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



Project Title: ***Miscanthus and Switchgrass Bioenergy Production and Soil Remediation on Marginal and Vulnerable Landscapes***

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Project Goal

The long-term goal of this research project is to determine the production capacity and remediation potential when growing bioenergy crops on marginal and vulnerable soil landscapes. Objectives include:

- 1) Measure and model *Miscanthus* and switchgrass production on marginal and vulnerable soil landscapes, and develop management practices for producing optimal yield.
- 2) Measure the soil remediation potential of *Miscanthus* and switchgrass production systems as compared to grain cropping on marginal and vulnerable soil landscapes.
- 3) Determine the profitability and equivalent foreign oil displacement of *Miscanthus* and switchgrass bioenergy crops on marginal and vulnerable soil

Project Outcomes

- N fertilizer correlated with in-season plant greenness (as measured with chlorophyll content readings) early in the growing season but the effect of N fertilizer rate diminished by September.
- Only one site responded to N fertilization in 2013. The lack of response to N fertilization could be due to the ability of *Miscanthus* to recycle nutrients from previous year's growth, along with its ability to re-partition N into the most photosynthetic-active upper leaves throughout the growing season.
- Preliminary results suggest little to no N fertilizer is needed when growing *Miscanthus* on claypan soils. Additional years of study are needed to confirm this finding.
- Switchgrass has been found to have 185-700% higher water use efficiency and 51% less surface runoff than corn production.
- Averaged across landscape positions, agronomic nitrogen use efficiency of switchgrass was double of that found for corn production.
- Using the ALMANAC model switchgrass yields were underestimated for claypan soils for most individual years compared to actual yield measurements. The model did not show variation in average yield with respect to differing depths to claypan, while measured yields increased with depth to clay for years with limited rainfall.



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