

2013 High Sugar Sorghum Report
UW-Extension Chippewa County
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During the spring of 2013 UW-Extension in Chippewa County was approached to investigate the potential of the performance of high sugar sorghum varieties on local soils. In response to interest in potential cellulosic energy feed stock and alternative forage, three varieties of high sugar sorghum were planted in 2013 at three county sites. This report outlines the data and results of the performance of three high sugar sorghum varieties at the Chippewa County UW-Extension Test Plot site.

Location and Soils

The Chippewa County UW-Extension Test Plot site is located northeast of the city of Chippewa Falls. The soil at the site is a nearly level, well drained Sattre loam. A 3.5 acre field was used.

Previous Crop: Corn

Tillage: Chisel plow (fall 2012) Field Cultivator (spring 2013)

Fertility: 200 lbs. of 0-0-60 (potash) was applied prior to spring tillage. 100 lbs. of actual nitrogen in the form of 28% nitrogen was applied with pre-emergence fertilizer following planting.

Varieties: Three varieties were provided for the performance evaluation through Blade Energy Crops

- ES 5200
- EJ 7281
- ES 5140

Planting: Date: 5/29/2013

Planting was accomplished with a John Deere 12-Row planter. The varieties were randomly assigned to planter seed boxes as one seed box/variety was used per four rows of the planter. Since only one seeding rate could be selected for all three varieties, 60,000 seeds per acre were selected as the seeding rate. This rate may be high for some varieties and low for others based on seed size and weight. Due to wet, cool conditions, soil conditions were moist at time of planting and impacted emergence



July 3



July 3

The plot was planted from the outside edges of the plot to the middle to plan for easier harvest. Figure 1. shows the plot replication layout across the field as each variety was harvested. Eight rows of each variety was harvested for each replication.

Figure 1. High Sugar Sorghum Plot Layout

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|--|--|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|--|--|---|---|---|---|---|---|---|---|---|

Pest Management: Verdict herbicide 13 oz/acre applied on June 4. 100# of actual nitrogen applied as 28% UAN with Verdict. Soil conditions were wet at the time of planting. Some wheel tracks and ruts were visible after application. Weed control was very good throughout the year with only a few late season weeds emerging toward harvest. Very little insect and disease pressure was observed. Some grasshopper feeding was noticed and always below threshold.

Weather conditions: Above normal rainfall and cooler weather led to less than ideal growing conditions. Just less than seven inches of rainfall fell during the month of June and growing degree days (GDD) running about 100 units under normal. Dry hot, weather dominated the rest of growing season as only two inches of rain fell in the months of July and August combined. By harvest in September, GDD were 150 units above normal.



July 23, 2013



September 13, 2013

Harvest: The plot was harvested on September 13 with a two-row John Deere pull type chopper. Each variety in each replication was chopped and weighed with the wagon being pulled over weigh pads to get weight measurements. A subsample of each variety in each replication was taken and added to a composite sample for moisture and quality testing. Nutrition and quality tests are available at the end of this report.



September 13



September 13

Yield and Moisture:

Yield was lower due to moisture stress during the mid to late part of the growing season. Moisture levels ranged from 71% to 79%. Harvested plant populations ranged from 48,000 to 57,000 plants per acre. Seeding rates and conditions affected final population stands and ultimately yield. Data in Table 1. contains yield and moisture results.

Table 1. Yield, Moisture, and Plant Population Results of High Sugar Sorghum

| Variety | Total Yield 3 replicaitons | Average Yield | Harvest Moisture | Plant Population at Harvest |
|---------|-------------------------------|---------------|---------------------|--------------------------------|
| | DM Tons/Acre | DM Tons/Acre | | |
| ES 5200 | 5.130 | 1.710 | 79.82 | 48000 |
| ES 5140 | 7.892 | 2.631 | 71.95 | 51000 |
| EJ 7281 | 9.491 | 3.164 | 75.81 | 57000 |

Table 2. Crude Protein, ADF, NDF, Non-carbohydrate Fiber, Relative Feed Quality of Sorghum Samples

| Variety | Crude Protein | ADF | NDF | Non Carb Fiber | RFQ |
|---------|---------------|-------|-------|----------------|--------|
| ES 5200 | 11.35 | 35.75 | 52.22 | 32.59 | 150.97 |
| ES 5140 | 12.82 | 33.49 | 50.47 | 30.81 | 158.62 |
| EJ 7281 | 11.10 | 34.39 | 46.52 | 40.13 | 168.15 |

Summary

High sugar sorghum can be grown in Chippewa County and has potential to be planted on more acres. Low yields experienced this year can be attributed to less than ideal planting conditions and dry weather experienced from late July into September. If yields in this study are 1/3 of normal because of these factors, then high sugar sorghum has the potential to produce seven to ten ton of dry matter per acre under more normal planting and growing conditions. Forage quality results indicate high sugar sorghum can be a potential emergency forage alternative. A crop budget summary based on 2013 production and expenses is in Table 3.

Table 3. Production costs and returns for High Sugar Sorghum at Chippewa County UW-Extension Plots

| | Unit | Quantity | Price | Amount |
|---|---|----------|-----------|-------------------|
| Fertilizer | | | (\$) | (\$/acre) |
| Potassium | lbs K2O | 100 | \$ 0.46 | \$ 46.00 |
| Nitrogen fertilizer | | | | |
| 28% | (lbs)of N | 100 | \$ 0.91 | \$ 91.00 |
| Seed Plants | | | | |
| Corn Seed | cost /bag estimate | 175 | | \$ 20.00 |
| | Plant Population | 60000 | | |
| Weed Control | | | | |
| Herbicide | acre | 1 | \$ 24.00 | \$ 24.00 |
| Spraying | acre | 1 | \$ 8.00 | \$ 8.00 |
| | | | | |
| Total Direct Production Inputs | | | | \$ 189.00 |
| | | | | |
| Tillage | | | | |
| Plow, chisel | acre | 1 | \$ 16.00 | \$ 16.00 |
| Field cultivator | acre | 1 | \$ 13.00 | \$ 13.00 |
| Planting regular | acre | 1 | \$ 17.00 | \$ 17.00 |
| | | | | |
| Total Tillage | | | | \$ 46.00 |
| | | | | |
| Other | | | | |
| Harvest Chopping | wet tons (chop, haul, fill) | 8.3 | \$ 8.00 | \$ 66.40 |
| Land | acre | 100 | \$ 100.00 | \$ 100.00 |
| Interest 8 mths @1%/mth * (Direct inputs plus 20% of Tillage) | | | \$ 20.00 | \$ 20.00 |
| Insurance | estimate | | \$ 30.00 | \$ 30.00 |
| | | | | |
| Total Expenses | | | | \$ 497.40 |
| | | | | |
| Crop Produced | | | | |
| Sorghum Forage | DM Ton/Acre | 3 | 120 | \$ 360.00 |
| | Price estimated based on WI grass hay market 10/24/13 | | | |
| | | | | |
| Revenue | | | | \$(137.40) |