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Research Category: PBG
Duration of Award: 1 Year
Project Title: Novel Microbial Antagonists of F. graminearum Rachis Spread and Spore Production

PROJECT 1 ABSTRACT
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Goal: Harness the plant-associated microbiome to reduce *Fusarium* success.

Objective 1: Identify beneficial microorganisms that are able to extensively colonize the rachis, constraining *Fusarium* secondary spread. Outcome will be identification of fungal and bacterial strains and taxa that efficiently colonize internal wheat tissues. When introduced to plants as seed treatments, these beneficial endophytes will retard pathogen secondary spread through the rachis. Drawing on existing culture collections, fungal and bacterial isolates will be screened using two different assessments of internal spread within wheat tissues. The top performing endophytes will be tested in planta for ability to retard the spread of point-inoculated *F. graminearum*.

Objective 2: Identify specialist parasites of *Fusarium* perithecia on crop residue. Outcome will be identification of organisms that are uniquely able to interfere with *Fusarium* spore production and discharge, reducing availability of air-borne inoculum. By contrasting microbiomes associated with *Fusarium* strains deficient in the production of perithecia, vs. their corresponding wild type strains, we will identify bacteria, fungi, and microarthropods that are preferentially associated with *Fusarium* perithecia. These candidate taxa will be tested directly for ability to parasitize or reduce the efficacy of spore release from perithecia.

Statement of Mutual Interest: This research does not duplicate prior investments in biological control approaches for Fusarium head blight, which have aimed primarily to develop strains and products to be applied externally to the wheat head. In contrast, the proposed research directs effort towards novel management targets. Demonstrating the feasibility of managing for rachis-colonizing endophytes and for parasites of *Fusarium* perithecia will spur additional investment in product development by industry. Exceptional strains of beneficial microbes characterized during this research may enter industrial product development pipelines.