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Project Title: Environmental Factors Influencing FHB and DON Accumulation in Hard Red Wheat.

PROJECT 2 ABSTRACT

(1 Page Limit)

Research is proposed that investigates the influence of environmental conditions on Fusarium head blight (FHB) severity and mycotoxin contamination in wheat under both field and controlled conditions. The available predictive system for wheat only models disease in response to environment and the need exists for a model specific to deoxynivalenol (DON) accumulation. Additionally, previous models were developed utilizing empirical data and therefore may not function very effectively under environmental conditions not represented in the original dataset. Thus, the development of a mechanistic model that takes into account multiple aspects of the pathogen's biology offers best the method to address the complexity of the FHB pathosystem. Additionally, many of the modules designed will be crop independent and can be utilized for the modeling of disease and/or DON in all classes of wheat and barley.

The development of robust and effective predictive modeling systems for FHB will provide producers with a support tool for fungicide application or grain marketing decisions. That stated, the ultimate goal of this effort is the development of a web-based risk advisory system that utilizes weather in the forecasting of FHB disease severity and DON accumulation for wheat with a mechanistic model. This project is part of a larger collaborative effort attempting to model these two factors for wheat and barley in the United States. Specific project objectives for this period of work are to: 1) investigate the interaction between environment and timing of inoculation on the development of disease and DON accumulation in a field environment and 2) evaluate the impact of post-anthesis temperature and humidity on deoxynivalenol production and *Tri5* expression by *Gibberella zeae* under controlled conditions.

The objectives of this proposal are directly relevant to the goals and priorities of the USWBSI, and specifically the EEDF RAC, in that the models to be developed out of this effort are intended to be utilized in the integrated management of both disease and DON contamination for wheat, and possibly barley. Their availability to producers will help reduce the impact of this disease further.