

Diverse sorghum microbiome discovery and characterization in nitrogen- and water-limited soils for improved biomass production

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Project Goals:

- **Generate microbial profiles of diverse sorghum genotype panels.**
- **Examine shifts in microbial community composition over the growing season.**
- **Identify microbes associated with the most productive and efficient sorghum genotypes under both nitrogen- and water- limited conditions.**

Plant roots harbor microbial communities selected from the environment, some of which improve nutrient uptake and growth. *Sorghum bicolor* is a genetically diverse, promising biofuel feedstock with high biomass yield under water and nutrient limitation. Our goal is to establish a systems-level understanding of plant, microbial, and environmental interactions for improved sorghum growth through microbial and plant adaptations to nitrogen- and water-limited environments. We have examined the soil, rhizosphere, and root microbial communities of 30 genetically diverse sorghum genotypes in four sorghum fields (well watered, drought, low nitrogen, full nitrogen) using 16S ribosomal sequencing and to determine the microbial composition. Preliminary results indicate significant differences in the microbial community composition between genotypes, as well as a large seasonal variation. This research will widen knowledge of the genetic and physiological mechanisms involved in plant interactions that shape microbial communities and will lead to strategies for enhancing the nutrient and water use efficiency to create sustainable sorghum biofuel feedstock systems on marginal lands.

<https://sorghumsysbio.org/>

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