GROWTH, NITROGEN UTILIZATION, AND ENERGY PRODUCTION OF GRAIN AND SWITCHGRASS MANAGEMENT SYSTEMS ON VARYING TOPSOIL DEPTH OF CLAYPAN SOILS

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ABSTRACT

Depth to claypan (DTC) plays an important role for Midwest claypan soils in storing plant-available water for grain crops, but it is unknown how this same soil property affects switchgrass (Panicum virgatum. L.) growth and nitrogen (N) utilization. This research assessed corn (Zea mays L.), soybean (Glycine max. L. Merr.) and switchgrass productivity as influenced by the DTC. Plot research was initiated in 2009 in Columbia, Missouri on a range of DTC. Canopy reflectance sensing early in the growing season was effective at estimating yield (p=<0.05; r²=0.70). Corn was sensitive to DTC. The N unaccounted for in corn decreased as DTC increased while switchgrass was unaffected. Energy grown in switchgrass was greater than the grain cropping for all DTC when at least 67 kg N ha⁻¹ was applied. This research establishes the capabilities of claypan soils for producing energy crops and establishes the need for site-specific crop and N management strategies.