

South Dakota - Native Warm-Season Grass Species for Bioenergy in the Northern Great Plains

by V. Owens, C. Hong, D. Lee, and A. Boe, South Dakota State University

High yielding, native warm-season grasses could be used as renewable bioenergy feedstocks. The objective of this study was to determine the effect of native grass monocultures and mixtures on biomass yield and chemical characteristics in the northern Great Plains. ‘Sunburst’ switchgrass, ‘Bison’ big bluestem, and ‘Tomahawk’ indiangrass were planted alone and in 2- and 3-species mixtures at three locations in May 2002: Brookings and Pierre, SD, and Morris, MN. Biomass was harvested once annually after a killing frost at each location in 2003-2005. Grab samples were taken at harvest to determine DM and chemical composition.

Total biomass yield increased each year at all locations as all grasses, except indiangrass, became better established. Rainfall patterns were better for biomass production in 2005 than in 2003. Biomass production was generally greatest when switchgrass was grown alone or in a mixture. Total N concentrations of all species decreased each year, while cellulose and hemicellulose concentrations generally increased by 2005. This was likely a result of more reproductive tillers in 2005. Based on the results, growing switchgrass in native grass mixtures, or in some cases alone, is recommended for the production of biomass energy in the northern Great Plains.

Table 1. Average annual biomass production of native, warm-season grasses at 3 locations over 3 years (2003-2005).

Grass Species or Mixture	Brookings, SD	Pierre, SD	Morris, MN
	-----Ton DM/ac-----		
Big bluestem	1.9	1.2	1.5
Indiangrass	1.7	1.2	1.6
Switchgrass	3.3	2.3	2.1
Indiangrass/Big bluestem	1.8	1.1	1.8
Switchgrass/Big bluestem	2.5	2.2	1.9
Switchgrass/Indiangrass	2.6	2.3	2.0
Switchgrass/Indiangrass/Big bluestem	2.6	2.0	2.1