

## Nitrogen Fertilization for Sweet Sorghum Used for Producing Ethanol Fuel

Gene Stevens, Roland Holou, Matthew Rhine, Jim Heiser

University of Missouri-Columbia

An experiment is being conducted to determine optimum nitrogen fertilizer rates for producing ethanol from corn and sweet sorghum on three Delta soils in Southeast Missouri. Sweet sorghum is commonly grown in Missouri for producing sorghum syrup. But, in this project, we are evaluating using the sorghum sugar to produce ethanol. Seven N rate treatments per crop are being used with four replications. In 2007 on a silt loam soil, we found that sorghum stalks contained sucrose, glucose and fructose which can be fermented to produce 587 gallons of ethanol per acre. Added with 195 gallons possible from converting glucan (cellulose) in the stalks to ethanol, the total potential ethanol was 782 gallons per acre. In 2007, corn plots in the same study yielded over 200 bushels grain per acre which produced close to the same amount of ethanol as from sweet sorghum sugar. This is assuming a conversion rate of 2.8 gallons of ethanol per bushel of corn grain. The main difference was that only 60 lbs N per acre was required on the sweet sorghum to produce optimum sugar yields versus 160 lbs N per acre in the corn plots. In 2008, corn yields plateaued at 175 bushels per acre on the silt loam soil but produced less than 100 bushels on the sandy loam and heavy clay soils. However, the sorghum produced 26 and 38 tons of stalks fresh weight per acre with juice averaging 15 and 11 Brix sugar content on the sandy loam and clay soils, respectively. This indicates that we may be more efficient planting corn for food and feed on our most productive silt loam soils and growing sweet sorghum for ethanol in fields with marginal soils.