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PROJECT 1 ABSTRACT

(1 Page Limit)

Fusarium head blight (FHB) and deoxynivalenol (DON) are best managed by combining production practices that reduce the risk of disease (Bai and Shaner, 1994). These production practices include the use of moderately resistant cultivars, rotation with non-host crops, and the timely application of fungicides or biological control products when needed. The disease forecasting models deployed via the Fusarium Head Blight Prediction Center (www.wheatscab.psu.edu) help farm managers evaluate the risk of disease and the need for fungicide applications. These daily predictions of risk are an important part of the integrated management of FHB and DON.

The models currently deployed through this web-based interface represent the third generation of prediction tools developed by a team of pathologists, meteorologists and computer information technology specialists funded by the USWBSI. The disease models can correctly distinguish years with high disease (>10% field severity) from years with low disease based on summaries of weather observed 7-days prior to anthesis with near 80% accuracy (DeWolf et al. 2005). Within the Prediction Center, these disease prediction models are coupled with state-of-the-art sources of atmospheric models and geo-spatial mapping techniques to produce daily estimates of disease risk in 24 states where epidemics of the FHB are most likely to occur.

This past year, the architecture of the prediction center was redesigned ingest and process data from the Real Time Mesoscale Analysis (RTMA) and the National Digital Forecast Database (NDFD). These new sources of weather information increase the resolution the disease risk maps from a 20 km to 5 km grid, and allow the 24- and 48-hour forecasts of risk to be made at the same spatial scale. The prediction center was also modified in 2007 to consider weather stations belonging to Agricultural Weather Networks in Michigan (MAWN) and North Dakota (NDAWN). The addition of these weather networks to the system improved the areal representation of station specific disease predictions in those states. These new sources of information improved the resolution of the disease predictions and represent a significant step forward in the delivery of disease prediction models for FHB in the U.S.

A commentary feature was added to FHB prediction tool in 2007. This text commentary consisted of a one to two paragraph discussion of the current model outputs and was displayed directly below the maps of disease risk. The commentary feature was a signification step forward, and for the first time, state specialists were able to help farm managers directly integrate model estimates of disease risk with local recommendations for FHB management.

The goal of the disease prediction effort is to provide small grain producers with accurate and timely estimates of disease risk and help them evaluate the need for chemical or biological control products. While we have already made considerable progress in reaching this goal, during 2008 more AWN will be added and a new bias correction technique will be employed to increase skill levels.