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Project Title: Genomics of *Gibberella zeae*, the Head Scab Fungus.

PROJECT 1 ABSTRACT

(1 Page Limit)

Head blight caused by *Fusarium* is a devastating disease of small grain in the US and around the world. Unfortunately, conventional control practices have not been effective in controlling this disease and outbreaks have increased over the last two decades. Our goal is to understand the disease cycle of *F. graminearum* and provide useful information for devising novel and more efficient disease control strategies. We will use functional genomics approach to identify and characterize genes and regulatory networks essential for sporulation and disease causing ability in the fungus. In previous studies, we have identified hundreds of genes that are differentially expressed during ascospore development. One objective of this study is to functionally characterize selected genes that may be important for ascospore formation and discharge based on microarray data and bioinformatics analysis. We will also examine transcription profiles of *F. graminearum* spores germinated in saprophytic conditions. Information generated in this study will be used to compare with genes differentially expressed during plant infection. Different genes may be involved in saprophytic versus pathogenic development. Overall, the proposed research will improve our knowledge about molecular mechanisms involved in the production of ascospores and conidia, and pathogenesis of *F. graminearum*. Further characterization of genes important for inoculum production and genes involved in *F. graminearum* – wheat interactions may ultimately lead to the development of novel targets for fungicide screens or disease control strategies. Results from proposed studies will also generate valuable genetic and genomic resources for the *Fusarium* community.