitland.

Sugar beets were grown in a coarse loamy-sand soil with 1.0% organic matter. Previous crop was soybeans. Plot area was chisel plowed 14 to 16 in. deep and disked before planting. Fertilizer was applied preplant incorporated at a rate of 56 lb/acre nitrogen, 56 lb/acre phosphate, 250 lb/acre potash, and 2 lb/acre boron. Additional nitrogen was sidedressed on May 28 (48 lb/acre), June 18 (36 lb/acre), and July 7 (36 lb/acre). Nitrogen rates were higher than planned because of abnormally high rainfall. During the season, plots were irrigated as needed with overhead sprinklers to supplement rainfall. Weed control was achieved with hand hoeing and three applications of glyphosate herbicide. Cercospora leafspot and Rhizoctonia crown rot were controlled with fungicide sprays of Dithane DF, Kocide 2000, and Quadris.

Southeast Research Farm, Crawfordsville.

Sugar beets were planted in a Mahaska silty clay loam soil with 1.9% organic matter. Previous crop was wheat. The plot area was field cultivated approximately 4 to 6 in. deep and harrowed before planting. A soil test indicated good fertility so only nitrogen was sidedressed on May 29 at 68 lb/acre and again on June 24 at 60 lb/acre. Weeds were controlled with hand hoeing and two applications of glyphosate herbicide.

Results and Discussion

Sugar beets were grown successfully at both locations. The 2008 and 2009 growing seasons were cooler and wetter than normal so prolonged periods of high temperatures or drought were not a problem. The highest yields were produced on the heavier soils at SERF with that location averaging 35.4 ton/acre in 2008 and 36.2 ton/acre in 2009 (Table 1). The coarse sand soil at MIRF produced somewhat lower yields even though

more inputs of irrigation and fertilizer were applied. One production problem discovered at MIRF was a boron deficiency. A 2009 study found that it can be corrected and yields increased by applying boron fertilizer (see Effect of Boron Fertilizer on Sugar Beet Grown on Fruitfield Sand Soil, RFR-A9023).

Sugar beets benefit from a long growing season and our southeast Iowa demonstration plantings indicate that maximum yields should be obtained with April planting, as soon as soil conditions allow, and delaying fall harvest until October. September, and October harvest dates were compared in 2008 at MIRF and SERF. Waiting until October 27 to harvest sugar beets increased root sugar content by

1.5% and yield by 5 ton/acre compared with an earlier September 23 harvest (Table 2, average of both locations). Late planting in the spring also can hurt yield. During 2009, an April 24 planting produced an impressive 32.7 ton/acre (October harvest). Conversely, a May 22 planting produced only 19.5 ton/acre. However, it is possible that unusually high rainfall during 2009 exaggerated these planting date differences.

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Table 1. Average yield of sugar beets grown at Muscatine Island Research Farm (MIRF), Fruitland, and Southeast Research Farm (SERF), Crawfordville, IA, in 2008 and 2009.

Location – planting	Harvest	Roots/acre	Avg root wt (lb)	Root yield ton/acre	Percent sugar	Sugar ton/acre
<u>MIRF</u>						
April 16, 2008	October 27	32,176	1.5	24.68	16.0	3.95
April 23, 2009	October 12	32,127	1.8	29.18	16.2	4.73
<u>SERF</u>						
April 23, 2008	October 22	34,616	2.1	35.36	15.6	5.52
April 24, 2009	October 13	27,872	2.6	36.18	15.1	5.46

Table 2. Effect of planting date (April vs. May) and harvest date (September vs. October) on yield of sugar beet grown in southeast Iowa^a.

Planting	Harvest	Roots/acre	Avg root wt (lb)	Root yield ton/acre	Percent sugar	Sugar ton/acre
April 24, 2009	October 13	30,000	2.2	32.68	15.7	5.10
May 22, 2009	October 13	31,796	1.3	19.52	15.1	2.94
April 23, 2008	September 23	31,842	1.6	24.77	14.2	3.51
April 23, 2008	October 27	33,396	1.8	30.02	15.8	4.74

^aData combined from Muscatine Island Research Farm, Fruitland, and Southeast Research Farm, Crawfordville.