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Project ID: 0405-KI-128

FY03 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. We have found that approximately 4% of *F. graminearum* lineage 7 strains surveyed in the U.S. in 1999-2000 produce 3 acetyl deoxynivalenol (3ADON) as the predominant acetylated form of DON, in contrast to the majority of isolates that produce predominantly 15 acetyl DON (15ADON). RFLP analysis using markers unlinked to the DON biosynthetic gene cluster clearly distinguishes 3ADON and 15ADON "chemotype" strains as distinct populations. Based on pathogen surveys made in 1999-2000, the 3ADON 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) develop and 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 2001-2003. To our knowledge, this will be 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.