Storage, Integration and Dissemination of data for a multi-disciplinary project.

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Website for the project: www.sorghumsysbio.org

Overall Project Goals:

- Establish a foundational, systems-level understanding of plant, microbial, and environmental interactions that will lead to translational strategies to enhance growth and sustainability of sorghum through improved genetic and microbial adaptations to water and nutrient-limited environments.

Project Objectives:
- Conduct deep census surveys of root microbiomes concurrent with phenotypic characterizations of a diverse panel of sorghum genotypes across multiple years to define the microbes associated with the most productive lines under drought and low nitrogen conditions.
- Associate systems-level genotypic, microbial, and environmental effects with improved sorghum performance using robust statistical approaches.
- Develop culture collections of sorghum root/leaf associated microbes that recapitulate root-enriched sequences defined in the census.
- Perform controlled environment experiments for in-depth characterization and hypothesis testing of $G_{sorghum}$ x $G_{microbe}$ x E interactions.
- Validate physiological mechanisms, map genetic loci for stress tolerance, and determine the persistence of optimal microbial strains under greenhouse and field conditions.

This multiple disciplinary project spans a wide array of data types, ranging from field-grown plant measurements to indoor greenhouse phenotypic analysis and images, and from metabolomic analysis to metagenomic sequences and OTU counts. Implementation of a website, database, and interface allows all project members to access data, coordinate efforts and merge datasets for more powerful uses of the data as a whole. We have developed a fluid database to store the data and designed a Shiny app to allow project members to mine and parse data for downstream analysis. We have designed group-specific Shiny apps to produce "on the fly" analyses. Our poster will demonstrate the website, database structure, interface utility and tools produced for this project.