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**Project ID: FY06-DE-086**

**FY05 ARS Agreement #: 59-0790-1-068**

**Research Area: EEDF**

**Duration of Award: 1 Year**

**Project Title: Integrating Inoculum and Host Resistance into Prediction Models for Head Scab.**

## **PROJECT 2 ABSTRACT**

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The central goal of the cooperative epidemiology group, consisting of researchers at PA, OH, IN, ND, and SD, is to provide growers and agricultural industry with timely and reliable disease predictions for Fusarium head blight. The efforts of this cooperative project have already produced forecasting models that are currently being evaluated in 23 states via the Fusarium Head Blight Prediction Center. The accuracy of these models is near 80% based on current data sets and the models allow users to customize predictions for either winter or spring wheat. These models also represent our first attempt to account for local sources of inoculum in model predictions. We propose here that further improvements in model accuracy should be possible when variables describing the relationship between inoculum and weather are more fully integrated into the model. We also propose experiments that will enable us to examine the interactions between inoculum, weather and many of the newly available means of managing Fusarium head blight including cultivars with partial resistance and fungicide applications. Results of these objectives will be incorporated into the prediction models for FHB and can also evaluate model predictions for making fungicide recommendations. In addition, we propose to continue a modeling effort that will specifically target Deoxynivalenol (DON) contamination in barley and wheat. This effort will combine existing data with a new initiative designed to either adjust the parameters of the existing forecasting models or to develop entirely new models that can be used to predict both disease and DON levels.

Penn State will continue to work closely with members of the cooperative epidemiology group to achieve our mutual goals. We will continue to contribute to this effort by coordination of data compilation and analysis for wheat and will work closely with researchers at South Dakota State to develop and evaluate models for barley. We are confident that this cooperative effort will continue to improve the accuracy of disease forecasts, and that the results can be used to more effectively manage Fusarium head blight of wheat and barley.