Biofuels Research at the NDSU Central Grasslands Research Extension Center

Evaluation of Perennial Herbaceous Biomass Crops for Energy

Biomass Power – Back to the Future

- 1920 – 27,000,000 horses and mules in USA
- 1954 – < 5,000,000
- Resulted in major land use change.
- 80,000,000 acres of pasture hayland released for other uses
- If we are to reach the federal governments goal of 1 billion tons of biomass for ethanol by 2030 then we will see a similar land use change again.

A study in cooperation with the USDA-ARS in Lincoln Nebraska was started in 2002 to evaluate the production and economics of raising switchgrass for ethanol.

Funding provided by the following:
- North Dakota Natural Resources Trust
- NDSU Agricultural Exp. Station
- USDA-ARS Northern Great Plains Research Laboratory
- ND Game and Fish Department
- ND Department of Commerce
- ND Farmers Union
- Jamestown/Stutsman Development Corporation
- Dakota West RC&D
- Dakota Prairie RC&D
- Natural Resources Conservation Service (NRCS)

Research Objectives
- Compare annual and biennial harvest on total biomass yield and maintenance of the stands.
- Evaluate carbon sequestration and storage of the various perennial crops.
- Evaluate the economic feasibility of the various perennial herbaceous energy crops with competing crops in the surrounding area.

Plot Locations
- Hettinger REC
- Williston REC, Dryland and Irrigated
- North Central REC, Minot
- Carrington REC
- Central Grasslands REC, Streeter

Experimental Design
harvested annually and biennially
- Sunburst Switchgrass
- Trailblazer Switchgrass (Hettinger, CGREC, Carrington)
- Dakota Switchgrass (Williston & North Central)
- Alkar Tall Wheatgrass
- Haymaker Intermediate Wheatgrass
- CRP Mix (Intermediate + Tall Wheatgrass)
- CRP Mix (Intermediate + Tall + Alfalfa + Sweetclover)
- Sunburst Switchgrass + Tall Wheatgrass
- Sunburst Switchgrass + Sunnyview Big Bluestem
- Sunburst Switchgrass + Mustang Altai Wildrye
- Magnar Basin Wildrye Mustang Altai Wildrye

Cumulative Cost/ ton, Including Land Rent

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<th>Location</th>
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Soil samples were taken prior to seeding by researchers Kristy Nichols and Mark Halverson of the USDA-ARS Field Laboratory in Mandan.

Plots are 15' X 30’ replicated 6 times, seeded with a cone seeder specially designed for seeding grasses and legumes.

Biomass plots at the CGREC as they looked on September 26, 2006.