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

**Project Title: Predicting Development of Fusarium Head Blight and DON in Winter Wheat.**

## PROJECT 2 ABSTRACT

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This project is part of a multi-state cooperative epidemiology and disease forecasting effort on Fusarium head blight (FHB) of wheat and barley caused primarily by *Fusarium graminearum*. The overall goals of the project are to A) collect data to be used in developing a deoxynivalenol (DON) module that can be added to existing FHB prediction models and B) improve pre-harvest estimates of DON based on visual assessments of disease. The specific objectives are to 1) develop a DON module for the current disease models that will help meet the immediate needs of the U.S. wheat and barley industries, 2) initiate a mechanistic modeling effort by investigating the influence of environment on the probability of infection and DON accumulation in a given field environment, and 3) improve pre-harvest estimates of DON based on visual assessments of disease by accounting for variation of disease within a given field. To accomplish the first goal we will use three winter wheat cultivars (susceptible, moderately susceptible, and moderately resistant to FHB), two planting dates, and three inoculation treatments (beginning anthesis, middle anthesis, and non-inoculated). For the second goal, we will use two cultivars (susceptible and moderately resistant). Wheat (total of five cultivars) will be planted in late September/early October 2006. Environmental data will be recorded using an automated weather station starting in April 2007 and continuing through harvest. Disease incidence and severity data will be collected and used to calculate an FHB index. Following harvest, wheat grain samples will be submitted to a specialized lab for DON analysis. This project seeks to fill existing knowledge gaps on the role of the environment, cultivar, and their interaction in DON accumulation, and methods to improve pre-harvest estimates of DON based on visual assessments of disease and spatial distribution of disease in the field. The project is relevant to the goals of the US Wheat and Barley Scab Initiative which under the Etiology, Epidemiology, and Disease Forecasting (EEDF) research area specifies pathogen biology and epidemiology as one of the research priorities for FY07, with specific reference to environmental conditions favoring pathogen survival, infection, mycotoxin production, factors affecting development of disease epidemics, and development and delivery of disease forecasting/risk assessment systems.