Project Abstract

Project Title:	**Improved model ensembles for prediction of Fusarium Head Blight**	
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The overall goal of this project is to create better models for predicting Fusarium head blight (FHB). For this project our objectives are to 1. Expand the data matrix used for modeling FHB with cases representing new environments and years; 2. Improve predictive performance of disease forecasts by combining models representing specific epidemiological processes within model ensembles. This project directly addresses research priorities 2 and 3 of the MGMT RAC; “Develop and validate the next generation of forecasting models,” and “Enhance communication and end-user education/outreach.” We have already made considerable progress in modeling epidemics of FHB. This includes developing an extensive data matrix of observations of FHB epidemics and non-epidemics, linked to hourly weather time series.

Continued collaboration with the Integrated Management Coordinated Project (IM-CP) will further expand the data matrix so that as many growing conditions as possible are covered and additional states can be included in the modeling effort. For this round of modeling, we propose a model development strategy that will use both machine learning algorithms and more mechanistic approaches to selecting models to include in ensembles. An iterative process will begin with machine learning algorithms that help identify candidate variables and time periods likely to perform well in an ensemble. These results will then guide the development of selection of models representing epidemiological processes contributing to the development of severe FHB. We expect this project will result in more accurate models and ensembles of models that can be deployed via the Fusarium Head Blight Prediction Center. As a result, growers, crop consultants, farm managers and other stakeholders will have more accurate forecasts of FHB epidemics, which will better inform the FHB management decisions.