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Research Area: **PGG** **Duration of Award: 1 Year**

Project Title: Heterogeneity and Toxigenic Potential of U.S. Fusarium graminearum Population.

PROJECT 1 ABSTRACT

(1 Page Limit)

Despite efforts to reduce the impact of FHB on grain production in the U.S., DON levels in grain often remain high. In order to address this problem, we continue to investigate the genetic diversity, especially with regard to toxin producing potential, of populations of *Fusarium graminearum* currently found in the U.S. We are focusing on **three genetically distinct populations of *F. graminearum* in the Upper Midwest**, two of which were first identified by us in collections from 1999/2000 and are referred to as emergent populations. The three populations are correlated to distinct DON chemotypes and result in different levels of DON accumulation in plants. Further monitoring and characterization of the emergent populations is important, not only because they have increased dramatically in frequency over a short period of time in some regions of the Upper Midwest, indicating that they are under strong positive selection, but also due to their higher toxigenic potential when compared to the population of *F. graminearum* that is otherwise predominant in the Midwestern U.S. (Midwestern 15ADON population).

A second focal point of our research concentrates on the recently discovered populations of **nivalenol-producing strains in Louisiana.**

The project objectives are to, 1) Assess whether strains of specific populations are more aggressive and/or cause more toxin accumulation on specific wheat cultivars (including lines containing the major 3BS QTL for FHB resistance) and 2) Determine whether *F. graminearum* and *F. asiaticum* with a nivalenol chemotype may spread to major Midwestern wheat growing areas of the U.S.

The goals of our project directly relate to **PGG FY07 Research Priority** #2: Characterize FHB pathogen diversity, phylogenetics, or taxonomy. We are focusing on pathogen diversity as it directly relates to mycotoxin contamination. By way of collaboration (**Integrated/Interdisciplinary Research**) we are partnering with Gene Milus, University of Arkansas to address the stability of host resistance. Genetically characterized strains will be used to screen wheat germplasm to determine whether a potential differential reaction occurs to distinct pathogen genotypes or strains that produce different toxin profiles. Of particular interest is whether plant genotypes with known tolerance to deoxynivalenol perform similarly when inoculated with strains that produce nivalenol. Other collaborators will provide infected material from Southern States so that we may determine the distribution of nivalenol-producing strains in that region.