

Biomass Yield, Phenology, and Survival of Diverse Switchgrass Cultivars and Experimental Strains in Western North Dakota

John D. Berdahl¹, Al B. Frank¹, Joseph M. Krupinsky¹, Patrick M. Carr², Jon D. Hanson¹
And Holly A. Johnson¹

¹ United States Department of Agriculture – Agricultural Research Service
Northern Great Plains Res. Laboratory
Mandan, ND

² North Dakota State University
Dickinson Research Extension Center

Summary

Switchgrass (*Panicum virgatum* L.) has been identified as a potential biofuel crop for the northern Great Plains region of the USA. Biomass yield and survival percentage in western North Dakota were measured for 3 yr at three field sites, and plant development was monitored for 2 yr at one site to determine adaptation and stability of performance for eight diverse switchgrass cultivars and experimental strains. Harvest treatments were single annual cuttings in mid-August or mid-September. Except for 'Dacotah', ND3743, and 'Sunburst', all other entries originated greater than 500 km south of the evaluation sites and were subject to winter injury. Sunburst, from southern South Dakota, ranked first or second in biomass yield in all environments and was the top-yielding entry in all environments in the third production year, a drought year at all sites. 'Trailblazer' ranked first, second, or third in biomass yield in all environments while yield ranking of the other entries was not consistent. Genotype x environment interactions occurred for biomass yield and would be expected based on the wide range in origin among the eight populations. Survival percentage was equal for the two harvest dates, but all eight populations averaged greater biomass yields at the mid-September (5.98 Mg ha⁻¹) than the mid-August (5.51 Mg ha⁻¹) harvest. Biomass yield of Sunburst at the site with the greatest yield potential ranged from 3.20 Mg ha⁻¹ in a drought year to 12.48 Mg ha⁻¹ in a year with above-average precipitation. Biomass yield of adapted switchgrass cultivars fluctuated widely in western North Dakota, depending in large part on available soil water.

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