

Project FY22-IM-021: Fungicide and Genetic Resistance for FHB and DON Management on Winter Wheat in Ohio

1. What are the major goals and objectives of the research project?

The overall goal of this project (as part of the FHB Integrated Management Coordinated Project [IM_CP]) is to develop best practices for FHB and mycotoxins management in wheat and barley that are robust to conditions experienced in production fields. The specific objectives were to:

- 1) Evaluate the integrated effects of fungicide treatment and genetic resistance on FHB and DON, with emphasis on new combination fungicides Prosaro Pro and Sphaerex;
- 2) Compare the efficacy of Prosaro Pro and Sphaerex to that of Prosaro, Caramba, and Miravis Ace;
- 3) Determine the additivity of mixtures and sequential applications of fungicides for FHB and DON management; and
- 4) Determine the rainfastness of Prosaro Pro, Sphaerex, Prosaro, Caramba, and Miravis Ace.

2. What was accomplished under these goals or objectives? (For each major goal/objective, address these three items below.)

What were the major activities?

For **Obj. 1 (IM_CP – Ohio)**, replicate plots of four soft red winter wheat cultivars with different levels of resistance to FHB were either left **1)** untreated and inoculated, **2)** untreated and not inoculated, or treated with the fungicides **3)** Prosaro; **4)** Miravis Ace; **5)** Prosaro Pro; or **6)** Sphaerex and spray-inoculated at Feekes 10.5.1. All products were applied at label-recommended rates.

For **Obj. 2 and 3 (Wheat Uniform Fungicide Trial: UFT - Ohio)**, replicate plots of a susceptible cultivar were either left untreated or subjected to one of eight core fungicide programs consisting of Feekes 10.5.1-only or sequential applications of the fungicides tested under Obj 1, as well as Caramba, Proline, and Tebuconazole. The sequential treatments consisted of Miravis Ace applied at anthesis followed by either Prosaro, Caramba, Prosaro Pro, Sphaerex, or Tebuconazole 4-6 days after anthesis. All products were applied at label-recommended rates.

For **Obj 4 (Rainfastness [RFT] – repeated from the previous funding cycle to get an additional year of date)**, separate replicate plots of a susceptible cultivar were treated with one of three fungicides (Prosaro, Caramba, or Miravis Ace) at label recommended rates at Feekes 10.5.1, with or without a non-ionic surfactant, and subjected to simulated rainfall treatments of different durations (15, 30, 60, and 120 min), beginning at different times (0, 15, 30, and 60 min) after fungicide application. Fungicide treated plots not subjected to simulated rainfall and non-treated plots were used as references to estimate rainfastness.

What were the significant results?

We were unable to evaluate and compare fungicide programs, variety resistance, or rainfall treatment effects on FHB and DON as proposed. Conditions during the

spring/summer of 2023 were highly unfavorable for FHB development and DON contamination of grain. Mean DON contamination in the nontreated checks ranged from 0.07 to 0.22, <0.05 to 0.19, and 0.11 to 0.42 in the UFT, IM_CP, and RFT experiments, respectively.

List key outcomes or other achievements.

Other than establishing the trials and applying the treatments as planned, there are no other major accomplishments to report. Conditions during the spring/summer of 2023 were highly unfavorable for FHB development and DON contamination of grain.

3. What opportunities for training and professional development has the project provided?

A research scientist, a research assistant, and a graduate student contributed to the project, learning how to design field experiments.

4. How have the results been disseminated to communities of interest?

Combined UFT and IM-CP results were disseminated by way of posters, abstracts, and talks at scientific meetings (including at the 2023 USWBSI Forum), electronic newsletter articles, and extension talks. A core set of slides was prepared and shared with all IM-CP/UFT PIs.

5. What do you plan to do during the next reporting period to accomplish the goals and objectives?

Repeat all experiments as described under the four objectives.