

## **Development of a model root-associated microbial consortia to investigate the roles of bacterial-fungal-plant interactions in the heat- and drought-tolerant grass *Bouteloua gracilis* (blue grama)**

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### **Project Goals**

Biological networks in soils are important ecosystem drivers, however little is known about how taxonomic diversity and the complexity of interactions influences biogeochemical processes. Among the two dominant soil-welling microorganisms, bacteria and fungi, their interactions with abiotic and biotic environmental factors remain poorly understood. Increasing our knowledge of these interactions and their responses to environmental pressures would provide substantial advancements in agricultural, environmental, and sustainable energy alternatives, which are in alignment with several DOE priorities. The overarching goal of this SFA program is to improve our understanding of bacterial-fungal interactions (BFI) in soil rhizospheres and their roles in carbon cycling and plant productivity.

### **Abstract**

Optimizing plant health and resiliency to natural and anthropogenically induced stress plays a critical role in our ability to meet the growing needs for food and sustainable energy alternatives. Plants benefit from interactions with root-associated microorganisms, such as increased pathogen resistance, nutrient acquisition, resilience to abiotic stressors, as well as improved plant growth yields. Root-associated microbiomes have garnered increased attention as a tool to optimize plant health, however characterization and quantification of these microbial populations and the molecular mechanisms associated with plant health remain underexplored. This work aims to further develop blue grama as a model plant and understand the BFI that contribute to its heat and drought tolerance. Towards this goal, a model microbial consortia representative of the core bacteria and fungi associated with blue grama roots is being developed. Additionally, this work demonstrates the feasibility of utilizing blue grama in EcoFABs; a step forward in furthering blue grama as a model for studying bacterial-fungal-plant interactions.

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