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Project Title: Use of Airulent Strains for Protection against Head Scab and for Increased Yield.

PROJECT 1 ABSTRACT

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Biological control has been used in the field to reduce aflatoxin contamination in cotton and increase yield and protect from disease in tomato. From previous work funded by USWBSI and by outside sources, we have screened over 2000 random insertional mutants for loss of pathogenicity. From this screen, we identified nine mutants that had lost their ability to cause disease. Interestingly, these mutants varied in their effect on wheat. Three of the most interesting avirulent isolates increased grain yield (seed number) in colonized plants. Above the inoculation point, these strains also increased grain weight. Interestingly, the three strains also have very different DON phenotypes. The characterization of these three strains as to their potential to use for biological control is the goal of this project. In addition, the information will add to our understanding of regulation of DON biosynthesis.

The objectives towards this end are:
(1) To characterize three avirulent strains for effects on growth in scab resistant and susceptible wheat cultivars. The characterization will focus on the extent and quality of colonization, and protection from virulent strains of *F. graminearum.* Effects on yield will also be monitored.
(2) To identify the tagged genes from two avirulent mutants.

The proposed research addresses two of the FY09 Research Prioirites for PBG: (1) Characterize plant-fungal interactions in plant lines being developed by researchers in the USWBSI. (2) Develop new strategies for reducing the impact of FHB and associated mycotoxin contamination in barley and wheat.