



September 25, 2015

SWITCHGRASS AS A BIOFUEL

At Husker Harvest Days this year in the UNL building one of the displays manned by John Hay in Biological Systems Engineering was about Liberty Switchgrass, not to be confused with Liberty herbicide. Dr. Ken Vogel, USDA-ARS, spent two decades of his life improving the native warm season grass with plant breeding techniques to develop a new cultivar called Liberty.

Vogel began working on Liberty in 1996 with the USDA-ARS native grass breeding program. His goal was to develop a high-yielding, lowland-type switchgrass cultivar, widely adapted throughout the Midwest, to be grown as a biomass energy crop. The USDA released the new cultivar November 2013, in partnership with the University of Nebraska-Lincoln.

Liberty produces about two tons more biomass per acre than typical northern switchgrass cultivars. The goal is generating higher yields on marginal productive cropland. Trials in Eastern Nebraska are indicating a 40 percent increase in yield compared to other varieties of switchgrass such as Shawnee. If you can sell switchgrass as a biomass fuel for \$70 per ton, Liberty could have an average gross of \$175 per acre more than Shawnee.

Liberty Switchgrass is the first true bioenergy switchgrass adapted for the Midwest and for use as a bioenergy crop. It also improves the economic feasibility of using switchgrass as a biomass energy crop in the Midwest. After 3 generations of cross-breeding, Vogel had the winter hardiness he needed and the high yields. Liberty flowers in September as compared to forage types flowering in July. The added time for vegetative growth can lead to impressive plants in both height and yield.

The next step for Liberty is to increase seed production so that it can be made available to farmers. Seed producers can request seed for establishing certified seed fields through Husker Genetics at the University of Nebraska-Lincoln. Liberty should be available to farmers in spring, 2016.

Who is buying switchgrass for biofuel in Nebraska? No one for biofuel at this time because the price of oil is low. Although technologically ready, the economics of cellulosic biofuel are not good enough right now for expansion. Some have strong interest in the future such as our military and aviation sectors that cannot rely on battery power anytime soon.

The two of the first three cellulosic biorefineries (Emmetsburg, IA; Nevada, IA; and Hogoton, KS) are located adjacent to existing corn ethanol plants to take advantage of the shared needs of the facilities. All three are running (yet not at full production) on corn stover. Nebraska's #2 ranking in ethanol production and 25 corn ethanol plants give us opportunity for a co-located facility. Switchgrass to biofuel has advantages and disadvantages over corn ethanol. The production of a hardy perennial and nonfood crop is one advantage as well as energy in/energy out ratios, while its status as a non-commodity crop and more complex conversion to fuel are a disadvantage.

Switchgrass is good grazing during vegetative stages but hay when harvested late is low quality forage and is usually mixed with distillers to make good feed. It provides good erosion control and the new variety should work well in flooded areas according to UNL's flooded research plots. Areas not well suited for row crops could still have some potential someday as biofuel.



Liberty may not be the best for the above applications but it is an exciting step if a biofuels cellulosic market develops in Nebraska in the future. To learn more go to:
<http://cropwatch.unl.edu/bioenergy/switchgrass> Further research and yield information can be found at: <http://ow.ly/SuWgR>

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