

Project title: “Transforming Cereal Genomics: Tooling Up For Empowered Phenotyping Platforms”

This project is a Plant Genome Research Program (PGRP), funded by National Science Foundation (NSF) - (07/01/15 – 06/30/19). This is a collaborative research project among three universities, i.e., University of Rhode Island (Principle Investigator), University of Missouri (Co-Principle Investigator), and Yale University (Co-Principle Investigator).

The specific objectives of this project are:

1. To purposefully address bottleneck obstacles associated with cereal transformation biology
2. To develop community resources for cereal transformation technologies including: germplasm, next-generation T-DNA vectors, expression cassettes, and associated protocols.
3. To develop technologies to rapidly and effectively characterize transgenic events including copy number, integration site and expression information.
4. To adapt new genome editing capabilities (TALENs and CRISPRs) for cereals
5. To establish best practices efficient transformation technologies for selected cereal species and genotypes extending these capabilities to the minor cereal crops and highly recalcitrant maize inbred lines,
6. To establish critical activities that will facilitate technology transfer to other laboratories requiring cereal transformation through training workshops, outreach activities and minority training.

For this project, Dr. Zhanyuan J. Zhang’s lab (Plant Transformation Core Facility) at the University of Missouri and Dr. Albert Kausch’s lab at the University of Rhode Island focus on cereal tissue culture and transformation and hosting transformation workshops whereas Dr. Steve Dellaporta’s lab at Yale University centers on high-throughput molecular characterization of transgenic events and hosting related workshop.

Since the project started, we have made intense efforts in improving cereal transformation with initial focus on maize B73 and sorghum P898012. B73 has been very difficult to transform and as a result no successful *Agrobacterium*-mediated transformation of B73 somatic embryos has been reported before. Using morphogenic regulators of *ZmBABY BOOM (BBM)* and *ZmWUSCHEL2 (WUS2)*, we have been able to establish an efficient *Agrobacterium*-mediated transformation of embryos for B73. Our next plan will be how to utilize this new technology to benefit maize research community.

