

Treated Wastewater Irrigation for Sustainable Bioenergy Crops Production

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BACKGROUND

Meeting congressionally mandated Renewable Fuels Standards (RFS2) goal of using 36 billion gallons of bioenergy by 2022 requires a comprehensive regional strategy such as bringing addition area from different regions within the country under bioenergy crops. In the southwest U.S. region such as west Texas and southeast NM, bringing vast abandoned crop lands and areas having permeable soils under bioenergy crops can be a part of such a regional strategy. While the region has adequate supply of land, finding reliable source of water to produce bioenergy crops is the main challenge. This challenge can be met by developing marginal quality water sources such as municipal and industrial wastewater, graywater, and saline groundwater for bioenergy crops production. Use of marginal quality waters to irrigate bioenergy crops may prove beneficial, if the bioenergy crops can grow under elevated salinity and the effects on soil and shallow groundwater can be minimized by appropriate management. This project evaluates the feasibility of using treated urban wastewater for producing select bioenergy crops (e.g., switchgrass, sorghum, castor, and jatropha) and its effects on saline soils representing El Paso, TX and Alomgordo NM (collected from BGNDRF- Brackish Groundwater National Desalination Research Facility) using greenhouse column study approach.



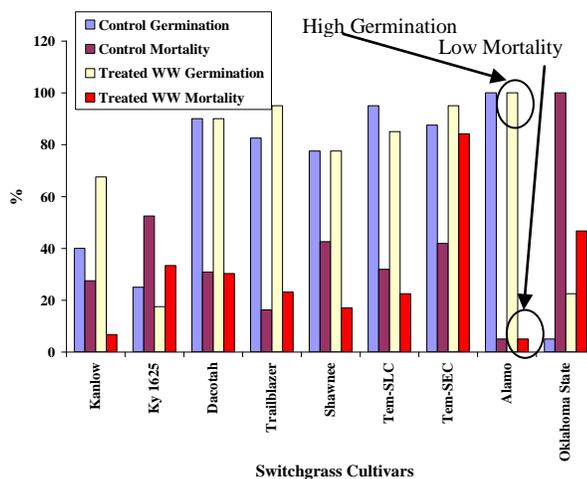
Switchgrass being grown in greenhouse soil columns

OBJECTIVES

- Determine germination and seedling mortality of select bioenergy cultivars
- Evaluate bioenergy crop performance under marginal quality water.
- Determine changes in soil salinity and potential for groundwater contamination.

BENEFITS

Salinity tolerance study results indicated that select cultivars of different bioenergy crops had tolerance to salinity of treated urban wastewater. Tolerant cultivars are now being grown in soil columns to evaluate plant performance and soil salinity changes under wastewater irrigation. Results of this research may help to utilize potentially large amounts of marginal quality waters for irrigating bioenergy crops. Use of marginal quality water to irrigate bioenergy crops in the arid southwest has several potential benefits such as extending the existing freshwater supplies, increased bioenergy feedstock production and improved farm income.



Salinity tolerance of different switchgrass cultivars