



U.S. Department of
Agriculture
National Institute of
Food & Agriculture



Project Title: Drought Tolerance and Water Use Efficiency in Biomass Sorghum Under Water-limited Conditions

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Rationale:

Biomass sorghum has been identified as a dedicated bioenergy crop by DOE due to its high yield potential. Field trials in southern US showed that biomass sorghum yield can be >40 Mg/ha under well-watered conditions. However, biomass sorghum may not reach the targeted yield potential in production fields because of various stress factors. Water is the most limiting factor affecting sorghum yield and drought stress occurs frequently during the growing season, even in high rainfall areas. As such, selection of genotypes with drought tolerant and high water use efficiency (WUE) is extremely important for sustainable biomass sorghum production under water limited conditions.

There is little information on drought tolerance and WUE in biomass sorghum. Texas A&M University has conducted research and development on biomass sorghum for over 10 years. Although there are extensive variations in various traits in the biomass sorghum germplasm pool, these traits have not been tested vigorously under water stress.

Goal and Objectives:

The goal is to better understand the physiological mechanisms of drought tolerance and WUE in biomass sorghum.

The objectives are to:

- (1) investigate yield, water use, and WUE in biomass sorghum genotypes in various water regimes
- (2) identify physiological traits related to drought tolerance and WUE
- (3) quantify chemical composition of biomass sorghum in various water regimes.

Project Outcomes and Impacts:

This work will provide critical information for the development of bioenergy sorghum and maintaining sustainable production to ensure ample feedstock streams for energy conversion. The benefits will be important to biomass sorghum production in 3 ways: 1) results will help sorghum breeders and geneticists to accelerate germplasm development and improve line selection efficiency; 2) results will allow producers to adopt proper management practices for high yields and WUE in specific water regime; 3) results of this project are not only important to producers in the Southern Great Plains but also important to the regions that sorghum is grown under rainfed conditions such as Mid-west, south and southeastern U.S.



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