

Understanding the Role of *Enterobacter* sp. 638 in the Growth Enhancement of Poplar and Willow Trees

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Enterobacter sp. 638 (E638) is an endophytic bacterium originally isolated from poplar that has been shown to significantly increase the biomass of poplar trees and selected willow cultivars in laboratory and greenhouse experiments. However, the mechanism of this enhancement, as well as utility under field conditions, has not been studied. To investigate the genetic mechanism by which endophytic bacteria increase plant growth, quantitative PCR is being used to determine differences in gene expression between E638 inoculated and control plants in *Populus deltoids* x *P. nigra* OP-367 and *Salix sachalinensis* cultivars SX64 and Fish Creek (9882-34). Poplar and willow cuttings were inoculated with E638 under hydroponic conditions mRNA extracted from roots and leaves. Separate plants were inoculated and then planted at field site in Tully, New York. Plant growth was monitored by measuring growth of shoots in both greenhouse and field conditions and root length of greenhouse plants. Quantitative PCR will be performed on both greenhouse and field plant tissues which will be collected after one year of growth. Preliminary results confirm increased shoot growth in both poplar and willow under field conditions. Plant-microbe interactions, such as endophytic symbiosis, may hold the key to providing increased biomass needed for biofuel production.

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