Biomass and Bioproducts Initiative

CRP to Ethanol

(Conservation Reserve Program)

NDSU

Collaborators
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Issues

- Preserve and even enhance the original objectives of the CRP program: “the restoration and permanence of prairie ecosystems, … the protection of their long-term productivity, … and the enhancement of wildlife habitats.”
- Conversion technology will have to be robust to handle a variable feedstock supply with minimal variation in processing parameters or ethanol yield.
- A careful assessment of the long-term economic feasibility of producing cellulosic ethanol from CRP biomass, in particular transportation issues, is needed.

Background

- CRP grasslands consist of perennial plants that are adapted to the climate and require limited maintenance.
- CRP grasslands generate minimal production and transportation-related greenhouse gas fluxes.
- Nationally, 35 million acres in CRP – 53% in Great Plains and central corn belt, with 3.5 million acres in North Dakota.
- Average biomass yield of 4,286 pounds per acre per year (range – 2,143-7,501).
- Potentially can generate 167 gallons of ethanol per year per acre.

Objective 1

Develop new restoration techniques and management strategies to optimize biomass production for ethanol while maintaining the CRP program objectives

Objective 2

Construct a user-oriented model for the planning and ecological assessments of CRP-ethanol projects across a variety of climatic and soils conditions

Objective 3

Determine which combination(s) of plant species will produce optimal fermentable sugar yields

Objective 4

Determine the optimal feedstock transportation, handling, and storage methods to deliver a steady supply of biomass from subdivided CRP regions to a centrally located cellulosic ethanol processing plant.

CRP species used

Grasses

Big bluestem
Blue grama
Bluebunch wheatgrass
Canadian wild rye
Crested wheatgrass
Foxtail barley
Green needlegrass
Indian grass
Junegrass
Kentucky bluegrass
Little bluestem
Needle and thread
Prairie sandreed
Sand dropseed
Sideoats grama
Smooth brome
Switchgrass

Forbs

American vetch
Asteraceae
Black eye susan
Blanket flower
Blue flax
Canada milk vetch
Canada thistle
Curly top gumweed
Dandelion
Evening primrose
Frigid asteraceae
Goat’s beard
Golden aster
Hoary vervain
Maximilian sunflower
Northern bedstraw
Pink wild onion
Platte lupine
Prairie coneflower
Prairie goldenrod
Prairie wild rose
Purple prairie clover
Rigid goldenrod
Silky wormwood
Stiff sunflower
Tall cinquefoil
Torch flower
White aster
Whorled milkweed
Yarrow
Yellow sweet clover