

**PI:** Corby Kistler

**PI's E-mail:** hckist@umn.edu

**Project ID:** 0506-KI-079

**FY04 ARS Agreement #:** NA

**Research Area:** EDM

**Duration of Award:** 1 Year

**Project Title:** Distribution, Survival and Discovery of New Populations of *Fusarium graminearum* in the U.S.

PROJECT 1 ABSTRACT

(1 Page Limit)

The overall goal of our project is to understand how *Fusarium graminearum* populations change over time by examining significant numbers of isolates from epidemic areas in the U.S. in yearly collections. This proposal specifically addresses the spatial and temporal distribution of a newly discovered population of *F. graminearum* identified based on diversity studies previously funded by USWBSI. Previously we found that approximately 4% of *F. graminearum* strains surveyed in the U.S. in 1999-2000 produce 3 acetyl deoxynivalenol (3 ADON) as the predominant acetylated form of DON, in contrast to the majority of isolates that produce predominantly 15 acetyl DON (15 ADON). RFLP analysis using markers unlinked to the DON biosynthetic gene cluster clearly distinguishes 3 ADON and 15 ADON "chemotype" strains as distinct populations. Based on pathogen surveys made in 1999-2000, the 3 ADON population has limited distribution, as it was found only in North Dakota and northwestern Minnesota, and was probably recently introduced into the U.S. The specific goals of this project are to 1) determine the distribution and frequency of the 3 ADON chemotype in ND and MN, and also if the 3 ADON strains have recombined with the 15 ADON population, 2) validate the use of PCR based co-dominant markers for population genetic analysis of *F. graminearum* lineage 7, and 3) survey for changes in the overall U.S. *F. graminearum* population in samples collected during 2001-2004. Based on our first year of funding we were able to survey 2133 *F. graminearum* strains in North Dakota, northwestern Minnesota and South Dakota for the 2003 growing season for chemotype. Areas were found where 25-40% of strains surveyed were 3 ADON, indicating a surprisingly large increase in population frequency of this chemotype over previous years. Also in the first year of funding we have been able to develop numerous PCR-based co-dominant markers, which we are using to track the spread of this newly emerging population of *F. graminearum* in the U.S. To our knowledge, this is the first work to study the survival, spread and ultimate fate of an introduced population of *F. graminearum*. Knowledge obtained from this work also will indicate the frequency of outcrossing among extant populations of the head blight pathogen in the U.S. and may also reflect on fitness characteristics attributable to distinct trichothecene toxin profiles.