Evaluation of Perennial Forages as Biofuel Crops

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A good deal of discussion has occurred in the past year or two about the use of grain crops for fuel, primarily ethanol. The use of cellulosic materials, including crop aftermath, small-grain straw, corn stover and perennial forages dedicated to biofuel crops, seems to be a more viable long-term solution. In the area of perennial forages for biofuels, switchgrass has received a lot of attention. Is switchgrass the best choice as a biofuel crop for North Dakota? What will the sustained production be when harvested? What type of husbandry, such as fertilizer, weed control, etc., will be needed? These are questions that need to be addressed before recommendations can be made to producers trying to make these cropping decisions. The NDSU Research Extension Centers at Hettinger, Williston, Minot, Carrington and Streeter are evaluating perennial forages for use as biofuel crops. This 10-year study will evaluate 10 species and species combinations for total yield, stand longevity, fertilizer requirements, weed control, annual vs. biennial harvest and carbon sequestration.

Results for 2008

Hettinger: Due to the dry weather in 2006 and the poor condition of the subsequent stands, the plots at Hettinger were reseeded in May 2008.

Williston: Yields on the dryland plots at Williston were down from 2007. In 2008, Haymaker intermediate wheatgrass had the highest yield of 0.79 ton/acre. Sunburst switchgrass yielded lowest at 0.50 ton/acre. On the irrigated plots, Sunburst and Dakota switchgrass increased their yield from 2007 with 7.28 and 4.91 tons/acre, respectively.

Minot: The top yielding plot at Minot this year was Haymaker intermediate wheatgrass with 4.13 tons/acre, followed closely by Alkar tall wheatgrass with 4.10 tons/acre and Sunburst switchgrass combined with tall wheatgrass with 4.09 tons/acre. For the most part, all yields at Minot were down from 2007.

Carrington: All plots at Carrington had lower yields than in 2007. In 2008, Sunburst switchgrass was the top producer, yielding 5.13 tons/acre, down slightly from 5.41 tons/acre in 2007. The top yielding plot in 2007, Trailblazer switchgrass, was down from 6.06 tons/acre to 4.57 tons/acre in 2008. Yields at Carrington ranged from a high of 5.13 tons/acre to a low of 3.12 tons/acre for Magnar basin wildrye in combination with Mustang Altai wildrye.

Streeter: The highest yielding plot at the CGREC in 2008 was again Sunburst switchgrass in combination with tall wheatgrass with 3.09 tons/acre, down 0.58 ton/acre from 2007. The only plots that increased their yield in 2008 were Sunburst switchgrass combined with Mustang Altai wildrye with 2.10 tons/acre, up 0.45 ton/acre, and Sunburst switchgrass combined with Sunnyview big bluestem with 1.98 tons/acre, up 0.41 ton/acre. Because of the poor switchgrass stands, these yields are mainly due to the species seeded in combination with the Sunburst switchgrass.

For more information, visit the CGREC Web site at www.ag.ndsu.edu/streeter.

Biomass plots at the CGREC being harvested in 2008.

- All the plots except those at Hettinger were harvested the week of Sept. 15
- A trend is beginning to emerge indicating that in areas with adequate precipitation, switchgrass has the highest yield. However, on areas with lower precipitation or droughty soils, the wheat grasses yield best.
- The plots on all sites had fewer weeds than in 2007.
- The switchgrass stands on the dryland plots at Williston were very poor.
- The switchgrass plots at the CGREC were reseeded in the spring of 2008 in an attempt to improve the poor stands.
- The overall decrease in plot yields in 2008 can be attributed to lower than normal rainfall across the region.
- Hettinger received adequate early spring precipitation and we are hopeful that the new stands there will have better yields.

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