

DEVELOPMENT OF SWITCHGRASS INTO A BIOMASS ENERGY CROP

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Switchgrass (*Panicum virgatum* L.) is a North American prairie grass that is being developed into a biomass energy crop in the United States and other countries. Research on switchgrass as a pasture and forage crop was initiated in the mid-1930s in a USDA and University of Nebraska cooperative program. In 1990, breeding and management research also was initiated to develop switchgrass into a biomass energy crop. Critical questions for a biomass/bioenergy production system include: What are the economics? Is energy from biomass net energy-positive? Is production system information available and verified? Is the system sustainable? To address these questions, 10 farmers in the mid-continental United States were contracted to grow switchgrass in 6-8 ha fields for a 5-year period and manage it as a biomass energy crop using available cultivars and management practices from 2000 to 2005. Results indicate that during this period switchgrass biomass feedstock could have been produced in this region at a cost of about \$50 Mg⁻¹ at the farm gate, which translates to about \$0.13 per liter of ethanol. Net energy yield on the established switchgrass fields was 60 GJ ha⁻¹ y⁻¹. In these farmer trials, switchgrass produced 540 percent more renewable energy than nonrenewable energy consumed. These baseline studies represent the technology that was available for switchgrass in 2000 and 2001 when the fields were planted but clearly demonstrate that for switchgrass a full array of production system technology is available for its use as a biomass energy crop. Improved genetics and agronomics will further enhance energy sustainability and biofuel yield of switchgrass. Carbon sequestration research is still in progress, but the initial results are very encouraging. Technology has been developed to rotate from switchgrass to crops including maize and soybeans and back to switchgrass without plowing.

KEY WORDS: herbaceous perennials, switchgrass, genetics, feedstocks

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*** INVITED SPEAKER ***