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Project Title: Starch Degradation by *Gibberella zeae* and its Role in Fueling Development.

PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium Head Blight is a devastating disease of wheat growing regions of the Midwestern U.S. Conventional control practices have not sufficiently reduced the vast losses of wheat and barley to this disease in recent years. Our goal is to understand the life cycle of the main causal agent, *Gibberella zeae*, and provide new information that will contribute to more effective control. Towards this end, we have concentrated our efforts on understanding the development and dissemination of the primary disease inoculum, ascospores. Recently, we have obtained information on the expression of genes during peritheciium development, wheat stem colonization and colonization of maize kernels. These data have provided us with insight into the use of several types of enzymes in starch degradation. Starches compose the majority of stored carbon in the plants and grains attacked by *G. zeae*. Expression data have indicated some specificity of expression of the genes encoding these enzymes. We propose to specifically disrupt the genes of 3 classes of starch degrading enzymes to determine their effect on inoculum production, pathogenicity and grain colonization. Overall, the proposed research will improve our understanding of the transfer of carbon sources from plant to fungus, a vital part of the host-pathogen interaction. Since these fungi appear to be highly dependent on starch for their energy supply, the examination of specific inhibitors for key enzymes in starch degradation is likely to provide a new target for control.