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Herbaceous perennial feedstocks for marginally-productive landscapes in the Central USA

Rob Mitchell, Gautam Sarath and Serge Edme
University of Nebraska, USA

Perennial C4 grasses are promising biomass feedstocks for the lignocellulosic bioenergy industry in the USA. Although the current perennial grass biomass feedstock market is limited, the recent emergence of cellulose-based biorefineries in the central USA has heightened interest in herbaceous perennials. The USDA location at Lincoln, NE has been conducting research on perennial grasses native to the central USA since 1936, and specifically for bioenergy since 1990. Current research focuses on cultivar development, lignin composition and cell wall chemistry, as well as all aspects of establishment and management. The recent release of 'Liberty' switchgrass (*Panicum virgatum* L.), the first bioenergy-specific switchgrass cultivar released for the central USA, provides yield potential in excess of 18 Mg ha⁻¹ and has excellent winter survival and drought tolerance. Additionally, low diversity grassland mixtures increase landscape-scale diversity and have produced field-scale baled yields in excess of 15 Mg ha⁻¹ in rainfed conditions on marginally-productive cropland. In recent research, switchgrass grown for bioenergy at the field-scale has stored more than 2 Mg ha⁻¹ year⁻¹ of soil organic carbon. Greenhouse gas emissions, specifically N₂O emissions, were 2.7 to 5.1 times greater for corn than for perennial grasses when grown on marginally-productive cropland in the central USA. Research during the past 80 years has demonstrated clearly that native perennial C4 grasses are productive and economically and environmentally sustainable on rainfed cropland that is marginally productive for row crop agriculture in the central USA.

Biography

Rob Mitchell is a Research Agronomist with the USDA-Agricultural Research Service in Lincoln, Nebraska. He is the Coordinator of the USDA Central-East Regional Biomass Research Center. He is a Fellow in the Crop Science Society of America and a Fellow in the American Society of Agronomy. In 2000, he was named the American Association of State Colleges of Agriculture and Renewable Resources National Outstanding Teacher. He has authored or co-authored more than 200 refereed journal publications, book chapters, proceedings, popular articles, cultivar releases and extension publications, and has given more than 120 invited presentations.

Rob.Mitchell@ARS.USDA.GOV

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