Optimizing Miscanthus Regeneration and Transformation

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https://cabbi.bio/research/feedstocks-theme/

Project Goals: One of the missions of the Center for Advanced Bioenergy and Bioproducts Innovation (CABBI) is to develop efficient ways to understand, grow, and sustainably increase the value of bioenergy crops. The goal of our work is to develop transformation methods to evaluate gene function and engineer miscanthus for traits of interest.

Miscanthus, an important bioenergy crop for biomass production, is a C4 grass native to Asia. Conventional breeding of miscanthus for genetic improvement and analysis of gene function is difficult because it displays self-incompatibility, heterogeneity of offspring, and relatively long life cycles. We are therefore exploring methods for direct genetic modifications to explore the function of genes from genomic studies and ultimately tailor miscanthus with traits of interest. Toward this goal, we have developed particle bombardment and *Agrobacterium*-mediated transformation methods for miscanthus. We have screened a number of genotypes from the miscanthus collection at the University of Illinois, as well as commercially available lines. From these**,** we have selected a few *M. sinensis*, *M. sacchariflorus*, and *M. x giganteus* lines that perform well in tissue culture and are transformable. Currently**,** we are optimizing transformation methods for these selected lines using highly embryonic calli induced from immature inflorescences and seeds. We have successfully transformed miscanthus with constructs carrying different selection markers and trait genes. We are in the process of analyzing T0 transformants from these experiments.

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