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**Project ID: 0304-TR-051**

**Research Area: EDM**

**Project Title: Colonization of wheat plants by *Gibberella zeae* and the genetics of perithecium development.**

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**PROJECT 2 ABSTRACT**

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The longterm goals of this research are to understand (1) the initiation and development of perithecia and ascospores on crop debris and (2) the role vegetative colonization has in formation of perithecia and sporodochia on debris. Over the last year, we have developed a comprehensive picture of how *Gibberella zeae* colonizes vegetative plant tissue and how this leads to perithecium production. The most notable feature of this process is the accumulation of lipids by the fungus in planta and the apparent recruitment of these reserves for generation of perithecia. Our current objectives are to understand the plant-fungal interface and how it affects spore production. Specifically, this research will provide (1) an understanding of the nutritional dependence of the fungus on the host plant; (2) identification of genes and gene products involved early in perithecium initiation and development. Using strains with mutations involved in initial stages of perithecium production or lacking perithecia, we can begin the genetic and physiological analysis of this early phase on inoculum production. The nutritional relationship between the plant and the fungus can be explored through the use of  $^{14}\text{C}$  and  $^{13}\text{C}$  labeling studies and NMR analyses. An understanding of how preharvest plant colonization and postharvest differentiation of the fungus on crop debris leads to the production of inoculum is vital to developing effective control methods.