

TOPSOIL DEPTH INFLUENCES SWITCHGRASS NITROGEN MANAGEMENT ON CLAYPAN SOILS

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ABSTRACT

Switchgrass (*Panicum virgatum* L.) is an attractive forage or bioenergy crop option for eroded portions of claypan landscapes where grain crop production is marginally profitable. Topsoil depth to the claypan can vary widely within fields and little information exists on the impacts of the topsoil depth on nitrogen (N) management of switchgrass. Therefore, a study was initiated in 2009 at University of Missouri South Farm located near Columbia, MO on a site known as Soil Productivity Assessment for Renewable Energy and Conservation (SPARC) to determine whether topsoil depth influenced fertilizer N requirements of switchgrass. The switchgrass cultivar 'Kanlow' was planted in 2009 on 16 main plots ranging in topsoil depth from 0 to 34 in and harvested during 2010 to 2014. Four subplot treatments were one-cut switchgrass harvested only once in November with 0, 0, 60, 90 lb N ac⁻¹ applied in May. One of the nonfertilized plots had interseeded native legumes as the N source. The fifth subplot treatment was two-cut switchgrass harvested in June and November with 30 lb N ac⁻¹ applied in May and in June after the first cut. Each treatment had four replications. Across years, native legumes interseeded with switchgrass apparently supplied no N because it produced the same switchgrass yield as nonfertilized plots. This may have occurred because the legume stand declined quickly after establishment. The two-cut switchgrass yielded the same as the one-cut on deep topsoil, but had lower yield on shallower soil. In all treatments except 90 lb N ac⁻¹, switchgrass yield increased as topsoil depth increased. Thus, in deeper soils, 60 lb N ac⁻¹ is needed to maximize switchgrass yield, but in shallow soils rates should increase to 90 lb N ac⁻¹.

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