Kalamazoo County

Switchgrass nitrogen rate study

Cropping syster
Other

MICHIGAN AGRICULTURAL EXPERIMENT STATION

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Purpose

The purpose of the study was to evaluate the effects of nitrogen rate on Switchgrass yields.

Materials and methods

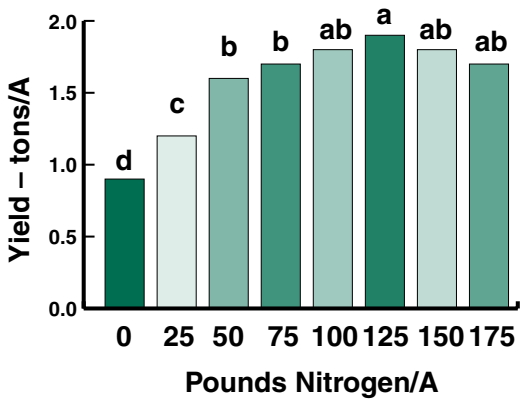
Cave-in-rock Switchgrass was planted in the spring of 2008. No nitrogen was applied during establishment year. Atrazine and quinclorac were applied for weed control in 2008 and 2009. Nitrogen application rates of zero, 25, 50, 75, 100, 125, 150 and 175 lbs/A N were applied in June 2009. Granular urea (46-0-0) was applied with a Gandy air seeder. All other variables were held constant including establishment method, weed control and harvest strategy.

County	**Kalamazoo**
Cooperator	**W.K. Kellogg Biological Station**
Nearest town	**Hickory Corners**
Soil type	**Kalamazoo sandy loam**
Tillage	**Chisel plow, field cultivation (2008)**
Planting date	**June 2008**
Variety	**Cave-in-Rock (switchgrass)**
Row spacing	**7 inches**
Planting pop.	**8 lbs. PLS**
Weed control	**0.5 lbs/A atrazine + 0.5 lbs/A quinclorac**
Harvest date	**11/23/09**
Exp. design	**RCB, 4 replications**

Results and discussion

This study was conducted on a two-year-old stand. A yield of 1.9 tons of switchgrass per acre was observed with 125 lbs/A N. While this treatment yield was significantly higher than 0, 25, 50 and 75 lbs/A N, it was not statistically different than 100, 150 or 175 lbs/A N rates. In the standard nitrogen response curve, 125 lbs/A N was the optimum application rate. This is a bit higher than expected as most literature suggests that 70 lbs/A N will produce optimum yields. Partial budgeting allows you to compare different nitrogen rates and their impact on profit. This answers the question, "is enough biomass produced to pay for the additional nitrogen costs?" In this study, 50 lbs/A N produced the greatest economic return.

Nitrogen rate – lbs/A	Yield (tons/A)
0	0.8857 d
25	1.1701 c
50	1.6007 b
75	1.6541 b
100	1.7691 ab
125	1.909 a
150	1.7689 ab
175	1.709 ab



High biomass yields have not been the primary focus of growing switchgrass in the past. The development of a biomass market for energy in Michigan will require further research to evaluate the influence of nitrogen rates on switchgrass yield on different soil types. The cost of nitrogen fertilizer and the potential long-term environmental implications need to be researched.

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