Public Abstract

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Title:PREDICTING SWITCHGRASS BIOMASS AND ETHANOL POTENTIAL ON CLAYPAN SOIL LANDSCAPES

Switchgrass (Panicum virgatum L.) yield on claypan soils was evaluated with a crop growth model and for actual ethanol production potential. Specifically, Agricultural Land Management Alternatives with Numerical Assessment Criteria (ALMANAC) was evaluated for switchgrass production on claypan soils. Switchgrass was established on the Soil Productivity and Resource Conservation (SPARC) plots near Columbia, MO in 2009. ALMANAC soil inputs were modified with soil texture and bulk density from measured soil samples. ALMANAC results were compared to yearly SPARC measured switchgrass yields and consistently underestimated yields. Yield simulated by repeating a single weather year was cyclical for consecutive years based on three of the four weather year patterns. The model was run over a 30-year simulation period where mean simulated yields matched mean measured yields only when model N-rates were increased to levels greater than actual. Model yields did not increase with increased DTC as was observed with measured results for drier than average years of precipitation. ALMANAC simulated results were closer to measured results when harvest dates were artificially made earlier in the fall and N-rates were increased above actual application amounts.

From the SPARC switchgrass plots Biomass was analyzed with near-infrared spectroscopy (NIRS). NIRS was used to determine 20 compositional parameters and predict actual ethanol yield. The ethanol yield was then multiplied by the biomass yield to determine ethanol production. Switchgrass ethanol production increased with greater DTC and N-rates for years with drier than average years of precipitation. Ethanol yield decreased at greater DTC for the driest years.