

SWITCHGRASS POTENTIAL ON RECLAIMED SURFACE MINES FOR BIOFUEL PRODUCTION IN WEST VIRGINIA¹

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Abstract: The high cost and environmental risks associated with non-renewable energy sources has caused increased interest in renewable biofuels. Switchgrass (*Panicum virgatum* L.), a warm season perennial grass, has been investigated extensively as a source of biofuel feedstock due to its high biomass production on marginal soils. Additionally, the plant's high tolerance to adverse growing conditions and its ability to provide habitat for wildlife makes it a widely used species for conservation cover. West Virginia contains vast expanses of reclaimed surface mine lands and could potentially benefit from the production of switchgrass as a biofuel feedstock. Furthermore, switchgrass production could satisfy Surface Mining Reclamation and Control Act of 1977 (SMCRA) requirements for reclamation bond release to mine operators. This paper reports the results of ongoing research to identify the best varieties of switchgrass for mined lands in West Virginia, their yields, and their potential for a biofuel feedstock. In 2008 two reclaimed mines were selected for this experiment: one in northern WV with topsoil and biosolids amendment and another in southern West Virginia with no topsoil applied. Three varieties of switchgrass (Carthage, Cave-in-Rock and Shawnee) were planted into randomly-assigned, one-acre plots, which were replicated three times for a total of nine plots at each site. At the northern WV site, soil pH was around 7.2 with high levels of nutrients (4.6 mg/kg P, 0.3 cmol_c/kg K, 1.8 cmol_c/kg Mg and 31.0 cmol_c/kg Ca). Switchgrass establishment and growth has been superb with complete ground coverage after the first year and average yield was 4501 kg/ha (combining all plots) during the second year. At the southern WV site with no topsoil added, yields were much lower with averages across varieties of 217 kg/ha after the second year. Soil pH was 7.9 and only low levels of nutrients were available even after fertilizing with 200 kg/ha of 19-19-19 during the first and second years. A new study is being established with treatments of municipal biosolids and topsoil to determine the rate of nutrient amendment at the time of seeding for switchgrass establishment and growth.

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