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

**Project Title:** Global Surveillance of FHB Species, Mycotoxin and Population Diversity.

PROJECT 1 ABSTRACT
(1 Page Limit)

The objectives of the proposed research are directed at providing novel molecular tools and information to plant breeders, plant pathologists, and regulatory agencies to facilitate and accelerate the development of plant cultivars with broad-based resistance to the full range of Fusarium Head Blight (FHB) pathogens, to better understand the global epidemiology and ecology of FHB pathogens, to establish robust global monitoring and disease control programs aimed at preventing the inadvertent introduction of novel FHB pathogens or strains with novel toxin potential into the U.S., and to monitor the survival and movement of foreign FHB pathogens already present within the U.S. To achieve these objectives, we propose to 1) develop and validate a high-throughput platform for the determination of FHB species, mycotoxin and population diversity based on single-nucleotide polymorphisms, 2) utilize this high-throughput system to build on surveillance efforts from our current USWBSI-funded proposal by determining FHB pathogen and chemotype diversity in collections made in 2005 from FHB hotspots in Argentina, Uruguay and 5 provinces in China (Sichuan, Hubei, Jiangsu, Henan, Heilongjiang); and by characterizing levels of genetic diversity and gene flow within and between *F. graminearum* populations identified in our ongoing and proposed survey work, and 3) establish a monitoring program for the active surveillance for two foreign FHB pathogens (i.e., *Fusarium asiaticum* and *F. meridionale*, Asian and South American endemics, respectively) that we detected during a 2001 survey at The Pennsylvania State University Agricultural Experiment Station. The proposed research will make substantial and direct contributions to the goals of the USWBSI by making available detailed and novel information on the population genetics, host and geographic distributions, and mycotoxin potential of FHB pathogens. In addition, the proposed research will enhance disease surveillance and control programs, characterize the impact of foreign pathogen introductions in Pennsylvania, and facilitate efforts to prevent additional introductions of foreign FHB pathogens or toxins into the U.S. As such, the proposed research directly addresses the Epidemiology and Disease Management (EDM) priorities (Pathogen biology and ecology and Fungal genetics and genomics) of advancing the current knowledge of the genetic variability, ecology and population dynamics of these mycotoxigenic cereal pathogens worldwide.