

Field Evaluation of Bioenergy Crops Performance on Saline Soils under Arid Conditions

Girisha Ganjegunte, Texas A&M AgriLife Research

Norman Meki and James Kiniry, USDA-ARS Southern Plains Area, Temple, TX

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BACKGROUND



Growth of switchgrass (Alamo)
on saline soil

USDA estimates that about 27 million acres are required for producing 36 billion gallons of bioenergy by 2022 to meet congressionally mandated Renewable Fuels Standards (RFS2) goal. This can put immense pressure on agricultural systems. Corn (*Zea mays*) is the current biofuel crop of choice but it is a resource (fertilizers, insecticide, herbicide and water) intensive crop. Meeting RFS2 goal by corn alone can impair soil and water qualities. Second generation

bioenergy crops such as switchgrass (*Panicum virgatum*), energy sorghum (*Sorghum bicolor*) and canola (*Brassica napus*) require less intensive practices. Finding additional land to produce bioenergy is a huge challenge. Producing second generation bioenergy crops on vast abandoned saline lands in the southwest U.S. with marginal quality waters (saline groundwater/recycling urban wastewater) can be an attractive strategy. This might help obtaining dependable feedstock supplies and reduce investment risk in the bioenergy industry. Before large investments are made in these potential bioenergy crops, it is critical to examine productivity of bioenergy crops under elevated salinity and their impacts on soil, water quality and other associated ecosystem. This study will evaluate second generation bioenergy crops performance under arid saline field conditions and apply the Agricultural Land Management and Numerical Assessment Criteria (ALMANAC) biophysical model to assess productivity of the proposed candidate bioenergy crops, impacts on soil salinity, and water quality.



Energy sorghum (Blade) can be a potential
bioenergy crop for saline soil



Biodiesel canola (DKL-30-42) also performed
well under elevated salinity

OBJECTIVES

- Evaluate performance of salt tolerant cultivars of bioenergy crop performance on saline soils under extremely arid conditions.
- Determine the effects of bioenergy crops on soil salinity and sodicity.
- Develop realistic estimates of bioenergy productivity under elevated salinity conditions, reduced water availability and water quality constraints using ALMANAC.

BENEFITS

Results of this research will identify salt tolerant cultivars of second generation bioenergy crops, provide realistic estimates of productivity under soil salinity and water quality constraints. Study outcomes will help in designing sustainable bioenergy production systems under elevated salinity conditions. Potential benefits of this research project include brining additional land under bioenergy crops, greater biofuel production and improved farm income.