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**Research Category: MGMT**

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**Project Title: Risk-based Fungicide Decision-making for FHB and DON Management in Wheat.**

### **PROJECT 3 ABSTRACT**

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The overall goal of this project is to facilitate the practical utilization of the web-based FHB risk assessment system for fungicide application decision-making. We propose to accomplish this through the following specific objectives:

1. Evaluate criteria for using the web-based risk assessment tool to make fungicide application decisions for FHB management.
2. Develop risk-based fungicide application guidelines for FHB management.

To accomplish these objectives, data will be collected at multiple locations in Ohio as well as in other states through collaborations with Drs. Bowen at Auburn University, Chilvers at Michigan State University, Collins at The Pennsylvania State University, Cowger at USDA-ARS North Carolina State University, Smith at the University of Wisconsin-Madison, Bradley at the University of Kentucky, Wegulo at the University of Nebraska-Lincoln, Kelly at the University of Tennessee, Friskop at North Dakota State University, Mehl at Virginia Tech Tidewater AREC, Byamukama at South Dakota State University, Wise at Purdue University, Dill-Macky at the University of Minnesota, Kleczewski at University of Delaware, and Darby at the University of Vermont. Based on the population of studies across locations, a wide range of environments at anthesis is anticipated, and thus a range of predicted FHB risk scenarios. We anticipate that fungicide efficacy will vary among risk scenarios based on whether the application is made when risk is low, moderate, high, or consistently moderate-high.

PIs will plant strips of wheat cultivars with different levels of FHB resistance on university research farms or in farmers' fields in 17 states, and half of each strip will be treated with Prosaro® at 6.5 fl. oz/acre at early anthesis and the other half left untreated. Using on the web-based risk tool, the risk of FHB will be determined at the time of each application, and each cultivar x flowering date x location combination will be assigned a code (**A**, **B**, **C**, or **D**) based on the predicted risk. If the risk of FHB is low when the fungicide is applied, the treatment will be coded as **A (calendar-based application)**, **B (moderate-risk based application)** if the risk is moderate, **C (high-risk based application)** if the risk is high, and **D (sustained-risk based application)** if the risk is moderate-high on consecutive days leading up to anthesis. Percent FHB/FDK/DON control will be estimated for each cultivar-location and then averaged across predicted risk scenarios to identify the scenario with the highest overall mean efficacy. Using data from sprayed and unsprayed strips, separate true positive proportion (fungicide treatment under predicted risk scenario **B or C or D**), true negative proportion (no fungicide application under scenario **A**), false positive proportion (fungicide application under scenario **A**), and false negative proportion (no fungicide application under scenario **B or C or D**) will be estimated. The advantage of using the tool under each risk scenario, relative to never spraying or always spraying will be quantified.

Results from the analyses will be used to identify risk scenarios under which an anthesis application of Prosaro is most effective and advantageous, and to develop specific criteria and guidelines for using the risk tool to make fungicide application decisions.