

Project FY22-IM-018: Integrated Management of Fusarium Head Blight in Wheat in Pennsylvania

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

1. Develop integrated management strategies for FHB and mycotoxins that are robust to conditions experienced in wheat and barley production fields.
2. Develop and validate the next generation of management tools, forecasting models, and fungicide application technologies for FHB and mycotoxin control.
3. Enhance communication and end-user education/outreach.

To accomplish the research goals, we contribute to the following:

1. Validating the integrated management strategies with the next generation of wheat and barley varieties in multiple production environments.
2. Developing economic analyses of effective integrated management strategies used alone and in combination.
3. Evaluating the flexibility of fungicide application timing within the context of the integrated management strategies.
4. Continuing to update and enhance the content of the FHB website.
5. Providing commentaries from the FHB forecasting site available on the USWBSI website and sent to users via mobile devices.

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 FY23, we conducted four wheat trials at two locations. Two trials were part of the uniform fungicide program, and the additional two were part of the integrated management coordinated project. Data were summarized and shared with the lead institution for the CP. Trials were also established to maintain the same number of trials and locations for the 2023-2024 growing season. Further, we established five on-farm participatory trials to explore the combined effect of fungicide applications at flowering on the overall disease complex.

FHB was relatively low in our trials. Inoculated plots provided measurable quantities of DON, indicating that if the environment were more favorable for FHB, we would have the conditions (i.e., inoculum) to establish an epidemic. As such, our outreach efforts focused on providing timely information about the risk of FHB during the growing season as part of Penn State Extension's Field Crop News, which is sent to approximately 11,000 people. Dr. Alyssa Collins continued to provide local commentary for the Fusarium Head Blight Prediction Center.

What were the significant results?

By continuing to conduct a standard set of trials across multiple locations, we are well-positioned to monitor and quantify FHB in Pennsylvania. While the last growing season had a lower FHB disease intensity, we could provide timely information to farmers and other

stakeholders. We also contributed field data to the larger CP, which is valuable information used to validate current models. Further, we established four research trials and five on-farm participatory research trials for 2023-2024.

List key outcomes or other achievements.

We have an established system to conduct multiple research trials annually, including the laboratory preparation for timing inoculation of those trials. This is especially important considering the year-to-year variation in flowering timing across locations and studies. We continue to train one graduate student on FHB, which integrates into their Ph.D. dissertation. One Education Program Specialist and several undergraduate researchers also contributed to disease assessments and quantification in small grains. Trials were also established for 2023-2024, and early reports were more favorable for FHB development in 2024 than in prior years.

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

The Ph.D. student (Olanrewaju Shittu) contributing to this project had the opportunity to conduct a scoping visit to Ethiopia. This formed part of his dissertation in the International Agriculture and Development dual degree program. This visit provided Olanrewaju with a novel opportunity to conduct integrated research and extension, working closely with two agricultural institutes in the country.

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

Extension articles were written and published as part of Penn State Extension’s Field Crop News. These articles provided timely information to stakeholders about the risk of FHB, among other wheat diseases. The Field Crop News is sent via email to well over 10,000 subscribers.

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

Trials were established in Fall 2023 as planned, including five on-farm participatory trials. When submitting this report, we can indicate that trials were successful, and data will be analyzed and shared with the CP. Olanrewaju Shittu continues the research that aligns with this project and is scheduled to finish his Ph.D. in 2025. We aim to complete 1-2 publications during the next reporting period that integrate aspects of our FHB program since 2018. We will also participate in the next National FHB Forum in December 2024.

Additional Activities are outlined below:

	<i>Research Activities</i>	<i>Extension/Outreach Activities</i>
Summer 2024	Harvest plots, process post-harvest samples, and submit samples to DON lab for analysis	Participate in summer field days.
Fall 2024	Establish IM and UFT wheat trials at two locations.	Small grains production workshop – participant/speaker. Provide data to the CP.

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Winter 2024/2025	Attend FHB Forum	Participate in winter meetings and present results of trials.
Spring 2025	Apply fungicide treatments and conduct disease ratings	Write extension articles about FHB and seasonal risk. Contribute to FHB risk tool interpretation.