Findings Prove Miscanthus x Giganteus Has Potential As Alternative Energy Source

URBANA, ILL.

Concerns about the worldwide energy supply and national, environmental and economic security have resulted in a search for alternative energy sources. A new University of Illinois study shows Miscanthus x giganteus (M. x giganteus) is a strong contender in the race to find the next source of ethanol if appropriate growing conditions are identified.

M. x giganteus is a bioenergy crop that can be grown to produce ethanol. The study investigated the establishment success, plant growth and dry biomass yield of the grass. Tom Voigt, lead scientist and associate professor in the U of I Department of Crop Sciences, said the overall goal is to promote biomass yield per acre for ethanol production using the fewest inputs with no environmental damage.

Researchers compared establishment and growth rates, and biomass yield at four locations over the past three years to identify regions best suited for the grass. Data was collected at sites in Urbana, Ill.; Lexington, Ky.; Mead, Neb.; and Adelphia, N.J. The study is part of the Department of Energy-funded North Central Sun Grant Feedstock Partnership Project.

The growing conditions were adequate at each location in different years. However, late planting and extreme winter temperatures during 2008 affected establishment rates at the Illinois site. Lower yields occurred at the New Jersey site in 2010, which could be attributed to the site's sandy soils and warm, dry weather conditions in that year.

"For the most part, we found that Miscanthus responds to sites in which water is adequately available," Voigt said. "The combination of warm temperatures and adequate precipitation spread throughout the growing season creates ideal growing conditions."

Voigt said the study increased researcher's understanding of how different environments impact M. x giganteus growth, development and biomass yield. In addition, they discovered positive environmental impacts.

Nitrogen fertilizer had no significant effects on the grass's biomass yield in season two or three at any site. M. x giganteus also promotes erosion control as the perennial forms a large mass of roots underground.

"We are trying to develop a recipe for management practices that can be used by farmers interested in growing the grass," Voigt said. "We want bioenergy crops to find their way into more marginal settings where ground is less easy to work with. Miscanthus can work where food crops can't."

Voigt said the results of the study are positive and prove that energy crops have great potential as alternative energy sources.

This study, "Miscanthus x giganteus Productivity: The Effects of Management in Different Environments" was published in GCB BIOENERGY Volume 3, Issue 6, December 2011. Researchers included Matt Maughan, German Bollero, D.K. Lee, Robert Darmody and Thomas Voight of the University of Illinois; Stacy Bonos, Laura Cortese and James Murphy of The State University of New Jersey; Roch Gaussoin and Matthew Sousek of the University of Nebraska – Lincoln; David Williams and Linda Williams of the University of Kentucky; and Fernando Miguez of Iowa State University. Funding was provided by the Department of Energy.

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Photo provided by Tom Voigt, University of Illinois College of ACES

Voigt is also principal investigator for the Feedstock Production Agronomy Program at the Energy Biosciences Institute (EBI) located in the Institute for Genomic Biology. The EBI is a biofuels research consortium that includes the University of Illinois, the University of California at Berkeley, Lawrence Berkeley National Laboratory, and funding agency BP. Δ