

PI: Leslie, John F.

PI's E-mail: jfl@ksu.edu

Project ID: FY07-LE-132

FY06 ARS Agreement #: 59-0790-6-064

Research Area: PGG

Duration of Award: 1 Year

Project Title: Genetic Diversity in and Genetic Mapping of *Gibberella zeae*.

PROJECT 1 ABSTRACT

(1 Page Limit)

Our long-term goals are: 1) to understand the evolutionary potential of *Gibberella zeae* (*Fusarium graminearum*) either to change in aggressiveness or to adapt to control measures such as fungicides, biocontrol agents, and cultivar resistance; and 2) to study the genetic basis of ecologically or agriculturally important traits of the pathogen such as toxin production, fertility, or aggressiveness with the objective of improving control strategies. Studying population genetic structure can help us understand the evolutionary past and future potential of this pathogen. By using AFLP markers, we have found that populations of *G. zeae* in North America are genetically diverse, but generally well-mixed, even when separated by large geographic distances. *G. zeae* has been postulated to contain nine phylogenetic lineages that have been recently described as separate species. We have shown that representatives of at least some of these lineages are cross-fertile, and hypothesize that *G. zeae* is one large biological species. The difference between one species and nine could be very significant in terms of quarantine regulations and trade barriers. We will evaluate single nucleotide polymorphism markers for their robustness in distinguishing these entities in a population setting. The objectives of the research are:

Objective 1: Evaluate interlineage hybrids for molecular polymorphisms and for fertility to estimate fitness.

Objective 2: Determine DNA sequences for three conserved genes from North American strains of *G. zeae*.