Nitrogen Rates for Biomass Sorghum Production Across Tillage Systems.

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ABSTRACT

Biomass yields and nutrient removal across different tillage systems and nitrogen rates are not well established for forage sorghum (*Sorghum bicolor* L. Moench) grown as an energy source in the Southeast. An experiment was initiated in long-term conventional and conservation tillage systems o a Compass loamy sand to determine total dry matter (TDM) production and selected nutrient uptake across six different N rates (0, 34, 67, 101, 134, 168 kg ha^{-1}) and two sorghum cultivars, photoperiod sensitive (ES 5200) and a non-photoperiod sensitive sweet sorghum (Sugar T) with four replications. Total dry matter yields averaged 16.3 Mg ha^{-1} (2010), 15.4 Mg ha^{-1} (2011) and 16.5 Mg ha^{-1} (2012) across rates, tillage systems, and cultivars. Preliminary optimum N fertilizer rates were between 101 and 134 k N ha^{-1}. Nitrogen uptake was highest in 2010 (148.8 kg ha^{-1} compared to 2011 (99.3 kg ha^{-1}) and 2012 (110.4 kg ha^{-1}), but was not consistent across tillage systems. Phosphorus uptake for the top three N rates increased 21% compared to no N, but this was only observed for ES 5200. Potassium uptake was 22% greater in 201 (162.2kg ha^{-1} compared to 2011 (132.8 kg ha^{-1}), but was inconsistent across tillage systems and sorghum cultivars. However, preliminary results indicate that root knot nematode (*Meloidogyne incognita* numbers were increased under the ES 5200 cultivar. As a result, TDM yields for this cultivar were consistent, but much lower than expected. This study is an on-going study with one more year of data collection planned. Results to date have shown some inconsistencies that may be attributed to the nematode pressure observed with the E 520 cultivar, but results for the sweet sorghum cultivar appear to be unaffected by nematodes.

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