202. Transcriptome Analysis of Diploid and Triploid Species Hybrids of Shrub Willow

Agnes Chan1, Yongwook Choi1, Craig H. Carlson2, Michelle J. Serapiglia2, Christopher D. Town1, and Lawrence B. Smart2,* (lbs33@cornell.edu)

1J. Craig Venter Institute, Rockville, MD; 2Horticulture Section, School of Integrative Plant Science, Cornell University, NYSAES, Geneva, NY

http://willow.cals.cornell.edu

Project Goals: Our goal is to understand how the gene expression patterns in willow hybrids are related to their yield potential and other traits important for biofuels production. Specifically, we will test if there is a bias in the expression of key genes from one parent versus the other in species hybrids, and whether there is a gene dosage effect skewing gene expression patterns in triploid progeny compared with their diploid and tetraploid parents.

Interspecific hybridization has been a primary approach in breeding shrub willow (Salix spp.) as an energy crop, as hybrids often display heterosis for yield. Expanding available genomic resources for shrub willow will not only facilitate breeding efforts but also contribute to our understanding of hybrid vigor in outcrossing woody perennials. Utilizing RNA-Seq, transcriptome variation in hybrids of intra- and interspecific crosses of shrub willow is being investigated to determine genome-wide dosage-dependent allelic bias and differential patterns of cis- and trans-regulation within and between hybrid categories. Specifically, shoot-tip and stem internode libraries of 10 random progeny from intra- and interspecific families and their parents have been sequenced to identify alleles that correlate with heterosis for biomass yield and variation in lignocellulosic composition. Allele-specific expression will be confirmed using independent assays and will subsequently be used as a resource for developing predictive models for heterosis in hybrid shrub willow.

This research was supported by the DOE Office of Science, Office of Biological and Environmental Research (BER), grant no. DE-SC0008375.